County of Los Angeles

Draft
Environmental Impact Report
SCH No. 2005051143
Volume IV
Appendix 4.1 (continued)

MISSION VILLAGE

Prepared for:

Los Angeles County
Department of Regional Planning
320 West Temple Street
Los Angeles, California 90012

Prepared by:

IMPACT SCIENCES, INC.
803 Camarillo Springs Road, Suite A
Camarillo, California 93012
Phone: (805) 437-1900

NEWHALL RANCH
Newhall Ranch Company

OCTOBER 2010

County of Los Angeles

Draft Environmental Impact Report

SCH No. 2005051143

Volume IV
Appendix 4.1 (continued)

MISSION VILLAGE

Project No.	04-181
Vesting Tentative Tract Map No.	61105
SEA Conditional Use Permit No.	RCUP200500080
Oak Tree Permit No.	ROAK200500032
Oak Tree Permit No.	T200500043
Conditional Use Permit (Off-Site Improvements)	RCUP200500081

Substantial Conformance Determinations for Grading and Hillside Management Guidelines

NEWHALL RANCH
Newhall Ranch Company

Prepared for:

Los Angeles County
Department of Regional Planning
320 West Temple Street
Los Angeles, California 90012

Prepared by:

IMPACT SCIENCES, INC.
803 Camarillo Springs Road, Suite A
Camarillo, California 93012
Phone: (805) 437-1900

OCTOBER 2010

DRAFT
ENVIRONMENTAL IMPACT REPORT
for
MISSION VILLAGE

SCH No. 2005051143

County Project No. 04-181
Vesting Tentative Tract Map No. 61105
SEA Conditional Use Permit No. RCUP200500080
Oak Tree Permit No. ROAK200500032

Oak Tree Permit No. T200500043
Conditional Use Permit RCUP200500081
(Off-Site Improvements)

Volume IV
Appendix 4.1 (continued)

Prepared for:

Los Angeles County
Department of Regional Planning
320 West Temple Street
Los Angeles, California 90012

Prepared by:

Impact Sciences, Inc.
803 Camarillo Springs Road, Suite A
Camarillo, California 93012
Phone: (805) 437-1900

October 2010

TABLE OF CONTENTS

Volume I

Section Page

Introduction I-1

Executive Summary ES-1

1.0 Project Description 1.0-1

2.0 Environmental and Regulatory Setting 2.0-1

3.0 Cumulative Impact Analysis Methodology 3.0-1

4.0 Environmental Impact Analysis 4.0-1
- 4.1 Geotechnical and Soil Resources 4.1-1
- 4.2 Hydrology 4.2-1
- 4.3 Biota 4.3-1
- 4.4 Visual Qualities 4.4-1

Volume II

- 4.5 Traffic/Access 4.5-1
- 4.6 Noise 4.6-1
- 4.7 Air Quality 4.7-1
- 4.8 Water Service 4.8-1
- 4.9 Wastewater Disposal 4.9-1
- 4.10 Solid Waste Services 4.10-1
- 4.11 Sheriff Services 4.11-1
- 4.12 Fire Protection Services 4.12-1
- 4.13 Education 4.13-1
- 4.14 Parks and Recreation 4.14-1
- 4.15 Library Services 4.15-1
- 4.16 Agricultural Resources 4.16-1
- 4.17 Utilities 4.17-1
- 4.18 Mineral Resources 4.18-1
- 4.19 Environmental Safety 4.19-1
- 4.20 Cultural/Paleontological Resources 4.20-1
- 4.21 Floodplain Modifications 4.21-1
- 4.22 Water Quality 4.22-1
- 4.23 Global Climate Change 4.23-1

5.0 Project Alternatives 5.0-1

6.0 Significant Irreversible Environmental Changes 6.0-1

7.0 Growth-Inducing Impacts 7.0-1

8.0 List of EIR Preparers, and Organizations/Persons Consulted 9.0-1

9.0 References 10.0-1

LIST OF APPENDICES

Volume III

Appendix I Initial Study/Notice of Preparation (NOP), and NOP Comment Letters
Initial Study/Notice of Preparation (NOP)
NOP Comment Letters

Appendix 1.0 Project Description Documentation
Vesting Tentative Tract Map No. 61105
Newhall Ranch Fiscal Impact Analysis, September 2006
Selected Exhibits and Tables from the Newhall Ranch Specific Plan

Appendix 2.0 Specific Plan Consistency Analysis, September 20, 2010

Appendix 3.0 Cumulative Impact Analysis Methodology
Development Monitoring System Database

Appendix 4.1 Geologic Reports
Geologic Report – Fault Investigation for Airport Mesa Area, Portion of Mesas East VTTM 61105, Newhall Ranch
Geologic and Geotechnical Report, Review of Vesting Tentative Tract Map 61105

Volume IV

Appendix 4.1 Geologic Reports (continued)
Geologic and Geotechnical Report, Review of Vesting Tentative Tract Map 61105 (continued)
Geologic and Geotechnical Report – Addendum No. 1, Response to Los Angeles County Geologic Review Sheet
Geologic and Geotechnical Report – Addendum No. 2, Response to Los Angeles County Geologic Review Sheet, January 26, 2005
Preliminary Geologic/Geotechnical Report, Review of Utility Corridor Plans (30% Submittal), Utility Corridor Along Highway 126, Newhall Ranch WRP Site to Travel Village, Castaic, May 25, 2007
Geologic and Geotechnical Report – Addendum No. 3, Response to Los Angeles County Geologic Review Sheet, September 17, 2007
Geologic and Geotechnical Report – Addendum No. 4, Response to Los Angeles County Geologic Review Sheet date January 16, 2008; March 13, 2008
Geologic and Geotechnical Report, Review Revised Vesting Tentative Tract Map 53108, December 21, 2009

Volume V

Appendix 4.1 Geologic Reports (continued)
Leighton and Associates, Inc., Geotechnical Report, Off-Site Grading for Proposed Southern California Edison Substation Alternatives, Responses to County of Los Angeles, Department of Public Works Geologic and Soils Engineering Review Sheets for TTM No. 61105 (Mission Village Project), November 26, 2007

LIST OF APPENDICES (continued)

Volume V (continued)

Appendix 4.1 Geologic Reports (continued)

Leighton and Associates, Inc., Responses to County of Los Angeles, Department of Public Works Geologic and Soils Engineering Review Sheets for Leighton's Geotechnical Report Off-Site Grading for Proposed Southern California Edison Substation Alternatives, March 11, 2008

Leighton and Associates, Inc., 100-Scale Grading Plan Review of Offsite Grading for Proposed Southern California Edison Substation Alternatives 1 and 2 March 2010, Vesting Tentative Tract Map 61105, County of Los Angeles March 16, 2010

R.T. Frankian & Associates, Evaluation of Building Setbacks, Airport Mesa (Area E1), Vesting Tentative Tract 61105, Newhall Ranch, Los Angeles County, California. October 14, 2009

R.T. Frankian & Associates, 100-Scale Plan Review, Revised Vesting Tentative Tract Map No. 61105, Mission Village, Newhall Ranch, December 21, 2009

R.T. Frankian & Associates, Response to County of Los Angeles Review Sheets and Geotechnical Plan Review, Revised Vesting Tentative Tract Map No. 61105, Mission Village, Newhall Ranch. March 30, 2010

Geologic/Geotechnical Report – EIR-Level Review of Preliminary Grading Study for Western Access Roads to Proposed Mission Village Development (VTTM 61105)

Geologic and Geotechnical Report – Review of Revised VTTM 61105 (Dated 12/21/05) for Screencheck Purposes

Geologic/Geotechnical Evaluation for Environmental Impact Report, Vesting Tentative Tracted Map No. 61105, March 31, 2010

R.T. Frankian & Associates, *Response to County of Los Angeles Review Sheets and Geotechnical Plan Review, Revised Tentative Tract Map No. 61105,* Mission Village, Newhall Ranch. April 29, 2010

Appendix 4.2 Hydrological Reports

Drainage Concept for Mesas VTTM 61105

Flood Technical Report – Santa Clara River, February 2007

Drainage Concept Report for Mission Village Santa Clara River Bank Protection, July 2007

Volume VI

Appendix 4.2 Hydrological Reports (continued)

California Regional Water Quality Control Board, Los Angeles Region, Review of Newhall Ranch Specific Plan Subregional Stormwater Mitigation Plan Letter, May 2008

Request for Conditional Letter of Map Revision, July 2007

Balance Hydrologics, Inc., "Assessment of Potential Impacts Resulting From Cumulative Hydromodification Effects, Selected Reaches of the Santa Clara River, Los Angeles County, California," (October 2005)

Newhall Ranch Santa Clara River Phase I River Fluvial Study, March 2006

LIST OF APPENDICES (continued)

Volume VI (continued)

Appendix 4.3 Biological Reports
California Native Plant Society, Inventory of Rare and Endangered Plants
California Natural Diversity Data Base
Compliance Biology, Inc., "Results of the Focused Western Spadefoot Toad Surveys on the Mission Village Project Site" (2006)
Entrix, Inc., "Focused Special-Status Aquatic Species Assessment – Santa Clara River, Mission Village Project, Newhall Ranch, California" (2006)
Impact Sciences, Inc., "Oak Tree Report: Mission Village VTTM 61105 Los Angeles County, California, March 2010 update" (2010)
Impact Sciences, Inc., "Mission Village VTTM 61105 Project Oak Tree Report, Los Angeles County, California" (2006)
Lemons, P., "Focused California Gnatcatcher Surveys for Mission Village, Los Angeles County, California" (January 26, 2008)
Dudek, "2007 Sensitive Plant Survey Results for the Newhall Ranch Specific Plan Area, Los Angeles County, California" (December 2007)

Appendix 4.5 Traffic Analysis
Mission Village Revised Traffic Impact Analysis, Austin-Foust Associates, Inc., October 2010
Westside Roadway Santa Clarita Valley Phasing Analysis, Austin-Foust Associates, Inc., November 2006
Westside Santa Clarita Valley Phasing Analysis for the City of Santa Clarita, Austin-Foust Associates, Inc., July 2006

Volume VII

Appendix 4.5 Traffic Analysis (continued)
Caltrans EIR/EIS Excerpts
City of Santa Clarita Department of Public Works and Los Angeles County Department of Public Works, Valencia B&T District Report Update, March 2008
City of Santa Clarita Transportation and Engineering Services, Via Princessa Bridge and Major Thoroughfare Construction Fee District Update Report, March 2002

Appendix 4.6 Noise Calculations
Noise Measurement Output Data and Analysis

Appendix 4.7 Air Quality Calculations
SCAQMD Santa Clarita Subregional Analysis, November 2004
Grading, Trenching, and Paving Emissions
Building Construction Emissions
Operational Emissions
CO Hotspots

LIST OF APPENDICES (continued)

Volume VII (continued)

Appendix 4.7 Air Quality Calculations (continued)
Localized Significance Thresholds Analysis
Health Risk Assessment

Appendix 4.8 Water Service Reports
SB 610 Water Supply Assessment
Water Supply Assessment Mission Village Vesting Tentative Tract Map No. 061105, April 2010
2005 Urban Water Management Plan
Los Angeles Superior Court Decision on Riverpark
Santa Barbara Superior Court Decision on West Creek
Newhall Ranch Revised Additional Analysis, Vol VIII

Volume VIII

Appendix 4.8 Water Service Reports (continued)
Nickel Water Contract Documentation
Nickel Environmental Documentation
The State Water Project Deliverability Reliability Report, Public Review Draft, November 16, 2005
The State Water Project Deliverability Reliability Report 2005, Final April 2006
Water Supply Contracts Between the State of California Department of Water Resources and CLWA including Amendment No. 18 (41,000 Acre-Feet Water Transfer)
Valencia Water Company Water Management Program Approved November 29, 2001, and Related CPUC Decisions
2002 Point of Delivery Agreement (Semitropic Groundwater Banking Program), February 13, 2004
California's Groundwater Bulletin 118, Update 2003, October 2003
CLWA Data Document Providing Economic Justification for Proposed Facility Capacity Fees, April 19, 2003
2004 Santa Clarita Valley Water Report, Dated May 2005
2005 Santa Clarita Valley Water Report, Dated April 2006
Results of Laboratory Testing of Valencia Water Company Wells
CH2MHill Memorandum, Effect of Urbanization on Aquifer Recharge in the Santa Clarita Valley, February 22, 2004
CH2MHill Final Report, Regional Groundwater Flow Model for the Santa Clarita Valley (Model Development and Calibration), April 2004
CH2MHill, Calibration Update of the Regional Groundwater Flow Model for the Santa Clarita Valley, Santa Clarita, California, August 2005
CH2MHill Final Report, Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, December 2004
CH2MHill Memorandum, Analysis of Near-Term Groundwater Capture Areas for Production Wells Located near the Whittaker-Bermite Property, December 21, 2004

LIST OF APPENDICES (continued)

Volume IX

Appendix 4.8 Water Service Reports (continued)
Analysis of Groundwater Basin Yield, Upper Santa Clara River Groundwater Basin, East Subbasin, Dated August 2005
Analysis of Groundwater Supplies and Groundwater Basin Yield Upper Santa Clara River Groundwater Basin, East Subbasin (2009 Basin Yield Update)
Draft EIR – Supplemental Water Project Transfer of 41,000 Acre-Feet of State Water Project Table A Amount, Dated June 2004
CLWA Draft Report, Recycled Water Master Plan, May 2002 and CLWA Resolution Regarding Availability of Recycled Water, Approved May 28, 2003
Impact and Response to Perchlorate Contamination, Valencia Water Company Well Q2, Dated April 2005
Groundwater Management Plan, Santa Clara River Valley Groundwater Basin, Dated December 2003
Memorandum of Understanding Between the Santa Clara River Valley Upper Basin Water Purveyors and United Water Conservation District, August 2001
Newhall Ranch Litigation, Statement of Decision, August 1, 2000

Volume X

Appendix 4.8 Water Service Reports (continued)
Slade, 2001 Update Report Hydrogeologic Conditions in the Alluvial and Saugus Formation Aquifer Systems, Dated July 2002
Interim Remedial Action plan, Dated December 2005
Valencia Water Company Letter to Impact Sciences, March 8, 2006
Luhdorf & Scalmanini Technical Memorandum: Evaluation of Groundwater Recharge Methods for the Saugus Formation in the Newhall Ranch Specific Plan Area, March 8, 2006
Luhdorf & Scalmanini Technical Memorandum: Potential Capture of Perchlorate Contamination, Valencia Water Company Wells E14-E17, April 26, 2006
Final Report, Reclaimed Water System Master Plan, CLWA, September 1993
CPUC Decision Dated November 29, 2001
CPUC Decision Dated October 16, 2003
CPUC Decision Dated August 24, 2006
2003 Point of Delivery Agreement (Semitropic Groundwater Banking Program), February 13, 2004
CLWA Resolution Regarding Availability of Recycled Water, Approved May 28, 2003
CLWA Memorandum to Board of Directors, June 1, 2007
Monterey Settlement Agreement
Friends of the Santa Clara River v. Castaic Lake Water Agency, 2003 WL 22839353 (*Friends II*)
DWR "News for Immediate Release," April 18, 2006
DWR Notice to SWP Contractors, May 23, 2007
DWR Bulletin 132-04, *Management of the California State Water Project*, September 2005
DWR Bulletin 132-03, *Management of the California State Water Project*, December 2004
DWR Bulletin 132-02, *Management of the California State Water Project*, January 2004

LIST OF APPENDICES (continued)

Volume X (continued)

Appendix 4.8 Water Service Reports (continued)

DWR Bulletin 132-01, *Management of the California State Water Project,* December 2002

DWR Bulletin 132-06, *Management of the California State Water Project*, December 2007

DWR's "Notices to State Water Project Contractors" 2000 to 2006

Sacramento County Trial Court's Order (re: Monterey Settlement Agreement)

Judgment Granting Peremptory Writ of Mandate, October 25, 2002

DWR Brief in the 41K litigation

California Water Impact Network, et al. v. Castaic Lake Water Agency, Appellate Court 2d Civil No. B177978 (Second District Court of Appeal's unpublished decision)

CalSim II: Simulation of Historical SWP-CVP Operations, Technical Memorandum, DWR Bay-Delta Office, November 2003

CalSimII Benchmark Studies

Musings On A Model: CalSim II In California's Water Community, San Francisco Estuary and Watershed Science, Vol. 3, Issue 1 (March 2005), Article 1, by Inês C. Ferreira, *et al*

DWR letter to Mindy McIntyre, Planning and Conservation League, April 20, 2006

Order Granting Plaintiff's Application for Temporary Restraining Order, February 3, 2006

Order Granting Plaintiff's Motion for Preliminary Injunction, February 15, 2006

Governor Schwarzenegger's release issued July 17, 2007

Volume XI

Appendix 4.8 Water Service Reports (continued)

2006 Santa Clarita Valley Water Report, May 2007

2008 Santa Clarita Valley Water Report, April 2009

Statement of Decision, *California Water Network v. Castaic Lake Water Agency*, Los Angeles County Superior Court No. BS098724, filed April 2, 2007 ("Chalfant Decision")

California Water Impact Network, Inc. v. Castaic Lake Water Agency, Second Appellate District, Division Five, Appellate Case No. B205622

Castaic Lake Water Agency Litigation Settlement Agreement

Order Granting Joint Motion for Court Approval, Good Faith Settlement Determination and Entry of Consent Order, July 13, 2007

Stipulation to Dismiss Plaintiffs' Claims and Defendants' Counterclaim, August 20, 2007

Carollo Engineers, Treatment of Perchlorate Contaminated Groundwater from the Saugus Aquifer, TM 3 Bench and Pilot Test Results, February 2004

DWR's 2009 Comprehensive Water Package, Special Session Policy Bills and Bond Summary, November 2009

DWR's Progress on Incorporating Climate Change into Management of California's Water Resources, July 2006

Emissions Pathways, Climate Change, Impacts on California, Katharine Hayhoe, et al., August 24, 2004

Pondering a Climate Conundrum in Antarctic, *Nature,* January 13, 2002

LIST OF APPENDICES (continued)

Volume XI (continued)

Appendix 4.8 Water Service Reports (continued)
Buried Soil Cement Evaluation after 2004/05 Winter Storm, PACE, May 8, 2007
In Hot Water: Water Management Strategies to Weather the Effects of Global Warming, NRDC, July 2007
Minute Order and Statement of Decision for the 2005 UWMP
Janavs Decision
Retired Irrigated Farmland, Tentative Tract Map No. TR61105, 2008
Valencia Water Company, Well E-15 Water Quality Compliance Monitoring Results – 2006 to 2009
Progress Letter Report from Hassan Amini, Ph.D., Project Coordinator for AMEC Geomatrix, to DTSC, September 15, 2009
Letter from Hassan Amini, Ph.D., Project Coordinator for AMEC Geomatrix, to DTSC, June 8, 2009
CLWA News Release, September 14, 2009
CLWA Memorandum from Brian J. Folsom to CLWA Board of Directors, October 1, 2009
U.S. EPA, Perchlorate, and Region 9 Perchlorate Update
Biological Opinion for Delta smelt, 2008

Volume XII

Appendix 4.8 Water Service Reports (continued)
Biological Opinion for Chinook salmon/sturgeon
Natural Resources Defense Council v. Kempthorne, 506 F.Supp.2d 322 (E.D. Cal. 2007) ("2007 Wanger decision")
Pacific Coast Federation of Fishermen's Associations, et al. v. Gutierrez, et al., No. 06-CV-00245-OWW-GSA (E.D. Cal. 2008) ("2008 Wanger decision")
NOAA/NMFS release summarizing the 2009 Biological Opinion, June 4, 2009
DWR release responding to the 2009 Biological Opinion, June 4, 2009
SWP Contractors release concerning litigation filed challenging the 2009 Biological Opinion, August 6, 2009
Coalition for a Sustainable Delta/Kern County Water Agency release concerning the litigation filed challenging the 2009 BO, August 28, 2009

Appendix 4.9 Wastewater Disposal
Wastewater Data

Appendix 4.10 Solid Waste Services
Calculations Details

Appendix 4.11 Sherriff Services
Written correspondence from Captain Patti A. Minutello, Los Angeles County Sheriff's Department, Santa Clarita Valley Station, November 3, 2004
Written communication from E. Conley, Captain, Commander, Newhall Area Station, California Highway Patrol, November 14, 2004

LIST OF APPENDICES (continued)

Volume XII (continued)

Appendix 4.12 Fire Protection Services
Written correspondence, David R. Leininger, Chief, Forestry Division, Prevention Bureau, County of Los Angeles Fire Department, December 22, 2004

Appendix 4.13 Education
School Facilities Funding Agreement entered into between the Newhall District and Newhall on October 17, 1995
School Facilities Funding Agreement Between the Saugus Union School District and Newhall Land and Farming Company, Effective February 18, 1997
School Facilities Funding Agreement Between the William S. Hart Union High School District and The Newhall Land and Farming Company, Effective October 1998
Facilities Mitigation and Funding Agreement By and Between Newhall Land Development, LLC, and the Newhall School District, December 1, 2009
Agreement for the Advancement of School Facilities Funds to the Saugus Union School District by the Newhall Land and Farming Company, Effective October 17, 2000
School Facilities Funding Agreement entered into between the Newhall District and Newhall Land and Farming Company (Newhall School Funding Agreement), Effective January 22, 2010
Student Generation Calculations

Appendix 4.15 Library Services
Written correspondence from Malou Rubio, Head, Staff Services, County of Los Angeles Public Library, Library Headquarters, August 11, 2004
Written correspondence from Malou Rubio, Head, Staff Services, County of Los Angeles Public Library, Library Headquarters, June 28, 2004
E-mail correspondence from Malaisha Hughes, County of Los Angeles Public Library, Library Headquarters, January 21, 2005
Library Calculations

Volume XIII

Appendix 4.19 Environmental Safety
Phase I Environmental Site Assessment of Proposed The Mesas East, Valencia, California
Phase I Environmental Site Assessment of Entrada Development Tract Map No. 53295, Henry Mayo Drive and The Old Road, Valencia, California, March 2007 (part 1)

Volume XIV

Appendix 4.19 Environmental Safety (continued)
Phase I Environmental Site Assessment of Entrada Development Tract Map No. 53295, Henry Mayo Drive and The Old Road, Valencia, California, March 2007 (part 2)
Phase I Environmental Site Assessment of Entrada Development Tract Map No. 53295, Henry Mayo Drive and The Old Road, Valencia, California, March 2007 (part 3)

LIST OF APPENDICES (continued)

Volume XV

Appendix 4.19 Environmental Safety (continued)
Phase I Environmental Site Assessment of Entrada Development Tract Map No. 53295, Henry Mayo Drive and The Old Road, Valencia, California, March 2007 (part 4)
Phase I Environmental Site Assessment of Parcel Map No. 060678, Highway 126, Valencia, California, September 2005 (part 1)

Volume XVI

Appendix 4.19 Environmental Safety (continued)
Phase I Environmental Site Assessment of Parcel Map No. 060678, Highway 126, Valencia, California, September 2005 (part 2)
Phase I Environmental Site Assessment of Parcel Map No. 060678, Highway 126, Valencia, California, September 2005 (part 3)

Volume XVII

Appendix 4.19 Environmental Safety (continued)
Phase I Environmental Site Assessment of Legacy Village Development Tract Map VTTM 061996, Valencia, California, March 2007

Volume XVIII

Appendix 4.19 Environmental Safety (continued)
Phase II Subsurface Investigation of Water Quality Basins, Entrada ME073-02 Basins, Valencia, California, September 2006
BA Environmental, *Phase I Environmental Site Assessment of River Village Tentative Tract Map No. 53108, Highway 126, Newhall Ranch, California*, September 27, 2004
BA Environmental, *Phase I Environmental Site Assessment Addendum Letter of Proposed Water Tank Locations and Utility Corridor Easements Associated with the proposed River Village Development, Tentative Tract Map No. 53108, Highway 126, Newhall Ranch, California*, September 28, 2004
BA Environmental, Phase I Environmental Site Assessment of Proposed SCE Substation Site and Soil Disposal Site, Valencia, California, May 2010

Appendix 4.20 Cultural Resources
Phase I Archaeological Survey of the West Ranch Area
Backhoe Testing Near the Asistencia de San Francisco

Appendix 4.21 Floodplain Modifications
PACE, Mission Village Flood Technical Report
ENTRIX, Focused Special-Status Aquatic Species Assessment

LIST OF APPENDICES (continued)

Volume XIX

Appendix 4.21 Floodplain Modifications (continued)
Geosyntec Consultants, "Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan" (April 2008)
Pacific Advanced Civil Engineering, Inc., "Newhall Ranch River Fluvial Study Phase 1, Final Draft" (March 2006; 2006a)
Pacific Advanced Civil Engineering, Inc., "Newhall Ranch River Fluvial Study Phase 2" (January 2008)
Philip Williams and Associates, Ltd., "Newhall Ranch Tributary Channel Design Guidelines" (November 20, 2008)

Volume XX

Appendix 4.22 Water Quality
Mission Village Water Quality Technical Report, March 2010
Geosyntec, Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan, April 2008

Appendix 4.23 Global Climate Change
ENVIRON, Climate Change Technical Report: Mission Village, August 2010
GSI Water Solutions, Inc., "Technical Memorandum Regarding Potential Effects of Climate Change on Groundwater Supplies for Newhall Ranch Specific Plan, Santa Clarita Valley, California," March 18, 2008
Mission Village Sustainability Overview, 2010
Global Climate Change and Its Effects on Sensitive Biological Resources, July 2010
Global Climate Change and Its Effects on California Water Supplies, July 2010

Appendix 5.0 Project Alternatives
Emissions Calculations

Geologic and Geotechnical Report,
Review of Vesting Tentative Tract Map 61105

ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

Geological And Geotechnical Consultants

GEOLOGIC AND GEOTECHNICAL REPORT

Review of Vesting Tentative Tract Map (Dated June 14, 2004)

Vesting Tentative Tract 61105

Mesas East

Newhall Ranch, California

VOLUME I OF VI

Prepared for:

The Newhall Land and Farming Company
23823 West Valencia Boulevard
Valencia, California 91355

Job No: 04-2023-4
Dated July 22, 2004

27825 Smyth Drive, Valencia, California 91355 661-294-0065 FAX 661-294-0833

TABLE OF CONTENTS

VOLUME I

1.0 SCOPE OF WORK 1
2.0 BACKGROUND 3
3.0 SITE DESCRIPTION 4
4.0 PROPOSED DEVELOPMENT 4
5.0 GEOLOGIC SETTING 4
6.0 FIELD EXPLORATIONS 5
6.1 Surface Mapping 5
6.2 Subsurface Investigations 6
6.3 Sampling Procedures 6
7.0 GENERALIZED GEOLOGIC/GEOTECHNICAL SUBSURFACE CONDITIONS AND SOIL PROPERTIES 7
7.1 Laboratory Program 7
7.2 Geologic Units 7
7.2.1 Saugus Formation (TQs_l and TQs_u) 7
7.2.2 Quaternary Terrace Deposits (Qt) 8
7.2.3 Quaternary Alluvium (Qal) 10
7.2.4 Slopewash (Qsw) 10
7.2.5 Residual Soil 11
7.2.6 Artificial Fill (af) 11
7.2.7 Certified Engineered Fill (Cef) 11
7.2.8 Mass Movement Deposits 11
7.3 Ground Water 13
7.4 Soil Compressibility and Hydroconsolidation 13
7.5 Potential Expansion of Onsite Materials 14
7.6 Potential Corrosivity of Soils 14
7.6.1 Soils Electrical Resistivity and pH 14
7.6.2 Soluble Sulfate and Chloride Content in Soils 14
7.7 Soils Shear Strength 14
7.8 Rippability 15
7.9 Sewage Disposal 15
7.10 Erosion Potential 15
7.11 Debris Flow Hazards 15
8.0 SEISMIC CONSIDERATIONS 16
8.1 Introduction 16
8.2 Ground Rupture 17

TABLE OF CONTENTS

8.2.1 Airport Mesa Area 17
8.2.2 Monclinal Warp Area 18
8.2.3 Lion Canyon Anticline 19
8.3 Ground Motion 19
8.3.1 Elementary School Site 20
8.4 Ground Failure 20
9.0 GENERAL CONCLUSIONS AND RECOMMENDATIONS 20
9.1 Feasibility of Development 20
9.2 Earthworks Recommendations 21
9.2.1 Introduction 21
9.2.2 Site Preparation 21
9.2.3 Removals and Benching 21
9.2.4 Preparation of Removal Bottom Areas 22
9.2.5 Dewatering During Removals 22
9.2.6 Over-Excavation 23
9.2.7 Fill Materials 23
9.2.8 Fill Compaction 23
9.2.9 Proposed Fill Slopes 24
9.2.10 Proposed Cut-Slopes 25
9.2.11 Natural Slopes 25
9.2.12 Existing Cut-Slopes 26
9.2.13 Slopes in Debris Basins 26
9.2.14 Building Setbacks 26
9.2.15 Restricted Use Areas 26
9.3 Oil Wells 26
9.4 Drainage Control 27
9.4.1 Surface Drainage and Erosion Control 27
9.4.2 Subsurface Water Control 28
9.5 Shrinkage, Bulking and Subsidence 28
9.6 Landscaping 29
9.7 Foundation and Settlement Considerations 29
9.8 Excavations, Shoring and Backfill Recommendations 30
9.9 Expansive Soils Considerations 31
9.10 Hydroconsolidation Considerations 31
9.11 Corrosivity and Chemical Attack Considerations 31
9.12 Retaining Walls and Pavement Design 32
10.0 LOS ANGELES COUNTY 111 STATEMENT 32

TABLE OF CONTENTS

11.0 GEOLOGIST/GEOTECHNICAL ENGINEER OF RECORD 32
12.0 LIMITATIONS 32

VOLUME I

Location Map/ "Aeral" Geologic Map following page 4
References
Summary of Landslides Table 1
Summary of Cut-Slopes Table 2

APPENDIX A - SUBSURFACE LOGS[1]

- Backhoe Trenches
  - T-1Q thru T-141Q
  - T-146Q thru T-160Q
  - T-177Q thru T-214Q
  - T-217Q
  - T-1M thru T-25M
  - T-1T thru T-59T
  - T-62T thru T-112T
  - T-114T
  - T-128T thru T-150T
  - T-158T
  - T-1B thru T-32B
  - T-40SA thru T-55SA
  - T-42I thru T-47I
  - T-7MW and T-12MW thru T-14MW

VOLUME II

- Bucket-Auger Borings
  - B-1E thru B-60E
  - B-63E thru B-73E
  - B-1M thru B-25M
  - B-1B thru B-8B
  - B-1W, B-2W, B-6W,
  - B-9W, B-10W, B-11W,
  - B-13W thru B-16W
- Rotary-Wash Borings
  - RW-1M thru RW-3M,
  - RW-1T thru RW-3T

[1] Please note that "H" series borings and trenches are attached to our report dated July 20, 2004 (04-1703H-1) for the Airport Mesa Area fault Investigation.

TABLE OF CONTENTS

- Hollow-Stem-Auger Borings
  HS-1T thru HS-29T
  HS-10 thru HS-13
  HS-12I & HS-14I
- CPT Data
  CPT 1M thru 18M
- Long Trench Logs
  T-60T, T-61T, T-113T and T-151T thru T-157T (In Pocket) Plate A1-A7
- Dozer Cut Logs
  DC-A and DC-B (In Pocket)Plate A5 and A7
- Excavator Trench Log
  ET – 1T (In Pocket)Plate A7

VOLUME III

APPENDIX B - GEOTECHNICAL LABORATORY INVESTIGATION AND TEST RESULTS

APPENDIX C - LIQUEFACTION POTENTIAL ASSESSMENT AND EVALUATION OF EARTHQUAKE-INDUCED SETTLEMENTS

APPENDIX D - SEISMICITY

APPENDIX E - GENERAL SPECIFICATIONS, FIGURES
Recommended Earthwork Specifications
Recommended Specifications for Placement of Trench Backfill
Drainage and Erosion Control Recommendations
Construction Diagrams Figures E1-E-11
Minimum Foundation and Slab Recommendations for Expansive Soils Table E1

VOLUME IV

APPENDIX F - SLOPE STABILITY ANALYSES

VOLUME V

APPENDIX G - MAPS AND CROSS SECTIONS
- **Maps** (In pockets)
  Summary Map Sheet (1"=300') **Plate G1**
  Geologic/Geotechnical Maps (1"=100') **Plates G2-G6**
  Geologic/Geotechnical Remediation Maps (1"= 100') **Plates G7-G11**
  Geologic/Geotechnical Maps Legend **Plate G12**

TABLE OF CONTENTS

VOLUME VI

Boring Log Data Sheet **Plate G13**

- **Cross Sections** (In pockets)
  Geologic Cross Sections 1-1' through 13-13' **Plate G14**
  Geologic Cross Sections 14-14' through 29-29' **Plate G15**
  Geologic Cross Sections 30-30' through 41-41' **Plate G16**
  Geologic Cross Sections 1E-1E' through 15E-15E' **Plate G17**
  Geologic Cross Sections 1M-1M' through 9M-9M' **Plate G18**

APPENDIX H – OIL WELL ABANDONMENT RECORDS

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

July 22, 2004 Job No: 04-2023-4

The Newhall Land and Farming Company
23823 West Valencia Boulevard
Valencia, California 91355

Attention: Mr. Corey Harpole

Subject: **GEOLOGIC AND GEOTECHNICAL REPORT**
Review of Vesting Tentative Tract Map 61105 (Dated June 14, 2004)

Project: Vesting Tentative Tract 61105
Mesas East
Newhall Ranch, California

References: See at end of text

Dear Mr. Harpole:

This report presents our opinions on the existing geologic and geotechnical conditions on the above-referenced vesting tentative tract and their effects on the proposed development. Our report dated July 20, 2004 for the Airport Mesa Fault investigation is to be submitted via a separate cover to Los Angeles County Department of Public Works along with this report.

1.0 SCOPE OF WORK

The scope of work performed for this study included the following:

1. Review of previous reports by this firm in the vicinity of the subject site.

2. Review of reports by others in the vicinity of the subject project (see References).

3. Review of Published reports and maps listed in the **References** section.

4. Review of the 2003 Munger Map Book, California-Alaska Oil & Gas Field.

5. Review of Alquist-Priolo Fault Rupture Hazard Zones in California (CDMG Special Publication 42).

6. Review of the following aerial photographs:

YEAR	PHOTO	SCALE	AGENCY
1928	E-95 to E-97 and E-121 to E-123	1" = 1700'±	Fairchild
3/2/77	1-VEN 2-47	1" = 2125'±	Continental
~1979	02714-0047 thru 0049	1" = 2775'±	? - Infrared
10/28/80	1280-61,1080-150 and 1088-151	1" = 4000'±	USDA
7/3/85	WAC-85CA 16-83, 16-85	1" = 1100'±	WAC Corp

7. Coordination with the Supervising Civil Engineer, Psomas.

8. Review of the site topography and the vesting tentative tract map design, dated June 14, 2004, provided to our office in computerized format (AutoCAD), prepared by Psomas. This computerized map was used as the base for our 100-scale Geologic/Geotechnical Maps, **Sheets 2-6** (Plates G2-G6), and 100-scale Geotechnical Remediation Maps **Sheets 2-6** (Plates G7-G11). We make no representations regarding the accuracy of the base maps.

9. Coordination with Underground Service Alert.

10. Coordination with California Department of Conservation Division of Oil, Gas and Geothermal Resources (DOGGR).

11. Geologic field mapping of the site.

12. Excavation, sampling and logging of 36 hollow-stem-auger borings drilled to a maximum depth of 55 feet, 6 rotary-wash borings drilled to a maximum depth of 50 feet, and 104 bucket-auger borings drilled to a maximum depth of 121 feet.

13. Excavation, sampling and logging of 426 backhoe trenches excavated to a maximum depth of 15 feet.

14. Excavation and logging of two dozer cuts and one excavator trench to a maximum depth of 27.5 feet.

15. Performed 18 Cone Penetrometer Test (CPT) soundings within the alluvial areas.

16. Location of all exploratory excavations with Trimble GPS instrumentation.

17. Laboratory testing of selected bulk and relatively undisturbed samples obtained in our subsurface investigations. Testing included dry density and moisture content of in-situ soils, percent minus #200 sieve, grain-size analysis including hydrometer, Atterberg Limits, compaction (modified proctor), direct shear and re-shear, hydroconsolidation, expansion index, sulfates, chlorides, pH and resistivity.

18. Hand cleaning and profiling (at a scale of 1"=5') a total of 2,786 lineal feet of backhoe trenches, dozer cuts and an excavator trench.

19. Evaluation of potential seismic ground motions at the site utilizing computer programs by Thomas Blake in accordance with current State Guidelines.

20. Geotechnical analysis of potential liquefaction, lateral spreading and seismic settlements based on our subsurface investigations, laboratory testing and potential seismic ground motion estimates.

21. Assessment of recommended grading removal depths based on weak soils, seismic settlements and proposed fill heights above the exiting ground surface.

22. Preparation of 65 geologic cross sections illustrating anticipated conditions for the proposed cut, fill and natural slopes.

23. Slope Stability analyses of proposed cut-slopes, fill slopes, natural slopes and debris basins on the site.

24. Preparation of Geologic/Geotechnical Maps, a Geologic/Geotechnical Remediation Maps, Location Map, drill hole logs, trench logs and pertinent figures.

25. Preparation of this report summarizing the results of our investigations and our conclusions and recommendations for the proposed development.

2.0 BACKGROUND

Mesas East (VTT 61105) is part of the Newhall Ranch Master Plan. Investigations relative to preliminary designs commenced in 1999 and have continued through to the investigations performed in 2003 – 2004 for this tentative map review.

A separate report was prepared for our fault investigation of the Airport Mesa Area (sheet 2) and is dated July 20, 2004. The recommendations from this report have been incorporated into our review of the tentative map.

3.0 SITE DESCRIPTION

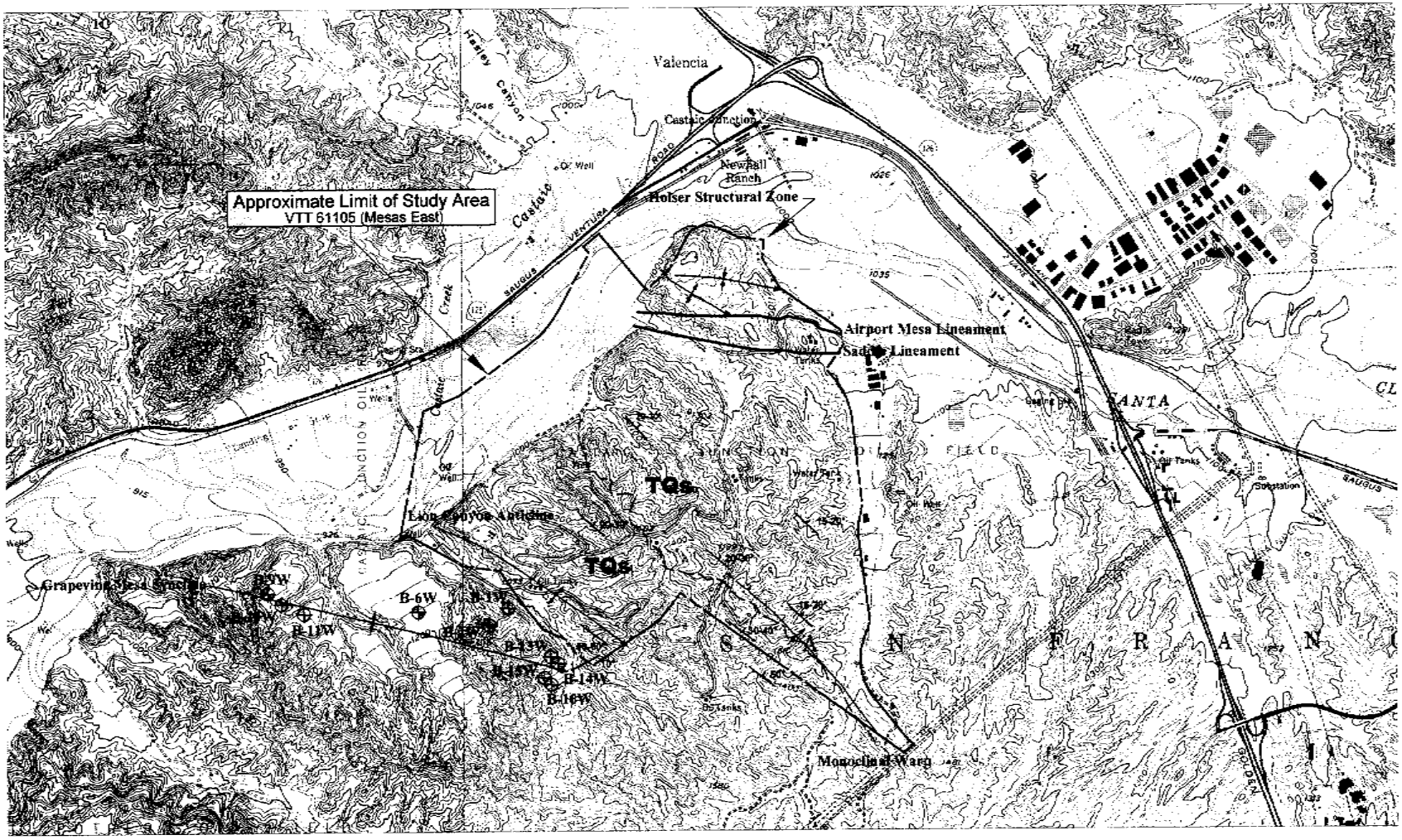
The proposed Mesas East development consists of approximately 1,250 acres located in the eastern portion of Newhall Ranch, south of the Santa Clara River and west of the City of Santa Clarita (see attached Location Map). The site is largely undeveloped except for roads and pads associated with past oil well drilling and operations and other cattle grazing and agricultural activities. Slopes range from gentle in the mesa and canyon floor areas to very steep along the Santa Clara River bluffs and where very resistant sandstone bedrock outcrops. The site topography is dominated by the north-trending Lion Canyon on the western margin, and "Magic Mountain Canyon" on the eastern margin of the site with Middle Canyon and Dead End Canyon lying between these two drainages. These canyons drain northward into the Santa Clara River which traverses the northern margin of the site. Elevated flat lands are present on the northern portion of the site in the vicinity of Airport Mesa and Exxon Mesa. These areas are underlain by old, uplifted stream and fan deposits. Elevations on the site range from 940' along the Santa Clara River to a high point of 1510'. Details of the site topography are illustrated on the attached Geologic/Geotechnical Maps. Vegetation on the site ranges from annual grasses to chaparral, with oak trees common in canyon areas and locally occurring on north-facing slopes. Vegetation has been modified by previous oil well drilling activities, as well as on-going cattle grazing. Agricultural crops are currently cultivated in Middle Canyon and were previously cultivated on Exxon Mesa.

4.0 PROPOSED DEVELOPMENT

It is our understanding that the proposed Mesas East area will be primarily developed for residential and commercial use and associated infrastructure. Mesa East consists of a total of 948 lots of which 139 are open space or park and 1 is an elementary school. Conventional cut and fill grading techniques will be utilized to construct the proposed development. Cut and fill slopes are proposed at gradients of 2:1 (h:v) or flatter. The highest proposed cut slope is about 165 feet high (CS-35) and the highest proposed fill slope is about 188 feet high adjacent (south) to CS-35. The maximum depth of cut will be about 200 feet in the vicinity of lot 381. The maximum depth of proposed will be about 118 feet in the vicinity of lot 221.

5.0 GEOLOGIC SETTING

The Mesas East area is located in the Transverse Ranges geomorphic province of Southern California in the eastern portion of the Ventura Basin. The Ventura Basin has been tectonically downwarped in the geologic past to produce a large-scale synclinal structure, which has developed a thick accumulation of Cenozoic sediments. The site is underlain by



Sources:
U.S. Geological Survey Val Verde Quadrangle, Dated 1952, Photorevised 1988
U.S. Geological Survey Newhall Quadrangle. Dated 1952, Photorevised 1988

Approximate Scale: 1"=2,000'

NOTE: THIS IS NOT A SURVEY OF THE PROPERTY

N

⊕ B-16W — Location of 24"-bucket-auger boring excavated for Mesas West included in this report

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

LOCATION MAP/
"AREAL" GEOLOGIC MAP

Job No.: 04-2023-4 | *Date: 7/22/04*

sedimentary rock of the Saugus Formation which has been tectonically deformed into southeast-plunging folds with local faulting in the Airport Mesa Area. Younger terrace deposits locally overlie the bedrock with minor to moderate angular discordance. Alluvium is present in the larger drainage areas and soil and slopewash mantle most of the site.

Mesas' East name is derived from the Mesa like topography which occurs on the northeastern (Airport Mesa) and northwestern (Exxon Mesa) portions of the site, and to the larger mesas located to the west on Newhall Ranch. These mesas consist of older stream channel and alluvial fan deposits (Qt) that have been uplifted and overlie bedrock of the Saugus Formation.

Bedrock on the site generally strikes northwest and dips moderately (15-30°) to the northeast. The exceptions to this are 1) the Holser Structural Zone which traverses Airport Mesa, 2) the Lion Canyon Anticline located on the eastern side of Lion Canyon and 3) the Monoclinal Warp located near the southeastern property line. These features are shown on the attached Geologic/Geotechnical maps.

The Holser Structural Zone consists of two strong lineaments, (which we investigated and found to be faults) and an anticline and syncline. This area was investigated by our firm in detail and our findings and recommendations are discussed and presented in our report dated July 20, 2004. The Lion Canyon Anticline is a southeast plunging asymmetrical fold that dips moderately on its eastern limb and fairly steep on its western limb for a short distance before the beds flatten towards the Grapevine Mesa Syncline which is located offsite to the west of Lion Canyon. The Monoclinal Warp trends southeast with steeply dipping bedrock south of the hinge and moderate to shallow dipping bedrock north of the hinge. The warp attenuates to the northwest and "dies out" before reaching the southern portion of Middle Canyon. The Lion Canyon Anticline and Monoclinal Warp were investigated by our firm utilizing a backhoe, bulldozer and an excavator in order to refine the geologic structure in these areas and to assess the potential for ground rupture hazard. For a detailed discussion of our investigations of these geologic features refer to Section 8.0 and **Appendix D** of this report.

6.0 FIELD EXPLORATIONS

6.1 Surface Mapping

For this report, surface geologic mapping in conjunction with aerial photo interpretations was undertaken by personnel from Allan E. Seward Engineering Geology Inc. (AESEGI)

using the proposed 100-scale Tentative Map as the base map. We also reviewed all our previous geologic/geotechnical data and available data by others in the vicinity of the project.

6.2 Subsurface Investigations

Our subsurface explorations included CPT soundings, and logging of rotary-wash, hollow-stem-auger and bucket-auger drill holes and backhoe trenches. Valley Well Drilling performed the rotary-wash and hollow-stem-auger drill holes. Tri-Valley Drilling and Valley Well Drilling excavated the bucket-auger drill holes, D.E. Eddings excavated the trenches, and Holguin, Fahn and Associates performed the CPT soundings. Bulldozer work was performed by Larry Price. Excavator trench work was performed by 3 Bar Engineering. The drill holes and trenches were logged and sampled by AESEGI personnel. Copies of all of our drill holes and trench logs are presented in **Appendix A**. The locations of the drill holes, trenches and CPTs are shown on the **Geologic/Geotechnical Maps**. All of the "H" series boring and trench logs (B-1H thru B-17H and T-1H thru T-82H) are in our report dated July 20, 2004 for the Airport Mesa Fault Investigation.

The drill hole logs included in **Appendix A** represent our interpretation of field data prepared for each boring by our geologic/engineering staff at the time of drilling, along with refinements based on observations and laboratory test results. Unit boundaries shown in the graphic log column of our rotary-wash and hollow-stem-auger drill hole logs are approximate and may represent gradual transitions.

6.3 Sampling Procedures

California-Drive (relatively undisturbed ring samples) and Standard Penetration Test (SPT) samples were obtained in the exploratory drill holes at various depths (see logs in **Appendix A**). Recovered soil samples were sealed in plastic containers and brought to our laboratory for further classification and testing.

Bulk (disturbed) samples of the near surface soils and bedrock were obtained from cuttings developed during excavation of the exploratory drill holes and trenches. The bulk samples were collected for classification and testing purposes and represent a mixture of soils within the noted depths.

7.0 GENERALIZED GEOLOGIC/GEOTECHNICAL SUBSURFACE CONDITIONS AND SOIL PROPERTIES

7.1 Laboratory Program

After visual and tactile classification in the field, the soil samples were brought to our laboratory. The soil classifications were checked in accordance with the Unified Soils Classification System. The field logs were reviewed to assess which samples would be analyzed or tested further. The results of the field investigation and the laboratory tests were used as the basis for our analyses and recommendations presented in this report. Laboratory test results are presented in **Appendix B**.

7.2 Geologic Units

A general description of geologic units, including bedrock, terrace deposits, alluvium, landslides, and artificial fill are presented below. Distribution of these units is shown on the Geologic/Geotechnical maps.

7.2.1 Saugus Formation (TQs_l and TQs_u)

The bedrock underlying the site consists of Plio-Pleistocene, non-marine sedimentary rock of the Saugus Formation. This formation includes light gray to yellowish-gray sandstone, pebbly sandstone and pebble to cobble conglomerate and light yellowish-brown to brown sandy siltstone, siltstone and mudstone and rare moderate-brown claystone. Siltstone, claystone and mudstone units of the Saugus Formation are potentially expansive.

Our subsurface investigations and field mapping indicate that the upper section of the Saugus Formation (TQs_u), is lithologically distinct from the more typical lower section (TQs_l). The lower (older) stratigraphic section of the Saugus Formation exposed on the western portion of the site, is generally coarse-grained, moderately to well indurated, and lithologically similar to the type section of the formation. The upper (younger) stratigraphic section exposed on the eastern portion of the site is less indurated and commonly contains more thinly bedded siltstone and mudstone than the type section and thick reddish-brown "red beds" are not common.

In contrast to the geologic maps of Kew (1924), Winterer and Durham (1962) and Dibblee (1996), the maps by Weber (1982) and Treiman (1986) have designated the upper section of the Saugus Formation as Pacoima Formation. Review of Oakeshott

(1958), however, indicates that the type section of the Pacoima Formation consists of a very poorly sorted mix of angular pebbles, cobbles and boulders in a dark-brown to reddish-brown mudstone matrix which was rapidly deposited as a fanglomerate. The upper section of the Saugus Formation on Newhall Ranch is dominated by thinly bedded siltstone, mudstone and sandy siltstone with sandstone and rounded pebble to cobble conglomerate interbeds. Unlike the Pacoima Formation, the upper Saugus Formation is moderately well bedded and appears to be a fluvial deposit. Oakeshott (1958) also indicates that the Pacoima Formation lies with distinct angular discordance above the Saugus Formation, but this distinction is not prominent on Mesas East. We have therefore defined a lower (older) member of the Saugus Formation, designated as TQ_l, and an upper (younger) member which is designated as TQs_u on the attached maps. Our laboratory testing indicates that the upper section has an overall (cross bedding) weaker shear strength than the typical Saugus Formation bedrock, due to its higher percentage of fine-grained materials.

We have designated the bedrock exposed to the south of the Saddle Linemeament as the upper member of the Saugus Formation (TQs_u). North of the Saddle Lineament the bedrock encountered in our subsurface explorations and exposed in outcrop is mostly coarse grained and is designated as undifferentiated Saugus Formation (TQs).

7.2.2 Quaternary Terrace Deposits (Qt)

Deposits of relatively flat-lying older alluvium which are significantly higher than the active stream channel areas are designated as terrace deposits on the attached Geologic Maps. The deposits at Airport Mesa proper were likely deposited in a fluvial environment and the deposits south of the Saddle Lineament and at most of Exxon Mesa were likely deposited in an alluvial fan.

At least two fill-terrace levels are present on the site. The dominant upper terrace forms large mesas on the northwestern portion of the site (Exxon Mesa) and northeastern portion of the site (Airport Mesa) which are roughly 180 to 200 feet above the adjacent drainages. Dr. Roy Shlemon reviewed the stratigraphy and degree of development of soils at Airport Mesa and concluded that the mesa surface was roughly 100,000 years old or older. A second, lower terrace level is present on the margins of Lion Canyon and locally in the larger canyons to the east across the site. The lower terrace surface is largely eroded but appears to commonly extend at least 20 to 40 feet above the adjacent drainages.

Small relic Qt deposit remnants were also encountered on portions of the upper slopes on the south side of Middle Canyon.

R.T. Frankian and Associates mapped a Qt deposit in the vicinity of the current northwest termination of Westridge Parkway (RTF&A Report dated June 3, 2002). However, based on our extensive exploration and similitude of lithology and geologic structure we have interpreted this unit to be the upper Saugus Formation (TQs_u) and have delineated its limits on the attached Geologic/Geotechnical Maps and cross sections.

The upper terrace deposits which compose the large mesa areas range in depth up to greater than 112 feet and typically consist of interbeded light yellowish-brown to yellowish gray sand, gravelly sand and silty sand with interbeds of yellowish-brown sandy silt and gravelly sandy silt and local brown silt to clayey silt. Cobbles only occur locally in the upper portion of the deposits. However, there is usually a coarse grained layer at the base which consists of 3 to 10 feet of coarse-grained sand and gravelly sand with cobbles and boulders (typically 2 ft. maximum diameter but up to 5 ft. diameter were locally observed). Per the USCS classification, cobbles are defined as having a diameter between 75 mm (3") and 305 mm (12") and boulders are greater than 12" in diameter. Orange iron staining and black rinds on clasts are common in this layer and cobbles and boulders are usually concentrated just above the bedrock. This layer is typically loose, friable and clast-supported in part. The cobbles and boulders typically consist of fine-grained granite, grandiorite, meta-granite and anorthosite, with lesser quantities of diorite, gabbro, gneiss, schist, and felsic to intermediate volcanics. The basal Qt elevations vary substantially across Airport Mesa owing primarily to deformation along the Airport Mesa and Saddle faults and tilting associated with underlying folds. Significant concentrations of cobbles and boulders appear to occur primarily north of the Saddle Lineament. In contrast, the basal terrace elevation over much of Exxon Mesa is nearly flat, with elevations ranging between 1075 and 1085. Surface mapping and subsurface explorations suggest that the eastern, buried margin of the Qt at Exxon Mesa is very steep, representing deposition against a steep slope or cliff. Data from Boring B-8B indicate that the slope had a gradient of up to 76 degrees locally, and up to 42 feet of very ancient and very dense (125 pcf) slopewash material was deposited on this slope prior to overlap by terrace alluvium. The terrace deposits daylight westward on the margin of Lion Canyon.

The lower terrace deposits typically consist of pebbly sandstone, pebble to cobble conglomerate and silty sandstone which range up to an observed thickness of 23 feet.

In general the larger Qt deposits on the site are dense (as indicated by blow counts and laboratory testing) and suitable for the support of engineered fill, and building structures, once the upper weathered and soil zones (generally upper 3-10 feet) have been removed. Some of the smaller localized Qt deposits on the lower canyon margins require complete removal due to their weathered nature. Please refer to the Geologic/Geotechnical Remediation Maps for recommended removal depths.

Where proposed pad grades occur near the basal Qt contact of the mesas and the basal Qt layer contains a high percentage of oversized (>8") clasts, the Qt shall be removed (over-excavated) and replaced with suitable engineered fill. Stability fills are recommended for all proposed cut-slopes that expose Qt deposits in the slope face. More detailed evaluations shall be performed at the Grading Plan Stage.

7.2.3 Quaternary Alluvium (Qal)

The larger canyon areas and Santa Clara River floodplain are underlain by alluvium. Older, incised alluvium is commonly present on the margins of the canyons. Both of these units are mapped as Qal on the attached Geologic Maps. These deposits typically consist of sands and gravel with cobbles, boulders and local silty intervals. Please refer to Section 7.4 of this report for information on the engineering characteristics of alluvium on the site. Partial to complete removal of the alluvial soils have been recommended on the subject site. Please refer to the Geotechnical Remediation Maps for removal depths and limits.

7.2.4 Slopewash (Qsw)

Swales and side-canyons adjacent to the larger canyon drainages commonly contain accumulations of slopewash. The maximum thickness of Slopewash/colluvium encountered in our exploratory excavations is about 15 feet. Slopewash has been noted on the Geologic logs and is indicated on the **Geologic/Geotechnical Maps** where it is estimated to be greater than 4 feet in thickness. All slopewash in areas of proposed development shall be completely removed prior to the placement of engineered fill. Slopewash removal depths and limits have been incorporated into the Geologic/Geotechnical Remediation Maps.

7.2.5 Residual Soil

Natural areas of the site are mantled by surface soils consisting of moderate-brown to yellowish-brown and yellowish gray silty sand with scattered pebbles. This unit is noted on our geologic logs, but is not shown on the Geologic Maps. Soil developed in the alluvial flats and in the relatively flat mesa areas has been disturbed by past agricultural and grading activities.

7.2.6 Artificial Fill (af)

Existing non-compacted artificial fill on the site ranges from minor spill fills generated during past grading of minor roads and oil well pads to larger accumulations placed to bridge roads across drainages (see Geologic/Geotechnical Maps). In proposed fill areas, all artificial fill impacting the proposed development will be entirely removed prior to placement of compacted/certified fill material. If artificial fill is present below proposed cut grade elevations, it shall be completely removed and replaced with certified engineered fill. Anticipated removal depths for artificial fill have been incorporated into the Geologic/Geotechnical Remediation Maps.

7.2.7 Certified Engineered Fill (Cef)

Certified engineered fill associated with the Westridge Development (Tract 45433-04) has been placed near the southeast corner of Mesas East. Proposed grades for VTT 61105 will tie into this existing fill for the extension of Westridge Parkway.

7.2.8 Mass Movement Deposits

7.2.8.1 Landslides (Qls)

We have performed extensive multi-phased subsurface investigations to evaluate the lateral limits, depth and geometry of the landslides encountered on Mesas East. The landslide limits are illustrated on the Geologic/Geotechnical Maps. Cross Sections have been constructed to illustrate the three-dimensional geometry of the more significant landslides and proposed grades.

A total of 52 landslides have been mapped on the site of, which, 21 are greater than 250 feet in width, and 31 are smaller. In general, the mapped landslides are translational failures, which occurred where daylighted (unsupported) clay-rich beds of the Saugus Formation bedrock were exposed. Most of the landslides are

concentrated on the eastern half of the site and occur within the weaker, upper member of the Saugus Formation (TQs_u). The landslides are typically geomorphically subtle and evidence of recent activity is generally lacking. Radiocarbon dating of a landslide near Newhall Ranch with similar geomorphology indicates that most of the large landslides on Mesas East are probably pre-Holocene in age (i.e. greater than 11,000 years old).

Except for Landslides Qls-I, Qls-XXXV, Qls-XXXVII, Qls-XLIII and Qls-XLIV all of the landslide debris material in areas of proposed development will be removed and replaced with engineered fill unless the proposed cut is deeper than the base of the landslide. Partial removals are recommended for Landslides Qls-I, XXXV, XLIII and XLIV. The deeper portions of these large ancient landslides consist of competent materials as indicated by our visual downhole logging of the landslides, in place density test and consolidation tests performed on the selected weaker samples. Based on our laboratory testing, blow counts and visual observations of these ancient landslides we have recommended that the upper 30 feet (or to bedrock) be removed and replaced with engineered fill. Due to the favorable geometry of the proposed grades at these locations, these landslides are considered to be grossly stable and safe for the use intended.

Landslide Qls-XXXVII will be completely removed below the proposed pad area however, due to environmental constraints the lower portion of this landslide will need to remain in place. A shear key is required to stabilize the upper pad area (F.S. > 1.50) as shown on Cross Sections 38-38' 39-39', 41-41', and 8M-8M', and the Geologic/Geotechnical Remediation Maps (Sheet 4, **Plate G-7**). The lower remaining portion of Qls-XXXVII will be placed within a Restricted Use Area (RUA).

For more information on the individual landslides please refer to the Landslide Summary Table, Geologic/Geotechnical Maps and Cross Sections. Removal depth ranges for landslides located in areas of proposed development are shown on the attached Geologic/Geotechnical Remediation maps. Landslides located outside areas of proposed development (Qls-XXXVIII and XXXIX) will be designated as Restricted Use Areas (RUA) on the Final Maps.

All landslide removals need to be performed under the observation of the project engineering geologist. All landslide removal bottoms need to be observed by the project engineering geologist and surveyed by the supervising civil engineer prior to the placement of engineered fill.

7.2.8.2 Surficial Failures (sf)

Shallow (5 to 15 feet in depth) surficial failures involving soil, slopewash and weathered bedrock were observed. Approximate locations and extent are shown on the **Geologic/Geotechnical Maps.** Any of the surficial failure material, which exists in areas of proposed development shall be removed prior to the placement of certified engineered fill. Anticipated removal depth ranges for surficial failures have been incorporated into the attached Geotechnical Remediation Maps.

7.3 Ground Water

No significant ground water was encountered in our exploratory bucket-auger borings or trenches on the site with the exception of the spring area at the mouth of Middle Canyon, where shallow ground water exists in the alluvium and locally at greater depths in the bedrock. Ground water is approximately 15 feet below the ground surface in the alluvium at the mouth of Middle Canyon and at 35 feet in the vicinity of (piezometer) RW-3M located approximately 1500 ft. up canyon from the mouth. Ground water was encountered in the bedrock near the mouth of Middle Canyon in borings B-72E and B-73E at depths of 49 and 40 ft., respectively. The relatively shallow ground water in the alluvium and bedrock at these locations is attributed to the coarse grained nature of these deposits (alluvium and conglomeratic bedrock observed in B-72E and B-73E) that are probably juxtaposed at depth against materials with lower permeability where the geologic structure associated with the Airport Mesa and Saddle Lineaments traverse Middle Canyon and restricts ground water flow. This area is also currently being irrigated for agriculture. Deep (>15 ft.) alluvial removals in this area will require dewatering. (Refer to section 9.2.5). Rotary wash borings drilled at the mouths of Lion Canyon (RW-1M) and Dead End Canyon (RW-2M) each encountered ground water at a depth of 35 feet. Minor seepage was encountered in only two bucket auger borings (B-23M and B-70E) at depths of 36–40 ft. and 61 ft., respectively.

Due to the elevated nature of the site ground water is not expected to pose a hazard to the proposed development or grading operations provided the dewatering is performed at the mouth of Middle Canyon.

7.4 Soil Compressibility and Hydroconsolidation

Based upon consolidation test data developed for this project, the **compressibility** of the subsurface soils below the recommended removals is considered to be typically low to

moderate within the depths tested ranging from 4 feet to 35 feet. The relatively lightly loaded residential and commercial structures proposed for this site are not expected to impose significant stress increases more than 10 feet below existing grade. Based upon laboratory data developed for this project, **no significant hydroconsolidation effects** due to water incursion are expected at the site after the recommended removals are completed.

7.5 Potential Expansion of Onsite Materials

Per CPT and boring data, the alluvial soils at the site are predominantly granular. The Terrace Deposits also typically have a very low to low expansion potential. Based on Expansion Index Tests (**Appendix B**), low to medium expansive Saugus Formation bedrock materials were identified at the site. The medium expansive materials typically consist of the siltstone, claystone and mudstone units.

7.6 Potential Corrosivity of Soils

7.6.1 Soils Electrical Resistivity and pH

Selected samples of on-site soils were tested for resistivity and pH. Soil electrical resistivity values of selected shallow soils suggest that on-site soils classifying (per County of Los Angeles) as moderately to severely corrosive to ferrous metals exist at the site; pH data shows no significant acidity of tested soils. Test results are presented in **Appendix B**.

7.6.2 Soluble Sulfate and Chloride Content in Soils

Selected samples of on-site soils were collected and tested for sulphates and chloride contents. Based upon test results, concrete exposure to sulfates in shallow soils classifies as negligible (per 1997 UBC Classification). Test results are presented in **Appendix B**.

7.7 Soils Shear Strength

Direct Shear tests were performed on samples of on-site Alluvium (Qal), Terrace Deposits (Qt), Saugus Formation (TQs_u and TQs_l), landslide material (Qls) and landslide plane material. Remolded samples of on-site soils were also tested for shear strength. Tests results along with family shear plots are presented in **Appendix B**.

The shear strength of the existing landslide planes was also determined by assuming conservatively that a factor of safety 1.0 currently exists (back-calculations or reverse slope stability). The computations are presented in our slope stability analysis in (see run no. 27) in **Appendix F**.

7.8 Rippability

The bedrock encountered at the site consists primarily of siltstone and sandstone of the Saugus Formation. This formation generally is graded using typical grading equipment and techniques. Heavy single-shank ripping may be required within the more indurated portions.

7.9 Sewage Disposal

It is our understanding that sewage disposal will be by public sanitary sewers.

7.10 Erosion Potential

The existing provisions in the Grading Ordinance for planting and irrigation of constructed slopes in conjunction with drainage recommendations provided in the section "Surface Drainage and Erosion Control," will be sufficient mitigation against potential erosion within the subject site.

7.11 Debris Flow Hazards

Review of the tentative tract map design, the topographic base map and field mapping of the site indicates that potential debris flow hazard exists on lots 511 and 512, the eastern portion of lot 657, lot 658 and the western portion of lot 659. We have shown our anticipated remediations on the Geologic/Geotechnical Remediation Maps at these locations. The following mitigation measures are available (but not limited to) to mitigate the potential for debris flow hazard:

1. Remove loose surficial material
2. Construct diverter slough walls
3. Construct impact walls
4. Construct debris basins
5. Control run-off
6. Plant selective deep-rooted vegetation
7. Construct stability fills

Alternative debris control devices are also shown on **Figure E10** within **Appendix E.** Appropriate mitigations/options will be addressed at the 40-scale Grading Plan stage for Tract 61105.

8.0 SEISMIC CONSIDERATIONS

8.1 Introduction

The subject property is within the Transverse Ranges Geomorphic Province of southern California. The Transverse Ranges consist of a series of west-trending mountains and intervening valleys, which is contrary to the northwest geomorphic trend that is typical of most of California and reflects the underlying structural (geologic) trend. These ranges are largely the result of north-south compression, which has resulted in east-west-trending folds and thrust faults. Associated faults in the vicinity of the site include the Holser Fault, Santa Susana, Northridge (East Oakridge) and Sierra Madre (San Fernando) reverse/thrust faults. The January 17, 1994 Northridge (M6.8) Earthquake occurred on a south-dipping thrust fault which uplifted the Santa Susana Mountains at least 40 cm.

The Southern California region is traversed by the San Andreas Fault, which is a transform boundary between the Pacific Plate and the North American Plate. The San Andreas Fault is part of the San Andreas system of northwest-striking, right-lateral faults. The faults of this system are generally historically active, as evidenced by the June 28, 1992 Landers (M7.6) Earthquake (**See Fault and Earthquake Epicenter Location Map, Figure D1 in Appendix D**).

The Southern California region is seismically active and commonly experiences strong ground shaking resulting from earthquakes along active faults. Earthquakes along these faults are part of a continuous, naturally occurring process, which has contributed to the characteristic landscape of the region.

Three common types of geologic hazards may be produced during a seismic event (earthquake). These include:

1. Ground Rupture:
2. Ground Motion: and
3. Ground Failure

8.2 Ground Rupture

8.2.1 Introduction

The potential for ground rupture on the site was evaluated utilizing published maps in conjunction with our own mapping and exploration programs, as discussed in this section, Appendix D, and our report dated July 20, 2004. For a detailed discussion on approach of investigations, criteria, and methodology refer to Sections 7.1 and 7.2 of our report dated July 20, 2004.

Review of the State of California Alquist-Priolo Earthquake Fault Zone Maps (APEFZ) indicate that the nearest APEFZ is located approximately 1.4 miles southeast of VTT 61105. No active faults are shown within the boundaries of VTT 61105 on the Alquist-Priolo maps for the Newhall Quadrangle or Val Verde Quadrangle. The Technical Appendix of the Los Angeles County Safety Element (1990) indicates a possible active fault (Holser Fault splay) in the Airport Mesa Area of VTT 61105.

Two additional areas of significant tectonic deformation exist on the site and consist of the Monoclinal Warp and Lion Canyon Anticline. These areas were also investigated in consideration of the changes in geologic structure. Our findings are discussed briefly below and in more detail in **Appendix D**.

8.2.2 Airport Mesa Area

Geologic maps by Weber (1982), Winterer and Durham (1962), Dibblee (1996) and Treiman (1986) suggested the possible existence of faulting in the Airport Mesa area on Newhall Ranch. Weber (1982) defined a broad zone of possible fault-related features and lineaments near the southeastern end of the Holser Fault as the "Holser Structural Zone". The southern portion of this zone includes the Airport Mesa area. Review of stereoscopic, aerial photographs and topography of the area also indicated possible fault-related geomorphic expression along two alignments designated as the Saddle Lineament to the south and the Airport Mesa Lineament to the north. We therefore conducted a multi-phase geologic fault investigation in order to assess the existence, lateral extent and activity of possible faults in this area. The details of this fault investigation are presented within our July 20, 2004 fault investigation report for the Airport Mesa Area.

Our multi-phase investigation revealed that the Saugus Formation bedrock has been tectonically deformed to produce several east-plunging folds and local faulting. The overlying Qt terrace deposits are also tectonically deformed along the Saddle and Airport Mesa Lineaments. The block between the two lineaments was found to have been uplifted at least 40 ft. as a result of folding and reverse faulting within the last 100,000 (±) years. A zone of normal faults was discovered in the terrace deposits overlying the trace of the anticlinal fold on the northwestern portion of Airport Mesa. This style of deformation is consistent with tensional stresses at the crest of a tightening anticline. Because the anticline intersects the Airport Mesa Lineament and minor, oblique strike-slip faults were encountered between the lineament and the anticline, the structures are considered to be related.

Based on the observed geologic conditions and discussions with Dr. Roy Shlemon regarding the age of the materials cut by faulting and the style of deformation, Building Setbacks were recommended for the Airport Mesa and Saddle Lineaments and for the anticline. Because of the potential for sympathetic movement, zones of restricted development and structural mitigation are also recommended between the two lineaments, in the area between the Airport Mesa Anticline and the Airport Mesa Lineament/Fault, and for 100 ft. beyond the recommended Building Setbacks. These Building Setback zones and areas of restricted development and structural mitigation are illustrated on the Geologic and Geotechnical Maps.

8.2.3 Monoclinal Warp Area

Building Setback zones were implemented on portions of the Stevenson Ranch and Westridge developments for the southeastern extent of this geologic feature. These setbacks were based upon observed zones of faulting near its hinge line (Leighton and Associates 1997) and its relationship with the reverse offsets observed in the bedrock after the 1994 Northridge Earthquake, where the State of California (CDMG 1995) established an Alquist-Priolo Earthquake Fault Zone on Stevenson Ranch and a small portion of Westridge.

Based on the setbacks established for Westridge and Stevenson Ranch we conducted an investigation in order to asses the style of deformation in the vicinity of the Monoclinal Warp on VTT 61105. Six (6) long trenches and two (2) dozer cuts (totaling 1879 lineal feet) were cleaned by hand and geologically logged at a scale of 1"=5'. The details of our investigation methods and findings are addressed in **Appendix D**.

Owing to the observed lack of significant faulting in the lower unit of the Saugus Formation south of the hinge line of the Monoclinal Warp and the observed absence of faulting in the upper unit of the Saugus Formation in our explorations across the hinge line it is our opinion that the potential for primary ground rupture hazard along the Monoclinal/Warp on Mesas East is negligible within the life of the proposed development. The monoclinal Warp "dies out" on Mesas East towards the northwest before reaching Middle Canyon. The potential for secondary ground failure along weak bedding planes is addressed in **Appendix D**.

8.2.4 Lion Canyon Anticline

Based on the asymmetrical geometry of the Lion Canyon Anticline and the somewhat anomalous change in geologic structure from steeply dipping to shallow dipping bedrock across Lion Canyon to the west, we performed an investigation to verify the presence or absence of faulting across this change in structure.

Four (4) backhoe trenches and one (1) excavator trench were excavated on the western limb of the anticline (totaling 907 lineal feet) and geologically logged at a scale of 1"=5'. The details of our investigation methods and findings are addressed in **Appendix D.**

No significant faulting was observed in our explorations with in the bedrock or Qt deposits in the vicinity of the structure change or in the steeply dipping beds. The shallowing of the dips towards the west is attributed to the Grapevine Mesa Syncline which trends southeast towards the southern property line in Lion Canyon. The potential for primary ground rupture hazard in the vicinity of the Lion Canyon Anticline is considered to be negligible within the life of the proposed development. The potential for secondary ground failure along weak bedding planes is addressed in **Appendix D.**

8.3 Ground Motion

Potential ground motions from future earthquakes on nearby faults have been evaluated utilizing the procedures outlined in the California Department of Conservation, Division of Mines and Geology (CDCMG) Guidelines described in Special Publication 117. Appendix D summarizes our ground motion evaluation, which utilized fault parameters from Peterson et al. (1996) and computer programs by Thomas F. Blake. Based on our probabilistic analysis, a peak horizontal acceleration of 0.88g was estimated as the design basis ground motion (10% chance of exceedance in 50 years) for use in our liquefaction

assessment of the site. Our deaggregation analysis utilizing Boore, et al. (1997) indicates this acceleration would most likely be produced by a 6.5 M earthquake on the Santa Susana fault. The Average magnitude-weighted (7.5) acceleration was found to be 0.59g for the design basis earthquake (see Table D-III). Uniform Building Code design parameters shall be provided during the Grading Plan stage.

8.3.1 Elementary School Site

The elementary school is considered a critical facility and hence potential ground motions from future earthquakes are based on a 10% chance of excedance in 100 years which, based on our probabilistic analysis, yields a peak horizontal acceleration of 1.05g as the upper bound ground motion.

8.4 Ground Failure

Ground Failure is a general term describing seismically induced secondary permanent ground deformation caused by strong ground motion. This includes liquefaction, lateral spreading, seismic settlement of poorly consolidated materials (dynamic densification), differential materials response, slope failures, sympathetic movement on weak bedding planes or non-causative faults, shattered ridge effects and ground lurching.

Potential secondary seismic hazards to Tentative Tract 61105 are described in **Appendix D**. The potential for liquefaction and seismic settlement are evaluated in detail in **Appendix C**. All potentially liquefiable soils will be completely removed beneath the proposed elementary school lot and hence specific liquefaction analyses are not needed for the proposed school site. The potential for adverse impacts to the proposed development from liquefaction and other secondary seismic effects is considered to be low to non-existent provided that our recommendations are incorporated into the 40-Scale Grading Plan and implemented during construction.

9.0 GENERAL CONCLUSIONS AND RECOMMENDATIONS

9.1 Feasibility of Development

Tentative Tract 61105 is feasible for development from the standpoint of geology/geotechnical conditions subject to the following recommendations:

9.2 Earthworks Recommendations

9.2.1 Introduction

All grading shall be accomplished under the observation and testing of the Project Soils Engineer, Engineering Geologist and/or their authorized representatives in accordance with the recommendations contained herein, the current Uniform Building Code requirements and this firm's "Recommended Earthwork Specifications" (**Appendix E**).

9.2.2 Site Preparation

The purpose of site preparation is to clear and strip the site of organics (vegetation), topsoil, roots, undocumented artificial fill, rubble, construction debris and other unsuitable materials, as applicable, and to grade the site to provide a firm base for compacted fill. All organics should be removed from the site for proper disposal. Topsoil may either be separately stockpiled for later reuse as topsoil in landscaped areas or properly disposed of offsite. On-site rubble should be disposed of as discussed in the "Debris" section below. The geotechnical engineer and/or his representatives shall observe the excavated areas prior to placing compacted fill.

9.2.3 Removals and Benching

In order to provide a uniform firm bottom prior to placing fill, all unconsolidated alluvium, slopewash, colluvial soils and severely weathered terrace deposits and bedrock should be removed from areas to receive fill. The estimated depths of removals (excluding landslides) are 5 to 22 feet as shown on the **Geologic/Geotechnical Remediation Maps (Plates G7-G12)**. The exact depth and extent of necessary removals will be determined in the field during the grading operations when observations and more location-specific evaluations can be performed. Removal depths for these areas are based on our subsurface investigations, laboratory testing, proposed fill, depth use intended and analyses (including liquefaction and cyclic settlement analyses) as well as geologic and geotechnical judgment.

All existing artificial fill (af) i.e. uncertified fill is considered unsuitable for support of proposed engineered fills and/or structures and must be removed and replaced with compacted fill. It is estimated that a maximum thickness of approximately 25 feet of artificial fill currently exists in the vicinity of proposed Lots 782 and 783 (see Geologic/Geotechnical Map) at the site. Colluvium/slopewash is present within the canyon swales and on drainage sideslopes as shown on the **Geologic/Geotechnical**

Maps. Slopewash typically interfingers with the alluvium as illustrated on the **Schematic Alluvial/Slopewash Detail, Figure E1** within **Appendix E**. Colluvium/slopewash may locally be 10 to 15 feet in thickness. Anticipated removal depths for landslides range from 10 to 60 feet as shown on the **Geologic/Geotechnical Remediation Maps**. Removals at the locations of exploratory trenches shall be extended to the bottom of the trench backfill if the adjacent removal depths are shallower than the trench (see **Geologic/Geotechnical Maps** for locations).

In areas to receive compacted fill where the surface gradient is steeper than 5:1 (H:V) the soil mantle, colluvium and unsuitable material should be removed and such areas benched horizontally into competent material prior to our in conjunction with fill placement (See **Appendix E, Fill Over Natural Slope, Figure E2**).

9.2.4 Preparation of Removal Bottom Areas

After the ground surface to receive fill has been exposed, it shall be ripped to a minimum depth of six inches, brought to optimum moisture content or above and thoroughly mixed to obtain a near uniform moisture condition and uniform blend of materials, and then compacted to the required relative compaction per the latest ASTM D 1557 laboratory maximum density.

9.2.5 Dewatering During Removals

Ground water is not expected to impede the grading operations over the site except on the lower portion of Middle Canyon where ground water was observed at a depth of 15 feet. The grading contractor should be prepared to implement dewatering measures as necessary, to achieve the required removals below the ground water

Where recommended removals encounter ground water, water levels will probably have to be controlled by providing an adequate excavation bottom slope and sumps for pumping water out as the excavation proceeds, or ground water may be lowered by installing shallow dewatering well points prior to grading. Partial removals of soils above the water table and soil improvement below the water table (e.g. shallow compaction grouting) may be another option. Dewatering may be needed depending on the season when the removals are performed.

9.2.6 Over-Excavation

It is recommended that a minimum 5-foot thick over-excavation be performed on all cut-lots, and transitional lots (transitions between bedrock, fill, terrace deposits and alluvium) and a minimum 3-foot thick over-excavation on streets. This over-excavation will provide attenuation of potential differential settlements or differential material response to seismic events and provide a uniform base for structural support of buildings. If on a cut/fill transition lot the maximum depth of fill exceeds 15 feet, then the thickness of the fill cap should be one-third of the deepest fill thickness below any proposed structure [see **Appendix E, Cut Lot and Cut Fill Lot (Transitional), Figure E3**]. If excavation of the native soils (i.e. bedrock) exposes high expansive materials, then the lot over-excavation should be deepened to 8 feet. Cut and transition lots located in areas of steeply dipping bedrock will need to be over-excavated 8 feet. If these lots are underlain by weak sheared bedding planes or shears they may require a deeper over-excavation and need to be evaluated on a case by case basis during the grading operations. Lots potentially affected by the requirements have been shown on the attached Geologic/Geotechnical Remediation Maps and should be re-evaluated if any changes to the proposed development occur and at the Grading Plan stage. The cut and transition pad areas on Airport Mesa, located within the zones of restricted development associated with the Holser Sturctural Zone, also require a minimum 8-foot over-excavation.

9.2.7 Fill Materials

Onsite soils that are free of debris, over-size rocks, topsoil and organic matter may be used as sources for compacted fills. Rock or similar irreducible material with a maximum dimension greater than eight (8) inches may not be placed in the fill. Rocks or hard fragments larger than four (4) inches shall not compose more than 25 percent of the fill and/or lift. Any large rock fragments over eight (8) inches in size, may be incorporated into the fill as rockfill in windrows after being reduced to the specific maximum rock fill size (see **Figure E4**, **Rock Disposal**, in **Appendix E**). Where fill depths are too shallow to allow large rock disposal, special handling or removal may be required (see **"Recommended Earthwork Specifications," Appendix E**).

9.2.8 Fill Compaction

All fill material should be placed in uniform lifts not exceeding eight (8) inches in its loose state and compacted to a minimum of 90 percent relative compaction as

determined based on the latest ASTM Test Designation D-1557. Additional field compaction requirements are presented in **Appendix E, "Recommended Earthwork Specifications"**. **Appendix E** also includes recommended specifications for placement of trench backfill.

For fills deeper than 40 feet, the portion of fill below 40 feet depth should be compacted to a minimum of 93 percent relative compaction. To ensure compliance, these areas should be delineated at the 40-Scale Grading Plan stage.

9.2.9 Proposed Fill Slopes

Fill slope inclination should not be steeper than 2:1 (h:v). The fill material within approximately one equipment width (typically 15 feet) of the slope face should be constructed with cohesive material obtained from on-site soils. The finished fill-slope face shall be constructed by over-building the slope and cutting back to the compacted fill material. Stability Fills are recommended where cut-slope faces will expose fill-over bedrock, alluvium-over-bedrock or Quaternary Terrace Deposits over bedrock conditions. These fills should be constructed with a keyway at the toe of the fill slope with a minimum equipment width but not less than 15 feet, and a minimum depth of 3 feet into the firm undisturbed earth. Following completion of the keyway excavations, the project engineering geologist shall observe and approve the keyway bottom prior to backfilling with Certified Engineered Fill.

Where fill slopes are constructed above natural ground with a gradient of 5:1 (H:V) or steeper, all topsoil, colluvium, and unsuitable material should be removed and a keyway should be constructed at the toe of the fill slope with a minimum width of 15 feet, and a minimum depth of 3 feet into firm undisturbed earth (see **Appendix E, Fill Slope Over Natural Slope diagram, Figure E5**). Following completion of the keyway excavations, the project Engineering Geologist/Geotechnical Engineer or his representative shall observe and approve the keyway bottom prior to backfilling with compacted fill.

Where fill slopes toe out on relatively level natural ground, the removals should be performed to a minimum 1:1 projection from the toe of slope to the recommended removal depth, (see **Appendix E, Fill Slope Toeing Out on Flat Alluviated Canyon, Figure E6**).

Where sliver fill-slopes are proposed, it is recommended that the slope be constructed with a minimum 15-foot width Stability Fill throughout, which is keyed in at the toe of slope (see **Appendix E, Stability/Buttress Fill and Backdrains Detail, Figure E7**).

9.2.10 Proposed Cut-Slopes

We have identified forty-seven proposed cut-slopes (25± feet or higher) on the subject site. Some of these slopes have been subdivided (using letter designations), based on their changes in orientation for a total of fifty-seven proposed cut-slopes evaluated. The slope geometry, anticipated geologic conditions and recommended mitigation, if necessary, for each slope are presented in the Cut-Slope Summary (**Table 2**) located at the end of the text. Except where subsurface data indicates otherwise, it has been conservatively assumed for the purposes of stability analysis that weak bedding planes may occur anywhere in the proposed cut-slopes. If any of the smaller proposed cut-slopes (less than 25± feet in height) have adverse geologic or grading configurations (fill over cut) they can be mitigated if necessary with a standard 15 to 20-foot wide key (depending on the proposed cut-slope height) and benching similar to a Stability Fill. A "Typical Fill above Cut-Slope" detail is shown on **Figure E8** within **Appendix E**.

Permanent cut-slopes should be constructed at a slope ratio not steeper than 2:1 (horizontal to vertical). All permanent cut-slopes exposing terrace deposits or alluvium should be constructed as a Stability Fill. Temporary cut slopes shall be evaluated during the Grading Plan stage. Potential unstable subsurface conditions exposed during construction, such as adverse bedding, joint planes, zones of weakness or exposed seepage, may require either flatter slopes than specified above or construction of benches. We recommend that an Engineering Geologist observe all backcuts during the grading operations and provide appropriate recommendations if necessary.

9.2.11 Natural Slopes

The natural slopes proposed on Tentative Tract 61105 have gradients ranging from 5:1 to ½:1 (h:v). The steepest slopes on the subject site are the bluffs adjacent to the Santa Clara River and the slopes where very resistant sandstone/conglomerate beds of the lower unit of the Saugus Formation crop out.

Where natural slopes are in close proximity to proposed building pads we constructed cross sections in order to analyze the existing and proposed conditions. Where warranted for gross stability, Building Setbacks have been delineated on the

Geologic/Geotechnical Remediation Maps. Where the potential for surficial instability on natural slopes exists directly above proposed building pads we have shown mitigation measures on the Geologic/Geotechnical Remediation Maps.

9.2.12 Existing Cut-Slopes

Existing cut-slopes associated with oil well pads exist on the site. Most of these cut-slopes are steeper than 1.5:1 (h:v) and will be removed by proposed grading. However, in areas of proposed fill these slopes will need to be laid back to reduce differential settlement, and will be evaluated in detail at the Grading Plan stage.

9.2.13 Slopes in Debris Basins

Fill slopes along planned debris basins were analyzed for slope stability under rapid drawdown conditions and steady state conditions based on a groundwater level at maximum basin level and an empty basin (see slope stability analyses in **Appendix F** for details).

9.2.14 Building Setbacks

We have shown Building Setback lines on the Geologic/Geotechnical Remediation Maps in areas where geologic conditions warrant a Building Setback in excess of the standards set forth in the Los Angeles County/California Uniform Building Code. The standard setbacks from ascending and descending slopes provided in the Los Angeles County/California Uniform Building Code shall also be followed.

9.2.15 Restricted Use Areas

Areas of geologic hazards that will remain after the proposed grading and mitigation measures have been performed shall be shown on the Final Map as Restricted Use Areas.

For more information on the geologic hazards associated with these Restricted Use Areas please refer to the Geologic/Geotechnical Remediation Maps and cross sections as well as the slope stability analysis in **Appendix F**.

9.3 Oil Wells

Review of the 2003 Munger Map book and the California Department of Conservation Division of Oil, Gas and Geothermal Resources (DOGGR) Maps 252 and 253 indicates

that **fifty five oil wells** are present within the project limits. Oil well records on file with the DOGGR were obtained for each well. All of these wells have been abandoned however the DOGGR will require review of the original abandonment files relative to the proposed development and possibly require re-abandonment to the latest DOGGR requirements. We have included the abandonment records for these wells in **Appendix H.** For approximate location of these oil wells, see the vesting tentative tract map.

If any leaking or undocumented oil wells are encountered during grading operations, their locations should be surveyed and the current well conditions evaluated immediately. Soils in the vicinity of oil wells could be contaminated with petroleum products spilled during operation of the wells. Wells may have associated mud pits which could also contain materials considered to be hazardous under current environmental regulations. If potentially hazardous materials are encountered during future grading operations, they should be assessed and mitigated.

9.4 Drainage Control

Ground water and soil moisture conditions can vary seasonally or for other reasons. It must be recognized that we do not and cannot have complete knowledge of the subsurface conditions at the site. It is possible that seepage could be encountered while stripping and excavating during site preparation at some areas (e.g. in drainages or along terrace/bedrock contacts on the site). Whenever seepage is observed, the condition must be evaluated by the Engineering Geologist and Geotechnical Engineer prior to covering with fill material.

9.4.1 Surface Drainage and Erosion Control

Surface drainage control design should include provisions for positive surface gradients to ensure that surface runoff is not permitted to pond, particularly above slopes or adjacent to building foundations or slabs. Surface runoff should be directed away from slopes and foundations and collected in lined ditches or drainage swales, via non-erodible drainage devices, which should discharge to paved roadways, or existing watercourses. If these facilities discharge onto natural ground, means should be provided for control erosion and to create sheet flow.

It should be expected that, even with the construction of carefully planned and designed erosion control measures, some erosion may occur during the first few wet seasons after the project is completed. Site grading should be observed, particularly after heavy,

prolonged rainfall, to identify erosion areas at an early stage. Maintenance work should be done as soon as practical to repair these areas and prevent their enlargement.

9.4.2 Subsurface Water Control

Fill slopes, Buttress Fill and Stability Fills, as applicable, shall be provided with subsurface drainage as necessary for stability. A typical backdrain detail is shown on **Figure E7, Appendix E**. Also, subdrains along the bottom of canyon fills should be constructed. A typical canyon subdrain detail is presented on **Figures E9** and **E11, Appendix E**.

9.5 Shrinkage, Bulking and Subsidence

The following bulking and shrinkage factors are based on and in-situ densities compared to average of 92 percent relative to the maximum dry density as determined per the ASTM D 1557 test, judgment, and our past experience. For the materials encountered at the site, shrinkage (decrease in volume) or bulking of those materials, when excavated, placed and compacted as controlled fill is estimated to be as follows:

MATERIAL TYPE	SHRINKAGE (%)	BULKING (%)
Artificial Fill (af)	12-18%	
Alluvium (Qal)	20%	
Slopewash (SW)	4-14%	
Upper Qt (0-8' depth) [1]	10-16%	
Qt (>8' depth)	10%	
Upper TQs (0-3' depth)*	4%	
TQs (>3' depth)		0-6%

[1] Denotes typical upper weathered zones in Terrace Deposits (Qt) and Saugus Formation (TQs) that are prone to shrinkage.

The above shrinkage, bulking and subsidence factors are only approximations. The actual volume changes from cut to fill depend on the quality or degree of compaction and mixing. The Supervising Civil Engineer should design pad grades with sufficient flexibility to accommodate a possible shortage or excess of fill of up to 10 percent of the total yardage graded.

9.6 Landscaping

All final grades should be sloped away from the building foundations to allow rapid removal of surface water runoff. No ponding of water should be allowed adjacent to the foundations. Plants and other landscaped vegetation requiring excessive watering should be avoided adjacent to the building foundations. Should landscaping be constructed, an effective water-tight barrier should be provided to prevent water from affecting the building foundations.

9.7 Foundation and Settlement Considerations

No specific building foundation designs have been provided at this time. The following general foundation criteria are provided for future design and planning consideration. The proposed Tentative Tract may generally involve the following foundation support conditions:

- Foundation support within engineered fill
- Foundation support within transition zones of cut and fill

The structural design should include seismic geotechnical parameters in accordance with UBC requirements for Seismic Zone 4. These parameters will be established at the 40-Scale Grading Plan stage.

Shallow spread footings for foundation support of both residential and commercial structures can adequately be founded on engineered fill compacted as previously recommended. Support for heavier structures, if applicable, should be addressed at the Grading Plan stage. Minimum recommended continuous foundation dimensions are 12 inches width and 12 inches depth below lowest adjacent grade for single-story residential structures. Tentatively, an allowable bearing capacity of **1,800 psf** can be used for (minimum-sized) shallow foundations constructed in certified compacted fill. This tentative allowable bearing value should be confirmed by further field and laboratory testing of the site soils before use in design. Lateral resistance of footing walls should be provided at the Grading Plan stage.

Figure E3 (Appendix E), "Cut Lot (Transitional)" and "Cut-Fill Lot (Transitional") provides a grading detail for locations where foundations will straddle transition zones between cut and fill materials. If the remaining cut-fill transition is steep at depth below the building area, the geometry of the transition should be reviewed during grading

operations by the soils engineer on a site specific basis to evaluate the need for additional overexcavation removals and/or additional foundation reinforcement. As a general guideline, steep cut/fill transitions would include slope gradients steeper than 4:1 (h:v) and overall variations in fill thickness of greater than 15 feet which occur within 20 feet of final pad grade.

To minimize significant settlements, it is recommended that the unsuitable soils in areas to receive fills be removed and replaced with compacted fill. No specific foundation design loads are available at this time. Some settlements will be expected due to loads from high fills (e.g. higher than 30 feet). The locations of proposed deep fills (> 40 ft.) will be provided during the 40-Scale Grading Plan study. Most of the settlements due to the load of added fill will occur during and shortly after rough grading is complete. A settlement monitoring for some of the deeper fill areas will be necessary at the completion of grading. A settlement monitoring program shall be presented during the 40-Scale Grading Plan study.

At other areas, potential settlements in alluvium will be minimized by the removals and recompaction recommended in this report. Also, potential effects from localized seismically-induced settlements will be attenuated by the recompacted upper layers and proposed additional fills (see **Appendix C**).

9.8 Excavations, Shoring and Backfill Recommendations

Excavations deeper than 3 feet should conform to **safety** requirements for excavations as set forth in the State Construction Safety Orders enforced by the State Division of Industrial Safety, CAL OSHA. Temporary excavations 12 feet or lower shall be no steeper than 1:1 (h:v). For excavations to 20 feet in height, the bottom 3.5 feet may be vertical and the upper portion should be no steeper than 1.5:1 (h:v). Excavations not complying with these requirements should be shored.

It is strongly recommended that excavation walls in sands and dry soils be kept moist, but not saturated at all times.

Parameters for design of cantilever and braced shoring if necessary will be provided at the Grading Plan stage.

The bases of excavations or trenches should be firm and unyielding prior to foundations or utility construction. On-site materials other than topsoil or soils with roots or deleterious materials may be used for backfilling excavations. Densification (compaction) by jetting

may be used for on site clean sands or imported equivalent of coarser sand provided they have a Sand Equivalent greater than or equal to 30 as determined by ASTM D2419 test method. Recommended specifications for placement of trench backfill are presented in **Appendix E**.

9.9 Expansive Soils Considerations

Soil expansion has been found to be a significant consideration for design and construction of foundations and concrete slabs-on-grade. The recommendations presented in the attached **Table E1, Minimum Foundation and Slab Recommendations for Expansive Soils**, in **Appendix E**, have been found to minimize the effects of soil expansion potential in southern California when followed during project design and construction. It is anticipated that compacted fill from the onsite materials will have a very low to medium expansion potential. The expansion potential of the site soils exposed at rough grade should be tested again after site grading is complete and the final foundation design should be based on those expansion test results.

9.10 Hydroconsolidation Considerations

Based upon our hydroconsolidation test data, existing soils below the recommended removals do not show significant hydroconsolidation characteristics.

9.11 Corrosivity and Chemical Attack Considerations

Soil corrosivity testing was performed for this study; test results are presented in **Appendix B**. As stated previously in this report, based on resistivity test data, on-site soils classify as moderately to severely corrosive to corrosive to buried metals per County of Los Angeles classification. Sulfate concentrations were negligible per UBC (1997) classification, and pH was near-neutral (ranging from 6.5 to 8.2). Chloride concentrations were low. Pending additional testing, either Type I or II cement may be considered for use in concrete placed in contact with the ground. Mitigating recommendations against soil corrosivity should be revised/expanded based on additional confirmatory tests that should be performed at the Grading Plan stage. Final recommendations for concrete will be in accordance with the latest UBC requirements, and a corrosion specialist should provide mitigating recommendations for potential corrosion of metals in contact with on-site soils.

9.12 Retaining Walls and Pavement Design

Retaining wall and cribwall geotechnical design parameters and pavement design(s) will be provided at the Grading Plan stage.

10.0 LOS ANGELES COUNTY 111 STATEMENT

In compliance with Section 111 of the Los Angeles County Building Code, it is the finding of this firm that the proposed development designated on Vesting Tentative Tract 61105 will be safe against hazard from landslide, settlement or slippage and will not affect offsite property provided all our recommendations are incorporated in the Grading Plan and implemented during construction.

11.0 GEOLOGIST/GEOTECHNICAL ENGINEER OF RECORD

This report has been prepared assuming that Allan E. Seward Engineering Geology, Inc. will refine all geology and geotechnically-related data for the Grading Plan stage of this project. If the recommendations contained in this report are to be utilized and expansion of the geology/geotechnical work is performed by others, the party performing the work must review this report and assume full responsibility for recommendations contained herein. That party would then assume the title of responsibility as "Geologist/Geotechnical Engineer of Record" for the specific work.

12.0 LIMITATIONS

This report has been prepared for the exclusive use of The Newhall Land and Farming Company and their design consultants for the specific site discussed herein. This report should not be considered transferable. Prior to use by others, we should be notified, as additional work may be required to update this report.

In the event that any modifications in the design or location of the proposed development, as discussed herein, are planned, the conclusions and recommendations contained in this report will require a written review by this firm with respect to the planned modifications.

The proposed development is located in southern California, which is in a geologically and seismically active region where large magnitude, potentially destructive earthquakes are common. Therefore, it is reasonable to assume that ground motions from moderate or large

magnitude earthquakes could affect the site during the life of a given structure in southern California.

It should be noted that faulting is normally confined to the area immediately adjacent to a known fault, or within a few feet of the last fault movement. Regardless of what criteria are used however, absolute assurance against future fault displacement or strong ground motion cannot be obtained in tectonically active areas. New faults can form, as the orientation and magnitude of deformational forces in the earth's crust change with time. Therefore, the location of new breaks or ground motions during a seismic event cannot be located or anticipated.

In performing these professional services, we have used the degree of care and skill ordinarily exercised, under similar circumstances, by reputable engineering geologists and geotechnical engineers practicing in this or similar localities.

The analyses and interpretations presented in this report have been based on the results of pertinent field and laboratory soil investigations. It should be recognized that subsurface conditions can vary in time and laterally and with depth at a given site. Our conclusions and recommendations are based on the data available and our interpretation of the data based on our experience and background. Hence, our **conclusions** and **recommendations** are **professional opinions** and are **not meant** to be a control of nature; therefore, **no warranty** is

This report may not be duplicated without the written consent of this firm.

This opportunity to be of service is greatly appreciated. If you have any questions regarding this report please give us a call.

Respectfully submitted,

Eric J. Seward, CEG 2110
Certified Engineering Geologist
Vice President

Dharmesh P. Amin, M.S.,P.E., GE 2553
Principal Geotechnical Engineer

Reviewed By:

Allan E. Seward, CEG 246
Principal Engineering Geologist
President

The following attachments and appendices complete this report.

VOLUME I

Location Map/ "Aeral" Geologic Map following page 4
References
Summary of Landslides Table 1
Summary of Cut-Slopes Table 2

APPENDIX A - SUBSURFACE LOGS[1]

- Backhoe Trenches
  - T-1Q thru T-141Q
  - T-146Q thru T-160Q
  - T-177Q thru T-214Q
  - T-217Q
  - T-1M thru T-25M
  - T-1T thru T-59T
  - T-62T thru T-112T
  - T-114T
  - T-128T thru T-150T
  - T-158T
  - T-1B thru T-32B
  - T-40SA thru T-55SA
  - T-42I thru T-47I
  - T-7MW and T-12MW thru T-14MW

VOLUME II

- Bucket-Auger Borings
  - B-1E thru B-60E
  - B-63E thru B-73E
  - B-1M thru B-25M
  - B-1B thru B-8B
  - B-1W, B-2W, B-6W,
  - B-9W, B-10W, B-11W,
  - B-13W thru B-16W
- Rotary-Wash Borings
  - RW-1M thru RW-3M,
  - RW-1T thru RW-3T

[1] Please note that "H" series borings and trenches are attached to our report dated July 20, 2004 (04-1703H-1) for the Airport Mesa Area fault Investigation.

SUMMARY OF LANDSLIDES

LANDSLIDE NO.	TENT MAP SHEET NO.	CROSS-SECTION	REMOVAL DEPTH RANGE & COMMENTS
XLVIII	5	--	Will be completely removed by proposed cut
IL	5	7E-7E'	CR = 10 – 45'; Removals include overlying Qt deposits
L	5	--	CR – 10 – 20'
LI	5	12-12'	CR = 10 – 35'; Replace natural slope with 2:1 fill slope to catch "CS-47"
LII	3	1E-1E' and 2E-2E'	CR = 10 – 35'; Replace lower portion with 2:1 fill slope as shown on 2E-2E'

*CR = Complete Removal Depth Range
*PR = Partial Removal Depth Range

- Hollow-Stem-Auger Borings
  HS-1T thru HS-29T
  HS-10 thru HS-13
  HS-12I & HS-14I
- CPT Data
  CPT 1M thru 18M
- Long Trench Logs
  T-60T, T-61T, T-113T and T-151T thru T-157T (In Pocket) Plate A1-A7
- Dozer Cut Logs
  DC-A and DC-B (In Pocket)Plate A5 and A7
- Excavator Trench Log
  ET – 1T (In Pocket)Plate A7

VOLUME III

APPENDIX B - GEOTECHNICAL LABORATORY INVESTIGATION AND TEST RESULTS

APPENDIX C - LIQUEFACTION POTENTIAL ASSESSMENT AND EVALUATION OF EARTHQUAKE-INDUCED SETTLEMENTS

APPENDIX D - SEISMICITY

APPENDIX E - GENERAL SPECIFICATIONS, FIGURES

Recommended Earthwork Specifications
Recommended Specifications for Placement of Trench Backfill
Drainage and Erosion Control Recommendations
Construction Diagrams Figures E1-E-11
Minimum Foundation and Slab Recommendations for Expansive Soils Table E1

VOLUME IV

APPENDIX F - SLOPE STABILITY ANALYSES

VOLUME V

APPENDIX G - MAPS AND CROSS SECTIONS

- **Maps** (In pockets)
  Summary Map Sheet (1"=300') **Plate G1**
  Geologic/Geotechnical Maps (1"=100') **Plates G2-G6**
  Geologic/Geotechnical Remediation Maps (1"= 100') **Plates G7-G11**
  Geologic/Geotechnical Maps Legend **Plate G12**

VOLUME VI

Boring Log Data Sheet	**Plate G13**
• **Cross Sections**	(In pockets)
Geologic Cross Sections 1-1' through 13-13'	**Plate G14**
Geologic Cross Sections 14-14' through 29-29'	**Plate G15**
Geologic Cross Sections 30-30' through 41-41'	**Plate G16**
Geologic Cross Sections 1E-1E' through 15E-15E'	**Plate G17**
Geologic Cross Sections 1M-1M' through 9M-9M'	**Plate G18**

APPENDIX H – OIL WELL ABANDONMENT RECORDS

Distribution: (1) The Newhall Land and Farming Company
Attn: Mr. Corey Harpole
(1) Psomas
1 - Attn: Matt Heideman
(2) Los Angeles County Department of Public Works Geotechnical and Materials Engineering
1 - Soils
1 - Geology
(1) Impact Sciences
1 - Attn: Ms. Susan Tebo

SUMMARY OF LANDSLIDES

LANDSLIDE NO.	TENT MAP SHEET NO.	CROSS-SECTION	REMOVAL DEPTH RANGE & COMMENTS
I	6	13E-13E' to 15E-15E' and 25-25'	PR* = 30' or to Bedrock; Results in complete removal of western ½ and partial removal of eastern ½, FS > 1.5 per stability calculations
II	6	--	CR* = 10 – 20'
III	6	11E-11E'; 20E-20E'	CR = 10 - 40'
IV	6	--	CR = 10 – 25'
V	6	12E-12E'	CR = 10 – 30'
VI	6	10E-10E'	CR = 10 – 30'
VII	6	--	CR = 10 – 20'
VIII	6	--	CR = 10-25'
IX	6	18-18'	CR = 10 – 30'; Replace with 2:1 fill slope to el. 1420 and replace to original natural grade above 1420 per x-section 18-18'
X	6	--	CR = 10 – 25'
XI	6	27-27' and 28-28'	CR = 10 - 25'.
XII	6	--	CR = 10 – 30'
XIII	6	--	CR = 10 – 25'
XIV	6	8E-8E',5-5'; 14-14' and 33-33'	CR = 10 – 35'
XV	6	14-14'	CR = 10 – 20' (Approximately upper 98% will be removed by proposed cut
XVI	6,4	9E-9E'	CR = 10 – 40'
XVII	4	--	CR = 10 – 20'
XVIII	4	--	CR = 10 - 20'
XIX	4	--	CR = 10 – 20'
XX	4	7M-7M'	CR = 10 – 40'
XXI	4	--	CR = 10 – 20'
XXII	4	--	CR = 10 – 20' (Approximately 90% will be removed by proposed cut).
XXIII	4	--	CR = 10 – 45'
XXIV	4	6M-6M'	CR = 10 – 35'

SUMMARY OF LANDSLIDES

LANDSLIDE NO.	TENT MAP SHEET NO.	CROSS-SECTION	REMOVAL DEPTH RANGE & COMMENTS
XXV	4	4M-4M' and 5M-5M'	CR = 10 – 60'
XXVI	4	– –	CR = 10 – 20'
XXVII	4	– –	CR = 10 – 20'
XXVIII	4	1M-1M'	CR = 10 – 20'
XXIX	4	– –	CR = 10 – 20'
XXX	4	– –	CR = 10 – 35'
XXXI	4	– –	CR = 10 – 30'
XXXII	4	– –	CR = 10 – 25'
XXXIII	4	– –	CR = 10 – 20'
XXXIV	4	– –	Will be completely removed by proposed cut
XXXV	4	2M-2M' and 3M-3M'	PR = 30' or to Bedrock; Bedding planes below Landslide analyzed on 3M-3M' and FS > 1.50. Landslide left in place on 2M-2M' stable by inspection.
XXXVI	4	– –	CR = 10 – 20'
XXXVII	2	38-38' thru 41-41' and 8M-8M'	PR and shear key. A portion of this landslide to remain due to environmental constraints. The landslide debris below the proposed building pad will be completely removed (CR = 10-50'). A shear key is needed at the toe of the proposed manufactured fill slope/cut-slope (CS-16) as illustrated on the attached maps and cross-sections (~20 to 40' below the toe elevation). Remainder to be shown as RUA on Final Map.
XXXIX	2	9M-9M'	No removal – located in open space and will not have an adverse affect on proposed or adjacent development. To be shown as an RUA on the Final Map.
XL	2,3	3E-3E'	CR = 10 – 40'
XLI	3	– –	CR = 10 – 30'
XLII	3	4E-4E'	CR = 10 – 40'
XLIII	3	5E-5E'	PR = 30' or to Bedrock (stable by inspection)
XLIV	3,5	6E-6E'	PR = 30' or to Bedrock (stable by inspection)
XLV	3	15-15'	Will be completely removed by proposed cut
XLVI	3	– –	CR = 10 – 20'
XLVII	3	– –	CR = 10 – 25'

PROPOSED CUT-SLOPE SUMMARY
MESAS EAST – VTT 61105

Cut Slope	Sheet No.	Cross Section	Slope Gradient	Slope Height (Feet ±)	Slope Face Direction	Geologic Materials In Vicinity	Geologic Stability	Mitigation/Comments
CS-1 a	5	6-6'	2:1	65	W	TQsl and minor Qsw @ Toe (Qsw will be removed by proposed cut)	Bedrock steeply dipping to the West Grossly stable	
CS-1b	5	7-7'	2:1	122	S and SW	TQsl	Bedrock dips into slope Grossly stable	
CS-2	5	- -	2:1	92	W	TQsl and af (af will be removed by proposed cut)	Bedrock dips into slope Grossly stable	
CS-3a	5	- -	2:1	36	S	TQsu and af (af will be removed by ~100' proposed cut)	Bedrock dips neutral to into slope Grossly stable	
CS-3b	5	- -	2:1	36	E	TQsu and af (af will be removed by ~100' proposed cut)	Daylighted bedding condition Grossly stable by inspection CS-9a (30-30') more critical	Stability Fill needed for daylighted bedding
CS-3c	5	- -	2:1	36	N	TQsu, Qls and af (Qls and af will be removed by ~100' proposed cut)	Daylighted bedding condition Grossly stable by inspection CS-9a (30-30') more critical	Stability Fill needed for daylighted bedding
CS-4	5,6	32-32' 33-33'	2:1	40	N	TQsl, TQsu, Qls and af (~90 of proposed cut will remove most Qls and all af)	Daylighted bedding condition Grossly stable per stability calc (33-33') Eastern edge will be R/R'd by Qls removal	Stability Fill needed for daylighted bedding
CS-5a	5,6	8E-8E'	2:1	155	NW	TQsl and Qls (~40 to 100' proposed cut will remove Qls)	Bedding neutral to into slope Grossly stable	
CS –5b	6	5-5' 14-14' 27-27' 28-28' 29-29' 8E-8E'	2:1 3:1	155	N and NE	TQsl and Qls (~40 to 100' proposed cut will remove most Qls)	Daylighted bedding condition, to steeper than slope face condition Grossly stable per stability calc's. Qls (XII) removals will undercut a small portion	Stability Fill needed for undercut and daylighted bedding
CS-6	6	- -	2:1	76	SE and E	TQsl	Bedding neutral to slope Grossly stable	

PROPOSED CUT-SLOPE SUMMARY
MESAS EAST – VTT 61105

Cut Slope	Sheet No.	Cross Section	Slope Gradient	Slope Height (Feet ±)	Slope Face Direction	Geologic Materials In Vicinity	Geologic Stability	Mitigation/Comments
CS-7	6	- -	2:1	30	N	TQsl and af (~10 to 50' proposed cut will remove af)	Bedding dipping steeper than slope face Grossly stable however, fill over cut condition	Stability fill needed for fill over cut condition
CS-8	6	- -	2:1	82	N	TQsl, Qsw, and Qls (~ 10 to 30' proposed cut)	Bedding steeper than slope face Grossly stable however, fill over cut and Qls (X) removals will undercut slope	Stability Fill needed for fill over cut and Qls undercut
CS-9a	6	30-30'	2:1	28	NE	TQsu and TQsl	Daylighted bedding condition Grossly stable per stability calc's	Stability Fill needed for daylighted bedding
CS-9b	6	21-21'	2:1	28	NE	TQsu and TQsl	Bedding dipping steeper than slope face – to daylighted on Western portion @ monoclinical warp hinge line Grossly stable	Stability fill needed due to daylighted condition on Western portion
CS-9c	6	10E-10E'	2:1	28	NE	TQsu and TQsl	Daylighted bedding condition Grossly Stable by inspection w/ CS –9a	Stability Fill needed due to daylighted bedding
CS-10	6	- -	2:1	80	N and NE	TQsl	Bedding dipping steeper than slope face Grossly stable	Stability Fill needed on Eastern portion due to Qls (IX) removal.
CS-11	6	- -	2:1 3:1	31	NE	TQsu and af (~ 30 to 40' proposed cut will remove af)	Bedding dipping steeper than slope face Grossly stable however,	Stability Fill needed due to proximity of monoclinal hinge to toe of slope
CS-12a	6	20-20'	2:1 3:1	142	E and SE	TQsu and Qls ($\leq$ 10 to 60' proposed cut)	Monoclinal Warp traverses the slope, bedding dipping steeper than upper slope face, to neutral, to daylighted on lower portion, Qls (III) removal undercuts lower slope and slope is **not grossly stable** w/ only Qls R/R per cal'cs	Buttress Fill required due to gross unstability (refer to Remediation Maps for dimensions)
CS-12b	6	17-17'	2:1 3:1	155	NE	TQsl, TQsu and Qls	Monoclinal Warp traverses slope, bedding dipping steeper than upper slope face to daylighted on lower portion Grossly stable per calcs's	Stability Fill needed due to daylighted bedding and Qls (VIII) removal
CS-13	6	- -	3:1 4:1	53	NW, N, and NE	TQsu, Qls, and Qsf	Daylighted bedding condition to neutral bedding	Stability Fill needed on N to NE facing portion due to daylighted bedding and Qls (I) removal
CS-14	6	10E-10E'	2:1	56	NE	TQsu and af (50' proposed cut will remove af)	Daylighted bedding condition Slope is **not grossly stable** per calc's	Buttress Fill required due to gross instability (refer to Remediation Maps for dimensions)

PROPOSED CUT-SLOPE SUMMARY
MESAS EAST – VTT 61105

Cut Slope	Sheet No.	Cross Section	Slope Gradient	Slope Height (Feet ±)	Slope Face Direction	Geologic Materials In Vicinity	Geologic Stability	Mitigation/Comments
CS-15	4,6	22-22'	2:1	67	N	TQsu and af (0' to 60' proposed cut will remove af)	Daylighted bedding condition Is **not grossly stable** per calc's	Buttress Fill required due to gross instability (refer to Remediation Maps for dimensions)
CS-16	2	41-41'	2:1	32	N	Qls and af	Slope tops and toes out Within Qls (XXXVIII) Grossly unstable	Buttress shear key needed to support slope and pad above Qls (XXXVIIII) to remain (refer to Remediation Maps for dimensions)
CS-17	2	- -	2:1	50	E	Qt and TQs	Favorable bedding Grossly stable but "sliver" cut in a swale area @ Qt/TQs contact	Stability Fill needed due to "sliver" cut in soil / weathered bedrock, and Qt deposits over bedrock
CS-18	2	- -	3:1	40 and 70'	N and NW	Qt	Favorable bedding Grossly stable but Qt deposits prone to erosion	Stability Fill needed due to Qt deposits.
CS-19	2	- -	2:1	30	S and SE	Qt	Favorable bedding Grossly stable but Qt deposits prone to erosion	Stability Fill needed due to Qt deposits.
CS-20	2	- -	2:1	52	S and SW	TQs	Steeply dipping bedding neutral to steeper than slope face Grossly stable	Slope is proposed in very resistant sandstone TQs (undifferentiated)
CS-21a	3	- -	2:1	30	E	TQsu	Favorable bedding Grossly stable	
CS-21b	3	- -	2:1	56	S	TQsu	Favorable bedding Grossly stable	
CS-22	3	- -	2:1	40	W and S	TQsu	Favorable bedding Grossly stable	
CS-23	3	- -	2:1	70	NW	TQsu and Qls (proposed cut will remove Qls w/ NE edge shortened by fill)	Favorable bedding Grossly stable	
CS-24	3	- -	2:1	47	N and NE	TQsu and Qls (Qls will be removed by proposed cut.)	Favorable bedding to daylighted bedding Grossly stable	Small (<20' high) NE facing portion needs a stability fill due to daylighted bedding

PROPOSED CUT-SLOPE SUMMARY
MESAS EAST – VTT 61105

Cut Slope	Sheet No.	Cross Section	Slope Gradient	Slope Height (Feet ±)	Slope Face Direction	Geologic Materials In Vicinity	Geologic Stability	Mitigation/Comments
CS-25	7	- -	2:1	48	NW	TQsu	Favorable bedding Grossly stable	Slope will likely be R/R'd with fill during grading operations due to adjacent removals in fill area
CS-26a	3,4	- -	2:1	45	NW and NE	TQsu	Favorable bedding to daylighted bedding Grossly stable	Small (< 20' high) NE facing portion needs a stability fill due to daylighted bedding
CS-26b	3,4	- -	2:1	40	NW and N	TQsu	Favorable bedding to daylighted bedding Grossly stable	Small (<20' high) NE facing portion needs a stability fill due to daylighted bedding
CS-27	3	23-23'	2:1	52	N	TQsu	Daylighted bedding component Grossly stable per calc's	
CS-28a	3	- -	2:1	143	W	TQsl and af (af will be under cut by proposed grade)	Favorable bedding Grossly stable	
CS-28b	3	23-23' 24-24' 31-31'	2:1	70	N and NW	TQsu and TQsl (af will be under cut by proposed grade)	Daylighted bedding condition Western portion grossly stable per calc's (TQsl and shallow component) **Eastern** portion is **not grossly stable** per calc's	Buttress required on Eastern portion due to FS < 1.50 Stability Fill needed for Western Portion due to shallow daylighted bedding component in TQsl. Due to varying height of overall slope the Buttress dimensions are similar to the Stability Fill. (refer to Remediation Maps for dimensions)
CS-29	3	15-15'	2:1	90	NE	TQsu	Daylighted bedding condition is **not grossly stable** per calc's	Buttress required due to gross instability (refer to Remediation Maps for dimensions)
CS-30	3	- -	2:1	26	N	TQsl and Qsw (Qsw will be undercut by proposed grade)	Bedding neutral to very shallow component out-of-slope Grossly stable	

PROPOSED CUT-SLOPE SUMMARY
MESAS EAST – VTT 61105

Cut Slope	Sheet No.	Cross Section	Slope Gradient	Slope Height (Feet ±)	Slope Face Direction	Geologic Materials In Vicinity	Geologic Stability	Mitigation/Comments
CS-31	3,5	- -	2:1	29	N	TQsl and af (af will be undercut by proposed grade)	Bedding neutral to very shallow out-of-slope component Grossly stable	
CS-32	3,5	- -	2:1	38	E	TQsl	Bedding neutral to very shallow out-of-slope component Grossly stable	
CS-33	5	- -	2:1	36	W	Qt	Favorable bedding Grossly stable, however, fill over cut configuration and Qt deposits prone to erosion	Stability Fill needed for fill over cut configuration and Qt deposits
CS-34	5	- -	2:1	66	NW and W	Qt and af (30' proposed cut will remove af)	Favorable bedding Grossly stable, however, Qt deposits prone to erosion	Stability Fill needed for Qt deposits
CS-35	3,5	- -	2:1	164	W	Qt and TQsl	Favorable bedding Grossly stable, however, Qt deposits prone to erosion	Stability Fill needed for Qt deposits
CS-36	3,5	- -	2:1	38	SW	Qt	Favorable bedding Grossly stable, however, Qt deposits prone to erosion	Stability Fill needed for Qt deposits
CS-37	5	- -	2:1	60	NW	Qt and af (proposed cut will remove af)	Favorable bedding Grossly stable, however, Qt deposits prone to erosion	Stability Fill needed for Qt deposits
CS-38	5	- -	2:1	51	SW	TQsl	Thin "sliver" cut in larger fill area close to anticline axis Grossly stable.	Stability Fill needed due to thin sliver cut and anticline. This slope will likely be R/R'd during grading operations due to proposed fill areas surrounding it
CS-39	5	- -	2:1	65	SW	Qt	Favorable bedding Grossly stable, however, Qt deposits prone to erosion	Stability Fill needed for Qt deposits and partial fill over cut configuration
CS-40	5	- -	2:1	48	SW	Qt and af (proposed cut will remove af)	Favorable bedding Grossly stable, however, fill overcut configuration and Qt deposits prone to erosion	Stability Fill needed for fill over cut configuration and Qt deposits
CS-41	5	- -	2:1	32	SW	Qt and af (proposed cut will remove af)	Favorable bedding Grossly stable, however, Qt deposits prone to erosion	Stability Fill needed for Qt deposits

PROPOSED CUT-SLOPE SUMMARY
MESAS EAST – VTT 61105

Cut Slope	Sheet No.	Cross Section	Slope Gradient	Slope Height (Feet ±)	Slope Face Direction	Geologic Materials In Vicinity	Geologic Stability	Mitigation/Comments
CS-42	5	- -	2:1	37	W	TQsl, and af (proposed cut will remove af)	Favorable bedding Grossly stable	
CS-43	5	- -	2:1	30	SE	TQls and af (~40' proposed cut will remove af)	Favorable bedding Grossly stable	
CS-44	5	- -	2:1	29	NW	TQsl	Favorable bedding Grossly stable	
CS-45	5	- -	2:1	29	W	TQsl	Favorable bedding Grossly stable however, anticline axis traverses slope and bedrock may be susceptible to erosion	Stability Fill needed for anticline
CS-46	5	- -	2:1	28	NW	TQsl	Favorable bedding Grossly stable	
CS-47	5	12-12'	2:1	45	S and SW	TQsl and Qls	Favorable bedding however Qls deposits occur in slope and a sliver cut/fill condition occurs	Portion affected by Qls(LI) removals results in a 2:1 fill slope that extends to the bottom of natural slope below CSW – 47 Remainder portion needs a stability fill due to sliver cut

* See Geologic/Geotechnical Remediation Maps, Cross Sections and **Appendix F** for additional information (dimensions) on mitigation measures.

Appendix A

JOB NO. 99-1703Q1s-1

PROJECT Newhall Ranch - Phase IB

LOGGED BY MAS/BJS

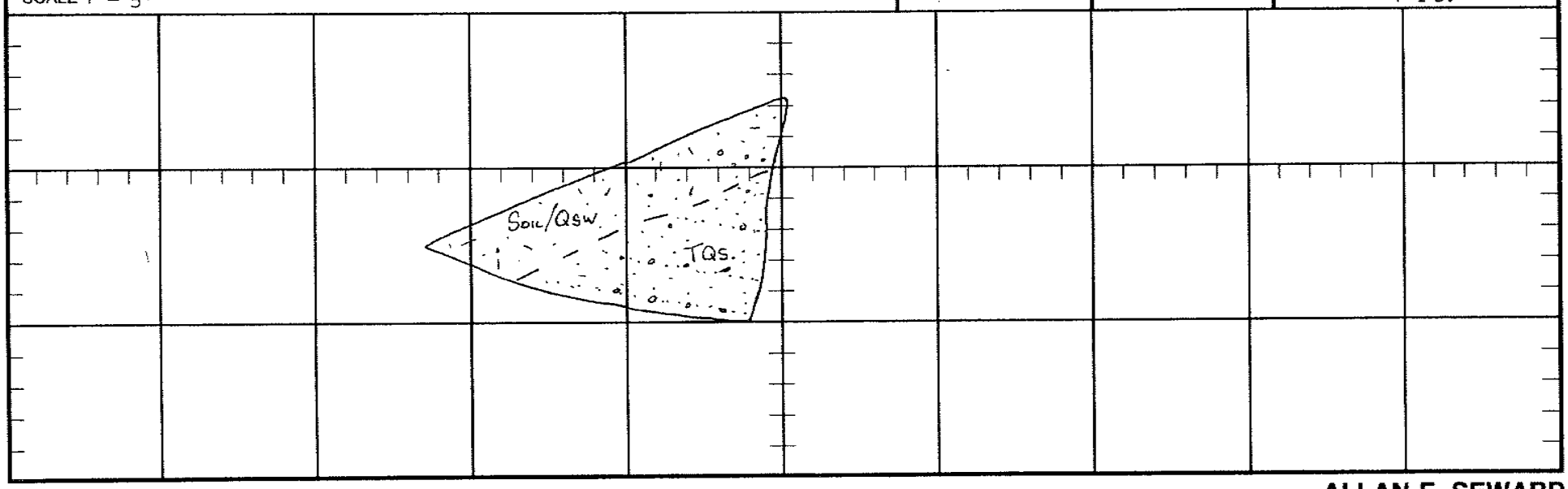
Trench Log No. 1Q

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2' SOIL/SLOPEWASH; soil/Qsw, Brown sandy mud with pebbles and cobbles; soft; dry; structureless			Trenches T-1Q thru T-12Q excavated with a 4WD rubber-tired backhoe and logged on 9/7/99
2 - 7' BEDROCK; TQs, Yellowish-gray sandstone and pebbly mudstone; moderately dense but moderately friable; dry; finely bedded	N46W,15NE		
			No Ground Water No Caving
			TOTAL DEPTH 7 Ft.

N 46 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Q1s-1

LOGGED BY MAS/BJS

Trench Log No. 2Q

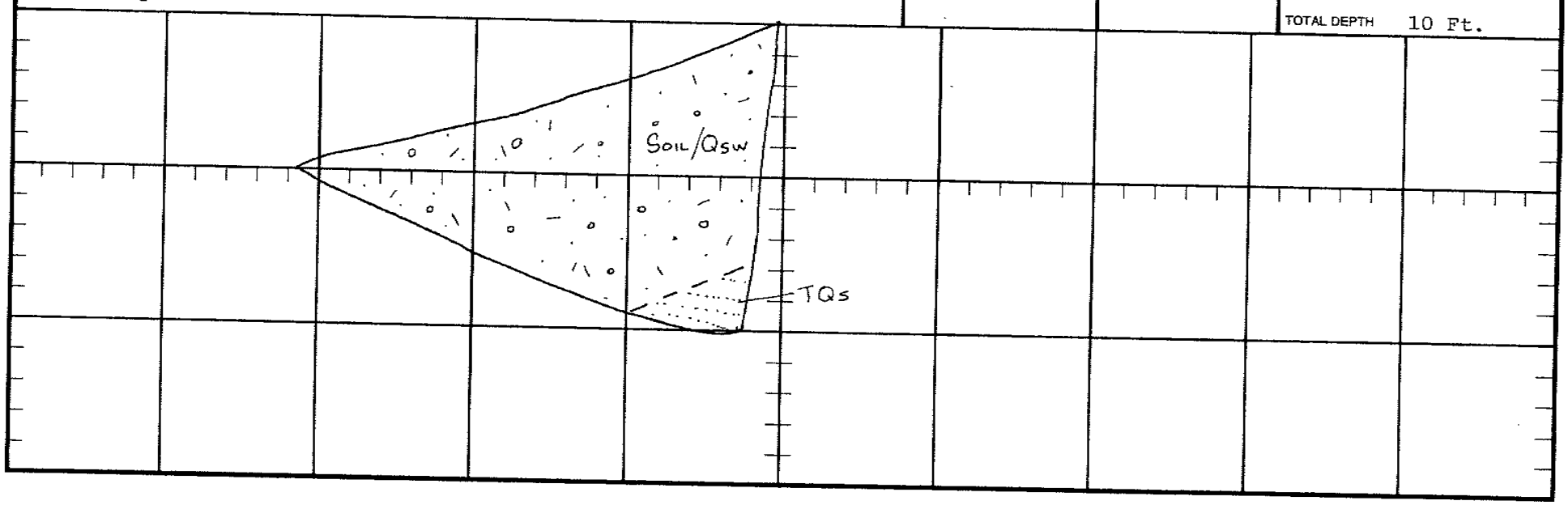
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 7' SOIL/SLOPEWASH; soil/Qsw, Grayish-brown sandy mud with pebbles and cobbles; soft; dry			
7 - 10' BEDROCK; TQs, Yellowish-gray to tan, finely bedded sand; moderately dense to dense; moderately friable; dry	N57W,22NE		No Ground Water No Caving
			TOTAL DEPTH 10 Ft.

SCALE 1" = 5'

N 65 W



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

PROJECT Newhall Ranch - Phase IB

LOGGED BY MAS/BJS

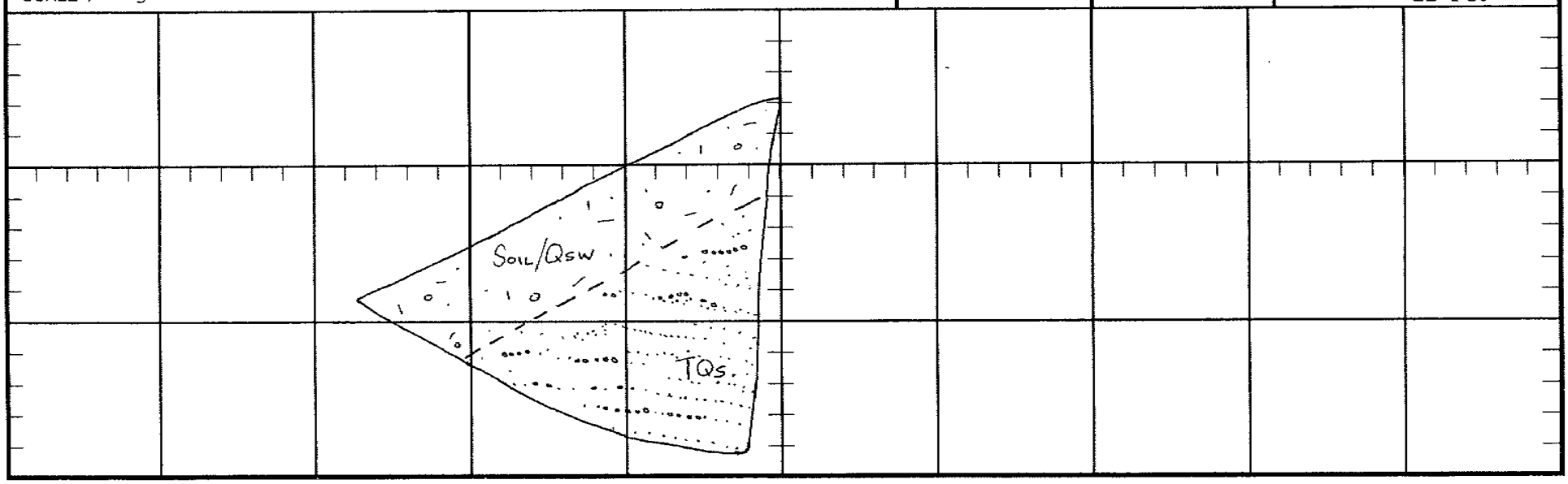
Trench Log No. 3Q

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SOIL/SLOPEWASH; soil/Qsw, Brown, silty clay with sand with cobbles; soft; dry			
3 - 11' BEDROCK; TQs, Light yellowish-gray to tan sandstone and pebbly sandstone; moderately dense to dense; dry to slightly damp; local cross bedding and channeling	N57W,12NE		No Ground Water No Caving TOTAL DEPTH 11 Ft.

SCALE 1" = 5'

N 35 E



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY MAS/BJS

Trench Log No. 4Q

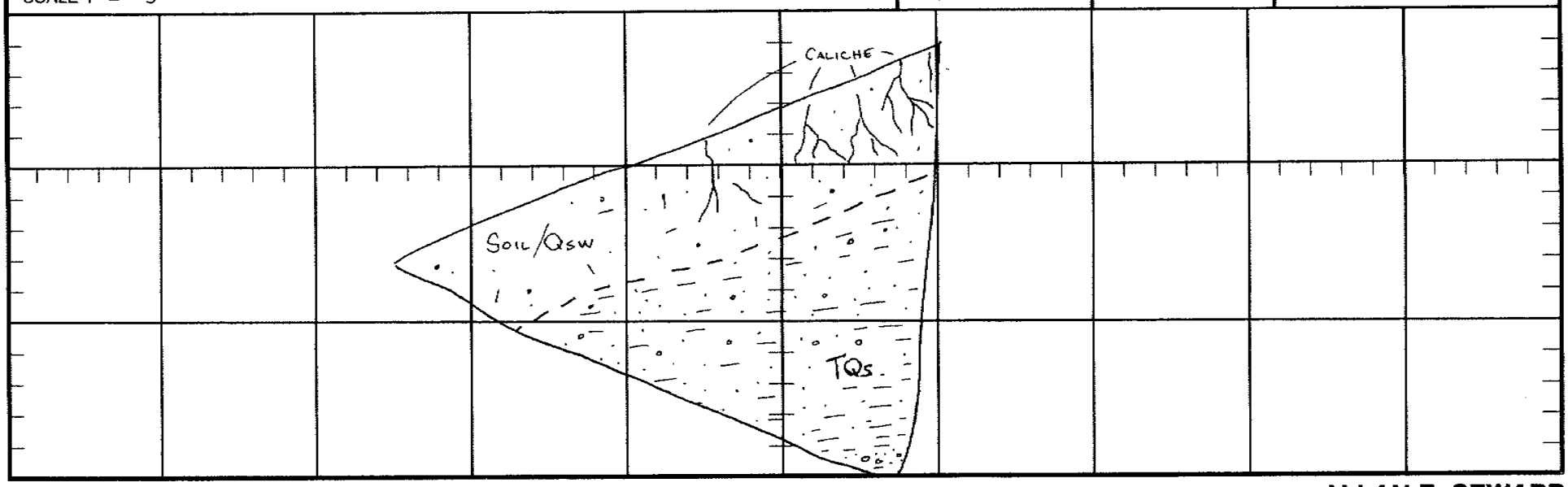
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4' SOIL/SLOPEWASH; soil/Qsw, Brown sandy mud with scattered pebbles; moderately hard; dry; local caliche			No Distinct Bedding
4 - 14' BEDROCK; TQs, Tan to brown pebbly silty sand; hard; dry; poorly bedded and poorly sorted			No Ground Water No Caving TOTAL DEPTH 14 Ft.

N 54 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY MAS/BJS

Trench Log No. 5Q

PROJECT Newhall Ranch - Phase IB

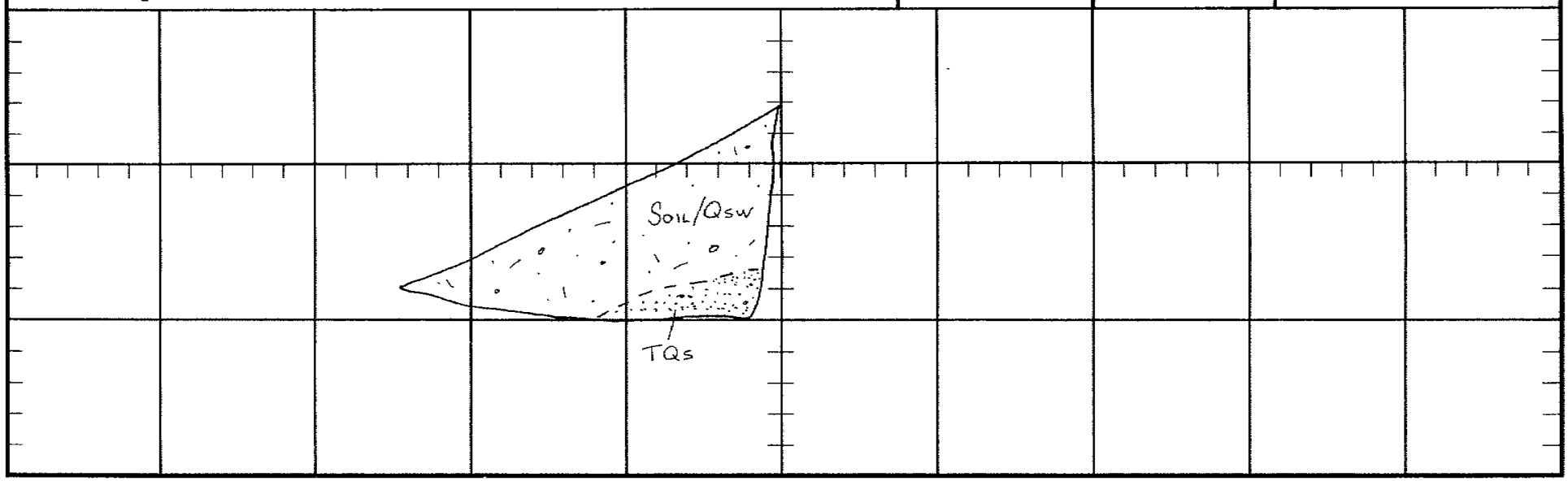
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SOIL/SLOPEWASH; soil/Qsw, Brown silty sand and gravel with local cobbles; loose; dry; no apparent bedding; organics			
3 - 7' BEDROCK ; TQs, Light-gray, well graded sandstone and pebbly sandstone; loose; bedding is vague with channels and cross bedding	N42W,6NE		No Ground Water No Caving

SCALE 1" = 5'

N 78 W

TOTAL DEPTH 7 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY MAS/BJS

Trench Log No. 6Q

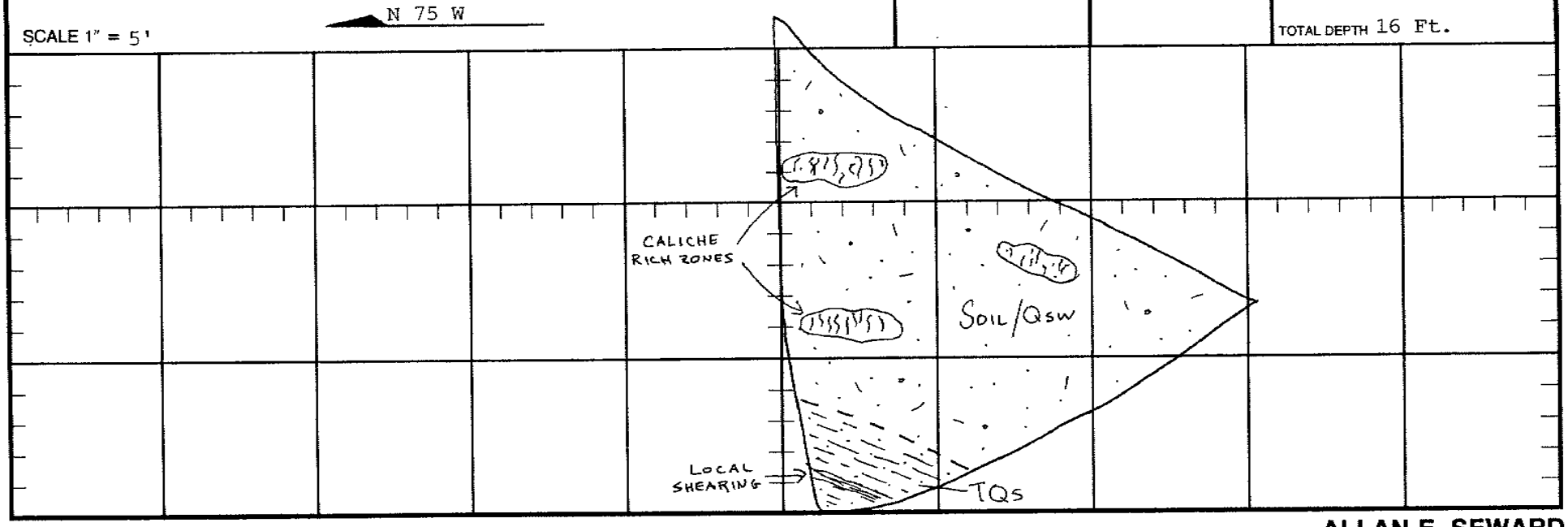
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 11' SOIL/SLOPEWASH; soil/Qsw, Brown muddy sand with scattered pebbles; soft; dry; local cemented areas with caliche			
11 - 16' BEDROCK; TQs, Yellowish-brown to brown siltstone and mudstone; moderately hard; damp to moist; clays are locally sheared			No Distinct Bedding
			No Ground Water No Caving TOTAL DEPTH 16 Ft.

SCALE 1" = 5'

N 75 W



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY MAS/BJS

Trench Log No. 7Q

PROJECT Newhall Ranch - Phase IB

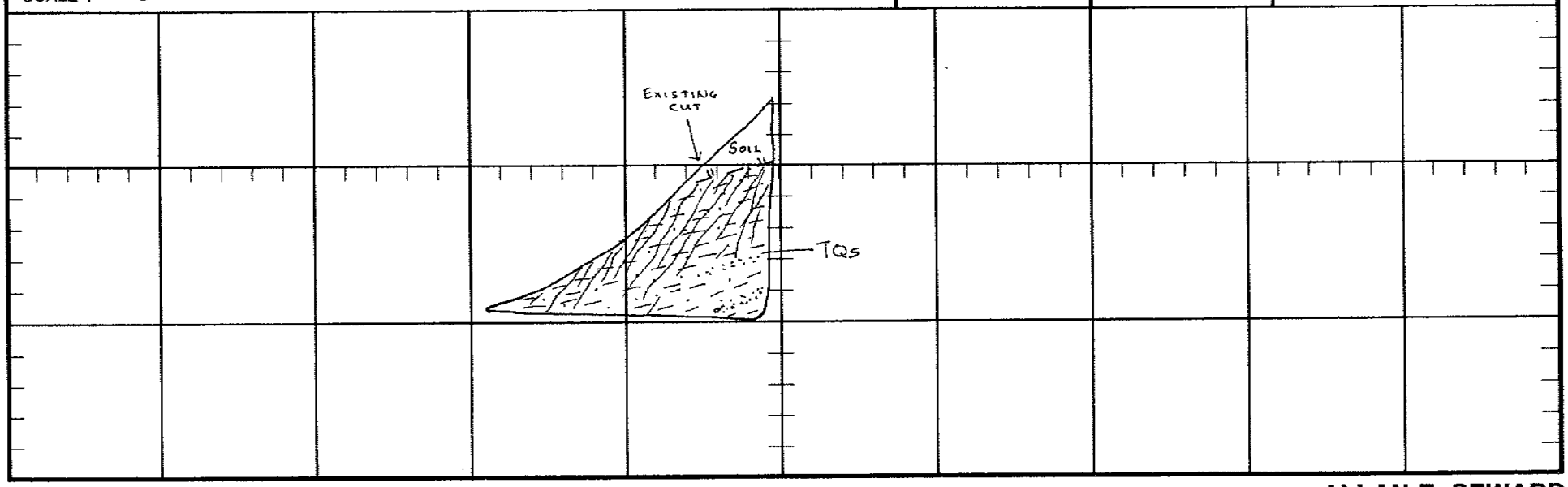
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2' SOIL; Brown sandy silt; loose; dry; some organics			Surficial material partially removed
2 - 7' BEDROCK; TQs, Light yellowish-brown to tan siltstone with local pebbly sandstone channels and clayey siltstone interbeds; moderately hard; damp; local caliche; upper 3 ft. highly fractured and creep affected	N50W,23NE		No Ground Water No Caving

N 85 E

SCALE 1" = 5'

TOTAL DEPTH 7 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY MAS/BJS

Trench Log No. 8Q

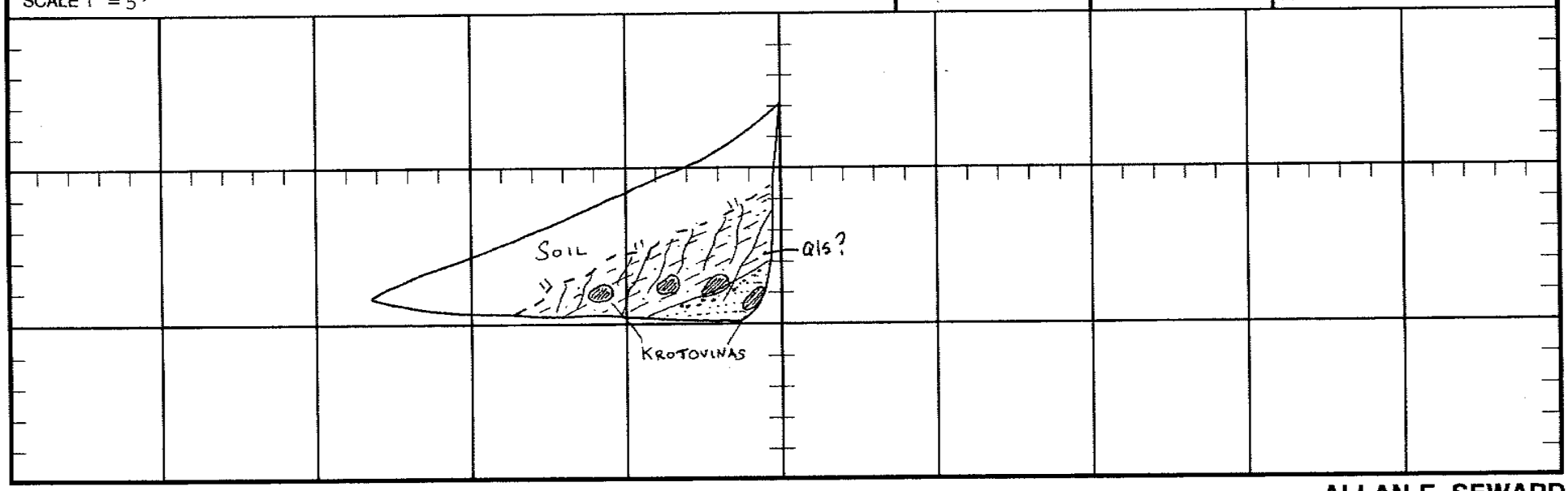
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2' SOIL; Brown sandy mud with local pebbles and cobbles; soft; dry; roots and minor organics			
2 - 7' LANDSLIDE?; Qls?, Light yellowish-brown siltstone and yellowish-gray sandstone; loose to firm; dry; local caliche; cross-bedding and channels in sandstone; krotovina common in siltstone	N40W,43NE		Weathered nature of bedrock and non-regional bedding attitude suggests possible landslide movement
			No Ground Water No Caving
			TOTAL DEPTH 7 Ft.

N 62 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY MAS/BJS

Trench Log No. 9Q

PROJECT Newhall Ranch - Phase IB

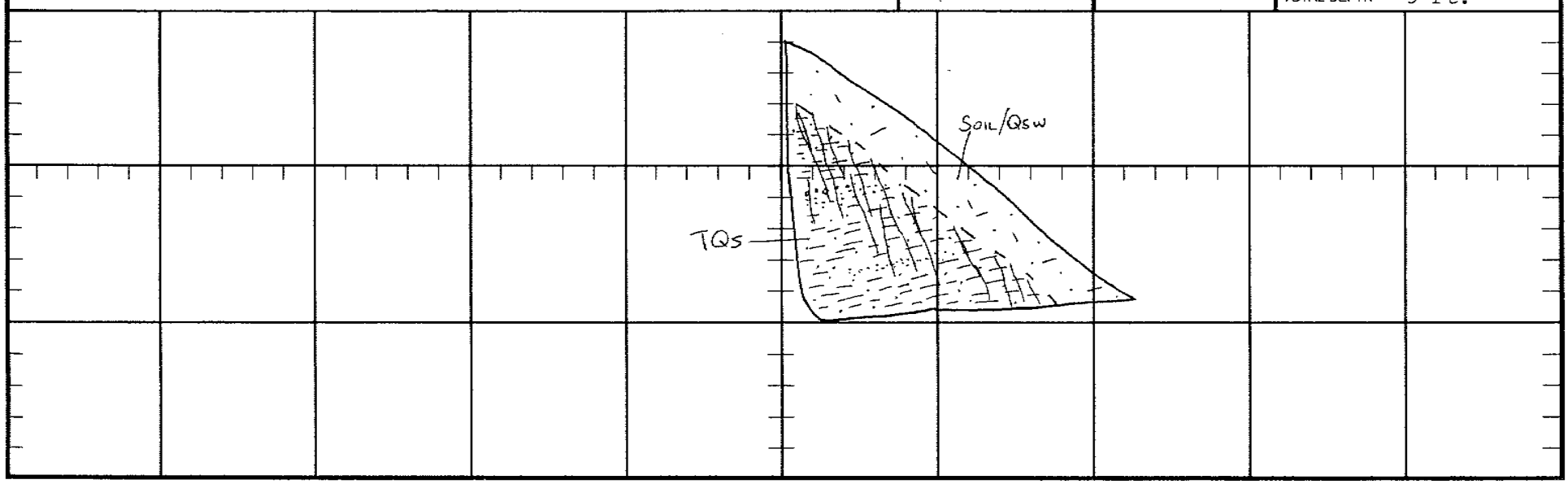
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2' SOIL/SLOPEWASH; soil/Qsw, Yellowish-brown sandy mud; soft; dry; minor roots and organics			
2 - 9' BEDROCK; TQs, Yellowish-brown mudstone silty sandstone, sandstone and pebbly sandstone; moderately hard; damp; fractured and weathered in upper 5 ft.	N47W,22NE		No Ground Water No Caving

SCALE 1" = 5'

N 33 E

TOTAL DEPTH 9 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY MAS/BJS

Trench Log No. 10Q

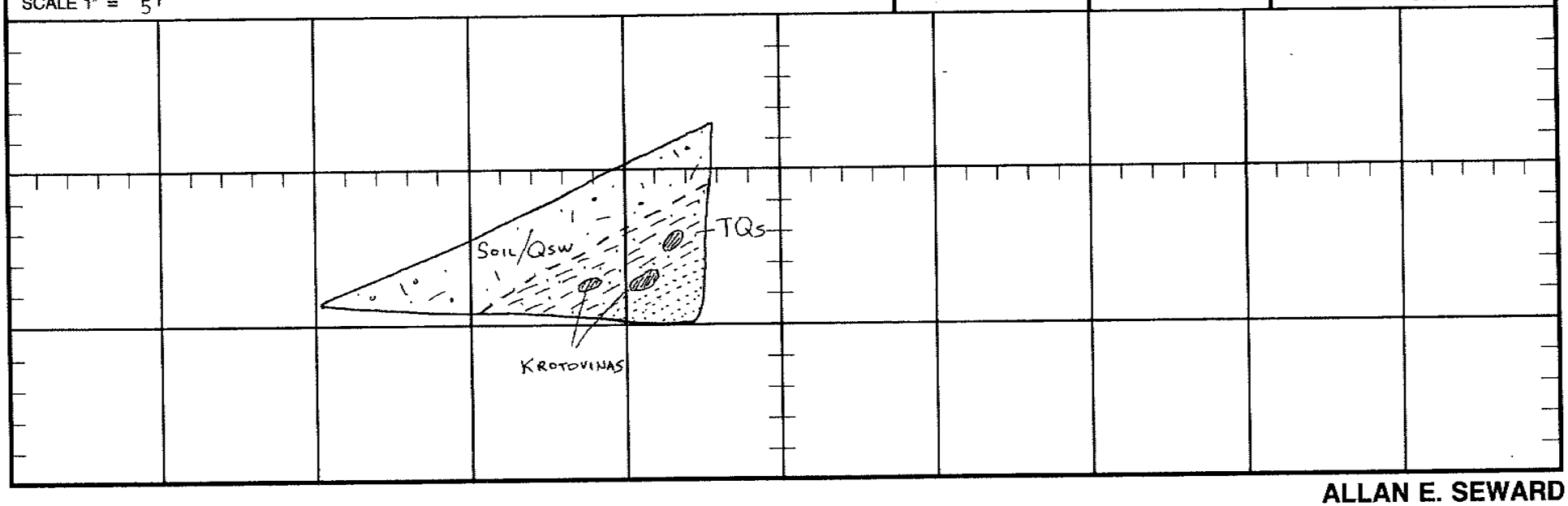
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2' SOIL/SLOPEWASH; soil/Qsw, Brown sandy mud with pebbles; soft; dry; minor organics			
2 - 7' BEDROCK; TQs, Light yellowish-brown siltstone and light yellowish-gray sandstone; soft to moderately dense; dry to slightly damp; sandstone is well bedded; caliche and krotovina common in siltstone	N46W,23NE		No Ground Water No Caving TOTAL DEPTH 7 Ft.

SCALE 1" = 5'

N 73 W



ALLAN E. SEWARD

JOB NO. 99-1703Q1s-1

LOGGED BY VCG

Trench Log No. 11Q

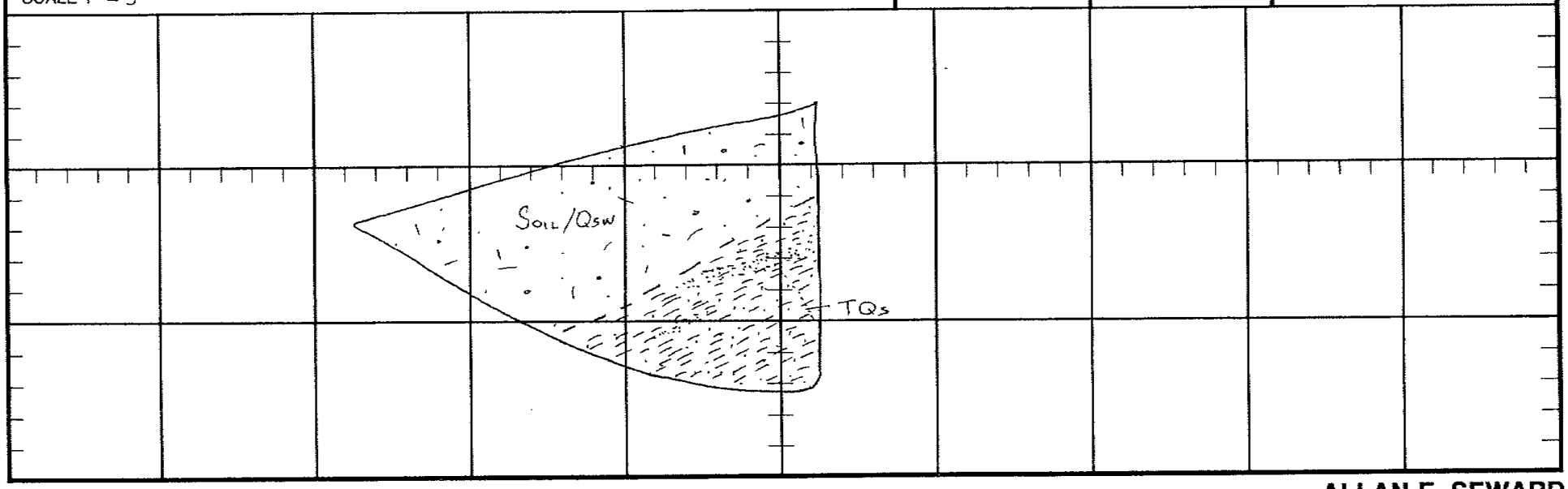
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4.5' SOIL/SLOPEWASH; soil/Qsw, Light yellowish-brown fine- to coarse-grained silty pebbly sand; loose; dry			Logged north-facing side of excavation, south-facing side has channel deposits and is bedded
4.5 - 9' BEDROCK; TQs, Light yellowish-tan to light-brown fine- to medium-grained silty sandstone and sandy siltstone; moderately dense; damp; minor fractures; faint stratification; calcium carbonate deposits present	N52W,20NE N58W,26NE		No Ground Water No Caving TOTAL DEPTH 9 Ft.

N 80 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY VCG

Trench Log No. 12Q

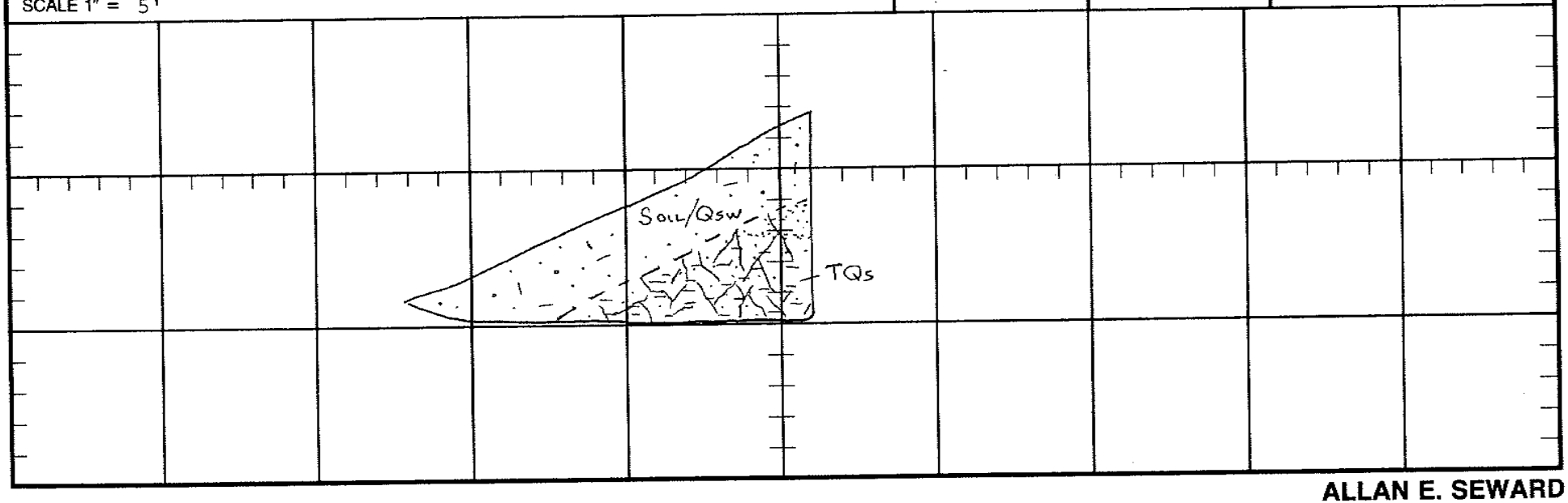
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SOIL/SLOPEWASH; soil/Qsw, Light yellowish-brown fine- to coarse-grained silty pebbly sand; loose; dry; abundant roots			
3 - 7' BEDROCK; TQs, Light yellowish-brown to light reddish-brown fine- to medium-grained silty sandstone and sandy siltstone, and fine- to coarse-grained sandstone; loose to moderately dense; dry; calcium carbonate on cleavage/fractures	Apx: N60W,23NE		Bedding vague
			No Ground Water No Caving
			TOTAL DEPTH 7 Ft.

N 45 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY MAS/BJS

Trench Log No. 13Q

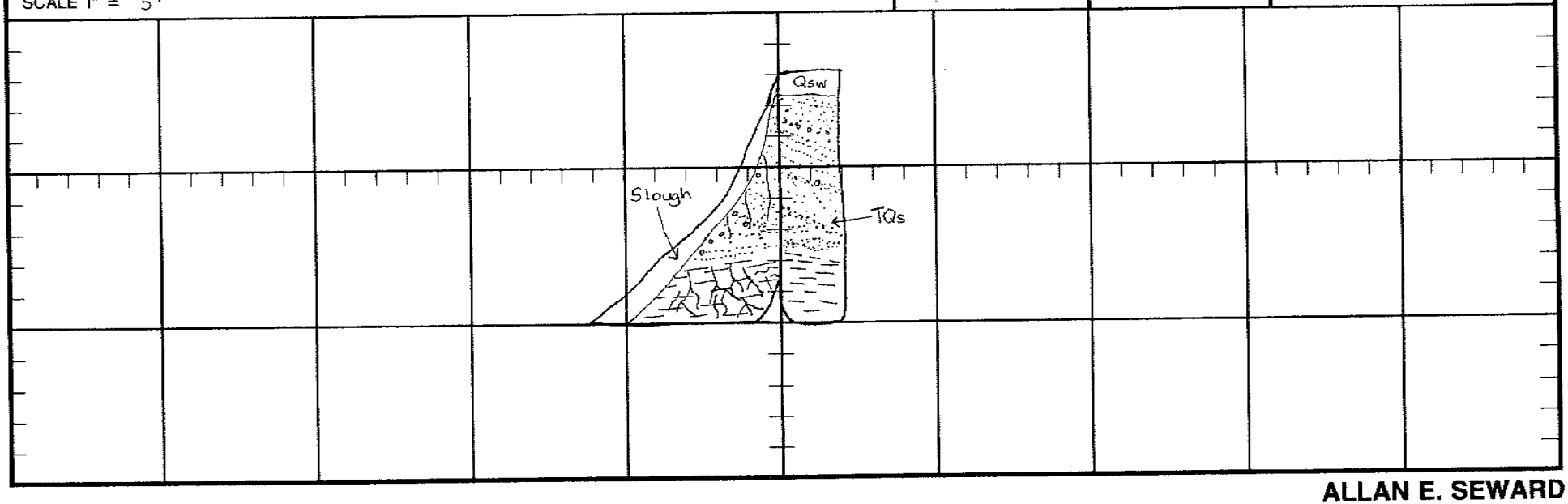
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1' SLOPEWASH; Qsw, Brown silty sand; soft; dry 1 - 8' BEDROCK; TQs, Light-gray to yellowish-gray sandstone; loose; slightly damp; channeling and cross bedding; underlain by yellowish-brown clayey siltstone; stiff; damp	N30W,16NE		Trenches T-13Q thru T-20Q excavated with a 4WD rubber-tired backhoe and logged on 9/8/99 Bag samples of sandstone (@4') and clayey siltstone (@7') Trench excavated into existing cut; surficial material removed No Ground Water No Caving TOTAL DEPTH 8 Ft.

N 72 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY MAS/BJS

Trench Log No. 14Q

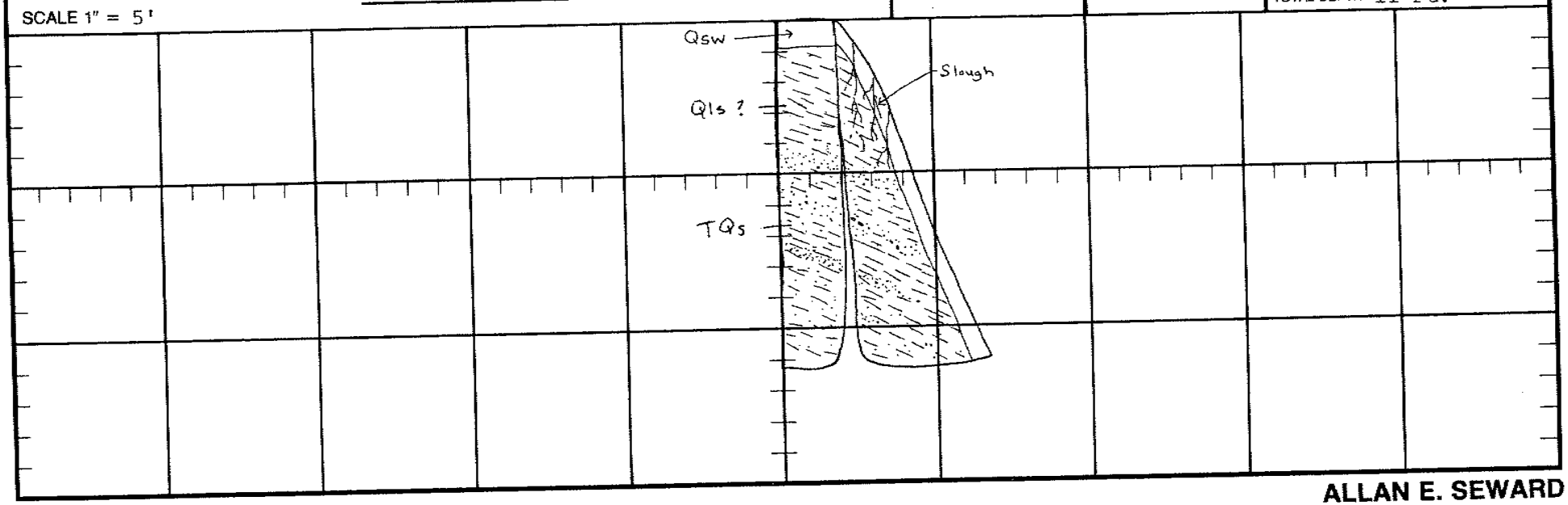
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1' SLOPEWASH; Qsw, Brown silty sand; soft; dry; minor organic material			Trench excavated into existing cut; surficial material mostly removed
1 - 5' LANDSLIDE?; Qls?, Brown silty claystone; stiff; damp; bedding looks slightly disrupted	Contact/B: N86W,22NE		
5 - 11' BEDROCK ; TQs , Yellowish-brown to tan sandy siltstone with channels of fine-grained sandstone and pebbly sandstone; dense; dry; bedding discontinuous and vague	Apx: N30E,40NW		No Ground Water No Caving TOTAL DEPTH 11 Ft.

N 27 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY MAS/BJS

Trench Log No. 15Q

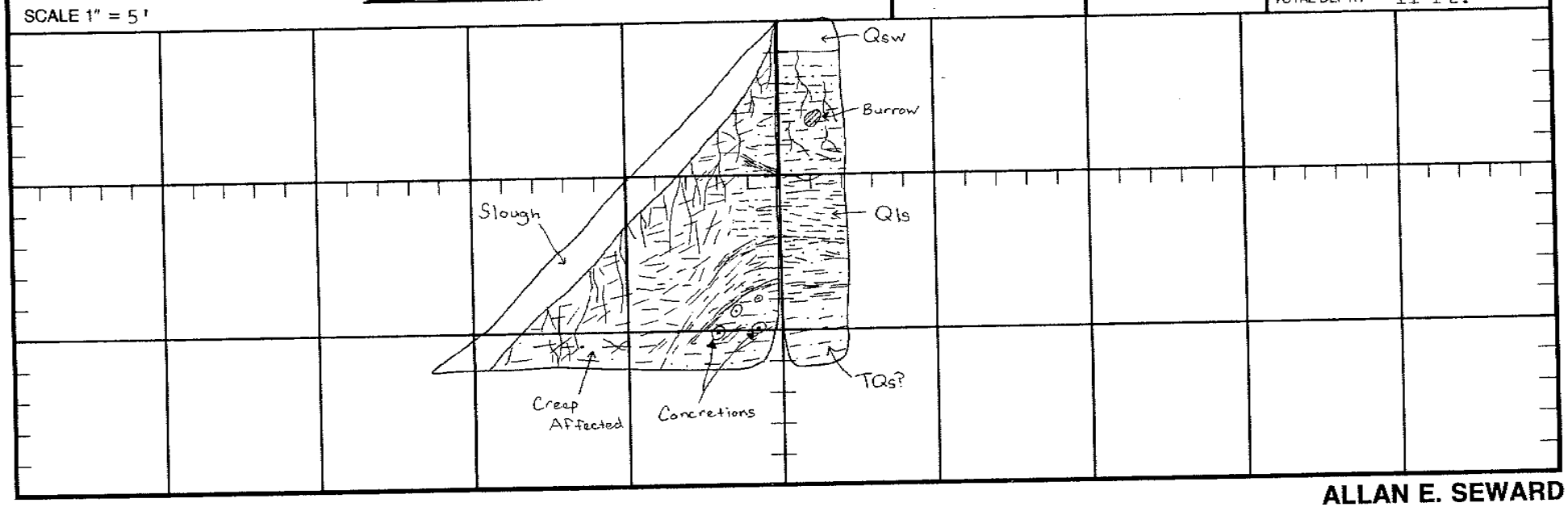
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1' SLOPEWASH; Qsw, Brown clayey sand; soft; krotovina; organic material			Trench excavated into existing cut; surficial material removed
1 - 9' LANDSLIDE; Qls, Yellowish-brown to tan siltstone with dark brownish-gray, moderately plastic clay interlayers; firm; slightly damp to damp, krotovina caliche, noduals, organic material weathered, locally thinly bedded (laminated) and irregular	N80E,12NW		Bedding is distinct but variable
9 - 11' BEDROCK?; TQs?, Yellowish-brown mudstone interbedded with yellowish-tan siltstone; firm to stiff; damp to moist			No Ground Water No Caving
			TOTAL DEPTH 11 Ft.

N 55 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY MAS/BJS

Trench Log No. 16Q

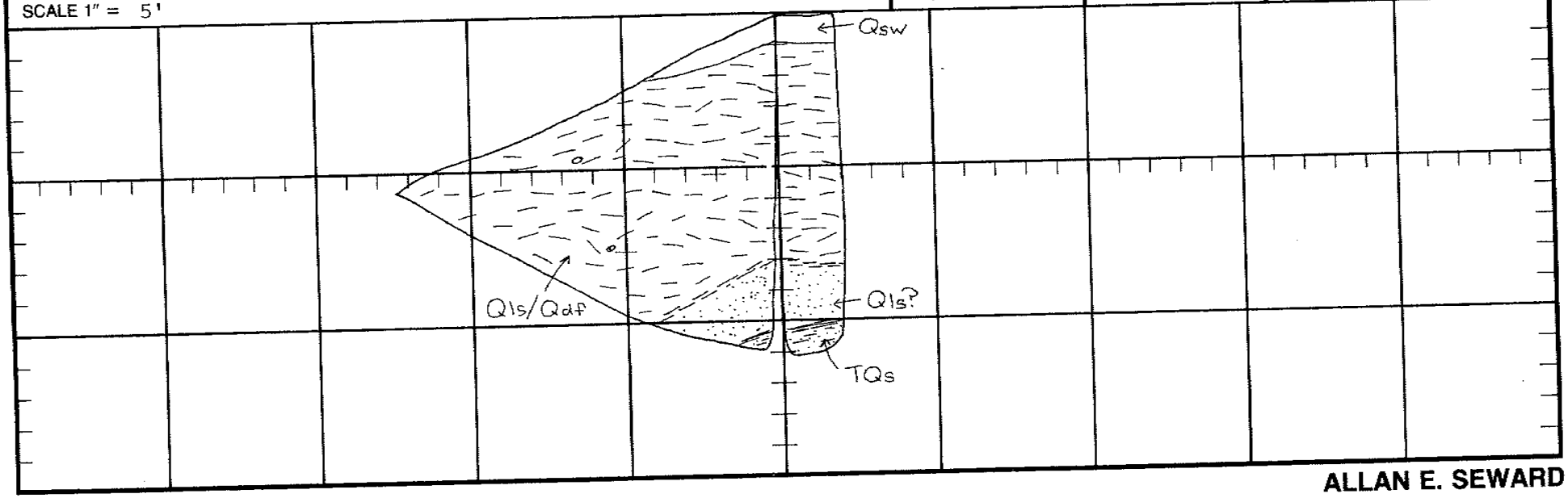
PROJECT Newhall Ranch - Phase IB

DATE

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1' SLOPEWASH; Qsw, Brown sandy mud; soft; dry; krotovina; minor organic material			
1 - 8' LANDSLIDE/DEBRIS FLOW DEPOSIT; Qls/Qdf, Brown sandy clayey siltstone; firm; damp; disturbed; $CaCo_3$ nodules; no distinct bedding; moderate yellowish-brown clay @ 8'; moderately plastic; damp; firm; 2-4" thick; slide plane?			
8 - 10' LANDSLIDE?; Qls?, Yellowish-tan, silty sandstone; dense; damp; claiche noduals; clay at base may be slide plane	B/SP?: N72W,41NE		Possible slide planes at 8 and 10 ft.
10 - 11' BEDROCK?; TQs, Slightly bluish-gray clayey siltstone; stiff; damp		SP?:N47W,23NE	
			No Ground Water No Caving
			TOTAL DEPTH 11 Ft.

N 10 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY MAS/BJS

Trench Log No. 17Q

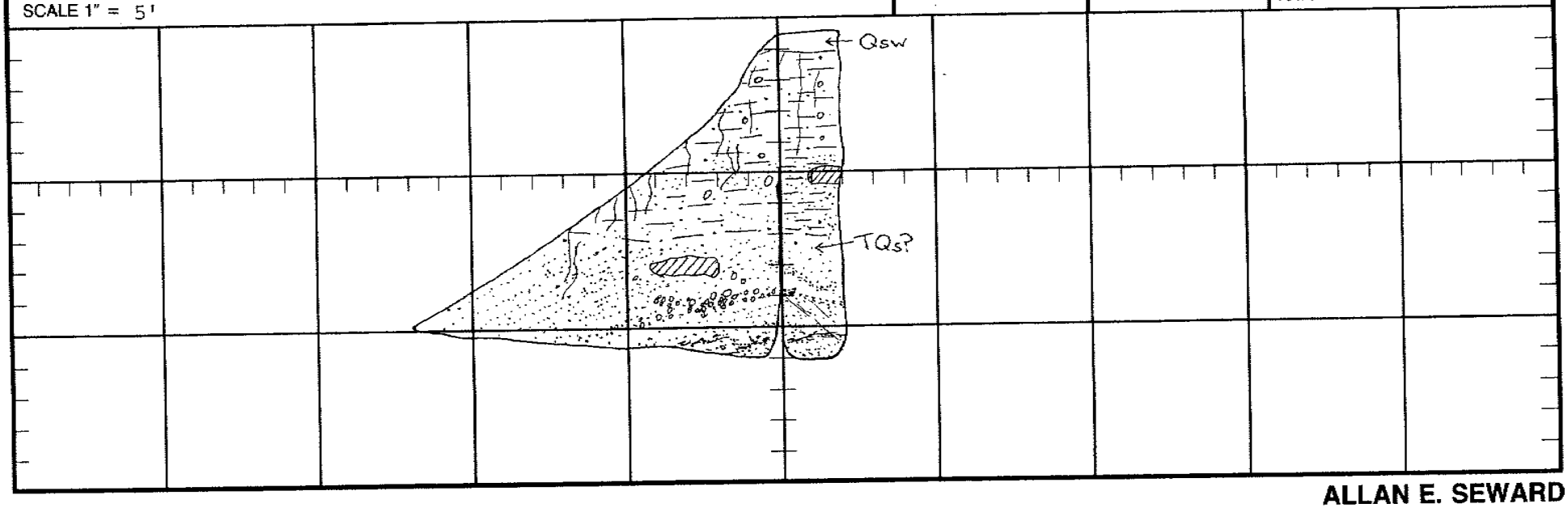
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 0.5' SLOPEWASH; Qsw, Brown sandy silt; soft; dry 0.5 - 10.5' BEDROCK?; TQs?, Yellowish-brown siltstone and sandy siltstone; stiff; weathered; slightly damp; krotovina; underlain by light yellowish-brown to light-gray sandstone and pebbly sandstone; moderately dense to dense but friable; dry to slightly damp; channeling and cross-bedding	N30E,16SE		Trench excavated into existing cut; surficial material removed May be creep affected No Ground Water No Caving TOTAL DEPTH 10.5 Ft.

N 10 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY MAS/BJS

Trench Log No. 18Q

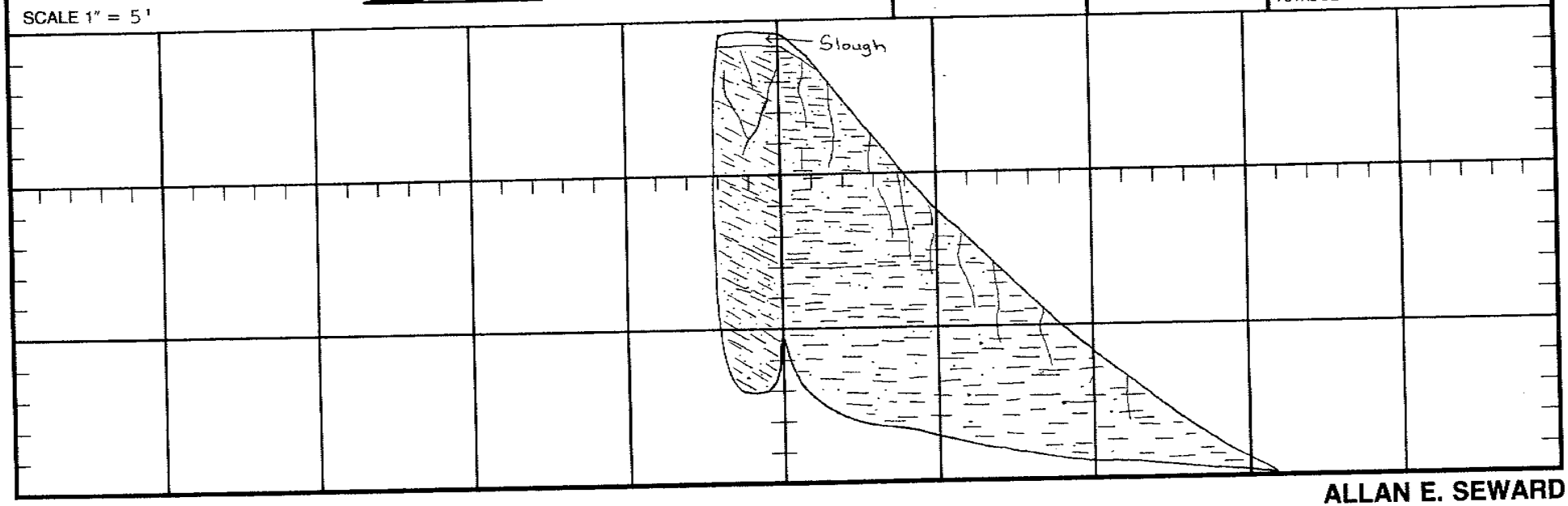
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 11.5' BEDROCK; TQs, Interbedded light yellowish-brown siltstone and sandy siltstone; moderately hard; slightly damp to damp; siltstone commonly laminated	N50W,32NE		Trench excavated into existing cut; surficial material removed No Ground Water No Caving TOTAL DEPTH 11.5 Ft.

N 44 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

PROJECT Newhall Ranch - Phase IB

LOGGED BY MAS/BJS

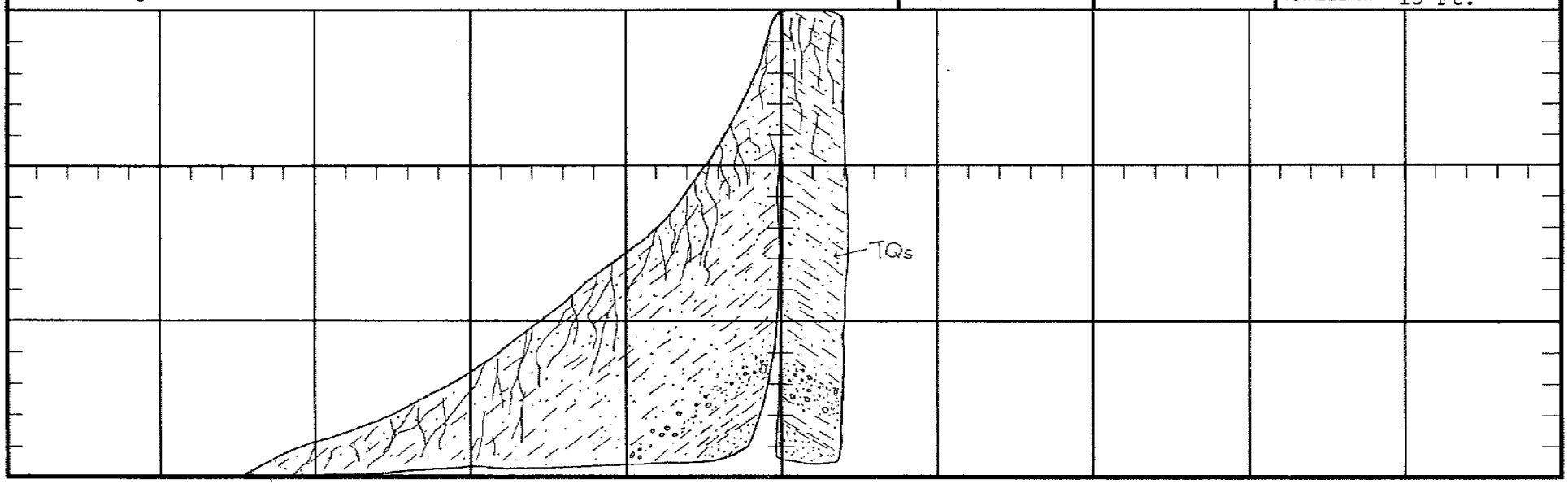
Trench Log No. 19Q

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 15' BEDROCK; TQs, Interbedded yellowish-brown clayey siltstone and light yellowish-brown silty sandstone and sandstone; moderately hard; slightly damp to damp; upper 4 ft. fractured and creep affected; channeling and cross bedding in sandstone	Apx N53W,28NE		Trench excavated into existing cut; surficial material removed
			No Ground Water No Caving TOTAL DEPTH 15 Ft.

N 75 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Q1s-1

PROJECT Newhall Ranch - Phase IB

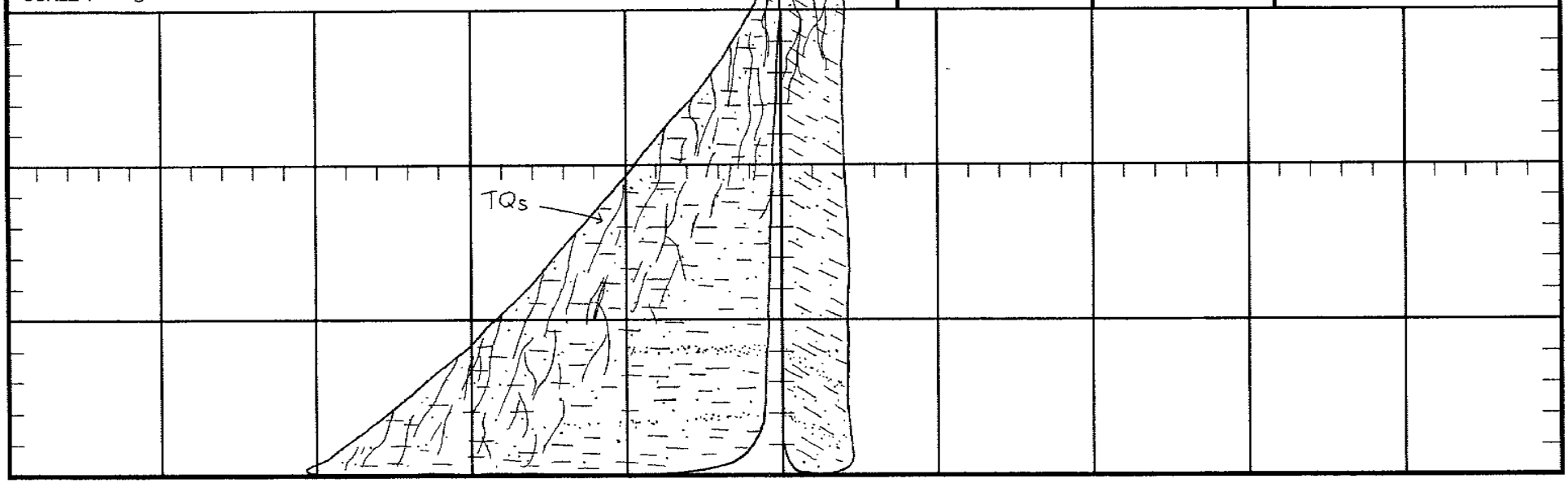
LOGGED BY MAS/BJS

Trench Log No. 20Q

DATE 7/12/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 16' BEDROCK; TQs, Light yellowish-brown sandy clayey siltstone with local pebbles and sand stringers; moderately hard; slightly damp to damp; upper 4 ft. fractured and creep affected	Apx N40W,31NE		Trench excavated into existing cut; surficial material removed No Ground Water No Caving TOTAL DEPTH 16 Ft.

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Q1s-1

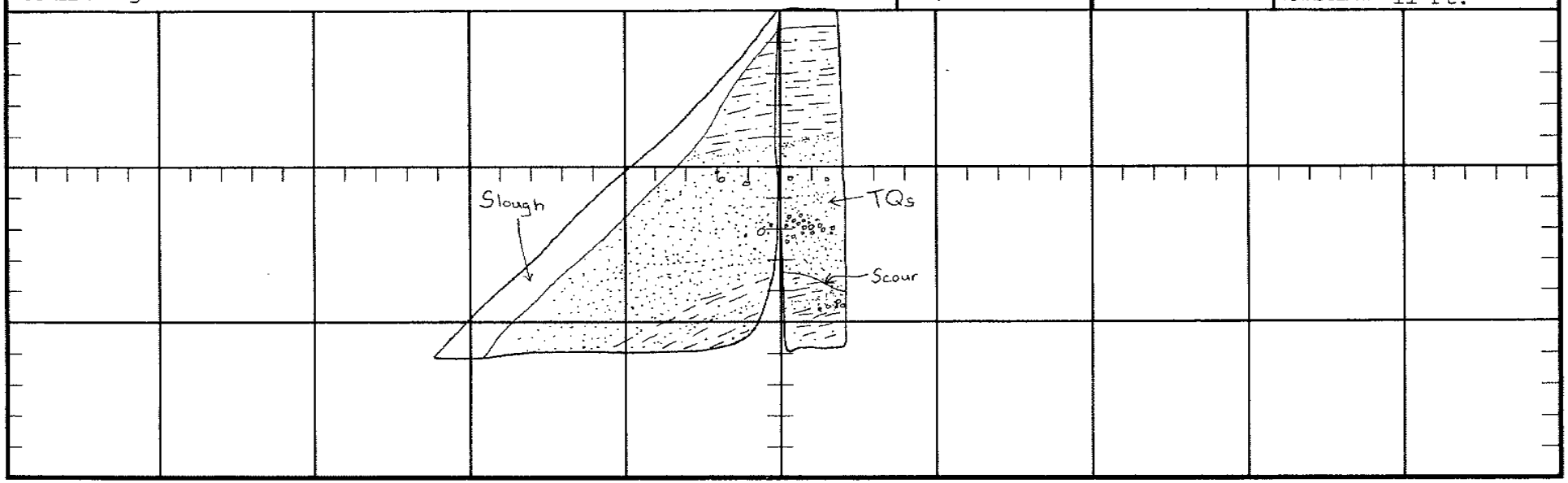
PROJECT Newhall Ranch - Phase IB

LOGGED BY MAS/BJS

Trench Log No. 21Q

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1' SLOUGH; Brown sandy silt; soft; dry			Trenches T-21Q thru T-28Q excavated with a track-mounted back-hoe and logged on 9/10/99
1 - 11' BEDROCK; TQs, Light yellowish-brown sandy siltstone and yellowish-gray sandstone and pebbly sandstone; moderately hard to slightly friable; slightly damp; channeling and cross beddding in sandstone	N39W,29NE		Trench excavated into existing cut
			No Ground Water No Caving
SCALE 1" = 5' N 15 W			TOTAL DEPTH 11 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY MAS/BJS

Trench Log No. 22Q

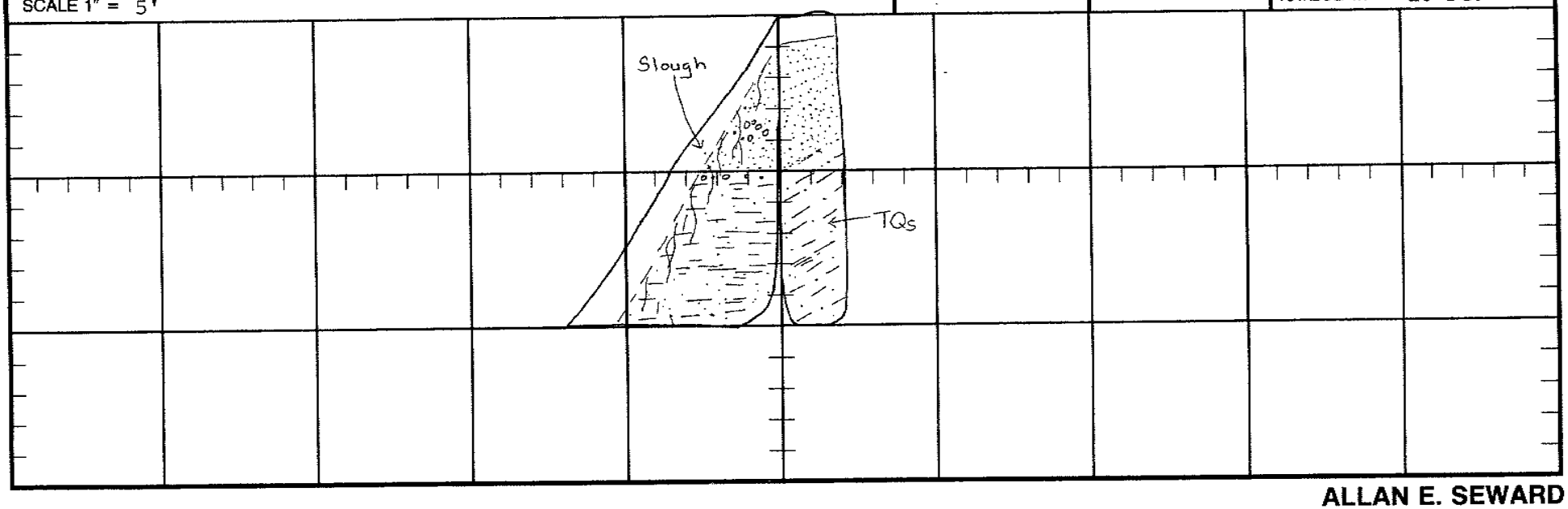
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1' SLOUGH; Yellowish-brown silty sand; soft; loose; dry			Trench excavated into existing cut
1 - 10' BEDROCK; TQs, Yellowish-gray sandstone and pebbly sandstone and yellowish-brown siltstone; moderately hard; dry to damp; crude bedding and channeling in sandstone; upper 2 feet creep affected and fractured	N40W,29NE		No Ground Water No Caving TOTAL DEPTH 10 Ft.

SCALE 1" = 5'

N 40 W



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY MAS/BJS

Trench Log No. 23Q

PROJECT Newhall Ranch - Phase IB

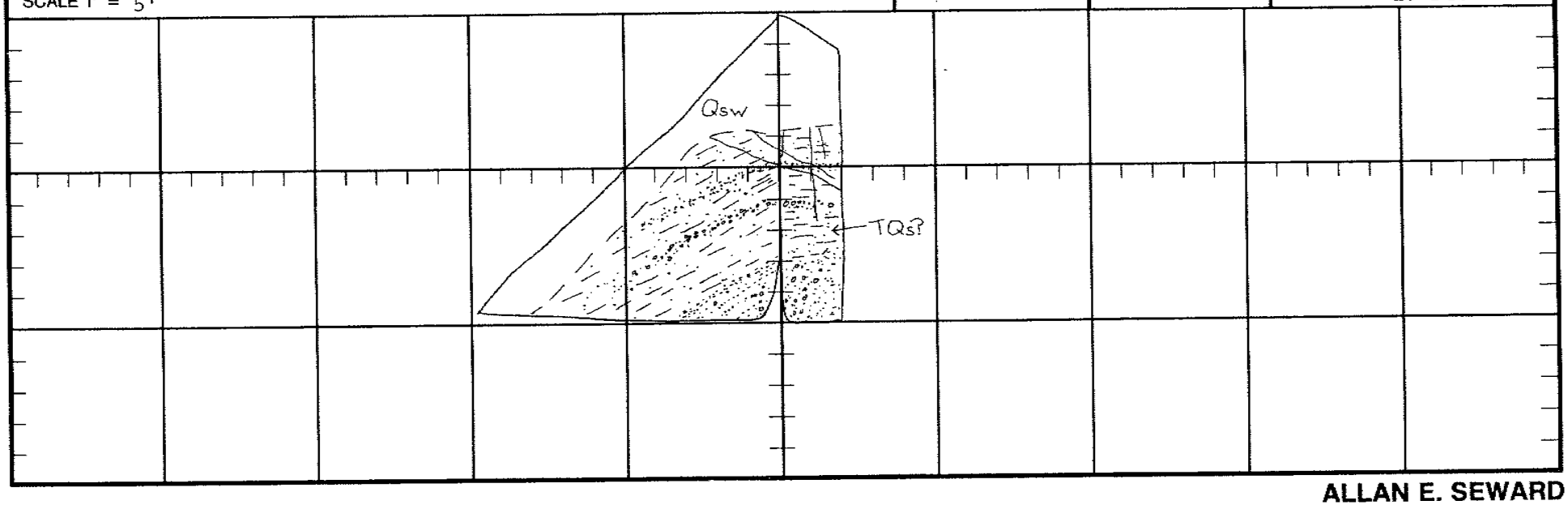
DATE 7/12/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4' SLOPEWASH; Qsw, Brown sandy silt with scattered pebbles and cobbles; loose; dry 4 - 10' BEDROCK?; TQs?; Yellowish-brown silty sandstone and light yellowish-brown sandstone and pebbly sandstone; moderately hard; slightly damp; $CACO_3$-lined fractures in upper 2 feet; bedding poor	Apx N82W,25NE		TQs is generally tight but bedding attitude is slightly off of regional

N 45 E

SCALE 1" = 5'

TOTAL DEPTH 10 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY MAS/BJS

Trench Log No. 24Q

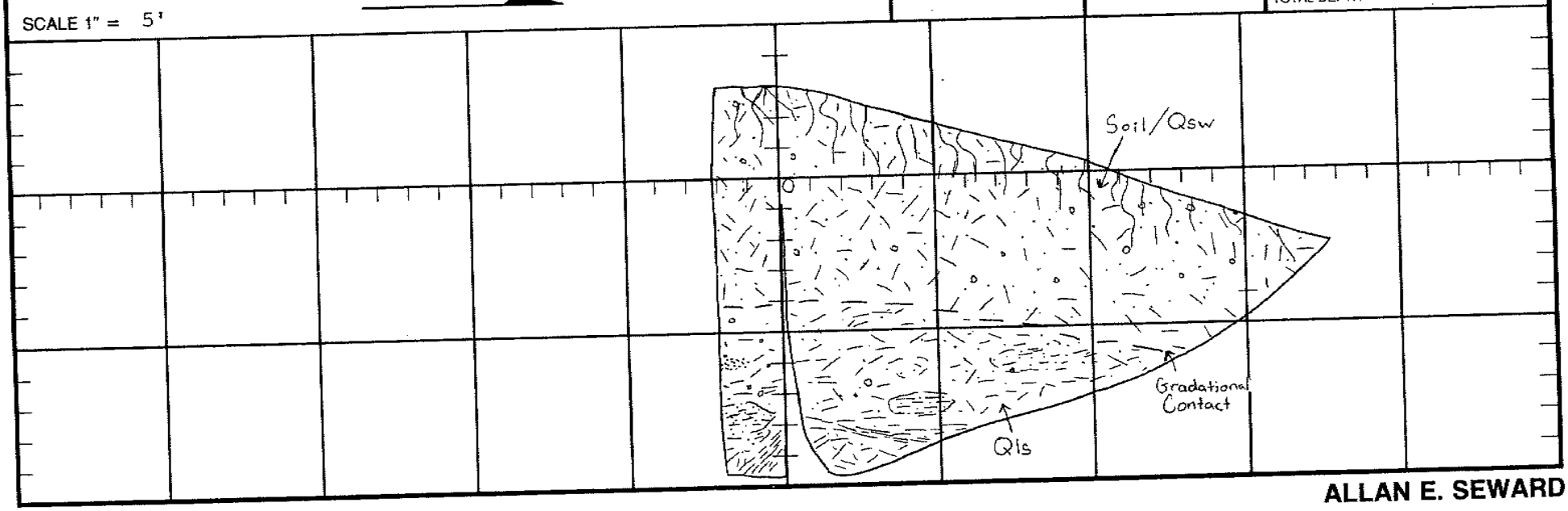
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 7' SOIL/SLOPEWASH; soil/Qsw, Brown clayey silt with scattered pebbles and cobbles; soft to firm; damp			Soil/Slopewash may be an old debris flow
7 - 12.5' LANDSLIDE; Qls, Yellowish-brown to olive-brown sandy siltstone with irregular fragments of disturbed siltstone, sandstone and mudstone; soft to firm; damp	N10W,33NE		No Ground Water No Caving
			TOTAL DEPTH 12.5 Ft.

N 35 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY MAS/BJS

Trench Log No. 25Q

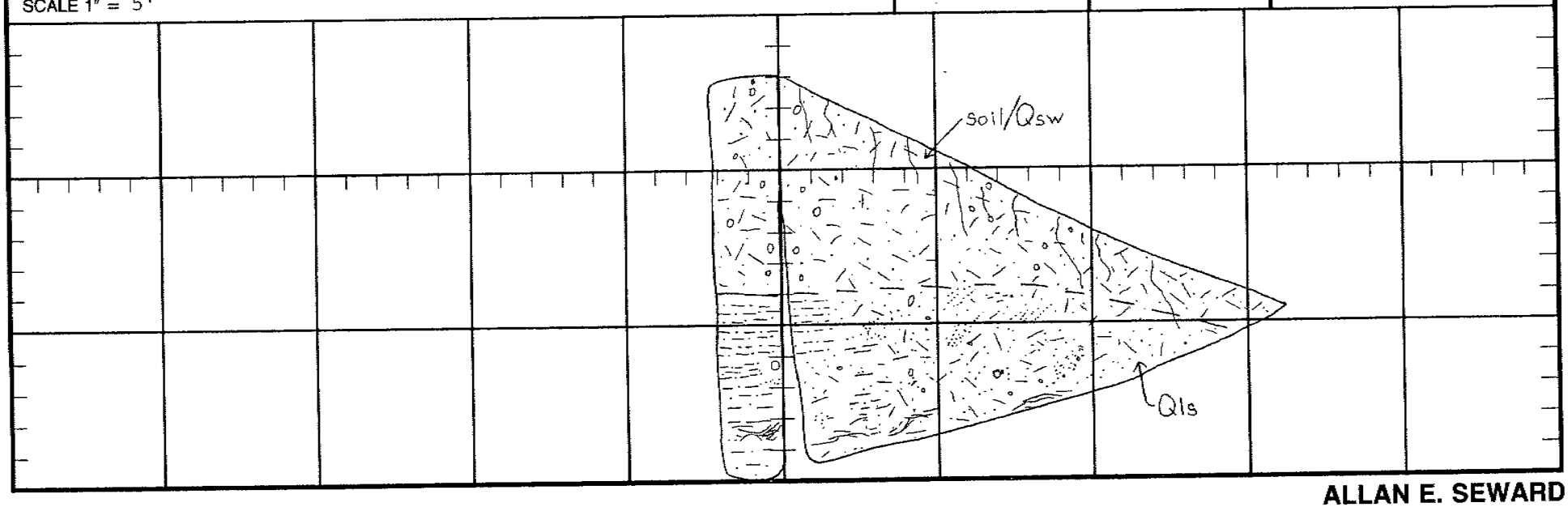
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 7' SOIL/SLOPEWASH; soil/Qsw, Brown clayey sandy silt with scattered pebbles and cobbles 7 - 13' LANDSLIDE; Qls, Disrupted mix of yellowish-brown siltstone, light yellowish-brown silty sandstone and brown mudstone; soft to firm; damp; bedding jumbled			No Ground Water No Caving TOTAL DEPTH 13 Ft.

SCALE 1" = 5'

N 10 E



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY MAS/BJS

Trench Log No. T-26Q

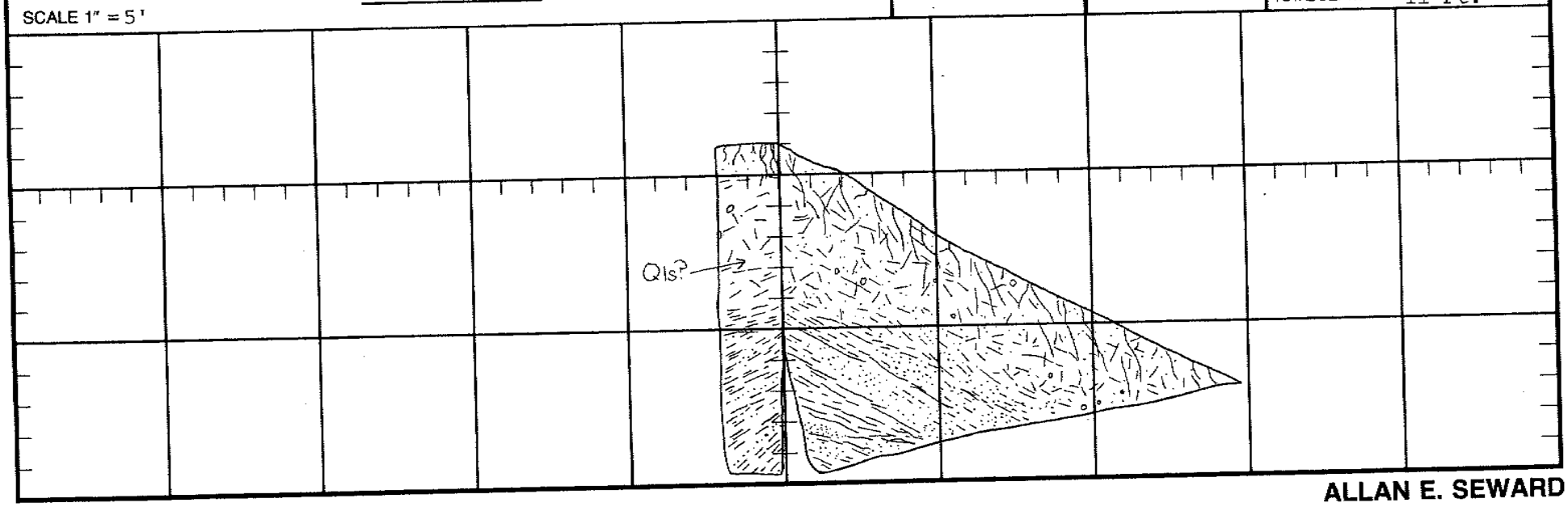
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 11' LANDSLIDE; Qls?, Yellowish-brown sandy siltstone to silty sandstone with interbedded laminated mudstone and sandstone; upper 3 feet weathered and fractured; moderately dense to moderately hard below; bedding locally laminated but slightly irregular	N64W,26NE		No Ground Water No Caving TOTAL DEPTH 11 Ft.

N 20 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY MAS/BJS

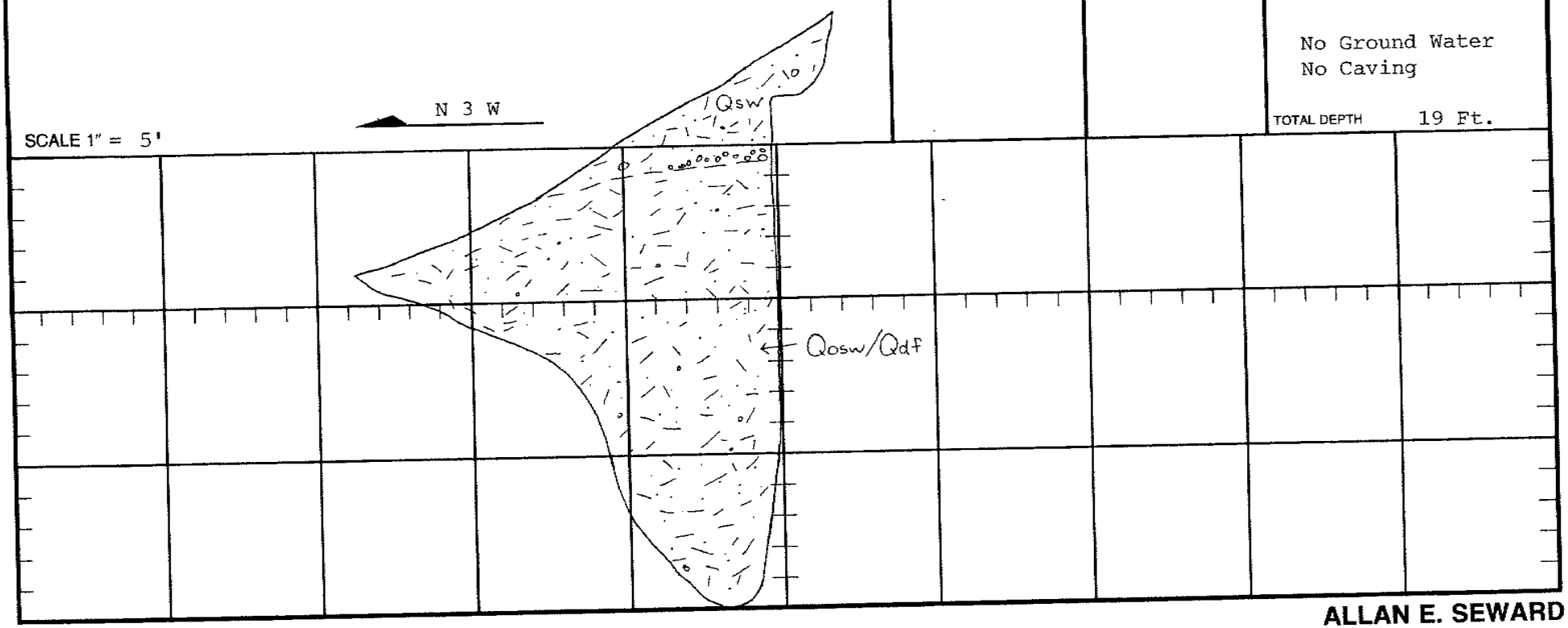
Trench Log No. 27Q

PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4' SLOPEWASH; Qsw, Brown clayey sandy silt; soft; dmap			Trench logged from surface
4 - 19' OLDER SLOPEWASH/DEBRIS FLOW DEPOSIT; Qosw/Qdf, Yellowish-brown clayey sandy silt with local pebbles; soft to firm; damp to moist; no apparent bedding structure			No Ground Water No Caving
			TOTAL DEPTH 19 Ft.

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY MAS/BJS

Trench Log No. 28Q

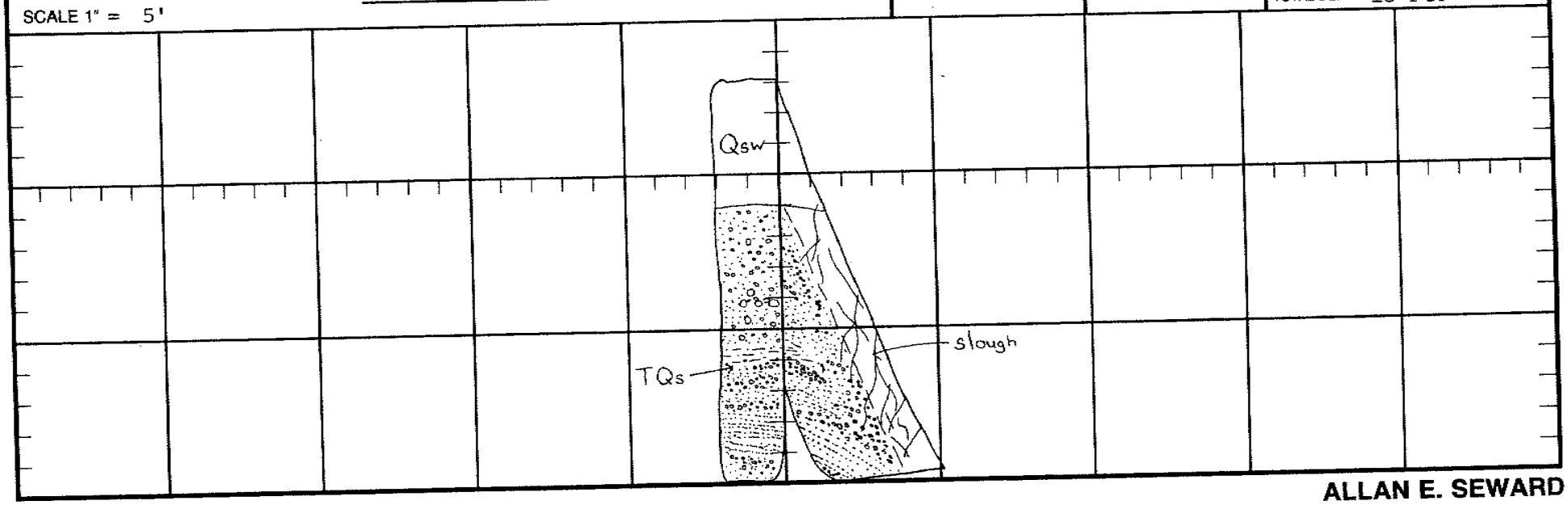
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4' SLOPEWASH; Qsw, Yellowish-brown sandy silt with scattered pebbles; soft; dry			Trench excavated into existing cut
4 - 13' BEDROCK?; TQs?, Light-gray sandstone and pebbly sandstone; dense but slightly to moderately friable; dry to slightly damp; cross bedding and channeling common	N35W,21NE		No Ground Water No Caving TOTAL DEPTH 13 Ft.

N 45 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

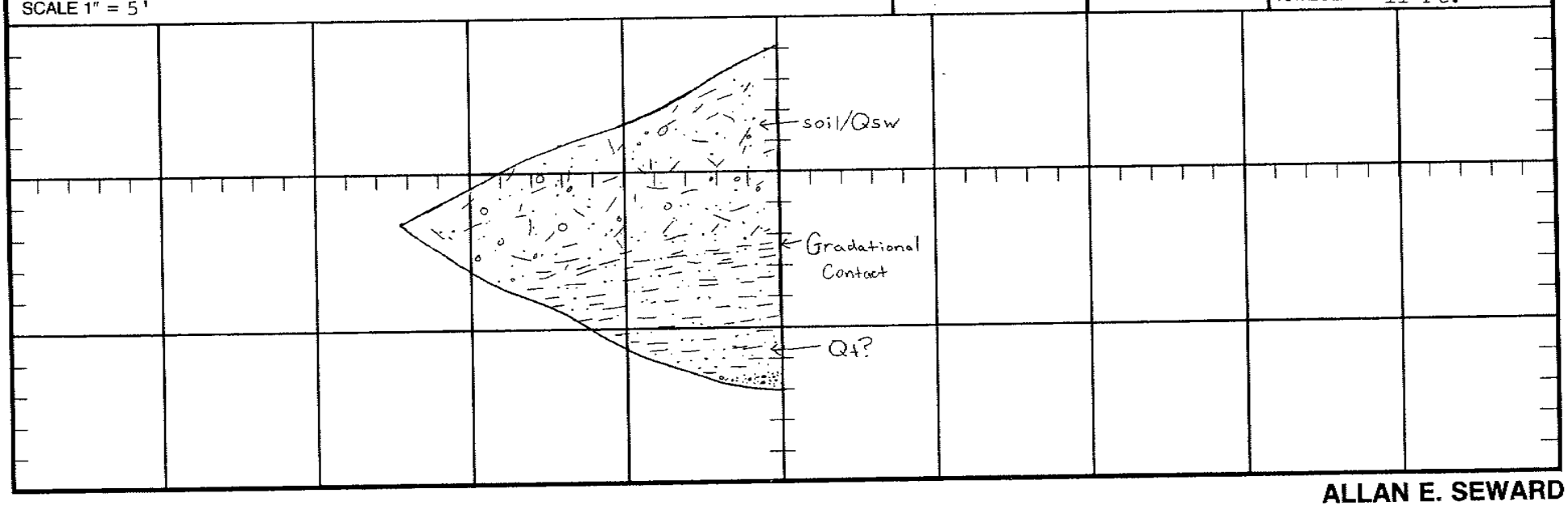
Trench Log No. 29Q

PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6' SOIL/SLOPEWASH; soil/Qsw, Light to medium-brown pebbly to cobbly sandy silt; moderately dense; dry 6 - 11' TERRACE DEPOSITS?; Qt?, Olive-gray to grayish-brown siltstone with scattered pebbles and light olive-gray coarse-grained pebbly sandstone at base; moderately dense to dense; slightly damp	Apx N60E,8NW		Trenches T-29Q and T-30Q excavated with a track-mounted backhoe and logged on 9/24/99 No Ground Water No Caving TOTAL DEPTH 11 Ft.

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 30Q

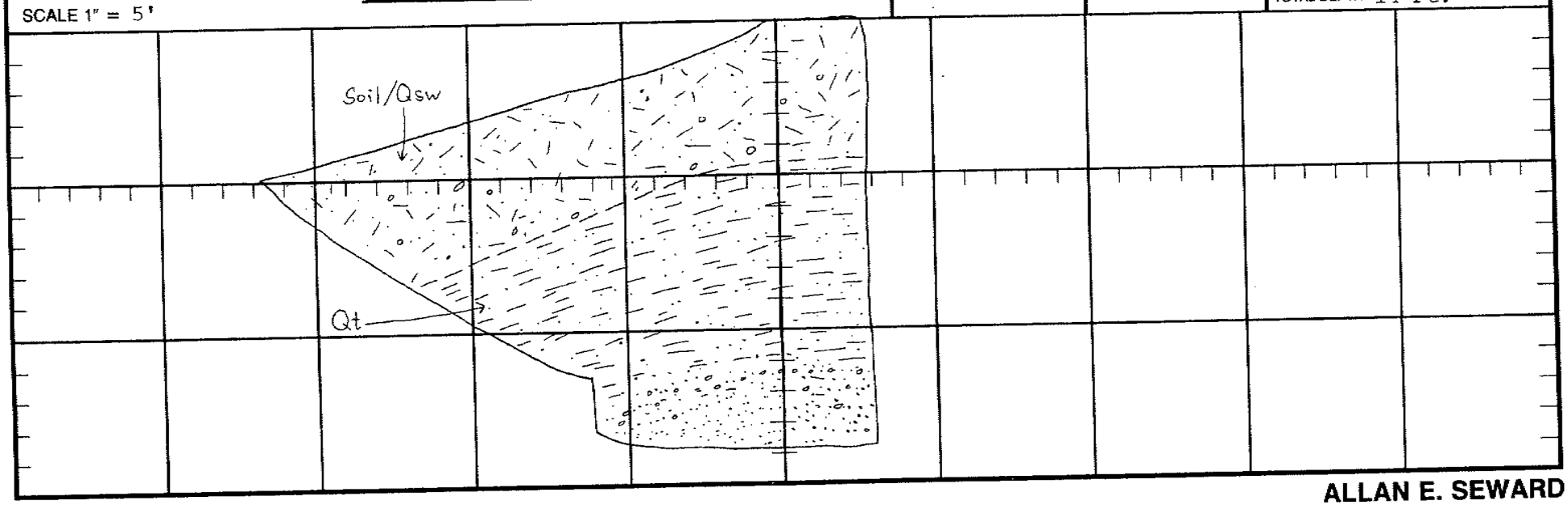
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4.5' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown pebbly to cobbly sandy silt; moderately dense; dry	N84E,11NW		sw/Bedrock contact very gradational
4.5 - 14' TERRACE DEPOSITS?; Qt?, Olive-gray to grayish-brown siltstone with scattered pebbles and light olive-gray to yellowish-gray coarse-grained sandstone; moderately dense to dense; slightly damp			No Ground Water No Caving TOTAL DEPTH 14 Ft.

N 9 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 31Q

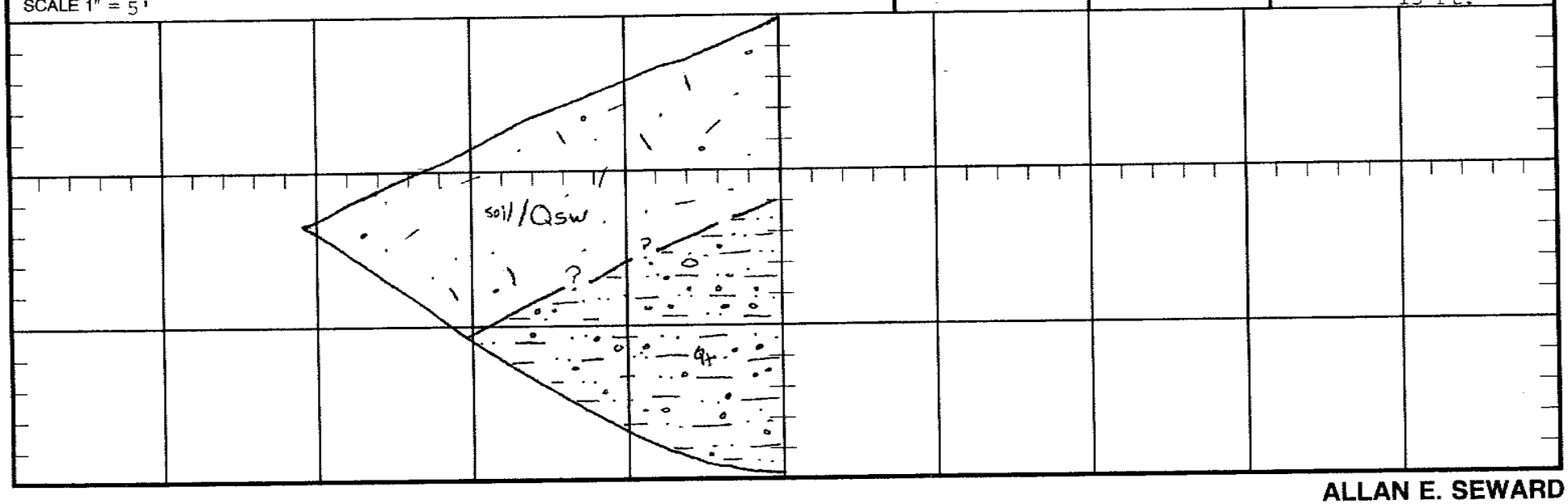
PROJECT Newhall Ranch - Phase IB

DATE 7/12/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 7' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown sandy silt with scattered pebbles; dense; dry to slightly damp 7 - 15' TERRACE DEPOSITS; Qt, Light- to medium-brown sandy siltstone with pebbles and scattered cobbles; moderately dense to dense; dry to slightly damp			Trenches 31Q thru 41Q excavated and logged 9/28/99 using track mounted backhoe with 24" bucket Contact between Qsw/ Qt gradational No Ground Water No Caving TOTAL DEPTH 15 Ft.

N 43 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 32Q

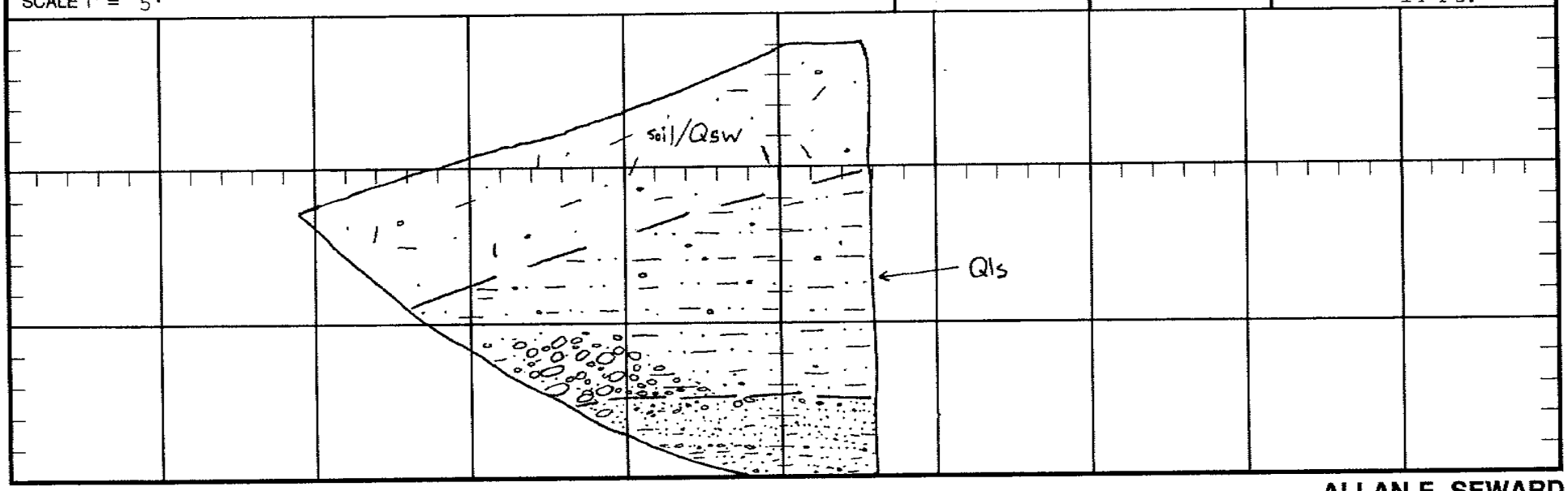
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 5' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown sandy silt with scattered pebbles; dense; dry to slightly damp			
5 - 11.5' LANDSLIDE; Qls, Light-gray siltstone with scattered pebbles and large cobbles to boulders locally at base;dense; dry to slightly damp			
11.5 - 14' Medium-gray to light olive-gray siltstone to fine- to coarse-grained sandstone with pebbles and some scattered cobbles; moderately dense to dense; dry to slightly damp	Apx:N55W,8SW		No Ground Water No Caving TOTAL DEPTH 14 Ft.

SCALE 1" = 5'

N 54 E



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

PROJECT Newhall Ranch - Phase IB

LOGGED BY DGG

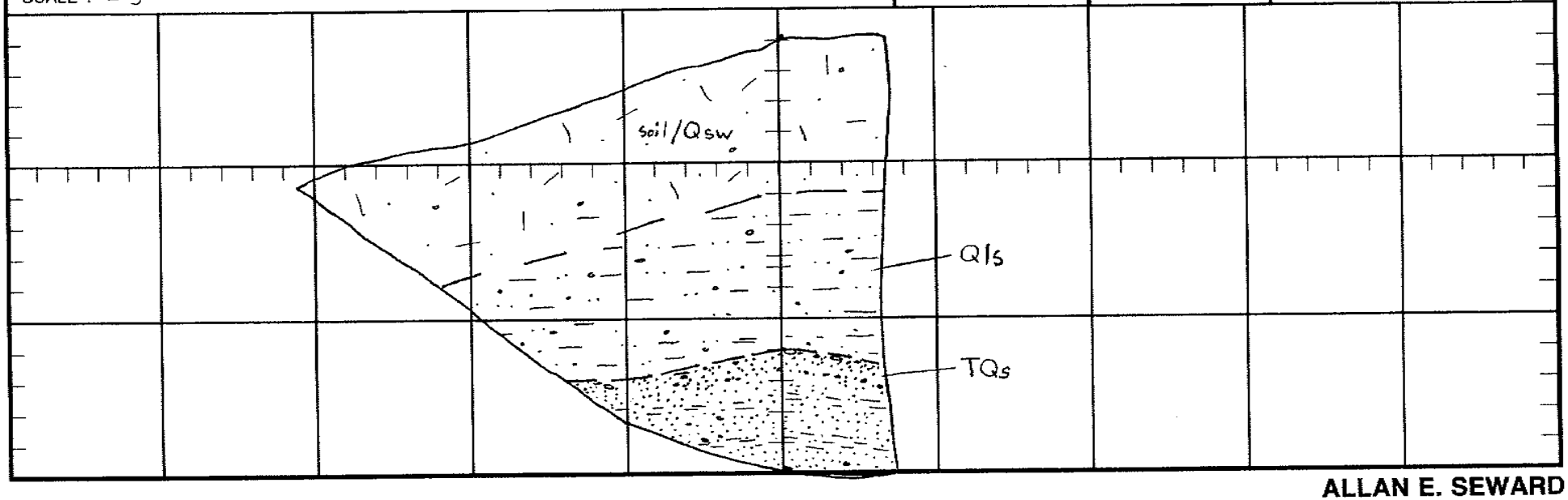
Trench Log No. 33Q

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 5' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown sandy silt with scattered pebbles; dense; dry to slightly damp			
5 - 10' LANDSLIDE; Qls, Light-gray siltstone with scattered pebbles; dense; dry to slightly damp			
10 - 14' BEDROCK; TQs, Medium-gray to light olive-gray siltstone to fine- to coarse-grained sandstone with pebbles and some scattered cobbles; moderately dense to dense; dry to slightly damp	N62W,14NE		No Ground Water No Caving TOTAL DEPTH 14 Ft.

N 84 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 34Q

PROJECT Newhall Ranch - Phase IB

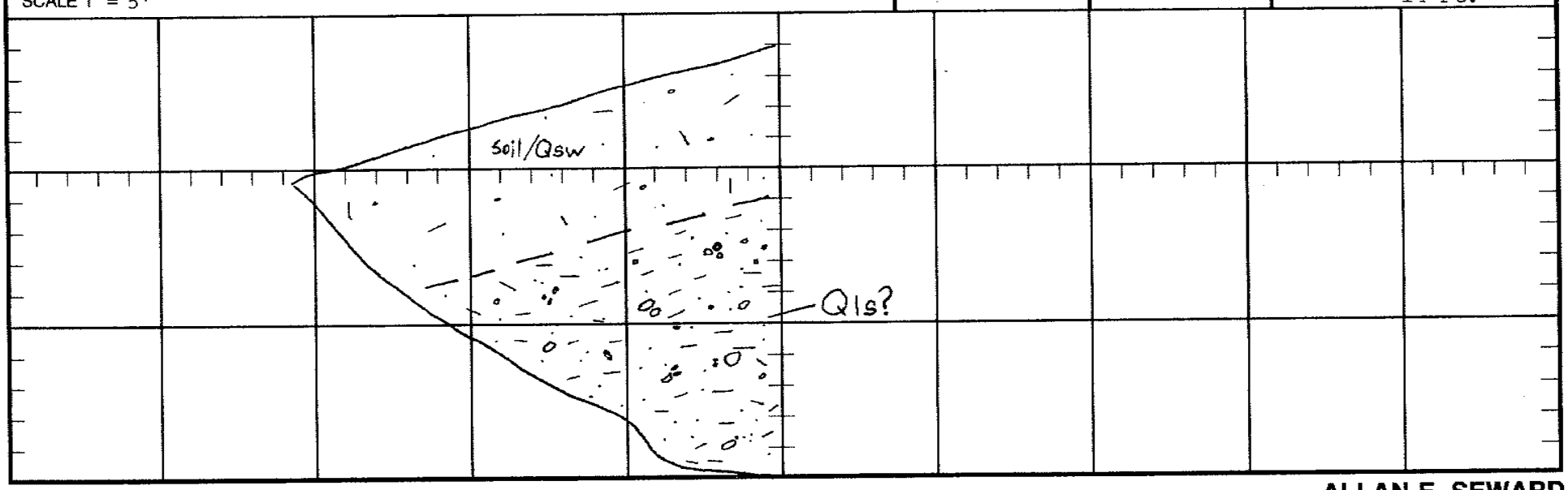
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 5' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown sandy silt with scattered pebbles; dense; dry to slightly damp			
5 - 14' LANDSLIDE; Qls?, Light to medium olive-gray siltstone to sandy siltstone with scattered pebbles and cobbles; moderately dense; slightly damp			No Ground Water No Caving

SCALE 1" = 5'

N 67 E

TOTAL DEPTH 14 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

PROJECT Newhall Ranch - Phase IB

LOGGED BY DGG

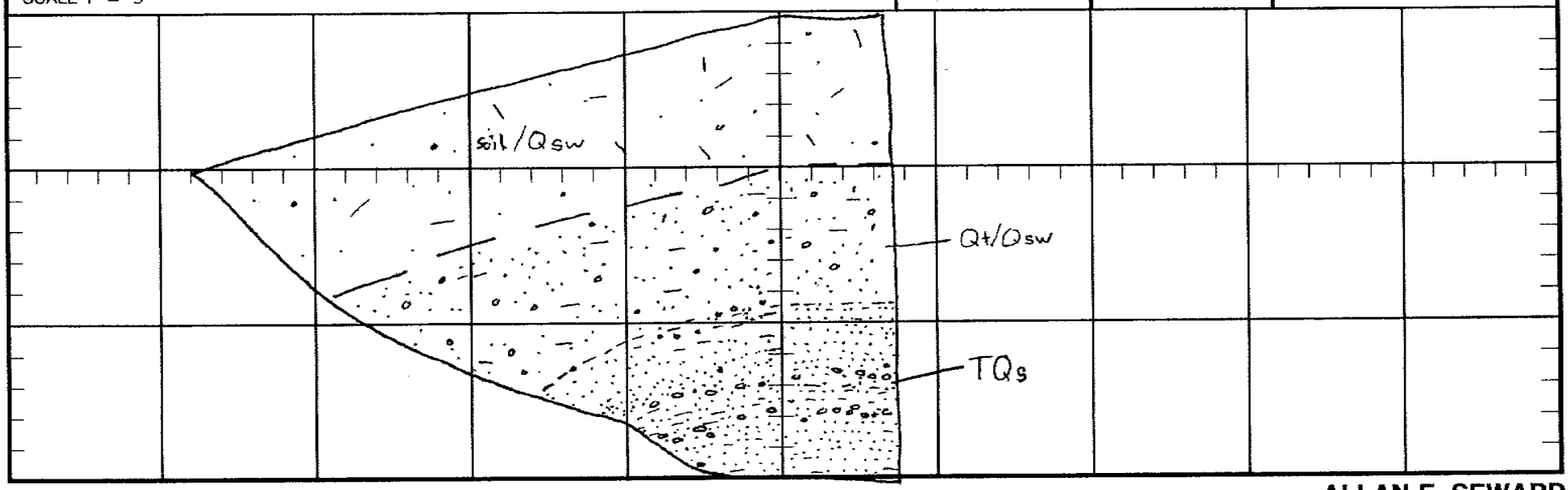
Trench Log No. 35Q

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 5' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown sandy silt with scattered pebbles; dense; dry to slightly damp			
5 - 9' TERRACE/OLDER SLOPEWASH?, Qt/Qsw?, Slightly reddish-brown fine- to medium-grained sandstone with minor silt, pebbles and scattered cobbles; dense; slightly damp			
9 - 15' BEDROCK; TQs, Medium-gray to light olive-gray siltstone to fine- to coarse-grained sandstone with pebbles and some scattered cobbles; moderately dense to dense; dry to slightly damp	Apx:N70W,13NE		No Ground Water No Caving TOTAL DEPTH 15 Ft.

N 43 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 36Q

PROJECT Newhall Ranch - Phase IB

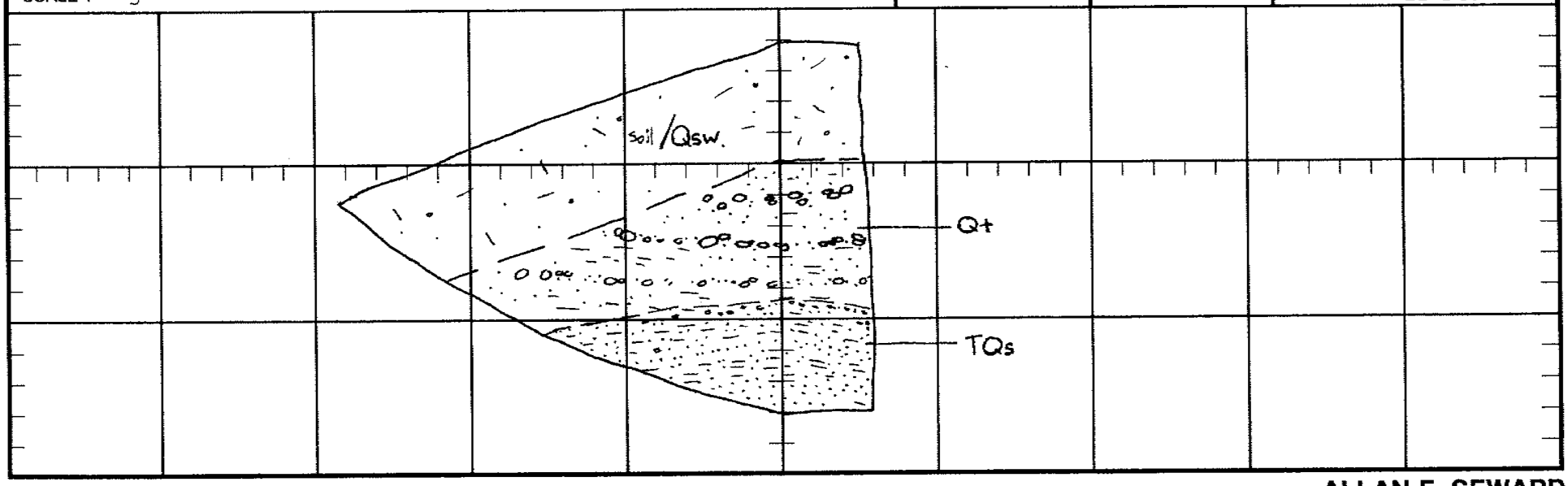
DATE 7/12/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown sandy silt with scattered pebbles; dense; dry to slightly damp			
4 - 8.5' TERRACE DEPOSITS; Qt, Light-gray pebbly, cobbly, silty sandstone; loose to moderately dense; dry			
8.5 - 12' BEDROCK; TQs, Medium-gray to light olive-gray siltstone to fine- to coarse-grained sandstone with pebbles and some scattered cobbles; moderately dense to dense; dry to slightly damp	N60W,12NE		No Ground Water No Caving

N 15 W

SCALE 1" = 5'

TOTAL DEPTH 12 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

PROJECT Newhall Ranch - Phase IB

LOGGED BY DGG

Trench Log No. 37Q

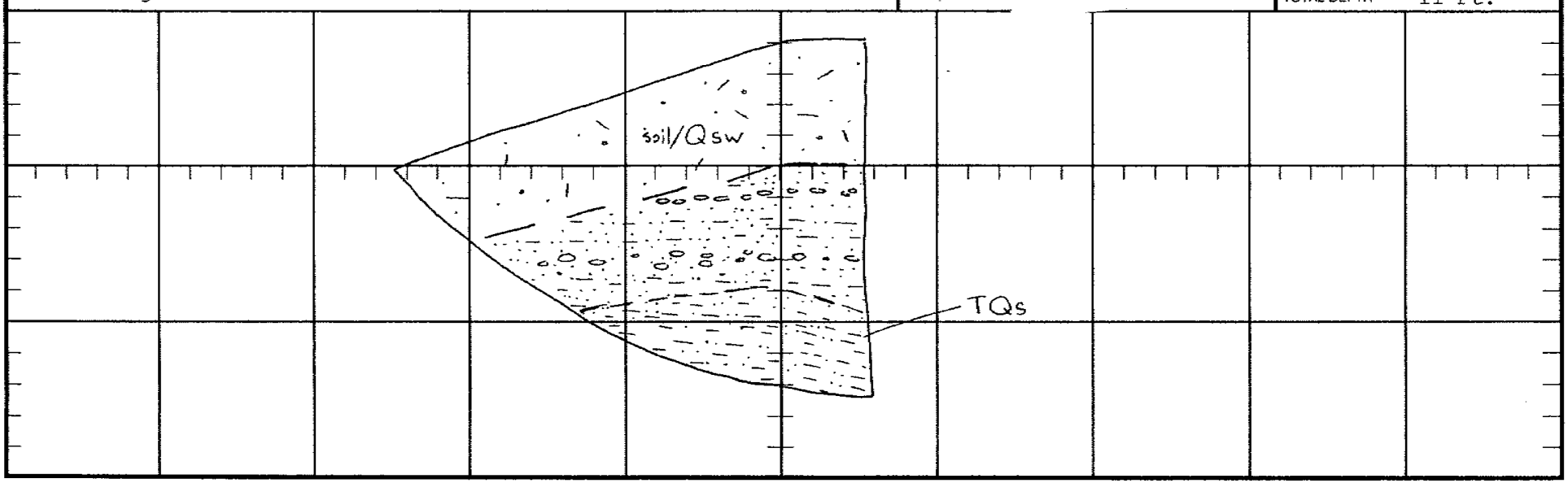
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown sandy silt with scattered pebbles; dense; dry to slightly damp			
4 - 8' TERRACE DEPOSIT; Qt, Light-gray pebbly, cobbly, silty sandstone; loose to moderately dense; dry			
8 - 11' BEDROCK; TQs, Medium-gray to light olive-gray siltstone; dense; slightly damp	N69W,8NE		
			No Ground Water No Caving

SCALE 1" = 5'

N 88 E

TOTAL DEPTH 11 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 38Q

PROJECT Newhall Ranch - Phase IB

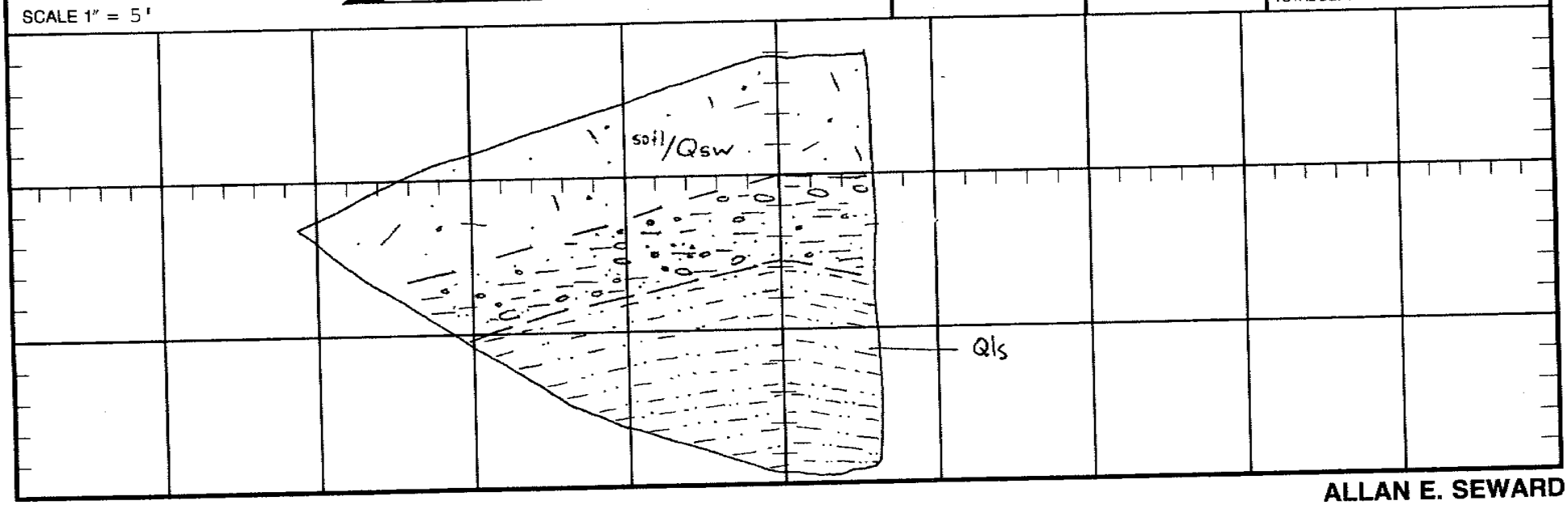
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown sandy silt with scattered pebbles; dense; dry to slightly damp			All contacts very gradational
4 - 14' LANDSLIDE; Qls, Light-gray pebbly, cobbly, silty sandstone and medium-gray to light olive-gray siltstone; dense; sandstone slightly loose and weathered;dry to slightly damp	N68W,12NE		No Ground Water No Caving

N 40 E

TOTAL DEPTH 14 Ft.

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 39Q

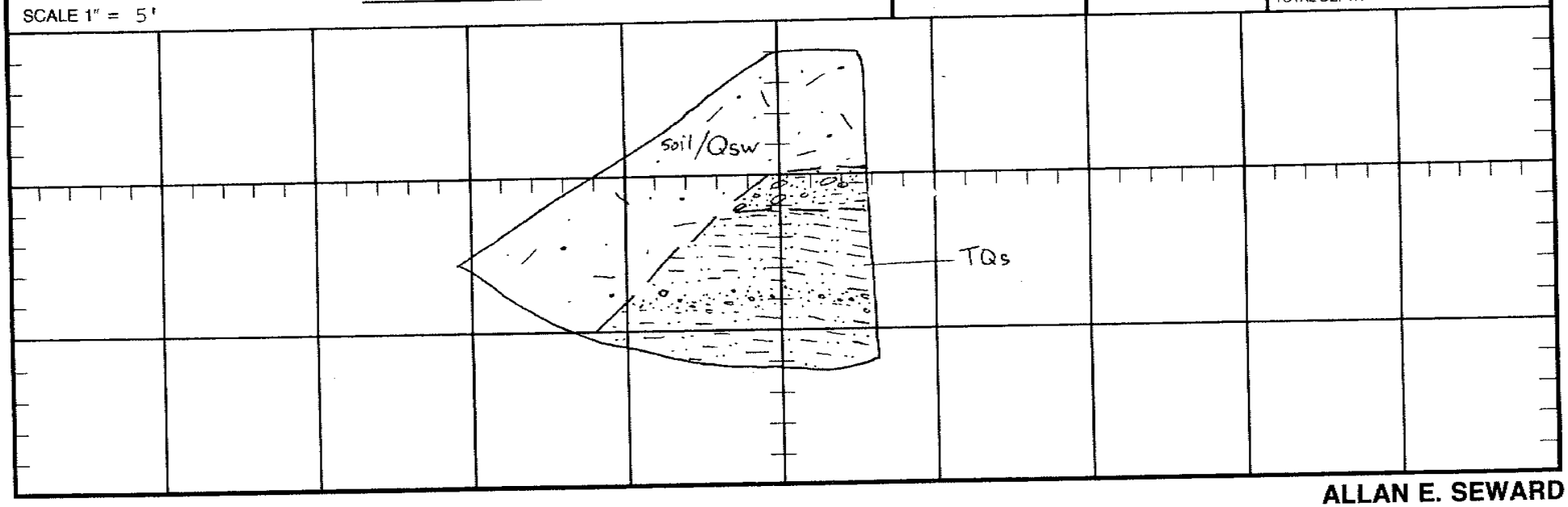
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown sandy silt with scattered pebbles; dense; dry to slightly damp			
4 - 10' BEDROCK; TQs, Light- to medium-gray pebbly sandstone and silty sandstone with scattered cobbles and light olive-gray sltstone; moderately dense to dense; dry; upper foot slightly reddish-brown and loose	Apx:N75W,9NE		No Ground Water No Caving TOTAL DEPTH 10 Ft.

N 37 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 40Q

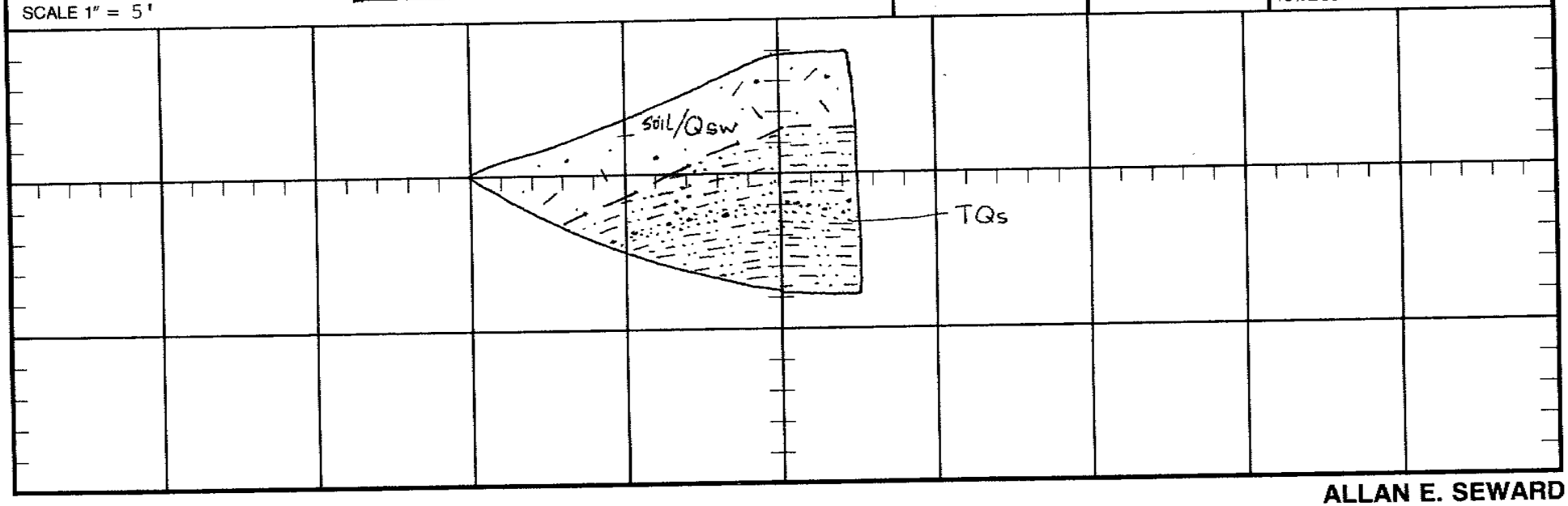
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2.5' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown sandy silt with scattered pebbles; dense; dry to slightly damp			
2.5 - 8' BEDROCK; TQs, Light-gray to light olive-gray siltstone to pebbly sandstone with scattered cobbles; moderately dense; dry	N38W,13NE		No Ground Water No Caving TOTAL DEPTH 8 Ft.

N 87 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 41Q

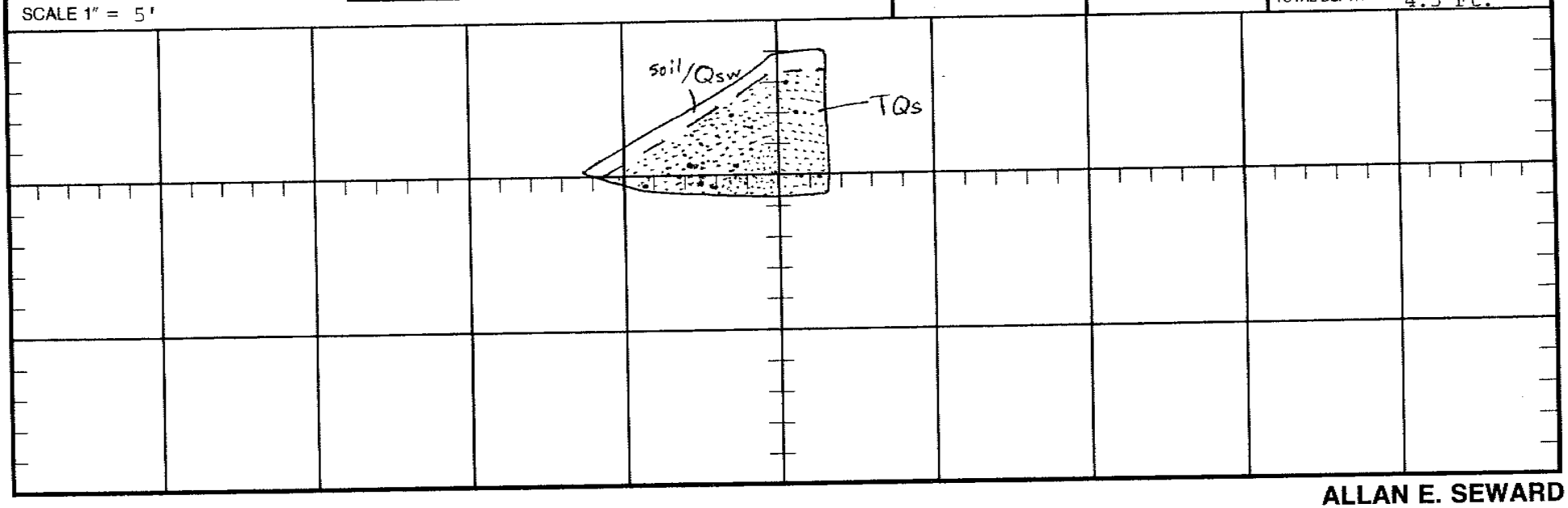
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6" SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown sandy silt with scattered pebbles; dense; dry to slightly damp			
6" - 4.5' BEDROCK; TQs, Light-gray fine- to coarse-grained pebbly sandstone with scattered cobbles; loose to moderately dense; dry	N58W,11NE		No Ground Water No Caving TOTAL DEPTH 4.5 Ft.

N 36 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 42Q

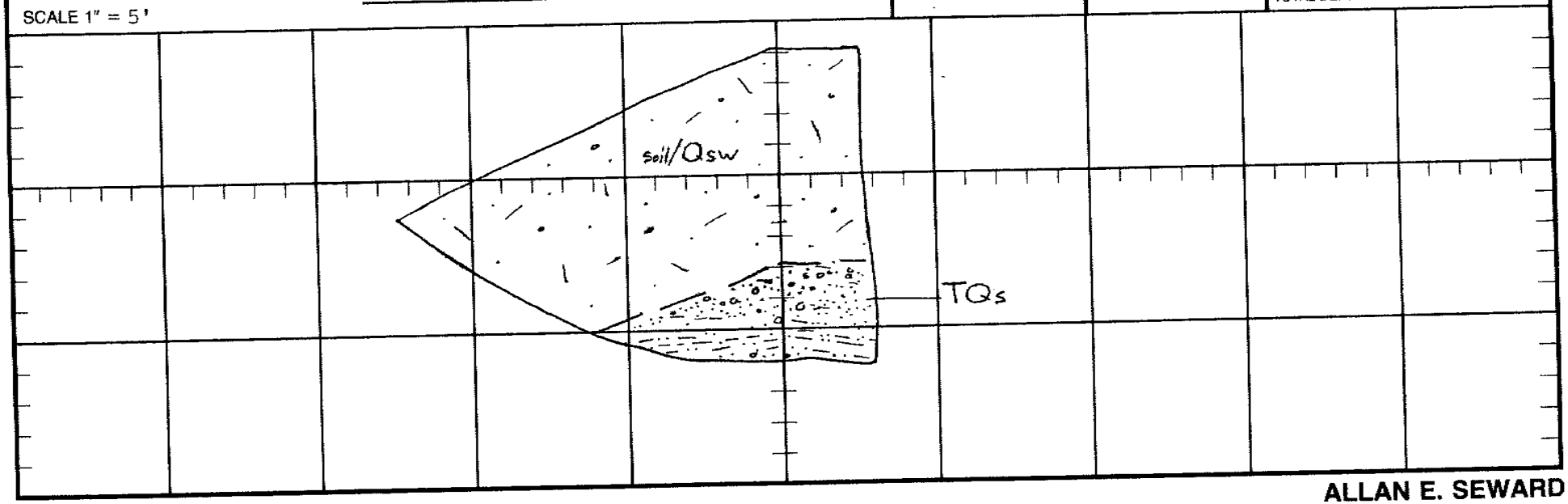
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 7' SOIL/SLOPEWASH; soil/Qsw, Light to medium-brown sandy silt with scattered pebbles and cobbles; loose to dense; dry			Trenches 42Q thru 53Q excavated and logged 9/29/99 using track-mounted back-hoe with 24" bucket
7 - 10' BEDROCK; TQs, Light-brown to medium-gray siltstone to fine- to coarse-grained sandstone with scattered pebbles and cobbles; loose to moderately dense; dry	Apx:N79W,13NE		7-9' Highly weathered
			No Ground Water No Caving
			TOTAL DEPTH 10 Ft.

N 65 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 43Q

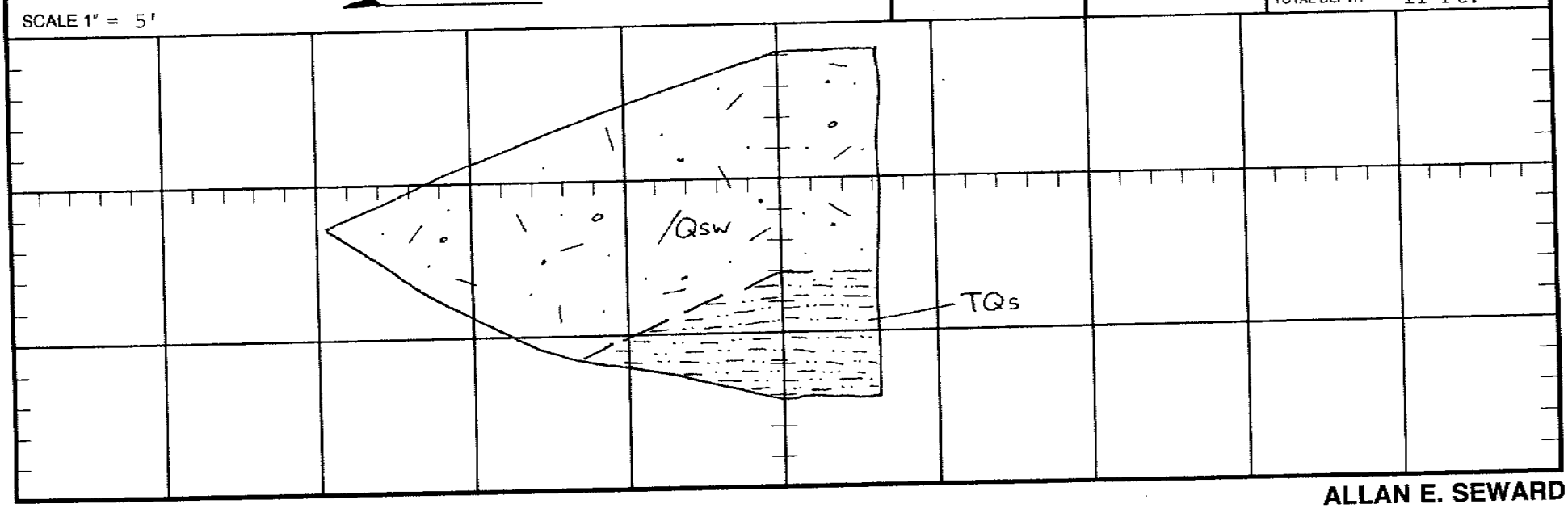
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 7' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown sandy silt with scattered pebbles and cobbles; loose to dense; dry 7 - 11' BEDROCK?; TQs?, Light-gray to medium-brown siltstone; dense; dry	Apx:N35W,12NE		No Ground Water No Caving TOTAL DEPTH 11 Ft.

N 38 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 44Q

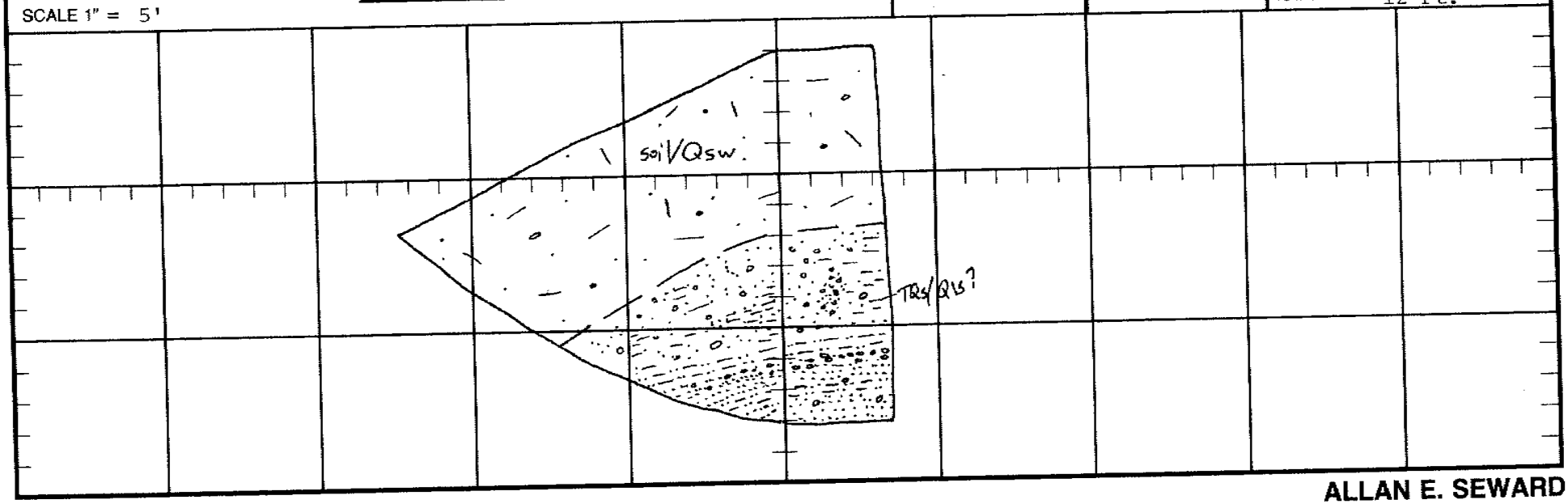
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6' SOIL/SLOPEWASH; soil/Qsw, Light-to medium-brown sandy silt with scattered pebbles and cobbles; loose to dense; dry			Material from 6-9' appears disturbed; material from 9-12' is tighter and may be in-place
6 - 12' BEDROCK/LANDSLIDE?; TQs/Qls?, Light-gray silty sandstone sandy siltstone and light-brown to medium-gray siltstone to fine- to coarse-grained sandstone with scattered pebbles and cobbles; loose to moderately dense; dry	N30W,16NE		No Ground Water No Caving TOTAL DEPTH 12 Ft.

N 49 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 45Q

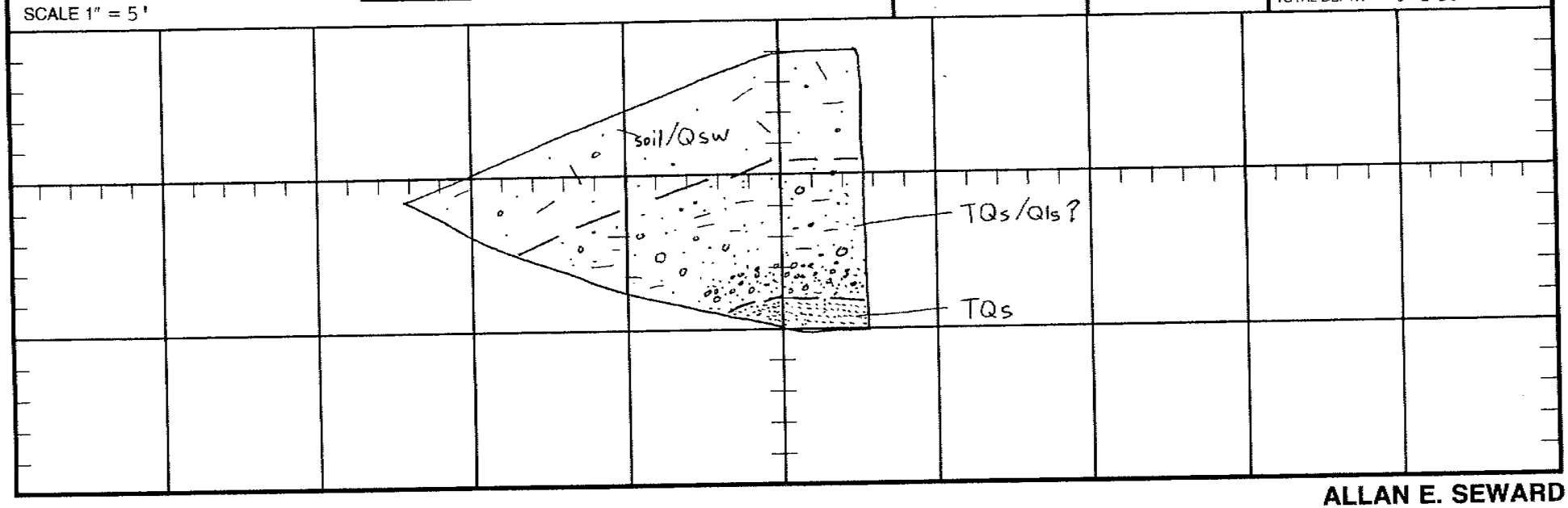
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3.5' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown sandy silt with scattered pebbles and cobbles; loose to dense; dry			
3.5 - 8' BEDROCK/LANDSLIDE?; TQs/Qls?, Light-gray silty sandstone/sandy siltstone with scattered pebbles and cobbles; loose; dry			
8 - 9' BEDROCK; TQs, Light-gray fine-grained sandstone; moderately dense; dry	N30W,12NE		No Ground Water No Caving TOTAL DEPTH 9 Ft.

Due East

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qlsl-1

LOGGED BY DGG

Trench Log No. 46Q

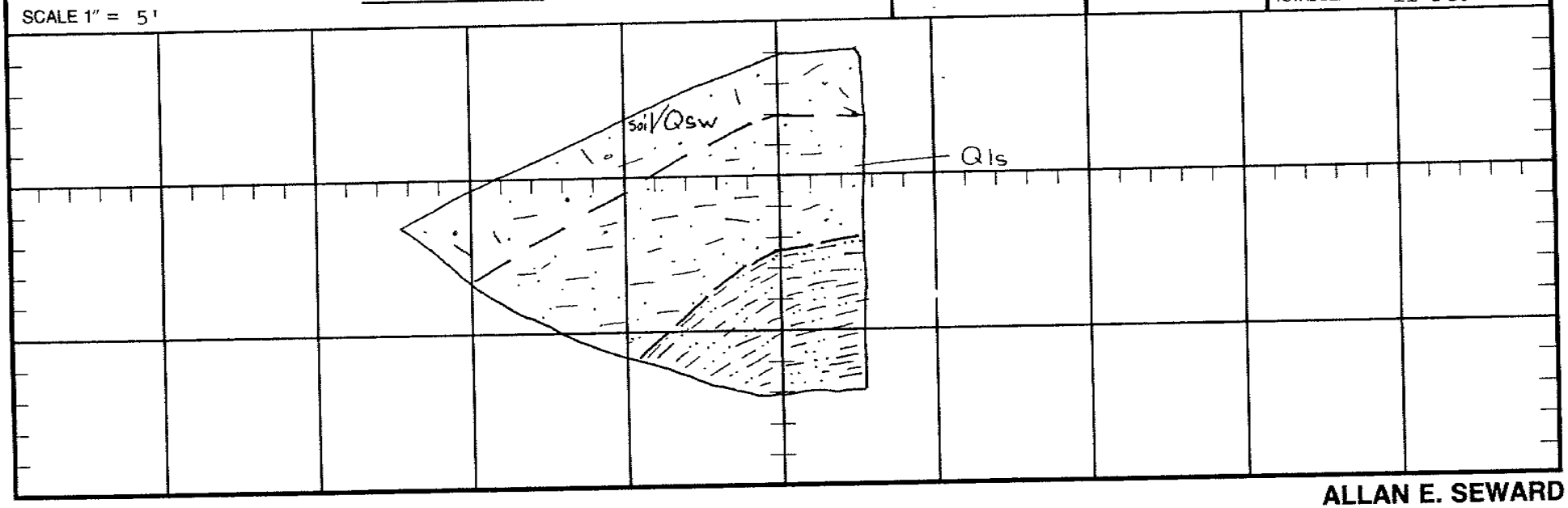
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2' SOIL/SLOPEWASH; soil/Qsw, Light-to medium-brown sandy silt with scattered pebbles and cobbles; loose to dense; dry		Sp? Apx: N53E,26SE	
2 - 6.5' LANDSLIDE; Qls, Light yellowish-gray siltstone; loose; dry			
6.5 - 11' Light-gray to medium-gray silt-stone; dense; dry to slightly damp			No Ground Water No Caving TOTAL DEPTH 11 Ft.

N 75 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 47Q

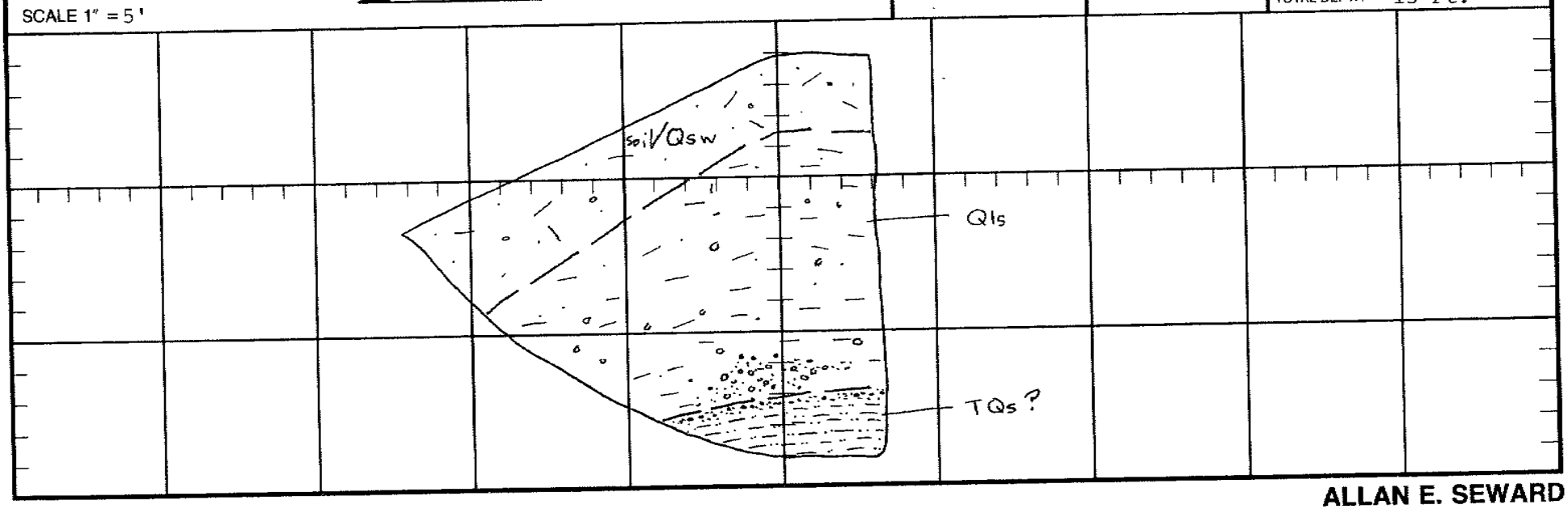
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2.5' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown sandy silt with scattered pebbles and cobbles; loose to dense; dry			Slopewash/Qls contact gradational
2.5 - 11' LANDSLIDE; Qls, Light- to medium-gray sandy siltstone with scattered pebbles and cobbles; loose; dry to slightly damp with caliche			
11 - 13' BEDROCK?; TQs?, Light- to medium gray sandy siltstone to coarse-grained pebbly sandstone; dense; slightly damp	Apx:N65W,18NE		No Ground Water No Caving
			TOTAL DEPTH 13 Ft.

N 6 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 48Q

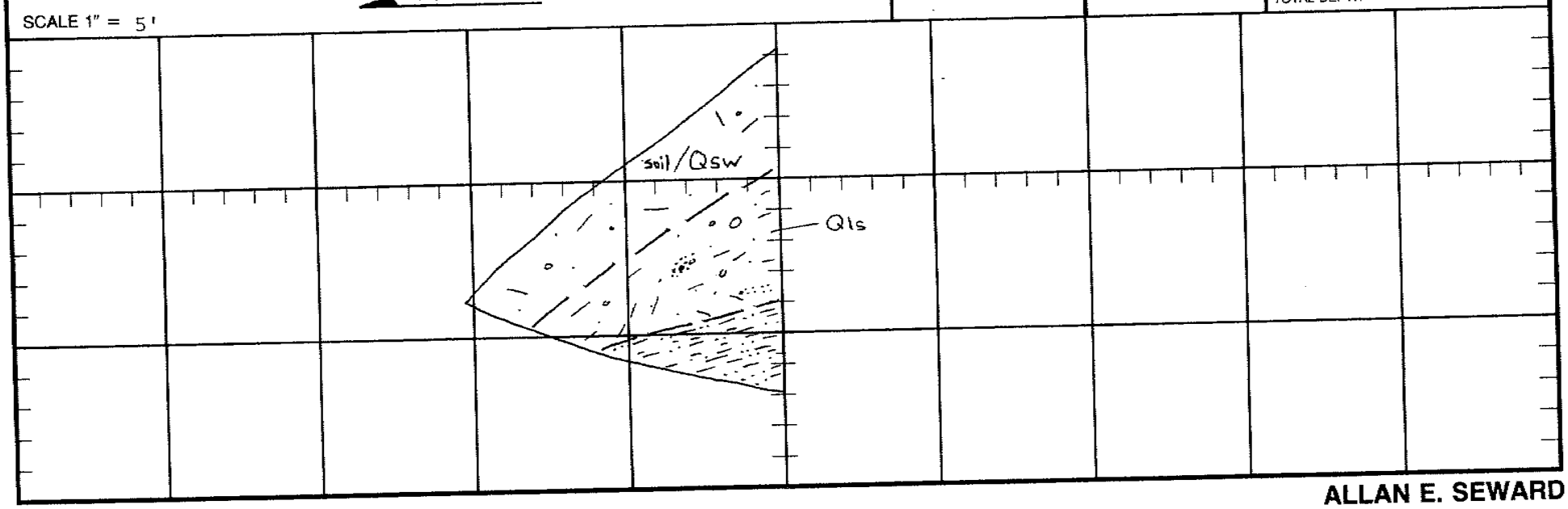
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3.5' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown sandy silt with scattered pebbles and cobbles; loose to dense; dry			
3.5 - 8' LANDSLIDE; Qls, Light-to medium-gray sandy silt-sotne with scattered pebbles and cobbles; loose; dry to slightly damp with caliche		SP?:N58E,15SE	
8 - 11' Light- to medium-gray siltstone; dense;slightly damp			No Ground Water No Caving
			TOTAL DEPTH 11 Ft.

Due East

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 49Q

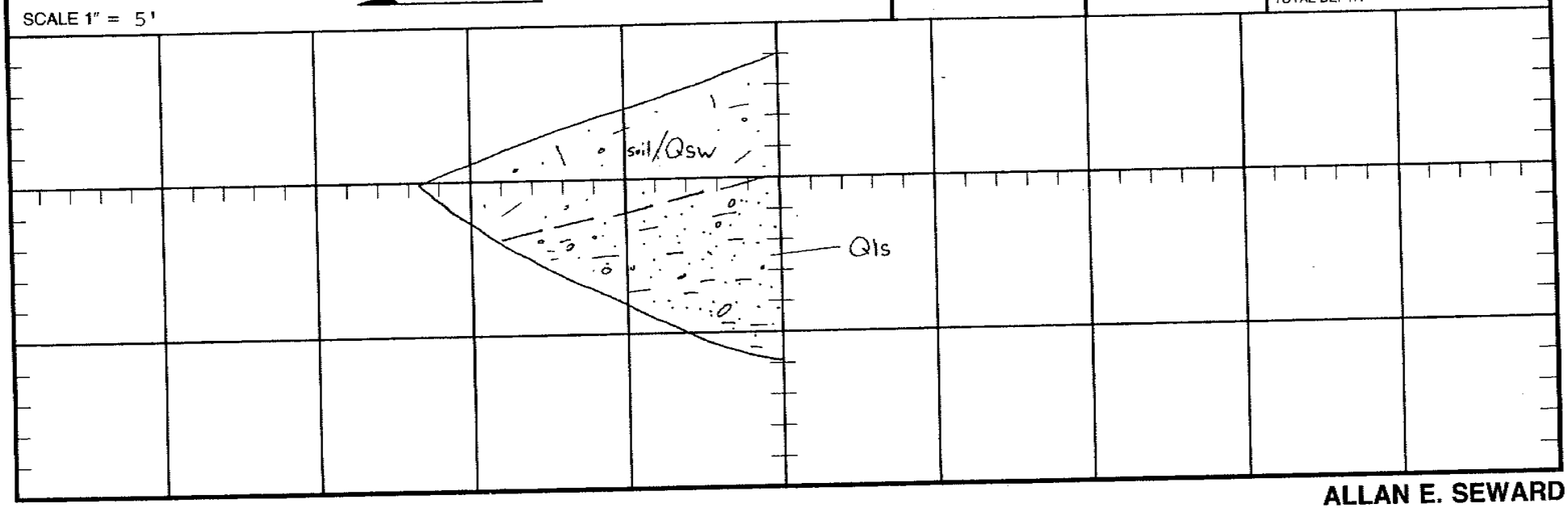
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown sandy silt with scattered pebbles and cobbles; loose to dense; dry 4 - 10' LANDSLIDE?; Qls?, Light- to medium-gray sandy siltstone with scattered pebbles and cobbles; loose; dry to slightly damp with caliche; moderately dense at base			No Ground Water No Caving TOTAL DEPTH 10 Ft.

N 28 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 50Q

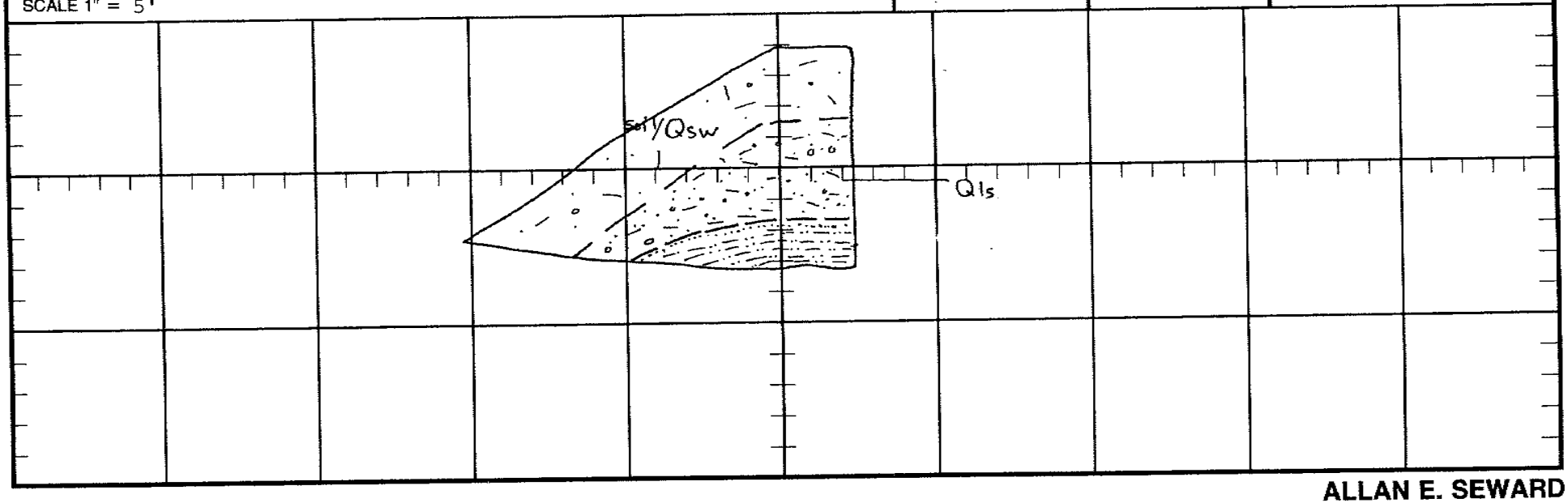
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2.5'? SOIL/SLOPEWASH; soil/Qsw, Light to medium-brown sandy silt with scattered pebbles and cobbles; loose to dense; dry			
2.5 - 6' LANDSLIDE; Qls, Light to medium-gray sandy siltstone with scattered pebbles and cobbles; loose; dry to slightly damp with caliche caliche	N56W,18NE		
6 - 7' Medium-gray sandy siltstone; dense; dry			
			No Ground Water No Caving TOTAL DEPTH 7 Ft.

N 48 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 51Q

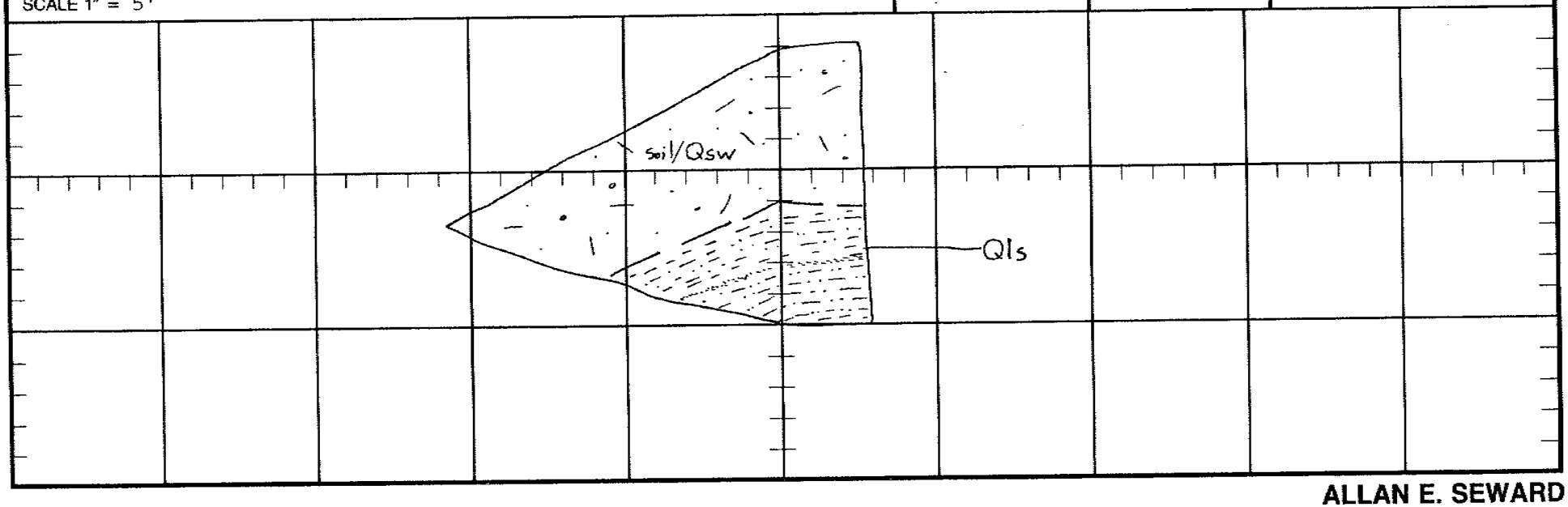
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 5' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown sandy silt with scattered pebbles and cobbles; loose to dense; dry			
5 - 9' LANDSLIDE; Qls, Light- to medium-gray siltstone to sandy siltstone; dense to very dense; dry	Apx:N64W;16NE		No Ground Water No Caving TOTAL DEPTH 9 Ft.

N 28 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 52Q

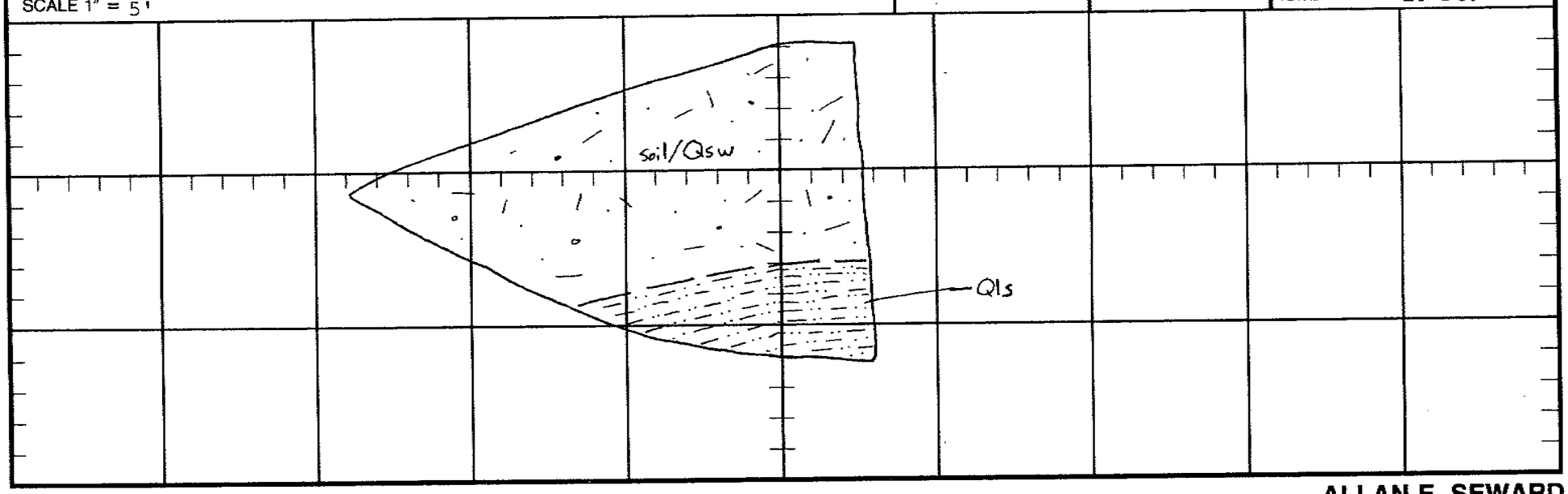
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 7' SOIL/SLOPEWASH; soil/Qsw, Light-to medium-brown sandy silt with scattered pebbles and cobbles; loose to dense; dry			
7 - 10' LANDSLIDE; Qls, Light- to medium-gray siltstone to sandy siltstone; dense to very dense; dry	Apx:N65W,11NE		No Ground Water No Caving TOTAL DEPTH 10 Ft.

SCALE 1" = 5'

N 23 E



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 53Q

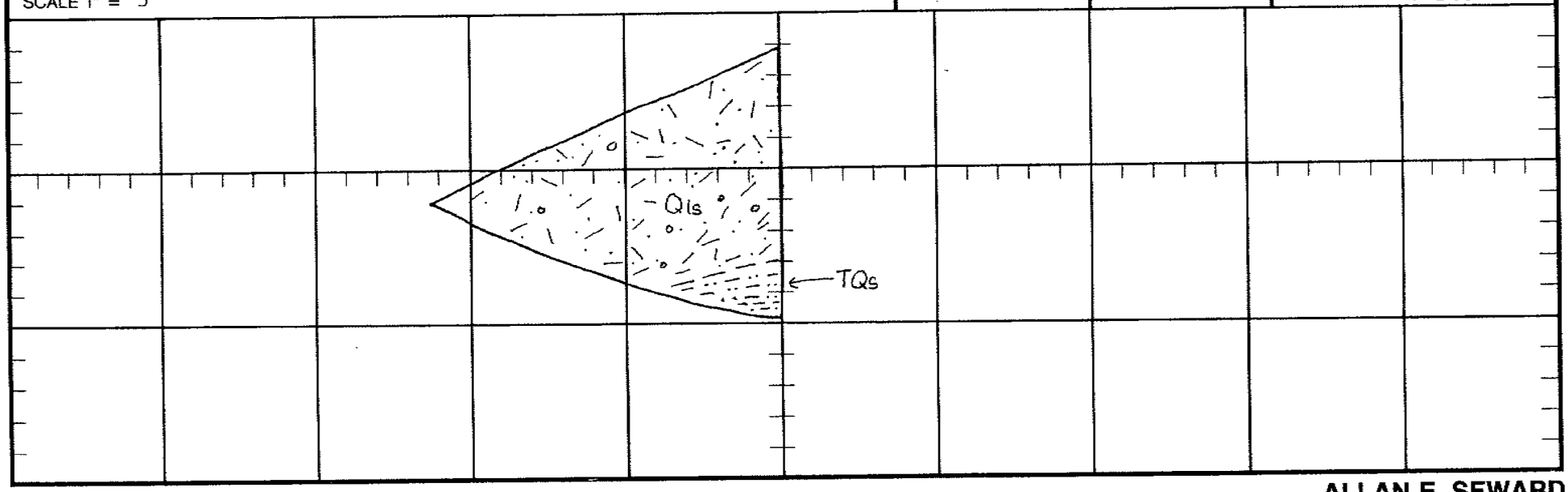
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 7' LANDSLIDE; Qls, Medium-brown to brownish-gray silty sand/sandy silt with pebbles and cobbles; chaotic; loose; dry			Upper portion of Qls is probably Qsw.
7 - 9' BEDROCK; TQs, Light- to medium-gray siltstone to sandy siltstone; moderately dense; dry			No Ground Water No Caving TOTAL DEPTH 9 Ft.

N 78 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 54Q

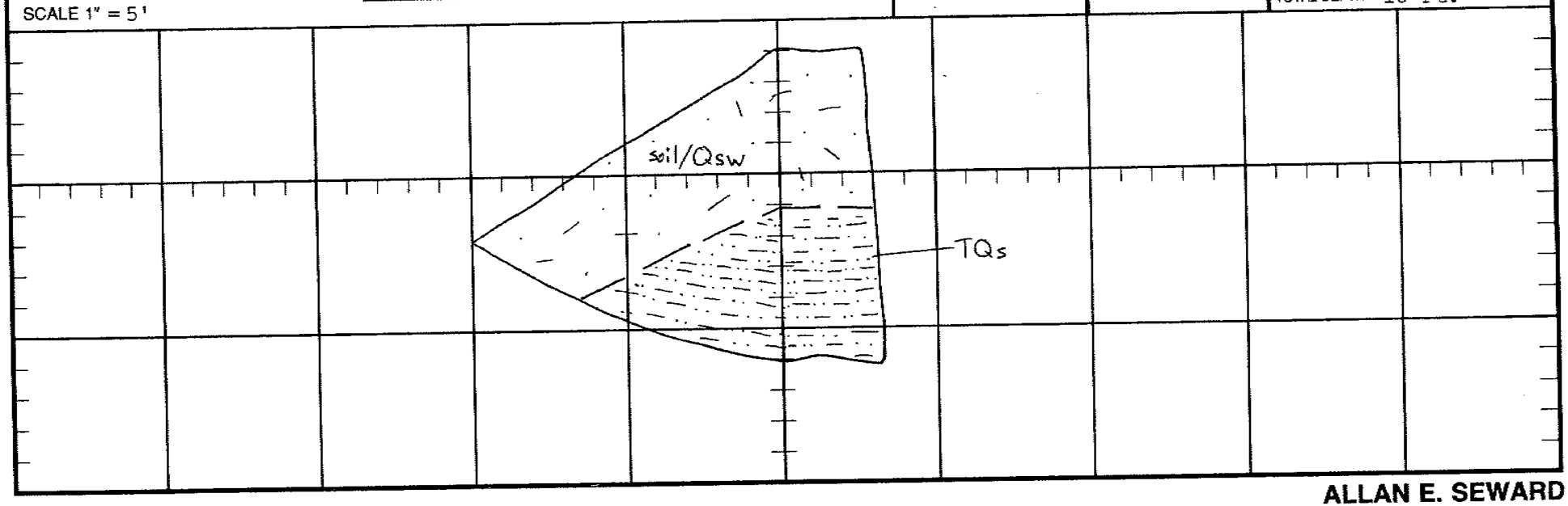
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 5' SOIL/SLOPEWASH; soil/Qsw, Light to medium-gray sandy siltstone; loose to moderately dense; dry; fractured; caliche with local lenses of fine- to coarse-grained sand; loose			Trenches 54Q thru 64Q excavated and logged 9/30/99 using a track-mounted backhoe with a 24" bucket
5 - 10' BEDROCK; TQs, Medium-gray to medium-brown siltstone; dense to very dense; slightly damp	Apx: N48W,15NE		
			No Ground Water No Caving TOTAL DEPTH 10 Ft.

N 46 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Q1sI-1

LOGGED BY DGG

Trench Log No. 55Q

PROJECT Newhall Ranch - Phase IB

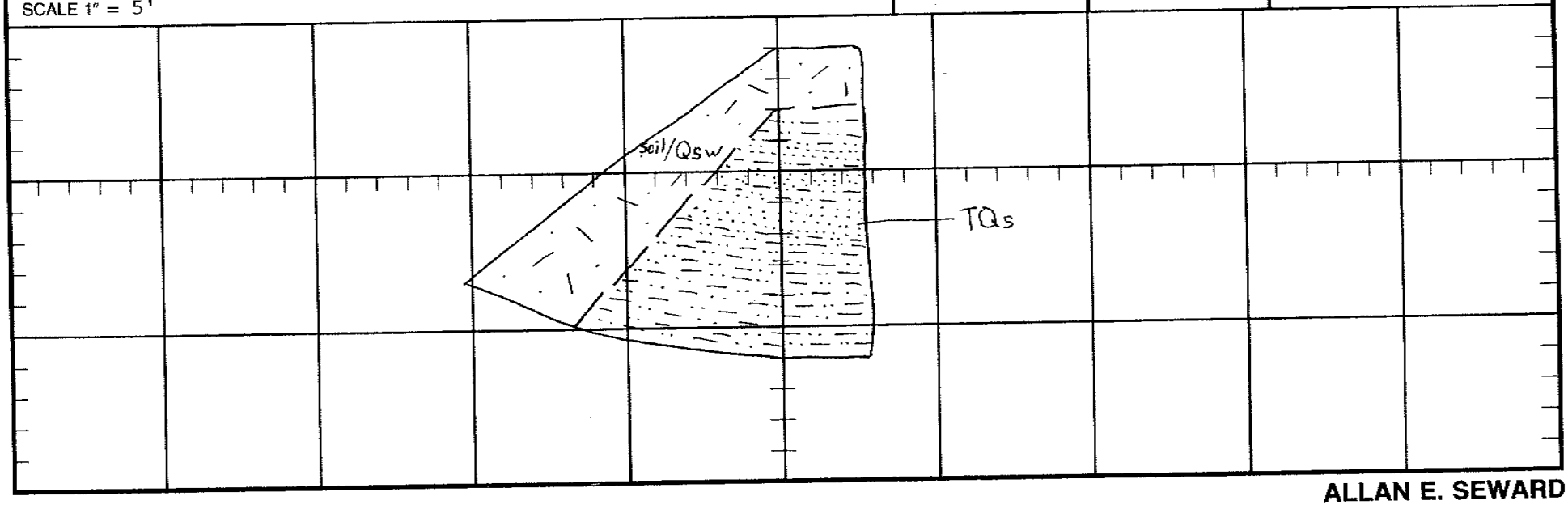
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2' SOIL/SLOPEWASH; soil/Qsw, Light-to medium-gray sandy siltstone; loose to moderately dense; dry; fractured; caliche with local lenses of fine- to coarse-grained sand; loose			Upper portions of TQs creep affected
2 - 10' BEDROCK; TQs, Light-to medium-gray siltstone to sandy siltstone to fine- to medium-grained siltstone; dense to very dense; slightly damp	N52W,14NE		No Ground Water No Caving

N 51 E

SCALE 1" = 5'

TOTAL DEPTH 10 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 56Q

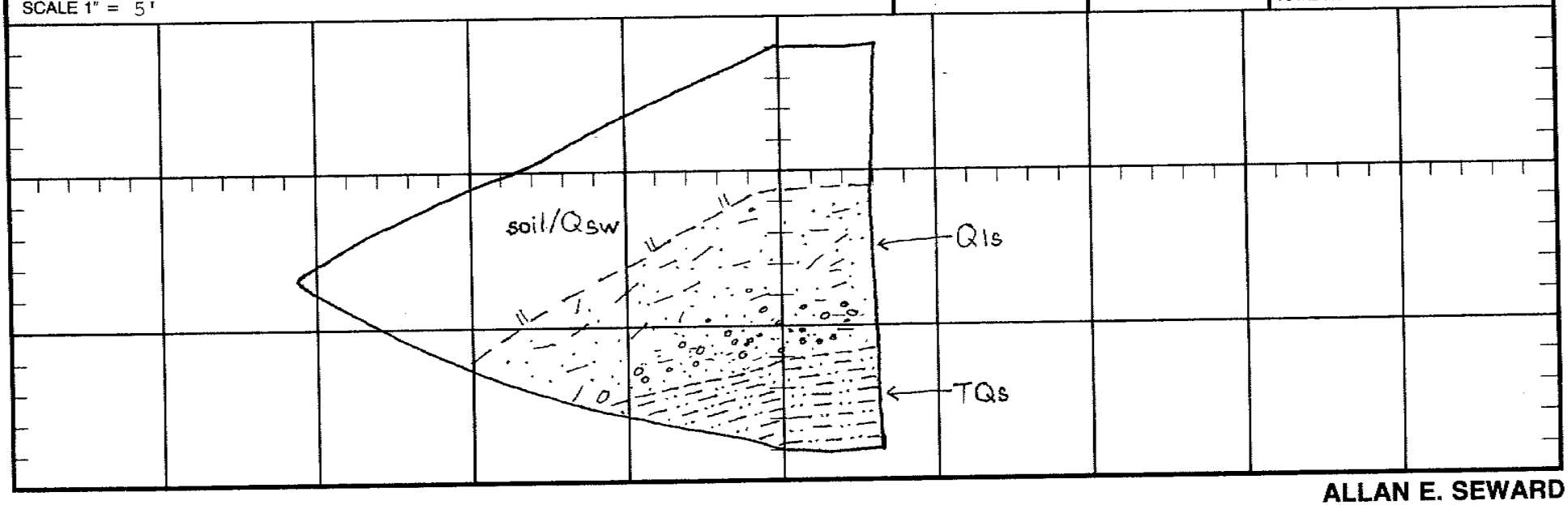
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4.5' SOIL/SLOPEWASH; soil/Qsw, Light-to medium-gray sandy siltstone, with local lenses of fine- to coarse-grained sand ; loose to moderately dense; dry; fractured; caliche			
4.5 - 10' LANDSLIDE; Qls, Medium-gray sandy siltstone; moderately dense; soft; slightly damp; cobble lense at base			
10 - 13' BEDROCK; TQs, Medium-gray siltstone; dense; slightly damp	SP?:N36W,15NE		No Ground Water No Caving TOTAL DEPTH 13 Ft.

N 9 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

PROJECT Newhall Ranch - Phase IB

LOGGED BY DGG

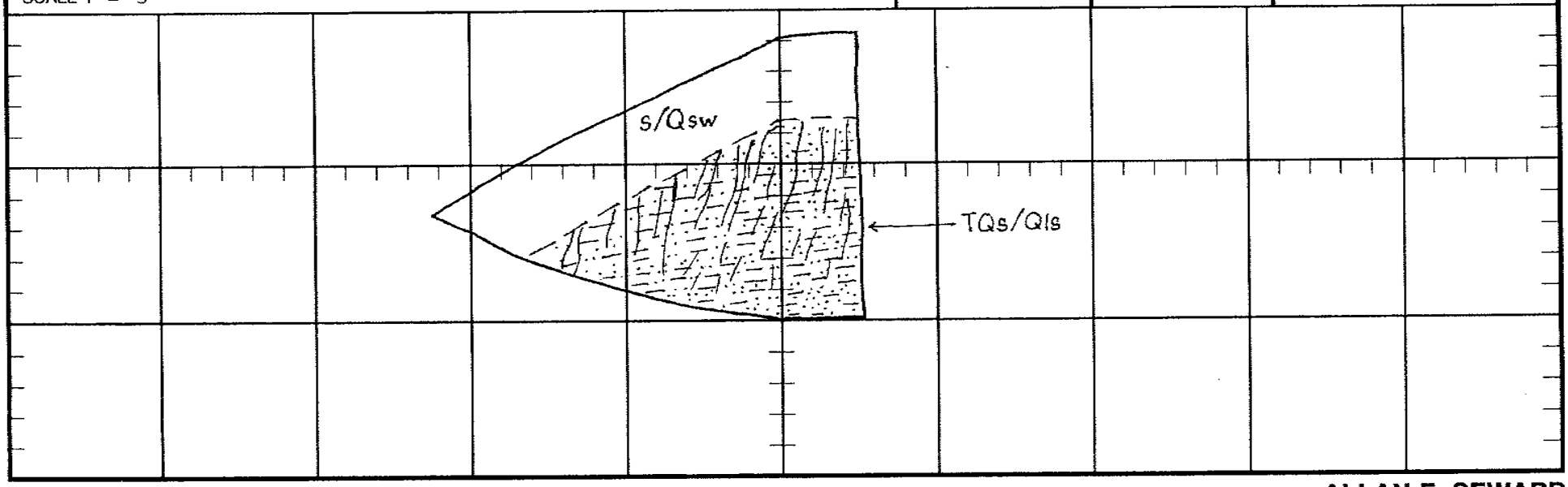
Trench Log No. 57Q

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2.5' SOIL/SLOPEWASH; soil/Qsw, Light-to medium-brown sandy silt; loose to moderately dense; dry			Upper 2 ft. TQs - weathered caliche-lined fracture surfaces
2.5 - 9' BEDROCK/LANDSLIDE?; TQs/Qls?, Light-to medium-gray siltstone to sandy siltstone; loose to dense; soft at upper margin; slightly damp	Apx:N40W,15NE		
			No Ground Water No Caving TOTAL DEPTH 9 Ft.

SCALE 1" = 5'

N 48 W



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 58Q

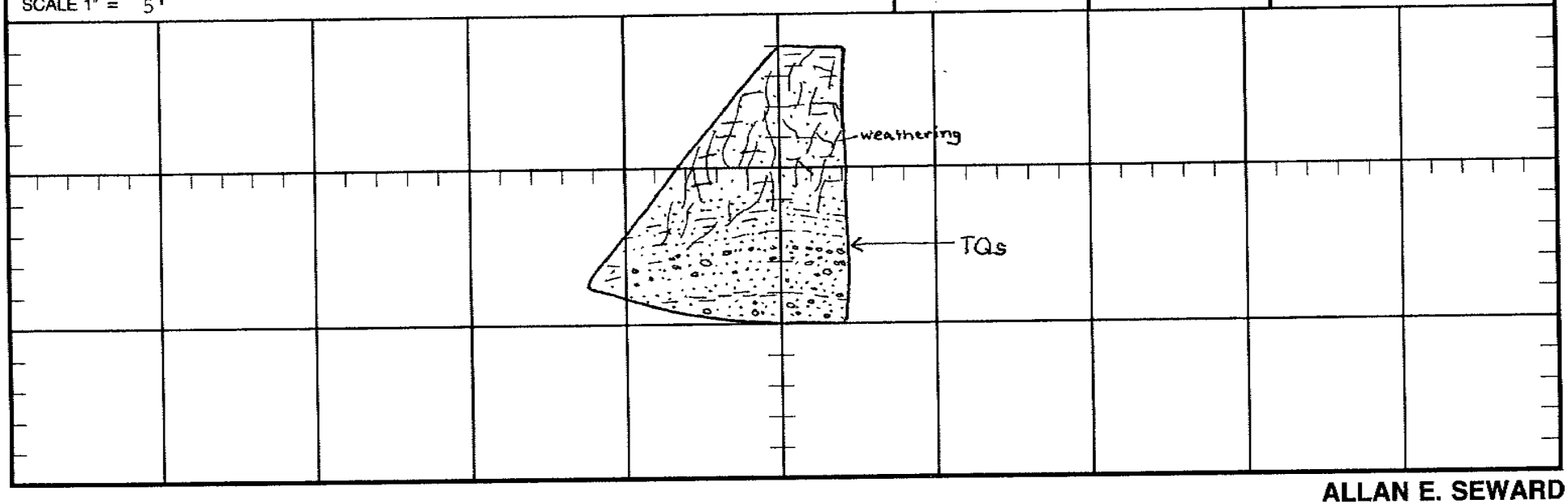
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 9' BEDROCK; TQs, Light-gray siltstone to sandy siltstone to fine- to coarse-grained pebbly cobbly sandstone; loose to moderately dense; dry	N66W,13NE		Top 5 ft. of TQs weathered No Ground Water No Caving TOTAL DEPTH 9 Ft.

N 87 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 59Q

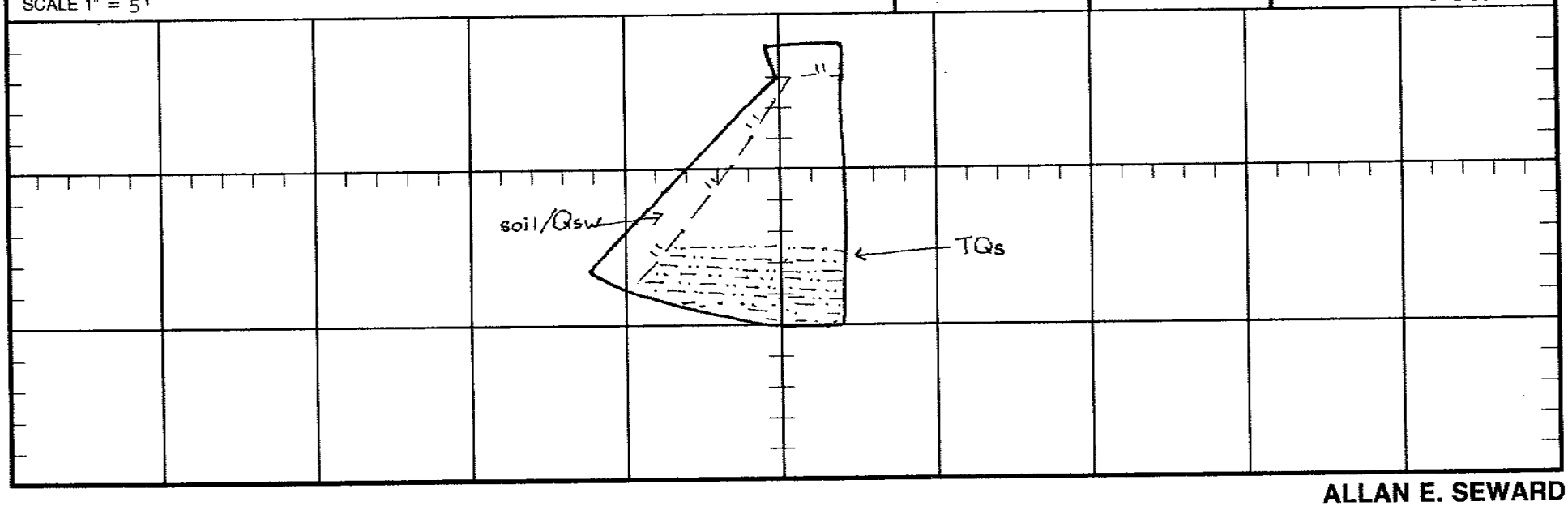
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1' SOIL/SLOPEWASH; soil/Qsw, Light-to medium-brown sandy silt; loose to moderately dense; dry			Top 4.5' of TQs creep affected - fractured and caliche surfaces
1 - 8' BEDROCK; TQs, Light-to medium-gray siltstone to sandy siltstone; dense to very dense; slightly damp	N62W,13NE		
			No Ground Water No Caving
			TOTAL DEPTH 8 Ft.

N 84 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 60Q

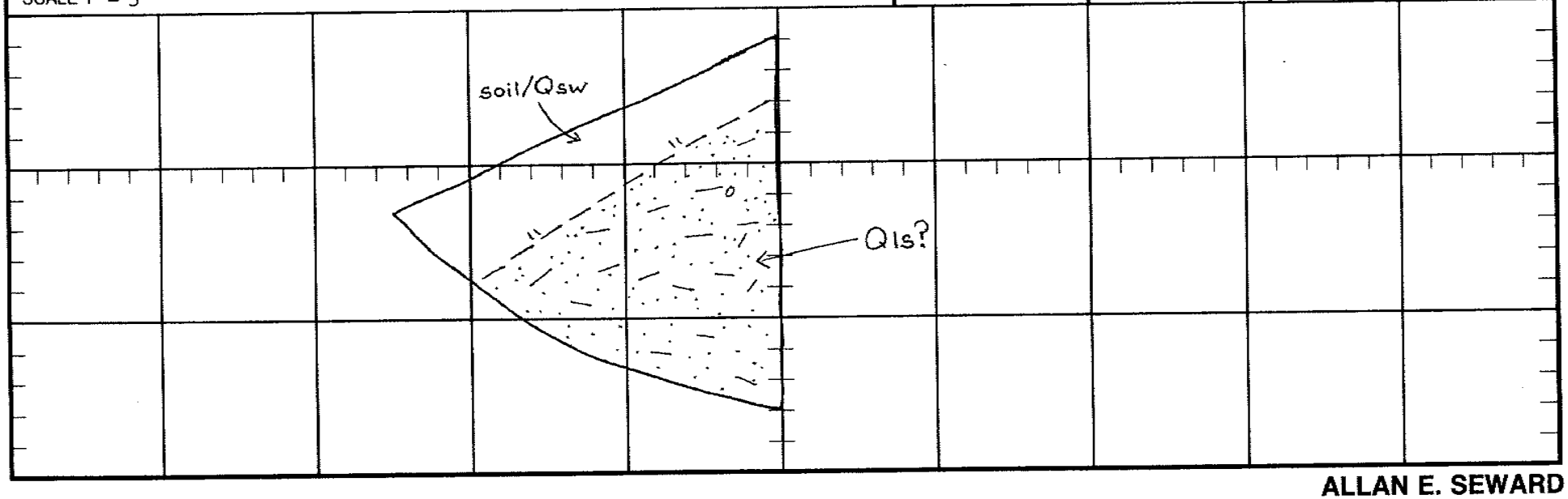
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown sandy silt; loose to moderately dense; dry 2 - 12' LANDSLIDE?; Qls?, Light- to medium-gray siltstone to sandy siltstone; loose to moderately dense; soft; slightly damp			No Ground Water No Caving TOTAL DEPTH 12 Ft.

SCALE 1" = 5'

N 26 E



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 61Q

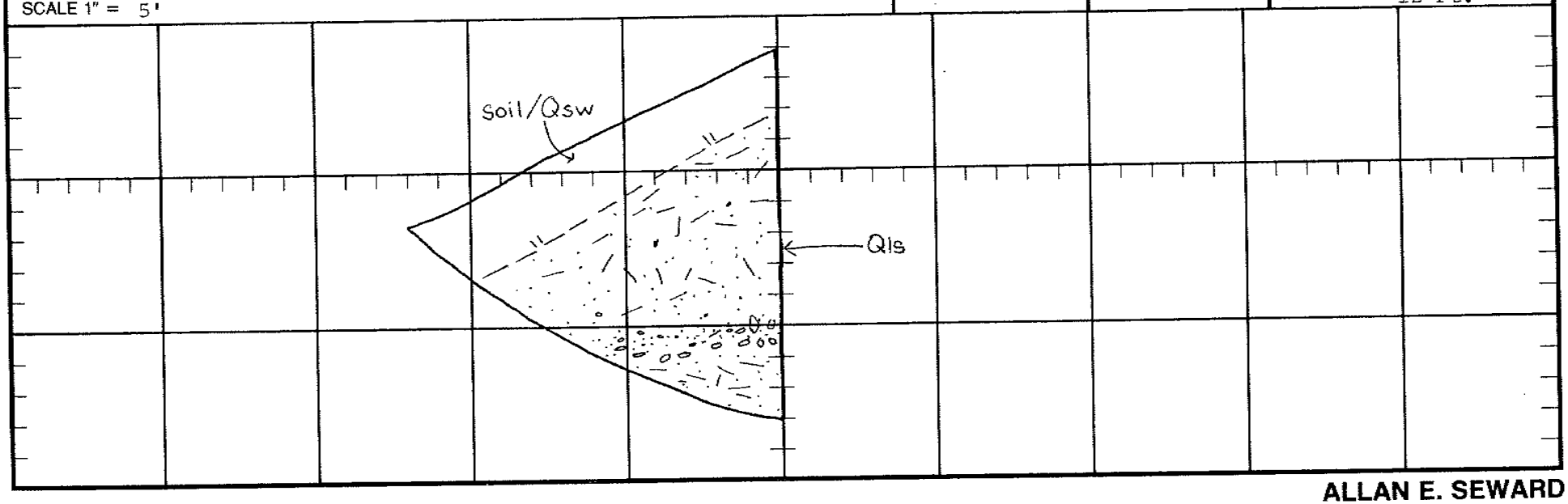
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown sandy silt; loose to moderately dense; dry 2 - 12' LANDSLIDE?; Qls?, Light- to medium-gray siltstone to sandy siltstone with local cobble lenses; loose to dense; soft to stiff; slightly damp			No Ground Water No Caving TOTAL DEPTH 12 Ft.

N 41 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 62Q

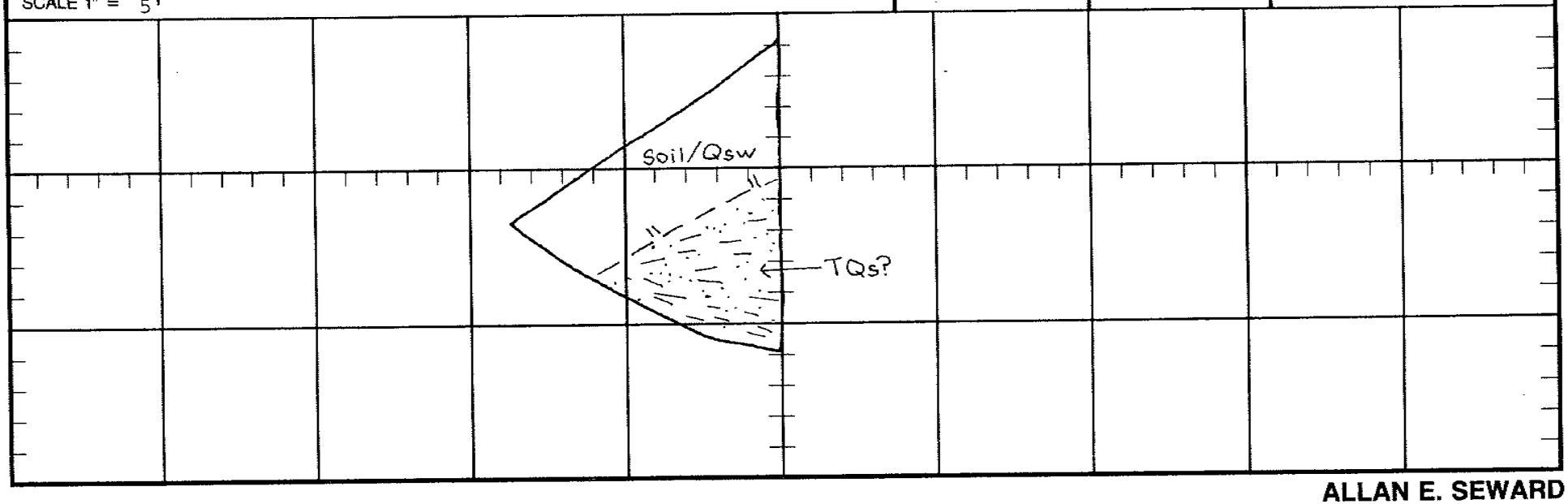
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4.5' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown sandy silt; loose to moderately dense; dry 4.5 - 10' BEDROCK;(?) TQs, Medium-gray to medium brown siltstone; loose to moderately dense; soft to firm; slightly damp; fractured; caliche			No Ground Water No Caving TOTAL DEPTH 10 Ft.

N 87 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 63Q

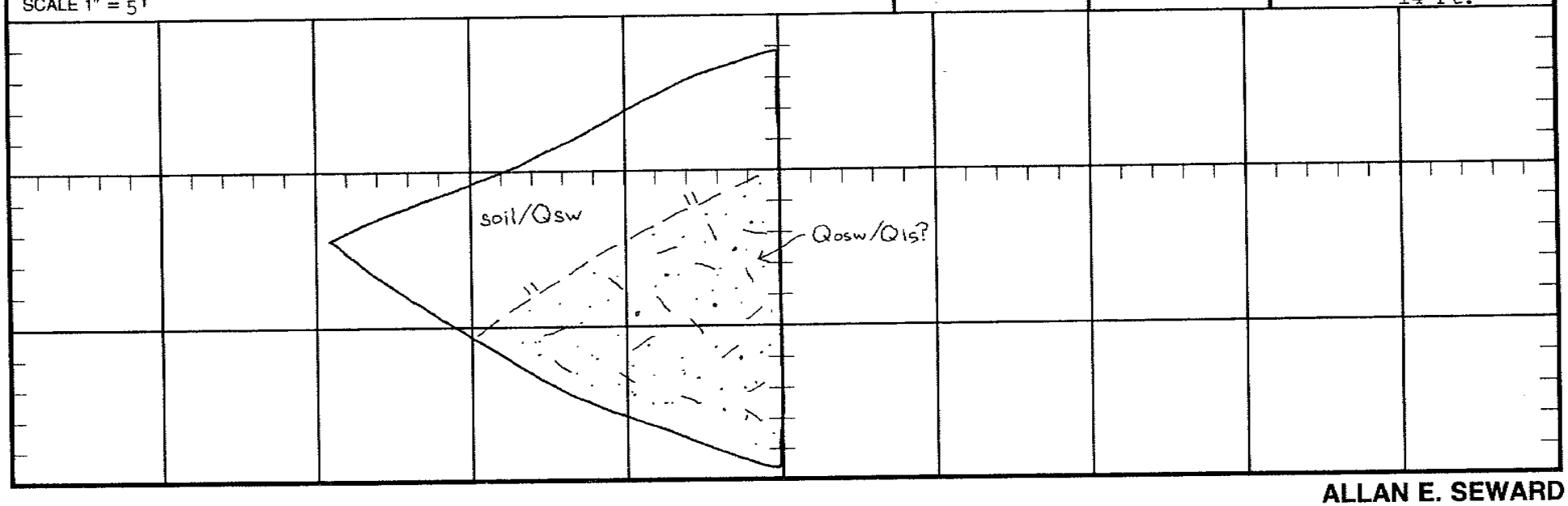
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4' SOIL/SLOPEWASH; soil/Qsw, Light-to medium-brown sandy silt; loose to moderately dense; dry 4 - 14' OLDER SLOPEWASH?/LANDSLIDE?; Qsw/Qls?, Medium-gray to medium-brown siltstone; loose to moderately dense; soft to firm; slightly damp; fractured; caliche			No Ground Water No Caving TOTAL DEPTH 14 Ft.

SCALE 1" = 5'

N 28 E



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 64Q

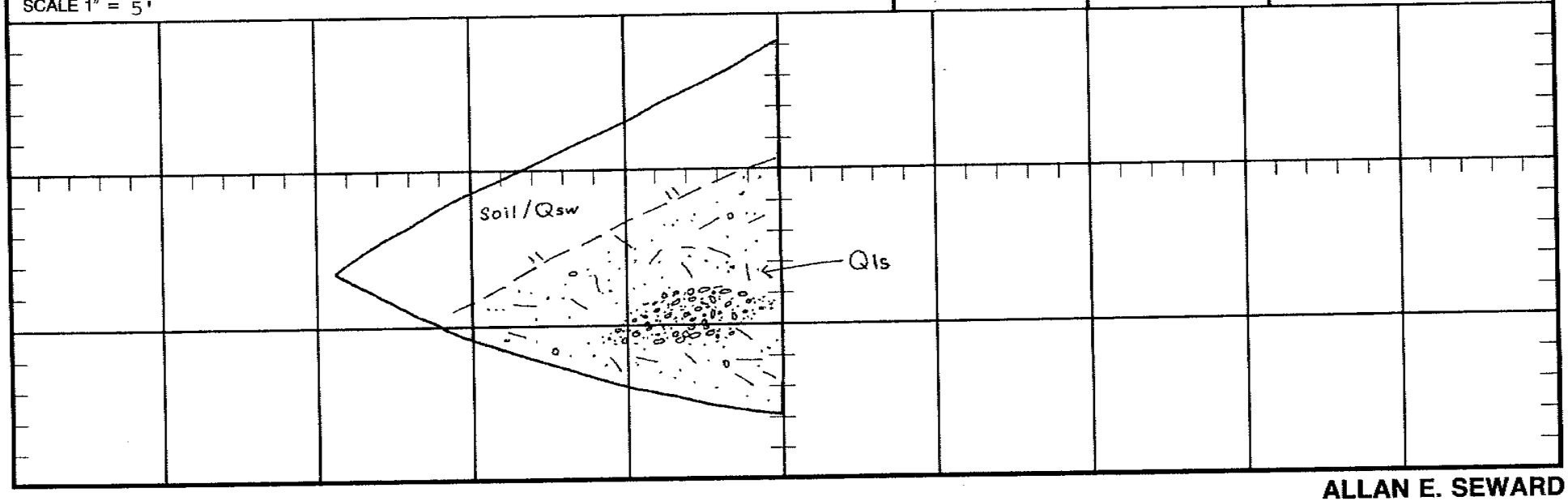
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3.5' SOIL/SLOPEWASH; soil/Qsw, Light-to medium-brown sandy silt; loose to moderately dense; dry 3.5 - 12' LANDSLIDE; Qls, Medium-gray to medium-brown siltstone to sandy siltstone with local pockets of pebbles and cobbles; loose to dense; soft to firm; slightly damp			No Ground Water No Caving TOTAL DEPTH 12 Ft.

N 40 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 65Q

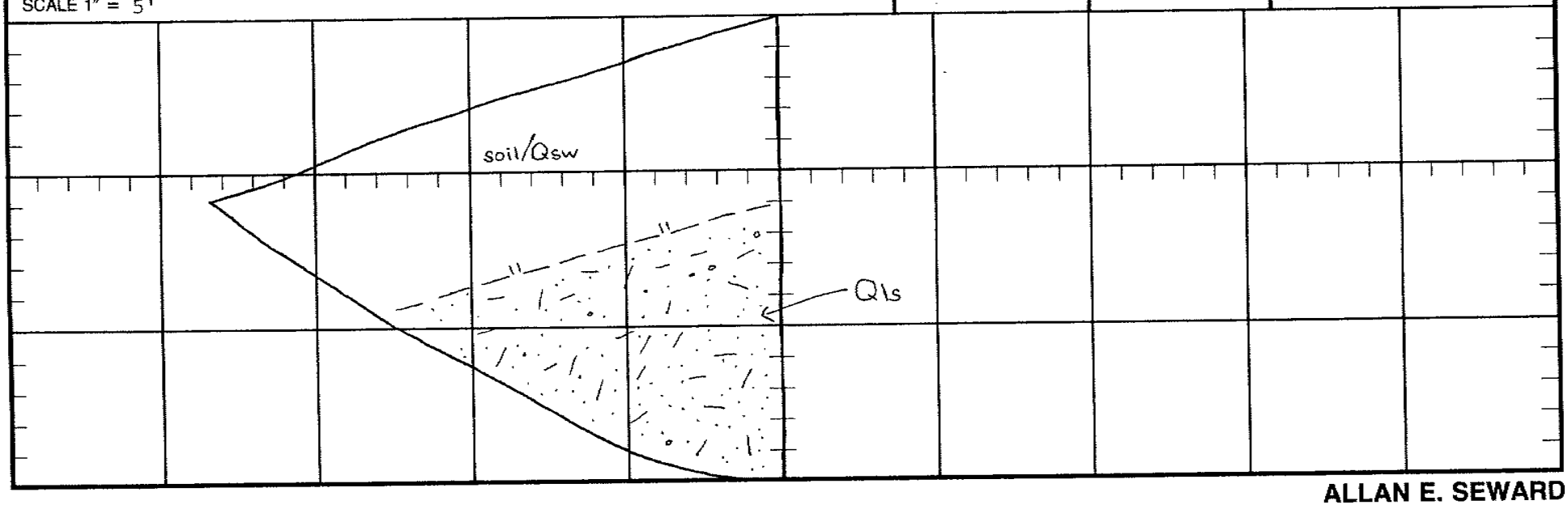
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown silt to sandy silt with some scattered pebbles; loose to medium dense; dry 6 - 15' LANDSLIDE; Qls, Light- to medium-gray to medium-brown siltstone; loose to dense; soft to stiff; slightly damp; upper 4-5' fractured with caliche	Apx:N5E,15NW		Trenches 65Q-73Q excavated and logged 10/1/99 using track-mounted backhoe with 24" bucket No Ground Water No Caving TOTAL DEPTH 15 Ft.

N 58 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 66Q

PROJECT Newhall Ranch - Phase IB

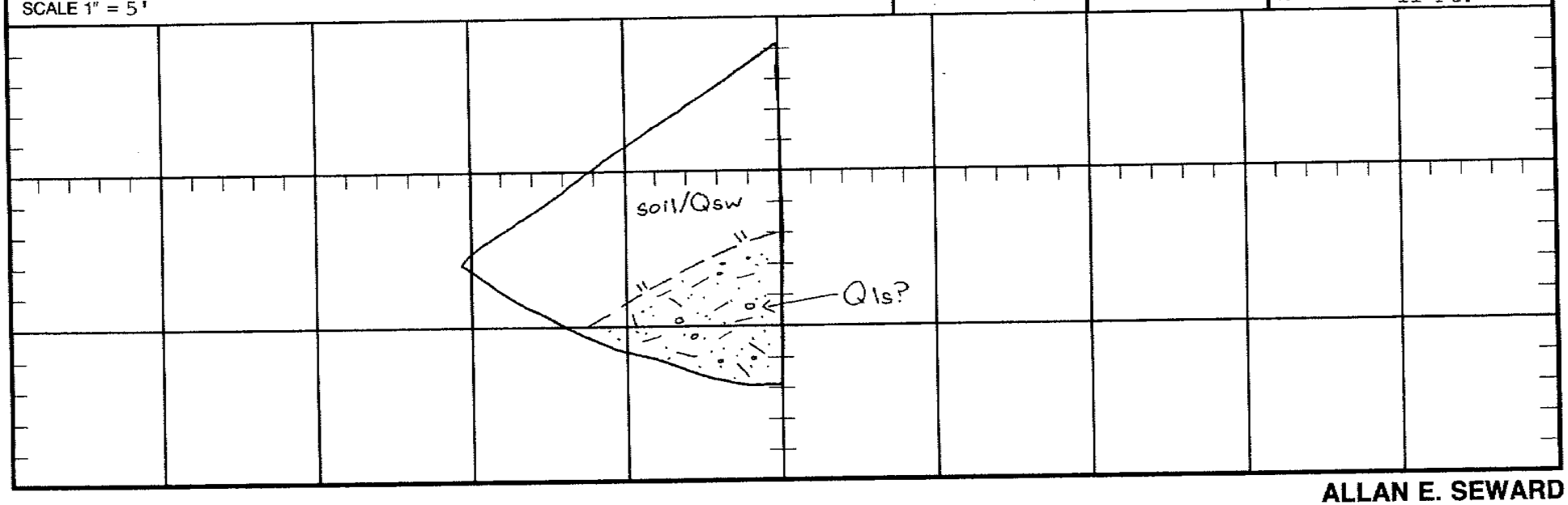
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown silt to sandy silt with some scattered pebbles; loose to medium dense; dry			Caliche surfaces in upper 2 ft. of trench
6 - 11' LANDSLIDE?; Qls?, Light-gray to medium-gray siltstone with few scattered pebbles and cobbles; soft to firm; dry to slightly damp			No Ground Water No Caving

N 38 E

SCALE 1" = 5'

TOTAL DEPTH 11 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 67Q

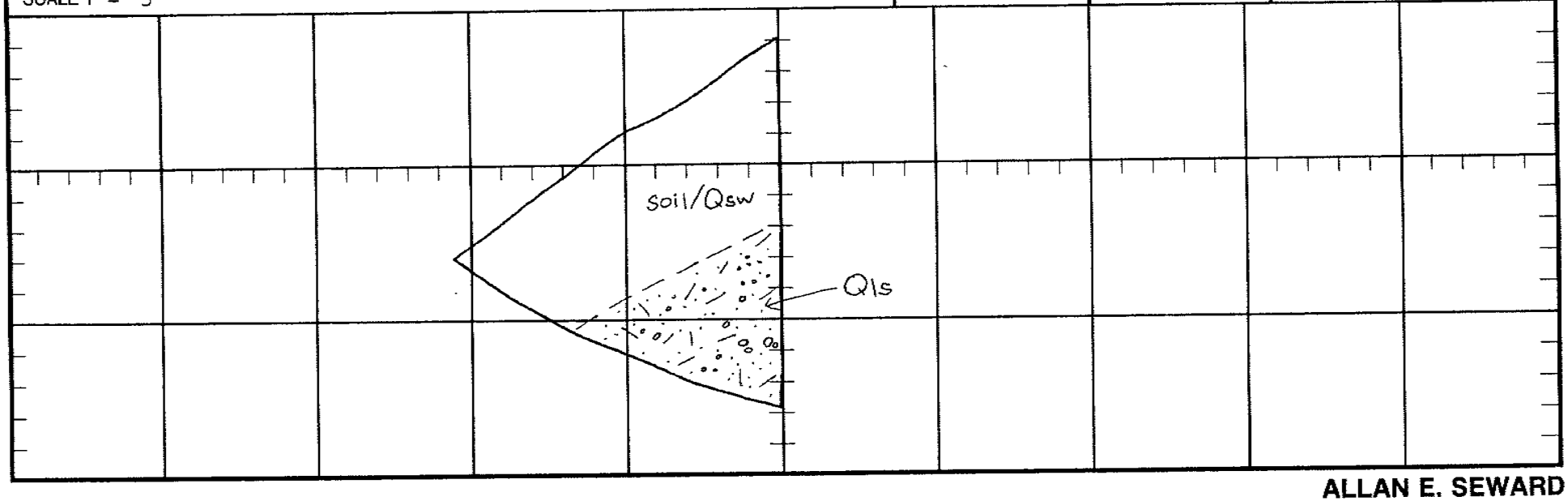
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown silt to sandy silt with some scattered pebbles; loose to medium dense; dry 6 - 12' LANDSLIDE; Qls, Medium-brown to dark-gray siltstone and sandy siltstone with scattered pebbles; soft to firm; loose to dense; slightly damp			No Ground Water No Caving TOTAL DEPTH 12 Ft.

N 36 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 68Q

PROJECT Newhall Ranch - Phase IB

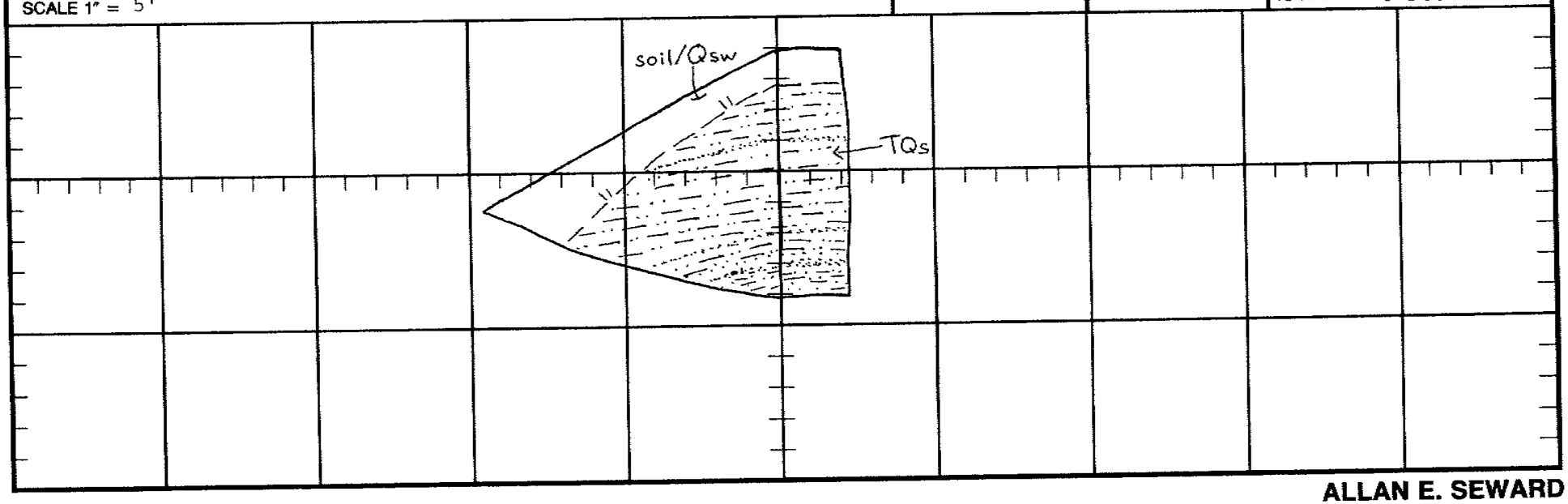
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1' SOIL/SLOPEWASH; soil/Qsw, Light-to medium-brown silt to sandy silt with some scattered pebbles; loose to medium dense; dry			Upper 3 ft. TQs creep affected; some fracturing and caliche
1 - 8' BEDROCK; TQs, Light-gray to medium-gray siltstone to sandy siltstone to fine- to medium-grained sandstone; dense; slightly damp	N75W,18NE		No Ground Water No Caving

N 47 E

SCALE 1" = 5'

TOTAL DEPTH 8 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703Qlsl-1

LOGGED BY DGG

Trench Log No. 69Q

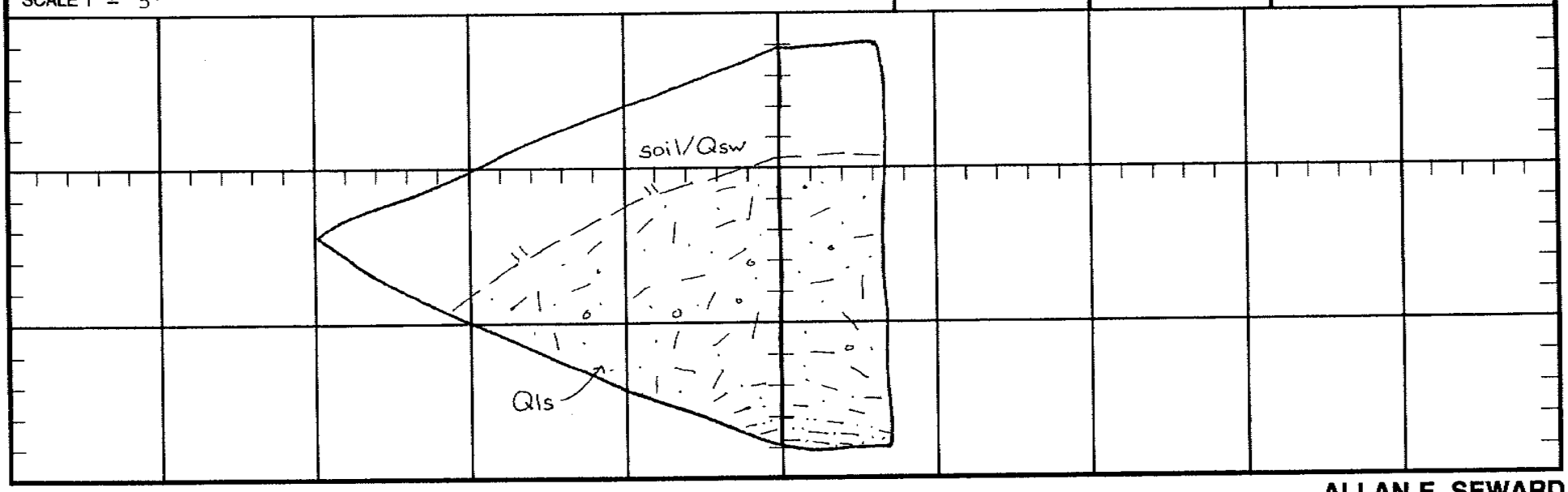
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3.5' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown silt to sandy silt with some scattered pebbles; loose to medium dense; dry			
3.5 - 13' LANDSLIDE; Qls, Medium-brown to dark-gray siltstone and sandy siltstone with scattered pebbles; soft to firm; loose to dense; slightly damp		SP:N28W,19NE	Possible bedrock at base of trench
			No Ground Water No Caving
			TOTAL DEPTH 13 Ft.

SCALE 1" = 5'

N 71 E



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 70Q

PROJECT Newhall Ranch - Phase IB

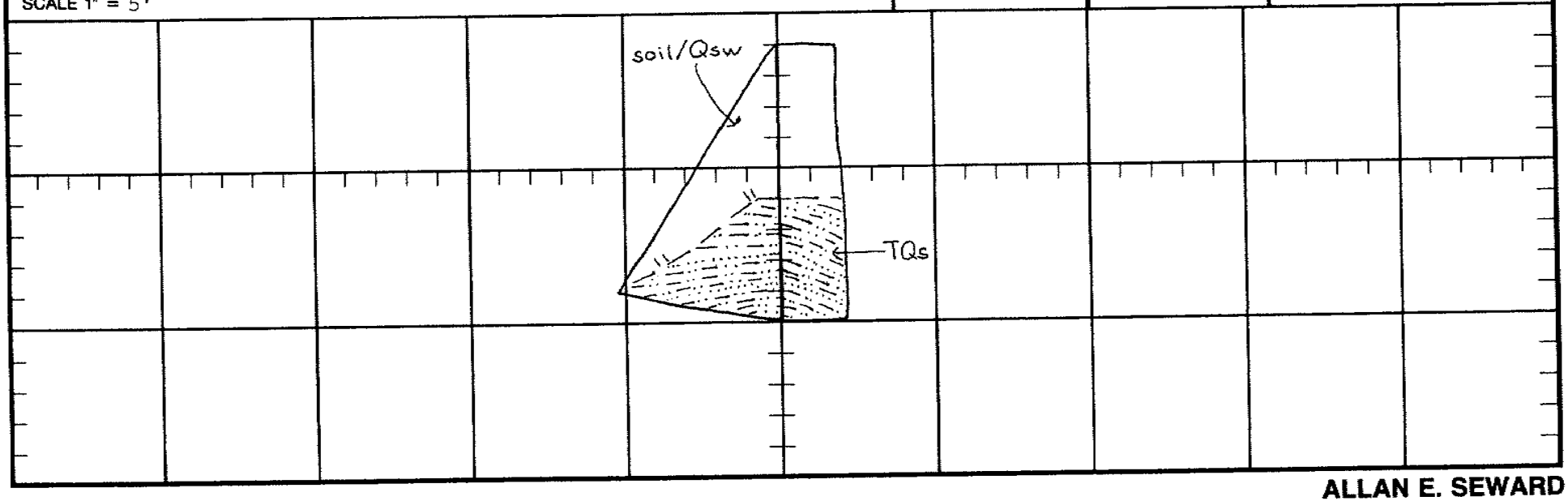
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 5' SOIL/SLOPEWASH; soil/Qsw, Light-to medium-brown silt to sandy silt with some scattered pebbles; loose to medium dense; dry			
5 - 9' BEDROCK; TQs, Light-gray to medium-brown siltstone with fine to medium-grained sandstone stringers; moderately dense to dense; slightly damp	N57W,21NE		No Ground Water No Caving

TOTAL DEPTH 9 Ft.

N 67 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 71Q

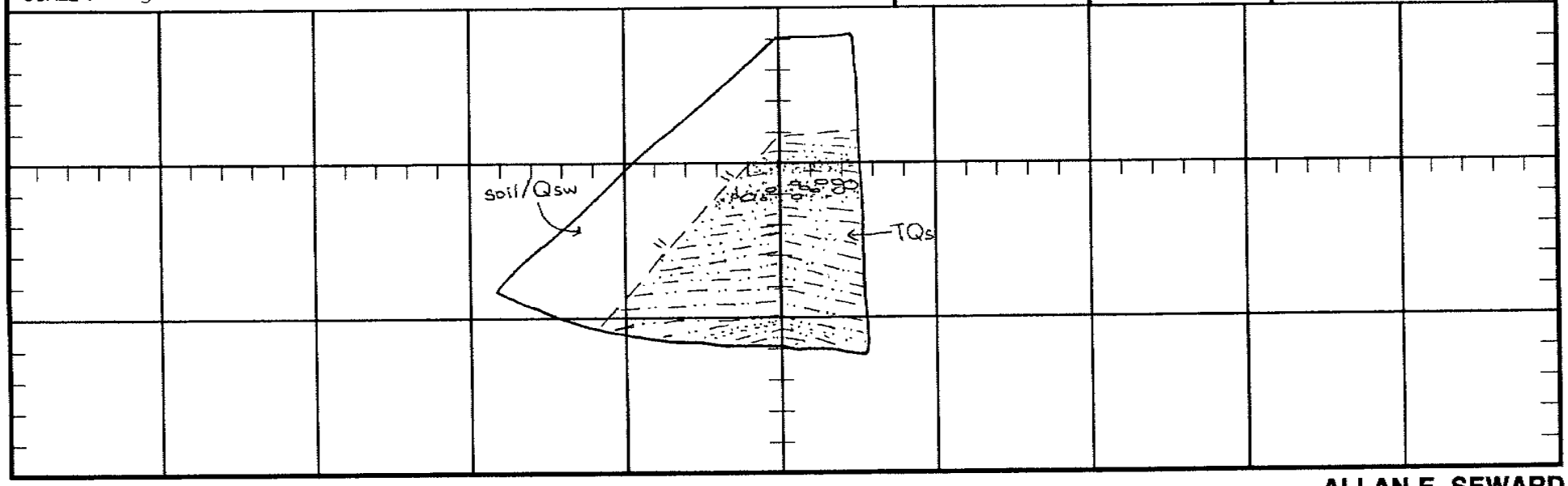
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown silt to sandy silt with some scattered pebbles; loose to medium dense; dry			Top 3-4' of TQs creep affected
3 - 10' BEDROCK; TQs, Light-gray to medium-brown siltstone with fine- to medium-grained sandstone stringers and local pebble/cobble lense; medium dense to dense; slightly damp	N35W,14NE		No Ground Water No Caving
			TOTAL DEPTH 10 Ft.

N 41 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 72Q

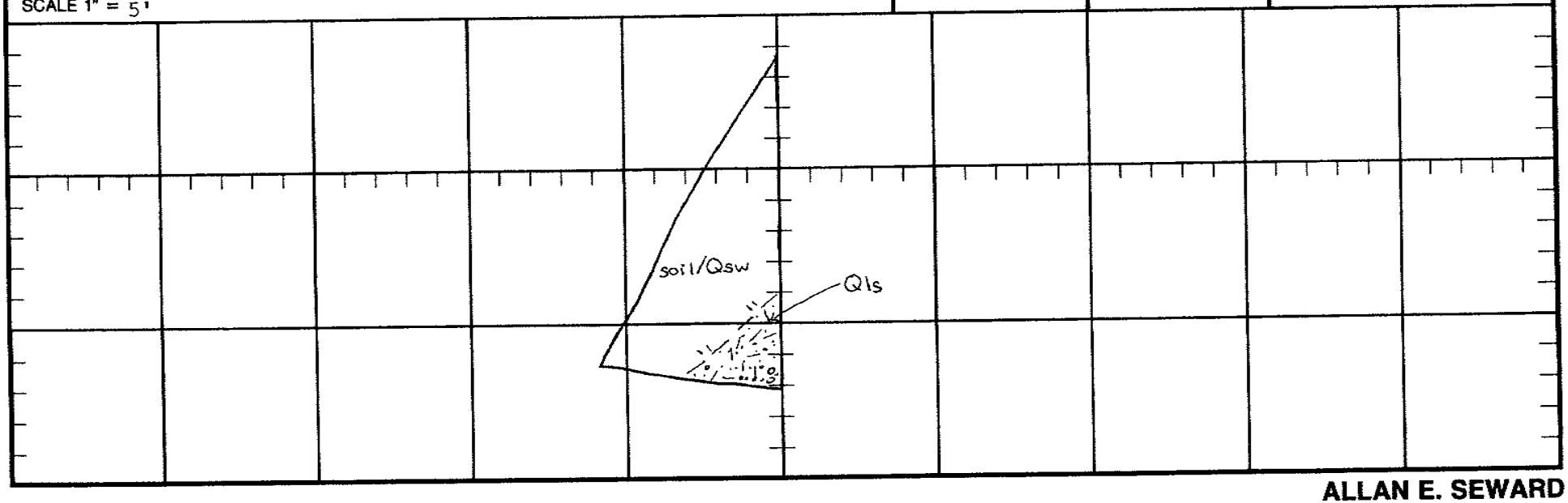
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 8' SOIL/SLOPEWASH; soil/Qsw, Tan to light-brown sandy, pebbly, cobbly silt; loose; dry 8 - 11' LANDSLIDE; Qls, Tan to medium-gray to reddish-brown sandy siltstone with scattered pebbles and some cobbles at base; soft to firm; loose to dense; slightly damp			No Ground Water No Caving TOTAL DEPTH 11 Ft.

N 35 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 73Q

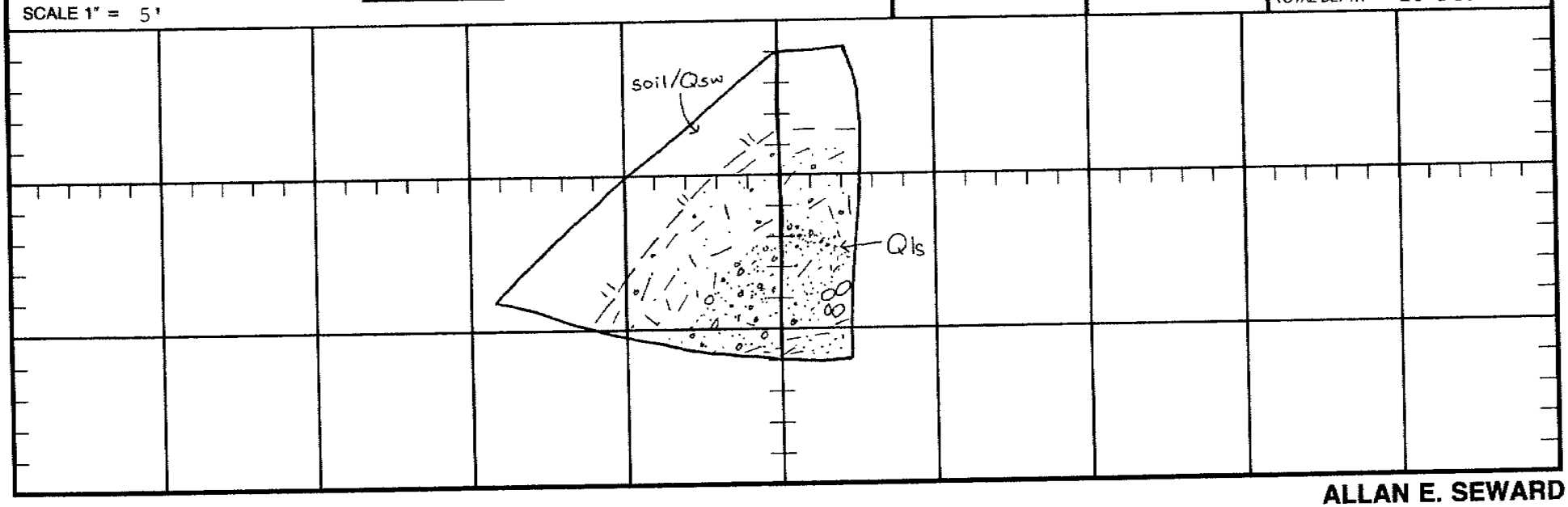
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2.5' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown silt to sandy silt with some scattered pebbles; loose to medium dense; dry 2.5 - 10' LANDSLIDE; Qls, Medium-gray to medium brownish-gray siltstone and fine- to coarse-grained pebbly sandstone with scattered cobbles; soft to firm; loose to dense; slightly damp; upper 3' fractured with caliche			No Ground Water No Caving TOTAL DEPTH 10 Ft.

N 49 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 74Q

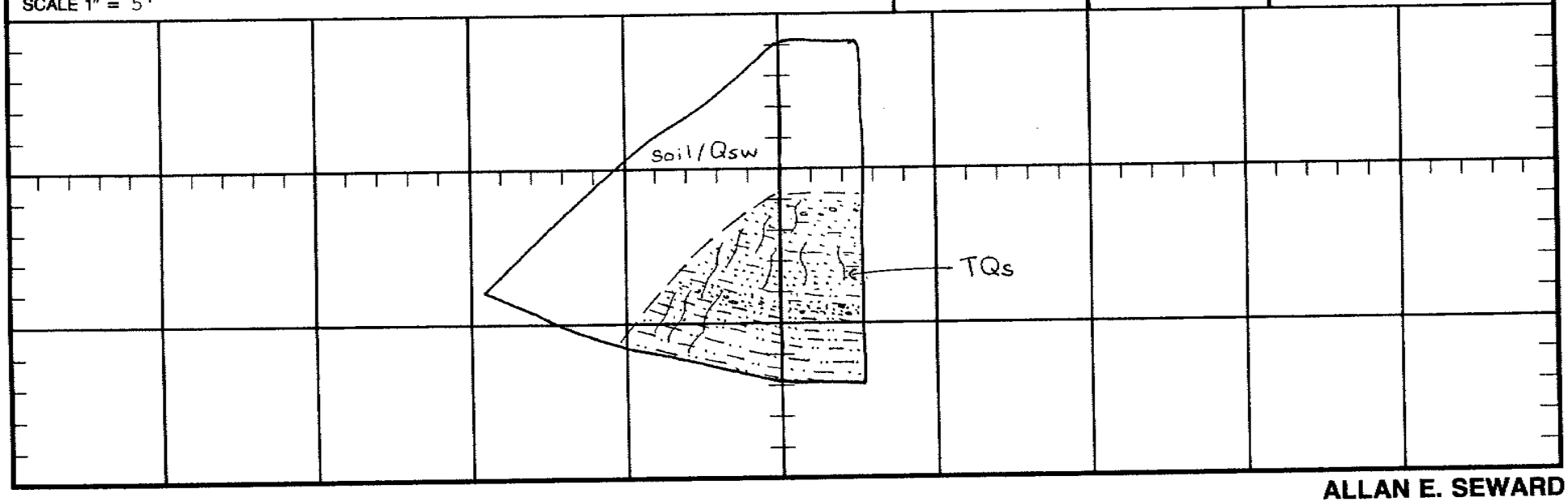
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 5' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown silt to sandy silt; soft; dry 5 - 11' BEDROCK; TQs, Light-brown to medium-gray siltstone; sandy siltstone, and fine- to coarse-grained sandstone with pebbles; soft to firm; loose to dense; slightly damp	N44W,27NE		Trenches 74Q thru 86Q excavated and logged 10/4/99 using a track-mounted backhoe with 24" bucket Upper 3 ft. of TQs highly creep affected-fractured; soft; loose; caliche No Ground Water No Caving TOTAL DEPTH 11 Ft.

N 40 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 75Q

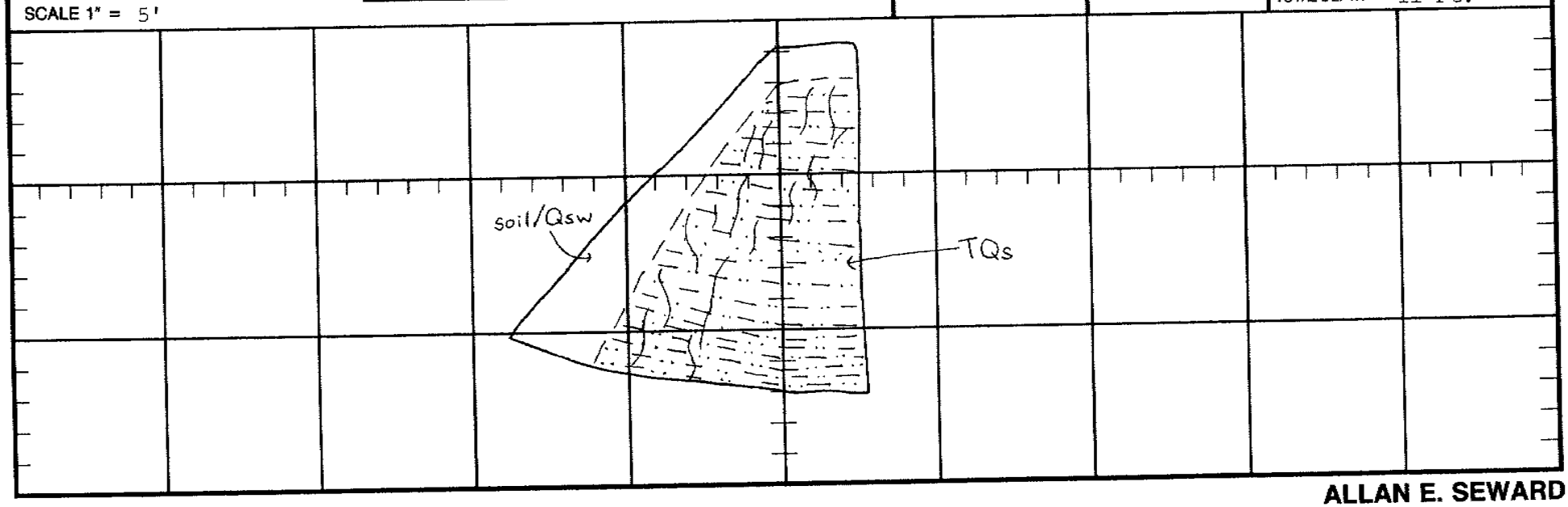
PROJECT Newhall Ranch - Phase IB

DATE 7/12/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1' SOIL/SLOPEWASH; soil/Qsw, Light to medium-brown silt to sandy silt; soft; dry			Upper 4.5 - 5' of TQs highly creep affected; fractured caliche
1 - 11' BEDROCK; TQs, Light gray to medium brown siltstone to sandy siltstone; loose to dense; dry to slightly damp	N41W,29NE		
			No Ground Water No Caving
			TOTAL DEPTH 11 Ft.

N 58 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 76Q

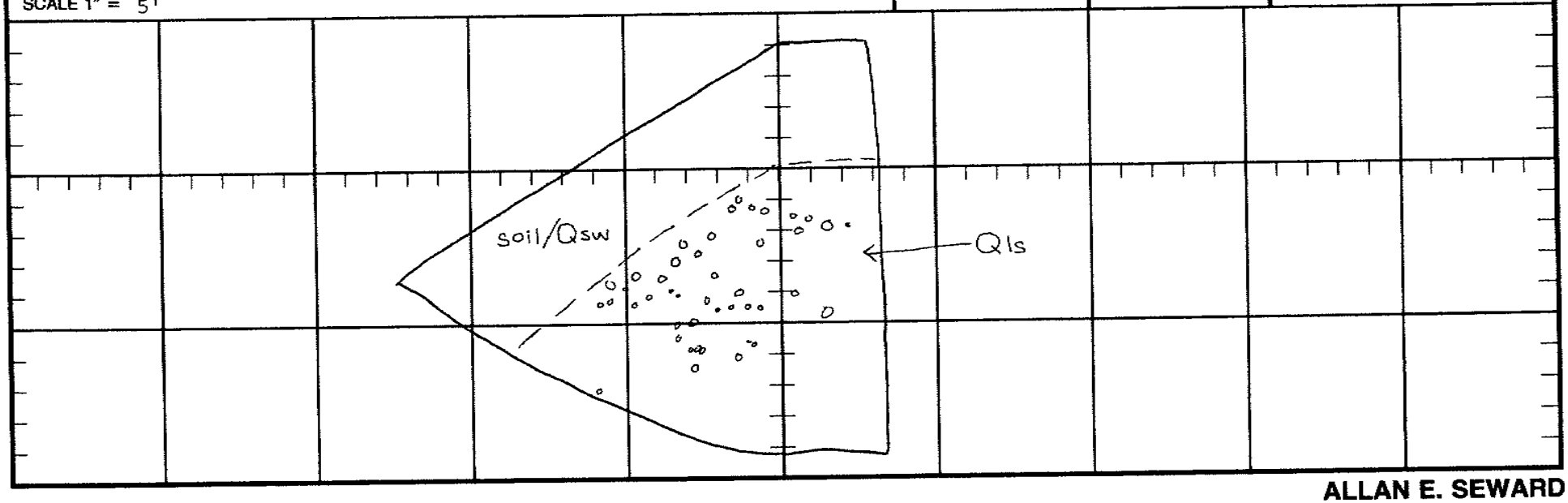
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown silt to sandy silt; soft; dry			
4 - 13' LANDSLIDE; Qls, Light- to medium-gray to medium-brown siltstone to sandy siltstone to fine- to coarse-grained pebbly sandstone with scattered cobbles; soft to firm; loose to dense; slightly damp	Apx:N70E,28SE		No Ground Water No Caving TOTAL DEPTH 13 Ft.

SCALE 1" = 5'

N 12 W



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 77Q

PROJECT Newhall Ranch - Phase IB

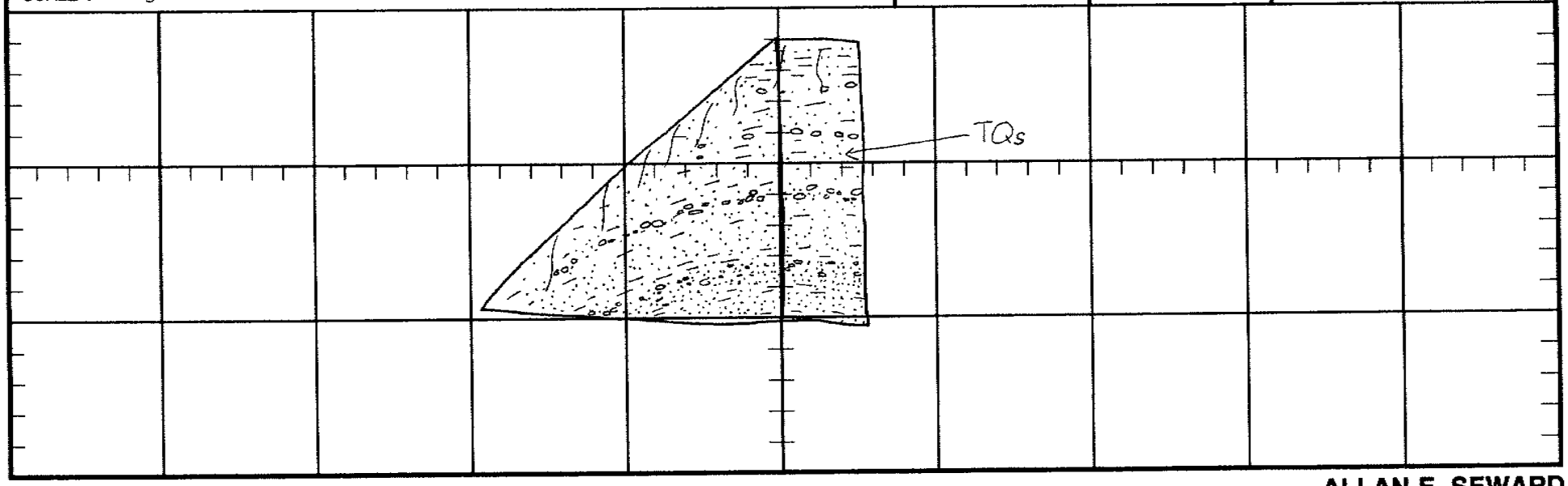
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 9' BEDROCK; TQs, Light-gray to yellowish-tan siltstone to sandy siltstone to fine- to coarse-grained pebbly sandstone with scattered cobbles; loose to dense; dry to slightly damp	N37W,20NE		Top 2-3' of TQs creep affected No Ground Water No Caving

N 59 E

SCALE 1" = 5'

TOTAL DEPTH 9 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 78Q

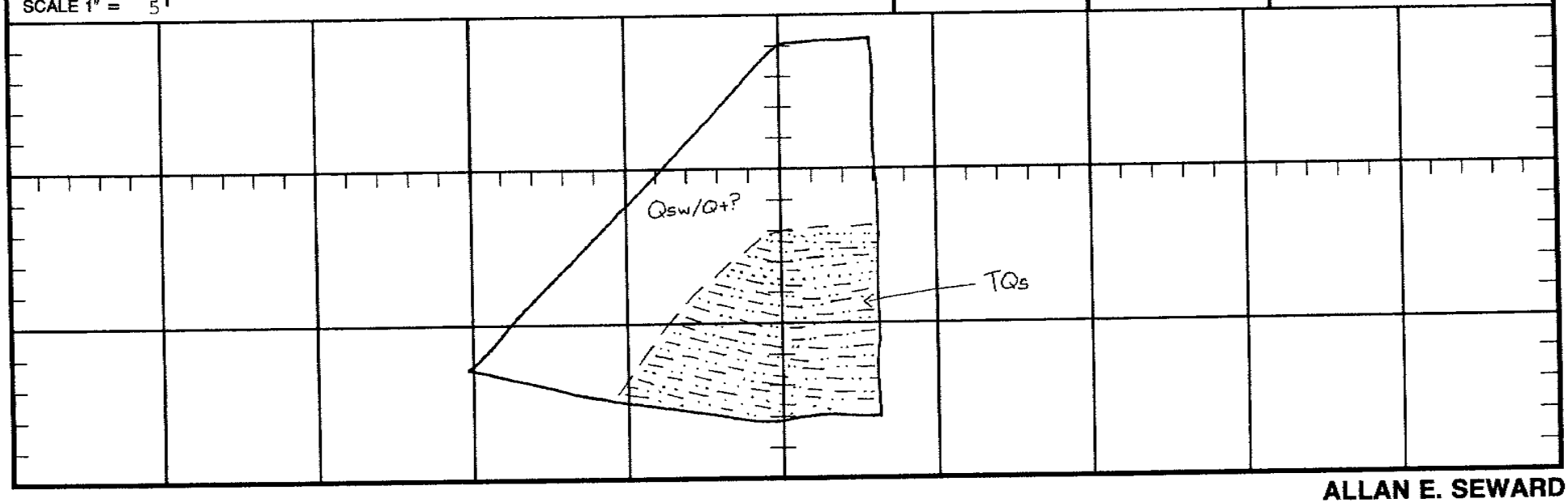
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6' SLOPEWASH/TERRACE DEPOSITS?; Qsw/Qt?, Tan to light-brown sandy silt with pebbles and cobbles; loose; dry			Upper 2-3' of TQs highly creep affected
6 - 12' BEDROCK; TQs, Light-to medium-gray siltstone to sandy siltstone; firm; medium dense to dense; slightly damp	N37W,23NE		
			No Ground Water No Caving
			TOTAL DEPTH 12 Ft.

SCALE 1" = 5'

N 68 E



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 79Q

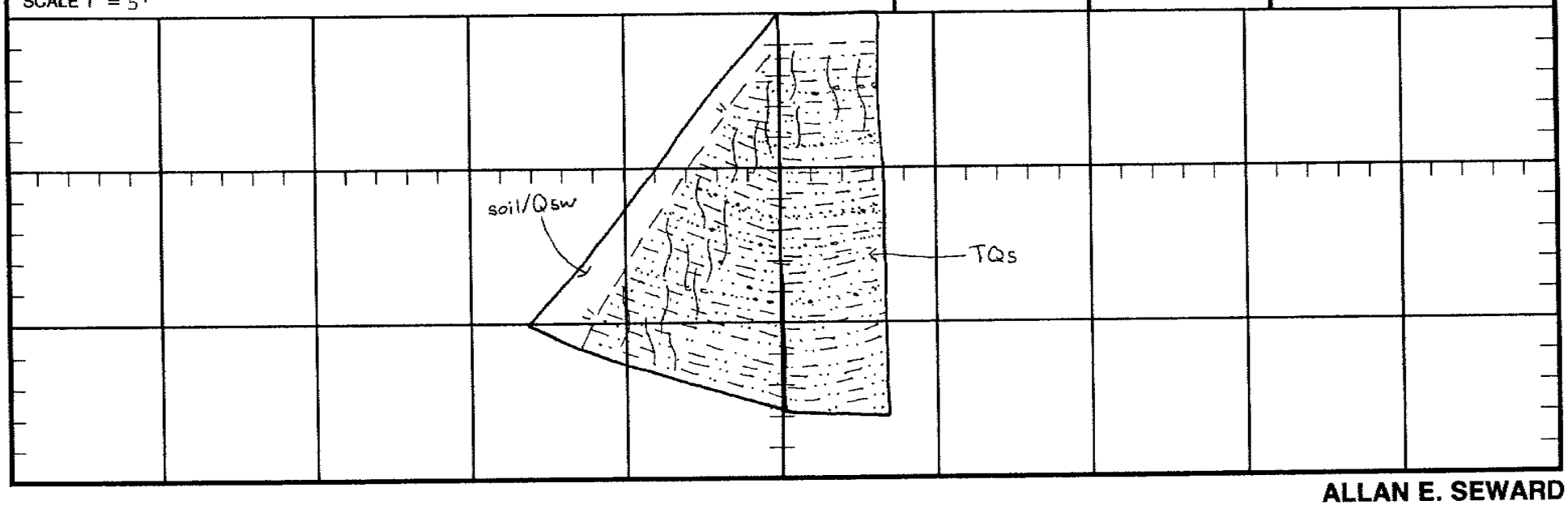
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown silt to sandy silt; soft; dry			Upper 2-3' of TQs highly creep affected; fractured
1 - 13' BEDROCK; TQs, Light- to medium-gray siltstone to sandy siltstone to pebbly sandstone; firm; medium dense to dense; slightly damp	N36W,22NE		No Ground Water No Caving
			TOTAL DEPTH 13 Ft.

N 75 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 80Q

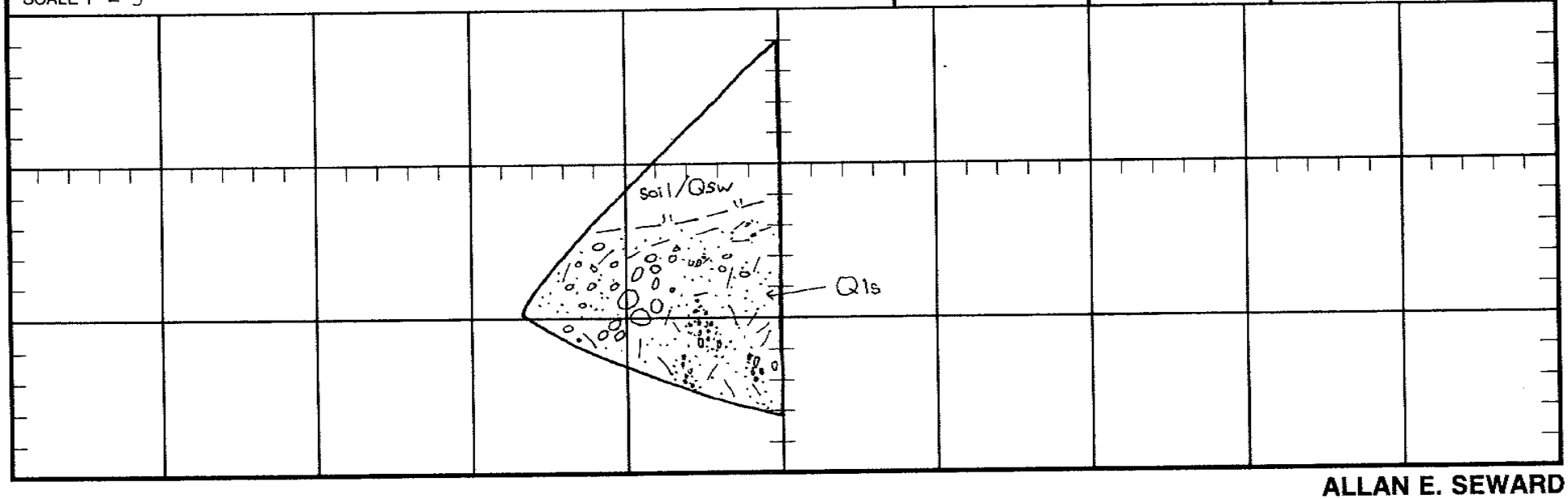
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 5' SOIL/SLOPEWASH: soil/Qsw, Light-to medium-brown silt to sandy silt; soft; dry 5 - 12' LANDSLIDE; Qls, Tan to light-gray to medium-brown sandy siltstone with pebbles and scattered cobbles; soft to firm; loose to dense; slightly damp			No Ground Water No Caving TOTAL DEPTH 12 Ft.

N 60 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 81Q

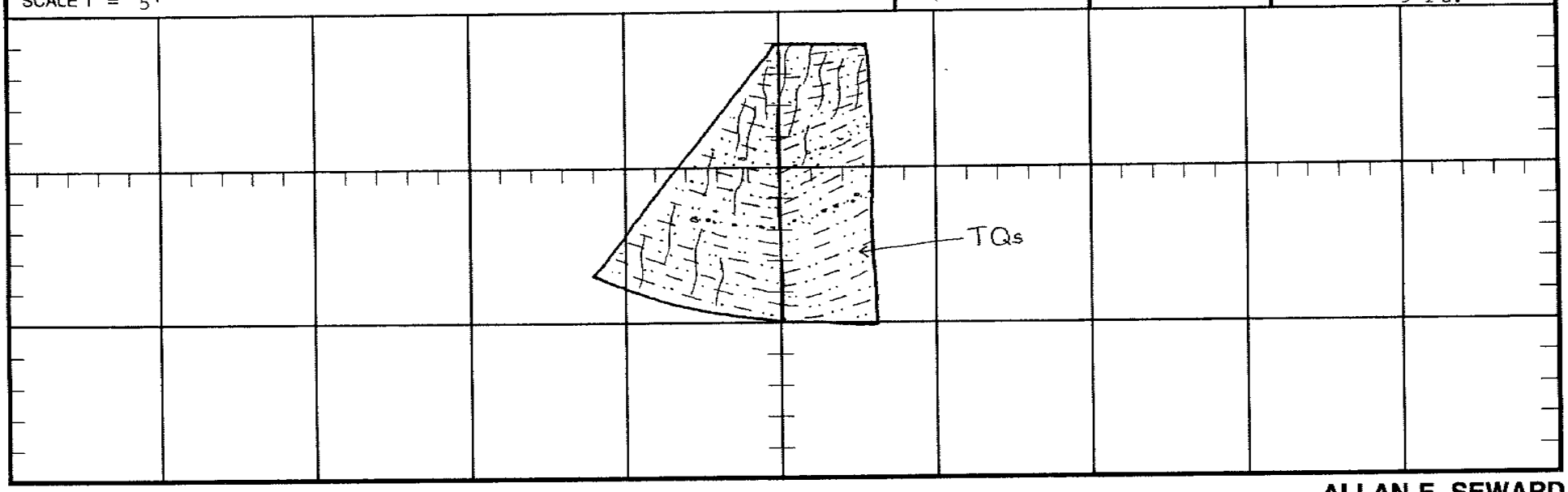
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 9' BEDROCK?; TQs?, Light-to medium-gray to medium-brown siltstone, sandy siltstone and fine- to coarse-grained sandstone; soft to firm; loose to dense; slightly damp	Apx:N54W,24NE		Upper 4-5' highly creep affected; fractured No Ground Water No Caving TOTAL DEPTH 9 Ft.

N 49 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 82Q

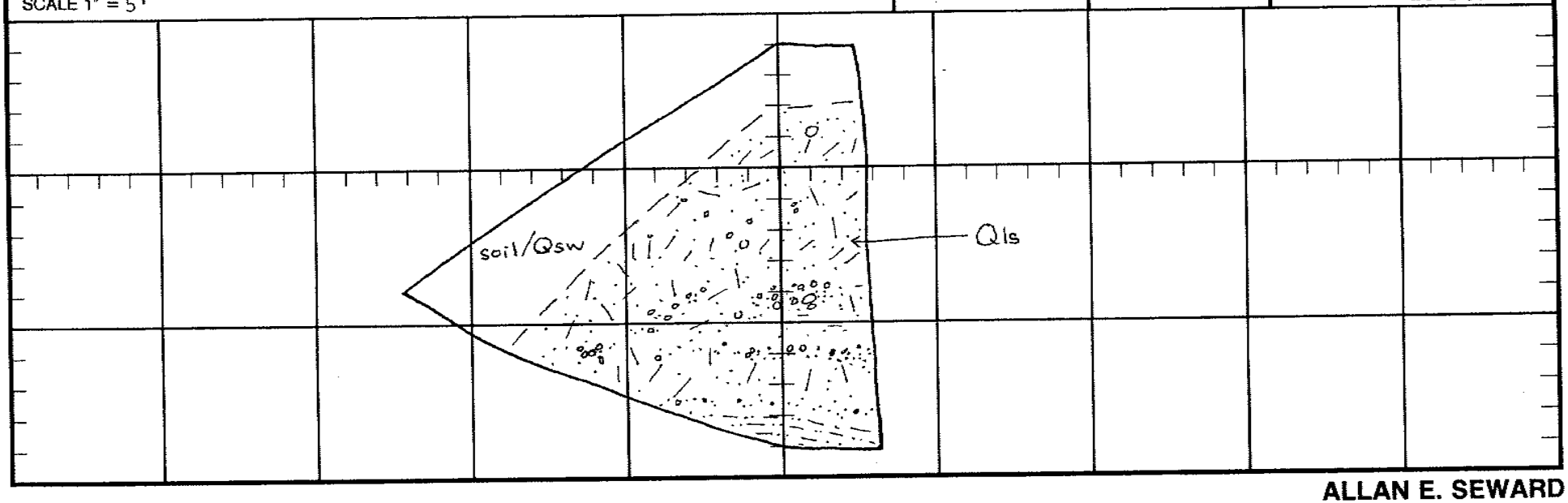
PROJECT Newhall Ranch - Phase IB

DATE 7/21/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2' SOIL/SLOPEWASH; soil/Qsw, Light to medium brown silt to sandy silt; soft; dry			
2 - 13' LANDSLIDE; Qls, Tan to light-gray to medium-brown sandy siltstone with pebbles and scattered cobbles; soft to firm; loose to dense; slightly damp	N23W;22SW		No Ground Water No Caving TOTAL DEPTH 13 Ft.

N 51 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 83Q

PROJECT Newhall Ranch - Phase IB

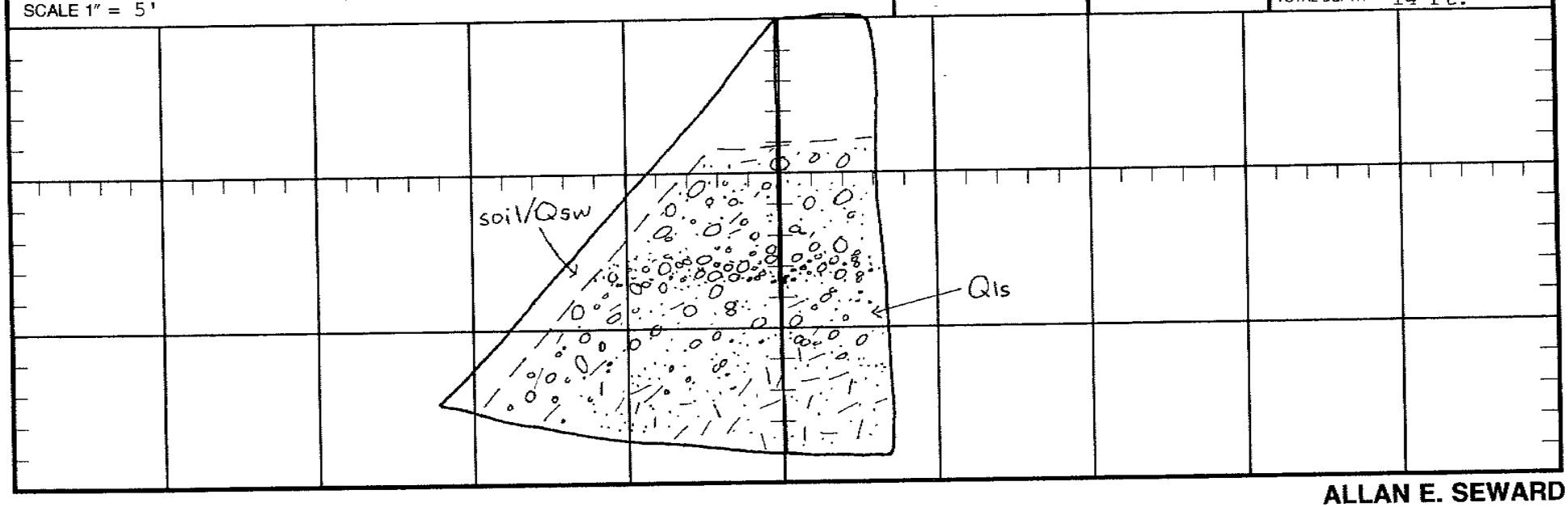
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown silt to sandy silt; soft; loose; dry			Pebble/Cobble conglomerate=Qt? very rough stratification
4 - 14' LANDSLIDE; Qls, Light-gray pebble, cobble conglomerate; soft; loose; dry; and medium brownish-gray siltstone; soft to firm; loose to moderately dense; slightly damp			No Ground Water No Caving

TOTAL DEPTH 14 Ft.

N 48 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 84Q

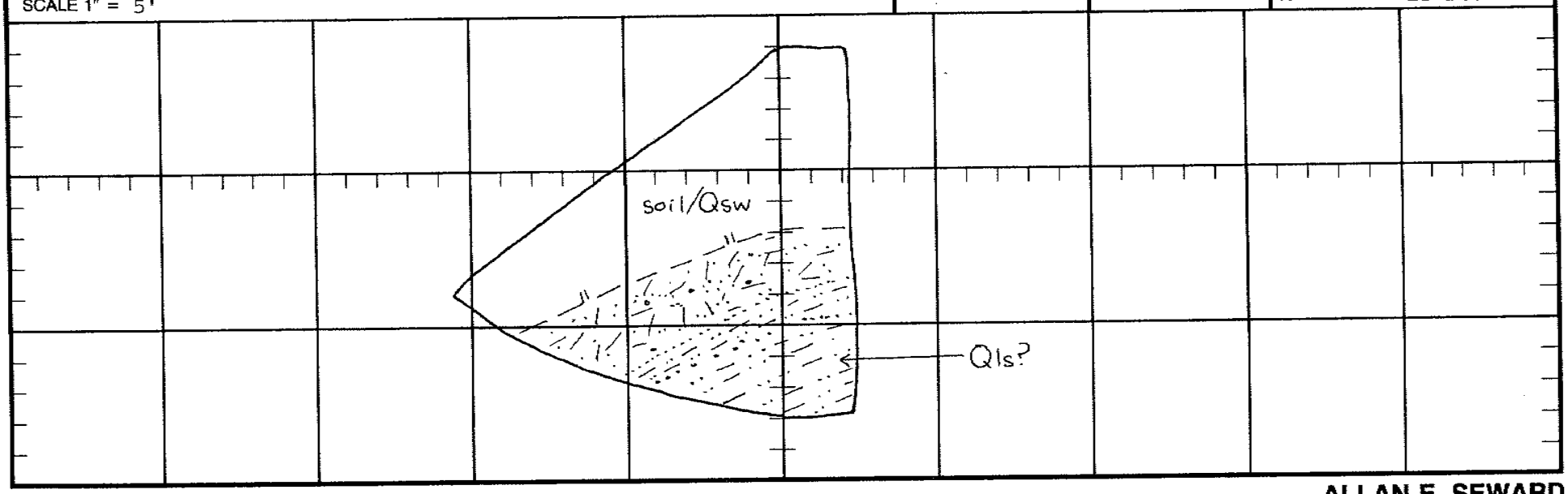
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6' SOIL/SLOPEWASH; soil/Qsw, Light-to medium-brown silt to sandy silt; soft; dry			Bottom 3' tighter than material above; faint bedding; not as disrupted as upper 3' of Qls?
6 - 12' LANDSLIDE?; Qls?, Tan to medium-gray siltstone to sandy siltstone; soft to firm; dry to slightly damp	Apx:N16W,26NE		
			No Ground Water No Caving
			TOTAL DEPTH 12 Ft.

N 39 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 85Q

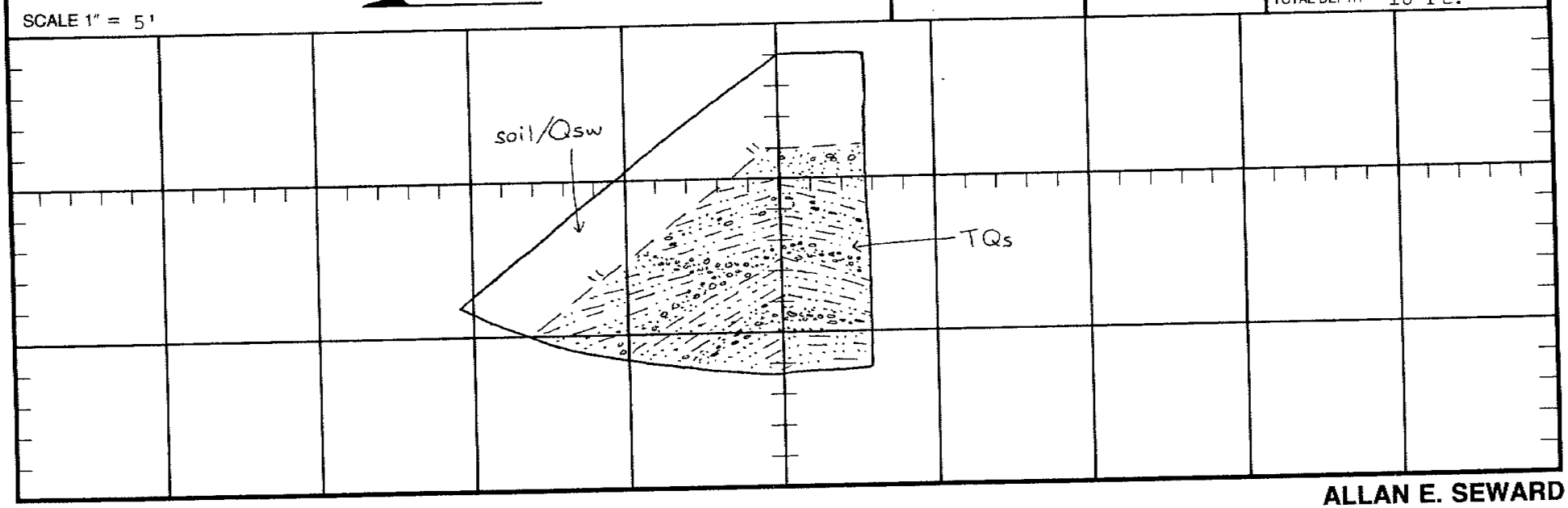
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown silt to sandy silt; soft; dry			
3 - 10' BEDROCK?; TQs?, Light orangish-brown to light-gray sandy siltstone to fine- to coarse-grained pebbly sandstone with scattered cobbles; soft to firm; loose to dense; dry to slightly damp	N64W,20NE		No Ground Water Slight Caving TOTAL DEPTH 10 Ft.

N 33 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 86Q

PROJECT Newhall Ranch - Phase IB

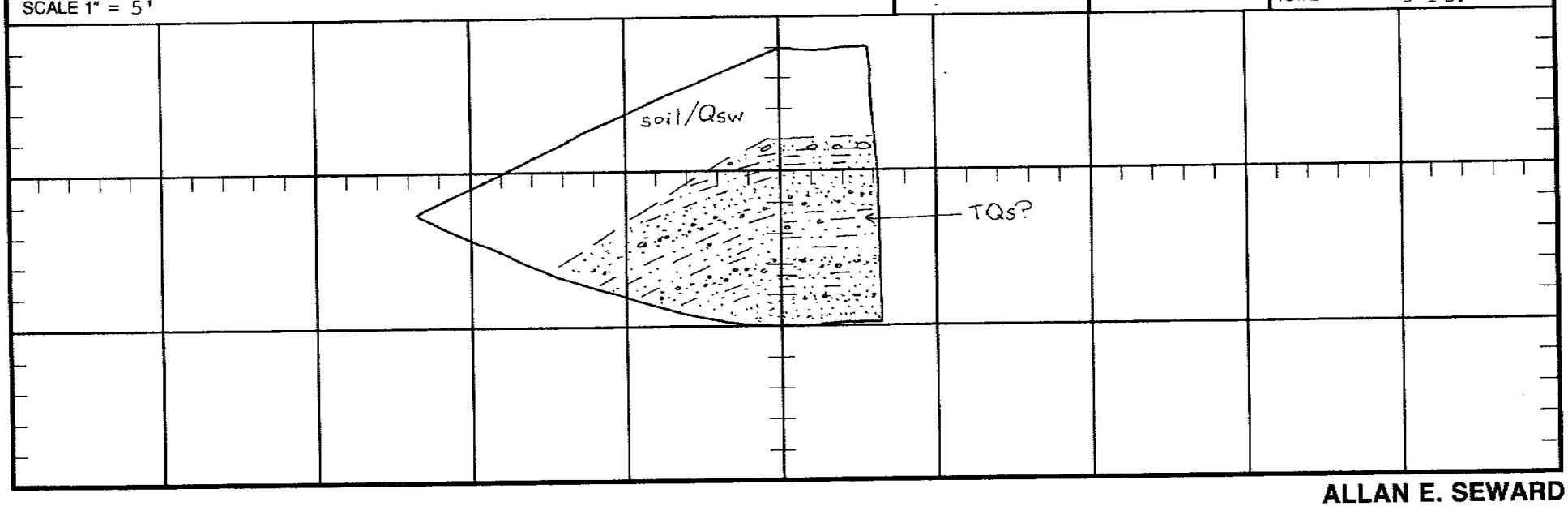
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3'? SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown silt to sandy silt; soft; dry			
3 - 9' BEDROCK?; TQs?, Light orangish-brown to light-gray sandy siltstone to fine- to coarse-grained pebbly sandstone with scattered cobbles; soft to firm; loose to dense; dry to slightly damp	N54W,25NE		No Ground Water Slight Caving

N 32 E

SCALE 1" = 5'

TOTAL DEPTH 9 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 87Q

PROJECT Newhall Ranch - Phase IB

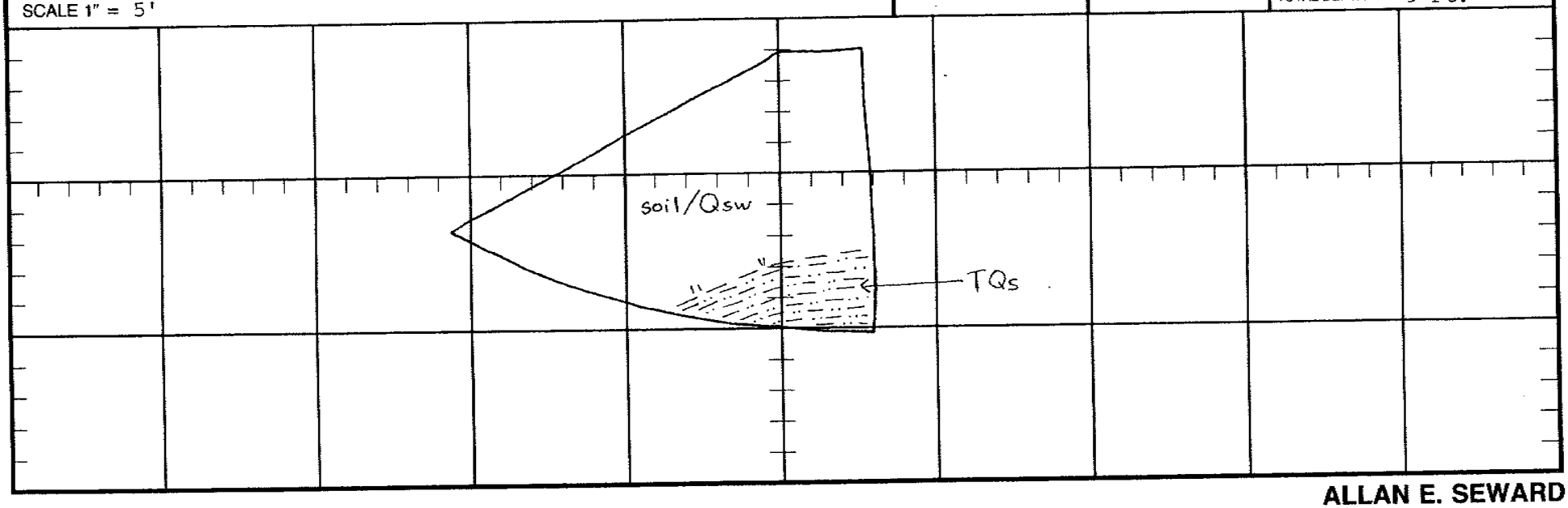
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 7' SOIL/SLOPEWASH; soil/Qls, Light- to medium-brown sandy silt with pebbles and cobbles predominant in lower 3'; loose; dry; 3-5% void space in upper 3'; slight caving 5-7'; lower 2' sandier			Trenches 87Q thru 98Q excavated and logged 10/5/99 using a track mounted backhoe with 24" bucket
7 - 9' BEDROCK; TQs, Yellowish-brown to light-gray siltstone; firm to stiff; dry to slightly damp	N56W,24NE		No Ground Water Slight Caving

N 19 E

TOTAL DEPTH 9 Ft.

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 88Q

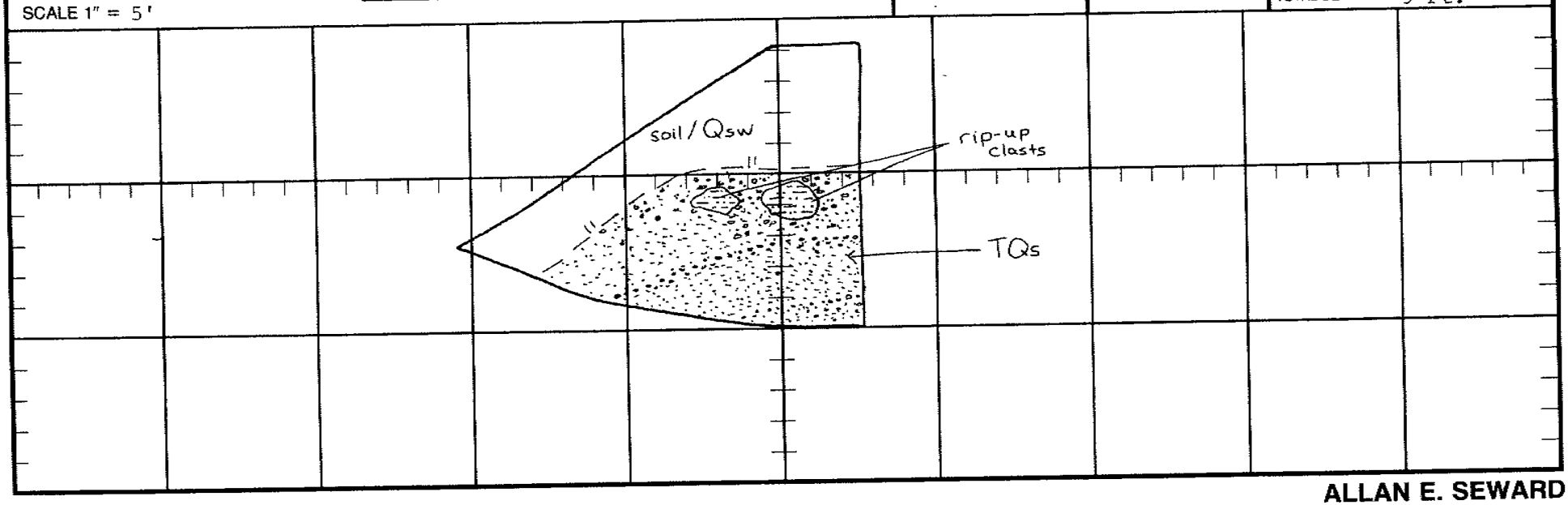
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4' SOIL/SLOPEWASH; soil/Qsw, Yellowish-brown to medium-brown silty sand to medium- to coarse-grained sand with pebbles and cobbles; soft; loose; dry			
4 - 9' BEDROCK; TQs, Light-gray to medium-gray fine- to coarse-grained sandstone and pebbly sandstone; loose to moderately dense; dry to slightly damp	N38W,15NE		No Ground Water No Caving TOTAL DEPTH 9 Ft.

N 23 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 89Q

PROJECT Newhall Ranch - Phase IB

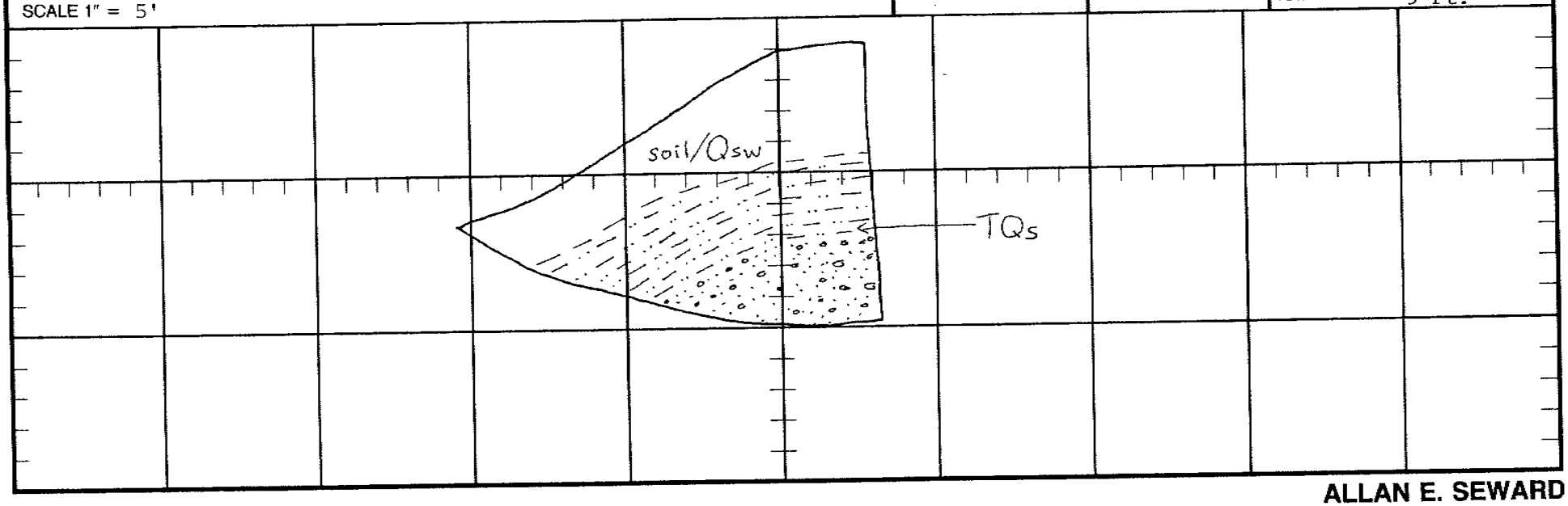
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3.5' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown sandy silt with scattered pebbles; loose to firm; dry			
3.5 - 9' BEDROCK; TQs, Light-gray to medium-gray siltstone, sandy siltstone and fine- to course-grained sand-sandstone and pebbly sandstone; loose to dense; dry to slightly damp	N54W,24NE		No Ground Water No Caving

TOTAL DEPTH 9 Ft.

N 5 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 90Q

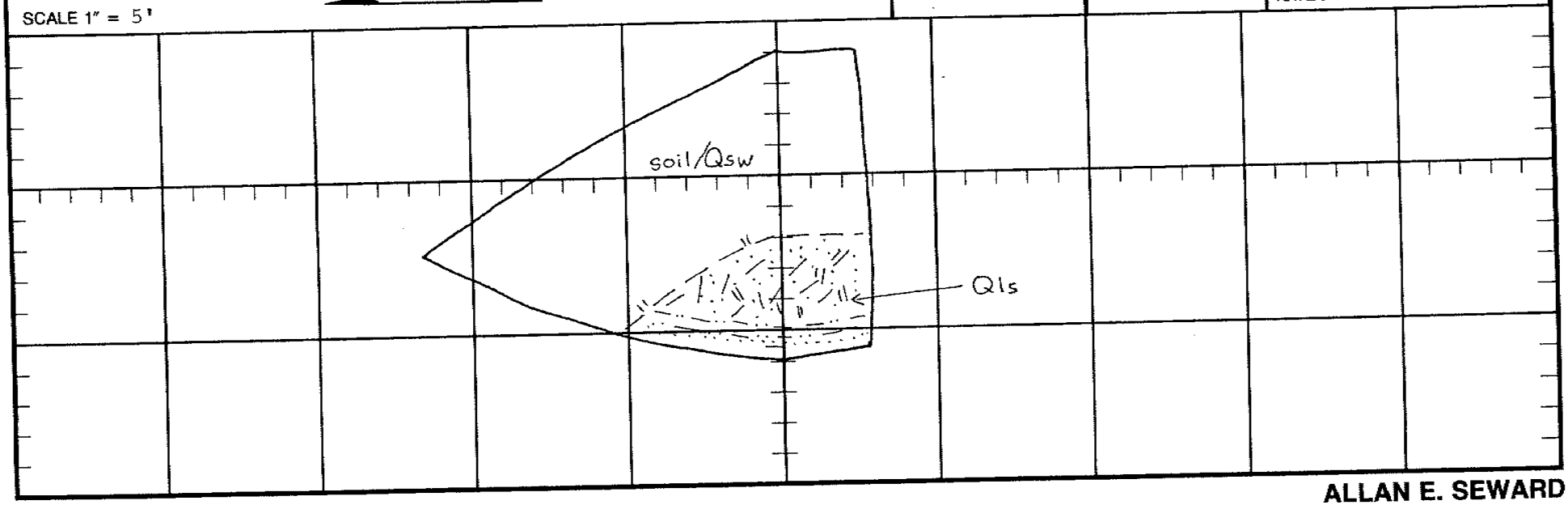
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown sandy silt with scattered pebbles; loose to firm; dry			
6 - 10' LANDSLIDE; Qls, Light- to medium-gray siltstone with minor fine-grained sandstone; soft to firm; loose to moderately dense; slightly damp	N43E,20SE		No Ground Water No Caving TOTAL DEPTH 10 Ft.

N 13 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 91Q

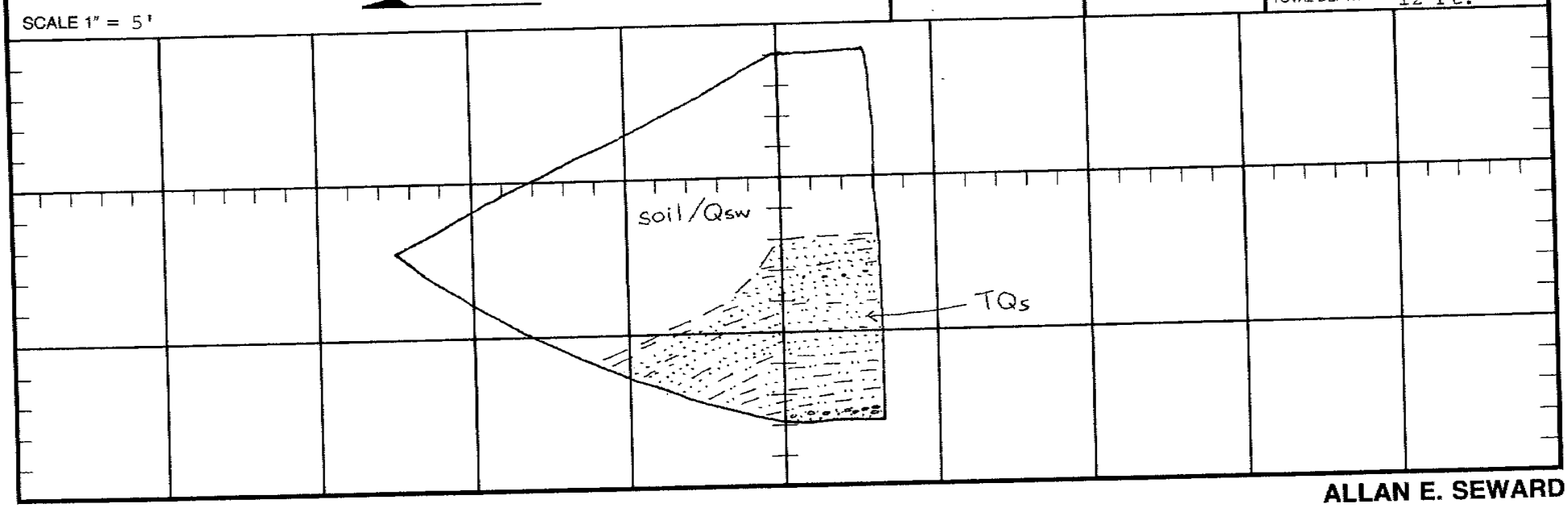
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown sandy silt wtih scattered pebbles; soft; loose to firm; dry			
6 - 12' BEDROCK; TQs, Light-brown to medium grayish-brown siltstone, sandy siltstone and fine- to coarse-grained sandstone and pebbly sandstone; soft to firm; loose to dense; dry to slightly damp	N75W,14NE		No Ground Water No Caving TOTAL DEPTH 12 Ft.

N 24 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 92Q

PROJECT Newhall Ranch - Phase IB

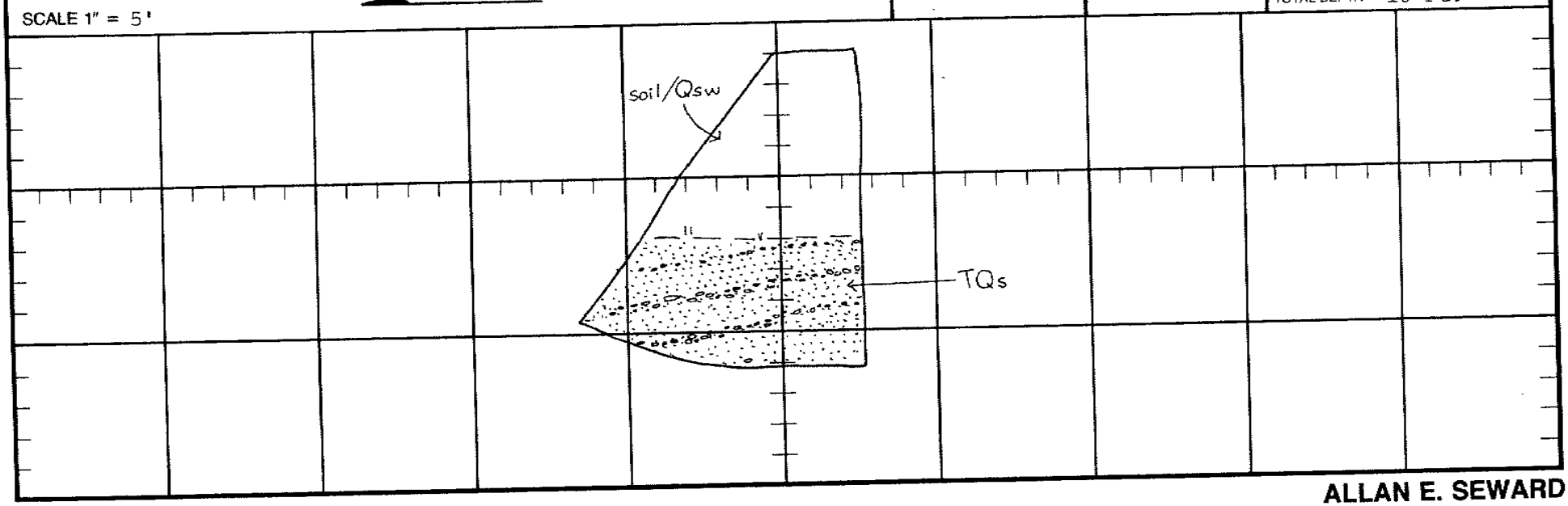
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6' SOIL/SLOPEWASH; soil/Qsw, Light-brown sandy silt; soft to firm; loose to moderately dense; dry			
6 - 10' BEDROCK: TQs, Light- to medium-gray fine- to coarse-grained sandstone; pebbly sandstone; and pebble/cobble conglomerate; soft to firm; loose to dense; slightly damp	N49W,18NE		No Ground Water No Caving

TOTAL DEPTH 10 Ft.

N 14 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 930

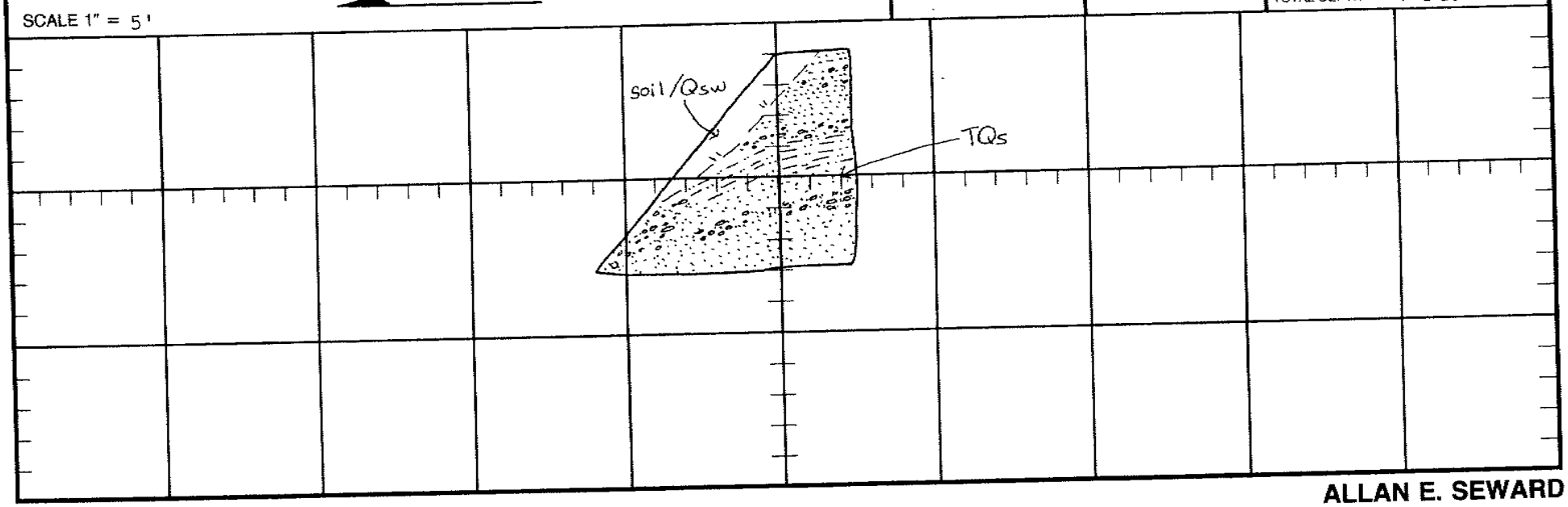
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1' SOIL/SLOPEWASH; soil/Qsw, Light yellowish-brown silt with pebbles and cobbles; soft; loose; dry			
1 - 7' BEDROCK; TQs, Light-to medium-gray fine- to coarse-grained sandstone, pebbly sandstone and pebbly conglomerate; firm; medium dense; slightly damp; and yellowish-orangish-brown siltstone; firm to stiff; dense; slightly damp	N79W,12NE		No Ground Water No Caving TOTAL DEPTH 7 Ft.

N 43 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 94Q

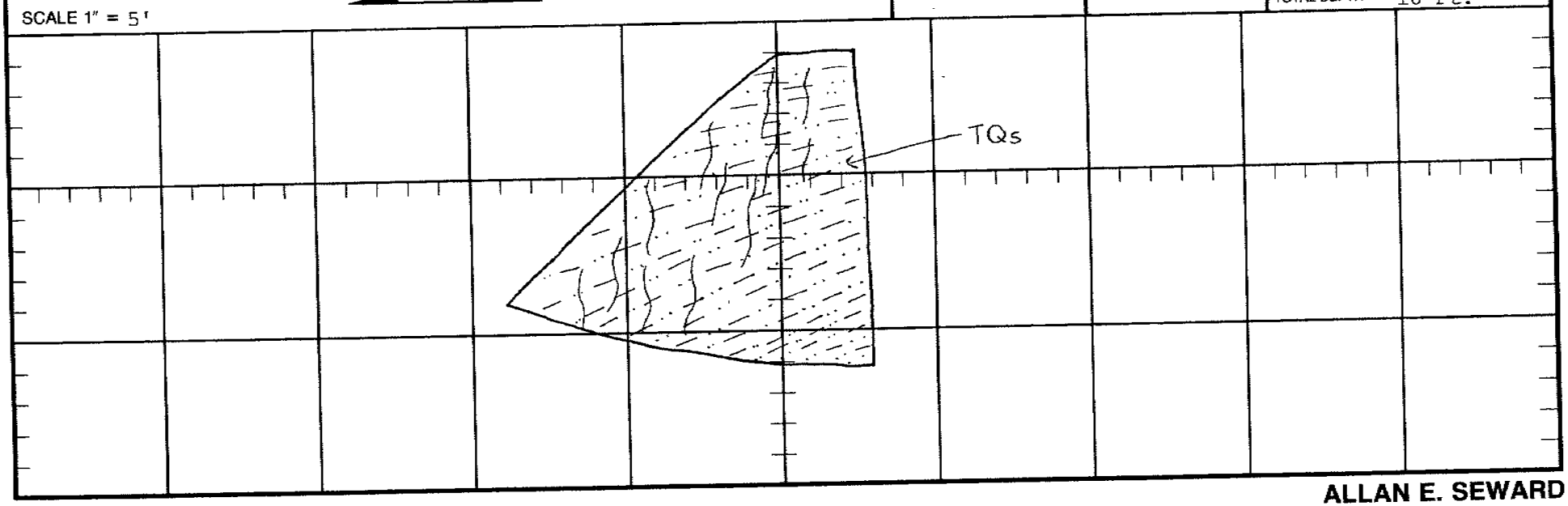
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 10' BEDROCK; TQs, Medium-gray to medium-brown siltstone; stiff to hard; dense to very dense; upper 5' highly creep affected; fractured; caliche surfaces	Apx:N65W,28NE		No Ground Water No Caving TOTAL DEPTH 10 Ft.

N 68 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 95Q

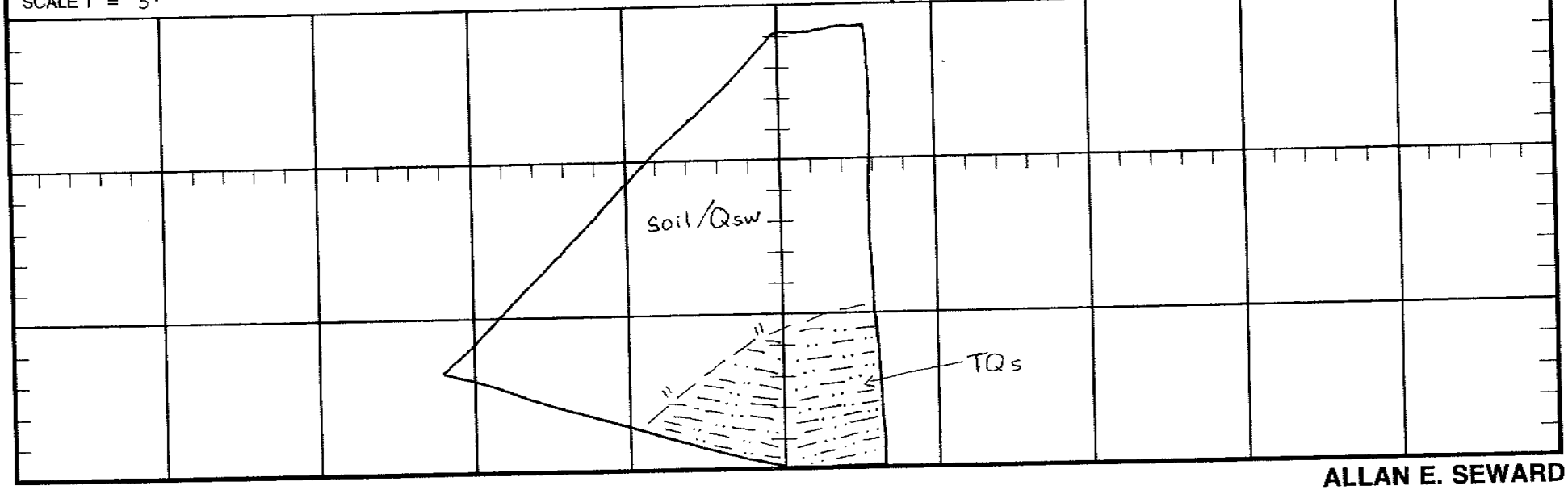
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 9' SOIL/SLOPEWASH; soil/Qsw, Light-brown sandy silt with scattered pebbles and cobbles; soft to firm; loose to dense; dry to slightly damp			
9 - 14' BEDROCK; TQs, Medium-gray to medium-brown siltstone; firm to stiff; dense; slightly damp; upper 3' minorly fractured with caliche surfaces	N37W,27NE		No Ground Water No Caving TOTAL DEPTH 14 Ft.

N 48 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 96Q

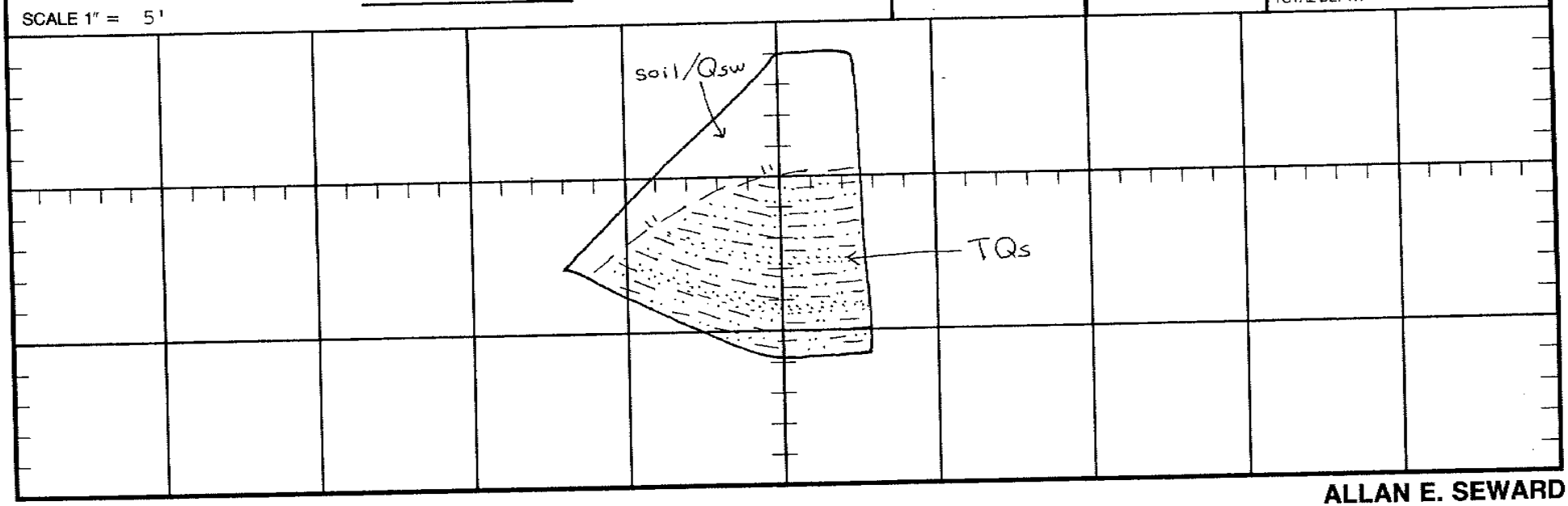
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4' SOIL/SLOPEWASH; soil/Qsw, Light-brown sandy silt with few scattered pebbles; soft; loose; dry			
4 - 10' BEDROCK; TQs, Light- to medium-gray siltstone, sandy siltstone and fine-grained sandstone; stiff; dense; slightly damp; upper 3' creep affected; fractured	N54W,29NE		No Ground Water No Caving TOTAL DEPTH 10 Ft.

N 44 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 97Q

PROJECT Newhall Ranch - Phase IB

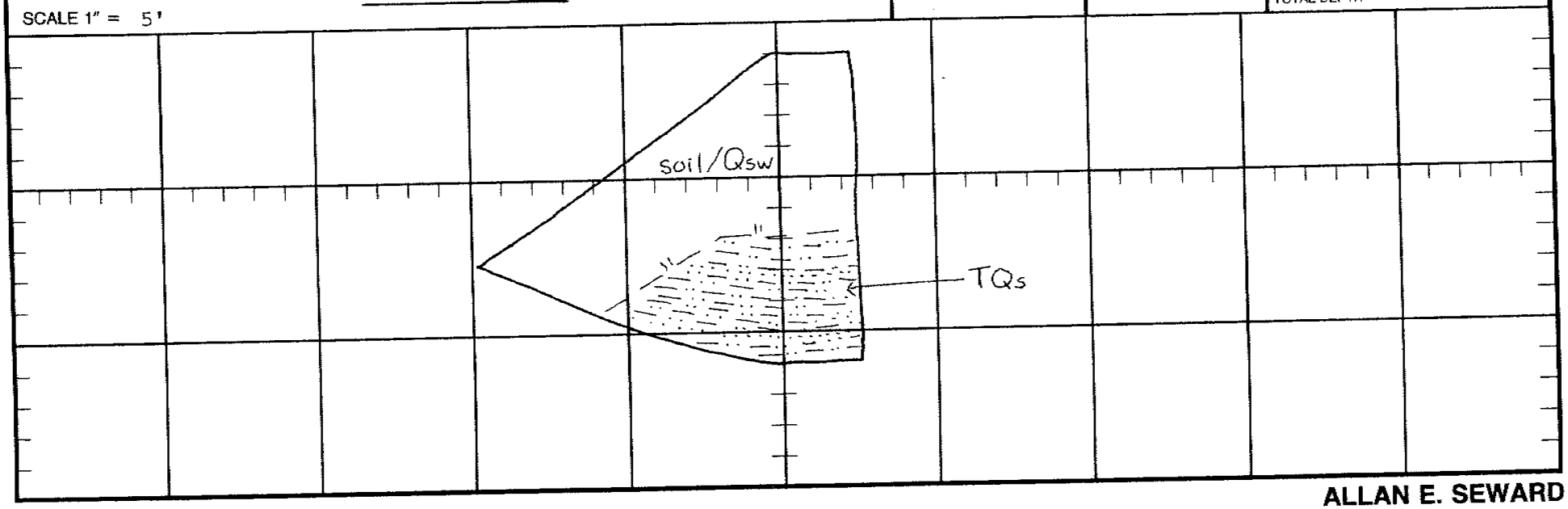
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6' SOIL/SLOPEWASH; soil/Qsw, Light-brown sandy silt with scattered pebbles, cobbles and small boulders; soft to firm; loose to dense; dry to slighlty damp			
6 - 10' BEDROCK; TQs, Light-to medium-gray siltstone, sandy siltstone and fine-grained sandstone; stiff; dense; slightly damp; upper 3 ft. creek affected; fractured	N66W,26NE		No Ground Water No Caving

TOTAL DEPTH 10 Ft.

N 18 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Q1sI-1

LOGGED BY DGG

Trench Log No. 98Q

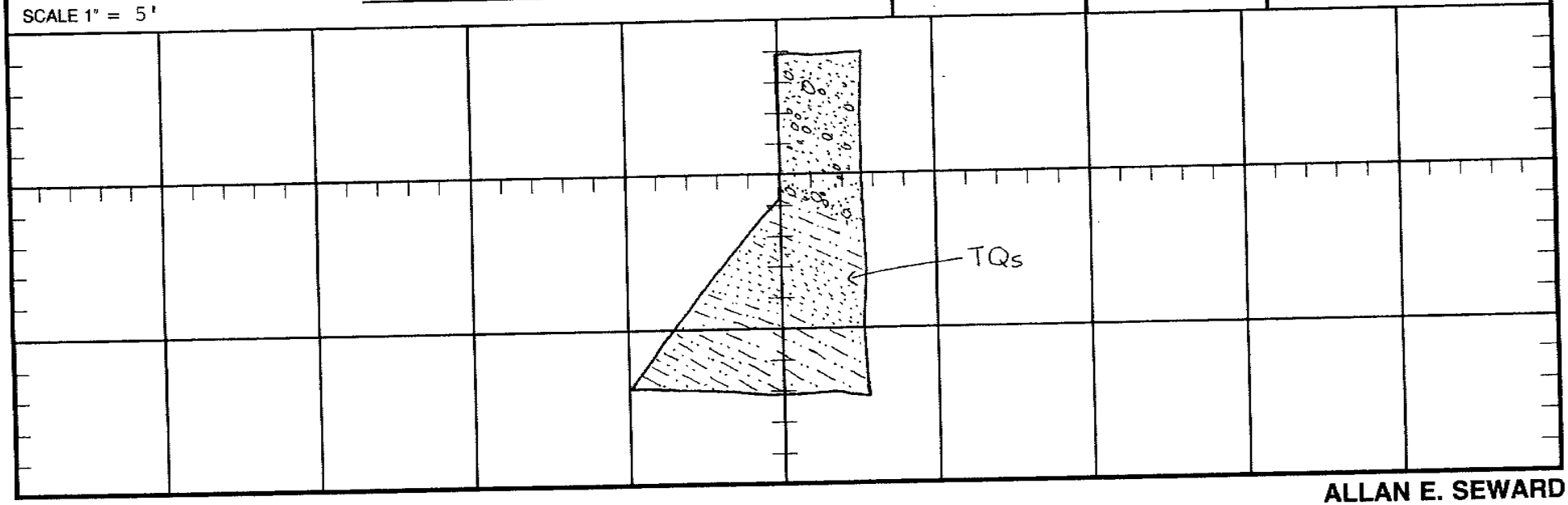
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 11' BEDROCK; TQs, Light- to medium-gray fine- to coarse-grained sandstone, pebbly sandstone, and pebble conglomerate; firm; loose to moderately dense; dry; and light yellowish-brown to medium-brown siltstone and snady siltstone; stiff to hard; dense to very dense; slightly damp	N50W,29NE		No Ground Water No Caving TOTAL DEPTH 11 Ft.

N 38 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 99Q

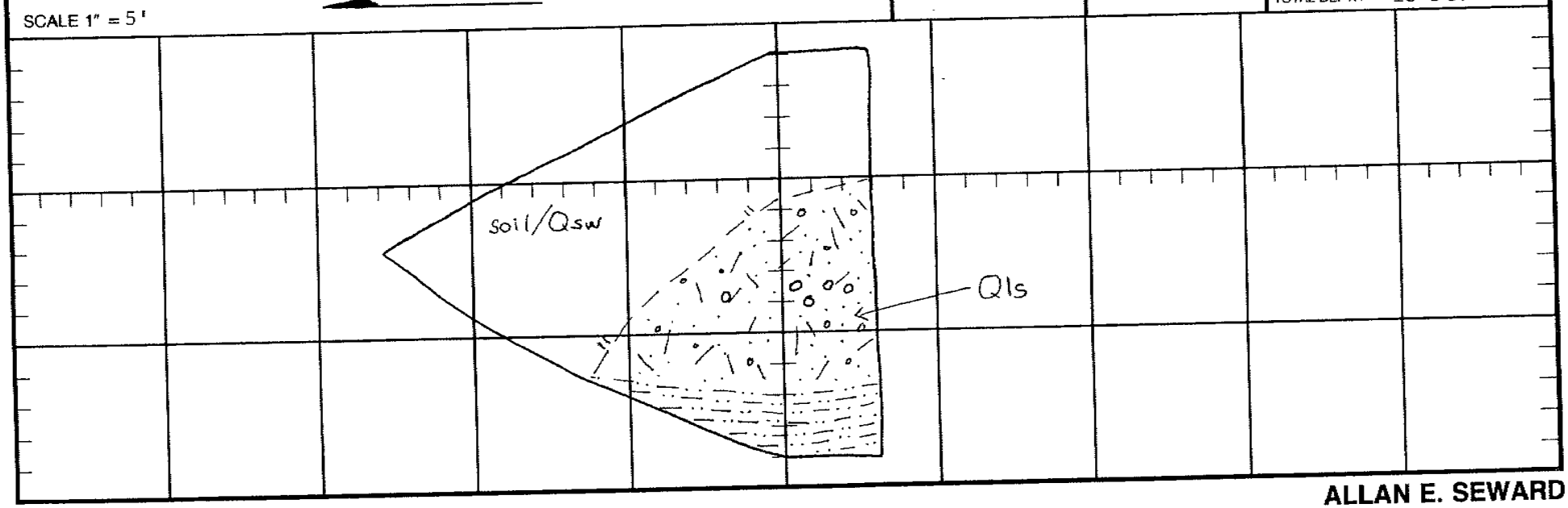
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4.5'? SOIL/SLOPEWASH; soil/Qsw, Light to medium grayish-brown sandy silt with scattered pebbles; soft to firm; loose to moderately dense; dry to slightly damp			Trenches 99Q thru 107Q excavated and logged 10/11/99 using a track-mounted backhoe with a 24" bucket
4.5 - 13' LANDSLIDE; Qls, Medium grayish-brown to medium-brown siltstone with scattered pebbles and some cobbles; soft to firm; loose to moderately dense; slightly damp to damp	N84E,14SE		No Ground Water No Caving
			TOTAL DEPTH 13 Ft.

N 43 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 100Q

PROJECT Newhall Ranch - Phase IB

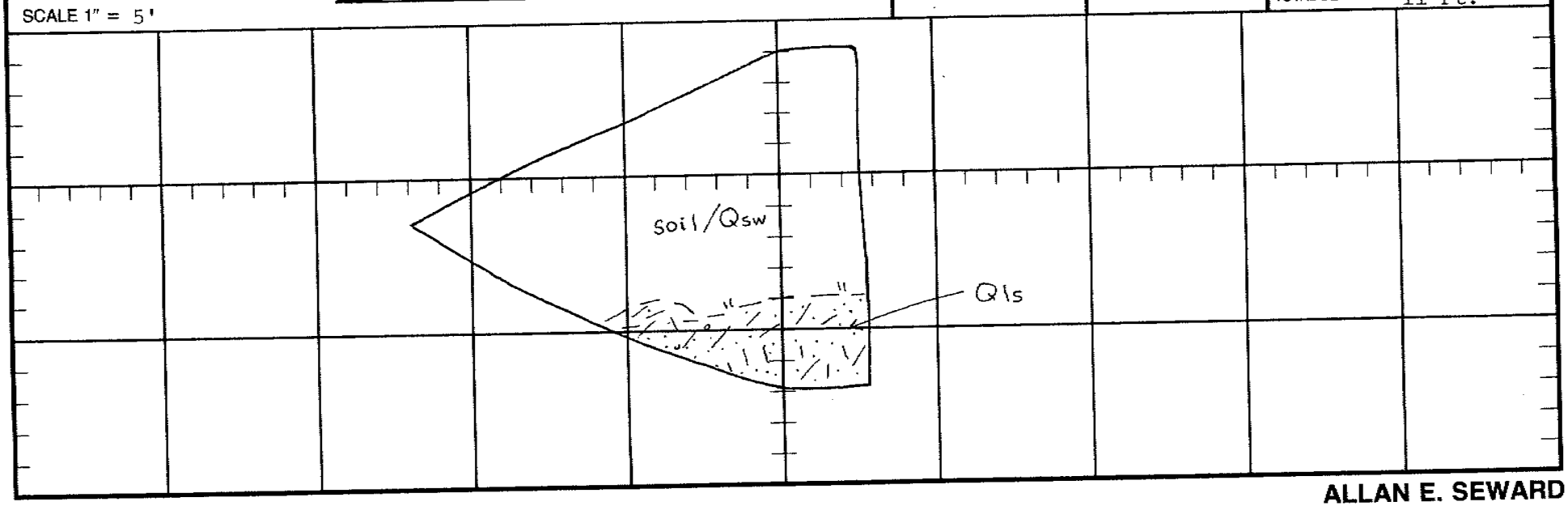
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 8' SOIL/SLOPEWASH; soil/Qsw, Light to medium grayish-brown sandy silt with scattered pebbles; firm to stiff; moderately dense to dense; dry to slightly damp			
8 - 11' LANDSLIDE; Qls, Light yellowish-gray to brownish-gray siltstone; firm to stiff; moderately dense to dense; slightly damp			No Ground Water No Caving

TOTAL DEPTH 11 Ft.

N 46 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 101Q

PROJECT Newhall Ranch - Phase IB

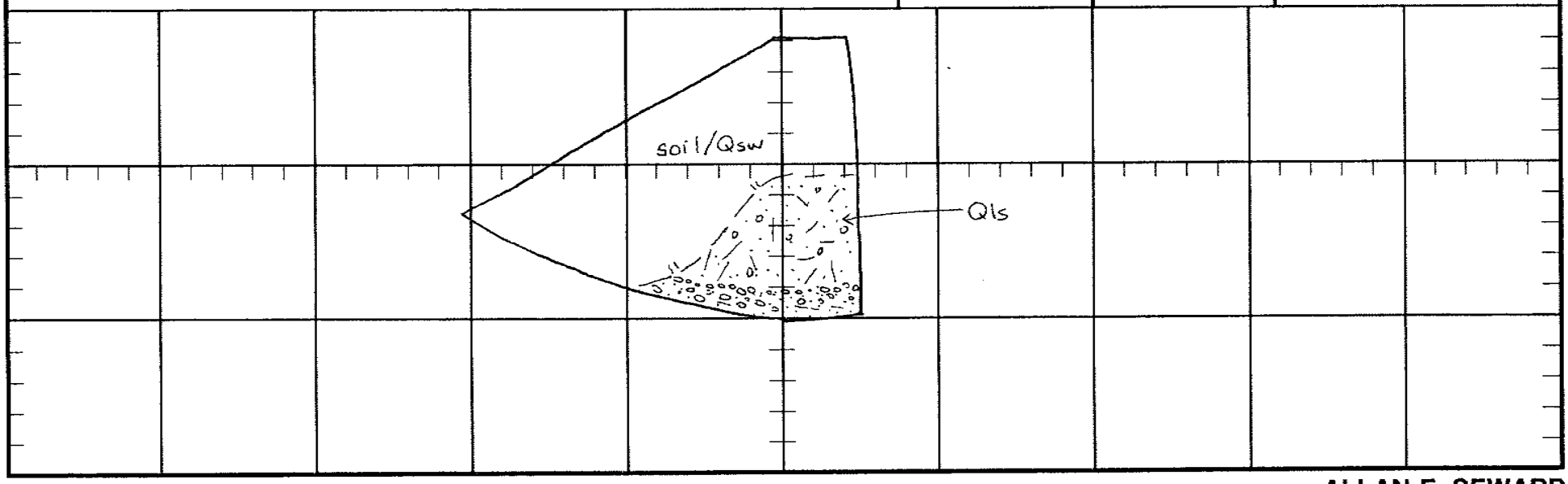
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4.5' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown sandy silt; soft to firm; loose to moderately dense; dry			
4.5 - 9' LANDSLIDE; Qls, Light to medium olive-brown sandy siltstone to pebbly sandstone with a cobbly, sandy siltstone bed at base; moderately dense to dense; dry to slightly damp	N58W,15NE		No Ground Water No Caving

SCALE 1" = 5'

N 53 E

TOTAL DEPTH 9 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 102Q

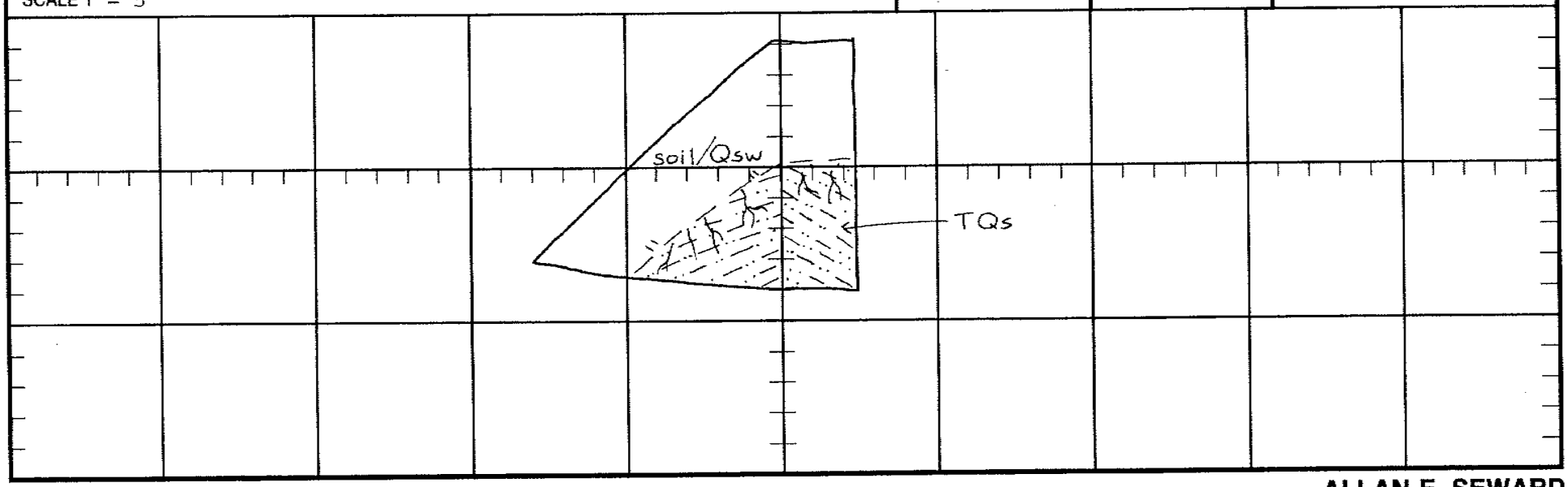
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4' SOIL/SLOPEWASH; soil/Qsw, Light-gray to grayish-brown sandy pebbly silt; soft; loose; dry			
4 - 8' BEDROCK; TQs, Light- to medium-gray siltstone; firm to stiff; moderately dense to dense; slightly damp; upper 2 ft. fractured	N43W;42NE		No Ground Water No Caving TOTAL DEPTH 8 Ft.

SCALE 1" = 5'

Due West



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 103Q

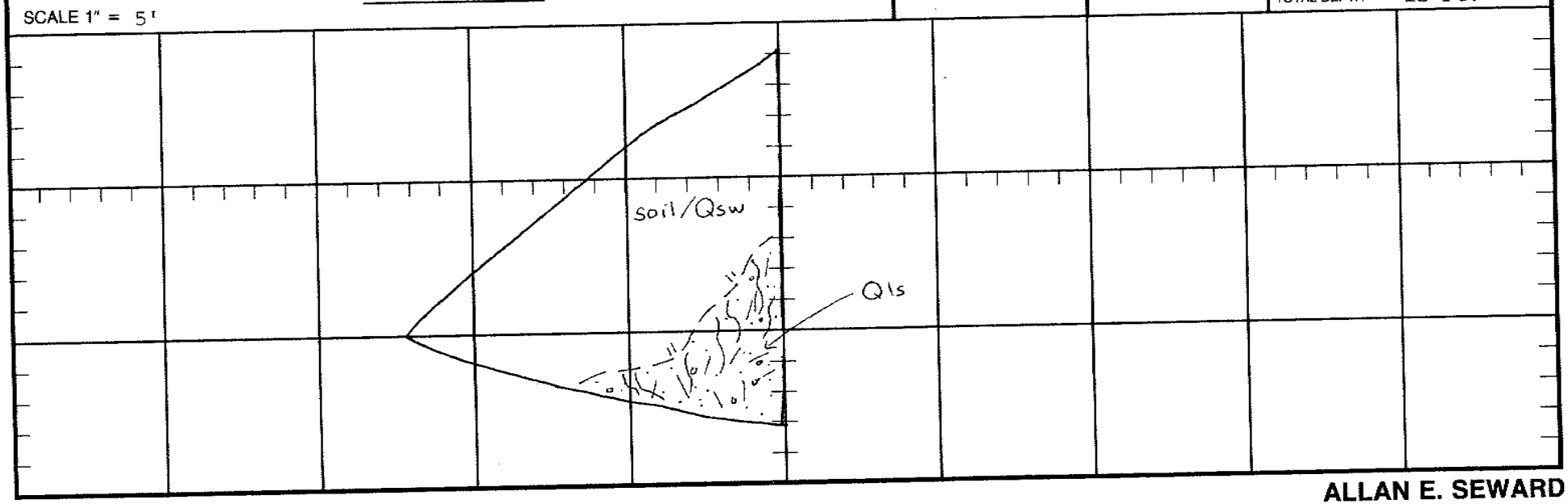
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6' SOIL/SLOPEWASH; soil/Qsw, Tan to light yellowish-brown sandy silt with scattered pebbles and cobbles; soft; loose; dry 6 - 12' LANDSLIDE; Qls, Grayish-brown to medium-brown siltstone with few scattered pebbles; soft to firm; loose to moderately dense; slightly damp; fractured; caliche surfaces			No Ground Water No Caving TOTAL DEPTH 12 Ft.

N 79 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-170301sI-1

LOGGED BY DGG

Trench Log No. 1040

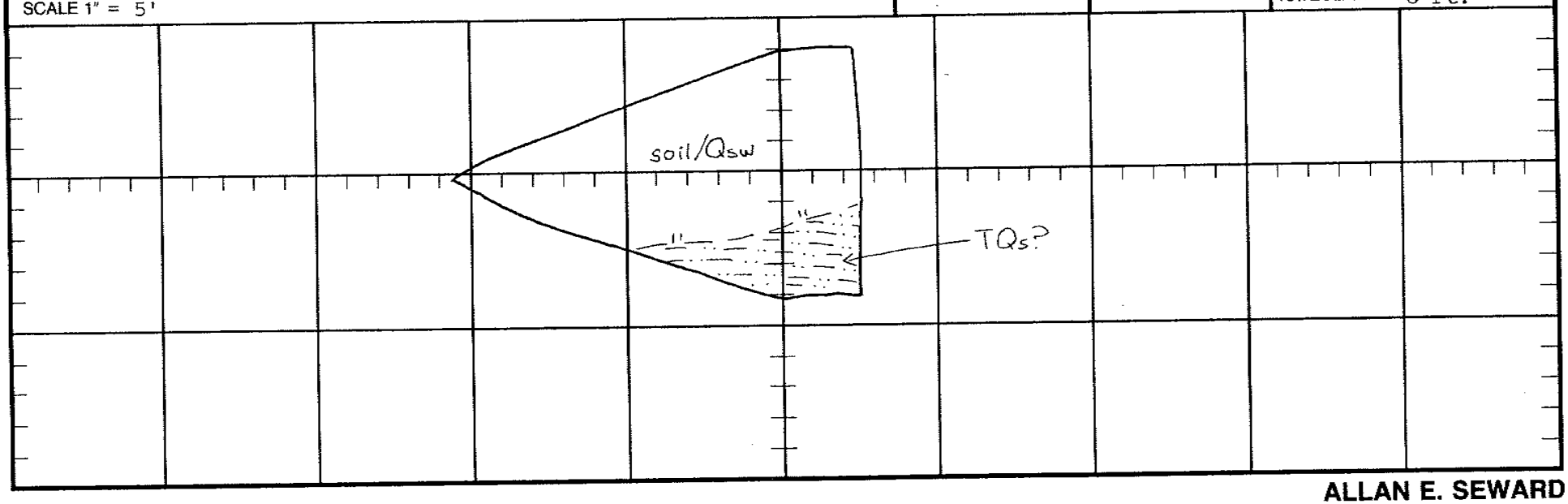
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6' SOIL/SLOPEWASH; soil/Qsw, Slightly reddish-brown silty pebbly cobbly sand; soft; loose; dry 6 - 8' BEDROCK?; TQs?; Medium-gray to medium-brown siltstone; dense; slightly damp	Apx:N52W,22NE		No Ground Water No Caving TOTAL DEPTH 8 Ft.

N 79 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qlsl-1

PROJECT Newhall Ranch - Phase IB

LOGGED BY DGG

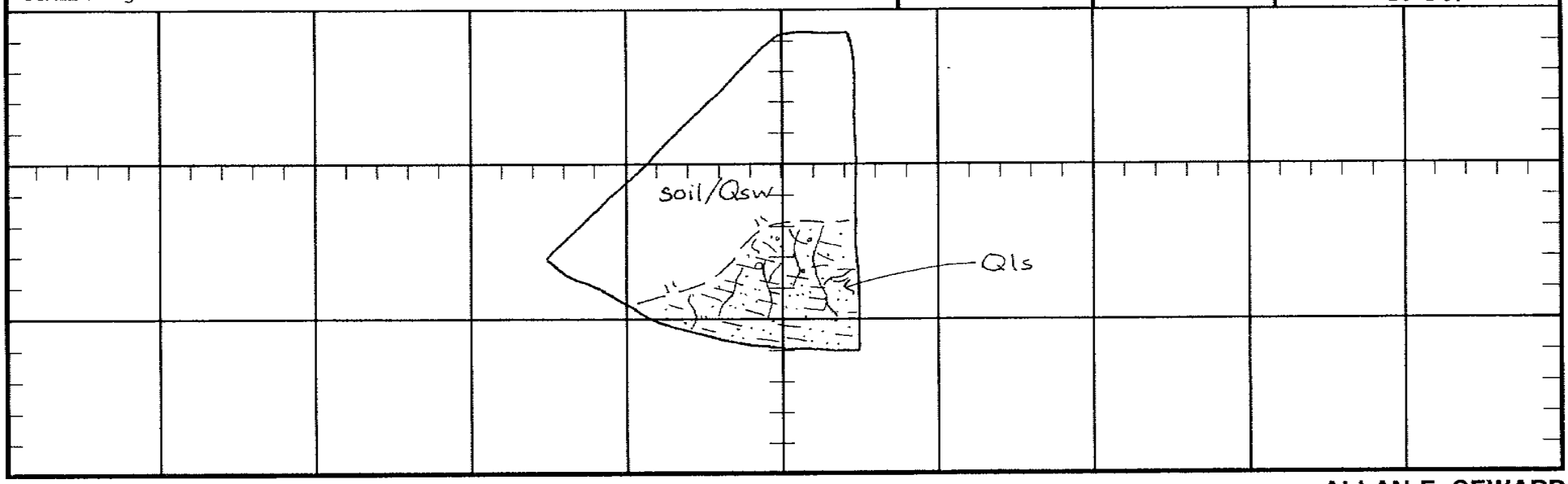
Trench Log No. 105Q

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6' SOIL/SLOPEWASH; soil/Qsw, Medium-brown to slightly reddish-brown sandy silt with scattered pebbles; firm; moderately dense; dry			
6 - 10' LANDSLIDE; Qls, Medium-gray siltstone; stiff; dense; slightly damp; fractured surfaces with caliche	Apx:N70E,10NW		
			No Ground Water No Caving TOTAL DEPTH 10 Ft.

SCALE 1" = 5'

N 88 W



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 106Q

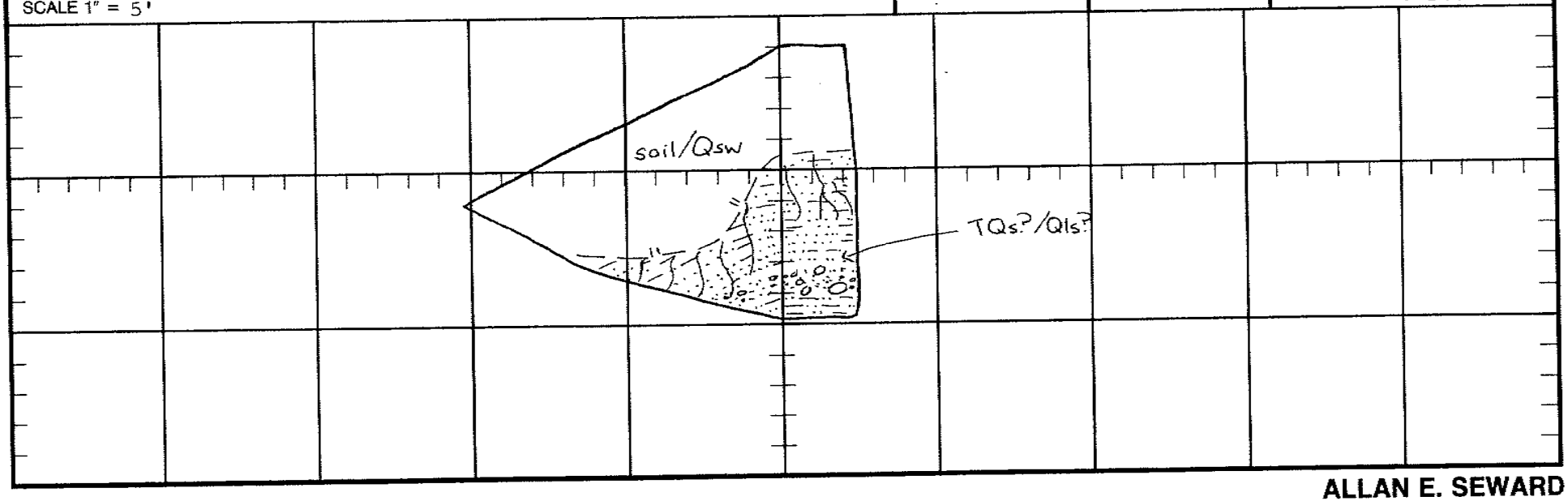
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3.5' SOIL/SLOPEWASH; soil/Qsw, Medium-brown to slightly reddish-brown sandy silt with scattered pebbles; firm; moderately dense; dry			
3.5 - 9' LANDSLIDE?/BEDROCK?; TQs?/Qls?, Medium-gray siltstone, fine to medium-grained sandstone and pebbly sandstone with scattered cobbles; loose to moderately dense; dry to slightly damp; fractured surfaces with caliche	N51E,32SE		No Ground Water No Caving TOTAL DEPTH 9 Ft.

N 37 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsI-1

LOGGED BY DGG

Trench Log No. 107Q

PROJECT Newhall Ranch - Phase IB

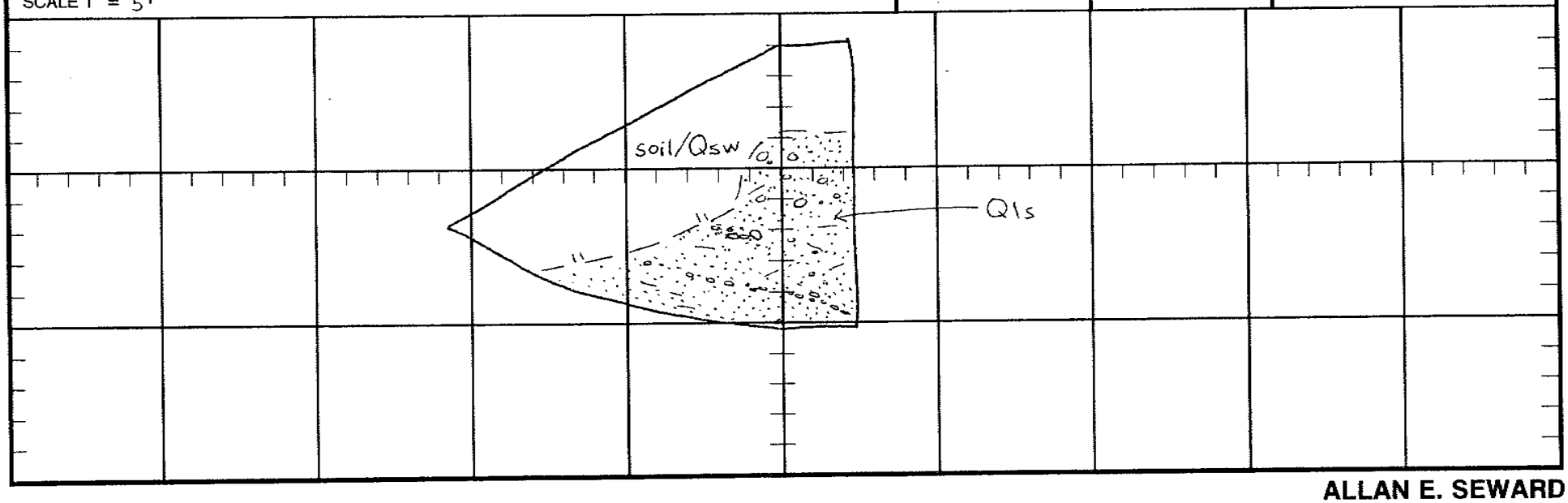
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SOIL/SLOPEWASH; soil/Qsw, Medium-brown sandy silt with scattered pebbles; loose; dry			
3 - 9' LANDSLIDE; Qls, Light orangish-brown fine- to medium-grained sandstone with scattered pebbles and fine- to coarse-grained pebbly sandstone; soft; loose; slightly damp	N9W,32SW		No Ground Water No Caving

N 35 E

SCALE 1" = 5'

TOTAL DEPTH 9 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

PROJECT Newhall Ranch - Phase IB

LOGGED BY DGG

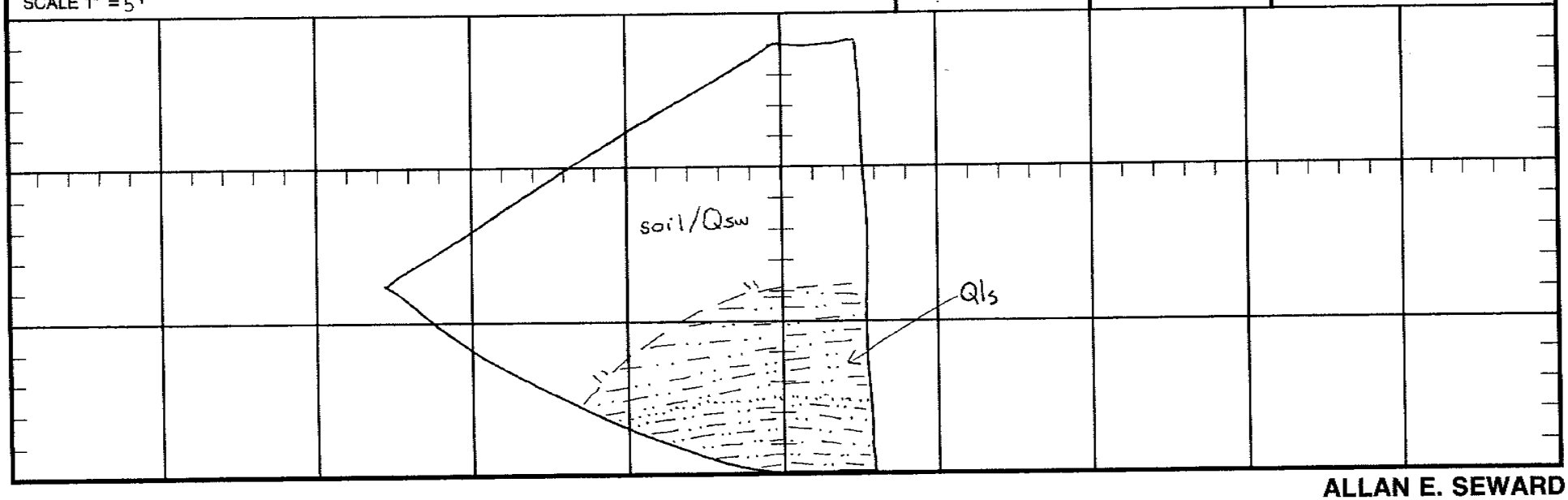
Trench Log No. 108Q

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 8' SOIL/SLOPEWASH; soil/Qsw, Light to medium-brown and yellowish-brown sandy silt with scattered pebbles; firm to stiff; loose to moderately dense; dry to slightly damp			Trenches 108Q thru 116Q excavated and logged 10/27/99 using a track-mounted backhoe with a 24" bucket
8 - 14' LANDSLIDE; Qls Olive-gray to medium-gray siltstone with local pebble stringers; moderately dense to dense; slightly damp	Very apx: E-W,9N		No Ground Water No Caving
			TOTAL DEPTH 14 Ft.

N 83 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 109Q

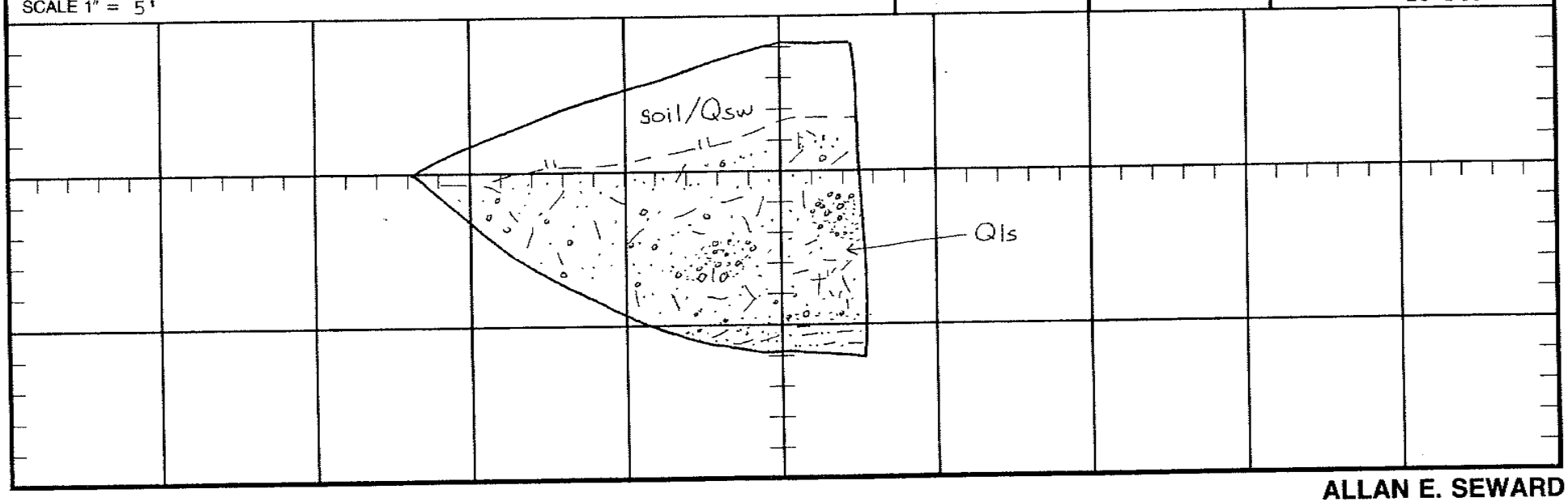
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2.5' SOIL/SLOPEWASH; soil/Qsw, Light-to medium-brown silty sand; stiff; dense; dry 2.5 - 10' LANDSLIDE; Qls, Medium-to reddish-brown to light-gray to medium olive-gray siltstone, sandy siltstone and pebbly sandstone; loose to dense; dry to slightly damp			No Ground Water No Caving TOTAL DEPTH 10 Ft.

N 37 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 110Q

PROJECT Newhall Ranch - Phase IB

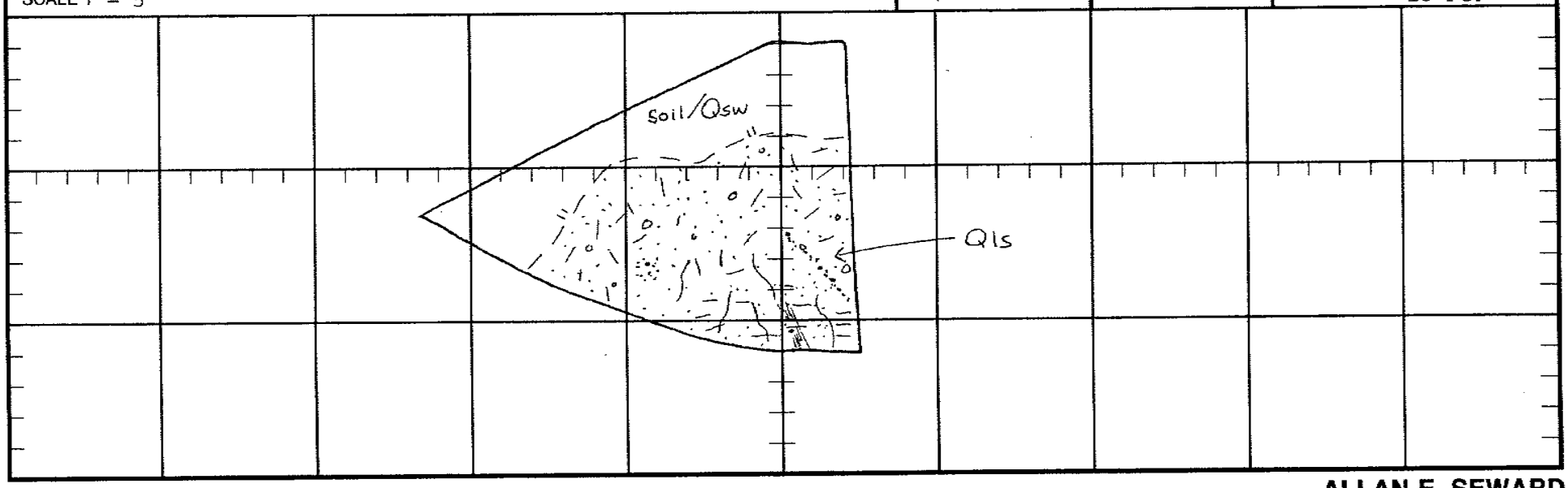
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SOIL/SLOPEWASH; soil/Qsw, Medium grayish-brown sandy silt; firm; moderately dense; dry			Siltstone at base appears sheared and/ or fractured
3 - 10' LANDSLIDE; Qls, Medium grayish-brown to medium olive-gray siltstone and sandy siltstone with scattered pebbles; loose to dense; dry to damp			No Ground Water No Caving

SCALE 1" = 5'

N 37 E

TOTAL DEPTH 10 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

PROJECT Newhall Ranch - Phase IB

LOGGED BY DGG

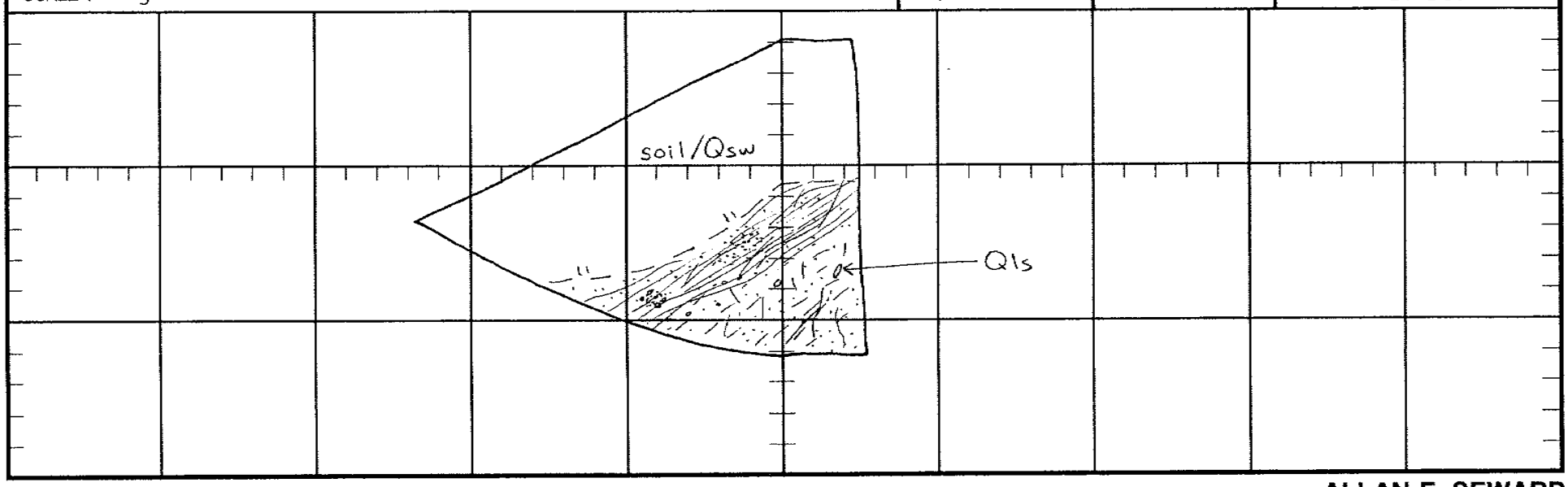
Trench Log No. 111Q

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4.5' SOIL/SLOPEWASH; soil/Qsw, Medium-brown sandy silt; soft to firm; loose to moderately dense; dry 4.5 - 10' LANDSLIDE; Qls, Tan to medium-brown to medium-gray siltstone to sandy siltstone with scattered pebbles; soft to stiff; loose to dense; damp	Apx:N56W,34NE	f:N60W,50NE	Bottom 2.5-3' of Qls is tight, upper 2.5-3' of Qls has well developed fracture surfaces with caliche No Ground Water No Caving TOTAL DEPTH 10 Ft.

SCALE 1" = 5'

N 21 W



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 112Q

PROJECT Newhall Ranch - Phase IB

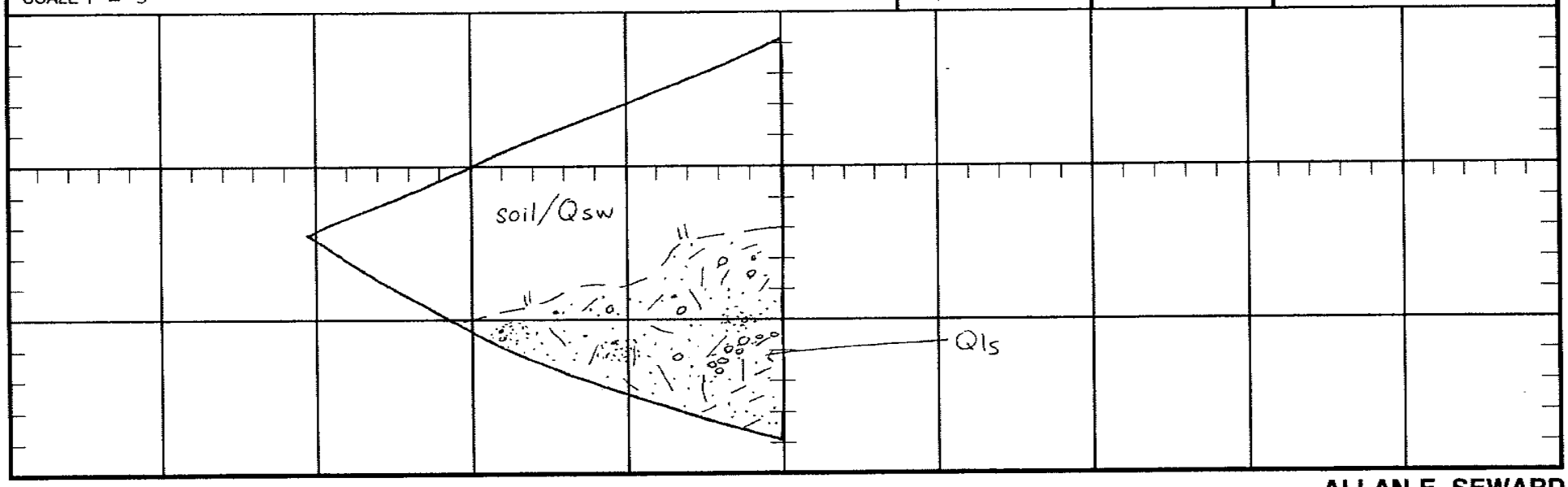
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown sandy silt with scattered pebbles; soft to firm; loose to moderately dense; dry			Bottom 2-3 Ft. of Qls is tight and dense
6 - 13' LANDSLIDE; Qls, Tan to medium-brownish gray siltstone to sandy siltstone with local pods of pebbles and scattered cobbles; soft to stiff; loose to dense; slightly damp to damp			No Ground Water No Caving

N 46 E

SCALE 1" = 5'

TOTAL DEPTH 13 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

PROJECT Newhall Ranch - Phase IB

LOGGED BY DGG

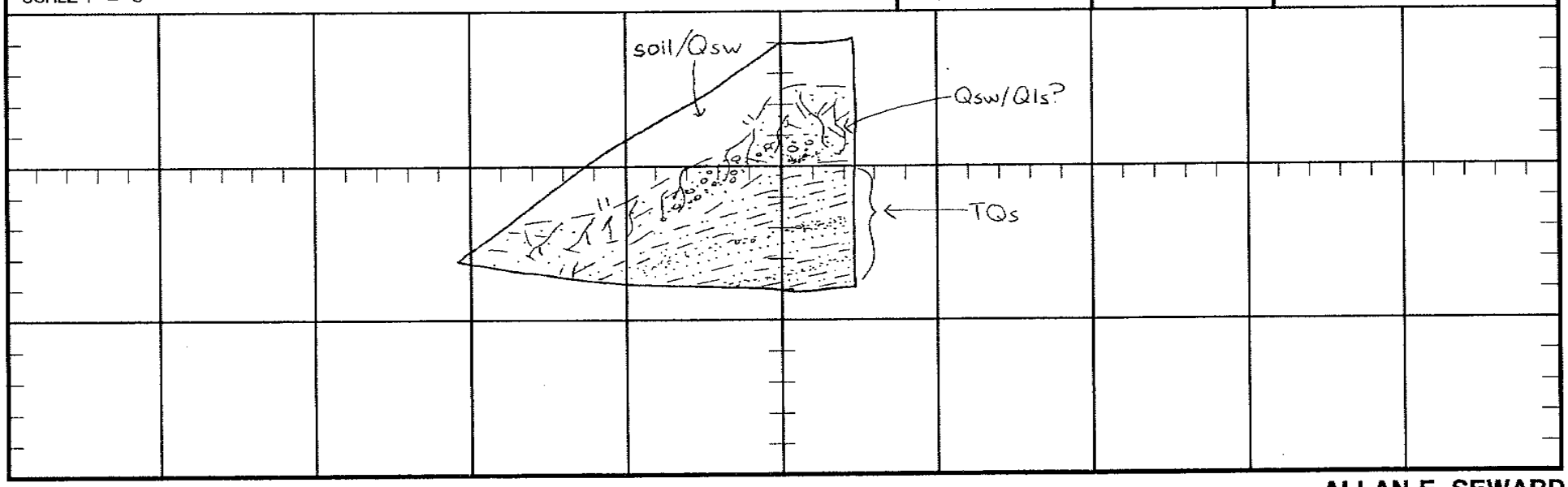
Trench Log No. 113Q

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1.5' SOIL/SLOPEWASH; soil/Qsw, Medium-brown to medium grayish-brown sandy silt; soft; loose; dry			
1.5 - 4' SLOPEWASH/LANDSLIDE?; Qsw/Qls?, Tan to grayish-tan sandy silt with pebbles and cobbles in concretionary pods; soft to firm; loose to moderately dense; dry; fractured			
4 - 8' BEDROCK; TQs, Light-gray to medium brownish-gray siltstone, sandy siltstone, and fine- to medium-grained pebbly sandstone; moderately dense to dense; dry to damp	B:N27W,17NE		No Ground Water No Caving TOTAL DEPTH 8 Ft.

N 25 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 114Q

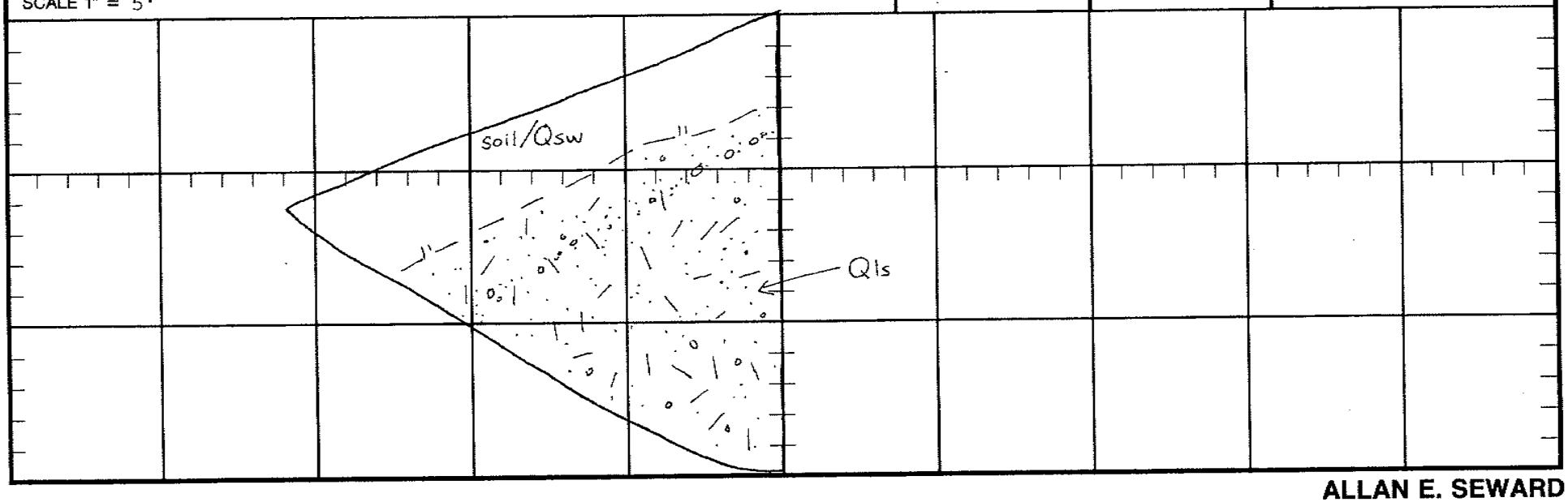
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SOIL/SLOPEWASH; soil/Qsw, Light-brown sandy silt with scattered pebbles and cobbles; firm; moderately dense; dry			
3 - 15' LANDSLIDE; Qls, Medium- to dark-gray to brownish-gray sandy siltstone with scattered pebbles; firm; loose to moderately dense; damp			No Ground Water NO Caving TOTAL DEPTH 15 Ft.

SCALE 1" = 5'

N 78 E



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 115Q

PROJECT Newhall Ranch - Phase IB

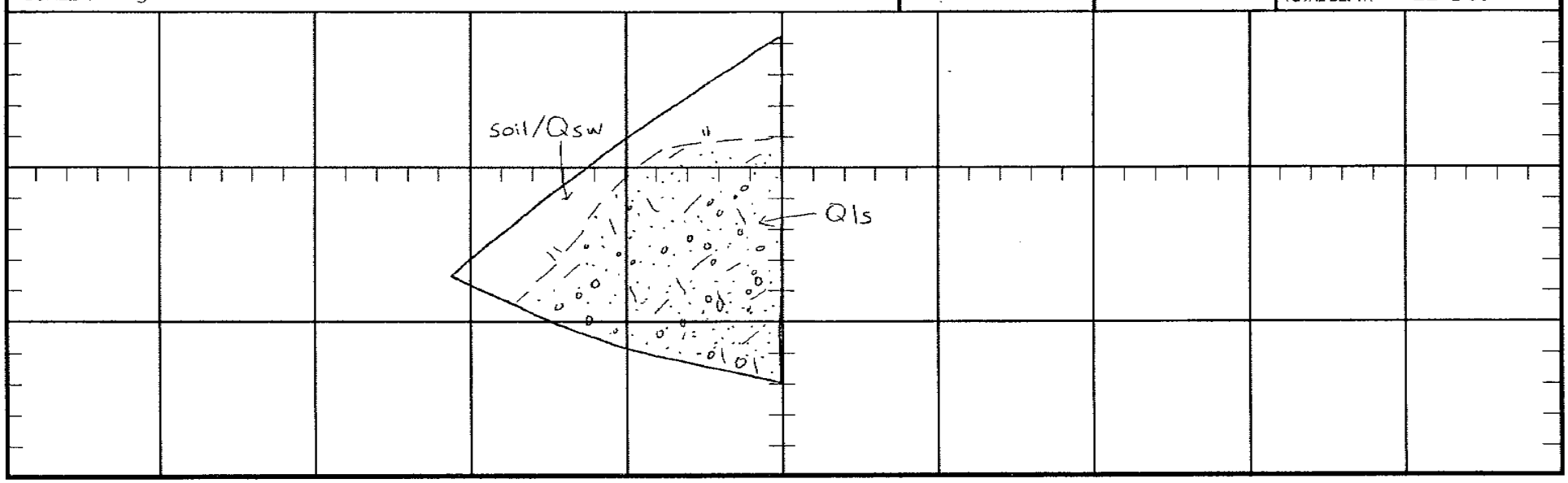
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4' SOIL/SLOPEWASH; soil/Qsw, Medium-brown silt with scattered pebbles and cobbles; firm; loose to moderately dense; dry			
4 - 11' LANDSLIDE; Qls, Tan to light-brown to medium-gray sandy siltstone to medium- to coarse-grained pebbly sandstone with scattered cobbles; soft to firm; loose to moderately dense; dry to slightly damp			No Ground Water No Caving

SCALE 1" = 5'

N 51 E

TOTAL DEPTH 11 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 116Q

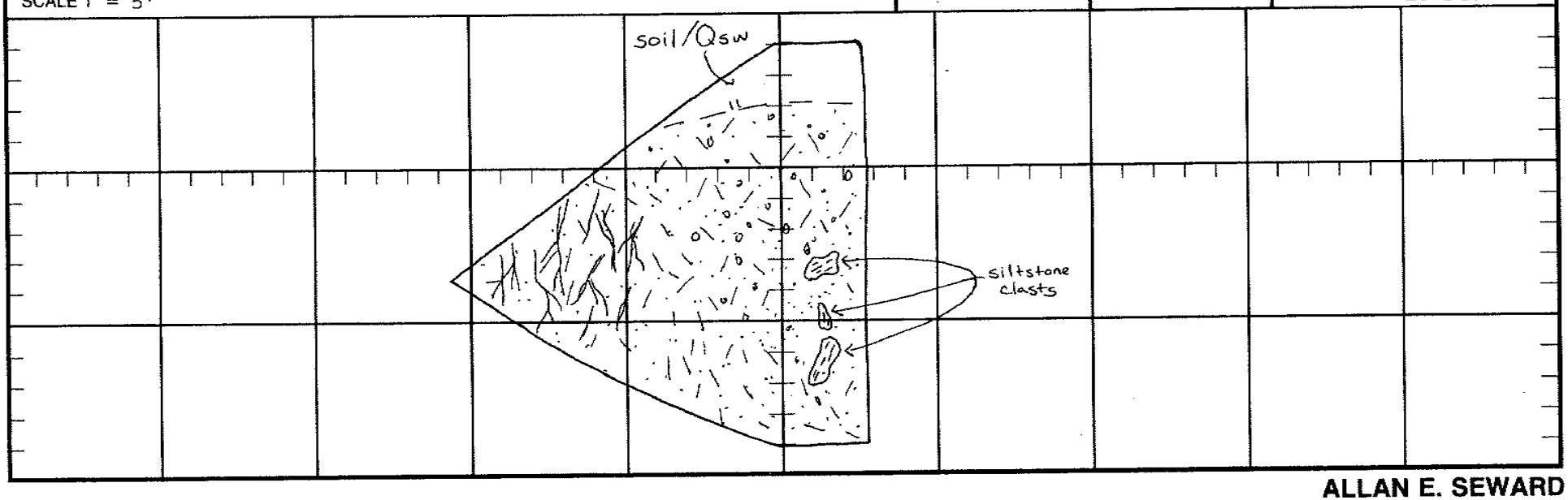
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2' SOIL/SLOPEWASH; soil/Qsw, Medium-brown sandy silt with scattered pebbles; firm; loose to moderately dense; dry 2 - 13' LANDSLIDE; Qls, Light- to medium-gray pebbly, silty sandstone/sandy siltstone and light-gray siltstone; soft to firm; loose to moderately dense; damp; locally fractured			No Ground Water No Caving TOTAL DEPTH 13 Ft.

N 58 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 117Q

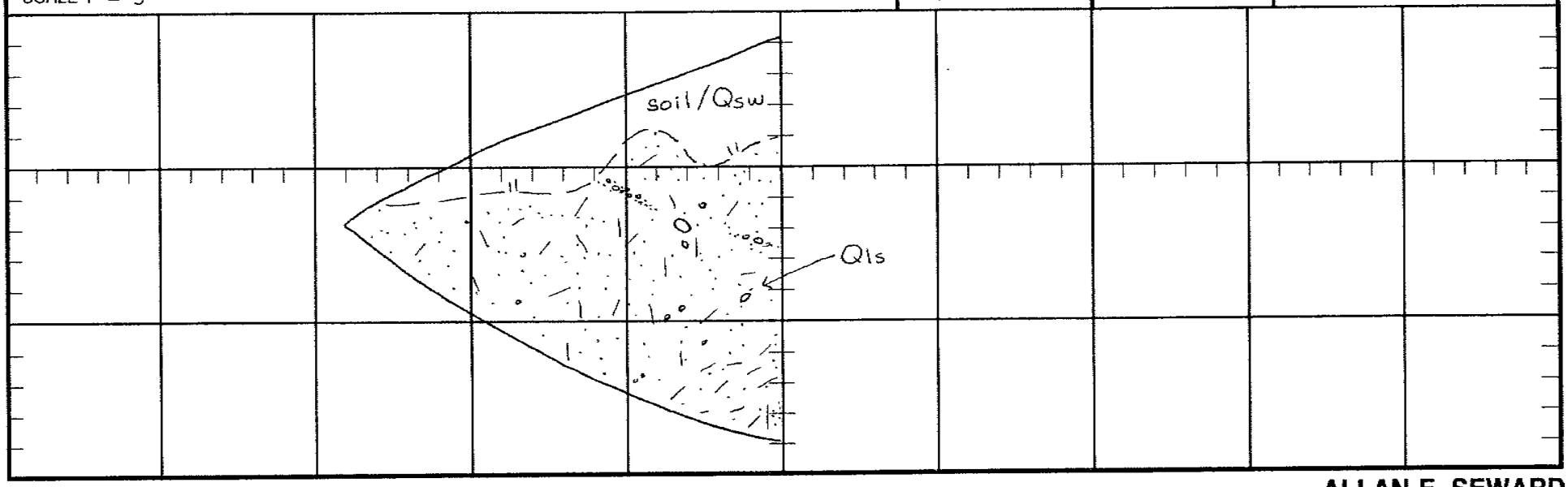
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4' SOIL/SLOPEWASH; soil/Qsw, Medium brown sandy silt with scattered pebbles; firm; moderately dense; slightly damp to damp 4 - 13' LANDSLIDE; Qls, Medium brown to olive gray siltstone and sandy siltstone with scattered pebbles; soft to firm; loose to dense; damp			Trenches 117Q thru 127Q excavated and logged 10/28/99 using a track-mounted backhoe with a 24" bucket Bottom 3' of Qls is fairly tight No Ground Water No Caving TOTAL DEPTH 13 Ft.

SCALE 1" = 5'

N 23 E



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 118Q

PROJECT Newhall Ranch - Phase IB

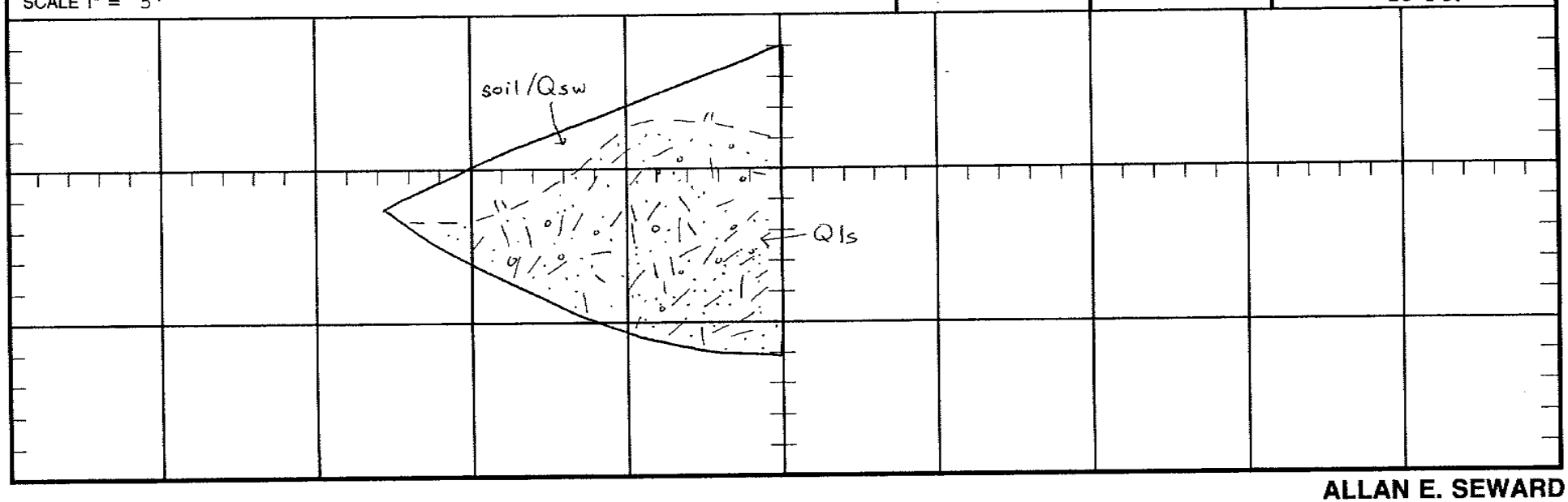
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SOIL/SLOPEWASH: soil/Qsw, Medium-brown sandy silt; soft; loose; dry			Bottom 3' of Qls hard/very dense
3 - 10' LANDSLIDE; Qls, Yellowish-brown to medium-brown to light olive-gray siltstone and sandy siltstone with scattered pebbles; stiff to hard; dense to very dense; dry to damp			No Ground Water No Caving

N 59 E

SCALE 1" = 5'

TOTAL DEPTH 10 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 119Q

PROJECT Newhall Ranch - Phase IB

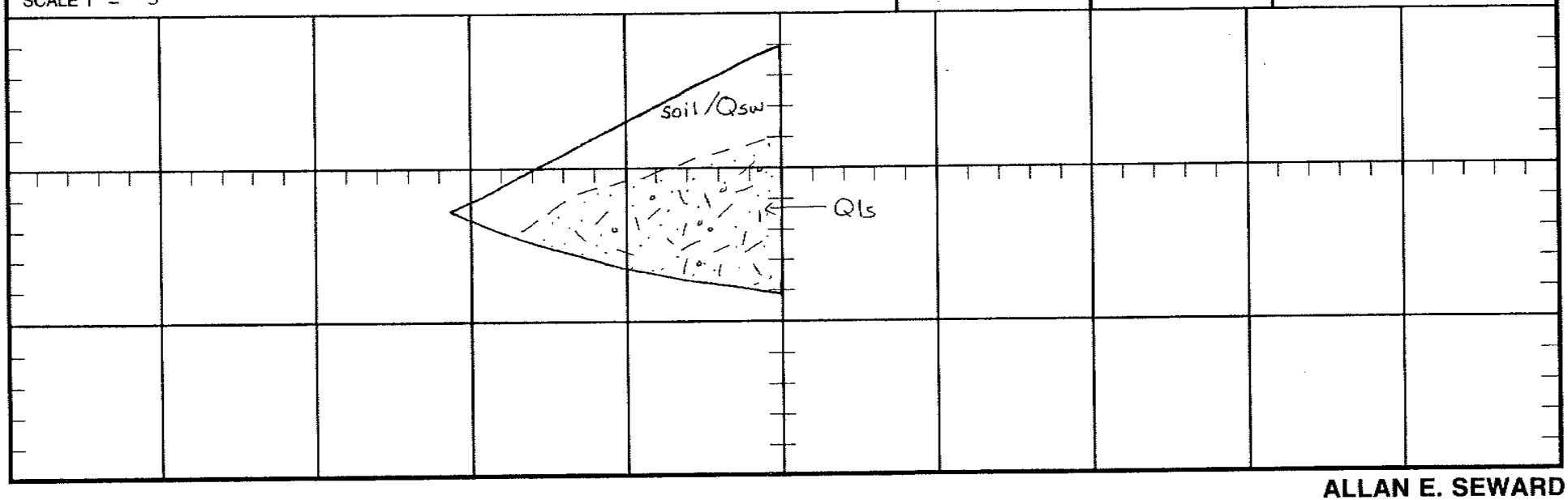
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SOIL/SLOPEWASH; soil/Qsw, Medium-brown sandy silt; soft to firm; loose to moderately dense; dry to slightly damp			
3 - 8' LANDSLIDE; Qls, Light-gray to medium-gray to medium olive-gray siltstone and sandy siltstone with scattered pebbles; soft to stiff; loose to dense; slightly damp to damp			No Ground Water No Caving

SCALE 1" = 5'

N 42 E

TOTAL DEPTH 8 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 120Q

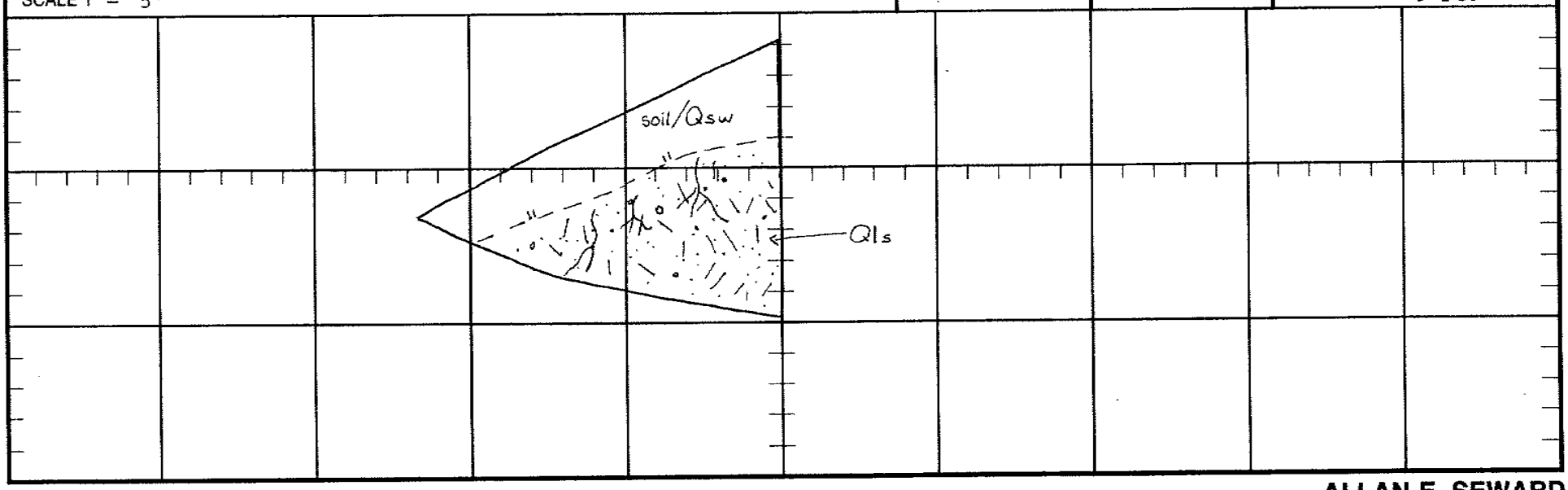
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SOIL/SLOPEWASH; soil/Qsw, Medium-brown sandy silt; soft to firm; loose to moderately dense; dry to slightly damp 3 - 9' LANDSLIDE; Qls, Light- to medium-gray siltstone to sandy siltstone with scattered pebbles; soft to stiff; loose to dense; dry to slightly damp			No Ground Water No Caving TOTAL DEPTH 9 Ft.

N 24 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 121Q

PROJECT Newhall Ranch - Phase IB

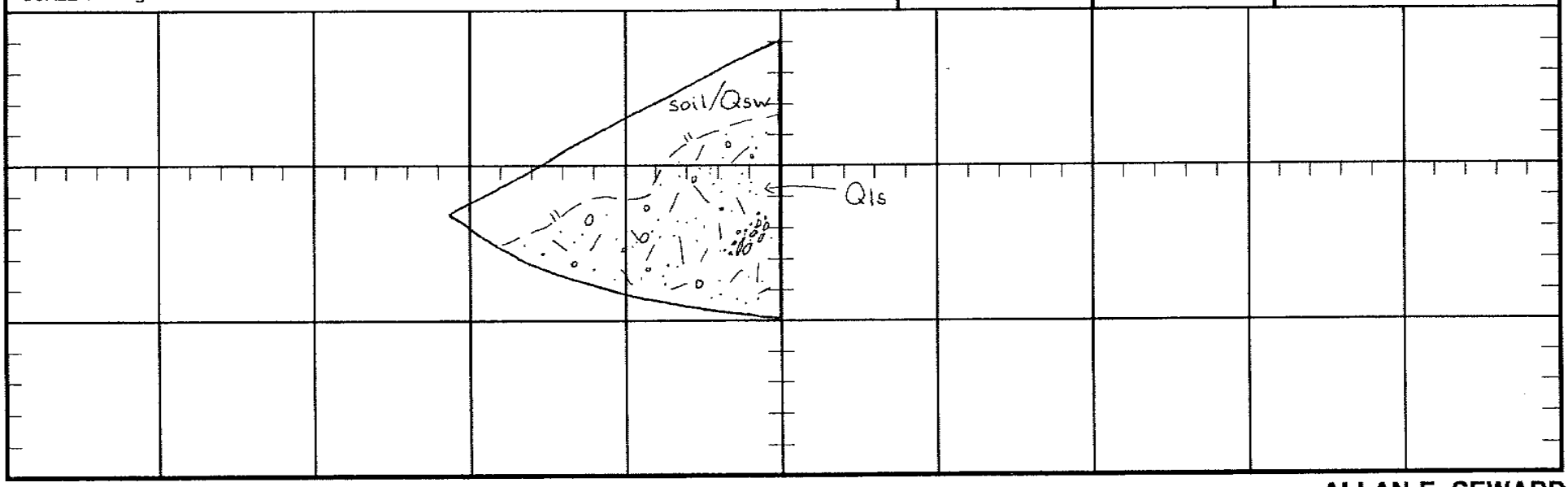
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2.5' SOIL/SLOPEWASH; soil/Qsw, Medium-brown sandy silt with scattered pebbles; firm; moderately dense; dry			
2.5 - 9' LANDSLIDE; Qls, Light- to medium-gray siltstone and sandy siltstone with scattered pebbles and cobbles; firm to stiff; loose to dense; dry to slightly damp			No Ground Water No Caving

SCALE 1" = 5'

N 25 E

TOTAL DEPTH 9 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 122Q

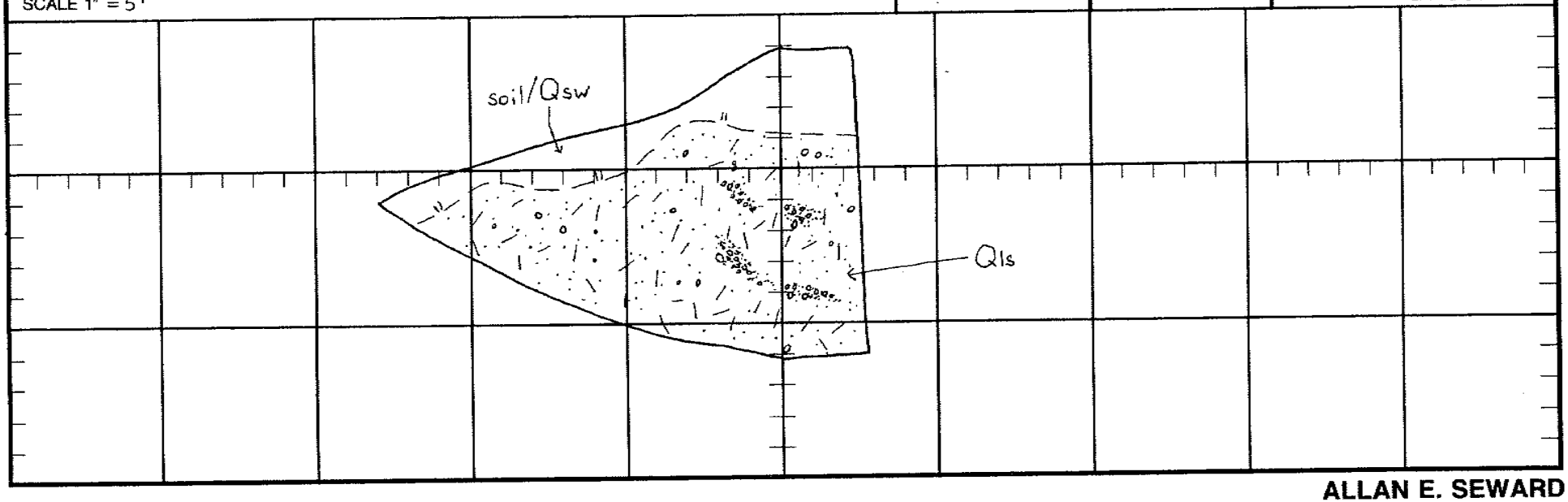
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SOIL/SLOPEWASH; soil/Qsw, Light-brown sandy silt; soft; loose; dry 3 - 10' LANDSLIDE; Qls, Light- to medium-gray siltstone, sandy siltstone and medium- to coarse-grained pebbly sandstone; soft to firm; loose to moderately dense; dry to slightly damp			No Ground Water No Caving TOTAL DEPTH 10 Ft.

SCALE 1" = 5'

N 35 E



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

PROJECT Newhall Ranch - Phase IB

LOGGED BY DGG

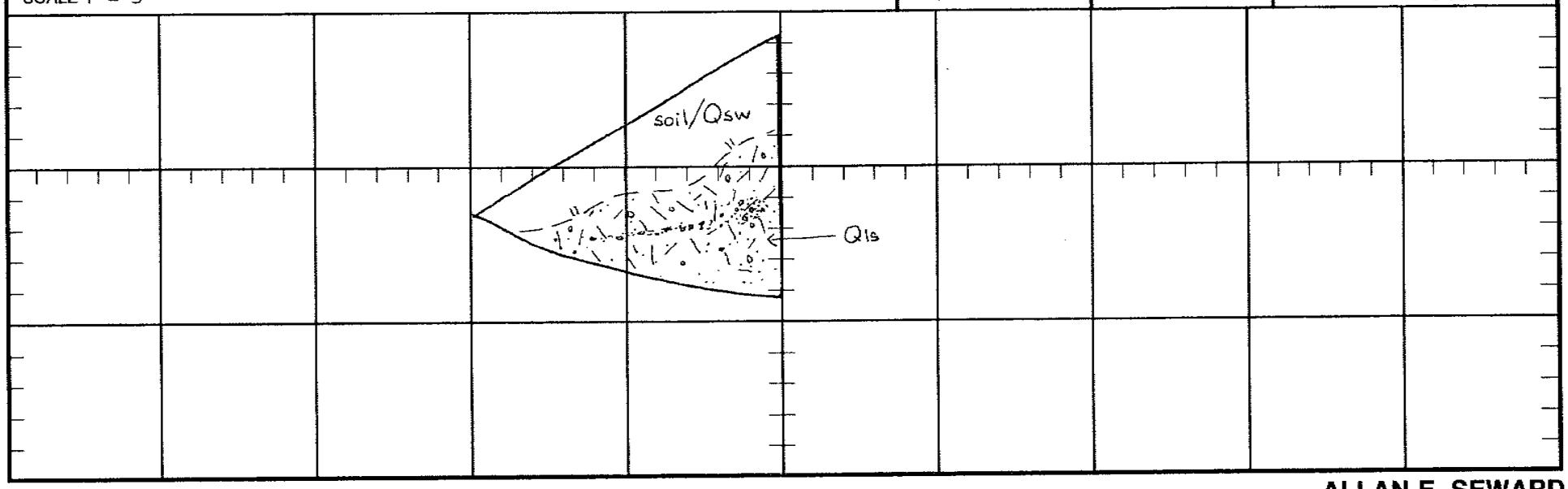
Trench Log No. 123Q

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SOIL/SLOPEWASH; soil/Qsw, Yellowish-brown sandy silt with scattered pebbles; soft; loose; dry 3 - 8' LANDSLIDE; Qls, Light- to medium-gray siltstone and sandy siltstone with scattered pebbles; soft to firm; loose to moderately dense; dry to slightly damp			No Ground Water No Caving TOTAL DEPTH 8 Ft.

SCALE 1" = 5'

N 33 E



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 124Q

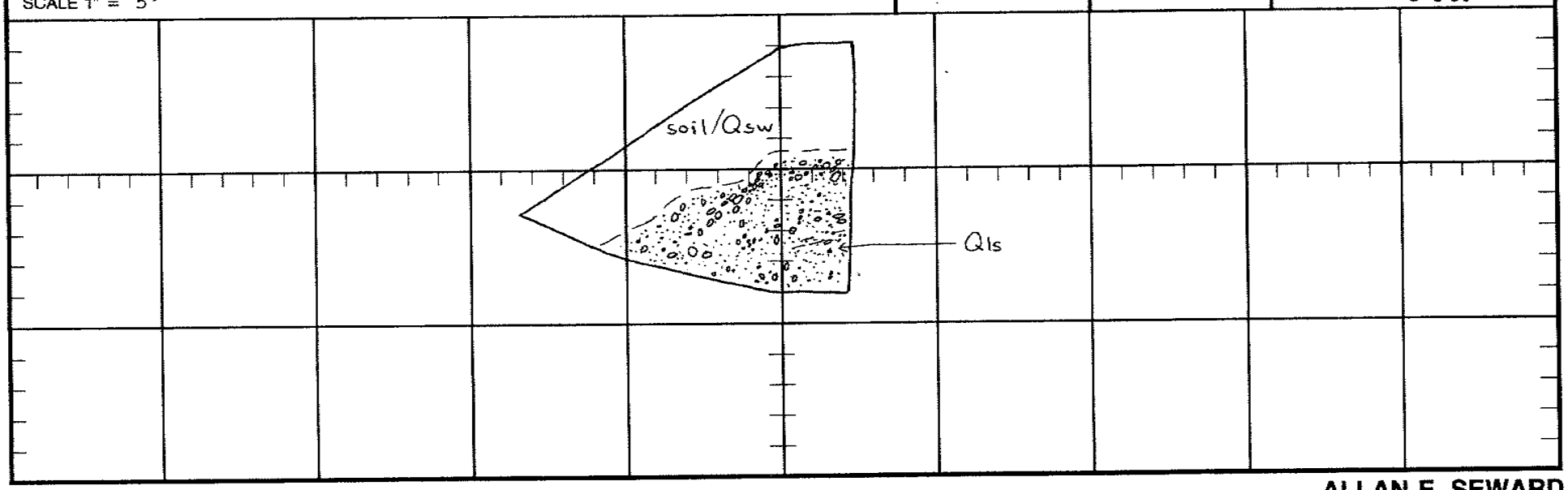
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3.5' SOIL/SLOPEWASH; soil/Qsw, Medium-brown pebbly sandy silt; soft; loose; dry 3.5 - 8' LANDSLIDE; Qls, Tan to light-gray fine- to coarse-grained pebbly sandstone and pebble to cobble conglomerate; loose to moderately dense; dry			Qls-disrupted TQs lithologies; no distinct bedding No Ground Water No Caving TOTAL DEPTH 8 Ft.

SCALE 1" = 5'

N 7 W



ALLAN E. SEWARD

JOB NO. 99-1703Q1s-1

PROJECT Newhall Ranch - Phase IB

LOGGED BY DGG

Trench Log No. 125Q

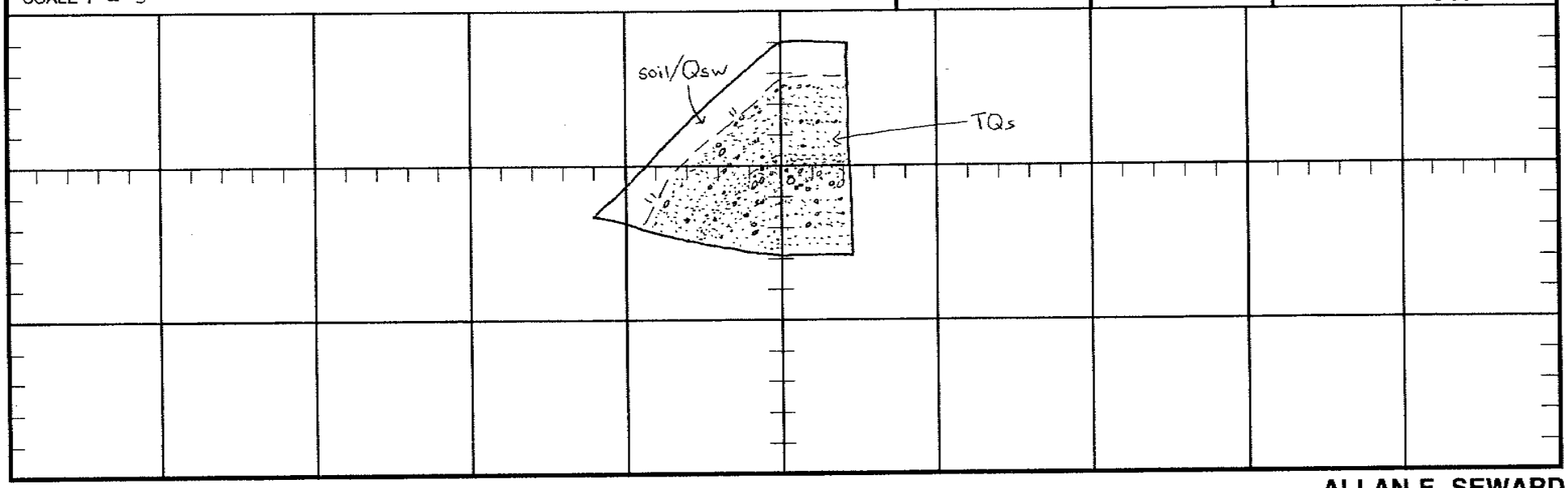
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1' SOIL/SLOPEWASH; s/Qsw, Medium-brown pebbly sandy silt; soft; loose; dry			TQs appears to be slightly creep affected - could account for steeper dip
1 - 7' BEDROCK; TQs, Tan to light-gray fine-grained sandstone, medium to coarse-grained sandstone and pebble conglomerate; loose to dense; dry	Apx:N50W,27NE		
			No Ground Water No Caving

N 36 E

SCALE 1" = 5'

TOTAL DEPTH 7 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 126Q

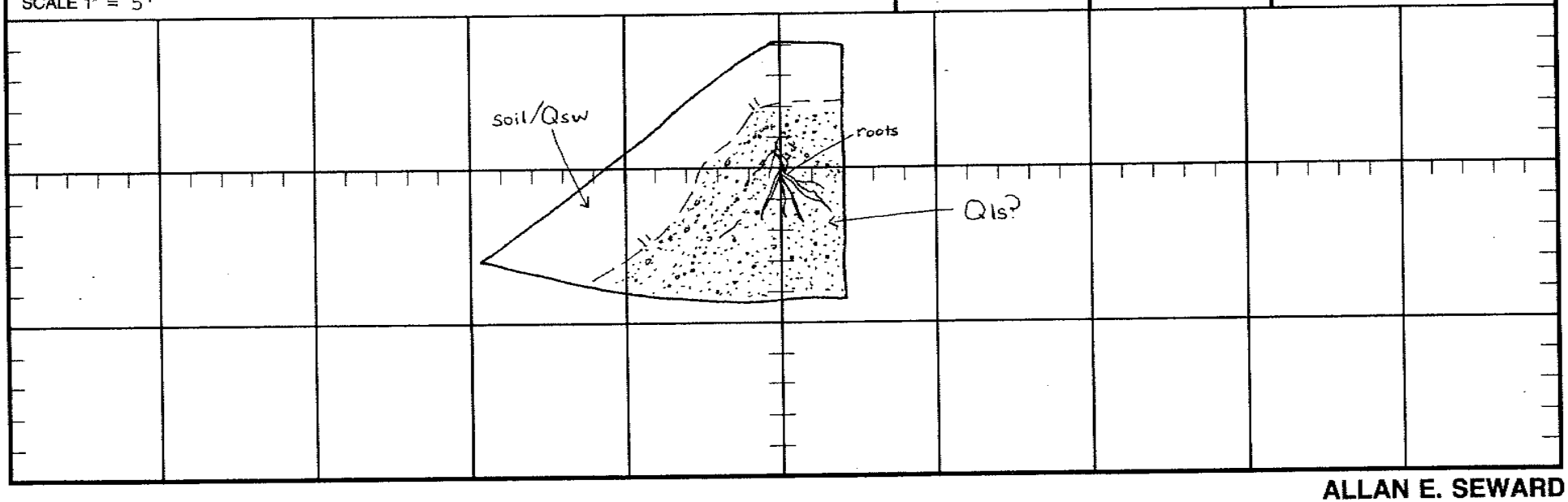
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown sandy silt with scattered pebbles; soft; loose; dry 2 - 8' LANDSLIDE?; Qls?, Tan to light-gray medium- to coarse-grained pebbly sandstone; loose to dense; dry			Top 3' of Qls creep affected bottom 3' vague stratification/ bedding? No Ground Water No Caving TOTAL DEPTH 8 Ft.

SCALE 1" = 5'

N 15 W



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 127Q

PROJECT Newhall Ranch - Phase IB

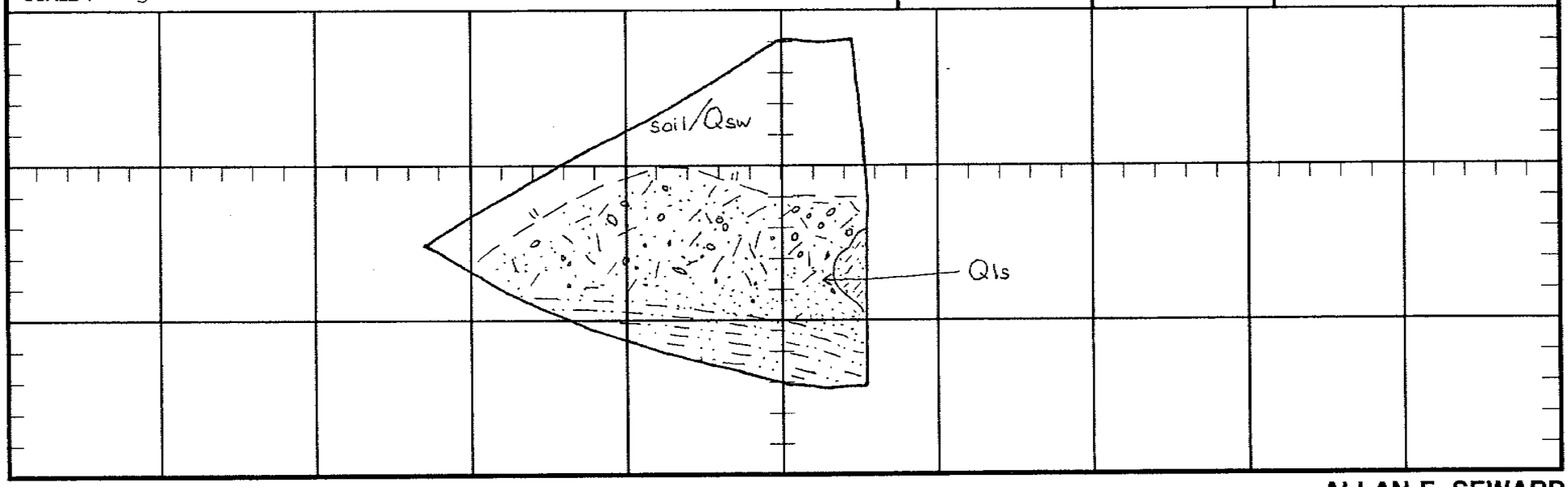
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 5' SOIL/SLOPEWASH; soil/Qsw, Yellowish- to medium-brown sandy silt with scattered pebbles; soft to firm; loose to moderately dense; dry			
5 - 11' LANDSLIDE; Qls, Orangish-brown to medium-brown to olive-gray siltstone, sandy siltstone and medium- to coarse-grained pebbly sandstone; loose to moderately dense; dry to damp		Disrupted bedding N52W,21SW	No Ground Water No Caving

SCALE 1" = 5'

N 27 W

TOTAL DEPTH 11 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 128Q

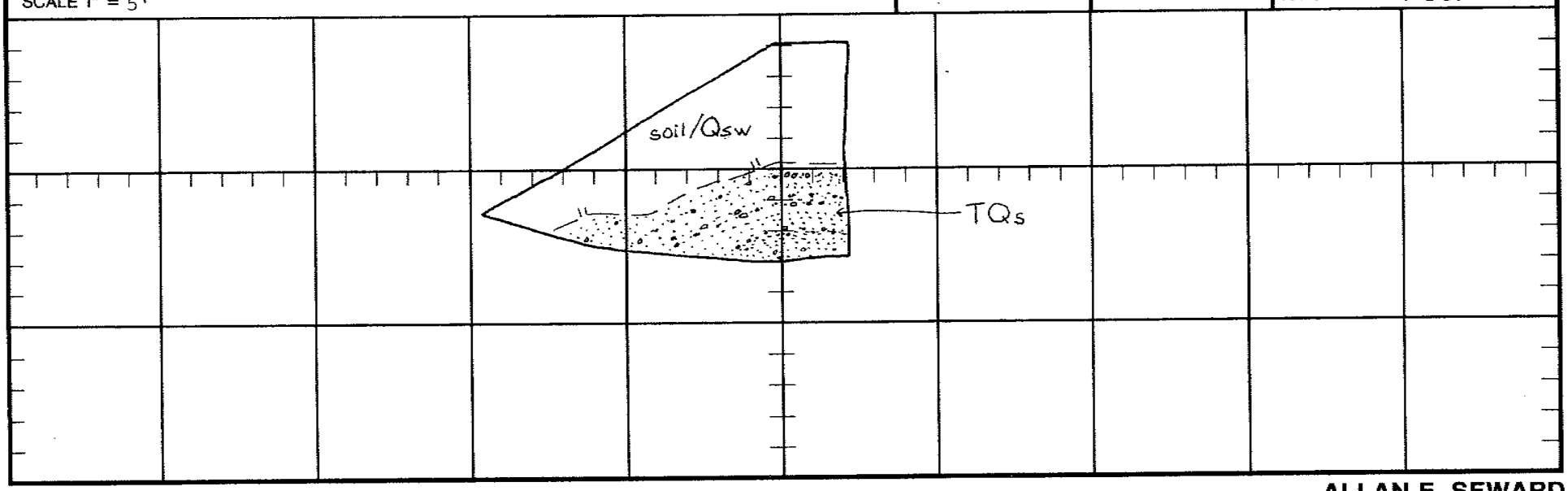
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4' SOIL/SLOPEWASH; soil/Qsw, Medium-brown sandy silt with scattered pebbles; firm to stiff; dense; dry 4 - 7' BEDROCK; TQs, Light-to medium-gray fine-grained sandstone, medium to coarse-grained pebbly sandstone; dense; dry	N45W,26NE		Trenches 128Q thru 141Q excavated on 10/29/99 using a trackmounted backhoe with a 24" bucket No Ground Water No Caving TOTAL DEPTH 7 Ft.

N 41 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 129Q

PROJECT Newhall Ranch - Phase IB

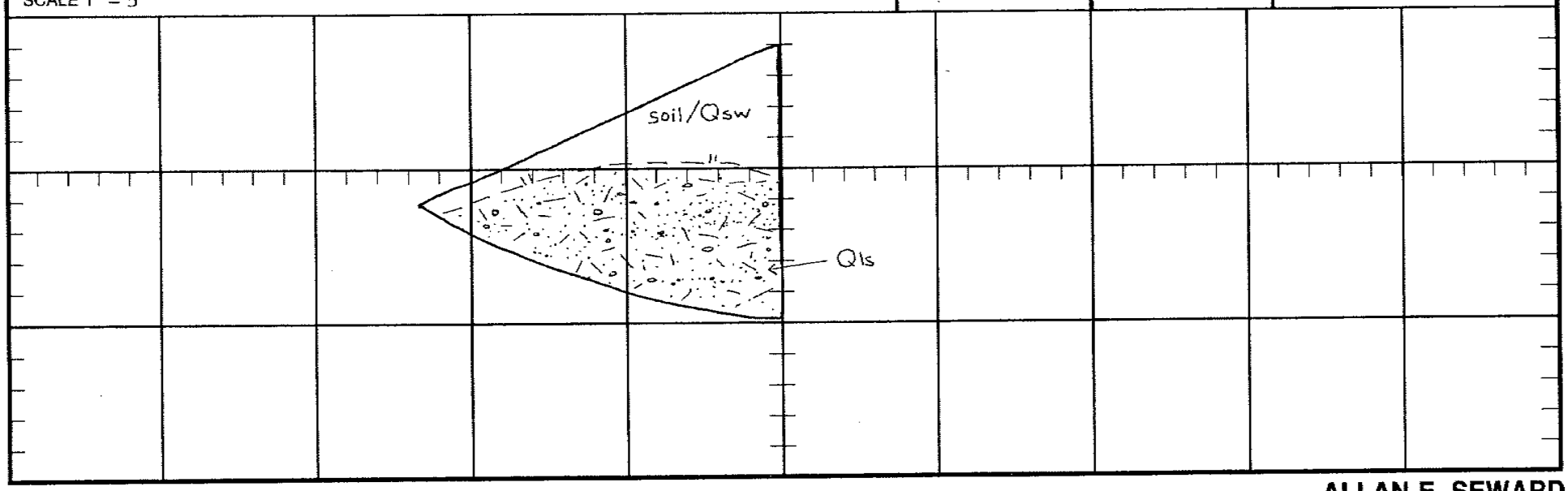
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4.5' SOIL/SLOPEWASH; soil/Qsw, Yellowish-tan to yellowish-brown sandy silt with scattered pebbles; firm; moderately dense; dry			
4.5 - 9' LANDSLIDE; Qls, Light- to medium-gray sandy siltstone, medium- to coarse-grained sandstone, and medium- to coarse-grained pebbly sandstone; soft to firm; loose to moderately dense; dry to slightly damp			No Ground Water No Caving

N 19 E

SCALE 1" = 5'

TOTAL DEPTH 9 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 130Q

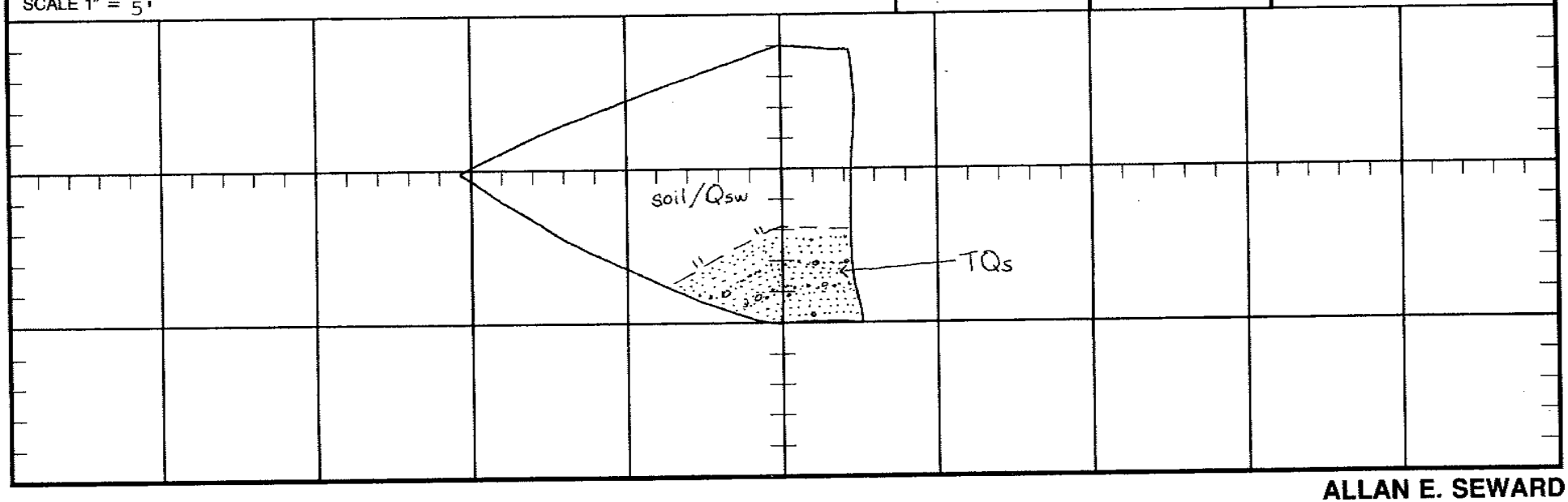
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6' SOIL/SLOPEWASH; soil/Qsw, Medium-brown sandy silt with scattered pebbles; firm to stiff; dense to very dense; dry			
6 - 9' BEDROCK; TQs, Light- to medium-gray and orangish-brown fine-grained sandstone, medium- to coarse-grained sandstone and medium to coarse-grained pebbly sandstone; dense; dry	N48W,27NE		No Ground Water No Caving TOTAL DEPTH 9 Ft.

N 38 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 131Q

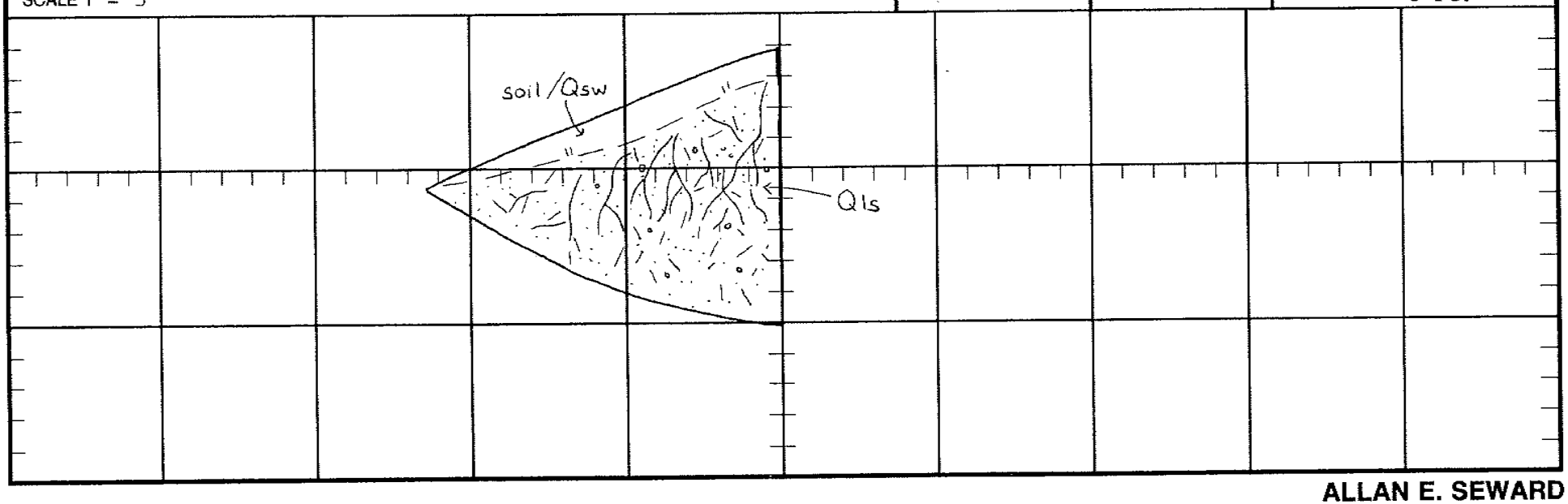
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1' SOIL/SLOPEWASH; soil/Qsw, Light-to yellowish-brown sandy silt; soft; loose; dry 1 - 8' LANDSLIDE; Qls, Light-gray to medium olive-gray siltstone and sandy siltstone; soft to firm; loose to dense; dry to slightly damp			Top 4' of Qls highly fractured No Ground Water No Caving TOTAL DEPTH 8 Ft.

SCALE 1" = 5'

N 43 E



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 132Q

PROJECT Newhall Ranch - Phase IB

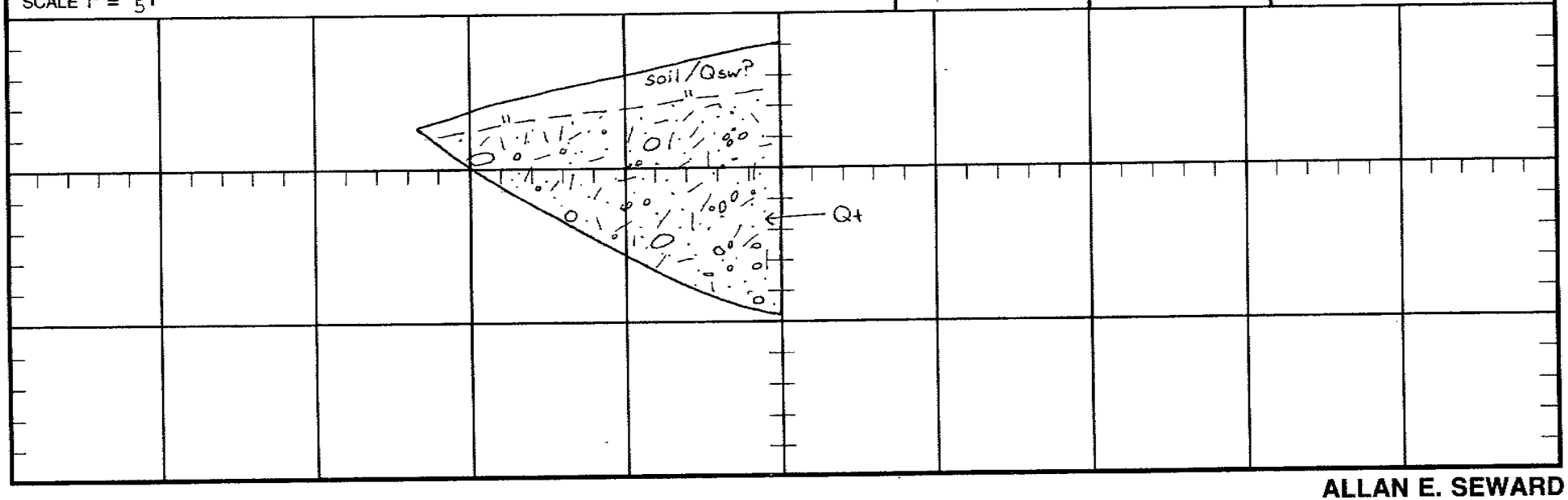
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1.5' SOIL/SLOPEWASH?; soil/Qsw?, Light-brown sandy silt with scattered pebbles; stiff; dense; dry			Qt is weathered and possibly creep affected
1.5 - 9' TERRACE DEPOSITS; Qt, Medium-green to slightly orangish-brown sandy silt with scattered pebbles and cobbles; loose to moderately dense; dry			No Ground Water No Caving

N 38 E

SCALE 1" = 5'

TOTAL DEPTH 9 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

PROJECT Newhall Ranch - Phase IB

LOGGED BY DGG

Trench Log No. 133Q

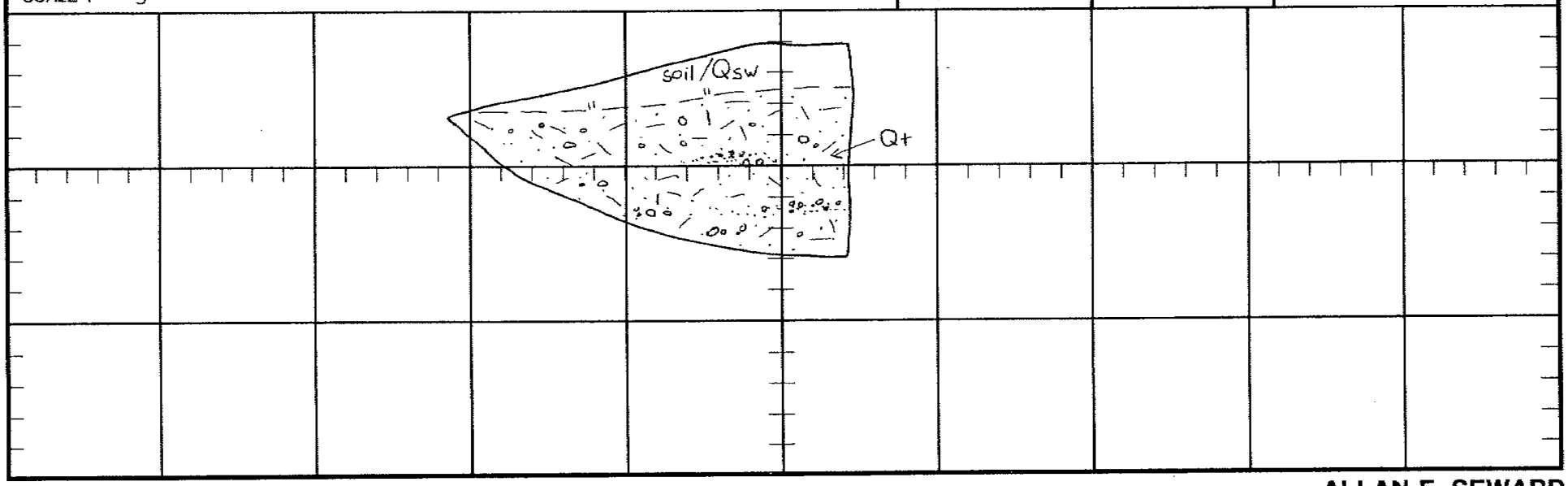
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1.5' SOIL/SLOPEWASH; soil/Qsw, Medium brown sandy silt with scattered pebbles; firm; moderately dense to dense; dry			Qt is weathered and possibly creep affected
1.5 - 7' TERRACE DEPOSITS; Qt, Yellowish- to medium-brown sandy silt with scattered pebbles and cobbles; loose to dense; dry to slightly damp; pebble and cobble beds are discontinuous			No Ground Water No Caving

SCALE 1" = 5'

N 87 W

TOTAL DEPTH 7 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703Q1s-1

LOGGED BY DGG

Trench Log No. 134Q

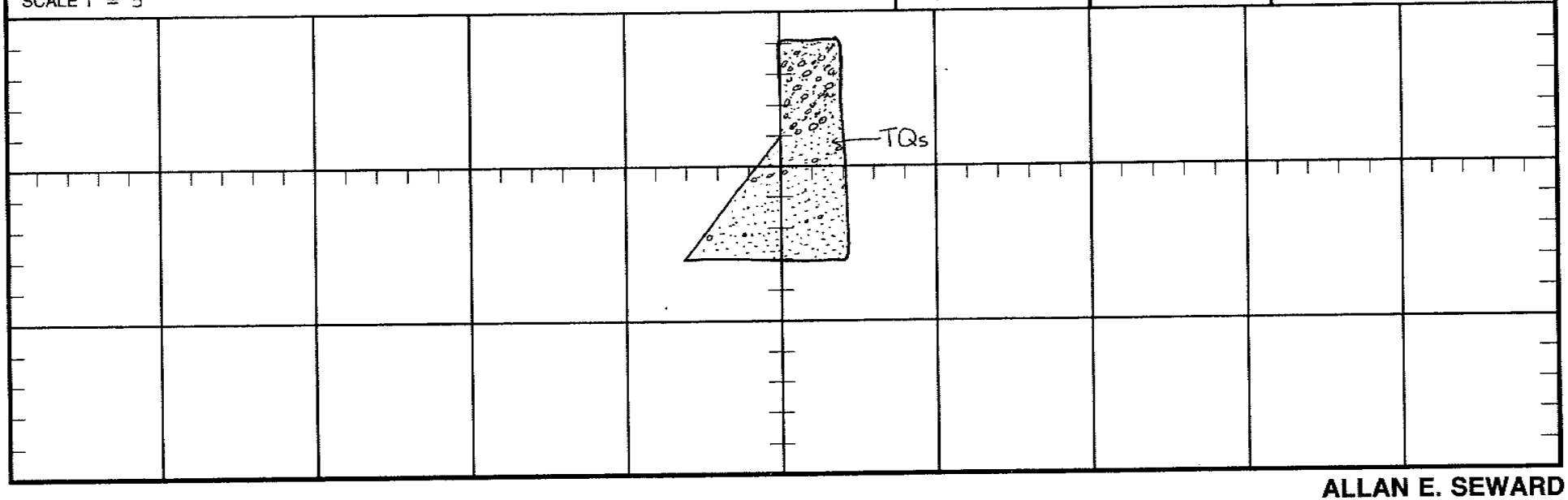
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 7' BEDROCK; TQs, Light-gray fine- to medium-grained sandstone and pinkish-gray pebble/cobble conglomerate; dense; dry	N7W,22NE		No Ground Water No Caving TOTAL DEPTH 7 Ft.

N 15 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

PROJECT Newhall Ranch - Phase IB

LOGGED BY DGG

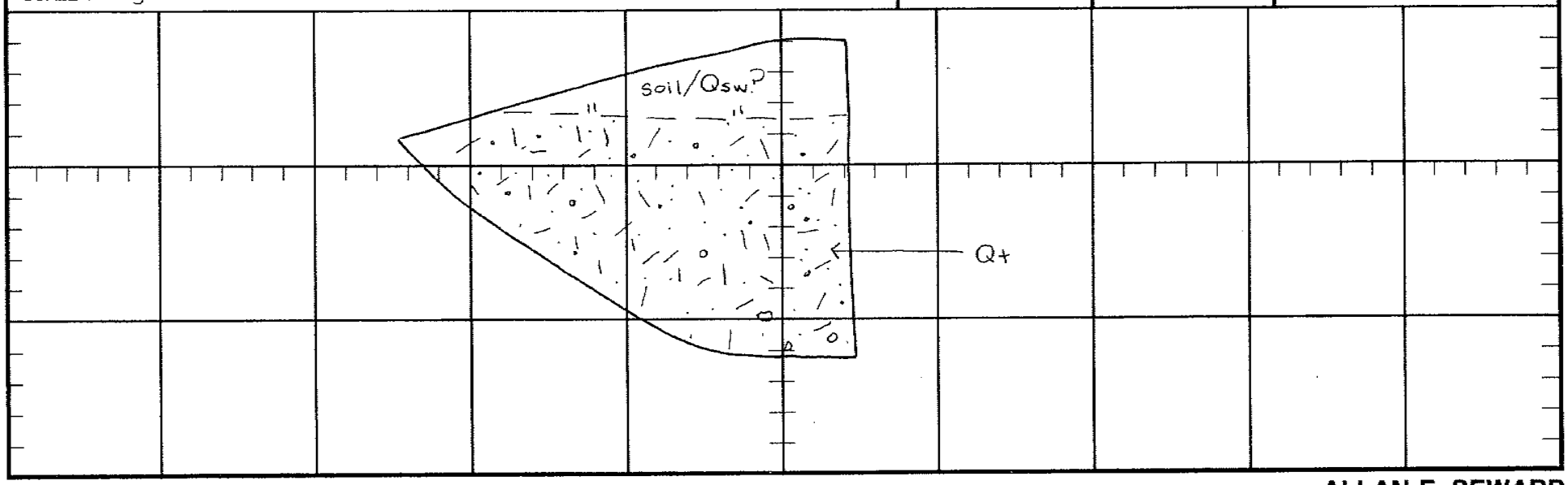
Trench Log No. 135Q

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2.5? SOIL/SLOPEWASH?; soil/Qsw?, Light-brown sandy silt; firm; moderately dense; dry			Qt is weathered with no distinct stratification
2.5 - 10' TERRACE DEPOSITS; Qt, Mottled light yellowish-brown and medium-brown siltstone to sandy siltstone; firm; moderately dense; damp			No Ground Water No Caving
			TOTAL DEPTH 10 Ft.

SCALE 1" = 5'

N 54 E



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 136Q

PROJECT Newhall Ranch - Phase IB

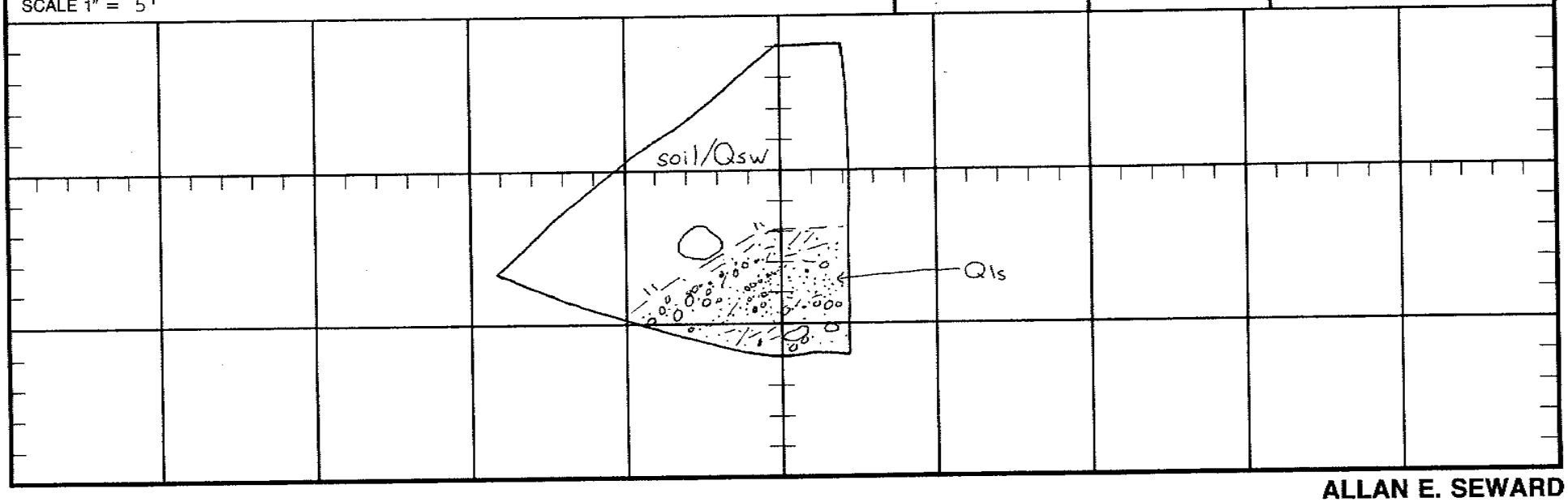
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6' SOIL/SLOPEWASH; soil/Qsw, Light-brown to slightly yellowish-brown sandy silt with scattered pebbles and cobbles; soft to firm; loose to moderately dense; dry			
6 - 10' LANDSLIDE; Qls, Light- to medium-gray silty sandstone, fine-grained sandstone and medium- to coarse-grained pebbly sandstone with scattered cobbles; moderately dense; dry			No Ground Water No Caving

N 44 W

SCALE 1" = 5'

TOTAL DEPTH 10 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 137Q

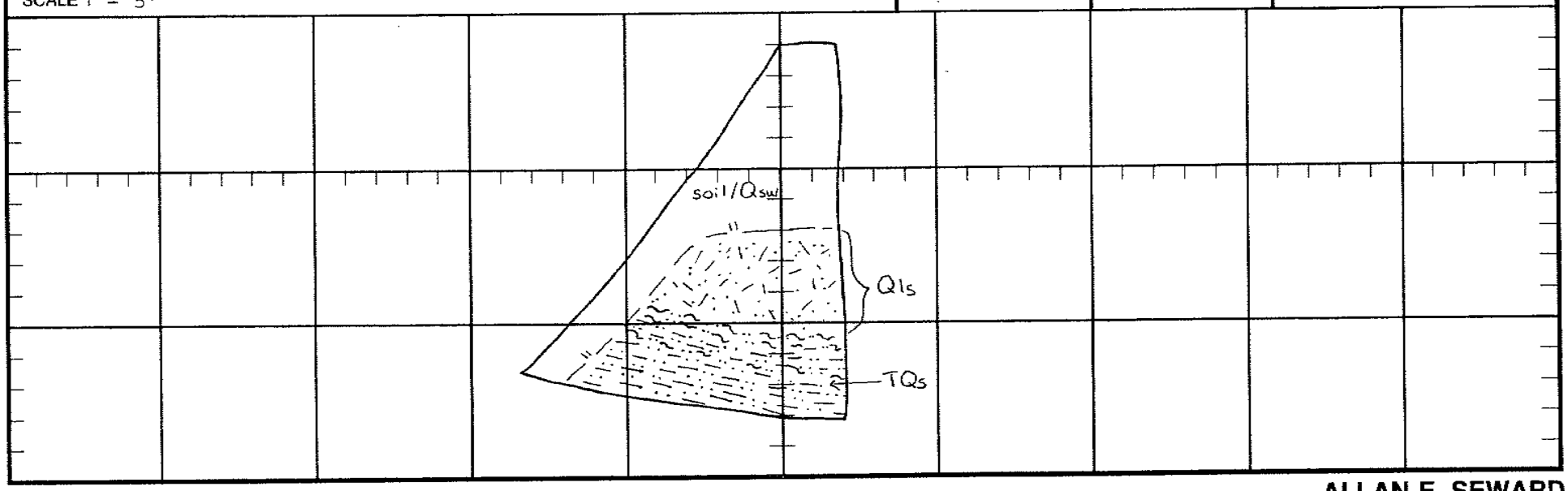
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6' SOIL/SLOPEWASH; soil/Qsw, Tan to light-brown sandy silt; soft to firm; loose to moderately dense; dry			
6 - 9.5' LANDSLIDE; Qls, Tan to light-gray silty sandstone; moderately dense; dry to damp			
9.5 - 12' BEDROCK?; TQs?, Medium-brown to yellowish-gray siltstone; dense; damp	N85E,18SE		
			No Ground Water No Caving
			TOTAL DEPTH 12 Ft.

N 10 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 138Q

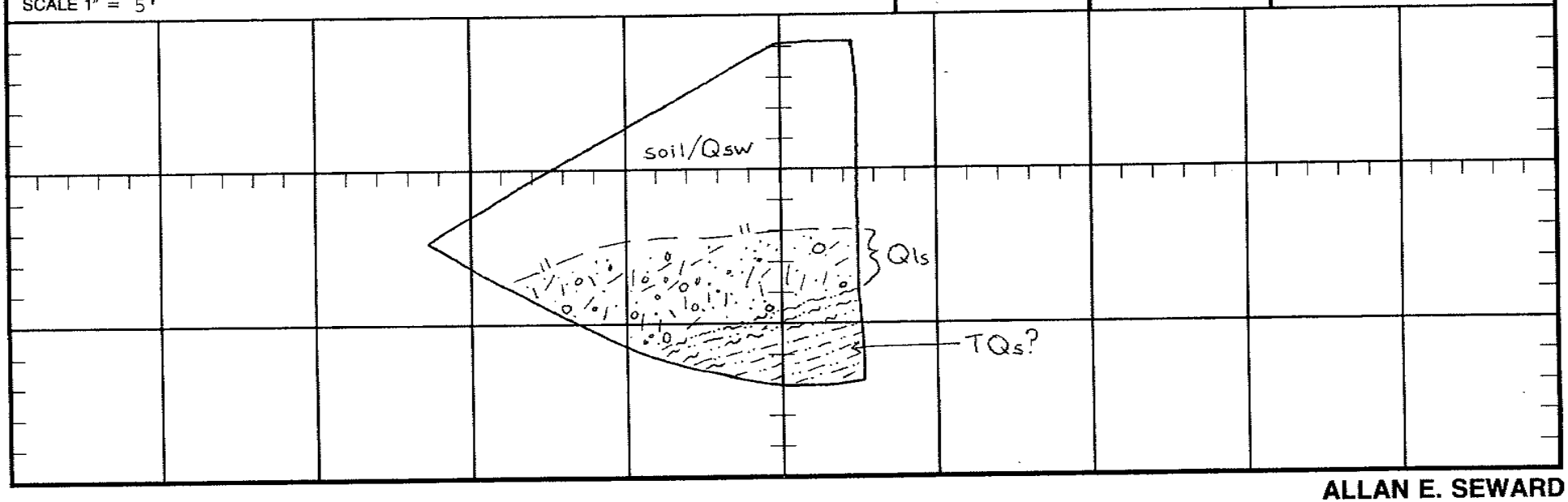
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6' SOIL/SLOPEWASH; soil/Qsw, Yellowish-brown to light brown sandy silt with scattered pebbles; soft; loose; dry			Bottom 3' in place??
6 - 8.5' LANDSLIDE; Qls, Yellowish-brown pebbly sandy siltstone with scattered cobbles; soft; loose; dry	B? N25W,28NE		
8.5 - 11' BEDROCK?; TQs?, Medium-brown olive-gray siltstone; moderately dense; slightly damp			No Ground Water No Caving TOTAL DEPTH 11 Ft.

N 13 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 139Q

PROJECT Newhall Ranch - Phase IB

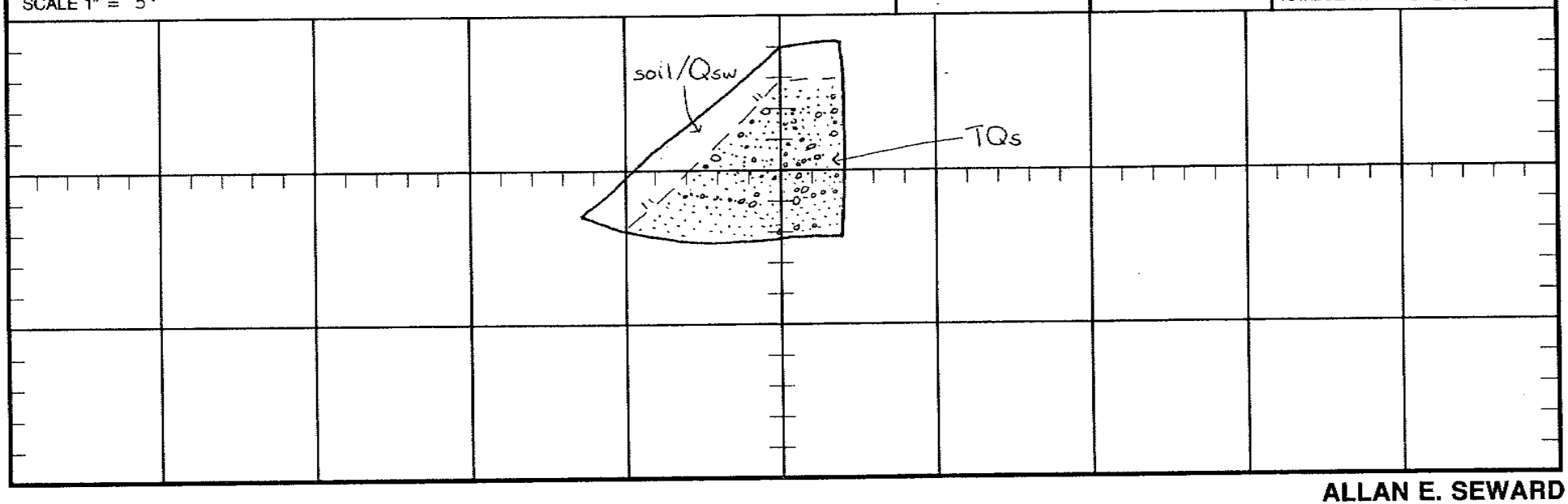
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown sandy silt; firm; moderately dense; dry			
1 - 6' BEDROCK; TQs, Tan to light-gray medium-grained sandstone and pebble to cobble conglomerate with a medium- to coarse-grained matrix; dense; dry	Apx: N29W,28NE		No Ground Water No Caving

TOTAL DEPTH 6 Ft.

SCALE 1" = 5'

N 63 E



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 140Q

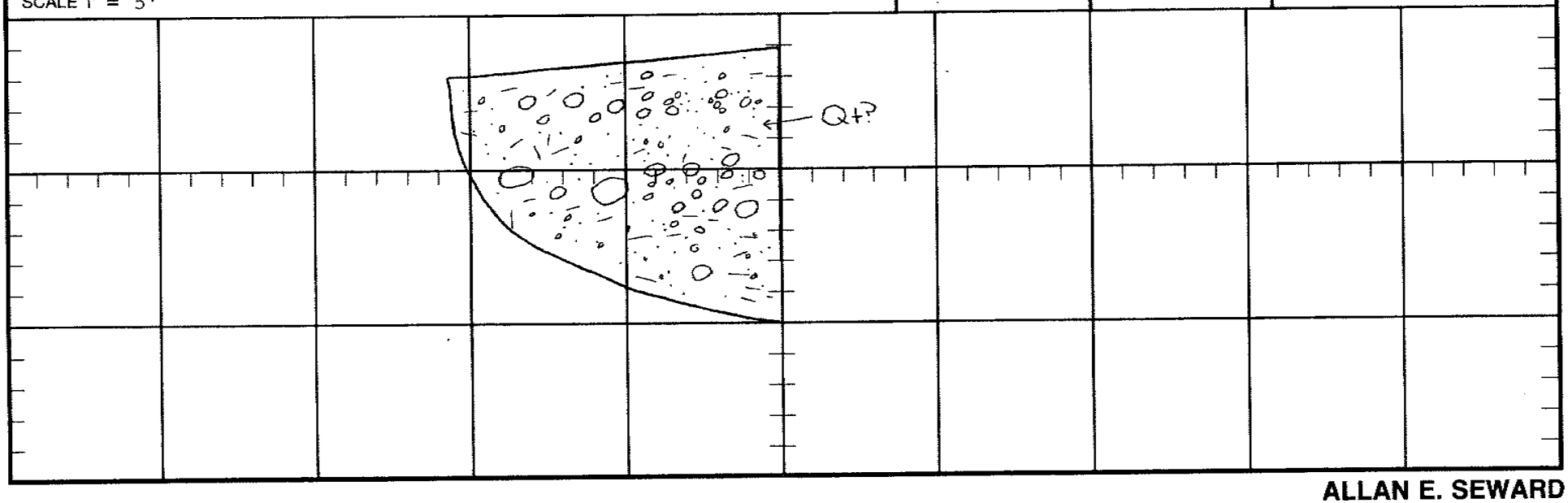
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 9' TERRACE DEPOSITS?; Qt?, Light-brown to yellowish-brown sandy siltstone with scattered pebbles, cobbles and small boulders; soft; loose; dry			Logged from surface due to caving No Ground Water Slight Caving TOTAL DEPTH 9 Ft.

SCALE 1" = 5'

N 4 E



ALLAN E. SEWARD

JOB NO. 99-1703Q1s-1

LOGGED BY DGG

Trench Log No. 141Q

PROJECT Newhall Ranch - Phase IB

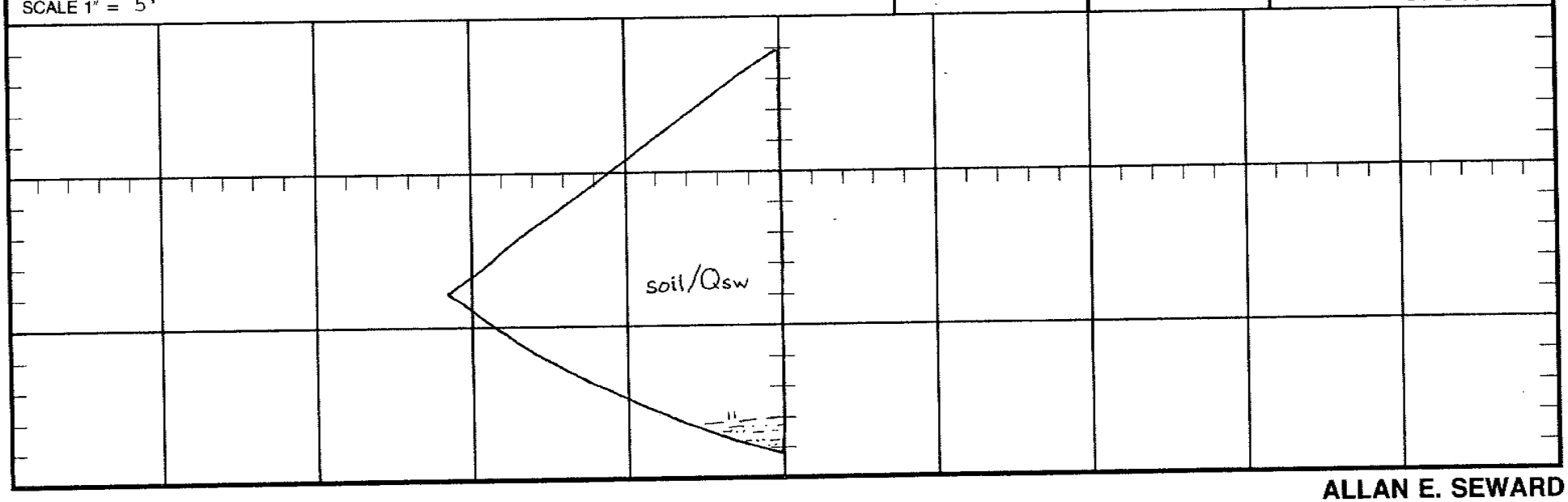
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 12' SOIL/SLOPEWASH; soil/Qsw, Light to medium grayish-brown sandy silt with scattered cobbles; firm; moderately dense; dry			
12 - 13' BEDROCK?, TQs?, Medium olive-gray siltstone; hard; dense; slightly damp			No Ground Water No Caving

SCALE 1" = 5'

N 7 E

TOTAL DEPTH 13 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703Q1s-1

LOGGED BY DGG

Trench Log No. 146Q

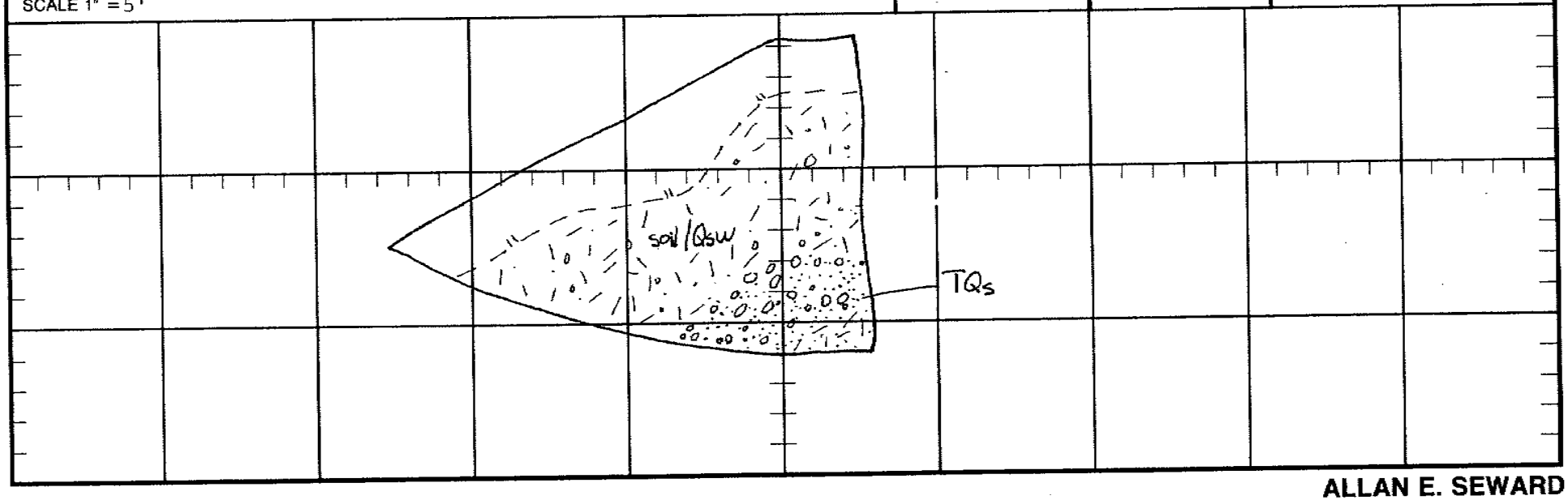
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 7' SOIL/SLOPEWASH; soil/Qsw, Light yellowish-brown sandy silt with scattered pebbles; soft; dry and light yellowish-brown sandy siltstone with scattered pebbles; soft to firm; loose to moderately dense; dry	Apx B?: N1W,36NE		
7 - 10' BEDROCK; TQs; Grayish-brown fine- to coarse-grained cobbly, pebbly sandstone; loose; dry			No Ground Water No Caving TOTAL DEPTH 10 Ft.

SCALE 1" = 5'

Due West



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

PROJECT Newhall Ranch - Phase IB

LOGGED BY DGG

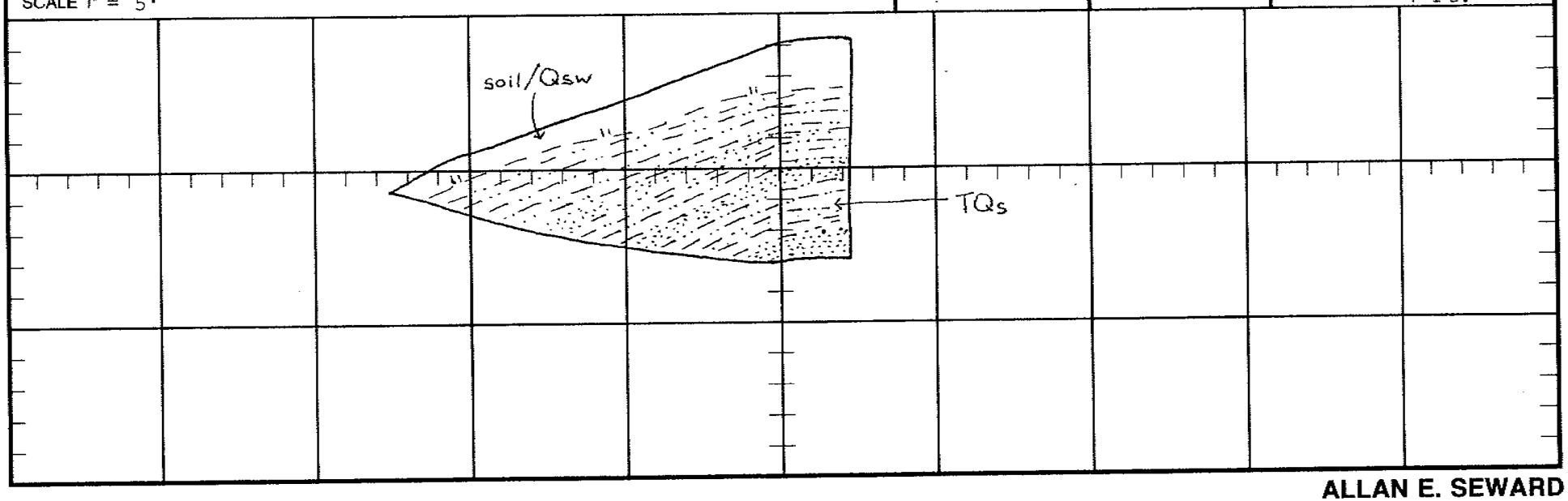
Trench Log No. 147Q

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1.5' SOIL/SLOPEWASH; soil/Qsw, Medium yellowish-brown sandy silt; soft; dry			Top 1' of TQs fractured
1.5 - 7' BEDROCK; TQs, Light-to medium-gray fine-grained sandstone, medium to coarse-grained sandstone, sandy siltstone and siltstone; moderately dense to dense; dry to damp	B:N73E,20SE		
			No Ground Water No Caving
			TOTAL DEPTH 7 Ft.

N 62 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

PROJECT Newhall Ranch - Phase IB

LOGGED BY DGG

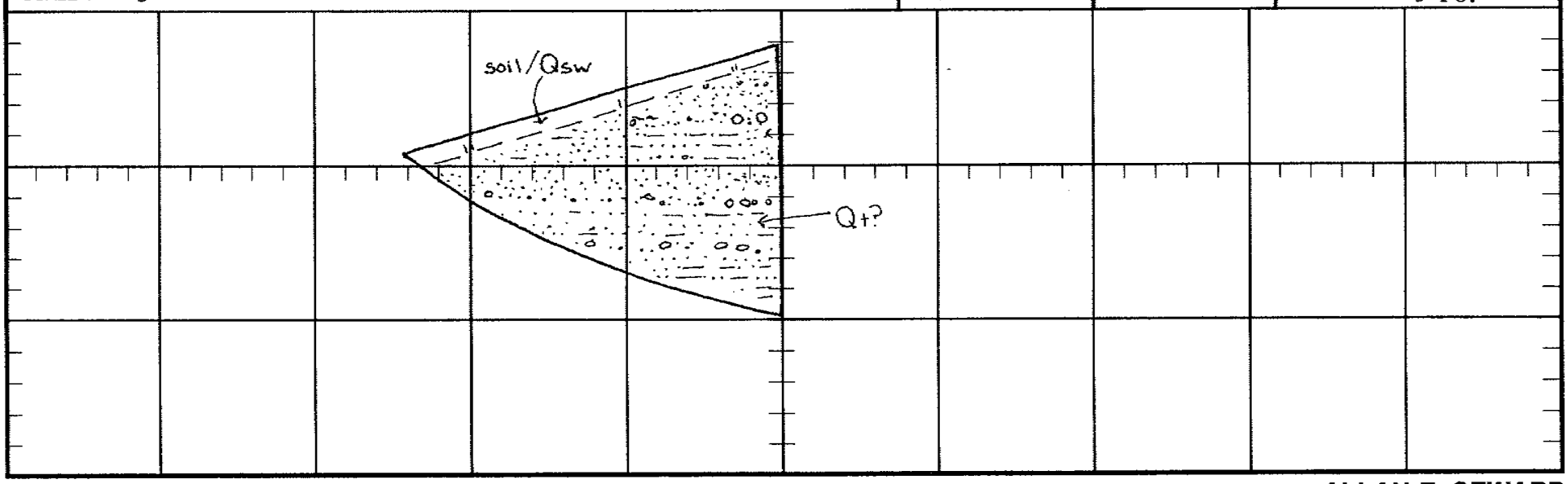
Trench Log No. 148Q

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6" SOIL/SLOPEWASH; soil/Qsw, Light-to medium-brown sandy silt with scattered pebbles; loose; dry 6" - 9' TERRACE DEPOSITS?; Qt?, Slightly orangish- to yellowish- to grayish-brown sandy siltstone, fine- to coarse-grained sandstone, and medium- to coarse-grained pebbly cobbly sandstone; loose; dry	B:Apx Horizontal		No Ground Water No Caving TOTAL DEPTH 9 Ft.

N 28 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

PROJECT Newhall Ranch - Phase IB

LOGGED BY DGG

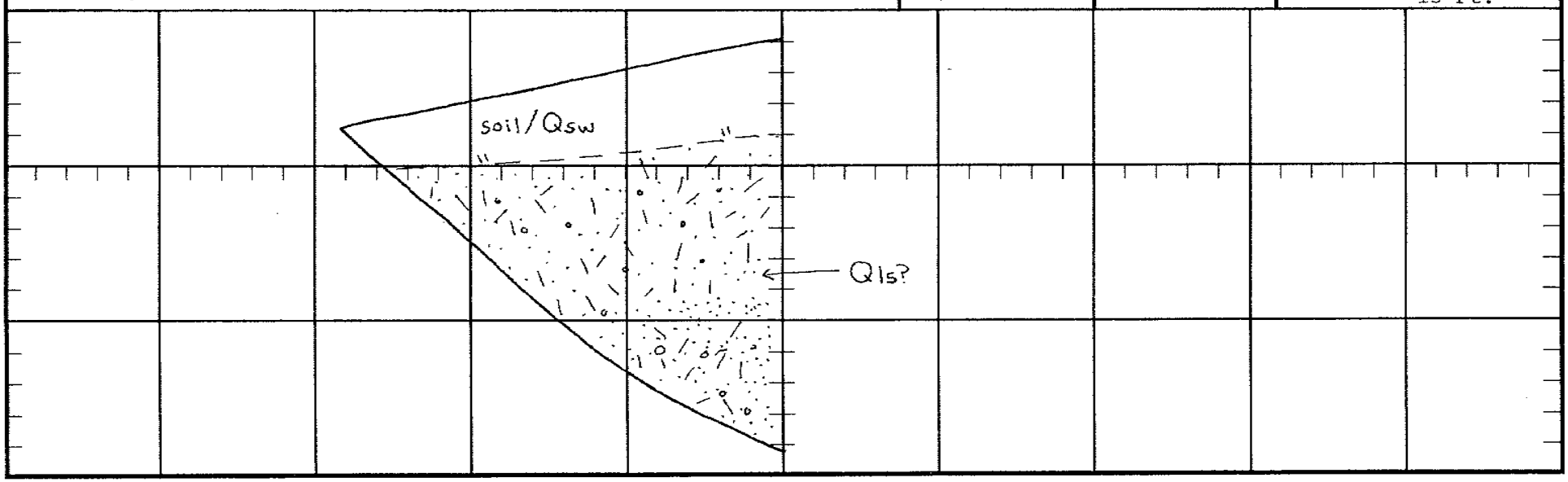
Trench Log No. 149Q

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SOIL/SLOPEWASH; soil/Qsw, Light- to medium-brown to yellowish-brown sandy silt with scattered pebbles; soft to firm; dry			Bottom 3-4' of Qls sandier
3 - 13' LANDSLIDE ?; Qls?, Light-gray to yellowish-gray sandy siltstone and silty sandstone; soft to firm; loose to moderately dense; dry to slightly damp			Possible creep-affected terrace deposits
			No Ground Water No Caving
			TOTAL DEPTH 13 Ft.

SCALE 1" = 5'

N 60 E



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

PROJECT Newhall Ranch - Phase IB

LOGGED BY DGG

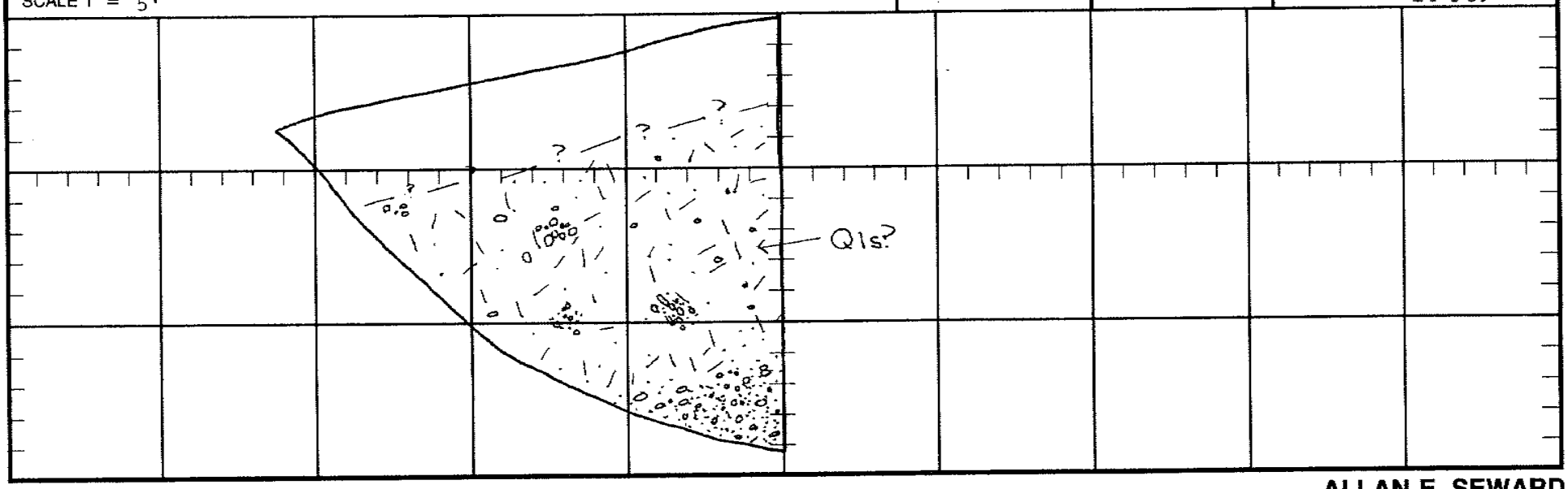
Trench Log No. 150Q

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SOIL/SLOPEWASH; soil/Qsw, Light-to yellowish-brown sandy silt with scattered pebbles; soft to firm; dry			Possible creep-affected terrace deposits
3 - 14' LANDSLIDE ?; Qls?, Light-to medium-gray sandy siltstone with scattered pebbles and lcoal cobble pods; soft to firm; loose to moderately dense; dry to slightly damp; and light-to medium-gray medium- to coarse-grained pebbly sandstone; loose; dry			No Ground Water No Caving
			TOTAL DEPTH 14 Ft.

SCALE 1" = 5'

N 73 E



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

PROJECT Newhall Ranch - Phase IB

LOGGED BY DGG

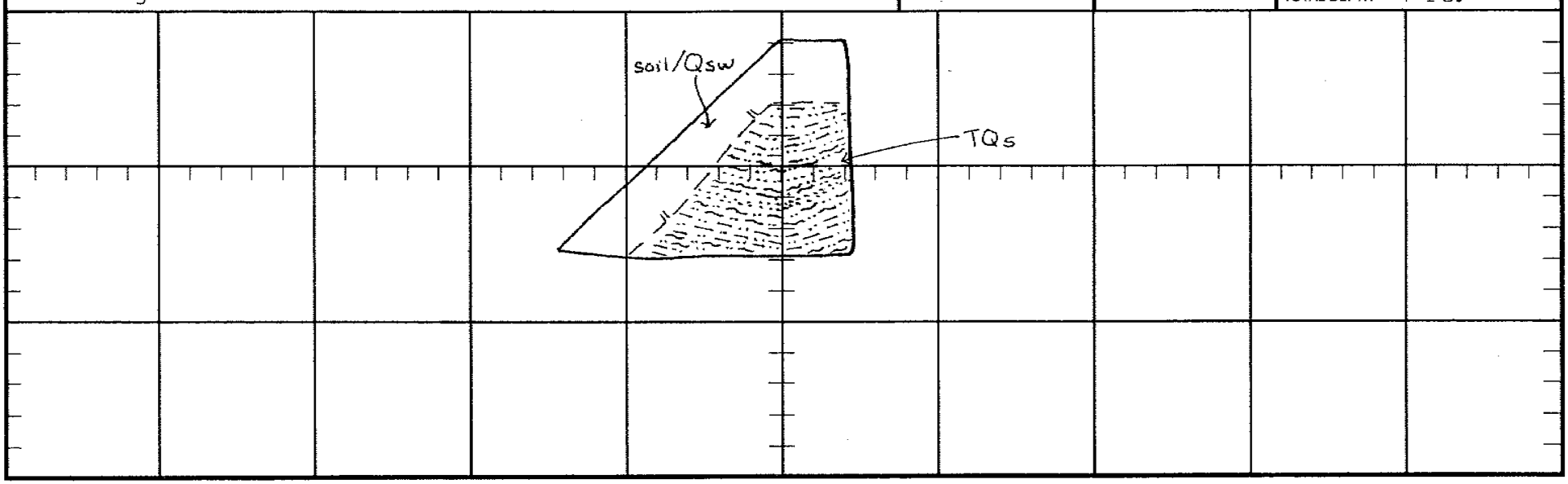
Trench Log No. 151Q

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2' SOIL/SLOPEWASH; soil/Qsw, Light-to medium-brown sandy silt with scattered pebbles; soft to firm; dry			Clayey siltstone is very sticky; at bottom 8" thick-sheared clay
2 - 7' BEDROCK; TQs, Light-gray siltstone to sandy silt-stone; moderately dense to dense; slightly damp; and medium-to dark-brown clayey siltstone; firm to stiff; dense; damp; sticky	B:N80E,29SE		
			No Ground Water No Caving TOTAL DEPTH 7 Ft.

SCALE 1" = 5'

N 64 E



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 152Q

PROJECT Newhall Ranch - Phase IB

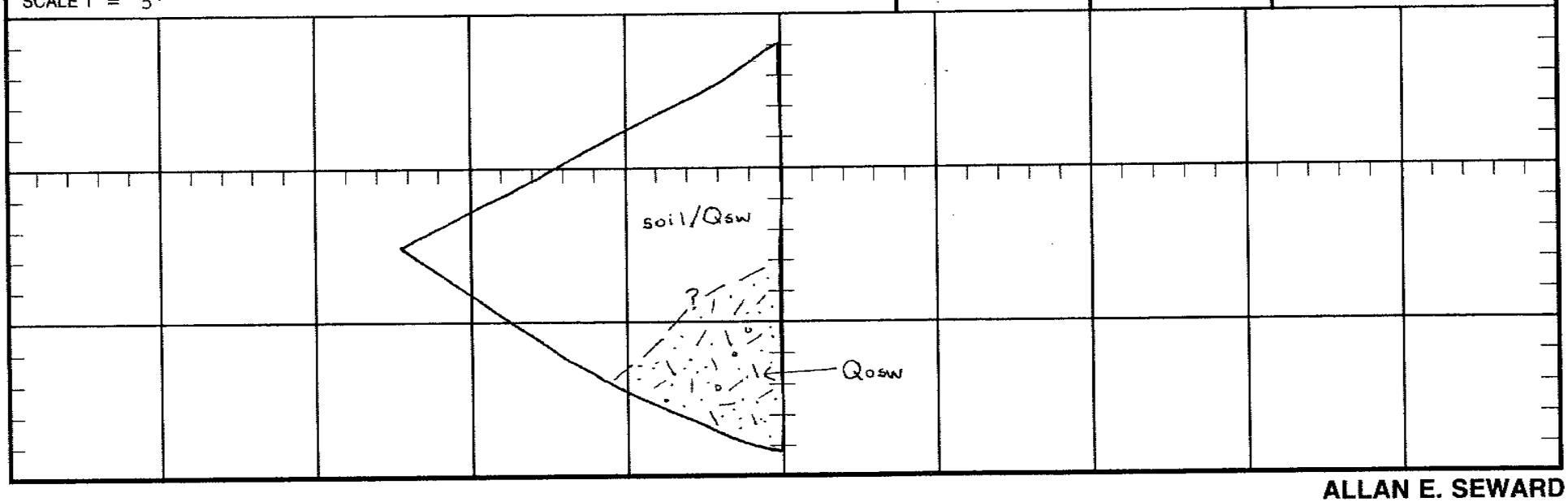
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 7' SOIL/SLOPEWASH; soil/Qsw, Medium-brown sandy silt with scattered pebbles; soft to firm; dry to slightly damp			
7 - 13' OLDER SLOPEWASH?;Qosw?, Medium-gray to medium grayish-brown sandy siltstone with scattered pebbles; soft to firm; loose to dense; slightly damp			No Ground Water No Caving

N 53 E

SCALE 1" = 5'

TOTAL DEPTH 13 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 153Q

PROJECT Newhall Ranch - Phase IB

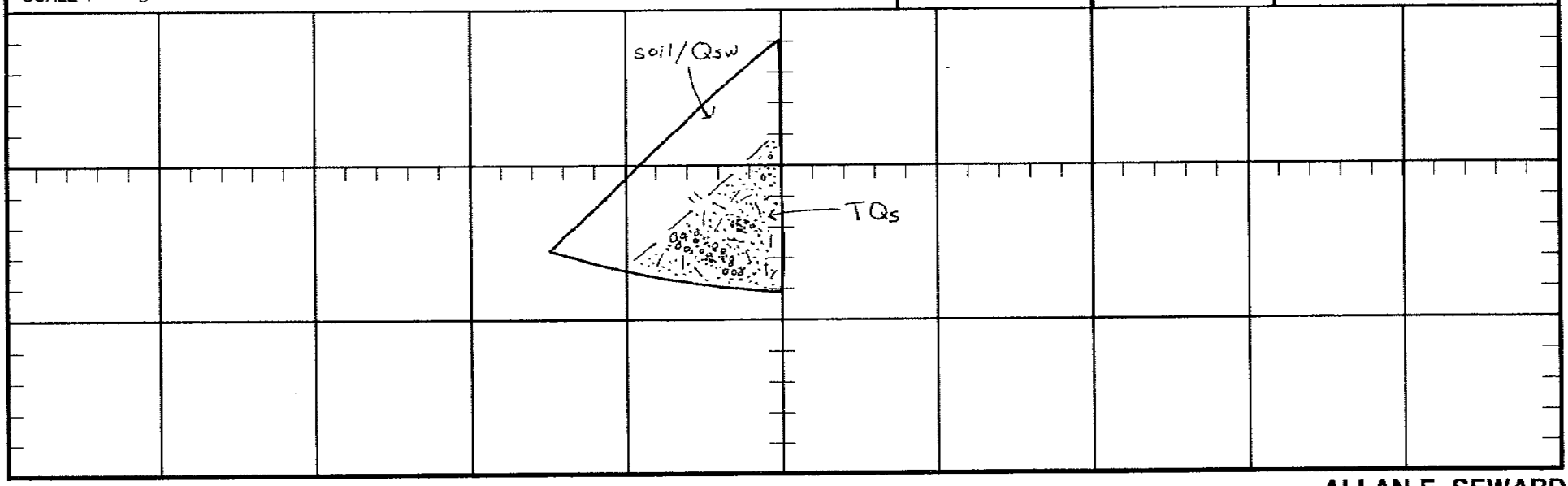
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SOIL/SLOPEWASH; soil/Qsw, Light-brown to yellowish-brown sandy silt with scattered pebbles; soft to firm; dry			
3 - 8' BEDROCK?; TQs?, Light-gray to medium-gray fine- to coarse-grained sandstone and pebbly sandstone; loose to moderately dense; dry			Bedrock is creep affected; bedding dips vaguely to south but is discontinuous (depositional?)
			No Ground Water No Caving

N 32 E

SCALE 1" = 5'

TOTAL DEPTH 8 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703Q1s-1

LOGGED BY DGG

Trench Log No. 154Q

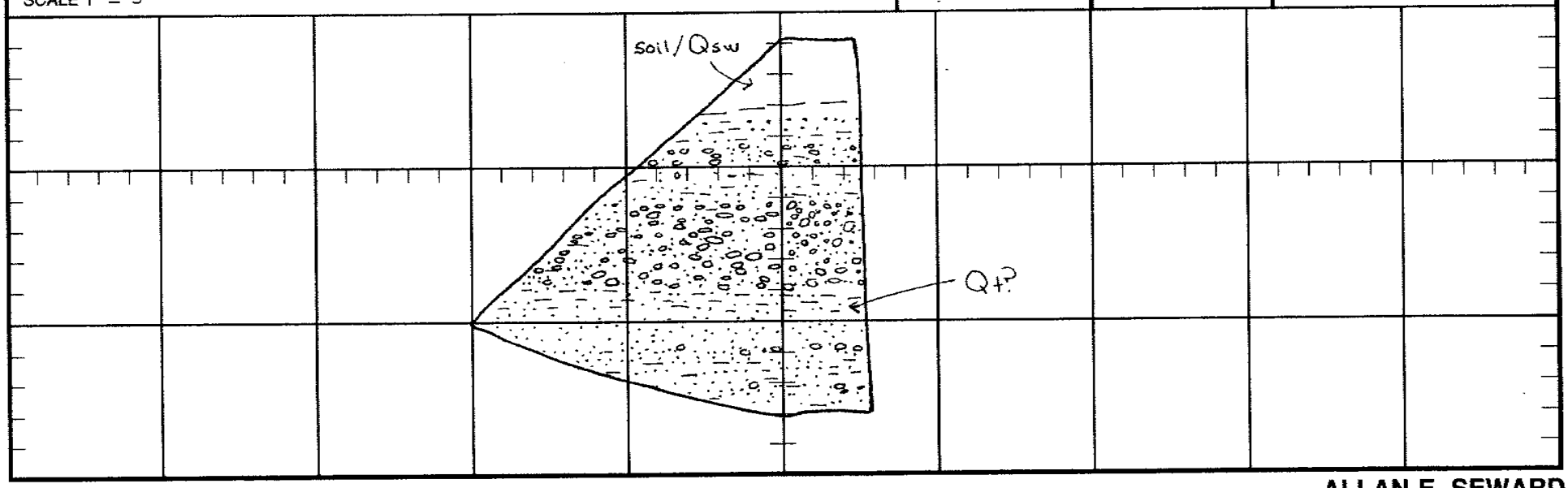
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2' SOIL/SLOPEWASH; soil/Qsw, Yellowish-brown sandy silt with scattered pebbles; soft; dry 2 - 12' TERRACE DEPOSITS?; Qt?, Yellowish-gray to light-gray sandy siltstone, fine-grained sandstone and medium- to coarse-grained pebbly sandstone; loose to moderately dense; dry to slightly damp	Apx:Horizontal		No Ground Water No Caving TOTAL DEPTH 12 Ft.

SCALE 1" = 5'

N 25 E



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 155Q

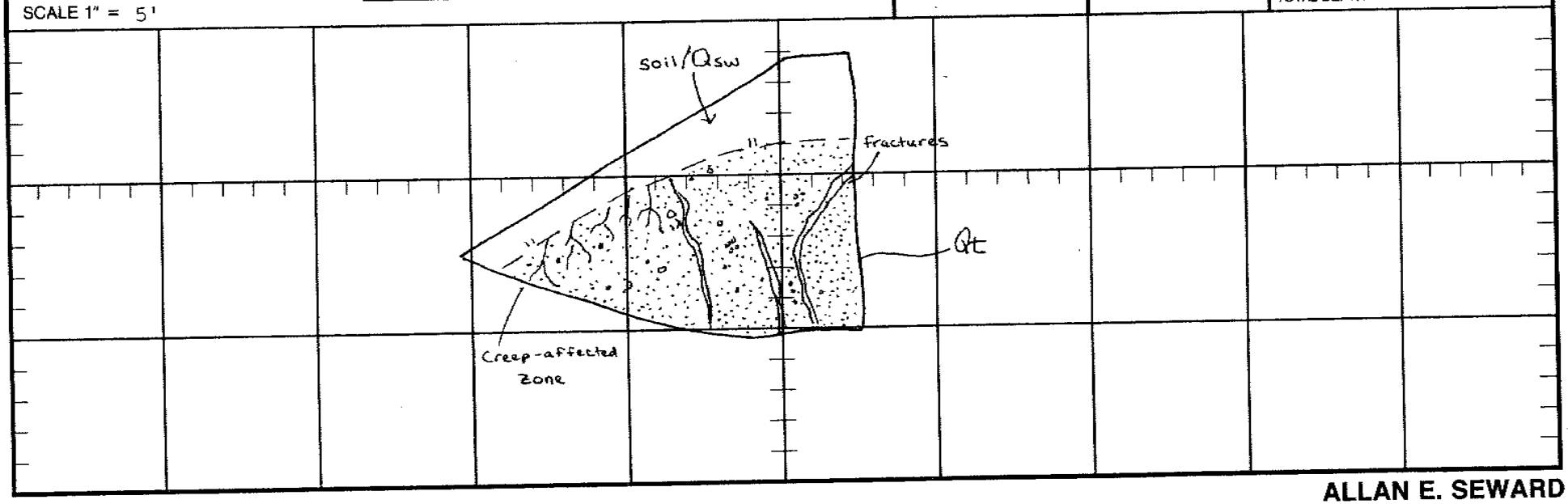
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SOIL/SLOPEWASH; soil/Qsw, Light-brown sandy silt with scattered pebbles and clasts of TQs; soft; loose; dry 3 - 9' TERRACE DEPOSITS; Qt, Light-gray fine- to coarse-grained sandstone with scattered pebbles; loose to moderately dense; dry; fractured			No Ground Water No Caving TOTAL DEPTH 9 Ft.

N 47 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 156Q

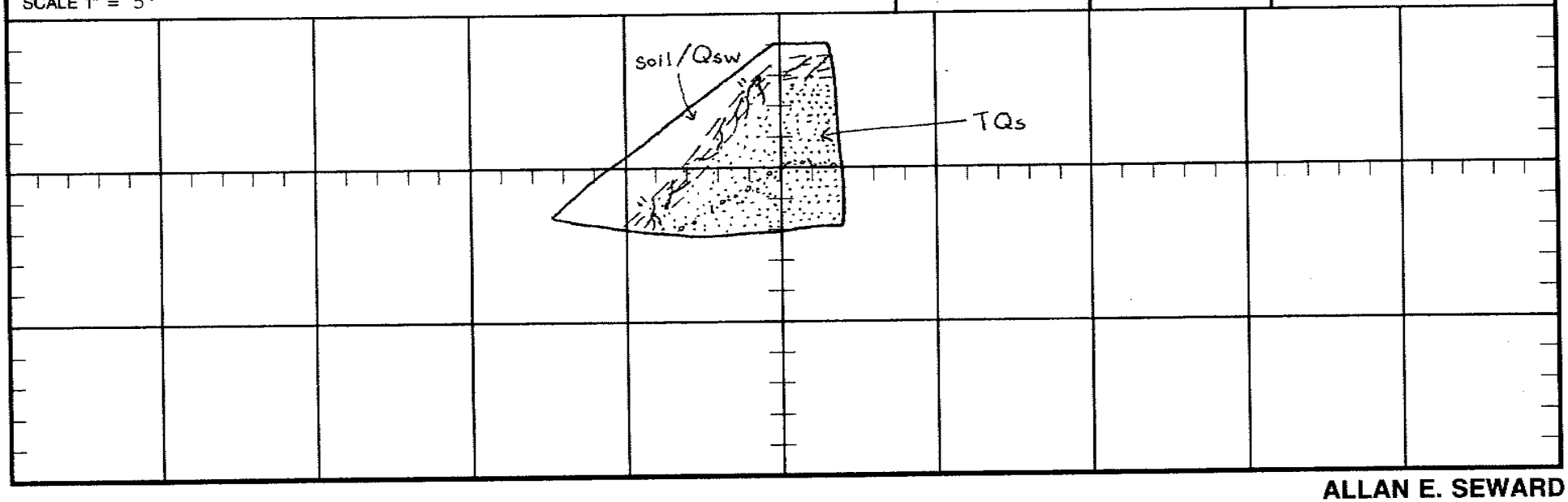
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1.5' SOIL/SLOPEWASH; soil/Qsw, Yellowish-brown sandy silt with scattered pebbles; soft; dry			Trenches 156Q thru 164Q excavated and logged 11/2/99 using a trackmounted back-hoe with a 24" bucket
1.5 - 6' BEDROCK; TQs, Medium-brown siltstone; firm; loose to moderately dense; dry; highly fractured; creep affected; and light-gray fine- to medium-grained sandstone and pebbly sandstone; moderately dense to dense; dry	Apx B:N59W,42SW		No Ground Water No Caving
			TOTAL DEPTH 6 Ft.

N 24 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 157Q

PROJECT Newhall Ranch - Phase IB

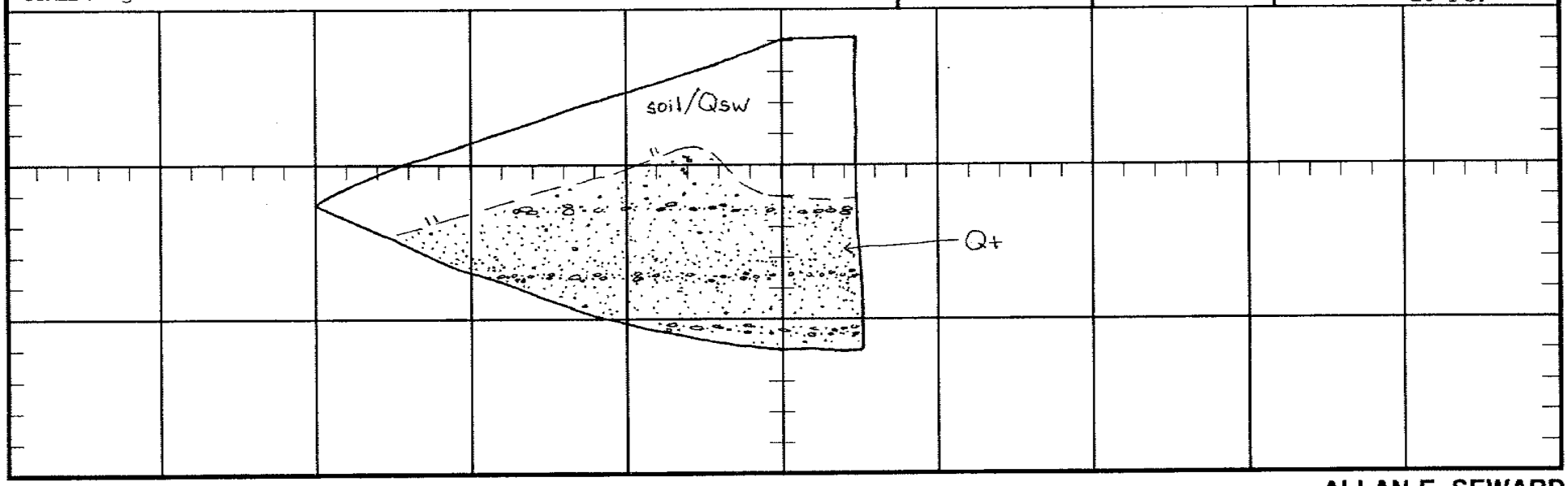
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 5' SOIL/SLOPEWASH; soil/Qsw, Light to medium-brown sandy silt with scattered pebbles and cobbles; firm moderately dense; dry			
5 - 10' TERRACE DEPOSITS; Qt, Light-gray to brownish-gray fine- to coarse-grained sandstone and pebbly sandstone; loose to moderately dense; dry	Apx:N10W,3NE		No Ground Water No Caving

SCALE 1" =5'

N 52 E

TOTAL DEPTH 10 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 158Q

PROJECT Newhall Ranch - Phase IB

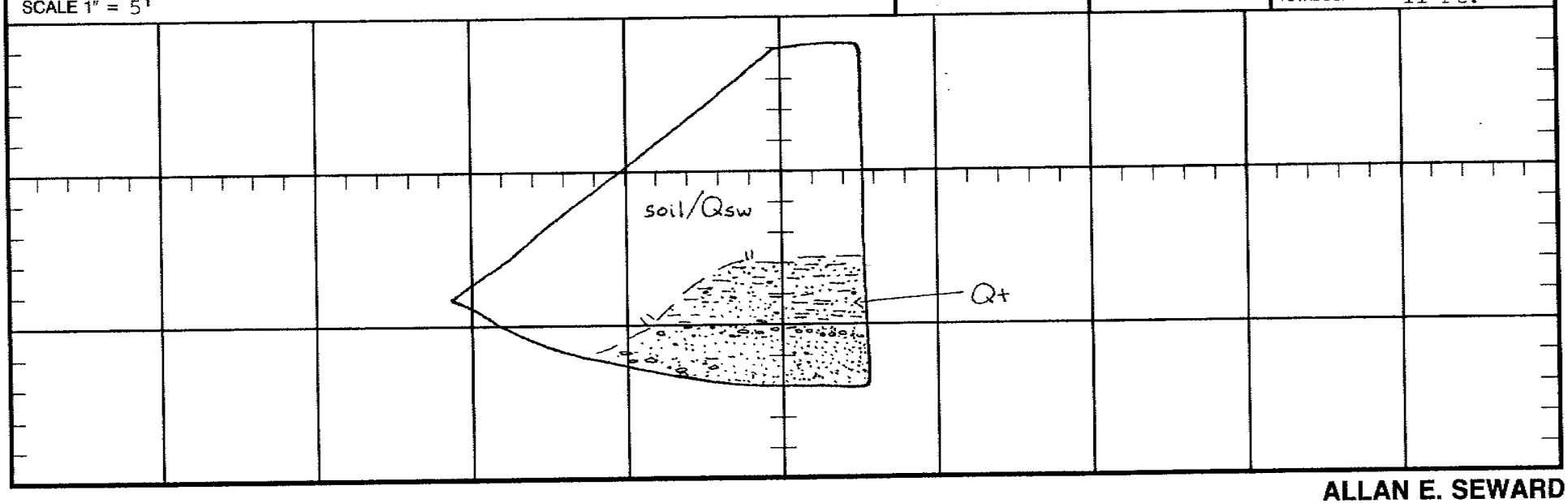
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 7' SOIL/SLOPEWASH; soil/Qsw, Light yellowish-brown to medium-brown sandy silt; soft to firm; loose to moderately dense; dry			
7 - 11' TERRACE DEPOSITS; Qt, Light- to medium-gray fine-grained sandstone; medium- to coarse-grained sandstone and pebbly sandstone with scattered cobbles; loose to moderately dense; dry			No Ground Water No Caving

N 49 E

SCALE 1" = 5'

TOTAL DEPTH 11 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703Q1s-1

LOGGED BY DGG

Trench Log No. 159Q

PROJECT Newhall Ranch - Phase IB

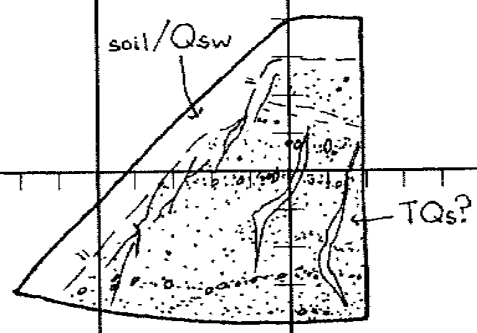
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1' SOIL/SLOPEWASH; soil/Qsw, Medium-brown silty sand with scattered pebbles and cobbles; soft; loose; dry			
1 - 8' BEDROCK?; TQs?, Light-to medium-gray fine- to coarse-grained sandstone and pebbly sandstone; moderately dense; dry	Apx B:N32W,12SW		No Ground Water No Caving

N 56 E

SCALE 1" = 5'

TOTAL DEPTH 8 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703Qls-1

LOGGED BY DGG

Trench Log No. 160Q

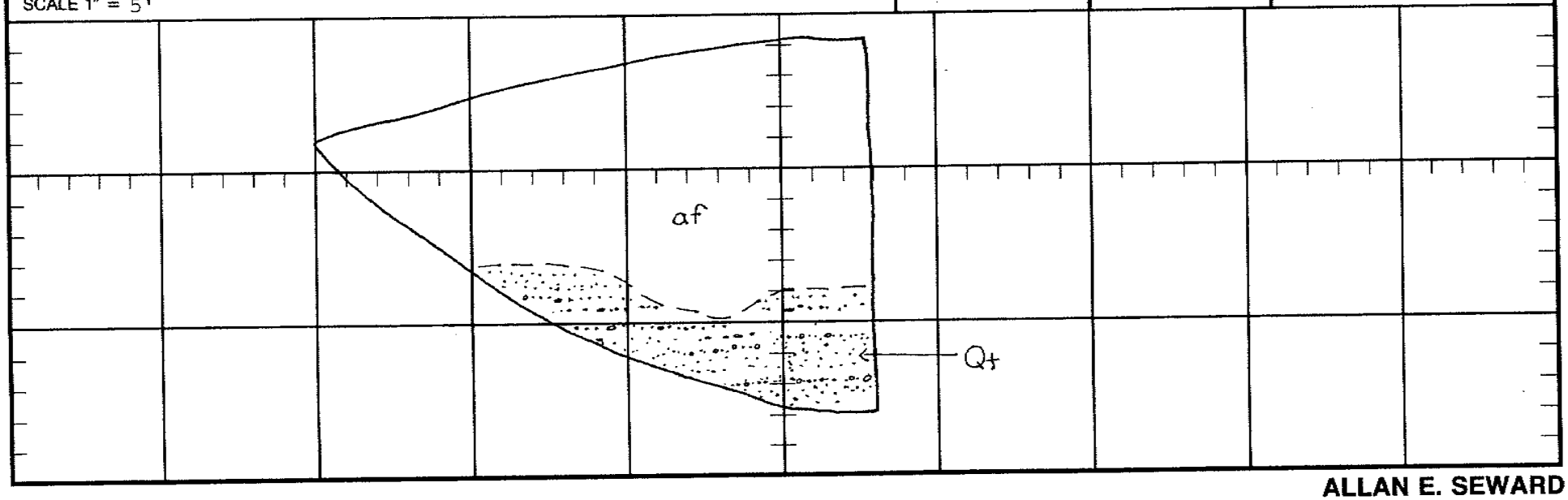
PROJECT Newhall Ranch - Phase IB

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 8' ARTIFICIAL FILL; af, Yellowish-brown to medium-brown sandy silt; firm; dry 8 - 12' TERRACE DEPOSITS; Qt, Medium-gray fine- to coarse-grained sandstone and pebbly sandstone; loose to moderately dense; dry			No Ground Water No Caving TOTAL DEPTH 12 Ft.

SCALE 1" = 5'

N 60 E



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

PROJECT Newhall Ranch - Mesas-East

LOGGED BY BJS

Trench Log No. 177Q

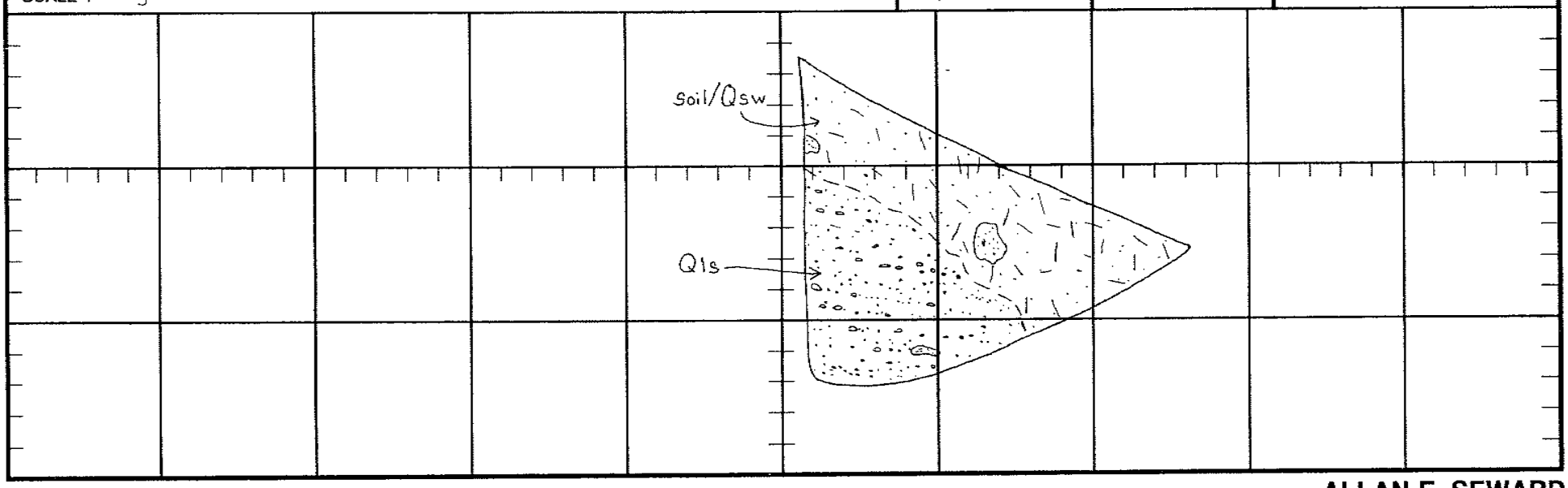
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3.5' SOIL/SLOPEWASH; soil/Qsw, Grayish-brown silty pebbly sand with TQs sandstone clasts; loose; dry to slightly damp			Trenches T-177Q thru T-189Q excavated with a track-mounted back-hoe and logged on 1/20/00
3.5- 10.5' LANDSLIDE?, Qls?, Yellowish-gray pebbly sandstone and sandstone; moderately dense; friable; slightly damp; local fractures and slightly weathered overall; bedding is slightly shallow for regional	N64W,9NE		No Ground Water No Caving

SCALE 1" = 5'

N 70 W

TOTAL DEPTH 10.5 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703Qls-II

LOGGED BY BJS

Trench Log No. 178Q

PROJECT Newhall Ranch - Mesas-East

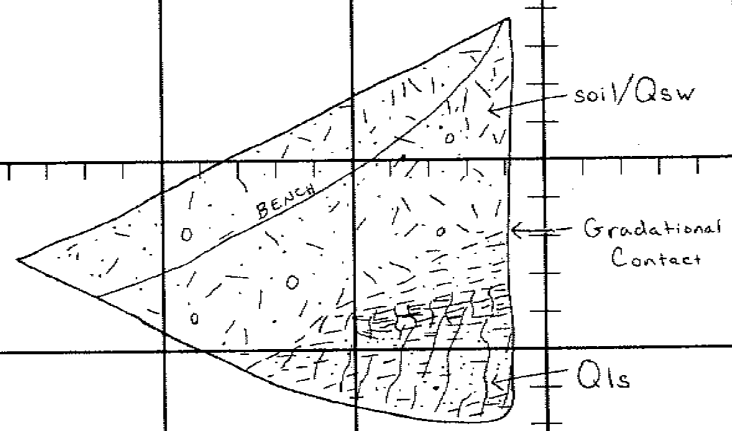
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6' SOIL/SLOPEWASH; soil/Qsw, Yellowish-brown silty pebbly sand with local cobbles; loose to firm; slightly damp; 5% voids			Trench laid back
6 - 11' LANDSLIDE; Qls, Light yellowish-brown siltstone, sandy siltstone and slightly silty sandstone with pebbles and moderate grayish-brown mudstone; firm to locally soft; slightly damp to damp; fractures and $CACO_3$ linings common, especially in mudstone; 1% pinhole voids in upper 2 ft.			No Ground Water No Caving

SCALE 1" = 5'

N 25 W

TOTAL DEPTH 11 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

PROJECT Newhall Ranch - Mesas-East

LOGGED BY BJS

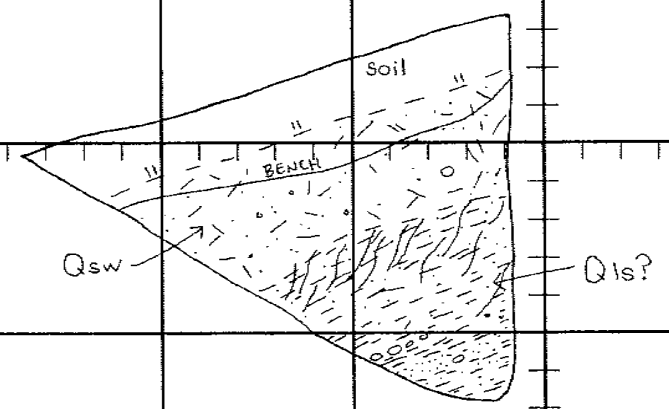
Trench Log No. 179Q

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 5' SOIL/SLOPEWASH; soil/Qsw, Brown to yellowish-brown muddy, silty sand with scattered pebbles; firm; slightly damp			
5 - 10.5' LANDSLIDE?, Qls?, Light yellowish-brown fine silty sandstone with discontinuous pebbly sandstone interbeds; moderately hard to locally slightly soft; slightly damp to damp; $CACO_3$-lined fractures	N35W,9NE		
			No Ground Water No Caving TOTAL DEPTH 10.5 Ft.

SCALE 1" = 5'

Due North



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

LOGGED BY BJS

Trench Log No. 180Q

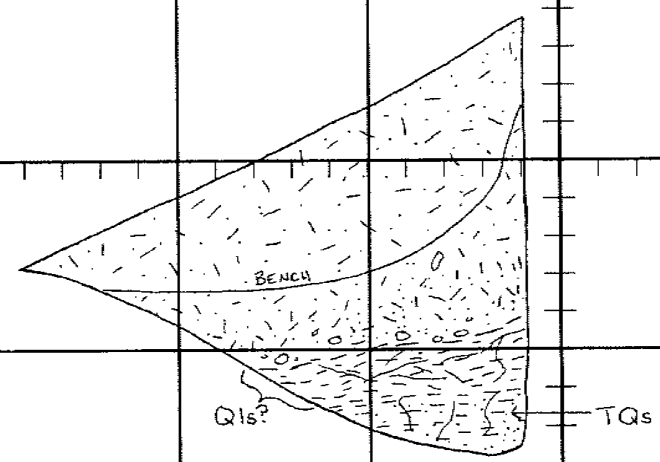
PROJECT Newhall Ranch - Mesas-East

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 8' SOIL/SLOPEWASH; soil/Qsw, Brown to yellowish-brown sandy mud with pebbles and pebbly silty sand at base; loose to firm; slightly damp; 1-3% voids throughout			
8 - 10' LANDSLIDE?; Qls?; Fractured and weathered yellowish-brown siltstone and sandy siltstone; moderately dense; slightly damp to damp; $CACO_3$ common		B/Base of Qls N25W,18NE	Qls may just be creep affected TQs
10 - 12' BEDROCK; TQs, Light yellowish-brown fine silty sandstone; moderately hard; damp; minor fractures with $CACO_3$			
			No Ground Water No Caving TOTAL DEPTH 12 Ft.

SCALE 1" = 5'

N 24 W



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

PROJECT Newhall Ranch - Mesas-East

LOGGED BY BJS

Trench Log No. 181Q

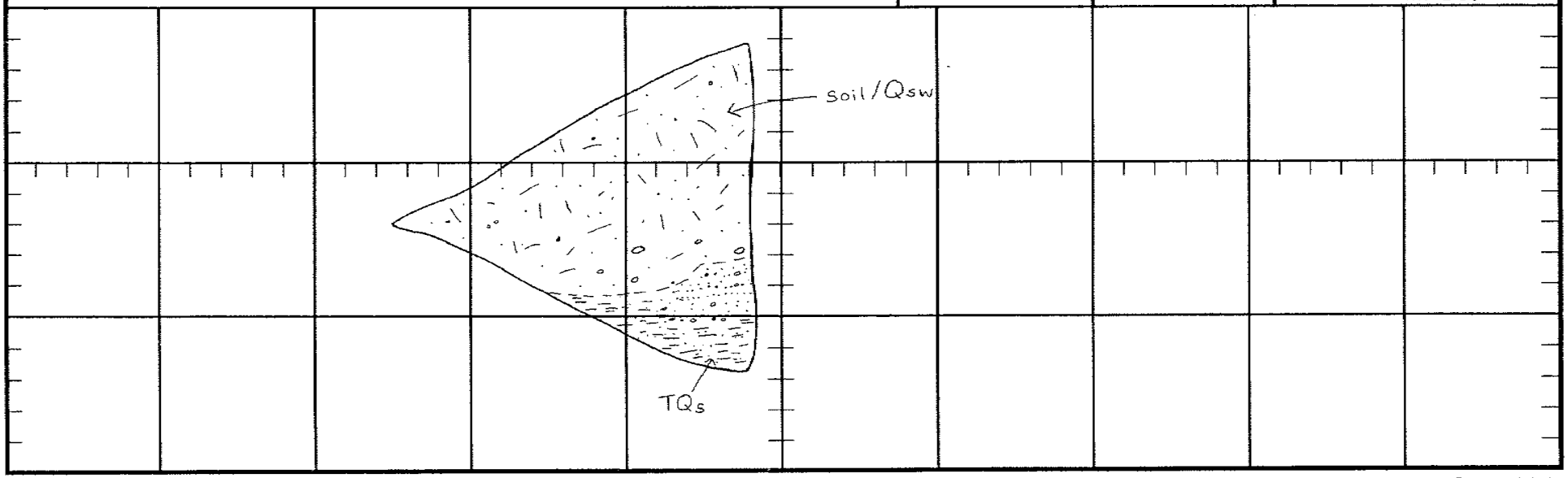
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 7' SOIL/SLOPEWASH; soil/Qsw, Brown to yellowish-brown muddy pebbly sand and silty pebbly sand with cobbles; loose to firm; slightly damp; $CACO_3$ filaments common from 4-6 ft.; roots; 1-3% voids	Apx. N38W,10NE		
7 - 11' BEDROCK; TQs, Yellowish-gray pebbly sandstone and sandstone and yellowish-brown to brown sandy siltstone and mudstone; moderately hard to slightly friable; slightly damp to damp; cross bedding and channeling in coarse units			No Ground Water No Caving

SCALE 1" = 5'

N 44 E

TOTAL DEPTH 11 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

LOGGED BY BJS

Trench Log No. 182Q

PROJECT Newhall Ranch - Mesas-East

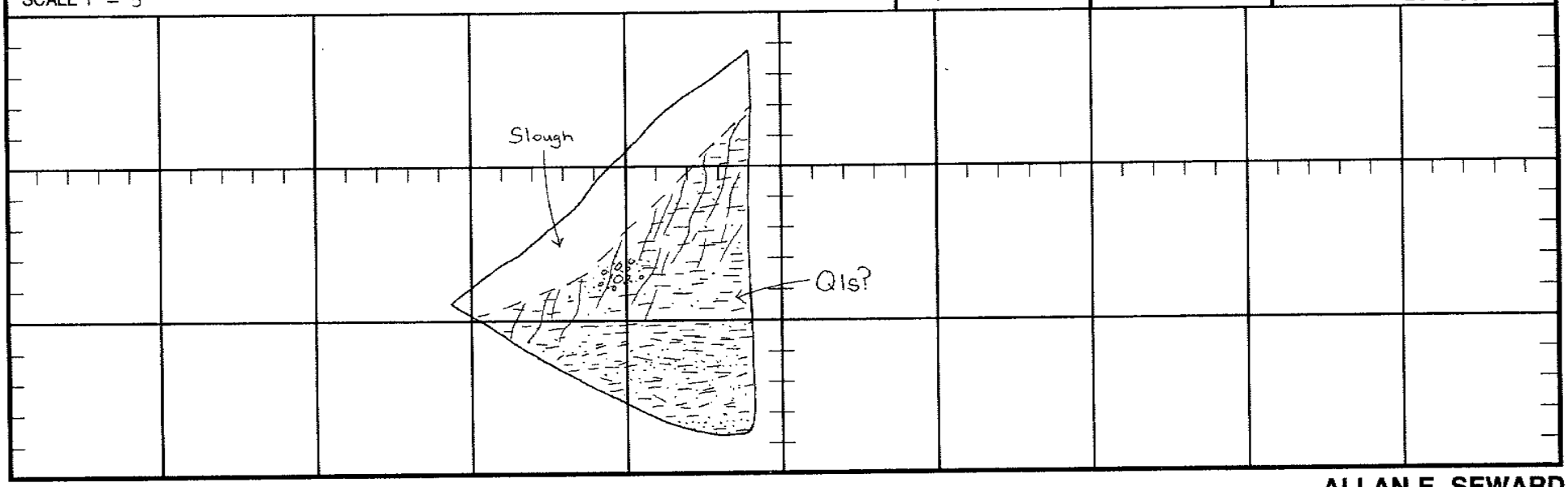
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2' Slough			Trench excavated into old cut
2 - 13' LANDSLIDE?; Qls?, Interbedded yellowish-brown to light yellowish-brown siltstone and sandy siltstone with minor mudstone interbeds; moderately dense to moderately hard; upper 4 feet creep affected; damp; bedding slightly irregular and locally laminated; basal 2 feet seems fairly intact	Apx N12E,17SE		No Ground Water No Caving

N 10 W

SCALE 1" = 5'

TOTAL DEPTH 13 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

PROJECT Newhall Ranch Mesas-East

LOGGED BY BJS

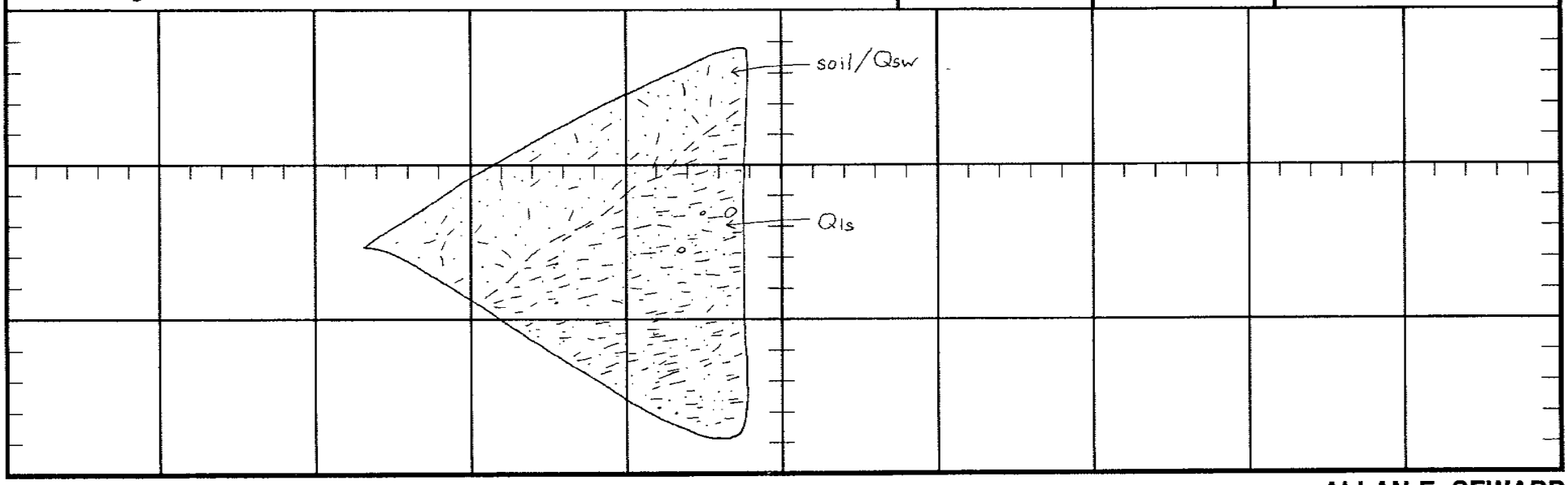
Trench Log No. 183Q

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2' SOIL/SLOPEWASH; soil/Qsw, Yellowish-brown sandy silt wtih local pebbles; soft; slightly damp 2 - 13' LANDSLIDE; Qls, Yellowish-brown to light yellowish-brown siltstone and sandy siltstone with local mudstone and silty pebbly sandstone; locally soft to dense; damp; bedding poor but locally disturbed; bottom foot slightly more intact			No Ground Water No Caving TOTAL DEPTH 13 Ft.

SCALE 1" = 5'

N 19 W



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

LOGGED BY BJS

Trench Log No. 184Q

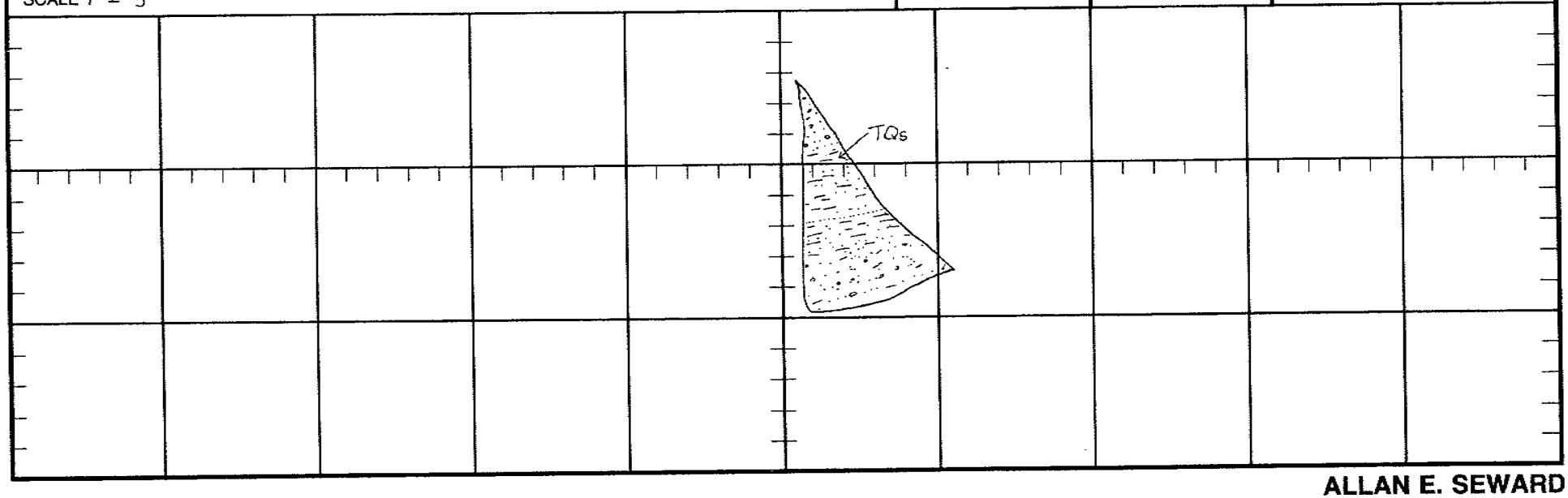
PROJECT Newhall Ranch - Mesas-East

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 8' BEDROCK; TQs, Interbedded light yellowish-brown fine silty sandstone and yellowish-gray sandstone and pebbly sandstone; moderately hard; slightly damp	N30W,12NE		Trench excavated into existing cut No Ground Water No Caving TOTAL DEPTH 8 Ft.

N 17 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

LOGGED BY BJS

Trench Log No. 185Q

PROJECT Newhall Ranch - Mesas-East

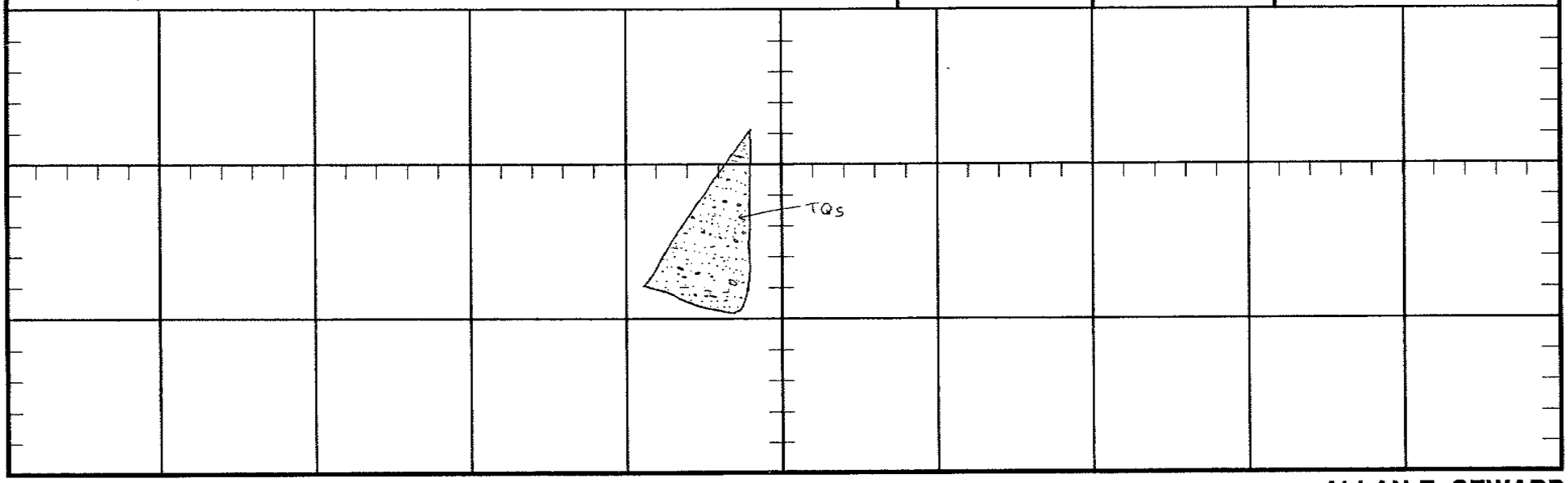
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6' BEDROCK; TQs, Interbedded light yellowish-brown sandstone and pebbly sandstone with local moderate-brown mudstone interbeds; moderately hard; slightly damp; cross-bedding	N47W,13NE		Trench excavated into existing cut No Ground Water No Caving

SCALE 1" = 5'

N 2 W

TOTAL DEPTH 6 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

PROJECT Newhall Ranch - Mesas-East

LOGGED BY BJS

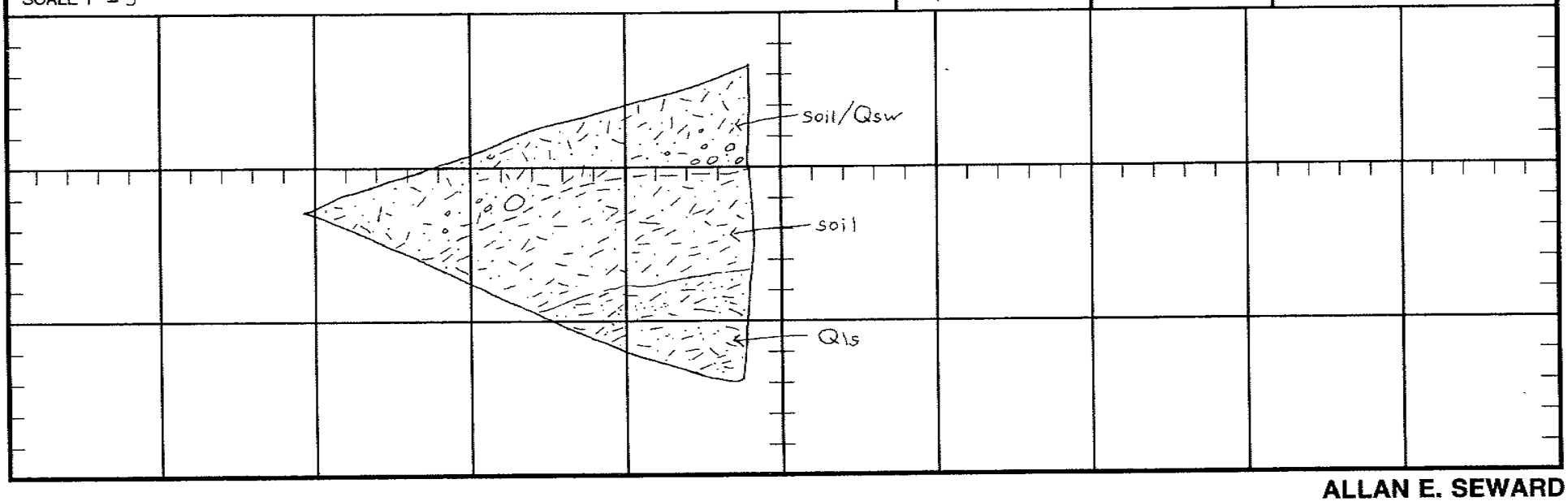
Trench Log No. 186Q

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3.5' SOIL/SLOPEWASH; soil/Qsw, Brown sandy pebbly mud; firm; damp; well developed soil with peds and some mud coatings on clasts 3.5 - 7' SOIL; Yellowish-brown fine sandy silt and clay; firm; damp; roots; minor $CACO_3$ 7 - 10.5' LANDSLIDE; Qls, Disturbed mix of moderate-brown mudstone and yellowish-brown to light-gray fine silty sandstone; stiff to soft; damp; minor $CACO_3$	B?:N50W,47NE		No Ground Water No Caving TOTAL DEPTH 10.5 Ft.

SCALE 1" = 5'

N67W



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

LOGGED BY BJS

Trench Log No. 187Q

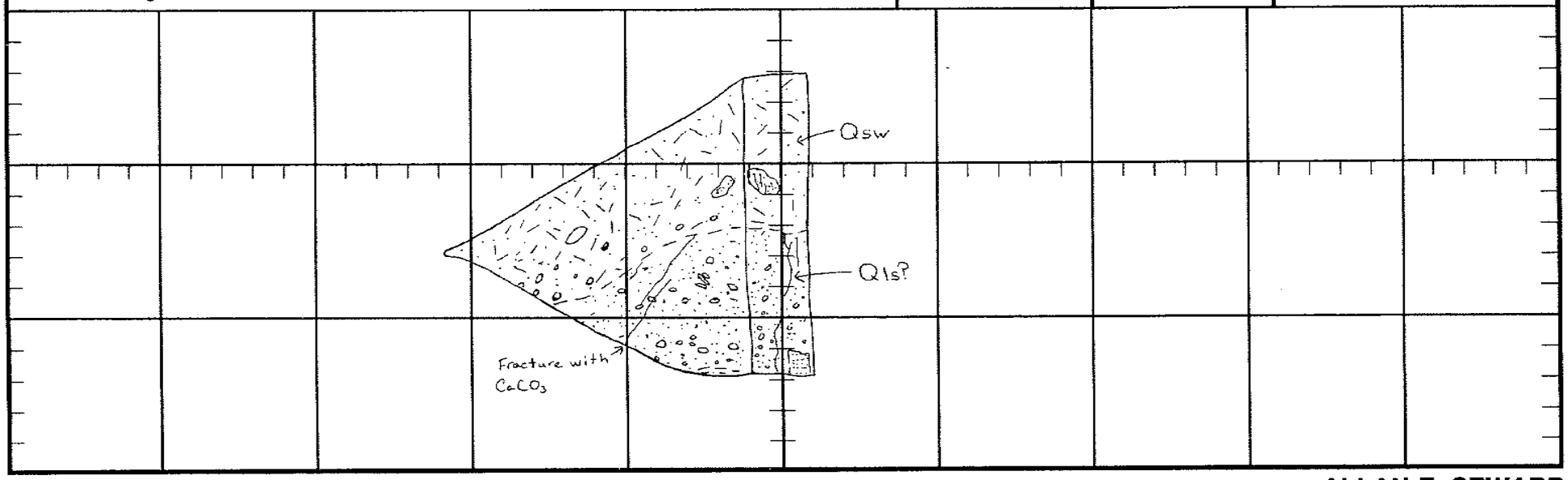
PROJECT Newhall Ranch - Mesas-East

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 5' SLOPEWASH; Qsw, Yellowish-brown silty pebbly sand with local cobbles; loose; dry to slightly damp; TQs clasts			
5 - 10' LANDSLIDE?; Qls?, Yellowish-gray to light yellowish-brown pebbly sandstone, conglomerate and sandstone; loose to dense; slightly damp; carbonate coatings on many clasts; secondary silty backfill/matrix common; bedding vague	Apx. N53W,8NE		No Ground Water No Caving TOTAL DEPTH 10 Ft.

SCALE 1" = 5'

N 63 W



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

PROJECT Newhall Ranch - Mesas-East

LOGGED BY BJS

Trench Log No. 188Q

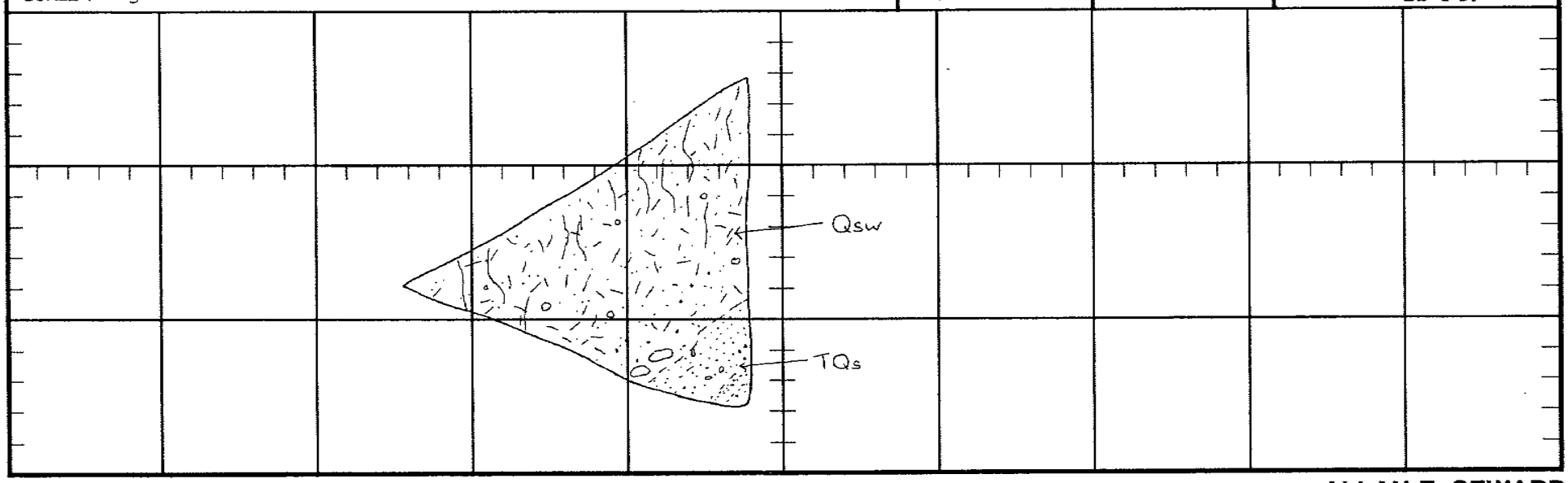
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 7.5' SLOPEWASH; Qsw, Yellowish-brown sandy silt with scattered pebbles; firm to loose; slightly damp; minor carbonate; 1-3% void space			
7.5 - 11' BEDROCK; TQs Yellowish-gray sandstone and pebbly sandstone; moderately hard; slightly damp	N42W,48NE		
			No Ground Water No Caving

SCALE 1" = 5'

N 64 E

TOTAL DEPTH 11 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

PROJECT Newhall Ranch - Mesas-East

LOGGED BY BJS

Trench Log No. 189Q

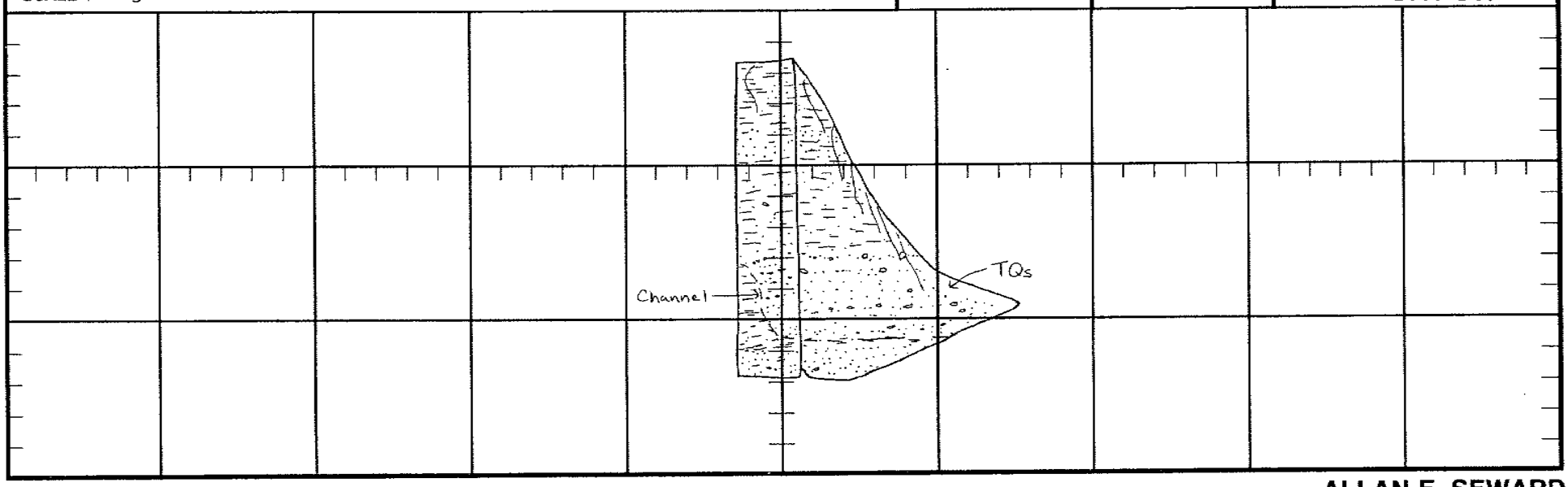
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 10.5' BEDROCK; TQs, Interbedded light yellowish-brown sandy siltstone and silty sandstone and yellowish-gray sandstone and pebbly sandstone; moderately friable to moderately hard; slightly damp; upper 2 ft. creep affected; cross bedding and channeling in sandstone	N18W,12NE		Trench excavated in existing cut/ bank No Ground Water No Caving

N 57 W

SCALE 1" = 5'

TOTAL DEPTH 10.5 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

PROJECT Newhall Ranch - Mesas East

LOGGED BY MJD

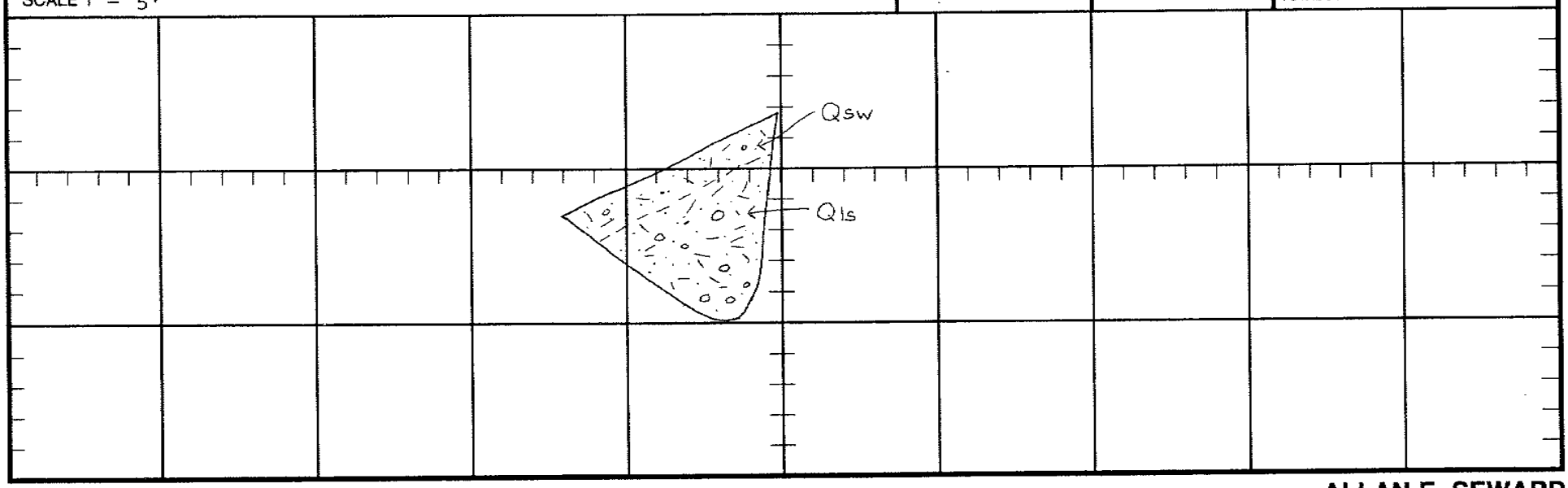
Trench Log No. T-190Q

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1.5' SLOPEWASH; Qsw, Tan to light-brown silty sand and sandy silt with pebbles and cobbles; soft; moist; large holes and voids; heavily bioturbated; abundant roots 1.5 - 7' LANDSLIDE; Qls, Light brown to tan sandy siltstone; abundant pebbles and cobbles; loose to moderately dense; damp; no distinct bedding; pinhole voids and roots to bottom of trench; abundant caliche			Trenches T-190Q thru T-201Q excavated with a trackhoe and logged on 1/21/00 No Ground Water No Caving TOTAL DEPTH 7 Ft.

N 78 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

PROJECT Newhall Ranch - Mesas East

LOGGED BY MJD

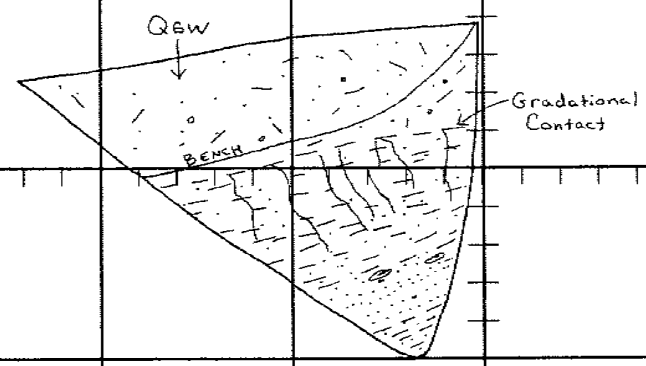
Trench Log No. T-191Q

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SLOPEWASH; Qsw, Brown silty sand and sandy silt; loose to firm; damp to moist; heavily bioturbated; abundant roots and voids; scattered pebbles and cobbles			
3 - 9' BEDROCK?; TQs? Moderate-brown siltstone, light yellowish-brown pebbly fine- to medium-grained sandstone and light-brown sandy siltstone; moderately hard; damp; lenticular siltstone clasts in sandstone; pinhole voids, roots and fractures in upper 3 ft.	B:N43W,20NE B:N15W,23NE		No Ground Water No Caving TOTAL DEPTH 9 Ft.

SCALE 1" = 5'

N 55 E



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

PROJECT Newhall Ranch - Mesas East

LOGGED BY MJD

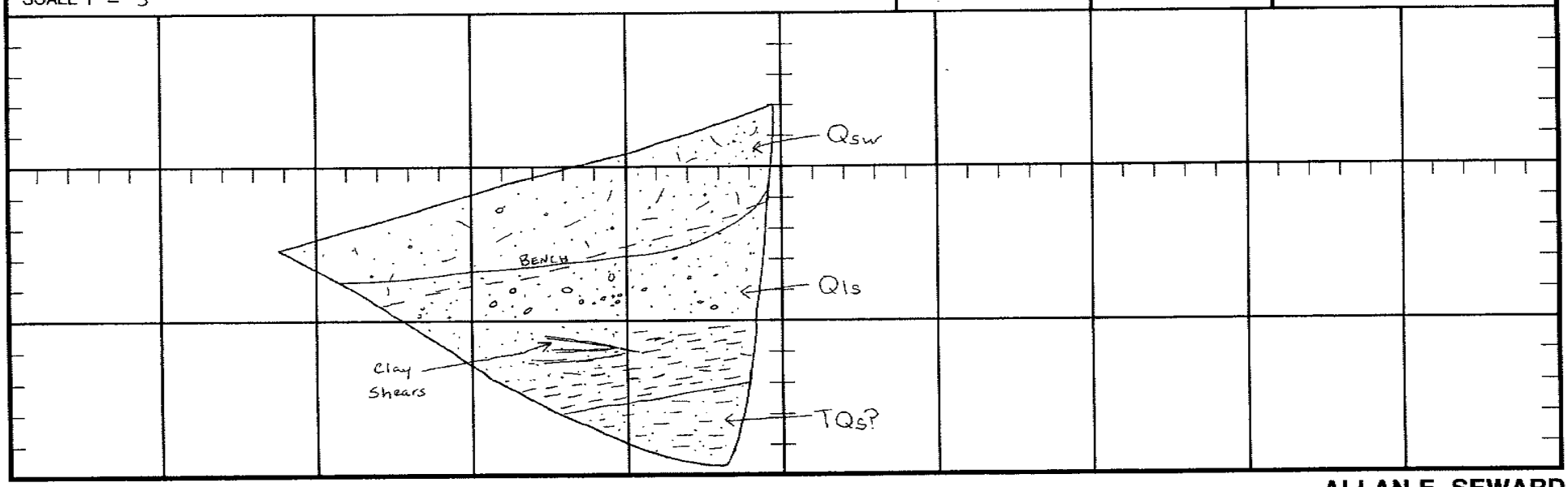
Trench Log No. T-192Q

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4' SLOPEWASH; Qsw, Dark reddish-brown sandy silt with scattered pebbles and cobbles; firm; damp to moist; abundant voids and roots			
4 - 9' LANDSLIDE; Qls, Tan to yellowish-brown pebbly sandstone with discontinuous coarse-grained lenses and dark-brown clayey siltstone with abundant caliche; firm to moderately hard; clayey siltstone splays into sandstone above; dry to damp	B:N30W,16NE B: N14W,17NE	Shears: N1E;47SE N13E,42SE Basal Land-slide contact approx. E-W,12N	
9 - 12' BEDROCK?; TQs?, Moderate-brown siltstone; hard; dry; no distinct bedding; relatively sharp contact with dark-brown clayey siltstone above; some caliche			No Ground Water No Caving TOTAL DEPTH 12 Ft.

SCALE 1" = 5'

Due North



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

PROJECT Newhall Ranch - Mesas East

LOGGED BY MJD

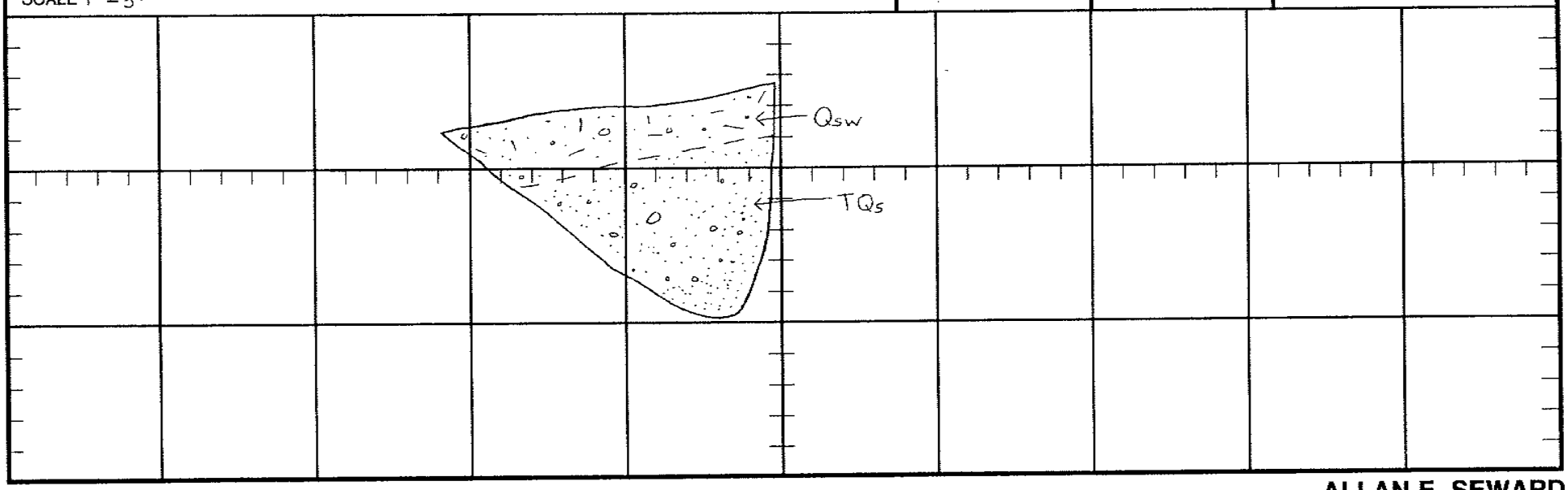
Trench Log No. T-1930

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2' SLOPEWASH; Qsw, Moderate-brown silty sand and sandy silt; abundant pebbles and cobbles; voids and roots abundant; firm; damp 2 - 8' BEDROCK; TQs, Tan to yellowish-gray fine- to coarse-grained sandstone with scattered pebbles and cobbles; moderately hard; damp; massive; no distinct bedding; finer-grained at bottom			No Ground Water No Caving TOTAL DEPTH 8 Ft.

SCALE 1" = 5'

N 30 E



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

LOGGED BY MJD

Trench Log No. T-194Q

PROJECT Newhall Ranch - Mesas East

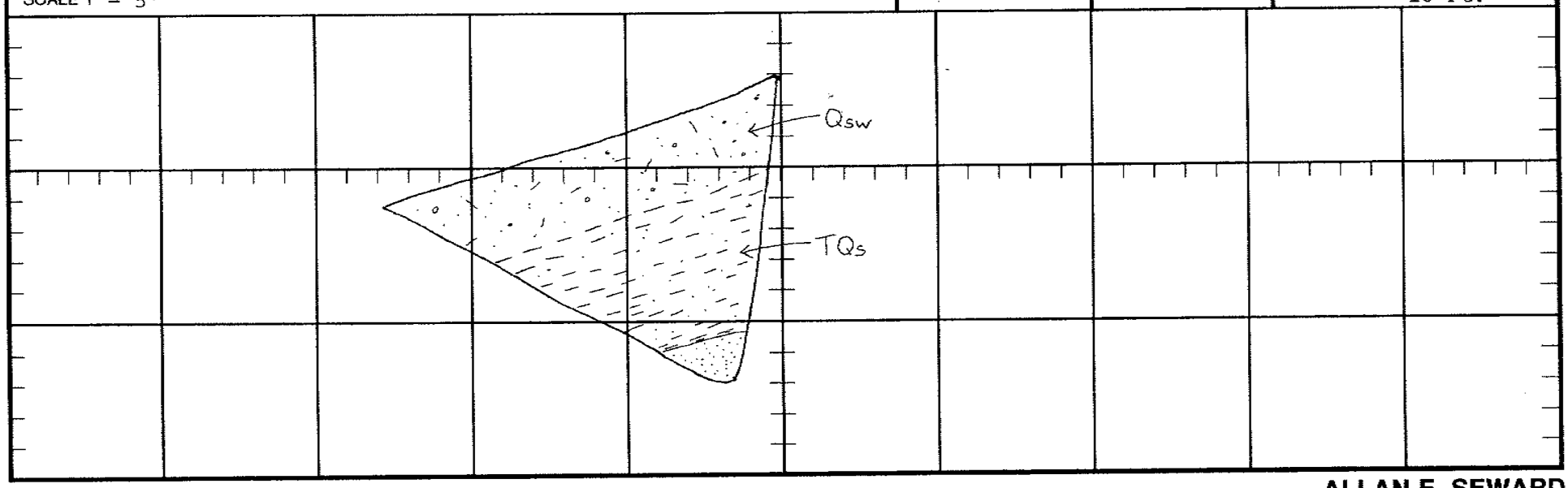
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4' SLOPEWASH; Qsw, Light-brown sandy silt with scattered pebbles; soft; damp; abundant voids and roots			
4 - 10' BEDROCK; TQs, Light yellowish-brown sandy siltstone and yellowish-gray sandstone; firm to hard; damp; heavily weathered, fractured and bioturbated to 7 ft.; 1/4-inch thick dark-brown siltstone on top of sandstone; sandstone massive; no distinct bedding	B:N32W,23NE		No Ground Water No Caving

SCALE 1" = 5'

N 42 E

TOTAL DEPTH 10 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

LOGGED BY MJD

Trench Log No. T-195Q

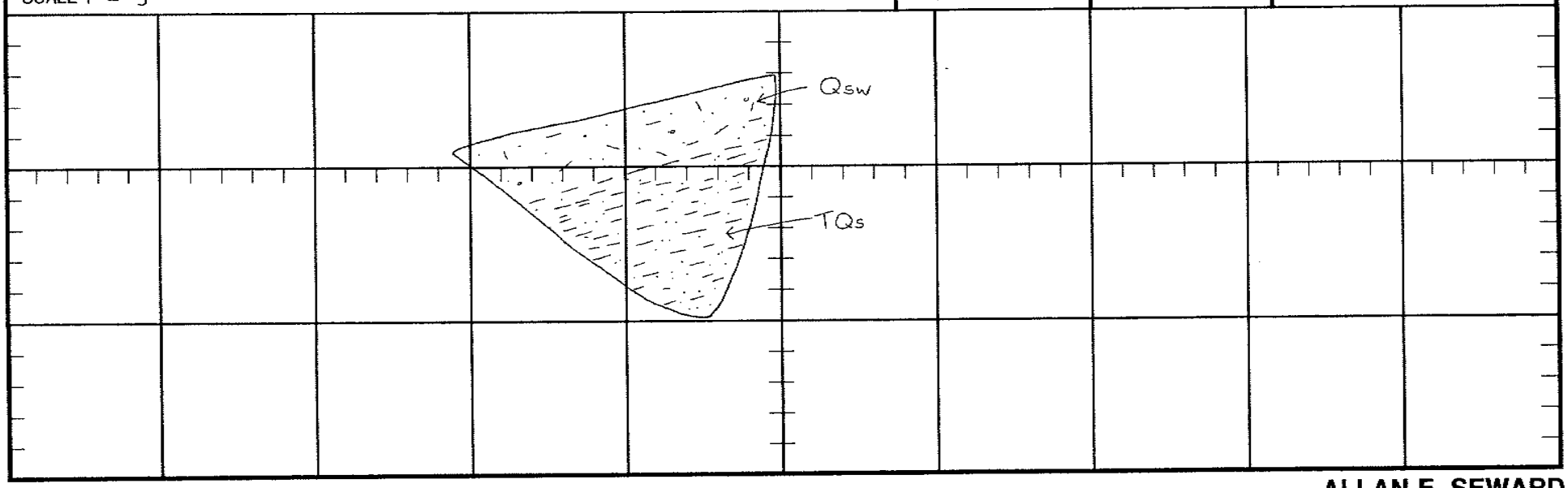
PROJECT Newhall Ranch - Mesas East

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SLOPEWASH; Qsw, Light-brown to moderate grayish-brown sandy silt with scattered pebbles; firm; damp; caliche			
3 - 8' BEDROCK; TQs; Moderate-brown clayey siltstone and yellowish-brown sandy siltstone; hard; damp; abundant caliche in brown clayey siltstone; relatively sharp contact	B:N42W,18NE		No Ground Water No Caving TOTAL DEPTH 8 Ft.

SCALE 1" = 5'

N 24 W



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

PROJECT Newhall Ranch - Mesas East

LOGGED BY MJD

Trench Log No. T-196Q

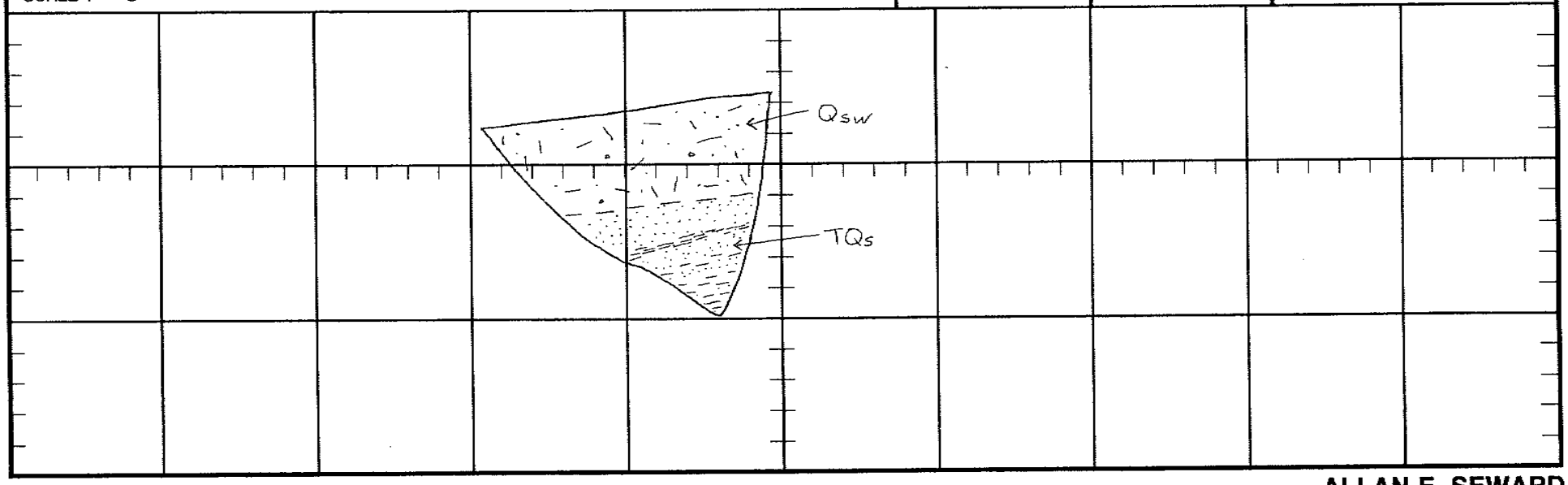
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3.5' SLOPEWASH; Qsw, Dark-brown sandy silt with scattered pebbles; loose to moderately dense; damp			
3.5 - 7.5' BEDROCK; TQs; Yellowish-gray coarse-grained sandstone and moderate-brown siltstone with interbedded 1"-thick reddish-brown claystone and light-brown silty sandstone; hard; damp	B:N29W,23NE B:N26W,21NE		No Ground Water No Caving

N 66 E

SCALE 1" = 5'

TOTAL DEPTH 7.5 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703Q1sII-1

PROJECT Newhall Ranch - Mesas East

LOGGED BY MJD

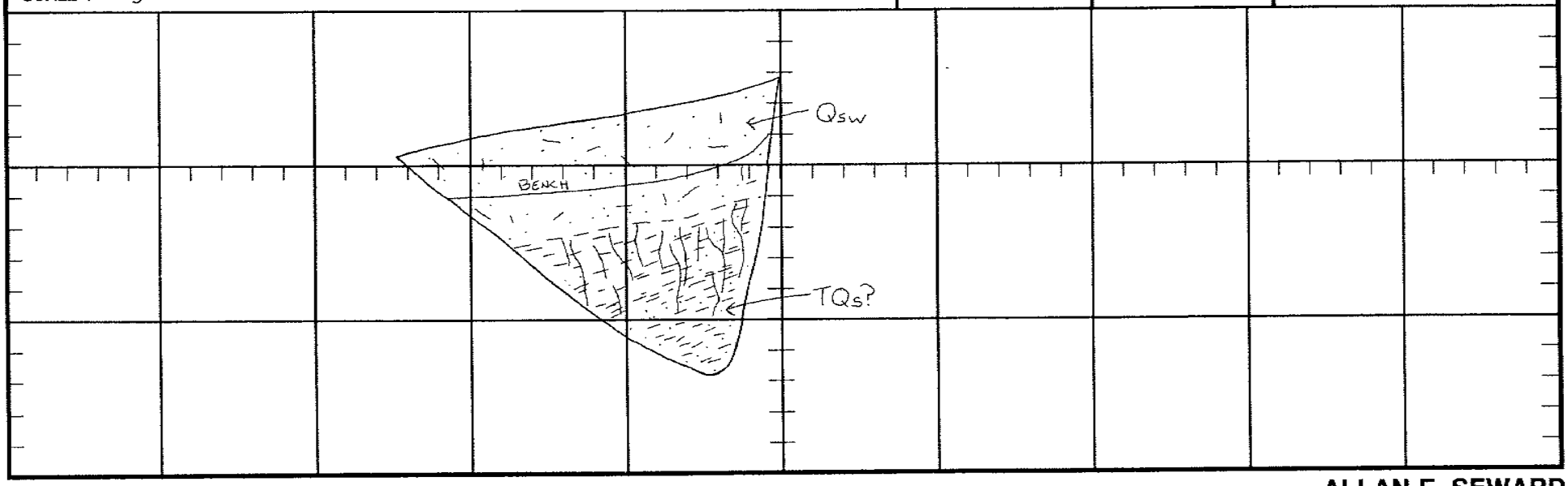
Trench Log No. T-197Q

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4' SLOPEWASH; Qsw, Light-brown silty sand and sandy silt; loose to moderately dense; damp to moist; voids and roots abundant			
4 - 10' BEDROCK?; TQs?, Light-brown to brown siltstone and clayey siltstone; firm to hard; damp; caliche down to 8 ft.	B:N27W,18NE		No Ground Water No Caving TOTAL DEPTH 10 Ft.

SCALE 1" = 5'

N 77 E



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

LOGGED BY MJD

Trench Log No. T-198Q

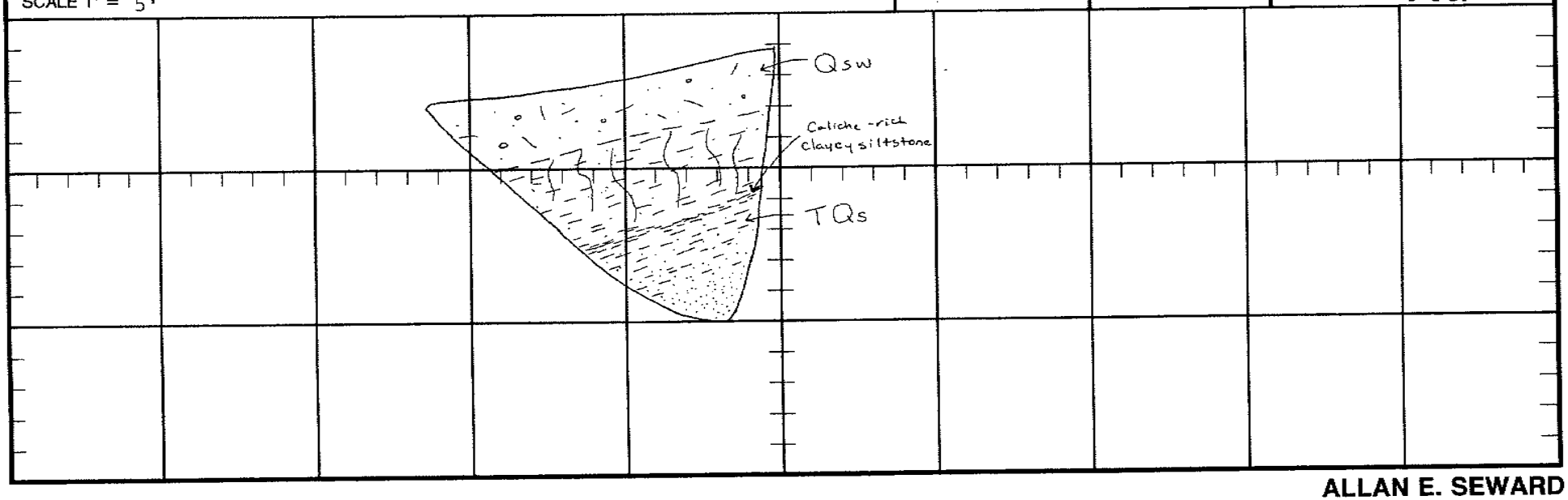
PROJECT Newhall Ranch - Mesas East

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SLOPEWASH; Qsw, Brown silty sand and sandy silt with scattered pebbles and cobbles; firm; damp 3 - 9' BEDROCK; TQs, Brown clayey siltstone and tan sandstone; hard; damp; abundant caliche to 6'; weathered and fractured to 6'; gradational contact with sandstone at bottom	B:N36W,23NE		No Ground Water No Caving TOTAL DEPTH 9 Ft.

SCALE 1" = 5'

N 60 E



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

PROJECT Newhall Ranch - Mesas East

LOGGED BY MJD

Trench Log No. T-199Q

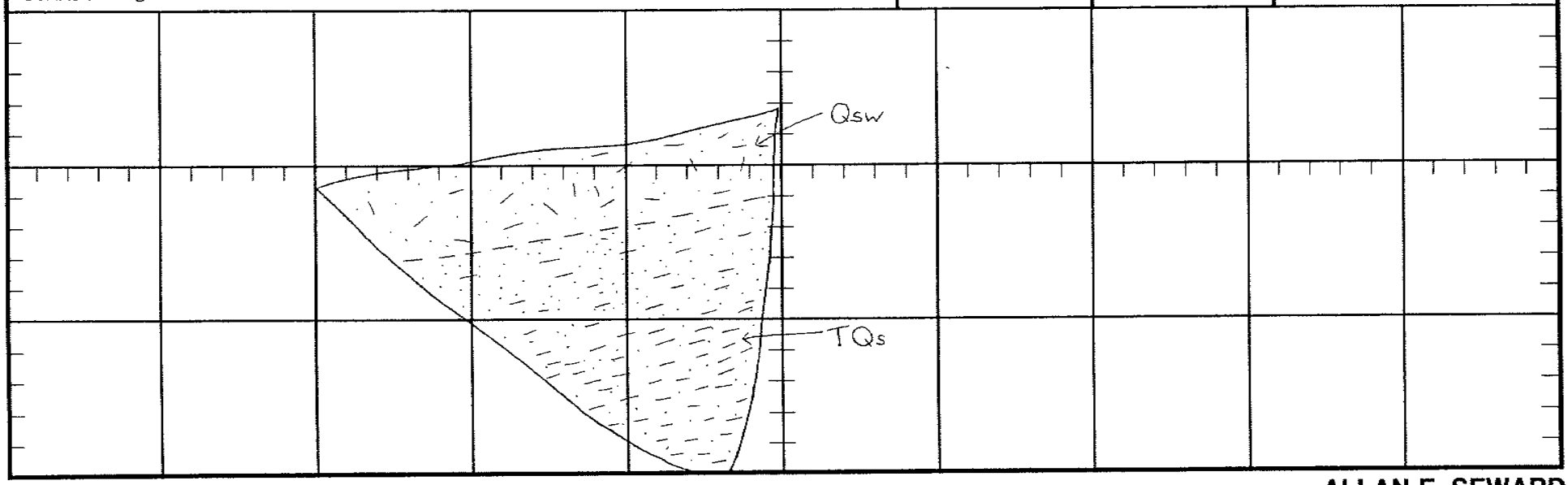
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SLOPEWASH; Qsw, Reddish-brown sandy silt; firm; damp; abundant voids and roots			
3 - 12' BEDROCK; TQs, Orangish-yellow fine- grained silty sandstone and brown siltstone; hard; damp; vaguely bedded; mostly massive/structureless	B:N40W,28NE apx		
			No Ground Water No Caving

N 43 E

SCALE 1" = 5'

TOTAL DEPTH 12 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

LOGGED BY MJD

Trench Log No. T-200Q

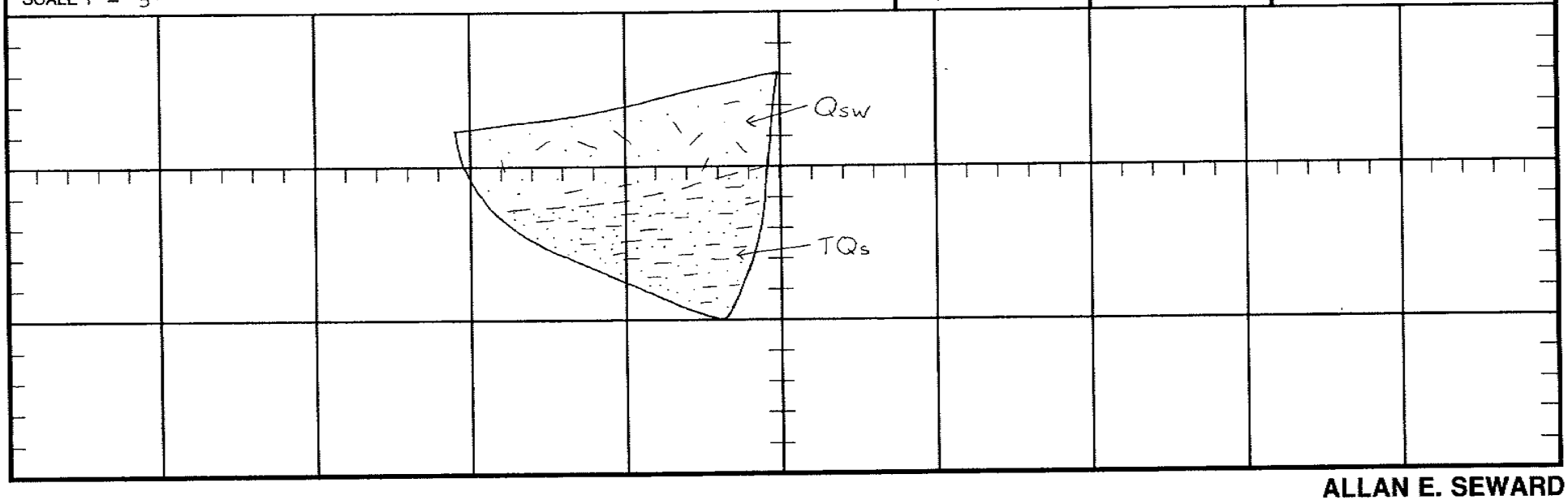
PROJECT Newhall Ranch-Mesas East

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SLOPEWASH; Qsw, Light yellowish-brown silty sand and sandy silt; firm; damp; abundant roots and voids; scattered pebbles and cobbles 3 - 9' BEDROCK; TQs, Tan to yellowish-brown silty sandstone; hard; damp; massive/structureless			No Ground Water No Caving TOTAL DEPTH 9 Ft.

SCALE 1" = 5'

N 54 E



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

PROJECT Newhall Ranch- Mesas East

LOGGED BY MJD

Trench Log No. T-201Q

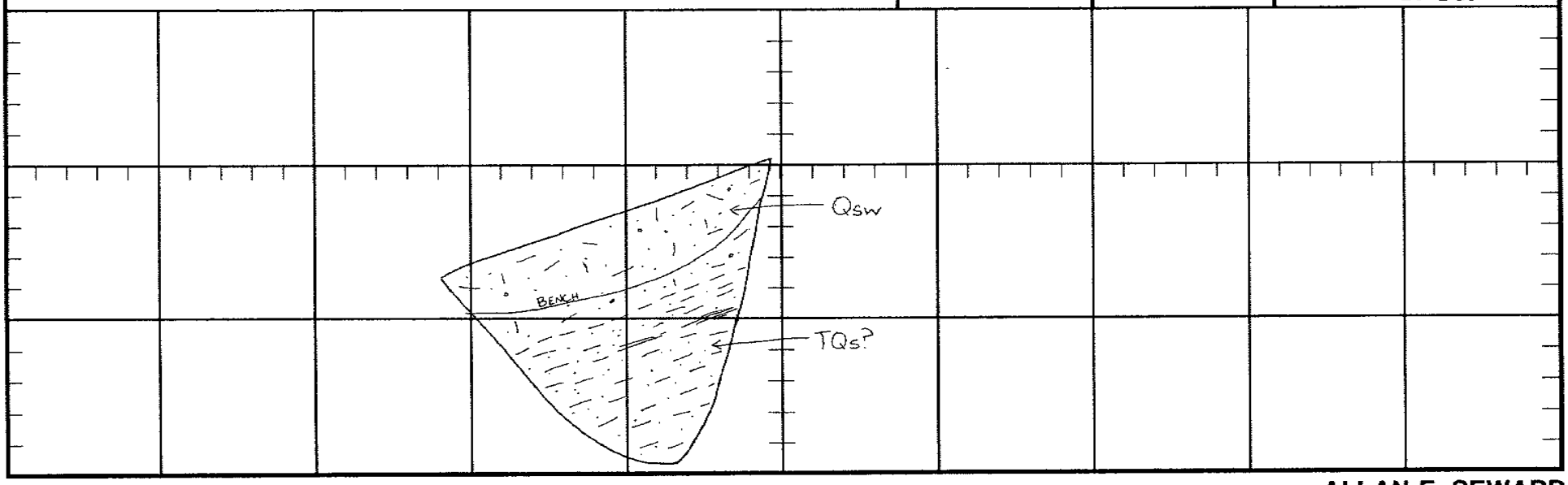
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3.5' SLOPEWASH; Qsw, Brown sandy silt and silty sand; soft to firm; damp; scattered pebbles			
3.5 - 10' BEDROCK?; TQs?, Yellowish-brown sandy siltstone; hard; damp; with 1/2" thick discontinuous mudstone interbed at depth of 5 ft.; otherwise massive; structureless	B:N-S,24E apx		No Ground Water No Caving

N 54 E

SCALE 1" = 5'

TOTAL DEPTH 10 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

LOGGED BY BJS

Trench Log No. T-202Q

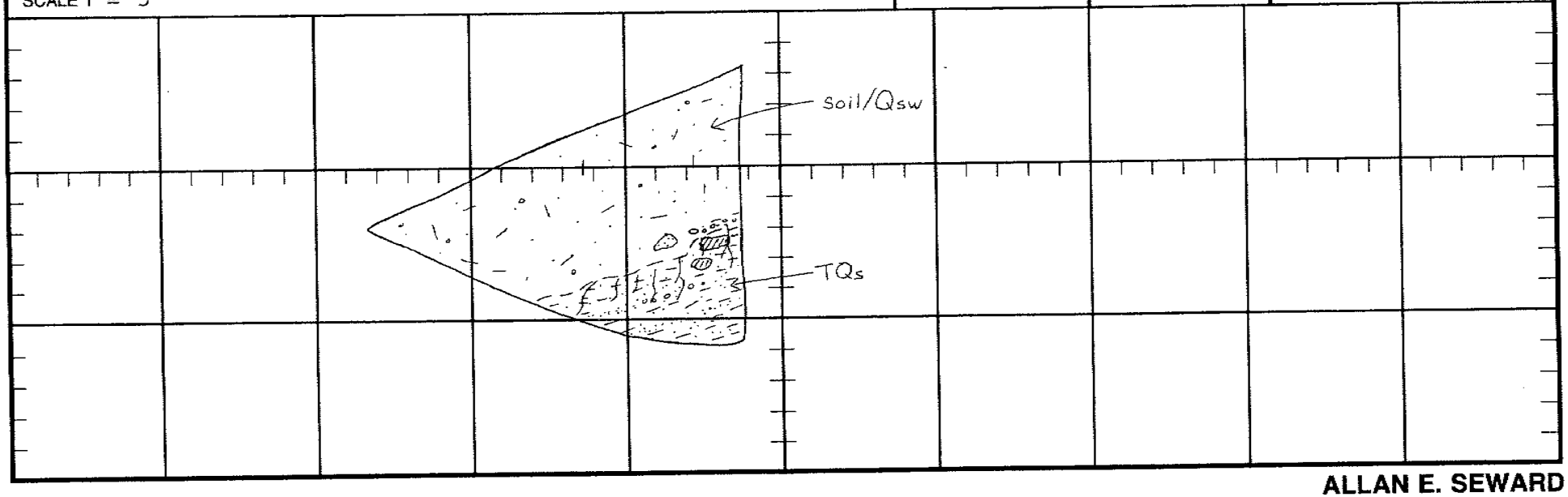
PROJECT Newhall Ranch-Mesas East

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 5' SOIL/SLOPEWASH; soil/Qsw, Brown to yellowish-brown muddy pebbly sand; soft to firm; slightly damp; carbonate filaments and TQs clasts in lower foot 5 - 9.5' BEDROCK; TQs, Light yellowish-brown silty sandstone and pebbly sandstone; moderately hard; damp; upper foot weathered	N58W,13NE		Trenches T-202Q thru T-214Q excavated with a track-mounted backhoe and logged on 1/24/00 No Ground Water No Caving TOTAL DEPTH 9.5 Ft.

N 33 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

PROJECT Newhall Ranch - Mesas East

LOGGED BY BJS

Trench Log No. T-203Q

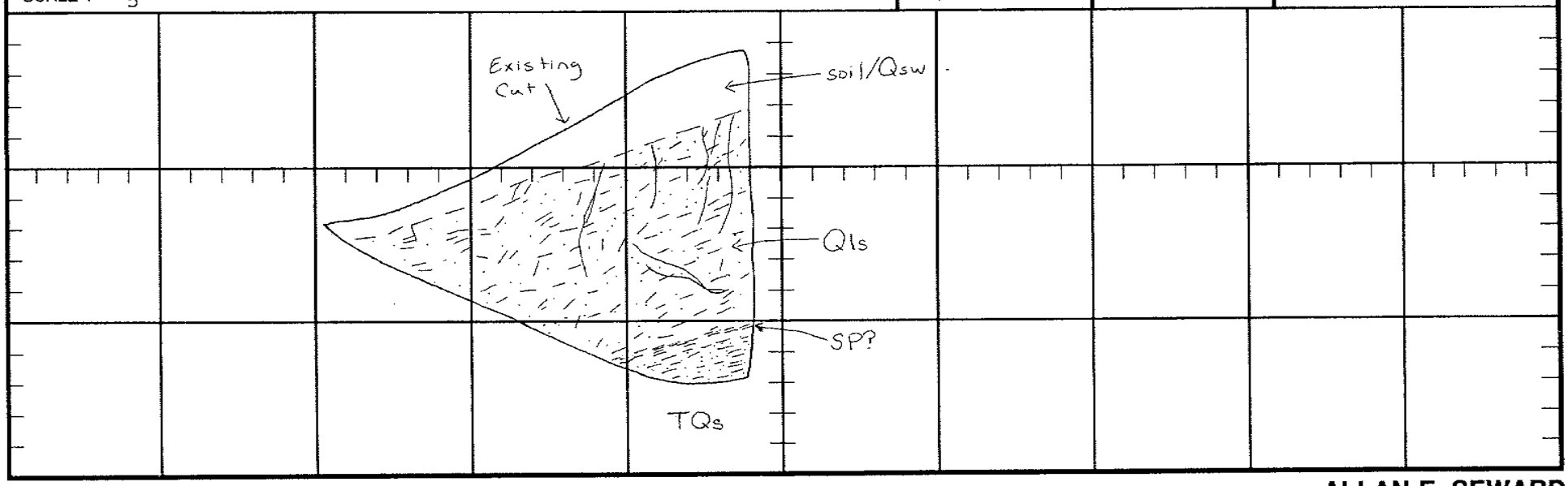
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2' SOIL/SLOPEWASH; soil/Qsw, Brown sandy mud with scattered pebbles; firm to crumbly; dry to slightly damp		SP?:N44W,30NE	
2 - 9' LANDSLIDE; Qls, Light yellowish-brown sandy siltstone/silty sandstone and local yellowish-brown mudstone at base; moderately dense to dense; slightly damp to damp; bedding clearly disturbed; mudstone at base is slightly sheared and plastic; minor carbonate			Bedding in TQs is vague but appears subparallel to "slide plane" at 9 ft.
9 - 11' BEDROCK; TQs, Light yellowish-brown silty sandstone; moderately hard; damp; upper 6-8" slightly disturbed parallel to "slide plane"			No Ground Water No Caving

SCALE 1" = 5'

N 2 E

TOTAL DEPTH 11 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

LOGGED BY BJS

Trench Log No. T-204Q

PROJECT Newhall Ranch-Mesas East

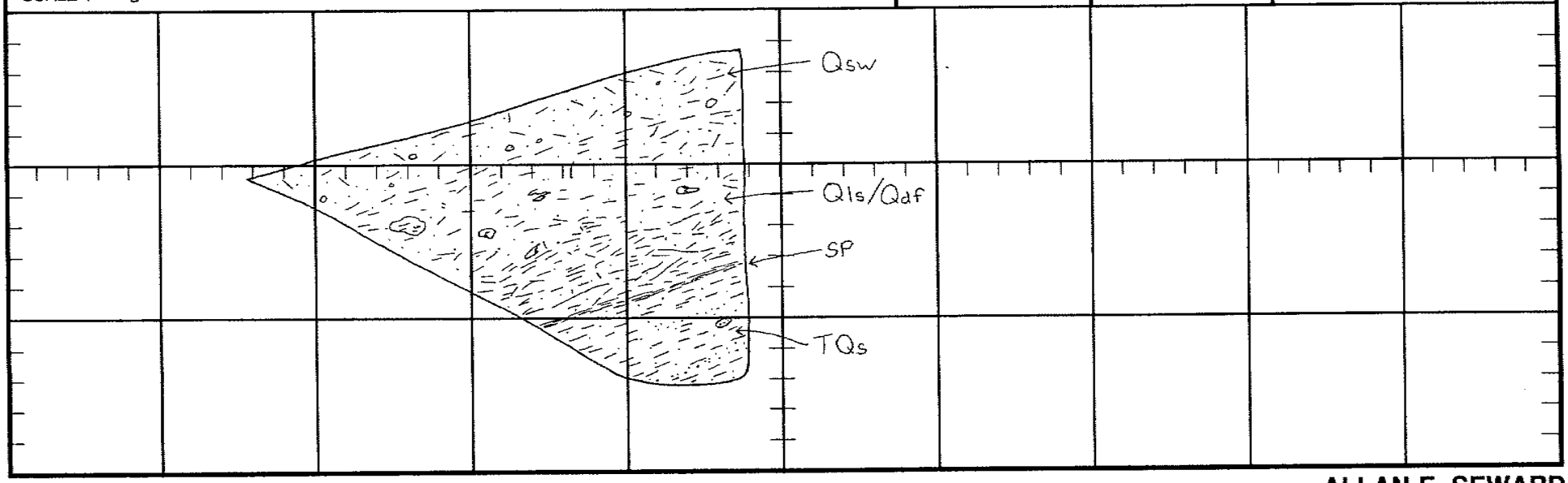
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2' SLOPEWASH; Qsw, Yellowish-brown pebbly silty sand; soft; slightly damp			
2 - 7' LANDSLIDE/DEBRIS FLOW DEPOSIT; Qls/Qdf, Light yellowish-brown silty sandstone/sandy siltstone; soft; slightly damp to damp; upper 3 ft. thoroughly disturbed wtih TQs fragments in silty sand matrix (Qdf)	Apx B: N55W,33NE	SP:N51W,29NE	SP- apx ¼"-thick slightly sheared moderate-brown silty clay with partings
7 - 11' BEDROCK; TQs, Light yellowish-brown sandy siltstone with local sandstone stringers; moderately hard; damp			No Ground Water No Caving

N 73 E

SCALE 1" = 5'

TOTAL DEPTH 11 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

LOGGED BY BJS

Trench Log No. T-205Q

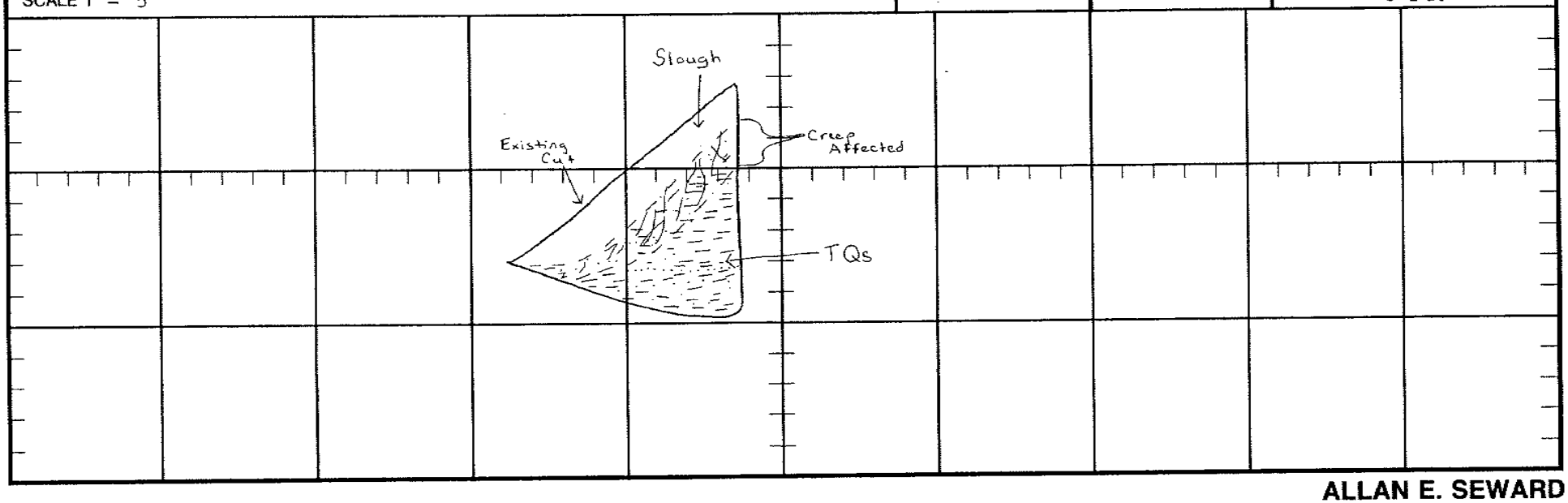
PROJECT Newhall Ranch- Mesas East

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2' SLOUGH 2 - 8' BEDROCK; TQs, Light yellowish-brown silty sandstone with local sandstone lenses on opposite trench wall; moderately hard; damp; upper 2 feet fractured and creep affected; locally laminated	N33W,25NE		Trench excavated into existing cut No Ground Water No Caving TOTAL DEPTH 8 Ft.

SCALE 1" = 5'

N 42 W



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

LOGGED BY BJS

Trench Log No. T-206Q

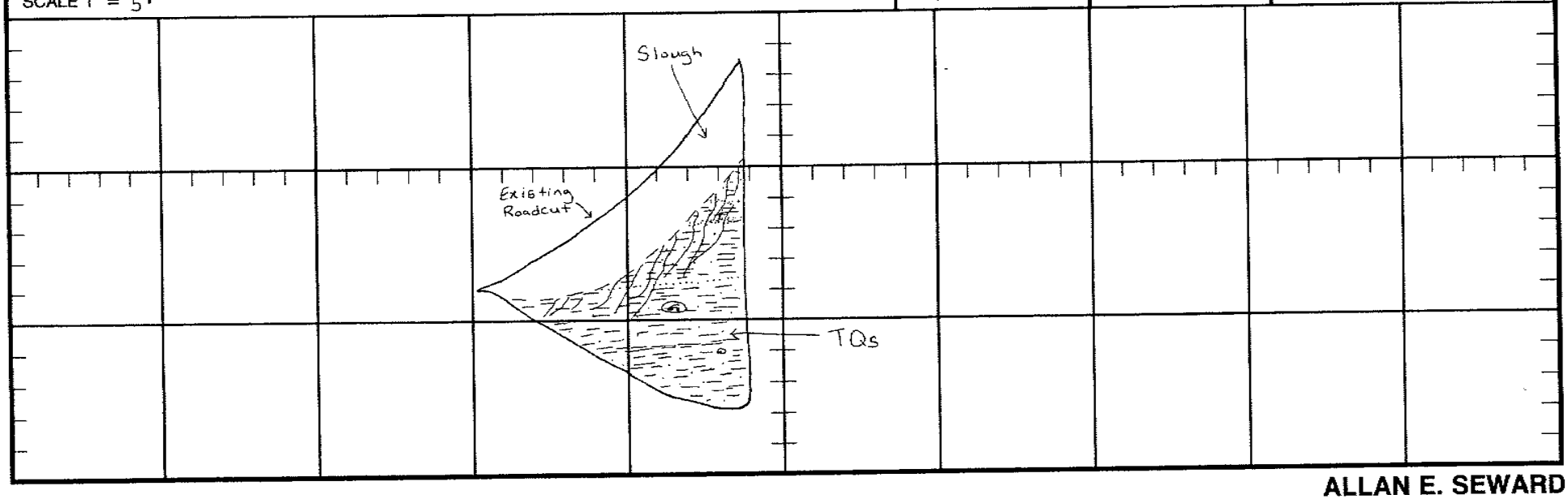
PROJECT Newhall Ranch-Mesas East

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4' SLOUGH			
4 - 11.5' BEDROCK; TQs, Interbedded light yellowish-brown silty sandstone and local sandstone and yellowish-brown siltstone; moderately hard; upper 2-3 ft. fractured and creep affected; damp; locally thin bedded to laminated; locally cross-laminated; local concretions	N35W,18NE		Trench excavated into existing cut
			No Ground Water No Caving
			TOTAL DEPTH 11.5 Ft.

N 12 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

PROJECT Newhall Ranch-Mesas East

LOGGED BY BJS

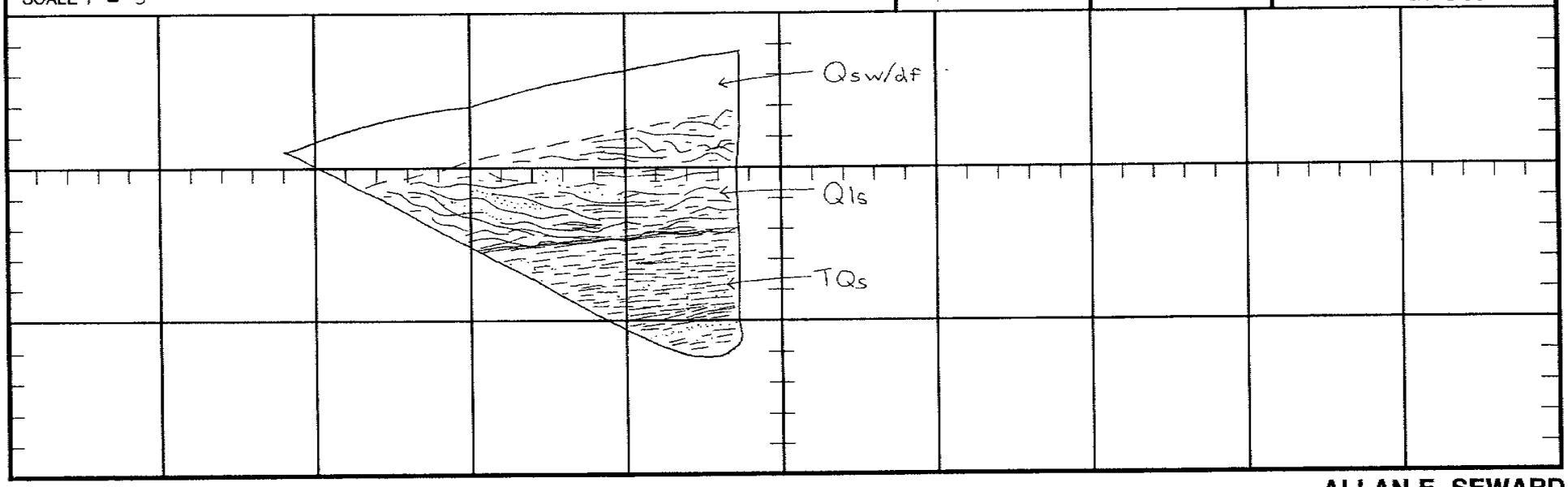
Trench Log No. T-207Q

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2' SLOPEWASH/DUMPED FILL; Qsw/df, Brown sandy mud; firm but fractured; slightly damp			
2 - 6' LANDSLIDE; Qls, Highly disturbed and moderately sheared, moderate reddish-brown mudstone and claystone with local silty sandstone stringers; soft to firm; damp to moist	N47W,24NE	Apx SP: N60E,5NW	
6 - 10' BEDROCK; TQs, Light yellowish-brown fine sandy siltstone and local silty sandstone and yellowish-brown siltstone/mudstone; moderately hard to locally fractured in upper 1.5 ft.; damp			No Ground Water No Caving TOTAL DEPTH 10 Ft.

SCALE 1" = 5'

N 48 E



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

LOGGED BY BJS

Trench Log No. T-208Q

PROJECT Newhall Ranch-Mesas East

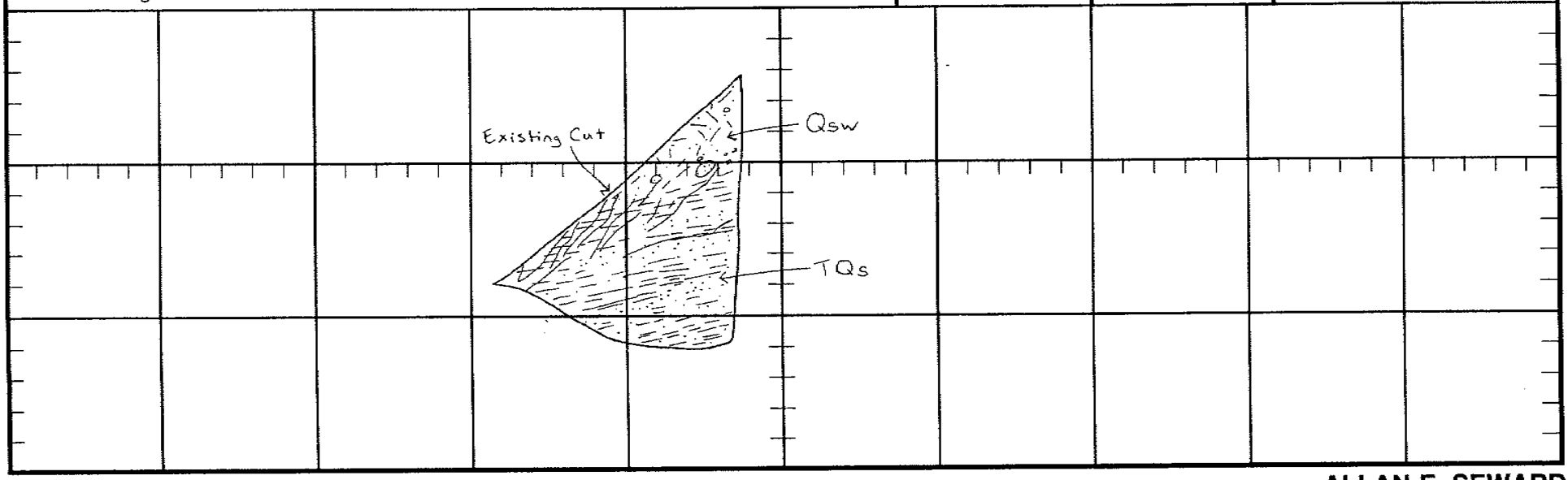
DATE 7/12/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SLOPEWASH; Qsw, Light yellowish-brown silty pebbly sand with local clasts of TQs; loose; dry			Trench excavated into existing cut
3 - 9' BEDROCK; TQs, Light yellowish-brown silty sandstone/sandy siltstone and local sandstone, and local yellowish-brown siltstone; dense to moderately hard; upper 4 ft. fractured and creep affected; cross laminations	N48W,17NE		No Ground Water No Caving

N 60 E

SCALE 1" = 5'

TOTAL DEPTH 9 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

PROJECT Newhall Ranch - Mesas East

LOGGED BY BJS

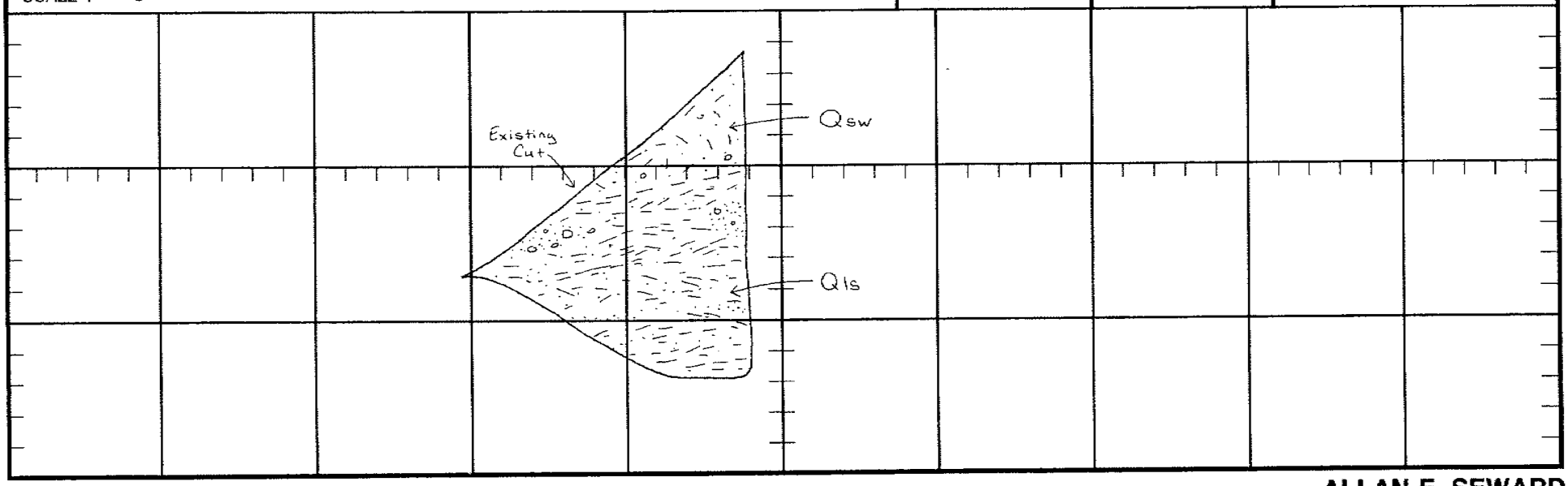
Trench Log No. T-209Q

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4' SLOPEWASH; Qsw, Yellowish-brown pebbly silty sand; loose; dry 4 - 11' LANDSLIDE; Qls, Light yellowish-brown silty sandstone and sandy siltstone and local pebble conglomerate, sandstone and siltstone; soft to dense; damp; bedding patchy and slightly to moderately disrupted; pinhole voids common in upper 3 ft.			Trench excavated into existing cut No Ground Water No Caving TOTAL DEPTH 11 Ft.

SCALE 1" = 5'

N 55 E



ALLAN E. SEWARD

JOB NO. 99-1703Q1sII-1

LOGGED BY BJS

Trench Log No. T-210Q

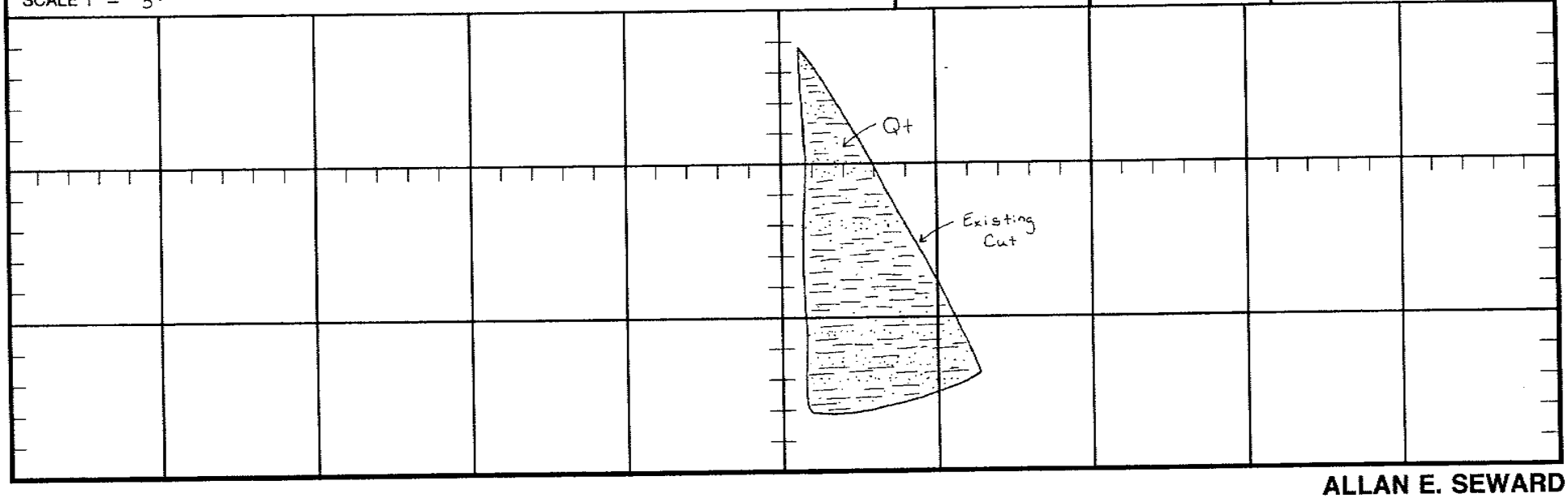
PROJECT Newhall Ranch-Mesas East

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 12' TERRACE DEPOSITS; Qt, Light yellowish-brown siltstone and sandy siltstone interbedded with yellowish-gray sandstone and pebbly sandstone; moderately dense to dense; well bedded	Subhorizontal		Trench excavated into existing cut No Ground Water No Caving TOTAL DEPTH 12 Ft.

N 68 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

LOGGED BY BJS

Trench Log No. T-211Q

PROJECT Newhall Ranch - Mesas East

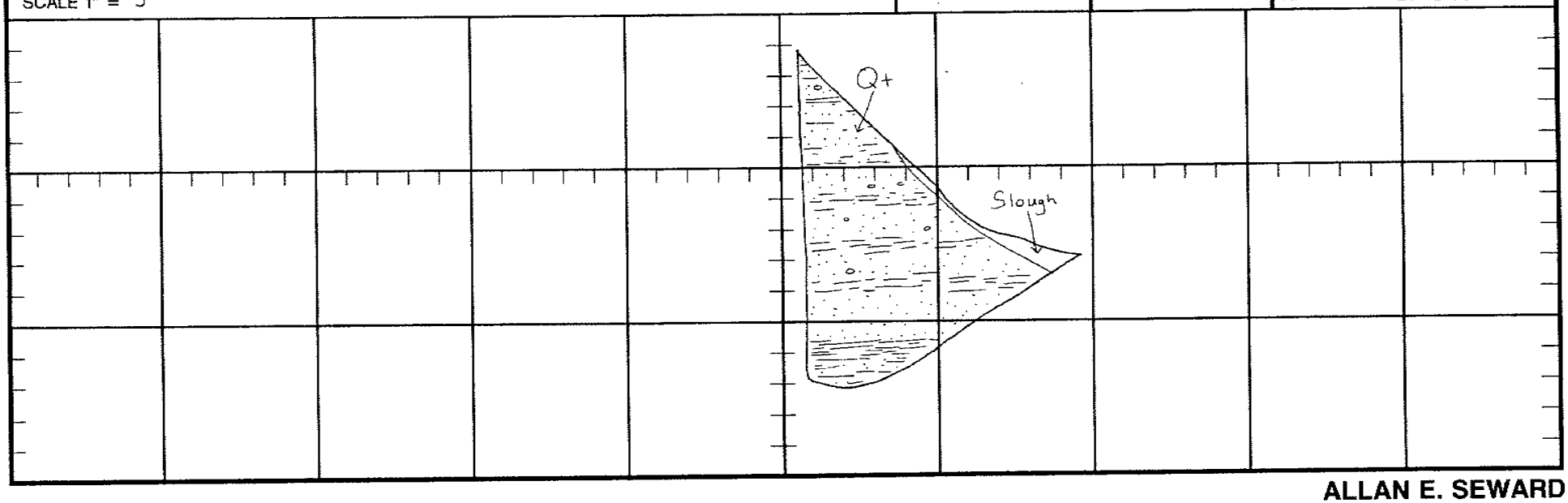
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 11' TERRACE DEPOSITS; Qt, Light yellowish-brown siltstone and sandy siltstone interbedded with yellowish-gray sandstone and pebbly sandstone; moderately dense to dense; well bedded	Subhorizontal		Trench excavated into existing cut/bank No Ground Water No Caving

N 86 E

SCALE 1" = 5'

TOTAL DEPTH 11 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

PROJECT Newhall Ranch - Mesas East

LOGGED BY BJS

Trench Log No. T-212Q

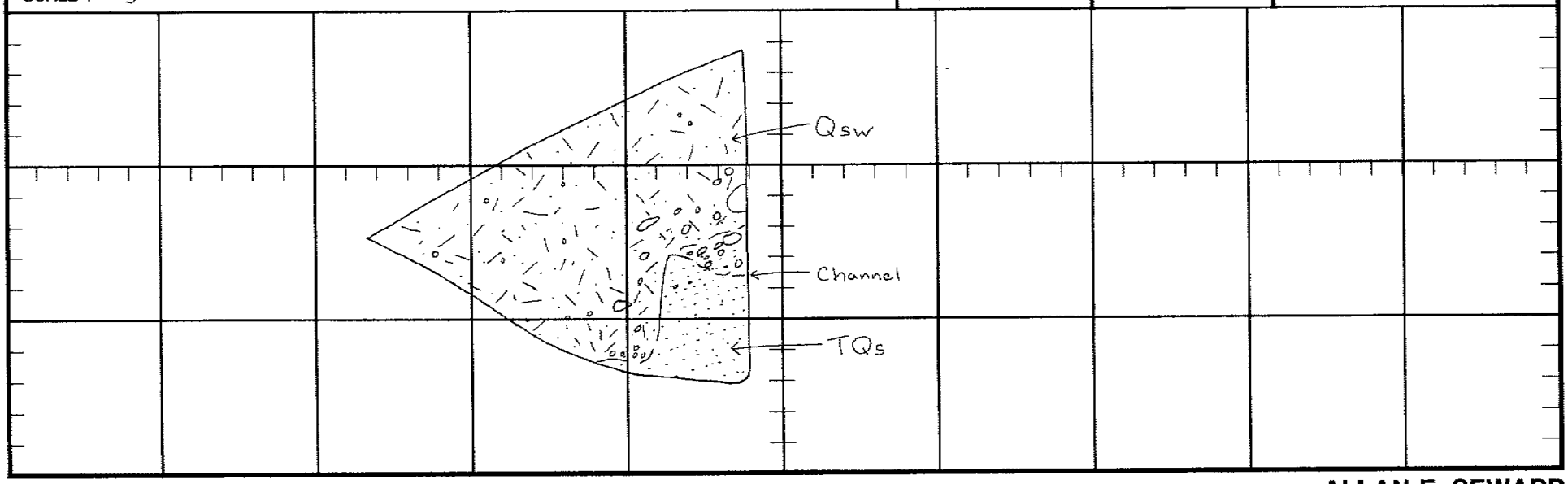
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6' SLOPEWASH; Qsw, Brown to yellowish-brown pebbly muddy sand with scattered cobbles and boulders; soft; dry to slightly damp	N32W,18NE		Cobbles and boulders probably from basal Qt
6 - 11' BEDROCK; TQs, Light yellowish-gray sandstone, pebbly sandstone and conglomerate; moderately hard to hard; slightly damp; channeling and cross bedding			No Ground Water No Caving

N 88 E

SCALE 1" = 5'

TOTAL DEPTH 11 Ft.



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

LOGGED BY BJS

Trench Log No. T-213Q

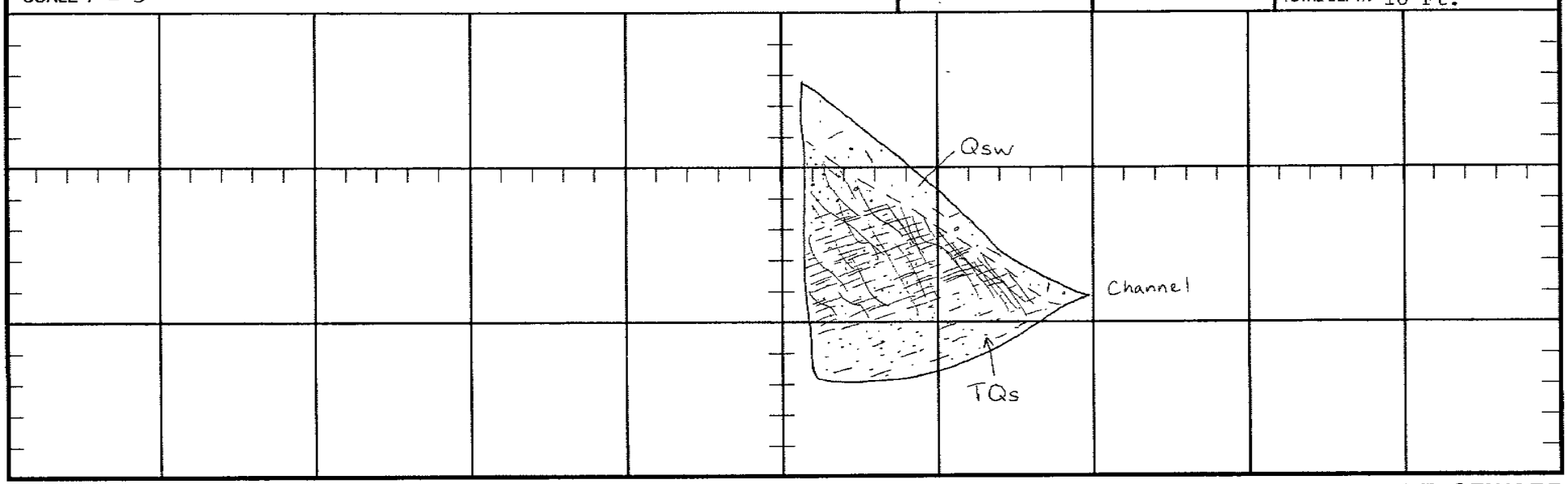
PROJECT Newhall Ranch - Mesas East

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2' SLOPEWASH; Qsw, Grayish-brown pebbly silty sand; loose; dry			Trench excavated into existing stream bank
2 - 10' BEDROCK; TQs, Interbedded yellowish-brown siltstone/mudstone with light-brown to light-gray mottling near surface and light yellowish-gray fine sandstone and pebbly sandstone; moderately hard; damp; upper 1-2' weathered, creep affected and locally iron-stained	N46W,20NE		Faint sulfurous odor in trench
			No Ground Water No Caving
			TOTAL DEPTH 10 Ft.

SCALE 1" = 5'

N 50 E



ALLAN E. SEWARD

JOB NO. 99-1703QlsII-1

LOGGED BY BJS

Trench Log No. T-214Q

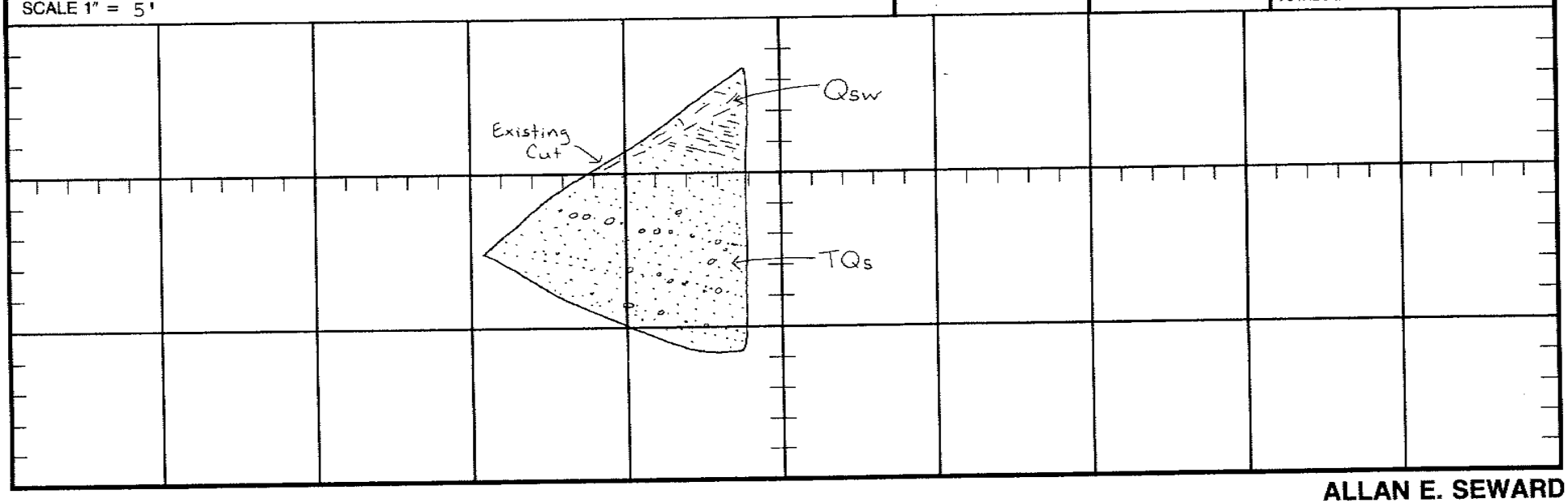
PROJECT Newhall Ranch-Mesas East

DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1.5' SOIL/SLOPEWASH; soil/Qsw, Yellowish-brown silty pebbly sand; loose; dry			Trench excavated into existing cut
1.5 - 9.5' BEDROCK; TQs, Light-gray sandstone and pebbly sandstone and yellowish-gray sandy siltstone; moderately hard; slightly damp; upper 2-3 ft. fractured and weathered	N36W,16NE		No Ground Water No Caving TOTAL DEPTH 9.5 Ft.

N 72 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 00-1703QlsII-1

PROJECT Newhall Ranch-Mesas East

LOGGED BY MJD

Trench Log No. 217Q

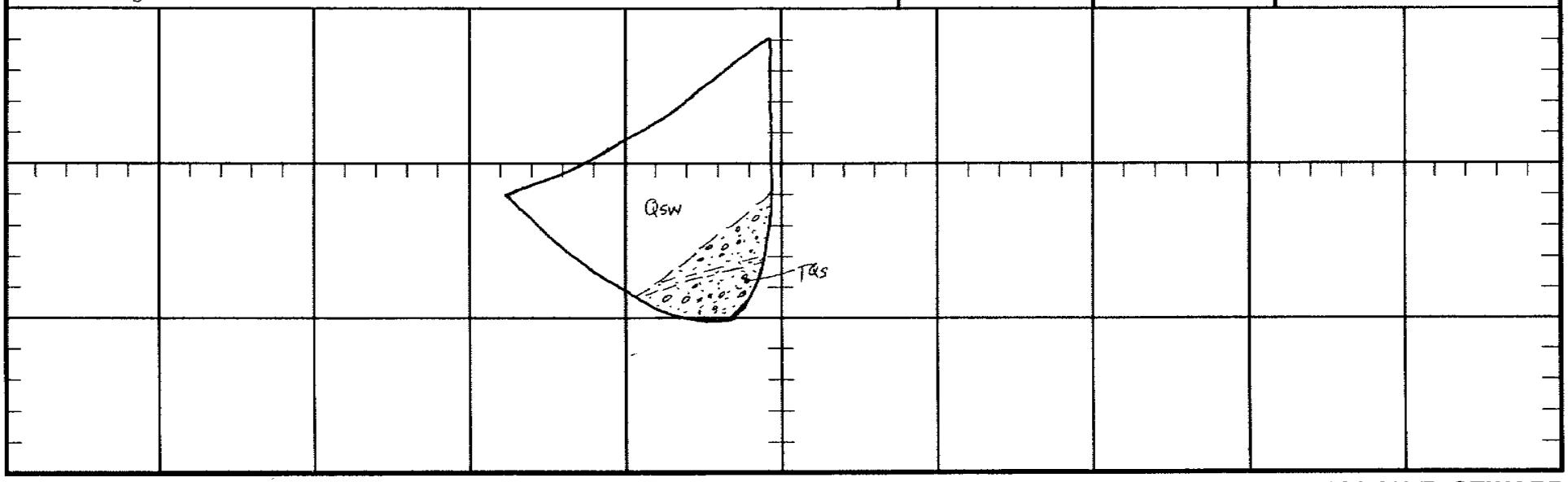
DATE 7/22/04

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 5' SLOPEWASH; Qsw, Light-brown to brown silty to pebbly sand with scattered cobbles; loose to moderately dense; dry to moist			Logged on 3/16/00 Slopewash moist from recent rain
5 - 9' BEDROCK; TQs, Yellowish-gray to gray coarse-grained sandstone and conglomerate; loose; friable; dry; interbedded with yellowish-brown siltstone bed; discontinuous; dense; damp	Apx B: N34W,22NE		No Ground Water No Caving

SCALE 1" = 5'

N 3 W

TOTAL DEPTH 9 Ft.

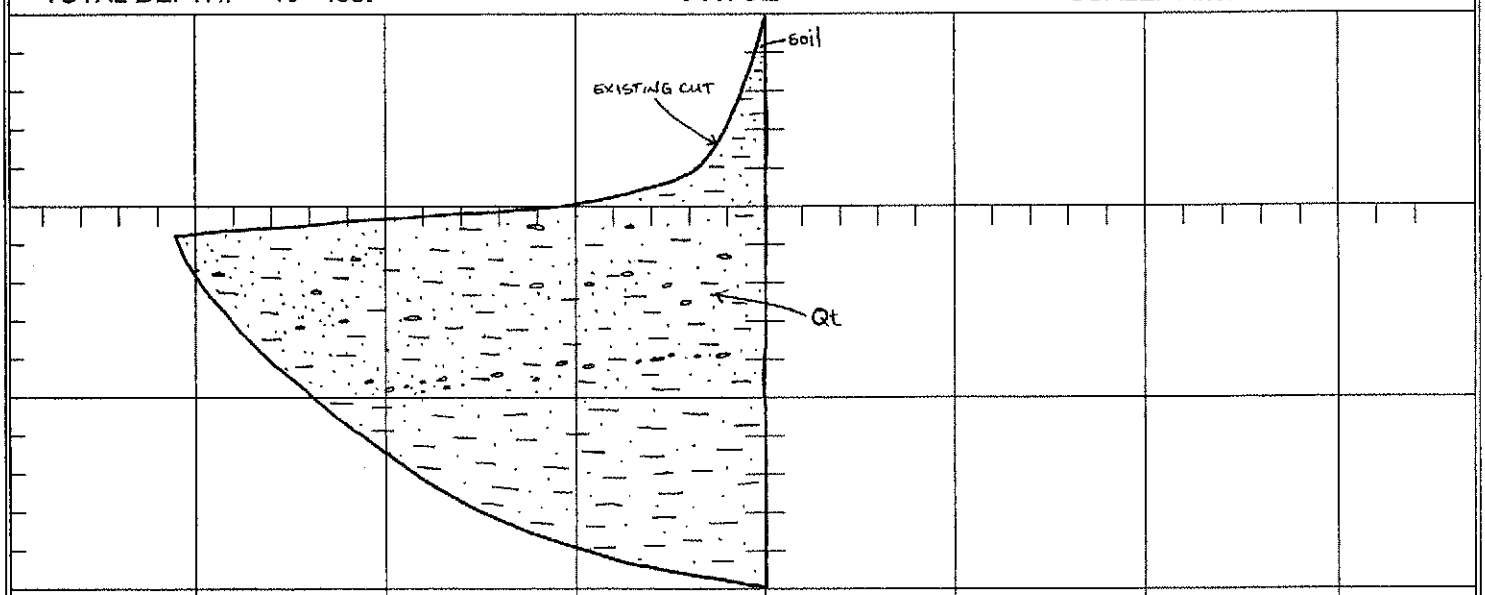


ALLAN E. SEWARD

CLIENT: Newhall Ranch Co.	JOB NO: 01-1703M-1	**TRENCH LOG**	
PROJECT: Mesas Entertainment	DATE: 7/22/04		
	LOGGED BY: DGG	**NO.** T-1M	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket			
ELEVATION: 1099	EXCAVATED: 5/16/01		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					SOIL; (0-0.5 ft.) @ 0' Medium grayish-brown silt; stiff; dry to slightly damp QUATERNARY TERRACE DEPOSITS; Qt, (0.5-15 ft.) @ 0.5' Medium orangish-brown siltstone to sandy siltstone to pebbly sandstone with locally abundant pebbles and local small cobbles; moderately dense; damp; no bedding				
5									
10									
15									
20									

TOTAL DEPTH: 15 feet ←N73E SCALE: 1 inch = 5 feet

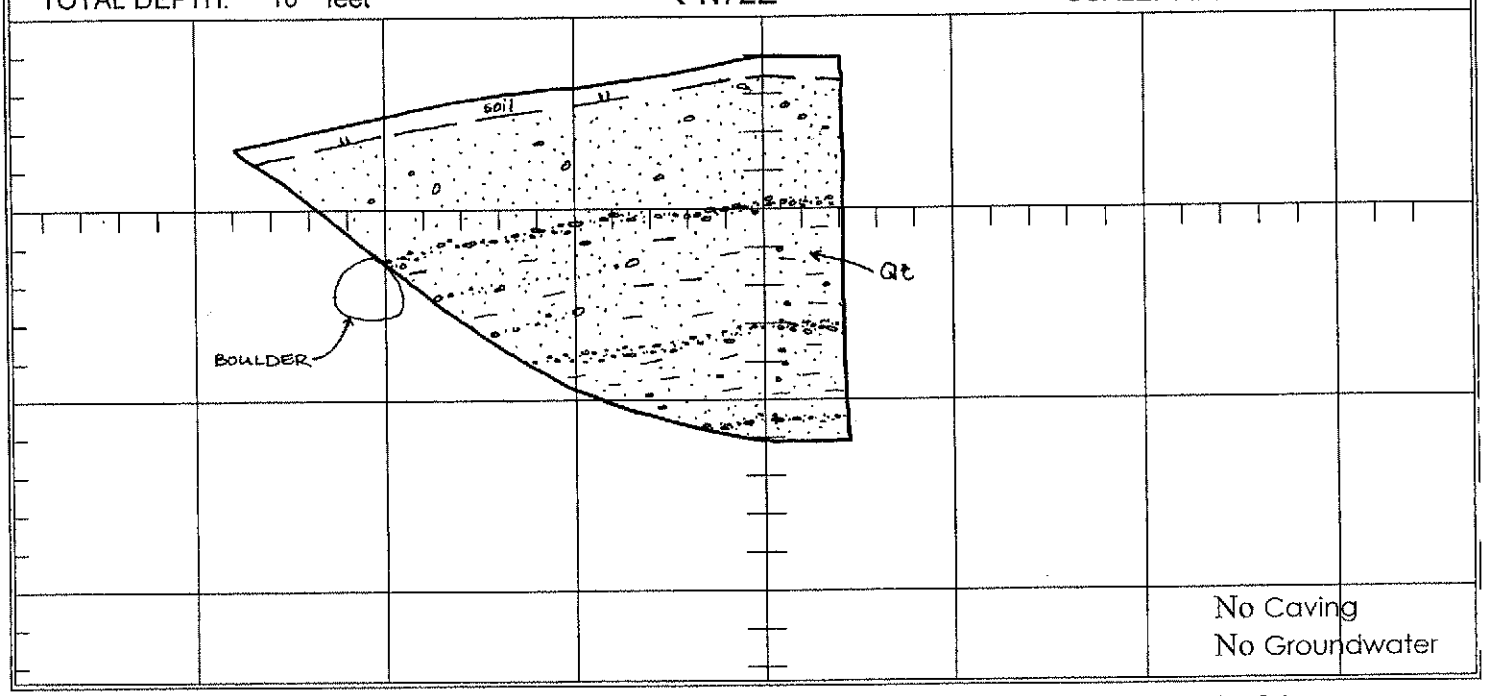


No Caving
No Groundwater

CLIENT: Newhall Ranch Co.	JOB NO: 01-1703M-1	**TRENCH LOG**	
PROJECT: Mesas Entertainment	DATE: 7/22/04		
	LOGGED BY: DGG	**NO.** T-2M	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket			
ELEVATION: 1092	EXCAVATED: 5/16/01		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					SOIL; (0-0.5 ft.) @ 0' Medium grayish-brown silt to sandy silt; stiff; dry to slightly damp QUATERNARY TERRACE DEPOSITS; Qt, (0.5- 10 ft.) @ 0.5' Orangish-brown to orangish-gray sandy siltstone to fine- to coarse-grained pebbly sandstone with local cobbles and 1 boulder; moderately dense to friable; damp; roots to 8 ft.	Apx. B:N6E,12SE			
5									
10									
15									
20									

TOTAL DEPTH: 10 feet ←N72E SCALE: 1 inch = 5 feet

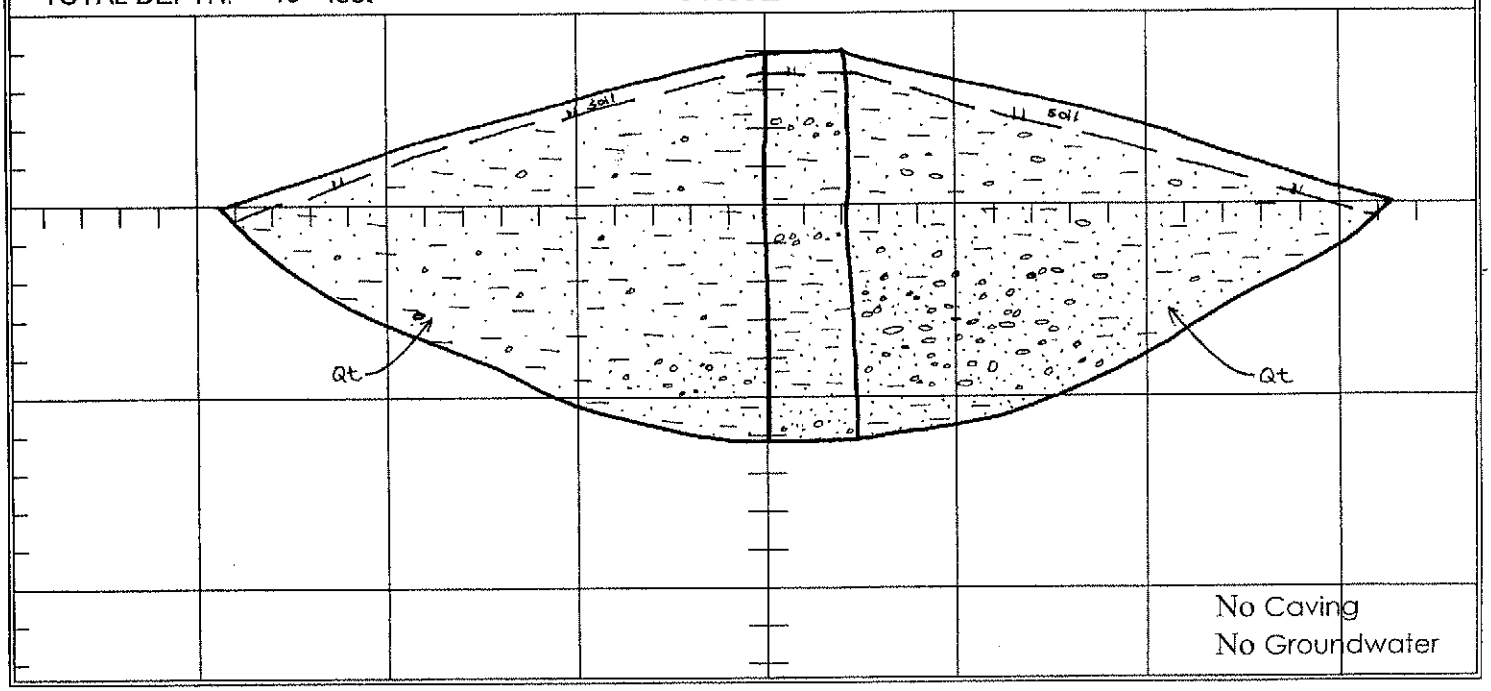


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 01-1703M-1	**TRENCH LOG**	
PROJECT: Mesas Entertainment	DATE: 7/22/04		
	LOGGED BY: DGG	**NO.** T-3M	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket			
ELEVATION: 1116	EXCAVATED: 5/16/01		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					SOIL; (0-0.5 ft.) @ 0' Medium grayish-brown silt to sandy silt; stiff; dry to slightly damp QUATERNARY TERRACE DEPOSITS; Qt, (0.5-10 ft.) @ 0.5' Yellowish-brown to olive-gray siltstone, sandy siltstone and pebbly sandstone; moderately dense to friable; damp				
5									
10					COMMENTS: -Northern wall coarser-grained				
15									
20									

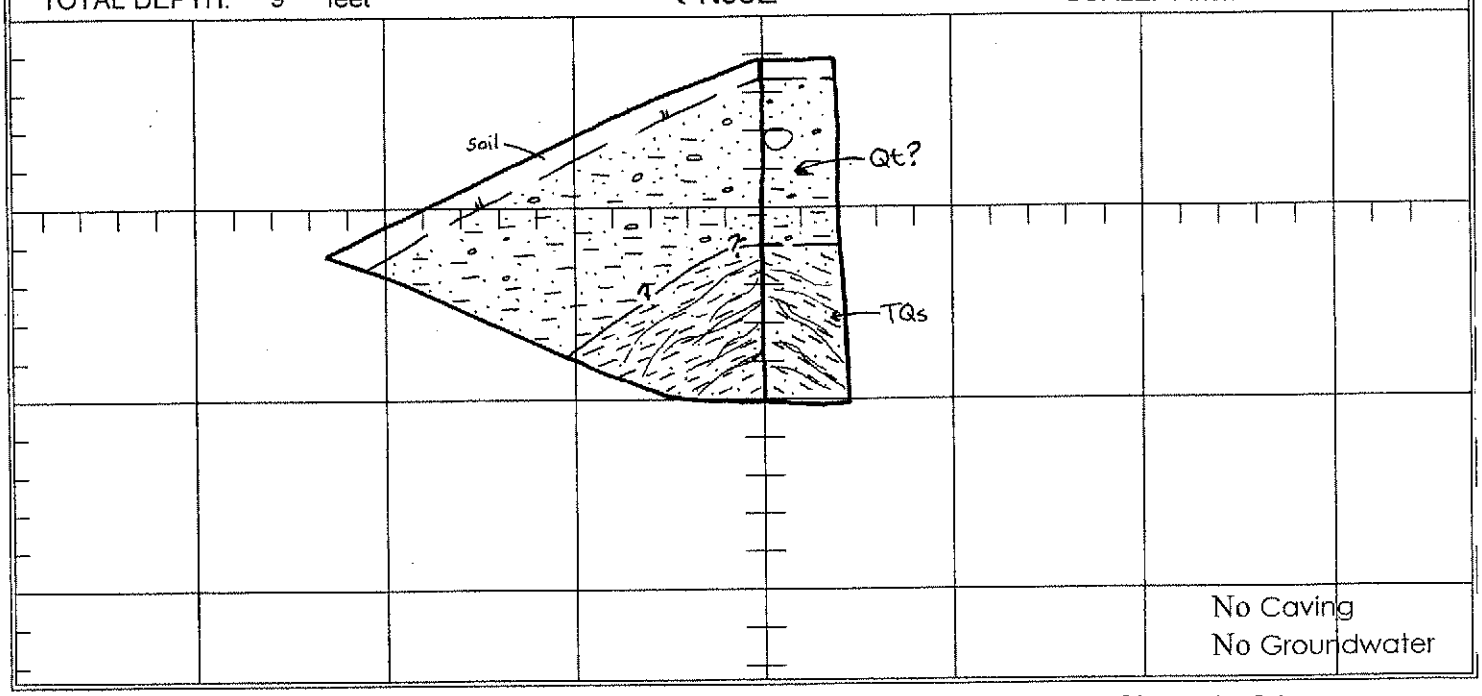
TOTAL DEPTH: 10 feet ←N35E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Co.	JOB NO: 01-1703M-1	**TRENCH LOG**	
PROJECT: Mesas Entertainment	DATE: 7/22/04		
	LOGGED BY: DGG/BJS	**NO.** T-4M	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket			
ELEVATION: 1110	EXCAVATED: 5/16/01		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					SOIL; (0-0.5 ft.) @ 0' Grayish-brown silt to sandy silt; stiff; dry QUATERNARY TERRACE DEPOSITS?; Qt?, (0.5 - 5 ft.) @ 0.5' Medium orangish-brown siltstone; sandy siltstone and pebbly sandstone; moderately friable but dense; damp				
5					BEDROCK; TQs, (5-9 ft.) @ 5' Yellowish-gray siltstone; dense; moderately fractured with caliche; damp	Apx.B/f:N65W,21NE			
10					COMMENTS: -TQs possibly creep affected				
15									
20									

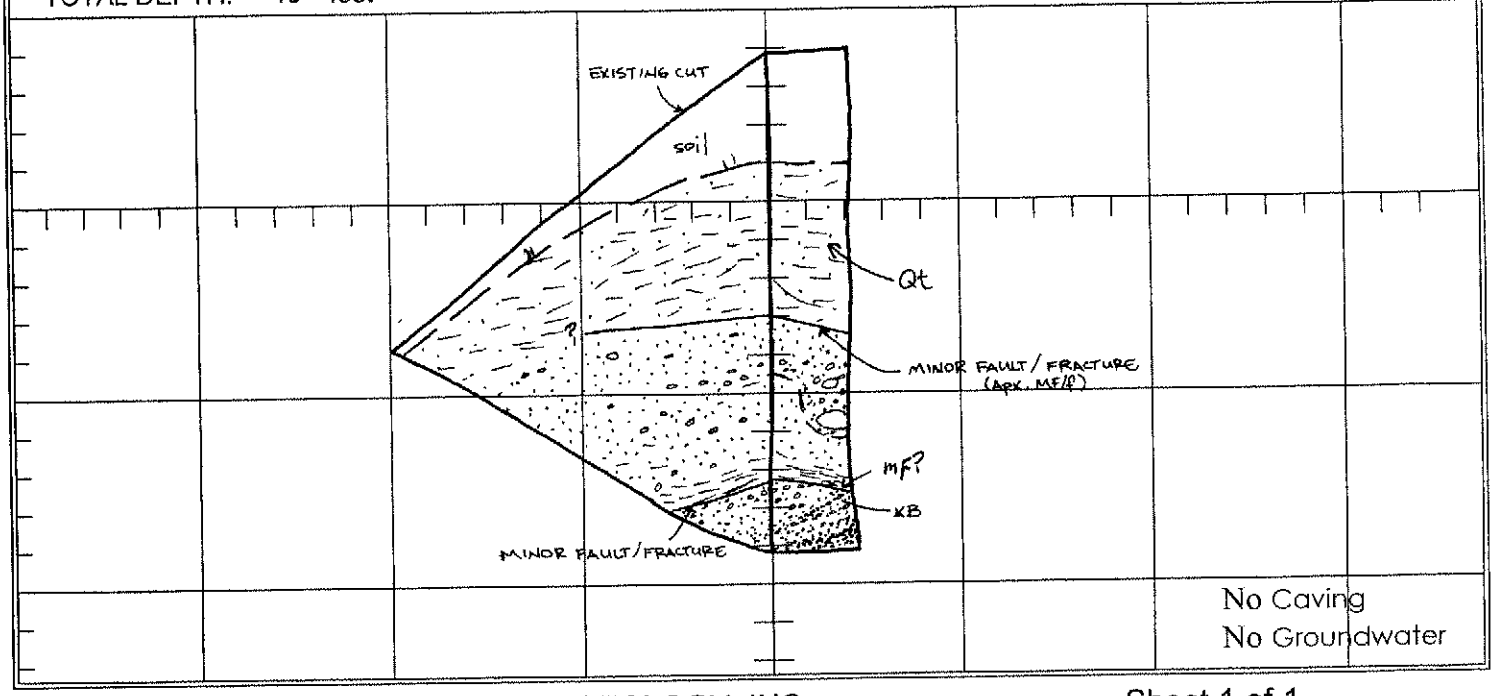
TOTAL DEPTH: 9 feet ←N56E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Co.	JOB NO: 01-1703M-1	**TRENCH LOG**	
PROJECT: Mesas Entertainment	DATE: 7/22/04		
	LOGGED BY: DGG/BJS	**NO.** T-5M	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket			
ELEVATION: 1088	EXCAVATED: 5/16/01		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					SOIL; (0-3 ft.) @ 0' Grayish-brown silt; firm to stiff; dry				
					QUATERNARY TERRACE DEPOSITS; Qt, (3-13 ft.) @ 3' Light yellowish-brown to yellowish-gray interbedded sandstone, pebbly sandstone, sandy siltstone and silty pebbly sandstone with scattered cobbles; moderately dense to dense; coarse materials friable; slightly damp to damp; cross-bedding common	XB:N68E,17SE Apx.MF/f: N50W,15NE			
5									
10									
15					COMMENTS: -Upper 3-4 ft. of Qt weathered -Minor faults/fractures and tilted bedding observed in Qt suggest proximity of trench to fault zone and/or suficial creep -Coarse material probably represents basal Qt layer				
20									

TOTAL DEPTH: 13 feet N58W→ SCALE: 1 inch = 5 feet

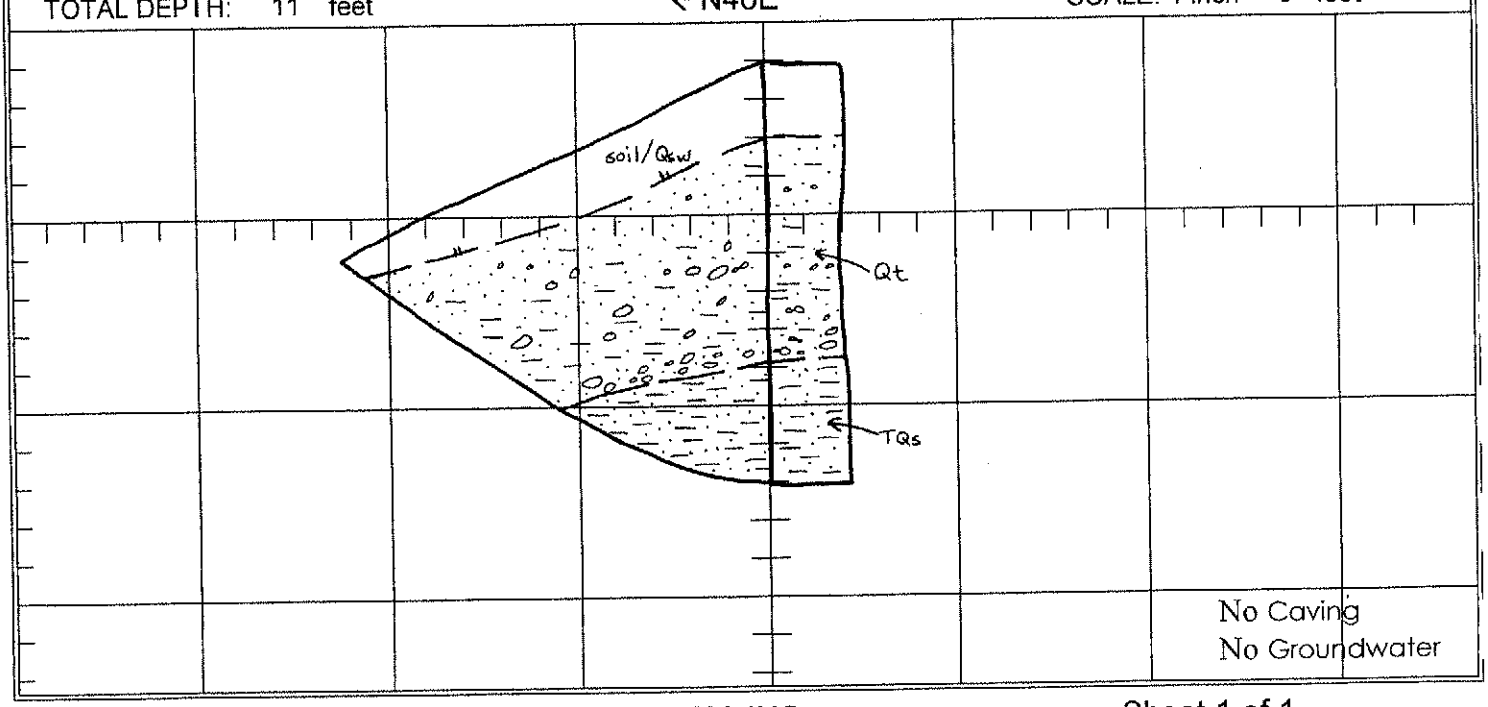


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 01-1703M-1	**TRENCH LOG**	
PROJECT: Mesas Entertainment	DATE: 7/22/04		
	LOGGED BY: DGG	**NO.** T-6M	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket			
ELEVATION: 1089	EXCAVATED: 5/16/01		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					SOIL/SLOPEWASH; Soil/Qsw, (0-2 ft.) @ 0' Grayish-brown silt; stiff; dry to slightly damp; abundant voids up to ¼" diameter QUATERNARY TERRACE DEPOSITS; Qt, (2-8 ft.) @ 2' Orangish-brown to medium-brown siltstone, sandy siltstone and pebbly sandstone with a basal cobble zone; loose to moderately dense and locally friable; damp				
5									
					BEDROCK; TQs, (8-11 ft.) @ 8' Tan to light-gray to olive-gray siltstone to sandy siltstone; moderately dense; damp	TQs massive			
10									
15									
20									

TOTAL DEPTH: 11 feet ←N46E SCALE: 1 inch = 5 feet

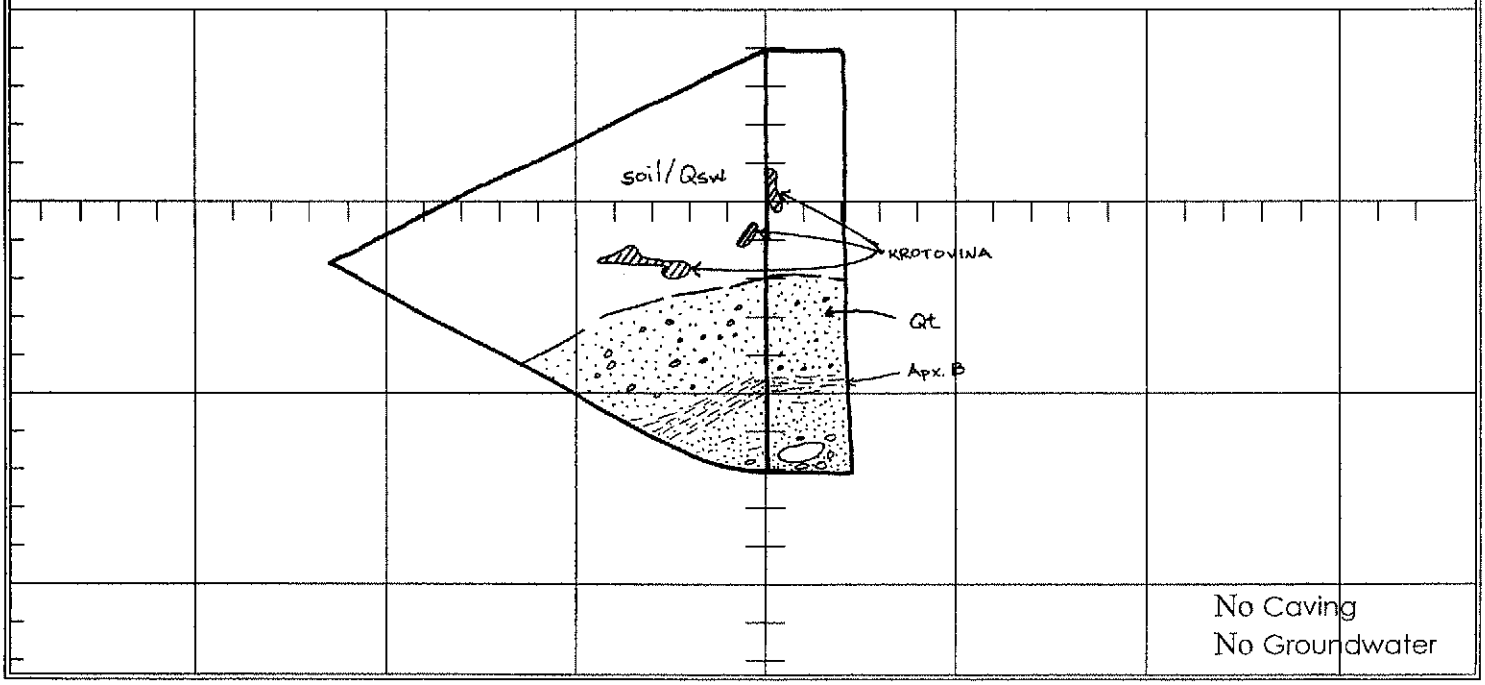


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 01-1703M-1	**TRENCH LOG**	
PROJECT: Mesas Entertainment	DATE: 7/22/04		
	LOGGED BY: DGG/BJS	**NO.** T-7M	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket			
ELEVATION: 1078	EXCAVATED: 5/16/01		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					SOIL/SLOPEWASH; Soil/Qsw, (0-6 ft.) @ 0' Grayish-brown silt to sandy silt; stiff; damp; scattered pebbles; pinhole voids				
5					QUATERNARY TERRACE DEPOSITS; Qt, (6-11 ft.) @ 6' Interbedded orangish- to medium-brown, blackish, and tan to light gray Fe02 stained siltstone, sandy siltstone, and fine- to coarse-grained cobbly pebbly sandstone; loose and friable to moderately dense; damp	Apx. B:N88E,21NW			
10									
15					COMMENTS: -Roots to 8 ft. -Qt appears slightly disturbed; possible landslide movement				
20									

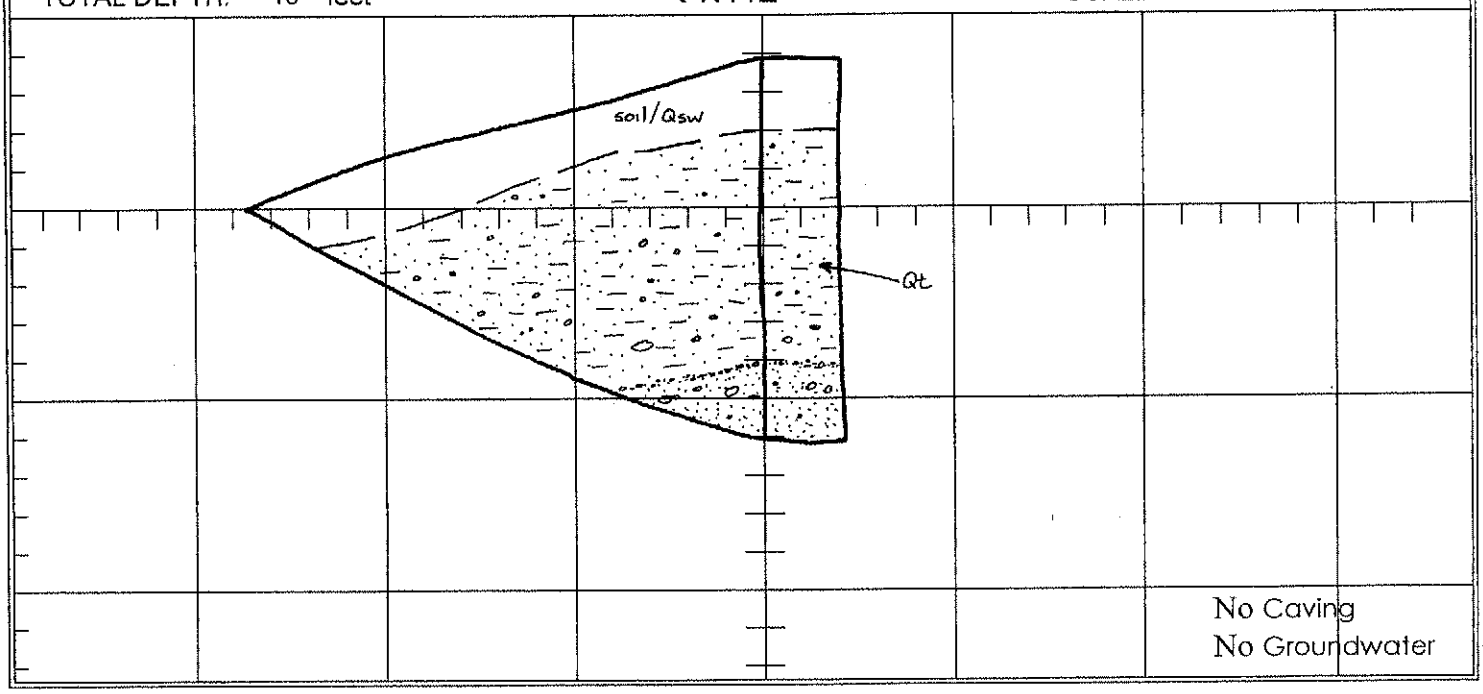
TOTAL DEPTH: 11 feet ←N4W SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Co.	JOB NO: 01-1703M-1	**TRENCH LOG**	
PROJECT: Mesas Entertainment	DATE: 7/22/04		
	LOGGED BY: DGG	**NO.** T-8M	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket			
ELEVATION: 1141	EXCAVATED: 5/16/01		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					SOIL/SLOPEWASH; Soil/Qsw, (0-2.5 ft.) @ 0' Grayish-brown silt to sandy silt with scattered pebbles; stiff; dry to slightly damp QUATERNARY TERRACE DEPOSITS; Qt, (2.5-10 ft.) @ 2.5' Orangish- to grayish-brown siltstone; sandy siltstone and pebbly sandstone with local cobbles; loose to moderately dense; locally friable; damp	Apx.B:N47W,6NE			
5									
10									
15									
20									

TOTAL DEPTH: 10 feet ←N44E SCALE: 1 inch = 5 feet

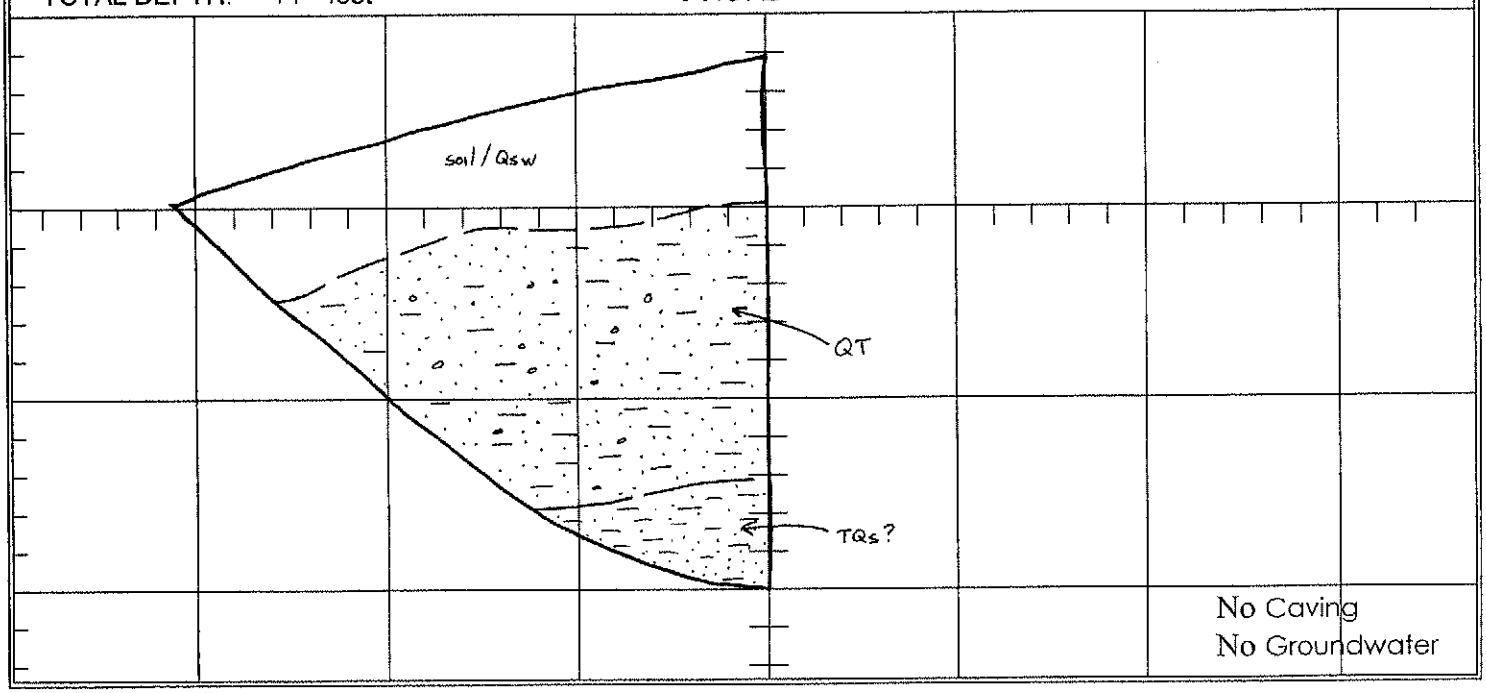


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 01-1703M-1	**TRENCH LOG**	
PROJECT: Mesas Entertainment	DATE: 7/22/04		
	LOGGED BY: DGG	**NO.** T-9M	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket			
ELEVATION: 1120	EXCAVATED: 5/16/01		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					SOIL/SLOPEWASH; Soil/Qsw, (0-4 ft.) @ 0' Grayish-brown silt; firm to stiff; dry to slightly damp				
5					QUATERNARY TERRACE DEPOSITS; Qt, (4-11 ft.) @ 4' Orangish- to medium-brown siltstone and sandy siltstone with scattered pebbles; loose to moderately dense; damp				
10					BEDROCK?; TQs?, (11-14 ft.) @ 11' Light grayish-brown siltstone to slightly sandy siltstone; damp				
15					COMMENTS: -Lower portion of trench not entered due to loose conditions				
20									

TOTAL DEPTH: 14 feet ←N87E SCALE: 1 inch = 5 feet

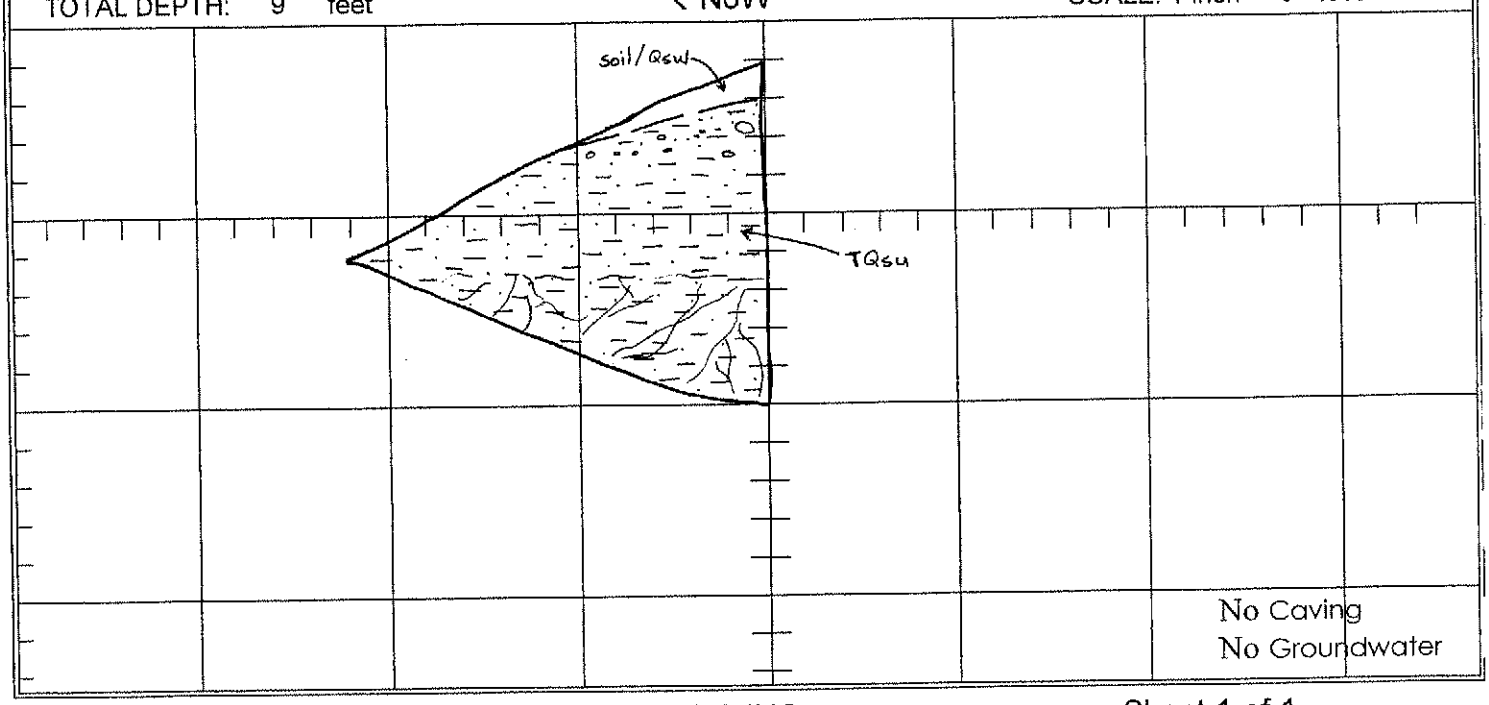


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 01-1703M-1	**TRENCH LOG**	
PROJECT: Mesas Entertainment	DATE: 7/22/04		
	LOGGED BY: DGG	**NO.** T-10M	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket			
ELEVATION: 1171	EXCAVATED: 5/16/01		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					SOIL/SLOPEWASH; Soil/Qsw, (0-1 ft.) @ 0' Grayish-brown silt to sandy silt; firm to stiff; dry to slightly damp BEDROCK; TQsu, (1-9 ft.) @ 1' Orangish-brown sandy siltstone to pebbly sandstone @ 2.5' Medium-brown siltstone; moderately dense; damp; and medium brownish-gray siltstone; dense; moderately fractured with caliche; damp	TQs - Massive			
5									
10									
15									
20									

TOTAL DEPTH: 9 feet ←N6W SCALE: 1 inch = 5 feet

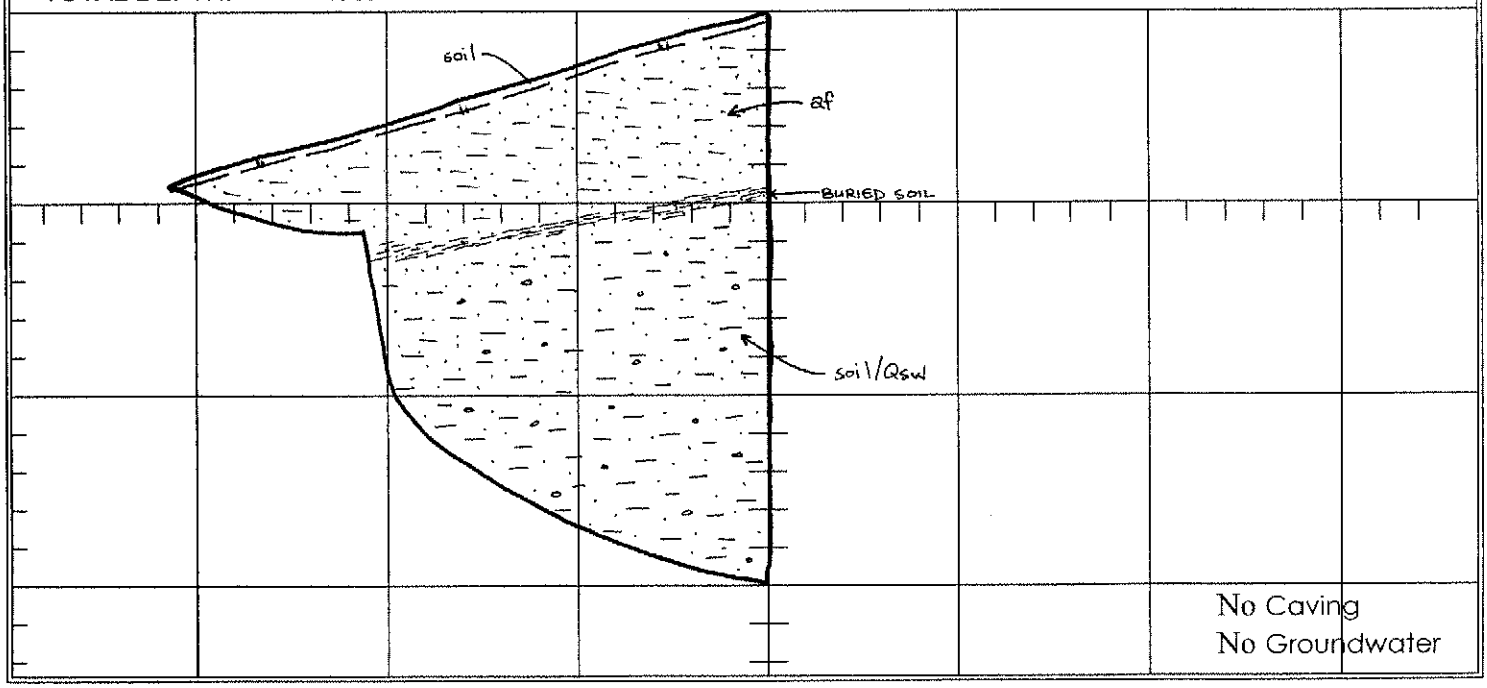


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 01-1703M-1	**TRENCH LOG**	
PROJECT: Mesas Entertainment	DATE: 7/22/04		
	LOGGED BY: DGG	**NO.** T-11M	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket			
ELEVATION: 1138	EXCAVATED: 5/16/01		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					SOIL; (0-0.25 ft.) @ 0' Grayish-brown silt; firm; dry ARTIFICIAL FILL; af, (0.25-4.5 ft.) @ 0.25' Grayish-brown siltstone; moderately dense; damp				
5					SOIL/SLOPEWASH?; Soil/Qsw?, (4.5-15 ft.) @ 4.5' Dark grayish-brown silt; firm; damp; pinhoe voids @ 5' Slightly orangish-brown siltstone to sandy siltstone with scattered pebbles; moderately dense; damp				
10									
15					COMMENTS: -Logged from surface -Buried soil layer @ 4.5 ft.				
20									

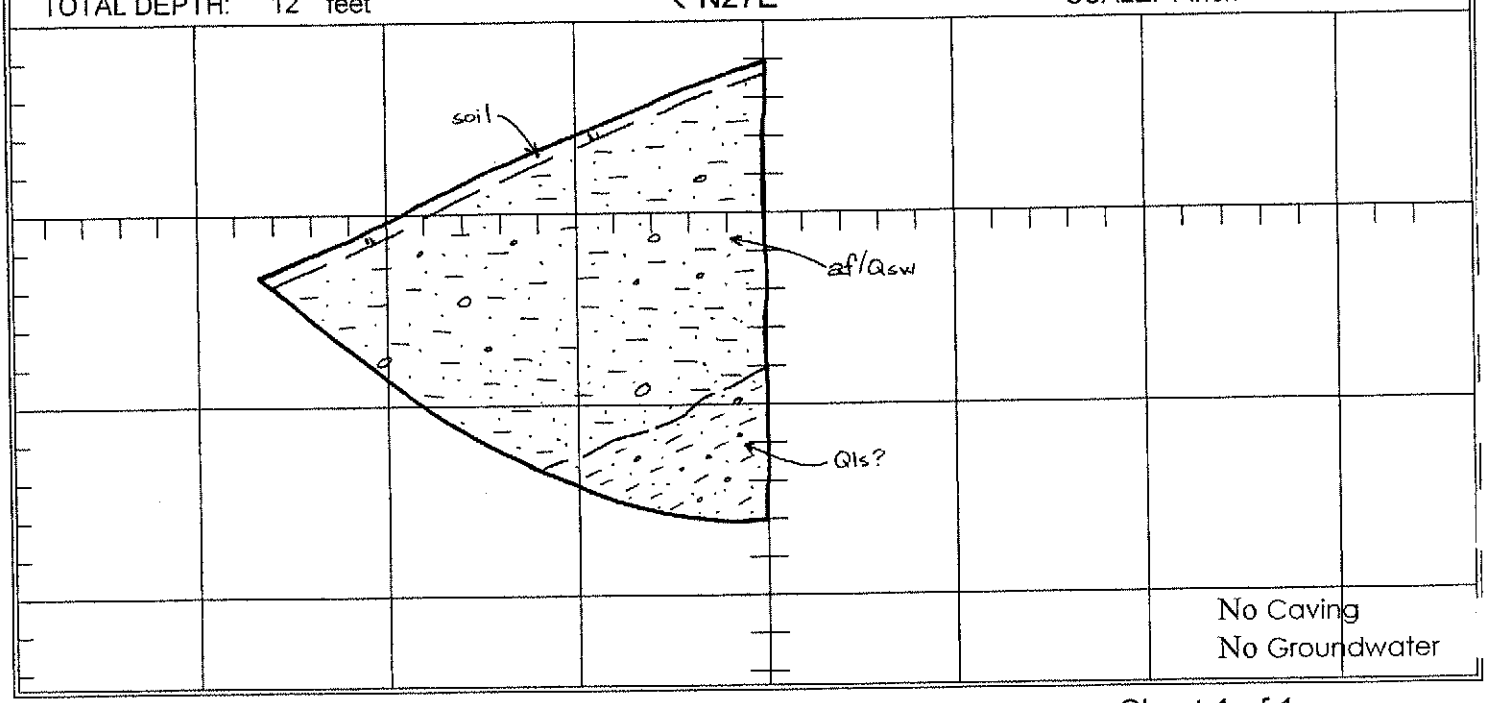
TOTAL DEPTH: 15 feet ←N10E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Co.	JOB NO: 01-1703M-1	**TRENCH LOG**	
PROJECT: Mesas Entertainment	DATE: 7/22/04		
	LOGGED BY: DGG	**NO.** T-12M	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket			
ELEVATION: 1153	EXCAVATED: 5/16/01		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					SOIL; (0-0.25 ft.) @ 0' Grayish-brown silt; firm; dry ARTIFICIAL FILL/SLOPEWASH; af/Qsw, (0.25-8 ft.) @ 0.25' Medium-brown silt to sandy silt with scattered pebbles and a few cobbles; fairly soft to hard at bottom; damp				
5									
					QUATERNARY LANDSLIDE?; Qls?, (8-12 ft.) @ 8' Yellowish-brown siltstone to sandy siltstone with scattered pebbles; moderately dense; damp; no bedding; appears slightly disturbed				
10									
15									
20									

TOTAL DEPTH: 12 feet ←N27E SCALE: 1 inch = 5 feet



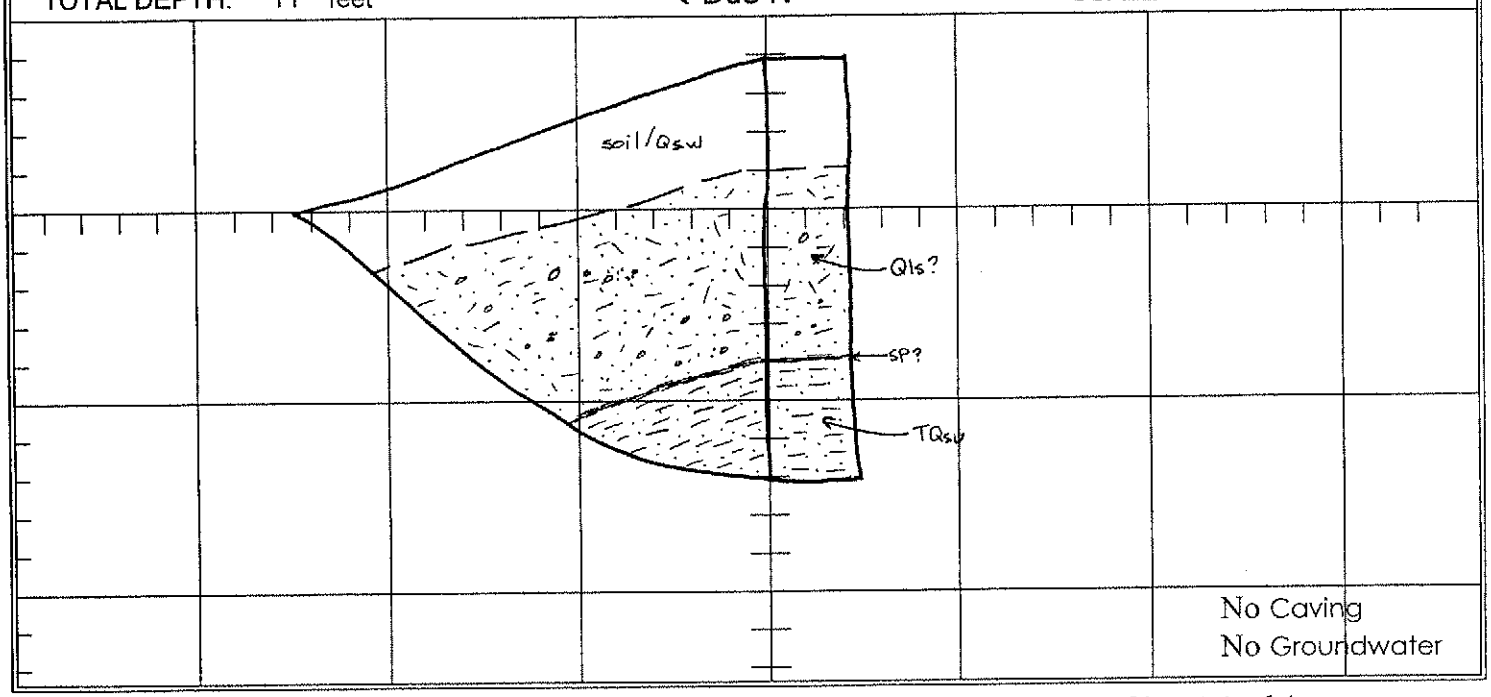
No Caving
No Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 01-1703M-1	**TRENCH LOG**	
PROJECT: Mesas Entertainment	DATE: 7/22/04		
	LOGGED BY: DGG	**NO.** T-13M	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket			
ELEVATION: 1255	EXCAVATED: 5/17/01		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					SOIL/SLOPEWASH; Soil/Qsw, (0-3 ft.) @ 0' Medium grayish-brown silt to sandy silt with scattered pebbles and a few cobbles; firm to stiff; dry to slightly damp				
					QUATERNARY LANDSLIDE?; Qls?, (3-8 ft.) @ 3' Light grayish-brown/browish-gray assemblage of siltstone; sandy siltstone and pebbly sandstone; loose to moderately dense; damp; punky; 1"-thick medium-brown clayey siltstone at base	SP?:N46W,18NE			
5					BEDROCK; TQsu, (8-11 ft.) @ 8' Light grayish-brown siltstone to sandy siltstone; moderately dense; damp				
10									
15									
20									

TOTAL DEPTH: 11 feet ←Due N SCALE: 1 inch = 5 feet

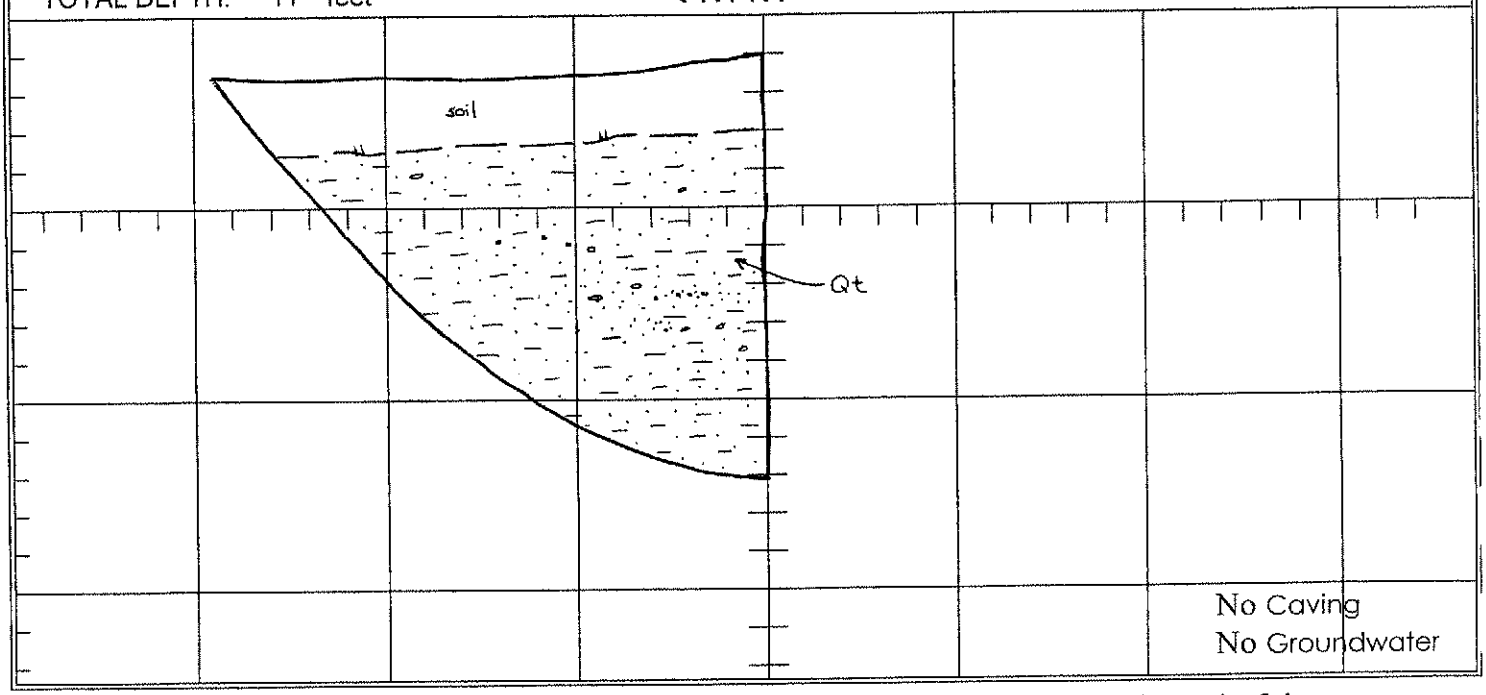


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 01-1703M-1	**TRENCH LOG**	
PROJECT: Mesas Entertainment	DATE: 7/22/04		
	LOGGED BY: DGG	**NO.** T-14M	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket			
ELEVATION: 1280	EXCAVATED: 5/17/01		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					SOIL; (0-2 ft.) @ 0' Medium- to dark grayish-brown silt to sandy silt with scattered pebbles; firm to stiff; damp QUATERNARY TERRACE DEPOSITS; Qt, (2-11 ft.) @ 2' Grayish-brown siltstone, sandy siltstone and pebbly sandstone and light yellowish-gray siltstone with scattered pebbles; moderately dense; damp; caliche surfaces; no laminations or distinct bedding COMMENTS: -Soil has vague columnar structure				
5									
10									
15									
20									

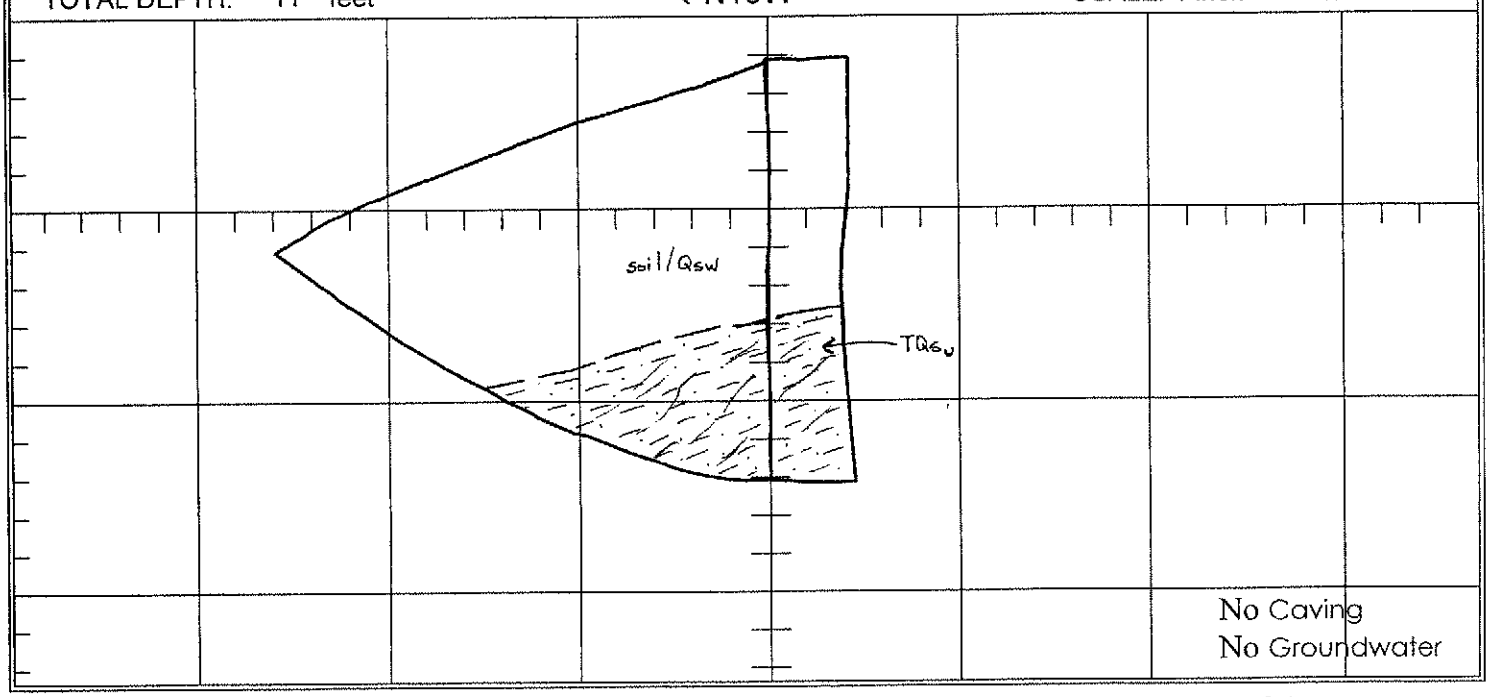
TOTAL DEPTH: 11 feet ←N14W SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Co.	JOB NO: 01-1703M-1	**TRENCH LOG**	
PROJECT: Mesas Entertainment	DATE: 7/22/04		
	LOGGED BY: DGG	**NO.** T-15M	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket			
ELEVATION: 1145	EXCAVATED: 5/17/01		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					SOIL/SLOPEWASH; Soil/Qsw, (0-7 ft.) @ 0' Medium- to yellowish-brown silt to sandy silt with some scattered pebbles; soft to firm; damp; bottom 2 ft. fractured with caliche				
5					BEDROCK; TQsu, (7-11 ft.) @ 7' Medium grayish-brown siltstone; moderately dense; damp; moderately fractured with caliche linings	Apx.B:N47W,31NE			
10					COMMENTS: -From 2-7' material appears disturbed - some fractures; caliche surfaces; Possible Qls?				
15									
20									

TOTAL DEPTH: 11 feet ←N13W SCALE: 1 inch = 5 feet



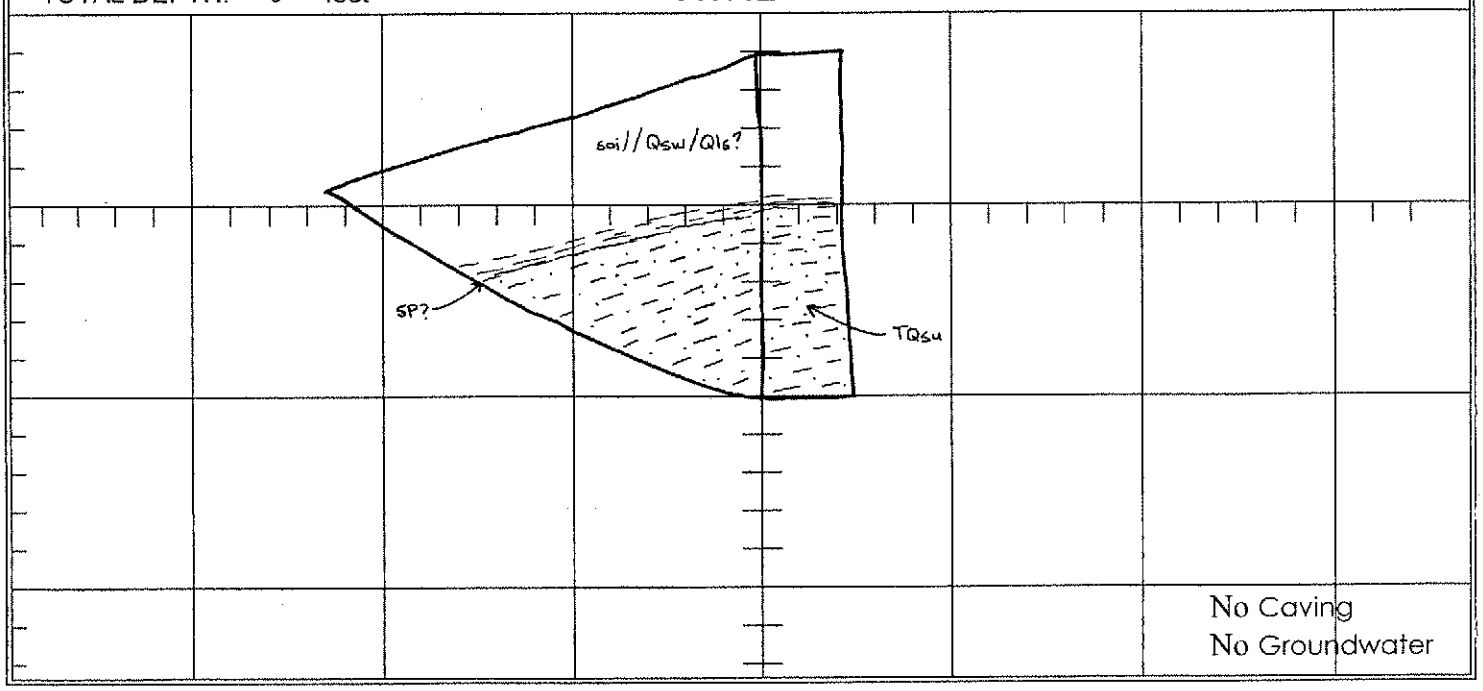
No Caving
No Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 01-1703M-1	**TRENCH LOG**	
PROJECT: Mesas Entertainment	DATE: 7/22/04		
	LOGGED BY: DGG	**NO.** T-16M	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket			
ELEVATION: 1233	EXCAVATED: 5/17/01		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					SOIL/SLOPEWASH/QUATERNARY LANDSLIDE?; Soil/ Qsw/Qls?, (0-4 ft.) @ 0' Yellowish-brown to yellowish-gray silt to sandy silt with scattered pebbles; loose to moderately dense; damp; 2 to 3"-thick layer of medium gray clayey siltstone at base	SP?:N26W,15NE			
5					BEDROCK; TQsu, (4-9 ft.) @ 4' Medium to dark grayish-brown siltstone; moderately dense to dense; damp; some fracturing with caliche				
10					COMMENTS: -@ 4' SP?				
15									
20									

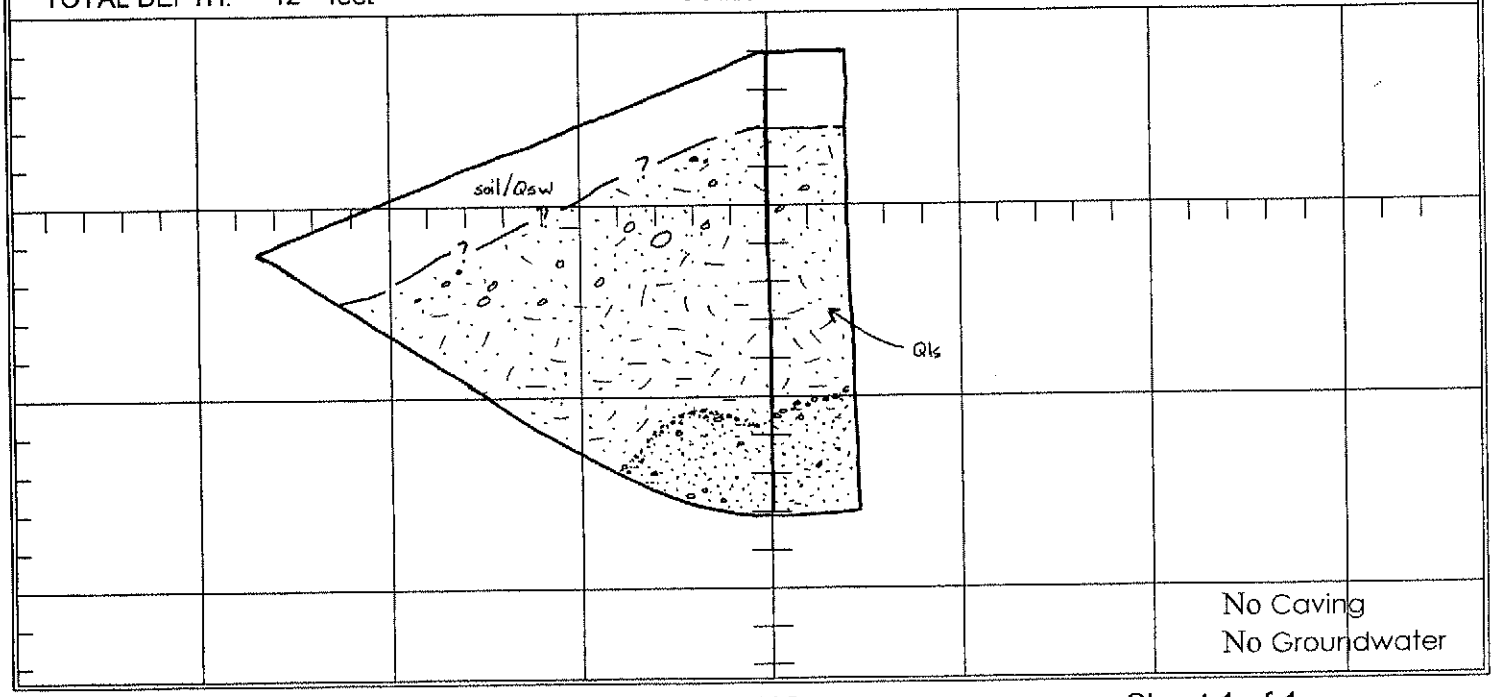
TOTAL DEPTH: 9 feet ←N14E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Co.	JOB NO: 01-1703M-1	**TRENCH LOG**	
PROJECT: Mesas Entertainment	DATE: 7/22/04		
	LOGGED BY: DGG	**NO.** T-17M	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket			
ELEVATION: 1317	EXCAVATED: 5/17/01		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					SOIL/SLOPEWASH; Soil/Qsw, (0-2 ft.) @ 0' Grayish-brown silt to sandy silt; firm to stiff; dry to slightly damp QUATERNARY LANDSLIDE; Qls, (2-12 ft.) @ 2' Yellowish- to grayish-brown siltstone to sandy siltstone with some scattered pebbles and cobbles in upper 3-4 ft. and medium brownish-gray to gray fine- to coarse-grained pebbly sandstone (bottom 3 ft.); siltstone is moderately dense; damp; sandstone is loose (friable); damp; some fracturing with caliche surfaces in siltstone				
5									
10									
15									
20									

TOTAL DEPTH: 12 feet ←N23E SCALE: 1 inch = 5 feet

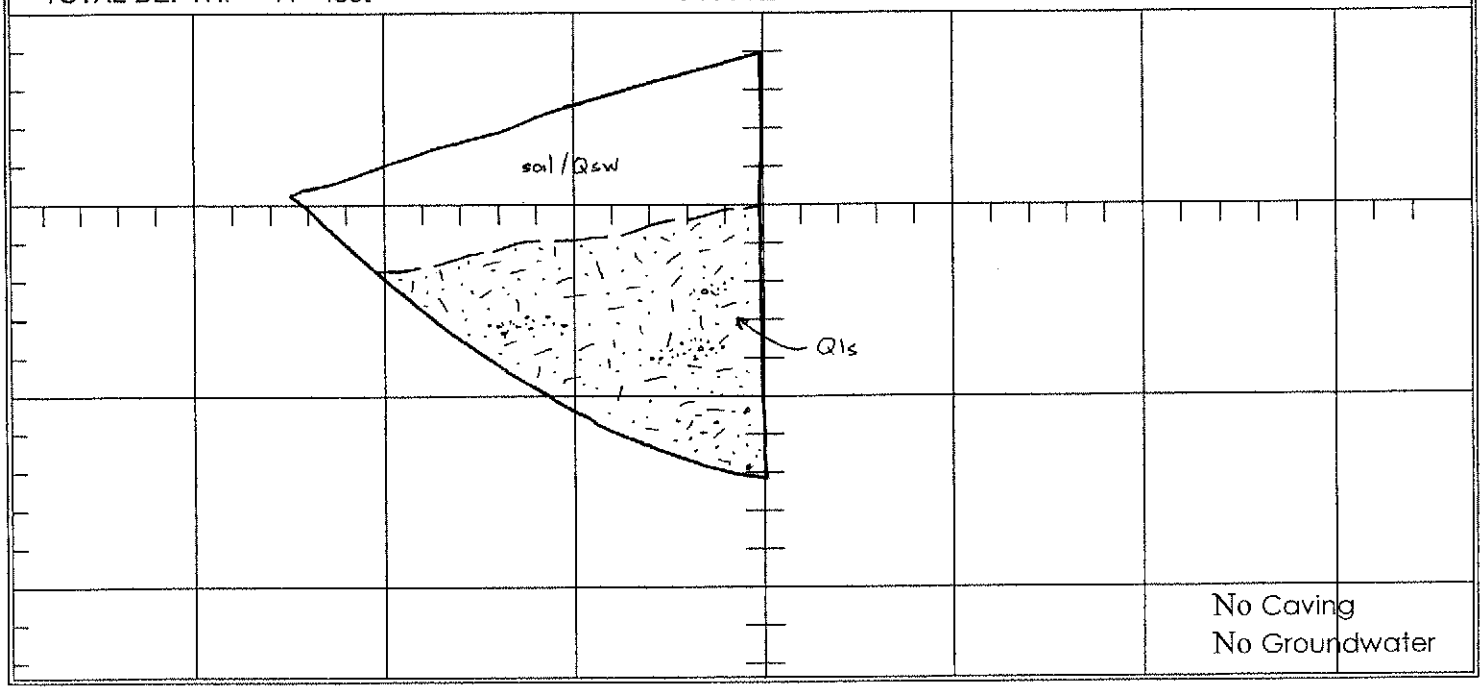


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 01-1703M-1	**TRENCH LOG**	
PROJECT: Mesas Entertainment	DATE: 7/22/04		
	LOGGED BY: DGG	**NO.** T-18M	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket			
ELEVATION: 1364	EXCAVATED: 5/17/01		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					SOIL/SLOPEWASH; Soil/Qsw, (0-4 ft.) @ 0' Medium grayish-brown silt to sandy silt; firm to stiff; dry to slightly damp				
5					QUATERNARY LANDSLIDE; Qls, (4-11 ft.) @ 4' Chaotic assemblage of grayish-brown to olive-gray siltstone, sandy siltstone and pebbly sandstone; loose to moderately dense; damp; locally punky				
10									
15									
20									

TOTAL DEPTH: 11 feet ←N44E SCALE: 1 inch = 5 feet

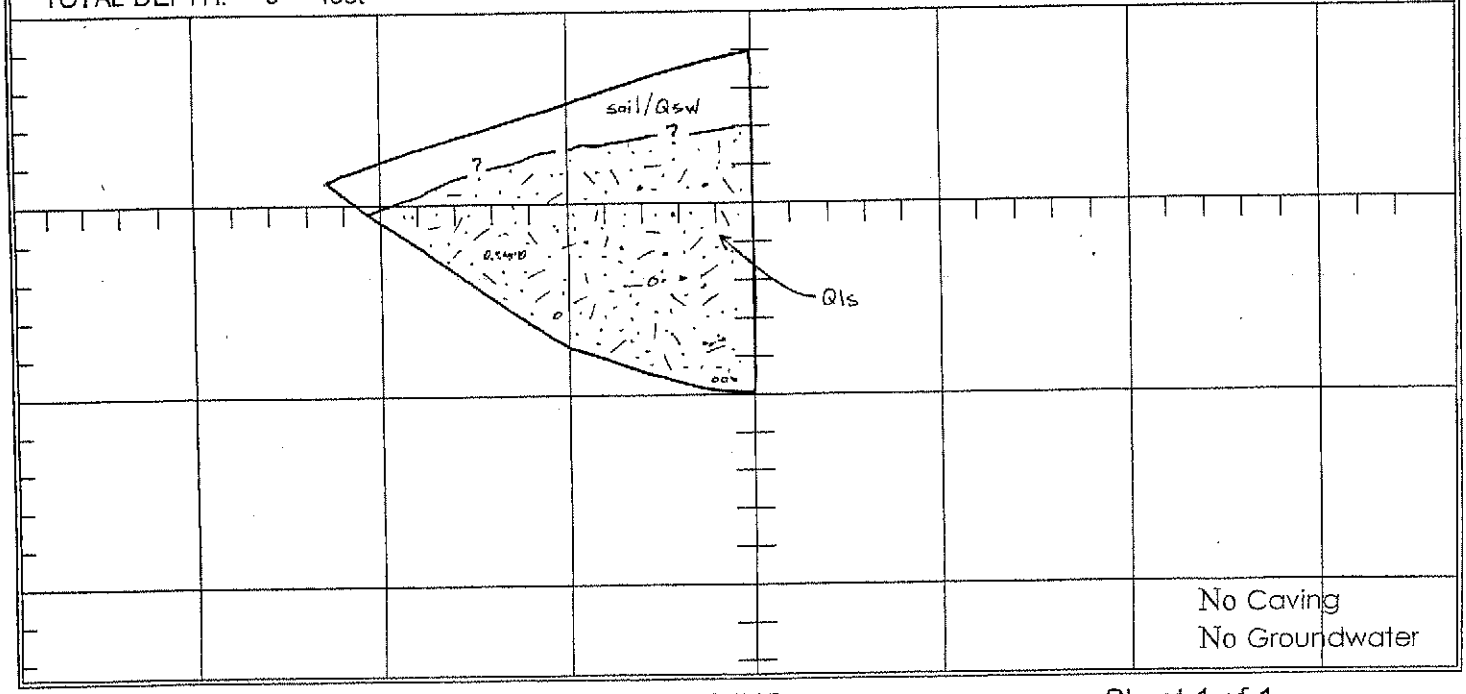


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 01-1703M-1	**TRENCH LOG**	
PROJECT: Mesas Entertainment	DATE: 7/22/04		
	LOGGED BY: DGG	**NO.** T-19M	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket			
ELEVATION: 1320	EXCAVATED: 5/17/01		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					SOIL/SLOPEWASH; Soil/Qsw, (0-2 ft.) @ 0' Medium grayish-brown silt to sandy silt; firm to stiff; dry to slightly damp QUATERNARY LANDSLIDE; Qls, (2-9 ft.) @ 2' Chaotic assemblage of medium grayish-brown to gray siltstone, sandy siltstone with scattered pebbles, and pebbly sandstone; moderately dense; damp; sandstone is friable				
5									
10									
15									
20									

TOTAL DEPTH: 9 feet ←N22E SCALE: 1 inch = 5 feet



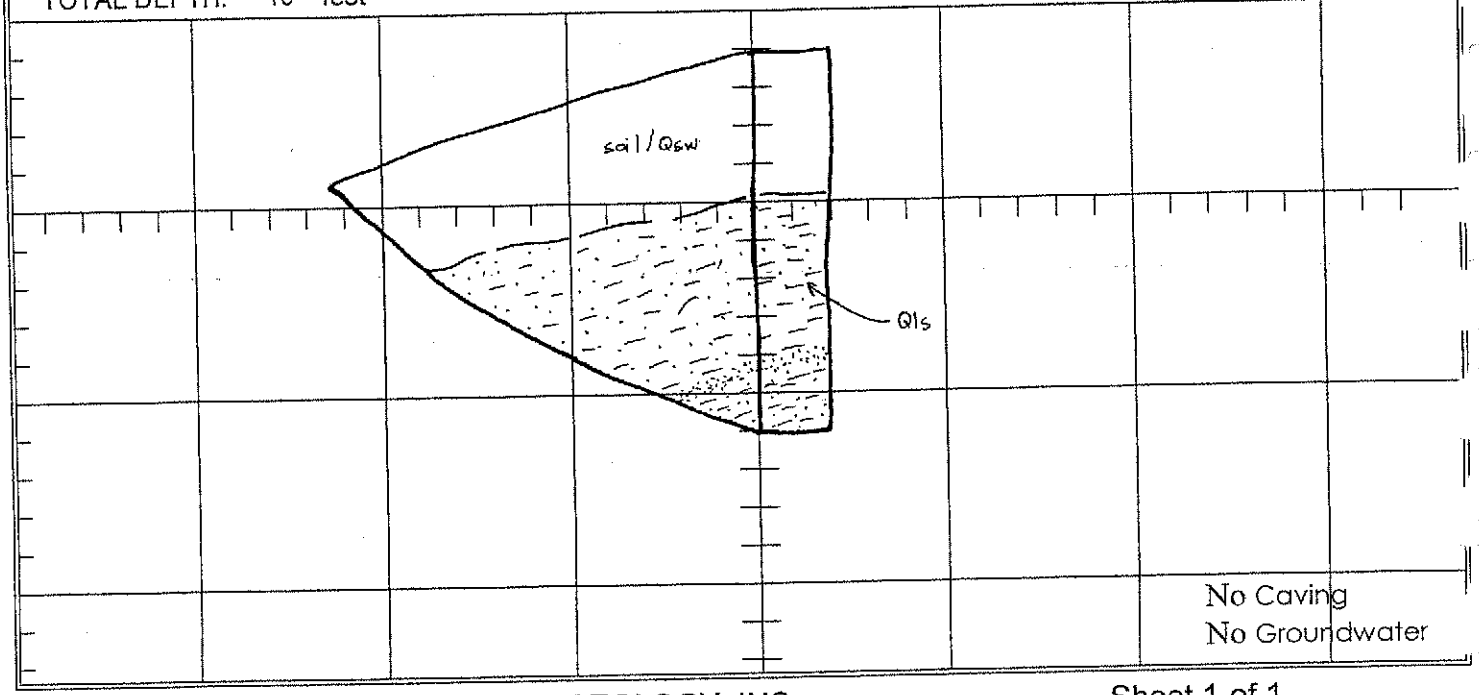
No Caving
No Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 01-1703M-1	**TRENCH LOG**	
PROJECT: Mesas Entertainment	DATE: 7/22/04		
	LOGGED BY: DGG	**NO.** T-20M	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket			
ELEVATION: 1263	EXCAVATED: 5/17/01		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					SOIL/SLOPEWASH; Soil/Qsw, (0-4 ft.) @ 0' Medium grayish-brown silt and sandy silt with scattered pebbles and cobbles; firm to stiff; dry to slightly damp				
5					QUATERNARY LANDSLIDE; Qls, (4-10 ft.) @ 4' Olive-gray to brownish-gray siltstone, sandy siltstone and fine- to medium-grained sandstone; moderately dense; sandstone friable; damp	Apx.B:N29W,15NE			
10					COMMENTS: -Bottom 1' relatively tighter -Possible TQs? -Qls material not as chaotic as in previous trenches				
15									
20									

TOTAL DEPTH: 10 feet ←N3W SCALE: 1 inch = 5 feet



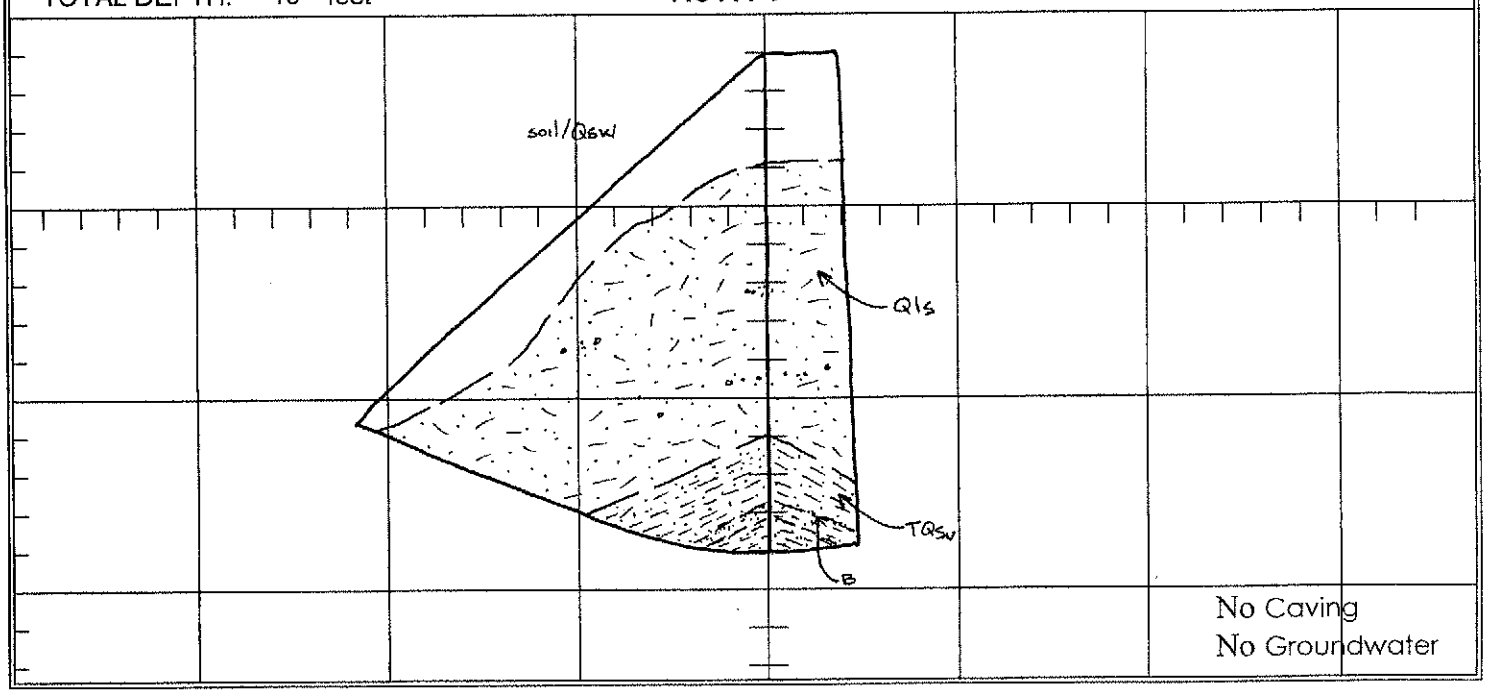
No Caving
No Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 01-1703M-1	**TRENCH LOG**	
PROJECT: Mesas Entertainment	DATE: 7/22/04		
	LOGGED BY: DGG	**NO.** T-21M	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket			
ELEVATION: 1198	EXCAVATED: 5/17/01		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					SOIL/SLOPEWASH; Soil/Qsw, (0-3 ft.) @ 0' Medium grayish-brown silt to sandy silt with scattered pebbles; firm to stiff; dry to slightly damp				
					QUATERNARY LANDSLIDE; Qls, (3-10 ft.) @ 3' Chaotic assemblage of light-gray to olive-gray to dark orange-brown (Fe02?) siltstone, sandy siltstone and fine- to medium-grained sandstone; loose to moderately dense; damp; punky; caliche surfaces				
5									
10					BEDROCK; TQsu, (10-13 ft.) @ 10' Medium-brown to olive-gray siltstone; moderately dense to dense; damp	B:N46W,12NE			
15									
20									

TOTAL DEPTH: 13 feet N81W→ SCALE: 1 inch = 5 feet

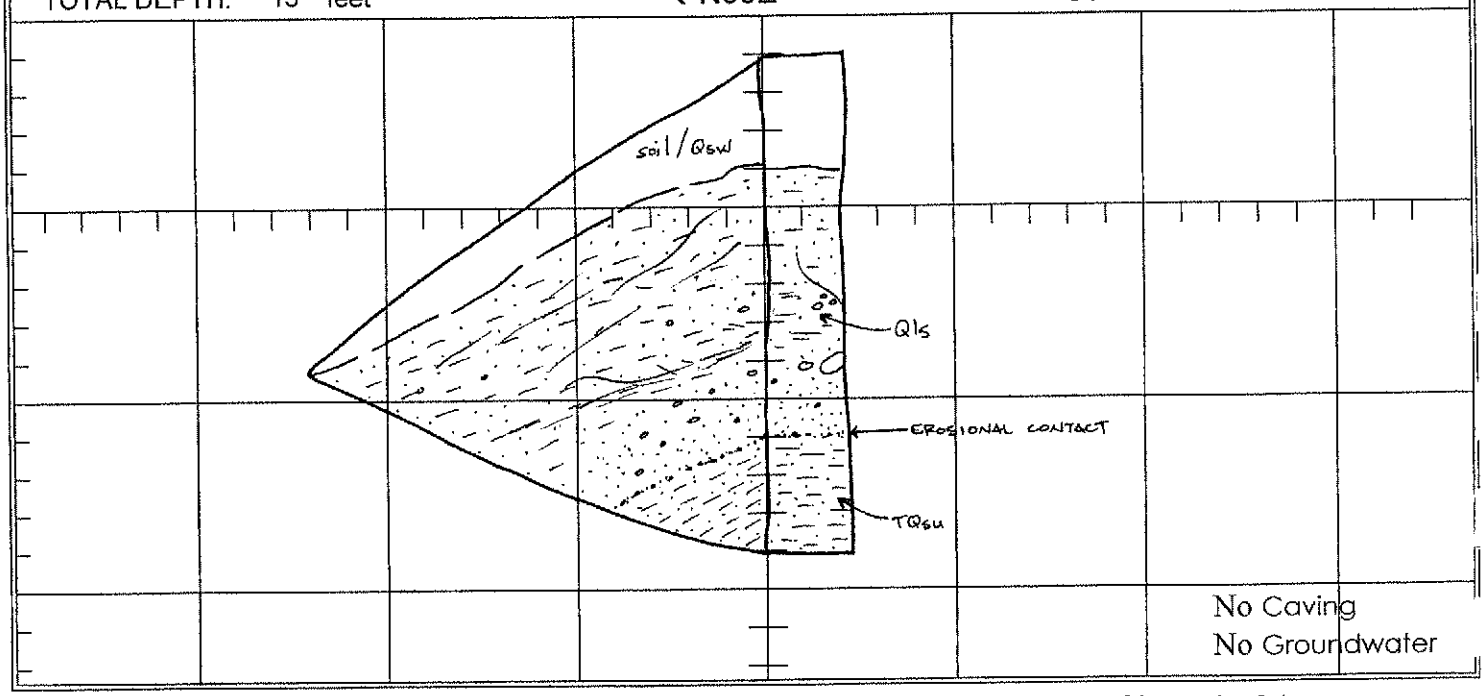


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 01-1703M-1	**TRENCH LOG**	
PROJECT: Mesas Entertainment	DATE: 7/22/04		
	LOGGED BY: DGG	**NO.** T-22M	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket			
ELEVATION: 1181	EXCAVATED: 5/17/01		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					SOIL/SLOPEWASH; Soil/Qsw, (0-3 ft.) @ 0' Medium- to dark grayish-brown silt to sandy silt with scattered pebbles; firm to stiff; dry to damp				
					QUATERNARY LANDSLIDE; Qls, (3-10 ft.) @ 3' Medium- to yellowish-brown to light-gray siltstone, sandy siltstone and pebbly sandstone with few scattered cobbles; loose to moderately dense; damp; sandstone friable; punky				
5									
10					BEDROCK; TQsu, (10-13 ft.) @ 10' Light to medium grayish-brown siltstone to sandy siltstone; moderately dense to dense; damp	Erosional contact: N35W,30NE			
					COMMENTS: -Qls material is stratified but disrupted				
15									
20									

TOTAL DEPTH: 13 feet ←N66E SCALE: 1 inch = 5 feet

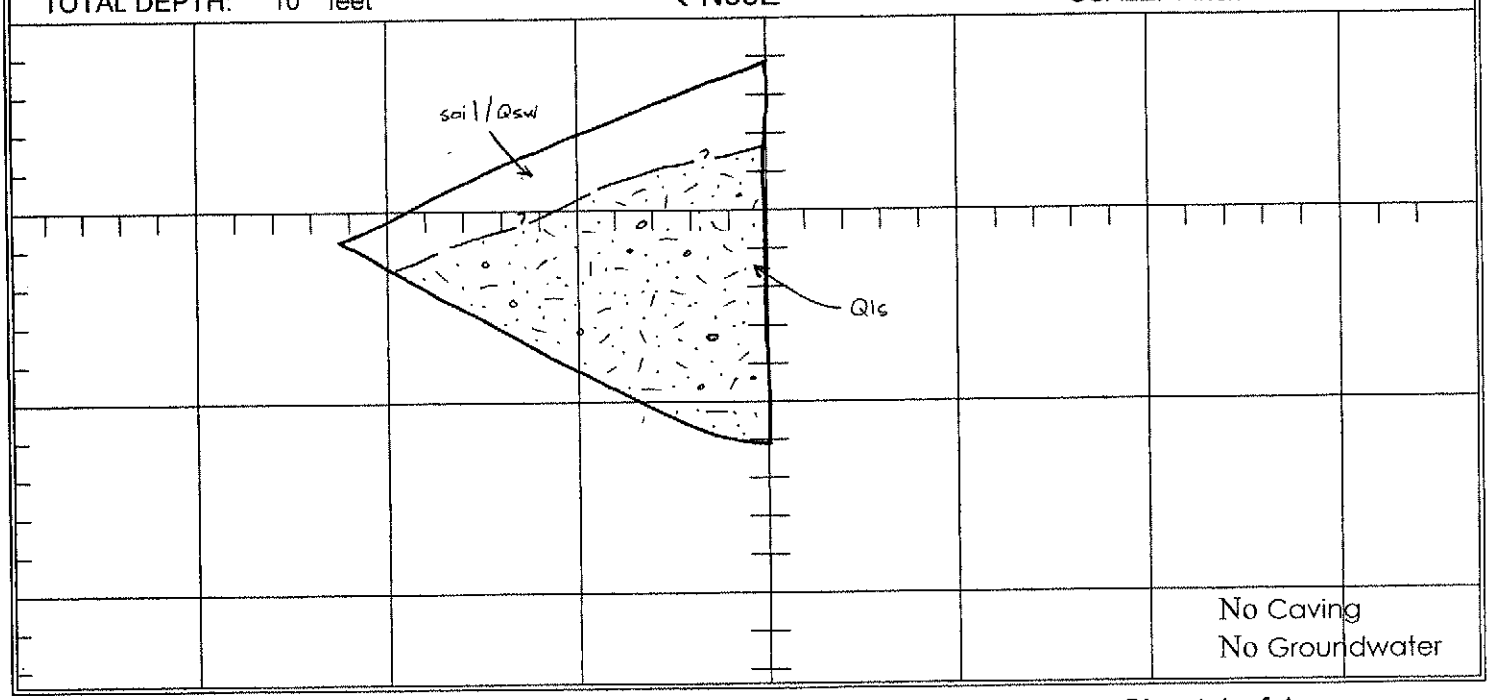


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 01-1703M-1	**TRENCH LOG**	
PROJECT: Mesas Entertainment	DATE: 7/22/04		
	LOGGED BY: DGG	**NO.** T-23M	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket			
ELEVATION: 1250	EXCAVATED: 5/17/01		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					SOIL/SLOPEWASH; Soil/Qsw, (0-2.5 ft.) @ 0' Medium grayish-brown silt to sandy silt with scattered pebbles; firm to stiff; dry to slightly damp QUATERNARY LANDSLIDE; Qls, (2.5-10 ft.) @ 2.5' Chaotic assemblage of medium to grayish-brown siltstone, sandy siltstone and pebbly sandstone with scattered cobbles; loose to moderately dense; damp; abundant caliche				
5									
10									
15									
20									

TOTAL DEPTH: 10 feet ←N88E SCALE: 1 inch = 5 feet

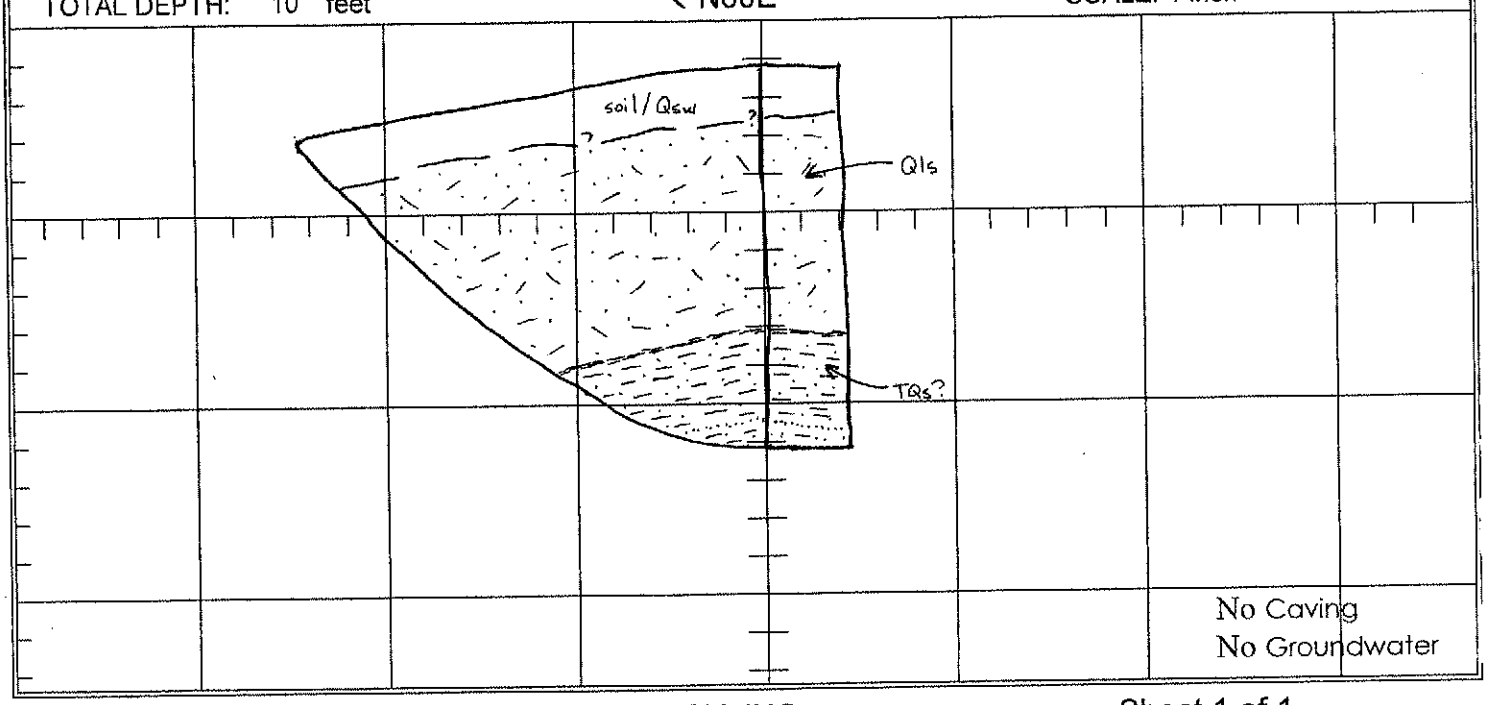


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 01-1703M-1	**TRENCH LOG**	
PROJECT: Mesas Entertainment	DATE: 7/22/04		
	LOGGED BY: DGG	**NO.** T-24M	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket			
ELEVATION: 1167	EXCAVATED: 5/17/01		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					SOIL/SLOPEWASH; Soil/Qsw, (0-1.5 ft.) @ 0' Light grayish-brown silt to sandy silt; firm to stiff; dry to slightly damp QUATERNARY LANDSLIDE; Qls, (1.5-7 ft.) @ 1.5' Chaotic assemblage of TQs lithologies; loose to moderately dense; damp; caliche surfaces				
5									
					BEDROCK?; TQs?, (7-10 ft.) @ 7' Medium to light grayish-brown siltstone, sandy siltstone and fine- to medium-grained sandstone; moderately dense to dense; damp	B/SP?:N33W,14NE			
10									
15									
20									

TOTAL DEPTH: 10 feet ←N60E SCALE: 1 inch = 5 feet

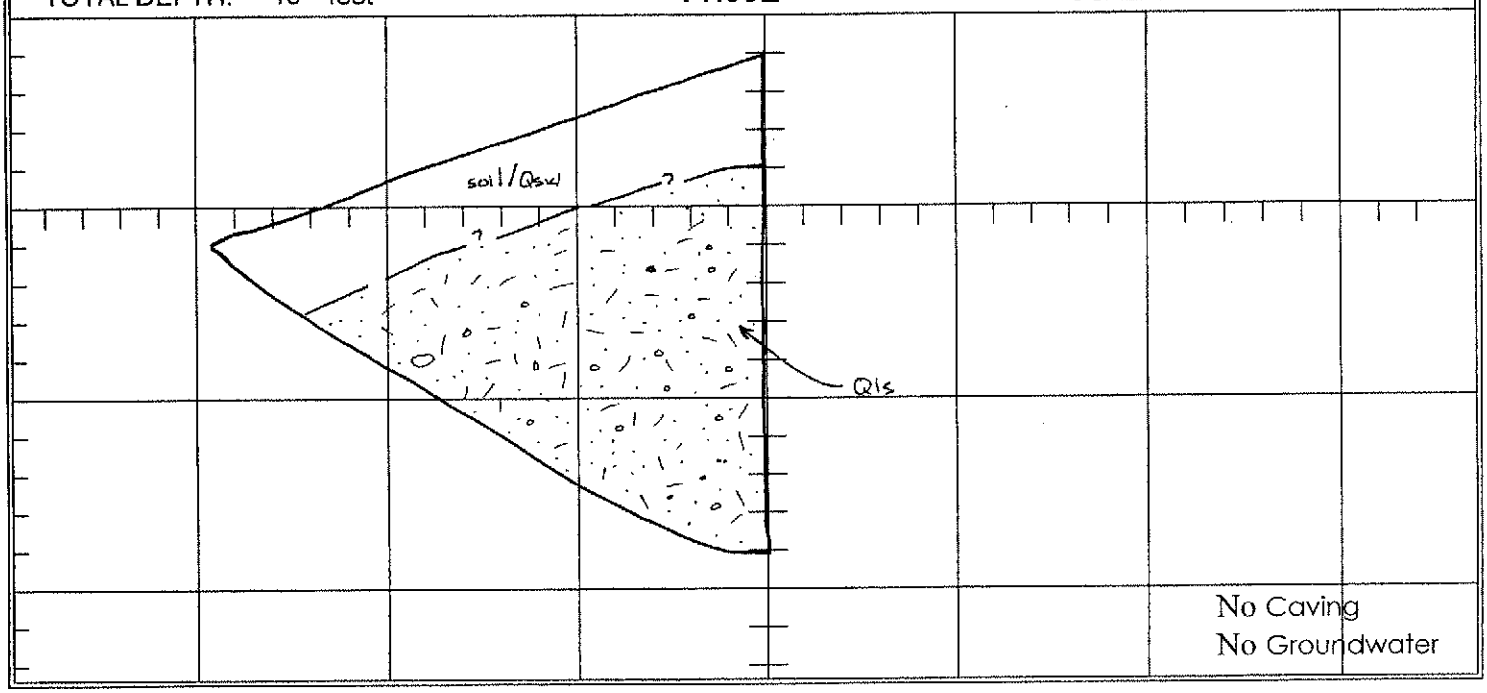


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 01-1703M-1	**TRENCH LOG**	
PROJECT: Mesas Entertainment	DATE: 7/22/04		
	LOGGED BY: DGG	**NO.** T-25M	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket			
ELEVATION: 1234	EXCAVATED: 5/17/01		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					SOIL/SLOPEWASH; Soil/Qsw, (0-3 ft.) @ 0' Medium grayish-brown silt to sandy silt; firm to stiff; dry to slightly damp QUATERNARY LANDSLIDE; Qls, (3-13 ft.) @ 3' Medium to grayish-brown siltstone to sandy siltstone with scattered pebbles and cobbles; loose to moderately dense; damp; grades sandier with depth; structureless				
5									
10									
15									
20									

TOTAL DEPTH: 13 feet ←N65E SCALE: 1 inch = 5 feet

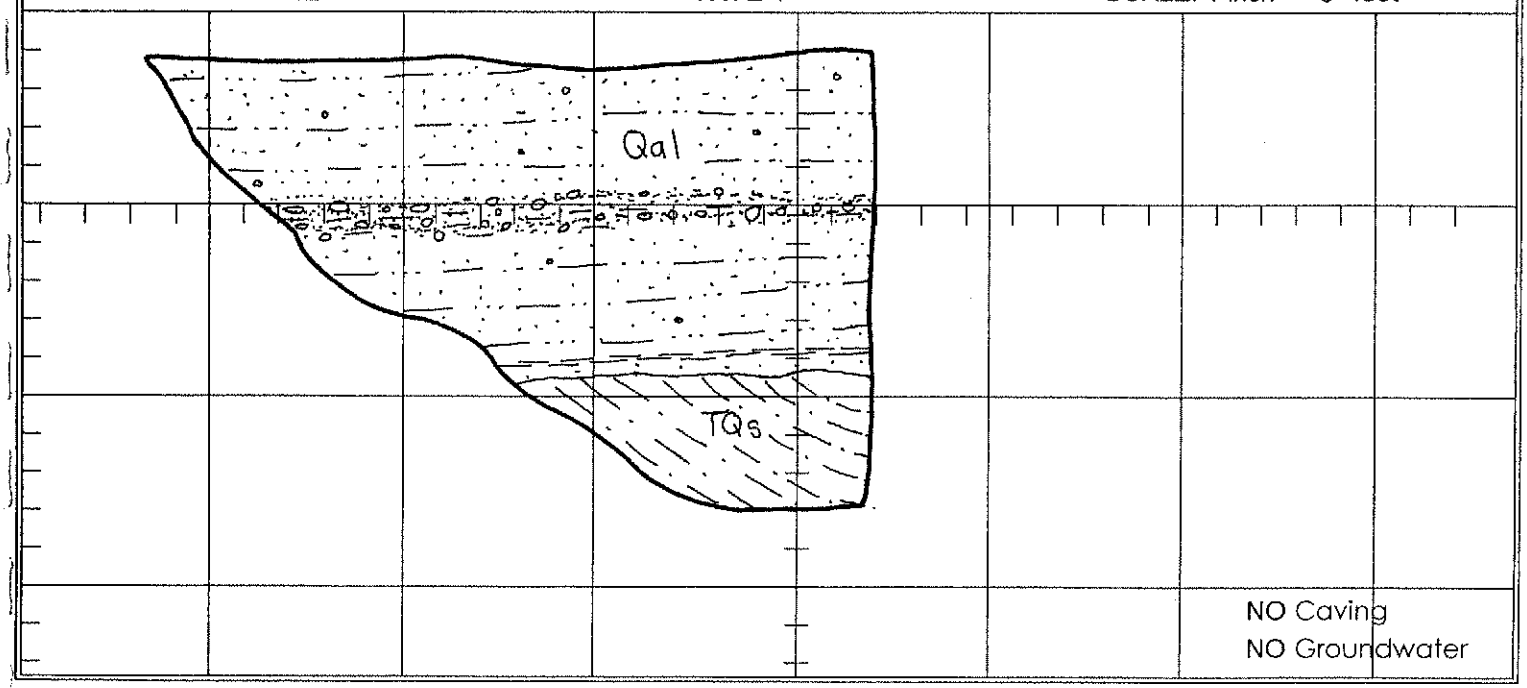


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-1T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/16/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1278		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**QUATERNARY ALLUVIUM; Qal (0-7')** @ 0' Interbedded silty clayey sand with gravel and pebbly, cobbly silty sand; firm to stiff; damp to moist; brown to light brown; voids to ~6'	B:Horizontal			
5									
					BEDROCK; TQs (7-12') @ 7' Brown silty mudstone; moderately hard to hard; moist; highly weathered to 9'	B/Fr.N41W,48NE			
10									
15									
20									

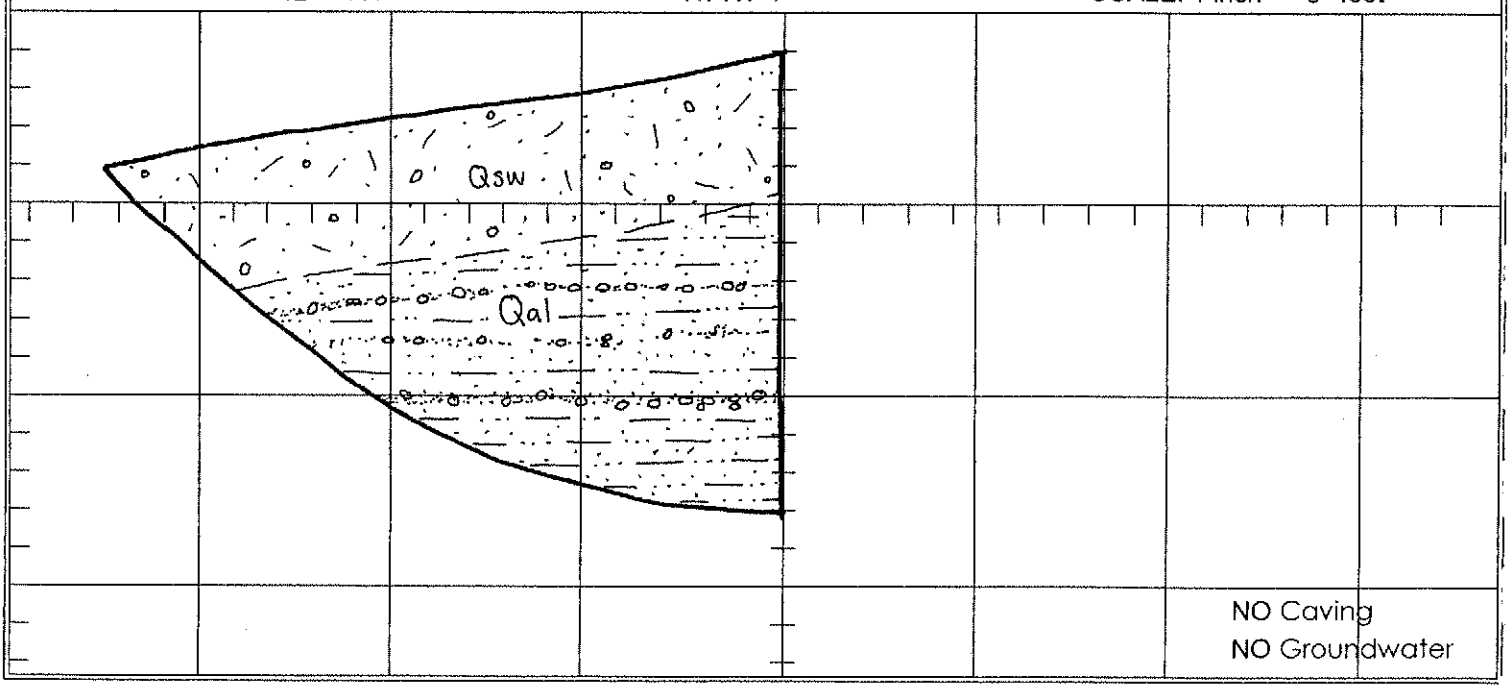
TOTAL DEPTH: 12 feet N47E→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-2T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/16/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1279		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL	**SOIL/SLOPEWASH; soil/Qsw (0-4')** @ 0' Silty clay; stiff; dry to damp; grayish- to medium-brown; abundant rootless				
5				CL-ML SM	**QUATERNARY ALLUVIUM; Qal (4-12')** @ 4' Silty clay to clayey silt interbedded with silty sand with gravel and cobbles; clay/silt is firm to stiff; silty sand is medium dense and slightly friable; damp; grayish- to yellowish-brown; voids to 12' decreasing in size from ~1/8" to pinhole with depth	~Horizontal			
10									
15									
20									

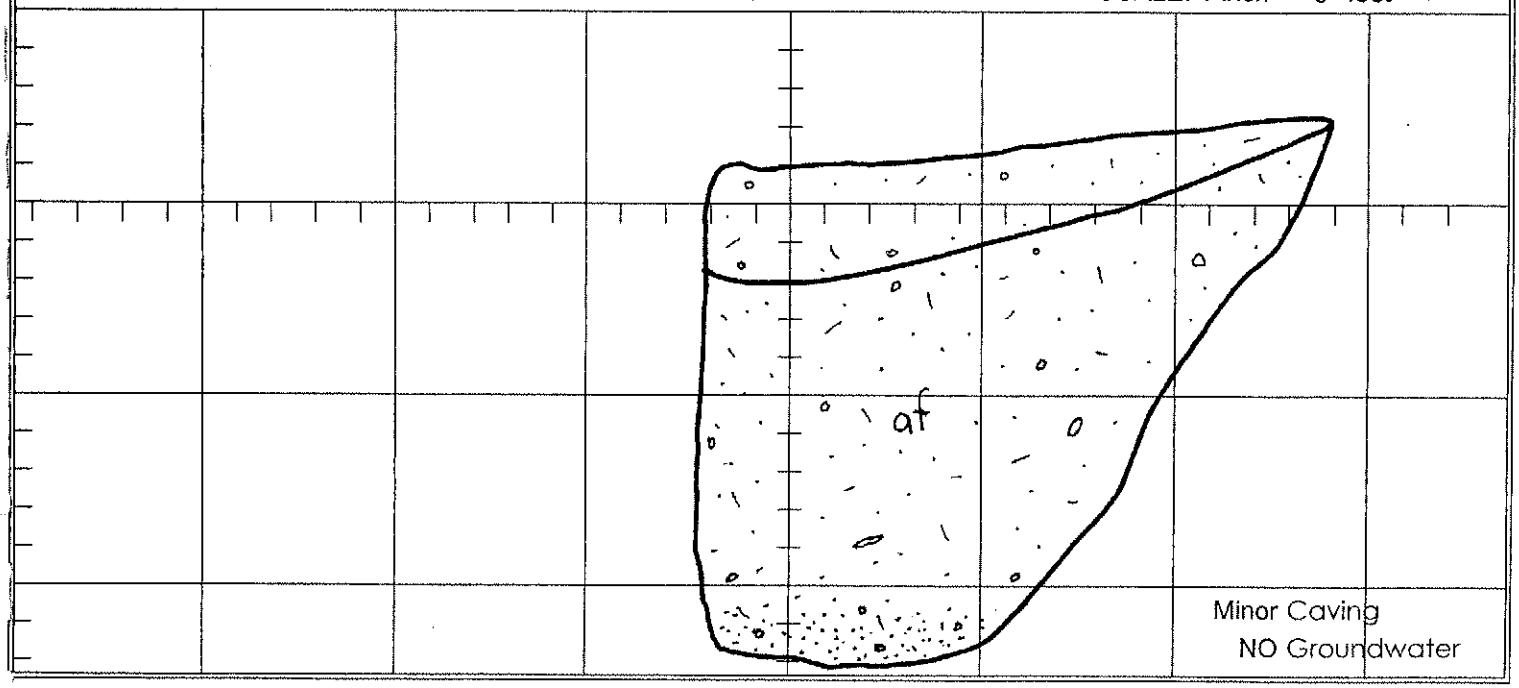
TOTAL DEPTH: 12 feet N71W→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-3T**	
PROJECT: Mesas East	DATE: 7/12/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/16/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1254		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**ARTIFICIAL FILL; af (0-13')** Silty clay with sand and gravel; soft; dry; brown; excavation was widened 2' both sides from 0-3'; minor caving				
					@ 4' Soft; moist to wet; brown to dark brown				
5									
					@ 7.5' Bottom and sides soft; 1" diameter cable				
10					@ 10' Broken roots and branches				
					@ 11' Silty clay with sand and gravel; loose; moist; yellowish-brown				
15									
20									

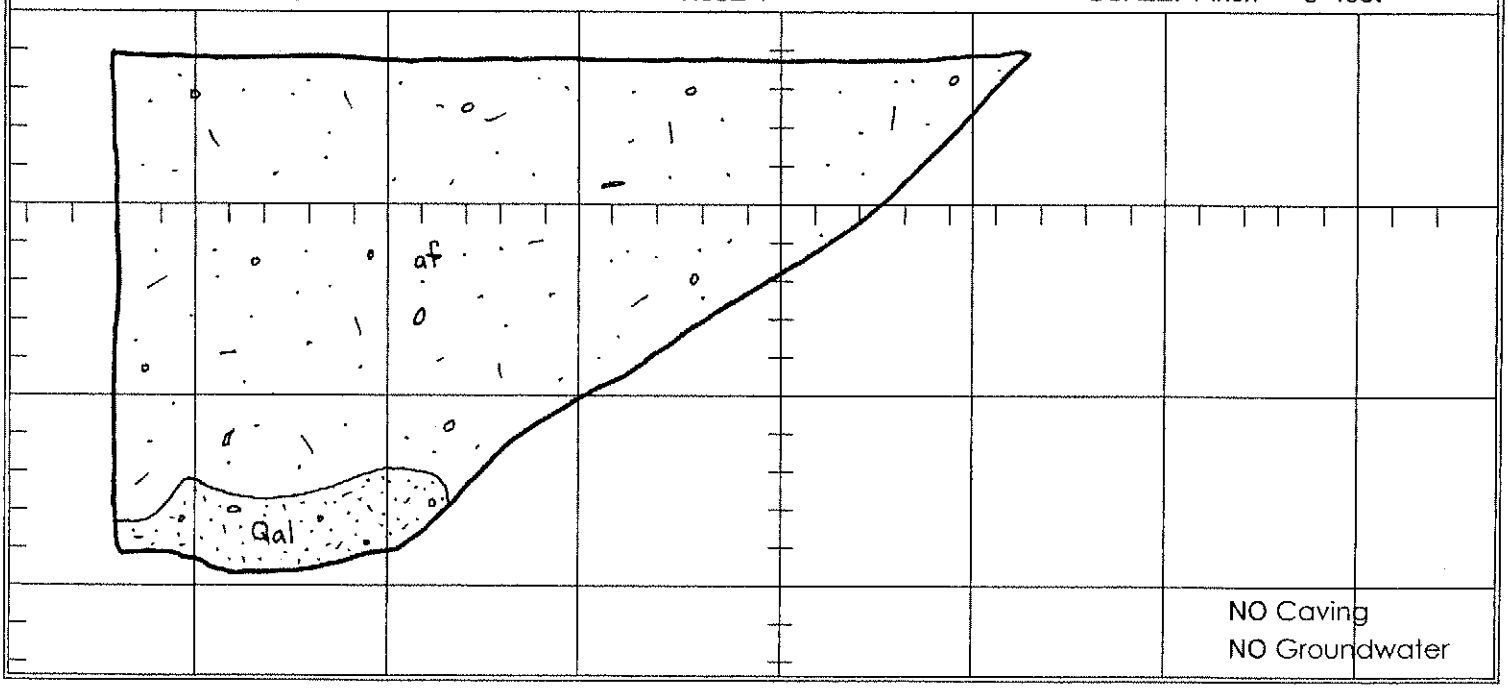
TOTAL DEPTH: 13 feet N62E→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-4T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/16/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1294		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/ARTIFICIAL FILL; Soil/af (0-11')** @ 0' Sandy silty clay with gravel; soft; moist; brown to dark brown; scattered cobbles				
5									
10				CL-ML	**QUATERNARY ALLUVIUM; Qal (11-13')** @ 11' Sandy silty clay with gravel; soft to firm; damp to moist; pinhole voids				
15									
20									

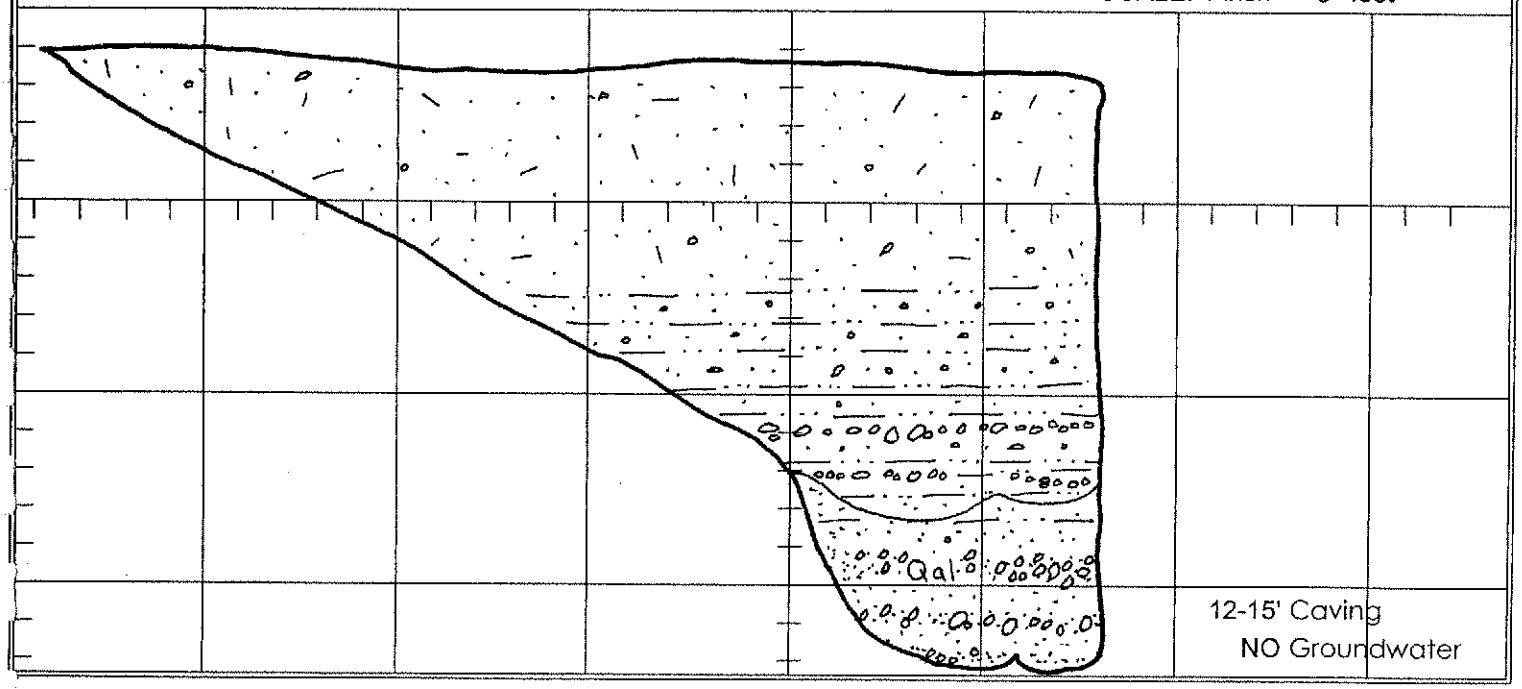
TOTAL DEPTH: 13 feet N68E→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-5T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/16/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1215		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL; (0-9')** @ 0' Silty clayey sand with gravel; medium dense; dry; brown to light brown; voids ≤1/2" diameter; roots, rootlets @ 2' Damp to moist; brown; voids ≤1/4" diameter, roots, rootlets				
5									
10				SP-SC	**QUATERNARY ALLUVIUM; Qal (9-15')** @ 9' Interbedded coarse-grained sand with gravel and cobbles; loose; dry to damp; yellowish-brown to yellowish-gray @ 12' Coarse-grained sand with gravel and cobbles; dense; damp; yellowish-gray to light gray	Apx. B:Horizontal			
15									
20									

TOTAL DEPTH: 15 feet ←N4W SCALE: 1 inch = 5 feet

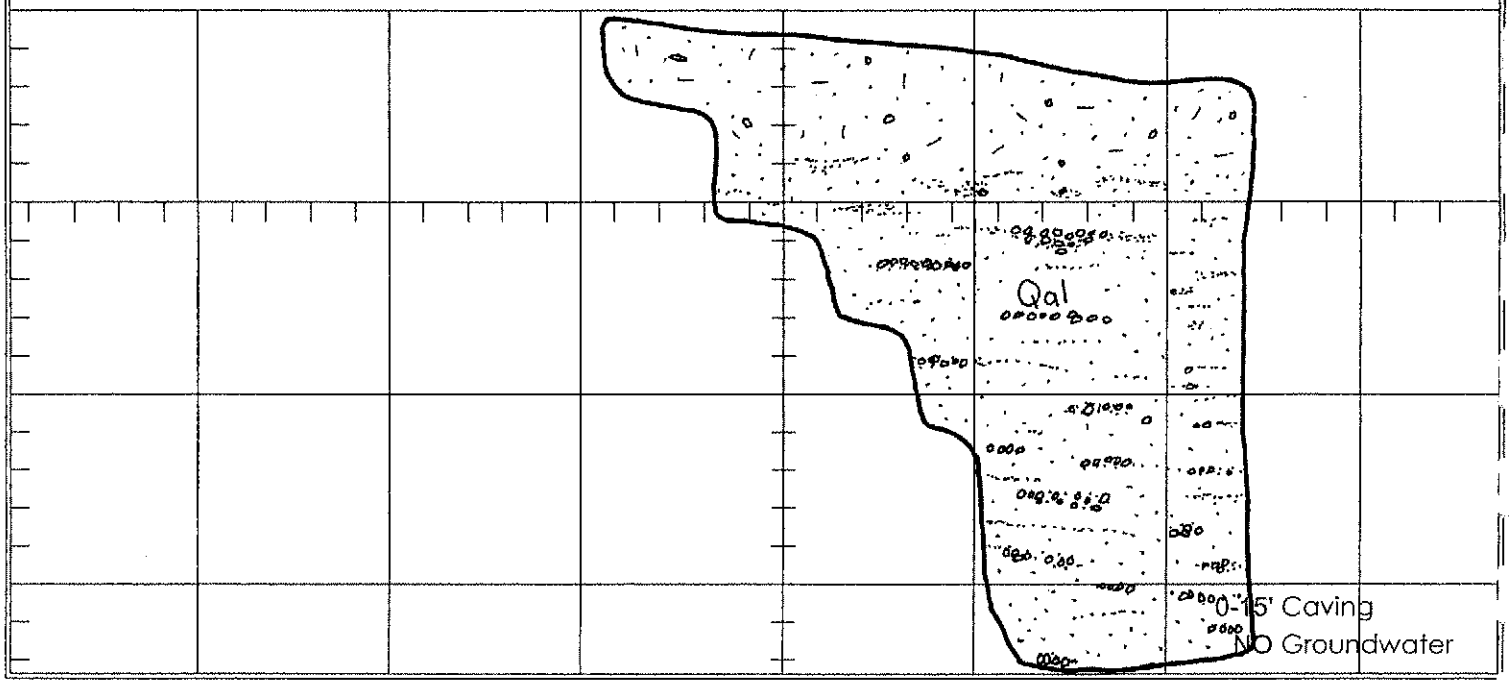


12-15' Caving
NO Groundwater

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-6T**
PROJECT: Mesas East	DATE: 7/22/04	
	LOGGED BY: MAS	
	EXCAVATED: 10/16/03	
EXCAVATION METHOD:	ELEVATION: 1191	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL;(0-3')** @ 0' Sandy silty clay with gravel; firm; dry ; brown; pinhole voids; roots, rootlets				
				SM	**QUATERNARY ALLUVIUM; Qal (3-15')** @ 3' Silty sand with gravel and cobbles; dense; dry to damp; yellowish-gray; small scours/channels, lenses; local cross bedding	Apx. B:Horizontal			
5									
10									
15					COMMENTS: Surface logged				
20									

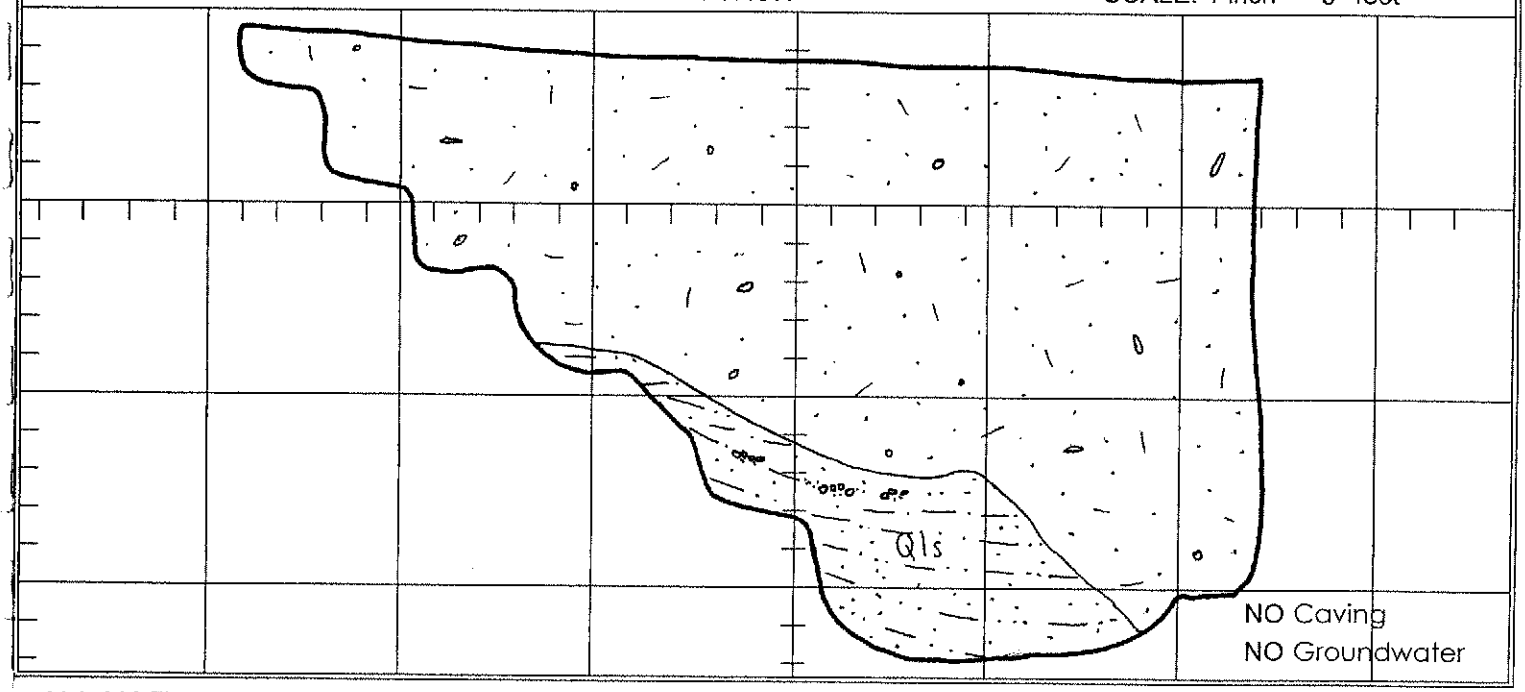
TOTAL DEPTH: 15 feet N77E→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-7T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/16/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1178		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; (0-11')** @ 0' Clayey sandy silt with gravel; firm; dry; light brown; roots, voids ≤1/2" in diameter, rootlets; @ 3' Damp to moist; brown; rootlets, pinhole voids				
5									
10					**LANDSLIDE; Qls (8-15')** @ 8' Light yellowish-brown siltstone with local discontinuous pebbly sand lenses; loose to dense; moderately hard; dry to damp; caliche; massive; weathered				
15									
20									

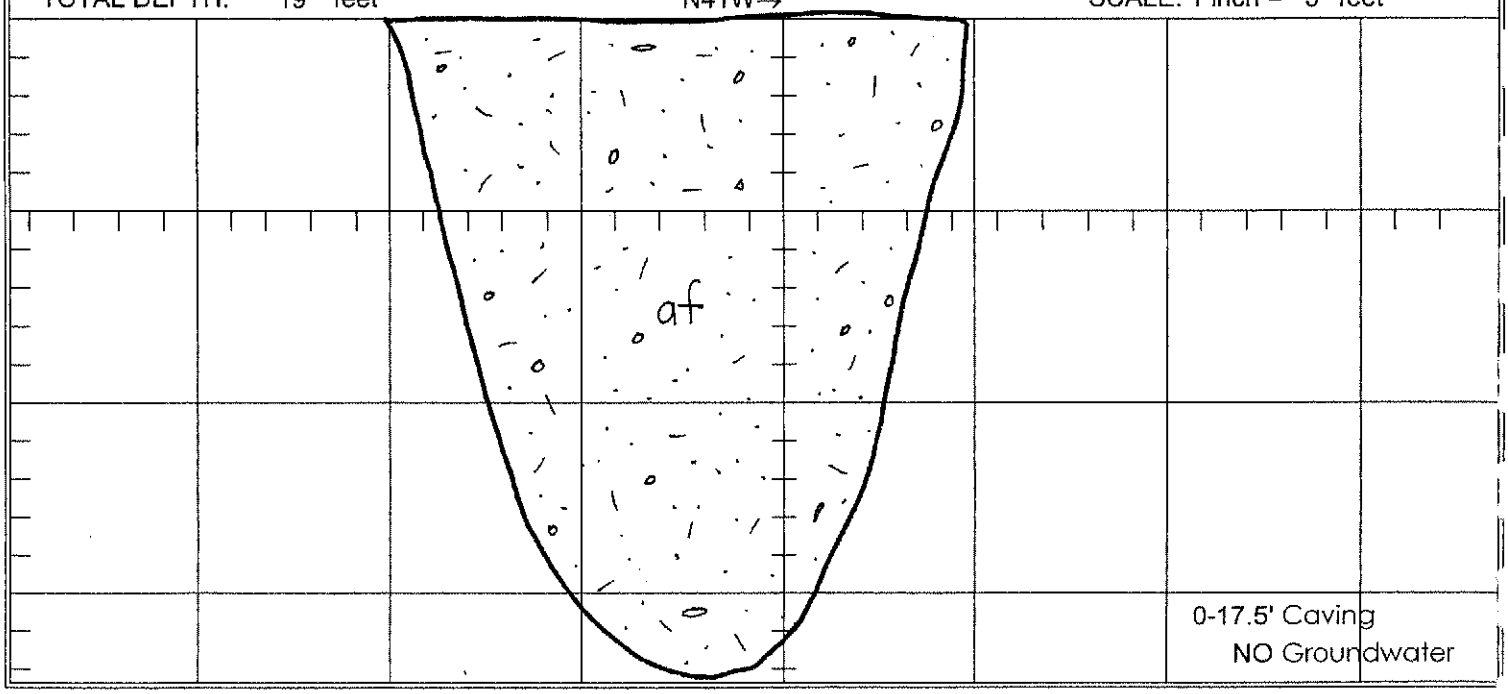
TOTAL DEPTH: 15 feet ←N46W SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG**	
PROJECT: Mesas East	DATE: 7/22/04	**NO. T-8T**	
	LOGGED BY: MAS		
	EXCAVATED: 10/16/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1200		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**ARTIFICIAL FILL; af (0-17.5')** @ 0' Sandy silty clay with local gravel; soft; moist; brown to dark brown				
5					@ 5' 1/2" diamter rusted steel cable ~4' long				
10									
				CL-ML	**SOIL; (13-17.5)** @ 13' Sandy silty clay; soft; moist; dark brown				
15					COMMENTS: -Operator indicated there was no change in density from 0-17.5' -Surface logged				
20									

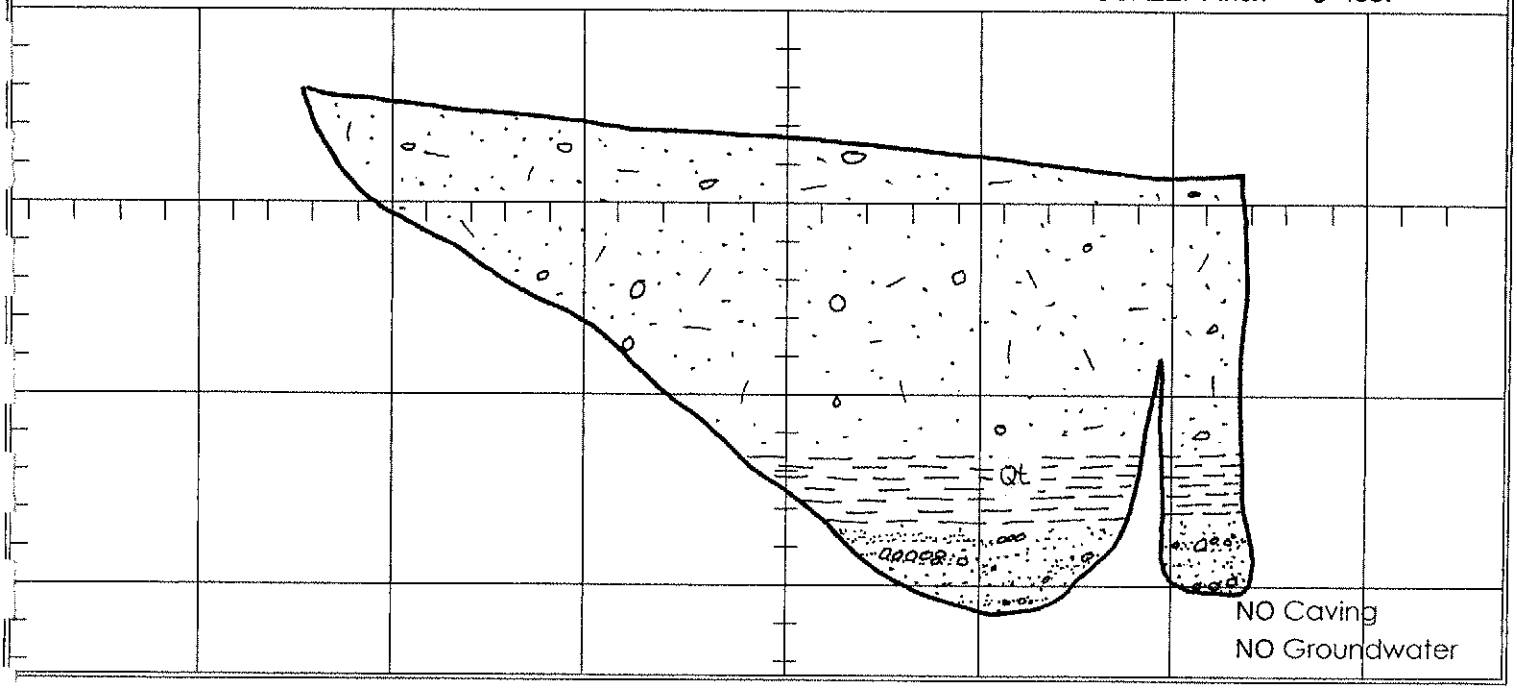
TOTAL DEPTH: 19 feet N41W→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-9T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/16/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1162		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL; (0-7.5')** @ 0' Silty clayey sand with gravel; medium dense; dry to damp; brown to light brown; void space ≤1/2" in diameter, roots and rootlets				
5									
				ML	**QUATERNARY TERRACE DEPOSITS; Qt (7.5-11')** @ 7.5' Sandy silt; firm to stiff; dry to damp; light yellowish-gray to light brown; caliche filled fractures; massive				
10				SP	@ 9.5' Medium to coarse-grained sand with gravels; medium dense; damp; light yellowish-gray to light gray	Contact: Horizontal Apx: B:Horizontal			
15									
20									

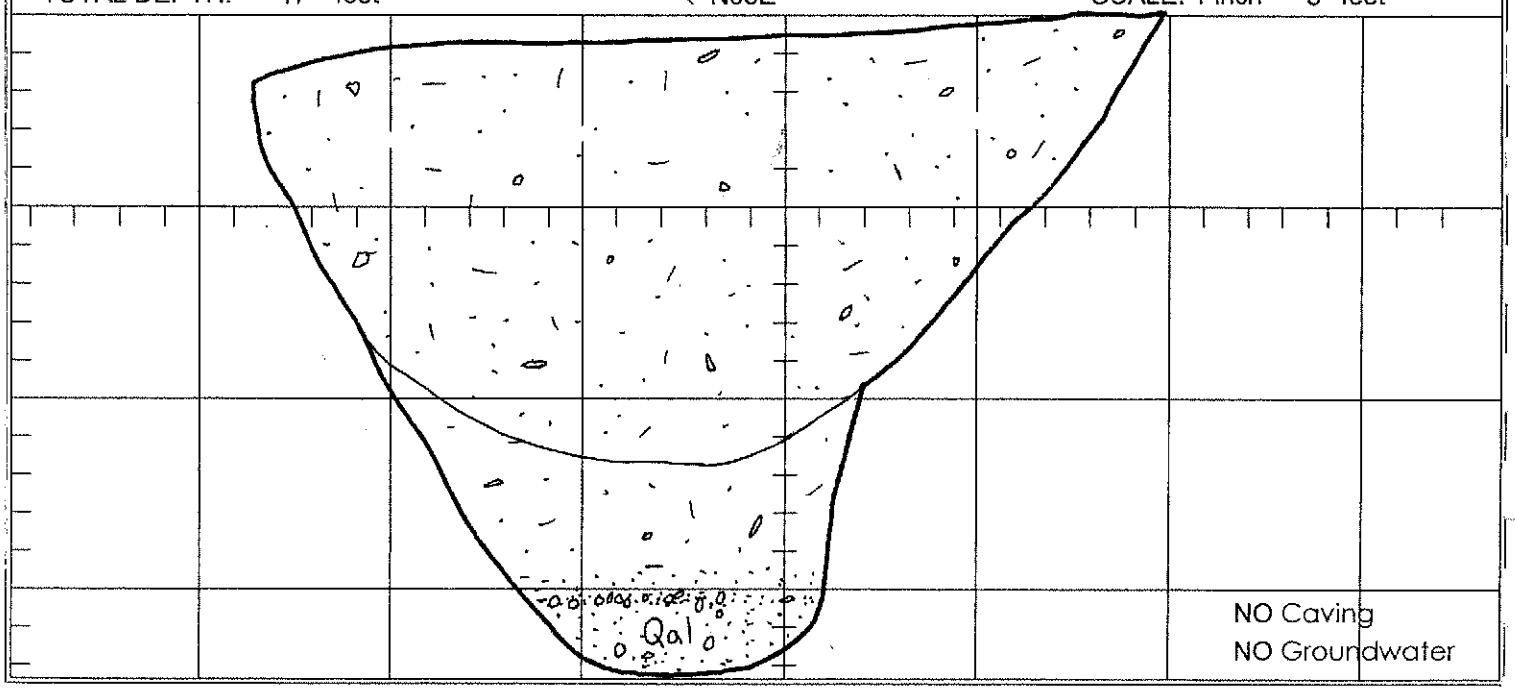
TOTAL DEPTH: 11 feet ←N85W SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-10T**	
PROJECT: Mesas East	DATE: 7/12/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/17/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1156		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL; (0-15')** @ 0' Silty clayey sand with gravel; medium dense; dry to damp; brown; rootlets, voids ≤1/4"				
5									
10									
15				SM	**QUATERNARY ALLUVIUM; Qal (15-17')** @ 15' Silty sand with gravel and cobbles; medium dense; damp; yellowish-brown COMMENTS: -Bottom 6' surface logged				
20									

TOTAL DEPTH: 17 feet ←N65E SCALE: 1 inch = 5 feet



NO Caving
NO Groundwater

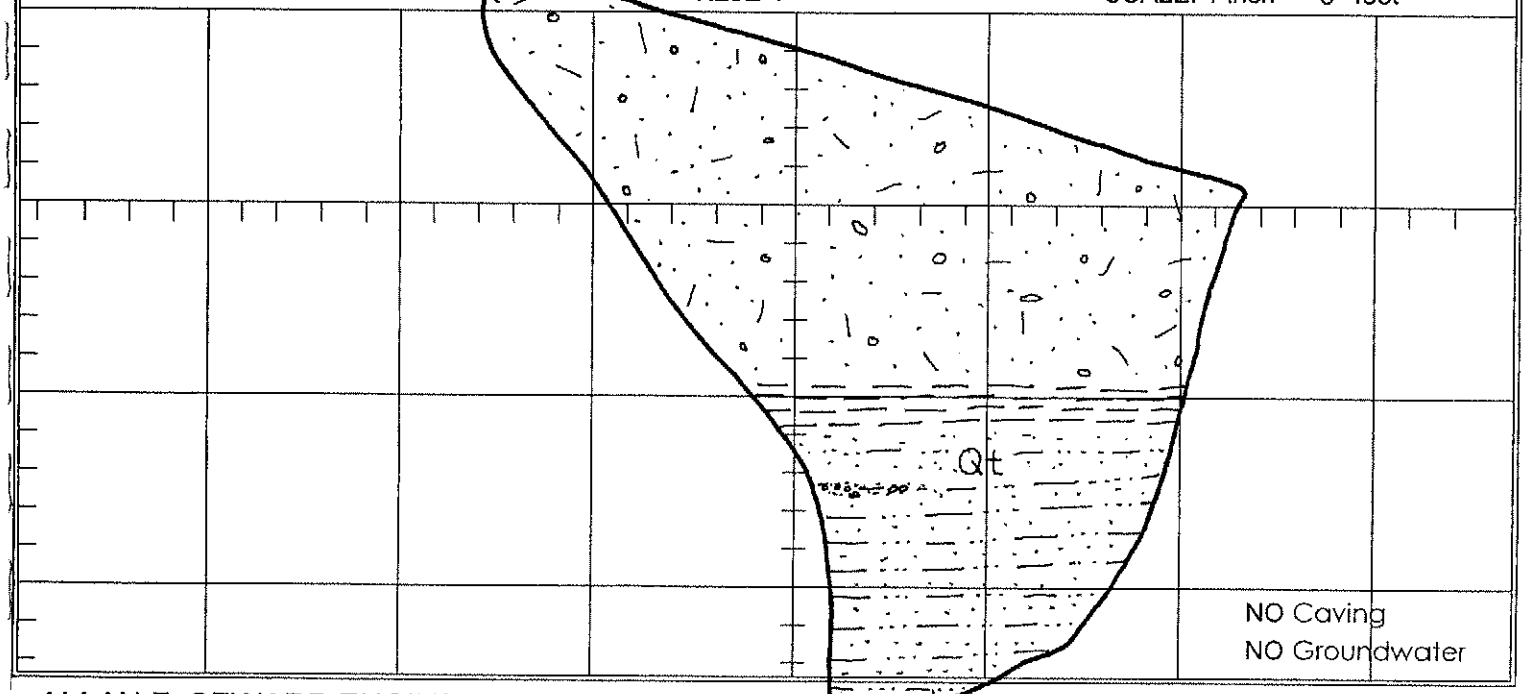
CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG**	
PROJECT: Mesas East	DATE: 7/22/04	**NO. T-11T**	
	LOGGED BY: MAS		
	EXCAVATED: 10/17/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1156		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL; (0-8')** @ 0' Silty clayey sand with gravel; medium dense; dry to damp; brown; voids ≤1/2", roots and rootlets				
5									
				CL-ML	**QUATERNARY TERACE DEPOSIT; Qt (8-17')** @ 8' Silty clay; firm; damp; light brown to yellow; pinhole voids, rootlets				
10				ML	@ 10' Sandy silt; firm; damp; light brown to yellow; pinhole voids, rootlets, local gravelly channels	Apx. B:Horizontal			
15									
				CL-ML	@ 17' Sandy silty clay; firm; damp to moist; light brown; pinhole voids, rootlets				
20									

TOTAL DEPTH: 17 feet

N28E→

SCALE: 1 inch = 5 feet

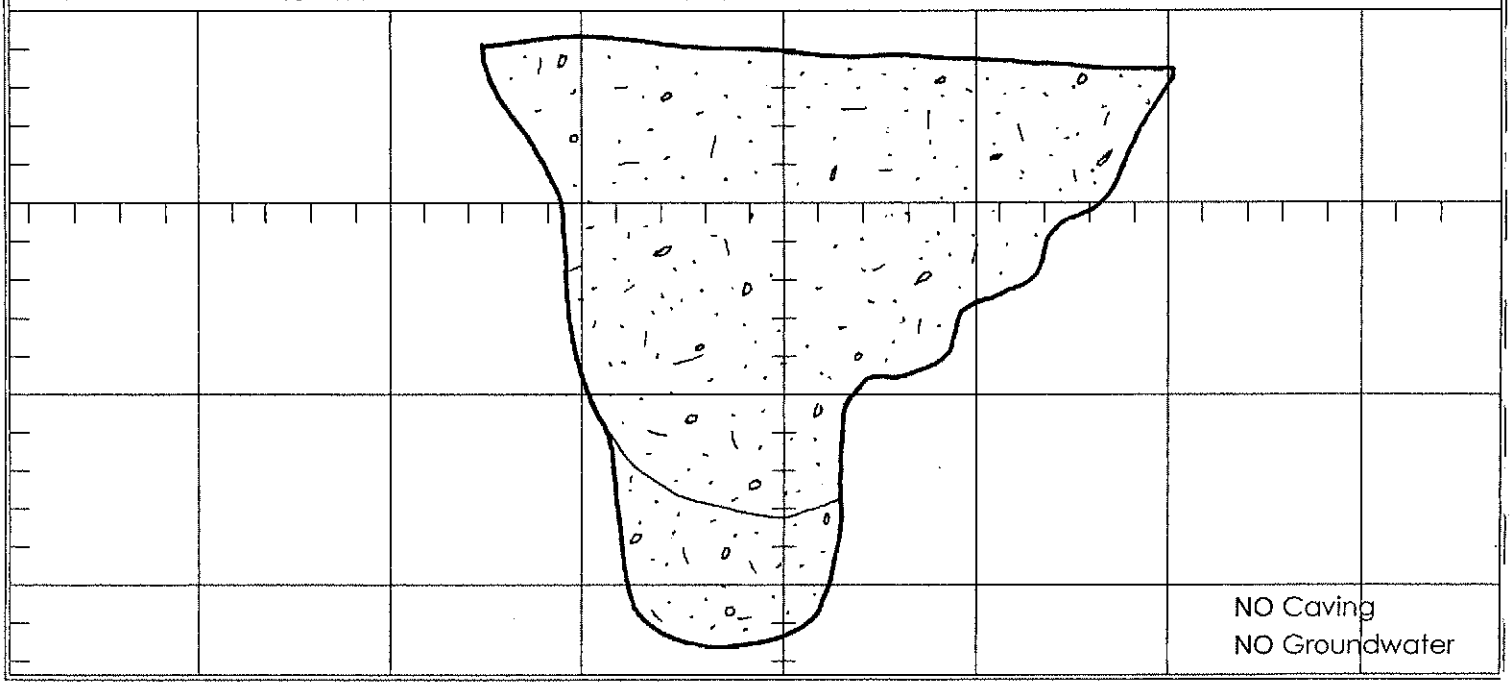


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-12T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/17/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1172		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC	**SOIL; (0-16')** @ 0' Silty clayey sand with gravel; medium dense; dry ; brown to light brown; void ≤1/4" diameter, rootlets				
					@ 4' Damp to moist; brown to dark brown; voids ≤1/8" diameter, rootlets				
5									
10									
15					@ 16' Same; voids ≤1/4" in diameter				
					COMMENTS: -Bottom 4' surface logged				
20									

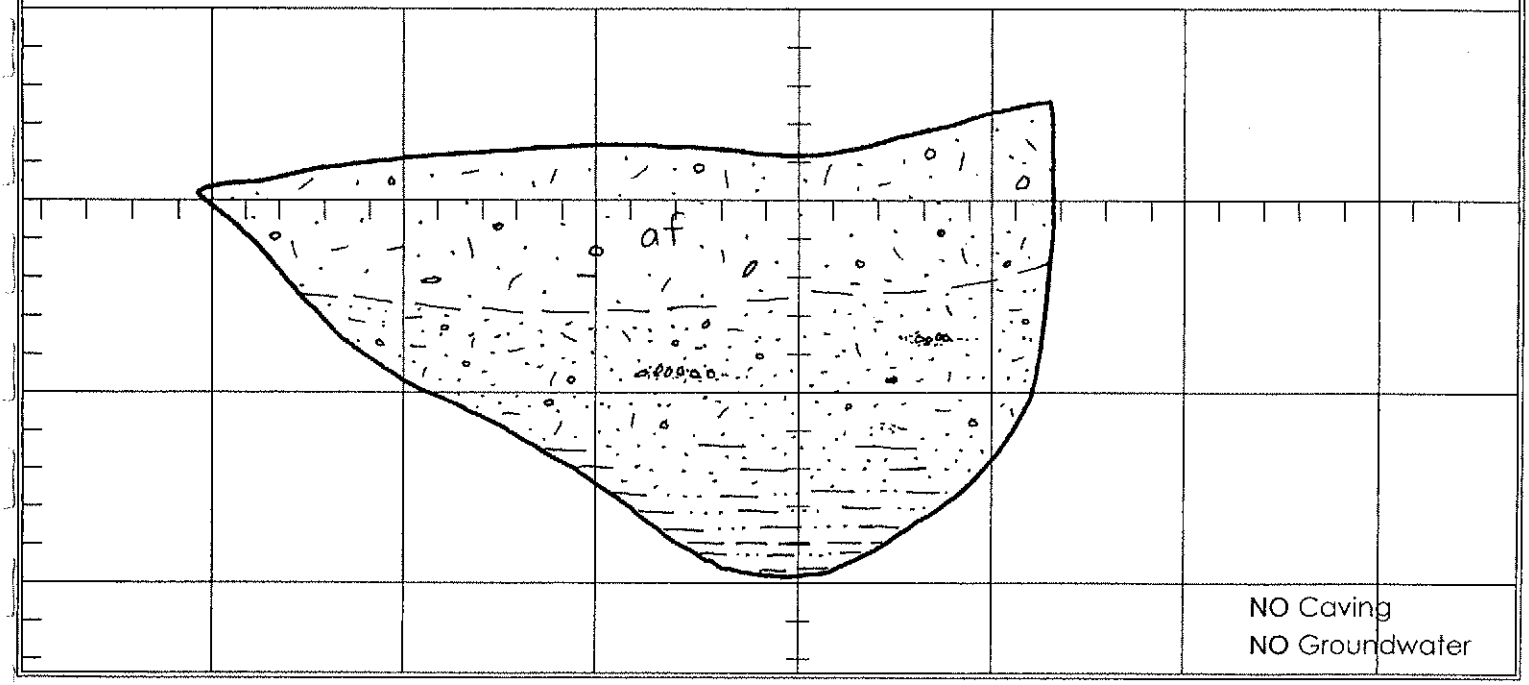
TOTAL DEPTH: 16 feet N26W→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG**	
PROJECT: Mesas East	DATE: 7/22/04	**NO. T-13T**	
	LOGGED BY: MAS		
	EXCAVATED: 10/17/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1160		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**ARTIFICIAL FILL; af (0-3.5')** @ 0' Silty clayey sand; medium dense; moist; light yellow to brown to dark brown				
				SC-SM	**SOIL; (3.5-11')** @ 3.5' Silty clayey sand with gravel; medium dense; moist; light brown; voids ≤1/8", roots, rootlets; local channels of coarse-grained sand with gravels, loose to medium dense, damp, light yellow to gray				
5				ML	@ 7' Sandy silt; firm; moist; light brown; local roots				
10									
15									
20									

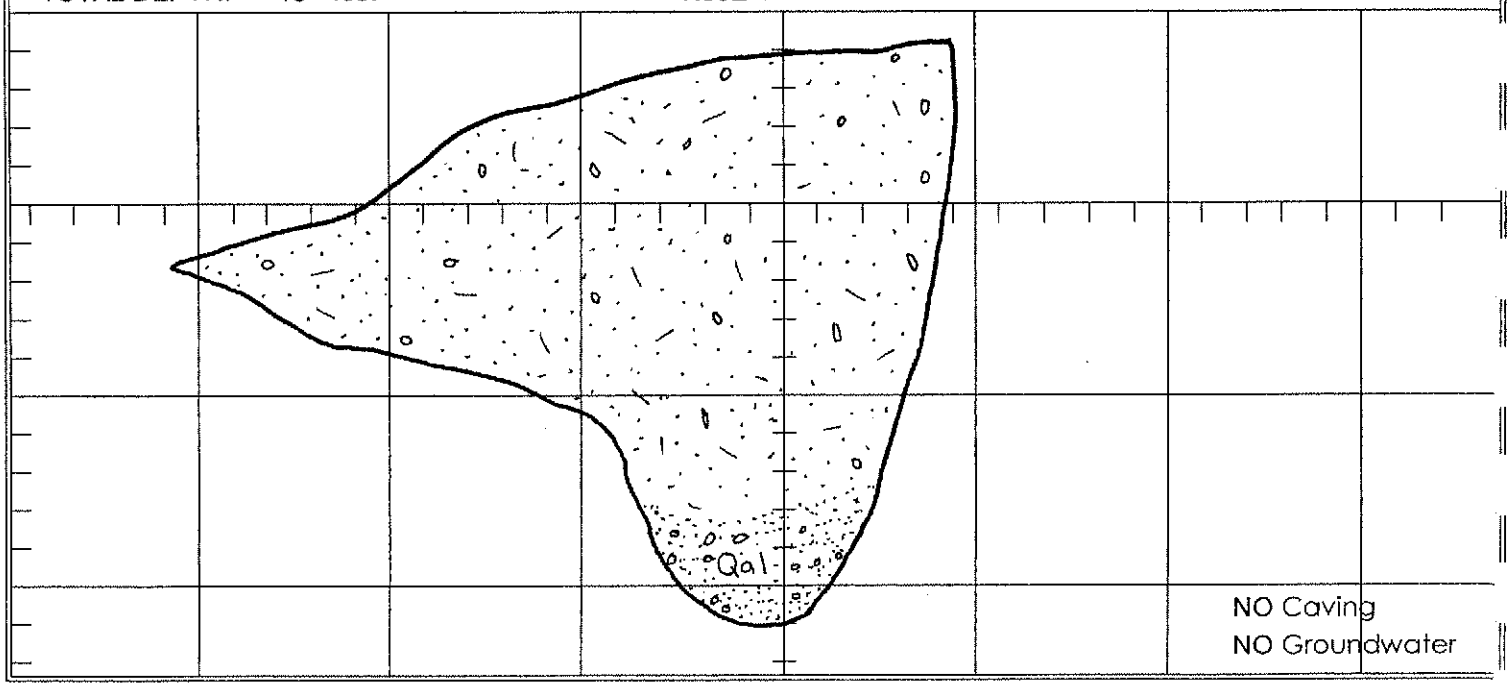
TOTAL DEPTH: 11 feet ←N48W SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-14T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/17/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1154		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL; (0-12')** @ 0' Silty clayey sand with gravel; medium dense; dry to damp; brown to light brown; voids ≤1/4" roots, rootlets				
5									
10					@ 10' Dense; dry to damp; brown; local pinhole voids				
				SM	**QUATERNARY ALLUVIUM; Qal (12-15')** @ 12' Silty coarse-grained sand with gravel and cobbles; dense; damp; yellowish-brown to yellow				
15									
20									

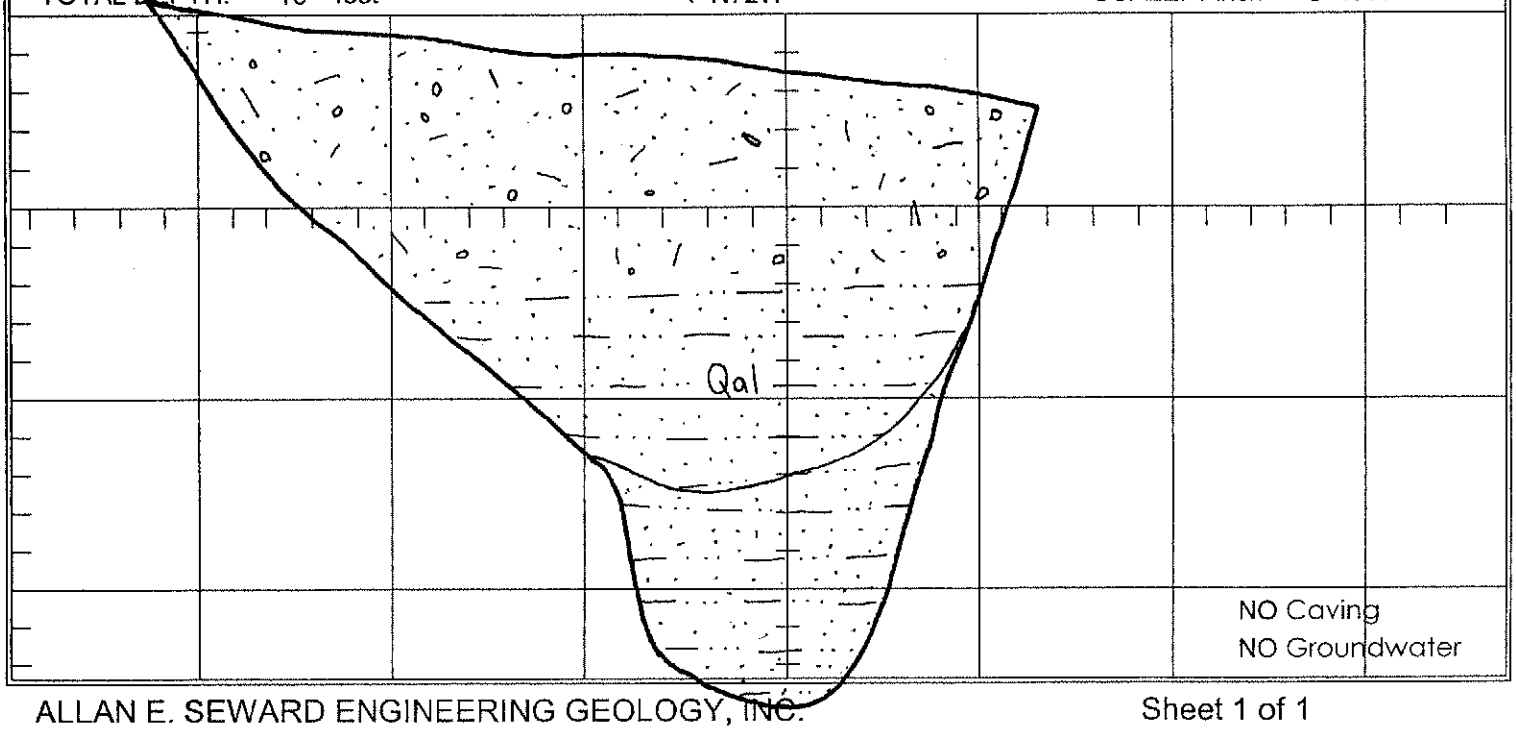
TOTAL DEPTH: 15 feet N50E→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-15T**
PROJECT: Mesas East	DATE: 7/22/04	
	LOGGED BY: MAS	
	EXCAVATED: 10/17/03	
EXCAVATION METHOD: Trackhoe	ELEVATION: 1144	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL; (0-7')** @ 0' Silty clayey sand with gravel; medium dense; dry to damp; brown; voids ≤1/8" diameter; roots and rootlets				
5				ML	**QUATERNARY ALLUVIUM; Qal (7-16')** @ 7' Sandy silt; firm; damp; light brown to yellow; voids <1/8" in diameter, rootlets				
10									
15					@ 16' Same; no voids; clumps of dirt out of bucket				
20					COMMENTS: -Last 5' was surface logged				

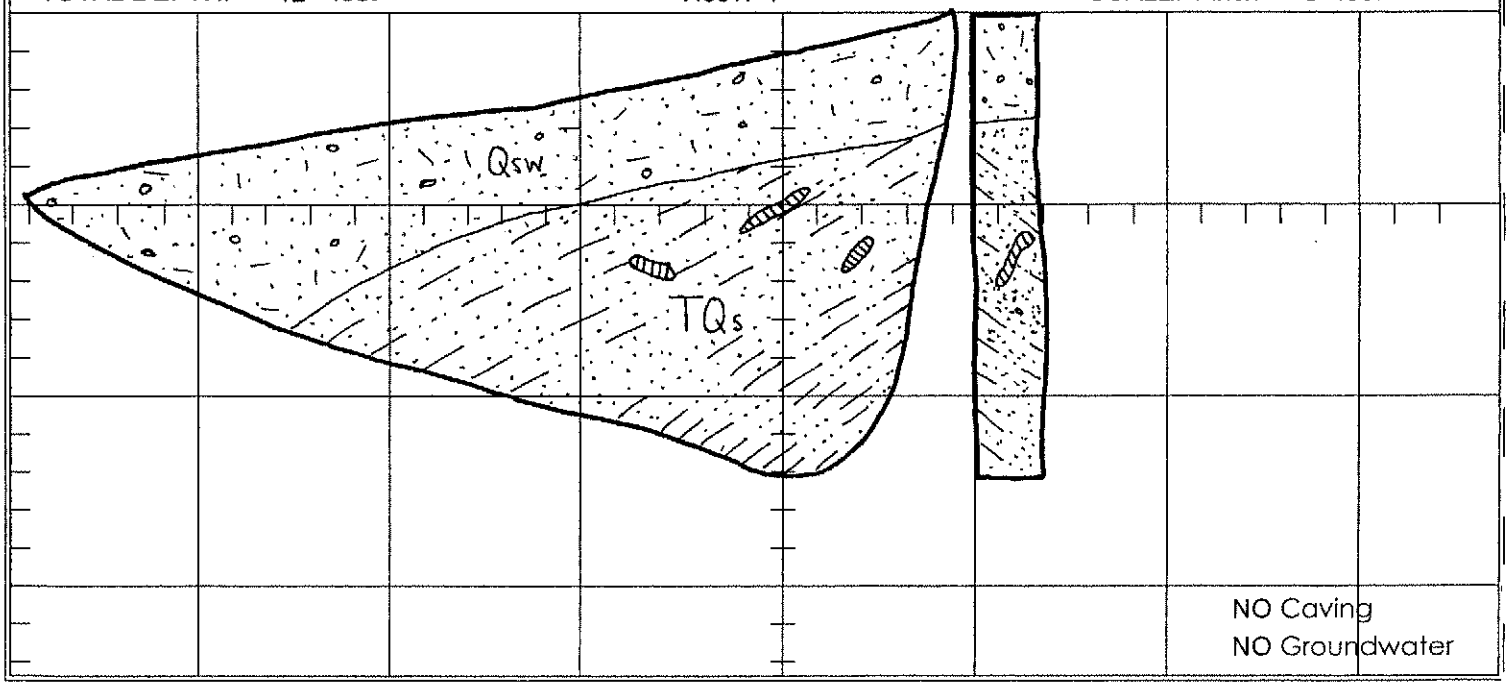
TOTAL DEPTH: 16 feet ←N72W SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-16T**	
PROJECT: Mesas East	DATE: 7/22/09		
	LOGGED BY: MAS		
	EXCAVATED: 10/17/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1167		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL/SLOPEWASH; Soil/Qsw (0-3')** @ 0' Silty clayey sand with gravel; medium dense; dry ; brown; voids ≤1/8", roots and rootlets				
					BEDROCK; TQs (3-12') @ 3' Light brown to brown sandy siltstone; soft; damp to moist; weathered; krotovina				
5									
					@ 8' Light brown to brown sandy siltstone; moderately hard; moist with interbedded yellowish brown medium-grained sandstone; friable; damp	Apx. B:N38W,41NE			
10									
15									
20									

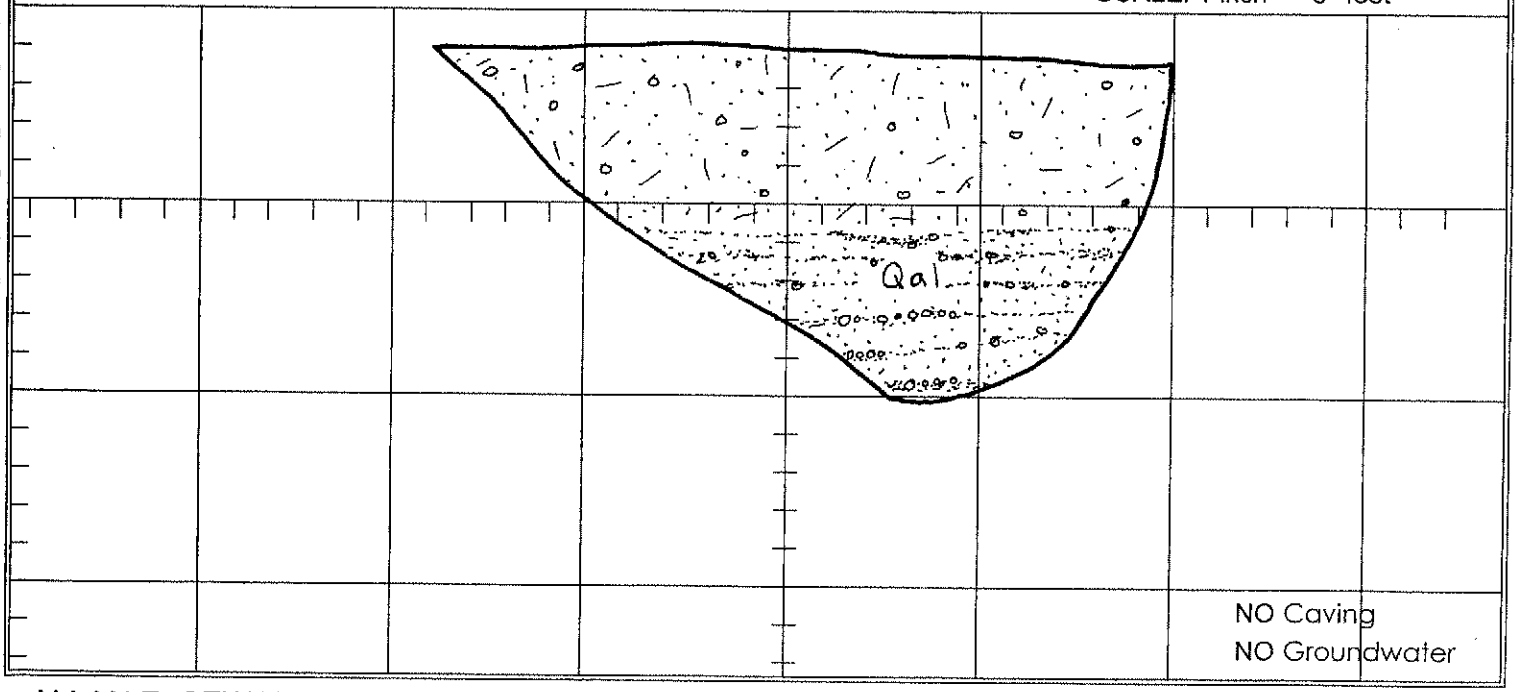
TOTAL DEPTH: 12 feet N89W→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-17T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/17/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1115		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL; (0-6')** @ 0' Silty clayey sand with gravel; medium dense; dry; brown; voids ≤1/8", rootlets				
5				SM	@ 5' Same; channels of medium-grained sand; loose; dry; yellowish-brown				
					QUATERNARY ALLUVIUM; Qal (6-9') @ 6' Silty sand with gravel; dense; damp; yellowish-brown to yellow	Apx. B:Horizontal			
10									
15									
20									

TOTAL DEPTH: 9 feet ←N67W SCALE: 1 inch = 5 feet

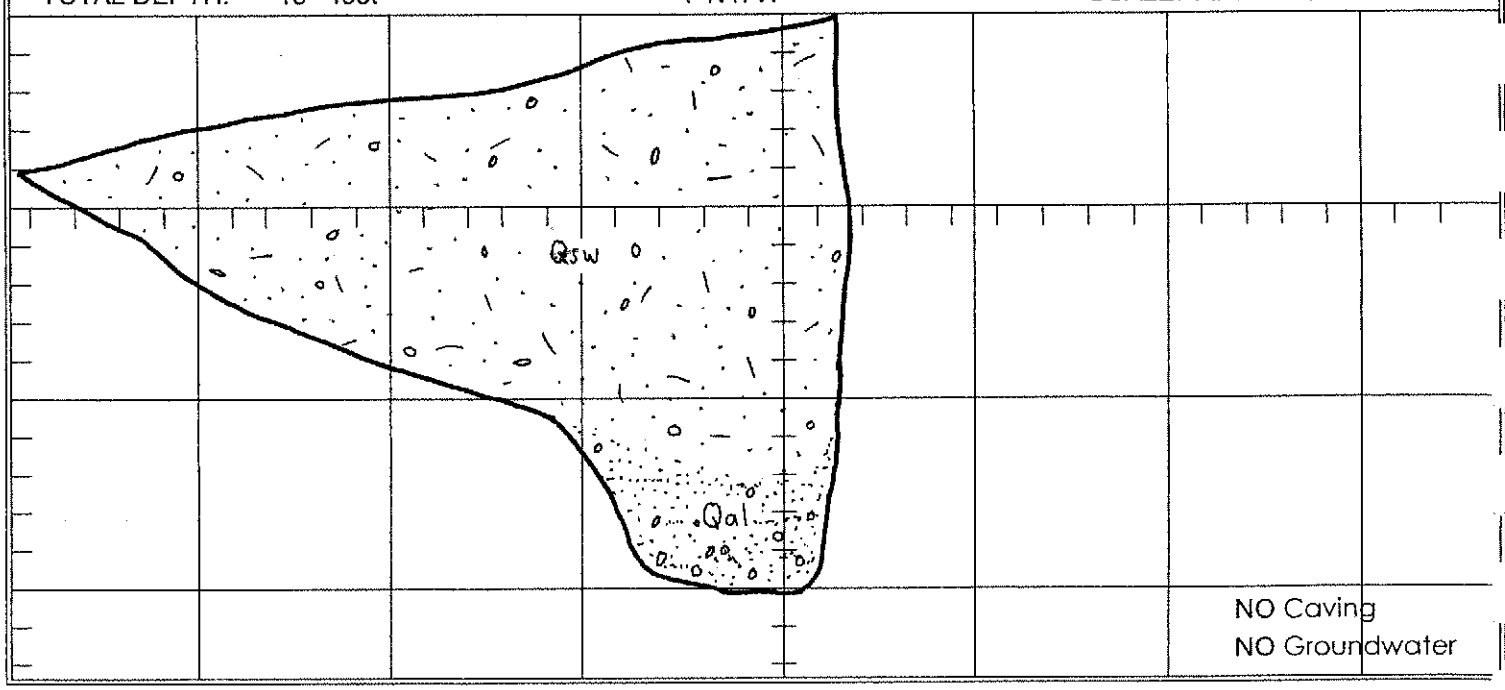


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-18T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/17/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1125		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SLOPE/SLOPEWASH; Soil/Qsw (0-12')** @ 0' Silty clayey sand with gravel; medium dense; dry to damp; brown; voids ≤1/8" diameter roots and rootlets				
5									
10				SM	**QUATERNARY ALLUVIUM; Qal (12-15')** @ 12' Silty sand with gravel; dense; damp; light brown to yellow; pinhole voids				
15									
20									

TOTAL DEPTH: 15 feet ←N47W SCALE: 1 inch = 5 feet



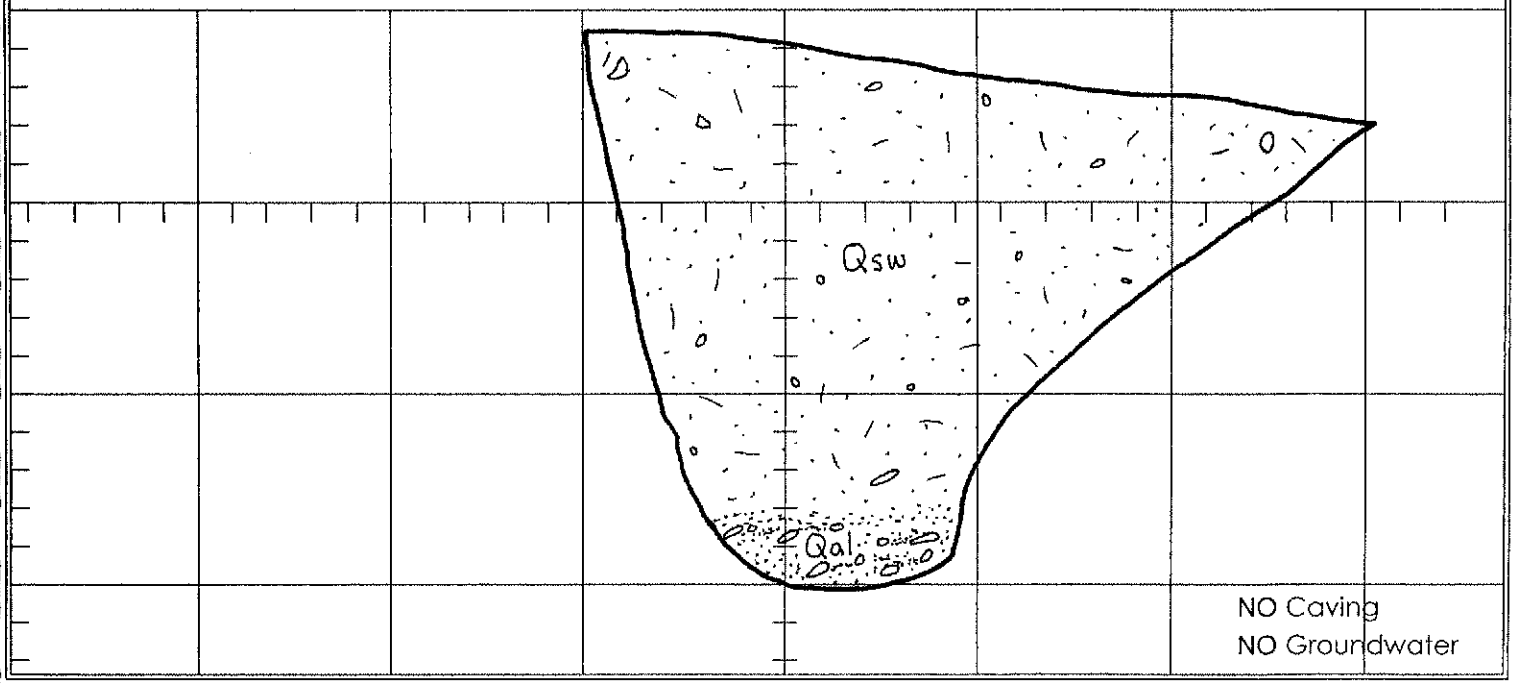
NO Caving
NO Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-19T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/17/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1117		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL/SLOPEWASH; Soil/Qsw (0-12')** @ 0' Silty-clayey sand with gravel and cobbles; medium dense to dense; dry to damp; brown; voids ≤1/8" in diamter, roots and rootlets				
5									
					@ 8' Same; pinhole voids, rootlets				
10									
				SM	**QUATERNARY ALLUVIUM; Qal (12-14')** @ 12' Silty sand with gravel and cobbles; dense; damp to moist; yellowish brown to yellow				
15					COMMENTS: -Last 3' were logged from surface				
20									

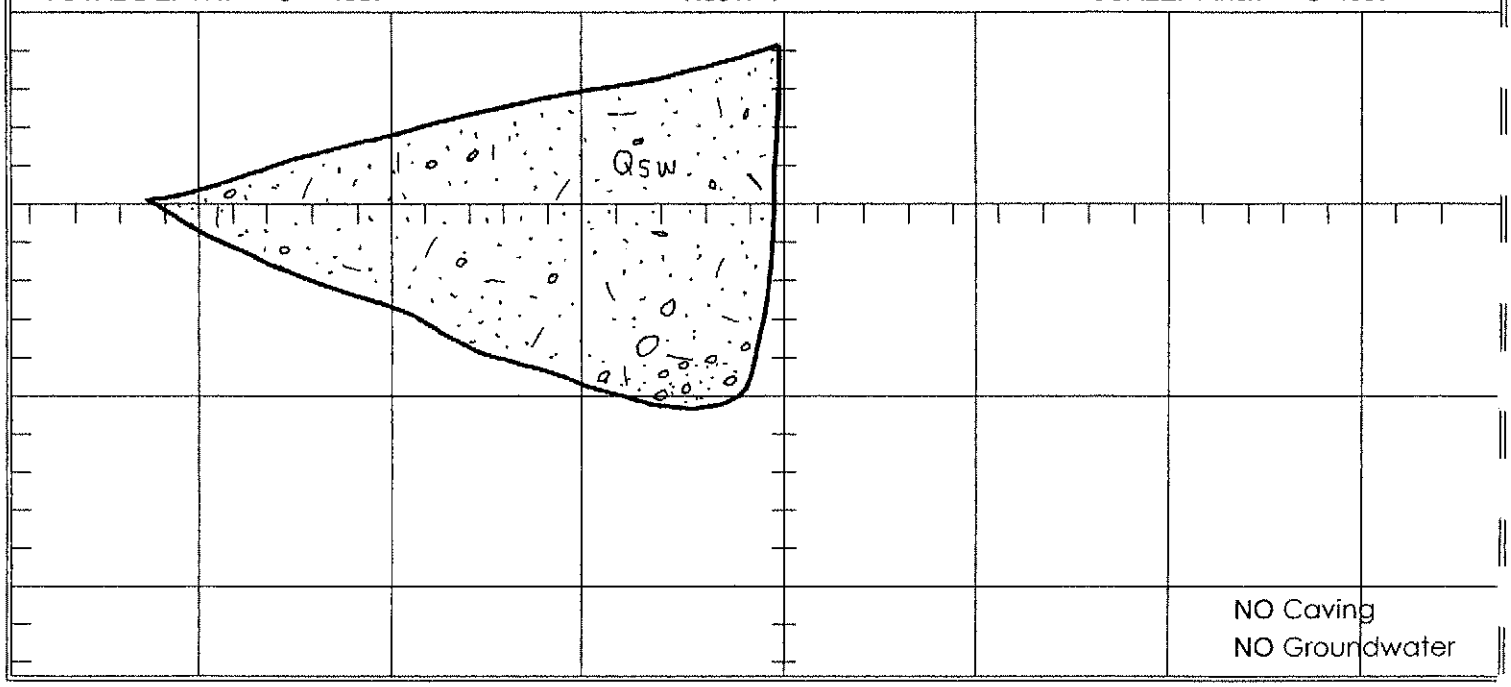
TOTAL DEPTH: 14 feet N75W→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-20T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/17/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1130		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL/SLOPEWASH; Soil/Qsw (0-9')** @ 0' Silty clayey sand with gravel and cobbles; medium dense to dense; damp to moist; brown to dark brown; voids ≤1/16", roots and rootlets				
5				GC-GM	@ 6' More gravel				
10									
15									
20									

TOTAL DEPTH: 9 feet N80W→ SCALE: 1 inch = 5 feet



ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

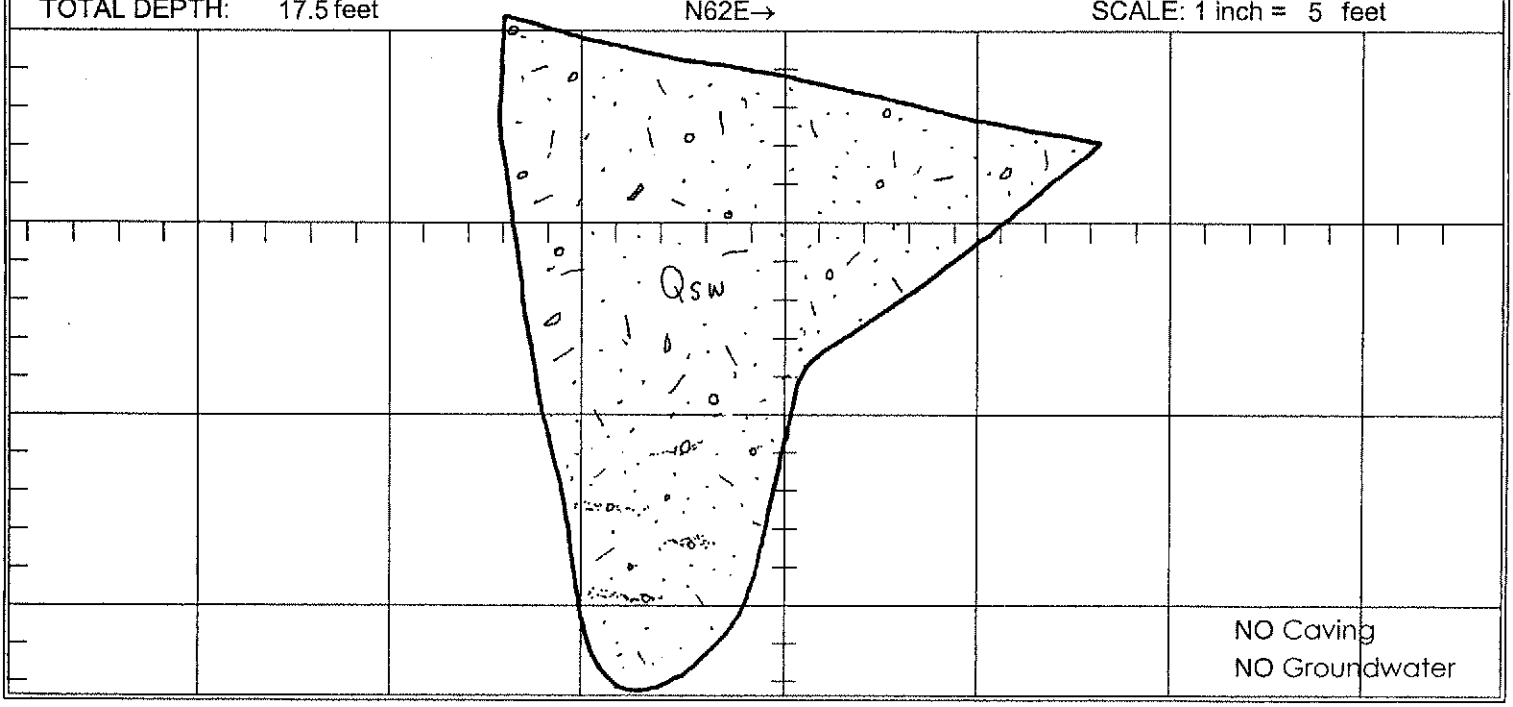
CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-21T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/20/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1169		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL/SLOPEWASH; Soil/Qsw (0-17.5')** @ 0' Silty clayey sand with gravel; firm; dry; brown; pinhole voids, rootlets				
5									
10					@ 9' Same; local gravelly channels				
15					COMMENTS: -Bottom 5.5' surface logged				
20									

TOTAL DEPTH: 17.5 feet

N62E→

SCALE: 1 inch = 5 feet

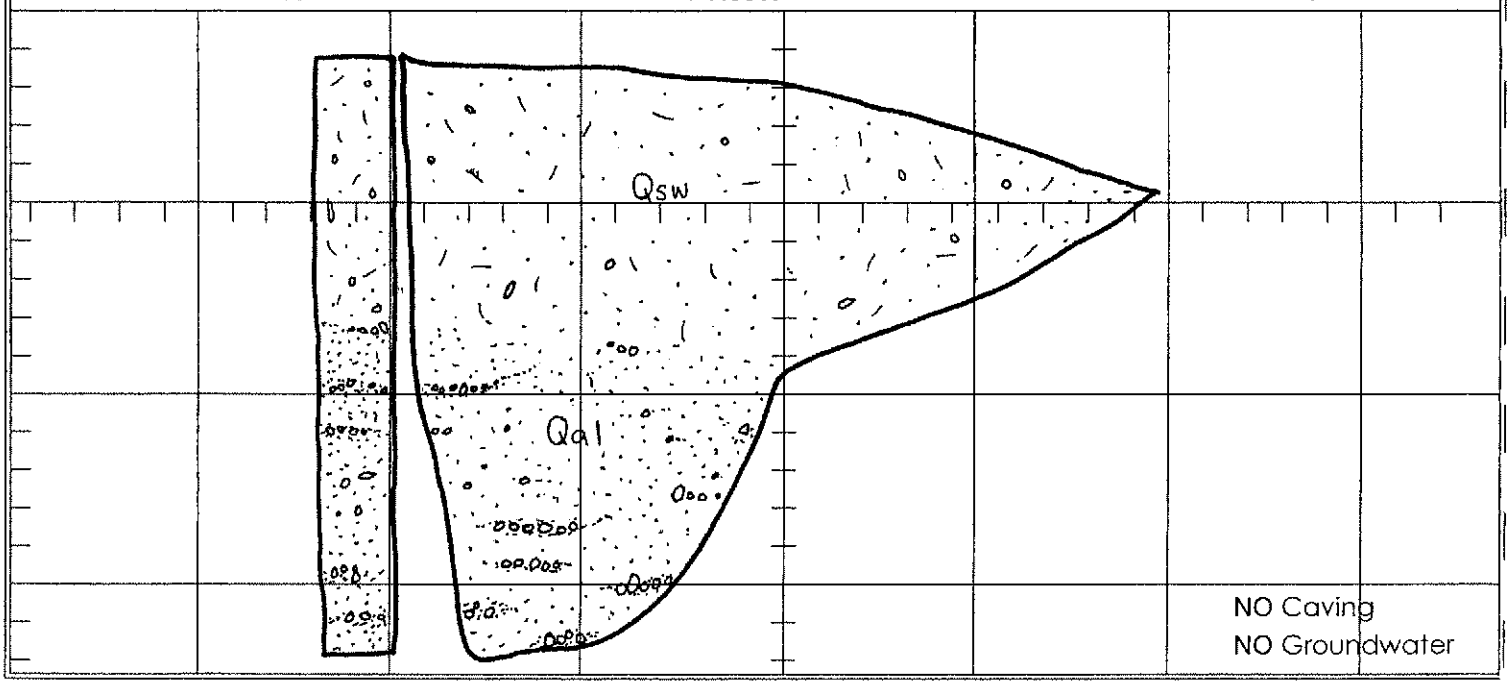


NO Caving
NO Groundwater

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-22T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/20/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1180		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; Soil/Qsw (0-12')** @ 0' Silty clayey sand with gravel and cobbles; firm; dry; brown; roots, rootlets, voids ≤1/8"				
					@ 4' Same; local gravel channels				
5									
10									
				SM	**QUATERNARY ALLUVIUM; Qal (12-15')** @ 12' Silty sand with gravel and cobbles; dense; damp; yellow to yellowish-brown	Apx. B:Horizontal			
15									
20									

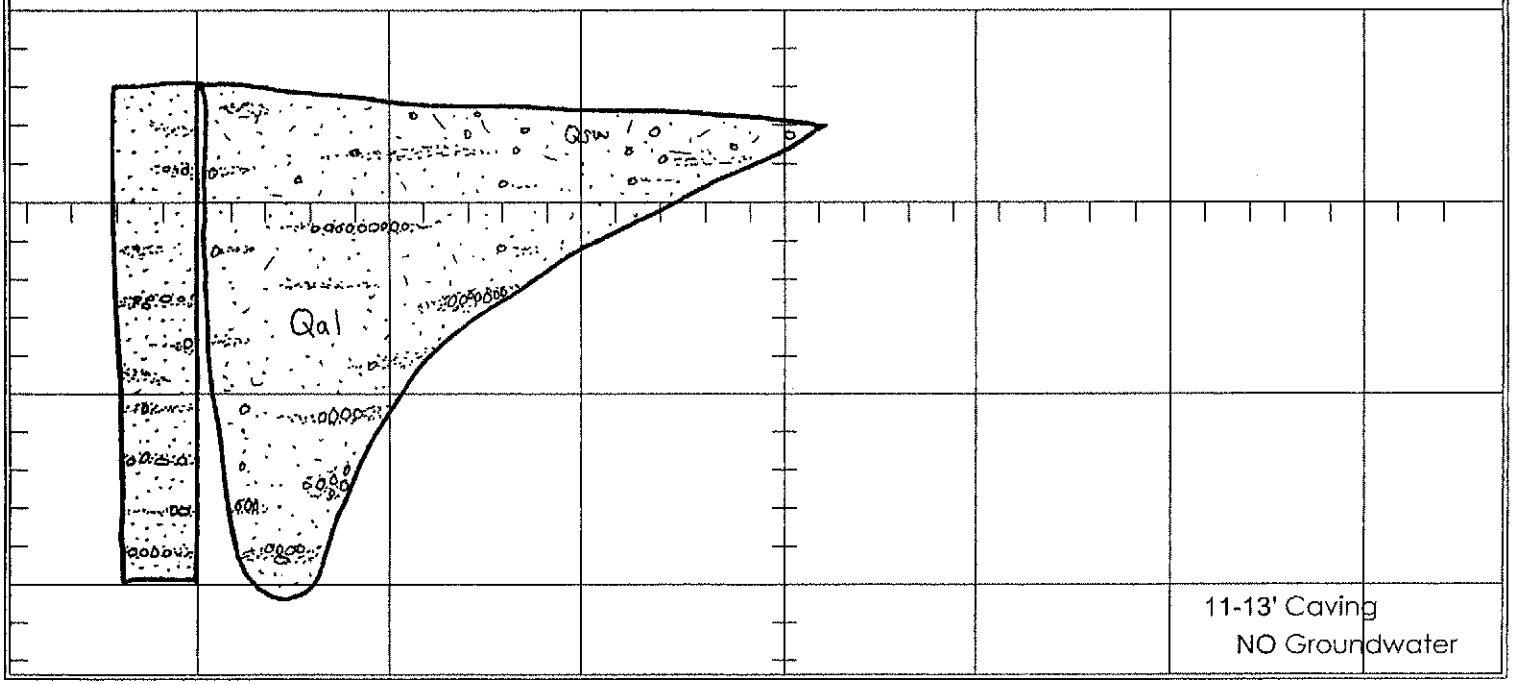
TOTAL DEPTH: 15 feet ←N89W SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-23T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/20/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1226		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SLOPEWASH/QUATERNARY ALLUVIUM; Qsw/Qal (0-9')** @ 0' Silty clayey sand with gravel; dense; dry; brown to dark brown; pinhole voids; rootlets; gravelly channels				
5									
10				SM	**QUARTERNARY ALLUVIUM; Qal (9-15')** @ 9' Silty sand with gravel and cobbles; loose to medium dense; damp; yellowish-brown to yellow				
					COMMENTS: -Bottom 5' surface logged				
15									
20									

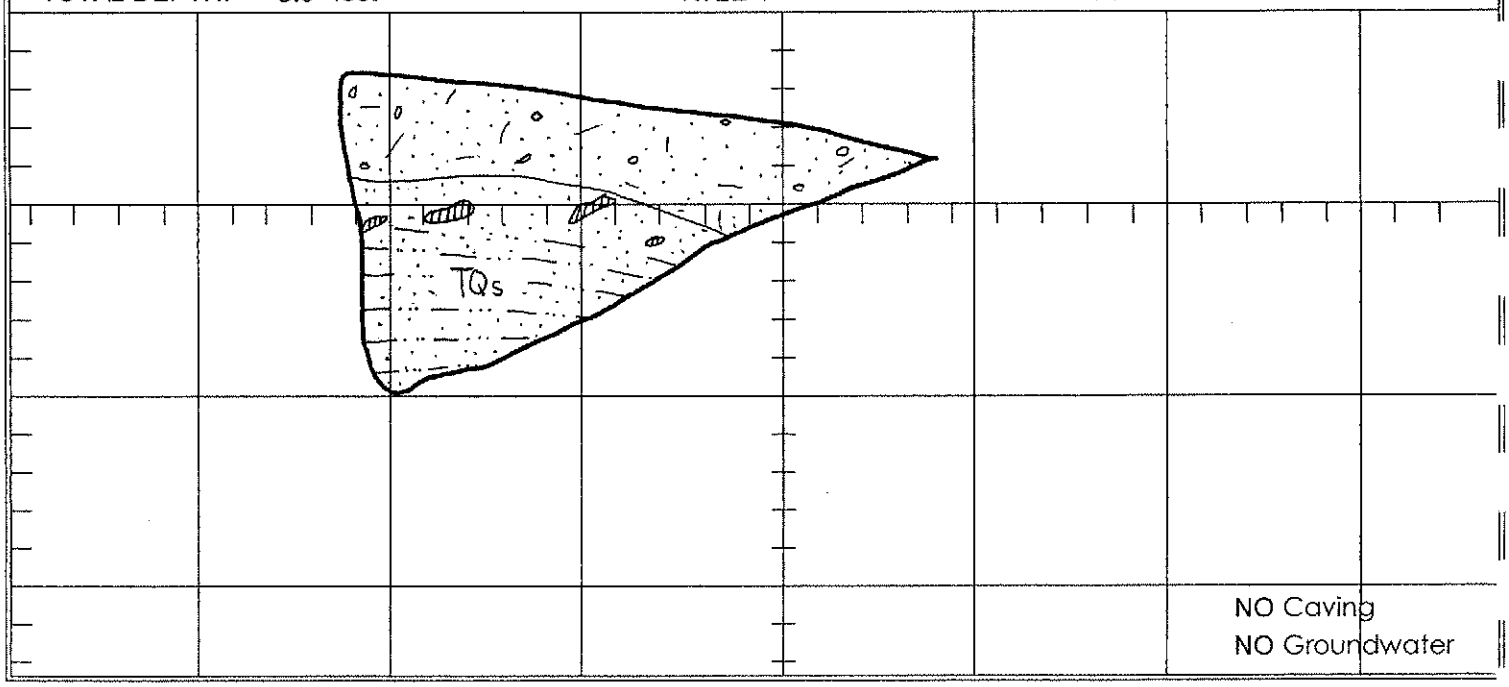
TOTAL DEPTH: 13 feet ←N80W SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-24T**	
PROJECT: Mesas East	DATE: 7/22/09		
	LOGGED BY: MAS		
	EXCAVATED: 10/20/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1220		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL/SLOPEWASH; Soil/Qsw (0-3')** @ 0' Silty clayey sand with gravel; medium dense; dry; brown; voids ≤1/8" diameter, rootlets **BEDROCK; TQs (3-8.5')** @ 3' Yellow to light brown sandy siltstone; moderately hard; damp; weathered; krotovina; massive @ 5.5' Hard				
5									
10									
15									
20									

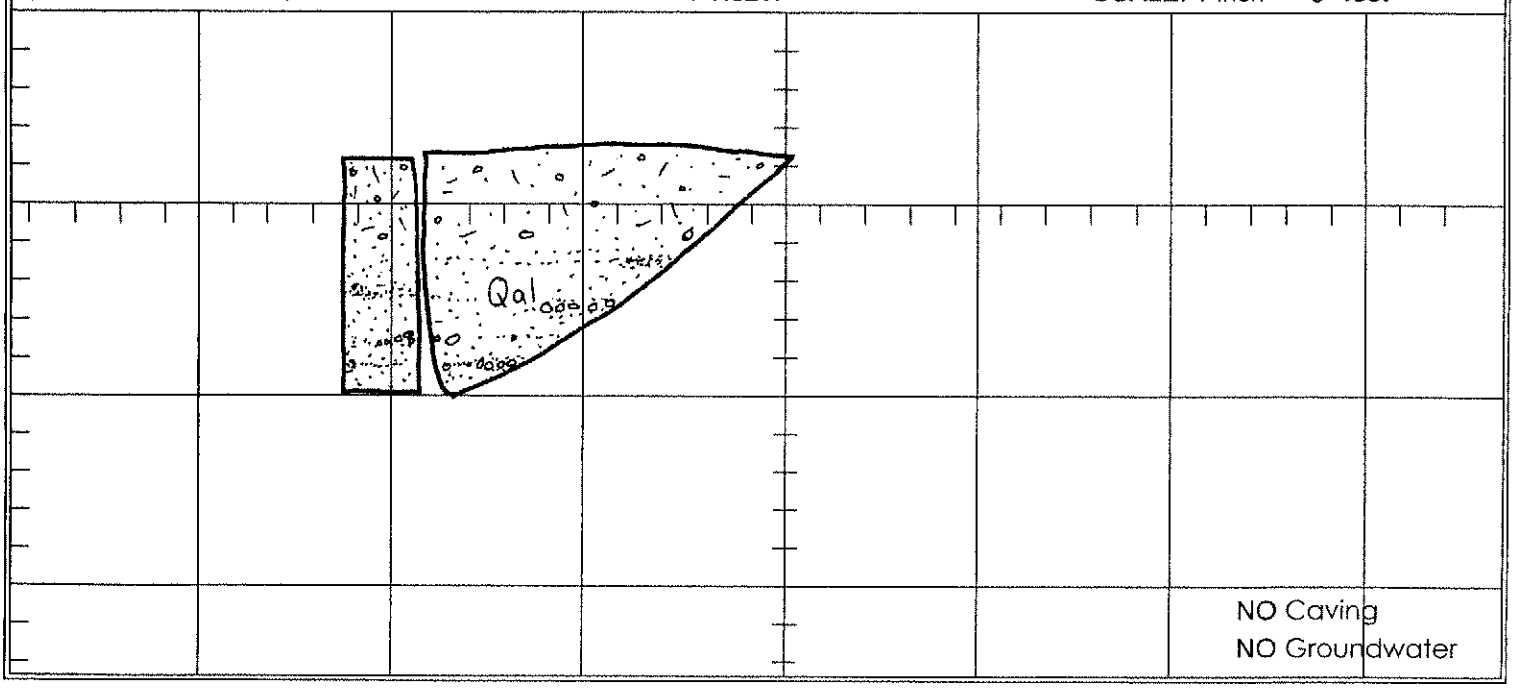
TOTAL DEPTH: 8.5 feet N72E→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-25T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/20/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1245		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL; (0-3')** @ 0' Silty clayey sand with gravel; medium dense; dry; brown; pinhole voids, rootlets				
				SM	**QUATERNARY ALLUVIUM; Qal (3-6')** @ 3' Silty sand with gravel; medium dense; damp; yellow to yellowish-brown; rootlets	Apx. B:Horizontal			
5									
10									
15									
20									

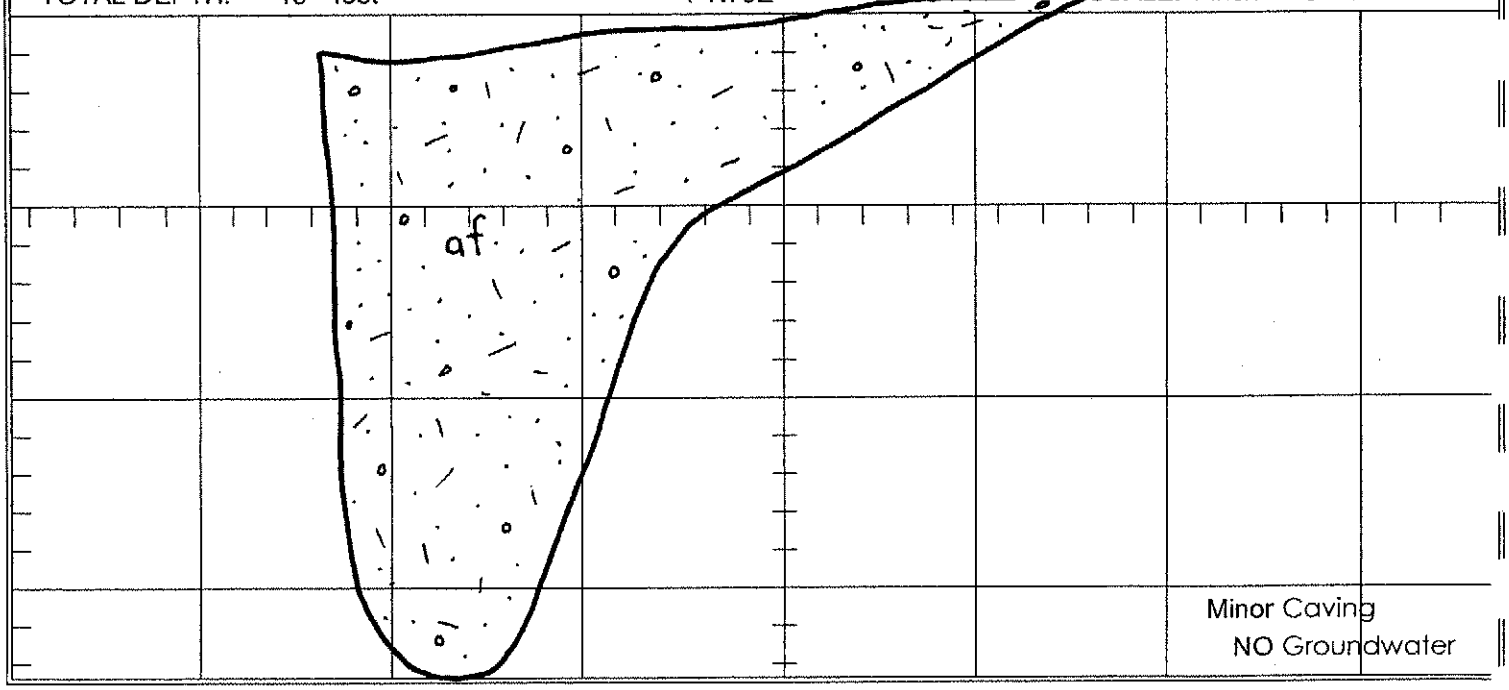
TOTAL DEPTH: 6 feet ←N52W SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-26T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/20/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1272		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**ARTIFICIAL FILL; af (0-15')** @ 0' Silty clayey sand with gravel; loose to moderately dense; damp; brown to dark brown; clasts ~2- 4" in diameter of light brown siltstone; stiff; damp; minor caving				
5									
10									
15									
20									

TOTAL DEPTH: 15 feet ←N75E SCALE: 1 inch = 5 feet



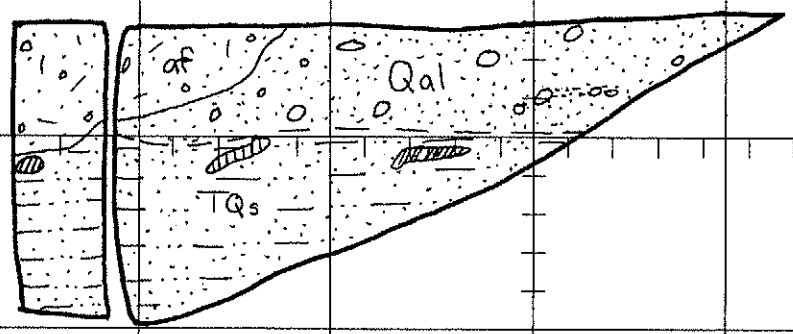
Minor Caving
NO Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-27T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/20/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1306		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**ARTIFICIAL FILL; af (0-3')** @ 0' Silty clayey sand with gravel; loose; dry; brown; minor caving				
				SM	**QUATERNARY ALLUVIUM; Qal (0-3')** @ 0' Silty sand with gravel; loose to medium dense; dry; yellowish-brown to brown; caving; massive **BEDROCK; TQs (3-8')** @ 3' Light brown sandy siltstone; moderately hard; damp; weathered with krotovina and rootlets @ 6' Hard				
5									
10									
15									
20									

TOTAL DEPTH: 8 feet ←N53W SCALE: 1 inch = 5 feet

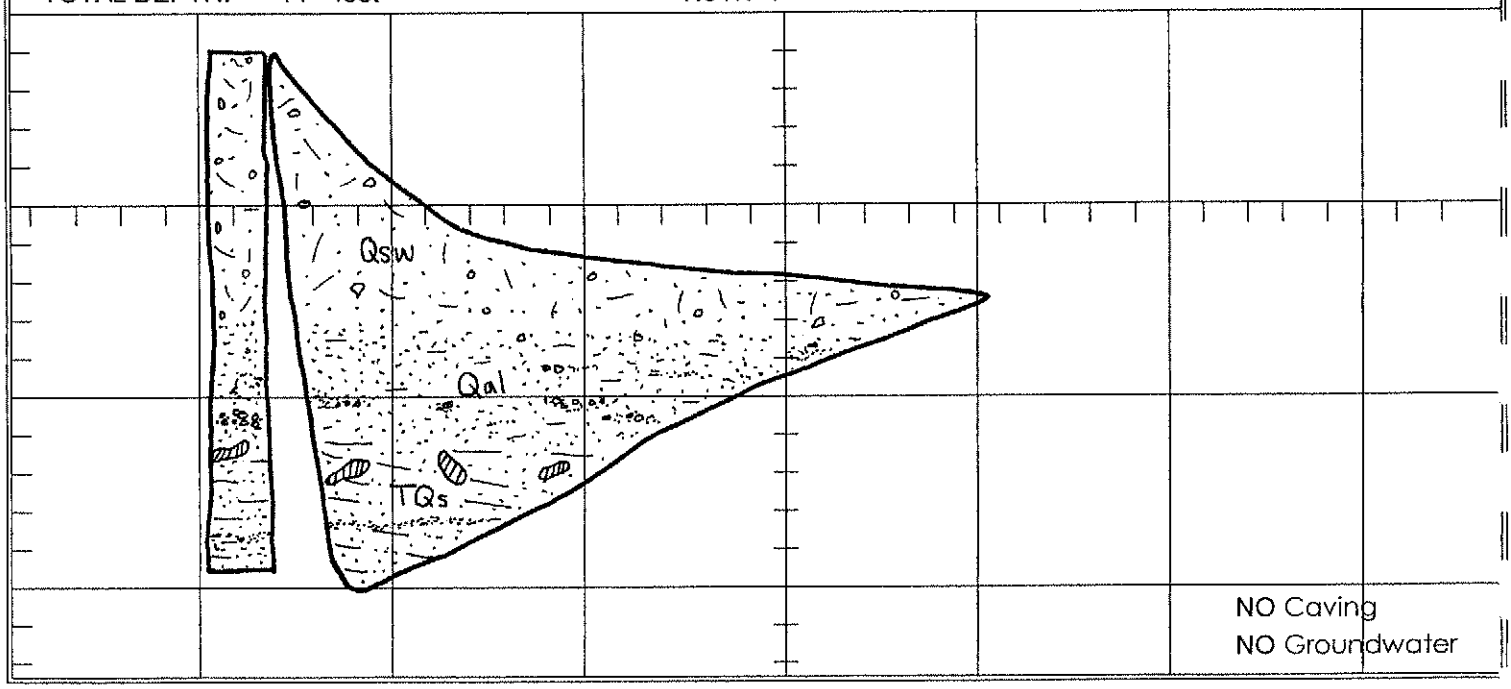


Minor Caving
NO Groundwater

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-28T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/20/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1220		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL/SLOPEWASH; Soil/Qsw (0-8')** @ 0' Silty clayey sand with gravel; medium dense; dry ; brown to dark brown; voids ≤1/8", roots and rootlets				
5									
				SM	**QUATERNARY ALLUVIUM; Qal (8-10')** @ 8' Silty sand with gravel; medium dense; dry; yellow to yellowish brown	Apx. B:Horizontal			
10					**BEDROCK; TQs (10-14')** @ 10' Light brown sandy siltstone; moderately hard to hard; damp; krotovina; rootlets; weathered	Contact: Horizontal			
					@ 12' Hard; no krotovina; with interbedded light brown silty sandstone	B:N25W,28NE			
15									
20									

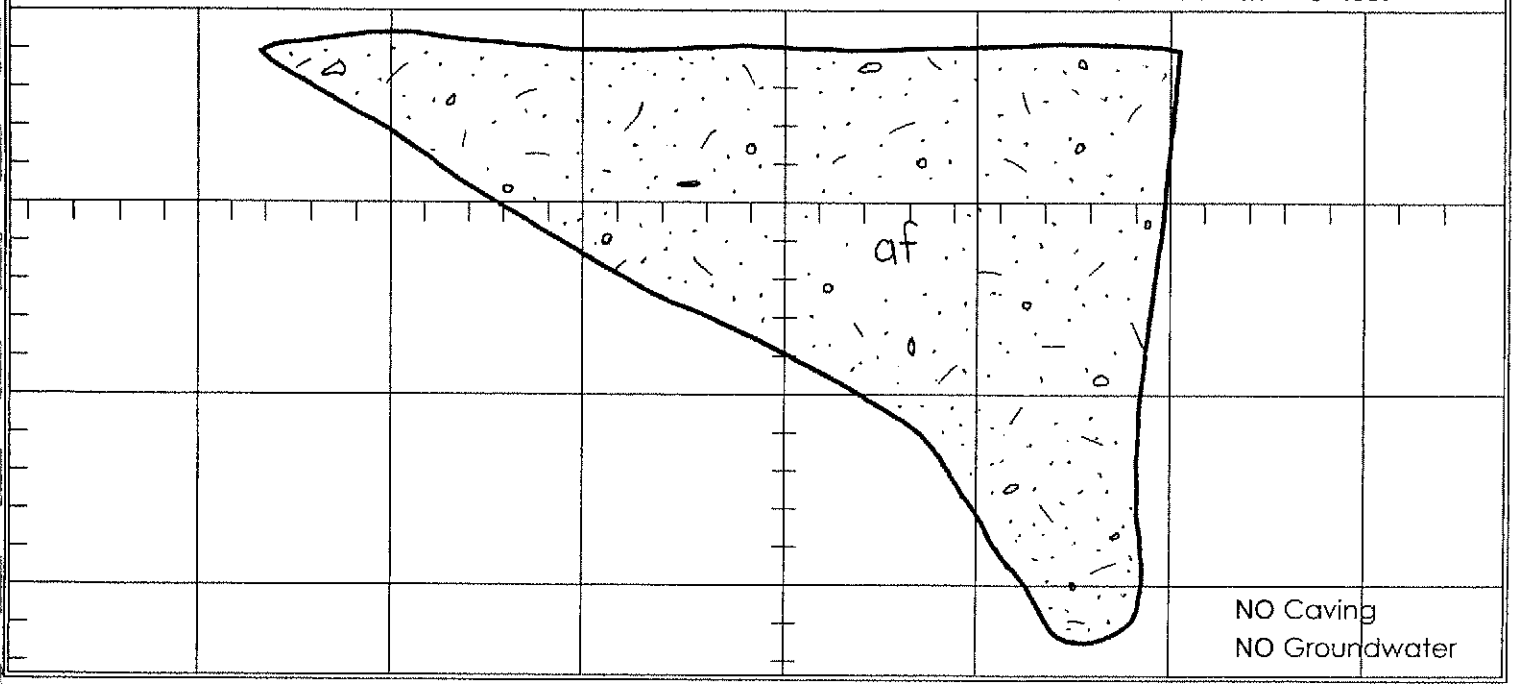
TOTAL DEPTH: 14 feet N64W→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG**	
PROJECT: Mesas East	DATE: 7/22/04	**NO. T-29T**	
	LOGGED BY: MAS		
	EXCAVATED: 10/20/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1249		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL/ARTIFICIAL FILL; Soil/af (0-16')** @ 0' Silty clayey sand with gravel; medium dense to dense; dry; brown; rootlets				
5									
10					@ 11' Same; no voids				
15					COMMENTS: Bottom 4' surface logged				
20									

TOTAL DEPTH: 16 feet ←N28E SCALE: 1 inch = 5 feet

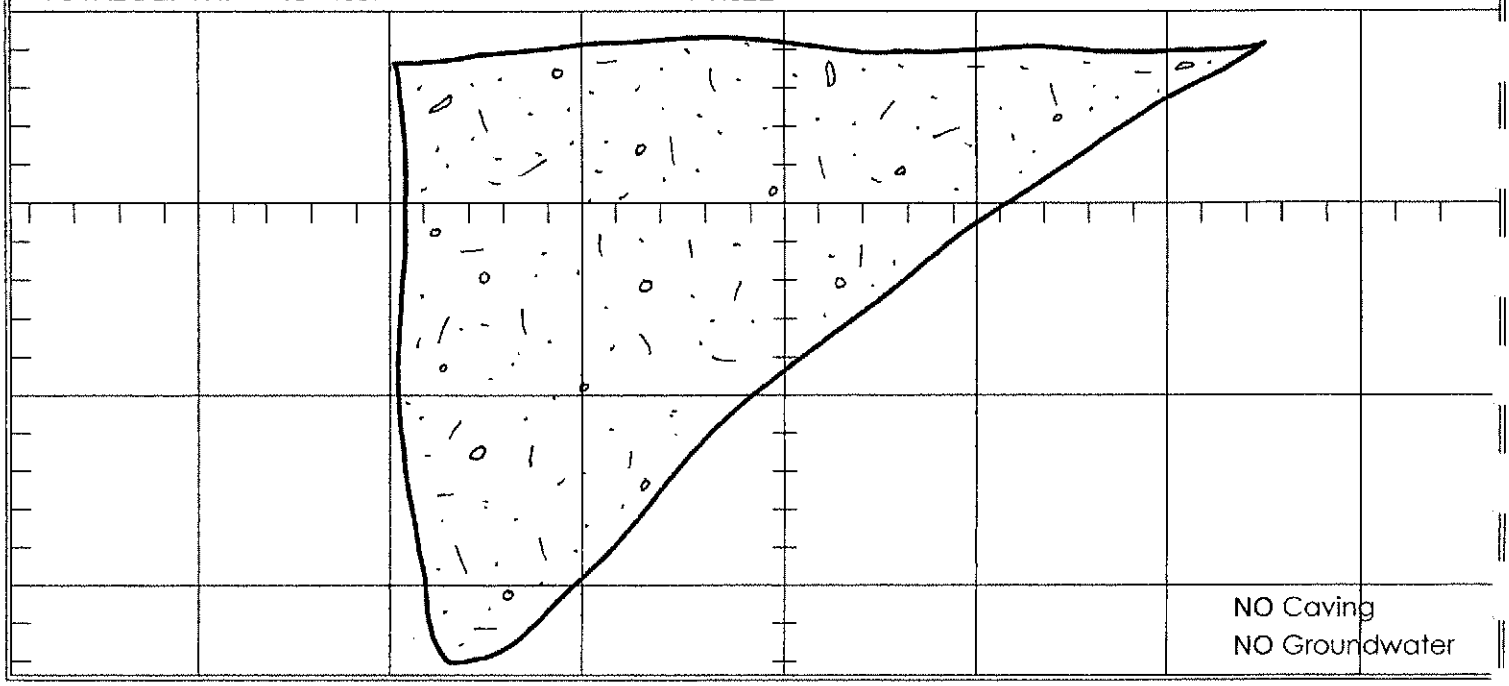


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-30T**
PROJECT: Mesas East	DATE: 7/22/04	
	LOGGED BY: MAS	
	EXCAVATED: 10/20/03	
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1264	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL; (0-16')** @ 0' Silty clayey sand with gravel; medium dense; damp to moist; brown to dark brown; pinhole voids; roots and rootlets				
5									
10					@ 11' Same; no voids, rootlets				
15					COMMENTS: -Bottom 5' surface logged				
20									

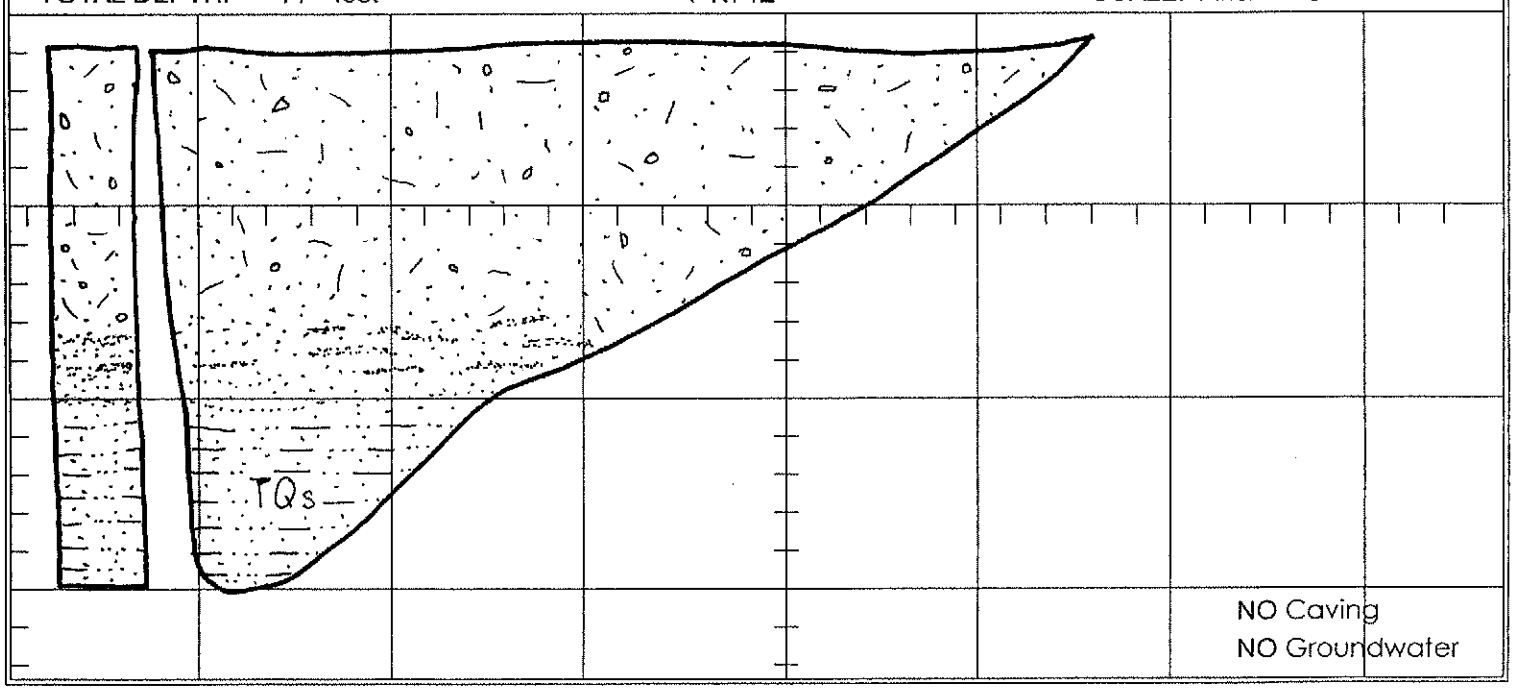
TOTAL DEPTH: 16 feet ←N32E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-31T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/20/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1228		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL; (0-7')** @ 0' Silty clayey sand with gravel; medium dense; damp to moist; brown; voids ≤1/8" diameter, roots, rootlets				
5				SM	**QUATERNARY ALLUVIUM; Qal (7-9')** @ 7' Silty sand; loose to medium dense; damp; yellowish-brown	B:Horizontal			
10					**BEDROCK; TQs (9-14')** @ 9' Light brown silty sandstone; moderately hard to hard; damp; weathered	C:Horizontal			
15					COMMENTS: -Bottom 3' surface logged				
20									

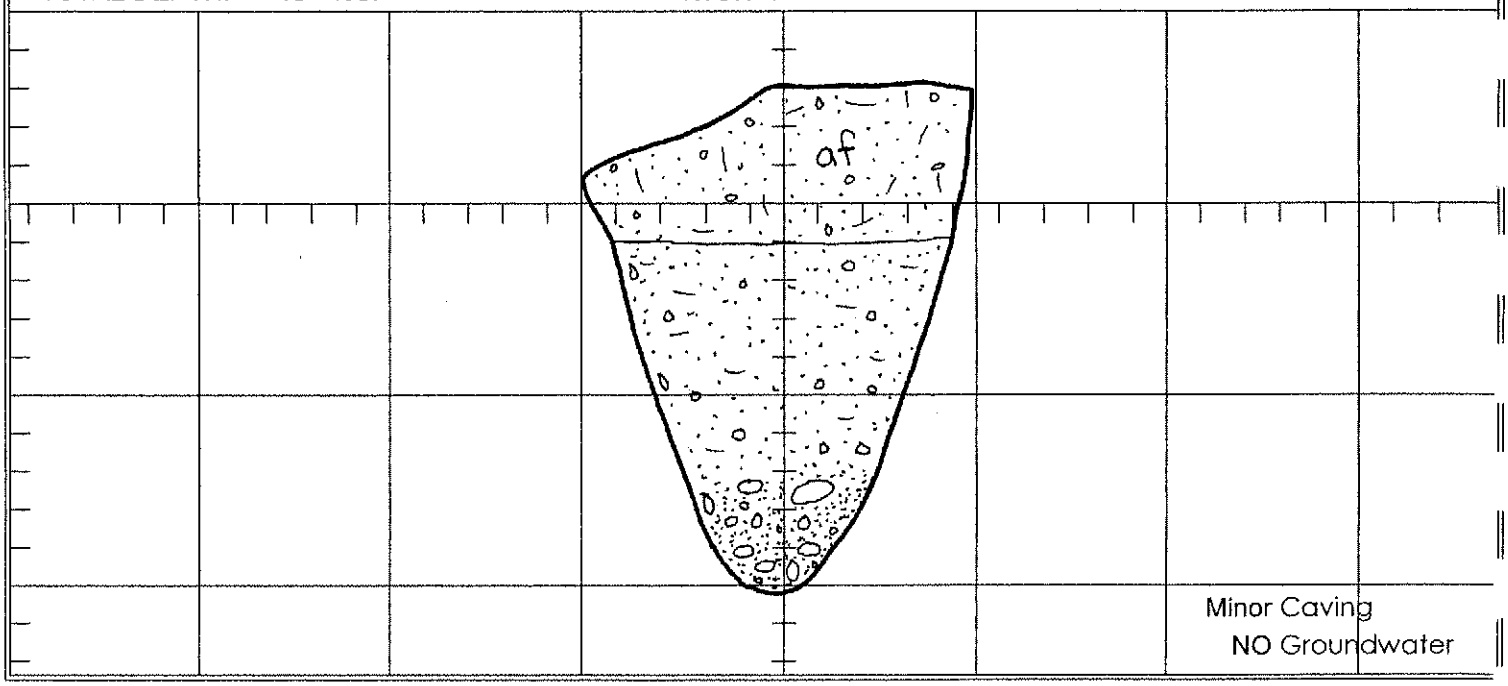
TOTAL DEPTH: 14 feet ←N74E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-32T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/20/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1076		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**ARTIFICIAL FILL; af (0-4')** @ 0' Silty clayey sand with gravel; loose to medium dense; damp to moist; brown to dark brown; wire, cloth, broken roots; minor caving				
5					**SOIL; (4-13')** @ 4' Silty clayey sand with gravel; medium dense; moist; brown to dark brown; roots, pinhole voids in clumps from bucket, rootlets				
10					@ 10' Silty clayey sand with gravel and cobbles; medium dense to dense; damp to moist; yellowish-brown; no voids in clumps from bucket				
15					COMMENTS: -Operator indicated digging was more difficult @ 10' -Logged from surface				
20									

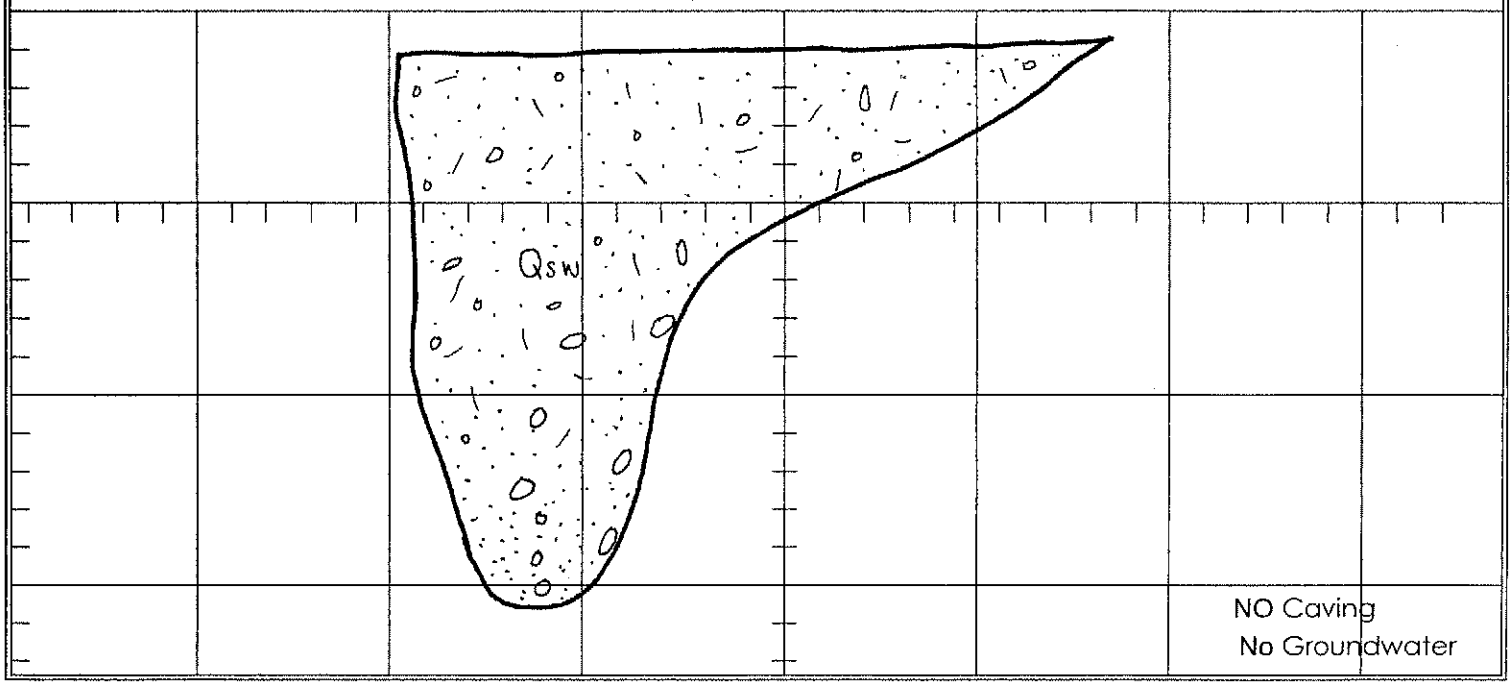
TOTAL DEPTH: 13 feet N75W→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG**	
PROJECT: Mesas East	DATE: 7/22/04	**NO. T-33T**	
	LOGGED BY: MAS		
	EXCAVATED: 10/21/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1007		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL/SLOPEWASH; Soil/Qsw (0-15')** @ 0' Silty clayey sand with gravel; medium dense; dry to damp; brown to dark brown; voids ≤1/4", roots, rootlets				
5					@ 4' Silty clayey sand with gravel and cobbles; medium dense to dense; damp; dark brown; no voids, rootlets				
10									
15					@ 14' Silty clayey sand with gravel and cobbles; loose to medium dense; wet; brown COMMENTS: -Last 6' logged from surface				
20									

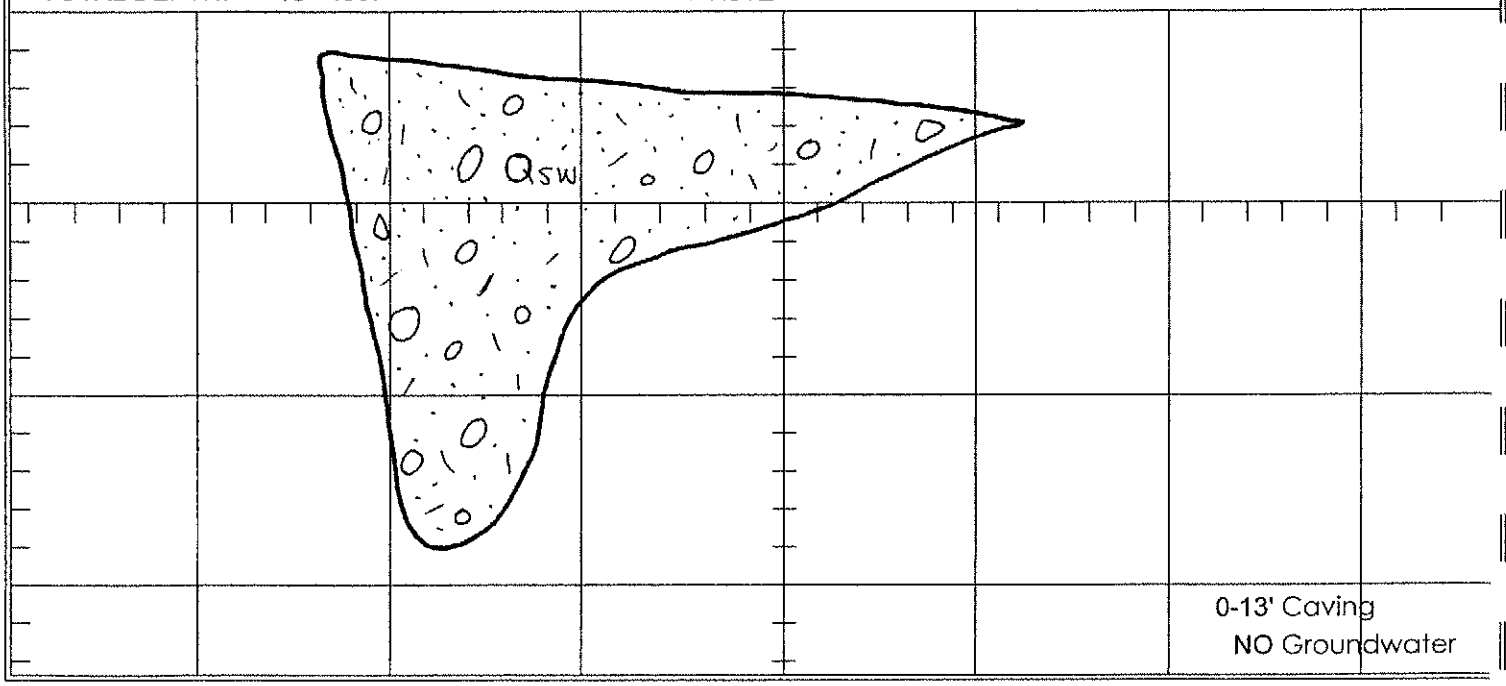
TOTAL DEPTH: 15 feet ←N62E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-34T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/21/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1060		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL/SLOPEWASH; Soil/Qsw (0-13')** @ 0' Silty clayey sand with gravel and cobbles; loose; dry; light brown to brown; roots and rootlets; caving				
5									
10									
15					COMMENTS: -Last 6' logged from surface				
20									

TOTAL DEPTH: 13 feet ←N51E SCALE: 1 inch = 5 feet

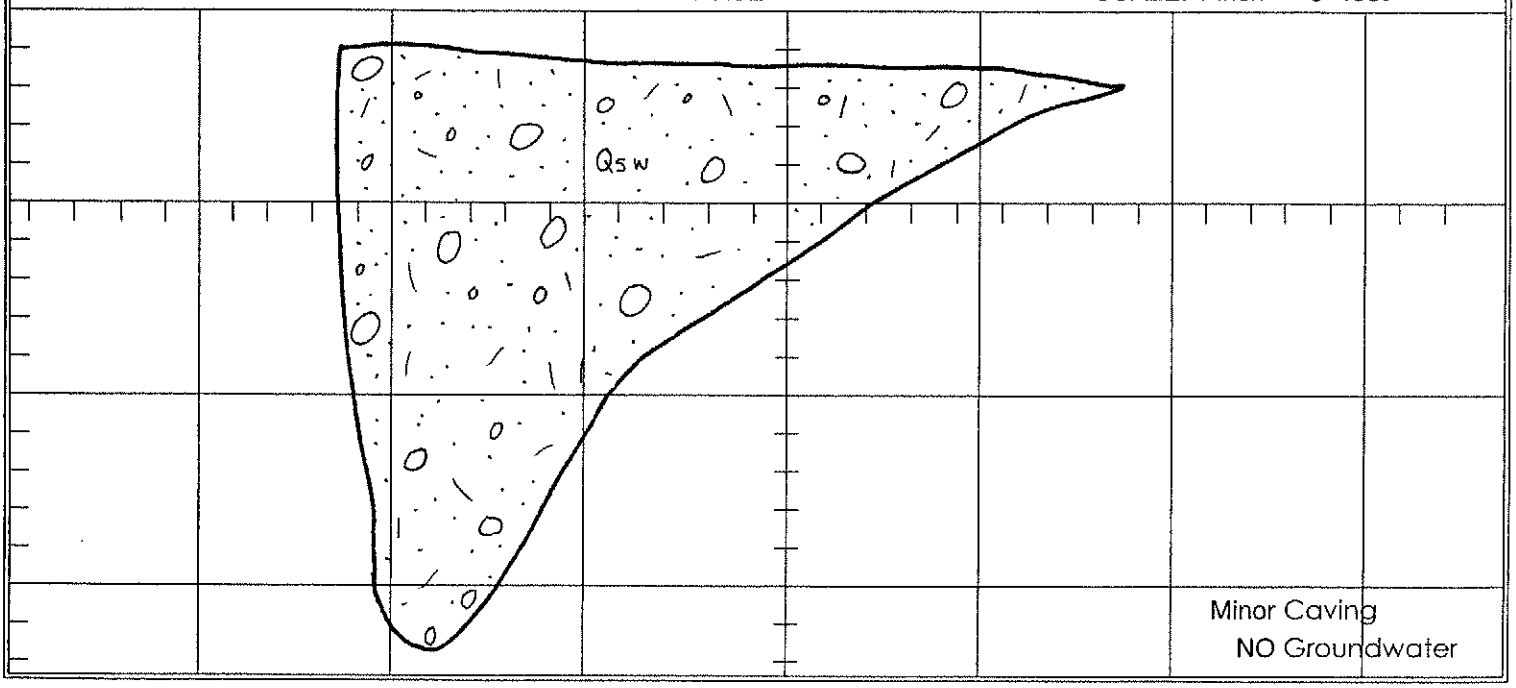


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-35T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/21/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1068		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SM	**SOIL/SLOPEWASH; Soil/Qsw (0-16')** @ 0' Silty sand with gravel; loose to medium dense; dry; light gray to light yellowish-gray; minor caving; rootlets, roots				
5									
10									
15					COMMENTS: -Last 6' logged from surface				
20									

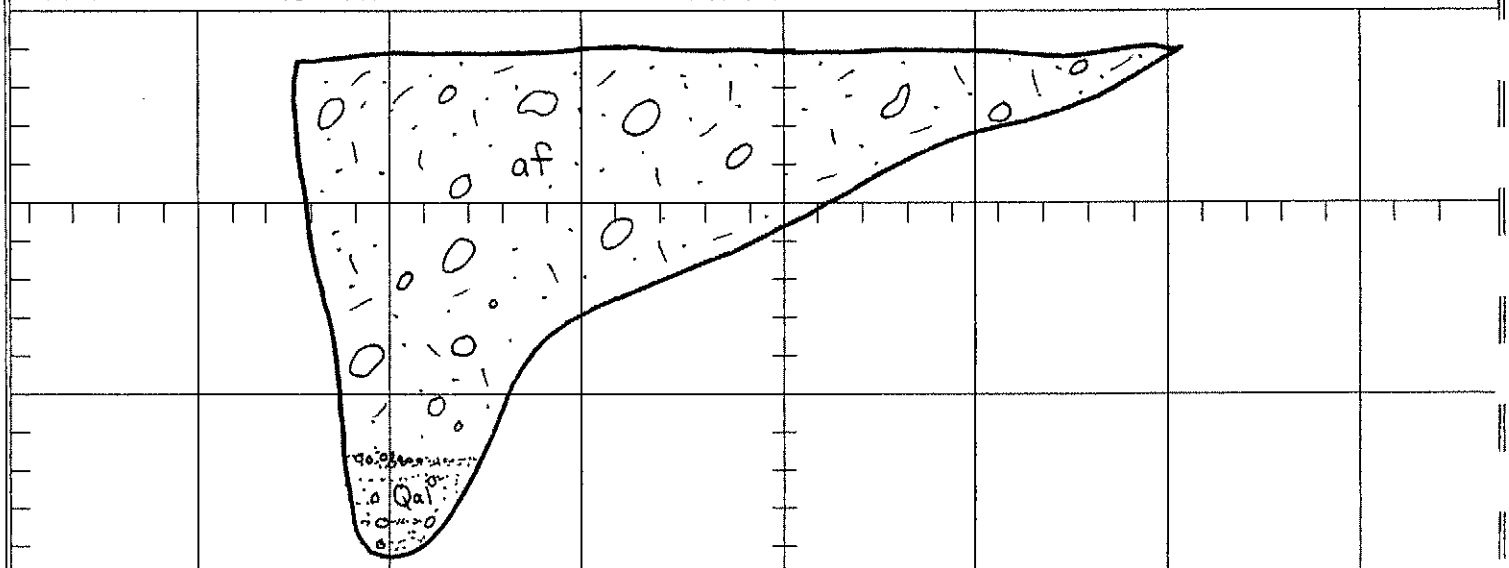
TOTAL DEPTH: 16 feet ←N8E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-36T**	
PROJECT: Mesas East	DATE: 7/22/09		
	LOGGED BY: MAS		
	EXCAVATED: 10/21/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1118		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SM	**SOIL/ARTIFICIAL FILL; Soil/af (0-9')** @ 0' Silty sandy gravel with cobbles; medium dense; damp; yellow to yellowish-brown; rootlets				
5									
10				SP	**QUATERNARY ALLUVIUM; Qal (9-13')** @ 9' Sand with gravel and cobbles; medium dense; damp; yellow	Apx. B:Horizontal			
15					COMMENTS: -Last 4' logged from surface				
20									

TOTAL DEPTH: 13 feet ←N10W SCALE: 1 inch = 5 feet

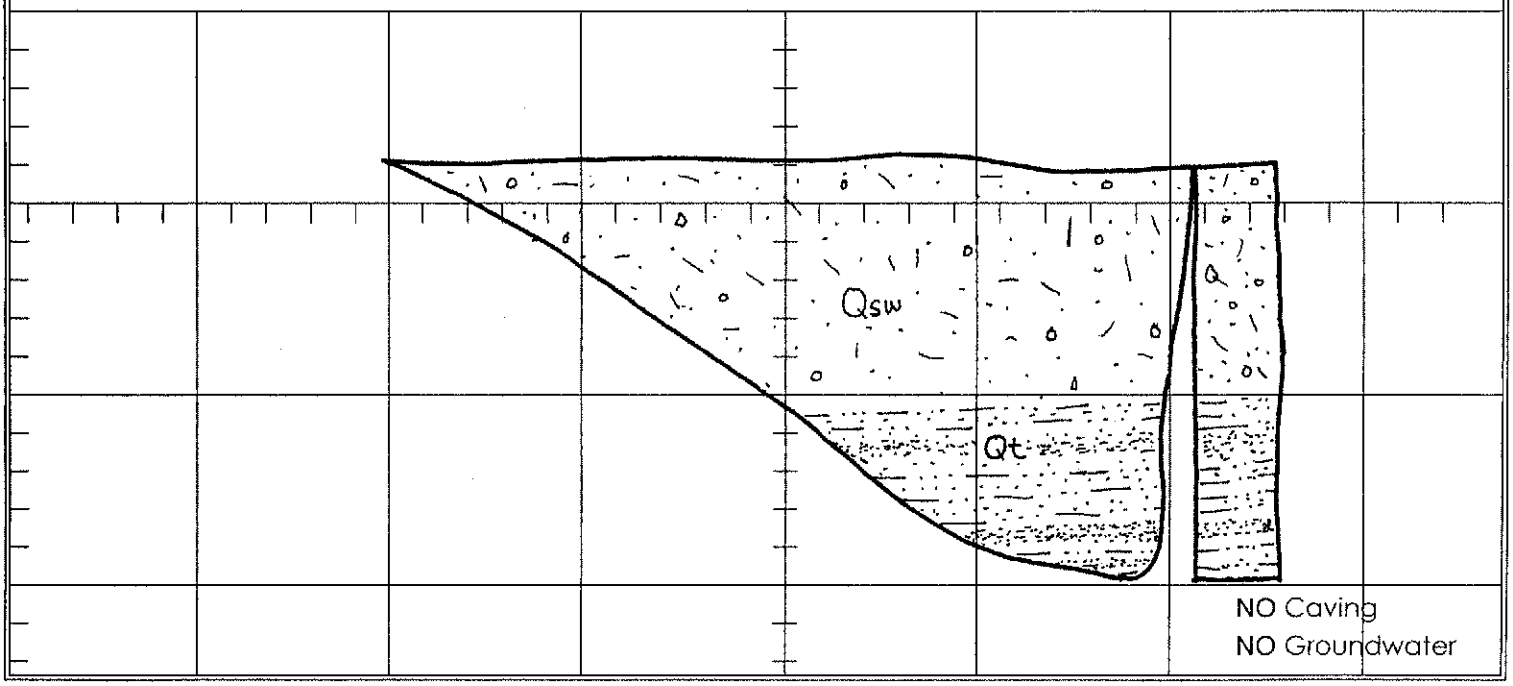


NO Caving
NO Groundwater

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-37T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/21/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1155		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL/SLOPEWASH; Soil/Qsw (0-7')** @ 0' Silty clayey sand with gravel; medium dense; dry to damp; brown; voids ≤1/4", roots, rootlets				
5				ML	**QUATERNARY TERRACE DEPOSITS; Qt (7-11')** @ 7' Sandy silt; firm to stiff; damp; light yellowish-brown; interbedded with fine-grained sand; medium dense; damp; light yellowish-brown to light yellow				
10									
15									
20									

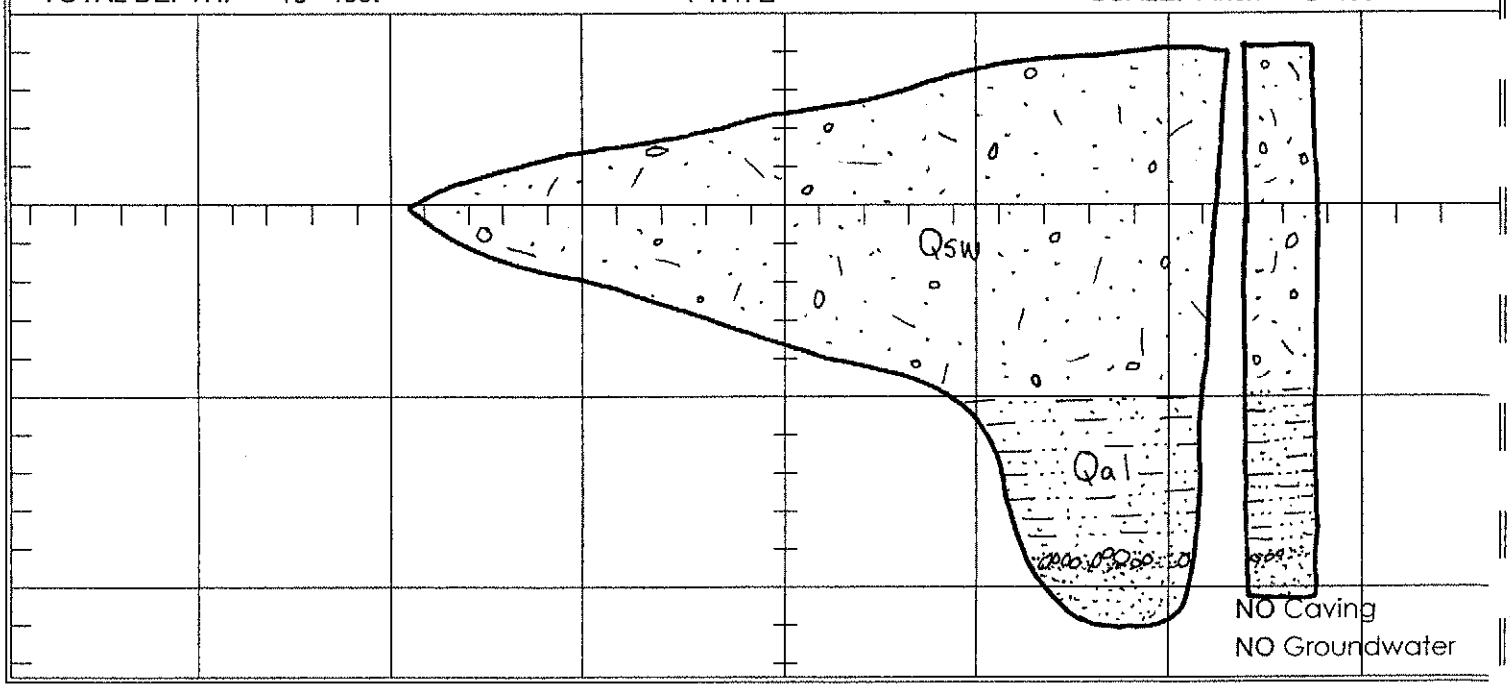
TOTAL DEPTH: 11 feet N42W→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-38T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/21/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1097		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL/SLOPEWASH; Soil/Qsw (0-9')** @ 0' Silty clayey sand with gravel; medium dense; dry to damp; brown to dark brown; voids ≤1/4" diameter, roots, rootlets				
5									
10				ML	**QUATERNARY ALLUVIUM; Qal (9-11')** @ 9' Sandy silt; firm to stiff; damp; light brown to yellow				
				SM	@ 13' Silty sand with gravel; medium dense; damp to moist; yellowish-brown to light brown	Apx. B:Horizontal			
15									
20									

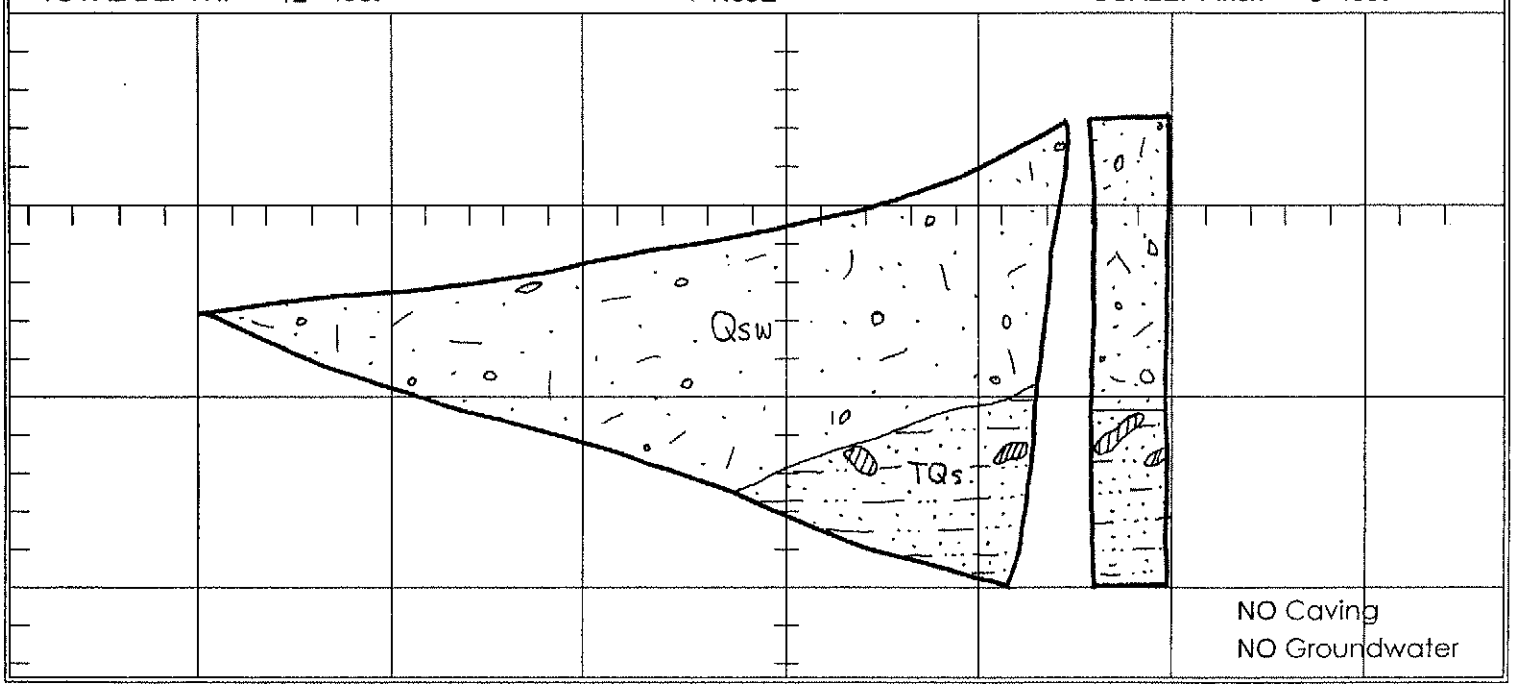
TOTAL DEPTH: 15 feet ←N47E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-39T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/21/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1065		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL/SLOPEWASH; Soil/Qsw (0-8')** @ 0' Silty clayey sand with gravel; medium dense; damp to moist; brown to dark brown; voids ≤1/4" diameter, roots, rootlets				
5									
					BEDROCK; TQs (8-12') @ 8' Light brown sandy siltstone; hard; moist; krotovina; weathered; rootlets @ 10' Light brown sandy siltstone; hard; moist				
10									
15									
20									

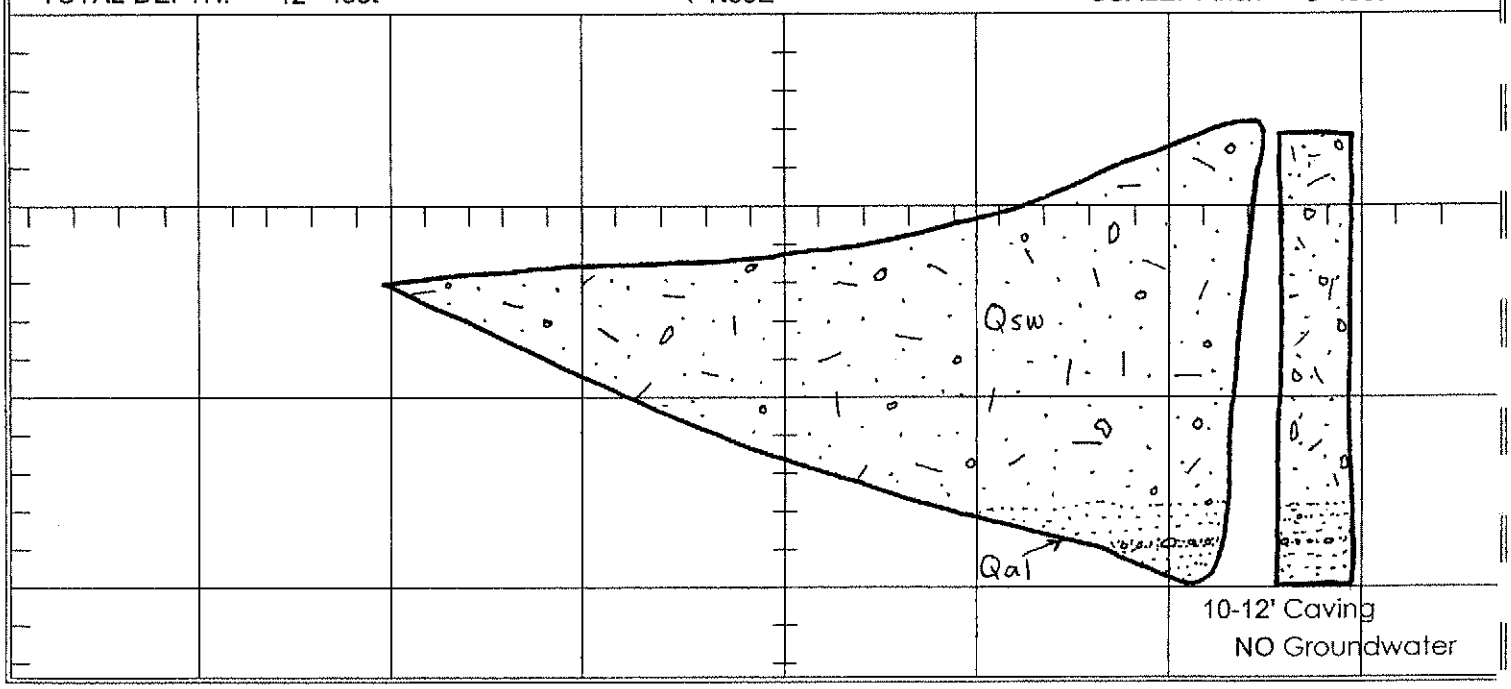
TOTAL DEPTH: 12 feet ←N39E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-40T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/21/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1043		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL/SLOPEWASH; Soil/Qsw (0-10')** @ 0' Silty clayey sand with gravel; medium dense; dry to damp; brown to dark brown; voids ≤1/8", roots, rootlets				
5									
10				SP	**QUATERNARY ALLUVIUM; Qal (10-12')** @ 10' Medium-to coarse grained sand; loose to medium dense; light gray; caving				
15									
20									

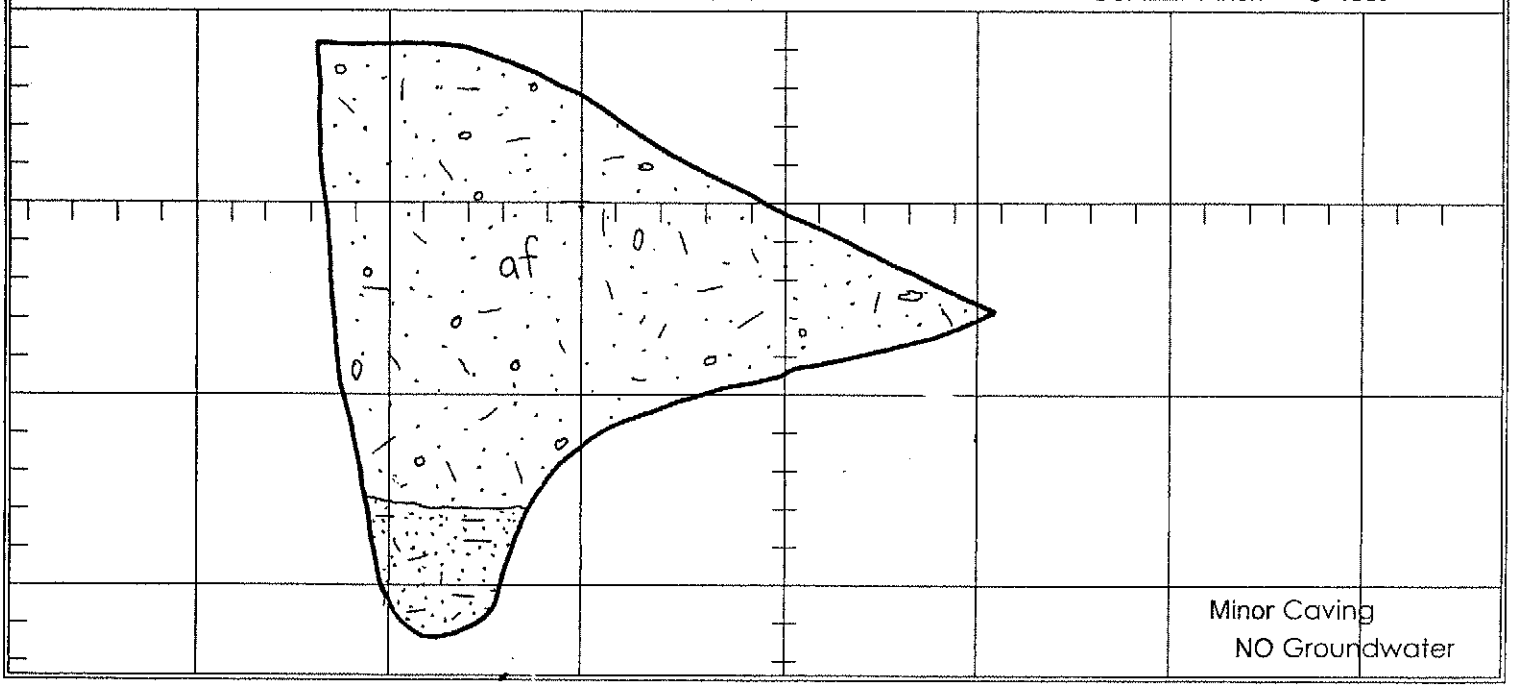
TOTAL DEPTH: 12 feet ←N35E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-41T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/21/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1006		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**ARTIFICIAL FILL; af (0-13')** @ 0' Silty clayey sand with gravel; loose to medium dense; dry; brown; no voids; minor caving 0-11'; miscellaneous trash (plastic, cloth, plywood, orange ribbon)				
5									
10									
				CL-ML	**SOIL; Soil (13-16')** @ 13' Silty clay with sand; firm; damp to moist; light brown to yellowish-brown; voids COMMENTS: -Last 5' were logged from surface				
15									
20									

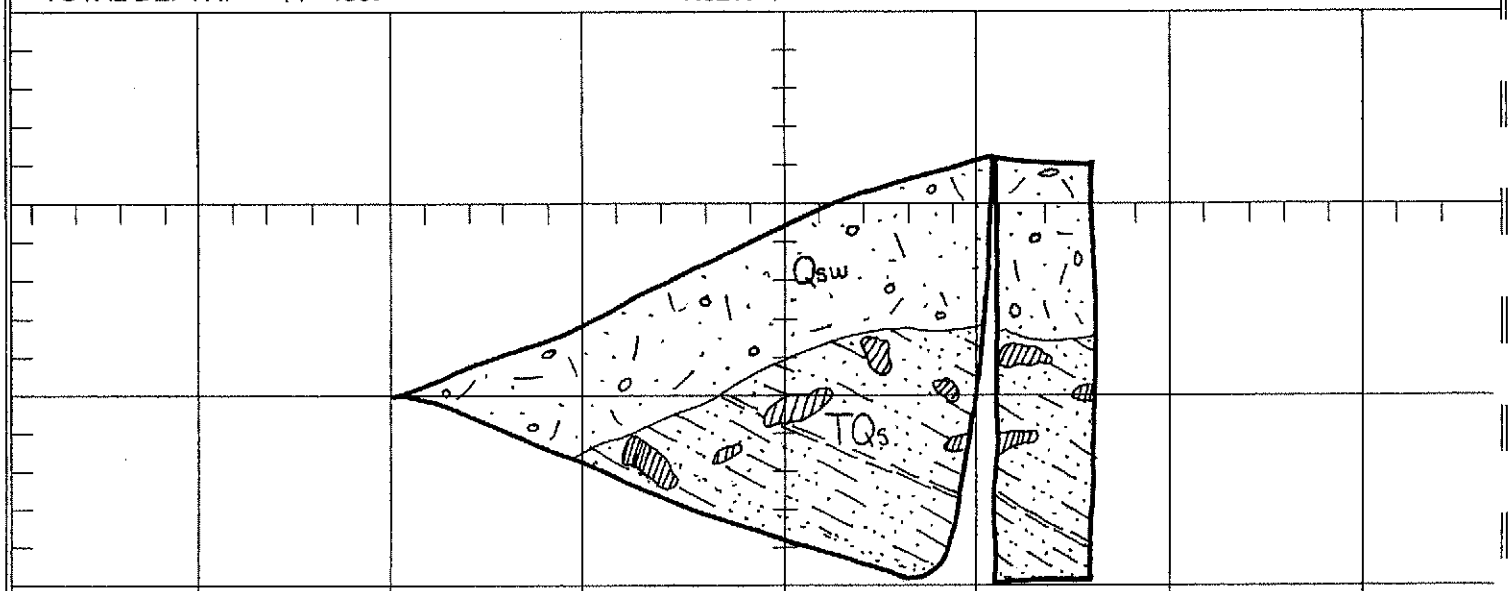
TOTAL DEPTH: 16 feet ←N10E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-42T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/21/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1056		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL/SLOPEWASH; Soil/Qsw (0-5')** @ 0' Silty clayey sand with gravel; medium dense; dry to damp; brown; pinhole voids, roots, rootlets				
5					**BEDROCK; TQs (5-11')** @ 5' Light brown sandy siltstone; soft to moderately hard; damp; krotovina; weathered; rootlets				
					@ 8' Moderately hard to hard; damp to moist; with local light reddish-brown silty claystone	B:N65W,32NE			
10									
15									
20									

TOTAL DEPTH: 11 feet N32W→ SCALE: 1 inch = 5 feet

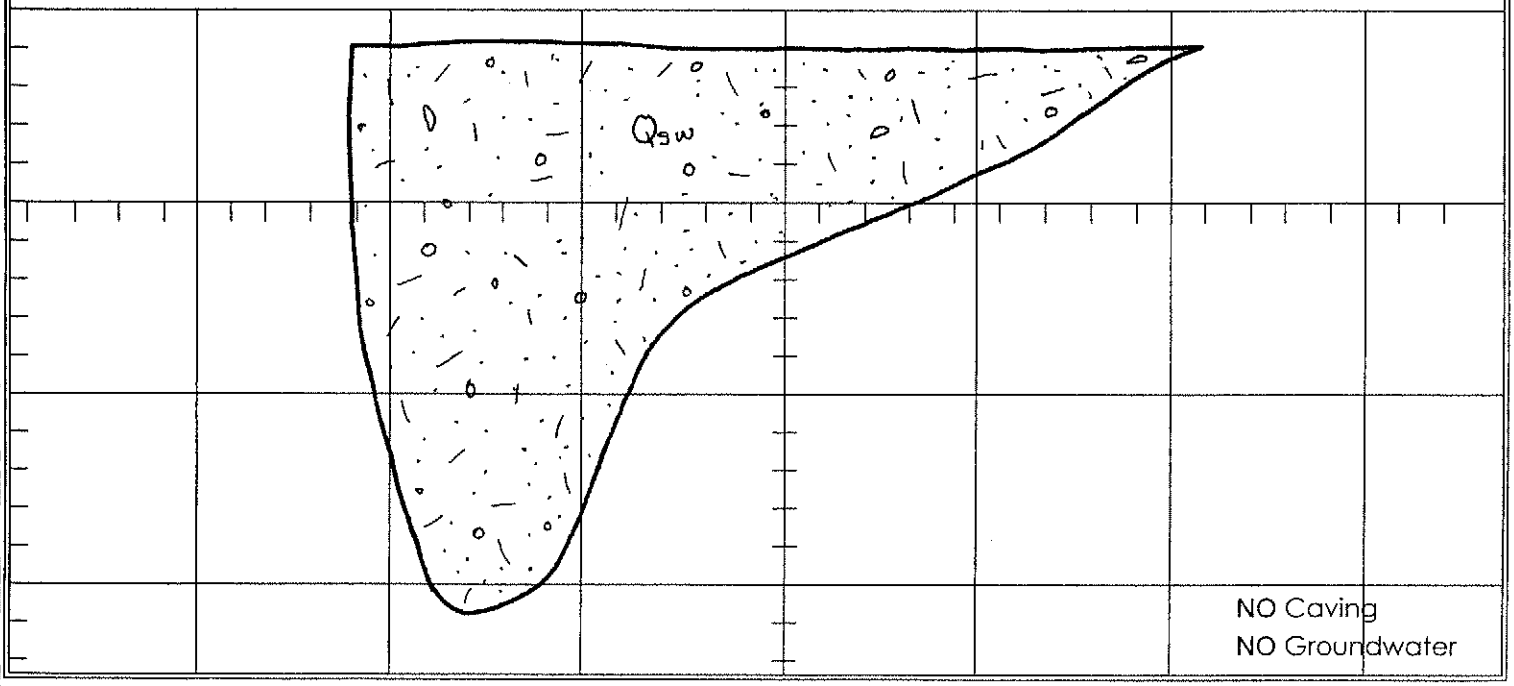


NO Caving
NO Groundwater

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-43T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/21/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1065		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; Soil/Qsw (0-15')** @ 0' Sandy silty clay with gravel; firm; dry to damp; light yellowish-brown; pinhole voids, rootlets				
5									
10									
15					COMMENTS: -Last 4' were logged from surface				
20									

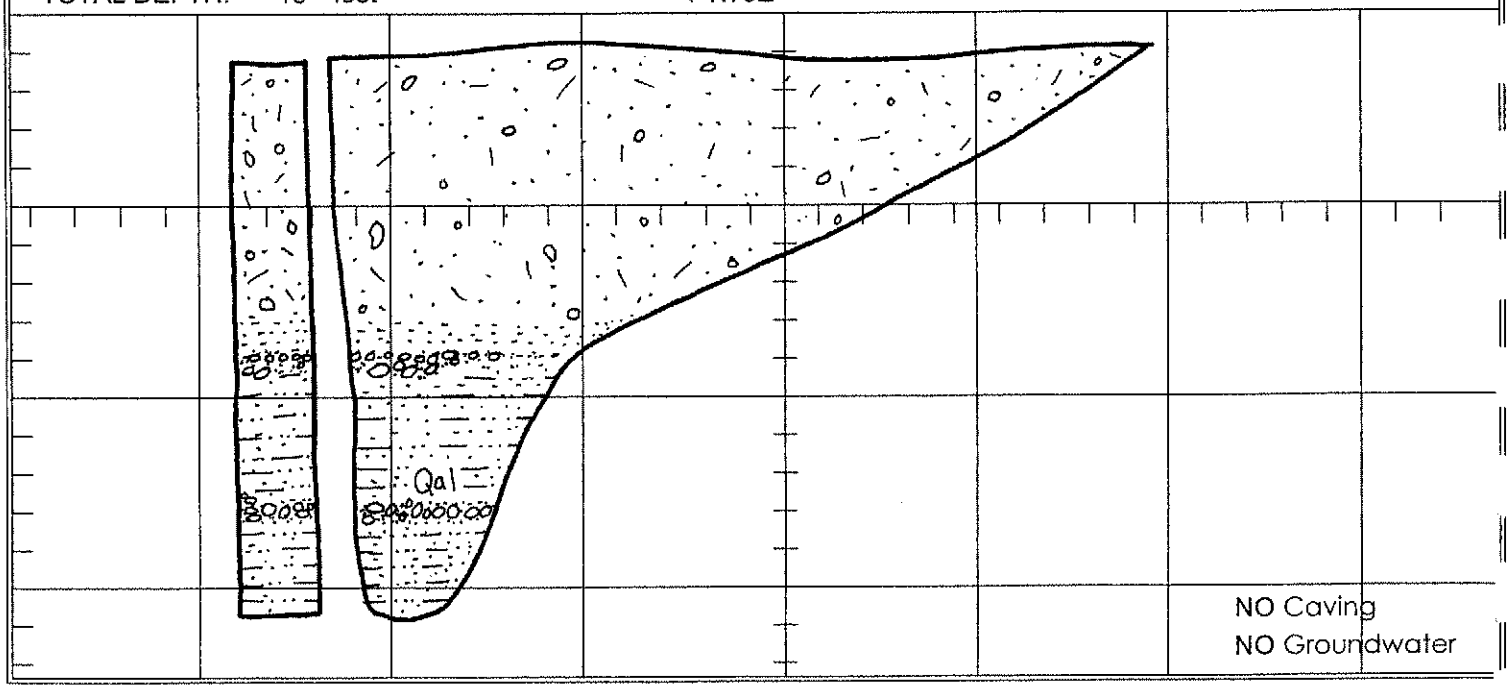
TOTAL DEPTH: 15 feet ←N72E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-44T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/21/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1036		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL; (0-7')** @ 0' Silty clayey sand with gravel; medium dense; damp; brown; pinhole voids, roots, rootlets				
5									
				SP	**QUATERNARY ALLUVIUM; Qal (7-10')** @ 7' Sand with gravel; loose to medium dense; damp; yellowish-brown to gray	Apx. B:Horizontal			
				ML	@ 9' Sandy silt with gravel; firm; damp to moist; light yellowish-brown				
10									
				SP	@ 12' Sand with gravel and cobbles; medium dense; damp; gray	Apx. B:Horizontal			
				ML	@ 13' Sandy silty with gravel; firm; damp to moist; light yellowish-brown				
15					COMMENTS: -Last 5' were logged from surface				
20									

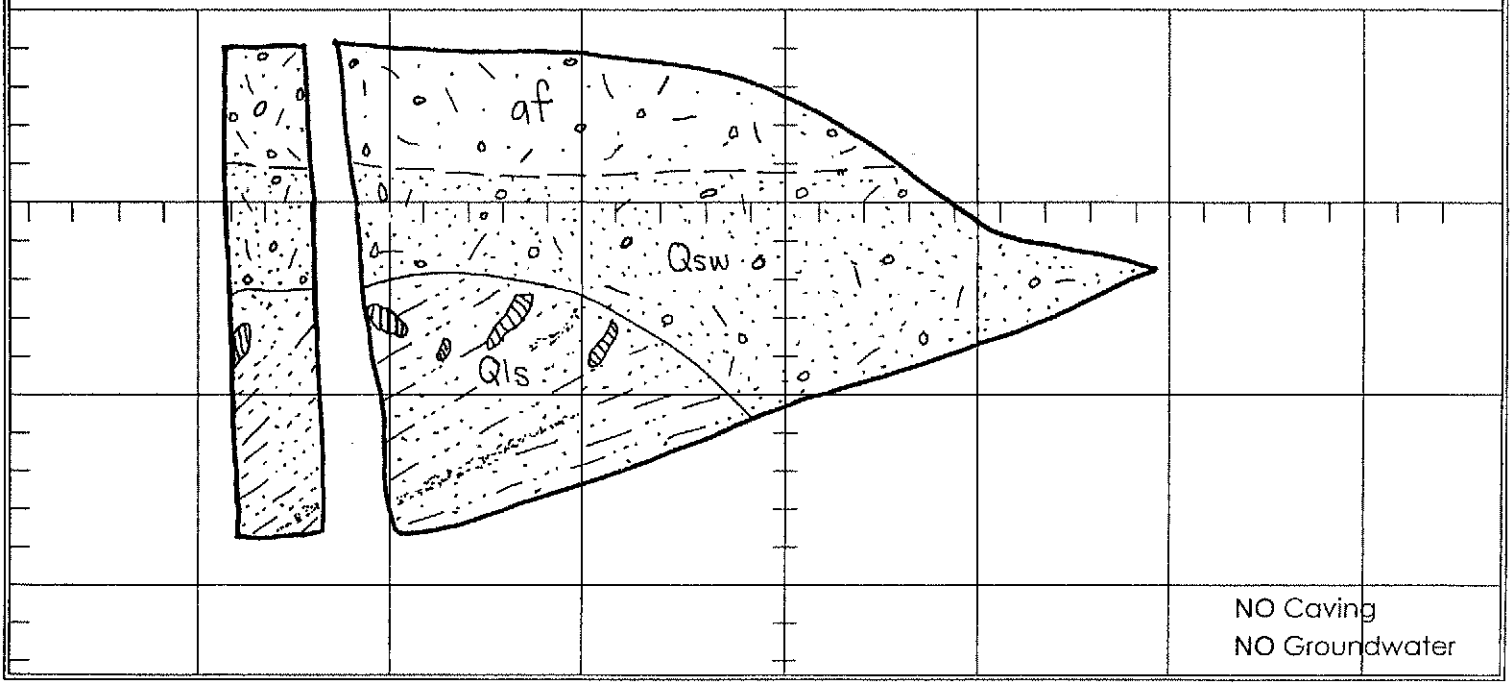
TOTAL DEPTH: 15 feet ←N70E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-45T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/22/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1028		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**ARTIFICIAL FILL; af (0-3')** @ 0' Silty clayey sand with gravel; medium dense to dense; dry; brown; no voids				
					SOIL/SLOPEWASH; Soil/Qsw (3-6') @ 3' Silty clayey sand with gravel; medium dense; dry to damp; brown to dark brown; pinhole voids				
5					**QUATERNARY LANDSLIDE; Qls (6-13')** @ 6' Light yellowish-brown sandy siltstone; moderately hard; damp; with interbedded yellowish-brown silty sandstone beds are discontinuouse; krotovina	B:N8W,49SW			
10									
15									
20									

TOTAL DEPTH: 13 feet N53E→ SCALE: 1 inch = 5 feet

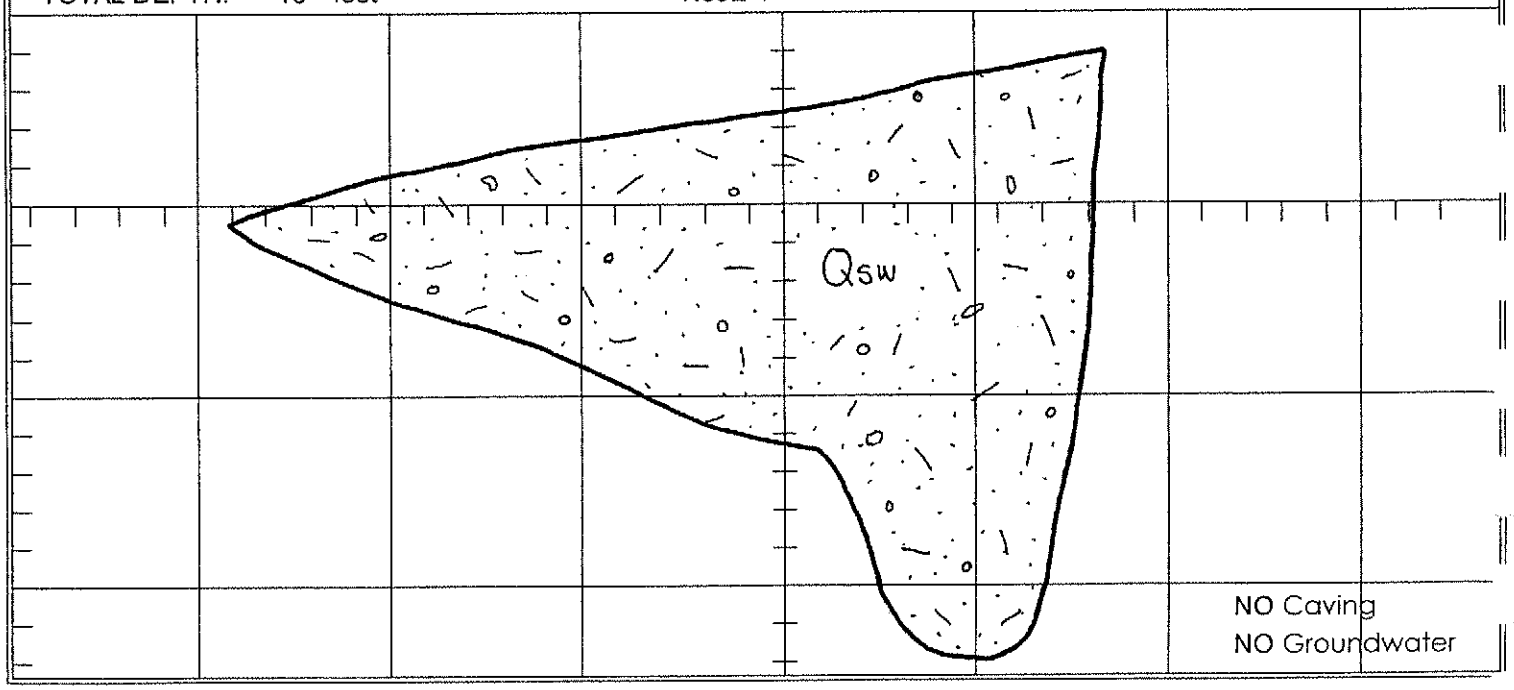


NO Caving
NO Groundwater

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-46T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/22/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1037		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL/SLOPEWASH; Soil/Qsw (0-16')** @ 0' Silty clayey sand with gravel; medium dense; dry; brown; voids ≤1/4", rootlets				
5				ML	@ 6' Sandy silt; soft to firm; damp; light yellowish-brown; voids ≤1/8", rootlets				
10									
15					@ 16' Same; clumps from bucket contained pinhole voids and rootlets COMMENTS: -Last 4' logged from surface				
20									

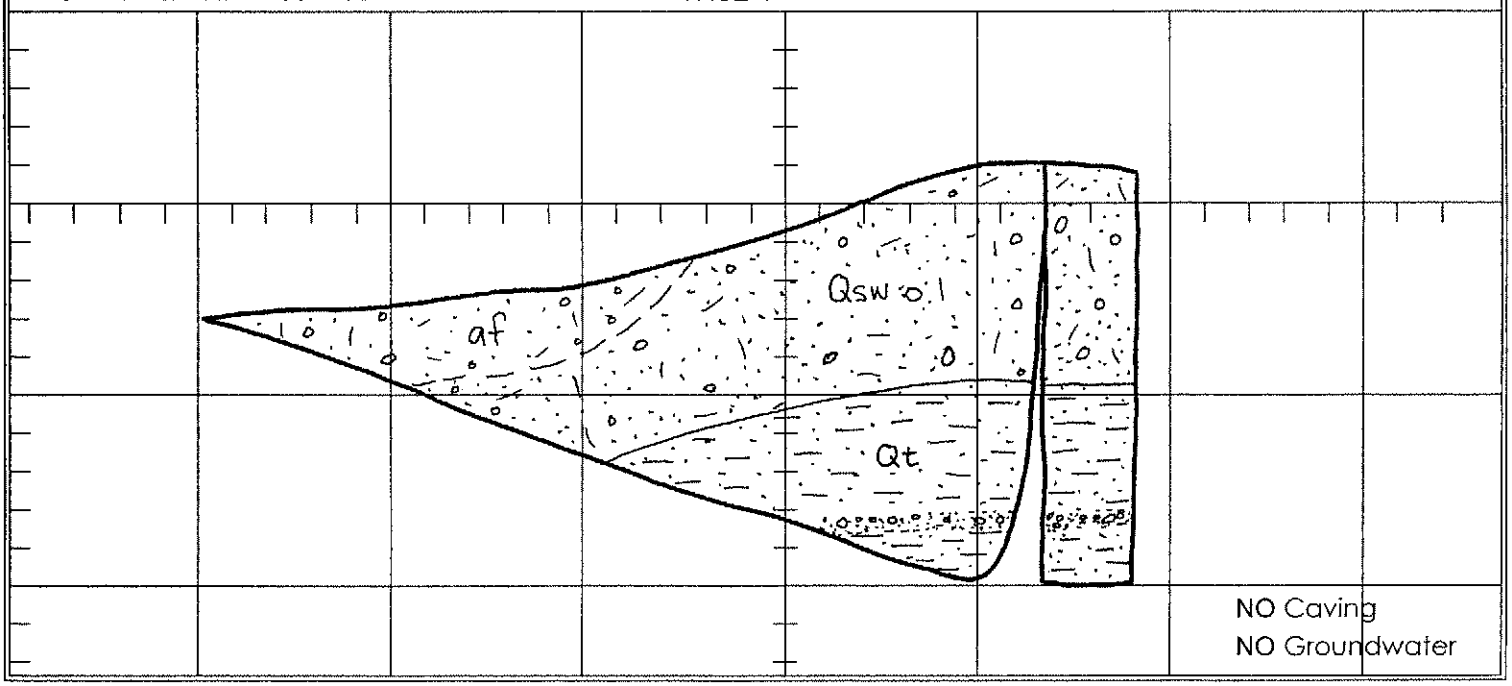
TOTAL DEPTH: 16 feet N89E→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-47T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/22/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1086		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL/SLOPEWASH; Soil/Qsw (0-6')** @ 0' Silty clayey sand with gravel; medium dense; dry to damp; brown; voids ≤1/8", roots, rootlets				
5				CL-ML	**QUATERNARY TERRACE; Qt (6-11')** @ 6' Sandy clayey silt; soft to firm; damp; light yellowish-brown; pinhole voids, rootlets				
				SM	@ 9' Silty sand with gravel; medium dense; damp; gray to light brown				
10				CL-ML	@ 10' Sandy clayey silt; firm; damp; light yellowish brown				
15									
20									

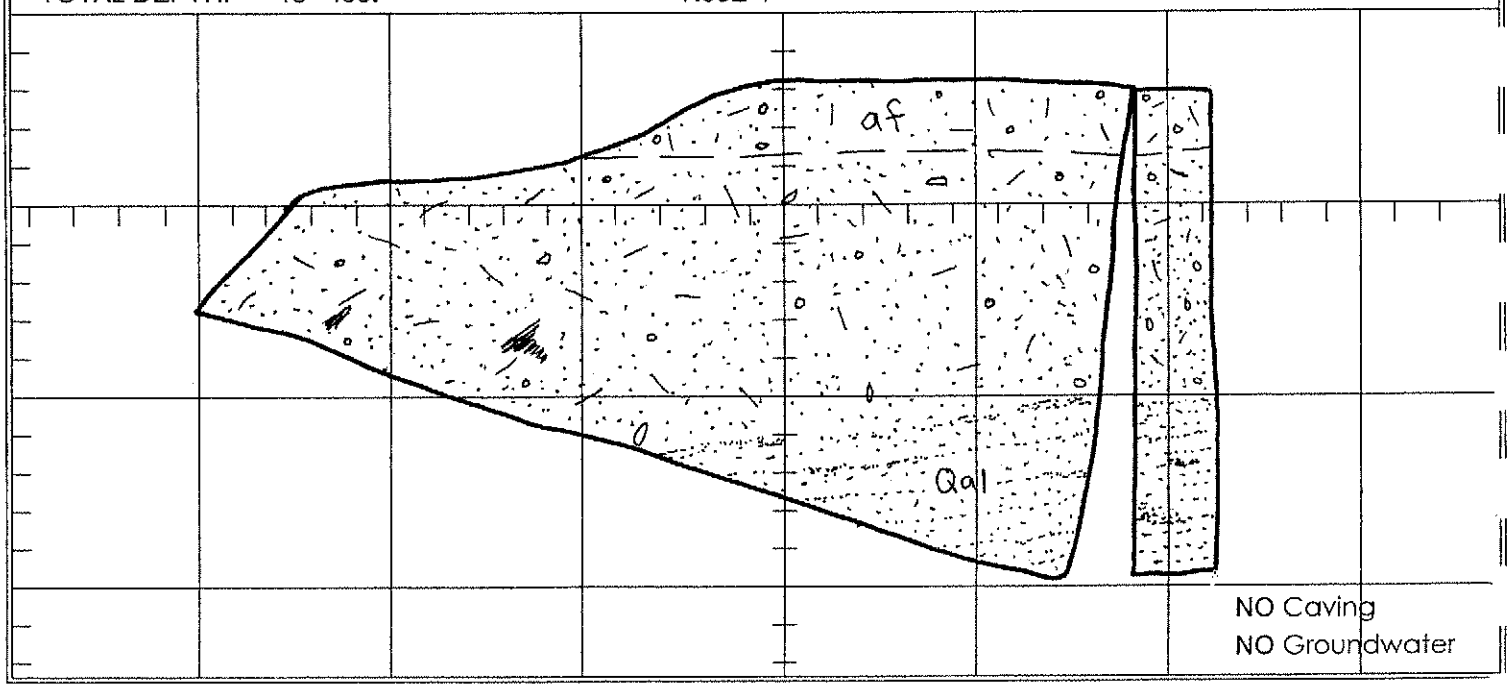
TOTAL DEPTH: 11 feet N48E→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-48T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/22/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1098		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**ARTIFICIAL FILL; af (0-2')** @ 0' Silty clayey sand with gravel; medium dense; dry; brown				
					SOIL; Soil (2-8') @ 2' Silty clayey sand with gravel; medium dense; dry to damp; brown to dark brown ; voids ≤2" in diameter (burrows to 8'), roots, rootlets				
5									
					@ 7' Same; Coarse sand channels; loose to medium dense; yellowish-brown				
				SM	**QUATERNARY ALLUVIUM; Qal (8-13')** @ 8' Silty sand with gravel; loose to medium dense; damp; yellowish-brown	Contact: Horizontal			
10									
15									
20									

TOTAL DEPTH: 13 feet N55E→ SCALE: 1 inch = 5 feet



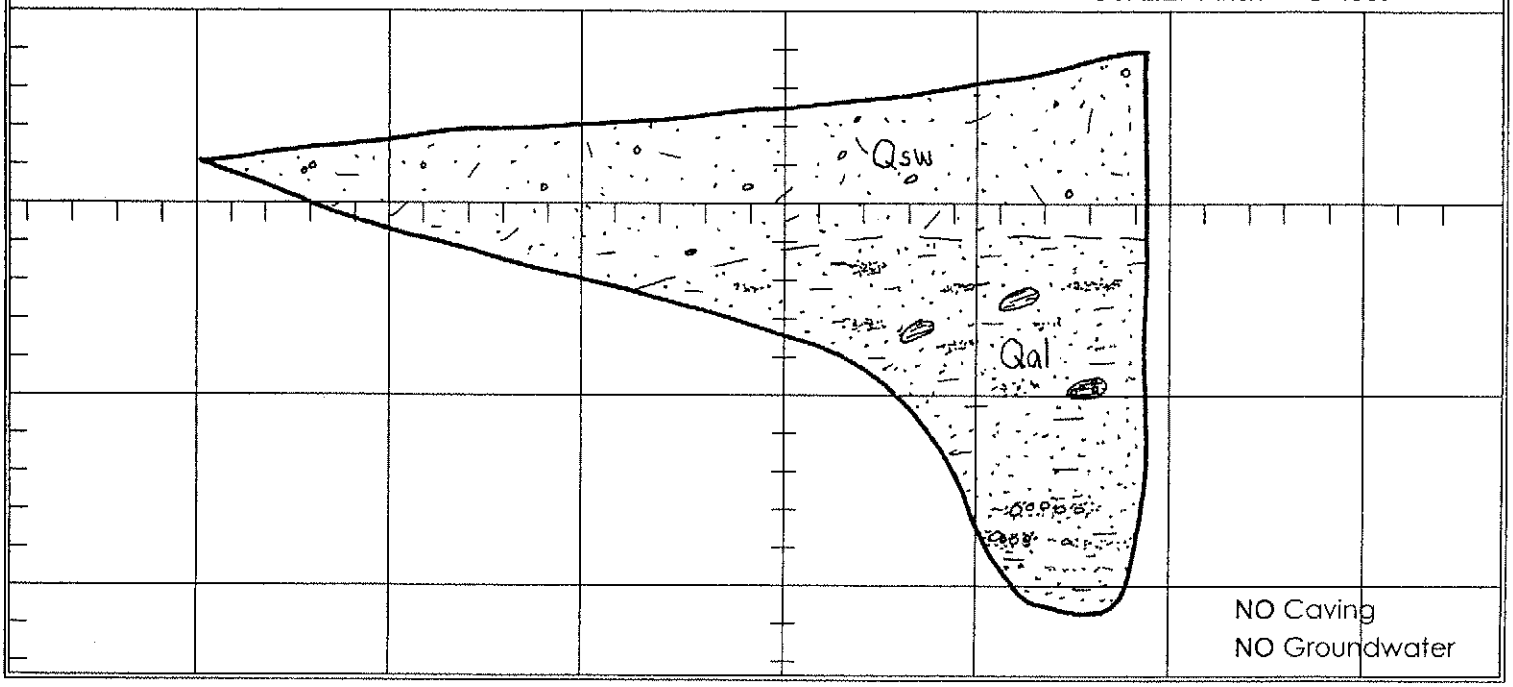
NO Caving
NO Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG**	
PROJECT: Mesas East	DATE: 7/22/04	**NO. T-49T**	
	LOGGED BY: MAS		
	EXCAVATED: 10/22/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1120		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL/SLOPEWASH; Soil/Qsw (0-12')** @ 0' Silty clayey sand with gravel; medium dense; dry to damp; brown; voids ≤1/8", rootlets				
5					@ 5' Same; with channels of silty coarse-grained sand; loose to medium dense; yellowish-brown; rootlets; clast of light brown sandy siltstone, pebbly sandstone, yellowish brown to yellow; clast supported conglomerate				
10				SM	**QUATERNARY ALLUVIUM; Qal (12-16')** @ 12' Silty sand with gravel; medium dense; damp; light yellowish-brown				
15					COMMENTS: -Last 6' logged from surface				
20									

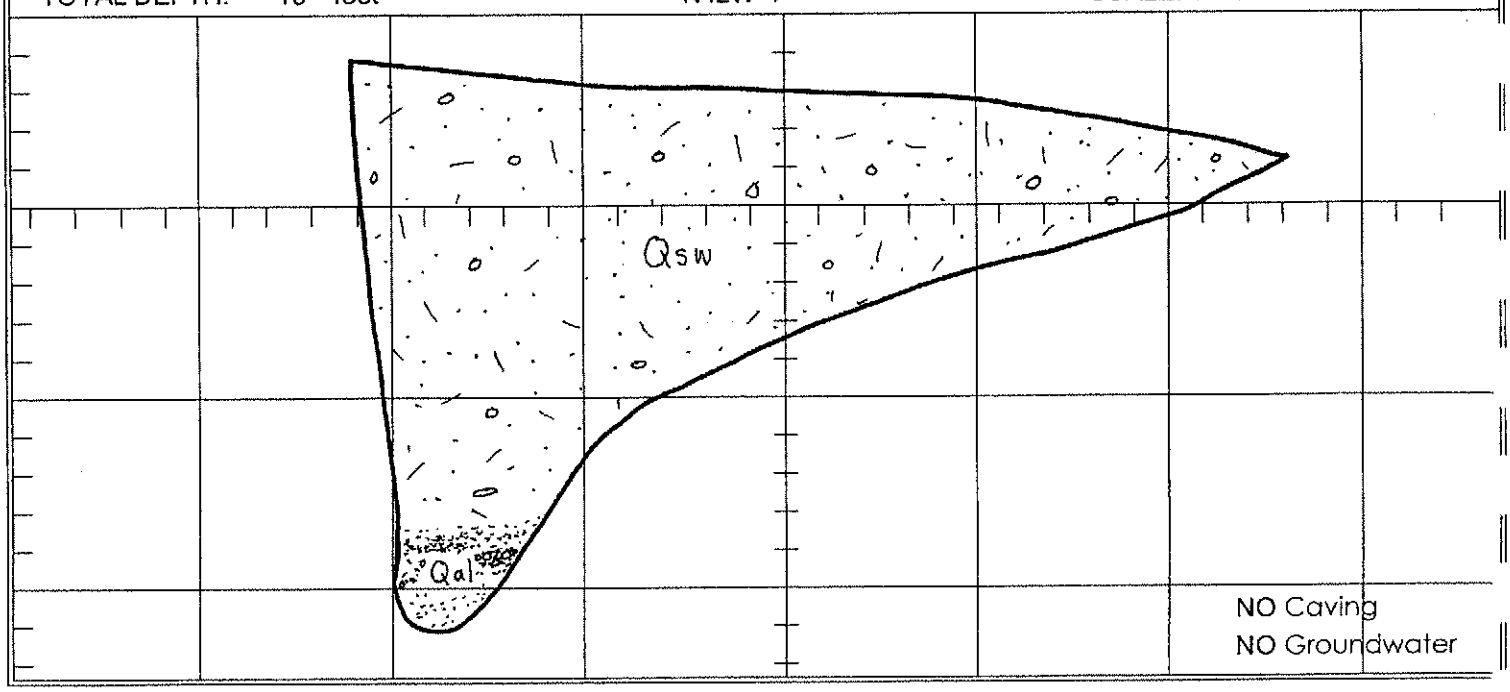
TOTAL DEPTH: 16 feet N34E→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-50T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/22/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1128		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL/SLOPEWASH; Soil/Qsw (0-12')** @ 0' Silty clayey sand with gravel to silty sandy gravel; medium dense; dry; brown; roots, rootlets; voids ≤1/2"				
5									
10									
				SM	**QUATERNARY ALLUVIUM; Qal (12-15')** @ 12' Silty sand with gravel; medium dense; dry to damp; light yellowish-brown				
15					COMMENTS: -Last 4' logged from surface				
20									

TOTAL DEPTH: 15 feet N42W→ SCALE: 1 inch = 5 feet

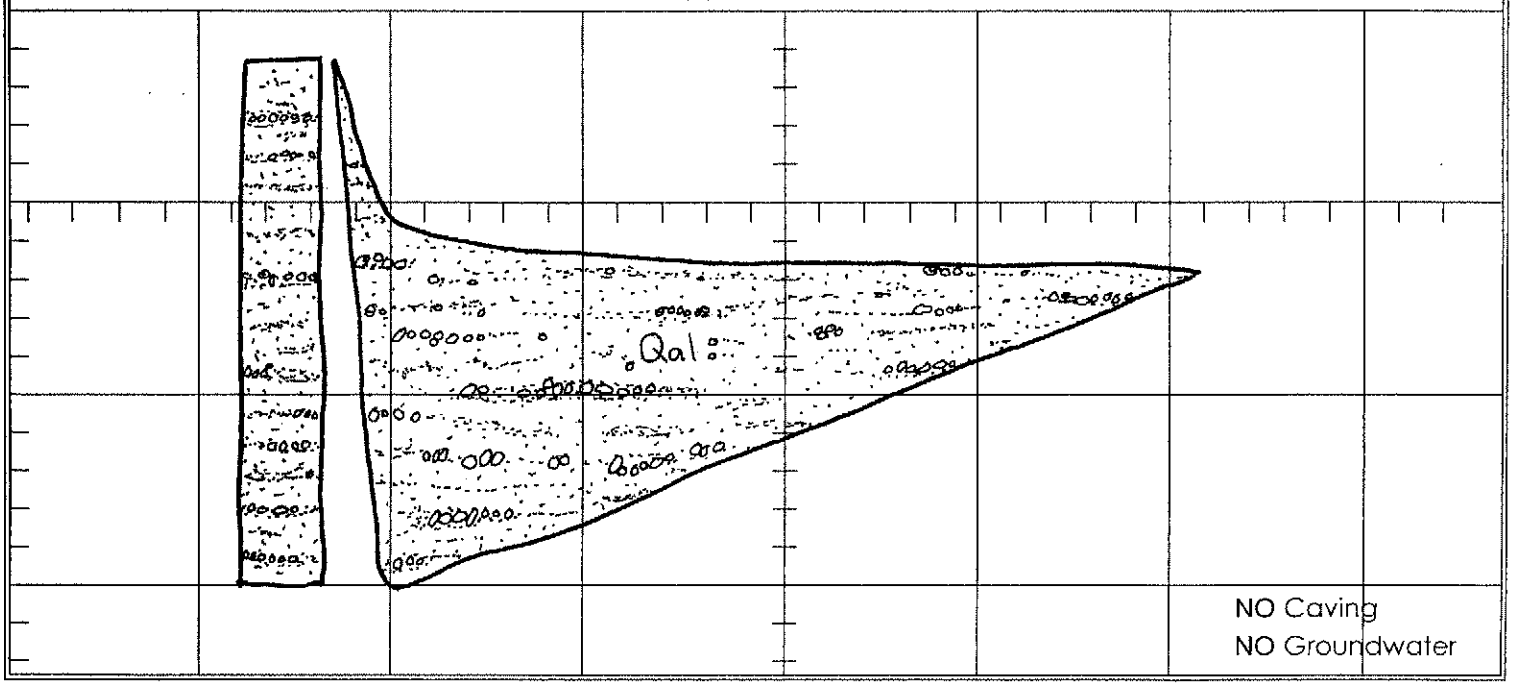


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-51T**	
PROJECT: Mesas East	DATE: 7/21/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/22/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1130		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SP	**QUATERNARY ALLUVIUM; Qal (0-14')** @ 0' Silty sand with gravel to sandy gravel; medium dense; dry to damp; roots, rootlets	B:Horizontal			
5									
					@ 8' Same; no roots or rootlets				
10									
15									
20									

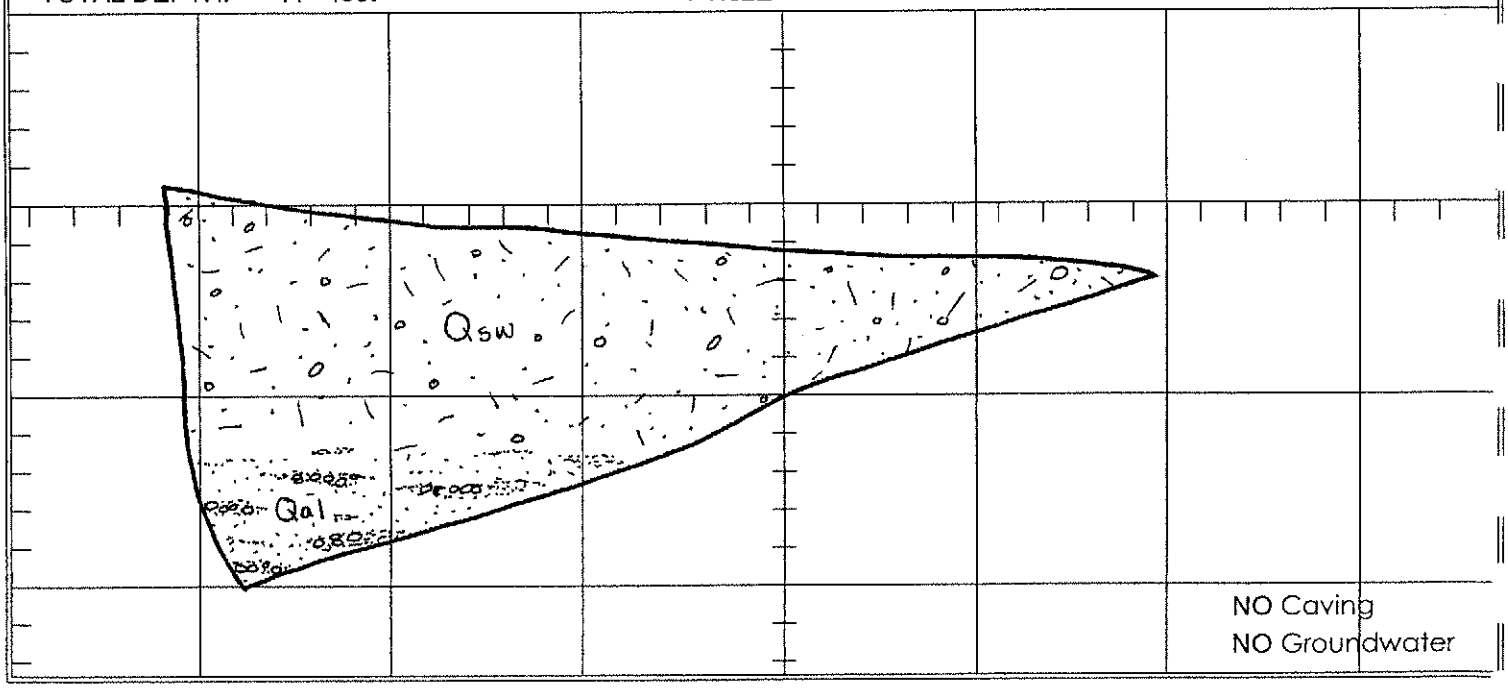
TOTAL DEPTH: 14 feet N72W→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-52T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/22/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1160		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL/SLOPEWASH; Soil/Qsw (0-7')** @ 0' Silty clayey sand with gravel; medium dense; dry to damp; brown; voids <1/8", roots, rootlets				
5				SM	**QUATERNARY ALLUVIUM; Qal (7-11')** @ 7' Silty sand with gravel and cobbles; medium dense; damp; yellowish-brown to light gray				
10									
15									
20									

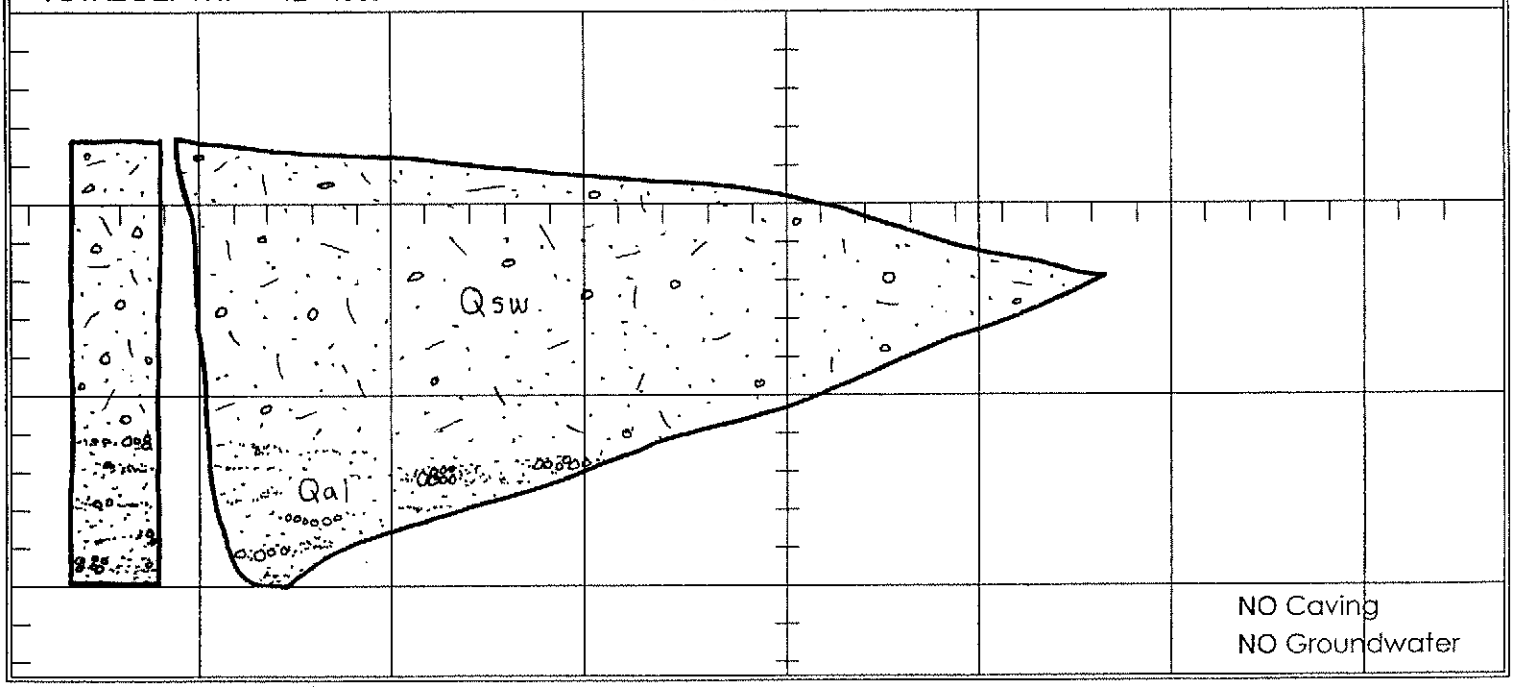
TOTAL DEPTH: 11 feet ←N82E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-53T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/22/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1263		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL/SLOPEWASH; Soil/Qsw (0-7')** @ 0' Silty clayey sandy with gravel; medium dense; dry; brown; voids ≤1/8" diameter, roots, rootlets				
5				SM	**QUATERNARY ALLUVIUM; Qal (7-12')** @ 7' Silty sand with gravel to sandy gravel; medium dense; dry to damp; light brown to yellowish-brown; gravel channels	B:Horizontal			
10									
15									
20									

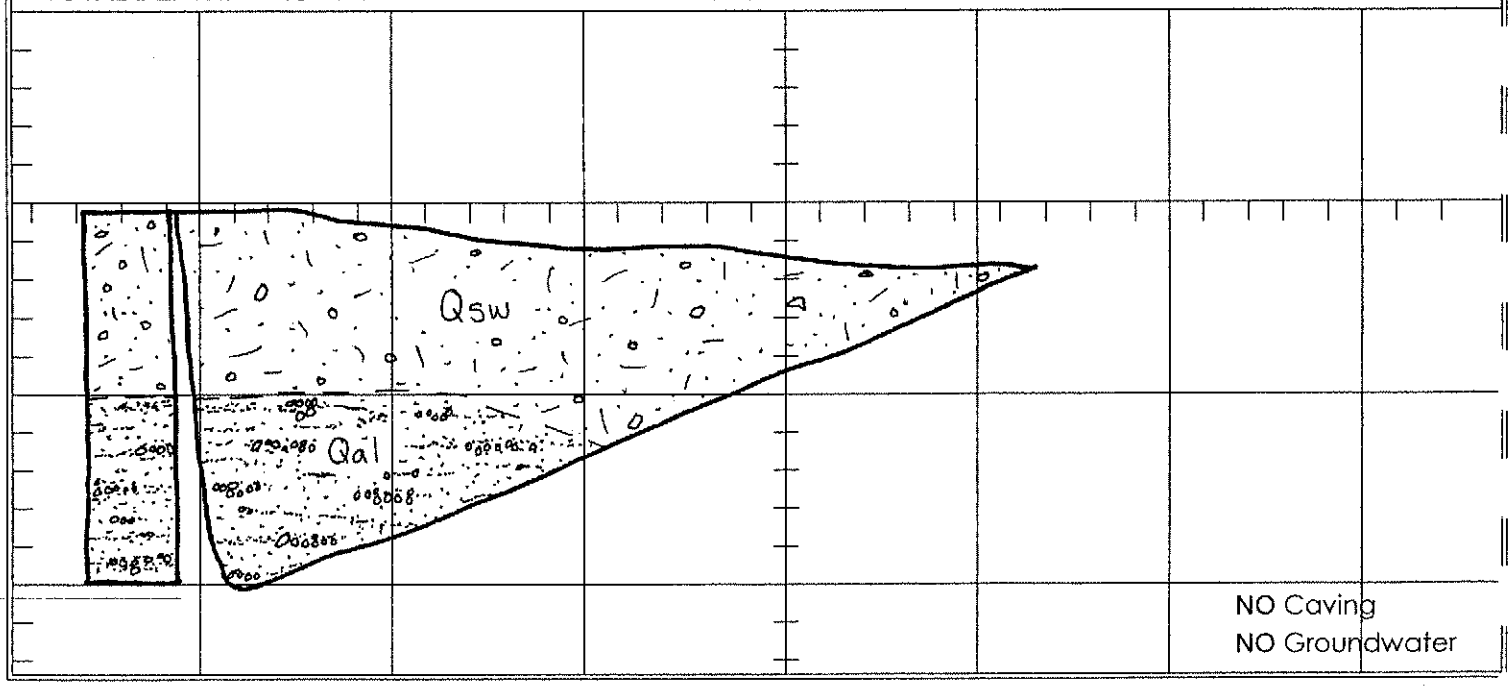
TOTAL DEPTH: 12 feet ←N21E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-54T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/22/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1232		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**SOIL/SLOPEWASH; Soil/Qsw (0-5')** @ 0' Silty clayey sand with gravel; medium dense; dry; brown; voids ≤1/4", roots, rootlets				
5				SM	**QUATERNARY ALLUVIUM; Qal (5-10')** @ 5' Silty sand with gravel; medium dense; dry; yellowish-brown to silty sandy gravel; medium dense; dry; light gray; channels; rootlets				
10									
15									
20									

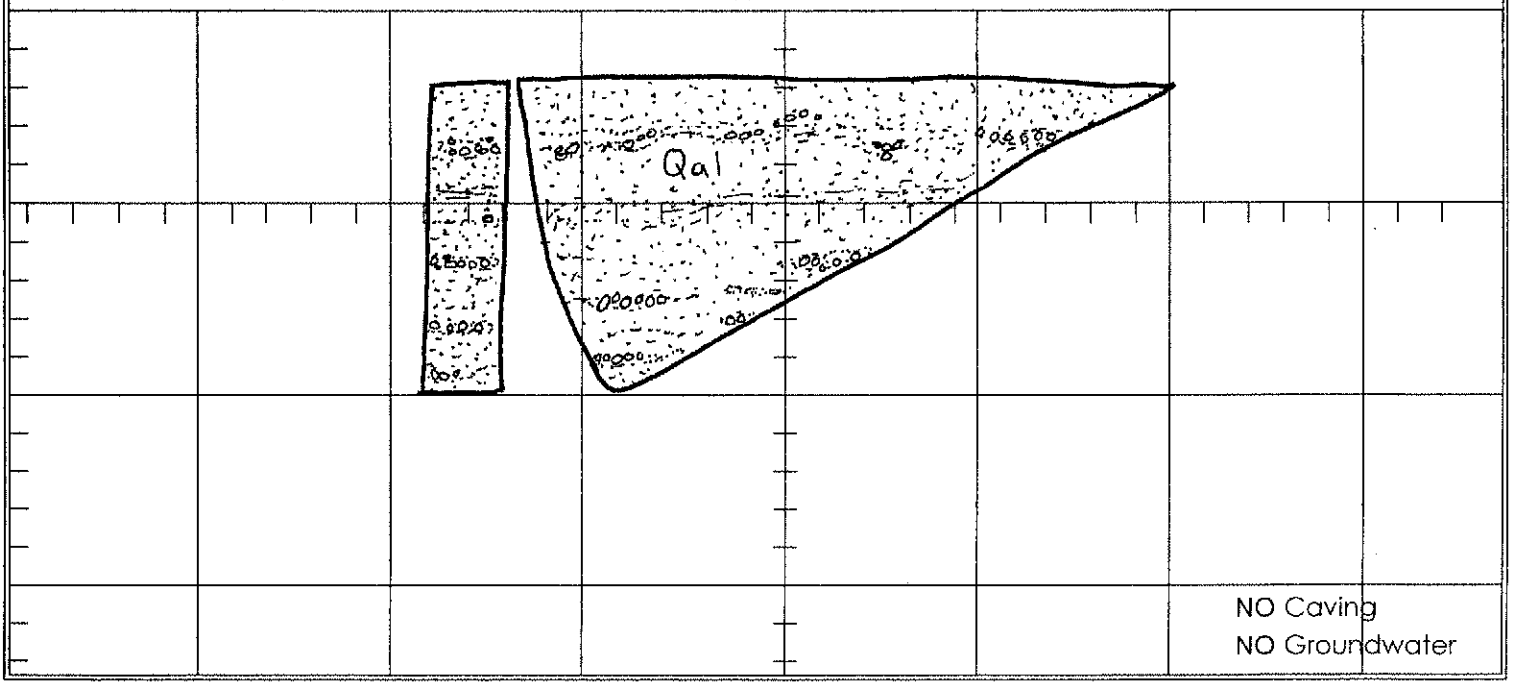
TOTAL DEPTH: 10 feet ←N45E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-55T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/22/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1202		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**QUATERNARY ALLUVIUM; Qal (0-8')** @ 0' Silty sand with gravel to sandy gravel; medium dense; dry; light gray to light brown; rootlets, roots interbedded with sandy silt, soft to firm, dry to damp, light brown; pinhole voids				
5					@ 5' Same; operator indicated digging was harder; cobbles; no voids, roots, or rootlets				
10									
15									
20									

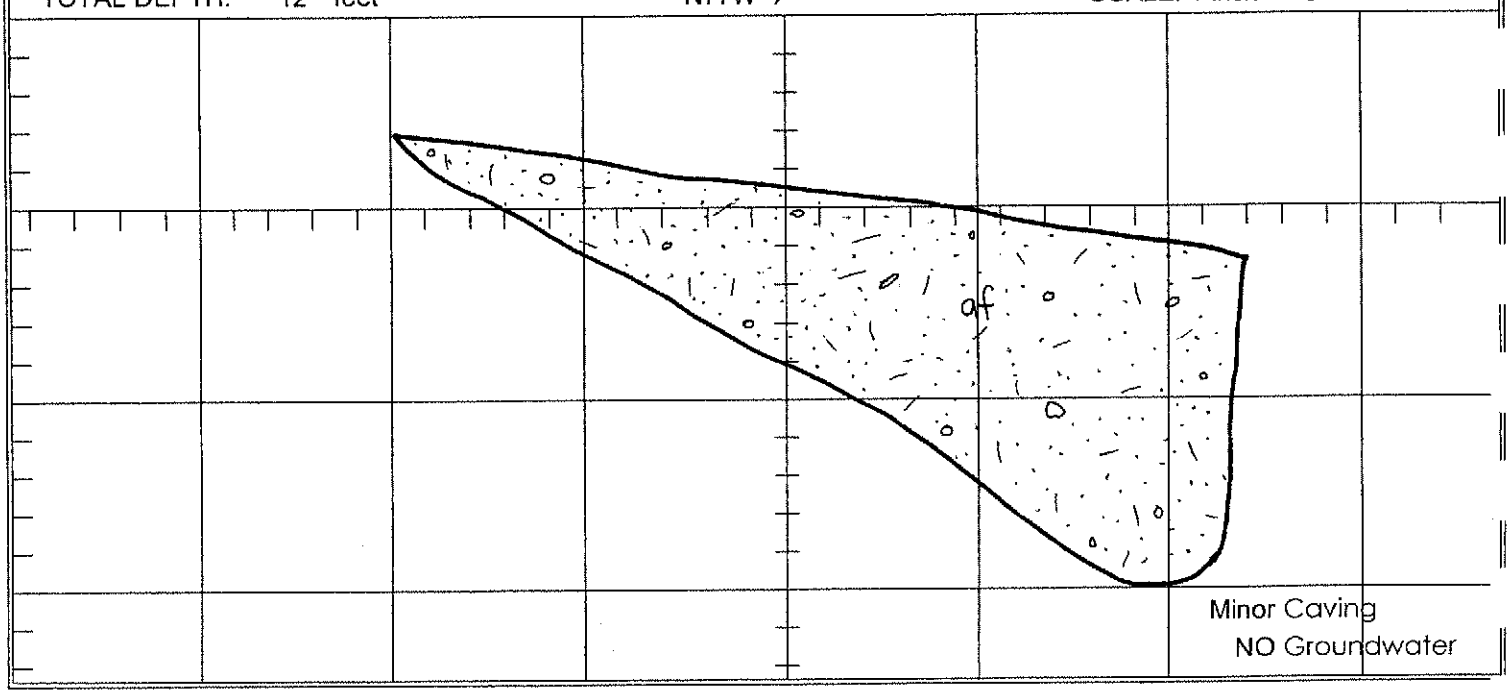
TOTAL DEPTH: 8 feet ←N65E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-56T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/22/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1260		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**ARTIFICIAL FILL; af (0-12')** @ 0' Silty clayey sand; loose to medium dense; damp to moist; brown to light yellowish-brown; minor caving				
5									
10									
15									
20									

TOTAL DEPTH: 12 feet N77W→ SCALE: 1 inch = 5 feet

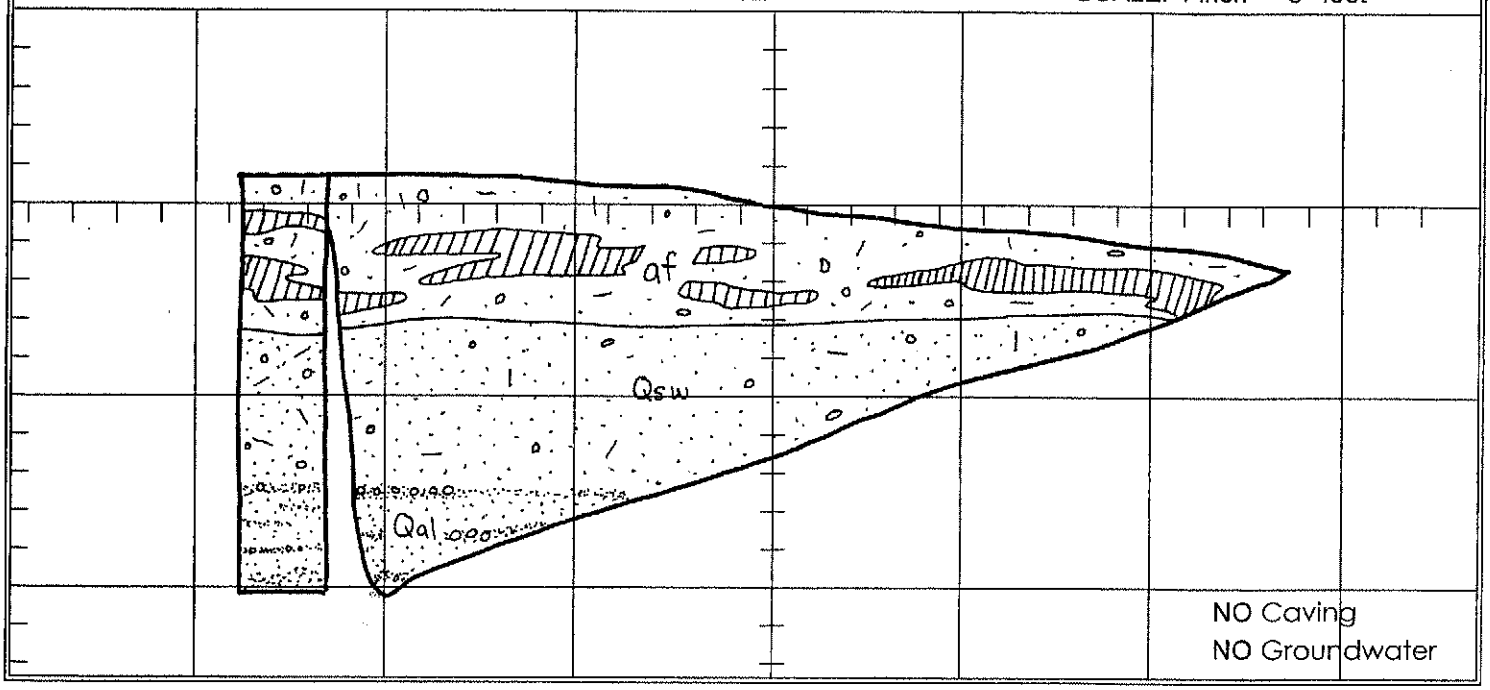


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-57T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 10/22/03		
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION: 1192		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SC-SM	**ARTIFICIAL FILL; af (0-4')** @ 0' Silty clayey sand with gravel; loose to medium dense; dry; brown to dark brown; miscellaneous trash				
5					**SOIL/SLOPEWASH; Soil/Qsw (4-8')** @ 4' Silty clayey sand with gravel; medium dense; damp; brown to light brown; pinhole voids, rootlets				
10				SM	**QUATERNARY ALLUVIUM; Qal (8-11')** @ 8' Silty sand with gravel; loose to medium dense; damp; light yellowish-brown to light gray; gravel channels	B:Horizontal			
15									
20									

TOTAL DEPTH: 11 feet ←N58E SCALE: 1 inch = 5 feet

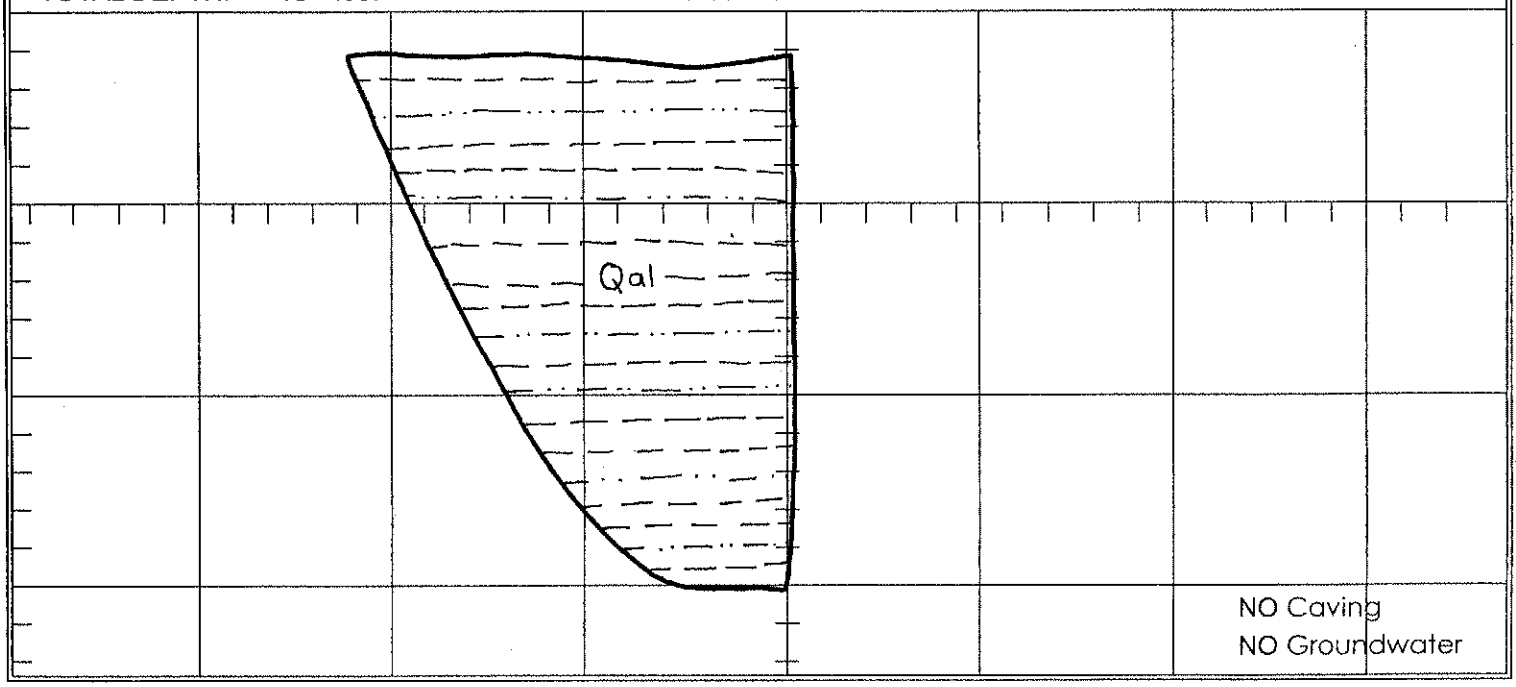


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-58T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/10/03		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1002		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**QUATERNARY ALLUVIUM; Qal (0-15')** @ 0' Silty clay; soft to stiff; damp; grayish-brown				
5									
10									
15					@ 15' Wet COMMENTS: -Surface logged				
20									

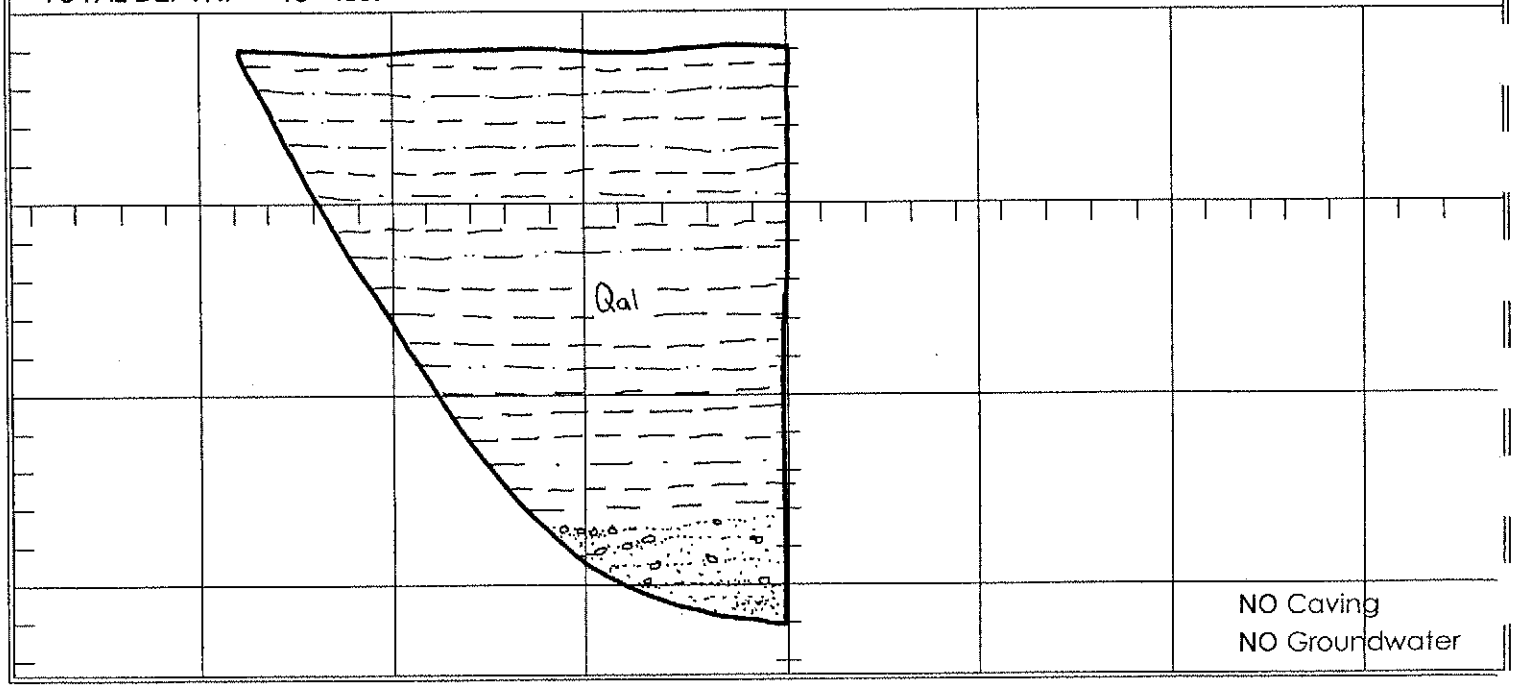
TOTAL DEPTH: 15 feet N44W→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-59T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/10/03		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1000		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**QUATERNARY ALLUVIUM; Qal (0-15')** @ 0' Silty clay; soft to stiff; damp; grayish-brown				
5									
10									
				SP	@ 12' Poorly graded sand with gravel; medium dense; moist; grayish-brown				
15					@ 15' Wet COMMENTS: -Surface logged				
20									

TOTAL DEPTH: 15 feet N62E→ SCALE: 1 inch = 5 feet

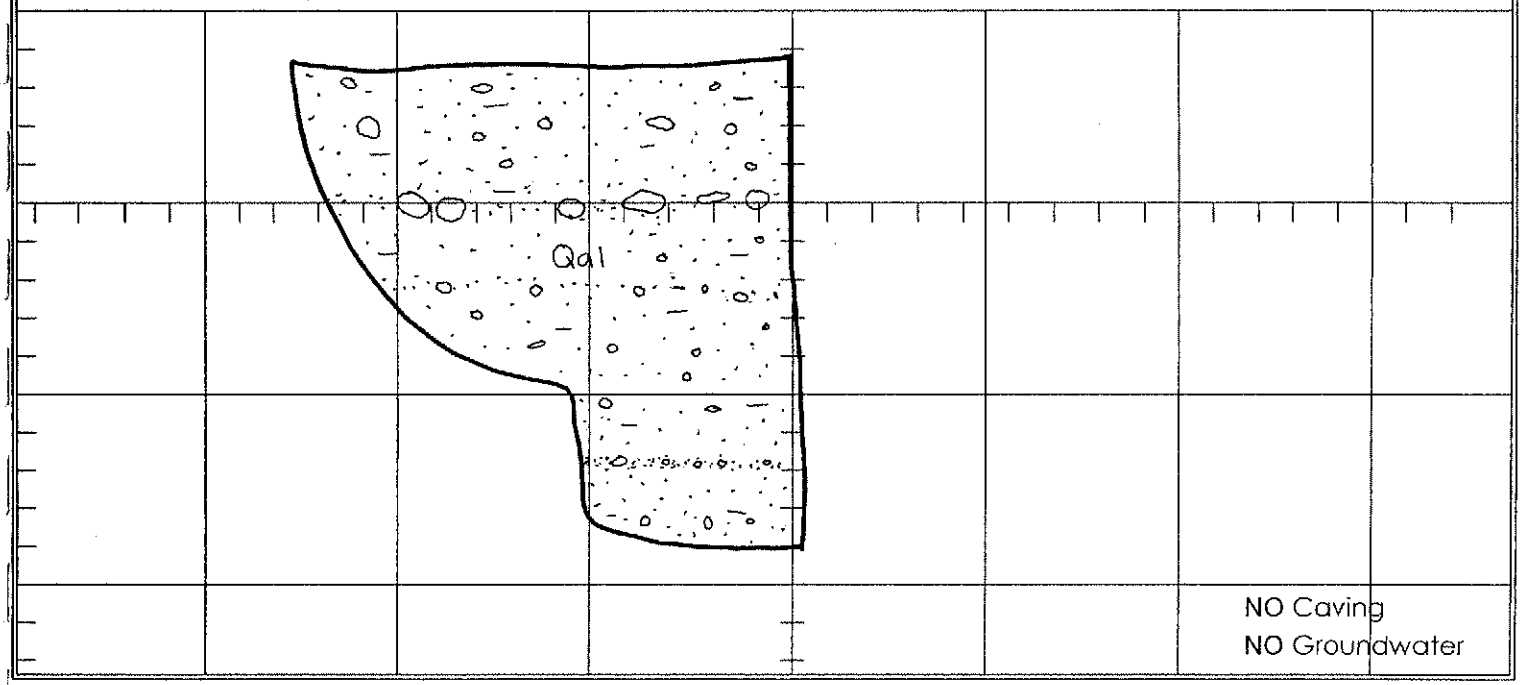


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-62T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/13/03		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1120		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**QUATERNARY ALLUVIUM; Qal (0-13')** @ 0' Poorly graded sand with silt and gravel; medium dense; damp; yellowish- to grayish-brown; moderately friable; local cobbles to boulders	~Horizontal			
5									
10									
					COMMENTS: -Surface logged below 6'				
15									
20									

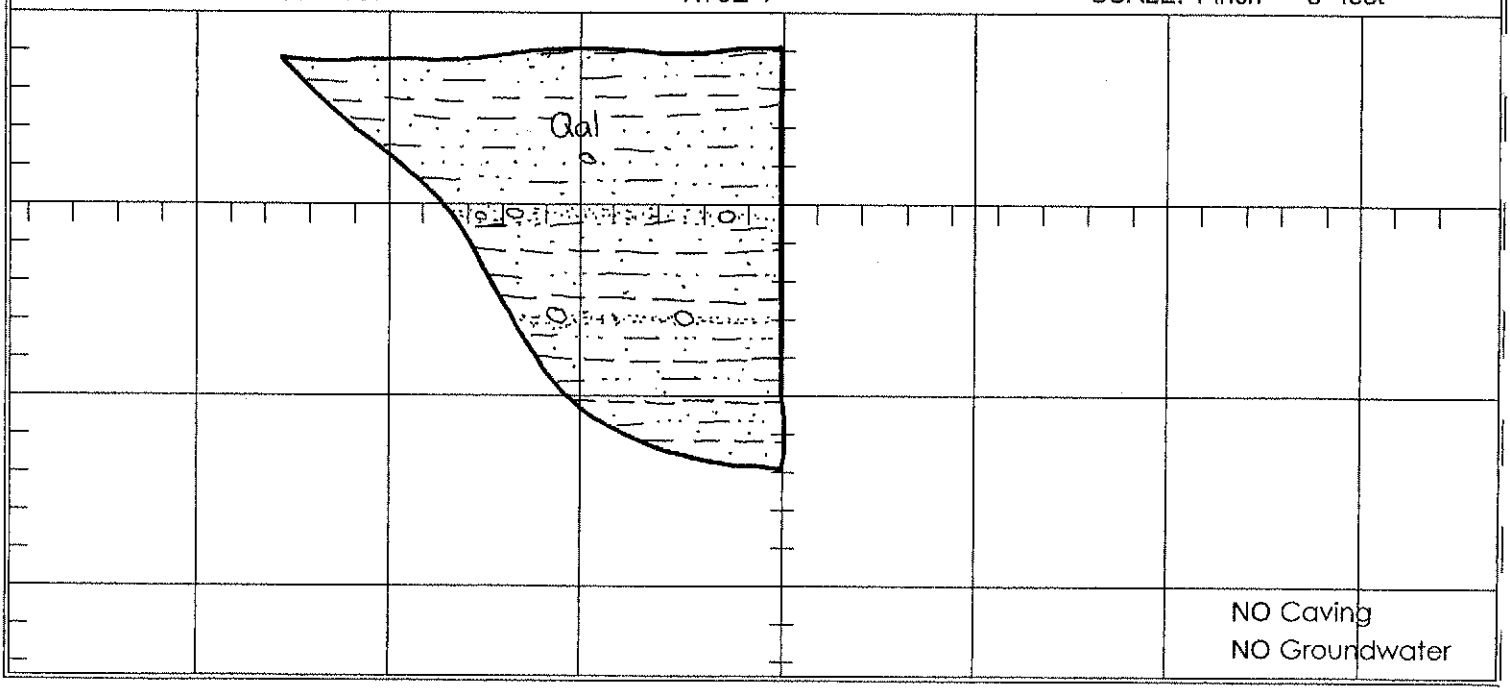
TOTAL DEPTH: 13 feet N80E→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-63T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/13/03		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1118		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**QUATERNARY ALLUVIUM; Qal (0-11')** @ 0' Sandy silty clay with gravel; stiff to very stiff; damp; yellowish- to grayish-brown; sandier with depth; pinhole voids to at least 8; scattered cobbles	Horizontal			
5									
10									
15									
20									

TOTAL DEPTH: 11 feet N78E→ SCALE: 1 inch = 5 feet

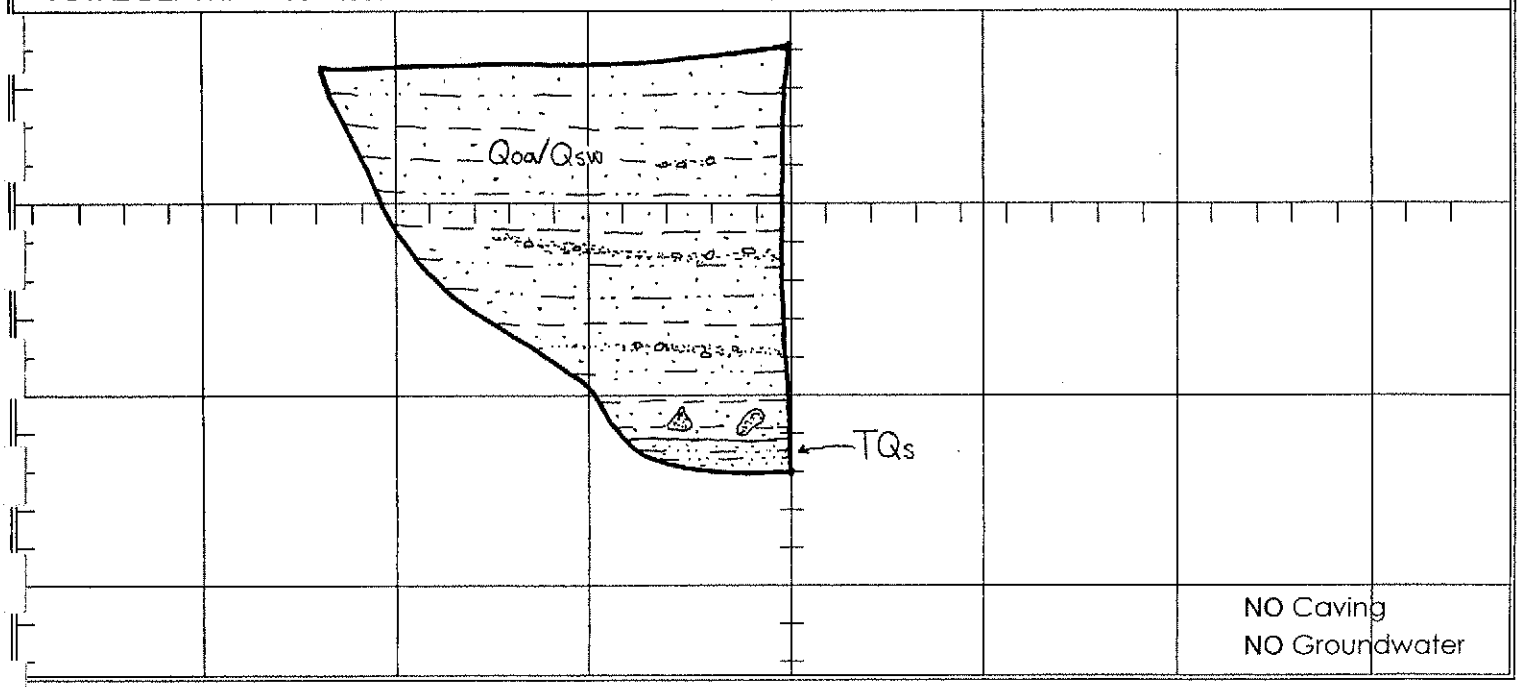


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-64T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/13/03		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1145		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**QUATERNARY OLDER ALLUVIUM/SLOPEWASH; Qoa/Qsw (0-10')** @ 0' Sandy silty clay with gravel; stiff to very stiff; damp; yellowish- to grayish-brown; pin hole voids to at least 6'; @ 9-10' pieces of weathered TQs; scattered cobbles				
5									
10					**BEDROCK; TQs (10-11')** @ 10' Light gray silty sandstone/sandy siltstone; moderately hard; weathered				
15									
20									

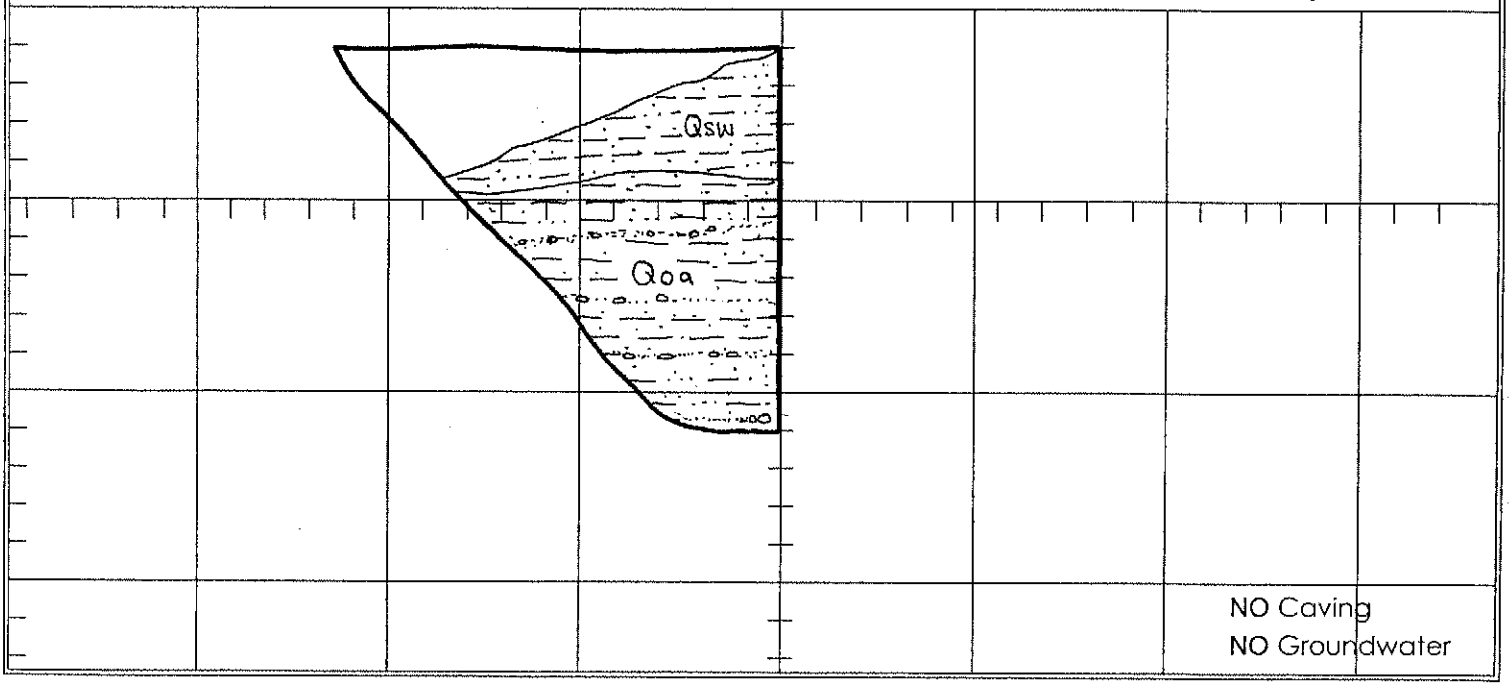
TOTAL DEPTH: 11 feet N27E→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-65T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/13/03		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1198		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**QUATERNARY SLOPEWASH; Qsw (0-4')** @ 0' Sandy silty clay; stiff; damp; yellowish- to grayish-brown				
5					**QUATERNARY OLDER ALLUVIUM; Qoa (4-10')** @ 4' Interbedded sandy silty clay and poorly graded sand with silt and gravel; fine-grained are stiff, coarse-grained are medium dense; damp; yellowish to grayish-brown; sands are moderately friable; scattered cobbles	~Horizontal			
10									
15									
20									

TOTAL DEPTH: 10 feet N10E→ SCALE: 1 inch = 5 feet

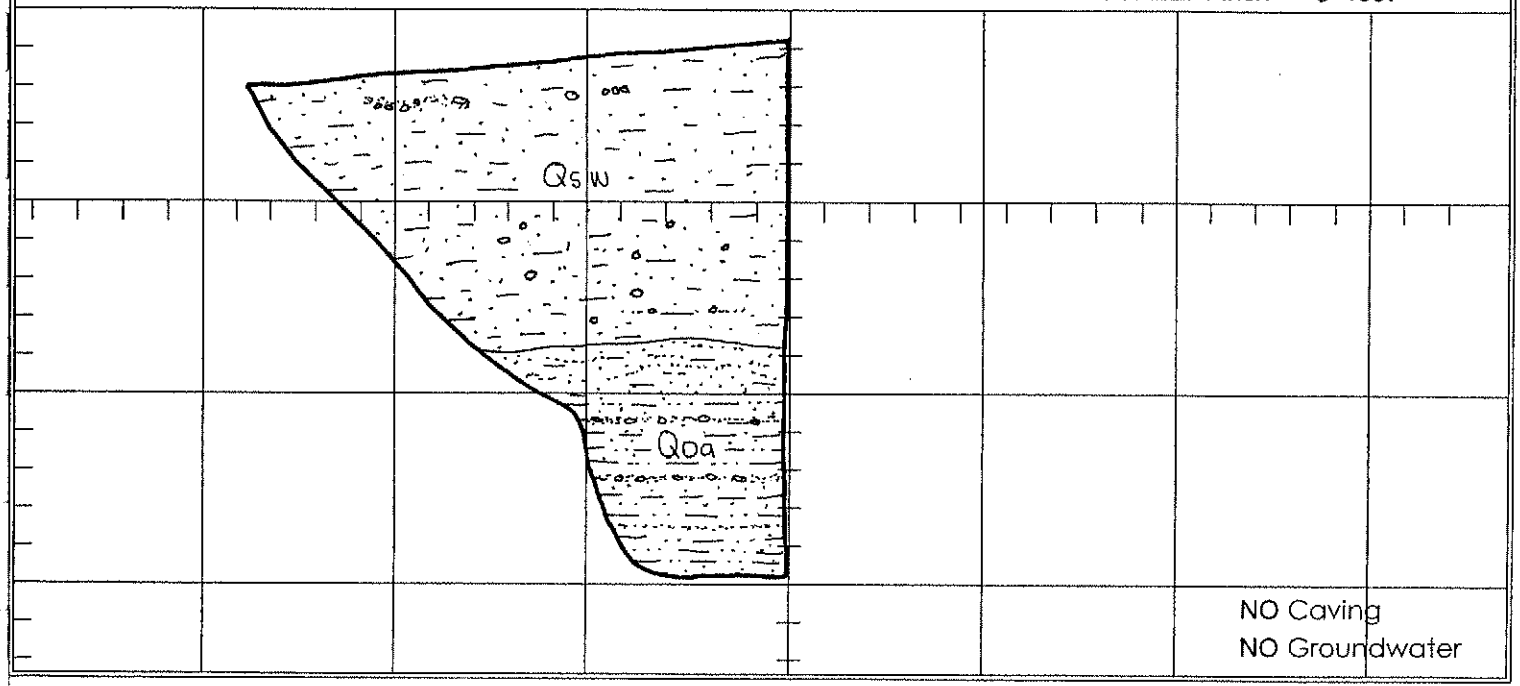


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-66T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/13/04		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1230		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SLOPEWASH; Qsw (0-8')** @ 0' Sandy silty clay with gravel; very stiff to hard; damp; yellowish- to grayish-brown				
5					@ 5' Brown to dark brown				
				SP-SM	**QUATERNARY OLDER ALLUVIUM; Qoa (8-14')** @ 8' Poorly graded sand with silt and gravel; medium dense; damp; light grayish-brown; friable upper 1'; below 9' siltier				
10									
15									
20									

TOTAL DEPTH: 8 feet N78E→ SCALE: 1 inch = 5 feet

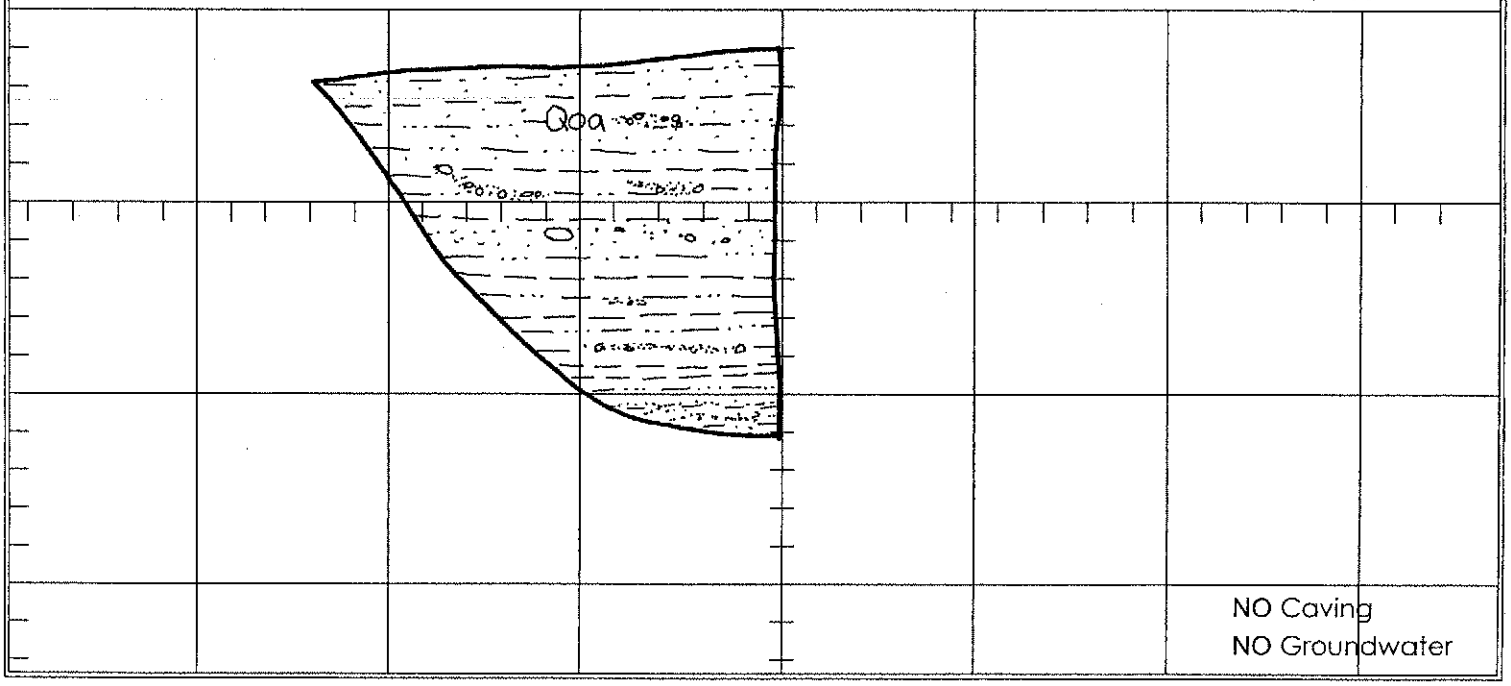


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-67T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/13/03		
EXCAVATION METHOD: Trackhoe w/24' Bucket	ELEVATION: 1172		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**QUATERNARY OLDER ALLUVIUM; Qoa (0-10')** @ 0' Sandy silty clay with gravel; firm to stiff; damp; yellowish- to grayish-brown to brown				
5					@ 6' Less gravel; stiff to very stiff; brown				
10					@ 9' Poorly graded sand with silt and gravel; medium dense to dense; grayish-brown COMMENTS: -Bulk sample @ 0-10'				
15									
20									

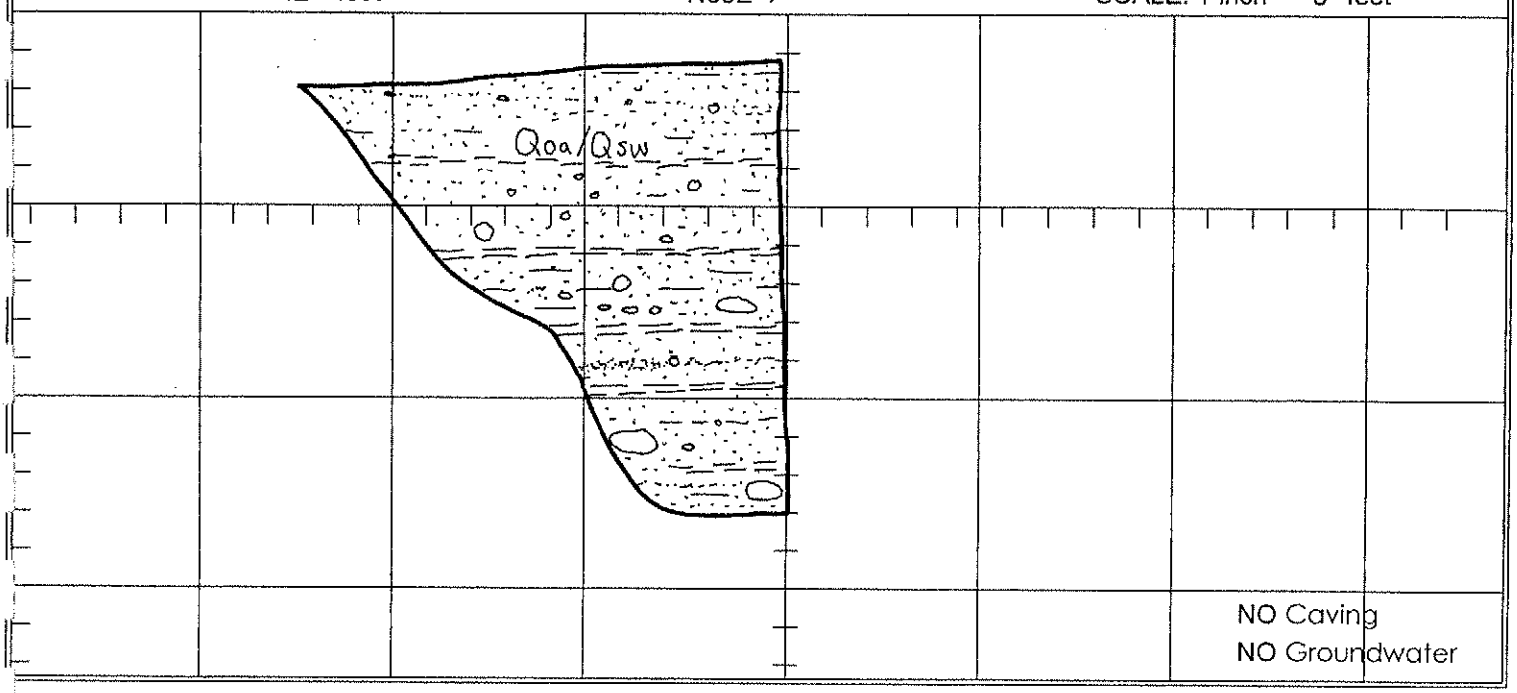
TOTAL DEPTH: 10 feet ←N33W SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-68T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/13/03		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1080		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**QUATERNARY OLDER ALLUVIUM/SLOPEWASH; Qoa/Qsw (0-12')** @ 0' Sandy silty clay with gravel and poorly graded sand with silt and gravel; stiff to medium dense; damp; yellowish- to grayish-brown; sands are moderately friable; pinhole voids to at least 6'; local boulders to 24" diameter COMMENTS: -Surface logged below 8'				
5									
10									
15									
20									

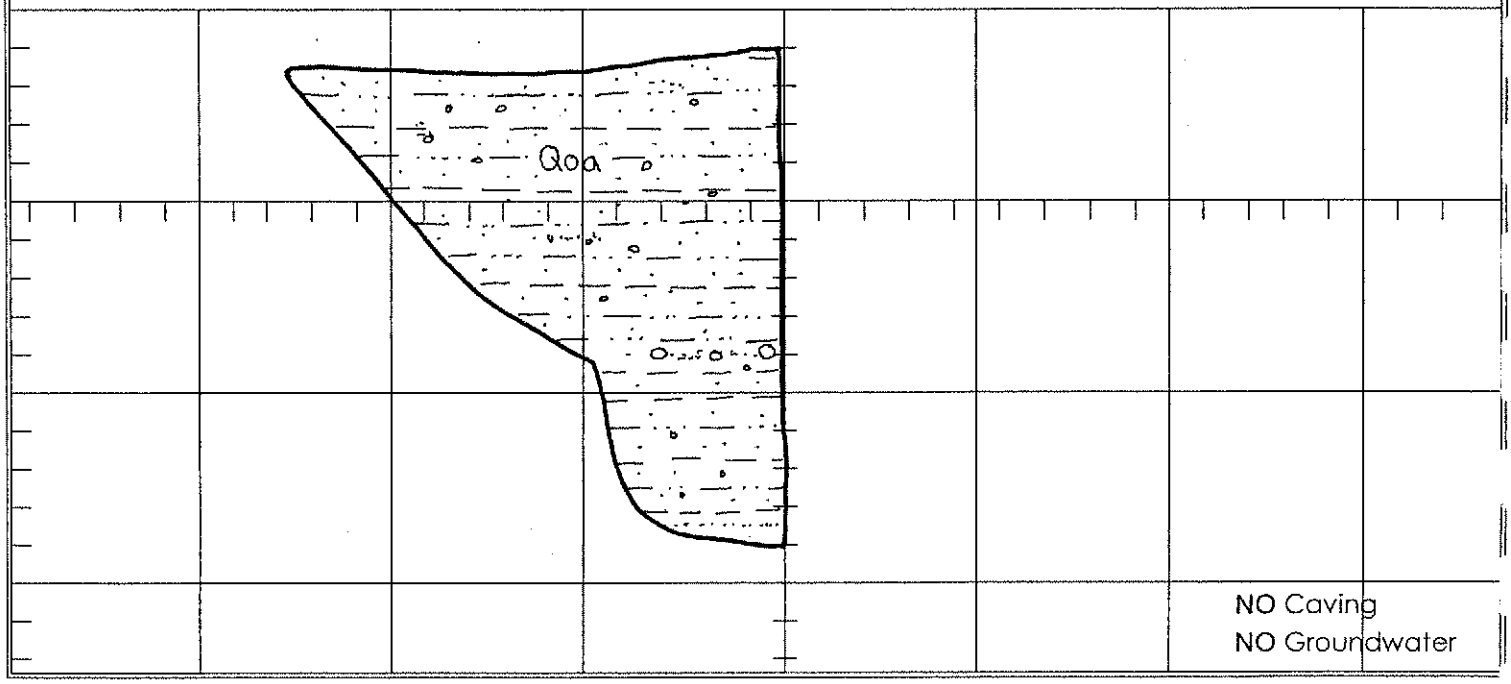
TOTAL DEPTH: 12 feet N65E→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-69T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/13/03		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1104		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML SM	**QUATERNARY OLDER ALLUVIUM; Qoa (0-13')** @ 0' Sandy silty clay with gravel; firm; damp; yellowish- to grayish-brown; and silty sand with gravel; loose to medium dense; damp; yellowish- to grayish-brown				
5									
10									
					COMMENTS: -Surface logged below 9' -Bulk sample @ 0-13'				
15									
20									

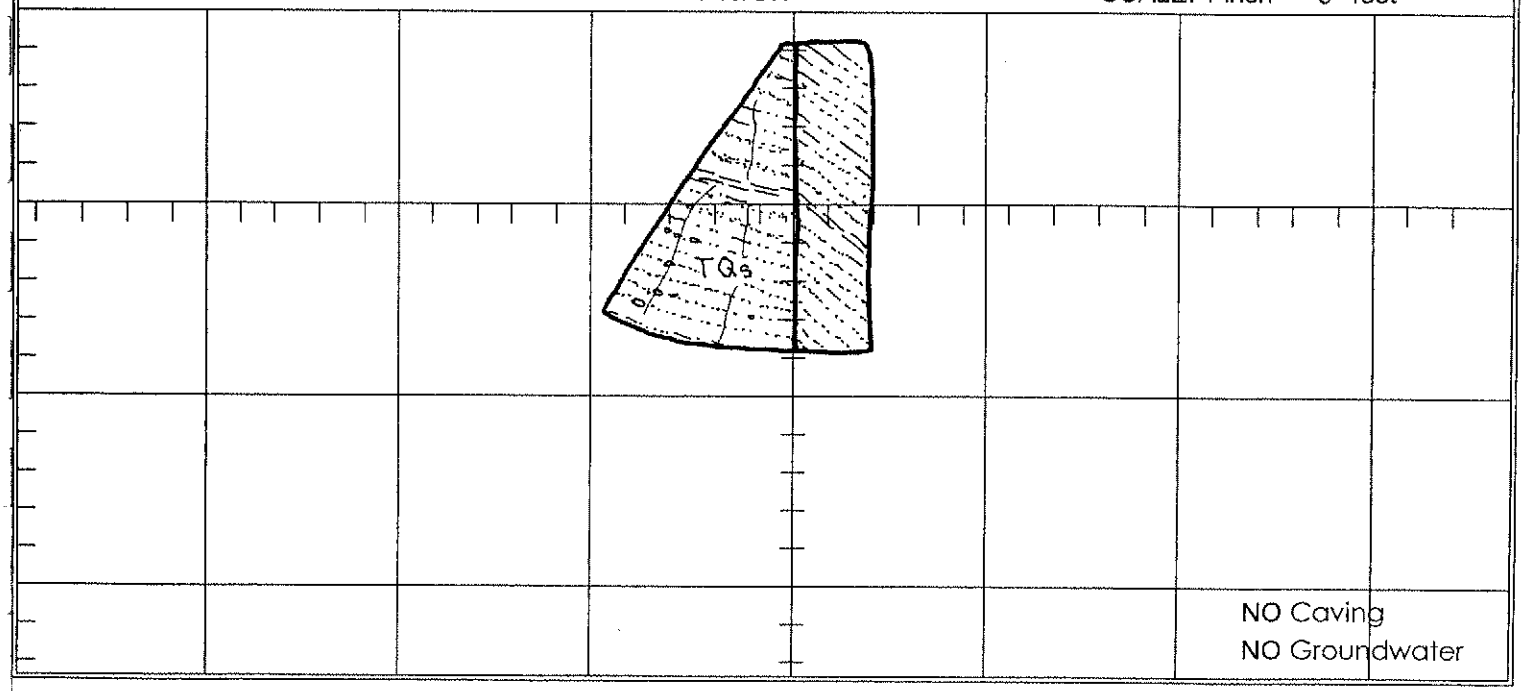
TOTAL DEPTH: 13 feet ←N53W SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-70T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/14/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1100		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**BEDROCK; TQs (0-8')** @ 0' Light gray interbedded silty sandstone; fine- to medium-grained pebbly sandstone; moderately hard to hard; damp; some fractures	B:N66W,44SW B:N67W,50SW			
5									
10									
15									
20									

TOTAL DEPTH: 8 feet ←N70W SCALE: 1 inch = 5 feet

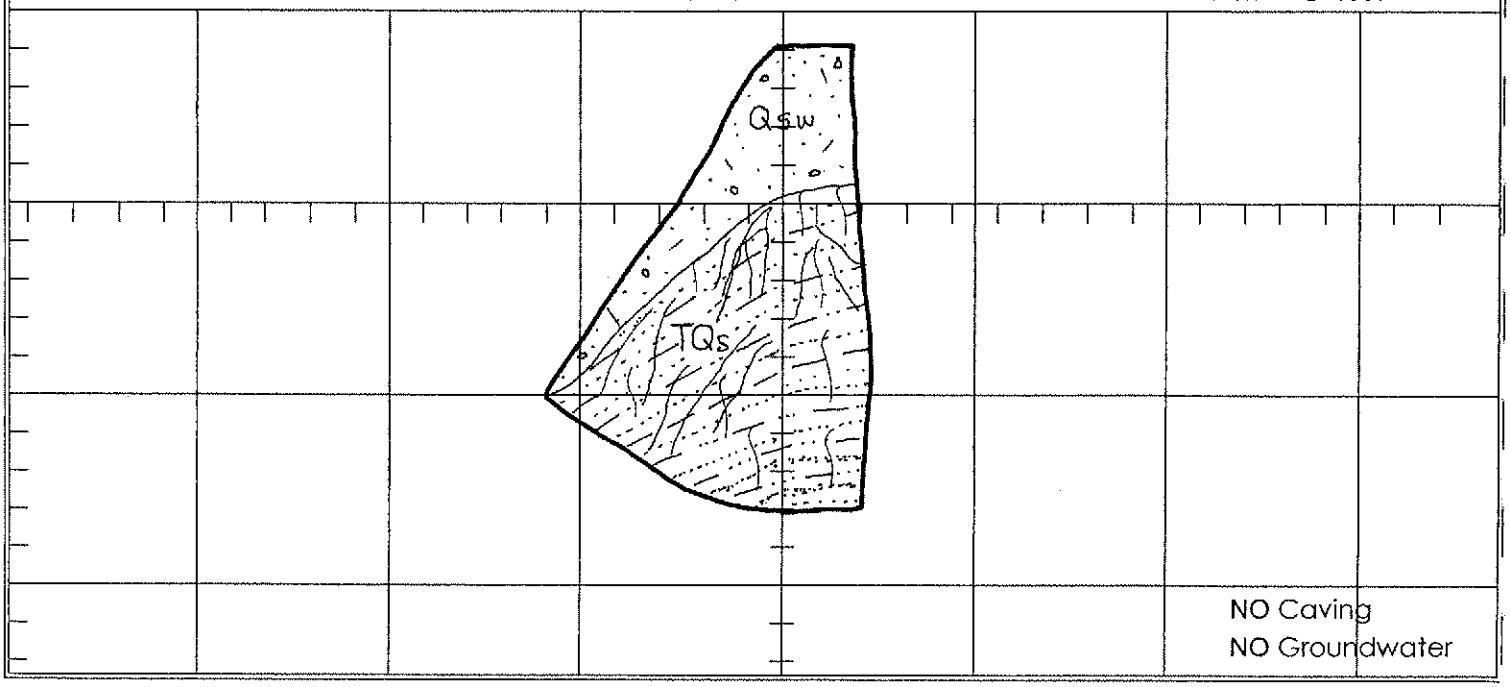


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-71T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/14/03		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1148		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SLOPEWASH; Qsw (0-4')** @ 0' Silty clay; firm; damp; grayish-brown				
5					**BEDROCK; TQs (4-12')** @ 4' Grayish-brown to light-gray silty sandstone/sandy siltstone, mudstone, and fine-grained sandstone; moderately hard; damp; weathered and fractured; caliche	B:N47W,26NE B:N57W,24NE			
10									
15									
20									

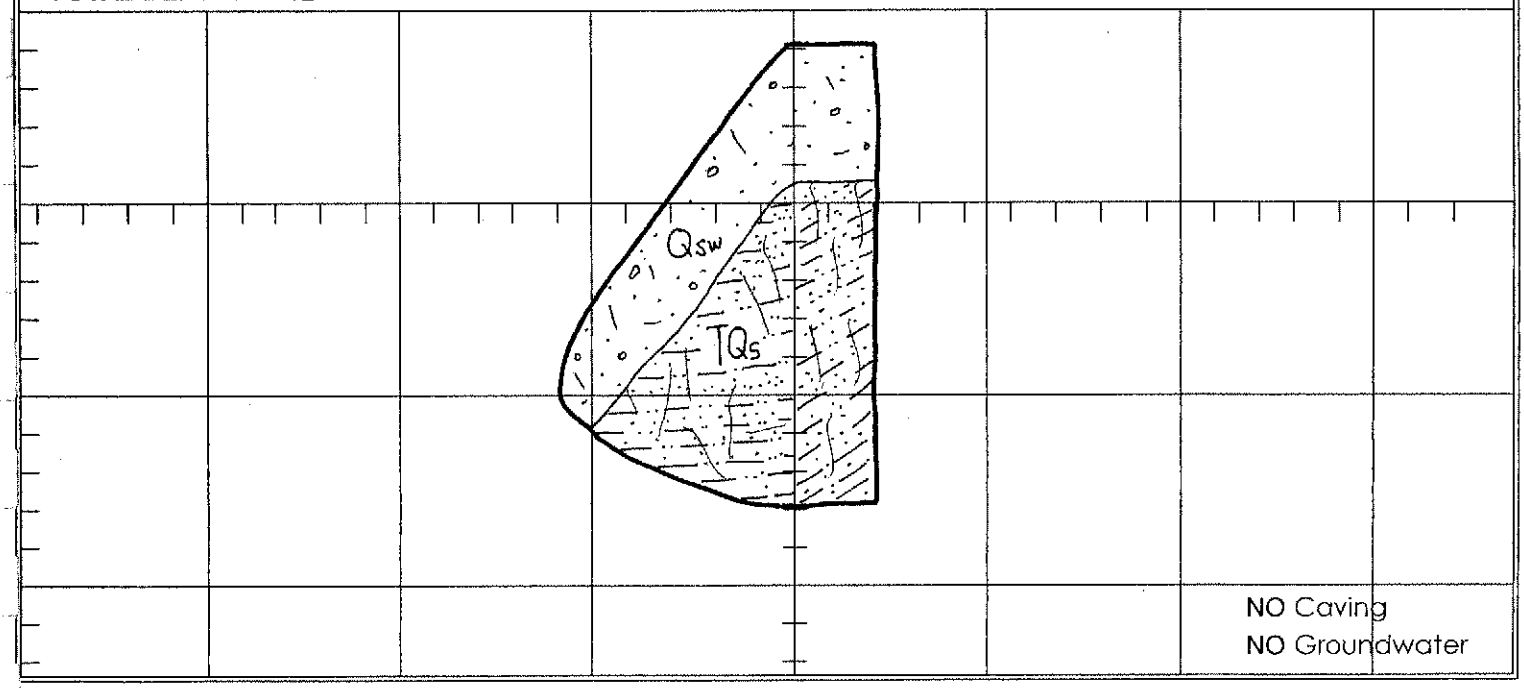
TOTAL DEPTH: 12 feet ←N17E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG**	
PROJECT: Mesas East	DATE: 7/22/04	**NO. T-72T**	
	LOGGED BY: DGG		
	EXCAVATED: 11/14/03		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1324		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SLOPEWASH; Qsw (0-3.5')** @ 0' Sandy silty clay; firm; damp; brown to grayish-brown				
					BEDROCK; TQs (3.5-12') @ 3.5' Light gray silty sandstone/sandy siltstone to fine-grained sandstone and gray mudstone; hard; damp; highly weathered in sidewalls to ~8"; fractured	B:N34W,25NE B:N44W,26NE			
5									
10									
15									
20									

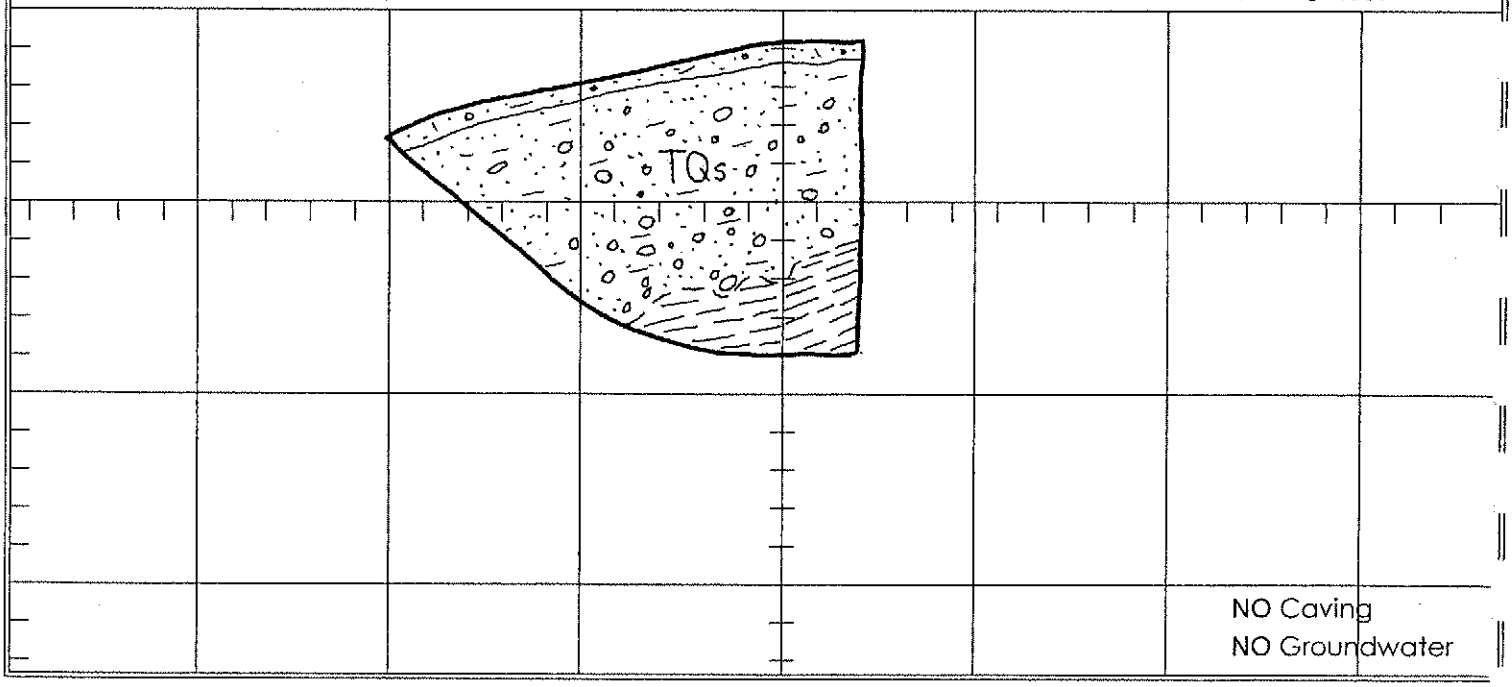
TOTAL DEPTH: 12 feet ←N52W SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-73T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/14/03		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1197		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL; (0-0.5')** @ 0' Sandy silty clay; firm; damp; grayish-brown **BEDROCK; TQs (0.5-8')** @ 0.5' Light-gray cobble pebble conglomerate and medium-grained mudstone; moderately hard to hard; damp; erosional contact; cobbles up to 6" diameter	Apx. B:N82W,15NE			
5									
10									
15									
20									

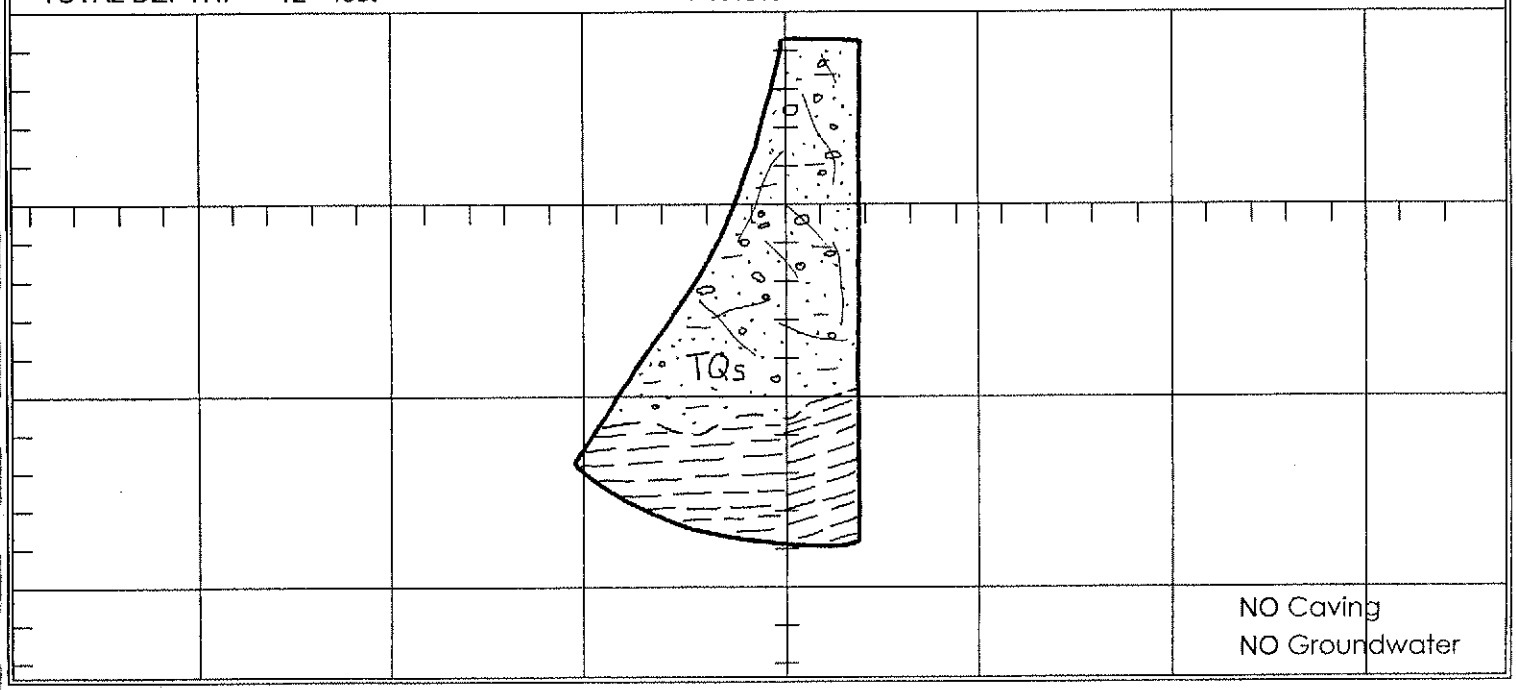
TOTAL DEPTH: 8 feet ←N75W SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-74T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/14/03		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1236		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**BEDROCK; TQs (0-12')** @ 0' Light gray pebble conglomerate; fine- to medium-grained sandstone and brown siltstone/mudstone; moderately hard; damp; upper 8-9' fractured; some caliche in fine-grained units	Apx. B:N60W,22NE			
5									
10									
15									
20									

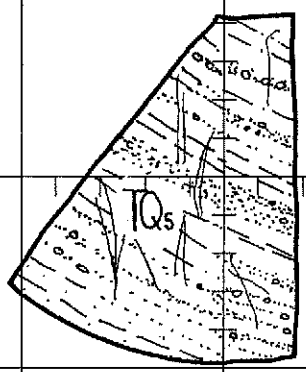
TOTAL DEPTH: 12 feet ←N46W SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-75T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/17/03		
EXCAVATION METHOD: Trackhoe w/24"Bucket	ELEVATION: 1245		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**BEDROCK; TQs (0-9')** @ 0' Light gray fine- to medium-grained sandstone, pebbly sandstone and silty sandstone; moderately hard to hard; damp; fractured	B:N28W,24NE			
5									
10									
15									
20									

TOTAL DEPTH: 9 feet N32E→ SCALE: 1 inch = 5 feet

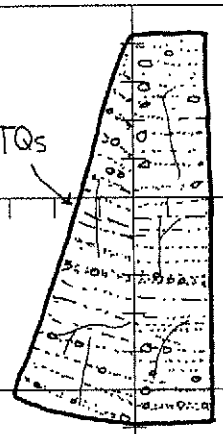


NO Caving
NO Groundwater

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-76T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/17/03		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1235		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**BEDROCK; TQs (0-10')** @ 0' Light gray silty sandstone; fine- to medium-grained sandstone and pebbly sandstone; moderately hard to hard; damp; fractured	Apx. B:N62W,13SW			
5									
10									
15									
20									

TOTAL DEPTH: 10 feet ←N7E SCALE: 1 inch = 5 feet

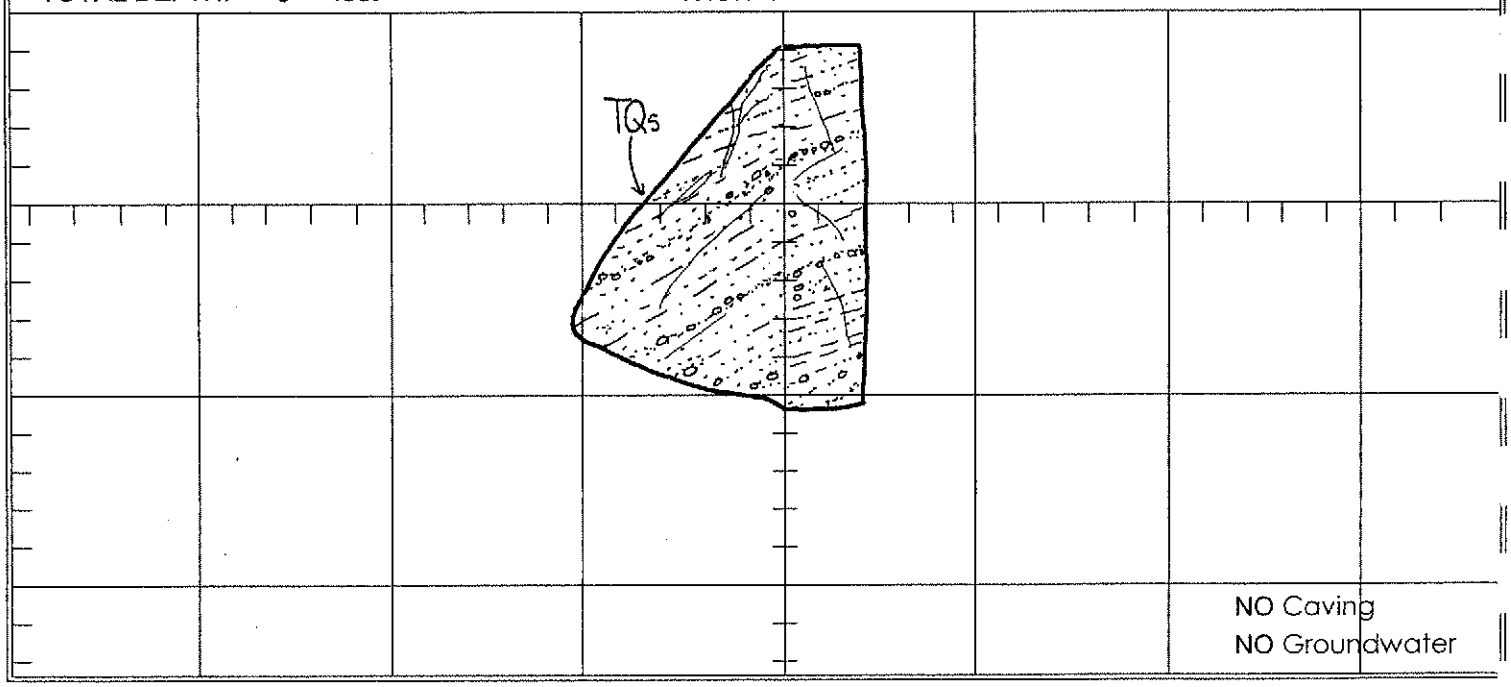


NO Caving
NO Groundwater

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-77T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/17/03		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1188		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**BEDROCK; TQs (0-9')** @ 0' Light gray silty sandstone, fine- to medium-grained sandstone and pebbly sandstone; moderately hard to hard; damp; fractured	Apx. B:N74W,47SW			
5									
10									
15									
20									

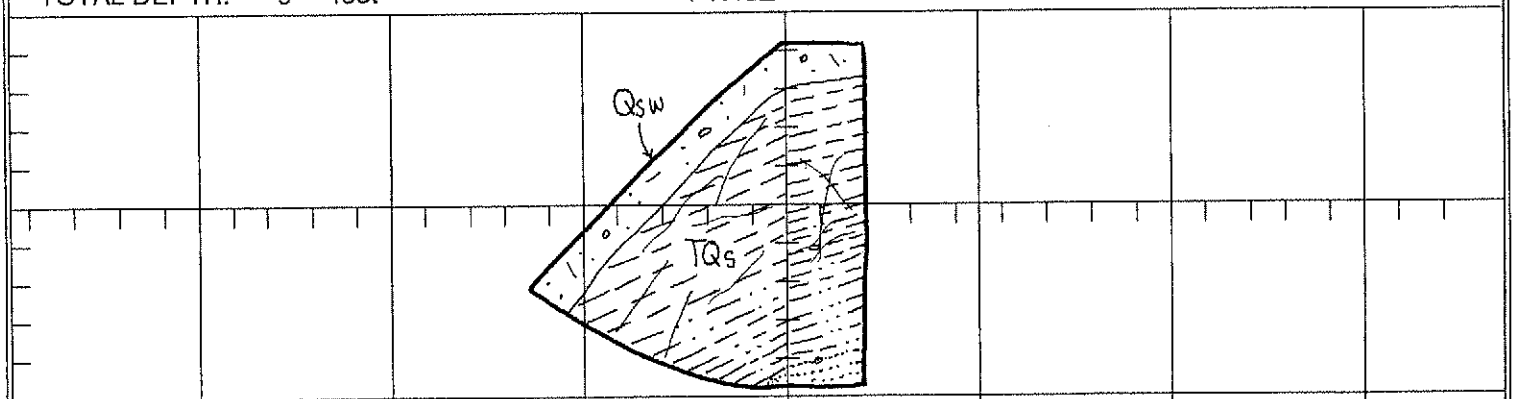
TOTAL DEPTH: 9 feet N18W→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-78T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/17/03		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1120		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-1')** @ 0' Sandy silty clay; soft to firm; damp; light grayish-brown **BEDROCK; TQs (1-9')** @ 1' Light grayish-brown mudstone to siltstone; moderately hard to hard; damp; fractured upper 5-6'; highly weathered-punky; bottom 1' pebbly silty sandstone				
5									
10									
15									
20									

TOTAL DEPTH: 9 feet ←N45E SCALE: 1 inch = 5 feet



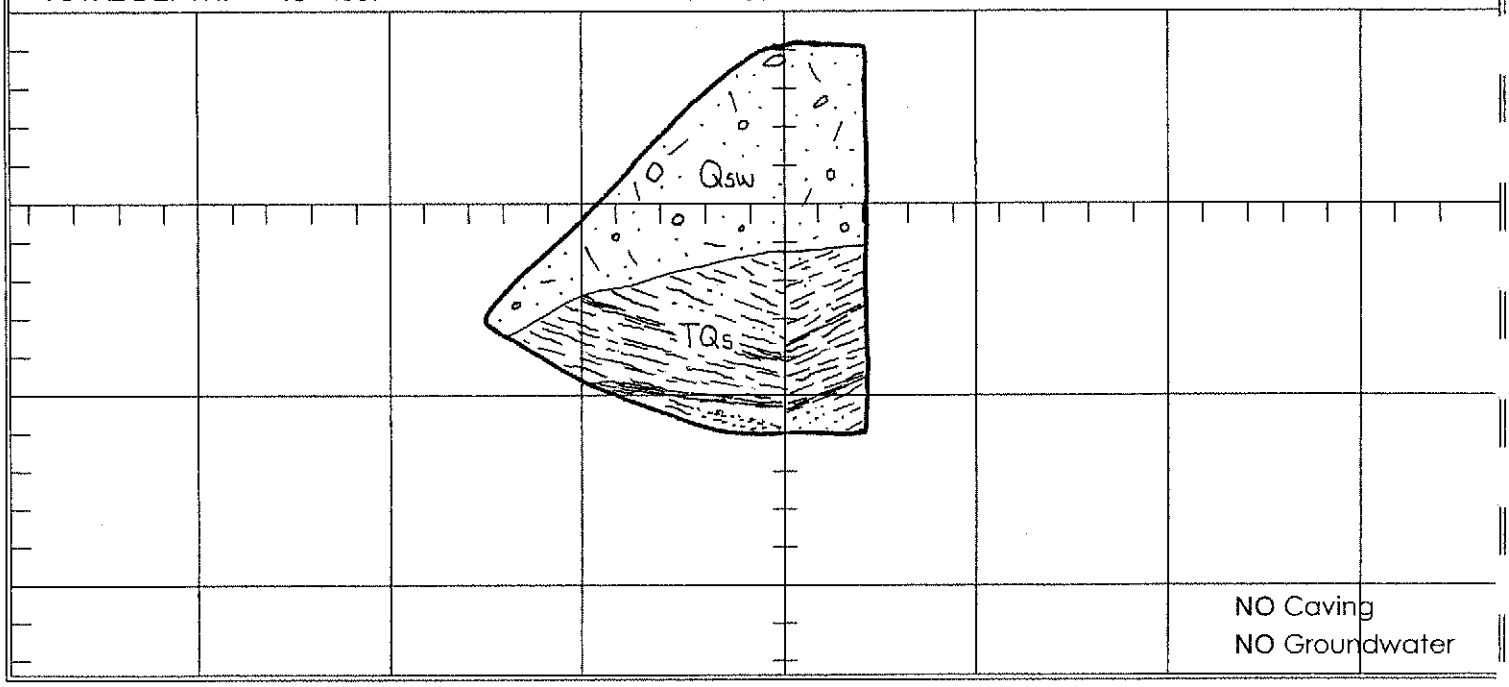
NO Caving
NO Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-79T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/17/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1205		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-5.5')** @ 0' Sandy silty clay; soft to firm; damp; medium- to grayish-brown; with scattered pebbles/cobbles				
5					**BEDROCK; TQs (5.5-10')** @ 5.5' Grayish-brown mudstone, gray claystone, and grayish-brown silty mudstone; hard; damp; upper 2-2.5' highly weathered; clay is sheared-slightly plastic/sticky; bottom ~1' hard with caliche	B:N40W,30NE			
10									
15									
20									

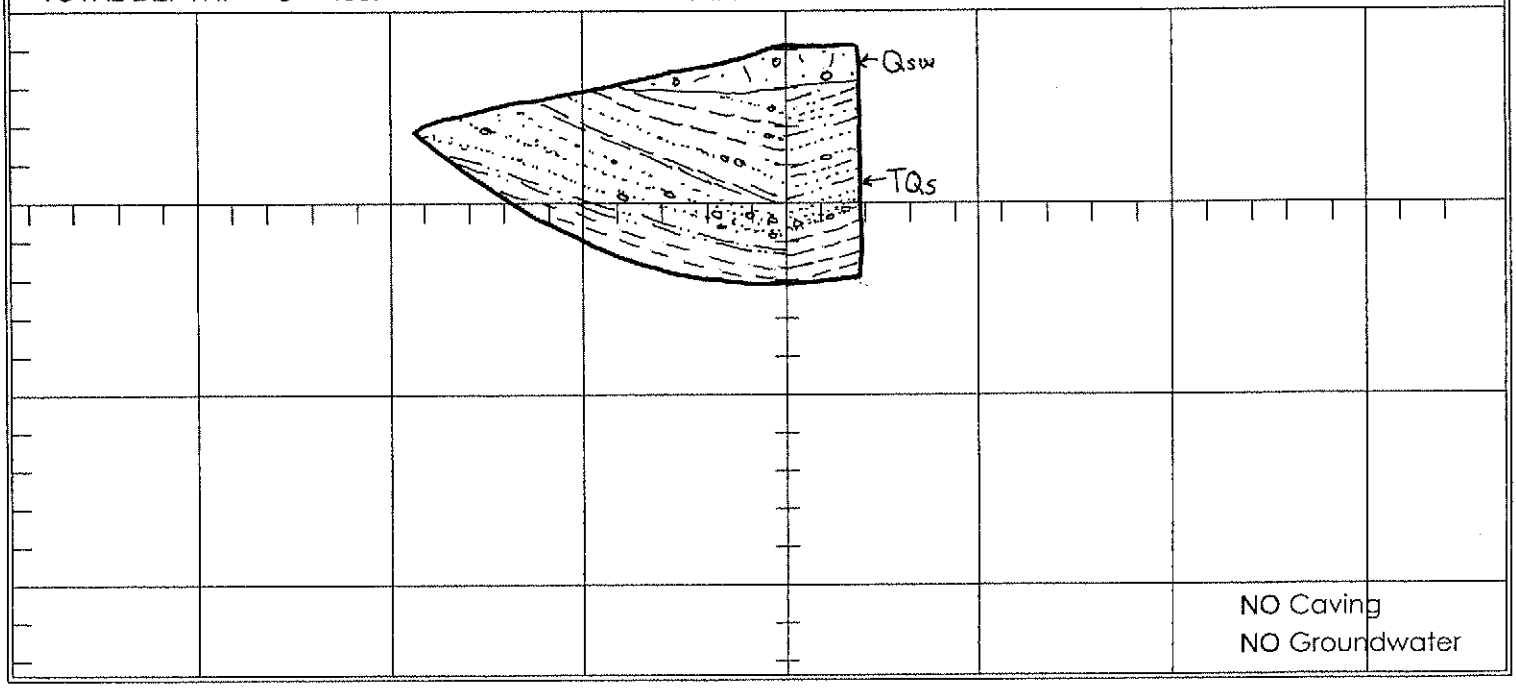
TOTAL DEPTH: 10 feet ←N76W SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-80T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/17/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1285		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-1')** @ 0' Sandy silty clay with gravel; soft to firm; damp; grayish-brown **BEDROCK; TQs (1-6')** @ 1' Grayish-brown fine- to medium-grained sandstone, pebbly sandstone, silty sandstone, and siltstone; moderately hard to hard; damp	B:N41W,25NE			
5									
10									
15									
20									

TOTAL DEPTH: 6 feet ←Due W SCALE: 1 inch = 5 feet

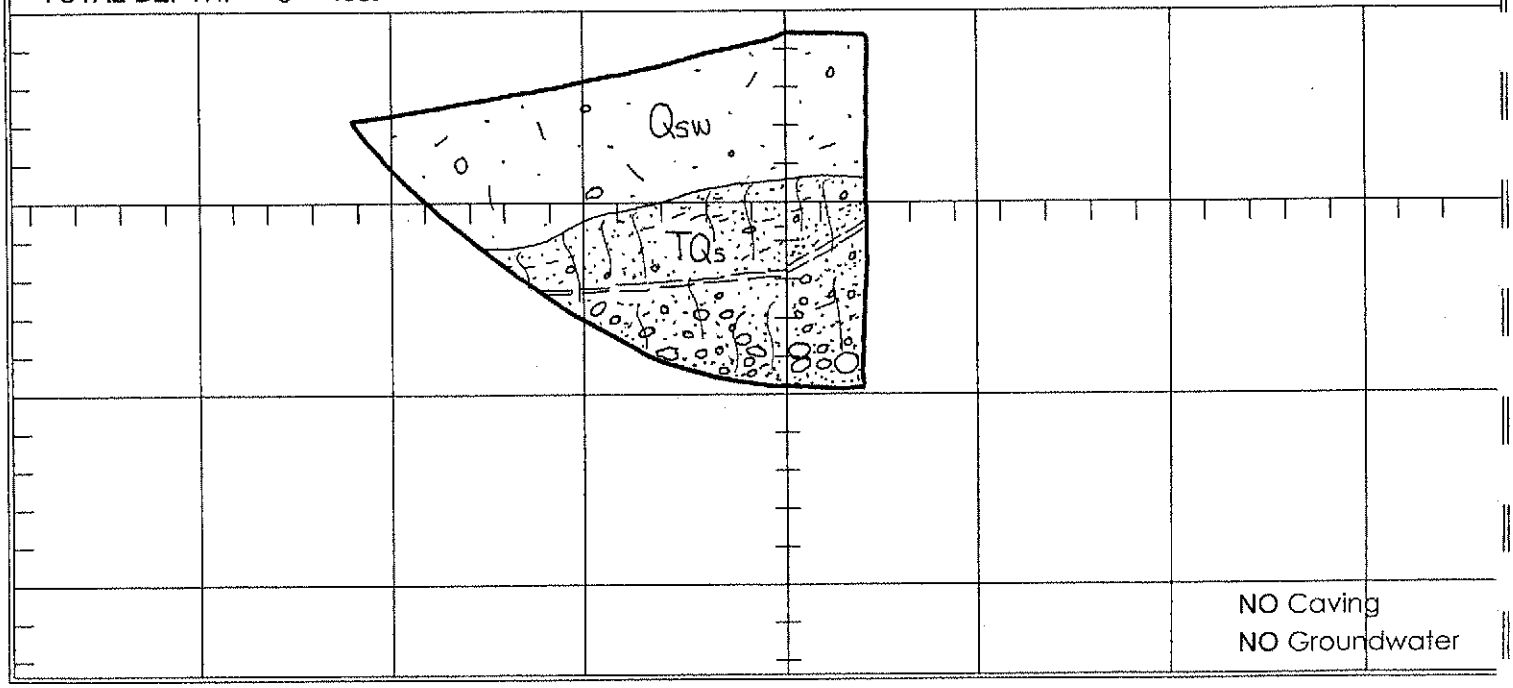


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-81T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/17/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1080		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-4')** @ 0' Sandy silty clay with gravel; soft to firm; damp; yellowish- to grayish-brown				
5					**BEDROCK; TQs (4-9')** @ 4' Yellowish- to grayish-brown siltstone, light gray silty sandstone, fine- to medium-grained sandstone, and pebble cobble conglomerate; moderately hard; damp; highly weathered	Apx. B:N28W,26NE			
10									
15									
20									

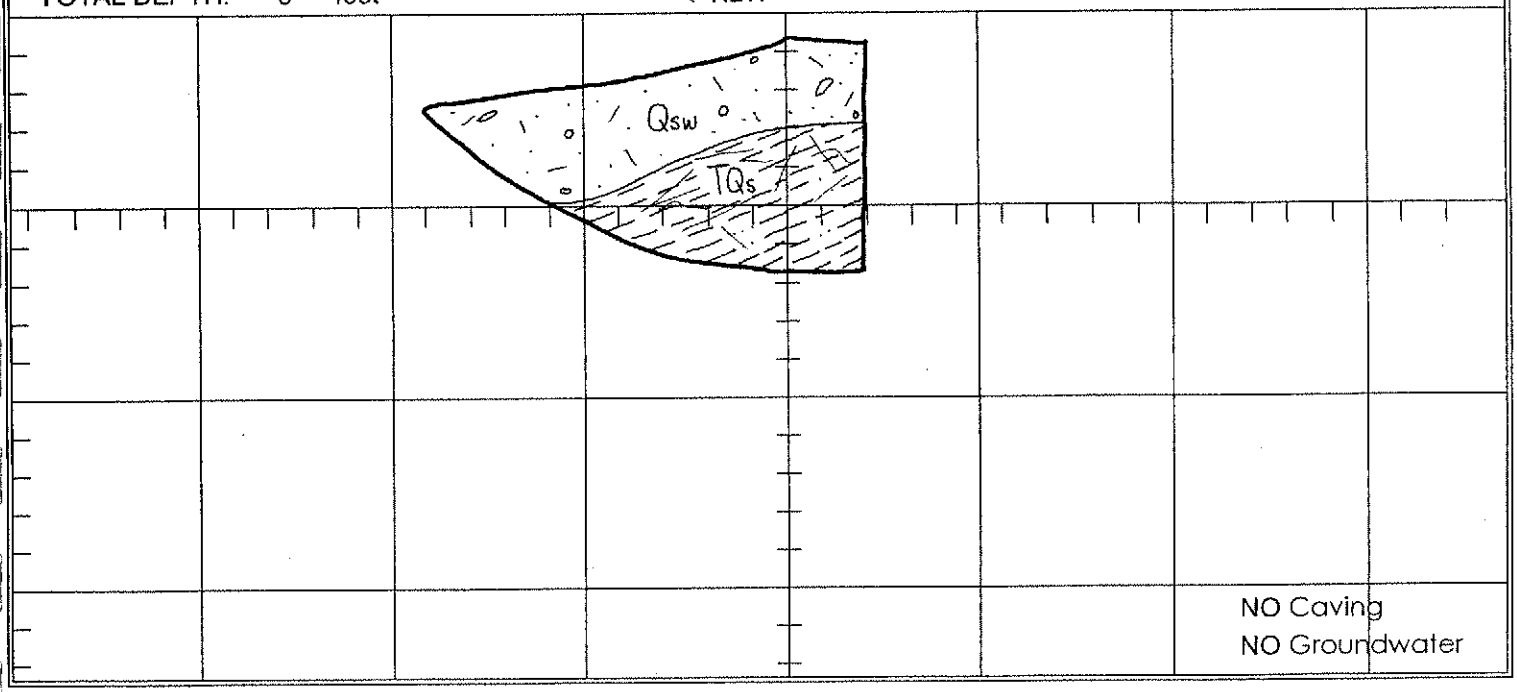
TOTAL DEPTH: 9 feet ←N8W SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-82T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/17/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1115		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-2.5')** @ 0' Sandy silty clay; firm; damp; grayish-brown				
					BEDROCK; TQs (2.5-6') @ 2.5' Grayish-brown to FeO2 stained silty mudstone to siltstone; moderately hard to hard; damp; upper 1-1.5' highly fractured/weathered with caliche	B:N34W,27NE			
5									
10									
15									
20									

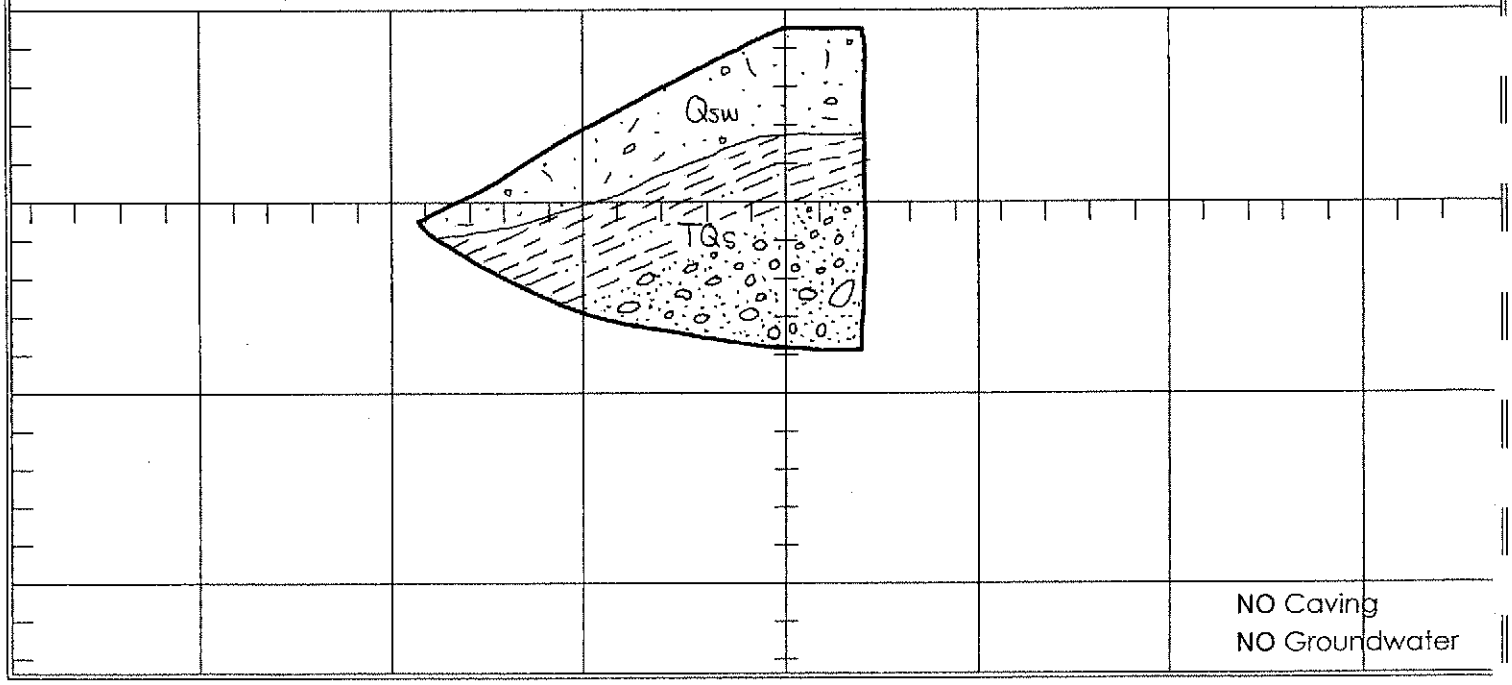
TOTAL DEPTH: 6 feet ←N2W SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-83T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/17/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1162		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-2.5')** @ 0' Silty clay; soft to firm; damp; yellowish- to grayish-brown				
					BEDROCK; TQs (2.5-8') @ 2.5' Yellowish-gray silty mudstone and grayish-brown to light gray siltstone, silty sandstone and fine- to medium-grained sandstone and pebble cobble conglomerate; moderately hard; damp; weathered/fractured	B:N45W,28NE			
5									
10									
15									
20									

TOTAL DEPTH: 8 feet ←N13W SCALE: 1 inch = 5 feet

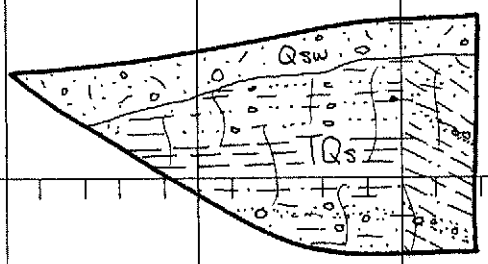


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-84T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/18/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1478		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-1')** @ 0' Sandy silty clay; soft to firm; damp; yellowish- to grayish-brown **BEDROCK; TQs (1-6')** @ 1' Yellowish- to grayish-brown pebbly silty sandstone and siltstone; moderately hard; damp; highly weathered; sandstone is slightly to moderately friable	B:N46W,26NE			
5									
10									
15									
20									

TOTAL DEPTH: 6 feet N40W→ SCALE: 1 inch = 5 feet

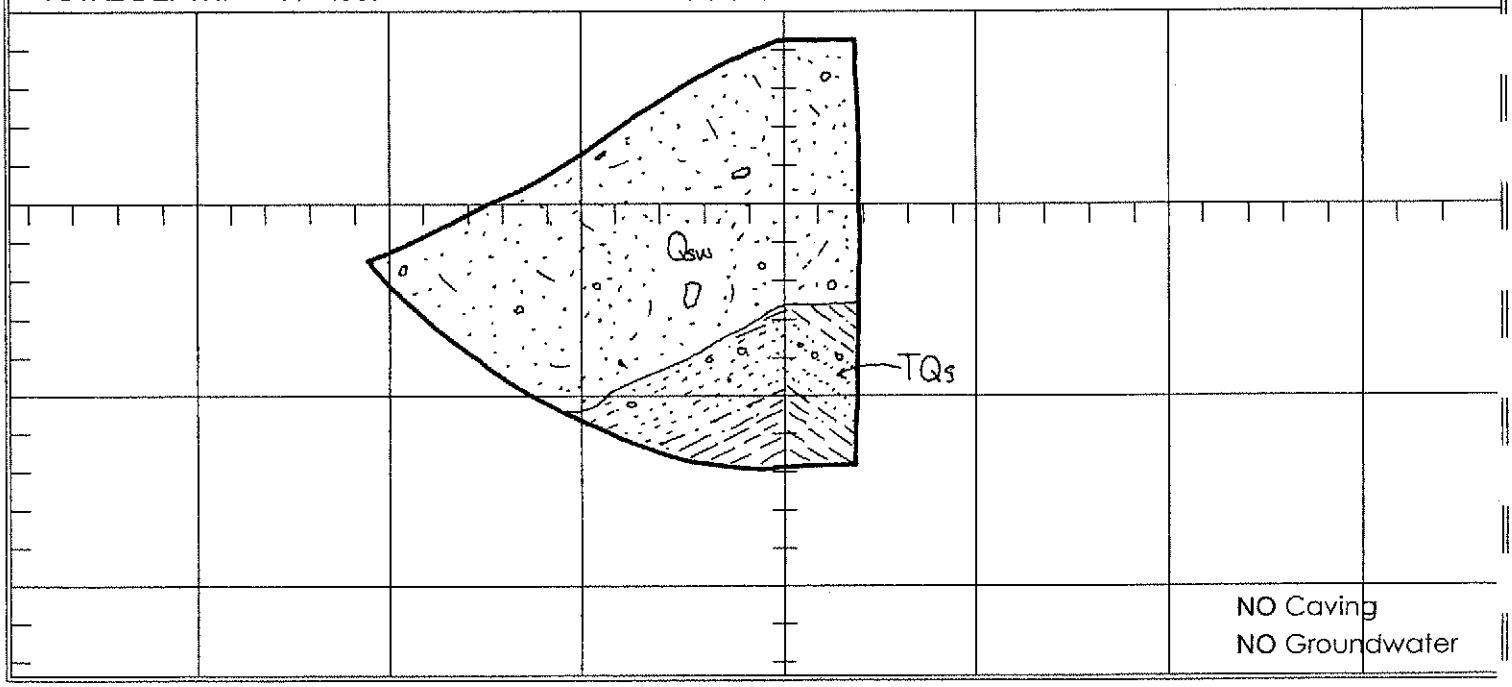


NO Caving
NO Groundwater

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-85T**
PROJECT: Mesas East	DATE: 7/22/04	
	LOGGED BY: DGG	
	EXCAVATED: 11/18/03	
EXCAVATION METHOD: Trackhoe	ELEVATION: 1458	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-7')** @ 0' Sandy silty clay with gravel; firm to stiff; damp; yellowish- to grayish-brown				
5					**BEDROCK; TQs (7-11')** @ 7' Grayish-brown pebbly silty sandstone/sandy siltstone and siltstone; moderately hard to hard; damp; upper 2' highly weathered-locally soft	B:N50W,35NE			
10									
15									
20									

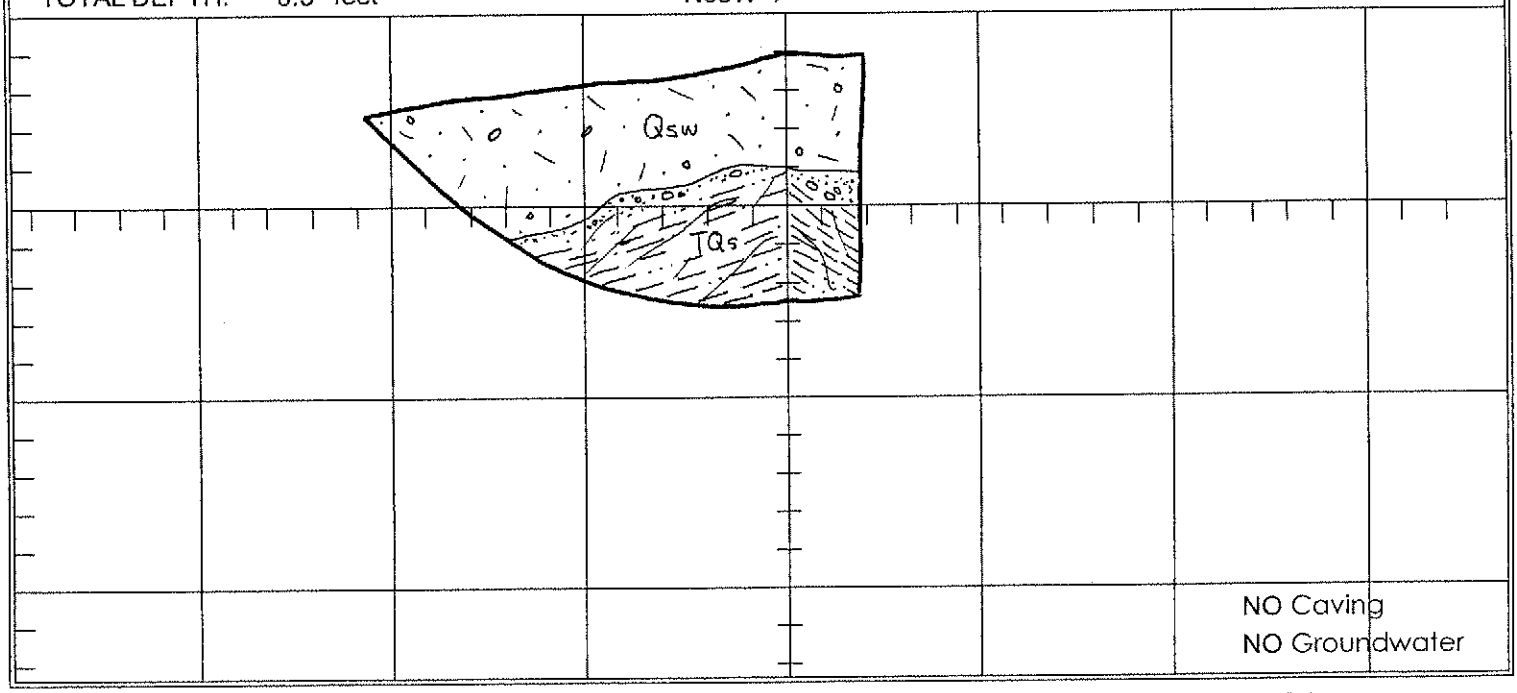
TOTAL DEPTH: 11 feet ←N81E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-86T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/18/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1384		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-3')** @ 0' Sandy silty clay with gravel; soft to firm; damp; yellowish- to grayish-brown				
					BEDROCK; TQs (3-6.5') @ 3' Yellowish- to grayish-brown silty mudstone to siltstone; moderately hard to hard; damp; fractured with caliche	Apx. B:N38W,34NE			
5									
10									
15									
20									

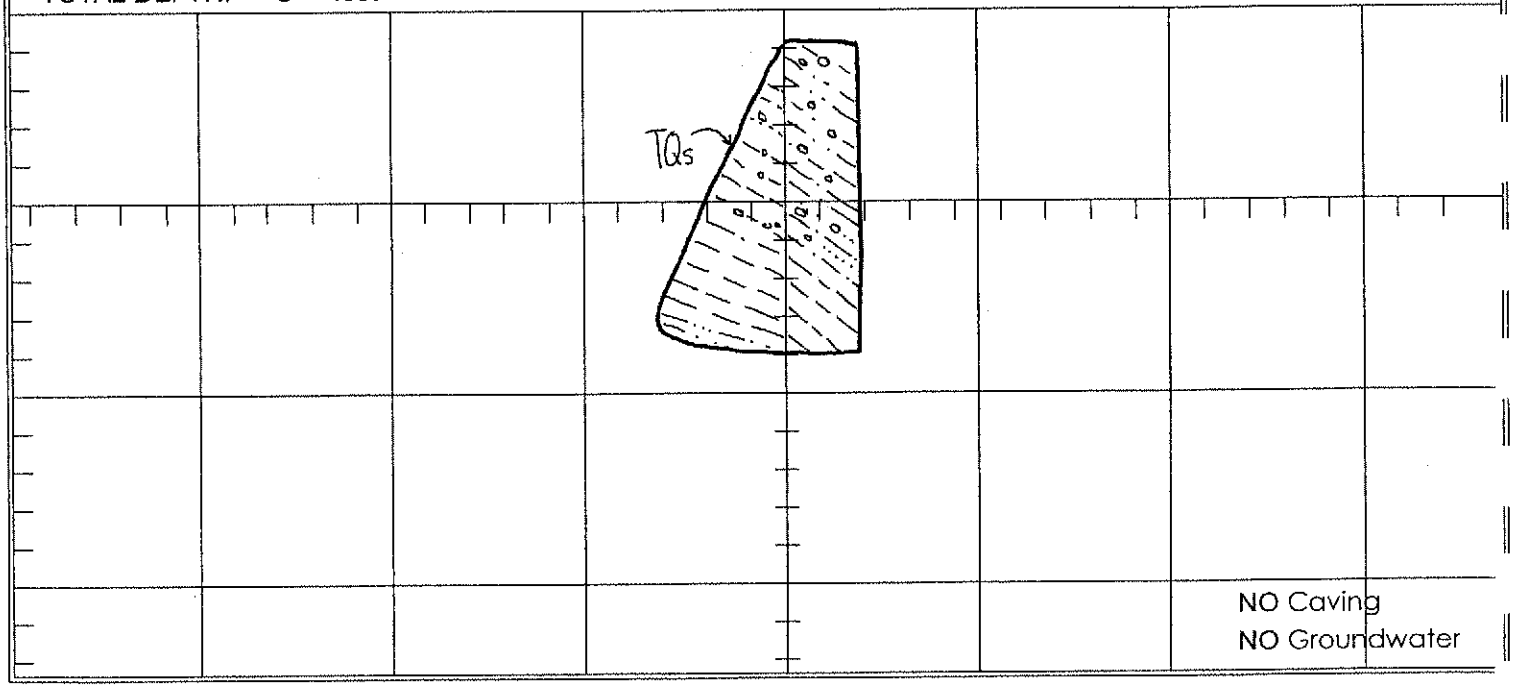
TOTAL DEPTH: 6.5 feet N68W→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-87T**	
PROJECT: Mesas East	DATE: 7/12/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/18/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1384		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**BEDROCK; TQs (0-8')** @ 0' Light gray pebbly silty sandstone and yellowish-brown silty mudstone; moderately hard to hard; damp; sidewalls exhibit weathering	B:N42W,34NE			
5									
10									
15									
20									

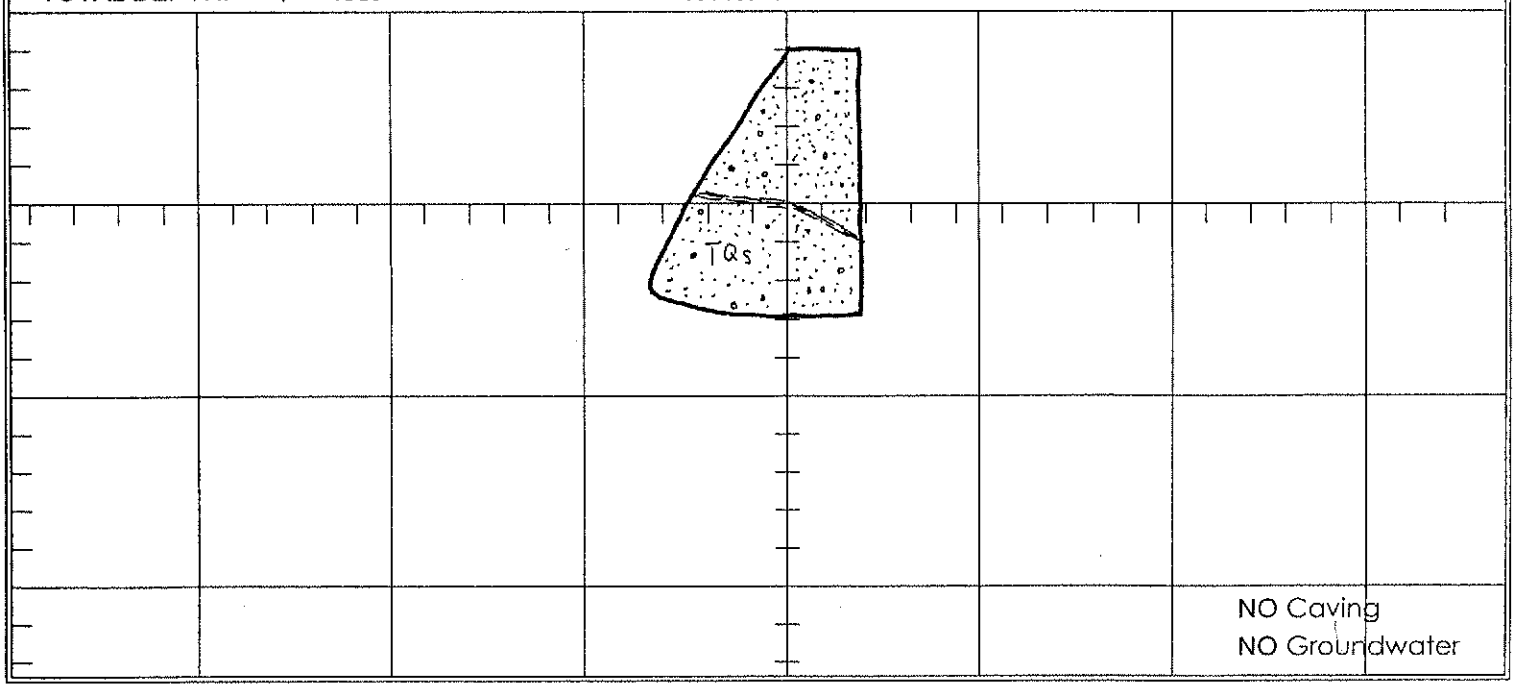
TOTAL DEPTH: 8 feet N26W→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-88T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/18/04		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1392		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**BEDROCK; TQs (0-4')** @ 0' Light gray silty sandstone; fine- to medium-grained sandstone and pebbly sandstone; moderately hard to hard; damp	B:N46W,31NE			
5									
10									
15									
20									

TOTAL DEPTH: 7 feet N44W→ SCALE: 1 inch = 5 feet

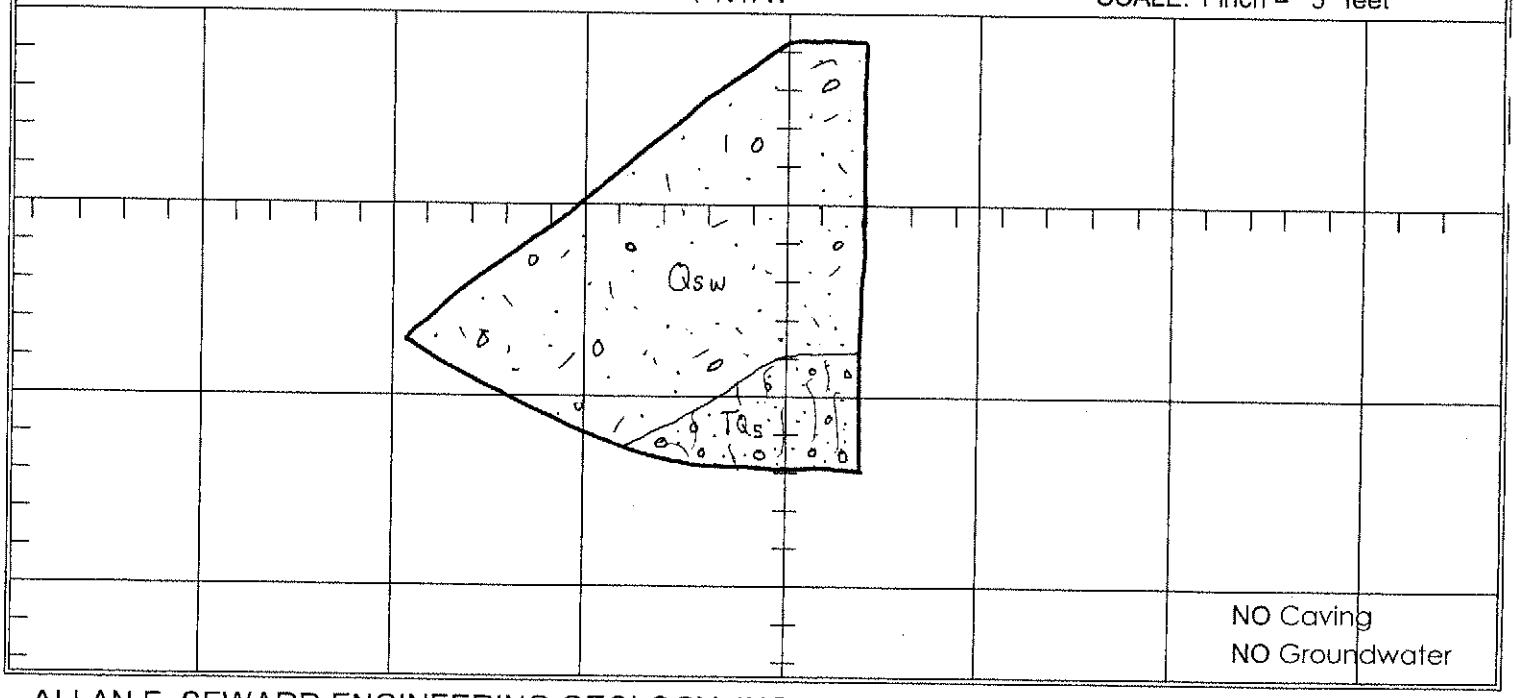


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-89T**	
PROJECT: Mesas East	DATE:		
	LOGGED BY: DGG		
	EXCAVATED: 11/18/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1400		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-8')** @ 0' Sandy silty clay with gravel; firm; damp; grayish-brown				
5									
10					**BEDROCK; TQs (8-11')** @ 8' Grayish-brown pebbly sandy siltstone; slightly to moderately hard; damp; highly weathered				
15									
20									

TOTAL DEPTH: 11 feet ←N47W SCALE: 1 inch = 5 feet

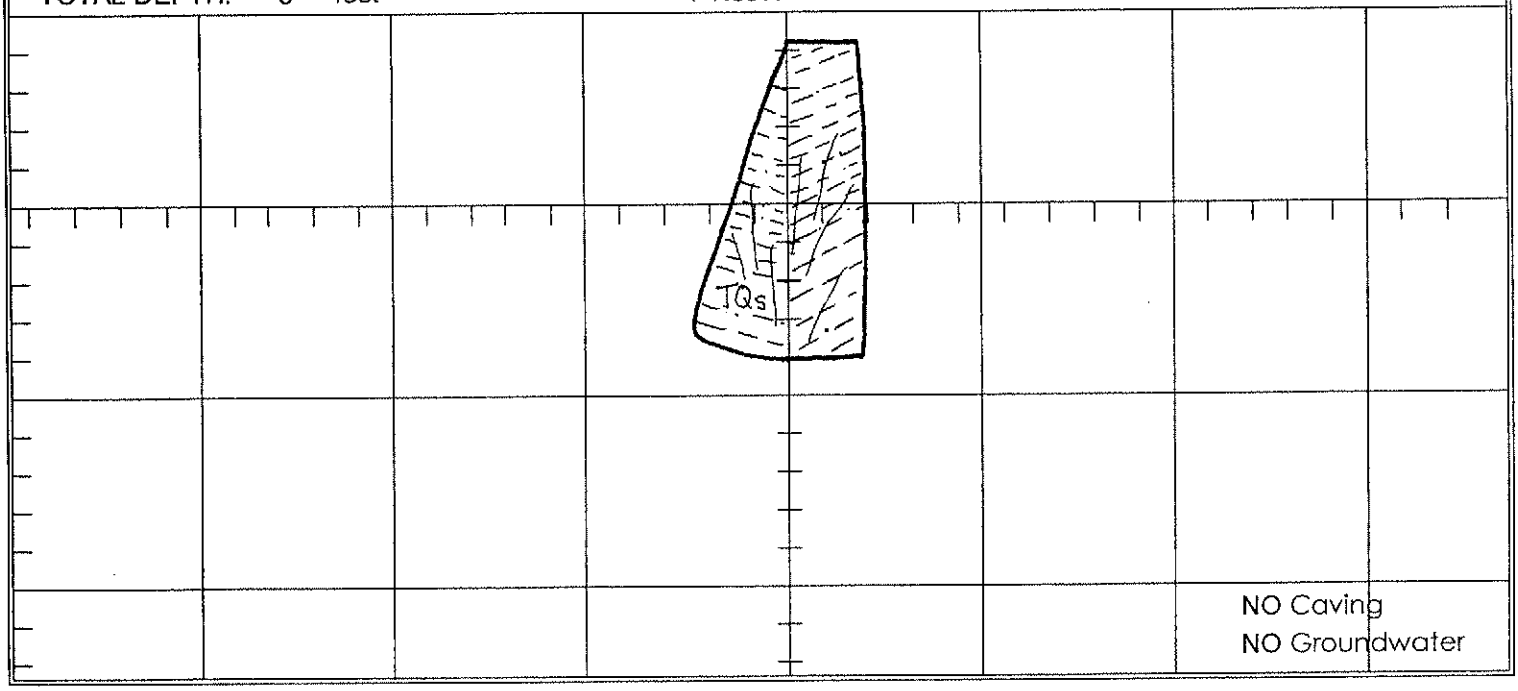


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-90T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/18/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1375		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**BEDROCK; TQs (0-8')** @ 0' Grayish-brown laminated silty mudstone; moderately hard to hard; damp; fractured	B:N47W,40NE			
5									
10									
15									
20									

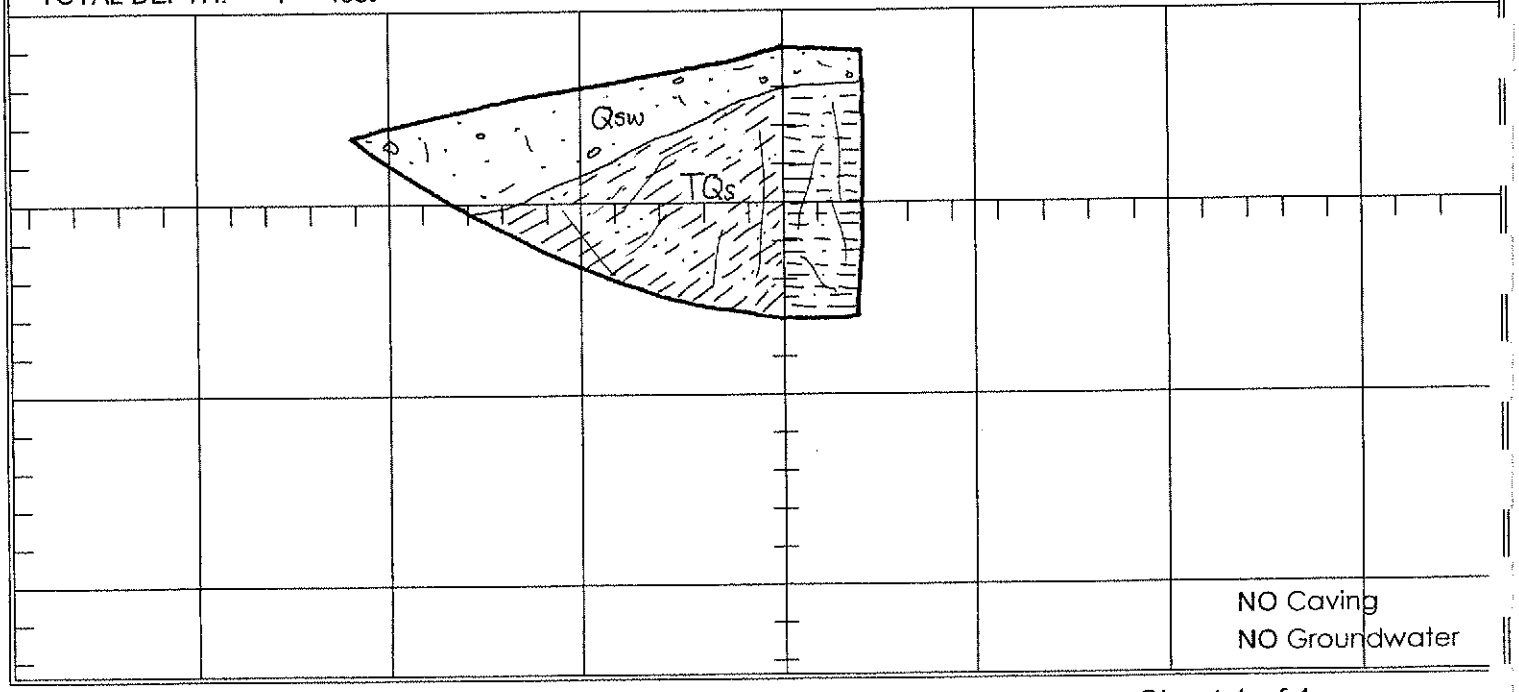
TOTAL DEPTH: 8 feet ←N50W SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-91T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/18/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1402		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-1')** @ 0' Silty clay; firm; damp; grayish-brown **BEDROCK; TQs (1-7')** @ 1' Grayish-brown silty mudstone; moderately hard; damp; highly fractured with caliche	Apx. B:N52W,34NE			
5									
10									
15									
20									

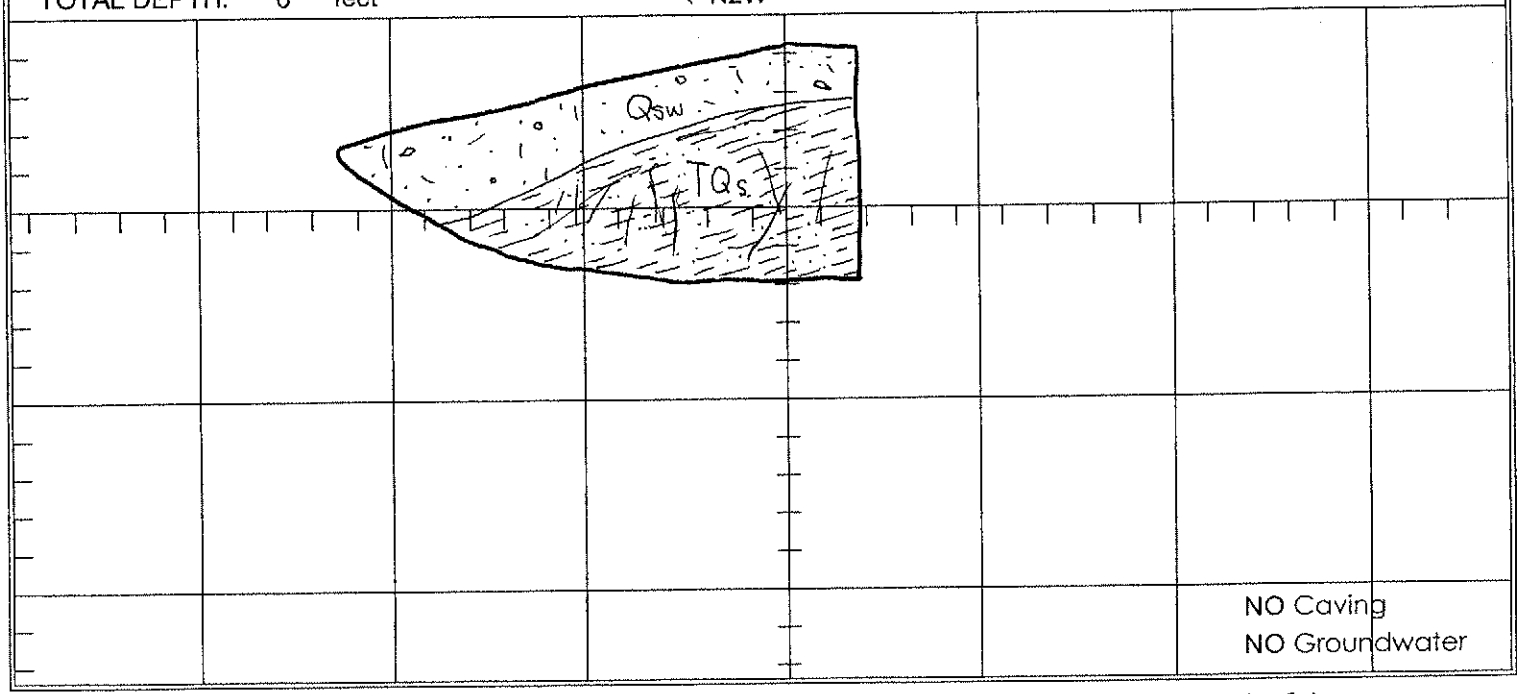
TOTAL DEPTH: 7 feet ←N55E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-92T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/18/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1345		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-1.5')** @ 0' Silty clay; firm; damp; grayish-brown **BEDROCK; TQs (1.5-6')** @ 1.5' Grayish-brown to brown silty mudstone; moderately hard to hard; damp; fractured with caliche	B:N35W,29NE			
5									
10									
15									
20									

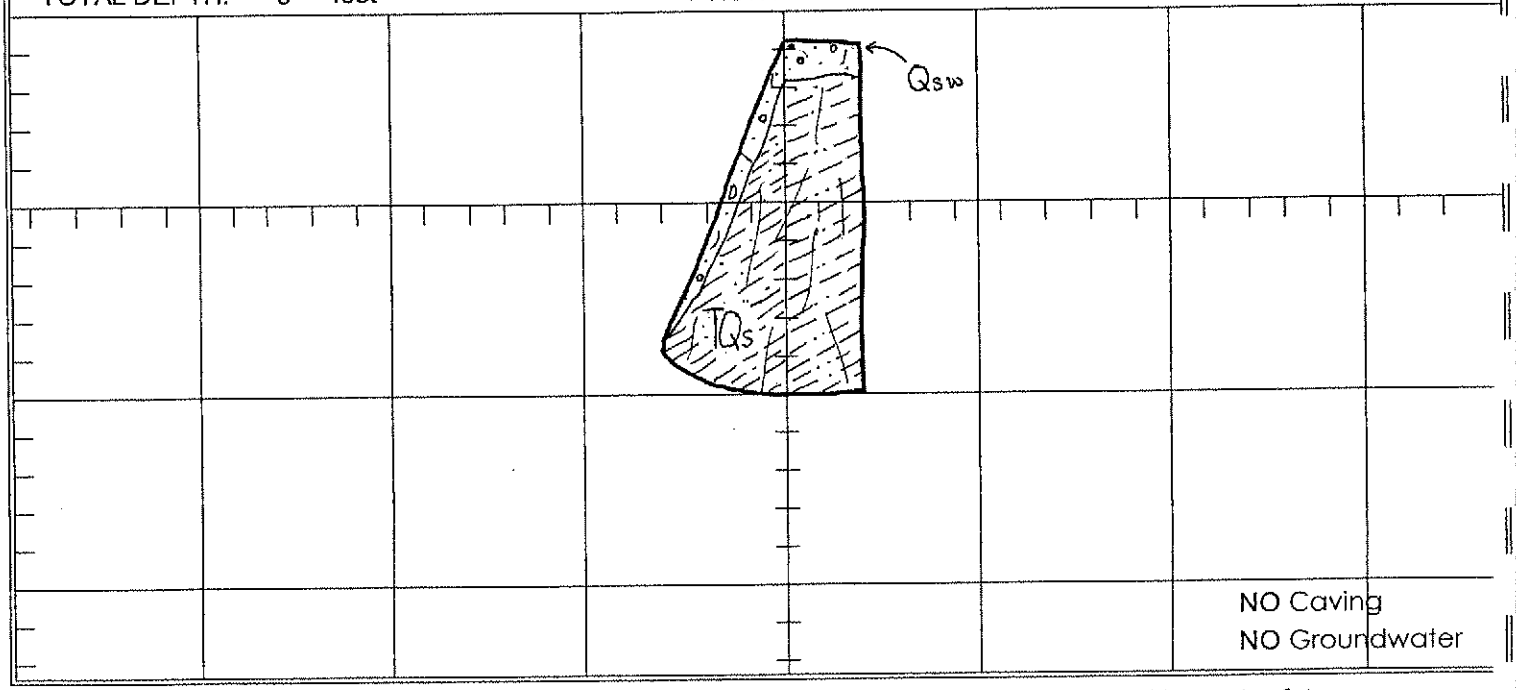
TOTAL DEPTH: 6 feet ←N2W SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG**	
PROJECT: Mesas East	DATE: 7/22/04	**NO. T-93T**	
	LOGGED BY: DGG		
	EXCAVATED: 11/18/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1010		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-1')** @ 0' Silty clay; firm; damp; grayish-brown **BEDROCK; TQs (1-9')** @ 1' Grayish brown silty mudstone; moderately hard; damp; fractured	Apx. B:N49W,34NE			
5									
10									
15									
20									

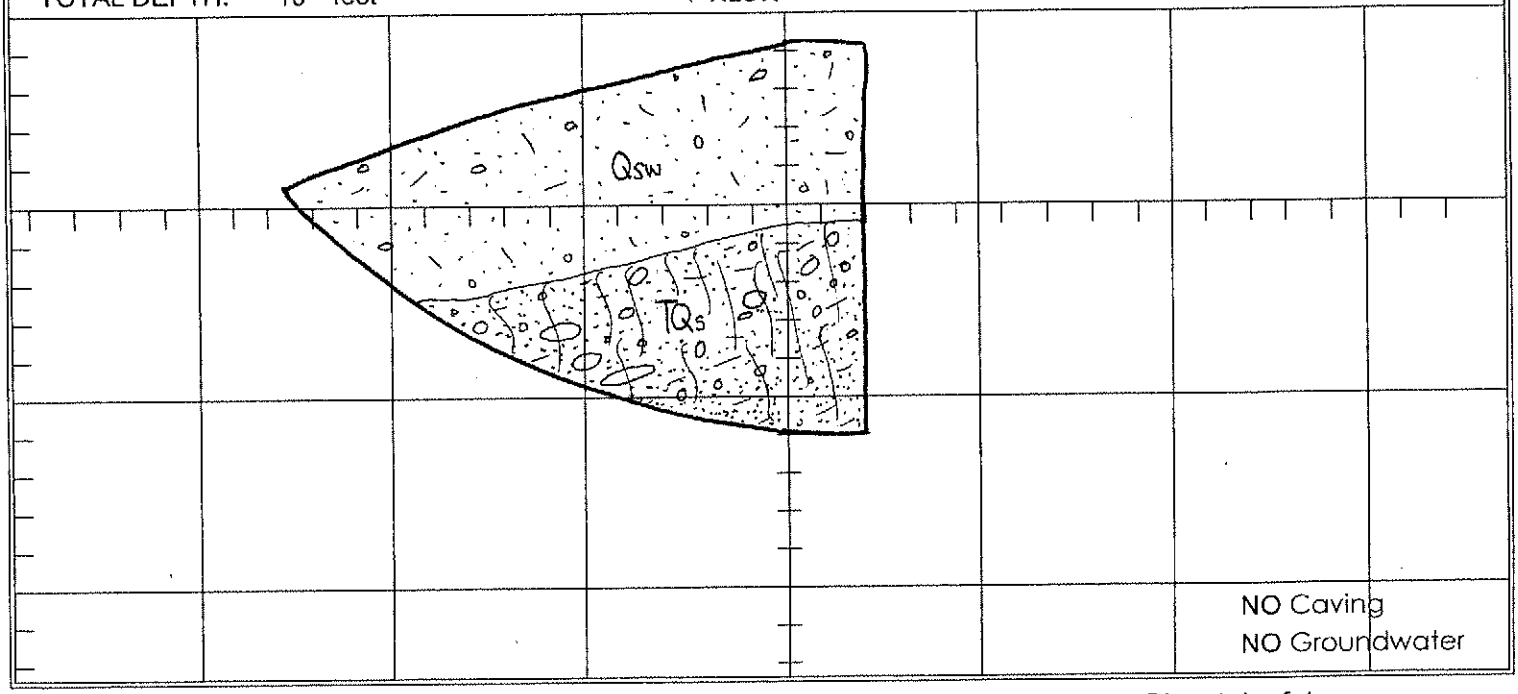
TOTAL DEPTH: 9 feet ←N24W SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-94T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/18/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1278		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-5')** @ 0' Sandy silty damp with gravel(cobbles); firm; damp; grayish-brown				
5					**BEDROCK; TQs (5-10')** @ 5' Grayish-brown pebbly cobbly silty sandstone and fine- to medium-grained sandstone; hard; damp; upper 2.5' highly weathered-punky; bottom 2.5' moderately friable				
10									
15									
20									

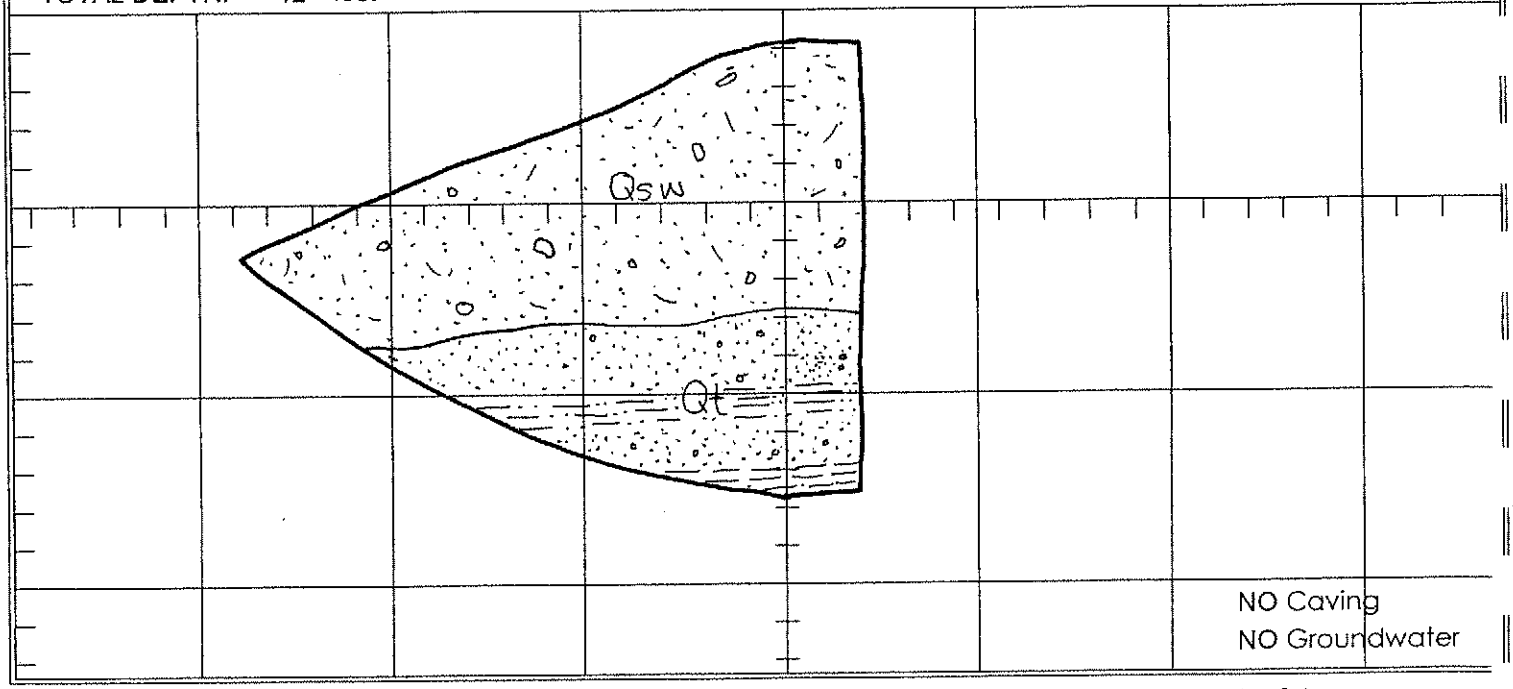
TOTAL DEPTH: 10 feet ←N23W SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG**	
PROJECT: Mesas East	DATE: 7/22/04	**NO. T-95T**	
	LOGGED BY: DGG		
	EXCAVATED: 11/18/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1180		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-7')** @ 0' Sandy silty clay with gravel; firm; damp; grayish-brown				
5									
					QUATERNARY TERRACE DEPOSITS; Qt (7-12') @ 7' Interbedded grayish-brown pebbly silty sandstone; fine- to medium-grained sandstone and siltstone; hard; damp; friable	~Horizontal			
10									
15									
20									

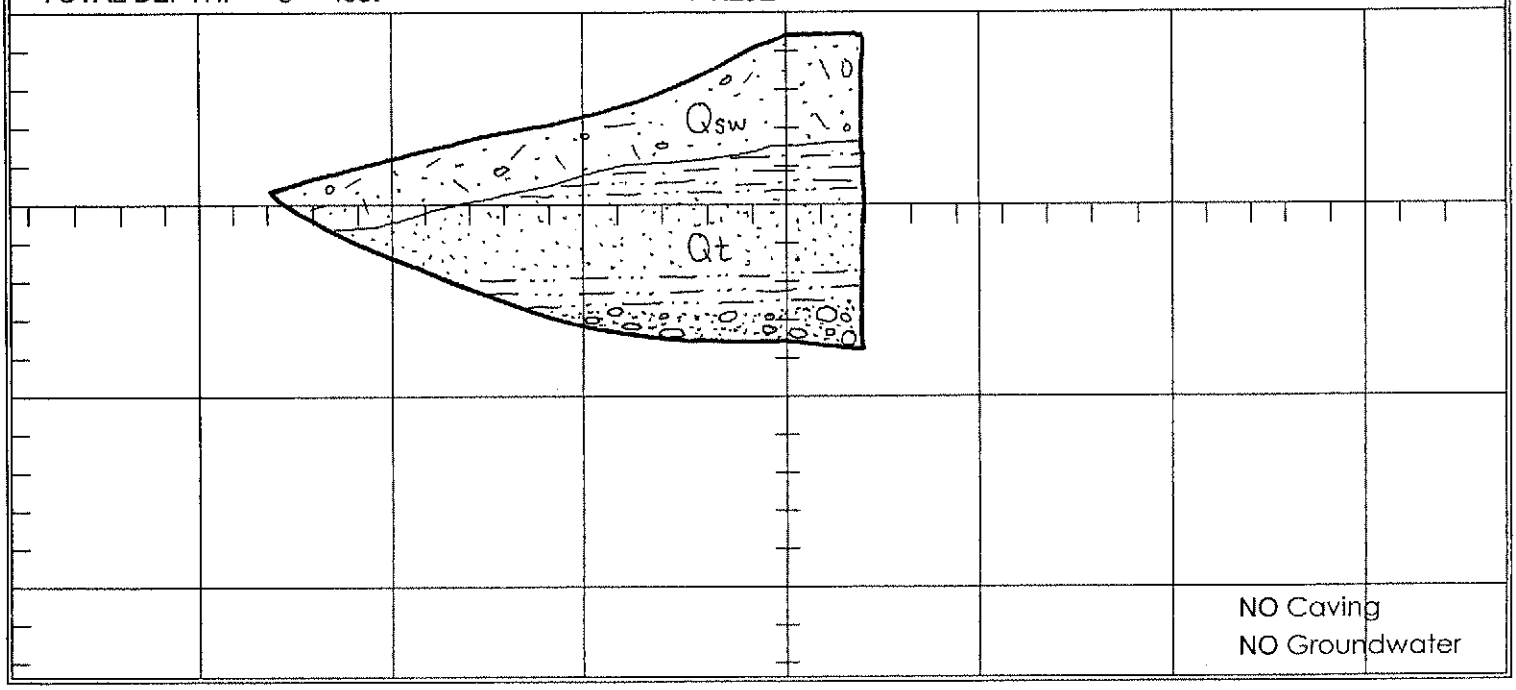
TOTAL DEPTH: 12 feet ←N37E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-96T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/18/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1190		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; Soil/Qsw (0-3')** @ 0' Tan to grayish-brown silty clay to mudstone; soft; damp; crumbly				
					QUATERNARY TERRACE DEPOSITS; Qt (3-8') @ 3' Grayish-brown pebbly silty sandstone; silty mudstone and cobble pebble conglomerate; hard; damp; punky; friable	B~Horizontal			
5									
10									
15									
20									

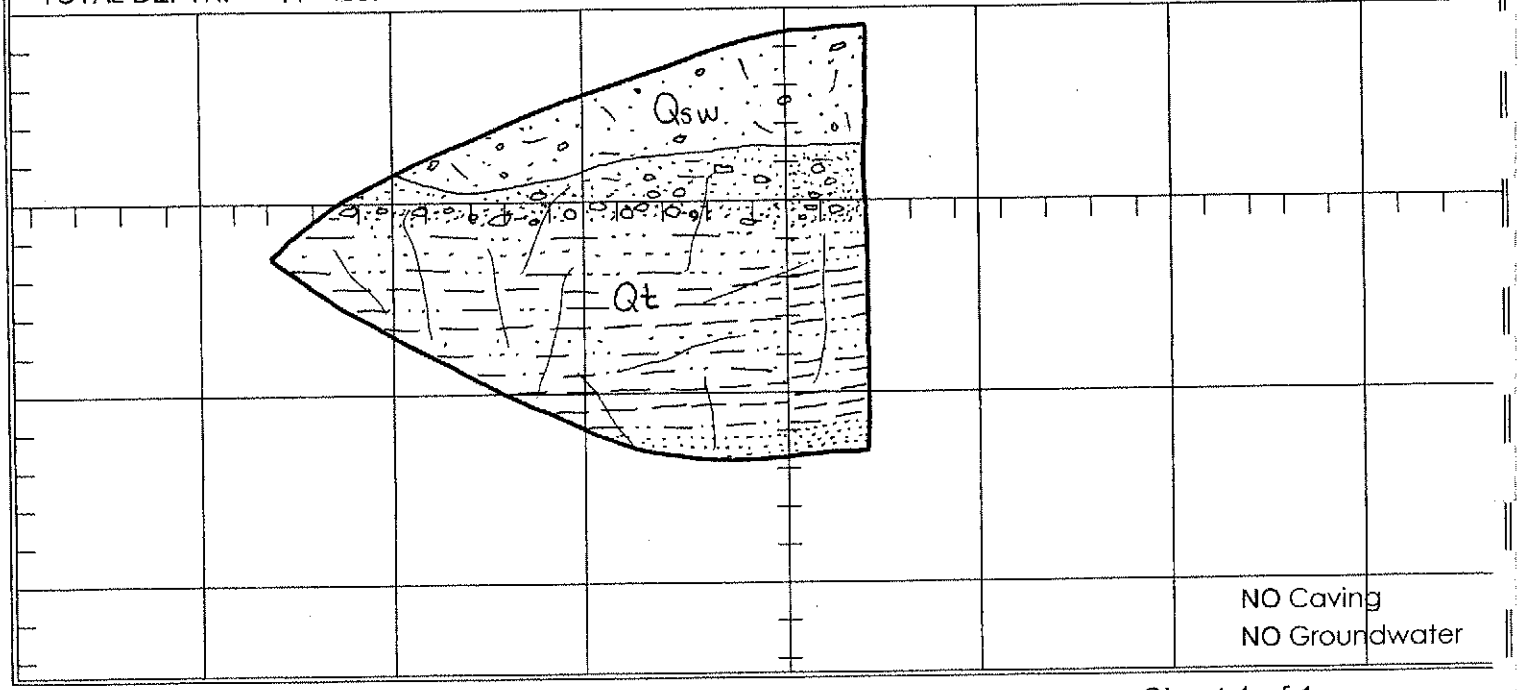
TOTAL DEPTH: 8 feet ←N29E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-97T**
PROJECT: Mesas East	DATE: 7/22/04	
	LOGGED BY: DGG	
	EXCAVATED: 11/18/03	
EXCAVATION METHOD: Trackhoe	ELEVATION: 1155	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-3')** @ 0' Sandy silty clay; firm; damp; grayish-brown				
					QUATERNARY TERRACE DEPOSITS; Qt (3-11') @ 3' Yellowish- to grayish-brown cobbley silty sand/sandy silt and sitly mud; moderately hard; damp; fractured; caliche; locally crumbly; bottom 1' sand-friable	B:~Horizontal			
5									
10									
15									
20									

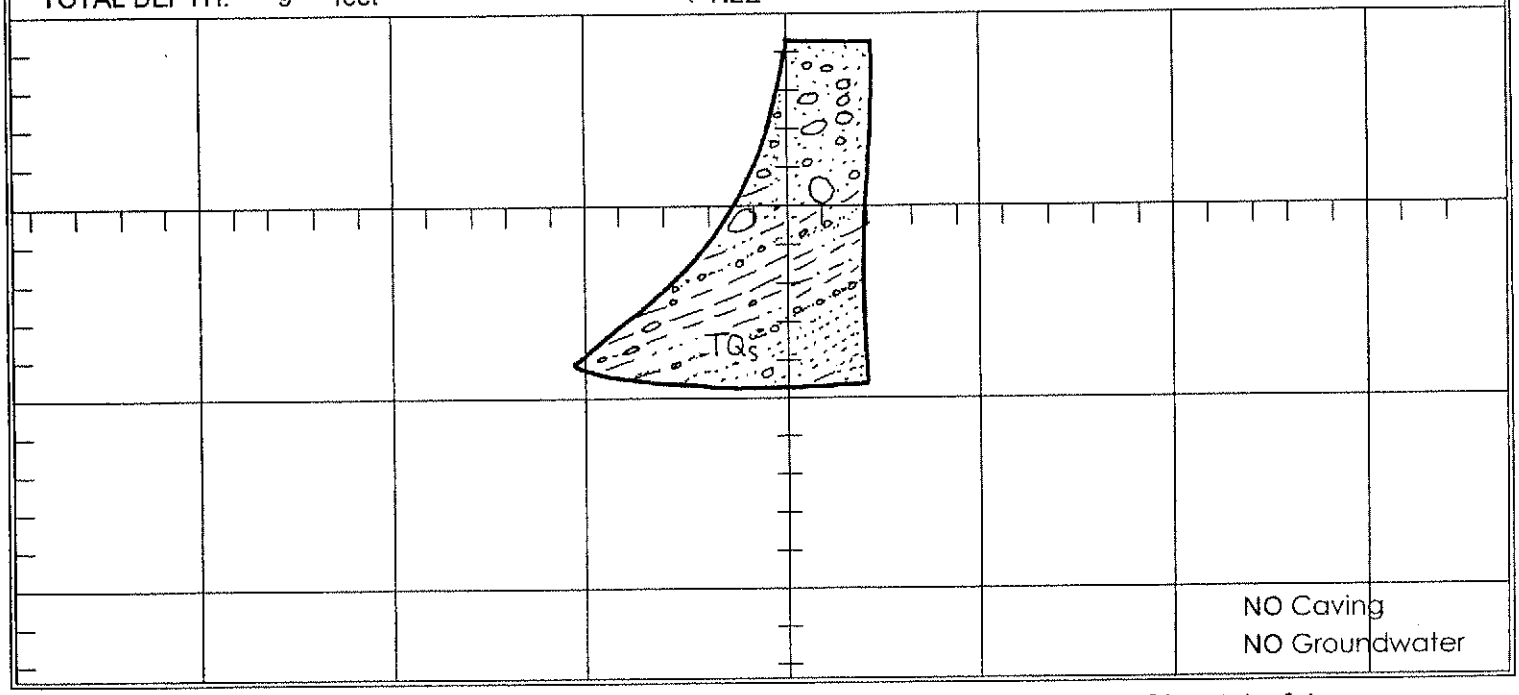
TOTAL DEPTH: 11 feet ←N27E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-98T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/18/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1135		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**BEDROCK; TQs (0-9')** @ 0' Grayish-brown silty sandstone; fine- to medium-grained sandstone and pebble cobble conglomerate; loose to slightly hard; damp; friable	Apx. B:N60W,25NE			
5									
10									
15									
20									

TOTAL DEPTH: 9 feet ←N2E SCALE: 1 inch = 5 feet

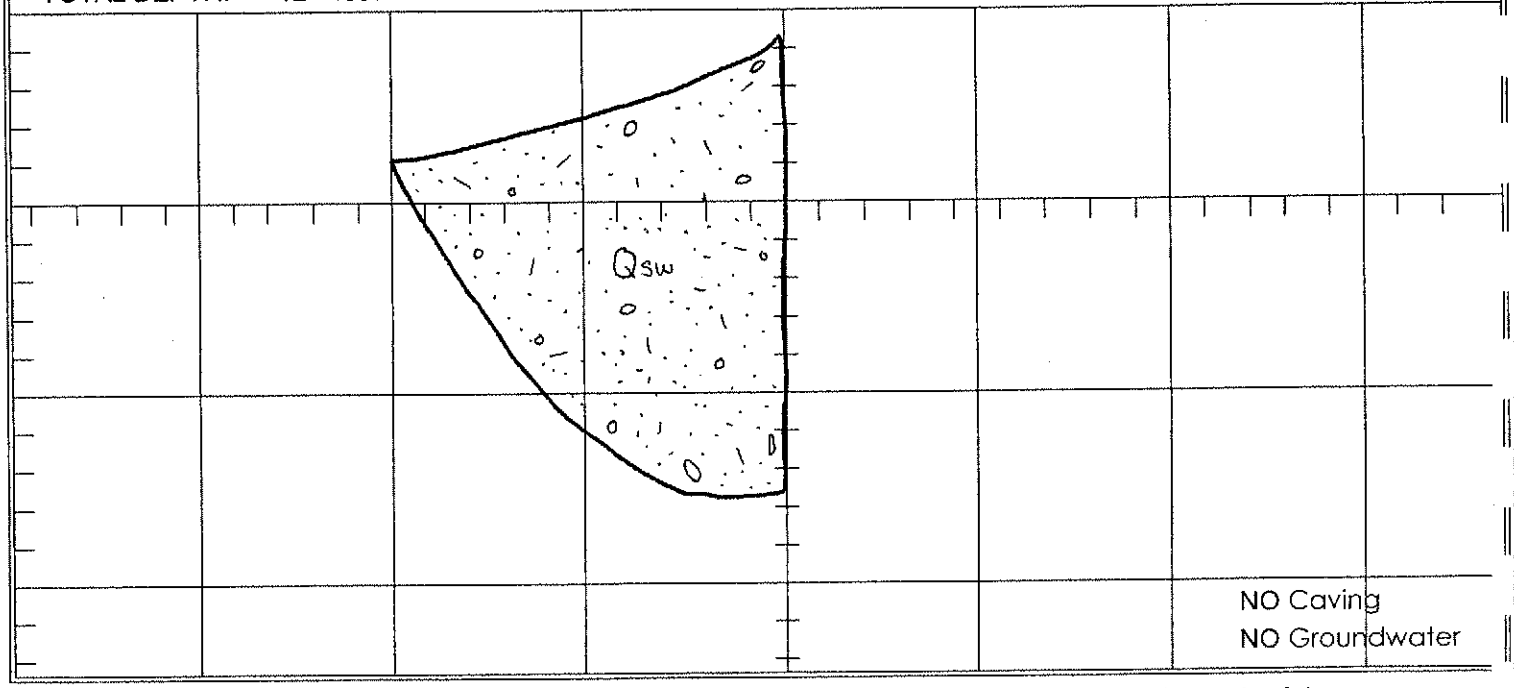


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-99T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/18/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1062		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-12')** @ 0' Sandy silty clay with gravel (cobbles/boulders); soft; damp; grayish-brown				
5									
10									
15					COMMENTS: -Surface logged				
20									

TOTAL DEPTH: 12 feet N35W→ SCALE: 1 inch = 5 feet

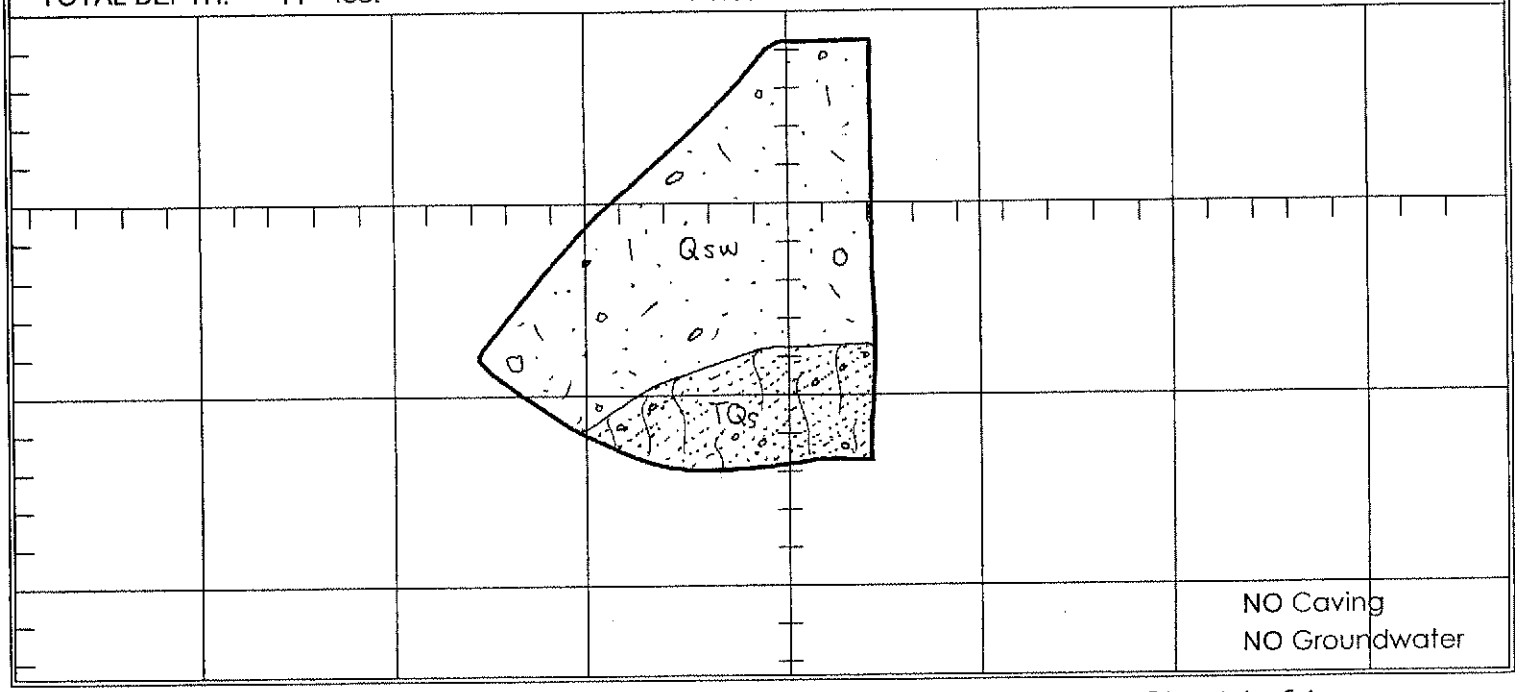


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-100T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/19/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1010		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-8')** @ 0' Sandy silty clay with gravel; soft to firm; damp; grayish-brown				
5									
					BEDROCK; TQs (8-11') @ 8' Grayish-brown silty to pebbly sandstone; moderately hard; damp; moderately friable; weathered	Apx. B:N45W,26NE			
10									
15									
20									

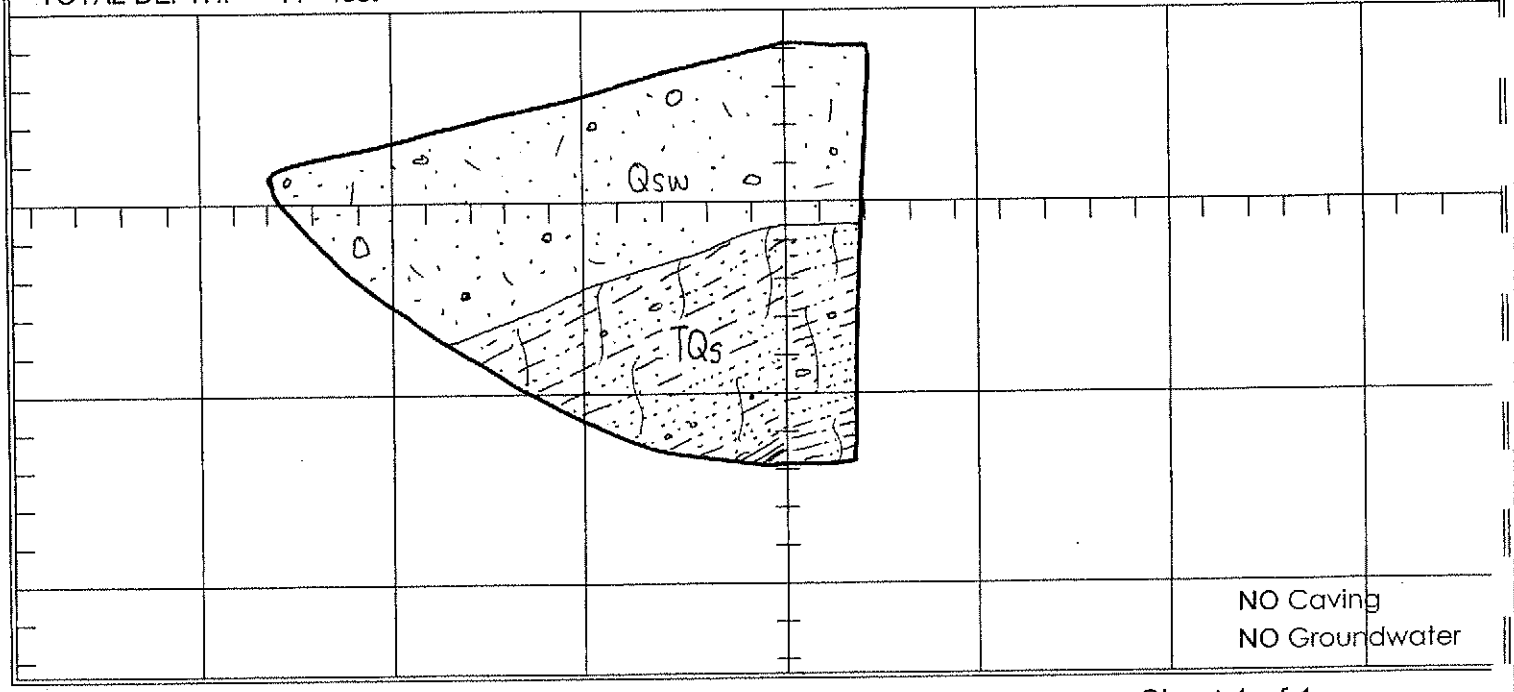
TOTAL DEPTH: 11 feet ←N55E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG**	
PROJECT: Mesas East	DATE: 7/22/04	**NO. T-101T**	
	LOGGED BY: DGG		
	EXCAVATED: 11/19/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1491		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-5')** @ 0' Sandy silty clay with gravel; firm; damp; grayish-brown				
5					**BEDROCK; TQs (5-11')** @ 5' Grayish-brown silty sandstone, pebbly silty sandstone and silty mudstone; moderately hard; damp; weathered; moderately friable	Apx. B:N59W,24NE			
10									
15									
20									

TOTAL DEPTH: 11 feet ←N2W SCALE: 1 inch = 5 feet



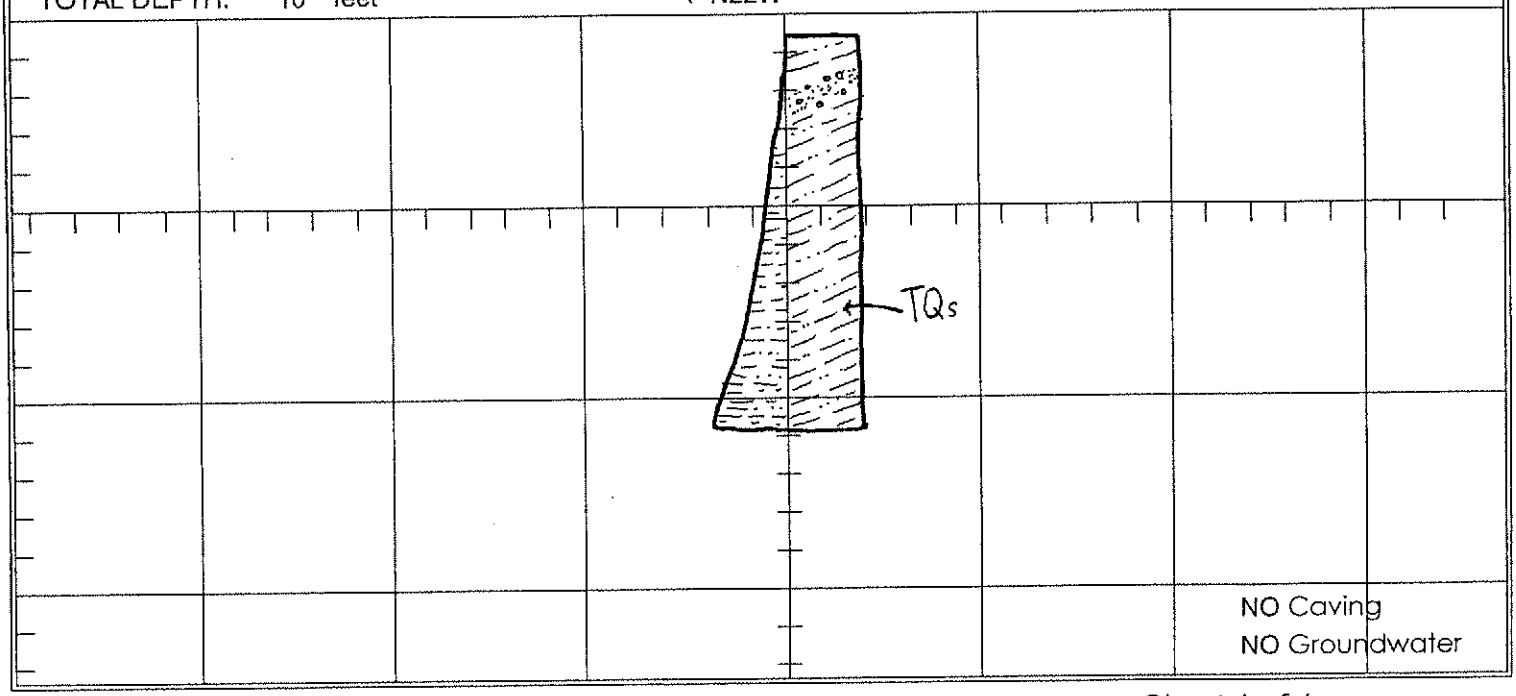
NO Caving
NO Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-102T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/19/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1280		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**BEDROCK; TQs (0-10')** @ 0' Yellowish- to grayish-brown pebbly sandy siltstone and silty mudstone; moderately hard to hard; damp				
5									
10									
15									
20									

TOTAL DEPTH: 10 feet ←N22W SCALE: 1 inch = 5 feet

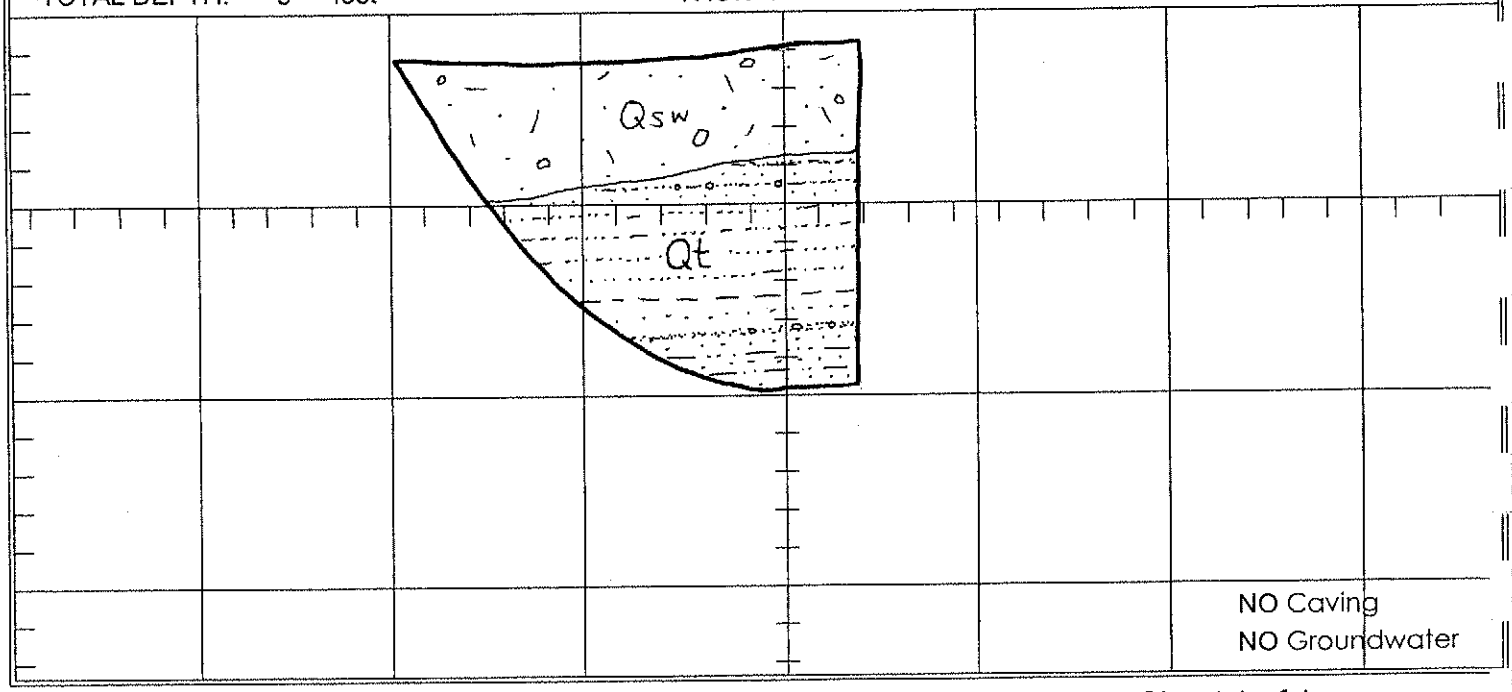


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-103T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/19/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1305		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-3')** @ 0' Sandy silty clay with gravel; soft to firm; damp; grayish-brown				
					QUATERNARY TERRACE DEPOSITS; Qt (3-9') @ 3' Grayish-brown silty sandstone, pebbly silty sandstone and siltstone; hard; damp; friable	~Horizontal			
5									
10									
15									
20									

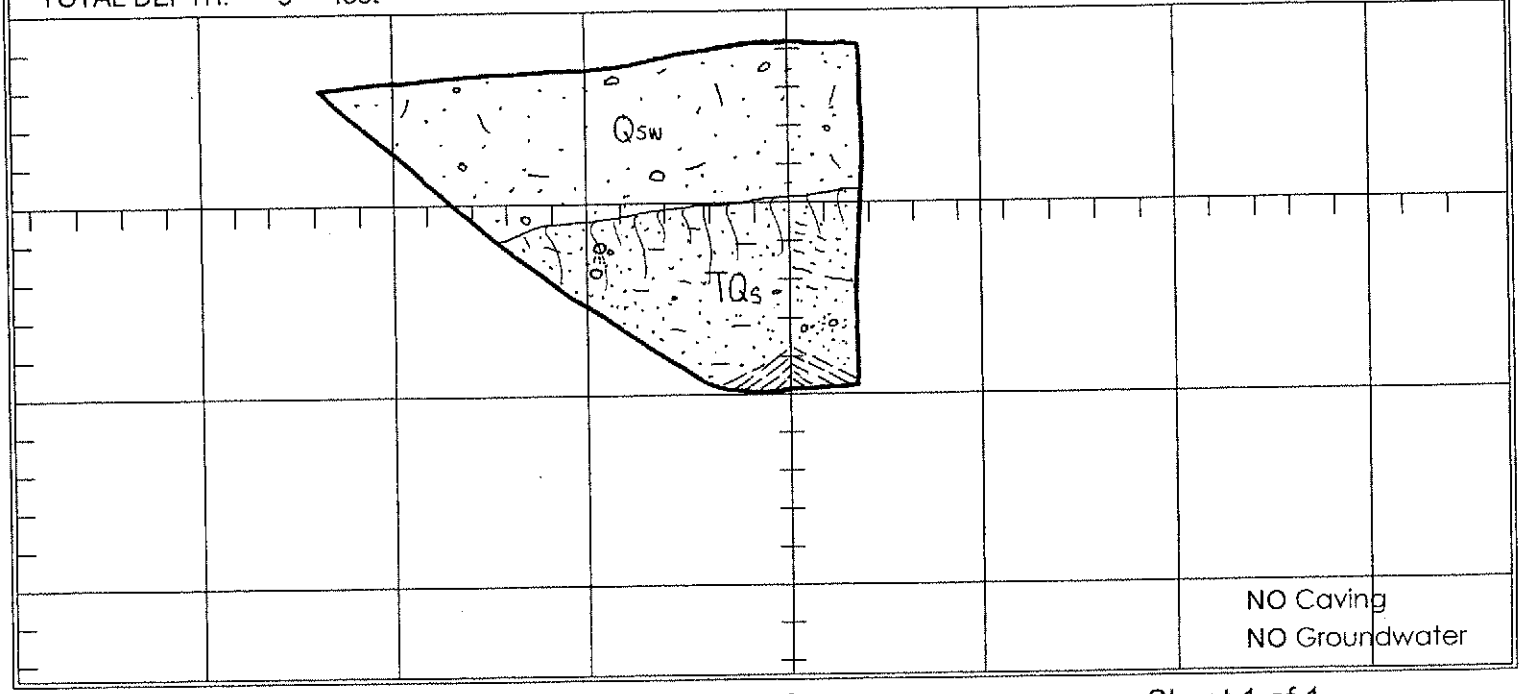
TOTAL DEPTH: 9 feet N40W→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-104T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/19/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1309		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; Soil/Qsw (0-4')** @ 0' Sandy silty clay with gravel; soft to firm; damp; grayish-brown				
5					**BEDROCK; TQs (4-9')** @ 4' Yellowish-brown to light gray silty sandstone, pebbly silty sandstone and siltstone; hard; damp; upper 4' highly weathered; bottom 1'-caliche	Apx. B:N12W,24NE			
10									
15									
20									

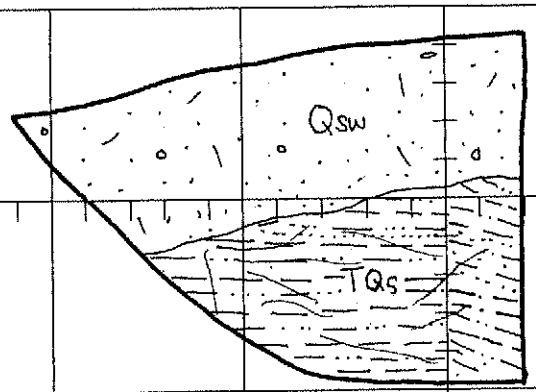
TOTAL DEPTH: 9 feet N43W→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-105T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/19/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1326		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-4')** @ 0' Silty clay; soft to firm; damp; yellowish- to grayish-brown				
5					**BEDROCK; TQs (4-9')** @ 4' Yellowish- to grayish-brown silty mudstone; moderately hard; damp; fractured with caliche	B:N23W,21NE			
10									
15									
20									

TOTAL DEPTH: 9 feet N16W→ SCALE: 1 inch = 5 feet



NO Caving
NO Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

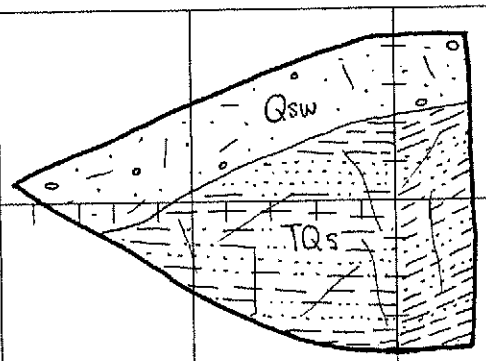
CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-106T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/19/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1343		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-2')** @ 0' Silty clay; firm; damp; yellowish- to grayish-brown **BEDROCK; TQs (2-8')** @ 2' Yellowish- to grayish-brown silty sandstone and siltstone; hard; damp; fractured-locally crumbly	B:N38W,26NE			
5									
10									
15									
20									

TOTAL DEPTH: 8 feet

Due E→

SCALE: 1 inch = 5 feet



NO Caving
NO Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

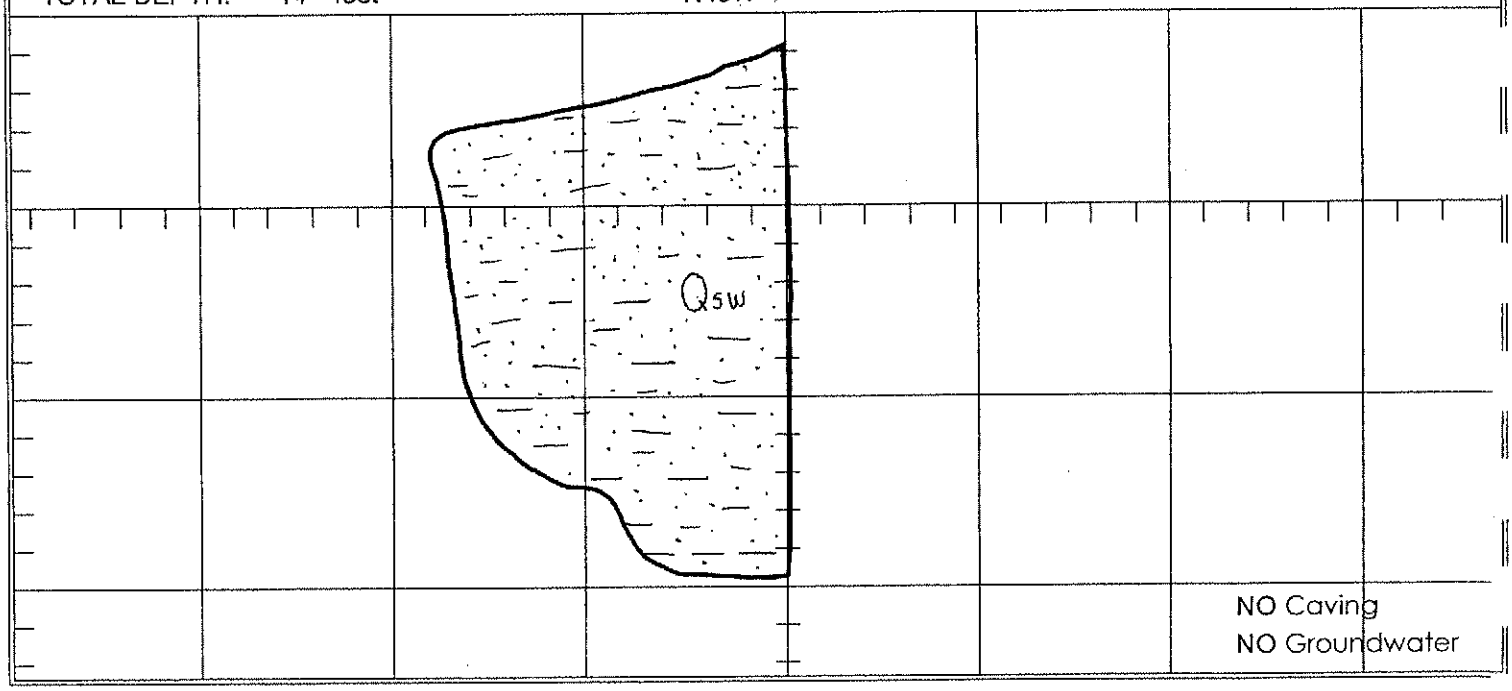
CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-107T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/19/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1404		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-14')** @ 0' Sandy silty clay; firm to stiff; damp; yellowish- to grayish-brown				
5									
10									
15					COMMENTS: -Surface logged				
20									

TOTAL DEPTH: 14 feet

N48W→

SCALE: 1 inch = 5 feet

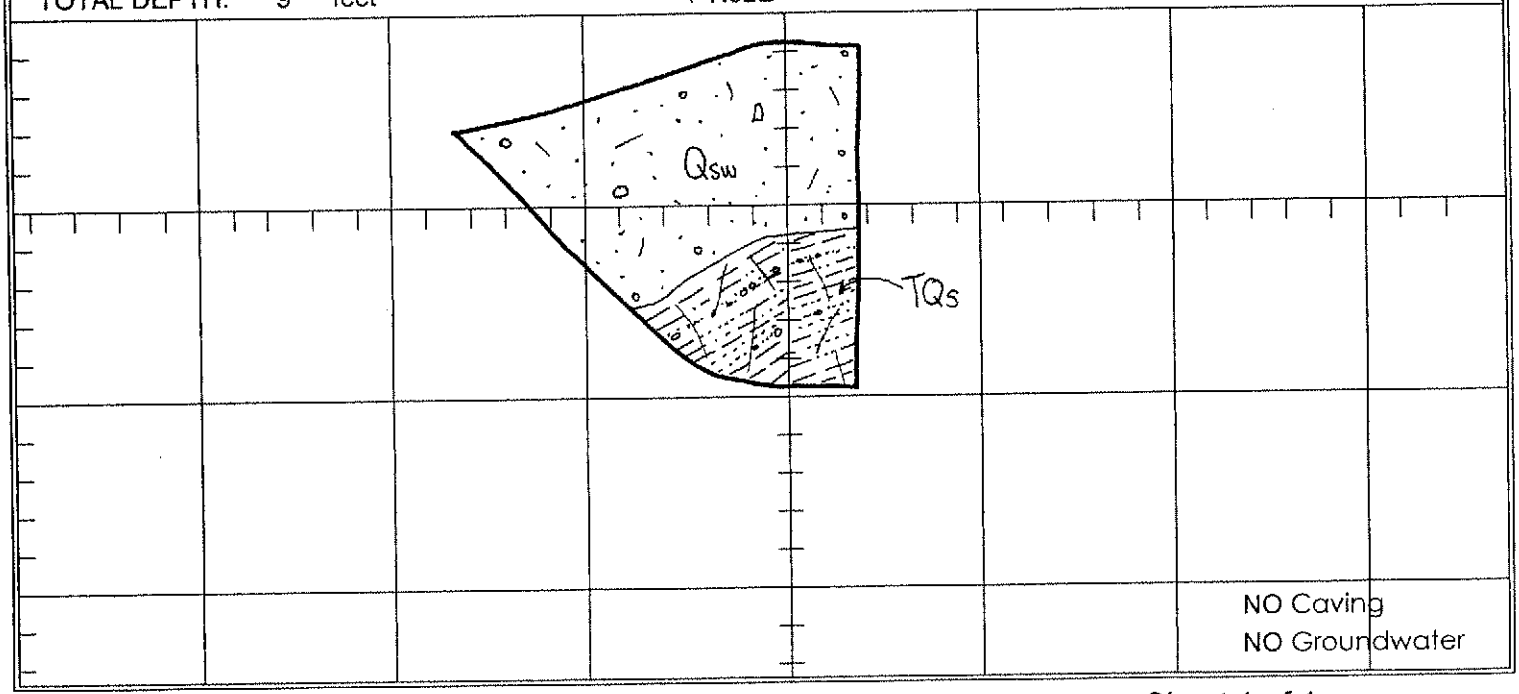


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-108T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/19/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1425		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-5')** @ 0' Sandy silty clay with gravel; firm; damp; yellowish- to grayish-brown				
5					**BEDROCK; TQs (5-9')** @ 5' Yellowish- to grayish-brown sandy siltstone, siltstone and pebbly silty sandstone; moderately hard to hard; damp; fractured with caliche	B:N37W,38NE			
10									
15									
20									

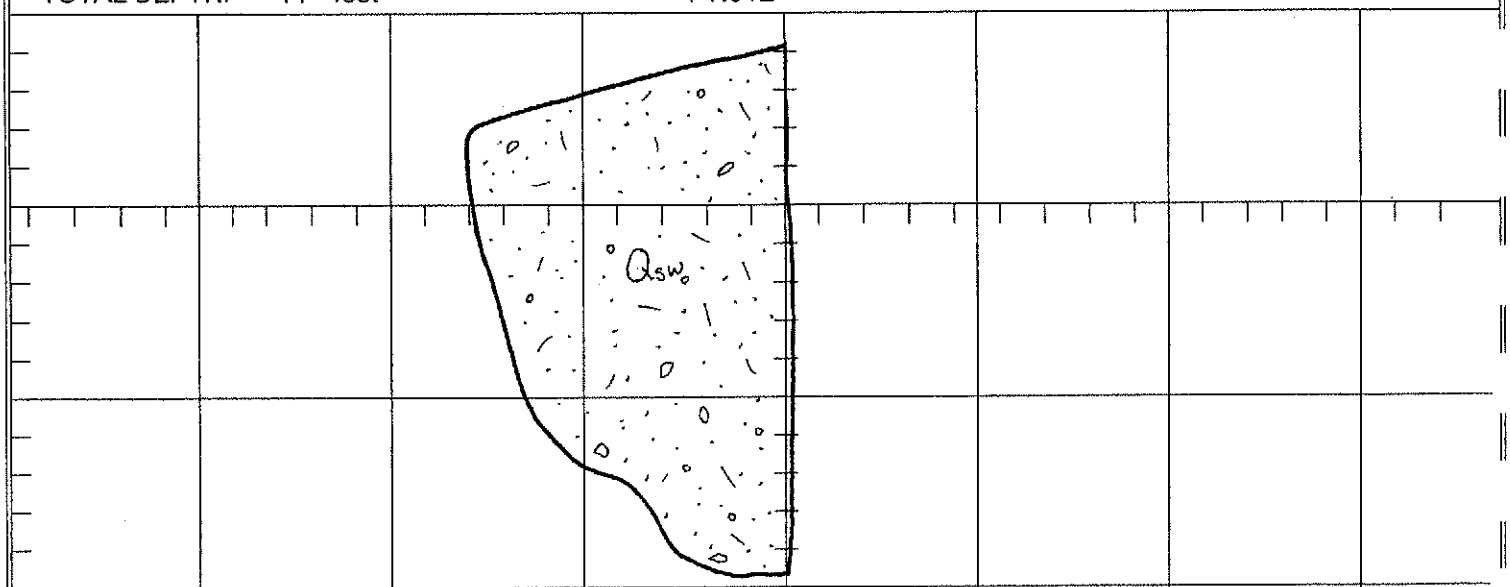
TOTAL DEPTH: 9 feet ←N32E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-109T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/19/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1382		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-14')** @ 0' Sandy silty clay with gravel; soft to stiff; damp; yellowish- to grayish-brown				
5									
10									
15									
20									

TOTAL DEPTH: 14 feet ←N34E SCALE: 1 inch = 5 feet



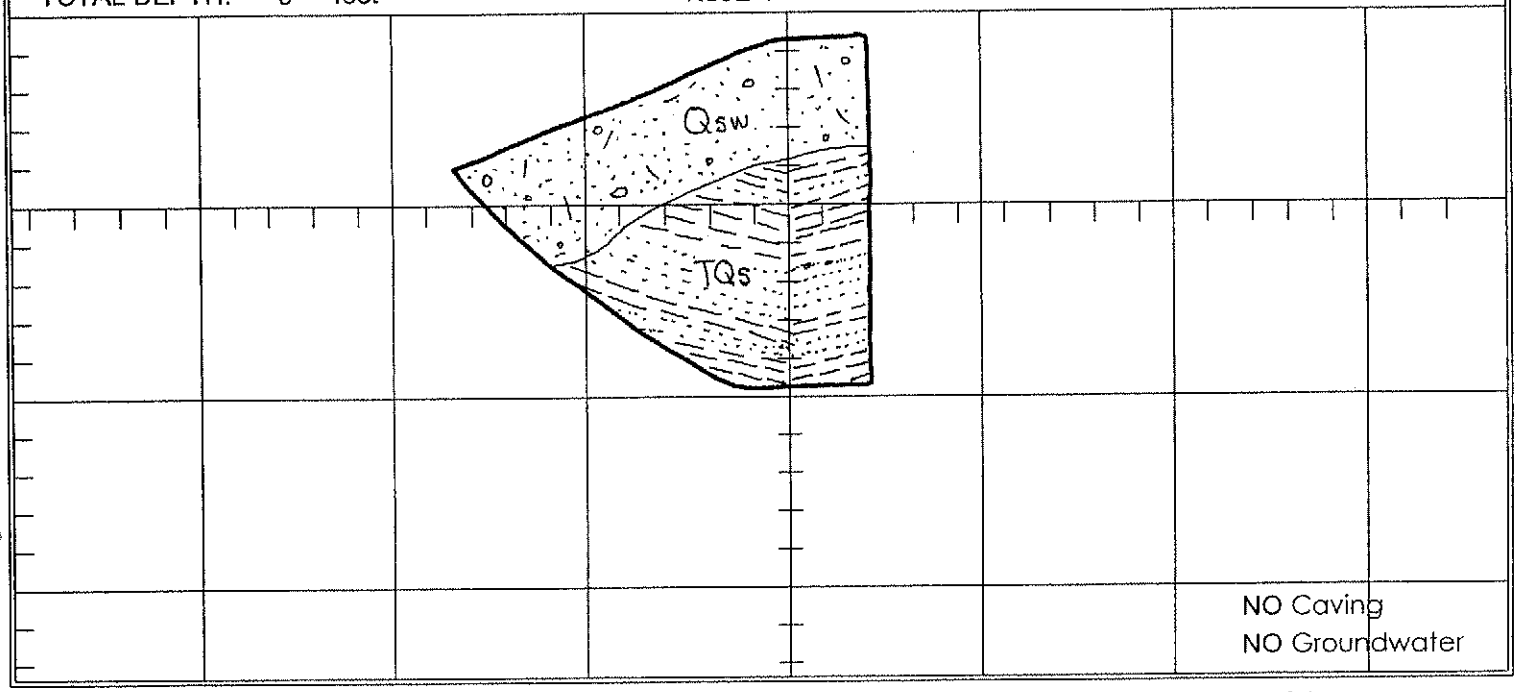
NO Caving
NO Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-110T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/19/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1354		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-3')** @ 0' Sandy silty clay with gravel; soft to firm; damp; yellowish- to grayish-brown				
					BEDROCK; TQs (3-9') @ 3' Yellowish- to grayish-brown silty sandstone; pebbly silty sandstone and siltstone; moderately hard; damp; moderately friable	B:N49W,18NE			
5									
10									
15									
20									

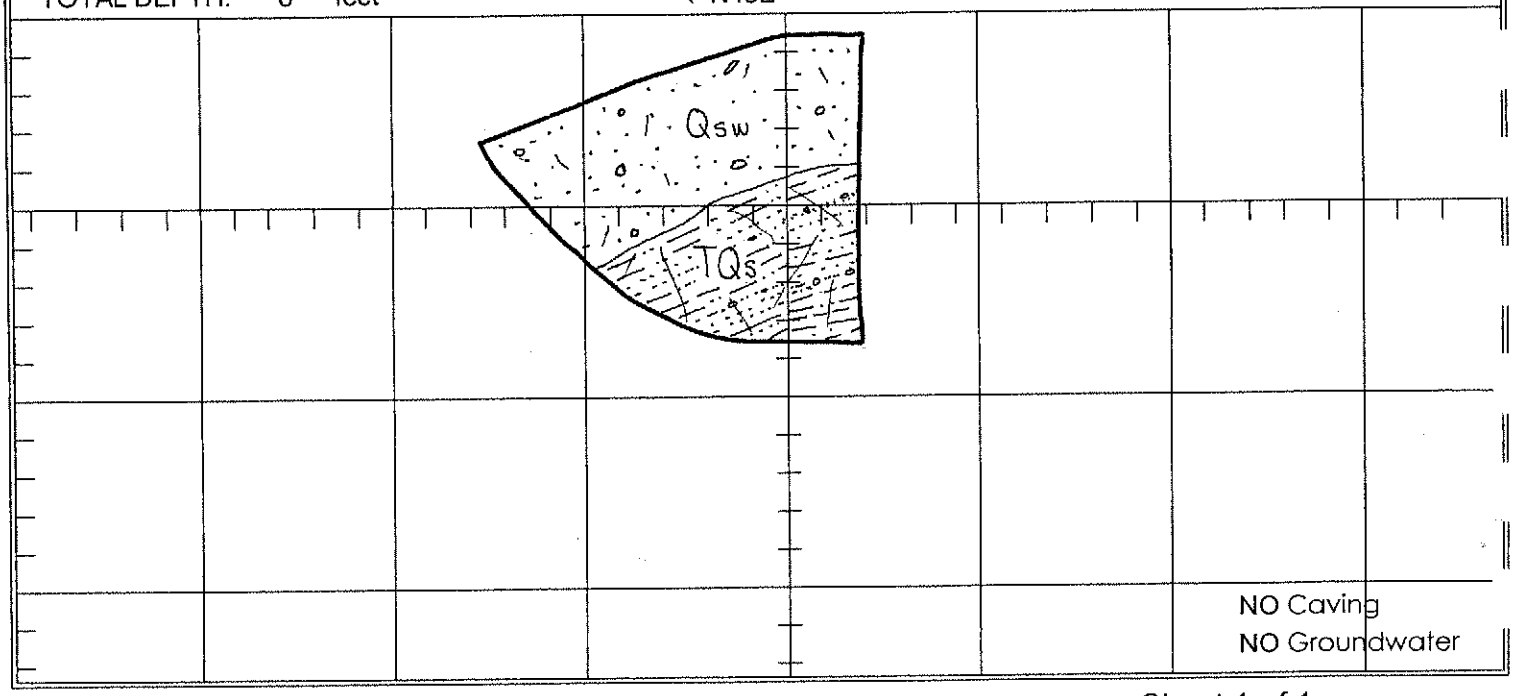
TOTAL DEPTH: 9 feet N59E→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-111T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/20/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1412		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-3.5')** @ 0' Sandy silty clay; soft to firm; damp; yellowish- to grayish-brown				
5					**BEDROCK; TQs (3.5-8')** @ 3.5' Yellowish- to grayish-brown fine- to medium-grained sandstone and siltstone; moderately hard to hard; damp; locally fractured	B:N43W,25NE			
10									
15									
20									

TOTAL DEPTH: 8 feet ←N43E SCALE: 1 inch = 5 feet

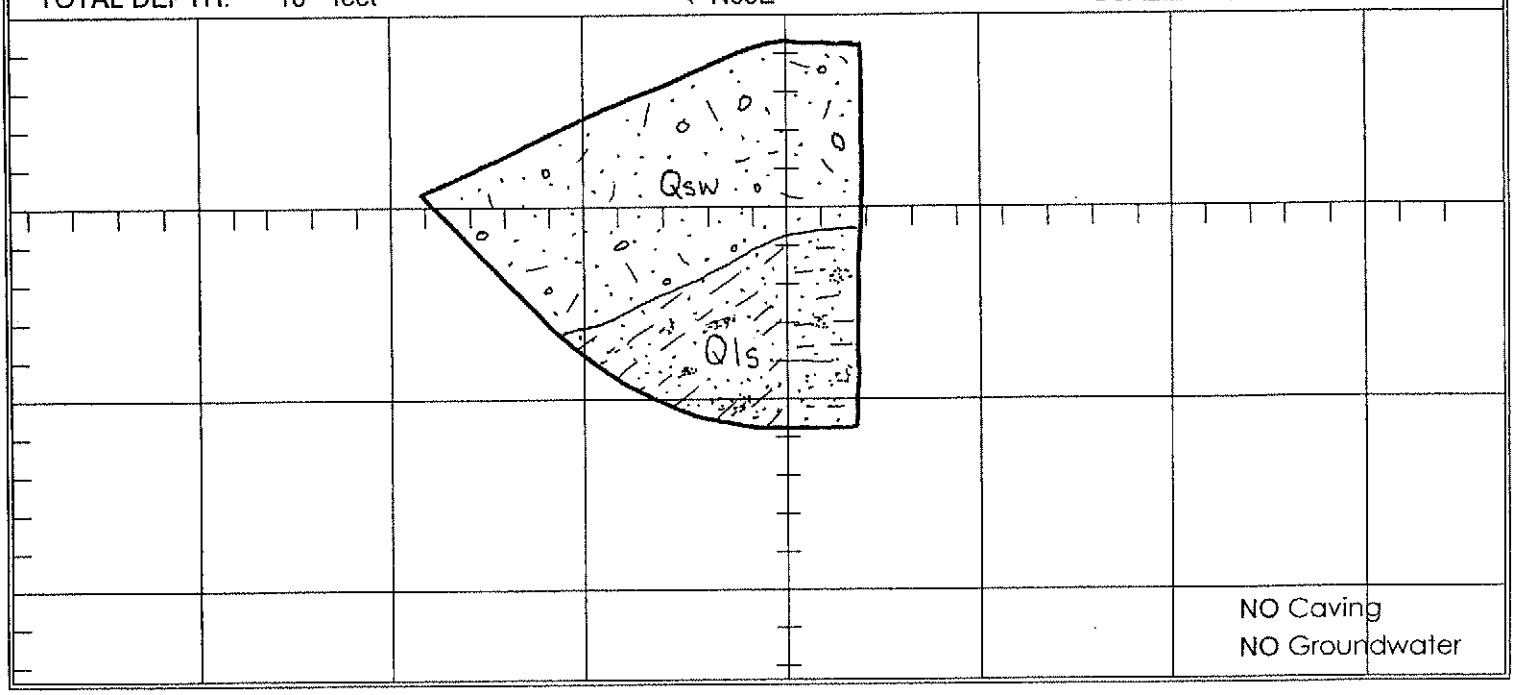


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-112T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/20/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1404		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				CL-ML	**SOIL/SLOPEWASH; Soil/Qsw (0-5')** @ 0' Sandy silty clay; soft to firm; damp; yellowish- to grayish-brown				
5					**QUATERNARY LANDSLIDE; Qls (5-10')** @ 5' Yellowish- to grayish-brown silty mudstone with patches of pebbly sandstone; moderately hard; caliche				
10									
15									
20									

TOTAL DEPTH: 10 feet ←N53E SCALE: 1 inch = 5 feet

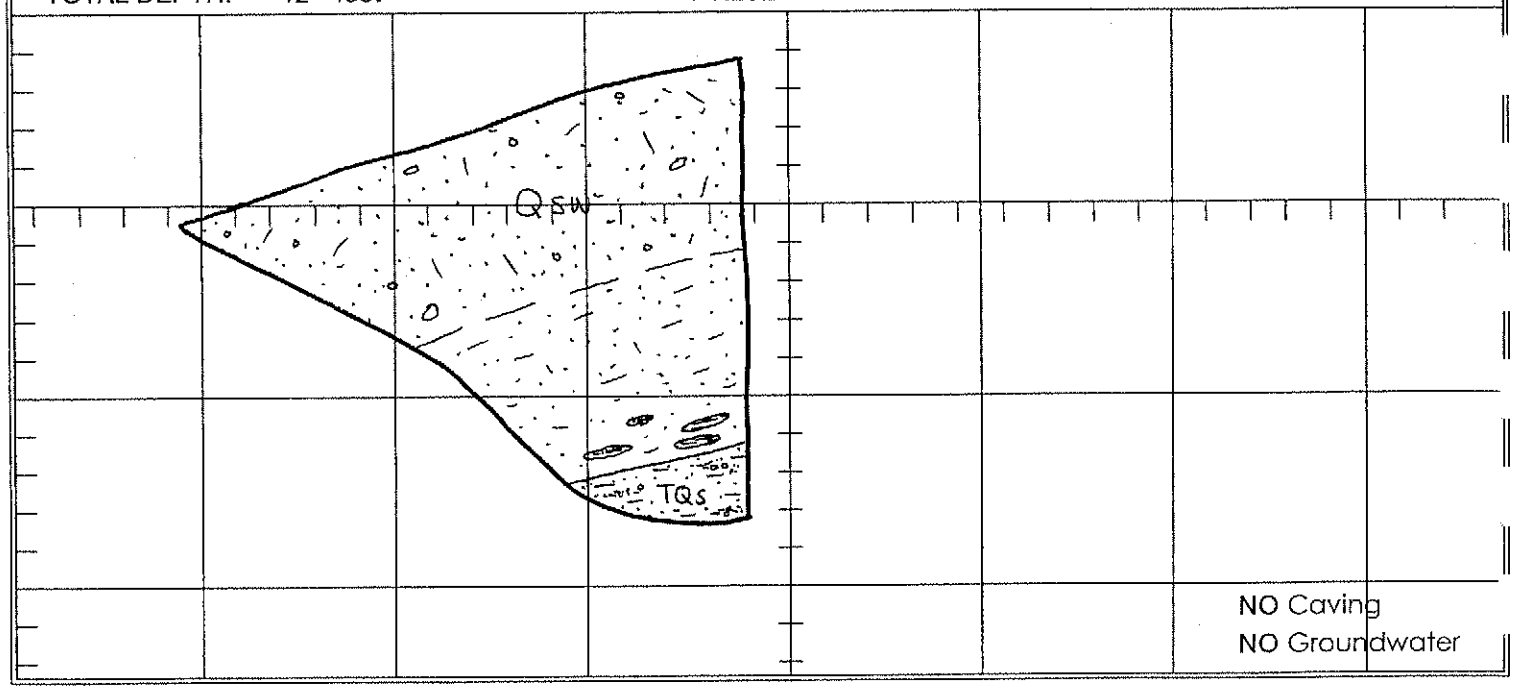


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-114T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: SKM		
	EXCAVATED: 11/25/03		
EXCAVATION METHOD: Trackhoe	ELEVATION: 14??		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; Soil/Qsw (0-5')** @ 0' Medium brown to reddish-brown clayey; sandy silt with pebbles; stiff; dry to damp				
5					**SURFICIAL FAILURE (5-10.5')** @ 5' Light yellowish-brown sandy silty matrix with pieces of mudstone				
10					**BEDROCK; TQs (10.5-12')** @ 10.5' Medium brown sandy siltstone with local pebbles; massive; moderately hard to hard; dry to damp	Slip surface N50W,14NE			
15					COMMENTS: -Highly weathered down to 10.5' -Excavated below T-61T to check depth for furture dozer/trench excavation				
20									

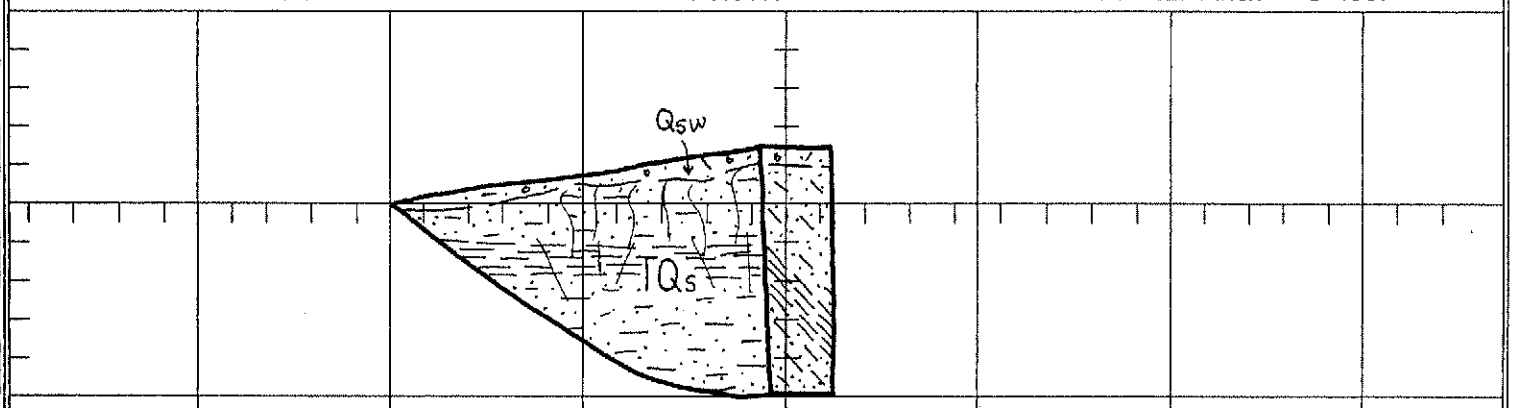
TOTAL DEPTH: 12 feet ←N20E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-128T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MJD		
	EXCAVATED: 3/3/04		
EXCAVATION METHOD: Trackhoe w/24' Bucket	ELEVATION: 1206		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SLOPEWASH; Qsw (0-0.5')** @ 0' Light brown silty sand; soft; moist; roots, voids **BEDROCK; TQs (0.5-6.5')** @ 0.5' Light brown sandy siltstone, brown siltstone and mudstone, and light gray fine-grained sandstone; moderately hard to hard; moist to damp; well-bedded; laminated; caliche in mudstone; highly to moderately fractured and weathered	Exc. B:N65W,52SW			
5									
10									
15					COMMENTS: -Highly weathered down to 4'				
20									

TOTAL DEPTH: 6.5 feet ←N51W SCALE: 1 inch = 5 feet

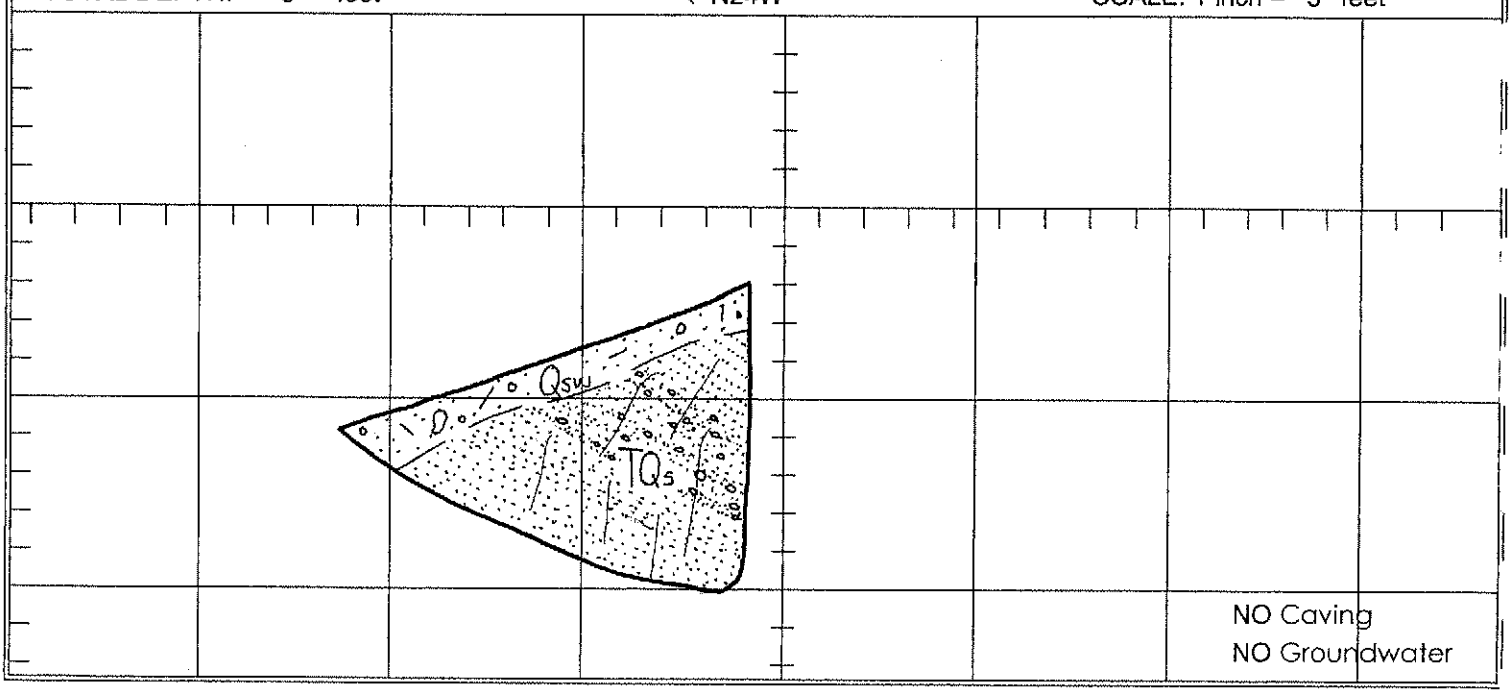


NO Caving
NO Groundwater

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-129T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MJD		
	EXCAVATED: 3/3/04		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1222		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SLOPEWASH; Qsw (0-1')** @ 0' Brown silty sand; soft; moist; roots, voids **BEDROCK; TQs (1-8')** @ 1' Light gray fine- to medium-grained sandstone and pebbly sandstone; moderately hard to hard; moist to damp; local laminations; moderately fractured	B:N78W,36SW Lamin.			
5									
10									
15					COMMENTS: -Highly weathered down to 4'				
20									

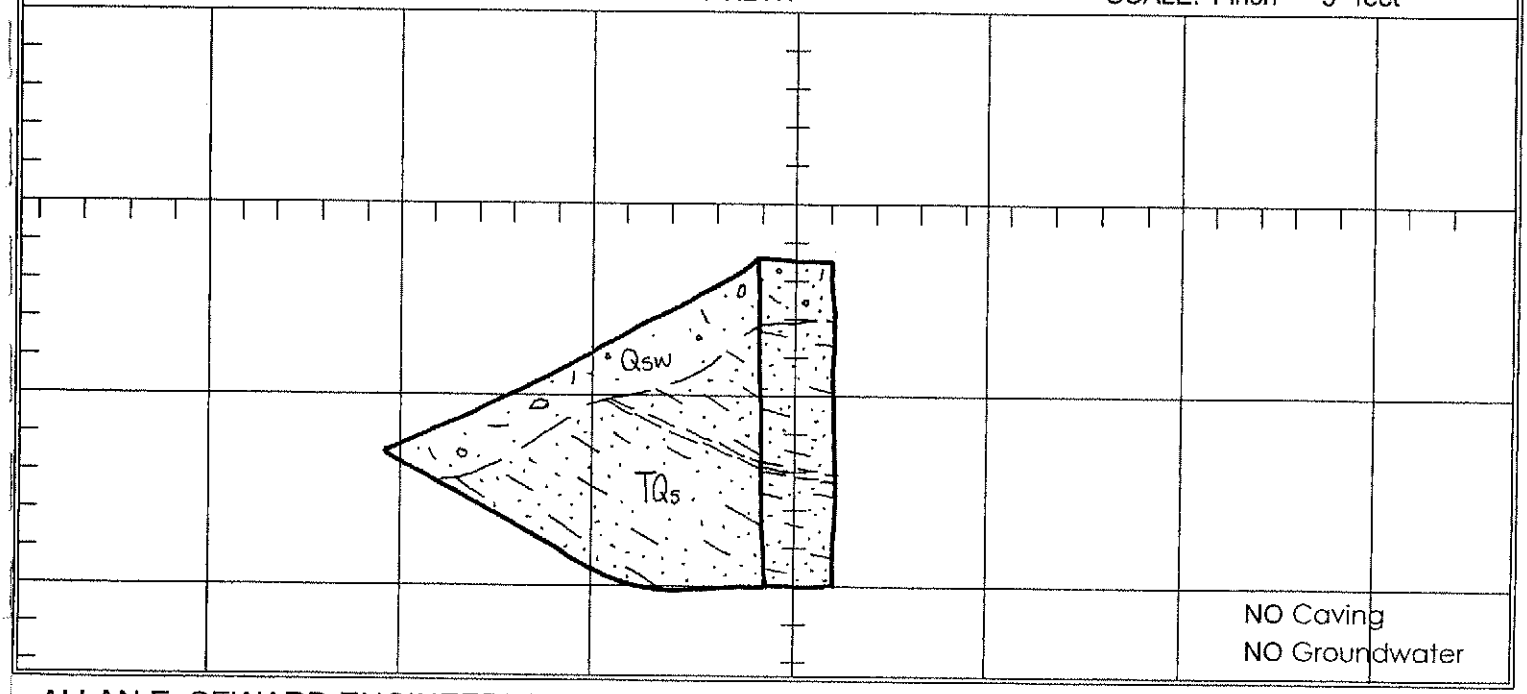
TOTAL DEPTH: 8 feet ←N24W SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-130T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MJD		
	EXCAVATED: 3/3/04		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1260		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SLOPEWASH; Qsw (0-1.5')** @ 0' Brown silty sand; soft; moist; roots, voids				
					BEDROCK; TQs (1.5-8.5') @ 1.5' Light grayish-brown to light yellowish-brown sandy siltstone, silty sandstone, and sandstone with brown mudstone interbed; moderately hard to hard; moist to slightly damp; gradational contact; slightly fractured; caliche to 4'	Exc. B:N76W,29SW Mudstone			
5									
10									
15					COMMENTS: -Highly weathered down to 4.5'				
20									

TOTAL DEPTH: 8.5 feet ←N21W SCALE: 1 inch = 5 feet



ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

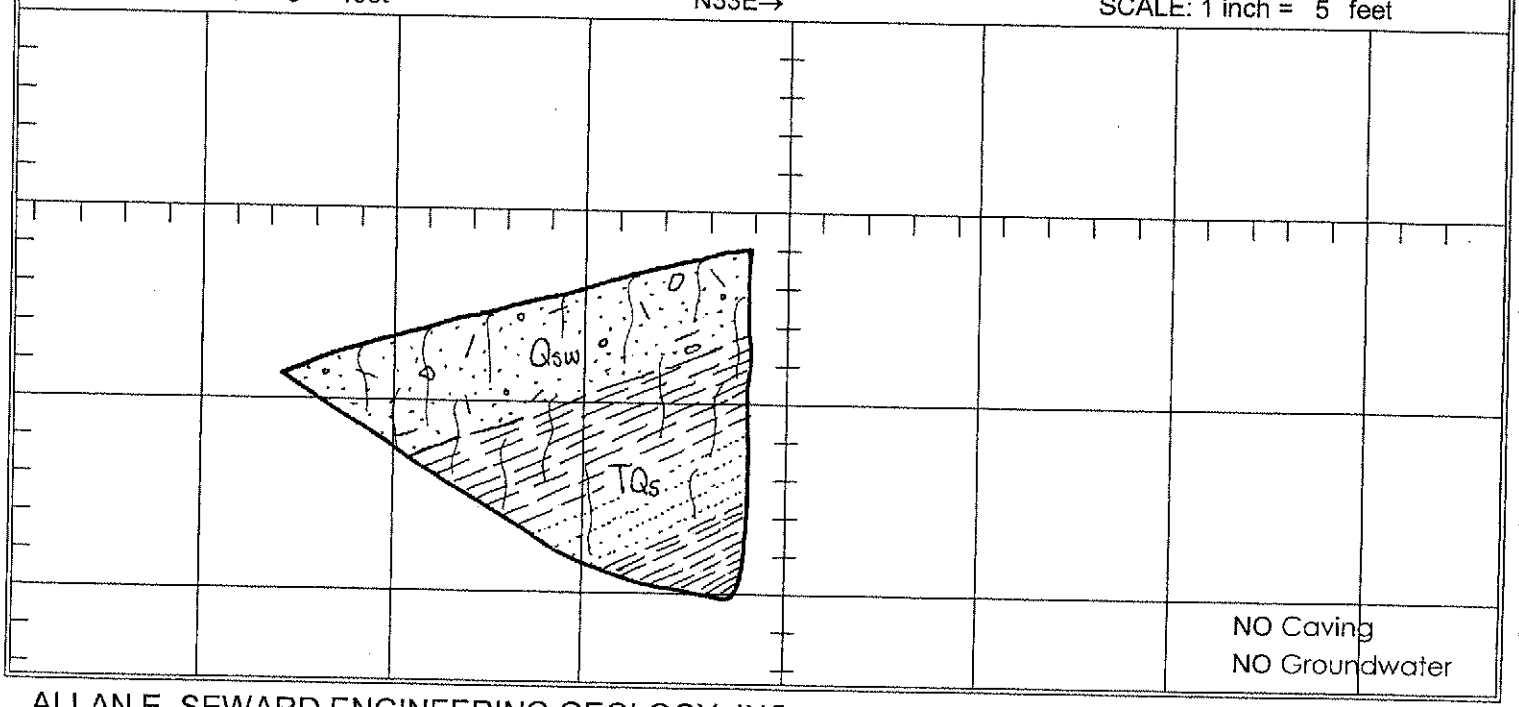
CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG**	
PROJECT: Mesas East	DATE: 7/22/04	**NO. T-131T**	
	LOGGED BY: MJD		
	EXCAVATED: 3/3/04		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1230		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SLOPEWASH; Qsw (0-3')** @ 0' Grayish-brown sandy silt; soft; moist; roots, voids				
5					**BEDROCK; TQs (3-9')** @ 3' Grayish-brown siltstone, brown mudstone, and light gray sandstone; moderately hard; moist to damp; highly to moderately fractured; caliche in siltstone and mudstone	B:N67E,35SE			
10									
15					COMMENTS: -Highly weathered down to 7.5'				
20									

TOTAL DEPTH: 9 feet

N33E→

SCALE: 1 inch = 5 feet

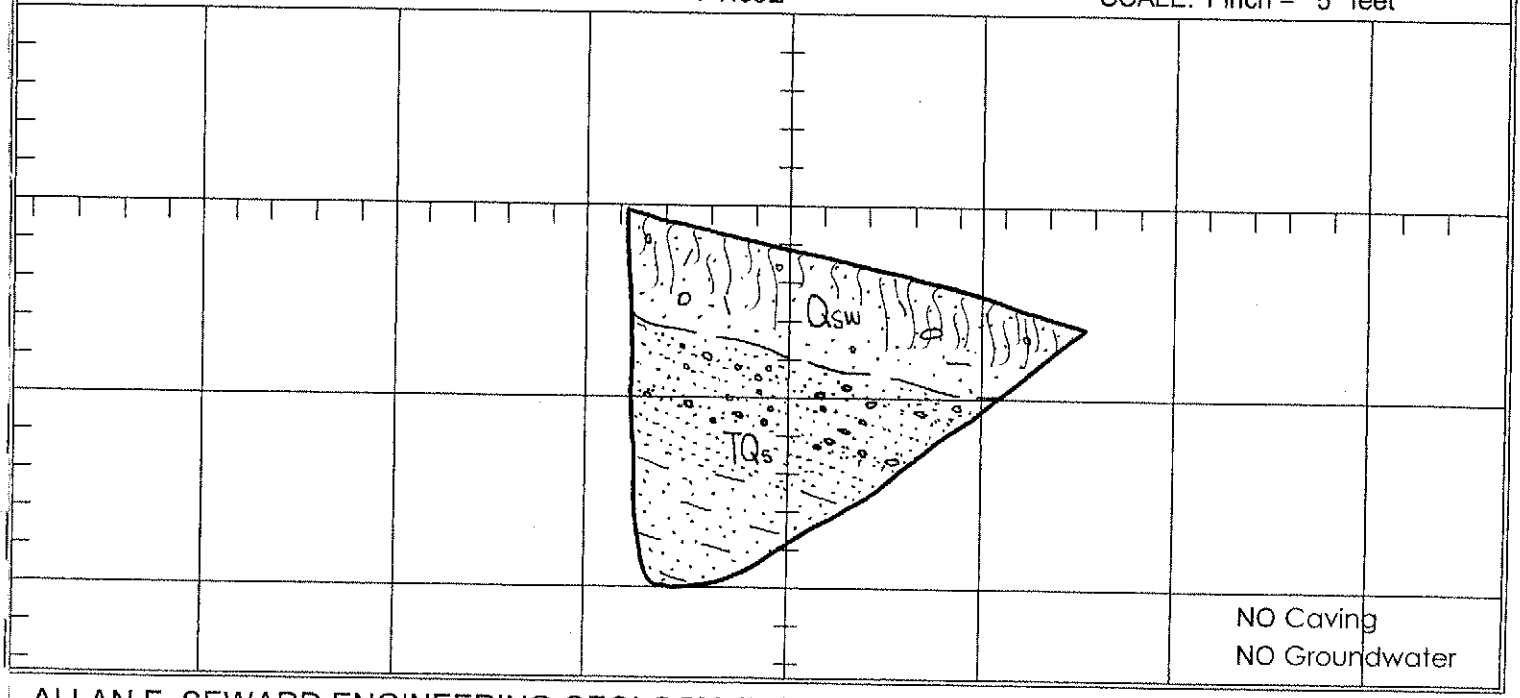


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-132T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MJD		
	EXCAVATED: 3/3/04		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1195		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SLOPEWASH; Qsw (0-3')** @ 0' Brown silty sand with pebbles and cobbles; soft; moist; roots, voids				
5					**BEDROCK; TQs (3-10')** @ 3' Light gray sandstone and pebbly sandstone, and yellowish-brown to light yellowish-brown fine-grained sandstone and silty sandstone; moderately hard to hard; moist to damp; locally laminated; local erosional scours; moderately fractured	a) B:N83E,19SE b) B:N85E,25SE			
10									
15					COMMENTS: -Highly weathered down to 6'				
20									

TOTAL DEPTH: 10 feet ←N68E SCALE: 1 inch = 5 feet

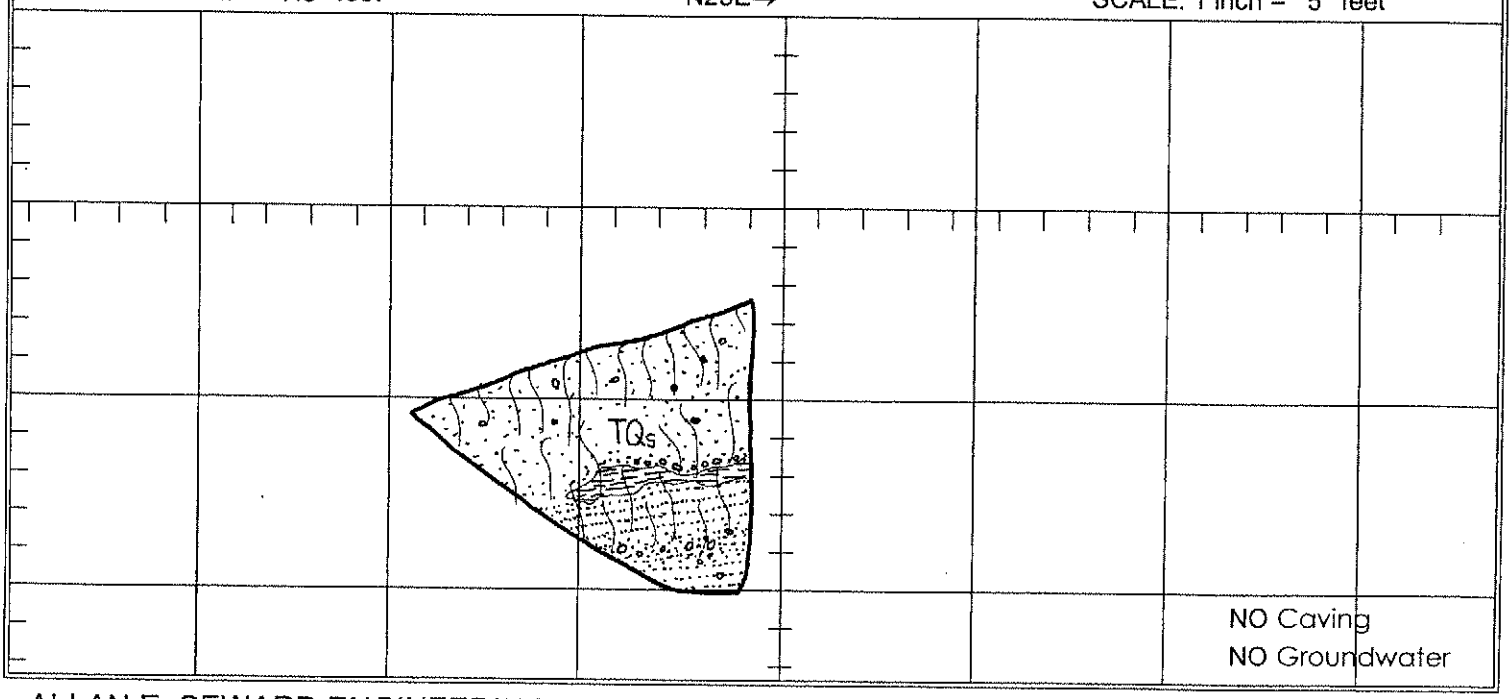


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-133T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MJD		
	EXCAVATED: 3/3/04		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1175		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**BEDROCK; TQs (0-7.5')** @ 0' Light gray sandstone and pebbly sandstone; moderately hard to hard; moist to damp; brown siltstone interbed 2-4" thick is discontinuous, eroded, channeled; sandstone locally laminated; scattered cobbles	B:N48E,10SE			
5									
10									
15					COMMENTS: -Highly weathered down to 1'				
20									

TOTAL DEPTH: 7.5 feet N25E→ SCALE: 1 inch = 5 feet

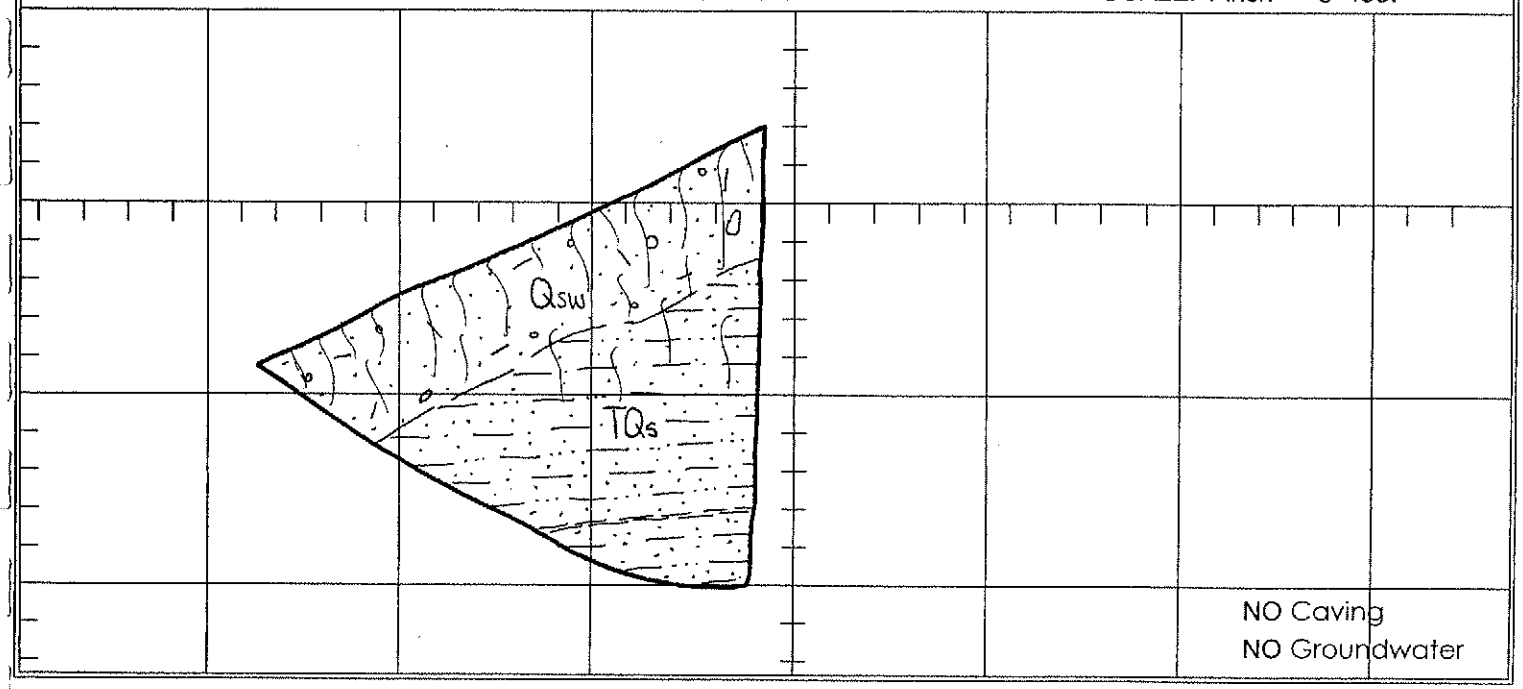


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-134T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MJD		
	EXCAVATED: 3/3/04		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1152		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SLOPEWASH; Qsw (0-3.5')** @ 0' Grayish-brown sandy silt; soft; moist; roots, voids				
5					**BEDROCK; TQs (3.5-12')** @ 3.5' Light grayish-brown to grayish-brown sandy siltstone/silty sandstone; moderately hard to hard; moist to damp; local caliche; massive; structureless; highly to moderately fractured	B:N76W,40SW			
10					@ 10' 1" thick brown mudstone interbed				
15					COMMENTS: -Highly weathered down to 7'				
20									

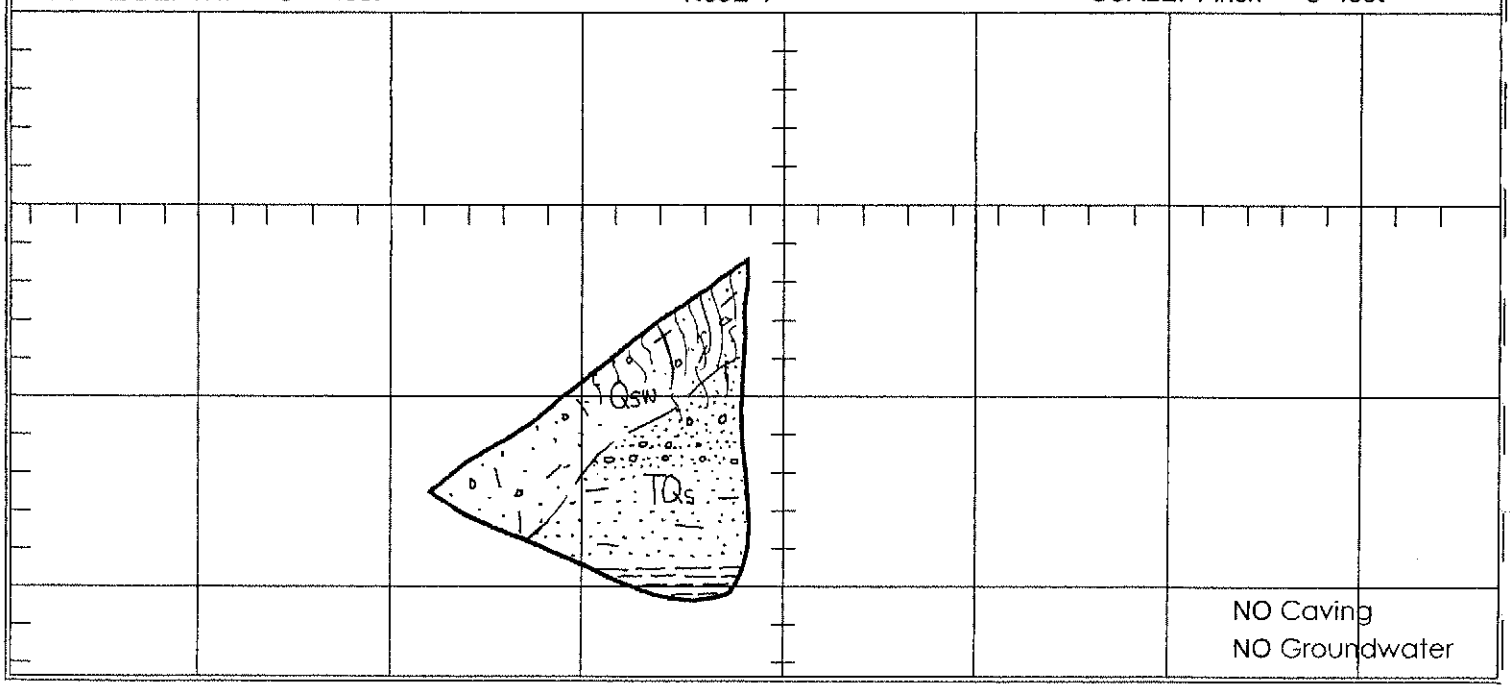
TOTAL DEPTH: 12 feet ←N85W SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-135T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MJD		
	EXCAVATED: 3/3/04		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1150		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SLOPEWASH; Qsw (0-3')** @ 0' Grayish-brown silty, pebbly sand with scattered cobbles; soft; moist; roots, voids				
					BEDROCK; TQs (3-9') @ 3' Light gray to gray sandstone, pebbly sandstone and silty sandstone; moderately hard to hard; moist to damp; vaguely bedded	B:N83E,15SE			
5									
					@ 8.5' Brown siltstone; hard				
10									
					COMMENTS: -Highly weathered down to 5'				
15									
20									

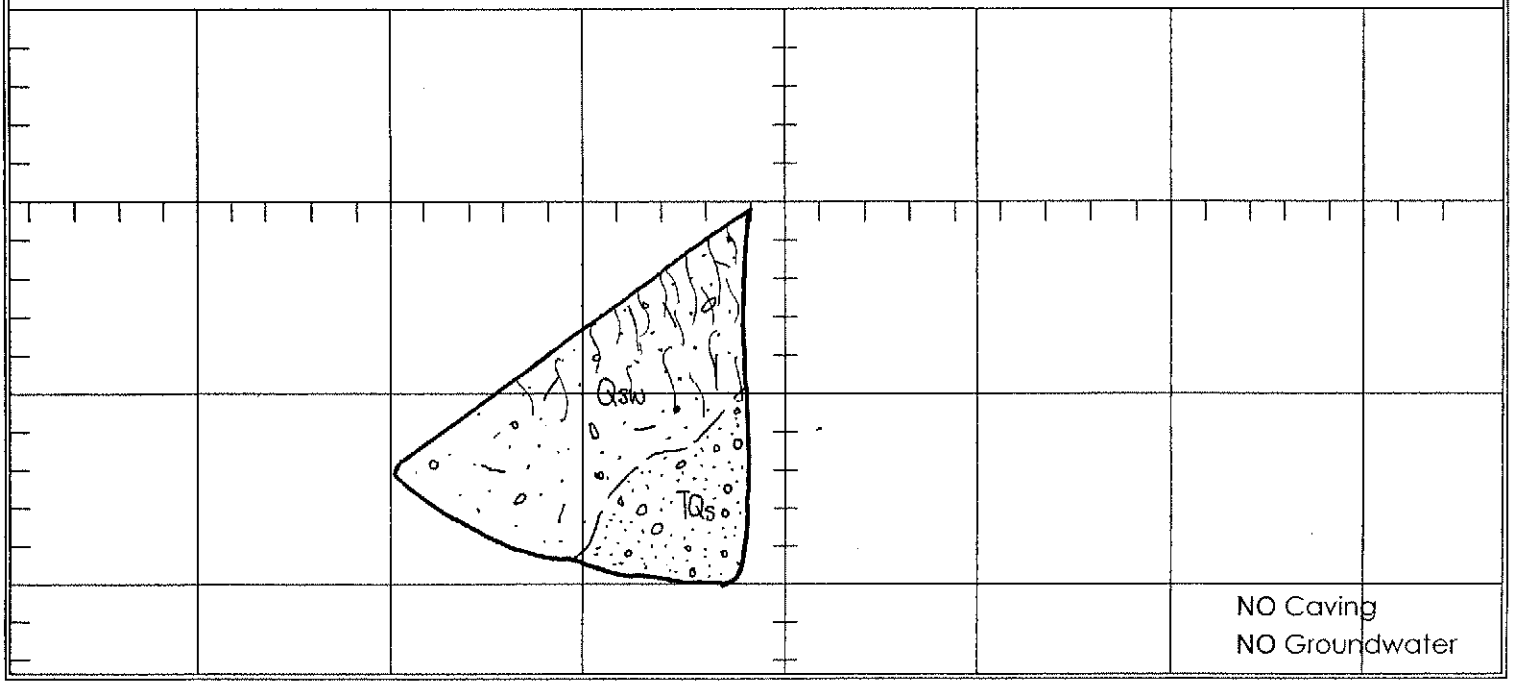
TOTAL DEPTH: 9 feet N83E→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-136T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MJD		
	EXCAVATED: 3/3/04		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1142		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SLOPEWASH; Qsw (0-5')** @ 0' Grayish-brown silty, pebbly sand with scattered cobbles; soft; moist; roots, voids				
5					**BEDROCK; TQs (5-10')** @ 5' Light gray sandstone and pebbly sandstone; moderately hard to hard; moist to damp; crudely bedded; scattered cobbles; local mudstone rip-ups	Apx. B:N83E,22SE			
10									
15					COMMENTS: -Highly weathered down to 6'				
20									

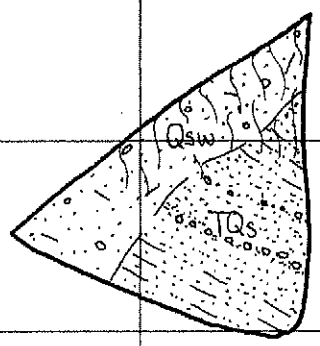
TOTAL DEPTH: 10 feet ←N85W SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-137T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MJD		
	EXCAVATED: 3/3/04		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1135		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SLOPEWASH; Qsw (0-2')** @ 0' Brown silty, pebbly, sand; soft; moist; roots, voids				
					BEDROCK; TQs (2-8.5') @ 2' Interbedded yellowish-brown siltstone and sandy siltstone and light yellowish-brown sandstone and pebbly sandstone; moderately hard to hard; moist; well-bedded; locally thinly bedded	B:N83E,21SE			
5									
10									
15					COMMENTS: -Highly weathered down to 3.5'				
20									

TOTAL DEPTH: 8.5 feet ←N30E SCALE: 1 inch = 5 feet

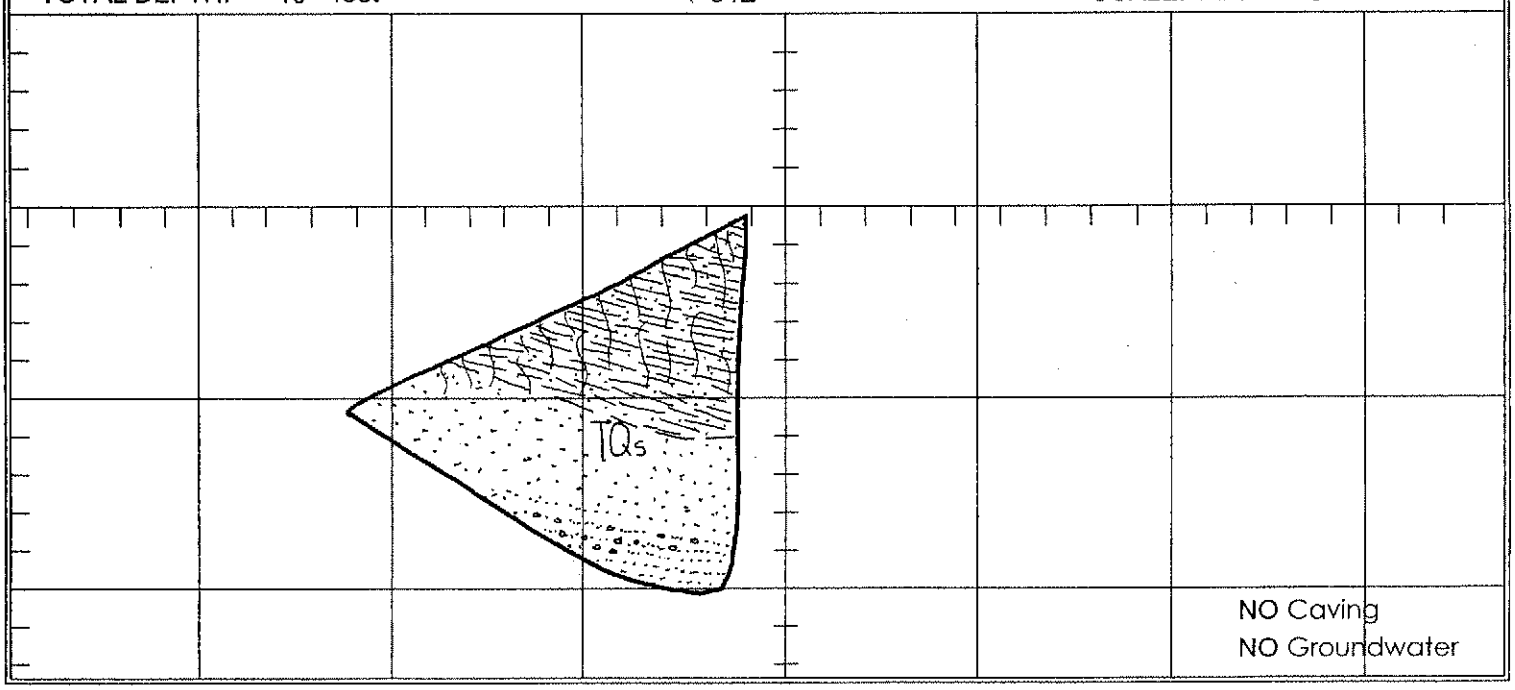


NO Caving
NO Groundwater

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-138T**	
PROJECT: Mesas East	DATE: 7/28/04		
	LOGGED BY: MJD		
	EXCAVATED: 3/3/04		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1134		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**BEDROCK; TQs (0-10')** @ 0' Brown siltstone and light-gray sandstone and pebbly sandstone; soft to hard; moist to damp; local laminations	B:N86W,21SW			
5									
10									
15					COMMENTS: -Highly weathered down to 5'				
20									

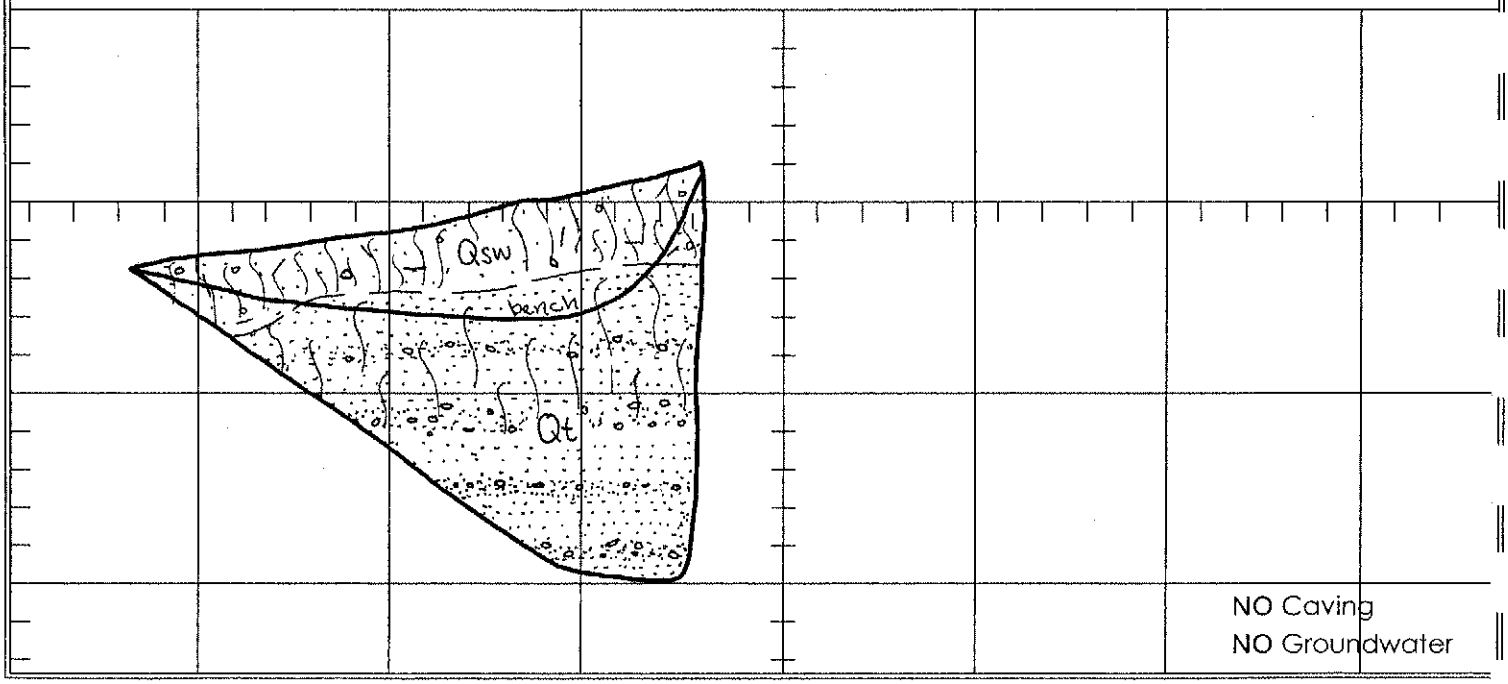
TOTAL DEPTH: 10 feet ←84E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-139T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MJD		
	EXCAVATED: 3/5/04		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1143		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SLOPEWASH; Qsw (0-2.5')** @ 0' Brown silty, pebbly sand with scattered cobbles; loose; moist; roots; voids **QUATERNARY TERRACE DEPOSITS; Qt (2.5-11')** @ 2.5' Light yellowish-gray to light-gray sand and pebbly sand with scattered cobbles; loose to medium dense; slightly friable to friable; moist to slightly damp; well-bedded; roots to 8'	B:Horizontal			
5									
10									
15					COMMENTS: -Highly weathered down to 8'				
20									

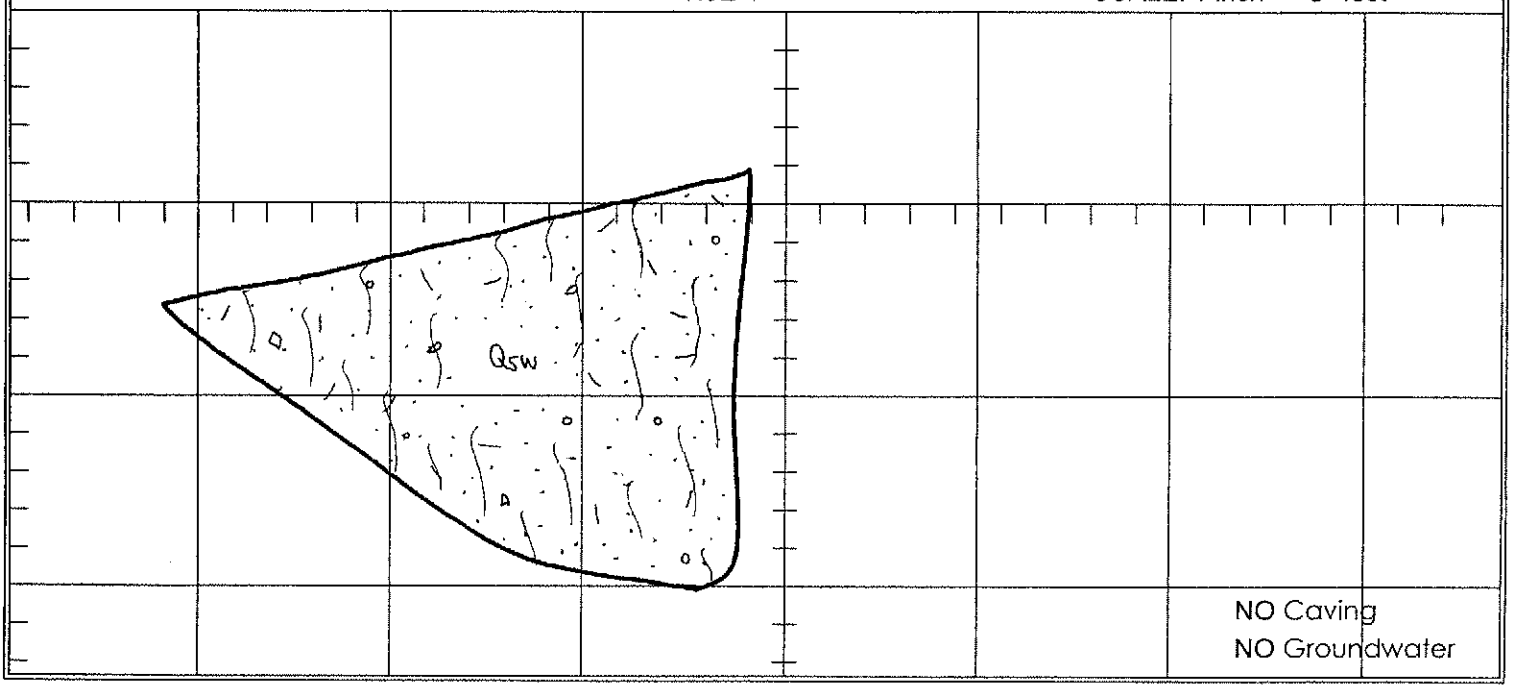
TOTAL DEPTH: 11 feet N8E→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-140T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MJD		
	EXCAVATED: 3/5/04		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1151		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SLOPEWASH; Qsw (0-11')** @ 0' Brown to light grayish-brown silty pebbly sand with cobbles; loose to medium dense; moist to damp; roots and voids to bottom; massive; structureless; friable				
5									
10					COMMENTS: -Highly weathered down to 11' -Weathered Qt?				
15									
20									

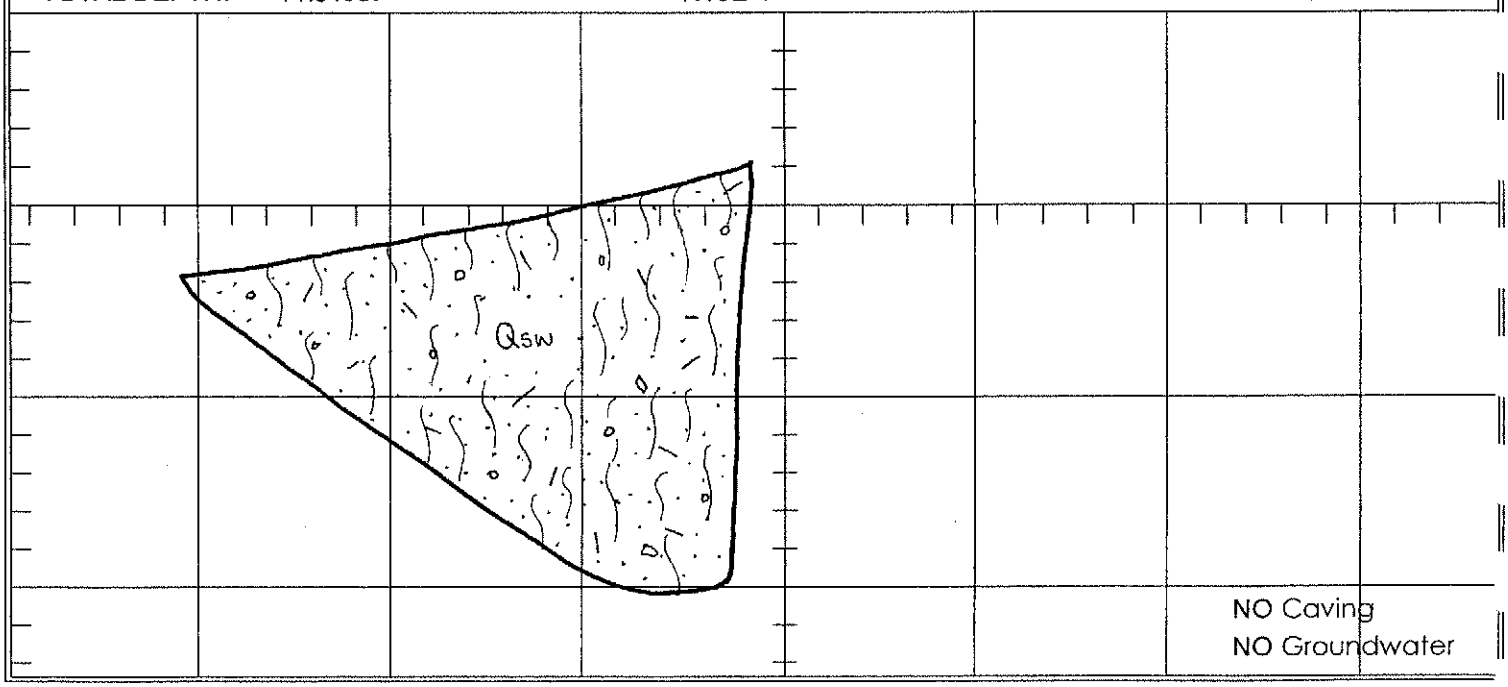
TOTAL DEPTH: 11 feet N3E→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-141T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MJD		
	EXCAVATED: 3/5/04		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1172		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SLOPEWASH; Qsw (0-11.5')** @ 0' Brown to light grayish-brown silty pebbly sand with cobbles; loose to medium dense; friable; moist to damp; roots, voids to 11.5'; massive; structureless				
5									
10									
15					COMMENTS: -Highly weathered down to 11.5' -Weathered Qt?				
20									

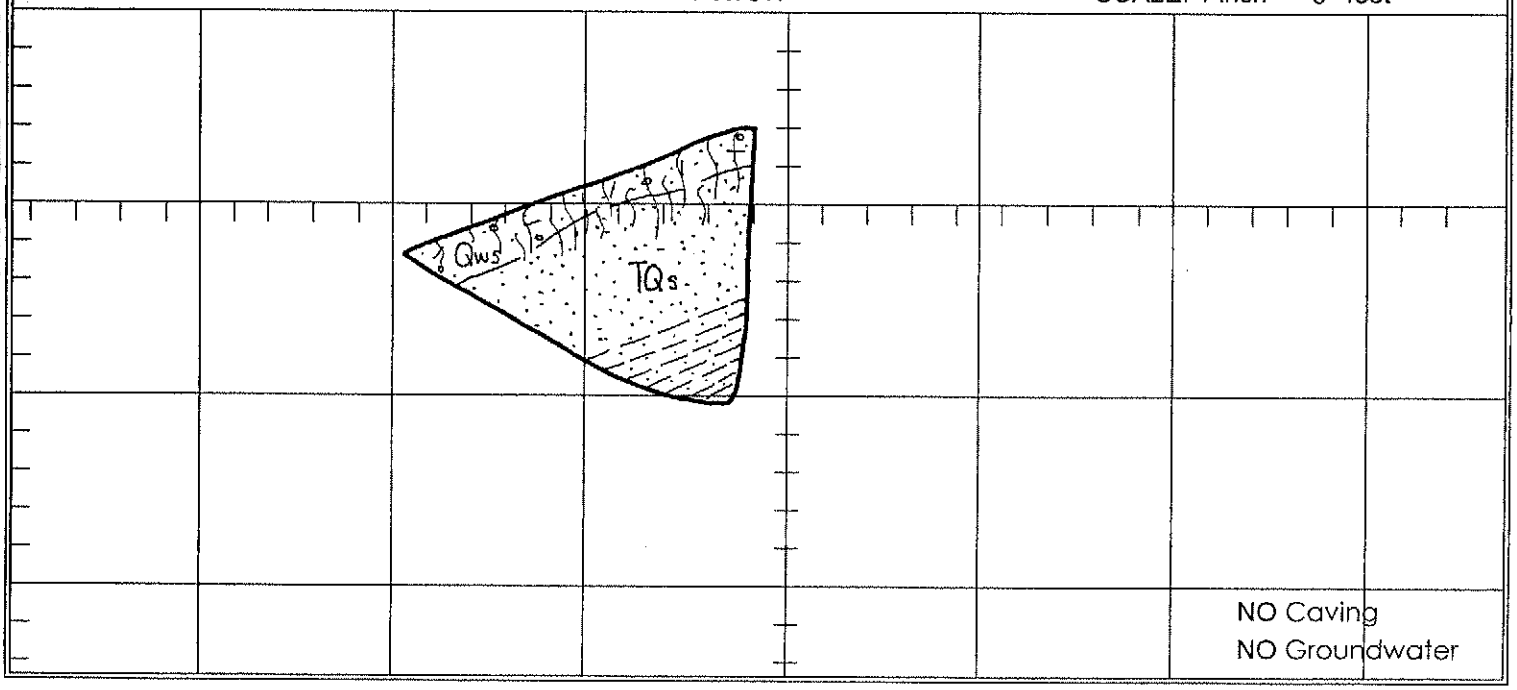
TOTAL DEPTH: 11.5 feet N10E→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-142T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MJD		
	EXCAVATED: 3/5/04		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1255		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SLOPEWASH; Qsw (0-1')** @ 0' Brown silty sand; loose; moist; roots, voids **BEDROCK; TQs (1-7')** @ 1' Light gray fine- to medium-grained sandstone and brown siltstone and sandy siltstone; moderately hard to hard; moist to slightly damp; local laminations; moderately fractured; local caliche	B:N26W,45SW			
5									
10					COMMENTS: -Highly weathered down to 5'				
15									
20									

TOTAL DEPTH: 7 feet ←N79W SCALE: 1 inch = 5 feet

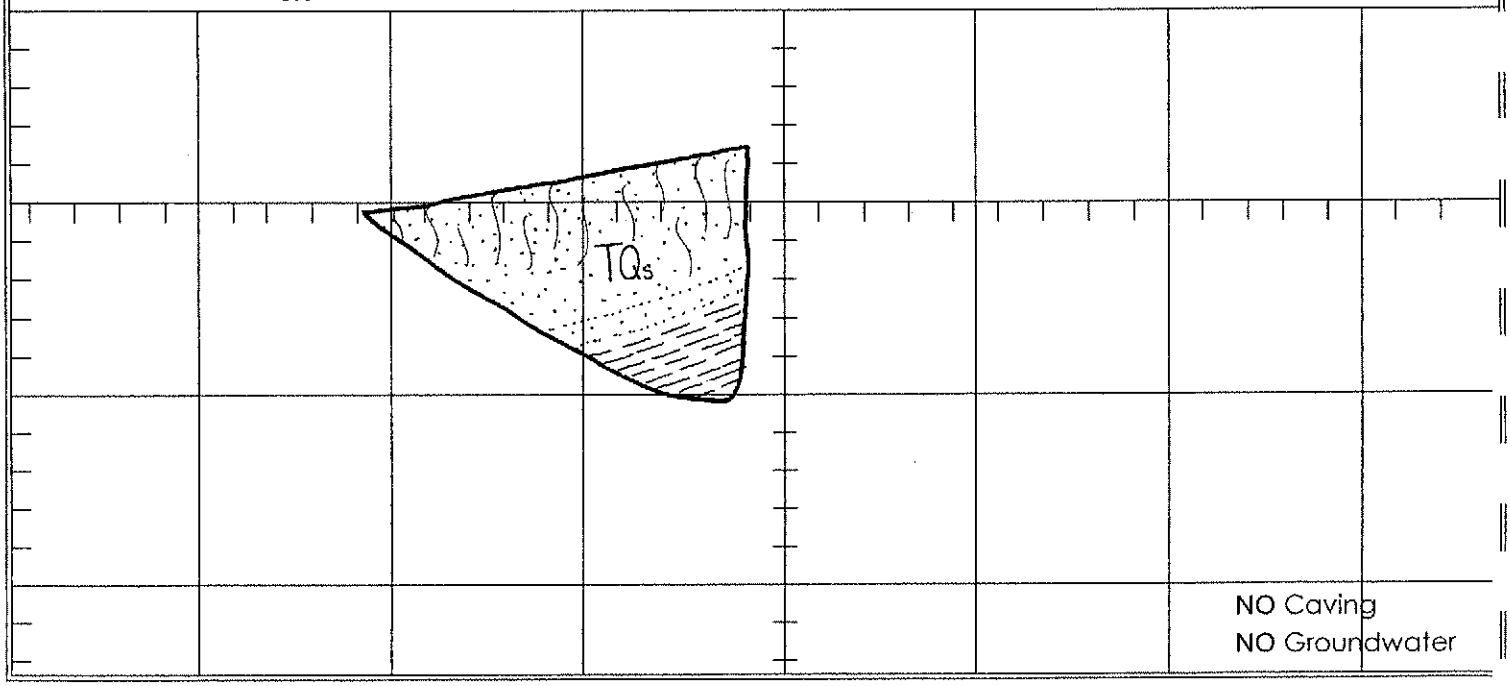


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-143T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MJD		
	EXCAVATED: 3/5/04		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1228		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**BEDROCK; TQs (0-6.5')** @ 0' Light gray sandstone and pebbly sandstone and brown siltstone and mudstone; moderately hard to hard; moist to damp; mudstone slightly sheared; plastic, sticky, caliche; sandstone locally laminated	B:N70W,42SW			
5									
10									
15					COMMENTS: -Highly weathered down to 3' -Moist from rain to 4'				
20									

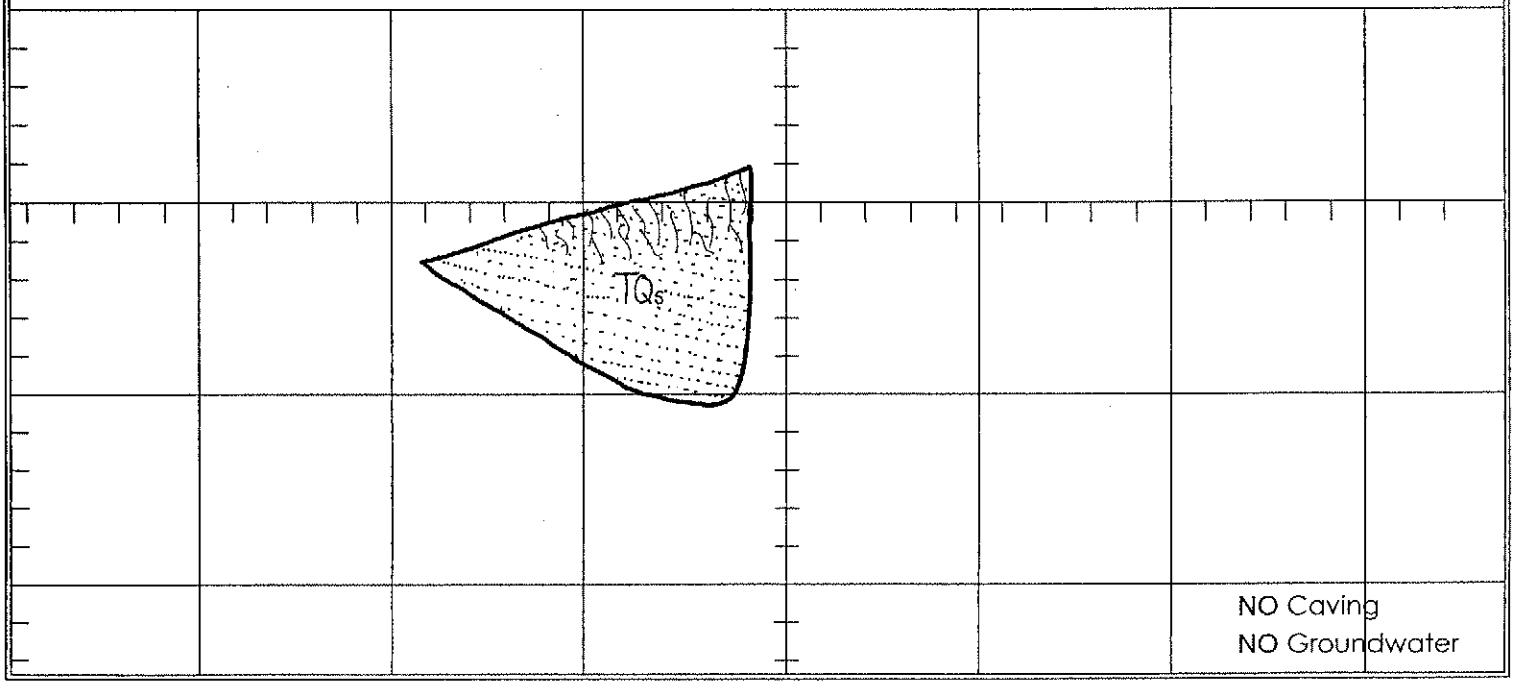
TOTAL DEPTH: 6.5 feet ←N79W SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-144T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MJD		
	EXCAVATED: 3/5/04		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1205		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**BEDROCK; TQs (0-6')** @ 0' Light gray fine- to medium-grained sandstone; moderately hard to hard; moist to damp; locally pebbly; laminated	B:N71W,44SW			
5									
10									
					COMMENTS: -Highly weathered down to 2'				
15									
20									

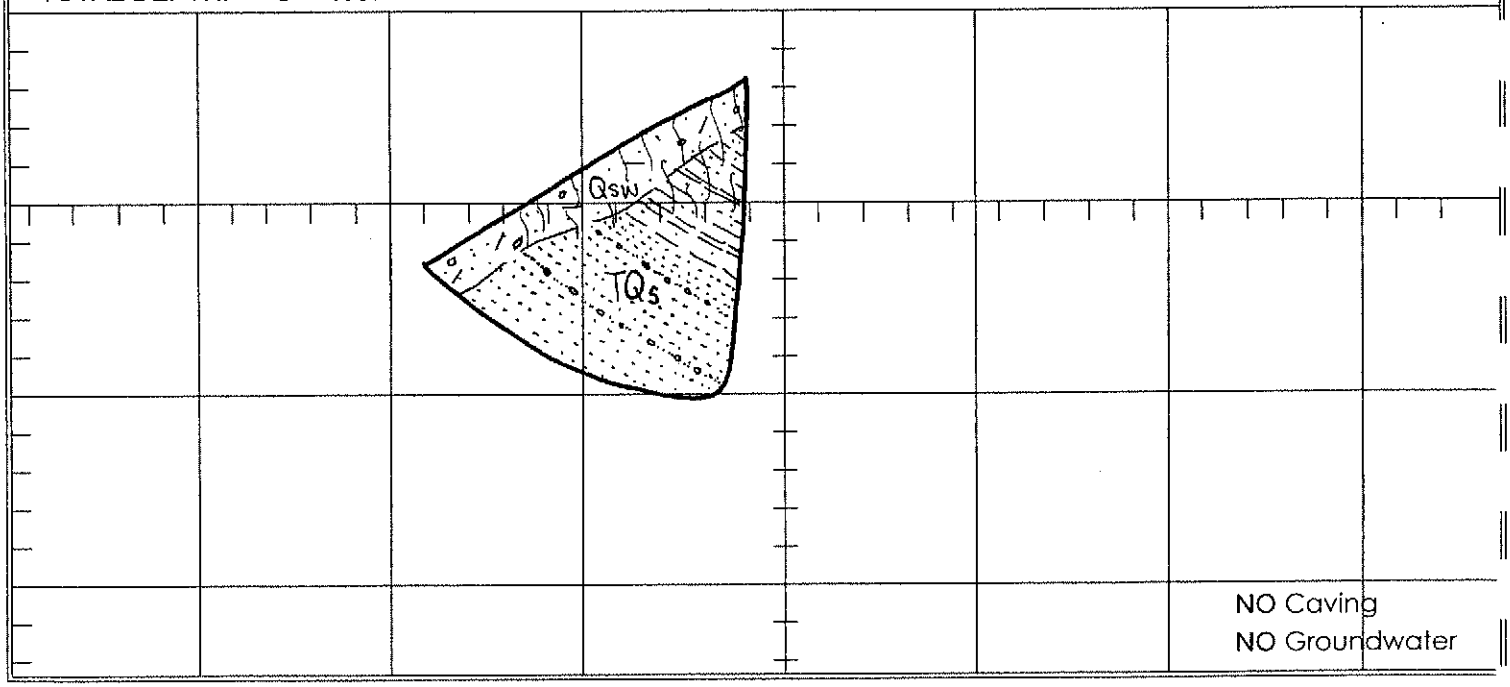
TOTAL DEPTH: 6 feet ←N55W SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-145T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MJD		
	EXCAVATED: 3/5/04		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1231		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SLOPEWASH; Qsw (0-1')** @ 0' Brown silty sand/sandy silt; soft; moist; roots, voids **BEDROCK; TQs (1-8')** @ 1' Interbedded gray and brown siltstone, mudstone, and sandy siltstone; soft to moderately hard; damp; well-bedded; highly weathered, fractured, creep-affected @ 5' Light gray laminated sandstone and pebbly sandstone; moderately hard to hard; damp COMMENTS: -Highly weathered down to 4.5'	B:N72W,38SW (Laminated)			
5									
10									
15									
20									

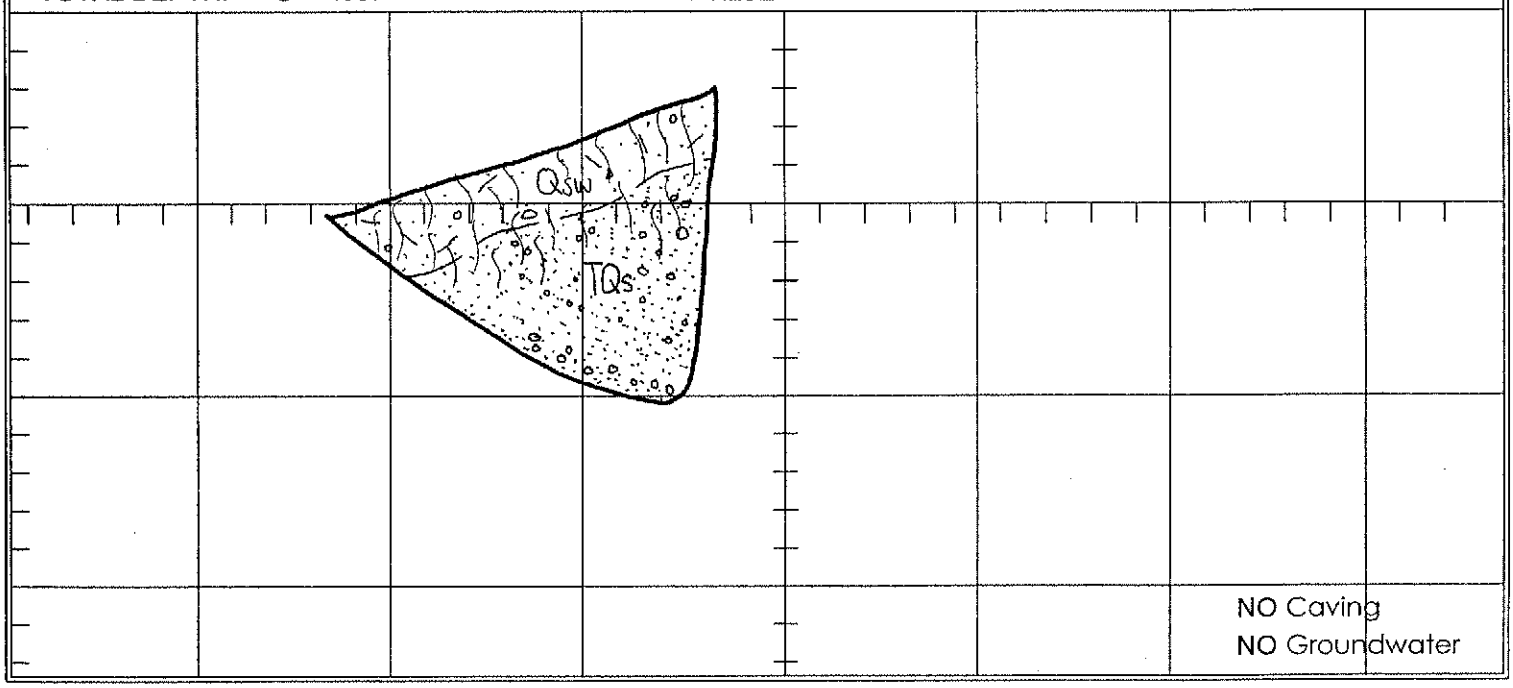
TOTAL DEPTH: 8 feet ←N16E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-146T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MJD		
	EXCAVATED: 3/5/04		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 2024		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SLOPEWASH; Qsw (0-1.5')** @ 0' Brown silty, pebbly sand with cobbles; loose; moist; roots, voids **BEDROCK; TQs (1.5-8')** @ 1.5' Light-gray sandstone and pebbly sandstone with scattered cobbles; moderately hard to hard; moist to damp; crudely bedded	B:N63W,34SW			
5									
10									
15					COMMENTS: -Highly weathered down to 5'				
20									

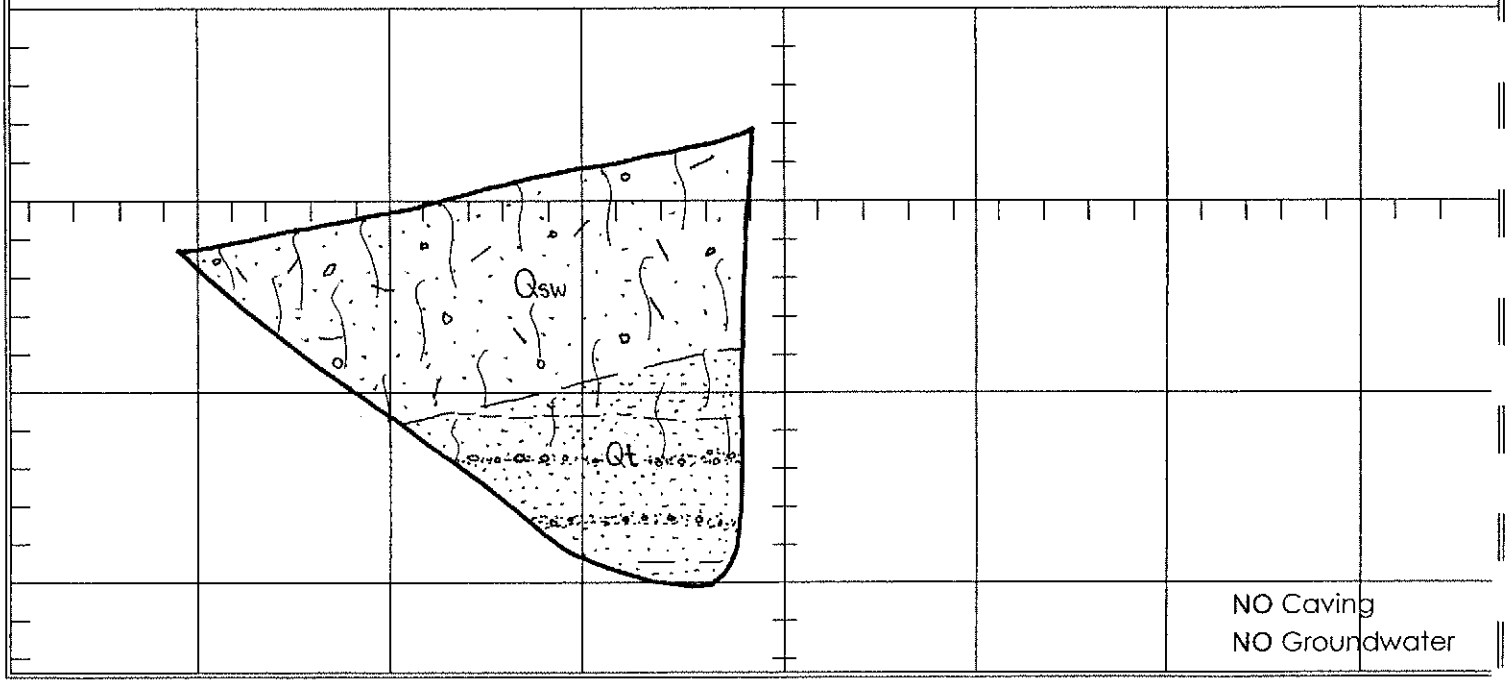
TOTAL DEPTH: 8 feet ←N23E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-147T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MJD		
	EXCAVATED: 3/5/04		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 2005		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SLOPEWASH; Qsw (0-6')** @ 0' Brown to light-brown silty pebbly sand with cobbles; loose; moist to damp; roots, voids				
5					**QUATERNARY TERRACE DEPOSITS; Qt (6-12')** @ 6' Light-brown to light-gray sand, pebbly sand and silty sand; loose to firm; damp; moderately bedded	B: Horizontal			
10									
15					COMMENTS: -Highly weathered down to 9'				
20									

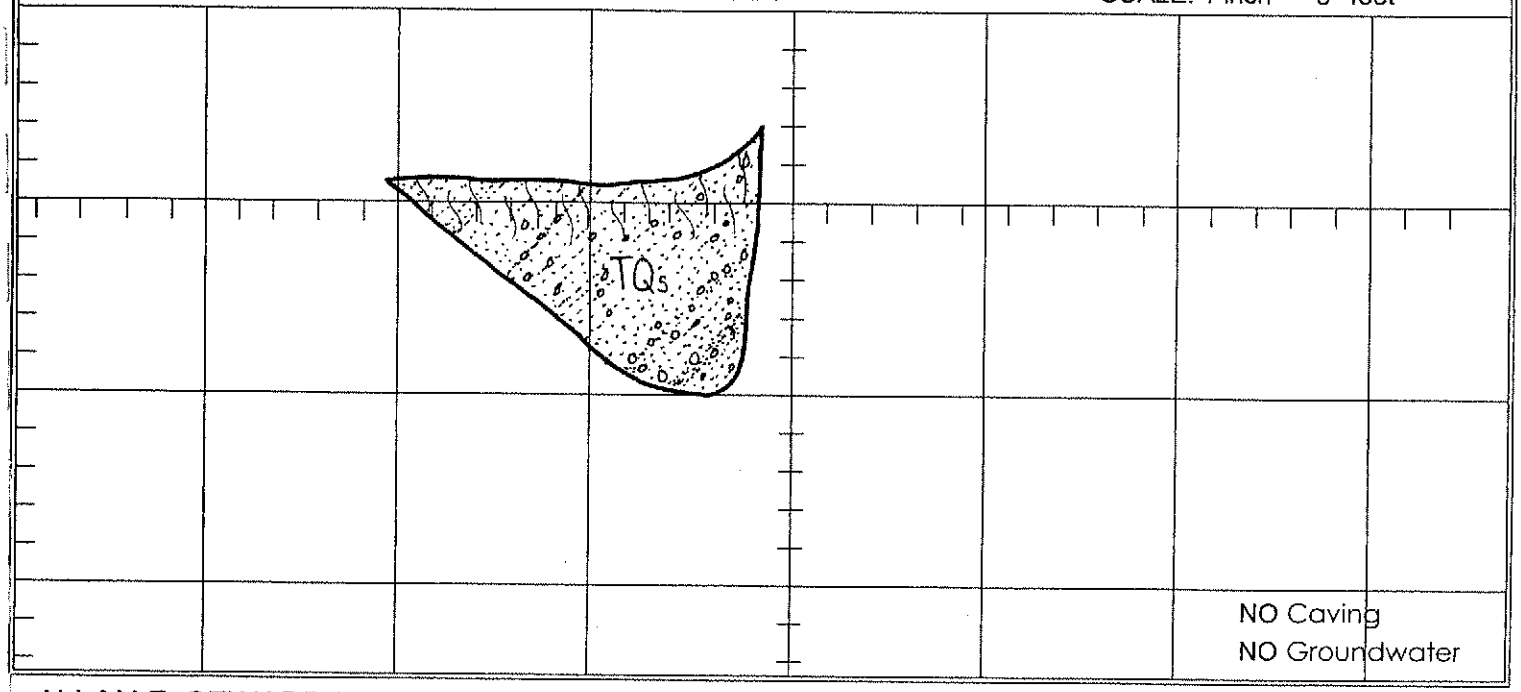
TOTAL DEPTH: 12 feet ←N13E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-148T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MJD		
	EXCAVATED: 3/5/04		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1170		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**BEDROCK; TQs (0-7')** @ 0' Light-gray sandstone and conglomerate; hard; moist to damp; crudely bedded; vague laminations	B:N59W,39SW (Coarse-grained)			
5									
10									
15					COMMENTS: -Highly weathered down to 1'				
20									

TOTAL DEPTH: 7 feet N23E→ SCALE: 1 inch = 5 feet

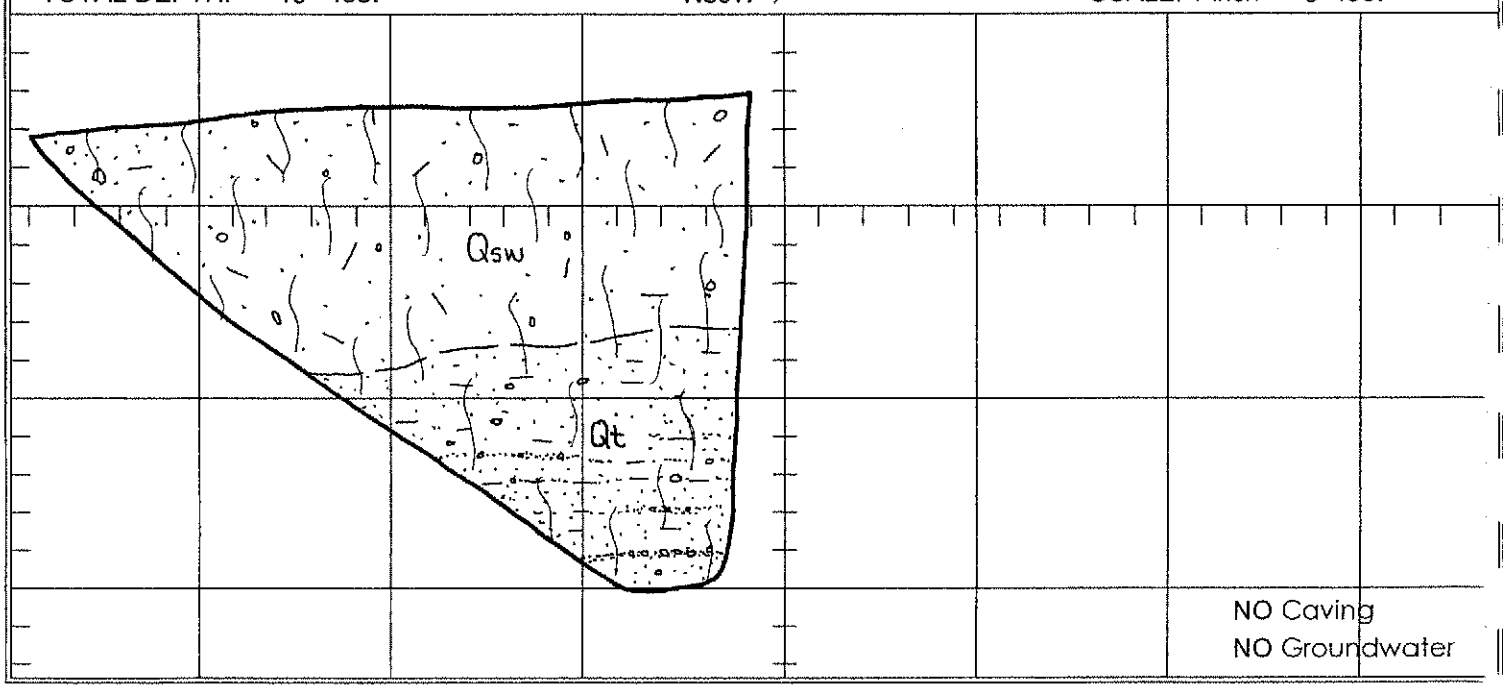


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-149T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MJD		
	EXCAVATED: 3/5/04		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1155		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; Qsw (0-6')** @ 0' Moderately to light-brown silty pebbly sand with cobbles; loose; moist to 4', damp to 6'; roots, voids				
5					**QUATERNARY TERRACE DEPOSITS; Qt (6-13')** @ 6' Grades to silty pebbly sand with scattered cobbles; loose to medium dense; damp; local lenses of pebbly, friable sand; very crudely bedded; mostly massive, structureless				
10									
15					COMMENTS: -Highly weathered down to 13' -Does not look like af				
20									

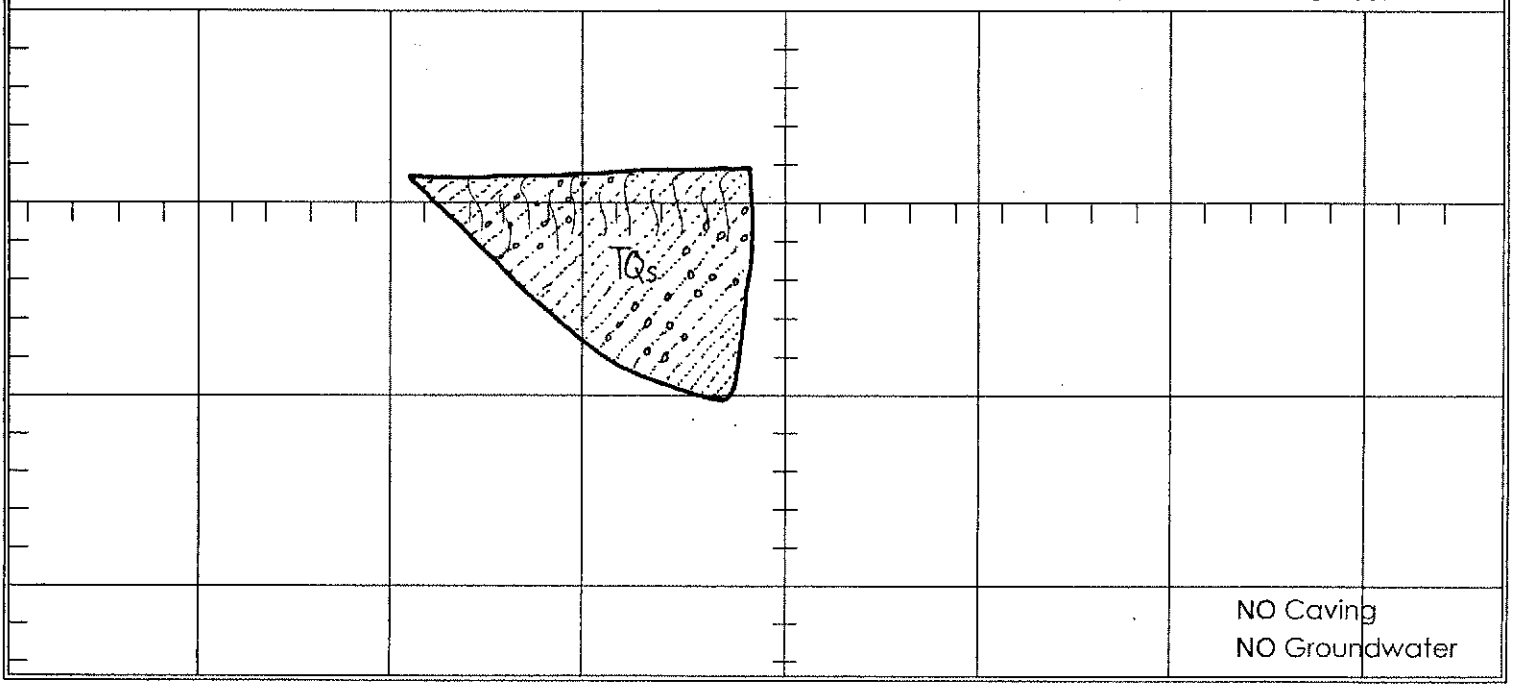
TOTAL DEPTH: 13 feet N80W→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-150T**
PROJECT: Mesas East	DATE: 7/22/04	
	LOGGED BY: MJD	
	EXCAVATED: 3/5/04	
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION: 1188	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**BEDROCK; TQs (0-6')** @ 0' Light-gray sandstone and pebbly sandstone; hard; moist; laminated, well-bedded COMMENTS: -Highly weathered down to 0'	B:N81W,45SW Lamin.			
5									
10									
15									
20									

TOTAL DEPTH: 6 feet N25E→ SCALE: 1 inch = 5 feet

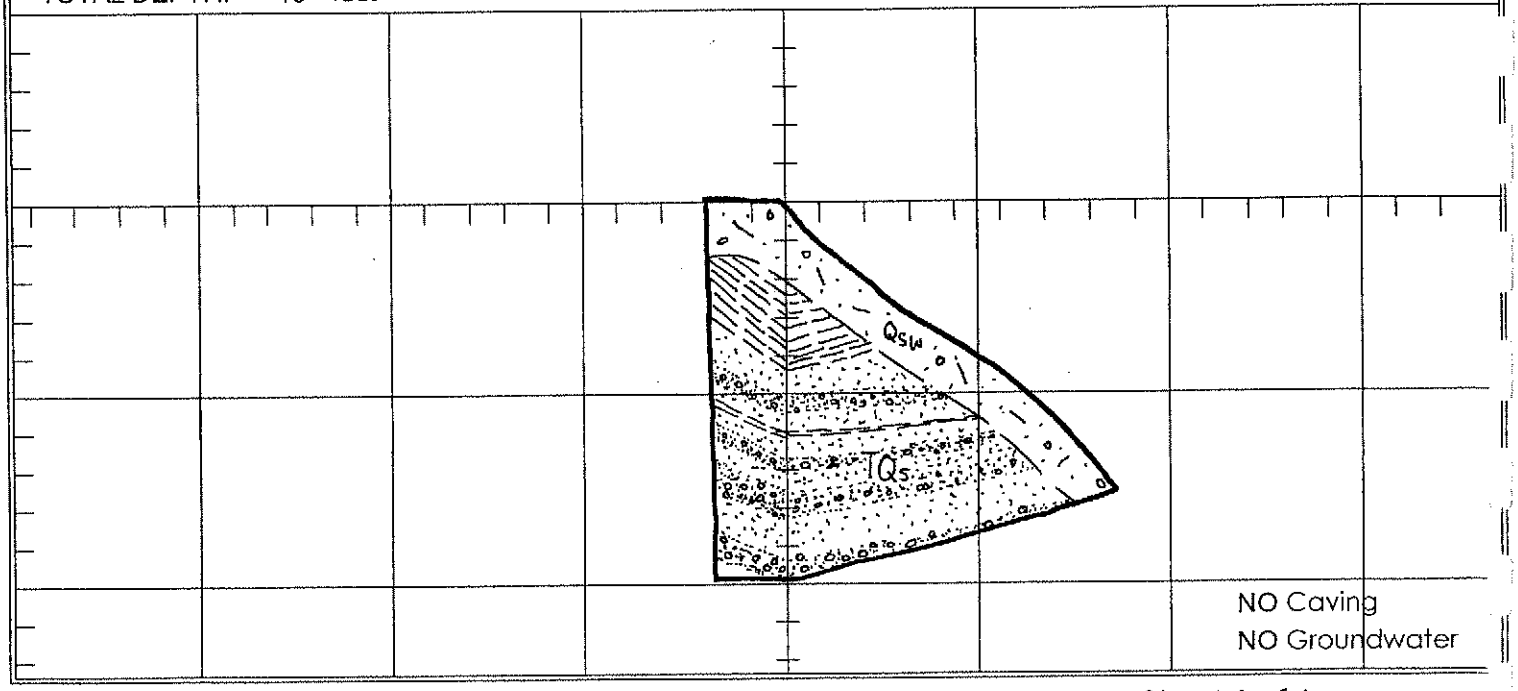


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Company	JOB NO: 04-2023-4	**TRENCH LOG NO. T-158T**	
PROJECT: Mesas East	DATE: 7/22/04		
	LOGGED BY: MAS		
	EXCAVATED: 3/25/04		
EXCAVATION METHOD: Trackhoe w/24" Bucket	ELEVATION:		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SLOPEWASH; Qsw (0-2')** @ 0' Brown silty clayey sand with gravel; loose to moderately dense; dry; voids≤ 1/8", roots and rootlets **BEDROCK; TQs (2-10')** @ 2' Light-brown to pale yellowish-brown sandstone; moderately hard to hard; dry to damp @ 4' Pale gray silty sandstone to pebbly conglomerate; moderately hard to hard; dry to damp	B:N75E,18SE			
5									
10									
15									
20									

TOTAL DEPTH: 10 feet N80W→ SCALE: 1 inch = 5 feet

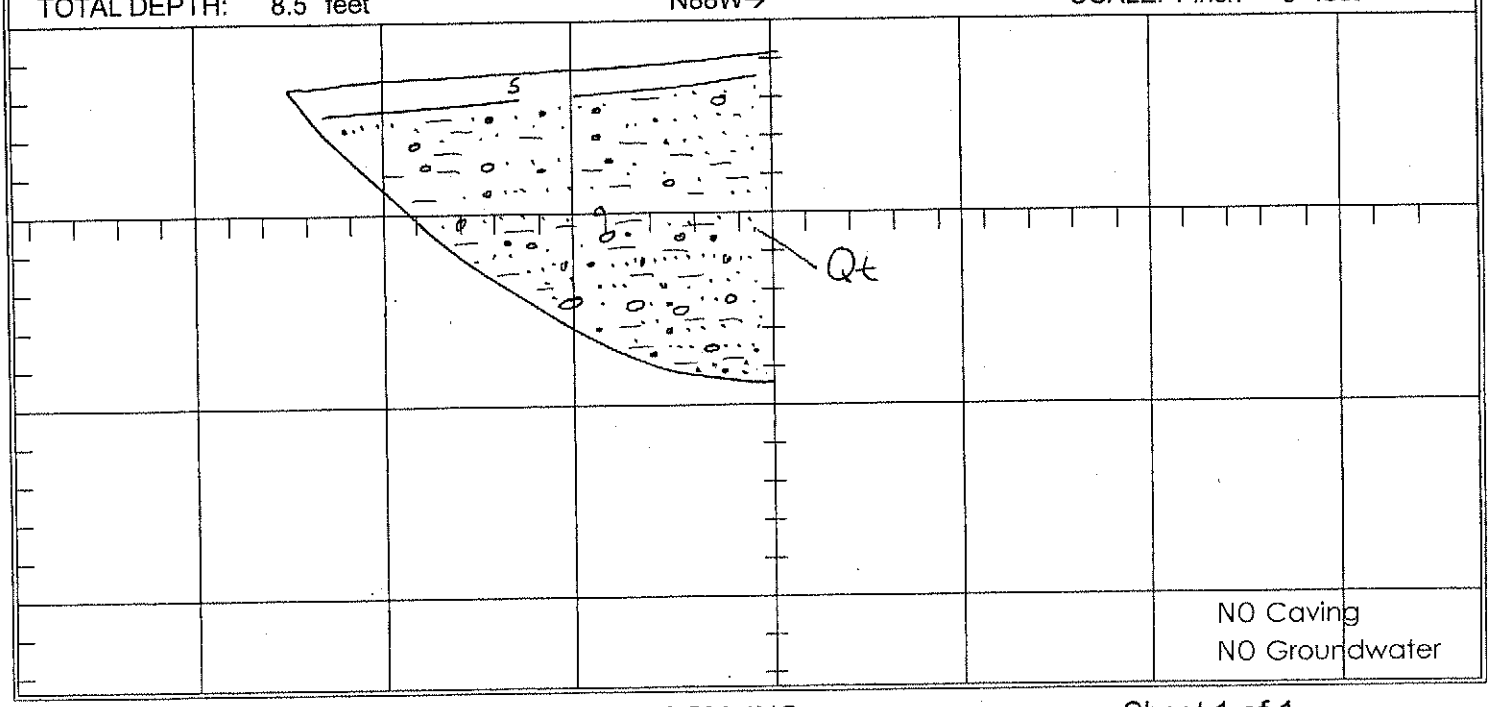


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-1B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: DGG		
	EXCAVATED: 2/11/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1231		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; (0-0.5 ft.)** @ 0' Light- to medium-brown sandy silt/silty sand with pebbles; loose to firm; dry to damp **QUATERNARY TERRACE DEPOSIT; Qt, (0.5-8.5 ft.)** @ 0.5' Light- to grayish-brown cobbly pebbly silty sand; slightly hard; dry to damp; friable	Apx.B: Horizontal			
5									
10					NOTE: Pits 1B through 13B excavated on the southern margin of Airport Mesa.				
15									
20									

TOTAL DEPTH: 8.5 feet N88W→ SCALE: 1 inch = 5 feet

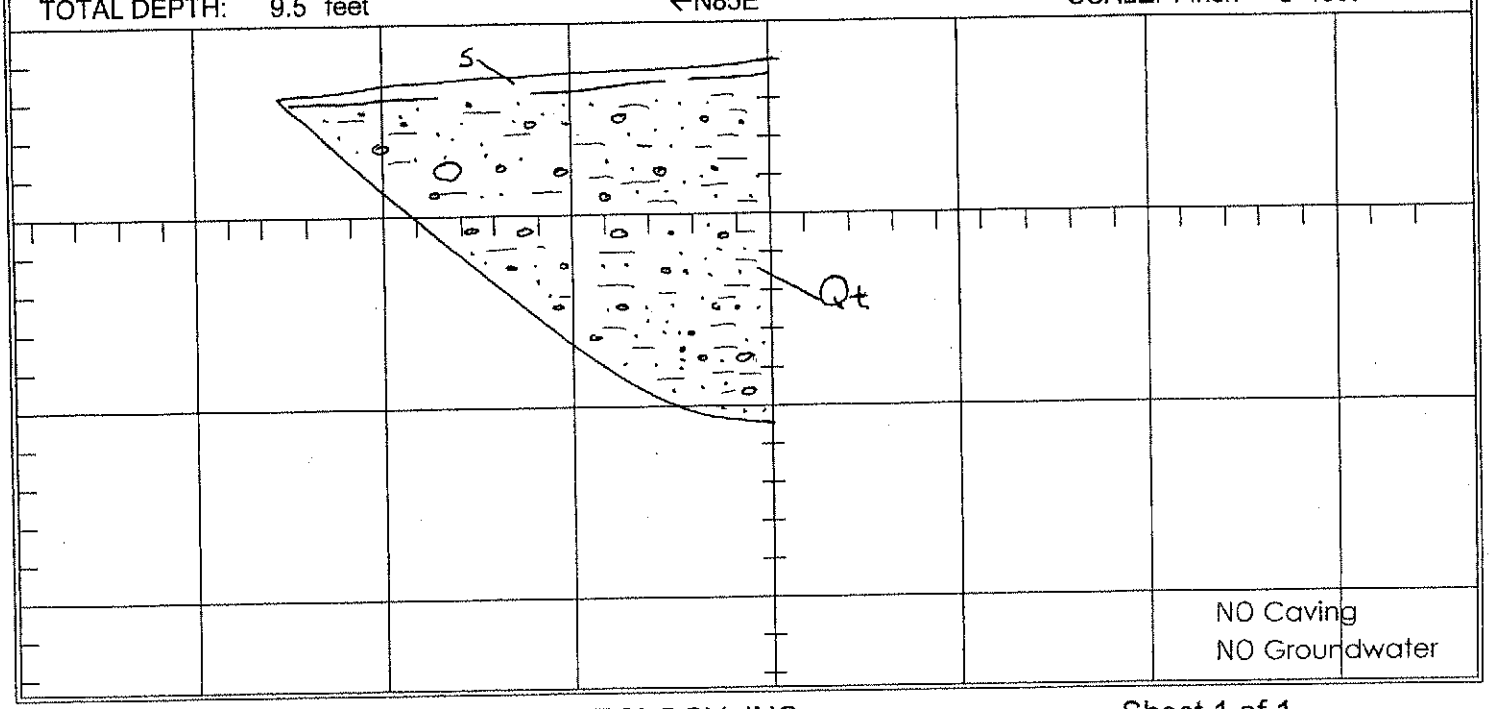


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-2B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: DGG		
	EXCAVATED: 2/11/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1218		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; (0-3")** @ 0' Light- to grayish-brown silty sand/sandy silt with pebbles; firm; dry to damp **QUATERANARY TERRACE DEPOSITS; Qt, (3"-9. 5 ft.)** @ 3" Light- to grayish-brown cobbly pebbly silty sand; moderately dense; dry to damp; friable	Apx.B: Horizontal			
5									
10									
15									
20									

TOTAL DEPTH: 9.5 feet ←N85E SCALE: 1 inch = 5 feet

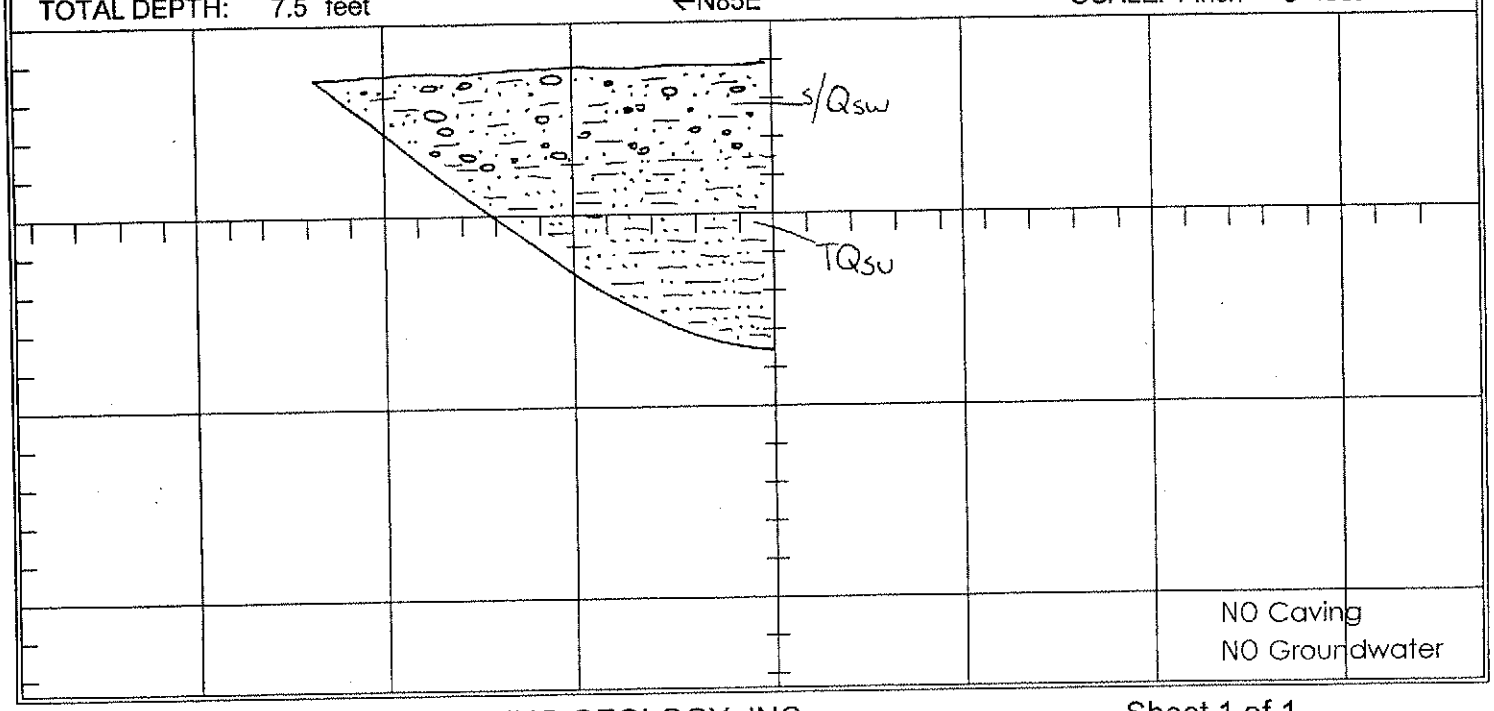


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-3B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: DGG		
	EXCAVATED: 2/11/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1202		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; Soil/Qsw, (0-2.5 ft.)** @ 0' Medium- to grayish-brown silty sand/sandy silt with pebbles & scattered cobbles; firm; dry to damp; friable **BEDROCK; TQsu, (2.5-7.5 ft.)** @ 2.5' Reddish- to yellowish-brown siltstone; hard; dry to damp; some caliche surfaces; upper 2'-clayey; bedding is massive				
5									
10									
15									
20									

TOTAL DEPTH: 7.5 feet ←N85E SCALE: 1 inch = 5 feet

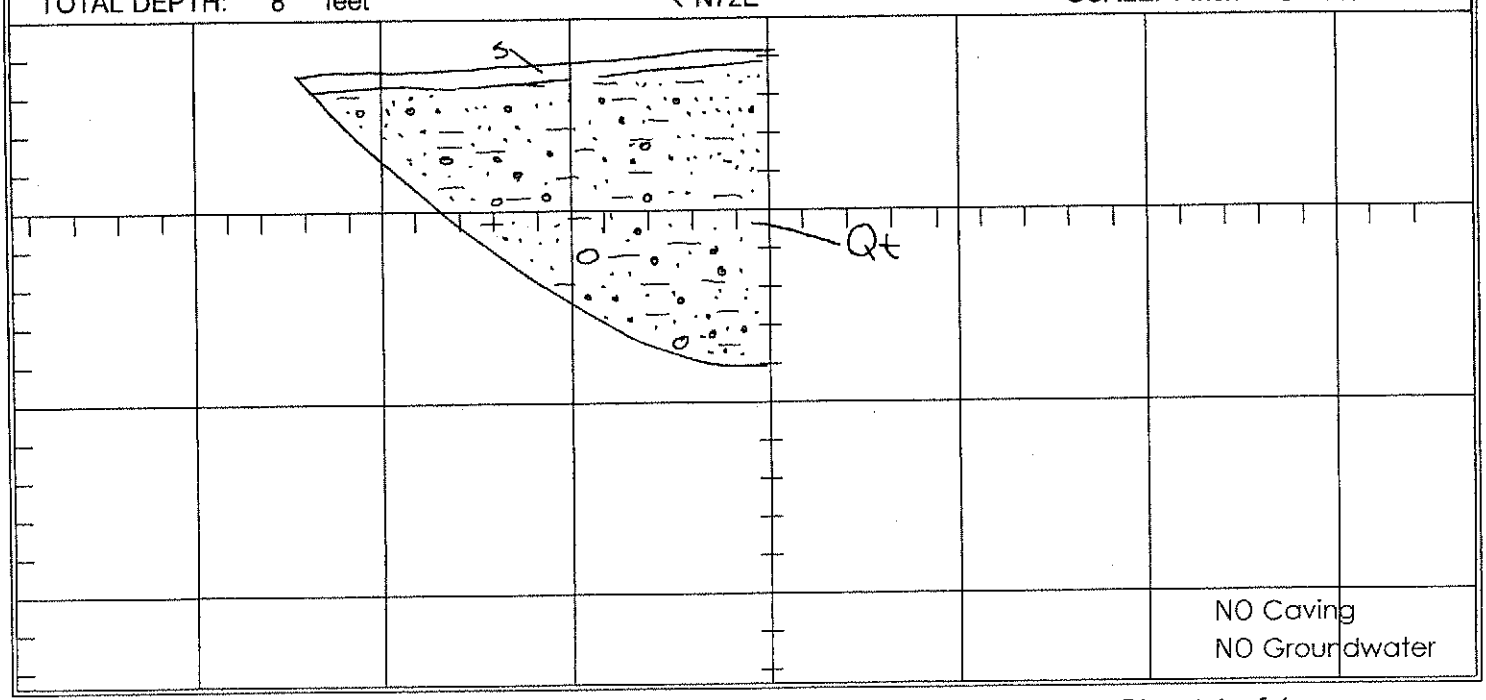


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-4B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: DGG		
	EXCAVATED: 2/11/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1182		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; (0-3")** @ 0' Medium- to grayish-brown silty sand/sandy silt; firm; dry to damp				
					QUATERNARY TERRACE DEPOSITS; Qt, (3"-8 ft.) @ 3" Orangish- to grayish-brown pebbly silty sand with scattered cobbles; moderately dense; dry to damp; friable	Apx.B: Horizontal			
5									
10									
15									
20									

TOTAL DEPTH: 8 feet ←N72E SCALE: 1 inch = 5 feet

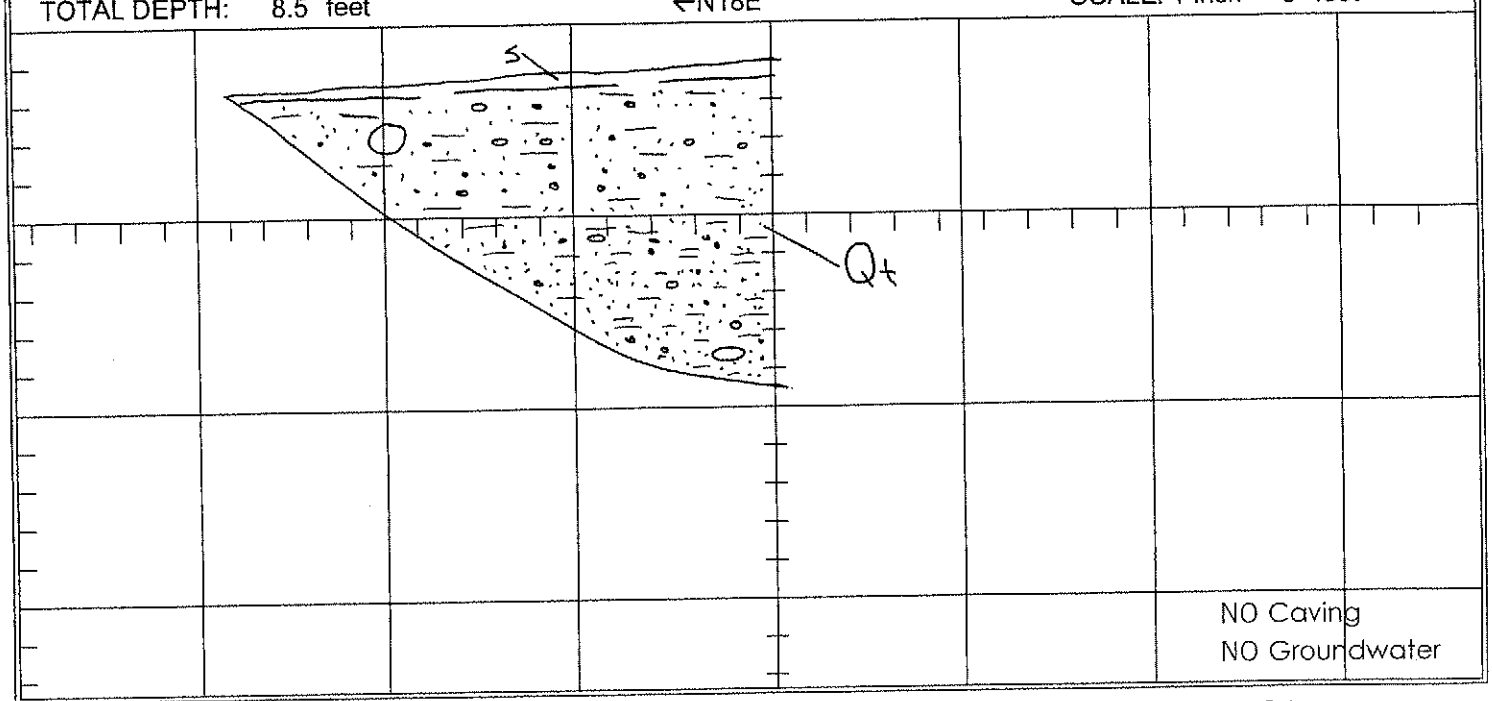


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02	**NO.** T-5B	
	LOGGED BY: DGG		
	EXCAVATED: 2/11/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1165		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; (0-3")** @ 0' Medium- to grayish-brown pebbly sandy silt/silty sand; firm; dry to damp				
					QUATERNARY TERRACE DEPOSITS; Qt, (3"-8.5 ft.) @ 3" Orangish- to grayish-brown pebbly silty sand with scattered cobbles (1 boulder); moderately dense to dense; damp; friable; local clast supported texture; lamellae	Apx.B:N85E,6NW			
5					@ 4.5' Medium- to grayish-brown pebbly silty sand with scattered cobbles; dense; damp; slightly friable				
10									
15									
20									

TOTAL DEPTH: 8.5 feet ←N18E SCALE: 1 inch = 5 feet



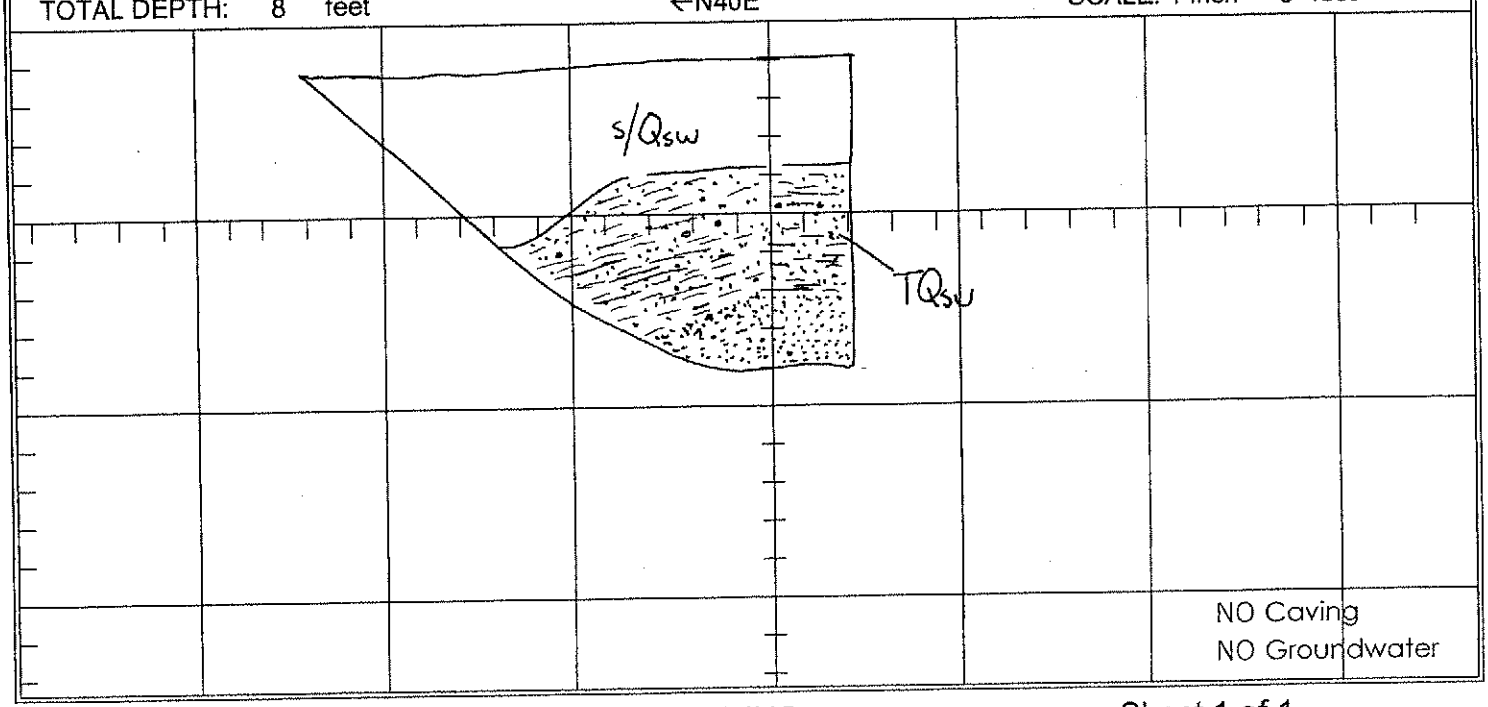
NO Caving
NO Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-6B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: DGG		
	EXCAVATED: 2/11/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1157		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; Soil/Qsw, (0-3 ft.)** @ 0' Orangish- to yellowish-brown pebbly sandy silt/silty sand with scattered cobbles; firm to stiff; damp; friable				
					BEDROCK; TQsu, (3-8 ft.) @ 3' Pale yellowish- to grayish-brown siltstone and pebbly sandy siltstone/silty sandstone; moderately hard; damp; sandstone is moderately friable	B:N54W,22NE			
5									
10									
15									
20									

TOTAL DEPTH: 8 feet ←N40E SCALE: 1 inch = 5 feet



ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

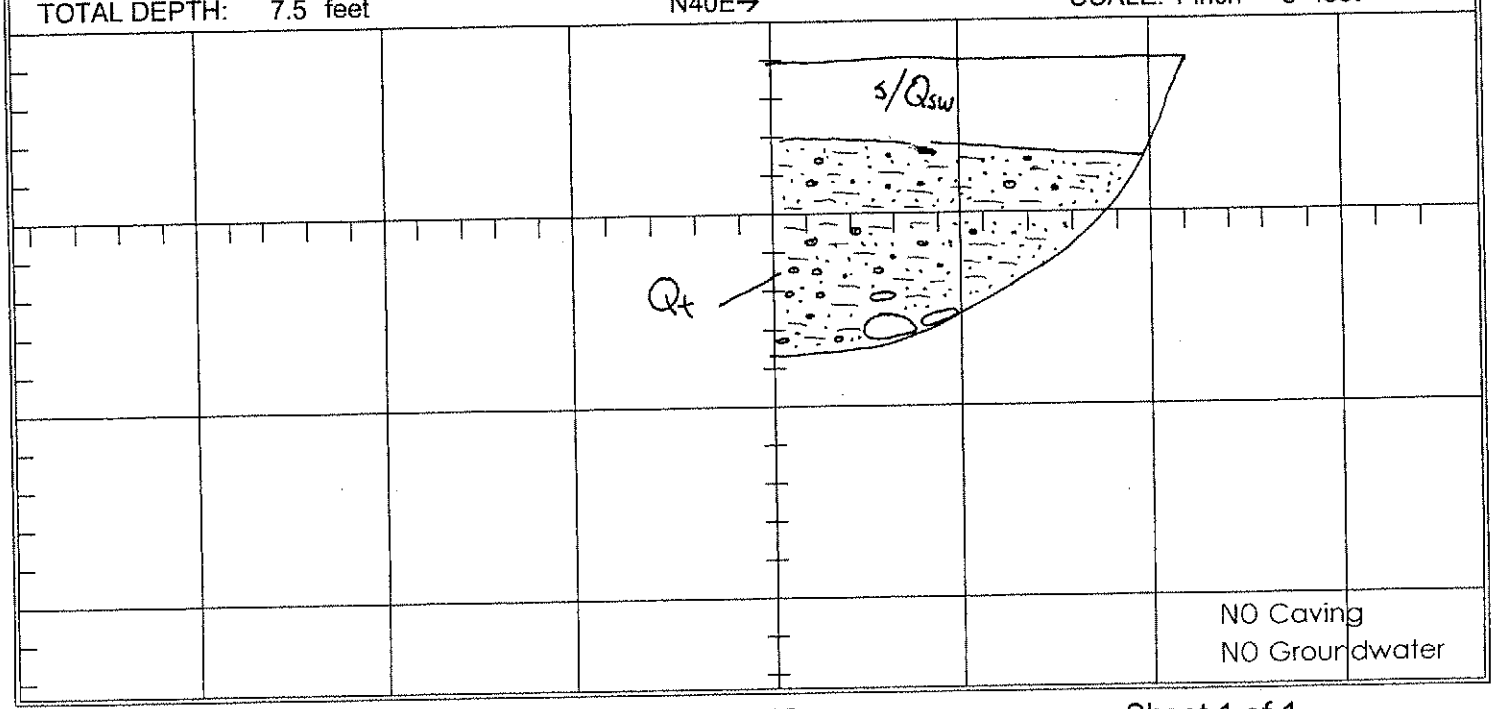
CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-7B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: DGG		
	EXCAVATED: 2/11/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1172		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; Soil/Qsw, (0-3 ft.)** @ 0' Orangish- to grayish-brown pebbly sandy silt; firm; dry to damp; pinhole voids				
					QUATERNARY TERRACE DEPOSITS; Qt, (3-7.5 ft.) @ 3' Reddish- to grayish-brown pebbly silty sand/sandy silt with scattered cobbles and boulders; moderately dense to dense; damp; friable; upper 2' finer grained				
5									
10									
15									
20									

TOTAL DEPTH: 7.5 feet

N40E→

SCALE: 1 inch = 5 feet



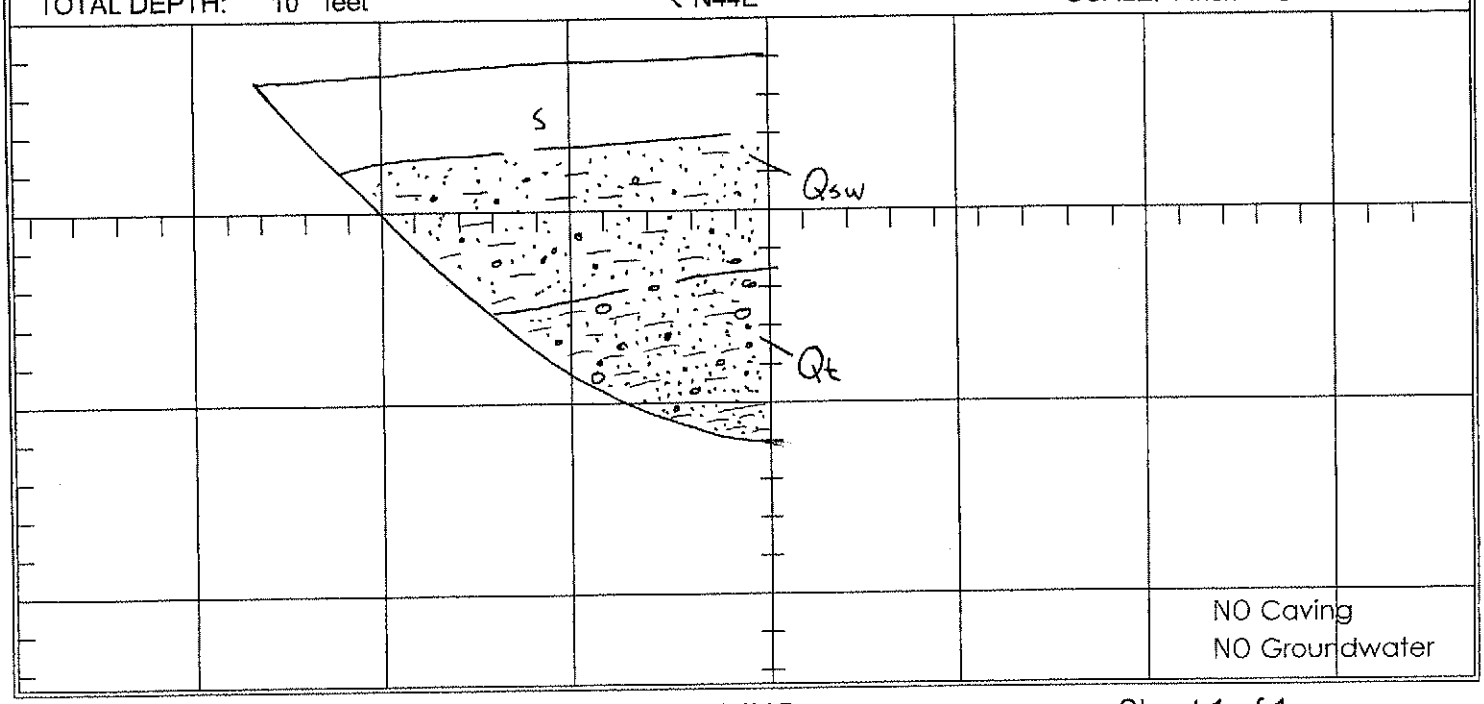
NO Caving
NO Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-8B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: DGG		
	EXCAVATED: 2/11/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1162		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; (0-2 ft.)** @ 0' Medium- to grayish-brown sandy silt with scattered pebbles; firm; dry to damp **SLOPEWASH; Qsw, (2-7 ft.)** @ 2' Reddish- to medium-brown pebbly silty sand/sandy silt with scattered cobbles; moderately dense; damp; friable				
5					**QUATERNARY TERRACE DEPOSITS; Qt, (7-10 ft.)** @ 7' Orangish- to grayish-brown pebbly silty sand and silt; dense; damp; friable	B:N61W,6NE			
10									
15									
20									

TOTAL DEPTH: 10 feet ←N44E SCALE: 1 inch = 5 feet

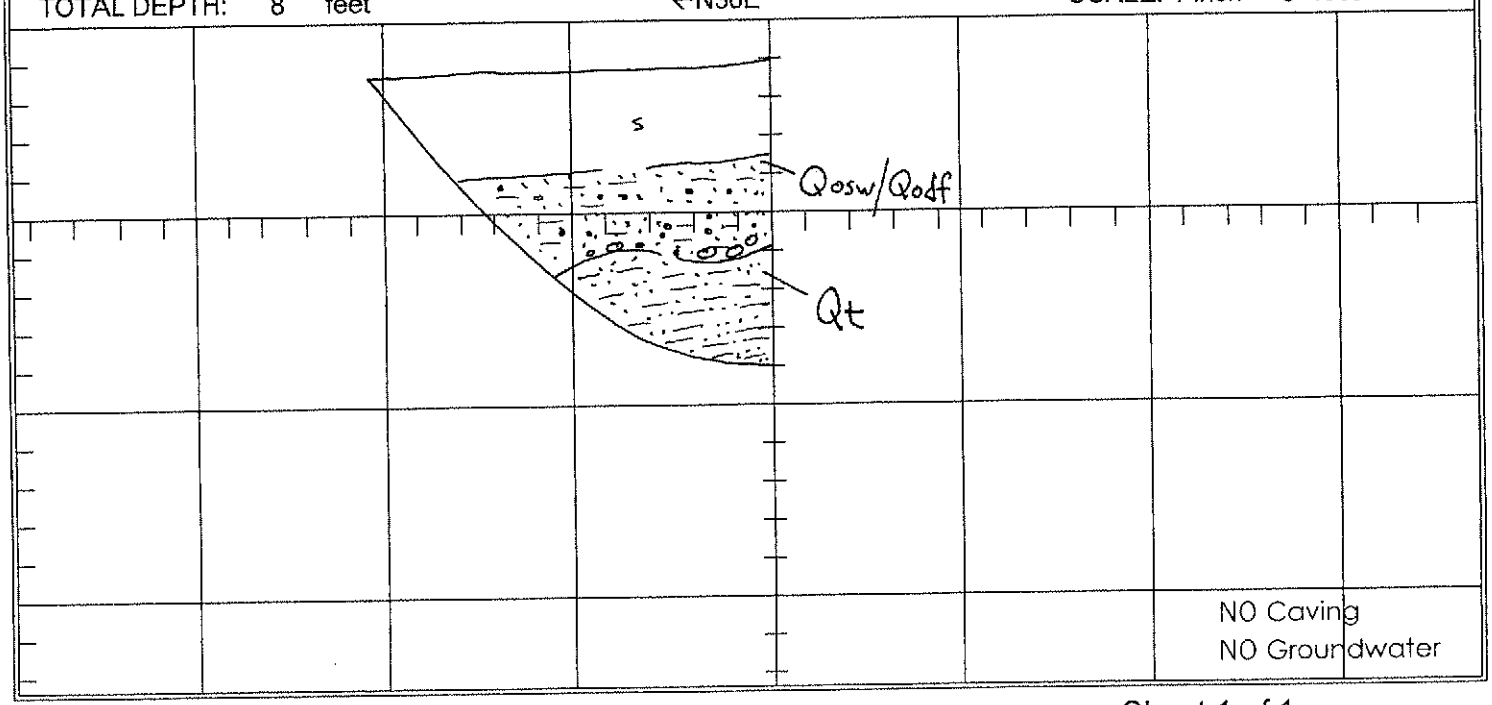


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-9B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: DGG		
	EXCAVATED: 2/11/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1129		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; (0-2.5 ft.)** @ 0' Medium- to light-brown pebbly sandy silt with clay; firm to stiff; damp **OLDER SLOPEWASH/OLDER DEBRIS FLOW; Qosw/ Qodf, (2.5-5 ft.)** @ 2.5' Orangish-brown pebbly silty sand/sandy silt; dense to very dense; damp **QUATERNARY TERRACE DEPOSITS; Qt, (5-8 ft.)** @ 5' Medium- to grayish-brown silt; moderately dense to dense; damp COMMENTS: -Contacts are gradational				
5									
10									
15									
20									

TOTAL DEPTH: 8 feet ←N36E SCALE: 1 inch = 5 feet

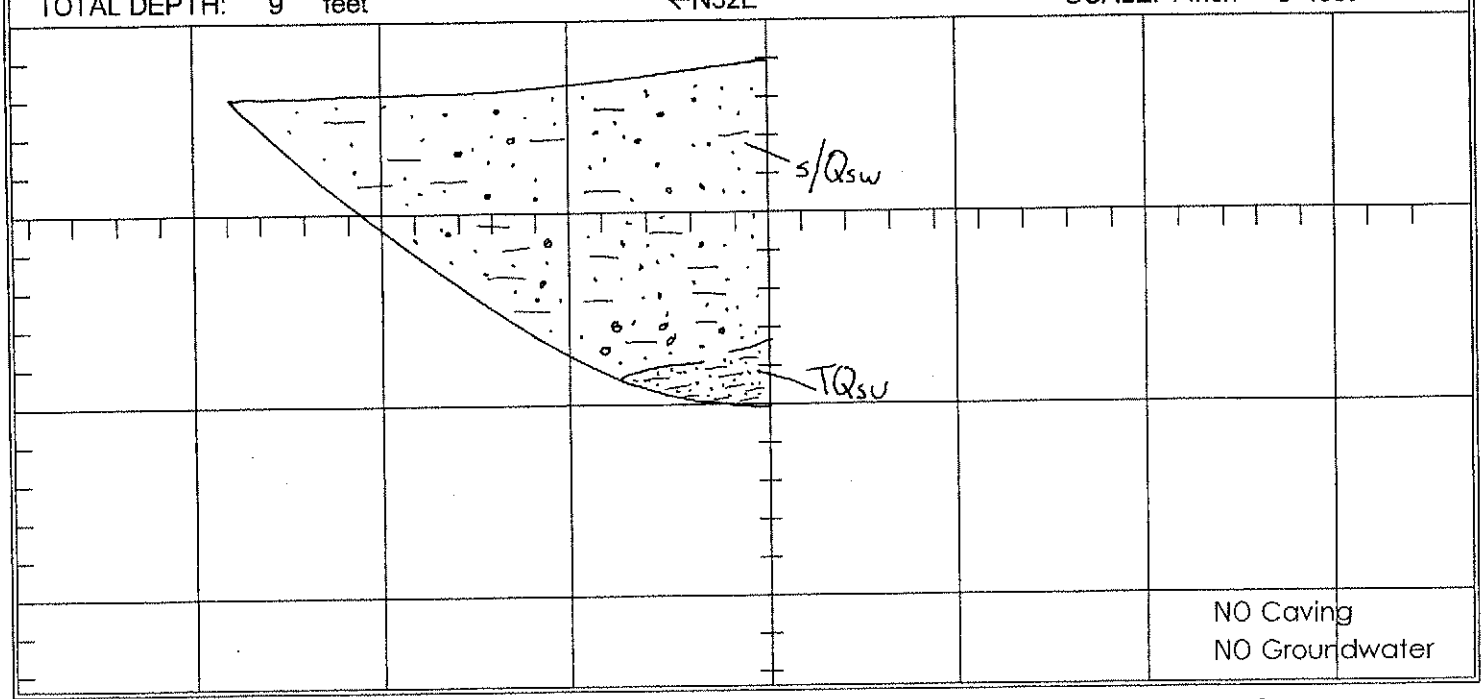


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-10B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: DGG		
	EXCAVATED: 2/11/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1161		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; Soil/Qsw, (0-7.5 ft.)** @ 0' Medium- to grayish-brown sandy silt with scattered pebbles; firm to stiff; dry to damp; voids to 1/4" diameter				
5									
					BEDROCK; TQsu, (7.5-9 ft.) @ 7.5' Pale yellowish- to grayish-brown siltstone; moderately hard but punky; damp				
10									
15									
20									

TOTAL DEPTH: 9 feet ←N32E SCALE: 1 inch = 5 feet

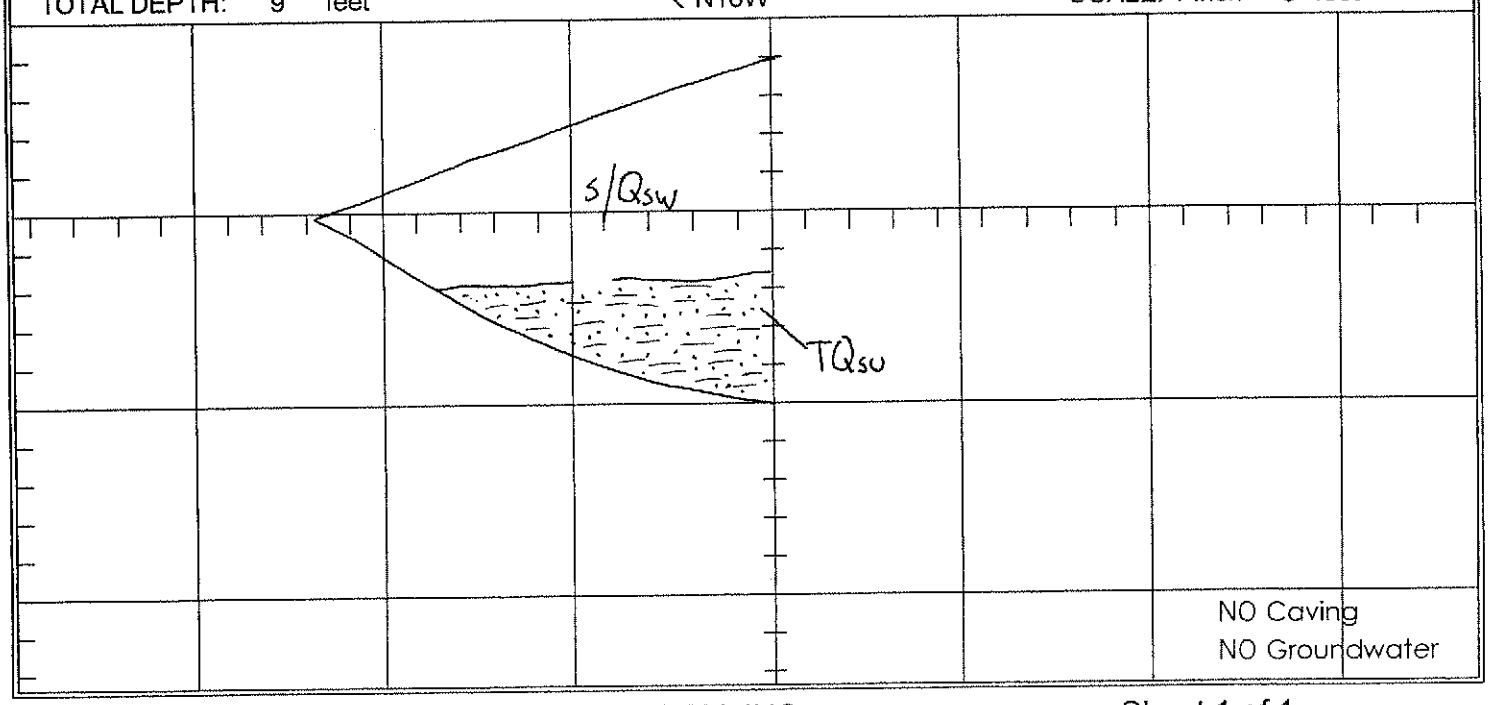


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-11B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: DGG		
	EXCAVATED: 2/11/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1150		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; Soil/Qsw, (0-6.5 ft.)** @ 0' Medium- to grayish-brown silt to sandy silt with scattered pebbles and one 2"-thick coarse-grained sandy lens; stiff; damp				
5					**BEDROCK; TQsu, (6.5-9 ft.)** @ 6.5' Pale yellowish- to grayish-brown siltstone; moderately hard; damp; caliche surfaces				
10									
15									
20									

TOTAL DEPTH: 9 feet ←N18W SCALE: 1 inch = 5 feet

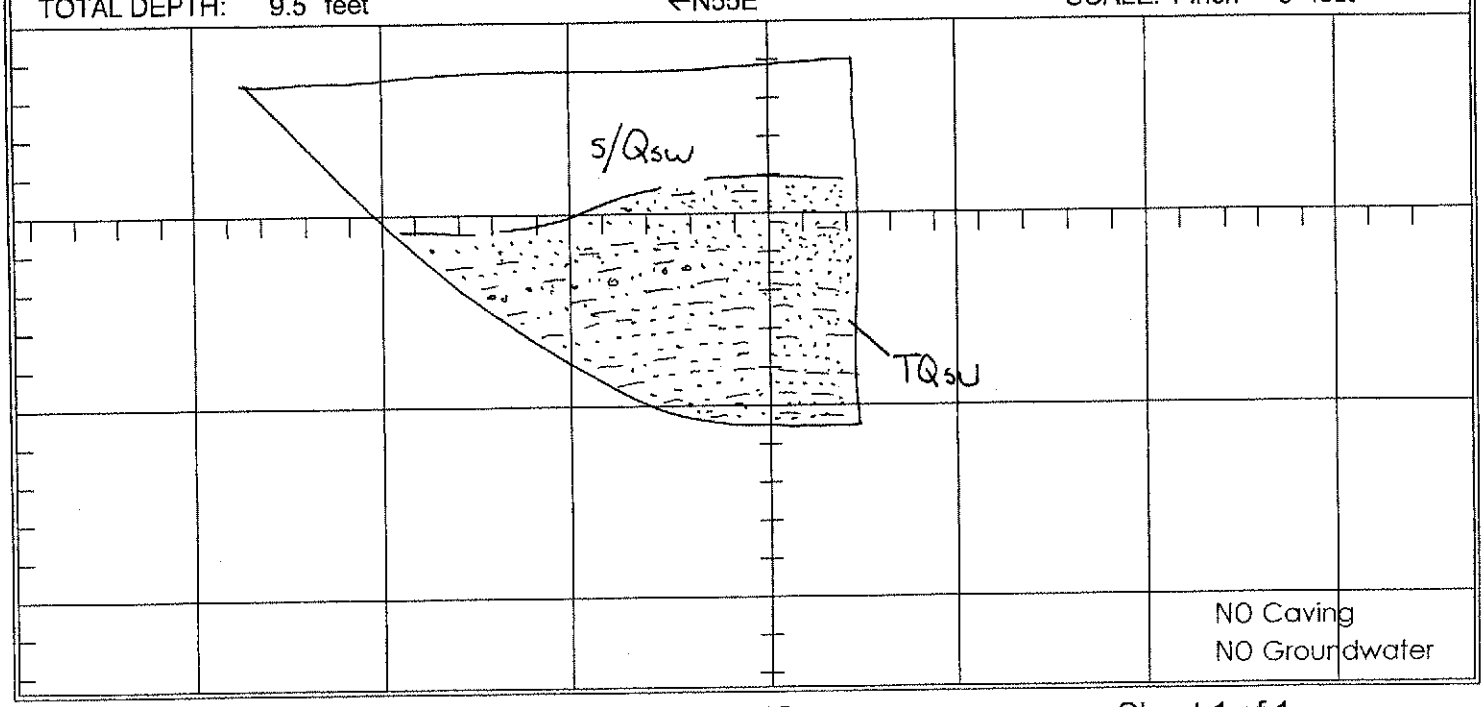


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-12B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: DGG		
	EXCAVATED: 2/11/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1133		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; Soil/Qsw, (0-3 ft.)** @ 0' Medium- to grayish-brown pebbly sandy silt with scattered cobbles; firm; damp				
					BEDROCK; TQsu, (3-9.5 ft) @ 3' Medium- to grayish-brown pebbly sandy siltstone/silty sandstone; dense; damp; moderately friable	B:N45W,13NE			
5									
10									
15									
20									

TOTAL DEPTH: 9.5 feet ←N55E SCALE: 1 inch = 5 feet

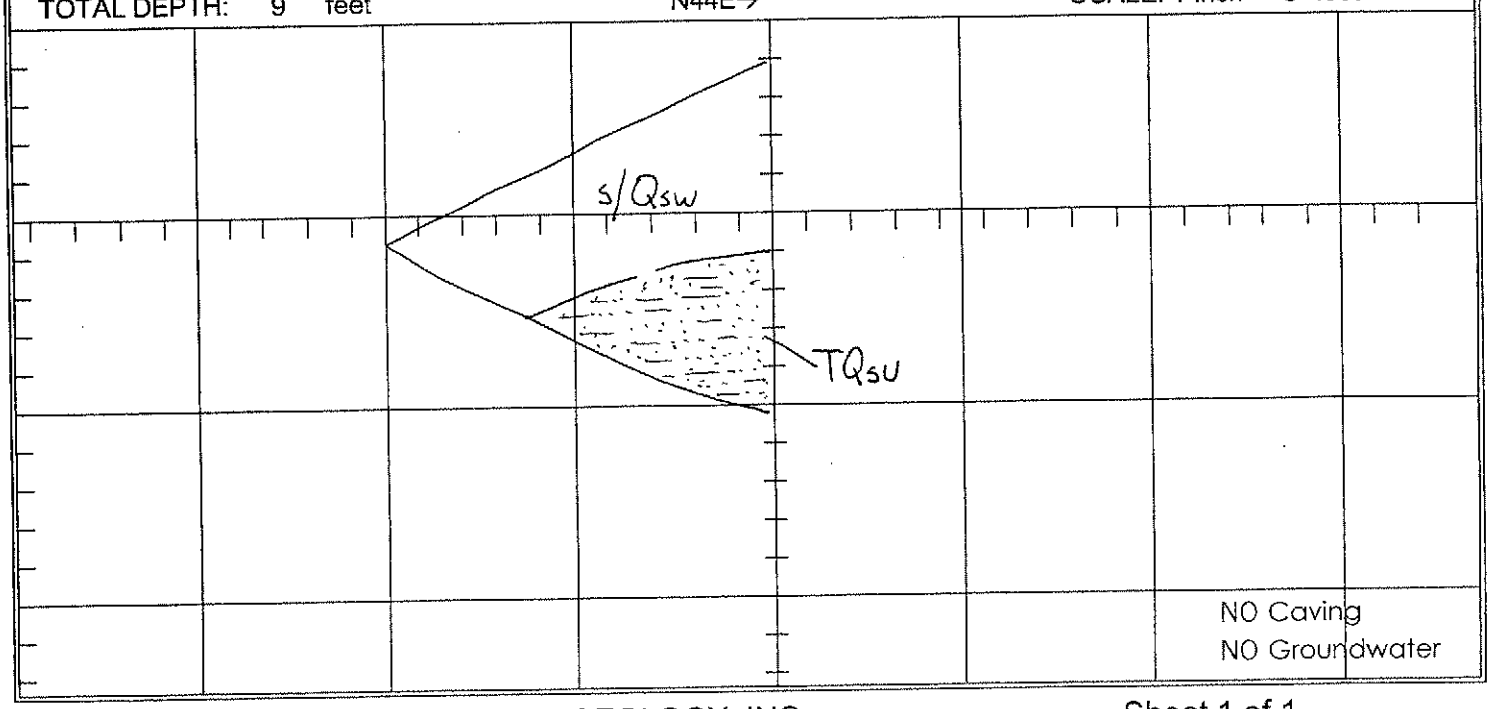


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-13B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: DGG		
	EXCAVATED: 2/11/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1095		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; Soil/Qsw, (0-5 ft.)** @ 0' Medium- to grayish-brown sandy silt with scattered pebbles and cobbles; firm; dry to damp; caliche surfaces				
5					**BEDROCK; TQsu, (5-9 ft.)** @ 5' Medium- to grayish-brown siltstone; moderately hard; damp; caliche surfaces; bedding is massive				
10									
15									
20									

TOTAL DEPTH: 9 feet N44E→ SCALE: 1 inch = 5 feet

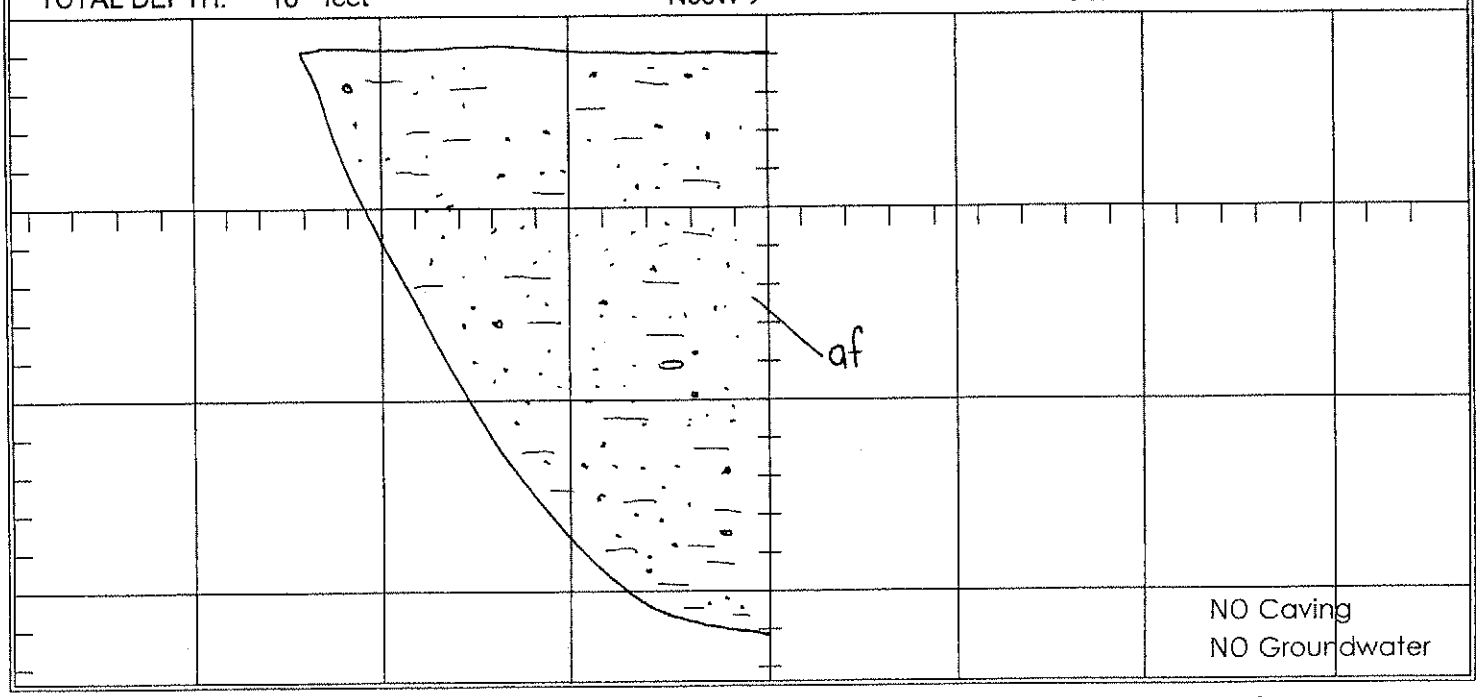


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-14B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: DGG		
	EXCAVATED: 2/12/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1274		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**ARTIFICIAL FILL; af, (0-16 ft.)** @ 0' Medium- to grayish-brown silt to silty sand/sandy silt; firm; damp; scattered pebbles and a few cobbles				
5									
10									
					NOTE: Pits 14B through 32B excavated at Exxon Mesa and vicinity.				
15					COMMENTS: -Surface logged due to depth -Possible buried soil at 14 ft.				
20									

TOTAL DEPTH: 16 feet N65W→ SCALE: 1 inch = 5 feet

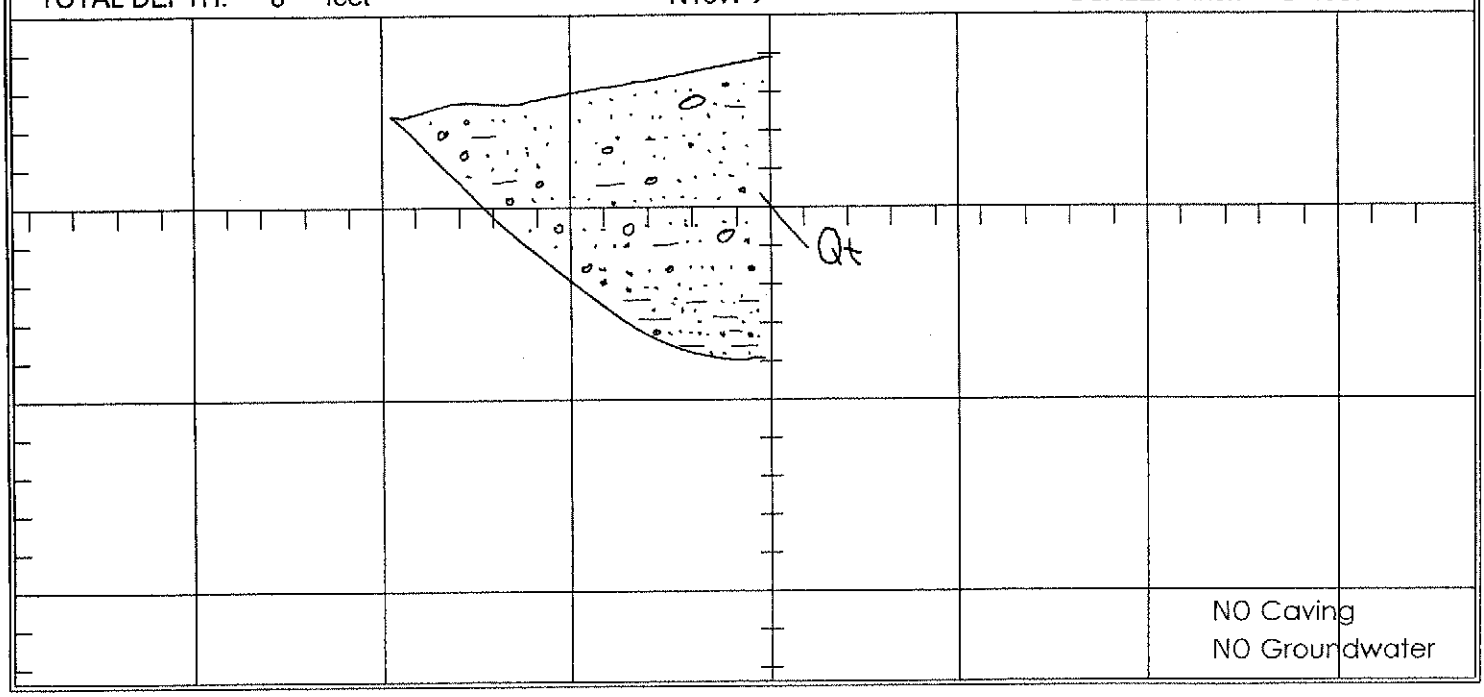


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-15B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: DGG		
	EXCAVATED: 2/12/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1123		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**QUATERNARY TERRACE DPEOSITS; Qt, (0-8 ft.)** @ 0' Medium- to grayish-brown cobbly pebbly silty sand/ sandy silt; dense; damp; friable; bottom 1.5' finer grained	Apx.B: Horizontal			
5									
10									
15									
20									

TOTAL DEPTH: 8 feet N16W→ SCALE: 1 inch = 5 feet

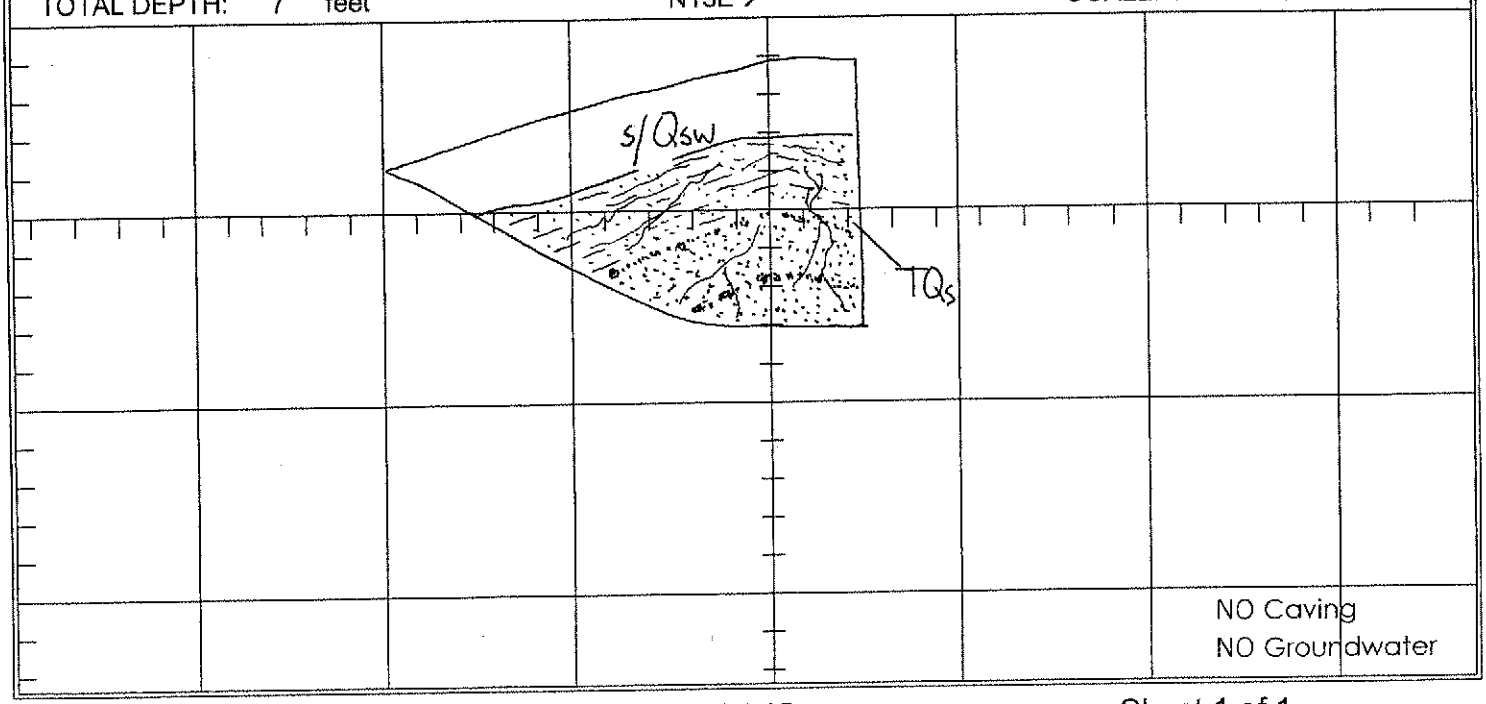


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-16B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: DGG		
	EXCAVATED: 2/12/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1080		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; Soil/Qsw, (0-2 ft.)** @ 0' Medium-brown sandy silt with scattered pebbles and cobbles; firm; dry to damp; voids **BEDROCK; TQs, (2-7 ft.)** @ 2' Medium-brown siltstone; moderately hard; damp; moderately fractured; caliche surfaces; and light-gray fine-grained sandstone and fine- to coarse-grained sandstone; moderately hard; damp; moderately fractured	B:N88W,28SW			
5									
10									
15									
20									

TOTAL DEPTH: 7 feet N13E→ SCALE: 1 inch = 5 feet

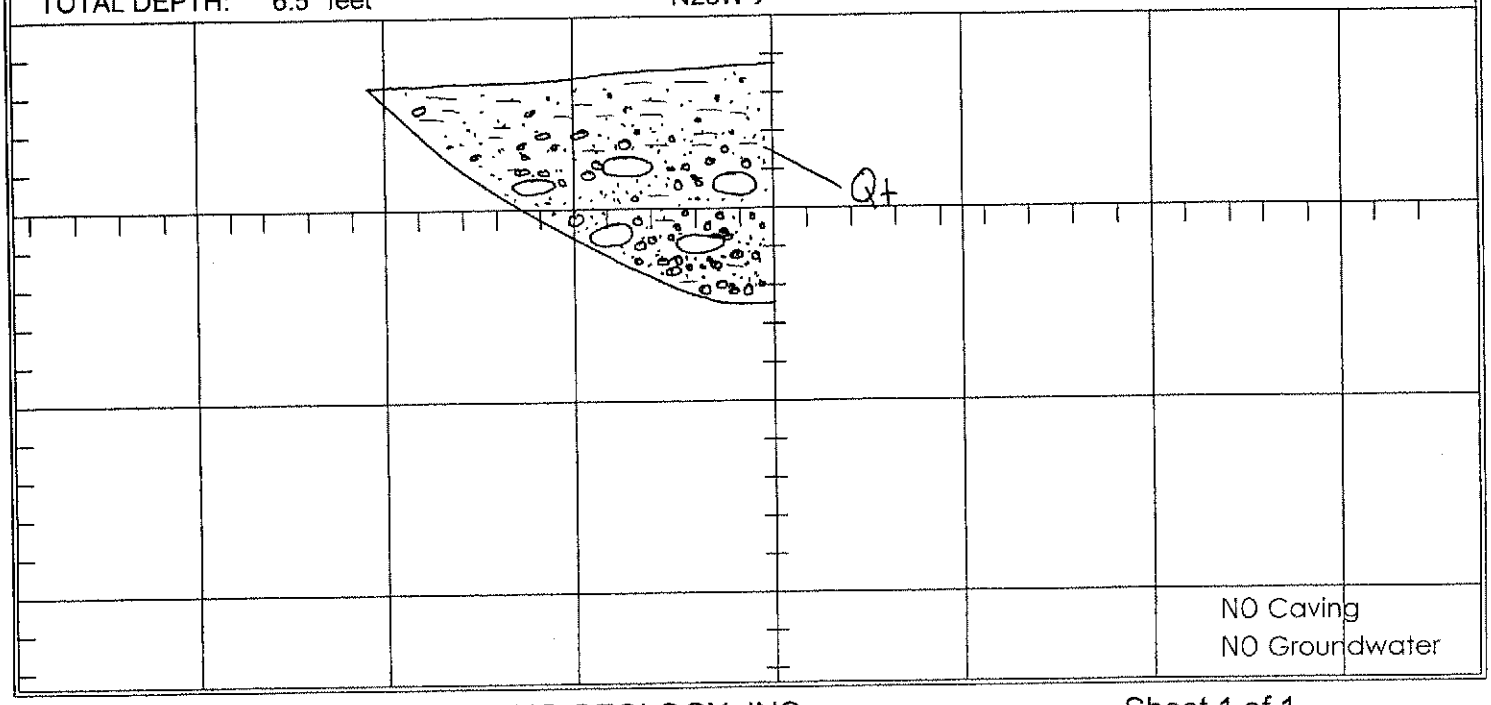


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02	**NO.** T-17B	
	LOGGED BY: DGG		
	EXCAVATED: 2/12/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1088		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**QUATERNARY TERRACE DEPOSITS; Qt, (0-6.5 ft.)** @ 0' Slightly orangish- to grayish-brown, cobbly pebbly silty sand with boulders; loose to firm; dry to damp; very friable; upper 1' finer-grained; 25-30% cobble- to boulder-size clasts in lower 4 ft.; locally clast supported				
5									
10									
15									
20									

TOTAL DEPTH: 6.5 feet N23W→ SCALE: 1 inch = 5 feet

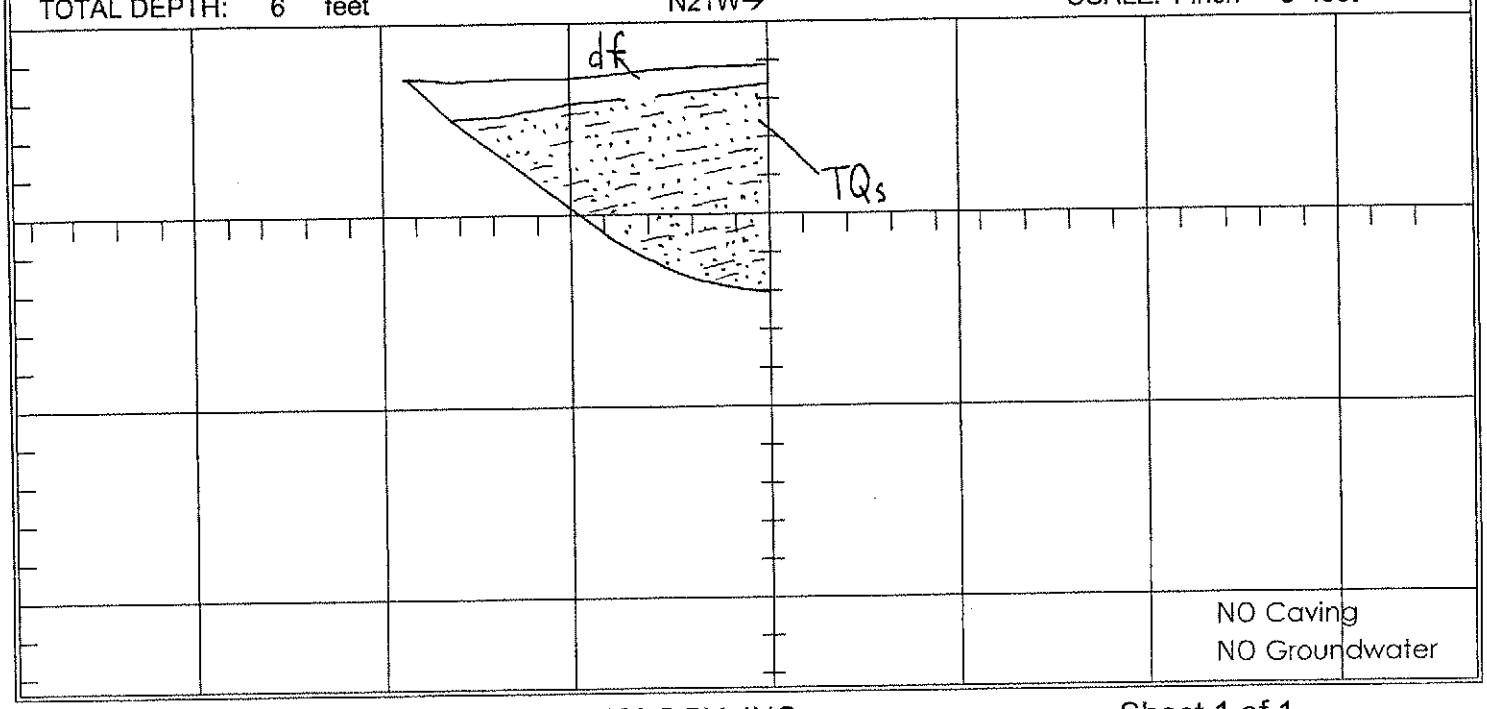


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-18B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: DGG		
	EXCAVATED: 2/12/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1084		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**DUMPED FILL; df, (0-8")** @ 0' Orangish- to grayish-brown pebbly silty sand; loose to firm; damp **BEDROCK; TQs, (8"-6 ft.)** @ 8" Medium-gray to medium-brown siltstone to slightly sandy siltstone; moderately hard; damp				
5									
10									
15									
20									

TOTAL DEPTH: 6 feet N21W→ SCALE: 1 inch = 5 feet

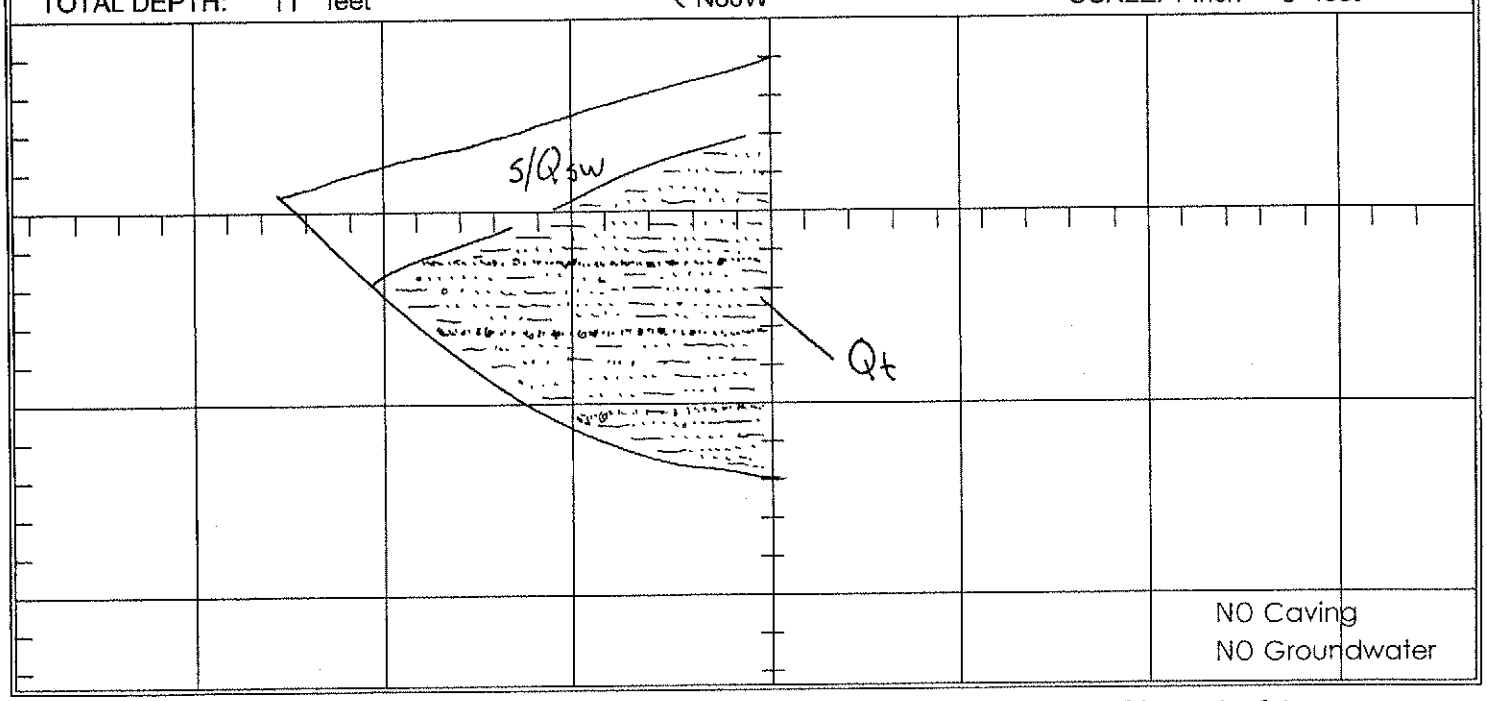


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-19B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: DGG		
	EXCAVATED: 2/12/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1101		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; Soil/Qsw, (0-2.5 ft.)** @ 0' Medium-brown silt; firm; dry to damp; many voids				
					QUATERNARY TERRACE DEPOSITS; Qt, (2.5-11 ft.) @ 2.5' Grayish- to medium-brown interbedded silt, sandy silt and fine-grained sand with scattered pebbles; moderately dense; damp; local burrows	Apx.B: Horizontal			
5									
10									
15									
20									

TOTAL DEPTH: 11 feet ←N80W SCALE: 1 inch = 5 feet

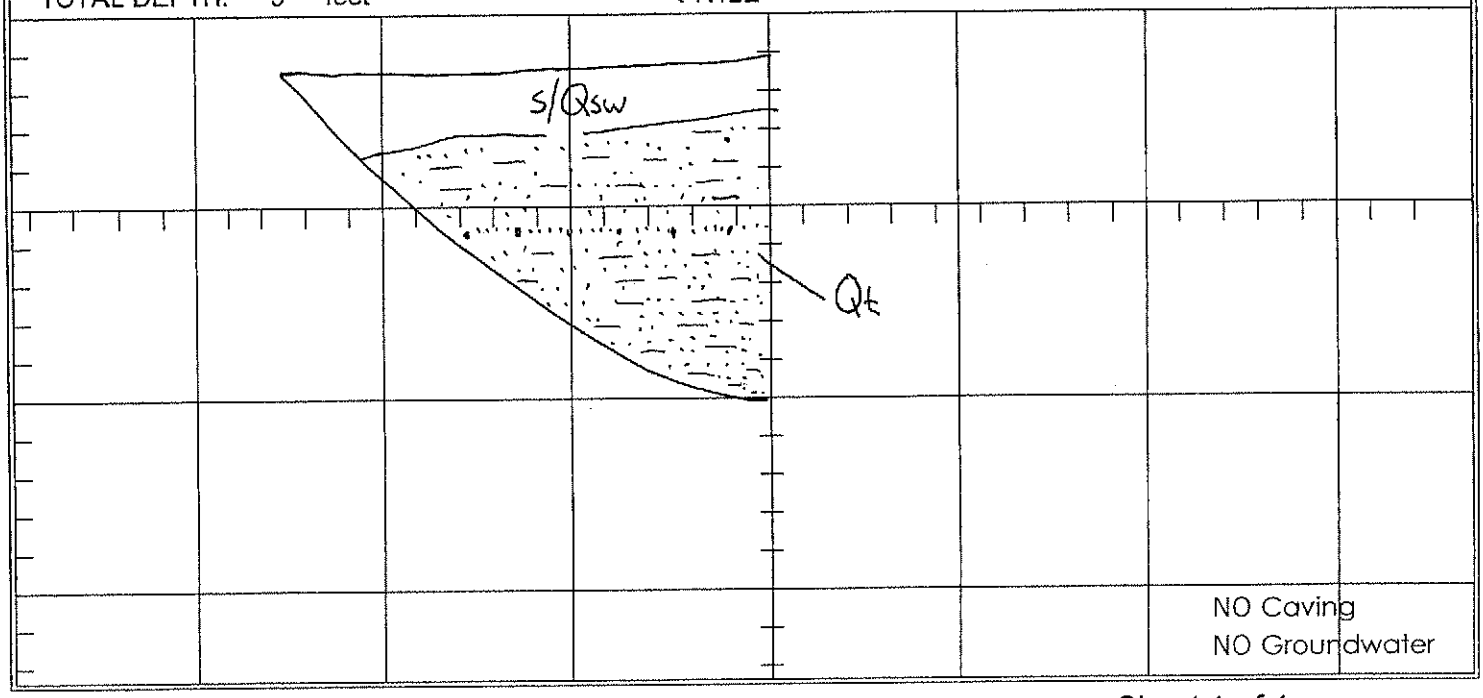


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-20B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: DGG		
	EXCAVATED: 2/12/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1120		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; Soil/Qsw, (0-1.5 ft.)** @ 0' Medium-brown sandy silt; firm; dry to damp; voids **QUATERNARY TERRACE DEPOSITS; Qt, (1.5-9 ft.)** @ 1.5' Medium- to grayish-brown interbedded silt; sandy silt; and fine-grained sand with pebbles; moderately dense; damp; local burrows	Apx.B: Horizontal			
5									
10									
15									
20									

TOTAL DEPTH: 9 feet ←N12E SCALE: 1 inch = 5 feet

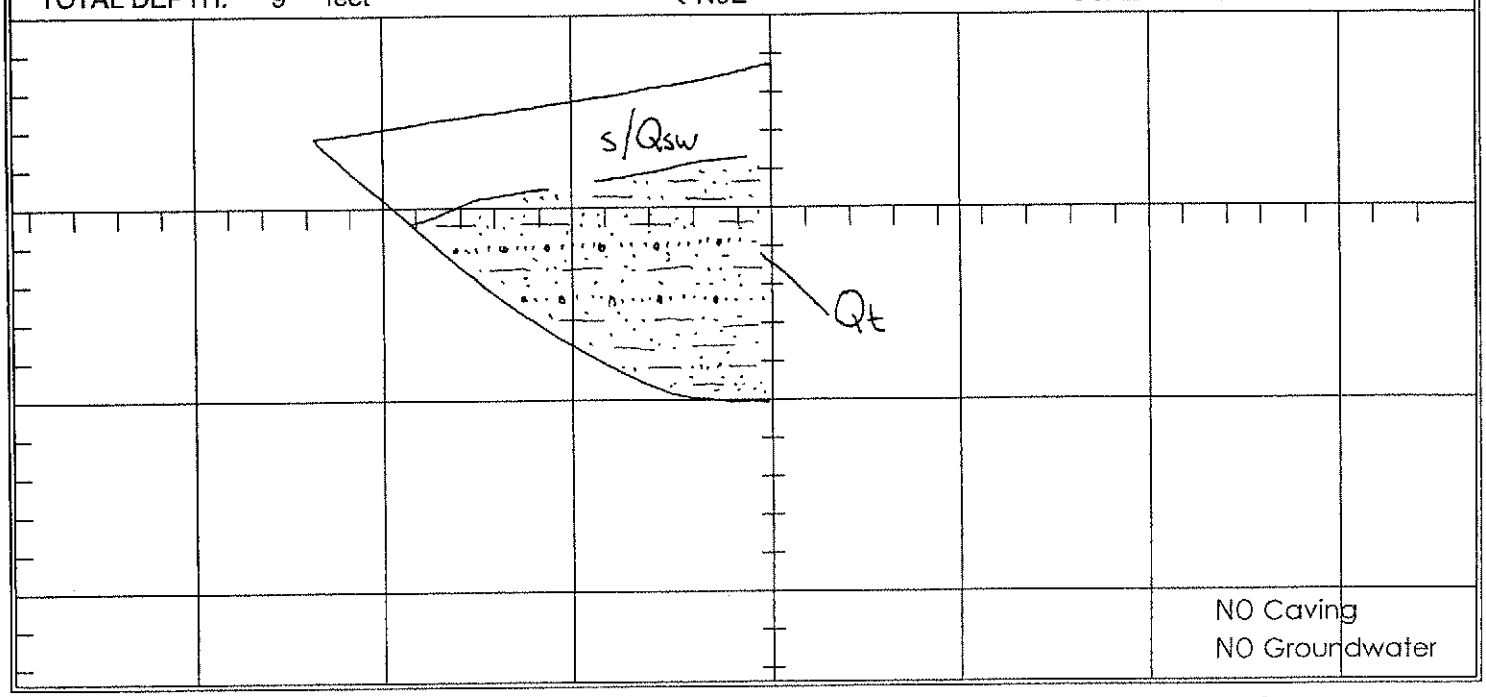


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-21B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: DGG		
	EXCAVATED: 2/12/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1106		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; Soil/Qsw, (0-2.5 ft.)** @ 0' Medium-brown sandy silt; firm; dry to damp; voids				
					QUATERNARY TERRACE DEPOSITS; Qt, (2.5-9 ft.) @ 2.5' Medium- to grayish-brown interbedded silt, sandy silt and fine-grained sand with pebbles; moderately dense; damp; local burrows	B:Horizontal			
5									
10									
15									
20									

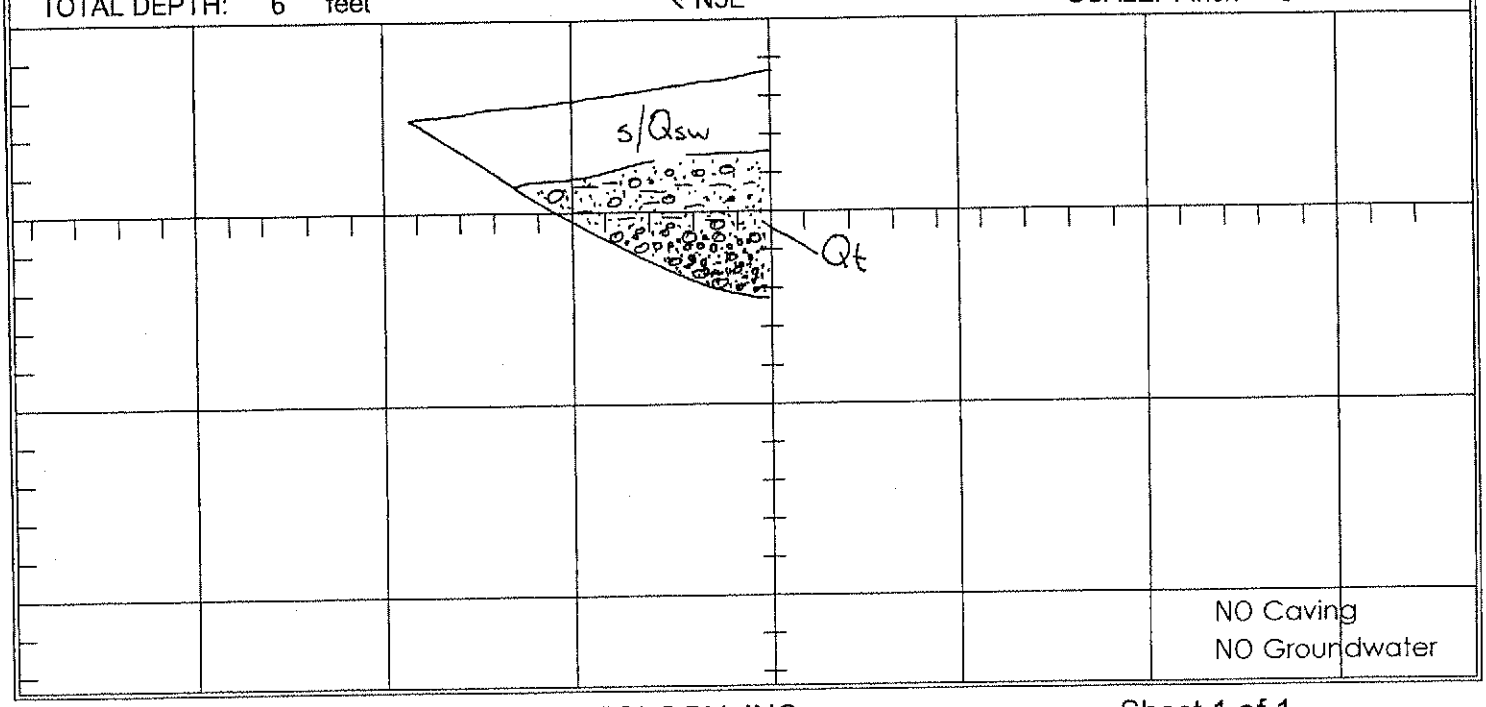
TOTAL DEPTH: 9 feet ←N5E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-22B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: DGG		
	EXCAVATED: 2/12/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1089		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; Soil/Qsw, (0-2.5 ft.)** @ 0' Medium-brown sandy silt; firm; damp; numerous voids				
					QUATERNARY TERRACE DEPSOSITS; Qt, (2.5 6 ft.) @ 2.5' Medium- to grayish-brown pebbly silty sand with cobbles and boulders; loose to firm; damp; friable; 10% of clasts cobble-sized or larger	B: Horizontal			
5									
					COMMENTS: -East wall possibly creep affected				
10									
15									
20									

TOTAL DEPTH: 6 feet ←N5E SCALE: 1 inch = 5 feet

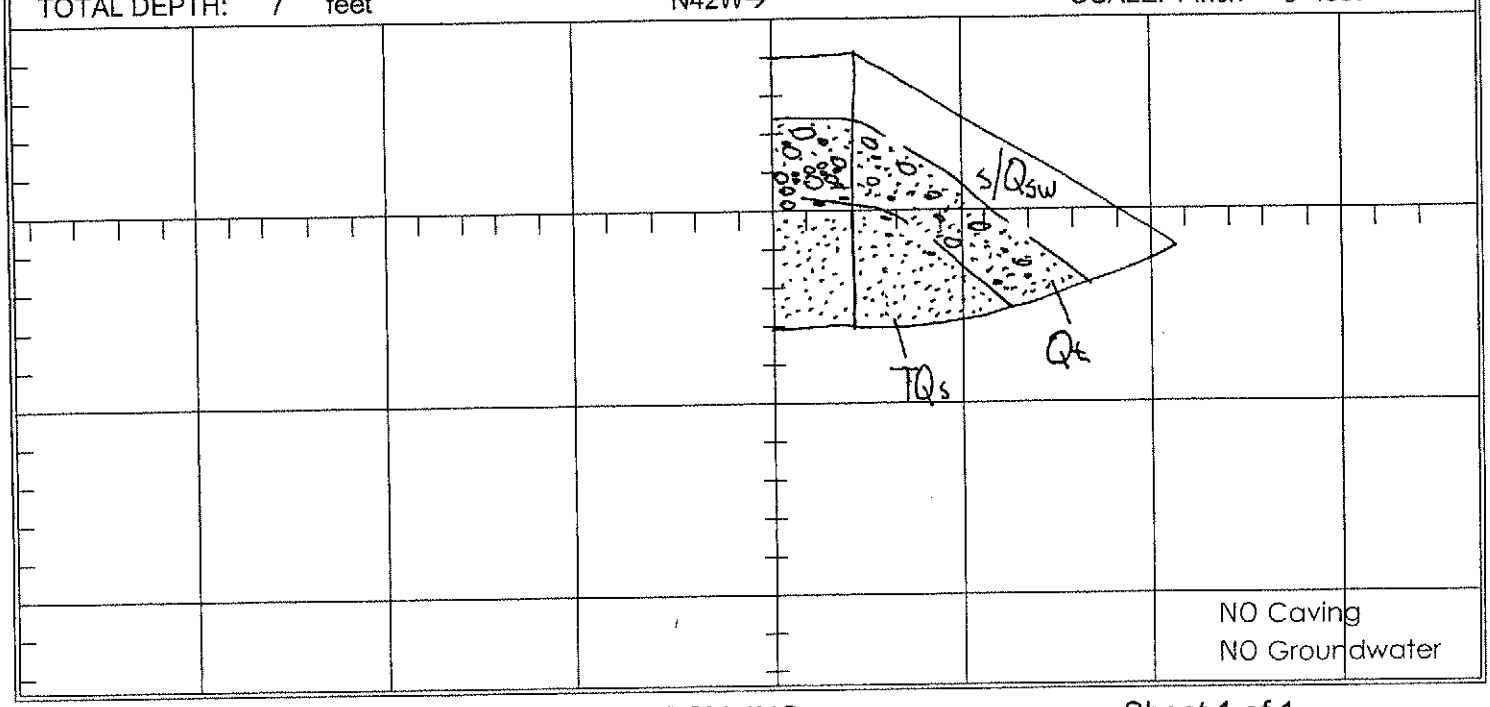


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02	**NO.** T-23B	
	LOGGED BY: DGG		
	EXCAVATED: 2/12/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1068		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; Soil/Qsw, (0-1.5 ft.)** @ 0' Medium-brown sandy silt with scattered pebbles; firm; dry to damp; numerous voids **QUATERNARY TERRACE DEPOSITS; Qt, (1.5-4 ft.)** @ 1.5' Orangish- to grayish-brown pebbly cobbly silty sand with boulders; loose; damp; 20% of clasts cobble-sized or larger **BEDROCK; TQs; (4-7 ft.)** @ 4' Light-gray, fine- to medium-grained sandstone; dense; damp; slightly friable; bedding is massive COMMENTS: -Upper 4' creep affected				
5									
10									
15									
20									

TOTAL DEPTH: 7 feet N42W→ SCALE: 1 inch = 5 feet

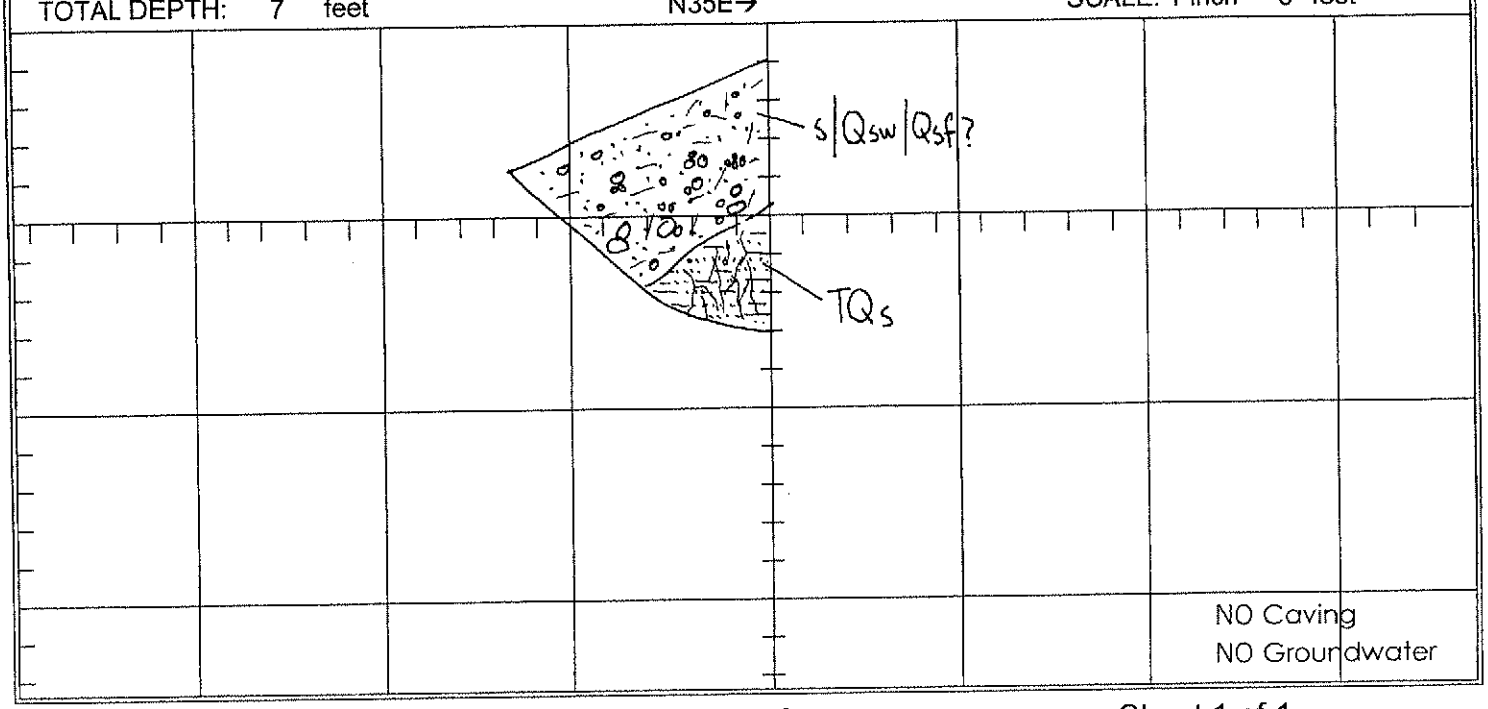


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-24B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: DGG		
	EXCAVATED: 2/12/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1070		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH/SURFICIAL FAILFURE?; Soil/Qsw/Qsf?, (0-4 ft.)** @ 0' Medium-brown pebbly cobbly sandy silt with boulders; loose to firm; dry to damp **BEDROCK; TQs, (4-7 ft.)** @ 4' Light-gray to grayish-brown sandy siltstone/silty sandstone; moderately hard; damp; mooderately fractured, caliche surfaces; bedding is massive COMMENTS: -Upper 4' chaotic assemblage no stratification; basal Qt layer probably just up slope				
5									
10									
15									
20									

TOTAL DEPTH: 7 feet N35E→ SCALE: 1 inch = 5 feet

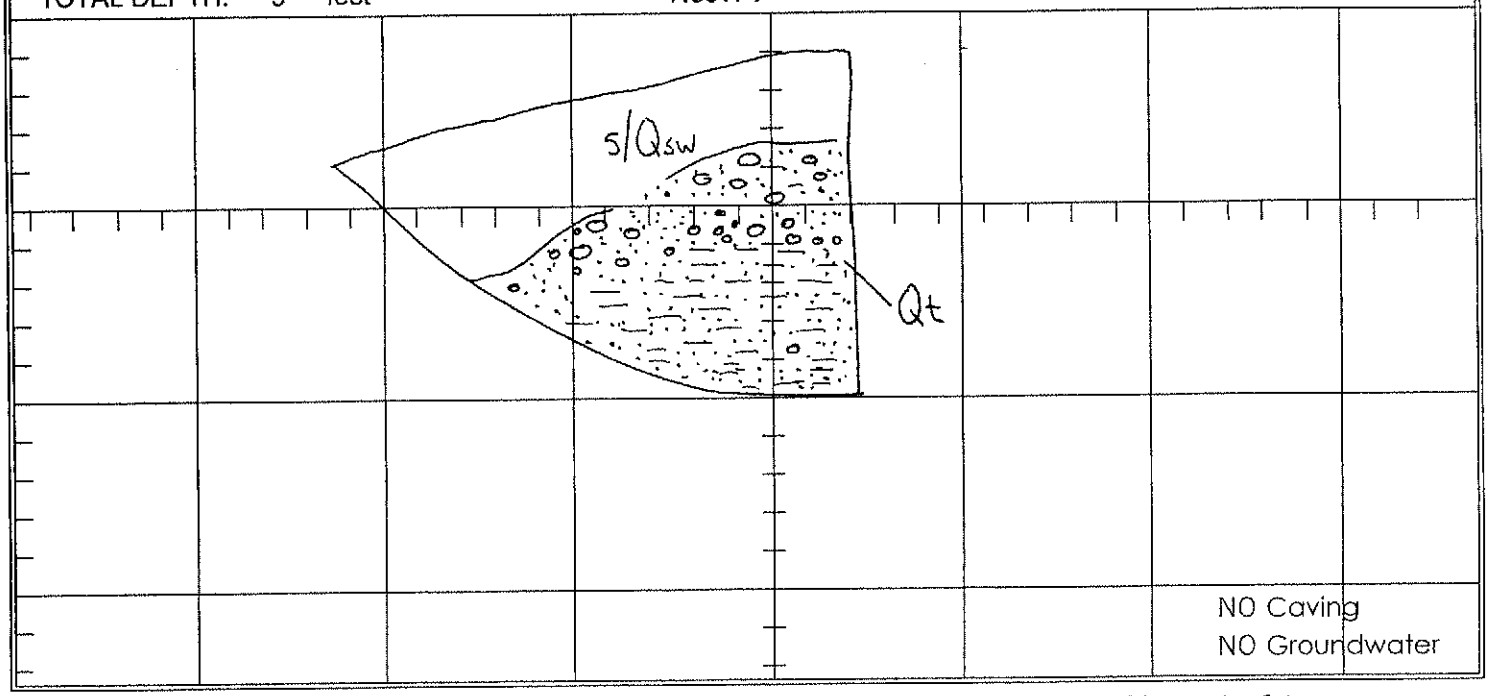


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-25B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: DGG		
	EXCAVATED: 2/12/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1086		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; Soil/Qsw, (0-2.5 ft.)** @ 0' Medium-brown sandy silt with pebbles; firm; dry to damp; some voids **QUATERNARY TERRACE DEPOSITS; Qt, (2.5-9 ft.)** @ 2.5' Medium- to grayish-brown cobbly pebbly silty sand; loose to moderately dense to dense; damp; friable @ 5' Medium- to grayish-brown silt to silty sand; moderately dense to dense; damp; 1 cobble; friable	B: Horizontal			
5									
10					COMMENTS: -Qt creep affected				
15									
20									

TOTAL DEPTH: 9 feet N33W→ SCALE: 1 inch = 5 feet

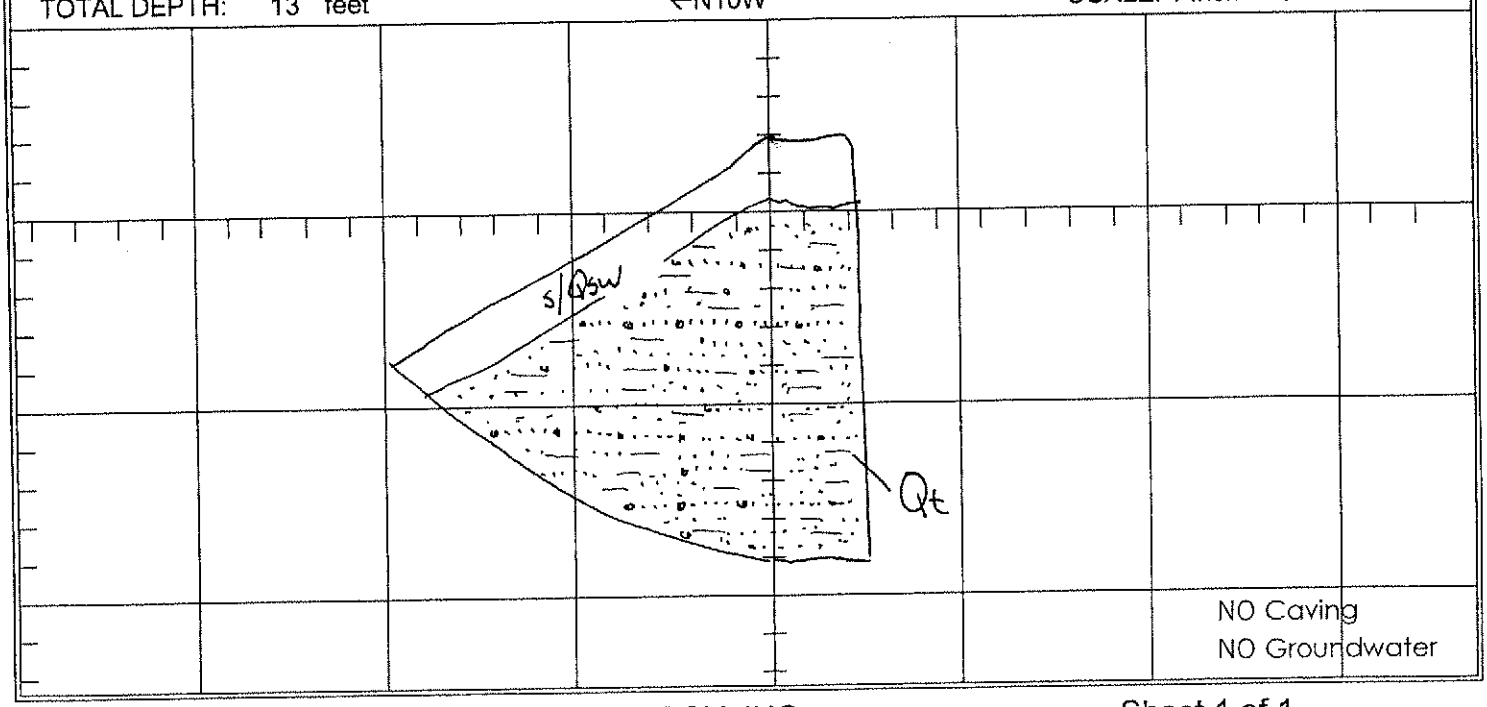


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-26B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: DGG		
	EXCAVATED: 2/12/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1180		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; Soil/Qsw, (0-4.5 ft.)** @ 0' Medium-brown sandy silt with scattered pebbles; firm; dry to damp; numerous voids				
5					**QUATERNARY TERRACE DEPOSITS; Qt, (4.5-13 ft.)** @ 4.5' Medium- to grayish-brown silt; silty sand and pebbly sand; moderately dense to dense; damp; friable	Apx.B: Horizontal			
10									
15									
20									

TOTAL DEPTH: 13 feet ←N10W SCALE: 1 inch = 5 feet

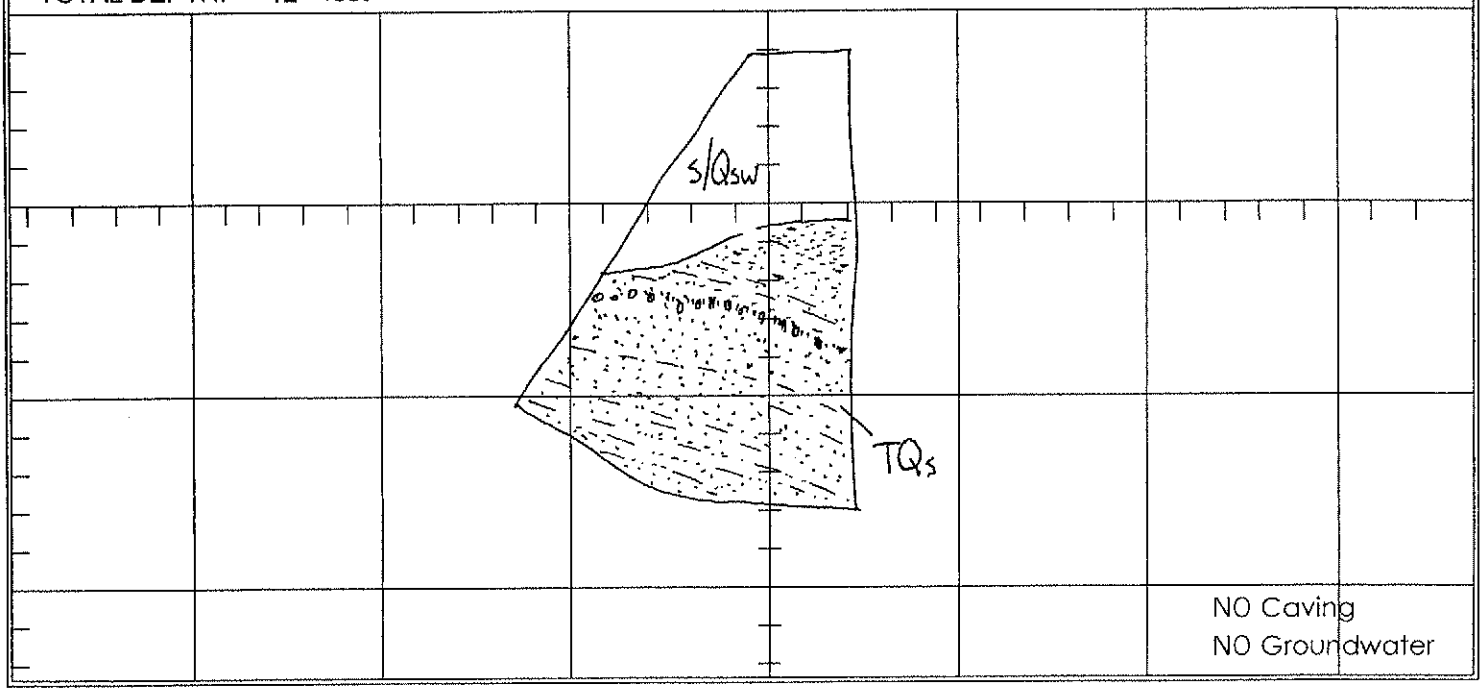


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-27B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: DGG		
	EXCAVATED: 2/12/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1220		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; Soil/Qsw, (0-4.5 ft.)** @ 0' Pale orangish- to grayish-brown sandy silt with pebbles and cobbles; firm; dry to damp				
5					**BEDROCK; TQs, (4.5-12 ft.)** @ 4.5' Light-gray to grayish-brown siltstone, silty sandstone and pebbly sandstone with some cobbles; moderately hard; damp	B:N15W,25NE			
10									
					COMMENTS: -TQs creep affected?				
15									
20									

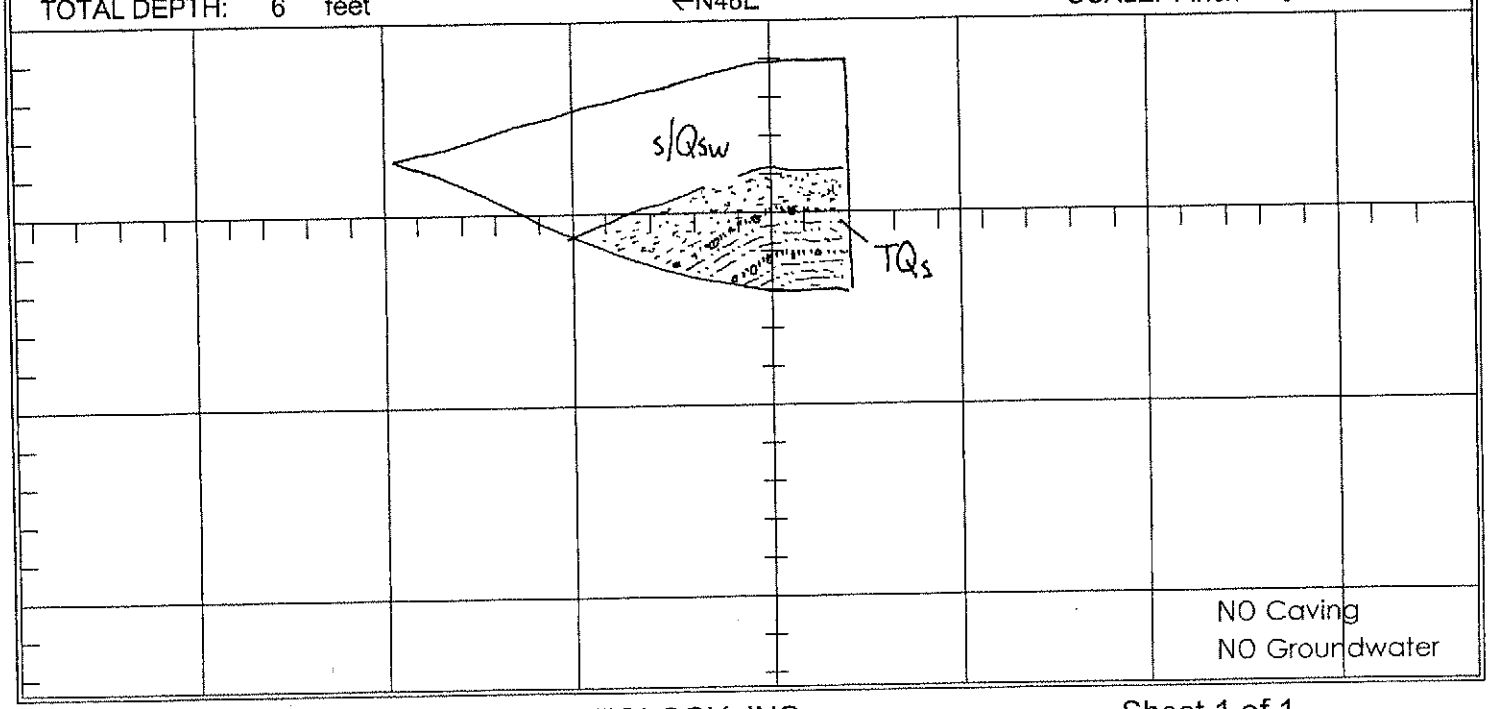
TOTAL DEPTH: 12 feet N10W→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-28B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: DGG		
	EXCAVATED: 2/12/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1271		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; Soil/Qsw, (0-3 ft.)** @ 0' Medium-brown sandy silt; firm; dry to damp				
					BEDROCK; TQs, (3-6 ft.) @ 3' Light-gray siltstone, silty sandstone and pebbly sandstone; moderately hard to hard; damp; some fractures	B:N45W,25NE			
5									
10									
15									
20									

TOTAL DEPTH: 6 feet ←N48E SCALE: 1 inch = 5 feet

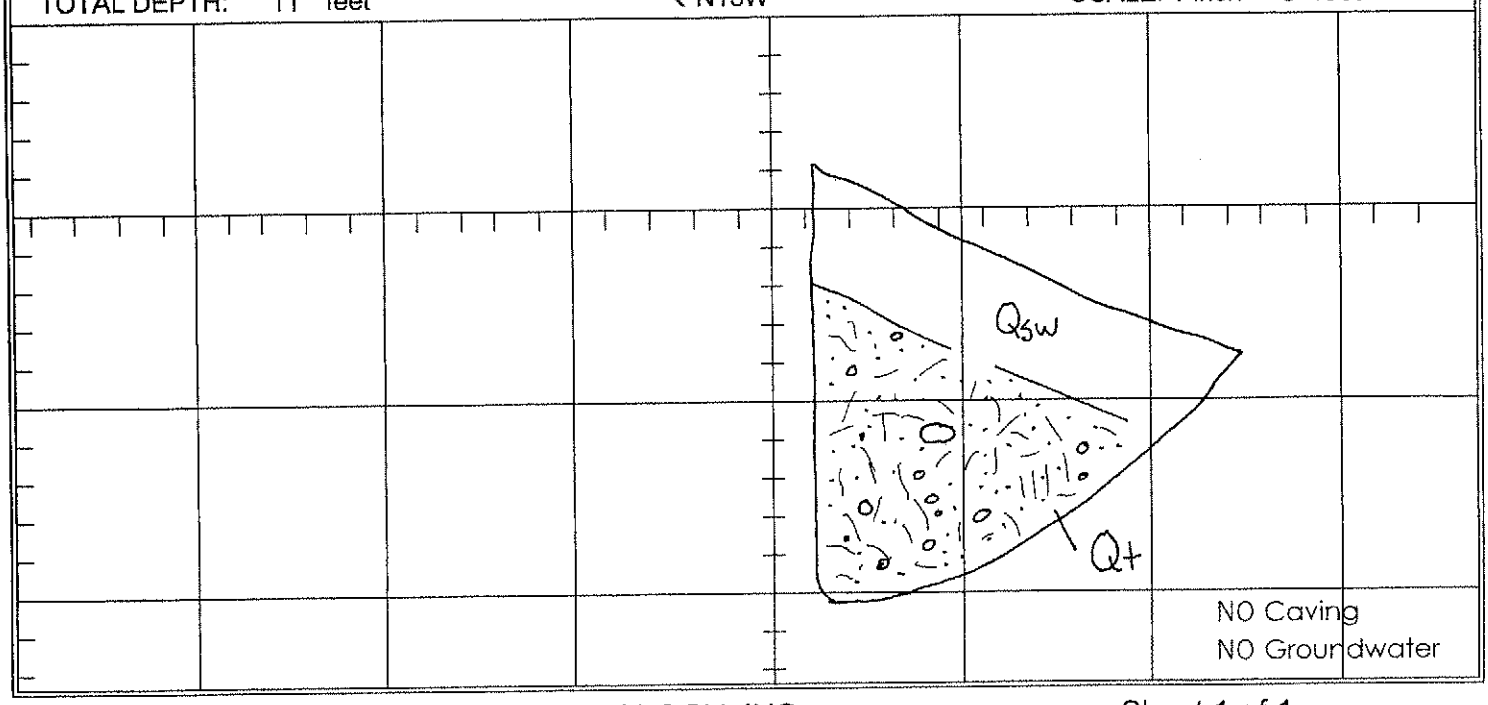


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-29B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: MJD		
	EXCAVATED: 3/19/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1195		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SLOPEWASH; Qsw, (0-3 ft.)** @ 0' Light-brown silty sand to sandy silt with pebbles and cobbles; soft; dry to damp; roots and voids **QUATERNARY TERRACE DEPOSITS; Qt, (3-11 ft.)** @ 3' Yellowish-brown, light-brown and medium-brown sandy silt to silty sand and silt with pebbles and cobbles; loose to dense; damp; heavily weathered and fractured; siltstone clasts; caliche rich; no bedding; roots to 10' COMMENTS: -Highly weathered to bottom of trench; digs soft				
5									
10									
15									
20									

TOTAL DEPTH: 11 feet ←N15W SCALE: 1 inch = 5 feet

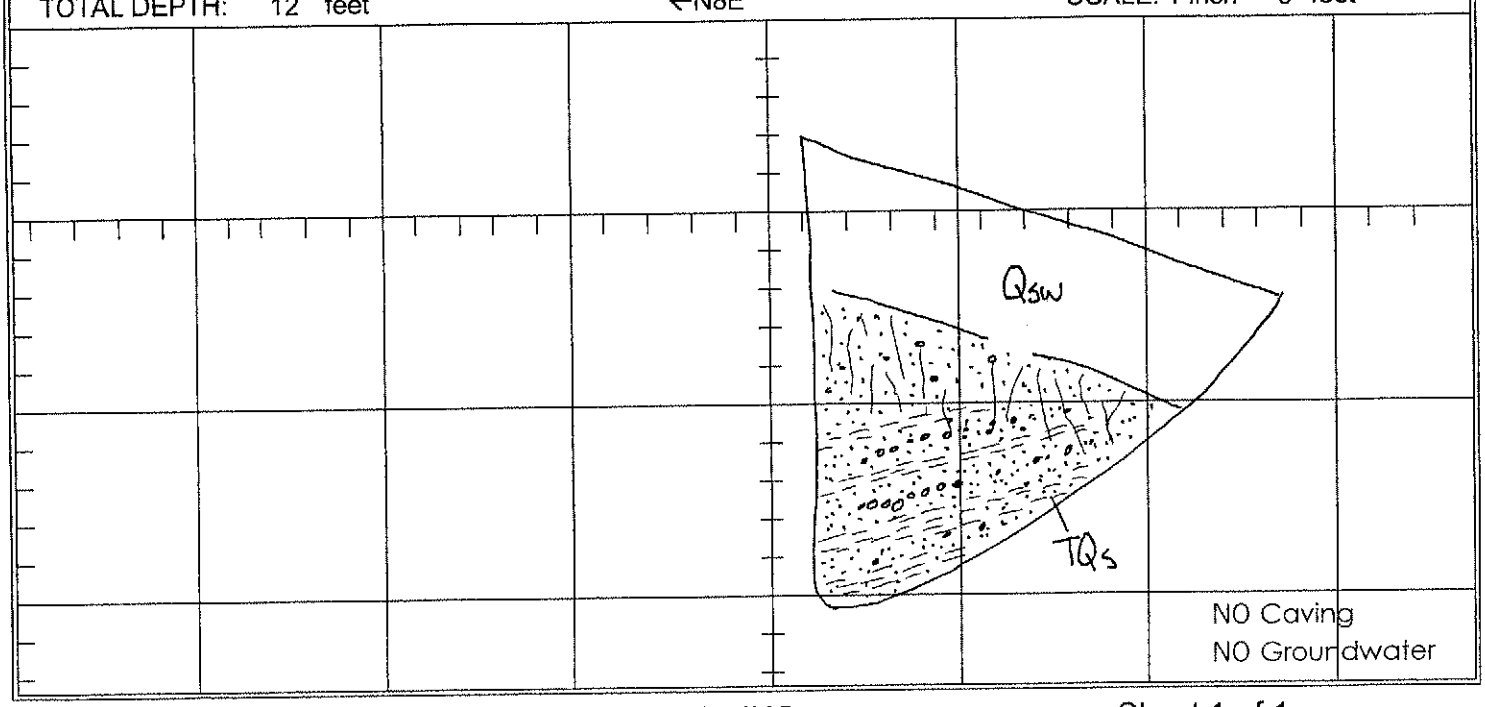


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-30B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: MJD		
	EXCAVATED: 3/19/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1150		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SLOPEWASH; Qsw, (0-4 ft.)** @ 0' Light-brown pebbly silty sand; loose; dry to slightly damp; cobbles up to 10" in diameter; roots to 5'				
5					**BEDROCK; TQs, (4-12 ft.)** @ 4' Yellowish-gray sandstone and brown siltstone with local pebble lenses; moderately hard to hard; slightly damp; caliche rich; well-bedded	B:N65W,21NE			
10									
15					COMMENTS: -Highly weathered to 7 ft.				
20									

TOTAL DEPTH: 12 feet ←N8E SCALE: 1 inch = 5 feet

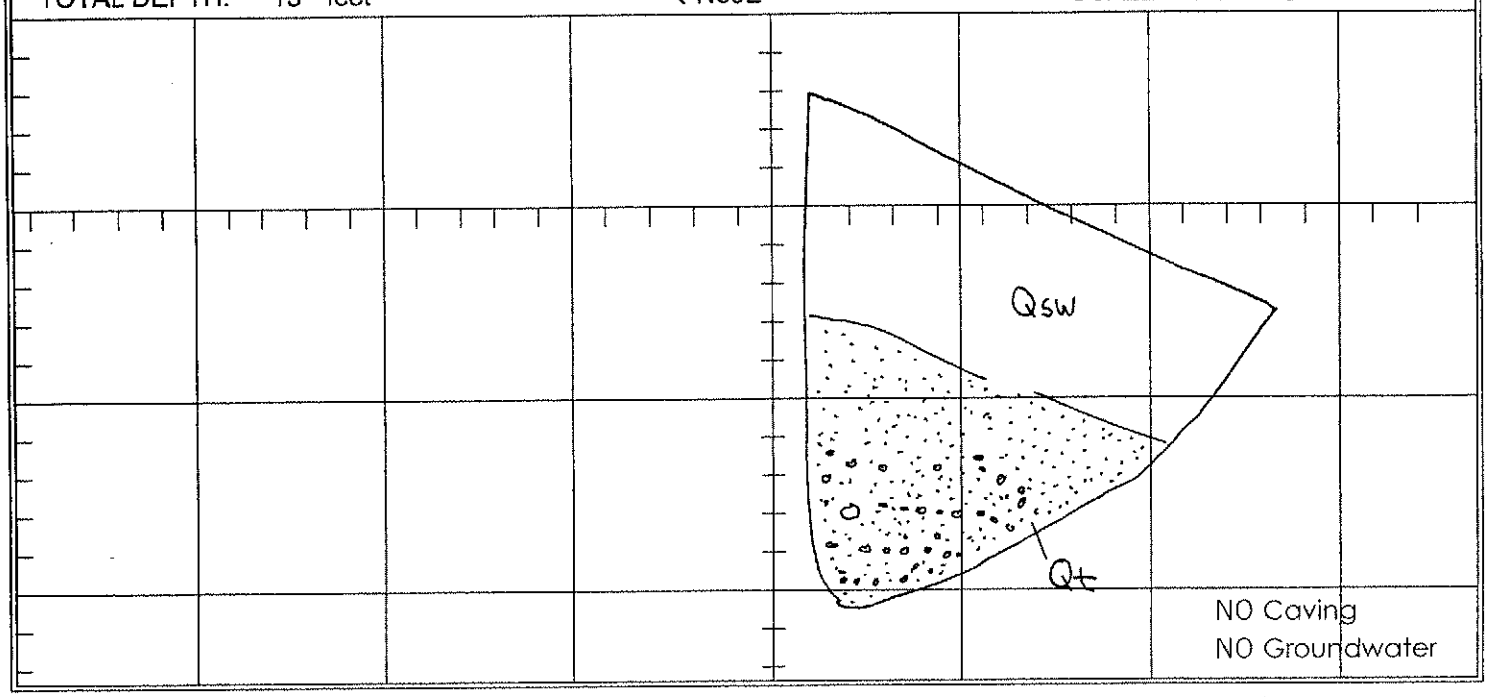


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-31B**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02		
	LOGGED BY: MJD		
	EXCAVATED: 3/19/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1114		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SLOPEWASH; Qsw, (0-6 ft.)** @ 0' Light-brown silty, pebbly, cobbly sand; loose; dry to slightly damp; roots; caliche rich				
5					**QUATERNARY TERRACE DEPOSITS; Qt, (6-13 ft.)** @ 6' Light yellowish-brown to yellowish-gray sand and pebbly sand with scattered cobbles; loose to moderately dense; locally friable; creep-affected; vaguely bedded; caliche rich	Apx.B: Horizontal			
10									
15					COMMENTS: -Highly weathered to 7 ft.				
20									

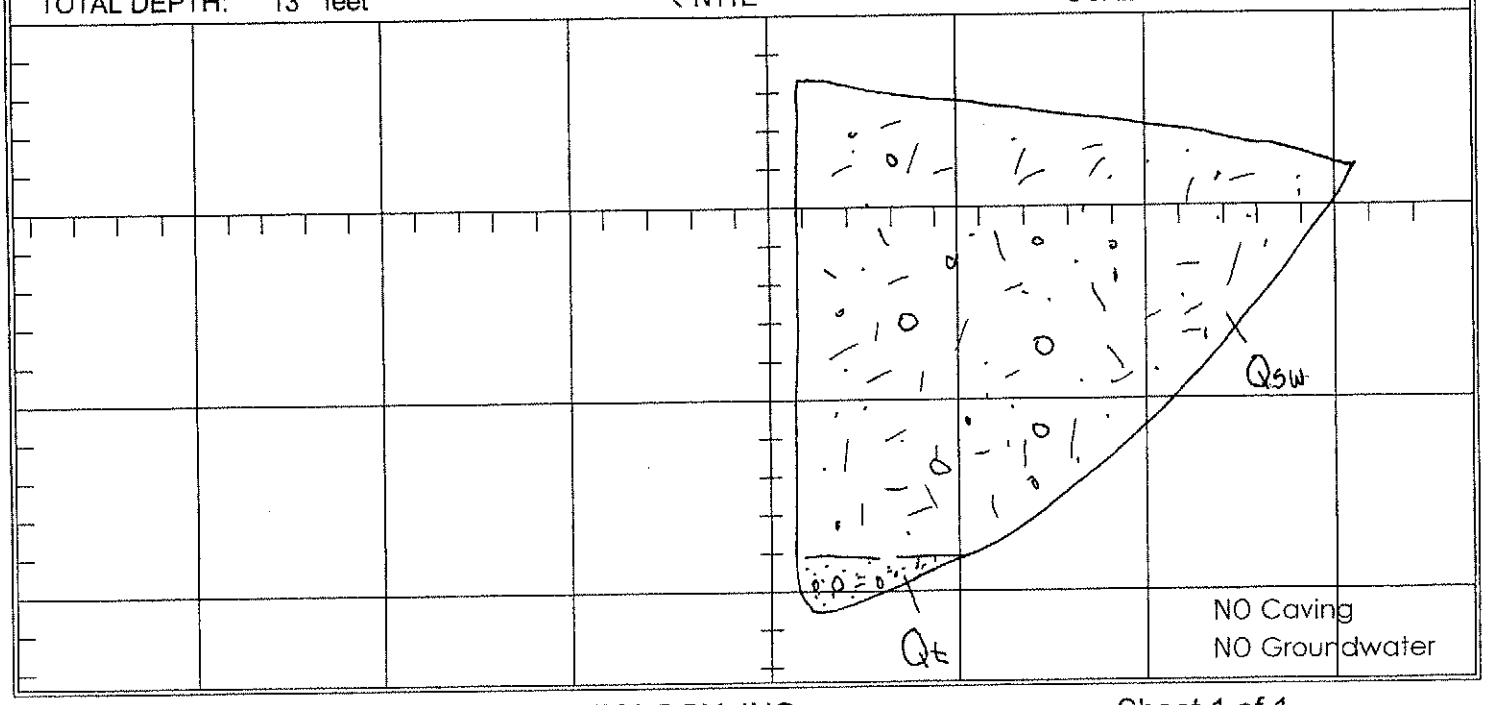
TOTAL DEPTH: 13 feet ←N60E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Co.	JOB NO: 02-1703B-1	**TRENCH LOG NO. T-32B**
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 9/12/02	
	LOGGED BY: MJD	
	EXCAVATED: 3/19/02	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1087	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SLOPEWASH; Qsw, (0-12 ft.)** @ 0' Medium-brown silty pebbly, cobbly sand; loose to firm; dry to damp; holes and roots to 10'				
5									
10					**QUATERNARY TERRACE DEPOSITS; Qt, (12-13 ft.)** @ 12' Yellowish-brown pebbly cobbly sand; loose and friable; dry; no bedding				
15									
20									

TOTAL DEPTH: 13 feet ←N11E SCALE: 1 inch = 5 feet

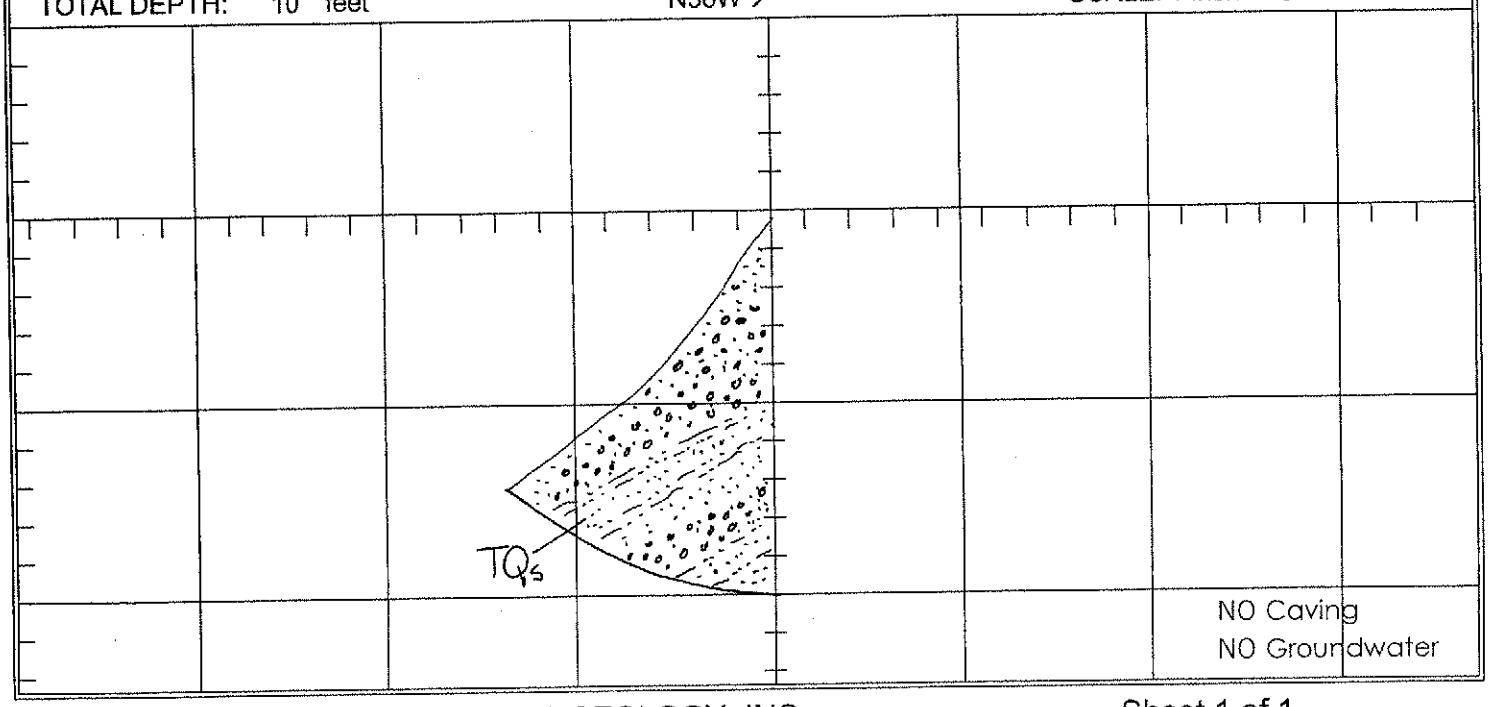


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1155SA-9	**TRENCH LOG NO. T-40SA**	
PROJECT: Evaluation of Aggregate Potential Newhall Ranch	DATE: Sept. 18, 2002		
	LOGGED BY: MJD		
	EXCAVATED: 4/9/02		
EXCAVATION METHOD: Rubber-Tired Backhoe (4WD)	ELEVATION: 1108		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SP-SM	**BEDROCK; TQs, (0-10 ft.)** @ 0' Sandstone, silty sandstone and conglomerate; moderately hard to hard; dry to damp; yellowish gray; Fe02 laminations COMMENTS: -Bulk sample from pile 0-10'	B:N79W,63SW			% fines=7.4
5									
10									
15									
20									

TOTAL DEPTH: 10 feet N58W→ SCALE: 1 inch = 5 feet

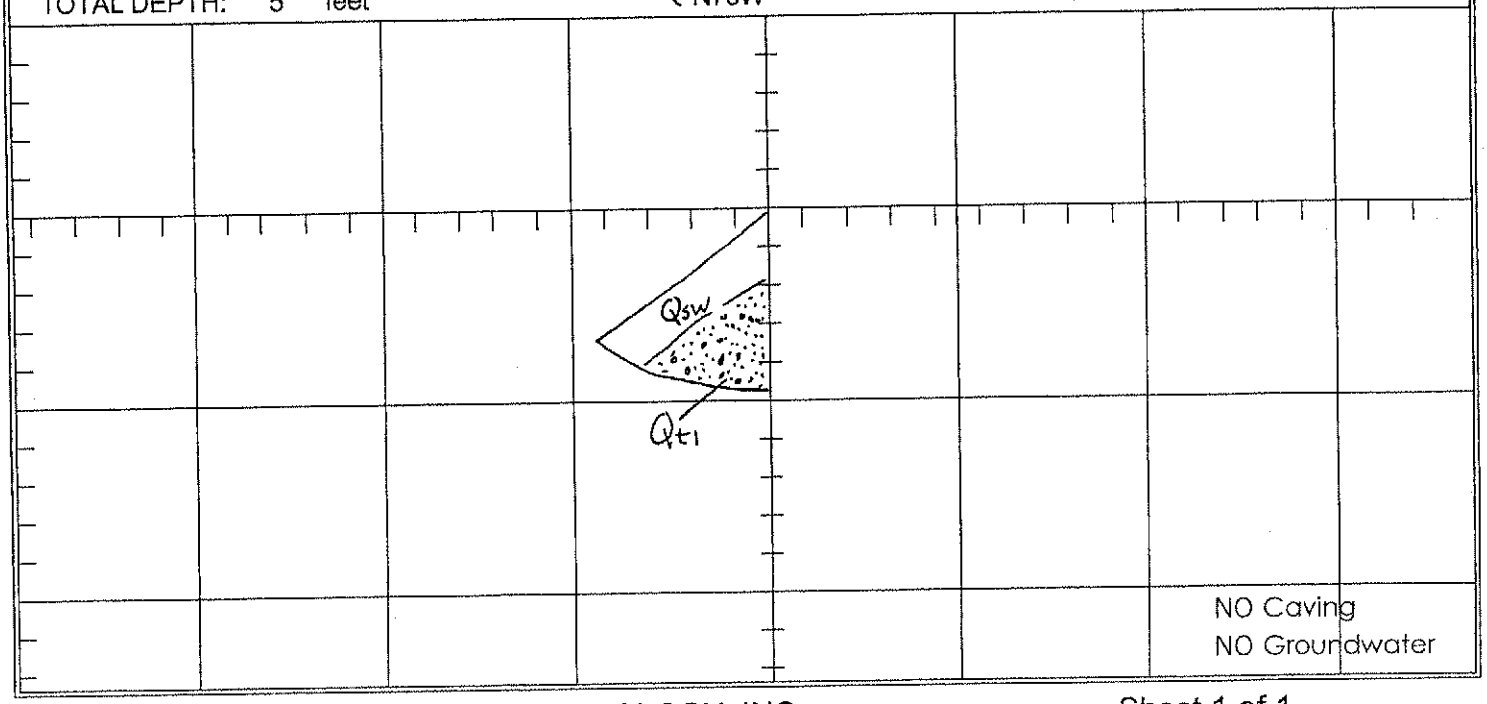


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1155SA-9	**TRENCH LOG NO. T-41SA**	
PROJECT: Evaluation of Aggregate Potential Newhall Ranch	DATE: Sept. 18, 2002		
	LOGGED BY: MJD		
	EXCAVATED: 4/9/02		
EXCAVATION METHOD: Rubber-Tired Backhoe (4WD)	ELEVATION: 1175		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SW-SM	**SLOPEWASH; Qsw, (0-2 ft.)** @ 0' Silty pebbly sand; dry to damp; light brown				% fines=9.0
					QUATERNARY TERRACE DEPOSITS; Qt1, (2-5 ft.) @ 2' Sand with gravel; damp; light yellowish gray	B:N85W,5SW			
5					COMMENTS: -Bulk sample @ 0-5'				
10									
15									
20									

TOTAL DEPTH: 5 feet ←N78W SCALE: 1 inch = 5 feet

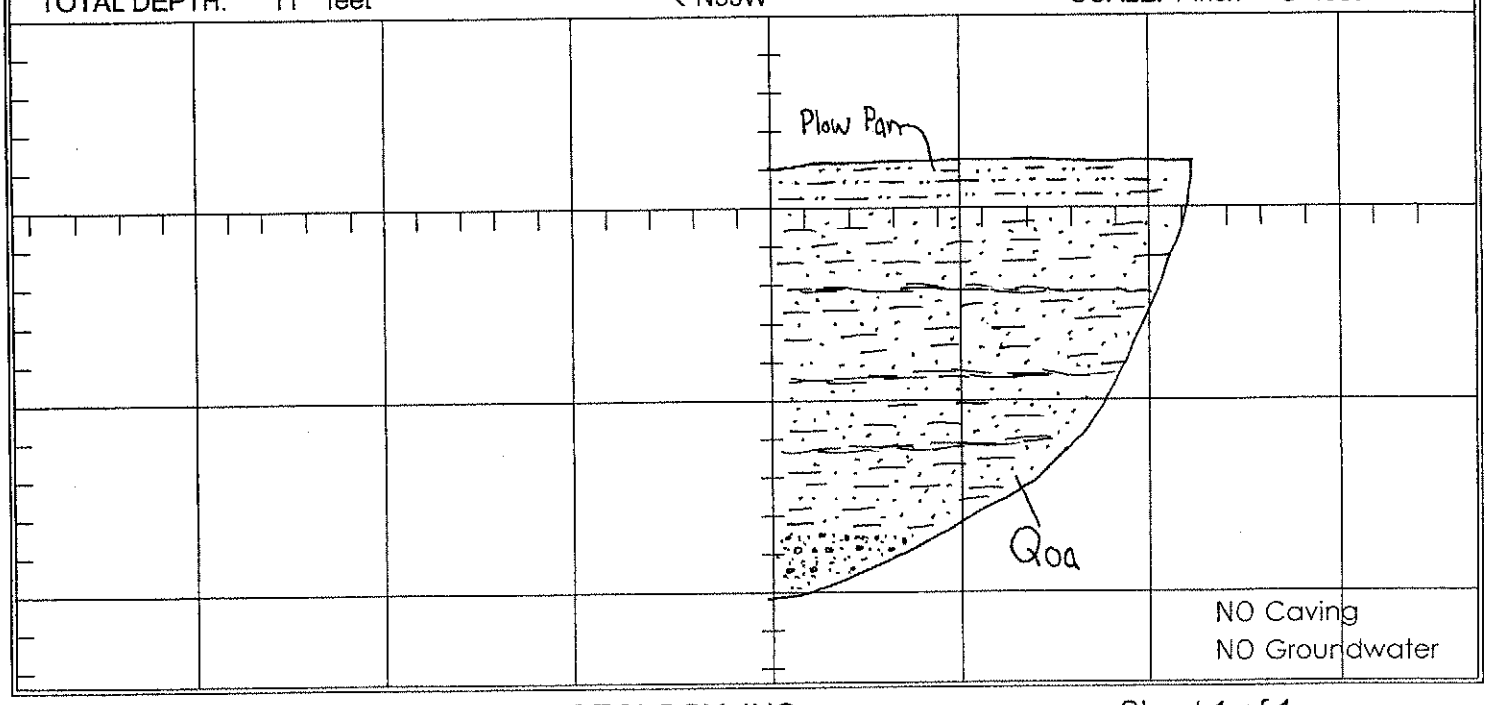


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1155SA-9	**TRENCH LOG NO. T-42SA**	
PROJECT: Evaluation of Aggregate Potential Newhall Ranch	DATE: Sept. 18, 2002		
	LOGGED BY: MJD		
	EXCAVATED: 4/9/02		
EXCAVATION METHOD: Rubber-Tired Backhoe (4WD)	ELEVATION: 1055		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**PLOW PAN, (0-1.5 ft.)** @ 0' Sandy silt; damp to moist; light to medium brown **QUATERNARY OLDER ALLUVIUM; Qoa, (1.5-11 ft.)** @ 1.5' Silt with sand; moist; dark brown				
5					@ 4' Silt with sand and clay; medium brown				
10				SP-SM	@ 9.5' Sand and silty sand with gravel; yellowish gray COMMENTS: -Bulk sample @ 10'				% fines=11.1
15									
20									

TOTAL DEPTH: 11 feet ←N55W SCALE: 1 inch = 5 feet

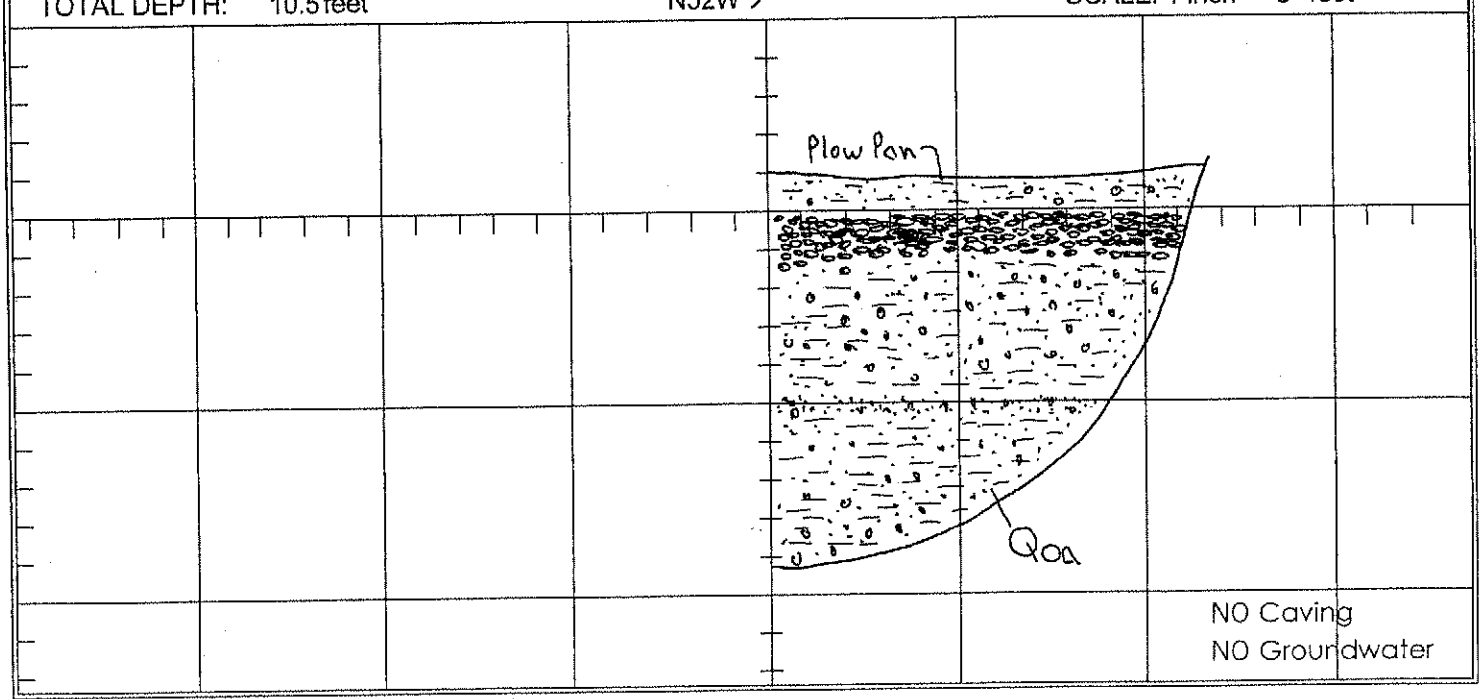


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1155SA-9	**TRENCH LOG NO. T-43SA**	
PROJECT: Evaluation of Aggregate Potential Newhall Ranch	DATE: Sept. 18, 2002		
	LOGGED BY: MJD		
	EXCAVATED: 4/9/02		
EXCAVATION METHOD: Rubber-Tired Backhoe (4WD)	ELEVATION: 1057		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**PLOW PAN; (0-1 ft.)** @ 0' Silty sand; damp to moist; light grayish brown **QUATERNARY OLDER ALLUVIUM; Qoa, (1-10.5 ft.)** @ 1' Sandy pebbly silt; moist; dark brown @ 2.5' Sandy, silty gravel; damp; grayish brown; locally clast supported				
5				SM	@ 3.5' Pebbly silty sand; dark brown @ 5.5' Interbedded sandy pebbly silt and silty sand with gravel; moist; grayish brown to medium brown; scattered cobbles				% fines=43.3
10					COMMENTS: -Bulk sample from pile @ 5-10'				
15									
20									

TOTAL DEPTH: 10.5 feet N52W→ SCALE: 1 inch = 5 feet

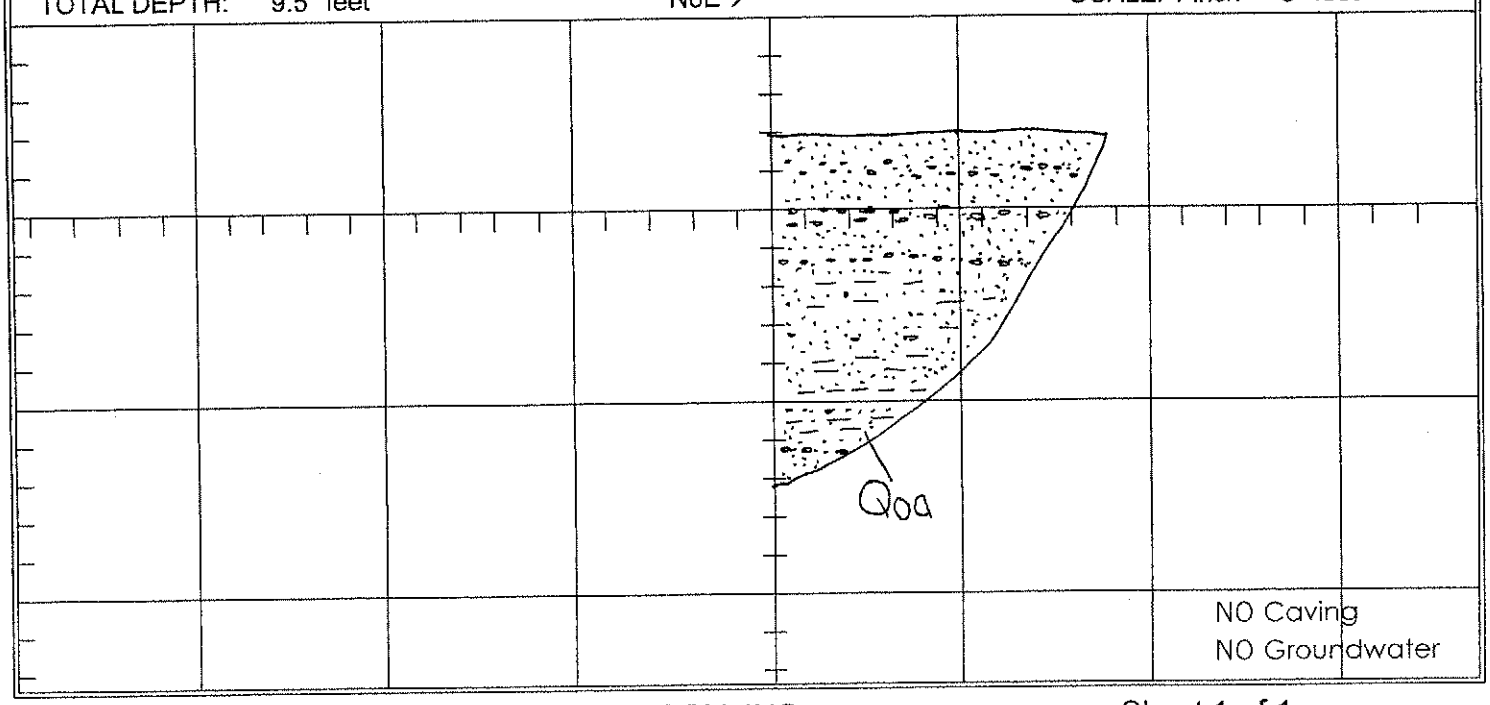


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1155SA-9	**TRENCH LOG NO. T-44SA**
PROJECT: Evaluation of Aggregate Potential Newhall Ranch	DATE: Sept. 18, 2002	
	LOGGED BY: MJD	
	EXCAVATED: 4/9/02	
EXCAVATION METHOD: Rubber-Tired Backhoe (4WD)	ELEVATION: 1123	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**QUATERNARY OLDER ALLUVIUM; Qoa, (0-9.5 ft.)**				
					@ 0' Interbedded silty sand and sand with gravel; dry to damp; yellowish gray; scattered cobbles				
				SM					% fines=13.3
5					@ 6' Interbedded silty sandy (-6"-thick); damp to moist; yellowish brown				
10					COMMENTS: -Bulk sample @ 4'				
15									
20									

TOTAL DEPTH: 9.5 feet N6E→ SCALE: 1 inch = 5 feet

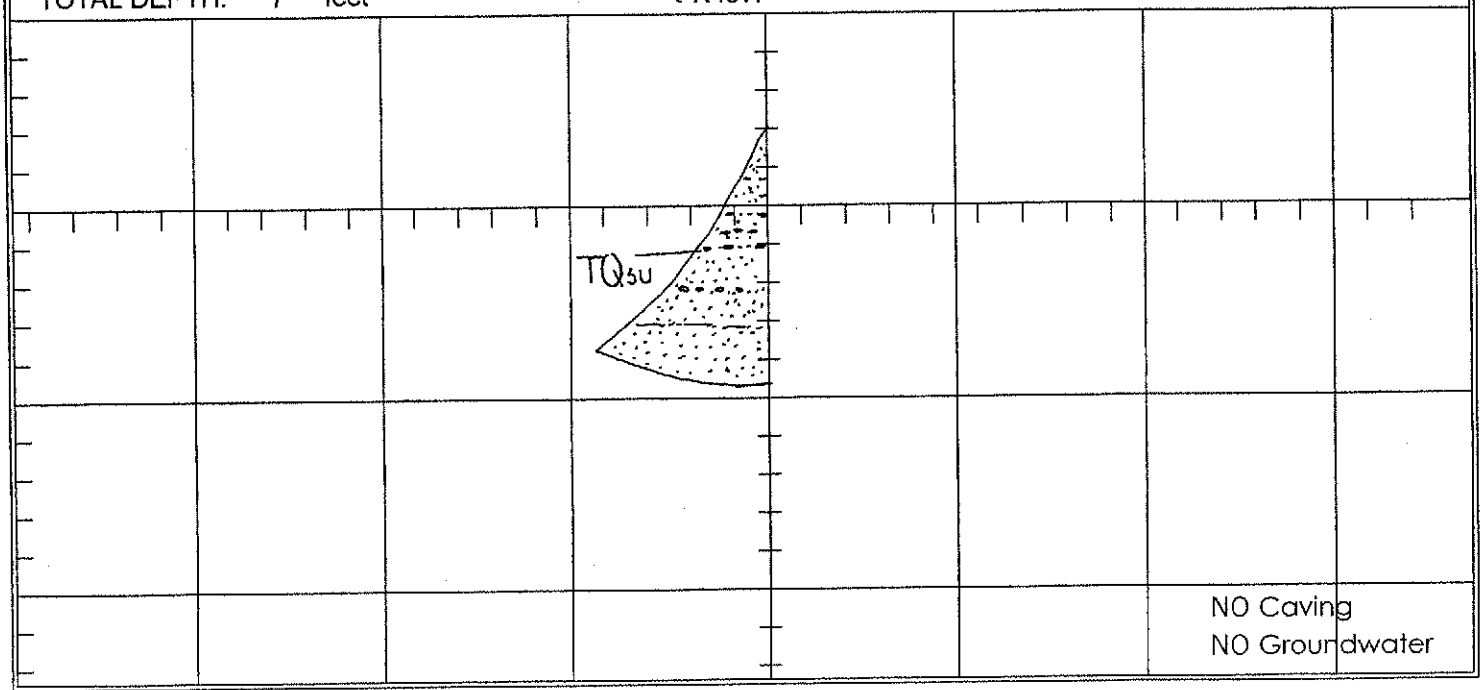


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1155SA-9	**TRENCH LOG NO. T-45SA**	
PROJECT: Evaluation of Aggregate Potential Newhall Ranch	DATE: Sept. 18, 2002		
	LOGGED BY: MJD		
	EXCAVATED: 4/9/02		
EXCAVATION METHOD: Rubber-Tired Backhoe (4WD)	ELEVATION: 1150		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**BEDROCK; TQsu, (0-7 ft.)** @ 0' Silty sandstone and pebbly sandstone; moderately hard; slightly friable; dry to moist; yellowish gray; well bedded; Fe02 laminations				
5				SP-SM		B:N28W,23NE			% fines=7.1
					COMMENTS: -Bulk sample @ 5'				
10									
15									
20									

TOTAL DEPTH: 7 feet ←N48W SCALE: 1 inch = 5 feet



ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

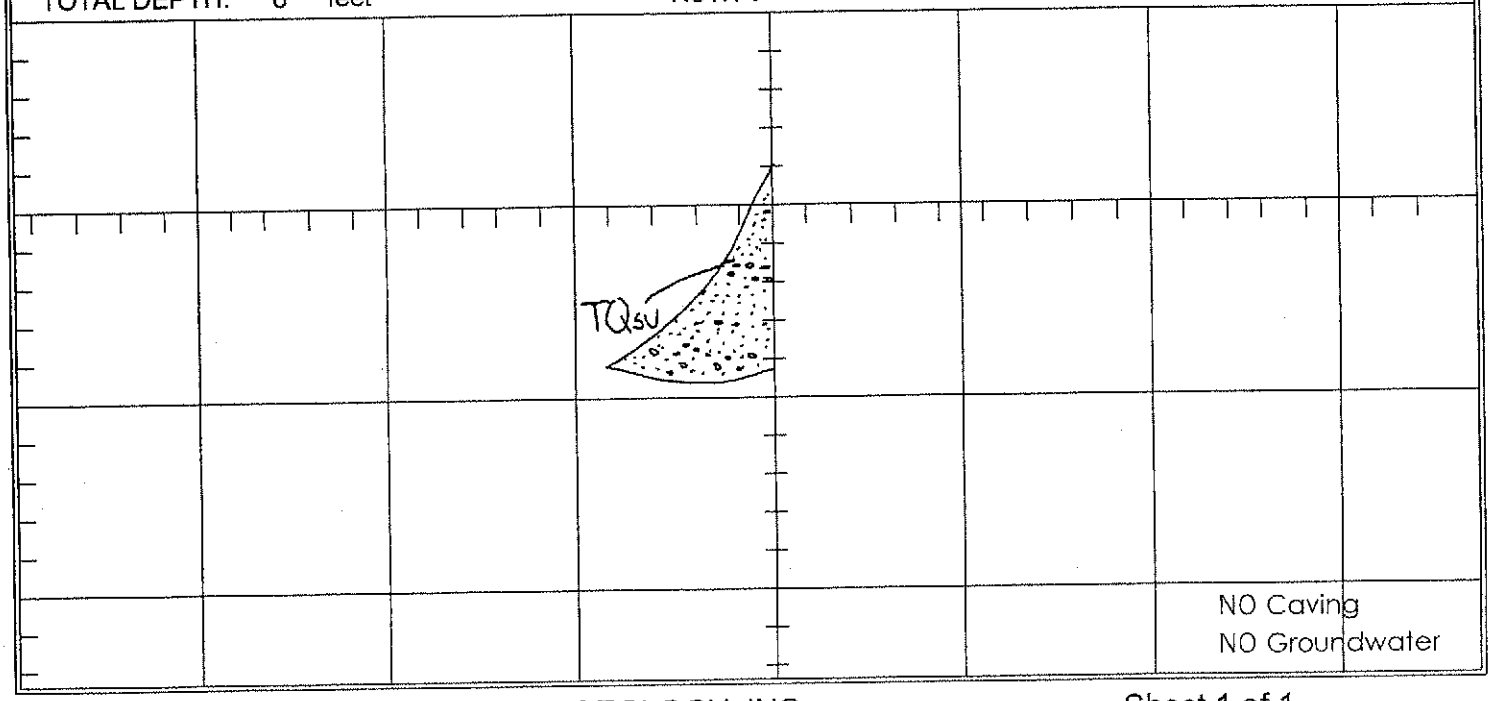
CLIENT: Newhall Ranch Co.	JOB NO: 02-1155SA-9	**TRENCH LOG NO. T-46SA**	
PROJECT: Evaluation of Aggregate Potential Newhall Ranch	DATE: Sept. 18, 2002		
	LOGGED BY: MJD		
	EXCAVATED: 4/9/02		
EXCAVATION METHOD: Rubber-Tired Backhoe (4WD)	ELEVATION: 1108		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**BEDROCK; TQsu, (0-6 ft.)** @ 0' Silty sandstone and pebbly sandstone; moderately hard; slightly friable; dry to moist; yellowish gray; well bedded; Fe02 laminations				
5				SP-SM		B:N64W,14NE			% fines=10.4
10									
15									
20									

TOTAL DEPTH: 6 feet

N64W→

SCALE: 1 inch = 5 feet



NO Caving
NO Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

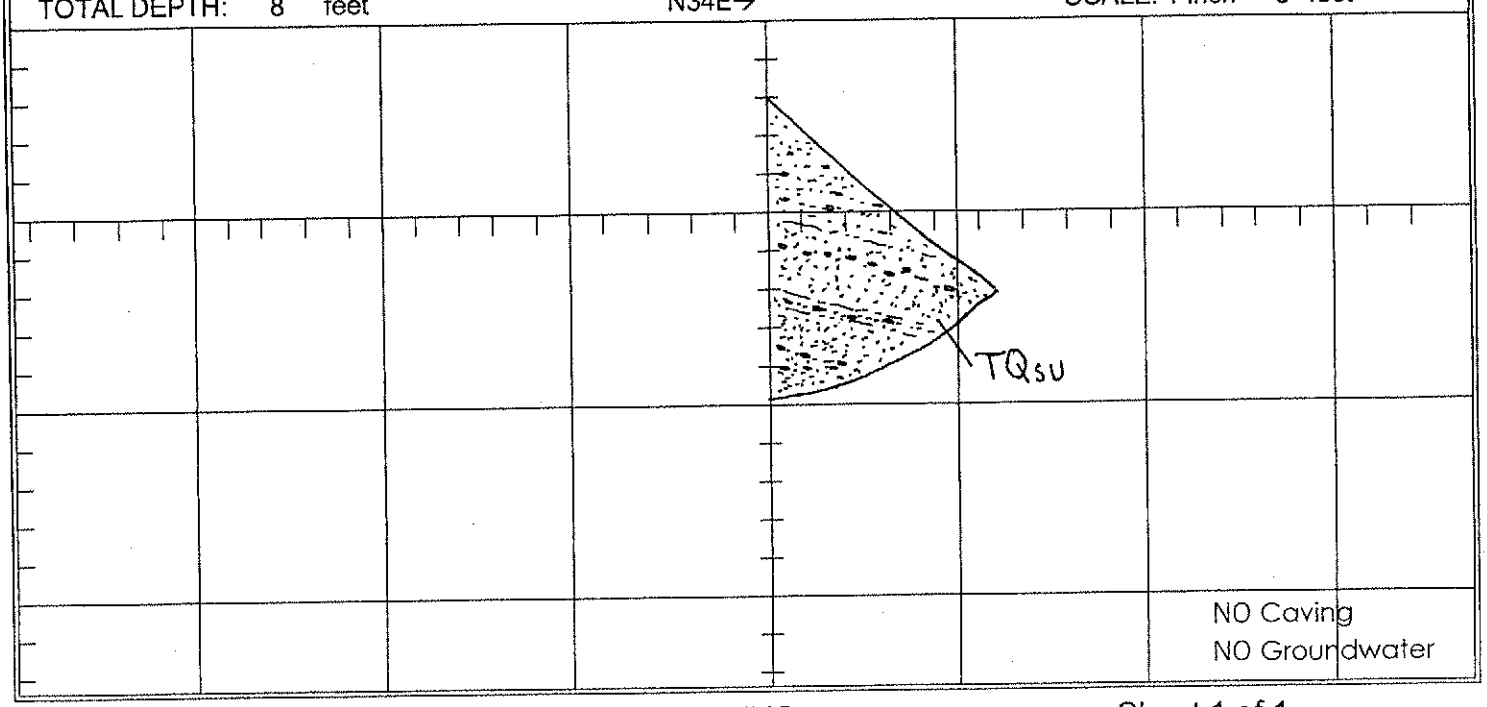
CLIENT: Newhall Ranch Co.	JOB NO: 02-1155SA-9	**TRENCH LOG NO. T-47SA**	
PROJECT: Evaluation of Aggregate Potential Newhall Ranch	DATE: Sept. 18, 2002		
	LOGGED BY: MJD		
	EXCAVATED: 4/9/02		
EXCAVATION METHOD: Rubber-Tired Backhoe (4WD)	ELEVATION: 1168		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**BEDROCK; TQsu, (0-8 ft.)** @ 0' Silty sandstone and pebbly sandstone; moderately hard; slightly friable; dry to moist; yellowish gray; well bedded; Fe02 laminations				
5				SP-SM		B:N50W,16NE			% fines=11.0
10					COMMENTS: -Bulk sample 5'				
15									
20									

TOTAL DEPTH: 8 feet

N34E→

SCALE: 1 inch = 5 feet

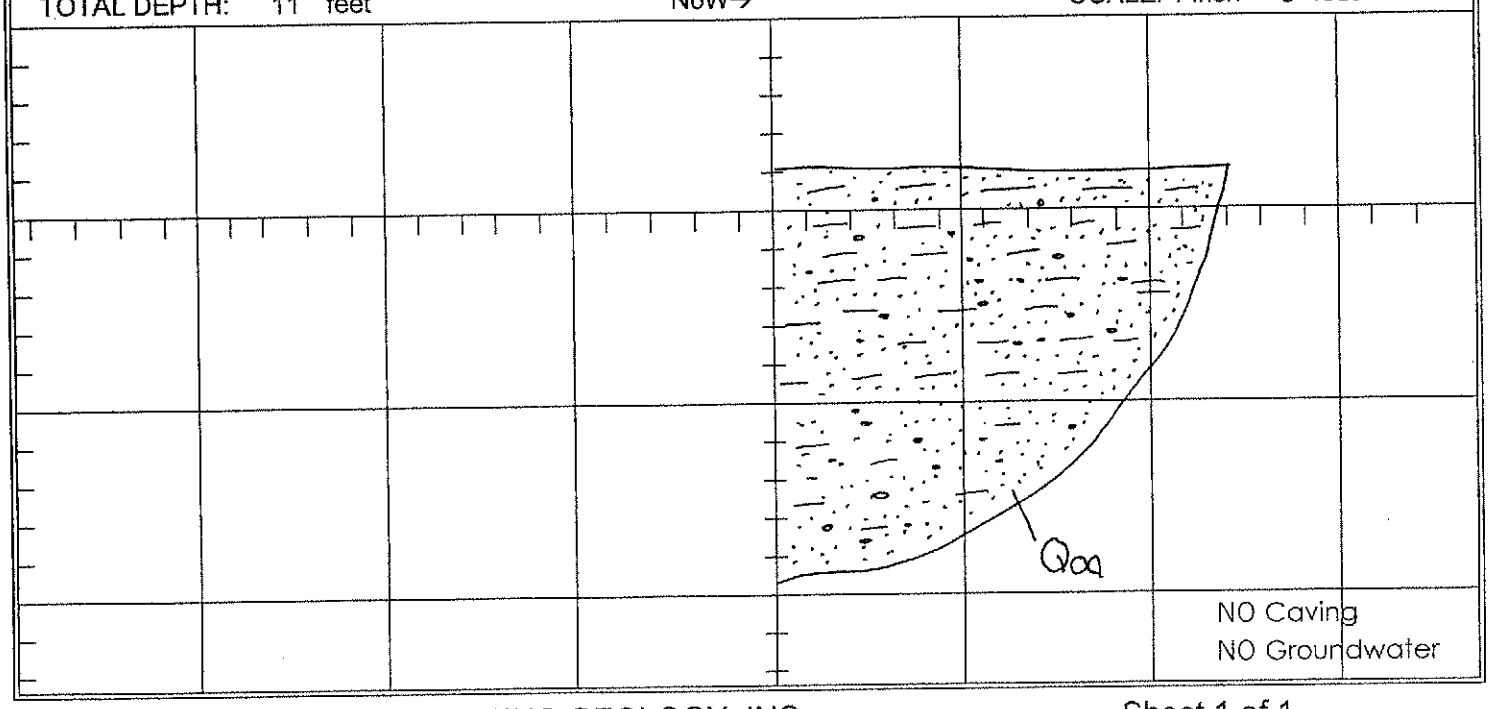


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1155SA-9	**TRENCH LOG**	
PROJECT: Evaluation of Aggregate Potential Newhall Ranch	DATE: Sept. 18, 2002	**NO. T-48SA**	
	LOGGED BY: MJD		
	EXCAVATED: 4/9/02		
EXCAVATION METHOD: Rubber-Tired Backhoe (4WD)	ELEVATION: 1083		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**QUATERNARY OLDER ALLUVIUM; Qoa, (0-11 ft.)** @ 0' Sandy silt/silty sand with gravel; damp to moist; medium to dark brown				
5					@ 6' Silty sand with gravel; moist; medium brown to yellowish brown				
				SM					% fines=34.0
10					COMMENTS: -Bulk sample @ 9' -Top 1' Plow Pan				
15									
20									

TOTAL DEPTH: 11 feet N6W→ SCALE: 1 inch = 5 feet

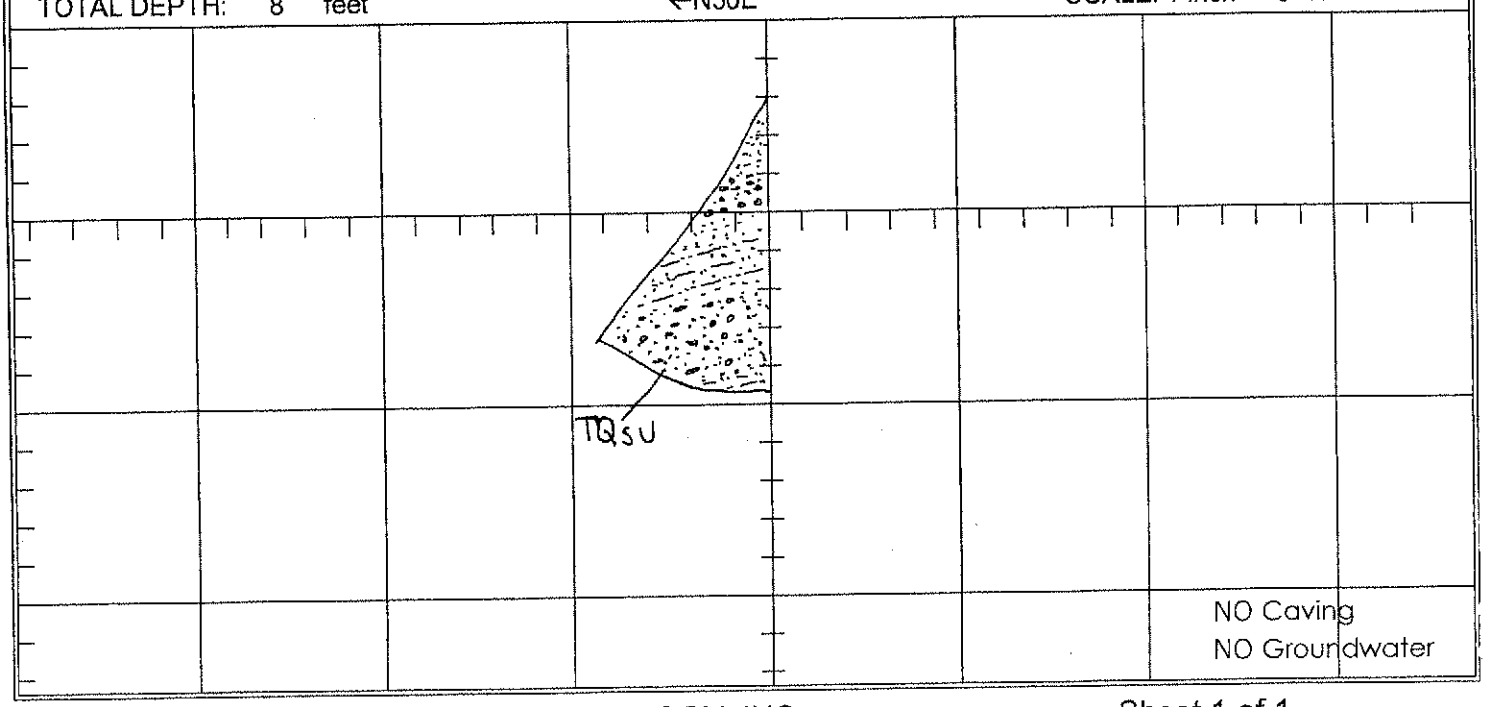


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1155SA-9	**TRENCH LOG NO. T-49SA**	
PROJECT: Evaluation of Aggregate Potential Newhall Ranch	DATE: Sept. 18, 2002		
	LOGGED BY: MJD		
	EXCAVATED: 4/9/02		
EXCAVATION METHOD: Rubber-Tired Backhoe (4WD)	ELEVATION: 1080		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SP	**BEDROCK; TQsu, (0-8 ft.)** @ 0' Sandstone and pebbly sandstone; moderately hard; slightly friable; dry to moist; yellowish gray; well bedded; Fe02 laminations	B:N43W,20NE			% fines=3.1
5									
10					COMMENTS: -Bulk sample off pile @ 0-8'				
15									
20									

TOTAL DEPTH: 8 feet ←N50E SCALE: 1 inch = 5 feet

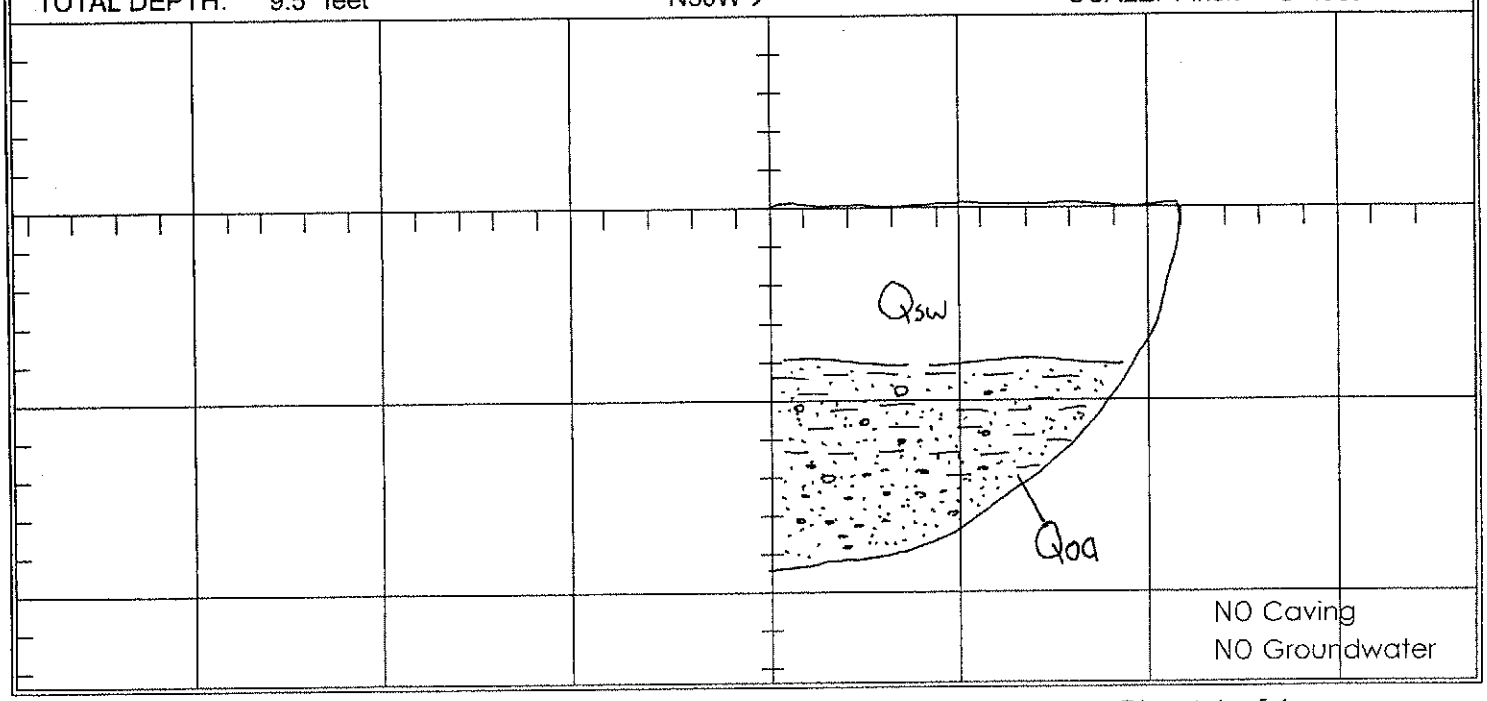


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1155SA-9	**TRENCH LOG NO. T-50SA**	
PROJECT: Evaluation of Aggregate Potential Newhall Ranch	DATE: Sept. 18, 2002		
	LOGGED BY: MJD		
	EXCAVATED: 4/9/02		
EXCAVATION METHOD: Rubber-Tired Backhoe (4WD)	ELEVATION: 1025		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SLOPEWASH; Qsw, (0-4 ft.)** @ 0' Sandy, pebbly silt; dry to damp; grayish brown; scattered cobbles; roots/voids				
5					**QUATERNARY OLDER ALLUVIUM; Qoa, (4-9.5 ft.)** @ 4' Silty, pebbly sand; damp; yellowish brown; scattered cobbles; no bedding observed @ 6.5' Silty sand with gravel; yellowish gray; scattered cobbles; vaguely bedded				
				SM					% fines=16.0
10					COMMENTS: -Bulk sample @ 8'				
15									
20									

TOTAL DEPTH: 9.5 feet N30W→ SCALE: 1 inch = 5 feet



ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

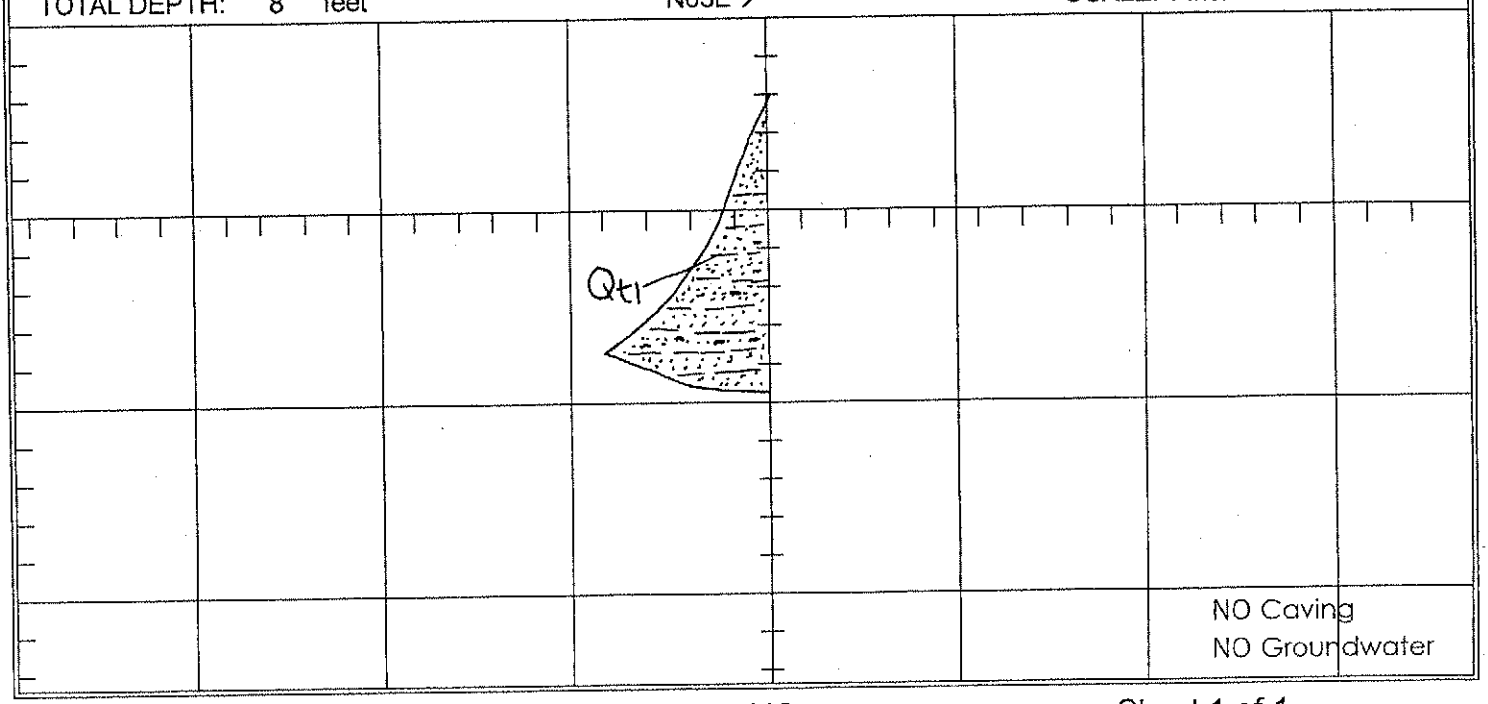
CLIENT: Newhall Ranch Co.	JOB NO: 02-1155SA-9	**TRENCH LOG NO. T-51SA**	
PROJECT: Evaluation of Aggregate Potential Newhall Ranch	DATE: Sept. 18, 2002		
	LOGGED BY: MJD		
	EXCAVATED: 4/9/02		
EXCAVATION METHOD: Rubber-Tired Backhoe (4WD)	ELEVATION: 1140		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SM	**QUATERNARY TERRACE DEPOSITS; Qt1, (0-8 ft.)** @ 0' Interbedded sand and silty sand; dry to damp; light yellowish brown; locally pebbly				% fines=48.4
5									
10					COMMENTS: -Bulk sample off pile @ 0-8'				
15									
20									

TOTAL DEPTH: 8 feet

N63E→

SCALE: 1 inch = 5 feet

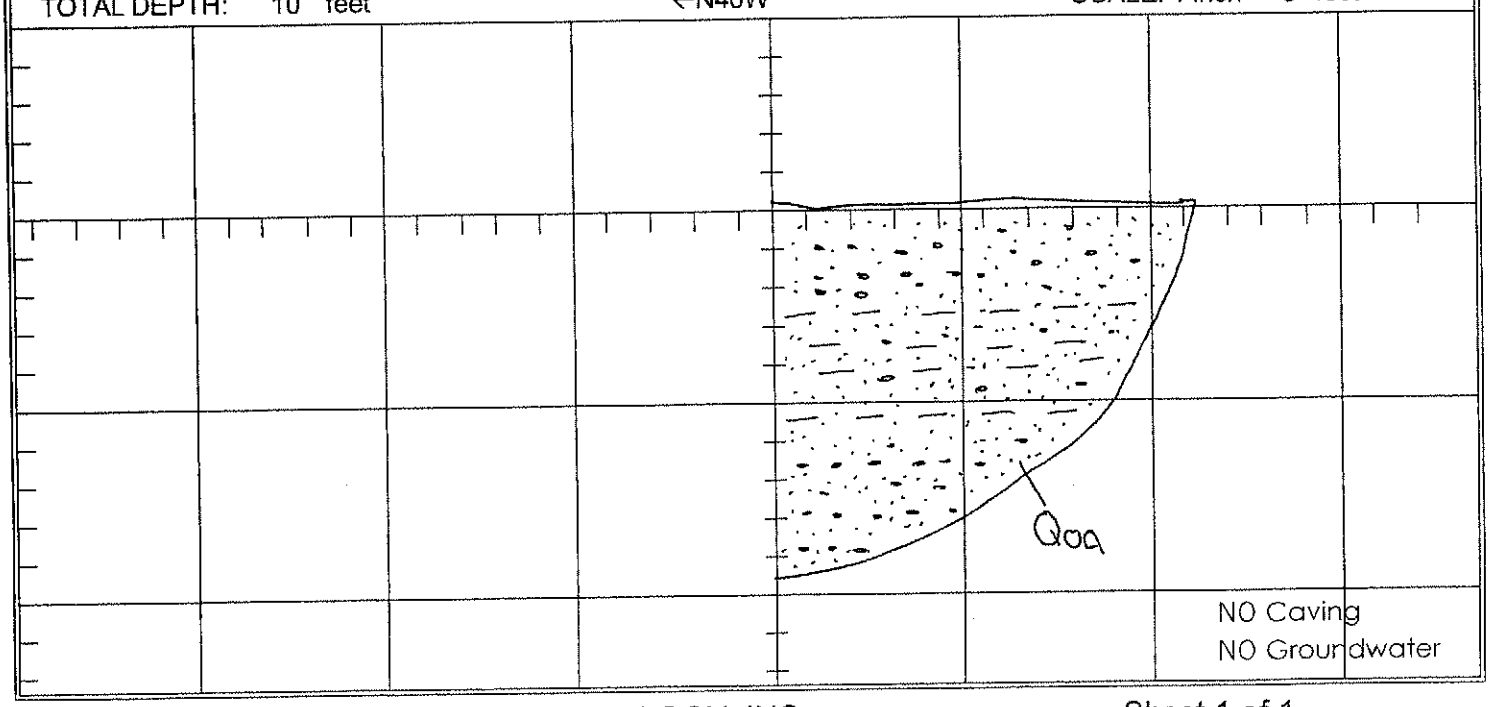


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1155SA-9	**TRENCH LOG NO. T-52SA**	
PROJECT: Evaluation of Aggregate Potential Newhall Ranch	DATE: Sept. 18, 2002		
	LOGGED BY: MJD		
	EXCAVATED: 4/9/02		
EXCAVATION METHOD: Rubber-Tired Backhoe (4WD)	ELEVATION: 1003		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**QUATERNARY OLDER ALLUVIUM; Qoa, (0-10 ft.)**				
					@ 0' Sand with gravel; dry to damp; yellowish gray; scattered cobbles				
					@ 3' Silty sand with gravel; moist; medium brown; scattered cobbles				
5					@ 6' Silty sand with gravel; yellowish gray				
				SM					% fines=48.4
10					COMMENTS: -Bulk sample @ 9'				
15									
20									

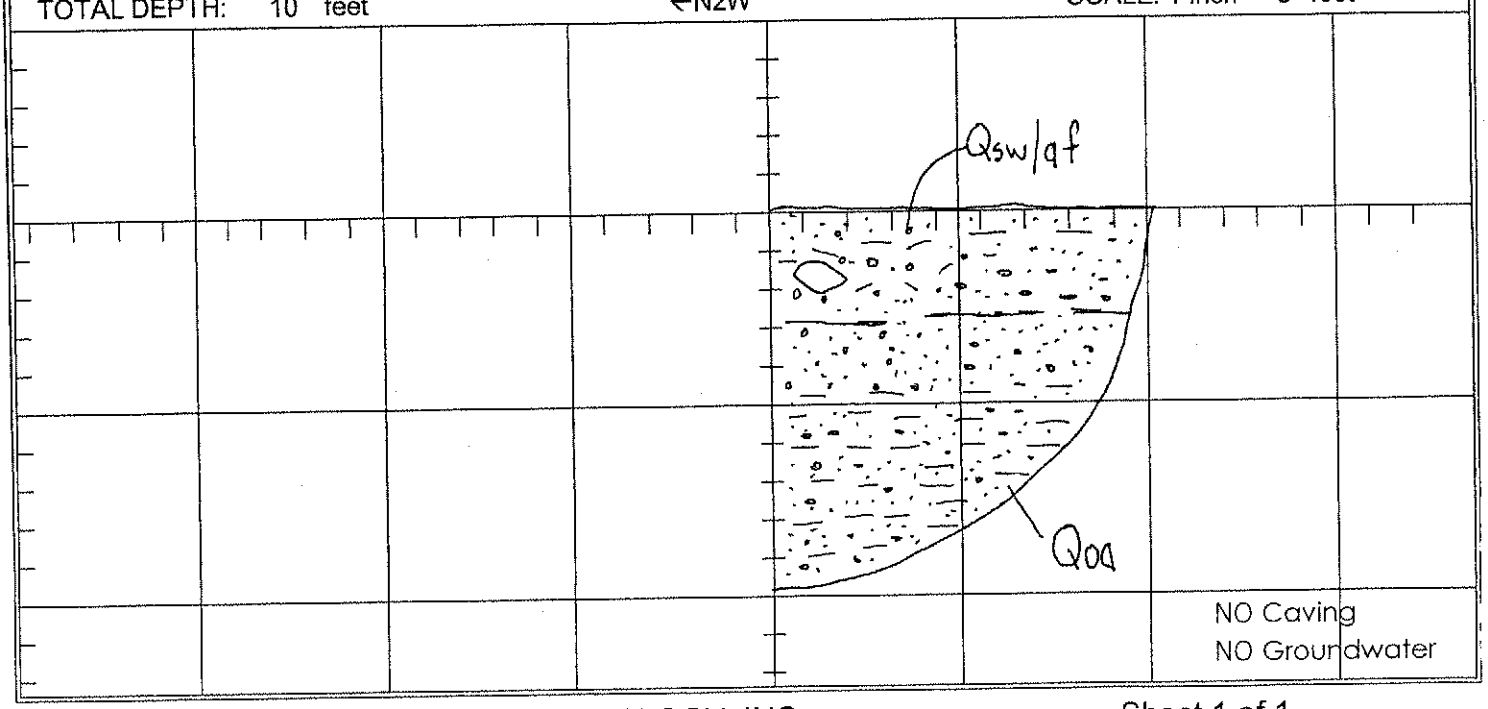
TOTAL DEPTH: 10 feet ←N40W SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Co.	JOB NO: 02-1155SA-9	**TRENCH LOG NO. T-53SA**	
PROJECT: Evaluation of Aggregate Potential Newhall Ranch	DATE: Sept. 18, 2002		
	LOGGED BY: MJD		
	EXCAVATED: 4/9/02		
EXCAVATION METHOD: Rubber-Tired Backhoe (4WD)	ELEVATION: 1037		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0				SM	**SLOPEWASH/ARTIFICIAL FILL; Qsw/af, (0-3 ft.)** @ 0' Silty, pebbly sand; dry to damp; medium brown; no bedding; scattered cobbles and boulders **QUATERNARY OLDER ALLUVIUM; Qoa, (3-10 ft .)** @ 3' Sand with gravel; damp; yellowish gray @ 5' Silty sand with gravel; medium brown to yellowish brown COMMENTS: -Bulk sample off pile @ 0-10'				% fines=28.3
5									
10									
15									
20									

TOTAL DEPTH: 10 feet ←N2W SCALE: 1 inch = 5 feet

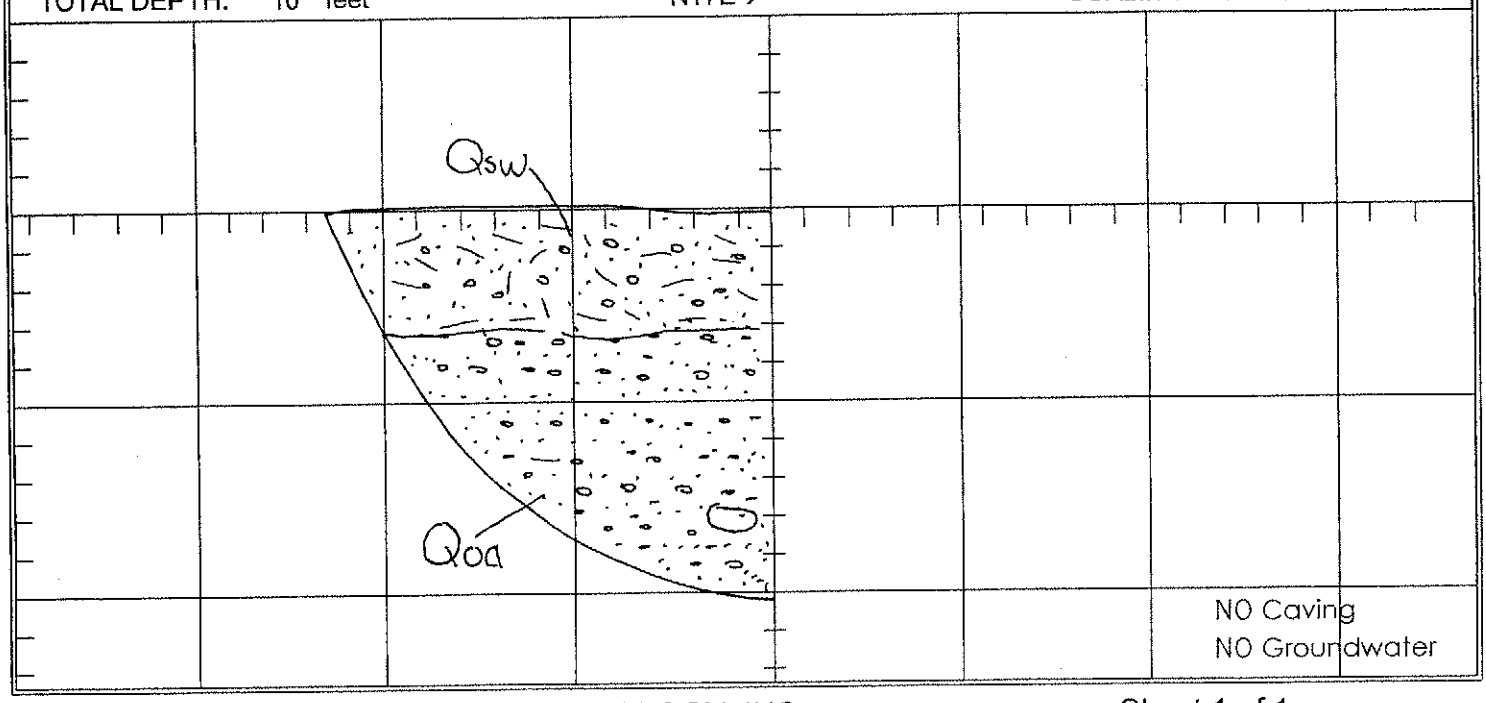


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1155SA-9	**TRENCH LOG NO. T-54SA**	
PROJECT: Evaluation of Aggregate Potential Newhall Ranch	DATE: Sept. 18, 2002		
	LOGGED BY: MJD		
	EXCAVATED: 4/9/02		
EXCAVATION METHOD: Rubber-Tired Backhoe (4WD)	ELEVATION: 1094		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SLOPEWASH; Qsw, (0-3 ft.)** @ 0' Silty sand with gravel; dry to damp; medium brown; scattered cobbles				
					QUATERNARY OLDER ALLUVIUM; Qoa, (3-10 ft.) @ 3' Silty sand with gravel and cobbles; damp; yellowish gray; scattered boulders				
5				SM					% fines=15.5
10					COMMENTS: -Bulk sample @ 5'				
15									
20									

TOTAL DEPTH: 10 feet N17E→ SCALE: 1 inch = 5 feet

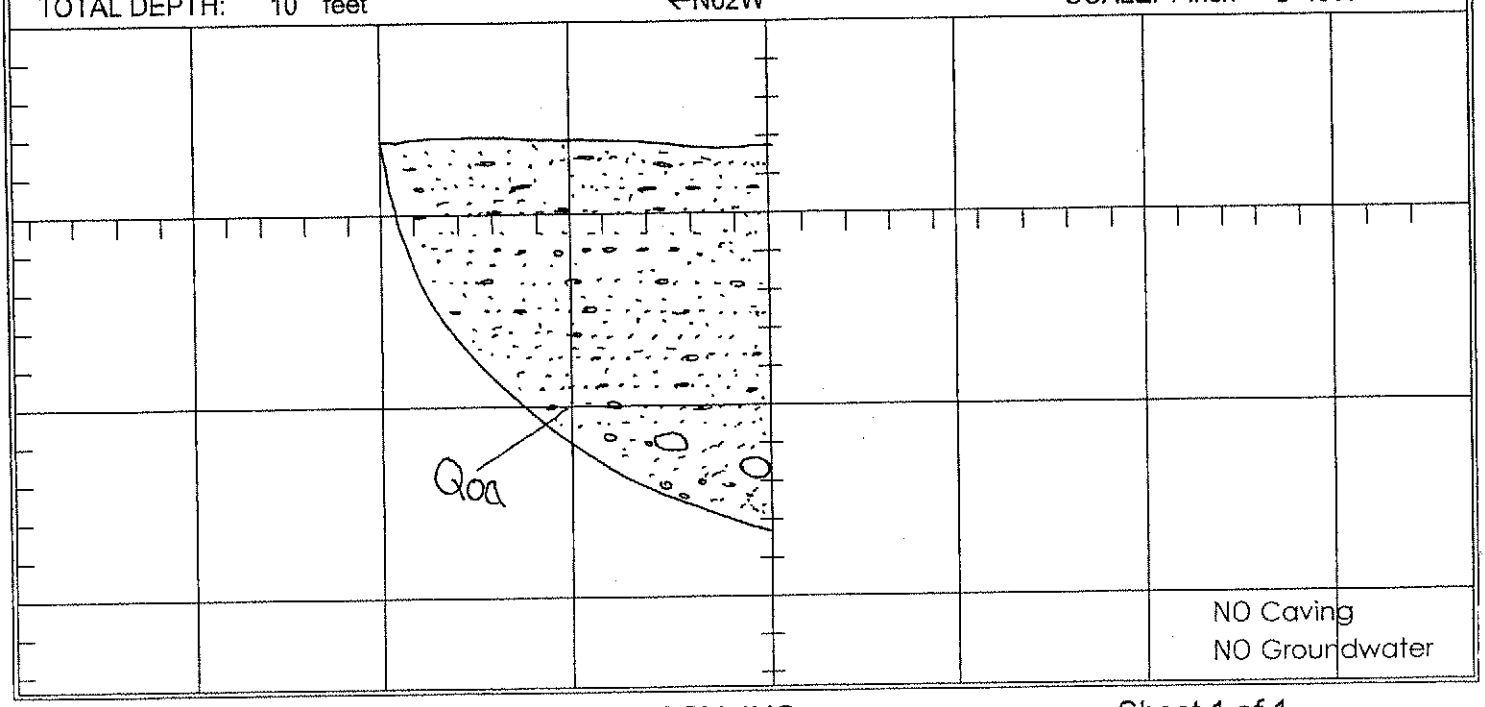


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 02-1155SA-9	**TRENCH LOG NO. T-55SA**	
PROJECT: Evaluation of Aggregate Potential Newhall Ranch	DATE: Sept. 18, 2002		
	LOGGED BY: MJD		
	EXCAVATED: 4/9/02		
EXCAVATION METHOD: Rubber-Tired Backhoe (4WD)	ELEVATION: 1067		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**QUATERNARY OLDER ALLUVIUM; Qoa, (0-10 ft.)**				
					@ 0' Sand with gravel; dry to moist; yellowish gray; scattered cobbles				
				SW-SM					% fines=5.5
5									
					@ 7' - scattered boulders				
10									
					COMMENTS: -Bulk sample @ 4'				
15									
20									

TOTAL DEPTH: 10 feet ←N62W SCALE: 1 inch = 5 feet



ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

JOB NO. 00-1155I-1

LOGGED BY MJD

Trench Log No. T-42I

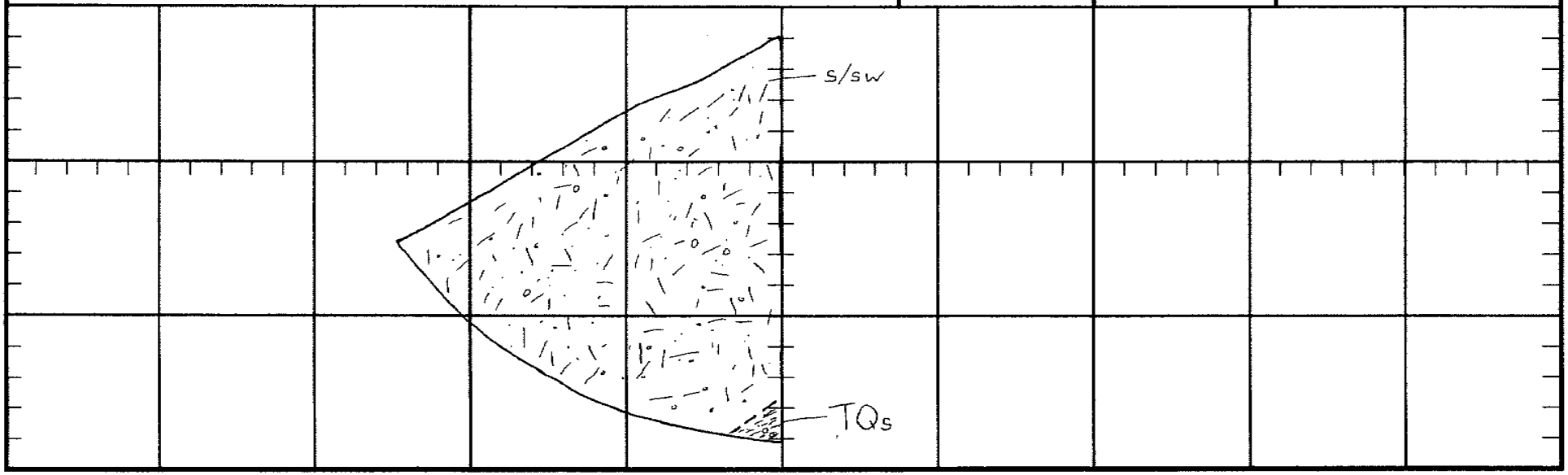
PROJECT Newhall Ranch Infrastructure - Phase I

DATE

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 12' SOIL/SLOPEWASH; s/sw, Light to medium brown silt to sandy silt with scattered pebbles; soft to firm; dry to slightly damp 12 - 13' BEDROCK; TQs, Medium brownish-gray siltstone with few scattered pebbles/cobbles; moderately hard; slightly damp			No Ground Water No Caving TOTAL DEPTH 13 Ft.

SCALE 1" = 5'

N 1 W



ALLAN E. SEWARD

JOB NO. 00-1155I-1

LOGGED BY MJD

Trench Log No. T-43I

PROJECT Newhall Ranch Infrastructure - Phase I

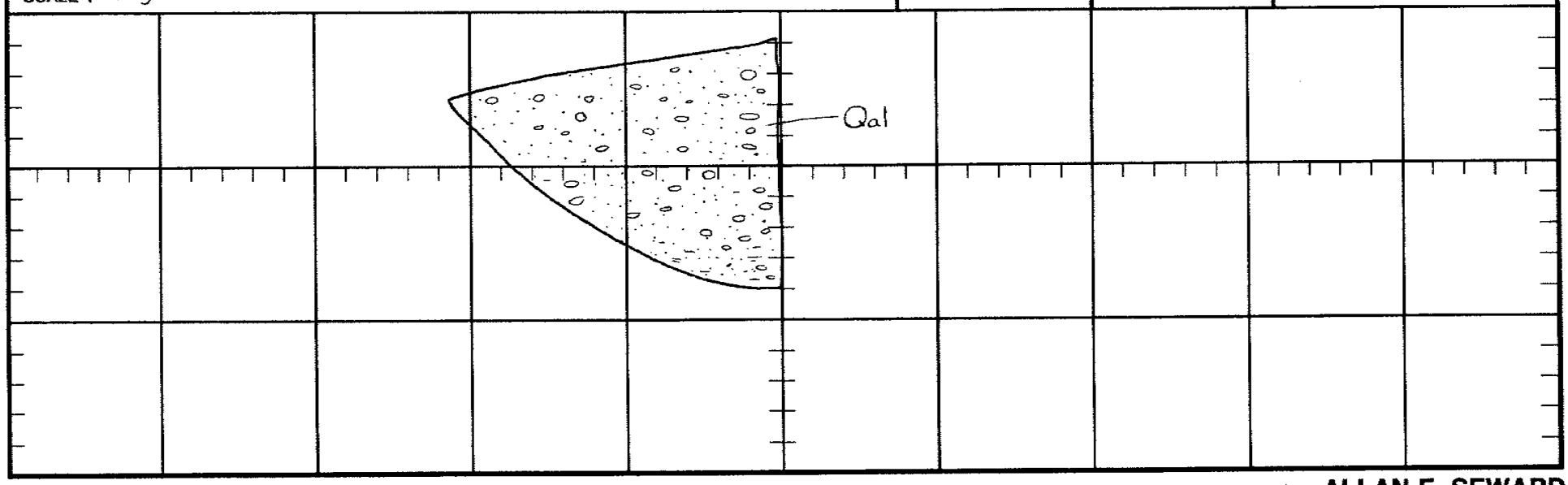
DATE

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 7 Ft. ALLUVIUM: Qal, Medium grayish-brown silt to coarse-grained sand with pebbles to medium cobbles; soft; loose; slightly damp to damp	horizontal		Bottom 2' siltier No Ground Water No Caving

SCALE 1" = 5'

N 72 W

TOTAL DEPTH 7 Ft.



ALLAN E. SEWARD

JOB NO. 00-1155I-1

LOGGED BY MJD

Trench Log No. T-44I

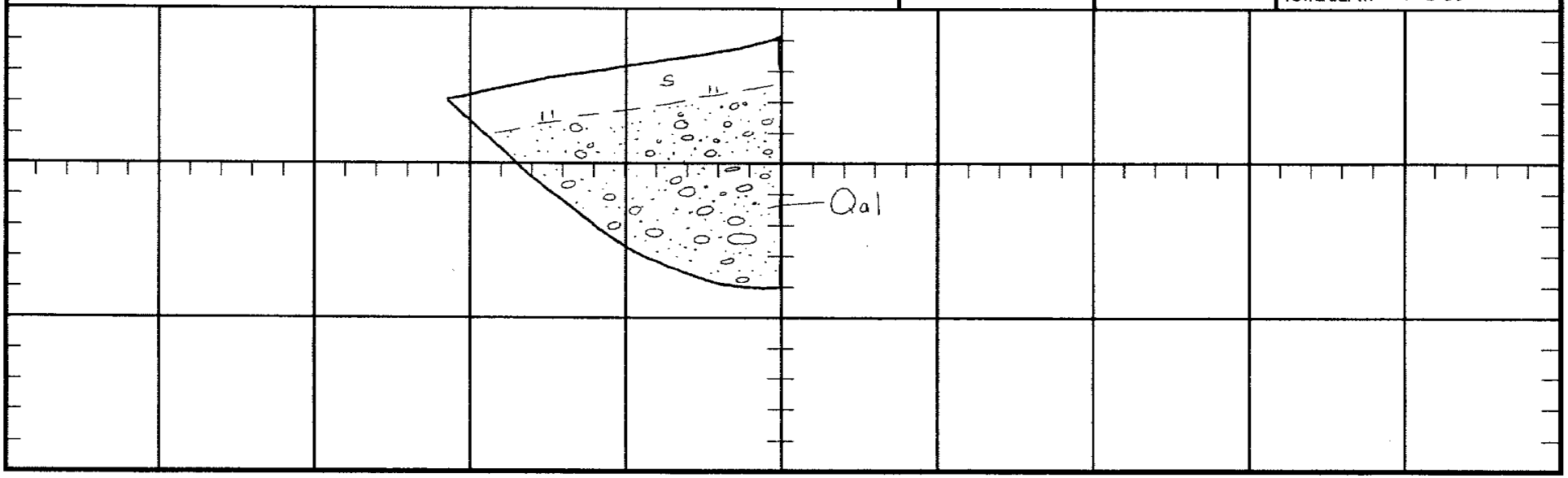
PROJECT Newhall Ranch Infrastructure - Phase I

DATE

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1.5' SOIL; s, Medium brown silt; soft; dry 1.5 - 8' ALLUVIUM; Qal, Medium grayish-brown silt to coarse-grained sand with pebbles to small boulders; soft to loose; slightly damp to damp	horizontal		No Ground Water No Caving TOTAL DEPTH 8 Ft.

SCALE 1" = 5'

Due W



ALLAN E. SEWARD

JOB NO. 00-1155I-1

LOGGED BY DGG

Trench Log No. T-45I

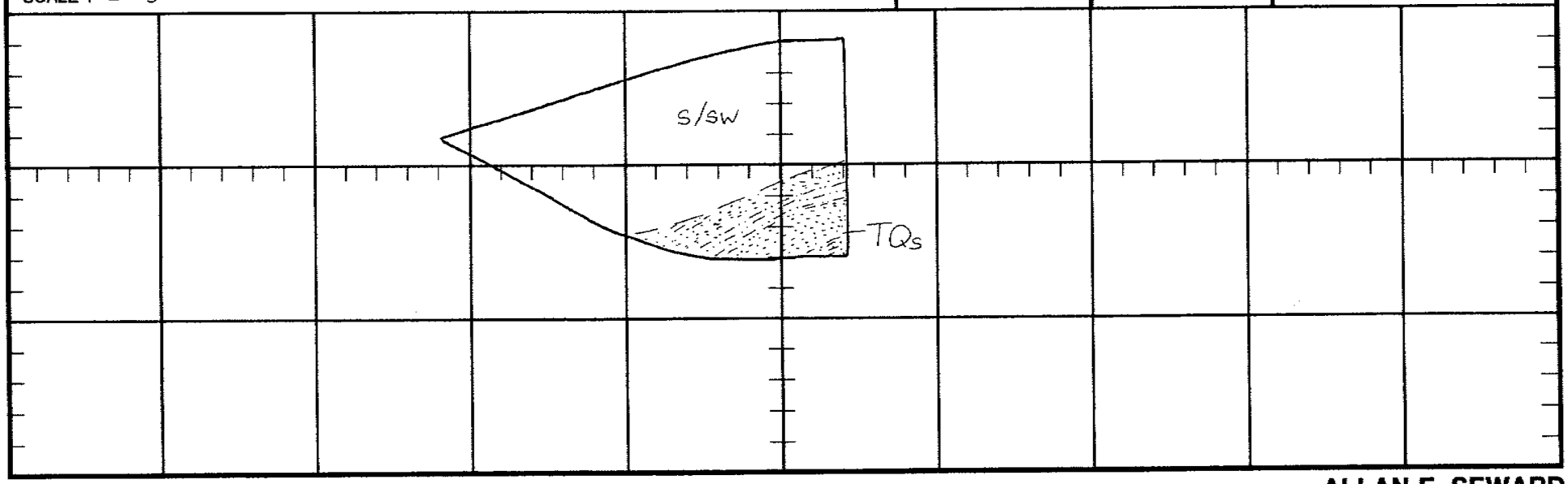
PROJECT Newhall Ranch Infrastructure - Phase I

DATE

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4.5' SOIL/SLOPEWASH; s/sw, Medium brown silt; soft to firm; slightly damp 4.5 - 7' BEDROCK; TQs, Medium brown to grayish-brown siltstone and light gray fine- to coarse-grained sandstone with scattered pebbles; slightly hard to moderately hard; slightly damp	B:N35W,25NE		No Ground Water No Caving TOTAL DEPTH 7 Ft.

SCALE 1" = 5'

N 29 E



ALLAN E. SEWARD

JOB NO. 00-1155I-1

LOGGED BY DGG

Trench Log No. T-46I

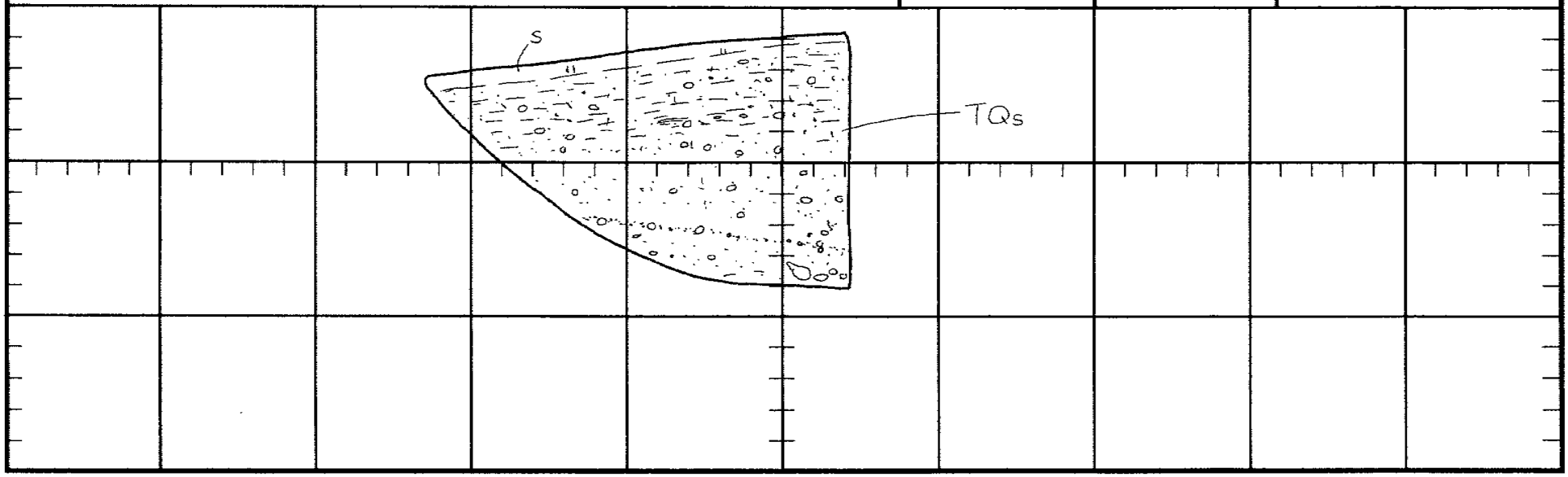
PROJECT Newhall Ranch Infrastructure - Phase I

DATE

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3" SOIL; s, Light brown silt; firm; dry 3" - 8' BEDROCK; TQs, Yellowish-brown siltstone and yellowish-gray to yellowish-brown fine- to coarse-grained sandstone and pebbly sandstone with scattered cobbles; slightly hard; dry to slightly damp	B:N45W,28NE apx.		Highly weathered down to 8 ft. No Ground Water No Caving TOTAL DEPTH 8 Ft.

SCALE 1" = 5'

N 8 W



ALLAN E. SEWARD

JOB NO. 00- 1155I-1

LOGGED BY DGG

Trench Log No. T-47I

PROJECT Newhall Ranch Infrastructure - Phase I

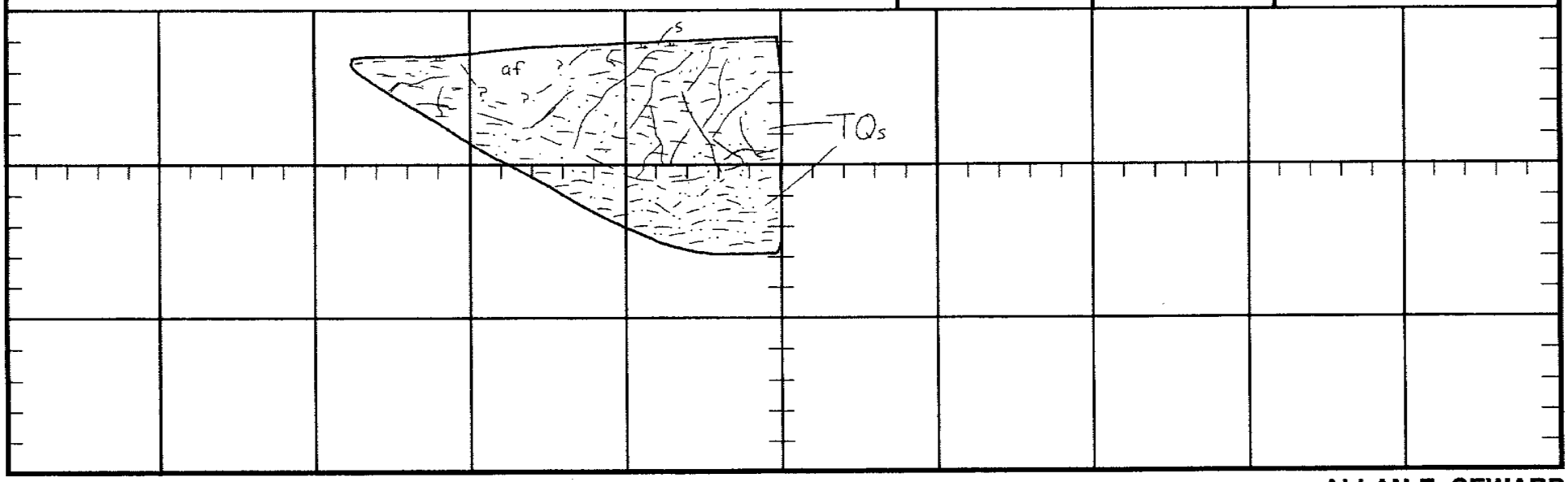
DATE

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1" SOIL; s, Medium brown silt; firm; dry 1" - 7' BEDROCK; TQs, Yellowish-gray siltstone; loose; soft to hard; slightly damp to damp			Highly weathered down to apx. 4 ft. No Ground Water No Caving

SCALE 1" = 5'

N 42 W

TOTAL DEPTH 7 Ft.

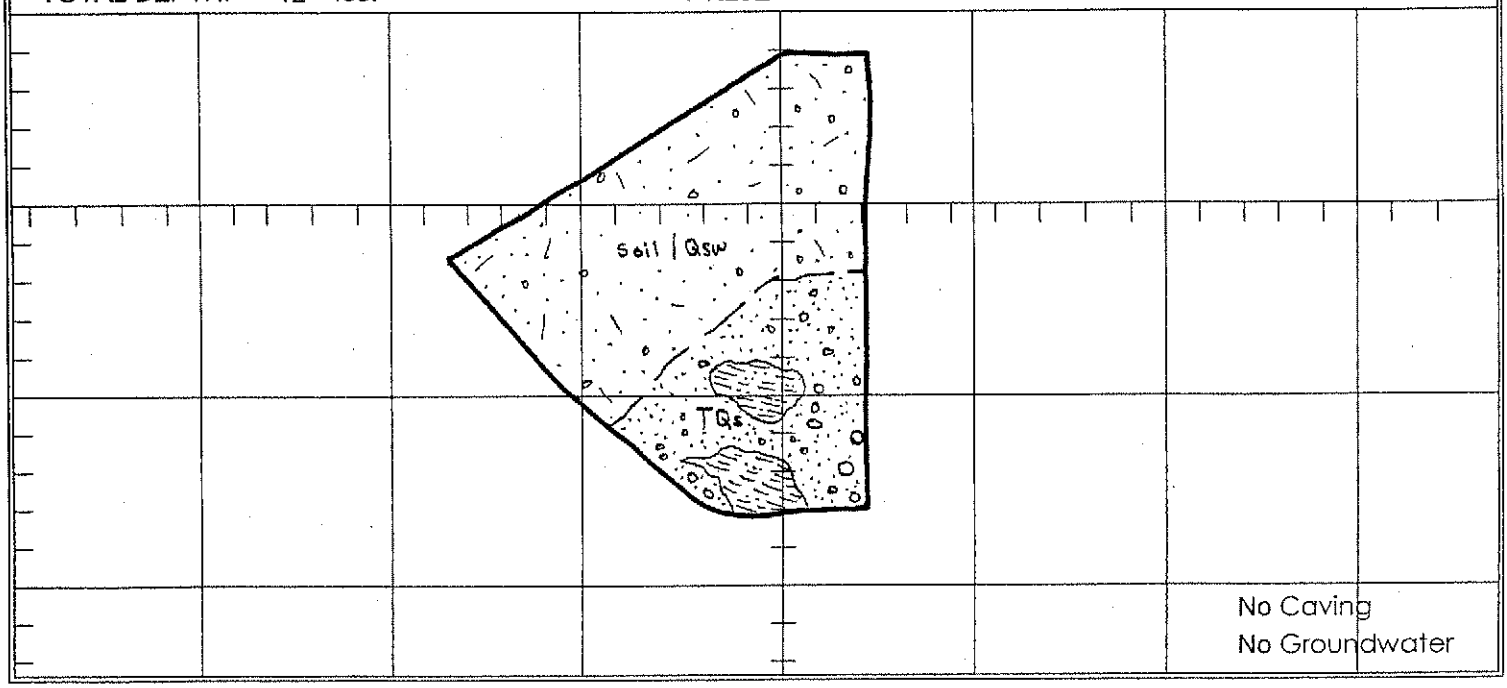


ALLAN E. SEWARD

CLIENT: Newhall Ranch Co.	JOB NO: 1703W-1	**TRENCH LOG**	
PROJECT: Mesas West	DATE: 7/22/04	**NO. T-7MW**	
	LOGGED BY: DGG		
	EXCAVATED: 11/20/03		
EXCAVATION METHOD: Trackhoe with 24" Bucket	ELEVATION: 1134'		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; Soil/Qsw (0-6')** @ 0' Sandy, silty clay with gravel; soft to firm; damp; grayish-brown				
5					**BEDROCK; TQs (6-12')** @ 6' Light-gray and grayish-brown silty sandstone, pebbly silty sandstone, and siltstone; moderately hard to hard; damp; channel deposit with rip-ups				
10									
15									
20									

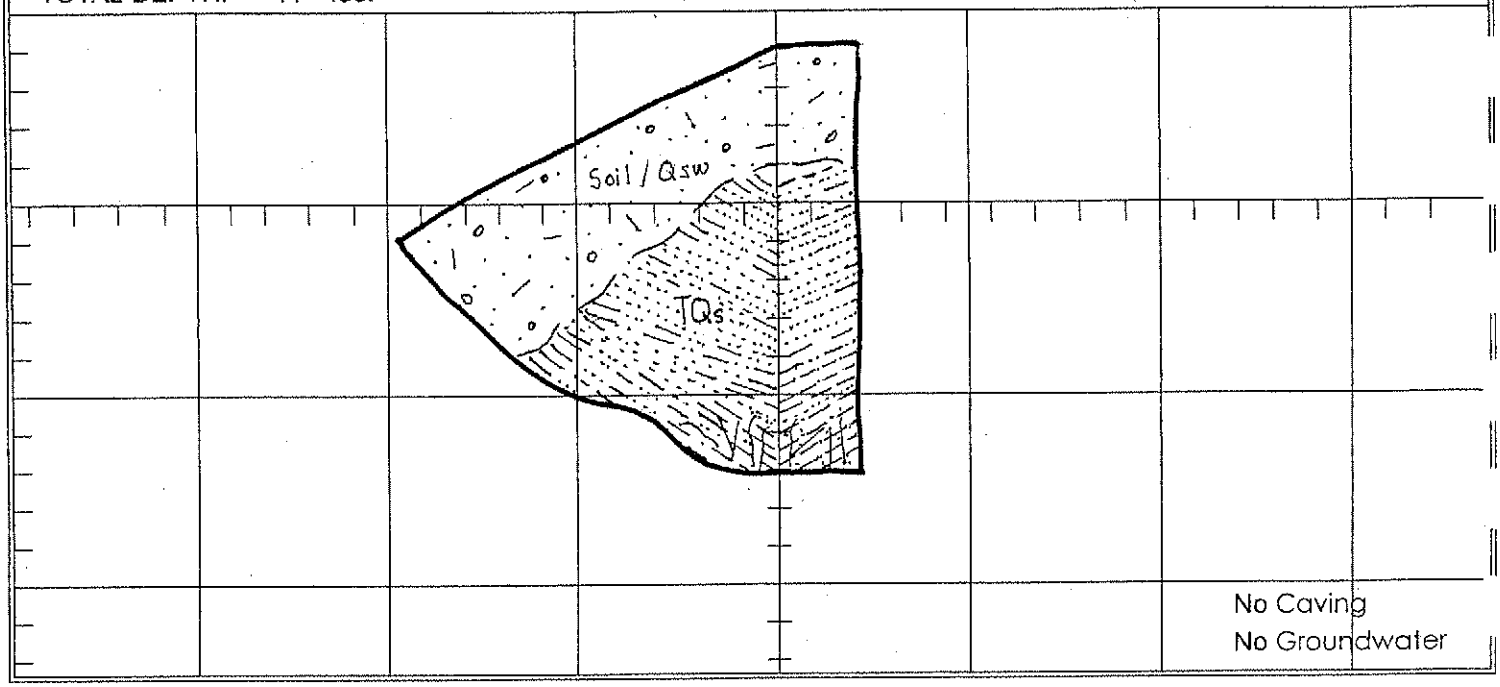
TOTAL DEPTH: 12 feet ←N20E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Co.	JOB NO: 1703W-1	**TRENCH LOG NO. T-12MW**	
PROJECT: Mesas West	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/20/03		
EXCAVATION METHOD: Trackhoe with 24" Bucket	ELEVATION: 1022'		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; Soil/Qsw (0-3')** @ 0' Sandy, silty clay; soft to firm; damp; grayish-brown				
					BEDROCK; TQs (3-11') @ 3' Light-gray to grayish-brown silty laminated sandstone, fine-grained sandstone and siltstone; moderately hard; damp; some fractures with caliche	B: E-W, 25S			
5									
10									
15									
20									

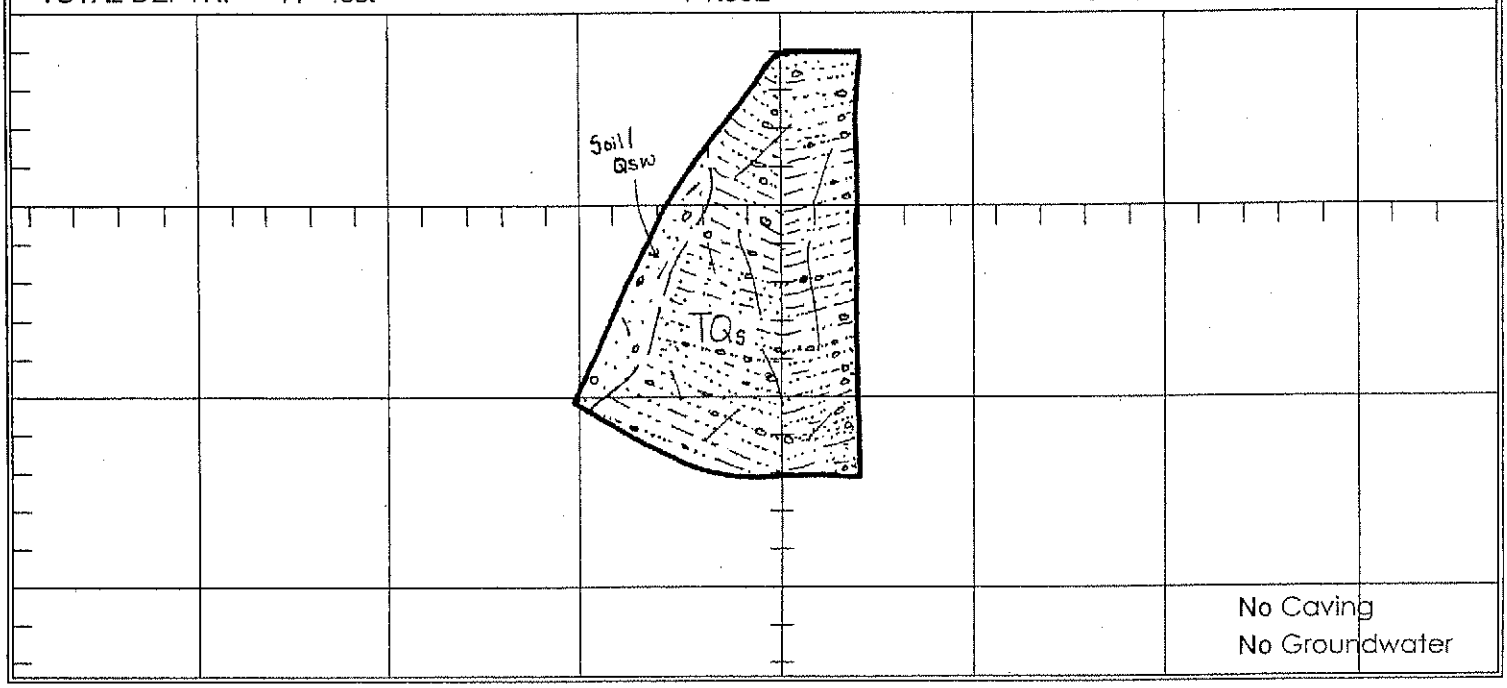
TOTAL DEPTH: 11 feet ←N35E SCALE: 1 inch = .5 feet



CLIENT: Newhall Ranch Co.	JOB NO: 1703W-1	**TRENCH LOG**	
PROJECT: Mesas West	DATE: 7/22/04	**NO. T-13MW**	
	LOGGED BY: DGG		
	EXCAVATED: 11/21/03		
EXCAVATION METHOD: Trackhoe with 24" Bucket	ELEVATION: 1026'		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**BEDROCK; TQs (0-11')** @ 0' Light-gray to grayish-brown silty sandstone and pebbly, silty sandstone; moderately hard; damp; fractures; slightly to moderately friable	Apx B: N85W, 15SW			
5									
10									
15									
20									

TOTAL DEPTH: 11 feet ←N38E SCALE: 1 inch = 5 feet

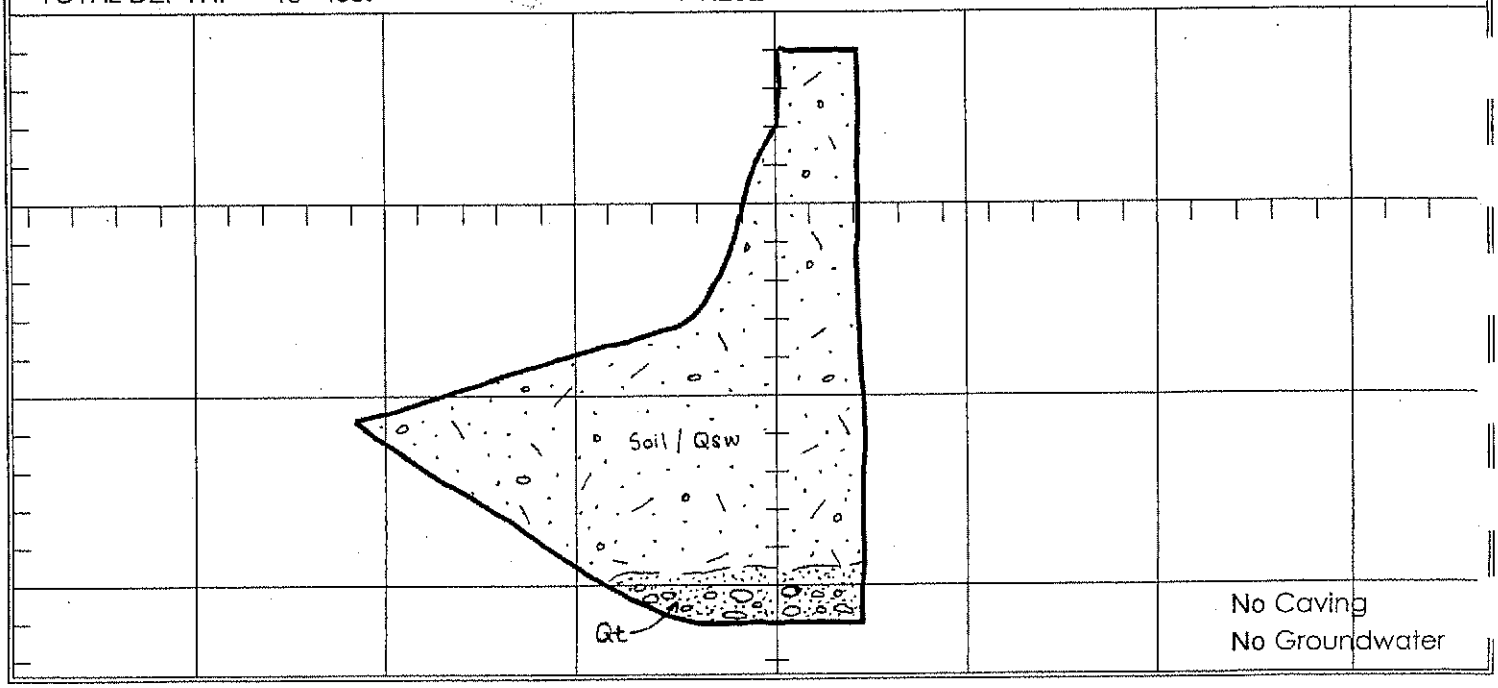


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 1703W-1	**TRENCH LOG NO. T-14MW**	
PROJECT: Mesas West	DATE: 7/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 11/21/03		
EXCAVATION METHOD: Trackhoe with 24" Bucket	ELEVATION: 998'		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; Soil/Qsw (0-14'?)** @ 0' Sandy, silty clay with gravel (cobbles); firm to stiff; damp; yellowish- to grayish-brown; horizontal lensing of gravels				
5									
10									
14					**QUATERNARY TERRACE DEPOSITS?; Qt? (14-15')** @ 14' Cobbly, pebbly, silty sand	Apx.B:Horizontal			
15					NOTES Surface logged				
20									

TOTAL DEPTH: 15 feet ←N23E SCALE: 1 inch = 5 feet



ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

GEOLOGIC AND GEOTECHNICAL REPORT

Review of Vesting Tentative Tract Map (Dated June 14, 2004)

Vesting Tentative Tract 61105

Mesas East

Newhall Ranch, California

VOLUME II OF VI

Prepared for:

The Newhall Land and Farming Company
23823 West Valencia Boulevard
Valencia, California 91355

Job No: 04-2023-4
Dated July 22, 2004

27825 Smyth Drive, Valencia, California 91355 661-294-0065 FAX 661-294-0833

Appendix A

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	VCG
DRILLED:	11/3-4/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1109'
BORING NO.	B-1E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						SLOPEWASH; Qsw (0 - 7 Ft.) @ 0' Light yellowish-brown to tan, fine- to coarse-grained silty pebbly sand; dry; loose; abundant root hairs and pinholes to 6 ft.	Downhole logged on 11/3 and 11/4/99
5	■	1 2 2	Qsw	114/5.5			@ 5' Bulk Sample
						BEDROCK; TQs (7 - 74 Ft.) @ 7' Mottled rusty brown and gray, fine- to medium-grained sandstone with thin interbeds of gray to dark-brown clayey siltstone; minor CaCo3-lined fractures; friable; loose to moderately dense; dry; krotovina to 8 ft.	
10	■	3 5 4		B:N68W,32NE			@ 10' Bulk Sample @ 10' % fines = 20.2
						@ 13' Tan to gray, fine- to coarse-grained pebbly sandstone with scattered pebbles; friable; well stratified	
15	■	4 6 8		123/12.2		@ 15' Medium-brown silty sandstone interbed, damp	
				apx B:N33W,24NE		@ 17' Medium- to coarse-grained pebbly sandstone	@ 17-22' minor ravelling and belling of hole
20	■	2 5 6	TQs	107/18.7			
				B:N63W,21NE B:N66W,25NE		@ 22' Medium- to rusty-brown clayey siltstone with minor sand; well stratified; soft to slightly firm @ 22.5' Minor parting surface	
25						@ 27' Grades to medium to very coarse pebbly sandstone and fine- to coarse-grained sandstone with scattered cobbles; moderately dense; friable	
30						@ 32' Yellowish-tan fine-grained silty sandstone with minor CaCo3 pods	
				B:N68W,22NE		@ 35' Medium-brown siltstone with mionr sand and clay	
35						@ 37' Yellowish-tan fine-grained sandstone	

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	VCG
DRILLED:	11/3-4/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1109'

BORING NO. B-1E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						@ 38' Medium-brown plastic clay with minor silt, 1" thick; no striations on parting surface; CaCo3 on parting surface	
40						@ 38.5' Yellowish-tan fine-grained silty sandstone	
						@ 43.5' Grades to fine- to coarse-grained pebbly sandstone and conglomerate; very friable	@ 45' belling of hole up to 7 ft. wide
45							@ 47' Downhole logging ceased due to unsafe conditions
50							
55							
60							
65							
70							
75						TOTAL DEPTH 74 Ft. (Elev. 1035') No Ground Water Minor Caving @ 17-22 Ft. Caving @ 45-74 Ft.	Backfill tampec every 5 ft.

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	VCG
DRILLED:	11/9/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1072'

BORING NO. B-2E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						SURFACE CASING; (0 - 2.5 Ft.)	Downhole logged on 11/9/99 Upper 3 ft. loose and ravelling
						BEDROCK; TQs, (2.5 - 18 Ft.) @ 2.5' Tan to light yellowish-brown medium- to coarse-grained sandstone, pebbly sandstone and cobble conglomerate; friable; moderately dense; dry to damp	@ 3' Bulk Sample
5				B:N64W,17NE			
10			TQs				
				B:N61W,21NE		@ 12' Fine-grained sandstone lense; well stratified	
15							
						TOTAL DEPTH 18 Ft. (Elev. 1054') No Ground Water No Caving	Backfill tamped every 5 ft.
20							
25							
30							
35							

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86'Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1145 lbs
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	SKM
DRILLED:	11/9/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1087'

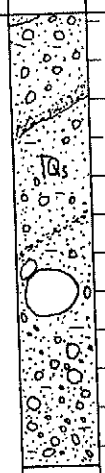
BORING NO. B-3E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						SLOPEWASH; Qsw (0 - 6 inches) @ 0' Medium grayish-brown sandy silt with pebbles; moderately dense **BEDROCK; TQs (6 inches - 49.5 Ft.)** @ 6" Weathered bedrock medium brown clayey siltstone with CaCO3 nodules	Downhole logged on 11/9/99 All contacts continuous and with consistent thickness around hole. Weathered down to 2 ft.
5		2 4 6		B:N61W,22NE		@ 2' Mottled olive-brown with FeOx (and CaCo3) siltstone to clayey siltstone; moderately hard; damp @ 8' Dark grayish-brown massive sandy clayey siltstone with pebbles and concretions	@ 5' % fines = 84. 5
10						@ 11.4' Light grayish-brown sandy gravel lense @ 11.7' Silty claystone to clayey siltstone	
15		3 8 9		123/14.2		@ 15.5' Grades to a mottled light reddish-brown to light greenish-tan silty sandstone	
						@ 18' Grades to an olive brown clayey siltstone interbedded with clay lenses	
20			TQs				
				B:N63W,24NW		@ 23' 1" medium brown silty clay lense	Clay lenses @ 23', 27.1' and 33' do not exhibit sharp contacts
25							
				B:N64W,27NE		@ 27.1' 3/4" medium brown clay lense	
30		4 10 14		108/19.1			
				B:N65W,26NE		@ 33' 1.5" medium brown clay lense	
35						@ 35' Grades to a mottled light brown to grayish-brown silty sandstone with siltstone lenses	

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86'Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1145 lbs
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	SKM
DRILLED:	11/9/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1087'
BORING NO.	B-3E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40				B:N48W,25NE B:N53W,23NE		@ 38' Light grayish-tan to brown cobble conglomerate with minor silt, moderately friable, damp	@ 38'-49.5' Minor caving (1 ft. back) Conglomerate unit is laminated in places and has continuous interbeds (1-2" thick) of fine-grained sandstone
45							
50						TOTAL DEPTH 49.5 Ft. (Elev. 1037.5') No Ground Water Minor Caving 38 to 49.5 Ft.	Stopped drilling at 49.5' due to bucket spinning on top of large igneous clasts Backfill tamped every 5 ft.
55							
60							
65							
70							
75							

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	VCG
DRILLED:	11/15/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1152'
BORING NO.	B-4E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						BEDROCK; TQs (0 - 42 Ft.) @ 0' Tan to light yellowish-brown fine- to medium- grained silty sandstone/sandy siltstone with minor carbonate deposits within the upper 2 ft.; moderately dense; dry to damp	Downhole logged on 11/15/99
5				B:N62W,18NE		@ 5' Tan fine- to coarse-grained sandstone, pebbly sandstone and pebble to cobble conglomerate; friable; minor belling due to ravelling of the sandstone units	
10			TQs	B:N64W,21NE		@ 10' Cobble conglomerate	
15						@ 14' Grades to pebble conglomerate	
						@ 17' Very coarse-grained sandstone	
20				B:N73W,24NE		@ 20' Medium-grained sandstone with scattered pebbles	
25						@ 26' Pebble lense 6" thick	
30							
35				apx B:N48W,17NE		@ 34' Scattered cobbles	

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.

JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	VCG
DRILLED:	11/15/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1152'

BORING NO. B-4E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40			Qs				
						TOTAL DEPTH 42 Ft. (Elev. 1110') No Ground Water Minor Belling from 5 to 42 Ft.	Backfill tamped every 5 ft.
45							
50							
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	VCG/BJS
DRILLED:	11/15/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1184'

BORING NO. B-5E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Qsw			**SLOPEWASH; Qsw (0 - 8 Ft.)** @ 0' Medium to yellowish-brown fine- to coarse- grained silty pebbly sand and silt with scattered cobbles; loose; dry to damp	Downhole logged on 11/15/99
5							
				B:N68W,24NE		**BEDROCK; TQs (8 - 45 Ft.)** @ 8' Tan to light yellowish-brown fine- to medium- grained silty sandstone; moderately dense; damp @ 9' Grades to a medium- to coarse-grained pebbly sandstone; friable	
10							
				B:N58W,24NE		@ 12.5' Cobble conglomerate within sandstone and pebbly sandstone	
15			TQs				
				B:N61W,25NE			
20							
25				B:N68W,34NE			
30						@ 31' Scattered cobbles	
				B:N65W,26NE			
35							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.

JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	VCG/BJS
DRILLED:	11/15/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1184'

BORING NO. B-5E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40			TQs	Apx B:N49W,39NE			
45						TOTAL DEPTH 45 Ft. (Elev. 1139') No Ground Water No Caving	Backfill tamped every 5 ft.
50							
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	VCG/BJS
DRILLED:	11/16/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1170'
BORING NO.	B-6E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Qsw			**SLOPEWASH; Qsw (0 - 7 Ft.)** @ 0' Medium- to pale yellowish-brown fine- to coarse-grained silty pebbly sand; loose; dry to damp; abundant pinholes to 6 ft.; roots to 7.5 ft.	Downhole logged on 11/16/99
5						**LANDSLIDE DEBRIS; Qls (7 - 31 Ft.)** @ 7' Medium- to light-brown fine- to coarse-grained silty sandstone with pebbles; loose; dry; friable; stratigraphy very faint and dipping towards the south	
				B:N31E,15SE			
10						@ 10' Pale yellow to tan fine- to coarse-grained sandstone; well stratified; moderately friable; loose to dense; fractured and discontinuous	
				B:N43W,24NE			
15							
			Qls	B:N40W,14NE		@ 17.4' Moderate- to dark-brown sandy siltstone with carbonate deposits; faint bedding	
20							
				B:N62W,22NE			
25				B:N48W,22NE			
30						@ 31' Reddish-brown fine-grained clayey sandy siltstone; slightly plastic	Slide Plane?
				B:N62W,16NE		**BEDROCK; TQs (31 - 50 Ft.)** @ 33' Fine-grained sandstone with minor silt and minor lenses of medium- to coarse-grained sandstone and pebbly sandstone; moderately dense; well stratified; slightly mottled	
				B:N59W,20NE			
35			TQs	B:N56W,24NE		@ 37' Tan medium- to coarse-grained pebbly sandstone and pebble to cobble conglomerate; friable; damp	Minor belling of hole up to 4 ft. in diameter @ 37'

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.

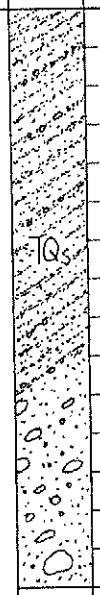
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	VCG/BJS
DRILLED:	11/16/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1170'

BORING NO. B-6E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40			TQs				
45							
50						TOTAL DEPTH 50 Ft. (Elev. 1120') No Ground Water Minor Belling from 37 to 50 Ft. Slide Plane? @ 31 Ft. (Elev. 1139')	Backfill tamped every 5 ft.
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	VCG/BJS
DRILLED:	11/17/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1156'
BORING NO.	B-7E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						**BEDROCK; TQs (0 - 15 Ft.)** @ 0' Tan to pale yellowish-brown to gray pebbly sandstone and pebble conglomerate; friable; moderately dense to dense; dry to damp; stratified	Downhole logged on 11/17/99
5				B:N62W,24NE B:N49E,26NE			
10						@ 10' Cobble conglomerate	Minor belling of hole below 9 ft.
15						TOTAL DEPTH 15 Ft. (Elev. 1141') No Ground Water Minor Belling from 9-15 Ft.	Backfill tamped every 5 ft.
20							
25							
30							
35							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	VCG/BJS
DRILLED:	11/18/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1080'
BORING NO.	B-8E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Qsw			**SLOPEWASH; Qsw (0 - 4 Ft.)** @ 0' Medium- to light yellowish-brown fine-grained sandy silt with carbonate pods; minor roots; loose to moderately dense; dry to damp	Downhole logged on 11/18/99
5				B:N62W,20NE		**BEDROCK; TQs (4 - 36 Ft.)** @ 4' Light yellowish-brown to tannish-brown to tan fine-grained sandy siltstone with lenses of medium-brown clayey siltstone, moderately dense; well bedded	
				B:N59W,25NE		@ 8' Tan to rusty gray fine- to coarse-grained sandstone	
10						@ 10' Fine-grained sandstone	
						@ 12.2' Medium- to grayish-brown, fine- to coarse-grained silty sandstone; damp	
15				B:N52W,24NE			
			TQs	B:N54W,21NE			
20						@ 19' Light yellowish-green to yellowish-brown fine-grained sandy siltstone with rusty brown mottling and minor clay @ 21' Grades to yellowish-tan, fine- to coarse-grained sandstone with scattered pebbles; well bedded	
25				B:N41W,24NE			
30							@ 33' Minor belling of hole
35						@ 35' Scattered cobbles	
						TOTAL DEPTH 36 Ft. (Elev. 1044') No Ground Water, Minor Belling from 33 to 36 Ft.	Backfill tamped every 5 ft.

CLIENT: Newhall Ranch Company	JOB NO.: 99-1703QlsII-1	**DRILL HOLE LOG**	
PROJECT: Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE: 7/22/04		
	LOGGED BY: VCG/BJS		
DRILLING COMPANY: Tri-Valley Drilling/Dave	DRILLED: 11/19/99		
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-9E	
DRIVING WEIGHTS: 0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.	ELEVATION: 1156'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						LANDSLIDE DEBRIS; Qls (0 - 23.8 Ft.) @ 0' Chaotic jumbled assemblage of light yellowish- to reddish-brown silty sandstone, sandstone and sandy siltstone with minor clay; loose to moderately dense; damp; minor rootlets to 9 ft; non-bedded	Downhole logged on 11/19/99
5							
10						@ 11' Tan to yellowish-tan fine- to coarse-grained pebbly sandstone with clasts of medium- to dark-brown clayey siltstone; nonbedded; loose	
			Qls				
15							
				B:N62W,32SW		@ 19' Medium- to dark-brown to greenish-brown silty claystone; non-planar; fractured	
20						@ 20' Tan fine-grained sandstone; carbonate-lined fractures @ 21' Clay stringers	
				B:N41E,12SE SP:N19E,13NW		@ 23.2-23.8' SLIDE PLANE; medium- to reddish-brown plastic silty clay; lower contact planar with carbonate modules up to 3-inches in diameter	
25				B:N41W,24NE		**BEDROCK; TQs (23.8 - 74 Ft.)** @ 23.8' Light yellowish-green to reddish-brown fine- grained sandy siltstone/silty sandstone; moderately hard; damp	
				B:N43W,23NE		@ 24.5' Medium-brown clayey siltstone/silty claystone with gypsum, minor carbonate nodules	
				B:N35W,24NE		@ 26' Grades to light yellowish-brown fine-grained sandstone with thinly bedded medium- to reddish-brown siltstone with minor clay; some primary soft sediment deformation	
30			TQs				
35				B:N38W,17NE			

CLIENT: Newhall Ranch Company	JOB NO.: 99-1703QlsII-1	**DRILL HOLE LOG**	
PROJECT: Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE: 7/22/04		
	LOGGED BY: VCG/BJS		
DRILLING COMPANY: Tri-Valley Drilling/Dave	DRILLED: 11/19/99		
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-9E	
DRIVING WEIGHTS: 0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.	ELEVATION: 1156'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40							
						@ 43' Medium- to dark-brown slightly plastic clay; some polished surfaces, minor faulting above plastic clay interbed	
45							
						@ 46.5' Dark greenish-black silty clay interbed; plastic; sticky	
50				B:N58W,28NE			
55			TQs	F:N64W,49NE B:N38W,30NE F:N80W,50NE		@ 57' Pebble conglomerate @ 57.5' Reddish-brown sandy siltstone with minor clay @ 58' Minor faulting; no gouge; 3" apparent normal offset; small fractures more prevalent	
60							
65				B:N46W,30NE			
70				B:N46W,29NE			
75						TOTAL DEPTH 74 Ft. (Elev. 1082') No Ground Water, No Caving Slide Plane @ 23.2 to 23.8 Ft. (Elev. 1132.8-1132.2')	Backfill tamped every 5 ft.

CLIENT: Newhall Ranch Company	JOB NO.: 99-1703QlsII-1	**DRILL HOLE LOG**	
PROJECT: Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE: 7/22/04		
	LOGGED BY: DGG/BJS		
DRILLING COMPANY: Tri-Valley Drilling/Dave	DRILLED: 11/19-20/99		
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-10E	
DRIVING WEIGHTS: 0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.	ELEVATION: 1137'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						SLOPEWASH/DEBRIS FLOW DEPOSIT; Qsw/Qdf (0 - 11 Ft.) @ 0' Medium-brown to dark grayish-brown sandy silt and slightly clayey silt with scattered pebbles; stiff; dry to slightly damp	Downhole logged on 11/19 and 11/20/99
5	■	2 2 1	Qsw/ Qdf	111/8.3			@ 5' Bulk Sample
						@ 7.2' Softer with scattered cobbles	
10	■	1 2 2		116/6.2		@ 9' Grayish-brown sandy silt and silty sand with scattered pebbles and cobbles; loose to moderately dense; slightly damp to damp **LANDSLIDE DEBRIS; Qls (11 - 29 Ft.)** @ 11' Disrupted mix of olive-gray to brown siltstone, sandy siltstone and mudstone with pebbly patches; firm to stiff; damp	@ 11' Bulk Sample
15	■	2 3 4		118/11.1		@ 15' Siltstone clasts apparent	
						@ 17' Disrupted medium-gray to reddish-brown siltstone to clayey siltstone	
20	■	3 3 3	Qls	B:N56W,32NE 108/19.1		@ 19.5' Thin olive-gray clayey seam	@ 20' Bulk Sample
	■	1 2 3		SP:N32W,31NE		@ 23' Clayey interlayers @ 24.5' Irregular contact from olive-gray clay to reddish-brown clay	@ 23' % fines = 99.5
25	■	3 7 11		119/13.5 B:N47W,31NE		@ 25' Reddish-brown mudstone; moderately plastic; slide plane?; underlain by olive-gray sandy siltstone and silty sandstone with fine-grained sandstone interbeds; dense; damp @ 27' 2" thick clay siltstone interbed	
30	■	17 31		SP:N51W,25NE 117/10.5 MF:N67W,49NE		@ 29' 1/2" thick olive-gray clayey slide plane; moderately plastic and sheared **BEDROCK; TQs (29 - 60 Ft.)** @ 29' Medium-gray siltstone; moderately hard; hard concretions @ 30' Mottled light-gray to orangish-brown siltstone; moderately hard; damp	@ 29' 4 hand-driven ring samples oriented normal to slide plane; @ 30' % fines = 98.5 @ 31.7' Minor reverse fault with 15' offset
35			TQs	B:N39W,34NE		@ 34.5' Olive-gray fine-grained sandstone with siltstone interbeds	

CLIENT: Newhall Ranch Company	JOB NO.: 99-1703QlsII-1	**DRILL HOLE LOG**	
PROJECT: Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE: 7/22/04		
	LOGGED BY: DGG/BJS		
DRILLING COMPANY: Tri-Valley Drilling/Dave	DRILLED: 11/19-20/99		
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-10E	
DRIVING WEIGHTS: 0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.	ELEVATION: 1137'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40		12 20/3"		B:N59W,32NE 120/6.8		@ 39' Light-gray to light yellowish-gray pebble conglomerate with cobbles and pebbly sandstone; moderately dense to moderately hard	@ 42' Bulk Sample
45				B:N41W,33NE		@ 44.3' Erosional contact with yellowish-brown to slightly orangish-green siltstone, clayey siltstone and sandy siltstone; moderately hard; damp; poorly bedded @ 47' 3/4" moderate reddish-brown mudstone interbed with interbed siltstone and sandstone below	
50		9 11/3"	TQs	114/17.5			
55				B:N46W,32NE		@ 53.5' Irregular patch of moderate-brown siltstone and clayey siltstone; discontinuous; bedding on opposite wall of boring undisturbed; probable primary soft sediment deformation or a clast @ 56' Fine yellowish-brown sandy siltstone; moderately hard to hard; slightly damp to damp	
60		26 35/1"		104/14.8		TOTAL DEPTH 60 Ft. (Elev. 1077') No Ground Water No Caving Slide Plane @ 24.5 Ft. (Elev. 1112.5') Slide Plane @ 29 Ft. (Elev. 1108')	Backfill tamped every 5 ft.
65							
70							
75							

CLIENT: Newhall Ranch Company	JOB NO.: 99-1703QlsII-1	**DRILL HOLE LOG**	
PROJECT: Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE: 7/22/04		
	LOGGED BY: DGG/BJS		
DRILLING COMPANY: Tri-Valley Drilling/Dave	DRILLED: 1123-24/99		
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-11E	
DRIVING WEIGHTS: 0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.	ELEVATION: 1214'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						LANDSLIDE DEBRIS; Qls (0 - 18.5 Ft.) @ 0' Yellowish-olive-tan sandy siltstone and silty sandstone with pebbles and cobbles; loose; dry to slightly damp	Downhole logged on 11/23 and 11/24/99 Casing used from 0 - 12.5 ft. due to loose zone
5							@ 5' Bulk Sample
			Qls			@ 7' Coarse-grained; slightly damp to damp	
10							
						@ 11' Siltstone interbeds; damp	
	■	1 2 2		107/22.6		@ 12.5' Olive-brownish-gray siltstone, clayey siltstone and sandy siltstone; firm; damp	
15							
				SP:N42E,22SE		@ 15.8' Sandy silt with pebbles (Qsw?) with a thin 1/2" thick medium-brown clayey siltstone (Sp?) and olive-brown siltstone below	@ 15' Bulk Sample
				SP:N22E,15SE		@ 17' 1/2" thick moderate-brown sticky plastic clay (SP); underlain by medium olive-gray fine-grained sandstone	
				B:N32W,26NE		@ 18' Thin (1/4") irregular, sheared, moderate reddish-brown mudstone; (probable slip surface)	
20	■	5 15/5"		124/10.7		**BEDROCK; TQs (18.5 - 75 Ft.)** @ 18.5' Interbedded yellowish-brown siltstone and light yellowish-brown sandy siltstone; moderately hard; damp	
				B:N37W,25NE		@ 19' Thin reddish-brown silty sandstone interbed @ 20' Pebbly lenses; hard @ 21.5' 1.5' thick, discontinuous pebbly sandstone interbed	
25	■	5 11 5/1"	TQs			@ 25' Moderate yellowish-brown siltstone and fine sandy siltstone with local fine light yellowish-brown silty sandstone interbeds; moderately hard; damp; locally laminated	@ 25' % fines = 85.0
30	■	8 12/4"		118/14.2			
				Apx B: N42W,26NE		@ 34' Two thin pebbly sandstone stringers	
35							

CLIENT: Newhall Ranch Company	JOB NO.: 99-1703QlsII-1	**DRILL HOLE LOG**	
PROJECT: Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE: 7/22/04		
	LOGGED BY: DGG/BJS		
DRILLING COMPANY: Tri-Valley Drilling/Dave	DRILLED: 1123-24/99		
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-11E	
DRIVING WEIGHTS: 0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.	ELEVATION: 1214'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40	■	10 18/3"		B:N35W,22NE 118/13.8			
				B:N39W,28NE B:N47W,30NE		@ 43' Coarse pebbly silty sandstone interbed	
45				B:N45W,28NE		@ 47.4' Coarse pebbly silty sandstone interbed	
50							
55			TQs	B:N34W,23NE			
60						@ 60' Still moderately hard to hard; local laminations @ 62' Laminated fine-grained sandstone unit; minor primary soft sediment deformation in sandstone	
65	■	21 36/3"		N43W,30NE 109/16.0		@ 65' 2" thick moderate-brown claystone; sticky; moderately plastic	@ 67' drilling harder
70							
75							Backfill tamped every 5 ft.

CLIENT: Newhall Ranch Company	JOB NO.: 99-1703QlsII-1	**DRILL HOLE LOG**	
PROJECT: Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE: 7/22/04		
	LOGGED BY: DGG/BJS		
DRILLING COMPANY: Tri-Valley Drilling/Dave	DRILLED: 1123-24/99		
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-11E	
DRIVING WEIGHTS: 0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.	ELEVATION: 1214'		

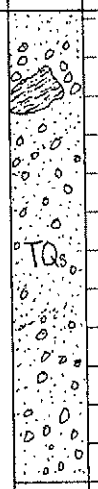
DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						TOTAL DEPTH 75 Ft. (Elev. 1139')	
						No Ground Water	
						Moderate Caving from 0 - 12 Ft.	
						Slide Plane @ 15.8' (Elev. 1198.2')	
						Slide Plane @ 17' (Elev. 1197')	
80						Slide Plane @ 18' (Elev. 1196')	
85							
90							
95							
100							
105							
110							

CLIENT: Newhall Ranch Company	JOB NO.: 99-1703QlsII-1	**DRILL HOLE LOG**	
PROJECT: Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE: 7/22/04		
	LOGGED BY: DGG/BJS		
DRILLING COMPANY: Tri-Valley Drilling/Dave	DRILLED: 11/29-30/99		
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-12E	
DRIVING WEIGHTS: 0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.	ELEVATION: 1228'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						LANDSLIDE DEBRIS; Qls (0 - 20 Ft.)	Downhole logged on 11/29 and 11/30/99
						@ 0' Yellowish-gray silty pebbly sandstone; loose, slightly damp	Upper 12 ft. of hole cased due to loose material
						@ 3' Pebbly to cobbly sandstone; loose	
5							@ 5' Bulk Sample
10							
	■	2 4 5		Apx B: N61W,30NE 115/16.3		@ 12' Olive-gray to olive-brown sandy siltstone/ silty sandstone and siltstone; firm; damp; slightly disrupted; local concretions	
15	■	2 3 4		111/20.3		@ 16' Disrupted sandstone interbed	@ 14 & 17' minor normal offset of bedding @ 17' Bulk Sample
			Qls	Apx B: N30W,26NE			
20	■	2 8 10/3"		SP:N41W,24NE		@ 20.5' 1/4-1/2" thick moderate-brown, sticky silty clay; slide plane **BEDROCK; TQs (20.5 - 50 Ft.)** @ 20.5' Slightly reddish-brown to olive-yellowish- brown siltstone, sandy siltstone/silty sandstone and fine-grained sandstone; moderately hard; damp; local concretions	@ 20' % fines = 69.5 @ 20.5' 4 hand-driven ring samples oriented normal to slide plane @ 20.5 % fines = 86.6
				B:N43W,25NE			
25	■	8 15/3"		117/7.9		@ 24.5' Light yellowish-gray fine, slightly silty sandstone interbed	
			TQs			@ 27' Moderate yellowish-brown slightly mottled silty sandstone/ sandy siltstone interbed	
30				B:N38W,22NE		@ 30' Silty pebbly sandstone interbed with local cobbles	
				Apx B: N62W,30NE		@ 32' Mottled light-brown to olive-green coloration @ 32.8' Light yellowish-gray to light-brown pebbly to cobbly sandstone; dense; slightly friable; damp; cross bedded	
35							@ 37' Coring bucket

DRILL HOLE LOG

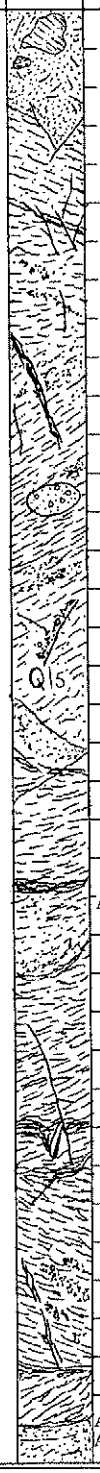
CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	DGG/BJS
DRILLED:	11/29-30/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1228'
BORING NO.	B-12E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40						@ 39.5' Large siltstone rip-up clast	
45							
50						TOTAL DEPTH 50 Ft. (Elev. 1178') No Ground Water Moderate Caving from 0 - 12 Ft. Slide Plane @ 20.5' (Elev. 1207.5')	Backfill tamped every 5 ft.
55							
60							
65							
70							
75							

CLIENT: Newhall Ranch Company	JOB NO.: 99-1703QlsII-1	**DRILL HOLE LOG**	
PROJECT: Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE: 7/22/04		
	LOGGED BY: BJS		
DRILLING COMPANY: Tri-Valley Drilling/Dave	DRILLED: 12/1/99		
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-13E	
DRIVING WEIGHTS: 0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.	ELEVATION: 1232'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						LANDSLIDE DEBRIS; Qls (0 - 15.8 Ft.) @ 0' Yellowish-gray slightly silty pebbly sandstone with cobbles; loose; dry to slightly damp	Downhole logged on 12/1/99 Casing used from 0-8 ft. due to loose zone
5							
						@ 8' Light yellowish-brown to grayish-brown sandstone and siltstone; damp; firm; slightly disrupted	
10			Qls				
				B:N88W,16NE		@ 11' Light bluish-gray to grayish-brown siltstone	
15							
				SP:N48W,30NE		@ 15.5' 3-4" of moderate reddish-brown clay; sticky; plastic; damp to moist; thin light bluish-gray clay at base	@ 15.5' Bag sample of slide plane material
						BEDROCK; TQs (15.8 - 30 Ft.) @ 15.8' Moderate yellowish-brown silty sandstone/sandy siltstone; moderately hard; damp @ 17.5' Thin grayish-brown silty clayey interbed	
20			TQs	B:N48W,22NE		@ 19' Moderate reddish-brown sandy siltstone interbed; local sandstone interbeds below @ 21' Local concretions along silty beds	
25							
						@ 27' Light-gray pebbly sandstone interbed	
30						TOTAL DEPTH 30 Ft. (Elev. 1202') No Ground Water No Caving Hydrocarbon Odor @ 11-15.5 Ft.; not methane or H2S Slide Plane @ 15.5 Ft. (Elev. 1216.5')	Backfill tamped every 5 ft.
35							

CLIENT: Newhall Ranch Company	JOB NO.: 99-1703QlsII-1	**DRILL HOLE LOG**	
PROJECT: Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE: 7/22/04		
	LOGGED BY: BJS		
DRILLING COMPANY: Tri-Valley Drilling/Dave	DRILLED: 12/1-2/99		
DRILLING METHOD: Bucket-Auger (85' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-14E	
DRIVING WEIGHTS: 0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.	ELEVATION: 1160'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						**LANDSLIDE DEBRIS; Qls (0 - 61 Ft.)** @ 0' Light yellowish-brown silty sandstone with scattered clasts of TQs siltstone; loose to locally firm; slightly damp; material is highly disturbed to 61 feet but generally dense; fractures and minor offsets common	Downhole logged on 12/1/99 and 12/2/99 Surficial material removed
						@ 2' Fragmented interbed of light-gray pebbly sandstone	
5		1 2 2		109/8.1		@ 5.5' Yellowish-brown fine sandy siltstone with local moderate yellowish-brown clayey siltstone interbeds; disturbed; soft; damp	@ 5' Bulk Sample @ 5' Consol
						@ 7.5' Patches of sandstone	
10		1 2 2		110/13.6			@ 9' Bedding dips roughly south @ 10' Bulk Sample @ 10' Consol
						@ 12' Isolated patch of light-gray pebbly sandstone; disrupted mix of light yellowish-brown fine silty sandstone and moderate yellowish-brown siltstone/mudstone with local sandstone stringers and patches below; damp; dense but softer than typical bedrock	
15		1 1 2					@ 15' % fines = 83.8 @ 15' Consol
20		2 2 2		103/23.7			@ 20' Consol
				Apx B:N84W,25NE		@ 22.5' 3/4" thick, irregular, moderate reddish-brown mudstone; slightly plastic and sticky	Firmer drilling from 21 to 27 ft.
25						@ 24.5' Moderate-brown slightly clayey siltstone interbed	
30		3 7 8		110/18.5		@ 29' Irregular moderate-brown clay with discontinuous striated partings	@ 30' Consol
						@ 32.5' Sandstone patches	
35						@ 35' Thick irregular zone of moderate-brown sticky plastic clay with local siltstone inclusions; damp to moist	
				Apx SP:N83E,22NW Apx SP:N10W,28SW		@ 37' Slightly irregular 1/2" thick moderate-brown plastic clay	

CLIENT: Newhall Ranch Company	JOB NO.: 99-1703QlsII-1	**DRILL HOLE LOG**	
PROJECT: Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE: 7/22/04		
	LOGGED BY: BJS		
DRILLING COMPANY: Tri-Valley Drilling/Dave	DRILLED: 12/1-2/99		
DRILLING METHOD: Bucket-Auger (85' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-14E	
DRIVING WEIGHTS: 0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.	ELEVATION: 1160'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						@ 38.2' 1/16-1/8" moderate-brown plastic clay	
40				Apx B:N75E,26NE			
				SP:N82E,26NW		@ 43' 1/8-1/2" moderate-brown sticky plastic clay	
				SP:N63W,23NE			
45				MF:N67W,59NE			MF @ 46' clearly truncates beds
				B:N65W,37NE		@ 47' Light yellowish-gray sandstone and pebbly sandstone interbeds; dense but slightly disrupted and clayey partings are present	
50				B:N85W,31NE		@ 50' Moderate-brown silty claystone; slightly sticky to sticky and plastic; underlying material is dense but highly disturbed mix of light yellowish-brown fine silty sandstone and moderate brown siltstone and claystone	
				SP:N85E,29NW			
				Parting: N49E, 56NW		@ 54.8' Thin, striated, clayey parting	
55				St:7,S53W			
				SP:N72E,32NW		@ 57' Thin moderate-brown silty pebbly sandstone @ 57.5' Thin yellowish-brown silty pebbly sandstone	
60				B:N80W,22NE		@ 59.5' Moderate-brown mudstone interbed with a light-gray disturbed sandstone bed below	
				SP:N84W,18NE		@ 61' Slightly soft yellowish-brown clayey siltstone and light yellowish-brown siltstone with local concretions; base of highly disturbed	Material from 61 to 70.5' is as tight as bedrock but locally appears slightly disrupted
				Apx B:N30W,37NE			
				?/14.6		@ 64' Moderate-brown silty mudstone interbed; not sheared	
65	■	18 75/3"				@ 66.5' Discontinuous laminated sandstone interbeds; appears slightly disturbed with some bedding pinchouts; moderately hard	@ 67' Bulk Sample
				Contact (B?): N56W, 23NE			
	■	16 75/4"		109/18.3			
70				B:N44W,25NE		**BEDROCK; TQs (70.5 - 92 Ft.)** @ 70.5' Distinct 3" thick planar light yellowish-brown sandstone bed; dip is consistent and regional @ 72' Pebbly sandstone lense	Material below 70.5' appears in tact with regional bedding; no distinct slide plane @ 70.5'
75						@ 73.5' Homogeneous moderate reddish-brown silty clay; no shearing; upper contact irregular	

CLIENT: Newhall Ranch Company	JOB NO.: 99-1703QlsII-1	**DRILL HOLE LOG**	
PROJECT: Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE: 7/22/04		
	LOGGED BY: BJS		
DRILLING COMPANY: Tri-Valley Drilling/Dave	DRILLED: 12/1-2/99		
DRILLING METHOD: Bucket-Auger (85' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-14E	
DRIVING WEIGHTS: 0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.	ELEVATION: 1160'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						@ 76' Grades slightly siltier and less clayey	
80						@ 80' Local concretions	
				B:N49W,24NE		@ 82' 1/2" moderate-brown silty clay; tight; no shearing; local concretions; yellowish-brown fine silty sandstone with sandstone lenses below	
85							
				B:N43W,26NE		@ 88' Light yellowish-gray pebbly sandstone; hard; damp; minor siltstone interbeds; slight depositional irregularities in bedding	
90							
						TOTAL DEPTH 92 Ft. (Elev. 1068') No Ground Water No Caving Slide Plane @ 35 Ft. (Elev. 1125') Slide Plane @ 37 Ft. (Elev. 1123') Slide Plane @ 43 Ft. (Elev. 1117') Slide Plane @ 50 Ft. (Elev. 1110') Slide Plane @ 57 Ft. (Elev. 1103') Slide Plane @ 61 Ft. (Elev. 1099') Base of landslide? @ 66.5 Ft. (Elev. 1093.5')	Backfill tamped every 5 ft.
95							
100							
105							
110							

DRILL HOLE LOG

CLIENT: Newhall Ranch Company	JOB NO.: 99-1703QlsII-1
PROJECT: Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE: 7/22/04
	LOGGED BY: DGG/BJS
DRILLING COMPANY: Tri-Valley Drilling/Dave	DRILLED: 12/7/99
DRILLING METHOD: Bucket-Auger	HOLE DIA: 24"
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.	ELEVATION: 1175'

BORING NO. B-15E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				B:N29E,30NW		**LANDSLIDE DEBRIS; Qls (0 - 9 Ft.)** @ 0' Moderate grayish-brown slightly plastic mudstone and light yellowish-brown fine-grained sandstone and silty sandstone; moderately hard; damp; clearly disturbed and fractured	Downhole logged on 12/7/99
				SP?:N35W,30NE		@ 3.5' 1/2-1" thick moderate-brown clay; plastic; damp; medium olive-brown to grayish-brown siltstone below; tight but slightly disrupted	Surficial material removed
5		3 8 13	Qls	118/14.4			
				B:N39W,29NE			
						@ 8' Bedding slightly wispy and irregular	@ 8' Bulk Sample
				SP:N28W,31NE Apx B:N47W,27NE		@ 9' 1/2" thick moderate-brown clay; plastic; slightly sticky **BEDROCK; TQs (9 - 45 Ft.)**	
10		6 15		120/9.5		@ 9' Light yellowish-brown silty sandstone; moderately hard; damp	
				B:N32W,26NE		@ 13' Fine- to medium-grained sandstone @ 13.5' Slightly orangish-yellowish-brown siltstone; massive; moderately hard; damp	
15		5 12 3/.5"	TQs	B:N48W,30NE 125/13.0			
20		4 12 4/3"		122/12.4			@ 19' Bulk Sample
						@ 21' Local concretionary lenses; very hard; minor sandstone and sandy siltstone interbeds below; moderately hard	
				B:N42W,30NE			
25				Apx MF:N65W,7NE			@ 24.5' Minor (3-4") normal offset along thin clayey parting
30		12 13/3"		B:N38W,30NE 107/7.9			
				B:N41W,27NE			
35						@ 35' Yellowish-gray fine- to medium-grained pebbly sandstone; moderately hard to hard; damp; local concretions	
				Apx B:N44W,28NE		@ 38' Yellowish-gray pebble conglomerate with cobbles in fine- to medium-grained sandstone matrix	

CLIENT: Newhall Ranch Company	JOB NO.: 99-1703QlsII-1	**DRILL HOLE LOG**	
PROJECT: Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE: 7/22/04		
	LOGGED BY: DGG/BJS		
DRILLING COMPANY: Tri-Valley Drilling/Dave	DRILLED: 12/7/99		
DRILLING METHOD: Bucket-Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-15E	
DRIVING WEIGHTS: 0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.	ELEVATION: 1175'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40						@ 42' Interbedded siltstone and fine silty sandstone	
45						TOTAL DEPTH 45 Ft. (Elev. 1130') No Ground Water No Caving Slide Plane @ 3.5 Ft. (Elev. 1171.5') Slide Plane @ 9 Ft. (Elev. 1166')	Backfill tamped every 5 ft.
50							
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	BJS
DRILLED:	12/8/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1160'

BORING NO. B-16E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				Apx B:N33W,24NE		**LANDSLIDE DEBRIS; Qls, (0 - 14.5 Ft.)** @ 0' Light yellowish-brown fine silty sandstone with moderate-brown to yellowish-brown siltstone/mudstone interbeds; moderately dense but softer than typical TQs; slightly damp; local concretions; roots common to 2 ft.; bedding slightly irregular	Downhole logged on 12/8/99 Surficial material removed for pad
				Apx SP:N64W,18NE		@ 4.5' 1/4" thick irregular moderate-brown plastic clay; damp	
5							
	■	1 3 3		115/14.0		@ 5'-6.5' Moderate-brown mudstone interbed	
			Qls			@ 8.5' Moderate-brown to yellowish-brown clayey siltstone; soft; disturbed; fine silty sandstone interbeds below	Local fractures in coarser units
10							
	■	1 2 2		108/16.7			
15				SP:N33W,28NE ST:27,N50E		@ 14.3' Discontinuous plastic clay @ 14.5' Distinct 3/4-1.5" thick, moderate-brown plastic clay; sticky; moist; slide plane; roots along clay	@ 14.5' 4 hand-driven ring samples oriented perpendicular to slide plane
				B:N44W,27NE		**BEDROCK; TQs (14.5 - 30 Ft.)** @ 14.5' Yellowish-brown slightly sandy siltstone; moderately hard; damp; minor concretions @ 17' Moderate-brown mudstone with concretions	Bedrock is consistently moderately hard
20							
	■	6 16		121/11.0		@ 20' Interbedded yellowish-brown siltstone/mudstone with local fine-grained sandstone interbeds; some cross laminations	@ 20' Bulk Sample
			TQs	B:N44W,24NE			
25						@ 24' Thin pebbly sandstone stringer; light yellowish-brown fine-grained sandstone interbedded with minor siltstone below	
30						TOTAL DEPTH 30 Ft. (Elev. 1130') No Ground Water No Caving Slide Plane @ 4.5 Ft. (elev. 1155.5') Slide Plane @ 14.5 Ft. (elev. 1145.5')	Backfill tamped every 5 ft.
35							

CLIENT: Newhall Ranch Company	JOB NO.: 99-1703QlsII-1	**DRILL HOLE LOG**	
PROJECT: Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE: 7/22/04		
	LOGGED BY: BJS		
DRILLING COMPANY: Tri-Valley Drilling/Dave	DRILLED: 12/8/99		
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-17E	
DRIVING WEIGHTS: 0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.	ELEVATION: 1098'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Qsw			**SLOPEWASH; Qsw (0 - 4.5 Ft.)** @ 0' Light yellowish-brown silty pebbly sand with scattered cobbles; moderately dense; dry to slightly damp; approximately 2% voids; rootlets and minor CACO3; jumbled blocks of TQs at base	Downhole logged on 12/9/99
5		1 2 2		108/7.0 Apx B: N35E,34SE		**LANDSLIDE DEBRIS; Qls (4.5 - 34.5 Ft.)** @ 4.5' Highly disturbed TQs units including light yellowish-brown fine silty sandstone, yellowish-gray sandstone and pebbly sandstone, yellowish-brown sandy siltstone/siltstone and local moderate to dark yellowish-brown mudstone stringers; soft to firm; damp	
10		1 2 2		109/14.8			@ 10' Consol
						@ 12' Local concretions	
15			Qls			@ 14.5' Sandstone interbeds @ 16' Tighter and slightly less jumbled but still disturbed	
				Apx B: N18E,22NW			
20		4 5 5		96/16.8 Apx SP: N35E,8SE		@ 20.5' Local concretions; locally soft @ 21.5' 1/4" thick moderate-brown clay; slightly sticky; soft and plastic	Drive Sample @ 20' had concretion in tip and only 6" of disturbed material; blow count suspect
				SP:N35E,30NW		@ 23' Concretions @ 24' Thin clayey slip surface; dense but disrupted mix of siltstone, fine silty sandstone and local sandstone/pebbly sandstone below	
25		2 2 4		106/20.9			@ 25' Bulk Sample @ 25' Consol
30		2 3 10		SP:N32W,12NE Parting: N5E,19NW St: 2,N2W 117/13.4		@ 29.5' Distinct 1/2"-thick, moderate reddish-brown clay; plastic; sticky; moist; within sheared moderate-brown mudstone @ 30.5' Thin clay parting along disturbed mudstone @ 31.5' Grayish-brown siltstone	@ 29.5' 4 hand driven rings oriented normal to slide plane @ 30' Consol
						@ 33.5' Slightly silty pebbly sandstone with local cobbles	@ 33.5' Coarse unit may be disturbed Qoa
35			TQs	Apx Contact: N35W, 39SW B:N38W,32NE		**BEDROCK; TQs (34.5 - 57 Ft.)** @ 34.5' Irregular (erosional?) contact with grayish- brown to locally blue-gray mottled siltstone and sandstone interbeds; possibly slightly disturbed; moderately hard; damp	

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	BJS
DRILLED:	12/8/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1098'

BORING NO. B-17E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				Sh:N37W,26NE		@ 37.5' 1/4-1" moderate-brown mudstone; slightly sheared with a planar parting @ 37.6' Interbedded moderate yellowish-brown siltstone and mudstone and light yellowish-brown fine silty sandstone; moderately hard to hard; damp	
40	■	6 19		B:N42W,28NE 116/16.5			
45			JQs	B:N40W,27NE			
50				B:N42W,26NE			
55							
						TOTAL DEPTH 57 Ft. (Elev. 1041') No Ground Water No Caving Slide Plane @ 24 Ft. (Elev. 1074') Slide Plane @ 29.5 Ft. (Elev. 1068.5') Base of landslide @ 33.5 Ft. (Elev. 1064.5')	Backfill tamped every 5 ft.
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	BJS
DRILLED:	12/9/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1143'
BORING NO.	B-18E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Qal	B:Horizontal		**QUATERNARY ALLUVIUM; Qal (0 - 1 Ft.)** @ 0' Yellowish-gray sandstone and silty sandstone; moderately dense; slightly friable; dry; well bedded	Downhole logged on 12/9/99
			af			**ARTIFICIAL FILL; af (1 - 6 Ft.)** @ 1' Yellowish-brown to dark yellowish-brown muddy pebbly sand with local cobbles; dense to locally loose; damp; apx 1% voids; local fragments of decomposing vegetation	
5		1 1		Apx. Contact: N65E, 27NW 113/9.4		**DEBRIS FLOW DEPOSITS/ALLUVIUM; Qdf/Qal (6 - 13 Ft.)** @ 6' Brown muddy sand with scattered pebbles and local siltstone clasts; some organics at sharp upper contact; possible buried soil at top of debris flows with interfingering Qal	@ 5' Bulk Sample @ 5' Sampler had only 10" of material; possibly disturbed
			Qdf/Qal			@ 8' Irregular contact with jumbled mix of yellowish-gray sand and pebbly sand (Qal?), light yellowish-brown fine silty sand and brown pebbly muddy sand with local charcoal fragments	
10		1 1		119/6.5		@ 11-12.5' Two lenses of pebbly sand on north side of hole; alluvium?; locally clast supported	@ 10-12' Bag Sample of charcoal fragments
				SS:N37W,33NE		**LANDSLIDE DEBRIS; Qls (13 - 18.5 Ft.)** @ 13' Light yellowish-brown fine silty sandstone, sandstone and pebbly sandstone; dense; slightly damp to damp; slightly disturbed (creep?)	@ 14' Small bag sample of clay
15			Qls			@ 14' 1-2"-thick; moderate-brown clay interbed; soft; sticky; plastic; sheared; carbonate blebs; truncated by overlying Qal	
		6		122/2.6			
				SP:N24W,28NE X-B:N7W,30NE		@ 18.5' 1/4-3/4" moderate-brown clay; slightly plastic; damp; slide plane?	Drive sample at 18 ft. stopped due to hard pebbly sandstone
20						**BEDROCK; TQs (18.5 - 30 Ft.)** @ 18.5' Yellowish-gray sandstone and pebbly sandstone; moderately hard to hard; damp; obvious cross-bedding and channeling	
				B:N49W,35NE B:N38W,30NE			
25			TQs			@ 28' Thin, irregular yellowish-gray siltstone interbed	
30						TOTAL DEPTH 30 Ft. (Elev. 1113') No Ground Water No Caving Slide Plane @ 18.5 Ft. (Elev. 1124.5')	Backfill tamped every 5 ft.
35							

CLIENT: Newhall Ranch Company	JOB NO.: 99-1703QlsII-1	**DRILL HOLE LOG**	
PROJECT: Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE: 7/22/04		
	LOGGED BY: BJS		
DRILLING COMPANY: Tri-Valley Drilling/Dave	DRILLED: 12/10/99		
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-19E	
DRIVING WEIGHTS: 0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.	ELEVATION: 1125'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			af			**ARTIFICIAL FILL; af (0 - 3.5 Ft.)** @ 0' Grayish-brown muddy pebbly sand; firm; slightly damp; irregular basal contact	Downhole logged on 12/10/99
						LANDSLIDE DEBRIS; Qls (3.5 - 53.5 Ft.) @ 3.5' Highly disturbed light-gray pebbly sandstone; loose; dry to slightly damp	
5	■	2 2 2		Apx B: N41E,31NW 123/2.0			Drive Sample @ 5 ft. had rock in tip
						@ 7' Irregular contact with light yellowish-brown to yellowish-brown fine sandy siltstone; moderately dense; damp	
10	■	1 2 1				@ 10.5' Yellowish-brown to brown mudstone interbeds; slight blue-gray mottling; wispy; disturbed	@ 10' Consol
15							
						@ 16.5' Irregular clayey mudstone; slightly sticky	
						@ 18' Bedding clearly disrupted	
20	■	2 2 4	Qls	SP:N70W,13SW 110/15.8		@ 21' 1.5-2" thick moderate-brown plastic clay; very sticky and plastic	@ 21' 4 hand-driven rings oriented normal to slide plane @ 20' Consol @ 21' % fines = 96.1
				B:N85W,18SW		@ 22.5' Yellowish-gray sandstone and pebbly sandstone interbeds	
25							
						@ 26' Yellowish-brown fine-grained silty sandstone	
						@ 28' Tight folded bedding; landslide disrupted	
30	■	4 12 20		B:N52W,60SW 114/13.1			@ 31' Bedding overturned?
35				Parting: N65W, 74SW ST:Down Dip SP:E-W,40SW SP:N74W,63SW		@ 35' Moderate-brown clay parting; disturbed mix of siltstone and claystone below	@ 34' 2 minor reverse faults; 6-8" separation

CLIENT: Newhall Ranch Company	JOB NO.: 99-1703QlsII-1	**DRILL HOLE LOG**	
PROJECT: Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE: 7/22/04		
	LOGGED BY: BJS		
DRILLING COMPANY: Tri-Valley Drilling/Dave	DRILLED: 12/10/99		
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-19E	
DRIVING WEIGHTS: 0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.	ELEVATION: 1125'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				ST:Downdip to southwesterly SP:N27E,10SE			
40		4 11 17	Qls	109/22.0		@ 39.5' 1/8-1/4"-thick moderate reddish-brown plastic clay; yellowish-brown siltstone with local fine silty sandstone interbeds below; dense; damp	@ 40' Consol
45				Parting: N58E,53SE ST:Gently SW SP:N30W,21NE B:N55W,24NE		@ 44' Common discontinuous clay-lined partings with subhorizontal striations @ 44.5' 1/4-1/2" thick, moderate-brown mudstone; sheared; sticky; tighter rock below but slightly disturbed	
50		6 20		B:N52W,22NE 113/17.9			
55				SP:N62W,26NE MF:N43W,47NE		@ 52.5' Discontinuous, polished clay partings with variable striations @ 53.5' 1"-thick moderate-brown clay; very plastic and sticky; moist; local polished pebbles in clay; irregular claystone and minor fault just below main slide plane	@ 54' Bulk sample of clay @ 54.5' Minor fault with 1/16" silty sand gouge; related to landslide movement?
60			TQs	B:N41W,30NE		**BEDROCK; TQs (53.5 - 65 Ft.)** @ 53.5' Yellowish-brown fine-grained silty sandstone with light-gray sandstone and pebbly sandstone interbeds; moderately hard to hard; damp @ 59' Conglomerate locally concretionary	
65						TOTAL DEPTH 65 Ft. (Elev. 1060') No Ground Water No Caving Slide Plane @ 21 Ft. (Elev. 1104') Slide Plane @ 35 Ft. (Elev. 1090') Slide Plane @ 39.5 Ft. (Elev. 1085.5') Slide Plane @ 44.5 Ft. (Elev. 1080.5') Slide Plane @ 53.5 Ft. (Elev. 1071.5')	Backfill tamped every 5 ft.
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company	JOB NO.:	99-1703QlsII-1
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE:	7/22/04
		LOGGED BY:	BJS/MAS
DRILLING COMPANY:	Tri-Valley Drilling/Dave	DRILLED:	12/13/99
DRILLING METHOD:	Bucket-Auger (86' Rig)	HOLE DIA:	24"
HAMMER TYPE:	Telescoping Kelly Bar	AVERAGE DROP (in.):	12"
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.	ELEVATION:	1161'

BORING NO. B-20E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						LANDSLIDE DEBRIS; Qls (0 - 31.5 Ft.) @ 0' Highly disturbed mix of light yellowish-brown siltstone and fine silty sandstone and yellowish-brown to moderate-brown mudstone stringers; moderately dense to crumbly; slightly damp to damp; local concretions; rootlets to 6 ft.	Downhole logged on 12/13/99 @ 0-10 ft. Mixed Bulk Sample
5		1 2 2		101/11.1			
				SP:N45E,25SE B:N63E,63SE		@ 6.5' Brown fine sandy mud layer; interbedded, steeply dipping pebbly sandstone and pebbly mudstone below	
10		1 2 3		108/21.4			@ 10' Consol
			Qls			@ 11' Thoroughly disturbed; possible Qosw?	@ 12-17' Mixed Bulk Sample
15				SP:N43E,32SE B:N80W,23NE		@ 14.5' 1/2"-thick moderate-brown clay; sticky; plastic; moist; slide plane; mottled yellowish-brown fine sandy siltstone below @ 16' Light-gray pebbly sandstone below sharp irregular contact parallel to slide plane @ 14.5'; cross bedding and chanelling @ 17.5' Siltstone rip-up clast	
20				Apx B: N5E,32SE		@ 19' Very coarse pebbly sandstone with minor silt; moderately hard to hard; poorly bedded @ 21' Pebbly conglomerate; locally clast-supported with black stains on pebbles	
25				Parting: N40W, 22NE		@ 25' Large siltstone rip-up clasts at base of conglomerate @ 27' Sharp, erosional contact with yellowish-brown fine sandy siltstone and mudstone; clayey parting just below contact @ 29' Grades to silty sandstone and sandstone	
30		30		SP:N49W,29NE		@ 31' Slightly wispy moderate-brown mudstone interbeds @ 31.5' 1/2"-thick moderate-brown clay; sticky; plastic; sheared; slide plane	Drive Sample at 30 ft. had rock in lip- no recovery
35		12 39	TQs	B:N49W,28NE 121/12.1		**BEDROCK; TQs (31.5 - 50 Ft.)** @ 31.5' Light yellowish-brown fine silty sandstone; moderately hard to hard; damp; locally laminated; local concretions	

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	BJS/MAS
DRILLED:	12/13/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1161'

BORING NO. B-20E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40		26 51		134/7.3		@ 38' Thin light yellowish-brown sandstone interbeds and lenses with local cross-bedding	
				B/SH:N45W,32NE		@ 42' 3/8"-thick moderate-brown mudstone interbed; slightly sheared, plastic and sticky @ 43.5' Cobble conglomerate with coarse-grained pebbly sandstone below; hard to very hard; well cemented	@ 42' Probable tectonic shearing
45			TQs				
50						TOTAL DEPTH 50 Ft. (Elev. 1111') No Ground Water No Caving Slide Plane @ 6.5 Ft. (Elev. 1154.5') Slide Plane @ 14.5 Ft. (Elev. 1146.5') Slide Plane @ 31.5 Ft. (Elev. 1129.5')	Backfill tamped every 5 ft.
55							
60							
65							
70							
75							

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

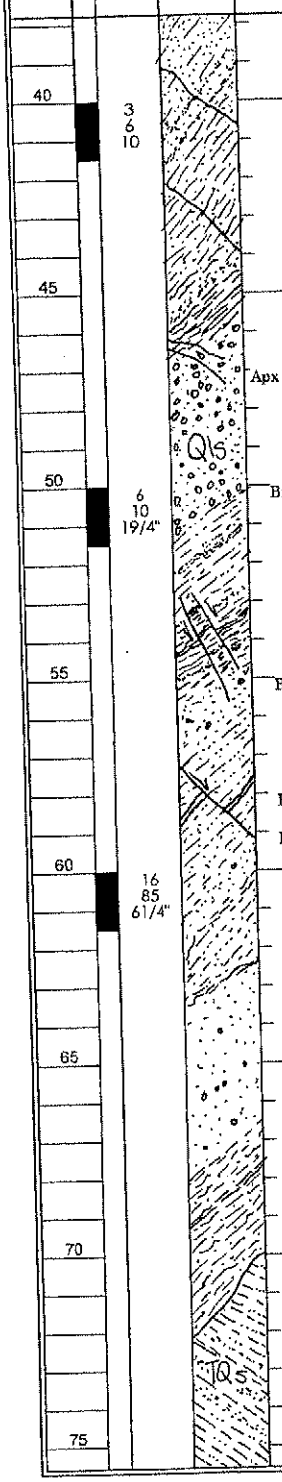
DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	BJS/MAS
DRILLED:	12/14-15/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1175'
BORING NO.	B-21E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Qsw			**SLOPEWASH; Qsw (0 - 1.5 Ft.)** @ 0' Yellowish- to grayish-brown silty pebbly sand; soft; slightly damp; 1-2% voids **LANDSLIDE DEBRIS; Qls (1.5 - 70 Ft.)** @ 1.5' Disturbed interbeds of light yellowish-brown fine silty sandstone, yellowish-brown siltstone/sandy siltstone and yellowish-brown to brown mudstone; soft to moderately dense; damp; fractures with CACO3 linings common to 5 ft.	Downhole logged on 12/14 and 12/15/99
5		2 3 4		108/15.2		@ 5' Dense	
						@ 7.5' Small patch of Qsw; local moderate reddish- brown siltstone interbeds	@ 7.5' Minor normal fault; 2" offset
10		3 4 6		Apx B:N55E,44NW Apx MF:N63E,44SE 111/16.5			@ 10' Minor Fault @ 10' Consol @ 12' Minor normal fault; 10" offset
						@ 14' Yellowish-brown fine-grained silty sandstone interbed	
15			Qls	B:N30E,52NW		@ 16' Pebble conglomerate and sandstone interbeds	
20		5 15 33		110/11.3			@ 20' Bulk Sample
						@ 23.5' Irregular contact/minor fault with 1/4-1/2" yellowish-brown slightly sticky sandy mud	
25						@ 25' Second irregular contact	
				Apx B:N47E,43NW		@ 27' Concretions	
						@ 29.5' Moderate reddish-brown fine muddy sandstone	@ 29' Minor Fault
30		7 20 28		129/10.8			
						@ 32.5' Grades yellowish-brown	@ 33' Minor Fault
35							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	BJS/MAS
DRILLED:	12/14-15/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1175'
BORING NO.	B-21E



DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						@ 38' Irregular contact/minor fault; local hollow sound below when struck with a hammer	
40		3 6 10		113/14.2		@ 40' Interbedded yellowish-brown siltstone/sandy siltstone with minor light yellowish-gray sandstone; moderately hard; damp; local fracturing	@ 40' Consol @ 42.5' Minor fault
45				Apx B:N55E,35NW		@ 46.5' Complex zone of disturbed mudstone and cross-bedded pebbly sandstone; locally soft	
50		6 10 19/4"		B:N51E,43NW 117/4.2		@ 50' Interbedded light yellowish-brown fine silty sandstone and yellowish-brown siltstone; moderately hard to locally soft; damp; well bedded but slightly irregular @ 53' Thin reddish-brown siltstone interbed	
55				B:N53E,42NW			@ 54.5' Minor Fault
				B:N50E,40NW MF:N2E,51SE		@ 58' Thin reddish-brown siltstone interbed	@ 58.5' Minor normal fault: 4" offset
60		16 85 61/4"		107/18.5		@ 62.5' Sandstone	
65							
				SP:N76E,37NW		@ 67' Siltstone/mudstone with clayey slide plane; underlain by additional sheared mudstone	@ 68' bag sample of clay @ 68' 4 hand-driven rings oriented normal to slide plane; Landslide materia generally tight but non-regional to 70 ft
70						**BEDROCK; TQs (70 - 85 Ft.)** @ 70' Yellowish-brown fine silty sandstone/sandy siltstone with siltstone and mudstone interbeds; moderately hard; damp	
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	BJS/MAS
DRILLED:	12/14-15/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1175'

BORING NO. B-21E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				B:N42W,24NE			
80			Qls				
85						TOTAL DEPTH 85 Ft. (Elev. 1090') No Ground Water No Caving Slide Plane @ 67 Ft. (Elev. 1108')	Backfill tamped every 5 ft.
90							
95							
100							
105							
110							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	BJS
DRILLED:	12/15/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1093'

BORING NO. B-22E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						ARTIFICIAL FILL; af (0 - 3 Ft.) @ 0' Grayish-brown muddy sand with local pebbles; firm; slightly damp	Downhole logged on 12/16/99
			af			**SLOPEWASH; Qsw (3 - 10 Ft.)** @ 3' Yellowish-brown pebbly muddy sand with blocks of TQs sandstone; soft to firm; damp; irregular basal contact	
5		1/18"	Qsw				@ 5' % fines = 43.3
10		2 2 3		107/23.0		**LANDSLIDE DEBRIS; Qls (10 - 26 Ft.)** @ 10' Yellowish-brown siltstone and light yellowish-brown fine sandy siltstone with sandstone and pebbly sandstone interbeds; disrupted; dense; damp; local CACO3 from 10-12 ft.	
				B:N70W,56NE			
15						@ 16' Brown siltstone; soft; bedding disrupted	
20		1 2 2	Qls	106/21.5		@ 20' Local light-brown sandstone stringers; soft; thoroughly disrupted; possibly some Qal material	
25						@ 25.5' Large clast of light-gray pebbly sandstone; hard	
				Apx B: Horizontal		**QUATERNARY OLDER ALLUVIUM; Qoa (26 - 32 Ft.)** @ 26' Yellowish-gray sand and pebbly sand with local cobbles; loose; damp; crude horizontal stratification; slightly disturbed; basal contact erosional	
30		6 4 18	Qoa	133/4.0		**BEDROCK; TQs (32 - 50 Ft.)** @ 32' Yellowish-brown to light yellowish-brown siltstone and mudstone with local sandstone interbeds; moderately hard to hard; damp; well bedded; evidence of slight primary soft sediment deformation	
35			TQs	B:42W,23NE			

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	BJS
DRILLED:	12/15/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1093'

BORING NO. B-22E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40		36 29 50/4"		117/15.3		@ 40' Concretions	
				B:N35W,24NE		@ 42' Thin moderate-brown clayey siltstone interbed; locally cross-bedded sandstone interbeds below @ 43' Pebbly interbed	
45			TQs				
50						TOTAL DEPTH 50 Ft. (Elev. 1043') No Ground Water No Caving Base of landslide @ 25.5 Ft. (Elev. 1067.5')	Backfill tamped every 5 ft.
55							
60							
65							
70							
75							

ALLAN F. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	MAS/BJS
DRILLED:	12/16-17/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1185'

BORING NO. B-23E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						SLOPEWASH/DEBRIS FLOW DEPOSIT; Qsw/Qdf (0 - 14 Ft.) @ 0' Silty pebbly sand with cobbles and small boulders; loose; slightly damp; poorly sorted	Downhole logged on 12/17/99 Surface casing used to 11 ft. due to moderate caving
5	■	4 6 6	Qsw/ Qdf	129/3.8			
10	■	2 3 3		113/12.1		@ 11' Sandstone clasts in light yellowish-brown sandstone matrix; highly disturbed; loose/soft to moderatley dense; damp	@ 10' Consol
15						**LANDSLIDE DEBRIS; Qls (14 - 33 Ft.)** @ 14' Yellowish-brown to grayish-yellowish-brown siltstone; soft to firm; damp @ 17' Disturbed sandstone interbeds	
20	■	2 3 3	Qls	124/11.7		@ 19.5' Light yellowish-brown silty sandstone to sandy siltstone with local pebbles @ 21' Yellowish-brown fine sandy mudstone; slightly sticky	@ 20' Consol
				SP:N87W,19NE		@ 23' 1/2"-thick moderate yellowish-brown silty clay; moderately plastic and sticky	
25						@ 24' Yellowish-brown silty sandstone with pebbles and local clasts of sandstone; thoroughly disrupted; moderately dense to dense; possible old debris flow	
30	■	3 5 6		113/16.8		@ 31.5' 1-2"-thick, irregular moderate grayish-brown muddy siltstone; soft; basal contact irregular but no distinct slide plane	@ 30' Consol
				B:N65E,15NW			
				Apx. Contact: N60E, 55NW		**BEDROCK; TQs (33 - 50 Ft.)** @ 33' Interbedded yellowish-brown siltstone/sandy siltstone with light yellowish-brown fine sandstone, moderate reddish-brown muddy sandstone, and moderate yellowish-brown mudstone interbeds; moderately hard to hard; damp; typically thin bedded	
35			TQs	Apx B:N42W,34NE		@ 35' Moderate reddish-brown mudstone interbeds	

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	MAS/BJS
DRILLED:	12/16-17/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1185'
BORING NO.	B-23E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40		7 18 24	TQs	B:N32W,27NE N37W,23NE 118/15.6		@ 38' Moderate reddish-brown mudstone interbeds	
45						@ 47' Pebbles	
50						TOTAL DEPTH 50 Ft. (Elev. 1135') No Ground Water Moderate Caving to 11 Ft. Slide Plane @ 23 Ft. (elev. 1162') Base of landslide @ 31.5 Ft. (Elev. 1153.5')	Backfill tamped every 5 ft.
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	MAS/BJS
DRILLED:	12/17,20/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1058'

BORING NO. B-24E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			af	119/5.2		**ARTIFICIAL FILL; af (0 - 2 Ft.)** @ 0' Yellowish-brown muddy sand with pebbles; firm; dry to damp; poorly sorted; pinhole voids	Downhole logged on 12/17 and 12/20/99
	■	1 2 2	Qsw			**SLOPEWASH; Qsw (2 - 4.5 Ft.)** @ 2' Yellowish-brown silty clayey sand with pebbles; soft; damp; minor caliche	
5	■	1 2 2		118/10.6		**LANDSLIDE DEBRIS; Qls (4.5 - 40 Ft.)** @ 4.5' Disrupted mix of yellowish-brown siltstone, moderate yellowish-brown mudstone and light yellowish-brown silty sandstone; stiff to moderately dense; damp; locally laminated @ 6' Brown clayey silt layer	
10	■	2 2 2		105/22.1		@ 10' Light-brown siltstone and clayey siltstone; sheared; fractures @ 11' 1-4"-thick moderate-brown siltstone and claystone; moderately plastic; moist; irregular; local disturbed sandstone units and mudstone stringers below	
15				SP:N40E,26SE		@ 14' Yellowish-brown silty sandstone and sandy siltstone; soft to moderately dense; damp	
				B/SP:N49E,29SE			
20	■	1 2 2	Qls	108/15.3		@ 20' Pebbly sandstone interbed @ 22' Dense	
25				Apx B: N43W,20NE			
				SP:N76E,13NW		@ 27' Local concretions @ 28' Thin moderate-brown clay, sheared	
30	■	5 9 15		120/8.8			
35				SP:N84W,15NE		@ 33' 1"-thick moderate-brown silty clay; slightly sheared; truncates beds; dense but disrupted below; concretions	

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	MAS/BJS
DRILLED:	12/17,20/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1058'

BORING NO. B-24E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40			Qls	B:N10W,9NE Contact: N22E,8NW		@ 39.5' Pebbly sand layer; dense; possible old alluvium **BEDROCK; TQs (40 - 50 Ft.)** @ 40' Interbedded yellowish-brown siltstone and mudstone and light yellowish-brown fine silty sandstone; moderately hard to hard; damp @ 42' Pebbly lense	
				B:N40W,29NE			
45			TQs	B:N41W,28NE			
50						TOTAL DEPTH 50 Ft. (Elev. 1008') No Ground Water No Caving Slide Plane @ 14 Ft. (Elev. 1044') Slide Plane @ 18 Ft. (Elev. 1040') Slide Plane @ 28 Ft. (Elev. 1030') Slide Plane @ 33 Ft. (Elev. 1025') Base of landslide @ 39.5 Ft. (Elev. 1018.5)	Backfill tamped every 5 ft.
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	MAS/BJS
DRILLED:	12/20-21/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1047'

BORING NO. B-25E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
		2 2 4	Qsw			**SLOPEWASH; Qsw (0 - 5.5 Ft.)** @ 0' Light yellowish-brown silty pebbly sand with zones of pebbly sand; poorly sorted; loose to firm; dry; structureless	Downhole logged on 12/20 and 12/21/99
5		3 2 3		124/2.4		**DEBRIS FLOW DEPOSIT/LANDSLIDE; Qdf/Qls (5.5 - 23 Ft.)** @ 5.5' Light yellowish-brown silty sand with pebbles and locally sandy lenses; loose to firm; slightly damp; vague subhorizontal layering of sandy lenses	
10		1 1 4		114/6.0		@ 11' Yellowish-brown fine silty sand with scattered pebbles and local sand lenses; damp; thin carbonate filaments	@ 10' Drive sample had rock in tip
15			Qdf/ Qls				
20		2 4 8		125/8.4 B: Shallow		@ 21.5' Light-gray coarse-grained pebbly sand layer; loose; possibly fluvial	
25				B:N2W,28NE Apx B: N39W,26NE		**LANDSLIDE DEBRIS?; Qls? (23 - 35.5 Ft.)** @ 23' Yellowish-brown siltstone/silty sandstone with TQs sandstone fragments and local moderate yellowish-brown mudstone; dense but slightly disturbed; damp; locally thin bedded @ 25' End of TQs sandstone fragments but still a slightly disturbed appearance @ 27' Moderately hard and only slightly disturbed appearance	
30		17 18 33	Qls?	124/8.2			
35			TQs	Contact/SP: N77W, 14NE B:N49W,31NE		@ 35' Moderate-brown silty clay; slightly plastic; overlies a thin yellowish-gray pebbly sandstone lense (possibly fluvial?) **BEDROCK; TQs (35.5 - 50 Ft.)** @ 35.5' Interbedded yellowish-brown siltstone and mudstone with light	

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	MAS/BJS
DRILLED:	12/20-21/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1047'
BORING NO.	B-25E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40		7 16 49		B:N40W,32NE 117/16.6		yellowish-brown silty sandstone interbeds; moderately hard to hard; damp; thin bedded to locally laminated; upper 2 feet slightly disturbed	
45			TQs	B:N48W,25NE			
50						TOTAL DEPTH 50 Ft. (Elev. 997') No Ground Water No Caving Base of landslide @ 35 Ft. (Elev. 1012')	Backfill tamped every 5 ft.
55							
60							
65							
70							
75							

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	MAS/BJS
DRILLED:	12/21-22/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1036'

BORING NO. B-26E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
		7 17/4"		127/7.5 B:N50W,24NE		**BEDROCK; TQs (0 - 43 Ft.)** @ 0' Light yellowish-gray pebbly sandstone and conglomerate with local silty interbeds; moderately hard and cemented; dry to slightly damp; cross bedded and channeled; siltstone rip-up clasts	Downhole logged on 12/21 and 12/22/99 @ 1' Drive sample had rock in tip
5		7 30		134/2.8 Apx B: N38W,31NE		@ 8' Pebble to cobble conglomerate with black stains; clast supported with locally no matrix; well cemented; cross-bedded sandstone interbed below	
10		18 30		138/3.2 B:N45W,26NE		@ 12' Erosional contact with light yellowish-brown sandy siltstone interbed; mottled to laminated; damp	
15			TQs				
20		7 16 16/3"		B:N40W,33NE B:N41W,23NE 126/12.3		@ 20' Erosional contact with yellowish-brown to brown siltstone and fine sandy siltstone and local silty clay interbeds; moderately hard to hard; damp; slight evidence of soft sediment deformation; local concretions	
25							
30		6 10 20		B/Sh:N42W,40NE B/Sh:N48W,33NE St:32,N33E		@ 30' 1"-thick moderate-brown clay; slightly plastic; soft; bedding sheared and steeper than regional to 31 ft. @ 31' 1"-thick moderate-brown silty clay; slightly plastic; 1/8"-thick plastic clay parting at base @ 31.1' Yellowish-brown siltstone and sandy siltstone with light yellowish-brown silty sandstone interbeds; moderately hard to hard; damp; thin bedded to laminated	@ 30' % fines = 87 Landslides to southeast probably failed along same clay beds observed here @ 30 & 31 bedrock above appears intact c observed shearing is probably tectonic in origin
35				B:N46W,28NE			

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	MAS/BJS
DRILLED:	12/21-22/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1036'
BORING NO.	B-26E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40	■	20 38	TQs	116/16.4			
						TOTAL DEPTH 43 Ft. (Elev. 993') No Ground Water No Caving	Backfill tamped every 5 ft.
45							
50							
55							
60							
65							
70							
75							

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	MAS/BJS
DRILLED:	12/22/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1042'

BORING NO. B-27E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						TERRACE DEPOSITS; Qt (0 - 28 Ft.) @ 0' Yellowish-brown siltstone and light yellowish- brown silty sandstone and discontinuous sandstone interbeds and lenses; moderately dense; dry to damp; minor carbonate; local dark grayish-brown muddy sand interbeds may represent paleosols	Downhole logged on 12/23/99
		1 1 1		Apx B: N65E,6NW 102/13.0			
							@ 5' % fines = 75.3
5		1 2 3		B:Gently SW dipping			
							@ 9' Bag sample of charcoal material
						@ 9' Brown muddy sand layer; possible paleosol; charcoal fragments	
10		3 4 5		B:N30W,6SW 115/7.7			
			Qt			@ 13' Brown muddy sand layer; possible paleosol	
15							
				B: Subhorizontal			
						@ 18.5' Brown muddy sand layer; possible paleosol @ 19' Brown mudstone interbed; slightly soft @ 20' Light yellowish-brown silty sandstone	
20		2 3 4		Contact: N50E, 25NW 126/7.5		@ 21' Yellowish-brown to brown muddy sand with scattered pebbles; soft to firm; damp to moist; poorly sorted; structureless; probably old slopewash/debris flow deposit; scattered charcoal fragments	@ 21-23' Bag sample of charcoa material
25						@ 25.5' Irregular contact with pebbly sandstone with cobbles; dense but friable; damp; crude bedding; cross bedded; basal deposits of older alluvium	
				Apx B: N60W,5NE		**BEDROCK; TQs (28 - 50 Ft.)** @ 28' Erosional contact with yellowish-gray fine-grained sandstone; moderately hard; damp; thin bedded to laminated and cross bedded; minor weathering and fracturing below older alluvium	
30		14 38 40		113/6.4 B:N39W,26NE		@ 31' Light yellowish-brown sandstone and silty sandstone, yellowish-brown siltstone and local lenses of clast-supported pebble conglomerate; local concretions	
35			TQs				

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT: Newhall Ranch Company	JOB NO.: 99-1703QlsII-1
PROJECT: Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE: 7/22/04
	LOGGED BY: MAS/BJS
DRILLING COMPANY: Tri-Valley Drilling/Dave	DRILLED: 12/22/99
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.	ELEVATION: 1042'

BORING NO. B-27E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40		10 14 48	TQs	119/12.7 B:N57W,27NE B:N44W,23NE		@ 40' Primarily siltstone and sandy siltstone interbeds; thin bedded to laminated; some mottling and cross laminations	
45							
50						TOTAL DEPTH 50 Ft. (Elev. 992') No Ground Water No Caving	Backfill tamped every 5 Ft.
55							
60							
65							
70							
75							

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	MAS/BJS
DRILLED:	12/27/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1237'

BORING NO. B-28E

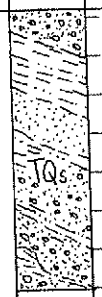
DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Qsw			**SLOPEWASH; Qsw (0 - 3 Ft.)** @ 0' Yellowish-brown sandy silt with pebbles; soft; damp; krotovina	Downhole logged on 12/27/99 @ 0-10' mixed bulk sample
			Qls			**LANDSLIDE DEBRIS; Qls (3 - 18.5 Ft.)** @ 3' Light yellowish-brown siltstone with sandy lenses; firm; damp; caliche common; bedding appears slightly disrupted	
5	■	1 3 2		Apx B: N34W,20NE 109/8.3		@ 6' Yellowish-brown mudstone interbeds; generally tight but with local soft spots	
						@ 9' Bedding slightly irregular	@ 10-20' mixed bulk sample
10	■	1 3 4		115/17.4			
				Apx B: N40W,8NE		@ 14' Discontinuous slightly irregular sandstone interbed	
15						@ 15.5' Wispy fine-grained sandstone interbed	
				B:N18W,18NE		@ 17' Interbedded siltstone and light yellowish- brown fine-grained sandstone; wispy; cross laminated; slightly soft	
				SP:N37W,20NE		@ 18.4' Thin moderate yellowish-brown sandy mudstone; soft; slightly sticky and sheared	@ 20' Rock in tip of drive sampler
20	■	1 4 22		B:N33W,28NE 115/13.4		**BEDROCK; TQs (18.5 - 45 Ft.)** @ 18.5' Interbedded yellowish-brown siltstone and light yellowish-brown silty sandstone and sandstone; dense; damp; bedding more consistent than above; possibly slightly disturbed	
				B:N41W,23NE		@ 22' Well-cemented conglomerate lense; hard; basal contact erosional	
25				B:N22W,33NE		@ 23' Interbedded yellowish-brown siltstone and light yellowish-brown fine-grained sandstone with local lenses of pebbly to cobbly sandstone; moderately hard; damp; locally laminated	
			TQs			@ 28' Pebbly lense with cobbles	
30	■	12 22 49		128/11.7 B:N40W,25NE			
						@ 33' Evidence or primary soft sediment deformation; poorly sorted silty sandstone interbed with scattered pebbles below	
35				B:N30W,27NE		@ 36' Well-cemented layer of pebbles and cobbles	

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.

JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	MAS/BJS
DRILLED:	12/27/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1237'

BORING NO. B-28E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40				B:N30W,23NE		@ 40' Sandstone and pebbly sandstone interbeds	
45						TOTAL DEPTH 45 Ft. (Elev. 1192') No Ground Water No Caving Slide Plane @ 18.4 Ft. (Elev. 1218.6')	Backfill tamped every 5 ft.
50							
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	MAS/BJS
DRILLED:	12/28/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1182'

BORING NO. B-29E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Soil			**SOIL; (0 - 3 Ft.)** @ 0' Grayish-brown sandy mud with scattered pebbles; soft to firm; slightly damp to damp; poorly sorted; structureless; small carbonate filaments	Downhole logged on 12/28/99 @ 0-20' Mixed Bulk Sample
			Qls/Qdf			**LANDSLIDE/DEBRIS FLOW DEPOSIT; Qls/Qdf (3 - 25 Ft.)** @ 3' Gradational contact with yellowish-brown muddy sand with scattered pebbles; soft to firm; damp; structureless; highly disturbed	
5				103/12.0			
10							
15						@ 17' Irregular light yellowish-brown silty sand layer @ 18' Yellowish-brown silty pebbly sand below	
20							
25				Apx Contact: N80E, 10SE		**BEDROCK; TQs (25 - 35 Ft.)** @ 25' Yellowish-gray silty, coarse, pebbly sandstone with local cobbles; moderately hard; damp	No distinct slide plane at base of Qls/Qdf
30			TQs	B:N54W,23NE		@ 30' Irregular erosional contact with yellowish-brown to light yellowish-brown siltstone and fine sandy siltstone with interbedded mudstone; moderately hard; damp	
35		7 14 29		121/13.6		TOTAL DEPTH 35 Ft. (Elev. 1147') No Ground Water, No Caving Base of landslide @ 25 Ft. (Elev. 1157')	Backfill tamped every 5 Ft.

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	MAS/BJS
DRILLED:	12/28/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1218'

BORING NO. B-30E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			af			**DUMPED FILL; af (0 - 1.5 Ft.)**	Downhole logged on 12/28/99 and 12/29/99
	■	1/12" 1		84/12.6		**SLOPEWASH/DEBRIS FLOW DEPOSIT; Qsw/Qdf (1.5-7.5 Ft.)** @ 1.5' Brown sandy mud with scattered pebbles; soft; slightly damp; krotovina	@ 0-5' mixed bulk sample
			Qsw/ Qdf				
5	■	1 1 2		110/8.8			@ 5-10' mixed bulk sample
						BEDROCK; TQs (7.5 - 35 Ft.) @ 7.5' Yellowish-brown sandy siltstone with sandstone interbeds; dense to moderately hard; damp	
10	■	4 8 12		B:N35W,26NE		@ 10' Interbedded light yellowish-brown slightly silty sandstone; pebbly sandstone and pebble conglomerate; moderately hard; damp; some cross bedding and channeling	@ 10' % fines = 37.3 @ 10-20' mixed bulk sample
15				B:N42W,29NE			
			TQs				
20	■	17 5/1"		124/3.5			
						@ 23' Erosional contact with yellowish-brown siltstone; moderately hard; damp	
25							
				B:N45W,22NE		@ 28' Yellowish-gray sandstone with pebbly lenses	
30	■	17 50/5"		131/3.4			
35						TOTAL DEPTH 35 Ft. (Elev. 1183') No Ground Water No Caving	Backfill tamped every 5 ft.

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	MAS/BJS
DRILLED:	12/29/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1260'

BORING NO. B-31E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Qsw			**SLOPEWASH; Qsw (0 - 2.5 Ft.)** @ 0' Grayish-brown sandy silt with pebbles; soft; damp	Downhole logged on 12/29/99
						LANDSLIDE/DEBRIS FLOW DEPOSIT; Qls/Qdf (2.5 - 15 Ft.) @ 2.5' Moderate yellowish-brown siltstone with silty pebbly sandstone patches; firm; damp to moist; local carbonate; nearly structureless; grades muddier with depth	
5	■	1 2 3		109/14.1			
			Qls/ Qdf				
10	■	1 2 3					@ 10' Bulk Sample
						@ 12' Slightly sticky	
15				B:N31W,25NE		@ 14.9' Slightly sheared mudstone above intact bedrock; slide plane? **BEDROCK; TQs (15 - 45 Ft.)** @ 15' Yellowish-brown siltstone, moderate-brown mudstone and interbedded light yellowish-brown fine- to medium-grained sandstone; moderately hard; damp; commonly thin bedded to laminated	
				B:N38W,20NE			
20	■	6 13 23		119/12.0 B:N45W,19NE		@ 21' Moderately hard to hard	
25			TQs				
30	■	8 29 52		118/14.3			
				B:N32W,25NE		@ 34' Sandstone interbed with a slightly erosional base	
35						@ 35' Local cross laminations and evidence of soft sediment deformation	

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	MAS/BJS
DRILLED:	12/29/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1260'
BORING NO.	B-31E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40			Tos	B:N35W,29NE			
45						TOTAL DEPTH 45 Ft. (Elev. 1215') No Ground Water No Caving Base of landslide @ 14.9 Ft. (lev. 1245.1')	Backfill tamped every 5 ft.
50							
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	MAS/BJS
DRILLED:	12/29-30/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1255'

BORING NO. B-32E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						SLOPEWASH; Qsw (0 - 8 Ft.) @ 0' Brown muddy sand with pebbles; firm; dry to damp; poorly sorted; krotovina; roots; tight but pinhole voids to 7 ft.	Downhole logged on 12/30/99
5	■	2 2 2	Qsw				
						LANDSLIDE; Qls (8 - 35 Ft.) @ 8' Irregular contact with light yellowish-brown silty pebbly sandstone; firm to locally loose; damp; bedding jumbled; some roots	
10	■	2 3 5		127/2.2			@ 12' Bulk Sample
15			Qls			@ 16' Irregular contact with moderate yellowish- brown, mottled clayey siltstone with irregular patches of sandstone and pebbly sandstone; damp to moist	
20	■	3 4 5					@ 20' % fines = 73.7
25						@ 28' Gravelly sand; loose	
30	■	7 4 8		SP:N87W,10N 110/21.1 SP:N30E,10NW		@ 30' 1-1.5"-thick moderate-brown clay; plastic; interbedded yellowish-brown sandy siltstone and mudstone below; slightly soft for TQs @ 32' Thin silty clay with minor blue-gray mottling and a parting/ slideplane	@ 30' 3 hand-driven rings oriented normal to slide plane
35			TQs	B:N35W,20NE		@ 34.9' Slightly sticky and plastic with clayey partings **BEDROCK; TQs (35 - 55 Ft.)** @ 35' Interbedded moderate-brown to yellowish-brown siltstone and mudstone; moderately hard; damp to moist; bedding vague; possible	

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	MAS/BJS
DRILLED:	12/29-30/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1255'
BORING NO.	B-32E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						primary soft sediment deformation	
						@ 39' Light yellowish-brown silty sandstone interbed	
40		7 13 33		116/17.8 B:N40W,24NE		@ 41' Sandstone interbed	
45			TQs	Apx B: N20W,18NE B:N42W,24NE		@ 45' Sandstone interbed	
50							
55						TOTAL DEPTH 55 Ft. (Elev. 1200') No Ground Water No Caving Slide Plane @ 30 Ft. (Elev. 1225') Slide Plane @ 32 Ft. (Elev. 1223') Base of landslide @ 34.9 Ft. (elev. 1220.1')	Backfill tamped every 5 ft.
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	MAS/BJS
DRILLED:	12/30/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1214'

BORING NO. B-33E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			af			**ARTIFICIAL FILL; af (0 - 1.5 Ft.)**	Downhole logged on 1/3/00
			Qsw/Qt			**SLOPEWASH/TERRACE DEPOSIT; Qsw/Qt (1.5 - 4 Ft.)** @ 1.5' Yellowish-brown pebbly silty sand; firm; slightly damp; sandy lenses; cobbles at base; vague stratification suggests fluvial deposit	@ 3' Bulk Sample
	■	3 5 7		110/14.2		**LANDSLIDE DEBRIS; Qls (4 - 12 Ft.)** @ 4' Moderate-brown to yellowish-brown mudstone and siltstone with minor CaCO3; dense; slightly damp to damp; bedding is slightly irregular but tight	@ 4' Fracture and minor offset
5	■	4 7 9	Qls	112/21.2			@ 8' Minor offset
							@ 10' Bulk Sample
10	■	3 5 6		B:N5W,17NE 106/22.3			
				SP:N32W,18NE		@ 11.9' Moderate-brown, sheared, moderately plastic clay mixed wtih siltstone and sandy siltstone with light-gray silty clay parting (slide plane) at the base	
15				B:N35W,22NE		**BEDROCK; TQs (12 - 38.5 Ft.)** @ 12' Interbedded moderate-brown mudstone to yellowish-brown silty sandstone; moderately hard; damp; bedding vague @ 13' Minor bedding plane shear @ 16' Local coarse-grained sandstone lenses; local concretions in siltstone; well bedded; locally laminated; some soft sediment deformation	
20	■	5 7 13		118/16.3		@ 20' Interbedded yellowish-brown siltstone and light yellowish-brown sandy siltstone	
			TQs				
25						@ 25' Mudstone interbed	
				B:N27W,20NE			
30	■	7 19 57		118/13.7 B:N17W,23NE			
				B:N42W,18NE		@ 33.5' Slightly sticky mudstone interbeds @ 34.5' Slightly sticky mudstone interbeds	
35							

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QislI-1
DATE:	7/22/04
LOGGED BY:	MAS/BJS
DRILLED:	12/30/99
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1214'
BORING NO.	B-33E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						TOTAL DEPTH 38.5 Ft. (Elev. 1175.5') No Ground Water No Caving Slide Plane @ 11.9 Ft. (Elev. 1202.1')	Backfill tamped every 5 ft.
40							
45							
50							
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	BJS
DRILLED:	1/3/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1382'

BORING NO. B-34E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Qsw			**SLOPEWASH; Qsw (0 - 4.5 Ft.)** @ 0' Grayish-brown sandy mud with scattered pebbles; firm to localy soft; damp; 1-2% voids; rootlets @ 3' Sandy siltstone clasts; basal Qsw contact irregular	Downhole logged on 1/3/00
5		Push 1 1		98/9.7		**LANDSLIDE DEBRIS; Qls (4.5 - 22.5 Ft.)** @ 4.5' Highly disrupted mix of yellowish-brown to light yellowish-brown fine sandy siltstone and silty sandstone with scattered pebbles; soft to firm; slightly damp; minor carbonate filaments; bedding	@ 5' Bulk Sample
						@ 9' Bedding present but disrupted and soft; interbedded siltstone and sandy siltstone below	@ 10' Bulk Sample
10		2 4 5	Qls	Apx B: N72E,23NW 112/8.3		@ 12' Pebbly sandstone lense	
15		1 1 2		106/12.6		@ 18' Moderate-brown to moderate reddish-brown mudstone; soft; sticky; wispy	
20		2 5 8		SP:N85W,23NE 117/11.5 B:N13W,20NE		@ 19.5' 0.5-1.5"-thick moderate reddish-brown plastic clay with silty CaCO3 inclusions; plastic; sheared; sticky; disturbed mudstone, pebbly sandstone and muddy sandstone below; soft to firm	@ 19.5' 4 hand-driven ring samples oriented normal to slide plane
				B:N18W,18NE		**BEDROCK; TQs (22.5 - 65 Ft.)** @ 22.5' Yellowish-brown siltstone and sandy siltstone with concretions; moderately hard; damp	
25				B:N27W,20NE		@ 25.5' Pebbly sandstone lense @ 26' Yellowish-brown fine silty sandstone, light yellowish-gray pebbly sandstone and yellowish-brown siltstone interbeds; moderately hard; damp; well bedded with local laminations and cross laminations; possible primary soft sediment deformation	
30		3 11 23	TQs	B/Sh:N39W,25NE 113/15.8		@ 30' Moderate grayish-brown mudstone; slightly sticky and plastic; moderately hard to hard below	
						@ 33.5' Cemented pebbly sandstone	
35				B/SH:N33W,22NE B:N35W,23NE		@ 35' 1-1.5"-thick moderate-brown clay interbed; sticky and plastic; damp to moist; reddish-brown siltstone and light yellowish-brown sandstone and silty sandstone with concretions below; moderately	@ 35' Bulk Sample

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	BJS
DRILLED:	1/3/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1382'
BORING NO.	B-34E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						hard	
40		10 30 48		116/17.2			
45				B:N42W,23NE			
						@ 48' Light-gray pebbly sandstone to pebble conglomerate with cobbles; hard; damp; channeling and cross bedding	
50			TQs	B:N38W,22NE			
55							
						@ 59' Yellowish-brown siltstone interbeds	
60							
65						TOTAL DEPTH 65 Ft. (Elev. 1317') No Ground Water No Caving Slide Plane @ 19.5 Ft. (Elev. 1362.5')	Backfill tamped every 5 ft.
70							
75							

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703Qlsll-1
DATE:	7/22/04
LOGGED BY:	BJS
DRILLED:	1/4/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1355'

BORING NO. B-35E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Slough			**SLOUGH (0 - 1 Ft.)**	Downhole logged on 1/4/00
			Qsw			**SLOPEWASH; Qsw (1 - 8 Ft.)** @ 1' Yellowish-brown to grayish-brown sandy silt with scattered pebbles; soft; slightly damp to damp; roots; pinhole voids throughout	
5							@ 5' Bulk Sample
						@ 6' CaCO3 filaments to 8 ft.	
						LANDSLIDE/DEBRIS FLOW DEPOSIT; Qls/Qdf (8 - 32 Ft.) @ 8' Gradational contact with yellowish-brown sandy silt to light yellowish-brown silty sandstone with local pebbles; firm to locally soft; damp; rare roots; minor CACO3; highly disturbed with no obvious bedding	
10		1 2 3					@ 10' % fines = 66.0
						@ 13.5' Light yellowish-brown pebbly silty sandstone	
15			Qls/ Qdf			@ 15.5' Light yellowish-brown to grayish-brown sandy silt with pebbles and local light-brown mottling; firm; damp	
						@ 19' Cobbly zone; locally loose to very hard	Material from 20-32 ft. is only slightly disturbed
20		7 20 13/1"		132/3.4		@ 20.5' Yellowish-gray pebbly sandstone with yellowish- brown siltstone and sandy siltstone; dense to moderately hard; damp; bedding locally laminated and undulating	@ 21' Bulk Sample
				B:N26W,14NE		@ 22.5' Hard concretionary layer underlain by yellowish-brown to light yellowish-brown silty sandstone/sandy siltstone	Hard drilling from 21-24 ft.
25				Apx B: N30W,19NE		@ 24.5' Mudstone interbed; slightly sheared	
						@ 28' Hard pebbly sandstone lense	
30				SP:N30W,25NE		@ 29.5' 1/2-3/4"-thick moderate reddish-brown clay; plastic; sticky; moist; sheared; parting; local carbonate/silt inclusions; slightly sticky and soft sandy mudstone below	
				B:N24W,25NE		**BEDROCK; TQs (32-55 Ft.)** @ 32' Interbedded light yellowish-brown silty sandstone and yellowish-brown siltstone/mudstone; moderately hard to hard; damp; moderately bedded to laminated; local evidence of primary soft sediment deformation	
35			TQs	B:N32W,25NE		@ 36' Sandstone interbeds; cross laminated	

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	BJS
DRILLED:	1/4/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1355'
BORING NO.	B-35E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40							
				B/Sh:N30W,24NE		@ 42.5' 3/4"-thick moderate-brown mudstone interbed; slightly sticky and irregular @ 43.5' 1/8"-thick moderate-brown mudstone interbed; slightly sticky; sheared and plastic; damp to moist	
45							
				B/Sh:N36W,21NE		@ 46.5' Moderate-brown mudstone interbed; slightly sticky and soft @ 47.5' 2-4"-thick moderate-brown mudstone/claystone; moderately sheared and plastic; damp to moist; parting at base	
50				B:N28W,25NE			
55						TOTAL DEPTH 55 Ft. (Elev. 1300') No Ground Water No Caving Slide Plane @ 29.5 Ft. (elev. 1325.5')	Backfill tamped every 5 ft.
60							
65							
70							
75							

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	MAS/BJS
DRILLED:	1/5/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1308'

BORING NO. B-36E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Qsw			**SLOPEWASH; Qsw (0 - 5 Ft.)** @ 0' Grayish-brown silty sand with pebbles; soft; dry to slightly damp; poorly sorted; roots; 1-2% voids	Downhole logged on 1/5/00
5			Qls			**LANDSLIDE DEBRIS; Qls (5 - 18 Ft.)** @ 5' Irregular contact with yellowish-brown to light-brown silty sand; moderately dense to dense; poorly sorted; damp	
10						@ 9' Irregular contact with light yellowish-brown sandstone; loose; weathered; crude bedding disturbed	
15						@ 13' Yellowish-brown sandy clayey siltstone; soft to firm; damp to moist; caliche; fractures; bedding very disturbed	
				SP:N23W,17NE		@ 17.5' 1/4-1/2" moderate reddish-brown clay; plastic; mottled; parting at top; moderate-brown slightly disturbed and sticky mudstone with concretions below	@ 20' Bulk Sample
20						**BEDROCK; TQs (18 - 60 Ft.)** @ 18' Yellowish-brown siltstone and sandy siltstone with local sandstone and pebbly sandstone interbeds; dense to moderately hard; damp; poorly bedded	
				Apx B: N14W,23NE		@ 21.5' Mudstone interbed	
25		3 6 12				@ 25' Mudstone interbed	@ 25' % fines = 89.9
				B/Sh:N27W,23NE		@ 27' 1/2"-thick moderate-brown silty clay; moderately sticky and plastic	
30			TQs			@ 31' Yellowish-brown sandy siltstone and mudstone; damp to moist	
						@ 33' Moderate-brown mudstone interbed; bedding slightly irregular-soft sediment deformation?; light-brown sandstone interbed below	
35		8 18 25		121/12.4 B:N43W,20NE		@ 36.5' 3/8"-thick moderate reddish-brown silty clay interbed; slightly	

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	MAS/BJS
DRILLED:	1/5/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1308'

BORING NO. B-36E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						plastic	
40						@ 40' Yellowish-brown silty sandstone @ 41' Light yellowish-brown sandstone and pebbly sandstone with siltstone, sandy siltstone and fine-grained sandstone interbeds; moderately hard to hard; bedding thin but discontinuous; local cross laminations and evidence of primary soft sediment deformation	
				B:N40W,17NE			
45				B:N43W,15NE			
50			Qs			@ 49.5' Yellowish-gray pebble to cobble conglomerate with pebbly sandstone interbeds; hard; damp; cross bedding and channeling	
				B:N32W,20NE			
55							
60						TOTAL DEPTH 60 Ft. (Elev. 1248') No Ground Water No Caving Slide Plane @ 17.5 Ft. (Elev. 1290.5')	Backfill tamped every 5 ft.
65							
70							
75							

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	MAS/BJS
DRILLED:	1/5-6/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1288'

BORING NO. B-37E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						SLOPEWASH; Qsw (0 - 6 Ft.) @ 0' Yellowish-brown to grayish-brown silty sand with pebbles; soft to firm; slightly damp; poorly sorted; roots; krotovina	Downhole logged on 1/5/00 and 1/6/00 @ 0-10' mixed bulk sample
		1 1 1	Qsw	104/6.4			
5						**LANDSLIDE DEBRIS; Qls (6 - 19.5 Ft.)** @ 6' Irregular contact with light yellowish-brown silty sandstone and yellowish-brown siltstone; soft; damp; bedding disrupted; roots; krotovina	
10		5 8 9	Qls	110/15.5		@ 11' Moderate yellowish-brown clayey siltstone; firm @ 12' Yellowish-gray pebbly sandstone interbed; loose to moderately dense; disrupted	
				Apx B: N83E,30NW		@ 14' Yellowish-brown clayey siltstone and light yellowish-brown fine sandy siltstone interbeds; locally slightly plastic	
15				SP:N82E,28NW		@ 16.5' 1/2-1"-thick moderate-brown clay; plastic; sticky; moderately sheared; damp to moist; underlying bedding still disrupted	@ 16.5' 3 hand-driven rings oriented normal to slide plane
				SP:N37W,17NE		@ 19.5' Thin grayish silty clay parting at base of slightly soft moderate-brown mudstone/siltstone	@ 20' Drive sample had rock in tip
20		6 9 12		125/13.1		**BEDROCK; TQs (19.5 - 40 Ft.)** @ 19.5' Light-brown slightly silty sandstone with local pebbles; moderately hard; damp; poorly bedded @ 22' Moderate yellowish-brown to moderate reddish- brown mudstone and siltstone; slightly plastic @ 24' Reddish-brown mudstone clast with crystalline core	
				B:N43W,20NE			
25			TQs				
30				B:N40W,15NE		@ 30' Light yellowish-brown fine silty sandstone with local reddish-brown sandy mudstone interbeds; local concretions; bedding gradational; possible primary soft sediment deformation	
35				B:N37W,19NE			

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	MAS/BJS
DRILLED:	1/5-6/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1288'
BORING NO.	B-37E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Tqs				
40		21 36 50/4"		122/8.2		TOTAL DEPTH 40 Ft. (Elev. 1248') No Ground Water No Caving Slide Plane @ 16.5 Ft. (Elev. 1271.5') Slide Plane @ 19.5 Ft. (Elev. 1268.5')	Backfill tamped every 5 ft.
45							
50							
55							
60							
65							
70							
75							

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	MAS/BJS
DRILLED:	1/6/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1398'

BORING NO. B-38E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Qsw/ Qdf			**SLOPEWASH/DEBRIS FLOW DEPOSIT; Qsw/Qdf (0 - 4 Ft.)** @ 0' Yellowish-brown silty sand with local pebbles TQs clasts; soft; slightly damp; krotovina; minor CaCo3; roots; 1-2% voids	Downhole logged on 1/6/00
						LANDSLIDE DEBRIS; Qls (4 - 23.5 Ft.) @ 4' Light yellowish-brown sandy siltstone and yellowish-brown mudstone; soft to firm; damp; CaCo3; poorly bedded	@ 0-10' Mixed Bulk Sample
5	■	2 2 3		Apx B:N35W,10NE 110/8.7			
				Apx B:N40W,32NE 118/11.7		@ 9' Pebbly sandstone interbed; generally dense but bedding is moderately disrupted	
10	■	2 4 7					
			Qls			@ 13.5' Disrupted yellowish-brown pebbly silty sandstone	
15							
20	■	12 4 8		125/6.4			@ 20' Drive sample had rock in tip; blow count suspect
						BEDROCK; TQs (23.5 - 45 Ft.) @ 23.5' Interbedded light yellowish-gray sandstone and pebbly sandstone and yellowish-brown siltstone; moderately hard to hard; damp to moist @ 23.5' Irregular contact at base of Qls; no distinct slide plane @ 26' Light yellowish-brown to yellowish-brown silty sandstone, siltstone and mudstone; well bedded @ 27' Interbed of pebbly sandstone and conglomerate; channeling	
25				B:N24W,40NE			
30	■	21 50/3"	TQs	B:N35W,50NE 130/4.9			
35				B:N42W,48NE		@ 37' 2"-thick moderate-brown clay interbed; moderately plastic and slightly sheared; bedding parallel above and below bed	

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	MAS/BJS
DRILLED:	1/6/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1398'

BORING NO. B-38E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40			TQs				
45						TOTAL DEPTH 45 Ft. (Elev. 1353') No Ground Water No Caving Base of landslide @ 23.5 Ft. (Elev. 1374.5')	Backfill tamped every 5 ft.
50							
55							
60							
65							
70							
75							

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	DGG/BJS
DRILLED:	1/7/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1396'

BORING NO. B-39E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				Apx B:N45W,32NE B:N50W,37NE		**BEDROCK; TQs (0 - 40 Ft.)** @ 0' Yellowish-brown to light yellowish-brown silty sandstone/sandy siltstone with yellowish-gray pebbly sandstone and moderate yellowish-brown siltstone interbeds; moderately hard but upper 2-3 ft. weathered and fractured; slightly damp to damp; minor caliche and rootlets	Downhole logged on 1/7/00 Upper 2-4 ft. weathered with fractures @ 0-10 ft. Mixed Bulk Sample
5		2 3 5		B:N46W,44NE 120/12.3 120/12.3		@ 5' Slight kink in bedding; thin sandstone interbeds; moderately hard	
10		4 6 12		B:N50W,43NE 118/16.3		@ 10' Thin clayey siltstone interbeds	
15			TQs	B/Sh: N52W,48NE 120/15.7		@ 18' 1-2"-thick moderate-brown, moderately plastic mudstone interbed; slightly sheared with CaCO3; moderately hard to hard siltstone with vague bedding below	Sheared @ 18' is apparently tectonic in origin
20		3 6 11					
25				B:N45W,45NE		@ 25' Thin clayey mudstone interbeds; locally well bedded with evidence of minor, primary soft sediment deformation	
30				B:N40W,45NE		@ 31' Pebbly sandstone interbed @ 32' Pebbly sandstone interbed with minor channelling; thin (≅1") sandy interbeds below	@ 30' Bulk Sample
35							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	DGG/BJS
DRILLED:	1/7/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1396'
BORING NO.	B-39E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			TQs				
40						TOTAL DEPTH 40 Ft. (Elev. 1356') No Ground Water No Caving	Backfill tamped every 5 ft.
45							
50							
55							
60							
65							
70							
75							

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	DGG/BJS
DRILLED:	1/7,10/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1230'
BORING NO.	B-40E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				Apx B:N41E,5SE		**BEDROCK; TQs (0 - 40 Ft.)** @ 0' Yellowish-brown to moderate-brown siltstone and sandy siltstone with lenses of fine- to medium-grained sandstone; dense; slightly damp @ 2.5' Yellowish-brown to moderate-brown clayey siltstone, grading into light yellowish-brown sandy siltstone/silty sandstone; moderately hard; damp; local concretions	Downhole logged 1/7 and 1/10/00 Material to 5 ft. is weathered with CaCO3- lined fractures @ 0-10' Mixed Bulk Sample
5	■	3 9 15		B:N49W,14NE 116/17.5 B:N48W,10NE B:N44W,18NE		@ 6.9' Poorly bedded siltstone with sandy siltstone below	
10	■	5 9 11		126/11.0			
15				Apx B:N44W,18NE B:N42W,19NE		@ 14.8' Fine- to medium-grained sandstone lenses and locally concretionary @ 17.5' Fine-grained and coarse-grained sandstone interbeds @ 18.5' Pebbly sandstone lense; poorly sorted	
20	■	5 9 9	TQs	115/12.7 B:N48W,21NE			
25				B:N45W,18NE		@ 28' Discontinuous pebbly sandstone interbed; yellowish-brown sandy siltstone/siltstone below	
30				B:N47W,17NE			
35							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	DGG/BJS
DRILLED:	1/7,10/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1230'
BORING NO.	B-40E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			TQs				
40						TOTAL DEPTH 40 Ft. (Elev. 1190') No Ground Water No Caving	Backfill tamped every 5 ft.
45							
50							
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company	JOB NO.:	99-1703QlsII-1
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE:	7/22/04
		LOGGED BY:	DGG/BJS
DRILLING COMPANY:	Tri-Valley Drilling/Dave	DRILLED:	1/10/00
DRILLING METHOD:	Bucket-Auger (86' Rig)	HOLE DIA:	24"
HAMMER TYPE:	Telescoping Kelly Bar	AVERAGE DROP (in.):	12"
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.	ELEVATION:	1240'

BORING NO. B-41E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Qsw			**SLOPEWASH; Qsw (0 - 2.5 Ft.)** @ 0' Yellowish-brown sandy silt with pebbles; loose to moderately dense; slightly damp; locally soft with caliche; krotovina	Downhole logged on 1/10/00 @ 0-10' Mixed Bulk Sample
						LANDSLIDE DEBRIS; Qls (2.5 - 9.5 Ft.) @ 2.5' Light yellowish-brown to yellowish-brown siltstone and silty sandstone; moderately dense to dense; slightly damp; caliche-filled fractures; bedrock slightly disturbed	
5	■	3 6 8	Qls	B:N49W,13NE 115/11.3		@ 5.7' Discontinuous pebbly sandstone interbed	
				Apx B:N51W,21NE		@ 7' Bedding slightly irregular and soft	
				B:N42W,20NE			
10	■	3 4 10		SP:N62W,15NE 119/14.0		@ 9.5' Thin silty clay layer; slightly sheared; base of caliche **BEDROCK; TQs (9.5 - 35 Ft.)** @ 9.5' Olive to yellowish-brown siltstone to clayey siltstone; moderately hard; damp; local discontinuous concretionary lenses; bedding is typically subtle but locally thin bedded to laminated	@ 10' % fines = 84.9
				B:N54W,14NE		@ 12.5' Grades into pale reddish-brown siltstone and sandy siltstone	
				Apx B:N49W,14NE		@ 13.7' Pebbly sandstone interbeds; lensing and channeled	
15						@ 15.5' Discontinuous medium- to coarse-grained sandstone interbed	
				B:N54W,16NE		@ 17.5' Moderate to yellowish-brown siltstone/mudstone	
20	■	4 9 15	TQs	B:N45W,15NE 114/13.0			
25							
				B:N47W,18NE		@ 26' Bedding slightly irregular and cross laminated; possible primary soft sediment deformation	
				B:N46W,13NE		@ 28.3' Pale reddish-brown siltstone @ 29' Light yellowish-brown slightly silty, fine-grained sandstone; grades into yellowish-gray pebbly sandstone	
30							
35						TOTAL DEPTH 35 Ft. (Elev. 1205') No Ground Water, No Caving Slide Plane @ 9.5 Ft. (Elev. 1230.5')	Backfill tamped every 5 Ft.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	DGG/BJS
DRILLED:	1/10-11/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1269'

BORING NO. B-42E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Qsw			**SLOPEWASH; Qsw (0 - 3 Ft.)** @ 0' Yellowish-brown sandy silt with scattered pebbles and cobbles; loose to moderately dense; slightly damp; CaCO3 on clasts above 5'	Downhole logged on 1/10/00 and 1/11/00 @ 0-10 Ft. Mixed Bulk Sample
						LANDSLIDE DEBRIS; Qls (3 - 18.5 Ft.) @ 3' Moderate yellowish-brown siltstone to slightly sandy siltstone with scattered pebbles; moderately dense; locally soft; damp; CaCO3 filaments; weathered	
5		1 1 2		107/9.1			
				B:N40W,12SW		@ 8.1' Moderate-brown clayey silt layer with CaCO3; dense sandstone and pebbly sandstone interbeds below @ 9.7' Grades to silty sandstone	
10		3 6 9		125/10.9 SP?:N85W,32NE		@ 10.6' Moderate-brown clayey siltstone; slightly sheared; minor carbonate; pebble to cobble lense and sandy siltstone below; poorly bedded	
			Qls				
				B:N68W,16NE		@ 14' Interbedded moderate-brown clayey siltstone and sandstone	
15						@ 16' Fine- to medium-grained sandstone with pebbles	
				B/SP:N45W,7NE		@ 18' Siltstone/mudstone; slightly sticky and sheared **LANDSLIDE?; Qls? (18.5 - 27.5 Ft.)** @ 18.5' Yellowish-brown siltstone; dense to moderately hard; damp	Queried landslide material looks fairly intact but correlations with B-43E indicate the basal slide plane is at 27 ft.
20		6 18	Qls?	Apx B:N43W,21NE 132/9.3		@ 21' Fine- to coarse-grained pebbly sandstone with minor siltstone interbeds; cross-bedded and channeled	
				B:N46W,14NE		@ 23' Moderate-brown siltstone; locally laminated	
25							
				B/SP:N44W,13NE @ 27' % fines = 95.7		@ 27' 1-2.5"-thick mudstone; slightly sheared; soft and sticky; slide plane? **BEDROCK; TQs (27.5 - 35 Ft.)** @ 27.5' Yellowish-brown siltstone; moderately hard; damp @ 29.5' Sandstone interbed	@ 27' 4 hand-driven rings oriented normal to mudstone bed
30				B:N42W,14NE			
			TQs				
35						TOTAL DEPTH 35 Ft. (Elev. 1234') No Ground Water, No Caving Slide Plane @ 10.6 Ft. (Elev. 1258.4') and @ 18 Ft. (Elev. 1257')	Backfill tamped every 5 ft.

DRILL HOLE LOG

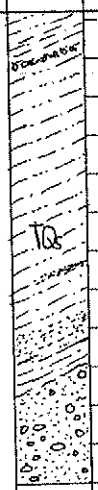
CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703Qlsll-1
DATE:	7/22/04
LOGGED BY:	DGG/BJS
DRILLED:	1/11-12/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1312'

BORING NO. B-43E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Qsw			**SLOPEWASH; Qsw (0 - 4 Ft.)** @ 0' Light-brown to yellowish-brown sandy silt and mud with scattered pebbles; loose to moderately dense; slightly damp; includes highly weathered Qls	Downhole logged on 1/11/00 and 1/12/00 @ 0-10' Mixed Bulk Sample
5		2 3 3		114/12.2		**LANDSLIDE DEBRIS; Qls (4 - 35.5 Ft.)** @ 4' Moderate yellowish-brown siltstone; moderately dense to dense; slightly damp; poorly bedded; CaCO3; fractures	
						@ 7.5' Sandy siltstone with scattered pebbles @ 8.5' Pebbles and cobbles; loose; slightly damp	
10		2 3 3		Apx B:N47W,25NE 110/12.2		@ 9.5' Moderate-brown siltstone/mudstone with local pebbles; dense; damp; mudstone/siltstone below	Landslide material is generally dense but slightly disrupted with local minor normal offset beds
15		3 6 11		Apx B:N48W,18NE 120/11.6		@ 14' Irregular mudstone interbed with CaCO3 @ 16' Pebbly sandstone lense up to 8" thick	
			Qls	Apx B:N41W,15NE			
20		2 2 4		B:N38W,24NE 113/16.4		@ 20.2' Moderate yellowish-brown clayey siltstone; irregular and moderately sheared; offset by minor normal fault @ 23' Grades to sandy siltstone	@ 20' % fines = 88.4 @ 20' Minor normal fault with apx 6" offset
25							
				Apx B:N54W,22NE		@ 27' Pebbly sandstone lense @ 28.2' Pebbly to cobbly sandstone lense; slightly loose	
30				B:N55W,18NE		@ 29.6' Moderate-brown mudstone interbeds, slightly sheared; offset by minor normal faults	@ 30' Minor normal faults with up to 5" of offset
		5 11 16		B:N50W,14NE 120/12.8 B:N47W,16NE			
35				SP:N38W,13NE ST:Northeast		@ 33.5' Clayey siltstone @ 34' 1/2"-thick moderate-brown silty clay; moderately plastic and sticky; undulating and shallow-dipping @ 35.2' 1/4-1/2"-thick moderate-brown clay and silty clay	Mudstone between 34 and 35.2' appears disturbed
			TQs	B:N50W,13NE		**BEDROCK; TQs (35.5 - 50 Ft.)** @ 35.5' Yellowish-brown sandy siltstone; moderately hard; damp	

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	DGG/BJS
DRILLED:	1/11-12/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1312'
BORING NO.	B-43E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						@ 37.4' Discontinuous sandstone interbeds and pebbly lenses	
40				B:N47W,15NE		@ 39.5' Yellowish-brown siltstone and sandy siltstone	
45				B:N51W,16NE		@ 45.5' Fine- to medium-grained sandstone interbed @ 47' Pebbly sandstone with local cobbles; some cross bedding	
50						TOTAL DEPTH 50 Ft. (Elev. 1262') No Ground Water No Caving Slide Plane @ 35.2 Ft. (Elev. 1276.8')	Backfill tamped every 5 Ft.
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	DGG/BJS
DRILLED:	1/12-13/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1096'
BORING NO.	B-44E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				B:N88W,53SW f:N60E,48NE		**BEDROCK; TQs (0 - 45 Ft.)** @ 0' Light yellowish-brown to yellowish-gray, fine- to medium-grained sandstone with scattered pebbles; moderately hard; slightly damp; thin bedded to laminated; caliche-lined fracture @ 1.5 ft. @ 2.5' Siltstone interbed; damp @ 3.6' Greenish-gray siltstone to sandy siltstone; moderately hard to hard	Downhole logged on 1/12/00 and 1/13/00 @ 0-10' Mixed Bulk Sample
5	■	6 13		126/12.5		@ 5' Clayey siltstone interbed; slightly sheared	
						@ 8.5' Clayey siltstone interbeds; slightly sheared	
10	■	7 17		B:N84W,47SW 124/11.4		@ 9.5' Light-gray fine- to medium-grained sandstone; moderately hard to hard; damp	
				B:N82W,43SW			
15				B:N88W,42SW		@ 15.5' Erosional contact with medium-brown siltstone to sandy siltstone and slightly clayey siltstone @ 17' Grades to medium-grained sandstone	
20	■	7 20	TQs	125/8.1			@ 20' % fines = 36.5
				Apx B:N72E,30SE		@ 22' Greenish-gray sandy siltstone and siltstone; locally laminated	
				B:N87E,34SE			
25				B:N72W,42SW		@ 25.5' Siltstone to clayey siltstone interbed	
	■	4 8 15		117/16.8			@ 27' % fines = 90.8
30				B:N75W,38SW		@ 31' Mudstone interbed; slightly soft; grades sandier below	
				B:N75W,43SW		@ 33.5' Medium-gray fine-grained sandstone to silty sandstone; cross-bedded to cross-laminated	
35				B:N72W,44SW		@ 37' Medium- to coarse-grained sandstone and pebbly sandstone	

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	DGG/BJS
DRILLED:	1/12-13/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1096'

BORING NO. B-44E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						interbeds	
40			TQs			@ 40' Coarse-grained pebbly sandstone interbed with silty sandstone below	
45						TOTAL DEPTH 45 Ft. (Elev. 1051') No Ground Water No Caving	Backfill tamped every 5 ft.
50							
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.

JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	DGG/BJS
DRILLED:	1/13/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1112'

BORING NO. B-45E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				Apx B:N66E,19NW		**TERRACE DEPOSITS; Qt (0 - 17 Ft.)** @ 0' Yellowish-brown pebbly silty sand with cobbles; loose; slightly damp @ 2' Yellowish-brown silitstone to sandy siltstone interbed; moderately dense; crude bedding	Downhole logged on 1/13/00 @ 0-10' Mixed Bulk Sample
5		3 3 4		118/2.7 B: Subhorizontal		@ 5' Light yellowish-brown slightly silty pebbly sand with cobbles and local silty sand interbeds; loose to moderately dense; damp; crude sub-horizontal bedding	Qt material overlies Qls and may be slightly affected by landslide movement
10		2 4 4	Qt	128/3.2			
15							
						LANDSLIDE DEBRIS; Qls (17 - 32 Ft.) @ 17' Silty pebbly sandstone; loose to moderately dense; damp; looks like disrupted TQs material; weathered	Landslide material is generally softer than typical TQs
20		2 2 4		116/5.1			
25			Qls	B:N70W,38NE		@ 24.5' Interbed of silty sand with pebbles underlain by siltstone/ sandy siltstone	
				SP/Sh: N65W,36NE B:N68W,34NE		@ 26.5' Moderate yellowish-brown slightly clayey sandy siltstone; moderately dense to dense; damp; slightly sheared; non-regional orientation @ 27' Light yellowish-gray fine-grained sandstone interbed; laminated	
30		8 17 20/5"		119/11.7 B:N23W,27NE SP:N8W,23NE		@ 31.5' 1/4-1/2"-thick moderate reddish-brown silty clay; moderately plastic and sheared; damp to moist	
				B:N15W,25NE		**BEDROCK; TQs (32 - 45 Ft.)** @ 32' Medium-gray sandstone, pebbly sandstone and slightly silty sandstone; moderately hard; damp; locally concretionary and laminated to thin bedded	@ 34' Fracture/ minor fault
35			TQs	B:N19W,24NE		@ 36.5' Concretionary bed	

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	DGG/BJS
DRILLED:	1/13/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1112'
BORING NO.	B-45E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40	■	19	Qs	111/5.5			@ 40' % fines = 22.8
45						TOTAL DEPTH 45 Ft. (Elev. 1067') No Ground Water No Caving Slide Plane @ 26.5 Ft. (Elev. 1085.5') Slide Plane @ 31.5 Ft. (Elev. 1080.5')	Backfill tamped every 5 ft.
50							
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	DGG/BJS
DRILLED:	1/14/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1129'
BORING NO.	B-46E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						TERRACE DEPOSITS; Qt (0 - 23 Ft.) @ 0' Yellowish-brown silty sandstone to silty pebbly sandstone with cobbles and small boulders; loose; slightly damp to damp	Downhole logged on 1/14/00 Casing placed from 0-21 ft. due to slight to moderate caving @ 0-10 ft. Mixed Bulk Sample
5							
10			Qt				
	■	3 5 7		132/3.7			
15							
20							
	■	1 1 1	Qsw	Contact: N35E, 35NW		@ 21' Medium-brown sandy silt/mud with scattered pebbles; soft to dense; damp; looks like older slopewash (Qosw)	
	■	1 3 5		Contact: N19E, 42NW 120/14.5		**BEDROCK; TQs (23 - 50 Ft.)** @ 23' Grayish-brown siltstone with local sandstone interbeds; moderately hard; damp	
25				B:N84W,54SW		@ 25' Two slightly sheared siltstone/mudstone interbeds	
30	■	17 20/3"	TQs	121/9.5 B:N82W,52SW			
35				B:N80W,52SW B:N79W,50SW		@ 35' Medium-gray fine-grained sandstone to silty sandstone @ 36.5' Thin concretionary siltstone interbed	

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	DGG/BJS
DRILLED:	1/14/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1129'
BORING NO.	B-46E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40		8 23	TQs	121/15.7 B:N84W,53SW		@ 41.5' Yellowish-gray fine- to medium-grained sandstone @ 43' Grades into pebbly sandstone with cobbles	
45							
50						TOTAL DEPTH 50 Ft. (Elev. 1079') No Ground Water Slight to Moderate Caving from 0-21 Ft.	Backfill tamped every 5 ft.
55							
60							
65							
70							
75							

CLIENT: Newhall Ranch Company	JOB NO.: 99-1703QlsII-1	**DRILL HOLE LOG**	
PROJECT: Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE: 7/22/04		
	LOGGED BY: BJS		
DRILLING COMPANY: Tri-Valley Drilling/Dave	DRILLED: 1/20/00		
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-47E	
DRIVING WEIGHTS: 0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.	ELEVATION: 1280'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						LANDSLIDE DEBRIS; Qls (0 - 24.5 Ft.) @ 0' Yellowish-brown silty sandstone with local sandstone lenses and thin mudstone interbeds; dense, but slightly soft for TQs; slightly damp to damp; caliche-lined fractures; disturbed mudstone bleb @ 3.5' Slightly disturbed, moderate-brown mudstone interbed; slightly sticky	Downhole logged on 1/20/00 Surficial material removed for drill pad
5							
				B:N22W,12NE		@ 6' Slightly undulating, laminated siltstone/sandy siltstone	
				B:N54W,13NE		@ 8' Reddish-brown, fine sandy mudstone interbed @ 8.5' Moderate-brown mudstone bleb; dense to moderately hard @ 9' Cross-laminated fine sandstone interbed	
10				B:N47W,17NE			Landslide material is generally tight and only slightly disturbed; suggesting only minor movement
			Qls			@ 13' Disturbed mudstone fragments and local hard concretions; slightly soft	
15							
				B:N44W,17NE		@ 16' Light reddish-brown sandy siltstone interbed	
						@ 18' Moderate-brown silty mudstone interbed; slightly sticky	
				B:N48W,13NE		@ 19' Light yellowish-brown to yellowish-gray sandstone with interbedded siltstone and sandy siltstone; dense	
20							
				B:N28W,15NE			
				SP?:N30W,15NE		@ 24.4' Moderate-brown mudstone; slightly soft and sheared	
25						**BEDROCK; TQs (24.5 - 40 Ft.)** @ 24.5' Light-brown sandy siltstone with pebbles; moderately hard; damp; poorly sorted @ 27' Yellowish-brown sandy mudstone	
						@ 29' Grades brown and more clayey; slightly sticky	
30							
			TQs	Parting: N50W, 23NE		@ 32' Minor discontinuous partings and polished pebbles; minor CaCO3 @ 32.5' Grades sandier	
35							
						@ 36' Discontinuous slightly silty sandstone interbeds	

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	BJS
DRILLED:	1/20/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1280'

BORING NO. B-47E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES. DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Qls				
40						TOTAL DEPTH 40 Ft. (Elev. 1240') No Ground Water No Caving Slide Plane @ 24.4 Ft. (Elev. 1255.6')	Backfill tamped every 5 ft.
45							
50							
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company	JOB NO.:	99-1703QlsII-1
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE:	7/22/04
		LOGGED BY:	DGG/BJS
DRILLING COMPANY:	Tri-Valley Drilling/Dave	DRILLED:	1/21,24/00
DRILLING METHOD:	Bucket-Auger (86' Rig)	HOLE DIA:	24"
HAMMER TYPE:	Telescoping Kelly Bar	AVERAGE DROP (in.):	12"
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.	ELEVATION:	1331'

BORING NO. B-49E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						SLOPEWASH/DEBRIS FLOW DEPOSIT; Qsw/Qdf (0 - 8 Ft.) @ 0' Medium- to dark-brown siltstone to sandy mudstone with scattered pebbles; dense and very tight; slightly damp	Downhole logged 1/21 and 1/24/00 @ 0-10' Mixed Bulk Sample
5	■	1 2 4	Qsw/ Qdf	116/7.2		@ 4.7' Yellowish-brown sandy silt with scattered pebbles; moderately dense to dense	
						LANDSLIDE DEBRIS; Qls (8 - 18.6 Ft.) @ 8' Irregular but distinct contact with medium-brown pebbly silty sandstone with cobbles; loose to moderately dense; slightly damp to damp; patchy sandstone interbeds	
10	■	1 3 6	Qls	130/2.3			
				Apx B:N72E,37NW		@ 14.1' Irregular contact with medium-brown siltstone; dense; damp; contact in part erosional and possibly disturbed	
15							
	■	2 3 5		B:N25W,34NE 110/18.7		@ 17' 1/2"-thick moderate-brown clayey siltstone; underlain by discontinuous pebbly sandstone; loose to moderately dense	
				SP:N5E,6SE B:N15E,12SE Apx B:N17W,28NE		@ 18.5' 1/2"-thick moderate-brown clay; moderately sticky and plastic **BEDROCK; TQs (18.6 - 70 Ft.)**	
20	■	2 5 11		117/2.8		@ 18.6' Yellowish-brown siltstone; dense to moderately hard; damp	
				B:N50W,13NE		@ 21.8' Slightly irregular contact with sandstone and pebbly sandstone interbed; cross bedded	
25			TQs			@ 24.5' Pebbly to cobbly sandstone; dense but slightly friable	
				Apx B:N5W,5NE			
						@ 28.7' Erosional contact with moderate yellowish-brown siltstone	
30	■	6 13 20		110/18.9			
				B/Sh:N21W,17NE		@ 32.2' 5"-thick moderate-brown clayey siltstone/ mudstone; slightly to moderately plastic; upper 1/4-1/2" is sticky and plastic @ 32.5' Siltstone/sandy siltstone; poorly bedded; moderately hard to hard	
35							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company	JOB NO.:	99-1703QlsII-1
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE:	7/22/04
		LOGGED BY:	DGG/BJS
DRILLING COMPANY:	Tri-Valley Drilling/Dave	DRILLED:	1/21,24/00
DRILLING METHOD:	Bucket-Auger (86' Rig)	HOLE DIA:	24"
HAMMER TYPE:	Telescoping Kelly Bar	AVERAGE DROP (in.):	12"
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.	ELEVATION:	1331'

BORING NO. B-49E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40		10 25/3"		129/6.7		@ 40' Grades to sandy siltstone and fine-grained sandstone with scattered pebbles	@ 40' Cobble in sampler tip; blow count maybe suspect
				Apx B:N30W,9NE		@ 43.5' Siltstone	
45				B:N15W,8NE		@ 46.2' Sandy siltstone	@ 47' Bulk Sample
						@ 49' Yellowish-brown siltstone and clayey siltstone	
50		9 15 36		124/13.3			
55			TQS				
				Apx B:N38W,8NE		@ 59' Discontinuous fine- to medium-grained pebbly sandstone @ 60' Grades to reddish-brown siltstone and sandy mudstone with scattered pebbles	
60							
65							
70						TOTAL DEPTH 70 Ft. (Elev. 1261') No Ground Water No Caving Slide Plane @ 18.5 Ft. (Elev. 1312.5')	Backfill tamped every 5 ft.
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company	JOB NO.:	99-1703QlsII-1
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE:	7/22/04
		LOGGED BY:	DGG/BJS
DRILLING COMPANY:	Tri-Valley Drilling/Dave	DRILLED:	1/27-28/00
DRILLING METHOD:	Bucket-Auger (86' Rig)	HOLE DIA:	24"
HAMMER TYPE:	Telescoping Kelly Bar	AVERAGE DROP (in.):	12"
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.	ELEVATION:	1281'

BORING NO. B-50E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Qsw			**SLOPEWASH; Qsw (0 - 7 Ft.)** @ 0' Yellowish-brown to brown sandy silt with scattered pebbles; moderately dense to dense; slightly damp	Downhole logged on 1/27/00 and 1/28/00 @ 0-10' Mixed Bulk Sample
5	■	2 2 2		116/10.4			
			Qls			**LANDSLIDE DEBRIS; Qls (7 - 23.5 Ft.)** @ 7' Moderate-brown to yellowish-brown siltstone and clayey siltstone and light yellowish-brown sandy siltstone; moderately dense to dense; damp; bedding disturbed and slightly sheared; caliche-filled fractures; locally soft	
10	■	1 2 2					@ 10' Consol
				B:N35E,17SE		@ 13' Scattered pebbles	
15	■	2 4 4		Apx B:N74E,21NW		@ 14.2' Fine silty sandstone interbed with pebbles; loose to moderately dense; underlain by interbedded moderate yellowish-brown siltstone to clayey siltstone and discontinuous yellowish-gray sandstone patches; clayey siltstone is sheared; loose to moderately dense; damp	@ 15' Consol
						@ 18' Yellowish-brown muddy sandstone; slightly sticky and soft; minor caliche; grades coarser below	
20	■	2 3 5					@ 20' Consol
						@ 22' Bedding is very disturbed	
				SP:N-S,15E		@ 23.5' 1/4-3/8"-thick moderate-brown to light-gray clay; moderately plastic; moist; minor caliche	
25						**BEDROCK; TQs (23.5 - 75 Ft.)** @ 23.5' Yellowish-brown to light yellowish-brown siltstone/sandy siltstone; moderately hard; damp; evidence of primary soft sediment deformation	
				B:N11W,17NE			
				Apx B:N7W,16NE		@ 25.9' Light yellowish-brown to yellowish-gray pebbly sandstone; cross bedded	
30	■	7 14 17	TQs	120/13.2		@ 26.5' Erosional contact with yellowish-brown siltstone with interbedded sandy siltstone and fine-grained sandstone	@ 30' Minor caliche-lined fracture
				B:N16W,19NE		@ 34' Pebbly silty sandstone with cobbles; grades into fine- to medium-grained sandstone and silty sandstone	
35							@ 35' Bedrock breaks apart locally on strike-sides of boring

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	DGG/BJS
DRILLED:	1/27-28/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1281'

BORING NO. B-50E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40		7 27		B:N17W,13NE 122/12.2		@ 39' Slightly sheared clayey siltstone @ 41' Sandy siltstone/silty sandstone	
				B:N14W,16NE		@ 42' Fine- to medium-grained sandstone; well bedded; moderately hard	
45				B:N14W,18NE		@ 45' Pebbly silty sandstone with cobbles; locally well cemented	
						@ 47.5' Siltstone interbeds; soft sediment deformation	
50				B:N11W,15NE			
						@ 52' Pebbles and cobbles more abundant	
55						@ 54' Silty sandstone with pebbles; poorly stratified	
				B:N4W,15NE		@ 58.2' Clayey siltstone; slightly sheared	
60						@ 60' Cobbly lense with pebbly silty sandstone below; damp to moist	
				Apx Contact: N6W, 11SW Apx B:N9W,14NE		@ 63' Erosional contact with moderate-brown to yellowish-brown siltstone/clayey siltstone; slightly plastic @ 63.6' Slightly sheared interbed; same at 66.5', 67.2' and 68.9'	
65				B:N15W,16NE B:N15W,16NE			
				B:N12W,13NE			
70		20 85		116/17.5			
75							Backfill tamped every 5 ft.

CLIENT: Newhall Ranch Company	JOB NO.: 99-1703QlsII-1	**DRILL HOLE LOG**	
PROJECT: Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE: 7/22/04		
	LOGGED BY: DGG/BJS		
DRILLING COMPANY: Tri-Valley Drilling/Dave	DRILLED: 1/27-28/00		
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-50E	
DRIVING WEIGHTS: 0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.	ELEVATION: 1281'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						TOTAL DEPTH 75 Ft. (Elev. 1206') No Ground Water No Caving Slide Plane @ 23.5 Ft. (Elev. 1257.5')	
80							
85							
90							
95							
100							
105							
110							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs.
JOB NO.:	99-1703Qlsll-1
DATE:	7/22/04
LOGGED BY:	DGG/BJS
DRILLED:	1/28,31/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1312'
BORING NO.	B-51E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						LANDSLIDE DEBRIS; Qls (0 - 16.2 Ft.) @ 0' Yellowish-brown to medium-brown siltstone to sandy siltstone with scattered pebbles and cobbles with pockets of pebbly sandstone; loose to moderately dense; damp	Downhole logged on 1/28/00 and 1/31/00 @ 0-10' Mixed Bulk Sample
5	■	2 3 3		107/15.3		@ 6' Pebbly sandstone clast in matrix @ 7' Irregular contact with pebbly muddy sand; locally soft	Surficial material removed for drill pad
				Apx B:N10E,21NW			
10	■	1 2 2	Qls	Apx B:N58E,13NW 116/10.3		@ 12.7' Pebbly sandstone clast; cemented; patchy pebbly sandstone adjacent and below clast; loose to moderately dense @ 14' Irregular contact with pebbly silty sandstone and siltstone	
15	■	2 4 7		112/12.4 B:N34W,31NE		@ 16.2' Base of disturbed material; contact irregular; no distinct slide plane **BEDROCK; TQs (16.2 - 35 Ft.)** @ 16.2' Interbedded siltstone, sandy siltstone and pebbly sandstone; moderately hard; damp; well bedded; local concretions	
20	■	2 5 8		105/29.2 B:N47W,28NE		@ 16.5' Clayey siltstone interbed; slightly sheared @ 20.5' Mudstone interbed; slightly sticky; local partings	
25			TQs	Apx B:N32W,25NE		@ 23.5' Scattered concretions	
				B:N43W,28NE			
30	■	12 38		122/11.4			
35						TOTAL DEPTH 35 Ft. (Elev. 1277') No Ground Water, No Caving Base of landslide @ 16.2 Ft. (Elev. 1295.8')	Backfill tamped every 5 ft.

CLIENT: Newhall Ranch Company	JOB NO.: 99-1703QlsII-1	**DRILL HOLE LOG**	
PROJECT: Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE: 7/22/04		
	LOGGED BY: BJS		
DRILLING COMPANY: Tri-Valley Drilling/Greg	DRILLED: 2/2/00		
DRILLING METHOD: Bucket-Auger (116' Rig)	HOLE DIA: 30"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 6"	**BORING NO.** B-52E	
DRIVING WEIGHTS: 0-30'=5952 lbs; 30-57'=3921 lbs; 57-86'=2531 lbs; 86-116'=1407lbs	ELEVATION: 1222'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			slough			**SLOUGH; (0 - 3 Ft.)**	Downhole logged on 2/2/00 @ 0-10' Mixed Bulk Sample
						SLOPEWASH; Qsw (3 - 12.5 Ft.) @ 3' Grayish-brown pebbly muddy sand; firm; slightly damp; 1-2% voids	
5		1 1 2					
			Qsw			@ 8' Grades to yellowish-brown pebbly silty sand with scattered cobbles; slightly friable; damp	
10		3 3 4					Drive sample at 10 ft. had rock in tip; disturbed; blow count suspect
						LANDSLIDE DEBRIS; Qls (12.5 - 30.6 Ft.) @ 12.5' Irregular transition into light yellowish- brown slightly silty pebbly sandstone; loose to dense; damp; weathered	
15		2 2 2					
						@ 16' Very irregular contact with yellowish-brown sandy mudstone; soft to firm; slightly sticky; damp to moist; very disturbed; CaCO3 pods common	
20		2 2 3	Qls				
						@ 21' Light-brown to light-gray mottling; bedding vague	
				SP:E-W,13N		@ 22.6' 1/8"-thick moderate reddish-brown plastic clay with parting, within an olive-brown mudstone; slightly sheared; moist; underlain by mottled yellowish-brown silty sandstone/sandy siltstone; slightly soft; damp	
				SP:N60W,21NE			
25							
				B:N48W,21NE		@ 24.5' Thin mudstone with partings; tighter below	
				B:N43W,25NE		@ 26' Cross-bedded sandstone interbed; siltstone and silty sandstone interbeds below; local concretions	
							@ 28' Bulk Sample
30		4 10 13		SP:N42W,21NE		@ 30' Grades muddier; moderately sheared with partings @ 30.5' 0.1-1"-thick moderate-brown clay; plastic; moist; thins to northwest	
						BEDROCK; TQs (30.6 - 64 Ft.) @ 30.6' Yellowish-brown sandy siltstone; moderately hard to hard; damp to moist; grades to light yellowish-brown slightly silty sandstone	
35			TQs			@ 33' Concretions @ 33.5' Yellowish-brown sandy siltstone interbed	
				B:N48W,25NE		@ 36' Light yellowish-gray sandstone and pebbly sandstone with local cobbly zones; cross bedded and channeled; moderately hard to hard;	

CLIENT: Newhall Ranch Company	JOB NO.: 99-1703QlsII-1	**DRILL HOLE LOG**	
PROJECT: Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE: 7/22/04		
	LOGGED BY: BJS		
DRILLING COMPANY: Tri-Valley Drilling/Greg	DRILLED: 2/2/00		
DRILLING METHOD: Bucket-Auger (116' Rig)	HOLE DIA: 30"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 6"	**BORING NO.** B-52E	
DRIVING WEIGHTS: 0-30'=5952 lbs; 30-57'=3921 lbs; 57-86'=2531 lbs; 86-116'=1407lbs	ELEVATION: 1222'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						local siltstone rip-up clasts	
40		11 26/5"		B:N58W,22NE B:N47W,20NE			
45							
				B:N54W,29NE			
50			TQs			@ 49' Large siltstone rip-up clasts	
				B:N49W,25NE			
55							
				B:N53W,21NE		@ 56' Erosional contact with fine-grained, laminated, slightly silty sandstone	
60						@ 60' Pebbly sandstone interbed	
65						TOTAL DEPTH 64 Ft. (Elev. 1158') No Ground Water No Caving Slide Plane @ 22.6 Ft. (Elev. 1199.4') Slide Plane @ 24.5 Ft. (Elev. 1197.5') Slide Plane @ 30.5 Ft. (Elev. 1191.5')	Backfill tamped every 10 ft.
70							
75							

CLIENT: Newhall Ranch Company	JOB NO.: 99-1703QlsII-1	**DRILL HOLE LOG**	
PROJECT: Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE: 7/22/04		
	LOGGED BY: DGG/BJS		
DRILLING COMPANY: Tri-Valley Drilling/Dave	DRILLED: 2/1/00		
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-53E	
DRIVING WEIGHTS: 0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs	ELEVATION: 1308'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Qsw			**SLOPEWASH; Qsw (0-5 Ft.)** @ 0' Medium-brown to yellowish-brown sandy silt with scattered pebbles; dense and tight; damp @ 3' Scattered cobbles; loose to moderately dense	Downhole logged on 2/1/00 @ 0-10' Mixed Bulk Sample
5		2 3 2		117/4.3		**LANDSLIDE DEBRIS; Qls (5-25.5 Ft.)** @ 5' Yellowish-brown siltstone, sandy siltstone and fine-grained sandstone with scattered pebbles and cobbles; loose to moderately dense; damp; disturbed	
				B:N47E,19NW		@ 8.5' Moderate-brown clayey siltstone; firm to stiff; sheared; siltstone/ mudstone below	
10		3 5 9		107/16.7 Apx B:N65W,12NE Apx Contact:N42E, 44SE		@ 11' Moderate-brown clayey siltstone; firm to stiff; sheared; pebbly silty sandstone below with scattered cobbles; loose to moderately dense @ 12' Erosional contact with moderate-brown siltstone with scattered pebbles; dense to moderately hard but fractured; bedding slightly disturbed	
15		3 8 7/4"	Qls	119/12.2 Apx B:N17W,17NE			
20						@ 19' Irregular contact with pebbly silt sandstone with scattered cobbles @ 20.4' Erosional contact with moderate yellowish-brown siltstone	@ 19-21' Carbide toothed bucket used for rocks
		3 5 9		111/20.7			
25				SP:N2E,7SE B:N2E,6SE		@ 25.4' 1-1.5"-thick moderate-brown clay; plastic; base of fractures **BEDROCK; TQs (25.5-65 Ft.)** @ 25.5' Yellowish-brown siltstone; moderately hard; damp to moist; poorly bedded; sandy siltstone @ 27' Sandstone interbed	@ 25' Bag sample of clay
30		8 14 22	TQs	121/14.7			
35				B:N22W,14NE (cross bedded)		@ 34.4' Shallow, slightly irregular contact with pebbly sandstone with cobbles; moderately hard to slightly friable; crudely bedded; cross bedding	@ 36-40' Carbide toothed bucket used for rocks

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	DGG/BJS
DRILLED:	2/1/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1308'
BORING NO.	B-53E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40		25 20/2"		B:N6W,8NE 124/3.9			
45				B:N10W,8NE B:N1W,9NE			
50			TQs	B:N6E,13SE		@ 52.3' Cobbly lenses with local silty sandstone stringers	
55				B:N15W,10NE		@ 54.5' Sandstone stringer @ 56.5' Erosional contact with yellowish-brown siltstone and sandy siltstone; moderately hard; damp to moist	
60				Apx B:N10W,8NE			
65						TOTAL DEPTH 65 Ft. (Elev. 1243') No Ground Water No Caving Slide Plane @ 25.4 Ft. (Elev. 1282.6')	Backfill tamped every 5 ft.
70							
75							

CLIENT: Newhall Ranch Company	JOB NO.: 99-1703QlsII-1	**DRILL HOLE LOG**	
PROJECT: Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE: 7/22/04		
	LOGGED BY: DGG/BJS		
DRILLING COMPANY: Tri-Valley Drilling/Dave	DRILLED: 2/2/00		
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-54E	
DRIVING WEIGHTS: 0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs	ELEVATION: 1284'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						BEDROCK; TQs (0-60 Ft.) @ 0' Yellowish-brown sandy siltstone; slightly loose to dense; slightly damp	Downhole logged on 2/2/00
						@ 2' Moderately hard with scattered pebbles and caliche filled fractures	Upper 5 ft. of TQs is weathered with CaCO3 - lined fractures
5							
	■	3 6 13		123/13.0			@ 0-10' Mixed Bulk Sample
				B:N25E,9SE		@ 8.7' Interbed of pebble to cobble conglomerate; damp	
10				118/4.5		@ 9.4' Yellowish-brown slightly sandy siltstone with scattered pebbles; poorly bedded	
	■	6 13 16		B:N12W,12NE		@ 11.5' Local concretions	
				Apx B:N4E,15SE		@ 12.3' Pebbly to cobbly silty sandstone with sandy siltstone/silty sandstone and siltstone interbeds; moderately hard to locally loose	
15							
	■	6 13 16/4"		121/11.0 B:N10W,13NE			
				B:N23W,9NE			
20			TQs	127/8.7			
	■	4 8 16		B:N11W,14NE		@ 20.5' 0-1/4"-thick slightly clayey siltstone; no significant shearing or partings	
25						@ 25' Poorly sorted silty pebbly sandstone	
						@ 28.2' Pebble to cobble conglomerate and pebbly sandstone; slightly friable; rip-up clasts	
30							
	■	11 11 17		123/13.3 B:N26W,8NE B:N17W,22NE		@ 31.8' Erosional contact with moderate yellowish-brown siltstone and mudstone with local pebbles and sandy interbeds; moderately hard; damp; poorly bedded	
35				Apx B:N8W,12NE			
				B:N20W,8NE			

CLIENT: Newhall Ranch Company	JOB NO.: 99-1703QlsII-1	**DRILL HOLE LOG**	
PROJECT: Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE: 7/22/04		
	LOGGED BY: DGG/BJS		
DRILLING COMPANY: Tri-Valley Drilling/Dave	DRILLED: 2/2/00		
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-54E	
DRIVING WEIGHTS: 0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs	ELEVATION: 1284'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						@ 37.4' Interbedded fine- to coarse-grained sandstone and silty sandstone; well bedded; low angle cross bedding	
40		11 28		123/4.5 Contact:N2W 19NE		@ 40.9' Moderate yellowish-brown siltstone to clayey siltstone; slightly sticky; poorly bedded @ 42' 4-6" thick mudstone to sandy mudstone interbed; slightly soft; sticky and sheared with minor partings	
45				B:N15,13NE			
50			TQs	B:N8W,11NE		@ 49' Sandy siltstone and fine- to medium-grained pebbly sandstone interbeds; moderately hard to locally slightly loose; damp	
55				B:N3W,11NE B:N7W,9NE		@ 53.9' Erosional contact with slightly sandy siltstone; moderately hard @ 55' Fine- to coarse-grained sandstone @ 56.3' Erosional contact with moderate yellowish--brown siltstone	@ 57' Bedrock breaks apart locally on strike- sides of boring
60						TOTAL DEPTH 60 Ft. (Elev. 1224) No Ground Water No Caving	Backfill tamped every 5 ft.
65							
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company	JOB NO.:	99-1703QlsII-1
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE:	7/22/04
		LOGGED BY:	DGG/BJS
DRILLING COMPANY:	Tri-Valley Drilling/Dave	DRILLED:	2/3/00
DRILLING METHOD:	Bucket-Auger (86' Rig)	HOLE DIA:	24"
HAMMER TYPE:	Telescoping Kelly Bar	AVERAGE DROP (in.):	12"
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs	ELEVATION:	1313'

BORING NO. B-55E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Qls			**LANDSLIDE; Qls (0-4 Ft.)** @ 0' Moderate-brown to yellowish-brown siltstone and slightly sheared clayey siltstone; soft to moderately dense; slightly damp; caliche; slightly disturbed bedding	Downhole logged on 2/3/00
				SP:N1E,10SE		@ 3.9' 1"-thick clayey siltstone; sheared	
5		2 5 7		121/14.1		**BEDROCK; TQs (4-40 Ft.)** @ 4' Moderate yellowish-brown siltstone with scattered pebbles and lenses of pebbly silty sandstone; dense with caliche-lined fractures in upper 2.5 ft.; damp; poorly bedded	@ 0-10' Mixed Bulk Sample
10		14 32		132/2.8 Apx B:N2W,18NE		@ 10' Fine- to medium-grained pebbly sandstone and sandstone; moderately hard to hard; damp; lensing; minor fractures @ 11.5' Erosional contact with silty sandstone and sandy siltstone; local concretions @ 13.2' Discontinuous pebbly to cobbly lense	
				B:N15W,10NE			
15		8 27		111/6.9			
				Apx B:N7E,8SE		@ 17.2' Pebbly sandstone interbed	
20		8 15 16	TQs	114/9.4 B:N4W,10NE		@ 20' Thin fine-grained sandstone interbed with yellowish-brown slightly sandy siltstone below; poorly bedded	
25							
30		14 29		127/10.5			
						@ 32' Pebbly sandstone lense @ 33' Grades slightly reddish-brown	
35							
				B:N5W,9NE		@ 37.2' Fine- to medium-grained pebbly sanstone	

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	DGG/BJS
DRILLED:	2/3/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1313'
BORING NO.	B-55E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Qls				
40						TOTAL DEPTH 40 Ft. (Elev. 1273') No Ground Water No Caving Slide Plane @ 3.9 Ft. (Elev. 1309.1')	Backfill tamped every 5 ft.
45							
50							
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	DGG/BJS
DRILLED:	2/3/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1332'

BORING NO. B-56E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Soil/Qsw			**SOIL/SLOPEWASH; soil/Qsw (0-5 Ft.)** @ 0' Brown muddy sand with pebbles; moderately dense and tight; damp	Downhole logged on 2/3 and 2/4/00
						@ 3.5' Local cobbles	
5		2 2 2		112/6.9		**LANDSLIDE; Qls (5 - 57 Ft.)** @ 5' Yellowish-brown silty pebbly sandstone and silty sandstone; loose to moderately dense; damp; very disturbed	@ 0-10' Mixed Bulk Sample
						@ 7.8' Cobbles	
						@ 8.8' Irregular erosional contact	
10		3 6 12		129/6.0 B:N82W,11SW B:N59W,10SW		@ 10' Patch of pebbly slopewash; loose	
						@ 11.8' Silty sandstone to fine-grained sandstone; loose @ 12.5' Pebbly to cobbly sandstone and silty sandstone	
15		3 8 13		128/3.3 B:N40W, 24SW B:N66W,14SW		@ 15.5' Fine-grained sandstone to silty sandstone interbed; fractures; tighter below; pebbly sandstone interbed below	
						@ 17.6' Erosional contact with silty sandstone/sandy silstone with local pods of pebbly sandstone	Bedding dep is not regional
20		6 5 13	Qls	128/5.0 B:E-W 12S		@ 19.3' Irregular contact with siltstone/sandy siltstone @ 20.1' Fine- to coarse-grained sandstone interbed	
						@ 22.5' Slightly silty pebble to cobble congolmerate; slightly loose; bedding is fairly consistent but not regional	
25				B:N82E,11SE B:N75W,9SW		@ 27.6' Erosional contact with medium-brown siltstone; dense @ 28' Thin yellowish-brown sticky mudstone interbed	
30		3 6 8		SP:N89E,15SE		@ 31.1' 1 ft. thick with interbed of moderate-brown mudstone and claystone; slightly soft-sticky and sheared	@ 30' Consol % ~~faults~~ fines = 84.4
35							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	DGG/BJS
DRILLED:	2/3/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1332'
BORING NO.	B-56E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				MF:N65E,70NW B:N80W,8SW		@ 38' Pebbly sandstone interbed; offset by minor fault; moderate-brown siltstone, mudstone and sandy siltstone below; moderately dense	@ 38' Minor normal fault with 3-4" of offset
40		3 5 10		114/5.4		@ 41' Irregular stringers of sandstone and pebbly sandstone within slightly sheared siltstone and mudstone; disturbed and slightly soft	
						@ 43.7' Irregular contact with siltstone and mudstone	
45						@ 45' Irregular sandtstone interbed; offset by minor fault; generally dense	@ 45' Two minor normal faults
				B:N55E,18SE		@ 48' Mudstone with a thin sandstone stringer; slightly soft and sticky	Landslide material is fairly tight but bedding is not regional and is locally disrupted @ 50' Consol
50		2 5 12	Qls	B:N75E,16SE		@ 50' Pebbly sandstone stringer	
55				SP:N12W,13NE		@ 55' Pebbly sandstone interbed; base erosional and disturbed; dense to moderately hard @ 56' 6"-thick disturbed mudstone iwth minor sandstone laminations; 1.5" - thick silty clay at base; sticky and plastic; damp to moist	@ 57' Bag Sample of Clay; Bedrock breaks apart on strike- sides of boring
				B:N14W,15NE		**BEDROCK; TQs (57-65 Ft.)** @ 57' Moderate yellowish-brown silstone and sandy siltstone and thin light yellowish-brown fine silty sandstone stringers; moderately hard; damp; faint laminations	
60		11 26 62	TQs				@ 60' % FINES = 78.66
65		15 78		118/15.0		TOTAL DEPTH 65 Ft. (Elev. 1267') No Ground Water No Caving Slide Plane @ 31.1 Ft. (Elev. 1300.9') Slide Plane @ 56 Ft. (Elev. 1276')	Backfill tamped every 5 ft.
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28'=3450 lbs; 28-57'=2050 lbs; 57-85'=1140 lbs
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	DGG
DRILLED:	2/4/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1282'

BORING NO. B-57E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						ALLUVIUM; Qal (0-29 Ft.) @ 0' Medium-brown silt to sandy silt with scattered pebbles and cobbles; damp	Surface logged on 2/4/00; no downhole logging
						@ 3' Large cobbles	
5		1 1 1		124/5.8		@ 5' Medium- to yellowish-brown silt to sandy silt with pebbles and cobbles; damp to moist	@ 5' Bulk sample
						@ 8' Large cobbles to small boulders	
10							@ 10' Bulk sample
		1 1 1				@ 12' Orangish- to medium-brown silt to sandy silt to fine- to coarse-grained sand with pebbles and cobbles; damp	@ 12' Consol
15		push 1 1	Qal			@ 15' Yellowish- to orangish-brown silt; damp to moist	@ 15' Consol @ 16' Bulk Sample
20		2 4 6		124/11.6		@ 20' Pebbly sandy silt interbed	
25		1 3 5				@ 25' Slightly clayey, sandy silt @ 26' Scattered cobbles	@ 25' Consol
						@ 28' Sandy; large cobbles	
30		8 16 28	TQs	129/3.5		**BEDROCK; TQs (29-30 Ft.)** @ 29' Yellowish- to orangish-tan, fine - to coarse-grained pebbly sandstone; damp	
						TOTAL DEPTH 30 Ft. (Elev. 1252') No Ground Water No Caving	
35							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Greg
DRILLING METHOD:	Bucket-Auger (116' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-30' =5952#, 30-57' = 3921#, 57-86' = 2531#, 86-116 = 1407#
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	DGG/BJS
DRILLED:	2/7/00
HOLE DIA:	24"
AVERAGE DROP (in.):	6"
ELEVATION:	1321'
BORING NO.	B-58E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						SLOPEWASH/DEBRIS FLOW DEPOSIT; Qsw/Qdf (0-18 Ft.) @ 0' Dark-brown pebbly mudstone and sandy mudstone; dense and tight; slightly damp	Downhole logged on 2/7/00 and 2/8/00
						@ 3' Scattered cobbles; locally loose	@ 0-10' Mixed Bulk Sample
5		2 4 4		123/4.5			
						@ 7' Yellowish-brown silty pebbly sand	
10		1 3 3	Qsw / Qdf	Apx Contact: N58W, 24NE 122/7.6		@ 9' Irregular contact with medium - to dark-brown pebbly sandy mud; moderately dense to dense and tight; damp; possible old slopewash or debris flow	@ 10' Consol
15		1 2 6		127/7.0		@ 15' Grades to dark yellowish-brown	@ 15' Consol
				Apx Contact:N5E, 55N W		**LANDSLIDE; Qls (18 - 44 Ft.)** @ 18' Steep irregular contact with yellowish- to orangish- brown silty sandstone and sandy siltstone with scattered pebbles and cobbles and pebbly lenses; moderately dense to locally loose; damp; disturbed	
20		3 5 8		131/4.4			
			Qls	SP:N21W,16NE		@ 23.8' 1/4-1/8"-thick moderate-brown clay; sticky and plastic; sheared clayey siltstone below; locally soft	@ 24' Bulk sample
25							
				SP:N55E,27NW		@ 27.6' 1/2 - 3/4"-thick moderate-brown clay	@ 28' Bulk Sample
30		4 6 8		B:N38E,19NW 114/15.7		@ 29.5' Locally sandy @ 30' Irregular patch of pebbly sandstone; loose to moderately dense; damp; very irregular; underlying siltstone tighter but still wispy and locally soft and hollow sounding	
35				B:N17W,14NE			

CLIENT: Newhall Ranch Company	JOB NO.: 99-1703QlsII-1	**DRILL HOLE LOG**	
PROJECT: Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE: 7/22/04		
	LOGGED BY: DGG/BJS		
DRILLING COMPANY: Tri-Valley Drilling/Greg	DRILLED: 2/7/00		
DRILLING METHOD: Bucket-Auger (116' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 6"	**BORING NO.** B-58E	
DRIVING WEIGHTS: 0-30' =5952#, 30-57' = 3921#, 57-86' = 2531#, 86-116 = 1407#	ELEVATION: 1321'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				B:N13W,8NE			
40		5 9 9		114/14.0 B:N12W,17NE B/Sh:N18W,18NE		@ 40.8' 1/2"-thick moderate-brown clay; sheared; moderately plastic	
				SP:N30W,9NE		@ 43.5'1/2- 1/12"-thick clay within mudstone unit	@ 43.5' 4 hand-driven ring samples oriented normal to slide plane
45						**BEDROCK; TQs (44-65 Ft.)** @ 44' Interbedded yellowish-brown siltstone/mudstone and fine silty sandstone; moderately hard, damp, local laminations	@ 44' Bedding locally breaks apart on strike-sides of boring
50		3 8 7/2"		113/17.2 B:N10W,11NE		@ 50.8' Fine-grained sandstone; cross bedded @ 52.2' Fine- to coarse-grained pebbly sandstone @ 53.5' Cobbly zone; locally loose	
55			TQs			@ 55' Erosional contact with moderate yellowish-brown siltstone; poorly bedded	
							@ 59' Bag Sample
60		7 15 24		113/17.9			
65						TOTAL DEPTH 65 Ft. (Elev. 1256') No Ground Water No Caving Slide Plane @ 23.8 Ft. (Elev. 1297.2') Slide Plane @ 27.6 Ft. (Elev. 1293.4') Slide Plane @ 43.5 Ft. (Elev. 1277.5)	Backfill tamped every 10 Ft.
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28' = 3450lbs, 28-57' = 2050lbs, 57-85' = 1140lbs
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	DGG
DRILLED:	2/10/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1273'
BORING NO.	B-59E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						SLOPEWASH/DEBRIS FLOW DEPOSIT; Qsw/Qdf (0-11 Ft.) @ 0' Medium-brown silt to sandy silt with scattered pebbles; firm; slightly damp	Downhold logged on 2/10/00 @ 0 - 10' mixed bulk sample
5		1 1 1	Qsw/ Qdf	109/8.6		@ 7' Medium to yellowish-brown @ 8.5' Soft to stiff	
10		1/12" 1		Apx B:Horizontal		**LANDSLIDE; Qls (11-28.3 Ft.)** @ 11' Pebbly silty sand interbed; soft; damp; within disrupted mix of medium- to yellowish-brown siltstone, sandy siltstone and pebbly to cobbly siltstone; soft to firm; damp	@ 10' Consol
15		1/12" 1	Qls				@ 15' Consol
20		1 2 2				@ 20' Medium brown siltstone, locally clayey or sandy, with scattered pebbles; soft to stiff	@ 20' Consol
25						@ 26' Scattered cobbles	
				Contact: N52W 16NE,		**BEDROCK; TQs (28.3 - 40 Ft.)** @ 28.3' Irregular erosional contact; fine- to medium-grained sandstone, locally pebbly and cobbly; in contact above medium-brown siltstone; stiff to firm; damp	
30		5 8 16		116/15.2 f:N10E,11NW f:N80E,32NW			1/2 -1" thick caliche-filled fractures @ 31.5', 32', & 34'
			TQs	f:N5E,19NW			
35				B:N-S,8E		@ 36.5' Slightly sandy siltstone	

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28' = 3450lbs, 28-57' = 2050lbs, 57-85' = 1140lbs
JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	DGG
DRILLED:	2/10/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1273'
BORING NO.	B-59E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Tqs				
40		5 10 17		122/13.5		TOTAL DEPTH 40 Ft. (Elev. 1233') No Ground Water No Caving Base of Landslide @ 28.3Ft. (Elev. 1244.7')	Backfill tamped every 5 ft.
45							
50							
55							
60							
65							
70							
75							

CLIENT: Newhall Ranch Company	JOB NO.: 99-1703QlsII-1	**DRILL HOLE LOG**	
PROJECT: Newhall Ranch - Mesas-East Phase II Landslide Investigation	DATE: 7/22/04		
	LOGGED BY: DGG		
DRILLING COMPANY: Tri-Valley Drilling/Dave	DRILLED: 2/11/00		
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-60E	
DRIVING WEIGHTS: 0-28' = 3450lbs, 28-57' = 2050lbs, 57-85' = 1140lbs	ELEVATION: 1200'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						ALLUVIUM; Qal (0-35 Ft.) @ 0' Yellowish-brown silt with scattered pebbles and cobbles; slightly damp	Surface logged on 2/11/00; no downhole logging
						@ 3' Color yellowish brown to light gray	
5							
		push/12 1				@ 5' Medium-brown silt	@ 5' Consol @ 5' Bulk Sample
10							
		1 2 4				@ 10' Medium- to grayish brown pebbly, cobbly, silty sand to sandy silt; damp	@ 10' Bulk sample @ 10' Consol
						@ 12' Yellowish-to medium-brown, fine- to medium-grained removed already pebbly to cobbly sand @ 13' Orangish-brown	
15							
		1 1 2				@ 17' Medium- to slightly orangish-brown silt to slightly sandy silt @ 18' Scattered pebbles and cobbles	% fines = 47.6 @ 17' Consol
20			Qa				
		1 3 2		123/2.5		@ 20' Orangish- to yellowish-tan, fine- to medium-grained sand @ 21' Pebbles and cobbles	
							@ 23' Bulk sample
25							@ 25' Too cobbly for drive sample
						@ 28' Finer-grained	
30							
		2 3 3				@ 30' Medium-brown silt to slightly sandy silt @ 31' Silty sand to sandy silt with pebbles and cobbles	@ 30' Consol
35							
		3 8 16	TQs	120/3.5		**BEDROCK; TQs (35 - 43 Ft.)** @ 35' Orangish-yellow, fine- to medium-grained pebbly sandstone @ 37' Medium- to orangish-brown siltstone with pebbles	

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company
PROJECT:	Newhall Ranch - Mesas-East Phase II Landslide Investigation
DRILLING COMPANY:	Tri-Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (86' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-28' = 3450lbs, 28-57' = 2050lbs, 57-85' = 1140lbs

JOB NO.:	99-1703QlsII-1
DATE:	7/22/04
LOGGED BY:	DGG
DRILLED:	2/11/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1200'

BORING NO. B-60E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40			TQs			@ 39' Pebbly, cobbly sandstone	
45		3 8 16				@ 43' Yellowish-orange fine-to coarse-grained pebbly sandstone TOTAL DEPTH 43 Ft. (Elev. 1157') No Ground Water No Caving	
50							
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company®
PROJECT:	Mesas East - Tentative Map
DRILLING COMPANY:	Valley Well Drilling (Danny)
DRILLING METHOD:	Bucket Auger
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-30'=6780 lbs, 30-60'=4780 lbs, 60-90'=3270 lbs 90-120'=2090 lbs
JOB NO.:	04-2023-4
DATE:	07/22/04
LOGGED BY:	MJD
DRILLED:	10/17 - 21/03
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1310'
BORING NO.	B-63E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Casing			**BEDROCK; TQs (0-120')** @ 0-4' Casing	
5		3 5		123/3.9		@ 4' Yellowish-gray sandstone and pebbly sandstone; moderately hard; damp to moist; local 1-2" thick interbedded yellowish-brown sandy siltstone; moderately well-bedded; local laminations	@ 5-10' Bulk sample
10		3 7		120/15.5 B:N41W,19NE B:N54W,18NE		@ 8.5' Yellowish-brown to grayish-brown sandy and clayey siltstone; hard; moist; massive, structureless @ 11' Yellowish-gray sandstone and pebbly sandstone; moderately hard to hard; erosional scours and channels; local siltstone rip-up clasts; locally slightly to moderately friable; scattered cobbles; cross-bedded	
15		4 7		124/3.3 B:N49W,23NE			
20			TQs			@ 19' Yellowish-brown silty, pebbly sandstone; hard	
25		1 4		113/20.6 B:N58W,23NE		@ 25' Yellowish-brown to grayish-brown sandy to clayey siltstone @ 26.5' Yellowish-gray sandstone and pebbly sandstone	@ 25-28' Bulk sample
30				B:N45W,20NE		@ 30-32' Cobbly	@ 30-33' Bulk sample
35		14/6" bounce		129/3.5			

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company®
PROJECT:	Mesas East - Tentative Map
DRILLING COMPANY:	Valley Well Drilling (Danny)
DRILLING METHOD:	Bucket Auger
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-30'=6780 lbs, 30-60'=4780 lbs, 60-90'=3270 lbs 90-120'=2090 lbs
JOB NO.:	04-2023-4
DATE:	07/22/04
LOGGED BY:	MJD
DRILLED:	10/17 - 21/03
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1310'
BORING NO.	B-63E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				B:N46W,21NE			
40							
				B:N57W,22NE			
45			TQs				
	■	8 2/1" bounce		128/3.6			
						@ 46.5' Grayish to orangish-brown silty, pebbly, clayey sandstone	@ 47-50' Bulk sample
	■	2 7		B:N31W,20NE 104/25.1		@ 48' Grayish-brown siltstone with interbedded thin mudstone	
50						@ 50' Yellowish-gray sandstone and pebbly sandstone	
				B:N51W,24NE			
						@ 53-57' Cobbly	
55							
				B:N49W,22NE			
60	■	7 6		126/3.0			
65				B:N50W,22NE			
						@ 67-70' Cobbly	
70							
				B:N53W,23NE		@ 73' Cobbly	
						@ 74' Grayish-brown sandy, clayey siltstone; erosional contacts	
75						@ 75' Yellowish-gray sandstone and pebbly sandstone	

CLIENT: Newhall Ranch Company®	JOB NO.: 04-2023-4	**DRILL HOLE LOG**	
PROJECT: Mesas East - Tentative Map	DATE: 07/22/04		
	LOGGED BY: MJD		
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 10/17 - 21/03		
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-63E	
DRIVING WEIGHTS: 0-30'=6780 lbs, 30-60'=4780 lbs, 60-90'=3270 lbs 90-120'=2090 lbs	ELEVATION: 1310'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
80	■	20 7/2"					
				B:N51W,18NE			
85							@ 85' stop drilling @ 1:00PM 10/17/03 Broken clutch on drill rig
				B:N41W,19NE			
90			Q_s			@ 89' Grayish-brown to yellowish-brown sandy, clayey siltstone; mostly massive, structureless; local sandy siltstone and clayey siltstone interbeds	
				B:N40W,22NE			
95							
100				B:N53W,24NE			
						@ 101' Yellowish-gray sandstone and pebbly sandstone	
105						@ 105-106' Grayish-brown siltstone	
				B:N57W,27NE			
110				B:N38W,20NE			

CLIENT: Newhall Ranch Company®	JOB NO.: 04-2023-4	**DRILL HOLE LOG**	
PROJECT: Mesas East - Tentative Map	DATE: 07/22/04		
	LOGGED BY: MJD		
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 10/17 - 21/03		
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-63E	
DRIVING WEIGHTS: 0-30'=6780 lbs, 30-60'=4780 lbs, 60-90'=3270 lbs 90-120'=2090 lbs	ELEVATION: 1310'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
115			Tqs	B:N45W,21NE			
120						TOTAL DEPTH 120' No Groundwater No Caving	
125							
130							
135							
140							
145							
150							

DRILL HOLE LOG

CLIENT: Newhall Ranch Company®	JOB NO.: 04-2023-4
PROJECT: Mesas East - Tentative Map	DATE: 07/22/04
	LOGGED BY: MJD
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 10/22/03
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-30'=6780 lbs, 30-60'=4780 lbs, 60-90'=3270 lbs, 90-120'=2090 lb lbs	ELEVATION: 1120'

BORING NO. B-64E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Casing			**BEDROCK; TQs (0-60')** @ 0-4' Casing	Drilled & logged 10/22/03
5						@ 4' Yellowish-gray pebbly sandstone; moderately hard; damp @ 5' Yellowish-brown sandy siltstone with scattered pebbles	@ 5-6' Bulk sample
				Apx. B:N57W,27NE		@ 8' light yellowish-brown pebbly sandstone; moderately hard; moist; scattered cobbles and siltstone clasts	
10	■	1 1		116/6.3		@ 9.5' Yellowish-brown to brown sandy siltstone; moderately hard @ 11' Yellowish-to grayish-brown silty sandstone/sandy siltstone; massive; structureless	
			TQs				
15				Apx. B:N44W,27NE		@ 15' Yellowish-gray pebbly sandstone with cobbles; cross- bedded; locally slightly friable to friable	
20	■	2 3		111/20.9		@ 19' Yellowish-brown silty, pebbly sandstone; hard @ 19.5' Brown to grayish-brown siltstone and mudstone; hard; moist; massive, structureless; locally plastic, sticky	
25							
30	■	2 4		114/16.0			
				B:N53W,33NE		@ 33.5' 6" thick yellowish-brown fine-grained sandstone interbed	@ 33' Bulk sample
35				B:N48W,34NE		@ 36' Thinly interbedded yellowish-brown sandy siltstone, orangish- to grayish-brown siltstone, and brown mudstone; well-bedded	

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company®
PROJECT:	Mesas East - Tentative Map
DRILLING COMPANY:	Valley Well Drilling (Danny)
DRILLING METHOD:	Bucket Auger
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-30'=6780 lbs, 30-60'=4780 lbs, 60-90'=3270 lbs, 90-120'=2090 lb lbs
JOB NO.:	04-2023-4
DATE:	07/22/04
LOGGED BY:	MJD
DRILLED:	10/22/03
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1120'
BORING NO.	B-64E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				B:N50W,31NE			
				B:N45W,32NE			
40				102/17.9			
	■	4 9/3"		B:N46W,32NE			
45						@ 45' Brown to grayish-brown siltstone and mudstone; massive, structureless; locally plastic, sticky	
			TQs				
50				124/13.1			
	■	2 11					
55						@ 54' Grades to siltstone and sandy siltstone; massive, structureless	
60				114/4.9		TOTAL DEPTH 60' No Ground Water No Caving	
	■	7 10					
65							
70							
75							

CLIENT: Newhall Ranch Company®	JOB NO.: 04-2023-4	**DRILL HOLE LOG**	
PROJECT: Mesas East - Tentative Map	DATE: 07/22/04		
	LOGGED BY: MJD		
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 10/22 - 24/03		
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-65E	
DRIVING WEIGHTS: 0-30'=6780 lbs, 30-60'=4780 lbs, 60-90'=3270 lbs, 90-120'=2090 lb	ELEVATION: 1148'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						QUATERNARY TERRACE DEPOSITS; Qt (0-34') @ 0' Medium to light reddish-brown silt and sandy silt; soft; dry to slightly damp; scattered pebbles; roots and voids; massive; structureless	
5	■	push 1		107/4.8			@ 5-6' Bulk sample
10	■	1 1		115/8.4		@ 10' Moderately hard	
			Qt			@ 12' Moist @ 13' Light orangish- to reddish-brown silty pebbly sand	
15	■	1/12"		115/9.9			@ 16-36' Set casing
						@ 16.5' Grades to grayish-brown sandy, silty clay with scattered pebbles @ 18.5' Relatively sharp irregular contact with yellowish-gray pebbly, cobbly sand; loose; friable; scattered boulders; orange iron-staining; erosional scours, channels; clast supported pebble lenses; cross-bedded	
20							
25						@ 24' Boulders	@ 24' use crowds drill to 25' 10/22/03
30							
35	■	3 11	TQs	Apx. CTC:N50E, 30SE 109/3.7		**BEDROCK; TQs (34-120')** @ 34' sharp erosional contact with yellowish-gray sandstone and pebbly sandstone; moderately hard to hard; moist; locally slightly to moderately friable; scattered cobbles; local laminations; highly erosional and cross-bedded	

CLIENT: Newhall Ranch Company®	JOB NO.: 04-2023-4	**DRILL HOLE LOG**	
PROJECT: Mesas East - Tentative Map	DATE: 07/22/04		
	LOGGED BY: MJD		
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 10/22 - 24/03		
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-65E	
DRIVING WEIGHTS: 0-30'=6780 lbs, 30-60'=4780 lbs, 60-90'=3270 lbs, 90-120'=2090 lb	ELEVATION: 1148'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40				B:N47E,36SE			
				B:N23E,40SE			
45	■	5 12/2"		B:N27E,23SE			@ 45' Rock in tip
						@ 48-50' Cobbly; local clast supported pebble beds; black staining	
50							@ 50-60' Bulk sample
				B:N37E,29SE			
55				B:N34E,29SE		@ 56' 2" thick orangish-brown silty sandstone bed	
						@ 58-61' Cobbly	
60				B:N35E,29SE		@ 61' Yellowish-gray to light yellowish-brown fine-to coarse-grained sandstone; hard; moist; well-bedded; thinly bedded; laminated; scattered pebbles	
65				B:N38E,22SE		@ 65' Local thin 1/8-1/4" thick interbedded grayish-brown sandy siltstone	
				B:N33E,29SE		@ 67' Brown clay interbed; 1/2" thick @ 68' Yellowish-gray pebbly sandstone	
70				B:N27E,31SE			
75						@ 75' 6" thick concretionary bed	

CLIENT: Newhall Ranch Company®	JOB NO.: 04-2023-4	**DRILL HOLE LOG**	
PROJECT: Mesas East - Tentative Map	DATE: 07/22/04		
	LOGGED BY: MJD		
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 10/22 - 24/03		
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-65E	
DRIVING WEIGHTS: 0-30'=6780 lbs, 30-60'=4780 lbs, 60-90'=3270 lbs, 90-120'=2090 lb	ELEVATION: 1148'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				B:N30E,31SE		@ 76.5' Same @ 78' Same	
80							
				B:N30E,33SE		@ 81' Yellowish-gray pebbly sandstone	
85	■	8 11					
				B:N42E,21SE		@ 86' Interbedded yellowish-brown sandy siltstone orangish- to grayish-brown siltstone and brown mudstone; thinly bedded, well-bedded	
	■	3 9					
90				B:N37E,28SE		@ 90.5' Grades to grayish-brown siltstone; massive	@ 90-92' Bulk sample
			TQs				
95							
				B:N31E,30SE		@ 96' Yellowish-gray sandstone	
				B:N34E,29SE		@ 98' Interbedded yellowish-gray fine- to medium-grained sandstone and massive grayish-brown silty sandstone	
100							
				B:N32E,32SE			
105							
						@ 108' Grayish-brown siltstone and mudstone; massive	
110							

CLIENT: Newhall Ranch Company®	JOB NO.: 04-2023-4	**DRILL HOLE LOG**	
PROJECT: Mesas East - Tentative Map	DATE: 07/22/04		
	LOGGED BY: MJD		
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 10/22 - 24/03		
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-65E	
DRIVING WEIGHTS: 0-30'=6780 lbs, 30-60'=4780 lbs, 60-90'=3270 lbs, 90-120'=2090 lb	ELEVATION: 1148'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
115			TQs				
120						TOTAL DEPTH 120' No Ground Water Belled out, Caving @ 18.5-34'	
125							
130							
135							
140							
145							
150							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company®
PROJECT:	Mesas East - Tentative Map
DRILLING COMPANY:	Valley Well Drilling (Danny)
DRILLING METHOD:	Bucket Auger
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-30'=6780 lbs, 30-60'=4780 lbs, 60-90=3270'lbs, 90-120'=2090 lbs lbs
JOB NO.:	04-2023-4
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	11/11-13/03
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1071'
BORING NO.	B-66E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						SLOPEWASH; Qsw; S (0-12') @ 0' Silty clayey sand with gravel; medium dense; dry to damp; brown; pinhole voids; roots rootlets	@ 0-10' Bulk sample
5	■	Push 1	Qsw				
10	■	1 3					@ 10-15' Bulk sample
			Qt			**QUATERNARY TERRACE DEPOSITS; Qt (12-15')** @ 12' Silty sand with gravel; loose to medium dense; dry; light yellowish-gray to light gray; large cobbles≥ 1 foot in diameter; caving	Boring was cased after logged to 16'
15	■	2 8		C:Horizontal B:N49W,19NE		**BEDROCK; TQs (15-121')** @ 15' Light-gray silty fine-grained sandstone; moderately hard; damp; finely laminated; white concretions~ 6" in diameter @ 17' Brown silty claystone; moderately hard to hard; moist	
20	■	3 5/2"				@ 20' Same; claystone grades into light-brown sandy siltstone; damp; concretions ~6" in diameter	
						@ 23' Sandy siltstone grades to light-brown silty sandstone; damp to moist; concretions~ 4-6" in diameter, massive	
25	■	2 5/4"		Apx. B:N56W,10NE		@ 26' Light-gray well-graded sandstone; damp	
30				Apx. B:N32W,34NE		@ 29' Same; gravelly channels/lenses	
						@ 32' Same; with interbedded light-gray fine-grained sandstone; moderately hard; finely cross-bedded	
35	■	14		B:N48W,26NE		@ 35' Light-gray fine- to medium-grained sandstone; moderately hard to hard	

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company®
PROJECT:	Mesas East - Tentative Map
DRILLING COMPANY:	Valley Well Drilling (Danny)
DRILLING METHOD:	Bucket Auger
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-30'=6780 lbs, 30-60'=4780 lbs, 60-90=3270'lbs, 90-120'=2090 lbs lbs
JOB NO.:	04-2023-4
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	11/11-13/03
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1071'
BORING NO.	B-66E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40							
						@ 41' Same; grades to light-gray well-graded sandstone with gravel channels	
				Apx. B:N54W,22NE			
45	■	22		Apx. B:N25W,12NE		@ 45' Same; with discontinuous brown silty claystone lenses; moderately hard; moist; no parting planes or striations @ 46' Light-gray silty fine-grained sandstone; moderatley hard to hard; damp @ 47-48.5' Same; concretion with light-reddish-brown rim; silty sandstone is discolored dark-gray within concretion rim	
50			TQs				
55	■	14					
				B:N33W,27NE		@ 57' Greenish-gray clayey sandy siltstone; moist	
				Apx. B:N39W,25NE		@ 58' Lenses of dark grayish-brown sandy, silty claystone; moderately hard	@ 58' Small bag sample
60							
65	■	10		Apx. B:N32W,25NE		@ 65' Greenish-gray clayey, sandy siltstone; grades to yellowish-brown silty fine-grained sandstone; hard	
70				Apx. B:N69W,25NE		@ Brown silty sandy claystone; hard; concretion demarcates bedding contact	
				Apx. B:N25W,19NE		@ 73' Same, grades to light-brown clayey sandy siltstone; hard	
75	■	18					

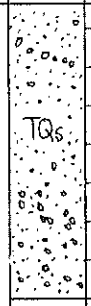
CLIENT: Newhall Ranch Company®	JOB NO.: 04-2023-4	**DRILL HOLE LOG**	
PROJECT: Mesas East - Tentative Map	DATE: 07/22/04		
	LOGGED BY: MAS		
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 11/11-13/03		
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-66E	
DRIVING WEIGHTS: 0-30'=6780 lbs, 30-60'=4780 lbs, 60-90=3270'lbs, 90-120'=2090 lbs lbs	ELEVATION: 1071'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						@ 77' Grades to light-gray silty sandstone; moderately hard to hard; damp; gravel channels; commonly thinly bedded	
				B:N43W,19NE			
80							
				B:N55W,17NE			
85							
						@ 87' Grades to light-gray well-graded sandstone; hard; damp; locally thinly bedded	
90			TQs				
				Apx. B:N15W,17NE			
95							
100							
105				B:N27W,18NE			
						@ 109' Same with, light-gray pebbly sandstone; moderately hard	
110							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company®
PROJECT:	Mesas East - Tentative Map
DRILLING COMPANY:	Valley Well Drilling (Danny)
DRILLING METHOD:	Bucket Auger
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-30'=6780 lbs, 30-60'=4780 lbs, 60-90=3270'lbs, 90-120'=2090 lbs lbs
JOB NO.:	04-2023-4
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	11/11-13/03
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1071'

BORING NO. B-66E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
115							
				Apx. B:N55E,18NE			
120							
	■					TOTAL DEPTH 121' No Ground Water Caving 12-16'	
125							
130							
135							
140							
145							
150							

CLIENT: Newhall Ranch Company®	JOB NO.: 04-2023-4	**DRILL HOLE LOG**	
PROJECT: Mesas East - Tentative Map	DATE: 07/22/04		
	LOGGED BY: MAS		
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 11/14 -17/03		
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-67E	
DRIVING WEIGHTS: 0-30'=6780 lbs; 30-60=4780; 60-90'=3270 lbs; 90-120'=2090 lbs	ELEVATION: 1262'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Soil			**SOIL; S (0-2')** @ 0' Silty clayey sand with gravel; medium dense; dry; brown **BEDROCK; TQs (2-121')** @ 2' Light-brown sandy siltstone; moderately hard; dry	
5		5		Apx. B:N16W,31NE 112/5.5		@ 5.5' Light-brown silty sandstone with local channels of coarse-grained sandstone pebbly sandstone to loose; dry roots	
10		1 2	TQs	111/10.2			
				Apx. B:N21W,13NE			
15		8		B:N35W,25NE		@ 15' Light-brown sandy siltstone; damp; with interbedded light-brown to brown sandy silty claystone beds; moderately hard to hard; moist; irregular erosional contact with sandstone above	
20		2 8					
				Apx. B:N29W,31NE		@ 23' Light-brown to gray pebbly sandstone @ 24' Light-brown silty sandstone; moist	
25		9		B:N42W,29NE		@ 25' Light-brown sandy clayey siltstone; moderately hard to hard	
30						@ 30' Siltstone grades to light-brown silty pebbly sandstone; moderately hard; damp; local coarse-grained sandstone and pebbly sandstone channels	
				Apx. B:N56W,18NE			
35		14					

CLIENT: Newhall Ranch Company®	JOB NO.: 04-2023-4	**DRILL HOLE LOG**	
PROJECT: Mesas East - Tentative Map	DATE: 07/22/04		
	LOGGED BY: MAS		
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 11/14 -17/03		
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-67E	
DRIVING WEIGHTS: 0-30'=6780 lbs; 30-60=4780; 60-90'=3270 lbs; 90-120'=2090 lbs	ELEVATION: 1262'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				Apx. B:N56W,18NE			
40							
				Apx. B:N50W,27NE			
45	■	18					
50			Tqs				
				B:N59W;11NE		@ 52' Irregular erosional contact; light-brown silty fine-grained sandstone	
55	■	15					
						@ 57' Light-brown to gray silty, pebbly sandstone; damp	
60							
				B:N52W,24NE		@ 61' Light brown sandy siltstone; moderately hard to hard; moist; with interbedded lenses of brown silty claystone; moderately hard to hard, moist; lenses; clay layers not well defined; no parting planes or striations	
65	■	8 10/5"					
				Apx. B:N44W,16NE			
70							
				Apx. B:N38W,17NE			
				B:N38W,22NE		@ 74' Light yellowish-brown, well-graded sandstone; soft to moderatley hard; damp; local channels and lenses of pebbly, silty fine-	
75	■	19/5"					

CLIENT: Newhall Ranch Company®	JOB NO.: 04-2023-4	**DRILL HOLE LOG**	
PROJECT: Mesas East - Tentative Map	DATE: 07/22/04		
	LOGGED BY: MAS		
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 11/14 -17/03		
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-67E	
DRIVING WEIGHTS: 0-30'=6780 lbs; 30-60=4780; 60-90'=3270 lbs; 90-120'=2090 lbs	ELEVATION: 1262'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						grained sandstone, and clay	
				B:N49W,31NE			
80				B:N50W,35NE PC:N47W,38NE		@ 80' Light-brown sandy siltstone; moderately hard; moist; steeply dipping erosional contact with sandstone above @ 81.5' ~1" thick brown claystone interbed; soft; moist; plastic; caliche @81.6 Brown mudstone; moderately hard to hard	
85	■	11		B:N42W,18NE		@ 85' Interbedded light-brown silty fine-grained sandstone and light-brown to light yellowish-brown clayey siltstone, moderately hard to hard @ 87' Light-gray sandstone; moderately hard; damp; friable	
90				B:N31W,25NE		@ 93' Light-brown clayey sandy siltstone; moderately hard to hard; moist	
95				B:N54W,31NE		@ 98' Light-gray medium-grained sandstone bed; damp; 1 foot thick	
100				Apx. B:N38W,34NE			
105							
110							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company®
PROJECT:	Mesas East - Tentative Map
DRILLING COMPANY:	Valley Well Drilling (Danny)
DRILLING METHOD:	Bucket Auger
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-30'=6780 lbs; 30-60=4780; 60-90'=3270 lbs; 90-120'=2090 lbs
JOB NO.:	04-2023-4
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	11/14 -17/03
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1262'
BORING NO.	B-67E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
115			Tqs	B:N30W,34NE			
120							
						TOTAL DEPTH 121' No Ground Water No Caving	
125							
130							
135							
140							
145							
150							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company®
PROJECT:	Mesas East - Tentative Map
DRILLING COMPANY:	Valley Well Drilling (Danny)
DRILLING METHOD:	Bucket Auger
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-30'=6780 lbs, 30-60'=4780, 60-90'=3270 lbs, 90-120'=2090 lbs
JOB NO.:	04-2023-4
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	11/18/03
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1351'
BORING NO.	B-68E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Soil			**SOIL; S (0-5')** @ 0' Silty clayey sand with gravel; medium dense; dry; brown; roots, rootlets; voids	
5	■	2 5		Apx. B:N6W,15NE 111/10.6		**BEDROCK; TQs (5-100')** @ 5' Interbedded light-brown silty sandstone and sandy siltstone; moderately hard; dry to damp; weathered, caliche	
10	■	2 4	TQs	109/5.8			
				B:N37W,12NE B:N38W,13NE		@ 12.5' Light yellowish-brown silty, clayey sandstone	
15	■	4 8		B:N37W,15NE		@ 15.5' Light yellowish-brown sandy siltstone; soft to moderately hard; dry	
						@ 19' Grades to light-brown clayey siltstone; moderately hard; moist	
20	■	3 4				@ 20' Yellowish-brown pebbly silty, clayey sandstone; soft to moderately hard; channel deposit @ 21.5' Light yellowish-brown clayey siltstone; moderately hard	
25	■	4 2/2"				@ 25' Grades to yellowish-brown silty clayey sandstone	@ 25-35' Bulk sample
				B:N52W,13NE		@ 28.5' Same; with light reddish-brown sandy claystone; moderately hard to hard	
30				B:N33W,32NE		@ 30' Grades to gray to brown pebbly sandstone; moderately hard @ 31' Light yellowish-brown clayey siltstone; soft to moderatley hard	
35	■	10 5/2"					

CLIENT: Newhall Ranch Company®	JOB NO.: 04-2023-4	**DRILL HOLE LOG**	
PROJECT: Mesas East - Tentative Map	DATE: 07/22/04		
	LOGGED BY: MAS		
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 11/18/03		
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-68E	
DRIVING WEIGHTS: 0-30'=6780 lbs, 30-60'=4780, 60-90'=3270 lbs, 90-120'=2090 lbs	ELEVATION: 1351'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40						@ 39' Light-gray pebbly sandstone interbed; moderately hard, damp	
				Apx. B:Horizontal		@ 43.5' Light reddish-brown sandy claystone interbed moderately hard to hard; moist	
45				Apx. B:Horizontal		@ 45.5' Light yellowish-brown to light-gray coarse-grained sandstone interbed; moderately hard; damp @ 46.5' Light yellowish-brown sandy clayey siltstone to clayey siltstone; moderately hard to hard; moist	
50							
55	■	2 6		B:N47W,13NE		@ 55' Reddish-brown sandy claystone interbed @ 55.5' Interbedded light yellowish-brown siltstone and silty sandstone; moderately hard	
				Apx. B:N63W,14NE			
60							
				Apx. B:N35W,22NE			
65	■	15				@ 65' Light-brown clayey silty sandstone; damp to moist; friable	
				B:N37W,12NE			
70				B:N60W,13NE		@ 70' Local laminae	
						@ 73' Grades to light yellowish-gray silty pebbly conglomerate to pebbly sandstone; moist	
75	■	5					

CLIENT: Newhall Ranch Company®	JOB NO.: 04-2023-4	**DRILL HOLE LOG**	
PROJECT: Mesas East - Tentative Map	DATE: 07/22/04		
	LOGGED BY: MAS		
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 11/18/03		
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-68E	
DRIVING WEIGHTS: 0-30'=6780 lbs, 30-60'=4780, 60-90'=3270 lbs, 90-120'=2090 lbs	ELEVATION: 1351'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
		10				@ 76' Light-brown sandy clayey siltstone to silty sandstone; damp to moist @ 78' Same; locally laminated to cross laminated with pebbly sandstone lenses	
80						@ 80' ("Fractures") Slaking "pattern" of vertical cleavage; 1-4" back in sides of boring ~N75W both sides of boring; slightly more prevalent on SE side of boring 78' to bottom	
				B:N38W,13NE			
85		5 10	TQs				
90				B:N54W,12NE			
95				Apx. B:N85W,12NE		@ 98' Same; with light yellowish-brown fine- to medium-grained sandstone bed; damp	
100						TOTAL DEPTH 100' No Ground Water No Caving	
105							
110							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company®
PROJECT:	Mesas East - Tentative Map
DRILLING COMPANY:	Valley Well Drilling (Danny)
DRILLING METHOD:	Bucket Auger
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-30'=6780 lbs; 30-60'= lbs; 60-90'=3270; 90-120'=2090 lbs
JOB NO.:	04-2023-4
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	11/20/03
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1375'
BORING NO.	B-69E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						SOIL; S (0-11') @ 0' Silty clayey sand with gravel; medium dense; dry; light brown to brown; voids; roots and rootlets	
5	■	1	Soil	111/8.7			@ 5-15' Bulk sample
10	■	1 1		115/9.6		**QUATERNARY LANDSLIDE DEPOSIT; Qls (11-18')** @ 11' Silty, clayey sand; medium dense; moist; brown to dark brown	
15	■	1 1		113/14.7			
				SP:N28W,29NE		**BEDROCK; TQs (18-90')** @ 18' Brown sandy clayey siltstone; moderately hard; moist; with brown claystone lenses	
20	■	1 2		B:N22W,24NE 114/16.9		@ 20' Reddish-brown sandy claystone interbed; soft; plastic clay	@ 20' Small bag sample
			Qls	B:N27W,24NE		@ 22' Interbedded light yellowish-brown well-graded sandstone and light-brown silty sandstone to sandy siltstone; soft to moderately hard	
25	■	3 6		133/3.9		@ 25' Light-brown pebble conglomerate	
				B/X.B:N44W,25NE		@ 27' Same; local laminar cross bedding/bedding	
				B:N19W,7NE B:N30W,23NE		@ 29' Light-brown sandy siltstone; with lenses of fine-grained silty sand	
30						@ 30' Same; grades to light-brown silty claystone; moderately hard to hard	
35	■	18		Apx. B:N22W,18NE 119/14.8		@ 35' Grades to light-brown clayey, silty sandstone; moderately hard	

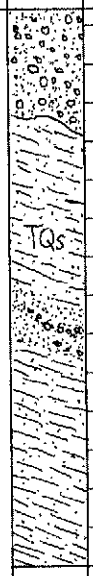
DRILL HOLE LOG

CLIENT:	Newhall Ranch Company®
PROJECT:	Mesas East - Tentative Map
DRILLING COMPANY:	Valley Well Drilling (Danny)
DRILLING METHOD:	Bucket Auger
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-30'=6780 lbs; 30-60'= lbs; 60-90'=3270; 90-120'=2090 lbs
JOB NO.:	04-2023-4
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	11/20/03
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1375'
BORING NO.	B-69E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				B:N15W,21NE		@ 38' Light-gray claystone; moderately hard to hard	
40				B:N31W,32NE		@ 39.5' Discontinuous layer of light-brown silty fine-grained sandstone; soft to moderately hard @ 40' Interbedded light-brown silty sandstone and sandy siltstone and light-brown to brown claystone; moderately hard	
				B:N27W,21NE		@ 44' Light-brown claystone; moderately hard to hard	
45	■	3 5					
				Apx. B:N22W,26NE			
50						@ 49' Light-brown silty fine-grained sandstone interbed; moderately hard @ 50' Claystone grades to light-brown siltstone with claystone lenses; moderately hard to hard	
			TQs	B:N19W,16NE		@ 53' Light-brown silty fine-grained sandstone; moderately hard; local laminations	
55	■	3 11		B:N35W,15NE 124/7.0		@ 55.5' Brown silty claystone @ 56' Light-brown clayey sandstone to pebble conglomerate	
				Apx. B:N37,25NE			
60							
				Apx. B:N53W,17NE		@ 63' Light brown sandy siltstone to silty sandstone	
65	■	18		B:N55W,12NE		@ 65' Light brown silty fine-grained sandstone interbed	
						@ 68' Light-brown sandstone to pebble conglomerate	
70							
				Apx. B:N15W,15NE			
75	■	10		117/3.0			

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company®
PROJECT:	Mesas East - Tentative Map
DRILLING COMPANY:	Valley Well Drilling (Danny)
DRILLING METHOD:	Bucket Auger
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-30'=6780 lbs; 30-60'= lbs; 60-90'=3270; 90-120'=2090 lbs
JOB NO.:	04-2023-4
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	11/20/03
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1375'
BORING NO.	B-69E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
							
				Ch Apx. B:N50W, 15NE		@ 78.5' Interbedded light-brown sandy clayey siltstone to clayey silty sandstone, moderately hard to hard,	
80							
				B:N45W,14NE		@ 83' Locally pebbly @ 84' Light-brown to brown clayey siltstone, moderately hard to hard	
85	■	6 13					
90						TOTAL DEPTH 90' No Ground Water No Caving	
95							
100							
105							
110							

DRILL HOLE LOG

CLIENT: Newhall Ranch Company®	JOB NO.: 04-2023-4
PROJECT: Mesas East - Tentative Map	DATE: 07/22/04
	LOGGED BY: MAS
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 11/21/03
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-30'=6780 lbs, 30-60'=4780 lbs, 60-90'=3270 lbs, 90-120'=2090 lb	ELEVATION: 1371'

BORING NO. B-70E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			af			**ARTIFICIAL FILL; Af (0-6')** @ 0' Silty clayey sand; loose to medium dense; moist; brown to dark brown; fragments of siltstone; rootlets	@ 0-15' Bulk sample
5	■	1		107/8.8			
						QUATERNARY LANDSLIDE; Qls (6-41') @ 6' Light yellowish-brown siltstone; moderatley hard; dry; rootlets	
10	■	Push 1		107/9.1			
15	■	1 1		108/8.5			
						@ 16' Same; block of light-gray sandstone; soft to moderately hard; damp	
20	■	2 7		114/15.4 B:N49E,39SE		@ 19.5' Interbedded light yellowish-brown siltstone; moderately hard; with light brown claystone; moist	
			Qls			@ 22' Light brown pebble conglomerate; soft to moderately hard	
25	■	2 4				@ 26' Light brown sandy siltstone; soft to moderately hard	
30							
				C:N75E,51SE			
35	■	2 6		129/5.7			

CLIENT: Newhall Ranch Company®	JOB NO.: 04-2023-4	**DRILL HOLE LOG**	
PROJECT: Mesas East - Tentative Map	DATE: 07/22/04		
	LOGGED BY: MAS		
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 11/21/03		
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-70E	
DRIVING WEIGHTS: 0-30'=6780 lbs, 30-60'=4780 lbs, 60-90'=3270 lbs, 90-120'=2090 lb	ELEVATION: 1371'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Qls				
40				B:N29W,31NE		@ 39' Silty plastic clay; soft; moist; grayish brown; slide zone; no parting plane; no striae	@ 39-40' Small bag sample
						BEDROCK; TQs (41-70') @ 41' Interbedded light-brown sandy siltstone; moderately hard to hard; moist; with lenses of light brown claystone	
				B:N26W,27NE		@ 43' Interbedded light-gray pebbly sandstone; moderately hard, damp, and light brown sandy siltstone; moist	
45	■	3 9					
				Apx. B:N19W,21NE		@ 47' Interbedded light-brown siltstone and light brown claystone; moderately hard to hard	
50				Apx. B:N34W,24NE			
			TQs	B:N32W,16NE		@ 54' Lense of light-gray silty fine-grained sandstone; damp	
55	■	13 20		119/15.4			
				B:N31W,27NE		@ 58' Lense of light-gray, silty fine-grained sandstone	
60				B:N25W,19NE		@ 61' Claystone grades to light brown silty fine-grained sandstone; wet	@ 61' Minor seepage
						@ 62' Reddish-brown sandy claystone; moist	
				Apx. B:N19W,22NE		@ 64' Grades to light brown sandy clayey siltstone	
65	■	22					
70						TOTAL DEPTH 70' Minor Seepage @ 61' No Caving	
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company®
PROJECT:	Mesas East - Tentative Map
DRILLING COMPANY:	Valley Well Drilling (Jesse)
DRILLING METHOD:	Bucket Auger
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-25'=2854 lbs; 25-47'=1802 lbs; 47-70'=1091 lbs
JOB NO.:	04-2023-4
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	12/3/03
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1339'
BORING NO.	B-71E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Soil			**SOIL; S (0-3')** @ 0' Silty clayey sand with gravel; medium dense; dry; brown; roots and rootlets	
						BEDROCK; TQs (3-40') @ 3' Light-brown siltstone; moderately hard to hard; dry; weathered; fractured	
5	■	3 4 5				@ 6' Discontinuous brown clay lenses; northwest side of boring	
						@ 8' Same with discontinuous sand lenses ~1-2" thick, 3-5" long	
10	■	3 5 8					
15	■	5 11	TQs				
				Apx. B:N56W,16NE		@ 18.5' Light-gray pebble conglomerate	
20	■	4 6 6		B:N44W,23NE Apx. B:N37W,21NE		@ 21' Interbedded light brown siltstone and light reddish-brown claystone; moderately hard; damp; not plastic; no striae	
25	■	7 12		Apx. B:N21W,19NE		@ 26' Gray pebble conglomerate interbed; dry	
				Apx. B:N39W,24NE		@ 28' Interbedded brown claystone and siltstone; moderately hard to hard; damp to moist	
30							
35	■	8 9 10					

CLIENT: Newhall Ranch Company®	JOB NO.: 04-2023-4	**DRILL HOLE LOG**	
PROJECT: Mesas East - Tentative Map	DATE: 07/22/04		
	LOGGED BY: MAS		
DRILLING COMPANY: Valley Well Drilling (Jesse)	DRILLED: 12/3/03		
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-71E	
DRIVING WEIGHTS: 0-25'=2854 lbs; 25-47'=1802 lbs; 47-70'=1091 lbs	ELEVATION: 1339'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40		7 9 11				TOTAL DEPTH 40' No Ground Water No Caving	
45							
50							
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT: Newhall Ranch Company®	JOB NO.: 04-2023-4
PROJECT: Mesas East - Tentative Map	DATE: 07/22/04
	LOGGED BY: MAS
DRILLING COMPANY: Tri-Valley Drilling (David)	DRILLED: 3/4 -5/04
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-27'=3450 lbs, 27-57'=2050 lbs, 57-87'=1140 lbs	ELEVATION: 1067'

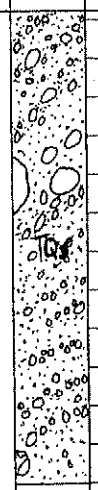
BORING NO. B-72E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						SOIL/DEBRIS FLOW; S (0-14') @ 0' Light brown silty sand with gravel; loose; damp; roots; no voids	
5		Push 1/12'	Soil	117/5.0			
10		Push 1/12'		113/2.7			
15		1 1 1		3.9		**BEDROCK; TQs (14-50')** @ 14' Pale yellowish-brown to pale whitish-gray pebbly sandstone; moderately hard to hard; dry to damp	
				B:N78W,37NE			@ 18-45' Continual use of core and grab buckets
20		2/4"					20' No Recovery, Rock in Tip
				B:N65W,34NE		@ 23' Pale yellowish-brown thinly laminated silty sandstone interbeds; moderately hard; damp	
25		2/6" Bounce	TQs				25' No Recovery, Rock in Tip
30				16.7		@ 30' Light brown to pale reddish-brown silty sandy mudstone interbed; moderately hard to hard; damp; continuous planes	@ 30' Small bulk sample
				B:N68W,24NE		@ 33' Pale yellowish-brown thinly laminated silty sandstone interbeds; moderately hard; damp	
35							@ 35' Did not sample due to cobbles

DRILL HOLE LOG

CLIENT: Newhall Ranch Company®	JOB NO.: 04-2023-4
PROJECT: Mesas East - Tentative Map	DATE: 07/22/04
	LOGGED BY: MAS
DRILLING COMPANY: Tri-Valley Drilling (David)	DRILLED: 3/4 -5/04
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-27'=3450 lbs, 27-57'=2050 lbs, 57-87'=1140 lbs	ELEVATION: 1067'

BORING NO. B-72E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40							
45							@ 45' Did not sample due to excessive cobble
							@ 49' Ground Water
50						TOTAL DEPTH 50' Ravelling 15-45' Ground Water @ 49' Caving 0-14'	
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Company®
PROJECT:	Mesas East - Tentative Map
DRILLING COMPANY:	Tri-Valley Drilling (David)
DRILLING METHOD:	Bucket Auger
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-27'=3450 lbs, 27-57'=2050 lbs, 57-87'=1140 lbs
JOB NO.:	04-2023-4
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	3/5 - 9/04
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1060'
BORING NO.	B-73E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						BEDROCK; TQs (0-55') @ 0' Pale yellowish-brown silty pebbly sandstone conglomerate; moderately hard; dry to damp; roots; no voids; pebbly channels	
				B:N65W,20NE			@ 3-40' continual use of core and grab bucket
5		1 4 4					@ 5' No Recovery, rock in tip
						@ 7' Light brown to pale reddish-brown silty claystone pods; moderately hard; damp	
10		1 4 6		136/3.7			
				17.7			
15		5 5/5"	TQs	129/2.0			@ 14' Small bulk sample @ 15' Rock in Tip
				B:N68W,22NE			
20		2					@ 20' No recovery, rock in tip; 1 Drop & 1 Bounce; Tip was destroyed
25				B:N58W,30NE			@ 25' Did not attempt to sample: abundent cobbles
30							
35				B:N64W,22NE			

DRILL HOLE LOG

CLIENT: Newhall Ranch Company®	JOB NO.: 04-2023-4
PROJECT: Mesas East - Tentative Map	DATE: 07/22/04
	LOGGED BY: MAS
DRILLING COMPANY: Tri-Valley Drilling (David)	DRILLED: 3/5 - 9/04
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-27'=3450 lbs, 27-57'=2050 lbs, 57-87'=1140 lbs	ELEVATION: 1060'

BORING NO. B-73E

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40							
45						TOTAL DEPTH 55' Ravelling @ 0-55' Ground Water @ 40' Caving @ 40-45'	
50							
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas Entertainment
DRILLING COMPANY:	Tri Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger/24" (82' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.
JOB NO.:	01-1703M-1
DATE:	07/22/04
LOGGED BY:	DGG
DRILLED:	12/15/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1201±
BORING NO.	B-1M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						QUATERNARY TERRACE DEPOSITS; Qt, (0 - 18 ft.) @ 0' Light yellowish-gray to light orangish-brown fine to coarse-grained sandstone, pebbly sandstone and pebble to cobble conglomerate with siltstone interbeds; loose; friable; dry to damp	Drilled & Logged 12/15/00 Drilled in cut for oil well pad; hole cased to 18 ft. due to loose conditions
5	■	6 15	Qt	B:Horizontal 126 / 2.6			Drive sample @ 5' bouncing on cobble after 12"
10							
15							
20	■	3 7 7		B:N38W,14NE		**BEDROCK; TQsu, (18 - 50 ft.)** @ 18' Pale orangish-brown to orangish-gray silty sandstone to sandy siltstone with interbedded medium- to coarse-grained pebbly sandstone lenses; moderately hard to hard; damp @ 21' Medium orangish- to yellowish-brown siltstone with scattered pebbles; hard; local concretions; grades to sandy siltstone and mudstone	@ 21' Core bucket
25							@ 25' Bulk sample
30	■	10 33/5"	TQsu	B:N40W,16NE 115 / 14.3 B:N35W,16NE		@ 29.5' Medium- to coarse-grained silty sandstone; moderately hard @ 29.75' Grades to pale orangish- to olive-gray siltstone; hard @ 31.25' Medium orangish-brown silty sandstone/sandy siltstone with scattered pebbles; moderately hard; damp	Drive sample @ 30' bouncing after 11"
35							

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1
PROJECT: Mesas Entertainment	DATE: 07/22/04
	LOGGED BY: DGG
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 12/15/00
DRILLING METHOD: Bucket-Auger/24" (82' Rig)	HOLE DIA: 24"
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1201±

BORING NO. B-1M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40		10 23 29	TQsc	131/10.1			
45							
50							Backfill tamped every 5 ft.
						Total Depth 50 ft. (Elev. 1151) No Ground Water No Caving	
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas Entertainment
DRILLING COMPANY:	
DRILLING METHOD:	Bucket-Auger/24" (82' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.
JOB NO.:	01-1703M-1
DATE:	07/22/04
LOGGED BY:	DGG
DRILLED:	12/18/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1202±
BORING NO.	B-2M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Qal			**QUATERNARY ALLUVIUM; Qal, (0-6")** @ 0' Orangish-brown medium-to coarse-grained pebbly sand with silt; loose; dry	Drilled and logged 12/18/00 @ 6" to 2' possible old debris flow deposit
						QUATERNARY LANDSLIDE; Qls, (6"-12.5 ft.) @ 6" Yellowish- to olive-brown siltstone with scattered pebbles; loose to moderately dense; slightly damp to damp	
5				SS?:N12W,22NE		@ 2" to 6" Thick siltstone bed @ 4.5' Irregular, ½" - thick silty clay; possible slip surface (ss); yellowish-gray siltstone below; dense to locally soft	
	■	3 4 6	Qls	123/9.6		@ 7' Pebbly lenses and local disturbed siltstone stringers to 9 ft.	
10	■	2 2 6		118/8.4			
				B:Horizontal Apx. contact: N12E,37SE		@ 11.5' Irregular contact with loose sandy pebbly interbed with local cobbles; subhorizontal stratifaction	Unit at 11.5' may be Qoa; underlying material is generally dense but shows local evidence of minor disturbance
						QUATERNARY LANDSLIDE?; Qls? (12.5-24 ft.) @ 12.5' Erosional contact with light olive-brown (2.5Y 5/4) to light yellowish-brown siltstone and yellowish-gray sandy siltstone; moderately hard; damp; local concretions; some soft sediment deformation locally	
				B:N48W,17NE			
15							
			Qls?	B:N47W,14NE		@ 16.75' Discontiuous ½"-thick mudstone/claystone @ 17.25' 3 to 5"-thick sand interbed; dense @ 18.5' & 19.7' 3 to 8"-thick pebbly, cobbly sand lenses	
20	■	5 14		114/9.6 Apx. B:N50W,16NE			Drive sample @ 20' bouncing after 12"
						@ 22.5' Pebbly sand interbed	
				SP:N46W,15NE		@ 23.9' 3/8"-thick, moderate-brown clay; moderately plastic; sticky	
25						**BEDROCK; TQsu, (24-35 ft.)** @ 24' Light olive-brown to light yellowish-brown siltstone and pebbly siltstone with local pebbly sand interbeds; moderately hard to hard; damp; poorly bedded	
							@ 28' Bulk sample
			TQs	B:49W,14NE		@ 29' Siltstone	
30	■	9 28					
35						Total Depth 35 ft. (Elev. 1167) No Groundwater - No Caving Slide Plane @ 23.9'	Backfill tamped every 5 ft.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas Entertainment
DRILLING COMPANY:	Tri Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger (82' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.
JOB NO.:	01-1703M-1
DATE:	07/22/04
LOGGED BY:	BJS
DRILLED:	12/18/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1144±
BORING NO.	B-3M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Qsw			**SLOUGH; (0-6")**	Drilled 12/18/00 and Logged 12/19/00
						QUATERNARY SLOPEWASH; Qsw, (6"-2.5 ft.) @ 6" Yellowish-gray pebbly sandy silt; loose; dry to slightly damp	
				B/Sh:N53W,16NE		**QUATERNARY LANDSLIDE; Qls, (2.5-36.5 ft.)** @ 2.5' Light yellowish-gray fine sandy siltstone and siltstone with olive-brown (2.5Y 4/4) mudstone interbeds; dense; slightly damp to damp; caliche pods; bedding disturbed	
5							
	■	1 2 3		102/26.7		@ 5' Mudstone interbeds slightly to moderately sheared; damp	@ 6' Bulk Sample
				B:N18W,12NE		@ 7' Light yellowish-gray sandstone and pebbly sandstone interbeds; slightly to moderately friable	
10							
	■	2 4 6		115/10.5			
			Qls	Apx. B:N51W;13NE		@ 11' Light yellowish-gray fine sandy siltstone with thin brown mottled mudstone interbeds; dense; locally sheared and disturbed	
				B:N35W,13NE		@ 13.5' Light-gray to light yellowish-gray sandstone and pebbly sandstone; slightly to moderately friable; cross bedding and laminations; local channelling	
15							
				XB:N40W,8NE		@ 18' - less friable	
20							
	■	5 8 8/3"		112/2.4			Drive Sample @ 20' bouncing after 15"
				B:N20W,24NE		@ 22' Steep erosional contact with light yellowish-brown siltstone and fine sandy siltstone with local thin mudstone interbeds; moderately hard to locally friable; damp @ 23.5' Local pebbly lenses and concretions	
25							
				B:N38W,16NE		@ 28' Erosional contact with light yellowish-brown to brown siltstone and mudstone interbeds; bedding appears slightly disturbed locally	@ 28' Material is tight but slightly softer than typical TQs
30							
	■	8 16 28					
				B:N44W,13NE			@ 32' Bulk Sample
				SP:N42W,15NE		@ 33' 1/8 to 3/8"-thick moderate-brown clay; plastic; sticky and sheared; parting, but no distinct striations; bedding slightly disturbed above and below to thin parting at 36. 5 ft.	
35						**BEDROCK?; TQsu, (36.5-43 ft.)**	
				MF:N39W,33NE		@ 36.5' Yellowish- to moderate-brown siltstone and mudstone interbeds; moderately hard; damp	

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1	**DRILL HOLE LOG**	
PROJECT: Mesas Entertainment	DATE: 07/22/04		
	LOGGED BY: BJS		
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 12/18/00		
DRILLING METHOD: Bucket-Auger (82' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-3M	
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1144±		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40				B/SS:N53W,15NE B:N55W,13NE		@ 39.5' Wispy clay rip-up clast; evidence of soft sediment deformation	
			TQsu	B/SS:N57W,16NE		@ 42.9' 1/8"-thick moderate-brown mudstone; moderately sheared **BEDROCK; TQsu, (43-49 ft.)** @ 43' Moderate yellowish-brown siltstone underlain by light- gray sandstone and pebbly sandstone with local cobbles; very dense but slightly friable; damp	
45			TQsu				
50						Total Depth 49 ft. (Elev. 1095) No Ground Water No Caving Slide plane @ 33 ft.	Backfill tamped every 5 ft.
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas Entertainment
DRILLING COMPANY:	Tri Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger/24" (82' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.
JOB NO.:	01-1703M-1
DATE:	07/22/04
LOGGED BY:	BJS
DRILLED:	12/19/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1148±
BORING NO.	B-4M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				104 / 6.1		**QUATERNARY SLOPEWASH/DEBRIS FLOW DEPOSIT; Qsw/ Qdf, (0-10 ft.)** @ 0' Yellowish-brown pebbly sandy mud; very tight; damp; no bedding	Drilled and Logged on 12/19/00
	■	1/12" 1	Qsw/Qdf			@ 3' Grades to pebbly sandy silt; soft; krotovina	
5	■	1/6" 1/20"					
						@ 7' Highly disturbed mix of TQs fragments in a yellowish-gray sandy silt matrix; soft; loose with minor caving; slightly damp	
10	■	3 5 7	Qls	104 / 11.6 Apx. B:Horizontal		@ 9.5' Loose sand and pebbly sand layer **QUATERNARY LANDSLIDE; Qls, (10-16 ft.)** @ 10' Irregular contact with light olive-brown (2.5Y 5/4-wet) to pale yellow (2.5Y 7/4-dry) fine sandy siltstone and siltstone with thin mudstone interbeds; laminations common; distinctly disturbed; dense but softer than typical TQs	@ 10-15' Bulk Sample
15	■	3 9 15		106 / 14.5 SP:N34W,10NE B:N45W,17NE		@ 13.8' Discontinuous moderate-brown plastic clay; sheared @ 15' Irregular sheared claystone @ 15.5' 3/8 to 3/4"-thick moderate-brown clay; plastic; sticky; moist **BEDROCK; TQsu, (16-35 ft.)** @ 16' Olive-brown (2.5Y 4/4-wet) to pale yellow (2.5Y 8/4-dry) fine sandy siltstone with moderate-brown mudstone interbeds; moderately hard; damp; local concretions; evidence of soft sediment deformation and rip-up clasts from 18-22 ft.	@ 16' Bulk Sample and 4 hand driven rings oriented normal to slide plane
20	■	3 10 13	TQsu				
				B:N41W,13NE		@ 22.5' Possible evidence of ancient liquefaction in fine sandy siltstone	
25				B:N40W,17NE			
				B:N51W,15NE		@ 27' Light-gray to light yellowish-gray sandstone and pebbly sandstone; very dense but slightly friable; damp; local cross bedding and channelling	
30	■	17 68		121 / 2.6			
35						Total Depth 35 ft. (Elev. 1113) No Ground Water Minor Caving from 7 to 10 ft.	Backfill tamped every 5 ft.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas Entertainment
DRILLING COMPANY:	Tri Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger/24" (82' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.
JOB NO.:	01-1703M-1
DATE:	07/22/04
LOGGED BY:	DGG
DRILLED:	12/20/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1167±
BORING NO.	B-5M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Qsw			**QUATERNARY SLOPEWASH; Qsw, (0-3 ft.)** @ 0' Pale yellowish- to orangish-brown to gray sandy silt with scattered pebbles; loose; dry to damp	Drilled and logged 12/20/00
5		2 4 8	Qls	105 / 11.7		**QUATERNARY LANDSLIDE; Qls, (3-9.5 ft.)** @ 3' Pale orangish-brown to olive-gray siltstone with scattered pebbles and local lenses and pods of pebbly sand and layers of brown siltstone with caliche; moderately hard; damp @ 5.75' Irregular pebbly sandstone interbed; loose	
				B/SS?:N55W,13NE		@ 7.5' Gray to brown clayey siltstone; medium dense; abundant caliche	@ 7' Core Bucket
				B:N55W,13NE		@ 8.5' Pale yellowish- to orangish-olive-gray siltstone	
10		7 15		116 / 5.3		@ 9.25' Pebbly sandstone interbed **BEDROCK; TQsu, (9.5-35 ft.)**	@ 10' Drive Sample Bouncing after 12"
				B:N48W,14NE		@ 9.4' ½ to 2"-thick olive-gray siltstone to clayey siltstone; slightly plastic and sticky	
				B:N35W,18NE		@ 9.5' Olive-gray sandy siltstone and fine-grained sandstone; very dense but moderately friable; damp; grades to fine- to coarse-grained pebbly sandstone	
15		11 30		124 / 3.2		@ 11.25' Pebbly cobbly interbed @ 15.5' Large cobbles	
20		10 25	TQsu				
				B:N44W,11NE Apx.B: N25E,7SE			
				Apx.B:N38E,12SE		@ 22.5' Erosional contact with orangish-brown to olive-gray siltstone with scattered pebbles; moderately hard to hard; concretions; locally clayey	
25							
				B:N42W,18NE		@ 26.5' Pale orangish- to olive-gray, fine- to coarse-grained pebbly sandstone lense	
30		10 27		130 / 10.7			
35						Total Depth 35 ft. (Elev. 1132) No Ground Water - No Caving Slide Plane @ 9.4 ft.	@ 35' Bulk Sample Backfill tamped every 5 ft.

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1	**DRILL HOLE LOG**	
PROJECT: Mesas Entertainment	DATE: 07/22/04		
	LOGGED BY: DGG		
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 12/20/00		
DRILLING METHOD: Bucket-Auger/24" (82' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-6M	
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1184±		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						QUATERNARY LANDSLIDE; Qls (0-30.5 ft.) @ 0' Pale yellowish- to grayish-brown and olive-gray siltstone with scattered pebbles and cobbles; moderately hard to locally loose; dry to damp; grades to medium orangish-brown pebbly silty sandstone	Drilled 12/20/00 and logged 12/21/00
5		1/12" 2		107 / 7.8 Apx. Contact: N25W,35SW		@ 5' Irregular contact with orangish-brown to olive-gray siltstone; highly fractured; very loose; belling	
10		1 1 2		111 / 2.4		@ 9' Pale yellowish- to orangish-brown fine- to medium-grained sandstone and silty sandstone with scattered pebbles; loose; dry to damp; siltstone is locally hard	
15		1 2 2	Qls	101 / 10.0 Apx. B:N50W,31SW		@ 14' Siltstone; moderately dense; damp; lenses of sandy siltstone and sandstone @ 16' Medium-brown clayey siltstone interbed; irregular bedding surface @ 16.5' Lense of fine- to coarse-grained sandstone; loose	Bedding in landslide is not oriented regionally
20		2 3 4				@ 19' Fine- to coarse-grained pebbly sandstone interbed; irregular bedding surface	
25							
30		6 9 20		SP:N68W,24NE 119 / 9.0 SP:N48W,13NE B:N43W,14NE		@ 28' 3 to 4"-thick, dark-yellowish-brown (10 YR 4/4) to olive-gray clay; moderately plastic and sticky; damp to moist; underlain by moderately hard siltstone with concretions @ 30.4' 1"-thick clay to silty clay; slightly plastic and sticky; damp to moist **BEDROCK; TQsu, (30.5 - 45 ft.)** @ 30.5' Pale orangish- to yellowish-olive-gray silty sandstone/sandy siltstone; moderately hard; damp	@ 28' (4) hand-driven rings oriented normal to slide plane, and bulk sample
35			TQsu	B:N45W,12NE		@ 33' Fine- to medium-grained pebbly sandstone with local cobbles; slightly friable; damp; cross bedding; local silty sandstone interbeds and lenses	@ 34' core bucket

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1	**DRILL HOLE LOG**	
PROJECT: Mesas Entertainment	DATE: 07/22/04		
	LOGGED BY: DGG		
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 12/20/00		
DRILLING METHOD: Bucket-Auger/24" (82' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-6M	
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1184±		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				B:N47W,14NE			
40	■	14 41	Qsm				
45							Backfill tamped every 5 ft.
						Total Depth 45 ft. (Elev. 1139) No Ground Water Minor Belling from 5 to 9 ft. Slide planes @ 28 & 30.5 ft.	
50							
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas Entertainment
DRILLING COMPANY:	Tri Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger/24" (82' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.
JOB NO.:	01-1703M-1
DATE:	07/22/04
LOGGED BY:	DGG
DRILLED:	12/21/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1184±
BORING NO.	B-7M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES. DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						QUATERNARY LANDSLIDE; Qls, (0-48 ft.) @ 0' Yellowish- to orangish-gray siltstone with local lenses of fine- to medium-grained sandstone; moderately hard; dry to damp; local caliche; poorly bedded	Drives and logged on 12/21/00
5	■	3 4 5		115/4.0			
				B:N42E,15SE		@ 7.5' Interbedded fine- to coarse-grained pebbly sandstone and siltstone; sandstone is friable; damp	
10	■	2 3 4		121/1.9 Contact: N18E,13SE		@ 9.75' Pale orangish-brown, fine- to coarse-grained pebbly sandstone; very friable	
						@ 12.25' Pale orangish-gray siltstone with minor clay; local concretions	@ 12' Bulk sample
15	■	2 3 3	Qls	106/21.3 Apx. B: N28E,13SE			
20	■	2 3 3		Apx. B: N80W,33SW			
25				SP/SS:N20W,12NE		@ 26' 3 to 4"-thick medium-brown to olive-gray clay; moderately sticky and plastic; damp to moist; irregular @ 26.5' Pale orangish- to olive-gray siltstone with clay, and fine-grained sandstone lenses; local concretions	
30	■	3 5 8		SP?:N65W,27SW 110/16.6		@ 29.5' Medium-brown to olive-gray clayey siltstone; slightly plastic and sticky; damp to moist	
35	■	4 7 12					

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1	**DRILL HOLE LOG**	
PROJECT: Mesas Entertainment	DATE: 07/22/04		
	LOGGED BY: DGG		
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 12/21/00		
DRILLING METHOD: Bucket-Auger/24" (82' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-7M	
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1184±		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40		7 13 25	Qls	SP:N49W,12NE B:N46W,11NE		@ 40.5' Apx. 1"-thick medium-brown to olive-gray clay; moderately sticky to plastic @ 42.25' Silty sandstone/sandy siltstone interbed	
45				SP:N48W,14NE B:46W,13NE		@ 47.5' 3 to 4"-thick medium-brown to olive-gray clayey siltstone to clay; moderately sticky and plastic; damp **BEDROCK; TQsu, (48-60 ft.)** @ 48' Orangish-brown to gray silty sandstone/sandy siltstone; hard; damp @ 48.75' 6"-thick medium-gray fine- to medium-grained pebbly sandstone @ 49.25' Interbedded fine-grained sandstone, fine- to coarse-grained pebbly sandstone and silty sandstone/sandy siltstone; moderately hard to slightly friable; damp	@ 47.5' 4 Hand driven rings oriented normal to slide plane and bag sample
50			TQsu				
55		34 25/1"		B:N51W,13NE			
60						Total Depth 60 ft. (Elev. 1124) No Ground Water No Caving Slide planes @ 26, 29.5, 40.5 and 47.5 ft.	Backfill tamped every 5 ft.
65							
70							
75							

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1
PROJECT: Mesas Entertainment	DATE: 07/22/04
	LOGGED BY: DGG
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 12/22/00
DRILLING METHOD: Bucket-Auger/24" (82' Rig)	HOLE DIA: 24"
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1200±

BORING NO. B-8M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						QUATERNARY LANDSLIDE; Qls, (0-31.5 ft.) @ 0' Medium-brown siltstone; soft; dry to damp @ 1.5' Yellowish-to orangish-brown siltstone with scattered pebbles; varies from moderately dense to locally soft; damp	Drilled and logged on 12/22/00
5		1 1 2		116 / 7.2		@ 7.25' Lense of olive-gray fine- to medium-grained pebbly sandstone; loose	
10		2 3 3		117 / 14.6		@ 10' Lense of pebbly silty sandstone/sandy siltstone; soft @ 12' Locally clayey	
15		1 2 2	Ql6	Apx. B: N49E,36NW 110 / 12.5 Contact: N10E,44NW		@ 14' 10"-thick discontinuous lense of fine- to medium-grained silty pebbly sandstone; loose @ 16.5 Fine- to coarse-grained pebbly sandstone interbed; loose @ 17.5' Orangish-brown locally clayey siltstone with interbeds and lenses of sandstone; pebbly sandstone and silty sandstone; moderately hard to friable	
20		1 3 3					
25							
30		5 8 11		112 / 11.3 SP:N46W,13NE B:N30W,12NE B:N53W,14NE		@ 31' 5"-thick medium-brown to olive-gray clay to clayey siltstone; plastic and sticky; moist **BEDROCK; TQsu, (31.5-45 ft.)** @ 31.5' Pale orangish-gray silty sandstone/sandy siltstone; moderately hard; damp @ 32.75' Pebbly sandstone interbed	
35		10 44	TQsu			@ 33' Interbedded pale orangish-gray pebbly sandstone and orangish-brown siltstone to sandy siltstone; sandstone is friable, siltstone is moderately hard to hard; both damp	

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas Entertainment
DRILLING COMPANY:	Tri Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger/24" (82' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.
JOB NO.:	01-1703M-1
DATE:	07/22/04
LOGGED BY:	DGG
DRILLED:	12/22/00
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1200±
BORING NO.	B-8M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				B:N51W,11NE		@ 34.5' Cross-bedded sandstone	@ 38' Bulk sample
40		14 43	TQ5u	B:N47W,12NE		@ 38' Olive-brown (2.5 YR 4/4) color	
						@ 43' Siltstone rip-up clasts	
45						Total Depth 45 ft. (Elev. 1155) No Ground Water No Caving Slide Plane @ 31 ft.	Backfill tamped every 5 ft.
50							
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1
PROJECT: Mesas Entertainment	DATE: 07/22/04
	LOGGED BY: DGG/VCG
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 12/27/00
DRILLING METHOD: Bucket-Auger/24" (82' Rig)	HOLE DIA: 24"
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1247±

BORING NO. B-9M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						QUATERNARY LANDSLIDE; Qls, (0-13.5 ft.) @ 0' Pale orangish- to olive-gray siltstone with scattered pebbles; loose to moderately dense; damp	Drilled 12/27/00 Logged 12/27 and 12/28/00
5		1/12" 2	Qls	120/1.1		@ 6' Chaotic assemblage of silty sandstone/sandy siltstone, fine-grained sandstone, and fine- to coarse-grained pebbly sandstone with scattered cobbles; loose; irregular contacts	
10		1 2 3		111/2.1			@ 12' Bulk Sample
				SP:N46W,12NE B:N49W,11NE		@ 13' 1 to 1.5"-thick olive-gray to brown clay to silty clay; moderately plastic and sticky; moist; carbonate nodules	
15		5 10		121/4.3 B:N38W,12NE		**BEDROCK; TQsu, (13.5-35 ft.)** @ 13.5' Olive-gray sandy siltstone/silty sandstone with minor sandy lenses; moderately hard; damp; locally laminated; soft sediment deformation @ 16' Light yellowish-brown to yellowish-gray fine- to coarse-grained sandstone and pebbly sandstone with local cobbles; cross bedded; moderately friable	@ 15' Drive sample bouncing after 12"
20			TQsu	B:N48W,14NE		@ 20' Pebbly to cobbly lense	
25				B:N46W,10NE			
				Apx.B:N39W,12NE			
30		9 24 49				@ 29' Erosional contact with pale reddish-brown to medium-brown sandy siltstone and silty sandstone with olive- gray mottling; moderately hard; damp; poorly bedded	
35		10 31		129/10.6		Total Depth 35 ft. (Elev. 1212) No Ground Water - Minor belling between 16 & 29 ft. Slide plane @ 13 ft.	Backfill tamped every 5 ft.

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1	**DRILL HOLE LOG**	
PROJECT: Mesas Entertainment	DATE: 07/22/04		
	LOGGED BY: DGG/BJS		
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 1/10/01		
DRILLING METHOD: Bucket-Auger/24" (82' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-10M	
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1192±		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						LANDSLIDE?; Qls, (0-30 ft.) @ 0' Light yellowish-brown fine sandy siltstone with local pebbly lenses; moderately hard; damp; minor caliche-filled fractures to 1.5 ft.	Drilled and Logged on 1/10/01
						@ 3' 12"-thick pebbly sandstone interbed; cross-bedding; slightly friable	
5		3 6 12		123/6.4		@ 5' Erosional contact with dark yellowish-brown (10 YR 4/4) siltstone and mudstone with minor caliche	@ 5' Bulk Sample
						@ 5.5' Interbedded light yellowish-brown fine silty sandstone and sandy siltstone, and yellowish-gray fine-grained sandstone with local moderate yellowish-brown siltstone/mudstone interbeds; bedding typically vague	
				B:N39W,10NE			
10		4 9 12		116/12.1 B:N48W,13NE		@ 11' Yellowish-brown siltstone/mudstone; grades downward to fine sandy siltstone with scattered pebbles; poorly sorted	
15		5 12 19	Qls	127/6.1		@ 15.5' Concretions @ 16.5' Lense of pebble conglomerate	
				B:N38W,20NE			
20						@ 19.5' Pebble to cobble conglomerate interbed	@ 19.5' Grab bucket
				B:N20W,15NE		@ 23.5' Fine sandstone interbed @ 24' Pebble to cobble conglomerate interbed	
25							Note: Material is generally tight with regional bedding, but nearby borings and trenches indicate it is part o a large landslide
30		8 18 33				Total Depth 30 ft. (Elev. 1162) No Ground Water No Caving	Backfill tamped every 5 ft.
35							

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1	**DRILL HOLE LOG**	
PROJECT: Mesas Entertainment	DATE: 07/22/04		
	LOGGED BY: BJS		
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 1/10/01		
DRILLING METHOD: Bucket-Auger/24" (82' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-11M	
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1188±		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						QUATERNARY LANDSLIDE; Qls, (0-18.5 ft.) @ 0' Light yellowish-brown to yellowish-gray fine sandy siltstone with scattered pebbles and local interbeds and lenses of sandstone and pebbly sandstone; moderately dense; damp; weathered backfills to 2.5 ft.; locally disturbed	Drilled and logged on 1/10/01 Deepened and logged 1/16/01 Upper 3-4 ft. of surficial material removed for pad
5		3 5 7		106 / 6.6 B:N56W,10NE		@ 6' Poorly sorted sandy siltstone; moderately hard	
10		4 7 10	Qls	122 / 6.1		@ 10.5' Pebbly lense @ 13' Irregular mudstone @ 14' Base of caliche-lined fractures	
15		3 5 10		125 / 6.0 Apx.B:N47W,12NE SP:N75W,7NE		@ 16' Pebbly sandstone interbed; crossbedded; slightly friable; disturbed @ 17.5' Erosional contact with siltstone @ 18.2' 1/8"-thick moderate-brown clay with caliche; slightly to moderately plastic and sheared	
20		4 9 4/2"		B:N50W,10NE		**BEDROCK; TQsu, (18.5-44 ft.)** @ 18.5' Light yellowish-brown fine sandy siltstone; moderately hard; damp @ 21' Grades to yellowish-gray fine silty sandstone	
25				Apx.B:N50W,7NE		@ 25.5' Pebble to cobble conglomerate and pebbly sandstone @ 27.5' Siltstone interbed	@ 26' Carbide bucket and crowding
30		3 13 34/5"	TQsu	131 / 7.8 B:N30W,12NE Apx.B:N45W,10NE		@ 30.25' Silty pebbly sandstone with scattered cobbles @ 31' Pebble to cobble conglomerate and pebbly sandstone	
35				B:N48W,11NE		@ 35.5' Fine-grained sandstone interbed @ 38' Siltstone to sandy siltstone interbed	

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1	**DRILL HOLE LOG**	
PROJECT: Mesas Entertainment	DATE: 07/22/04		
	LOGGED BY: BJS		
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 1/10/01		
DRILLING METHOD: Bucket-Auger/24" (82' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-11M	
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1188±		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40		9 25	TQsu	Apx.B:N47W,11NE		@ 41' Olive-gray siltstone; moderately hard; damp	
45						Total Depth 44 ft. (Elev 1144) No Ground Water No Caving Slide plane @ 18.2 ft.	Backfill tamped every 5 ft.
50							
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1		
PROJECT: Mesas Entertainment	DATE: 07/22/04		
	LOGGED BY: DGG		
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 1/16/01		
DRILLING METHOD: Bucket-Auger/24" (82' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	BORING NO.	B-12M
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1183±		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						QUATERNARY TERRACE DEPOSITS; Qt, (0-10 ft.) @ 0' Medium- to orangish-brown siltstone with scattered pebbles; moderately hard to locally friable; damp	Drilled and logged on 1/16/01
5	■	3 3 2	Qt	93/4.8 B:Horizontal		@ 6' Siltstone, silty sandstone and fine- to coarse-grained pebbly cobbly sandstone; friable; damp; few scattered boulders; belling	@ 9' Grab bucket
10	■	2 3 5		104/21.8		**BEDROCK; TQsu, (10-30 ft.)** @ 10' Olive-gray siltstone; moderately hard; damp; local caliche-rich zones	@ 10' Belling @ 12-15' carbide bucket
15				B:N50W,13NE B:N48W,12NE		@ 14' Orangish-brown fine- to coarse-grained pebbly sandstone; moderately dense to dense; moderately friable; damp @ 16' Fine-grained sandstone; moderately dense; slightly friable @ 17' Fine- to coarse-grained pebbly sandstone	@ 18' Bulk sample
20	■	9 10/3"	TQsu	B:N47W,14NE B:N45W,13NE 117/2.1		@ 19' Siltstone interbed @ 20.5' Orangish-gray fine- to coarse-grained pebbly sandstone; moderately hard; moderately friable	@ 21' Drive sample Bouncing after 9" @ 22-28' carbide bucket
25				B:N50W,12NE		@ 25' Lenticular rip-up clasts	
30	■	11 25/5"				@ 29' Olive-gray siltstone Total Depth 30 ft. (Elev. 1153) No Ground Water Caving from 6-10 ft.	Backfill tamped every 5 ft.
35							

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1	**DRILL HOLE LOG**	
PROJECT: Mesas Entertainment	DATE: 07/22/04		
	LOGGED BY: DGG		
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 1/19/01		
DRILLING METHOD: Bucket-Auger/24" (82' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-13M	
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1205±		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES. DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						QUATERNARY LANDSLIDE; Qls, (0-41.5 ft.) @ 0' Medium-brown siltstone; stiff; damp to moist @ 1.5' Orangish-brown siltstone with scattered pebbles and cobbles; hard; damp	Drilled and logged on 1/19/01
5		4 5 5		124 / 8.4		@ 6' Sandy siltstone; local patches of fine- to coarse-grained pebbly sandstone	
10		3 4 5		123 / 3.0		@ 11' Patch of fine- to coarse-grained pebbly cobbly sandstone; friable; damp @ 12' Fine-grained pebbly sandstone; friable; cross bedded	
15			Qls	Apx.B:N62E,9NW		@ 14' Pale orangish-brown siltstone; moderately hard to hard; damp @ 15' Faint laminations; scattered pebbles	
20		3 4 6		111 / 14.9 Apx.B/Contact: N84W,10NE		@ 22.5' Fine- to coarse-grained pebbly sandstone interbed with scattered cobbles; friable; damp @ 24' Caliche-filled fractures	@ 21' Bulk Sample
25							
30		5 7 9		Apx.B:N78E,11NW		@ 30' Clayey siltstone; slightly plastic and sticky; damp @ 33' Orangish-brown siltstone with scattered pebbles; moderately hard to hard; damp; local patches of friable fine- to coarse-grained pebbly sandstone	Note: Bedding observed in landslide material is not regional
35						@ 38' Discontinuous lense of fine- to coarse-grained pebbly sandstone; friable	

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1	**DRILL HOLE LOG**	
PROJECT: Mesas Entertainment	DATE: 07/22/04		
	LOGGED BY: DGG		
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 1/19/01		
DRILLING METHOD: Bucket-Auger/24" (82' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-13M	
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1205±		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40		7 17 19		113 / 13.5 SP:N80W-80E,12N Apx.B:N82E,13NW		@ 41.3' Medium-brown to olive-gray clay; moderately plastic and sticky; moist **BEDROCK; TQsu, (41.5 - 50 ft.)** @ 42' Pale-orangish-brown to gray siltstone; moderately hard to hard; damp	@ 41.3' 4 Hand-driven rings oriented normal to slide plane
45			TQsu	Apx.B:N78W,9NE			
50		8 29/4"				Total Depth 50 ft. (Elev. 1155) No Ground Water No Caving Slide Plane @ 41.5 ft.	Backfill tamped every 5 ft.
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1
PROJECT: Mesas Entertainment	DATE: 07/22/04
	LOGGED BY: DGG
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 1/19-1/20/01
DRILLING METHOD: Bucket-Auger/24" (82' Rig)	HOLE DIA: 24"
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1205±

BORING NO. B-14M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						QUATERNARY LANDSLIDE; Qls, (0-8 ft.) @ 0' Pale yellowish-gray siltstone with scattered pebbles; soft; damp @ 1.5' No pebbles; slightly to moderately hard	Drilled 1/19/01 and 1/22/01 and logged on 1/22/01
5			Qls				
	■	2 5 6		106 / 12.3		@ 5' Fractures	
				SP:N73W,13NE		@ 7' Discontinuos fine-grained sandstone interbed; Apx. 3" thick @ 7.5' Slightly clayey siltstone layer with caliche; slide plane? **BEDROCK; TQsu, (8-35 ft.)** @ 8' Yellowish-gray siltstone; moderately hard to hard locally; damp	
10							
	■	3 4 6		118 / 13.7			
				B:N83E,14NW		@ 14' 2-3"-thick fine- to coarse-grained pebbly sandstone interbed; friable; few cobbles @ 15' Scattered pebbles	
15							
			TQsu				
20							
	■	4 9 18		126 / 12.2			
				Apx.B:N75W,11NE		@ 21' Locally sandy siltstone	
25							@ 25' Bulk Sample
				B:N74W,14NE		@ 29' Local concretions	
30							
	■	3 13 23					
						@ 32' Sandy siltstone interbeded with pebbly sandstone	
35							Backfill tamped every 5 ft.
						Total Depth 35 ft. (Elev. 1170) No Ground Water - No Caving Slide Plane @ 7 ft.	

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1
PROJECT: Mesas Entertainment	DATE: 07/22/04
	LOGGED BY: DGG/VCG
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 1/22/01
DRILLING METHOD: Bucket-Auger/24" (82' Rig)	HOLE DIA: 24"
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1260±

BORING NO. B-15M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						QUATERNARY LANDSLIDE; Qls, (0-27.5 ft.) @ 0' Orangish-brown siltstone with scattered pebbles; soft; damp	Drilled and logged on 1/22/01
				Contact: N32W,24SW		@ 2.5' Fine- to coarse-grained pebbly sandstone; friable and loose to slightly dense; damp	
5		3 5 6		119 / 6.5		@ 4.5' Pale orangish- to yellowish-gray to brown siltstone; moderately hard; damp	
10		2 2 4		Apx.B:N22W,23NE 117 / 5.3		@ 10.5' Medium-brown clay; moderately plastic and sticky; damp; irregular surface; disrupted	
				Apx.B:N40W,24NE		@ 11' Yellowish- to orangish-gray siltstone to sandy siltstone with scattered cobbles, pebbles and zones of coarse-grained sandstone; moderately hard; damp	
15			Qls	XB:N84W,10NE		@ 14' Orangish-brown, fine- to coarse-grained pebbly sandstone and siltstone with scattered cobbles; friable and loose to moderately dense; damp	
						@ 16' Cross bedding	@ 17' Carbide bucket
				Apx.B:N30W,11NE		@ 18' Cobbles	
20				B:N70W,10NE		@ 20' Cobbles	
						@ 20.5' Pale orangish-gray siltstone to sandy siltstone; grades to fine-grained sandstone and fine- to coarse-grained pebbly sandstone; friable; damp; some beds discontinuous	
		8/5"		111 / 1.0			@ 23' Sampler Bouncing after 5"
25				SP:N60W,29NE		@ 25.5' Orangish- to medium-brown slightly clayey siltstone; slightly plastic and sticky; damp	
				SP:N44W,12NE		@ 27' 2"-thick medium-brown clay; plastic and sticky; damp	
						BEDROCK; TQsu, (27.5-42 ft.)	
30		9 15 23	TQsu	B:N47W,18NE		@ 27.5' Orangish-brown siltstone to sandy siltstone with fine- to coarse-grained pebbly sandstone; moderately hard to hard; damp; local lenses	
							@ 34' Bulk sample
35				B/SS:N48W,16NE		@ 35' 2"-thick medium-brown clayey siltstone interbed; slightly sticky and plactic; damp	

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1	**DRILL HOLE LOG**	
PROJECT: Mesas Entertainment	DATE: 07/22/04		
	LOGGED BY: DGG/VCG		
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 1/22/01		
DRILLING METHOD: Bucket-Auger/24" (82' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-15M	
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1260±		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				Apx.B:N30W,18NE		@ 38' Clayey interbed	
40		6 12 32	TQsu	Apx.B:N43W,12NE			Backfill tamped every 5 ft.
45						Total Depth 42 ft. (Elev. 1218) No Ground Water No Caving Slide Planes @ 25.5 and 27 ft.	
50							
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1
PROJECT: Mesas Entertainment	DATE: 07/22/04
	LOGGED BY: DGG/BJS
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 1/23/01
DRILLING METHOD: Bucket-Auger/24" (82' Rig)	HOLE DIA: 24"
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1228±

BORING NO. B-16M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Qsw			**QUATERNARY SLOPEWASH; Qsw, (0-4 ft.)** @ 0' Medium orangish-brown silt and sandy silt with pebbles and scattered cobbles; firm; damp to moist	Drilled and logged on 1/23/01
5	■	2 2 1	Qosw			**QUATERNARY OLDER SLOPEWASH; Qosw, (4-9 ft.)** @ 4' Light orangish-brown to olive-brown silt with scattered pebbles; dense to locally soft; damp	Qosw may be an old debris flow deposit
10				Apx.B:N20E,10NW		**QUATERNARY LANDSLIDE; Qls, (9-36 ft.)** @ 9' Irregular zones of pebbly siltstone, coarse-grained pebbly sandstone and concretionary zones; locally friable and loose to hard; damp	
	■	4 8 10		B?:N40W,17NE 122/8.4		@ 12.5' Erosional contact with orangish- to olive-gray siltstone; moderately hard; caliche-filled fractures @ 14' Discontinuous pebbly lense	
15						@ 15.5' Medium-brown siltstone/mudstone; contact gradational	
						@ 18' Caliche nodules	
20				117/14.5		@ 19.5' Local mudstone and sandstone fragments/clasts	
	■	3 6 7		B/SS:N44W,14NE		@ 21.5' Slightly clayey interbed, slightly sticky; disturbed below	
			Qls	SP:N43W,14NE		@ 23' Slightly clayey, caliche-rich bed; slightly sheared and plastic	
25				f:N60W,33-45NE		@ 24.5' Sandy siltstone grading to sandstone with scattered pebbles; weathered; bedding slightly disturbed; planar fractures	
				Apx.B:N40W,13NE		@ 26.5' Local concretions @ 27' Pocket of pebbly sandstone; friable; cross bedded	@ 28' Bulk sample
30						@ 29' Chaotic assemblage of medium orangish-brown siltstone, sandy siltstone and pebbly sandstone; friable	
				B:N50W,54SW		@ 33' Erosional contact with olive-gray to medium-brown siltstone below; moderately hard	@ 33' Bedding locally steep above erosional contact
	■	4 8 16		SP:N42W,12NE SP:N54W,13NE		@ 34' 1 to 1.5"-thick moderate reddish-brown clay; plastic; moist @ 34.5' 0.25 to 0.5"-thick moderate-brown clay; plastic; sticky; planar; slightly disturbed below	@ 34' 4 Hand-driven rings oriented normal to slide plane
35				SP:N45W,13NE		**BEDROCK; TQsu, (36-42 ft.)** @ 36' Light yellowish-brown siltstone and fine silty sandstone;	
			TQs				

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1	**DRILL HOLE LOG**	
PROJECT: Mesas Entertainment	DATE: 07/22/04		
	LOGGED BY: DGG/BJS		
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 1/23/01		
DRILLING METHOD: Bucket-Auger/24" (82' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-16M	
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1228±		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				Apx.B:N37W,11NE		moderately hard; damp	
40			TQsu	114 / 17.4			
		8 15 20				Total Depth 42 ft. (Elev. 1186) No Ground Water No Caving Slide Planes @ 23, 34, 34.5 and 36 ft.	Backfill tamped every 5 ft.
45							
50							
55							
60							
65							
70							
75							

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1	**DRILL HOLE LOG**	
PROJECT: Mesas Entertainment	DATE: 07/22/04		
	LOGGED BY: DGG		
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 1/25/01		
DRILLING METHOD: Bucket-Auger/24" (82' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-17M	
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1212±		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						QUATERNARY LANDSLIDE; Qls, (0-14.5 ft.) @ 0' Medium olive-gray to pale yellowish-olive-gray siltstone; soft to firm; damp to moist; some caliche surfaces	Drilled and logged on 1/25/01
5		1 1 2	Qls	110 / 10.2		@ 4' Increasingly firm @ 6' Local patches of clayey siltstone and fine- to medium-grained pebbly sand	
10		1 2 2					
15				SP:N44W,20NE 110/20.1		@ 14.4' ¾"-thick medium olive-gray clayey siltstone; moderately plastic and sticky; damp **BEDROCK; TQsu, (14.5-40 ft.)** @ 14.5' Yellowish- to orangish-olive-gray siltstone to sandy siltstone; moderately hard; damp @ 16.5' Local concretions	@ 14.4' 4 Hand-driven rings oriented normal to slide plane
20		3 4 8		B:N47W,17NE		@ 22.5' Sandy to pebbly interbed	
25			TQsu	f:N82E,90 B:N43W,19NE B:N44W,17NE		@ 24.5' Fractures @ 25.5' Silty to fine-grained sandstone; dense; damp @ 27' Fine- to coarse-grained pebbly sandstone; dense to slightly friable @ 27.5' Siltstone to sandy siltstone with clay; moderately hard; damp	
30		7 11 19		Apx.B:N42W,14NE f:N88E,90 115/19.6 Apx.B:N40W,16NE		@ 29' Fractured	
35							@ 35' Bulk sample

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas Entertainment
DRILLING COMPANY:	Tri Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger/24" (82' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.
JOB NO.:	01-1703M-1
DATE:	07/22/04
LOGGED BY:	DGG
DRILLED:	1/25/01
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1212±
BORING NO.	B-17M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40		8 21 49				Total Depth 40 ft. (Elev. 1172) No Ground Water No Caving Slide Plane @ 14.5 ft.	Backfill tamped every 5 ft.
45							
50							
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1		
PROJECT: Mesas Entertainment	DATE: 07/22/04		
	LOGGED BY: DGG		
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 2/6/01		
DRILLING METHOD: Bucket-Auger/24" (82' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	BORING NO. B-18M	
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1259±		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						QUATERNARY LANDSLIDE; Qls, (0-42 ft.) @ 0' Medium-brown siltstone with scattered pebbles and cobbles; soft; damp @ 1' Yellowish-brown siltstone @ 2' Large cobbles; loose	Drilled and logged on 2/6/01
				Contact: N33W,27SW		@ 4' Locally sandy with patches of fine- to medium-grained pebbly sandstone; very friable and loose	
5		2 3 6		114/5.8		@ 6' Caliche surfaces	
				B:N82W,28NE		@ 7' Discontinuous orangish-brown, fine- to medium-grained sandstone interbed @ 8' Orangish-brown siltstone; stiff to hard; damp @ 9' Sandy	
10		3 4 4		SP/SS:N65W,6SW 119/2.9		@ 9.5' Fine- to coarse-grained pebbly sandstone @ 10' Medium-brown silty clay; brittle; damp; slide plane? @ 10.5' Chaotic assemblage of siltstone, sandy siltstone and fine- to medium-grained pebbly sandstone; locally cobbly; siltstone is firm to stiff; sandstone is friable	
15			Qls	B/Contact: N35W,47SW		@ 16.5' Erosional contact with chaotic assemblage of fine- to coarse-grained pebbly sandstone and fine-grained sandstone	@ 18' Bulk sample
20		3 3 4		116/3.9			
				B/Contact: N45W,42SW		@ 22' Erosional contact within chaotic assemblage to orangish-brown siltstone with sandy and pebbly to cobbly zones; hard to locally friable	Note: Bedding within landslide material is not regional
25						@ 27' Predominantly coarser-grained units	
30		6 10 18					
				B/Contact: N80W,26SW			
35							

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1	**DRILL HOLE LOG**	
PROJECT: Mesas Entertainment	DATE: 07/22/04		
	LOGGED BY: DGG		
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 2/6/01		
DRILLING METHOD: Bucket-Auger/24" (82' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-18M	
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1259±		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40			Qs				
				SS/SP:N41W,11NE SP:N37W,14NE		@ 41.5' and 42' Medium-brown to gray clay; moderately plastic and sticky; damp	
	■	5 30				**<u>BEDROCK</u>; TQsu, (42-55 ft.)** @ 42' Orangish-brown to gray siltstone; hard; damp; massive; local concretions	
45			TQsu				
50	■	6 17 24					
55						Total Depth 55 ft. (Elev. 1204) No Ground Water No Caving Slide Planes @ 10, 41.5 and 42 ft.	Backfill tamped every 5 ft.
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1
PROJECT: Mesas Entertainment	DATE: 07/22/04
	LOGGED BY: MJD/BJS
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 2/6-2/7/01
DRILLING METHOD: Bucket-Auger/24" (82' Rig)	HOLE DIA: 24"
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1204±

BORING NO. B-19M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						QUATERNARY LANDSLIDE; Qls, (0-38.5 ft.) @ 0' Light-brown sandy siltstone with scattered pebbles; dense but locally softer and fractured; moist; bedding is distinctly disturbed @ 2' Caliche; hard; damp	Drilled and logged on 2/6/01 and 2/7/01 and Logged 2/7/01
5		1 2 4		B:N28E,19SE 104/21.0 B:N39E,21SE		@ 4.5' 3 to 5"-thick yellowish-gray, fine- to medium-grained sandstone bed; interbedded medium-brown silty clay to clayey siltstone with yellowish-brown sandstone lenses below; moderately hard; caliche @ 7.5' Medium- to light-brown fine sandy siltstone and silty sandstone	
10		2 4 6		B:N57E,22SE 113/4.5		@ 10' Yellowish-gray fine- to coarse-grained sandstone and silty sandstone with pebbly sandstone lenses	
				B:N39E,16SE			@ 13' Bulk sample
15						@ 16.5' Medium-brown sandy siltstone with scattered pebbles; massive	
20		3 7 10	Qls	127/1.2		@ 20' Light-brown to yellowish-gray fine- to coarse-grained silty sandstone with discontinous clayey siltstone interbeds; scattered pebbles and cobbles	
25				B/Contact: N24E,15SE MF:N40W,62NE		@ 24' Erosional contact with sandy to clayey siltstone @ 25' Sandy to pebbly lense within slightly sticky medium-brown clayey siltstone	
30		4 6 12		B/Contact: N80W,28NE		@ 29.5' Yellowish-brown fine- to medium-grained sandstone and silty sandstone @ 31.5' Coarse-grained pebbly lense; soft	
35				SP:N80W,10SW		@ 34.5' Medium-brown sandy to silty mudstone; slightly sticky and plastic; caliche	@ 34' 4 Hand-driven rings oriented normal to slide plane
				SP:N20W,7NE Apx.SP:N28W,		@ 37' Irregular slip surface; underlying siltstone and mudstone are disturbed	

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1
PROJECT: Mesas Entertainment	DATE: 07/22/04
	LOGGED BY: MJD/BJS
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 2/6-2/7/01
DRILLING METHOD: Bucket-Auger/24" (82' Rig)	HOLE DIA: 24"
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1204±

BORING NO. B-19M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				17NE		@ 38.5' Thin, sticky slip surface above coarse material	
				Contact: N31W,17NE		**QUATERNARY OLDER ALLUVIUM; Qoa, (38.5-46 ft.)**	
40		2 4 5	Qoa	120 / 11.0		@ 38.5' Weathered silty sandstone and pebbly sandstone; loose to moderately dense; damp; appears disturbed by overlying Qls	
						@ 42' Yellowish-brown to yellowish-gray medium to coarse-grained sandstone and pebbly sandstone; moderately dense to dense but slightly friable; locally cemented; damp; matrix locally lacking	
45						**BEDROCK; TQsu, (46-60 ft.)**	@ 46' Grab/core bucket used
				B:N40W,16NE		@ 46' Light yellowish-brown pebbly to cobbly sandstone; moderately hard to locally strongly cemented; damp	
50							
		29 7/1"	TQsu	B:N47W,14NE		@ 53' Slightly silty sandstone, pebbly sandstone and pebble conglomerate with scattered cobbles; strongly cemented	
55							
60		31 25/1"				Total Depth 60 ft. (Elev. 1144) No Ground Water No Caving Slide Planes @ 34.5, 37 and 38.5 ft.	Backfill tamped every 5 ft.
65							
70							
75							

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1	**DRILL HOLE LOG**	
PROJECT: Mesas Entertainment	DATE: 07/22/04		
	LOGGED BY: MJD/BJS		
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 2/7-2/8/01		
DRILLING METHOD: Bucket-Auger/24" (82' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-20M	
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1225±		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				Apx.B:N33W,22NE		**QUATERNARY LANDSLIDE; Qls, (0-57 ft.)** @ 0' Yellowish-brown to light yellowish-brown fine sandy siltstone with slightly silty pebbly sandstone lenses and interbeds; dense but slightly friable; damp to moist; northeast-dipping fractures with minor caliche	Drilled 2/7/01 and 2/8/01 and logged on 2/8/01 Note: Surficial material removed for drill pad
5	■	5 9		B:N47W,15NE 123 / 9.1		@ 5' Contact with yellowish-brown siltstone and mudstone with minor sand and local pebbles; bedding irregular at contact; moderately hard; damp; poorly bedded below 5 ft.	
10	■	3 6 11		123 / 10.1		@ 10' Thin, irregular moderate-brown clay seams; concretions	
				B:N75W,10NE		@ 12.5' Yellowish-gray fine sandstone interbed; local laminations; fractures	
15			Qls	B:N50W,15NE		@ 13.5' 6"-thick moderate-brown mudstone with fine laminations; moderately disturbed and sheared @ 15' Fine-grained sandstone interbed @ 16' Yellowish-gray to light yellowish-brown sandstone and pebbly sandstone interbed; fine sandy siltstone with local mudstone interbeds below; soft sediment deformation	
20	■	4 8 14		116 / 15.5 B:N32W,15NE			
				SP:N37W,12NE		@ 23' 1/8"-thick moderate-brown clayey seam; moderately plastic; slightly irregular	
25						@ 24.5' Pebbly lenses; bedding slightly weathered	
						@ 28' Caliche-lined fracture @ 29' Pebbly sandstone interbed	
30	■	7 18 32		B:N73W,15NE		@ 31' Local concretions; slightly softer overall; bedding slightly irregular and discontinuous; slightly weathered; some soft sediment deformation also; local clayey blebs	
35						@ 35' Discontinous interbed of slightly silty sandstone with pebbles	
				Mf:N15E,50-90NW		@ 38' Light yellowish-gray sandstone interbed; moderately friable; truncated by minor fault; caliche at top of bed	

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas Entertainment
DRILLING COMPANY:	Tri Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger/24" (82' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.
JOB NO.:	01-1703M-1
DATE:	07/22/04
LOGGED BY:	MJD/BJS
DRILLED:	2/7-2/8/01
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1225±
BORING NO.	B-20M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40		5 8 11		115/17.5 SP:N10W,10NE		@ 40' Concretions; disturbed sandstone @ 40.5' 1/4 to 1/2"-thick, moderate reddish-brown silty claystone; moderately plastic; underlying mudstone is slightly plastic	
45			Qls			@ 43' Grades to yellowish-brown slightly sandy siltstone with scattered pebbles; local clay blebs @ 44' Irregular sandstone lense; slightly softer @ 45' Grades to slightly disturbed siltstone and mudstone	
50		8 15 17		B:N14W,11NE SP:N31W,15NE SP:N45W,11NE		@ 49' Mudstone interbeds @ 50' Laminated siltstone and mudstone @ 52' Thin seam of moderate-brown clay; moderately plastic; damp to moist; disturbed moderate-brown to moderate reddish-brown mudstone and claystone below	
55				SP?:N54W,14NE		@ 54' 3/8 to 3/4"-thick moderate-brown clay; plastic and sticky; moist; slightly disturbed mudstone and sandy siltstone below @ 56' Sandstone interbed; slightly disturbed @ 57' Silty claystone below; slightly sheared	Note: Most of landslide distress appears to be above slide plane @ 54 ft.; slightly disturbed to 57 ft.
60		23 75	TQsu	B:N46W,14NE		**BEDROCK; TQsu, (57-65 ft.)** @ 57' Yellowish-brown fine sandy siltstone with local pebbles; hard; damp; poorly bedded	
65						Total Depth 65 ft. (Elev. 1160) No Ground Water No Caving Slide Planes @ 23, 40.5, 52, 54 and 57 ft.	Backfill tamped every 5 ft.
70							
75							

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1		
PROJECT: Mesas Entertainment	DATE: 07/22/04		
	LOGGED BY: DGG/BJS		
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 2/8-2/9/01		
DRILLING METHOD: Bucket-Auger/24" (82' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	BORING NO. B-21M	
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1271±		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						QUATERNARY LANDSLIDE; Qls, (0-52 ft.) @ 0' Medium yellowish-brown siltstone, sandy siltstone, and fine- to coarse grained pebbly sandstone with scattered cobbles; soft; friable; damp; highly weathered	Drilled 2/8/01 and 2/9/01 and Logged on 2/9/01
						@ 3.5' Yellowish-brown siltstone and fine-grained pebbly sandstone; siltstone is firm, sandstone is friable; disturbed pebble lense	@ 3' Bulk sample
5		2 3 5		114 / 3.4		@ 5' Chaotic assemblage of siltstone, sandy siltstone/silty sandstone and fine- to coarse-grained pebbly sandstone; loose and friable; damp	
							@ 8' Bulk sample. From 8-20', Units are cut by a series of landslide-related minor normal faults @ 13' 3-5" separation on MF
10		3 4 7		123 / 1.5			
				Apx.B:N34E,8SE MF:N-S,71E			
15				Apx.B:N30W,7SW			
20				Contact: N25E,38SE MF:N23E,73SE 117 / 14.2		@ 20' Offset erosional contact above yellowish-brown siltstone to sandy siltstone; stiff; damp; local pebbly lenses; bedding faint and disturbed	@ 21' 12-15" Separation on MF
		2 2 3					
25				B:N72W,14SW		@ 25' Discontinuous fine-to coarse-grained pebbly interbeds and local mudstone interbeds; coarse units friable	
30		4 8 13				@ 30' Relatively hard @ 31' Grades to light-brown slightly sandy mudstone with scattered pebbles	
35				MF:N5W,60NE		@ 34' Grades to yellowish-brown slightly sandy siltstone; moderately hard	@ 36' 2-3" Separation on MF

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas Entertainment
DRILLING COMPANY:	Tri Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger/24" (82' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.
JOB NO.:	01-1703M-1
DATE:	07/22/04
LOGGED BY:	DGG/BJS
DRILLED:	2/8-2/9/01
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1271±
BORING NO.	B-21M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES. DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				B:N84E,7SE		@ 37.5' Interbedded fine sandy siltstone and mudstone	
40		3 6 10		111/17. 7			
				SP:N87E,15SE Apx.B:N80W,12SW B:N70E,32SE		@ 42' 1 to 2"-thick olive-gray clayey siltstone to silty clay; moderately plastic and sticky; damp; grades to mudstone; disturbed	@ 43-47' Landslide-related minor faults
45			Qs	MF:N55W,50NE			
				SP:N50E,7SE Apx. Contact: N28E,14NW		@ 48' 1 to 3"-thick medium-brown clay; locally plastic and sticky; damp	
50		4 5 8		SP:N55W,14NE		@ 50' Disturbed lense of pebbly sandstone @ 52' 1"-thick moderate reddish-brown clay; moderately plastic **BEDROCK; TQsu, (52-75 ft.)** @ 52' Yellowish-brown to olive siltstone, sandy siltstone and mudstone; moderately hard; damp to moist	
55				B:N40W,19NE			
				B:N41W,13NE			
60		17 59		B/SS:N40W,18NE		@ 60.5' Clayey interbed; slightly sheared; local concretions below	
			TQsu				
65							
70		21 85/5"					
75							Backfill tamped

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.	JOB NO.:	01-1703M-1
PROJECT:	Mesas Entertainment	DATE:	07/22/04
		LOGGED BY:	DGG/BJS
DRILLING COMPANY:	Tri Valley Drilling/Dave	DRILLED:	2/8-2/9/01
DRILLING METHOD:	Bucket-Auger/24" (82' Rig)	HOLE DIA:	24"
HAMMER TYPE:	Telescoping Kelly Bar	AVERAGE DROP (in.):	12"
DRIVING WEIGHTS:	0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION:	1271±

BORING NO. B-21M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						Total Depth 75 ft. (Elev. 1196) No Ground Water No Caving Slide Planes @ 42, 48 and 52 ft.	every 5 ft.
80							
85							
90							
95							
100							
105							
110							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas Entertainment
DRILLING COMPANY:	Tri Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger/24" (82' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.
JOB NO.:	01-1703M-1
DATE:	07/22/04
LOGGED BY:	MJD
DRILLED:	3/28/01
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1176±
BORING NO.	B-22M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						ARTIFICIAL FILL; af, (0-18 ft.) @ 0' Medium-brown sandy pebbly silt; moist to damp	Excavated on 3/28/01 Surface logged only due to hydrocarbon contaminated soil
						@ 3' Light brown; with cobbles	
5	■	1 1 1	af	113/5.6			@ 5' Bulk Sample
						@ 7' Medium brown	
10	■	1/12" 1	af	122/10.5		@ 10' Blueish gray	
15	■	Push/ 12" 2	af	99/24.8			
						QUATERNARY LANDSLIDE; Qls, (18-28 ft.) @ 18' Yellowish-gray sandstone and pebbly sandstone; moderately dense; moist; scattered cobbles	
20	■	2 4 8	Qls				
25	■	3 2 2	Qls	113/6.2			@ 26' Bulk sample
						@ 27.5 Tan sandy and clayey siltstone; slightly sheared **BEDROCK; TQsu, (28-55 ft.)** @ 28' Light brown silty sandstone; dense; damp	
30	■	6 8 13/2"	TQsu			@ 31' Yellowish-gray pebbly sandstone	
			TQsu			@ 33' Cobbles @ 34' Grayish white	
35	■	10 23 13/1"	TQsu	119/2.2			

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas Entertainment
DRILLING COMPANY:	Tri Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger/24" (82' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.
JOB NO.:	01-1703M-1
DATE:	07/22/04
LOGGED BY:	MJD
DRILLED:	3/28/01
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1176±
BORING NO.	B-22M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40							
						@ 43' Medium-brown sandy and pebbly siltstone; mottled	
45	■	24 54	TQsn				
						@ 49' Yellowish-brown silty and pebbly sandstone; scattered pebbles	
50							
							@ 54-55' Bulk Sample
55	■	17 59				Total Depth 55' (Elev. 1121) No Ground Water No Caving Slide Plane ? @ 27.5 ft.	Backfill tamped every 5 ft.
60							
65							
70							
75							

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1	**DRILL HOLE LOG**	
PROJECT: Mesas Entertainment	DATE: 07/22/04		
	LOGGED BY: MJD/BJS		
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 3/29/01		
DRILLING METHOD: Bucket-Auger/24" (82' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-23M	
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1250		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Qsw			**QUATERNARY SLOPEWASH; Qsw, (0-5 ft.)** @ 0' Brown pebbly, silty sand/sandy silt with local cobbles; moist; no bedding	Excavated and logged on 3/29/01
5	■	1 2 1	Qls	123/4.4 B:N21W,12NE B:N50W,28NE		**QUATERNARY LANDSLIDE; Qls, (5-19.5 ft.)** @ 5' Yellowish-brown slightly silty sandstone and pebbly sandstone; moderately dense; slightly friable; moist; cross bedding; channeling, crudely bedded to laminated	Qls may include disturbed Qt deposits @ 7' Bulk sample
10	■	1 1 2		115/16.0 Apx.B:N77W,6SW		@ 10' Bedding truncated; irregular contact with mottled medium-to light-brown sandy siltstone with scattered pebbles; firm to soft; moist; disrupted @ 13.5' Interbedded yellowish-gray sandstone, medium-brown clayey siltstone; and silty to pebbly sandstone; bedding	
15	■	1 1 2		116/14.6			
20	■	3 6 11		SP:N81W,17NE B:N87W,17NE		@ 19.5' 1/4"-thick, medium yellowish-brown silty clay; parting; slightly sticky & plastic **QUATERNARY LANDSLIDE?; Qls?, 19.5-51 ft.)** @ 19.5' Light-brown to tan silty sandstone and sandy siltstone with scattered pebbles; moderately hard; moist; structureless, massive; grades downward into sandstone; slightly friable	Note: Qls? material may include disturbed Qt deposits; Qls? is generally dense but shows local evidence of secondary disturbance
25	■	3 5 10					
			Qls?	B:N65W,16NE		@ 27' Vaguely bedded; laminated	
30	■	10 26 25		120/2.9 B:N55W,11NE		@ 29.5' Light yellowish-brown pebbly sandstone; cross-bedded; laminated; slightly friable; pebbly stringer; locally lack matrix; siltstone rip-up clasts @ 32' Erosional contact with medium-brown sandy siltstone with scattered pebbles and local sandy to pebbly lenses; moderately hard; bedding discontinuous	
35							@ 36' Minor seep @ 38' Minor seep

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1
PROJECT: Mesas Entertainment	DATE: 07/22/04
	LOGGED BY: MJD/BJS
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 3/29/01
DRILLING METHOD: Bucket-Auger/24" (82' Rig)	HOLE DIA: 24"
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1250

BORING NO. B-23M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40		5 10 24				@ 39' Irregular contact with orangish and grayish-brown clayey siltstone	@ 40-41' Minor seeps
				MF:N44W,55NE		@ 42' Discontinuos sandstone interbed with non-regional dip	@ 40-45' Mixed bulk sample 42' Minor fault with adjacent tilted bedding
45			Qls?				
				B:N53W,12NE		@ 46' Interbedded, laminated sandstone; locally friable	
50		9 14 24		B:N46W,15NE SP?:N47W,13NE 117/16.1		@ 49.5' 6"-thick laminated sandstone interbed; friable @ 50.5' Moderate-brown silty clay layer; slightly plastic; moist; slide plane? **BEDROCK; TQsu, (51-65 ft.)** @ 51' Brown siltstone; hard; moist; massive, structureless; concretions; vague discontinuous laminations; locally clay rich and sandy	
55			Qsu				
60		7 70/5"					
65						Total Depth 65' (Elev. 1185) Minor Ground water Seeps @ 36, 38, 40 and 41 ft. No Caving Slide Planes @ 19.5 and 50.5? ft.	Backfill tamped every 5 ft.
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas Entertainment
DRILLING COMPANY:	Tri Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger/24" (82' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.
JOB NO.:	01-1703M-1
DATE:	07/22/04
LOGGED BY:	MJD/BJS
DRILLED:	3/30/01
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1106±
BORING NO.	B-24M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Qsw			**QUATERNARY SLOPEWASH; Qsw, (0-7.5 ft.)** @ 0' Medium-brown clayey and silty sand with pebbles and cobbles; firm; moist	Excavated and logged on 3/30/01
5	■	1 1 2		122 / 8.7		@ 5' Less clay and silt; more pebbles and cobbles	
			Qls			**QUATERNARY LANDSLIDE; Qls, (7.5 to 19.5 ft.)** @ 7.5' Yellowish-brown silty, pebbly sandstone with cobbles; weathered; loose; moist; poorly stratified	
10	■	1 2 2		B/Contact: N77W,23NE 92 / 28.1		@ 10' Irregular shallow dip @ 10.5' Grayish-brown mottled clayey siltstone and claystone; stiff; moist; weathered; slightly plastic; slightly sheared	@ 10.5' Sharp planar contact
				B/Sh:N87E,43NW		@ 13' Less disturbed; laminated siltstone and mudstone below	
15	■	2 2 2		100 / 7.2		@ 15' Sandy siltstone bed	Material from 7.5 to 19 ft. appears to be Qt deposits deformed tectonically and overprinted by landslide movement
				SS/SP?:N75W 20NE		@ 18' Slightly irregular slip surface showing normal-slip drag features @ 19.2' Soft zone underlain by gray siltstone with small caliche pods	
20	■	3 7 14	Qt	SP:N84W,10NE		**QUATERNARY TERRACE DEPOSITS; Qt, (19.5 36 ft.)** @ 19.5' Yellowish-gray fine-grained sandy siltstone; dense; moist @ 21' Light yellowish-gray sandstone; dense but friable; damp; grades progressively coarser-grained	@ 22' Bulk sample
				B:Horizontal			Qt deposits from 28 to 36 ft. logged from surface cuttings due to caving and placement of casing; basal Qt layer
25							
30							
35			TQs	B:N60W,30NE		**BEDROCK; TQs, (36-54 ft.)** @ 36' Yellowish-gray sandstone and pebbly sandstone; moderately hard; locally friable; moist; scattered cobbles; cross bedded; laminated; channeling	

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 01-1703M-1
PROJECT: Mesas Entertainment	DATE: 07/22/04
	LOGGED BY: MJD/BJS
DRILLING COMPANY: Tri Valley Drilling/Dave	DRILLED: 3/30/01
DRILLING METHOD: Bucket-Auger/24" (82' Rig)	HOLE DIA: 24"
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.	ELEVATION: 1106±

BORING NO. B-24M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40		13 26		B:N47W,26NE 115 / 5.1 B:N70W,29NE			
45			TQs	B:N52W,25NE B:N66W,27NE			
50		27		B:N55W,29NE			
55						Total Depth 54 ft. (Elev. 1052 ft.) No Ground Water Caving from 19.2 to 36 ft. Slide Planes @ 18 and 19.2 ft.	Backfill tamped every 5 ft.
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas Entertainment
DRILLING COMPANY:	Tri Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger/24" (82' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.
JOB NO.:	01-1703M-1
DATE:	07/22/04
LOGGED BY:	MJD/BJS
DRILLED:	4/3/01
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1126±
BORING NO.	B-25M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Soil			**SOIL; (0-3.5 ft.)** @ 0' Dark-brown to light reddish-brown pebbly and cobbly sand with silt and clay; firm; moist	Excavated and logged on 4/3/01
5		1/12" 2		112 / 7.4		**QUATERNARY TERRACE DEPOSITS; Qt, (3.5-41 ft.)** @ 3.5' Grades to yellowish-brown to light-brown silty pebbly sand with local cobbles; moderately dense but slightly friable @ 6' Yellowish-gray pebbly sandstone with cobbles; friable; crudely bedded to cross-bedded	
				B:N10E,8NW			@ 7' Bulk sample
				MF:N28W,22NE B:N14W,16SW		@ 8' Irregular lense of clean sandstone; local laminations; slightly disturbed; moderately well bedded below	@ 9' Minor fault with 4-6" normal offset @ 11' Minor fault with Apx. 6" normal offset
10		2 4 6		B:N24W,22SW MF:N55W,16NE 115 / 4.6			@ 14' Minor fault with 2-4" reverse offset
				B:N30W,23SW MF:N49W,57NE		@ 13' Interbedded light-gray sandstone to silty sandstone @ 14' Medium-brown siltstone; disrupted and faulted; orange Fe02 staining	Qt material from approximately 8 to 21.5 ft. shows evidence of tectonic disturbance with local minor faults; material may be affected by down slope movement as well
15		2 3 4		110 / 1.6		@ 16' Erosional contact with interbedded clayey siltstone and light-brown sandstone and silty sandstone; possible soft sediment deformation	
				B/SS:N38W,15SW B:N44W,18SW B:Horizontal		@ 17.5' Yellowish-gray pebbly sandstone; friable; Fe02-rich laminations; minor offsets	
20		1 2 4	Qt			@ 19.5' Interbedded light-brown sandstone and clayey siltstone; slightly irregular @ 21.5' Disturbed interval approximately 6"-thick with medium-brown moderately plastic clay; irregular; slipsurface?; interbedded fine-grained sandstone; siltstone and pebbly sandstone	
				B:N60W,9NE			
25		5 7 14		122 / 2.7 B:N15E,8NW		@ 25' Reddish-orange stained pebbly sandstone; moderately friable @ 26' Yellowish-gray fine-grained sandstone and pebbly sandstone; locally laminated; local black stains; cross bedded; moderate caving	
				Apx.B: Horizontal			
30		5 16 28					
35						@ 35' Local pebbly and cobbly lenses lack sand matrix; black stains @ 36' Irregular contact with zone of highly disturbed mix of yellowish-brown to medium-brown siltstone and mudstone clasts in a sandy matrix	

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas Entertainment
DRILLING COMPANY:	Tri Valley Drilling/Dave
DRILLING METHOD:	Bucket-Auger/24" (82' Rig)
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-25'=2852 lbs; 25-54'=1700 lbs.; 54-82'=950 lbs.
JOB NO.:	01-1703M-1
DATE:	07/22/04
LOGGED BY:	MJD/BJS
DRILLED:	4/3/01
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1126±
BORING NO.	B-25M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40				B:N50W,26NE		@ 39' Contact with light yellowish-gray pebbly to cobbly sandstone; friable @ 40' Irregular contact with yellowish-brown muddy pebbly sand; dense; possible old buried slopewash **BEDROCK; TQs, (41-55 ft.)** @ 41' Erosional contact with light yellowish-brown to yellowish-gray sandstone; moderately hard to hard; damp; cross-bedded	
45			TQs	B:N33W,20NE 114 / 2.9 B:N37W,18NE			
	■	6 16 16/3"					
50							
55	■	26 89/5"				Total Depth 55 ft. (Elev. 1071) No Ground Water Moderate Caving from 26 to 36 ft. and @ 40 ft.	Backfill tamped every 5 ft.
60							
65							
70							
75							

KEY TO SYMBOLS

Symbol Description

UNITED SOIL CLASSIFICATION SYMBOLS

Silt

Fat clay

SAMPLE TYPE

CALIFORNIA DRIVE SAMPLE
2.42" I.D. sampler

Notes:

1. These logs are subject to the limitations, conclusions, and recommendations in this report.

2. Results of tests conducted on samples recovered are reported on the logs.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Cobble/Boulder Assessment Airport and Exxon Mesas
DRILLING COMPANY:	Tri-Valley Drilling (Dave)
DRILLING METHOD:	Bucket-Auger
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-27'=3450 lbs, 27-57'=2050 lbs, 57-87'=1140 lbs
JOB NO.:	02-1703B-1
DATE:	7/22/2004
LOGGED BY:	BJS
DRILLED:	2/11 & 12/02
HOLE DIA:	24"
AVERAGE DROP (in.):	12
ELEVATION:	1211

BORING NO. B-1B

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						SOIL; (0-5.5 ft.) @ 0' Grayish-brown fine sandy silt with clay and scattered pebbles; firm; dry to slightly damp (A-horizon) @ 2' Brown to slightly reddish-brown muddy pebbly sand; moderately hard; slightly damp; grades less clayey and more friable with depth	Logged to 75' on 2/11/02 and deepened to 96' and logged on 2/12/02 @ 3' Pebble in sampler tip
		4 4 4					
5						**TERRACE DEPOSITS; Qt, (5.5-83 ft.)** @ 5.5' Gradational contact with yellowish-brown silty pebbly sandstone; dense slightly friable; damp; subhorizontal lamellae	
		3 3 5				@ 8' Interbed of poorly sorted sandy siltstone with pebbles	
				Apx.B: Horizontal			
10		3 5 6				@ 10' Light yellowish-brown silty sandstone with pebbles; more friable; moderately bedded; local lamellae	
					SP-SM		@ 12' Bulk sample
15		2 5 8					
						@ 17.5' Grades more pebbly; moderately friable	
20		3 4 5		B:NW Strike Apx. 2-3NE		@ 19.5' Erosional contact with light yellowish-brown fine silty sandstone to sandy siltstone; dense; damp @ 20.5' Irregular silty pebbly sandstone; interbedded fine silty sandstone/sandy siltstone with pebbles and silty pebbly sandstone; poorly sorted; bedding irregular and lensing	@ 19.5' Possible unconformity with older unit of terrace deposits
25		3 3 4		Apx.B: Horizontal		@ 24.5' Pebbly lenses	
30		3 9 15				@ 30' Silty pebbly sandstone with local pebbles to small cobbles; poorly sorted; no bedding	@ 30' Pebble in sampler tip @ 32' Bulk sample
35		6 14 6/4"		Apx.B: Horizontal		@ 36' Cross bedding	@ 35' Pebble in sampler tip

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Cobble/Boulder Assessment Airport and Exxon Mesas
DRILLING COMPANY:	Tri-Valley Drilling (Dave)
DRILLING METHOD:	Bucket-Auger
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-27'=3450 lbs, 27-57'=2050 lbs, 57-87'=1140 lbs
JOB NO.:	02-1703B-1
DATE:	7/22/2004
LOGGED BY:	BJS
DRILLED:	2/11 & 12/02
HOLE DIA:	24"
AVERAGE DROP (in.):	12
ELEVATION:	1211

BORING NO. B-1B

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				B:NW Strike; Apx. 3NE		@ 38.5' 2"-thick moderate yellowish-brown mudstone; moist; locally channelled out	
40						@ 40' Coarse pebbly sandstone interbed; slightly friable; locally clast supported @ 41' - same	
45						@ 44' Cross-bedded sandstone above an erosional contact; yellowish-gray to light yellowish-brown, fine-grained silty sandstone and sandy siltstone below @ 45 & 46' Small cobbles in poorly bedded, pebbly silty sandstone unit	
50				B:N30W,4NE		@ 50' Fine sandy siltstone interbed; yellowish-gray sandstone and pebbly sandstone below; silty units rare; dense; slightly friable; damp; coarse units locally clast supported; well-bedded; attitudes generally consistent	
55				B:N45W,3NE		@ 55' Slightly to moderately friable; locally clast supported	
	■	13 44/5					@ 57' Bulk samp @ 58' Rock in sampler tip
60				B:N48W,4NE			
65				B:N45W,4NE			
70						@ 68.5' Coarse pebbly sandstone interbed; locally clast supported	
75							

CLIENT: Newhall Ranch Co.	JOB NO.: 02-1703B-1	**DRILL HOLE LOG**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 7/22/2004		
	LOGGED BY: BJS		
DRILLING COMPANY: Tri-Valley Drilling (Dave)	DRILLED: 2/11 & 12/02		
DRILLING METHOD: Bucket-Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12	**BORING NO.** B-1B	
DRIVING WEIGHTS: 0-27'=3450 lbs, 27-57'=2050 lbs, 57-87'=1140 lbs	ELEVATION: 1211		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
80						@ 79.5' Yellowish-gray coarse pebbly sandstone; slightly friable; damp; increasing concentration of large pebbles and local small cobbles; less than 5% cobbles overall	
						<u>BEDROCK</u>; TQsu, (83-96 ft.) @ 83' Erosional contact with yellowish-brown to light yellowish-brown slightly sticky clayey siltstone with sand and local pebbles; depositionally chaotic with irregular lenses of pebbly sandstone and silty pebbly sandstone; no bedding	
85							
90							
	■	27					@ 93' Driving wt = 1740#
95							
						Total Depth 96' (Elev. 1115) No Groundwater No Caving	Backfill tamped every 5 ft.
100							
105							
110							

CLIENT: Newhall Ranch Co.	JOB NO.: 02-1703B-1	**DRILL HOLE LOG**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 7/22/2004		
	LOGGED BY: MJD		
DRILLING COMPANY: Tri-Valley Drilling (Dave)	DRILLED: 2/13-15/02		
DRILLING METHOD: Bucket-Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12	**BORING NO.** B-2B	
DRIVING WEIGHTS: 0-27'=3450 lbs, 27-57'=2050 lbs, 57-87'=1140 lbs	ELEVATION: 1184		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						SOIL; (0-8 ft.) @ 0' Light-brown silty sand to sandy silt with clay and pebbles; firm; dry to slightly damp; scattered cobbles; grades less clayey and more sandy with depth	
	■	1/12" 2					
5							
	■	2 2 3		B:N67W,7NE		**TERRACE DEPOSITS; Qt, (8-96 ft.)** @ 8' Gradational contact with yellowish-gray sand; medium-dense; slightly friable; damp	
10	■	2 2 2				@ 8.5' Light-brown to yellowish-brown sandy silt and silty sand with pebbles; dense; damp; structureless @ 9' Sandstone lenses	
				B:N40W,5NE		@ 14' Interbed of pebbly sand; grades siltier and less pebbly	
15	■	1 2 2			SC		@ 15' Bulk sample
						@ 17' Grades sandier; slightly friable	
20	■	2 2 3		B:N54W,7NE		@ 20.5' Contact with light-brown silt; grades to sandy silt and yellowish-gray silty sand with pebbles; dense; damp	
25				B:N72W,8NE		@ 24.5' Contact with light-brown sandy silt to silty sand with pebbles	
						@ 26' Yellowish-gray pebbly sand; moderately friable @ 27' Light-brown to light yellowish-brown silty sand to sandy silt with scattered pebbles; interbedded sand lenses	
30	■	3 5 7					
35	■	3 5 9					
						@ 36.5' Yellowish-gray pebbly and cobbly sand; friable @ 37' Erosional contact with silty sand	

CLIENT: Newhall Ranch Co.	JOB NO.: 02-1703B-1	**DRILL HOLE LOG**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 7/22/2004		
	LOGGED BY: MJD		
DRILLING COMPANY: Tri-Valley Drilling (Dave)	DRILLED: 2/13-15/02		
DRILLING METHOD: Bucket-Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12	**BORING NO.** B-2B	
DRIVING WEIGHTS: 0-27'=3450 lbs, 27-57'=2050 lbs, 57-87'=1140 lbs	ELEVATION: 1184		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40						@ 39' Yellowish-gray pebbly cobbly sand; slightly to moderately friable; interbedded fine-grained sand; local laminations; locally clast supported	< 5% Cobbles
				Apx.B: Horizontal			
45							@ 45' Bulk sample
				B:NW Strike Apx. 2-3 NE		@ 48' Interbedded yellowish-gray sand to light yellowish-brown pebbly sand; cross-bedded; local laminations	
50						@ 50' Interbed of cobbly sand @ 50.5' Interbedded light-brown sandy silt and brown clayey silt; firm; small pebble lenses	
	■	4 11 17				@ 52' Pebbly sand with small cobbles	
55						@ 54' Thinly interbedded silt and clayey silt; upper contact eroded	
				B:N22W,4NE			
60	■	7 26/5"		B:N67W,5NE			
						@ 63' Cobbly bed	
65						@ 64.5' Interbedded sand, silt and clayey silt; firm to moderately dense; locally friable; local clast-supported pebbly lenses; local cross bedding	
70	■	7 25		Apx.B: Horizontal			
75							

CLIENT: Newhall Ranch Co.	JOB NO.: 02-1703B-1	**DRILL HOLE LOG**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 7/22/2004		
	LOGGED BY: MJD		
DRILLING COMPANY: Tri-Valley Drilling (Dave)	DRILLED: 2/13-15/02		
DRILLING METHOD: Bucket-Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12	**BORING NO.** B-2B	
DRIVING WEIGHTS: 0-27'=3450 lbs, 27-57'=2050 lbs, 57-87'=1140 lbs	ELEVATION: 1184		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
80	■	13 32					
				B:NW Strike Apx. 1-2 NE		@ 83' Orange-stained sand and pebbly sand with interbedded light-gray, laminated, fine-grained sand; dense; moist; silt and grayish-brown clayey silt to silty clay below	
85							
				Apx.B: Horizontal		@ 86.5' Contact with yellowish-gray coarse-grained sand and pebbly and cobbly sand; loose; friable; local laminations and cross bedding; scattered cobbles up to 8" diameter; common clast supported pebble lenses and beds	Cobbles < 5%
90							
95							
100				B:N53W,15NE		**<u>BEDROCK</u>; TQs, (96-104 ft.)** @ 96' Erosional contact with light-gray, fine- to medium-grained laminated sandstone; moderately hard; locally friable @ 98' Interbedded siltstone and silty sandstone with scattered pebbles @ 99' Yellowish-gray coarse-grained sandstone with interbedded fine-grained laminated sandstone and pebbly sandstone; slightly hard; locally slightly friable to friable	
105						Total Depth 104 ft. (Elev. 1080) No Ground Water Minor belling from 86 to 96 ft.	Backfill tamped every 5 ft.
110							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Cobble/Boulder Assessment Airport and Exxon Mesas
DRILLING COMPANY:	Tri-Valley Drilling (Dave)
DRILLING METHOD:	Bucket-Auger
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-27'=3450 lbs, 27-57'=2050 lbs, 57-87'=1140 lbs
JOB NO.:	02-1703B-1
DATE:	7/22/2004
LOGGED BY:	MJD
DRILLED:	2/15-18/02
HOLE DIA:	24"
AVERAGE DROP (in.):	12
ELEVATION:	1208
BORING NO.	B-3B

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						SOIL; (0-3 ft.) @ 0' Reddish-brown sand and clayey silt to silty clay with scattered pebbles; dense; moist to wet; caliche	
	■	2 3 5				**TERRACE DEPOSITS; Qt, (3-17 ft.)** @ 3' Grades more sandy and pebbly; less dense	
5							
						@ 6' Yellowish-brown pebbly sand; moderately dense; moist; no bedding	
	■	1 1 1				@ 8' Light-brown silty sand to sandy silt; moderately dense; small voids	
10							
	■	1 1 1		Apx.B: N25W,3NE		@ 10' Yellowish-gray, fine- to medium-grained sand; moderately dense; orange-staining; no bedding @ 11.5' Gray silty sand; minor clay @ 12.5' Pebbly sand with cobbles; friable @ 13' Grades more pebbly and cobbly; orange-staining; loose; friable; clast-supported pebbles and cobble lenses; cross bedding; channelling; scattered boulders to 17" diameter	
15							
				B:N42E,25SE	SP-SM	**BEDROCK; TQs, (17-32 ft.)** @ 17' Yellowish-gray pebbly sandstone with cobbles; hard; damp @ 18' Interbed of laminated sandstone; scattered pebbles @ 19' More cobbly	@ 16' Bulk sample 10-20% cobbles from 13 to 17'
20							
				B:N41E,27SE			
25							
				B:N10E,30SE		@ 27' Erosional contact with brown siltstone and silty claystone; dense; moist; locally plastic and sticky	
	■	5 8 22					
30						@ 30' Light-brown siltstone	
						Total Depth 32 ft. (Elev. 1176) No Groundwater Slight belling from 13 to 17 ft.	Backfill tamped every 5 ft.
35							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Cobble/Boulder Assessment Airport and Exxon Mesas
DRILLING COMPANY:	Tri-Valley Drilling (Dave)
DRILLING METHOD:	Bucket-Auger
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-27'=3450 lbs, 27-57'=2050 lbs, 57-87'=1140 lbs
JOB NO.:	02-1703B-1
DATE:	7/22/2004
LOGGED BY:	MJD
DRILLED:	2/13-15/02
HOLE DIA:	24"
AVERAGE DROP (in.):	12
ELEVATION:	1236
BORING NO.	B-4B

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						SOIL; (0-7 ft.) @ 0' Medium- to dark-brown sandy silt to silty sand with scattered pebbles and minor clay; firm; moist to damp	
	■	Push/ 6" 1/12"			SM		
5	■						
	■	2 2 2				**TERRACE DEPOSITS; Qt, (7-16 ft.)** @ 7' Grades more pebbly with scattered cobbles @ 8' Grades to light-brown silty pebbly sand with scattered cobbles; dense; slightly damp; vaguely bedded	
10	■	1 1 2					
						@ 11.5' Grades more pebbly and cobbly @ 12' Medium-brown silty sand and sandy silt with scattered pebbles and cobbles; dense; slightly damp	
15						@ 14' Silty pebbly cobbly sand	25% Cobbles fr 14 to 16'
				B:N50W,25NE		**BEDROCK; TQs, (16 to 37.5 ft.)** @ 16' Light yellowish-gray sandstone; moderately dense; damp; local laminations @ 17' Pebbly cobbly sandstone; moderately hard; locally friable; vaguely bedded	
20							
							@ 24' Bulk sample
25							
30							
	■	6 11/5"		B:N35W,33NE		@ 32.5' Gray, fine- to coarse-grained sandstone; moderately hard; local laminations; well-bedded	
35						@ 34.5' Yellowish-brown siltstone interbeds @ 35' Pebbly sandstone with scattered cobbles	

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Cobble/Boulder Assessment Airport and Exxon Mesas
DRILLING COMPANY:	Tri-Valley Drilling (Dave)
DRILLING METHOD:	Bucket-Auger
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-27'=3450 lbs, 27-57'=2050 lbs, 57-87'=1140 lbs
JOB NO.:	02-1703B-1
DATE:	7/22/2004
LOGGED BY:	MJD
DRILLED:	2/13-15/02
HOLE DIA:	24"
AVERAGE DROP (in.):	12
ELEVATION:	1236

BORING NO. B-4B

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
	■	12 26/5"				Total Depth 37.5 ft. (Elev. 1198.5) No Groundwater No Caving	Backfilled tamped every 5 ft.
40							
45							
50							
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Cobble/Boulder Assessment Airport and Exxon Mesas
DRILLING COMPANY:	Tri-Valley Drilling (Dave)
DRILLING METHOD:	Bucket-Auger
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-27'=3450 lbs, 27-57'=2050 lbs, 57-87'=1140 lbs
JOB NO.:	02-1703B-1
DATE:	7/22/2004
LOGGED BY:	MJD
DRILLED:	2/19-21/02
HOLE DIA:	24"
AVERAGE DROP (in.):	12
ELEVATION:	1198
BORING NO.	B-5B

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						TERRACE DEPOSITS; Qt, (0-112 ft.) @ 0' Interbedded yellowish-brown and light yellowish-brown sand, pebbly sand and silty sand; moderately dense; locally friable; damp to moist; locally channeled	
5						@ 4.5' Silty sand with scattered pebbles; minor clay	
		3 4 6		B:NW Strike Apx. 1-2 NE		@ 6.5' Pebbly sand with cobbles; loose to moderately dense; moist; channeled; vaguely to moderately bedded; local clast-supported pebble beds/lenses; local silty sand interbeds; less than 3% cobbles	
10							
15							
				Apx.B: Horizontal		@ 18' 6"-thick interbed of silty sand	
20							
						@ 22' More pebbly and cobbly; less than 5% cobbles	
25							@ 25' Bulk samp
				Apx.B: Horizontal		@ 27.5' Interbedded, laminted silty sand @ 28.5' Interbedded light- to medium-brown sand and silty sand with scattered pebbles and pebble lenses	
30							
				B:NW Strike 2-3 NE		@ 33' Pebbly sand with scattered cobbles with interbedded silty sand	
35							
						@ 36' 1"-thick cobble bed; cobbles to 8" diameter	
				B:Subhorizontal		@ 37' Interbedded silty sand, sand and pebbly sand with minor sandy silt;	

CLIENT: Newhall Ranch Co.	JOB NO.: 02-1703B-1	**DRILL HOLE LOG**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 7/22/2004		
	LOGGED BY: MJD		
DRILLING COMPANY: Tri-Valley Drilling (Dave)	DRILLED: 2/19-21/02		
DRILLING METHOD: Bucket-Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12	**BORING NO.** B-5B	
DRIVING WEIGHTS: 0-27'=3450 lbs, 27-57'=2050 lbs, 57-87'=1140 lbs	ELEVATION: 1198		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						moderately dense; well-bedded	
40		3 5 8					
45		5 8 8					
50		2 4 8					
						@ 52' 1-ft. thick cobbly bed	
55							
						@ 56' Interbedded sandy silt and sand with scattered pebbles; well-bedded	
60		6 16 31					
						@ 62' Interbed of pebbly sand with scattered cobbles	
						@ 64' Interbed of pebbly sand with scattered cobbles	
65							
70		8 14 30					
75						@ 75' Interbed of pebbly sand with scattered cobbles	

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Cobble/Boulder Assessment Airport and Exxon Mesas
DRILLING COMPANY:	Tri-Valley Drilling (Dave)
DRILLING METHOD:	Bucket-Auger
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-27'=3450 lbs, 27-57'=2050 lbs, 57-87'=1140 lbs
JOB NO.:	02-1703B-1
DATE:	7/22/2004
LOGGED BY:	MJD
DRILLED:	2/19-21/02
HOLE DIA:	24"
AVERAGE DROP (in.):	12
ELEVATION:	1198
BORING NO.	B-5B

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				B:Subhorizontal		@ 76' Yellowish-gray to light yellowish-brown pebbly and cobbly sand; loose to moderately dense; damp; locally friable; channeled; local clast-supported pebble beds/lenses	<3% Cobbles below 76'
80							@ 80' Bulk sample
85							
90							
				B:Subhorizontal to gently North dipping		@ 92' Interbedded light-brown and yellowish-brown silt and silty sand; dense; damp; well-bedded	
95				B:Subhorizontal to gently North dipping		@ 95' Yellowish-gray pebbly sand with scattered cobbles @ 97' Interbedded yellowish-gray to yellowish-brown sand and silty sand with local light-brown thin silt interbeds; dense; moist; locally friable; well-bedded	
100		6 9 17				@ 101.5' Siltier with scattered pebbles	
105						@ 106' Clean sand with pebbles and scattered cobbles; friable; dry to damp; Basal Qt layer @ 107' Belling	Downhole logged to 105' Surface logge from 105 to 1
110						@ 110' More cobbles Total Depth 112 ft. (Elev. 1086) No Groundwater Belling from 107-112 ft.	Backfilled tamp every 5 ft.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Cobble/Boulder Assessment Airport and Exxon Mesas
DRILLING COMPANY:	Tri-Valley Drilling (Dave)
DRILLING METHOD:	Bucket-Auger
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-27'=3450 lbs, 27-57'=2050 lbs, 57-87'=1140 lbs
JOB NO.:	02-1703B-1
DATE:	7/22/2004
LOGGED BY:	MJD
DRILLED:	2/22-25/02
HOLE DIA:	24"
AVERAGE DROP (in.):	12
ELEVATION:	1156
BORING NO.	B-6B

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						ARTIFICIAL FILL; af, (0-9 ft.) @ 0' Medium- to dark-brown pebbly sandy silt to silty sand with scattered cobbles; loose to moderately dense; moist; miscellaneous trash	
	■	1/12" 2					
5							
	■	Push/ 18"					
						TERRACE DEPOSITS; Qt, (9-70.5 ft.) @ 9' Grades lighter brown; sandier; soft; damp to moist; no cobbles; no bedding	
10	■	1 1 2					
						@ 12' Interbed of yellowish-brown pebbly sand @ 13' Grayish-brown sandy to pebbly silt with local clay; moderately dense to dense; moist; orange staining; structureless; interbedded pebbly sand lenses	
15	■	1 1 2					
						@ 17' Yellowish-brown pebbly sand with scattered cobbles; loose; damp; friable; local clasts-supported pebble lenses	
				Apx.B: Horizontal	SM		@ 19' Bulk sample
20	■	1 3 3				@ 20' Sand interbed; well-bedded	
						@ 22' 4"-thick, medium-brown silt interbed	
25	■	1 1 1				@ 24.5' Grayish-brown sandy silt with scattered pebbles; moderately dense @ 26' Interbed of pebbly sand @ 27' Yellowish-brown, light-brown and medium-brown, thinly interbedded sand; silty sand and sandy silt with local clay and scattered pebbles; moderately dense; damp to moist; local pebble lenses; well-bedded	
				B:N45E,3NW			
30	■	3 3 3		Apx.B: Horizontal			
				B:N15E,2NW			
35	■	3 5 4					

CLIENT: Newhall Ranch Co.	JOB NO.: 02-1703B-1	**DRILL HOLE LOG**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 7/22/2004		
	LOGGED BY: MJD		
DRILLING COMPANY: Tri-Valley Drilling (Dave)	DRILLED: 2/22-25/02		
DRILLING METHOD: Bucket-Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12	**BORING NO.** B-6B	
DRIVING WEIGHTS: 0-27'=3450 lbs, 27-57'=2050 lbs, 57-87'=1140 lbs	ELEVATION: 1156		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40		2 3 6				@ 39.5' More clayey, less sandy	
45				Apx.B: Horizontal		@ 45' Interbedded yellowish-brown sand and pebbly sand; friable; well-bedded	@ 45' Bulk sample
50				Apx.B: Horizontal			
						@ 52.5' Thinly interbedded, medium-brown silty clay	
55		2 4		Apx.B: Horizontal			
						@ 58.5' Yellowish-gray pebbly and cobbly sand; loose; friable; damp; local laminations	<3% cobbles from 58-65'
60						@ 60' Medium-brown sandy silt to silty sand with pebbles and scattered cobbles; structureless	
						@ 63' Light yellowish-brown pebbly and cobbly sand; moderately dense but friable; clast-supported pebble beds/lenses; orange staining; cross-bedding	
65							5-10% cobbles from 65-70.5'
70						@ 70' One boulder	
				B:N30W,29NE		**BEDROCK; TQs, (70.5-83 ft.)** @ 70.5' Yellowish-gray pebbly sandstone; hard; damp; cross-bedded @ 72' Erosional contact with reddish-brown siltstone; dense; damp @ 73' Yellowish-gray, fine-grained sandstone and silty sandstone	
75				B:N22W,18NE			

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Cobble/Boulder Assessment Airport and Exxon Mesas
DRILLING COMPANY:	Tri-Valley Drilling (Dave)
DRILLING METHOD:	Bucket-Auger
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-27'=3450 lbs, 27-57'=2050 lbs, 57-87'=1140 lbs
JOB NO.:	02-1703B-1
DATE:	7/22/2004
LOGGED BY:	MJD
DRILLED:	2/22-25/02
HOLE DIA:	24"
AVERAGE DROP (in.):	12
ELEVATION:	1156
BORING NO.	B-6B

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
	■	33				@ 75.5' Interbedded, light- to medium-gray silty sandstone	
80						@ 79' Light greenish-gray silty sandstone to sandy siltstone	@ 81' Bulk sample
	■	19 68				Total Depth 83 ft. (Elev. 1073) No Groundwater Belled out from 58 to 70.5 ft.	Backfill tamped every 5 ft.
85							
90							
95							
100							
105							
110							

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 02-1703B-1
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 7/22/2004
	LOGGED BY: MJD
DRILLING COMPANY: Tri-Valley Drilling (Dave)	DRILLED: 2/22-25/02
DRILLING METHOD: Bucket-Auger	HOLE DIA: 24"
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12
DRIVING WEIGHTS: 0-27'=3450 lbs, 27-57'=2050 lbs, 57-87'=1140 lbs	ELEVATION: 1208

BORING NO. B-7B

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						ARTIFICAL FILL; af, (0-6 in.)	
						@ 0' Medium-brown silty, pebbly sand; loose; dry	
						TERRACE DEPOSITS; Qt, (6 in.-109 ft.)	
	■	2 1 1				@ 6" Yellowish-gray to light yellowish-brown pebbly sand with scattered cobbles; moderately dense; damp; locally friable; vaguely to moderately bedded	
5						@ 4' Interbed of light-brown silty sand	
						@ 6' Local clast-supported pebble lenses; loose; moist; interbedded	
10							
	■	1 3 5		B:N15W,3SW		@ 10.5' Interbedded light yellowish-brown and light-brown, fine-grained sand and silty sand; locally pebbly; moderately dense; well-bedded	
15							
	■	1 3 2				@ 17' Interbed of sandy silt	
					SM	@ 18.5' Thinly interbedded silty sand	@ 19' Bulk samp
20				Apx.B: N-S,2-3 W			
25	■	1 1					
30	■	1 5 9					
35	■	2 2 5		Apx.B: N-S, 1-2 W			
						@ 36.5' Interbed of medium-brown clayey silt	

CLIENT: Newhall Ranch Co.	JOB NO.: 02-1703B-1	**DRILL HOLE LOG**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 7/22/2004		
	LOGGED BY: MJD		
DRILLING COMPANY: Tri-Valley Drilling (Dave)	DRILLED: 2/22-25/02		
DRILLING METHOD: Bucket-Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12	**BORING NO.** B-7B	
DRIVING WEIGHTS: 0-27'=3450 lbs, 27-57'=2050 lbs, 57-87'=1140 lbs	ELEVATION: 1208		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40		2 3 5					
45		4 6 12					
50							
55		4 8 9					
60						@ 60' Grades more pebbly	
65						@ 65' Interbed of pebbly sand with cobbles; loose; clast supported	@ 65' Bulk sample
70							
						@ 73' Interbed of pebbly, cobbly sand	
75							

CLIENT: Newhall Ranch Co.	JOB NO.: 02-1703B-1	**DRILL HOLE LOG**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 7/22/2004		
	LOGGED BY: MJD		
DRILLING COMPANY: Tri-Valley Drilling (Dave)	DRILLED: 2/22-25/02		
DRILLING METHOD: Bucket-Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12	**BORING NO.** B-7B	
DRIVING WEIGHTS: 0-27'=3450 lbs, 27-57'=2050 lbs, 57-87'=1140 lbs	ELEVATION: 1208		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
80							
						@ 83' Cobbly bed	
85							
90							
95							
				Apx.B: Horizontal			
						@ 98.5' Grayish-brown silt and sandy silt with pebbles; moderately dense	
100							
				B:N10W,4SW			
105							
	■	9 13/5"					
							Backfill tampe every 5 ft.
110							
						Total Depth 109 ft. (Elev. 1099) No Groundwater No Caving	

CLIENT: Newhall Ranch Co.	JOB NO.: 02-1703B-1	**DRILL HOLE LOG**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 7/22/2004		
	LOGGED BY: MJD		
DRILLING COMPANY: Tri-Valley Drilling (Dave)	DRILLED: 2/27-28/02		
DRILLING METHOD: Bucket-Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12	**BORING NO.** B-8B	
DRIVING WEIGHTS: 0-27'=3450 lbs, 27-57'=2050 lbs, 57-87'=1140 lbs	ELEVATION: 1248		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						SOIL; (0-6 ft.) @ 0' Medium-brown silty sand to sandy silt with pebbles and scattered cobbles; moderately dense; dry to damp	
	■	4 7				@ 3' Light-brown pebbly and cobbly sand with minor silt; dry	Small cobble in sampler tip
5							
						TERRACE DEPOSITS; Qt, (6-34 ft.) @ 6' Yellowish-brown pebbly sand with scattered cobbles and minor silt; loose to moderately dense; dry to damp; locally friable; local clast-supported pebble lenses @ 8' Medium-brown silty sand to sandy silt with pebbles; moderately dense; dry	
10				Apx.B: Horizontal		@ 10' Interbedded yellowish-brown sand and pebbly sand; loose to moderately dense	
	■	2 2 3					
						@ 14' Krotovina and roots	
15							
	■	2 4 3/3"				@ 16' Light yellowish-brown pebbly and cobbly sand; very loose; friable; dry to damp; clast-supported pebble beds/lenses; interbedded laminated sand	@ 16' 1-2% Cobbles
20							@ 20' Bulk sample @ 20-25' ~3% Cobbles
25						@ 25' Scattered cobbles	
				Apx.B: Horizontal		@ 27.5' Interbedded fine sand, silty sand and pebbly sand; loose to moderately dense; locally friable; damp; well-bedded	
30	■	1 2 3					
						@ 31' Yellowish-brown pebbly sand; channeled out; clast-supported pebble lense	
35						**TERRACE/OLD SLOPEWASH DEPOSITS; Qt/Qosw, (34-76.5 ft.)** @ 34' Erosional contact with medium-brown sandy clayey silt; moderately dense; moist; scattered pebbles; no bedding	
	■	2 3 6					

CLIENT: Newhall Ranch Co.	JOB NO.: 02-1703B-1	**DRILL HOLE LOG**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 7/22/2004		
	LOGGED BY: MJD		
DRILLING COMPANY: Tri-Valley Drilling (Dave)	DRILLED: 2/27-28/02		
DRILLING METHOD: Bucket-Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12	**BORING NO.** B-8B	
DRIVING WEIGHTS: 0-27'=3450 lbs, 27-57'=2050 lbs, 57-87'=1140 lbs	ELEVATION: 1248		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						@ 38' Grades move sandy and pebbly with scattered cobbles; no bedding	
40							
						@ 41' Brown to greenish-brown clayey silt/silty clay with pebbles scattered sandstone cobbles and boulders; very stiff; dense; locally plastic and sticky	
45							
	■	4 6 8					
						@ 47' Large, 2 ft.-diameter sandstone block	@ 48' Bulk samp
50							
55							
	■	4 7 9					
60							
						@ 62' Mixed assemblage of brown silt and clay with sandstone clasts, pebbles and cobbles; irregular sandstone lenses; no bedding	
65							
70							
75							

CLIENT: Newhall Ranch Co.	JOB NO.: 02-1703B-1	**DRILL HOLE LOG**	
PROJECT: Cobble/Boulder Assessment Airport and Exxon Mesas	DATE: 7/22/2004		
	LOGGED BY: MJD		
DRILLING COMPANY: Tri-Valley Drilling (Dave)	DRILLED: 2/27-28/02		
DRILLING METHOD: Bucket-Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12	**BORING NO.** B-8B	
DRIVING WEIGHTS: 0-27'=3450 lbs, 27-57'=2050 lbs, 57-87'=1140 lbs	ELEVATION: 1248		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				CTC: N24E,76NW B:N35W,13-18NE		**BEDROCK; TQs, (76.5-83 ft.)** @ 76.5' Yellowish-gray to light-gray sandstone and conglomerate; hard; dry to slightly damp; sandstone locally laminated	
80							
85						Total Depth 83 ft. (Elev. 1165) No Groundwater Belling from 15-20 ft.	Backfill tamped every 5 ft.
90							
95							
100							
105							
110							

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 1703W-1
PROJECT: Mesas West	DATE:
	LOGGED BY: MJD
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 10/27/03
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"
HAMMER TYPE: Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-30'=6780 lbs; 30-60'=4780 lbs; 60-90'=3270 lbs; 90-120'=2090 lb	ELEVATION: 1183

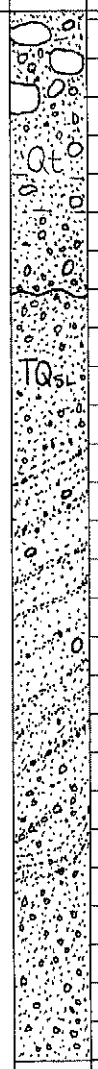
BORING NO. B-1W

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Casing			**QUATERNARY TERRACE DEPOSITS; Qt (0-45')** @ 0-4' Casing	
5		push 1		108/11.6		@ 4' Light-brown to light yellowish-brown sand, pebbly sand and silty, pebbly sand with cobbles and scattered boulders; soft to moderately hard; dry to damp; mostly massive, structureless; locally crudely bedded @ 6' Moist	
10		1 2		130/5.5		@ 11-12.5' Silty sand	@ 10-15' Bulk Sample
15		1 1	Qt	114/7.8		@ 16' Pebbly sand, scattered cobbles and boulders	
20							
25		1 7				@ 24-26' Silty sand	
30							@ 33' Rock in tip
35		4 11					

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 1703W-1
PROJECT: Mesas West	DATE:
	LOGGED BY: MJD
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 10/27/03
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"
HAMMER TYPE: Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-30'=6780 lbs; 30-60'=4780 lbs; 60-90'=3270 lbs; 90-120'=2090 lb	ELEVATION: 1183

BORING NO. B-1W

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						@ 38' Boulders	
40							
				B: N38E,10SE		@ 42' Interbedded light-brown silty sand; moderately well-bedded	
45				ctc: subhorizontal		**BEDROCK; TQsl (45-65')** @ 45' Light yellowish-gray medium- to coarse-grained sandstone and pebbly sandstone; hard; moist; scattered cobbles; mostly massive, structureless; local laminae; local cross bedding	
50				B: N89E,22SE			
				B: N83E,33SE			
55				B: N55W,27SW B: N84E,36SE			
60							
65	■	8 31/5"				Total Depth 65' No Caving No Ground Water	
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas West
DRILLING COMPANY:	Valley Well Drilling (Danny)
DRILLING METHOD:	Bucket Auger
HAMMER TYPE:	Kelly Bar
DRIVING WEIGHTS:	0-30'=6780 lbs; 30-60=4780 lbs; 60-90'=3270 lbs; 90-120'=2090
JOB NO.:	1703W-1
DATE:	
LOGGED BY:	MAS
DRILLED:	10/28/03
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1215
BORING NO.	B-2W

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			af			**ARTIFICIAL FILL; af (0-3')** @ 0' Medium-brown silty, pebbly sand with cobbles; soft; dry to damp	
						BEDROCK; TQsl (3-25') @ 3' Grayish-brown sandy siltstone; hard; damp; massive, structureless	
5	■	3		119/13.4			
			TQsl	B: N59E,13SE		@ 6.5' Thin mudstone interbed 1/8" thick; plastic; sticky @ 7' Grades to light yellowish-gray medium- to coarse-grained sandstone and pebbly sandstone; hard; moist; mostly massive, structureless; local laminations; local cross-bedding; scattered cobbles	@ 10-15' Bulk Sample
10	■	6		B: N71E,10SE			@ 10-15' Bulk Sample
15	■	7		B: N81W,13SW			
20							
25	■	5				Total Depth 25' No Caving No Ground Water	
30							
35							

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 1703W-1
PROJECT: Mesas West	DATE:
	LOGGED BY: MAS
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 11/10/03
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"
HAMMER TYPE: Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-30'=6780lbs; 30-60'=4780lbs; 60-90'=3270lbs; 90-120'=2090lbs	ELEVATION: 1179

BORING NO. B-6W

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						SOIL/SLOPEWASH; s/Qsw (0-7') @ 0' Silty, clayey sand; medium dense; moist; brown; roots; rootlets	Drilled on 11/10 03. Logged on 11/11/ 03. Located in agricultural area.
5	■	push 18"	s/Qsw	114/8.0			
						QUATERNARY TERRACE DEPOSITS; Qt (7-121') @ 7' Silty sand; medium dense; damp; light brown with coarse-grained sand channels; loose to medium dense; damp; light brown and interbedded fine-grained sand; loose; dry; light gray	
10	■	push 1		Apx B: Horizontal 111/7.4			
			Qt	Apx B: Horizontal			
15	■	1 2		112/12.9 Apx. B: Horizontal			
						@ 18' Silty, clayey sand with gravel; medium dense; moist; light brown; rootlets; uncommon gravelly channels	
20	■	1 2		115/8.9			
				Apx B: Horizontal			
25	■	push 1		Apx B: Horizontal 107/9.1	SM	@ 25' Silty sand; loose; slightly moist; yellowish-brown	
				B: Horizontal			
30						@ 30' Sand; loose to medium dense; dry to damp; light gray with channels composed of sandy gravel; medium dense; dry; light gray	
35	■	2 5					
						@ 37' Silty sand to sandy silt; medium dense; firm; damp; light brown; interbedded	

CLIENT: Newhall Ranch Co.	JOB NO.: 1703W-1	**DRILL HOLE LOG**	
PROJECT: Mesas West	DATE:		
	LOGGED BY: MAS		
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 11/10/03		
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"		
HAMMER TYPE: Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-6W	
DRIVING WEIGHTS: 0-30'=6780lbs; 30-60'=4780lbs; 60-90'=3270lbs; 90-120'=2090lbs	ELEVATION: 1179		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						with sandy gravel to gravelly sand; loose to medium dense; dry to damp; light gray; silty sand commonly contain laminar bedding, cross bedding or finely laminated	
40							
45	■	2 4		Apx B: Horizontal			
50			Qt	B: Horizontal			
55	■	6 13				@ 54' Interbedded well-graded sand; medium dense; dry; light gray with sandy gravel channels; loose to medium dense; dry; light gray; and uncommon fine-grained silty sand layers/lenses; medium dense; dry; light gray	
60				B: Horizontal		@ 62' Fine-grained silty sand; medium dense; damp; light brown; interbedded with sandy silt; firm; damp to moist; light brown	
65	■	6 13		B: Horizontal			
70				Apx B: Horizontal		@ 72' Fine-grained silty sand; medium dense; damp; light brown; with interbedded sandy silt; firm; damp to moist; light brown; and sandy gravel channels; loose to medium dense; dry; light gray to light yellowish-brown	
75	■	9					

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 1703W-1
PROJECT: Mesas West	DATE:
	LOGGED BY: MAS
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 11/10/03
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"
HAMMER TYPE: Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-30'=6780lbs; 30-60'=4780lbs; 60-90'=3270lbs; 90-120'=2090lbs	ELEVATION: 1179

BORING NO. B-6W

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
	■	21		B: Horizontal		@ 76' Fine-grained silty sand; medium dense; damp; light brown with interbedded sandy silt; firm; damp to moist; light brown	
80							
						@ 82' Fine-grained silty sand; medium dense; damp; light brown; with interbedded sandy silt; firm; damp to moist; light brown; and sandy gravel channels; loose to medium dense; dry; light gray to light yellowish-brown	
85	■	6 13					
90			Qt	B: Horizontal		@ 90' Fine-grained silty sand; medium dense; damp; light yellowish brown; interbedded with sandy silt; firm ; damp to moist; light brown; uncommon coarse-grained sand to gravel channels; medium dense; dry to damp; light brown to light yellowish-brown; fine-grained sands are commonly laminated	
	■	5 7					
95							
				B: Horizontal			
100							
105							
				Apx B: Horizontal			
110							

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 1703W-1
PROJECT: Mesas West	DATE:
	LOGGED BY: MAS
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 11/10/03
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"
HAMMER TYPE: Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-30'=6780lbs; 30-60'=4780lbs; 60-90'=3270lbs; 90-120'=2090lbs	ELEVATION: 1179

BORING NO. B-6W

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
115			Qtc				
				B: Horizontal			
120							
						Total Depth 121' No Caving No Ground Water	
125							
130							
135							
140							
145							
150							

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 1703W-1
PROJECT: Mesas West	DATE:
	LOGGED BY: MJD
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 11/3-4/03
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"
HAMMER TYPE: Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-30'=6780 lbs; 20-60'=4780 lbs; 60-90'=3270 lbs; 90-120'=2090lbs	ELEVATION: 1192

BORING NO. B-9W

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			Casing			**BEDROCK; TQsl (0-40')** @ 0-4' Casing	
5		2 4				@ 4' Light-gray to light yellowish-gray sandstone and pebbly sandstone; hard; slightly damp; slightly to moderately fractured; massive to crudely bedded; erosional scours and channels	@ 6-8' Bulk Sampl
10		5 7				@ 9.5-12' Pebbly sandstone; moist; cross-bedded	
15		2 4		B: N68E,19SE		@ 15' Open fracture up to 1/16" wide, probably due to tectonic deformation near hinge of syncline	
20			TQsl				
				B: N69W,15SW			
25							
				B: N65W,18SW			
30							
		4 7		B: N61E,13SE B: N61E,11SE		@ 32.5' Sharp, relatively planar, erosional contact with medium-gray to grayish-brown siltstone and mudstone; hard; damp to moist; moderately well-bedded; locally sticky, plastic @ 33' 1.5" thick brown clay interbed; moist; plastic; sticky @ 34' Grades to yellowish-brown sandy siltstone @ 35.5' Grades to light yellowish-brown silty sandstone @ 37' Yellowish-gray sandstone	@ 33' No slicker or striations on bed
35							

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 1703W-1
PROJECT: Mesas West	DATE:
	LOGGED BY: MJD
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 11/3-4/03
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"
HAMMER TYPE: Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-30'=6780 lbs; 20-60'=4780 lbs; 60-90'=3270 lbs; 90-120'=2090lbs	ELEVATION: 1192

BORING NO. B-9W

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			TQsl				
40	■	5 11				Total Depth 40' No Caving No Ground Water	
45							
50							
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 1703W-1
PROJECT: Mesas West	DATE:
	LOGGED BY: MAS
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 11/4 & 5/03
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"
HAMMER TYPE: Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-30'=6780 lbs; 30-60'=4780 lbs; 60-90'=3270 lbs; 90-120'=2090lbs	ELEVATION: 1146

BORING NO. B-10W

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						SOIL; s (0-4') @ 0' Silty, clayey sand with gravel; loose to medium dense; dry; brown; pinhole voids; burrows; krotovina; roots and rootlets	Start drilling at no[illegible] 11/4/03
5	■	push 12"		106/3.5		**QUATERNARY TERRACE DEPOSITS; Qt (4-16')** @ 4' Silty sand with gravel to silty sandy gravel; loose to medium dense; dry; light gray to light brown; roots; local burrows; rootlets; local pop-outs, cobbles; vague bedding and gravel channels gently dipping	@ 4-16' Quickly logged and th[illegible] cased
10	■	1 1		118/1.8			
				Apx B: N20W,7NE			
15	■	2 3		c: Horizontal			@ 15' No sample retrieved/fell [illegible]
						BEDROCK; TQsl (16-65') @ 16' Light-gray silty fine-grained sandstone; soft to moderately hard; dry to damp	
20	■	1 1		112/6.3			
				B: N67E,15SE		@ 23' Light-brown silty sandstone; moderately hard; damp; with interbedded discontinuous fine-grained sandstone lenses	
25							@ 25-30' Bu[illegible] Sample
30	■	2 4		Apx B: N22E,20SE 130/5.3		@ 30' Light-gray fine- to medium-grained sandstone	
35							
				Apx B: N10E,22SE			

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 1703W-1
PROJECT: Mesas West	DATE:
	LOGGED BY: MAS
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 11/4 & 5/03
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"
HAMMER TYPE: Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-30'=6780 lbs; 30-60'=4780 lbs; 60-90'=3270 lbs; 90-120'=2090lbs	ELEVATION: 1146

BORING NO. B-10W

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				Apx B: N10E,22SE			
40				B: N27W,18NE			Drill to 41' on 11/4/03; 41-65' on 11/5/03
						@ 42' Light-gray sandstone with coarse-grained sandstone to pebbley sandstone channels	
45	■	5 10/3"	TQsL				
				Apx B: N 6 W, 10NE			
50	■	5 10					
55							
				B: N18W,15NE		@ 59' Light greenish-gray to brown sandy siltstone; hard; moist;	
60	■	4 10				@ 60' Plastic clay, soft; grayish-brown; soft plastic clay 2" thick	Clay @ 60' Not a sharp contact No Striations or slickensides
65	■	20/6"				Total Depth 65' Caving @ 5-16' No Ground Water	
70							
75							

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 1703W-1
PROJECT: Mesas West	DATE:
	LOGGED BY: MAS
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 11/6/03
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"
HAMMER TYPE: Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-30'=6780lbs; 30-60'=4780lbs; 60-90'=3270 lbs; 90-120'=2090lbs	ELEVATION: 1158

BORING NO. B-11W

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			S			**SOIL; s (0-7')** @ 0' Silty, clayey sand with gravel; loose to medium dense; dry; brown; pinhole voids; rootlets	
5	■	1 1		108/3.6		Soil - Qt contact is gradational	
						QUATERNARY TERRACE; Qt (7-105') @ 7' Silty sand; loose to medium dense; dry; light-gray to light-brown; gravel channels	
10	▲	2 2					No recovery @ 10'
				Apx B: Horizontal		@ 12' Silty, clayey sand; moist; light-brown; with interbedded sandy silt lenses; light yellowish-brown	
15	■	1 2		121/8.3			
				Apx B: Horizontal			
20	■	2 4	Qt				
25	■	1 2		117/8.1		@ 25' Coarse-grained sand to gravel lenses	
30				Apx B: Horizontal			
35	■	3/10"		111/3.1			

CLIENT: Newhall Ranch Co.	JOB NO.: 1703W-1	**DRILL HOLE LOG**	
PROJECT: Mesas West	DATE:		
	LOGGED BY: MAS		
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 11/6/03		
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"		
HAMMER TYPE: Kelly Bar	AVERAGE DROP (in.): 12"	**BORING NO.** B-11W	
DRIVING WEIGHTS: 0-30'=6780lbs; 30-60'=4780lbs; 60-90'=3270 lbs; 90-120'=2090lbs	ELEVATION: 1158		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40				Apx B: Horizontal		@ 41' Fine-grained silty sand; damp; light-gray; to sandy, clayey silt; firm; moist; light yellowish-brown	
				B: Horizontal			
45	■	3 6					
50			Qt			@ 49' Fine-grained sandy silt with clay; firm; moist; light-brown; with interbedded discontinuous lenses of sand; loose to medium dense; damp to moist; light-gray to light yellowish-brown	
55	■	3 7					
60							
65	■	5 14					
70				Apx B: Horizontal			
75	■	4					

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 1703W-1
PROJECT: Mesas West	DATE:
	LOGGED BY: MAS
DRILLING COMPANY: Valley Well Drilling (Danny)	DRILLED: 11/6/03
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"
HAMMER TYPE: Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-30'=6780lbs; 30-60'=4780lbs; 60-90'=3270 lbs; 90-120'=2090lbs	ELEVATION: 1158

BORING NO. B-11W

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
	■	15		B: Horizontal			
80							
85	■	4 10	Qt	B: Horizontal			
90	■	5 6		B: Horizontal			
95						@ 97' Silty fine-grained sand to medium-grained sand; loose to medium dense; light-gray; with interbedded sandy silt; moist; light-brown; gravelly channels	
100							
105						Total Depth 105' No Ground Water No Caving	
110							

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 1703W-1
PROJECT: Mesas West	DATE:
	LOGGED BY: MAS
DRILLING COMPANY: Valley Well Drilling (Jesse)	DRILLED: 11/24/03
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"
HAMMER TYPE: Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-25'=2854 lbs; 25-47'=1802 lbs; 47-70'=1091 lbs	ELEVATION: 1242

BORING NO. B-13W

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			S			**SOIL; s (0-2')** @ 0' Silty, clayey sand with gravel; medium dense; dry; brown; roots, rootlets; voids ≤ 1/8"	
						QUATERNARY LANDSLIDE DEPOSIT; Qls(Qt derived) (2-24') @ 2' Interbedded light yellowish-brown, silty, fine-grained sandstone and sandy siltstone; moderately hard; dry	
5		2 2 3					
10		1 2 3		Apx B: N8E, 34NW			
				B: N66W, 16SW			
			Qls (Qt)	Apx B: Horizontal		@ 14' Light-brown pebble conglomerate; damp	
15		5 10					@ 15' rock in tip
20		5 10					@ 20' rock in tip
				Apx B: Horizontal		**QUATERNARY LANDSLIDE DEPOSIT; Qls(TQs derived) (24-30.5')**	
25		8 11 7/3"	Qls (TQs)	B: N75E, 19SE		@ 24' Interbedded light-brown sandy siltstone and brown claystone; moderately hard to hard; moist	
				B: N68E, 13SE		@ 29' Light-gray silty, fine-grained sandstone; damp	
30				SP: N73E, 15SE Avg B: N66E, 14SE		@ 30' Plastic clay; soft; moist; greenish-gray; approx 1-2" thick; anastomosing parting for 6" beneath	
						BEDROCK; TQsl (30.5-45') @ 30.5' Greenish-gray claystone; moderately hard to hard; moist	
				B: N63E, 16SE		@ 33' Light-gray silty, fine-grained sandstone	@ 33' crowding to 45'
35		16	TQsl	B: N70E, 11SE		@ 35' Interbedded light-gray sandy siltstone and grayish-brown claystone;	
				Apx B: N65E, 15SE		@ 36.5' Light-brown pebble conglomerate	

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 1703W-1
PROJECT: Mesas West	DATE:
	LOGGED BY: MAS
DRILLING COMPANY: Valley Well Drilling (Jesse)	DRILLED: 11/24/03
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"
HAMMER TYPE: Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-25'=2854 lbs; 25-47'=1802 lbs; 47-70'=1091 lbs	ELEVATION: 1242

BORING NO. B-13W

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40			TQsL				
45	■	16				Total Depth 45' No Ground Water No Caving	
50							
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 1703W-1
PROJECT: Mesas West	DATE:
	LOGGED BY: MAS
DRILLING COMPANY: Valley Well Drilling (Jesse)	DRILLED: 11/25/03
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"
HAMMER TYPE: Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-25'=2854 lbs; 25-47'=1802 lbs; 47-70'=1091 lbs	ELEVATION: 1195

BORING NO. B-14W

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						BEDROCK; TQsl (0-45') @ 0' Light yellowish-brown sandy siltstone; moderately hard; dry; with interbedded silty, fine-grained sandstone lenses	
5		2 6 9		Apx B: N45E, 27SE		@ 5' Light-gray silty sandstone with gravelly lenses	
				B: N47E, 25SE			
				B: N65E, 29SE		@ 9' Light-brown sandy siltstone; moderately hard to hard	
10		4 6 10		B: N56E, 28SE		@ 11' Light-brown sandstone to pebble conglomerate; moderately hard	
			TQsl	B: N68E, 25SE			
15		1 7 12		B: N68E, 26SE			
				B: N61E, 81SE		@ 16' Light-brown sandy siltstone with interbedded lenses of light brown fine-grained sandstone and light-brown claystone; moderately hard to hard; damp	
20		3 3 3		B: N72E, 25SE			
				Apx B: N61E, 22SE		@ 22.5' Light-brown to brown plastic clay; soft; moist @ 23' Light-brown pebble conglomerate; moderately hard to hard; damp	
25		10 17					
30				B: N75E, 16SE			
						@ 31.5' Light-brown sandy siltstone; moderately hard; damp to moist; with interbedded light-brown claystone	
				Apx B: N45E, 24SE			
35		6 7 13					

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas West
DRILLING COMPANY:	Valley Well Drilling (Jesse)
DRILLING METHOD:	Bucket Auger
HAMMER TYPE:	Kelly Bar
DRIVING WEIGHTS:	0-25'=2854 lbs; 25-47'=1802 lbs; 47-70'=1091 lbs
JOB NO.:	1703W-1
DATE:	
LOGGED BY:	MAS
DRILLED:	11/25/03
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1195
BORING NO.	B-14W

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40			TQs	B/sh: N82E, 22SE Apx B: N53E, 19SE		@ 38' Approximately 3" of light-gray to gray, moderately plastic clay; soft to moderately hard; moist; followed by light-gray silty, fine-grained sandstone with interbedded light-gray to light-brown claystone lenses; moderately hard to hard	
45	■	13 18				Total Depth 45' No Ground Water No Caving	
50							
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 1703W-1
PROJECT: Mesas West	DATE:
	LOGGED BY: MAS
DRILLING COMPANY: Valley Well Drilling (Jesse)	DRILLED: 12/1/03
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"
HAMMER TYPE: Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-25'=2854 lbs;25-47'=1802 lbs; 47-70'=1091 lbs	ELEVATION: 1214

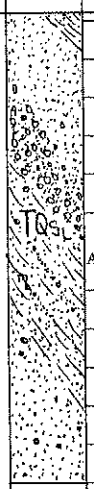
BORING NO. B-15W

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			S			**SOIL; s (0-1')** @ 0' Silty, clayey sand with gravel; loose; dry; brown **BEDROCK; TQsl (1-50')** @ 1' Pale yellowish-brown silty fine-grained sandstone to coarse-grained sandstone; moderately hard; dry; fractured; roots and rootlets	Bedrock highly weathered to 9'
5	■	6 9 9		B: N59W, 40NE 128/2.3 f: N64W, 42SW		@ 5' Pale yellowish-brown sandy siltstone	
				B: N60W, 55NE		@ 7.5' Light-gray sandstone @ 8.5' Light-brown sandy siltstone	
10	■	3 5 9		B: N59W, 59NE 123/6.2		@ 10' Light-brown sandy siltstone; moderately hard; dry; with lenses of brown claystone	
			TQs	Apx B: N55W, 52NE			
15	■	5 15		B: N57W, 54NE		@ 15' With light-brown, discontinuous, silty fine-grained sandstone lenses; pale yellowish-brown concretions approximately 4" long and 1-2" thick @ 16.5' Light-brown sandstone; dry to damp	@ 15-20' Bulk Sample
20	■	7 12		Apx B: N67W, 69NE		@ 19.5' Light-brown sandy siltstone with brown claystone lenses	
				Apx B: N55W, 60NE			
25	■	8 13		B: N64W, 59NE		@ 24' With light-brown, fine-grained, silty sandstone lenses @ 27' Interbedded with light-brown silty sandstone and sandy siltstone	
30				Apx B: N64W, 66NE			
				B: N68W, 65NE			
35	■	7 12		Apx B: N65W, 60NE		@ 35' Brown claystone; damp; no parting planes or striae	

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas West
DRILLING COMPANY:	Valley Well Drilling (Jesse)
DRILLING METHOD:	Bucket Auger
HAMMER TYPE:	Kelly Bar
DRIVING WEIGHTS:	0-25'=2854 lbs;25-47'=1802 lbs; 47-70'=1091 lbs
JOB NO.:	1703W-1
DATE:	
LOGGED BY:	MAS
DRILLED:	12/1/03
HOLE DIA:	24"
AVERAGE DROP (in.):	12"
ELEVATION:	1214

BORING NO. B-15W

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40				B: N51W, 56NE		@ 39' Light-brown pebble conglomerate @ 41' Light-brown silty sandstone to sandy siltstone with brown claystone lenses	
				Apx B: N61W, 52NE			
45	■	15				@ 45' Light-brown silty sandstone	
50	■	18				Total Depth 50' No Ground Water No Caving	
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 1703W-1
PROJECT: Mesas West	DATE:
	LOGGED BY: MAS
DRILLING COMPANY: Valley Well Drilling (Jesse)	DRILLED: 12/2/03
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"
HAMMER TYPE: Kelly Bar	AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-25'=2854 lbs; 25-47'=1802 lbs; 47-70'=1091 lbs	ELEVATION: 1202

BORING NO. B-16W

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						SOIL/SLOPEWASH; s/Qsw (0-2.5') @ 0' Silty, clayey sand with gravel; medium dense; dry; brown	@ 0-5' Bulk Sample
						QUATERNARY TERRACE DEPOSITS; Qt (2.5-5.5') @ 2.5' Coarse-grained sand to gravel; medium dense; yellowish-brown; dry; cobbles	
5							
	■	3 3 5		C: Horizontal		**BEDROCK; TQsl (5.5-35')** @ 5.5' Brown, silty, gravelly sandstone; moderately hard; dry; roots and rootlets	
				Apx B: N70W, 44NE		@ 8.5' Light-gray gravelly sandstone	
10							
	■	6 10				@ 11' Light-gray pebble conglomerate; moderately hard to hard	
				B: N44W, 56NE		@ 13' Light-gray, coarse-grained sandstone; gravel lenses; medium- to light-gray concretions	
15							
	■	12					
						@ 18' Pale light-gray concretions	@ 18' crowding
20							
	■	10 6/3"		Apx B: N66W, 56NE			
				Apx B: N56W, 47NE			
25							
	■	18		Apx B: N56W, 59NE			
						@ 26' Light-brown siltstone; moderately hard; damp; with brown claystone lenses	
30							
				B: N67W, 46NE			
						@ 32' Light-brown sandy siltstone with brown claystone lenses	
35							
	■	10 13				Total Depth 35' No Ground Water No Caving	

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Newhall Ranch Mesas Area
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Rotary Wash
HAMMER TYPE:	Automatic Safety
DRIVING WEIGHTS:	140 lbs
JOB NO.:	99-1703L-1
DATE:	7/22/04
LOGGED BY:	MAS
DRILLED:	10/6/99
HOLE DIA:	5 1/2" O.D.
AVERAGE DROP (in.):	30"
ELEVATION	993

BORING NO. RW-1M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY ALLUVIUM; Qal (0-25')**				
		12 20 20		SM	@ 3' Silty SAND with gravel; medium dense; damp; borwn to grayish-brown	2.5	114		
5		32 42 33		SP-SM	@ 5' Poorly graded SAND with silt and gravel; dense; moist; grayish-brown	7.3	135	9	
		27 22 24			@ 8' -medium dense	9.9	110		
10		15 17 18				6.3	114	8	
15		12 17 18		SM	@ 15' Silty SAND; dense; moist; grayish-brown			24	
20		36 50			**BEDROCK; TQs (20-50')** @ 20' SANDSTONE and gravel; dense; moist; grayish-brown			7	
25		32 52/2"			@ 26.5' -very dense				
30									
35		36 50			@ 35' -dense; moist to wet; grayish-brown	7.4	113		

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.	JOB NO.:	99-1703L-1
PROJECT:	Newhall Ranch Mesas Area	DATE:	7/22/04
		LOGGED BY:	MAS
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	10/6/99
DRILLING METHOD:	Rotary Wash	HOLE DIA:	5 1/2" O.D.
HAMMER TYPE:	Automatic Safety	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs	ELEVATION	993

BORING NO. RW-1M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40		50			@ 40' -wet				
45		50/3"			@ 45' SILTSTONE; very dense; wet; grayish-brown				
50		47 50/5"			@ 50' SANDSTONE; very dense; wet; grayish-brown				
					TOTAL DEPTH 50' (Elev. 943')				
					Ground Water @ 35'				
					No Caving				
55									
60									
65									
70									
75									

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Newhall Ranch Mesas Area
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Rotary Wash
HAMMER TYPE:	Automatic Safety
DRIVING WEIGHTS:	140 lbs
JOB NO.:	99-1703L-1
DATE:	7/22/04
LOGGED BY:	MAS
DRILLED:	10/9/99
HOLE DIA:	5 1/2" O.D.
AVERAGE DROP (in.):	30"
ELEVATION	987

BORING NO. RW-2M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY ALLUVIUM; Qal (0-25')**				
		20 20 25		SM	@ 2' Silty SAND with gravel; medium dense; damp; brown	4.4	108		
5		36 40 38			@ 4' -dense	5.0	112		Consol
		13 20 16			@ 7' -medium dense	4.2	114		
10		13 16 18		CL	@ 10' Sand lean CLAY; very stiff; moist; brown	6.4	113		LL= 31 PI= 11 Consol
15		26 38 50		SM	@ 15' Silty SAND with gravel; very dense; moist; brown			38	
20		24 32 32			@ 19' -dense	9.0	124		
25		27 50/5"			**BEDROCK; TQs (25-50')** @ 25' SANDSTONE and gravel; very dense; moist; grayish-brown				
30		36 50/5"							
35		23 40 50			@ 35' CLAYSTONE; very dense; moist to wet; olive brown	14.1	119		

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.	JOB NO.:	99-1703L-1
PROJECT:	Newhall Ranch Mesas Area	DATE:	7/22/04
		LOGGED BY:	MAS
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	10/9/99
DRILLING METHOD:	Rotary Wash	HOLE DIA:	5 1/2" O.D.
HAMMER TYPE:	Automatic Safety	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs	ELEVATION	987

BORING NO. RW-2M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40		50			@ 40' SANDSTONE; very dense; wet; grayish brown				
45		50							
50		34 36 37			TOTAL DEPTH 50' (Elev. 937') Ground Water @ 35' No Caving				
55									
60									
65									
70									
75									

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Newhall Ranch Mesas Area
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Rotary Wash
HAMMER TYPE:	Automatic Safety
DRIVING WEIGHTS:	140 lbs
JOB NO.:	99-1703L-1
DATE:	7/22/04
LOGGED BY:	MAS
DRILLED:	10/7/99
HOLE DIA:	5 1/2" O.D.
AVERAGE DROP (in.):	30"
ELEVATION	1068

BORING NO. RW-3M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY ALLUVIUM; Qal (0-30')**			7	
		17 13 10		SW-SM	@ 3' Well graded SAND with silt and gravel; medium dense; moist; grayish-brown				
5		7 10 15		SW	@ 5' Well graded SAND with gravel; medium dense; moist; grayish-brown	8.5	117	4	Consol
		12 20 18		SM	@ 8' Silty SAND with gravel; medium dense; moist; grayish-brown	11.1	119	31	Consol
10		10 15 25		SP-SM	@ 11' Poorly graded SAND with silt and gravel; medium dense; moist; grayish-brown	5.5	122		
15		12 21 22		SM	@ 15' Silty SAND with gravel; medium dense; moist; grayish-brown			33	
20		17 37 34			@ 20' -very dense			21	
25		10 17 20		CL-ML	@ 25' Sandy, silty CLAY with gravel; hard; moist; brown			51	LL= 27 PI= 7 % -5 micron= 10
30		17 50			**BEDROCK; TQs (30-50')** @ 30' SANDSTONE; dense; moist to wet; grayish-brown				
					@ 32' -wet				
35		12 50			@ 35' -very dense				

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.	JOB NO.:	99-1703L-1
PROJECT:	Newhall Ranch Mesas Area	DATE:	7/22/04
		LOGGED BY:	MAS
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	10/7/99
DRILLING METHOD:	Rotary Wash	HOLE DIA:	5 1/2" O.D.
HAMMER TYPE:	Automatic Safety	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs	ELEVATION	1068

BORING NO. RW-3M

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40		50							
45		50			@ 45' SILTSTONE; very dense; wet; brown				
50		27 34 50/5"			@ 50' CLAYSTONE; hard; wet; yellowish-brown TOTAL DEPTH 50' (Elev. 1018) No Caving Ground Water @ 32'				
55									
60									
65									
70									
75									

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.	JOB NO.:	1703E-1
PROJECT:	Mesas East	DATE:	07/22/04
		LOGGED BY:	KPC
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	10/21/03
DRILLING METHOD:	Rotary Wash	HOLE DIA:	5 1/2" O.D.
HAMMER TYPE:	Safety Drive	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs.	ELEVATION	999'

BORING NO. RW-1T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY ALLUVIUM; Qal (0-38')**				
		7 8 15		CL-ML	@ 3' Silty CLAY; stiff; damp; grayish brown; caliche and voids	7.7	107		
5		20 35 50/3"		CL	@ 6' Lean CLAY with sand and gravel; hard; damp; orangish to grayish brown; some small cobbles and voids	6.6	121		
10		27 24 50/5"		SP-SM	@ 9' Poorly graded SAND with silt and gravel; very dense; damp; yellowish brown	5.7	123		
		23 35 25		SP	@ 12' Poorly graded SAND with gravel; very dense; moist; yellowish brown	9.4			
15		10 10 14		SP-SC	@ 15' Poorly graded SAND with clay; medium dense; slightly moist; grayish brown	14.1			
20		6 7 11		CL	@ 20' Lean CLAY with gravel; stiff; slightly moist; gray	23.3	105		Consol
25		10 24 48		GC CL	@ 25' Clayey GRAVEL; medium dense; slightly moist; gray @ 25.5' Sandy lean CLAY; hard; slightly moist; gray	13.9	117		
30		6 6 10			@ 30' -very stiff	27.6			LL= 35 PI= 16
35		30 27 29		SP-SM	@ 35' Poorly graded SAND with silt and gravel; dense; moist; orangish brown	15.3	112		
		32 50		GM	@ 38' Silty GRAVEL; very dense; moist; grayish brown	11.2			

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.	JOB NO.:	1703E-1
PROJECT:	Mesas East	DATE:	07/22/04
		LOGGED BY:	KPC
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	10/21/03
DRILLING METHOD:	Rotary Wash	HOLE DIA:	5 1/2" O.D.
HAMMER TYPE:	Safety Drive	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs.	ELEVATION	999'

BORING NO. RW-1T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40					Total depth 38' Ground Water @ 15'				
45									
50									
55									
60									
65									
70									
75									

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas East
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Rotary Wash
HAMMER TYPE:	Safety Drive
DRIVING WEIGHTS:	140 lbs.
JOB NO.:	1703E-1
DATE:	07/22/04
LOGGED BY:	KPC
DRILLED:	10/21/03
HOLE DIA:	5 1/2" O.D.
AVERAGE DROP (in.):	30"
ELEVATION	1037'

BORING NO. RW-2T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY ALLUVIUM; Qal (0-35')**				
		18 16 24		SM	@ 3' Silty SAND with gravel; medium dense; damp; yellowish to grayish brown	3.3	122		
5		30 50/5"			@ 6' -dense	4.2	129		
10		35 50		SP-SM	@ 9' Poorly graded SAND with silt; very dense; damp; yellowish to grayish brown	10.0			
					@ 12' -no recovery				
15		30 50			@ 15' -with gravel; damp to moist; grayish brown	7.2	124		
20		30 50				7.1			
25		10 20 30		SP	@ 25' Poorly graded SAND; dense to very dense; damp to moist; grayish to yellowish brown	3.1			
30		26 29/2" 29/2"			@ 30' -very dense	5.1			
35		17 24 36				5.0			
					Total depth 35' Ground Water @ 14.5'				

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 1703E-1
PROJECT: Mesas East	DATE: 07/22/04
	LOGGED BY: KPC
DRILLING COMPANY: Valley Well Drilling	DRILLED: 10/22/03
DRILLING METHOD: Rotary Wash	HOLE DIA: 5 1/2" O.D.
HAMMER TYPE: Safety Drive	AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs.	ELEVATION 1051'

BORING NO. RW-3T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY ALLUVIUM; Qal (0-40')** @ 0-5' Bulk Sample				
		5 4 3		SM	@ 3' Silty SAND; loose; damp; yellowish brown	8.8			
5		7 4 2		SP-SM	@ 6' Poorly graded SAND with silt and gravel; loose; damp; yellowish brown; partial recovery	9.0			
10		7 4 9		SC	@ 9' Clayey SAND; medium dense; damp to moist; yellowish brown	10.8			
		11 12 12		SP-SM	@ 12' Poorly graded SAND with silt; medium dense; damp; yellowish to grayish brown; sandy clay lenses at 13.5 ft	17.9	112		
15		15 14 21		SC	@ 15' Clayey SAND with cobbles; dense; slightly moist; yellowish brown	10.0			
20		12 13 25		CL	@ 20' Sandy lean CLAY with gravel; hard; moist; yellowish brown	18.9			
25		8 16 22		SC	@ 25' Clayey SAND; dense; moist; yellowish brown	12.7	124		
30		50/5"			@ 30' -no recovery				
		22 50/5"		GP-SP	@ 33' Poorly graded SAND interbedded with poorly graded GRAVEL; very dense; moist; light gray	6.0			
35		30 50/4"				7.8			

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.	JOB NO.:	1703E-1
PROJECT:	Mesas East	DATE:	07/22/04
		LOGGED BY:	KPC
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	10/22/03
DRILLING METHOD:	Rotary Wash	HOLE DIA:	5 1/2" O.D.
HAMMER TYPE:	Safety Drive	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs.	ELEVATION	1051'

BORING NO. RW-3T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40		8 16 46		SP	@ 40' Poorly graded SAND; very dense; moist; grayish brown	6.7			
					Total Depth 40' Ground Water @ 21'				
45									
50									
55									
60									
65									
70									
75									

KEY TO SYMBOLS

Symbol	Description
UNITED SOIL CLASSIFICATION SYMBOLS	
	Poorly graded sand
	Silty sand
	Silty lean clay
	Blank
	Clayey sand
	Silty clayey sand
	Lean clay
	Poorly graded sand with silt
	Poorly graded sand with clay
	Silt
	Poorly graded gravel
	Silty gravel
	Clayey gravel
	Silty clayey gravel
	Fat clay

Symbol	Description
	Poorly graded gravel and sand
GROUND WATER DATA	
	GROUND WATER WHILE DRILLING
SAMPLE TYPE	
	CALIFORNIA DRIVE SAMPLE 2.42" I.D. sampler
	No Recovery
	STANDARD PENETRATION TEST Split barrel sampler in accordance with ASTM D-1558 Standard Test Method

Notes:

1. These logs are subject to the limitations, conclusions, and recommendations in this report.
2. Results of tests conducted on samples recovered are reported on the logs.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.	JOB NO.:	1703E-1
PROJECT:	Mesas East	DATE:	07/22/04
		LOGGED BY:	KPC
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	10/21/03
DRILLING METHOD:	Rotary Wash	HOLE DIA:	5 1/2" O.D.
HAMMER TYPE:	Safety Drive	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs.	ELEVATION	999'

BORING NO. RW-1T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY ALLUVIUM; Qal (0-38')**				
		7 8 15		CL-ML	@ 3' Silty CLAY; stiff; damp; grayish brown; caliche and voids	7.7	107		
5		20 35 50/3"		CL	@ 6' Lean CLAY with sand and gravel; hard; damp; orangish to grayish brown; some small cobbles and voids	6.6	121		
10		27 24 50/5"		SP-SM	@ 9' Poorly graded SAND with silt and gravel; very dense; damp; yellowish brown	5.7	123		
		23 35 25		SP	@ 12' Poorly graded SAND with gravel; very dense; moist; yellowish brown	9.4			
15		10 10 14		SP-SC	@ 15' Poorly graded SAND with clay; medium dense; slightly moist; grayish brown	14.1			
20		6 7 11		CL	@ 20' Lean CLAY with gravel; stiff; slightly moist; gray	23.3	105		Consol
25		10 24 48		GC CL	@ 25' Clayey GRAVEL; medium dense; slightly moist; gray @ 25.5' Sandy lean CLAY; hard; slightly moist; gray	13.9	117		
30		6 6 10			@ 30' -very stiff	27.6			LL= 35 PI= 16
35		30 27 29		SP-SM	@ 35' Poorly graded SAND with silt and gravel; dense; moist; orangish brown	15.3	112		
		32 50		GM	@ 38' Silty GRAVEL; very dense; moist; grayish brown	11.2			

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.	JOB NO.:	1703E-1
PROJECT:	Mesas East	DATE:	07/22/04
		LOGGED BY:	KPC
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	10/21/03
DRILLING METHOD:	Rotary Wash	HOLE DIA:	5 1/2" O.D.
HAMMER TYPE:	Safety Drive	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs.	ELEVATION	999'

BORING NO. RW-1T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40					Total depth 38' Ground Water @ 15'				
45									
50									
55									
60									
65									
70									
75									

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 1703E-1
PROJECT: Mesas East	DATE: 07/22/04
	LOGGED BY: KPC
DRILLING COMPANY: Valley Well Drilling	DRILLED: 10/21/03
DRILLING METHOD: Rotary Wash	HOLE DIA: 5 1/2" O.D.
HAMMER TYPE: Safety Drive	AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs.	ELEVATION 1037'

BORING NO. RW-2T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY ALLUVIUM; Qal (0-35')**				
		18 16 24		SM	@ 3' Silty SAND with gravel; medium dense; damp; yellowish to grayish brown	3.3	122		
5		30 50/5"			@ 6' -dense	4.2	129		
10		35 50		SP-SM	@ 9' Poorly graded SAND with silt; very dense; damp; yellowish to grayish brown	10.0			
					@ 12' -no recovery				
15		30 50			@ 15' -with gravel; damp to moist; grayish brown	7.2	124		
20		30 50				7.1			
25		10 20 30		SP	@ 25' Poorly graded SAND; dense to very dense; damp to moist; grayish to yellowish brown	3.1			
30		26 29/2" 29/2"			@ 30' -very dense	5.1			
35		17 24 36				5.0			
					Total depth 35' Ground Water @ 14.5'				

LABORATORY TESTS

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 1703E-1
PROJECT: Mesas East	DATE: 07/22/04
	LOGGED BY: KPC
DRILLING COMPANY: Valley Well Drilling	DRILLED: 10/22/03
DRILLING METHOD: Rotary Wash	HOLE DIA: 5 1/2" O.D.
HAMMER TYPE: Safety Drive	AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs.	ELEVATION 1051'

BORING NO. RW-3T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY ALLUVIUM; Qal (0-40')** @ 0-5' Bulk Sample				
		5 4 3		SM	@ 3' Silty SAND; loose; damp; yellowish brown	8.8			
5		7 4 2		SP-SM	@ 6' Poorly graded SAND with silt and gravel; loose; damp; yellowish brown; partial recovery	9.0			
10		7 4 9		SC	@ 9' Clayey SAND; medium dense; damp to moist; yellowish brown	10.8			
		11 12 12		SP-SM	@ 12' Poorly graded SAND with silt; medium dense; damp; yellowish to grayish brown; sandy clay lenses at 13.5 ft	17.9	112		
15		15 14 21		SC	@ 15' Clayey SAND with cobbles; dense; slightly moist; yellowish brown	10.0			
20		12 13 25		CL	@ 20' Sandy lean CLAY with gravel; hard; moist; yellowish brown	18.9			
25		8 16 22		SC	@ 25' Clayey SAND; dense; moist; yellowish brown	12.7	124		
30		50/5"			@ 30' -no recovery				
		22 50/5"		GP-SP	@ 33' Poorly graded SAND interbedded with poorly graded GRAVEL; very dense; moist; light gray	6.0			
35		30 50/4"				7.8			

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.	JOB NO.:	1703E-1
PROJECT:	Mesas East	DATE:	07/22/04
		LOGGED BY:	KPC
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	10/22/03
DRILLING METHOD:	Rotary Wash	HOLE DIA:	5 1/2" O.D.
HAMMER TYPE:	Safety Drive	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs.	ELEVATION	1051'

BORING NO. RW-3T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40		B 16 46		SP	@ 40' Poorly graded SAND; very dense; moist; grayish brown	6.7			
					Total Depth 40' Ground Water @ 21'				
45									
50									
55									
60									
65									
70									
75									

KEY TO SYMBOLS

Symbol	Description
UNITED SOIL CLASSIFICATION SYMBOLS	
	Poorly graded sand
	Silty sand
	Silty lean clay
	Blank
	Clayey sand
	Silty clayey sand
	Lean clay
	Poorly graded sand with silt
	Poorly graded sand with clay
	Silt
	Poorly graded gravel
	Silty gravel
	Clayey gravel
	Silty clayey gravel
	Fat clay

Symbol	Description
	Poorly graded gravel and sand
GROUND WATER DATA	
	GROUND WATER WHILE DRILLING
SAMPLE TYPE	
	CALIFORNIA DRIVE SAMPLE 2.42" I.D. sampler
	No Recovery
	STANDARD PENETRATION TEST Split barrel sampler in accordance with ASTM D-1558 Standard Test Method

Notes:

1. These logs are subject to the limitations, conclusions, and recommendations in this report.
2. Results of tests conducted on samples recovered are reported on the logs.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas East
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem
HAMMER TYPE:	Automatic Safety Hammer
DRIVING WEIGHTS:	140 lbs
JOB NO.:	1703E-1
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	10/24/03
HOLE DIA:	8" O.D.
AVERAGE DROP (in.):	30"
ELEVATION	1269'

BORING NO. HS-1T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**ARTIFICIAL FILL; af (0-7')**				
		9 11 11		SP	@ 2' Poorly graded SAND; medium dense; dry; light gray to light brown	1.7	118		
5		7 10 10		ML	@ 5' Sandy SILT; stiff; damp; light brown	2.5	117	63	
					QUATERNARY ALLUVIUM; Qal (7-25')				
10		1 4 4		CL-ML	@ 10' Silty CLAY; soft to firm; damp; brown to dark brown	14.8	99		Consol
15		12 17 22		SP	@ 15' Poorly graded SAND with gravel; medium dense; damp; light gray to light brown	1.5	124		
20		29 44 49			@ 20' -no recovery				
		19 22 26		SM	@ 22' Silty SAND; medium dense; damp to moist; light yellowish brown	3.7	111		
25		12 14 26			**BEDROCK; TQs (25')** @ 25' Silty SANDSTONE; medium dense; moist; light brown	10.0	113		
					Total Depth 25' No Ground Water				
30									
35									

LABORATORY TESTS

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas East
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem
HAMMER TYPE:	Automatic Safety Hammer
DRIVING WEIGHTS:	140 lbs
JOB NO.:	1703E-1
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	11/4/03
HOLE DIA:	8" O.D.
AVERAGE DROP (in.):	30"
ELEVATION	1245'

BORING NO. HS-2T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY ALLUVIUM; Qal (0-34')**				
		12 19 22		SM	@ 2' Silty SAND; medium dense; dry to damp; light brown; pinhole voids	4.5	103		
5		11 21 30		SC	@ 5' Clayey SAND with gravel; medium dense; dry to damp; light brown	2.7	114		
10		13 26 31		SP	@ 10' Poorly graded SAND; dense; damp; light gray	1.3	124		
15		32 50/5"			@ 15' -no recovery				
20		36 50/5"			@ 20' -no recovery				
25		10 14 17		SM-SC	@ 25' Silty, clayey SAND; medium dense; moist; brown	5.4	123	30	
30		12 23 23				3.8	129		
					BEDROCK; TQs (34-45')				
35		25 50/5"			@ 35' Silty, clayey SANDSTONE; very dense; moist; light brown				

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.	JOB NO.:	1703E-1
PROJECT:	Mesas East	DATE:	07/22/04
		LOGGED BY:	MAS
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	11/4/03
DRILLING METHOD:	Hollow-Stem	HOLE DIA:	8" O.D.
HAMMER TYPE:	Automatic Safety Hammer	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs	ELEVATION	1245'

BORING NO. HS-2T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40		45 50/4"							
45		50			@ 45' -light yellowish brown				
					Total Depth 45' No Ground Water Caving @ 10-25'				
50									
55									
60									
65									
70									
75									

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas East
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem
HAMMER TYPE:	Automatic Safety Hammer
DRIVING WEIGHTS:	140 lbs
JOB NO.:	1703E-1
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	10/24/03
HOLE DIA:	8" O.D.
AVERAGE DROP (in.):	30"
ELEVATION	1287'

BORING NO. HS-3T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**ARTIFICIAL FILL; af (0-10')**				
		6 7 8		CL-ML	@ 2' Sandy, silty CLAY; firm to stiff; damp to moist; brown to dark brown	5.6	110		
5		5 9 12		CL	@ 5' Sandy lean CLAY with gravel; stiff; damp to moist; brown to dark brown	7.0	105		Consol
10		5 16 22		SM	**QUATERNARY ALLUVIUM; Qal (10-42')** @ 10' Silty SAND; medium dense; damp; gray to brown	2.9	110		
15		8 12 16		SC	@ 15' Clayey SAND; medium dense; damp; gray to brown	4.8	110	46	
20		9 14 20				4.5	113		
25		6 12 16		SM-SC	@ 25' Silty, clayey SAND; medium dense; damp; light brown	10.4	112	48	
30		5 5 5		CL	@ 30' Silty CLAY with sand; firm; moist; mottled brown	14.0	99	69	Consol
35		6 9 29			@ 35' Silty CLAY; very stiff; moist; brown to dark brown	14.2	99		Consol

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.	JOB NO.:	1703E-1
PROJECT:	Mesas East	DATE:	07/22/04
		LOGGED BY:	MAS
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	10/24/03
DRILLING METHOD:	Hollow-Stem	HOLE DIA:	8" O.D.
HAMMER TYPE:	Automatic Safety Hammer	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs	ELEVATION	1287'

BORING NO. HS-3T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40		50/5"			@ 40' -no recovery				
		50/5"			@ 42' -no recovery				
					Total Depth 42' No Ground Water				
45									
50									
55									
60									
65									
70									
75									

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas East
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem
HAMMER TYPE:	Automatic Safety Hammer
DRIVING WEIGHTS:	140 lbs
JOB NO.:	1703E-1
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	10/24/03
HOLE DIA:	8" O.D.
AVERAGE DROP (in.):	30"
ELEVATION	1233'

BORING NO. HS-4T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**ARTIFICIAL FILL; af (0-10')**				
	■	5 2 2		SC	@ 2.5' Clayey SAND with gravel; loose; moist; brown	4.2		31	
5	■	1 1 1				7.2		47	
	■	2 2 3		SM	@ 7.5 Silty SAND with gravel; loose; moist; brown to light brown	5.4		38	
10	■	5 4 4		CL	**QUATERNARY ALLUVIUM; Qal (10-35')** @ 10' Sandy lean CLAY; firm; moist; brown	7.5		51	
	▨	24 25 17		SM	@ 12.5' -no recovery	0.7		19	
15	■	10 14 13			@ 15' Silty SAND; medium dense; moist; light brown to light gray	3.2		20	
	■	9 14 14			@ 17.5' -with gravel; damp; light gray	3.1		17	
20	■	8 11 15		SC	@ 20' -moist; light brown	6.3		40	
	■	7 12 19		SM	@ 22.5' -dense; damp; light gray	3.1		18	
25	■	15 28 32		SP-SM	@ 25' Poorly graded SAND with silt and gravel; very dense; damp; light gray	1.2		8	
	■	7 8 15		SM	@ 27.5' Silty SAND with gravel; medium dense; damp; light brown	4.5		29	
30	■	8 12 17		CL	@ 30' Sandy lean CLAY; very stiff; moist; light brown	9.8		60	
	■	10 24 25		SP-SM	@ 32.5' Poorly graded SAND with silt and gravel; dense; damp; light brown	1.9		10	
35	■	18 38 50/5"			@ 35' -very dense	1.4		8	
					Total Depth 35' No Ground Water				

LABORATORY TESTS

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.	JOB NO.:	1703E-1
PROJECT:	Mesas East	DATE:	07/22/04
		LOGGED BY:	MAS
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	10/24/03
DRILLING METHOD:	Hollow-Stem	HOLE DIA:	8" O.D.
HAMMER TYPE:	Automatic Safety Hammer	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs	ELEVATION	1200'

BORING NO. HS-5T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY ALLUVIUM; Qal (0-20')**				
		9 13 15		SP	@ 2' Poorly graded SAND with gravel; medium dense; dry; light gray	0.8	112		
5		6 13 24				1.4	120		
10		12 19 21				1.4	122		
15		16 27 27			@ 15' Poorly graded SAND with silt and gravel; dense; damp; light gray	3.0	116		
20		15 32 38			Total Depth 20' No Ground Water	2.9	120		
25									
30									
35									

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.	JOB NO.:	1703E-1
PROJECT:	Mesas East	DATE:	07/22/04
		LOGGED BY:	MAS
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	10/27/03
DRILLING METHOD:	Hollow-Stem	HOLE DIA:	8" O.D.
HAMMER TYPE:	Automatic Safety Hammer	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs	ELEVATION	1248'

BORING NO. HS-6T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY TERRACE; Qt (0-15')**				
	■	29 50/5"		SC	@ 2' Clayey SAND; dense to very dense; damp; reddish brown	7.1	120		
5	■	29 50				4.3	120		
10	■	17 23 25			@ 10' -with gravel; medium dense; light brownish yellow	5.2	118		
15	■	26 28 39		SP-SM	@ 15' Poorly graded SAND with silt; dense; dry; light brownish yellow	2.8	122		
					Total Depth 15' No Ground Water				
20									
25									
30									
35									

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas East
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem
HAMMER TYPE:	Automatic Safety Hammer
DRIVING WEIGHTS:	140 lbs
JOB NO.:	1703E-1
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	10/27/03
HOLE DIA:	8" O.D.
AVERAGE DROP (in.):	30"
ELEVATION	1190'

BORING NO. HS-7T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY TERRACE; Qt (0-10')**				
		27 50		SC	@ 2' Clayey SAND; very dense; damp; reddish brown	3.8	127		
5		20 50		SM-SC	@ 5' Silty, clayey SAND; very dense; damp; reddish brown	5.2	116		
10		14 18 38		SM	@ 10' Silty SAND with gravel; dense; damp; yellowish brown	6.5	120		
					Total Depth 10' No Ground Water				
15									
20									
25									
30									
35									

LABORATORY TESTS

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.	JOB NO.:	1703E-1
PROJECT:	Mesas East	DATE:	07/22/04
		LOGGED BY:	MAS
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	10/27/03
DRILLING METHOD:	Hollow-Stem	HOLE DIA:	8" O.D.
HAMMER TYPE:	Automatic Safety Hammer	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs	ELEVATION	1059'

BORING NO. HS-8T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**ARTIFICIAL FILL; af (0-5')**				
		10 15 17		SM	@ 2' Silty SAND; medium dense; dry; brown; pinhole voids	3.0	117		
5		10 13 17			**QUATERNARY ALLUVIUM; Qal (5-48')** @ 5' Silty SAND; medium dense; dry; brown	3.8	119		
10		11 28 37			@ 10' -dense; damp; no voids	4.3	116	31	
15		10 15 19		SP-SM	@ 15' Poorly graded SAND with silt and gravel; dense; dry; brown	2.2	115		
20		11 12 13		SM	@ 20' Silty SAND with gravel; medium dense; damp; light brown	7.5	112	50	
25		25 33 40		SP-SM	@ 25' Poorly graded SAND with silt and gravel; dense; damp; light brown to light yellowish brown	3.0	112		
30		11 13 18			@ 30' -medium dense; light brown	7.1	112		
35		50/5"			@ 35' -no recovery				

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas East
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem
HAMMER TYPE:	Automatic Safety Hammer
DRIVING WEIGHTS:	140 lbs
JOB NO.:	1703E-1
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	10/27/03
HOLE DIA:	8" O.D.
AVERAGE DROP (in.):	30"
ELEVATION	1059'

BORING NO. HS-8T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40		50			@ 40' -no recovery				
		50/5"		SM	@ 42' Silty SAND; dense; wet; light brown; rock in tip				
45		50/5"			@ 45' -no recovery				
					@ 48' -refusal				
50					Total Depth 47' Ground Water @ 40' Caving @ 40-47' Sloughing from 40-48'				
55									
60									
65									
70									
75									

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.	JOB NO.:	1703E-1
PROJECT:	Mesas East	DATE:	07/22/04
		LOGGED BY:	MAS
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	10/27/03
DRILLING METHOD:	Hollow-Stem	HOLE DIA:	8" O.D.
HAMMER TYPE:	Automatic Safety Hammer	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs	ELEVATION	1093'

BORING NO. HS-9T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY ALLUVIUM; Qal (0-50')**				
		2 2 4		SM	@ 2' Silty SAND with gravel; very loose; damp; brown	4.3	115		
5		3 6 6			@ 5' -loose	6.7	118		
10		3 6 17			@ 10' -medium dense; moist	10.8	121		
15		5 5 7		SP-SM	@ 15' Poorly graded SAND with silt; loose; damp; brown	6.9	112		
20		5 7 14		SM	@ 20' Silty SAND; medium dense; moist; brown	9.5	114		
25		8 18 13		SP-SM	@ 25' Poorly graded SAND with silt and gravel; medium dense; damp; brown	3.9	116		
30		8 14 25			@ 30' -moist; light brown				
35		28 42 50			@ 35' -very dense; light gray				

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.	JOB NO.:	1703E-1
PROJECT:	Mesas East	DATE:	07/22/04
		LOGGED BY:	MAS
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	10/27/03
DRILLING METHOD:	Hollow-Stem	HOLE DIA:	8" O.D.
HAMMER TYPE:	Automatic Safety Hammer	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs	ELEVATION	1093'

BORING NO. HS-9T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40		47 50				3.2	118		
45		39 50			@ 45' -no recovery				
					@ 50' -no recovery				
50		50			Total Depth 50' No Ground Water				
55									
60									
65									
70									
75									

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas East
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem
HAMMER TYPE:	Automatic Safety Hammer
DRIVING WEIGHTS:	140 lbs
JOB NO.:	1703E-1
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	10/28/03
HOLE DIA:	8" O.D.
AVERAGE DROP (in.):	30"
ELEVATION	1074'

BORING NO. HS-10T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY ALLUVIUM; Qal (0-50')**				
		1 2 2		CL	@ 2' Sandy lean CLAY with gravel; soft; damp; brown	5.3		55	
5		1 2 3			@ 5' -firm; moist	12.6		66	
		3 4 4			@ 7.5' -light brown	10.7		55	
10		3 7 5		SM	@ 10' Silty SAND with gravel; medium dense; damp; light yellowish brown	3.3		13	
		4 6 3			@ 12.5' -loose	3.5		18	
15		1 2 3		CL	@ 15' Sandy lean CLAY; firm; moist; light brown	12.6		61	
		3 7 14		SP	@ 17.5' Poorly graded SAND with silt and gravel; medium dense; moist; light gray	2.4		9	
20		9 11 9			@ 20' -no gravel; damp; light gray to light brown	2.1		6	
		13 15 10			@ 22.5' -with gravel; light brown	2.5		8	
25		7 13 22		SC	@ 25' Clayey SAND; dense; moist; light gray to light brown	10.1		41	
		16 19 28		SM	@ 27.5' Silty SAND with gravel; dense; damp; light gray to light brown	6.5		28	
30		9 16 24				6.4		24	
		16 30 39		SP	@ 32.5' Poorly graded SAND with silt and gravel; very dense; wet; light gray to light brown	27.6		12	
35		44 54			@ 35' -damp; gray	2.2		6	
		50				2.6		10	

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.	JOB NO.:	1703E-1
PROJECT:	Mesas East	DATE:	07/22/04
		LOGGED BY:	MAS
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	10/28/03
DRILLING METHOD:	Hollow-Stem	HOLE DIA:	8" O.D.
HAMMER TYPE:	Automatic Safety Hammer	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs	ELEVATION	1074'

BORING NO. HS-10T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40		36 50/3"		SM	@ 40' Silty SAND; very dense; damp; gray	7.0		15	
		40 50/5"		SP-SM	@ 42.5' Poorly graded SAND with silt and gravel; very dense; wet; gray	12.3		9	
45		40 50/3"				12.4		8	
		40 50/5"				12.6		8	
50		40 50/1"				14.2		11	
					Total Depth 50' Ground Water @ 42.5'				
55									
60									
65									
70									
75									

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 1703E-1
PROJECT: Mesas East	DATE: 07/22/04
	LOGGED BY: MAS
DRILLING COMPANY: Valley Well Drilling	DRILLED: 10/28/03
DRILLING METHOD: Hollow-Stem	HOLE DIA: 8" O.D.
HAMMER TYPE: Automatic Safety Hammer	AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs	ELEVATION 1277'

BORING NO. HS-11T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**ARTIFICIAL FILL; af (0-5')**				
		7 8 12		CL	@ 2' Sandy lean CLAY; stiff; moist; light brown	10.6	119		
5		13 15 17		SC	**QUATERNARY ALLUVIUM; Qal (5-30')** @ 5' Clayey SAND; medium dense; moist; light brown	5.7	120		
10		14 19 18		CL	@ 10' Lean CLAY with sand; very stiff; moist; light brown	11.2	113	72	
15		11 15 20			@ 15' -with gravel	9.9	123		
20		8 12 13		CL-ML	@ 20' Sandy, silty CLAY with gravel; stiff; moist; light brown	6.1	113		
25		6 10 11		SC	@ 25' Clayey SAND; medium dense; moist; light brown	7.5	121		
					@ 27' -hard drilling, possible TQs				
30		15 31 50/4"			**BEDROCK; TQs (30')** @ 30' Poorly graded SANDSTONE with clay; very dense; moist; light brown to light gray				
					Total Depth 30' No Ground Water				
35									

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas East
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem
HAMMER TYPE:	Automatic Safety Hammer
DRIVING WEIGHTS:	140 lbs
JOB NO.:	1703E-1
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	10/28/03
HOLE DIA:	8" O.D.
AVERAGE DROP (in.):	30"
ELEVATION	1277'

BORING NO. HS-12T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**ARTIFICIAL FILL; af, (0-5')**				
		8 8 11		SM	@ 2' Silty SAND with gravel; medium dense; dry; light brown; very friable	1.0	109		Consol
5		14 20 30			**QUATERNARY ALLUVIUM; Qal, (5-20')** @ 5' Silty SAND with gravel; medium dense; dry; light yellow to yellowish brown	1.0	126		
10		19 21 17				1.7	121		
15		13 21 40			@ 15' -dense; damp; light brown; pinhole voids				
20		16 25 27			@ 20' -medium dense; light brownish yellow				
					Total Depth 20' No Ground Water				
25									
30									
35									

LABORATORY TESTS

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 1703E-1		
PROJECT: Mesas East	DATE: 07/22/04		
	LOGGED BY: MAS		
DRILLING COMPANY: Valley Well Drilling	DRILLED: 10/29/03		
DRILLING METHOD: Hollow-Stem	HOLE DIA: 8" O.D.	BORING NO.	HS-13T
HAMMER TYPE: Automatic Safety Hammer	AVERAGE DROP (in.): 30"		
DRIVING WEIGHTS: 140 lbs	ELEVATION 1174'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**ARTIFICIAL FILL; af (0-8')**				
		6 7 9		SM	@ 2' Silty SAND with gravel; loose; damp; brown	2.9	119		
5		9 13 25			@ 5' -medium dense	2.4	114		
				SP-SM	**QUATERNARY ALLUVIUM; Qal (8-29')**				
10		25 50/5"			@ 10' Poorly graded SAND with silt and gravel; dense; damp; light yellowish brown	1.9	119		
15		50			@ 15' -very dense	2.5	105		
20		10 12 15		SP	@ 20' Poorly graded SAND with gravel; medium dense; damp; light yellowish brown	3.0	119		
25		6 9 13		SC	@ 25' Clayey SAND with gravel; medium dense; moist; light yellowish brown	7.4	123		
					BEDROCK; TQs (29-40')				
30		20 33 17			@ 30' Poorly graded SANDSTONE with silt and gravel; medium dense; moist; weathered	3.2	121		
35		50			@ 35' -very dense				

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.	JOB NO.:	1703E-1
PROJECT:	Mesas East	DATE:	07/22/04
		LOGGED BY:	MAS
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	10/29/03
DRILLING METHOD:	Hollow-Stem	HOLE DIA:	8" O.D.
HAMMER TYPE:	Automatic Safety Hammer	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs	ELEVATION	1174'

BORING NO. HS-13T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40		32 39 50/5"			@ 40' Sandy SILTSTONE; hard; moist; light greenish gray to reddish brown along fractures				
					Total Depth 40' No Ground Water				
45									
50									
55									
60									
65									
70									
75									

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.	JOB NO.:	1703E-1
PROJECT:	Mesas East	DATE:	07/22/04
		LOGGED BY:	MAS
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	10/29/03
DRILLING METHOD:	Hollow-Stem	HOLE DIA:	8" O.D.
HAMMER TYPE:	Automatic Safety Hammer	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs	ELEVATION	1121'

BORING NO. HS-14T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**ARTIFICIAL FILL; af (0-7')** @ 0-20' Bulk Sample				
		7 10 11		SM	@ 2' Silty SAND; medium dense; damp; light brown; pinhole voids and rootlets	3.4	114		
5		6 6 12			@ 5' -loose	3.8	114		
					QUATERNARY ALLUVIUM; Qal (7-33')				
10		12 18 12		SP	@ 10' Poorly graded SAND with silt and gravel; medium dense; damp; light brown	1.4	120		
15		12 15 39			@ 15' Poorly graded SAND with gravel; medium dense; damp; light yellowish brown	0.9	128		
20		12 19 28							
25		33 50			@ 25' -very dense				
30		35 50/5"							
					BEDROCK; TQs (33-40')				
35		26 38 50/3"			@ 35' Silty SANDSTONE; very dense; moist; light brown				

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas East
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem
HAMMER TYPE:	Automatic Safety Hammer
DRIVING WEIGHTS:	140 lbs
JOB NO.:	1703E-1
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	10/29/03
HOLE DIA:	8" O.D.
AVERAGE DROP (in.):	30"
ELEVATION	1121'

BORING NO. HS-14T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40		50			Total Depth 40' No Ground Water				
45									
50									
55									
60									
65									
70									
75									

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas East
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem
HAMMER TYPE:	Automatic Safety Hammer
DRIVING WEIGHTS:	140 lbs
JOB NO.:	1703E-1
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	10/29/03
HOLE DIA:	8" O.D.
AVERAGE DROP (in.):	30"
ELEVATION	1149'

BORING NO. HS-15T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**ARTIFICIAL FILL/QUATERNARY ALLUVIUM; af/Qal(0-19)'**				
		7 10 13		SM	@ 2' Silty SAND; medium dense; damp; light brown	4.3	119		
5		5 6 10			@ 5' -loose	2.5	115		
10		4 7 11				6.5	118	43	
15		7 17 34		SP-SC	@ 15' Poorly graded SAND with clay; medium dense; damp; light brown	7.9	123		
					BEDROCK; TQs (19-25')				
20		19 50			@ 20' Sandy MUDSTONE; hard; damp; light brown	15.7	115		
25		37 50/3"			@ 25' Sandy MUDSTONE; hard; moist; light brown				
					Total Depth 25' No Ground Water				
30									
35									

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas East
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem
HAMMER TYPE:	Automatic Safety Hammer
DRIVING WEIGHTS:	140 lbs
JOB NO.:	1703E-1
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	10/30/03
HOLE DIA:	8" O.D.
AVERAGE DROP (in.):	30"
ELEVATION	1203'

BORING NO. HS-16T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**ARTIFICIAL FILL; af (0-10')**				
	■	10 13 13		CL-ML	@ 2' Sandy, silty CLAY; stiff; moist; light brown; weathered	9.0	113		
5	■	7 9 15			@ 5' Sandy lean CLAY; stiff; moist; light brown	8.4	113		
10	■	3 6 7		CL	**QUATERNARY ALLUVIUM; Qal (10-23')** @ 10' Lean CLAY with sand; firm; moist; light brown; weathered; pinhole voids	7.7	101	80	Consol
15	■	4 5 8				12.1	106		Consol
20	■	21 28 50		SC	@ 20' Clayey SAND; dense; damp; light brown				
					@ 23' -refusal				
25					Total Depth 23' No Ground Water				
30									
35									

LABORATORY TESTS

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas East
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem
HAMMER TYPE:	Automatic Safety Hammer
DRIVING WEIGHTS:	140 lbs
JOB NO.:	1703E-1
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	10/30/03
HOLE DIA:	8" O.D.
AVERAGE DROP (in.):	30"
ELEVATION	1205'

BORING NO. HS-17T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**ARTIFICIAL FILL; af (0-11')**				
	■	2 10 11		CL-ML	@ 2' Silty CLAY; stiff; moist; light brown	14.5	105	94	Consol
5	■	5 8 18				5.2	108		
10	■	16 6 5		CL	**QUATERNARY ALLUVIUM; Qal (11-13')** @ 10' Sandy lean CLAY; firm; moist; light yellowish brown	7.7	105	56	Consol
					BEDROCK; TQs (13-20')				
15	■	19 50			@ 15' MUDSTONE; hard; moist; light brown				
20	■	29 50/5"			Total Depth 20' No Ground Water				
25									
30									
35									

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.	JOB NO.:	1703E-1
PROJECT:	Mesas East	DATE:	07/22/04
		LOGGED BY:	MAS
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	10/30/03
DRILLING METHOD:	Hollow-Stem	HOLE DIA:	8" O.D.
HAMMER TYPE:	Automatic Safety Hammer	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs	ELEVATION	1265'

BORING NO. HS-18T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**ARTIFICIAL FILL; af (0-5')**				
		28 50		SM	@ 2' Silty SAND; dense; damp; light yellowish brown	6.2	128		
5		29 50/5"			**BEDROCK; TQs (5-10')** @ 5' Sandy MUDSTONE; hard; damp; light yellowish brown	12.6	124		
10		27 50/5"			Total Depth 10' No Ground Water				
15									
20									
25									
30									
35									

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.	JOB NO.:	1703E-1
PROJECT:	Mesas East	DATE:	07/22/04
		LOGGED BY:	MAS
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	10/30/03
DRILLING METHOD:	Hollow-Stem	HOLE DIA:	8" O.D.
HAMMER TYPE:	Automatic Safety Hammer	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs	ELEVATION	1262'

BORING NO. HS-19T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**ARTIFICIAL FILL; af (0-10')**				
		2 3 4		CL	@ 2' Lean CLAY with sand; soft; damp to moist; brown	9.9	108		
5		5 8 11			@ 5' -stiff	10.5	112	79	
10		5 6 9		SC	**QUATERNARY ALLUVIUM; Qal (10-15')** @ 10' Clayey SAND with gravel; loose; moist; light brown; pinhole voids	4.3	120		
15		29 50			**BEDROCK; TQs (15-20')** @ 15' Sandy SILTSTONE; hard; moist; light brown	6.3	128		
20		34 50/3"			Total Depth 20' No Ground Water				
25									
30									
35									

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas East
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem
HAMMER TYPE:	Automatic Safety Hammer
DRIVING WEIGHTS:	140 lbs
JOB NO.:	1703E-1
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	10/30/03
HOLE DIA:	8" O.D.
AVERAGE DROP (in.):	30"
ELEVATION	1139'

BORING NO. HS-20T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**ARTIFICIAL FILL; af (0-5')**				
		12 13 13		SC	@ 2' Clayey SAND with gravel; medium dense; dry; dark brown; pinhole voids	6.6	116		
5		3 6 6		CL	**QUATERNARY TERRACE; Qt (5-25')** @ 5' Sandy lean CLAY; firm; dry; dark brown	5.6	108		Consol
10		3 3 5			@ 10' -moist; light yellowish brown	7.2	107	56	Consol
15		7 9 11		CL-ML	@ 15' Sandy, silty CLAY; stiff; moist; light yellowish brown	5.1	117	59	
20		5 9 14		CL	@ 20' Sandy lean CLAY; stiff; moist; light yellowish brown; pinhole voids	13.9	114		
25		12 28 45			**BEDROCK; TQs (25-30')** @ 25' Silty, clayey SANDSTONE; dense; moist; light yellowish brown	12.8	114		
30		12 32 50			@ 30' Silty CLAYSTONE; hard; moist; light brownish yellow				
					Total Depth 30' No Ground Water				
35									

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas East
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem
HAMMER TYPE:	Automatic Safety Hammer
DRIVING WEIGHTS:	140 lbs
JOB NO.:	1703E-1
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	10/31/03
HOLE DIA:	8" O.D.
AVERAGE DROP (in.):	30"
ELEVATION	1013'

BORING NO. HS-21T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**ARTIFICIAL FILL; af (0-5')**				
		6 4 11		SC	@ 2' Silty, clayey SAND with gravel; loose; moist; brown; rootlets	6.2	113		
5		6 10 10		ML	**QUATERNARY ALLUVIUM; Qal (5-27')** @ 5' Sandy SILT; stiff; moist; light yellowish brown; pinhole voids and rootlets	3.8	115	51	
10		4 6 10			@ 10' -brown	9.0	112		
15		4 6 9		CL	@ 15' Sandy lean CLAY; stiff; moist; brown	14.0	111	53	
20		6 9 15				14.8	112		LL= 33 PI= 14
25		10 14 20		SM-SC	@ 25' Silty, clayey SAND; medium dense; moist; light brown	10.7	112		
					BEDROCK; TQs (27-40')				
30		50/2"			@ 30' -no recovery				
35		50/2"			@ 35' -no recovery				
		50/3"			@ 37.5' Poorly graded SANDSTONE with gravel; very dense; damp; light gray; minimal recovery				

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.	JOB NO.:	1703E-1
PROJECT:	Mesas East	DATE:	07/22/04
		LOGGED BY:	MAS
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	10/31/03
DRILLING METHOD:	Hollow-Stem	HOLE DIA:	8" O.D.
HAMMER TYPE:	Automatic Safety Hammer	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs	ELEVATION	1013'

BORING NO. HS-21T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40		50/1"			@ 40' -no recovery				
					Total Depth 40' No Ground Water				
45									
50									
55									
60									
65									
70									
75									

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.	JOB NO.:	1703E-1
PROJECT:	Mesas East	DATE:	07/22/04
		LOGGED BY:	MAS
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	10/31/03
DRILLING METHOD:	Hollow-Stem	HOLE DIA:	8" O.D.
HAMMER TYPE:	Automatic Safety Hammer	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs	ELEVATION	1064'

BORING NO. HS-22T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**ARTIFICIAL FILL; af (0-9')**				
		11 26 20		SM-SC	@ 2' Silty, clayey SAND with gravel; medium dense; dry to damp; brown	8.1	125		
5		10 10 13		SM	@ 5' Silty SAND; medium dense; damp to moist; light yellowish brown	6.9	112		
					QUATERNARY ALLUVIUM; Qal, (9-35')				
10		16 17 17		SP-SM	@ 10' Poorly graded SAND with silt and gravel; medium dense; damp; light yellow	1.0	120	10	
15		12 35 31		GP	@ 15' Poorly graded GRAVEL; dense; damp; light yellowish brown	0.8	121		
20		16 43 50			@ 20' -very dense; rock in tip				
25		9 13 43		SM	@ 25' Silty SAND; dense; moist; light brownish yellow				
30		35 39 12			@ 30' -with gravel; medium dense				
35		29 40 50/5"			**BEDROCK; TQs (35')** @ 35' Silty conglomerate; very dense; damp; medium brown				
					Total Depth 35' No Ground Water				

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas East
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem
HAMMER TYPE:	Automatic Safety Hammer
DRIVING WEIGHTS:	140 lbs
JOB NO.:	1703E-1
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	10/31/03
HOLE DIA:	8" O.D.
AVERAGE DROP (in.):	30"
ELEVATION	1095'

BORING NO. HS-23T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**ARTIFICIAL FILL; af, (0-4')**				
		4 4 6		CL	@ 2' Sandy lean CLAY; firm; moist; light brown	11.5	112	67	LL= 36 PI= 18 Consol
					QUATERNARY ALLUVIUM; Qal (4-14')				
5		1 1 1			@ 5' Silty CLAYwith sand; very soft; moist; light brown	14.6	101		Consol
10		3 4 6			@ 10' Sandy, silty CLAY with gravel; firm; damp; light brown; pinhole voids	8.9	100		LL= 33 PI= 13
					BEDROCK; TQs (14-20')				
15		16 25 29			@ 15' Sandy CLAYSTONE; hard; damp to moist; light brown				
20		9 20 23			@ 20' -very stiff; moist				
					Total Depth 20' No Ground Water				
25									
30									
35									

LABORATORY TESTS

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas East
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem
HAMMER TYPE:	Automatic Safety Hammer
DRIVING WEIGHTS:	140 lbs
JOB NO.:	1703E-1
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	10/31/03
HOLE DIA:	8" O.D.
AVERAGE DROP (in.):	30"
ELEVATION	1117'

BORING NO. HS-24T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY ALLUVIUM; Qal (0-10')**				
	■	4 6 10		SM	@ 2' Silty SAND; loose; dry; brown; roots and pinhole voids	4.0	104		Consol
5	■	4 5 6		CL		4.1	101		LL= 30 PI= 13 Consol
10	■	21 50			**BEDROCK; TQs (10-15')** @ 10' SILTSTONE; hard; damp; light brown				
15	■	30 50/5"			Total Depth 15' No Ground Water				
20									
25									
30									
35									

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas East
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem
HAMMER TYPE:	Automatic Safety Hammer
DRIVING WEIGHTS:	140 lbs
JOB NO.:	1703E-1
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	10/31/03
HOLE DIA:	8" O.D.
AVERAGE DROP (in.):	30"
ELEVATION	1138'
BORING NO.	HS-25T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**ARTIFICIAL FILL; af (0-10')**				
		14 16 17		GM	@ 2' Silty GRAVEL with sand; medium dense; dry; light gray	1.8	122		
5		15 30 23				1.5	120		
					@ 8' -refusal; moved rig over 5'				
10		14 13 13		SM	**QUATERNARY ALLUVIUM; Qal (10-37')** @ 10' Silty SAND with gravel; medium dense; damp; light gray to light brown	4.6	114		
15		10 24 16			@ 15' -light gray				
20		12 20 33							
25		37 50			@ 25' -dense			26	
30		12 32 37							
35		9 12 15		SM-SC	@ 35' Silty, clayey SAND with gravel; medium dense; moist; light gray	1.8	92		
					BEDROCK; TQs (37-45')				

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.	JOB NO.:	1703E-1
PROJECT:	Mesas East	DATE:	07/22/04
		LOGGED BY:	MAS
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	10/31/03
DRILLING METHOD:	Hollow-Stem	HOLE DIA:	8" O.D.
HAMMER TYPE:	Automatic Safety Hammer	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs	ELEVATION	1138'

BORING NO. HS-25T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40	■	40 30/3"			@ 42' Sandy, silty CLAYSTONE; hard; moist; light brown				
45	■	50/5"			Total Depth 45' No Ground Water				
50									
55									
60									
65									
70									
75									

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas East
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem
HAMMER TYPE:	Safety Hammer
DRIVING WEIGHTS:	140 lbs
JOB NO.:	1703E-1
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	11/03/03
HOLE DIA:	8" O.D.
AVERAGE DROP (in.):	30"
ELEVATION	1128'

BORING NO. HS-26T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY TERRACE; Qt (0-23')**				
		7 12 15		SM	@ 2' Silty SAND with gravel; medium dense; dry; brown; pinhole voids	2.4	125		
5		9 15 41		SP	@ 5' Poorly graded SAND with gravel; dense; dry; light yellowish brown; very friable	1.5	122		
10		27 50		SP-SM	@ 10' Poorly graded SAND with silt and gravel; dense; dry; light brown	1.8	92		
15		32 40 40		SM-SC	@ 15' Silty, clayey SAND with gravel; dense; damp; light brown				
20		15 37 50/3"			@ 20' -very dense				
					BEDROCK; TQs (23-35')				
25		50/5"			@ 25' -no recovery				
30		35 30/4"			@ 30' Silty, clayey SANDSTONE; dense to very dense; moist; brown to grayish brown				
35		50/3"			@ 35' Silty SANDSTONE; very dense; damp; light brown				
					Total Depth 35' No Ground Water				

LABORATORY TESTS

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas East
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem
HAMMER TYPE:	Safety Hammer
DRIVING WEIGHTS:	140 lbs
JOB NO.:	1703E-1
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	11/3/03
HOLE DIA:	8" O.D.
AVERAGE DROP (in.):	30"
ELEVATION	1061'

BORING NO. HS-27T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**ARTIFICIAL FILL; af (0-4')**			22	
					@ 0-25' Bulk Sample				
	■	14 13 12		SM	@ 2' Silty SAND with gravel; medium dense; dry; light brown	2.0	114		
					QUATERNARY ALLUVIUM; Qal (4-54 ft)				
5	■	12 13 16			@ 5' -light brown to yellow	1.6	118		
10	■	29 22 24		SC	@ 10' Clayey SAND; medium dense; damp; light brown to yellow	5.9	128	29	
15	■	28 37 23		SM	@ 15' Silty SAND with gravel; dense; damp; light yellowish brown	3.5	123		
20	■	26 43 50			@ 20' -very dense; light yellow				
25	■	40 50							
30	■	22 43 50							
35	■	32 50/5"							

LABORATORY TESTS

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas East
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem
HAMMER TYPE:	Safety Hammer
DRIVING WEIGHTS:	140 lbs
JOB NO.:	1703E-1
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	11/3/03
HOLE DIA:	8" O.D.
AVERAGE DROP (in.):	30"
ELEVATION	1061'

BORING NO. HS-27T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40		35 50			@ 40' -no recovery				
45		25 50			@ 45' -damp to moist; yellowish brown				
50		25 50		GP	@ 50' Poorly graded GRAVEL with sand; very dense; wet; gray to green				
					BEDROCK; TQs (54-55')				
55		41 50/4"			@ 55' Sandy MUDSTONE; hard; moist; grayish green to greenish gray	16.6	115		
					Total Depth 55' Ground Water @ 50'				
60									
65									
70									
75									

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.
PROJECT:	Mesas East
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem
HAMMER TYPE:	Automatic Safety Hammer
DRIVING WEIGHTS:	140 lbs
JOB NO.:	1703E-1
DATE:	07/22/04
LOGGED BY:	MAS
DRILLED:	11/4/03
HOLE DIA:	8" O.D.
AVERAGE DROP (in.):	30"
ELEVATION	1171'

BORING NO. HS-28T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**ARTIFICIAL FILL; af (0-4')**				
		18 19 25		CL	@ 2' Sandy lean CLAY; very stiff; dry; brown	5.1	122		
					QUATERNARY TERRACE; Qt (4-40')				
5		2 7 12			@ 5' -stiff; voids	4.6	110	51	
10		16 17 18		SM	@ 10' Silty SAND with gravel; medium dense; dry; light yellowish brown	3.2	115		
15		13 14 20		SP CL	@ 15' Poorly graded SAND; medium dense; dry; light yellowish brown @ 15.5' Sandy lean CLAY; very stiff; dry; light yellowish brown	2.1	118		
20		11 13 16		SM	@ 20' Silty SAND; medium dense; dry to damp; light brownish yellow	2.8	114	29	
25		12 15 25		CL	@ 25' Sandy lean CLAY; very stiff; damp; light yellowish brown	11.4	114		
30		35 27 32		GC	@ 30' Clayey GRAVEL with sand; dense; damp; light yellowish brown to light gray				
35		32 44 40		SM	@ 35 Silty SAND with gravel; dense; damp; light brownish yellow				

DRILL HOLE LOG

CLIENT: Newhall Ranch Co.	JOB NO.: 1703E-1
PROJECT: Mesas East	DATE: 07/22/04
	LOGGED BY: MAS
DRILLING COMPANY: Valley Well Drilling	DRILLED: 11/4/03
DRILLING METHOD: Hollow-Stem	HOLE DIA: 8" O.D.
HAMMER TYPE: Automatic Safety Hammer	AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs	ELEVATION 1171'

BORING NO. HS-28T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40	■	31 50		GM-GC	@ 40' Silty, clayey GRAVEL with sand; very dense; moist; light yellowish brown				
					Total Depth 40' No Ground Water				
45									
50									
55									
60									
65									
70									
75									

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.	JOB NO.:	1703E-1
PROJECT:	Mesas East	DATE:	07/22/04
		LOGGED BY:	MAS
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	11/4/03
DRILLING METHOD:	Hollow-Stem	HOLE DIA:	8" O.D.
HAMMER TYPE:	Automatic Safety Hammer	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs	ELEVATION	1158'

BORING NO. HS-29T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**ARTIFICIAL FILL; af (0-5')**				
	■	10 11 13		SC	@ 2' Clayey SAND with gravel; medium dense; damp; brown to dark brown; pinhole voids	8.0	124		
5	■	10 12 15		SM	**QUATERNARY TERRACE; (5-40')** @ 5' Silty SAND with gravel; medium dense; damp; brown to dark brown	3.6	115		
10	■	10 14 15		SC	@ 10' Clayey SAND; medium dense; moist; brown	8.2	117		
15	■	9 15 21		CL-ML	@ 15' Silty CLAY with sand; very stiff; moist; brown	17.3	113		
20	■	10 19 14		SM-SC	@ 20' Silty, clayey SAND; medium dense; moist; light yellowish brown	11.4	110		
25	■	6 9 15		CL-ML	@ 25' Silty CLAY; stiff; moist; light brown	17.6	106		Consol
30	■	15 32 19		SP-SM	@ 30' Poorly graded SAND with silt; medium dense; damp to moist; light yellowish brown	3.0	115		
35	■	8 10 14		CL-ML	@ 35' Silty CLAY; stiff; moist; light yellowish brown	28.0	96		

DRILL HOLE LOG

CLIENT:	Newhall Ranch Co.	JOB NO.:	1703E-1
PROJECT:	Mesas East	DATE:	07/22/04
		LOGGED BY:	MAS
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	11/4/03
DRILLING METHOD:	Hollow-Stem	HOLE DIA:	8" O.D.
HAMMER TYPE:	Automatic Safety Hammer	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs	ELEVATION	1158'

BORING NO. HS-29T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40		30 40 40		SP-SM	@ 40' Poorly graded SAND with silt; dense; damp; light gray				
					Total Depth 40' No Ground Water				
45									
50									
55									
60									
65									
70									
75									

DRILL HOLE LOG

BORING NO. HS-10

PROJECT: Valencia Company
Magic Mountain Entertainment

JOB NO.: 00-1729-1
DATE: 5/25/00

DRILLING COMPANY/DRILLER: Valley Well Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Hollow-Stem Auger
HAMMER TYPE: Downhole **AVERAGE DROP (in.):** 30"
DRIVING WEIGHTS: 140 lbs.
ELEVATION: 1219 **LOGGED BY:** MAS

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						QUATERNARY ALLUVIUM; Qal (0 - 30 Ft.)	Excavated and logged on 3/21/00
		2 2 2		107.7/7.8	SM	@ 2' Silty sand with gravel, loose, moist, light brown	
5		8 11 25		108.2/3.5		@ 5' - less gravel and medium dense	
		11 13 11		107.9/5.3		@ 8' - less gravel and medium dense	
10		17 22 34		110.1/4.1		@ 11' - dense	% fines=19.8
15		31 36 50/ 6"					@ 15' No Recovery
		13 25 40		103.1/7.6		@ 16.5' - dense, light yellowish-brown	
20		50/ 4"					@ 20' No Recovery
		50/ 4" 48 50/ 5"		110.3/2.5	SP-SM	@ 21' Poorly graded sand with silt and gravel, very dense, moist, light yellowish-brown	
25		32 36 50/ 5"					
30		50			SM	@ 30' Silty sand wtih gravel, very dense, moist, yellowish-brown	
						TOTAL DEPTH 30 Ft. (Elev. 1189) No Ground Water No Caving	
35							

DRILL HOLE LOG

BORING NO. HS-11

PROJECT: Valencia Company
Magic Mountain Entertainment

JOB NO.: 00-1729-1
DATE: 5/25/00

DRILLING COMPANY/DRILLER: Valley Well Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Hollow-Stem Auger
HAMMER TYPE: Downhole
AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs.
ELEVATION: 1176
LOGGED BY: MAS

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						QUATERNARY ALLUVIUM; Qal (0 - 30 Ft.)	Excavated and logged on 3/21/00
		13 16 17		91.8/3.8	SP	@ 2' Poorly graded sand, medium dense, damp, light yellowish-brown	@ 0-5' Bulk Sample
5		7 8 32		105.7/4.1		@ 5' - with some gravel	@ 5' Bulk Sample % fines=3.9
		50/ 6"		104.4/5.5	SM	@ 9' Silty sand, dense, damp, yellowish-brown	% fines=21.9
10		12 20 47					@ 11' No Recovery
		24 50/ 6"		113.8/1.9	SW	@ 13' Well graded sand with gravel, dense, damp, yellowish-brown	
15		50/ 6"		110.0/2.3	SW-SM	@ 15' Well graded sand with silt and gravel, dense, damp, yellowish-brown	110.0/2.3
20		15 15 17		102.8/6.7	SM	@ 20' Silty sand, medium dense, moist, yellowish-brown	% fines=33.0
25		17 21 17				@ 25' - with gravel	@ 25-30' Bull Sample
30		17 20 21				@ 30' - with gravel TOTAL DEPTH 30 Ft. (Elev. 1146) No Ground Water No Caving	
35							

DRILL HOLE LOG

BORING NO. HS-12

PROJECT: Valencia Company
Magic Mountain Entertainment

JOB NO.: 00-1729-1
DATE: 5/25/00

DRILLING COMPANY/DRILLER: Valley Well Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Hollow-Stem Auger
HAMMER TYPE: Downhole **AVERAGE DROP (in.):** 30"
DRIVING WEIGHTS: 140 lbs.
ELEVATION: 1163 **LOGGED BY:** MAS

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						QUATERNARY ALLUVIUM; Qal (0 - 8 Ft.)	Excavated and logged on 3/21/00
		3 3 6		112.3/6.6	SM	@ 2' Silty sand with gravel, loose, moist, yellowish-brown	@ 0-5' Bulk Sample
5		12 13 15		109.6/3.5		@ 5' - medium dense, damp, light yellowish-brown	
		18 32 21		124.2/2.8		BEDROCK; TQs (8 - 30 Ft.) @ 8' - medium dense	
10							
		36 22 30		116.1/3.3		@ 12' - medium dense	
15		33 28 30		116.6/2.8		@ 15' - dense	@ 17-20' Bulk Sample
20		30 20 17		107.0/5.0		@ 20' - medium dense	
25		30 42 42			SP-SM	@ 25' Poorly graded sand with silt and gravel, very dense, damp, light yellowish-brown	
30		50/5"				TOTAL DEPTH 30 Ft. (Elev. 1133) No Ground Water No Caving	
35							

DRILL HOLE LOG

BORING NO. HS-13

PROJECT: Valencia Company
Magic Mountain Entertainment

JOB NO.: 00-1729-1
DATE: 5/25/00

DRILLING COMPANY/DRILLER: Valley Well Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Hollow-Stem Auger
HAMMER TYPE: Downhole
AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs.
ELEVATION: 1085
LOGGED BY: MAS

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						ARTIFICIAL FILL; af (0 - 5 Ft.)	@ 0-2' Bulk Sample
		50/5"		113.1/4.1			@ 2' No Recovery
		11 13 15			SM	@ 3' Silty sand, medium dense, moist, light brown	
5		13 8 9		97.5/11.0		QUATERNARY ALLUVIUM; Qal (5 - 23 Ft.)	% fines=12.5
		5 4 7		102.0/12.2	CL	@ 8' Sandy clay, stiff, moist, brown	% fines=65.6
10							
		5 7 12		91.0/22.9		@ 11' - less sand and very stiff	@ 11-15' Bulk Sample
15		7 6 7		104.5/6.8	SC	@ 15' Clayey sand with gravel, loose, moist, light reddish-brown	% fines=34.5
20		16 21 31		122.1/10.2		@ 20' - medium dense	@ 20-23' Bulk Sample
		27 44 50				QUATERNARY TERRACE; Qt/TQs?, (23 - 25 Ft.) @ 23' - very dense	@ 23' may be TQs
25		13 40 50/4				@ 25' - very dense TOTAL DEPTH 25 Ft. (Elev. 1060) No Ground Water No Caving	
30							
35							

DRILL HOLE LOG

BORING NO. HS-12I

PROJECT: Newhall Ranch Infrastructure
JOB NO.: 00-1155I-1
DATE:
DRILLING COMPANY/DRILLER: Valley Well Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Hollow Stem Auger
HAMMER TYPE: Downhole
AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs.
ELEVATION: 1105
LOGGED BY: DGG

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						QUATERNARY ALLUVIUM; Qal (0 - 25 Ft.)	Drilled and logged on 5/24/00
		3 4 6			SM	@ 2' Silty sand; loose; damp; medium brown	
5		17 15 12		119/3.0	SW-SM	@ 5' Well-graded sand sith silt; medium dense; damp; light brown to light orange	% fines=8
		26 25 24					
10							
		6 22 23		114/3.3	SP-SM	@ 11' Poorly graded sand with silt; medium dense; damp; light brown	% fines=11
15		16 15 14				@ 15' - with gravel	% fines=12
20		17 27 25				@ 20' - very dense	@ 20' Cobble in tip
25		33 50			SM	@ 25' Silty sand; very dense; damp; yellowish-gray	% fines=41
						TOTAL DEPTH 25 Ft. (Elev. 1080) No Ground Water No Caving	
30							
35							

DRILL HOLE LOG

BORING NO. HS-14I

PROJECT: Newhall Ranch Infrastructure
JOB NO.: 00-1155I-1
DATE:
DRILLING COMPANY/DRILLER: Valley Well Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Hollow Stem Auger
HAMMER TYPE: Downhole
AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs.
ELEVATION: 1248
LOGGED BY: DGG

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						QUATERNARY ALLUVIUM; Qal (0 - 25 Ft.)	Drilled and logged on 5/24/00
		8 5 5			SM	@ 3' Silty sand; loose; damp; medium to darkish-brown	
5		8 12 12		116/2.5	SP-SM	@ 5' Poorly graded sand with silt; medium dense; damp; medium brown	% fines=12
		16 17 23		118/2.7		@ 8' - orangish-gray	
10							
		17 25 32		123/2.6		@ 11' - dense; orangish-gray	% fines=5
15		12 19 19					% fines=10
20		19 34 34			SM	@ 20' Silty sand; very dense; damp; medium brown	
25		40 50				@ 25' - light orangish-brown TOTAL DEPTH 25 Ft. (Elev. 1223) No Ground Water No Caving	
30							
35							

CPT INTERPRETATIONS

SOUNDING : CPT-1M
PROJECT : AES-NEWHALL RNCH
DATE/TIME: 09-07-99 13:33

PROJECT No.: 99-A893
CONE/RIG : 408\#1 JH,GO

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	308.41	2.19	SAND to SILTY SAND	77	100	100		
.300	.98	165.39	2.95	SILTY SAND to SANDY SILT	55	88	91		
.450	1.48	119.86	2.50	SILTY SAND to SANDY SILT	40	64	82		
.600	1.97	144.21	1.88	SILTY SAND to SANDY SILT	48	77	87		
.750	2.46	184.13	1.11	SAND to SILTY SAND	46	74	94		
.900	2.95	139.26	1.61	SAND to SILTY SAND	35	56	86		49.0
1.050	3.44	113.83	2.00	SILTY SAND to SANDY SILT	38	61	80		48.0
1.200	3.94	79.22	3.33	SANDY SILT to CLAYEY SILT	32	51		4.6	
1.350	4.43	98.55	2.09	SILTY SAND to SANDY SILT	33	53	76		46.0
1.500	4.92	109.56	1.47	SAND to SILTY SAND	27	44	79		46.0
1.650	5.41	99.70	2.68	SANDY SILT to CLAYEY SILT	40	64		5.8	
1.800	5.91	124.22	1.50	SAND to SILTY SAND	31	50	83		46.0
1.950	6.40	61.89	3.31	SANDY SILT to CLAYEY SILT	25	40		3.6	
2.100	6.89	41.07	2.59	SANDY SILT to CLAYEY SILT	16	26		2.7	
2.250	7.38	47.35	2.29	SANDY SILT to CLAYEY SILT	19	28		3.1	
2.400	7.87	47.61	2.23	SANDY SILT to CLAYEY SILT	19	28		3.1	
2.550	8.37	79.86	2.61	SANDY SILT to CLAYEY SILT	32	45		5.3	
2.700	8.86	127.55	1.66	SILTY SAND to SANDY SILT	43	58	83		44.5
2.850	9.35	120.65	.91	SAND to SILTY SAND	30	40	81		44.0
3.000	9.84	111.71	1.90	SILTY SAND to SANDY SILT	37	48	78		43.5
3.150	10.33	105.23	2.12	SILTY SAND to SANDY SILT	35	45	75		43.0
3.300	10.83	76.84	3.69	CLAYEY SILT to SILTY CLAY	38	48		4.5	
3.450	11.32	74.25	4.24	CLAYEY SILT to SILTY CLAY	37	45		4.3	
3.600	11.81	64.41	4.68	CLAY to SILTY CLAY	43	51		3.7	
3.750	12.30	46.57	5.16	CLAY	47	54		2.7	
3.900	12.80	61.06	4.95	CLAY to SILTY CLAY	41	46		3.5	
4.050	13.29	69.22	6.03	*VERY STIFF FINE GRAINED	69	78			
4.200	13.78	81.60	4.06	CLAYEY SILT to SILTY CLAY	41	45		4.8	
4.350	14.27	219.35	1.53	SAND to SILTY SAND	55	59	92		44.5
4.500	14.76	267.94	1.81	SAND to SILTY SAND	67	71	97		45.5
4.650	15.26	401.17	1.62	SAND to SILTY SAND	100	100	100		47.0
4.800	15.75	293.48	1.76	SAND to SILTY SAND	73	75	99		45.5
4.950	16.24	190.91	2.52	SILTY SAND to SANDY SILT	64	64	86		43.5
5.100	16.73	214.49	2.38	SILTY SAND to SANDY SILT	71	71	89		44.0
5.250	17.22	165.94	2.88	SILTY SAND to SANDY SILT	55	54	81		42.5
5.400	17.72	173.95	2.38	SILTY SAND to SANDY SILT	58	56	82		43.0
5.550	18.21	416.95	1.79	SAND to SILTY SAND	100	100	100		46.5
5.700	18.70	430.70	1.38	SAND	86	81	100		46.5
5.850	19.19	129.61	2.64	SILTY SAND to SANDY SILT	43	40	72		41.0
6.000	19.69	113.91	3.28	SANDY SILT to CLAYEY SILT	46	42		6.6	
6.150	20.18	111.34	3.43	SANDY SILT to CLAYEY SILT	45	40		6.5	

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 25.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

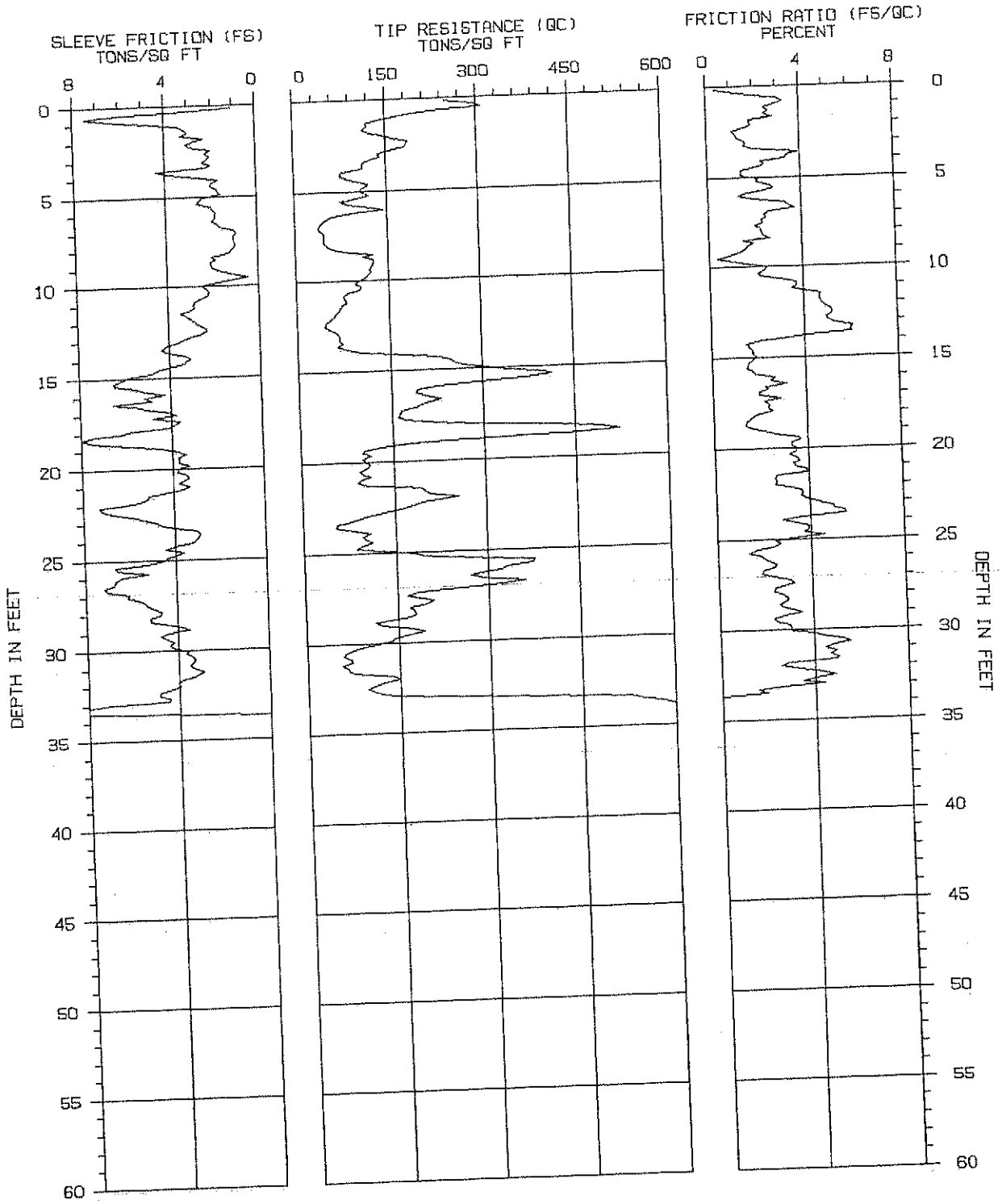
SOUNDING : CPT-1 M

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	99.72	3.62	SANDY SILT to CLAYEY SILT	40	36		5.8	
6.450	21.16	91.29	3.94	CLAYEY SILT to SILTY CLAY	46	41		5.3	
6.600	21.65	200.89	2.56	SILTY SAND to SANDY SILT	67	59	83		42.5
6.750	22.15	235.01	3.09	SILTY SAND to SANDY SILT	78	68	87		43.0
6.900	22.64	160.25	3.65	SANDY SILT to CLAYEY SILT	64	55		9.3	
7.050	23.13	90.18	4.97	*VERY STIFF FINE GRAINED	90	77			
7.200	23.62	53.37	5.50	CLAY	53	45		3.1	
7.350	24.11	96.41	3.41	SANDY SILT to CLAYEY SILT	39	32		5.6	
7.500	24.61	97.28	3.72	CLAYEY SILT to SILTY CLAY	49	40		5.6	
7.650	25.10	180.22	2.50	SILTY SAND to SANDY SILT	60	49	78		41.5
7.800	25.59	376.50	1.73	SAND to SILTY SAND	94	76	99		44.5
7.950	26.08	322.45	2.04	SAND to SILTY SAND	81	65	94		44.0
8.100	26.57	292.73	2.43	SILTY SAND to SANDY SILT	98	78	92		43.5
8.250	27.07	252.60	2.41	SILTY SAND to SANDY SILT	84	67	87		42.5
8.400	27.56	181.96	2.91	SILTY SAND to SANDY SILT	61	48	78		41.0
8.550	28.05	170.94	2.78	SILTY SAND to SANDY SILT	57	45	76		40.5
8.700	28.54	169.49	2.57	SILTY SAND to SANDY SILT	56	45	75		40.5
8.850	29.04	124.20	3.50	SANDY SILT to CLAYEY SILT	50	39		7.2	
9.000	29.53	168.34	2.47	SILTY SAND to SANDY SILT	56	44	75		40.0
9.150	30.02	115.42	3.09	SANDY SILT to CLAYEY SILT	46	36		6.7	
9.300	30.51	63.29	5.18	CLAY to SILTY CLAY	42	33		3.6	
9.450	31.00	73.27	4.51	CLAYEY SILT to SILTY CLAY	37	28		4.2	
9.600	31.50	70.17	5.02	*VERY STIFF FINE GRAINED	70	54			
9.750	31.99	151.09	2.60	SILTY SAND to SANDY SILT	50	39	71		39.5
9.900	32.48	99.30	4.89	*VERY STIFF FINE GRAINED	99	76			
10.050	32.97	158.30	4.41	*VERY STIFF FINE GRAINED	100	100			
10.200	33.46	549.24	1.98	SAND to SILTY SAND	100	100	100		

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 25.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.



TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-1 M

PROJECT NAME : AES-NEWHALL RNCH

PROJECT NUMBER : 99-A893

CONE/RIG : 408\#1 JH.GO

DATE/TIME: 09-07-99 13:33

HFA

CPT INTERPRETATIONS

SOUNDING : CPT-2M
PROJECT : AES-NEWHALL RNCH
DATE/TIME: 09-07-99 08:52

PROJECT No.: 99-A893
CONE/RIG : 408\#1 JH,GO

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	302.84	.79	SAND	61	97	100		
.300	.98	181.66	1.32	SAND to SILTY SAND	45	73	93		
.450	1.48	143.51	1.44	SAND to SILTY SAND	36	57	87		
.600	1.97	100.89	.85	SAND to SILTY SAND	25	40	77		49.5
.750	2.46	76.82	1.47	SILTY SAND to SANDY SILT	26	41	69		47.5
.900	2.95	71.57	1.42	SILTY SAND to SANDY SILT	24	38	67		46.5
1.050	3.44	65.86	1.06	SILTY SAND to SANDY SILT	22	35	64		45.5
1.200	3.94	60.25	1.39	SILTY SAND to SANDY SILT	20	32	62		44.5
1.350	4.43	69.00	1.11	SILTY SAND to SANDY SILT	23	37	66		44.5
1.500	4.92	56.17	2.14	SANDY SILT to CLAYEY SILT	22	36		3.7	
1.650	5.41	38.64	2.52	SANDY SILT to CLAYEY SILT	15	25		2.6	
1.800	5.91	39.90	2.46	SANDY SILT to CLAYEY SILT	16	26		2.6	
1.950	6.40	43.30	2.62	SANDY SILT to CLAYEY SILT	17	28		2.9	
2.100	6.89	50.84	2.86	SANDY SILT to CLAYEY SILT	20	32		3.4	
2.250	7.38	52.01	5.29	CLAY	52	78		3.0	
2.400	7.87	52.47	5.62	CLAY	52	76		3.1	
2.550	8.37	51.52	5.81	CLAY	52	73		3.0	
2.700	8.86	47.57	5.92	CLAY	48	65		2.8	
2.850	9.35	41.66	5.42	CLAY	42	56		2.4	
3.000	9.84	38.11	5.41	CLAY	38	50		2.2	
3.150	10.33	35.67	5.03	CLAY	36	45		2.1	
3.300	10.83	34.59	5.05	CLAY	35	43		2.0	
3.450	11.32	34.74	5.17	CLAY	35	42		2.0	
3.600	11.81	30.80	4.63	CLAY to SILTY CLAY	21	25		1.8	
3.750	12.30	27.21	4.95	CLAY	27	33		1.6	
3.900	12.80	25.09	4.74	CLAY	25	30		1.4	
4.050	13.29	23.92	4.40	CLAY to SILTY CLAY	16	19		1.5	
4.200	13.78	22.24	4.57	CLAY	22	26		1.4	
4.350	14.27	20.88	4.33	CLAY	21	24		1.3	
4.500	14.76	18.10	3.71	CLAY to SILTY CLAY	12	14		1.1	
4.650	15.26	18.27	4.41	CLAY	18	21		1.2	
4.800	15.75	16.72	3.72	CLAY to SILTY CLAY	11	12		1.1	
4.950	16.24	14.98	3.75	CLAY to SILTY CLAY	10	11		.9	
5.100	16.73	12.53	3.70	CLAY	13	14		.8	
5.250	17.22	11.92	3.36	CLAY to SILTY CLAY	8	9		.7	
5.400	17.72	12.28	3.35	CLAY to SILTY CLAY	8	9		.7	
5.550	18.21	30.91	3.55	CLAYEY SILT to SILTY CLAY	15	17		2.0	
5.700	18.70	16.66	2.51	CLAYEY SILT to SILTY CLAY	8	9		1.0	
5.850	19.19	14.26	3.07	CLAY to SILTY CLAY	10	10		.9	
6.000	19.69	13.64	3.15	CLAY to SILTY CLAY	9	10		.8	
6.150	20.18	16.44	2.85	CLAYEY SILT to SILTY CLAY	8	9		1.0	

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 11.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

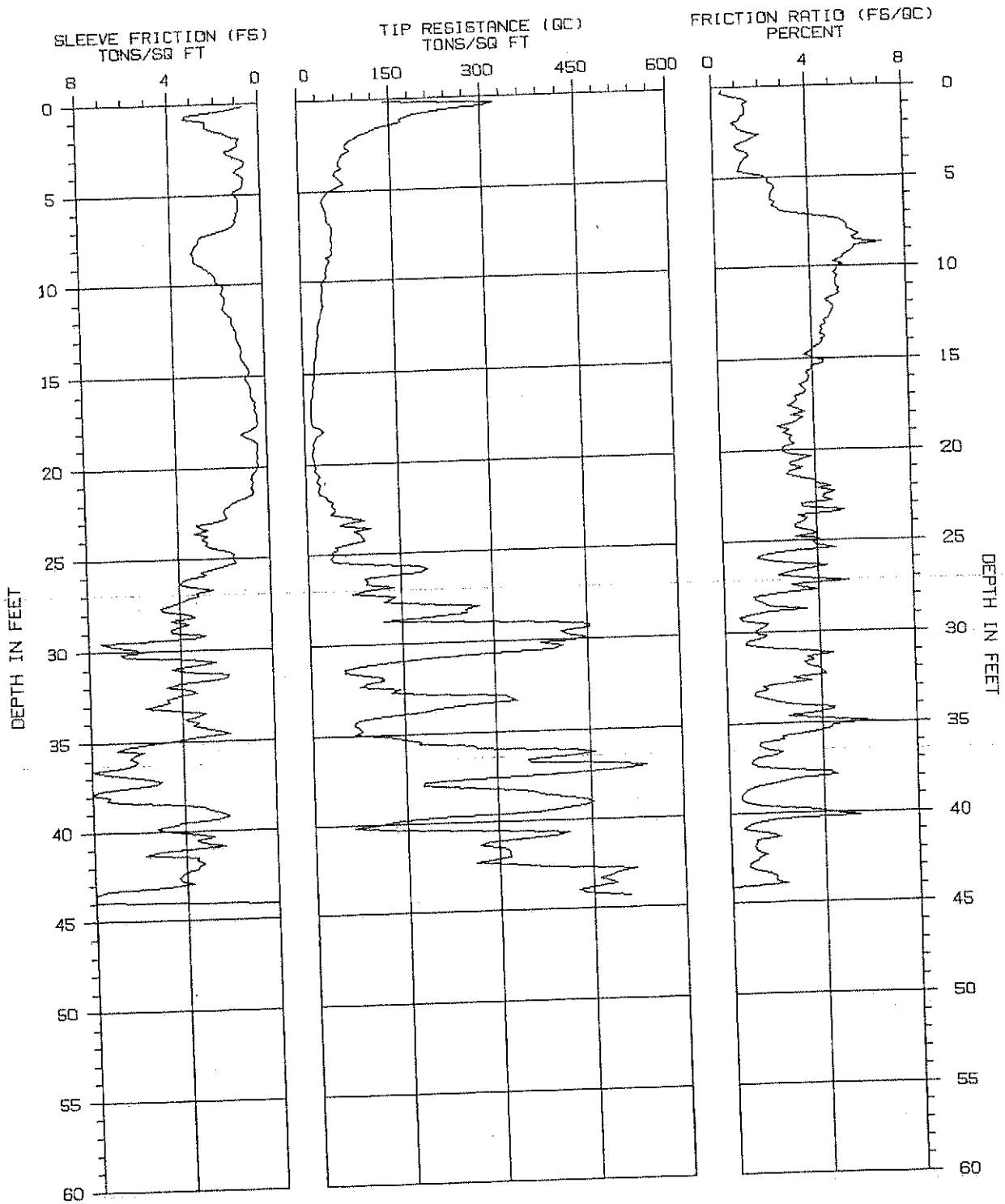
HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-2 M

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	23.54	2.97	CLAYEY SILT to SILTY CLAY	12	12		1.5	
6.450	21.16	23.67	2.95	CLAYEY SILT to SILTY CLAY	12	12		1.5	
6.600	21.65	22.43	3.93	CLAY to SILTY CLAY	15	15		1.4	
6.750	22.15	41.75	4.16	CLAY to SILTY CLAY	28	28		2.4	
6.900	22.64	44.85	4.27	CLAY to SILTY CLAY	30	30		2.6	
7.050	23.13	91.99	3.47	SANDY SILT to CLAYEY SILT	37	37		5.3	
7.200	23.62	101.49	3.24	SANDY SILT to CLAYEY SILT	41	40		5.9	
7.350	24.11	88.42	3.10	SANDY SILT to CLAYEY SILT	35	35		5.1	
7.500	24.61	46.14	4.02	CLAYEY SILT to SILTY CLAY	23	22		2.6	
7.650	25.10	41.49	3.81	CLAYEY SILT to SILTY CLAY	21	20		2.4	
7.800	25.59	91.14	2.78	SANDY SILT to CLAYEY SILT	36	35		5.3	
7.950	26.08	183.68	1.98	SILTY SAND to SANDY SILT	61	59	83		43.0
8.100	26.57	95.09	3.60	SANDY SILT to CLAYEY SILT	38	36		5.5	
8.250	27.07	92.41	3.43	SANDY SILT to CLAYEY SILT	37	35		5.3	
8.400	27.56	135.31	3.21	SANDY SILT to CLAYEY SILT	54	51		7.9	
8.550	28.05	278.73	1.29	SAND	56	52	94		44.5
8.700	28.54	195.41	1.87	SAND to SILTY SAND	49	45	84		43.0
8.850	29.04	394.56	1.10	SAND	79	73	100		46.0
9.000	29.53	408.39	1.82	SAND to SILTY SAND	100	93	100		46.0
9.150	30.02	427.17	1.32	SAND	85	78	100		46.0
9.300	30.51	395.47	.90	SAND	79	72	100		46.0
9.450	31.00	130.38	3.37	SANDY SILT to CLAYEY SILT	52	47		7.6	
9.600	31.50	54.73	3.68	CLAYEY SILT to SILTY CLAY	27	24		3.1	
9.750	31.99	117.06	3.98	CLAYEY SILT to SILTY CLAY	59	52		6.8	
9.900	32.48	143.30	2.86	SILTY SAND to SANDY SILT	48	42	74		41.0
10.050	32.97	314.78	1.57	SAND to SILTY SAND	79	69	96		44.5
10.200	33.46	259.08	1.16	SAND	52	45	90		43.5
10.350	33.96	116.63	2.84	SANDY SILT to CLAYEY SILT	47	41		6.7	
10.500	34.45	66.56	3.81	CLAYEY SILT to SILTY CLAY	33	29		3.8	
10.650	34.94	67.98	6.23	*VERY STIFF FINE GRAINED	68	59			
10.800	35.43	176.31	3.87	*SAND to CLAYEY SAND	88	75			
10.950	35.93	268.70	2.34	SILTY SAND to SANDY SILT	90	76	91		43.5
11.100	36.42	421.20	1.56	SAND to SILTY SAND	100	89	100		45.5
11.250	36.91	485.40	1.36	SAND	97	82	100		46.0
11.400	37.40	412.62	1.28	SAND	83	69	100		45.5
11.550	37.89	178.92	4.58	*VERY STIFF FINE GRAINED	100	100			
11.700	38.39	357.15	1.87	SAND to SILTY SAND	89	74	98		44.5
11.850	38.88	441.85	.65	GRAVELLY SAND to SAND	74	61	100		45.5
12.000	39.37	397.43	.67	GRAVELLY SAND to SAND	66	55	100		45.0
12.150	39.86	142.55	3.68	SANDY SILT to CLAYEY SILT	57	47		8.2	
12.300	40.35	141.47	1.99	SILTY SAND to SANDY SILT	47	38	71		39.5
12.450	40.85	392.60	.59	GRAVELLY SAND to SAND	65	53	100		44.5
12.600	41.34	270.00	2.13	SAND to SILTY SAND	68	55	89		43.0
12.750	41.83	316.02	1.02	SAND	63	51	94		44.0
12.900	42.32	261.04	1.53	SAND to SILTY SAND	65	52	88		43.0
13.050	42.81	520.18	.81	GRAVELLY SAND to SAND	87	69	100		46.0
13.200	43.31	461.16	1.60	SAND to SILTY SAND	100	91	100		45.0
13.350	43.80	454.24	1.92	SAND to SILTY SAND	100	90	100		45.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 11.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE



TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-2M

PROJECT NAME : AES-NEWHALL RNCH

PROJECT NUMBER : 99-A893

CONE/RIG : 408\#1 JH.00

DATE/TIME: 09-07-99 08:52

HFA

CPT INTERPRETATIONS

SOUNDING : CPT-3 M
PROJECT : AES-NEWHALL RNCH
DATE/TIME: 09-07-99 07:47

PROJECT No.: 99-A893
CONE/RIG : 408\#1 JH,GO

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	173.12	1.31	SAND to SILTY SAND	43	69	92		
.300	.98	242.42	.86	SAND	48	78	100		
.450	1.48	225.28	1.64	SAND to SILTY SAND	56	90	100		
.600	1.97	83.98	1.84	SILTY SAND to SANDY SILT	28	45	71		48.5
.750	2.46	34.03	1.33	SILTY SAND to SANDY SILT	11	18	45		44.5
.900	2.95	22.97	1.44	SANDY SILT to CLAYEY SILT	9	15		1.8	
1.050	3.44	21.50	.57	SILTY SAND to SANDY SILT	7	11	32		40.0
1.200	3.94	20.80	.73	SANDY SILT to CLAYEY SILT	8	13		1.6	
1.350	4.43	19.69	1.67	SANDY SILT to CLAYEY SILT	8	13		1.6	
1.500	4.92	18.55	.87	SANDY SILT to CLAYEY SILT	7	12		1.5	
1.650	5.41	18.23	1.01	SANDY SILT to CLAYEY SILT	7	12		1.4	
1.800	5.91	19.42	.78	SANDY SILT to CLAYEY SILT	8	12		1.5	
1.950	6.40	16.63	2.71	CLAYEY SILT to SILTY CLAY	8	13		1.1	
2.100	6.89	82.90	2.14	SILTY SAND to SANDY SILT	28	43	71		44.0
2.250	7.38	40.28	2.19	SANDY SILT to CLAYEY SILT	16	24		2.7	
2.400	7.87	53.92	2.19	SANDY SILT to CLAYEY SILT	22	31		3.6	
2.550	8.37	18.40	4.35	CLAY	18	26		1.2	
2.700	8.86	17.76	3.21	CLAYEY SILT to SILTY CLAY	9	12		1.1	
2.850	9.35	18.25	4.18	CLAY	18	24		1.2	
3.000	9.84	19.65	4.05	CLAY to SILTY CLAY	13	17		1.3	
3.150	10.33	32.87	3.52	CLAYEY SILT to SILTY CLAY	16	21		2.1	
3.300	10.83	66.26	2.42	SANDY SILT to CLAYEY SILT	27	33		4.4	
3.450	11.32	98.41	1.86	SILTY SAND to SANDY SILT	33	40	72		42.5
3.600	11.81	122.16	2.04	SILTY SAND to SANDY SILT	41	48	78		43.0
3.750	12.30	136.77	2.89	SANDY SILT to CLAYEY SILT	55	64		8.0	
3.900	12.80	50.86	3.84	CLAYEY SILT to SILTY CLAY	25	29		2.9	
4.050	13.29	43.11	3.11	CLAYEY SILT to SILTY CLAY	22	24		2.8	
4.200	13.78	41.02	3.21	CLAYEY SILT to SILTY CLAY	21	23		2.7	
4.350	14.27	30.87	4.87	CLAY	31	33		1.8	
4.500	14.76	35.86	4.65	CLAY to SILTY CLAY	24	25		2.1	
4.650	15.26	81.94	2.44	SANDY SILT to CLAYEY SILT	33	34		5.4	
4.800	15.75	66.24	3.26	SANDY SILT to CLAYEY SILT	26	27		3.8	
4.950	16.24	17.38	4.90	CLAY	17	18		1.1	
5.100	16.73	10.64	1.99	CLAYEY SILT to SILTY CLAY	5	5		.8	
5.250	17.22	13.83	3.93	CLAY	14	14		.9	
5.400	17.72	17.04	4.34	CLAY	17	17		1.1	
5.550	18.21	26.51	3.80	CLAY to SILTY CLAY	18	17		1.7	
5.700	18.70	28.55	4.20	CLAY to SILTY CLAY	19	19		1.6	
5.850	19.19	55.36	4.36	CLAYEY SILT to SILTY CLAY	28	27		3.2	
6.000	19.69	45.44	3.97	CLAYEY SILT to SILTY CLAY	23	22		2.6	
6.150	20.18	12.39	6.70	CLAY	12	12		.7	

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 16.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

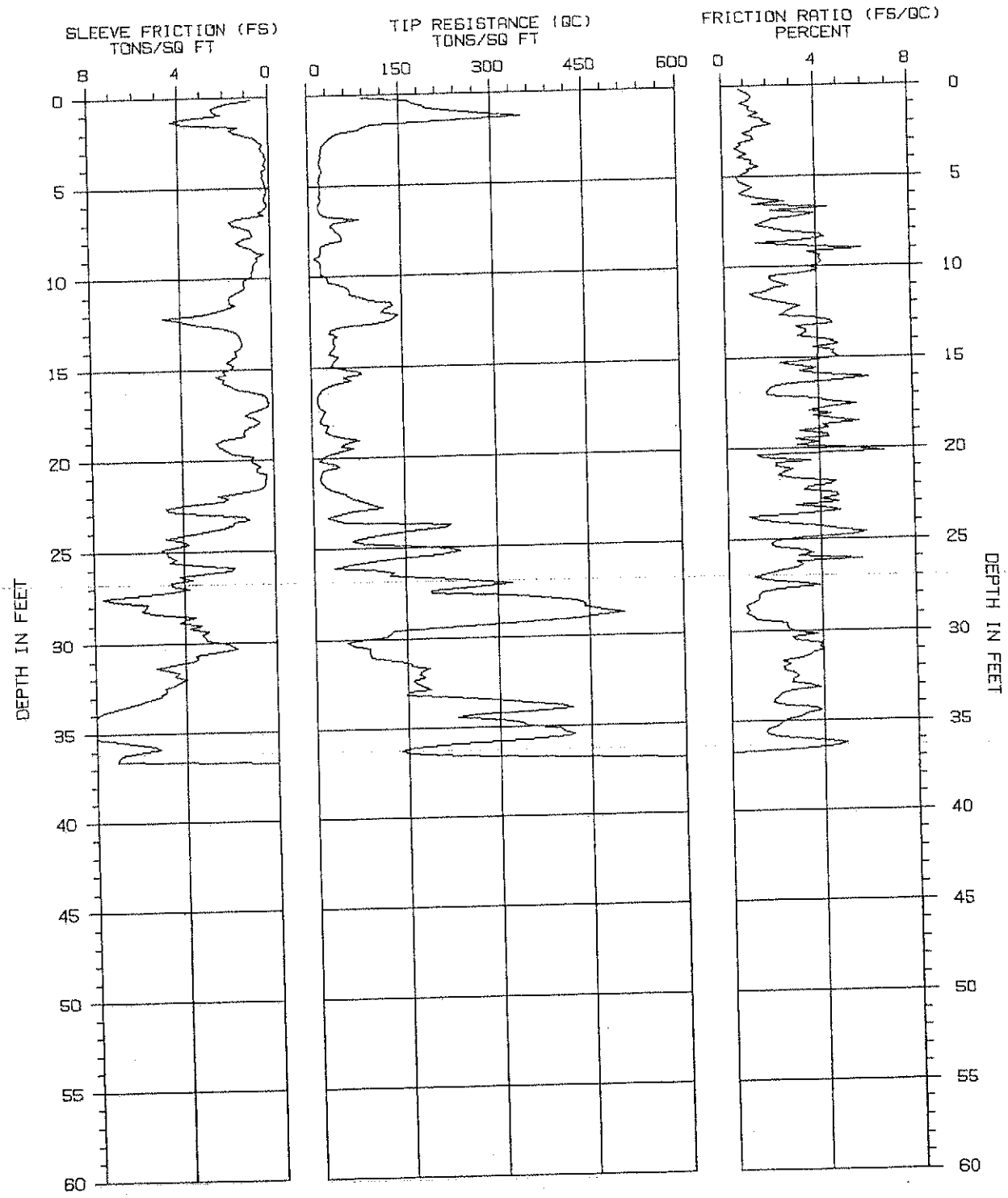
HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-3M

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	19.33	3.61	CLAY to SILTY CLAY	13	12		1.2	
6.450	21.16	12.07	2.87	CLAY to SILTY CLAY	8	8		.7	
6.600	21.65	21.92	2.90	CLAYEY SILT to SILTY CLAY	11	10		1.4	
6.750	22.15	56.30	3.52	CLAYEY SILT to SILTY CLAY	28	26		3.2	
6.900	22.64	99.06	4.80	*VERY STIFF FINE GRAINED	99	92			
7.050	23.13	41.79	3.01	CLAYEY SILT to SILTY CLAY	21	19		2.7	
7.200	23.62	52.75	3.45	CLAYEY SILT to SILTY CLAY	26	24		3.0	
7.350	24.11	156.87	2.46	SILTY SAND to SANDY SILT	52	48	77		42.0
7.500	24.61	63.63	5.90	CLAY	64	58		3.7	
7.650	25.10	220.50	2.15	SILTY SAND to SANDY SILT	74	66	87		43.0
7.800	25.59	140.07	3.29	SANDY SILT to CLAYEY SILT	56	50		8.1	
7.950	26.08	33.44	5.75	CLAY	33	30		1.9	
8.100	26.57	124.43	2.94	SANDY SILT to CLAYEY SILT	50	44		7.2	
8.250	27.07	323.52	1.16	SAND	65	57	97		44.5
8.400	27.56	193.03	3.92	*SAND to CLAYEY SAND	97	85			
8.550	28.05	427.13	1.34	SAND	85	75	100		46.0
8.700	28.54	472.40	.75	GRAVELLY SAND to SAND	79	68	100		46.0
8.850	29.04	431.59	.76	GRAVELLY SAND to SAND	72	62	100		46.0
9.000	29.53	129.21	2.52	SILTY SAND to SANDY SILT	43	37	70		39.5
9.150	30.02	68.26	3.05	SANDY SILT to CLAYEY SILT	27	23		3.9	
9.300	30.51	88.40	2.84	SANDY SILT to CLAYEY SILT	35	30		5.1	
9.450	31.00	92.18	4.06	CLAYEY SILT to SILTY CLAY	46	39		5.3	
9.600	31.50	158.44	2.92	SILTY SAND to SANDY SILT	53	45	75		41.0
9.750	31.99	170.11	2.32	SILTY SAND to SANDY SILT	57	48	77		41.5
9.900	32.48	166.07	2.96	SILTY SAND to SANDY SILT	55	46	76		41.0
10.050	32.97	150.84	3.37	SANDY SILT to CLAYEY SILT	60	50		8.8	
10.200	33.46	297.09	2.22	SILTY SAND to SANDY SILT	99	82	93		44.0
10.350	33.96	419.12	1.89	SAND to SILTY SAND	100	86	100		45.0
10.500	34.45	231.84	3.87	*SAND to CLAYEY SAND	100	95			
10.650	34.94	345.48	2.40	SILTY SAND to SANDY SILT	100	94	97		44.0
10.800	35.43	420.82	1.66	SAND to SILTY SAND	100	85	100		45.0
10.950	35.93	229.59	2.23	SILTY SAND to SANDY SILT	77	62	85		42.5
11.100	36.42	153.37	4.57	*VERY STIFF FINE GRAINED	100	100			

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 16.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE



TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-3 M

PROJECT NAME : AES-NEWHALL RNCH

PROJECT NUMBER : 99-A893

CONE/RIG : 408\#1 JH.GO

DATE/TIME: 09-07-99 07:47

HFA

CPT INTERPRETATIONS

SOUNDING : CPT-4 M
PROJECT : AES-NEWHALL RNCH
DATE/TIME: 09-07-99 14:20

PROJECT No.: 99-A893
CONE/RIG : 408\#1 JH,GO

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	181.01	2.05	SILTY SAND to SANDY SILT	60	96	93		
.300	.98	199.09	2.87	SILTY SAND to SANDY SILT	66	100	96		
.450	1.48	262.69	.69	SAND	53	84	100		
.600	1.97	84.34	3.97	CLAYEY SILT to SILTY CLAY	42	67		5.0	
.750	2.46	70.83	2.46	SANDY SILT to CLAYEY SILT	28	45		4.7	
.900	2.95	56.43	2.18	SANDY SILT to CLAYEY SILT	23	36		3.8	
1.050	3.44	44.47	1.89	SANDY SILT to CLAYEY SILT	18	28		3.0	
1.200	3.94	62.46	2.75	SANDY SILT to CLAYEY SILT	25	40		4.1	
1.350	4.43	83.47	2.41	SILTY SAND to SANDY SILT	28	44	71		45.5
1.500	4.92	90.14	1.49	SILTY SAND to SANDY SILT	30	48	73		45.5
1.650	5.41	90.46	5.31	*VERY STIFF FINE GRAINED	90	100			
1.800	5.91	63.22	3.02	SANDY SILT to CLAYEY SILT	25	40		4.2	
1.950	6.40	49.93	3.02	SANDY SILT to CLAYEY SILT	20	32		3.3	
2.100	6.89	87.40	2.52	SANDY SILT to CLAYEY SILT	35	54		5.8	
2.250	7.38	87.59	4.19	CLAYEY SILT to SILTY CLAY	44	66		5.1	
2.400	7.87	88.70	3.99	CLAYEY SILT to SILTY CLAY	44	65		5.2	
2.550	8.37	116.34	2.92	SANDY SILT to CLAYEY SILT	47	66		6.8	
2.700	8.86	123.58	3.47	SANDY SILT to CLAYEY SILT	49	68		7.2	
2.850	9.35	121.20	2.77	SANDY SILT to CLAYEY SILT	48	65		7.1	
3.000	9.84	139.85	2.38	SILTY SAND to SANDY SILT	47	61	84		44.5
3.150	10.33	144.36	2.80	SILTY SAND to SANDY SILT	48	61	84		44.5
3.300	10.83	135.78	3.65	SANDY SILT to CLAYEY SILT	54	67		7.9	
3.450	11.32	144.97	2.57	SILTY SAND to SANDY SILT	48	59	83		44.0
3.600	11.81	148.73	2.55	SILTY SAND to SANDY SILT	50	59	83		44.0
3.750	12.30	134.86	3.06	SANDY SILT to CLAYEY SILT	54	63		7.9	
3.900	12.80	119.03	3.49	SANDY SILT to CLAYEY SILT	48	54		7.0	
4.050	13.29	124.20	3.39	SANDY SILT to CLAYEY SILT	50	56		7.3	
4.200	13.78	192.33	1.66	SAND to SILTY SAND	48	53	88		44.5
4.350	14.27	143.23	2.46	SILTY SAND to SANDY SILT	48	52	79		43.0
4.500	14.76	112.02	2.53	SILTY SAND to SANDY SILT	37	40	72		42.0
4.650	15.26	80.77	2.98	SANDY SILT to CLAYEY SILT	32	34		4.7	
4.800	15.75	68.58	4.23	CLAYEY SILT to SILTY CLAY	34	35		4.0	
4.950	16.24	128.23	2.48	SILTY SAND to SANDY SILT	43	43	74		42.0
5.100	16.73	134.46	2.27	SILTY SAND to SANDY SILT	45	45	75		42.0
5.250	17.22	138.66	2.94	SANDY SILT to CLAYEY SILT	55	55		8.1	
5.400	17.72	109.79	2.81	SANDY SILT to CLAYEY SILT	44	43		6.4	
5.550	18.21	82.05	3.66	CLAYEY SILT to SILTY CLAY	41	39		4.8	
5.700	18.70	90.40	3.83	CLAYEY SILT to SILTY CLAY	45	43		5.3	
5.850	19.19	134.82	2.33	SILTY SAND to SANDY SILT	45	42	74		41.0
6.000	19.69	166.01	1.99	SILTY SAND to SANDY SILT	55	51	79		42.0
6.150	20.18	121.80	3.19	SANDY SILT to CLAYEY SILT	49	44		7.1	

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 30.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

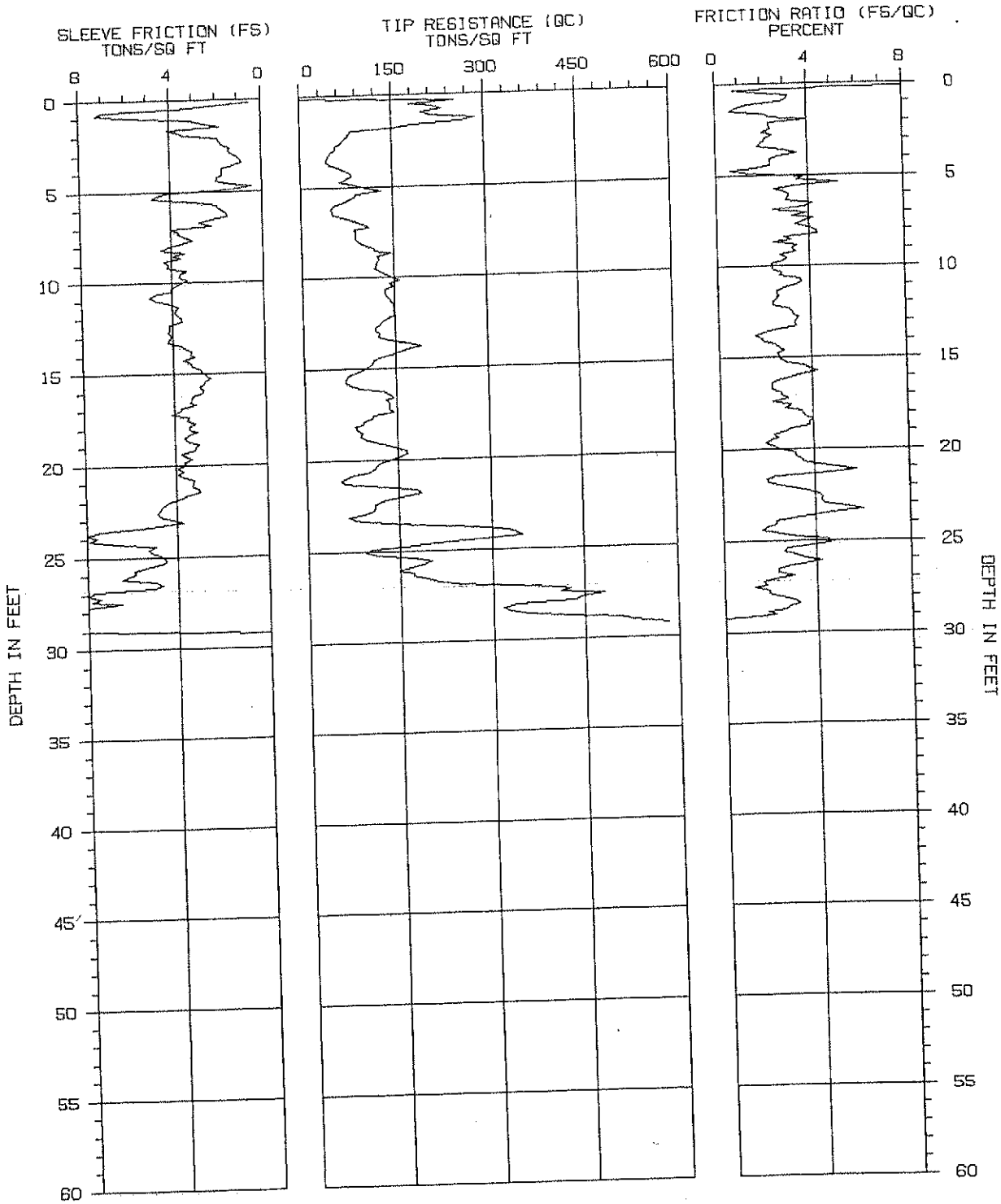
SOUNDING : CPT-4 M

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	100.83	3.54	SANDY SILT to CLAYEY SILT	40	36		5.9	
6.450	21.16	56.72	5.77	CLAY	57	50		3.3	
6.600	21.65	180.45	1.95	SILTY SAND to SANDY SILT	60	53	80		42.0
6.750	22.15	142.40	3.13	SANDY SILT to CLAYEY SILT	57	49		8.3	
6.900	22.64	112.41	4.30	*VERY STIFF FINE GRAINED	100	96			
7.050	23.13	69.56	5.35	*VERY STIFF FINE GRAINED	70	59			
7.200	23.62	179.07	4.10	*VERY STIFF FINE GRAINED	100	100			
7.350	24.11	341.91	2.31	SILTY SAND to SANDY SILT	100	95	97		44.5
7.500	24.61	208.26	2.50	SILTY SAND to SANDY SILT	69	57	82		42.0
7.650	25.10	95.28	4.80	*VERY STIFF FINE GRAINED	95	78			
7.800	25.59	202.00	2.65	SILTY SAND to SANDY SILT	67	54	81		42.0
7.950	26.08	148.59	4.21	*VERY STIFF FINE GRAINED	100	100			
8.100	26.57	195.62	2.38	SILTY SAND to SANDY SILT	65	52	80		41.5
8.250	27.07	370.32	2.21	SAND to SILTY SAND	93	73	98		44.0
8.400	27.56	480.35	1.35	SAND	96	75	100		45.5
8.550	28.05	338.05	2.51	SILTY SAND to SANDY SILT	100	87	94		44.0
8.700	28.54	359.44	2.80	*SAND to CLAYEY SAND	100	100			
8.850	29.04	530.50	2.22	*SAND to CLAYEY SAND	100	100			

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 30.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.



TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-4 M

PROJECT NAME : AES-NEWHALL RNCH

PROJECT NUMBER : 99-A893

CONE/RIG : 408\#1 JH.GO

DATE/TIME: 09-07-99 14:20

HFA

CPT INTERPRETATIONS

SOUNDING : CPT-5 M
PROJECT : AES-NEWHALL RNCH
DATE/TIME: 09-07-99 14:51

PROJECT No.: 99-A893
CONE/RIG : 408\#1 JH,GO

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	121.73	1.31	SAND to SILTY SAND	30	49	82		
.300	.98	95.84	2.56	SANDY SILT to CLAYEY SILT	38	61		6.4	
.450	1.48	83.02	1.68	SILTY SAND to SANDY SILT	28	44	71		
.600	1.97	25.37	7.45	CLAY	25	41		1.5	
.750	2.46	34.52	3.93	CLAYEY SILT to SILTY CLAY	17	28		2.0	
.900	2.95	38.98	3.32	CLAYEY SILT to SILTY CLAY	19	31		2.6	
1.050	3.44	40.81	3.55	CLAYEY SILT to SILTY CLAY	20	33		2.4	
1.200	3.94	4.82	5.03	CLAY	5	8		.3	
1.350	4.43	.81	31.44	ORGANIC MATERIAL	1	1		.1	
1.500	4.92	38.81	2.98	CLAYEY SILT to SILTY CLAY	19	31		2.6	
1.650	5.41	49.33	2.67	SANDY SILT to CLAYEY SILT	20	32		3.3	
1.800	5.91	60.97	2.60	SANDY SILT to CLAYEY SILT	24	39		4.0	
1.950	6.40	72.34	1.52	SILTY SAND to SANDY SILT	24	39	67		43.5
2.100	6.89	161.97	2.08	SILTY SAND to SANDY SILT	54	84	90		46.5
2.250	7.38	137.65	1.49	SAND to SILTY SAND	34	52	85		45.5
2.400	7.87	183.94	1.43	SAND to SILTY SAND	46	67	94		46.5
2.550	8.37	150.99	1.59	SAND to SILTY SAND	38	53	88		45.5
2.700	8.86	62.42	1.73	SILTY SAND to SANDY SILT	21	29	63		41.0
2.850	9.35	41.49	3.29	CLAYEY SILT to SILTY CLAY	21	28		2.7	
3.000	9.84	38.86	3.36	CLAYEY SILT to SILTY CLAY	19	25		2.6	
3.150	10.33	46.29	2.72	SANDY SILT to CLAYEY SILT	19	24		3.0	
3.300	10.83	175.35	1.51	SAND to SILTY SAND	44	54	89		45.0
3.450	11.32	68.88	1.46	SILTY SAND to SANDY SILT	23	28	62		40.0
3.600	11.81	36.69	3.81	CLAYEY SILT to SILTY CLAY	18	22		2.1	
3.750	12.30	46.19	3.32	CLAYEY SILT to SILTY CLAY	23	27		3.0	
3.900	12.80	57.72	2.88	SANDY SILT to CLAYEY SILT	23	26		3.8	
4.050	13.29	67.20	2.26	SANDY SILT to CLAYEY SILT	27	30		4.4	
4.200	13.78	72.85	2.19	SILTY SAND to SANDY SILT	24	27	61		39.5
4.350	14.27	42.96	3.63	CLAYEY SILT to SILTY CLAY	21	23		2.5	
4.500	14.76	32.04	5.09	CLAY	32	34		1.8	
4.650	15.26	33.18	4.75	CLAY	33	35		1.9	
4.800	15.75	34.27	4.89	CLAY	34	35		2.0	
4.950	16.24	32.74	5.02	CLAY	33	33		1.9	
5.100	16.73	32.57	4.82	CLAY	33	33		1.9	
5.250	17.22	57.57	2.49	SANDY SILT to CLAYEY SILT	23	23		3.8	
5.400	17.72	79.31	2.51	SANDY SILT to CLAYEY SILT	32	31		5.2	
5.550	18.21	81.60	3.82	CLAYEY SILT to SILTY CLAY	41	39		4.7	
5.700	18.70	50.63	3.50	CLAYEY SILT to SILTY CLAY	25	24		2.9	
5.850	19.19	36.84	4.60	CLAY to SILTY CLAY	25	23		2.1	
6.000	19.69	36.39	4.65	CLAY to SILTY CLAY	24	22		2.1	
6.150	20.18	30.53	5.85	CLAY	31	28		1.7	

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 30.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

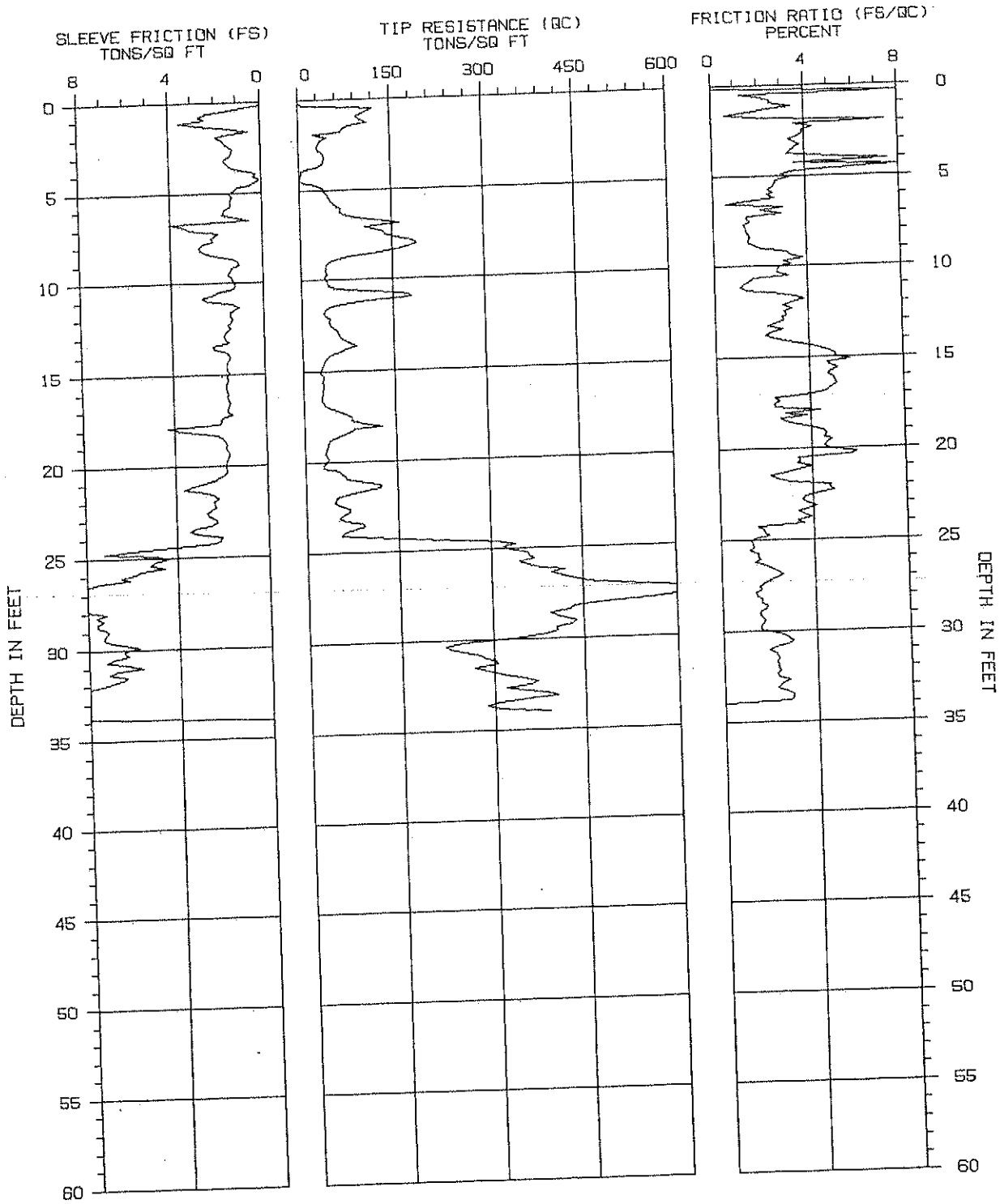
HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-5 M

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	60.08	3.51	CLAYEY SILT to SILTY CLAY	30	27		3.5	
6.450	21.16	96.81	3.38	SANDY SILT to CLAYEY SILT	39	34		5.6	
6.600	21.65	94.16	2.45	SILTY SAND to SANDY SILT	31	28	61		38.5
6.750	22.15	49.08	4.71	CLAY to SILTY CLAY	33	28		2.8	
6.900	22.64	71.91	3.71	CLAYEY SILT to SILTY CLAY	36	31		4.2	
7.050	23.13	53.73	4.14	CLAYEY SILT to SILTY CLAY	27	23		3.1	
7.200	23.62	94.94	3.61	SANDY SILT to CLAYEY SILT	38	32		5.5	
7.350	24.11	57.51	3.60	CLAYEY SILT to SILTY CLAY	29	24		3.3	
7.500	24.61	311.05	1.94	SAND to SILTY SAND	78	64	94		44.0
7.650	25.10	331.06	1.32	SAND	66	54	95		44.0
7.800	25.59	370.11	1.24	SAND	74	60	98		44.5
7.950	26.08	380.35	1.70	SAND to SILTY SAND	95	76	99		44.5
8.100	26.57	418.06	2.18	SAND to SILTY SAND	100	83	100		45.0
8.250	27.07	522.37	2.31	*SAND to CLAYEY SAND	100	100			
8.400	27.56	710.02	1.67	SAND	100	100	100		
8.550	28.05	477.24	1.50	SAND	95	74	100		45.0
8.700	28.54	394.03	1.93	SAND to SILTY SAND	99	75	99		44.5
8.850	29.04	437.24	1.62	SAND to SILTY SAND	100	83	100		44.5
9.000	29.53	407.07	1.75	SAND to SILTY SAND	100	76	99		44.0
9.150	30.02	294.13	2.16	SAND to SILTY SAND	74	55	89		43.0
9.300	30.51	229.83	3.00	SILTY SAND to SANDY SILT	77	57	82		42.0
9.450	31.00	284.89	1.98	SAND to SILTY SAND	71	53	88		42.5
9.600	31.50	269.04	2.35	SILTY SAND to SANDY SILT	90	66	87		42.5
9.750	31.99	319.10	2.31	SILTY SAND to SANDY SILT	100	78	91		43.0
9.900	32.48	359.46	2.33	SAND to SILTY SAND	90	66	95		43.5
10.050	32.97	384.66	2.42	SILTY SAND to SANDY SILT	100	93	96		44.0
10.200	33.46	307.35	2.93	*SAND to CLAYEY SAND	100	100			

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 30.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE



TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-5 M

PROJECT NAME : AES-NEWHALL RNCH

PROJECT NUMBER : 99-A893

CONE/RIG : 408\#1 JH.GO

DATE/TIME: 09-07-99 14:51

HFA

CPT INTERPRETATIONS

SOUNDING : CPT-6 M
PROJECT : AES-NEWHALL RNCH
DATE/TIME: 09-07-99 09:50

PROJECT No.: 99-A893
CONE/RIG : 408\#1 JH,GO

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	78.99	2.25	SILTY SAND to SANDY SILT	26	42	70		
.300	.98	66.71	3.80	CLAYEY SILT to SILTY CLAY	33	53		3.9	
.450	1.48	55.05	3.52	CLAYEY SILT to SILTY CLAY	28	44		3.2	
.600	1.97	157.83	1.99	SILTY SAND to SANDY SILT	53	84	89		
.750	2.46	135.84	1.80	SILTY SAND to SANDY SILT	45	72	85		
.900	2.95	99.77	2.05	SILTY SAND to SANDY SILT	33	53	76		48.0
1.050	3.44	64.78	2.74	SANDY SILT to CLAYEY SILT	26	41		4.3	
1.200	3.94	74.23	1.71	SILTY SAND to SANDY SILT	25	40	68		45.5
1.350	4.43	126.77	1.60	SAND to SILTY SAND	32	51	83		47.0
1.500	4.92	130.57	1.32	SAND to SILTY SAND	33	52	84		47.0
1.650	5.41	186.21	1.20	SAND to SILTY SAND	47	74	94		48.0
1.800	5.91	246.59	3.55	*SAND to CLAYEY SAND	100	100			
1.950	6.40	191.10	1.51	SAND to SILTY SAND	48	76	95		47.5
2.100	6.89	150.39	1.62	SAND to SILTY SAND	38	58	88		46.0
2.250	7.38	92.10	1.25	SAND to SILTY SAND	23	35	74		44.0
2.400	7.87	76.16	1.12	SAND to SILTY SAND	19	28	69		42.5
2.550	8.37	90.69	1.19	SAND to SILTY SAND	23	32	74		43.0
2.700	8.86	367.56	.79	SAND	74	100	100		48.5
2.850	9.35	426.32	.96	SAND	85	100	100		49.0
3.000	9.84	367.71	.78	SAND	74	96	100		48.0
3.150	10.33	220.39	1.22	SAND	44	56	96		46.0
3.300	10.83	75.46	2.34	SANDY SILT to CLAYEY SILT	30	37		5.0	
3.450	11.32	50.46	2.58	SANDY SILT to CLAYEY SILT	20	24		3.3	
3.600	11.81	76.52	1.85	SILTY SAND to SANDY SILT	26	30	64		40.5
3.750	12.30	133.08	1.74	SILTY SAND to SANDY SILT	44	52	80		43.0
3.900	12.80	287.46	1.26	SAND	57	66	100		46.0
4.050	13.29	134.69	2.33	SILTY SAND to SANDY SILT	45	50	79		43.0
4.200	13.78	432.44	1.42	SAND	86	95	100		47.5
4.350	14.27	311.90	1.25	SAND	62	67	100		46.0
4.500	14.76	419.46	1.13	SAND	84	89	100		47.0
4.650	15.26	164.54	2.84	SILTY SAND to SANDY SILT	55	57	83		43.0
4.800	15.75	234.93	1.20	SAND	47	48	92		44.5
4.950	16.24	206.84	.99	SAND	41	42	88		44.0
5.100	16.73	131.61	1.16	SAND to SILTY SAND	33	33	75		42.0
5.250	17.22	135.44	1.47	SAND to SILTY SAND	34	33	75		42.0
5.400	17.72	120.67	.60	SAND	24	23	71		41.0
5.550	18.21	87.38	.99	SAND to SILTY SAND	22	21	62		39.0
5.700	18.70	42.30	2.08	SANDY SILT to CLAYEY SILT	17	16		2.7	
5.850	19.19	100.70	.73	SAND to SILTY SAND	25	23	65		39.5
6.000	19.69	116.40	.80	SAND to SILTY SAND	29	27	69		40.0
6.150	20.18	127.00	1.68	SILTY SAND to SANDY SILT	42	38	71		40.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 30.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

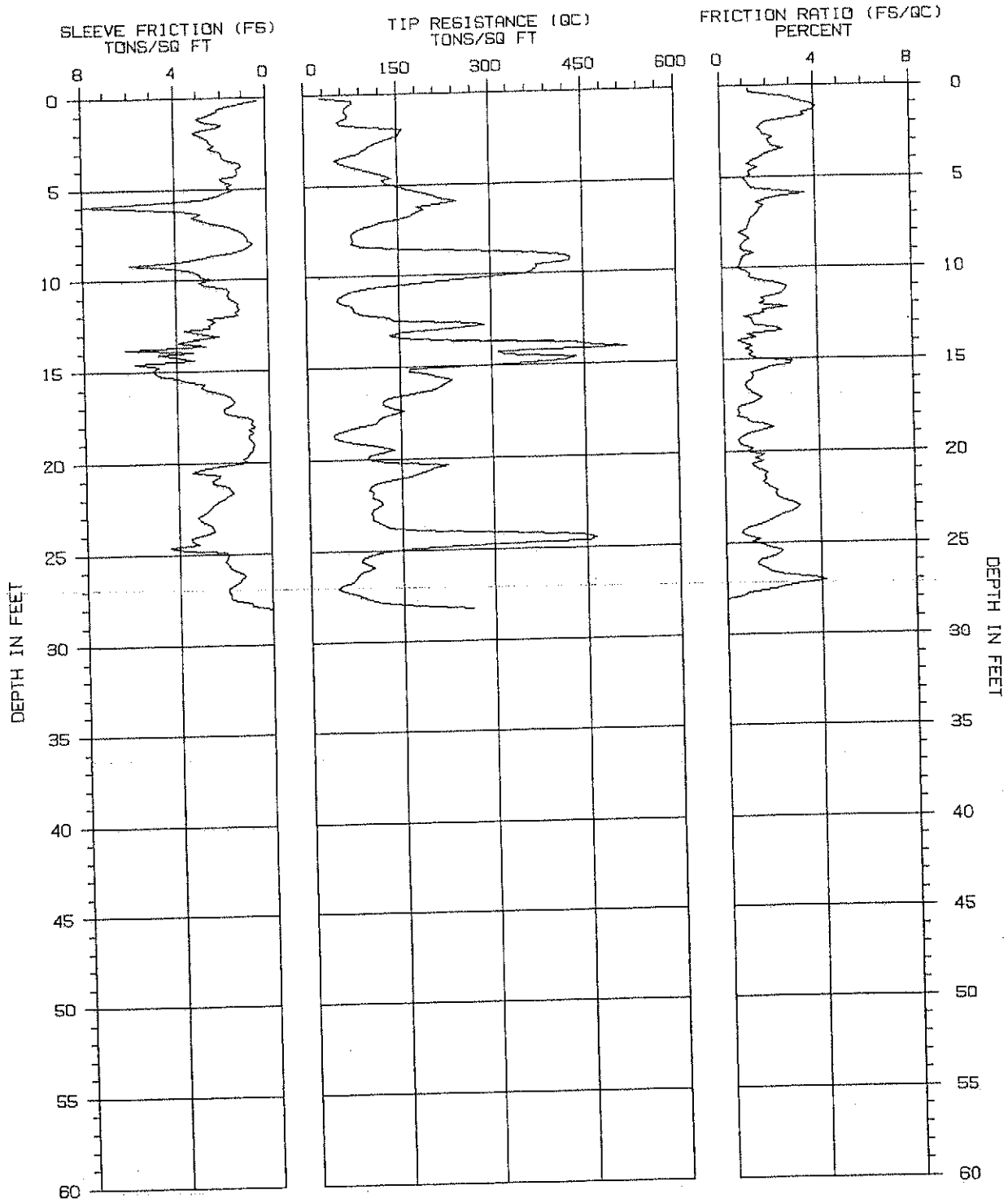
SOUNDING : CPT-6 M

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	192.10	1.16	SAND to SILTY SAND	48	43	83		42.5
6.450	21.16	137.77	1.84	SILTY SAND to SANDY SILT	46	41	73		40.5
6.600	21.65	97.30	1.66	SILTY SAND to SANDY SILT	32	28	62		38.5
6.750	22.15	102.78	2.23	SILTY SAND to SANDY SILT	34	30	64		39.0
6.900	22.64	110.64	2.47	SILTY SAND to SANDY SILT	37	32	65		39.0
7.050	23.13	101.36	3.02	SANDY SILT to CLAYEY SILT	41	34		5.9	
7.200	23.62	119.20	2.13	SILTY SAND to SANDY SILT	40	33	67		39.0
7.350	24.11	318.18	1.08	SAND	64	53	95		44.0
7.500	24.61	453.53	.97	SAND	91	75	100		45.5
7.650	25.10	121.39	1.55	SAND to SILTY SAND	30	25	67		39.0
7.800	25.59	84.04	2.26	SILTY SAND to SANDY SILT	28	23	56		38.0
7.950	26.08	91.80	1.36	SAND to SILTY SAND	23	18	58		38.0
8.100	26.57	74.59	1.91	SILTY SAND to SANDY SILT	25	20	52		37.0
8.250	27.07	45.17	4.19	CLAYEY SILT to SILTY CLAY	23	18		2.6	
8.400	27.56	85.26	2.02	SILTY SAND to SANDY SILT	28	22	55		37.5
8.550	28.05	173.10	*****		0	0			45.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 30.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.



TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-6 M

PROJECT NAME : AES-NEWHALL RNCH

PROJECT NUMBER : 99-A893

CONE/RIG : 408\#1 JH.GO

DATE/TIME: 09-07-99 09:50

HFA

CPT INTERPRETATIONS

SOUNDING : CPT-7 M
PROJECT : AES-NEWHALL RNCH
DATE/TIME: 09-07-99 10:34

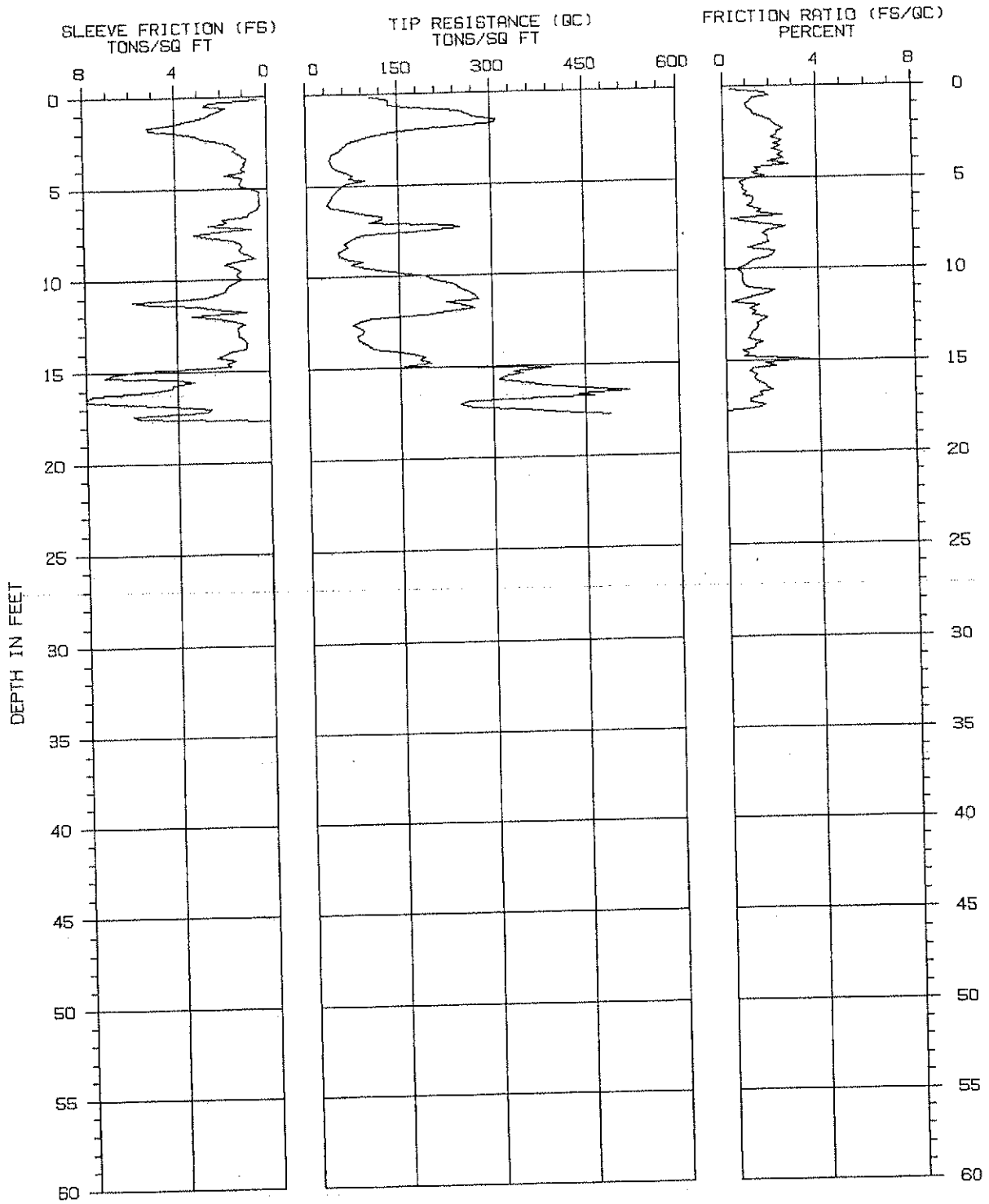
PROJECT No.: 99-A893
CONE/RIG : 408\#1 JH,GO

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	135.48	1.99	SILTY SAND to SANDY SILT	45	72	85		
.300	.98	247.65	1.00	SAND	50	79	100		
.450	1.48	307.35	1.29	SAND	61	98	100		
.600	1.97	186.42	2.16	SILTY SAND to SANDY SILT	62	99	94		
.750	2.46	88.99	2.32	SILTY SAND to SANDY SILT	30	47	73		48.0
.900	2.95	56.87	2.55	SANDY SILT to CLAYEY SILT	23	36		3.8	
1.050	3.44	39.58	2.16	SANDY SILT to CLAYEY SILT	16	25		2.6	
1.200	3.94	42.26	2.60	SANDY SILT to CLAYEY SILT	17	27		2.8	
1.350	4.43	76.06	1.40	SILTY SAND to SANDY SILT	25	41	68		45.0
1.500	4.92	63.44	1.78	SILTY SAND to SANDY SILT	21	34	63		44.0
1.650	5.41	44.91	.86	SILTY SAND to SANDY SILT	15	24	53		42.0
1.800	5.91	33.65	.88	SILTY SAND to SANDY SILT	11	18	45		39.5
1.950	6.40	65.18	1.21	SILTY SAND to SANDY SILT	22	35	64		43.0
2.100	6.89	122.67	1.43	SAND to SILTY SAND	31	48	82		45.5
2.250	7.38	248.67	.74	SAND	50	75	100		48.0
2.400	7.87	76.59	1.98	SILTY SAND to SANDY SILT	26	37	69		42.5
2.550	8.37	66.88	1.86	SILTY SAND to SANDY SILT	22	31	65		42.0
2.700	8.86	52.50	1.01	SILTY SAND to SANDY SILT	18	24	58		40.0
2.850	9.35	72.89	1.93	SILTY SAND to SANDY SILT	24	32	66		42.0
3.000	9.84	163.67	.79	SAND	33	43	89		45.0
3.150	10.33	222.22	.76	SAND	44	56	97		46.0
3.300	10.83	258.61	.87	SAND	52	64	100		46.5
3.450	11.32	277.95	1.82	SAND to SILTY SAND	69	84	100		46.5
3.600	11.81	271.83	.33	GRAVELLY SAND to SAND	45	54	100		46.5
3.750	12.30	104.16	1.35	SAND to SILTY SAND	26	30	72		42.0
3.900	12.80	80.50	1.66	SILTY SAND to SANDY SILT	27	31	65		40.0
4.050	13.29	80.90	1.32	SILTY SAND to SANDY SILT	27	30	64		40.0
4.200	13.78	99.79	1.00	SAND to SILTY SAND	25	27	70		41.5
4.350	14.27	171.36	1.29	SAND to SILTY SAND	43	46	85		44.0
4.500	14.76	200.42	.82	SAND	40	43	89		44.0
4.650	15.26	333.12	2.16	SAND to SILTY SAND	83	87	100		46.0
4.800	15.75	310.54	1.34	SAND	62	64	100		46.0
4.950	16.24	449.05	1.70	SAND to SILTY SAND	100	100	100		47.0
5.100	16.73	462.41	1.43	SAND	92	92	100		47.0
5.250	17.22	267.03	1.01	SAND	53	53	95		44.5
5.400	17.72	489.42	*****		0	0			41.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 30.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.



TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-7 M

PROJECT NAME : AES-NEWHALL RNCH

PROJECT NUMBER : 99-A893

CONE/RIG : 408\#1 JH.DO

DATE/TIME: 09-07-99 10:34

HFA

CPT INTERPRETATIONS

SOUNDING : CPT-8 M
PROJECT : AES-NEWHALL RNCH
DATE/TIME: 09-07-99 11:05

PROJECT No.: 99-A893
CONE/RIG : 408\#1 JH,GO

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	132.91	2.27	SILTY SAND to SANDY SILT	44	71	84		
.300	.98	192.80	4.86	*VERY STIFF FINE GRAINED	100	100			
.450	1.48	113.34	6.20	*VERY STIFF FINE GRAINED	100	100			
.600	1.97	86.55	5.67	*VERY STIFF FINE GRAINED	87	100			
.750	2.46	79.77	5.19	*VERY STIFF FINE GRAINED	80	100			
.900	2.95	88.42	5.00	*VERY STIFF FINE GRAINED	88	100			
1.050	3.44	85.98	5.68	*VERY STIFF FINE GRAINED	86	100			
1.200	3.94	65.18	5.65	*VERY STIFF FINE GRAINED	65	100			
1.350	4.43	44.32	5.65	CLAY	44	71		2.6	
1.500	4.92	35.50	4.81	CLAY	36	57		2.1	
1.650	5.41	42.09	4.53	CLAY to SILTY CLAY	28	45		2.5	
1.800	5.91	45.68	4.11	CLAYEY SILT to SILTY CLAY	23	37		2.7	
1.950	6.40	30.49	4.34	CLAY to SILTY CLAY	20	33		1.8	
2.100	6.89	32.84	5.94	CLAY	33	51		1.9	
2.250	7.38	41.17	6.78	CLAY	41	62		2.4	
2.400	7.87	50.39	6.24	CLAY	50	73		2.9	
2.550	8.37	65.69	5.31	*VERY STIFF FINE GRAINED	66	93			
2.700	8.86	82.03	5.46	*VERY STIFF FINE GRAINED	82	100			
2.850	9.35	52.77	4.48	CLAY to SILTY CLAY	35	47		3.1	
3.000	9.84	59.10	5.88	CLAY	59	77		3.4	
3.150	10.33	59.76	5.45	CLAY	60	76		3.5	
3.300	10.83	70.49	5.26	*VERY STIFF FINE GRAINED	70	87			
3.450	11.32	60.17	5.71	CLAY	60	73		3.5	
3.600	11.81	80.73	5.09	*VERY STIFF FINE GRAINED	81	96			
3.750	12.30	79.12	4.93	*VERY STIFF FINE GRAINED	79	92			
3.900	12.80	72.42	4.29	CLAYEY SILT to SILTY CLAY	36	41		4.2	
4.050	13.29	53.88	4.94	CLAY to SILTY CLAY	36	40		3.1	
4.200	13.78	71.15	4.92	*VERY STIFF FINE GRAINED	71	78			
4.350	14.27	66.31	5.16	*VERY STIFF FINE GRAINED	66	72			
4.500	14.76	76.35	4.84	*VERY STIFF FINE GRAINED	76	81			
4.650	15.26	80.22	4.65	*VERY STIFF FINE GRAINED	80	84			
4.800	15.75	71.43	5.24	*VERY STIFF FINE GRAINED	71	73			
4.950	16.24	50.84	6.56	CLAY	51	52		2.9	
5.100	16.73	70.45	4.43	CLAYEY SILT to SILTY CLAY	35	35		4.1	
5.250	17.22	87.21	3.03	SANDY SILT to CLAYEY SILT	35	34		5.1	
5.400	17.72	136.50	1.97	SILTY SAND to SANDY SILT	46	44	75		42.0
5.550	18.21	152.96	3.07	SANDY SILT to CLAYEY SILT	61	59		8.9	
5.700	18.70	227.04	3.27	*SAND to CLAYEY SAND	100	100			
5.850	19.19	226.17	5.36	*VERY STIFF FINE GRAINED	100	100			
6.000	19.69	280.24	4.33	*VERY STIFF FINE GRAINED	100	100			
6.150	20.18	328.00	3.70	*SAND to CLAYEY SAND	100	100			

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 30.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

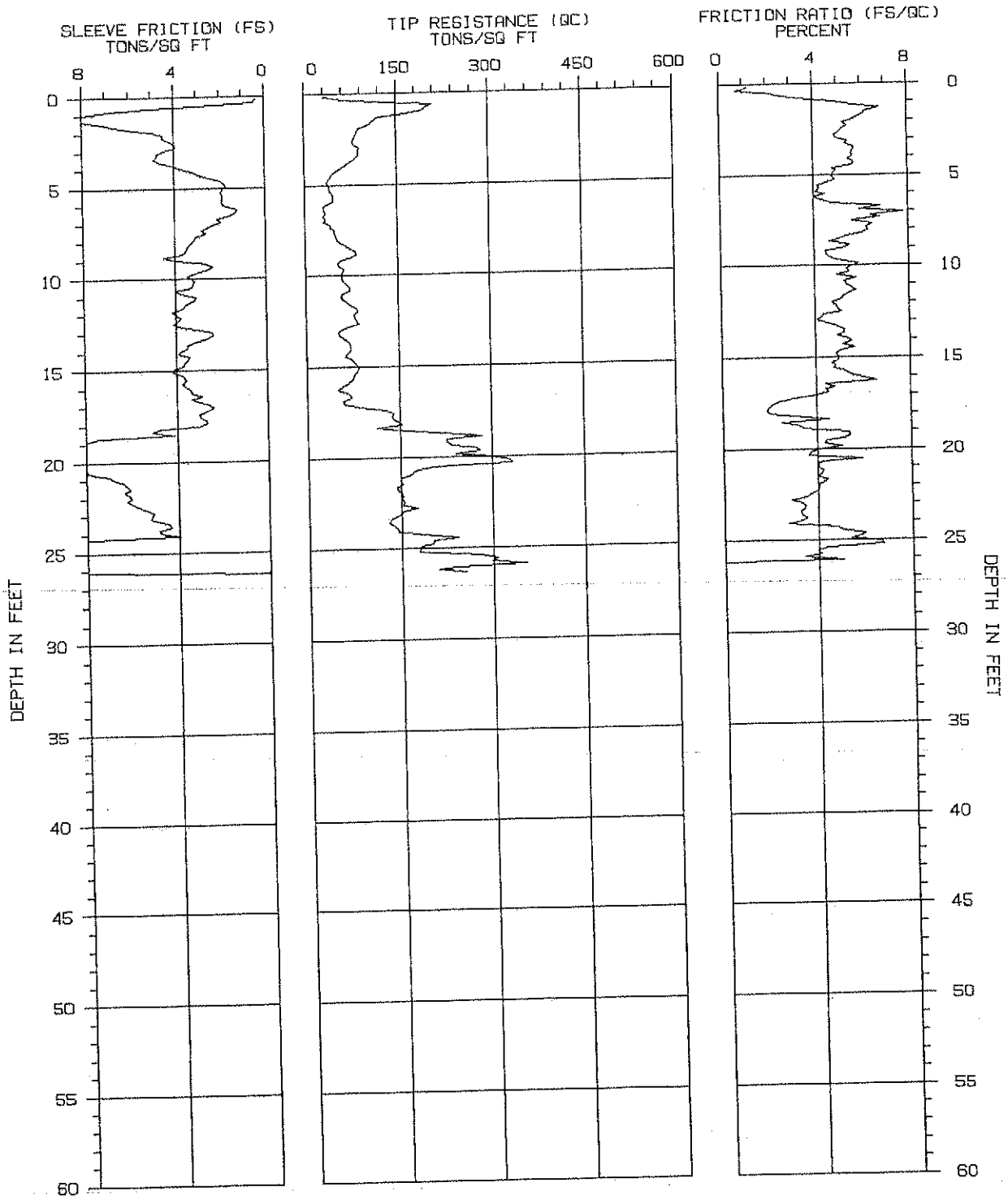
HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-8 M

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	180.71	4.19	*VERY STIFF FINE GRAINED	100	100			
6.450	21.16	151.45	4.21	*VERY STIFF FINE GRAINED	100	100			
6.600	21.65	143.85	4.39	*VERY STIFF FINE GRAINED	100	100			
6.750	22.15	154.07	4.05	*VERY STIFF FINE GRAINED	100	100			
6.900	22.64	153.47	3.53	SANDY SILT to CLAYEY SILT	61	53		8.9	
7.050	23.13	149.84	3.49	SANDY SILT to CLAYEY SILT	60	51		8.7	
7.200	23.62	129.98	3.29	SANDY SILT to CLAYEY SILT	52	44		7.6	
7.350	24.11	144.44	2.73	SILTY SAND to SANDY SILT	48	40	72		40.0
7.500	24.61	202.91	5.98	*VERY STIFF FINE GRAINED	100	100			
7.650	25.10	180.13	6.69	*VERY STIFF FINE GRAINED	100	100			
7.800	25.59	305.97	3.96	*SAND to CLAYEY SAND	100	100			
7.950	26.08	240.75	5.04	*VERY STIFF FINE GRAINED	100	100			

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 30.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE



TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-8 M

PROJECT NAME : AES-NEWHALL RNCH

PROJECT NUMBER : 99-A893

CONE/RIG : 408\#1 JH.GO

DATE/TIME: 09-07-99 11:05

HFA

CPT INTERPRETATIONS

SOUNDING : CPT-9 M
PROJECT : AES-NEWHALL RNCH
DATE/TIME: 09-07-99 12:59

PROJECT No.: 99-A893
CONE/RIG : 408\#1 JH,GO

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	171.55	3.91	*SAND to CLAYEY SAND	86	100			
.300	.98	188.65	4.42	*VERY STIFF FINE GRAINED	100	100			
.450	1.48	132.06	2.40	SILTY SAND to SANDY SILT	44	70	84		
.600	1.97	285.64	2.70	SILTY SAND to SANDY SILT	95	100	100		
.750	2.46	95.07	3.32	SANDY SILT to CLAYEY SILT	38	61		5.6	
.900	2.95	92.69	2.52	SILTY SAND to SANDY SILT	31	49	74		47.5
1.050	3.44	62.14	3.13	SANDY SILT to CLAYEY SILT	25	40		3.6	
1.200	3.94	29.89	4.57	CLAY to SILTY CLAY	20	32		1.7	
1.350	4.43	29.45	3.98	CLAY to SILTY CLAY	20	31		1.9	
1.500	4.92	53.07	2.20	SANDY SILT to CLAYEY SILT	21	34		3.5	
1.650	5.41	24.71	2.02	SANDY SILT to CLAYEY SILT	10	16		2.0	
1.800	5.91	8.33	3.82	CLAY	8	13		.5	
1.950	6.40	8.58	3.38	CLAY	9	14		.5	
2.100	6.89	11.58	3.11	CLAY to SILTY CLAY	8	12		.7	
2.250	7.38	9.96	3.87	CLAY	10	15		.6	
2.400	7.87	8.20	4.18	CLAY	8	12		.5	
2.550	8.37	9.03	5.77	CLAY	9	13		.6	
2.700	8.86	33.33	3.04	CLAYEY SILT to SILTY CLAY	17	23		2.2	
2.850	9.35	24.30	4.36	CLAY to SILTY CLAY	16	22		1.6	
3.000	9.84	30.83	3.28	CLAYEY SILT to SILTY CLAY	15	20		2.0	
3.150	10.33	34.52	3.53	CLAYEY SILT to SILTY CLAY	17	22		2.3	
3.300	10.83	43.45	3.74	CLAYEY SILT to SILTY CLAY	22	27		2.5	
3.450	11.32	48.99	3.33	CLAYEY SILT to SILTY CLAY	24	30		2.8	
3.600	11.81	38.81	5.26	CLAY	39	46		2.2	
3.750	12.30	68.39	4.98	*VERY STIFF FINE GRAINED	68	80			
3.900	12.80	62.61	3.18	SANDY SILT to CLAYEY SILT	25	29		3.6	
4.050	13.29	103.44	2.51	SILTY SAND to SANDY SILT	34	39	71		42.0
4.200	13.78	149.58	2.25	SILTY SAND to SANDY SILT	50	55	81		43.0
4.350	14.27	194.67	2.25	SILTY SAND to SANDY SILT	65	70	88		44.0
4.500	14.76	251.41	2.35	SILTY SAND to SANDY SILT	84	89	95		45.0
4.650	15.26	289.18	1.84	SAND to SILTY SAND	72	76	99		45.5
4.800	15.75	375.48	1.74	SAND to SILTY SAND	94	97	100		46.5
4.950	16.24	313.25	1.80	SAND to SILTY SAND	78	79	100		46.0
5.100	16.73	280.03	1.72	SAND to SILTY SAND	70	70	96		45.0
5.250	17.22	173.19	1.44	SAND to SILTY SAND	43	43	82		43.0
5.400	17.72	192.80	1.96	SILTY SAND to SANDY SILT	64	62	85		43.0
5.550	18.21	247.03	1.43	SAND to SILTY SAND	62	59	92		44.0
5.700	18.70	256.72	1.35	SAND to SILTY SAND	64	61	92		44.0
5.850	19.19	274.21	2.31	SILTY SAND to SANDY SILT	91	85	94		44.5
6.000	19.69	458.44	1.36	SAND	92	84	100		46.5
6.150	20.18	692.75	1.39	SAND	100	100	100		

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 25.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

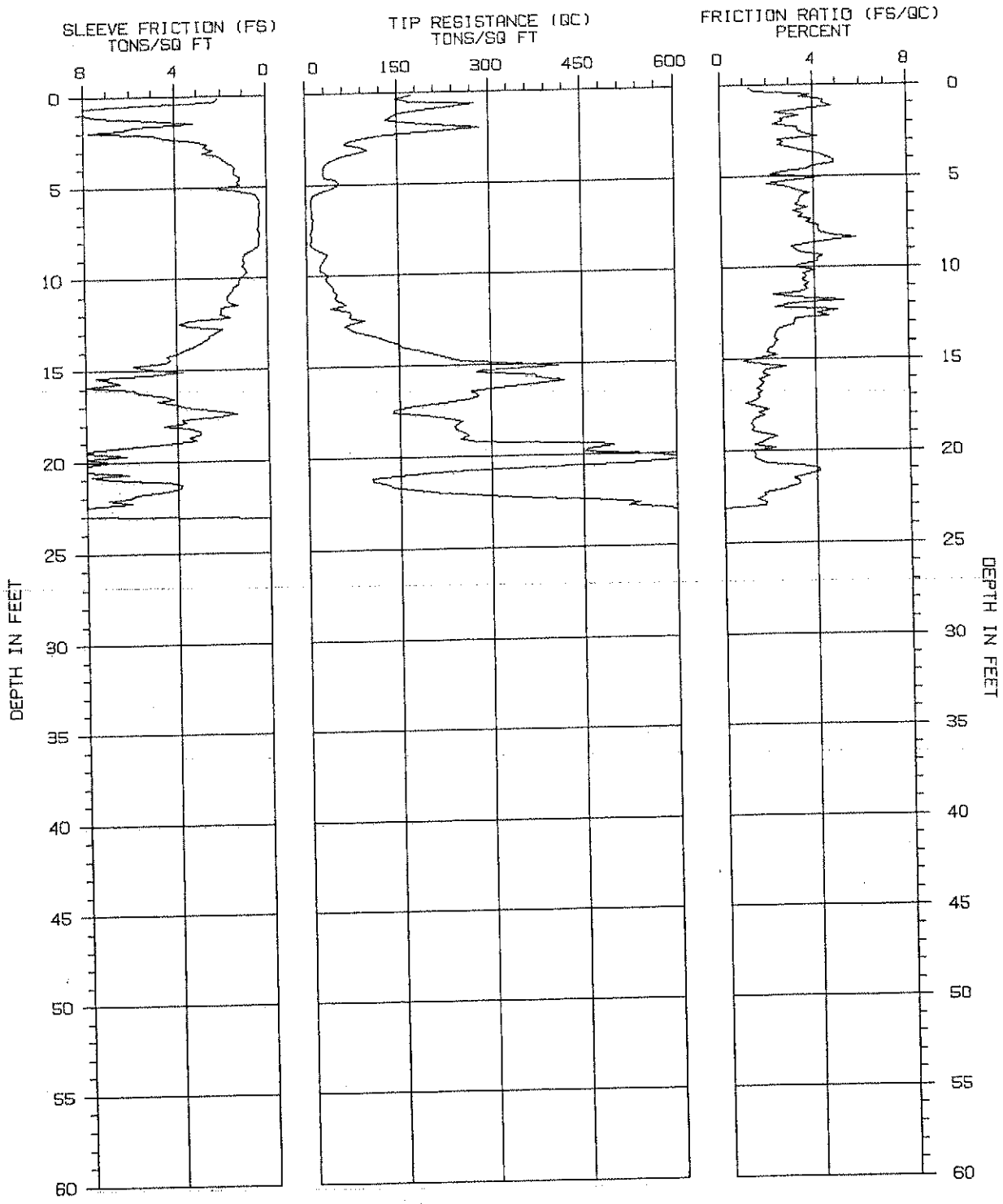
HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-9 M

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	321.05	1.91	SAND to SILTY SAND	80	72	97		44.5
6.450	21.16	103.99	4.14	CLAYEY SILT to SILTY CLAY	52	46		6.0	
6.600	21.65	138.94	3.25	SANDY SILT to CLAYEY SILT	56	49		8.1	
6.750	22.15	271.87	2.60	SILTY SAND to SANDY SILT	91	79	92		44.0
6.900	22.64	540.81	1.47	SAND	100	93	100		
7.050	23.13	627.08	*****		0	0			

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 25.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE



TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-9 M

PROJECT NAME : AES-NEWHALL RNCH

PROJECT NUMBER : 99-A893

CONE/RIG : 408\#1 JH.GO

DATE/TIME: 09-07-99 12:59

HFA

CPT INTERPRETATIONS

SOUNDING : CPT-10M
PROJECT : AES/NEWHALL RNCH
DATE/TIME: 09-22-99 08:46

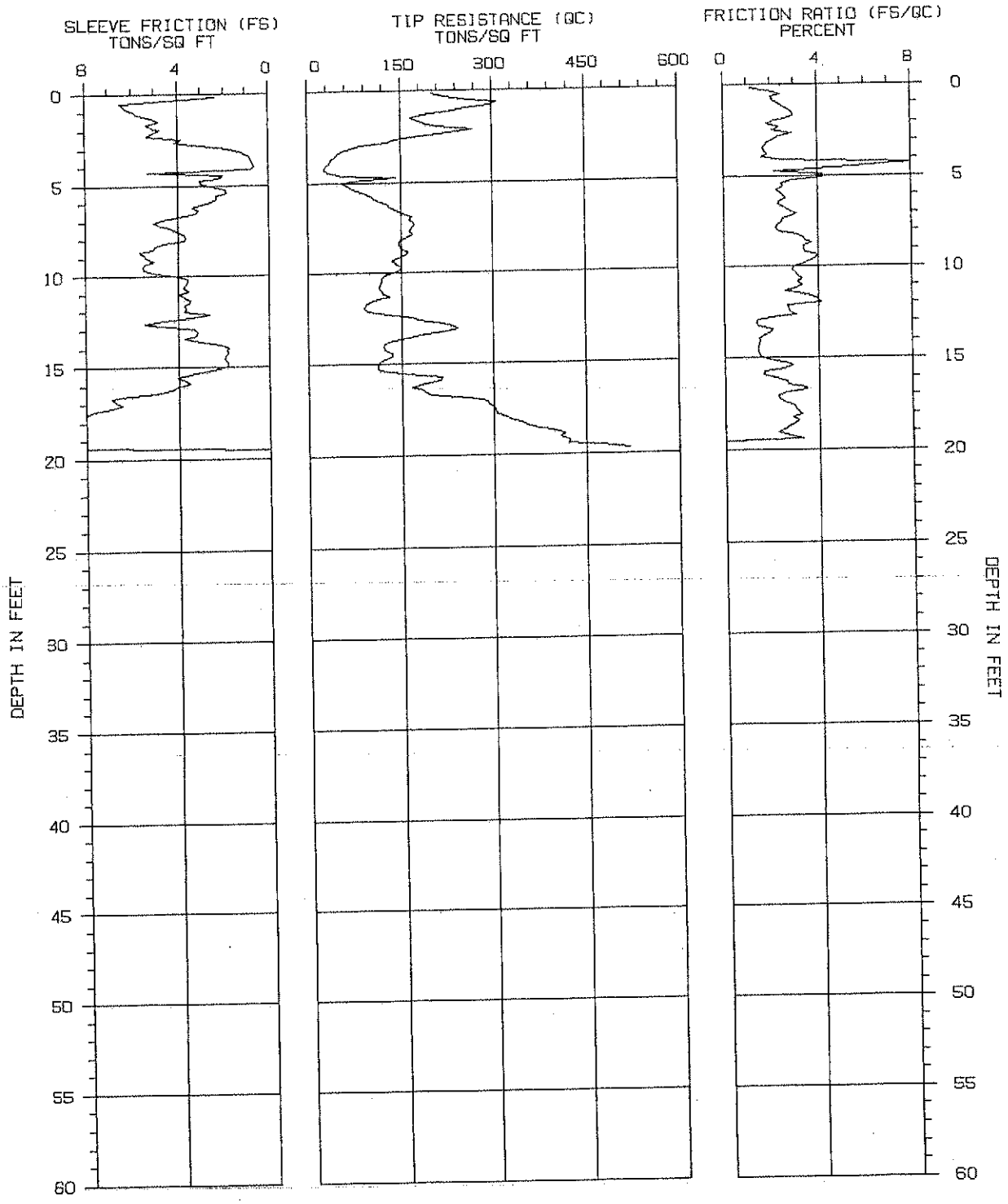
PROJECT No.: 99-A893
CONE/RIG : 473,GO,MR,R#4

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	260.99	2.47	SILTY SAND to SANDY SILT	87	100	100		
.300	.98	254.83	2.29	SILTY SAND to SANDY SILT	85	100	100		
.450	1.48	166.71	2.88	SILTY SAND to SANDY SILT	56	89	91		
.600	1.97	213.83	2.21	SILTY SAND to SANDY SILT	71	100	98		
.750	2.46	182.30	2.11	SILTY SAND to SANDY SILT	61	97	94		
.900	2.95	84.41	2.16	SILTY SAND to SANDY SILT	28	45	71		47.0
1.050	3.44	48.95	1.72	SILTY SAND to SANDY SILT	16	26	56		44.5
1.200	3.94	36.24	1.66	SANDY SILT to CLAYEY SILT	14	23		2.9	
1.350	4.43	33.42	6.16	CLAY	33	53		2.0	
1.500	4.92	70.81	4.21	CLAYEY SILT to SILTY CLAY	35	57		4.1	
1.650	5.41	74.93	2.47	SANDY SILT to CLAYEY SILT	30	48		5.0	
1.800	5.91	107.29	2.40	SILTY SAND to SANDY SILT	36	57	78		45.5
1.950	6.40	131.27	2.36	SILTY SAND to SANDY SILT	44	70	84		46.0
2.100	6.89	166.67	2.78	SILTY SAND to SANDY SILT	56	86	91		46.5
2.250	7.38	172.47	2.50	SILTY SAND to SANDY SILT	57	86	92		46.5
2.400	7.87	168.30	2.20	SILTY SAND to SANDY SILT	56	82	91		46.0
2.550	8.37	145.55	3.40	SANDY SILT to CLAYEY SILT	58	82		8.5	
2.700	8.86	161.52	3.38	SANDY SILT to CLAYEY SILT	65	89		9.5	
2.850	9.35	135.58	4.03	*VERY STIFF FINE GRAINED	100	100			
3.000	9.84	146.84	3.29	SANDY SILT to CLAYEY SILT	59	76		8.6	
3.150	10.33	118.42	3.03	SANDY SILT to CLAYEY SILT	47	60		6.9	
3.300	10.83	113.17	3.13	SANDY SILT to CLAYEY SILT	45	56		6.6	
3.450	11.32	132.48	2.60	SILTY SAND to SANDY SILT	44	54	81		43.5
3.600	11.81	92.58	3.95	CLAYEY SILT to SILTY CLAY	46	55		5.4	
3.750	12.30	128.53	2.72	SILTY SAND to SANDY SILT	43	50	79		43.0
3.900	12.80	209.03	2.26	SILTY SAND to SANDY SILT	70	80	92		45.0
4.050	13.29	217.16	1.48	SAND to SILTY SAND	54	61	92		45.0
4.200	13.78	130.04	1.66	SILTY SAND to SANDY SILT	43	48	77		42.5
4.350	14.27	123.26	1.46	SAND to SILTY SAND	31	33	75		42.0
4.500	14.76	123.47	1.47	SAND to SILTY SAND	31	33	75		42.0
4.650	15.26	111.28	2.74	SANDY SILT to CLAYEY SILT	45	47		6.5	
4.800	15.75	216.02	1.69	SAND to SILTY SAND	54	56	90		44.0
4.950	16.24	166.62	2.61	SILTY SAND to SANDY SILT	56	56	82		43.0
5.100	16.73	198.07	3.48	*SAND to CLAYEY SAND	99	99			
5.250	17.22	292.50	2.34	SILTY SAND to SANDY SILT	98	96	97		45.0
5.400	17.72	304.10	2.97	*SAND to CLAYEY SAND	100	100			
5.550	18.21	344.12	2.85	*SAND to CLAYEY SAND	100	100			
5.700	18.70	401.31	2.66	*SAND to CLAYEY SAND	100	100			
5.850	19.19	422.09	2.75	*SAND to CLAYEY SAND	100	100			
6.000	19.69	518.76	*****		0	0			.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 35.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.



TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-10 M

PROJECT NAME : AES/NEWHALL RNCH

PROJECT NUMBER : 99-A893

CONE/RIG : 473.GO.MR.R#4

DATE/TIME: 09-22-99 08:46

HFA

CPT INTERPRETATIONS

SOUNDING : CPT-11 M
PROJECT : AES/NEWHALL RNCH
DATE/TIME: 09-22-99 08:14

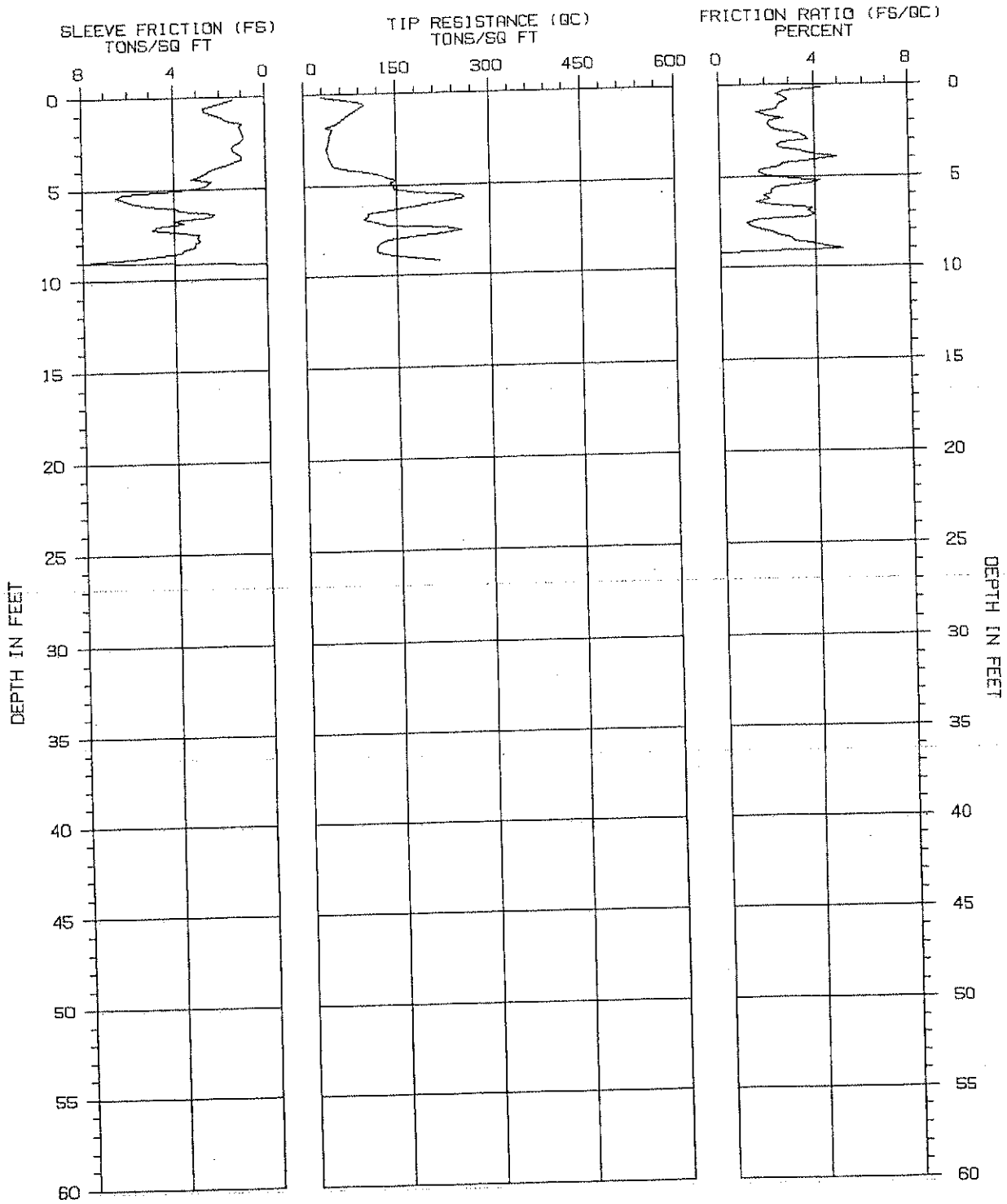
PROJECT No.: 99-A893
CONE/RIG : 473,GO,MR,R#4

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	94.92	2.52	SILTY SAND to SANDY SILT	32	51	75		
.300	.98	83.51	2.68	SANDY SILT to CLAYEY SILT	33	53		5.6	
.450	1.48	60.23	1.63	SILTY SAND to SANDY SILT	20	32	62		48.5
.600	1.97	46.80	2.19	SANDY SILT to CLAYEY SILT	19	30		3.1	
.750	2.46	42.17	2.50	SANDY SILT to CLAYEY SILT	17	27		2.8	
.900	2.95	36.77	3.75	CLAYEY SILT to SILTY CLAY	18	29		2.2	
1.050	3.44	39.77	2.61	SANDY SILT to CLAYEY SILT	16	25		2.6	
1.200	3.94	47.55	4.94	CLAY to SILTY CLAY	32	51		2.8	
1.350	4.43	125.64	2.58	SILTY SAND to SANDY SILT	42	67	83		47.0
1.500	4.92	139.85	1.94	SILTY SAND to SANDY SILT	47	75	86		47.0
1.650	5.41	183.45	3.56	*SAND to CLAYEY SAND	92	100			
1.800	5.91	229.74	2.22	SILTY SAND to SANDY SILT	77	100	100		48.5
1.950	6.40	140.68	1.61	SAND to SILTY SAND	35	56	86		46.0
2.100	6.89	97.53	3.68	CLAYEY SILT to SILTY CLAY	49	76		5.7	
2.250	7.38	228.32	1.72	SAND to SILTY SAND	57	86	100		47.5
2.400	7.87	173.06	1.67	SAND to SILTY SAND	43	63	92		46.0
2.550	8.37	119.27	3.01	SANDY SILT to CLAYEY SILT	48	67		7.0	
2.700	8.86	132.91	4.44	*VERY STIFF FINE GRAINED	100	100			

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 30.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.



TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-11M

PROJECT NAME : AES/NEWHALL RNCH

PROJECT NUMBER : 99-A893

CONE/RIG : 473.GO.MR.R#4

DATE/TIME: 09-22-99 08:14

HFA

CPT INTERPRETATIONS

SOUNDING : CPT-12M
PROJECT : AES/NEWHALL RNCH
DATE/TIME: 09-22-99 12:12

PROJECT No.: 99-A893
CONE/RIG : 473,GO,MR,R#4

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	.00	-4.23		0	0			
.300	.98	.00	-2.20		0	0			
.450	1.48	.00	-6.85		0	0			
.600	1.97	8.46	14.32	CLAY	8	14		.6	
.750	2.46	139.45	1.58	SAND to SILTY SAND	35	56	86		
.900	2.95	180.56	2.58	SILTY SAND to SANDY SILT	60	96	93		
1.050	3.44	172.10	.87	SAND	34	55	92		49.5
1.200	3.94	88.44	.91	SAND to SILTY SAND	22	35	73		46.0
1.350	4.43	103.23	1.25	SAND to SILTY SAND	26	41	77		46.5
1.500	4.92	92.08	.97	SAND to SILTY SAND	23	37	74		45.5
1.650	5.41	70.28	3.13	SANDY SILT to CLAYEY SILT	28	45		4.1	
1.800	5.91	68.85	1.90	SILTY SAND to SANDY SILT	23	37	66		43.5
1.950	6.40	82.54	1.75	SILTY SAND to SANDY SILT	28	44	71		44.0
2.100	6.89	80.41	1.67	SILTY SAND to SANDY SILT	27	42	70		43.5
2.250	7.38	81.30	1.08	SAND to SILTY SAND	20	31	70		43.5
2.400	7.87	67.62	1.40	SILTY SAND to SANDY SILT	23	33	65		42.0
2.550	8.37	70.11	1.49	SILTY SAND to SANDY SILT	23	33	66		42.0
2.700	8.86	107.12	1.25	SAND to SILTY SAND	27	37	78		44.0
2.850	9.35	94.54	1.01	SAND to SILTY SAND	24	32	74		43.0
3.000	9.84	88.95	1.79	SILTY SAND to SANDY SILT	30	39	71		42.5
3.150	10.33	76.55	1.88	SILTY SAND to SANDY SILT	26	32	66		41.5
3.300	10.83	89.08	1.65	SILTY SAND to SANDY SILT	30	37	70		42.0
3.450	11.32	109.52	1.69	SILTY SAND to SANDY SILT	37	44	75		42.5
3.600	11.81	157.98	1.21	SAND to SILTY SAND	39	47	85		44.0
3.750	12.30	202.85	1.05	SAND	41	47	92		45.0
3.900	12.80	237.05	1.26	SAND	47	54	95		45.5
4.050	13.29	217.19	1.15	SAND	43	49	92		45.0
4.200	13.78	282.87	1.33	SAND	57	62	99		46.0
4.350	14.27	333.90	1.52	SAND to SILTY SAND	83	90	100		46.5
4.500	14.76	390.56	1.74	SAND to SILTY SAND	98	100	100		47.0
4.650	15.26	382.73	1.32	SAND	77	80	100		46.5
4.800	15.75	419.65	1.86	SAND to SILTY SAND	100	100	100		47.0
4.950	16.24	479.98	1.38	SAND	96	97	100		47.5
5.100	16.73	386.61	1.37	SAND	77	77	100		46.5
5.250	17.22	416.99	1.15	SAND	83	82	100		46.5
5.400	17.72	305.78	1.51	SAND to SILTY SAND	76	74	98		45.0
5.550	18.21	152.39	1.75	SAND to SILTY SAND	38	36	78		42.0
5.700	18.70	161.16	2.84	SILTY SAND to SANDY SILT	54	51	79		42.0
5.850	19.19	181.15	1.48	SAND to SILTY SAND	45	42	82		42.5
6.000	19.69	232.08	1.57	SAND to SILTY SAND	58	53	89		43.5
6.150	20.18	202.87	1.13	SAND	41	37	85		43.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 35.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

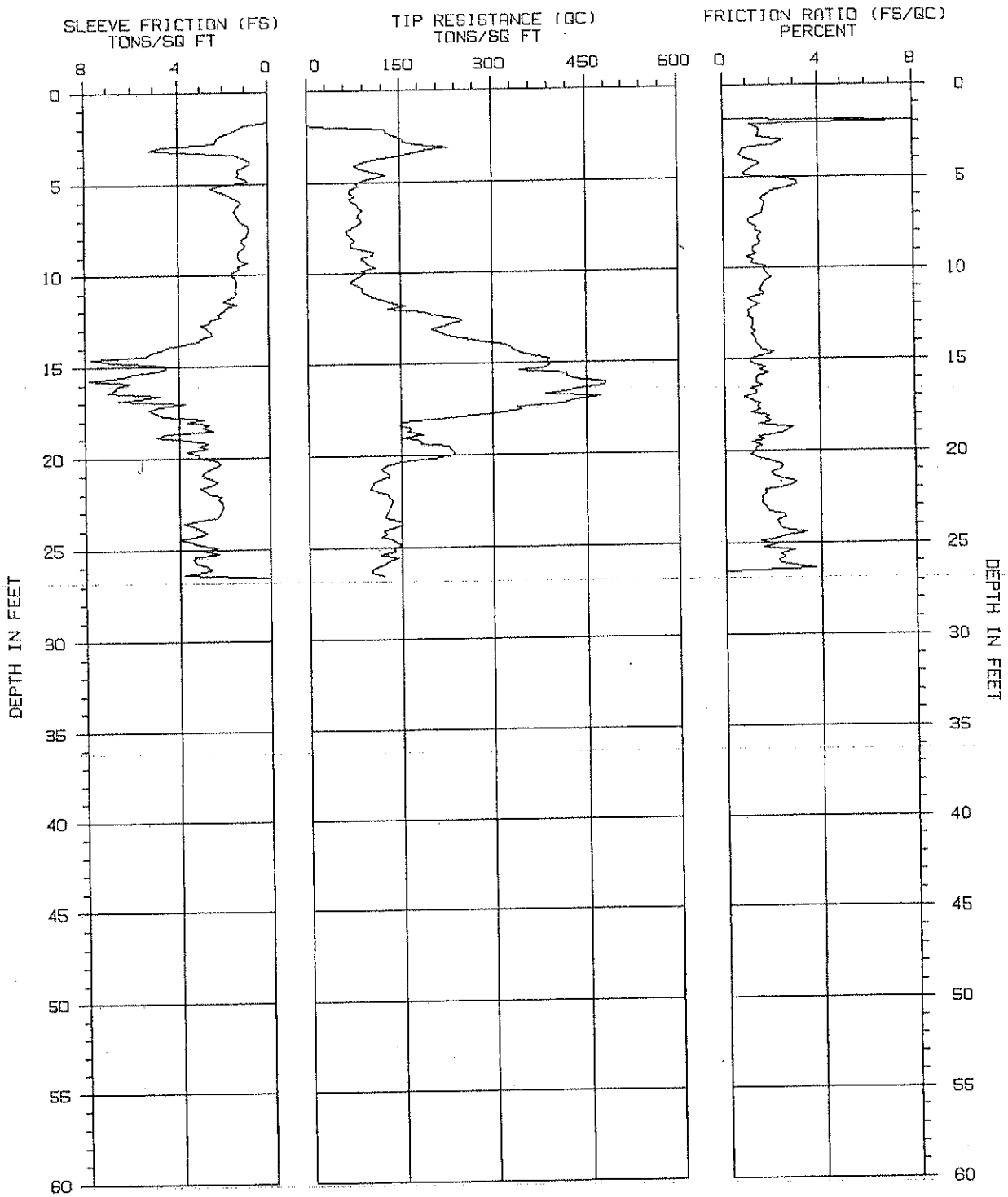
HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-12 M

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	117.04	2.35	SILTY SAND to SANDY SILT	39	35	68		39.5
6.450	21.16	132.14	1.97	SILTY SAND to SANDY SILT	44	39	72		40.0
6.600	21.65	102.70	2.98	SANDY SILT to CLAYEY SILT	41	36		6.0	
6.750	22.15	126.60	1.69	SILTY SAND to SANDY SILT	42	37	70		39.5
6.900	22.64	133.52	1.57	SAND to SILTY SAND	33	29	71		40.0
7.050	23.13	127.07	1.74	SILTY SAND to SANDY SILT	42	36	69		39.5
7.200	23.62	149.18	2.53	SILTY SAND to SANDY SILT	50	42	73		40.5
7.350	24.11	120.99	2.31	SILTY SAND to SANDY SILT	40	34	67		39.0
7.500	24.61	136.18	2.55	SILTY SAND to SANDY SILT	45	37	70		39.5
7.650	25.10	136.39	2.13	SILTY SAND to SANDY SILT	45	37	70		39.5
7.800	25.59	144.17	2.32	SILTY SAND to SANDY SILT	48	39	71		39.5
7.950	26.08	107.52	2.38	SILTY SAND to SANDY SILT	36	29	63		38.5
8.100	26.57	120.82	*****		0	0			.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 35.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE



TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-12 M

PROJECT NAME : AES/NEWHALL RNCH

PROJECT NUMBER : 99-A893

CONE/RIG : 473.GO.MR.R#4

DATE/TIME: 09-22-99 12:12

HFA

CPT INTERPRETATIONS

SOUNDING : CPT-13 M
PROJECT : AES/NEWHALL RNCH
DATE/TIME: 09-22-99 11:41

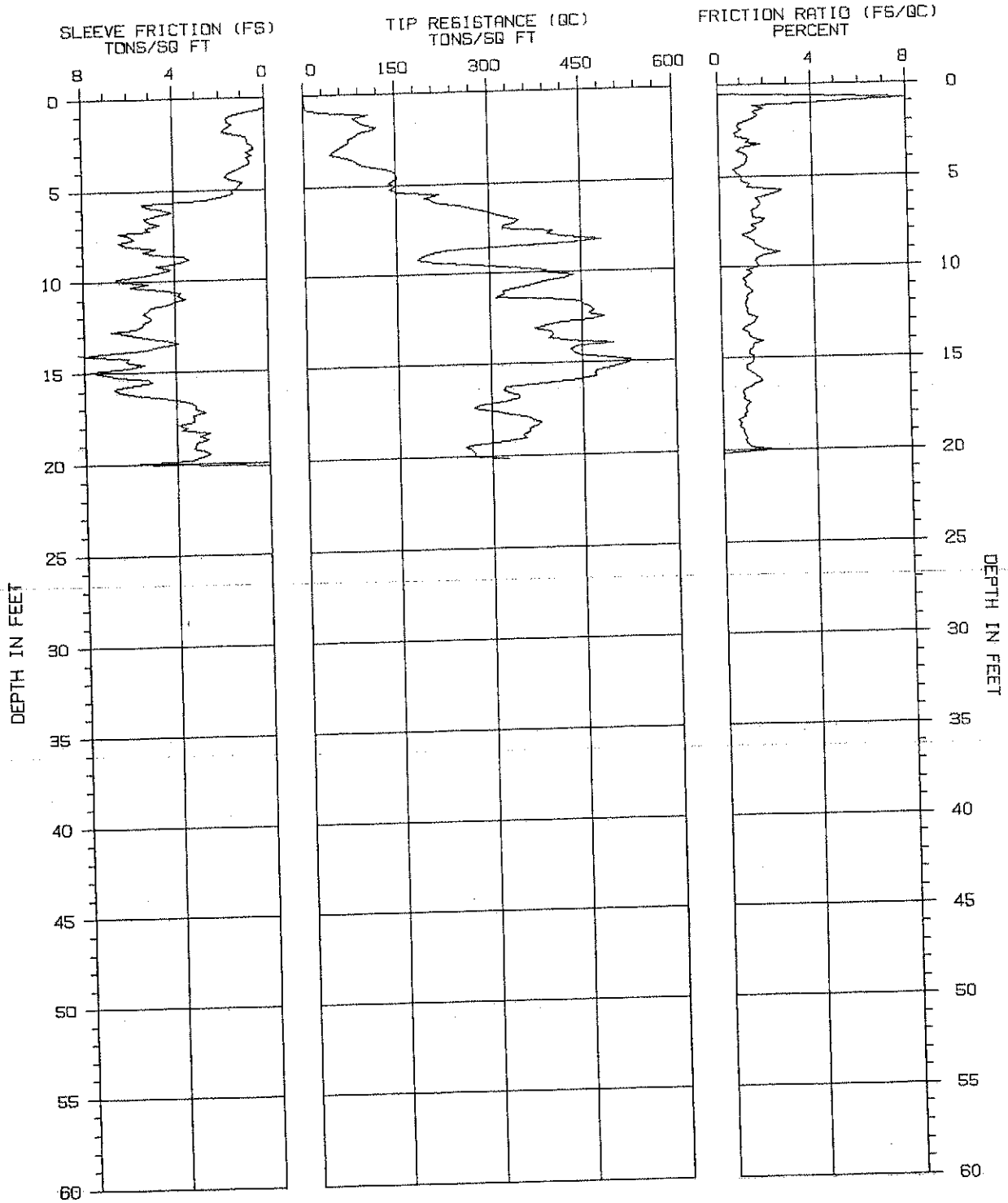
PROJECT No.: 99-A893
CONE/RIG : 473,GO,MR,R#4

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	1.85	.00		0	0			
.300	.98	30.97	4.84	CLAY	31	50		1.8	
.450	1.48	89.91	1.57	SILTY SAND to SANDY SILT	30	48	73		
.600	1.97	113.49	1.32	SAND to SILTY SAND	28	45	80		
.750	2.46	73.32	1.02	SAND to SILTY SAND	18	29	67		47.5
.900	2.95	56.19	1.41	SILTY SAND to SANDY SILT	19	30	60		45.5
1.050	3.44	66.11	1.00	SILTY SAND to SANDY SILT	22	35	64		45.5
1.200	3.94	103.82	1.24	SAND to SILTY SAND	26	42	77		47.0
1.350	4.43	150.63	1.00	SAND to SILTY SAND	38	60	88		48.0
1.500	4.92	137.90	.91	SAND to SILTY SAND	34	55	86		47.0
1.650	5.41	152.92	1.34	SAND to SILTY SAND	38	61	89		47.0
1.800	5.91	209.45	2.45	SILTY SAND to SANDY SILT	70	100	98		48.0
1.950	6.40	270.89	1.76	SAND to SILTY SAND	68	100	100		48.5
2.100	6.89	328.57	1.41	SAND	66	100	100		49.0
2.250	7.38	323.90	1.97	SAND to SILTY SAND	81	100	100		49.0
2.400	7.87	393.82	1.62	SAND to SILTY SAND	98	100	100		49.5
2.550	8.37	431.95	1.23	SAND	86	100	100		49.5
2.700	8.86	206.31	1.64	SAND to SILTY SAND	52	71	97		46.5
2.850	9.35	211.77	1.94	SAND to SILTY SAND	53	71	97		46.0
3.000	9.84	393.01	1.66	SAND to SILTY SAND	98	100	100		48.5
3.150	10.33	420.86	1.40	SAND	84	100	100		48.5
3.300	10.83	344.80	1.12	SAND	69	86	100		47.5
3.450	11.32	310.62	1.42	SAND	62	75	100		47.0
3.600	11.81	451.79	1.18	SAND	90	100	100		48.5
3.750	12.30	460.50	1.17	SAND	92	100	100		48.0
3.900	12.80	417.91	1.62	SAND to SILTY SAND	100	100	100		47.5
4.050	13.29	399.72	1.08	SAND	80	90	100		47.5
4.200	13.78	431.29	1.22	SAND	86	95	100		47.5
4.350	14.27	431.61	1.40	SAND	86	93	100		47.5
4.500	14.76	499.32	1.21	SAND	100	100	100		48.0
4.650	15.26	499.83	1.28	SAND	100	100	100		47.5
4.800	15.75	472.08	1.28	SAND	94	97	100		47.5
4.950	16.24	323.30	1.77	SAND to SILTY SAND	81	82	100		46.0
5.100	16.73	345.70	.96	SAND	69	69	100		46.0
5.250	17.22	282.26	.97	SAND	56	56	96		45.0
5.400	17.72	331.12	.98	SAND	66	64	100		45.5
5.550	18.21	382.05	.98	SAND	76	73	100		46.0
5.700	18.70	362.12	.74	SAND	72	68	100		46.0
5.850	19.19	323.35	1.01	SAND	65	60	99		45.0
6.000	19.69	266.05	1.10	SAND	53	49	93		44.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 35.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.



TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-13 M

PROJECT NAME : AES/NEWHALL RNCH

PROJECT NUMBER : 99-A893

CONE/RIG : 473.GO.MR.R#4

DATE/TIME: 09-22-99 11:41

HFA

CPT INTERPRETATIONS

SOUNDING : CPT-14 M
PROJECT : AES/NEWHALL RNCH
DATE/TIME: 09-22-99 09:45

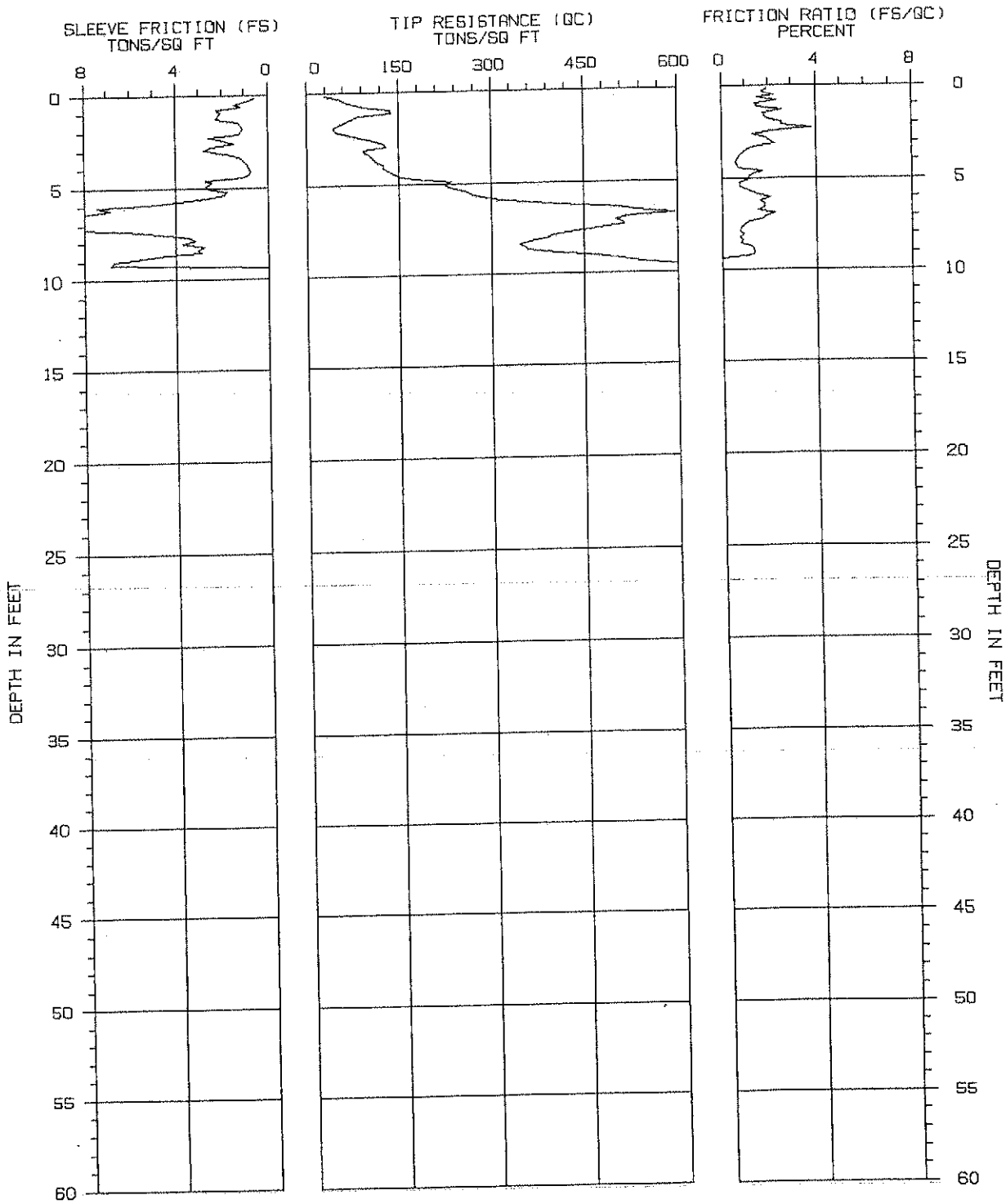
PROJECT No.: 99-A893
CONE/RIG : 473,GO,MR,R#4

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	63.03	2.27	SANDY SILT to CLAYEY SILT	25	40		4.2	
.300	.98	136.56	1.49	SAND to SILTY SAND	34	55	85		
.450	1.48	71.96	1.78	SILTY SAND to SANDY SILT	24	38	67		49.5
.600	1.97	44.34	2.57	SANDY SILT to CLAYEY SILT	18	28		2.9	
.750	2.46	87.74	2.18	SILTY SAND to SANDY SILT	29	47	73		48.0
.900	2.95	129.93	2.10	SILTY SAND to SANDY SILT	43	69	84		49.0
1.050	3.44	104.44	1.10	SAND to SILTY SAND	26	42	78		47.5
1.200	3.94	125.79	.67	SAND	25	40	83		47.5
1.350	4.43	141.96	.70	SAND	28	45	86		47.5
1.500	4.92	234.50	1.16	SAND	47	75	100		49.0
1.650	5.41	255.58	.75	SAND	51	82	100		49.0
1.800	5.91	312.38	1.70	SAND to SILTY SAND	78	100	100		49.5
1.950	6.40	507.60	1.85	SAND to SILTY SAND	100	100	100		
2.100	6.89	521.43	2.27	*SAND to CLAYEY SAND	100	100			
2.250	7.38	514.38	1.18	SAND	100	100	100		
2.400	7.87	401.99	.78	SAND	80	100	100		49.5
2.550	8.37	346.16	.89	SAND	69	98	100		48.5
2.700	8.86	406.46	1.33	SAND	81	100	100		49.0
2.850	9.35	541.00	*****		0	0			46.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 35.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.



TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-14 M

PROJECT NAME : AES/NEWHALL RNCH

PROJECT NUMBER : 99-A893

CONE/RIG : 473.GO.MR.R#4

DATE/TIME: 09-22-99 09:45

HFA

CPT INTERPRETATIONS

SOUNDING : CPT-15 M
PROJECT : AES/NEWHALL RNCH
DATE/TIME: 09-22-99 10:33

PROJECT No.: 99-A893
CONE/RIG : 473,GO,MR,R#4

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	194.20	.61	SAND	39	62	95		
.300	.98	171.32	1.45	SAND to SILTY SAND	43	68	92		
.450	1.48	259.55	1.31	SAND	52	83	100		
.600	1.97	271.87	.75	SAND	54	87	100		
.750	2.46	196.47	1.05	SAND	39	63	96		
.900	2.95	117.82	.93	SAND to SILTY SAND	29	47	81		48.5
1.050	3.44	108.43	.89	SAND to SILTY SAND	27	43	79		47.5
1.200	3.94	121.39	.95	SAND to SILTY SAND	30	49	82		47.5
1.350	4.43	112.81	.96	SAND to SILTY SAND	28	45	80		46.5
1.500	4.92	127.85	.90	SAND to SILTY SAND	32	51	83		46.5
1.650	5.41	205.10	1.57	SAND to SILTY SAND	51	82	97		48.0
1.800	5.91	258.17	1.76	SAND to SILTY SAND	65	100	100		49.0
1.950	6.40	244.70	.85	SAND	49	78	100		48.5
2.100	6.89	216.93	.79	SAND	43	67	99		47.5
2.250	7.38	199.89	.63	SAND	40	60	96		47.0
2.400	7.87	155.00	2.06	SILTY SAND to SANDY SILT	52	75	89		46.0
2.550	8.37	315.59	1.64	SAND to SILTY SAND	79	100	100		48.0
2.700	8.86	467.17	.83	GRAVELLY SAND to SAND	78	100	100		49.5
2.850	9.35	485.19	.84	GRAVELLY SAND to SAND	81	100	100		49.5
3.000	9.84	292.09	1.25	SAND	58	76	100		47.5
3.150	10.33	449.37	.88	SAND	90	100	100		49.0
3.300	10.83	497.09	1.00	SAND	99	100	100		49.0
3.450	11.32	542.02	1.23	SAND	100	100	100		
3.600	11.81	565.92	1.12	SAND	100	100	100		
3.750	12.30	482.32	1.60	SAND to SILTY SAND	100	100	100		48.5
3.900	12.80	600.42	.85	GRAVELLY SAND to SAND	100	100	100		
4.050	13.29	429.93	1.78	SAND to SILTY SAND	100	100	100		47.5
4.200	13.78	341.98	1.05	SAND	68	75	100		46.5
4.350	14.27	280.69	.51	SAND	56	61	99		46.0
4.500	14.76	153.73	1.52	SAND to SILTY SAND	38	41	81		43.0
4.650	15.26	132.48	1.97	SILTY SAND to SANDY SILT	44	46	76		42.5
4.800	15.75	133.57	2.37	SILTY SAND to SANDY SILT	45	46	76		42.0
4.950	16.24	152.77	2.29	SILTY SAND to SANDY SILT	51	52	79		42.5
5.100	16.73	285.59	.99	SAND	57	57	97		45.0
5.250	17.22	178.20	1.90	SILTY SAND to SANDY SILT	59	58	83		43.0
5.400	17.72	420.54	1.12	SAND	84	82	100		46.5
5.550	18.21	462.69	1.18	SAND	93	89	100		46.5
5.700	18.70	266.90	1.09	SAND	53	50	93		44.5
5.850	19.19	134.33	3.10	SANDY SILT to CLAYEY SILT	54	50		7.8	
6.000	19.69	116.12	4.08	CLAYEY SILT to SILTY CLAY	58	53		6.8	
6.150	20.18	134.37	3.27	SANDY SILT to CLAYEY SILT	54	49		7.8	

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 30.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

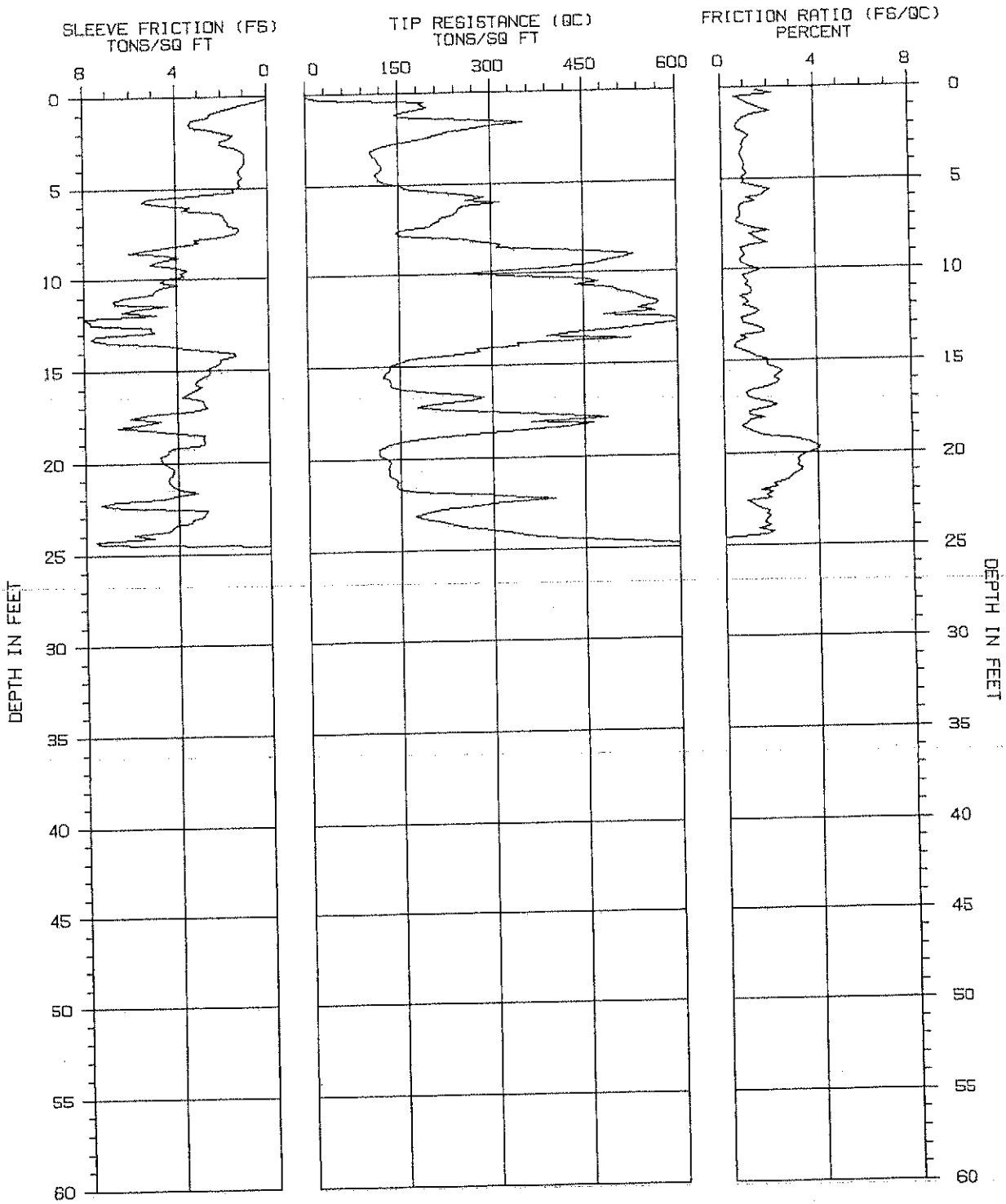
HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-15 M

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	131.97	3.18	SANDY SILT to CLAYEY SILT	53	47		7.7	
6.450	21.16	143.19	3.00	SANDY SILT to CLAYEY SILT	57	51		8.3	
6.600	21.65	147.50	2.14	SILTY SAND to SANDY SILT	49	43	74		41.0
6.750	22.15	321.50	2.06	SAND to SILTY SAND	80	70	96		44.5
6.900	22.64	273.61	.98	SAND	55	47	91		44.0
7.050	23.13	173.40	1.94	SILTY SAND to SANDY SILT	58	49	78		41.5
7.200	23.62	230.85	1.82	SAND to SILTY SAND	58	48	86		42.5
7.350	24.11	334.82	1.51	SAND to SILTY SAND	84	70	96		44.5
7.500	24.61	512.79	*****		0	0			.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 30.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE



TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-15 M

PROJECT NAME : AES/NEWHALL RNCH

PROJECT NUMBER : 99-A893

CONE/RIG : 473.GO.MR.R#4

DATE/TIME: 09-22-99 10:33

HFA

CPT INTERPRETATIONS

SOUNDING : CPT-18 M
PROJECT : AES/NEWHALL RNCH
DATE/TIME: 09-22-99 14:45

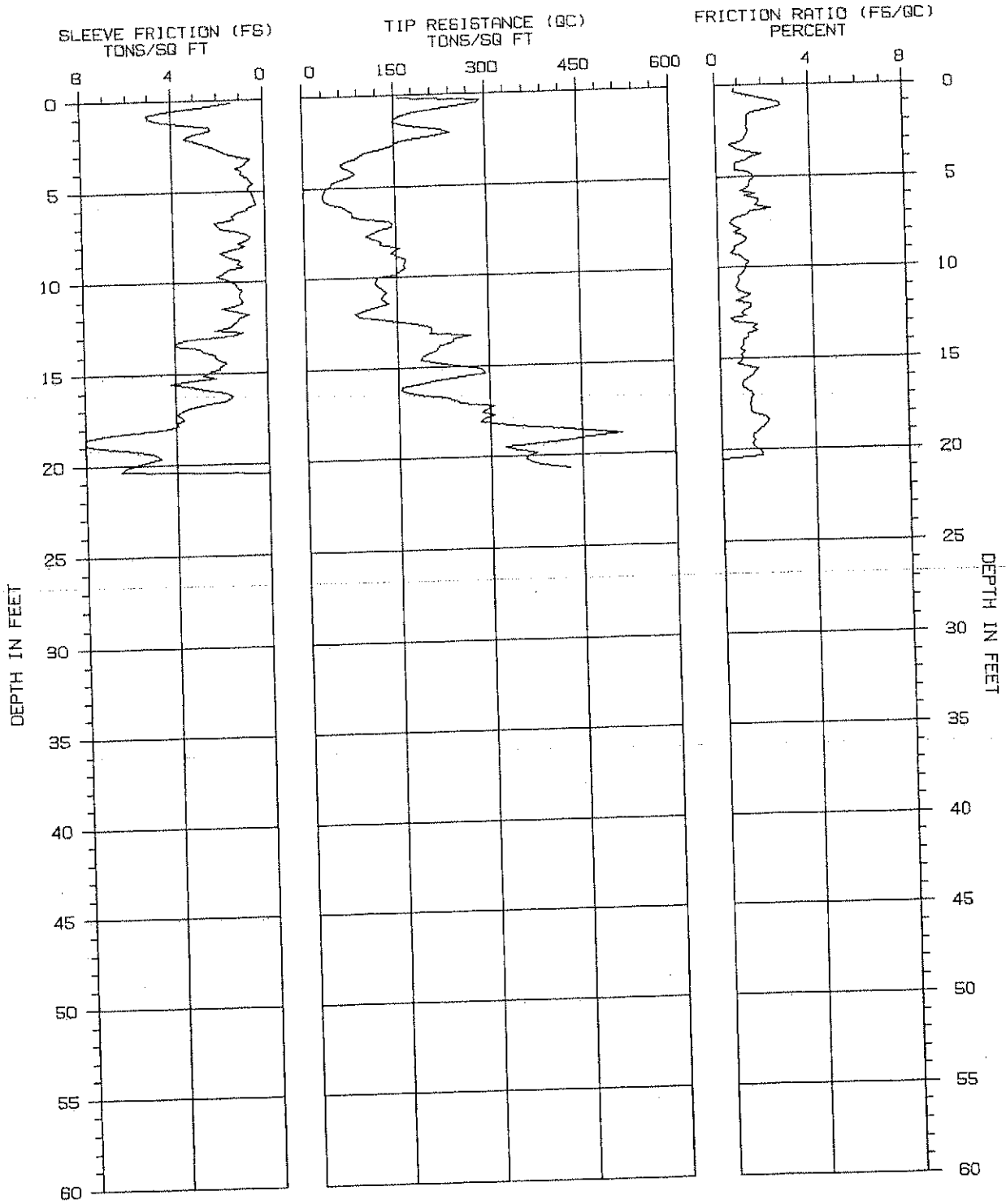
PROJECT No.: 99-A893
CONE/RIG : 473,GO,MR,R#4

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	287.00	1.25	SAND	57	92	100		
.300	.98	182.90	2.75	SILTY SAND to SANDY SILT	61	97	94		
.450	1.48	149.44	1.57	SAND to SILTY SAND	37	60	88		
.600	1.97	226.15	1.41	SAND to SILTY SAND	57	90	100		
.750	2.46	174.40	1.44	SAND to SILTY SAND	44	70	92		
.900	2.95	130.23	1.22	SAND to SILTY SAND	33	52	84		49.0
1.050	3.44	89.08	.83	SAND to SILTY SAND	22	36	73		46.5
1.200	3.94	64.92	1.52	SILTY SAND to SANDY SILT	22	35	64		45.0
1.350	4.43	73.27	.82	SAND to SILTY SAND	18	29	67		45.0
1.500	4.92	43.45	1.59	SILTY SAND to SANDY SILT	14	23	52		42.5
1.650	5.41	30.40	1.41	SANDY SILT to CLAYEY SILT	12	19		2.4	
1.800	5.91	45.32	1.68	SILTY SAND to SANDY SILT	15	24	54		42.0
1.950	6.40	78.29	1.80	SILTY SAND to SANDY SILT	26	42	69		44.0
2.100	6.89	140.64	1.44	SAND to SILTY SAND	35	55	86		46.0
2.250	7.38	125.94	.63	SAND	25	38	83		45.0
2.400	7.87	113.87	1.03	SAND to SILTY SAND	28	41	80		44.5
2.550	8.37	156.26	1.24	SAND to SILTY SAND	39	55	89		45.5
2.700	8.86	152.16	.71	SAND	30	42	88		45.0
2.850	9.35	162.03	1.01	SAND to SILTY SAND	41	54	89		45.0
3.000	9.84	148.16	1.15	SAND to SILTY SAND	37	48	86		44.5
3.150	10.33	115.53	1.04	SAND to SILTY SAND	29	37	78		43.5
3.300	10.83	134.29	.84	SAND to SILTY SAND	34	42	82		44.0
3.450	11.32	131.91	1.03	SAND to SILTY SAND	33	40	80		43.5
3.600	11.81	97.26	.77	SAND to SILTY SAND	24	29	71		42.0
3.750	12.30	125.60	1.12	SAND to SILTY SAND	31	37	78		43.0
3.900	12.80	205.05	.49	SAND	41	47	91		45.0
4.050	13.29	269.68	1.46	SAND to SILTY SAND	67	76	99		46.0
4.200	13.78	220.82	1.25	SAND to SILTY SAND	55	61	92		45.0
4.350	14.27	198.92	1.05	SAND	40	43	89		44.5
4.500	14.76	214.28	.95	SAND	43	46	91		44.5
4.650	15.26	292.26	.76	SAND	58	61	99		45.5
4.800	15.75	214.96	1.53	SAND to SILTY SAND	54	55	90		44.0
4.950	16.24	155.26	.99	SAND to SILTY SAND	39	39	80		42.5
5.100	16.73	229.13	1.13	SAND	46	46	91		44.0
5.250	17.22	306.61	1.29	SAND	61	60	99		45.5
5.400	17.72	307.26	1.29	SAND	61	60	98		45.0
5.550	18.21	302.57	1.90	SAND to SILTY SAND	76	72	97		45.0
5.700	18.70	461.12	1.88	SAND to SILTY SAND	100	100	100		46.5
5.850	19.19	421.94	1.39	SAND	84	79	100		46.0
6.000	19.69	343.44	1.36	SAND	69	63	100		45.5
6.150	20.18	356.89	1.77	SAND to SILTY SAND	89	81	100		45.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 35.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.



TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-18 M

PROJECT NAME : AES/NEWHALL RNCH

PROJECT NUMBER : 99-A893

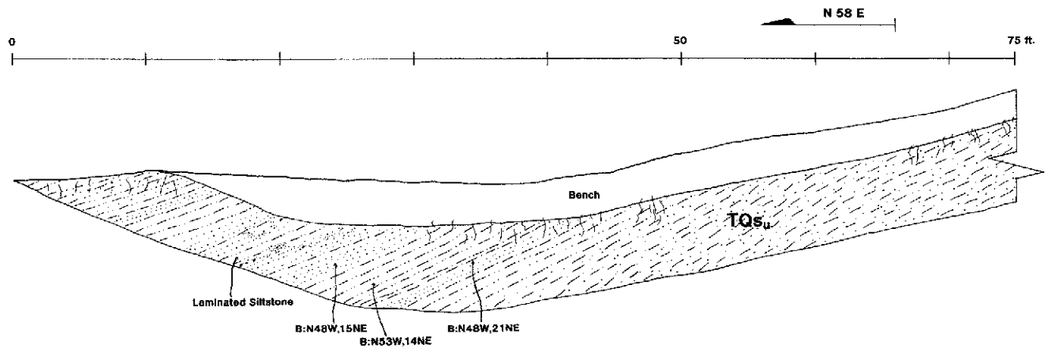
CONE/RIG : 473.GO.MR.Ru4

DATE/TIME: 09-22-99 14:45

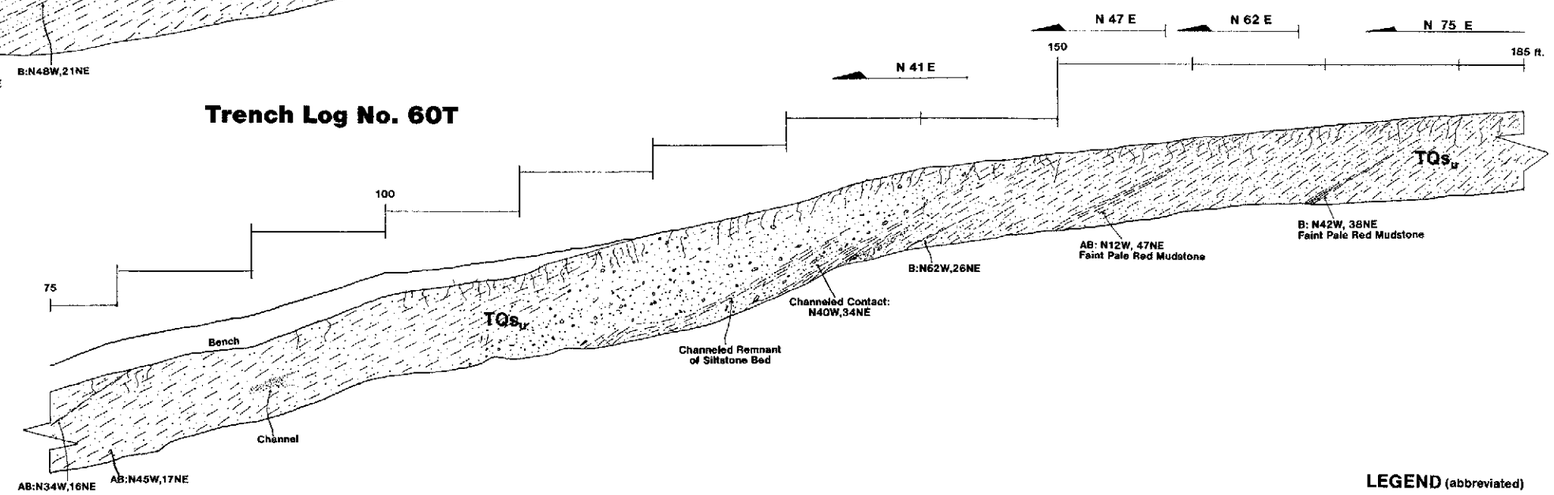
HFA

PLATE A1

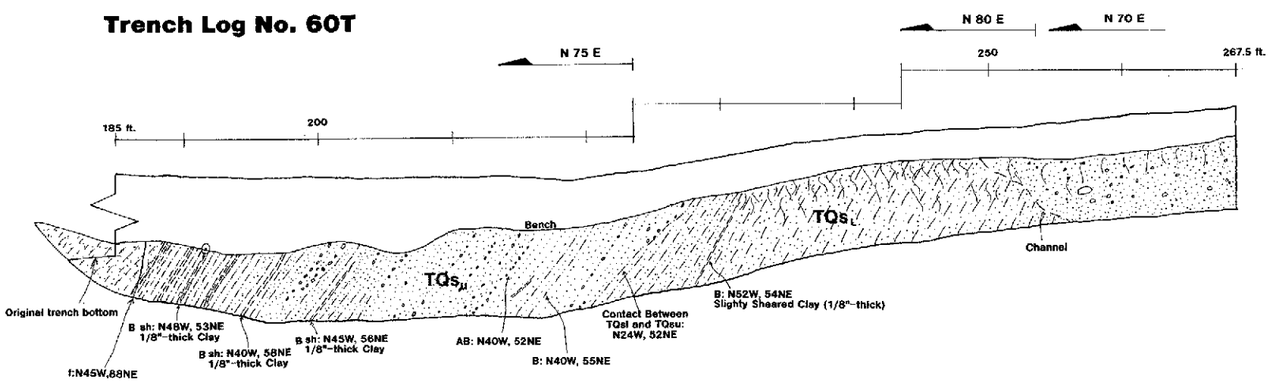
Trench Log No. 60T



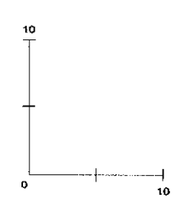
Trench Log No. 60T



Trench Log No. 60T



Trench deepened and extended to the south @ sheared beds



LEGEND (abbreviated)

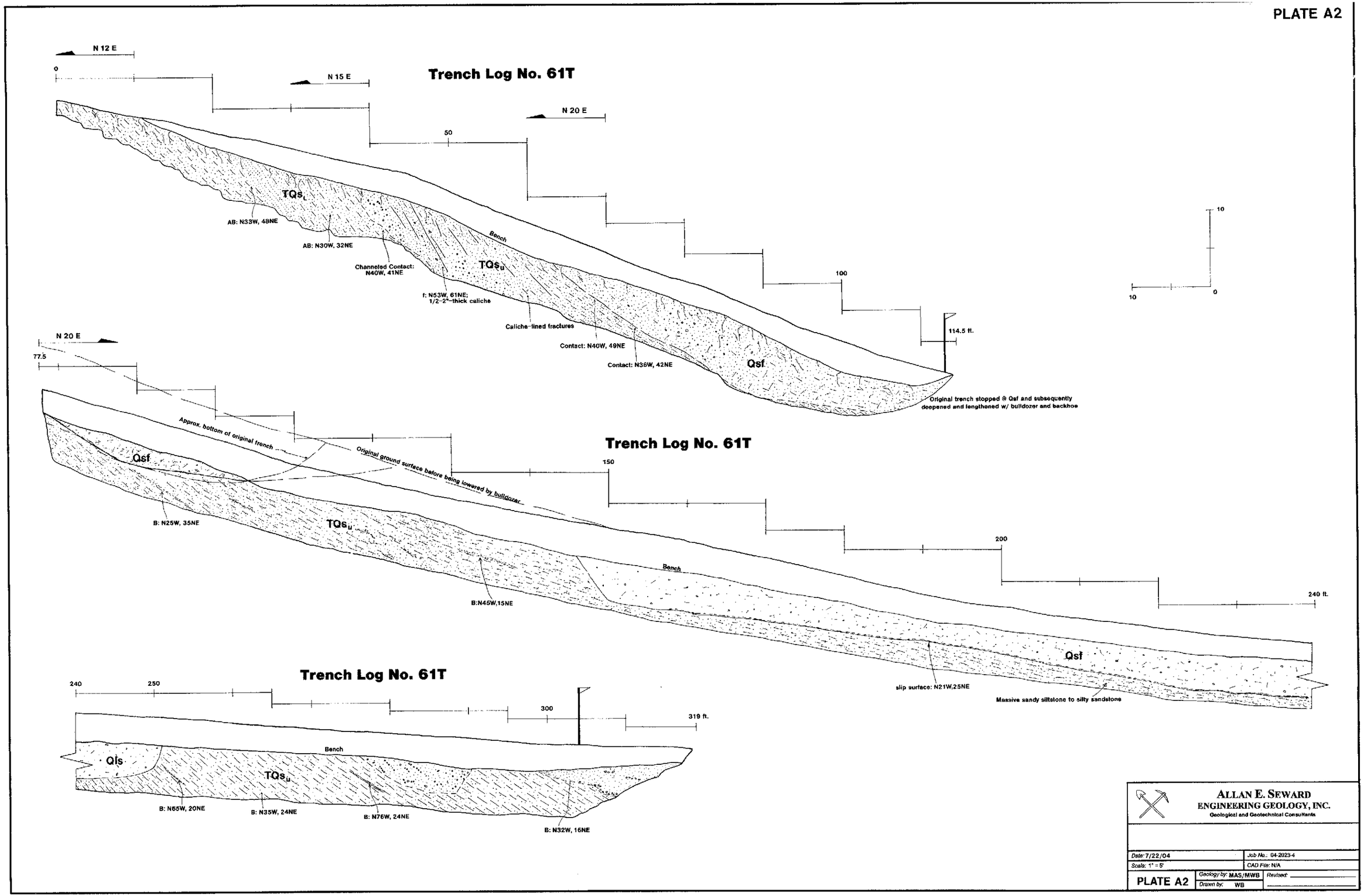
B: , AB:	Bedding Attitude , Approximate
B sh:	Bedding Plane Shear
sp:	Slide Plane
f:	Fracture
mF:	Minor Fault

Please refer to report text or maps Legend for unit explanation if needed; for lithology and definitions refer to logs Legend in accompanying 7/20/04 report

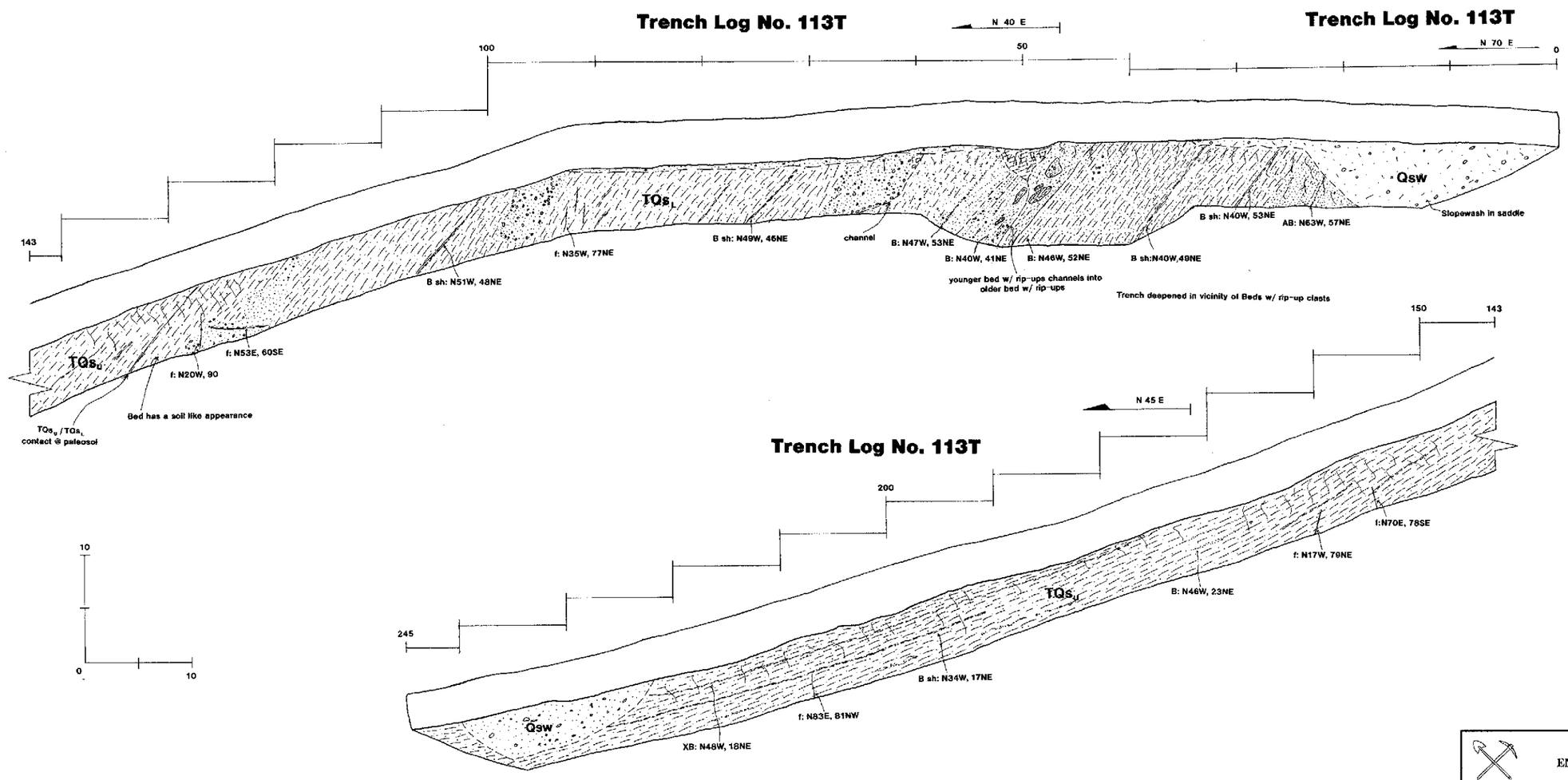
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

Date: 7/22/04		Job No.: 04-2023-4
Scale: 1" = 5'		CAD File: N/A
PLATE A1	Geology by: MWB Drawn by: WB	Revised:

A full-size reproduction of this figure can be found at Impact Sciences.



A full-size reproduction of this figure can be found at Impact Sciences.

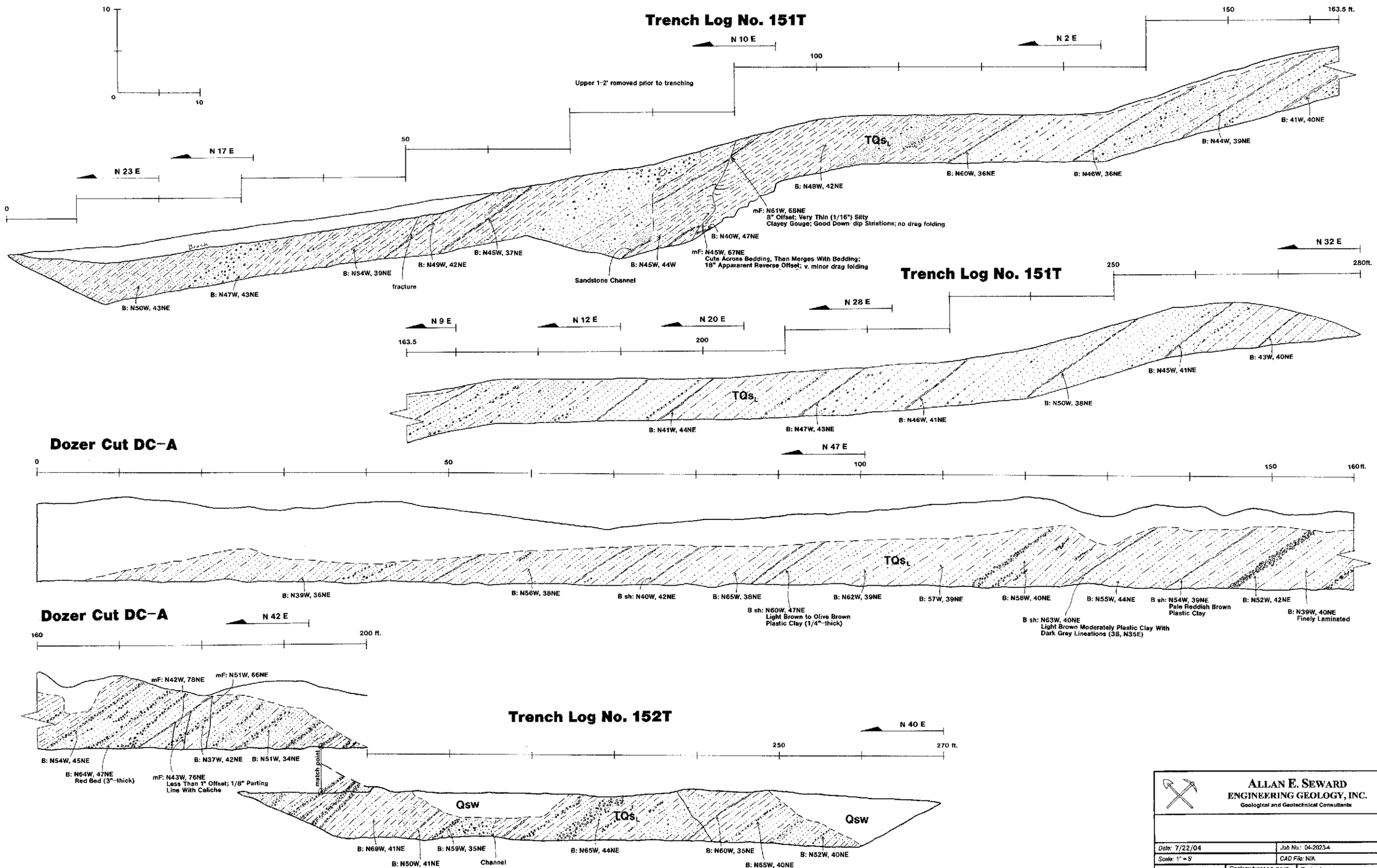


ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

Date: 7/22/04	Job No.: 04-2023-4
Scale: 1" = 5'	CAD File: N/A
PLATE A3	Geology by: DGG/MAS; Drawn by: WB; Revised:

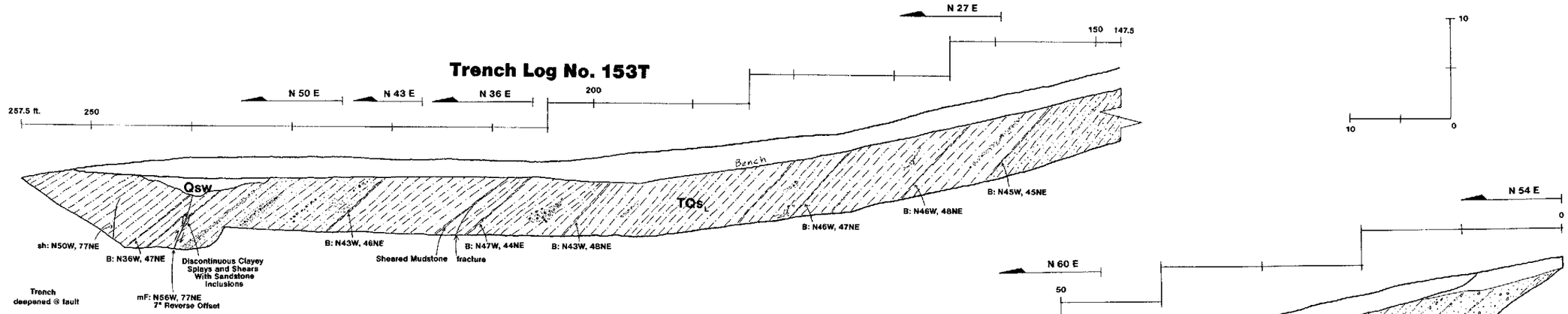
A full-size reproduction of this figure can be found at Impact Sciences.

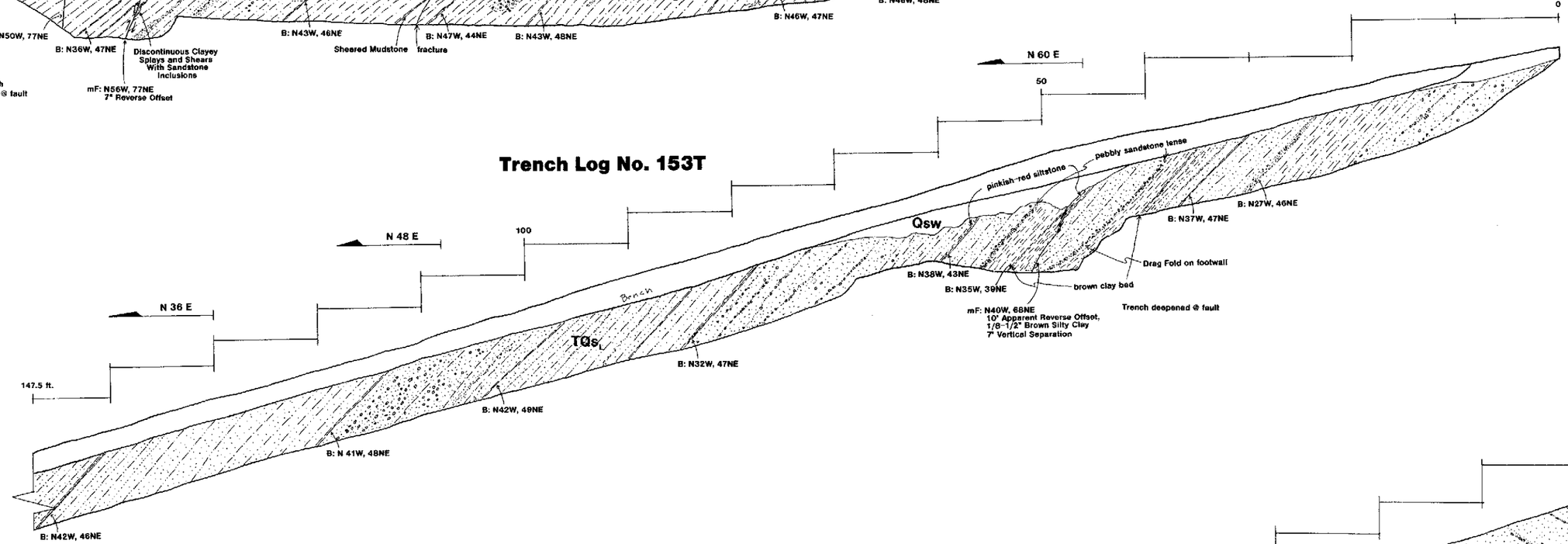
PLATE A4

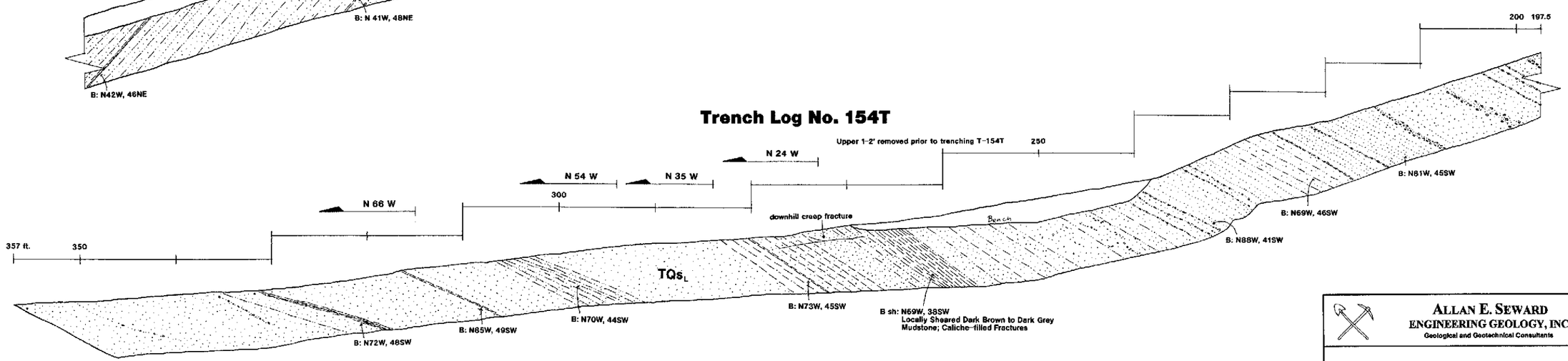


A full-size reproduction of this figure can be found at Impact Sciences.

PLATE A5



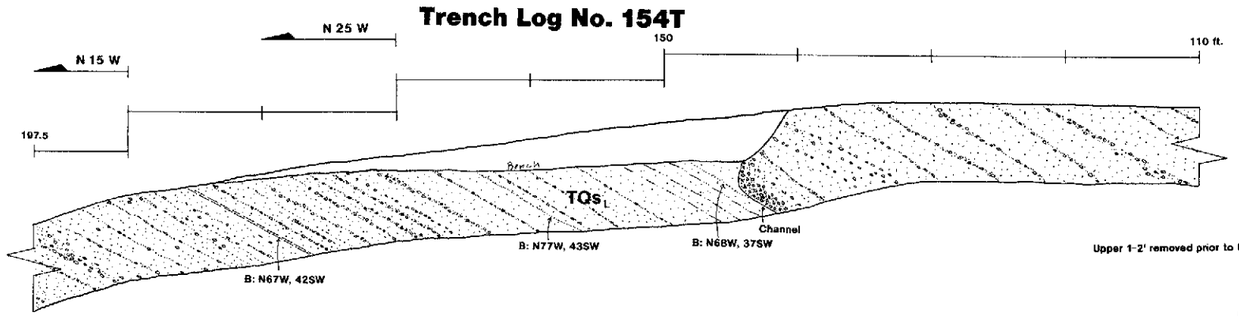


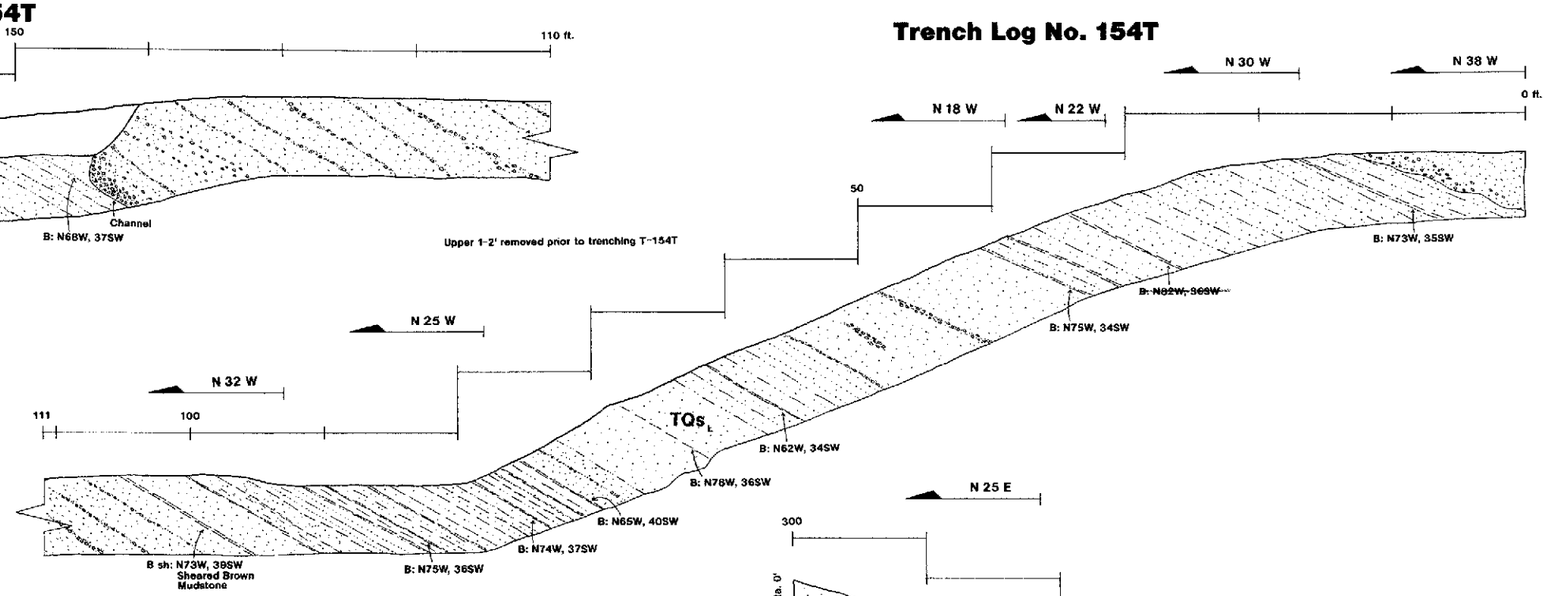


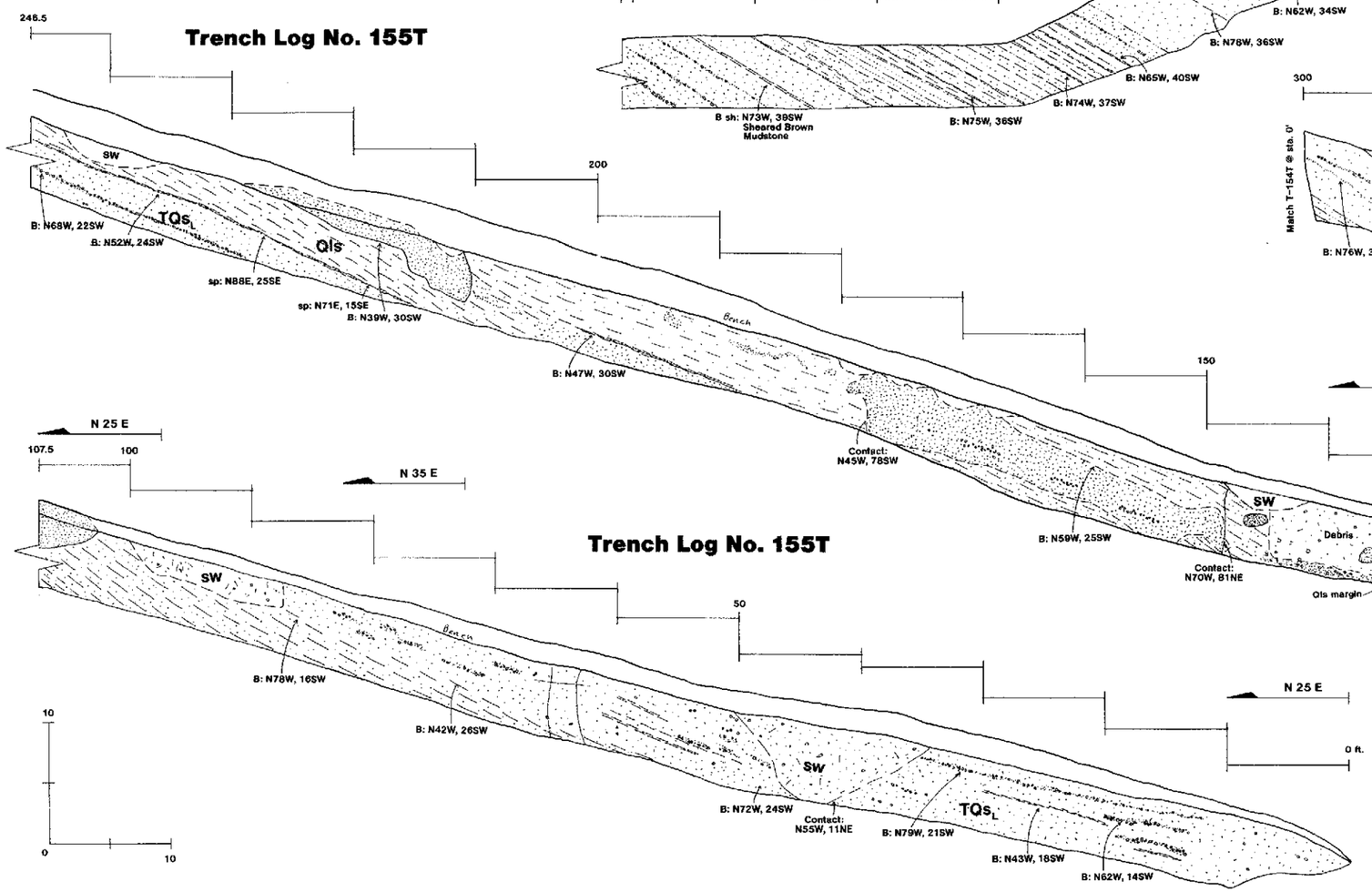
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

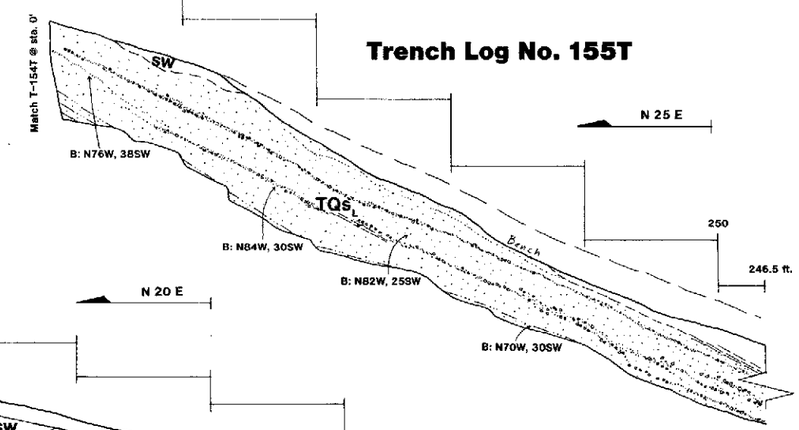
Date: 7/22/04		Job No.: 04-2023-4
Scale: 1" = 5'		CAD File: N/A
PLATE A5	Geology by: MJD	Revised:
	Drawn by: WB	

A full-size reproduction of this figure can be found at Impact Sciences.





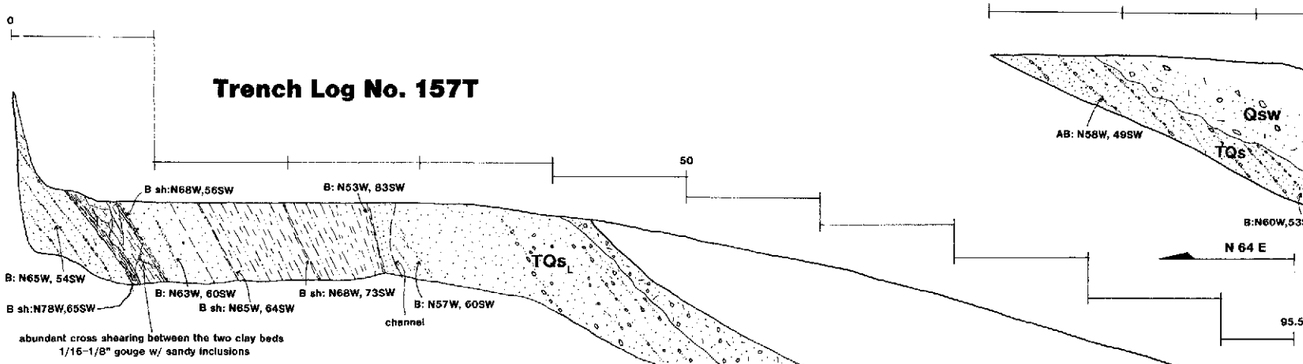


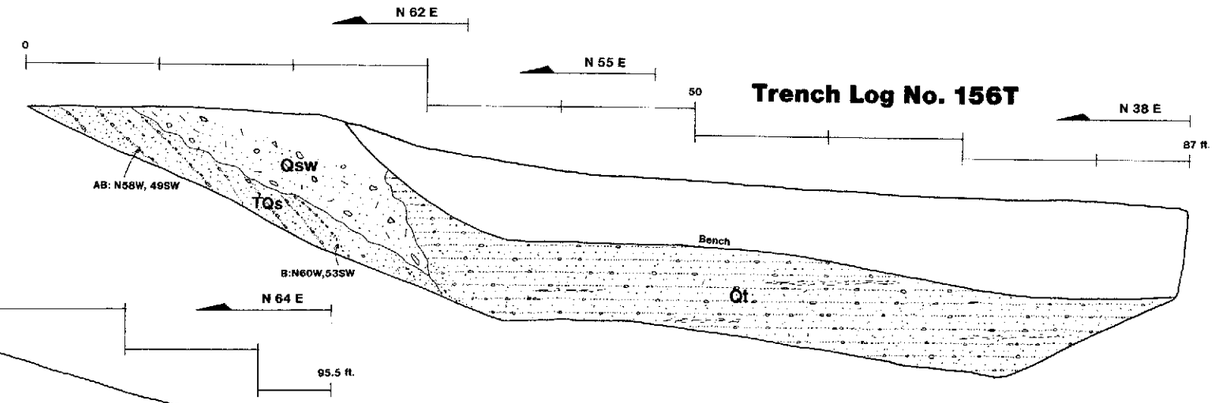


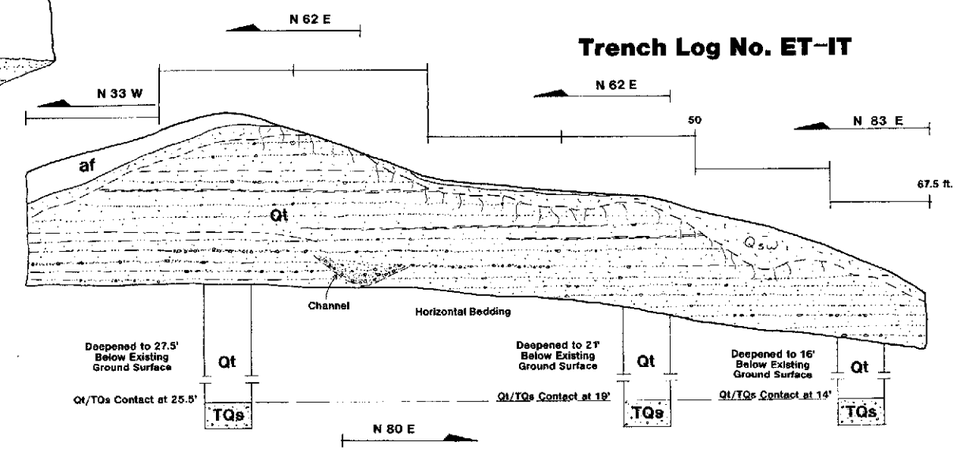
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

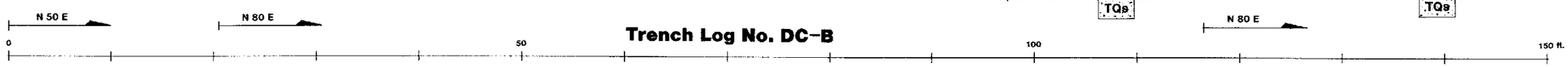
Date: 7/22/04		Job No.: 04-2023-4
Scale: 1" = 5'		CAD File: N/A
PLATE A6	Geology by: MJD/MAS	Revised:
	Drawn by: WB	

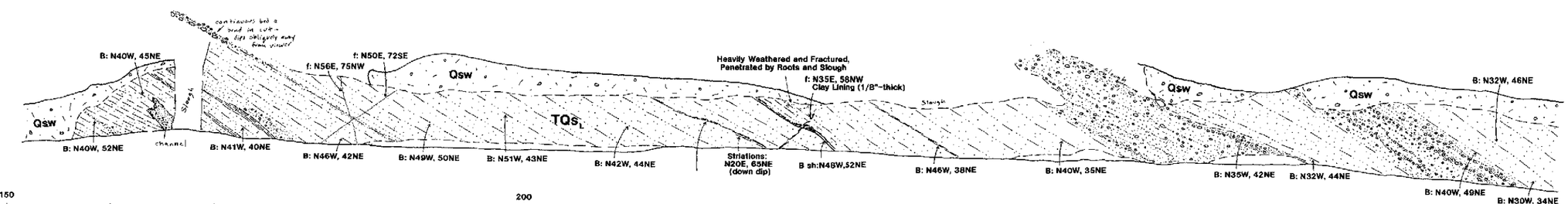
A full-size reproduction of this figure can be found at Impact Sciences.

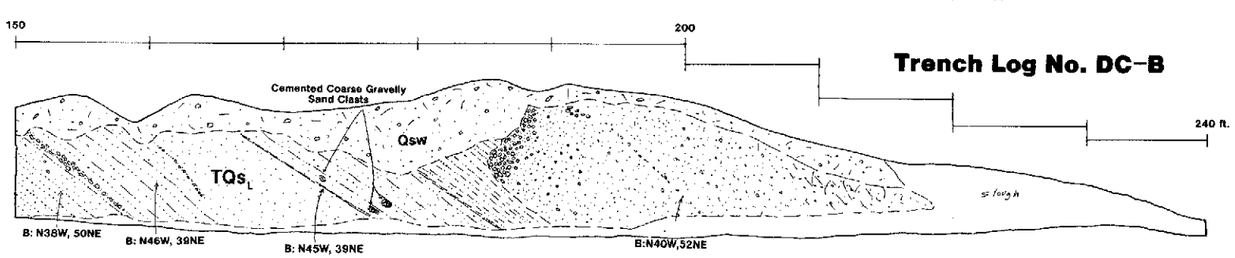


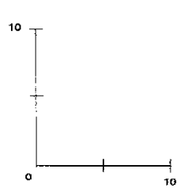












ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

Date: 7/22/04		Job No.: 04-2023-4
Scale: 1" = 5'		CAD File: N/A
PLATE A7	Geology by: MJD/SKM	Revised:
	Drawn by: WB	

A full-size reproduction of this figure can be found at Impact Sciences.

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

GEOLOGIC AND GEOTECHNICAL REPORT

Review of Vesting Tentative Tract Map (Dated June 14, 2004)

Vesting Tentative Tract 61105

Mesas East

Newhall Ranch, California

VOLUME III OF VI

Prepared for:

The Newhall Land and Farming Company
23823 West Valencia Boulevard
Valencia, California 91355

Job No: 04-2023-4
Dated July 22, 2004

27825 Smyth Drive, Valencia, California 91355 661-294-0065 FAX 661-294-0833

Appendix B

APPENDIX B

GEOTECHNICAL LABORATORY INVESTIGATION

1. General

a. The purpose of the laboratory investigation was to evaluate the geotechnical engineering characteristics of the various materials encountered during the field investigation. The investigation program was carried out employing, wherever practical, currently accepted test procedures of the American Society of Testing and Materials (ASTM) and California Test Standards.

b. Relatively undisturbed ring samples and bag samples were obtained during the course of the field investigation. Laboratory sample identification is by project name and number, drill hole number or trench number and depth. Laboratory testing was completed entirely by this firm.

c. The results of the laboratory testing are organized into the following three major subgroups:

- Index Properties Tests
- Geotechnical Engineering Properties Tests, and
- Corrosion Tests

2. Index Properties Tests

The following Index Properties test were performed on native soils collected during the field exploration.

TEST TYPE	NO. OF TESTS PERFORMED	TESTING STANDARD
Moisture Content	725	ASTM D 2216
Dry Unit Weight	677	ASTM D 2937
Percent-Finer than #200 Sieve	150	ASTM D 1140
Particle-Size Analysis (sieve only)	12	ASTM D 422
Particle-Size with Hydrometer	11	ASTM D 422
Expansion Index	4	ASTM D 4829
Atterberg Limits	62	ASTM D 4318

APPENDIX B

The purpose of each test is briefly described below.

a. The in-situ water content and dry unit weight of native soils provided an indication of their strength before additional testing was performed. These data, in conjunction with field blow count data, served in the selection of samples for additional testing. Test results are presented on the Drill Hole Logs within **Appendix A**.

b. Wash-sieve analyses were performed on selected samples to evaluate only the percentage of fine particles finer than the No. 200 sieve (75 microns in diameter) within the soil. These tests were conducted to aid in classifying the soils in accordance with the Unified Soil Classification System (USCS). Test results are presented on the Drill Hole Logs within **Appendix A** and in other test reports within this Appendix.

c. Complete mechanical particle-size analyses of soil fractions larger and smaller than the No. 200 sieve (75 microns) were conducted on selected critical samples to aid in classifying the soils in accordance with the Unified Soil Classification System (USCS). Test results are presented on Lab Report **Figures B1.1** through **B1.8** within this **Appendix**.

d. Liquid and plastic limit tests (Atterberg limits) were conducted on selected samples to evaluate soil plasticity and aid in classifying the soils in accordance with USCS. Test results are presented on Lab Report **Figures B2.1** through **B2.14** within this **Appendix** and on the Drill Hole Logs presented in **Appendix A**.

e. Expansion Index Tests provided an index to the expansion potential of soils when inundated with water. This test method controls variables that influence the expansive characteristics of soils. Results are summarized in **Table B-1** of this **Appendix.**

APPENDIX B

3. Geotechnical Engineering Properties Tests

The following Geotechnical Engineering Property Tests were performed on bulk samples or relatively undisturbed ring samples, as applicable, collected at this site.

TEST TYPE	NO. OF TESTS PERFORMED	TESTING STANDARD
Compaction (Modified Proctor)	21	ASTM D 1557
Consolidation	69	ASTM D 2435
Direct Shear and Reshear	66	ASTM D 3080

The purpose of each test is briefly described below.

a. Modified proctor tests were performed on selected bulk samples to assess the moisture-density relationship of materials for future use in defining compaction parameters during grading operations. Proctor tests were also completed on samples utilized for remolded direct shear testing. Test results are presented on Lab Report **Figures B3.1** through **B3.21** within this **Appendix**.

b. One-dimensional consolidation tests were performed on selected ring samples to assess the soils compressibility characteristics by subjecting the specimens to loads ranging from as low as 50 psf to as high as 25,600 psf. High loads were used for this project in order to produce adequate curves for a reliable determination of the virgin curve portion and past pressure (Pp), needed to explore over-consolidation (or under-consolidation) conditions of some fine-grained soils. The specimens were allowed to consolidate under each load increment until the rate of settlement was less than 0.0002 inches per hour. Time was recorded for readings under some selected loads to produce time-settlement curves. Final readings under each load increment were used to generate load-compression relationships. Hydroconsolidation was assessed on separate specimens by inundating the sample with water after consolidation had been achieved under a load, which approximately equals the overburden pressure at the sample depth plus the expected effect from the structural load to that depth. The percent settlement due to the addition of water is identified as "Hydroconsolidation". Test results are plotted on Lab Report **Figures B4.1** through **B4.69** within this **Appendix**.

c. Direct shear tests were performed on relatively undisturbed or remolded test specimens using a displacement-controlled direct shear machine. Samples were

tested at normal pressures ranging from approximately 1000 psf to 12,000 psf in order to define the peak, ultimate and residual shear strength parameters. The samples were consolidated under the normal load at saturated conditions and then sheared horizontally at a controlled displacement rate until a residual strength was attained. For remolded specimens, material passing the no. 4 sieve was used. Reshears were conducted on selected fine-grained ring samples to obtain along-bedding shear strength parameters. Individual test results are plotted on Lab Report **Figures B5.1** through **B5.66** within this **Appendix** and the shear strength parameters used for slope stability analysis are summarized in **Table B-1**, organized by material type.

d. Family shear plots based on individual shear strength test data were constructed to illustrate how shear strength parameters were developed for each material type encountered at the site. Peak shear strengths were utilized for seismic slope stability analyses. For static slope stability analyses, ultimate shear strengths were generally used for coarse-grained materials and residual shear strengths were used for fine-grained materials and landslide debris. For bedding plane and landslide plane, residual shear strengths were utilized for all stability analyses. Family shear plots are shown on **Figures B6.1** through **B6.8** within this **Appendix**, organized by material type.

4. Corrosion Tests

The following corrosion tests were performed on native soil samples collected at the site.

TEST TYPE	NO. OF TESTS PERFORMED	TESTING STANDARD
Sulfate-Content	5	Caltrans Test 417
Chloride-Content	5	Caltrans Test 422
Resistivity	5	Caltrans Test 643
pH	5	LaMotte

a. Representative bulk samples were obtained from the field and tested for soluble sulfate and chloride contents, electrical resistivity and pH. Sulfate content was tested to assess potential corrosion to exposed concrete. Chloride content, electrical resistivity, and pH were tested to evaluate the potential corrosive characteristics of the site materials to steel reinforcement and buried metal utilities.

APPENDIX B

b. Sulfate test results classify concrete exposure to sulfates as negligible per 1997 UBC. The UBC (1997) provides the following recommendation for negligible exposure of concrete to sulfates: either Type I or Type II Portland Cement may be used in concrete for structures and concrete pipe that will be in contact with near finish grade soils. Final recommendations for concrete should be in accordance with the latest UBC requirements. Chloride content and pH test results indicate no significant acidity of the soils. Resistivity test results indicate that the on-site soils are moderately to severely corrosive towards ferrous metals. Additional grading on the site may warrant revisions to these findings. All test results are summarized in **Table B-3** within this **Appendix.**

The following attachments completed this Appendix.

• Expansion Index Summary	Table B1
• Direct Shear Strength Parameters used in Analysis	Table B2
• Corrosion Test Results on Soil Samples	Table B3
• Particle-Size Distribution Test Reports	Figures B1.1 through B1.8
• Liquid and Plastic Limits Test Reports	Figures B2.1 through B2.14
• Compaction (Modified Proctor) Test Reports	Figures B3.1 through B3.21
• Consolidation Test Reports	Figures B4.1 through B4.69
• Direct Shear Test Results	Figures B5.1 through B5.66
• Family Shear Plots	Figures B6.1 through B6.8

APPENDIX B

EXPANSION TEST SUMMARY

SAMPLES	USCS	EXPANSION INDEX (UBC)	EXPANSION CLASSIFICATION (UBC)
B-15E @ 19'	CL	85	Medium
B-54E @ 0-10'	CL	51	Medium
B-65E @ 5-6'	CL	29	Low
B-3B @ 28'	CL	92	Medium

APPENDIX B

DIRECT SHEAR STRENGTH PARAMETERS USED IN ANALYSIS

MATERIAL	PEAK		ULTIMATE		RESIDUAL	
	COHESION (PSF)	PHI ø	COHESION (PSF)	PHI ø	COHESION (PSF)	PHI ø
Bedrock (TQs), Cross-bedding Upper Saugus Formation	400	38°	-	-	300	31°
Bedrock (TQs), Cross-bedding Lower Saugus Formation	600	38°	500	35°	-	-
Bedrock (TQs), Along-bedding	-	-	-	-	200	20°
Terrace Deposits (Qt)	300	31°	200	30°	-	-
Alluvium (Qal)	300	31°	200	29°	-	-
Slopewash (Qsw)	300	28°	250	28°	-	-
Landslide Debris (Qls)	200	29°	-	-	140	25°
Slide Plane (Sp)	200	15°	200	15°	200	15°
Qls Back Calculation*	200	15°	200	15°	200	15°
Artificial Fill (Cef),	300	30°	300	30°	300	30°

*See Slope Stability Analyses, **Appendix F**, Run No. 27.

APPENDIX B

CORROSION TEST RESULTS ON SOIL SAMPLES

Sample Location	B-1E @ 5'	B-15E @ 19'	B-54E @0-10'	B-57E @16'	B-65E @5-6'
Bedrock or Soil Type (USCS)	SM	TQs	TQs	ML	ML

Resistivity (Ω- cm)	1329	1256	897	644	3089
Corrosivity Potentia[1]	Corrosive	Corrosive	Severely Corrosive	Severely Corrosive	Moderately Corrosive

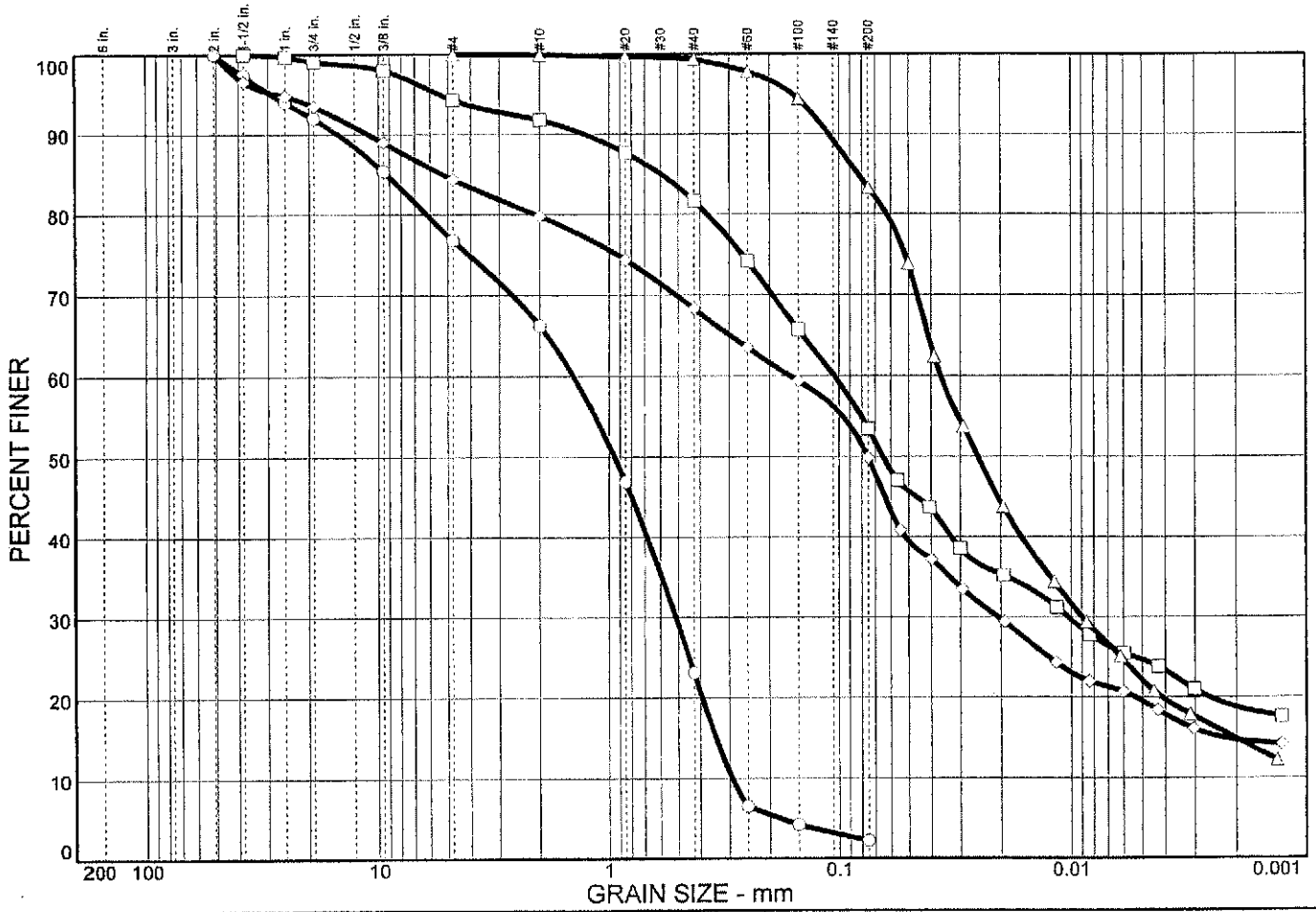
Chemical Analyses

pH	7.9	8.2	8.2	7.6	6.6
Chloride Cl_2 (ppm)	ND	8.1	3.6	2.7	27
Sulfate SO_4 (%)	.002	.001	.005	.001	.001
Concrete exposure to sulfate[2]	Negligible	Negligible	Negligible	Negligible	Negligible

ND = not detected

[1] Per County of Los Angeles Classification
[2] Per 1997 UBC- Table 19-A-4

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% COBBLES	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	8.0	15.2	10.5	43.2	20.9	2.2	
□	0.0	0.9	4.8	2.5	10.1	28.2	28.8	24.7
△	0.0	0.0	0.0	0.1	0.5	16.1	61.1	22.2
◇	0.0	6.5	9.1	4.6	11.5	18.4	30.4	19.5

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
○	B-2E		3	Poorly graded SAND with gravel	SP
□	B-10E		5,11	Yellowish brown sandy lean CLAY	CL
△	B-16E		20	Lean clay with sand	CL
◇	B-20E		0-10	Yellowish brown sandy lean CLAY with gravel	SC

PARTICLE SIZE DISTRIBUTION TEST REPORT

ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

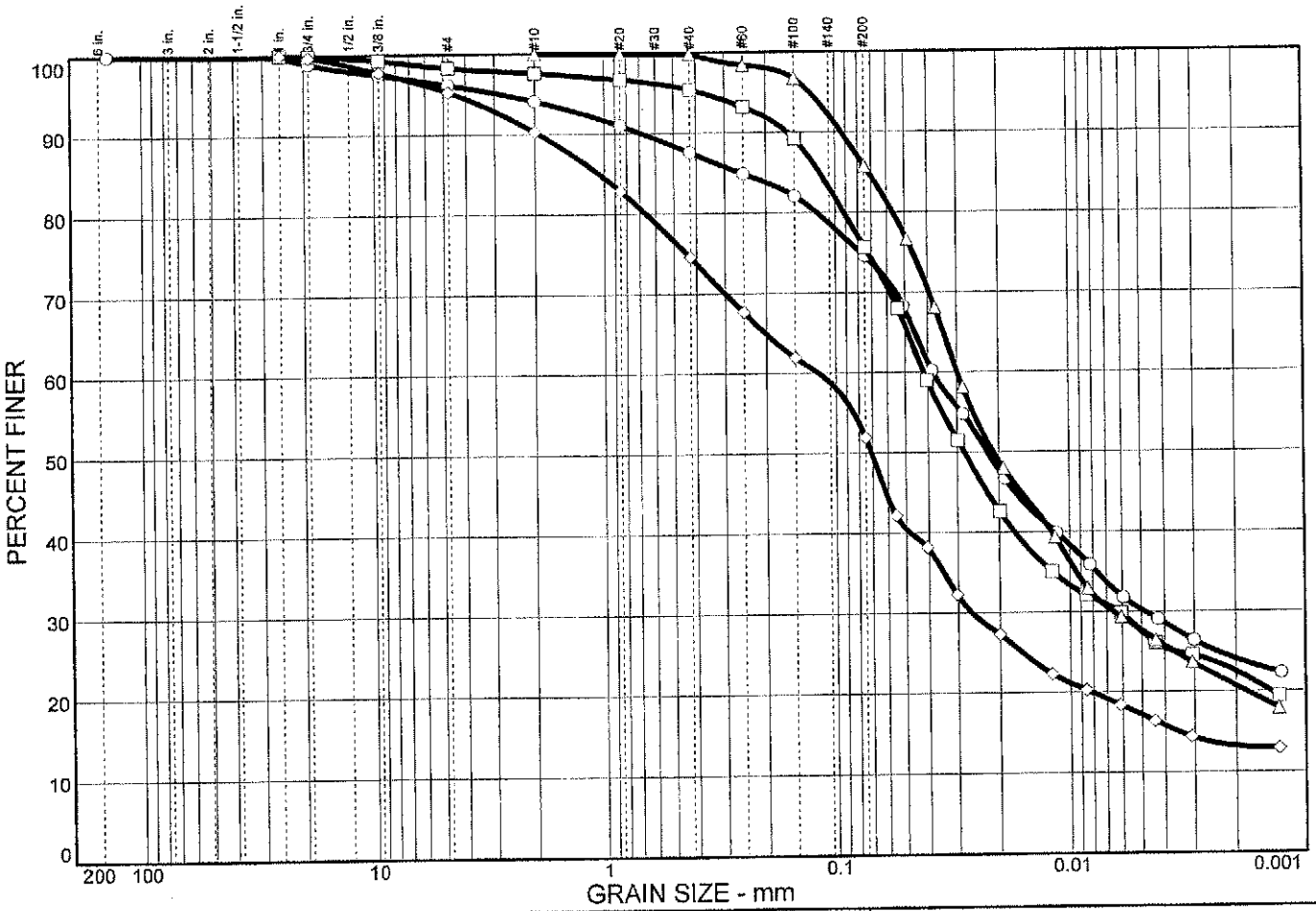
Client: Newhall Ranch Co.

Project: Newhall Ranch, Mesas-East

Project No.: 00-1703CM-1

Figure B1.1

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% COBBLES	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.1	1.0	2.7	2.1	6.5	13.0	44.3	30.3
□	0.0	0.1	1.6	0.7	2.2	19.7	48.1	27.6
△	0.0	0.0	0.0	0.0	0.2	14.0	58.1	27.7
◇	0.0	0.3	4.4	5.0	15.7	22.7	34.7	17.2

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
○	B-33E		3, 10	Yellowish brown lean CLAY with sand	CL
□	B-36E		20	Yellowish brown lean CLAY with sand	CL
△	B-39E		30	Lean CLAY	CL
◇	B-48E		0-10	Yellowish brown sandy lean CLAY	CL

PARTICLE SIZE DISTRIBUTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

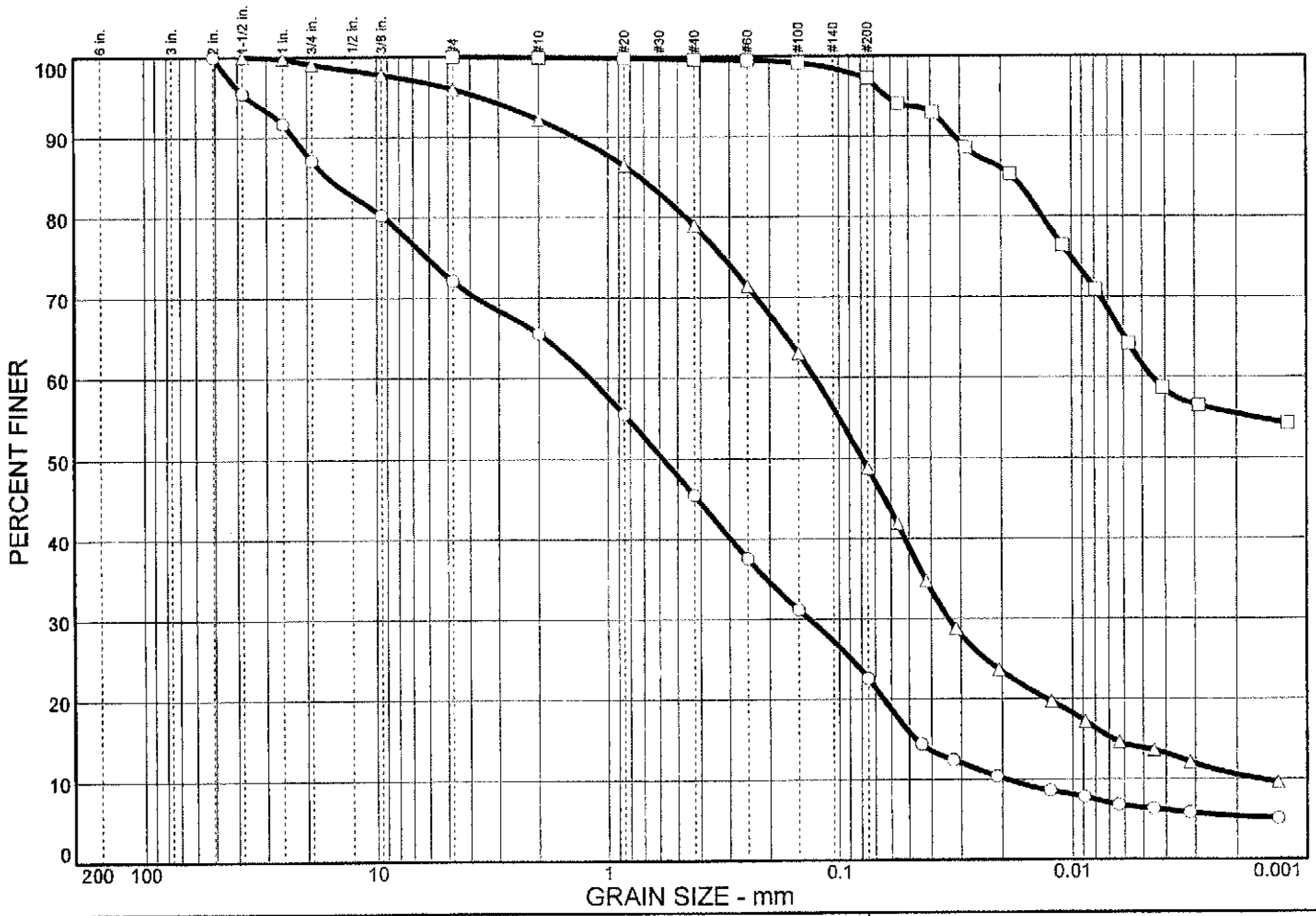
Client: Newhall Ranch Co.

Project: Mesas East - Phase II Landslide Investigation

Project No.: 00-1703QlsII-1

Figure B1.2

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% COBBLES	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	12.9	15.0	6.6	20.0	22.9	16.2	6.4
□	0.0	0.0	0.0	0.1	0.3	2.3	35.7	61.6
△	0.0	0.9	3.1	3.8	13.2	30.2	34.9	13.9

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
○	B-57E		5, 10	Yellowish brown clayey SAND with gravel	SC
□	B-58E		43.5	Fat clay	CH
△	B-61E		0-10	Yellowish brown clayey SAND	SC

PARTICLE SIZE DISTRIBUTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

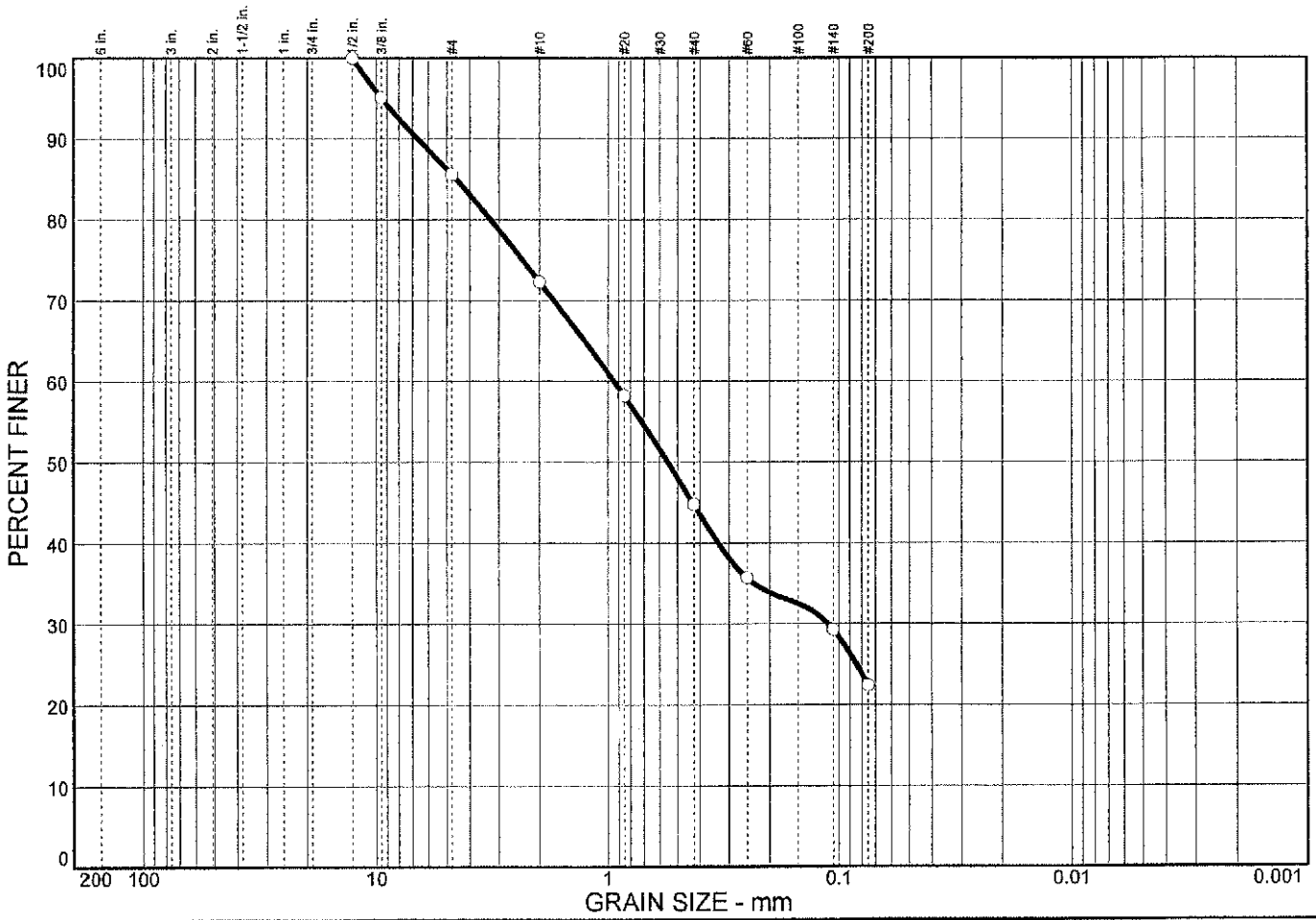
Client: Newhall Ranch Co.

Project: Newhall Ranch, Mesas-East

Project No.: 00-1703CM-1

Figure B1.3

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% COBBLES	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	14.4	13.3	27.5	22.4	22.4	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
○	HS-27T		0-25	Silty SAND	SM

PARTICLE SIZE DISTRIBUTION TEST REPORT

ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

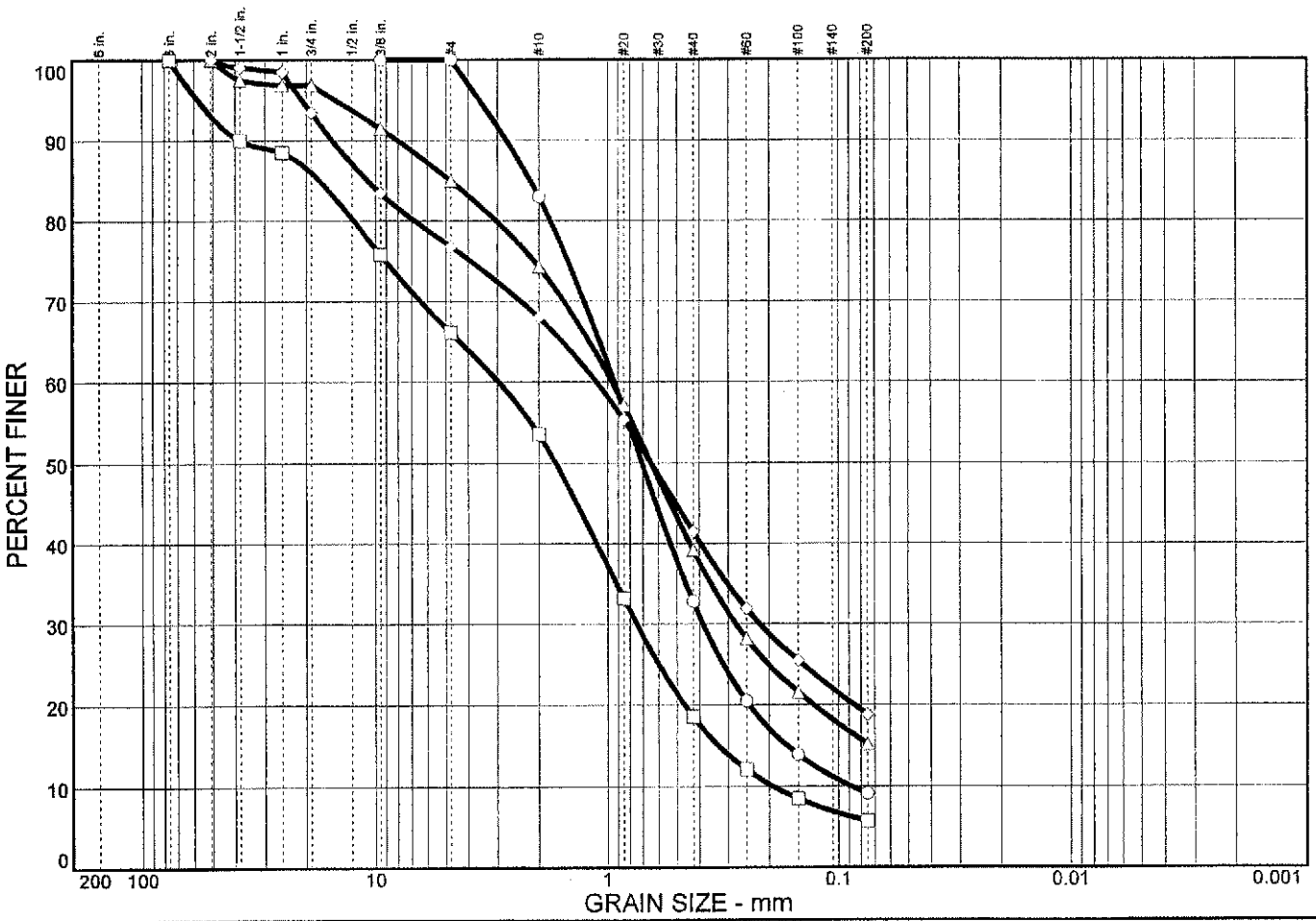
Client: Newhall Ranch Co.

Project: Mesas East

Project No.: 04-1703E-1

Figure B1.4

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% COBBLES	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	17.0	50.2	23.7	9.1	
□	0.0	13.9	20.0	12.5	35.0	12.9	5.7	
△	0.0	3.1	11.9	10.7	35.1	24.0	15.2	
◇	0.0	6.5	16.7	8.8	26.5	22.7	18.8	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
○	B-1B		12	Poorly graded SAND with silt	SP-SM
□	B-3B		16	Poorly graded sand with silt and gravel	SP-SM
△	B-6B		19	Silty SAND with gravel	SM
◇	B-7B		19	Silty SAND with gravel	SM

PARTICLE SIZE DISTRIBUTION TEST REPORT

ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

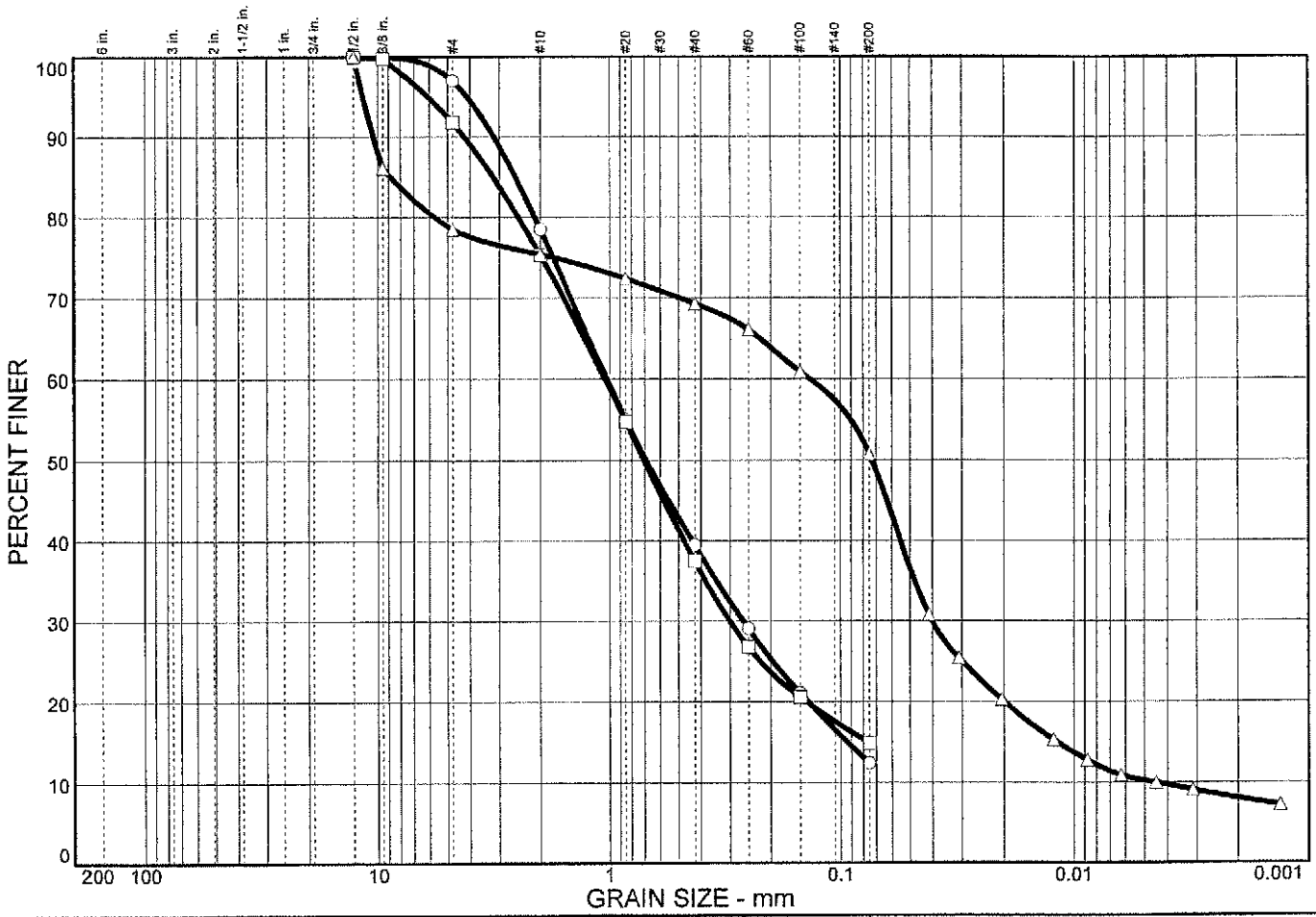
Client: Newhall Ranch Co.

Project: Cobble/Boulder Assessment
Airport and Exxon Mesas

Project No.: 02-1703B-1

Figure B1.5

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% COBBLES	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	3.0	18.5	39.0	27.1	12.4	
□	0.0	0.0	8.2	16.5	37.8	22.6	14.9	
△	0.0	0.0	21.5	3.1	6.1	18.5	40.6	10.2

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
○	RW-1		0-15	Brown to grayish-brown silty SAND	SM
□	RW-2		0-15	Brown to grayish-brown silty SAND	SM
△	RW-3		25	Brown sandy, silty CLAY with gravel	CL-ML

PARTICLE SIZE DISTRIBUTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

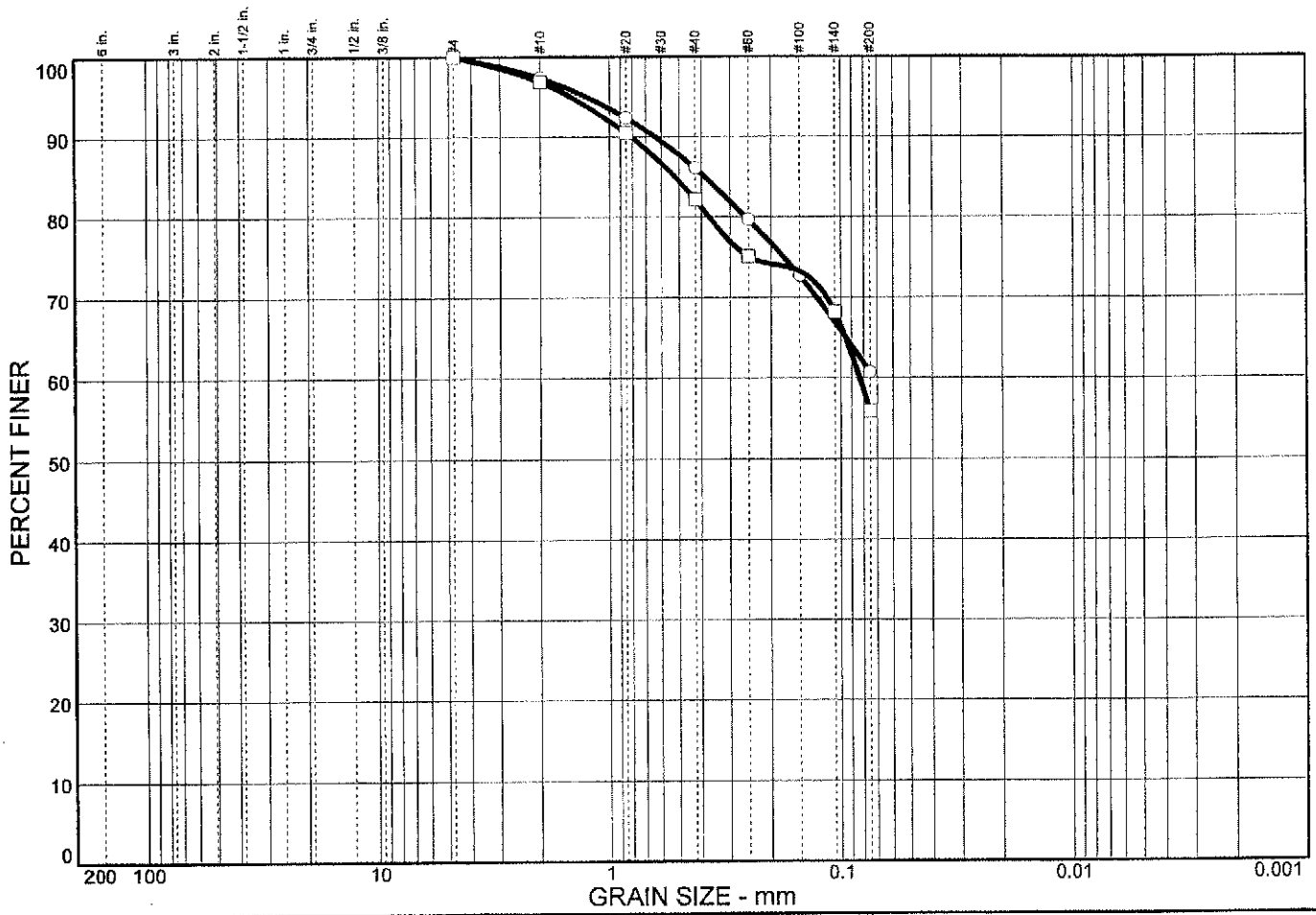
Client: Newhall Ranch Co.

Project: Newhall Ranch Mesas Area

Project No.: 99-1703L-1

Figure B1.6

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% COBBLES	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	2.6	11.3	25.4	60.7	
□	0.0	0.0	0.0	3.1	14.7	26.3	55.9	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
○	B-1M		25	Brown sandy lean CLAY	CL
□	B-4M		2, 10	Brown sandy SILT	ML

PARTICLE SIZE DISTRIBUTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

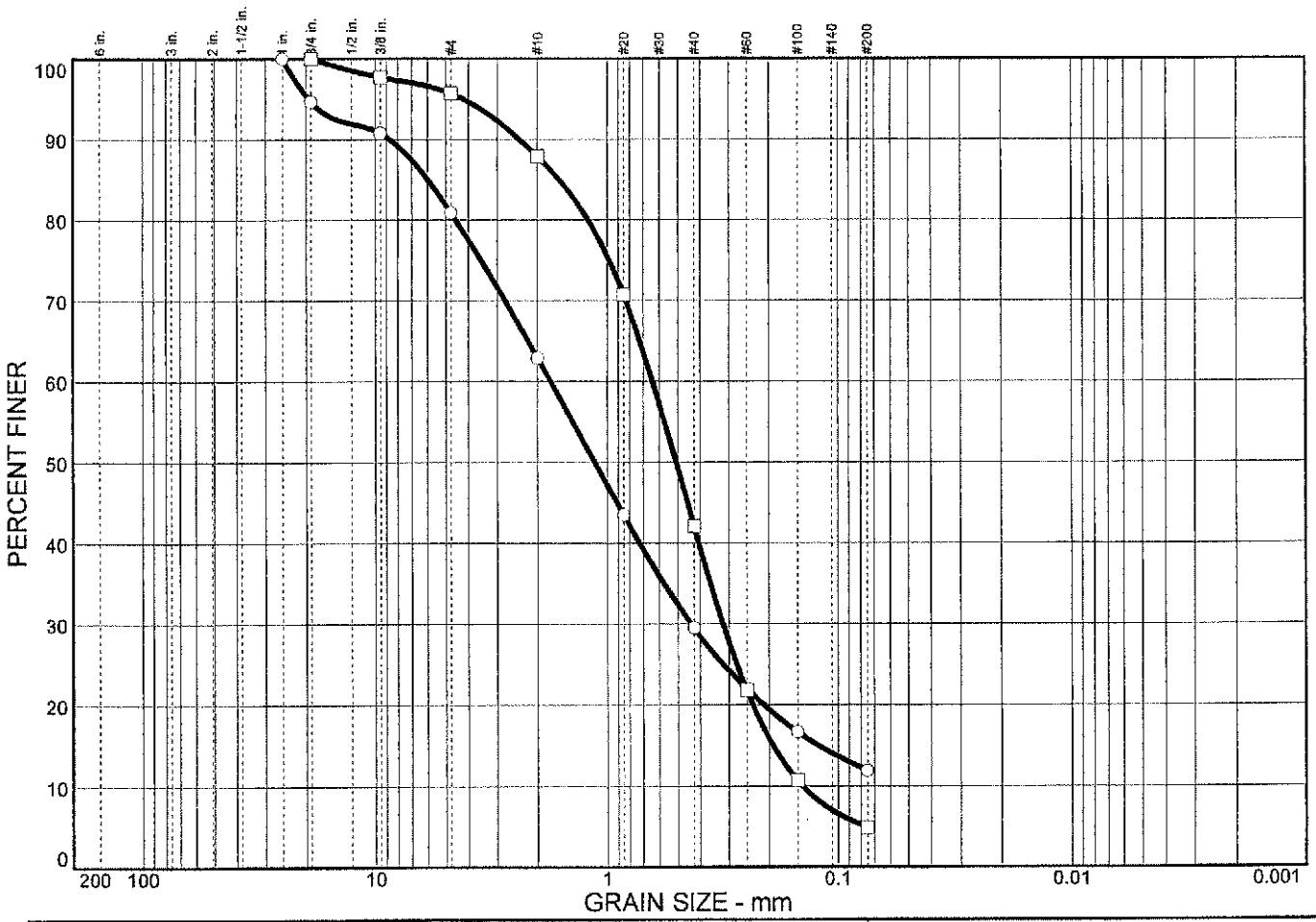
Client: Newhall Ranch Co.

Project: Mesas Entertainment

Project No.: 01-1703M-1

Figure B1.7

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% COBBLES	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	5.3	13.8	18.0	33.4	17.6	11.9	
□	0.0	0.0	4.3	7.8	45.8	37.2	4.9	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
○	HS-12I		15	Poorly graded SAND with silt and gravel	SP-SM
□	HS-14I		11	Poorly graded SAND	SP

PARTICLE SIZE DISTRIBUTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

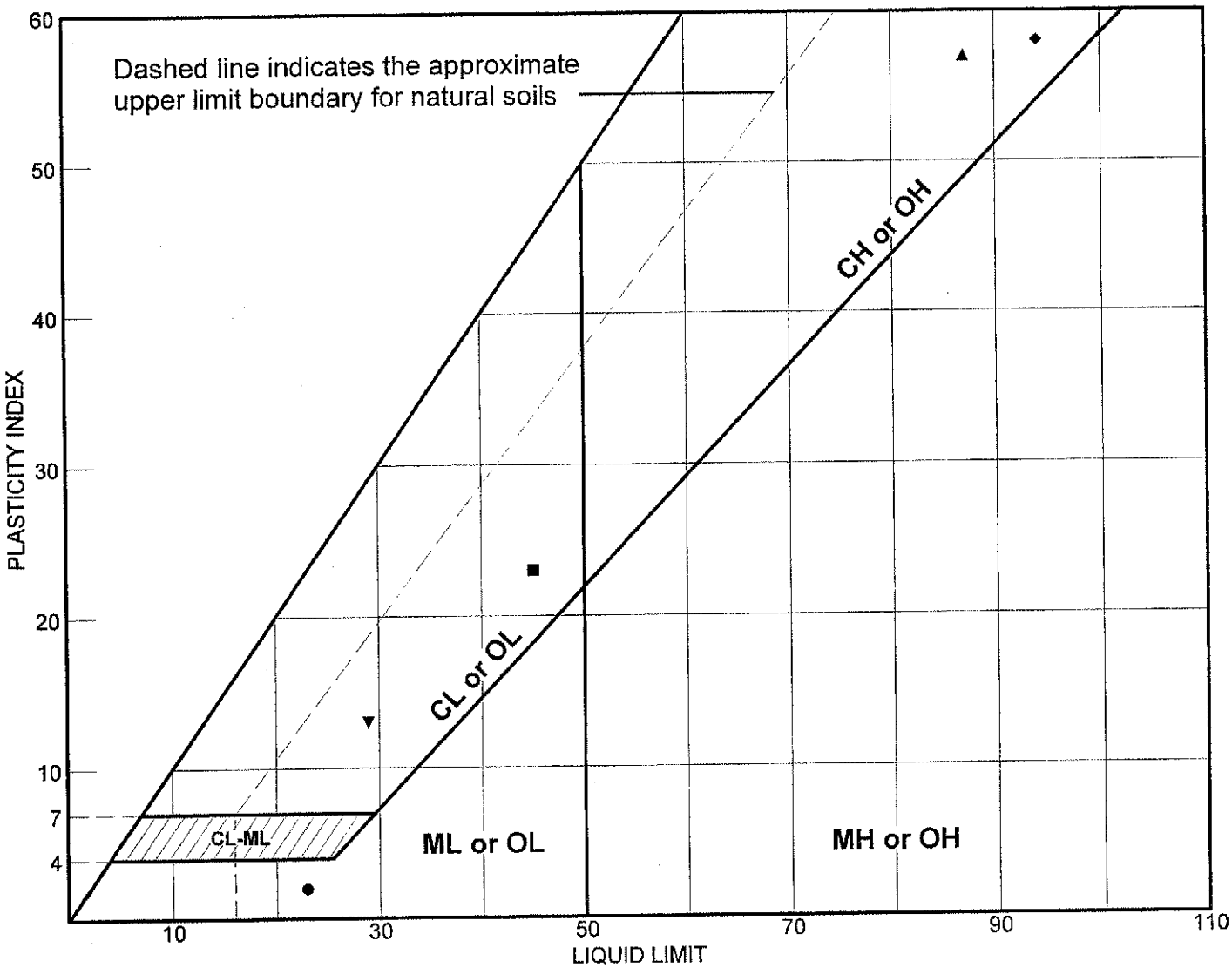
Client: Newhall Ranch

Project: Newhall Ranch Infrastructure

Project No.: 00-1155I-1

Figure B1.8

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-1E		10		21	23	2	SM
■	B-3E		5		22	45	23	CL
▲	B-10E		20	19.1	30	87	57	CH
◆	B-10E		23		36	94	58	CH
▼	B-10E		5,11		16	29	13	CL

LIQUID AND PLASTIC LIMITS TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

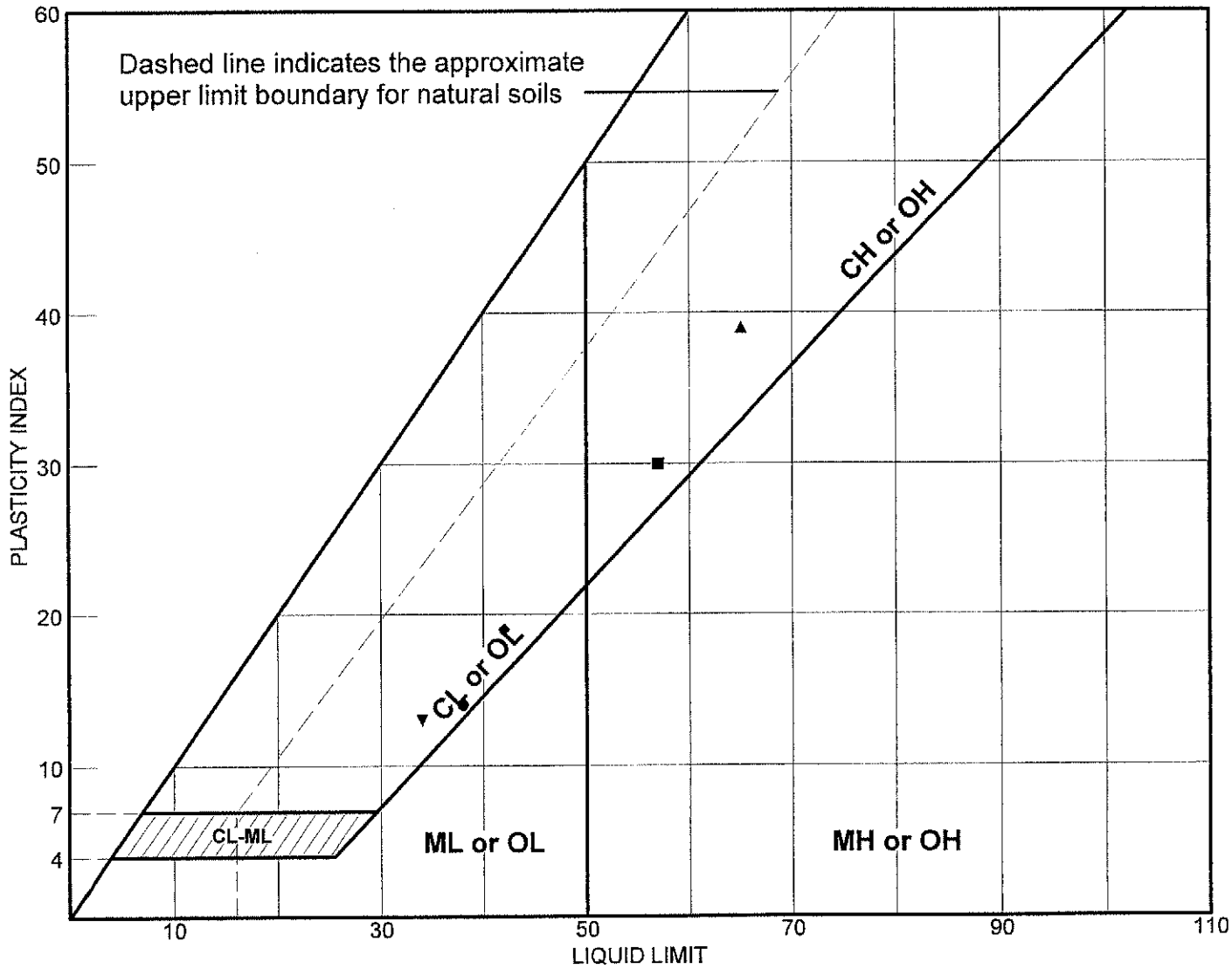
Client: Newhall Ranch Co.

Project: Mesas East - Phase II Landslide Investigation

Project No.: 00-1703QlsII-1

Figure B2.1

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-11E		25		24	38	14	CL
■	B-12E		20		27	57	30	CH
▲	B-13E		15.5		26	65	39	CH
◆	B-14E		15		23	42	19	CL
▼	B-16E		20	11.0	21	34	13	CL

LIQUID AND PLASTIC LIMITS TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

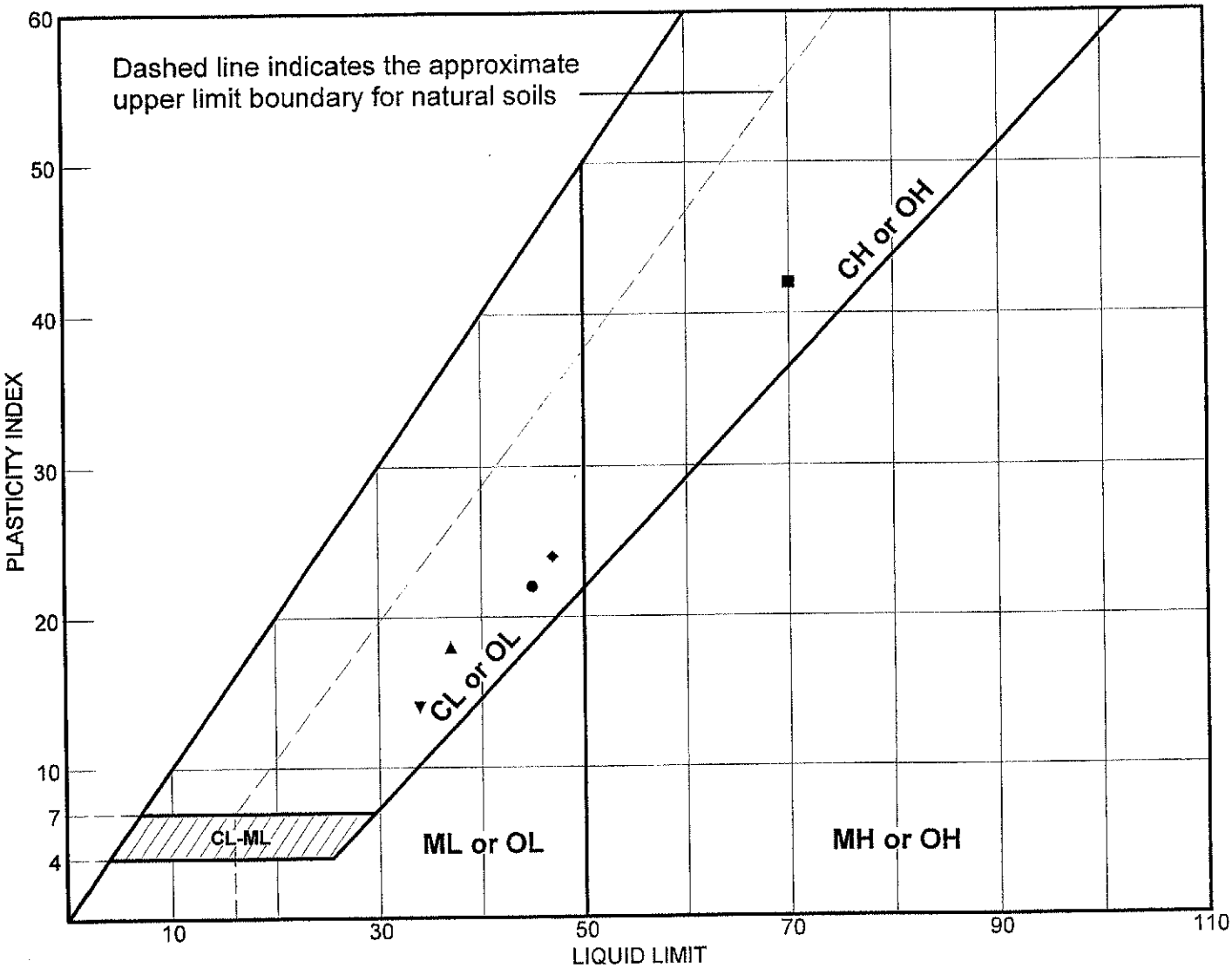
Client: Newhall Ranch Co.

Project: Mesas East - Phase II Landslide Investigation

Project No.: 00-1703QlsII-1

Figure B2.2

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-19E		10		23	45	22	CL
■	B-19E		21		28	70	42	CH
▲	B-20E		0-10		19	37	18	CL
◆	B-21E		69-70		23	47	24	CL
▼	B-22E		5		20	34	14	SC

LIQUID AND PLASTIC LIMITS TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

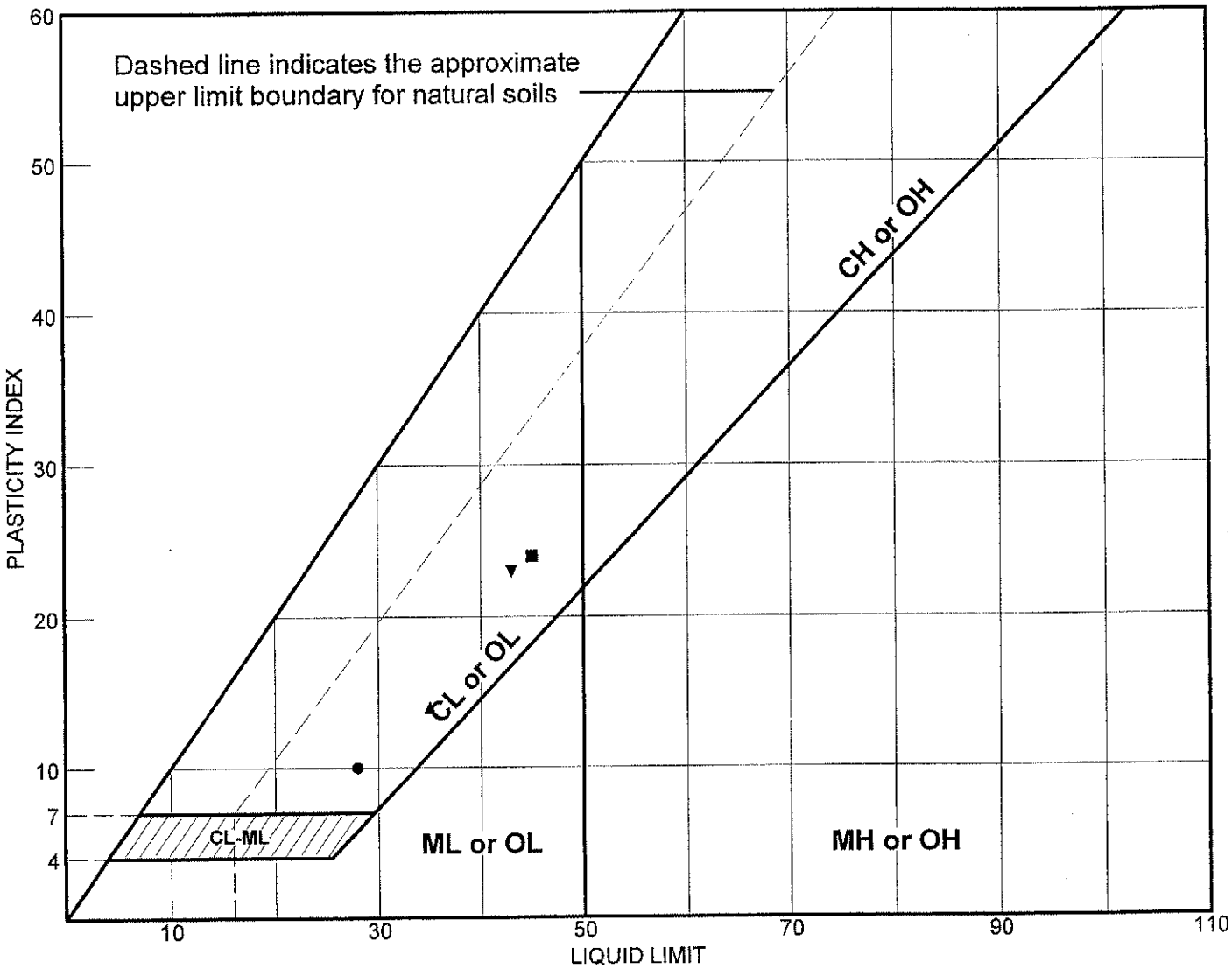
Client: Newhall Ranch Co.

Project: Mesas East - Phase II Landslide Investigation

Project No.: 00-1703QlsII-1

Figure B2.3

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-25E		1		18	28	10	SC
■	B-26E		30		21	45	24	CL
▲	B-27E		5		21	35	14	CL
◆	B-30E		10		18	28	10	SC
▼	B-32E		5		20	43	23	CL

LIQUID AND PLASTIC LIMITS TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

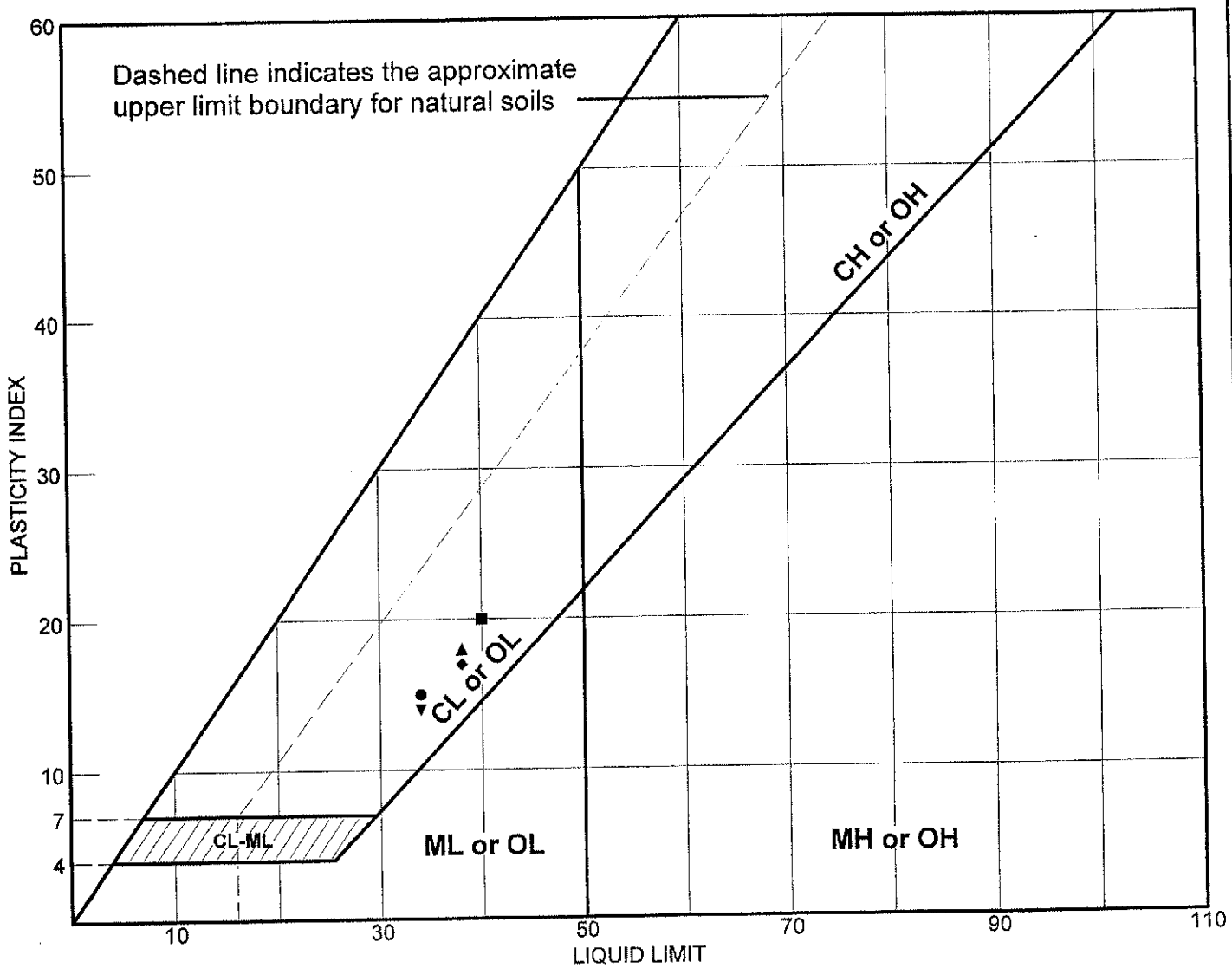
Client: Newhall Ranch Co.

Project: Mesas East - Phase II Landslide Investigation

Project No.: 00-1703QlsII-1

Figure B2.4

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-32E		20		19	34	15	CL
■	B-33E		3, 10		20	40	20	CL
▲	B-35E		5		20	38	18	CL
◆	B-35E		10		21	38	17	CL
▼	B-36E		20		20	34	14	CL

LIQUID AND PLASTIC LIMITS TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

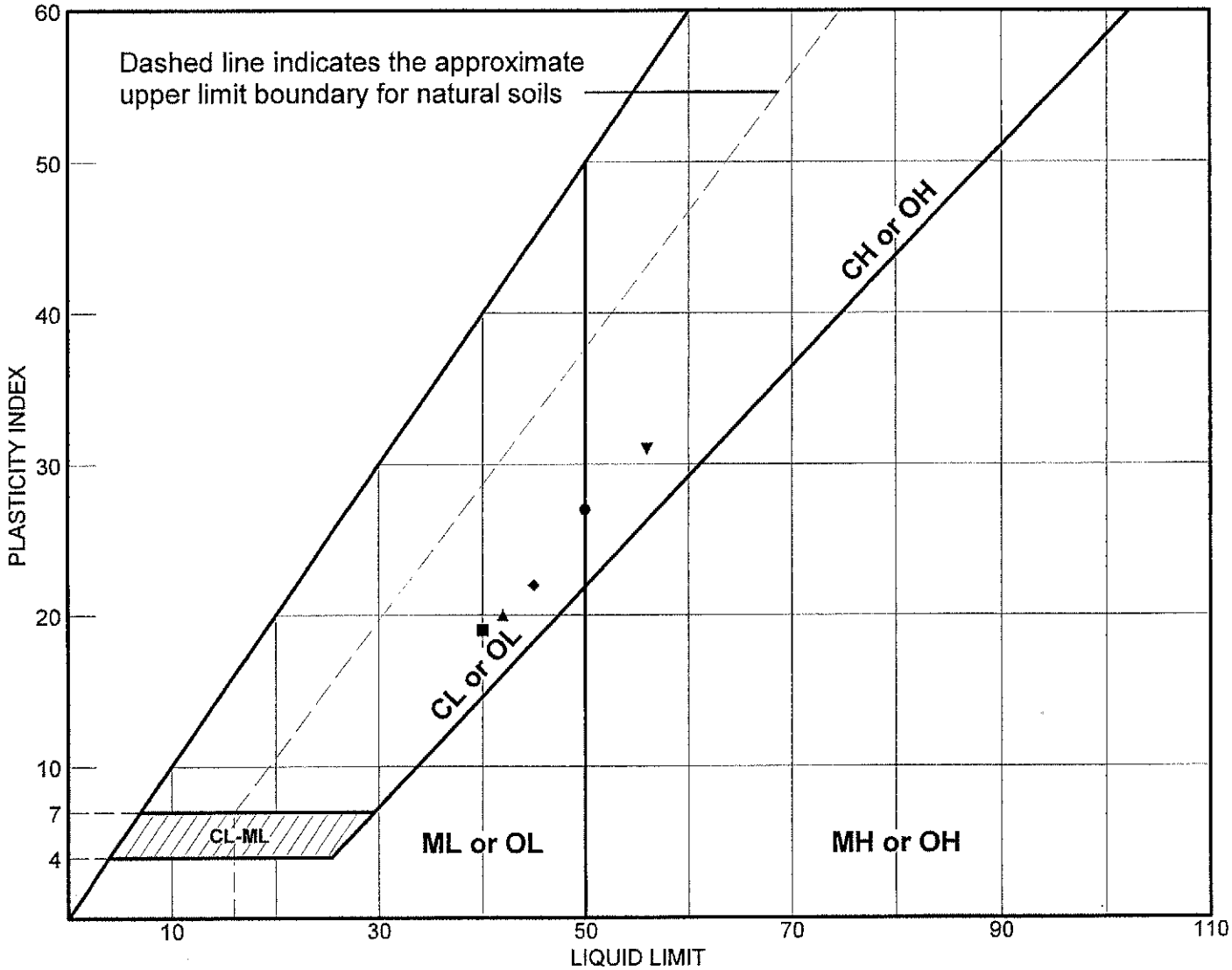
Client: Newhall Ranch Co.

Project: Mesas East - Phase II Landslide Investigation

Project No.: 00-1703QlsII-1

Figure B2.5

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-36E		25		23	50	27	CL-CH
■	B-39E		30		21	40	19	CL
▲	B-41E		10	14.0	22	42	20	CL
◆	B-42E		27		23	45	22	CL
▼	B-43E		20	16.4	25	56	31	CH

LIQUID AND PLASTIC LIMITS TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

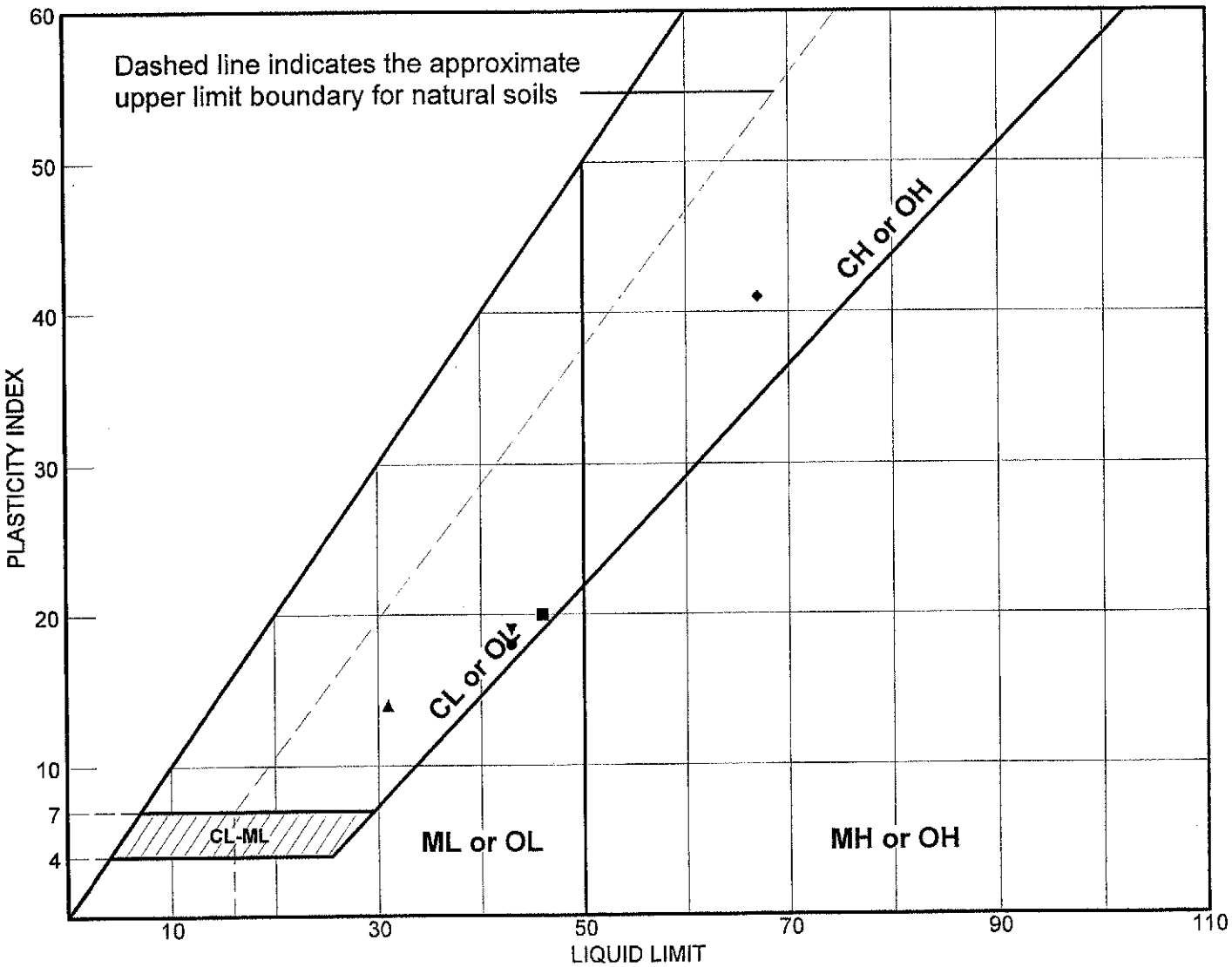
Client: Newhall Ranch Co.

Project: Mesas East - Phase II Landslide Investigation

Project No.: 00-1703QlsII-1

Figure B2.6

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-44E		10	11.4	25	43	18	CL
■	B-44E		27	16.8	26	46	20	CL
▲	B-48E		0-10		17	31	14	CL
◆	B-53E		25		26	67	41	CH
▼	B-56E		30		24	43	19	CL

LIQUID AND PLASTIC LIMITS TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

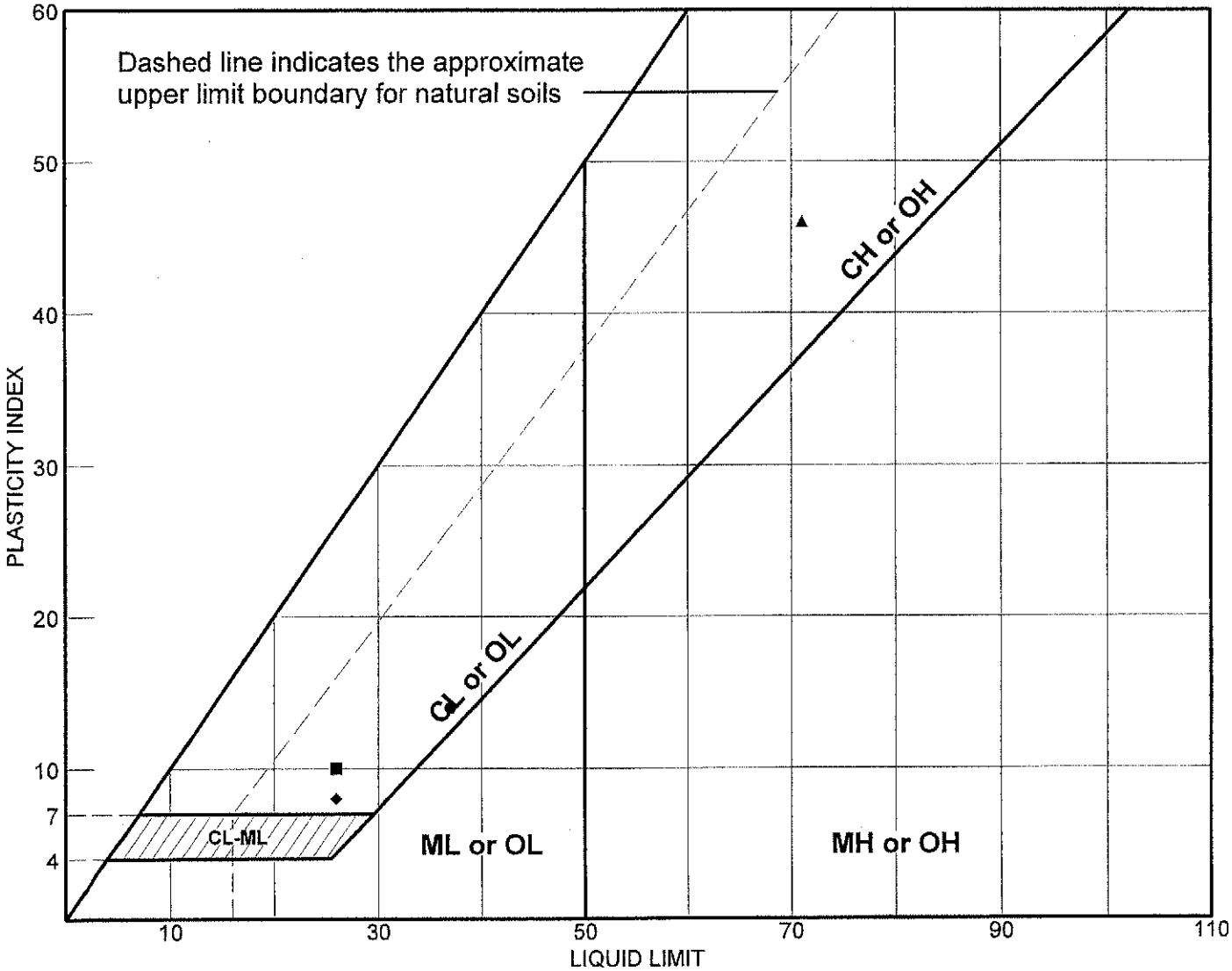
Client: Newhall Ranch Co.

Project: Mesas East - Phase II Landslide Investigation

Project No.: 00-1703QlsII-I

Figure B2.7

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-56E		60		23	37	14	CL
■	B-57E		5, 10		16	26	10	SC
▲	B-58E		43.5		25	71	46	CH
◆	B-60E		17		18	26	8	SC

LIQUID AND PLASTIC LIMITS TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

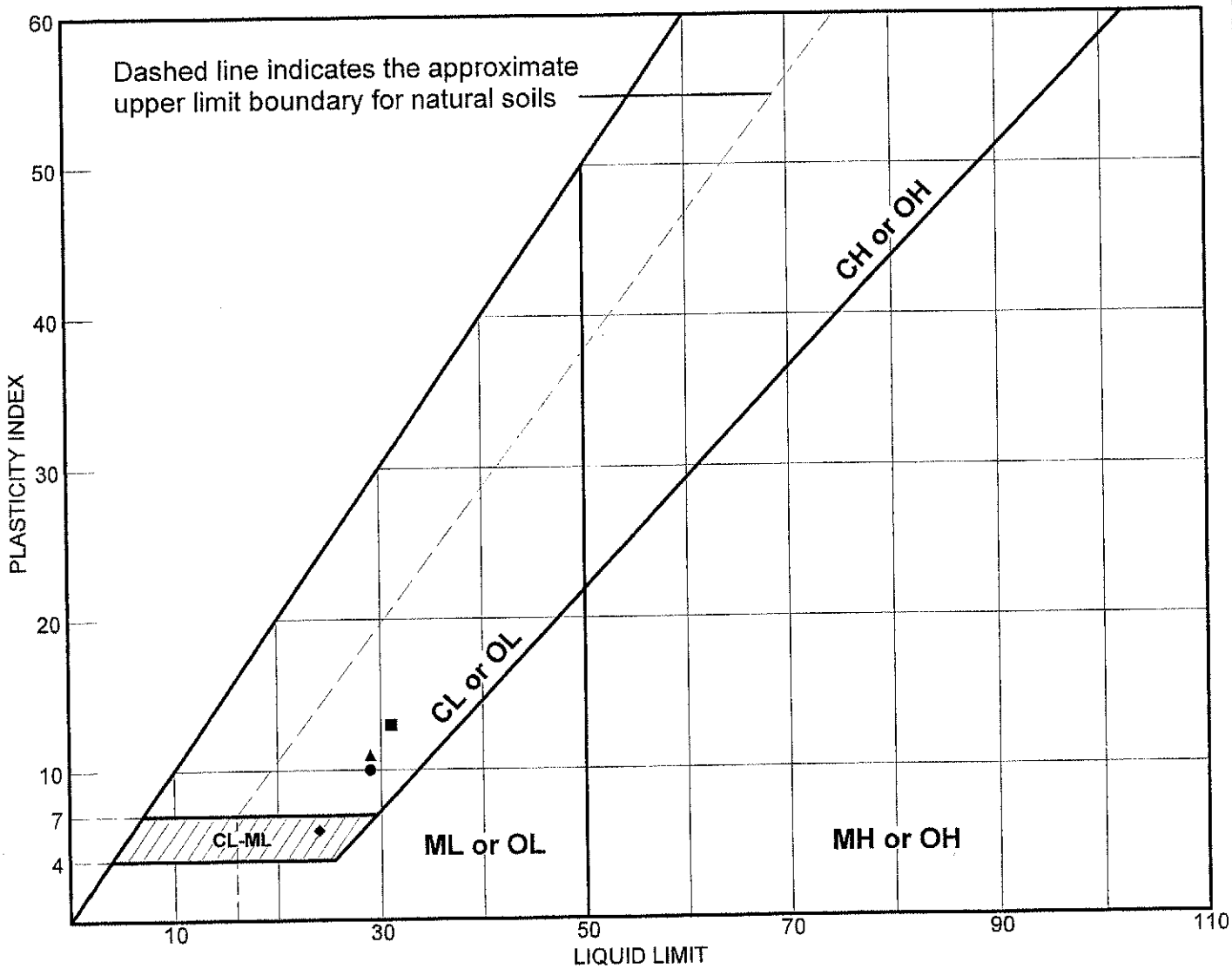
Client: Newhall Ranch Co.

Project: Mesas East - Phase II Landslide Investigation

Project No.: 00-1703QlsII-1

Figure B2.8

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-61E		10		19	29	10	CL
■	B-61E		40	11.0	18	31	13	CL
▲	B-61E		0-10		18	29	11	SC
◆	B-62E		20		18	24	6	CL-ML

LIQUID AND PLASTIC LIMITS TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

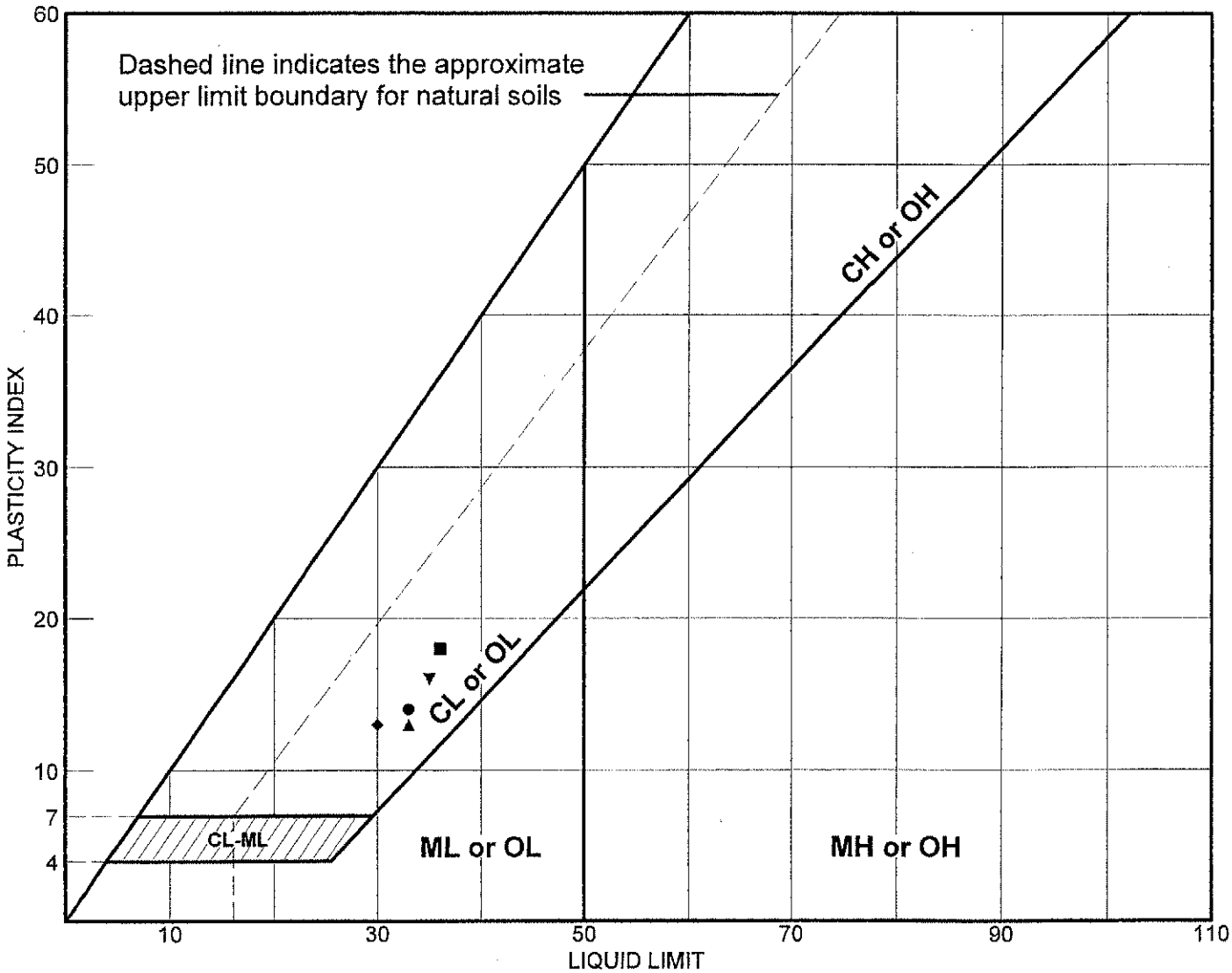
Client: Newhall Ranch Co.

Project: Mesas East - Phase II Landslide Investigation

Project No.: 00-1703QlsII-1

Figure B2.9

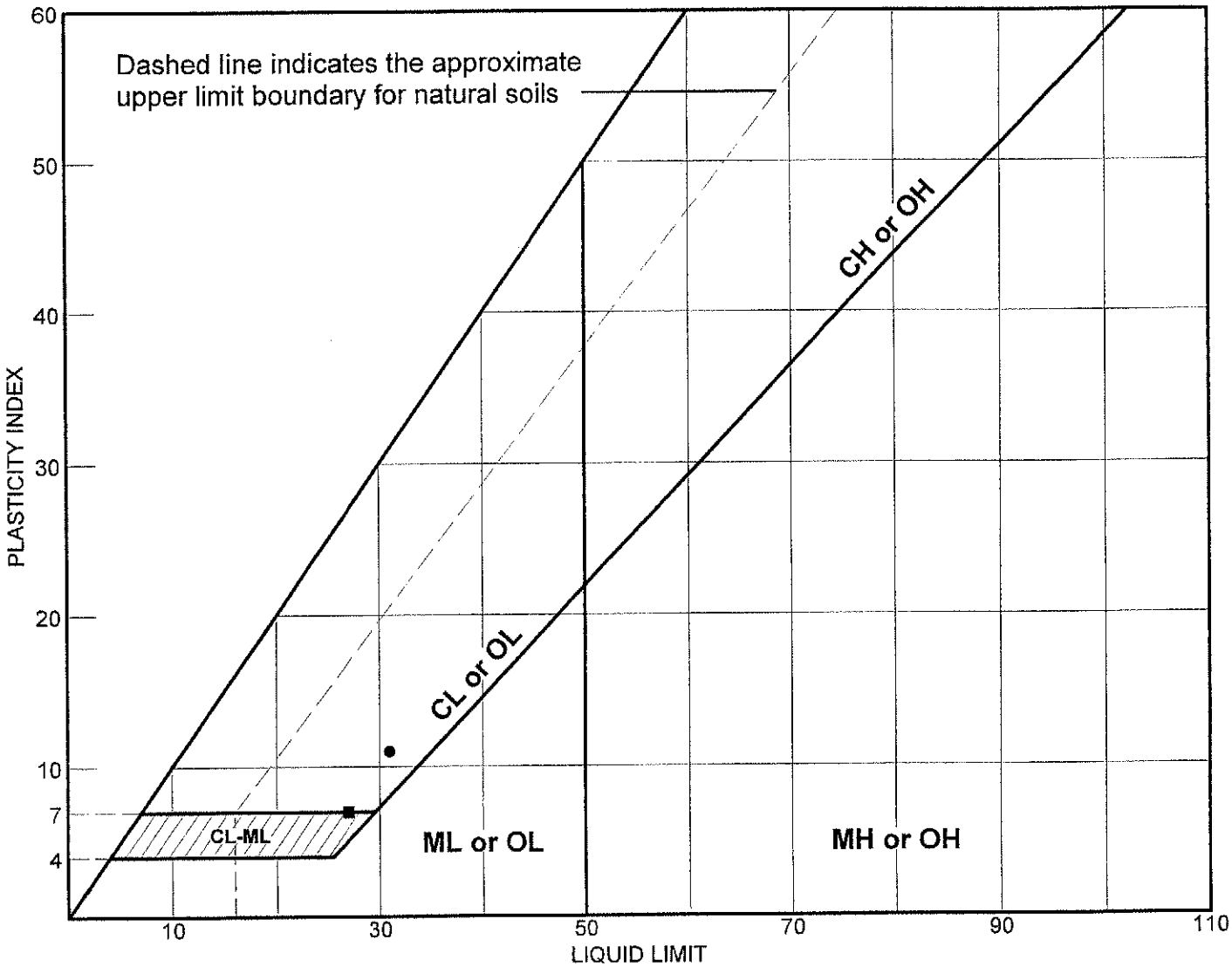
LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	HS-21T		20	14.8	19	33	14	CL
■	HS-23T		2	11.5	18	36	18	CL
▲	HS-23T		10	8.9	20	33	13	CL
◆	HS-24T		5	4.1	17	30	13	CL
▼	RW-1T		30	27.6	19	35	16	CL

LIQUID AND PLASTIC LIMITS TEST REPORT **ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.**	**Client:** Newhall Ranch Co. **Project:** Mesas East **Project No.:** 04-1703E-1 **Figure** B2.10

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	RW-2		10		20	31	11	CL
■	RW-3		25		20	27	7	CL-ML

LIQUID AND PLASTIC LIMITS TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

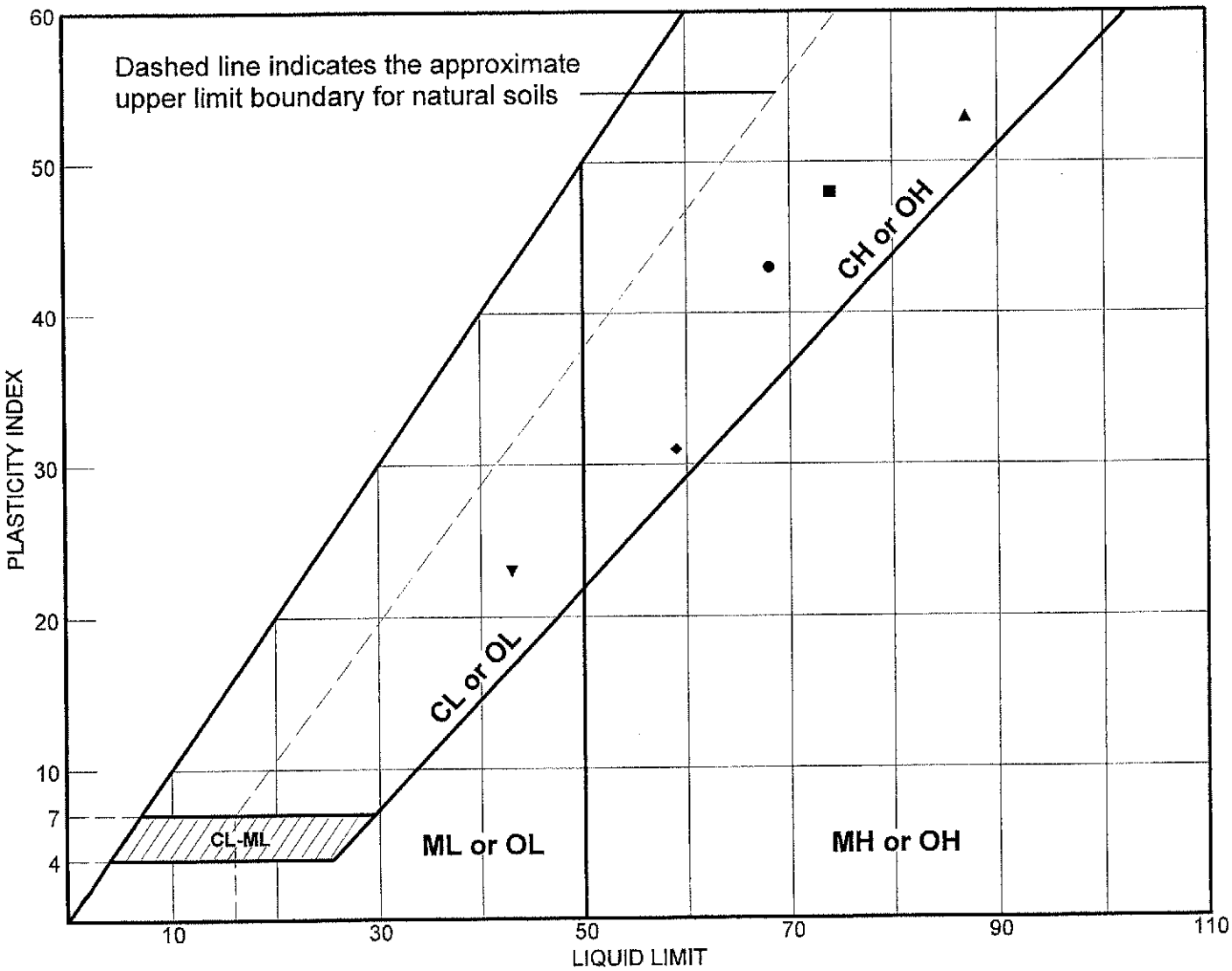
Client: Newhall Ranch Co.

Project: Newhall Ranch Mesas Area

Project No.: 99-1703L-1

Figure B2.11

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-3M		6		25	68	43	CH
■	B-4M		15.5		26	74	48	CH
▲	B-6M		28		34	87	53	CH
◆	B-7M		47.5		28	59	31	CH
▼	B-14M		10		20	43	23	CL

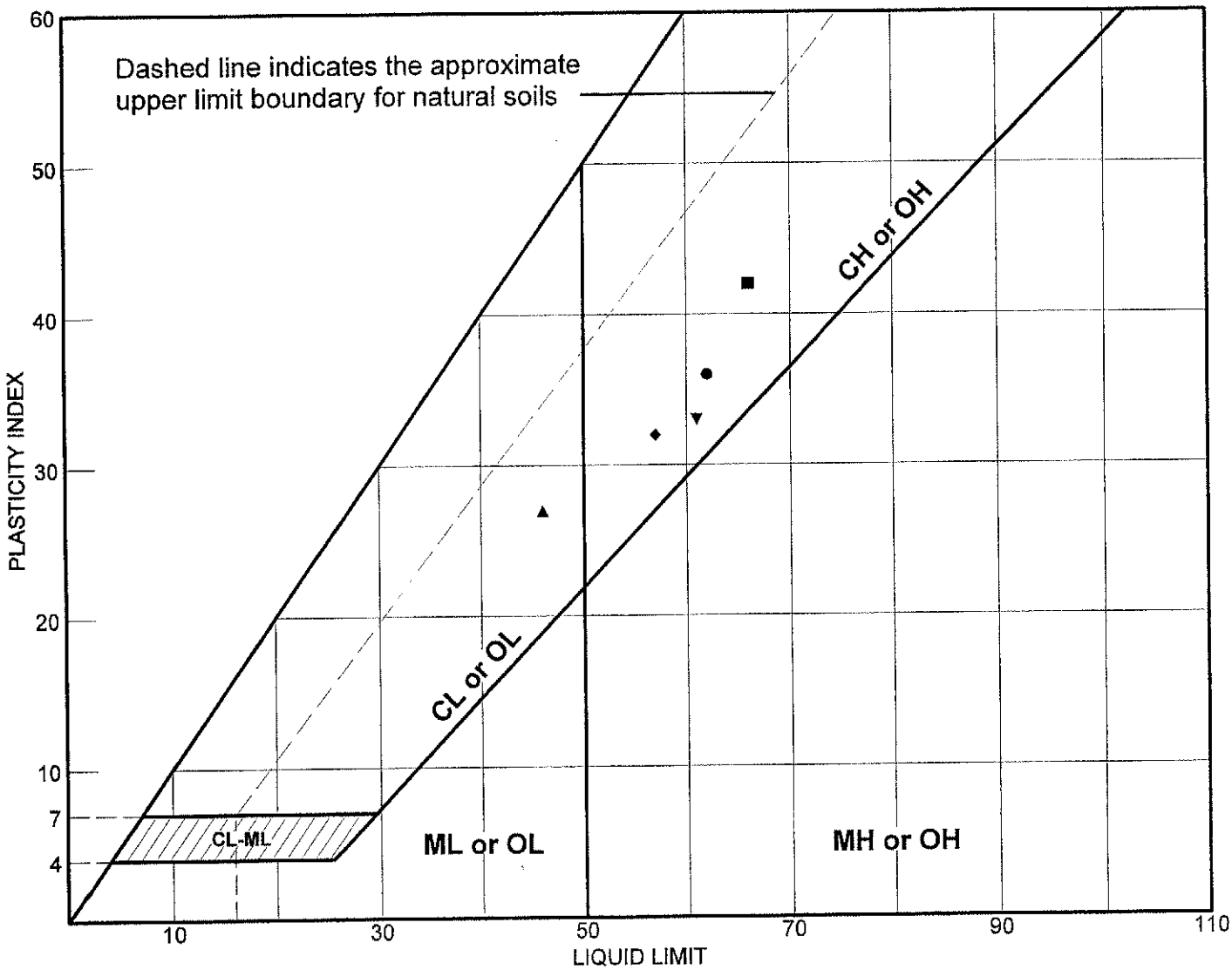
LIQUID AND PLASTIC LIMITS TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Mesas Entertainment

Project No.: 01-1703M-1 **Figure** B2.12

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-16M		34.5		26	62	36	CH
■	B-17M		14.5		24	66	42	CH
▲	B-18M		42		19	46	27	CL
◆	B-20M		54		25	57	32	CH
▼	B-21M		42		28	61	33	CH

LIQUID AND PLASTIC LIMITS TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

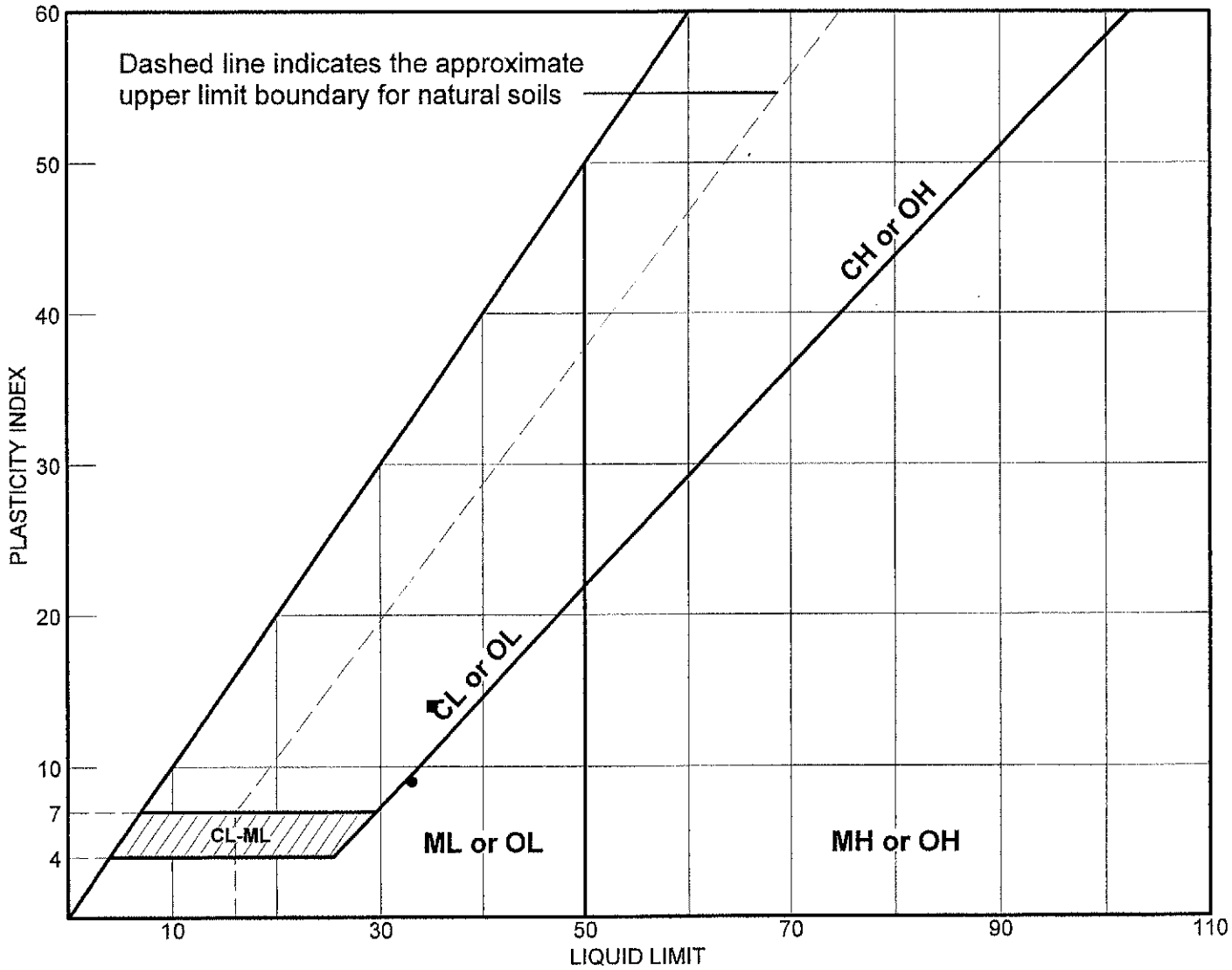
Client: Newhall Ranch Co.

Project: Mesas Entertainment

Project No.: 01-1703M-1

Figure B2.13

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-72E		30	16.7	24	33	9	CL-ML
■	B-73E		14	17.7	21	35	14	CL

LIQUID AND PLASTIC LIMITS TEST REPORT

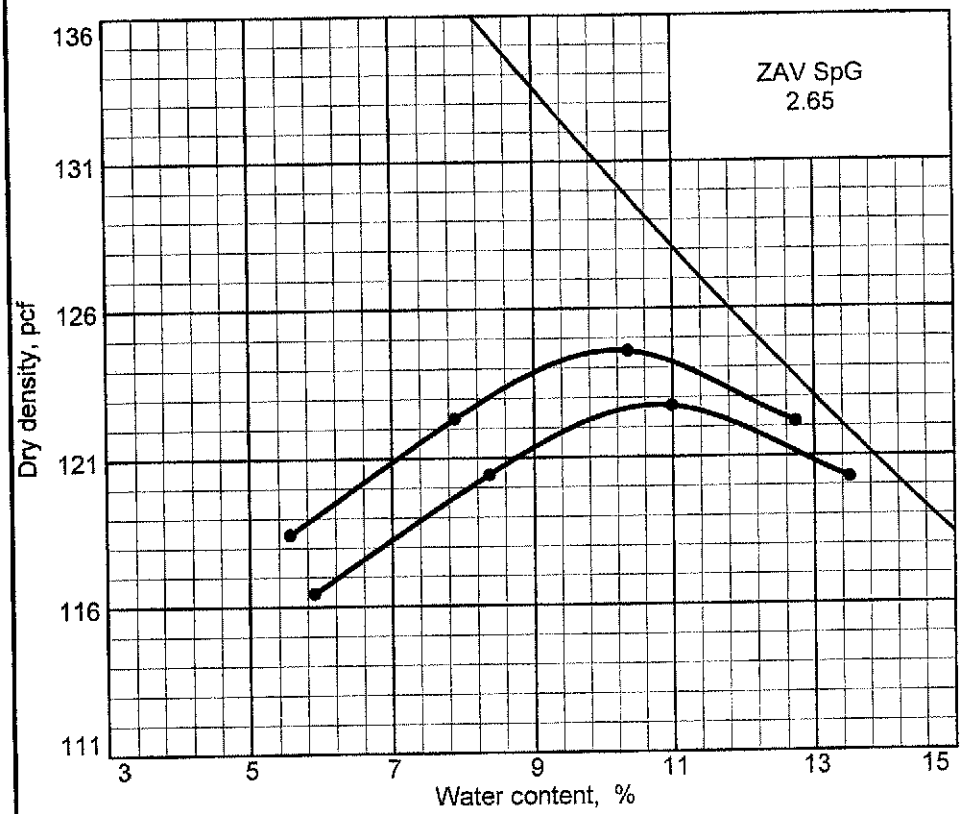
ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Company□Symbol\b

Project: Mesas East - Tentative Map

Project No.: 04-2023-4 **Figure** B2.14

COMPACTION TEST REPORT



Curve No.

A

Test Specification:

ASTM D 1557-91 Procedure A Modified
Oversize correction applied to each point

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.

Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL	29	**PI**	13
%>No.4	5.7	**%<#200**	53.5
USCS	CL	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.60	8.84	9.03	9.04		
WM	4.49	4.49	4.49	4.49		
WW + T #1	212.76	222.51	234.48	238.04		
WD + T #1	202.68	207.58	214.42	213.30		
TARE #1	31.79	29.22	31.86	30.16		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	5.6	7.9	10.4	12.7		
DRY DENSITY	118.4	122.3	124.6	122.2		

ROCK CORRECTED TEST RESULTS

Maximum dry density = 124.5 pcf

Optimum moisture = 10 %

Material Description

Yellowish brown sandy lean CLAY

Project No. 00-1703QlsII- **Client:** Newhall Ranch Co.

Project: Mesas East - Phase II Landslide Investigation

● **Source:** B-10E **Elev./Depth:** 5,11

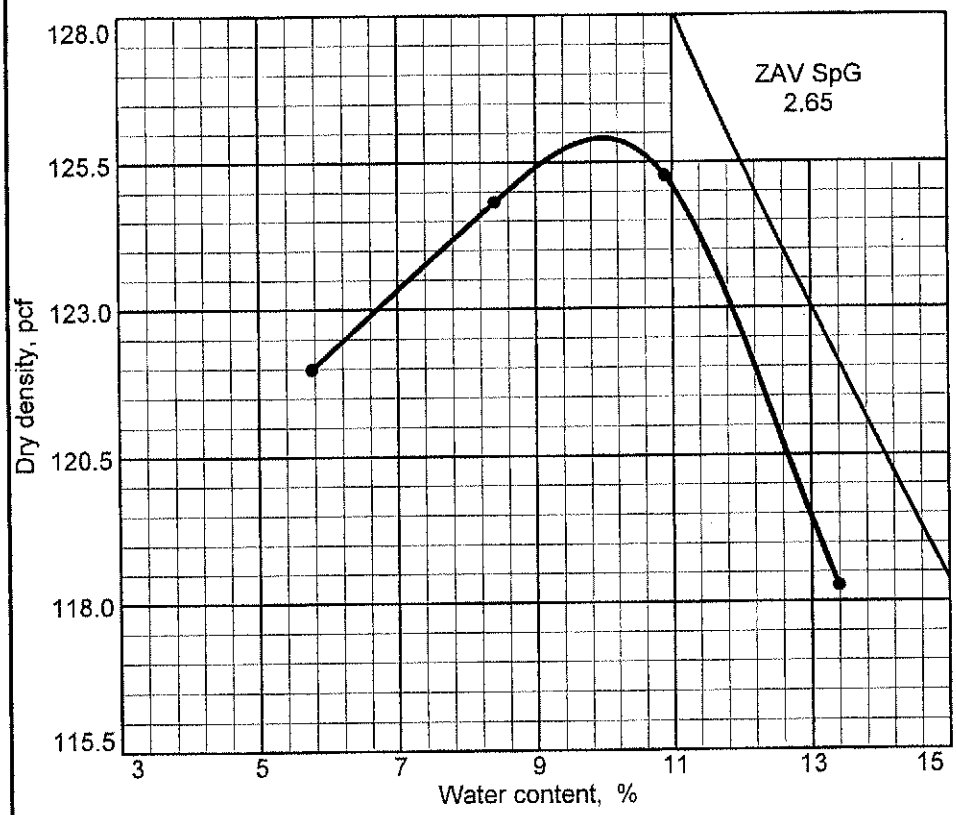
Remarks:

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B3.1

COMPACTION TEST REPORT



Curve No.
B

Test Specification:
ASTM D 1557-91 Procedure A Modified

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.
Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL		**PI**	
%>No.4	2.6	**%<#200**	45.1
USCS	SC	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.79	9.00	9.12	8.96		
WM	4.49	4.49	4.49	4.49		
WW + T #1	270.39	324.16	336.47	342.26		
WD + T #1	257.38	301.48	306.33	305.32		
TARE #1	31.38	31.62	29.62	29.54		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	5.8	8.4	10.9	13.4		
DRY DENSITY	122.0	124.8	125.3	118.3		

TEST RESULTS

Maximum dry density = 126 pcf

Optimum moisture = 10 %

Material Description

Yellowish brown clayey SAND with gravel

Project No. 00-1703CM-1 **Client:** Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

● **Source:** B-11E **Elev./Depth:** 5, 15

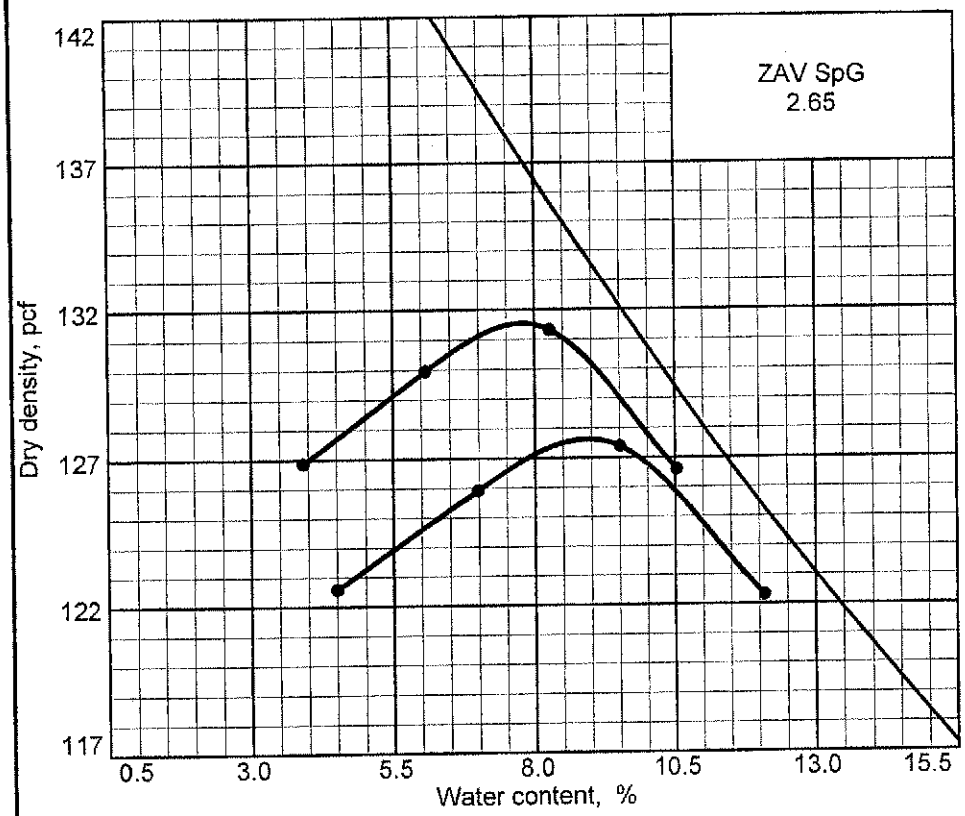
Remarks:

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B3.2

COMPACTION TEST REPORT



Curve No.
C

Test Specification:
ASTM D 1557-91 Procedure A Modified
Oversize correction applied to each point

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.
Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL		**PI**	
%>No.4	13.0	**%<#200**	53.0
USCS	CL	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.76	8.98	9.14	9.06		
WM	4.49	4.49	4.49	4.49		
WW + T #1	314.72	324.11	331.50	343.30		
WD + T #1	302.54	305.15	305.51	309.86		
TARE #1	32.12	33.74	32.29	33.45		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	3.9	6.1	8.3	10.5		
DRY DENSITY	126.9	130.0	131.3	126.6		

ROCK CORRECTED TEST RESULTS

Maximum dry density = 131.5 pcf

Optimum moisture = 8 %

Material Description

Yellowish brown sandy lean CLAY

Project No. 00-1703QlsII- **Client:** Newhall Ranch Co.
Project: Mesas East - Phase II Landslide Investigation

• **Source:** B-18E **Elev./Depth:** 5

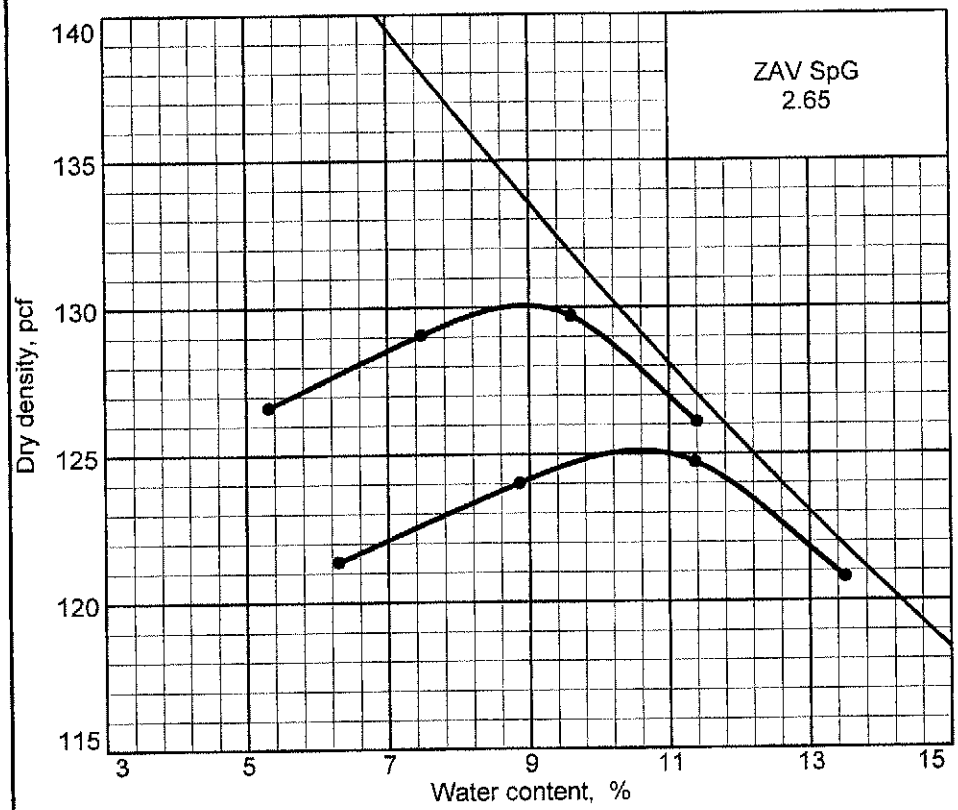
Remarks:

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B3.3

COMPACTION TEST REPORT



Curve No.
D

Test Specification:
ASTM D 1557-91 Procedure A Modified
Oversize correction applied to each point

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.
Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL	37	**PI**	18
%>No.4	15.6	**%<#200**	52.3
USCS	CL	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.79	8.99	9.12	9.06		
WM	4.49	4.49	4.49	4.49		
WW + T #1	215.18	221.39	227.56	234.21		
WD + T #1	204.34	206.00	207.30	209.30		
TARE #1	32.18	32.29	29.17	24.91		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	5.3	7.5	9.6	11.4		
DRY DENSITY	126.6	129.1	129.7	126.1		

ROCK CORRECTED TEST RESULTS

Maximum dry density = 130 pcf

Optimum moisture = 9 %

Material Description

Yellowish brown sandy lean CLAY with gravel

Project No. 00-1703QlsII- **Client:** Newhall Ranch Co.
Project: Mesas East - Phase II Landslide Investigation

● **Source:** B-20E **Elev./Depth:** 0-10

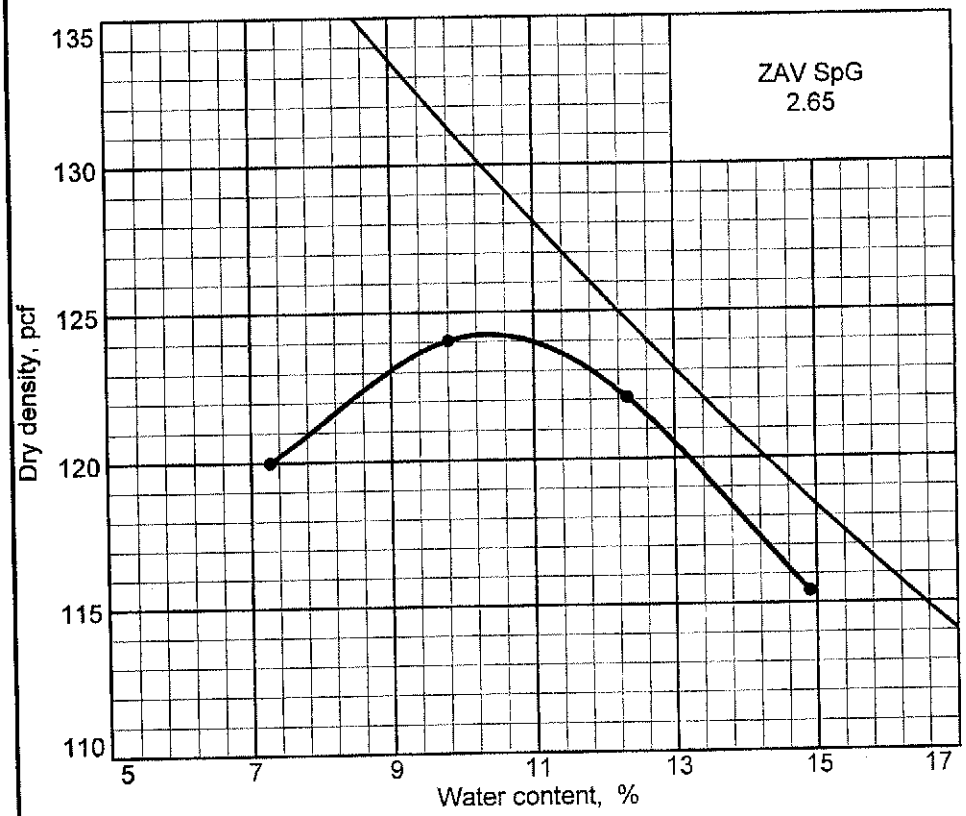
Remarks:

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B3.4

COMPACTION TEST REPORT



Curve No.
E

Test Specification:
ASTM D 1557-91 Procedure A Modified

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.
Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL		**PI**	
%>No.4	4.4	**%<#200**	71.4
USCS	CL	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.78	9.03	9.06	8.91		
WM	4.49	4.49	4.49	4.49		
WW + T #1	215.53	223.70	237.52	249.70		
WD + T #1	203.05	206.56	214.94	221.39		
TARE #1	31.41	31.84	31.72	31.39		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	7.3	9.8	12.3	14.9		
DRY DENSITY	120.0	124.0	122.1	115.4		

TEST RESULTS

Maximum dry density = 124 pcf

Optimum moisture = 10.5 %

Material Description

Yellowish brown lean CLAY with sand

Project No. 00-1703CM-1 **Client:** Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

● **Source:** B-29E **Elev./Depth:** 0-10

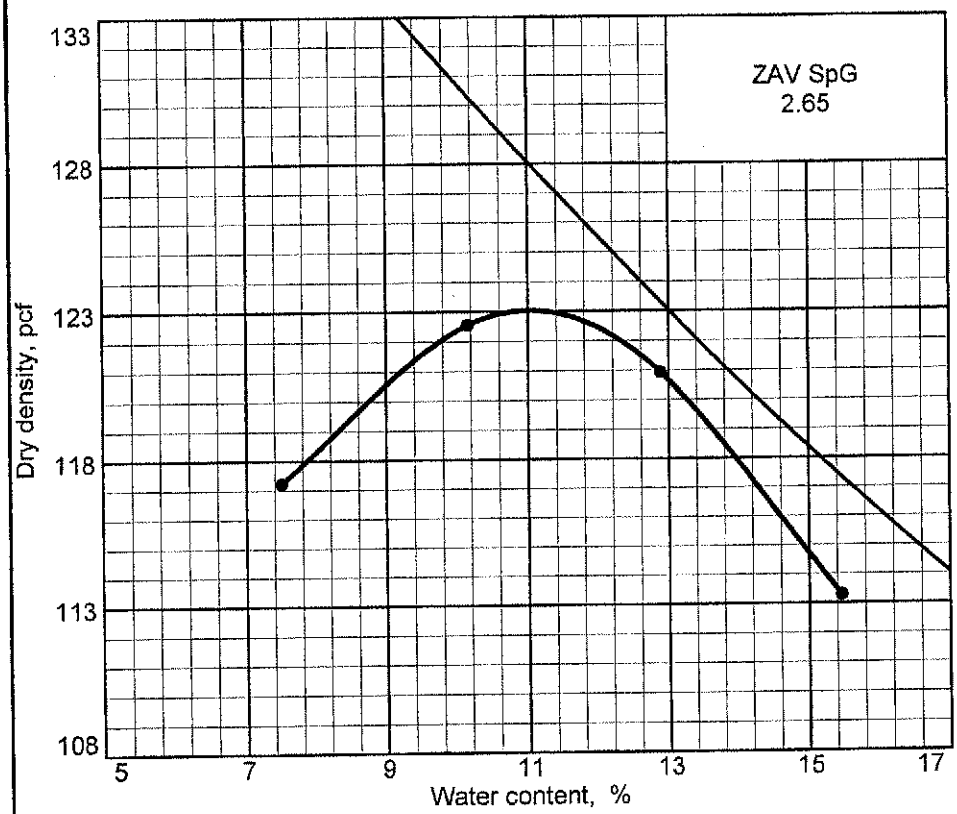
Remarks:

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B3.5

COMPACTION TEST REPORT



Curve No.
F

Test Specification:
ASTM D 1557-91 Procedure A Modified

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.
Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL		**PI**	
%>No.4	2.8	**%<#200**	70.0
USCS	CL	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.69	8.99	9.04	8.85		
WM	4.49	4.49	4.49	4.49		
WW + T #1	254.09	355.79	367.26	374.95		
WD + T #1	238.44	325.87	329.02	328.65		
TARE #1	29.64	31.44	32.20	29.30		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	7.5	10.2	12.9	15.5		
DRY DENSITY	117.2	122.6	120.9	113.3		

TEST RESULTS

Maximum dry density = 123 pcf

Optimum moisture = 11 %

Material Description

Yellowish brown lean CLAY with sand

Project No. 00-1703CM-1 **Client:** Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

● **Source:** B-30E **Elev./Depth:** 0-10

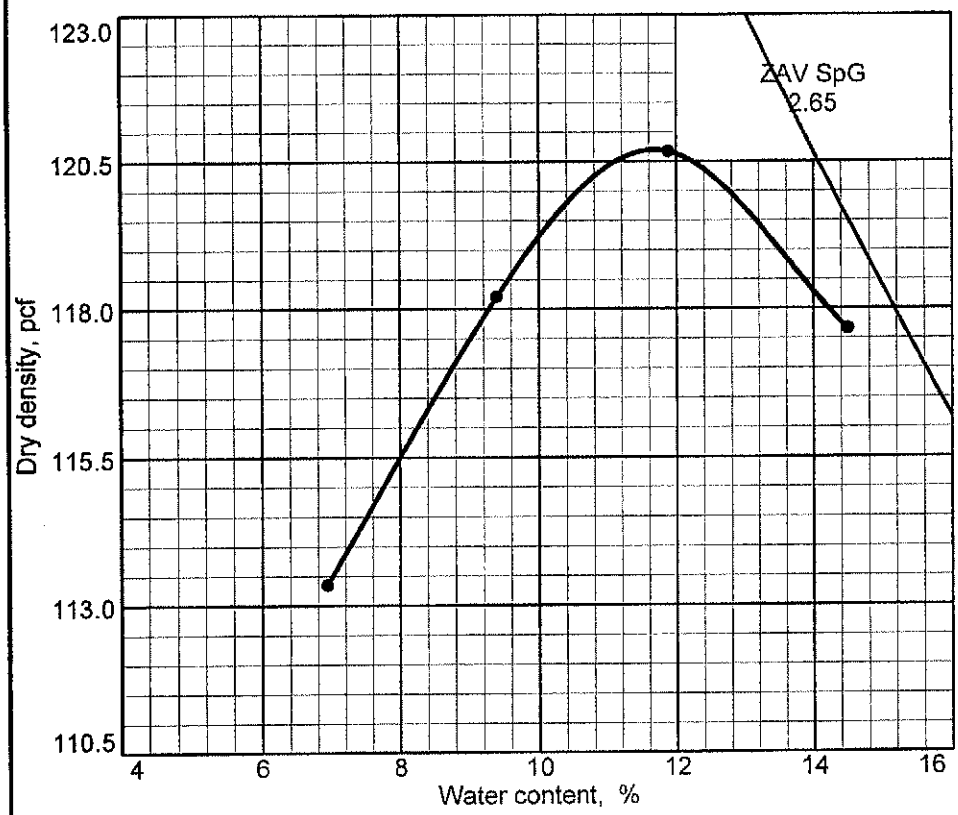
Remarks:

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B3.6

COMPACTION TEST REPORT



Curve No.
G

Test Specification:
ASTM D 1557-91 Procedure A Modified

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.

Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL	40	**PI**	20
%>No.4	3.8	**%<#200**	74.6
USCS	CL	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.53	8.80	8.99	8.98		
WM	4.49	4.49	4.49	4.49		
WW + T #1	217.18	221.75	232.11	236.40		
WD + T #1	205.02	205.46	210.87	210.44		
TARE #1	29.73	32.03	32.12	31.28		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	6.9	9.4	11.9	14.5		
DRY DENSITY	113.3	118.2	120.7	117.7		

TEST RESULTS

Maximum dry density = 120.5 pcf

Optimum moisture = 11.5 %

Material Description

Yellowish brown lean CLAY with sand

Project No. 00-1703CM-1 **Client:** Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

● **Source:** B-33E **Elev./Depth:** 3, 10

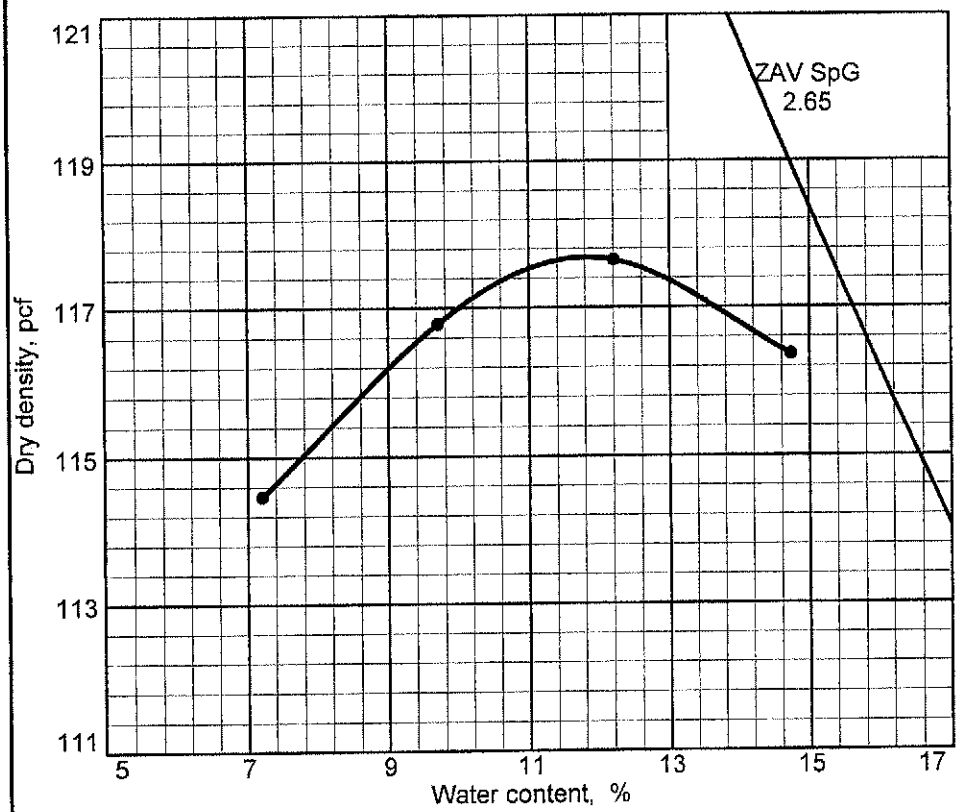
Remarks:

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B3.7

COMPACTION TEST REPORT



Curve No.
H

Test Specification:
ASTM D 1557-91 Procedure A Modified

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.

Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL	34	**PI**	14
%>No.4	1.7	**%<#200**	75.7
USCS	CL	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.58	8.76	8.89	8.94		
WM	4.49	4.49	4.49	4.49		
WW + T #1	237.55	246.62	251.14	254.67		
WD + T #1	223.75	227.62	227.32	225.34		
TARE #1	32.21	31.75	32.25	26.31		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	7.2	9.7	12.2	14.7		
DRY DENSITY	114.5	116.8	117.6	116.4		

TEST RESULTS

Maximum dry density = 117.5 pcf

Optimum moisture = 12 %

Material Description

Yellowish brown lean CLAY with sand

Project No. 00-1703CM-1 **Client:** Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

● **Source:** B-36E **Elev./Depth:** 20

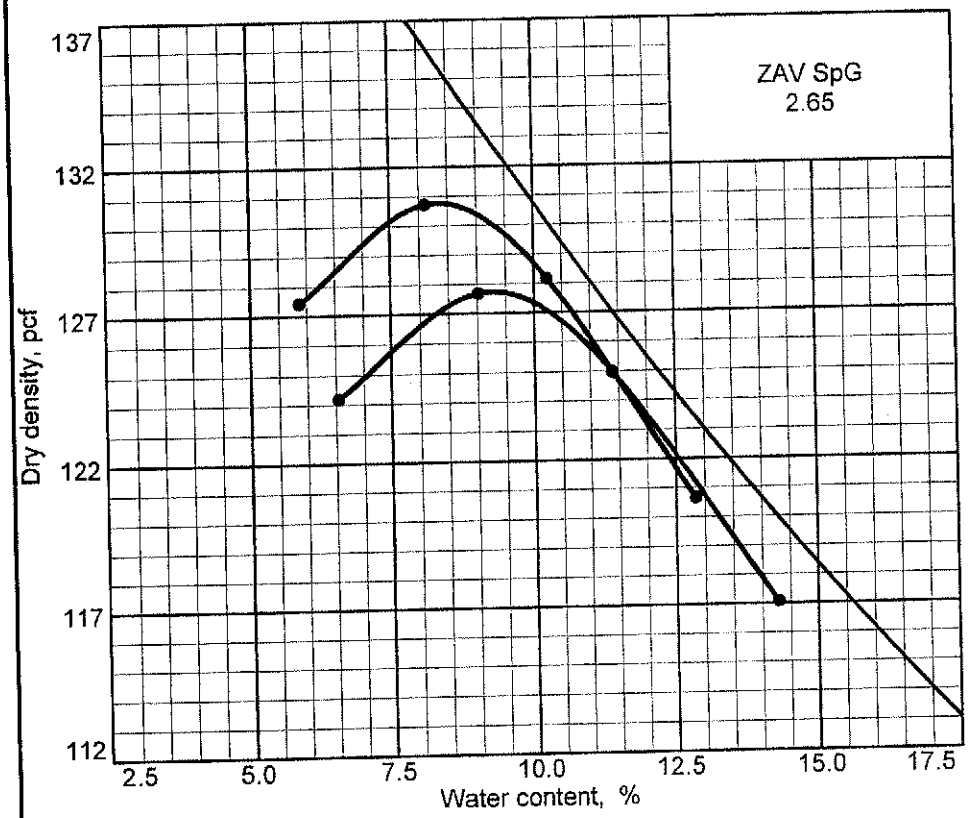
Remarks:

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B3.8

COMPACTION TEST REPORT



Curve No.

I

Test Specification:

ASTM D 1557-91 Procedure A Modified
Oversize correction applied to each point

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.
Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL		**PI**	
%>No.4	10.2	**%<#200**	53.5
USCS		**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.90	9.13	9.13	8.95		
WM	4.49	4.49	4.49	4.49		
WW + T #1	286.15	354.45	367.05	375.44		
WD + T #1	270.40	327.88	332.74	332.70		
TARE #1	29.75	33.63	31.81	33.83		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	5.9	8.1	10.2	12.8		
DRY DENSITY	127.4	130.7	128.2	120.7		

ROCK CORRECTED TEST RESULTS

Maximum dry density = 131 pcf

Optimum moisture = 8.5 %

Material Description

Yellowish brown sandy lean CLAY

Project No. 00-1703QlsII- **Client:** Newhall Ranch Co.
Project: Mesas East - Phase II Landslide Investigation

● **Source:** B-38E **Elev./Depth:** 0-10

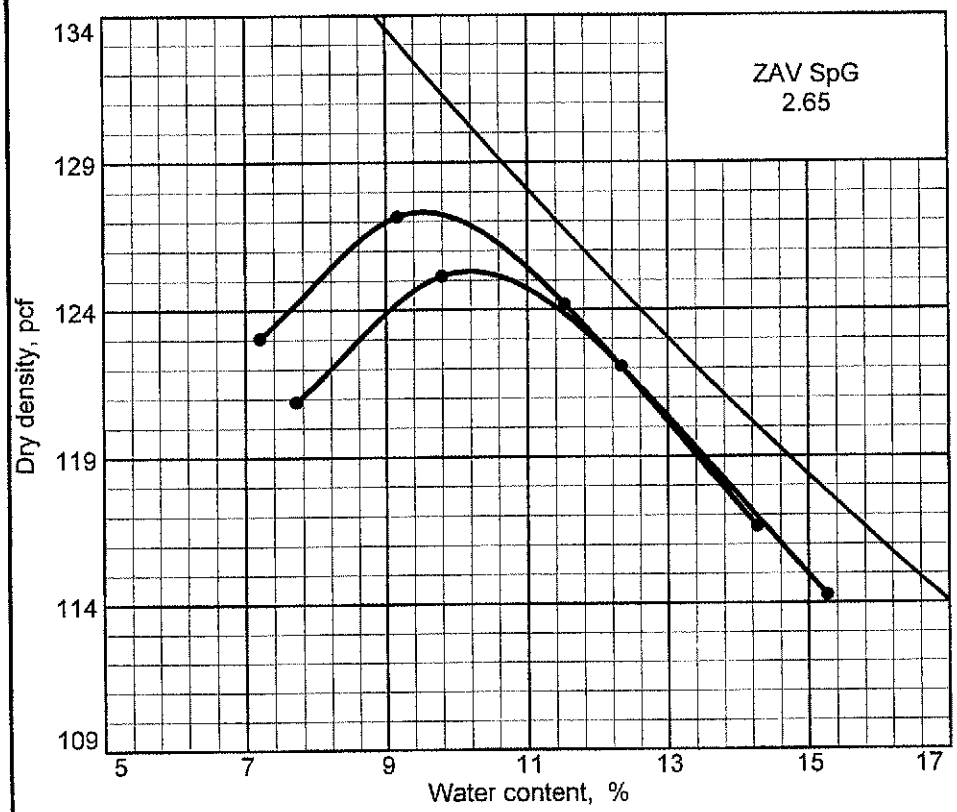
Remarks:

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B3.9

COMPACTION TEST REPORT



Curve No.
J

Test Specification:
ASTM D 1557-91 Procedure A Modified
Oversize correction applied to each point

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.
Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL		**PI**	
%>No.4	6.5	**%<#200**	62.5
USCS	CL	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.83	9.07	9.06	8.88		
WM	4.49	4.49	4.49	4.49		
WW + T #1	215.88	357.15	365.00	378.53		
WD + T #1	202.54	328.06	328.23	332.26		
TARE #1	29.41	31.22	30.05	29.14		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	7.2	9.2	11.5	14.3		
DRY DENSITY	123.1	127.2	124.2	116.6		

ROCK CORRECTED TEST RESULTS

Maximum dry density = 127.5 pcf

Optimum moisture = 9.5 %

Material Description

Yellowish sandy lean CLAY

Project No. 00-1703QlsII- **Client:** Newhall Ranch Co.
Project: Mesas East - Phase II Landslide Investigation

● **Source:** B-42E **Elev./Depth:** 0-10

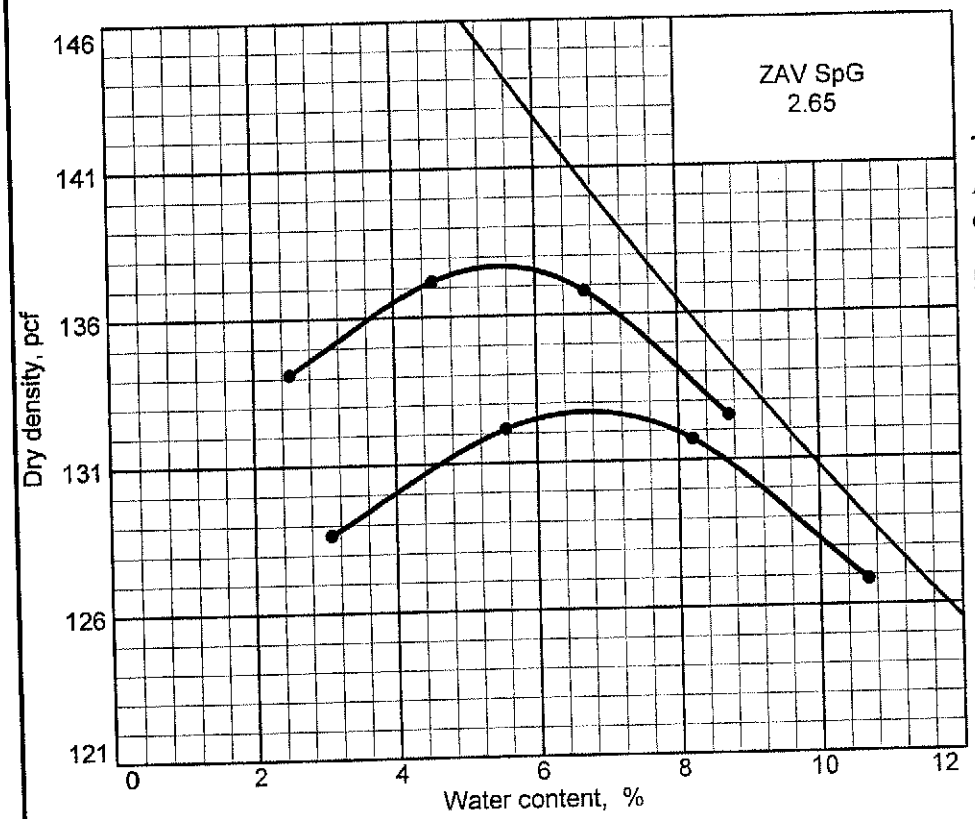
Remarks:

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B3.10

COMPACTION TEST REPORT



Curve No.
K

Test Specification:
ASTM D 1557-91 Procedure A Modified
Oversize correction applied to each point

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.
Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL		**PI**	
%>No.4	18.3	**%<#200**	19.8
USCS	SM	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.91	9.14	9.24	9.17		
WM	4.49	4.49	4.49	4.49		
WW + T #1	217.87	343.50	355.57	360.51		
WD + T #1	212.25	327.07	331.05	328.72		
TARE #1	29.26	32.05	32.20	31.18		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	2.5	4.5	6.7	8.7		
DRY DENSITY	134.1	137.2	136.8	132.5		

ROCK CORRECTED TEST RESULTS

Maximum dry density = 137.5 pcf

Optimum moisture = 5.5 %

Material Description

Silty SAND with gravel

Project No. 00-1703QlsII- **Client:** Newhall Ranch Co.
Project: Mesas East - Phase II Landslide Investigation

● **Source:** B-45E **Elev./Depth:** 0-10

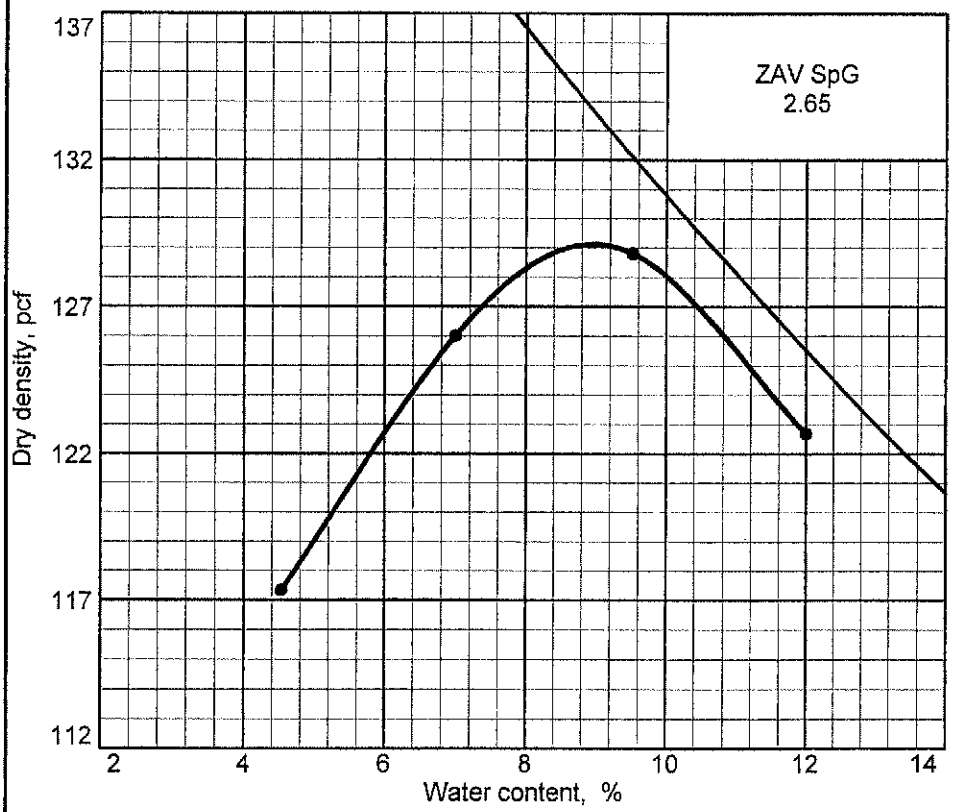
Remarks:

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B3.11

COMPACTION TEST REPORT



Curve No.
L

Test Specification:
ASTM D 1557-91 Procedure A Modified

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.
Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL	31	**PI**	14
%>No.4	4.7	**%<#200**	51.9
USCS	CL	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.58	8.98	9.19	9.07		
WM	4.49	4.49	4.49	4.49		
WW + T #1	240.33	249.61	258.55	261.74		
WD + T #1	231.30	235.36	238.88	237.13		
TARE #1	32.03	31.79	32.37	32.03		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	4.5	7.0	9.5	12.0		
DRY DENSITY	117.3	126.0	128.8	122.7		

TEST RESULTS

Maximum dry density = 129 pcf

Optimum moisture = 9 %

Material Description

Yellowish brown sandy lean CLAY

Project No. 00-1703CM-1 **Client:** Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

● **Source:** B-48E **Elev./Depth:** 0-10

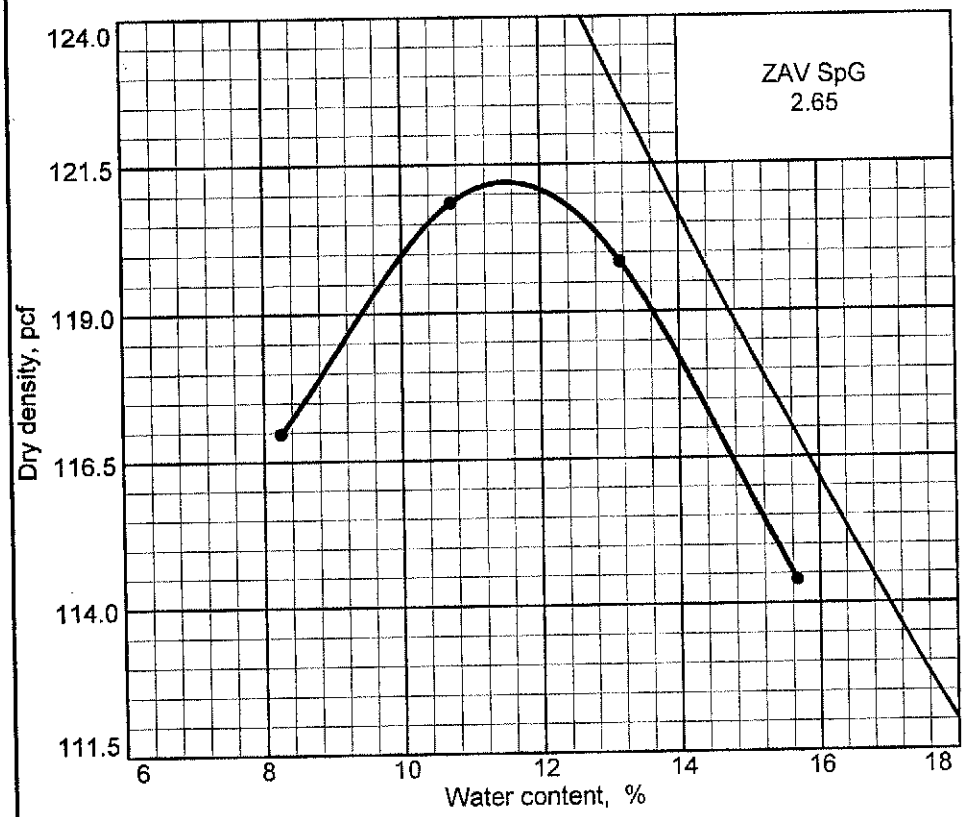
Remarks:

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B3.12

COMPACTION TEST REPORT



Curve No.
M

Test Specification:
ASTM D 1557-91 Procedure A Modified

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.
Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL		**PI**	
%>No.4	0.7	**%<#200**	74.8
USCS	CL	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.71	8.95	9.01	8.90		
WM	4.49	4.49	4.49	4.49		
WW + T #1	199.16	204.39	214.96	222.51		
WD + T #1	186.33	187.45	193.40	196.80		
TARE #1	30.68	29.44	29.49	32.65		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	8.2	10.7	13.2	15.7		
DRY DENSITY	117.0	120.9	119.8	114.4		

TEST RESULTS

Maximum dry density = 121 pcf

Optimum moisture = 11.5 %

Material Description

Yellowish brown lean CLAY with sand

Project No. 00-1703CM-1 **Client:** Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

● **Source:** B-55E **Elev./Depth:** 0-10

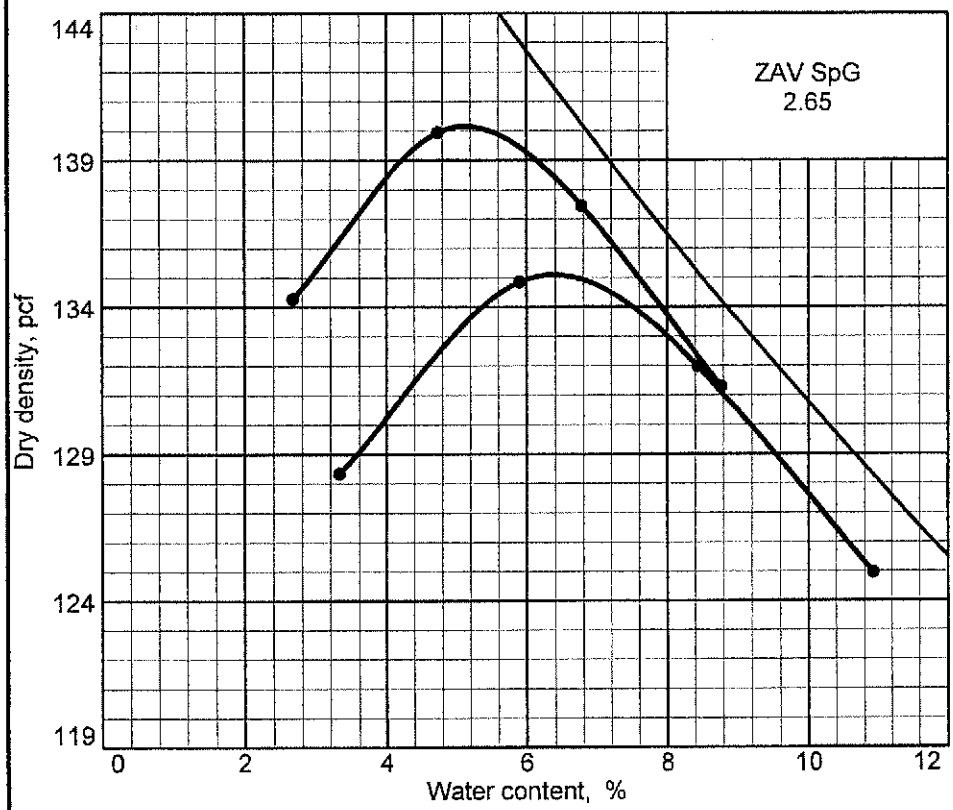
Remarks:

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B3.13

COMPACTION TEST REPORT



Curve No.
N

Test Specification:
ASTM D 1557-91 Procedure B Modified
Oversize correction applied to each point

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.
Test Performed on Material Passing 3/8 in. **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL	26	**PI**	10
%>3/8 in.	19.7	**%<#200**	22.6
USCS	SC	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.91	9.25	9.26	9.11		
WM	4.49	4.49	4.49	4.49		
WW + T #1	226.47	240.09	264.84	266.10		
WD + T #1	220.19	228.35	246.72	242.98		
TARE #1	31.31	29.44	32.05	31.41		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	2.7	4.7	6.8	8.8		
DRY DENSITY	134.3	140.0	137.5	131.3		

ROCK CORRECTED TEST RESULTS

Maximum dry density = 140 pcf

Optimum moisture = 5 %

Material Description

Yellowish brown clayey SAND with gravel

Project No. 00-1703QlsII- **Client:** Newhall Ranch Co.
Project: Mesas East - Phase II Landslide Investigation

● **Source:** B-57E **Elev./Depth:** 5, 10

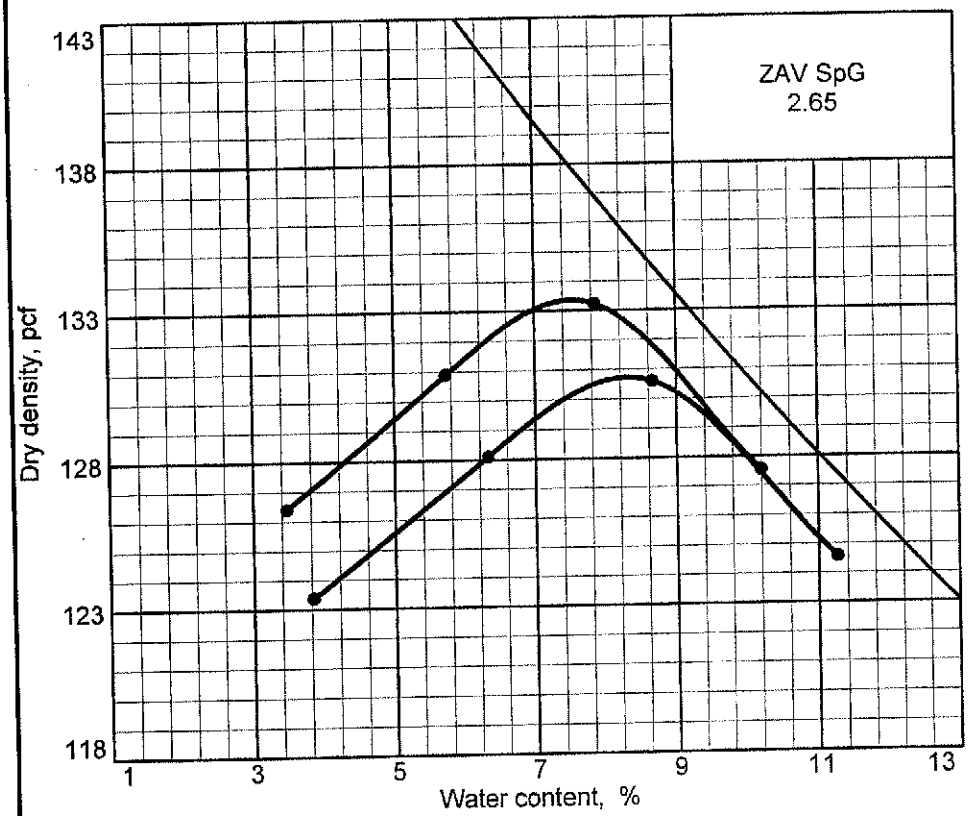
Remarks:

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B3.14

COMPACTION TEST REPORT



Curve No.
O

Test Specification:
ASTM D 1557-91 Procedure A Modified
Oversize correction applied to each point

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.
Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL		**PI**	
%>No.4	9.4	**%<#200**	44.1
USCS	SC	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.76	9.03	9.22	9.11		
WM	4.49	4.49	4.49	4.49		
WW + T #1	230.60	235.31	362.49	372.60		
WD + T #1	223.28	223.20	336.23	338.12		
TARE #1	32.14	31.78	33.01	31.89		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	3.5	5.7	7.8	10.2		
DRY DENSITY	126.4	130.9	133.2	127.5		

ROCK CORRECTED TEST RESULTS

Maximum dry density = 133.5 pcf

Optimum moisture = 7.5 %

Material Description

Yellowish clayey SAND

Project No. 00-1703QlsII- **Client:** Newhall Ranch Co.
Project: Mesas East - Phase II Landslide Investigation

● **Source:** B-58E **Elev./Depth:** 0-10

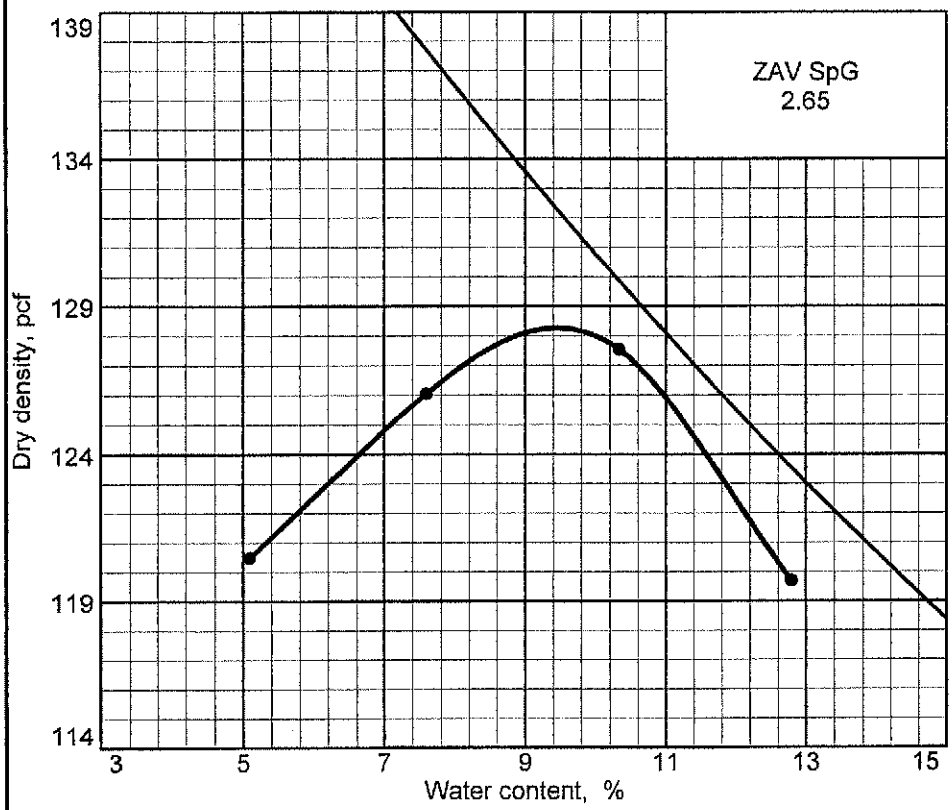
Remarks:

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B3.15

COMPACTION TEST REPORT



Curve No.
P

Test Specification:
ASTM D 1557-91 Procedure A Modified

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.
Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL	29	**PI**	11
%>No.4	4.0	**%<#200**	48.8
USCS	SC	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.71	9.01	9.18	8.99		
WM	4.49	4.49	4.49	4.49		
WW + T #1	220.00	227.27	234.20	245.24		
WD + T #1	210.92	213.48	215.00	221.07		
TARE #1	32.52	31.85	29.24	32.13		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	5.1	7.6	10.3	12.8		
DRY DENSITY	120.5	126.0	127.5	119.7		

TEST RESULTS

Maximum dry density = 128.5 pcf

Optimum moisture = 9.5 %

Material Description

Yellowish brown clayey SAND

Project No. 00-1703CM-1 **Client:** Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

● **Source:** B-61E **Elev./Depth:** 0-10

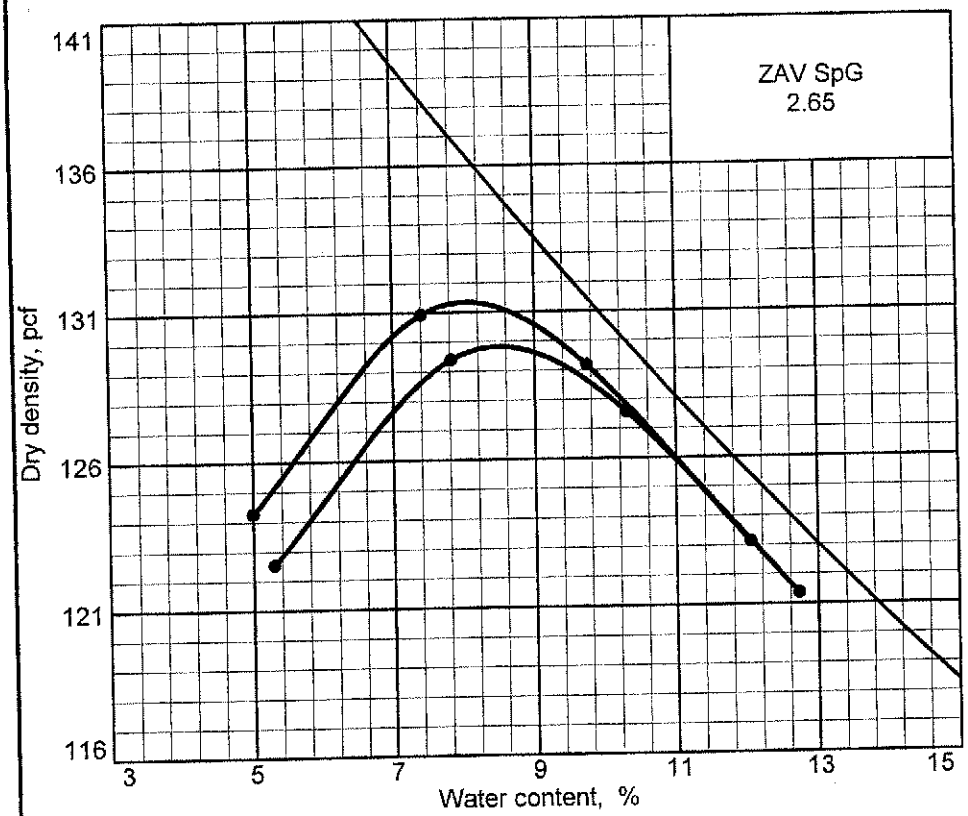
Remarks:

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B3.16

COMPACTION TEST REPORT



Curve No.
Q

Test Specification:
ASTM D 1557-91 Procedure A Modified
Oversize correction applied to each point

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.

Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL		**PI**	
%>No.4	5.4	**%<#200**	50.0
USCS	CL	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.79	9.14	9.18	9.05		
WM	4.49	4.49	4.49	4.49		
WW + T #1	244.35	252.99	263.88	267.58		
WD + T #1	233.68	237.00	242.23	240.96		
TARE #1	31.86	32.70	32.05	31.82		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	5.0	7.4	9.7	12.0		
DRY DENSITY	124.3	130.9	129.2	123.1		

ROCK CORRECTED TEST RESULTS

Maximum dry density = 131.5 pcf

Optimum moisture = 8 %

Material Description

Yellowish brown sandy lean CLAY

Project No. 00-1703QlsII- **Client:** Newhall Ranch Co.
Project: Mesas East - Phase II Landslide Investigation

● **Source:** B-62E **Elev./Depth:** 0-10

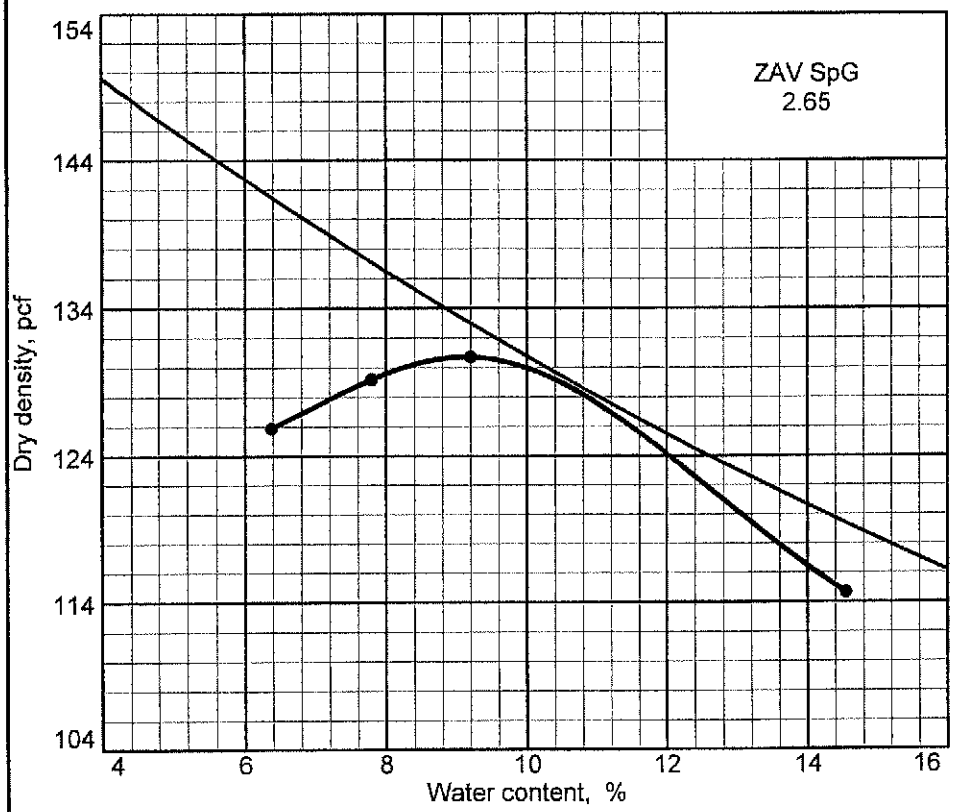
Remarks:

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B3.17

COMPACTION TEST REPORT



Curve No.
R

Test Specification:
ASTM D 1557-91 Procedure A Modified

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.
Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL		**PI**	
%>No.4	0.0	**%<#200**	41.9
USCS	SC	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.94	9.12	9.23	8.85		
WM	4.48	4.48	4.48	4.48		
WW + T #1	318.85	350.41	360.08	340.20		
WD + T #1	301.64	327.21	332.45	300.70		
TARE #1	31.92	29.59	32.25	29.28		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	6.4	7.8	9.2	14.6		
DRY DENSITY	125.9	129.2	130.7	114.7		

TEST RESULTS

Maximum dry density = 130.5 pcf

Optimum moisture = 9 %

Material Description

Clayey SAND

Project No. 02-1703B-1 **Client:** Newhall Ranch Co.
Project: Cobble/Boulder Assessment
Airport and Exxon Mesas
● **Source:** B-2B **Elev./Depth:** 15

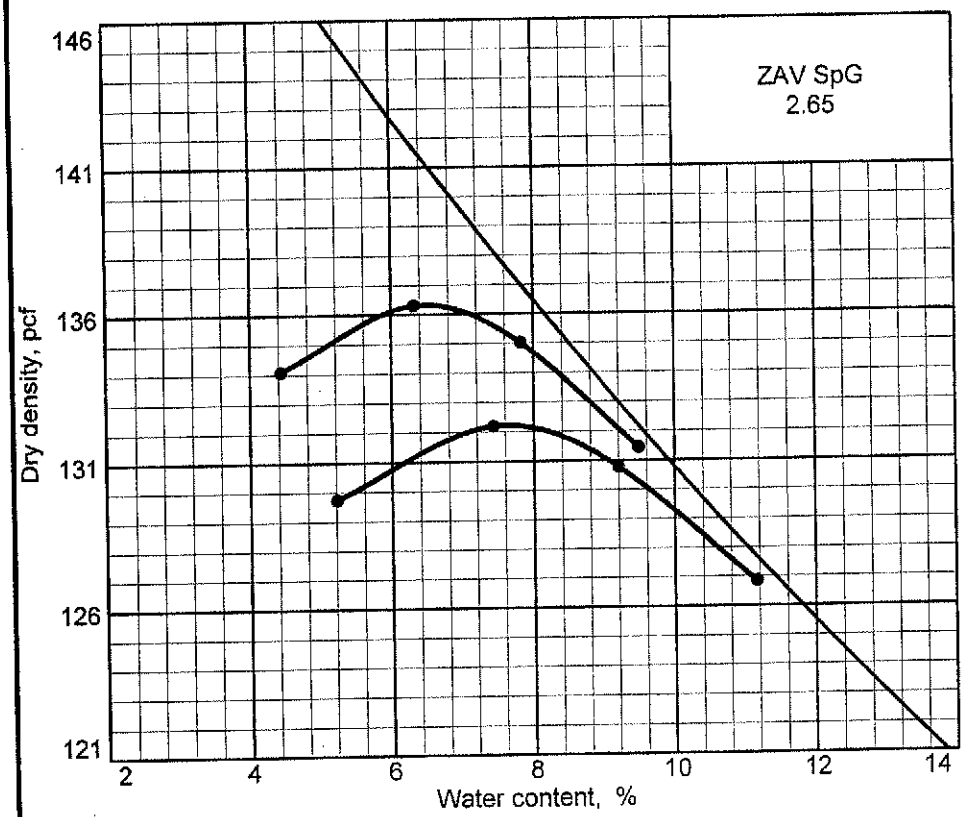
Remarks:

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B3.18

COMPACTION TEST REPORT



Curve No.
S

Test Specification:
ASTM D 1557-00 Method A Modified
Oversize correction applied to each point

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.

Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL		**PI**	
%>No.4	15.0	**%<#200**	15.2
USCS	SM	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	9.02	9.20	9.23	9.17		
WM	4.47	4.47	4.47	4.47		
WW + T #1	386.15	419.82	436.96	451.69		
WD + T #1	368.59	392.78	402.60	409.56		
TARE #1	31.85	29.34	29.36	32.25		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	4.4	6.3	7.8	9.5		
DRY DENSITY	134.1	136.3	135.0	131.4		

ROCK CORRECTED TEST RESULTS

Maximum dry density = 136.5 pcf

Optimum moisture = 6.5 %

Material Description

Silty SAND with gravel

Project No. 02-1703B-1 **Client:** Newhall Ranch Co.
Project: Cobble/Boulder Assessment
Airport and Exxon Mesas
● **Source:** B-6B **Elev./Depth:** 19

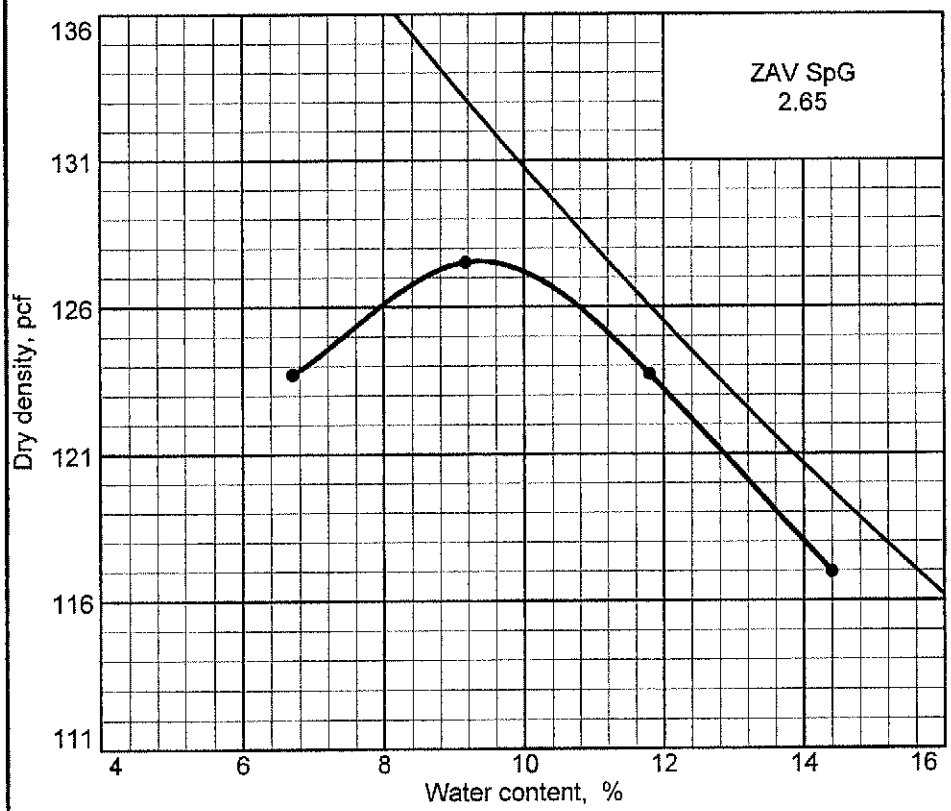
Remarks:

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B3.19

COMPACTION TEST REPORT



Curve No.
T

Test Specification:
ASTM D 1557-91 Procedure A Modified

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.

Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL		**PI**	
%>No.4	0.0	**%<#200**	60.7
USCS	CL	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.86	9.10	9.07	8.92		
WM	4.46	4.46	4.46	4.46		
WW + T #1	170.65	176.82	187.97	193.22		
WD + T #1	161.79	164.46	171.25	172.67		
TARE #1	29.74	29.60	29.52	29.96		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	6.7	9.2	11.8	14.4		
DRY DENSITY	123.7	127.5	123.7	117.0		

TEST RESULTS

Maximum dry density = 127.5 pcf

Optimum moisture = 9.5 %

Material Description

Brown sandy lean CLAY

Project No. 01-1703M-1 **Client:** Newhall Ranch Co.
Project: Mesas Entertainment

● **Source:** B-1M **Elev./Depth:** 25

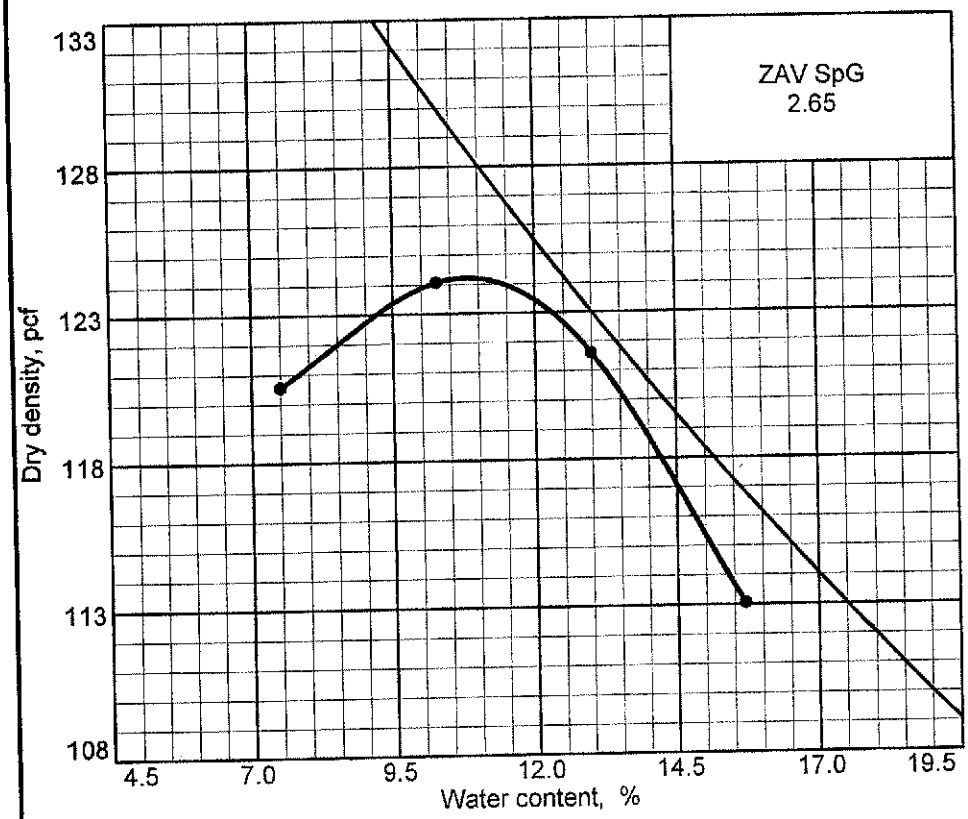
Remarks:

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B3.20

COMPACTION TEST REPORT



Curve No.
U

Test Specification:
ASTM D 1557-91 Procedure A Modified

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.
Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL		**PI**	
%>No.4	0.0	**%<#200**	55.9
USCS	ML	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.81	9.05	9.07	8.85		
WM	4.49	4.49	4.49	4.49		
WW + T #1	186.30	207.35	215.57	221.98		
WD + T #1	176.82	191.04	194.21	196.07		
TARE #1	50.41	32.18	29.92	31.02		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	7.5	10.3	13.0	15.7		
DRY DENSITY	120.6	124.1	121.6	113.1		

TEST RESULTS

Maximum dry density = 124 pcf

Optimum moisture = 11 %

Material Description

Brown sandy SILT

Project No. 01-1703M-1 **Client:** Newhall Ranch Co.
Project: Mesas Entertainment

● **Source:** B-4M **Elev./Depth:** 2, 10

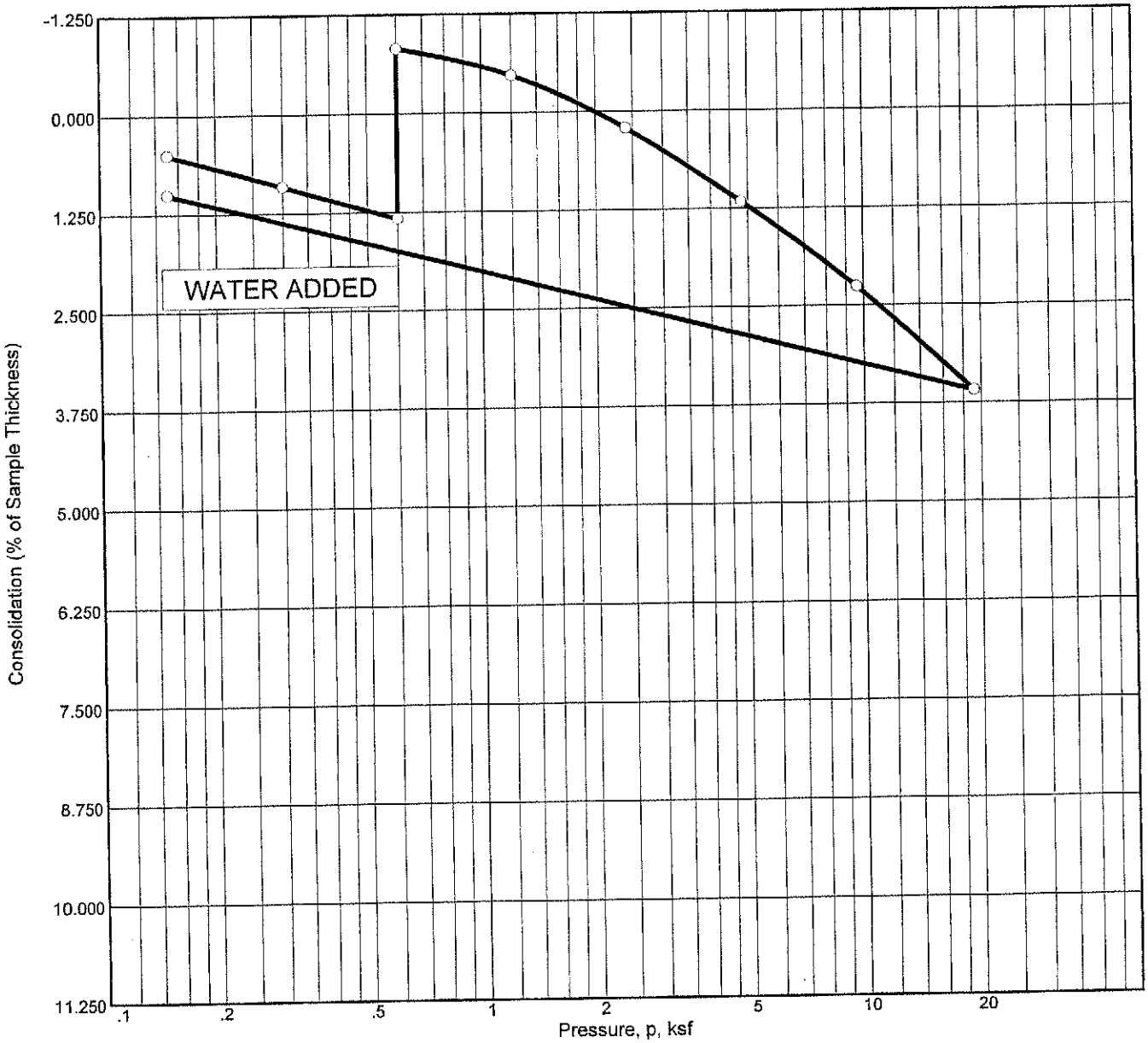
Remarks:

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B3.21

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	109.3	14.1	72.7	1.000	0.513	2.65	0.07	0.60	2.78	ML
FINAL	110.4	20.0	100.0	0.990	0.498					

Source: B-14E
Material Description: Yellowish-brown sandy SILT
Remarks:

Elev./Depth: 5'

ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

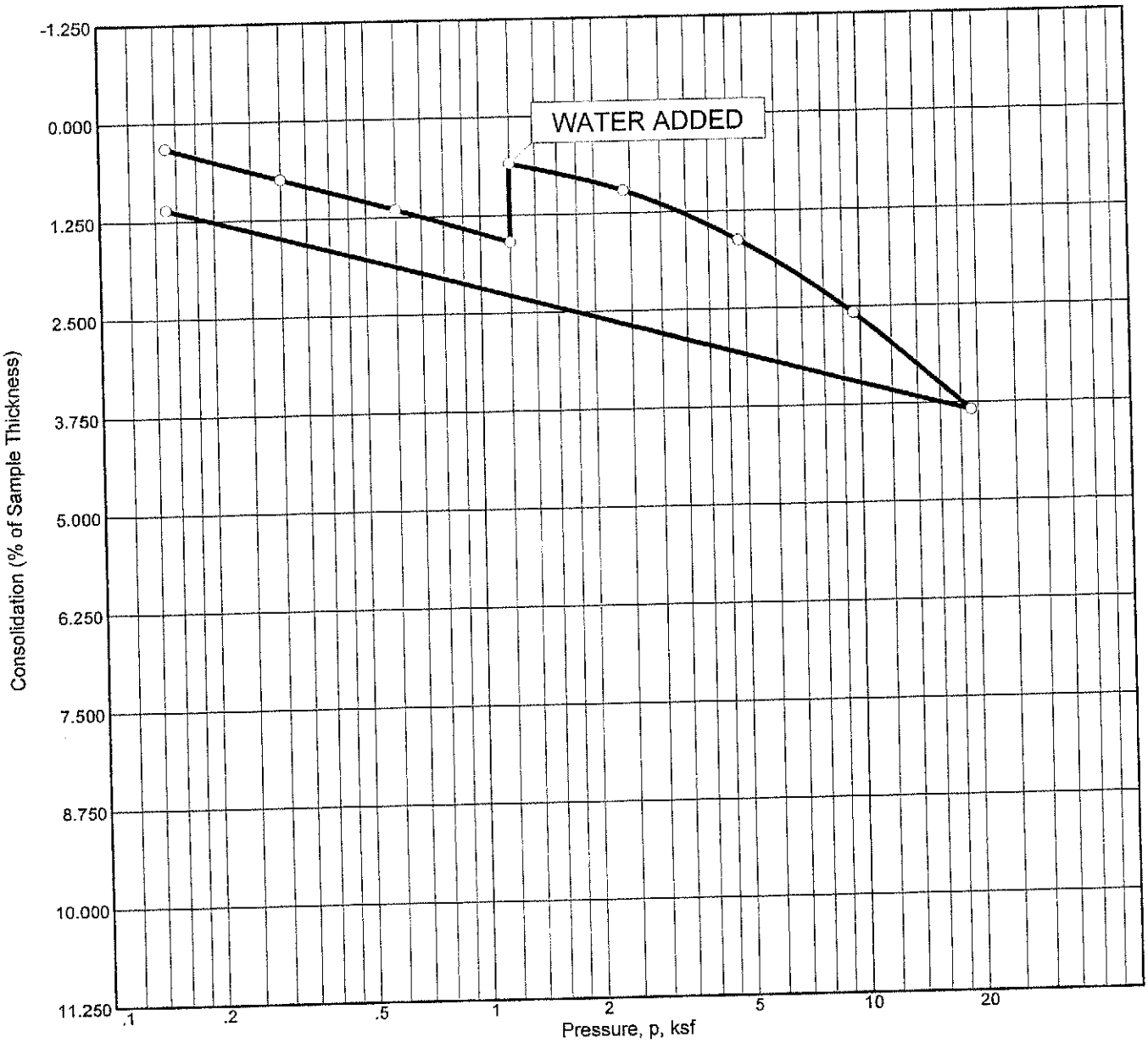
Client: Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

Job No.: 00-1703CM-1

Figure B4.1

DRAWN BY
DATE
CHECKED BY
APPROVED BY

CONSOLIDATION TEST REPORT



DRAWN BY
DATE
CHECKED BY
APPROVED BY

SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	109.9	15.2	79.8	1.000	0.506	2.65	0.06	1.20	4.59	ML
FINAL	111.1	19.8	100.0	0.989	0.489					

Elev./Depth: 10'

Source: B-14E
Material Description: Yellowish-brown sandy SILT
Remarks:

ALLAN E. SEWARD

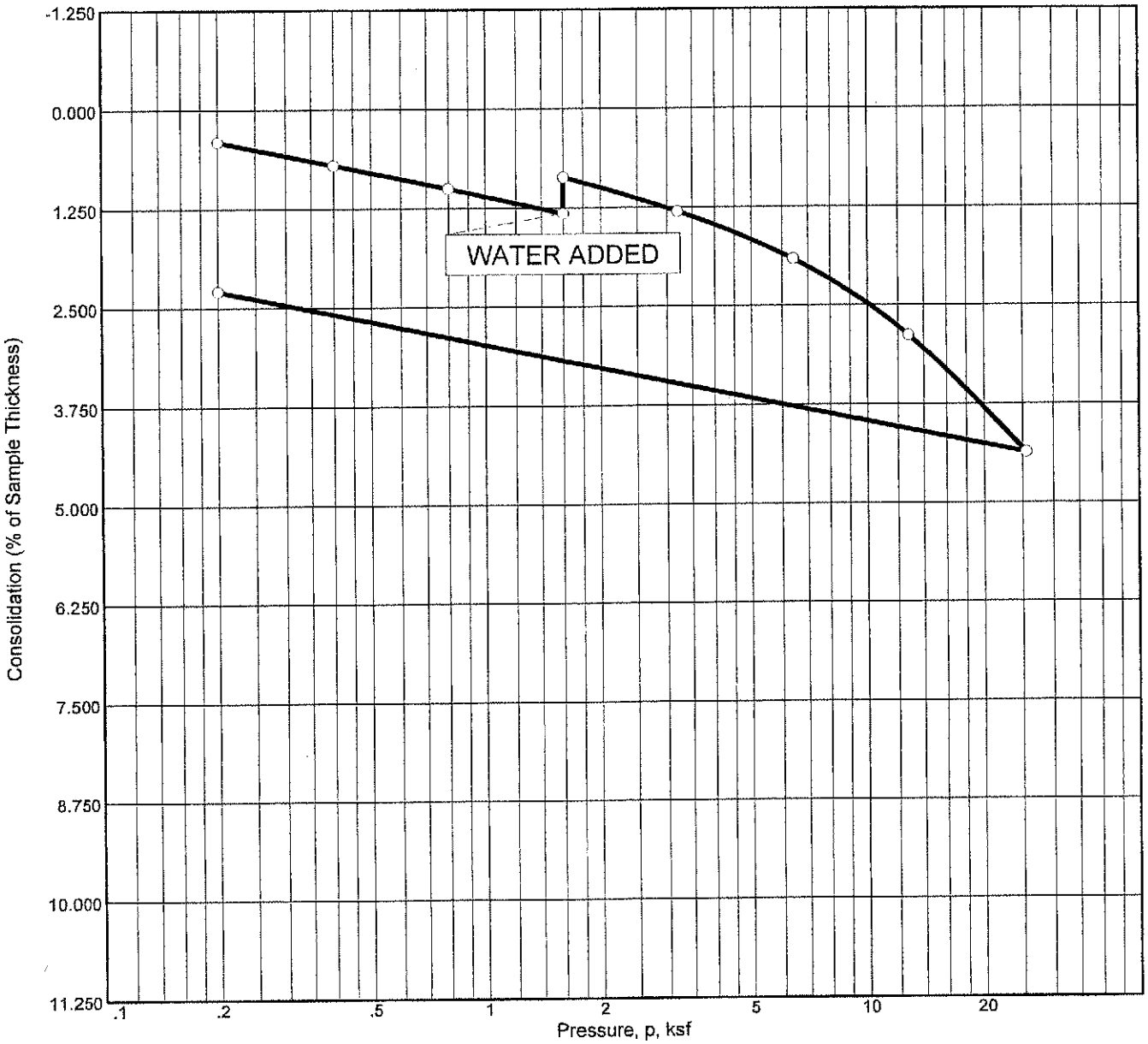
ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

Job No.: 00-1703CM-1

Figure B4.2

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	110.5	13.4	71.7	1.000	0.497	2.65	0.07	1.80	11.54	CL
FINAL	113.1	17.7	100.0	0.977	0.462					

Source: B-14E **Elev./Depth:** 15'
Material Description: Lean CLAY with sand
Remarks:

ALLAN E. SEWARD

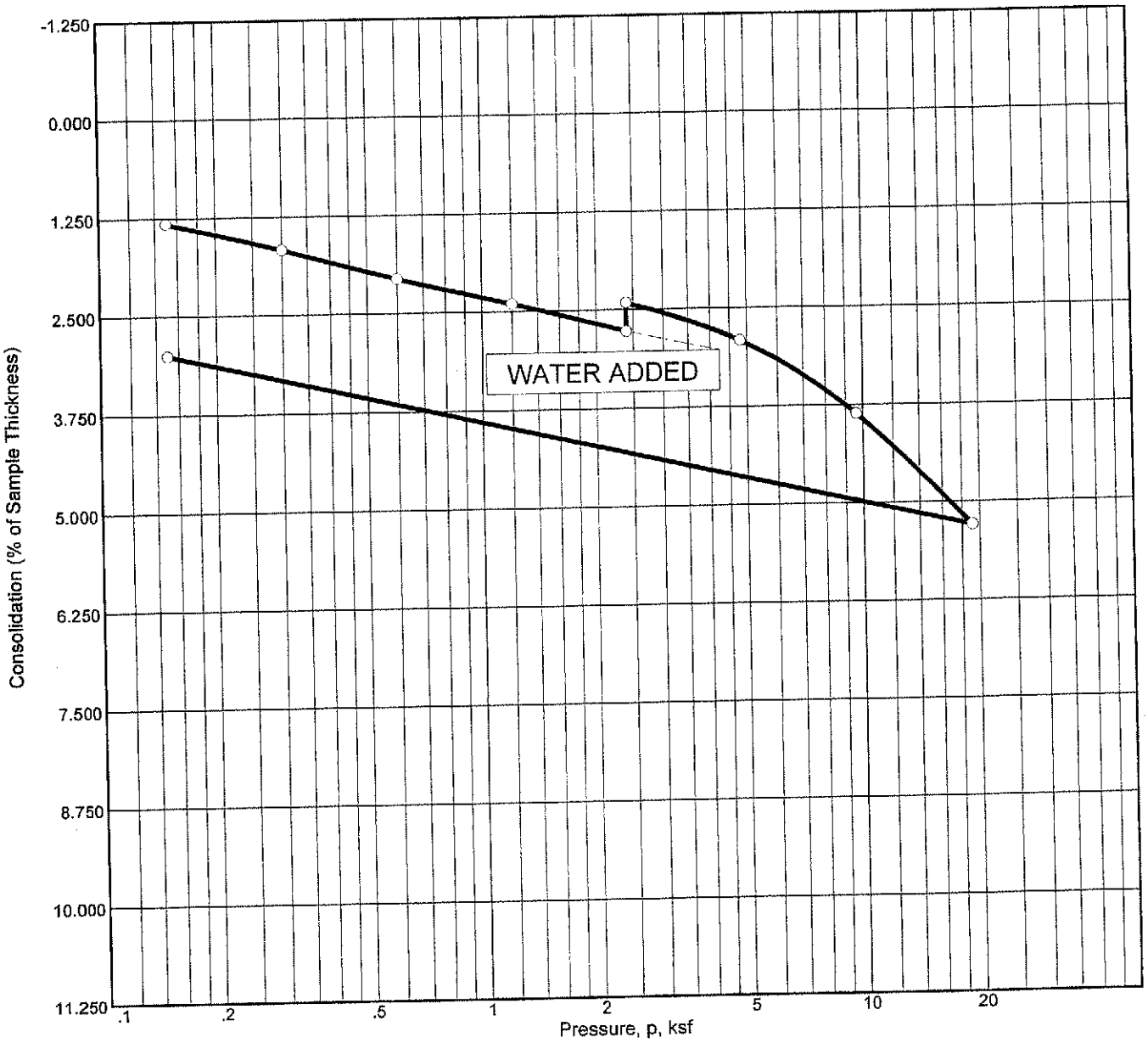
ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

Job No.: 00-1703CM-1 **Figure** B4.3

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



DRAWN BY
DATE
CHECKED BY
APPROVED BY

SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	105.4	17.8	82.7	1.000	0.570	2.65	0.08	2.40	6.77	CL
FINAL	108.7	22.2	100.0	0.970	0.523					

Elev./Depth: 20'

Source: B-14E
Material Description: Sandy lean CLAY
Remarks:

ALLAN E. SEWARD

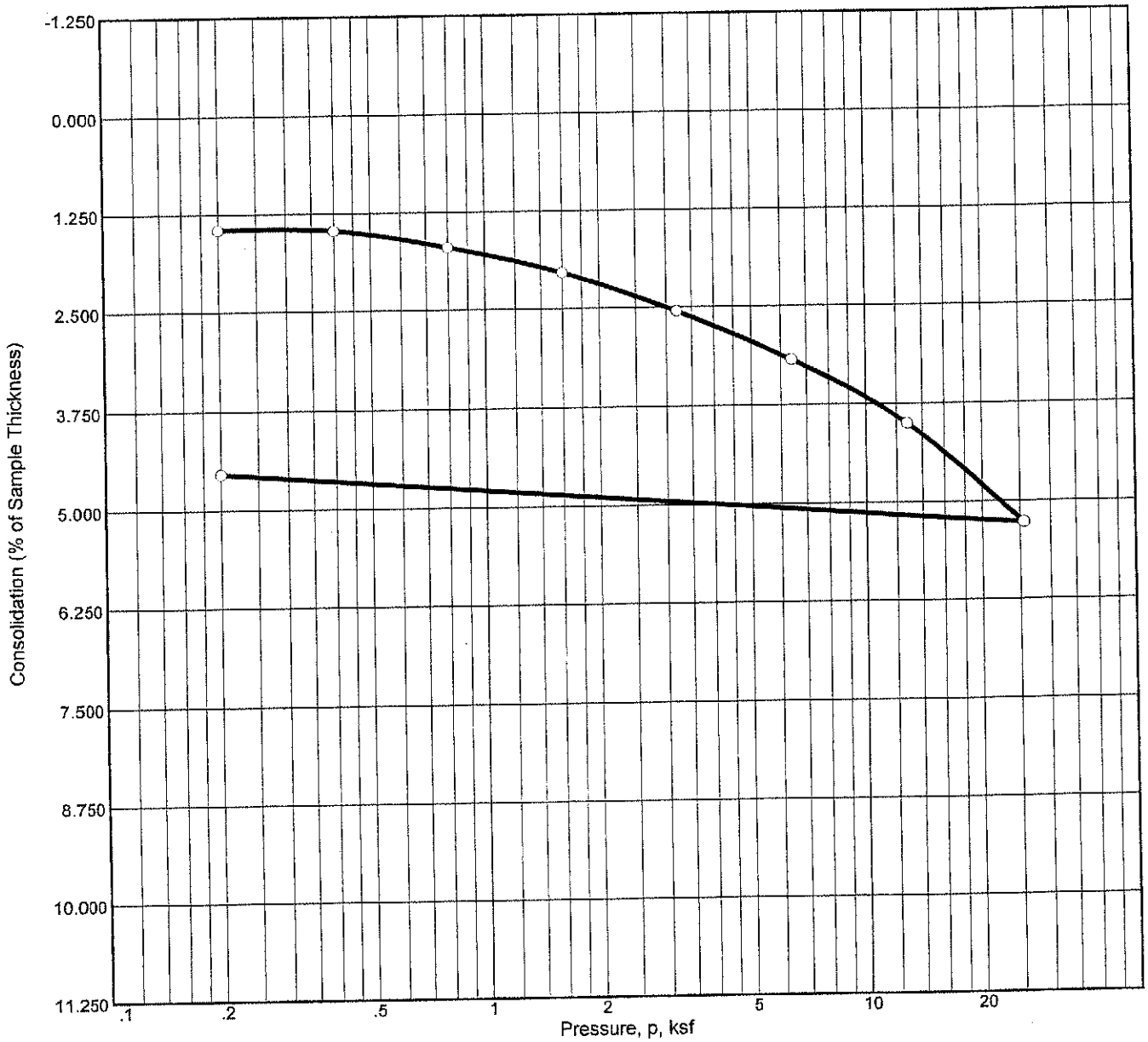
ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

Job No.: 00-1703CM-1

Figure B4.4

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	112.0	17.6	97.7	1.000	0.478	2.65	0.06	3.60	13.44	CL
FINAL	117.3	15.4	99.6	0.955	0.410					

Source: B-14E
Material Description: Sandy lean CLAY
Remarks:

Elev./Depth: 30'

ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

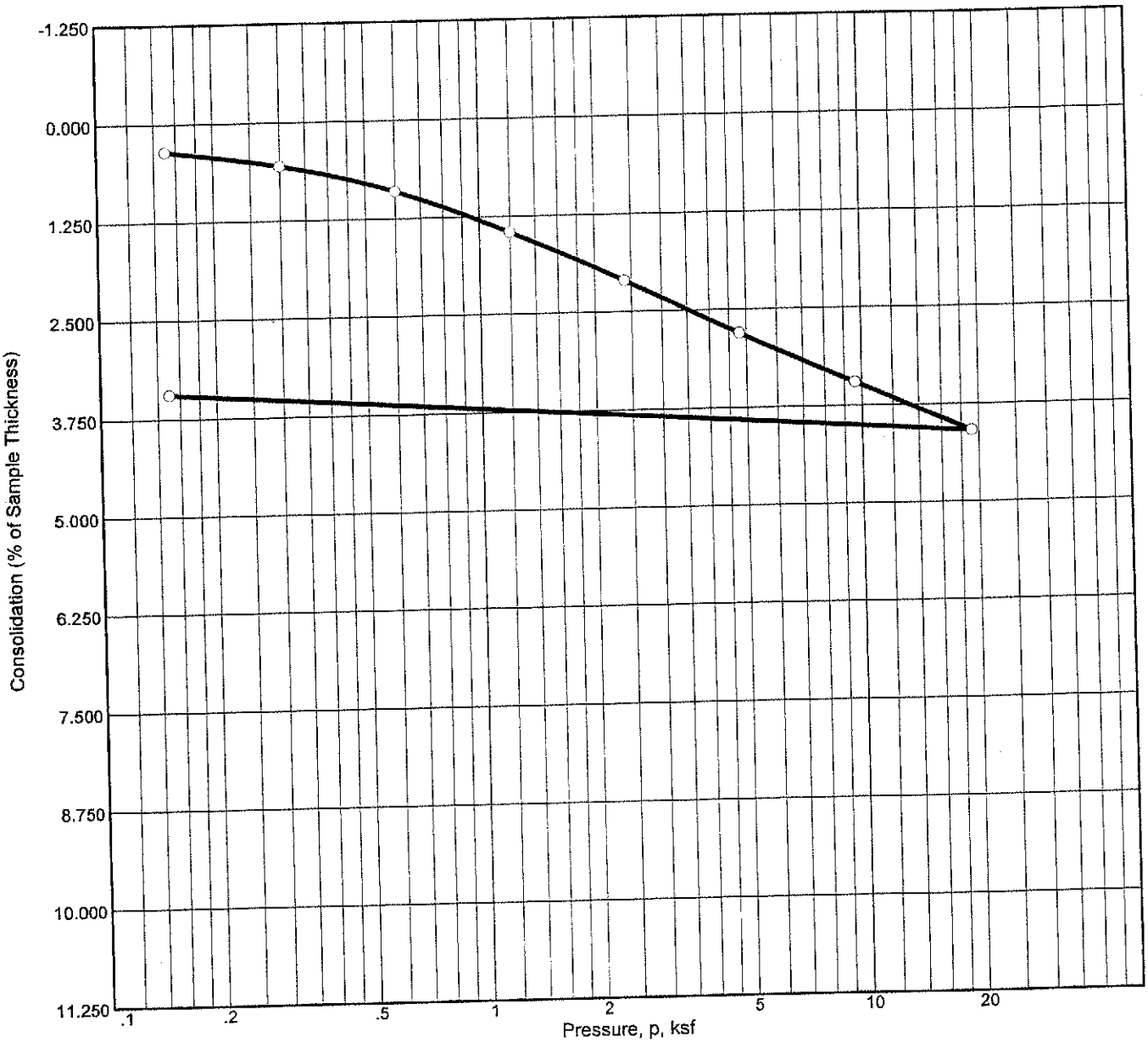
Client: Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

Job No.: 00-1703CM-1

Figure B4.5

DRAWN BY	CHECKED BY
DATE	APPROVED BY

CONSOLIDATION TEST REPORT



DRAWN BY
DATE
CHECKED BY
APPROVED BY

SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	103.9	21.7	97.3	1.000	0.592	2.65	0.03	1.20	0.61	ML
FINAL	107.6	20.1	98.9	0.966	0.538					

Elev./Depth: 10'

Source: B-17E
Material Description: Sandy SILT
Remarks:

ALLAN E. SEWARD

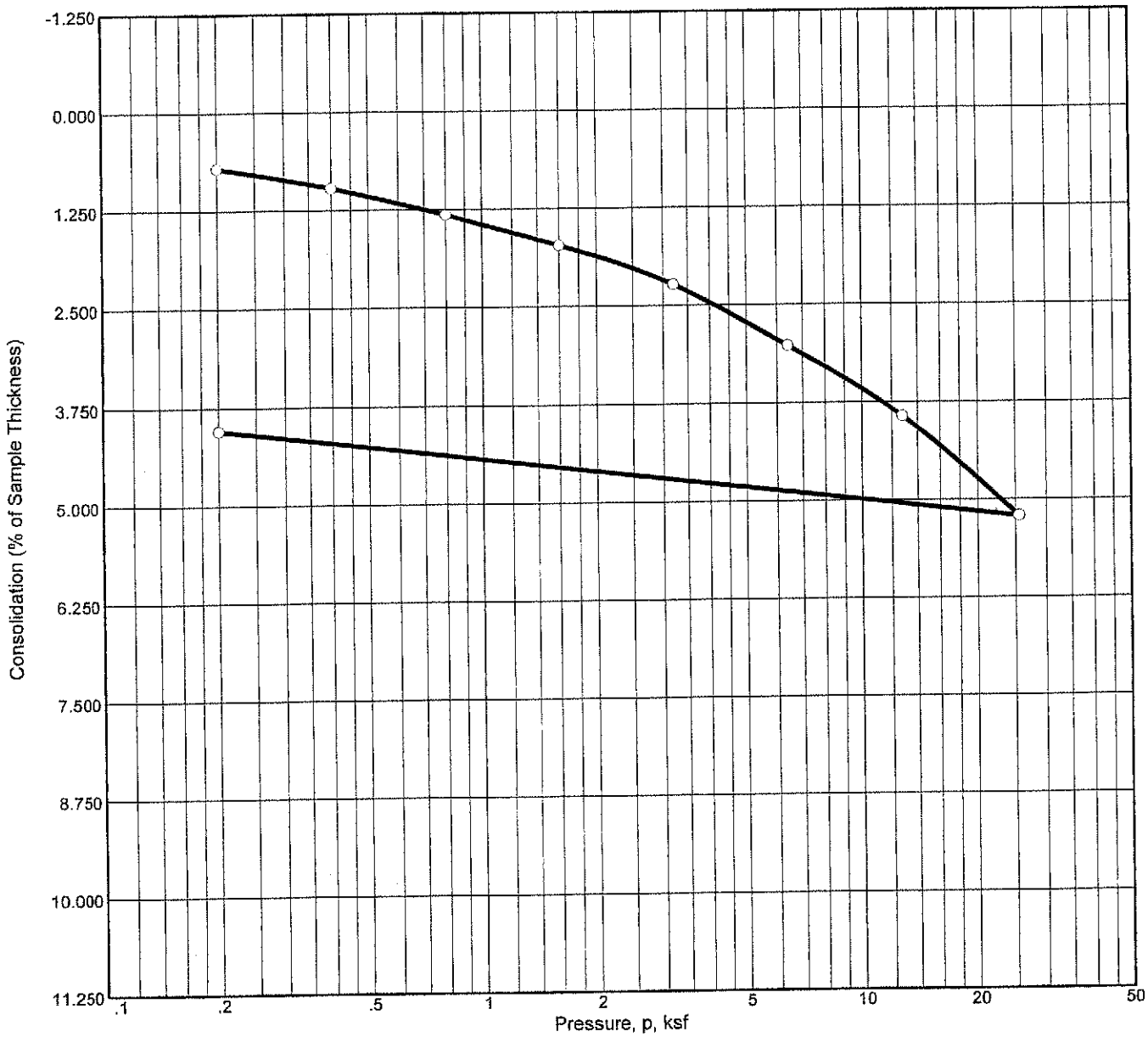
ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

Job No.: 00-1703CM-1

Figure B4.6

CONSOLIDATION TEST REPORT



DRAWN BY
DATE
CHECKED BY
APPROVED BY

SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	107.3	17.7	86.3	1.000	0.542	2.65	0.07	3.00	6.32	CL-ML
FINAL	111.8	27.8	100.0	0.960	0.480					

Source: B-17E
Material Description: Sandy, silty CLAY
Remarks:

Elev./Depth: 25'

ALLAN E. SEWARD

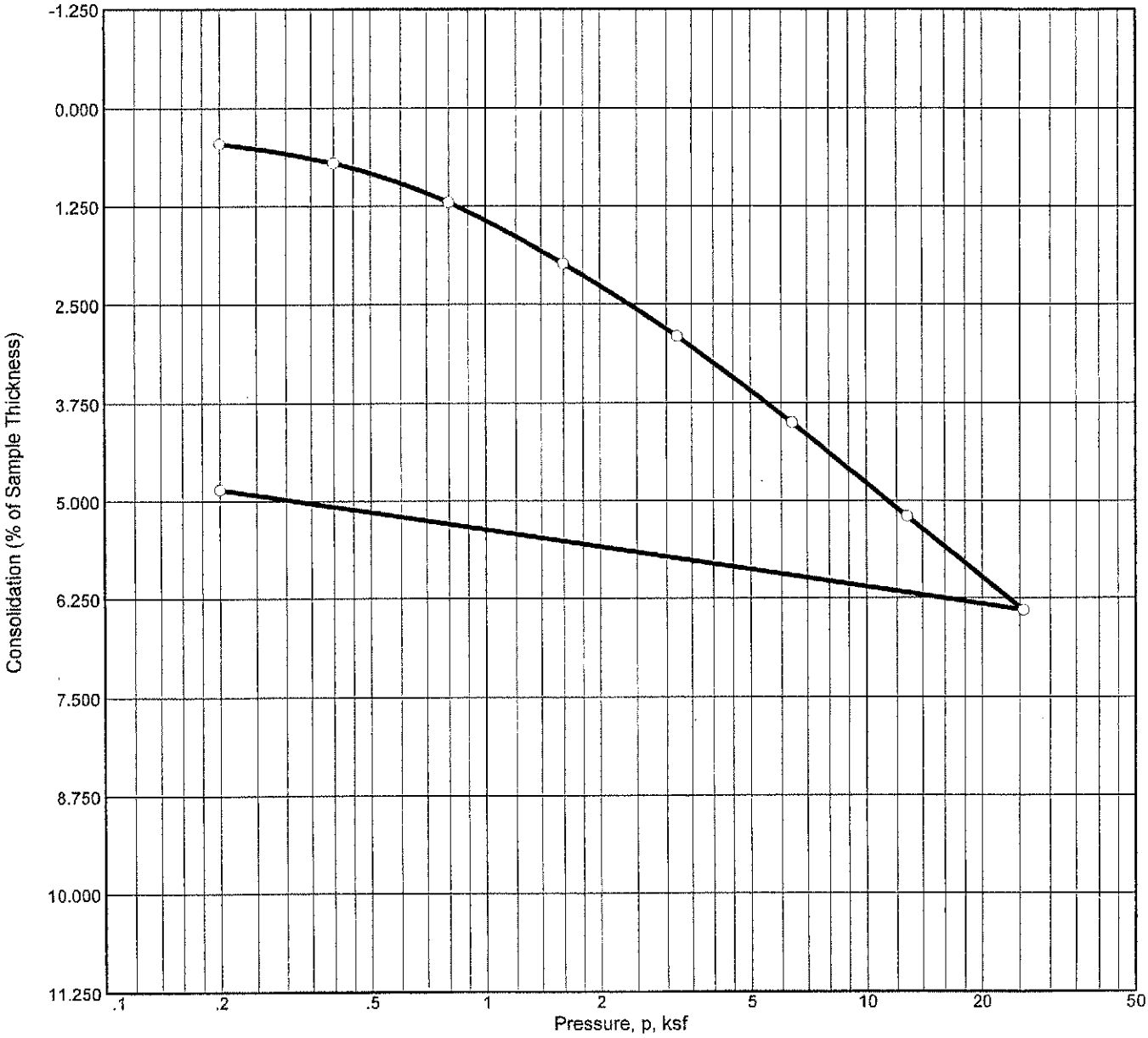
ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

Job No.: 00-1703CM-1

Figure B4.7

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	105.9	21.0	99.0	1.000	0.563	2.65	0.06	3.60	1.26	CL-ML
FINAL	111.3	22.2	100.0	0.951	0.487					

Source: B-17E **Elev./Depth:** 30'
Material Description: Silty CLAY
Remarks:

ALLAN E. SEWARD

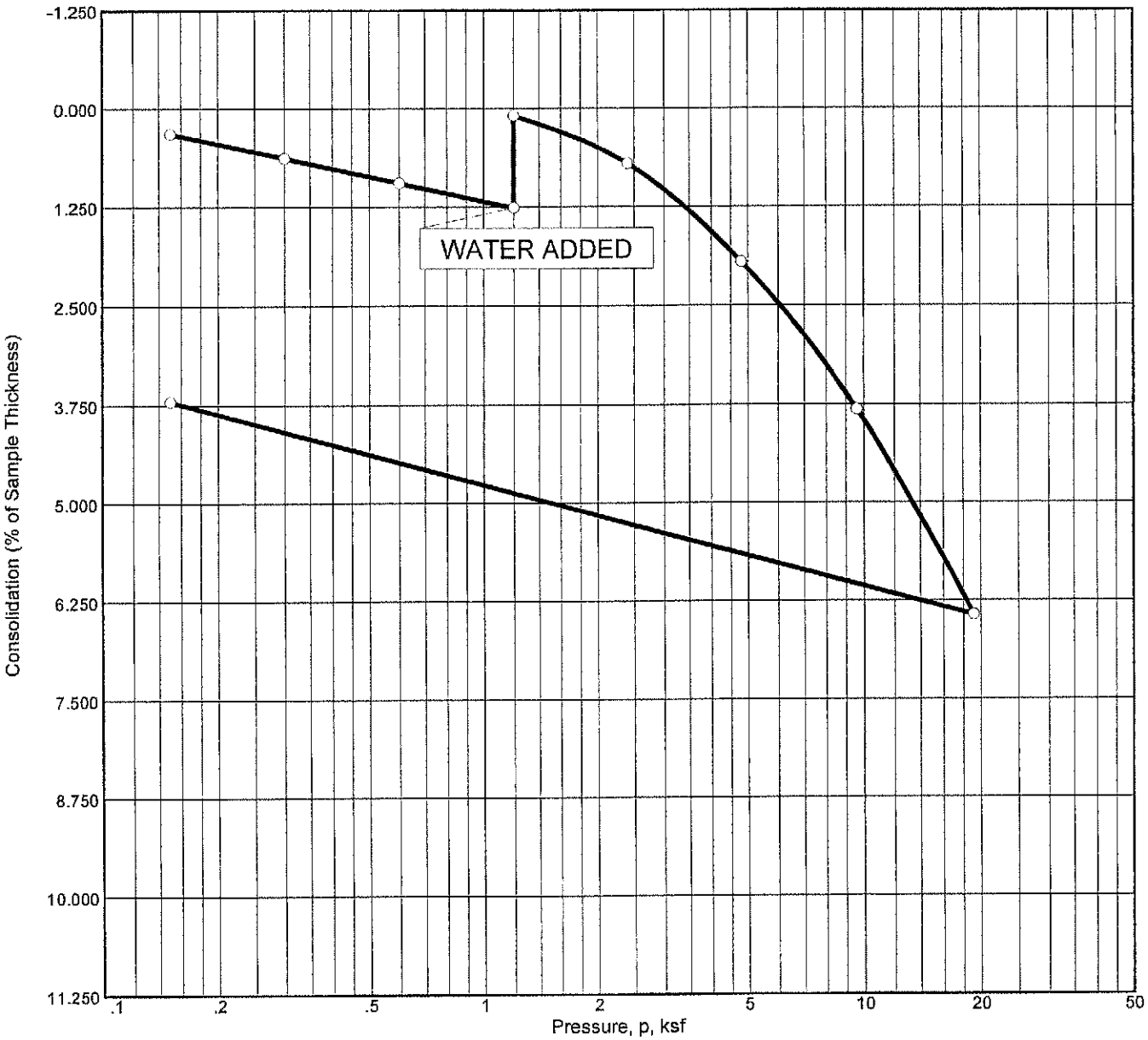
ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

Job No.: 00-1703CM-1 **Figure** B4.8

DATE N BY APPROVED BY ECK

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	106.9	10.3	49.8	1.000	0.547	2.65	0.14	1.20	4.93	CL
FINAL	111.0	18.8	100.0	0.963	0.490					

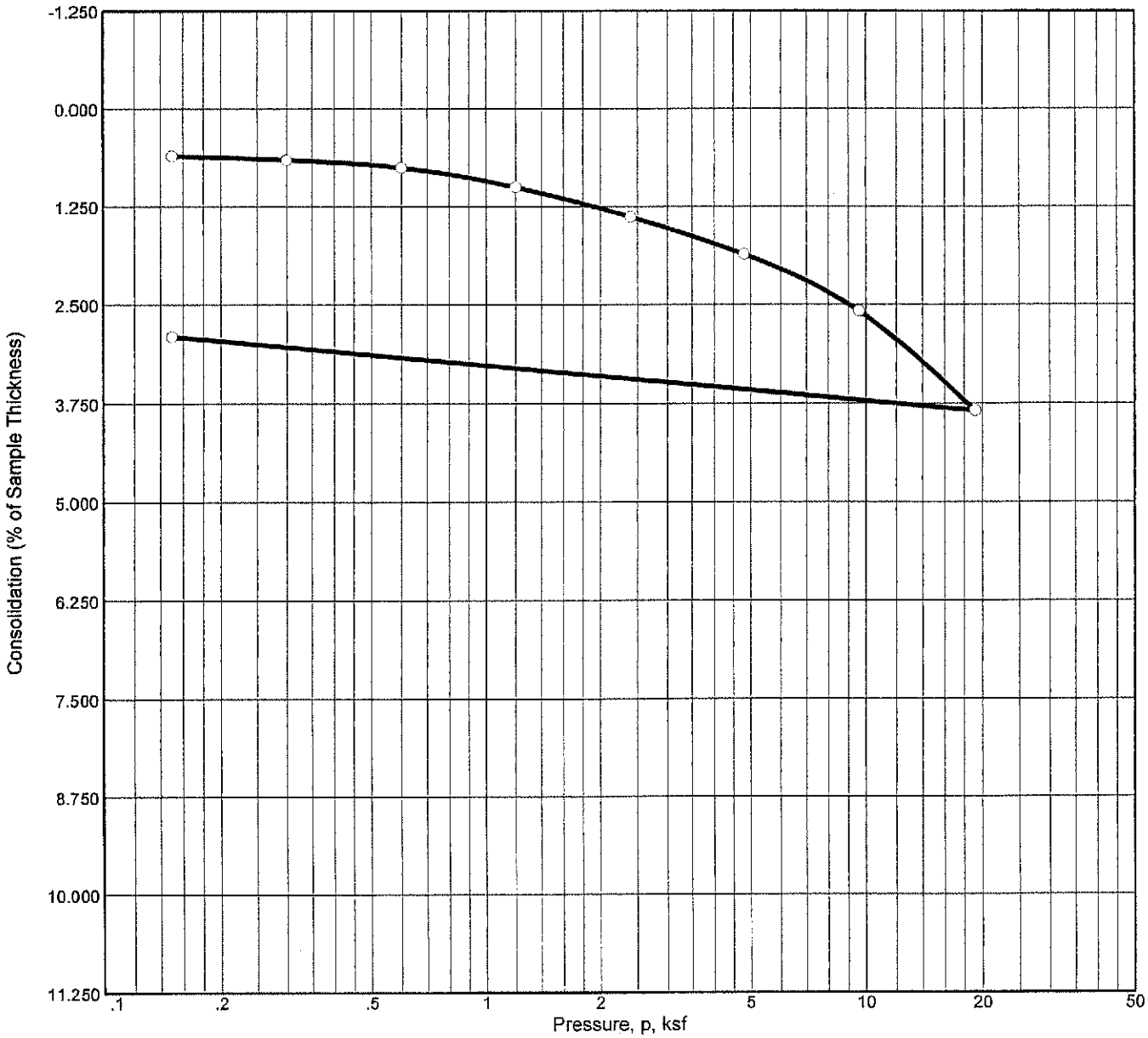
Source: B-19E
Material Description: Lean CLAY
Remarks:

Elev./Depth: 10'

ALLAN E. SEWARD **ENGINEERING GEOLOGY, INC.**	**Client:** Newhall Ranch Co. **Project:** Newhall Ranch, Mesas-East **Job No.:** 00-1703CM-1 **Figure** B4.9

DRAWN BY
DATE
CHECKED BY
APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

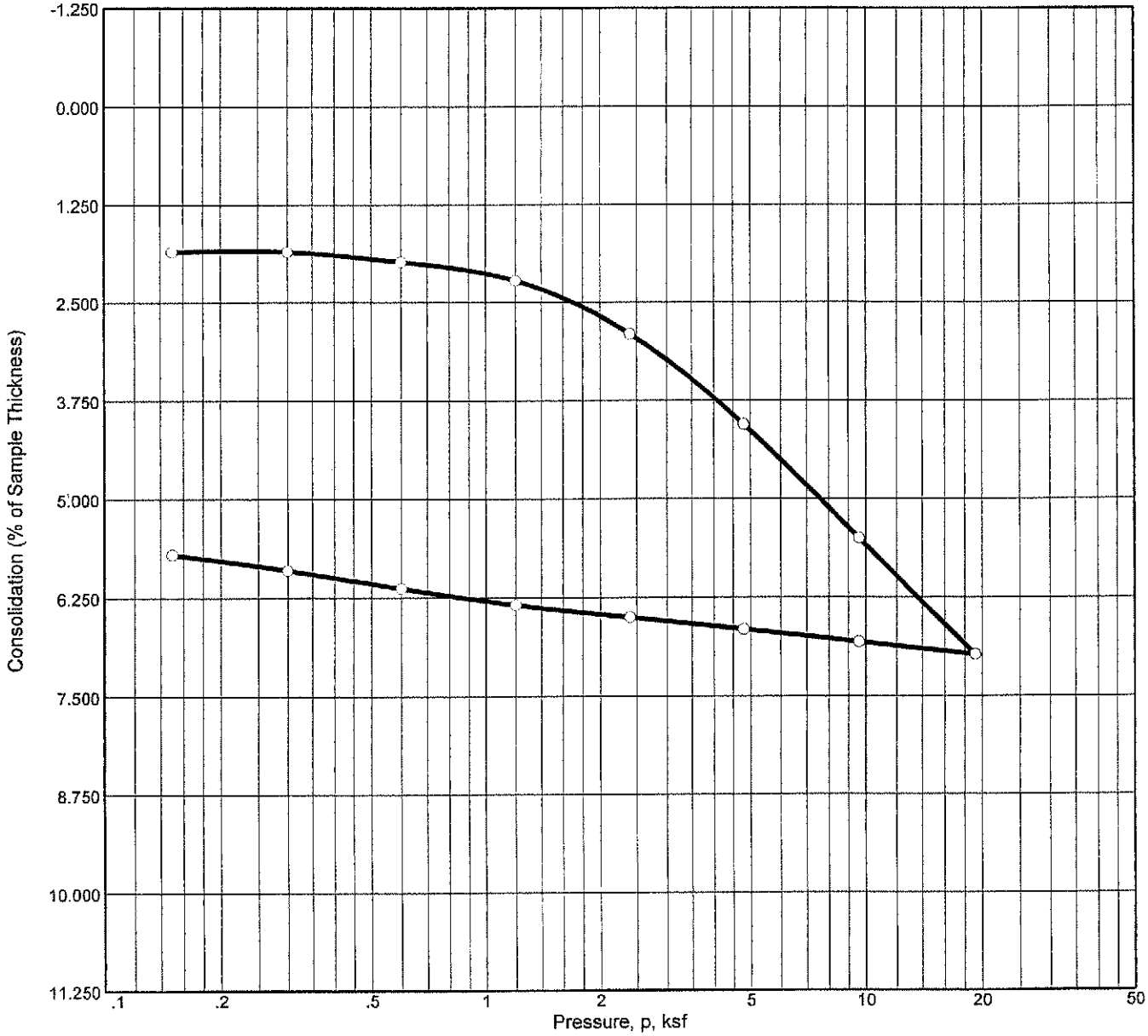
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	105.5	17.8	83.1	1.000	0.569	2.65	0.07	2.40	9.67	CL-ML
FINAL	108.6	22.2	100.0	0.971	0.523					

Source: B-19E **Elev./Depth:** 20'
Material Description: Silty CLAY
Remarks:

ALLAN E. SEWARD	**Client:** Newhall Ranch Co.
	Project: Newhall Ranch, Mesas-East
ENGINEERING GEOLOGY, INC.	**Job No.:** 00-1703CM-1 **Figure** B4.10

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

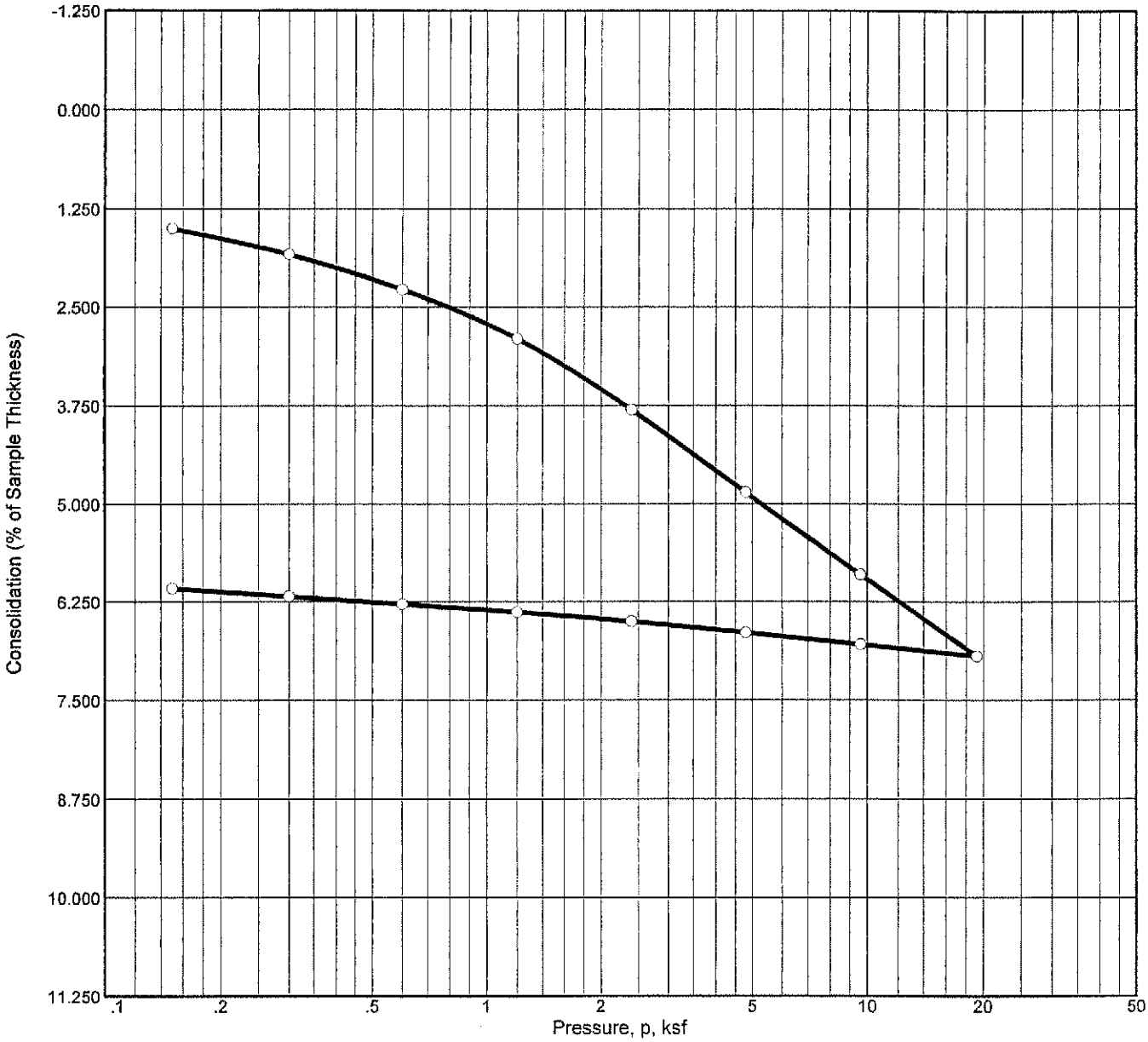
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	114.7	16.3	97.9	1.000	0.442	2.65	0.07	4.80	2.22	CL-ML
FINAL	121.6	23.8	100.0	0.943	0.360					

Source: B-19E **Elev./Depth:** 40'
Material Description: Sandy, silty CLAY
Remarks:

ALLAN E. SEWARD	**Client:** Newhall Ranch Co.
	Project: Newhall Ranch, Mesas-East
ENGINEERING GEOLOGY, INC.	**Job No.:** 00-1703CM-1 **Figure** B4.11

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	106.6	20.2	97.3	1.000	0.551	2.65	0.05	1.20	1.36	CL
FINAL	113.5	27.5	100.0	0.939	0.457					

Source: B-20E **Elev./Depth:** 10'
Material Description: Sandy lean CLAY
Remarks:

ALLAN E. SEWARD

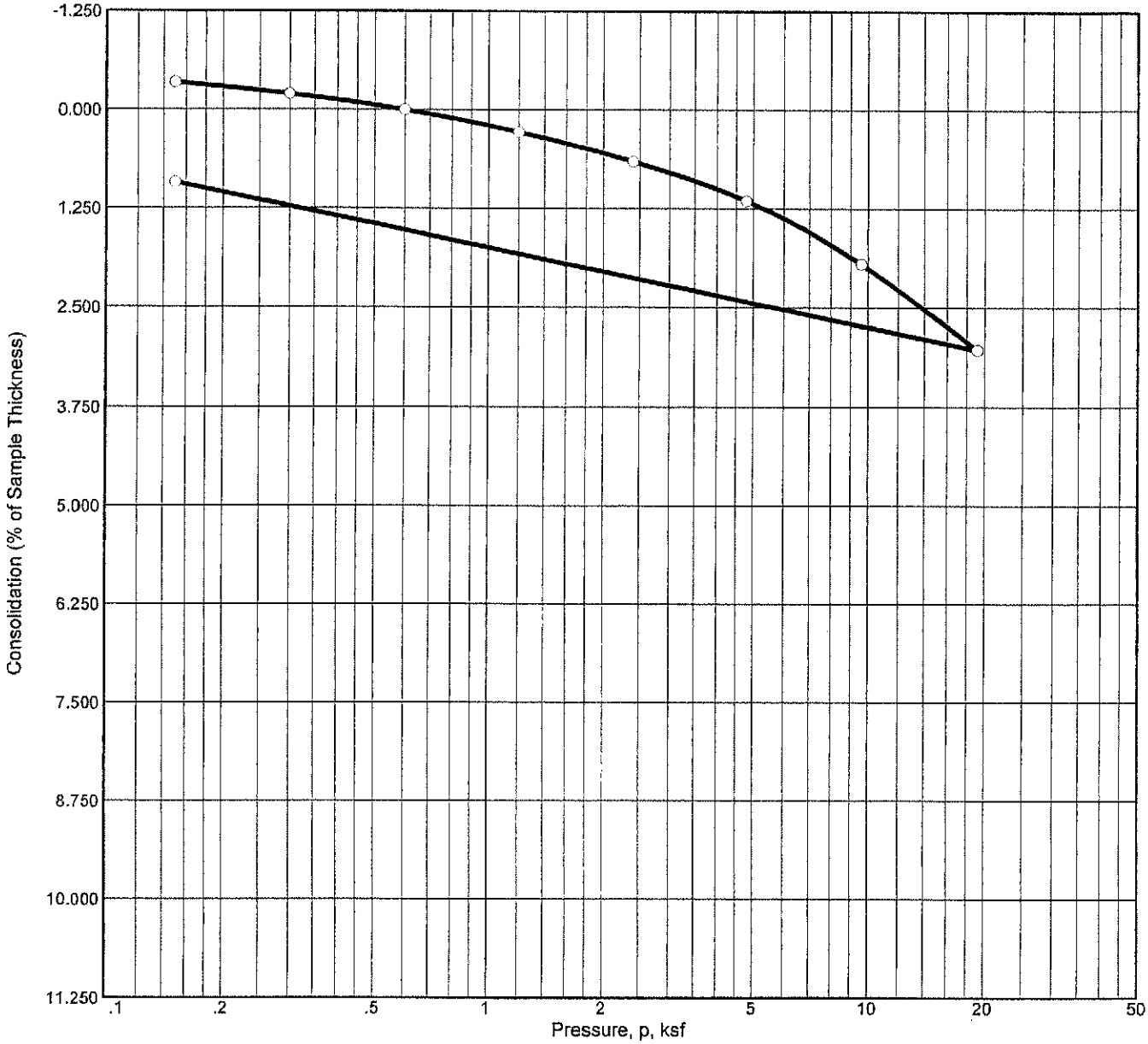
ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

Job No.: 00-1703CM-1 **Figure** B4.12

DRAWN BY
DATE
CHECKED BY
APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	106.9	19.6	94.8	1.000	0.547	2.65	0.06	1.20	6.39	ML
FINAL	107.9	20.5	100.0	0.991	0.533					

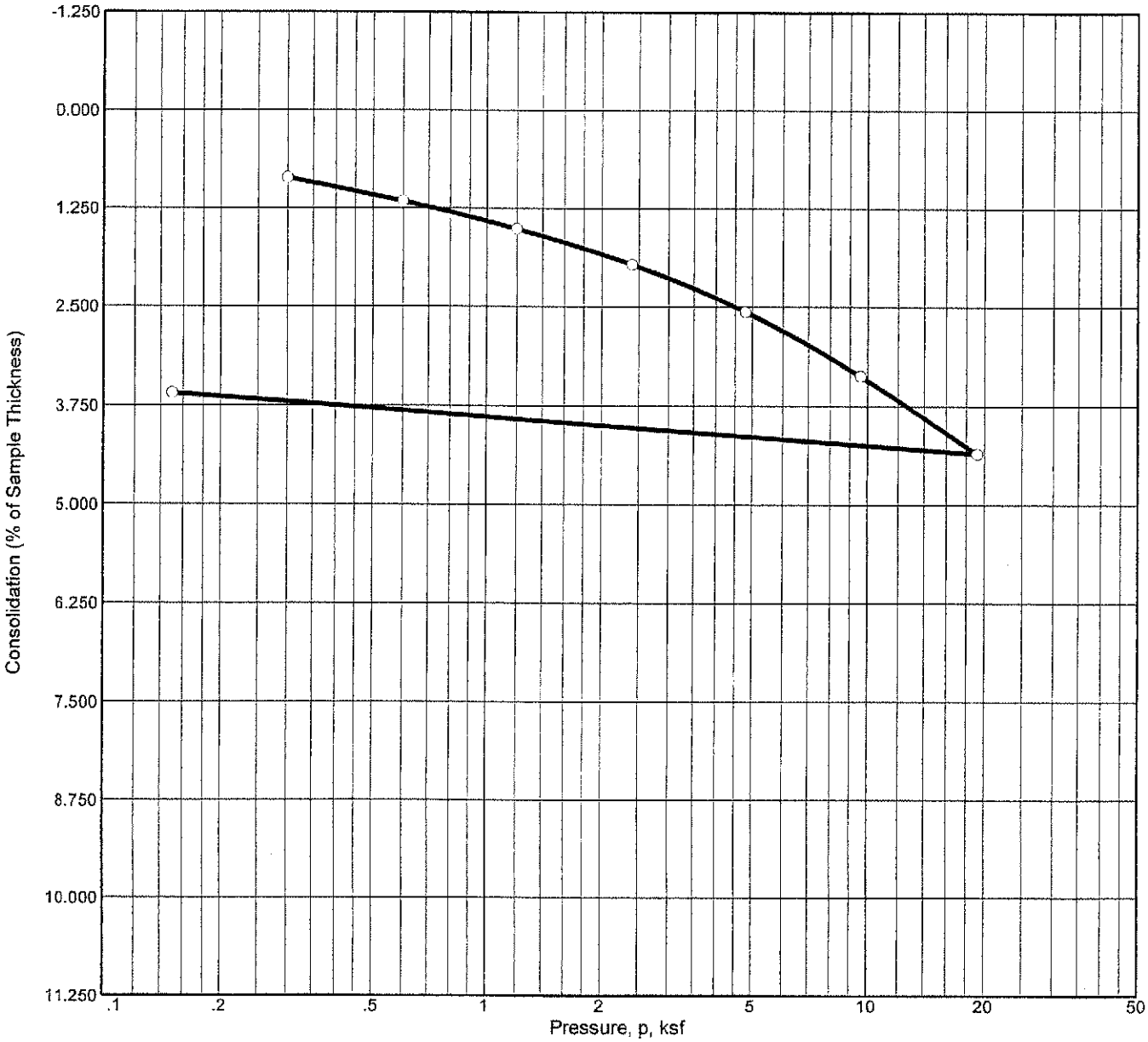
Source: B-21E
Material Description: Sandy SILT
Remarks:

Elev./Depth: 10'

ALLAN E. SEWARD **ENGINEERING GEOLOGY, INC.**	**Client:** Newhall Ranch Co. **Project:** Newhall Ranch, Mesas-East **Job No.:** 00-1703CM-1 **Figure** B4.13

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



DRAWN BY
DATE
CHECKED BY
APPROVED BY

SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	114.0	17.0	99.6	1.000	0.452	2.65	0.05	4.80	5.93	ML
FINAL	118.2	19.0	100.0	0.964	0.399					

Source: B-21E **Elev./Depth:** 40'
Material Description: Sandy SILT
Remarks:

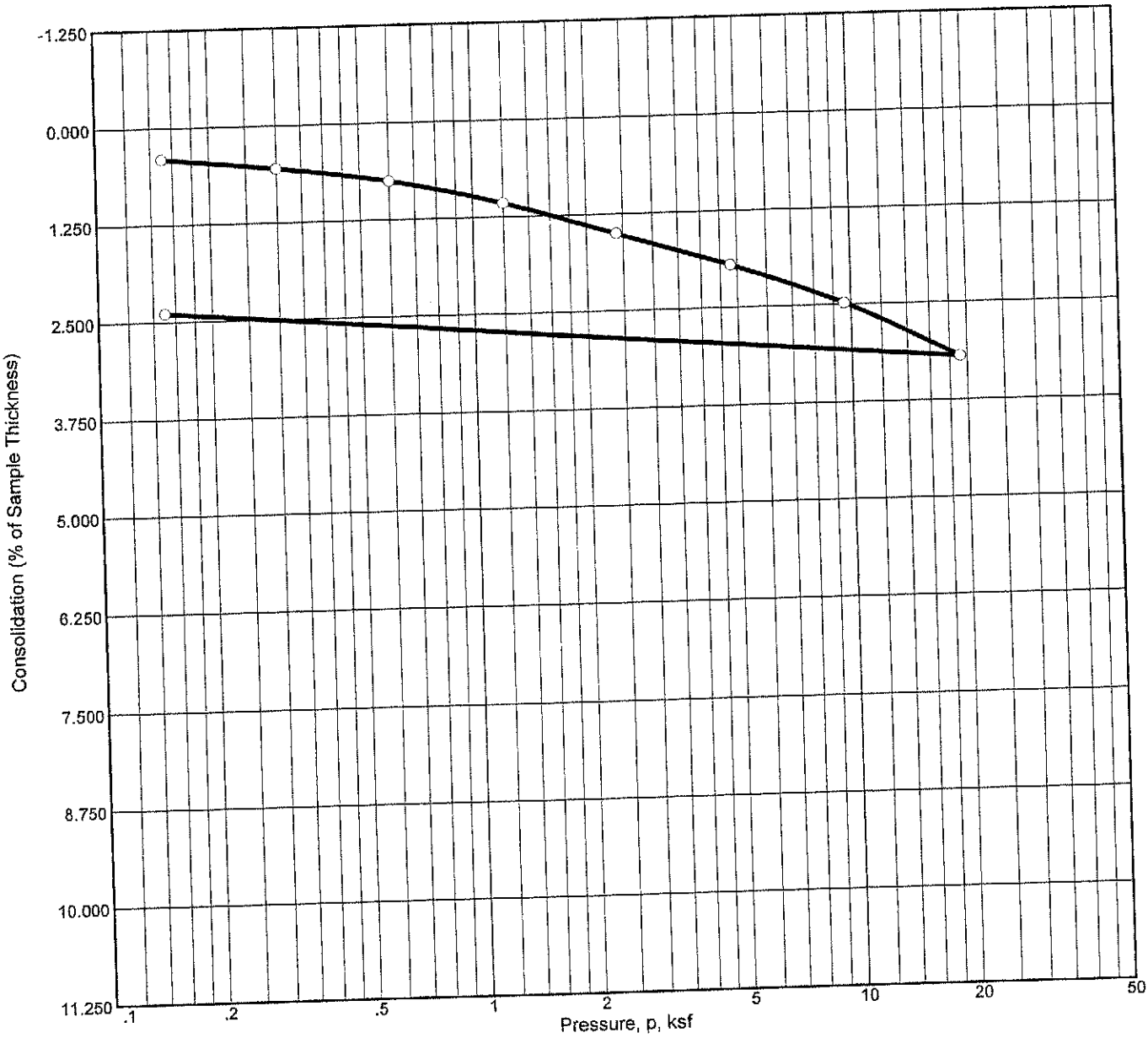
ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

Job No.: 00-1703CM-1 **Figure** B4.14

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	107.0	19.9	96.4	1.000	0.547	2.65	0.04	1.20	9.95	SM
FINAL	109.6	19.8	100.0	0.976	0.510					

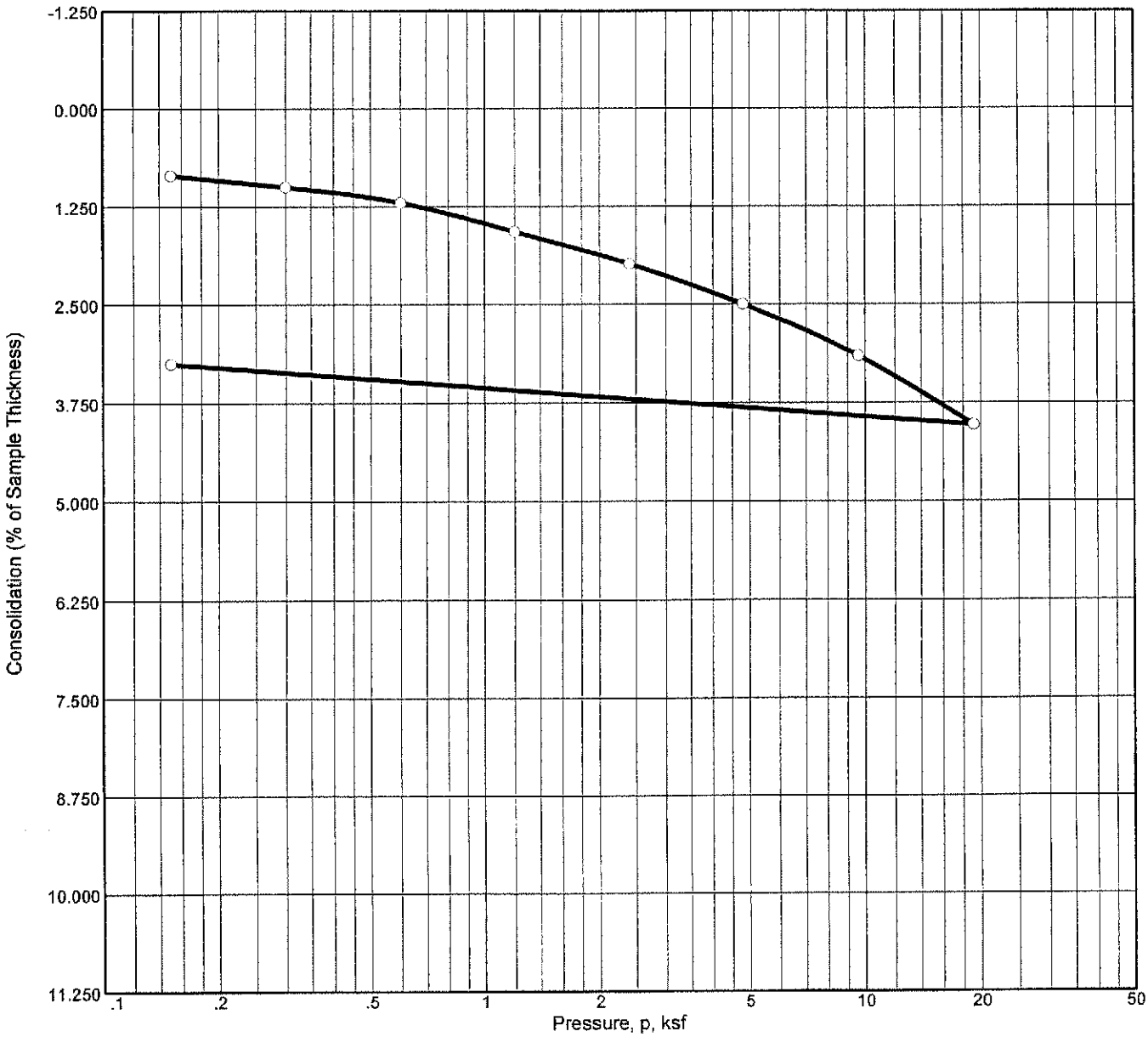
Elev./Depth: 10'

Source: B-23E
Material Description: Silty SAND with pebbles
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.	**Client:** Newhall Ranch Co. **Project:** Newhall Ranch, Mesas-East **Job No.:** 00-1703CM-1 **Figure** B4.15

DRAWN BY
DATE
CHECKED BY
APPROVED BY

CONSOLIDATION TEST REPORT



DRAWN BY
DATE
CHECKED BY
APPROVED BY

SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	124.2	11.8	94.3	1.000	0.332	2.65	0.04	2.40	2.77	SM
FINAL	128.4	14.8	100.0	0.967	0.288					

Source: B-23E
Material Description: Silty SAND
Remarks:

Elev./Depth: 20'

ALLAN E. SEWARD

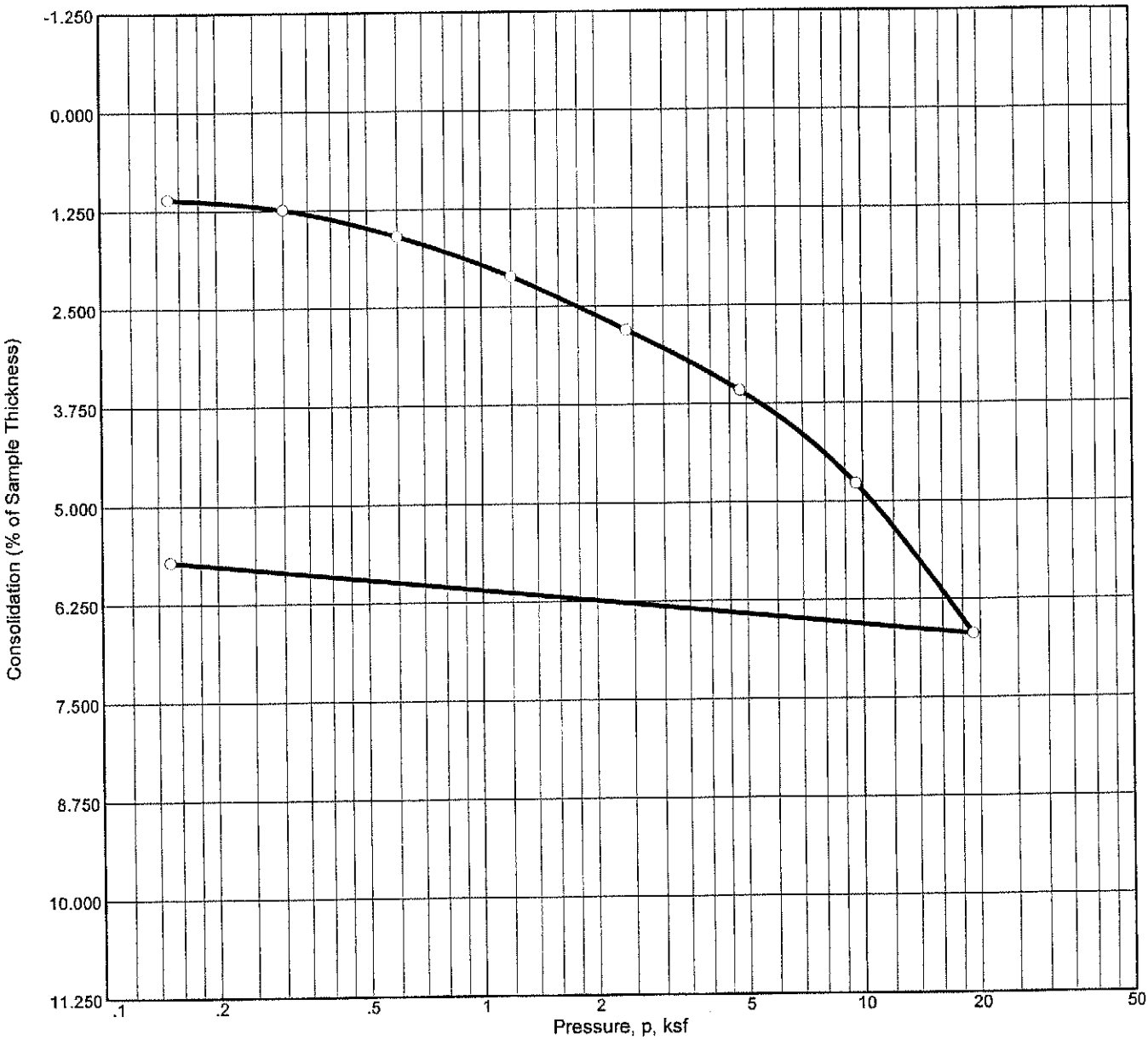
ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

Job No.: 00-1703CM-1

Figure B4.16

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	112.4	17.5	98.1	1.000	0.471	2.65	0.10	3.60	9.65	SM
FINAL	119.2	17.2	100.0	0.943	0.387					

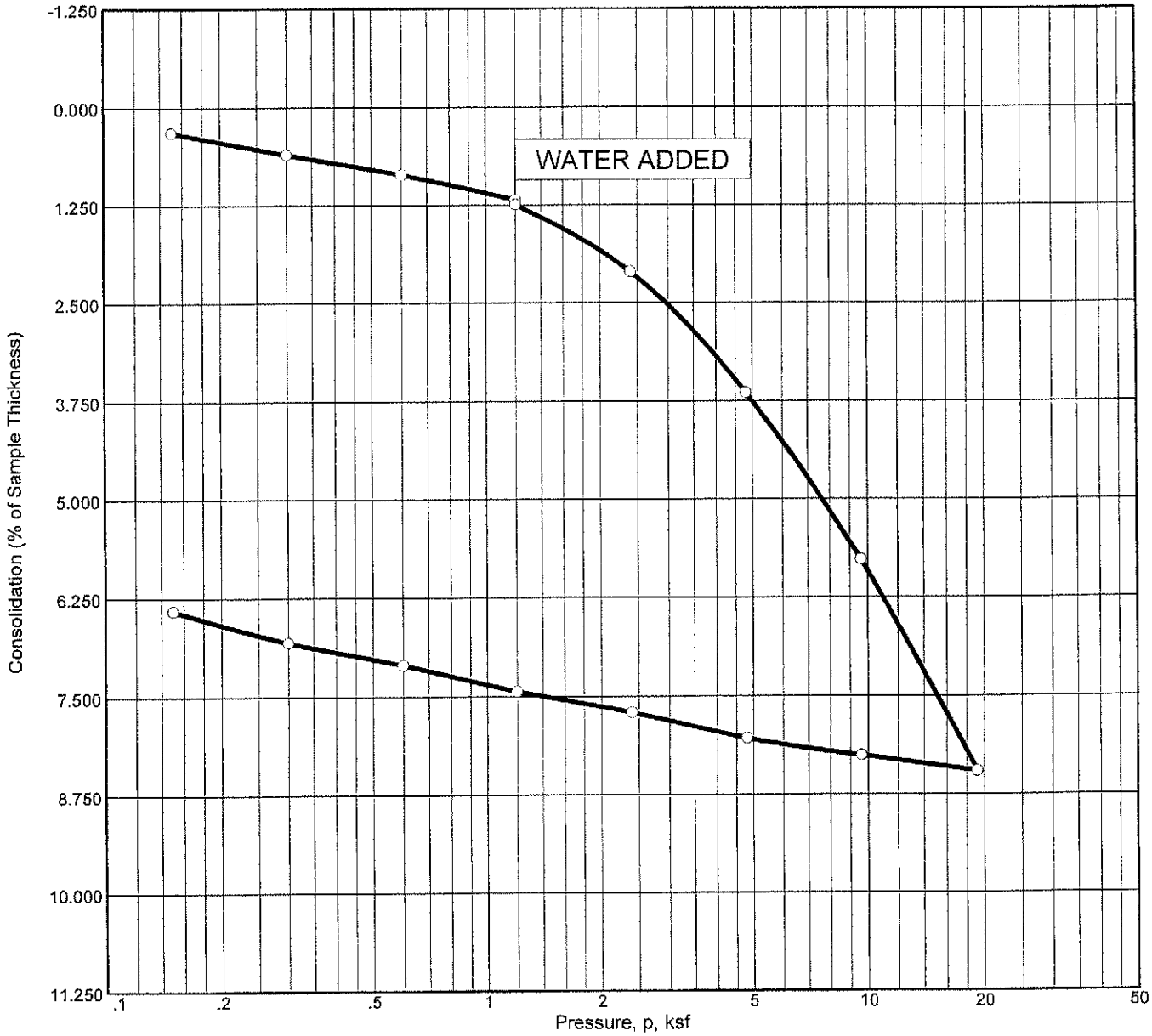
Source: B-23E
Material Description: Silty SAND with pebbles
Remarks:

Elev./Depth: 30'

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.	**Client:** Newhall Ranch Co. **Project:** Newhall Ranch, Mesas-East **Job No.:** 00-1703CM-1 **Figure** B4.17

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	107.2	5.8	28.5	1.000	0.543	2.65	0.14	1.20	4.32	ML
FINAL	114.6	16.8	100.0	0.936	0.444					

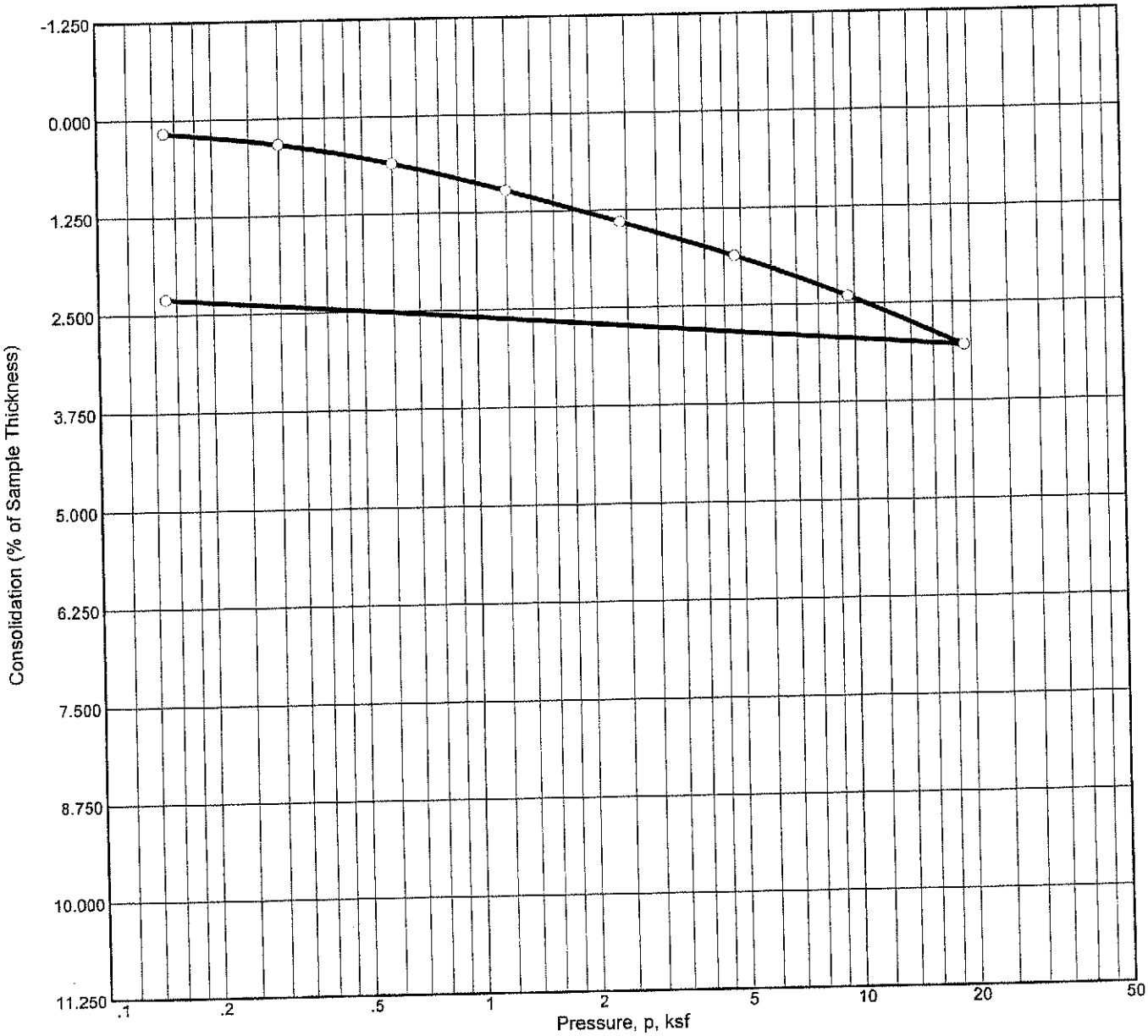
Source: B-48E
Material Description: Sandy SILT
Remarks:

Elev./Depth: 10'

ALLAN E. SEWARD **ENGINEERING GEOLOGY, INC.**	**Client:** Newhall Ranch Co. **Project:** Newhall Ranch, Mesas-East **Job No.:** 00-1703CM-1 **Figure** B4.18

DRAWN BY
DATE
CHECKED BY
APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	110.8	9.8	52.9	1.000	0.493	2.65	0.03	1.80	1.34	SM
FINAL	113.4	5.7	32.7	0.977	0.458					

Elev./Depth: 15'

Source: B-48E
Material Description: Silty SAND
Remarks:

ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

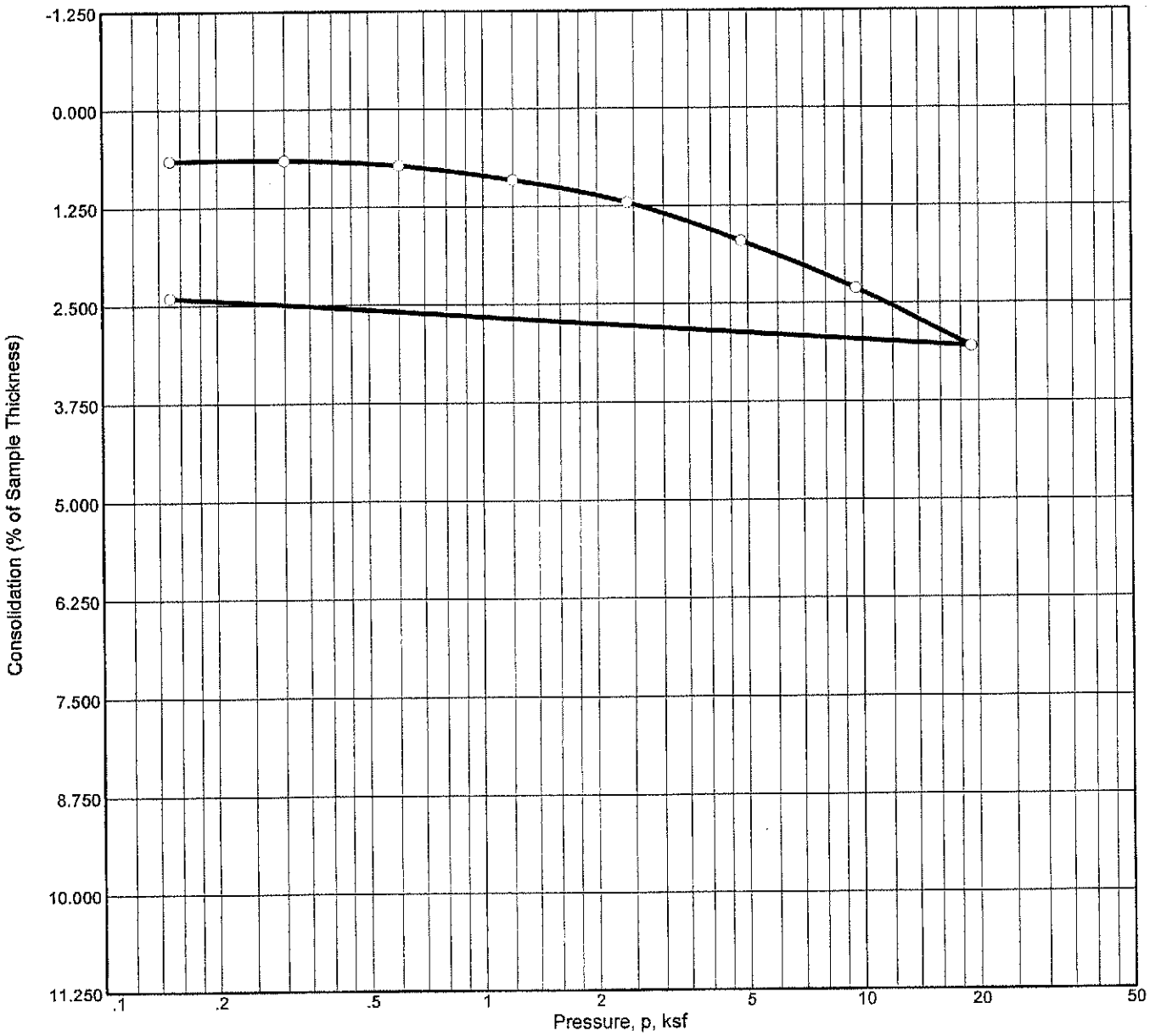
Client: Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

Job No.: 00-1703CM-1

Figure B4.19

DRAWN BY	CHECKED BY
DATE	APPROVED BY

CONSOLIDATION TEST REPORT



DRAWN BY
DATE
CHECKED BY
APPROVED BY

SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	106.5	20.4	97.5	1.000	0.554	2.65	0.04	1.80	3.97	CL-ML
FINAL	109.1	20.5	100.0	0.976	0.517					

Source: B-50E **Elev./Depth:** 10'
Material Description: Sandy, silty CLAY
Remarks:

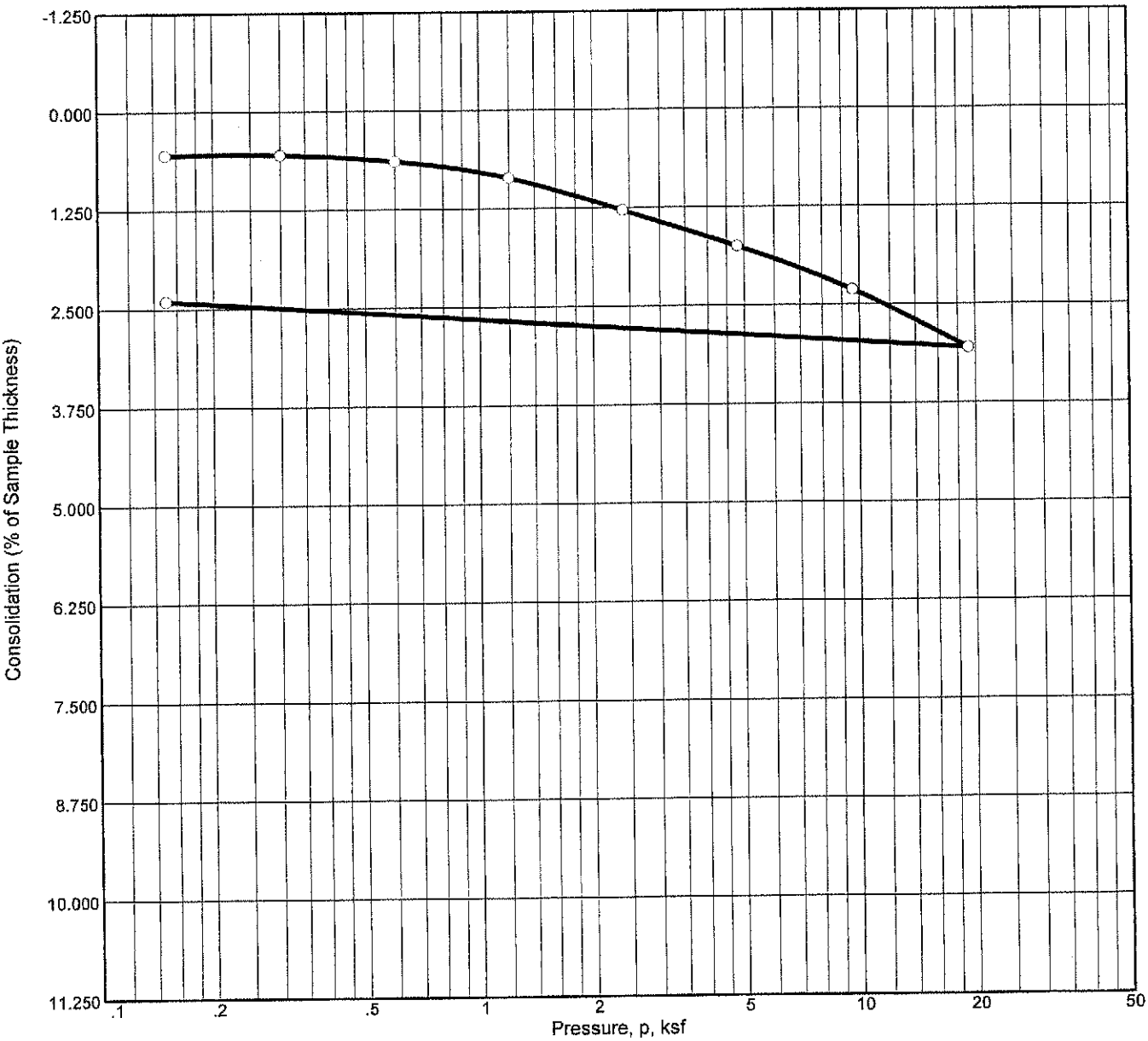
ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

Job No.: 00-1703CM-1 **Figure** B4.20

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

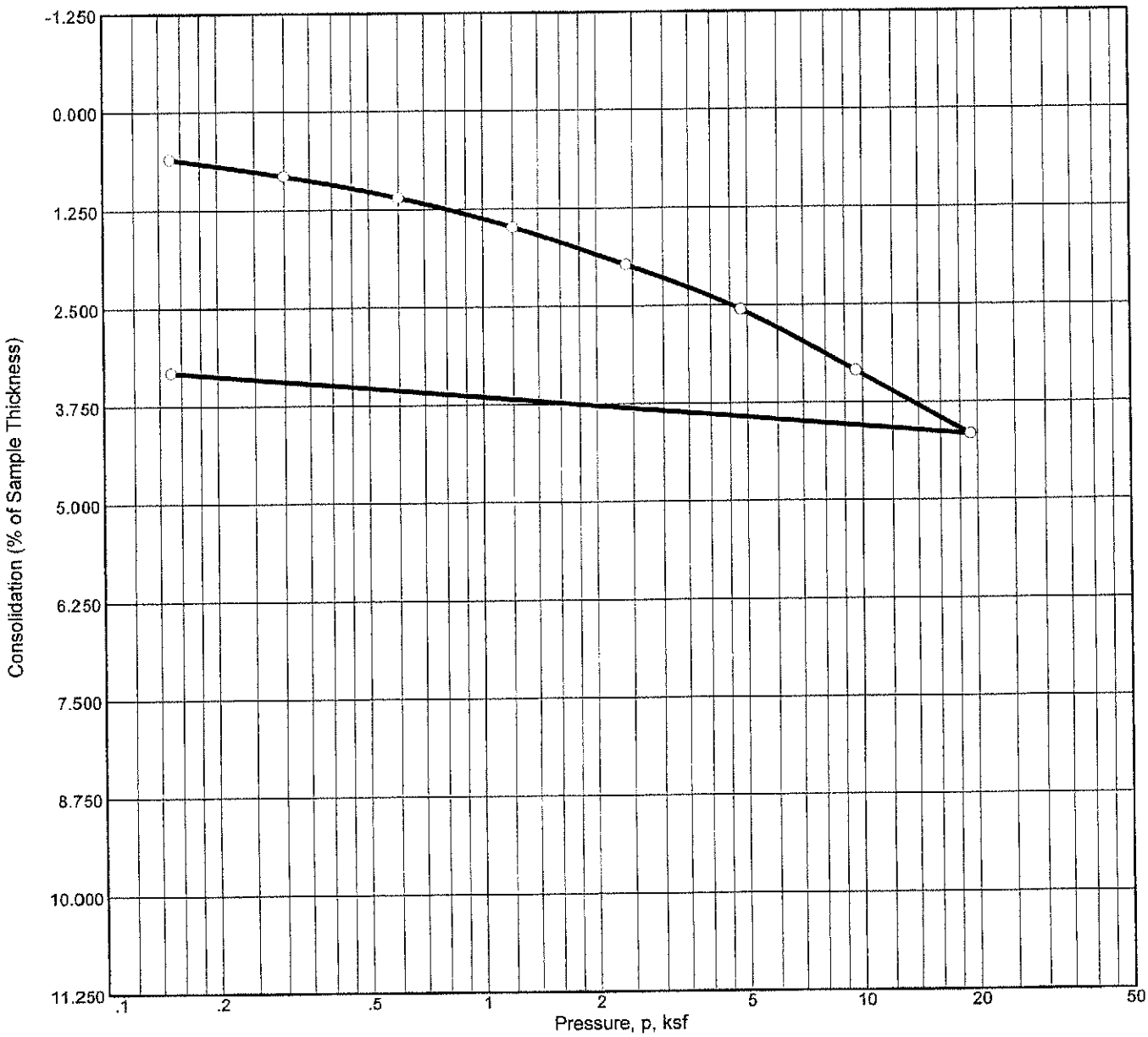
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	125.0	9.2	75.6	1.000	0.324	2.65	0.03	1.80	3.17	CL-ML
FINAL	128.1	4.5	40.5	0.976	0.292					

Source: B-50E **Elev./Depth:** 15'
Material Description: Sandy, silty CLAY
Remarks:

ALLAN E. SEWARD	**Client:** Newhall Ranch Co.
	Project: Newhall Ranch, Mesas-East
ENGINEERING GEOLOGY, INC.	**Job No.:** 00-1703CM-1 **Figure** B4.21

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	117.2	16.0	100.0	1.000	0.411	2.65	0.04	2.40	4.98	SC-SM
FINAL	121.3	10.0	72.9	0.967	0.364					

Source: B-50E **Elev./Depth:** 20'
Material Description: Clayey, silty SAND
Remarks:

ALLAN E. SEWARD

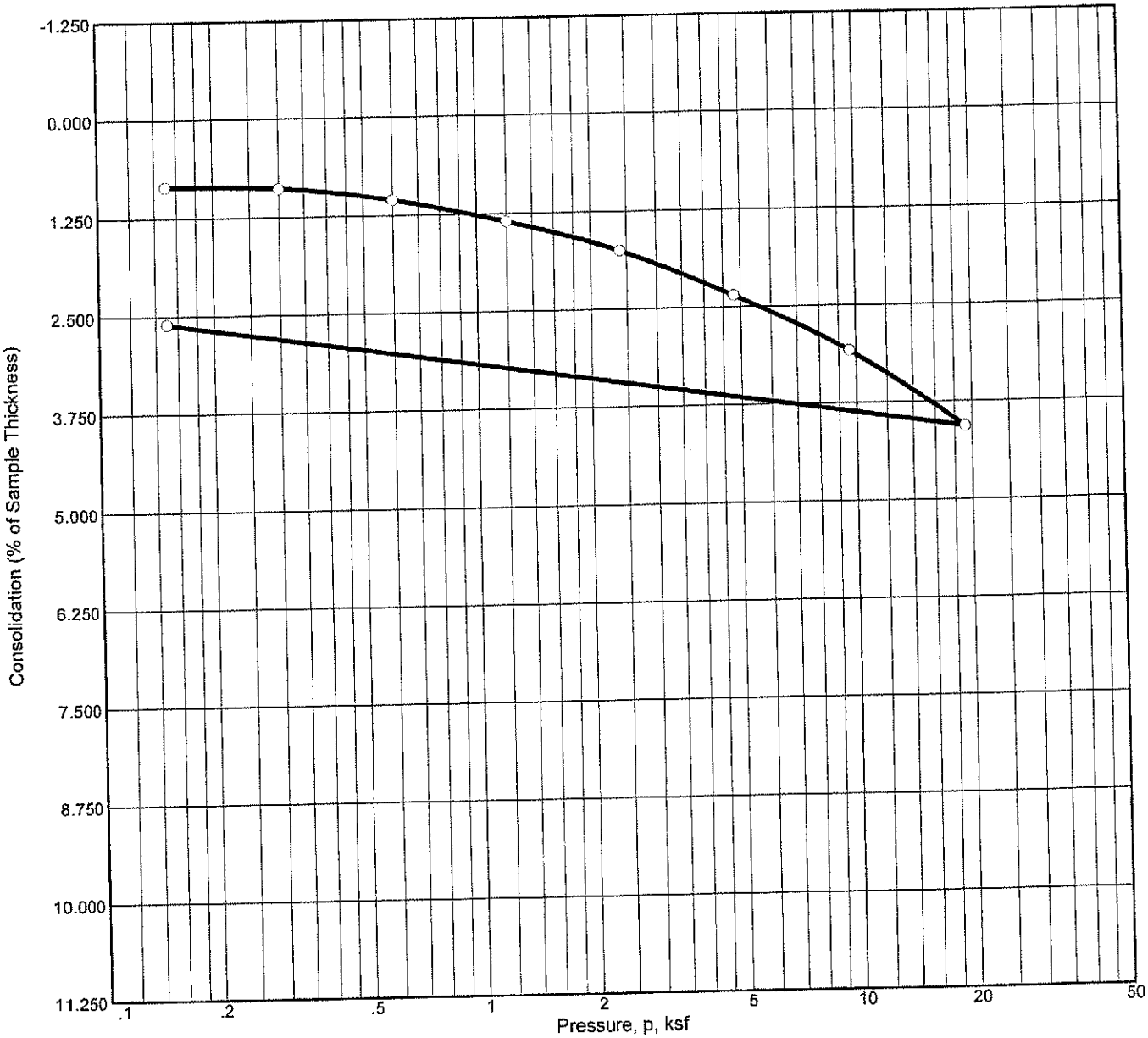
ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

Job No.: 00-1703CM-1 **Figure** B4.22

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	107.7	19.8	97.6	1.000	0.536	2.65	0.05	3.60	4.57	SC-SM
FINAL	110.6	21.4	100.0	0.974	0.496					

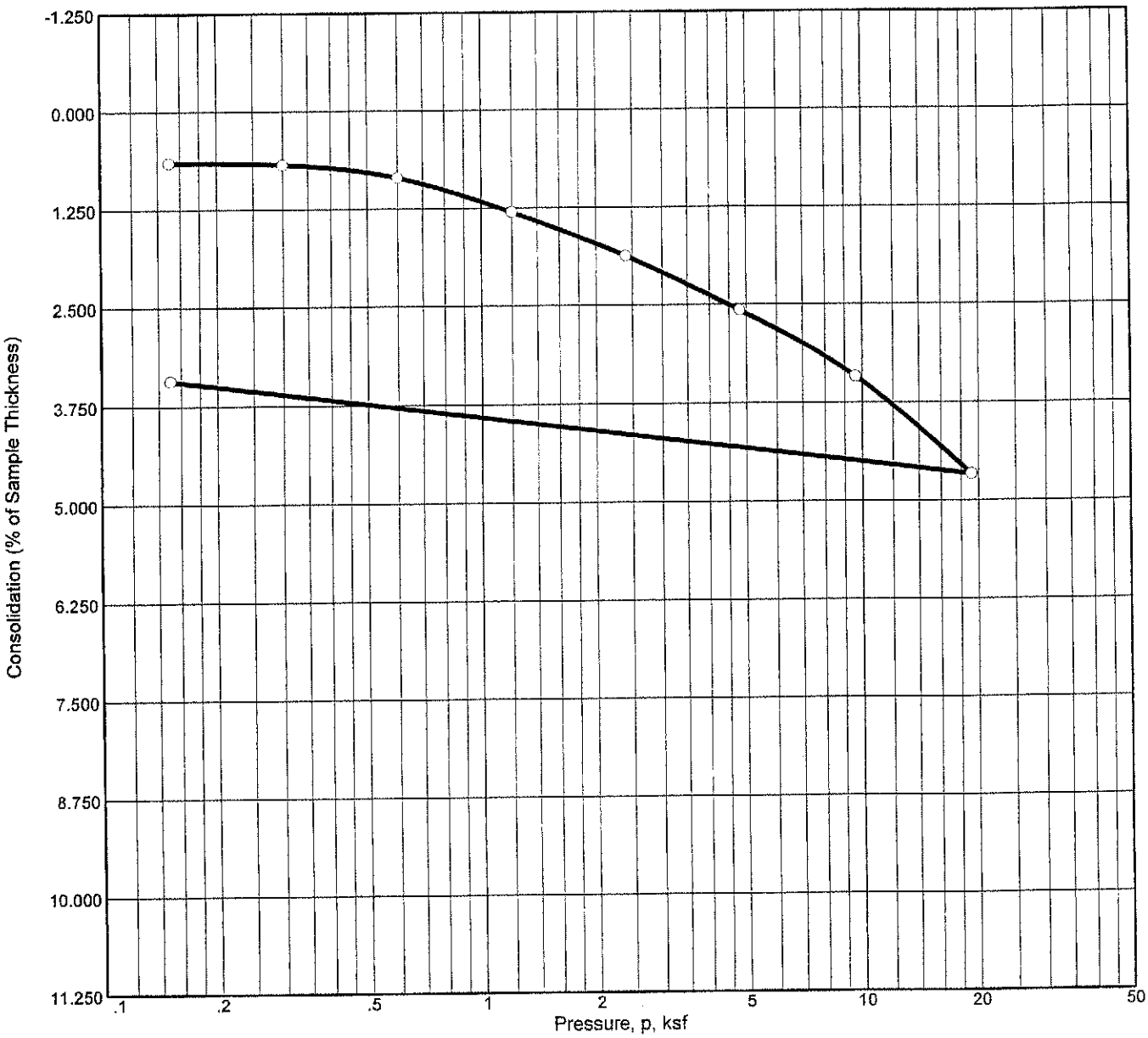
Elev./Depth: 30'

Source: B-56E
Material Description: Silty, clayey SAND
Remarks:

ALLAN E. SEWARD	**Client:** Newhall Ranch Co.
	Project: Newhall Ranch, Mesas-East
ENGINEERING GEOLOGY, INC.	**Job No.:** 00-1703CM-1 **Figure** B4.23

DRAWN BY	CHECKED BY
DATE	APPROVED BY

CONSOLIDATION TEST REPORT



DRAWN BY
DATE
CHECKED BY
APPROVED BY

SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	102.3	23.1	99.3	1.000	0.617	2.65	0.07	6.00	2.94	SM
FINAL	106.0	14.8	70.1	0.966	0.561					

Source: B-56E
Material Description: Silty SAND with pebbles
Remarks:

Elev./Depth: 50'

ALLAN E. SEWARD

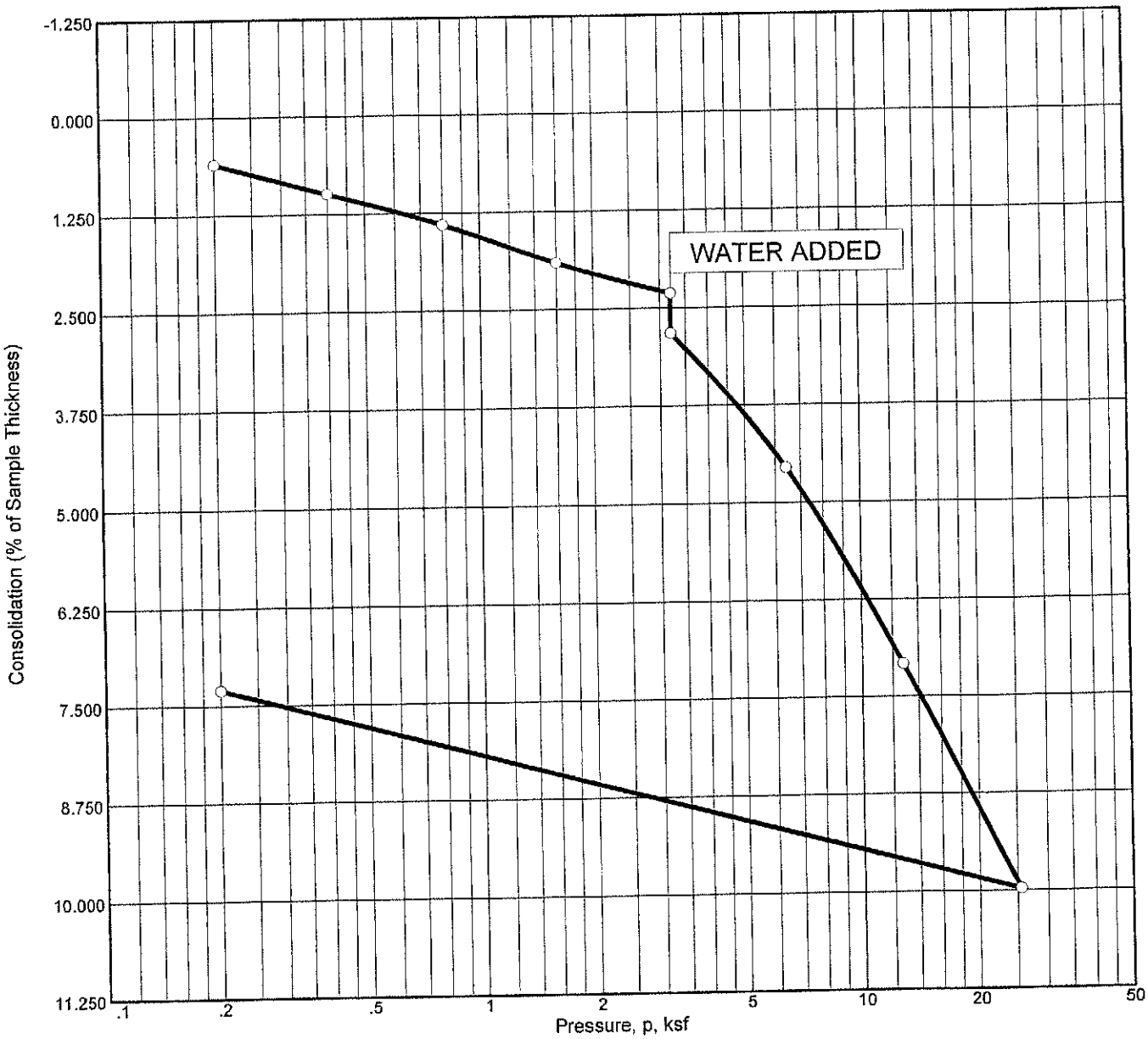
ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

Job No.: 00-1703CM-1

Figure B4.24

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	111.7	11.4	62.5	1.000	0.482	2.65	0.14	1.44	7.41	ML
FINAL	120.4	14.8	100.0	0.927	0.374					

Source: B-57E
Material Description: Sandy SILT with pebbles
Remarks:

Elev./Depth: 12'

ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

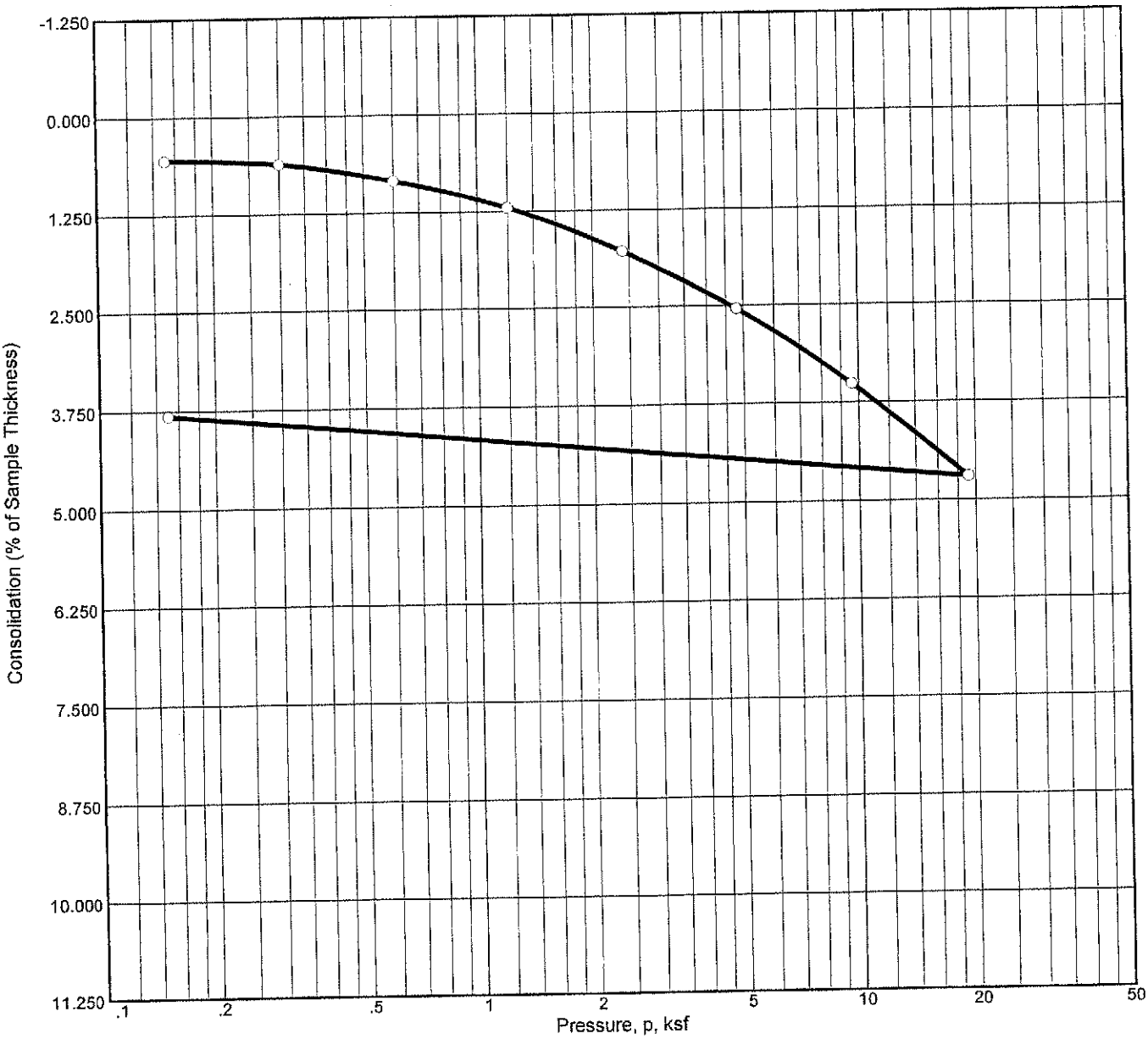
Client: Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

Job No.: 00-1703CM-1

Figure B4.25

DRAWN BY	CHECKED BY
DATE	APPROVED BY

CONSOLIDATION TEST REPORT



DRAWN BY
DATE
CHECKED BY
APPROVED BY

SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	98.7	25.1	98.4	1.000	0.675	2.65	0.07	1.80	3.08	ML
FINAL	102.7	24.5	100.0	0.962	0.612					

Source: B-57E
Material Description: SILT
Remarks:

Elev./Depth: 15'

ALLAN E. SEWARD

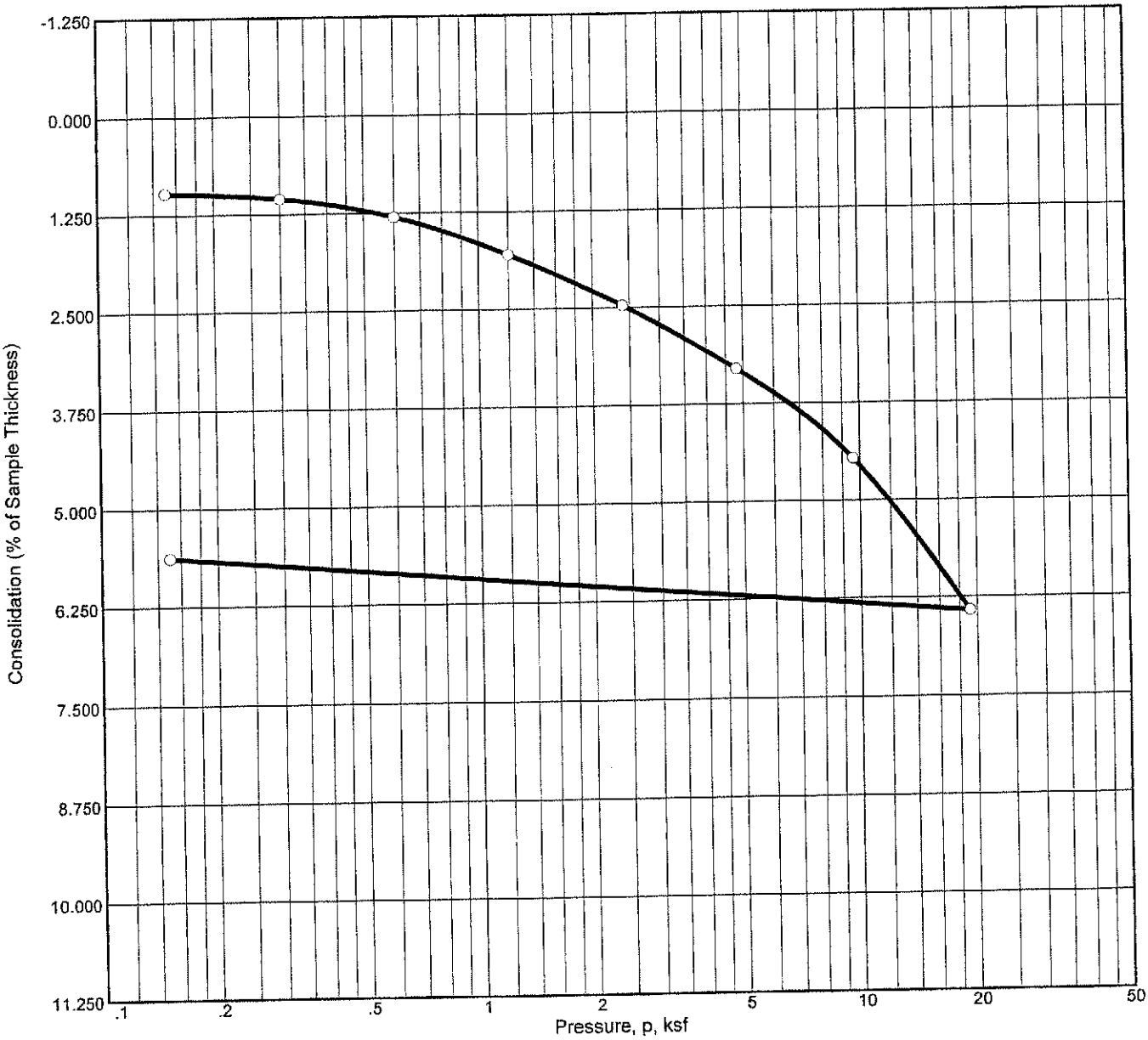
ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

Job No.: 00-1703CM-1

Figure B4.26

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	112.7	17.2	97.2	1.000	0.468	2.65	0.10	3.00	10.07	CL-ML
FINAL	119.4	23.5	100.0	0.944	0.386					

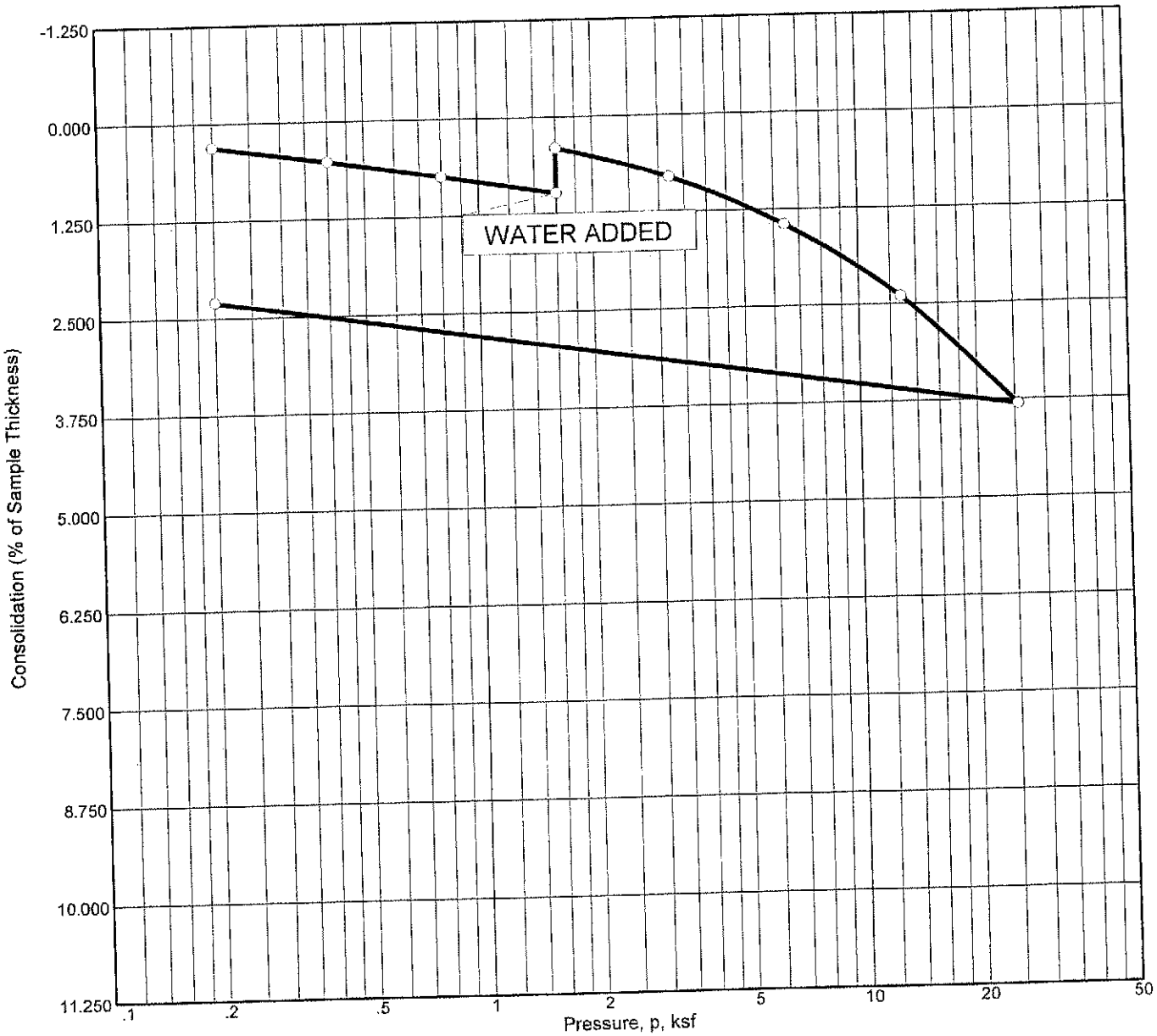
Source: B-57E
Material Description: Sandy, silty CLAY
Remarks:

Elev./Depth: 25'

ALLAN E. SEWARD **ENGINEERING GEOLOGY, INC.**	**Client:** Newhall Ranch Co. **Project:** Newhall Ranch, Mesas-East **Job No.:** 00-1703CM-1 **Figure** B4.27

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



DRAWN BY
DATE
CHECKED BY
APPROVED BY

SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	126.4	9.1	77.9	1.000	0.309	2.65	0.06	1.20	6.96	SC
FINAL	129.3	12.2	100.0	0.977	0.279					

Elev./Depth: 10'

Source: B-58E
Material Description: Clayey SAND
Remarks:

ALLAN E. SEWARD

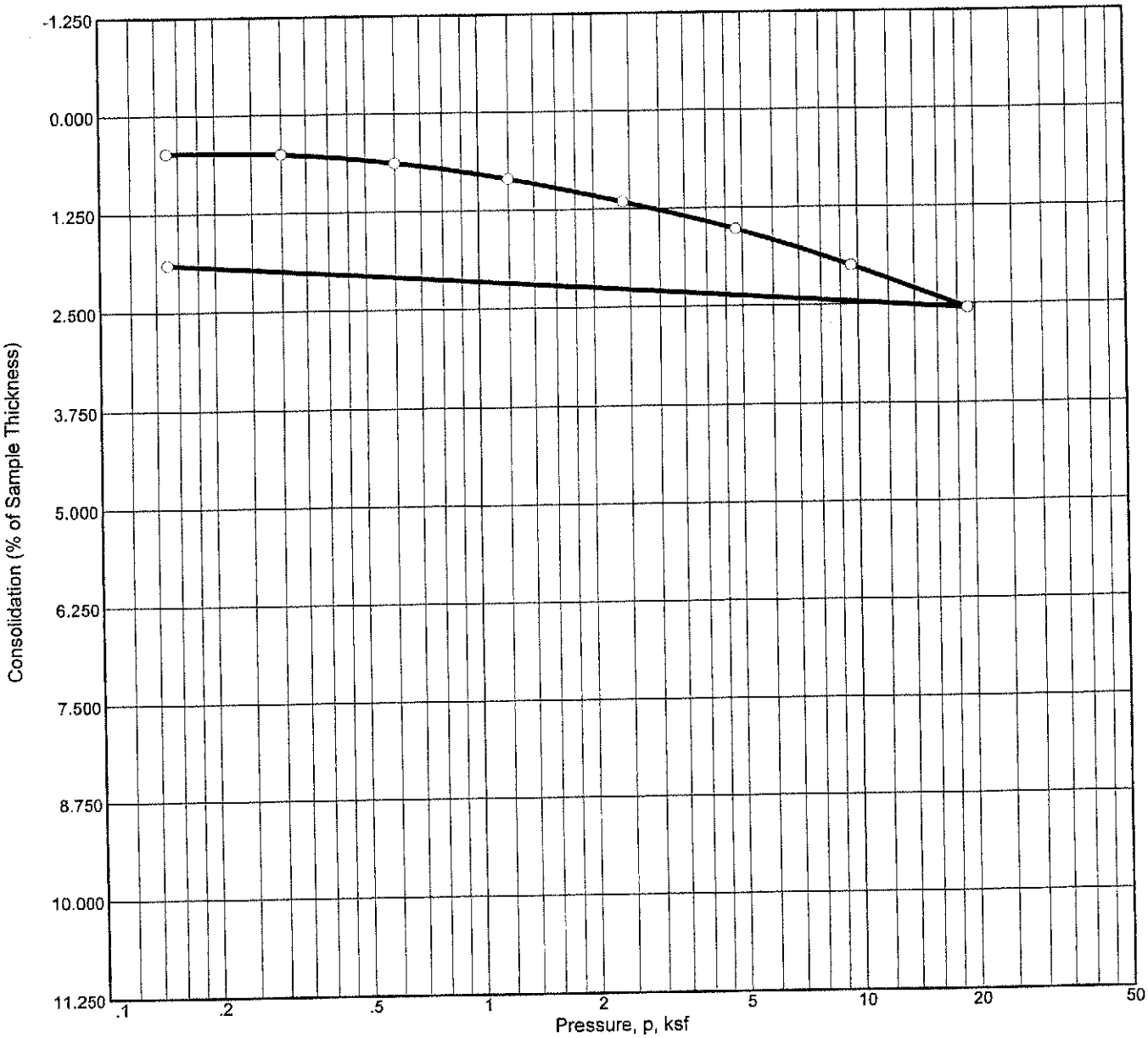
ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

Job No.: 00-1703CM-1

Figure B4.28

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	130.4	8.4	83.0	1.000	0.269	2.65	0.02	1.80	1.64	SM
FINAL	132.9	9.7	100.0	0.981	0.245					

Source: B-58E
Material Description: Silty SAND with gravel
Remarks:

Elev./Depth: 15'

ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

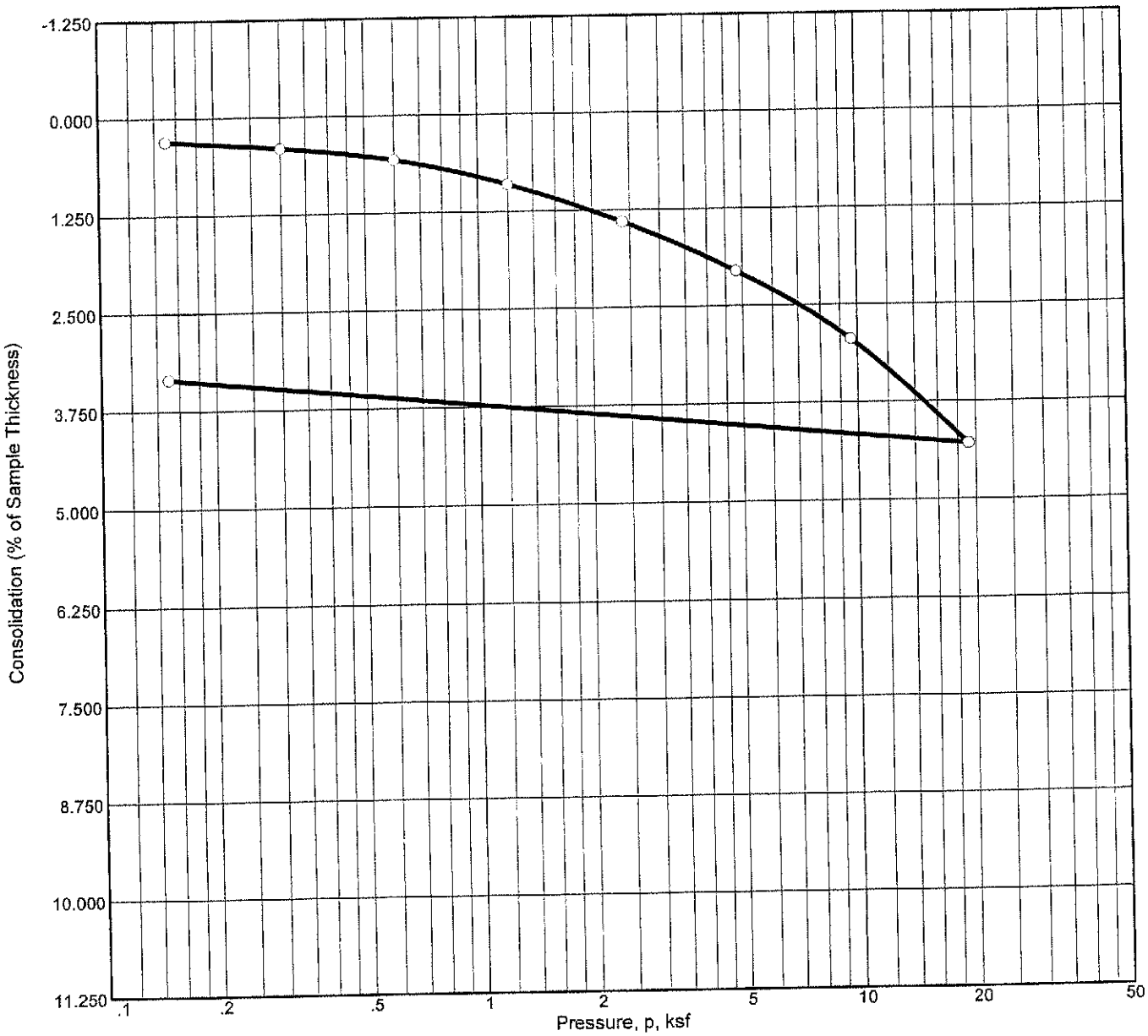
Client: Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

Job No.: 00-1703CM-1

Figure B4.29

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



DRAWN BY
DATE
CHECKED BY
APPROVED BY

SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	107.4	14.9	73.1	1.000	0.541	2.65	0.07	1.20	10.05	SM
FINAL	111.1	14.5	78.4	0.966	0.489					

Source: B-59E
Material Description: Silty SAND
Remarks:

Elev./Depth: 10'

ALLAN E. SEWARD

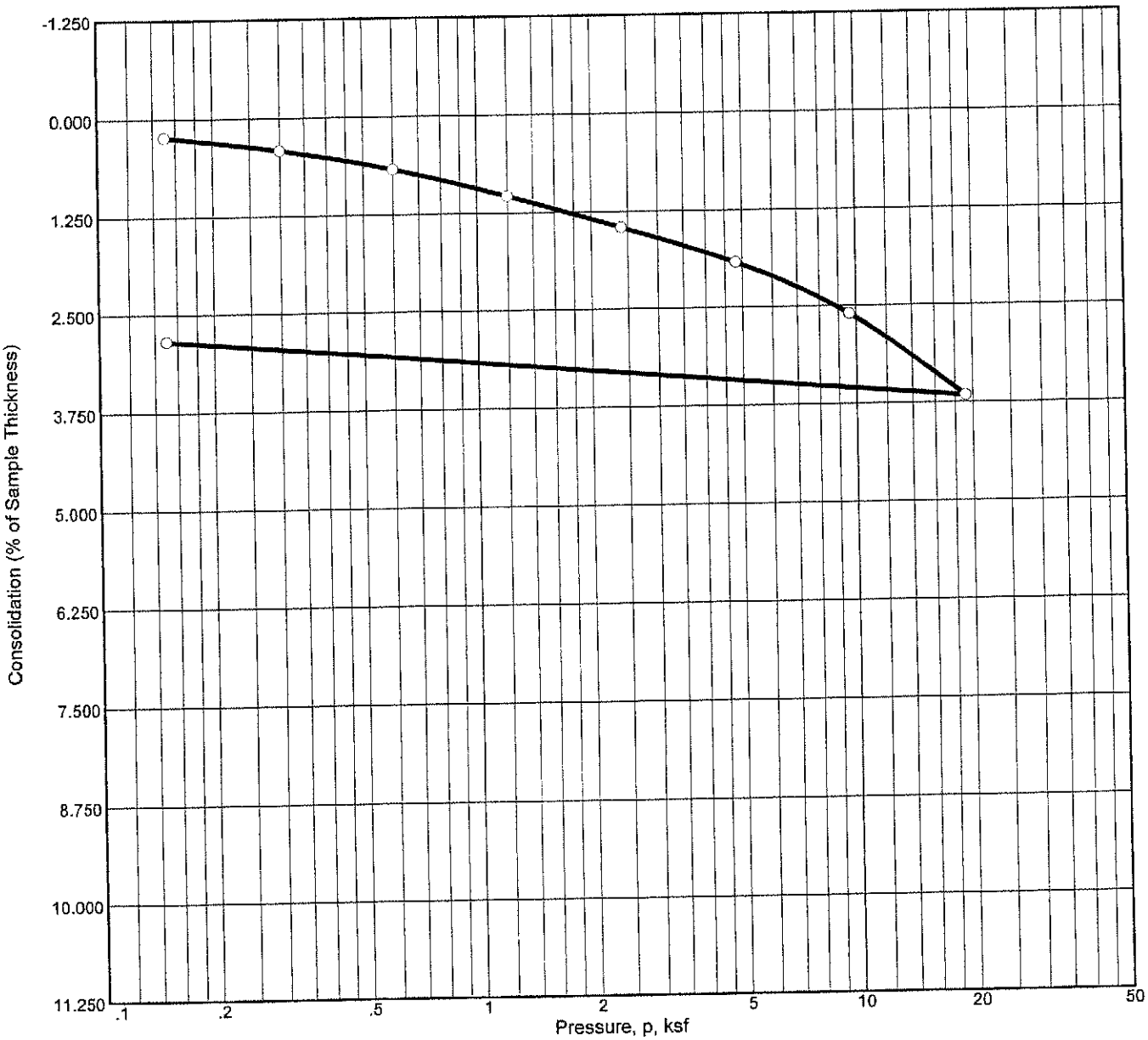
ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

Job No.: 00-1703CM-1

Figure B4.30

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	109.4	11.3	58.6	1.000	0.513	2.65	0.05	1.80	9.86	SM
FINAL	112.6	14.6	82.4	0.972	0.470					

Source: B-59E
Material Description: Silty SAND
Remarks:

Elev./Depth: 15'

ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

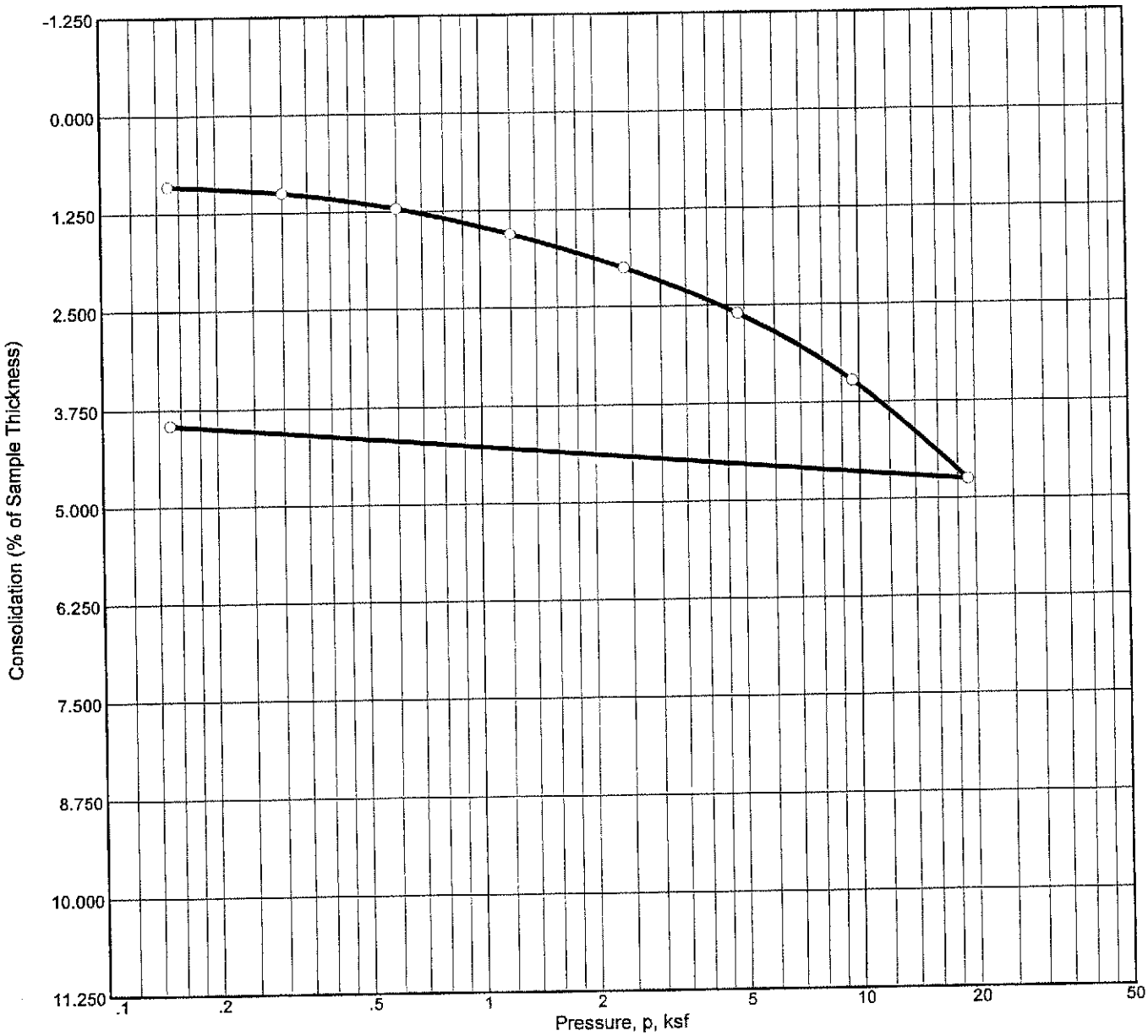
Client: Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

Job No.: 00-1703CM-1

Figure B4.31

DRAWN BY
DATE
CHECKED BY
APPROVED BY

CONSOLIDATION TEST REPORT



DRAWN BY
DATE
CHECKED BY
APPROVED BY

SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	120.4	13.6	96.4	1.000	0.375	2.65	0.06	2.40	10.02	ML
FINAL	125.3	9.3	77.1	0.960	0.320					

Source: B-59E
Material Description: Sandy SILT
Remarks:

Elev./Depth: 20'

ALLAN E. SEWARD

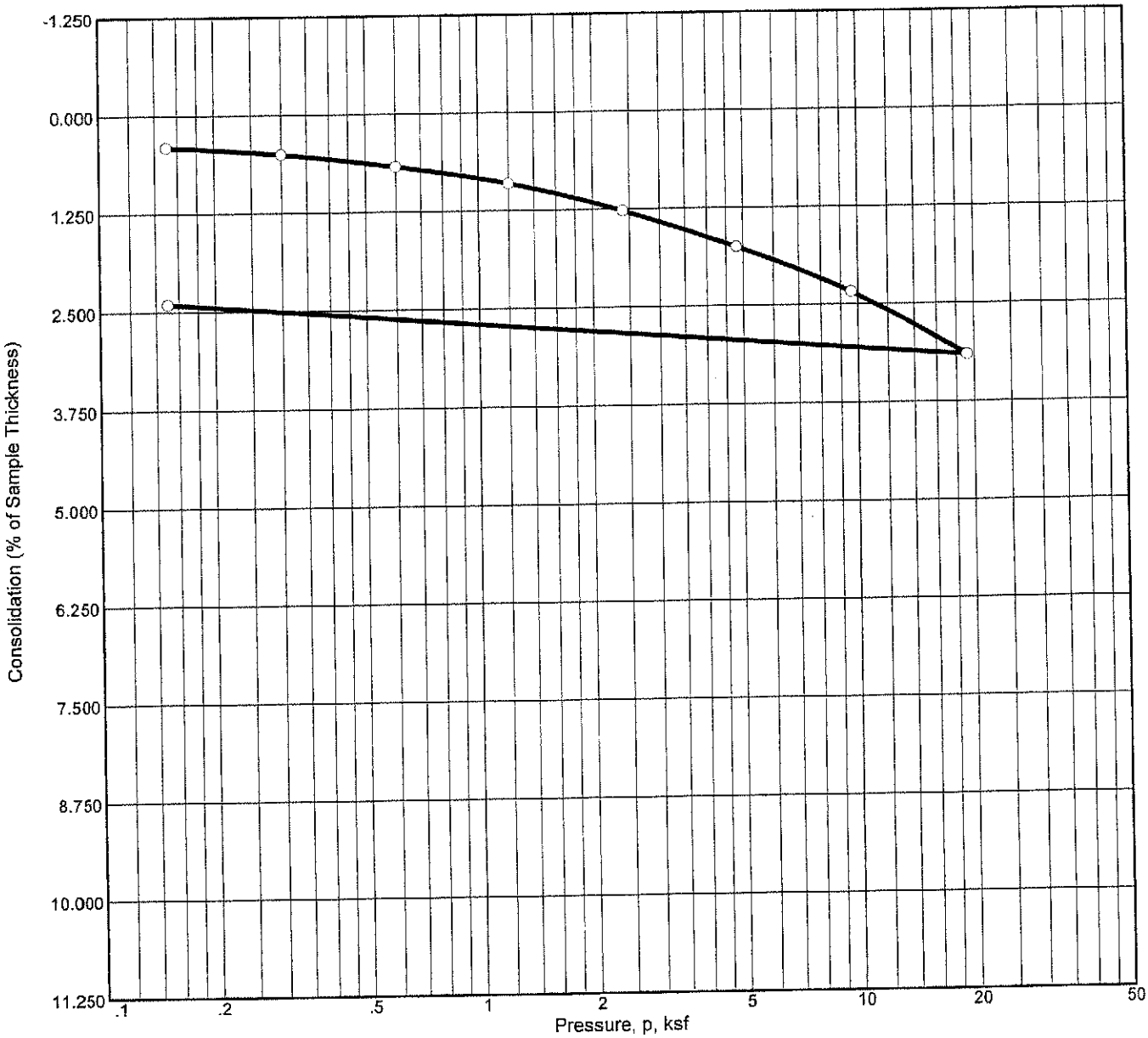
ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

Job No.: 00-1703CM-1

Figure B4.32

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	94.2	21.9	76.7	1.000	0.755	2.65	0.05	0.60	9.98	ML
FINAL	96.6	28.3	100.0	0.976	0.713					

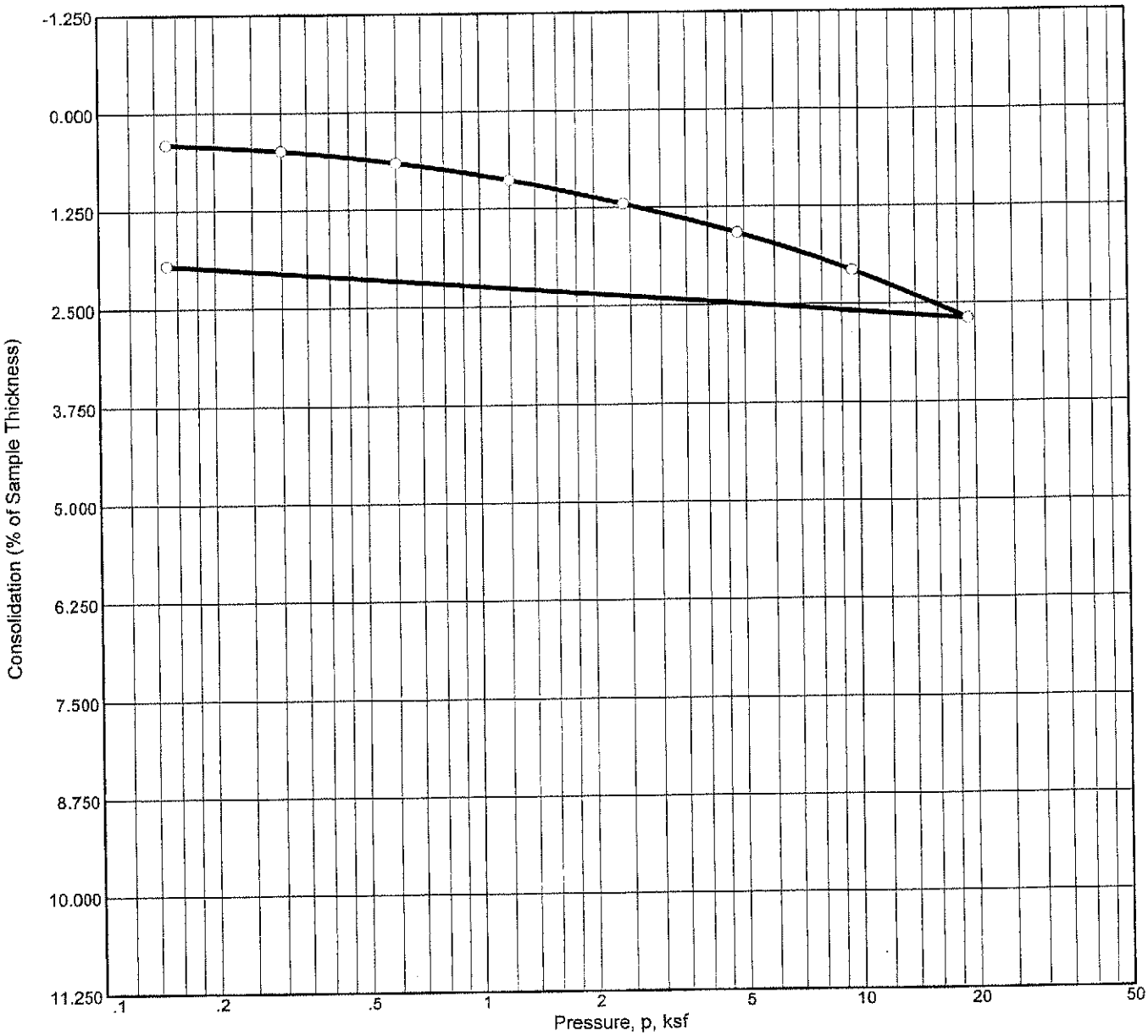
Source: B-60E
Material Description: SILT
Remarks:

Elev./Depth: 5'

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.	**Client:** Newhall Ranch Co. **Project:** Newhall Ranch, Mesas-East **Job No.:** 00-1703CM-1 **Figure** B4.33

DRAWN BY	CHECKED BY
DATE	APPROVED BY

CONSOLIDATION TEST REPORT



DRAWN BY
DATE
CHECKED BY
APPROVED BY

SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	116.0	10.2	63.3	1.000	0.426	2.65	0.03	1.20	3.26	SM
FINAL	118.3	1.2	8.0	0.980	0.398					

Source: B-60E
Material Description: Silty SAND with gravel
Remarks:

Elev./Depth: 10'

ALLAN E. SEWARD

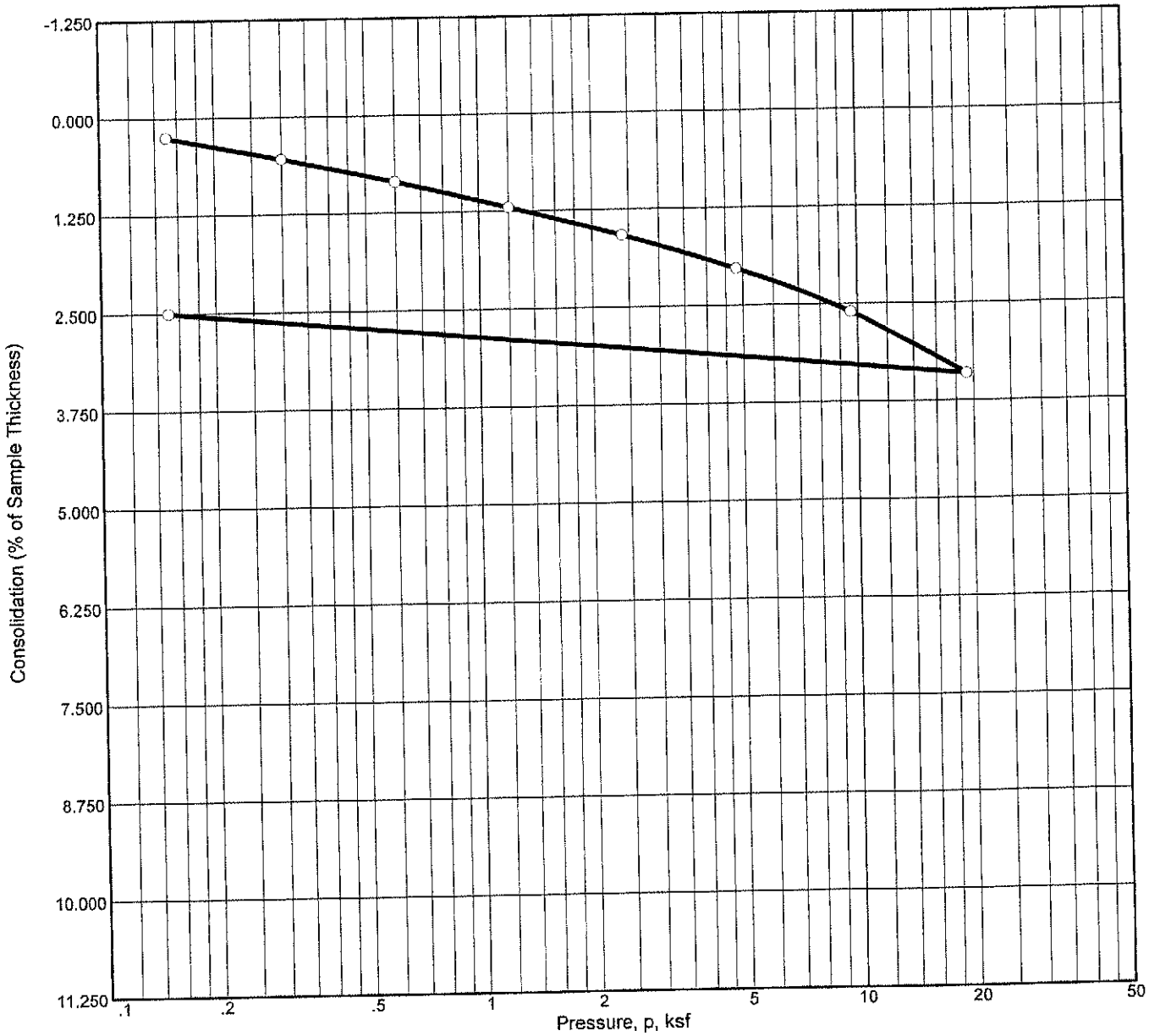
ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

Job No.: 00-1703CM-1

Figure B4.34

CONSOLIDATION TEST REPORT



DRAWN BY
DATE
CHECKED BY
APPROVED BY

SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	119.0	9.2	62.5	1.000	0.391	2.65	0.04	2.04	9.99	ML
FINAL	122.0	5.5	40.6	0.975	0.356					

Source: B-60E
Material Description: Sandy SILT
Remarks:

Elev./Depth: 17'

ALLAN E. SEWARD

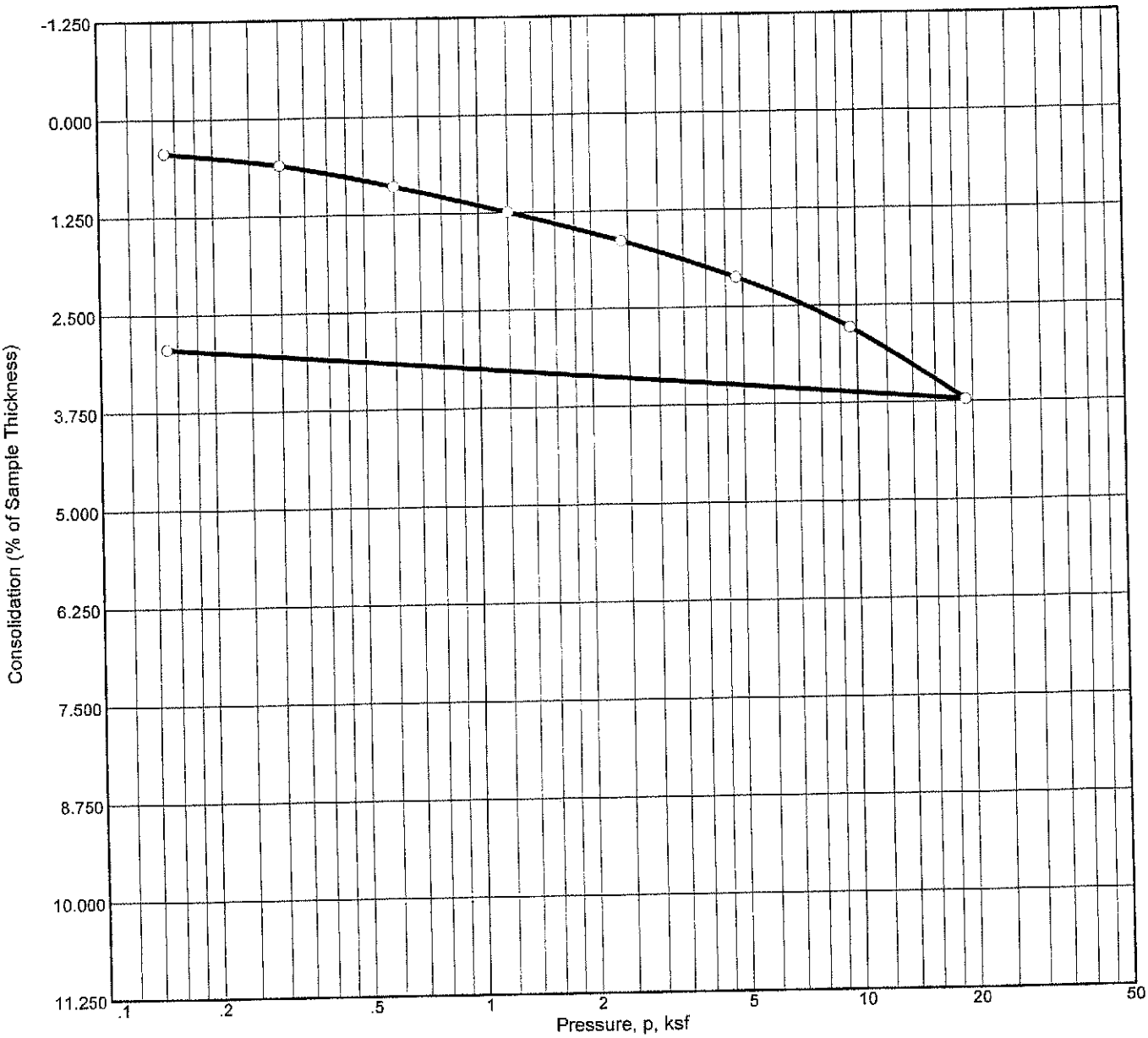
ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

Job No.: 00-1703CM-1

Figure B4.35

CONSOLIDATION TEST REPORT



DRAWN BY
DATE
CHECKED BY
APPROVED BY

SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	115.4	13.0	79.3	1.000	0.434	2.65	0.05	3.60	10.00	ML
FINAL	118.9	8.1	54.8	0.971	0.392					

Source: B-60E
Material Description: Sandy SILT
Remarks:

Elev./Depth: 30'

ALLAN E. SEWARD

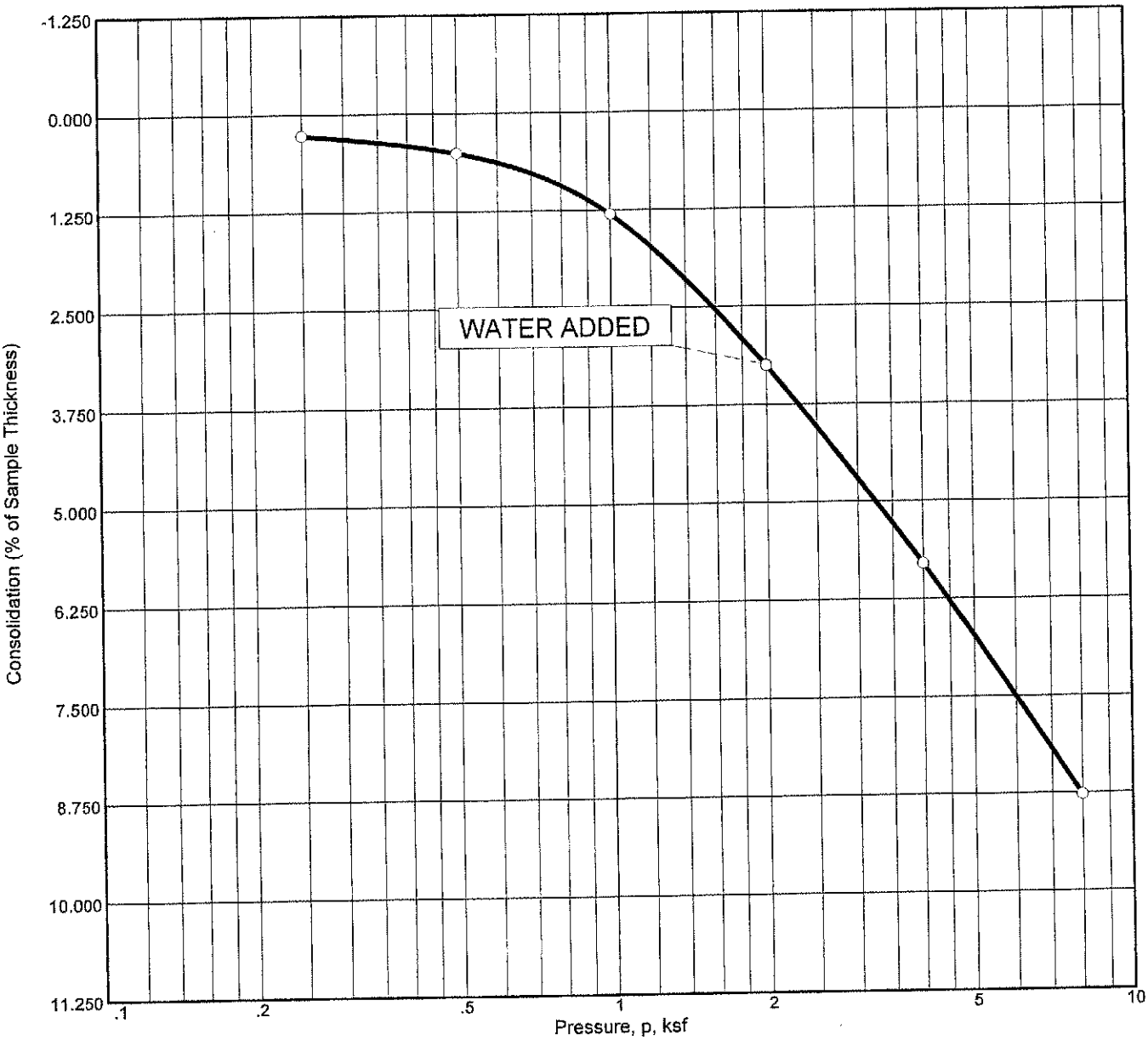
ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Newhall Ranch, Mesas-East

Job No.: 00-1703CM-1

Figure B4.36

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

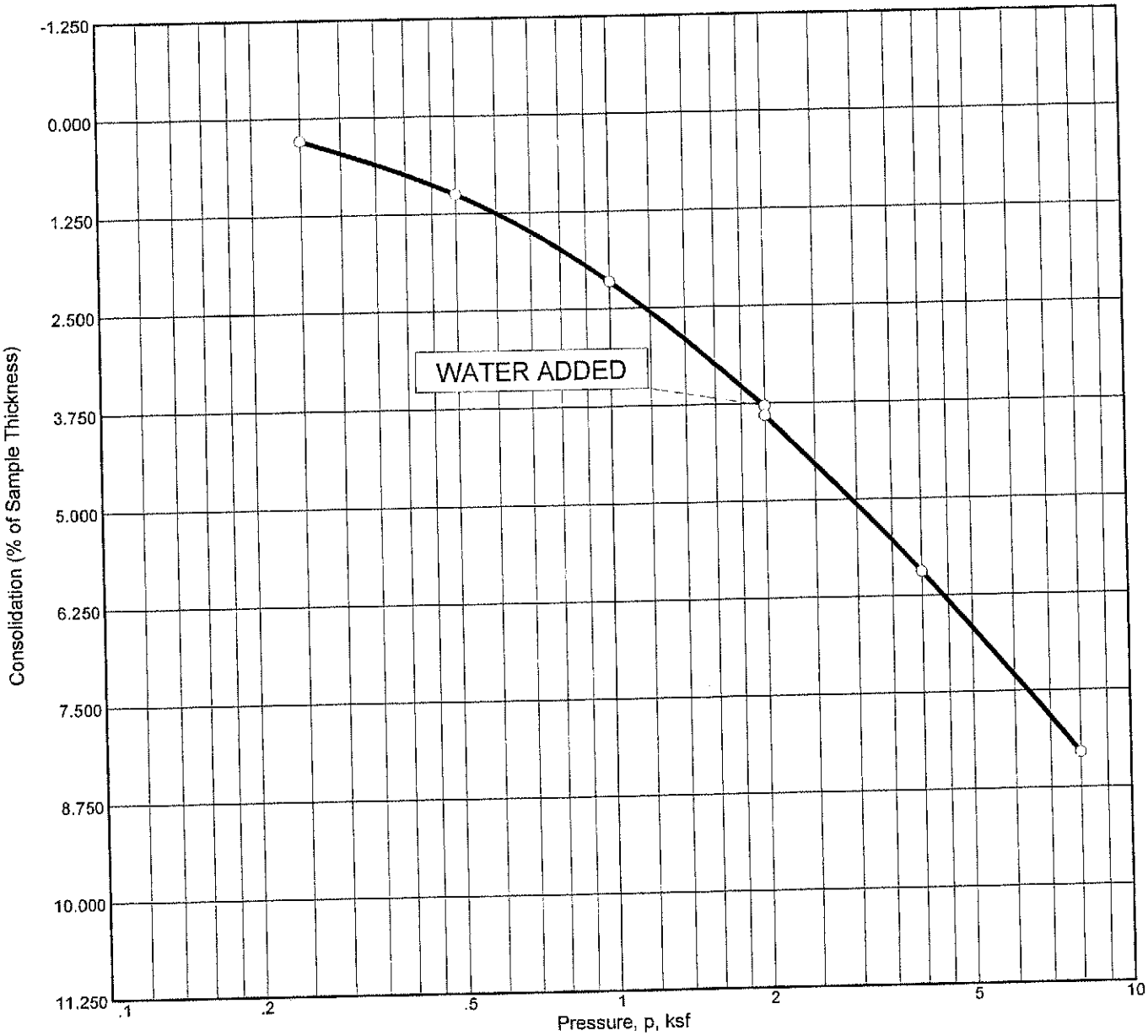
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	82.9	15.8	42.0	1.000	0.996	2.65	0.20	1.20	1.59	CL-ML
FINAL	90.9	31.0	100.0	0.912	0.821					

Source: HS-1T **Elev./Depth:** 10'
Material Description: Brown to dark brown silty CLAY
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.	**Client:** Newhall Ranch Co. **Project:** Mesas East **Job No.:** 04-1703E-1 **Figure** B4.37

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	104.5	6.1	27.8	1.000	0.583	2.65	0.13	0.60	1.11	CL
FINAL	114.0	17.0	100.0	0.917	0.451					

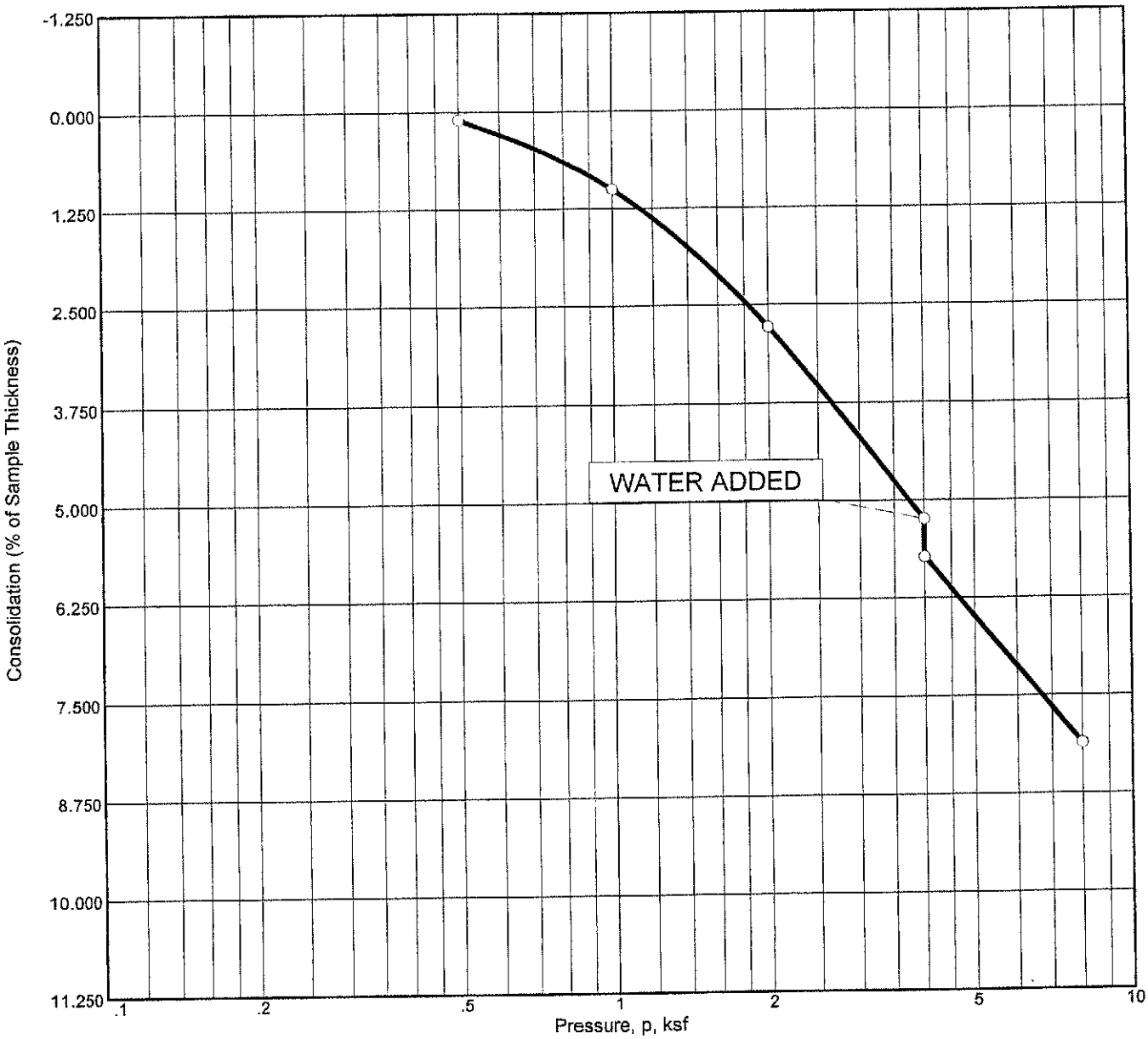
Elev./Depth: 5'

Source: HS-3T
Material Description: Brown to dark brown sandy lean CLAY
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.	**Client:** Newhall Ranch Co. **Project:** Mesas East **Job No.:** 04-1703E-1 **Figure** B4.38

CHECKED BY	
APPROVED BY	
DRAWN BY	
DATE	

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	84.1	15.1	41.5	1.000	0.967	2.65	0.16	3.60	1.02	CL
FINAL	91.5	30.5	100.0	0.919	0.807					

Source: HS-3T **Elev./Depth:** 30'
Material Description: Mottled brown silty CLAY with sand
Remarks:

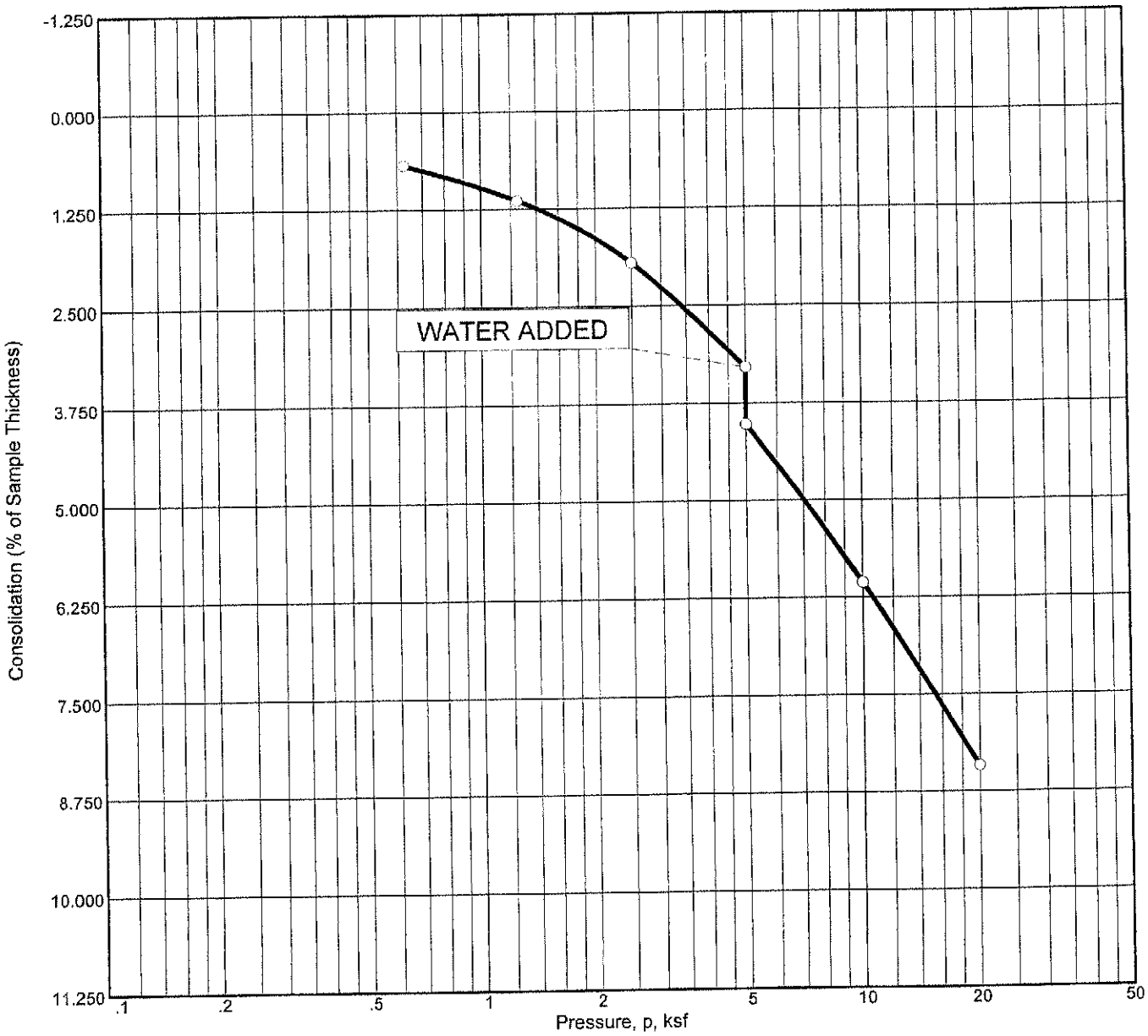
ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Mesas East
Job No.: 04-1703E-1
Figure B4.39

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

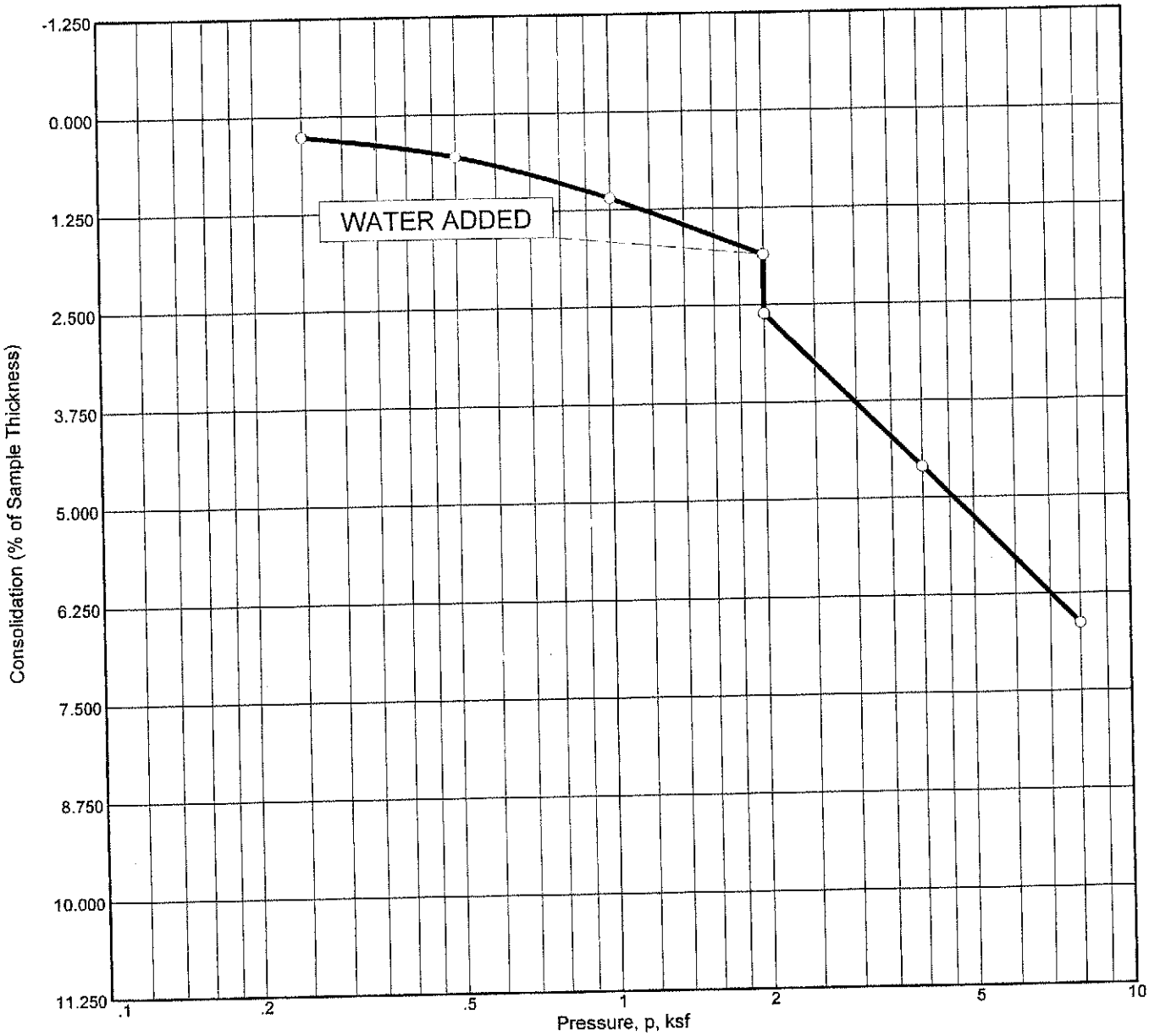
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	76.9	13.7	31.6	1.000	1.152	2.65	0.17	4.20	3.25	CL
FINAL	83.9	36.6	100.0	0.916	0.971					

Source: HS-3T **Elev./Depth:** 35
Material Description: Mottled brown silty CLAY
Remarks:

ALLAN E. SEWARD	**Client:** Newhall Ranch Co.
	Project: Mesas East
ENGINEERING GEOLOGY, INC.	**Job No.:** 04-1703E-1 **Figure** B4.40

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	103.7	3.8	16.9	1.000	0.595	2.65	0.11	0.24	1.08	SM
FINAL	111.1	18.5	100.0	0.934	0.489					

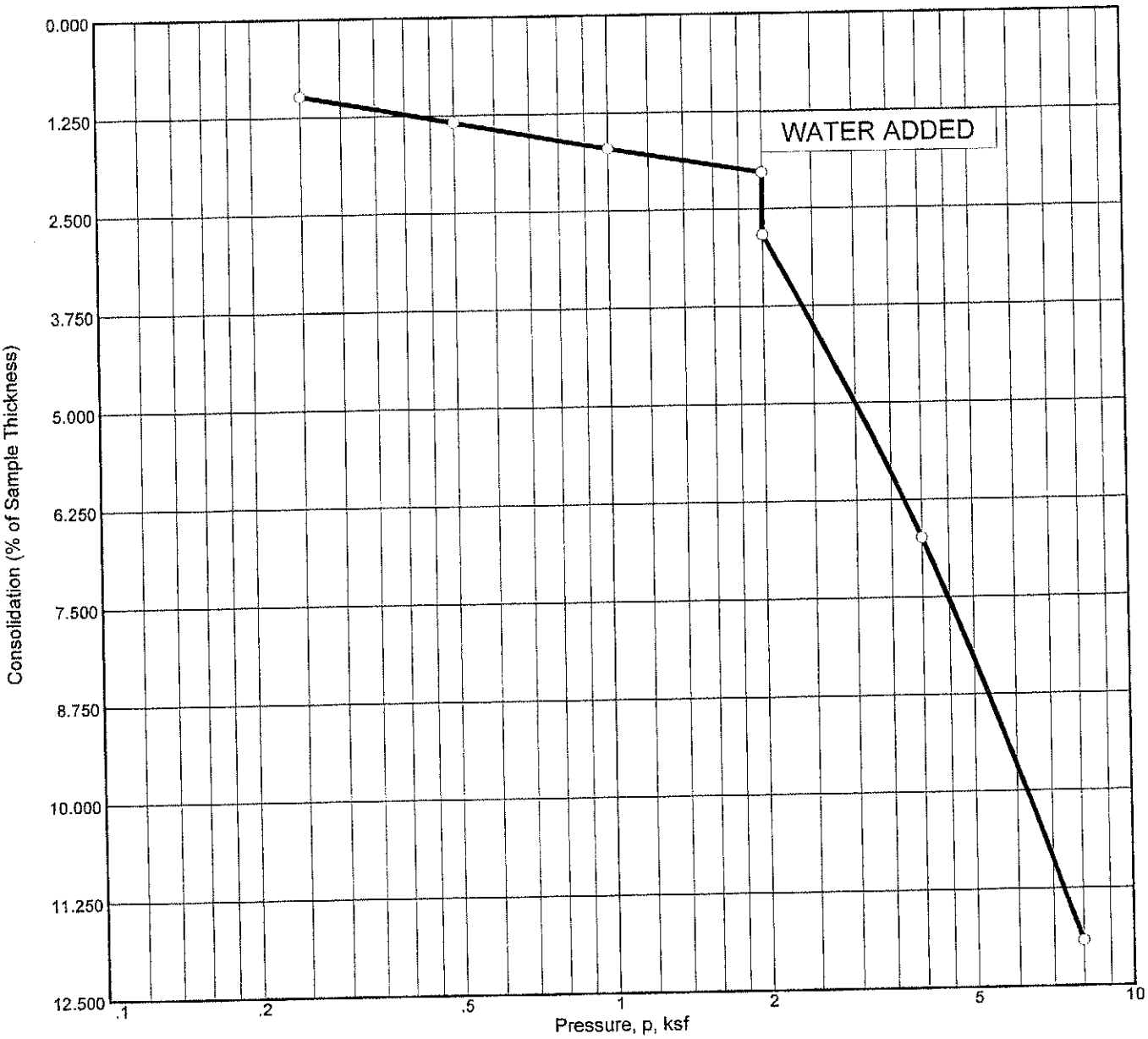
Elev./Depth: 2'

Source: HS-12T
Material Description: Silty SAND with gravel
Remarks:

ALLAN E. SEWARD	**Client:** Newhall Ranch Co.
	Project: Mesas East
ENGINEERING GEOLOGY, INC.	**Job No.:** 04-1703E-1 **Figure** B4.41

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

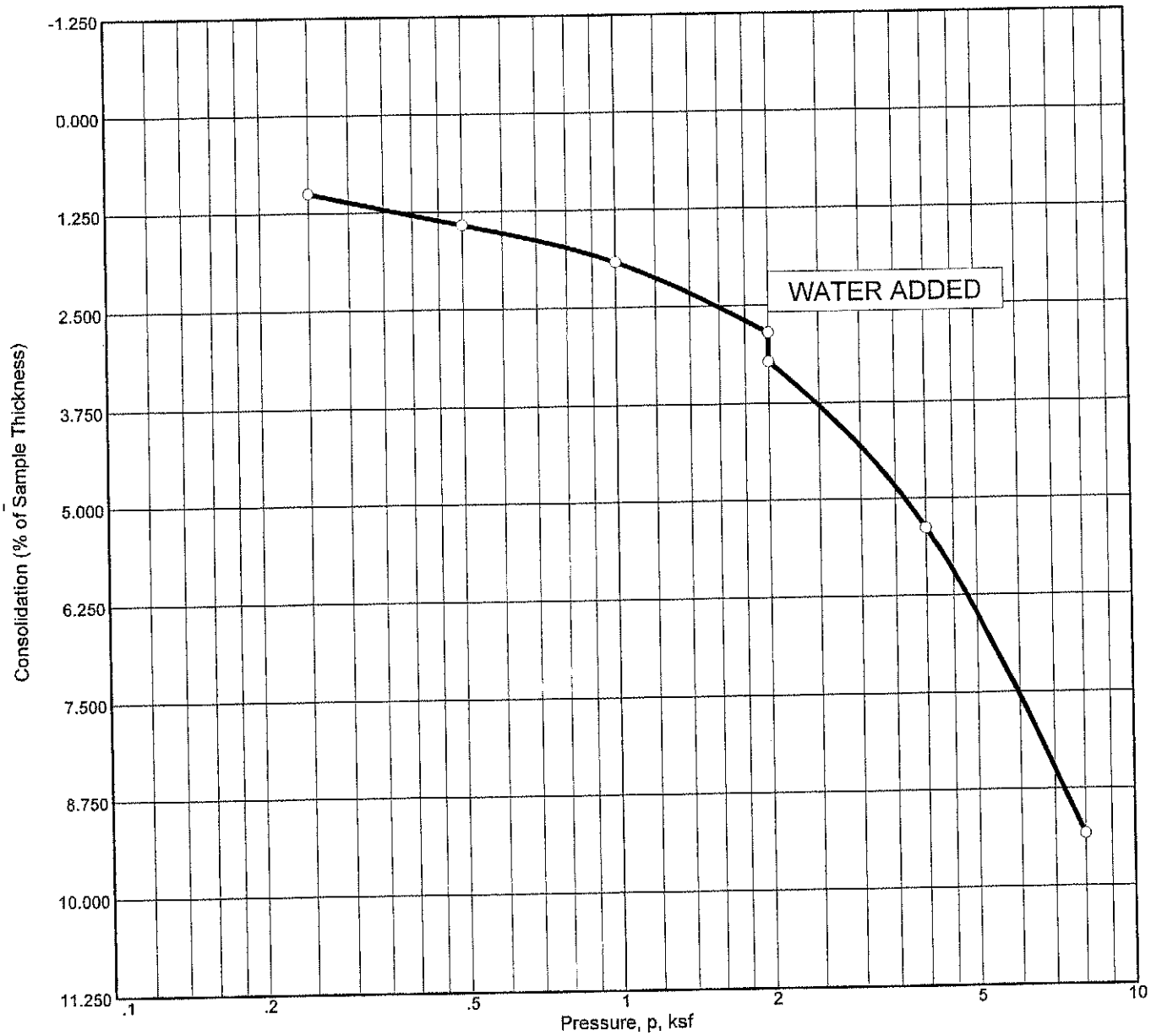
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	87.5	9.2	27.2	1.000	0.891	2.65	0.33	1.00	4.15	CL
FINAL	99.3	25.1	100.0	0.881	0.666					

Source: HS-16T **Elev./Depth:** 10'
Material Description: Light brown lean CLAY with sand
Remarks:

ALLAN E. SEWARD	**Client:** Newhall Ranch Co.
	Project: Mesas East
ENGINEERING GEOLOGY, INC.	**Job No.:** 04-1703E-1 **Figure** B4.42

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	85.1	12.8	35.9	1.000	0.945	2.65	0.26	1.80	3.97	CL
FINAL	93.8	28.8	100.0	0.907	0.763					

Source: HS-16T
Material Description: Lean CLAY with sand
Remarks:

Elev./Depth: 15'

ALLAN E. SEWARD

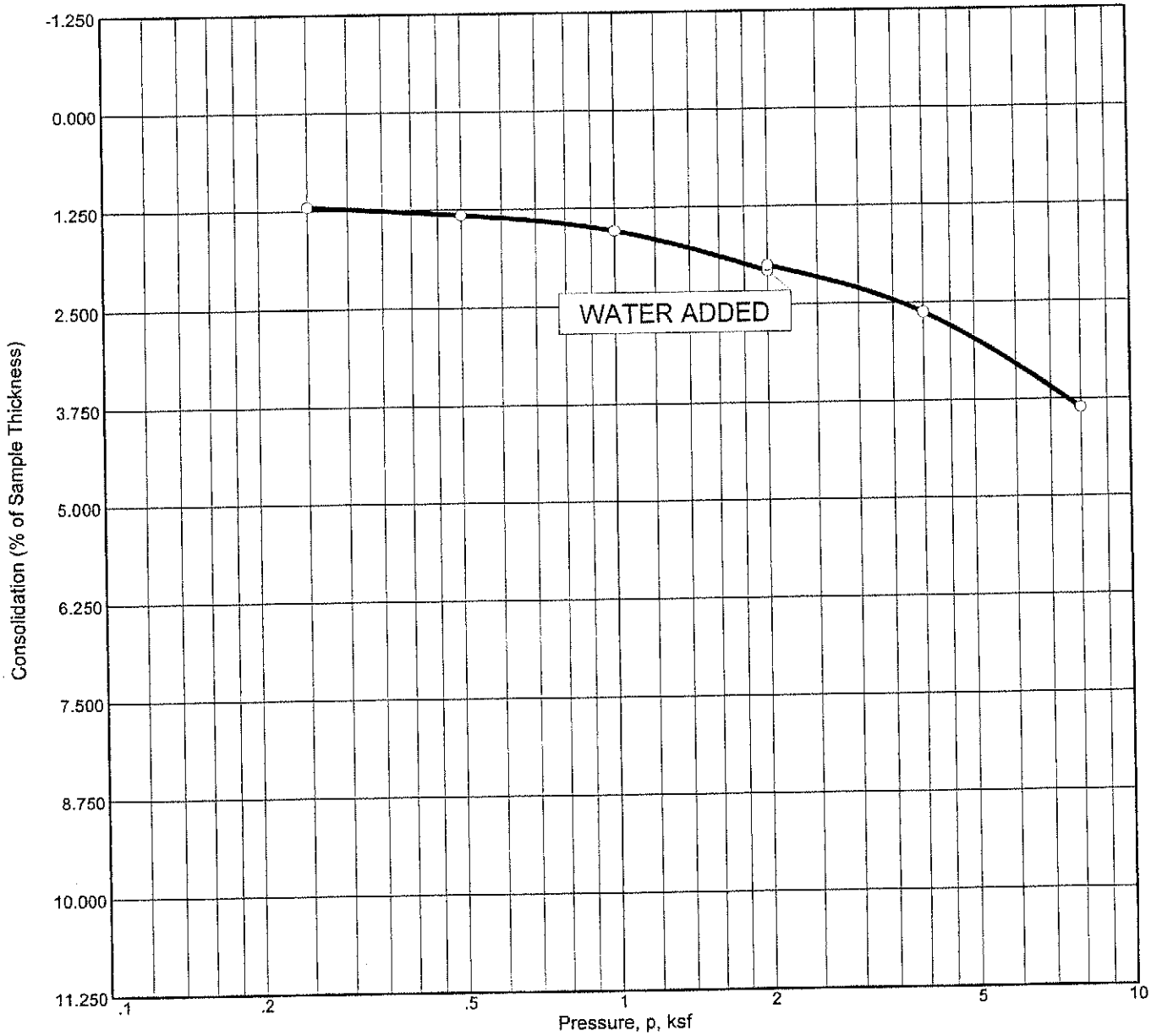
ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Mesas East
Job No.: 04-1703E-1

Figure B4.43

DRAWN BY
DATE
CHECKED BY
APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

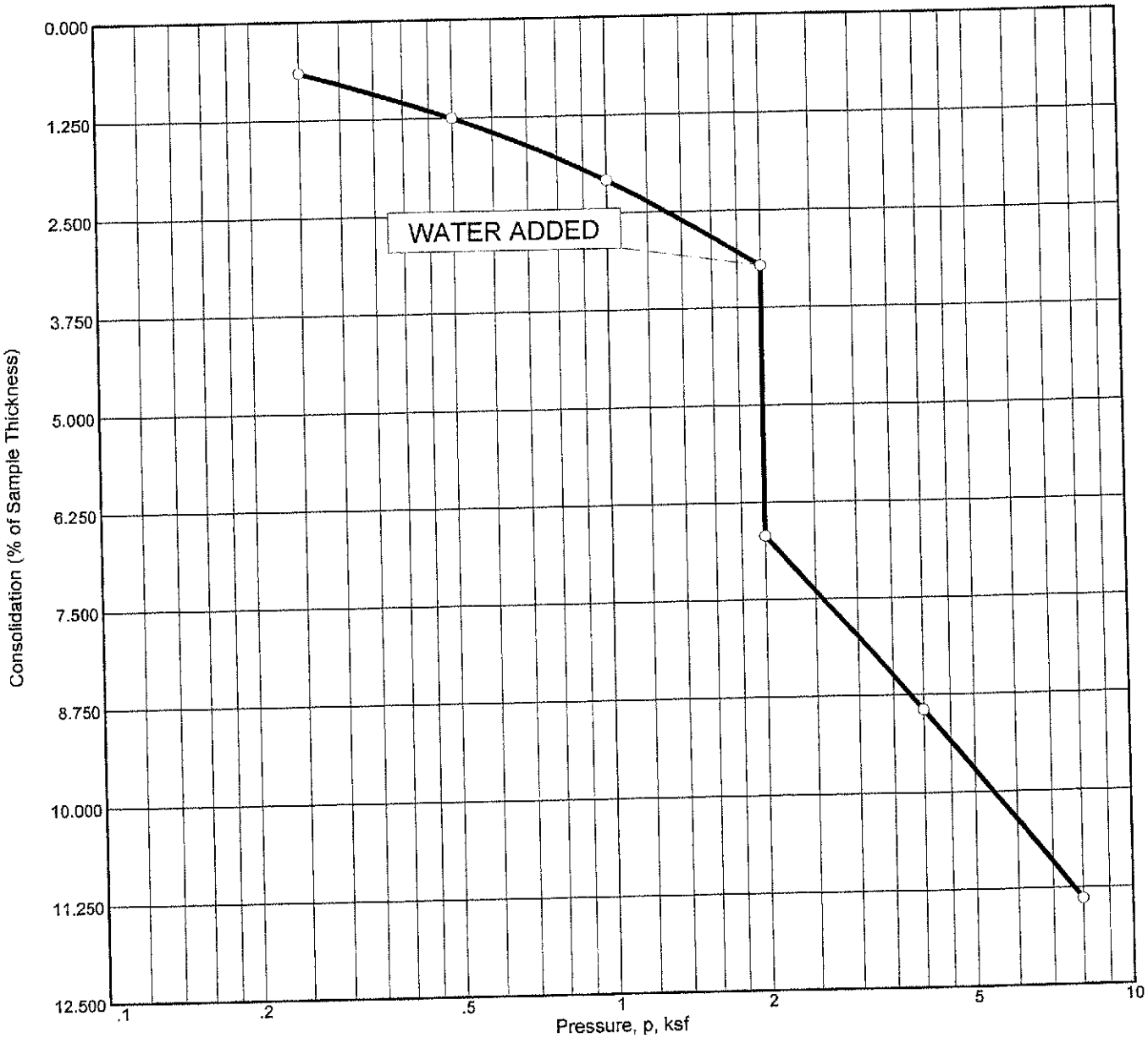
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	87.0	14.8	43.3	1.000	0.903	2.65	0.08	0.24	4.15	CL-ML
FINAL	90.4	31.3	100.0	0.961	0.829					

Source: HS-17T **Elev./Depth:** 2'
Material Description: Light brown silty CLAY
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.	**Client:** Newhall Ranch Co. **Project:** Mesas East **Job No.:** 04-1703E-1 **Figure** B4.44

DRAWN BY	CHECKED BY
DATE	APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	90.5	9.1	29.2	1.000	0.828	2.65	0.15	1.20	0.51	CL
FINAL	102.1	23.4	100.0	0.886	0.620					

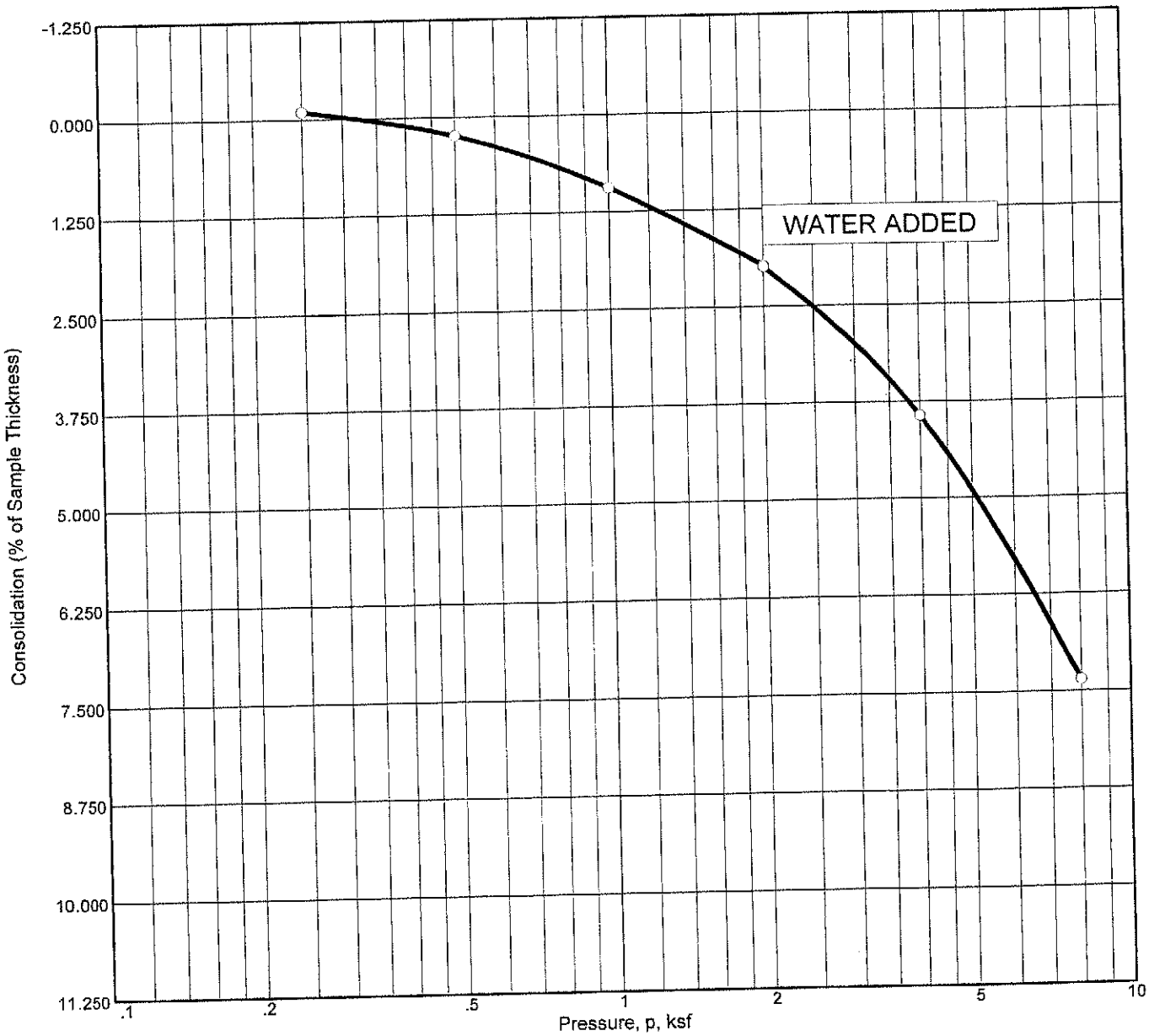
Elev./Depth: 10'

Source: HS-17T
Material Description: Light yellowish brown sandy lean CLAY
Remarks:

ALLAN E. SEWARD	**Client:** Newhall Ranch Co.
	Project: Mesas East
ENGINEERING GEOLOGY, INC.	**Job No.:** 04-1703E-1 **Figure** B4.45

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	100.9	6.9	28.5	1.000	0.640	2.65	0.19	0.60	3.93	CL
FINAL	108.9	19.6	100.0	0.926	0.519					

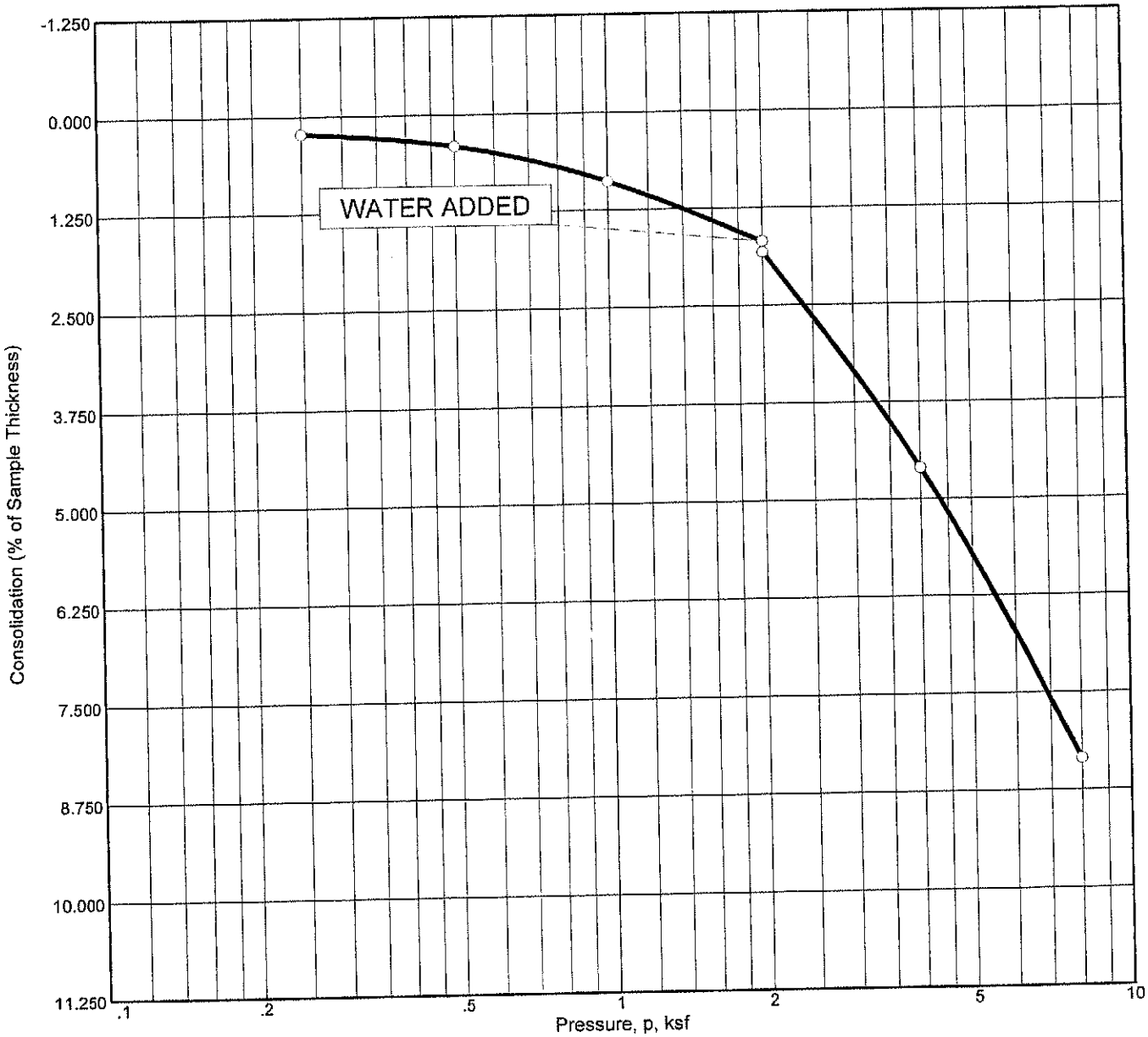
Elev./Depth: 5'

Source: HS-20T
Material Description: Sandy lean CLAY
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.	**Client:** Newhall Ranch Co. **Project:** Mesas East **Job No.:** 04-1703E-1 **Figure** B4.46

DRAWN BY | DATE | CHECKED BY | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	95.3	9.1	32.8	1.000	0.736	2.65	0.22	1.20	2.19	CL
FINAL	104.0	22.3	100.0	0.916	0.591					

Source: HS-20T
Material Description: Sandy lean CLAY
Remarks:

Elev./Depth: 10'

ALLAN E. SEWARD

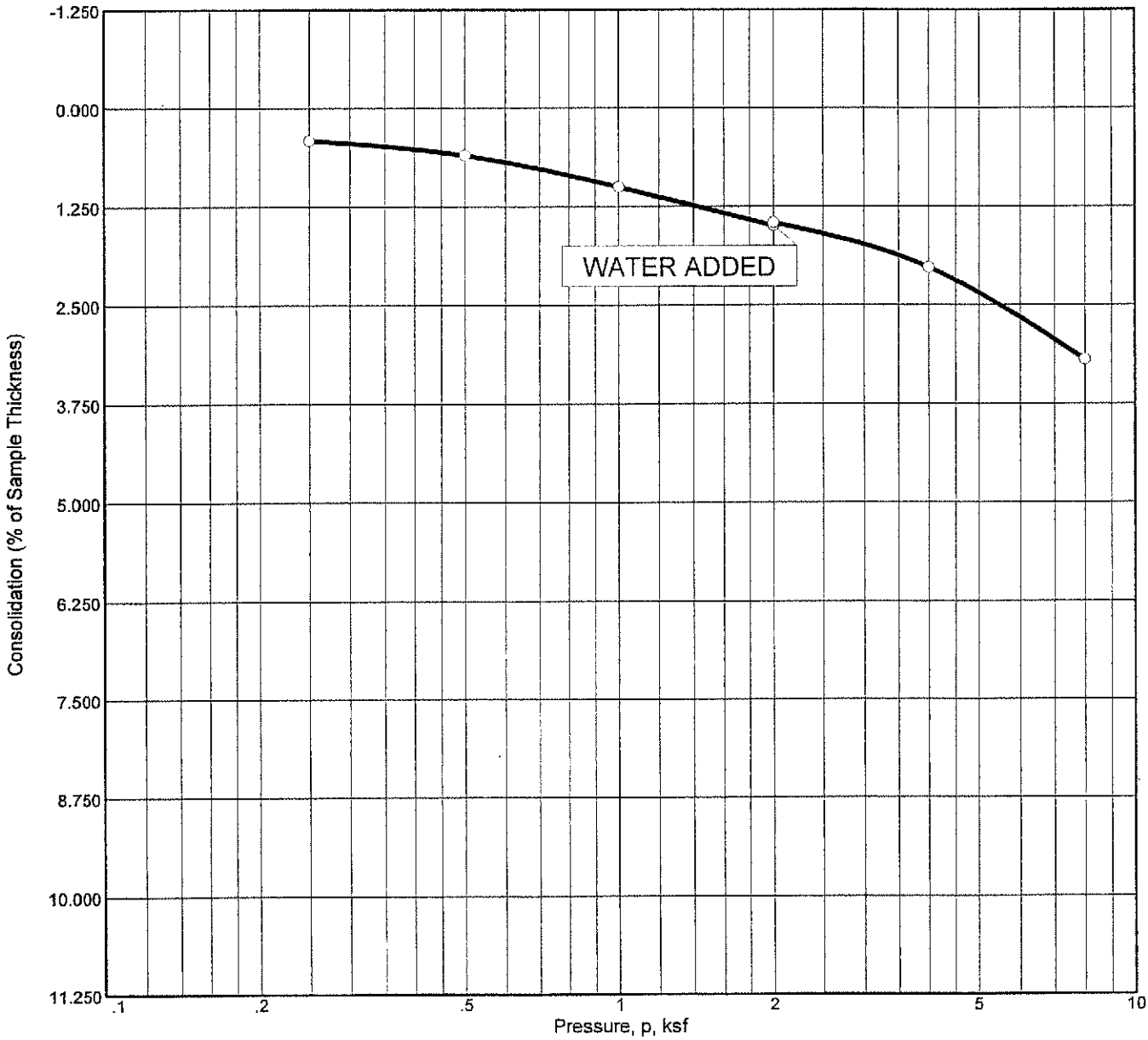
ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Mesas East
Job No.: 04-1703E-1

Figure B4.47

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

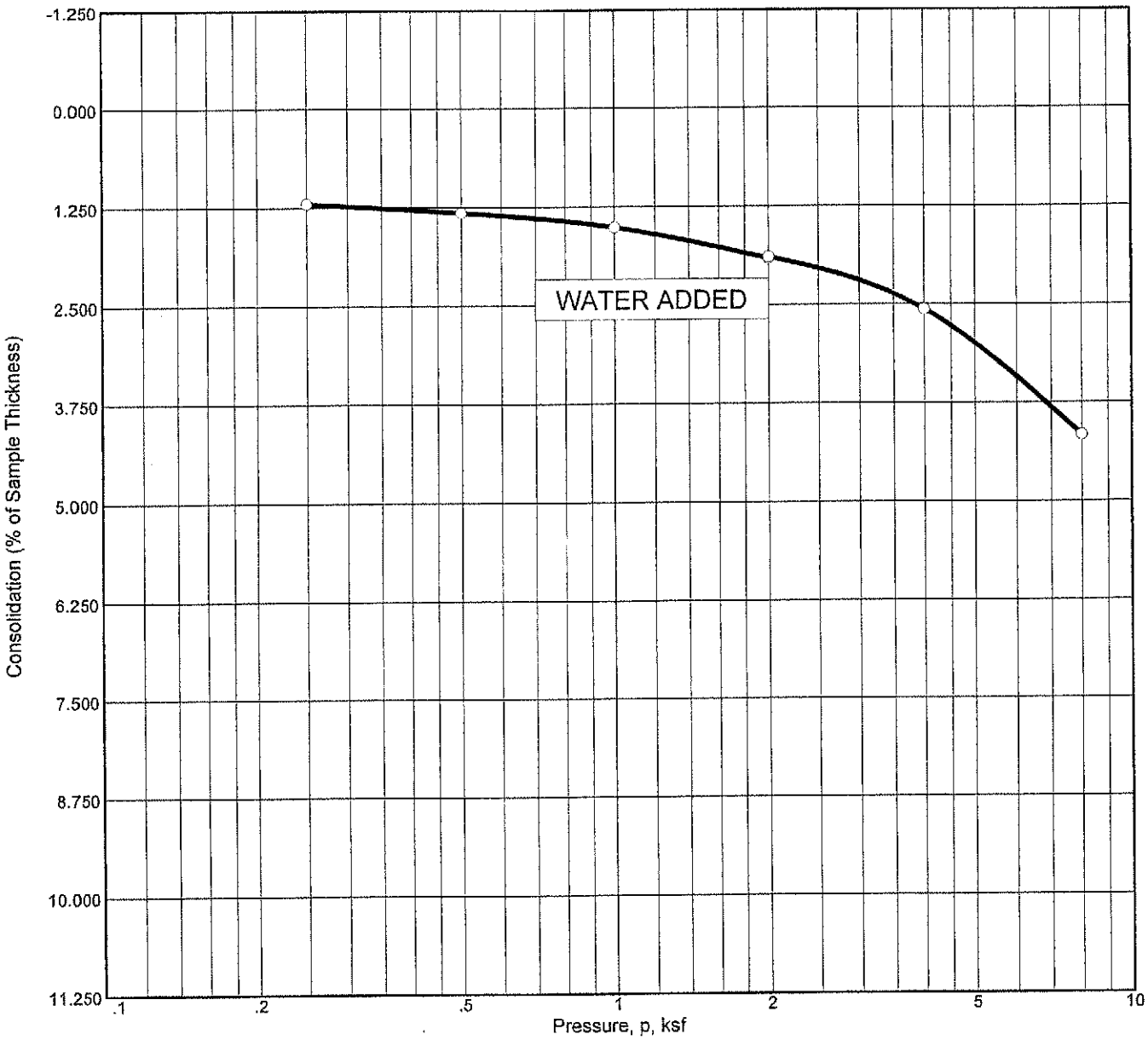
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	100.3	12.2	49.6	1.000	0.650	2.65	0.07	0.24	4.04	CL
FINAL	103.6	22.5	100.0	0.968	0.597					

Source: HS-23T **Elev./Depth:** 2'
Material Description: Sandy lean CLAY
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.	**Client:** Newhall Ranch Co. **Project:** Mesas East **Job No.:** 04-1703E-1 **Figure** B4.48

DRAWN BY
DATE
CHECKED BY
APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	96.6	12.5	46.4	1.000	0.712	2.65	0.09	0.60	4.00	CL-ML
FINAL	100.8	24.2	100.0	0.958	0.641					

Source: HS-23T **Elev./Depth:** 5
Material Description: Light brown silty CLAY
Remarks:

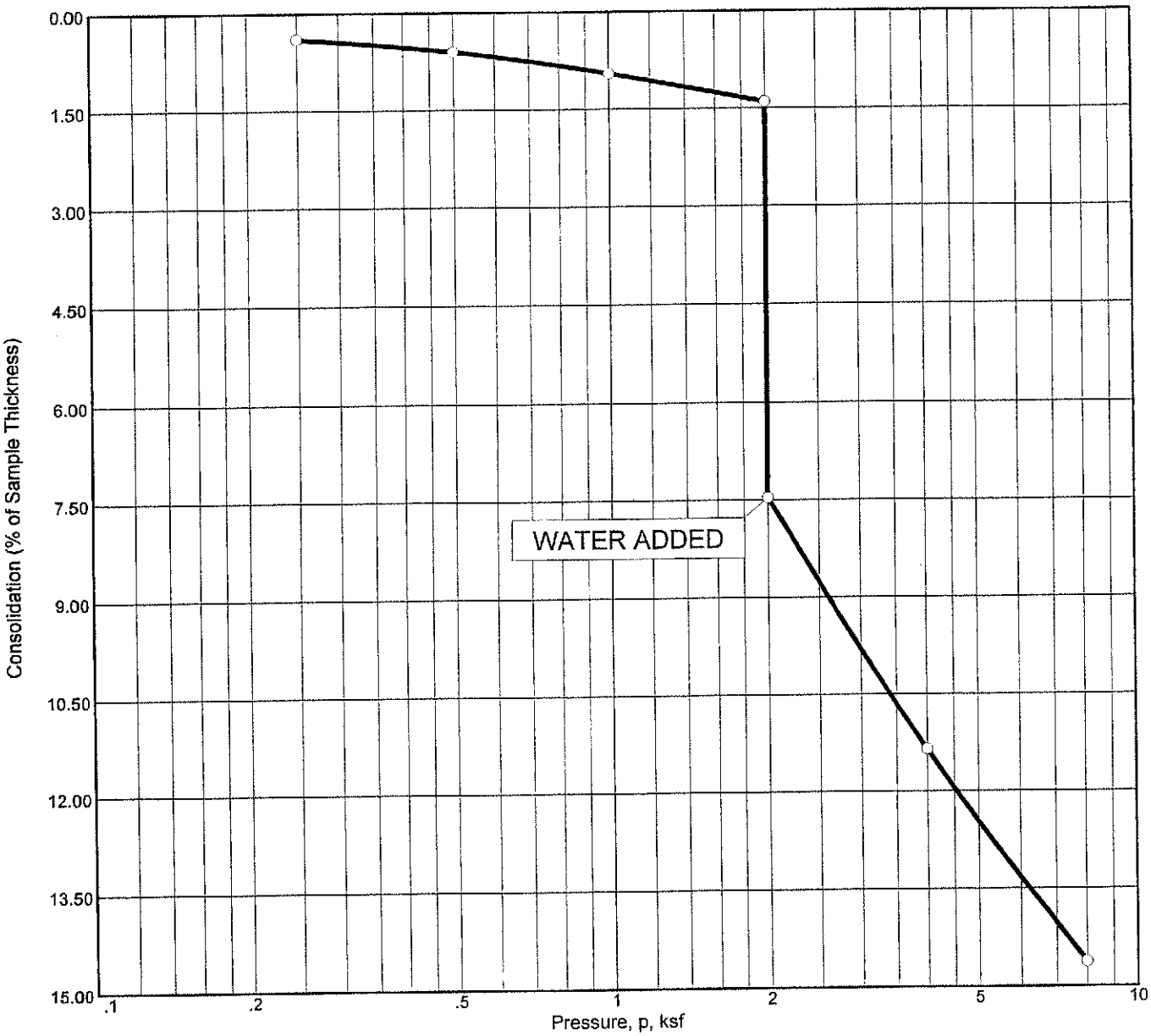
ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Mesas East
Job No.: 04-1703E-1 **Figure** B4.49

DRAWN BY	CHECKED BY
DATE	APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	95.6	4.2	15.3	1.000	0.730	2.65	0.19	0.24	3.85	SM
FINAL	112.0	18.0	100.0	0.854	0.477					

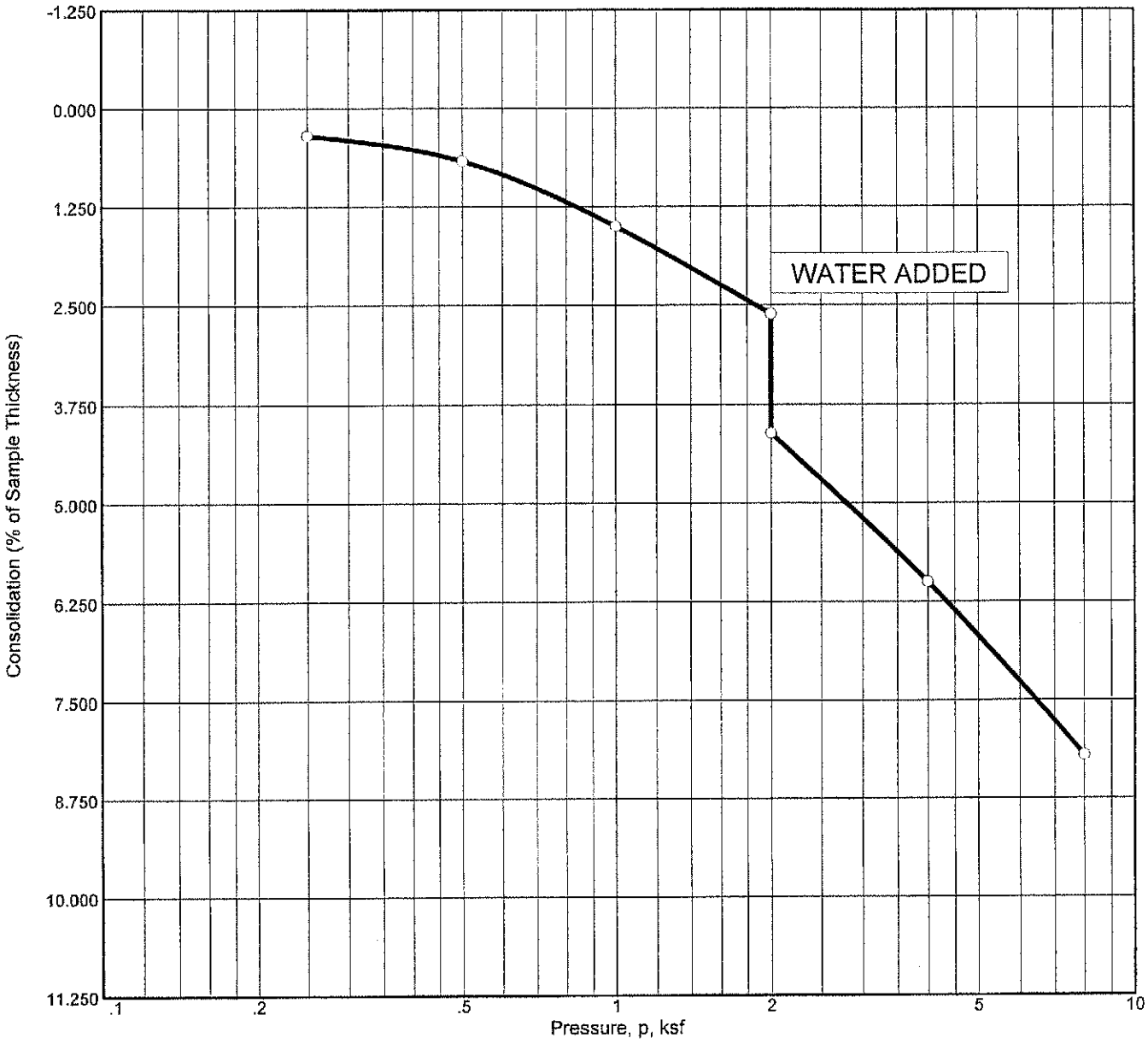
Source: HS-24T
Material Description: Brown silty SAND
Remarks:

Elev./Depth: 2'

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.	**Client:** Newhall Ranch Co. **Project:** Mesas East **Job No.:** 04-1703E-1 **Figure** B4.50

DRAWN BY
DATE
CHECKED BY
APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

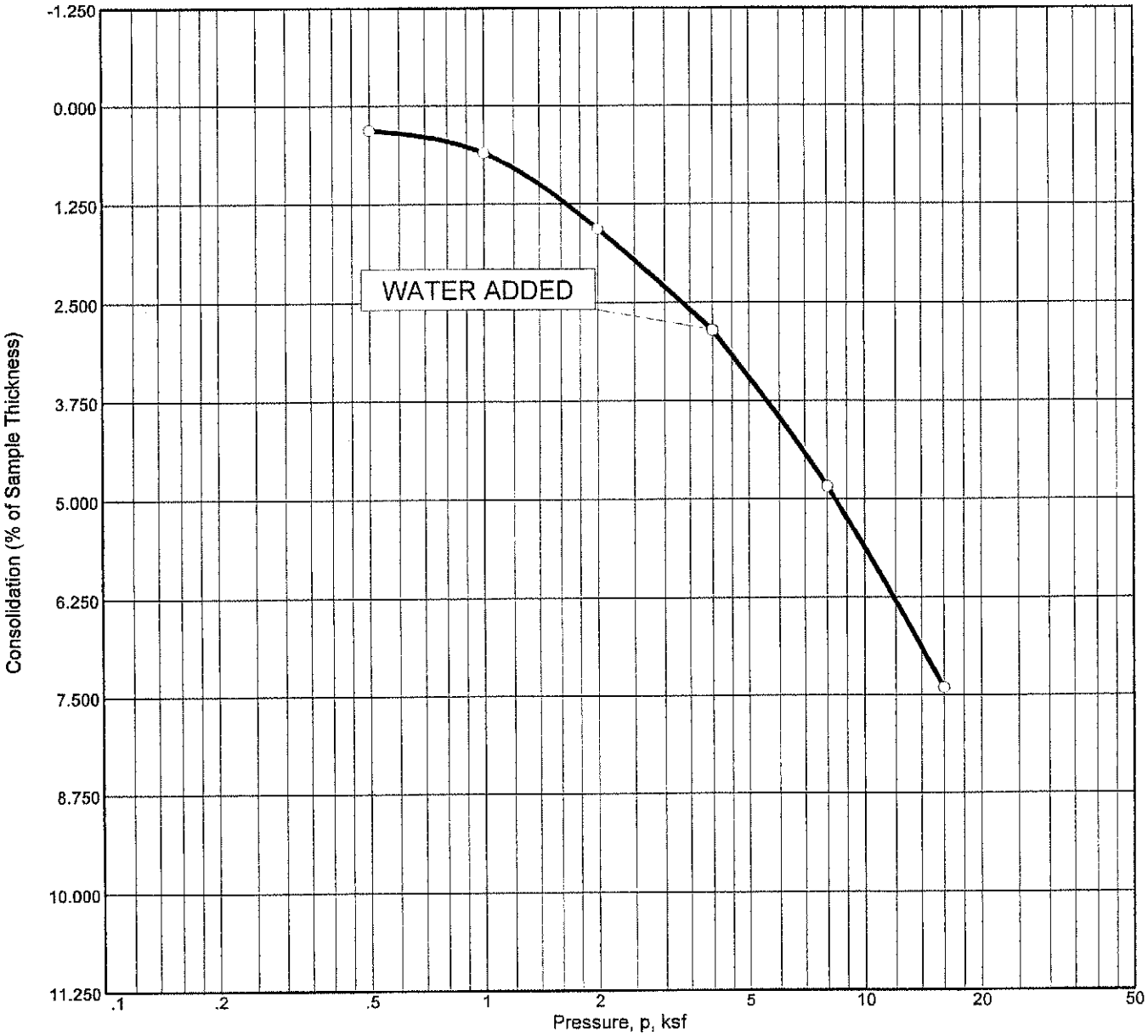
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	98.4	5.6	21.7	1.000	0.681	2.65	0.12	0.60	0.81	CL
FINAL	107.2	18.6	90.7	0.918	0.543					

Source: HS-24T **Elev./Depth:** 5'
Material Description: Brown sandy lean CLAY
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.	**Client:** Newhall Ranch Co. **Project:** Mesas East **Job No.:** 04-1703E-1 **Figure** B4.51

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

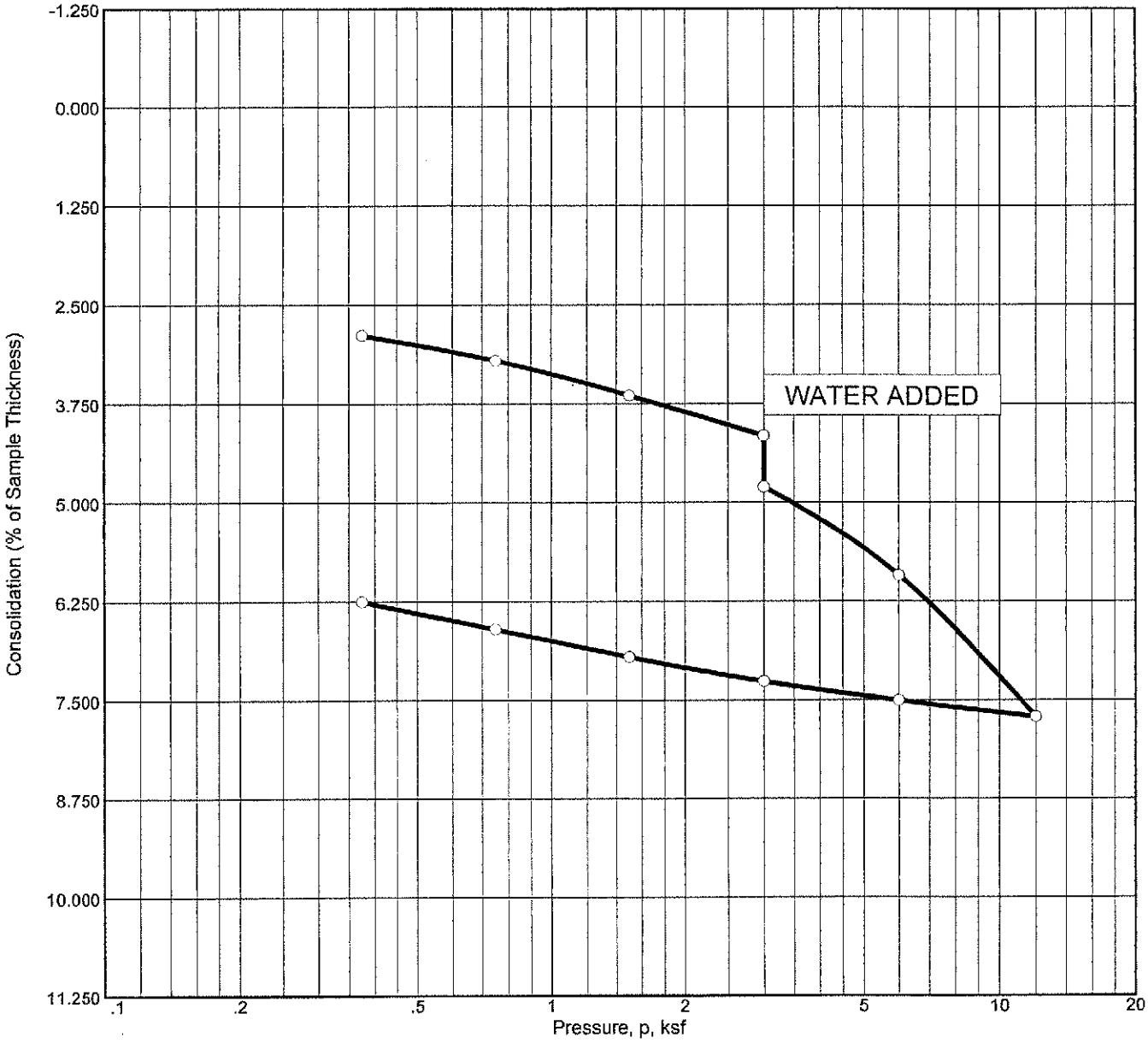
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	80.4	22.4	56.2	1.000	1.057	2.65	0.18	3.00	2.99	CL-ML
FINAL	86.9	34.2	100.0	0.926	0.905					

Source: HS-29T **Elev./Depth:** 25'
Material Description: Silty CLAY
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.	**Client:** Newhall Ranch Co. **Project:** Mesas East **Job No.:** 04-1703E-1 **Figure** B4.52

DRAWN BY	CHECKED BY
DATE	APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

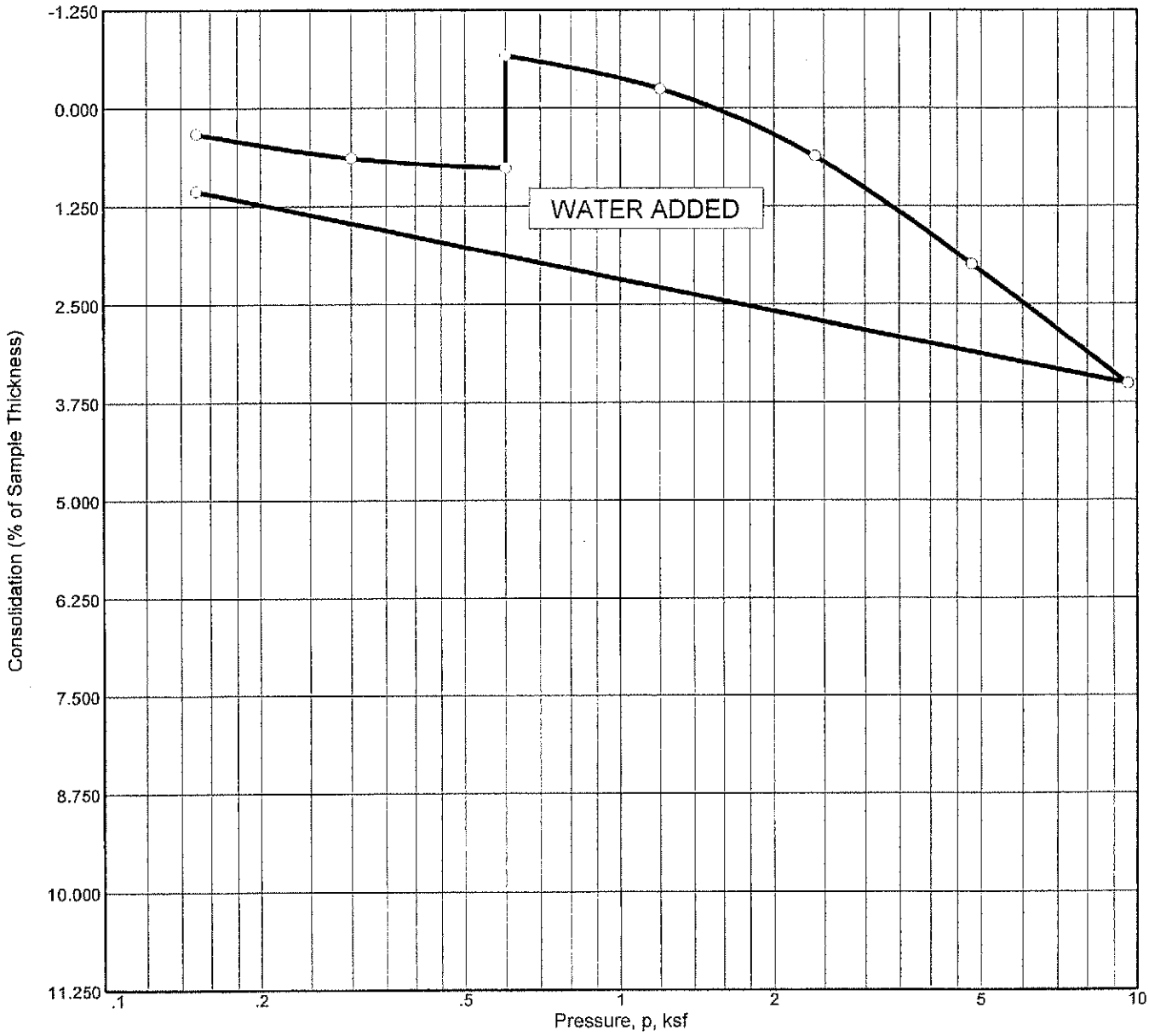
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	91.5	19.1	62.5	1.000	0.809	2.65	0.11	2.40	6.32	CL
FINAL	97.6	26.3	100.0	0.937	0.696					

Source: RW-1T **Elev./Depth:** 20'
Material Description: Sandy lean CLAY with gravel
Remarks:

ALLAN E. SEWARD	**Client:** Newhall Ranch Co.
	Project: Mesas East
ENGINEERING GEOLOGY, INC.	**Job No.:** 04-1703E-1 **Figure** B4.53

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

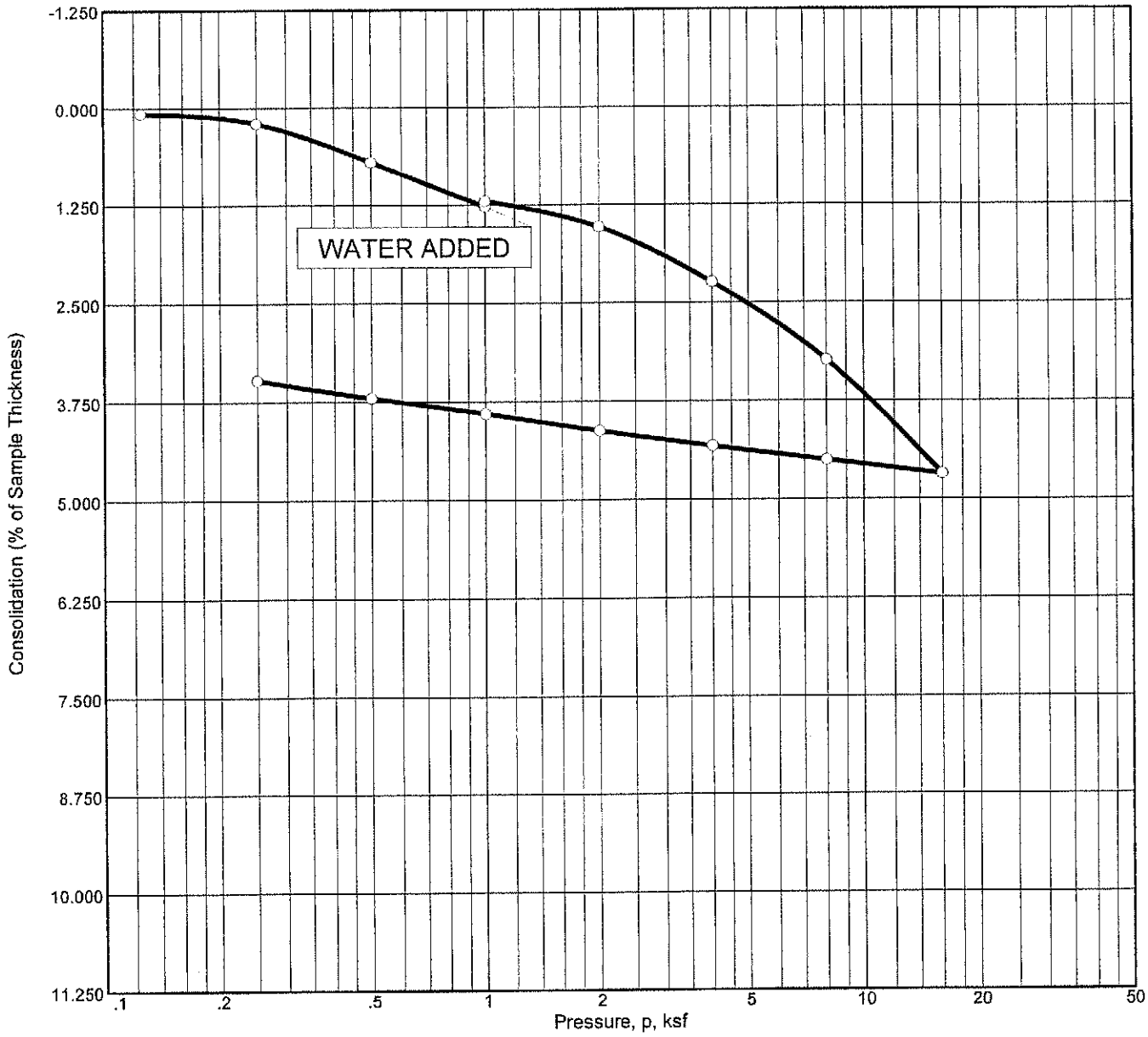
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	119.2	10.8	74.2	1.000	0.388	2.65	0.07	0.36	1.91	SC-SM
FINAL	120.5	15.7	100.0	0.989	0.373					

Source: B-3B **Elev./Depth:** 3'
Material Description: Silty, clayey SAND to sandy CLAY
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.	**Client:** Newhall Ranch Co. **Project:** Cobble/Boulder Assessment Airport and Exxon Mesas **Job No.:** 02-1703B-1 **Figure** B4.54

DRAWN BY
DATE
CHECKED BY
APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

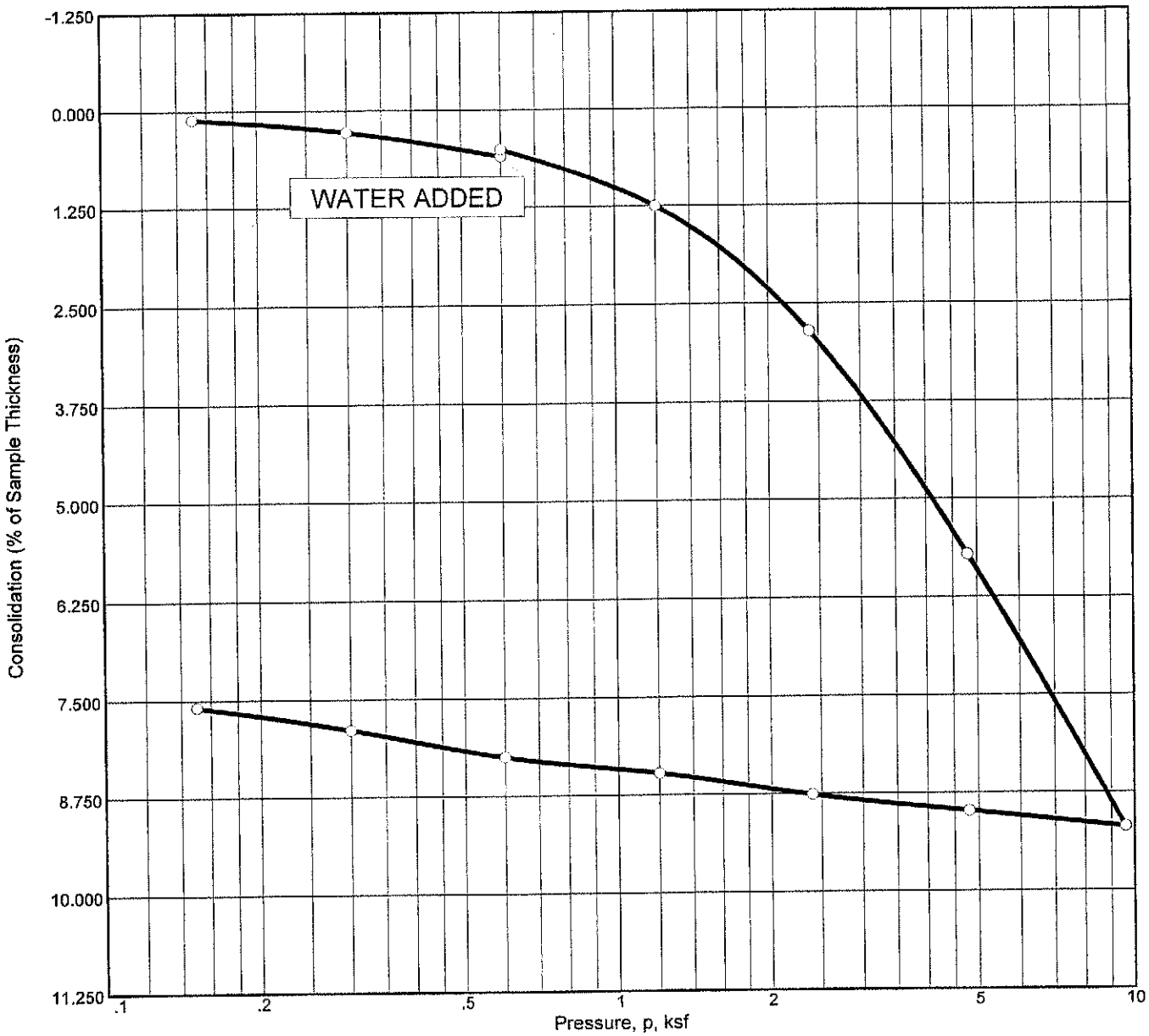
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	112.1	9.7	54.0	1.000	0.476	2.65	0.07	0.84	2.54	SP
FINAL	116.1	16.2	100.0	0.965	0.425					

Source: B-3B **Elev./Depth:** 7'
Material Description: Poorly graded SAND with gravel
Remarks:

ALLAN E. SEWARD	**Client:** Newhall Ranch Co.
ENGINEERING GEOLOGY, INC.	**Project:** Cobble/Boulder Assessment Airport and Exxon Mesas
	Job No.: 02-1703B-1 **Figure** B4.55

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



DRAWN BY
DATE
CHECKED BY
APPROVED BY

SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	109.3	9.3	48.0	1.000	0.513	2.65	0.18	0.36	2.43	SM
FINAL	118.3	16.0	100.0	0.924	0.398					

Source: B-4B
Material Description: Silty SAND
Remarks:

Elev./Depth: 3'

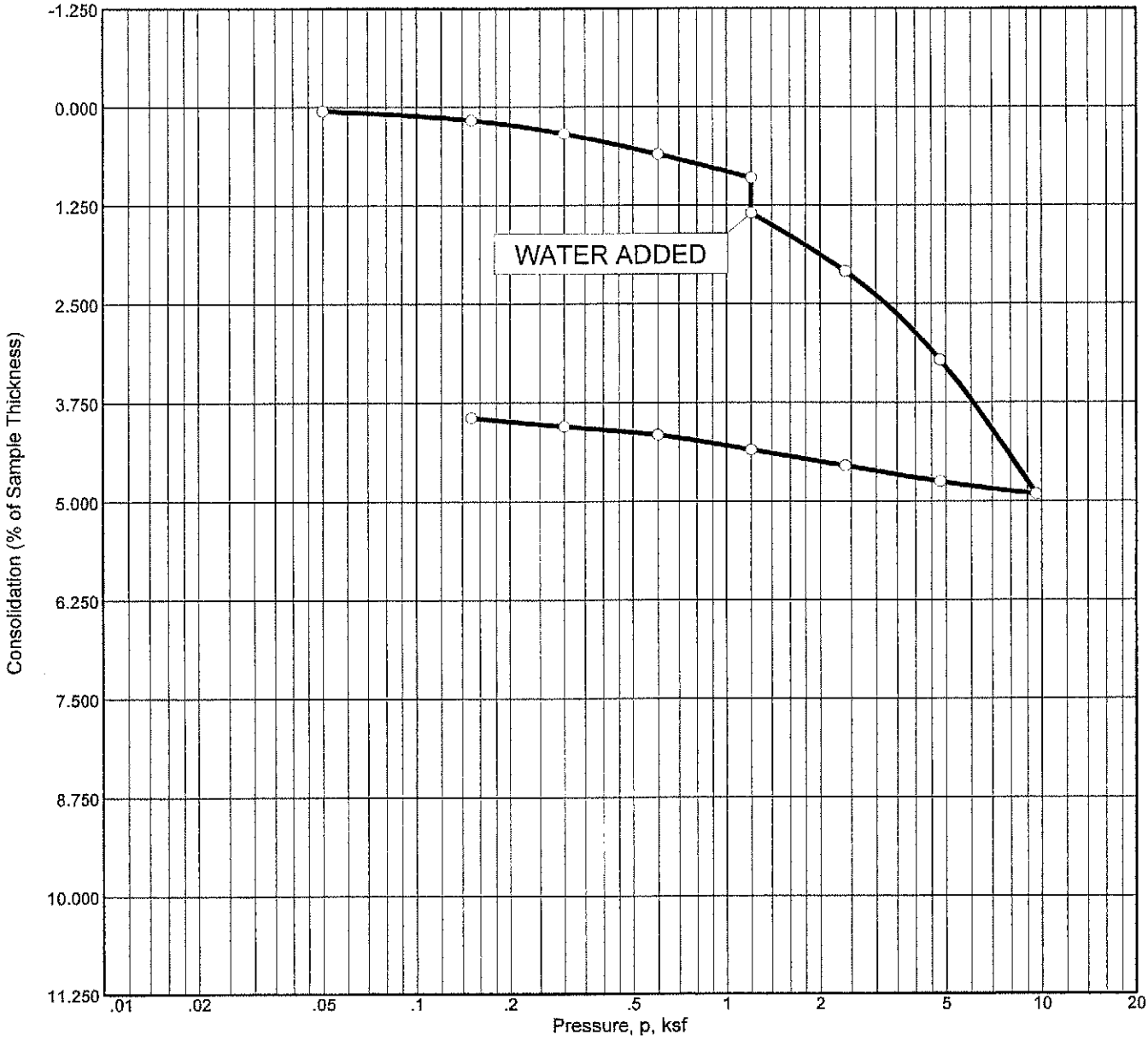
ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Cobble/Boulder Assessment
Airport and Exxon Mesas
Job No.: 02-1703B-1

Figure B4.56

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	115.2	10.0	61.0	1.000	0.436	2.65	0.08	0.84	4.28	SM
FINAL	120.0	14.3	100.0	0.961	0.379					

Source: B-6B **Elev./Depth:** 7'
Material Description: Pebbly, silty SAND
Remarks:

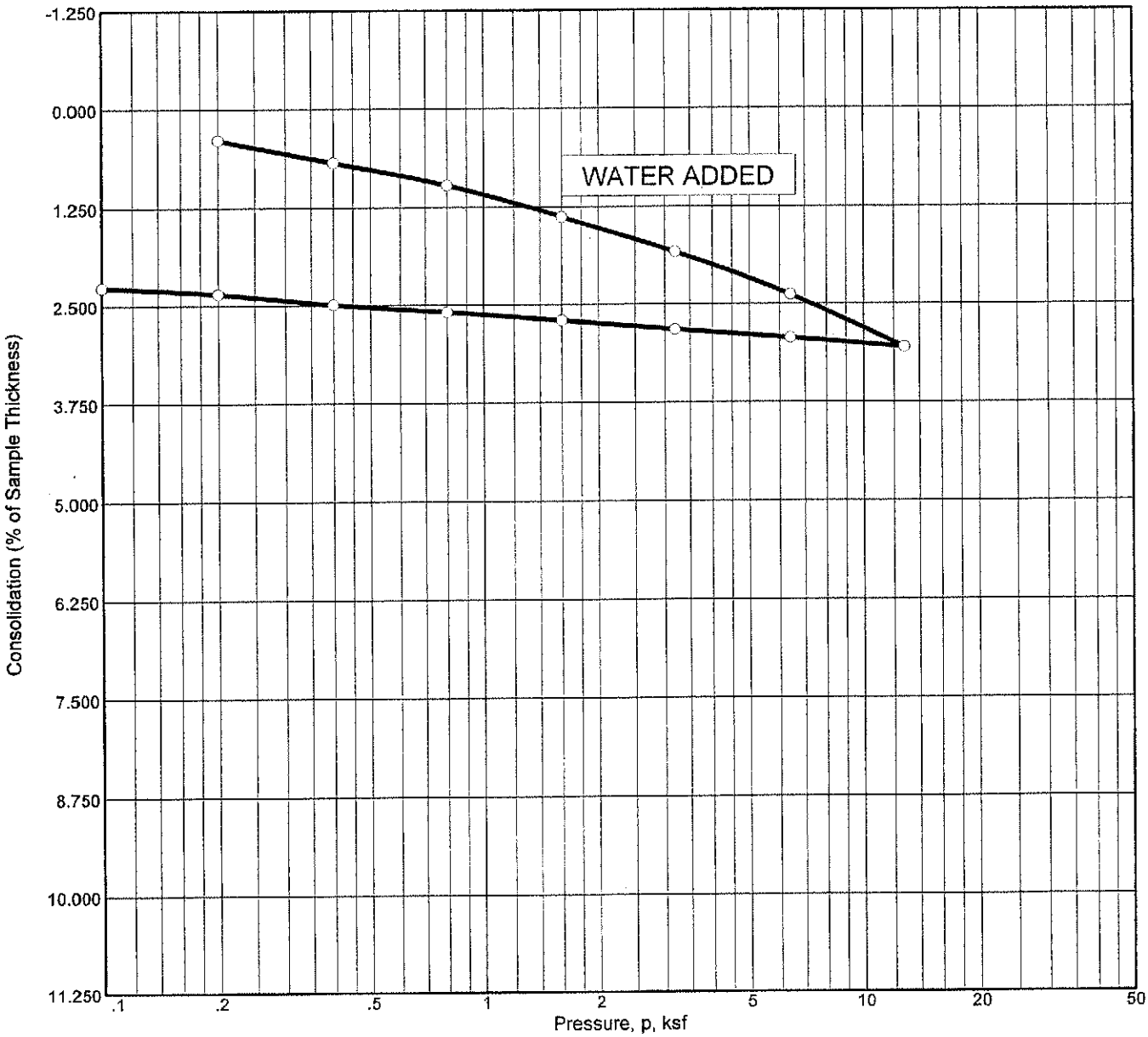
DRAWN BY	CHECKED BY
DATE	APPROVED BY

ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Cobble/Boulder Assessment
Airport and Exxon Mesas
Job No.: 02-1703B-1 **Figure** B4.57

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

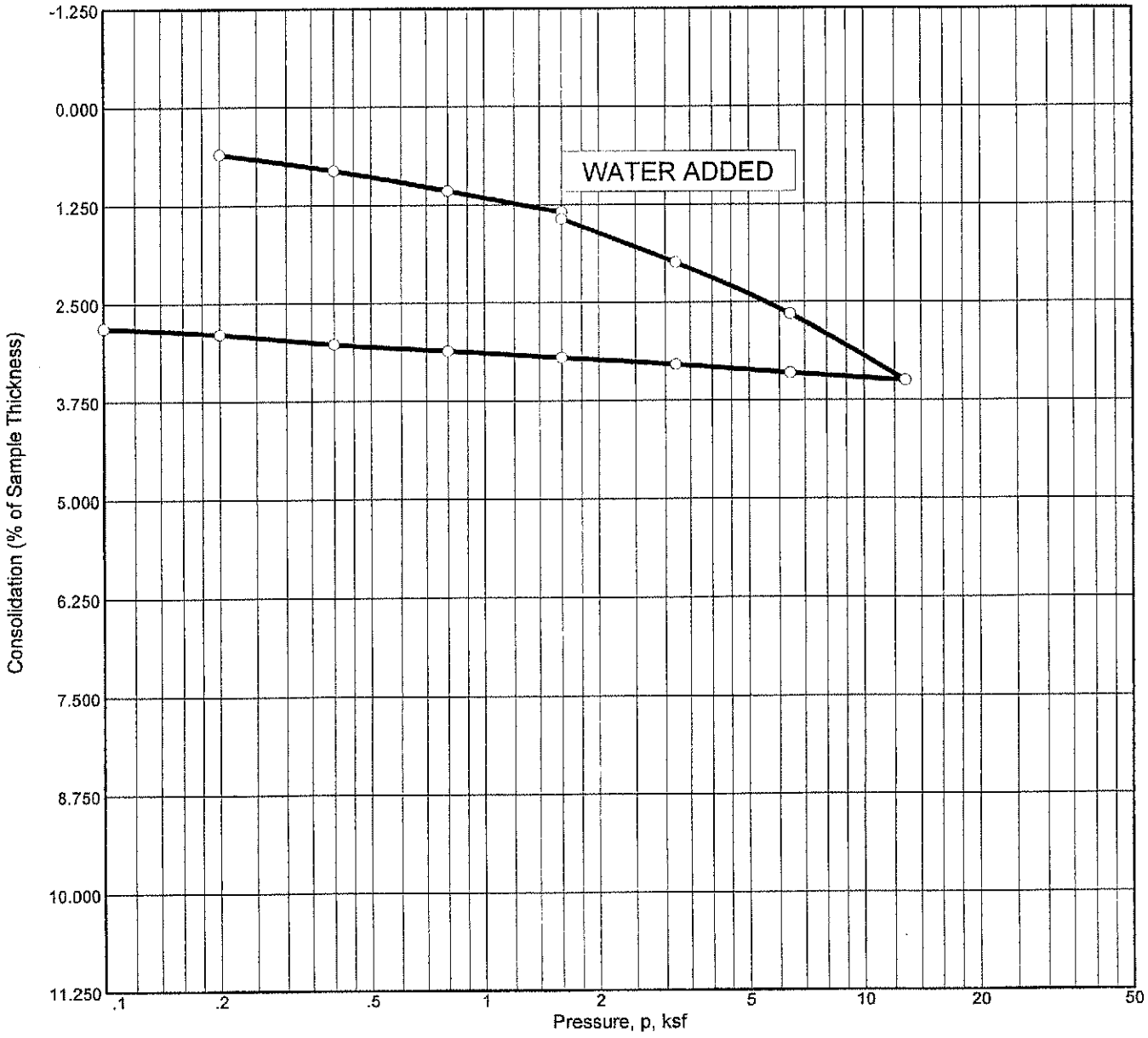
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	110.0	9.9	52.1	1.000	0.504	2.65	0.03	0.96	1.90	SP-SM
FINAL	112.6	22.0	100.0	0.977	0.470					

Source: RW-1 **Elev./Depth:** 8'
Material Description: Grayish brown poorly graded SAND with silt and gravel
Remarks:

ALLAN E. SEWARD	**Client:** Newhall Ranch Co.
ENGINEERING GEOLOGY, INC.	**Project:** Newhall Ranch Mesas Area
	Job No.: 99-1703L-1 **Figure** B4.58

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

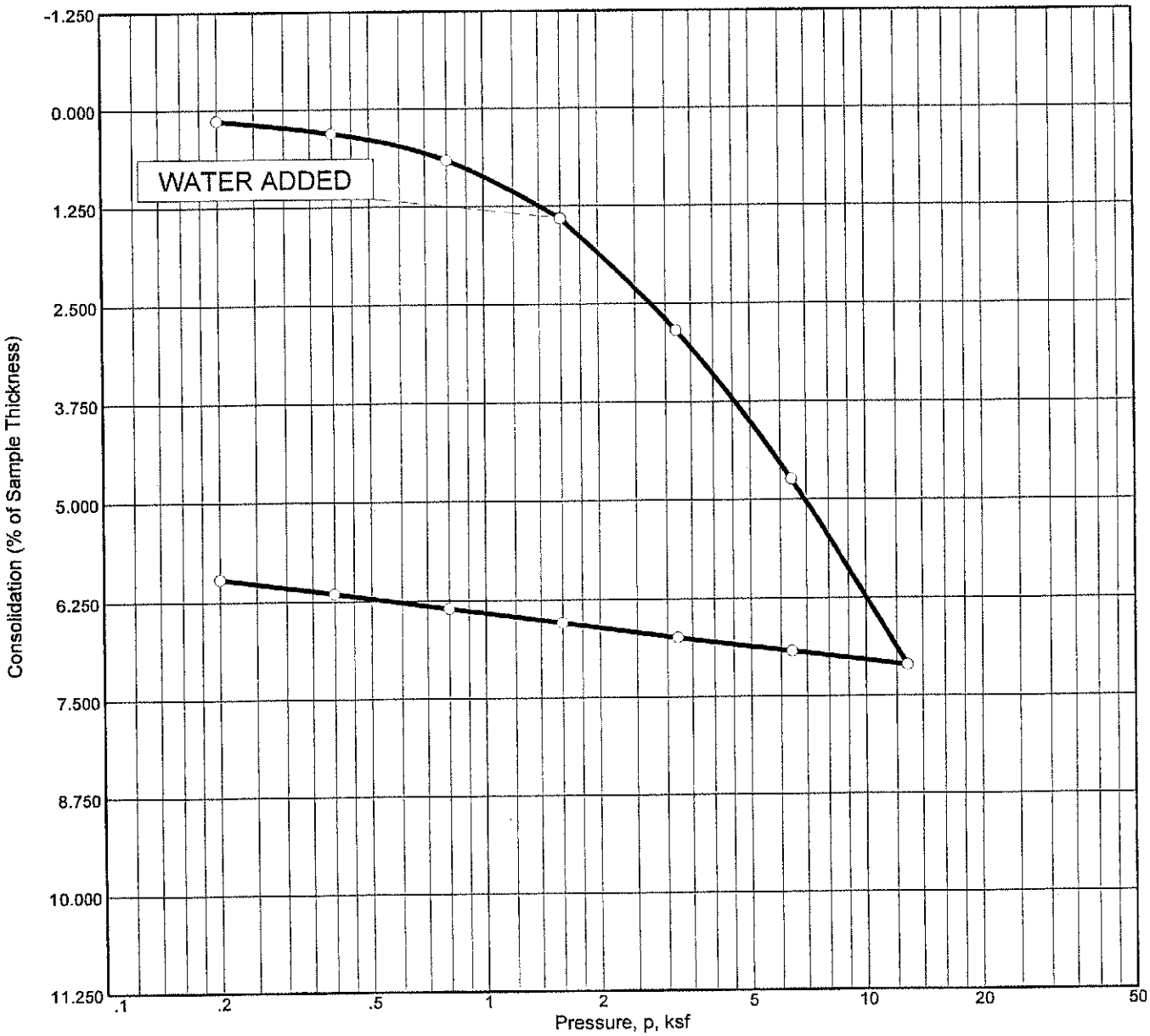
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	113.9	6.3	37.2	1.000	0.452	2.65	0.04	1.32	6.61	SP-SM
FINAL	117.2	16.4	100.0	0.972	0.411					

Source: RW-1 **Elev./Depth:** 11'
Material Description: Grayish brown poorly graded SAND with silt and gravel
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.	**Client:** Newhall Ranch Co. **Project:** Newhall Ranch Mesas Area **Job No.:** 99-1703L-I **Figure** B4.59

DRAWN BY | DATE | CHECKED BY | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

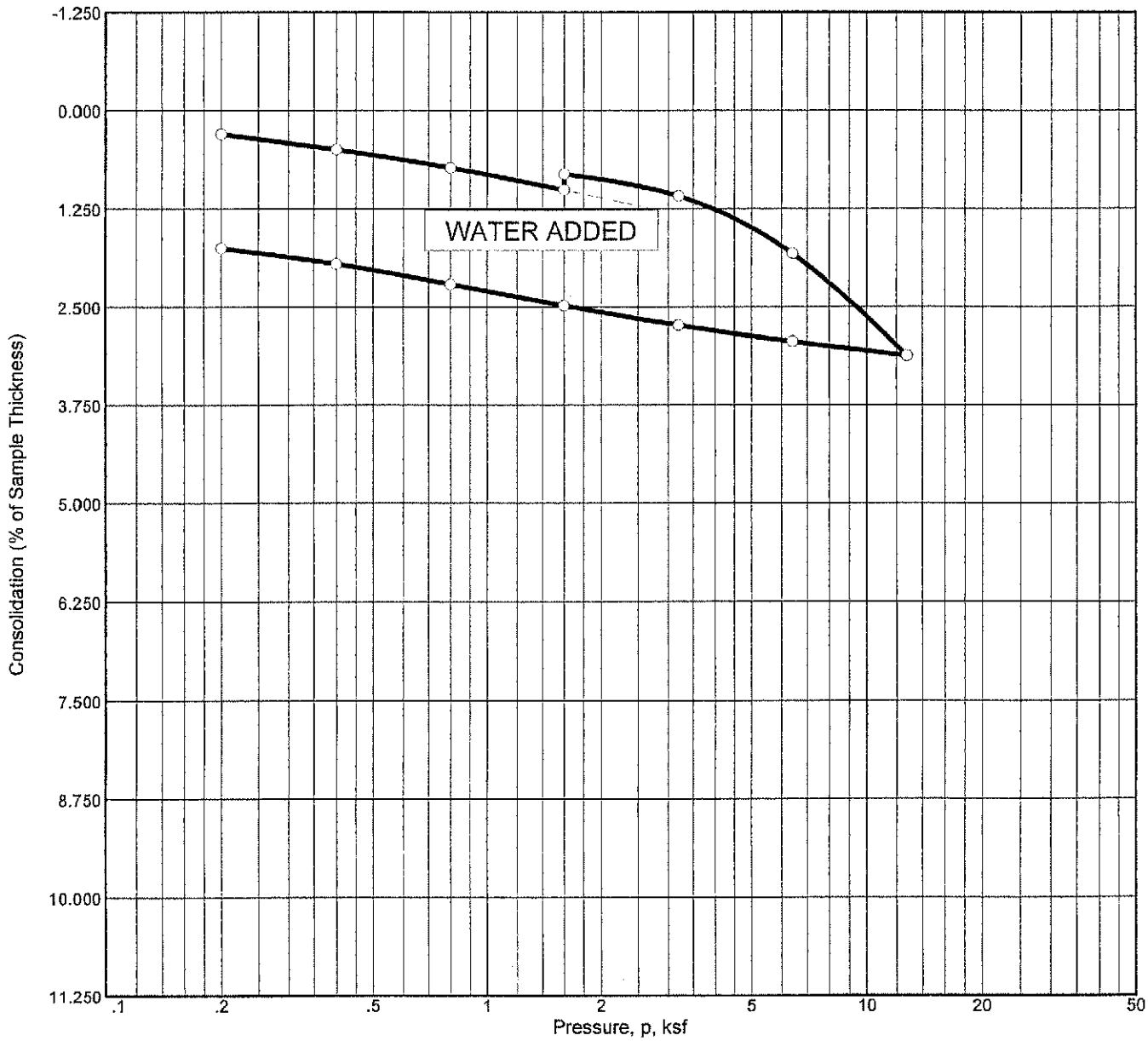
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	112.3	5.0	28.0	1.000	0.473	2.65	0.12	0.48	2.23	SM
FINAL	119.4	14.6	100.0	0.940	0.385					

Source: RW-2 **Elev./Depth:** 4'
Material Description: Brown silty SAND with gravel
Remarks:

ALLAN E. SEWARD	**Client:** Newhall Ranch Co.
ENGINEERING GEOLOGY, INC.	**Project:** Newhall Ranch Mesas Area
	Job No.: 99-1703L-1 **Figure** B4.60

DRAWN BY
DATE
CHECKED BY
APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

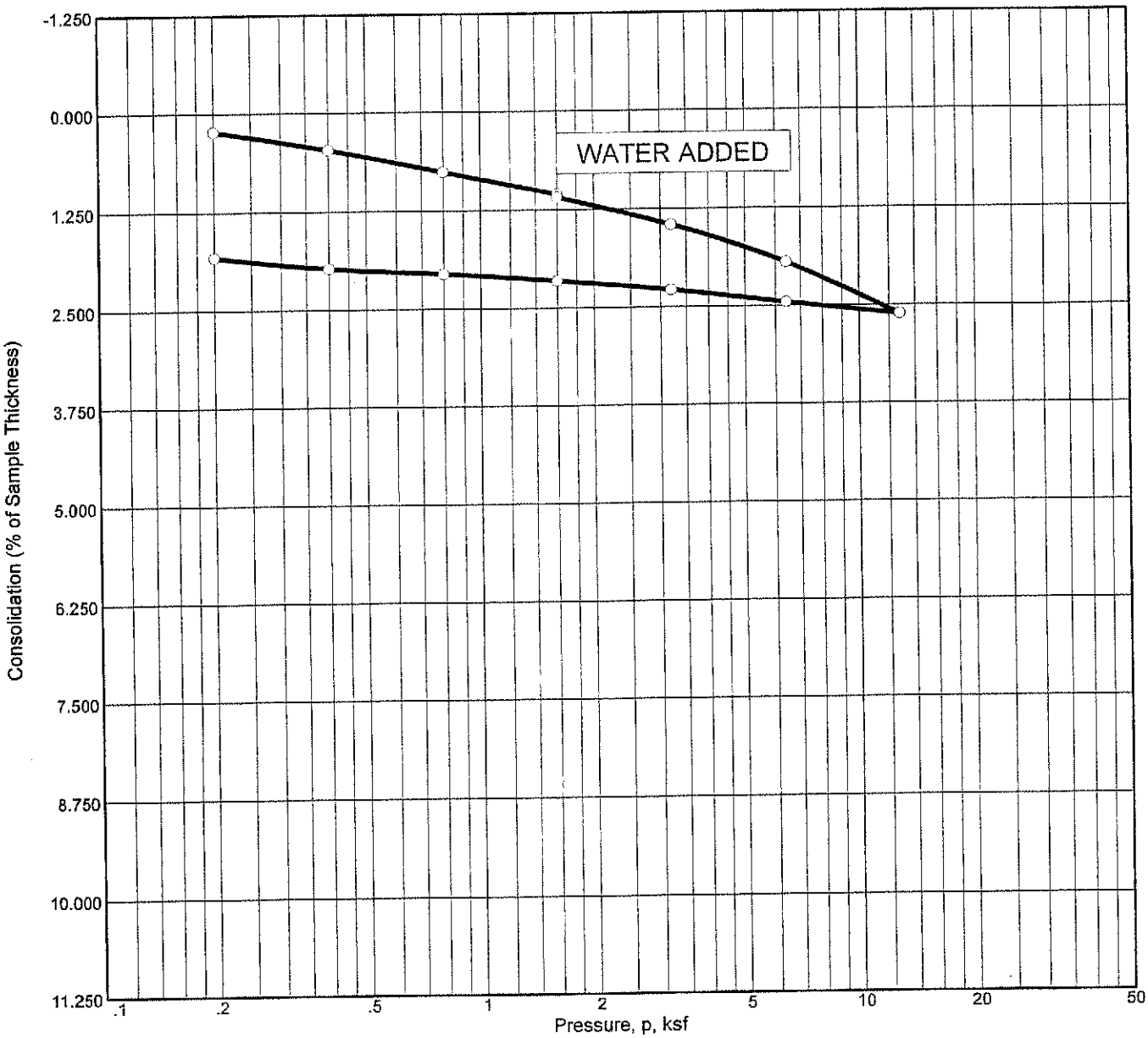
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	113.1	6.4	36.7	1.000	0.463	2.65	0.06	1.20	4.84	CL
FINAL	115.1	16.2	98.1	0.982	0.437					

Source: RW-2 **Elev./Depth:** 10'
Material Description: Brown sandy lean CLAY
Remarks:

ALLAN E. SEWARD **ENGINEERING GEOLOGY, INC.**	**Client:** Newhall Ranch Co. **Project:** Newhall Ranch Mesas Area **Job No.:** 99-1703L-1 **Figure** B4.61

DRAWN BY
DATE
CHECKED BY
APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	117.3	8.5	54.8	1.000	0.410	2.65	0.03	0.60	6.55	SW
FINAL	119.5	14.5	100.0	0.982	0.385					

Source: RW-3
Material Description: Grayish brown well-graded
Remarks: SAND with gravel

Elev./Depth: 5'

ALLAN E. SEWARD

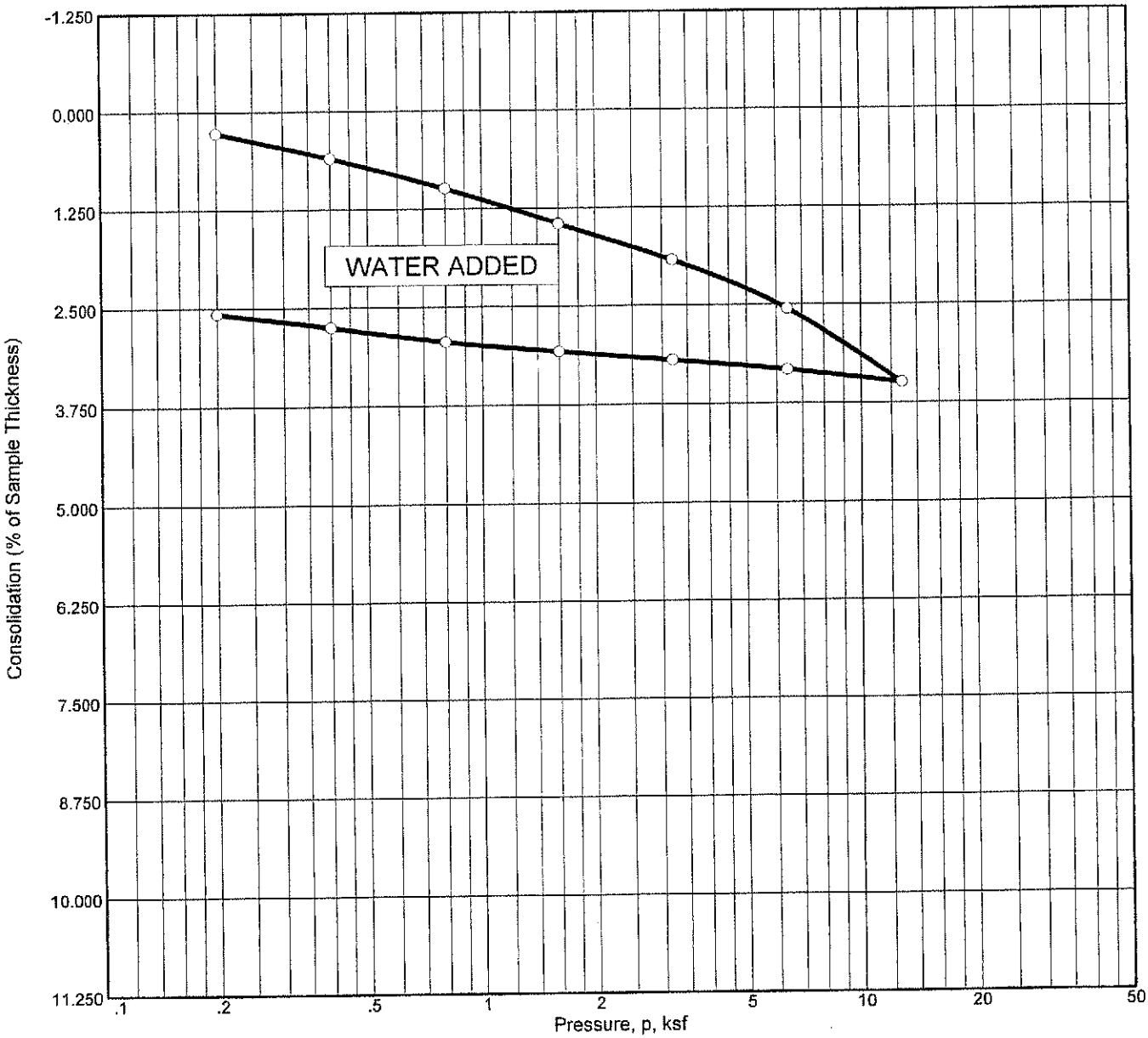
ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Newhall Ranch Mesas Area
Job No.: 99-1703L-1

Figure B4.62

DRAWN BY
DATE
CHECKED BY
APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	118.7	11.1	74.7	1.000	0.394	2.65	0.04	0.96	6.69	SM
FINAL	121.8	16.2	100.0	0.974	0.358					

Source: RW-3
Material Description: Grayish brown silty SAND
Remarks: with gravel

Elev./Depth: 8'

ALLAN E. SEWARD

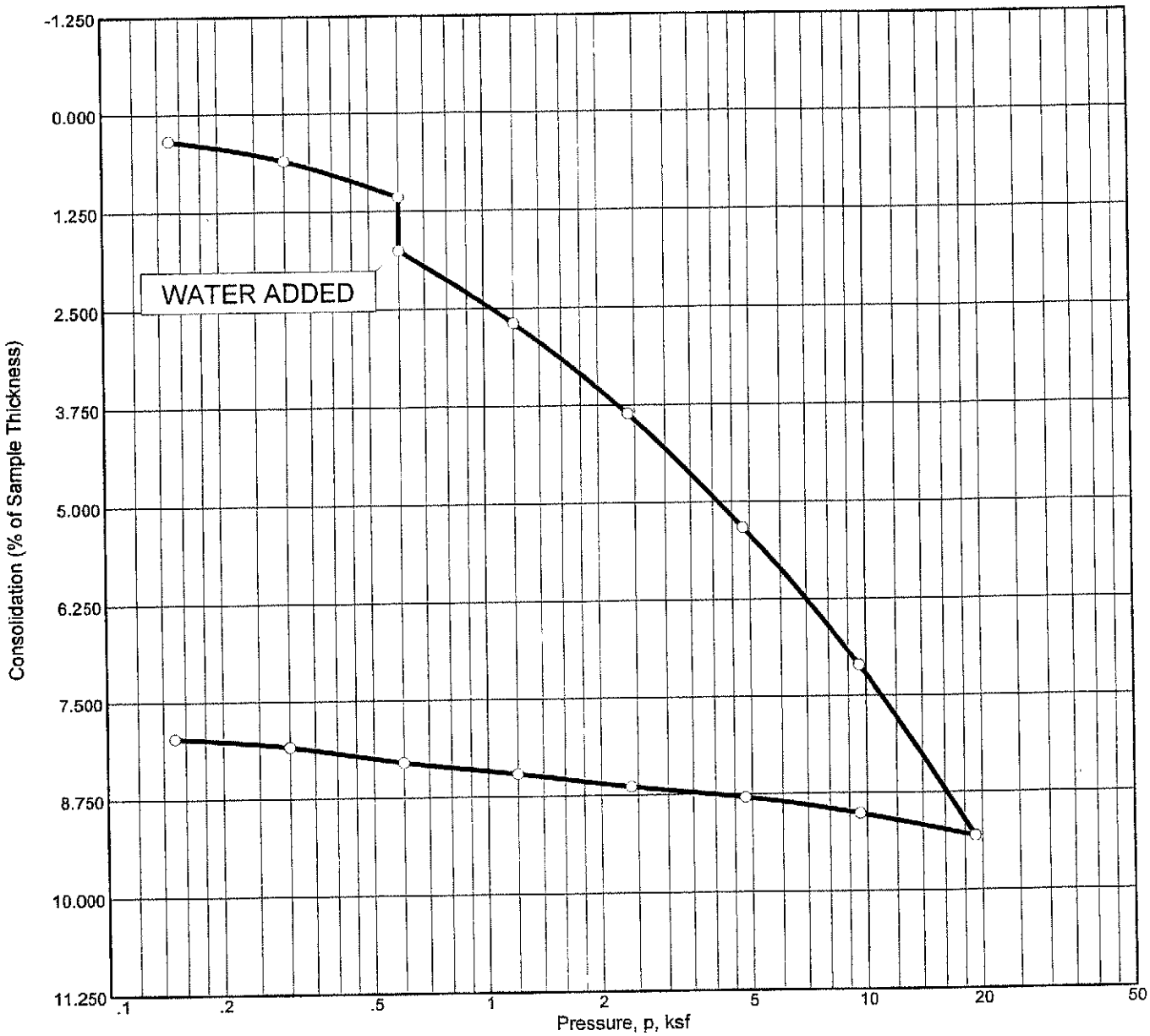
ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Newhall Ranch Mesas Area
Job No.: 99-1703L-1

Figure B4.63

DRAWN BY | DATE | CHECKED BY | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	111.6	4.4	24.4	1.000	0.482	2.65	0.11	0.60	9.88	SM
FINAL	121.3	20.3	100.0	0.920	0.364					

Source: B-4M
Material Description: Silty SAND
Remarks:

Elev./Depth: 5'

ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

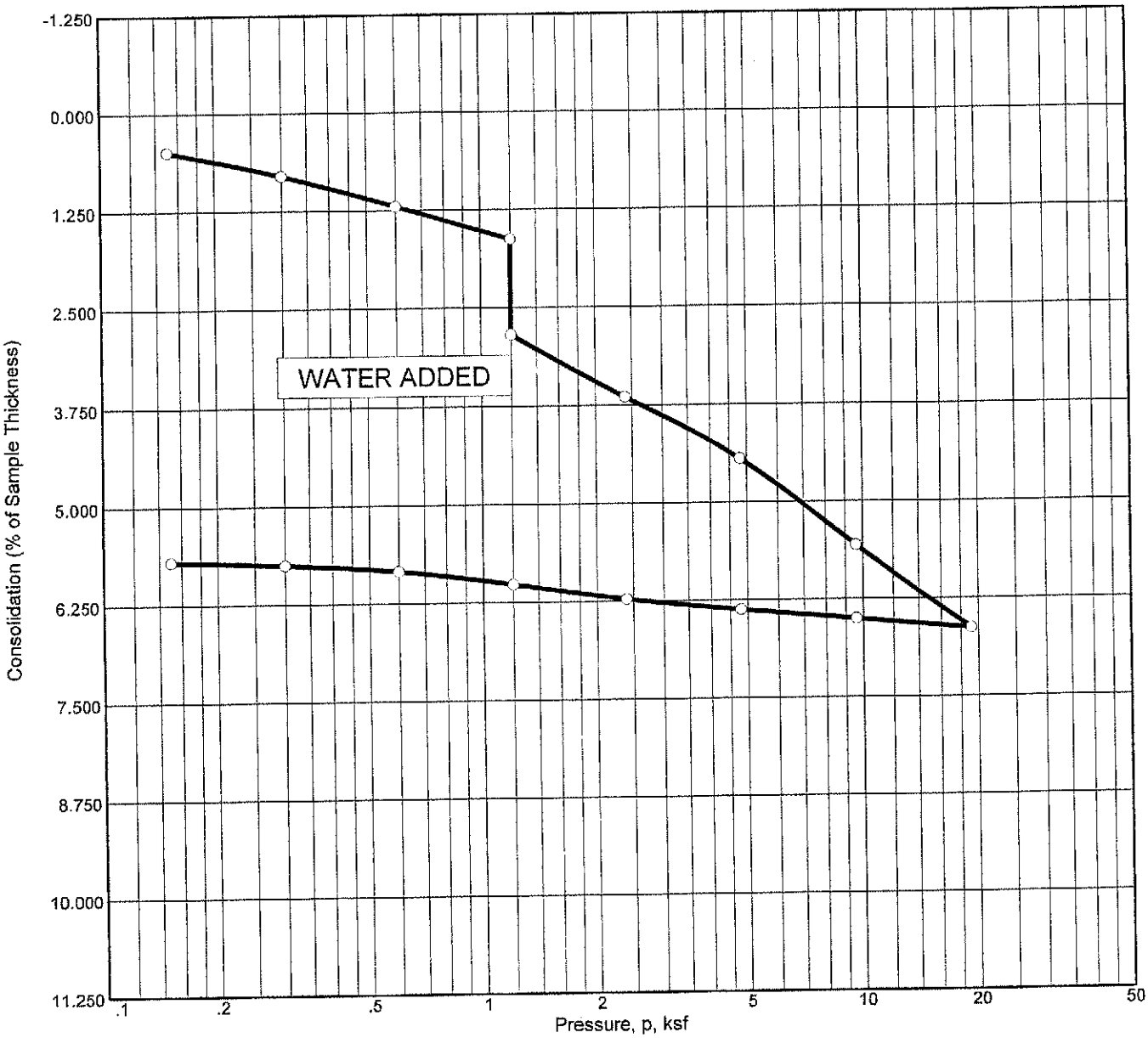
Client: Newhall Ranch Co.
Project: Mesas Entertainment

Job No.: 01-1703M-1

Figure B4.64

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	107.3	3.3	15.9	1.000	0.542	2.65	0.05	1.20	4.38	SP-SM
FINAL	113.8	21.8	100.0	0.943	0.454					

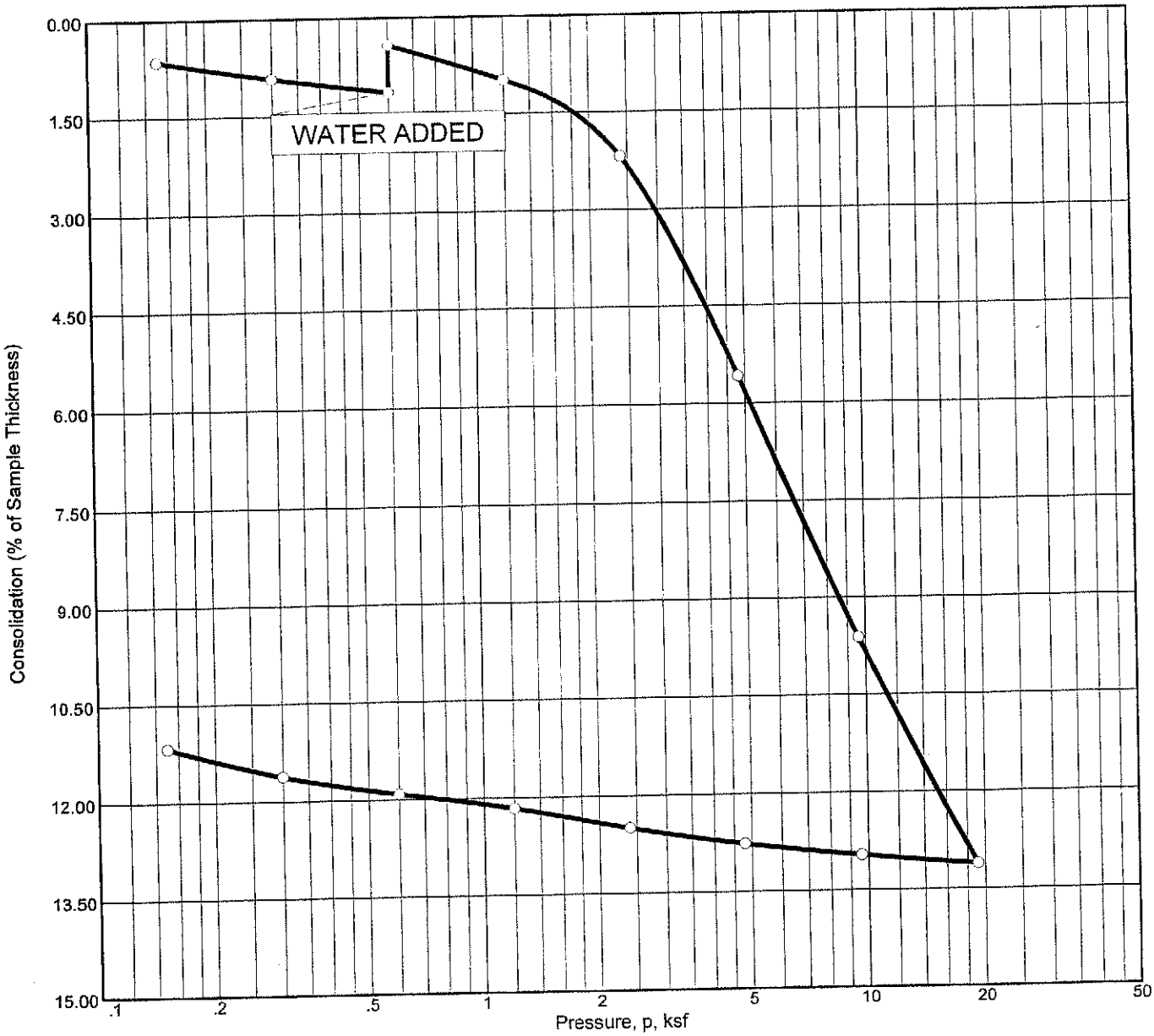
Source: B-6M
Material Description: Poorly graded SAND with silt
Remarks:

Elev./Depth: 10'

ALLAN E. SEWARD	**Client:** Newhall Ranch Co.
	Project: Mesas Entertainment
ENGINEERING GEOLOGY, INC.	**Job No.:** 01-1703M-1 **Figure** B4.65

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



DRAWN BY
DATE
CHECKED BY
APPROVED BY

SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	105.6	7.1	33.0	1.000	0.566	2.65	0.18	0.60	1.98	CL
FINAL	118.9	21.0	100.0	0.888	0.391					

Source: B-16M
Material Description: Sandy lean CLAY
Remarks:

Elev./Depth: 5'

ALLAN E. SEWARD

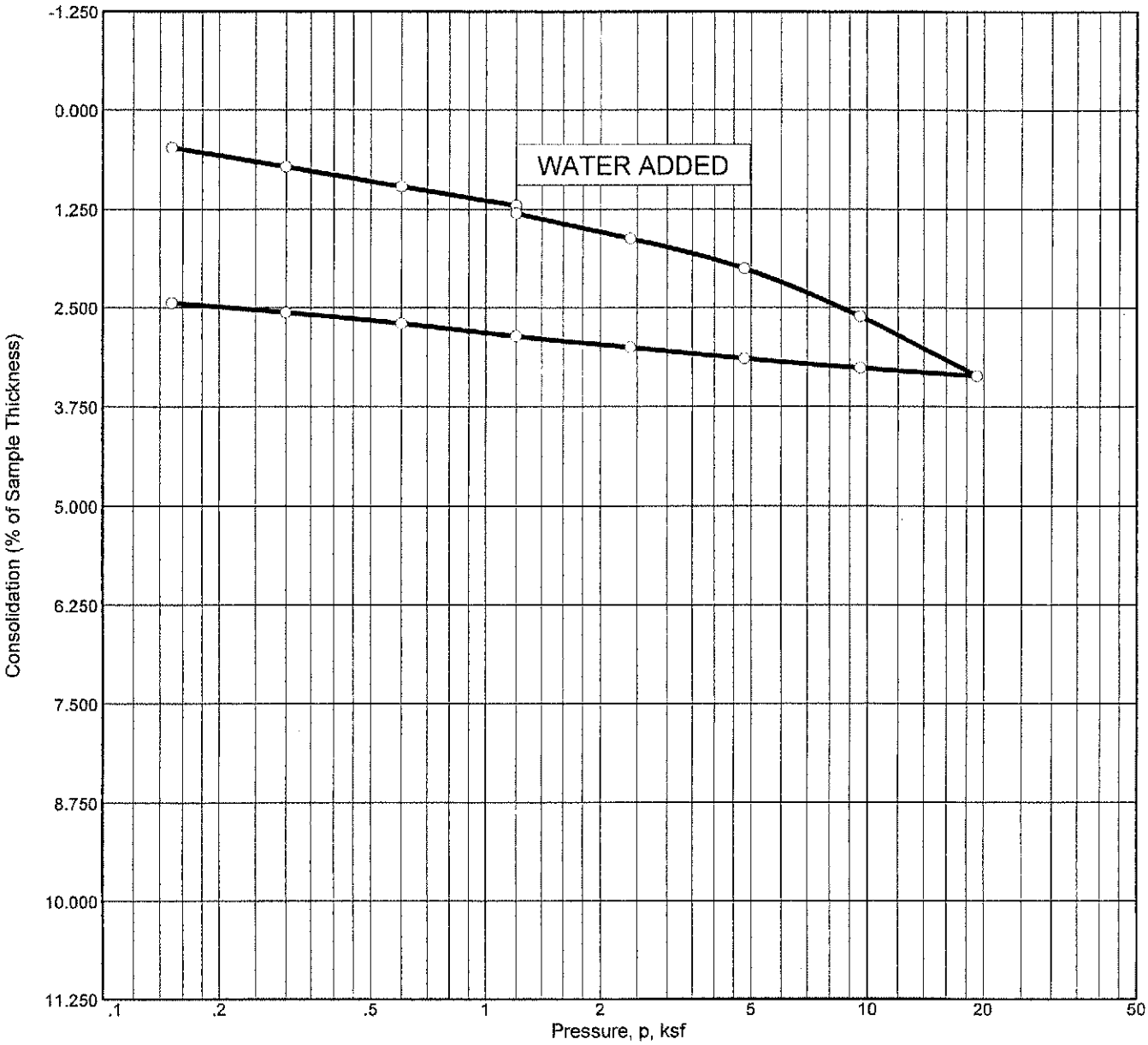
ENGINEERING GEOLOGY, INC.

Client: Newhall Ranch Co.
Project: Mesas Entertainment

Job No.: 01-1703M-1

Figure B4.66

CONSOLIDATION TEST REPORT



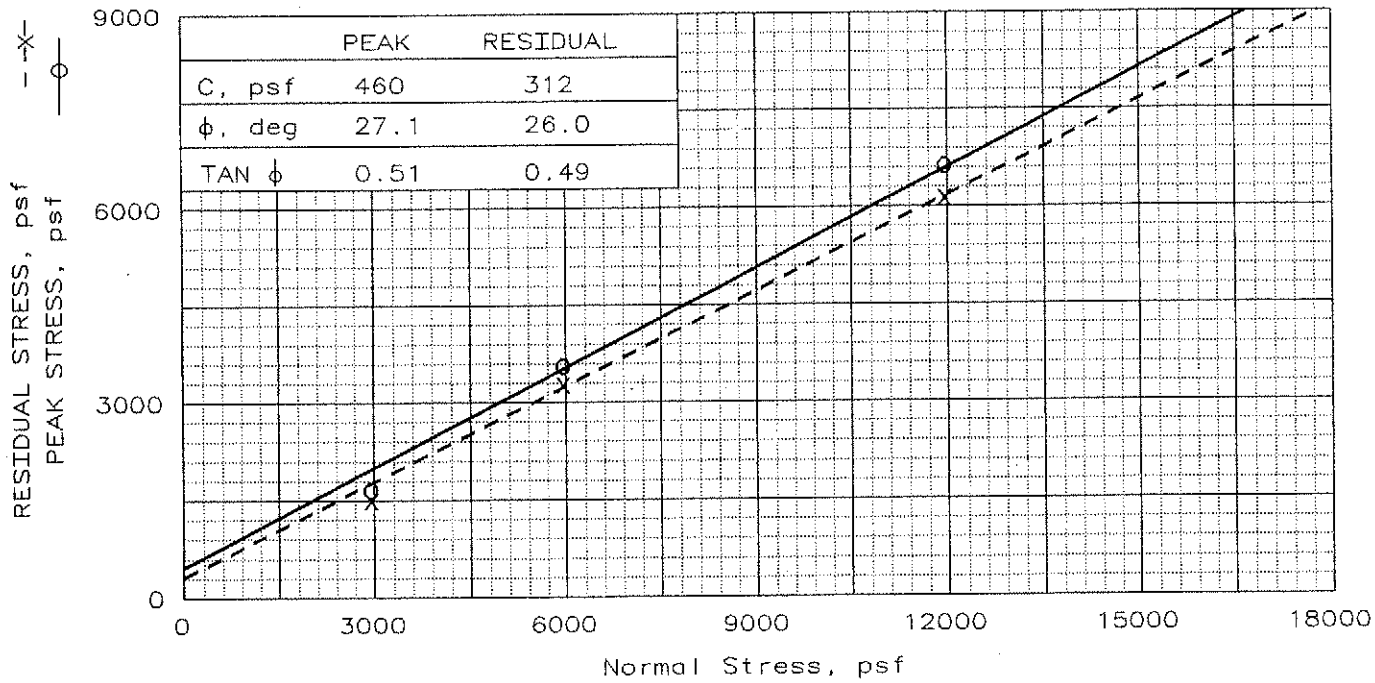
SUMMARY OF TEST RESULTS

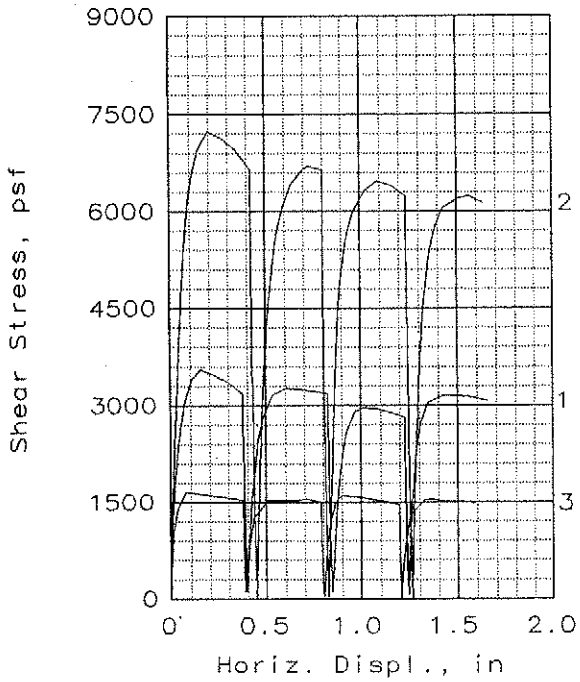
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	118.6	9.2	61.8	1.000	0.395	2.65	0.04	1.20	5.93	ML
FINAL	121.5	22.7	100.0	0.976	0.361					

Source: B-22M **Elev./Depth:** 10'
Material Description: Sandy SILT
Remarks:

ALLAN E. SEWARD	**Client:** Newhall Ranch Co.
	Project: Mesas Entertainment
ENGINEERING GEOLOGY, INC.	**Job No.:** 01-1703M-1 **Figure** B4.67

DRAWN BY | CHECKED BY
DATE | APPROVED BY





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	15.5	10.8	15.5
	DRY DENSITY, pcf	100.1	101.4	100.0
	SATURATION, %	63.1	45.2	63.0
	VOID RATIO	0.653	0.632	0.654
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	20.4	18.6	24.6
	DRY DENSITY, pcf	107.4	110.8	100.2
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.541	0.493	0.652
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.93	0.92	1.00
NORMAL STRESS, psf		6000	12000	3000
PEAK STRESS, psf		3552	6623	1656
DISPLACEMENT, in		0.16	0.12	0.08
RESIDUAL STRESS, psf		3264	6131	1488
DISPLACEMENT, in		0.61	1.64	1.59
Strain rate, in/min		0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed
DESCRIPTION: Silty CLAYSTONE (CL-ML)

SPECIFIC GRAVITY= 2.65
REMARKS: Bedrock (TQs)
Along-bedding

Fig. No.: B5.21

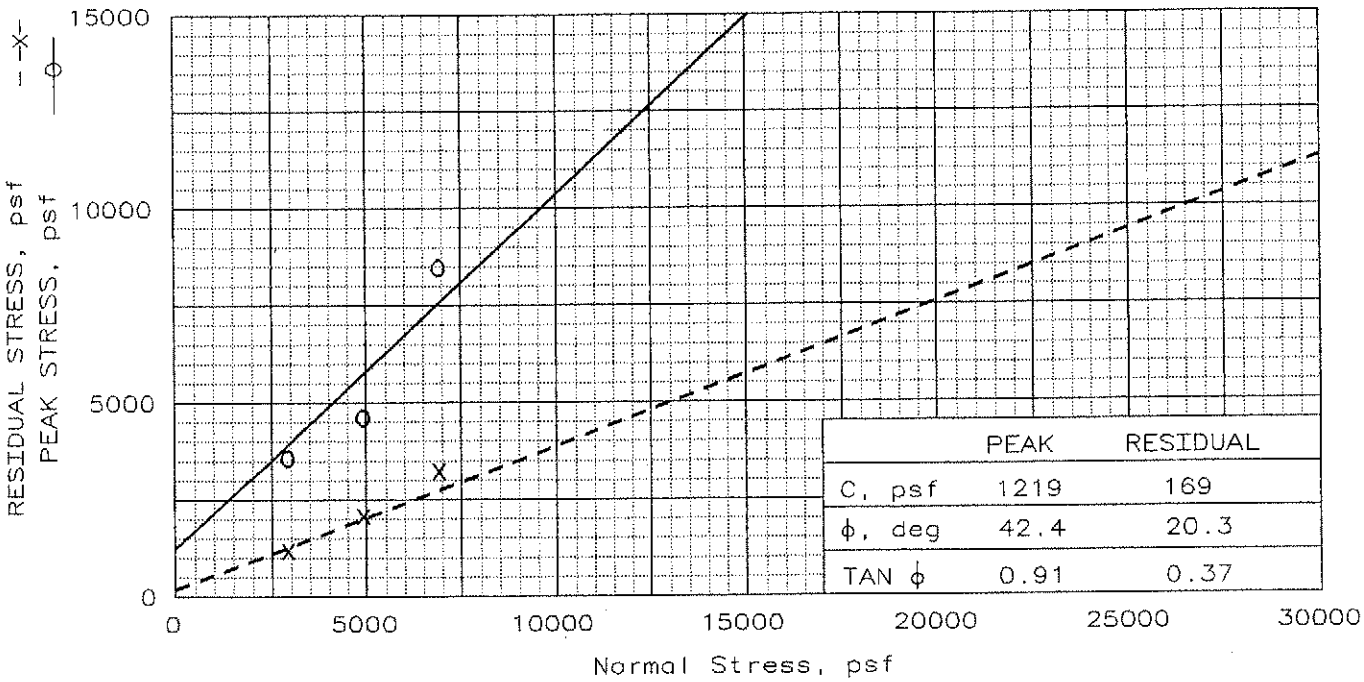
CLIENT: Newhall Ranch Co.

PROJECT: Mesas East/Bluff Erosion

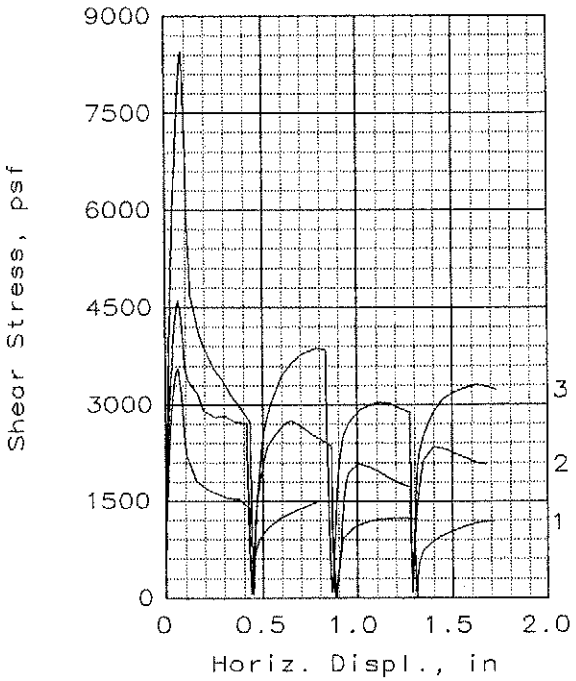
SAMPLE LOCATION: B-66E @ 65 ft

PROJ. NO.: 04-2023-4 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.



	PEAK	RESIDUAL
C, psf	1219	169
ϕ, deg	42.4	20.3
TAN ϕ	0.91	0.37



	Sample No.:	1	2	3
INITIAL	WATER CONTENT, %	15.9	13.3	13.4
	DRY DENSITY, pcf	114.1	119.3	119.3
	SATURATION, %	93.4	90.8	91.7
	VOID RATIO	0.450	0.387	0.386
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	17.3	16.0	15.4
	DRY DENSITY, pcf	113.4	116.1	117.4
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.459	0.425	0.409
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.01	1.03	1.02
	NORMAL STRESS, psf	3000	5000	7000
	PEAK STRESS, psf	3564	4608	8459
	DISPLACEMENT, in	0.07	0.07	0.09
	RESIDUAL STRESS, psf	1176	2076	3228
	DISPLACEMENT, in	1.72	1.68	1.73
	Strain rate, in/min	0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed
DESCRIPTION: Lean CLAYSTONE (CL)
LL= 45 PL= 27 PI= 18
SPECIFIC GRAVITY= 2.65
REMARKS: Bedrock (TQs)
Along-bedding
% fines = 89.2

Fig. No.: B5.22

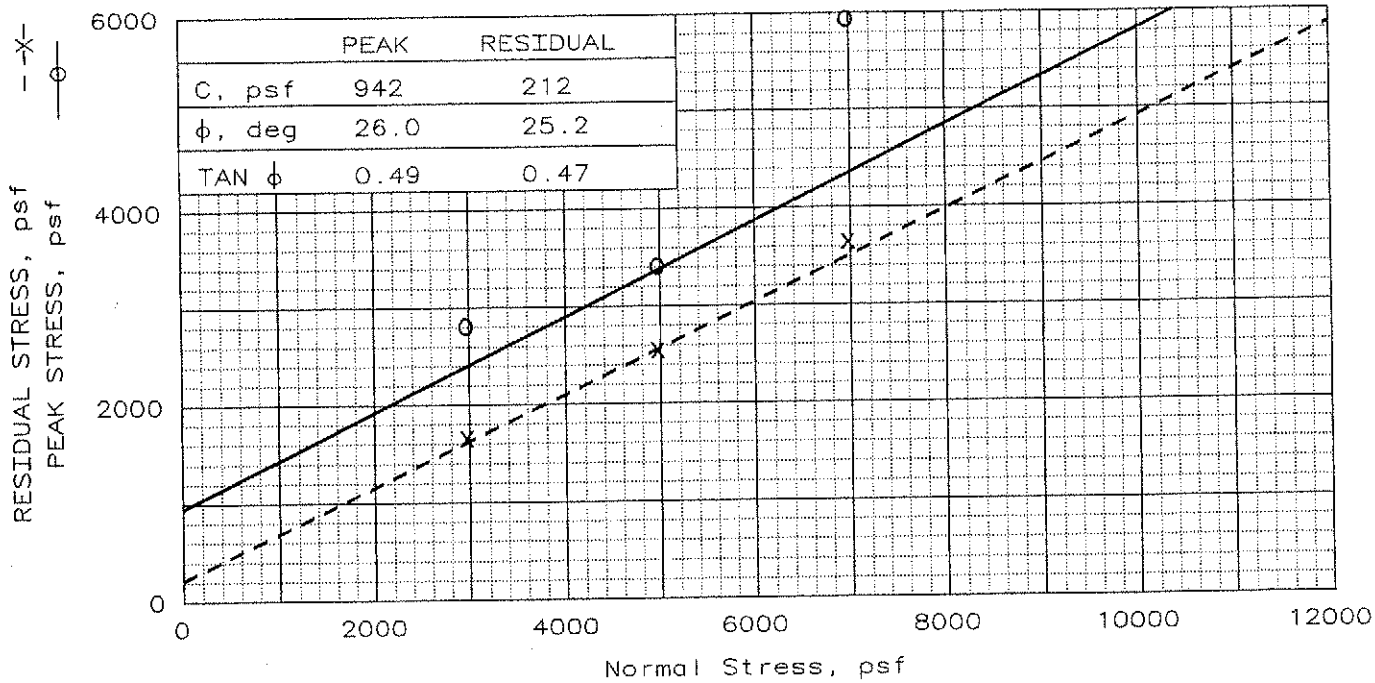
CLIENT: Newhall Ranch Co.

PROJECT: Mesas West

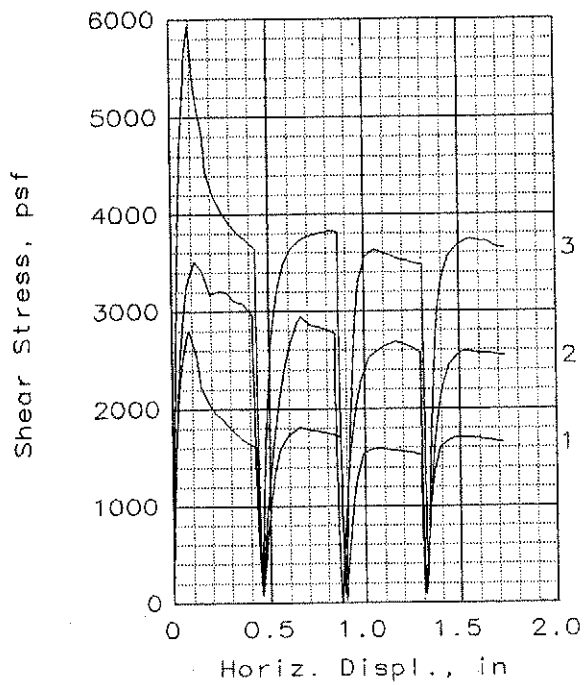
SAMPLE LOCATION: B-9W @ 32 ft

PROJ. NO.: 04-1703W-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.



	PEAK	RESIDUAL
C, psf	942	212
ϕ, deg	26.0	25.2
TAN ϕ	0.49	0.47



	Sample No.:	1	2	3
INITIAL	WATER CONTENT, %	12.7	13.1	12.3
	DRY DENSITY, pcf	120.4	119.0	121.9
	SATURATION, %	89.8	88.7	91.2
	VOID RATIO	0.374	0.391	0.357
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	14.7	15.8	14.1
	DRY DENSITY, pcf	119.1	116.5	120.4
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.389	0.420	0.374
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.01	1.02	1.01
NORMAL STRESS, psf		3000	5000	7000
PEAK STRESS, psf		2808	3408	5939
DISPLACEMENT, in		0.09	0.16	0.10
RESIDUAL STRESS, psf		1656	2544	3648
DISPLACEMENT, in		1.73	1.74	1.74
Strain rate, in/min		0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed
DESCRIPTION: Silty CLAYSTONE (CL-ML)
LL= 41 PL= 25 PI= 16
SPECIFIC GRAVITY= 2.65
REMARKS: Bedrock (TQs)
Along-bedding
% fines = 89.7

Fig. No.: B5.23

CLIENT: Newhall Ranch Co.

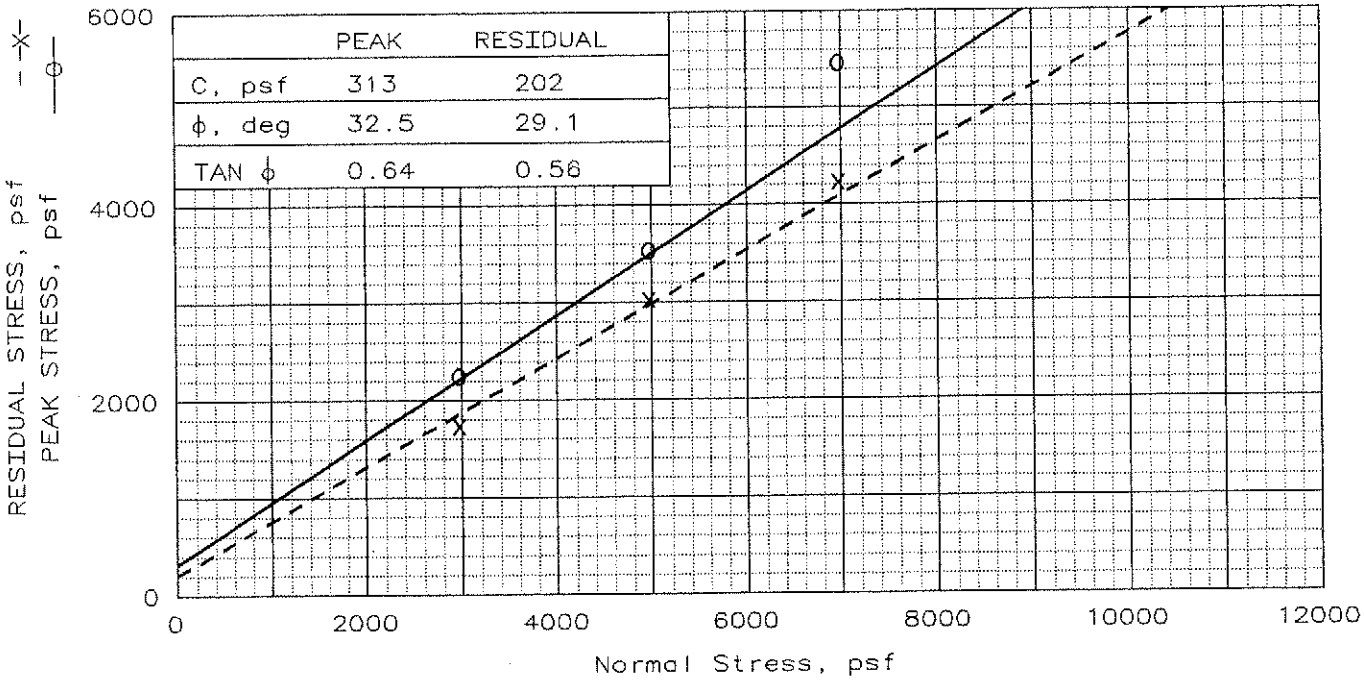
PROJECT: Mesas West

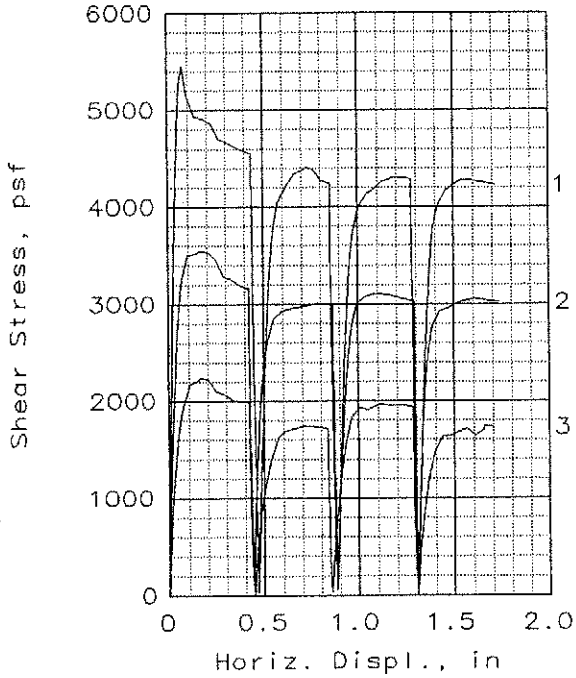
SAMPLE LOCATION: B-10W @ 60 ft

PROJ. NO.: 04-1703W-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	10.2	9.6	8.1
	DRY DENSITY, pcf	118.6	109.9	107.2
	SATURATION, %	68.8	50.5	39.8
	VOID RATIO	0.394	0.505	0.543
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	14.8	17.3	19.2
	DRY DENSITY, pcf	118.9	113.5	109.6
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.391	0.458	0.510
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	0.97	0.98
NORMAL STRESS, psf		7000	5000	3000
PEAK STRESS, psf		5459	3528	2244
DISPLACEMENT, in		0.08	0.21	0.17
RESIDUAL STRESS, psf		4224	3024	1728
DISPLACEMENT, in		1.72	1.74	1.71
Strain rate, in/min		0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed
DESCRIPTION: Sandy SILTSTONE (ML)

SPECIFIC GRAVITY= 2.65
REMARKS: Bedrock (TQs)
Along-bedding
% fines = 54.6

Fig. No.: B5.24

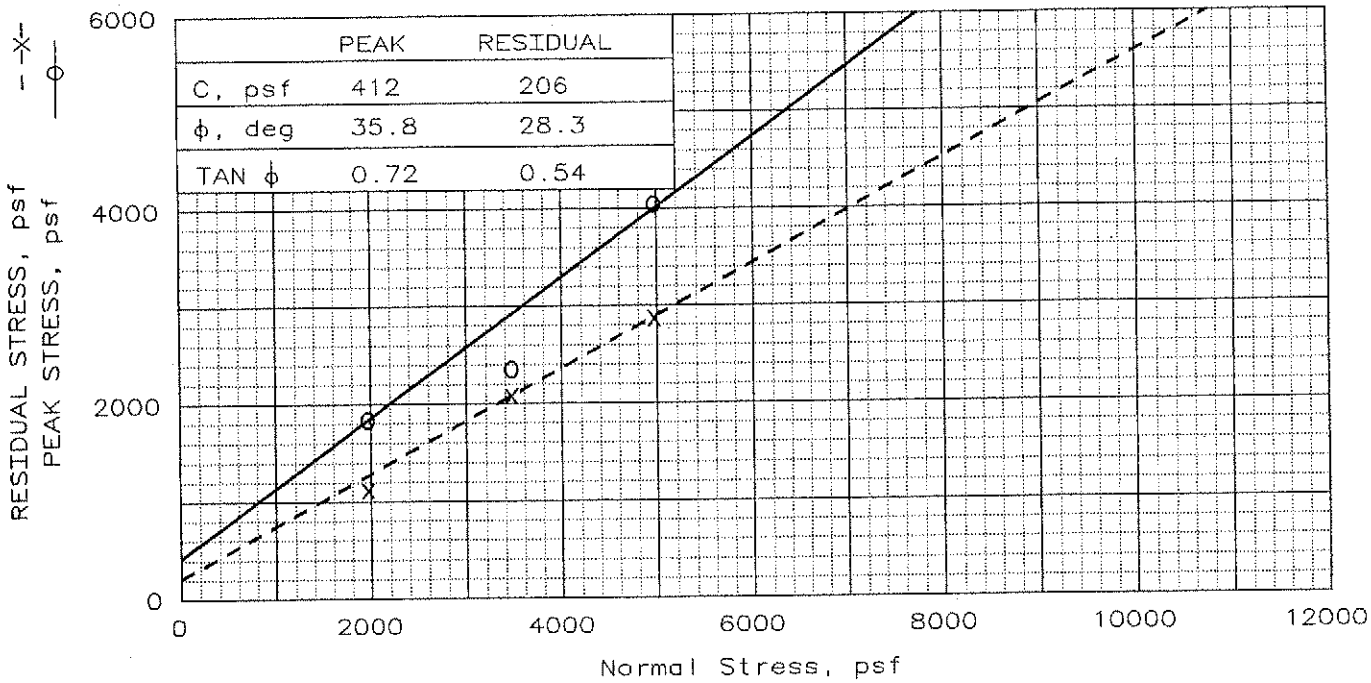
CLIENT: Newhall Ranch Co.

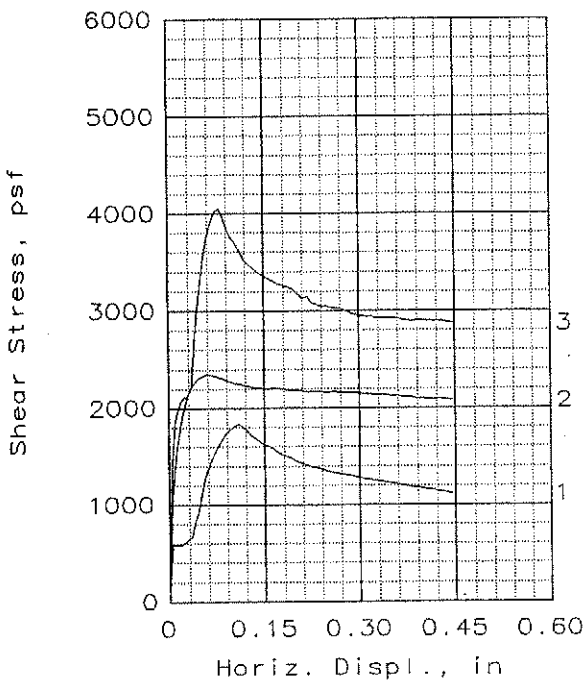
PROJECT: Mesas West

SAMPLE LOCATION: B-15W @ 35 ft

PROJ. NO.: 04-1703W-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	18.2	31.5	14.3
	DRY DENSITY, pcf	103.8	88.6	113.5
	SATURATION, %	81.2	96.1	83.1
	VOID RATIO	0.594	0.868	0.457
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	21.8	31.8	16.2
	DRY DENSITY, pcf	104.8	89.8	115.7
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.579	0.843	0.430
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.99	0.98
NORMAL STRESS, psf		2000	3500	5000
PEAK STRESS, psf		1836	2352	4044
DISPLACEMENT, in		0.11	0.06	0.08
RESIDUAL STRESS, psf		1116	2076	2868
DISPLACEMENT, in		0.45	0.45	0.45
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Undisturbed
DESCRIPTION: SILT with sand (ML)
LL= 35 PL= 21 PI= 14
SPECIFIC GRAVITY= 2.65
REMARKS: Terrace Deposit (Qt)
% fines = 75.3

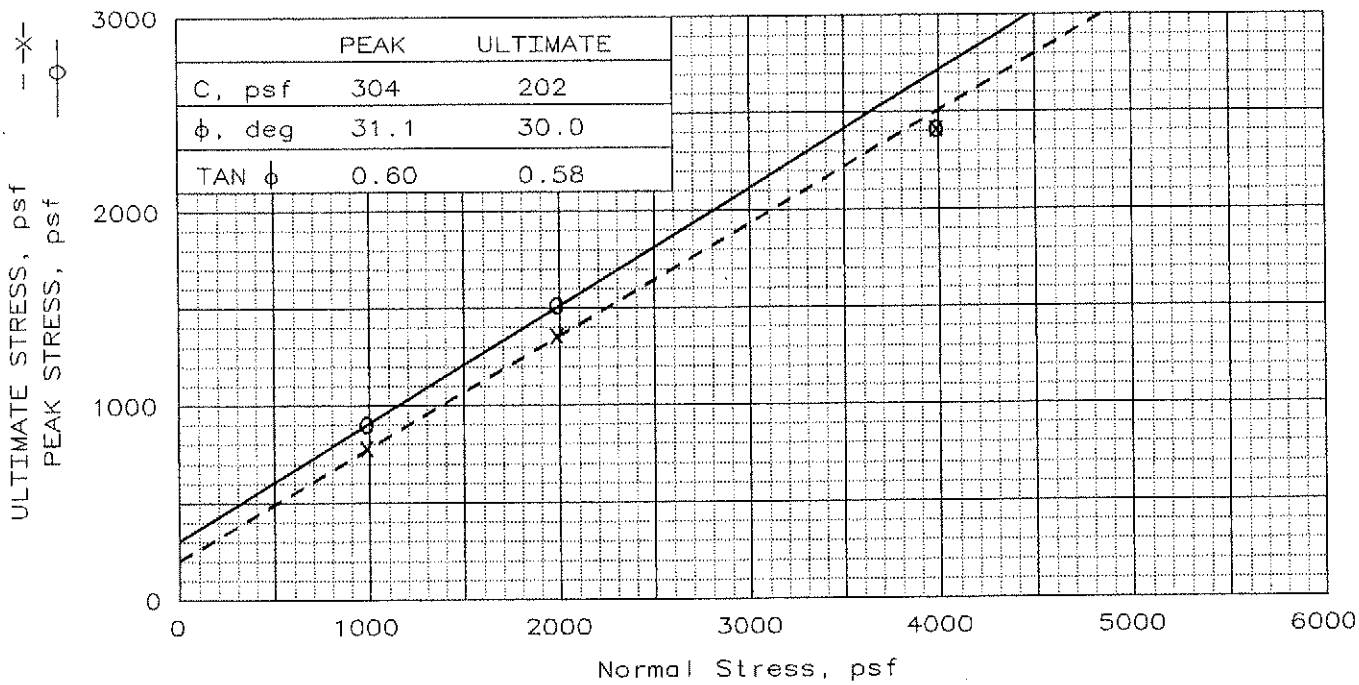
Fig. No.: B5.25

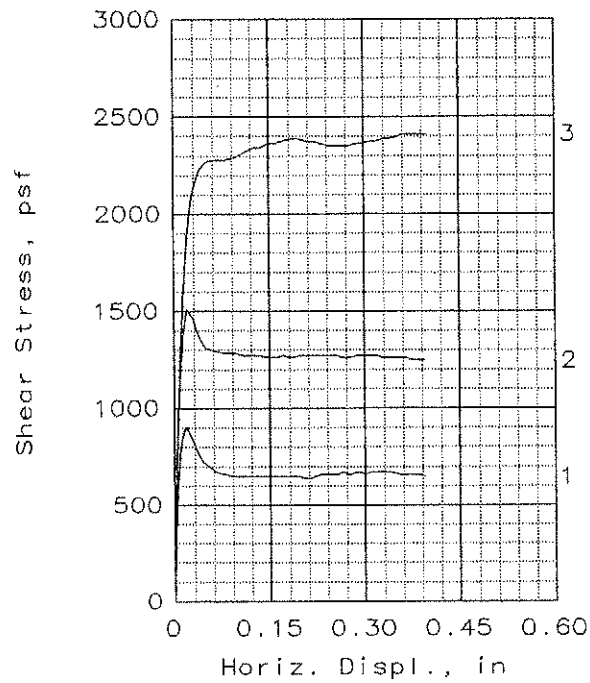
CLIENT: Newhall Ranch Co.

PROJECT: Mesas East - Phase II Landslide Investigation
SAMPLE LOCATION: B-27E @ 5 ft

PROJ. NO.: 00-1703QLSII-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	8.9	8.4	9.5
	DRY DENSITY, pcf	118.0	118.1	117.5
	SATURATION, %	58.6	55.6	61.9
	VOID RATIO	0.402	0.401	0.408
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	15.1	14.6	14.6
	DRY DENSITY, pcf	118.2	119.3	119.3
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.399	0.386	0.387
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	0.99	0.98
NORMAL STRESS, psf		1000	2000	4000
PEAK STRESS, psf		900	1512	2412
DISPLACEMENT, in		0.02	0.02	0.36
ULTIMATE STRESS, psf		780	1356	2412
DISPLACEMENT, in		0.04	0.04	0.40
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Undisturbed
DESCRIPTION: Silty SAND with clay (SM)

SPECIFIC GRAVITY= 2.65
REMARKS: Terrace Deposit (Qt)
% fines = 41.9

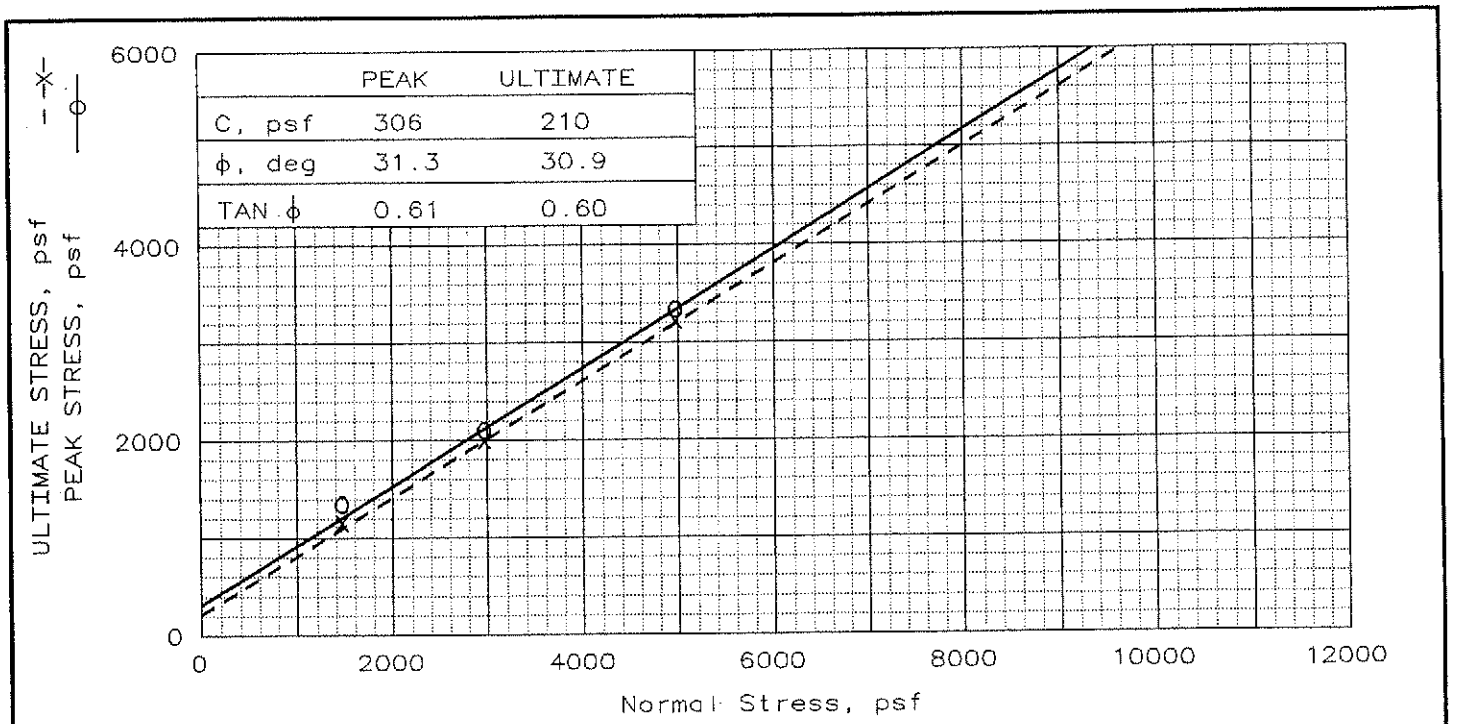
Fig. No.: B5.26

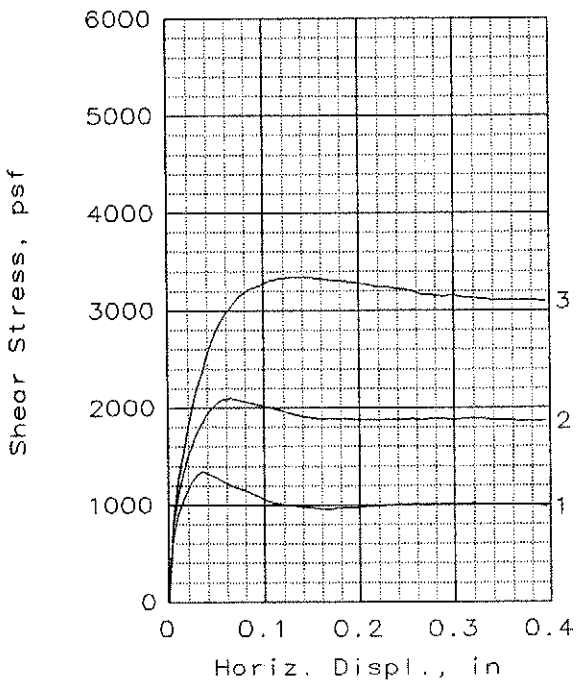
CLIENT: Newhall Ranch Co.

PROJECT: Cobble/Boulder Assessment
Airport and Exxon Mesas
SAMPLE LOCATION: B-2B @ 15 ft

PROJ. NO.: 02-1703B-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	15.4	15.7	16.3
	DRY DENSITY, pcf	112.0	112.5	115.0
	SATURATION, %	85.3	88.3	98.3
	VOID RATIO	0.477	0.471	0.438
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	17.7	17.1	15.5
	DRY DENSITY, pcf	112.6	113.8	117.2
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.469	0.453	0.412
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.99	0.98
NORMAL STRESS, psf		1500	3000	5000
PEAK STRESS, psf		1344	2100	3336
DISPLACEMENT, in		0.04	0.07	0.13
ULTIMATE STRESS, psf		1152	1992	3216
DISPLACEMENT, in		0.08	0.11	0.25
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Undisturbed
DESCRIPTION: Silty SAND (SM)

SPECIFIC GRAVITY= 2.65
REMARKS: Terrace Deposit (Qt)

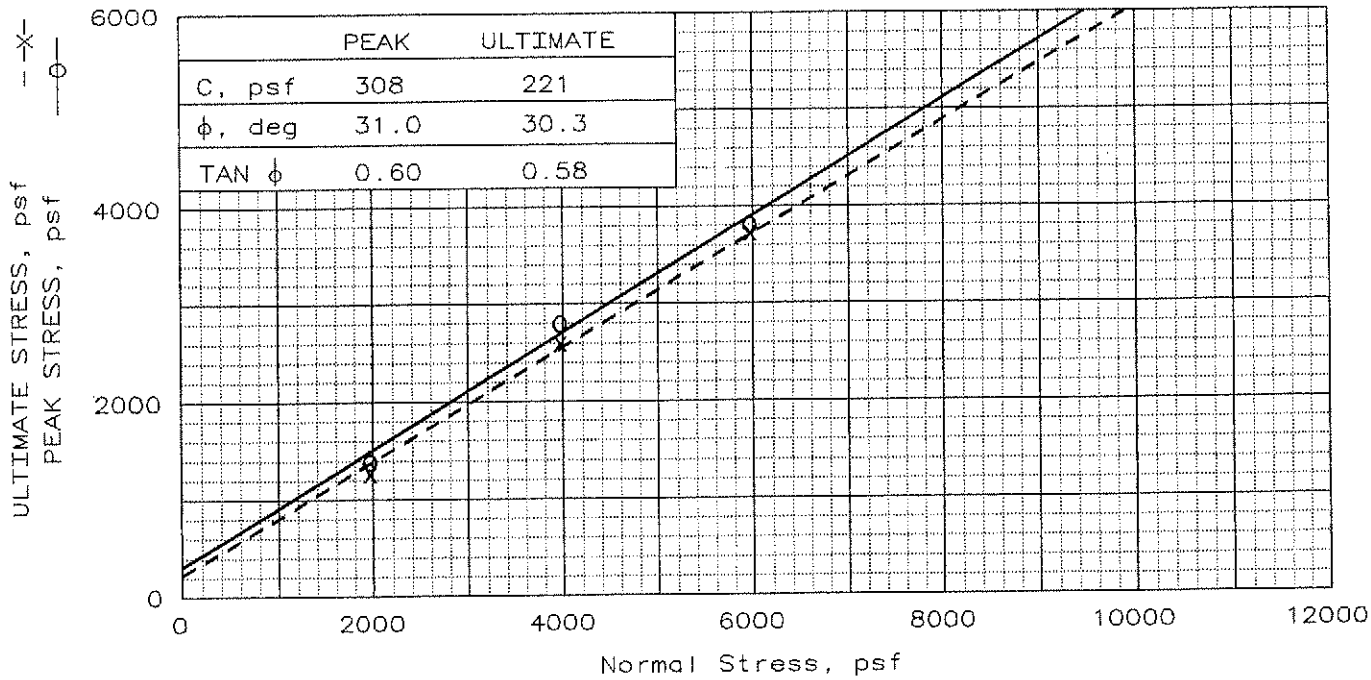
CLIENT: Newhall Ranch Co.

PROJECT: Cobble/Boulder Assessment
Airport and Exxon Mesas
SAMPLE LOCATION: B-6B @ 15 ft

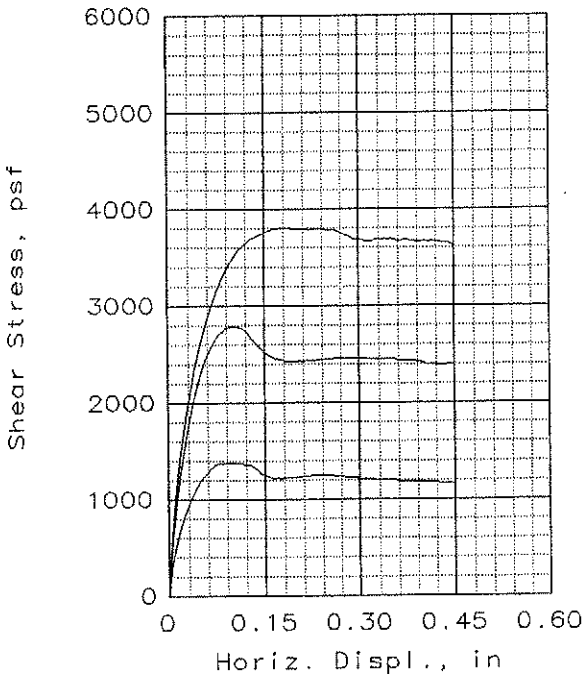
PROJ. NO.: 02-1703B-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.

Fig. No.: B5.27



	PEAK	ULTIMATE
C, psf	308	221
ϕ, deg	31.0	30.3
TAN ϕ	0.60	0.58



SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	11.2	6.3	7.5
	DRY DENSITY, pcf	105.9	107.5	109.6
	SATURATION, %	53.0	31.1	38.8
	VOID RATIO	0.562	0.538	0.509
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	22.2	19.1	21.0
	DRY DENSITY, pcf	104.2	109.8	106.2
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.588	0.506	0.558
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.02	0.98	1.03
NORMAL STRESS, psf		2000	4000	6000
PEAK STRESS, psf		1380	2796	3804
DISPLACEMENT, in		0.09	0.10	0.18
ULTIMATE STRESS, psf		1260	2592	3720
DISPLACEMENT, in		0.15	0.14	0.29
Strain rate, %/min		0.01	0.01	0.01

SAMPLE TYPE: Undisturbed
DESCRIPTION: Silty SAND (SM)

SPECIFIC GRAVITY= 2.65
REMARKS: Terrace Deposit (Qt)
% fines = 38.3

Fig. No.: B5.28

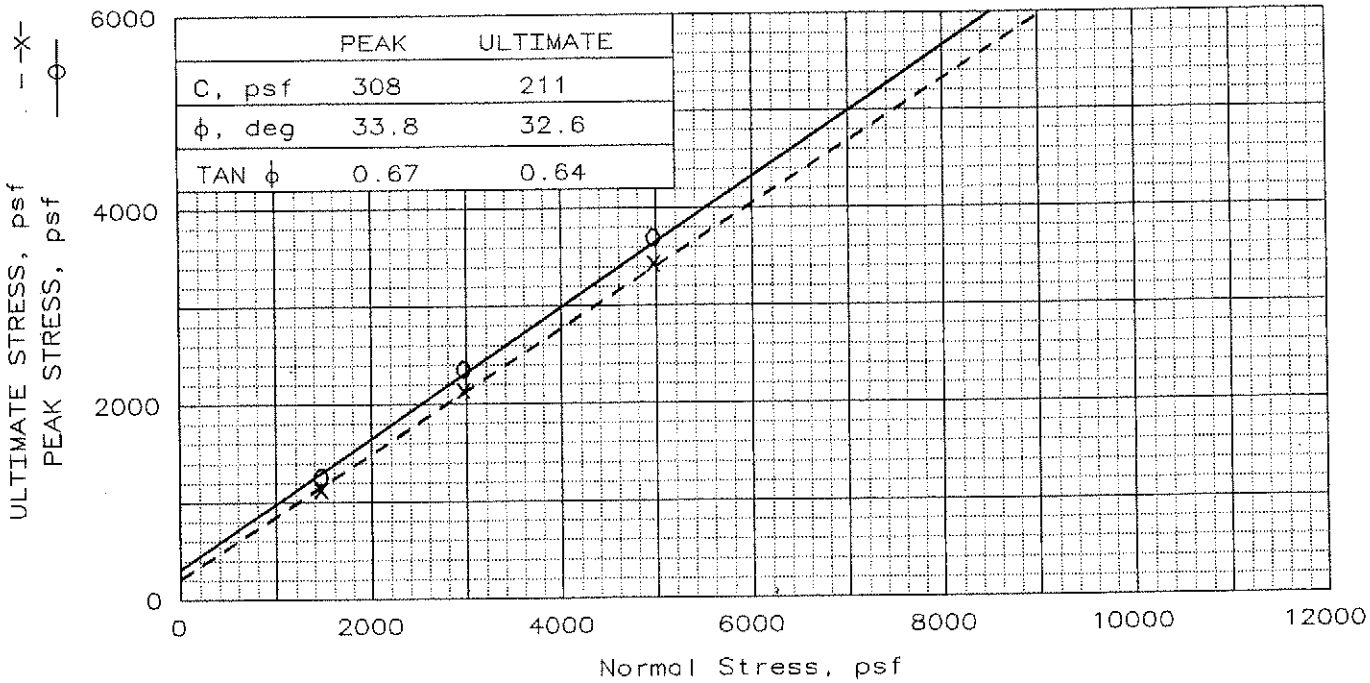
CLIENT: Newhall Ranch Co.

PROJECT: Mesas West

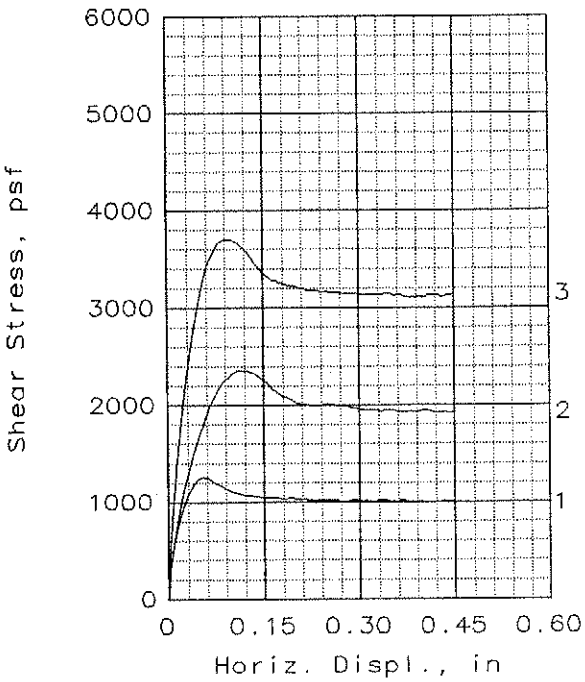
SAMPLE LOCATION: B-6W @ 45 ft

PROJ. NO.: 04-1703W-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.



	PEAK	ULTIMATE
C, psf	308	211
ϕ, deg	33.8	32.6
TAN ϕ	0.67	0.64



Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	9.7	10.4	9.6
	DRY DENSITY, pcf	116.7	120.1	121.7
	SATURATION, %	61.5	73.1	70.5
	VOID RATIO	0.418	0.378	0.359
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	14.9	13.4	12.6
	DRY DENSITY, pcf	118.7	122.2	124.1
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.394	0.354	0.334
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.98	0.98	0.98
NORMAL STRESS, psf		1500	3000	5000
PEAK STRESS, psf		1260	2352	3696
DISPLACEMENT, in		0.06	0.11	0.09
ULTIMATE STRESS, psf		1128	2136	3432
DISPLACEMENT, in		0.10	0.17	0.14
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Undisturbed
DESCRIPTION: Clayey SAND (SC)

SPECIFIC GRAVITY= 2.65
REMARKS: Terrace Deposit (Qt)

CLIENT: Newhall Ranch Co.

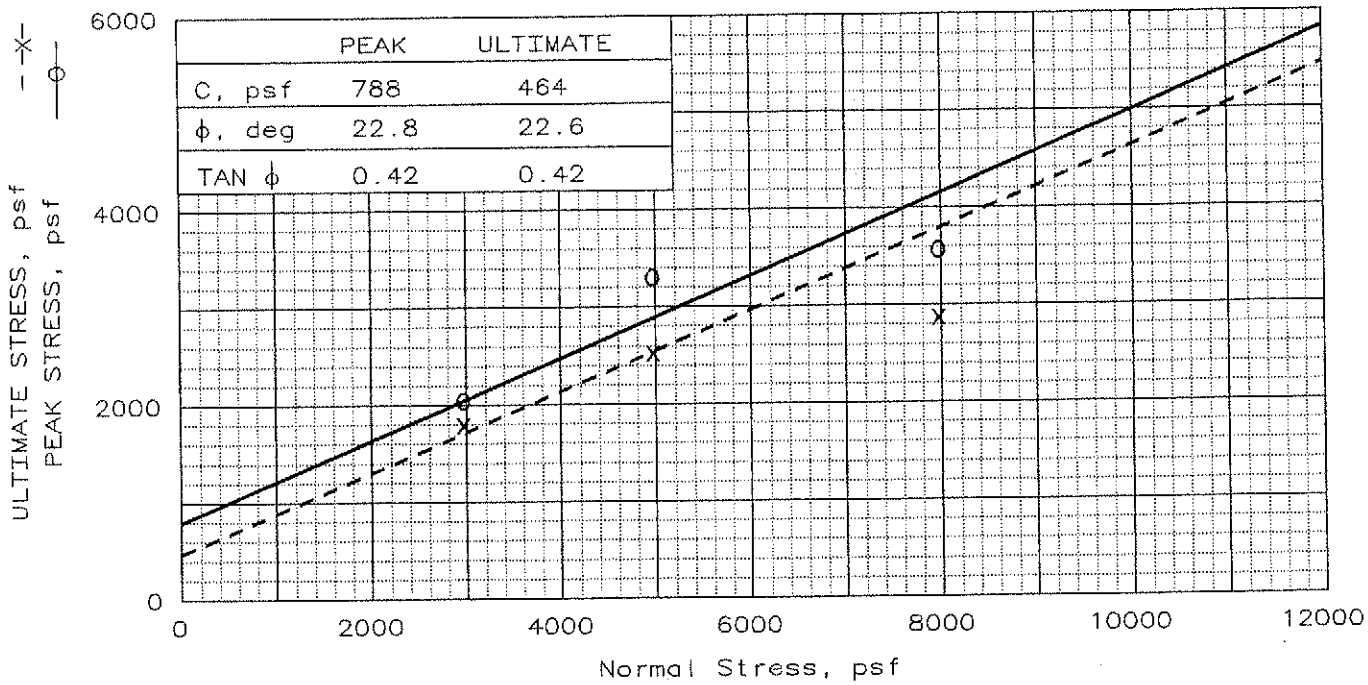
PROJECT: Mesas West

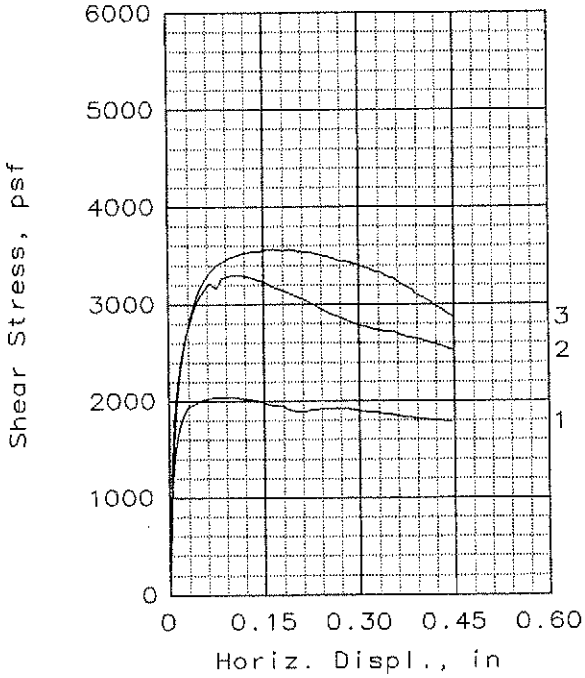
SAMPLE LOCATION: B-11W @ 20 ft

PROJ. NO.: 04-1703W-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.

Fig. No.: B5.29





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	27.9	26.8	26.3
	DRY DENSITY, pcf	95.0	96.7	97.5
	SATURATION, %	99.7	99.9	99.9
	VOID RATIO	0.742	0.710	0.697
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	28.4	27.2	25.9
	DRY DENSITY, pcf	94.4	96.1	98.1
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.753	0.722	0.687
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.01	1.01	0.99
NORMAL STRESS, psf		3000	5000	8000
PEAK STRESS, psf		2040	3300	3564
DISPLACEMENT, in		0.08	0.10	0.16
ULTIMATE STRESS, psf		1788	2520	2868
DISPLACEMENT, in		0.45	0.45	0.45
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Undistubed
DESCRIPTION: CLAYSTONE (CH)

LL= 94 PL= 36 PI= 58
SPECIFIC GRAVITY= 2.65
REMARKS: Landslide Debris (Qls)
% fines = 99.5

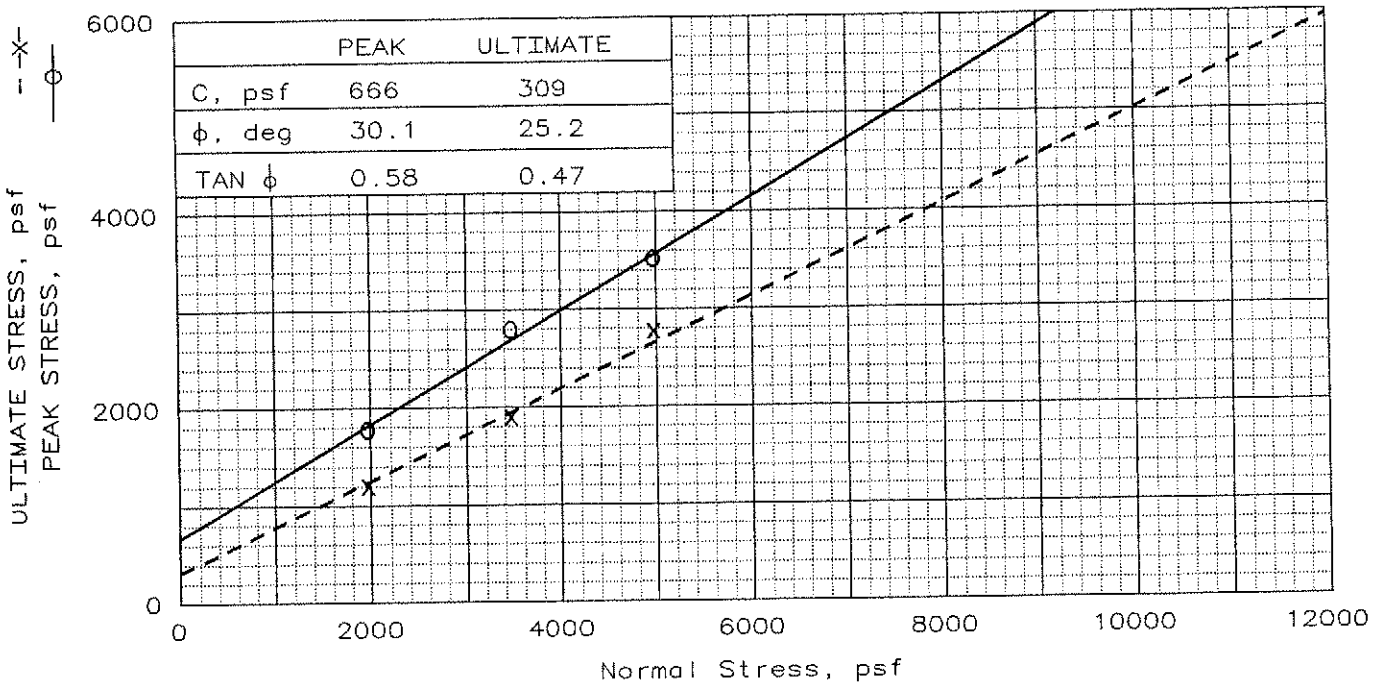
CLIENT: Newhall Ranch Co.

PROJECT: Mesas East - Phase II Landslide Investigation
SAMPLE LOCATION: B-10E @ 23 ft

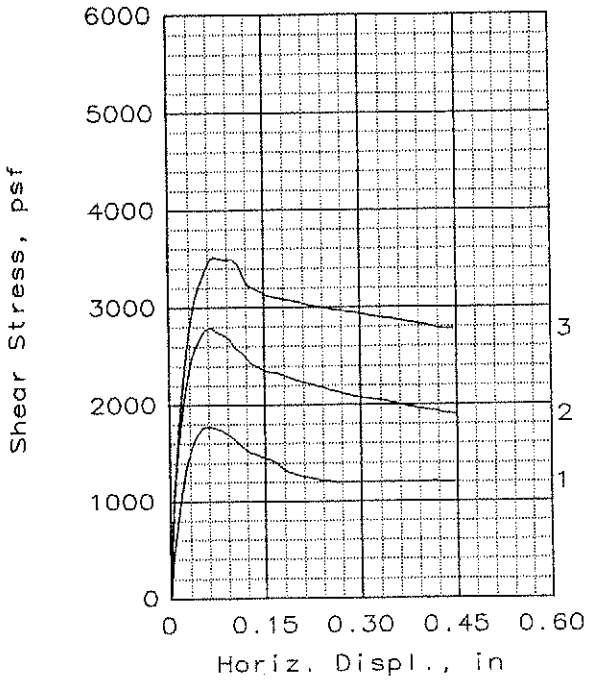
PROJ. NO.: 00-1703QlsII-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.

Fig. No.: B5.30



	PEAK	ULTIMATE
C, psf	666	309
ϕ, deg	30.1	25.2
TAN ϕ	0.58	0.47



	Sample No.:	1	2	3
INITIAL	WATER CONTENT, %	18.5	17.9	17.3
	DRY DENSITY, pcf	105.6	106.3	106.6
	SATURATION, %	86.6	85.5	83.0
	VOID RATIO	0.567	0.556	0.552
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	20.8	19.8	19.3
	DRY DENSITY, pcf	106.6	108.4	109.4
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.551	0.526	0.512
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.98	0.97
	NORMAL STRESS, psf	2000	3500	5000
	PEAK STRESS, psf	1776	2796	3516
	DISPLACEMENT, in	0.06	0.07	0.07
	ULTIMATE STRESS, psf	1200	1896	2772
	DISPLACEMENT, in	0.45	0.45	0.45
	Strain rate, in/min	0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed
DESCRIPTION: MUDSTONE with sand (CL)
LL= 42 PL= 23 PI= 19
SPECIFIC GRAVITY= 2.65
REMARKS: Landslide Debris (Qls)
% fines = 83.8

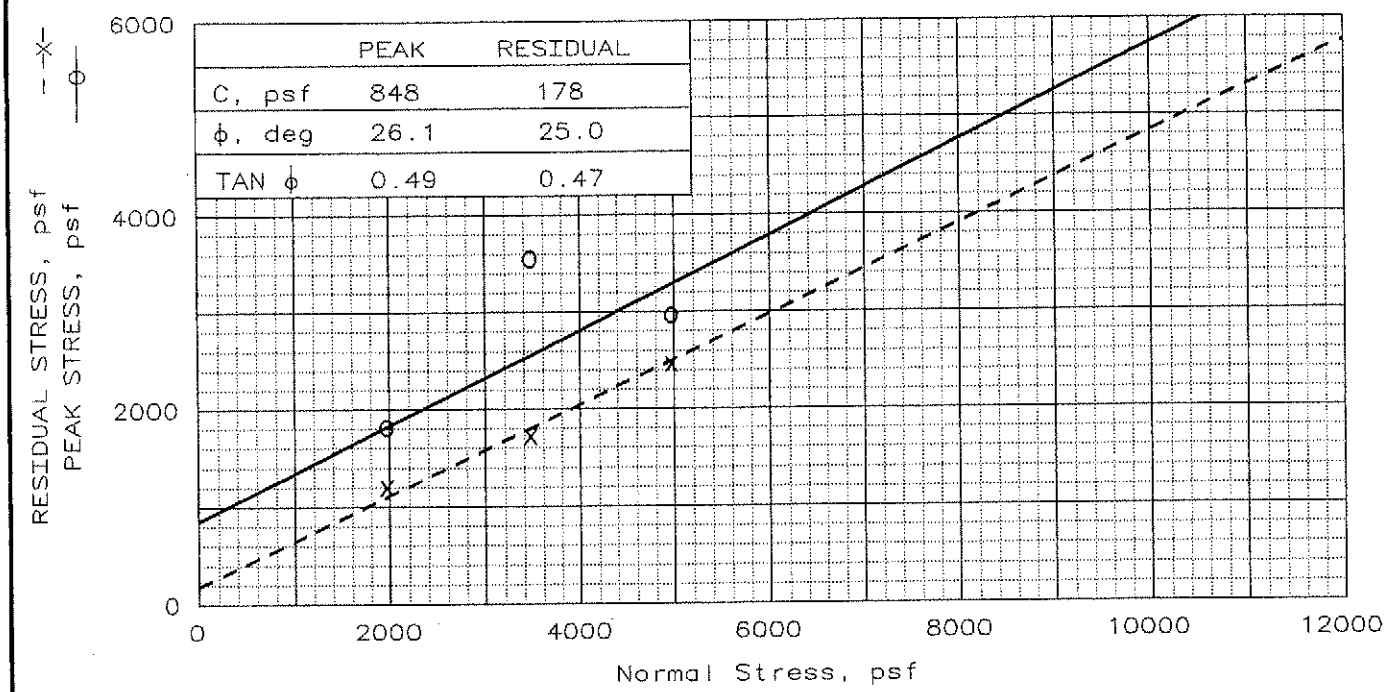
Fig. No.: B5.31

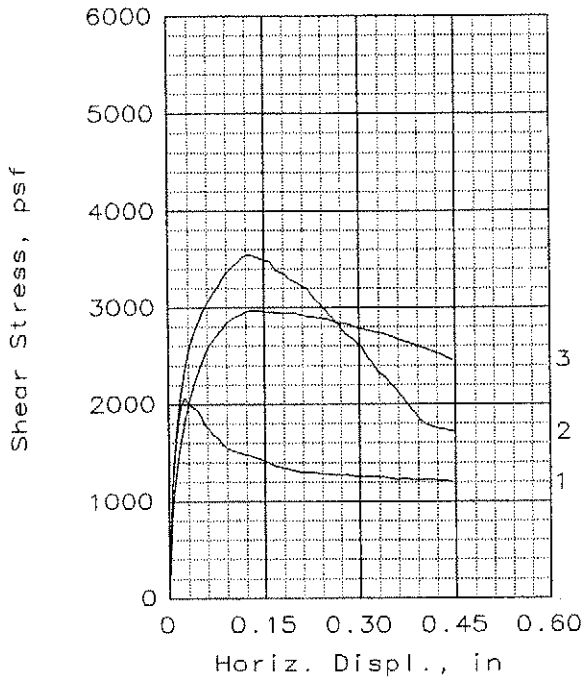
CLIENT: Newhall Ranch Co.

PROJECT: Mesas East - Phase II Landslide Investigation
SAMPLE LOCATION: B-14E @ 15 ft

PROJ. NO.: 99-17030lsII-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	14.5	16.0	15.2
	DRY DENSITY, pcf	108.7	105.2	105.2
	SATURATION, %	73.9	74.1	70.2
	VOID RATIO	0.522	0.573	0.573
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	19.7	21.6	21.6
	DRY DENSITY, pcf	108.7	105.2	105.2
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.522	0.573	0.573
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
NORMAL STRESS, psf		2000	3500	5000
PEAK STRESS, psf		1812	3552	2964
DISPLACEMENT, in		0.06	0.13	0.13
RESIDUAL STRESS, psf		1200	1716	2460
DISPLACEMENT, in		0.45	0.45	0.45
Strain rate, in/min		0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed
DESCRIPTION: MUDSTONE and SILTSTONE (CL-ML)
LL= 45 PL= 23 PI= 22
SPECIFIC GRAVITY= 2.65
REMARKS: Landslide Debris (Qls)
% fines = 87.2

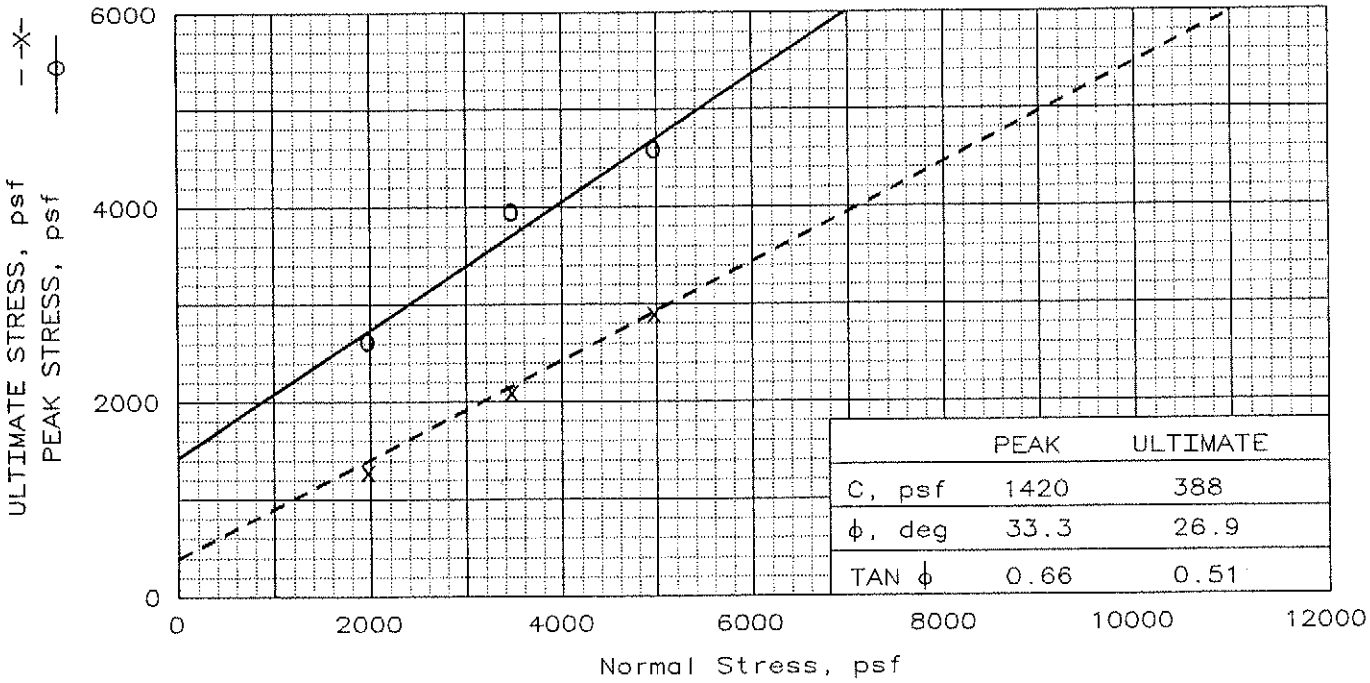
CLIENT: Newhall Ranch Co.

PROJECT: Mesas East - Phase II Landslide Investigation
SAMPLE LOCATION: B-19E @ 10 ft

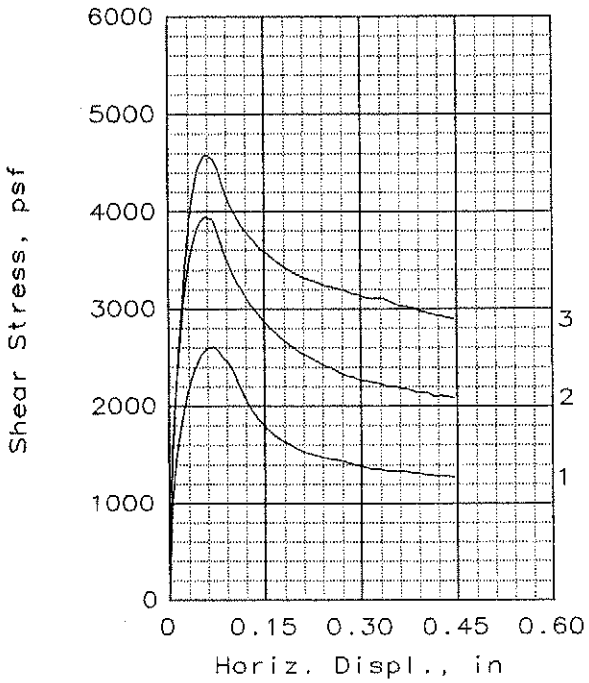
PROJ. NO.: 00-1703QLSII-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.

Fig. No.: B5.32



	PEAK	ULTIMATE
C, psf	1420	388
ϕ, deg	33.3	26.9
TAN ϕ	0.66	0.51



Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	12.7	10.6	15.2
	DRY DENSITY, pcf	121.6	122.0	117.0
	SATURATION, %	93.0	79.2	97.7
	VOID RATIO	0.361	0.356	0.413
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	13.6	12.8	15.1
	DRY DENSITY, pcf	121.7	123.6	118.3
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.360	0.338	0.399
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	0.99	0.99
NORMAL STRESS, psf		2000	3500	5000
PEAK STRESS, psf		2616	3948	4584
DISPLACEMENT, in		0.07	0.06	0.06
ULTIMATE STRESS, psf		1272	2088	2892
DISPLACEMENT, in		0.45	0.45	0.45
Strain rate, in/min		0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed
DESCRIPTION: Lean CLAYSTONE
with sand (CL)
LL= 34 PL= 19 PI= 15
SPECIFIC GRAVITY= 2.65
REMARKS: Landslide Debris (Qls)
% fines = 73.7

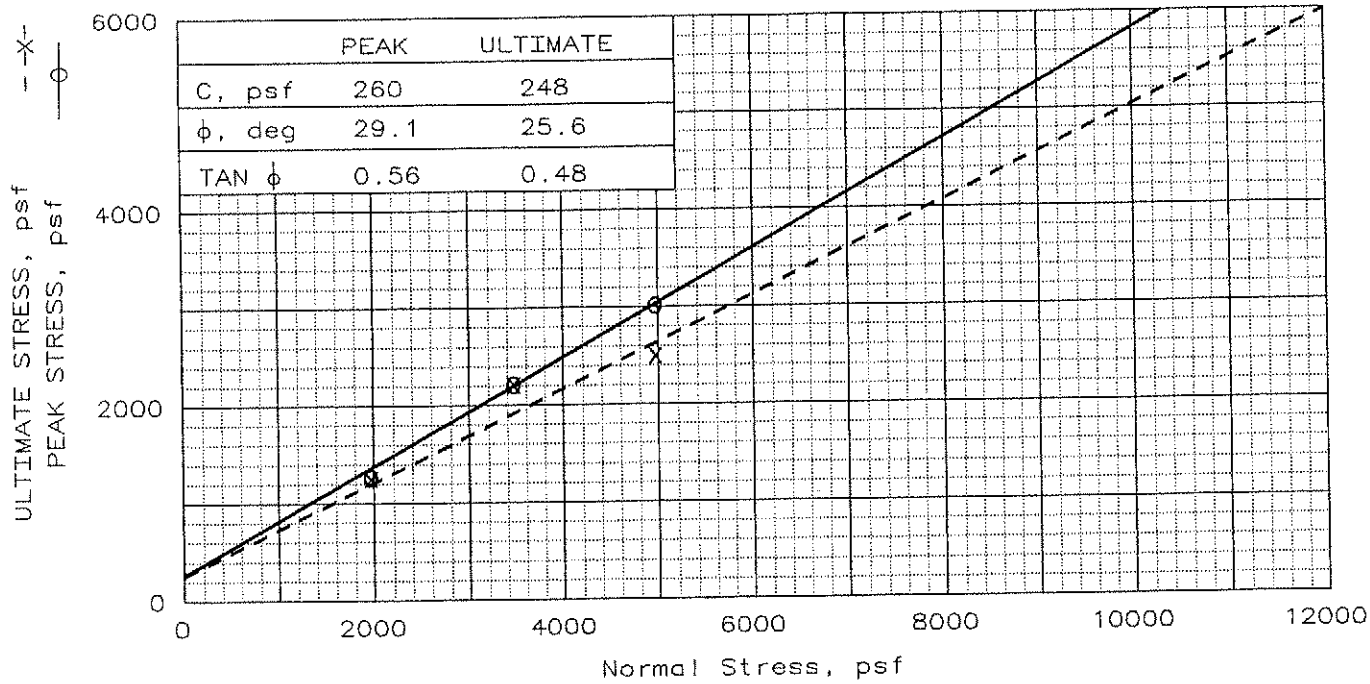
Fig. No.: B5.33

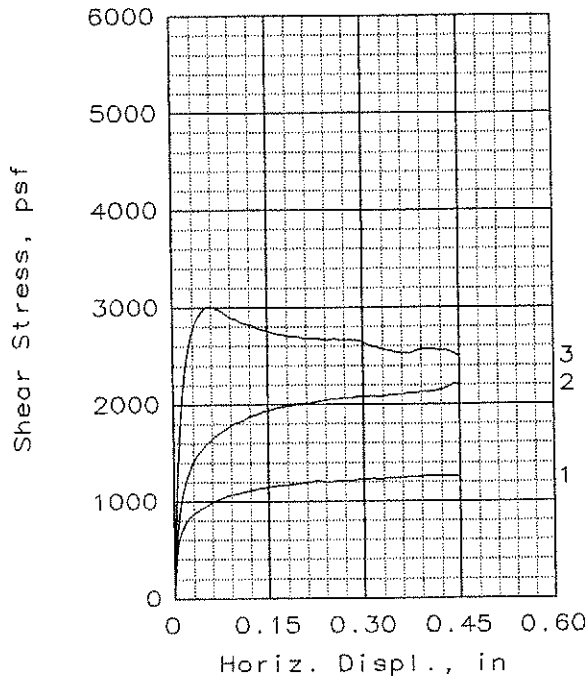
CLIENT: Newhall Ranch Co.

PROJECT: Mesas East - Phase II Landslide Investigation
SAMPLE LOCATION: B-32E @ 20 ft

PROJ. NO.: 00-1703QLSII-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	7.2	6.7	8.2
	DRY DENSITY, pcf	107.1	107.5	114.7
	SATURATION, %	35.0	32.9	49.3
	VOID RATIO	0.545	0.538	0.443
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	20.1	18.8	16.1
	DRY DENSITY, pcf	108.0	110.4	115.9
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.532	0.498	0.428
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.97	0.99
NORMAL STRESS, psf		2000	3500	5000
PEAK STRESS, psf		1260	2208	3012
DISPLACEMENT, in		0.40	0.44	0.06
ULTIMATE STRESS, psf		1248	2208	2496
DISPLACEMENT, in		0.45	0.45	0.45
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Undisturbed
DESCRIPTION: Sandy CLAYSTONE (CL)
LL= 38 PL= 21 PI= 17
SPECIFIC GRAVITY= 2.65
REMARKS: Landslide Debris (Qls)
% fines = 66.0

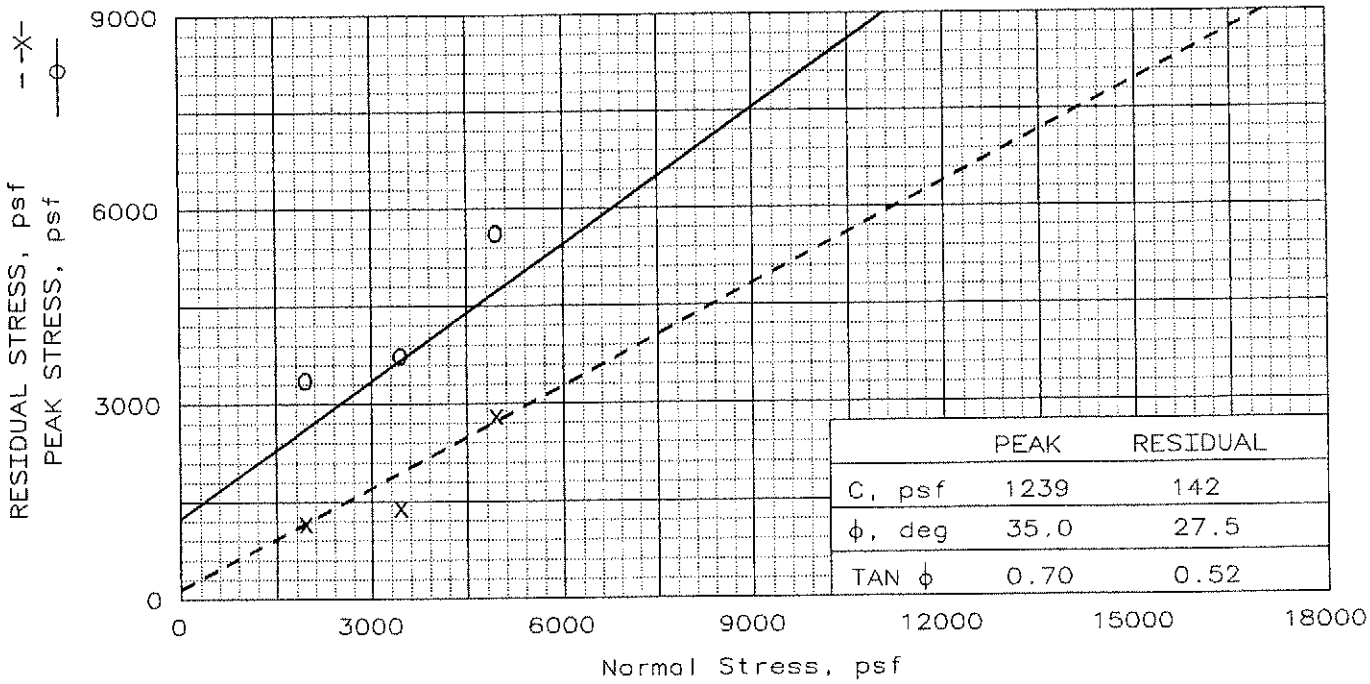
Fig. No.: B5.34

CLIENT: Newhall Ranch Co.

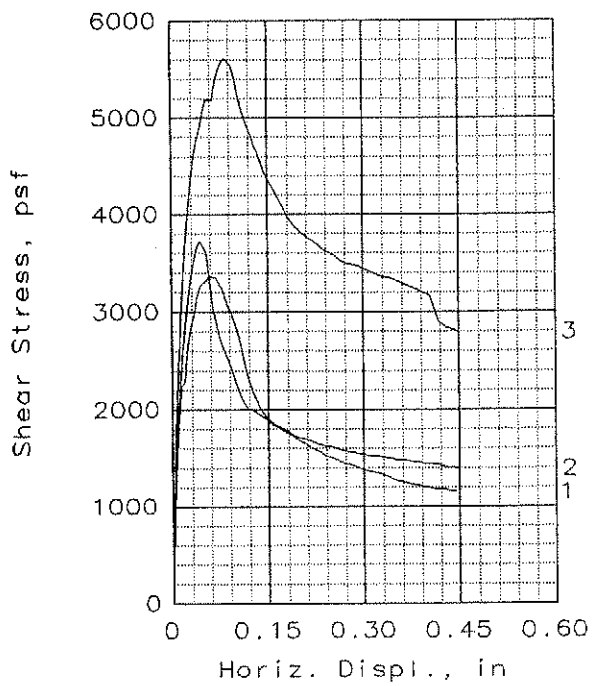
PROJECT: Mesas East - Phase II Landslide Investigation
SAMPLE LOCATION: B-35E @ 10 ft

PROJ. NO.: 00-1703QLSII-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.



	PEAK	RESIDUAL
C, psf	1239	142
ϕ, deg	35.0	27.5
TAN ϕ	0.70	0.52



	Sample No.:	1	2	3
INITIAL	WATER CONTENT, %	16.8	17.8	16.5
	DRY DENSITY, pcf	113.4	110.2	115.2
	SATURATION, %	97.1	93.9	100.0
	VOID RATIO	0.459	0.501	0.436
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	19.0	19.6	16.3
	DRY DENSITY, pcf	110.1	108.8	115.4
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.503	0.520	0.433
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.03	1.01	1.00
	NORMAL STRESS, psf	2000	3500	5000
	PEAK STRESS, psf	3360	3732	5615
	DISPLACEMENT, in	0.06	0.05	0.09
	RESIDUAL STRESS, psf	1152	1392	2796
	DISPLACEMENT, in	0.45	0.45	0.45
	Strain rate, in/min	0.0100	0.0100	0.0100

SAMPLE TYPE: Undisturbed
DESCRIPTION: MUDSTONE, sandy SILTSTONE and fat CLAY (CH)
LL= 56 PL= 25 PI= 31
SPECIFIC GRAVITY= 2.65
REMARKS: Landslide Debris (Qls)
% fines = 88.4

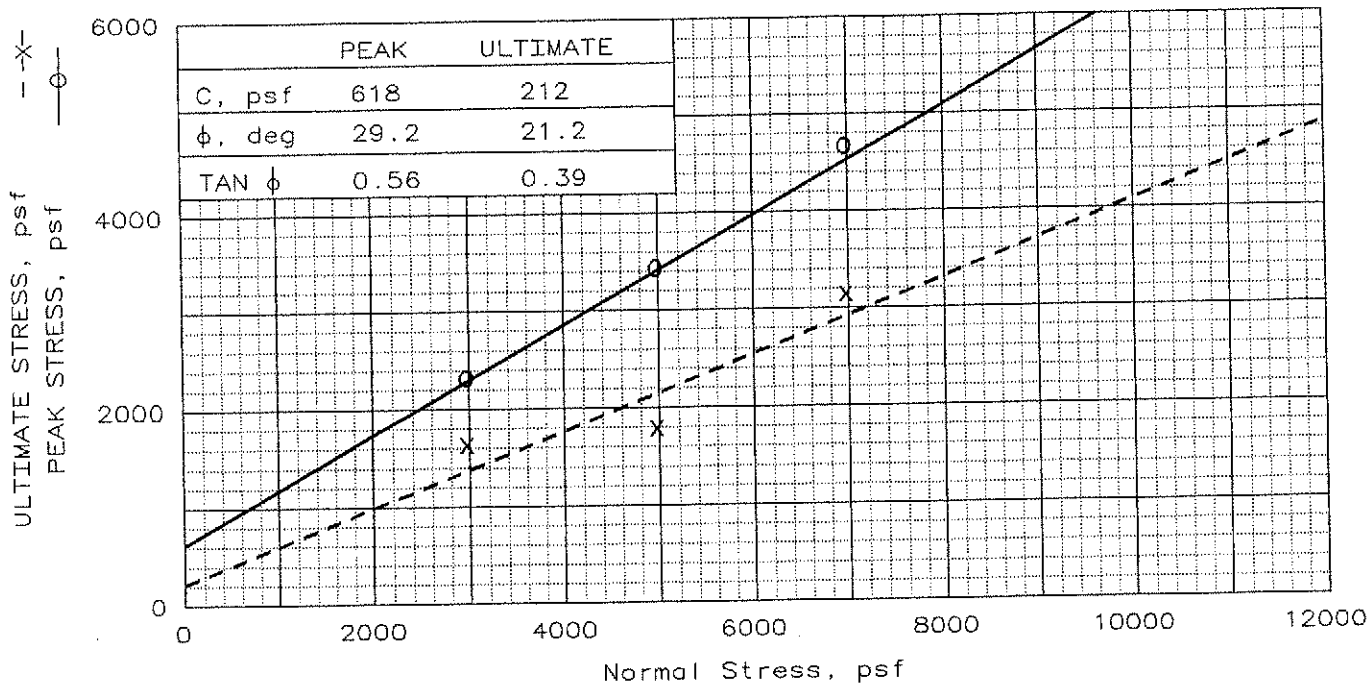
Fig. No.: B5.35

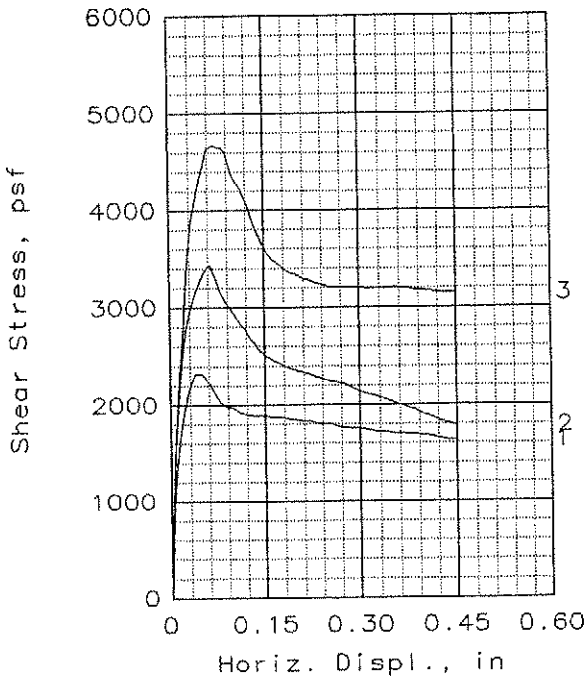
CLIENT: Newhall Ranch Co.

PROJECT: Mesas East - Phase II Landslide Investigation
SAMPLE LOCATION: B-43E @ 20 ft

PROJ. NO.: 00-1703QLSII-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	16.0	22.3	20.5
	DRY DENSITY, pcf	108.8	103.6	106.5
	SATURATION, %	81.4	99.0	98.3
	VOID RATIO	0.521	0.596	0.554
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	19.2	21.7	19.8
	DRY DENSITY, pcf	109.7	105.0	108.5
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.508	0.575	0.525
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.99	0.98
NORMAL STRESS, psf		3000	5000	7000
PEAK STRESS, psf		2316	3432	4668
DISPLACEMENT, in		0.04	0.07	0.07
ULTIMATE STRESS, psf		1632	1788	3144
DISPLACEMENT, in		0.45	0.45	0.45
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Undisturbed
DESCRIPTION: CLAYSTONE (CL)

LL= 43 PL= 24 PI= 19
SPECIFIC GRAVITY= 2.65
REMARKS: Landslide Debris (Qls)
% fines = 84.4

CLIENT: Newhall Ranch Co.

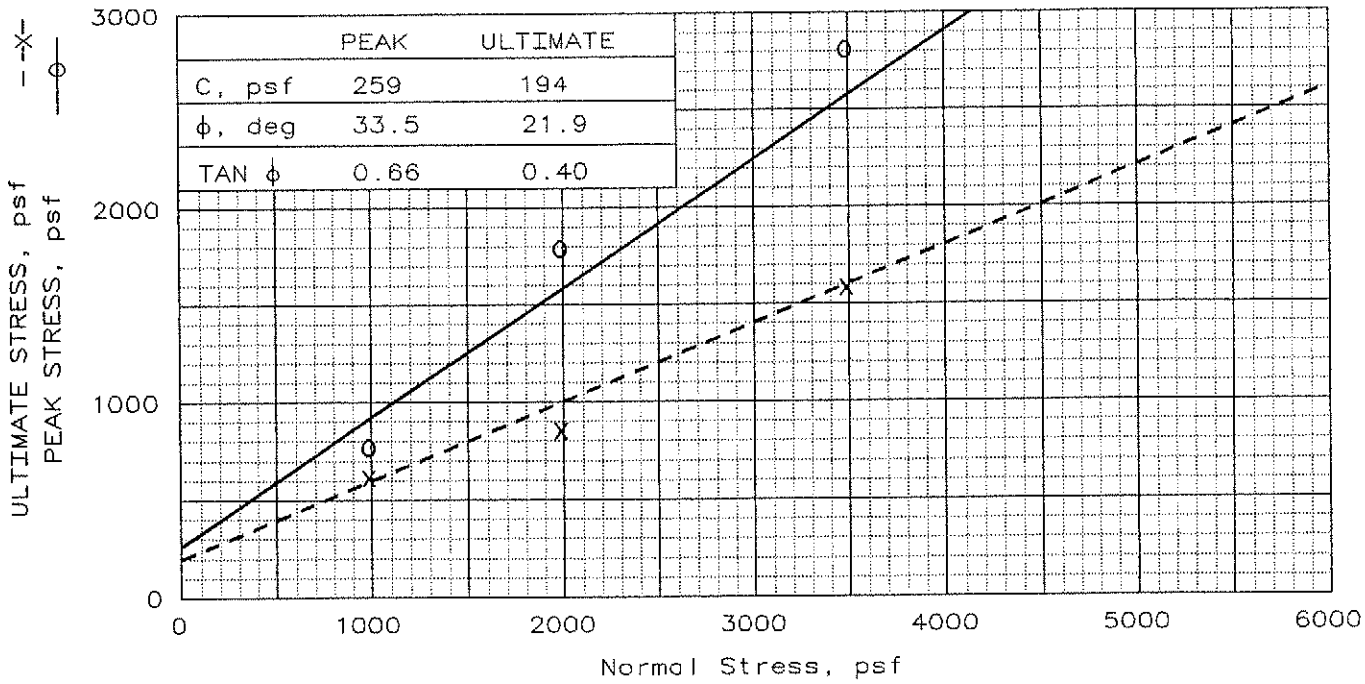
PROJECT: Newhall Ranch - Mesas East

SAMPLE LOCATION: B-56E @ 30 ft

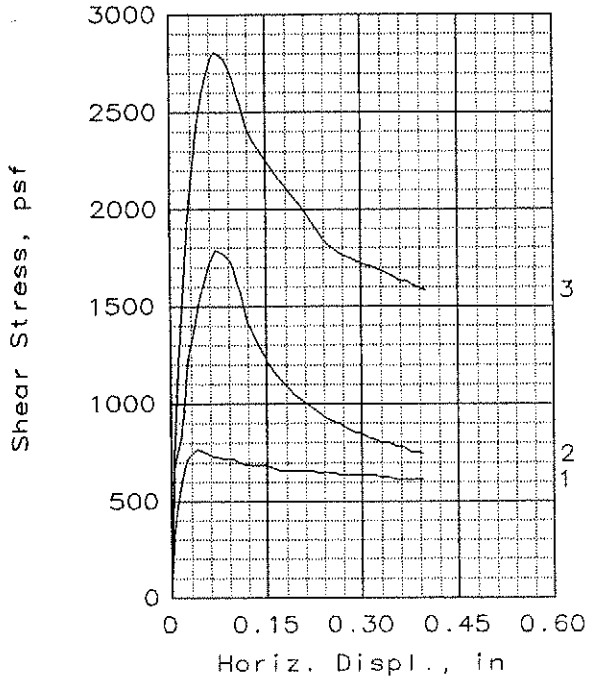
PROJ. NO.: 00-1703CM-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.

Fig. No.: B5.36



	PEAK	ULTIMATE
C, psf	259	194
ϕ, deg	33.5	21.9
TAN ϕ	0.66	0.40



	Sample No.:	1	2	3
INITIAL	WATER CONTENT, %	10.2	19.7	21.6
	DRY DENSITY, pcf	104.2	99.4	100.5
	SATURATION, %	46.0	78.7	88.5
	VOID RATIO	0.588	0.664	0.646
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	22.4	26.3	24.2
	DRY DENSITY, pcf	103.9	97.5	100.8
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.593	0.697	0.641
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.02	1.00
	NORMAL STRESS, psf	1000	2000	3500
	PEAK STRESS, psf	768	1788	2808
	DISPLACEMENT, in	0.04	0.07	0.07
	ULTIMATE STRESS, psf	612	852	1584
	DISPLACEMENT, in	0.40	0.30	0.40
	Strain rate, in/min	0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed
DESCRIPTION: SILTSTONE with sand (ML)

SPECIFIC GRAVITY= 2.65
REMARKS: Landslide Debris (Qls)
% fines = 83.4

Fig. No.: B5.37

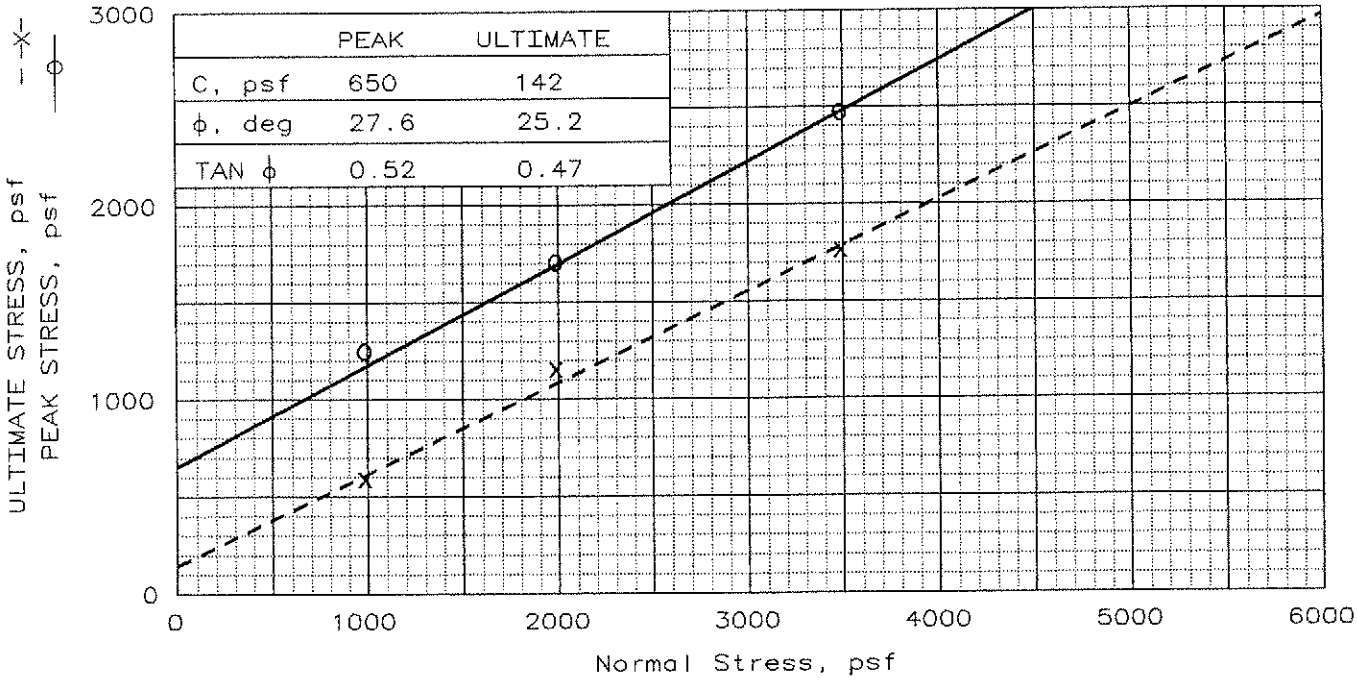
CLIENT: Newhall Ranch Co.

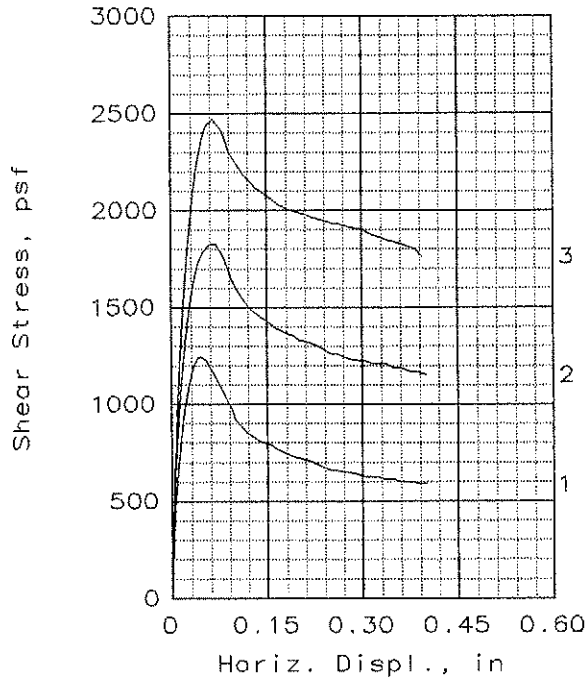
PROJECT: Mesas Entertainment

SAMPLE LOCATION: B-6M @ 15 ft

PROJ. NO.: 01-1703M-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	15.9	18.1	17.3
	DRY DENSITY, pcf	108.4	106.2	106.9
	SATURATION, %	80.1	85.9	83.6
	VOID RATIO	0.526	0.557	0.547
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	19.6	20.1	19.4
	DRY DENSITY, pcf	108.9	107.9	109.2
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.519	0.534	0.515
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	0.98	0.98
NORMAL STRESS, psf		1000	2000	3500
PEAK STRESS, psf		1248	1704	2472
DISPLACEMENT, in		0.05	0.04	0.07
ULTIMATE STRESS, psf		588	1152	1764
DISPLACEMENT, in		0.40	0.40	0.40
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Undisturbed
DESCRIPTION: Silty SANDSTONE with pebbles (SM)

SPECIFIC GRAVITY= 2.65
REMARKS: Landslide Debris (Qls)

CLIENT: Newhall Ranch Co.

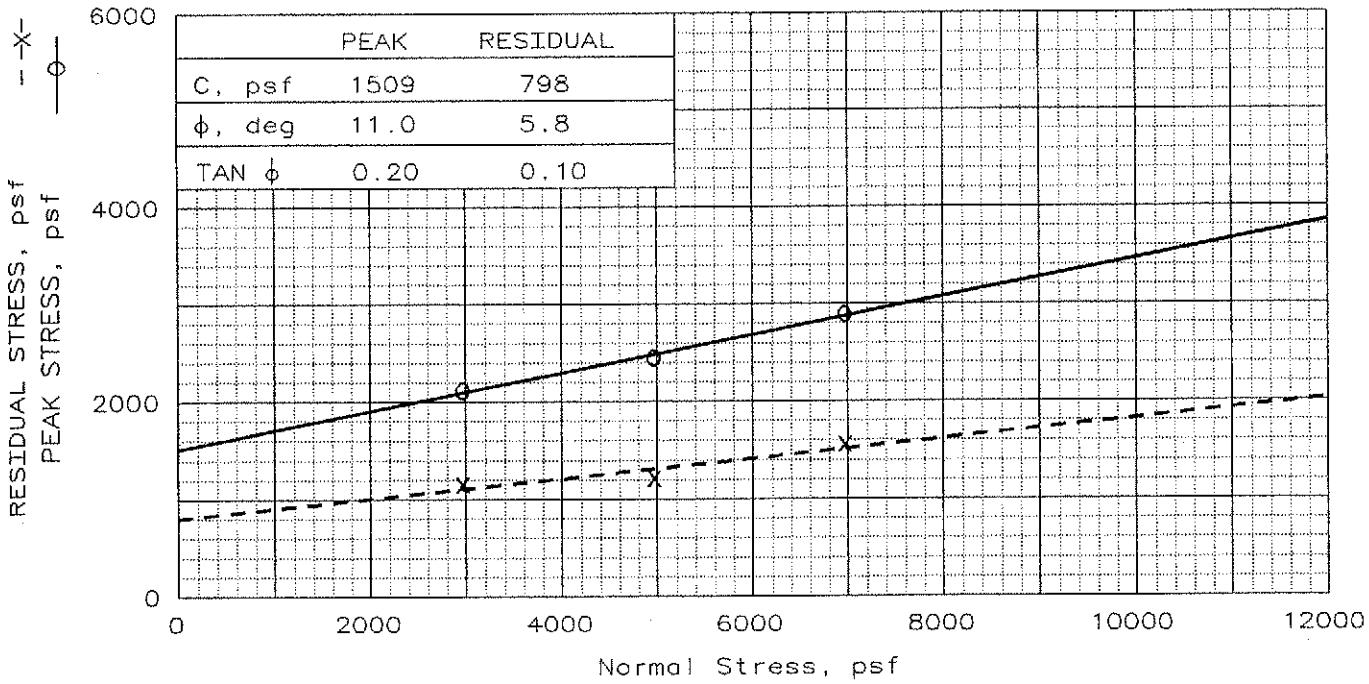
PROJECT: Mesas Entertainment

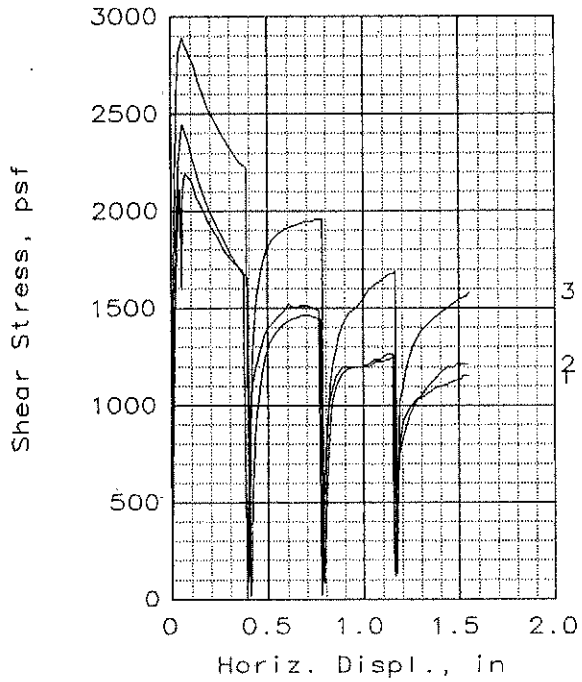
SAMPLE LOCATION: B-8M @ 15 ft

PROJ. NO.: 01-1703M-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.

Fig. No.: B5.38





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	21.0	22.0	22.2
	DRY DENSITY, pcf	102.8	101.7	101.9
	SATURATION, %	91.3	92.9	94.2
	VOID RATIO	0.609	0.627	0.624
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	22.7	22.6	22.1
	DRY DENSITY, pcf	103.4	103.4	104.4
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.601	0.599	0.585
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	0.98	0.98
NORMAL STRESS, psf		3000	5000	7000
PEAK STRESS, psf		2112	2448	2892
DISPLACEMENT, in		0.05	0.06	0.06
RESIDUAL STRESS, psf		1152	1212	1560
DISPLACEMENT, in		1.55	1.55	1.54
Strain rate, in/min		0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed
DESCRIPTION: Moderate brown fat CLAY (CH)
LL= 71 PL= 25 PI= 46
SPECIFIC GRAVITY= 2.65
REMARKS: Basal slide plane (Sp)
Hand-driven rings

Fig. No.: B5.39

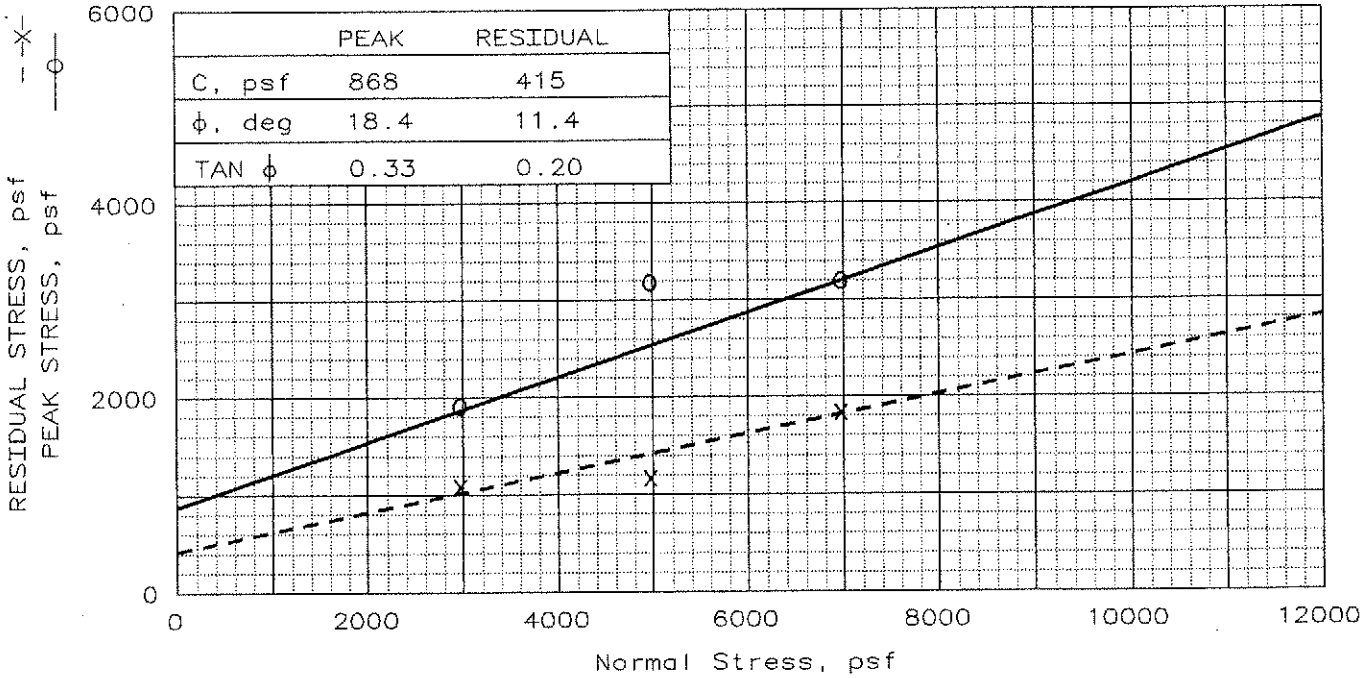
CLIENT: Newhall Ranch Co.

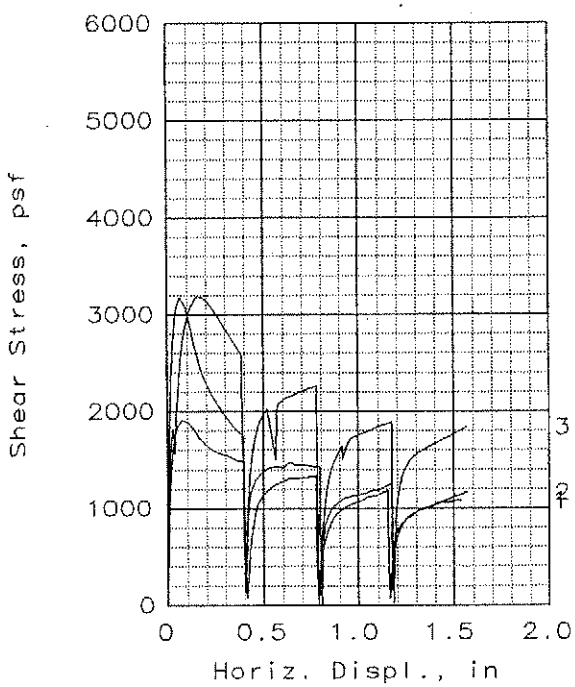
PROJECT: Mesas Entertainment

SAMPLE LOCATION: B-4M @ 15.5 ft

PROJ. NO.: 01-1703M-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	26.4	30.2	29.6
	DRY DENSITY, pcf	97.3	89.2	89.8
	SATURATION, %	100.0	93.5	93.2
	VOID RATIO	0.700	0.855	0.842
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	26.8	31.7	30.3
	DRY DENSITY, pcf	96.7	89.9	91.7
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.711	0.840	0.804
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.01	0.99	0.98
NORMAL STRESS, psf		3000	5000	7000
PEAK STRESS, psf		1908	3180	3192
DISPLACEMENT, in		0.08	0.07	0.16
RESIDUAL STRESS, psf		1080	1164	1836
DISPLACEMENT, in		1.54	1.57	1.57
Strain rate, in/min		0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed
DESCRIPTION: Dark-yellowish-brown to olive-gray fat CLAY
LL= 87 PL= 34 PI= 53
SPECIFIC GRAVITY= 2.65
REMARKS: Slide plane (Sp)
Hand-driven rings

CLIENT: Newhall Ranch Co.

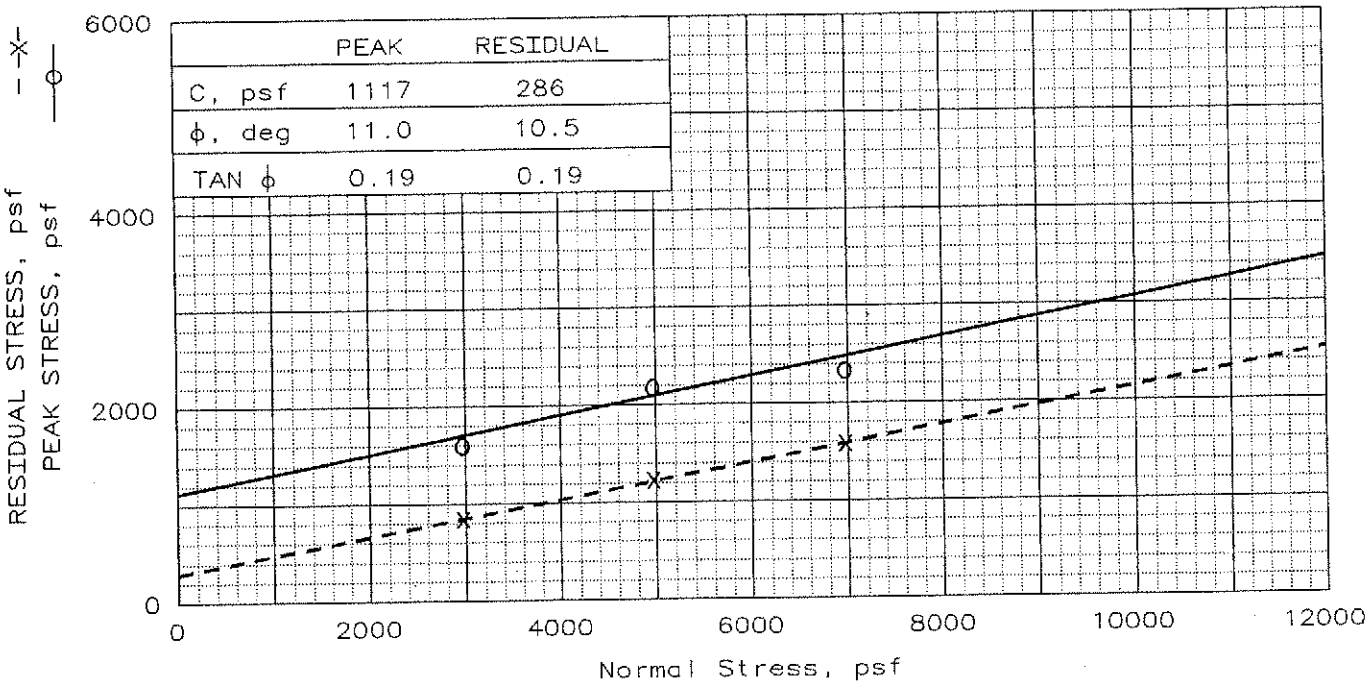
PROJECT: Mesas Entertainment

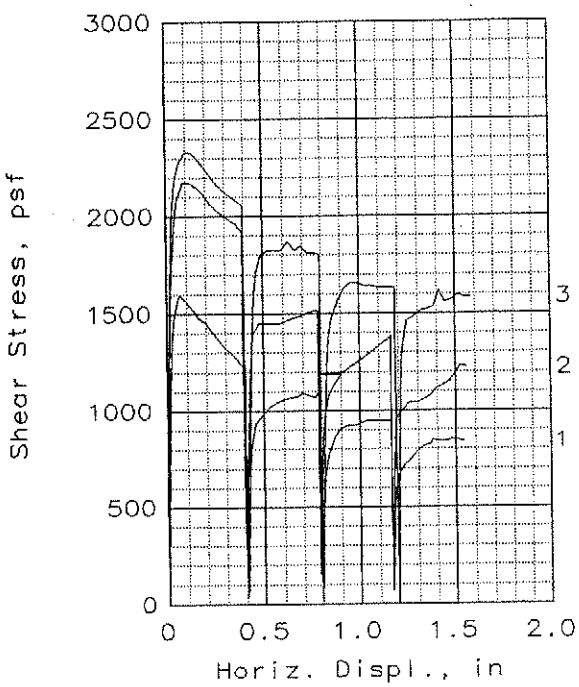
SAMPLE LOCATION: B-6M @ 28 ft

PROJ. NO.: 01-1703M-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.

Fig. No.: B5.40





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	23.8	23.8	22.3
	DRY DENSITY, pcf	101.0	101.4	103.5
	SATURATION, %	99.0	100.0	98.6
	VOID RATIO	0.638	0.631	0.599
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	23.5	22.8	21.1
	DRY DENSITY, pcf	101.9	103.1	106.1
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.623	0.604	0.559
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.98	0.98
NORMAL STRESS, psf		3000	5000	7000
PEAK STRESS, psf		1596	2172	2328
DISPLACEMENT, in		0.07	0.09	0.10
RESIDUAL STRESS, psf		840	1224	1584
DISPLACEMENT, in		1.54	1.56	1.58
Strain rate, in/min		0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed
DESCRIPTION: Moderate-brown fat CLAY (CH)
LL= 62 PL= 26 PI= 36
SPECIFIC GRAVITY= 2.65
REMARKS: Slide plane (Sp)
Hand-driven rings

CLIENT: Newhall Ranch Co.

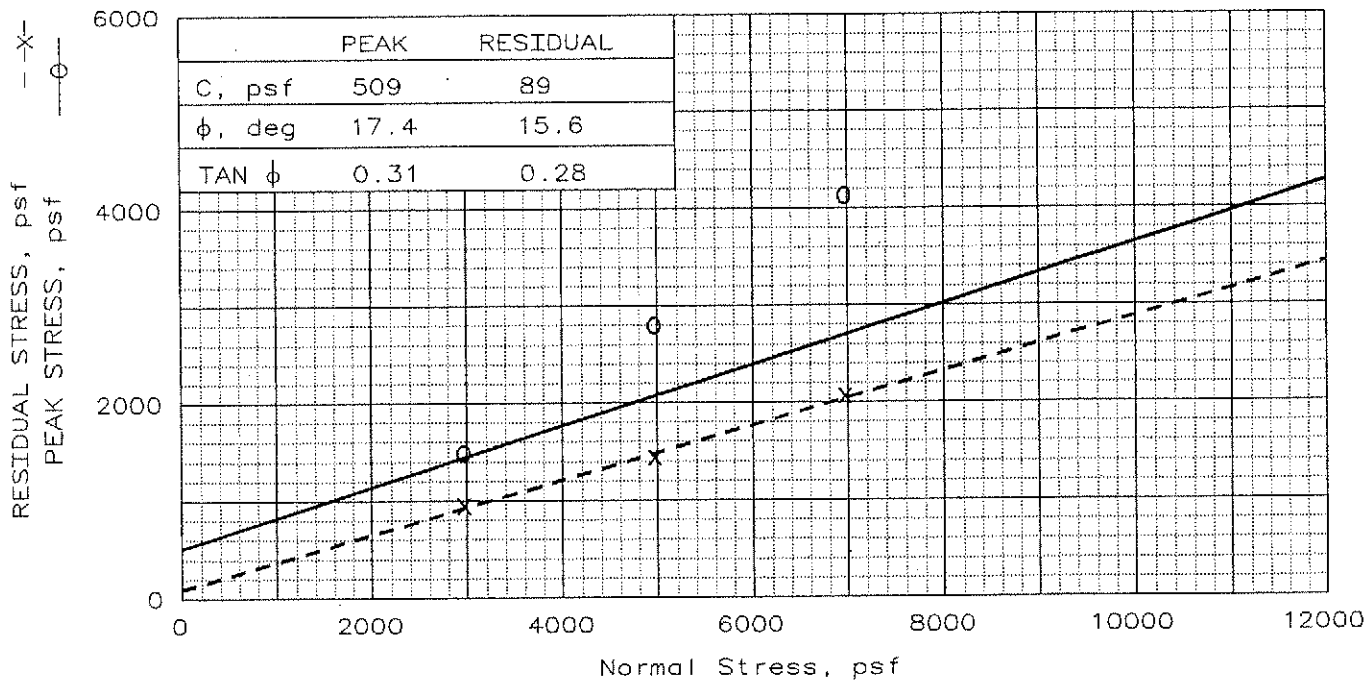
PROJECT: Mesas Entertainment

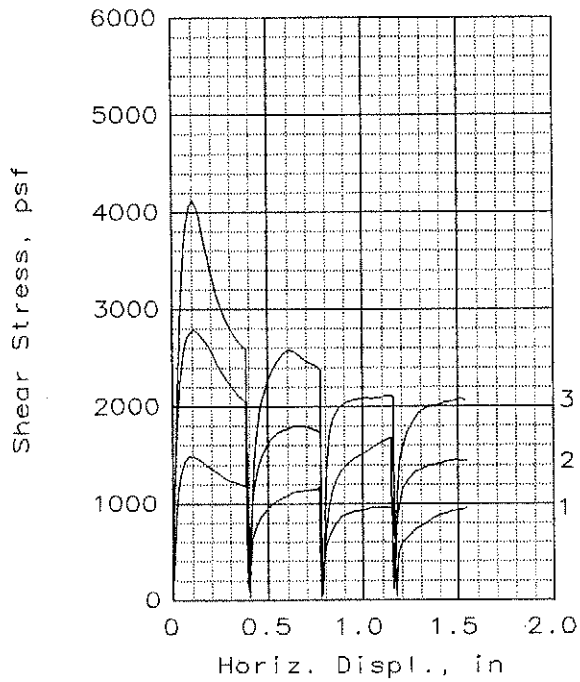
SAMPLE LOCATION: B-16M @ 34.5 ft

PROJ. NO.: 01-1703M-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.

Fig. No.: B5.41





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	24.4	26.4	25.9
	DRY DENSITY, pcf	98.1	96.6	97.4
	SATURATION, %	94.3	98.4	98.3
	VOID RATIO	0.687	0.712	0.698
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	25.2	25.5	24.5
	DRY DENSITY, pcf	99.1	98.7	100.3
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.669	0.676	0.650
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.98	0.97
NORMAL STRESS, psf		3000	5000	7000
PEAK STRESS, psf		1488	2796	4128
DISPLACEMENT, in		0.09	0.11	0.11
RESIDUAL STRESS, psf		948	1440	2064
DISPLACEMENT, in		1.54	1.55	1.54
Strain rate, in/min		0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed
DESCRIPTION: Fat CLAY with silt (CH)

SPECIFIC GRAVITY= 2.65
REMARKS: Slide plane (Sp)
Hand-driven rings

Fig. No.: B5.42

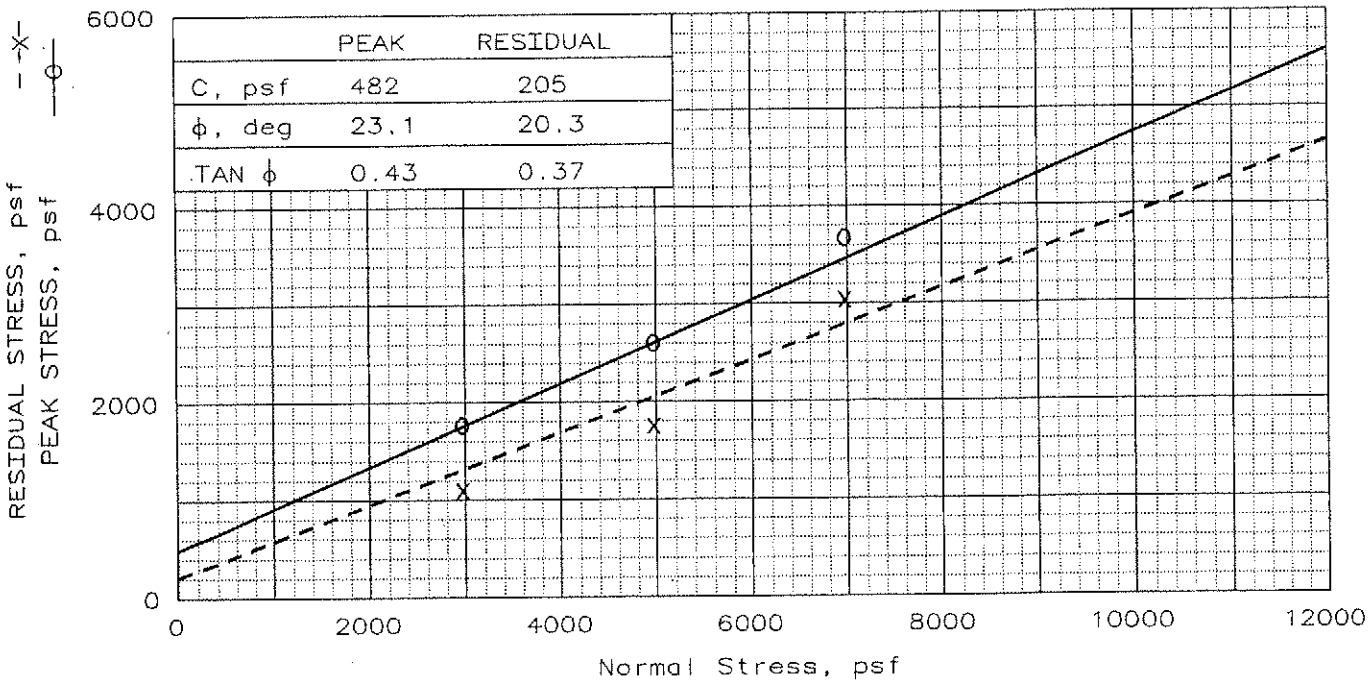
CLIENT: Newhall Ranch Co.

PROJECT: Mesas Entertainment

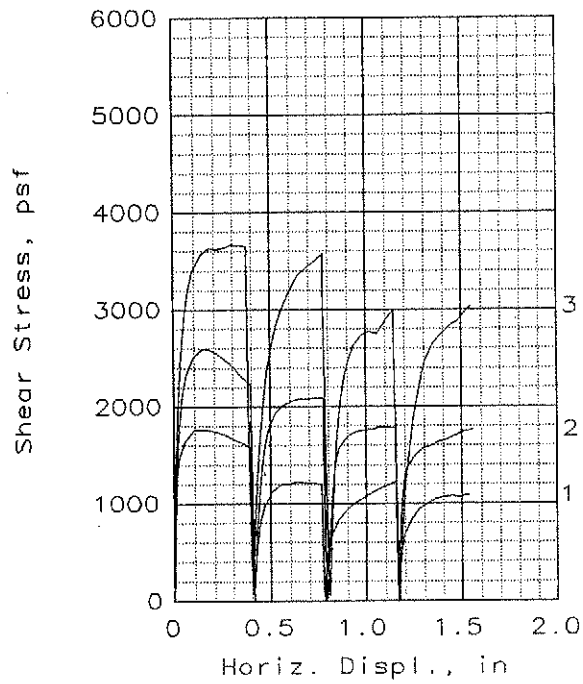
SAMPLE LOCATION: B-19M @ 34' ft

PROJ. NO.: 01-1703M-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.



	PEAK	RESIDUAL
C, psf	482	205
ϕ, deg	23.1	20.3
TAN ϕ	0.43	0.37



Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	24.9	21.1	20.0
	DRY DENSITY, pcf	99.2	101.6	103.7
	SATURATION, %	98.9	88.8	89.0
	VOID RATIO	0.667	0.629	0.596
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	25.2	23.7	20.6
	DRY DENSITY, pcf	99.2	101.6	107.1
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.667	0.629	0.545
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	0.97
NORMAL STRESS, psf		3000	5000	7000
PEAK STRESS, psf		1764	2604	3672
DISPLACEMENT, in		0.11	0.15	0.30
RESIDUAL STRESS, psf		1092	1752	3036
DISPLACEMENT, in		1.54	1.55	1.55
Strain rate, in/min		0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed
DESCRIPTION: Olive-gray fat CLAY (CH)

SPECIFIC GRAVITY= 2.65
REMARKS: Basal slide plane (Sp)
Hand-driven rings
% fines = 98

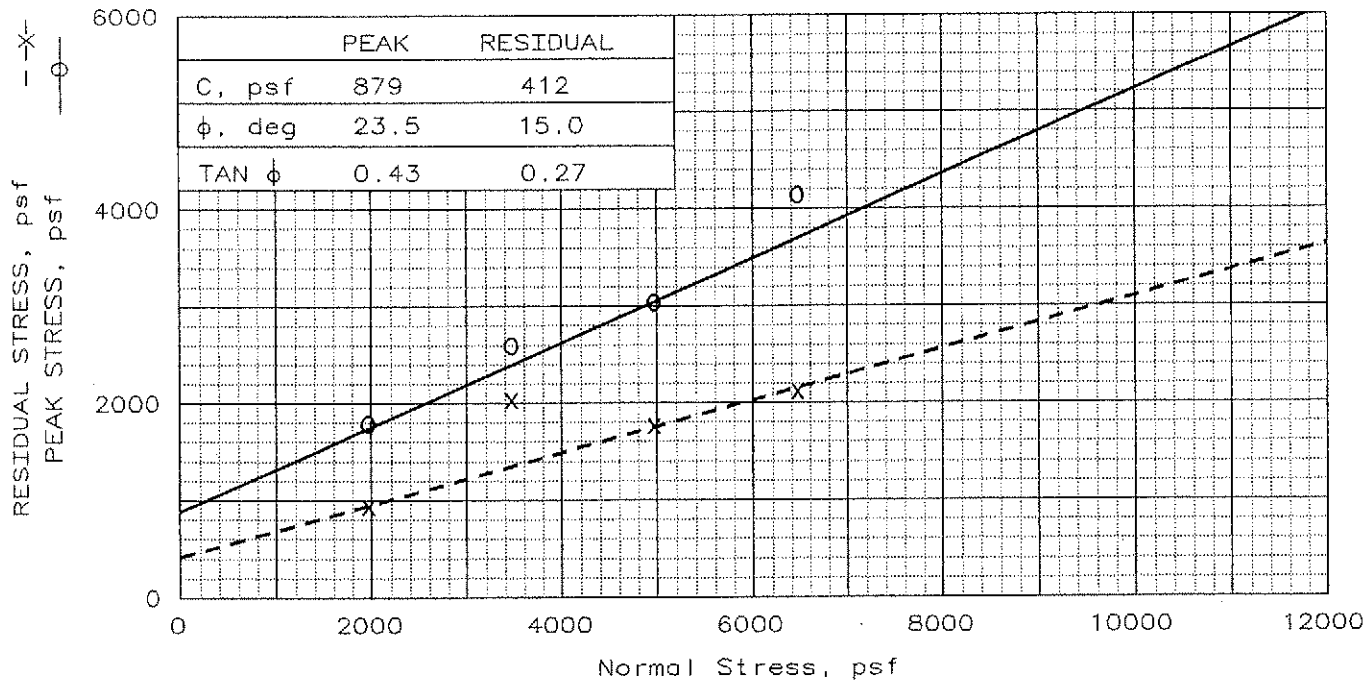
Fig. No.: B5.43

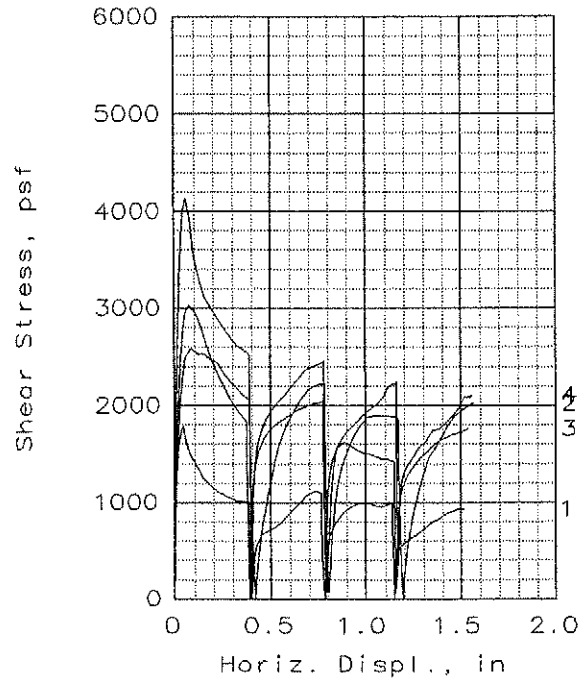
CLIENT: Newhall Ranch Co.

PROJECT: Mesas East - Phase II Landslide Investigation
SAMPLE LOCATION: B-10E @ 29 ft

PROJ. NO.: 00-17030lsII-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.





Sample No.:		1	2	3	4
INITIAL	WATER CONTENT, %	22.3	19.9	23.1	18.5
	DRY DENSITY, pcf	99.4	102.9	99.6	107.3
	SATURATION, %	89.0	86.8	92.8	90.7
	VOID RATIO	0.664	0.607	0.661	0.542
	DIAMETER, in	2.42	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	25.0	22.9	24.9	20.4
	DRY DENSITY, pcf	99.4	102.9	99.6	107.3
	SATURATION, %	100.0	100.0	100.0	100.0
	VOID RATIO	0.664	0.607	0.661	0.542
	DIAMETER, in	2.42	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00	1.00
NORMAL STRESS, psf		2000	3500	5000	6500
PEAK STRESS, psf		1788	2592	3036	4140
DISPLACEMENT, in		0.05	0.09	0.08	0.06
RESIDUAL STRESS, psf		936	2028	1764	2112
DISPLACEMENT, in		1.52	1.57	1.54	1.56
Strain rate, in/min		0.0050	0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed
DESCRIPTION: Moderate-brown fat CLAY (CH)
LL= 57 PL= 27 PI= 30
SPECIFIC GRAVITY= 2.65
REMARKS: Basal slide plane
Hand-driven rings
% fines = 86.6

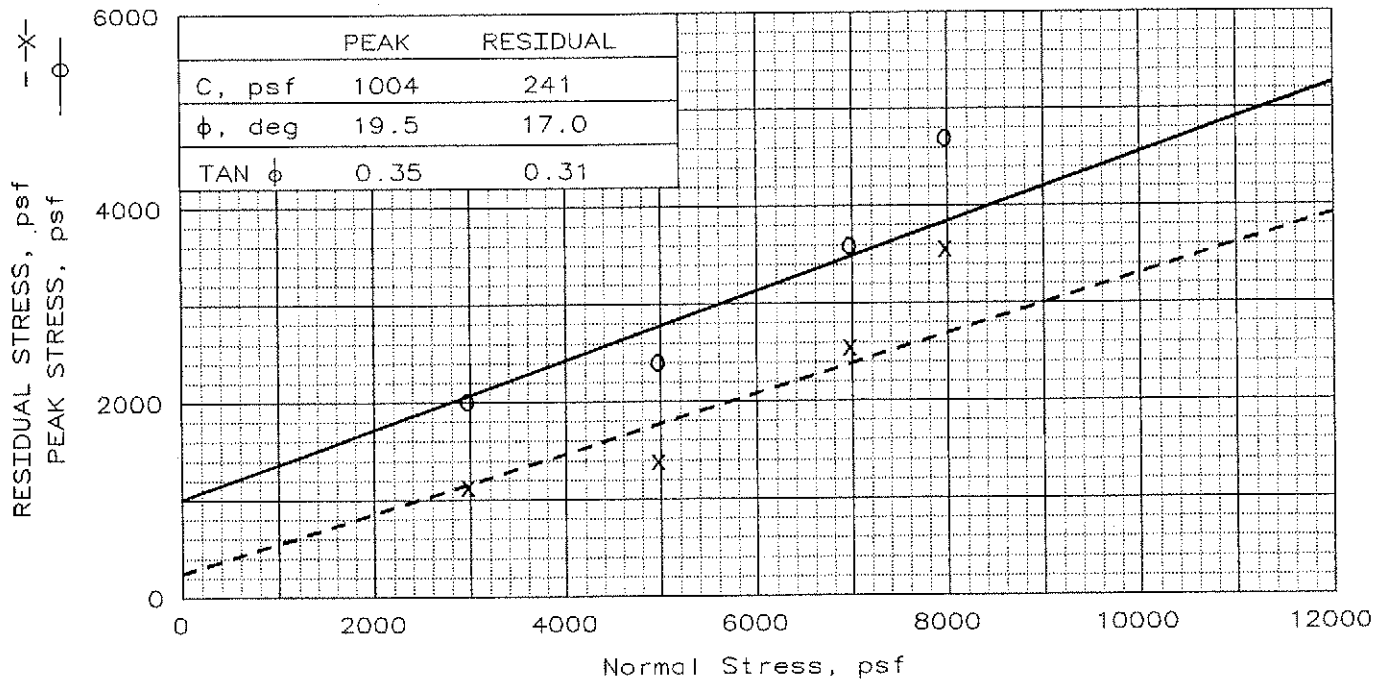
Fig. No.: B5.44

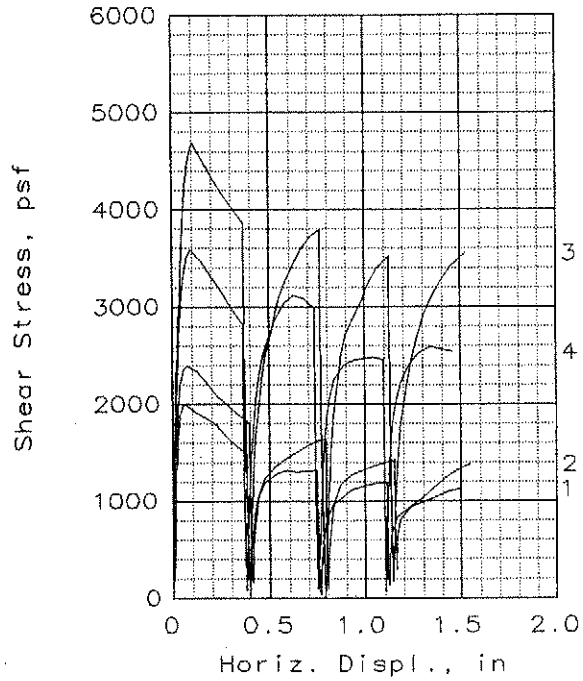
CLIENT: Newhall Ranch Co.

PROJECT: Mesas East - Phase II Landslide Investigation
SAMPLE LOCATION: B-12E @ 20.5 ft

PROJ. NO.: 00-1703QlsII-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.





Sample No.:		1	2	3	4
INITIAL	WATER CONTENT, %	24.2	22.8	20.5	23.2
	DRY DENSITY, pcf	99.7	101.5	103.5	99.8
	SATURATION, %	97.1	95.7	90.8	93.6
	VOID RATIO	0.660	0.630	0.598	0.658
	DIAMETER, in	2.42	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	24.9	23.8	22.6	23.1
	DRY DENSITY, pcf	99.7	101.5	103.5	102.5
	SATURATION, %	100.0	100.0	100.0	100.0
	VOID RATIO	0.660	0.630	0.598	0.613
	DIAMETER, in	2.42	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00	0.97
NORMAL STRESS, psf		3000	5000	8000	7000
PEAK STRESS, psf		2004	2400	4692	3588
DISPLACEMENT, in		0.06	0.08	0.11	0.10
RESIDUAL STRESS, psf		1128	1380	3552	2544
DISPLACEMENT, in		1.50	1.55	1.53	1.46
Strain rate, in/min		0.0050	0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed
DESCRIPTION: Moderate-brown fat CLAY (CH)

SPECIFIC GRAVITY= 2.65
REMARKS: Basal slide plane
Hand-driven rings
% fines = 96.4

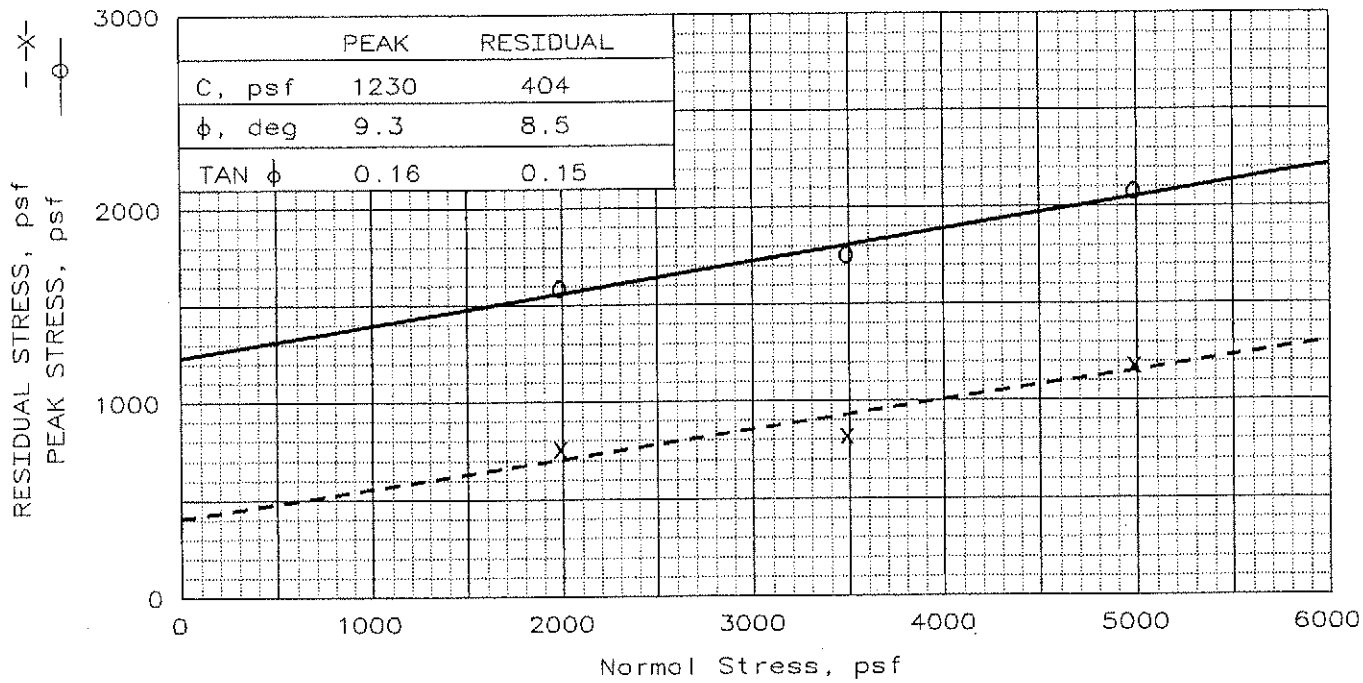
Fig. No.: B5.45

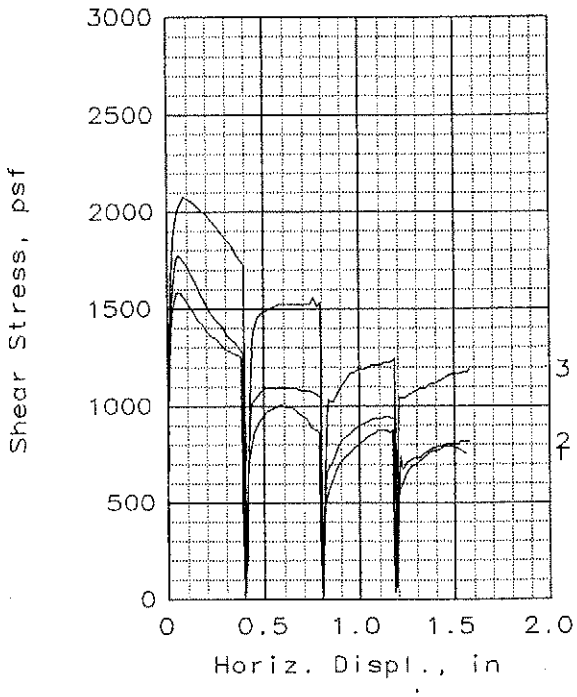
CLIENT: Newhall Ranch Co.

PROJECT: Mesas East - Phase II Landslide Investigation
SAMPLE LOCATION: B-16E @ 14.5 ft

PROJ. NO.: 00-1703-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	30.8	30.3	24.4
	DRY DENSITY, pcf	89.2	90.1	96.3
	SATURATION, %	95.6	95.9	90.1
	VOID RATIO	0.855	0.837	0.718
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	33.1	31.6	17.1
	DRY DENSITY, pcf	88.2	90.0	113.8
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.877	0.838	0.454
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.01	1.00	0.85
NORMAL STRESS, psf		2000	3500	5000
PEAK STRESS, psf		1584	1752	2076
DISPLACEMENT, in		0.05	0.05	0.09
RESIDUAL STRESS, psf		756	816	1176
DISPLACEMENT, in		1.56	1.58	1.57
Strain rate, in/min		0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed
DESCRIPTION: Moderate-brown fat CLAY (CH)
LL= 70 PL= 28 PI= 42
SPECIFIC GRAVITY= 2.65
REMARKS: Slide plane (Sp)
Hand-driven rings
% fines = 96.1

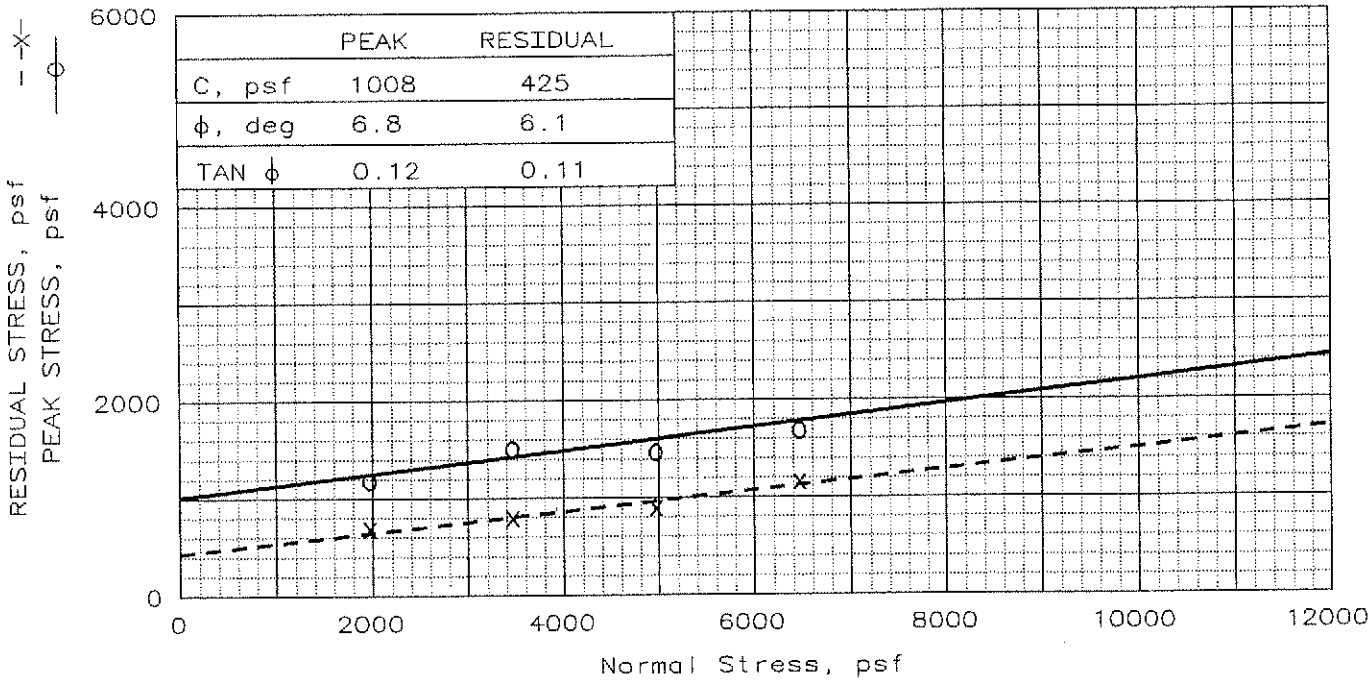
Fig. No.: 85.46

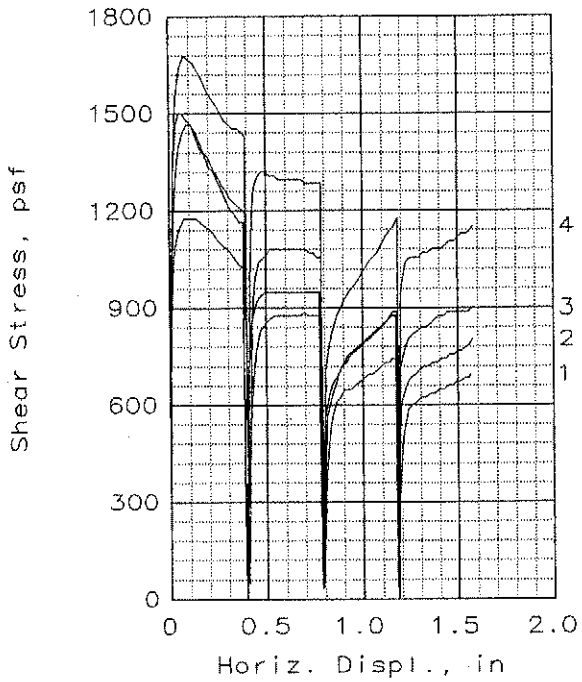
CLIENT: Newhall Ranch Co.

PROJECT: Mesas East - Phase II Landslide Investigation
SAMPLE LOCATION: B-19E @ 21 ft

PROJ. NO.: 99-1703QlsII-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.





Sample No.:		1	2	3	4
INITIAL	WATER CONTENT, %	27.6	28.0	31.0	28.8
	DRY DENSITY, pcf	94.1	94.3	90.8	93.8
	SATURATION, %	96.6	98.4	99.9	99.9
	VOID RATIO	0.757	0.754	0.822	0.764
	DIAMETER, in	2.42	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	28.6	28.5	31.0	26.7
	DRY DENSITY, pcf	94.1	94.3	90.8	96.9
	SATURATION, %	100.0	100.0	100.0	100.0
	VOID RATIO	0.757	0.754	0.822	0.707
	DIAMETER, in	2.42	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00	0.97
NORMAL STRESS, psf		2000	3500	5000	6500
PEAK STRESS, psf		1176	1500	1464	1680
DISPLACEMENT, in		0.08	0.05	0.09	0.08
RESIDUAL STRESS, psf		684	792	888	1152
DISPLACEMENT, in		1.56	1.57	1.56	1.58
Strain rate, in/min		0.0050	0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed
DESCRIPTION: Moderate reddish-brown fat CLAY (CH)

SPECIFIC GRAVITY= 2.65
REMARKS: Basal slide plane (Sp)
Hand-driven rings
% fines = 99.0

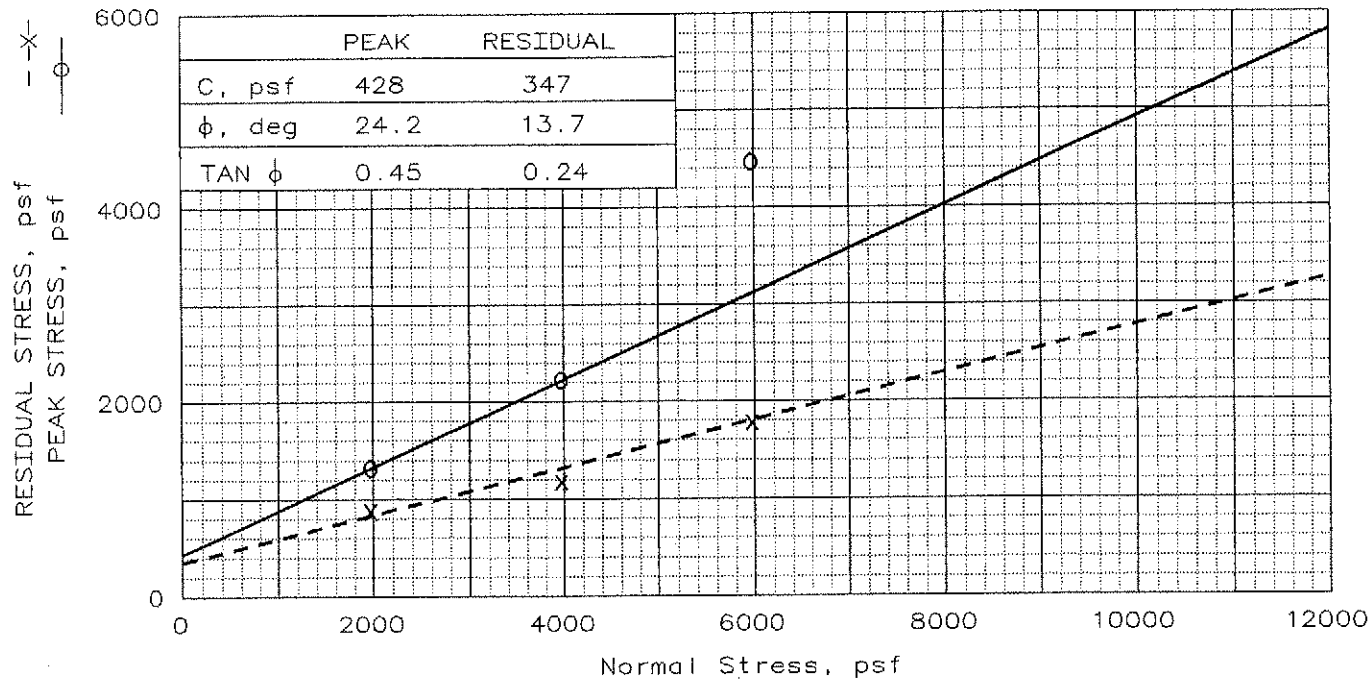
Fig. No.: B5.47

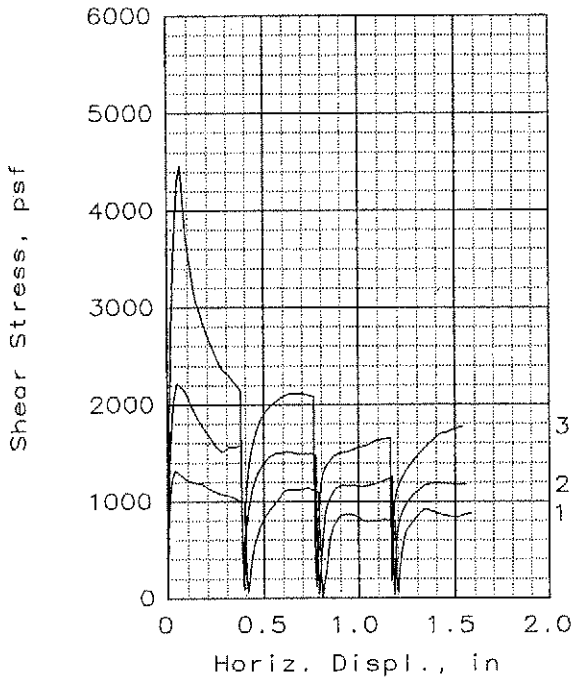
CLIENT: Newhall Ranch Co.

PROJECT: Mesas East - Phase II Landslide Investigation
SAMPLE LOCATION: B-34E @ 19.5 ft

PROJ. NO.: 00-1703QLSII-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	21.5	24.2	23.5
	DRY DENSITY, pcf	99.0	97.7	100.9
	SATURATION, %	85.1	92.5	97.3
	VOID RATIO	0.671	0.692	0.640
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	25.1	25.5	23.3
	DRY DENSITY, pcf	99.3	98.8	102.2
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.666	0.675	0.619
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	0.99	0.99
NORMAL STRESS, psf		2000	4000	6000
PEAK STRESS, psf		1320	2220	4464
DISPLACEMENT, in		0.04	0.05	0.07
RESIDUAL STRESS, psf		876	1176	1776
DISPLACEMENT, in		1.58	1.56	1.54
Strain rate, in/min		0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed
DESCRIPTION: Fat CLAY (CH)

LL= 45 PL= 23 PI= 22
SPECIFIC GRAVITY= 2.65
REMARKS: Basal slide plane (Sp)
Hand-driven rings
% fines = 95.7

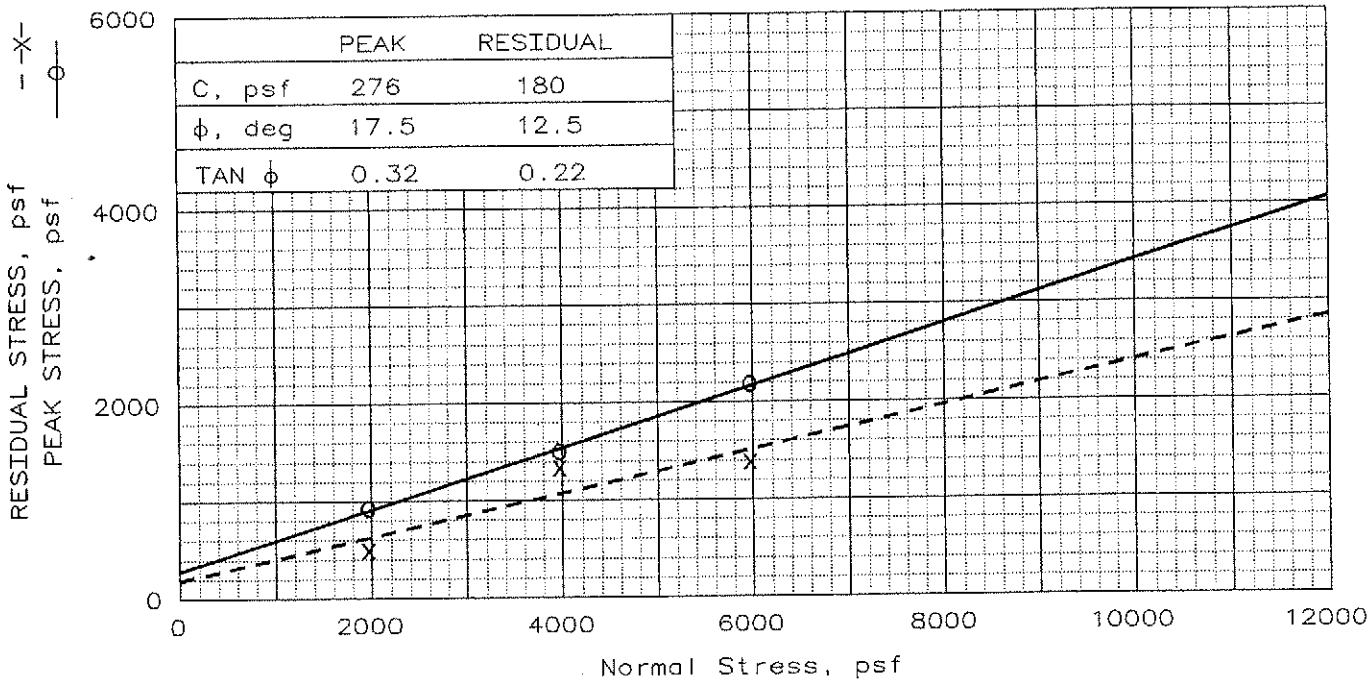
Fig. No.: B5.48

CLIENT: Newhall Ranch Co.

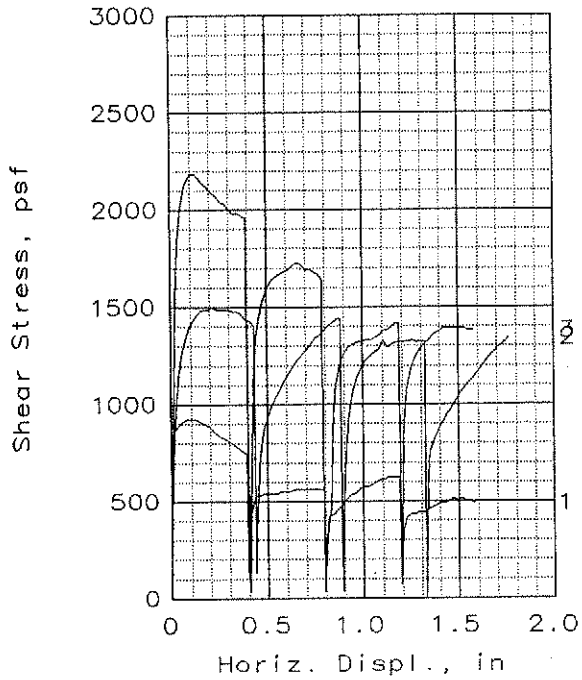
PROJECT: Mesas East - Phase II Landslide Investigation
SAMPLE LOCATION: B-42E @ 27 ft

PROJ. NO.: 00-1703QLSII-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.



	PEAK	RESIDUAL
C, psf	276	180
ϕ, deg	17.5	12.5
TAN ϕ	0.32	0.22



	Sample No.:	1	2	3
INITIAL	WATER CONTENT, %	24.9	24.4	24.7
	DRY DENSITY, pcf	98.4	99.1	98.3
	SATURATION, %	96.9	96.5	96.0
	VOID RATIO	0.681	0.669	0.683
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	25.6	24.2	24.2
	DRY DENSITY, pcf	98.5	100.8	100.7
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.679	0.642	0.642
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	0.98	0.98
NORMAL STRESS, psf		2000	4000	6000
PEAK STRESS, psf		924	1500	2184
DISPLACEMENT, in		0.08	0.22	0.11
RESIDUAL STRESS, psf		492	1332	1380
DISPLACEMENT, in		1.58	1.76	1.58
Strain rate, in/min		0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed
DESCRIPTION: Moderate-brown fat CLAY (CH)

SPECIFIC GRAVITY= 2.65
REMARKS: Basal slide plane (Sp)

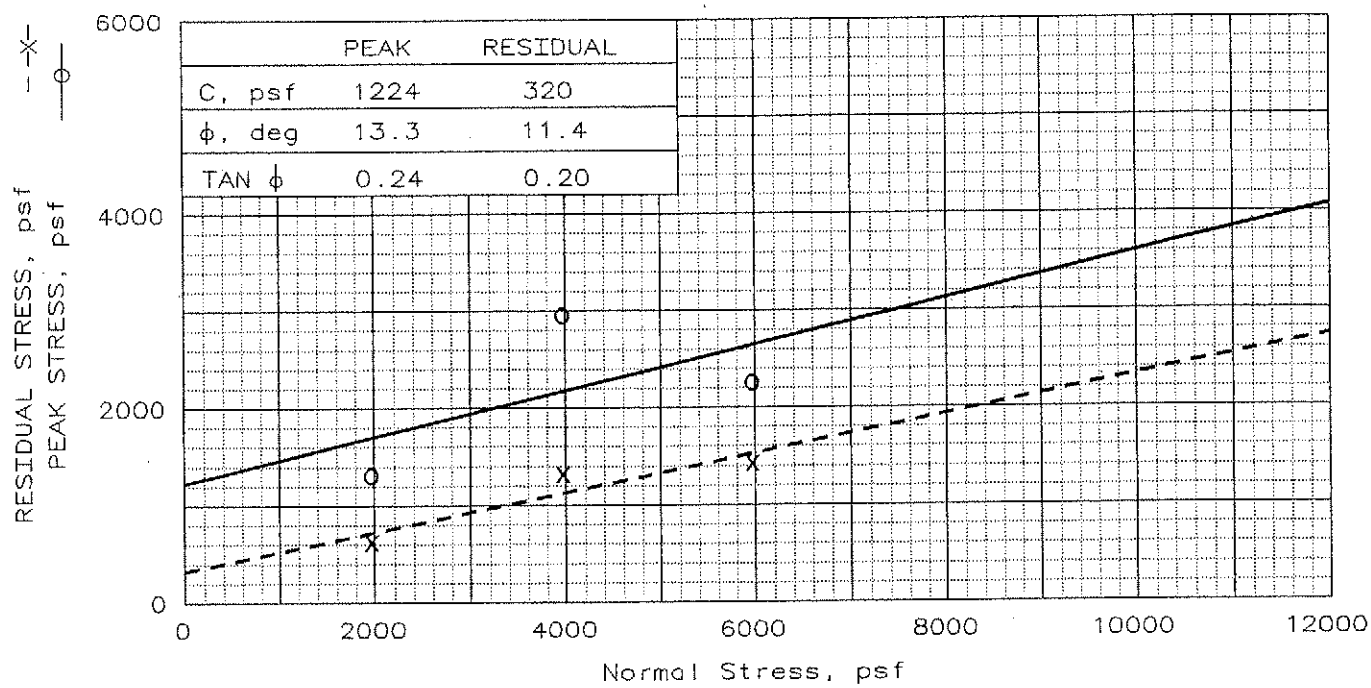
CLIENT: Newhall Ranch Co.

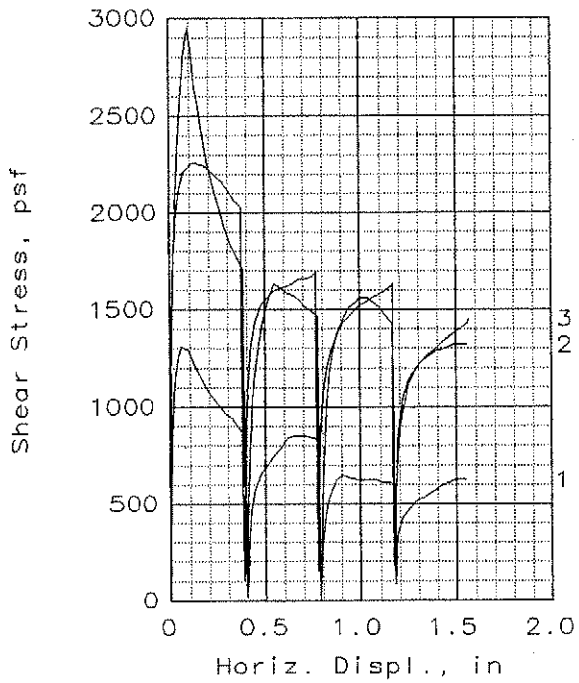
PROJECT: Mesas East - Phase II Landslide Investigation
SAMPLE LOCATION: B-48E @ 45 ft

PROJ. NO.: 00-1703QlsII-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Fig. No.: B5.49





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	22.6	19.5	21.6
	DRY DENSITY, pcf	102.2	107.6	104.1
	SATURATION, %	96.7	96.3	96.9
	VOID RATIO	0.618	0.537	0.590
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	23.0	19.3	21.0
	DRY DENSITY, pcf	102.7	109.5	106.4
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.611	0.511	0.556
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	0.98	0.98
NORMAL STRESS, psf		2000	4000	6000
PEAK STRESS, psf		1308	2952	2256
DISPLACEMENT, in		0.06	0.10	0.11
RESIDUAL STRESS, psf		624	1320	1428
DISPLACEMENT, in		1.55	1.56	1.56
Strain rate, in/min		0.0050	0.0050	0.0050

SAMPLE TYPE: Disturbed
DESCRIPTION: Moderate-brown fat CLAY (CH)
LL= 67 PL= 26 PI= 41
SPECIFIC GRAVITY= 2.65
REMARKS: Basal slide plane (Sp)
Bag sample

CLIENT: Newhall Ranch Co.

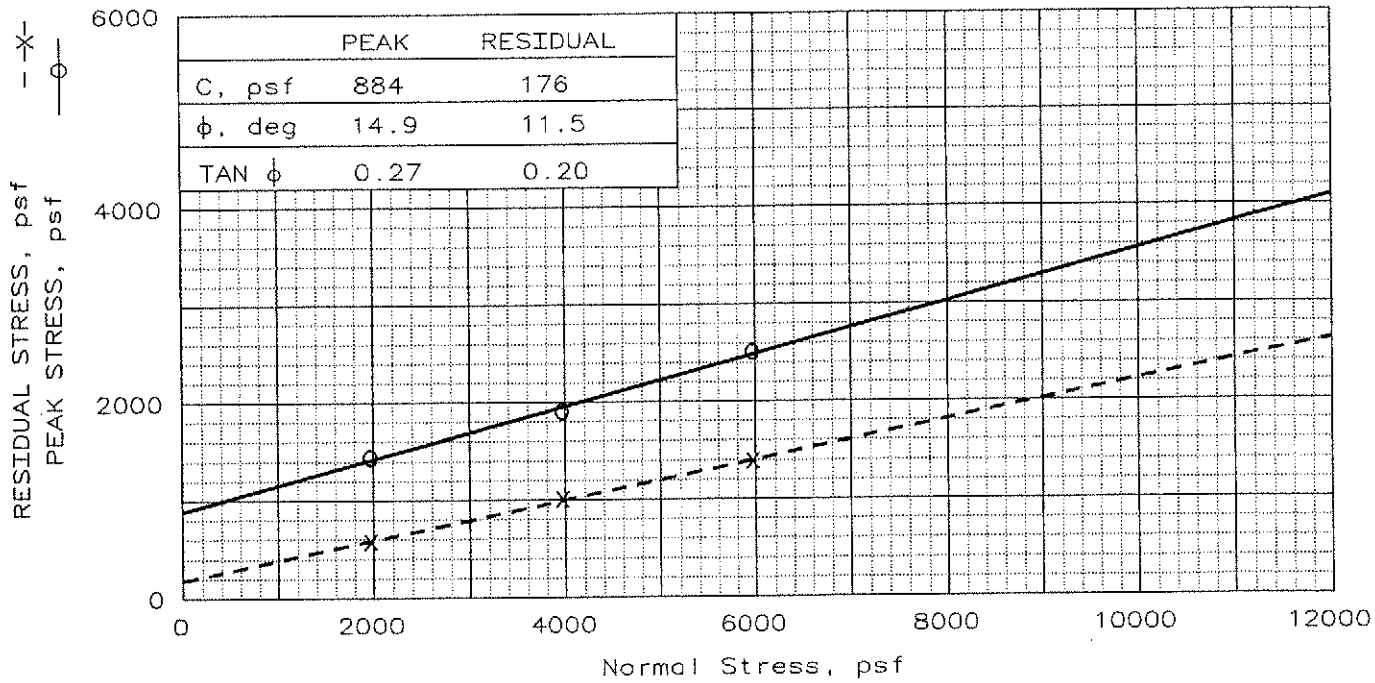
PROJECT: Newhall Ranch, Mesas-East

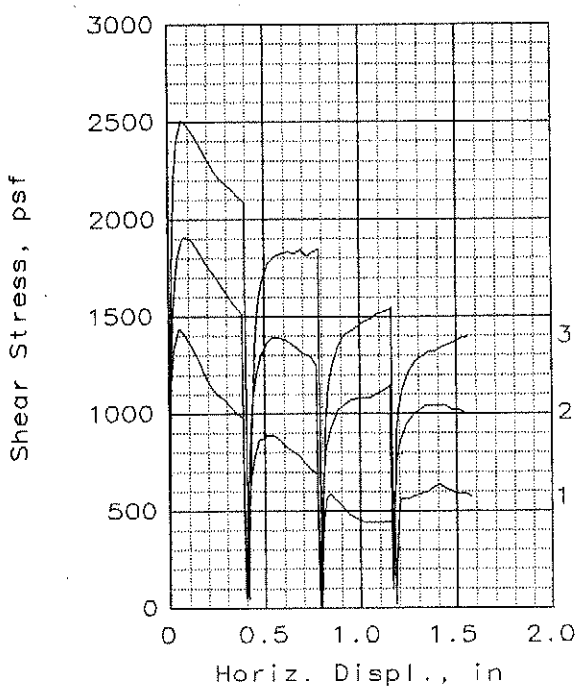
SAMPLE LOCATION: B-53E @ 25 ft

PROJ. NO.: 00-1703CM-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.

Fig. No.: B5.50





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	25.7	25.8	24.8
	DRY DENSITY, pcf	97.0	96.6	98.1
	SATURATION, %	96.4	96.1	96.0
	VOID RATIO	0.706	0.712	0.686
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	26.8	26.2	24.8
	DRY DENSITY, pcf	96.8	97.6	99.9
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.709	0.695	0.657
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	0.99	0.98
NORMAL STRESS, psf		2000	4000	6000
PEAK STRESS, psf		1440	1908	2508
DISPLACEMENT, in		0.06	0.08	0.07
RESIDUAL STRESS, psf		576	1008	1392
DISPLACEMENT, in		1.58	1.54	1.56
Strain rate, in/min		0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed
DESCRIPTION: Fat CLAY (CH)

LL= 71 PL= 25 PI= 46
SPECIFIC GRAVITY= 2.65
REMARKS: Basal slide plane (Sp)
Hand-driven rings

Fig. No.: B5.51

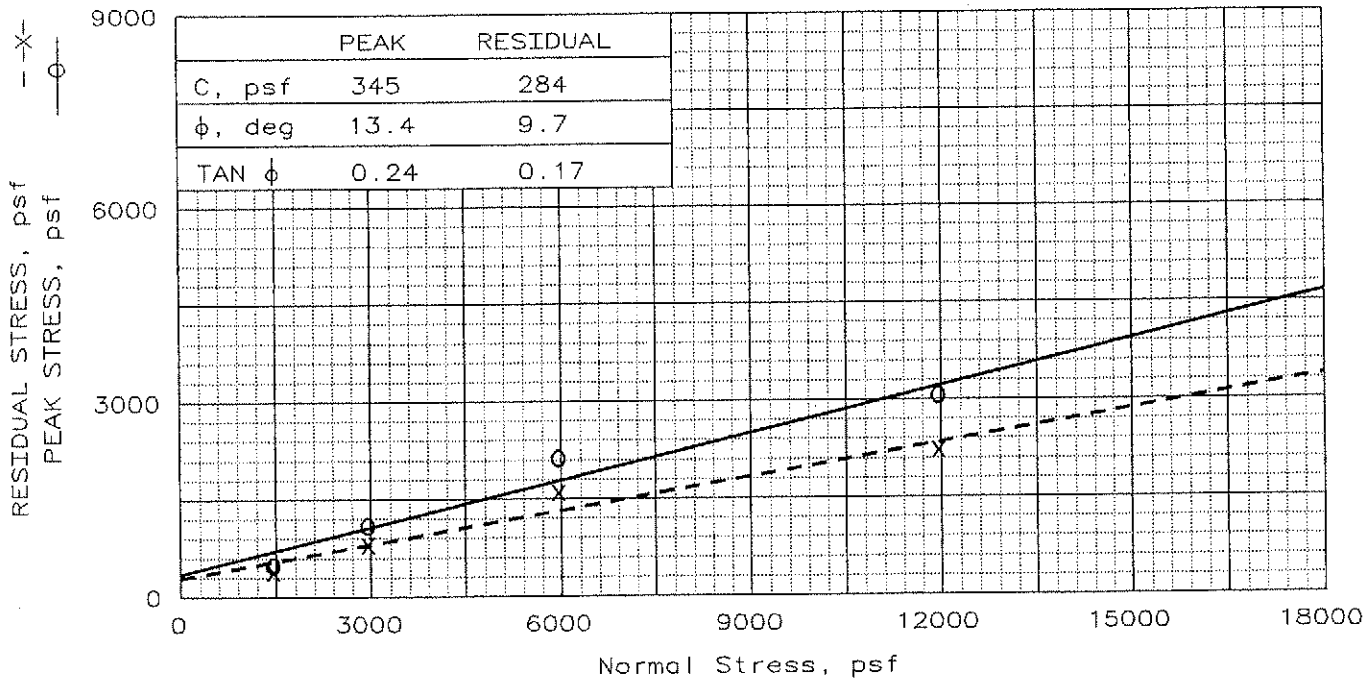
CLIENT: Newhall Ranch Co.

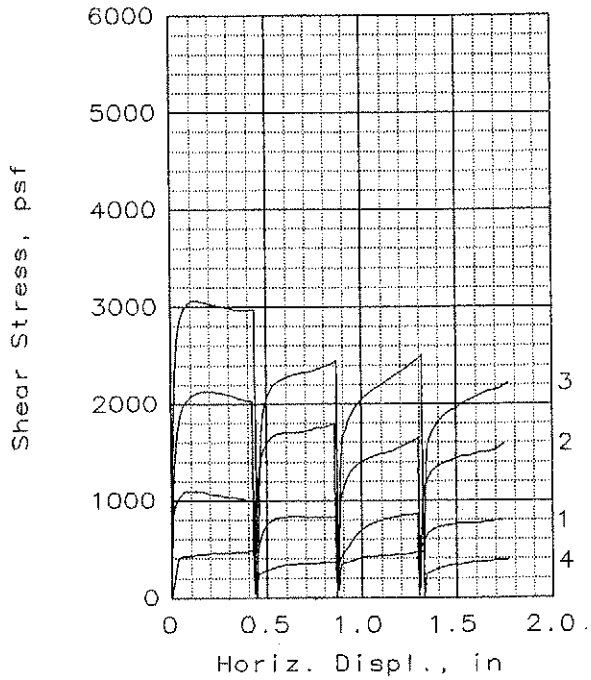
PROJECT: Newhall Ranch, Mesas-East

SAMPLE LOCATION: B-58E @ 43.5 ft

PROJ. NO.: 00-1703CM-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.





Sample No.:		1	2	3	4
INITIAL	WATER CONTENT, %	25.2	26.1	26.9	25.2
	DRY DENSITY, pcf	99.3	95.8	96.4	99.2
	SATURATION, %	100.0	95.0	99.3	100.0
	VOID RATIO	0.667	0.727	0.717	0.667
	DIAMETER, in	2.42	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	25.7	29.0	29.0	24.8
	DRY DENSITY, pcf	98.4	93.6	93.5	99.8
	SATURATION, %	100.0	100.0	100.0	100.0
	VOID RATIO	0.682	0.768	0.769	0.658
	DIAMETER, in	2.42	2.42	2.42	2.42
	HEIGHT, in	1.01	1.02	1.03	0.99
NORMAL STRESS, psf		3000	6000	12000	1500
PEAK STRESS, psf		1092	2124	3060	480
DISPLACEMENT, in		0.07	0.16	0.11	0.41
RESIDUAL STRESS, psf		792	1596	2220	384
DISPLACEMENT, in		1.74	1.75	1.77	1.77
Strain rate, in/min		0.0050	0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed
DESCRIPTION: Greenish-gray fat CLAY (CH)
LL= 83 PL= 34 PI= 49
SPECIFIC GRAVITY= 2.65
REMARKS: Basal slide plane (Sp)

CLIENT: Newhall Ranch Co.

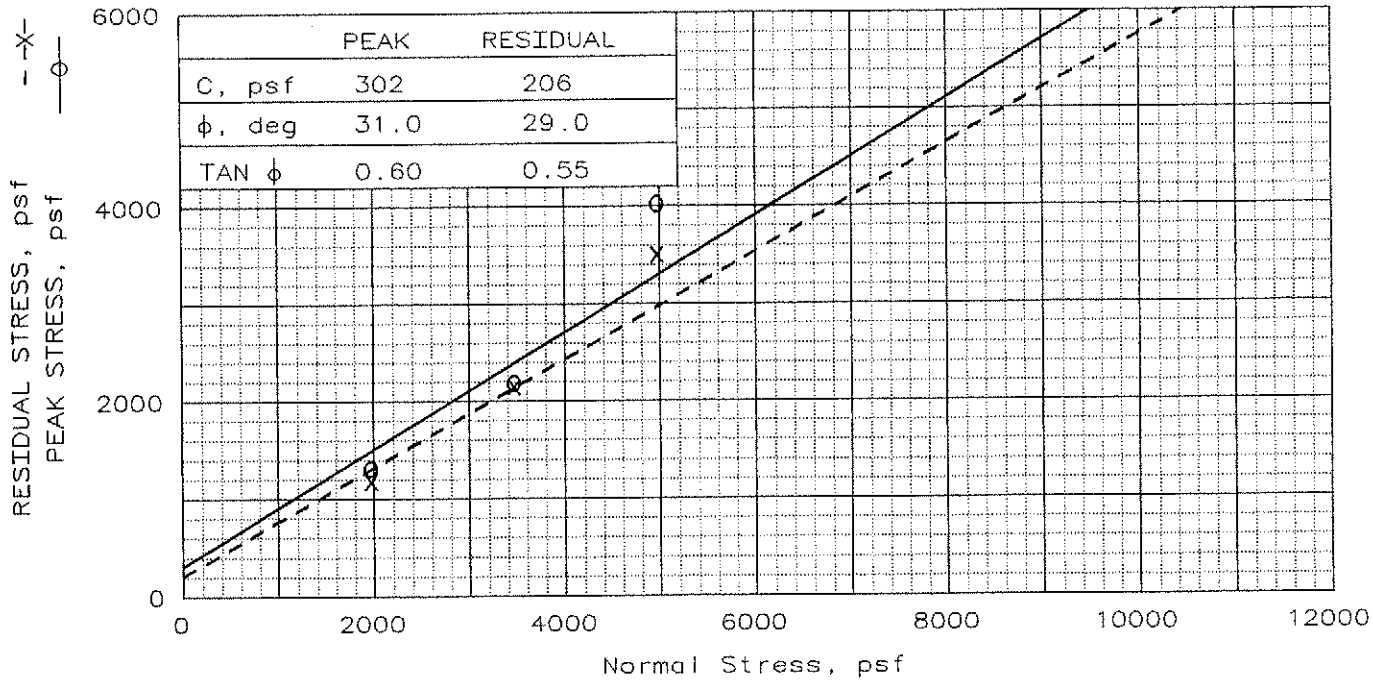
PROJECT: Mesas West

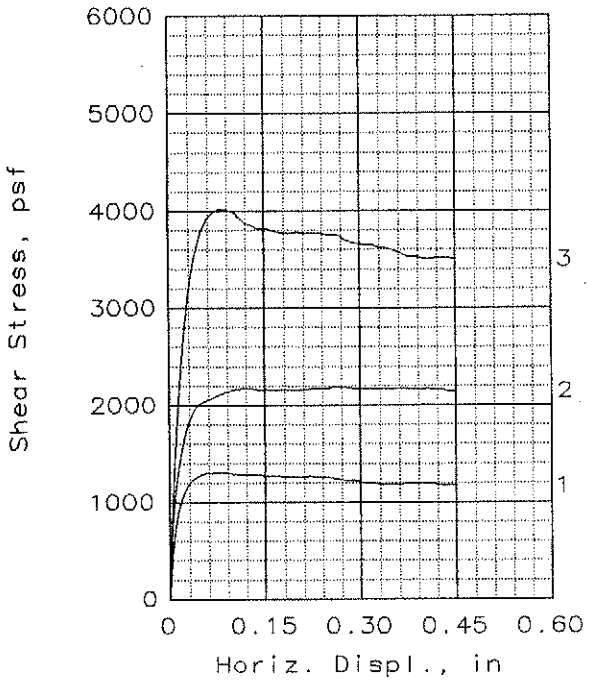
SAMPLE LOCATION: B-13W @ 30 ft

PROJ. NO.: 03-1703W-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.

Fig. No.: B5.52





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	8.4	9.6	7.1
	DRY DENSITY, pcf	110.8	113.8	122.4
	SATURATION, %	45.0	56.4	53.6
	VOID RATIO	0.493	0.453	0.351
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	17.8	16.2	12.2
	DRY DENSITY, pcf	112.3	115.7	124.9
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.473	0.429	0.324
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.98	0.98
NORMAL STRESS, psf		2000	3500	5000
PEAK STRESS, psf		1308	2184	4020
DISPLACEMENT, in		0.08	0.26	0.08
RESIDUAL STRESS, psf		1176	2148	3504
DISPLACEMENT, in		0.44	0.45	0.45
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Undisturbed
DESCRIPTION: Clayey SAND (SC)

LL= 26 PL= 18 PI= 8
SPECIFIC GRAVITY= 2.65
REMARKS: Alluvium (Qal)
% fines = 47.6

Fig. No.: B5.53

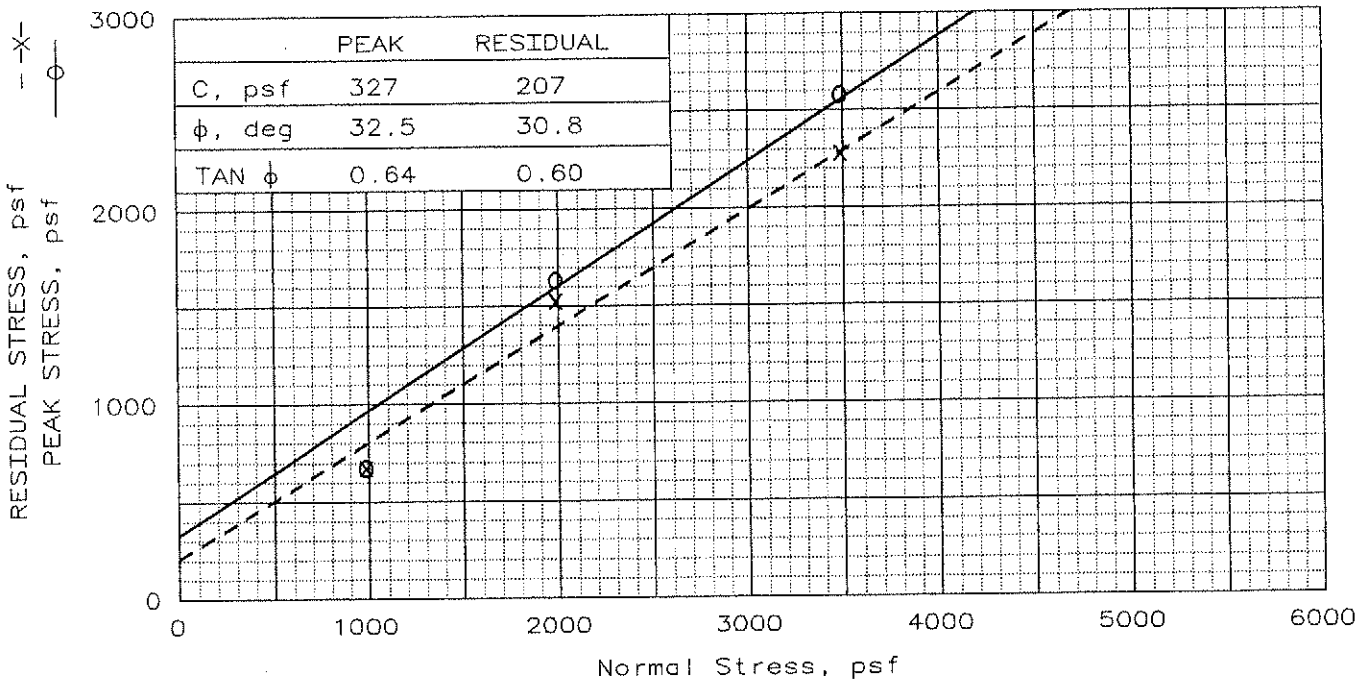
CLIENT: Newhall Ranch Co.

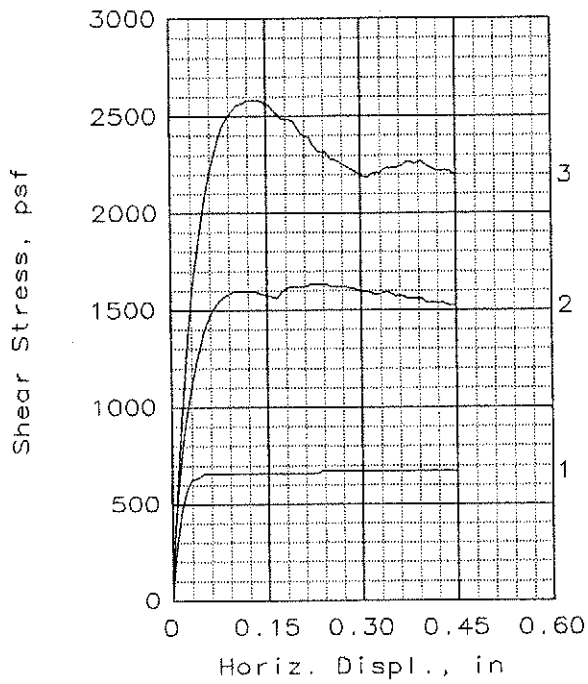
PROJECT: Newhall Ranch, Mesas-East

SAMPLE LOCATION: B-60E @ 17 ft

PROJ. NO.: 00-1703CM-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	8.9	6.9	6.6
	DRY DENSITY, pcf	100.6	102.0	102.4
	SATURATION, %	36.5	29.6	28.4
	VOID RATIO	0.644	0.622	0.616
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	23.3	22.1	21.0
	DRY DENSITY, pcf	102.3	104.3	106.3
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.618	0.586	0.557
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.98	0.98	0.96
NORMAL STRESS, psf		1000	2000	3500
PEAK STRESS, psf		672	1632	2580
DISPLACEMENT, in		0.24	0.22	0.12
RESIDUAL STRESS, psf		672	1524	2280
DISPLACEMENT, in		0.45	0.45	0.26
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Undisturbed
DESCRIPTION: Silty Sand (SM)

SPECIFIC GRAVITY= 2.65
REMARKS: Alluvium (Qal)
% fines = 32.2

CLIENT: Newhall Ranch Co.

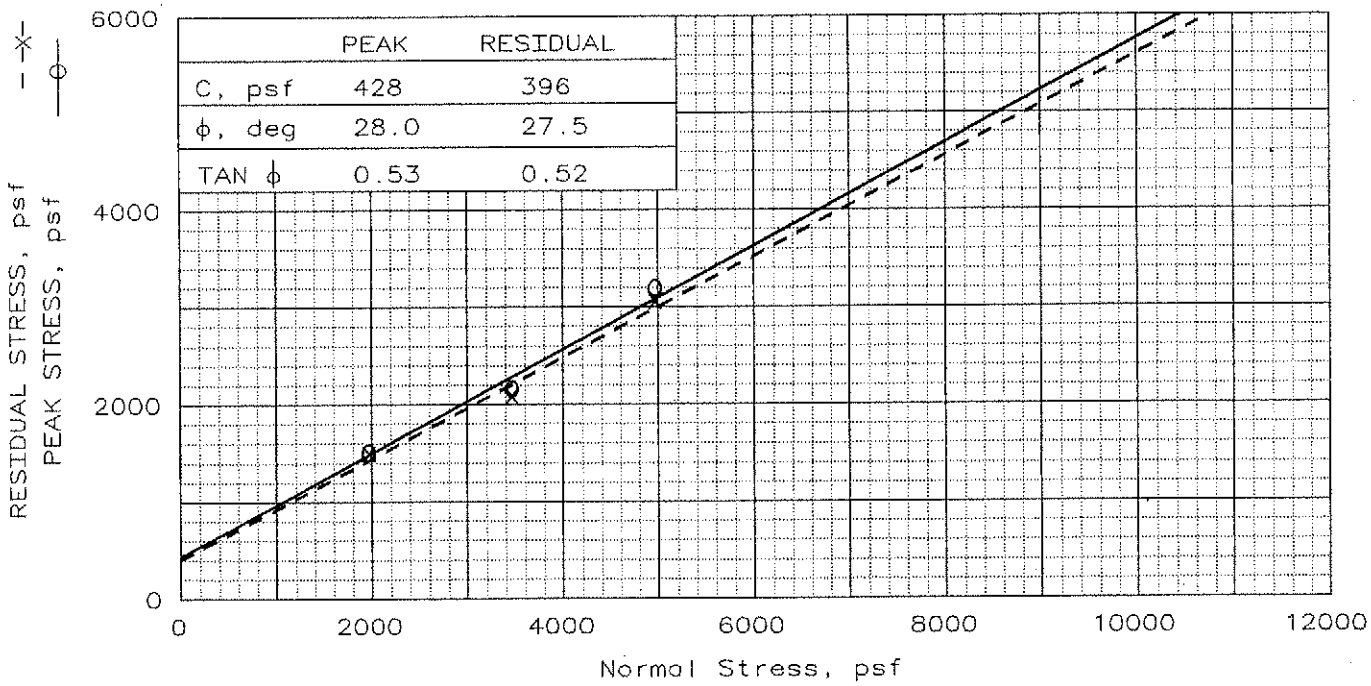
PROJECT: Newhall Ranch Infrastructure

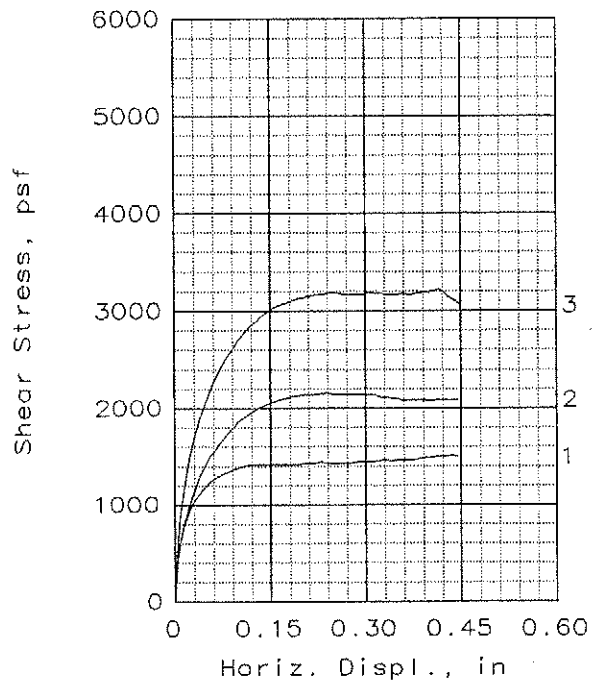
SAMPLE LOCATION: HS-1I @ 5 ft

PROJ. NO.: 00-1155I-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.

Fig. No.: B5.54





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	6.4	25.9	23.2
	DRY DENSITY, pcf	117.9	96.6	101.2
	SATURATION, %	41.7	96.5	96.7
	VOID RATIO	0.403	0.713	0.634
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	14.5	26.0	23.1
	DRY DENSITY, pcf	119.5	97.9	102.6
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.385	0.689	0.612
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.99	0.99
NORMAL STRESS, psf		2000	3500	5000
PEAK STRESS, psf		1512	2160	3192
DISPLACEMENT, in		0.44	0.24	0.25
RESIDUAL STRESS, psf		1500	2088	3060
DISPLACEMENT, in		0.45	0.45	0.45
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Undisturbed
DESCRIPTION: Silty SAND (SM)

LL= 34 PL= 20 PI= 14
SPECIFIC GRAVITY= 2.65
REMARKS: Slopewash (Qsw)
% fines = 43.3

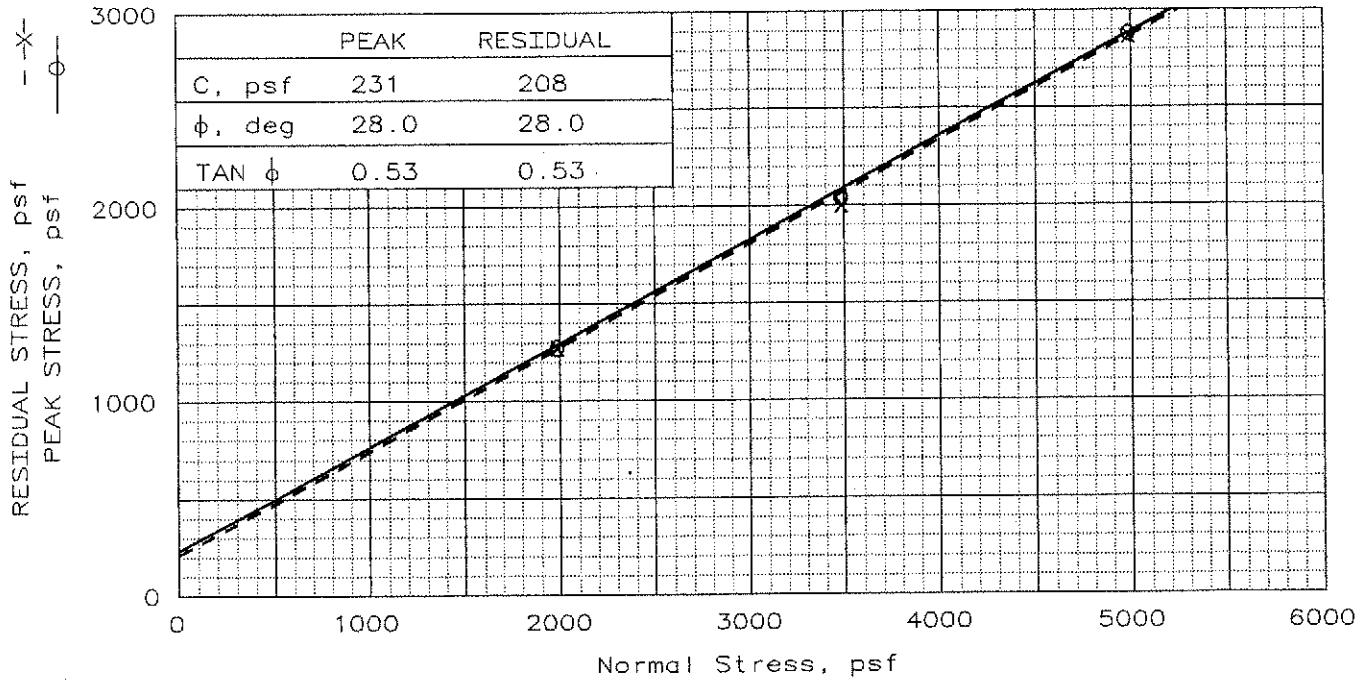
Fig. No.: B5.55

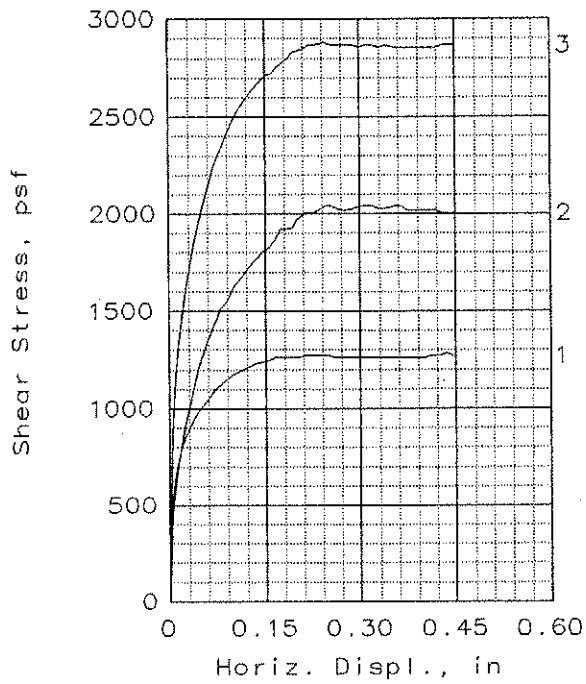
CLIENT: Newhall Ranch Co.

PROJECT: Mesas East - Phase II Landslide Investigation
SAMPLE LOCATION: B-22E @ 5 ft

PROJ. NO.: 00-1703QlsII-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	46.0	42.3	36.4
	DRY DENSITY, pcf	72.2	76.3	82.6
	SATURATION, %	94.3	96.1	96.1
	VOID RATIO	1.291	1.168	1.003
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	46.4	41.0	34.5
	DRY DENSITY, pcf	74.2	79.2	86.4
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	1.230	1.088	0.914
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.97	0.96	0.96
NORMAL STRESS, psf		2000	3500	5000
PEAK STRESS, psf		1272	2040	2880
DISPLACEMENT, in		0.22	0.25	0.25
RESIDUAL STRESS, psf		1272	2004	2868
DISPLACEMENT, in		0.45	0.45	0.45
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Undisturbed
DESCRIPTION: Sandy lean CLAY (CL)
LL= 38 PL= 20 PI= 18
SPECIFIC GRAVITY= 2.65
REMARKS: Slopewash (Qsw)
% fines = 68.7

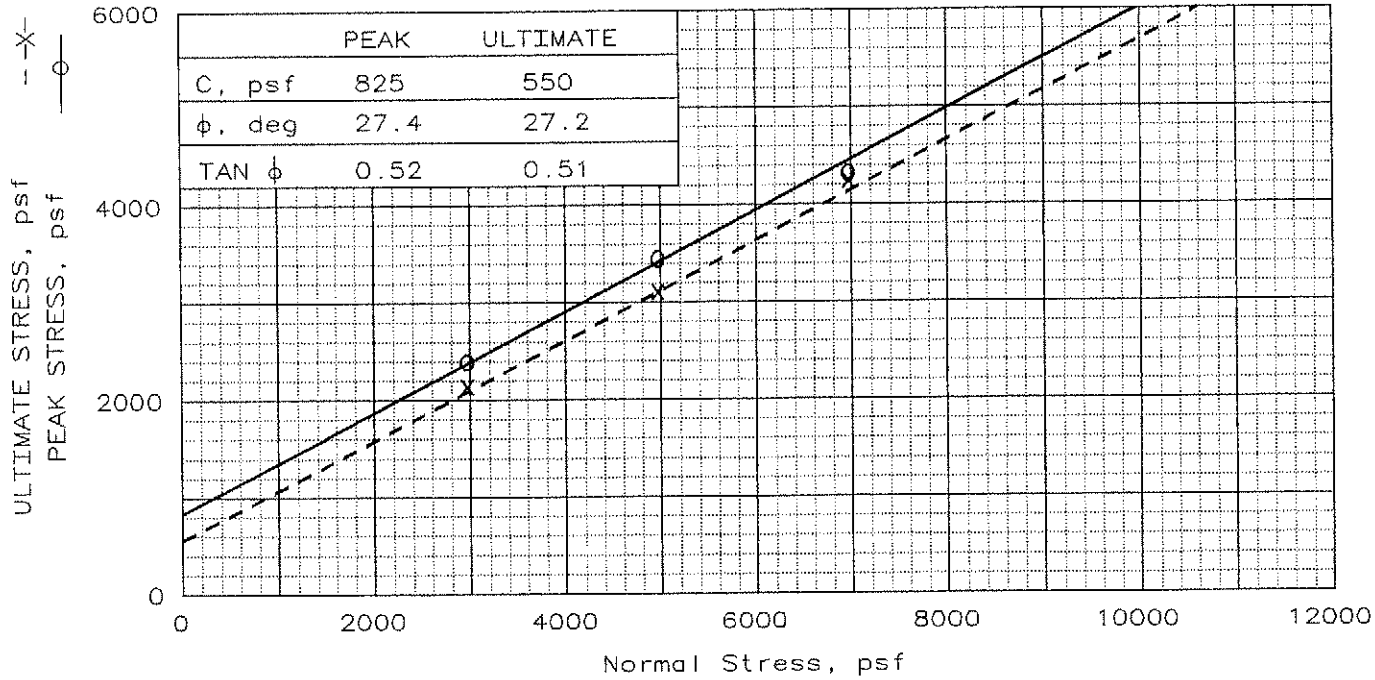
CLIENT: Newhall Ranch Co.

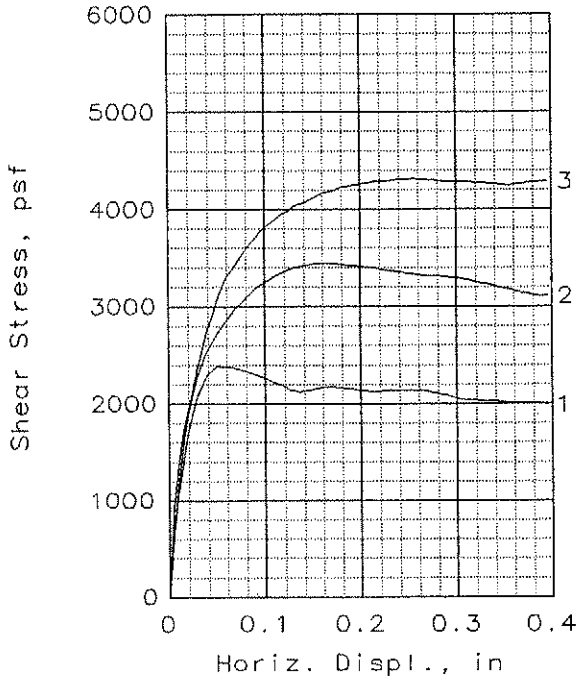
PROJECT: Mesas East - Phase II Landslide Investigation
SAMPLE LOCATION: B-35E @ 5 ft

PROJ. NO.: 00-1703QlsII-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.

Fig. No.: B5.56





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	10.1	10.4	9.9
	DRY DENSITY, pcf	116.5	116.2	116.8
	SATURATION, %	64.0	65.2	63.1
	VOID RATIO	0.419	0.423	0.417
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	14.9	14.6	13.8
	DRY DENSITY, pcf	118.6	119.2	121.1
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.395	0.388	0.366
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.98	0.98	0.96
NORMAL STRESS, psf		3000	5000	7000
PEAK STRESS, psf		2388	3444	4320
DISPLACEMENT, in		0.05	0.16	0.26
ULTIMATE STRESS, psf		2136	3108	4248
DISPLACEMENT, in		0.27	0.40	0.36
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Remold
DESCRIPTION: Sandy SILT (SM)

SPECIFIC GRAVITY= 2.65
REMARKS: Remolded to 90% of MDD
(TQs derived)
% fines = 53.6

Fig. No.: B5.57

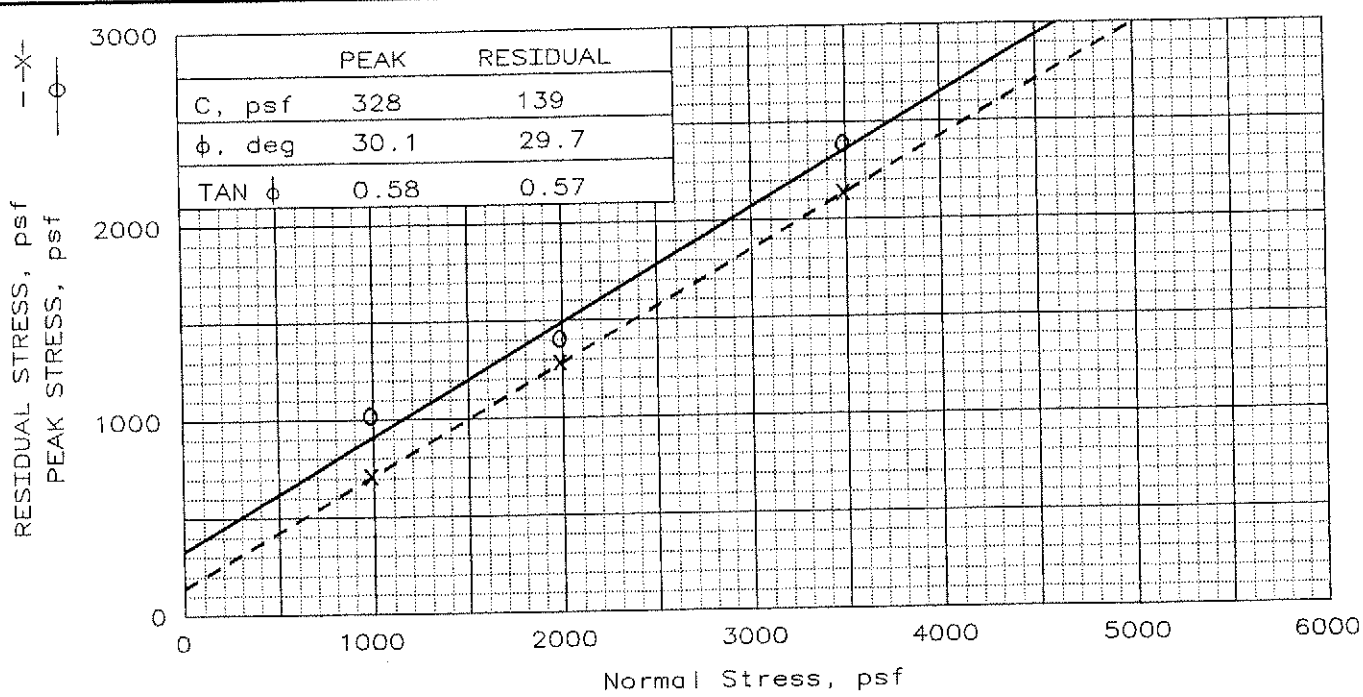
CLIENT: Newhall Ranch Co.

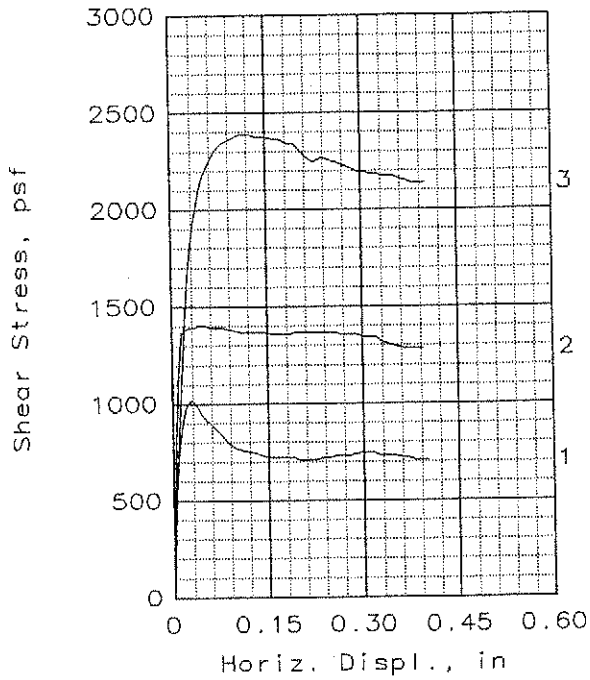
PROJECT: Mesas Entertainment

SAMPLE LOCATION: B-1M @ 25 ft

PROJ. NO.: 00-1703M-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	11.9	11.9	11.9
	DRY DENSITY, pcf	111.2	111.3	111.2
	SATURATION, %	64.5	64.5	64.5
	VOID RATIO	0.488	0.487	0.488
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	18.3	17.9	17.5
	DRY DENSITY, pcf	111.5	112.2	113.1
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.484	0.474	0.462
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	0.99	0.98
NORMAL STRESS, psf		1000	2000	3500
PEAK STRESS, psf		1020	1404	2388
DISPLACEMENT, in		0.03	0.04	0.11
RESIDUAL STRESS, psf		708	1284	2136
DISPLACEMENT, in		0.40	0.40	0.40
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Remold
DESCRIPTION: Sandy, silty CLAY (CL-ML)

SPECIFIC GRAVITY= 2.65
REMARKS: Remolded to 90% of MDD (Qsw/Qdf/Qls derived)
% fines = 57.9

Fig. No.: B5.58

CLIENT: Newhall Ranch Co.

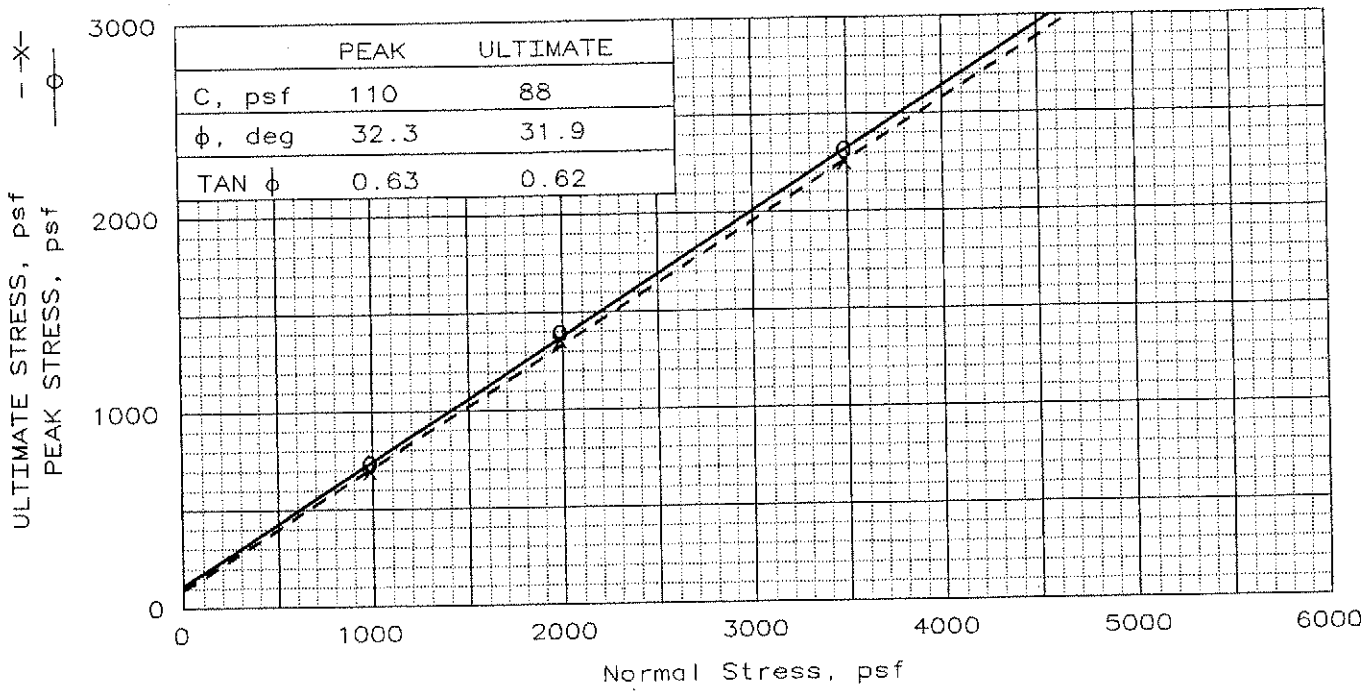
PROJECT: Mesas Entertainment

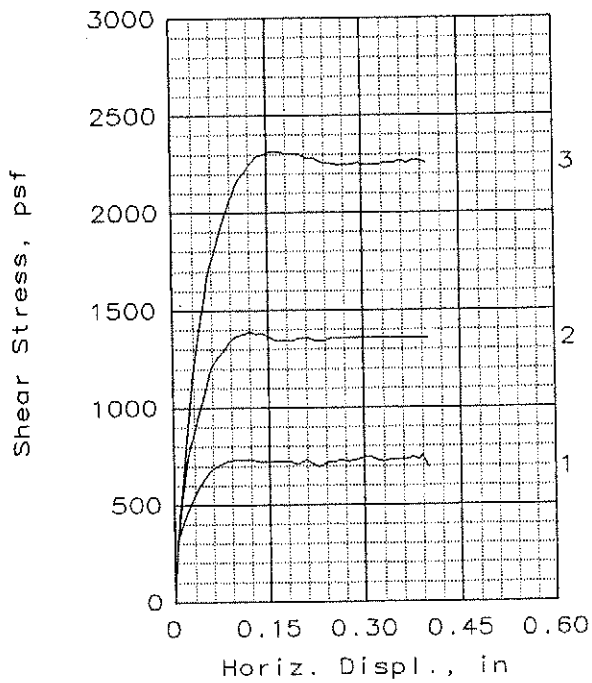
SAMPLE LOCATION: B-4M @ 2,10 & 15 ft Mix

PROJ. NO.: 01-1703M-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	3.1	3.4	4.6
	DRY DENSITY, pcf	109.1	110.6	109.4
	SATURATION, %	15.7	18.3	23.7
	VOID RATIO	0.516	0.496	0.512
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	18.4	17.1	16.7
	DRY DENSITY, pcf	111.2	113.9	114.6
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.488	0.453	0.443
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.98	0.97	0.95
NORMAL STRESS, psf		1000	2000	3500
PEAK STRESS, psf		732	1392	2316
DISPLACEMENT, in		0.10	0.12	0.16
ULTIMATE STRESS, psf		696	1356	2256
DISPLACEMENT, in		0.40	0.40	0.40
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Remold
DESCRIPTION: Silty SAND (SM)

SPECIFIC GRAVITY= 2.65
REMARKS: Remolded to 90% of MDD
(Qsw derived)
% fines = 20.8

Fig. No.: B5.59

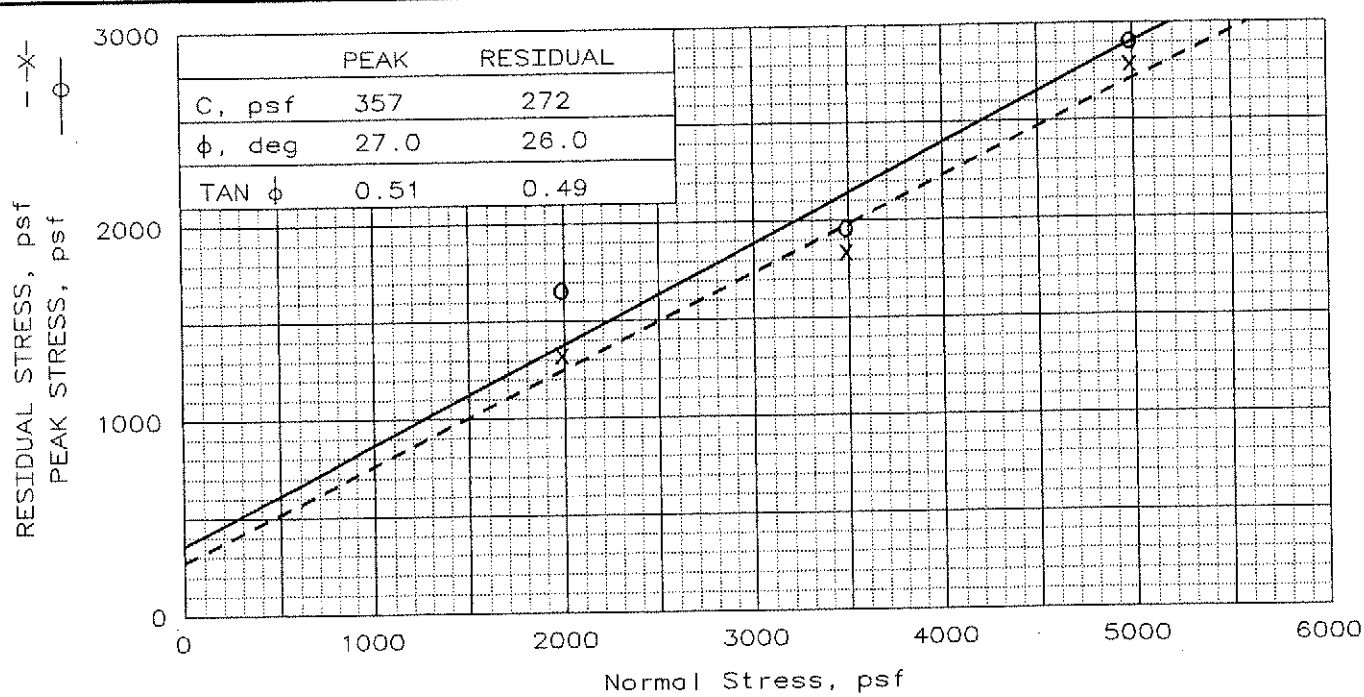
CLIENT: Newhall Ranch Co.

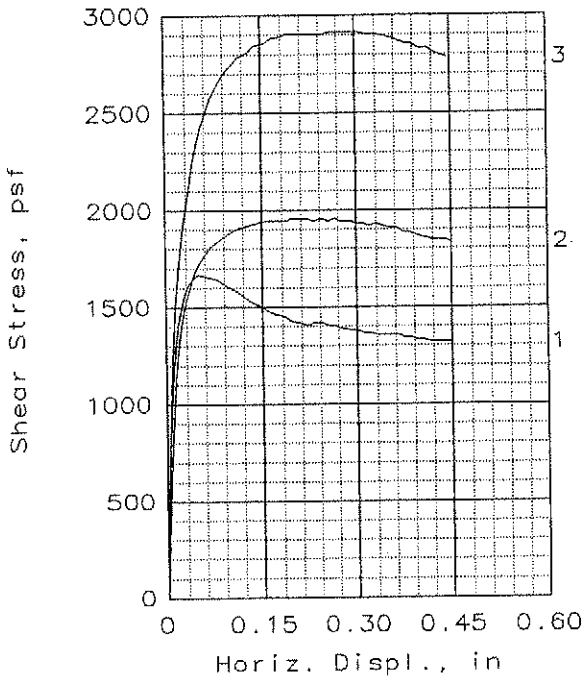
PROJECT: Mesas Entertainment

SAMPLE LOCATION: B-4M @ 5 ft

PROJ. NO.: 00-1703M-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	9.3	9.5	9.5
	DRY DENSITY, pcf	118.1	117.9	117.9
	SATURATION, %	61.3	62.4	62.4
	VOID RATIO	0.401	0.404	0.404
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	15.8	14.4	14.5
	DRY DENSITY, pcf	116.6	119.8	119.6
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.418	0.380	0.383
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.01	0.98	0.99
NORMAL STRESS, psf		2000	3500	5000
PEAK STRESS, psf		1656	1956	2904
DISPLACEMENT, in		0.07	0.20	0.19
RESIDUAL STRESS, psf		1320	1836	2784
DISPLACEMENT, in		0.45	0.45	0.45
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Remold
DESCRIPTION: Sandy lean CLAY (CL)
LL= 37 PL= 19 PI= 18
SPECIFIC GRAVITY= 2.65
REMARKS: Remolded to 90% of MDD (Qls derived)
% fines = 52.9

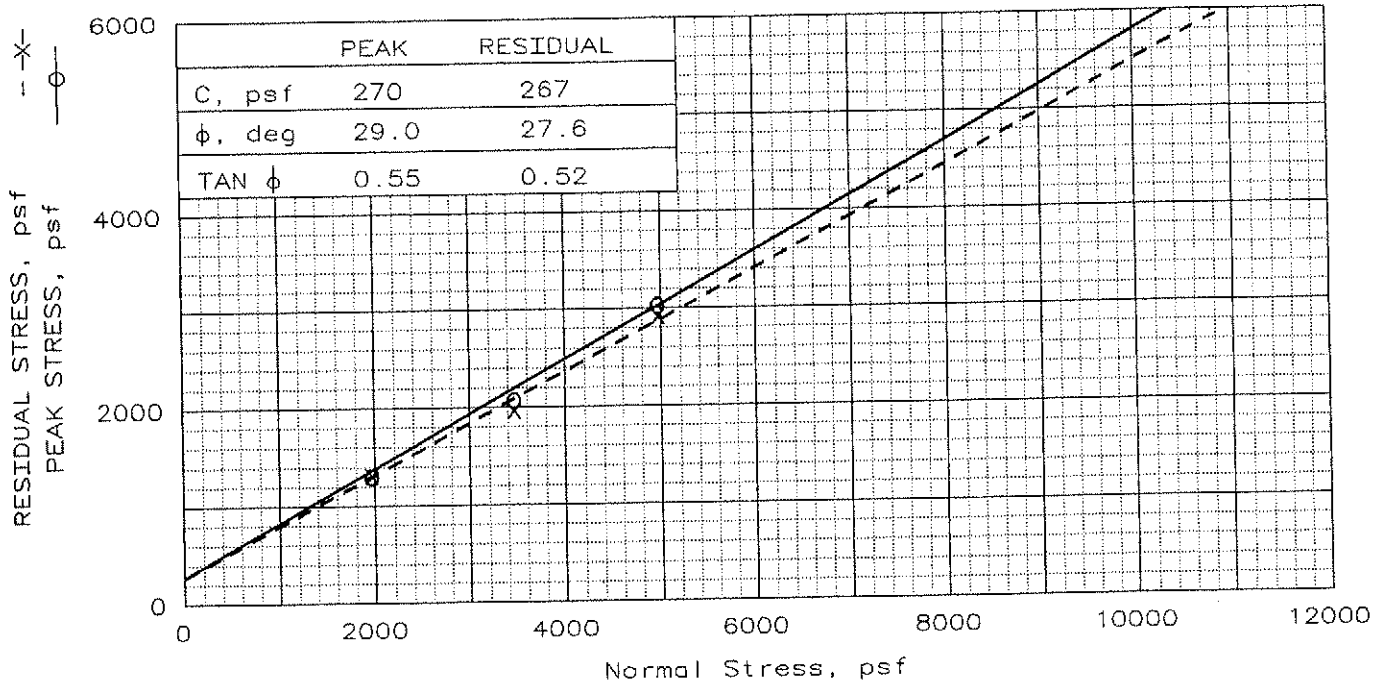
Fig. No.: B5.60

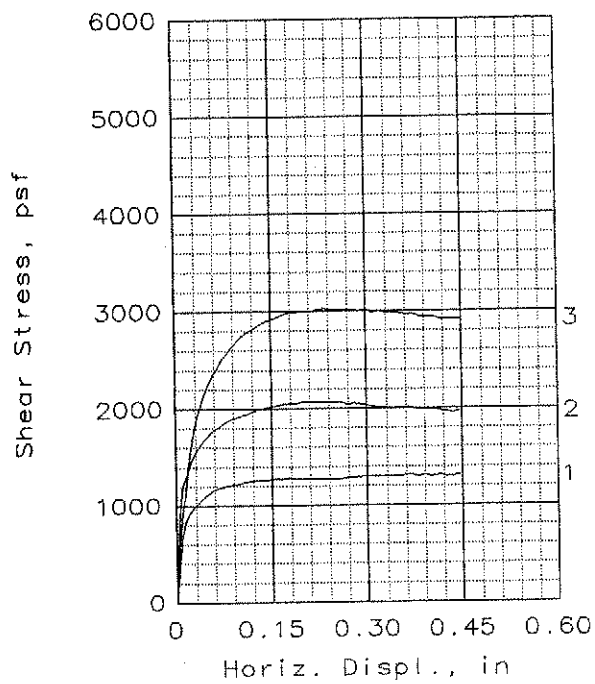
CLIENT: Newhall Ranch Co.

PROJECT: Mesas East - Phase II Landslide Investigation
SAMPLE LOCATION: B-20E @ 0-10 ft

PROJ. NO.: 00-1703QLSII-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	19.2	19.6	19.4
	DRY DENSITY, pcf	108.4	108.1	108.2
	SATURATION, %	96.8	97.6	97.1
	VOID RATIO	0.527	0.531	0.528
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	19.4	19.3	18.7
	DRY DENSITY, pcf	109.2	109.5	110.6
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.515	0.511	0.495
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.99	0.98
NORMAL STRESS, psf		2000	3500	5000
PEAK STRESS, psf		1296	2064	3024
DISPLACEMENT, in		0.30	0.20	0.24
RESIDUAL STRESS, psf		1308	1968	2916
DISPLACEMENT, in		0.45	0.45	0.45
Strain rate, in/min		0.0050	0.0050	0.0050

SAMPLE TYPE: Remold
DESCRIPTION: Silty, clayey SAND with pebbles (SC-SM)
LL= 31 PL= 17 PI= 14
SPECIFIC GRAVITY= 2.65
REMARKS: Remolded to 90% of MDD (Qsw/Qdf derived)
% fines = 51.9

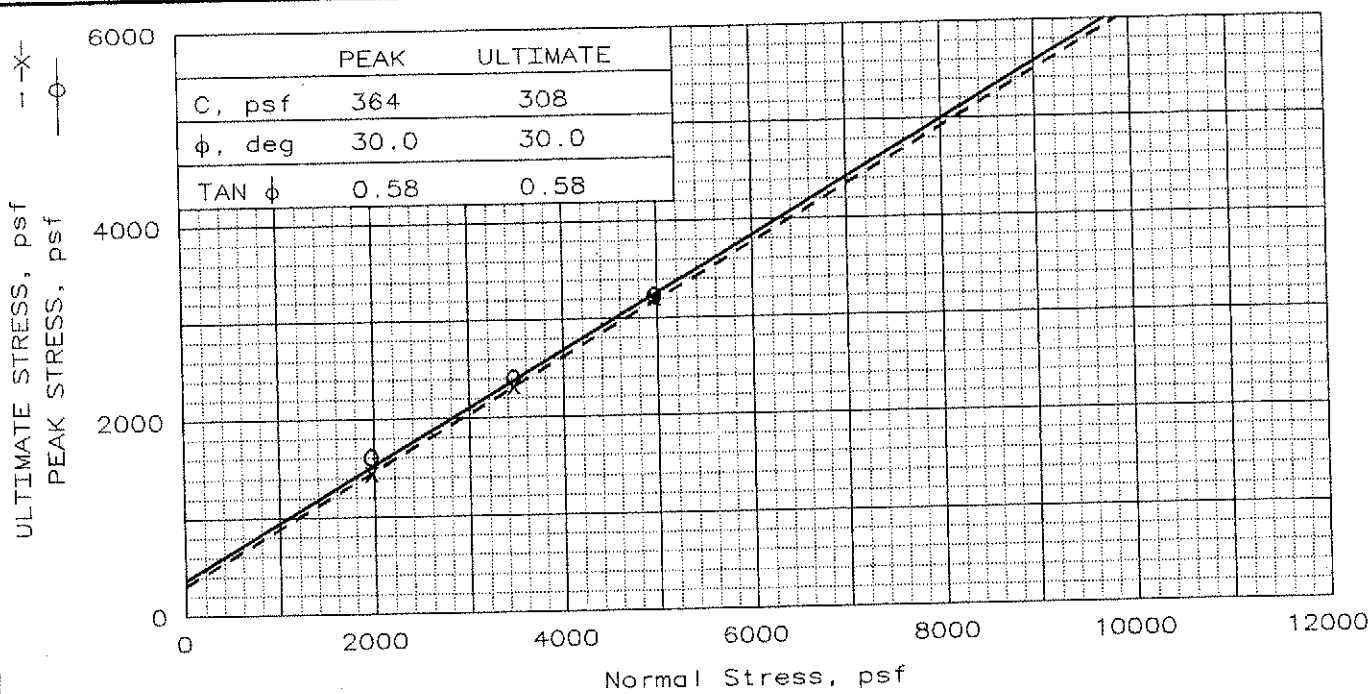
Fig. No.: B5.61

CLIENT: Newhall Ranch Co.

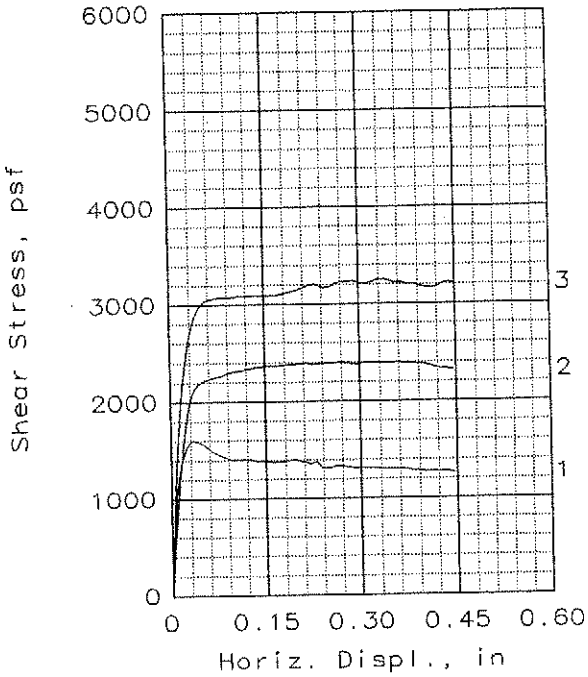
PROJECT: Mesas East - Phase II Landslide Investigation
SAMPLE LOCATION: B-48E @ 0-10 ft

PROJ. NO.: 00-1703GlsII-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.



	PEAK	ULTIMATE
C, psf	364	308
ϕ, deg	30.0	30.0
TAN ϕ	0.58	0.58



	Sample No.:	1	2	3
INITIAL	WATER CONTENT, %	15.5	15.4	15.5
	DRY DENSITY, pcf	116.3	116.3	116.3
	SATURATION, %	97.1	96.9	97.1
	VOID RATIO	0.423	0.422	0.422
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	15.3	15.2	15.2
	DRY DENSITY, pcf	117.7	118.0	118.0
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.406	0.403	0.401
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.99	0.99
NORMAL STRESS, psf		2000	3500	5000
PEAK STRESS, psf		1608	2400	3228
DISPLACEMENT, in		0.04	0.22	0.28
ULTIMATE STRESS, psf		1440	2316	3204
DISPLACEMENT, in		0.08	0.45	0.45
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Remold
DESCRIPTION: Clayey Sand (SC)

LL= 26 PL= 16 PI= 10
SPECIFIC GRAVITY= 2.65
REMARKS: Remolded to 90% of MDD
(Qal derived)
% fines = 22.6

Fig. No.: B5.62

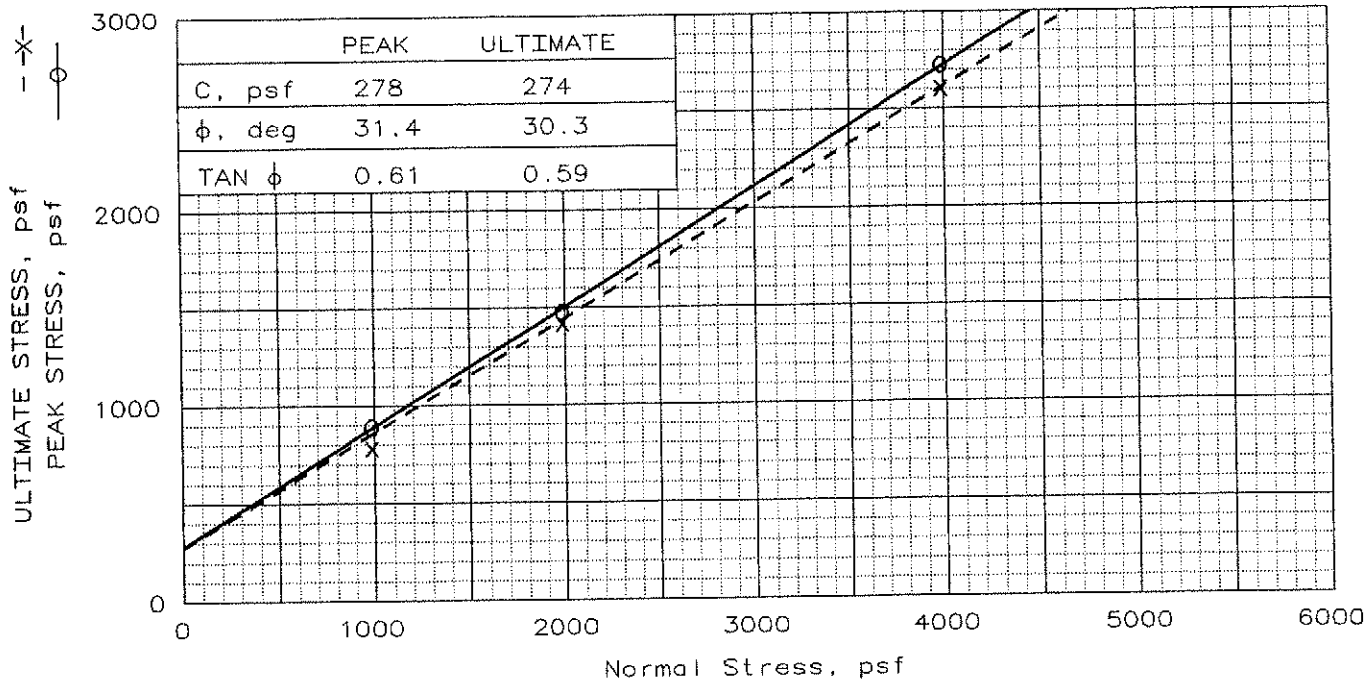
CLIENT: Newhall Ranch Co.

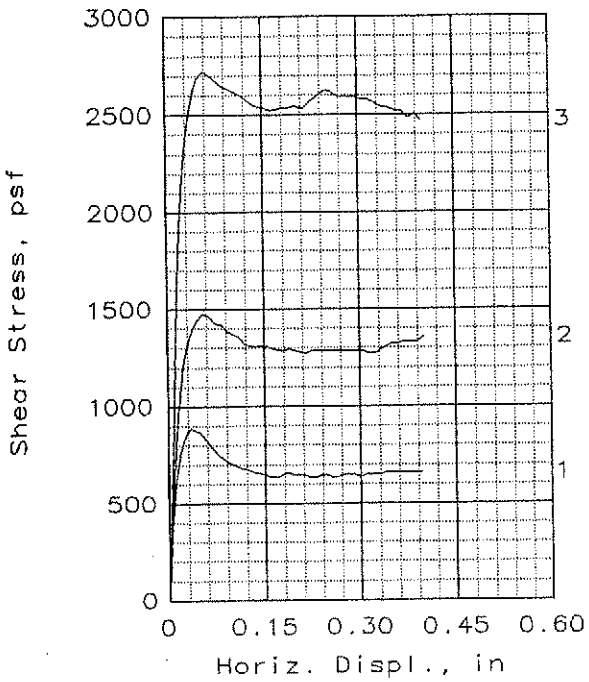
PROJECT: Newhall Ranch, Mesas-East

SAMPLE LOCATION: B-57E @ 5 & 10 ft

PROJ. NO.: 00-1703CM-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.





Sample No.:		1	2	3
INITIAL	WATER CONTENT, %	9.1	8.0	8.0
	DRY DENSITY, pcf	117.4	118.6	117.9
	SATURATION, %	58.8	53.8	52.7
	VOID RATIO	0.409	0.395	0.403
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	15.1	14.5	14.6
	DRY DENSITY, pcf	118.2	119.4	119.4
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.400	0.385	0.386
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.99	0.99
NORMAL STRESS, psf		1000	2000	4000
PEAK STRESS, psf		888	1476	2724
DISPLACEMENT, in		0.04	0.06	0.06
ULTIMATE STRESS, psf		780	1416	2604
DISPLACEMENT, in		0.07	0.09	0.12
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Remold
DESCRIPTION: Silty SAND (SM)

SPECIFIC GRAVITY= 2.65
REMARKS: Remolded to 90% of MDD
(Qt derived)
% fines = 16.2

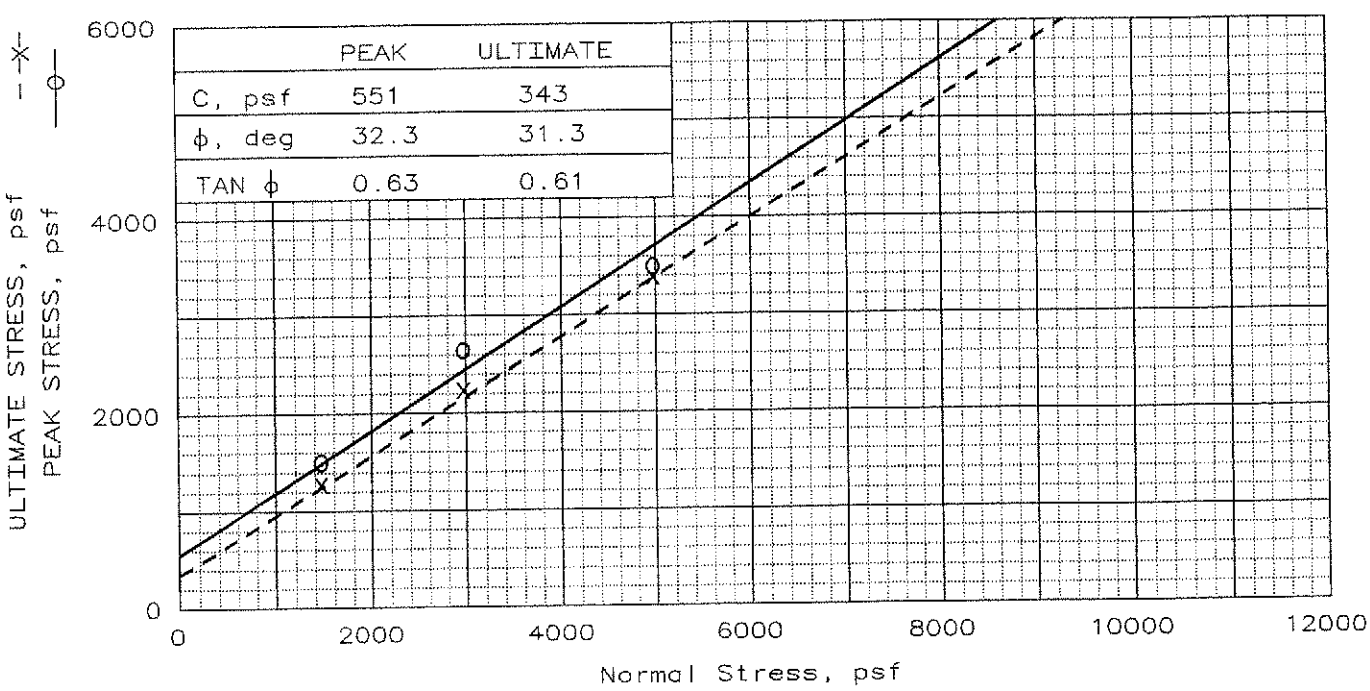
Fig. No.: B5.63

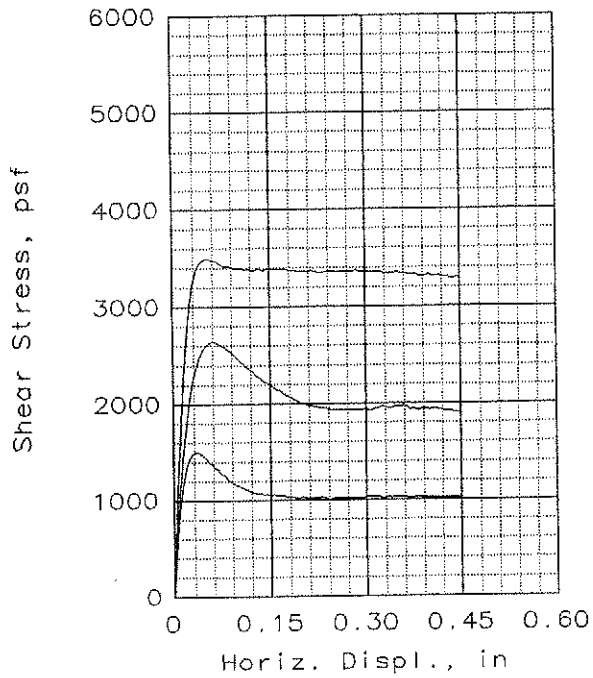
CLIENT: Newhall Ranch Co.

PROJECT: Cobble/Boulder Assessment
Airport and Exxon Mesas
SAMPLE LOCATION: B-6B @ 19 ft

PROJ. NO.: 02-1703B-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	8.8	9.0	7.6
	DRY DENSITY, pcf	128.6	128.5	128.5
	SATURATION, %	80.9	82.9	69.9
	VOID RATIO	0.287	0.287	0.287
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	11.2	11.6	11.4
	DRY DENSITY, pcf	127.7	126.7	127.0
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.296	0.306	0.303
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.01	1.01	1.01
NORMAL STRESS, psf		1500	3000	5000
PEAK STRESS, psf		1500	2640	3492
DISPLACEMENT, in		0.04	0.06	0.05
ULTIMATE STRESS, psf		1272	2232	3384
DISPLACEMENT, in		0.08	0.14	0.11
Strain rate, %/min		0.01	0.01	0.01

SAMPLE TYPE: Remold
DESCRIPTION: Clayey SAND (SC)

SPECIFIC GRAVITY= 2.65
REMARKS: Remolded to 90% of MDD
(Qt derived)
% fines = 30.6

Fig. No.: B5.64

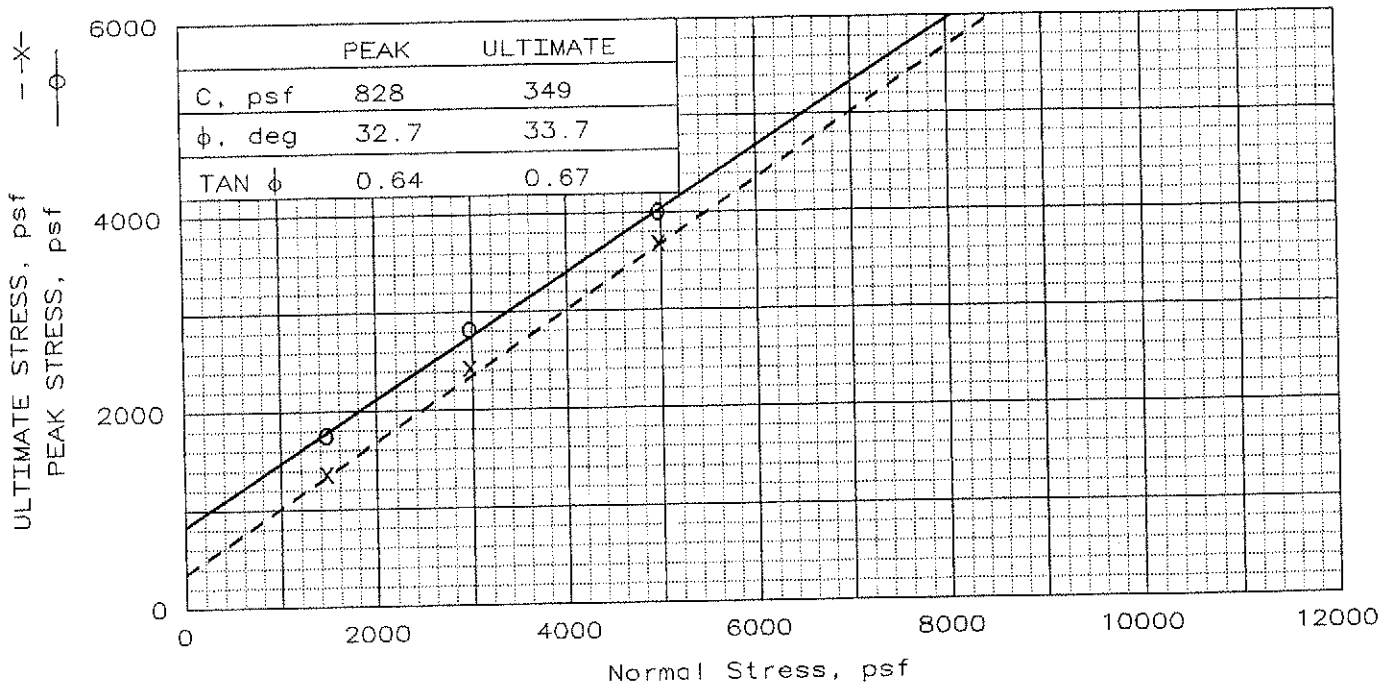
CLIENT: Newhall Ranch Co.

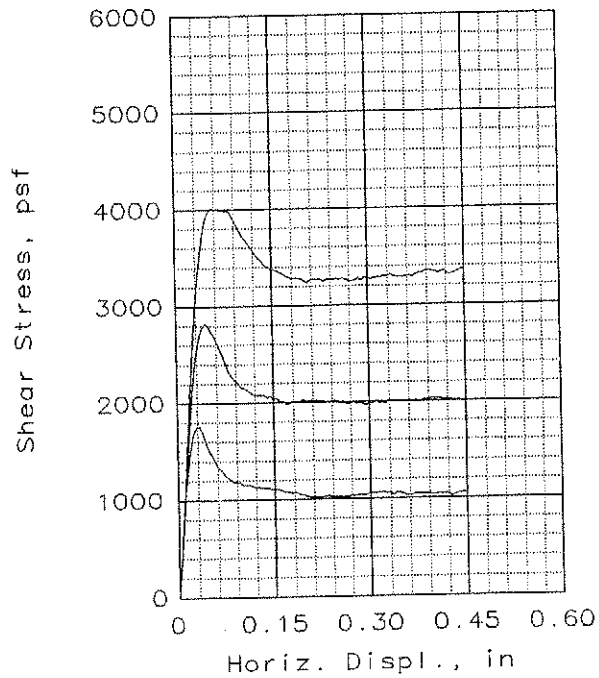
PROJECT: Mesas West

SAMPLE LOCATION: B-1W @ 10-15 ft

PROJ. NO.: 04-1703W-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	6.1	5.4	6.4
	DRY DENSITY, pcf	129.0	129.6	128.4
	SATURATION, %	57.3	51.5	59.2
	VOID RATIO	0.282	0.276	0.288
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	10.7	11.1	11.6
	DRY DENSITY, pcf	128.9	127.9	126.6
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.284	0.293	0.306
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.01	1.01
NORMAL STRESS, psf		1500	3000	5000
PEAK STRESS, psf		1752	2820	4008
DISPLACEMENT, in		0.03	0.05	0.06
ULTIMATE STRESS, psf		1356	2424	3684
DISPLACEMENT, in		0.06	0.08	0.11
Strain rate, %/min		0.01	0.01	0.01

SAMPLE TYPE: Remold
DESCRIPTION: Silty SAND with gravel (SM)

SPECIFIC GRAVITY= 2.65
REMARKS: Remolded to 90% of MDD (TQs derived)
% fines = 19.6

Fig. No.: B5.65

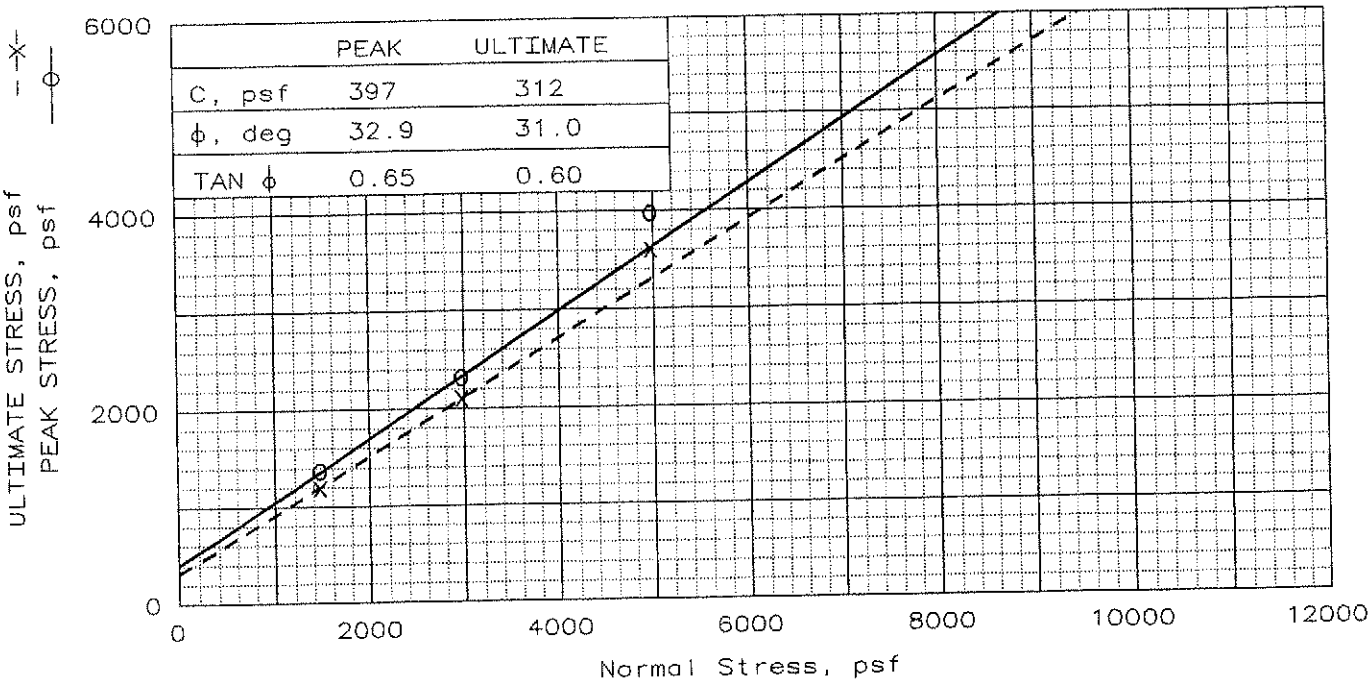
CLIENT: Newhall Ranch Co.

PROJECT: Mesas West

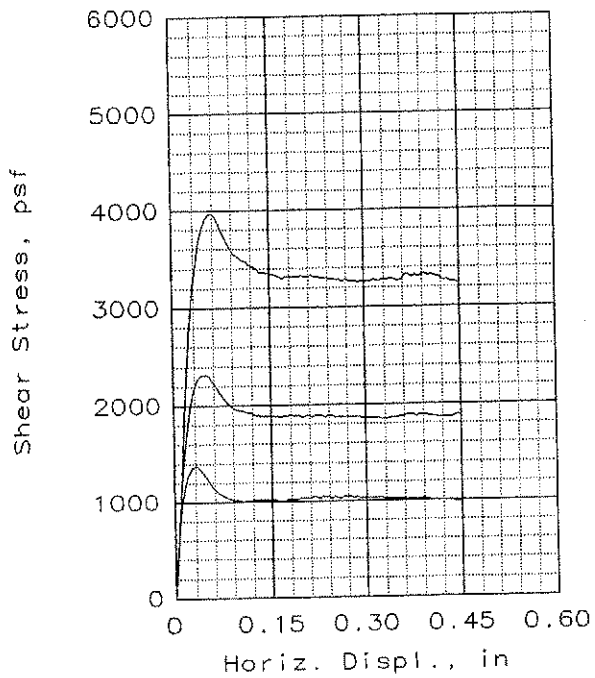
SAMPLE LOCATION: B-2W @ 10-15 ft

PROJ. NO.: 04-1703W-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.



	PEAK	ULTIMATE
C, psf	397	312
ϕ, deg	32.9	31.0
TAN ϕ	0.65	0.60



	SAMPLE NO.:	1	2	3
INITIAL	WATER CONTENT, %	8.2	8.2	8.7
	DRY DENSITY, pcf	123.7	123.7	123.5
	SATURATION, %	64.3	64.3	67.9
	VOID RATIO	0.337	0.338	0.339
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	12.5	12.1	11.9
	DRY DENSITY, pcf	124.3	125.2	125.8
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.331	0.322	0.315
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	0.99	0.98
	NORMAL STRESS, psf	1500	3000	5000
	PEAK STRESS, psf	1368	2316	3972
	DISPLACEMENT, in	0.03	0.05	0.06
	ULTIMATE STRESS, psf	1188	2100	3600
	DISPLACEMENT, in	0.06	0.08	0.09
	Strain rate, %/min	0.01	0.01	0.01

SAMPLE TYPE: Remold
DESCRIPTION: Silty SAND with gravel (SM)

SPECIFIC GRAVITY= 2.65
REMARKS: Remolded to 90% of MDD (TQs derived)
% fines = 18.8

Fig. No.: B5.66

CLIENT: Newhall Ranch Co.

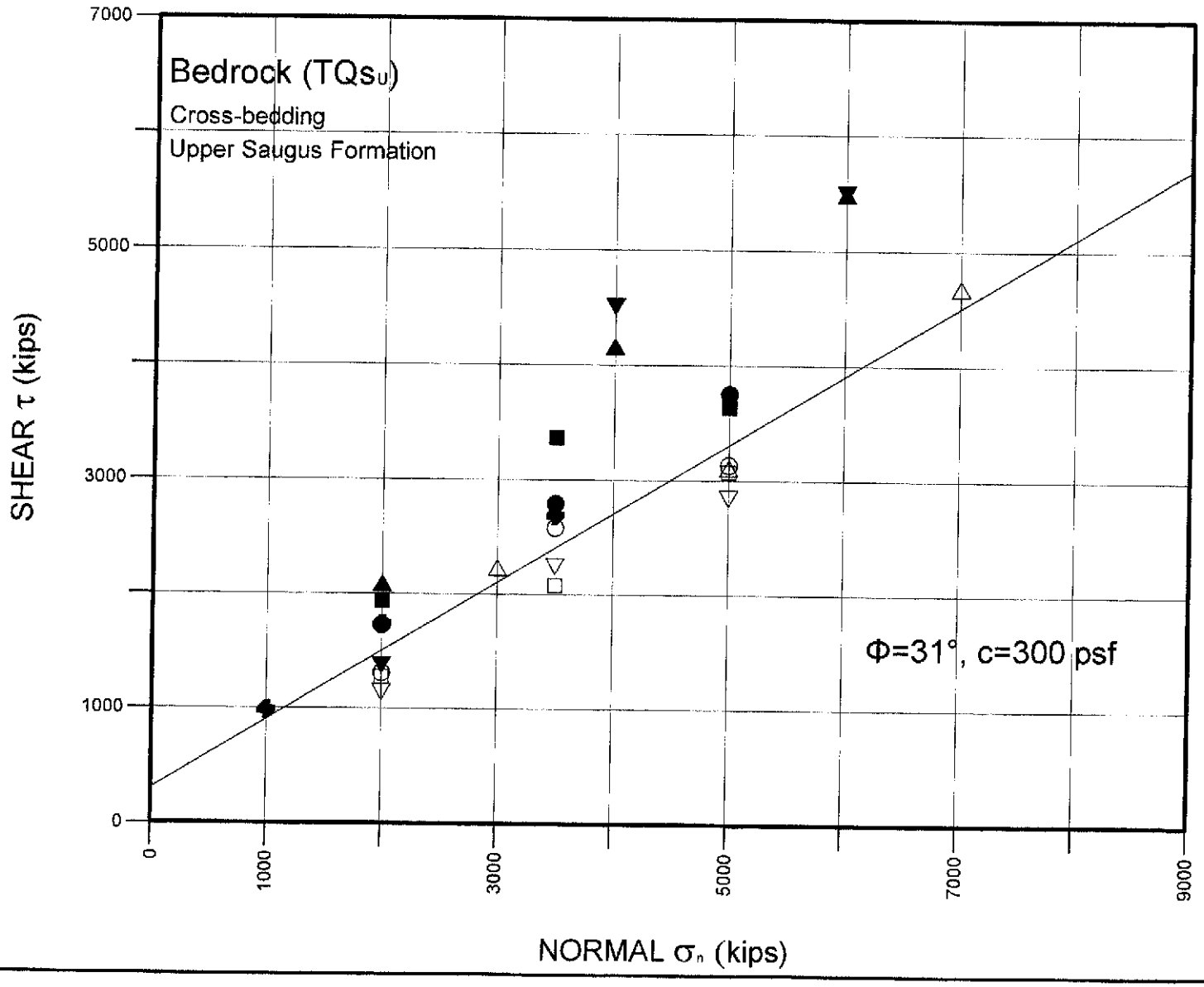
PROJECT: Mesas West

SAMPLE LOCATION: B-9W @ 6-8 ft

PROJ. NO.: 04-1703W-1 DATE: 7/22/04

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.

SUMMARY OF SHEAR TEST DATA



Residual (fine-grained)

- ▽ B-3E @ 5'
- ○ B-41E @ 10'
- □ B-61E @ 10'
- △ B-2M @ 30'

Ultimate (coarse-grained)

- ● B-1E @ 10'
- ■ B-30E @ 10'
- ▲ B-30E @ 30'
- ▼ B-53E @ 40'
- B-1M @ 18'

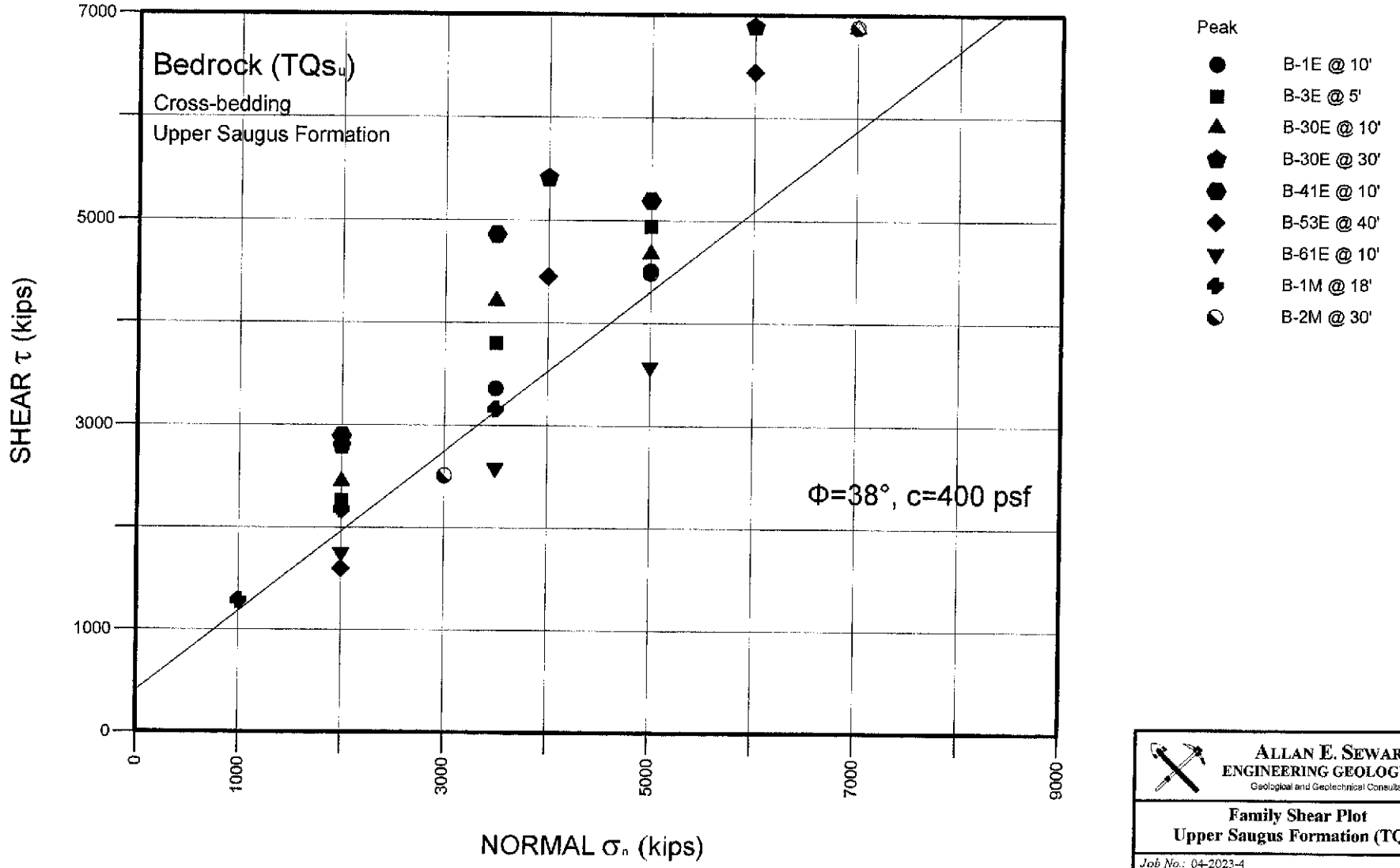
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

Family Shear Plot
Upper Saugus Formation (TQsu)

Job No.: 04-2023-4

Date: 7/22/04 | *Figure:* B6.1

SUMMARY OF SHEAR TEST DATA



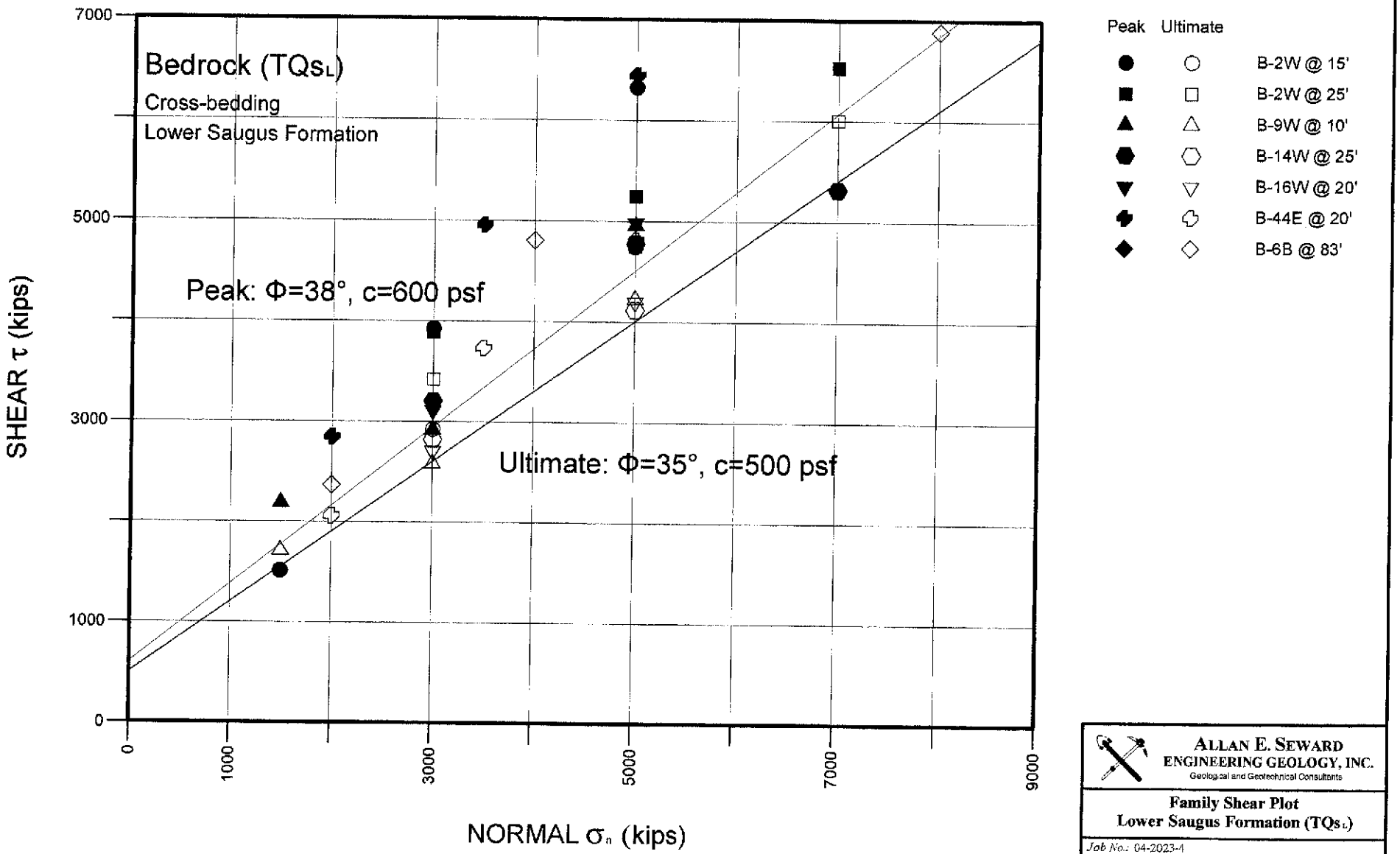
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

Family Shear Plot
Upper Saugus Formation (TQsu)

Job No.: 04-2023-4

Date: 7/22/04 | *Figure:* B6.2

SUMMARY OF SHEAR TEST DATA



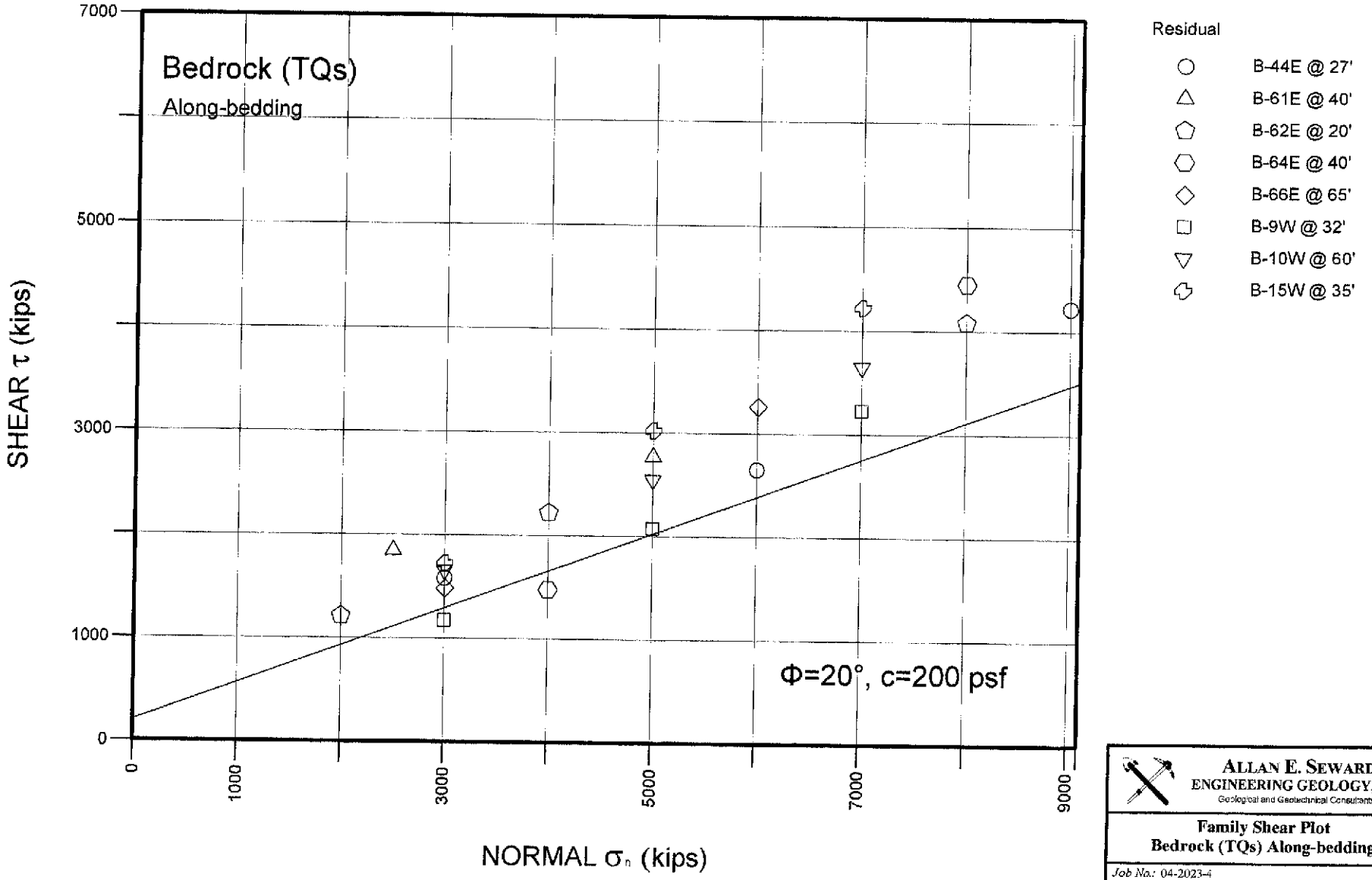
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

Family Shear Plot
Lower Saugus Formation (TQsL)

Job No.: 04-2023-4

Date: 7/22/04 | Figure: B6.3

SUMMARY OF SHEAR TEST DATA



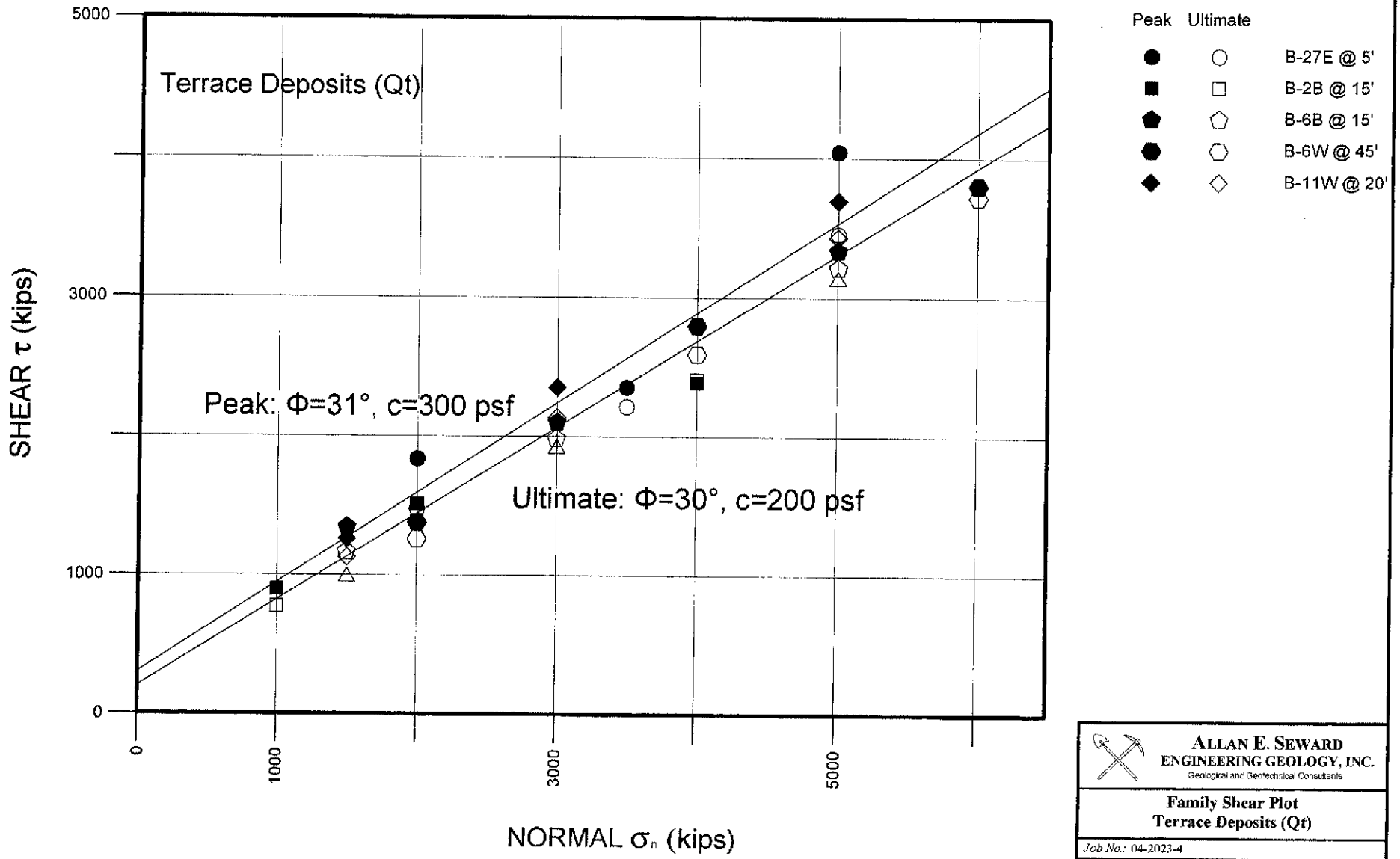
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

Family Shear Plot
Bedrock (TQs) Along-bedding

Job No.: 04-2023-4

Date: 7/22/04 | *Figure:* B6.4

SUMMARY OF SHEAR TEST DATA



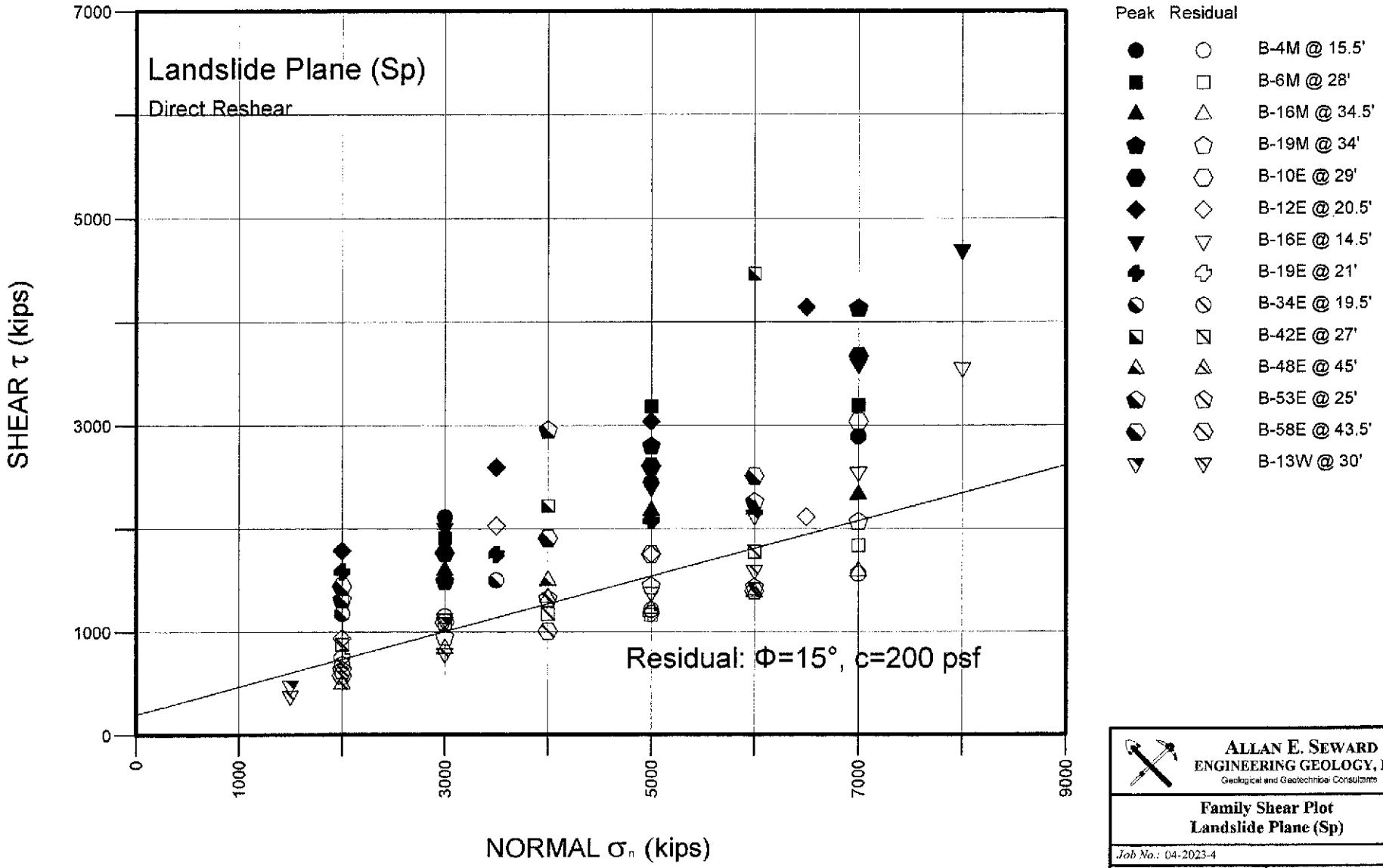
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

Family Shear Plot
Terrace Deposits (Qt)

Job No.: 04-2023-4

Date: 7/22/04 | *Figure:* B6.5

SUMMARY OF SHEAR TEST DATA



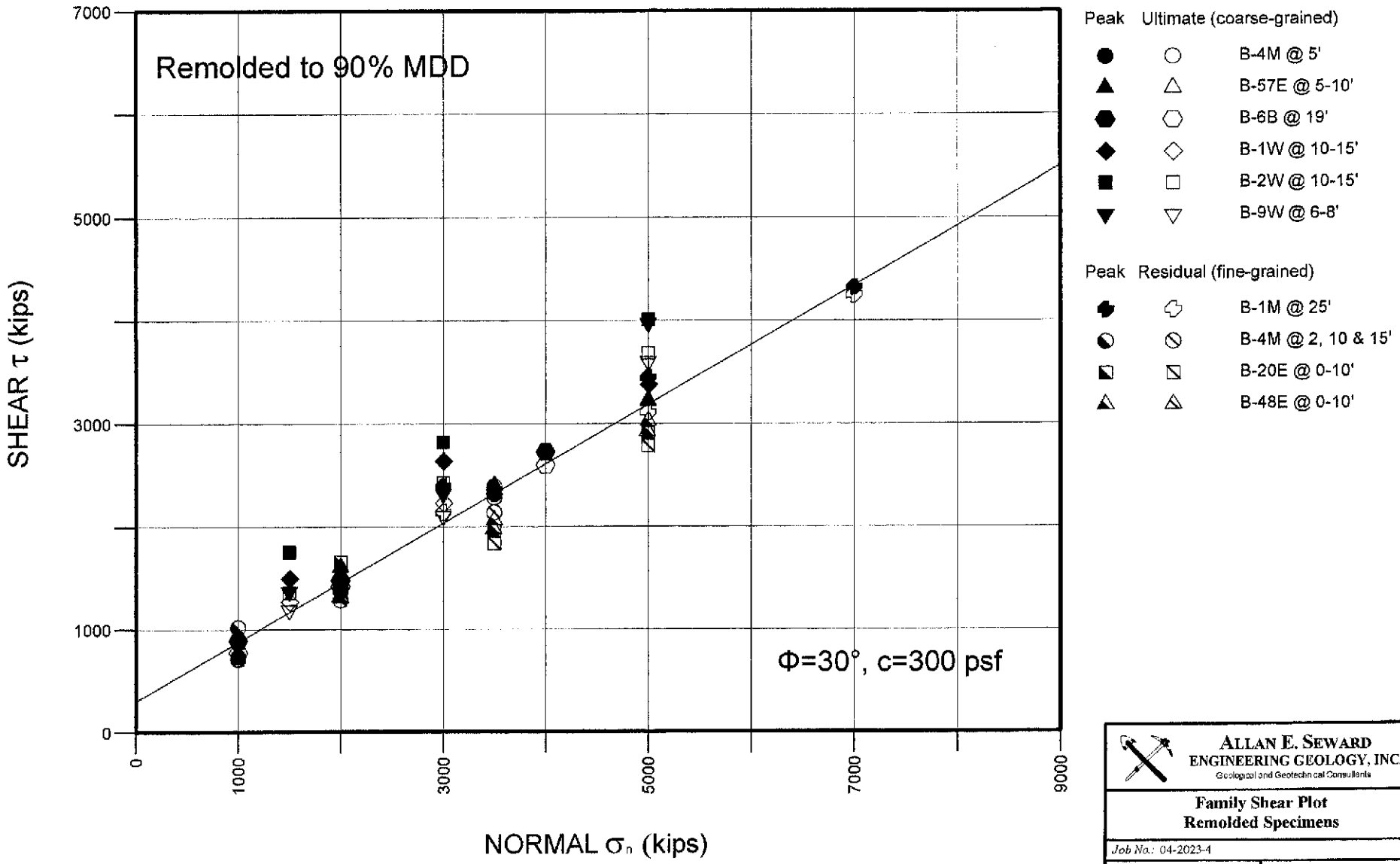
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

Family Shear Plot
Landslide Plane (Sp)

Job No.: 04-2023-4

Date: 7/22/04 | *Figure:* B6.7

SUMMARY OF SHEAR TEST DATA



ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

Family Shear Plot
Remolded Specimens

Job No.: 04-2023-4

Date: 7/22/04 | *Figure:* B6.8

Appendix C

APPENDIX C

LIQUEFACTION POTENTIAL ASSESSMENT AND EVALUATION OF EARTHQUAKE-INDUCED SETTLEMENTS

1. Introduction

Based on the field and laboratory data presented in this report, the liquefaction potential and estimated seismic settlements of the Mesas East Tract have been performed following the procedures of the referenced 2001 NCEER/NSF *Liquefaction Resistance of Soils: Summary Report* written by Youd, Idriss, et al. The percentage of fines used in the liquefaction analyses was that determined following the procedures of the referenced *Cyclic Liquefaction and its Evaluation Based on the SPT and CPT* by Robertson and Wride, 1997. Based on the results of our calculations of liquefaction potential and seismic settlements, recommendations for removals of upper relatively weak soils have been prepared for the Mesas East Tract. These removals are shown on the Geologic/Geotechnical Map.

The liquefaction potential and seismic settlement analyses were performed following current criteria of the County of Los Angeles and the referenced DMG SP 117 Guidelines. Results of our analyses of CPT data for the site indicate that the in-situ subsurface soils below our recommended removal depths generally (based on cone-tip penetration resistance and interpreted soil types) reveal low potential for significant liquefaction and seismic settlements.

2. Data and Assumptions

Based on the probabilistic seismic hazard analyses (PSHA) presented in Appendix D of this report, a design basis earthquake (DBE) magnitude of 6.5 generating an estimated peak horizontal ground acceleration of 0.88g and a horizontal acceleration of 0.59g corresponding to an earthquake with a weighted magnitude of 7.5 were used for the liquefaction and earthquake-inducted settlement analyses of the Mesas East Tract site.

Data included tip resistances and friction ratios obtained from CPT sounding data, together with soil types and ground water levels obtained from nearby borings, piezometers and waterwells. As illustrated on Figures C-17 and C-18 of this appendix, the results from two hollow-stem borings (HS-4T and HS-10T) next to CPT sounding locations (CPT-9M and CPT-5M, respectively) verify the soil parameters interpreted from CPT logs. Based on the field data presented in this report, the cone-tip resistances

and percent fines interpreted from the CPTs used in the analyses are conservative relative to the blow counts and the percent fines measured from the hollow-stem borings drilled at the site.

For analysis, historic ground water depths ranging between 10 ft. and 30 ft. at the locations analyzed were used. Per boring log and CPT data, ground water depths at the time of the explorations ranged between 11 feet and 35 feet at the CPT locations analyzed for the current study.

Youd, Idriss, et al (NCEER/NSF), 2001, present design curves of Cyclic Resistance Ratio (CRR) vs corrected cone-tip resistance $(q_{c\,1N})_{cs}$, based on actual field performance during earthquakes (cases where evidence of liquefaction has been observed). These curves separate liquefaction and non-liquefaction conditions. Therefore, liquefiable zones in this analysis are based upon the premise that liquefaction potential exists if the Cyclic Resistance Strength (CRR times effective overburden pressure) against liquefaction is less than the earthquake-induced Cyclic Stress (CS). This is to say that liquefiable zones are located where the CRS/CS ratio (factor of safety against liquefaction) is less than unity. In contrast, the earthquake-induced settlement analysis considers zones that may settle somewhat even though the factor of safety may be greater than one (i.e. a non-liquefaction condition).

3. <u>CPT Logs and Interpretations</u>

The interpretations of soil type and percent fines presented in this Appendix were developed following the procedures presented by the referenced 2001 NCEER/NSF *Liquefaction Resistance of Soils: Summary Report* written by Youd, Idriss, et al. The interpretations of soil types shown in the CPT logs in Appendix A follow procedures described by Robertson and Campanella, 1989. Our updated interpretations of soil type and actual tip resistance and friction ratio versus depth, together with interpreted geotechnical parameters for each CPT sounding log analyzed for this report are included as an attachment to this appendix. Details of the CPT data interpretation procedures used to develop the recommendations presented in this report are presented in this Appendix.

APPENDIX C

4. Assessment of Liquefaction Potential

a. Method and Locations Analyzed

Liquefaction is a phenomenon whereby a saturated granular soil temporarily loses its strength because of the buildup of pore water pressure during seismic excitation. This loss of strength may cause structures founded on these soils to experience subsidence and/or lateral movement.

Liquefaction potential analyses are performed by a method first proposed by Seed, et al. (1984) and amended by Youd, Idriss, et al (NCEER/NSF), 2001 as mentioned in Section 2 above. Some data provided by the liquefaction analyses are used for the evaluation of earthquake-induced settlements. Per Seed's method as modified by Youd, Idriss, et. al. (NCEER/NSF), 2001, the earthquake-induced stresses at any depth are estimated and compared with empirically based resistances (strength) for sites where liquefaction has occurred.

The calculation of strength against liquefaction is based on nearly continuous existing soil data (cone-tip resistance, q_c, and friction ratio, f_s, vs depth) from CPTs, together with the calculated effective overburden pressure and estimated percent fines. Corrected cone-tip penetration resistance, q_c, data from continuous CPTs are utilized to determine the strength/overburden pressure ratio for 7.5 magnitude earthquakes. Correction of cone-tip penetration resistance for normalized overburden pressure is provided by Youd, Idriss et al (NCEER/NSF), 2001, by the equation $C_Q = (1/\sigma'_o)^{0.5}$, where σ'_o = effective overburden pressure in TSF. Based on data by Youd, Idriss, et al, (NCEER), 2001, we interpret a maximum value of C_Q of 1.7 and a minimum of 0.5. The corrected CPT parameter $q_{c\,1N}$ is computed as: $q_{c\,1N} = C_Q \times q_c$.

Correction for fines is provided by both Youd & Idriss and Robertson & Wride (both in NCEER, 1997). This correction provides equivalent penetration resistance, q_c, values for clean sand, which is ultimately used to assess strength against liquefaction.

APPENDIX C

The earthquake-induced stress is calculated per the following equation by Seed (1984):

Earthquake-induced stress = $\tau_{av} = 0.65\ (a_{max}/g)\ \sigma_o\ r_d$

Where a_{max}/g = ratio of peak ground acceleration and acceleration of gravity.
σ_o =Total overburden pressure
r_d = stress reduction factor to account for soil deformability

Theoretical factors of safety against liquefaction are calculated using corrected values of cone-tip resistance, $q_{c\ IN}$, from CPT data at nearly continuous 0.5 foot depth intervals, per Youd, Idriss, et.al. (NCEER/NSF) 2001.

b. Results of Liquefaction Potential Assessment

In general, the analyses indicates after the recommended removals are implemented there exists the potential for liquefaction of isolated, thin zones, which are separated by non-liquefiable layers. Results of computer-based calculations for the assessment of liquefaction potential and seismic settlement are summarized in **Table C1** of this Appendix and are presented for individual CPT locations in **Figures C-1** through **C-16** of this appendix. We have attached the typical spreadsheets showing the factor of safety computations (see **Figures C1M**, **C2M**, and **C3M**).

5. <u>Estimation of Earthquake-Induced Settlements</u>

a. Method of Analysis

Earthquake-induced settlements were estimated using procedures presented by Tokimatsu and Seed (1987) for dry/moist soils (above the water table) and saturated sands. Settlement analyses were performed for the same locations analyzed for liquefaction potential to estimate possible range of settlements to be expected at the project site.

Volumetric strains for soils above the water table were estimated using CPT data and estimated cyclic shear strain. **The volumetric strain was then doubled to account**

for multidirectional effects. Settlement was obtained by multiplying the thickness of the soil layer by the calculated volumetric strain.

Cone tip resistances, q_c, used in the settlement calculations above the water table were not corrected for fines content (but were corrected for other factors addressed in the liquefaction potential assessment). Although the referenced procedure applies to both silty and clean sands, the use of the cone tip resistances, q_c, without corrections for fines content produces more conservative results.

Settlements for saturated sands were estimated using the cone tip resistances, q_c, corrected for fines content (i.e. cone-tip-resistance for equivalent clean sand was used) and other factors used for liquefaction analyses. The referenced procedure applies only to saturated clean sands.

Volumetric strain for saturated sands was estimated using the calculated earthquake-induced cyclic shear stress and corrected cone tip resistances, q_c. The settlement was obtained by multiplying the thickness of the liquefied soil layer by the volumetric strain. The volumetric strain obtained from the design chart for saturated sands includes the multidirectional effect.

b. Results of Earthquake-Induced Settlement Analyses

The results of computerized cyclic settlement analyses are presented in **Figures C-1(d)** through **C-16(d)**. A maximum cumulative total seismic settlement of 0.39 inches has been estimated at the CPT-6M location after recommended removals have been performed. Considering the above results, together with the planned 22 foot thick removal and recompacted fill mats to be provided throughout the site, differential settlements are expected to be no greater than 0.26 inch (2/3 x 0.39) in a horizontal distance of 30 feet (per CDMG, Special Publication 117, 1997). The compacted fill mats (removals and recompaction of existing soils plus planned compacted fill) will help mitigate the seismic settlements estimated at the site.

6. Conclusions

The results of the liquefaction assessment indicate that some relatively thin liquefaction-prone zones locally exist at the site at isolated depth intervals (see **Figures C-1** through **C-16**).

APPENDIX C

a. The estimated seismic settlements were also analyzed as noted above. Even though some thin deposits appear to be liquefiable, **the potential seismically-induced settlements in subsurface soils at the site are small at most locations**. The maximum cumulative calculated settlement after removals is 0.39 inches, located near CPT-6M, and differential settlements are expected to be not greater than 0.26 inch in a horizontal distance of 30 ft. Certified compacted fill from proposed removals and recompaction shown in the Geologic/Geotechnical Map, together with planned compacted fill to raise site grades, will help mitigate the expected seismic effects, due to expected bridging effects. Summary **Table C-1** of computed seismic settlement, approximate removal depth, thickness of proposed additional fill, groundwater table depth, effective fill cap thickness, thickness of non-liquefiable material below planned grade and cumulative thickness of potentially liquefiable zones for each CPT location follows the References for this appendix.

b. **Minimal lateral spreading** due to liquefaction is expected at this site for the following reasons:

- Most of the site surface has a very gentle slope to the north site boundary, and,
- Liquefaction potential and associated settlements are considered to be limited at the site.
- Thicknesses of liquefiable layers are relatively small.

7. Recommendations

Based on the expected cyclic settlements after the recommended removals of alluvial soils, no special structural reinforcement of light-framed buildings to further mitigate the above-mentioned settlements is recommended for most areas of the subject Mesas East Tract.

APPENDIX C

The following attachments complete this Appendix.

• Liquefaction Potential Assessment References	
• Spreadsheets of Liquefaction Potential Analyses for CPT-01M, CPT-02M, and CPT-06M	Figures C-1M, C-2M & C-6M
• Graphs of the Assessment of Liquefaction Potential and Earthquake-Induced Settlements for CPT-1M through CPT-15M and CPT-18M	Figures C-1 thru C-16
• Graphs Comparing Actual SPT Blow Counts and Percentages of Fines from Borings with CPT Data from Adjacent CPT's for Boring HS-4T vs CPT-9M and Boring HS-10T vs CPT-5M	Figures C-17 & C-18
• Summary Table of Computed Liquefaction Effects	Table C-1
• Interpreted CPT data for CPT-1M through CPT-15M and CPT-18M	

APPENDIX C

REFERENCES FOR LIQUEFACTION POTENTIAL ASSESSMENT

Bartlett, S.F., and Youd, T.L., "Empirical prediction of liquefaction – induced lateral spread", Journal of Geotechnical Engineering, Vol. 121, No. 4, April 1995

California Division of Mines and Geology, Special Publication 117, "Guidelines for Evaluating and Mitigating Seismic Hazards in California", adopted by the State on March 13, 1997.

Douglas, B.J., and Olsen, R.S., "Soil classification using Electric Cone Penetrometer", ASCE Special Technical Publication, ST. Louis, Missouri, October, 1981.

Douglas, B.J., Olsen, R.S., and Martin, G.R., "Evaluation of the Cone Penetrometer Test for use in SPT--Liquefaction Potential Assessment," ASCE Preprint Volume No. 81-544, St. Louis, Missouri, October 1981.

Fear and McRoberts, "Reconsideration of initiation of liquefaction in sandy soils", ASCE Geotechnical Journal, March 1995.

Housner, G.W., Chairman of Committee on Earthquake Engineering, Book, "Liquefaction of soils during earthquakes", p. 110-114, National Academy Press, 1985.

Ishihara, K., "Soil Behaviour in Earthquake Geotechnics", Clarendon Press, Oxford, 1996.

Ishihara, K., "Stability of natural deposits during earthquakes", Proceedings of the Eleventh International Conference on Soil Mechanics and Foundation Engineering, A.A. Balkema Publishers, Rotterdame, Netherlands, 1985

Liao, S.S.C., and Whitman, R.V., "Overburden correction factors for SPT in sand", Journal of Geotechnical Engineering, Vol. 112, No. 3, March 1986.

Olsen, Richard S., "Cyclic Liquefaction Based on the Cone Penetrometer Test" in the *Proceedings of the NCEER Workshop on Evaluating the Liquefaction Resistance of Soils*, edited by Youd, T.L. and Idriss, I.M., Technical Report NCEER-97-0022, pp. 225-276, 1997

Pradel, D., "Procedure to evaluate earthquake-induced settlements in dry sandy soils," Journal of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 124, No. 4, April 1998.

Proprietary charts for correction of blow-count by sampler type to N-SPT

Robertson, P.K., and Fear, C.E., "Soil liquefaction and its evaluation based on SPT and CPT" Liquefaction Workshop, University of Alberta, January 1996.

Robertson, P.K., and Fear, C.E., "Liquefaction of sands and its evaluation", First International Conference and Earthquake Geotechnical Engineering, 1995.

Robertson, P.K., and Campanella, R.G., "Guidelines for Geotechnical Design using the Cone Penetrometer Test and CPT with Pore Pressure Measurement", University of Alberta and University of British Columbia, 4th edition, 1989.

Robertson, P. K., and Wride, C.F., "Cyclic Liquefaction and its Evaluation Based on the SPT and CPT" in the *Proceedings of the NCEER Workshop on Evaluating the Liquefaction Resistance of Soils*, edited by Youd, T.L. and Idriss, I.M., Technical Report NCEER-97-0022, pp. 41-87, 1997

APPENDIX C

Seed, H.B., "Design problems in soil liquefaction," Report No. UCB/EERC-86/02, February, 1986

Seed, H.B., Tokimatsu, K., Harder, L.F., and Chung, R.M., "The influence of SPT procedures in soil liquefaction resistance evaluations", Earthquake Engineering Research Center Report No. 84/15, University of California, Berkeley, 1984.

Seed, H.B., Idriss, I.M., and Arango, I., "Evaluation of liquefaction potential using field performance data", ASCE Journal of Geotechnical Engineering, Vol. 109, No.3, March 1983.

Seed, H.B. and Idriss, I.M., "Ground motions and soil liquefaction during earthquakes", 1982, Monograph, Earthquake Engineering Research Institute.

Seed, H.B. and Idriss, I.M., "A simplified procedure for evaluating soil liquefaction potential", EERC 70-9, Nov. 1970.

Tokimatsu, K. and Seed, H.B., "Evaluation of settlements in sands due to earthquake shaking", ASCE Journal of Geotechnical Engineering, Vol. 113, No. 8, August, 1987.

University of Southern California (USC), Southern California Earthquake Center, Workshop on "Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California", USC, Los Angeles, California, June 17, 1999.

Youd, T.L. and Idriss, I.M., editors, "Proceedings of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils", Technical Report NCEER-97-0022, December, 1997.

Youd, T.L., Idriss, I.M., et al "Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils", Vol. 127, No. 10, ASCE Journal of Geotechnical and Geoenvironmental Engineering, October 2001.

Youd, T. Leslie, Hanson, Corbett M. and Bartlett, Steven F. "Revised Multilinear Regression Equations for Prediction of Lateral Spread Displacement", Vol. 128, No. 12, ASCE Journal of Geotechnical and Geoenvironmental Engineering, December 2002.

LIQUEFACTION POTENTIAL AND CYCLIC SETTLEMENT ANALYSIS

PROJECT: **Mesas East**
Job No.: **04-1703E-1**

Location	CPT-1M	Basic Earthquake Magnitude	7.5	Conditions:	Existing conditions with historic groundwater level
Type of Sampler (CPT/SPT/CD)	CPT	Approx. Distance From Site (miles)	4.2		
Ground Surface Elevation	1264 ft. MSL	Design Magnitude	6.5		
Existing Ground Water Depth	25 ft. Below GL	Peak Ground Accel (M = 7.5)	0.59 g		
Historic Ground Water Depth	20.0 ft. Below GL	Design PGA (M = 6.5)	0.66 g		
		Magnification Factor	1.0		

Layer No.	Mid-layer Depth (ft)	Elevation (ft. MSL)	Depth of layer below Ground Level (ft) Top	Bottom	Total Unit Wt. (1). (kcf)	Total Stress (2) (ksf)	Effective Stress (3) (ksf)	CPT Tip Resistance (4) (kips/sq ft)	F, % normalized (5)	1st trial I_c (6)	2nd trial I_c (7)	exponent n of Final I_c and q_{c1N} (8).	q_{c1N} normalized kips/ft2 (9).	Final I_c (10)	K_c factor for fines (11).	Equivalent $(q_{c1N})_{cs}$ clean sand (12)	Percent Fines, % Estimated (13).	Lab (14).	Cyclic Resistance Ratio (15) M=7.5	Cyclic Resistance M = 7.5 (ksf) (12)	Stress Reduction Factor, r_d (13).	Induced Stress M = 7.5 (ksf) (14)	Theoretical Factor of Safety (15).
1	0.25	1263.8	0	0.49	0.120	0.029	0.029	616.82	2.190	1.7776	1.5624	0.50	2472.43	1.562	1.000	2472.42	4		>0.6	>5.0	0.999	0.011	Non Liquefiable
2	0.74	1263.3	0.49	0.98	0.120	0.088	0.088	330.78	2.951	1.6931	1.7867	0.50	765.50	1.789	1.095	840.93	6		>0.6	>5.0	0.998	0.034	Non Liquefiable
3	1.23	1262.8	1.0	1.48	0.120	0.148	0.148	298.72	2.502	1.6389	1.5222	0.50	428.65	1.822	1.123	481.67	9		>0.6	>5.0	0.997	0.056	Non Liquefiable
4	1.73	1262.3	1.48	1.97	0.120	0.207	0.207	285.42	1.881	1.5297	1.7096	0.50	435.69	1.710	1.045	455.09	6		>0.6	>5.0	0.996	0.079	Non Liquefiable
5	2.22	1261.8	1.97	2.46	0.120	0.286	0.285	388.26	1.111	1.3076	1.4862	0.50	490.93	1.466	1.000	490.93	3		>0.6	>5.0	0.995	0.101	Non Liquefiable
6	2.71	1261.3	2.46	2.95	0.120	0.325	0.325	278.52	1.812	1.6250	1.7111	0.50	335.99	1.711	1.045	351.22	8		>0.6	>5.0	0.994	0.124	Non Liquefiable
7	3.20	1260.8	2.95	3.44	0.120	0.383	0.383	227.66	2.003	1.6738	1.8588	0.50	252.70	1.859	1.152	291.19	9		>0.6	>5.0	0.993	0.146	Non Liquefiable
8	3.69	1260.3	3.44	3.94	0.120	0.443	0.443	158.44	3.399	1.9703	2.1490	0.50	163.64	2.149	1.551	253.75	17		>0.6	>5.0	0.991	0.168	Non Liquefiable
9	4.19	1259.8	3.94	4.43	0.120	0.502	0.502	167.10	2.095	1.7734	1.9463	0.50	191.16	1.946	1.236	236.24	12		>0.6	>5.0	0.990	0.191	Non Liquefiable
10	4.68	1259.3	4.43	4.92	0.120	0.561	0.561	219.12	1.474	1.6435	1.6135	0.50	201.07	1.614	1.117	224.62	8		>0.6	>5.0	0.989	0.213	Non Liquefiable
11	5.17	1258.8	4.92	5.41	0.120	0.620	0.620	189.40	2.868	1.9135	2.0572	0.50	174.08	2.057	1.382	240.61	15		>0.6	>5.0	0.988	0.235	Non Liquefiable
12	5.66	1258.3	5.41	5.91	0.120	0.679	0.679	248.44	1.504	1.6694	1.6120	0.50	207.19	1.612	1.115	231.11	8		>0.6	>5.0	0.987	0.257	Non Liquefiable
13	6.16	1257.8	5.91	6.40	0.120	0.739	0.739	123.78	3.830	2.1435	2.2825	0.50	92.89	2.283	1.894	187.40	22		>0.6	>5.0	0.986	0.279	Non Liquefiable
14	6.65	1257.4	6.40	6.89	0.120	0.797	0.797	82.14	2.615	2.1948	2.3363	0.50	63.22	2.336	2.078	131.35	24		0.291	0.232	0.985	0.301	0.77
15	7.14	1256.9	6.89	7.38	0.120	0.856	0.856	94.70	2.311	2.1340	2.2676	0.50	70.34	2.268	1.840	130.05	21		0.285	0.244	0.983	0.323	0.75
16	7.63	1256.4	7.38	7.87	0.120	0.915	0.915	85.27	2.252	2.1437	2.2664	0.50	68.42	2.266	1.851	126.65	21		0.269	0.246	0.982	0.345	0.71
17	8.12	1255.9	7.87	8.37	0.120	0.974	0.974	199.72	2.626	2.0564	2.1713	0.50	111.21	2.171	1.599	177.86	18		>0.6	>5.0	0.981	0.367	Non Liquefiable
18	8.62	1255.4	8.37	8.86	0.120	1.034	1.034	255.10	1.667	1.8312	1.6974	0.50	172.44	1.697	1.186	204.68	10		>0.6	>5.0	0.980	0.388	Non Liquefiable
19	9.11	1254.9	8.86	9.35	0.120	1.093	1.093	241.30	0.914	1.8331	1.7339	0.50	156.66	1.734	1.061	166.29	7		>0.6	>5.0	0.979	0.410	Non Liquefiable
20	9.60	1254.4	9.35	9.84	0.120	1.151	1.151	223.42	1.910	1.9120	1.9851	0.50	143.10	1.995	1.204	125.13	13		>0.6	>5.0	0.978	0.432	Non Liquefiable
21	10.09	1253.9	9.84	10.33	0.120	1.210	1.210	210.48	2.132	1.9702	2.0552	0.50	131.49	2.056	1.379	181.37	14		>0.6	>5.0	0.976	0.453	Non Liquefiable
22	10.58	1253.4	10.33	10.83	0.120	1.270	1.270	163.68	3.721	2.2872	2.3348	0.50	93.74	2.335	2.065	163.56	24		>0.6	>5.0	0.976	0.476	Non Liquefiable
23	11.08	1252.9	10.83	11.32	0.120	1.328	1.328	148.80	4.276	2.3368	2.3972	0.50	86.53	2.397	2.301	203.70	28		>0.6	>5.0	0.974	0.497	Non Liquefiable
24	11.57	1252.4	11.32	11.81	0.120	1.388	1.388	128.82	4.731	2.4212	2.4702	0.50	75.15	2.479	2.651	199.25	30		>0.6	>5.0	0.973	0.518	Non Liquefiable
25	12.06	1251.9	11.81	12.30	0.120	1.447	1.447	93.14	5.241	2.5681	2.6082	0.70	57.43	2.585	3.243	186.27	35		>0.6	>5.0	0.972	0.539	Non Liquefiable
26	12.55	1251.5	12.30	12.80	0.120	1.506	1.506	122.12	5.012	2.4779	2.5218	0.50	68.36	2.522	2.881	197.05	32		>0.6	>5.0	0.971	0.561	Non Liquefiable
27	13.05	1251.0	12.8	13.29	0.120	1.566	1.565	138.44	6.099	2.5213	2.5585	0.50	76.05	2.558	3.082	234.36	33		>0.6	>5.0	0.970	0.582	Non Liquefiable
28	13.54	1250.5	13.29	13.78	0.120	1.624	1.624	183.2	4.101	2.3510	2.3640	0.50	66.01	2.365	2.251	196.09	26		>0.6	>5.0	0.968	0.603	Non Liquefiable
29	14.03	1250.0	13.78	14.27	0.120	1.683	1.683	438.7	1.638	1.7584	1.7676	0.50	252.42	1.768	1.009	255.16	8		>0.6	>5.0	0.967	0.624	Non Liquefiable
30	14.52	1249.5	14.27	14.76	0.120	1.742	1.742	535.66	1.810	1.7761	1.7691	0.50	279.07	1.799	1.105	308.66	8		>0.6	>5.0	0.966	0.645	Non Liquefiable
31	15.01	1249.0	14.76	15.26	0.120	1.801	1.801	602.34	1.624	1.6490	1.6672	0.50	410.86	1.667	1.015	417.22	6		>0.6	>5.0	0.965	0.667	Non Liquefiable
32	15.51	1248.5	15.26	15.75	0.120	1.861	1.861	586.96	1.768	1.7599	1.7740	0.50	295.75	1.775	1.089	321.98	8		>0.6	>5.0	0.964	0.688	Non Liquefiable
33	16.00	1248.0	15.75	16.24	0.120	1.919	1.919	381.82	2.533	2.0033	2.0146	0.50	180.42	2.016	1.310	249.02	13		>0.6	>5.0	0.963	0.709	Non Liquefiable
34	16.49	1247.5	16.24	16.73	0.120	1.978	1.978	428.98	2.391	1.8910	1.9894	0.50	209.62	1.958	1.261	264.31	12		>0.6	>5.0	0.962	0.729	Non Liquefiable
35	16.98	1247.0	16.73	17.22	0.120	2.037	2.037	331.66	2.868	2.1021	2.1055	0.50	159.62	2.105	1.465	234.10	16		>0.6	>5.0	0.960	0.750	Non Liquefiable
36	17.47	1246.5	17.22	17.72	0.120	2.096	2.096	347.8	2.394	2.0314	2.0311	0.50	165.14	2.031	1.343	221.75	14		>0.6	>5.0	0.959	0.771	Non Liquefiable
37	17.97	1246.0	17.72	18.21	0.120	2.156	2.156	833.9	1.785	1.7165	1.7189	0.50	390.35	1.716	1.049	409.32	6		>0.6	>5.0	0.958	0.792	Non Liquefiable
38	18.46	1245.5	18.21	18.70	0.120	2.215	2.215	861.4	1.384	1.6214	1.6155	0.50	397.63	1.615	1.000	397.63	5		>0.6	>5.0	0.957	0.813	Non Liquefiable
39	18.95	1245.1	18.7	19.19	0.120	2.273	2.273	259.22	2.663	2.1714	2.1688	0.50	118.16	2.169	1.572	185.71	18		>0.6	>5.0	0.956	0.833	Non Liquefiable
40	19.44	1244.6	19.19	19.69	0.120	2.333	2.333	227.82	3.314	2.2876	2.2711	0.50	102.52	2.271	1.859	190.63	21		>0.6	>5.0	0.955	0.854	Non Liquefiable
41	19.94	1244.1	19.69	20.18	0.120	2.392	2.392	222.68	3.487	2.3162	2.2961	0.50	98.05	2.296	1.936	191.59	22		>0.6	>5.0	0.954	0.875	Non Liquefiable
42	20.43	1243.6	20.18	20.67	0.120	2.451	2.424	199.44	3.685	2.3700	2.3473	0.50	88.03	2.347	2.110	185.73	24		>0.6	>5.0	0.952	0.895	Non Liquefiable
43	20.92	1243.1	20.67	21.16	0.120	2.510	2.453	182.58	3.895	2.4272	2.4023	0.50	80.13	2.402	2.322	186.03	27		>0.6	>5.0	0.951	0.916	Non Liquefiable
44	21.41	1242.6	21.16	21.65	0.120	2.569	2.481	401.78	2.676	2.0631	2.0405	0.50	175.32	2.041	1.357	237.85	14		>0.6	>5.0	0.950	0.936	Non Liquefiable
45	21.90	1242.1	21.65	22.15	0.120	2.628	2.509	470.02	3.107	2.0908	2.0666	0.50	203.92	2.069	1.401	285.62	15		>0.6	>5.0	0.949	0.956	Non Liquefiable
46	22.40	1241.6	22.15	22.64	0.120	2.687	2.538	320.5	3.661	2.2523	2.2283	0.50	190.27	2.226	1.734	339.73	20		>0.6	>5.0	0.948	0.977	Non Liquefiable
47	22.89	1241.1	22.64	23.13	0.120	2.746	2.566	180.36	5.047	2.5208	2.4697	0.50	77.38	2.490	2.717	210.26	30		>0.6	>5.0	0.947	0.997	Non Liquefiable
48	23.38	1240.6	23.13	23.62	0.120	2.805	2.594	106.74	5.046	2.7157	2.7157	1.00	40.06	2.716	4.112	Fine-Grained	41		>0.6	>5.0	0.945	1.017	Non Liquefiable
49	23.87	1240.1	23.62	24.11	0.120	2.864	2.623	192.82	3.461	2.3848	2.3404	0.50	81.83	2.340	2.117	173.26	24		>0.6	>5.0	0.944	1.037	Non Liquefiable
50	24.36	1239.6	24.11	24.61	0.120	2.923	2.651	194.58	3.777	2.4135	2.3768	0.50	82.13	2.377	2.220	182.34	25		>0.6	>5.0	0.943	1.057	Non Liquefiable
51	24.86	1239.1	24.61	25.10	0.120	2.983	2.680	380.44	2.821	2.1067	2.0721	0.50	151.33	2.072	1.406	212.84	16		>0.6	>5.0	0.942	1.078	Non Liquefiable
52	25.35	1238.7	25.10	25.59	0.120	3.041	3.020	763	1.737	1.8129	1.7672	0.50	297.61	1.767	1.080	322.06	7		>0.6	>5.0	0.941	1.097	Non Liquefiable
53	25.84	1238.2	25.59	26.08	0.120	3.100	3.048	644.5	2.050	1.9134	1.8656	0.50	253.67	1.866	1.158	294.06	10		>0.6	>5.0	0.940	1.117	Non Liquefiable
54	26.33	1237.7	26.08	26.57	0.120	3.159	3.076	585.46	2.443	2.0021	1.9535	0.50	229.41	1.954	1.244	285.34	12		>0.6	>5.0	0.939	1.137	Non Liquefiable
55	26.82	1237.2	26.57	27.07	0.120	3.218	3.105	505.2	2.425	2.0412	1.9882	0.50	197.66	1.989	1.285	253.44	13		>0.6	>5.0	0.937	1.157	Non Liquefiable
56	27.32	1236.7	27.07	27.56	0.120	3.278	3.133	363.62	2.838	2.1986	2.1425	0.50	141.30	2.143	1.537	217.22	17		>0.6	>5.0	0.936	1.177	Non Liquefiable
57	27.81	1236.2	27.56	28.05	0.120	3.337	3.162	341.88	2.807	2.2040	2.1454	0.50	132.15	2.145	1.543	203.93	17		>0.6	>5.0	0.935	1.197	Non Liquefiable
58	28.30	1235.7	28.05	28.54	0.120	3.395	3.190	338.08	2.606	2.1835	2.1227	0.50	130.45	2.123	1.497	195.33	17		>0.6	>5.0	0.934	1.216	Non Liquefiable
59	28.79	1235.2	28.54	29.04	0.120	3.455	3.218	249.4	3.549	2.3784	2.3148	0.50	95.17	2.315	1.897	180.04	23		>0.6	>5.0	0.933	1.236	Non Liquefiable
60	29.29	1234.7	29.04	29.53	0.120	3.514	3.247	335.68	2.486	2.1780	2.1140	0.50	128.42	2.114	1.481	190.14	16		>0.6	>5.0	0.932	1.256	Non Liquefiable
61	29.78	1234.2	29.53	30.02	0.120	3.573	3.275	230.04	3.139	2.3684	2.2977	0.50	87.67	2.298	1.941	170.19	22		>0.6	>5.0	0.931	1.275	Non Liquefiable
62	30.27	1233.7	30.02	30.51	0.120	3.632	3.303	126.58	6.333	2.7190	2.7190	1.00	37.22	2.720	4.143	Fine-Grained	42		>0.6	>5.0	0.928	1.292	Non Liquefiable
63	30.76	1233.2	30.51	31.00	0.120	3.691	3.331	146.54	4.827	2.6328	2.6328	1.00	42.86	2.633	3.534	Fine-Grained	37		>0.6	>5.0	0.924	1.307	Non Liquefiable
64	31.25	1232.8	31.00	31.50	0.120	3.750	3.360	140.34	5.158	2.6828	2.6828	1.00	40.65	2.683	3.673	Fine-Grained	40		>0.6	>5.0	0.920	1.323	Non Liquefiable
65	31.75	1232.3	31.5	31.99	0.120	3.809	3.389	302.18	2.833	2.2400	2.1661	0.50	112.82	2.166	1.592	179.64	18		>0.6	>5.0	0.916	1.338	Non Liquefiable
66	32.24	1231.8	31.99	32.48	0.120	3.868	3.417	198.6	4.937	2.5723	2.4967	0.50	73.84	2.490	2.762	203.95	31		>0.6	>5.0	0.912	1.352	Non Liquefiable
67	32.73	1231.3	32.48	32.97	0.120	3.927	3.445	310.6	4.405	2.4047	2.3385	0.50	117.24	2.338	2.071	242.82	24		>0.6	>5.0	0.908	1.367	Non Liquefiable
68	33.22	1230.8	32.97	33.46	0.120	3.980	3.473	1096.48	1.937	1.8025	1.7481	0.50	405.11	1.746	1.069	433.03	7		>0.6	>5.0	0.904	1.381	Non Liquefiable

LIQUEFACTION POTENTIAL AND CYCLIC SETTLEMENT ANALYSIS

PROJECT: Mesas East
Job No.: 04-1703E-1

Location	CPT-2M	Basic Earthquake Magnitude	7.5
Type of Sampler (CPT/SPT/CD)	CPT	Approx. Distance From Site (miles)	4.2
Ground Surface Elevation	1023 ft. MSL	Design Magnitude	6.5
Existing Ground Water Depth	11 ft. Below GL	Peak Ground Accel (M = 7.5)	0.59 g
Historic Ground Water Depth	10.0 ft. Below GL	Design PGA (M = 6.5)	0.88 g
		Magnification Factor	1.0

Conditions: Existing conditions with historic groundwater level

Layer No.	Mid-layer Depth (ft)	Elevation (ft. MSL)	Depth of layer below Ground Level (ft) Top	Bottom	Total Unit Wt. (1). (kcf)	Total Stress (2) (ksf)	Effective Stress (3) (ksf)	CPT Tip Resistance (4) (kips/sq ft)	F_r % normalized (5).	1st trial I_c (6)	2nd trial I_c (7)	exponent n of Final I_c and q_{c1N} (8).	q_{c1N} normalized kips/ft2 (9).	Final I_c (10)	K_c factor for fines (11).	Equivalent $(q_{c1N})_{cs}$ clean sand (12)	Percent Fines, % Estimated (13).	Lab (14)	Cyclic Resistance Ratio (15) M=7.5	Cyclic Resistance M = 7.5 (ksf) (12)	Stress Reduction Factor, r_d (13).	Induced Stress M = 7.5 (ksf) (14)	Theoretical Factor of Safety (15).
1	0.25	1022.8	0	0.49	0.120	0.029	0.029	605.09	0.780	1.4005	1.1209	0.50	2427.78	1.121	1.000	2427.78	0		>0.6	>5.0	0.999	0.011	Non Liquefiable
2	0.74	1022.3	0.49	0.98	0.120	0.088	0.088	363.32	1.320	1.3485	1.4473	0.50	840.80	1.447	1.000	840.80	2		>0.6	>5.0	0.998	0.034	Non Liquefiable
3	1.23	1021.8	1.0	1.48	0.120	0.148	0.148	287.02	1.441	1.3905	1.5740	0.50	513.46	1.574	1.000	513.46	4		>0.6	>5.0	0.997	0.056	Non Liquefiable
4	1.73	1021.3	1.48	1.97	0.120	0.207	0.207	201.78	0.851	1.2488	1.5147	0.50	304.81	1.515	1.000	304.81	3		>0.6	>5.0	0.996	0.079	Non Liquefiable
5	2.22	1020.8	1.97	2.46	0.120	0.266	0.266	153.84	1.473	1.5586	1.8001	0.50	204.82	1.808	1.113	227.88	6		>0.6	>5.0	0.995	0.101	Non Liquefiable
6	2.71	1020.3	2.46	2.95	0.120	0.325	0.325	143.14	1.423	1.6028	1.8454	0.50	172.87	1.845	1.141	197.09	9		>0.6	>5.0	0.994	0.124	Non Liquefiable
7	3.20	1019.8	2.95	3.44	0.120	0.383	0.383	131.72	1.003	1.5584	1.8047	0.50	146.21	1.805	1.110	162.31	8		>0.6	>5.0	0.993	0.146	Non Liquefiable
8	3.69	1019.3	3.44	3.94	0.120	0.443	0.443	120.90	1.395	1.7138	1.9372	0.50	124.46	1.937	1.226	152.59	11		0.410	0.182	0.991	0.168	1.08
9	4.19	1018.8	3.94	4.43	0.120	0.502	0.502	138.00	1.114	1.8344	1.8496	0.50	133.84	1.847	1.142	152.88	9		0.412	0.207	0.990	0.191	1.09
10	4.68	1018.3	4.43	4.92	0.120	0.561	0.561	112.34	2.151	1.9444	2.1230	0.50	103.08	2.128	1.610	155.64	17		0.491	0.242	0.989	0.213	1.14
11	5.17	1017.8	4.92	5.41	0.120	0.620	0.620	77.28	2.540	2.1303	2.3093	0.50	67.47	2.309	1.979	133.51	23		0.301	0.187	0.988	0.235	0.80
12	5.66	1017.3	5.41	5.91	0.120	0.679	0.670	79.80	2.481	2.1295	2.3069	0.50	66.65	2.305	1.969	131.05	22		0.289	0.197	0.987	0.257	0.76
13	6.16	1016.8	5.91	6.40	0.120	0.739	0.739	66.80	2.843	2.1608	2.3134	0.50	69.26	2.313	1.992	137.98	23		0.324	0.240	0.986	0.279	0.86
14	6.65	1016.4	6.40	6.89	0.120	0.797	0.797	101.56	2.883	2.1683	2.3037	0.50	78.26	2.304	1.961	153.43	23		0.418	0.332	0.985	0.301	1.10
15	7.14	1015.9	6.89	7.38	0.120	0.856	0.856	104.52	5.334	2.3617	2.5097	0.50	77.25	2.509	2.813	217.34	31		>0.6	>5.0	0.983	0.323	Non Liquefiable
16	7.63	1015.4	7.38	7.87	0.120	0.915	0.916	104.34	5.669	2.4280	2.5950	0.50	76.40	2.535	2.957	222.97	32		>0.6	>5.0	0.982	0.345	Non Liquefiable
17	8.12	1014.9	7.87	8.37	0.120	0.974	0.974	103.04	5.865	2.4608	2.5811	0.50	71.74	2.581	3.097	222.16	33		>0.6	>5.0	0.981	0.367	Non Liquefiable
18	8.62	1014.4	8.37	8.86	0.120	1.034	1.034	95.14	5.985	2.5042	2.5890	0.50	64.31	2.588	3.314	213.16	35		>0.6	>5.0	0.980	0.389	Non Liquefiable
19	9.11	1013.9	8.86	9.35	0.120	1.093	1.093	83.32	5.492	2.5258	2.6150	0.70	62.53	2.577	3.191	199.51	34		>0.6	>5.0	0.979	0.410	Non Liquefiable
20	9.60	1013.4	9.35	9.84	0.120	1.151	1.151	76.22	6.493	2.5658	2.6444	0.70	55.14	2.613	3.408	Fine-Grained	36		>0.6	>5.0	0.978	0.432	Non Liquefiable
21	10.09	1012.9	9.84	10.33	0.120	1.210	1.206	71.34	6.117	2.5746	2.6521	0.70	50.00	2.619	3.443	Fine-Grained	38		>0.6	>5.0	0.976	0.453	Non Liquefiable
22	10.58	1012.4	10.33	10.83	0.120	1.270	1.233	69.18	6.144	2.5923	2.6684	0.70	47.70	2.634	3.643	Fine-Grained	37		>0.6	>5.0	0.975	0.475	Non Liquefiable
23	11.08	1011.9	10.83	11.32	0.120	1.329	1.324	69.48	5.271	2.6196	2.6196	1.00	51.48	2.620	3.450	Fine-Grained	38		>0.6	>5.0	0.974	0.497	Non Liquefiable
24	11.57	1011.4	11.32	11.81	0.120	1.388	1.353	61.60	4.737	2.6288	2.6288	1.00	44.52	2.629	3.508	Fine-Grained	37		>0.6	>5.0	0.973	0.518	Non Liquefiable
25	12.06	1010.9	11.81	12.30	0.120	1.447	1.381	64.42	5.085	2.6959	2.6959	1.00	38.37	2.695	3.880	Fine-Grained	40		>0.6	>5.0	0.972	0.539	Non Liquefiable
26	12.55	1010.5	12.30	12.80	0.120	1.506	1.409	60.18	4.887	2.7168	2.7168	1.00	34.64	2.716	4.113	Fine-Grained	41		>0.6	>5.0	0.971	0.561	Non Liquefiable
27	13.05	1010.0	12.8	13.29	0.120	1.565	1.436	47.64	4.549	2.7161	2.7161	1.00	32.18	2.716	4.115	Fine-Grained	41		>0.6	>5.0	0.970	0.582	Non Liquefiable
28	13.54	1009.5	13.29	13.78	0.120	1.624	1.466	44.48	4.742	2.7589	2.7589	1.00	29.23	2.759	4.446	Fine-Grained	44		>0.6	>5.0	0.968	0.603	Non Liquefiable
29	14.03	1009.0	13.78	14.27	0.120	1.683	1.494	41.78	4.512	2.7715	2.7715	1.00	26.82	2.771	4.547	Fine-Grained	44		>0.6	>5.0	0.967	0.624	Non Liquefiable
30	14.52	1008.5	14.27	14.76	0.120	1.742	1.522	36.2	3.808	2.7845	2.7845	1.00	22.83	2.784	4.654	Fine-Grained	45		>0.6	>5.0	0.966	0.645	Non Liquefiable
31	15.01	1008.0	14.76	15.26	0.120	1.801	1.551	36.54	4.639	2.8376	2.8376	1.00	22.40	2.838	5.113	Fine-Grained	48		>0.6	>5.0	0.965	0.667	Non Liquefiable
32	15.51	1007.5	15.26	15.75	0.120	1.861	1.579	33.44	3.939	2.8286	2.8286	1.00	19.89	2.829	5.032	Fine-Grained	48		>0.6	>5.0	0.964	0.688	Non Liquefiable
33	16.00	1007.0	15.75	16.24	0.120	1.919	1.606	29.88	4.007	2.8790	2.8790	1.00	17.44	2.879	5.495	Fine-Grained	51		>0.6	>5.0	0.963	0.709	Non Liquefiable
34	16.49	1006.5	16.24	16.73	0.120	1.978	1.636	25.06	4.017	2.9516	2.9516	1.00	14.11	2.952	6.220	Fine-Grained	55		>0.6	>5.0	0.962	0.729	Non Liquefiable
35	16.98	1006.0	16.73	17.22	0.120	2.037	1.664	23.84	3.874	2.9533	2.9533	1.00	13.10	2.953	6.239	Fine-Grained	55		>0.6	>5.0	0.960	0.750	Non Liquefiable
36	17.47	1005.5	17.22	17.72	0.120	2.096	1.693	24.56	3.663	2.9480	2.9480	1.00	13.27	2.948	6.184	Fine-Grained	55		>0.6	>5.0	0.959	0.771	Non Liquefiable
37	17.97	1005.0	17.72	18.21	0.120	2.156	1.721	61.62	3.878	2.6294	2.6294	1.00	34.68	2.629	3.512	Fine-Grained	37		>0.6	>5.0	0.958	0.792	Non Liquefiable
38	18.46	1004.5	18.21	18.70	0.120	2.215	1.749	33.32	2.888	2.7658	2.7658	1.00	17.78	2.766	4.601	Fine-Grained	44		>0.6	>5.0	0.957	0.813	Non Liquefiable
39	18.95	1004.1	18.7	19.19	0.120	2.273	1.776	28.52	3.338	2.8866	2.8866	1.00	14.79	2.887	5.566	Fine-Grained	51		>0.6	>5.0	0.956	0.833	Non Liquefiable
40	19.44	1003.6	19.19	19.69	0.120	2.333	1.806	27.26	3.445	2.9181	2.9181	1.00	13.81	2.918	5.877	Fine-Grained	53		>0.6	>5.0	0.955	0.854	Non Liquefiable
41	19.94	1003.1	19.69	20.18	0.120	2.392	1.835	32.88	3.074	2.8242	2.8242	1.00	16.62	2.824	4.904	Fine-Grained	47		>0.6	>5.0	0.954	0.875	Non Liquefiable
42	20.43	1002.6	20.18	20.67	0.120	2.451	1.863	47.08	3.133	2.7046	2.7046	1.00	23.96	2.705	4.030	Fine-Grained	41		>0.6	>5.0	0.952	0.895	Non Liquefiable
43	20.92	1002.1	20.67	21.16	0.120	2.510	1.891	47.34	3.115	2.7069	2.7069	1.00	23.71	2.707	4.044	Fine-Grained	41		>0.6	>5.0	0.951	0.916	Non Liquefiable
44	21.41	1001.6	21.16	21.65	0.120	2.569	1.919	44.85	4.180	2.8123	2.8123	1.00	22.08	2.812	4.890	Fine-Grained	47		>0.6	>5.0	0.950	0.936	Non Liquefiable
45	21.90	1001.1	21.65	22.15	0.120	2.628	1.948	83.5	4.295	2.6196	2.6196	1.00	41.52	2.620	3.449	Fine-Grained	38		>0.6	>5.0	0.949	0.956	Non Liquefiable
46	22.40	1000.6	22.15	22.64	0.120	2.687	1.976	89.7	4.402	2.6093	2.6093	1.00	44.03	2.600	3.384	Fine-Grained	38		>0.6	>5.0	0.948	0.977	Non Liquefiable
47	22.89	1000.1	22.64	23.13	0.120	2.746	2.005	183.96	3.523	2.3267	2.3301	0.50	86.31	2.330	2.046	183.01	24		>0.6	>5.0	0.947	0.997	Non Liquefiable
48	23.38	999.6	23.13	23.62	0.120	2.805	2.033	202.08	3.285	2.2785	2.2813	0.50	97.85	2.281	1.890	184.96	22		>0.6	>5.0	0.945	1.017	Non Liquefiable
49	23.87	999.1	23.62	24.11	0.120	2.864	2.061	176.84	3.151	2.3099	2.3091	0.50	84.88	2.309	1.976	167.47	23		>0.6	>5.0	0.944	1.037	Non Liquefiable
50	24.36	998.6	24.11	24.61	0.120	2.923	2.090	82.28	4.152	2.6001	2.6001	1.00	42.76	2.600	3.327	Fine-Grained	35		>0.6	>5.0	0.943	1.057	Non Liquefiable
51	24.86	998.1	24.61	25.10	0.120	2.983	2.118	82.68	3.952	2.6237	2.6237	1.00	37.77	2.624	3.475	Fine-Grained	37		>0.6	>5.0	0.942	1.078	Non Liquefiable
52	25.35	997.7	25.10	25.59	0.120	3.041	2.146	182.26	2.627	2.2783	2.2713	0.50	85.81	2.271	1.860	159.00	21		0.454	0.975	0.941	1.097	0.89
53	25.84	997.2	25.59	26.08	0.120	3.100	2.174	307.90	1.697	1.9657	1.9597	0.50	171.22	1.960	1.251	214.15	12		>0.6	>5.0	0.940	1.117	Non Liquefiable
54	26.33	996.7	26.08	26.57	0.120	3.159	2.203	190.18	3.681	2.3571	2.3488	0.50	88.07	2.347	2.108	185.65	24		>0.6	>5.0	0.939	1.137	Non Liquefiable
55	26.82	996.2	26.57	27.07	0.120	3.218	2.231	184.82	3.491	2.3537	2.3411	0.50	85.04	2.341	2.068	177.53	24		>0.6	>5.0	0.937	1.157	Non Liquefiable
56	27.32	995.7	27.07	27.56	0.120	3.278	2.260	270.62	3.248	2.2260	2.2128	0.60	123.79	2.213	1.698	210.19	19		>0.6	>5.0	0.936	1.177	Non Liquefiable
57	27.81	995.2	27.56	28.05	0.120	3.337	2.288	557.48	1.298	1.7194	1.7072	0.60	253.30	1.707	1.043	264.12	6		>0.6	>5.0	0.935	1.197	Non Liquefiable
58	28.30	994.7	28.05	28.54	0.120	3.396	2.318	390.82	1.888	1.6470	1.9322	0.50	176.49	1.932	1.221	215.46	11		>0.6	>5.0	0.934	1.218	Non Liquefiable
59	28.79	994.2	28.54	29.04	0.120	3.455	2.345	788.12	1.105	1.5778	1.5632	0.50	354.19	1.563	1.000	354.19	4		>0.6	>5.0	0.933	1.238	Non Liquefiable
60	29.29	993.7	29.04	29.53	0.120	3.514	2.373	816.78	1.828	1.7623	1.7382	0.50	364.40	1.738	1.064	387.57	7		>0.6	>5.0	0.932	1.256	Non Liquefiable
61	29.78	993.2	29.53	30.02	0.120	3.573	2.401	854.34	1.326	1.6278	1.6114	0.50	378.81	1.611	1.000	378.81	5		>0.6	>5.0	0.931	1.275	Non Liquefiable
62	30.27	992.7	30.02	30.51	0.120	3.632	2.430	790.94	0.904	1.5179	1.4978	0.60	348.75	1.496	1.000	348.75	3		>0.6	>5.0	0.928	1.292	Non Liquefiable
63	30.76	992.2	30.51	31.00	0.120	3.691	2.458	260.76	3.419	2.2759	2.2615	0.60	114.31	2.262	1.803	206.08	21		>0.6	>5.0	0.924	1.307	Non Liquefiable
64	31.25	991.8	31.00	31.50	0.120	3.750	2.486	109.46	3.811	2.5758	2.5402	0.60	47.71	2.540	2.980	142.18	33		0.347	0.864	0.920	1.323	0.65
65	31.75	991.3	31.5	31.99	0.120	3.809	2.515	234.12	4.046	2.3681	2.3410	0.50	101.47	2.341	2.087	211.79	24		>0.6	>5.0	0.916	1.338	Non Liquefiable
66	32.24	990.8	31.99	32.48	0.120	3.858	2.543	285.8	2.899	2.2040	2.1748	0.60	123.52	2.175	1.607	198.52	18		>0.6	>5.0	0.912	1.352	Non Liquefiable
67	32.73	990.3	32.48	32.97	0.120	3.927	2.571	629.56	1.580	1.7853	1.7564	0.60	260.63	1.758	1.077	280.69	7		>0.6	>5.0	0.908	1.367	Non Liquefiable
68	33.22	989.8	32.97	33.46	0.120	3.986	2.600	516.16	1.159	1.7425	1.7106	0.60	220.68	1.711	1.046	230.81	6		>0.6	>5.0	0.904	1.381	Non Liquefiable
69	33.71	989.3	33.46	33.96	0.120	4.045	2.628	233.26	2.683	2.2728	2.2352	0.60	98.89	2.236	1.760	174.06	20		>0.6	>5.0	0.900	1.396	Non Liquefiable
70	34.21	988.8	33.96	34.45	0.120	4.105	2.657	133.12	3.931	2.5414	2.5007	0.50	56.10	2.501	2.772	155.81	31		0.430	1.143	0.896	1.410	0.81
71	34.70	988.3	34.45	34.94	0.120	4.168	2.686	135.96	8.427	2.6077	2.6077	1.00	49.09	2.698	3.979	Fine-Grained	40		>0.6	>5.0	0.892	1.424	Non Liquefiable
72	35.19	987.8	34.94	35.43	0.120	4.222	2.713	352.82	3.017	2.2877	2.2322	0.50	147.14	2.232	1.749	257.39	20		>0.6	>5.0	0.888	1.437	Non Liquefiable

LIQUEFACTION POTENTIAL AND CYCLIC SETTLEMENT ANALYSIS

Layer No.	Mid-layer Depth (ft)	Elevation (ft. MSL)	Depth of layer below Ground Level (ft) Top	Bottom	Total Unit Wt. (1). (kcf)	Total Stress (2) (ksf)	Effective Stress (3) (ksf)	CPT Tip Resistance (4) (kips/sq ft)	F, % normalized (5).	1st trial I_c (6)	2nd trial I_c (7)	exponent n of Final I_c and $q_{c\ 1N}$ (8).	$q_{c\ 1N}$ normalized kips/ft2 (9).	Final I_c (10)	K_c factor for fines (11).	Equivalent $(q_{c\ 1N})_{cs}$ clean sand (12)	Percent Fines, % Estimated (13).	Lab (14).	Cyclic Resistance Ratio (15) M=7.5	Cyclic Resistance M = 7.5 (ksf) (12)	Stress Reduction Factor, r_d (13).	Induced Stress M = 7.5 (ksf) (14)	Theoretical Factor of Safety (15).
83	40.80	982.4	40.35	40.85	0.120	4.872	3.026	785.2	0.694	1.4517	1.3943	0.50	310.28	1.394	1.000	310.28	1		>0.6	>5.0	0.844	1.579	Non Liquefiable
84	41.10	981.9	40.85	41.34	0.120	4.931	3.053	540	2.160	1.8783	1.9277	0.50	212.30	1.028	1.216	258.28	11		>0.6	>5.0	0.840	1.588	Non Liquefiable
85	41.59	981.4	41.34	41.83	0.120	4.980	3.082	632.04	1.028	1.6832	1.8381	0.50	247.45	1.638	1.300	247.45	5		>0.6	>5.0	0.838	1.598	Non Liquefiable
86	42.08	980.9	41.83	42.32	0.120	5.049	3.110	522.00	1.545	1.6830	1.8280	0.50	203.47	1.626	1.126	229.12	9		>0.6	>5.0	0.832	1.610	Non Liquefiable
87	42.57	980.4	42.32	42.81	0.120	5.108	3.138	1040.36	0.814	1.4776	1.4230	0.50	403.83	1.423	1.000	403.83	2		>0.6	>5.0	0.828	1.621	Non Liquefiable
88	43.06	979.9	42.81	43.31	0.120	5.167	3.167	922.32	1.608	1.7460	1.6965	0.50	356.22	1.597	1.096	388.66	6		>0.6	>5.0	0.824	1.632	Non Liquefiable
89	43.56	979.4	43.31	43.80	0.120	5.227	3.185	908.48	1.031	1.8180	1.7662	0.50	349.31	1.780	1.084	378.67	7		>0.6	>5.0	0.820	1.643	Non Liquefiable

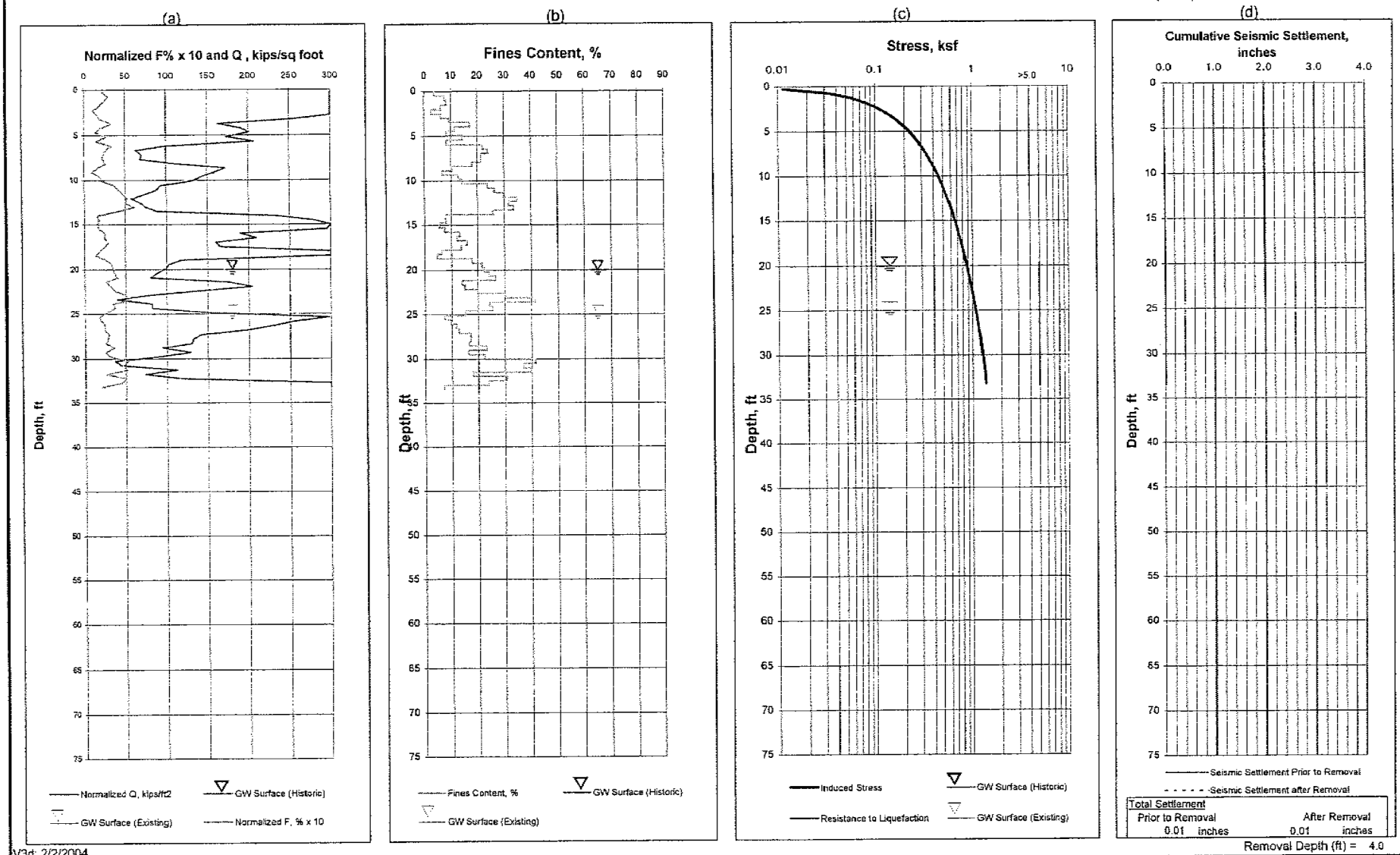
LIQUEFACTION POTENTIAL AND CYCLIC SETTLEMENT ANALYSIS

PROJECT: Mesas East
Job No.: 04-2023-4

Location	CPT-6M	Basic Earthquake Magnitude	7.5	Conditions:	Existing conditions with historic groundwater level
Type of Sampler (CPT/SPT/CD)	CPT	Approx. Distance From Site (miles)	4.2		
Ground Surface Elevation	1109 ft. MSL	Design Magnitude	6.5		
Existing Ground Water Depth	30 ft. Below GL	Peak Ground Accel (M = 7.5)	0.59 g.		
Historic Ground Water Depth	25.0 ft. Below GL	Design PGA (M = 6.5)	0.88 g.		
		Magnification Factor	1.0		

Layer No.	Mid-layer Depth (ft)	Elevation (ft. MSL)	Depth of layer below Ground Level (ft) Top	Bottom	Total Unit Wt. (1). (kcf)	Total Stress (2) (ksf)	Effective Stress (3) (ksf)	CPT Tip Resistance (4) (kips/sq ft)	F, % normalized (5).	1st trial I_c (6)	2nd trial I_c (7)	exponent n of Final I_c and q_{c1N} (8).	q_{c1N} normalized kips/ft2 (9).	Final I_c (10)	K_c factor for fines (11).	Equivalent $(q_{c1N})_{cs}$ clean sand (12)	Percent Fines, % Estimated (13).	Lab (14).	Cyclic Resistance Ratio (15) M=7.5	Cyclic Resistance M = 7.5 (ksf) (12)	Stress Reduction Factor, r_d (13).	Induced Stress M = 7.5 (ksf) (14)	Theoretical Factor of Safety (15).
1	0.25	1108.8	0	0.49	0.120	0.029	0.029	157.98	2.250	1.6936	1.7095	0.50	833.24	1.708	1.044	880.82	6		>0.6	>5.0	0.999	0.011	Non Liquefiable
2	0.74	1108.3	0.49	0.98	0.120	0.088	0.088	133.42	3.803	1.8234	2.0497	0.50	309.76	2.050	1.371	423.20	14		>0.6	>5.0	0.998	0.034	Non Liquefiable
3	1.23	1107.8	1.0	1.48	0.120	0.148	0.148	110.10	3.525	1.8855	2.1225	0.50	196.96	2.122	1.497	294.83	18		>0.6	>5.0	0.997	0.056	Non Liquefiable
4	1.73	1107.3	1.48	1.97	0.120	0.207	0.207	315.66	1.991	1.6460	1.7130	0.50	476.84	1.713	1.047	499.08	6		>0.6	>5.0	0.996	0.079	Non Liquefiable
5	2.22	1106.8	1.97	2.46	0.120	0.266	0.266	271.89	1.802	1.6460	1.7348	0.50	362.16	1.734	1.061	384.25	7		>0.6	>5.0	0.995	0.101	Non Liquefiable
6	2.71	1106.3	2.46	2.95	0.120	0.325	0.325	199.54	2.053	1.8774	1.8737	0.50	240.71	1.880	1.170	281.71	10		>0.6	>5.0	0.994	0.124	Non Liquefiable
7	3.20	1105.8	2.95	3.44	0.120	0.383	0.383	129.66	2.746	1.9080	2.1153	0.50	143.81	2.115	1.483	213.28	18		>0.6	>5.0	0.993	0.148	Non Liquefiable
8	3.69	1105.3	3.44	3.94	0.120	0.443	0.443	148.46	1.715	1.7348	1.9402	0.50	153.34	1.940	1.229	188.49	11		>0.6	>5.0	0.991	0.168	Non Liquefiable
9	4.19	1104.8	3.94	4.43	0.120	0.502	0.502	253.54	1.603	1.6186	1.7676	0.50	245.89	1.768	1.098	269.92	8		>0.6	>5.0	0.990	0.191	Non Liquefiable
10	4.68	1104.3	4.43	4.92	0.120	0.561	0.561	281.14	1.323	1.5835	1.7288	0.50	239.82	1.729	1.057	253.34	7		>0.6	>5.0	0.989	0.213	Non Liquefiable
11	5.17	1103.8	4.92	5.41	0.120	0.620	0.620	372.42	1.202	1.4726	1.6146	0.50	325.12	1.615	1.000	325.12	5		>0.6	>5.0	0.988	0.235	Non Liquefiable
12	5.66	1103.3	5.41	5.91	0.120	0.679	0.679	493.18	3.555	1.6726	1.9668	0.50	411.29	1.967	1.259	517.80	12		>0.6	>5.0	0.987	0.257	Non Liquefiable
13	6.16	1102.8	5.91	6.40	0.120	0.739	0.739	362.20	1.513	1.5814	1.7116	0.50	205.65	1.712	1.046	219.69	6		>0.6	>5.0	0.986	0.279	Non Liquefiable
14	6.65	1102.4	6.40	6.89	0.120	0.797	0.797	303.78	1.624	1.6873	1.8080	0.50	231.60	1.808	1.113	257.66	8		>0.6	>5.0	0.985	0.301	Non Liquefiable
15	7.14	1101.9	6.89	7.38	0.120	0.856	0.856	184.20	1.258	1.7429	1.8758	0.50	136.62	1.876	1.167	159.85	10		0.458	0.393	0.983	0.323	1.22
16	7.63	1101.4	7.38	7.87	0.120	0.915	0.915	152.32	1.127	1.7842	1.9144	0.50	109.44	1.914	1.203	131.62	11		0.292	0.257	0.982	0.345	0.76
17	8.12	1100.9	7.87	8.37	0.120	0.974	0.974	181.38	1.190	1.7695	1.8902	0.50	128.29	1.890	1.176	140.93	10		0.365	0.375	0.981	0.367	1.02
18	8.62	1100.4	8.37	8.86	0.120	1.034	1.034	735.12	0.701	1.2780	1.3508	0.50	406.91	1.350	1.000	406.91	1		>0.6	>5.0	0.980	0.388	Non Liquefiable
19	9.11	1099.9	8.86	9.35	0.120	1.093	1.093	852.84	0.861	1.3348	1.4025	0.50	560.63	1.403	1.000	560.63	2		>0.6	>5.0	0.979	0.410	Non Liquefiable
20	9.60	1099.4	9.35	9.84	0.120	1.151	1.151	735.42	0.781	1.2965	1.3657	0.50	471.04	1.369	1.000	471.04	1		>0.6	>5.0	0.978	0.432	Non Liquefiable
21	10.09	1098.9	9.84	10.33	0.120	1.210	1.210	440.78	1.223	1.5929	1.6640	0.50	275.38	1.665	1.014	279.12	5		>0.6	>5.0	0.976	0.453	Non Liquefiable
22	10.58	1098.4	10.33	10.83	0.120	1.270	1.270	150.92	2.380	2.1107	2.1921	0.50	92.06	2.192	1.646	151.67	18		0.404	0.514	0.975	0.475	1.08
23	11.08	1097.9	10.83	11.32	0.120	1.329	1.329	100.92	2.614	2.2880	2.3536	0.50	60.17	2.354	2.133	128.31	26		0.276	0.367	0.974	0.497	0.74
24	11.57	1097.4	11.32	11.81	0.120	1.388	1.388	153.04	1.697	2.0670	2.1287	0.50	89.29	2.129	1.509	134.75	17		0.308	0.427	0.973	0.518	0.82
25	12.06	1096.9	11.81	12.30	0.120	1.447	1.447	256.18	1.750	1.8909	1.9490	0.50	152.09	1.949	1.239	188.41	12		>0.6	>5.0	0.972	0.539	Non Liquefiable
26	12.55	1096.5	12.30	12.80	0.120	1.506	1.506	574.92	1.253	1.5928	1.6347	0.50	321.98	1.635	1.000	321.98	6		>0.6	>5.0	0.971	0.561	Non Liquefiable
27	13.05	1096.0	12.8	13.29	0.120	1.565	1.565	268.38	2.344	2.0143	2.0536	0.50	147.98	2.054	1.377	203.71	14		>0.6	>5.0	0.970	0.582	Non Liquefiable
28	13.54	1095.5	13.29	13.78	0.120	1.624	1.624	884.88	1.423	1.5620	1.5895	0.50	466.42	1.590	1.000	466.42	4		>0.6	>5.0	0.968	0.603	Non Liquefiable
29	14.03	1095.0	13.78	14.27	0.120	1.683	1.683	623.6	1.253	1.5973	1.6253	0.50	330.46	1.625	1.000	330.46	5		>0.6	>5.0	0.967	0.624	Non Liquefiable
30	14.52	1094.5	14.27	14.76	0.120	1.742	1.742	836.92	1.132	1.4961	1.5203	0.50	436.88	1.520	1.000	438.88	3		>0.6	>5.0	0.966	0.645	Non Liquefiable
31	15.01	1094.0	14.76	15.26	0.120	1.801	1.801	329.08	2.850	2.0673	2.0886	0.50	168.52	2.087	1.431	241.15	15		>0.6	>5.0	0.965	0.667	Non Liquefiable
32	15.51	1093.5	15.26	15.75	0.120	1.861	1.861	469.86	1.236	1.6840	1.7009	0.50	236.75	1.701	1.036	245.85	6		>0.6	>5.0	0.984	0.688	Non Liquefiable
33	16.00	1093.0	15.75	16.24	0.120	1.919	1.919	413.88	0.895	1.6670	1.6602	0.50	205.22	1.660	1.024	210.23	6		>0.6	>5.0	0.983	0.700	Non Liquefiable
34	16.49	1092.5	16.24	16.73	0.120	1.978	1.978	263.22	1.169	1.8651	1.8734	0.50	128.62	1.873	1.185	149.82	10		0.393	0.777	0.962	0.729	1.07
35	16.98	1092.0	16.73	17.22	0.120	2.037	2.037	270.86	1.431	1.9370	1.9413	0.50	130.44	1.941	1.230	160.49	11		>0.6	>5.0	0.960	0.750	Non Liquefiable
36	17.47	1091.5	17.22	17.72	0.120	2.096	2.096	241.34	0.596	1.7319	1.7305	0.50	114.66	1.731	1.058	121.26	7		0.246	0.515	0.959	0.771	0.67
37	17.97	1091.0	17.72	18.21	0.120	2.156	2.156	174.76	1.002	1.9862	1.9786	0.50	81.80	1.976	1.273	104.16	12		0.185	0.399	0.958	0.792	0.50
38	18.46	1090.5	18.21	18.70	0.120	2.215	2.215	84.8	2.136	2.4513	2.4349	0.50	39.07	2.435	2.480	98.13	28		0.183	0.360	0.957	0.813	0.44
39	18.95	1090.1	18.7	19.19	0.120	2.273	2.273	201.4	0.738	1.6756	1.6590	0.50	91.80	1.659	1.152	105.80	9		0.190	0.432	0.956	0.833	0.52
40	19.44	1089.6	19.19	19.69	0.120	2.333	2.333	232.8	0.808	1.6583	1.6366	0.50	104.78	1.637	1.134	118.83	8		0.238	0.551	0.955	0.854	0.64
41	19.94	1089.1	19.69	20.18	0.120	2.392	2.392	254	1.898	2.0498	2.0273	0.50	112.87	2.027	1.337	150.94	14		0.400	0.956	0.954	0.875	1.09
42	20.43	1088.6	20.18	20.67	0.120	2.451	2.451	384.2	1.187	1.8136	1.7894	0.50	169.67	1.789	1.098	186.37	8		>0.6	>5.0	0.952	0.895	Non Liquefiable
43	20.92	1088.1	20.67	21.16	0.120	2.510	2.510	275.54	1.957	2.0887	2.0365	0.50	119.54	2.030	1.354	161.82	14		>0.6	>5.0	0.951	0.916	Non Liquefiable
44	21.41	1087.6	21.16	21.65	0.120	2.569	2.569	194.6	1.632	2.1536	2.1166	0.50	85.45	2.119	1.450	124.30	16		0.259	0.654	0.950	0.938	0.71
45	21.90	1087.1	21.65	22.15	0.120	2.628	2.628	205.56	2.759	2.2318	2.1946	0.50	87.15	2.195	1.654	144.16	19		0.350	0.942	0.949	0.956	0.99
46	22.40	1086.6	22.15	22.64	0.120	2.687	2.687	221.28	2.500	2.2474	2.2081	0.50	92.77	2.208	1.667	150.49	19		0.430	1.173	0.948	0.977	1.20
47	22.89	1086.1	22.64	23.13	0.120	2.746	2.746	202.72	3.061	2.3442	2.3018	0.50	84.08	2.302	1.954	164.38	23		>0.6	>5.0	0.947	0.997	Non Liquefiable
48	23.38	1085.6	23.13	23.62	0.120	2.805	2.805	238.4	2.155	2.1915	2.1453	0.50	97.83	2.145	1.543	150.95	17		0.409	1.122	0.946	1.017	1.10
49	23.87	1085.1	23.62	24.11	0.120	2.864	2.864	636.36	1.085	1.6858	1.6416	0.50	253.45	1.642	0.997	257.73	5		>0.6	>5.0	0.944	1.037	Non Liquefiable
50	24.36	1084.6	24.11	24.61	0.120	2.923	2.923	907.00	0.973	1.5554	1.5114	0.50	354.62	1.511	1.000	354.62	3		>0.6	>5.0	0.943	1.057	Non Liquefiable
51	24.86	1084.1	24.61	25.10	0.120	2.983	2.983	242.78	1.669	2.1101	2.0517	0.50	96.62	2.052	1.374	132.71	14		0.287	0.867	0.942	1.078	0.82
52	25.35	1083.7	25.10	25.59	0.120	3.041	3.020	168.08	2.302	2.3461	2.2840	0.50	66.48	2.284	1.898	126.19	22		0.287	0.806	0.941	1.097	0.73
53	25.84	1083.2	25.59	26.08	0.120	3.100	3.048	183.6	1.883	2.1757	2.1089	0.50	72.28	2.109	1.471	106.33	16		0.192	0.585	0.940	1.117	0.52
54	26.33	1082.7	26.08	26.57	0.120	3.159	3.076	149.16	1.951	2.3448	2.2764	0.50	58.49	2.276	1.875	109.62	22		0.202	0.623	0.938	1.137	0.55
55	26.82	1082.2	26.57	27.07	0.120	3.218	3.105	00.34	4.346	2.7489	2.7456	1.00	26.06	2.746	4.343	Fine-Grained	43		>0.6	>5.0	0.937	1.157	Non Liquefiable
56	27.32	1081.7	27.07	27.56	0.120	3.278	3.133	170.52	2.060	2.3215	2.2521	0.50	66.21	2.252	1.804	119.45	21		0.239	0.747	0.936	1.177	0.63

Location..... **CPT-1M**
Elevation (MSL)..... 1264 ft



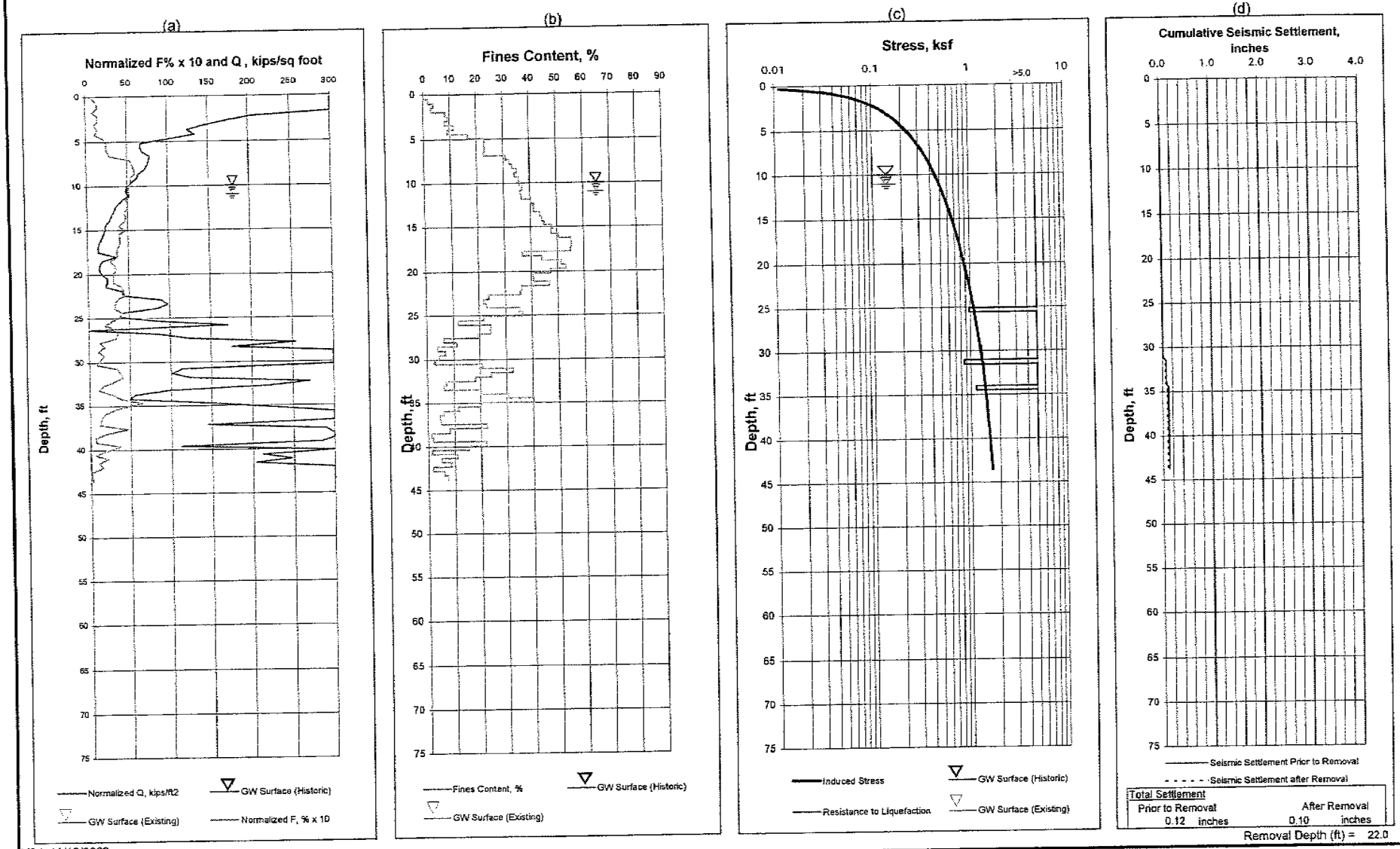
V3d; 2/2/2004

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Mesas East	Weighted Gr. Acc. (M=7.5).	0.59 g	Project No.	04-2023-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.88 g	Figure No.	CPT-1 C-1
For: Newhall Ranch	Magnification Factor.....	1	Date.	7-22-2004

Location..... **CPT-2M**
Elevation (MSL)..... 1023 ft



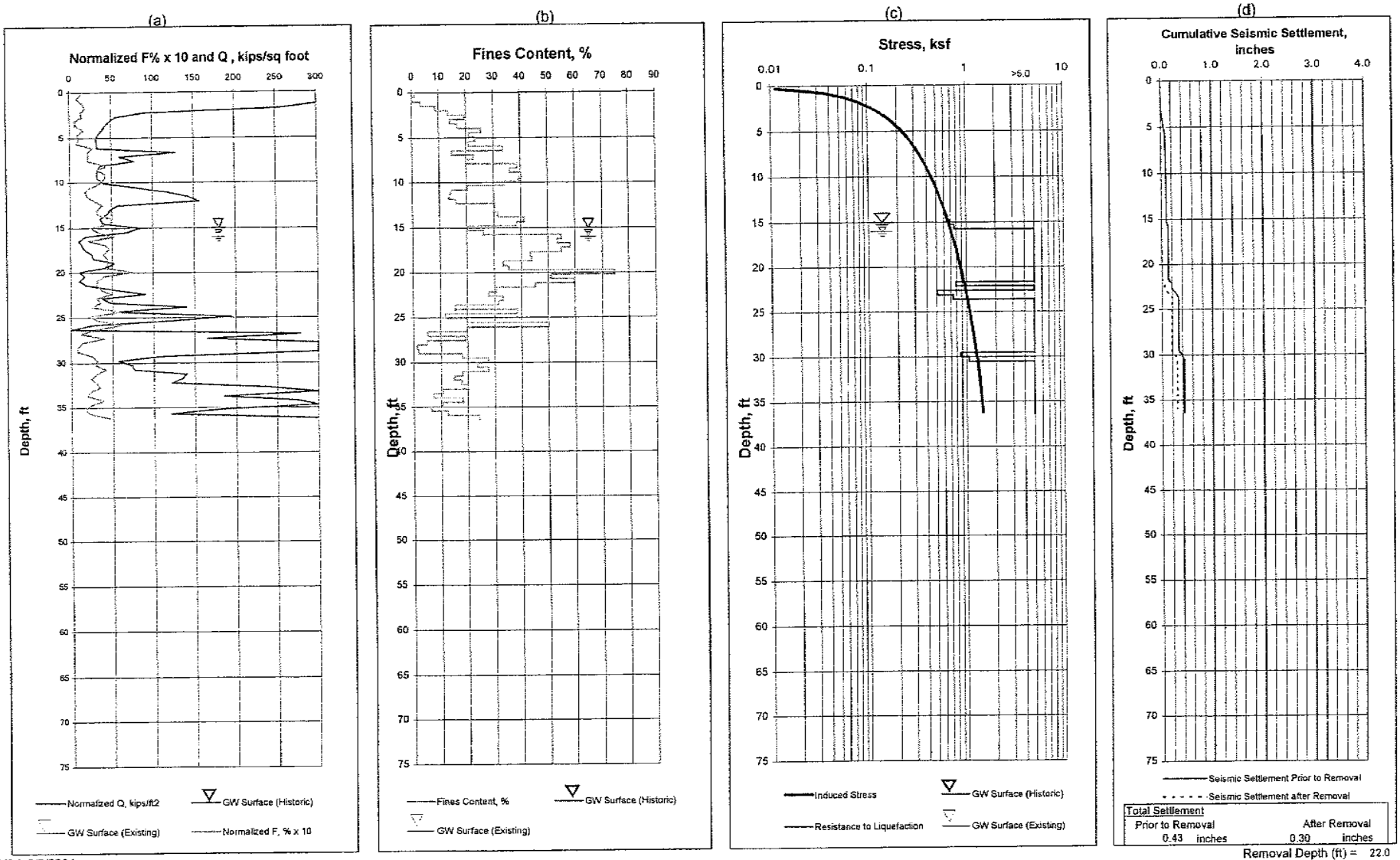
V3d; 11/19/2003

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Mesas East	Weighted Gr. Acc. (M=7.5).	0.59 g	Project No.	04-2023-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.88 g	Figure No.	CPT-2 C-2
For: Newhall Ranch	Magnification Factor.....	1	Date.	7-22-2004

Location..... **CPT-3M**
Elevation (MSL)..... 1048 ft



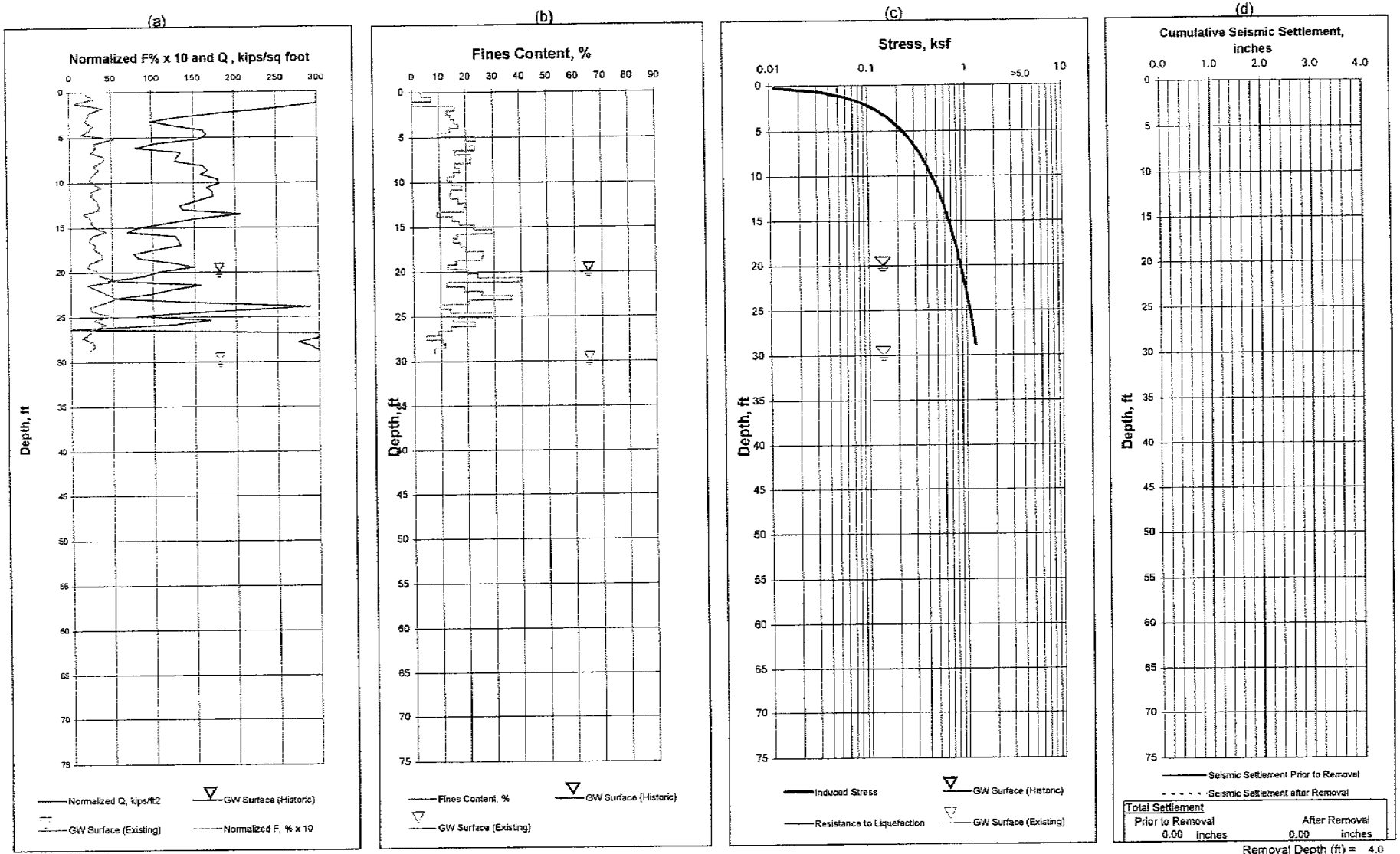
V3d; 2/2/2004

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Mesas East	Weighted Gr. Acc. (M=7.5).	0.59 g	Project No.	04-2023-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.88 g	Figure No.	CPT-3 C-3
For: Newhall Ranch	Magnification Factor.....	1	Date.	7-22-2004

Location..... CPT-4M
Elevation (MSL)..... 1065 ft



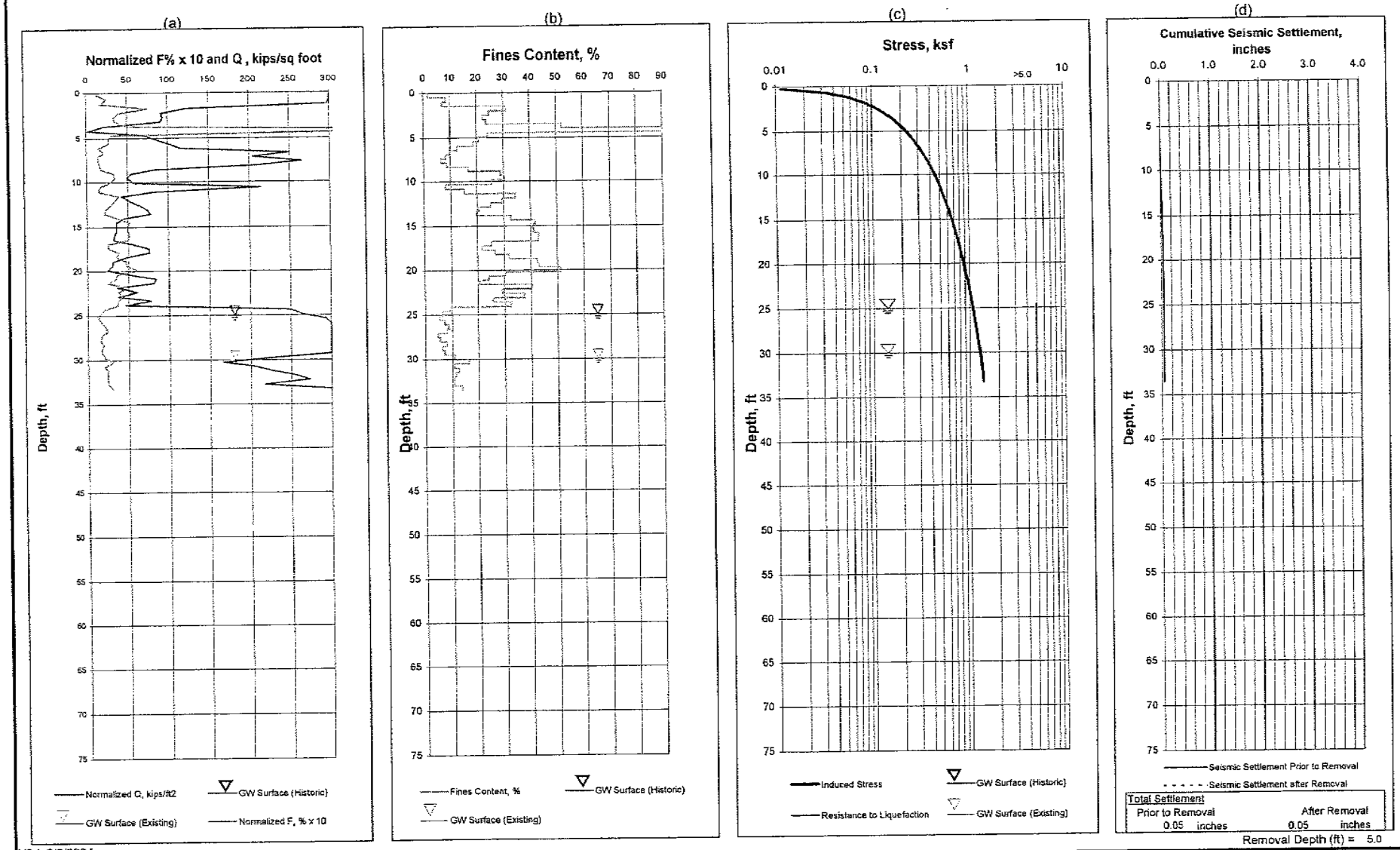
V3d; 2/2/2004

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Mesas East	Weighted Gr. Acc. (M=7.5).	0.59 g	Project No.	04-2023-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.88 g	Figure No.	CPT-4 C-4
For: Newhall Ranch	Magnification Factor.....	1	Date.	7-22-2004

Location..... **CPT-5M**
Elevation (MSL)..... 1072 ft



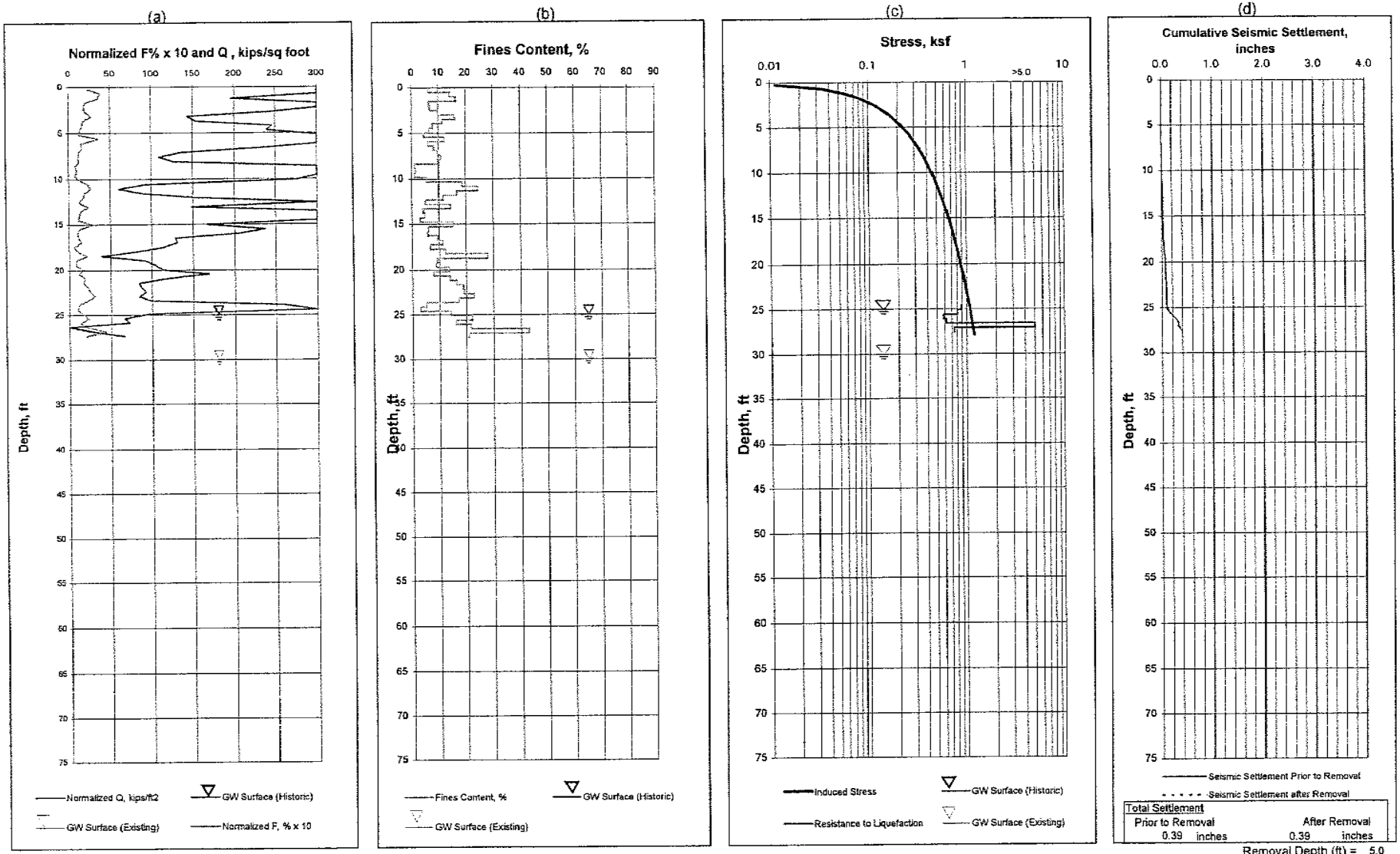
V3d; 2/2/2004

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Mesas East	Weighted Gr. Acc. (M=7.5).	0.59 g	Project No.	04-2023-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.88 g	Figure No.	CPT-5 C-5
For: Newhall Ranch	Magnification Factor.....	1	Date.	7-22-2004

Location..... CPT-6M
Elevation (MSL)..... 1109 ft



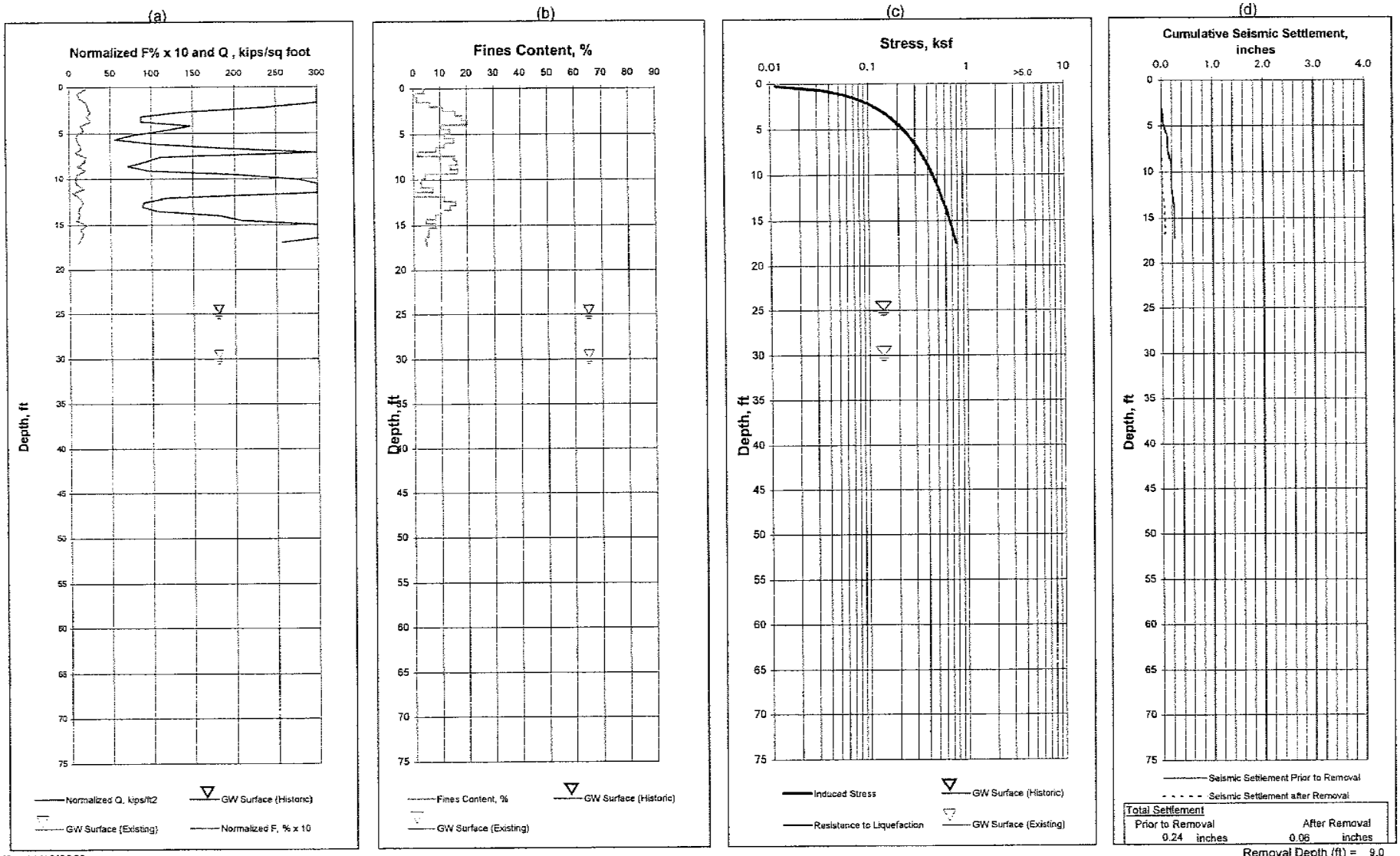
V3d; 2/2/2004

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Mesas East	Weighted Gr. Acc. (M=7.5).	0.59 g	Project No.	04-2023-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.88 g	Figure No.	CPT-6 C-6
For: Newhall Ranch	Magnification Factor.....	1	Date.	7-22-2004

Location..... **CPT-7M**
Elevation (MSL)..... 1130 ft



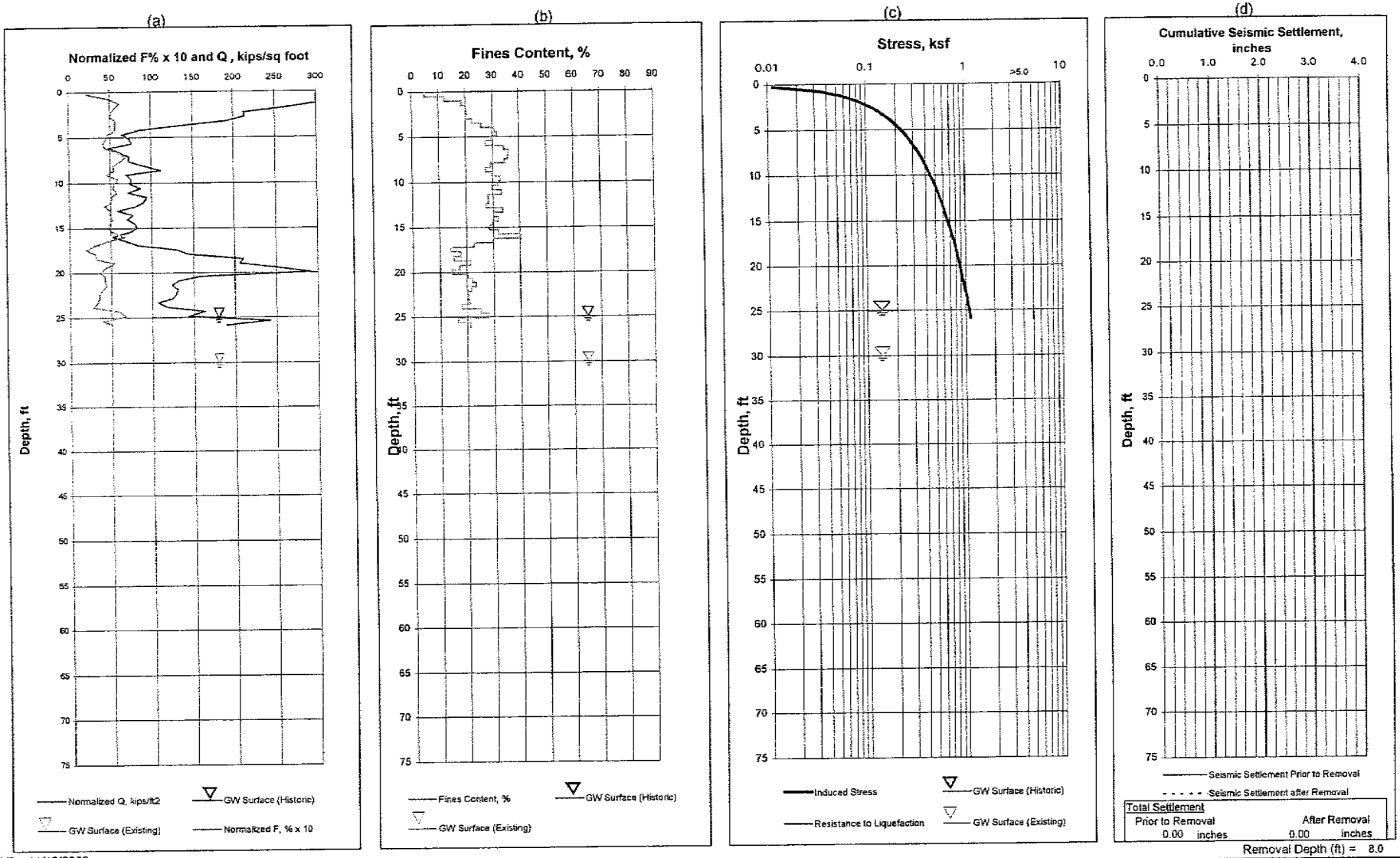
V3c; 11/19/2003

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Mesas East	Weighted Gr. Acc. (M=7.5).	0.59 g	Project No.	04-2023-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.88 g	Figure No.	CPT-7 C-7
For: Newhall Ranch	Magnification Factor.....	1	Date.	7-22-2004

Location..... **CPT-8M**
Elevation (MSL)..... 1173 ft



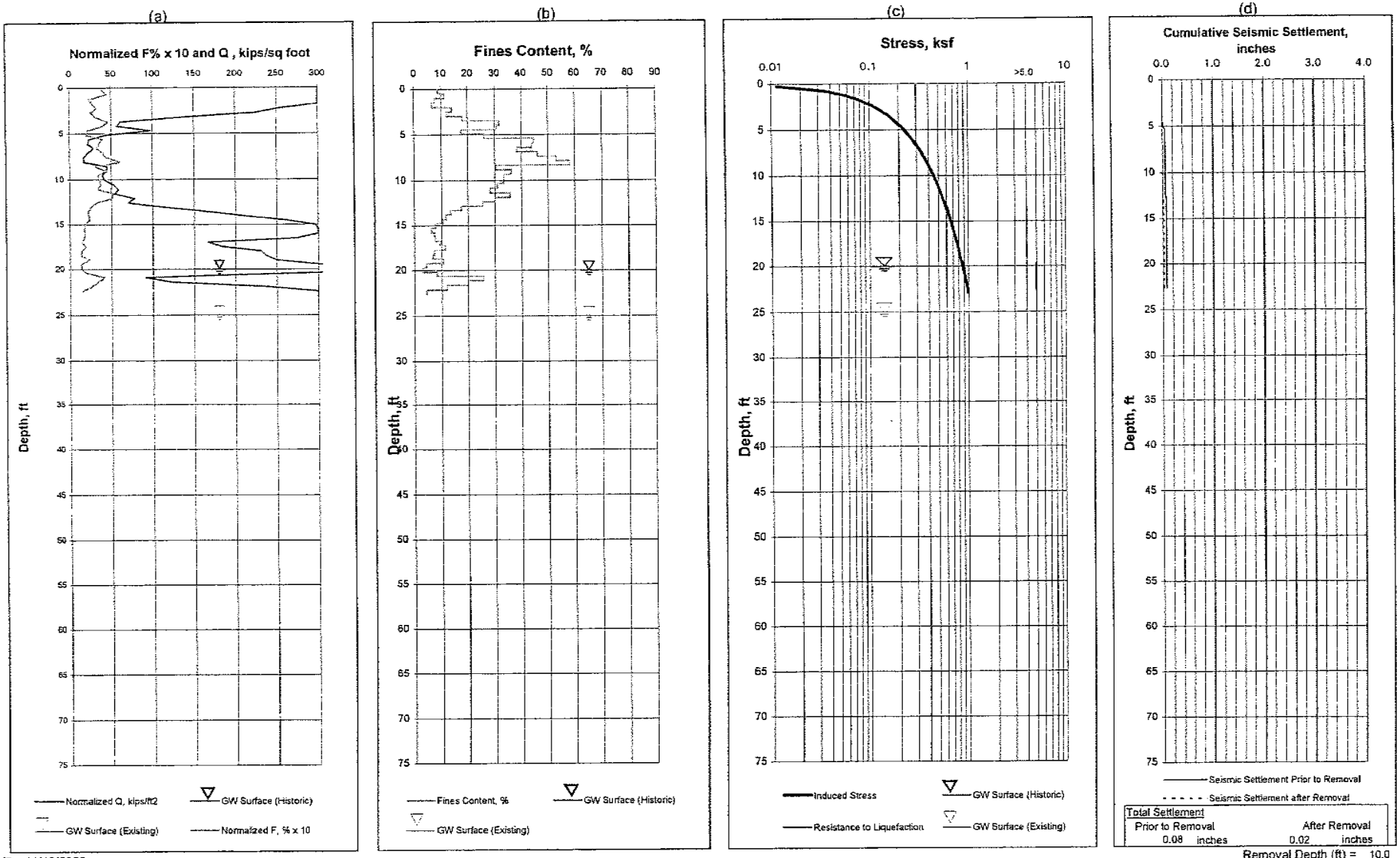
V3c; 11/19/2003

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Mesas East	Weighted Gr. Acc. (M=7.5).	0.59 g	Project No.	04-2023-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.88 g	Figure No.	CPT-8 C-8
For: Newhall Ranch	Magnification Factor.....	1	Date.	7-22-2004

Location..... CPT-9M
Elevation (MSL)..... 1231 ft



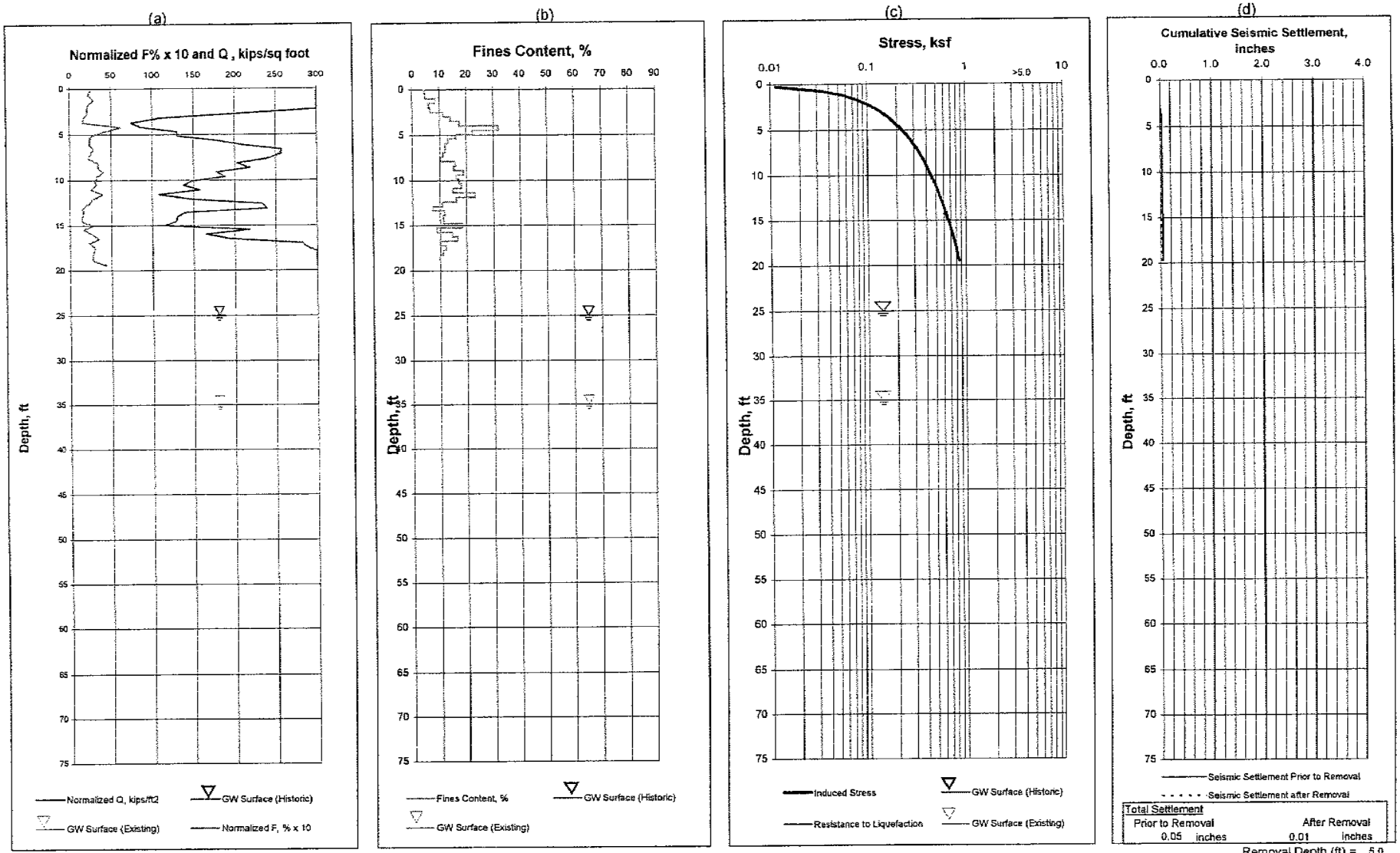
V3c; 11/19/2003

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Mesas East	Weighted Gr. Acc. (M=7.5).	0.59 g	Project No.	04-2023-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.88 g	Figure No.	CPT-9 C-9
For: Newhall Ranch	Magnification Factor.....	1	Date.	7-22-2004

Location..... CPT-10M
Elevation (MSL)..... 994 ft



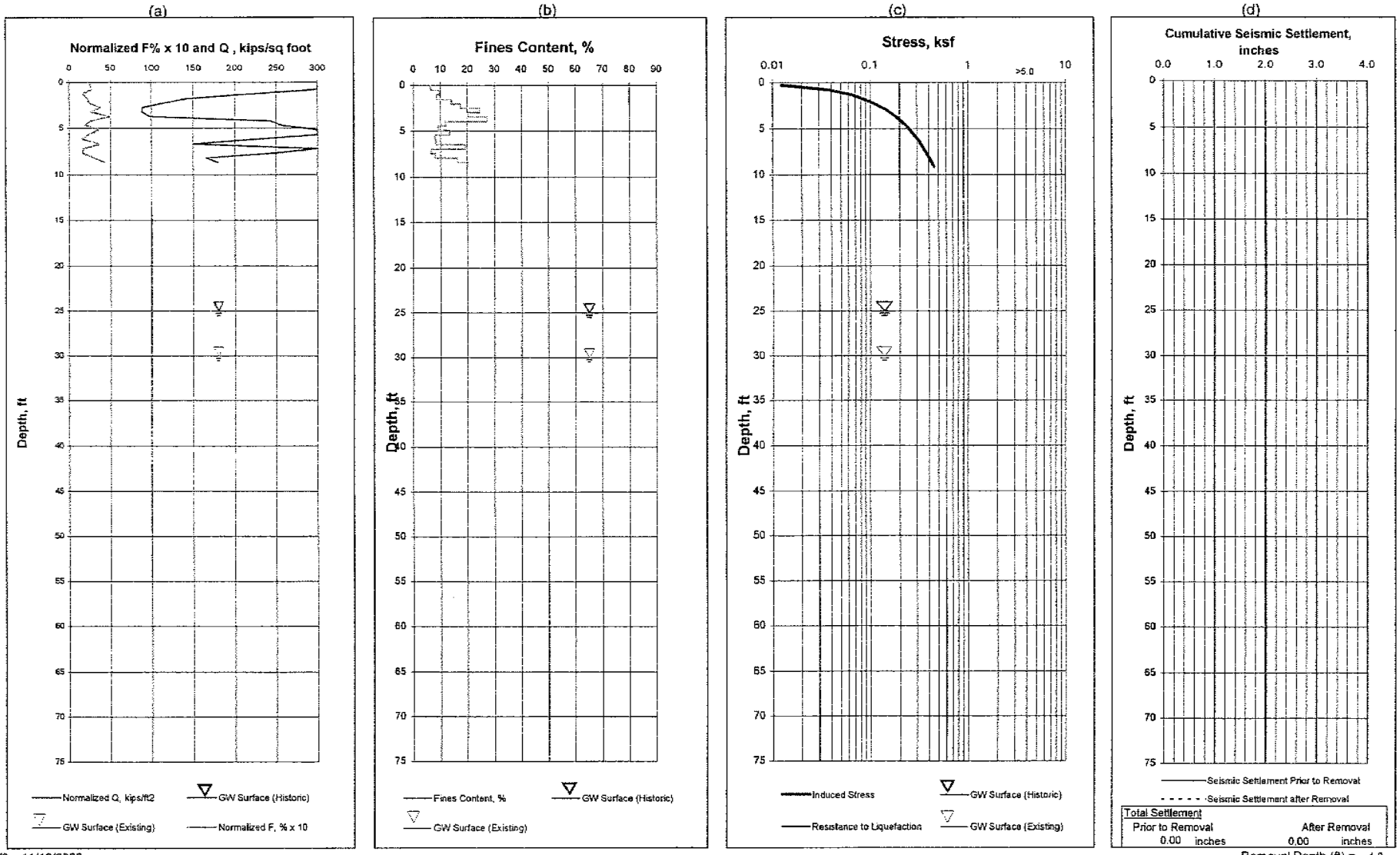
V3c; 11/19/2003

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Mesas East	Weighted Gr. Acc. (M=7.5).	0.59 g	Project No.	04-2023-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.88 g	Figure No.	CPT-10 C-10
For: Newhall Ranch	Magnification Factor.....	1	Date.	7-22-2004

Location..... CPT-11M
Elevation (MSL)..... 1033 ft



Removal Depth (ft) = 4.0

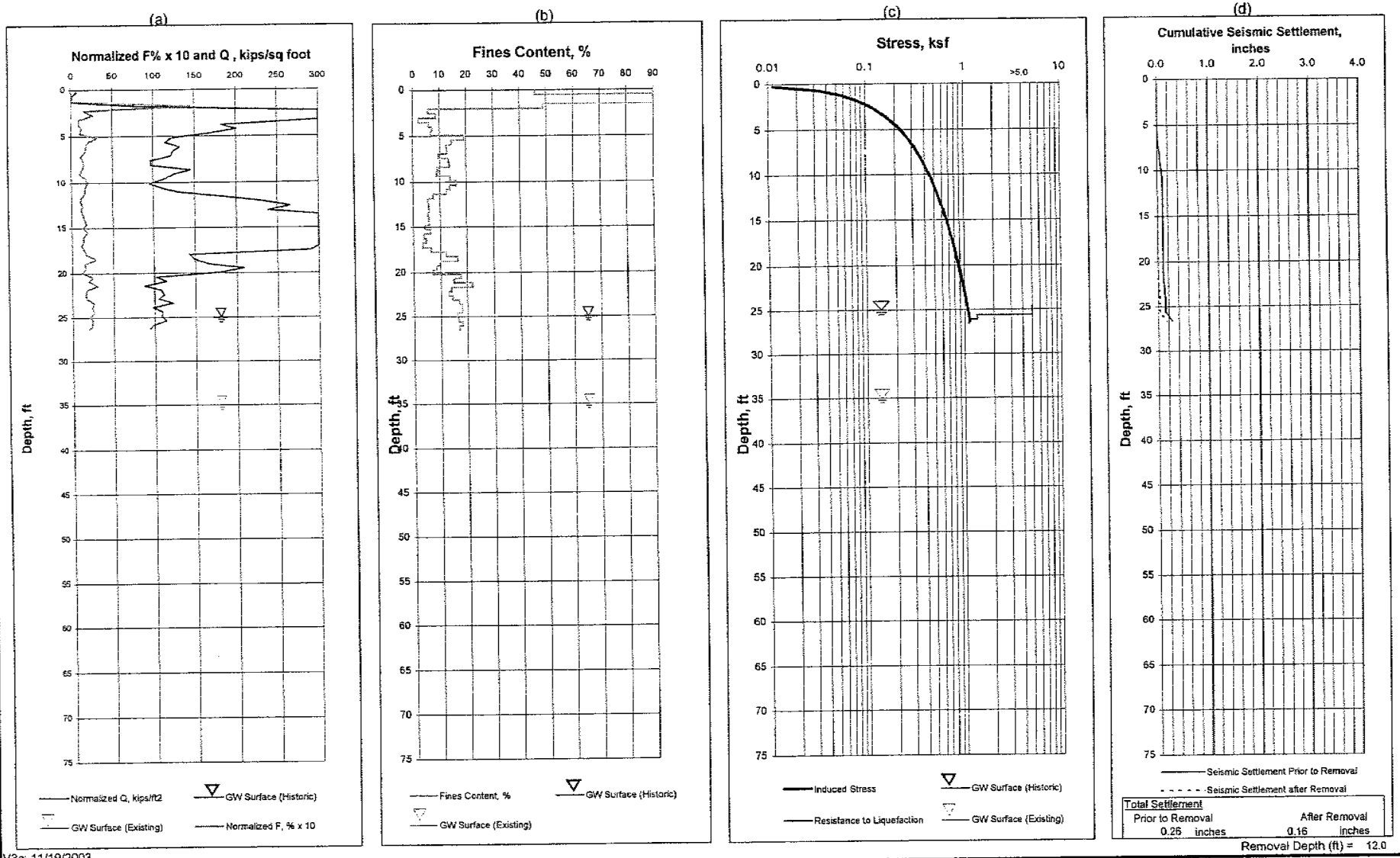
V3c; 11/19/2003

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Mesas East	Weighted Gr. Acc. (M=7.5). 0.65 g	Project No.	04-2023-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)... 0.98 g	Figure No.	CPT-11 C-11
For: Newhall Ranch	Magnification Factor..... 1	Date.	7-22-2004

Location..... CPT-12M
Elevation (MSL)..... 1020 ft



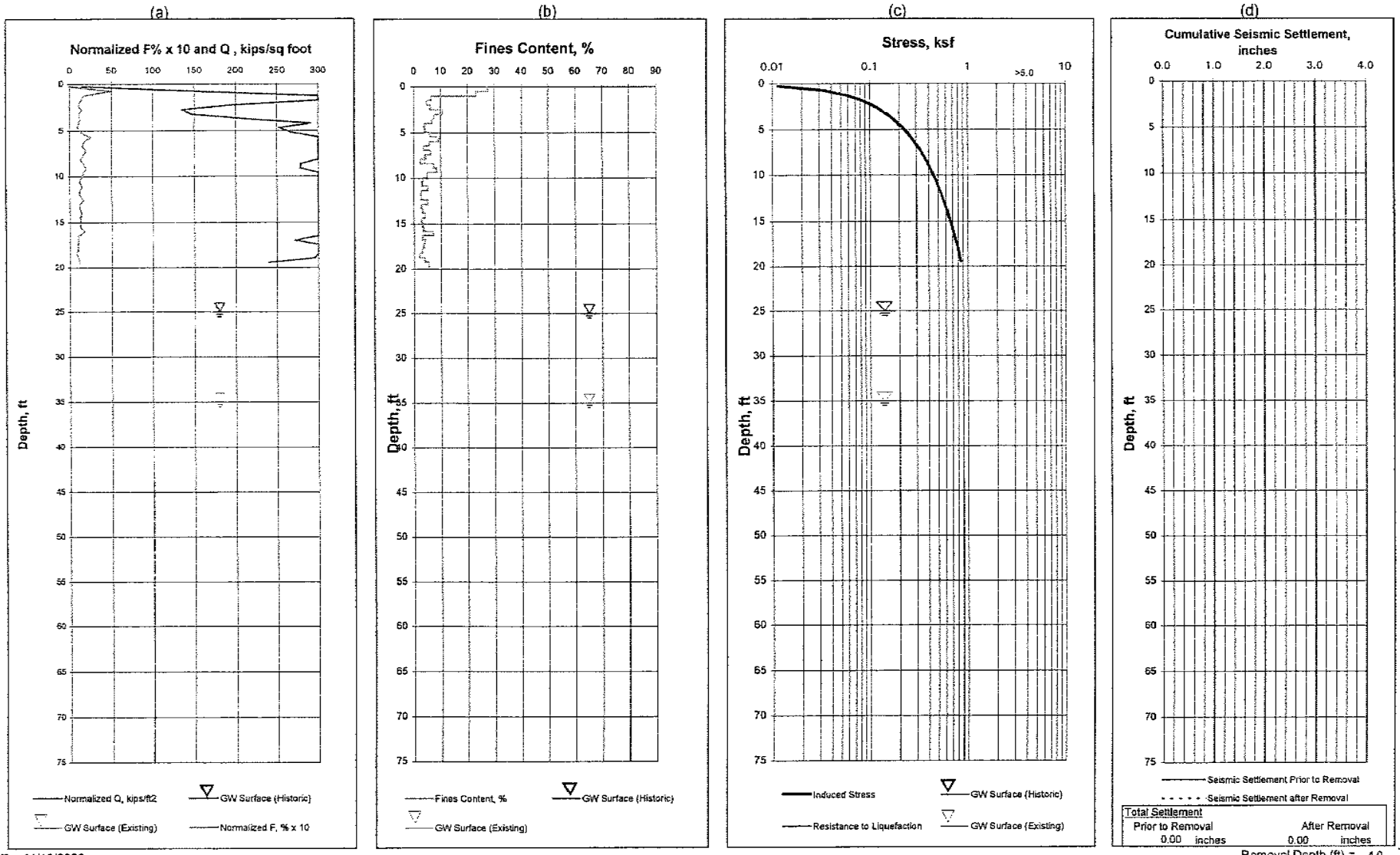
V3c; 11/19/2003

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Mesas East	Weighted Gr. Acc. (M=7.5).	0.59 g	Project No.	04-2023-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.88 g	Figure No.	CPT-12 C-12
For: Newhall Ranch	Magnification Factor.....	1	Date.	7-22-2004

Location..... CPT-13M
Elevation (MSL)..... 1052 ft



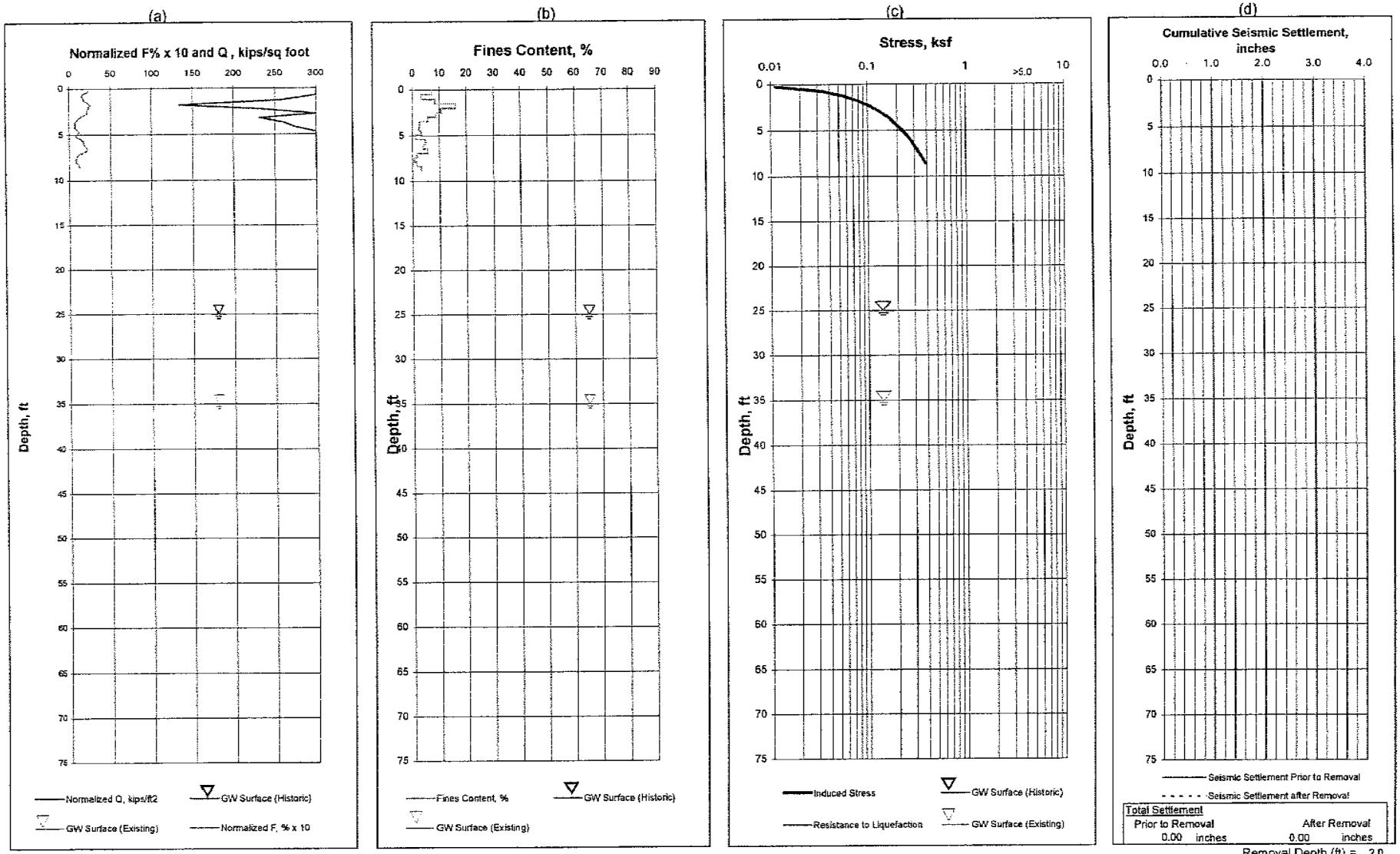
V3c; 11/19/2003

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Mesas East	Weighted Gr. Acc. (M=7.5). 0.59 g	Project No.	04-2023-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)... 0.88 g	Figure No.	CPT-13 C-13
For: Newhall Ranch	Magnification Factor..... 1	Date.	7-22-2004

Location..... **CPT-14M**
Elevation (MSL)..... 1092 ft



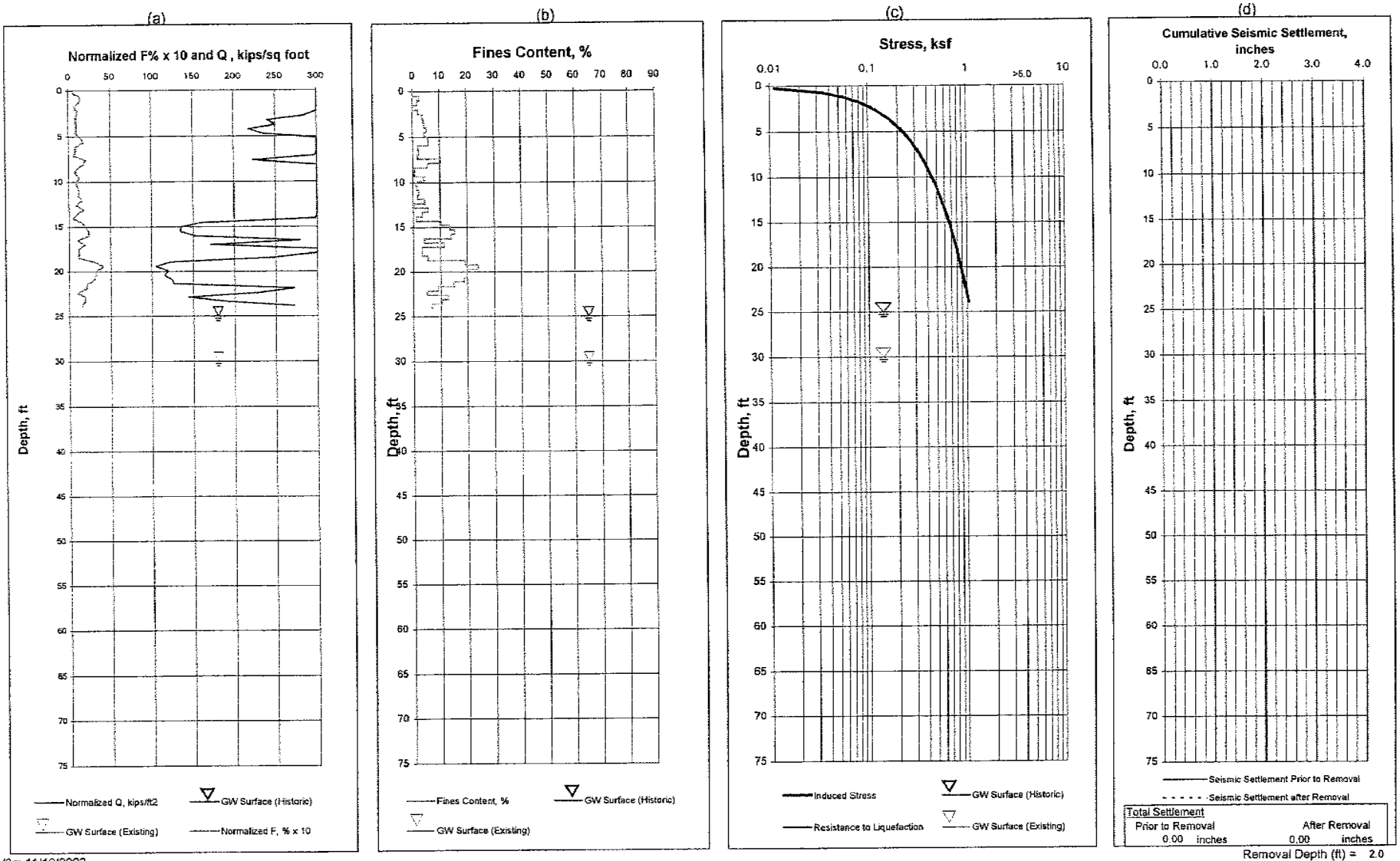
V3c; 11/19/2003

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Mesas East	Weighted Gr. Acc. (M=7.5).	0.59 g	Project No.	04-2023-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.88 g	Figure No.	CPT-14 C-14
For: Newhall Ranch	Magnification Factor.....	1	Date.	7-22-2004

Location..... CPT-15M
Elevation (MSL)..... 1132 ft



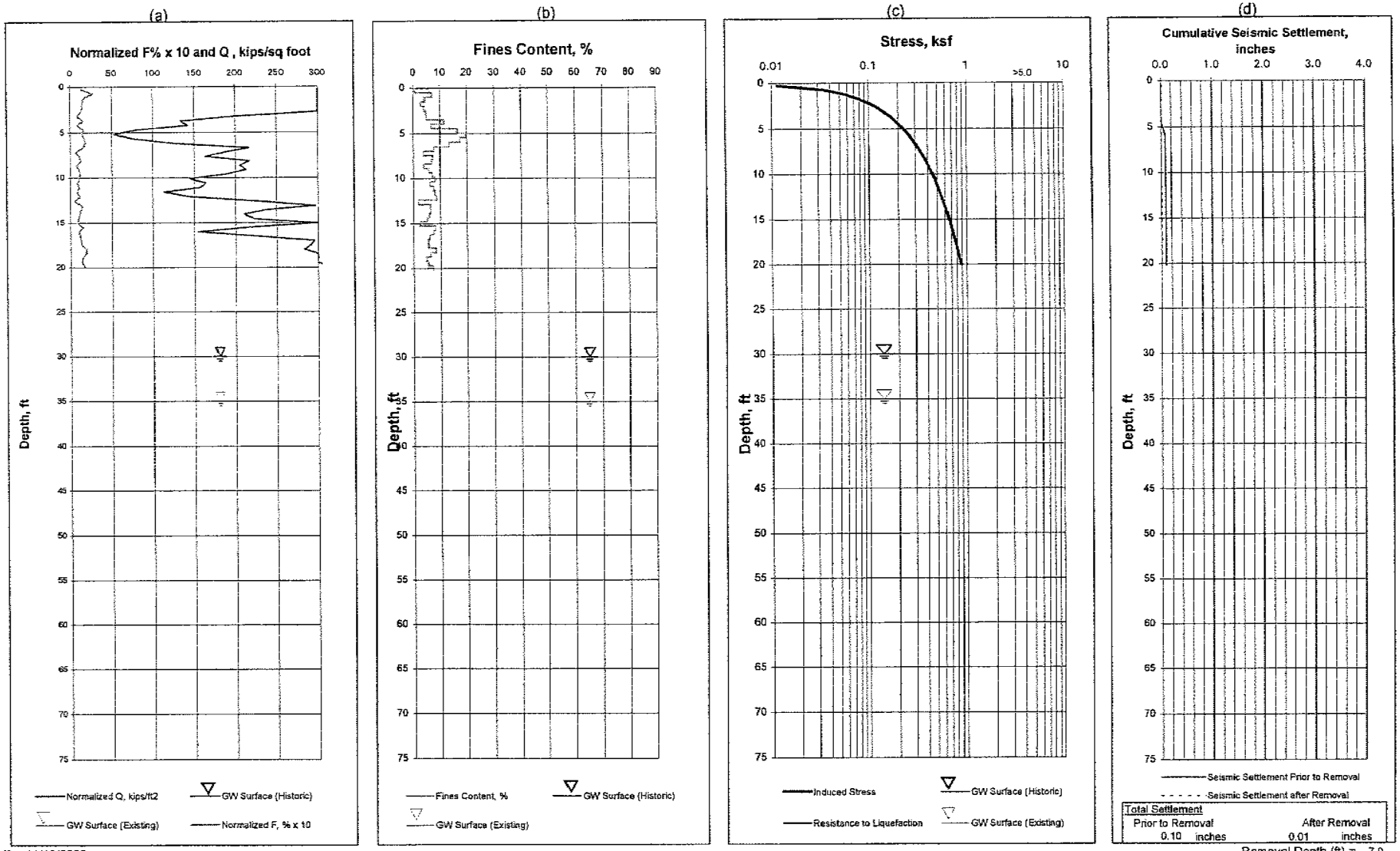
V3c; 11/19/2003

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Mesas East	Weighted Gr. Acc. (M=7.5).	0.59 g	Project No.	04-2023-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.88 g	Figure No.	CPT-15 C-15
For: Newhall Ranch	Magnification Factor.....	1	Date.	7-22-2004

Location..... CPT-18M
Elevation (MSL)..... 988 ft



V3c; 11/19/2003

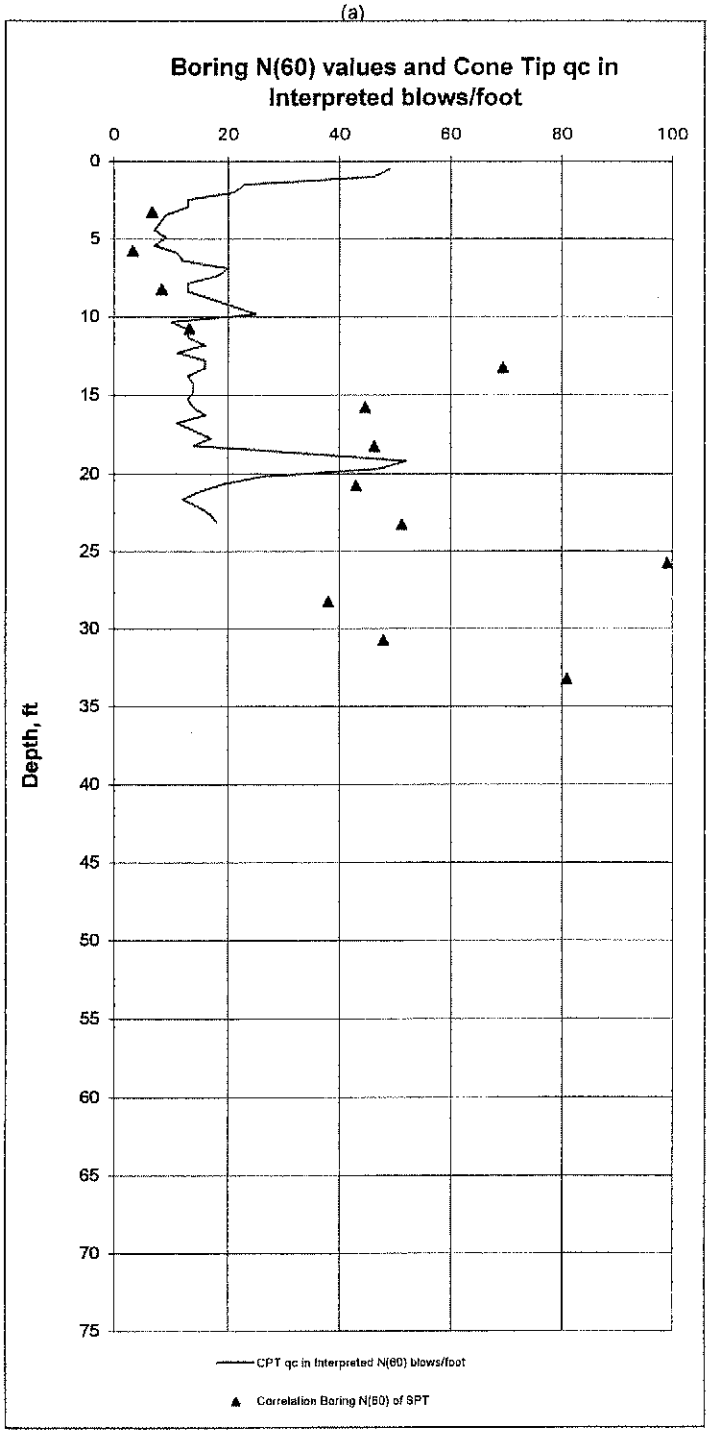
Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

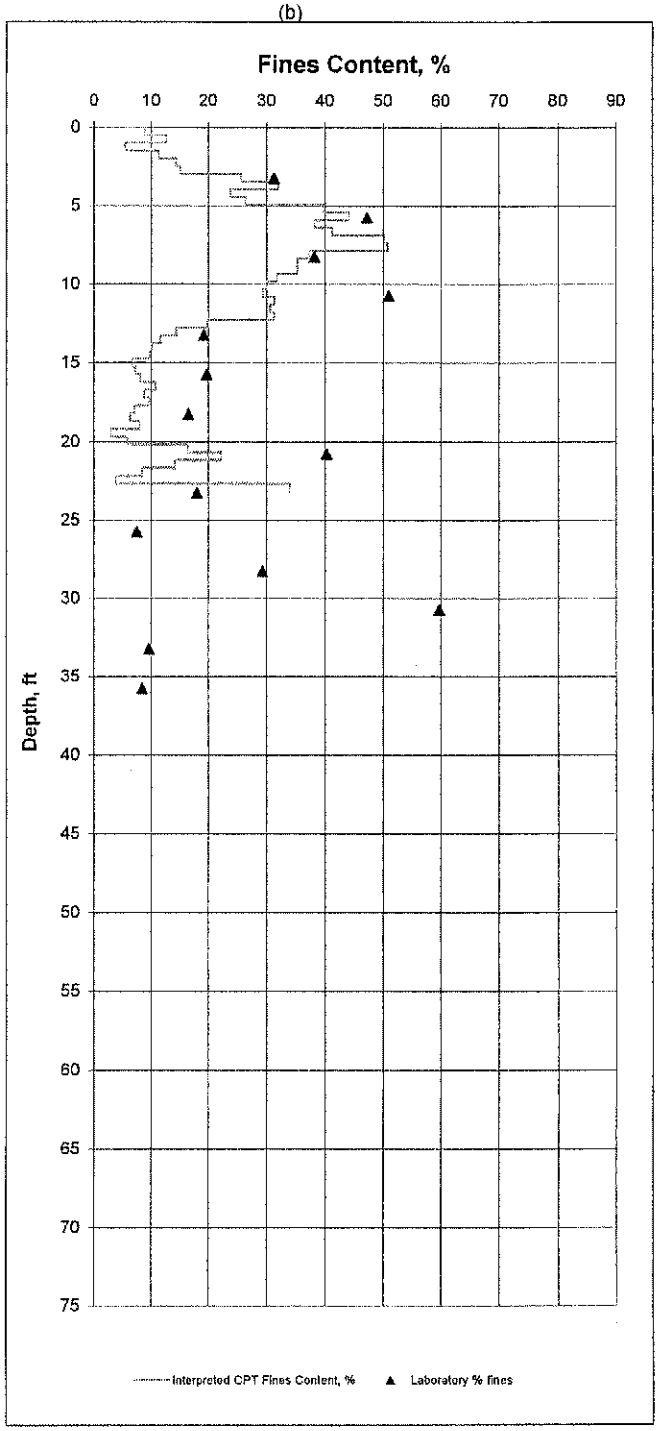
Mesas East	Weighted Gr. Acc. (M=7.5).	0.59 g	Project No.	04-2023-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.88 g	Figure No.	CPT-18 C-16
For: Newhall Ranch	Magnification Factor.....	1	Date.	7-22-2004

Location CPT-9M and HS-4T

(a)



(b)



NOTES:

1) The Interpreted SPT blows/foot presented above, based on CPT q_c and f_s data, is calculated following procedures of referenced Robertson and Campanella, 1989.

2) The Interpreted CPT fines content, percent, presented above is calculated following procedures of referenced Robertson and Wride, 1997.

REFERENCES:

1) Robertson, P.K. and Campanella, R.G., 1989, *Guidelines for Geotechnical Design Using the Cone Penetrometer and CPT with Pore-Pressure Measurement*, Hogentogler and Company, Inc.

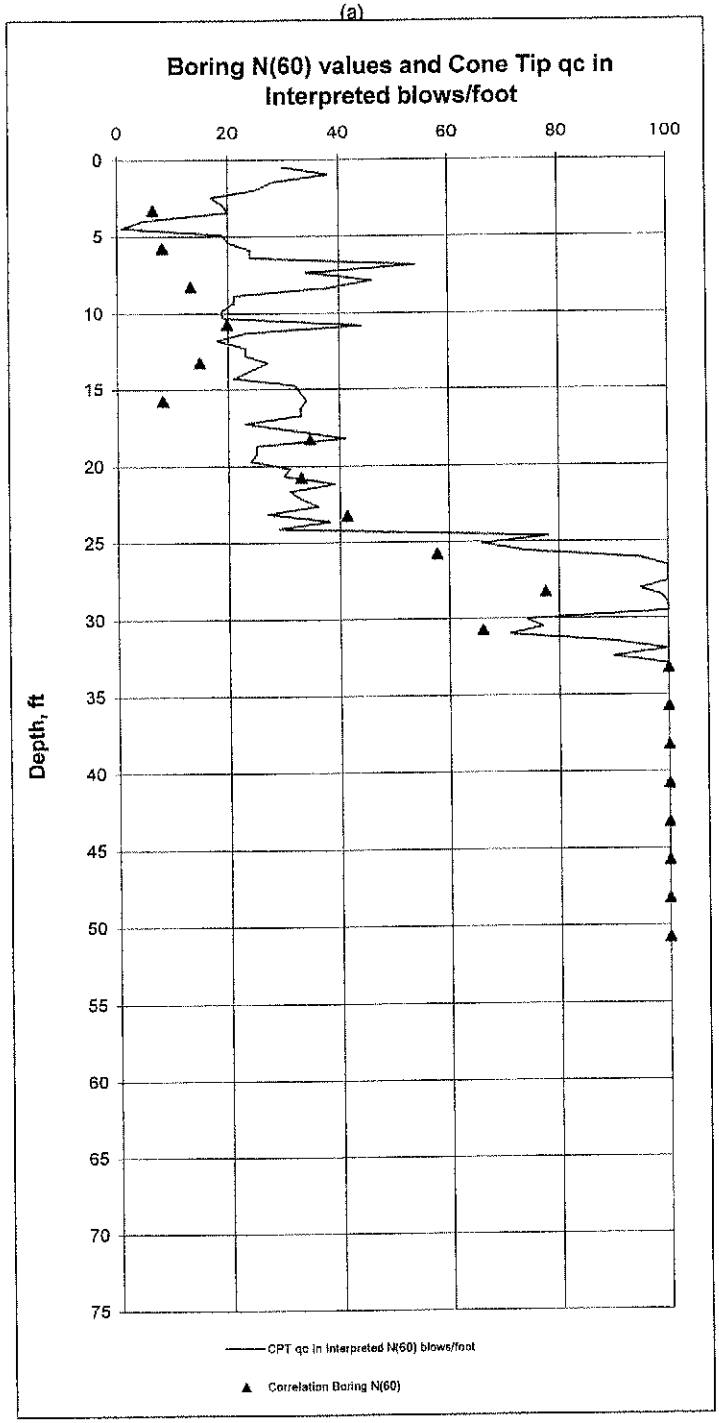
2) Robertson, P.K. and Wride, C.E., 1997, "Cyclic Liquefaction and Its Evaluation Based on the SPT and CPT", in *Proceeding of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils*, Tech Report NCEER-97-0022, National Center for Earthquake Engineering Research

V1c; 11/13/2003

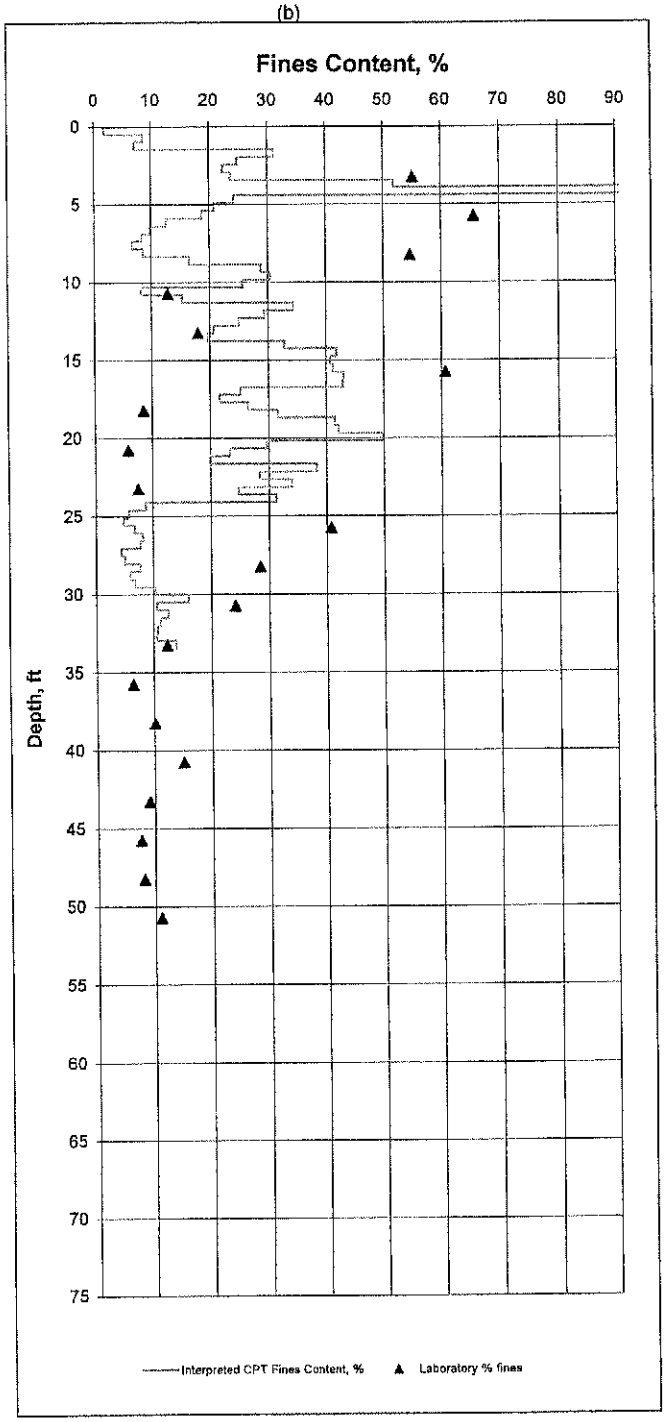
Allan E. Seward Engineering Geology, Inc. **Geological and Geotechnical Consultants** **Valencia, California**	**Correlation of SPT-Values and % Fines from Boring vs CPT Data**		
	Mesas East, Newhall Ranch Valencia, L.A. County, California For: Newhall Land Company		Project No.: 04-2023-4 Figure No. C-17

Locatin CPT-5M and HS-10T

(a)



(b)



NOTES:

1) The Interpreted SPT blows/foot presented above, based on CPT q_c and f_s data, is calculated following procedures of referenced Robertson and Campanella, 1989.

2) The Interpreted CPT fines content, percent, presented above is calculated following procedures of referenced Robertson and Wride, 1997.

REFERENCES:

1) Robertson, P.K. and Campanella, R.G., 1989, *Guidelines for Geotechnical Design Using the Cone Penetrometer and CPT with Pore-Pressure Measurement*, Hogentogler and Company, Inc.

2) Robertson, P.K. and Wride, C.E., 1997, "Cyclic Liquefaction and its Evaluation Based on the SPT and CPT", in *Proceeding of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils*, Tech Report NCEER-97-0022, National Center for Earthquake Engineering Research

V1d; 1/27/2004

Allan E. Seward Engineering Geology, Inc. **Geological and Geotechnical Consultants** **Valencia, California**	**Correlation of SPT-Values and % Fines from Boring vs CPT Data** Mesas East, Newhall Ranch Valencia, L.A. County, California For: Newhall Land Company	Project No.: 04-2023-4 Figure No. C-18

APPENDIX C

SUMMARY TABLE OF COMPUTED LIQUEFACTION EFFECTS

ANALYZED LOCATION CPT	ESTIMATED SETTLEMENT INCHES		SURVEYED ELEVATION (FEET, MSL)	RECOMMENDED REMOVALS (FEET)	ADJACENT BORINGS	DEPTH TO GWT (FEET)		THICKNESS OF NON-LIQUEFIABLE SOILS BELOW EXISTING GRADES (FEET)	TOTAL THICKNESS OF POTENTIALLY LIQUEFIABLE ZONES REMAINING (FEET)
	BEFORE REMOVALS	AFTER REMOVALS				MEASURED	HISTORIC		
1M	0.01	0.01	1264	4		25	20	30	-
2M	0.12	0.10	1023	22		11	10	25	1.5
3M	0.43	0.30	1048	22		16	15	15	2.5
4M	0	0	1065	4		30	20	29	-
5M	0.05	0.05	1072	5	HS-10T	30	25	33	-
6M	0.39	0.39	1109	5		30	25	25	3
7M	0.24	0.06	1130	9		30	25	25	-
8M	0	0	1173	8		30	25	25	-
9M	0.08	0.02	1231	10	HS-4T	25	20	22	-
10M	0.05	0.01	994	5		35	25	25	-
11M	0	0	1033	4		30	25	25	-
12M	0.26	0.16	1020	12		35	25	26	0.5
13M	0	0	1052	4		35	25	25	-
14M	0	0	1092	2		35	25	25	-
15M	0	0	1132	2		30	25	25	-
18M	0.10	0.01	988	7		35	30	30	-

CPT INTERPRETATIONS

PROJECT: Mesas East
DATE/TIME: 9/22/99 14:45
PROJECT NO.: 04-1703E-1

CONE/RIG: 473/R#4,GO,MR
ASSUMED DEPTH OF WATER TABLE: 35 feet
SOUNDING: CPT-18M

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
0.15	0.49	287.00	1.25	Very stiff sand to clayey sand	1.321	1.000	
0.30	0.98	182.90	2.75	Very stiff sand to clayey sand	1.746	1.069	
0.45	1.48	149.44	1.57	Sands - clean sands to silty sand	1.599	1.000	
0.60	1.97	226.15	1.41	Sands - clean sands to silty sand	1.510	1.000	
0.75	2.46	174.40	1.44	Sands - clean sands to silty sand	1.595	1.000	
0.90	2.95	130.23	1.22	Sands - clean sands to silty sand	1.629	1.000	
1.05	3.44	89.08	0.83	Sands - clean sands to silty sand	1.636	1.000	
1.20	3.94	64.92	1.52	Sands - clean sands to silty sand	1.942	1.231	
1.35	4.43	73.27	0.82	Sands - clean sands to silty sand	1.739	1.064	
1.50	4.92	43.45	1.59	Sand mixtures - silty sand to sandy silt	2.118	1.489	
1.65	5.41	30.40	1.41	Sand mixtures - silty sand to sandy silt	2.221	1.719	
1.80	5.91	45.32	1.68	Sand mixtures - silty sand to sandy silt	2.152	1.557	
1.95	6.40	78.29	1.80	Sand mixtures - silty sand to sandy silt	2.016	1.322	
2.10	6.89	140.64	1.44	Sands - clean sands to silty sand	1.786	1.097	
2.25	7.38	125.94	0.63	Sands - clean sands to silty sand	1.574	1.000	
2.40	7.88	113.87	1.03	Sands - clean sands to silty sand	1.761	1.079	
2.55	8.37	156.26	1.24	Sands - clean sands to silty sand	1.735	1.062	
2.70	8.86	152.16	0.71	Sands - clean sands to silty sand	1.578	1.000	
2.85	9.35	162.03	1.01	Sands - clean sands to silty sand	1.675	1.021	
3.00	9.85	148.16	1.15	Sands - clean sands to silty sand	1.751	1.072	
3.15	10.34	115.53	1.04	Sands - clean sands to silty sand	1.804	1.109	
3.30	10.83	134.29	0.84	Sands - clean sands to silty sand	1.700	1.038	
3.45	11.32	131.91	1.03	Sands - clean sands to silty sand	1.774	1.088	
3.60	11.81	97.26	0.77	Sands - clean sands to silty sand	1.798	1.105	
3.75	12.31	125.60	1.12	Sands - clean sands to silty sand	1.828	1.128	
3.90	12.80	205.05	0.49	Sands - clean sands to silty sand	1.436	1.000	
4.05	13.29	269.68	1.46	Sands - clean sands to silty sand	1.708	1.043	
4.20	13.78	220.82	1.25	Sands - clean sands to silty sand	1.713	1.046	
4.35	14.28	198.92	1.05	Sands - clean sands to silty sand	1.691	1.032	
4.50	14.77	214.28	0.95	Sands - clean sands to silty sand	1.642	0.998	
4.65	15.26	292.26	0.76	Sands - clean sands to silty sand	1.484	1.000	
4.80	15.75	214.96	1.53	Sands - clean sands to silty sand	1.807	1.112	
4.95	16.25	155.26	0.99	Sands - clean sands to silty sand	1.769	1.085	
5.10	16.74	229.13	1.13	Sands - clean sands to silty sand	1.697	1.036	
5.25	17.23	306.61	1.29	Sands - clean sands to silty sand	1.666	1.014	
5.40	17.72	307.26	1.29	Sands - clean sands to silty sand	1.669	1.017	
5.55	18.22	302.57	1.90	Sands - clean sands to silty sand	1.813	1.116	
5.70	18.71	461.12	1.88	Sands - clean sands to silty sand	1.715	1.048	
5.85	19.20	421.94	1.39	Sands - clean sands to silty sand	1.626	1.000	
6.00	19.69	343.44	1.36	Sands - clean sands to silty sand	1.672	1.019	
6.15	20.18	356.89	1.77	Sands - clean sands to silty sand	1.760	1.078	

Interpretations based on:
1. *Youd and Idriss (NCEER), 1997, 2001*
2. *Robertson and Wride, (NCEER), 1997*

I_c=soil behavior type index
Kc=cor. factor for grain characteristics
S_u=overburden normalized undrained shear strength

PROJECT NO.: 04-1703E-1 SOUNDING: CPT-15M

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
6.45	21.17	143.19	3.00	Sand mixtures - silty sand to sandy silt	2.188	1.637	
6.60	21.66	147.50	2.14	Sand mixtures - silty sand to sandy silt	2.070	1.404	
6.75	22.15	321.50	2.06	Sands - clean sands to silty sand	1.852	1.146	
6.90	22.64	273.61	0.98	Sands - clean sands to silty sand	1.644	0.999	
7.05	23.13	173.40	1.94	Sands - clean sands to silty sand	2.001	1.302	
7.20	23.63	230.85	1.82	Sands - clean sands to silty sand	1.903	1.191	
7.35	24.12	334.82	1.51	Sands - clean sands to silty sand	1.742	1.066	

Interpretations based on:
1. *Youd and Idriss (NCEER), 1997, 2001*
2. *Robertson and Wride, (NCEER), 1997*

I_c=soil behavior type index
Kc=cor. factor for grain characteristics
S_u=overburden normalized undrained shear strength

CPT INTERPRETATIONS

PROJECT: Mesas East
DATE/TIME: 9/22/99 10:33
PROJECT NO.: 04-1703E-1

CONE/RIG: 473/#1 GO-MR
ASSUMED DEPTH OF WATER TABLE: 30 feet
SOUNDING: CPT-15M

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
0.15	0.49	194.20	0.61	Gravelly sand to dense sand	1.043	1.000	
0.30	0.98	171.32	1.45	Sands - clean sands to silty sand	1.495	1.000	
0.45	1.48	259.55	1.31	Sands - clean sands to silty sand	1.429	1.000	
0.60	1.97	271.87	0.75	Gravelly sand to dense sand	1.228	1.000	
0.75	2.46	196.47	1.05	Sands - clean sands to silty sand	1.451	1.000	
0.90	2.95	117.82	0.93	Sands - clean sands to silty sand	1.564	1.000	
1.05	3.44	108.43	0.89	Sands - clean sands to silty sand	1.598	1.000	
1.20	3.94	121.39	0.95	Sands - clean sands to silty sand	1.607	1.000	
1.35	4.43	112.81	0.96	Sands - clean sands to silty sand	1.651	1.004	
1.50	4.92	127.85	0.90	Sands - clean sands to silty sand	1.609	1.000	
1.65	5.41	205.10	1.57	Sands - clean sands to silty sand	1.687	1.029	
1.80	5.91	258.17	1.76	Sands - clean sands to silty sand	1.688	1.029	
1.95	6.40	244.70	0.85	Sands - clean sands to silty sand	1.447	1.000	
2.10	6.89	216.93	0.79	Sands - clean sands to silty sand	1.465	1.000	
2.25	7.38	199.89	0.63	Sands - clean sands to silty sand	1.427	1.000	
2.40	7.87	155.00	2.06	Sands - clean sands to silty sand	1.902	1.190	
2.55	8.37	315.59	1.64	Sands - clean sands to silty sand	1.657	1.008	
2.70	8.86	467.17	0.83	Sands - clean sands to silty sand	1.322	1.000	
2.85	9.35	485.19	0.84	Sands - clean sands to silty sand	1.324	1.000	
3.00	9.84	292.09	1.25	Sands - clean sands to silty sand	1.594	1.000	
3.15	10.34	449.37	0.88	Sands - clean sands to silty sand	1.370	1.000	
3.30	10.83	497.09	1.00	Sands - clean sands to silty sand	1.401	1.000	
3.45	11.32	542.02	1.23	Sands - clean sands to silty sand	1.467	1.000	
3.60	11.81	565.92	1.12	Sands - clean sands to silty sand	1.427	1.000	
3.75	12.30	482.32	1.60	Sands - clean sands to silty sand	1.600	1.000	
3.90	12.80	600.42	0.85	Gravelly sand to dense sand	1.317	1.000	
4.05	13.29	429.93	1.78	Sands - clean sands to silty sand	1.673	1.019	
4.20	13.78	341.98	1.05	Sands - clean sands to silty sand	1.536	1.000	
4.35	14.27	280.69	0.51	Sands - clean sands to silty sand	1.362	1.000	
4.50	14.77	153.73	1.52	Sands - clean sands to silty sand	1.890	1.180	
4.65	15.26	132.48	1.97	Sand mixtures - silty sand to sandy silt	2.023	1.331	
4.80	15.75	133.57	2.37	Sand mixtures - silty sand to sandy silt	2.086	1.430	
4.95	16.24	152.77	2.29	Sand mixtures - silty sand to sandy silt	2.041	1.358	
5.10	16.74	285.59	0.99	Sands - clean sands to silty sand	1.591	1.000	
5.25	17.23	178.20	1.90	Sands - clean sands to silty sand	1.944	1.234	
5.40	17.72	420.54	1.12	Sands - clean sands to silty sand	1.539	1.000	
5.55	18.21	462.69	1.18	Sands - clean sands to silty sand	1.538	1.000	
5.70	18.70	266.90	1.09	Sands - clean sands to silty sand	1.658	1.009	
5.85	19.20	134.33	3.10	Sand mixtures - silty sand to sandy silt	2.203	1.673	
6.00	19.69	116.12	4.08	Very stiff, fine grained	2.339	2.081	
6.15	20.18	134.37	3.27	Sand mixtures - silty sand to sandy silt	2.228	1.737	
6.30	20.67	131.97	3.18	Sand mixtures - silty sand to sandy silt	2.227	1.734	

Interpretations based on:
1. Youd and Idriss (NCEER), 1997, 2001
2. Robertson and Wride, (NCEER), 1997

I_c=soil behavior type index
Kc=cor. factor for grain characteristics
S_u=overburden normalized undrained shear strength

CPT INTERPRETATIONS

PROJECT: Mesas East
DATE/TIME: 9/22/99 9:45
PROJECT NO.: 04-1703E-1

CONE/RIG: 473/R#4 GO-MR
ASSUMED DEPTH OF WATER TABLE: 35 feet
SOUNDING: CPT-14M

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
0.15	0.49	63.03	2.27	Very stiff sand to clayey sand	1.753	1.073	
0.30	0.98	136.56	1.49	Sands - clean sands to silty sand	1.546	1.000	
0.45	1.48	71.96	1.78	Sands - clean sands to silty sand	1.813	1.116	
0.60	1.97	44.34	2.57	Sand mixtures - silty sand to sandy silt	2.113	1.478	
0.75	2.46	87.74	2.18	Sands - clean sands to silty sand	1.909	1.197	
0.90	2.95	129.93	2.10	Sands - clean sands to silty sand	1.824	1.125	
1.05	3.44	104.44	1.10	Sands - clean sands to silty sand	1.677	1.022	
1.20	3.94	125.79	0.67	Sands - clean sands to silty sand	1.486	1.000	
1.35	4.43	141.96	0.70	Sands - clean sands to silty sand	1.482	1.000	
1.50	4.92	234.50	1.16	Sands - clean sands to silty sand	1.533	1.000	
1.65	5.41	255.58	0.75	Sands - clean sands to silty sand	1.369	1.000	
1.80	5.91	312.38	1.70	Sands - clean sands to silty sand	1.635	1.000	
1.95	6.40	507.60	1.85	Very stiff sand to clayey sand	1.590	1.000	
2.10	6.89	521.43	2.27	Very stiff sand to clayey sand	1.675	1.021	
2.25	7.38	514.38	1.18	Sands - clean sands to silty sand	1.419	1.000	
2.40	7.87	401.99	0.78	Gravelly sand to dense sand	1.319	1.000	
2.55	8.37	346.16	0.89	Sands - clean sands to silty sand	1.410	1.000	
2.70	8.86	406.46	1.33	Sands - clean sands to silty sand	1.530	1.000	

Interpretations based on:
1. Youd and Idriss (NCEER), 1997, 2001
2. Robertson and Wride, (NCEER), 1997

I_c=soil behavior type index
Kc=cor. factor for grain characteristics
S_u=overburden normalized undrained shear strength

CPT INTERPRETATIONS

PROJECT: Mesas East
DATE/TIME: 9/22/99 11:41
PROJECT NO.: 04-1703E-1

CONE/RIG: 473/#1 GO-MR
ASSUMED DEPTH OF WATER TABLE: 35 feet
SOUNDING: CPT-13M

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
0.15	0.49	1.85	0.01	Sand mixtures - silty sand to sandy silt	2.426	2.424	
0.30	0.98	30.97	4.84	Very stiff, fine grained	2.314	1.996	
0.45	1.48	89.91	1.57	Sands - clean sands to silty sand	1.712	1.046	
0.60	1.97	113.49	1.32	Sands - clean sands to silty sand	1.635	1.000	
0.75	2.46	73.32	1.02	Sands - clean sands to silty sand	1.703	1.040	
0.90	2.95	56.19	1.41	Sands - clean sands to silty sand	1.915	1.204	
1.05	3.44	66.11	1.00	Sands - clean sands to silty sand	1.786	1.097	
1.20	3.94	103.82	1.24	Sands - clean sands to silty sand	1.739	1.064	
1.35	4.43	150.63	1.00	Sands - clean sands to silty sand	1.581	1.000	
1.50	4.92	137.90	0.91	Sands - clean sands to silty sand	1.591	1.000	
1.65	5.41	152.92	1.34	Sands - clean sands to silty sand	1.705	1.041	
1.80	5.91	209.45	2.45	Very stiff sand to clayey sand	1.858	1.151	
1.95	6.40	270.89	1.76	Sands - clean sands to silty sand	1.686	1.029	
2.10	6.89	328.57	1.41	Sands - clean sands to silty sand	1.569	1.000	
2.25	7.38	323.90	1.97	Very stiff sand to clayey sand	1.708	1.043	
2.40	7.87	393.82	1.62	Sands - clean sands to silty sand	1.600	1.000	
2.55	8.37	431.95	1.23	Sands - clean sands to silty sand	1.481	1.000	
2.70	8.86	206.31	1.64	Sands - clean sands to silty sand	1.764	1.081	
2.85	9.35	211.77	1.94	Sands - clean sands to silty sand	1.824	1.125	
3.00	9.84	393.01	1.66	Sands - clean sands to silty sand	1.633	1.000	
3.15	10.33	420.86	1.40	Sands - clean sands to silty sand	1.559	1.000	
3.30	10.83	344.80	1.12	Sands - clean sands to silty sand	1.526	1.000	
3.45	11.32	310.62	1.42	Sands - clean sands to silty sand	1.643	0.998	
3.60	11.81	451.79	1.18	Sands - clean sands to silty sand	1.493	1.000	
3.75	12.30	460.50	1.17	Sands - clean sands to silty sand	1.491	1.000	
3.90	12.80	417.91	1.62	Sands - clean sands to silty sand	1.639	1.000	
4.05	13.29	399.72	1.08	Sands - clean sands to silty sand	1.503	1.000	
4.20	13.78	431.29	1.22	Sands - clean sands to silty sand	1.534	1.000	
4.35	14.27	431.61	1.40	Sands - clean sands to silty sand	1.589	1.000	
4.50	14.76	499.32	1.21	Sands - clean sands to silty sand	1.506	1.000	
4.65	15.26	499.83	1.28	Sands - clean sands to silty sand	1.530	1.000	
4.80	15.75	472.08	1.28	Sands - clean sands to silty sand	1.547	1.000	
4.95	16.24	323.30	1.77	Sands - clean sands to silty sand	1.757	1.076	
5.10	16.73	345.70	0.96	Sands - clean sands to silty sand	1.528	1.000	
5.25	17.22	282.26	0.97	Sands - clean sands to silty sand	1.591	1.000	
5.40	17.72	331.12	0.98	Sands - clean sands to silty sand	1.554	1.000	
5.55	18.21	382.05	0.98	Sands - clean sands to silty sand	1.520	1.000	
5.70	18.70	362.12	0.74	Sands - clean sands to silty sand	1.443	1.000	
5.85	19.19	323.35	1.01	Sands - clean sands to silty sand	1.582	1.000	
6.00	19.69	266.05	1.10	Sands - clean sands to silty sand	1.669	1.017	

Interpretations based on:
1. Youd and Idriss (NCEER), 1997, 2001
2. Robertson and Wride, (NCEER), 1997

I_c=soil behavior type index
Kc=cor. factor for grain characteristics
S_u=overburden normalized undrained shear strength

PROJECT NO.: 04-1703E-1 SOUNDING: CPT-12M

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
6.45	21.16	132.14	1.97	Sand mixtures - silty sand to sandy silt	2.073	1.407	
6.60	21.66	102.70	2.98	Sand mixtures - silty sand to sandy silt	2.284	1.897	
6.75	22.15	126.60	1.69	Sand mixtures - silty sand to sandy silt	2.045	1.363	
6.90	22.64	133.52	1.57	Sands - clean sands to silty sand	2.009	1.312	
7.05	23.13	127.07	1.74	Sand mixtures - silty sand to sandy silt	2.059	1.386	
7.20	23.63	149.18	2.53	Sand mixtures - silty sand to sandy silt	2.135	1.522	
7.35	24.12	120.99	2.31	Sand mixtures - silty sand to sandy silt	2.170	1.596	
7.50	24.61	136.18	2.55	Sand mixtures - silty sand to sandy silt	2.170	1.596	
7.65	25.10	136.39	2.13	Sand mixtures - silty sand to sandy silt	2.114	1.481	
7.80	25.59	144.17	2.32	Sand mixtures - silty sand to sandy silt	2.127	1.506	
7.95	26.09	125.00	2.32	Sand mixtures - silty sand to sandy silt	2.171	1.598	
8.10	26.58	120.82	2.00	Sand mixtures - silty sand to sandy silt	2.136	1.524	

Interpretations based on:
1. Youd and Idriss (NCEER), 1997, 2001
2. Robertson and Wride, (NCEER), 1997

I_c=soil behavior type index
Kc=cor. factor for grain characteristics
S_u=overburden normalized undrained shear strength

CPT INTERPRETATIONS

PROJECT: Mesas East
DATE/TIME: 9/22/99 12:12
PROJECT NO.: 04-1703E-1

CONE/RIG: 473/#4 GO-MR
ASSUMED DEPTH OF WATER TABLE: 35 feet
SOUNDING: CPT-12M

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
0.15	0.49	0.10	0.01	Sensitive, fine-grained	2.798	4.769	0.01
0.30	0.98	0.10	0.01	Sensitive, fine-grained	3.408	12.465	0.01
0.45	1.48	0.01	0.01	Sensitive, fine-grained	5.227	63.778	0.00
0.60	1.97	8.46	14.32	Very stiff, fine grained	2.848	5.210	1.13
0.75	2.46	139.45	1.58	Sands - clean sands to silty sand	1.680	1.024	
0.90	2.95	180.56	2.58	Very stiff sand to clayey sand	1.831	1.130	
1.05	3.44	172.10	0.87	Sands - clean sands to silty sand	1.461	1.000	
1.20	3.94	88.44	0.91	Sands - clean sands to silty sand	1.689	1.030	
1.35	4.43	103.23	1.25	Sands - clean sands to silty sand	1.761	1.079	
1.50	4.92	92.08	0.97	Sands - clean sands to silty sand	1.733	1.060	
1.65	5.41	70.28	3.13	Sand mixtures - silty sand to sandy silt	2.204	1.676	
1.80	5.91	68.85	1.90	Sand mixtures - silty sand to sandy silt	2.059	1.386	
1.95	6.40	82.54	1.75	Sands - clean sands to silty sand	1.992	1.289	
2.10	6.89	80.41	1.67	Sands - clean sands to silty sand	1.996	1.295	
2.25	7.38	81.30	1.08	Sands - clean sands to silty sand	1.872	1.163	
2.40	7.87	67.62	1.40	Sands - clean sands to silty sand	2.018	1.324	
2.55	8.37	70.11	1.49	Sands - clean sands to silty sand	2.035	1.348	
2.70	8.86	107.12	1.25	Sands - clean sands to silty sand	1.858	1.152	
2.85	9.35	94.54	1.01	Sands - clean sands to silty sand	1.843	1.139	
3.00	9.84	88.95	1.79	Sand mixtures - silty sand to sandy silt	2.043	1.361	
3.15	10.34	76.55	1.88	Sand mixtures - silty sand to sandy silt	2.112	1.477	
3.30	10.83	89.08	1.65	Sand mixtures - silty sand to sandy silt	2.033	1.345	
3.45	11.32	109.52	1.69	Sands - clean sands to silty sand	1.984	1.280	
3.60	11.81	157.98	1.21	Sands - clean sands to silty sand	1.776	1.089	
3.75	12.30	202.85	1.05	Sands - clean sands to silty sand	1.663	1.012	
3.90	12.80	237.05	1.26	Sands - clean sands to silty sand	1.686	1.028	
4.05	13.29	217.19	1.15	Sands - clean sands to silty sand	1.684	1.027	
4.20	13.78	282.87	1.33	Sands - clean sands to silty sand	1.668	1.016	
4.35	14.27	333.90	1.52	Sands - clean sands to silty sand	1.678	1.023	
4.50	14.77	390.56	1.74	Sands - clean sands to silty sand	1.696	1.035	
4.65	15.26	382.73	1.32	Sands - clean sands to silty sand	1.603	1.000	
4.80	15.75	419.65	1.86	Sands - clean sands to silty sand	1.713	1.046	
4.95	16.24	479.98	1.38	Sands - clean sands to silty sand	1.575	1.000	
5.10	16.73	386.61	1.37	Sands - clean sands to silty sand	1.625	1.000	
5.25	17.23	416.99	1.15	Sands - clean sands to silty sand	1.547	1.000	
5.40	17.72	305.78	1.51	Sands - clean sands to silty sand	1.725	1.055	
5.55	18.21	152.39	1.75	Sands - clean sands to silty sand	1.970	1.263	
5.70	18.70	161.16	2.84	Sand mixtures - silty sand to sandy silt	2.120	1.491	
5.85	19.20	181.15	1.48	Sands - clean sands to silty sand	1.873	1.164	
6.00	19.69	232.08	1.57	Sands - clean sands to silty sand	1.826	1.126	
6.15	20.18	202.87	1.13	Sands - clean sands to silty sand	1.761	1.079	
6.30	20.67	117.04	2.35	Sand mixtures - silty sand to sandy silt	2.162	1.578	

Interpretations based on:
1. Youd and Idriss (NCEER), 1997, 2001
2. Robertson and Wride, (NCEER), 1997

I_c=soil behavior type index
Kc=cor. factor for grain characteristics
S_u=overburden normalized undrained shear strength

CPT INTERPRETATIONS

PROJECT: Mesas East
DATE/TIME: 9/22/99 8:14
PROJECT NO.: 04-1703E-1

CONE/RIG: 473/R#4 GO-MR
ASSUMED DEPTH OF WATER TABLE: 30 feet
SOUNDING: CPT-11M

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
0.15	0.49	94.92	2.52	Very stiff sand to clayey sand	1.725	1.055	
0.30	0.98	83.51	2.68	Very stiff sand to clayey sand	1.870	1.162	
0.45	1.48	60.23	1.63	Sands - clean sands to silty sand	1.829	1.128	
0.60	1.97	46.80	2.19	Sand mixtures - silty sand to sandy silt	2.044	1.362	
0.75	2.46	42.17	2.50	Sand mixtures - silty sand to sandy silt	2.153	1.559	
0.90	2.95	36.77	3.75	Silt mixtures - clayey silt to silty clay	2.354	2.135	
1.05	3.44	39.77	2.61	Sand mixtures - silty sand to sandy silt	2.238	1.765	
1.20	3.94	47.55	4.94	Very stiff, fine grained	2.419	2.394	
1.35	4.43	125.64	2.58	Very stiff sand to clayey sand	1.959	1.250	
1.50	4.92	139.85	1.94	Sands - clean sands to silty sand	1.844	1.140	
1.65	5.41	183.45	3.56	Very stiff sand to clayey sand	2.018	1.324	
1.80	5.91	229.74	2.22	Very stiff sand to clayey sand	1.800	1.107	
1.95	6.40	140.68	1.61	Sands - clean sands to silty sand	1.813	1.117	
2.10	6.89	97.53	3.68	Very stiff sand to clayey sand	2.207	1.683	
2.25	7.38	228.32	1.72	Sands - clean sands to silty sand	1.733	1.060	
2.40	7.87	173.06	1.67	Sands - clean sands to silty sand	1.800	1.106	
2.55	8.37	119.27	3.01	Very stiff sand to clayey sand	2.110	1.473	
2.70	8.86	132.91	4.44	Very stiff, fine grained	2.230	1.742	

Interpretations based on:
1. *Youd and Idriss (NCEER), 1997, 2001*
2. *Robertson and Wride, (NCEER), 1997*

I_c=soil behavior type index
Kc=cor. factor for grain characteristics
S_u=overburden normalized undrained shear strength

CPT INTERPRETATIONS

PROJECT: Mesas East
DATE/TIME: 9/22/99 8:46
PROJECT NO.: 04-1703E-1

CONE/RIG: 408/#1 GO-JH
ASSUMED DEPTH OF WATER TABLE: 35 feet
SOUNDING: CPT-10M

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
0.15	0.49	260.99	2.47	Very stiff sand to clayey sand	1.620	1.000	
0.30	0.98	254.83	2.29	Very stiff sand to clayey sand	1.629	1.000	
0.45	1.48	166.71	2.88	Very stiff sand to clayey sand	1.817	1.120	
0.60	1.97	213.83	2.21	Very stiff sand to clayey sand	1.698	1.037	
0.75	2.46	182.30	2.11	Very stiff sand to clayey sand	1.732	1.059	
0.90	2.95	84.41	2.16	Sands - clean sands to silty sand	1.941	1.230	
1.05	3.44	48.95	1.72	Sand mixtures - silty sand to sandy silt	2.044	1.363	
1.20	3.94	36.24	1.66	Sand mixtures - silty sand to sandy silt	2.151	1.555	
1.35	4.43	33.42	6.16	Very stiff, fine grained	2.530	2.927	
1.50	4.92	70.81	4.21	Very stiff, fine grained	2.291	1.919	
1.65	5.41	74.93	2.47	Sand mixtures - silty sand to sandy silt	2.107	1.467	
1.80	5.91	107.29	2.40	Sand mixtures - silty sand to sandy silt	2.012	1.316	
1.95	6.40	131.27	2.36	Sands - clean sands to silty sand	1.964	1.256	
2.10	6.89	166.67	2.78	Very stiff sand to clayey sand	1.974	1.268	
2.25	7.38	172.47	2.50	Very stiff sand to clayey sand	1.936	1.225	
2.40	7.87	168.30	2.20	Sands - clean sands to silty sand	1.904	1.193	
2.55	8.37	145.55	3.40	Very stiff sand to clayey sand	2.104	1.462	
2.70	8.86	161.52	3.38	Very stiff sand to clayey sand	2.084	1.426	
2.85	9.35	135.58	4.03	Very stiff sand to clayey sand	2.196	1.658	
3.00	9.84	146.84	3.29	Very stiff sand to clayey sand	2.110	1.474	
3.15	10.33	118.42	3.03	Sand mixtures - silty sand to sandy silt	2.143	1.538	
3.30	10.83	113.17	3.13	Sand mixtures - silty sand to sandy silt	2.173	1.602	
3.45	11.32	132.48	2.60	Sand mixtures - silty sand to sandy silt	2.073	1.408	
3.60	11.81	92.58	3.95	Very stiff sand to clayey sand	2.318	2.009	
3.75	12.30	128.53	2.72	Sand mixtures - silty sand to sandy silt	2.108	1.469	
3.90	12.80	209.03	2.26	Sands - clean sands to silty sand	1.922	1.210	
4.05	13.29	217.16	1.48	Sands - clean sands to silty sand	1.769	1.085	
4.20	13.78	130.04	1.66	Sands - clean sands to silty sand	1.958	1.248	
4.35	14.27	123.26	1.46	Sands - clean sands to silty sand	1.939	1.227	
4.50	14.76	123.47	1.47	Sands - clean sands to silty sand	1.945	1.235	
4.65	15.26	111.28	2.74	Sand mixtures - silty sand to sandy silt	2.181	1.622	
4.80	15.75	216.02	1.69	Sands - clean sands to silty sand	1.839	1.137	
4.95	16.24	166.62	2.61	Sand mixtures - silty sand to sandy silt	2.062	1.391	
5.10	16.73	198.07	3.48	Very stiff sand to clayey sand	2.124	1.500	
5.25	17.22	292.50	2.34	Sands - clean sands to silty sand	1.890	1.179	
5.40	17.72	304.10	2.97	Very stiff sand to clayey sand	1.972	1.265	
5.55	18.21	344.12	2.85	Very stiff sand to clayey sand	1.933	1.221	
5.70	18.70	401.31	2.66	Very stiff sand to clayey sand	1.877	1.168	
5.85	19.19	422.09	2.75	Very stiff sand to clayey sand	1.882	1.172	

Interpretations based on:
1. *Youd and Idriss (NCEER), 1997, 2001*
2. *Robertson and Wride, (NCEER), 1997*

I_c=soil behavior type index
Kc=cor. factor for grain characteristics
S_u=overburden normalized undrained shear strength

PROJECT NO.: 04-1703E-1

SOUNDING: CPT-9M

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
6.45	21.16	103.99	4.14	Very stiff, fine grained	2.382	2.240	
6.60	21.65	138.94	3.25	Sand mixtures - silty sand to sandy silt	2.222	1.721	
6.75	22.15	271.87	2.60	Very stiff sand to clayey sand	1.971	1.264	
6.90	22.64	540.81	1.47	Sands - clean sands to silty sand	1.603	1.000	

Interpretations based on:
1. Youd and Idriss (NCEER), 1997, 2001
2. Robertson and Wride, (NCEER), 1997

I_c=soil behavior type index
Kc=cor. factor for grain characteristics
S_u=overburden normalized undrained shear strength

CPT INTERPRETATIONS

PROJECT: Mesas East
DATE/TIME: 9/7/99 12:59
PROJECT NO.: 04-1703E-1

CONE/RIG: 408/#1 GO-JH
ASSUMED DEPTH OF WATER TABLE: 25 feet
SOUNDING: CPT-9M

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
0.15	0.49	171.55	3.91	Very stiff sand to clayey sand	1.842	1.139	
0.30	0.98	188.65	4.42	Very stiff sand to clayey sand	1.939	1.228	
0.45	1.48	132.06	2.40	Very stiff sand to clayey sand	1.787	1.098	
0.60	1.97	285.64	2.70	Very stiff sand to clayey sand	1.736	1.062	
0.75	2.46	95.07	3.32	Very stiff sand to clayey sand	2.042	1.359	
0.90	2.95	92.69	2.52	Sand mixtures - silty sand to sandy silt	1.972	1.265	
1.05	3.44	62.14	3.13	Sand mixtures - silty sand to sandy silt	2.172	1.601	
1.20	3.94	29.89	4.57	Silt mixtures - clayey silt to silty clay	2.523	2.889	
1.35	4.43	29.45	3.98	Silt mixtures - clayey silt to silty clay	2.502	2.779	
1.50	4.92	53.07	2.20	Sand mixtures - silty sand to sandy silt	2.155	1.563	
1.65	5.41	24.71	2.02	Sand mixtures - silty sand to sandy silt	2.390	2.271	
1.80	5.91	8.33	3.82	Silt mixtures - clayey silt to silty clay	2.778	4.599	1.11
1.95	6.40	8.58	3.38	Silt mixtures - clayey silt to silty clay	2.763	4.477	1.14
2.10	6.89	11.58	3.11	Silt mixtures - clayey silt to silty clay	2.660	3.714	1.54
2.25	7.38	9.96	3.87	Clays - silty clay to clay	2.800	4.787	1.33
2.40	7.87	8.20	4.18	Clays - silty clay to clay	2.917	5.863	1.09
2.55	8.37	9.03	5.77	Clays - silty clay to clay	2.996	6.701	1.20
2.70	8.86	33.33	3.04	Silt mixtures - clayey silt to silty clay	2.494	2.740	
2.85	9.35	24.30	4.36	Silt mixtures - clayey silt to silty clay	2.617	3.434	3.24
3.00	9.84	30.83	3.28	Silt mixtures - clayey silt to silty clay	2.560	3.088	
3.15	10.33	34.52	3.53	Silt mixtures - clayey silt to silty clay	2.553	3.054	
3.30	10.83	43.45	3.74	Silt mixtures - clayey silt to silty clay	2.507	2.804	
3.45	11.32	48.99	3.33	Silt mixtures - clayey silt to silty clay	2.441	2.488	
3.60	11.81	38.81	5.26	Silt mixtures - clayey silt to silty clay	2.606	3.364	5.17
3.75	12.30	68.39	4.98	Very stiff, fine grained	2.486	2.699	
3.90	12.80	62.61	3.18	Sand mixtures - silty sand to sandy silt	2.371	2.199	
4.05	13.29	103.44	2.51	Sand mixtures - silty sand to sandy silt	2.153	1.559	
4.20	13.78	149.58	2.25	Sand mixtures - silty sand to sandy silt	2.018	1.324	
4.35	14.27	194.67	2.25	Sands - clean sands to silty sand	1.953	1.243	
4.50	14.76	251.41	2.35	Sands - clean sands to silty sand	1.909	1.197	
4.65	15.26	289.18	1.84	Sands - clean sands to silty sand	1.790	1.100	
4.80	15.75	375.48	1.74	Sands - clean sands to silty sand	1.712	1.046	
4.95	16.24	313.25	1.80	Sands - clean sands to silty sand	1.771	1.086	
5.10	16.73	280.03	1.72	Sands - clean sands to silty sand	1.786	1.097	
5.25	17.22	173.19	1.44	Sands - clean sands to silty sand	1.861	1.154	
5.40	17.72	192.80	1.96	Sands - clean sands to silty sand	1.937	1.226	
5.55	18.21	247.03	1.43	Sands - clean sands to silty sand	1.766	1.083	
5.70	18.70	256.72	1.35	Sands - clean sands to silty sand	1.740	1.065	
5.85	19.19	274.21	2.31	Sands - clean sands to silty sand	1.914	1.202	
6.00	19.68	458.44	1.36	Sands - clean sands to silty sand	1.602	1.000	
6.15	20.18	692.75	1.39	Sands - clean sands to silty sand	1.524	1.000	
6.30	20.67	321.05	1.91	Sands - clean sands to silty sand	1.815	1.118	

Interpretations based on:
1. *Youd and Idriss (NCEER), 1997, 2001*
2. *Robertson and Wride, (NCEER), 1997*

I_c=soil behavior type index
Kc=cor. factor for grain characteristics
S_u=overburden normalized undrained shear strength

PROJECT NO.: 04-1703E-1 SOUNDING: CPT-8M

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
6.45	21.16	151.45	4.21	Very stiff, fine grained	2.289	1.915	
6.60	21.65	143.85	4.39	Very stiff, fine grained	2.320	2.016	
6.75	22.15	154.07	4.05	Very stiff sand to clayey sand	2.277	1.878	
6.90	22.64	153.47	3.53	Very stiff sand to clayey sand	2.234	1.753	
7.05	23.13	149.84	3.49	Very stiff sand to clayey sand	2.239	1.768	
7.20	23.62	129.98	3.29	Sand mixtures - silty sand to sandy silt	2.261	1.831	
7.35	24.11	144.44	2.73	Sand mixtures - silty sand to sandy silt	2.172	1.602	
7.50	24.61	202.91	5.98	Very stiff, fine grained	2.362	2.165	
7.65	25.10	180.13	6.69	Very stiff, fine grained	2.434	2.456	
7.80	25.59	305.97	3.96	Very stiff sand to clayey sand	2.119	1.491	
7.95	26.08	240.75	5.04	Very stiff, fine grained	2.265	1.840	

Interpretations based on:
1. Youd and Idriss (NCEER), 1997, 2001
2. Robertson and Wride, (NCEER), 1997

I_c=soil behavior type index
Kc=cor. factor for grain characteristics
S_u=overburden normalized undrained shear strength

CPT INTERPRETATIONS

PROJECT: Mesas East
DATE/TIME: 9/7/99 11:05
PROJECT NO.: 04-1703E-1

CONE/RIG: 408/#1 GO-JH
ASSUMED DEPTH OF WATER TABLE: 30 feet
SOUNDING: CPT-8M

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
0.15	0.49	132.91	2.27	Very stiff sand to clayey sand	1.637	1.000	
0.30	0.98	192.80	4.86	Very stiff sand to clayey sand	1.976	1.270	
0.45	1.48	113.34	6.20	Very stiff, fine grained	2.189	1.641	
0.60	1.97	86.55	5.67	Very stiff, fine grained	2.237	1.763	
0.75	2.46	79.77	5.19	Very stiff, fine grained	2.248	1.792	
0.90	2.95	88.42	5.00	Very stiff, fine grained	2.233	1.752	
1.05	3.44	85.98	5.68	Very stiff, fine grained	2.306	1.967	
1.20	3.94	65.18	5.65	Very stiff, fine grained	2.386	2.256	
1.35	4.43	44.32	5.65	Very stiff, fine grained	2.501	2.776	
1.50	4.92	35.50	4.81	Silt mixtures - clayey silt to silty clay	2.525	2.896	
1.65	5.41	42.09	4.53	Silt mixtures - clayey silt to silty clay	2.471	2.624	
1.80	5.91	45.68	4.11	Silt mixtures - clayey silt to silty clay	2.428	2.432	
1.95	6.40	30.49	4.34	Silt mixtures - clayey silt to silty clay	2.578	3.193	
2.10	6.89	32.84	5.94	Silt mixtures - clayey silt to silty clay	2.612	3.402	4.38
2.25	7.38	41.17	6.78	Very stiff, fine grained	2.608	3.376	5.49
2.40	7.87	50.39	6.24	Very stiff, fine grained	2.583	3.222	
2.55	8.37	65.69	5.31	Very stiff, fine grained	2.464	2.594	
2.70	8.86	82.03	5.46	Very stiff, fine grained	2.423	2.410	
2.85	9.35	52.77	4.48	Silt mixtures - clayey silt to silty clay	2.484	2.690	
3.00	9.84	59.10	5.88	Very stiff, fine grained	2.551	3.037	
3.15	10.33	59.76	5.45	Very stiff, fine grained	2.529	2.918	
3.30	10.83	70.49	5.26	Very stiff, fine grained	2.478	2.660	
3.45	11.32	60.17	5.71	Very stiff, fine grained	2.556	3.066	
3.60	11.81	80.73	5.09	Very stiff, fine grained	2.442	2.493	
3.75	12.30	79.12	4.93	Very stiff, fine grained	2.442	2.494	
3.90	12.80	72.42	4.29	Silt mixtures - clayey silt to silty clay	2.426	2.421	
4.05	13.29	53.88	4.94	Silt mixtures - clayey silt to silty clay	2.563	3.108	
4.20	13.78	71.15	4.92	Silt mixtures - clayey silt to silty clay	2.487	2.705	
4.35	14.27	66.31	5.16	Silt mixtures - clayey silt to silty clay	2.528	2.915	
4.50	14.76	76.35	4.84	Very stiff, fine grained	2.472	2.631	
4.65	15.26	80.22	4.65	Very stiff, fine grained	2.450	2.526	
4.80	15.75	71.43	5.24	Silt mixtures - clayey silt to silty clay	2.527	2.907	
4.95	16.24	50.84	6.56	Clays - silty clay to clay	2.694	3.956	6.78
5.10	16.73	70.45	4.43	Silt mixtures - clayey silt to silty clay	2.484	2.689	
5.25	17.22	87.21	3.03	Sand mixtures - silty sand to sandy silt	2.303	1.957	
5.40	17.72	136.50	1.97	Sand mixtures - silty sand to sandy silt	2.036	1.350	
5.55	18.21	152.96	3.07	Sand mixtures - silty sand to sandy silt	2.157	1.567	
5.70	18.70	227.04	3.27	Very stiff sand to clayey sand	2.082	1.423	
5.85	19.19	226.17	5.36	Very stiff, fine grained	2.268	1.850	
6.00	19.68	280.24	4.33	Very stiff sand to clayey sand	2.143	1.539	
6.15	20.18	328.00	3.70	Very stiff sand to clayey sand	2.053	1.375	
6.30	20.67	180.71	4.19	Very stiff, fine grained	2.240	1.770	

Interpretations based on:
1. Youd and Idriss (NCEER), 1997, 2001
2. Robertson and Wride, (NCEER), 1997

I_c=soil behavior type index
Kc=cor. factor for grain characteristics
S_u=overburden normalized undrained shear strength

CPT INTERPRETATIONS

PROJECT: Mesas East
DATE/TIME: 9/7/99 10:34
PROJECT NO.: 04-1703E-1

CONE/RIG: 408/#1 GO-JH
ASSUMED DEPTH OF WATER TABLE: 30 feet
SOUNDING: CPT-7M

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
0.15	0.49	135.48	1.99	Very stiff sand to clayey sand	1.580	1.000	
0.30	0.98	247.65	1.00	Gravelly sand to dense sand	1.287	1.000	
0.45	1.48	307.35	1.29	Sands - clean sands to silty sand	1.398	1.000	
0.60	1.97	186.42	2.16	Very stiff sand to clayey sand	1.713	1.047	
0.75	2.46	88.99	2.32	Sands - clean sands to silty sand	1.927	1.216	
0.90	2.95	56.87	2.55	Sand mixtures - silty sand to sandy silt	2.104	1.461	
1.05	3.44	39.58	2.16	Sand mixtures - silty sand to sandy silt	2.180	1.619	
1.20	3.94	42.26	2.60	Sand mixtures - silty sand to sandy silt	2.240	1.771	
1.35	4.43	76.06	1.40	Sands - clean sands to silty sand	1.888	1.177	
1.50	4.92	63.44	1.78	Sand mixtures - silty sand to sandy silt	2.034	1.348	
1.65	5.41	44.91	0.86	Sands - clean sands to silty sand	1.955	1.246	
1.80	5.91	33.65	0.88	Sand mixtures - silty sand to sandy silt	2.080	1.420	
1.95	6.40	65.18	1.21	Sands - clean sands to silty sand	1.952	1.242	
2.10	6.89	122.67	1.43	Sands - clean sands to silty sand	1.822	1.123	
2.25	7.38	248.67	0.74	Sands - clean sands to silty sand	1.415	1.000	
2.40	7.87	76.59	1.98	Sand mixtures - silty sand to sandy silt	2.085	1.429	
2.55	8.37	66.88	1.86	Sand mixtures - silty sand to sandy silt	2.117	1.486	
2.70	8.86	52.50	1.01	Sands - clean sands to silty sand	2.032	1.345	
2.85	9.35	72.89	1.93	Sand mixtures - silty sand to sandy silt	2.119	1.491	
3.00	9.84	163.67	0.79	Sands - clean sands to silty sand	1.604	1.000	
3.15	10.33	222.22	0.76	Sands - clean sands to silty sand	1.506	1.000	
3.30	10.83	258.61	0.87	Sands - clean sands to silty sand	1.513	1.000	
3.45	11.32	277.95	1.82	Sands - clean sands to silty sand	1.759	1.078	
3.60	11.81	271.83	0.33	Gravelly sand to dense sand	1.219	1.000	
3.75	12.30	104.16	1.35	Sands - clean sands to silty sand	1.943	1.232	
3.90	12.80	80.50	1.66	Sand mixtures - silty sand to sandy silt	2.093	1.442	
4.05	13.29	80.90	1.32	Sands - clean sands to silty sand	2.030	1.342	
4.20	13.78	99.79	1.00	Sands - clean sands to silty sand	1.888	1.178	
4.35	14.27	171.36	1.29	Sands - clean sands to silty sand	1.801	1.107	
4.50	14.76	200.42	0.82	Sands - clean sands to silty sand	1.617	1.000	
4.65	15.26	333.12	2.16	Sands - clean sands to silty sand	1.816	1.119	
4.80	15.75	310.54	1.34	Sands - clean sands to silty sand	1.664	1.013	
4.95	16.24	449.05	1.70	Sands - clean sands to silty sand	1.668	1.016	
5.10	16.73	462.41	1.43	Sands - clean sands to silty sand	1.599	1.000	
5.25	17.22	267.03	1.01	Sands - clean sands to silty sand	1.621	1.000	

Interpretations based on:
1. *Youd and Idriss (NCEER), 1997, 2001*
2. *Robertson and Wride, (NCEER), 1997*

I_c=soil behavior type index
Kc=cor. factor for grain characteristics
S_u=overburden normalized undrained shear strength

PROJECT NO.: 04-1703E-1 SOUNDING: CPT-6M

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
6.45	21.16	137.77	1.84	Sand mixtures - silty sand to sandy silt	2.039	1.354	
6.60	21.65	97.30	1.66	Sand mixtures - silty sand to sandy silt	2.119	1.490	
6.75	22.15	102.78	2.23	Sand mixtures - silty sand to sandy silt	2.195	1.654	
6.90	22.64	110.64	2.47	Sand mixtures - silty sand to sandy silt	2.208	1.687	
7.05	23.13	101.36	3.02	Sand mixtures - silty sand to sandy silt	2.302	1.954	
7.20	23.62	119.20	2.13	Sand mixtures - silty sand to sandy silt	2.145	1.543	
7.35	24.11	318.18	1.08	Sands - clean sands to silty sand	1.642	0.997	
7.50	24.61	453.53	0.97	Sands - clean sands to silty sand	1.511	1.000	
7.65	25.10	121.39	1.55	Sand mixtures - silty sand to sandy silt	2.052	1.374	
7.80	25.59	84.04	2.26	Sand mixtures - silty sand to sandy silt	2.284	1.898	
7.95	26.08	91.80	1.36	Sand mixtures - silty sand to sandy silt	2.109	1.471	
8.10	26.57	74.59	1.91	Sand mixtures - silty sand to sandy silt	2.276	1.875	
8.25	27.07	45.17	4.19	Silt mixtures - clayey silt to silty clay	2.746	4.343	6.02
8.40	27.56	85.26	2.02	Sand mixtures - silty sand to sandy silt	2.252	1.804	

Interpretations based on: 1. Youd, Idriss, et al (NCEER), 1997, 2001
2. Robertson and Wride, (NCEER), 1997; 3. Olsen (NCEER), 1997

Ic=soil behavior type index
Kc=grain-size cor. factor
Su= normalized undrained shear strength

CPT INTERPRETATIONS

PROJECT: Mesas East
DATE/TIME: 9/7/99 9:50
PROJECT NO.: 04-1703E-1

CONE/RIG: 408\#1 GO-JH
ASSUMED DEPTH OF WATER TABLE: 30 feet
SOUNDING: CPT-6M

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
0.15	0.49	78.99	2.25	Very stiff sand to clayey sand	1.708	1.044	
0.30	0.98	66.71	3.80	Very stiff sand to clayey sand	2.050	1.371	
0.45	1.48	55.05	3.52	Very stiff sand to clayey sand	2.122	1.497	
0.60	1.97	157.83	1.99	Very stiff sand to clayey sand	1.713	1.047	
0.75	2.46	135.84	1.80	Sands - clean sands to silty sand	1.734	1.061	
0.90	2.95	99.77	2.05	Sands - clean sands to silty sand	1.880	1.170	
1.05	3.44	64.78	2.74	Sand mixtures - silty sand to sandy silt	2.115	1.483	
1.20	3.94	74.23	1.71	Sands - clean sands to silty sand	1.940	1.229	
1.35	4.43	126.77	1.60	Sands - clean sands to silty sand	1.788	1.098	
1.50	4.92	130.57	1.32	Sands - clean sands to silty sand	1.729	1.057	
1.65	5.41	186.21	1.20	Sands - clean sands to silty sand	1.615	1.000	
1.80	5.91	246.59	3.55	Very stiff sand to clayey sand	1.967	1.259	
1.95	6.40	191.10	1.51	Sands - clean sands to silty sand	1.712	1.046	
2.10	6.89	150.39	1.62	Sands - clean sands to silty sand	1.808	1.113	
2.25	7.38	92.10	1.25	Sands - clean sands to silty sand	1.876	1.167	
2.40	7.87	76.16	1.12	Sands - clean sands to silty sand	1.914	1.203	
2.55	8.37	90.69	1.19	Sands - clean sands to silty sand	1.886	1.176	
2.70	8.86	367.56	0.79	Sands - clean sands to silty sand	1.360	1.000	
2.85	9.35	426.32	0.96	Sands - clean sands to silty sand	1.403	1.000	
3.00	9.84	367.71	0.78	Sands - clean sands to silty sand	1.369	1.000	
3.15	10.33	220.39	1.22	Sands - clean sands to silty sand	1.665	1.014	
3.30	10.83	75.46	2.34	Sand mixtures - silty sand to sandy silt	2.192	1.648	
3.45	11.32	50.46	2.58	Sand mixtures - silty sand to sandy silt	2.354	2.133	
3.60	11.81	76.52	1.85	Sand mixtures - silty sand to sandy silt	2.129	1.509	
3.75	12.30	133.08	1.74	Sands - clean sands to silty sand	1.949	1.239	
3.90	12.80	287.46	1.26	Sands - clean sands to silty sand	1.635	1.000	
4.05	13.29	134.69	2.33	Sand mixtures - silty sand to sandy silt	2.054	1.377	
4.20	13.78	432.44	1.42	Sands - clean sands to silty sand	1.590	1.000	
4.35	14.27	311.90	1.25	Sands - clean sands to silty sand	1.625	1.000	
4.50	14.76	419.46	1.13	Sands - clean sands to silty sand	1.520	1.000	
4.65	15.26	164.54	2.84	Sand mixtures - silty sand to sandy silt	2.087	1.431	
4.80	15.75	234.93	1.20	Sands - clean sands to silty sand	1.701	1.038	
4.95	16.24	206.84	0.99	Sands - clean sands to silty sand	1.680	1.024	
5.10	16.73	131.61	1.16	Sands - clean sands to silty sand	1.873	1.165	
5.25	17.22	135.44	1.47	Sands - clean sands to silty sand	1.941	1.230	
5.40	17.72	120.67	0.60	Sands - clean sands to silty sand	1.731	1.058	
5.55	18.21	87.38	0.99	Sands - clean sands to silty sand	1.979	1.273	
5.70	18.70	42.30	2.08	Sand mixtures - silty sand to sandy silt	2.435	2.460	
5.85	19.19	100.70	0.73	Sands - clean sands to silty sand	1.859	1.152	
6.00	19.69	116.40	0.80	Sands - clean sands to silty sand	1.837	1.134	
6.15	20.18	127.00	1.68	Sand mixtures - silty sand to sandy silt	2.027	1.337	
6.30	20.67	192.10	1.16	Sands - clean sands to silty sand	1.789	1.099	

Interpretations based on: 1. Youd, Idriss, et al (NCEER), 1997, 2001
2. Robertson and Wride, (NCEER), 1997; 3. Olsen (NCEER), 1997

Ic=soil behavior type index
Kc=grain-size cor. factor
Su= normalized undrained shear strength

PROJECT NO.: 04-1703E-1 SOUNDING: CPT-5M

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
6.45	21.16	96.81	3.38	Sand mixtures - silty sand to sandy silt	2.338	2.078	
6.60	21.65	94.16	2.45	Sand mixtures - silty sand to sandy silt	2.247	1.791	
6.75	22.15	49.08	4.71	Silt mixtures - clayey silt to silty clay	2.697	3.975	6.54
6.90	22.64	71.91	3.71	Silt mixtures - clayey silt to silty clay	2.467	2.607	
7.05	23.13	53.73	4.14	Silt mixtures - clayey silt to silty clay	2.643	3.598	7.16
7.20	23.62	94.94	3.61	Silt mixtures - clayey silt to silty clay	2.382	2.240	
7.35	24.11	57.51	3.60	Silt mixtures - clayey silt to silty clay	2.537	2.963	
7.50	24.61	311.05	1.94	Sands - clean sands to silty sand	1.852	1.146	
7.65	25.10	331.06	1.32	Sands - clean sands to silty sand	1.704	1.040	
7.80	25.59	370.11	1.24	Sands - clean sands to silty sand	1.654	1.006	
7.95	26.08	380.35	1.70	Sands - clean sands to silty sand	1.760	1.078	
8.10	26.57	418.06	2.18	Sands - clean sands to silty sand	1.829	1.128	
8.25	27.07	522.37	2.31	Very stiff sand to clayey sand	1.803	1.109	
8.40	27.56	710.02	1.67	Sands - clean sands to silty sand	1.617	1.000	
8.55	28.05	477.24	1.50	Sands - clean sands to silty sand	1.664	1.013	
8.70	28.54	394.03	1.93	Sands - clean sands to silty sand	1.802	1.108	
8.85	29.04	437.24	1.62	Sands - clean sands to silty sand	1.715	1.048	
9.00	29.53	407.07	1.75	Sands - clean sands to silty sand	1.761	1.079	
9.15	30.02	294.13	2.16	Sands - clean sands to silty sand	1.919	1.207	
9.30	30.51	229.83	3.00	Very stiff sand to clayey sand	2.110	1.474	
9.45	31.00	284.89	1.98	Sands - clean sands to silty sand	1.910	1.199	
9.60	31.50	269.04	2.35	Sand mixtures - silty sand to sandy silt	1.986	1.282	
9.75	31.99	319.10	2.31	Sands - clean sands to silty sand	1.937	1.226	
9.90	32.48	359.46	2.33	Sands - clean sands to silty sand	1.912	1.200	
10.05	32.97	384.66	2.42	Very stiff sand to clayey sand	1.910	1.199	
10.20	33.46	307.35	2.93	Very stiff sand to clayey sand	2.035	1.348	

Interpretations based on:
1. Youd and Idriss (NCEER), 1997, 2001
2. Robertson and Wride, (NCEER), 1997

Ic=soil behavior type index
Kc=grain-size cor. factor
Su= normalized undrained shear strength

CPT INTERPRETATIONS

PROJECT: Mesas East
DATE/TIME: 9/7/99 14:51
PROJECT NO.: 04-1703E-1

CONE/RIG: 408/#1 GO-JH
ASSUMED DEPTH OF WATER TABLE: 30 feet
SOUNDING: CPT-5M

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
0.15	0.49	121.73	1.31	Sands - clean sands to silty sand	1.421	1.000	
0.30	0.98	95.84	2.56	Very stiff sand to clayey sand	1.825	1.125	
0.45	1.48	83.02	1.68	Sands - clean sands to silty sand	1.756	1.076	
0.60	1.97	25.37	7.45	Very stiff, fine grained	2.510	2.818	
0.75	2.46	34.52	3.93	Very stiff, fine grained	2.359	2.154	
0.90	2.95	38.98	3.32	Sand mixtures - silty sand to sandy silt	2.297	1.940	
1.05	3.44	40.81	3.55	Sand mixtures - silty sand to sandy silt	2.330	2.049	
1.20	3.94	4.82	5.03	Clays - silty clay to clay	2.899	5.690	0.64
1.35	4.43	0.81	31.44	Unstable clayey silts	4.247	31.727	0.11
1.50	4.92	38.81	2.98	Sand mixtures - silty sand to sandy silt	2.345	2.100	
1.65	5.41	49.33	2.67	Sand mixtures - silty sand to sandy silt	2.253	1.807	
1.80	5.91	60.97	2.60	Sand mixtures - silty sand to sandy silt	2.196	1.656	
1.95	6.40	72.34	1.52	Sands - clean sands to silty sand	1.987	1.284	
2.10	6.89	161.97	2.08	Sands - clean sands to silty sand	1.876	1.167	
2.25	7.38	137.65	1.49	Sands - clean sands to silty sand	1.814	1.117	
2.40	7.87	183.94	1.43	Sands - clean sands to silty sand	1.730	1.058	
2.55	8.37	150.99	1.59	Sands - clean sands to silty sand	1.828	1.127	
2.70	8.86	62.42	1.73	Sand mixtures - silty sand to sandy silt	2.126	1.504	
2.85	9.35	41.49	3.29	Silt mixtures - clayey silt to silty clay	2.458	2.565	
3.00	9.84	38.86	3.36	Silt mixtures - clayey silt to silty clay	2.493	2.734	
3.15	10.33	46.29	2.72	Sand mixtures - silty sand to sandy silt	2.382	2.240	
3.30	10.83	175.35	1.51	Sands - clean sands to silty sand	1.806	1.111	
3.45	11.32	68.88	1.46	Sand mixtures - silty sand to sandy silt	2.085	1.428	
3.60	11.81	36.69	3.81	Silt mixtures - clayey silt to silty clay	2.579	3.203	
3.75	12.30	46.19	3.32	Silt mixtures - clayey silt to silty clay	2.472	2.629	
3.90	12.80	57.72	2.88	Sand mixtures - silty sand to sandy silt	2.365	2.175	
4.05	13.29	67.20	2.26	Sand mixtures - silty sand to sandy silt	2.249	1.796	
4.20	13.78	72.85	2.19	Sand mixtures - silty sand to sandy silt	2.220	1.718	
4.35	14.27	42.96	3.63	Silt mixtures - clayey silt to silty clay	2.546	3.011	
4.50	14.76	32.04	5.09	Clays - silty clay to clay	2.726	4.188	4.27
4.65	15.26	33.18	4.75	Silt mixtures - clayey silt to silty clay	2.704	4.026	4.42
4.80	15.75	34.27	4.89	Clays - silty clay to clay	2.713	4.093	4.57
4.95	16.24	32.74	5.02	Clays - silty clay to clay	2.746	4.345	4.37
5.10	16.73	32.57	4.82	Clays - silty clay to clay	2.745	4.339	4.34
5.25	17.22	57.57	2.49	Sand mixtures - silty sand to sandy silt	2.370	2.194	
5.40	17.72	79.31	2.51	Sand mixtures - silty sand to sandy silt	2.276	1.874	
5.55	18.21	81.60	3.82	Silt mixtures - clayey silt to silty clay	2.406	2.335	
5.70	18.70	50.63	3.50	Silt mixtures - clayey silt to silty clay	2.527	2.909	
5.85	19.19	36.84	4.60	Clays - silty clay to clay	2.737	4.270	4.91
6.00	19.69	36.39	4.65	Clays - silty clay to clay	2.752	4.395	4.85
6.15	20.18	30.53	5.85	Clays - silty clay to clay	2.889	5.591	4.07
6.30	20.67	60.08	3.51	Silt mixtures - clayey silt to silty clay	2.491	2.721	

Interpretations based on:
1. *Youd and Idriss (NCEER), 1997, 2001*
2. *Robertson and Wride, (NCEER), 1997*

Ic=soil behavior type index
Kc=grain-size cor. factor
Su= normalized undrained shear strength

PROJECT NO.: 04-1703E-1 SOUNDING: CPT-4M

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
6.45	21.16	56.72	5.77	Clays - silty clay to clay	2.694	3.951	7.56
6.60	21.65	180.45	1.95	Sands - clean sands to silty sand	1.977	1.271	
6.75	22.15	142.40	3.13	Sand mixtures - silty sand to sandy silt	2.204	1.676	
6.90	22.64	112.41	4.30	Very stiff, fine grained	2.378	2.225	
7.05	23.13	69.56	5.35	Silt mixtures - clayey silt to silty clay	2.622	3.462	9.27
7.20	23.62	179.07	4.10	Very stiff sand to clayey sand	2.242	1.775	
7.35	24.11	341.91	2.31	Sands - clean sands to silty sand	1.878	1.169	
7.50	24.61	208.26	2.50	Sand mixtures - silty sand to sandy silt	2.032	1.344	
7.65	25.10	95.28	4.80	Very stiff, fine grained	2.469	2.616	
7.80	25.59	202.00	2.65	Sand mixtures - silty sand to sandy silt	2.063	1.391	
7.95	26.08	148.59	4.21	Very stiff, fine grained	2.306	1.969	
8.10	26.57	195.62	2.38	Sand mixtures - silty sand to sandy silt	2.037	1.352	
8.25	27.07	370.32	2.21	Sands - clean sands to silty sand	1.851	1.146	
8.40	27.56	480.35	1.35	Sands - clean sands to silty sand	1.611	1.000	
8.55	28.05	338.05	2.51	Very stiff sand to clayey sand	1.922	1.210	
8.70	28.54	359.44	2.80	Very stiff sand to clayey sand	1.949	1.239	
8.85	29.04	530.50	2.22	Very stiff sand to clayey sand	1.778	1.091	

Interpretations based on:
1. *Youd and Idriss (NCEER), 1997, 2001*
2. *Robertson and Wride, (NCEER), 1997*

Ic=soil behavior type index
Kc= grain-size cor. factor
Su= normalized undrained shear strength

CPT INTERPRETATIONS

PROJECT: Mesas East
DATE/TIME: 9/7/99 14:20
PROJECT NO.: 04-1703E-1

CONE/RIG: 408\#1 GO-JH
ASSUMED DEPTH OF WATER TABLE: 30 feet
SOUNDING: CPT-4M

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
0.15	0.49	181.01	2.05	Very stiff sand to clayey sand	1.563	1.000	
0.30	0.98	199.09	2.87	Very stiff sand to clayey sand	1.752	1.073	
0.45	1.48	262.69	0.69	Gravelly sand to dense sand	1.170	1.000	
0.60	1.97	84.34	3.97	Very stiff sand to clayey sand	2.108	1.469	
0.75	2.46	70.83	2.46	Sand mixtures - silty sand to sandy silt	2.006	1.308	
0.90	2.95	56.43	2.18	Sand mixtures - silty sand to sandy silt	2.054	1.377	
1.05	3.44	44.47	1.89	Sand mixtures - silty sand to sandy silt	2.103	1.460	
1.20	3.94	62.46	2.75	Sand mixtures - silty sand to sandy silt	2.146	1.545	
1.35	4.43	83.47	2.41	Sand mixtures - silty sand to sandy silt	2.040	1.355	
1.50	4.92	90.14	1.49	Sands - clean sands to silty sand	1.874	1.165	
1.65	5.41	90.46	5.31	Very stiff, fine grained	2.325	2.032	
1.80	5.91	63.22	3.02	Sand mixtures - silty sand to sandy silt	2.234	1.755	
1.95	6.40	49.93	3.02	Sand mixtures - silty sand to sandy silt	2.315	1.997	
2.10	6.89	87.40	2.52	Sand mixtures - silty sand to sandy silt	2.106	1.465	
2.25	7.38	87.59	4.19	Very stiff, fine grained	2.289	1.914	
2.40	7.87	88.70	3.99	Very stiff sand to clayey sand	2.277	1.878	
2.55	8.37	116.34	2.92	Sand mixtures - silty sand to sandy silt	2.106	1.466	
2.70	8.86	123.58	3.47	Very stiff sand to clayey sand	2.159	1.572	
2.85	9.35	121.20	2.77	Sand mixtures - silty sand to sandy silt	2.092	1.441	
3.00	9.84	139.85	2.38	Sand mixtures - silty sand to sandy silt	2.009	1.312	
3.15	10.33	144.36	2.80	Sand mixtures - silty sand to sandy silt	2.064	1.393	
3.30	10.83	135.78	3.65	Very stiff sand to clayey sand	2.179	1.617	
3.45	11.32	144.97	2.57	Sand mixtures - silty sand to sandy silt	2.045	1.363	
3.60	11.81	148.73	2.55	Sand mixtures - silty sand to sandy silt	2.041	1.358	
3.75	12.30	134.86	3.06	Sand mixtures - silty sand to sandy silt	2.136	1.523	
3.90	12.80	119.03	3.49	Very stiff sand to clayey sand	2.220	1.716	
4.05	13.29	124.20	3.39	Very stiff sand to clayey sand	2.203	1.675	
4.20	13.78	192.33	1.66	Sands - clean sands to silty sand	1.846	1.142	
4.35	14.27	143.23	2.46	Sand mixtures - silty sand to sandy silt	2.065	1.395	
4.50	14.76	112.02	2.53	Sand mixtures - silty sand to sandy silt	2.148	1.549	
4.65	15.26	80.77	2.98	Sand mixtures - silty sand to sandy silt	2.301	1.953	
4.80	15.75	68.58	4.23	Silt mixtures - clayey silt to silty clay	2.468	2.610	
4.95	16.24	128.23	2.48	Sand mixtures - silty sand to sandy silt	2.117	1.486	
5.10	16.73	134.46	2.27	Sand mixtures - silty sand to sandy silt	2.079	1.417	
5.25	17.22	138.66	2.94	Sand mixtures - silty sand to sandy silt	2.161	1.576	
5.40	17.72	109.79	2.81	Sand mixtures - silty sand to sandy silt	2.215	1.705	
5.55	18.21	82.05	3.66	Silt mixtures - clayey silt to silty clay	2.390	2.272	
5.70	18.70	90.40	3.83	Silt mixtures - clayey silt to silty clay	2.381	2.236	
5.85	19.19	134.82	2.33	Sand mixtures - silty sand to sandy silt	2.106	1.466	
6.00	19.69	166.01	1.99	Sand mixtures - silty sand to sandy silt	1.999	1.298	
6.15	20.18	121.80	3.19	Sand mixtures - silty sand to sandy silt	2.247	1.789	
6.30	20.67	100.83	3.54	Sand mixtures - silty sand to sandy silt	2.337	2.072	

Interpretations based on:
1. Youd and Idriss (NCEER), 1997, 2001
2. Robertson and Wride, (NCEER), 1997

Ic=soil behavior type index
Kc= grain-size cor. factor
Su= normalized undrained shear strength

PROJECT NO.: 04-1703E-1 SOUNDING: CPT-3M

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
6.45	21.16	12.07	2.87	Clays - silty clay to clay	3.020	6.965	1.61
6.60	21.65	21.92	2.90	Silt mixtures - clayey silt to silty clay	2.788	4.682	2.92
6.75	22.15	56.30	3.52	Silt mixtures - clayey silt to silty clay	2.500	2.767	
6.90	22.64	99.06	4.80	Very stiff, fine grained	2.436	2.466	
7.05	23.13	41.79	3.01	Silt mixtures - clayey silt to silty clay	2.553	3.052	
7.20	23.62	52.75	3.45	Silt mixtures - clayey silt to silty clay	2.520	2.873	
7.35	24.11	156.87	2.46	Sand mixtures - silty sand to sandy silt	2.088	1.434	
7.50	24.61	63.63	5.90	Clays - silty clay to clay	2.662	3.729	8.48
7.65	25.10	220.50	2.15	Sands - clean sands to silty sand	1.953	1.243	
7.80	25.59	140.07	3.29	Sand mixtures - silty sand to sandy silt	2.223	1.725	
7.95	26.08	33.44	5.75	Clays - silty clay to clay	2.872	5.429	4.46
8.10	26.57	124.43	2.94	Sand mixtures - silty sand to sandy silt	2.221	1.721	
8.25	27.07	323.52	1.16	Sands - clean sands to silty sand	1.645	1.000	
8.40	27.56	193.03	3.92	Very stiff sand to clayey sand	2.206	1.682	
8.55	28.05	427.13	1.34	Sands - clean sands to silty sand	1.626	1.000	
8.70	28.54	472.40	0.75	Sands - clean sands to silty sand	1.398	1.000	
8.85	29.04	431.59	0.76	Sands - clean sands to silty sand	1.429	1.000	
9.00	29.53	129.21	2.52	Sand mixtures - silty sand to sandy silt	2.170	1.596	
9.15	30.02	68.26	3.05	Silt mixtures - clayey silt to silty clay	2.426	2.420	
9.30	30.51	88.40	2.84	Sand mixtures - silty sand to sandy silt	2.325	2.031	
9.45	31.00	92.18	4.06	Silt mixtures - clayey silt to silty clay	2.429	2.434	
9.60	31.50	158.44	2.92	Sand mixtures - silty sand to sandy silt	2.167	1.589	
9.75	31.99	170.11	2.32	Sand mixtures - silty sand to sandy silt	2.071	1.405	
9.90	32.48	166.07	2.96	Sand mixtures - silty sand to sandy silt	2.161	1.577	
10.05	32.97	150.84	3.37	Sand mixtures - silty sand to sandy silt	2.233	1.752	
10.20	33.46	297.09	2.22	Sands - clean sands to silty sand	1.911	1.200	
10.35	33.96	419.12	1.89	Sands - clean sands to silty sand	1.771	1.086	
10.50	34.45	231.84	3.87	Very stiff sand to clayey sand	2.175	1.607	
10.65	34.94	345.48	2.40	Very stiff sand to clayey sand	1.906	1.195	
10.80	35.43	420.82	1.66	Sands - clean sands to silty sand	1.726	1.055	
10.95	35.93	229.59	2.23	Sand mixtures - silty sand to sandy silt	1.986	1.282	
11.10	36.42	153.37	4.57	Very stiff, fine grained	2.343	2.095	

Interpretations based on:
1. *Youd and Idriss (NCEER), 1997, 2001*
2. *Robertson and Wride, (NCEER), 1997*

I_c=soil behavior type index
Kc=cor. factor for grain characteristics
S_u=overburden normalized undrained shear strength

CPT INTERPRETATIONS

PROJECT: Mesas East
DATE/TIME: 9/7/99 7:47
PROJECT NO.: 04-1703E-1

CONE/RIG: 408\#1 GO-JH
ASSUMED DEPTH OF WATER TABLE: 16 feet
SOUNDING: CPT-3M

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
0.15	0.49	173.12	1.31	Very stiff sand to clayey sand	1.377	1.000	
0.30	0.98	242.42	0.86	Gravelly sand to dense sand	1.229	1.000	
0.45	1.48	225.28	1.64	Very stiff sand to clayey sand	1.542	1.000	
0.60	1.97	83.98	1.84	Sands - clean sands to silty sand	1.828	1.128	
0.75	2.46	34.03	1.33	Sands - clean sands to silty sand	2.024	1.333	
0.90	2.95	22.97	1.44	Sand mixtures - silty sand to sandy silt	2.211	1.694	
1.05	3.44	21.50	0.57	Sands - clean sands to silty sand	2.042	1.358	
1.20	3.94	20.80	0.73	Sand mixtures - silty sand to sandy silt	2.135	1.522	
1.35	4.43	19.69	1.67	Sand mixtures - silty sand to sandy silt	2.380	2.231	
1.50	4.92	18.55	0.87	Sand mixtures - silty sand to sandy silt	2.262	1.832	
1.65	5.41	18.23	1.01	Sand mixtures - silty sand to sandy silt	2.321	2.018	
1.80	5.91	19.42	0.78	Sand mixtures - silty sand to sandy silt	2.257	1.818	
1.95	6.40	16.63	2.71	Silt mixtures - clayey silt to silty clay	2.565	3.122	
2.10	6.89	82.90	2.14	Sand mixtures - silty sand to sandy silt	2.067	1.397	
2.25	7.38	40.28	2.19	Sand mixtures - silty sand to sandy silt	2.306	1.967	
2.40	7.87	53.92	2.19	Sand mixtures - silty sand to sandy silt	2.224	1.727	
2.55	8.37	18.40	4.35	Silt mixtures - clayey silt to silty clay	2.669	3.778	2.45
2.70	8.86	17.76	3.21	Silt mixtures - clayey silt to silty clay	2.611	3.392	2.37
2.85	9.35	18.25	4.18	Silt mixtures - clayey silt to silty clay	2.698	3.980	2.43
3.00	9.84	19.65	4.05	Silt mixtures - clayey silt to silty clay	2.681	3.861	2.62
3.15	10.33	32.87	3.52	Silt mixtures - clayey silt to silty clay	2.568	3.138	
3.30	10.83	66.26	2.42	Sand mixtures - silty sand to sandy silt	2.242	1.776	
3.45	11.32	98.41	1.86	Sand mixtures - silty sand to sandy silt	2.047	1.366	
3.60	11.81	122.16	2.04	Sand mixtures - silty sand to sandy silt	2.020	1.327	
3.75	12.30	136.77	2.89	Sand mixtures - silty sand to sandy silt	2.112	1.477	
3.90	12.80	50.86	3.84	Silt mixtures - clayey silt to silty clay	2.494	2.736	
4.05	13.29	43.11	3.11	Silt mixtures - clayey silt to silty clay	2.486	2.700	
4.20	13.78	41.02	3.21	Silt mixtures - clayey silt to silty clay	2.518	2.859	
4.35	14.27	30.87	4.87	Clays - silty clay to clay	2.713	4.093	4.12
4.50	14.76	35.86	4.65	Silt mixtures - clayey silt to silty clay	2.662	3.726	4.78
4.65	15.26	81.94	2.44	Sand mixtures - silty sand to sandy silt	2.234	1.753	
4.80	15.75	66.24	3.26	Silt mixtures - clayey silt to silty clay	2.392	2.279	
4.95	16.24	17.38	4.90	Clays - silty clay to clay	2.947	6.170	2.32
5.10	16.73	10.64	1.99	Silt mixtures - clayey silt to silty clay	2.925	5.951	1.42
5.25	17.22	13.83	3.93	Clays - silty clay to clay	2.995	6.689	1.84
5.40	17.72	17.04	4.34	Clays - silty clay to clay	2.948	6.188	2.27
5.55	18.21	26.51	3.80	Silt mixtures - clayey silt to silty clay	2.756	4.424	3.53
5.70	18.70	28.55	4.20	Clays - silty clay to clay	2.764	4.490	3.81
5.85	19.19	55.36	4.36	Silt mixtures - clayey silt to silty clay	2.559	3.086	
6.00	19.69	45.44	3.97	Silt mixtures - clayey silt to silty clay	2.601	3.335	6.06
6.15	20.18	12.39	6.70	Clays - silty clay to clay	3.222	9.557	1.65
6.30	20.67	19.33	3.61	Clays - silty clay to clay	2.884	5.544	2.58

Interpretations based on:
1. Youd and Idriss (NCEER), 1997, 2001
2. Robertson and Wride, (NCEER), 1997

I_c=soil behavior type index
Kc=cor. factor for grain characteristics
S_u=overburden normalized undrained shear strength

PROJECT NO.: 04-1703E-1 SOUNDING: CPT-2M

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
6.45	21.16	23.67	2.95	Silt mixtures - clayey silt to silty clay	2.707	4.044	3.16
6.60	21.65	22.43	3.93	Clays - silty clay to clay	2.812	4.890	2.99
6.75	22.15	41.75	4.16	Silt mixtures - clayey silt to silty clay	2.620	3.449	5.57
6.90	22.64	44.85	4.27	Silt mixtures - clayey silt to silty clay	2.609	3.384	5.98
7.05	23.13	91.99	3.47	Sand mixtures - silty sand to sandy silt	2.330	2.049	
7.20	23.62	101.49	3.24	Sand mixtures - silty sand to sandy silt	2.281	1.890	
7.35	24.11	88.42	3.10	Sand mixtures - silty sand to sandy silt	2.309	1.978	
7.50	24.61	46.14	4.02	Silt mixtures - clayey silt to silty clay	2.600	3.327	6.15
7.65	25.10	41.49	3.81	Silt mixtures - clayey silt to silty clay	2.624	3.475	5.53
7.80	25.59	91.14	2.78	Sand mixtures - silty sand to sandy silt	2.271	1.860	
7.95	26.08	183.68	1.98	Sands - clean sands to silty sand	1.960	1.251	
8.10	26.57	95.09	3.60	Sand mixtures - silty sand to sandy silt	2.347	2.108	
8.25	27.07	92.41	3.43	Sand mixtures - silty sand to sandy silt	2.341	2.088	
8.40	27.56	135.31	3.21	Sand mixtures - silty sand to sandy silt	2.213	1.699	
8.55	28.05	278.73	1.29	Sands - clean sands to silty sand	1.707	1.043	
8.70	28.54	195.41	1.87	Sands - clean sands to silty sand	1.932	1.221	
8.85	29.04	394.56	1.10	Sands - clean sands to silty sand	1.563	1.000	
9.00	29.53	408.39	1.82	Sands - clean sands to silty sand	1.738	1.064	
9.15	30.02	427.17	1.32	Sands - clean sands to silty sand	1.611	1.000	
9.30	30.51	395.47	0.90	Sands - clean sands to silty sand	1.498	1.000	
9.45	31.00	130.38	3.37	Sand mixtures - silty sand to sandy silt	2.252	1.803	
9.60	31.50	54.73	3.68	Silt mixtures - clayey silt to silty clay	2.540	2.980	
9.75	31.99	117.06	3.98	Very stiff, fine grained	2.341	2.087	
9.90	32.48	143.30	2.86	Sand mixtures - silty sand to sandy silt	2.175	1.607	
10.05	32.97	314.78	1.57	Sands - clean sands to silty sand	1.758	1.077	
10.20	33.46	259.08	1.16	Sands - clean sands to silty sand	1.711	1.045	
10.35	33.96	116.63	2.84	Sand mixtures - silty sand to sandy silt	2.236	1.760	
10.50	34.45	66.56	3.81	Silt mixtures - clayey silt to silty clay	2.501	2.772	
10.65	34.94	67.98	6.23	Clays - silty clay to clay	2.698	3.979	9.06
10.80	35.43	176.31	3.87	Very stiff sand to clayey sand	2.232	1.749	
10.95	35.93	268.70	2.34	Sands - clean sands to silty sand	1.948	1.238	
11.10	36.42	421.20	1.56	Sands - clean sands to silty sand	1.693	1.033	
11.25	36.91	485.40	1.36	Sands - clean sands to silty sand	1.610	1.000	
11.40	37.40	412.62	1.28	Sands - clean sands to silty sand	1.629	1.000	
11.55	37.89	178.92	4.58	Very stiff, fine grained	2.295	1.932	
11.70	38.39	357.15	1.87	Sands - clean sands to silty sand	1.803	1.109	
11.85	38.88	441.85	0.65	Sands - clean sands to silty sand	1.384	1.000	
12.00	39.37	397.43	0.67	Sands - clean sands to silty sand	1.426	1.000	
12.15	39.86	142.55	3.68	Very stiff sand to clayey sand	2.284	1.897	
12.30	40.35	141.47	1.99	Sand mixtures - silty sand to sandy silt	2.084	1.427	
12.45	40.85	392.60	0.59	Sands - clean sands to silty sand	1.394	1.000	
12.60	41.34	270.00	2.13	Sands - clean sands to silty sand	1.928	1.216	
12.75	41.83	316.02	1.02	Sands - clean sands to silty sand	1.636	1.000	
12.90	42.32	261.04	1.53	Sands - clean sands to silty sand	1.826	1.126	
13.05	42.81	520.18	0.81	Sands - clean sands to silty sand	1.423	1.000	
13.20	43.31	461.16	1.60	Sands - clean sands to silty sand	1.697	1.036	
13.35	43.80	454.24	1.92	Sands - clean sands to silty sand	1.768	1.084	

Interpretations based on:
1. *Youd and Idriss (NCEER), 1997, 2001*
2. *Robertson and Wride, (NCEER), 1997*

Ic=soil behavior type index
Kc= grain-size cor. factor
Su= normalized undrained shear strength

CPT INTERPRETATIONS

PROJECT: Mesas East
DATE/TIME: 9/7/99 8:52
PROJECT NO.: 04-1703E-1

CONE/RIG: 408\#1 JH, GO
ASSUMED DEPTH OF WATER TABLE: 11 feet
SOUNDING: CPT-2M

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
0.15	0.49	302.84	0.79	Gravelly sand to dense sand	1.121	1.000	
0.30	0.98	181.66	1.32	Sands - clean sands to silty sand	1.447	1.000	
0.45	1.48	143.51	1.44	Sands - clean sands to silty sand	1.574	1.000	
0.60	1.97	100.89	0.85	Sands - clean sands to silty sand	1.515	1.000	
0.75	2.46	76.82	1.47	Sands - clean sands to silty sand	1.808	1.113	
0.90	2.95	71.57	1.42	Sands - clean sands to silty sand	1.845	1.141	
1.05	3.44	65.86	1.06	Sands - clean sands to silty sand	1.805	1.110	
1.20	3.94	60.25	1.39	Sands - clean sands to silty sand	1.937	1.226	
1.35	4.43	69.00	1.11	Sands - clean sands to silty sand	1.847	1.142	
1.50	4.92	56.17	2.14	Sand mixtures - silty sand to sandy silt	2.129	1.510	
1.65	5.41	38.64	2.52	Sand mixtures - silty sand to sandy silt	2.309	1.979	
1.80	5.91	39.90	2.46	Sand mixtures - silty sand to sandy silt	2.306	1.969	
1.95	6.40	43.30	2.62	Sand mixtures - silty sand to sandy silt	2.313	1.992	
2.10	6.89	50.84	2.86	Sand mixtures - silty sand to sandy silt	2.304	1.961	
2.25	7.38	52.01	5.29	Very stiff, fine grained	2.509	2.813	
2.40	7.87	52.47	5.62	Very stiff, fine grained	2.536	2.957	
2.55	8.37	51.52	5.81	Very stiff, fine grained	2.561	3.097	
2.70	8.86	47.57	5.92	Silt mixtures - clayey silt to silty clay	2.598	3.314	
2.85	9.35	41.66	5.42	Silt mixtures - clayey silt to silty clay	2.577	3.191	
3.00	9.84	38.11	5.41	Silt mixtures - clayey silt to silty clay	2.613	3.408	5.08
3.15	10.33	35.67	5.03	Silt mixtures - clayey silt to silty clay	2.619	3.443	4.76
3.30	10.83	34.59	5.05	Silt mixtures - clayey silt to silty clay	2.634	3.543	4.61
3.45	11.32	34.74	5.17	Silt mixtures - clayey silt to silty clay	2.620	3.450	4.63
3.60	11.81	30.80	4.63	Silt mixtures - clayey silt to silty clay	2.629	3.508	4.11
3.75	12.30	27.21	4.95	Clays - silty clay to clay	2.696	3.966	3.63
3.90	12.80	25.09	4.74	Clays - silty clay to clay	2.716	4.113	3.35
4.05	13.29	23.92	4.40	Silt mixtures - clayey silt to silty clay	2.716	4.115	3.19
4.20	13.78	22.24	4.57	Clays - silty clay to clay	2.759	4.446	2.97
4.35	14.27	20.88	4.33	Clays - silty clay to clay	2.771	4.547	2.78
4.50	14.76	18.10	3.71	Silt mixtures - clayey silt to silty clay	2.784	4.654	2.41
4.65	15.26	18.27	4.41	Clays - silty clay to clay	2.838	5.113	2.44
4.80	15.75	16.72	3.72	Clays - silty clay to clay	2.829	5.032	2.23
4.95	16.24	14.98	3.75	Clays - silty clay to clay	2.879	5.495	2.00
5.10	16.73	12.53	3.70	Clays - silty clay to clay	2.952	6.220	1.67
5.25	17.22	11.92	3.36	Clays - silty clay to clay	2.953	6.239	1.59
5.40	17.72	12.28	3.35	Clays - silty clay to clay	2.948	6.184	1.64
5.55	18.21	30.91	3.55	Silt mixtures - clayey silt to silty clay	2.629	3.512	4.12
5.70	18.70	16.66	2.51	Silt mixtures - clayey silt to silty clay	2.766	4.501	2.22
5.85	19.19	14.26	3.07	Clays - silty clay to clay	2.887	5.568	1.90
6.00	19.69	13.64	3.15	Clays - silty clay to clay	2.918	5.877	1.82
6.15	20.18	16.44	2.85	Silt mixtures - clayey silt to silty clay	2.824	4.994	2.19
6.30	20.67	23.54	2.97	Silt mixtures - clayey silt to silty clay	2.705	4.030	3.14

Interpretations based on:
1. Youd and Idriss (NCEER), 1997, 2001
2. Robertson and Wride, (NCEER), 1997

Ic=soil behavior type index
Kc= grain-size cor. factor
Su= normalized undrained shear strength

PROJECT NO.: 04-1703E-1 SOUNDING: CPT-1M

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
6.45	21.16	91.29	3.94	Silt mixtures - clayey silt to silty clay	2.402	2.322	
6.60	21.65	200.89	2.56	Sand mixtures - silty sand to sandy silt	2.041	1.357	
6.75	22.15	235.01	3.09	Very stiff sand to clayey sand	2.069	1.401	
6.90	22.64	160.25	3.65	Very stiff sand to clayey sand	2.226	1.734	
7.05	23.13	90.18	4.97	Very stiff, fine grained	2.490	2.717	
7.20	23.62	53.37	5.50	Clays - silty clay to clay	2.716	4.112	7.12
7.35	24.11	96.41	3.41	Sand mixtures - silty sand to sandy silt	2.349	2.117	
7.50	24.61	97.28	3.72	Silt mixtures - clayey silt to silty clay	2.377	2.220	
7.65	25.10	180.22	2.50	Sand mixtures - silty sand to sandy silt	2.072	1.406	
7.80	25.59	376.50	1.73	Sands - clean sands to silty sand	1.767	1.083	
7.95	26.08	322.45	2.04	Sands - clean sands to silty sand	1.866	1.158	
8.10	26.57	292.73	2.43	Sands - clean sands to silty sand	1.954	1.244	
8.25	27.07	252.60	2.41	Sand mixtures - silty sand to sandy silt	1.989	1.286	
8.40	27.56	181.96	2.91	Sand mixtures - silty sand to sandy silt	2.143	1.537	
8.55	28.05	170.94	2.78	Sand mixtures - silty sand to sandy silt	2.145	1.543	
8.70	28.54	169.49	2.57	Sand mixtures - silty sand to sandy silt	2.123	1.497	
8.85	29.04	124.20	3.50	Sand mixtures - silty sand to sandy silt	2.315	1.997	
9.00	29.53	168.34	2.47	Sand mixtures - silty sand to sandy silt	2.114	1.481	
9.15	30.02	115.42	3.09	Sand mixtures - silty sand to sandy silt	2.298	1.941	
9.30	30.51	63.29	5.18	Clays - silty clay to clay	2.720	4.143	8.44
9.45	31.00	73.27	4.51	Silt mixtures - clayey silt to silty clay	2.633	3.534	9.77
9.60	31.50	70.17	5.02	Clays - silty clay to clay	2.683	3.873	9.36
9.75	31.99	151.09	2.60	Sand mixtures - silty sand to sandy silt	2.168	1.592	
9.90	32.48	99.30	4.89	Silt mixtures - clayey silt to silty clay	2.499	2.762	
10.05	32.97	158.30	4.41	Very stiff, fine grained	2.336	2.071	
10.20	33.46	549.24	1.98	Sands - clean sands to silty sand	1.746	1.069	

Interpretations based on:
1. Youd and Idriss (NCEER), 1997, 2001
2. Robertson and Wride, (NCEER), 1997

I_c=soil behavior type index
Kc=cor. factor for grain characteristics
S_u=overburden normalized undrained shear strength

CPT INTERPRETATIONS

PROJECT: Mesas East
DATE/TIME: 9/7/99 13:33
PROJECT NO.: 04-1703E-1

CONE/RIG: 408\#1 GO-JH
ASSUMED DEPTH OF WATER TABLE: 25 feet
SOUNDING: CPT-1M

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
0.15	0.49	308.41	2.19	Very stiff sand to clayey sand	1.562	1.000	
0.30	0.98	165.39	2.95	Very stiff sand to clayey sand	1.789	1.098	
0.45	1.48	119.86	2.50	Very stiff sand to clayey sand	1.822	1.123	
0.60	1.97	144.21	1.88	Sands - clean sands to silty sand	1.710	1.045	
0.75	2.46	184.13	1.11	Sands - clean sands to silty sand	1.486	1.000	
0.90	2.95	139.26	1.61	Sands - clean sands to silty sand	1.711	1.045	
1.05	3.44	113.83	2.00	Sands - clean sands to silty sand	1.859	1.152	
1.20	3.94	79.22	3.33	Very stiff sand to clayey sand	2.149	1.551	
1.35	4.43	98.55	2.09	Sands - clean sands to silty sand	1.946	1.236	
1.50	4.92	109.56	1.47	Sands - clean sands to silty sand	1.814	1.117	
1.65	5.41	99.70	2.68	Sand mixtures - silty sand to sandy silt	2.057	1.382	
1.80	5.91	124.22	1.50	Sands - clean sands to silty sand	1.812	1.115	
1.95	6.40	61.89	3.31	Sand mixtures - silty sand to sandy silt	2.283	1.894	
2.10	6.89	41.07	2.59	Sand mixtures - silty sand to sandy silt	2.338	2.078	
2.25	7.38	47.35	2.29	Sand mixtures - silty sand to sandy silt	2.268	1.849	
2.40	7.87	47.61	2.23	Sand mixtures - silty sand to sandy silt	2.268	1.851	
2.55	8.37	79.86	2.61	Sand mixtures - silty sand to sandy silt	2.171	1.599	
2.70	8.86	127.55	1.66	Sands - clean sands to silty sand	1.897	1.186	
2.85	9.35	120.65	0.91	Sands - clean sands to silty sand	1.734	1.061	
3.00	9.84	111.71	1.90	Sands - clean sands to silty sand	1.995	1.294	
3.15	10.33	105.23	2.12	Sand mixtures - silty sand to sandy silt	2.055	1.379	
3.30	10.83	76.84	3.69	Sand mixtures - silty sand to sandy silt	2.335	2.065	
3.45	11.32	74.25	4.24	Very stiff, fine grained	2.397	2.301	
3.60	11.81	64.41	4.68	Silt mixtures - clayey silt to silty clay	2.476	2.651	
3.75	12.30	46.57	5.16	Silt mixtures - clayey silt to silty clay	2.586	3.243	
3.90	12.80	61.06	4.95	Silt mixtures - clayey silt to silty clay	2.522	2.881	
4.05	13.29	69.22	6.03	Very stiff, fine grained	2.558	3.082	
4.20	13.78	81.60	4.06	Very stiff, fine grained	2.385	2.251	
4.35	14.27	219.35	1.53	Sands - clean sands to silty sand	1.788	1.098	
4.50	14.76	267.94	1.81	Sands - clean sands to silty sand	1.799	1.106	
4.65	15.26	401.17	1.62	Sands - clean sands to silty sand	1.667	1.015	
4.80	15.75	293.48	1.76	Sands - clean sands to silty sand	1.775	1.089	
4.95	16.24	190.91	2.52	Sand mixtures - silty sand to sandy silt	2.015	1.319	
5.10	16.73	214.49	2.38	Sand mixtures - silty sand to sandy silt	1.968	1.261	
5.25	17.22	165.94	2.88	Sand mixtures - silty sand to sandy silt	2.105	1.465	
5.40	17.72	173.95	2.38	Sand mixtures - silty sand to sandy silt	2.031	1.343	
5.55	18.21	416.95	1.79	Sands - clean sands to silty sand	1.716	1.049	
5.70	18.70	430.70	1.38	Sands - clean sands to silty sand	1.615	1.000	
5.85	19.19	129.61	2.64	Sand mixtures - silty sand to sandy silt	2.159	1.572	
6.00	19.69	113.91	3.28	Sand mixtures - silty sand to sandy silt	2.271	1.859	
6.15	20.18	111.34	3.43	Sand mixtures - silty sand to sandy silt	2.296	1.936	
6.30	20.67	99.72	3.62	Silt mixtures - clayey silt to silty clay	2.347	2.110	

Interpretations based on:
1. *Youd and Idriss (NCEER), 1997, 2001*
2. *Robertson and Wride, (NCEER), 1997*

I_c=soil behavior type index
Kc=cor. factor for grain characteristics
S_u=overburden normalized undrained shear strength

Appendix D

APPENDIX D

SEISMICITY

1.0 EVALUATION OF POTENTIAL SEISMIC HAZARDS

1.1 Ground Rupture

1.1.1 Introduction

The potential for ground rupture hazard in the Airport Mesas Area is addressed in Section 8.0 of this report and discussed in detail in our report dated July 20, 2004. Two other areas of significant tectonic deformation exist on VTT 61105 and consist of the Monoclinal Warp and Lion Canyon Anticline. The findings of our investigations are discussed below.

1.1.2 Monoclinal Warp

Three long trenches were excavated across the hinge line of the monoclinal warp (T-60T, T-61T and T-113T) on the southwestern portion of VTT 61105. For safety reasons and for better quality of bedrock exposure the upper 2 to 8 feet of surficial materials were removed prior to excavating the 24" wide trenches. Selected portion of these trenches were later deepened or lengthened to further improve the bedrock exposures. The change in the amount of dip of the bedding planes across the warp were consistent in these three trenches (45-60° NE, south of the warp to 15-20° NE north of the warp). An apparent conformable contact between the upper and lower units of the Saugus Formation was observed in trenches T-60T and T-113T. Trench T-61T is located entirely within the upper unit of the Saugus Formation. A paleosol was noted in the vicinity of the upper/lower Saugus Formation in contact T-113T indicating a possible disconformity between the two units at this location. No faults were observed within these three trenches and the fine-grained bedrock units were only slightly to moderately sheared in the steeply dipping bedrock south of the hinge line and the potential for primary ground rupture hazard along the Monoclinal Warp is considered to be negligible within the life of the proposed development.

Additional trenching was performed south of the hinge line in order to assess the presence or absence of a fault zone in the steeply dipping bedrock south of the hinge line of the warp on VTT 61105.

APPENDIX D

Trenches T-151T, T-152T, T-153T were excavated in the area of steeply dipping bedrock and Dozer cuts DC-A and DC-B were re-excavated at the base of existing oil pad cuts in the steeply dipping bedrock. One minor fault was encountered in T-151T (sta.. 90 ft.) and exhibited 18" of apparent reverse offset near the bottom of the trench and 8" of apparent reverse offset near the top of the trench. Trench T-152T and DC-A were excavated to the west and on strike with this minor fault and did not encounter any faults in the vicinity of the projected minor fault from T-151T. The only faulting observed in T-152T and DC-A consisted of a very small, vertically discontinuous, fault with less than 1" of apparent reverse offset and is likely a penecontemporaneous soft sediment feature. The warp is dying out in this area (T-151T, T-152T, and DC-A) as evidenced by the shallower overall dips of the bedrock (35-45°) on strike with the more steeply dipping (45-60°) bedrock to the southeast and the "uniformity" of dips (20-30°), further to the northwest, across the northeasterly projection of the monoclinal warp.

T-153T was excavated east of T-151T and combined with T-160T and DC-B provide a span of continuous coverage from the warp to just beyond the projection of the minor fault encountered in T-151T (Sta. 90 ft). A minor fault was encountered in T-153T (sta. 50 ft.) generally on strike with the fault encountered in T-151T. This minor fault exhibited approximately 10 ft. of apparent reverse offset but geologic structure did not change across it. The gouge zone along this fault was $^{1}/_{16}$" - ⅛" wide and lined with caliche. In this long span of continuous coverage (T-153T, DC-B and T-60T) only one other minor fault was encountered (sta. 240 ft.) and exhibited 7" of apparent reverse offset with no change in geologic structure across it. The gouge zone along this fault was ⅛ to ¼" wide and lined with caliche. Some of the finer grained bedrock units in these trenches exhibited slight to moderate shearing along the bedding planes.

Review of the aerial photographs listed at the beginning of this report did not reveal any evidence of photo lineaments or obvious geomorphic expression such as aligned saddles, swales, linear drainage or other topographic features usually indicative of active faults. The few minor faults encountered in the long trenches and dozer cuts are carbonate lined and this carbonate is not present in modern or pre-Holocene alluvium. It is therefore more likely precipitated under soil climates of the past. The faults are generally planar without the "flowering upward" structure so characteristic of relatively young faults. We interpret these minor faults as features that formed under high confining pressure caused by a once thick cover of sediments, now long since stripped away. Based on the corroborating evidence provided by the lack of geomorphic expression and lineaments, the presence of carbonate deposits along faults, fracture planes and the lack of flowering

upward structures, the last displacement of these minor faults took place in pre-Holocene time. The potential for ground rupture hazard in the areas of steeply dipping bedrock south of the Monoclinal Warp on VTT 61105 is considered negligible within the life of the proposed development. The potential for secondary ground failure along weak bedding planes is addressed in Section 1.3 of this Appendix.

1.1.3 Lion Canyon Anticline

Pit trenches T-128T through T-150T were excavated across the western limb of the Lion Canyon Anticline to better define the geologic structure in this area. Long trenches T-154T and T-155T were subsequently excavated as a continuous trench across the change in structure indicated by the pit trenches, where bedding planes shallowed toward the southwest from approximately 50° SW dips to 10° SW dips. No faulting was observed in these trenches and the change in dips from steep to shallow occurred gradually toward the southwest where the Grapevine Mesa Syncline occurs just west of VTT 61105.

Even more steeply dipping (55-70°) beds were encountered during our mapping of this limb of the anticline, in the road cut and oil pad area, in the vicinity of Lot 439. Trenches T-156T and T-157T were excavated within the TQs_l and across the TQs_l/Qt contact in this area to ascertain if the steeply dipping and sheared beds in this area were caused by faulting and if the overlying Qt deposits were disrupted. Prior to excavating these trenches with the backhoe the bulldozer removed the upper 5 to 10 feet of soil and weathered materials where needed to provide good exposure. The TQs_l /Qt contact exposed in T-156T and T-157T consisted of undisrupted horizontally bedded Qt deposited against TQs_l and old slopewash deposits. The Qt deposits consisted of well bedded sands and gravel with occasional lenses of sandy silt. No faulting was observed in the TQs_l bedrock or Qt deposits. The bedrock structure observed in T-156T was consistent with our previous findings in this area where beds are dipping approximately 50° to the southwest. However, bedding planes steepened up to 83° SW for a short distance within T-157T (between stations 2 ft. and 40 ft). Fine grained units occur in this portion of the trench and the clay beds in this segment were highly sheared with very minor offsets within the softer clay beds. In order to explore the potential of a bedding plane fault at this location an excavator trench (ET-IT) was excavated and logged down to a maximum depth of 27.5' in order to provide an exposure of the Qt deposits and to find the basal Qt/TQs_l contact at selected locations, across the projection of the steeply dipping section of beds in question. The Qt deposits exposed in ET-IT consisted of horizontally bedded sands and gravels with occasional lenses of sandy silt.

No faulting or offsets of beds were observed within the Qt deposits exposed in ET-IT. The basal Qt/TQs_l contact observed in the three deepened portions of ET-IT revealed that the basal Qt contact is essentially horizontal and is not offset across the projection of the steeply dipping beds encountered in T-157T. Based on these findings the locally steeper section of bedrock encountered in T-157T is attributed to differential tectonic deformation of the more ductile, finer grained units which are subjacent and superjacent to much harder sandstone beds.

Based on the above findings the potential for ground rupture hazard on the western limb of the Lion Canyon Anticline on VTT 61105 is considered to be negligible for the life of the proposed development. The potential for secondary ground failure along weak bedding planes is addressed in section 1.3 of this Appendix.

1.2 Ground Motion

1.2.1 Introduction

Ground motion is generated during an earthquake as two blocks of the earth's crust slip past each other. The intensity of ground motion at a specific site is controlled primarily by the magnitude of the earthquake and the distance from the epicenter and/or ground rupture area. Ground motion generally increases with increasing magnitude and is generally greatest near the epicenter and/or rupture area, and decreases (attenuates) with increasing distance. However, the ground motion measured at a given site is modified by a number of factors including focal depth, proximity to projected or actual fault rupture, fault mechanism, duration of shaking, local geologic structure, source direction of earthquake, underlying earth material characteristics, and topography. All of these factors make it difficult to accurately predict potential ground motions at a given site in the geologically and topographically complex Southern California area.

Current methods used to evaluate future potential ground motions are based on the review of historic earthquakes and statistical distributions of both rupture dimensions and ground motions generated during these earthquakes. Three primary procedures are currently in use to evaluate potential ground motions at a site:

1. Review of ground motions recorded during historic earthquakes
2. Deterministic seismic hazard analysis (DSHA)

3. Probabilistic seismic hazard analysis (PSHA)

Procedure number one involves the use of historically recorded earthquake magnitudes and ground accelerations to estimate accelerations, which have occurred at a given site during known earthquake events. Deterministic analysis (DSHA) utilizes maximum potential magnitude values for each significant fault to estimate maximum potential ground accelerations at a site without reference to a specific time frame. A probabilistic analysis (PSHA) evaluates potential earthquake magnitudes and accelerations based on historic earthquake data and interpreted slip rates for each fault to estimate potential accelerations anticipated within a particular time frame (return period) of interest.

Review of Guidelines for Evaluating and Mitigating Seismic Hazards in California (CDCDMG, 1997) indicates that potential ground motion should be evaluated using simple prescribed parameter values derived from published State maps (Petersen, et al., 1996; SHMA Quadrangle Maps) or by site specific probabilistic or deterministic analyses where sites are in close proximity to seismic sources. In accordance with current State guidelines and L.A. County policies for geotechnical and geologic reports, we have evaluated potential ground motions at the site with a probabilistic procedure, utilizing the computer program FRISKSP by Thomas Blake. Historic ground motions at the site have been estimated with the computer program EQSEARCH.

1.2.2 Earthquake Magnitude

Earthquake **magnitude** is a quantitative measure of the strength of an earthquake or the strain energy released by it, as determined by seismographic or geologic observations. It does not vary with distance or the underlying earth material. This differs from **intensity**, which is a qualitative measure of the effects a given earthquake has on people, structures, loose objects, and the ground at a specific location. Intensity generally increases with increasing magnitude and in areas underlain by unconsolidated materials, and decreases with distance from the epicenter. **Figure D2** gives the 1956 version of the Modified Mercalli intensity scale and the approximate magnitude necessary to generate the effects.

Review of criteria presented in CDCDMG Special Publication 117 and L.A. County policies (5/18/99 Memorandum) indicates that probabilistic ground motions should be

estimated based on maximum moment magnitude earthquakes for each fault of interest. In this report, we have utilized the default magnitudes contained in the CDMGSCF.DAT file provided with Version 4.00 of the FRISKSP Program by Thomas Blake. These magnitudes were derived primarily from CDMG Open-File Report 96-08 (Peterson et al., 1996) and are based on historic displacements per seismic event or the rupture area-to-magnitude relationships of Wells and Coppersmith (1994). Minor adjustments were made to the locations of the Holser and San Gabriel Faults to reflect refinements from subsurface investigations completed by this firm. The maximum magnitudes for the significant faults within 50 km of the site are presented in **Table D2** under the AMMAX descriptor for each fault.

1.2.3 Ground Acceleration

Ground motion is typically reported with respect to the acceleration of gravity in units of g. Maximum, peak amplitudes in two perpendicular horizontal directions and the vertical axis are typically recorded during historic earthquakes on accelerograms.

Review of Sections 1804.5 and 1629A of the 1998 California Building Code (based on the 1997 UBC), Chapter 4 of the CDCDMG 1997 Guidelines and L.A. County policies indicates that an acceleration with a 10% chance of exceedance in 50 years (design basis earthquake ground motion) should be utilized for the evaluation of liquefaction potential for standard structures. This roughly correlates to a 475 year return period.

Site specific evaluation of potential ground motions requires the use of an attenuation relationship based on the observed attenuation of ground motions during historic earthquakes to estimate how ground acceleration will dissipate with increasing distance from the earthquake source. Review of CDCDMG Open-File Report 96-08 and SCEC Implementation Guidelines (Martin and Lew, 1999) indicates that design ground accelerations can be based on the equally weighted average of accelerations from three acceptable attenuation relationships. This procedure has been followed in our probabilistic analysis.

It should be emphasized that the ground acceleration values presented in our report are based on simplified curves of fault rupture area to magnitude, and ground motion attenuation relationships which represent averages of highly variable data measured during historic earthquakes. Predicted accelerations should be considered rough

estimates rather than precise facts and, therefore, ground accelerations at the subject site from future seismic events may exceed the predicted accelerations. Due to the dip-slip nature of most of the faults in Southern California, vertical accelerations may equal horizontal accelerations. Ground motions may originate from virtually any direction due to the presence of major faults in all directions from the site.

1.2.4 Seismic Analysis – Vesting Tentative Tract 61105

1.2.4.1 Site Conditions

The elevated portions of the site are underlain by Quaternary Terrace Deposits and Saugus Formation Bedrock. Alluvial deposits are present in the low-lying areas within the Santa Clara River drainage and its tributary canyons. The Terrace Deposits typically consist of friable, fine -to very coarse-grained sand and pebbly sand with cobbles and boulders with sandy silt interbeds. The bedrock generally consists of sandstone and pebbly sandstones with interbeds of silty sandstone and mudstones. To the depths explored, the alluvium consists of silty and clayey with gravel, cobbles and boulders. Generally, these soils are strong, except typically the top 5 feet to 22 feet. Weaker upper soils will be removed and recompacted prior to construction. Therefore, it is reasonable to classify the site as S_D per the Uniform Building Code ("Stiff Soil Profile"). For our analysis, we used soil profile type S_D.

1.2.4.2 Maximum Historic Accelerations

In order to provide a rough estimate of maximum ground motions which have occurred at the site from known, historic earthquakes, a site specific analysis using the computer program EQSEARCH (Version 3.00) by Thomas F. Blake was completed. This program utilizes a data base file that contains data on approximately 6000 events greater than magnitude 4 which have occurred in California between 1800 and 2000. This data was extracted primarily from the CDMG computerized earthquake catalog, Townley and Allen (1939) and the U.S. Geological Survey's Earthquake Data Base System. The attenuation relationship of Boore et al. (1997) with a random horizontal component and Site Class D Soil Classification was used to estimate the dissipation of ground motion from the epicenter to the subject site.

Table D1 summarizes the input parameters and a listing of earthquakes of magnitude 5 or greater which have occurred within 50 miles of the site, and the estimated ground motions produced at the site from each event. The locations of historic earthquakes near the subject site are shown on **Figure D1**. The largest historic acceleration indicated by EQSEARCH for the alluvium at the site is 0.39g from a nearby aftershock of the 1994 Northridge Earthquake. However, because the rupture area of this earthquake extended substantially north of the epicenter and closer to the site, the contour map of accelerations for bedrock and soil sites prepared by Stewart et al. (1994) for the Northridge Earthquake was consulted. This map indicates that the alluvium at the site probably experienced ground accelerations of approximately 0.40g during the Northridge Earthquake (**Figure D3**).

1.2.4.3 Probabilistic Seismic Hazard Analysis

In order to provide a site specific, probabilistic seismic hazard analysis for the proposed development, the computer program FRISKSP (Version 4.00) by Thomas F. Blake was utilized. This program evaluates potential ground motions which may statistically occur within a time frame (return period) of interest. For this investigation a return period of 475 years was analyzed. Potential ground motions include a standard deviation to account for variability in observed ground motion attenuation.

The peak ground acceleration with a 10% probability of exceedance in 50 years (design basis ground motion) was calculated to be 0.88g for the alluvial portions of the site (see problem #1 **Table D2**). This acceleration was determined by using an unweighted average of the three accelerations indicated by the attenuation relationships of Boore et al. (1997) for a Site Class D, Sadigh et al. (1997) for deep soil, and Campbell and Bozorgnia (1997) for alluvium (see Summary of Calculated Accelerations **Table D3**). The Seismic Hazard Zone Reports for the Newhall Quadrangle (Open-File Report 97-11) and the Val Verde Quadrangle (Seismic Hazard Zone Report 076) indicate a peak ground acceleration with a 10 percent probability of exceedance in 50 years to range from 0.72g to 0.79g for the alluvial portions of the site.

The dominant fault controlling maximum potential ground accelerations at the site is the Santa Susana Fault, with secondary impacts from the, Northridge (East Oak

Ridge) and Holser per analysis with Boore et al. (1997) (**see Table D2** for Summaries of Significant Faults). Site-fault distances for faults within 50 km of the site are summarized at the end of **Table D2**.

The FRISKSP program runs two problems for each attenuation relationship evaluated. The first evaluates potential accelerations, which may be generated within the return period of interest. The second problem normalizes potential accelerations to a 7.5 magnitude based on published empirical relationships because most liquefaction and settlement analyses are based on this standard magnitude. The acceleration is normalized to account for changes in duration for the same acceleration because larger, more distant earthquakes will produce ground motions with a longer duration (i.e. more cycles and more distress) than smaller, closer earthquakes. Where the design earthquake is smaller than a 7.5 magnitude, the normalized acceleration will be smaller than the design acceleration to account for the shorter duration of shaking from the design earthquake compared to the same acceleration from the larger 7.5 magnitude earthquake. The empirical relationship used for magnitude weighting in our analysis is from Youd and Idriss (1997). The average, magnitude-weighted acceleration was found to be 0.59g for the design basis earthquake (see **Table D3**).

1.2.5 Deaggregation of Fault Hazard

A probabilistic analysis evaluates a range of magnitudes from 5.0 to the maximum magnitude for each fault. However, the dominant magnitude which statistically generates the peak acceleration within a limited time period (e.g. 475 years) is typically less than the maximum magnitude for a given fault. We have, therefore, performed a deaggregation of fault hazard analysis with the PROBOUT Sub-Program of FRISKSP to evaluate what dominate magnitude-distance combination produces the design basis accelerations (DBA). We utilized the unweighted acceleration from Boore et al. (1997) of 1.03g (DBA) for our deaggregation analyses. Review of the magnitude-distance contributions to hazard indicates that the dominant magnitude which generates the DBA acceleration is 6.5 as shown graphically in **Figure D4**.

1.2.6 Summary

The peak design basis ground acceleration value used in our liquefaction analysis was 0.88g from a 6.5 magnitude earthquake on the Santa Susana Fault based on our probabilistic evaluation of the site.

Although research on earthquakes during the last forty years has greatly enhanced the level of understanding of earthquake faulting in California, the record is much too short to constrain behavior of all faults in Southern California and the attenuation characteristics of all areas relative to each future potential earthquakes. Predicted accelerations should, therefore, be considered **rough estimates** rather than precise facts and ground motions from future earthquakes may exceed the predicted accelerations. Neither the **Time, Location, nor Magnitude** of an earthquake can be accurately predicted at this time.

The proposed development is located in Southern California, which is in a geologically and seismically active region where large magnitude, potentially destructive earthquakes are common. Therefore, it is reasonable to assume that moderate or large magnitude earthquakes will affect the site during the life of a given structure. The current standards for construction provided in the California Building Code based on the 1997 Uniform Building Code are designed to safeguard against major failures and loss of life, but are not intended to limit damage, maintain functions or provide for easy repair. Per SEAOC, conformance to these recommendations does not constitute any kind of guarantee or assurance that significant structural damage will not occur in the event of a maximum level of earthquake ground motion. However, it is reasonable to expect that a well-planned and constructed structure will not collapse in a major earthquake and that protection of life is reasonably provided, but not with complete assurance.

1.3 Ground Failure

Ground failure is a general term describing seismically induced, secondary permanent ground deformation caused by strong ground motion. This includes liquefaction, lateral spreading, seismic settlement of poorly consolidated materials (dynamic densification), differential materials response, slope failures, sympathetic movement on weak bedding planes or non-causative faults, shattered ridge effects and ground lurching.

APPENDIX D

The seismic hazards map for the Newhall Quadrangle (dated 2/1/98) and Val Verde Quadrangle (2002) indicates that the alluvial portions of Tentative Tract 61105 are in designated zones of required investigation to evaluate the potential for liquefaction and lateral spreading. The potential for liquefaction and seismic settlement has been evaluated in **Appendix C** of this report. Recommended measures to mitigate potential liquefaction and seismic settlements are provided in the earthworks recommendations and foundation and settlement considerations of this report. Historic high ground water levels were assumed at a conservative depth of 10 to 30 feet below existing topography based on historical water well records available at the County of Los Angeles and our field observations.

Differential materials response refers to the different responses various materials display when subjected to seismic waves. Where materials with different densities or strengths are in contact, differential response to the seismic energy may cause distress along the contact. The combination of dynamic compaction and differential settlement along with differential materials response is a source of future potential hazard along cut/fill and bedrock/alluvium contacts. It is, therefore, recommended that **lots** underlain by transitions between different material types (ex. bedrock to fill, bedrock to alluvium, etc.) be **over-excavated a minimum of 5 feet** to minimize potential adverse impacts. Cut and transition lots located 1) in close proximity to the Monoclinal Warp, 2) south of the Monoclinal Warp area on VTT 61105 and 3) on the western limb of or over the Lion Canyon Anticline shall be over-excavated a **minimum of 8 feet** to minimize potential adverse impacts. These areas have been shaded on the Geologic/Geotechnical Remediation Maps for reference and should be re-evaluated if any changes in proposed development on VTT 61105 occurs and at the Grading Plan Stage.

Earthquake-induced slope failures include activation and reactivation of landslides, rock falls, debris flows and surficial failures. Review of the SHMA maps for the Newhall and Val Verde Quadrangles indicates that much of the slope areas on the site are within designated areas requiring investigation to evaluate potential earthquake-induced landslides. Landslides and surficial failures have been mapped by this firm in the vicinity of the proposed development. Existing landslides which could potentially impact the proposed development have been evaluated and appropriate mitigation recommended as presented in this report. The stability of natural and constructed slopes which could potentially affect the proposed development has been evaluated and appropriate mitigation recommended. The potential for earthquake-induced slope failures to adversely impact the proposed development is considered negligible, provided that our

APPENDIX D

Recommendations and those of the Supervising Civil Engineer are incorporated into the proposed design and implemented during construction.

The specific location of future potential sympathetic movement along weak planes such as inclined clay beds cannot be reliably predicted on a site specific basis at this time. Over-excavation of clay-rich bedding planes of the Saugus Formation and subsequent placement of a certified fill cap has been recommended to mitigate potential hazards from expansive material. This certified fill will also reduce potential hazards from potential secondary seismogenic movement along bedding planes.

Development is not proposed on narrow ridgelines, therefore, potential hazards from shattered ridge affects are considered negligible.

The following attachments complete this Appendix

Summary Table of EQSEARCH Parameters and Output	Table D1
Summary Table of FRISKSP Parameters and Output (.out File) Boore et al. (1997) + Portions of Sadigh et al. (1997) & Campbell (1997)	Table D2
Summary of Calculated Accelerations	Table D3
Fault and Earthquake Epicenter Location Map	Figure D1
Modified Mercalli Scale, 1956 Version	Figure D2
Contours of Maximum Acceleration, Northridge Earthquake (Stewart et al., 1994)	Figure D3
Excel Histograms of Magnitude - Distance Contributions to Hazard	Figure D4

APPENDIX D

SUMMARY TABLE OF EQSEARCH PARAMETERS AND OUTPUT

```
*************************
*                       *
*    E Q S E A R C H    *
*                       *
*     Version 3.00      *
*                       *
*************************
```

ESTIMATION OF
PEAK ACCELERATION FROM
CALIFORNIA EARTHQUAKE CATALOGS

JOB NUMBER: 04-2023-4

DATE: 07-21-2004

JOB NAME: Mesas East - Newhall Ranch Co.

EARTHQUAKE-CATALOG-FILE NAME: ALLQUAKE.DAT

MAGNITUDE RANGE:
MINIMUM MAGNITUDE: 5.00
MAXIMUM MAGNITUDE: 9.00

SITE COORDINATES:
SITE LATITUDE: 34.4167
SITE LONGITUDE: 118.6258

SEARCH DATES:
START DATE: 1800
END DATE: 2000

SEARCH RADIUS:
50.0 mi
80.5 km

ATTENUATION RELATION: 3) Boore et al. (1997) Horiz. - NEHRP D (250)
UNCERTAINTY (M=Median, S=Sigma): S Number of Sigmas: 1.0
ASSUMED SOURCE TYPE: DS [SS=Strike-slip, DS=Reverse-slip, BT=Blind-thrust]
SCOND: 0 Depth Source: A
Basement Depth: 5.00 km Campbell SSR: Campbell SHR:
COMPUTE PEAK HORIZONTAL ACCELERATION

MINIMUM DEPTH VALUE (km): 0.0

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
GSP	34.3780	118.6180	01/19/1994	211144.9	11.0	5.10	0.385	X	2.7(4.4)
GSP	34.3940	118.6690	06/26/1995	084028.9	13.0	5.00	0.357	IX	2.9(4.7)

APPENDIX D

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
GSP	34.3690	118.6720	04/26/1997	103730.7	16.0	5.10	0.325	IX	4.2(6.8)
GSP	34.3770	118.6980	01/18/1994	004308.9	11.0	5.20	0.317	IX	4.9(7.9)
GSB	34.3790	118.7110	01/19/1994	210928.6	14.0	5.50	0.350	IX	5.5(8.9)
GSP	34.3260	118.6980	01/17/1994	233330.7	9.0	5.60	0.307	IX	7.5(12.1)
GSP	34.3050	118.5790	01/29/1994	112036.0	1.0	5.10	0.223	IX	8.2(13.1)
DMG	34.3000	118.6000	04/04/1893	1940 0.0	0.0	6.00	0.357	IX	8.2(13.2)
GSB	34.3010	118.5650	01/17/1994	204602.4	9.0	5.20	0.225	IX	8.7(14.0)
DMG	34.3080	118.4540	02/09/1971	144346.7	6.2	5.20	0.176	VIII	12.3(19.8)
DMG	34.4110	118.4010	02/09/1971	14 1 8.0	8.0	5.80	0.236	IX	12.8(20.6)
DMG	34.4110	118.4010	02/09/1971	14 041.8	8.4	6.40	0.323	IX	12.8(20.6)
DMG	34.4110	118.4010	02/09/1971	14 244.0	8.0	5.80	0.236	IX	12.8(20.6)
DMG	34.4110	118.4010	02/09/1971	141028.0	8.0	5.30	0.181	VIII	12.8(20.6)
GSP	34.2130	118.5370	01/17/1994	123055.4	18.0	6.70	0.338	IX	14.9(24.0)
GSP	34.2310	118.4750	03/20/1994	212012.3	13.0	5.30	0.158	VIII	15.4(24.8)
DMG	34.5190	118.1980	08/23/1952	10 9 7.1	13.1	5.00	0.093	VII	25.4(40.8)
DMG	34.7000	119.0000	10/23/1916	254 0.0	0.0	5.50	0.109	VII	28.9(46.5)
T-A	34.8300	118.7500	11/27/1852	0 0 0.0	0.0	7.00	0.237	IX	29.4(47.3)
DMG	34.0000	118.5000	08/04/1927	1224 0.0	0.0	5.00	0.082	VII	29.6(47.7)
MGI	34.0000	118.5000	11/19/1918	2018 0.0	0.0	5.00	0.082	VII	29.6(47.7)
MGI	34.0800	118.2600	07/16/1920	18 8 0.0	0.0	5.00	0.079	VII	31.2(50.3)
DMG	33.9500	118.6320	08/31/1930	04036.0	0.0	5.20	0.086	VII	32.2(51.9)
PAS	33.9440	118.6810	01/01/1979	231438.9	11.3	5.00	0.076	VII	32.8(52.8)
DMG	34.0650	119.0350	02/21/1973	144557.3	8.0	5.90	0.120	VII	33.7(54.2)
MGI	34.0000	118.3000	09/03/1905	540 0.0	0.0	5.30	0.086	VII	34.3(55.1)
PAS	33.9190	118.6270	01/19/1989	65328.8	11.9	5.00	0.073	VII	34.4(55.3)
DMG	34.8670	118.9330	09/21/1941	1953 7.2	0.0	5.20	0.079	VII	35.6(57.4)
MGI	34.0000	119.0000	12/14/1912	0 0 0.0	0.0	5.70	0.103	VII	35.8(57.7)
DMG	34.0000	119.0000	09/24/1827	4 0 0.0	0.0	7.00	0.204	VIII	35.8(57.7)
T-A	34.0000	118.2500	09/23/1827	0 0 0.0	0.0	5.00	0.071	VI	35.9(57.8)
T-A	34.0000	118.2500	03/26/1860	0 0 0.0	0.0	5.00	0.071	VI	35.9(57.8)
T-A	34.0000	118.2500	01/10/1856	0 0 0.0	0.0	5.00	0.071	VI	35.9(57.8)
DMG	34.9000	118.9000	10/23/1916	244 0.0	0.0	6.00	0.118	VII	36.8(59.3)
PAS	34.9430	118.7430	06/10/1988	23 643.0	6.8	5.40	0.086	VII	36.9(59.4)
MGI	34.1000	118.1000	07/11/1855	415 0.0	0.0	6.30	0.137	VIII	37.1(59.7)
GSP	34.2620	118.0020	06/28/1991	144354.5	11.0	5.40	0.085	VII	37.1(59.7)
DMG	34.8000	119.1000	09/05/1883	1230 0.0	0.0	6.00	0.116	VII	37.8(60.8)
DMG	34.9000	118.9500	08/01/1952	13 430.0	0.0	5.10	0.071	VI	38.1(61.3)
PAS	34.0730	118.0980	10/04/1987	105938.2	8.2	5.30	0.079	VII	38.3(61.7)
T-A	34.9200	118.9200	01/20/1857	0 0 0.0	0.0	5.00	0.067	VI	38.6(62.0)
T-A	34.9200	118.9200	05/23/1857	0 0 0.0	0.0	5.00	0.067	VI	38.6(62.0)
DMG	34.9500	118.8670	07/21/1952	121936.0	0.0	5.30	0.078	VII	39.3(63.2)
PAS	34.0610	118.0790	10/01/1987	144220.0	9.5	5.90	0.106	VII	39.7(63.9)
DMG	34.9320	118.9760	03/01/1963	02557.9	13.9	5.00	0.064	VI	40.8(65.6)
DMG	34.9410	118.9870	11/15/1961	53855.5	10.7	5.00	0.063	VI	41.6(66.9)
DMG	35.0000	118.8330	07/23/1952	181351.0	0.0	5.20	0.070	VI	42.0(67.5)
DMG	35.0000	118.8330	07/23/1952	75319.0	0.0	5.40	0.078	VII	42.0(67.5)
DMG	34.2000	117.9000	08/28/1889	215 0.0	0.0	5.50	0.079	VII	44.0(70.8)
DMG	34.9830	118.9830	05/23/1954	235243.0	0.0	5.10	0.064	VI	44.0(70.9)
DMG	33.8500	118.2670	03/11/1933	1425 0.0	0.0	5.00	0.060	VI	44.2(71.1)
DMG	35.0000	119.0000	07/21/1952	12 531.0	0.0	6.40	0.124	VII	45.5(73.3)
DMG	35.0000	119.0000	02/16/1919	1557 0.0	0.0	5.00	0.059	VI	45.5(73.3)

APPENDIX D

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
MGI	34.0000	118.0000	12/25/1903	1745 0.0	0.0	5.00	0.059	VI	45.9(73.8)
DMG	35.0000	119.0170	01/12/1954	233349.0	0.0	5.90	0.094	VII	46.0(74.0)
DMG	35.0000	119.0170	07/21/1952	115214.0	0.0	7.70	0.243	IX	46.0(74.0)
DMG	35.0000	119.0330	07/21/1952	12 2 0.0	0.0	5.60	0.080	VII	46.4(74.7)
DMG	33.7830	118.2500	11/14/1941	84136.3	0.0	5.40	0.069	VI	48.7(78.4)
DMG	34.1000	119.4000	05/19/1893	035 0.0	0.0	5.50	0.072	VII	49.3(79.3)

****
-END OF SEARCH- 59 EARTHQUAKES FOUND WITHIN THE SPECIFIED SEARCH AREA.

TIME PERIOD OF SEARCH: 1800 TO 2000

LENGTH OF SEARCH TIME: 201 years

THE EARTHQUAKE CLOSEST TO THE SITE IS ABOUT 2.7 MILES (4.4 km) AWAY.

LARGEST EARTHQUAKE MAGNITUDE FOUND IN THE SEARCH RADIUS: 7.7

LARGEST EARTHQUAKE SITE ACCELERATION FROM THIS SEARCH: 0.385 g

COEFFICIENTS FOR GUTENBERG & RICHTER RECURRENCE RELATION:
a-value= 1.198
b-value= 0.394
beta-value= 0.907

TABLE OF MAGNITUDES AND EXCEEDANCES:

Earthquake Magnitude	Number of Times Exceeded	Cumulative No. / Year
4.0	59	0.29353
4.5	59	0.29353
5.0	59	0.29353
5.5	22	0.10945
6.0	10	0.04975
6.5	4	0.01990
7.0	3	0.01493
7.5	1	0.00498

APPENDIX D

SUMMARY TABLE OF FRISKSP PARAMETERS AND OUTPUT

```
*****************************************
*                                       *
*        FRISKSP - IBM-PC VERSION       *
*                                       *
*  Modified from *FRISK* (McGuire 1978) *
*   To Perform Probabilistic Earthquake *
*  Hazard Analyses Using Multiple Forms *
* of Ground-Motion-Attenuation Relations *
*                                       *
*   Modifications by:  Thomas F. Blake  *
*              - 1988-2000 -            *
*                                       *
*              VERSION 4.00             *
*             (Visual Fortran)          *
*****************************************
```

```
ANALYSIS PERFORMED FOR NEWHALL RANCH CO.
JOB NO: 04-2023-4
DATE: JULY 21, 2004
DESCRIPTION: SUMMARY OF FRISKSP.OUT FILES FOR BOORE ET AL (1997), SADIGH ET AL (1997) AND CAMPBELL & BOZORGNIA (1997)

 IPR_FILE
  0

Note: Binary file will be generated for only the first attenuation problem and first site.

 IPLOT
  0

 SITE CONDITION
  0.00

 BASEMENT     DEPTH (km)
  5.00

 RHGA FACTOR     RHGA DIST (km)
     1.000            0.000

 NFLT  NSITE   NPROB   NATT     LCD
```

APPENDIX D

15	0.100	0.200	0.300	0.400	0.500	0.600	0.700	0.800	0.900	1.000
	1.100	1.200	1.300	1.400	1.500					

MAGNITUDE WEIGHTING FACTORS: MWF: 2 MWF MAGNITUDE: 7.50

SADIGH ET AL. 1997

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
1	-2.1700	1.0000	1.7000	0.0000	0.0000	0.0000	0.0000	1.5200	0.1600	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	25	0
ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
2	-1.9200	1.0000	1.7000	0.0000	0.0000	0.0000	0.0000	1.5200	0.1600	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	25	0
ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
3	-2.1700	1.0000	1.7000	0.0000	0.0000	0.0000	0.0000	1.5200	0.1600	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
3	0.0000	0.0000	0.0000	0.0000.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	25	0
ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
4	-1.9200	1.0000	1.7000	0.0000	0.0000	0.0000	0.0000	1.5200	0.1600	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	25	0
ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
5	-1.9200	1.0000	1.7000	0.0000	0.0000	0.0000	0.0000	1.5200	0.1600	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	25	0
ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
6	-1.9200	1.0000	1.7000	0.0000	0.0000	0.0000	0.0000	1.5200	0.1600	0.0000	0.0000	0.0000	0.0000	0.0000
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23	PER	DSMIN	SIGA	IRELAF	ICHK
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	25	0

PROBLEM DATA:

SADIGH ET AL. (1997) DEEP SOIL 1 AMPLITUDES:

15	0.100	0.200	0.300	0.400	0.500	0.600	0.700	0.800	0.900	1.000
	1.100	1.200	1.300	1.400	1.500					

APPENDIX D

```
PROBLEM DATA:

CAMP. & BOZ. (1997 Rev.) AL 1    AMPLITUDES:
    15        0.100    0.200    0.300    0.400    0.500    0.600    0.700    0.800    0.900    1.000
              1.100    1.200    1.300    1.400    1.500

     MAGNITUDE WEIGHTING FACTORS:     MWF:   0    MWF MAGNITUDE:     0.00

CAMP. & BOZ. (1997 Rev.) AL 2    AMPLITUDES:
    15        0.100    0.200    0.300    0.400    0.500    0.600    0.700    0.800    0.900    1.000
              1.100    1.200    1.300    1.400    1.500

     MAGNITUDE WEIGHTING FACTORS:     MWF:   2    MWF MAGNITUDE:     7.50


RISKS SPECIFIED:
  5     0.013900  0.010000  0.005000  0.002105  0.001000

SITE COORDINATES:
 1    -118.6258   34.4167


FAULT INFORMATION:

-----------------------------------------------------------------------------

FAULT  1

FAULT NAME:  HOLSER


NFP    NRL   ATTENUATION CODES:
 5     10      2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  0.4000  2.072  1.000  2.000  1.000

NMAX AMMAX  PMAX
 1    6.50  1.00
```

APPENDIX D

```
AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  1.5000  2.072  1.500  2.000  1.000

NMAX AMMAX  PMAX
 1    6.90  1.00


  dmchar ampchar dmpchar
    0.50    6.40    1.00

Slip Rate (  1.5000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.360E+12
Input Fault Area     - cm**2
0.682E+13
LOG10[Mo(m)]         = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  6.9000  1.0000   0.00891   0.00602   0.00288


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.7027   34.4057
 2    -118.4078   34.2781

NDP
  3
ORIGINAL FAULT CROSS SECTION
 1       0.0000    4.9900
 2       0.0000    5.0000
 3      16.3000   19.7000

Computed Total Fault Area = 0.67E+03

-----------------------------------------------------------------------

FAULT  3
```

APPENDIX D

```
10     -118.8761    34.7139

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1        0.0000     0.0000
 2        0.0000    13.0000

Computed Total Fault Area = 0.93E+03

-----------------------------------------------------------------------

FAULT  4

FAULT NAME:  SANTA SUSANA


NFP    NRL   ATTENUATION CODES:
 8     10       2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  5.0000  2.072  1.300  2.000  1.000

NMAX AMMAX  PMAX
 1    6.60  1.00


  dmchar ampchar dmpchar
    0.50    6.10    1.00

 Slip Rate (  5.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area     - cm**2
0.432E+13
 LOG10[Mo(m)]         = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.6000  1.0000   0.03249   0.01677   0.01573


 IND_RL
      2
```

APPENDIX D

```
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.700E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.9000  1.0000   0.02235   0.01511   0.00723


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1    -119.2050   34.2481
  2    -119.1582   34.2630
  3    -119.0974   34.3165
  4    -119.0402   34.3522
  5    -118.9589   34.3631
  6    -118.8805   34.3813
  7    -118.8104   34.3850
  8    -118.7742   34.4013
  9    -118.7227   34.3978

 NDP
   3
 ORIGINAL FAULT CROSS SECTION
  1        0.0000    1.0000
  2        0.0000    1.1000
  3        5.9000   13.7000

 Computed Total Fault Area = 0.67E+03

 ---------------------------------------------------------------------------

 FAULT  6

 FAULT NAME:  SAN CAYETANO


 NFP    NRL   ATTENUATION CODES:
```

APPENDIX D

```
 2        7.5000    13.0000

Computed Total Fault Area = 0.60E+03

-----------------------------------------------------------------------

FAULT  7

FAULT NAME:  SIERRA MADRE (San Fernando)


NFP    NRL   ATTENUATION CODES:
 8     10      2  4

AMMIN   AMSTEP  IRATE   RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  2.0000  2.072  0.900  2.000  1.000

NMAX AMMAX  PMAX
 1    6.70  1.00


  dmchar ampchar dmpchar
    0.50    6.20    1.00

Slip Rate (  2.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.324E+13
LOG10[Mo(m)]        = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  6.7000  1.0000   0.00781   0.00447   0.00334


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.2940   34.2782
 2    -118.2951   34.2782
```

APPENDIX D

```
    1  6.7000  1.0000   0.00543   0.00311   0.00232

IND_RL
    2
RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.7982   34.2901
 2    -118.9084   34.2578
 3    -118.9364   34.2615
 4    -118.9680   34.2615
 5    -119.1147   34.2261

NDP
  3
ORIGINAL FAULT CROSS SECTION
 1       0.0000    1.0000
 2       0.0000    1.1000
 3       7.5000   14.0000

Computed Total Fault Area = 0.45E+03

-----------------------------------------------------------------------------

FAULT  9

FAULT NAME:  VERDUGO


NFP    NRL   ATTENUATION CODES:
 7     10      2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1 . 0.5000  2.072  1.400  2.000  1.000

NMAX AMMAX  PMAX
 1    6.70  1.00


  dmchar ampchar dmpchar
```

APPENDIX D

```
 6      10       1  3

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  2.0000  2.072  3.400  2.000  1.000

NMAX AMMAX  PMAX
 1    7.00  1.00


  dmchar ampchar dmpchar
    0.50    6.50    1.00

Slip Rate (  2.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.884E+13
LOG10[Mo(m)]        = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  7.0000  1.0000   0.01164   0.00840   0.00323


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -119.6298   34.4939
 2    -119.5091   34.4864
 3    -119.3783   34.5065
 4    -119.1972   34.5367
 5    -119.1167   34.5317
 6    -118.9055   34.5870

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       2.3000   12.8000

Computed Total Fault Area = 0.89E+03
```

APPENDIX D

```
 6    -119.4061   34.9395
 7    -119.2103   34.8639
 8    -118.9010   34.8175
 9    -118.5075   34.7006
10    -118.5024   34.6989
11    -118.0075   34.5116
12    -117.5298   34.3106

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1        0.0000     0.0000
 2        0.0000    12.0000

Computed Total Fault Area = 0.41E+04

-----------------------------------------------------------------------

FAULT 12

FAULT NAME:  SAN ANDREAS - Mojave


NFP    NRL   ATTENUATION CODES:
 3     10      1  3

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1 30.0000  2.072  4.900  2.000  0.500

NMAX AMMAX  PMAX
 1    7.10  1.00


  dmchar ampchar dmpchar
    0.50    6.60    1.00

 Slip Rate ( 30.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.300E+12
 Input Fault Area    - cm**2
0.119E+14
 LOG10[Mo(m)]        = (1.50)m + (16.05)
```

APPENDIX D

```
Slip Rate ( 34.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.300E+12
Input Fault Area    - cm**2
0.174E+14
LOG10[Mo(m)]        = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  7.2000  1.0000   0.24626   0.19696   0.04930


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -119.8598   35.3072
 2    -119.6673   35.1336
 3    -119.4061   34.9395
 4    -119.2103   34.8639
 5    -118.9010   34.8175
 6    -118.5075   34.7006

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       0.0000   12.0000

Computed Total Fault Area = 0.17E+04

-----------------------------------------------------------------------

FAULT 14

FAULT NAME:  SIERRA MADRE


NFP    NRL   ATTENUATION CODES:
12     10      2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
```

APPENDIX D

```
 2       12.7000    12.7000

Computed Total Fault Area = 0.11E+04

-----------------------------------------------------------------------

FAULT 15

FAULT NAME:  MALIBU COAST


NFP     NRL    ATTENUATION CODES:
 4      10       2  4

AMMIN    AMSTEP  IRATE    RATE    BETA    ECTR    ECDP    COEF
5.000    0.1000      1  0.3000  2.072   1.800   2.000   1.000

NMAX AMMAX  PMAX
 1    6.70  1.00


  dmchar ampchar dmpchar
    0.50    6.20    1.00

 Slip Rate (  0.3000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area     - cm**2
0.481E+13
 LOG10[Mo(m)]         = (1.50)m + (16.05)
   IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
      1   6.7000   1.0000    0.00174    0.00100    0.00074


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA     SIG_RA  -3.490      0.910      0.240

 FAULT SEGMENT COORDINATES
  1     -118.5333    34.0299
  2     -118.6339    34.0412
```

APPENDIX D

```
    2
RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.2302   34.1192
 2    -118.3170   34.1104
 3    -118.3723   34.0991
 4    -118.4063   34.0827

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       4.8000   13.2000

Computed Total Fault Area = 0.25E+03
-----------------------------------------------------------------------

FAULT 17

FAULT NAME:  SANTA MONICA


NFP    NRL   ATTENUATION CODES:
 3     10      2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  1.0000  2.072  1.400  2.000  1.000

NMAX AMMAX  PMAX
 1    6.60  1.00


  dmchar ampchar dmpchar
    0.50    6.10    1.00

Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.360E+12
Input Fault Area    - cm**2
```

APPENDIX D

```
    0.50     6.30     1.00

 Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area     - cm**2
0.533E+13
 LOG10[Mo(m)]          = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.8000  1.0000   0.00520   0.00326   0.00195


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1    -119.1411   34.3453
  2    -119.1940   34.3088
  3    -119.2243   34.2928
  4    -119.3034   34.2892
  5    -119.4040   34.3166
  6    -119.5527   34.3093

 NDP
   3
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    1.0000
  2       0.0000    1.1000
  3       3.4000   13.6000

 Computed Total Fault Area = 0.51E+03

 ------------------------------------------------------------------------------

 FAULT 19

 FAULT NAME:  ANACAPA-DUME


 NFP    NRL   ATTENUATION CODES:
```

APPENDIX D

FAULT 20

FAULT NAME: NEWPORT-INGLEWOOD (L.A.Basin)

NFP	NRL	ATTENUATION CODES:	
5	10	1	3

AMMIN	AMSTEP	IRATE	RATE	BETA	ECTR	ECDP	COEF
5.000	0.1000	1	1.0000	2.072	3.200	2.000	1.000

NMAX	AMMAX	PMAX
1	6.90	1.00

dmchar	ampchar	dmpchar
0.50	6.40	1.00

Slip Rate (1.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area - cm**2
0.832E+13
LOG10[Mo(m)] = (1.50)m + (16.05)

IMAX	AMMAX	PMAX	ARATE =	EX-RATE +	CH-RATE
1	6.9000	1.0000	0.00664	0.00449	0.00215

IND_RL
2

RUPTURE AREA VS. MAGNITUDE A_RA B_RA SIG_RA -3.490 0.910 0.240

FAULT SEGMENT COORDINATES

1	-118.3723	34.0337
2	-118.1862	33.8073
3	-118.1510	33.7822
4	-118.1208	33.7746
5	-117.9246	33.6061

APPENDIX D

```
RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.0051   34.1670
 2    -118.0579   34.1444
 3    -118.1258   34.1293
 4    -118.2227   34.1217

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       3.4000   12.6000

Computed Total Fault Area = 0.26E+03
-----------------------------------------------------------------------

FAULT 22

FAULT NAME:  PALOS VERDES


NFP    NRL   ATTENUATION CODES:
 4     10      1  3

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  3.0000  2.030  4.800  2.000  1.000

NMAX AMMAX  PMAX
 1    7.10  1.00


  dmchar ampchar dmpchar
    0.50    6.60    1.00

Slip Rate (  3.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.125E+14
LOG10[Mo(m)]        = (1.50)m + (16.05)
```

APPENDIX D

```
 Slip Rate (  0.4000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area     - cm**2
0.975E+13
 LOG10[Mo(m)]          = (1.50)m + (16.05)
   IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
      1   6.7000   1.0000    0.00470    0.00269    0.00201


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA     SIG_RA  -3.490      0.910      0.240

 FAULT SEGMENT COORDINATES
  1     -119.1658    34.4701
  2     -119.2878    34.4298
  3     -119.3456    34.4235
  4     -119.4261    34.4160
  5     -119.4714    34.4273
  6     -119.5104    34.4311
  7     -119.6110    34.4411
  8     -119.6914    34.4499
  9     -119.7430    34.4424
 10     -119.7506    34.4411
 11     -119.7857    34.4336
 12     -119.8071    34.4336
 13     -119.8688    34.4248
 14     -119.8977    34.4298

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1        0.0000     0.0000
  2        7.5000    13.0000

 Computed Total Fault Area = 0.10E+04
```

APPENDIX D

FAULT 10	E(NO/YR)	0.5670E-07	0.2778E-07	0.1409E-07	0.7373E-08	0.3967E-08
FAULT 11	E(NO/YR)	0.3705E-05	0.2048E-05	0.1161E-05	0.6728E-06	0.3982E-06
FAULT 12	E(NO/YR)	0.4813E-06	0.2364E-06	0.1201E-06	0.6293E-07	0.3390E-07
FAULT 13	E(NO/YR)	0.5195E-06	0.2579E-06	0.1324E-06	0.7004E-07	0.3807E-07
FAULT 14	E(NO/YR)	0.3443E-06	0.1771E-06	0.9400E-07	0.5131E-07	0.2873E-07
FAULT 15	E(NO/YR)	0.1162E-07	0.5534E-08	0.2734E-08	0.1395E-08	0.7332E-09
FAULT 16	E(NO/YR)	0.1511E-07	0.6893E-08	0.3270E-08	0.1607E-08	0.8154E-09
FAULT 17	E(NO/YR)	0.2457E-07	0.1146E-07	0.5552E-08	0.2782E-08	0.1437E-08
FAULT 18	E(NO/YR)	0.5858E-08	0.2662E-08	0.1259E-08	0.6173E-09	0.3125E-09
FAULT 19	E(NO/YR)	0.7272E-06	0.3868E-06	0.2117E-06	0.1188E-06	0.6830E-07
FAULT 20	E(NO/YR)	0.1030E-08	0.4452E-09	0.2011E-09	0.9439E-10	0.4579E-10
FAULT 21	E(NO/YR)	0.1643E-08	0.7183E-09	0.3278E-09	0.1553E-09	0.7617E-10
FAULT 22	E(NO/YR)	0.4591E-08	0.2037E-08	0.9431E-09	0.4530E-09	0.2249E-09
FAULT 23	E(NO/YR)	0.1297E-08	0.5697E-09	0.2611E-09	0.1243E-09	0.6113E-10
TOTAL	E(NO/YR)	0.1657E-02	0.1181E-02	0.8485E-03	0.6147E-03	0.4488E-03
TOTAL RISK		0.1656E-02	0.1180E-02	0.8481E-03	0.6145E-03	0.4487E-03

SPECIFIED RISKS:	0.013900	0.010000	0.005000	0.002105	0.001000
ESTIMATED LN AMP. :	-0.642	-0.496	-0.236	0.029	0.222
ESTIMATED AMP. (g):	0.52619	0.60889	0.79002	**1.02987**	1.24913

BOORE ET AL(1997) NEHRP D (250) - Problem #2

AMPLITUDES (g):	0.1000E+00	0.2000E+00	0.3000E+00	0.4000E+00	0.5000E+00	0.6000E+00	0.7000E+00	0.8000E+00	0.9000E+00	0.1000E+01
LN (AMPLITUDE):	-2.30	-1.61	-1.20	-0.92	-0.69	-0.51	-0.36	-0.22	-0.11	0.00
FAULT 1 E(NO/YR)	0.1727E-02	0.1115E-02	0.6813E-03	0.4014E-03	0.2337E-03	0.1366E-03	0.8079E-04	0.4849E-04	0.2958E-04	0.1834E-04
FAULT 2 E(NO/YR)	0.4451E-02	0.2697E-02	0.1731E-02	0.1087E-02	0.6750E-03	0.4194E-03	0.2626E-03	0.1662E-03	0.1066E-03	0.6920E-04
FAULT 3 E(NO/YR)	0.2460E-02	0.1426E-02	0.8527E-03	0.4957E-03	0.2856E-03	0.1655E-03	0.9709E-04	0.5787E-04	0.3508E-04	0.2163E-04
FAULT 4 E(NO/YR)	0.2422E-01	0.1572E-01	0.1010E-01	0.6261E-02	0.3820E-02	0.2328E-02	0.1428E-02	0.8866E-03	0.5575E-03	0.3555E-03
FAULT 5 E(NO/YR)	0.7260E-02	0.3105E-02	0.1396E-02	0.6521E-03	0.3172E-03	0.1605E-03	0.8421E-04	0.4567E-04	0.2551E-04	0.1464E-04
FAULT 6 E(NO/YR)	0.1278E-01	0.4542E-02	0.1648E-02	0.6346E-03	0.2608E-03	0.1139E-03	0.5248E-04	0.2534E-04	0.1275E-04	0.6656E-05
FAULT 7 E(NO/YR)	0.3259E-02	0.1213E-02	0.4334E-03	0.1609E-03	0.6332E-04	0.2645E-04	0.1167E-04	0.5407E-05	0.2616E-05	0.1316E-05
FAULT 8 E(NO/YR)	0.1559E-02	0.3871E-03	0.1012E-03	0.2958E-04	0.9617E-05	0.3426E-05	0.1319E-05	0.5427E-06	0.2363E-06	0.1081E-06
FAULT 9 E(NO/YR)	0.7153E-03	0.1362E-03	0.2916E-04	0.7303E-05	0.2095E-05	0.6720E-06	0.2364E-06	0.8983E-07	0.3644E-07	0.1564E-07
FAULT 10 E(NO/YR)	0.1340E-02	0.2229E-03	0.4423E-04	0.1051E-04	0.2897E-05	0.8997E-06	0.3079E-06	0.1143E-06	0.4539E-07	0.1912E-07
FAULT 11 E(NO/YR)	0.7640E-02	0.3411E-02	0.1480E-02	0.6430E-03	0.2877E-03	0.1338E-03	0.6469E-04	0.3246E-04	0.1685E-04	0.9024E-05
FAULT 12 E(NO/YR)	0.1032E-01	0.1942E-02	0.4158E-03	0.1041E-03	0.2981E-04	0.9539E-05	0.3346E-05	0.1268E-05	0.5127E-06	0.2193E-06
FAULT 13 E(NO/YR)	0.1085E-01	0.2108E-02	0.4765E-03	0.1254E-03	0.3754E-04	0.1249E-04	0.4536E-05	0.1772E-05	0.7371E-06	0.3234E-06
FAULT 14 E(NO/YR)	0.3091E-02	0.6468E-03	0.1526E-03	0.4154E-04	0.1280E-04	0.4367E-05	0.1623E-05	0.6474E-06	0.2744E-06	0.1226E-06
FAULT 15 E(NO/YR)	0.2956E-03	0.3948E-04	0.6460E-05	0.1309E-05	0.3153E-06	0.8718E-07	0.2695E-07	0.9135E-08	0.3344E-08	0.1307E-08
FAULT 16 E(NO/YR)	0.7239E-03	0.5846E-04	0.6850E-05	0.1085E-05	0.2150E-06	0.5057E-07	0.1362E-07	0.4093E-08	0.1347E-08	0.4783E-09
FAULT 17 E(NO/YR)	0.8996E-03	0.9795E-04	0.1397E-04	0.2557E-05	0.5683E-06	0.1470E-06	0.4294E-07	0.1385E-07	0.4851E-08	0.1823E-08
FAULT 18 E(NO/YR)	0.5136E-03	0.5201E-04	0.7168E-05	0.1286E-05	0.2822E-06	0.7235E-07	0.2099E-07	0.6736E-08	0.2350E-08	0.8804E-09

APPENDIX D

SITE 1 COORDINATES: -118.6258 34.4167

SADIGH ET AL. (1997) DEEP SOIL - PROBLEM #1

AMPLITUDES (g):	0.1000E+00	0.2000E+00	0.3000E+00	0.4000E+00	0.5000E+00	0.6000E+00	0.7000E+00	0.8000E+00	0.9000E+00	0.1000E+01	
LN (AMPLITUDE):	-2.30	-1.61	-1.20	-0.92	-0.69	-0.51	-0.36	-0.22	-0.11	0.00	
FAULT 1 E(NO/YR)	0.1998E-02	0.1679E-02	0.1334E-02	0.1013E-02	0.7447E-03	0.5370E-03	0.3832E-03	0.2723E-03	0.1935E-03	0.1378E-03	
FAULT 2 E(NO/YR)	0.5989E-02	0.3881E-02	0.2577E-02	0.1642E-02	0.1008E-02	0.6059E-03	0.3611E-03	0.2153E-03	0.1290E-03	0.7803E-04	
FAULT 3 E(NO/YR)	0.3595E-02	0.2252E-02	0.1427E-02	0.8467E-03	0.4779E-03	0.2631E-03	0.1439E-03	0.7902E-04	0.4388E-04	0.2473E-04	
FAULT 4 E(NO/YR)	0.2872E-01	0.2109E-01	0.1416E-01	0.8967E-02	0.5507E-02	0.3346E-02	0.2034E-02	0.1246E-02	0.7707E-03	0.4828E-03	
FAULT 5 E(NO/YR)	0.1057E-01	0.5411E-02	0.2793E-02	0.1427E-02	0.7292E-03	0.3760E-03	0.1969E-03	0.1050E-03	0.5719E-04	0.3179E-04	
FAULT 6 E(NO/YR)	0.1909E-01	0.8577E-02	0.3737E-02	0.1633E-02	0.7291E-03	0.3350E-03	0.1588E-03	0.7766E-04	0.3916E-04	0.2033E-04	
FAULT 7 E(NO/YR)	0.4851E-02	0.2354E-02	0.1012E-02	0.4194E-03	0.1759E-03	0.7600E-04	0.3406E-04	0.1584E-04	0.7639E-05	0.3812E-05	
FAULT 8 E(NO/YR)	0.2336E-02	0.7508E-03	0.2267E-03	0.7124E-04	0.2392E-04	0.8608E-05	0.3306E-05	0.1347E-05	0.5790E-06	0.2612E-06	
FAULT 9 E(NO/YR)	0.1115E-02	0.2789E-03	0.6784E-04	0.1790E-04	0.5203E-05	0.1658E-05	0.5738E-06	0.2136E-06	0.8477E-07	0.3564E-07	
FAULT 10 E(NO/YR)	0.1425E-02	0.1642E-03	0.2011E-04	0.2958E-05	0.5253E-06	0.1108E-06	0.2730E-07	0.7728E-08	0.2480E-08	0.8902E-09	
FAULT 11 E(NO/YR)	0.8187E-02	0.2413E-02	0.5674E-03	0.1272E-03	0.2966E-04	0.7393E-05	0.1980E-05	0.5688E-06	0.1745E-06	0.5693E-07	
FAULT 12 E(NO/YR)	0.1154E-01	0.1455E-02	0.1773E-03	0.2511E-04	0.4253E-05	0.8582E-06	0.2041E-06	0.5648E-07	0.1796E-07	0.6455E-08	
FAULT 13 E(NO/YR)	0.1046E-01	0.1299E-02	0.1585E-03	0.2226E-04	0.3711E-05	0.7333E-06	0.1705E-06	0.4628E-07	0.1450E-07	0.5165E-08	
FAULT 14 E(NO/YR)	0.3697E-02	0.6683E-03	0.1181E-03	0.2296E-04	0.5042E-05	0.1249E-05	0.3459E-06	0.1062E-06	0.3583E-07	0.1319E-07	
FAULT 15 E(NO/YR)	0.4044E-03	0.5186E-04	0.7348E-05	0.1267E-05	0.2621E-06	0.6325E-07	0.1741E-07	0.5366E-08	0.1824E-08	0.6759E-09	
FAULT 16 E(NO/YR)	0.1154E-02	0.1272E-03	0.1812E-04	0.3315E-05	0.7397E-06	0.1932E-06	0.5731E-07	0.1889E-07	0.6800E-08	0.2642E-08	
FAULT 17 E(NO/YR)	0.1260E-02	0.1440E-03	0.1960E-04	0.3347E-05	0.6942E-06	0.1690E-06	0.4699E-07	0.1462E-07	0.5012E-08	0.1868E-08	
FAULT 18 E(NO/YR)	0.4880E-03	0.3276E-04	0.2930E-05	0.3547E-06	0.5506E-07	0.1047E-07	0.2360E-08	0.6145E-09	0.1811E-09	0.5927E-10	
FAULT 19 E(NO/YR)	0.3473E-02	0.5940E-03	0.9033E-04	0.1482E-04	0.2740E-05	0.5728E-06	0.1345E-06	0.3522E-07	0.1022E-07	0.3272E-08	
FAULT 20 E(NO/YR)	0.1951E-03	0.6279E-05	0.3408E-06	0.2875E-07	0.3444E-08	0.5495E-09	0.1114E-09	0.2746E-10	0.7741E-11	0.2325E-11	
FAULT 21 E(NO/YR)	0.2575E-03	0.1640E-04	0.1583E-05	0.2147E-06	0.3763E-07	0.8048E-08	0.2018E-08	0.5767E-09	0.1840E-09	0.6448E-10	
FAULT 22 E(NO/YR)	0.5202E-03	0.1631E-04	0.7784E-06	0.5712E-07	0.6106E-08	0.9098E-09	0.1806E-09	0.4486E-10	0.1287E-10	0.3784E-11	
FAULT 23 E(NO/YR)	0.1908E-03	0.9339E-05	0.7474E-06	0.8671E-07	0.1331E-07	0.2543E-08	0.5806E-09	0.1537E-09	0.4605E-10	0.1527E-10	
TOTAL E(NO/YR)	0.1215E+00	0.5327E-01	0.2852E-01	0.1626E-01	0.9449E-02	0.5561E-02	0.3319E-02	0.2013E-02	0.1242E-02	0.7797E-03	
TOTAL RISK	0.1144E+00	0.5187E-01	0.2812E-01	0.1613E-01	0.9405E-02	0.5545E-02	0.3314E-02	0.2011E-02	0.1241E-02	0.7794E-03	

AMPLITUDES (g):	0.1100E+01	0.1200E+01	0.1300E+01	0.1400E+01	0.1500E+01
LN (AMPLITUDE):	0.10	0.18	0.26	0.34	0.41
FAULT 1 E(NO/YR)	0.9861E-04	0.7093E-04	0.5133E-04	0.3739E-04	0.2741E-04
FAULT 2 E(NO/YR)	0.4770E-04	0.2950E-04	0.1848E-04	0.1172E-04	0.7526E-05
FAULT 3 E(NO/YR)	0.1417E-04	0.8271E-05	0.4916E-05	0.2976E-05	0.1834E-05
FAULT 4 E(NO/YR)	0.3064E-03	0.1971E-03	0.1285E-03	0.8483E-04	0.5672E-04
FAULT 5 E(NO/YR)	0.1804E-04	0.1045E-04	0.6170E-05	0.3713E-05	0.2275E-05
FAULT 6 E(NO/YR)	0.1085E-04	0.5942E-05	0.3333E-05	0.1913E-05	0.1122E-05
FAULT 7 E(NO/YR)	0.1964E-05	0.1043E-05	0.5693E-06	0.3189E-06	0.1830E-06
FAULT 8 E(NO/YR)	0.1231E-06	0.6040E-07	0.3073E-07	0.1617E-07	0.8776E-08
FAULT 9 E(NO/YR)	0.1577E-07	0.7316E-08	0.3540E-08	0.1781E-08	0.9286E-09

APPENDIX D

FAULT 19 E(NO/YR)	0.2276E-02	0.3168E-03	0.3993E-04	0.5640E-05	0.9175E-06	0.1704E-06	0.3557E-07	0.8221E-08	0.2076E-08	0.5666E-09
FAULT 20 E(NO/YR)	0.5716E-04	0.8528E-06	0.2672E-07	0.1429E-08	0.1121E-09	0.1153E-10	0.1348E-11	0.0000E+00	0.0000E+00	0.0000E+00
FAULT 21 E(NO/YR)	0.4958E-04	0.1198E-05	0.6130E-07	0.5143E-08	0.6079E-09	0.9229E-10	0.1690E-10	0.3379E-11	0.4419E-12	0.0000E+00
FAULT 22 E(NO/YR)	0.2156E-03	0.3726E-05	0.1132E-06	0.5534E-08	0.3885E-09	0.3572E-10	0.3805E-11	0.1981E-12	0.0000E+00	0.0000E+00
FAULT 23 E(NO/YR)	0.4558E-04	0.9918E-06	0.4519E-07	0.3370E-08	0.3552E-09	0.4825E-10	0.7880E-11	0.1410E-11	0.1790E-12	0.0000E+00
TOTAL E(NO/YR)	0.7712E-01	0.2900E-01	0.1250E-01	0.5615E-02	0.2599E-02	0.1241E-02	0.6123E-03	0.3117E-03	0.1637E-03	0.8847E-04
TOTAL RISK	0.7422E-01	0.2859E-01	0.1242E-01	0.5599E-02	0.2596E-02	0.1241E-02	0.6121E-03	0.3117E-03	0.1637E-03	0.8847E-04

AMPLITUDES (g):	0.1100E+01	0.1200E+01	0.1300E+01	0.1400E+01	0.1500E+01
LN (AMPLITUDE):	0.10	0.18	0.26	0.34	0.41
FAULT 1 E(NO/YR)	0.1214E-04	0.7669E-05	0.4912E-05	0.3188E-05	0.2095E-05
FAULT 2 E(NO/YR)	0.7322E-05	0.4016E-05	0.2243E-05	0.1275E-05	0.7368E-06
FAULT 3 E(NO/YR)	0.1885E-05	0.9577E-06	0.4977E-06	0.2643E-06	0.1433E-06
FAULT 4 E(NO/YR)	0.2473E-04	0.1383E-04	0.7900E-05	0.4603E-05	0.2732E-05
FAULT 5 E(NO/YR)	0.2115E-05	0.1078E-05	0.5635E-06	0.3013E-06	0.1646E-06
FAULT 6 E(NO/YR)	0.8281E-06	0.3966E-06	0.1958E-06	0.9939E-07	0.5177E-07
FAULT 7 E(NO/YR)	0.8963E-07	0.4098E-07	0.1941E-07	0.9489E-08	0.4778E-08
FAULT 8 E(NO/YR)	0.3863E-08	0.1615E-08	0.7048E-09	0.3194E-09	0.1497E-09
FAULT 9 E(NO/YR)	0.3717E-09	0.1454E-09	0.5956E-10	0.2536E-10	0.1115E-10
FAULT 10 E(NO/YR)	0.4186E-11	0.8664E-12	0.0000E+00	0.0000E+00	0.0000E+00
FAULT 11 E(NO/YR)	0.3580E-07	0.1330E-07	0.5146E-08	0.2066E-08	0.8581E-09
FAULT 12 E(NO/YR)	0.3400E-10	0.6443E-11	0.0000E+00	0.0000E+00	0.0000E+00
FAULT 13 E(NO/YR)	0.5438E-10	0.1331E-10	0.2780E-11	0.0000E+00	0.0000E+00
FAULT 14 E(NO/YR)	0.1454E-09	0.4734E-10	0.1607E-10	0.5550E-11	0.1589E-11
FAULT 15 E(NO/YR)	0.2007E-11	0.4481E-12	0.0000E+00	0.0000E+00	0.0000E+00
FAULT 16 E(NO/YR)	0.3303E-11	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
FAULT 17 E(NO/YR)	0.3648E-11	0.2889E-12	0.0000E+00	0.0000E+00	0.0000E+00
FAULT 18 E(NO/YR)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
FAULT 19 E(NO/YR)	0.1653E-09	0.5101E-10	0.1637E-10	0.5405E-11	0.1731E-11
FAULT 20 E(NO/YR)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
FAULT 21 E(NO/YR)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
FAULT 22 E(NO/YR)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
FAULT 23 E(NO/YR)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
TOTAL E(NO/YR)	0.4914E-04	0.2800E-04	0.1634E-04	0.9742E-05	0.5929E-05
TOTAL RISK	0.4914E-04	0.2800E-04	0.1634E-04	0.9742E-05	0.5929E-05

SPECIFIED RISKS:	0.013900	0.010000	0.005000	0.002105	0.001000
ESTIMATED LN AMP. :	-1.259	-1.126	-0.883	-0.641	-0.464
ESTIMATED AMP. (g):	0.28404	0.32444	0.41336	0.52657	0.62890

APPENDIX D

FAULT 10	E(NO/YR)	0.2108E-08	0.8421E-09	0.3522E-09	0.1534E-09	0.6930E-10
FAULT 11	E(NO/YR)	0.1312E-06	0.5017E-07	0.1990E-07	0.8164E-08	0.3456E-08
FAULT 12	E(NO/YR)	0.1978E-07	0.7818E-08	0.3234E-08	0.1393E-08	0.6226E-09
FAULT 13	E(NO/YR)	0.1987E-07	0.7806E-08	0.3208E-08	0.1373E-08	0.6097E-09
FAULT 14	E(NO/YR)	0.4109E-08	0.1633E-08	0.6790E-09	0.2942E-09	0.1321E-09
FAULT 15	E(NO/YR)	0.2412E-09	0.1010E-09	0.4432E-10	0.2025E-10	0.9589E-11
FAULT 16	E(NO/YR)	0.4457E-09	0.1890E-09	0.8395E-10	0.3878E-10	0.1814E-10
FAULT 17	E(NO/YR)	0.6157E-09	0.2600E-09	0.1150E-09	0.5297E-10	0.2530E-10
FAULT 18	E(NO/YR)	0.1443E-09	0.6091E-10	0.2688E-10	0.1230E-10	0.5765E-11
FAULT 19	E(NO/YR)	0.3953E-08	0.1570E-08	0.6525E-09	0.2825E-09	0.1269E-09
FAULT 20	E(NO/YR)	0.1179E-09	0.4967E-10	0.2188E-10	0.9992E-11	0.4683E-11
FAULT 21	E(NO/YR)	0.2308E-10	0.9270E-11	0.3816E-11	0.1564E-11	0.5943E-12
FAULT 22	E(NO/YR)	0.4654E-09	0.1952E-09	0.8565E-10	0.3903E-10	0.1838E-10
FAULT 23	E(NO/YR)	0.2086E-10	0.8596E-11	0.3671E-11	0.1593E-11	0.6816E-12
TOTAL	E(NO/YR)	0.4515E-03	0.2639E-03	0.1559E-03	0.9318E-04	0.5631E-04
TOTAL RISK		0.4514E-03	0.2639E-03	0.1559E-03	0.9318E-04	0.5631E-04

SPECIFIED RISKS:	0.013900	0.010000	0.005000	0.002105	0.001000
ESTIMATED LN AMP. :	-0.742	-0.620	-0.408	-0.198	-0.047
ESTIMATED AMP. (g):	0.47614	0.53780	0.66500	**0.82064**	0.95384

CAMPBELL & BOZORGNIA (1997) ALLUVIUM - PROBLEM #2

AMPLITUDES (g):	0.1000E+00	0.2000E+00	0.3000E+00	0.4000E+00	0.5000E+00	0.6000E+00	0.7000E+00	0.8000E+00	0.9000E+00	0.1000E+01	
LN (AMPLITUDE):	-2.30	-1.61	-1.20	-0.92	-0.69	-0.51	-0.36	-0.22	-0.11	0.00	
FAULT 1	E(NO/YR)	0.1897E-02	0.1482E-02	0.1061E-02	0.6699E-03	0.3844E-03	0.2082E-03	0.1094E-03	0.5674E-04	0.2937E-04	0.1527E-04
FAULT 2	E(NO/YR)	0.4143E-02	0.2762E-02	0.1771E-02	0.1011E-02	0.5339E-03	0.2703E-03	0.1345E-03	0.6663E-04	0.3318E-04	0.1668E-04
FAULT 3	E(NO/YR)	0.2456E-02	0.1569E-02	0.9110E-03	0.4520E-03	0.2057E-03	0.9023E-04	0.3926E-04	0.1719E-04	0.7638E-05	0.3456E-05
FAULT 4	E(NO/YR)	0.2442E-01	0.1555E-01	0.8630E-02	0.4068E-02	0.1765E-02	0.7428E-03	0.3116E-03	0.1321E-03	0.5703E-04	0.2515E-04
FAULT 5	E(NO/YR)	0.6612E-02	0.3057E-02	0.1336E-02	0.5505E-03	0.2210E-03	0.8873E-04	0.3611E-04	0.1501E-04	0.6396E-05	0.2795E-05
FAULT 6	E(NO/YR)	0.1102E-01	0.3527E-02	0.9771E-03	0.2637E-03	0.7321E-04	0.2132E-04	0.6543E-05	0.2117E-05	0.7197E-06	0.2563E-06
FAULT 7	E(NO/YR)	0.3060E-02	0.8974E-03	0.1928E-03	0.4012E-04	0.8799E-05	0.2077E-05	0.5289E-06	0.1447E-06	0.4228E-07	0.1311E-07
FAULT 8	E(NO/YR)	0.1094E-02	0.1589E-03	0.2120E-04	0.3128E-05	0.5262E-06	0.1005E-06	0.2150E-07	0.5087E-08	0.1315E-08	0.3679E-09
FAULT 9	E(NO/YR)	0.4281E-03	0.4412E-04	0.5034E-05	0.6994E-06	0.1166E-06	0.2270E-07	0.5036E-08	0.1248E-08	0.3399E-09	0.1005E-09
FAULT 10	E(NO/YR)	0.8402E-03	0.9304E-04	0.1188E-04	0.1857E-05	0.3467E-06	0.7516E-07	0.1845E-07	0.5028E-08	0.1498E-08	0.4821E-09
FAULT 11	E(NO/YR)	0.6947E-02	0.3505E-02	0.1297E-02	0.4193E-03	0.1317E-03	0.4202E-04	0.1385E-04	0.4745E-05	0.1693E-05	0.6286E-06
FAULT 12	E(NO/YR)	0.7404E-02	0.9914E-03	0.1396E-03	0.2311E-04	0.4478E-05	0.9946E-06	0.2481E-06	0.6831E-07	0.2048E-07	0.6609E-08
FAULT 13	E(NO/YR)	0.7524E-02	0.1131E-02	0.1739E-03	0.3055E-04	0.6171E-05	0.1413E-05	0.3605E-06	0.1010E-06	0.3071E-07	0.1002E-07
FAULT 14	E(NO/YR)	0.1531E-02	0.1762E-03	0.2293E-04	0.3604E-05	0.6729E-06	0.1453E-06	0.3547E-07	0.9601E-08	0.2840E-08	0.9070E-09
FAULT 15	E(NO/YR)	0.9707E-04	0.5767E-05	0.5411E-06	0.7180E-07	0.1228E-07	0.2543E-08	0.6123E-09	0.1664E-09	0.5000E-10	0.1634E-10
FAULT 16	E(NO/YR)	0.1601E-03	0.6173E-05	0.4732E-06	0.5604E-07	0.8933E-08	0.1769E-08	0.4135E-09	0.1101E-09	0.3242E-10	0.1026E-10
FAULT 17	E(NO/YR)	0.2471E-03	0.1232E-04	0.1072E-05	0.1369E-06	0.2295E-07	0.4709E-08	0.1130E-08	0.3072E-09	0.9252E-10	0.3012E-10
FAULT 18	E(NO/YR)	0.1087E-03	0.5332E-05	0.4835E-06	0.6502E-07	0.1148E-07	0.2475E-08	0.6223E-09	0.1768E-09	0.5546E-10	0.1880E-10

APPENDIX D

CLOSEST DISTANCES BETWEEN SITE AND FAULT RUPTURES

NO.	FAULT NAME	CD_1DRP	CD_2DRP	CDIST	CLODIS	CD_EPI	CD_HYPO
1	HOLSER	2.7	0.0	2.5	2.5	0.0	2.5 km
2	NORTHRIDGE (E. Oak Ridge)	4.4	4.4	6.6	6.6	5.2	7.7 km
3	SAN GABRIEL	5.7	5.7	5.7	5.7	5.7	5.8 km
4	SANTA SUSANA	9.2	0.0	7.5	7.5	0.6	7.5 km
5	OAK RIDGE (Onshore)	9.1	9.1	9.2	9.2	10.3	10.5 km
6	SAN CAYETANO	12.7	12.7	12.7	12.7	13.9	13.9 km
7	SIERRA MADRE (San Fernando)	18.5	13.6	16.2	16.2	14.7	17.1 km
8	SIMI-SANTA ROSA	21.2	19.6	21.0	21.0	20.7	22.0 km
9	VERDUGO	25.6	25.3	25.4	25.4	26.4	26.5 km
10	SANTA YNEZ (East)	31.9	30.1	31.6	31.6	30.9	32.2 km
11	SAN ANDREAS - 1857 Rupture	33.2	33.2	33.2	33.2	33.2	33.8 km
12	SAN ANDREAS - Mojave	33.2	33.2	33.2	33.2	33.2	33.3 km
13	SAN ANDREAS - Carrizo	33.4	33.4	33.4	33.4	33.4	33.4 km
14	SIERRA MADRE	34.1	30.4	32.2	32.2	31.5	33.2 km
15	MALIBU COAST	41.8	38.3	40.3	40.3	38.6	40.3 km
16	HOLLYWOOD	42.2	37.4	39.7	39.7	37.8	39.7 km
17	SANTA MONICA	42.3	38.9	40.8	40.8	39.2	40.9 km
18	VENTURA - PITAS POINT	47.9	47.9	47.9	47.9	49.0	49.0 km
19	ANACAPA-DUME	48.4	32.6	38.2	38.2	33.9	38.9 km
20	NEWPORT-INGLEWOOD (L.A.Basin)	48.5	48.5	48.5	48.5	49.6	49.6 km
21	RAYMOND	49.4	47.0	48.5	48.5	48.0	49.3 km
22	PALOS VERDES	49.9	49.9	49.9	49.9	50.7	50.7 km
23	M.RIDGE-ARROYO PARIDA-SANTA ANA	49.9	49.9	49.9	49.9	51.1	51.1 km

EXPLANATION

CD_1DRP = Closest distance to projection of rupture area along fault trace.
CD_2DRP = Closest distance to surface projection of the rupture area.
CDIST = Closest distance to seismogenic rupture.
CLODIS = Closest distance to subsurface rupture.
CD_EPI = Closest epicentral distance.
CD_HYPO = Closest hypocentral distance.

APPENDIX D

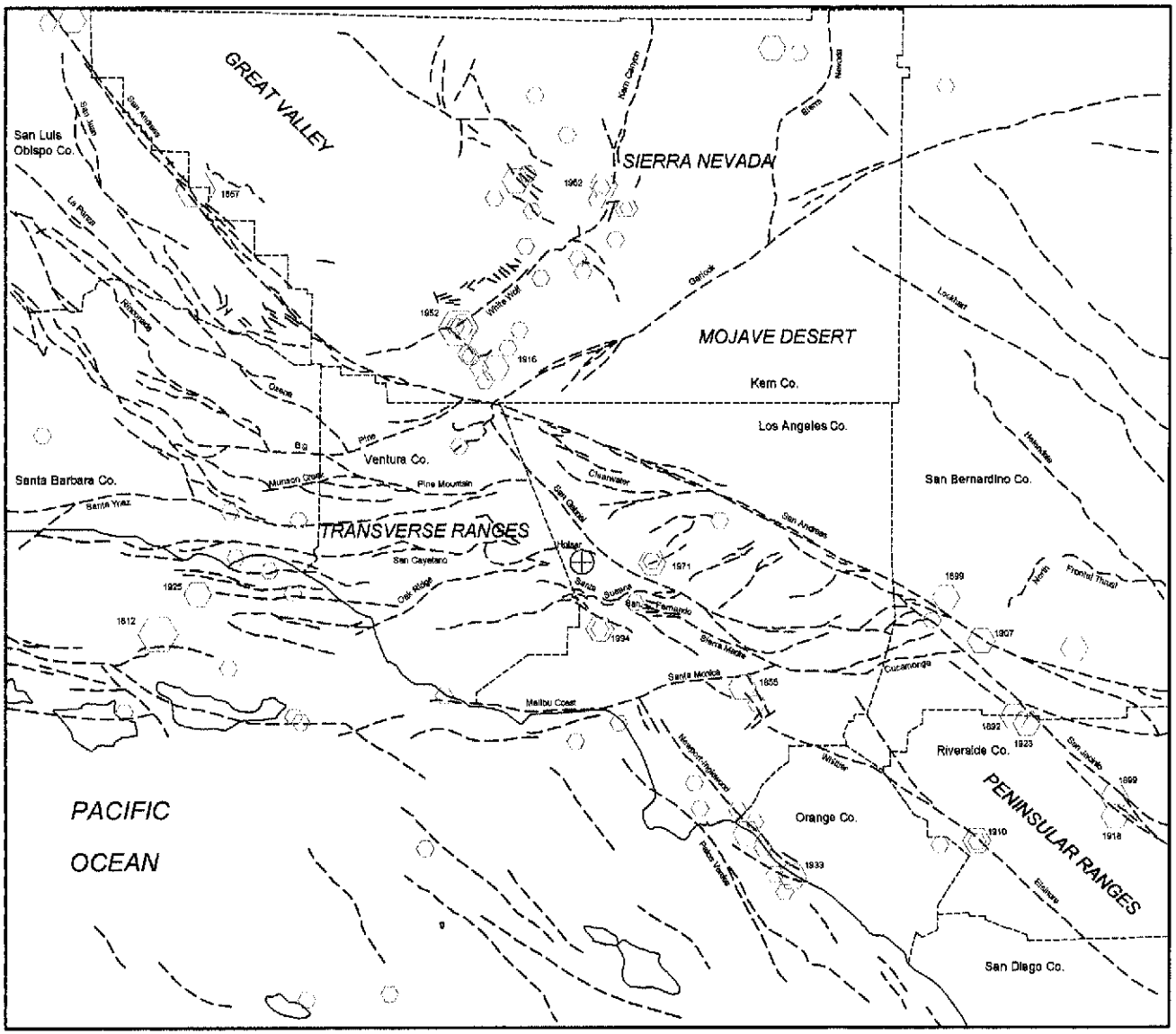
SUMMARY OF CALCULATED ACCELERATIONS

Unweighted Accelerations (g)

Attenuation Relationship	Return Period Evaluated				
	72	100	200	475	1000
Boore et al. (1997)	0.52619	0.60889	0.79002	**1.02987**	1.24913
Sadigh et al. (1997)	0.42539	0.48747	0.61889	**0.79030**	0.94513
Campbell & Bozorgnia (1997)	0.47614	0.53780	0.66500	**0.82064**	0.95384
Average	0.48	0.54	0.69	**0.88**	1.05

Accelerations (g) Weighted for a 7.5 Magnitude

Attenuation Relationship	Return Period Evaluated				
	72	100	200	475	1000
Boore et al. (1997)	0.35374	0.41091	0.53340	**0.69925**	0.84914
Sadigh et al. (1997)	0.28404	0.32444	0.41336	**0.52657**	0.62890
Campbell & Bozorgnia (1997)	0.31921	0.36023	0.44734	**0.55377**	0.64540
Average	0.32	0.37	0.46	**0.59**	0.71



EXPLANATION

APPROXIMATE LOCATION OF MAJOR KNOWN FAULTS

San Andreas

EARTHQUAKE EPICENTERS

Location	Magnitude
⬡	5.0 - 5.9
⬡	6.0 - 6.9
⬡	7.0 - 7.9

APPROXIMATE LOCATION OF SUBJECT SITE

⊕

Compiled and modified from: Jennings (1994), Real et al. (1978), Yerkes (1985), Ziony and Jones (1989), and Shakal et al. (1994)

40 30 20 10 0 40 KILOMETERS

Approximate Scale 1 : 1,250,000

30 20 10 0 30 MILES

N

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

FAULT AND EARTHQUAKE EPICENTER LOCATION MAP

Job No.: 04-2023-4

Date: 7/22/04 | *Figure:* D1

MODIFIED MERCALLI SCALE, 1956 VERSION *

	Intensity	Effects	v† cm/s	g‡
M§	I.	Not felt. Marginal and long-period effects of large earthquakes(for details see text).		
3	II.	Felt by persons at rest, on upper floors, or favorably placed.		
	III.	Felt indoors. Hanging objects swing. Vibration like passing of light trucks. Duration estimated. May not be recognized as an earthquake.		0.0035-0.007
4	IV.	Hanging objects swing. Vibration like passing of heavy trucks; or sensation of a jolt like a heavy ball striking the walls. Standing motor cars rock. Windows, dishes, doors rattle. Glasses clink. Crockery clashes. In the upper range of wooden walls walls and frame creak.		0.007-0.015
	V.	Felt outdoors: direction estimated. Sleepers wakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset. Doors swing, close, open. Shutters, pictures move. Pendulum clocks stop, start, change rate.	1-3	0.015-0.035
5	VI.	Felt by all. Many frightened and run outdoors. Persons walk unsteadily. Windows, dishes, glassware broken. Kinickkacks, books, etc., off shelves. Pictures off walls. Furniture moved or overturned. Weak plaster and masonry D cracked. Small bells ring (church or school). Trees, bushes shaken (visibly, or heard to rustle - CFR).	3-7	0.035-0.07
6	VII.	Difficult to stand. Noticed by drivers of motor cars. Hanging objects quiver. Furniture broken. Damage to masonry D, including cracks. Weak chimneys broken at roof line. Fall of plaster, loose bricks, stones, tiles, cornices (also unbraced parapets and architectural ornaments - CFR). Some cracks in masonry C. Waves on ponds; water turbid with mud. Small slides and caving in along sand or gravel banks. Large bells ring. Concrete irrigation ditches damaged.	7-20	0.07-0.15
	VIII.	Steering from motor cars affected. Damage to masonry C; partial collaspe. Some damage to masonry B; none to masonry A. Fall of stucco and some masonry walls. Twisting, fall of chimneys, factory stacks, monuments, towers, elevated tanks, Frame houses moved on foundations if not bolted down, loose panel walls thrown out. Decayed piling broken off. Branches broken from trees. Changes in flow or temperature of springs and wells. Cracks in wet ground and on steep slopes.	20-60	0.15-0.35
7	IX.	General panic. Masonry D destroyed; masonry C heavely damaged, sometimes with complete collaspe; masonry B seriously damaged. (General damage to foundations - CFR.) Frame structures, if not bolted, shifted off foundations. Frames rocked. Serious damage to reserviors. Underground pipes broken. Conspicuous cracks in ground. In alluviated areas sand and mud ejected, earthquake fountains, sand craters.	60-200	0.35-0.7
8	X.	Most masonry and frame structures destroyed with their foundations. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes embankments. Large landslides. Water thrown on banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flat land. Rails slightly bent.	200-500	0.7-1.2
	XI.	Rails bent greatly. Underground pipelines completely out of service		>1.2
	XII.	Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into the air.	From Fig. 11.14	

NOTE: Masonry A, B, C, D. To avoid ambiguity of language, the quality of masonry, brick or otherwise, is specified by the following lettering (which has no connection to the conventional Class A, B, C construction).

- *Masonry A*: Good workmanship, mortar, and design; reinforced, especially laterally, and bound together by using steel, concrete, etc.; designed to resist lateral forces.
- *Masonry B*: Good workmanship and mortar; reinforced, but not designed to resist lateral forces.
- *Masonry C*: Ordinary workmanship and mortar; no extreme weaknesses such as non-tied-in corners, but masonry is neither reinforced nor designed against horizontal forces.
- *Masonry D*: Weak materials, such as adobe; poor mortar; low standard of workmanship; weak horizontally.

* From Richter (1958). Adapted with permission of W.H. Freeman and Company.

† Average peak ground velocity, cm/s.

‡ Average peak acceleration (away from source).

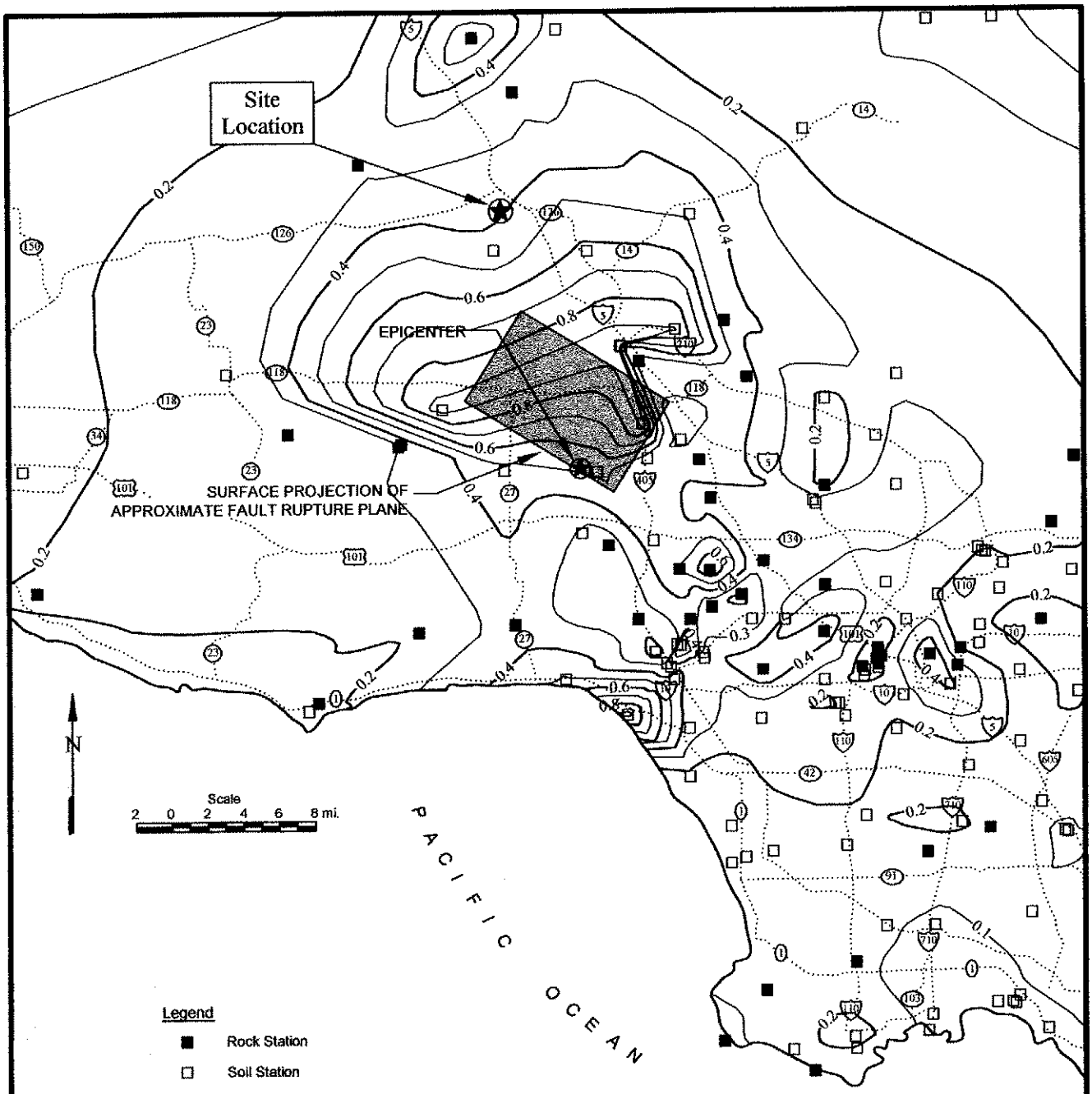
§ Magnitude correlation.

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

MODIFIED MERCALLI SCALE

Job No.: 04-2023-4

Date: 7/22/04 | *Figure:* D2



Note: Site classification was provided by the owner/agency except for USGS stations as discussed in Section 3.3.1. Sites were typically classified by surficial geology; however, USC stations were classified based on Seed et. al. (1976) in which surficial materials with V_s> 800 m/s are designated as "rock" sites.

Contours of maximum horizontal acceleration based on recordings at rock and soil sites during the January 17, 1994 Northridge Earthquake

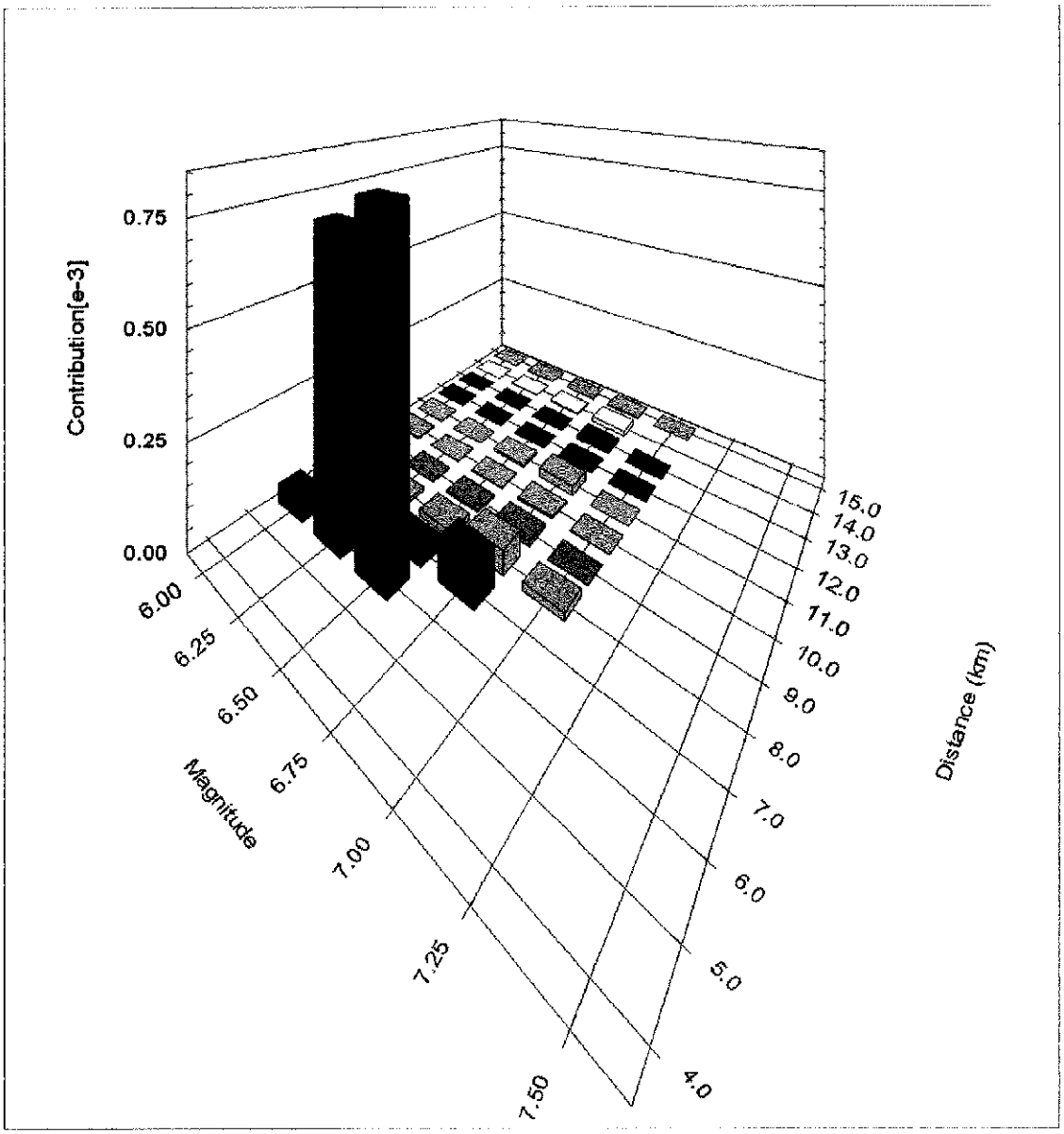
(Figure modified from Stewart et al., 1994)

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

NORTHRIDGE EARTHQUAKE ACCELERATIONS

Job No.: 04-2023-4

Date: 7/22/04 | *Figure:* D3



An earthquake with a magnitude of 6.5 and a distance of 6 km from the hypocenter is the most significant contributor to the hazard for the DBA (10% in 50 years)

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

MAGNITUDE/DISTANCE DEAGGREGATION OF HAZARD

Job No.: 04-2023-4

Date: 7/22/04 | *Figure:* D4

Appendix E

APPENDIX E

RECOMMENDED EARTHWORK SPECIFICATIONS

The following specifications are recommended to provide a basis for quality control during the placement of compacted fill or backfill as applicable.

1. Areas that are to receive compacted fill shall be observed by Allan E. Seward Engineering Geology, Inc. (AESGI) prior to the placement of fill.

2. All drainage devices shall be properly installed and observed by AESGI and/or owner's representative(s) prior to placement of backfill.

3. Fill soils shall consist of imported soils or on-site soils free of organics, cobbles, and deleterious material provided each material is approved by AESGI. AESGI shall evaluate and/or test the import material for its conformance with the report recommendations prior to its delivery to the site. The contractor shall notify AESGI 72 hours prior to importing material to the site.

4. Fill shall be placed in controlled layers (lifts), the thickness of which is compatible with the type of compaction equipment used. The fill materials shall be brought to optimum moisture content or above, thoroughly mixed during spreading to obtain a near uniform moisture condition and uniform blend of materials, and then placed in layers with a thickness (loose) not exceeding 8 inches. Each layer shall be compacted to a minimum compaction of 90% relative to the maximum dry density determined per the latest ASTM D1557 test. Density testing shall be performed by AESEGI to verify relative compaction. The contractor shall provide proper access and level areas for testing.

5. Rocks or rock fragments less than eight (8) inches in the largest dimension may be utilized in the fill, provided they are not placed in concentrated pockets, except rocks larger than four (4) inches shall not be placed within three (3) feet of finish grade.

   Rocks greater than eight (8) inches in largest dimension shall be taken offsite, or placed in accordance with the recommendation of the Soils Engineer in areas designated as suitable for rock disposal.

6. Where space limitations do not allow for conventional fill compaction operations, special backfill materials and procedures may be required. Pea gravel or other select

APPENDIX E

fill can be used in areas of limited space. A sand and portland cement slurry (2 sacks per cubic-yard mix) shall be used in limited space areas for shallow backfill near final pad grade, and pea gravel shall be placed in deeper backfill near drainage systems.

7. AESGI shall observe the placement of fill and conduct in-place field density tests on the compacted fill to check for adequate moisture content and the required relative compaction. Where less than specified relative compaction is indicated, additional compacting effort shall be applied and the soil moisture conditioned as necessary until adequate relative compaction is attained.

8. The Contractor shall comply with the minimum relative compaction out to the finish slope face of fill slopes, buttresses, and stabilization fills as set forth in the specifications for compacted fill. This may be achieved by overbuilding the slope and cutting back as necessary.

9. Any abandoned underground structures such as cesspools, cisterns, mining shafts, tunnels, septic tanks, wells, pipelines or others not discovered prior to grading are to be removed or treated to the satisfaction of the Soils Engineer and/or the controlling agency for the project.

10. The Contractor shall have suitable and sufficient equipment during a particular operation to handle the volume of fill being placed. When necessary, fill placement equipment shall be shut down temporarily in order to permit proper compaction of fills, correction of deficient areas, or to facilitate required field testing.

11. The Contractor shall be responsible for the satisfactory completion of all earthwork in accordance with the project plans and specifications.

12. Final reports shall be submitted after completion of earthwork and after the Soils Engineer and Engineering Geologist have finished their observations of the work. No additional excavation or filling shall be performed without prior notification to the Soils Engineer and/or Engineering Geologist.

13. Whenever the words "supervision", "inspection" or "control" are used, they shall mean <u>observation</u> of the work and/or testing of the compacted fill by AESEGI to assess whether substantial compliance with plans, specifications and design concepts has been achieved, and does not include direction of the actual work of the contractor or the contractor's workmen.

APPENDIX E

RECOMMENDED SPECIFICATIONS FOR PLACEMENT OF TRENCH BACKFILL

1. Trench excavations to receive backfill shall be free of trash, debris or other unsatisfactory materials prior to backfill placement, and shall be observed by Allan E. Seward Engineering Geology, Inc. (AESEGI) representative.

2. Except as stipulated herein, soils obtained from the excavation may be used as backfill if they are essentially free of organics and deleterious materials.

   Rocks generated from the trench excavation not exceeding three (3) inches in largest dimension may be used as backfill material. However, such material may not be placed within 12 inches of the top of the pipeline. No more than 30 percent of the backfill volume shall contain particles larger than 1 ½ inches in diameter, and rocks shall be well mixed with finer soil.

3. Soils (other than aggregates) with a Sand Equivalent (SE) greater than or equal to 30, as determined by ASTM D 2419 Standard Test Method or at the discretion of the engineer or representative in the field, may be used for bedding and shading material in the pipe zone areas. These soils are considered satisfactory for compaction by jetting procedures.

4. No jetting will be permitted in utility trenches within the top 2 feet of the subgrade of concrete slabs-on-grade.

5. Trench backfill other than bedding and shading shall be compacted by mechanical methods as tamping sheepsfoot, vibrating or pneumatic rollers or other mechanical tampers to achieve the density specified herein. The backfill materials shall be brought to optimum moisture content or above, thoroughly mixed during spreading to obtain a near uniform moisture condition and uniform blend of materials, and then placed in horizontal layers with a thickness (loose) not exceeding 8 inches. Trench backfills shall be compacted to a minimum compaction of 90 percent relative to the maximum dry density determined per the latest ASTM D1557 test.

6. The contractor shall select the equipment and process to be used to achieve the specified density without damage to the pipeline, the adjacent ground, existing improvements or completed work.

APPENDIX E

7. Observations and field tests shall be carried on during construction by AES to confirm that the required degree of compaction has been obtained. Where compaction is less than that specified, additional compaction effort shall be made with adjustment of the moisture content as necessary until the specified compaction is obtained. Field density tests may be omitted at the discretion of the engineer or his representative in the field.

8. Whenever, in the opinion of AESGI or the Owner's Representative(s), an unstable condition is being created, either by cutting or filling, the work shall not proceed until an investigation has been made and the excavation plan revised, if deemed necessary.

9. Fill material shall not be placed, spread, or rolled during unfavorable weather conditions. When the work is interrupted by heavy rain, fill operations shall not be resumed until field tests by AES indicate the moisture content and density of the fill are as specified.

10. Whenever the words "supervision", "inspection", or "control" are used, they shall mean observation of the work and/or testing of the compacted fill by AESEGI to assess whether substantial compliance with plans, specifications and design concepts has been achieved.

DRAINAGE AND EROSION CONTROL RECOMMENDATIONS

Slopes and pads on this project were designed to direct surficial runoff away from structures and reduce water-induced surficial erosion/sloughing. Permanent erosion control measures should be initiated immediately following completion of grading. All constructed slopes will undergo some erosion when subjected to sustained water influx. To maintain appropriate long-term drainage and erosion control, the following points should be considered in slope protection, landscaping, irrigation and modifications to slopes, pads and structures:

1. All interceptor ditches, drainage terraces, down-drains and any other drainage devices should be maintained and kept clear of debris. A qualified Engineer should review any proposed additions or revisions to these systems, to evaluate their impact on slope erosion.

APPENDIX E

2. Retaining walls should have adequate freeboard to provide a catchment area for minor slope erosion. Periodic inspection, and if necessary, cleanout of deposited soil and debris should be performed; particularly during and after periods of rainfall.

3. The future developers should be made aware of the **potential problems**, which may develop **when drainage is altered** through landscaping and/or construction of retaining walls, and paved walkways. Ponded water, water directed over slope faces, leaking irrigation systems, **overwatering** or other conditions which could lead to excessive soil moisture, **must be avoided**.

4. Slope surficial soils may be subject to water-induced mass erosion. Therefore, a suitable proportion of slope planting should have root systems, which will develop well below three feet. We suggest consideration of drought-resistant shrubs and low trees for this purpose. Intervening areas can then be planted with lightweight surface plants with shallower root systems. All plants should be lightweight and require low moisture. Any loose slough generated during the process of planting should be properly removed from the slope face(s).

5. Construction delays, climate/weather conditions, and plant growth rates may be such that additional short-term, nonplant erosion control measures may be needed; examples would be matting, netting, plastic sheets, deep (5-feet) staking, etc.

6. Major erosion can be initiated by seemingly insignificant events; rodent burrowing, human trespass (footprints, etc.), small concentrations of uncontrolled surface/subsurface water; or poor compaction of utility trench backfill on slopes.

7. High and/or fluctuating water content in slope materials is a major factor in slope erosion and/or slope failures. Therefore, all possible precautions should be taken to maintain a moderate and uniform soil moisture. Slope irrigation systems should be properly operated and maintained and system controls should be placed under strict control.

APPENDIX E

EROSION CONTROL REFERENCES

1. "Slope Protection for Residential Developments", National Academy of Sciences, Washington D.C. (1969).

2. "Guide for Erosion and Debris Control in Hillside Areas", Department of Building and Safety, City of Los Angeles. (1970).

3. "Slope Stability Report", Orange County Department of Building and Safety (1973).

4. "Guides for Erosion and Sediment Control", Soil Conservation Service, Davis, California, U.S. Department of Agriculture (1977).

5. "Rain-Care and Protection of Hillside Homes", brochure undated, published by Building and Safety Division, Los Angeles County Engineer.

6. "Guidelines for Erosion and Sediment Control Planning and Implementation: Office of Research and Monitoring", U.S. Environmental Protection Agency (1972).

7. "Resource Conservation Glossary", Soil Conservation Society of America (1970).

8. "Standards and Specifications for Soil Erosion and Sediment Control Developing Areas", Soil Conservation Service, U.S. Department of Agriculture (1975).

9. "Homeowners Guide for Debris and Erosion Control", Los Angeles County Flood Control District (undated).

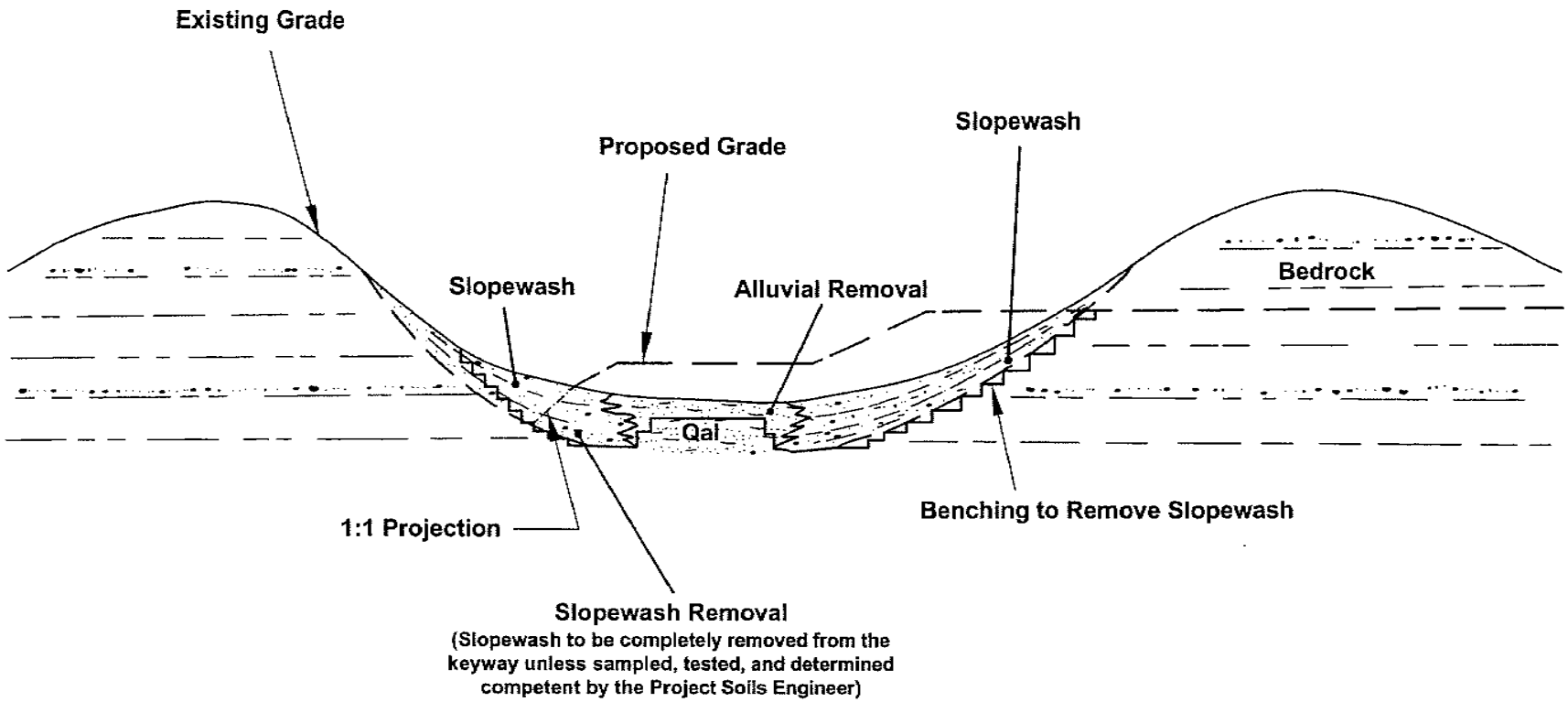
10. "Grading Guidelines (8 pages, stapled sheets)", Building and Safety Division, Department of County Engineer, County of Los Angeles (undated, but probably about 1977).

11. "Biotechnical Slope Protection and Erosion Control", Donald H. Gray and Andrew T. Leiser, Robert E. Krieger Publishing Company, Malabuv, Florida, 1989.

APPENDIX E

CONSTRUCTION DIAGRAMS

Schematic Alluvial/Slopewash Detail	Figure E1
Fill Over Natural Slope	Figure E2
Cut Lot (Transitional) and Cut-Fill Lot (Transitional)	Figure E3
Rock Disposal Windrows	Figure E4
Fill Slope Over Natural Slope	Figure E5
Fill Slope Toeing Out on Flat Alluviated Canyon	Figure E6
Stability/Buttress Fill and Backdrain Detail	Figure E7
Typical Fill Above Cut-Slope	Figure E8
Subdrain Detail	Figure E9
Debris Flow Hazard Control Devices	Figure E10
Typical Canyon Subdrain Outlet	Figure E11



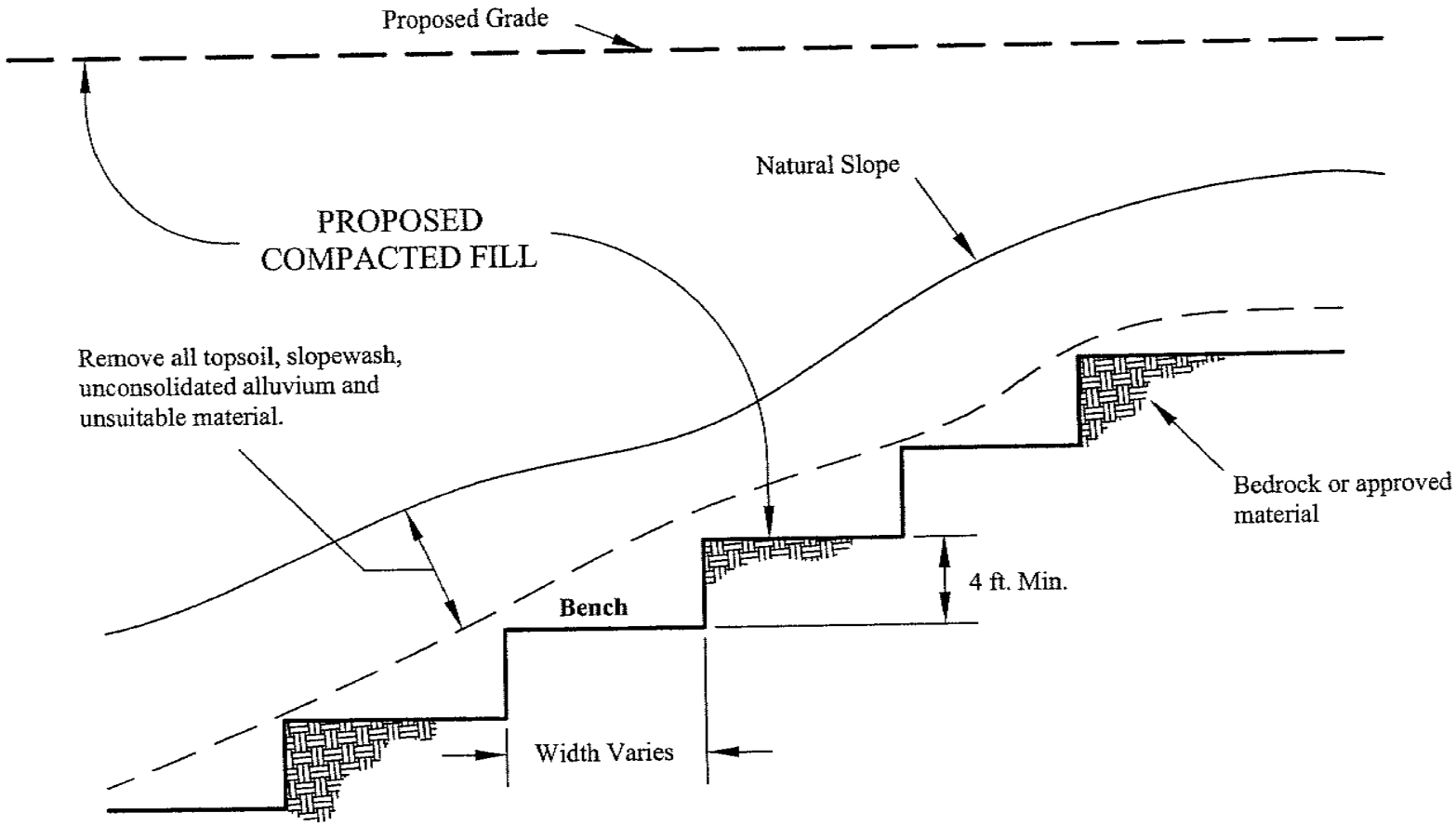
Note: Not to Scale

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

SCHEMATIC ALLUVIAL/ SLOPEWASH DETAIL

Job No.: 04-2023-4

Date: 7/22/04 | *Figure:* E1



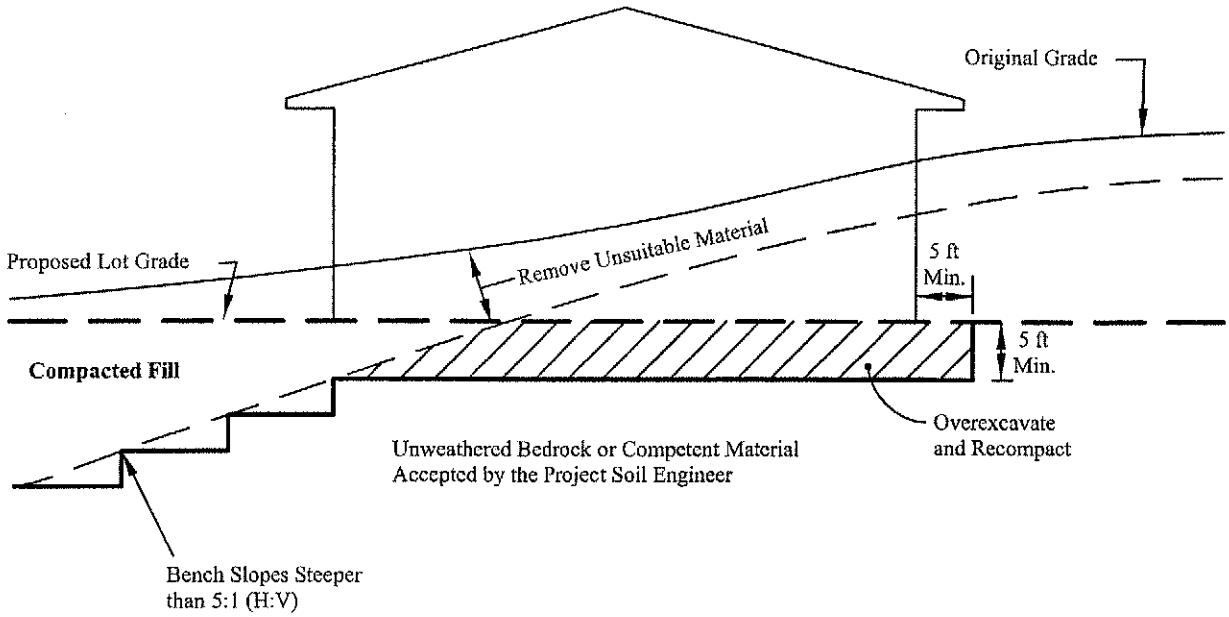
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

FILL OVER NATURAL SLOPE 5:1 OR STEEPER

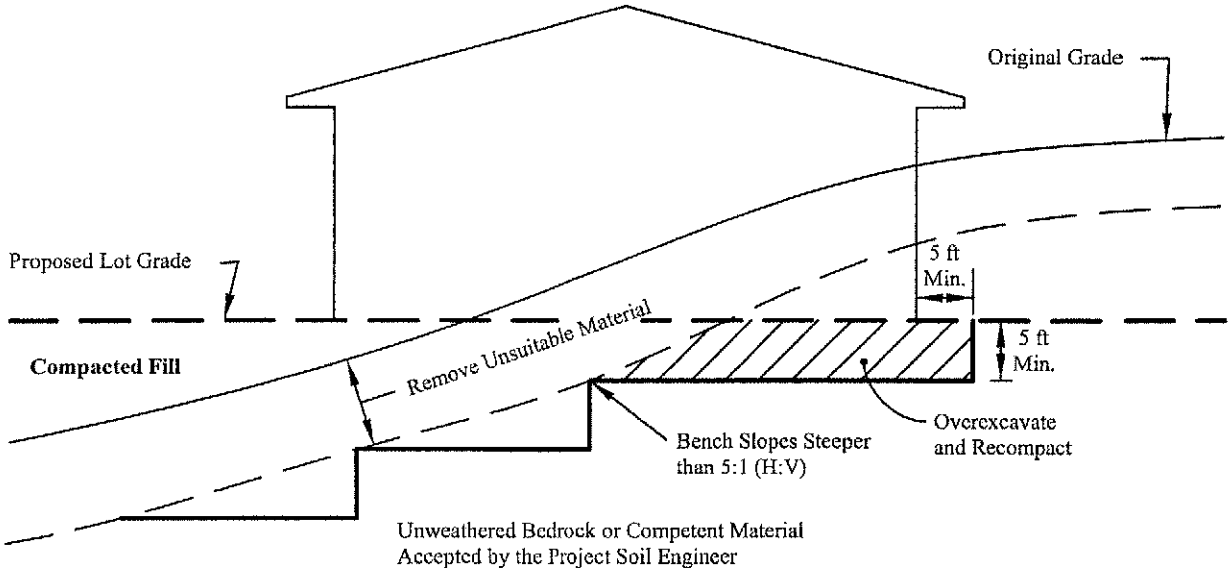
Job No.: 04-2023-4

Date: 7/22/04 | *Figure:* E2

Cut Lot



Cut Fill Lot



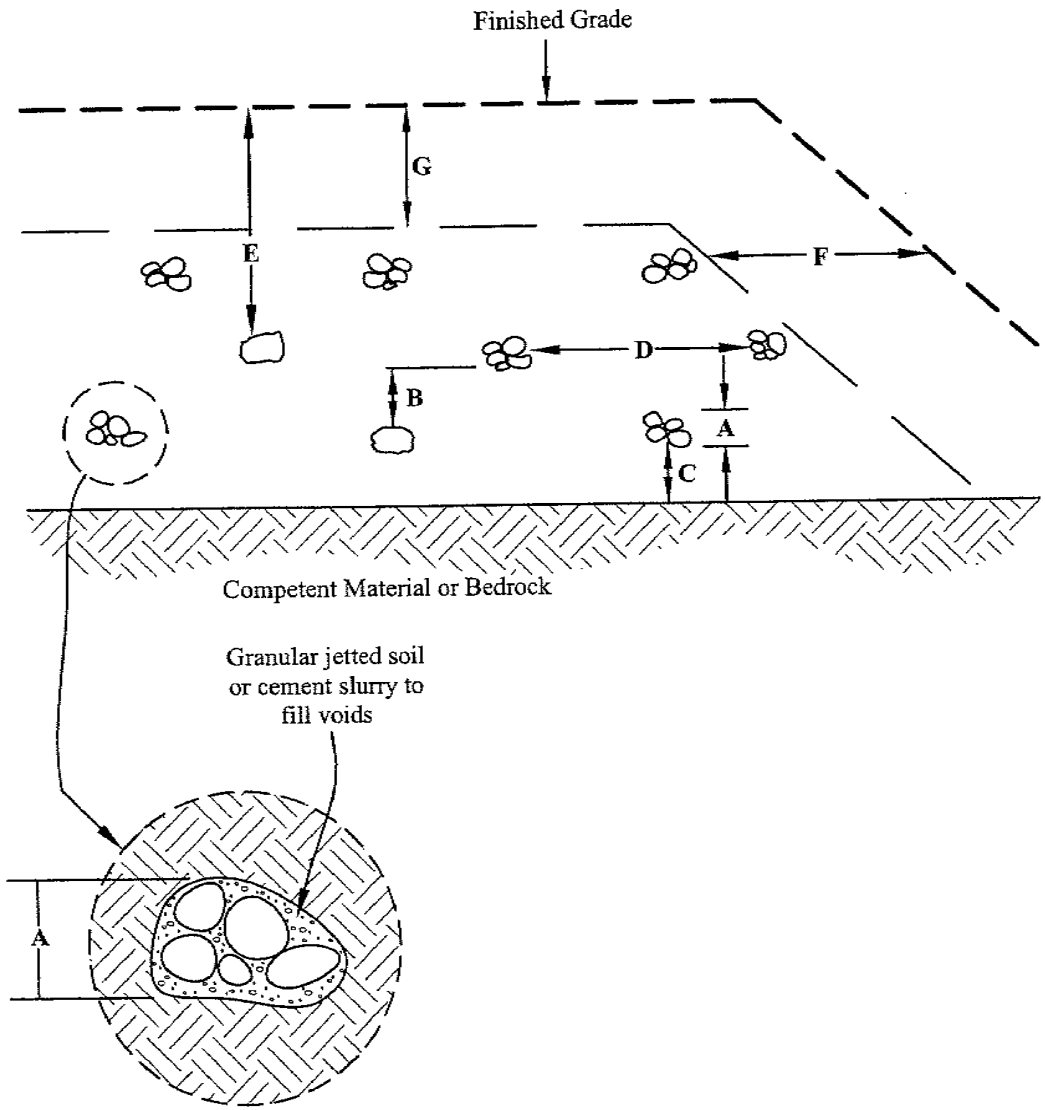
NOTE: Deeper Overexcavation and/or Additional Foundation Reinforcement may be Required by the Soils Engineer in Steep Cut/Fill Transition Areas (See Text)

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

CUT LOT AND CUT FILL LOT(TRANSITIONAL)

Job No.: 04-2023-4

Date: 7/22/04 | *Figure:* E3



EXPLANATION

A) ±4 ft, Height and Width may vary depending on rock size

B) Minimum of 4 ft from stagger windrow

C) Minimum of 5 ft from first set of windrow to competent material or bedrock

D) Minimum of 15 ft between windrows

E) Minimum of 23 ft from oversized rocks (> 4 ft in its largest dimension) to finished subgrade;all oversized rocks must be individually placed

F) Minimum of 25 ft from projected windrow area to finished subgrade

G) Minimum of 15 ft to clear for foundations and pools or 5 ft below the deepest adjacent utility trench, whichever is deepest

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

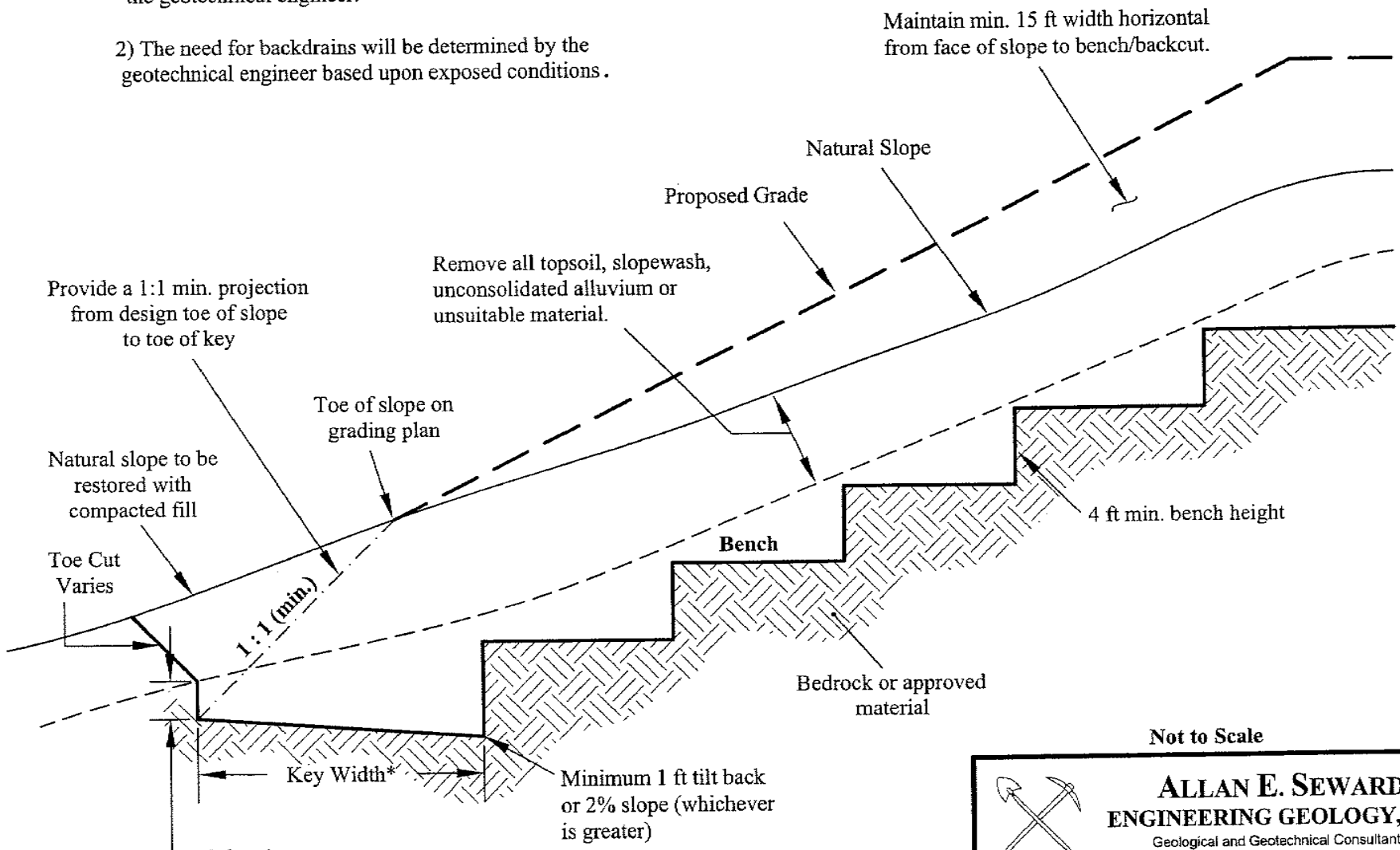
ROCK DISPOSAL (WINDROWS)

Job No.: 04-2023-4

Date: 7/22/04 | *Figure:* E4

NOTE: 1) Where the natural slope approches or exceeds the design slope ratio, special recommendations will be provided by the geotechnical engineer.

2) The need for backdrains will be determined by the geotechnical engineer based upon exposed conditions.



*Keyway width in competent material minimum of 15 ft or as recommended by the Geotechnical Engineer.

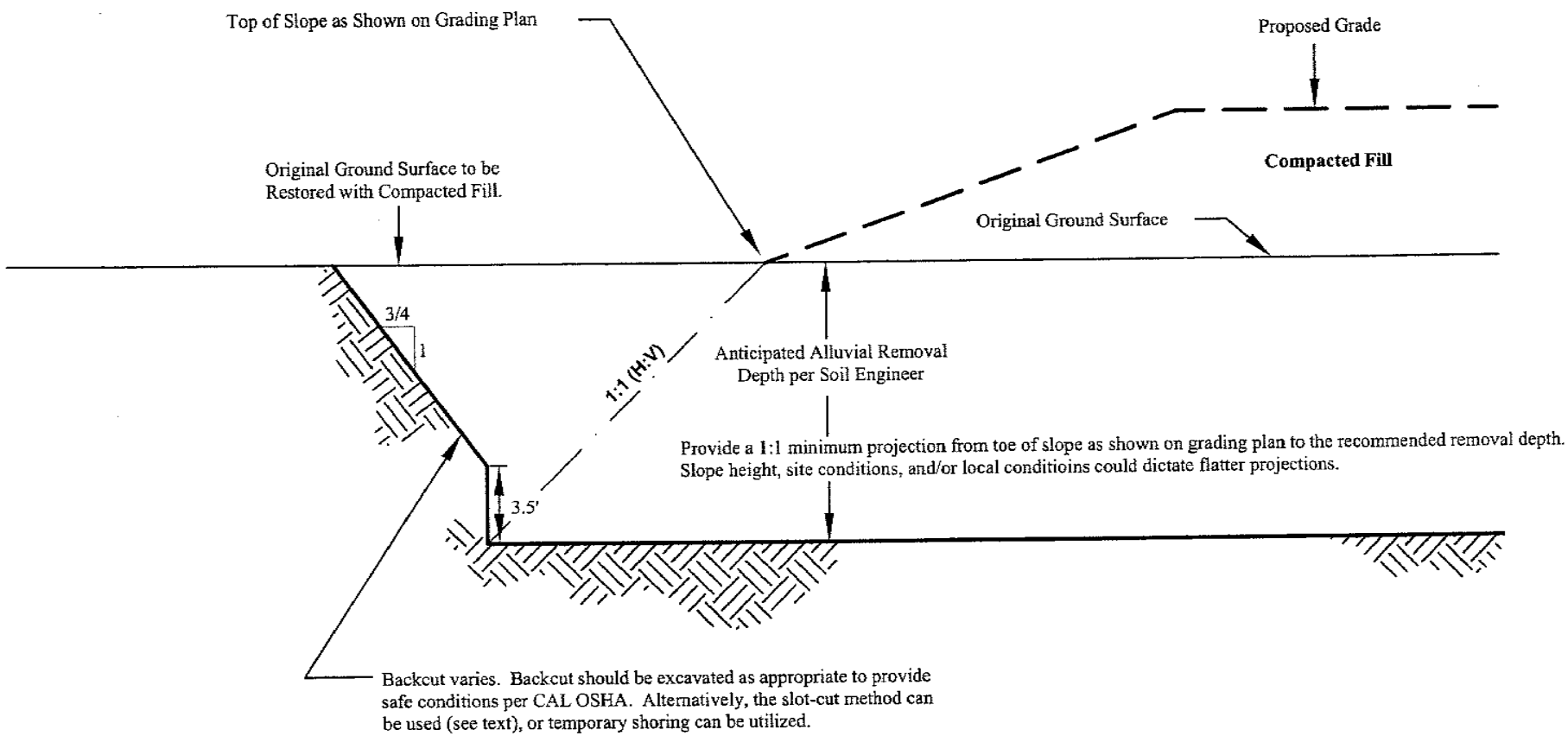
Not to Scale

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

FILL SLOPE OVER NATURAL SLOPE
5:1 OR STEEPER

Job No.: 04-2023-4

Date: 7/22/04 | *Figure:* E5



ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

FILL SLOPE TOEING OUT ON FLAT ALLUVIATED CANYON

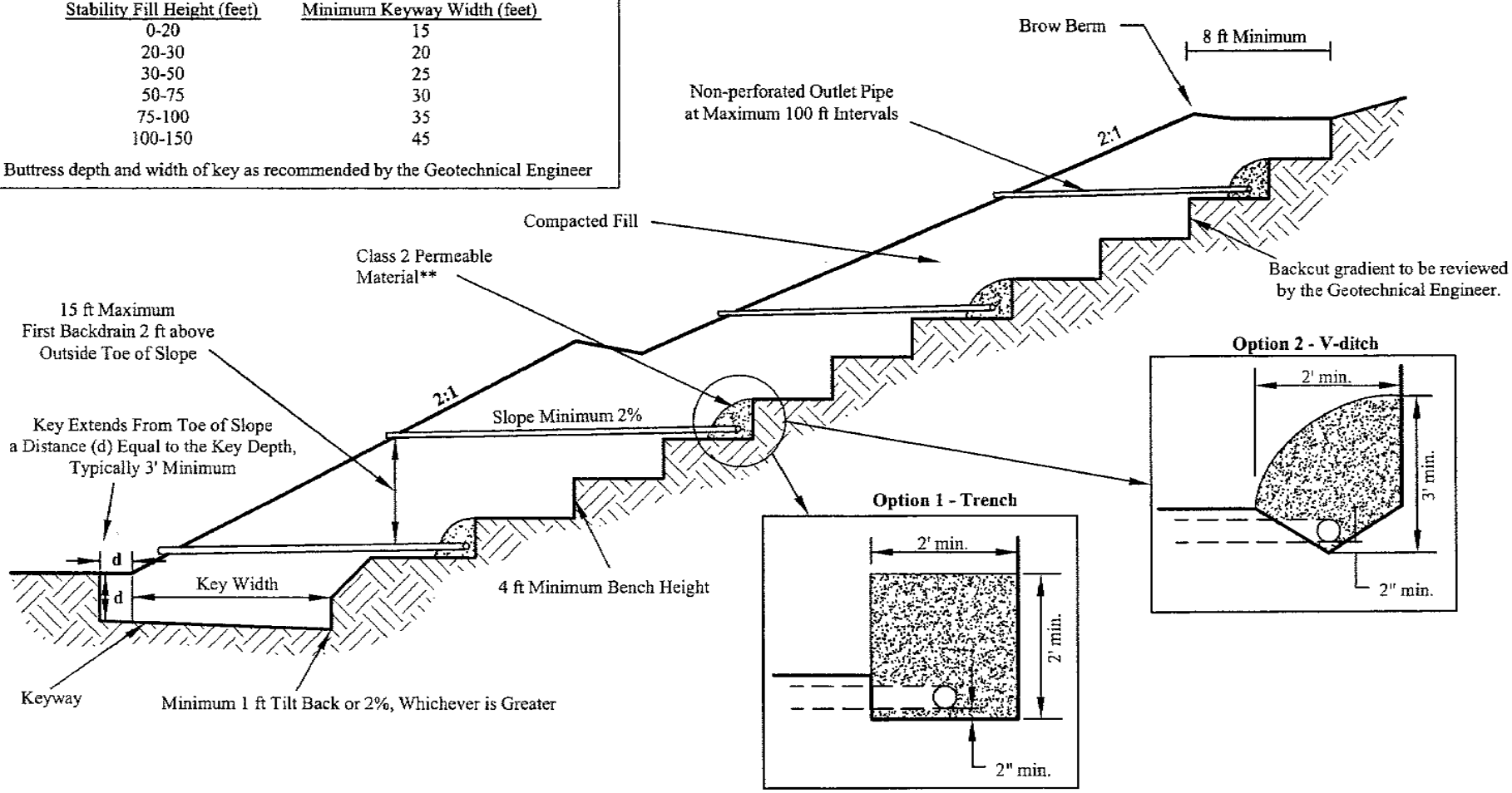
Job No.: 04-2023-4

Date: 7/22/04 | *Figure:* E6

Standard Keyway Width vs. Slope Height for Stability Fill

Stability Fill Height (feet)	Minimum Keyway Width (feet)
0-20	15
20-30	20
30-50	25
50-75	30
75-100	35
100-150	45

Buttress depth and width of key as recommended by the Geotechnical Engineer



All backdrains and outlet pipes to be 4" diameter PVC pipe (SDR 35 or Schedule 40); Backdrain Perforations positioned down; Upper ends of backdrains to be sealed with an approved cap.

**Specifications for CalTrans Class 2 Permeable Material

U.S. Standard Sieve Size	% Passing
1"	100
3/4"	90-100
3/8"	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

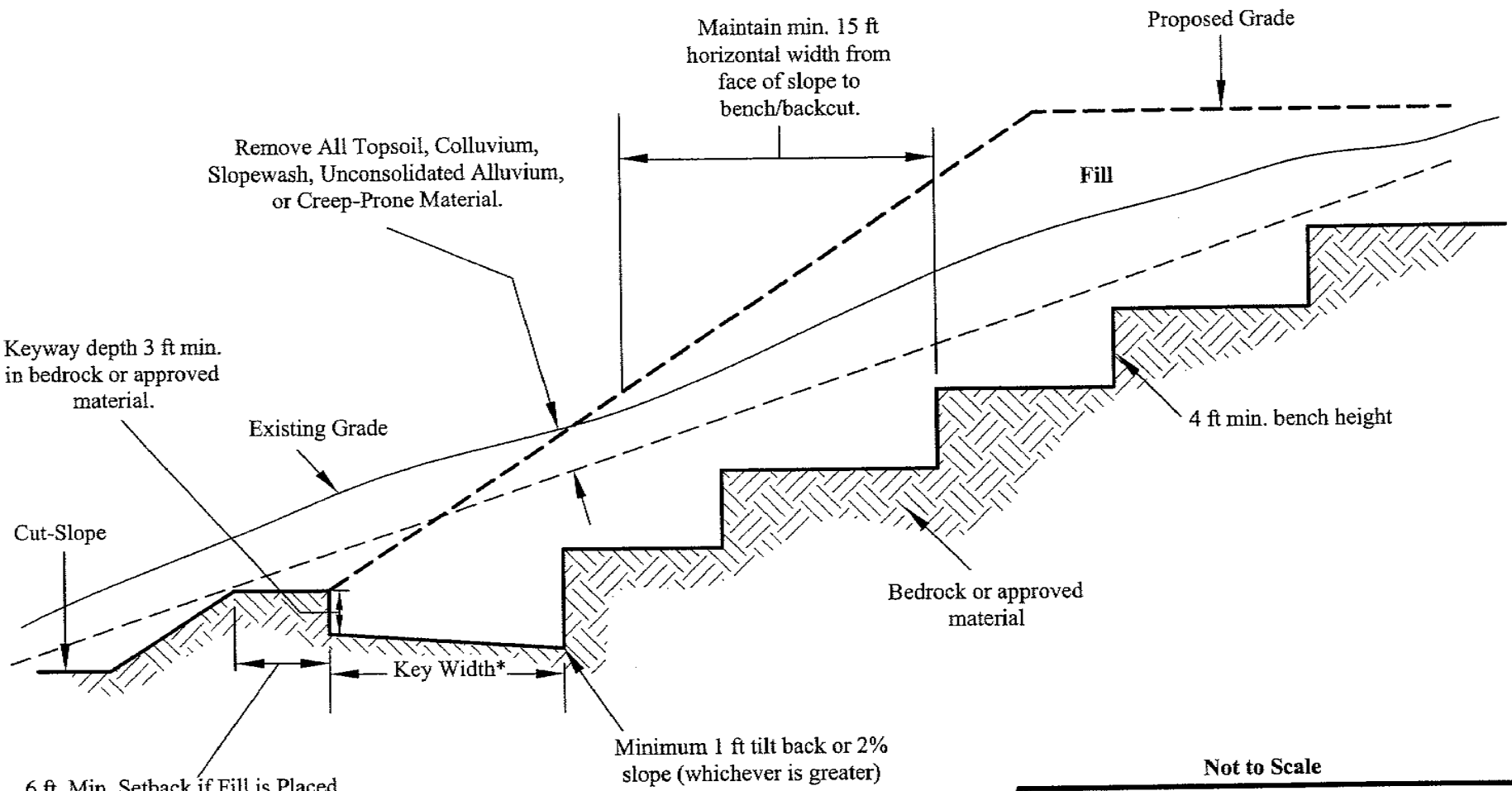
Sand Equivalent >75

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

STABILITY/BUTTRESS FILL AND BACKDRAINS

Job No.: 04-2023-4

Date: 7/22/04 | *Figure:* E7



*Keyway width in competent material minimum of 15 ft. or as recommended by Geotechnical Engineer.

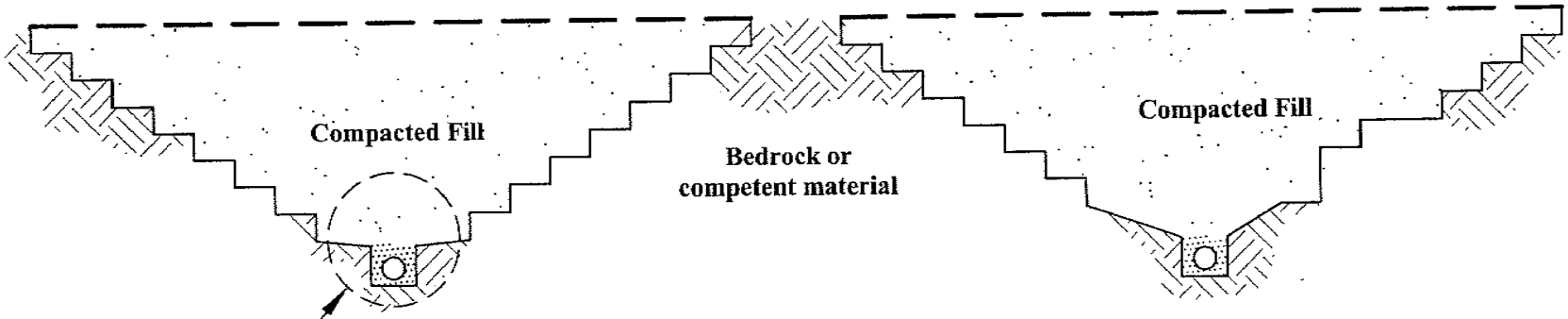
Not to Scale

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

TYPICAL FILL ABOVE CUT-SLOPE

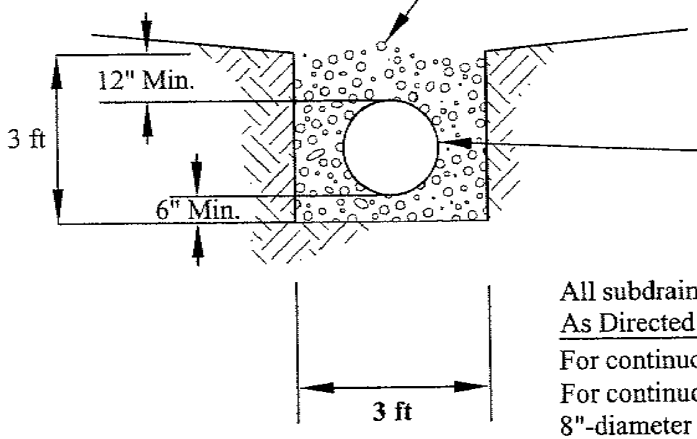
Job No.: 04-2023-4

Date: 7/22/04 | *Figure:* E8



See enlargement below (typ.)

9 cubic feet per linear foot of perforated pipe of Class 2 Permeable material as specified in Sec. 68-1.025 of the State of California, Dept. of Transportation Standard Spec.



All subdrains to be PVC pipe (SDR 35 or Schedule 40)

As Directed by the Soils Engineer:

For continuous run up to 500 ft, use 6"-diameter pipe
For continuous run in excess of 500 ft, use 8"-diameter pipe
For continuous run in excess of 1500 ft, use 10"-diameter pipe

Notes:

Downstream 20 feet minimum of pipe at outlet shall be non-perforated.
Drain pipe perforations shall be 1/4" diameter open holes in two rows along the bottom quarter of pipe.
Center to center spacing between perforations in each row shall not exceed 12 inches.
Subdrain perforations positioned down.
Remove all unsuitable material before placing any fill.
Upslope end of pipe should be capped with an approved cap*.
Minimum 2% gradient.

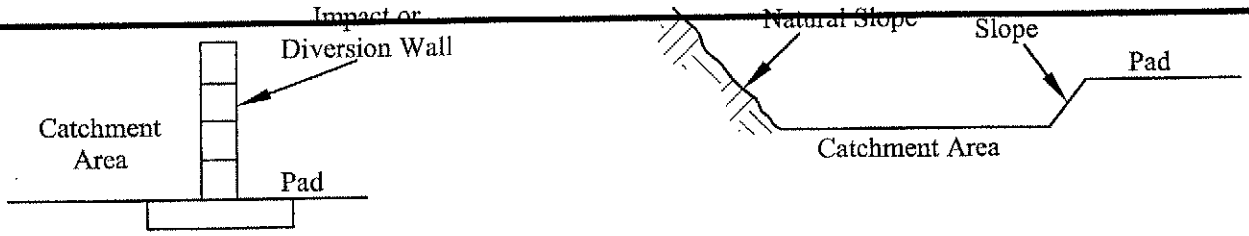
* Endpoints and long runs should be surveyed

Not to scale

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

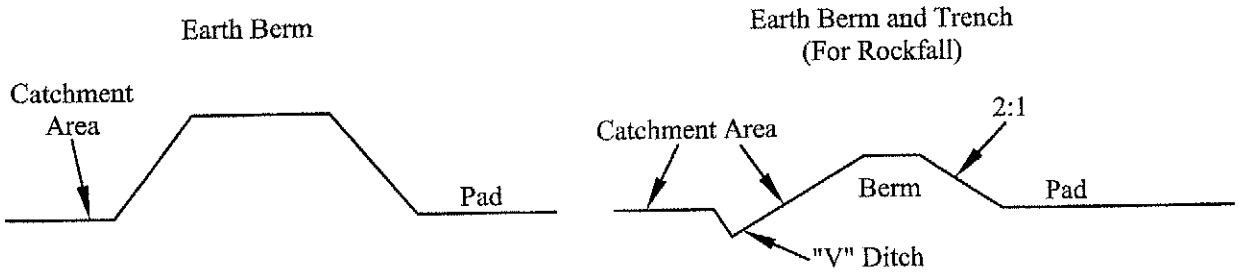
CANYON SUBDRAIN DETAIL

Job No.: 04-2023-4	
Date: 7/22/04	*Figure:* E9

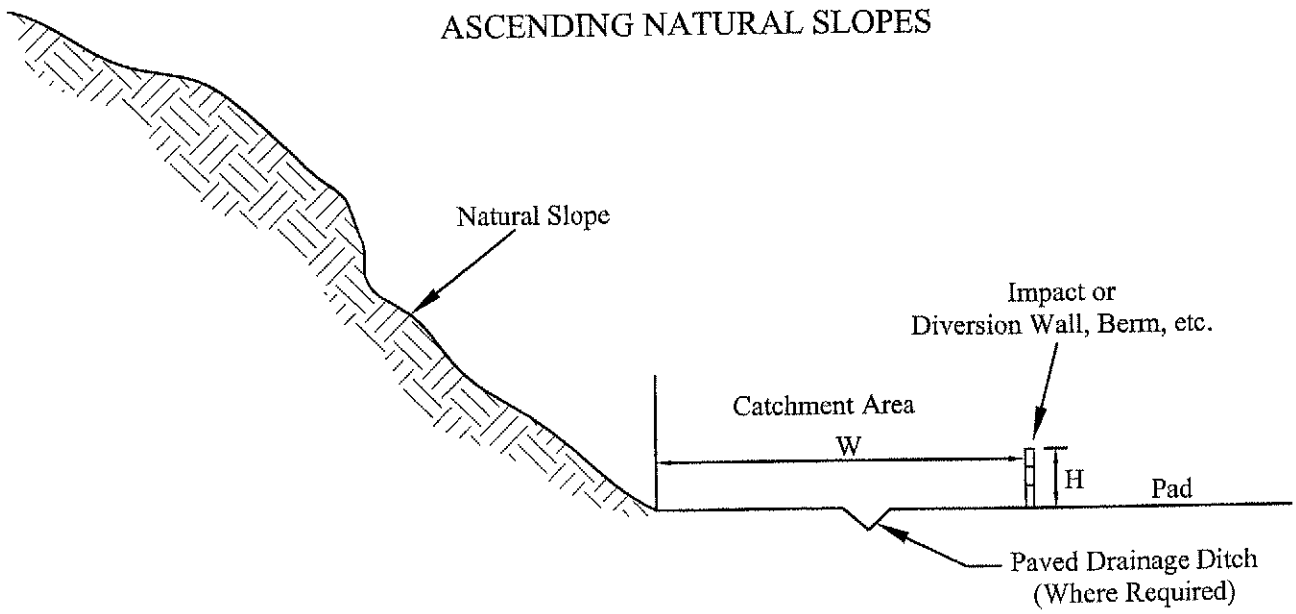


NOTE: Not to scale

ALTERNATIVE DEBRIS CONTROL DEVICES



ASCENDING NATURAL SLOPES



NOTE: W and H will vary according to natural slope height, gradient, and material

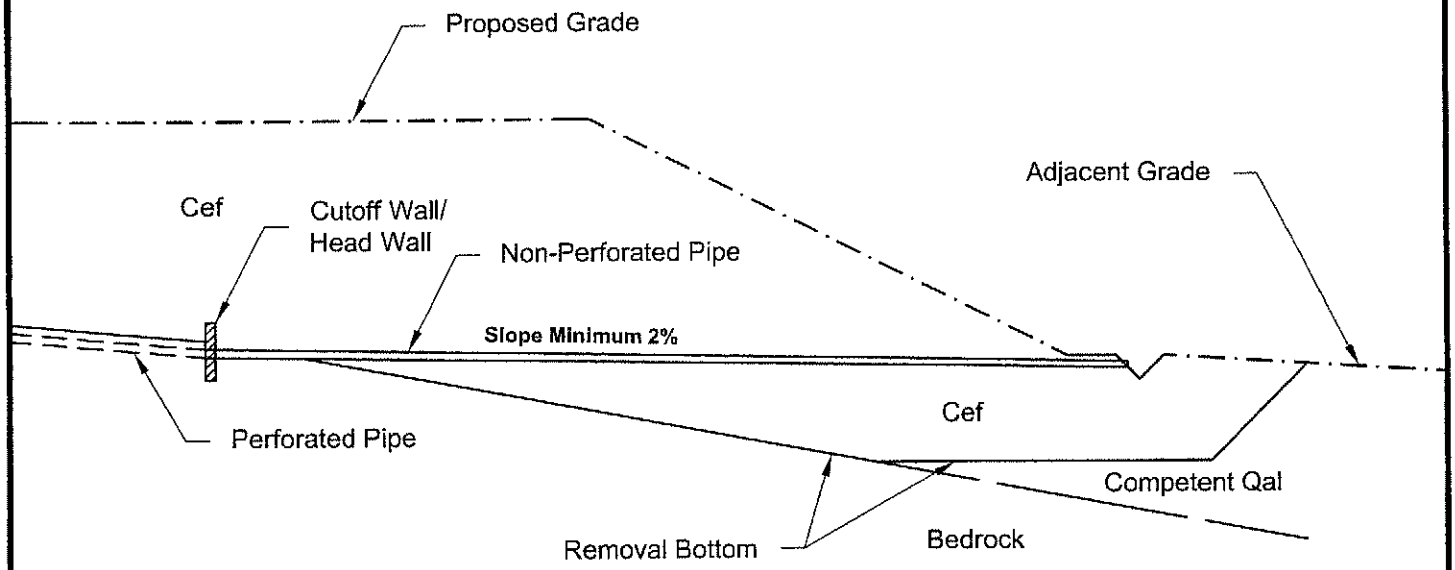
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

DEBRIS FLOW HAZARD CONTROL DEVICES

Job No.: 04-2023-4	
Date: 7/22/04	*Figure:* E10

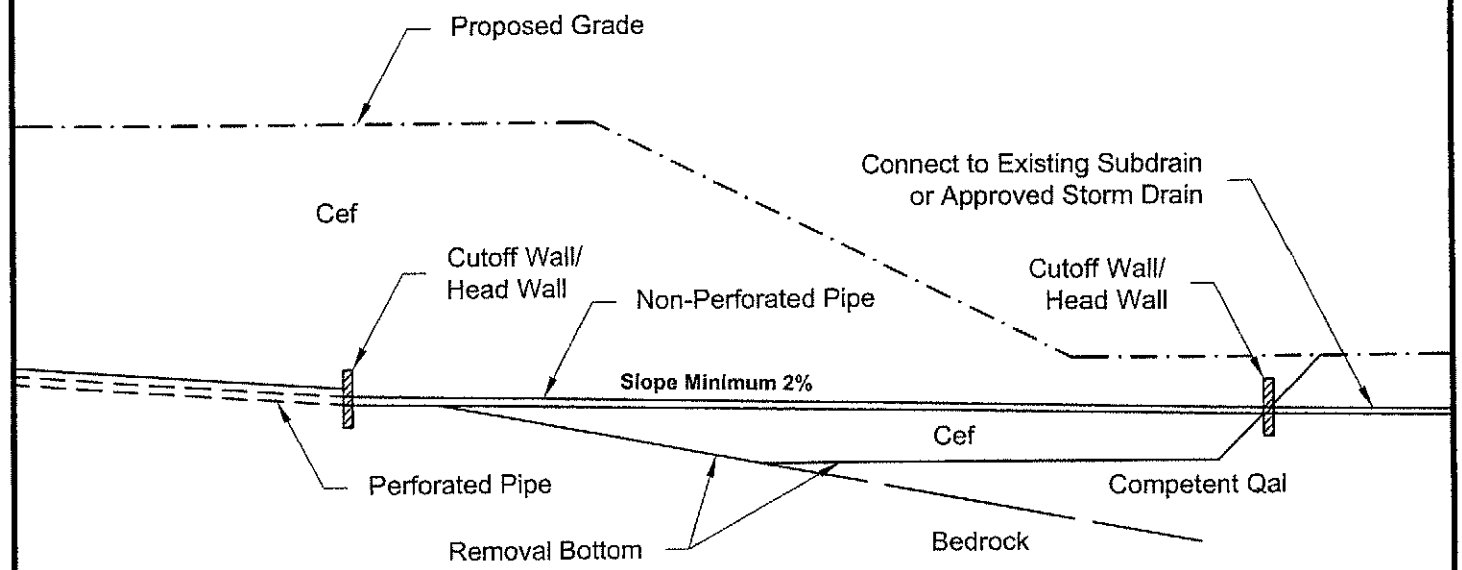
CASE I

Subdrain Daylights at Toe of Slope



CASE II

Subdrain Connects to Existing Subdrain or Storm Drain



Cef - Compacted fill to 90% or 93% or 95% of laboratory maximum, depending upon Soil Engineer's requirements.

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

TYPICAL CANYON SUBDRAIN OUTLET

Job No.: 04-2023-4

Date: 7/22/04 | *Figure:* E11

MINIMUM FOUNDATION AND SLAB RECOMMENDATIONS FOR EXPANSIVE SOILS
(ONE-, TWO-, AND THREE-STORY BUILDINGS)

Minimum Residential Footing Recommendations

Expansion Classification (UBC)	Expansion Index (UBC)	Footing Depths (inches)				Continuous Footing Reinforcement
		One and Two Stories		Three Stories		
		Perimeter	Interior	Perimeter	Interior	
Very Low	0 to 20	18	12	24	18	Per structural requirements
Low	21 to 50	18	12	24	18	One # 4 Rebar Top and Bottom
Medium	51 to 90	24	18	30	24	One # 4 Rebar Top and Bottom
High	91 to 130	30	18	36	30	Two # 4 Rebars Top and Bottom

- Minimum footing widths: 12 inches (one-story); 15 inches (two-story); 18 inches (three-story); 24 inches for individual columns.
- All footing depths are measured below lowest adjacent final grade.
- The base of the garage door grade beam should be at the same elevation as that of the adjoining footings.
- Garage slabs should be isolated from stem wall footings with a minimum 3/8" felt expansion joint.
- Isolated exterior structural column footings should be tied back to the main foundation system in at least two (2) orthogonal directions (conventional foundations only).

Minimum Residential Slab Recommendations

Expansion Classification (UBC)	Expansion Index (UBC)	*Slab Subgrade* Presoaking	*Slab Reinforcement*		*Minimum* Slab Thickness (Ref: PCA)
			Option 1	Option 2	
Very Low	0 to 20	None	#3 Rebar at 24" each way	6-#6 gauge, 10"x10" welded wire mesh or equivalent	4 inches
Low	21 to 50	120 percent of optimum moisture content[1] to 18 inches depth	#3 Rebar at 18" each way		
Medium	51 to 90	130 percent of optimum moisture content to 18 inches depth	#4 Rebar at 18" each way	#6-#6 gauge, 6"x6" welded wire mesh or equivalent	5 inches
High	91 to 130	140 percent of optimum moisture content to 24 inches depth	#4 Rebar at 14" each way		6 inches

- Concrete for floor slabs should conform to the requirements contained in Chapter 19 of the 1997 edition of the Uniform Building Code.

Minimum Residential Slab Recommendations continued on back of this page

[1] Optimum moisture content as determined by ASTM D1557 Test Method on subgrade soils.

MINIMUM FOUNDATION AND SLAB RECOMMENDATIONS FOR EXPANSIVE SOILS
(ONE-, TWO-, AND THREE-STORY BUILDINGS)

Minimum Residential Slab Recommendations (continued from front side of this page)

- Sand base should have a Sand Equivalent of 30 or greater (e.g., washed concrete sand).
- Interior area slabs, except garages may be tied to the footings as directed by the Structural Engineer. For Medium and High Expansion Potential subgrades, dowels of No. 3 bars should be placed at 36 inches on centers in the footings and bent 3 feet into the slab.
- It has been observed that welded wire-fabric reinforcement seldom stays at the design height within concrete slabs. We recommend the use of No. 3 reinforcing bars instead of 6x6-10/10 WWF and No. 4 reinforcing bars instead of 6x6-6/6 WWF at the center spacings indicated above.
- Vapor barrier for slabs-on-grade: A sheet of 10-mil visqueen sandwiched between two, 2-inch layers of compacted sand. The vapor barrier must be properly lapped and/or sealed, and sealed around all plumbing structures and other openings. Care should be taken to avoid punctures in the vapor barrier resulting from sharp objects in the subgrade and/or structures. Equivalents are acceptable.
- To reduce moisture intrusion beneath slabs on grade, utility trenches should be backfilled with lean concrete or concrete slurry at foundation perimeters. The plug shall be under the full width of the footing and be extended along a minimum of 24-inch of trench length below the slab.
- Materials from foundation and/or utility trench excavations should not be spread on slab-on-grade areas unless it is compacted and tested.
- Foundation excavations should be observed by a representative of this firm prior to placement of forms, reinforcement, or concrete, to verify that the excavations are embedded to the recommended depth into the recommended material. The excavations should be moisture-conditioned and free of all loose or sloughed material prior to placement of concrete.
- Foundations and floor slabs supported on subsoils with an expansion index greater than 130 should be individually engineered based on actual details of the foundation system.

Post-Tensioned Slabs

As an alternative to conventional foundations, buildings may be supported on post-tensioned slabs, to be designed by a structural engineer in consultation with the geotechnical engineer. In addition, a post-tensioned slab is also recommended for VERY HIGH expansion potential soils (Expansion Index greater than 130), if encountered. Post-tensioned slabs should have footings embedded a minimum of 12 inches below the lowest adjacent grade. The slabs should be designed so that they can be deformed approximately 1 inch vertically over a width of 30 feet without distress in the event of shrinkage or swelling of the supporting soils. The slab should be underlain by a vapor barrier sandwiched between two, 2-inch layers of compacted sand.

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

GEOLOGIC AND GEOTECHNICAL REPORT

Review of Vesting Tentative Tract Map (Dated June 14, 2004)

Vesting Tentative Tract 61105

Mesas East

Newhall Ranch, California

VOLUME IV OF VI

Prepared for:

The Newhall Land and Farming Company
23823 West Valencia Boulevard
Valencia, California 91355

Job No: 04-2023-4
Dated July 22, 2004

27825 Smyth Drive, Valencia, California 91355 661-294-0065 FAX 661-294-0833

Appendix F

APPENDIX F

SLOPE STABILITY ANALYSES

General

Analyses were performed to evaluate the stability of proposed cut and fill slopes, critical natural slopes proposed to remain adjacent to the development and landslide areas which may impact the proposed development. The stability analyses utilized cross sections constructed to illustrate critical structural geometries and maximum slope heights for each analyzed slope. Our evaluation included gross and surficial stability and static and pseudostatic (i.e. with an imposed pseudostatic simulated load) conditions were considered for gross stability. Based on our analyses, the need for stabilization measures was explored and dimensional design of these measures was performed, as needed, in a step-by-step fashion utilizing computer-based numerical slope stability analyses. The results of our stability analyses are summarized in **Table F1** along with slope parameters and recommended mitigations. Slope stability diagrams graphically illustrating the results of our analyses for each cross section are attached for review. Critical failure surfaces (factor of safety 1.70 or less) were plotted on our Cross Sections in **Appendix G.**

Buttresses and building setback zones were utilized to mitigate proposed cut, fill and natural slopes that did not meet the calculated minimum factors of safety for gross stability.

Geometry and Groundwater

As shown on the respective cross sections, the analyzed geometries of cut-slopes and natural slopes included removal of vegetation, topsoil, artificial fill, alluvium, landslide debris and bedrock materials and adding certified compacted fill to achieve the proposed grades, or remedial grades as needed on portions of the slopes. Anticipated removal depths were shown on the cross section in **Appendix G** only if integral to slope stability calculations. Analyses included cross-bedding and potential adverse bedding with dips ranging from 0 to 60 degrees depending on geologic data obtained near each cross section listed in **Table F1**.

Review of ground water data in the vicinity and trench and boring log data indicates that the proposed cut-slopes in bedrock are above historic high ground water levels. Ground water was modeled in the slope stability source for future ground water existed directly up gradient (updip) of the slope being analyzed. In general a static water table was modeled where existing ground water was encountered and an assumed pore-pressured parameters (ru of

0.12) was utilized where a future source of ground water could exist, directly above and directly updip of the scope.

It should be noted that ground water in the bedrock and alluvium is very rare on the subject site with the exception of the mouth of Middle Canyon.

Where rapid drawdown and steady state seepage conditions were expectable adjacent to planned debris basins, those conditions were included in the analyses. Backdrains are proposed for all Stability Fill/Buttress slopes.

Shear Strength Parameters

A total of 66 direct shear strength tests were performed for this project. Individual Direct Shear test results are presented in **Appendix B**. Data used in our analyses are summarized in the below table:

Table F2 - Summary of Design Shear Strength Values

Material	Peak		Ultimate		Residual		Unit Wt. (pcf)
	Cohesion (psf)	Phi ϕ	Cohesion (psf)	Phi ϕ	Cohesion (psf)	Phi ϕ	
Bedrock (TQs), cross-bedding Upper Saugus Formation	400	38°	-	-	300	31°	135
Bedrock (TQs), cross-bedding Lower Saugus Formation	600	38°	500	35°	-	-	135
Bedrock (TQs), parallel-bedding			-	-	200	20°	135
Terrace Deposits (Qt)	300	31°	200	30°	-	-	125
Alluvium (Qal)	300	31°	200	29°	-	-	125
Slopewash (Qsw)	300	28°	250	28°	-	-	125
Landslide Mass (Qls)	200	29°	-	-	140	25°	125
Slide Plane (Sp)	200	15°	200	15°	200	15°	125
Qls back calculation[1]	200	15°	200	15°	200	15°	125
Artificial Fill (Cef), fine-grained	350	24°	-	-	350	24°	125
Artificial Fill (Cef), coarse-grained	300	30°	300	30°	-	-	125

[1] See Run No. 27 in Table F1

APPENDIX F

In our analyses, peak shear strengths were utilized for seismic slope stability. For static slope stability, ultimate shear strengths were generally used for coarse-grained materials and residual shear strengths were used for fine-grained materials and landslide debris. Residual shear strengths were utilized for bedding plane and landslide plane stability analyses.

Methods of Analysis

The computer program GSTABL7, originally written by Purdue University and updated by Garry H. Gregory, Gregory Geotechnical Software was used for the analyses. This program computes the minimum factor of safety from trial failure surfaces using limit equilibrium methods of analysis, such as the Modified Bishop's Method for circular slip surfaces or Janbu's methods for both circular or planar surfaces. In many cases, exit of slip planes at the ground surface is not known. For this report, GSTABL7 method was used to determine breakage of slip planes through upper layers and their exit at the ground surface where the failure surface is unknown. Janbu's method was used to provide the static minimum safety factor corresponding to the complete slip plane.

The pseudostatic procedure introduces a static horizontal force equal to a "seismic" (pseudostatic) coefficient times the weight of individual slices in addition to other forces acting on the slice. The seismic coefficient is an empirical number which in no way models actual seismic forces. However, the pseudostatic method provides some indication of stability or instability. We selected a seismic coefficient of 0.15 for our analyses in accordance with Los Angeles County Guidelines.

Surficial Stability Evaluation

Surficial stability of fill and cut slopes was not analyzed using the "Infinite Slope" method since the lower-bound cohesion value of bedrock and proposed fill materials is greater than 250 psf. Stability fills are need and shown on the Geologic/Geotechnical Maps for cut-slopes that are proposed with thin terrace deposits (Qt), exhibits daylighted bedding conditions, have a fill over cut configurations, or if traversed by a geologic fold. Surficial stability calculations were not performed on natural slopes because the proposed grading configuration and our debris flow hazard mitigation measure precluded the need for analyzation.

APPENDIX F

Conclusion

The analyzed cut-slopes, proposed grades, remedial grades and compacted fill slopes comply with Los Angeles County minimum requirements for gross stability under static and pseudostatic loading conditions and for surficial stability, as applicable, provided our recommendations are followed and incorporated into project construction. The results of the stability analyses are summarized in **Table F1**.

The following attachments complete this Appendix.

Slope Stability Analyses Results — Table F1
Slope Stability Diagrams and Data Sheets for Run No. 1 through 117

APPENDIX F

SLOPE STABILITY ANALYSES RESULTS

Cross Section	File Name	Slope Designation	Analyzed Plane	Method	Factor of Safety		Comments	Run No.
					Static	Pseudostatic[1] (Coeff = 0.15)		
1-1′	T1S2A	Natural slope	Circular	Modified Bishop	1.49	-	Minimum FS < 1.50; see recommended action below.	1
1-1′	T1S1A T1PS1A	Natural slope	Circular	Modified Bishop	1.55	1.33	Natural TQs slope mantled by Qt. Slope setback = 40′(R.U.A.)	2 3
2-2′	T2S2	Natural slope	Circular	Modified Bishop	1.49	-	Minimum FS < 1.50; see recommended action below.	4
2-2′	T2S1 T2PS1	Natural slope	Circular	Modified Bishop	1.55	1.31	Natural TQs slope. Slope setback = 83′ (R.U.A.)	5 6
3-3′	T3S1A T3PS1A	Natural slope	Bedding plane	Janbu	1.66	1.23	Minimum factor of safety.	7 8
3-3′	T3S2A	Natural slope	Circular	Modified Bishop	2.18	-	Pseudostatic is not critical and therefore not performed.	9
4-4′	T4S2A	Natural slope	Circular	Modified Bishop	1.49	-	Minimum FS < 1.50; see recommended action below.	10
4-4′	T4S1A T4PS1A	Natural slope	Circular	Modified Bishop	1.55	1.31	Slope setback = 73′ (R.U.A.)	11 12
5-5′	T5S4A	CS-5b	Bedding plane	Janbu	1.72	-	Cross-section 14-14′ is more critical. Pseudostatic is not critical and therefore not performed.	13
8-8′	T8S2A	Natural slope	Circular	Modified Bishop	1.31	-	Minimum FS < 1.50; see recommended action below.	14

[1] Peak shear strength values were utilized.

APPENDIX F

SLOPE STABILITY ANALYSES RESULTS

Cross Section	File Name	Slope Designation	Analyzed Plane	Method	Factor of Safety		Comments	Run No.
					Static	Pseudostatic[1] (Coeff = 0.15)		
8-8′	T8S1A T8PS1A	Natural slope	Circular	Modified Bishop	1.55	1.44	Slope Setback = 113′ (R.U.A.)	15 16
9-9′	T9S1A	Natural slope	Circular	Modified Bishop	1.82	-	Pseudostatic is not critical and therefore not performed.	17
10-10′	T10S2A T10PS2A	Natural slope	Bedding plane	Janbu	1.78	1.30	Analyzed along siltstone bed.	18 19
10-10′	T10S1A T10PS1A	Natural slope	Circular	Modified Bishop	1.76	1.24	Circular analyses.	20 21
11-11′	T11S1A T11PS1A	Natural slope	Bedding plane	Janbu	1.61	1.21	Minimum factor of safety.	22 23
11-11′	T11S2A	Natural slope	Circular	Modified Bishop	2.03	-	Pseudostatic is not critical and therefore not performed.	24
12-12′	T12S1B	Qls (LI) removal	Bedding plane	Janbu	3.49	-	Qls removal utilizing 50′ key.	25
12-12′	T12S2A	Qls (LI) removal	Circular	Modified Bishop	1.95	-	Circular search in buttress.	26
12-12′	T12BKCLC	Natural slope	Landslide plane	Modified Bishop	1.04	-	Qls back calculation.	27
13-13′	T13S1A T13PS1A	Natural slope	Circular	Modified Bishop	1.87	1.59	Grossly stable with H/3 setback.	28 29
14-14′	T14S1A T14PS1A	CS-5b	Bedding plane	Janbu	1.71	1.21	Minimum factor of safety.	30 31
14-14′	T14S2A	CS-5b	Circular	Modified Bishop	2.70	-	Pseudostatic is not critical and therefore not performed.	32

APPENDIX F

SLOPE STABILITY ANALYSES RESULTS

Cross Section	File Name	Slope Designation	Analyzed Plane	Method	Factor of Safety		Comments	Run No.
					Static	Pseudostatic[1] (Coeff = 0.15)		
15-15'	T15S1E	CS-29	Bedding plane	Janbu	1.28	-	Minimum FS < 1.5; see recommended action below.	33
15-15'	T15S3A T15PS3A	CS-29	Bedding plane	Janbu	1.61	1.30	Buttress with 10'd by 75'w key and with 2.75:1 backcut.	34 35
15-15'	T15S4A T15PS4A	CS-29	Circular	Modified Bishop	1.90	1.34	Buttress with 10'd by 75'w key and with 2.75:1 backcut.	36 37
16-16'	T16S1A	CS-27	Bedding plane	Janbu	1.73	-	Ascending slope above the proposed pad. Stability Fill with 5'd by 25'w key and with 2.75:1 backcut.	38
16-16'	T16S1B T16PS1B	Natural slope	Bedding plane	Janbu	1.63	1.20	Natural slope below the pad. Minimum factor of safety.	39 40
16-16'	T16S2A	CS-27	Circular	Modified Bishop	2.35	-	Ascending slope above the pad. Pseudostatic is not critical and therefore not performed	41
16-16'	T16S2B	Natural Slope	Circular	Modified Bishop	2.18	-	Natural slope below the proposed pad. Pseudostatic is not critical and therefore not performed	42
17-17'	T17S1F T17PS1F	CS-12b	Bedding plane	Janbu	1.68	1.33	Bedding plane analyses. Minimum factor of safety.	43 44
17-17'	T17S1A	CS-12b	Circular	Modified Bishop	2.03	-	Pseudostatic is not critical and therefore not performed.	45
20-20'	T20S2B T20PS2B	Qls	Bedding plane	Janbu	1.65	1.20	Qls removal; Buttress with 20'd by 65'w key with an average 2.75:1 backcut.	46 47
20-20'	T20S2C	Qls	Circular	Modified Bishop	2.16	-	Pseudostatic is not critical and therefore not performed	48

APPENDIX F

SLOPE STABILITY ANALYSES RESULTS

Cross Section	File Name	Slope Designation	Analyzed Plane	Method	Factor of Safety		Comments	Run No.
					Static	Pseudostatic[1] (Coeff = 0.15)		
22-22′	T22S1A	CS-15	Bedding plane	Janbu	1.42	-	Minimum FS < 1.5; see recommended action below.	49
22-22′	T22S2A T22PS2A	CS-15	Bedding plane	Janbu	1.59	1.10	Buttress with 10′d by 60′w key with 1.75:1 backcut.	50 51
22-22′	T22S3A	CS-15	Circular	Modified Bishop	1.98	-	Pseudostatic is not critical and therefore not performed.	52
23-23′	T23S1A	CS-28b	Bedding plane	Janbu	1.49	-	Ascending slope above the proposed upper pad. Minimum FS < 1.50; see recommended action below.	53
23-23′	T23S1D	CS-28b	Bedding plane	Janbu	2.13	-	Buttress with 5′d by 25′w key with 1.75:1 backcut.	54
23-23′	T23S2A	CS-27	Bedding plane	Janbu	1.52	-	Descending slope below the proposed upper pad. Minimum factor of safety.	55
23-23′	T23S2D	CS-27	Bedding plane	Janbu	2.17	-	Buttress with 5′d by 25′w key with 1.75:1 backcut.	56
24-24′	T24S1A T24PS1A	CS-28b	Bedding plane	Janbu	1.83	1.29	Stability fill required due to daylighted bedding conditions.	57 58
24-24′	T24S2A	CS-28b	Circular	Modified Bishop	2.69	-	Pseudostatic is not critical and therefore not performed.	59
27-27′	T27S1B T27PS1B	CS-5b	Bedding plane	Janbu	1.88	1.41	Minimum factor of safety. Circular analyses is not critical and therefore not performed.	60 61
28-28′	T28S1A T28PS1A	CS-5b	Bedding plane	Janbu	1.74	1.34	Minimum factor of safety.	62 63

APPENDIX F

SLOPE STABILITY ANALYSES RESULTS

Cross Section	File Name	Slope Designation	Analyzed Plane	Method	Factor of Safety		Comments	Run No.
					Static	Pseudostatic[1] (Coeff = 0.15)		
28-28′	T28S2A	CS-5b	Circular	Modified Bishop	2.69	-	Pseudostatic is not critical and therefore not performed.	64
29-29′	T29S1B T29PS1B	CS-5b	Bedding plane	Janbu	1.65	1.25	Cut-slope below water tank. Minimum factor of safety.	65 66
29-29′	T29S2A	CS-5b	Circular	Modified Bishop	2.70	-	Pseudostatic is not critical and therefore not performed.	67
30-30′	T30S1A	CS-9a	Bedding plane	Janbu	1.85	-	Minimum factor of safety; Pseudostatic is not critical and therefore not performed.	68
31-31′	T31S2A T31PS2A	CS-28b	Bedding plane	Janbu	1.66	1.32	Stability fill required due to daylighted bedding conditions.	69 70
31-31′	T31S2B	CS-28b	Circular	Modified Bishop	2.11	-	Pseudostatic is not critical and therefore not performed.	71
33-33′	T33S1A T33PS1A	CS-4	Bedding plane	Janbu	1.80	1.25	Descending slope below the proposed pad. Minimum factor of safety.	72 73
33-33′	T33S2A	CS-4	Circular	Modified Bishop	2.73	-	Pseudostatic is not critical and therefore not performed.	74
33-33′	T33BS1B T33BPS1B	CS-5a	Bedding plane	Janbu	1.69	1.10	Ascending slope above the proposed pad. Minimum factor of safety.	75 76
33-33′	T33BS2A	CS-5a	Circular	Modified Bishop	2.74	-	Pseudostatic is not critical and therefore not performed.	77
34-34′	T34S1A	Natural slope	Circular	Modified Bishop	1.52	1.34	Steep natural slope adjacent to proposed development.	78 79

APPENDIX F

SLOPE STABILITY ANALYSES RESULTS

Cross Section	File Name	Slope Designation	Analyzed Plane	Method	Factor of Safety		Comments	Run No.
					Static	Pseudostatic[1] (Coeff = 0.15)		
35-35′	T35S1A T35PS1A	Natural slope	Circular	Modified Bishop	1.70	1.43	Natural slope below the proposed development. Bedding plane analyses is not critical.	80 81
36-36′	T36S1A T36PS1A	Natural Slope	Circular	Modified Bishop	1.50	1.29	Natural slope below the proposed development	82 83
37-37′	T37S1A	Fill slope CS-34 and CS-35	Circular	Modified Bishop	1.76	-	Highest fill slope. Pseudostatic is not critical and therefore not performed.	84
38-38′	T38S4A	Qls (XXXVII)	Circular	Modified Bishop	1.46	-	Partial Qls removal. Minimum FS < 1.5, see recommended action below.	85
38-38′	T38S4B T38PS4A	Qls (XXXVII)	Circular	Modified Bishop	1.55	1.12	R.U.A. for the remaining landslide.	86 87
39-39′	T39S2A	Natural slope	Circular	Modified Bishop	1.48	-	Minimum FS < 1.5; see recommended R.U.A.	88
39-39′	T39S1A T39PS1A	Natural slope	Bedding Plane	Janbu	1.69	1.16	Partial Qls removal.	89 90
39-39′	T39S3A T39PS3A	Natural slope	Circular	Modified Bishop	1.54	1.16	R.U.A. with partial Qls removal.	91 92
41-41′	T41S3D	Fill over natural slope	Circular	Modified Bishop	1.45	-	Minimum FS < 1.5; see recommended R.U.A.	93
41-41′	T41S1A T41PS1A	Fill over natural slope	Circular	Modified Bishop	1.50	1.12	R.U.A. with partial Qls removal.	94 95
41-41′	T41S4A T41PS4A	Fill over natural slope	Bedding Plane	Janbu	1.68	1.21	R.U.A. with partial Qls removal.	96 97

APPENDIX F

SLOPE STABILITY ANALYSES RESULTS

Cross Section	File Name	Slope Designation	Analyzed Plane	Method	Factor of Safety		Comments	Run No.
					Static	Pseudostatic[1] (Coeff = 0.15)		
2E-2E'	T2ES2A T2EPS2A	CS-28b	Bedding plane	Janbu	1.64	1.32	Cut-slope over Qls removal. Minimum factor of safety.	98 99
10E-10E'	T10ES1A	CS-14	Bedding plane	Janbu	1.32	-	Descending slope below the proposed pad. Minimum FS < 1.5; see recommended action below.	100
10E-10E'	T10ES4A T10EPS4A	CS-14	Bedding plane	Janbu	1.60	1.16	Buttress with 15'd by 30'w key with 2:1 (h:v) backcut.	101 102
10E-10E'	T10ES4B	CS-14	Circular	Modified Bishop	1.90	-	Pseudostatic is not critical and therefore not performed.	103
13E-13E'	T13ES1A	Natural slope	Bedding plane	Janbu	3.27	-	Analyzed landslide plane.	104
14E-14E'	T14ES1A	Natural slope	Bedding plane	Janbu	2.89	-	Analyses along the slide plane. Pseudostatic is not critical and therefore not performed.	105
14E-14E'	T14ES1C	Natural slope	Bedding plane	Janbu	3.01	-	Analyzed natural slope above the proposed road. Pseudostatic is not critical and therefore not performed.	106
14E-14E'	T14ES1D	Natural slope	Circular	Janbu	2.64	-	Analyzed Qls mass above the proposed road. Pseudostatic is not critical and therefore not performed.	107
14E-14E'	T14ES1E	Natural slope	Circular	Modified Bishop	2.41	-	Analyzed natural slope above the proposed road. Pseudostatic is not critical and therefore not performed.	108

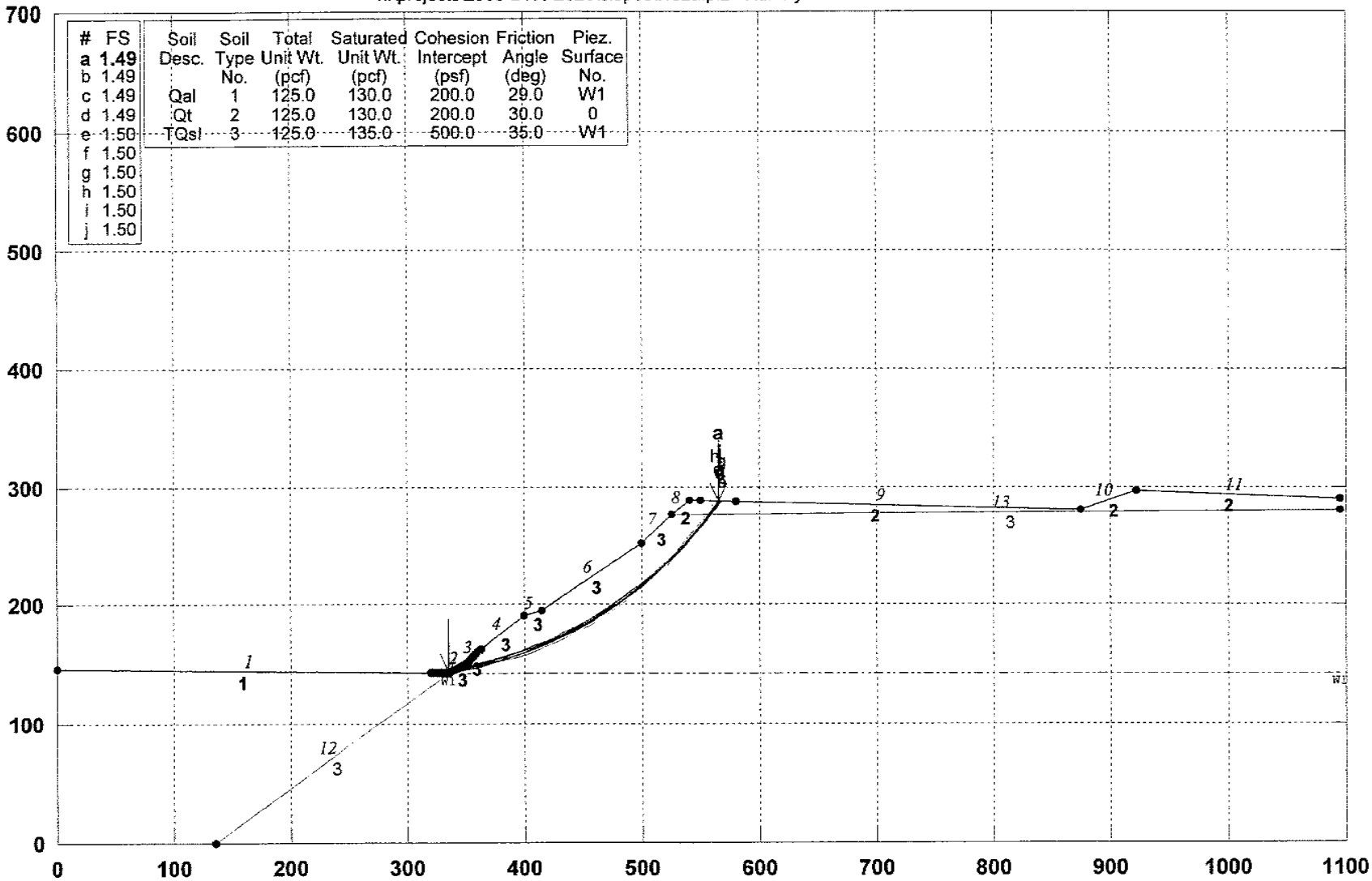
APPENDIX F

SLOPE STABILITY ANALYSES RESULTS

Cross Section	File Name	Slope Designation	Analyzed Plane	Method	Factor of Safety		Comments	Run No.
					Static	Pseudostatic[1] (Coeff = 0.15)		
14E-14E'	T14ES2B	Natural slope	Bedding Plane	Modified Bishop	2.50	-	Minimum factor of safety Qls removal. Pseudostatic is not critical and therefore not performed.	109
15E-15E'	T15ES1B	Natural slope	Circular	Modified Bishop	2.77	-	Pseudostatic is not critical and therefore not performed	110
15E-15E'	T15ES1A	Natural slope	Bedding plane	Janbu	12.62	-	Pseudostatic is not critical and therefore not performed	111
3M-3M'	T3MS2D	Fill slope	Bedding plane	Janbu	1.77	-	Qls removal; Minimum factor of safety. Pseudostatic is not critical and therefore not performed.	112
3M-3M'	T3MS1A	Fill slope	Bedding plane	Janbu	1.89	-	Pseudostatic is not critical and therefore not performed.	113
8M-8M'	T8MS2A	Qls removal	Bedding plane	Janbu	2.60	-	Minimum factor of safety. Pseudostatic is not critical and therefore not performed.	114
8M-8M'	T8MS1A	Qls removal	Circular	Modified Bishop	3.11	-	Minimum factor of safety. Pseudostatic is not critical and therefore not performed.	115
N/A	RD1S1	Internal basin face	Circular	Modified Bishop	1.55	-	Rapid drawdown conditions for critical debris basin upstream 2:1 fill slope.	116
N/A	SS1S1	External basin face	Circular	Modified Bishop	2.18	-	Steady state seepage conditions for critical downstream fill slope.	117

Mesas East, x-sec 1-1'; Static; Circular

n:\projects\2000-2499\2023\slopes\t1s2a.pl2 Run By: DA 6/21/2004 10:37AM



#	FS	Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
a	**1.49**							
b	1.49							
c	1.49	Qal	1	125.0	130.0	200.0	29.0	W1
d	1.49	Qt	2	125.0	130.0	200.0	30.0	0
e	1.50	TQsl	3	125.0	135.0	500.0	35.0	W1
f	1.50							
g	1.50							
h	1.50							
i	1.50							
j	1.50							

GSTABL7 v.2 FSmin=1.49

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 1

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/21/2004
Time of Run: 10:37AM
Run By: DA
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t1s2a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t1s2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopes2a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 1-1'; Static;
Circular

BOUNDARY COORDINATES
11 Top Boundaries
13 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	146.00	335.00	143.00	1
2	335.00	143.00	350.00	150.00	3
3	350.00	150.00	360.00	160.00	3
4	360.00	160.00	400.00	190.00	3
5	400.00	190.00	415.00	195.00	3
6	415.00	195.00	500.00	252.00	3
7	500.00	252.00	526.00	276.00	3
8	526.00	276.00	540.00	289.00	2
9	540.00	289.00	875.00	280.00	2
10	875.00	280.00	922.00	297.00	2
11	922.00	297.00	1095.00	290.00	2
12	135.00	0.00	335.00	143.00	3
13	526.00	276.00	1095.00	280.00	3

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	200.0	29.0	0.00	0.0	1
2	125.0	130.0	200.0	30.0	0.00	0.0	0
3	125.0	135.0	500.0	35.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	335.00	143.00
2	1095.00	143.00

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
3440 Trial Surfaces Have Been Generated.
40 Surface(s) Initiate(s) From Each Of 86 Points Equally Spaced
Along The Ground Surface Between X = 320.00(ft)
and X = 363.00(ft)
Each Surface Terminates Between X = 550.00(ft)
and X = 580.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation

At Which A Surface Extends Is Y = 0.00(ft)
14.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -10.0
And 25.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 3440
Statistical Data On All Valid FS Values:
FS Max = 1.927 FS Min = 1.492 FS Ave = 1.612
Standard Deviation = 0.065 Coefficient of Variation = 4.01 %
Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	335.18	143.08
2	348.99	145.38
3	362.69	148.25
4	376.26	151.69
5	389.68	155.70
6	402.91	160.25
7	415.95	165.36
8	428.76	171.00
9	441.33	177.17
10	453.63	183.86
11	465.64	191.05
12	477.34	198.74
13	488.71	206.91
14	499.73	215.54
15	510.38	224.62
16	520.65	234.14
17	530.51	244.08
18	539.94	254.43
19	548.94	265.15
20	557.49	276.24
21	565.56	287.68
22	565.97	288.30

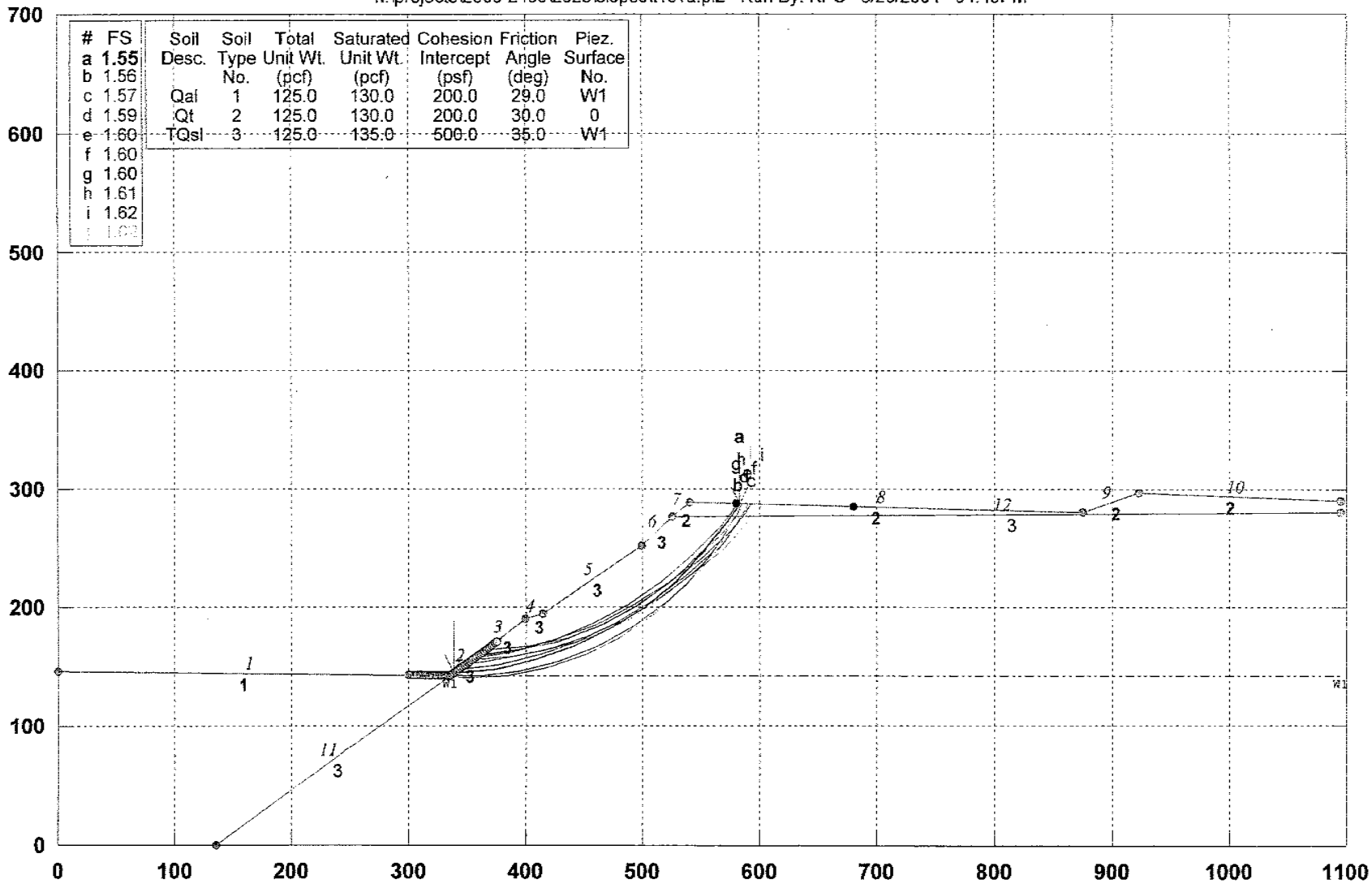
Circle Center At X = 286.88 ; Y = 475.85 ; and Radius = 336.25
Factor of Safety
*** 1.492 ***
Individual data on the 29 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	13.8	3577.6	0.0	0.0	0.	0.	0.0	0.0	0.0
2	1.0	541.6	0.0	0.0	0.	0.	0.0	0.0	0.0
3	10.0	10446.6	0.0	0.0	0.	0.	0.0	0.0	0.0
4	2.7	4381.1	0.0	0.0	0.	0.	0.0	0.0	0.0
5	13.6	29060.2	0.0	0.0	0.	0.	0.0	0.0	0.0
6	13.4	39459.3	0.0	0.0	0.	0.	0.0	0.0	0.0
7	10.3	36981.4	0.0	0.0	0.	0.	0.0	0.0	0.0
8	2.9	11190.9	0.0	0.0	0.	0.	0.0	0.0	0.0
9	12.1	45879.7	0.0	0.0	0.	0.	0.0	0.0	0.0
10	0.9	3578.3	0.0	0.0	0.	0.	0.0	0.0	0.0
11	12.8	50859.2	0.0	0.0	0.	0.	0.0	0.0	0.0
12	12.6	53973.2	0.0	0.0	0.	0.	0.0	0.0	0.0
13	12.3	55757.9	0.0	0.0	0.	0.	0.0	0.0	0.0
14	12.0	56264.5	0.0	0.0	0.	0.	0.0	0.0	0.0
15	11.7	55558.5	0.0	0.0	0.	0.	0.0	0.0	0.0
16	11.4	53718.4	0.0	0.0	0.	0.	0.0	0.0	0.0
17	11.0	50835.6	0.0	0.0	0.	0.	0.0	0.0	0.0
18	0.3	1219.4	0.0	0.0	0.	0.	0.0	0.0	0.0
19	10.4	47495.2	0.0	0.0	0.	0.	0.0	0.0	0.0
20	10.3	47392.7	0.0	0.0	0.	0.	0.0	0.0	0.0
21	5.4	24546.1	0.0	0.0	0.	0.	0.0	0.0	0.0

22	4.5	20438.7	0.0	0.0	0.	0.	0.0	0.0	0.0
23	9.4	41656.0	0.0	0.0	0.	0.	0.0	0.0	0.0
24	0.1	240.7	0.0	0.0	0.	0.	0.0	0.0	0.0
25	8.9	32484.2	0.0	0.0	0.	0.	0.0	0.0	0.0
26	8.5	19149.5	0.0	0.0	0.	0.	0.0	0.0	0.0
27	0.0	22.4	0.0	0.0	0.	0.	0.0	0.0	0.0
28	8.1	6524.7	0.0	0.0	0.	0.	0.0	0.0	0.0
29	0.4	16.1	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 1-1'; Static; Circular

n:\projects\2000-2499\2023\slopes\t1s1a.pl2 Run By: KPC 6/23/2004 04:45PM



#	FS
a	1.55
b	1.56
c	1.57
d	1.59
e	1.60
f	1.60
g	1.60
h	1.61
i	1.62

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qal	1	125.0	130.0	200.0	29.0	W1
Qt	2	125.0	130.0	200.0	30.0	0
TQsl	3	125.0	135.0	500.0	35.0	W1

GSTABL7 v.2 FSmin=1.55

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 2

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*************************************************************************
Analysis Run Date:        6/23/2004
Time of Run:              04:45PM
Run By:                   KPC
Input Data Filename:      N:\Projects\2000-2499\2023\Slopes\t1s1a.in
Output Filename:          N:\Projects\2000-2499\2023\Slopes\t1s1a.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\2000-2499\2023\Slopes1a.PLT
PROBLEM DESCRIPTION:  Mesas East, x-sec 1-1'; Static;
                      Circular
BOUNDARY COORDINATES
   10 Top   Boundaries
   12 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     146.00     335.00     143.00        1
    2       335.00     143.00     360.00     160.00        3
    3       360.00     160.00     400.00     190.00        3
    4       400.00     190.00     415.00     195.00        3
    5       415.00     195.00     500.00     252.00        3
    6       500.00     252.00     526.00     276.00        3
    7       526.00     276.00     540.00     289.00        2
    8       540.00     289.00     875.00     280.00        2
    9       875.00     280.00     922.00     297.00        2
   10       922.00     297.00    1095.00     290.00        2
   11       135.00       0.00     335.00     143.00        3
   12       526.00     276.00    1095.00     280.00        3
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 3 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   125.0    130.0     200.0     29.0    0.00       0.0      1
  2   125.0    130.0     200.0     30.0    0.00       0.0      0
  3   125.0    135.0     500.0     35.0    0.00       0.0      1
1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water =  62.40 (pcf)
Piezometric Surface No.  1 Specified by  2 Coordinate Points
Pore Pressure Inclination Factor =  0.50
  Point      X-Water     Y-Water
   No.        (ft)        (ft)
    1       335.00      143.00
    2      1095.00      143.00
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
 500 Trial Surfaces Have Been Generated.
  10 Surface(s) Initiate(s) From Each Of    50 Points Equally Spaced
Along The Ground Surface Between  X = 300.00(ft)
                              and  X = 375.00(ft)
Each Surface Terminates Between   X = 580.00(ft)
                              and  X = 680.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =       0.00(ft)
35.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
```

The Angle Has Been Restricted Between The Angles Of -45.0
And 10.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 3.691 FS Min = 1.550 FS Ave = 2.321
Standard Deviation = 0.427 Coefficient of Variation = 18.41 %
Failure Surface Specified By 10 Coordinate Points

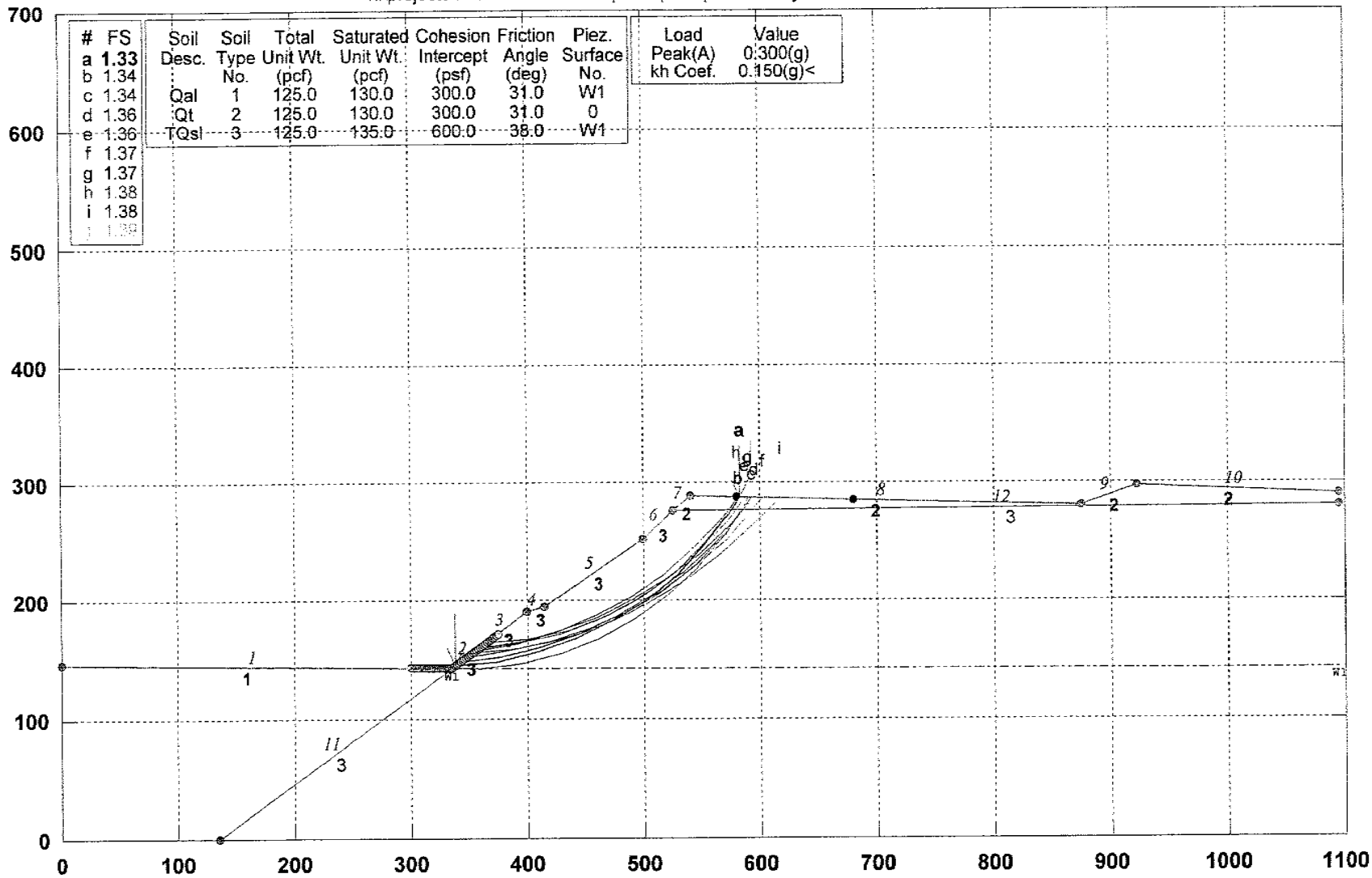
Point No.	X-Surf (ft)	Y-Surf (ft)
1	338.27	145.22
2	373.12	148.36
3	407.37	155.56
4	440.54	166.73
5	472.17	181.72
6	501.83	200.31
7	529.10	222.25
8	553.60	247.24
9	575.01	274.93
10	582.77	287.85

Circle Center At X = 329.58 ; Y = 440.99 ; and Radius = 295.90
Factor of Safety
*** 1.550 ***
Individual data on the 16 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	21.7	17419.8	0.0	0.0	0.	0.	0.0	0.0	0.0
2	13.1	28142.8	0.0	0.0	0.	0.	0.0	0.0	0.0
3	26.9	96542.3	0.0	0.0	0.	0.	0.0	0.0	0.0
4	7.4	33595.0	0.0	0.0	0.	0.	0.0	0.0	0.0
5	7.6	35154.9	0.0	0.0	0.	0.	0.0	0.0	0.0
6	25.5	131336.9	0.0	0.0	0.	0.	0.0	0.0	0.0
7	31.6	191789.8	0.0	0.0	0.	0.	0.0	0.0	0.0
8	27.8	181664.8	0.0	0.0	0.	0.	0.0	0.0	0.0
9	1.8	12133.2	0.0	0.0	0.	0.	0.0	0.0	0.0
10	24.2	165605.2	0.0	0.0	0.	0.	0.0	0.0	0.0
11	3.1	21842.2	0.0	0.0	0.	0.	0.0	0.0	0.0
12	10.9	76498.3	0.0	0.0	0.	0.	0.0	0.0	0.0
13	13.6	82492.3	0.0	0.0	0.	0.	0.0	0.0	0.0
14	21.4	72949.7	0.0	0.0	0.	0.	0.0	0.0	0.0
15	0.9	1322.5	0.0	0.0	0.	0.	0.0	0.0	0.0
16	6.9	5041.3	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 1-1'; pseudotatic; circular

n:\projects\2000-2499\2023\slopes\t1ps1a.pl2 Run By: KPC 6/23/2004 04:48PM



#	FS
a	**1.33**
b	1.34
c	1.34
d	1.36
e	1.36
f	1.37
g	1.37
h	1.38
i	1.38

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qal	1	125.0	130.0	300.0	31.0	W1
Qt	2	125.0	130.0	300.0	31.0	0
TQsl	3	125.0	135.0	600.0	38.0	W1

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.33

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No. 3

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:        6/23/2004
Time of Run:              04:48PM
Run By:                   KPC
Input Data Filename:      N:\Projects\2000-2499\2023\Slopes\t1ps1a.in
Output Filename:          N:\Projects\2000-2499\2023\Slopes\t1ps1a.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\2000-2499\2023\Slopeps1a.PLT
PROBLEM DESCRIPTION:  Mesas East, x-sec 1-1'; pseudotatic;
                      circular
BOUNDARY COORDINATES
   10 Top   Boundaries
   12 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1          0.00     146.00     335.00     143.00        1
    2        335.00     143.00     360.00     160.00        3
    3        360.00     160.00     400.00     190.00        3
    4        400.00     190.00     415.00     195.00        3
    5        415.00     195.00     500.00     252.00        3
    6        500.00     252.00     526.00     276.00        3
    7        526.00     276.00     540.00     289.00        2
    8        540.00     289.00     875.00     280.00        2
    9        875.00     280.00     922.00     297.00        2
   10        922.00     297.00    1095.00     290.00        2
   11        135.00       0.00     335.00     143.00        3
   12        526.00     276.00    1095.00     280.00        3
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 3 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   125.0    130.0     300.0     31.0    0.00       0.0      1
  2   125.0    130.0     300.0     31.0    0.00       0.0      0
  3   125.0    135.0     600.0     38.0    0.00       0.0      1
1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water =  62.40 (pcf)
Piezometric Surface No.  1 Specified by  2 Coordinate Points
Pore Pressure Inclination Factor =  0.50
  Point      X-Water     Y-Water
   No.         (ft)        (ft)
    1        335.00      143.00
    2       1095.00      143.00
Specified Peak Ground Acceleration Coefficient (A) =   0.300(g)
Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
Specified Seismic Pore-Pressure Factor =   0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
 500 Trial Surfaces Have Been Generated.
  10 Surface(s) Initiate(s) From Each Of    50 Points Equally Spaced
Along The Ground Surface Between  X = 300.00(ft)
                            and  X = 375.00(ft)
Each Surface Terminates Between   X = 580.00(ft)
                           and   X = 680.00(ft)
```

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
35.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 10.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 3.008 FS Min = 1.333 FS Ave = 1.926
Standard Deviation = 0.343 Coefficient of Variation = 17.82 %
Failure Surface Specified By 10 Coordinate Points

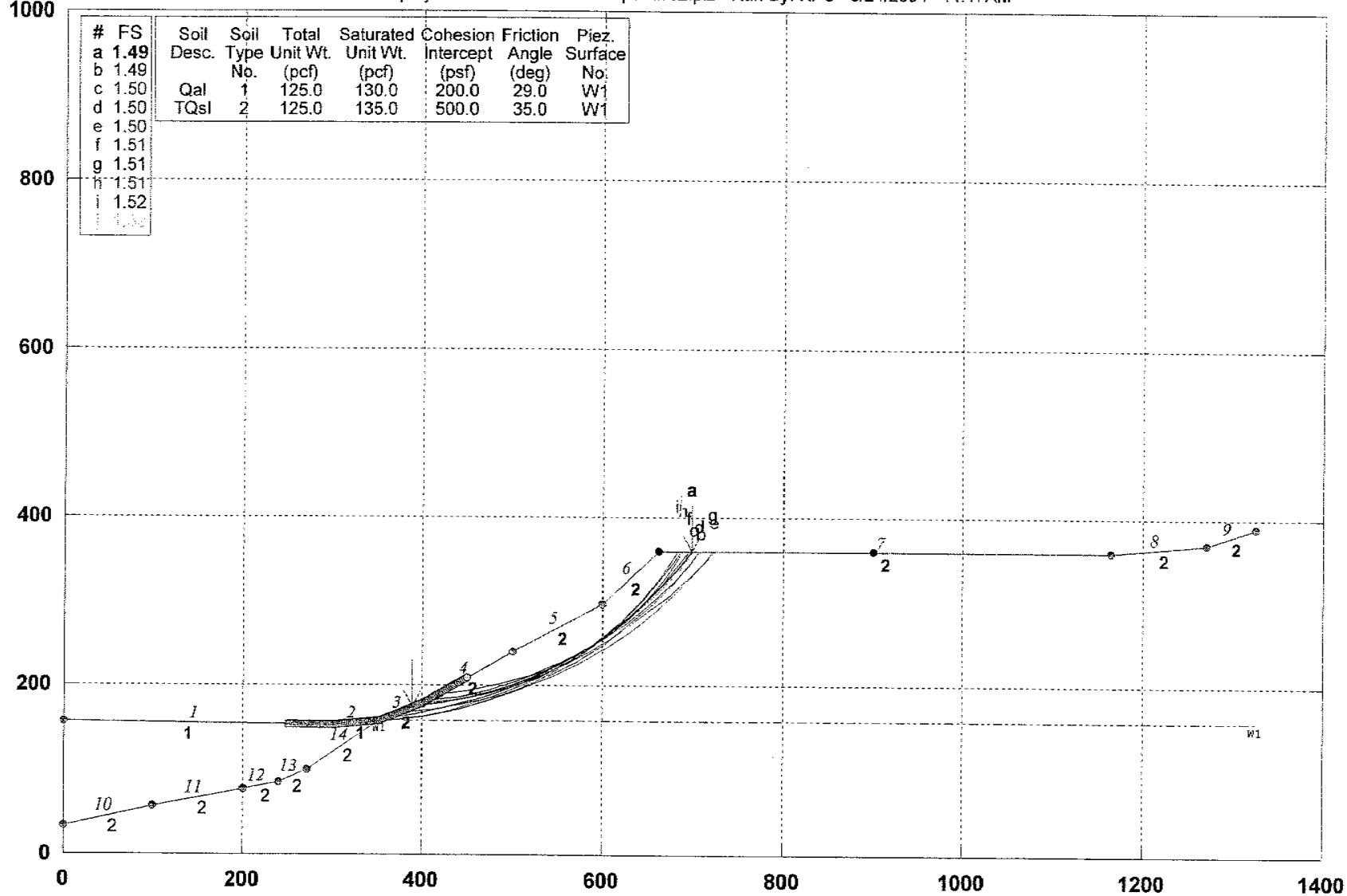
Point No.	X-Surf (ft)	Y-Surf (ft)
1	338.27	145.22
2	373.12	148.36
3	407.37	155.56
4	440.54	166.73
5	472.17	181.72
6	501.83	200.31
7	529.10	222.25
8	553.60	247.24
9	575.01	274.93
10	582.77	287.85

Circle Center At X = 329.58 ; Y = 440.99 ; and Radius = 295.90
Factor of Safety
*** 1.333 ***
Individual data on the 16 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	21.7	17419.8	0.0	0.0	0.	0.	2613.0	0.0	0.0
2	13.1	28142.8	0.0	0.0	0.	0.	4221.4	0.0	0.0
3	26.9	96542.3	0.0	0.0	0.	0.	14481.3	0.0	0.0
4	7.4	33595.0	0.0	0.0	0.	0.	5039.3	0.0	0.0
5	7.6	35154.9	0.0	0.0	0.	0.	5273.2	0.0	0.0
6	25.5	131336.9	0.0	0.0	0.	0.	19700.5	0.0	0.0
7	31.6	191789.8	0.0	0.0	0.	0.	28768.5	0.0	0.0
8	27.8	181664.8	0.0	0.0	0.	0.	27249.7	0.0	0.0
9	1.8	12133.2	0.0	0.0	0.	0.	1820.0	0.0	0.0
10	24.2	165605.2	0.0	0.0	0.	0.	24840.8	0.0	0.0
11	3.1	21842.2	0.0	0.0	0.	0.	3276.3	0.0	0.0
12	10.9	76498.3	0.0	0.0	0.	0.	11474.8	0.0	0.0
13	13.6	82492.3	0.0	0.0	0.	0.	12373.8	0.0	0.0
14	21.4	72949.7	0.0	0.0	0.	0.	10942.5	0.0	0.0
15	0.9	1322.5	0.0	0.0	0.	0.	198.4	0.0	0.0
16	6.9	5041.3	0.0	0.0	0.	0.	756.2	0.0	0.0

Mesas East, x-sec 2-2'; static; circular

n:\projects\2000-2499\2023\slopes\t2s2.pl2 Run By: KPC 6/24/2004 11:17AM



GSTABL7 v.2 FSmin=1.49

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 4

```
                    ***  GSTABL7  ***
                ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                   SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:        6/24/2004
Time of Run:              11:17AM
Run By:                   KPC
Input Data Filename:      N:\Projects\2000-2499\2023\Slopes\t2s2.in
Output Filename:          N:\Projects\2000-2499\2023\Slopes\t2s2.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\2000-2499\2023\Slopes2.PLT
PROBLEM DESCRIPTION:  Mesas East, x-sec 2-2'; static;
                      circular
BOUNDARY COORDINATES
    9 Top   Boundaries
   14 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	156.00	300.00	152.00	1
2	300.00	152.00	353.00	157.00	1
3	353.00	157.00	400.00	178.00	2
4	400.00	178.00	500.00	240.00	2
5	500.00	240.00	600.00	297.00	2
6	600.00	297.00	662.00	360.00	2
7	662.00	360.00	1165.00	360.00	2
8	1165.00	360.00	1270.00	370.00	2
9	1270.00	370.00	1325.00	390.00	2
10	0.00	33.00	100.00	57.00	2
11	100.00	57.00	200.00	76.00	2
12	200.00	76.00	240.00	85.00	2
13	240.00	85.00	272.00	100.00	2
14	272.00	100.00	353.00	157.00	2

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 2 Type(s) of Soil
```

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	200.0	29.0	0.00	0.0	1
2	125.0	135.0	500.0	35.0	0.00	0.0	1

```
1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water =  62.40 (pcf)
Piezometric Surface No.  1 Specified by  2 Coordinate Points
Pore Pressure Inclination Factor =  0.50
```

Point No.	X-Water (ft)	Y-Water (ft)
1	353.00	157.00
2	1325.00	157.00

```
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
  10 Surface(s) Initiate(s) From Each Of   100 Points Equally Spaced
Along The Ground Surface Between  X = 250.00(ft)
                             and  X = 450.00(ft)
Each Surface Terminates Between   X = 662.00(ft)
                            and   X = 900.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =      0.00(ft)
35.00(ft) Line Segments Define Each Trial Failure Surface.
```

Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 10.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 4.106 FS Min = 1.488 FS Ave = 2.386
Standard Deviation = 0.564 Coefficient of Variation = 23.62 %
Failure Surface Specified By 12 Coordinate Points

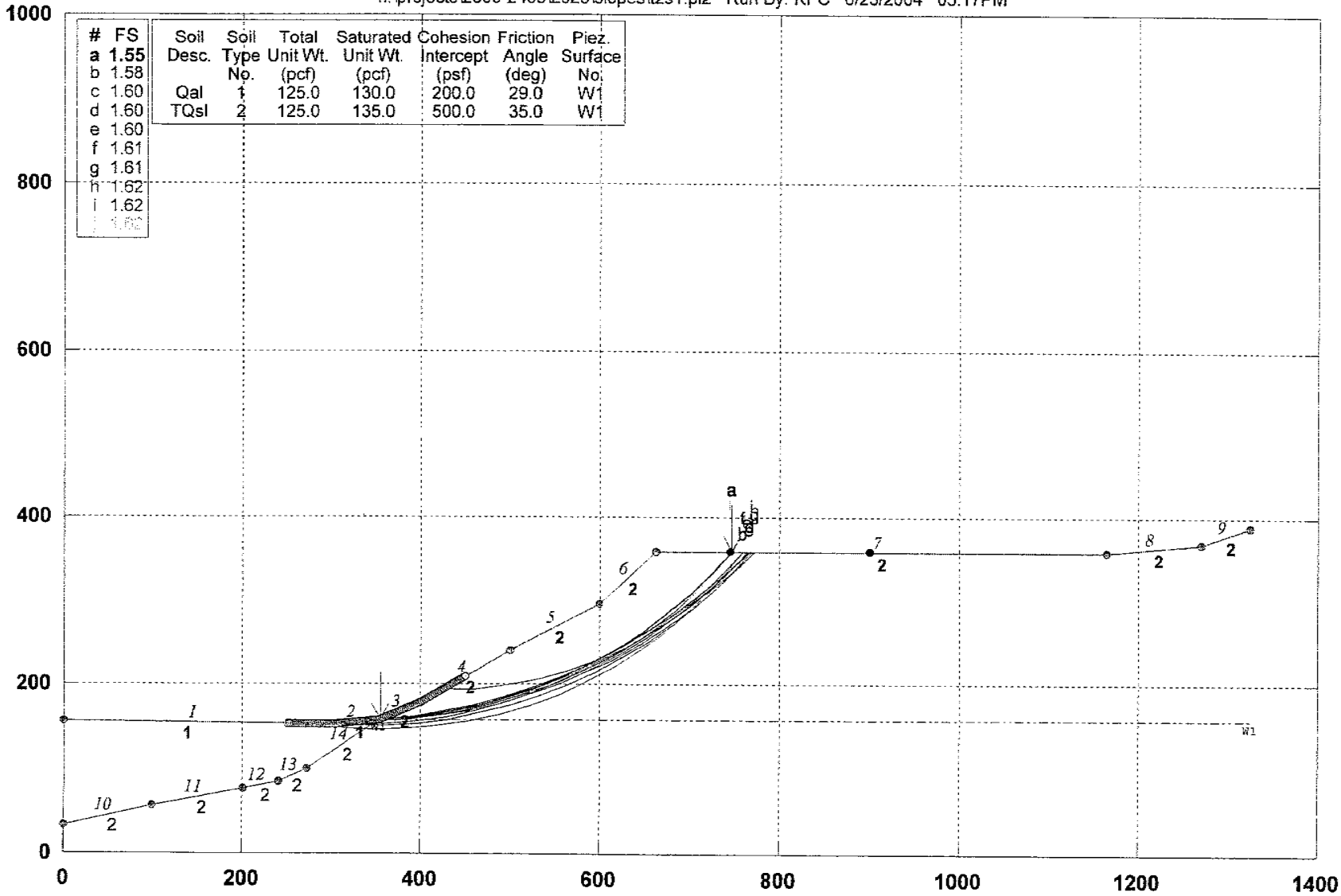
Point No.	X-Surf (ft)	Y-Surf (ft)
1	389.39	173.26
2	423.98	178.61
3	458.03	186.73
4	491.31	197.58
5	523.60	211.07
6	554.70	227.12
7	584.41	245.62
8	612.53	266.46
9	638.88	289.50
10	663.28	314.60
11	685.58	341.57
12	698.45	360.00

Circle Center At X = 340.98 ; Y = 602.51 ; and Radius = 431.97
Factor of Safety
*** 1.488 ***
Individual data on the 15 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	10.6	2053.7	0.0	0.0	0.	0.	0.0	0.0	0.0
2	24.0	26015.0	0.0	0.0	0.	0.	0.0	0.0	0.0
3	34.0	88304.1	0.0	0.0	0.	0.	0.0	0.0	0.0
4	33.3	133690.7	0.0	0.0	0.	0.	0.0	0.0	0.0
5	8.7	41204.1	0.0	0.0	0.	0.	0.0	0.0	0.0
6	23.6	119750.1	0.0	0.0	0.	0.	0.0	0.0	0.0
7	31.1	168060.2	0.0	0.0	0.	0.	0.0	0.0	0.0
8	29.7	160713.7	0.0	0.0	0.	0.	0.0	0.0	0.0
9	15.6	80198.9	0.0	0.0	0.	0.	0.0	0.0	0.0
10	12.5	65069.2	0.0	0.0	0.	0.	0.0	0.0	0.0
11	26.3	148631.3	0.0	0.0	0.	0.	0.0	0.0	0.0
12	23.1	135445.1	0.0	0.0	0.	0.	0.0	0.0	0.0
13	1.3	7351.9	0.0	0.0	0.	0.	0.0	0.0	0.0
14	22.3	88959.6	0.0	0.0	0.	0.	0.0	0.0	0.0
15	12.9	14832.7	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 2-2'; static; circular

n:\projects\2000-2499\2023\slopes\t2s1.pl2 Run By: KPC 6/23/2004 05:17PM



GSTABL7 v.2 FSmin=1.55

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 5

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/23/2004
Time of Run: 05:17PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t2s1.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t2s1.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopes1.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 2-2'; static;
circular

BOUNDARY COORDINATES
9 Top Boundaries
14 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	156.00	300.00	152.00	1
2	300.00	152.00	353.00	157.00	1
3	353.00	157.00	400.00	178.00	2
4	400.00	178.00	500.00	240.00	2
5	500.00	240.00	600.00	297.00	2
6	600.00	297.00	662.00	360.00	2
7	662.00	360.00	1165.00	360.00	2
8	1165.00	360.00	1270.00	370.00	2
9	1270.00	370.00	1325.00	390.00	2
10	0.00	33.00	100.00	57.00	2
11	100.00	57.00	200.00	76.00	2
12	200.00	76.00	240.00	85.00	2
13	240.00	85.00	272.00	100.00	2
14	272.00	100.00	353.00	157.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	200.0	29.0	0.00	0.0	1
2	125.0	135.0	500.0	35.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	353.00	157.00
2	1325.00	157.00

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 250.00(ft)
and X = 450.00(ft)
Each Surface Terminates Between X = 745.00(ft)
and X = 900.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
35.00(ft) Line Segments Define Each Trial Failure Surface.

Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 10.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 4.096 FS Min = 1.553 FS Ave = 2.441
Standard Deviation = 0.521 Coefficient of Variation = 21.34 %
Failure Surface Specified By 14 Coordinate Points

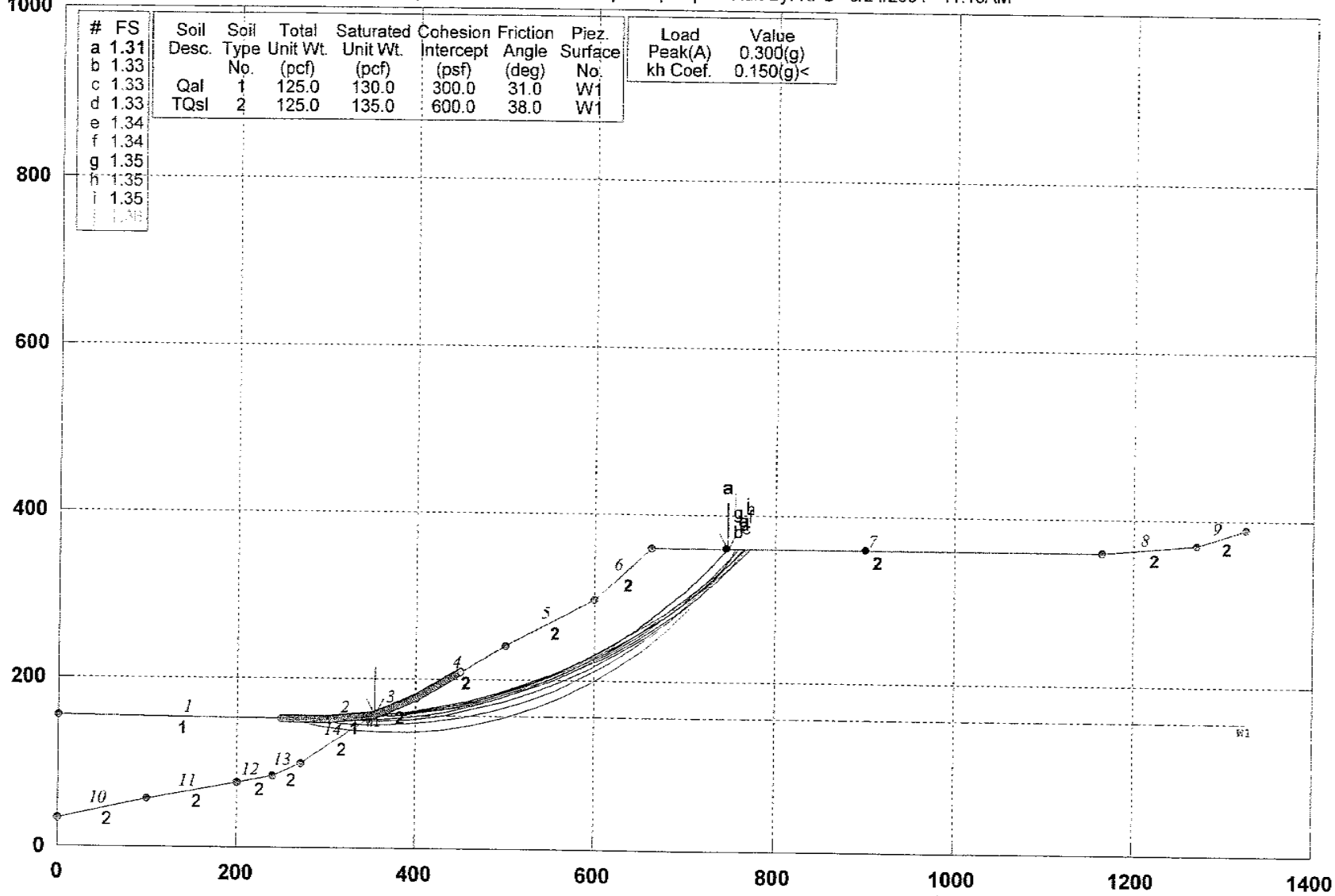
Point No.	X-Surf (ft)	Y-Surf (ft)
1	355.05	157.92
2	389.95	160.55
3	424.60	165.51
4	458.84	172.77
5	492.51	182.30
6	525.48	194.05
7	557.59	207.99
8	588.69	224.03
9	618.66	242.12
10	647.34	262.17
11	674.63	284.09
12	700.39	307.79
13	724.51	333.15
14	746.83	360.00

Circle Center At X = 333.14 ; Y = 681.21 ; and Radius = 523.75
Factor of Safety
*** 1.553 ***
Individual data on the 17 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	34.9	28273.9	0.0	0.0	0.	0.	0.0	0.0	0.0
2	10.0	18197.9	0.0	0.0	0.	0.	0.0	0.0	0.0
3	24.6	67276.8	0.0	0.0	0.	0.	0.0	0.0	0.0
4	34.2	148638.0	0.0	0.0	0.	0.	0.0	0.0	0.0
5	33.7	199490.8	0.0	0.0	0.	0.	0.0	0.0	0.0
6	7.5	50570.6	0.0	0.0	0.	0.	0.0	0.0	0.0
7	25.5	183944.4	0.0	0.0	0.	0.	0.0	0.0	0.0
8	32.1	251450.2	0.0	0.0	0.	0.	0.0	0.0	0.0
9	31.1	255362.0	0.0	0.0	0.	0.	0.0	0.0	0.0
10	11.3	93755.5	0.0	0.0	0.	0.	0.0	0.0	0.0
11	18.7	163202.8	0.0	0.0	0.	0.	0.0	0.0	0.0
12	28.7	281089.7	0.0	0.0	0.	0.	0.0	0.0	0.0
13	14.7	154793.1	0.0	0.0	0.	0.	0.0	0.0	0.0
14	12.6	127841.1	0.0	0.0	0.	0.	0.0	0.0	0.0
15	25.8	206277.3	0.0	0.0	0.	0.	0.0	0.0	0.0
16	24.1	119193.4	0.0	0.0	0.	0.	0.0	0.0	0.0
17	22.3	37458.2	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 2-2'; pseudostatic; circular

n:\projects\2000-2499\2023\slopes\t2ps1.pl2 Run By: KPC 6/24/2004 11:13AM



GSTABL7 v.2 FSmin=1.31

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No. 6

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/24/2004
Time of Run: 11:13AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t2ps1.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t2ps1.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopeps1.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 2-2'; pseudostatic; circular

BOUNDARY COORDINATES
9 Top Boundaries
14 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	156.00	300.00	152.00	1
2	300.00	152.00	353.00	157.00	1
3	353.00	157.00	400.00	178.00	2
4	400.00	178.00	500.00	240.00	2
5	500.00	240.00	600.00	297.00	2
6	600.00	297.00	662.00	360.00	2
7	662.00	360.00	1165.00	360.00	2
8	1165.00	360.00	1270.00	370.00	2
9	1270.00	370.00	1325.00	390.00	2
10	0.00	33.00	100.00	57.00	2
11	100.00	57.00	200.00	76.00	2
12	200.00	76.00	240.00	85.00	2
13	240.00	85.00	272.00	100.00	2
14	272.00	100.00	353.00	157.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	31.0	0.00	0.0	1
2	125.0	135.0	600.0	38.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	353.00	157.00
2	1325.00	157.00

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 250.00(ft)
and X = 450.00(ft)
Each Surface Terminates Between X = 745.00(ft)

and X = 900.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
35.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 10.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 3.173 FS Min = 1.308 FS Ave = 1.971
Standard Deviation = 0.405 Coefficient of Variation = 20.53 %
Failure Surface Specified By 14 Coordinate Points

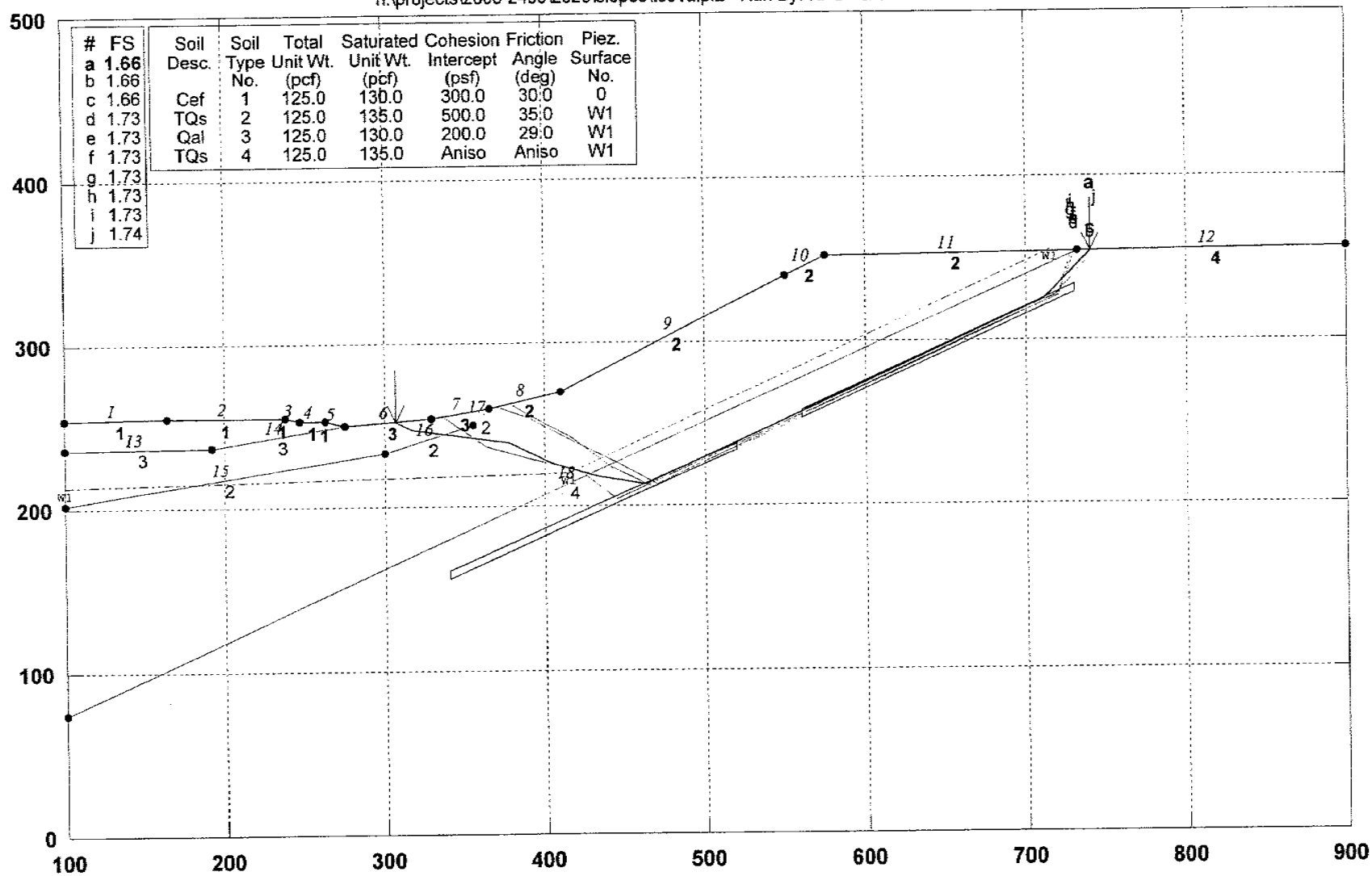
Point No.	X-Surf (ft)	Y-Surf (ft)
1	355.05	157.92
2	389.95	160.55
3	424.60	165.51
4	458.84	172.77
5	492.51	182.30
6	525.48	194.05
7	557.59	207.99
8	588.69	224.03
9	618.66	242.12
10	647.34	262.17
11	674.63	284.09
12	700.39	307.79
13	724.51	333.15
14	746.83	360.00

Circle Center At X = 333.14 ; Y = 681.21 ; and Radius = 523.75
Factor of Safety
*** 1.308 ***
Individual data on the 17 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	34.9	28273.9	0.0	0.0	0.	0.	4241.1	0.0	0.0
2	10.0	18197.9	0.0	0.0	0.	0.	2729.7	0.0	0.0
3	24.6	67276.8	0.0	0.0	0.	0.	10091.5	0.0	0.0
4	34.2	148638.0	0.0	0.0	0.	0.	22295.7	0.0	0.0
5	33.7	199490.8	0.0	0.0	0.	0.	29923.6	0.0	0.0
6	7.5	50570.6	0.0	0.0	0.	0.	7585.6	0.0	0.0
7	25.5	183944.4	0.0	0.0	0.	0.	27591.7	0.0	0.0
8	32.1	251450.2	0.0	0.0	0.	0.	37717.5	0.0	0.0
9	31.1	255362.0	0.0	0.0	0.	0.	38304.3	0.0	0.0
10	11.3	93755.5	0.0	0.0	0.	0.	14063.3	0.0	0.0
11	18.7	163202.8	0.0	0.0	0.	0.	24480.4	0.0	0.0
12	28.7	281089.7	0.0	0.0	0.	0.	42163.5	0.0	0.0
13	14.7	154793.1	0.0	0.0	0.	0.	23219.0	0.0	0.0
14	12.6	127841.1	0.0	0.0	0.	0.	19176.2	0.0	0.0
15	25.8	206277.3	0.0	0.0	0.	0.	30941.6	0.0	0.0
16	24.1	119193.4	0.0	0.0	0.	0.	17879.0	0.0	0.0
17	22.3	37458.2	0.0	0.0	0.	0.	5618.7	0.0	0.0

Mesas East, x-sec 3-3'; static; critical bedding plane

n:\projects\2000-2499\2023\slopes\t3s1a.pl2 Run By: KPC 6/24/2004 11:59AM



#	FS
a	1.66
b	1.66
c	1.66
d	1.73
e	1.73
f	1.73
g	1.73
h	1.73
i	1.73
j	1.74

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
TQs	2	125.0	135.0	500.0	35.0	W1
Qal	3	125.0	130.0	200.0	29.0	W1
TQs	4	125.0	135.0	Aniso	Aniso	W1

GSTABL7 v.2 FSmin=1.66

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 7

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/24/2004
Time of Run: 11:59AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t3s1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t3s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopes1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 3-3'; static;
critical bedding plane

BOUNDARY COORDINATES
12 Top Boundaries
18 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	100.00	254.00	164.00	255.00	1
2	164.00	255.00	238.00	255.00	1
3	238.00	255.00	247.00	253.00	1
4	247.00	253.00	263.00	253.00	1
5	263.00	253.00	275.00	250.00	1
6	275.00	250.00	329.00	254.00	3
7	329.00	254.00	365.00	260.00	3
8	365.00	260.00	410.00	270.00	2
9	410.00	270.00	550.00	340.00	2
10	550.00	340.00	575.00	352.00	2
11	575.00	352.00	732.00	354.00	2
12	732.00	354.00	900.00	356.00	4
13	100.00	236.00	192.00	237.00	3
14	192.00	237.00	275.00	250.00	3
15	100.00	202.00	300.00	233.00	2
16	300.00	233.00	355.00	250.00	2
17	355.00	250.00	365.00	260.00	2
18	100.00	74.00	732.00	354.00	4

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	135.0	500.0	35.0	0.00	0.0	1
3	125.0	130.0	200.0	29.0	0.00	0.0	1
4	125.0	135.0	300.0	31.0	0.00	0.0	1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 4 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	22.5	300.00	31.00
2	25.5	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 3 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	100.00	213.00
2	415.00	220.00
3	715.00	355.00

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	340.00	158.00	520.00	236.00	5.00
2	560.00	255.00	730.00	331.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 3.265 FS Min = 1.659 FS Ave = 2.125
Standard Deviation = 0.291 Coefficient of Variation = 13.69 %
Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	307.15	252.38
2	318.16	247.39
3	347.77	242.59
4	377.58	239.23
5	404.55	226.08
6	433.31	217.55
7	462.90	212.62
8	711.19	324.80
9	732.29	346.13
10	740.00	354.10

Factor of Safety
*** 1.659 ***

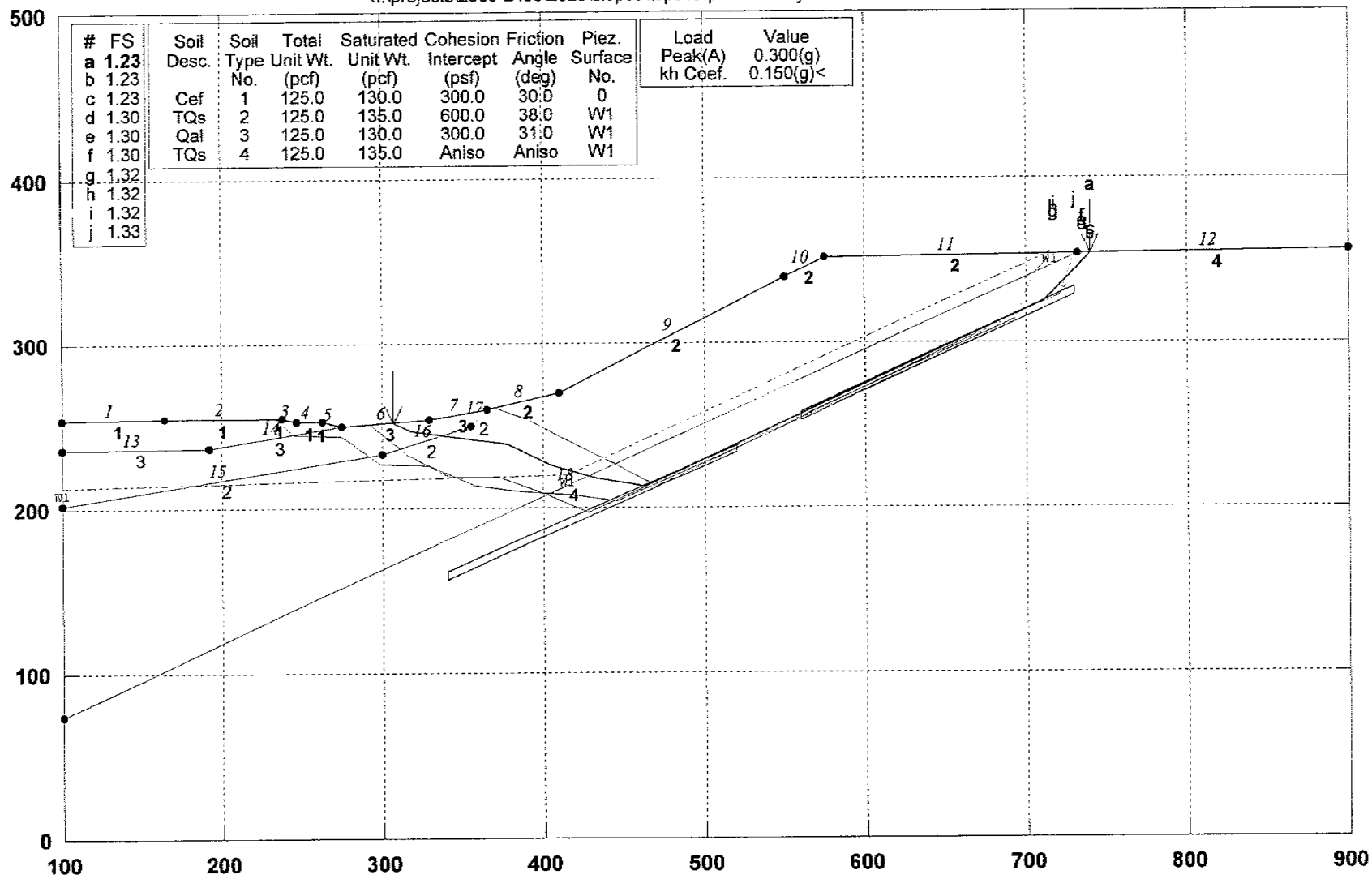
Individual data on the 20 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	11.0	3994.9	0.0	0.0	0.	0.	0.0	0.0	0.0
2	10.8	9599.3	0.0	0.0	0.	0.	0.0	0.0	0.0
3	7.8	9393.6	0.0	0.0	0.	0.	0.0	0.0	0.0
4	11.0	17478.1	0.0	0.0	0.	0.	0.0	0.0	0.0
5	7.2	14046.4	0.0	0.0	0.	0.	0.0	0.0	0.0
6	10.0	22444.4	0.0	0.0	0.	0.	0.0	0.0	0.0
7	12.6	33756.9	0.0	0.0	0.	0.	0.0	0.0	0.0
8	27.0	111703.7	0.0	0.0	0.	0.	0.0	0.0	0.0
9	5.4	30048.3	0.0	0.0	0.	0.	0.0	0.0	0.0
10	9.0	55217.3	0.0	0.0	0.	0.	0.0	0.0	0.0
11	8.7	61682.2	0.0	1702.6	0.	0.	0.0	0.0	0.0

12	5.6	43541.9	0.0	2860.4	0.	0.	0.0	0.0	0.0
13	29.6	278990.6	0.0	33967.7	0.	0.	0.0	0.0	0.0
14	87.1	958507.2	0.0	*******	0.	0.	0.0	0.0	0.0
15	25.0	282764.5	0.0	45076.3	0.	0.	0.0	0.0	0.0
16	136.2	1037204.2	0.0	*******	0.	0.	0.0	0.0	0.0
17	3.8	13836.0	0.0	8490.5	0.	0.	0.0	0.0	0.0
18	17.0	38201.2	3306.1	29807.1	0.	0.	0.0	0.0	0.0
19	0.3	311.0	131.0	390.6	0.	0.	0.0	0.0	0.0
20	7.7	4099.9	4453.6	9126.8	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 3-3'; pseudostatic; critical bedding plane

n:\projects\2000-2499\2023\slopes\t3ps1a.pl2 Run By: KPC 6/24/2004 12:40PM



GSTABL7 v.2 FSmin=1.23

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 8

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/24/2004
Time of Run: 12:40PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t3ps1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t3ps1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopeps1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 3-3'; pseudostatic;
critical bedding plane

BOUNDARY COORDINATES
12 Top Boundaries
18 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	100.00	254.00	164.00	255.00	1
2	164.00	255.00	238.00	255.00	1
3	238.00	255.00	247.00	253.00	1
4	247.00	253.00	263.00	253.00	1
5	263.00	253.00	275.00	250.00	1
6	275.00	250.00	329.00	254.00	3
7	329.00	254.00	365.00	260.00	3
8	365.00	260.00	410.00	270.00	2
9	410.00	270.00	550.00	340.00	2
10	550.00	340.00	575.00	352.00	2
11	575.00	352.00	732.00	354.00	2
12	732.00	354.00	900.00	356.00	4
13	100.00	236.00	192.00	237.00	3
14	192.00	237.00	275.00	250.00	3
15	100.00	202.00	300.00	233.00	2
16	300.00	233.00	355.00	250.00	2
17	355.00	250.00	365.00	260.00	2
18	100.00	74.00	732.00	354.00	4

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	135.0	600.0	38.0	0.00	0.0	1
3	125.0	130.0	300.0	31.0	0.00	0.0	1
4	125.0	135.0	400.0	38.0	0.00	0.0	1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 4 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	22.5	400.00	38.00
2	25.5	200.00	20.00
3	90.0	400.00	38.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 3 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	100.00	213.00
2	415.00	220.00
3	715.00	355.00

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	340.00	158.00	520.00	236.00	5.00
2	560.00	255.00	730.00	331.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 2.825 FS Min = 1.231 FS Ave = 1.661
Standard Deviation = 0.234 Coefficient of Variation = 14.08 %
Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	307.15	252.38
2	318.16	247.39
3	347.77	242.59
4	377.58	239.23
5	404.55	226.08
6	433.31	217.55
7	462.90	212.62
8	711.19	324.80
9	732.29	346.13
10	740.00	354.10

Factor of Safety
*** 1.231 ***

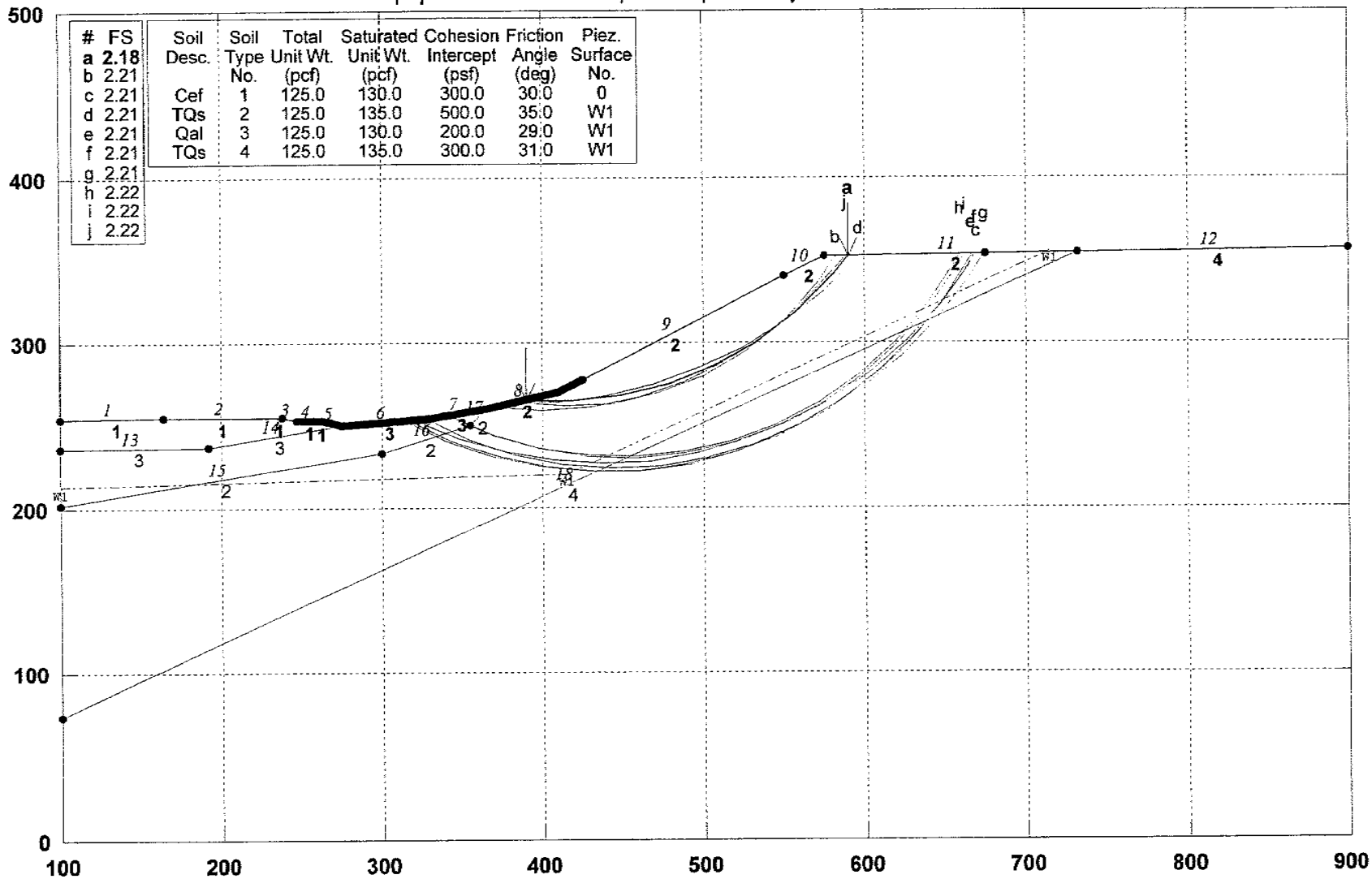
Individual data on the 20 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	11.0	3994.9	0.0	0.0	0.	0.	599.2	0.0	0.0
2	10.8	9599.3	0.0	0.0	0.	0.	1439.9	0.0	0.0
3	7.8	9393.6	0.0	0.0	0.	0.	1409.0	0.0	0.0
4	11.0	17478.1	0.0	0.0	0.	0.	2621.7	0.0	0.0
5	7.2	14046.4	0.0	0.0	0.	0.	2107.0	0.0	0.0
6	10.0	22444.4	0.0	0.0	0.	0.	3366.7	0.0	0.0
7	12.6	33756.9	0.0	0.0	0.	0.	5063.5	0.0	0.0

8	27.0	111703.7	0.0	0.0	0.	0.	16755.6	0.0	0.0
9	5.4	30048.3	0.0	0.0	0.	0.	4507.2	0.0	0.0
10	9.0	55217.3	0.0	0.0	0.	0.	8282.6	0.0	0.0
11	8.7	61682.2	0.0	1702.6	0.	0.	9252.3	0.0	0.0
12	5.6	43541.9	0.0	2860.4	0.	0.	6531.3	0.0	0.0
13	29.6	278990.6	0.0	33967.7	0.	0.	41848.6	0.0	0.0
14	87.1	958507.2	0.0	*******	0.	0.	*******	0.0	0.0
15	25.0	282764.5	0.0	45076.3	0.	0.	42414.7	0.0	0.0
16	136.2	1037204.2	0.0	*******	0.	0.	*******	0.0	0.0
17	3.8	13836.0	0.0	8490.5	0.	0.	2075.4	0.0	0.0
18	17.0	38201.2	3306.1	29807.1	0.	0.	5730.2	0.0	0.0
19	0.3	311.0	131.0	390.6	0.	0.	46.6	0.0	0.0
20	7.7	4099.9	4453.6	9126.8	0.	0.	615.0	0.0	0.0

Mesas East, x-sec 3-3'; static; circular

n:\projects\2000-2499\2023\slopes\t3s2a.pl2 Run By: KPC 6/24/2004 01:30PM



#	FS
a	2.18
b	2.21
c	2.21
d	2.21
e	2.21
f	2.21
g	2.21
h	2.22
i	2.22
j	2.22

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
TQs	2	125.0	135.0	500.0	35.0	W1
Qal	3	125.0	130.0	200.0	29.0	W1
TQs	4	125.0	135.0	300.0	31.0	W1

GSTABL7 v.2 FSmin=2.18

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 9

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:          6/24/2004
Time of Run:                01:30PM
Run By:                     KPC
Input Data Filename:        N:\Projects\2000-2499\2023\Slopes\t3s2a.in
Output Filename:            N:\Projects\2000-2499\2023\Slopes\t3s2a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\2000-2499\2023\Slopes2a.PLT
PROBLEM DESCRIPTION:  Mesas East, x-sec 3-3'; static;
                      circular
BOUNDARY COORDINATES
   12 Top   Boundaries
   18 Total Boundaries
Boundary     X-Left      Y-Left      X-Right     Y-Right     Soil Type
   No.        (ft)        (ft)        (ft)        (ft)      Below Bnd
    1        100.00      254.00      164.00      255.00        1
    2        164.00      255.00      238.00      255.00        1
    3        238.00      255.00      247.00      253.00        1
    4        247.00      253.00      263.00      253.00        1
    5        263.00      253.00      275.00      250.00        1
    6        275.00      250.00      329.00      254.00        3
    7        329.00      254.00      365.00      260.00        3
    8        365.00      260.00      410.00      270.00        2
    9        410.00      270.00      550.00      340.00        2
   10        550.00      340.00      575.00      352.00        2
   11        575.00      352.00      732.00      354.00        2
   12        732.00      354.00      900.00      356.00        4
   13        100.00      236.00      192.00      237.00        3
   14        192.00      237.00      275.00      250.00        3
   15        100.00      202.00      300.00      233.00        2
   16        300.00      233.00      355.00      250.00        2
   17        355.00      250.00      365.00      260.00        2
   18        100.00       74.00      732.00      354.00        4
 Default Y-Origin = 0.00(ft)
 Default X-Plus Value = 0.00(ft)
 Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  4 Type(s) of Soil
 Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
 Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
  No.  (pcf)    (pcf)     (psf)     (deg)   Param.   (psf)     No.
   1   125.0    130.0     300.0     30.0    0.00      0.0      0
   2   125.0    135.0     500.0     35.0    0.00      0.0      1
   3   125.0    130.0     200.0     29.0    0.00      0.0      1
   4   125.0    135.0     300.0     31.0    0.00      0.0      1
 1 PIEZOMETRIC SURFACE(S) SPECIFIED
 Unit Weight of Water =  62.40 (pcf)
 Piezometric Surface No.  1 Specified by  3 Coordinate Points
 Pore Pressure Inclination Factor =  0.50
   Point       X-Water     Y-Water
    No.         (ft)        (ft)
     1         100.00      213.00
     2         415.00      220.00
     3         715.00      355.00
 A Critical Failure Surface Searching Method, Using A Random
```

Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 250.00(ft)
and X = 425.00(ft)
Each Surface Terminates Between X = 575.00(ft)
and X = 675.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
30.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 3.220 FS Min = 2.183 FS Ave = 2.500
Standard Deviation = 0.189 Coefficient of Variation = 7.54 %
Failure Surface Specified By 9 Coordinate Points

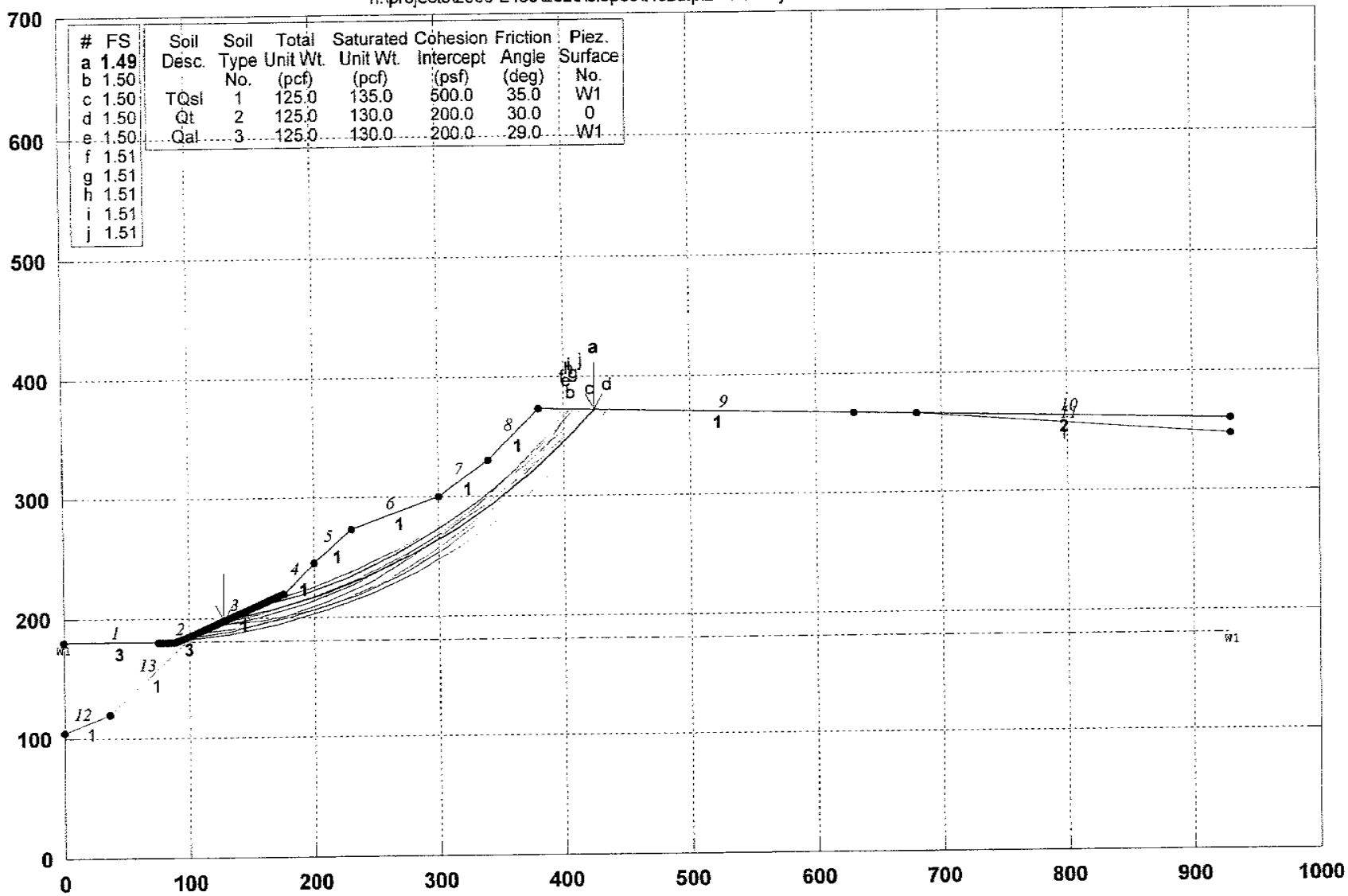
Point No.	X-Surf (ft)	Y-Surf (ft)
1	389.65	265.48
2	419.63	264.63
3	449.47	267.76
4	478.64	274.78
5	506.62	285.60
6	532.93	300.01
7	557.11	317.76
8	578.74	338.55
9	589.61	352.19

Circle Center At X = 411.00 ; Y = 491.43 ; and Radius = 226.95
Factor of Safety
*** 2.183 ***
Individual data on the 11 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	20.4	6480.9	0.0	0.0	0.	0.	0.0	0.0	0.0
2	9.6	9198.5	0.0	0.0	0.	0.	0.0	0.0	0.0
3	29.8	59976.6	0.0	0.0	0.	0.	0.0	0.0	0.0
4	29.2	93899.0	0.0	0.0	0.	0.	0.0	0.0	0.0
5	28.0	108861.4	0.0	0.0	0.	0.	0.0	0.0	0.0
6	26.3	105523.3	0.0	0.0	0.	0.	0.0	0.0	0.0
7	17.1	62848.3	0.0	0.0	0.	0.	0.0	0.0	0.0
8	7.1	23610.3	0.0	0.0	0.	0.	0.0	0.0	0.0
9	17.9	47726.1	0.0	0.0	0.	0.	0.0	0.0	0.0
10	3.7	7141.1	0.0	0.0	0.	0.	0.0	0.0	0.0
11	10.9	9161.9	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 4-4'; Static; circular

n:\projects\2000-2499\2023\slopes\t4s2a.pl2 Run By: KPC 7/6/2004 09:35AM



#	FS
a	1.49
b	1.50
c	1.50
d	1.50
e	1.50
f	1.51
g	1.51
h	1.51
i	1.51
j	1.51

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
TQsl	1	125.0	135.0	500.0	35.0	W1
Qt	2	125.0	130.0	200.0	30.0	0
Qal	3	125.0	130.0	200.0	29.0	W1

GSTABL7 v.2 FSmin=1.49

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 10

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 7/6/2004
Time of Run: 09:35AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t4s2a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t4s2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopes2a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 4-4'; Static; circular

BOUNDARY COORDINATES
10 Top Boundaries
13 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	180.00	88.00	180.00	3
2	88.00	180.00	103.00	186.00	3
3	103.00	186.00	175.00	220.00	1
4	175.00	220.00	200.00	245.00	1
5	200.00	245.00	230.00	273.00	1
6	230.00	273.00	300.00	300.00	1
7	300.00	300.00	339.00	330.00	1
8	339.00	330.00	380.00	373.00	1
9	380.00	373.00	680.00	366.00	1
10	680.00	366.00	930.00	360.00	2
11	680.00	366.00	930.00	348.00	1
12	0.00	105.00	36.00	120.00	1
13	36.00	120.00	103.00	186.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	500.0	35.0	0.00	0.0	1
2	125.0	130.0	200.0	30.0	0.00	0.0	0
3	125.0	130.0	200.0	29.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	180.00
2	930.00	180.00

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 75.00(ft)
and X = 175.00(ft)
Each Surface Terminates Between X = 380.00(ft)
and X = 630.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation

At Which A Surface Extends Is Y = 0.00(ft)
40.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 20.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 4.578 FS Min = 1.493 FS Ave = 2.710
Standard Deviation = 0.745 Coefficient of Variation = 27.49 %
Failure Surface Specified By 10 Coordinate Points

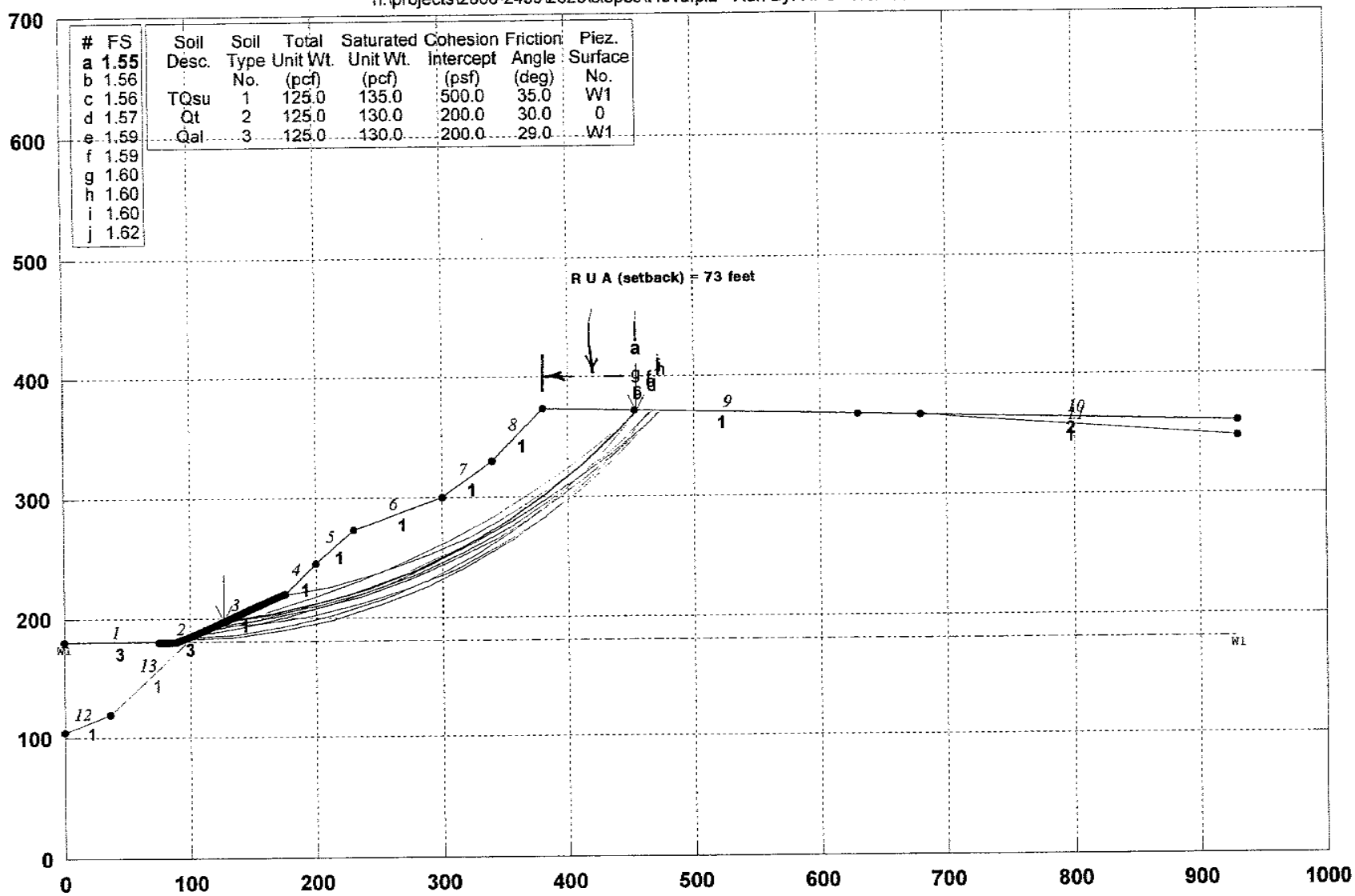
Point No.	X-Surf (ft)	Y-Surf (ft)
1	127.53	197.58
2	166.55	206.37
3	204.75	218.23
4	241.89	233.09
5	277.72	250.86
6	312.03	271.42
7	344.60	294.65
8	375.21	320.39
9	403.68	348.49
10	423.97	371.97

Circle Center At X = 37.46 ; Y = 689.83 ; and Radius = 500.42
Factor of Safety
*** 1.493 ***
Individual data on the 15 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	39.0	23515.9	0.0	0.0	0.	0.	0.0	0.0	0.0
2	8.5	10908.0	0.0	0.0	0.	0.	0.0	0.0	0.0
3	25.0	61335.0	0.0	0.0	0.	0.	0.0	0.0	0.0
4	4.7	17646.3	0.0	0.0	0.	0.	0.0	0.0	0.0
5	25.3	119734.9	0.0	0.0	0.	0.	0.0	0.0	0.0
6	11.9	66231.6	0.0	0.0	0.	0.	0.0	0.0	0.0
7	35.8	190471.7	0.0	0.0	0.	0.	0.0	0.0	0.0
8	22.3	106285.7	0.0	0.0	0.	0.	0.0	0.0	0.0
9	12.0	55362.3	0.0	0.0	0.	0.	0.0	0.0	0.0
10	27.0	130077.7	0.0	0.0	0.	0.	0.0	0.0	0.0
11	5.6	28185.3	0.0	0.0	0.	0.	0.0	0.0	0.0
12	30.6	169926.8	0.0	0.0	0.	0.	0.0	0.0	0.0
13	4.8	28564.3	0.0	0.0	0.	0.	0.0	0.0	0.0
14	23.7	106338.3	0.0	0.0	0.	0.	0.0	0.0	0.0
15	20.3	30370.7	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 4-4'; Static; circular

n:\projects\2000-2499\2023\slopes\t4s1a.pl2 Run By: KPC 7/6/2004 09:42AM



#	FS
a	1.55
b	1.56
c	1.56
d	1.57
e	1.59
f	1.59
g	1.60
h	1.60
i	1.60
j	1.62

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
TQsu	1	125.0	135.0	500.0	35.0	W1
Qt	2	125.0	130.0	200.0	30.0	0
Qal	3	125.0	130.0	200.0	29.0	W1

GSTABL7 v.2 FSmin=1.55

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No. 11

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:          7/6/2004
Time of Run:                09:42AM
Run By:                     KPC
Input Data Filename:        N:\Projects\2000-2499\2023\Slopes\t4s1a.in
Output Filename:            N:\Projects\2000-2499\2023\Slopes\t4s1a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\2000-2499\2023\Slopes1a.PLT
PROBLEM DESCRIPTION:  Mesas East, x-sec 4-4'; Static;
                      circular
BOUNDARY COORDINATES
   10 Top   Boundaries
   13 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	180.00	88.00	180.00	3
2	88.00	180.00	103.00	186.00	3
3	103.00	186.00	175.00	220.00	1
4	175.00	220.00	200.00	245.00	1
5	200.00	245.00	230.00	273.00	1
6	230.00	273.00	300.00	300.00	1
7	300.00	300.00	339.00	330.00	1
8	339.00	330.00	380.00	373.00	1
9	380.00	373.00	680.00	366.00	1
10	680.00	366.00	930.00	360.00	2
11	680.00	366.00	930.00	348.00	1
12	0.00	105.00	36.00	120.00	1
13	36.00	120.00	103.00	186.00	1

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  3 Type(s) of Soil
```

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	500.0	35.0	0.00	0.0	1
2	125.0	130.0	200.0	30.0	0.00	0.0	0
3	125.0	130.0	200.0	29.0	0.00	0.0	1

```
1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water =  62.40 (pcf)
Piezometric Surface No.  1 Specified by  2 Coordinate Points
Pore Pressure Inclination Factor =  0.50
```

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	180.00
2	930.00	180.00

```
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
  10 Surface(s) Initiate(s) From Each Of   100 Points Equally Spaced
Along The Ground Surface Between  X =  75.00(ft)
                                and  X = 175.00(ft)
Each Surface Terminates Between   X = 453.00(ft)
                                and  X = 630.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
```

At Which A Surface Extends Is Y = 0.00(ft)
40.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 4.617 FS Min = 1.552 FS Ave = 2.807
Standard Deviation = 0.698 Coefficient of Variation = 24.89 %
Failure Surface Specified By 11 Coordinate Points

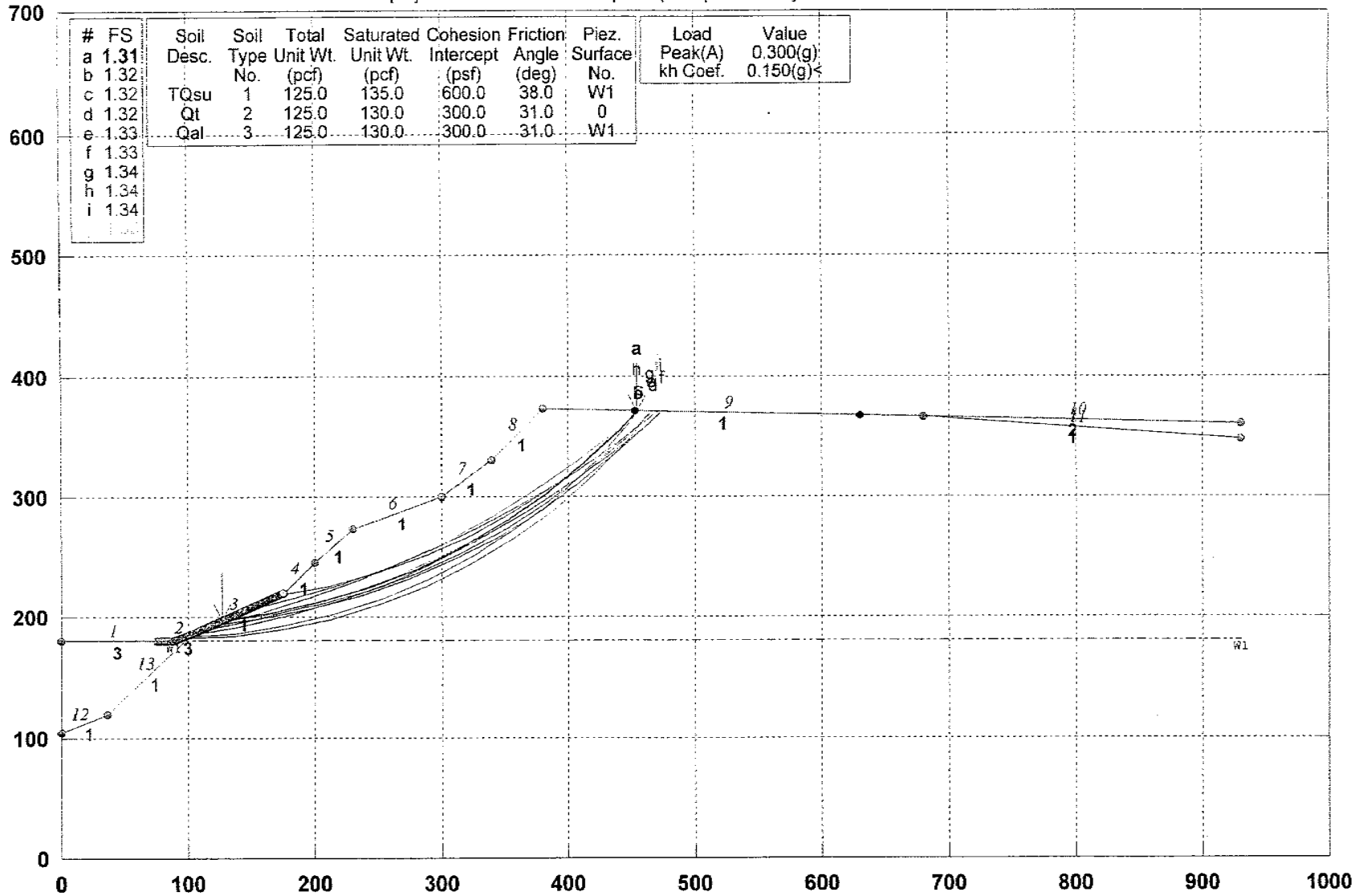
Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.52	197.10
2	166.06	203.15
3	205.00	212.30
4	243.09	224.48
5	280.11	239.64
6	315.82	257.67
7	349.99	278.46
8	382.42	301.88
9	412.90	327.78
10	441.24	356.01
11	454.30	371.27

Circle Center At X = 69.76 ; Y = 700.61 ; and Radius = 506.70
Factor of Safety
*** 1.552 ***
Individual data on the 16 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	39.5	31202.9	0.0	0.0	0.	0.	0.0	0.0	0.0
2	8.9	15303.4	0.0	0.0	0.	0.	0.0	0.0	0.0
3	25.0	75979.2	0.0	0.0	0.	0.	0.0	0.0	0.0
4	5.0	22246.2	0.0	0.0	0.	0.	0.0	0.0	0.0
5	25.0	140758.7	0.0	0.0	0.	0.	0.0	0.0	0.0
6	13.1	86966.1	0.0	0.0	0.	0.	0.0	0.0	0.0
7	37.0	245825.4	0.0	0.0	0.	0.	0.0	0.0	0.0
8	19.9	128039.9	0.0	0.0	0.	0.	0.0	0.0	0.0
9	15.8	103618.9	0.0	0.0	0.	0.	0.0	0.0	0.0
10	23.2	163325.8	0.0	0.0	0.	0.	0.0	0.0	0.0
11	11.0	83319.4	0.0	0.0	0.	0.	0.0	0.0	0.0
12	30.0	254954.4	0.0	0.0	0.	0.	0.0	0.0	0.0
13	2.4	21746.8	0.0	0.0	0.	0.	0.0	0.0	0.0
14	30.5	220037.2	0.0	0.0	0.	0.	0.0	0.0	0.0
15	28.3	106284.4	0.0	0.0	0.	0.	0.0	0.0	0.0
16	13.1	12707.0	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 4-4'; pseudostatic; circular

n:\projects\2000-2499\2023\slopes\t4ps1a.pl2 Run By: KPC 7/6/2004 09:46AM



GSTABL7 v.2 FSmin=1.31

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 12

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 7/6/2004
Time of Run: 09:46AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t4ps1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t4ps1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopeps1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 4-4'; pseudostatic; circular

BOUNDARY COORDINATES
10 Top Boundaries
13 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	180.00	88.00	180.00	3
2	88.00	180.00	103.00	186.00	3
3	103.00	186.00	175.00	220.00	1
4	175.00	220.00	200.00	245.00	1
5	200.00	245.00	230.00	273.00	1
6	230.00	273.00	300.00	300.00	1
7	300.00	300.00	339.00	330.00	1
8	339.00	330.00	380.00	373.00	1
9	380.00	373.00	680.00	366.00	1
10	680.00	366.00	930.00	360.00	2
11	680.00	366.00	930.00	348.00	1
12	0.00	105.00	36.00	120.00	1
13	36.00	120.00	103.00	186.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	600.0	38.0	0.00	0.0	1
2	125.0	130.0	300.0	31.0	0.00	0.0	0
3	125.0	130.0	300.0	31.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	88.00	180.00
2	930.00	180.00

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 75.00(ft)
and X = 175.00(ft)
Each Surface Terminates Between X = 453.00(ft)

and X = 630.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
40.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 3.451 FS Min = 1.309 FS Ave = 2.221
Standard Deviation = 0.517 Coefficient of Variation = 23.29 %
Failure Surface Specified By 11 Coordinate Points

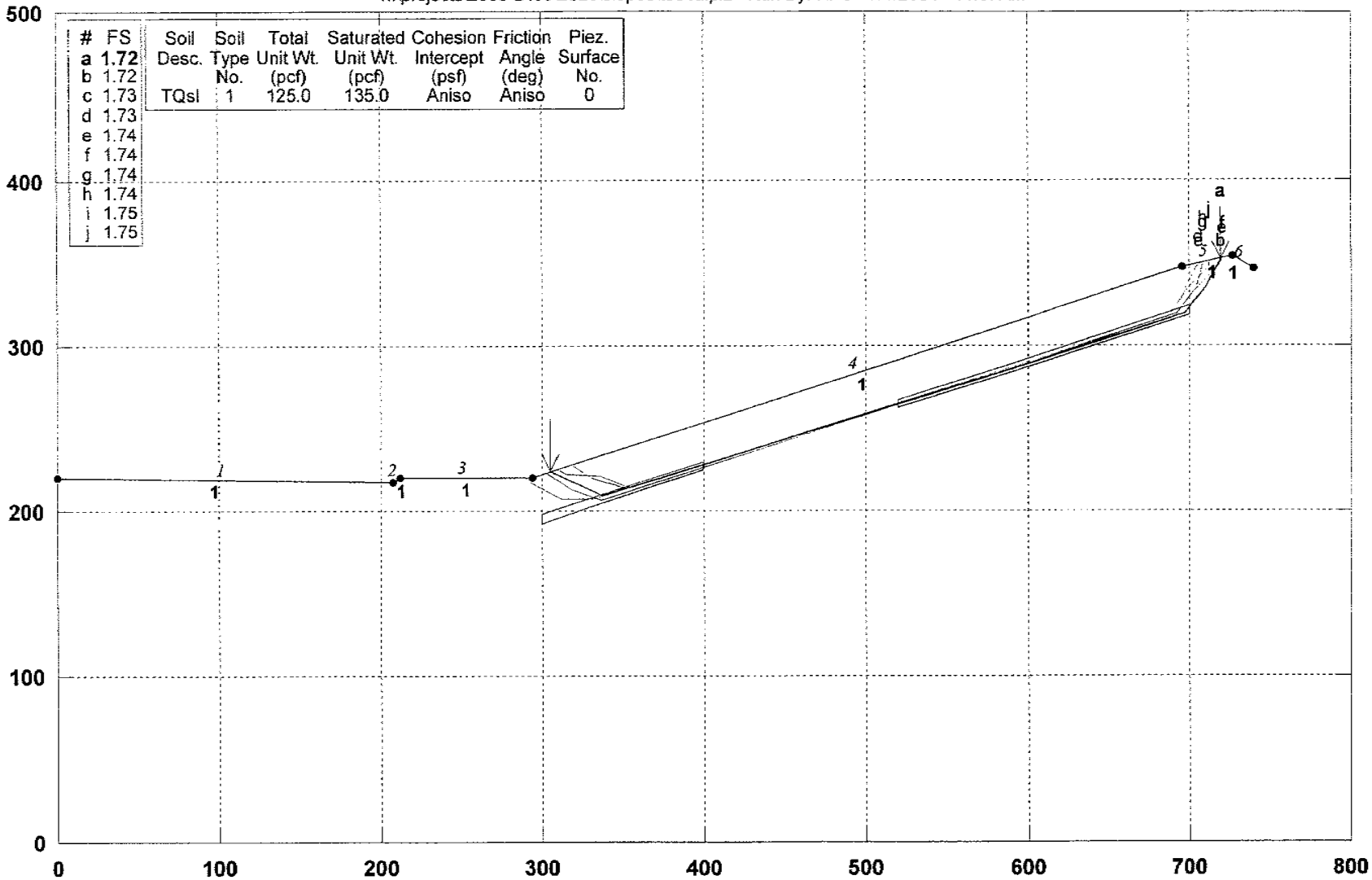
Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.52	197.10
2	166.06	203.15
3	205.00	212.30
4	243.09	224.48
5	280.11	239.64
6	315.82	257.67
7	349.99	278.46
8	382.42	301.88
9	412.90	327.78
10	441.24	356.01
11	454.30	371.27

Circle Center At X = 69.76 ; Y = 700.61 ; and Radius = 506.70
Factor of Safety
*** 1.309 ***
Individual data on the 16 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	39.5	31202.9	0.0	0.0	0.	0.	4680.4	0.0	0.0
2	8.9	15303.4	0.0	0.0	0.	0.	2295.5	0.0	0.0
3	25.0	75979.2	0.0	0.0	0.	0.	11396.9	0.0	0.0
4	5.0	22246.2	0.0	0.0	0.	0.	3336.9	0.0	0.0
5	25.0	140758.7	0.0	0.0	0.	0.	21113.8	0.0	0.0
6	13.1	86966.1	0.0	0.0	0.	0.	13044.9	0.0	0.0
7	37.0	245825.4	0.0	0.0	0.	0.	36873.8	0.0	0.0
8	19.9	128039.9	0.0	0.0	0.	0.	19206.0	0.0	0.0
9	15.8	103618.9	0.0	0.0	0.	0.	15542.8	0.0	0.0
10	23.2	163325.8	0.0	0.0	0.	0.	24498.9	0.0	0.0
11	11.0	83319.4	0.0	0.0	0.	0.	12497.9	0.0	0.0
12	30.0	254954.4	0.0	0.0	0.	0.	38243.2	0.0	0.0
13	2.4	21746.8	0.0	0.0	0.	0.	3262.0	0.0	0.0
14	30.5	220037.2	0.0	0.0	0.	0.	33005.6	0.0	0.0
15	28.3	106284.4	0.0	0.0	0.	0.	15942.7	0.0	0.0
16	13.1	12707.0	0.0	0.0	0.	0.	1906.1	0.0	0.0

Mesas East, x-sec 5-5'; CS-5b; critical bedding plane; static

n:\projects\2000-2499\2023\slopes\t5s4a.pl2 Run By: KPC 7/1/2004 11:07AM



GSTABL7 v.2 FSmin=1.72

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 13

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*****************************************************************************
Analysis Run Date:        7/1/2004
Time of Run:              11:07AM
Run By:                   KPC
Input Data Filename:      N:\Projects\2000-2499\2023\Slopes\t5s4a.in
Output Filename:          N:\Projects\2000-2499\2023\Slopes\t5s4a.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\2000-2499\2023\Slopes4a.PLT
PROBLEM DESCRIPTION:  Mesas East, x-sec 5-5'; CS-5b;
                      critical bedding plane; static
BOUNDARY COORDINATES
    6 Top   Boundaries
    6 Total Boundaries
Boundary     X-Left     Y-Left     X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00      220.00     207.00     217.00        1
    2       207.00      217.00     212.00     220.00        1
    3       212.00      220.00     294.00     220.00        1
    4       294.00      220.00     696.00     347.00        1
    5       696.00      347.00     727.00     353.00        1
    6       727.00      353.00     740.00     346.00        1
 Default Y-Origin = 0.00(ft)
 Default X-Plus Value = 0.00(ft)
 Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  1 Type(s) of Soil
 Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
 Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
  No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
   1   125.0    135.0     500.0     35.0    0.00      0.0       0
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  1 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise     Cohesion     Friction
   Range       Direction Limit    Intercept      Angle
    No.            (deg)            (psf)        (deg)
     1             16.5             500.00        35.00
     2             19.5             200.00        20.00
     3             90.0             500.00        35.00
 ANISOTROPIC SOIL NOTES:
    (1) An input value of 0.01 for C and/or Phi will cause Aniso
        C and/or Phi to be ignored in that range.
    (2) An input value of 0.02 for Phi will set both Phi and
        C equal to zero, with no water weight in the tension crack.
    (3) An input value of 0.03 for Phi will set both Phi and
        C equal to zero, with water weight in the tension crack.
 Janbus Empirical Coef is being used for the case of  c & phi both > 0
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Sliding Block Surfaces, Has Been
 Specified.
 1000 Trial Surfaces Have Been Generated.
 2 Boxes Specified For Generation Of Central Block Base
 Length Of Line Segments For Active And Passive Portions Of
 Sliding Block Is  20.0
```

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	300.00	195.00	400.00	227.00	5.00
2	520.00	265.00	700.00	321.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 4.043 FS Min = 1.724 FS Ave = 2.017
Standard Deviation = 0.276 Coefficient of Variation = 13.70 %
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	305.10	223.51
2	319.51	217.80
3	337.42	208.91
4	697.66	319.46
5	710.69	334.63
6	719.29	351.51

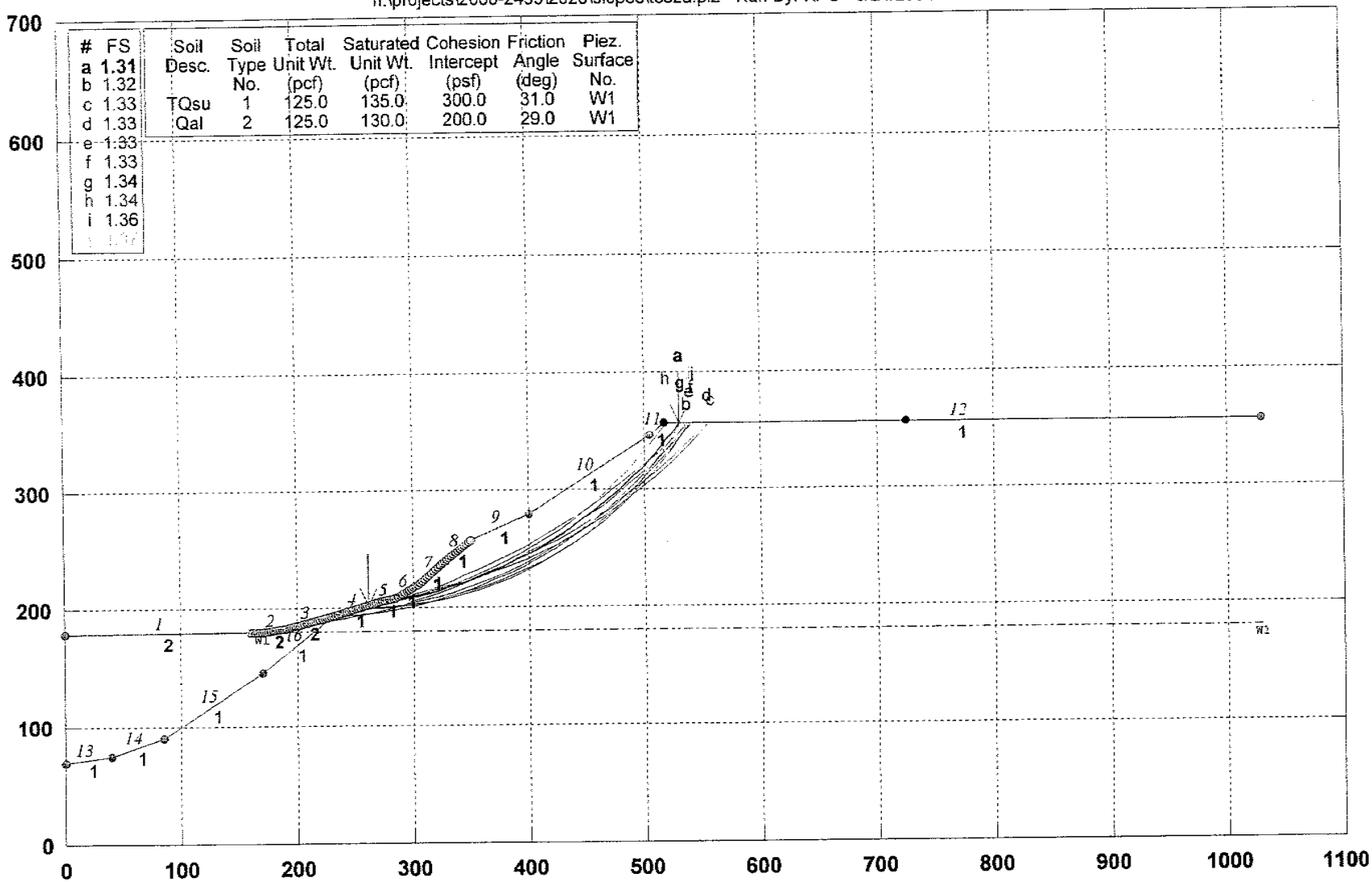
Factor of Safety
*** 1.724 ***

Individual data on the 6 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	14.4	9238.4	0.0	0.0	0.	0.	0.0	0.0	0.0
2	17.9	39262.3	0.0	0.0	0.	0.	0.0	0.0	0.0
3	358.6	1184772.5	0.0	0.0	0.	0.	0.0	0.0	0.0
4	1.7	5801.2	0.0	0.0	0.	0.	0.0	0.0	0.0
5	13.0	35095.6	0.0	0.0	0.	0.	0.0	0.0	0.0
6	8.6	8175.2	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 8-8'; Static; Circular

n:\projects\2000-2499\2023\slopes\t8s2a.pl2 Run By: KPC 6/24/2004 01:25PM



GSTABL7 v.2 FSmin=1.31

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No. 14

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/24/2004
Time of Run: 01:25PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t8s2a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t8s2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopes2a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 8-8'; Static; Circular

BOUNDARY COORDINATES
12 Top Boundaries
16 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	179.00	170.00	180.00	2
2	170.00	180.00	190.00	183.00	2
3	190.00	183.00	230.00	193.00	2
4	230.00	193.00	270.00	205.00	1
5	270.00	205.00	285.00	208.00	1
6	285.00	208.00	305.00	220.00	1
7	305.00	220.00	328.00	240.00	1
8	328.00	240.00	350.00	257.00	1
9	350.00	257.00	400.00	280.00	1
10	400.00	280.00	505.00	346.00	1
11	505.00	346.00	517.00	357.00	1
12	517.00	357.00	1030.00	357.00	1
13	0.00	70.00	40.00	75.00	1
14	40.00	75.00	85.00	90.00	1
15	85.00	90.00	170.00	145.00	1
16	170.00	145.00	230.00	193.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.00	0.0	1
2	125.0	130.0	200.0	29.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	170.00	180.00
2	1030.00	180.00

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 160.00(ft)
and X = 350.00(ft)
Each Surface Terminates Between X = 517.00(ft)
and X = 725.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation

At Which A Surface Extends Is Y = 0.00(ft)
15.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 4.119 FS Min = 1.312 FS Ave = 2.248
Standard Deviation = 0.585 Coefficient of Variation = 26.05 %
Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	261.72	202.52
2	276.57	204.58
3	291.34	207.21
4	306.00	210.39
5	320.53	214.12
6	334.91	218.40
7	349.11	223.22
8	363.12	228.57
9	376.92	234.45
10	390.49	240.84
11	403.81	247.74
12	416.86	255.14
13	429.62	263.03
14	442.07	271.39
15	454.20	280.21
16	465.99	289.49
17	477.42	299.21
18	488.47	309.35
19	499.13	319.90
20	509.39	330.84
21	519.23	342.17
22	528.63	353.86
23	530.96	357.00

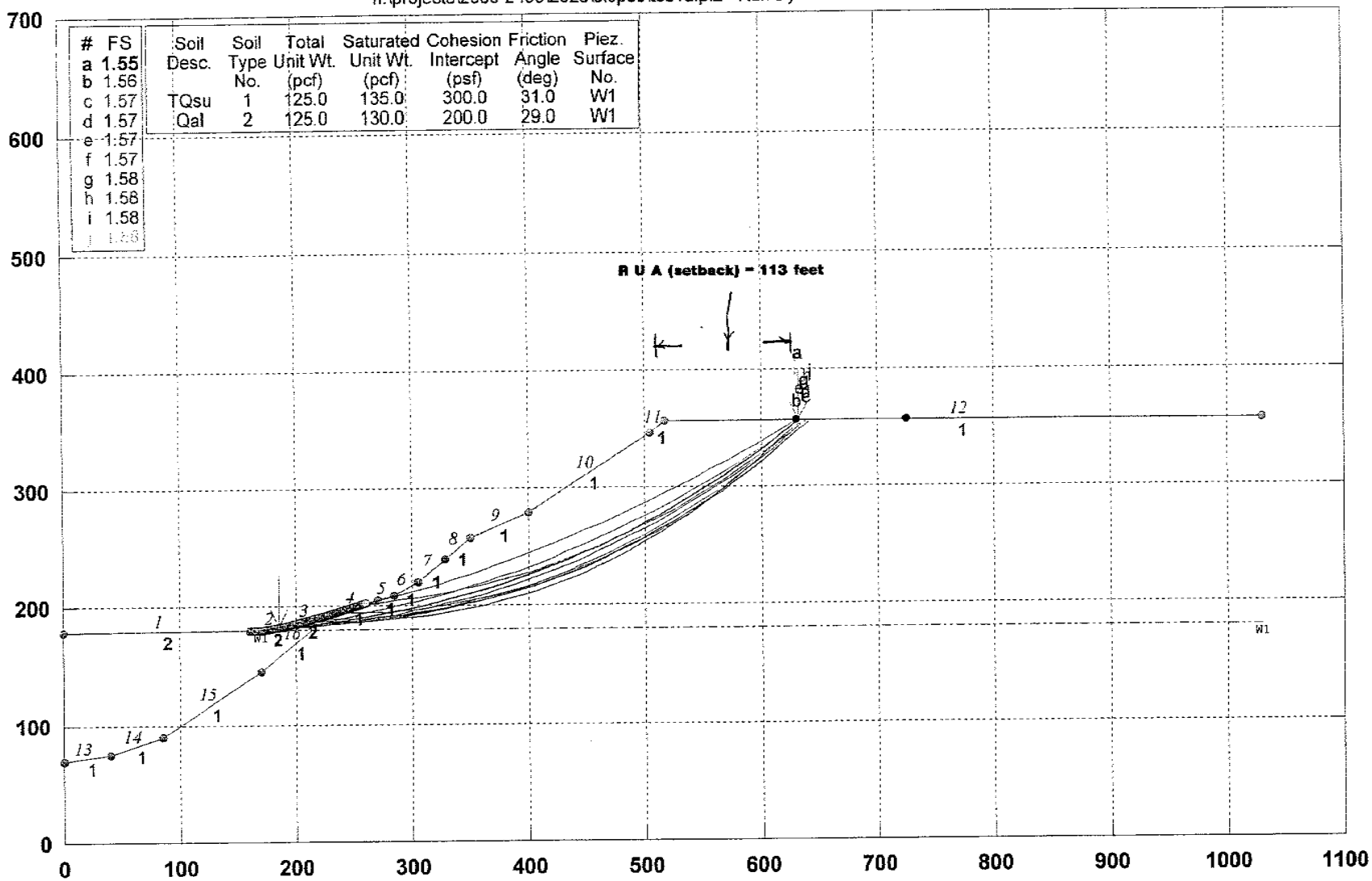
Circle Center At X = 214.41 ; Y = 596.97 ; and Radius = 397.29
Factor of Safety
*** 1.312 ***
Individual data on the 30 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	8.3	689.9	0.0	0.0	0.	0.	0.0	0.0	0.0
2	6.6	1259.5	0.0	0.0	0.	0.	0.0	0.0	0.0
3	8.4	1923.5	0.0	0.0	0.	0.	0.0	0.0	0.0
4	6.3	2583.3	0.0	0.0	0.	0.	0.0	0.0	0.0
5	13.7	12312.9	0.0	0.0	0.	0.	0.0	0.0	0.0
6	1.0	1270.4	0.0	0.0	0.	0.	0.0	0.0	0.0
7	14.5	27114.0	0.0	0.0	0.	0.	0.0	0.0	0.0
8	7.5	20094.3	0.0	0.0	0.	0.	0.0	0.0	0.0
9	6.9	21834.8	0.0	0.0	0.	0.	0.0	0.0	0.0
10	14.2	53293.6	0.0	0.0	0.	0.	0.0	0.0	0.0
11	0.9	3697.2	0.0	0.0	0.	0.	0.0	0.0	0.0
12	13.1	55700.0	0.0	0.0	0.	0.	0.0	0.0	0.0
13	13.8	59865.6	0.0	0.0	0.	0.	0.0	0.0	0.0
14	13.6	59132.8	0.0	0.0	0.	0.	0.0	0.0	0.0
15	9.5	41005.7	0.0	0.0	0.	0.	0.0	0.0	0.0
16	3.8	16416.0	0.0	0.0	0.	0.	0.0	0.0	0.0
17	13.0	57179.4	0.0	0.0	0.	0.	0.0	0.0	0.0
18	12.8	56662.6	0.0	0.0	0.	0.	0.0	0.0	0.0
19	12.5	54989.0	0.0	0.0	0.	0.	0.0	0.0	0.0
20	12.1	52239.3	0.0	0.0	0.	0.	0.0	0.0	0.0

21	11.8	48504.3	0.0	0.0	0.	0.	0.0	0.0	0.0
22	11.4	43884.7	0.0	0.0	0.	0.	0.0	0.0	0.0
23	11.1	38489.7	0.0	0.0	0.	0.	0.0	0.0	0.0
24	10.7	32437.0	0.0	0.0	0.	0.	0.0	0.0	0.0
25	5.9	15495.0	0.0	0.0	0.	0.	0.0	0.0	0.0
26	4.4	10703.4	0.0	0.0	0.	0.	0.0	0.0	0.0
27	7.6	17396.9	0.0	0.0	0.	0.	0.0	0.0	0.0
28	2.2	4481.2	0.0	0.0	0.	0.	0.0	0.0	0.0
29	9.4	10561.4	0.0	0.0	0.	0.	0.0	0.0	0.0
30	2.3	459.3	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 8-8'; Static; Circular

n:\projects\2000-2499\2023\slopes\t8s1a.pl2 Run By: KPC 6/24/2004 08:10AM



#	FS
a	1.55
b	1.56
c	1.57
d	1.57
e	1.57
f	1.57
g	1.58
h	1.58
i	1.58

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
TQsu	1	125.0	135.0	300.0	31.0	W1
Qal	2	125.0	130.0	200.0	29.0	W1

GSTABL7 v.2 FSmin=1.55

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No. 15

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/24/2004
Time of Run: 08:10AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t8s1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t8s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopes1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 8-8'; Static;
Circular

BOUNDARY COORDINATES
12 Top Boundaries
16 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	179.00	170.00	180.00	2
2	170.00	180.00	190.00	183.00	2
3	190.00	183.00	230.00	193.00	2
4	230.00	193.00	270.00	205.00	1
5	270.00	205.00	285.00	208.00	1
6	285.00	208.00	305.00	220.00	1
7	305.00	220.00	328.00	240.00	1
8	328.00	240.00	350.00	257.00	1
9	350.00	257.00	400.00	280.00	1
10	400.00	280.00	505.00	346.00	1
11	505.00	346.00	517.00	357.00	1
12	517.00	357.00	1030.00	357.00	1
13	0.00	70.00	40.00	75.00	1
14	40.00	75.00	85.00	90.00	1
15	85.00	90.00	170.00	145.00	1
16	170.00	145.00	230.00	193.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.00	0.0	1
2	125.0	130.0	200.0	29.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	170.00	180.00
2	1030.00	180.00

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 160.00(ft)
and X = 260.00(ft)
Each Surface Terminates Between X = 630.00(ft)
and X = 725.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation

At Which A Surface Extends Is Y = 0.00(ft)
15.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 2.971 FS Min = 1.548 FS Ave = 2.132
Standard Deviation = 0.313 Coefficient of Variation = 14.66 %
Failure Surface Specified By 34 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	185.25	182.29
2	200.22	183.31
3	215.16	184.62
4	230.08	186.21
5	244.96	188.10
6	259.80	190.27
7	274.60	192.73
8	289.34	195.47
9	304.03	198.50
10	318.66	201.81
11	333.23	205.40
12	347.72	209.28
13	362.13	213.43
14	376.46	217.86
15	390.71	222.57
16	404.86	227.54
17	418.91	232.80
18	432.85	238.32
19	446.69	244.11
20	460.41	250.17
21	474.02	256.49
22	487.49	263.07
23	500.84	269.91
24	514.06	277.01
25	527.13	284.36
26	540.06	291.96
27	552.84	299.82
28	565.47	307.91
29	577.94	316.25
30	590.24	324.83
31	602.38	333.64
32	614.35	342.69
33	626.14	351.96
34	632.29	357.00

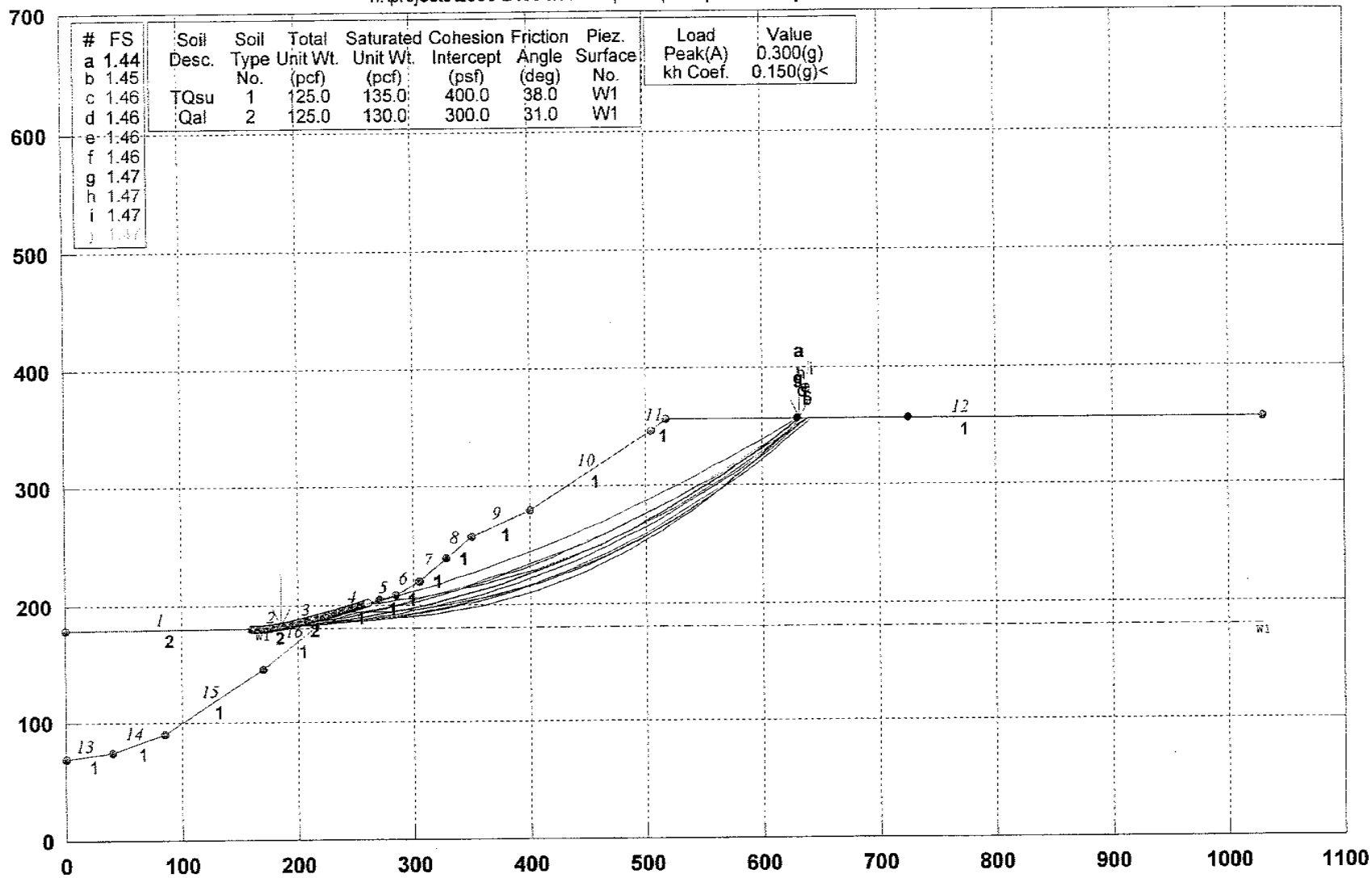
Circle Center At X = 139.99 ; Y = 957.37 ; and Radius = 776.41
Factor of Safety
*** 1.548 ***
Individual data on the 44 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	4.7	115.3	0.0	0.0	0.	0.	0.0	0.0	0.0
2	10.2	1682.7	0.0	0.0	0.	0.	0.0	0.0	0.0
3	14.9	6462.3	0.0	0.0	0.	0.	0.0	0.0	0.0
4	5.0	3167.3	0.0	0.0	0.	0.	0.0	0.0	0.0
5	9.8	7467.9	0.0	0.0	0.	0.	0.0	0.0	0.0
6	0.1	64.0	0.0	0.0	0.	0.	0.0	0.0	0.0
7	14.9	15063.5	0.0	0.0	0.	0.	0.0	0.0	0.0
8	14.8	19532.1	0.0	0.0	0.	0.	0.0	0.0	0.0
9	10.2	15750.5	0.0	0.0	0.	0.	0.0	0.0	0.0

10	4.6	7532.0	0.0	0.0	0.	0.	0.0	0.0	0.0
11	10.4	17248.7	0.0	0.0	0.	0.	0.0	0.0	0.0
12	4.3	7726.4	0.0	0.0	0.	0.	0.0	0.0	0.0
13	14.7	33103.7	0.0	0.0	0.	0.	0.0	0.0	0.0
14	1.0	2548.5	0.0	0.0	0.	0.	0.0	0.0	0.0
15	13.7	43853.5	0.0	0.0	0.	0.	0.0	0.0	0.0
16	9.3	38486.2	0.0	0.0	0.	0.	0.0	0.0	0.0
17	5.2	24346.2	0.0	0.0	0.	0.	0.0	0.0	0.0
18	14.5	76618.6	0.0	0.0	0.	0.	0.0	0.0	0.0
19	2.3	13264.7	0.0	0.0	0.	0.	0.0	0.0	0.0
20	12.1	72958.9	0.0	0.0	0.	0.	0.0	0.0	0.0
21	14.3	89985.4	0.0	0.0	0.	0.	0.0	0.0	0.0
22	14.2	92999.4	0.0	0.0	0.	0.	0.0	0.0	0.0
23	9.3	62341.3	0.0	0.0	0.	0.	0.0	0.0	0.0
24	4.9	33280.0	0.0	0.0	0.	0.	0.0	0.0	0.0
25	14.1	100630.2	0.0	0.0	0.	0.	0.0	0.0	0.0
26	13.9	105832.5	0.0	0.0	0.	0.	0.0	0.0	0.0
27	13.8	110322.6	0.0	0.0	0.	0.	0.0	0.0	0.0
28	13.7	114106.9	0.0	0.0	0.	0.	0.0	0.0	0.0
29	13.6	117192.7	0.0	0.0	0.	0.	0.0	0.0	0.0
30	13.5	119590.0	0.0	0.0	0.	0.	0.0	0.0	0.0
31	13.3	121309.4	0.0	0.0	0.	0.	0.0	0.0	0.0
32	4.2	38280.3	0.0	0.0	0.	0.	0.0	0.0	0.0
33	9.1	85560.8	0.0	0.0	0.	0.	0.0	0.0	0.0
34	2.9	28624.0	0.0	0.0	0.	0.	0.0	0.0	0.0
35	10.1	95605.1	0.0	0.0	0.	0.	0.0	0.0	0.0
36	12.9	111262.2	0.0	0.0	0.	0.	0.0	0.0	0.0
37	12.8	97633.1	0.0	0.0	0.	0.	0.0	0.0	0.0
38	12.6	83871.5	0.0	0.0	0.	0.	0.0	0.0	0.0
39	12.5	70009.7	0.0	0.0	0.	0.	0.0	0.0	0.0
40	12.3	56082.1	0.0	0.0	0.	0.	0.0	0.0	0.0
41	12.1	42123.7	0.0	0.0	0.	0.	0.0	0.0	0.0
42	12.0	28168.8	0.0	0.0	0.	0.	0.0	0.0	0.0
43	11.8	14253.3	0.0	0.0	0.	0.	0.0	0.0	0.0
44	6.2	1935.5	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 8-8'; pseudostatic; circular

n:\projects\2000-2499\2023\slopes\t8ps1a.pl2 Run By: KPC 6/24/2004 12:13PM



GSTABL7 v.2 FSmin=1.44

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No. 16

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/24/2004
Time of Run: 12:13PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t8psla.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t8psla.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopepsla.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 8-8'; pseudostatic; circular

BOUNDARY COORDINATES
12 Top Boundaries
16 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	179.00	170.00	180.00	2
2	170.00	180.00	190.00	183.00	2
3	190.00	183.00	230.00	193.00	2
4	230.00	193.00	270.00	205.00	1
5	270.00	205.00	285.00	208.00	1
6	285.00	208.00	305.00	220.00	1
7	305.00	220.00	328.00	240.00	1
8	328.00	240.00	350.00	257.00	1
9	350.00	257.00	400.00	280.00	1
10	400.00	280.00	505.00	346.00	1
11	505.00	346.00	517.00	357.00	1
12	517.00	357.00	1030.00	357.00	1
13	0.00	70.00	40.00	75.00	1
14	40.00	75.00	85.00	90.00	1
15	85.00	90.00	170.00	145.00	1
16	170.00	145.00	230.00	193.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	400.0	38.0	0.00	0.0	1
2	125.0	130.0	300.0	31.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	170.00	180.00
2	1030.00	180.00

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced Along The Ground Surface Between X = 160.00(ft)

and X = 260.00(ft)
Each Surface Terminates Between X = 630.00(ft)
and X = 725.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
15.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 2.680 FS Min = 1.439 FS Ave = 1.953
Standard Deviation = 0.295 Coefficient of Variation = 15.08 %
Failure Surface Specified By 34 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	185.25	182.29
2	200.22	183.31
3	215.16	184.62
4	230.08	186.21
5	244.96	188.10
6	259.80	190.27
7	274.60	192.73
8	289.34	195.47
9	304.03	198.50
10	318.66	201.81
11	333.23	205.40
12	347.72	209.28
13	362.13	213.43
14	376.46	217.86
15	390.71	222.57
16	404.86	227.54
17	418.91	232.80
18	432.85	238.32
19	446.69	244.11
20	460.41	250.17
21	474.02	256.49
22	487.49	263.07
23	500.84	269.91
24	514.06	277.01
25	527.13	284.36
26	540.06	291.96
27	552.84	299.82
28	565.47	307.91
29	577.94	316.25
30	590.24	324.83
31	602.38	333.64
32	614.35	342.69
33	626.14	351.96
34	632.29	357.00

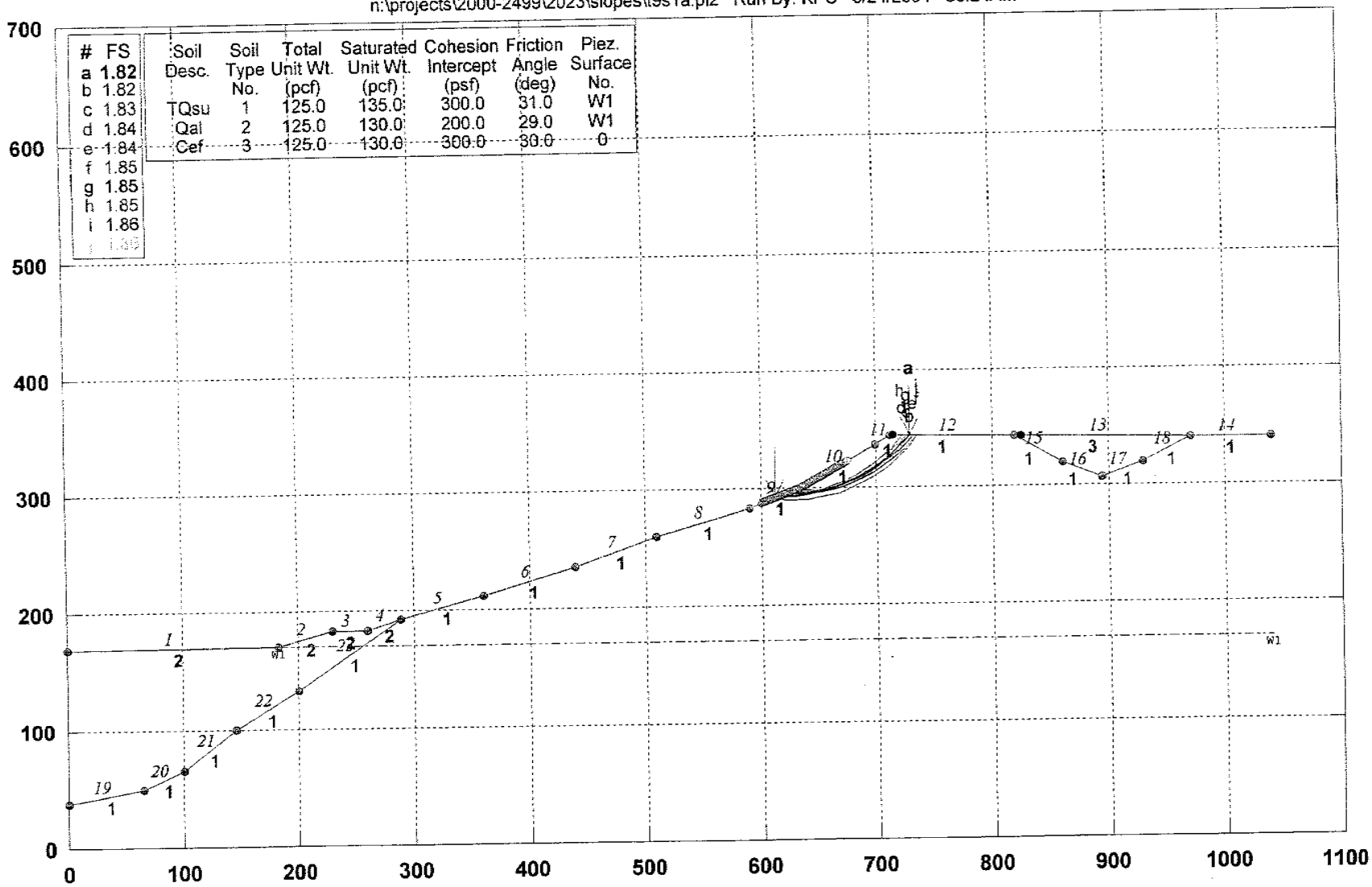
Circle Center At X = 139.99 ; Y = 957.37 ; and Radius = 776.41
Factor of Safety
*** 1.439 ***
Individual data on the 44 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	4.7	115.3	0.0	0.0	0.	0.	17.3	0.0	0.0
2	10.2	1682.7	0.0	0.0	0.	0.	252.4	0.0	0.0
3	14.9	6462.3	0.0	0.0	0.	0.	969.4	0.0	0.0
4	5.0	3167.3	0.0	0.0	0.	0.	475.1	0.0	0.0
5	9.8	7467.9	0.0	0.0	0.	0.	1120.2	0.0	0.0

6	0.1	64.0	0.0	0.0	0.	0.	9.6	0.0	0.0
7	14.9	15063.5	0.0	0.0	0.	0.	2259.5	0.0	0.0
8	14.8	19532.1	0.0	0.0	0.	0.	2929.8	0.0	0.0
9	10.2	15750.5	0.0	0.0	0.	0.	2362.6	0.0	0.0
10	4.6	7532.0	0.0	0.0	0.	0.	1129.8	0.0	0.0
11	10.4	17248.7	0.0	0.0	0.	0.	2587.3	0.0	0.0
12	4.3	7726.4	0.0	0.0	0.	0.	1159.0	0.0	0.0
13	14.7	33103.7	0.0	0.0	0.	0.	4965.6	0.0	0.0
14	1.0	2548.5	0.0	0.0	0.	0.	382.3	0.0	0.0
15	13.7	43853.5	0.0	0.0	0.	0.	6578.0	0.0	0.0
16	9.3	38486.2	0.0	0.0	0.	0.	5772.9	0.0	0.0
17	5.2	24346.2	0.0	0.0	0.	0.	3651.9	0.0	0.0
18	14.5	76618.6	0.0	0.0	0.	0.	11492.8	0.0	0.0
19	2.3	13264.7	0.0	0.0	0.	0.	1989.7	0.0	0.0
20	12.1	72958.9	0.0	0.0	0.	0.	10943.8	0.0	0.0
21	14.3	89985.4	0.0	0.0	0.	0.	13497.8	0.0	0.0
22	14.2	92999.4	0.0	0.0	0.	0.	13949.9	0.0	0.0
23	9.3	62341.3	0.0	0.0	0.	0.	9351.2	0.0	0.0
24	4.9	33280.0	0.0	0.0	0.	0.	4992.0	0.0	0.0
25	14.1	100630.2	0.0	0.0	0.	0.	15094.5	0.0	0.0
26	13.9	105832.5	0.0	0.0	0.	0.	15874.9	0.0	0.0
27	13.8	110322.6	0.0	0.0	0.	0.	16548.4	0.0	0.0
28	13.7	114106.9	0.0	0.0	0.	0.	17116.0	0.0	0.0
29	13.6	117192.7	0.0	0.0	0.	0.	17578.9	0.0	0.0
30	13.5	119590.0	0.0	0.0	0.	0.	17938.5	0.0	0.0
31	13.3	121309.4	0.0	0.0	0.	0.	18196.4	0.0	0.0
32	4.2	38280.3	0.0	0.0	0.	0.	5742.0	0.0	0.0
33	9.1	85560.8	0.0	0.0	0.	0.	12834.1	0.0	0.0
34	2.9	28624.0	0.0	0.0	0.	0.	4293.6	0.0	0.0
35	10.1	95605.1	0.0	0.0	0.	0.	14340.8	0.0	0.0
36	12.9	111262.2	0.0	0.0	0.	0.	16689.3	0.0	0.0
37	12.8	97633.1	0.0	0.0	0.	0.	14645.0	0.0	0.0
38	12.6	83871.5	0.0	0.0	0.	0.	12580.7	0.0	0.0
39	12.5	70009.7	0.0	0.0	0.	0.	10501.5	0.0	0.0
40	12.3	56082.1	0.0	0.0	0.	0.	8412.3	0.0	0.0
41	12.1	42123.7	0.0	0.0	0.	0.	6318.6	0.0	0.0
42	12.0	28168.8	0.0	0.0	0.	0.	4225.3	0.0	0.0
43	11.8	14253.3	0.0	0.0	0.	0.	2138.0	0.0	0.0
44	6.2	1935.5	0.0	0.0	0.	0.	290.3	0.0	0.0

Mesas East, x-sec 9-9'; static; circular

n:\projects\2000-2499\2023\slopes\t9s1a.pl2 Run By: KPC 6/24/2004 08:24AM



GSTABL7 v.2 FSmin=1.82

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 17

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/24/2004
Time of Run: 08:24AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t9s1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t9s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopes1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 9-9'; static; circular

BOUNDARY COORDINATES
14 Top Boundaries
23 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	169.00	183.00	170.00	2
2	183.00	170.00	230.00	183.00	2
3	230.00	183.00	260.00	183.00	2
4	260.00	183.00	288.00	192.00	2
5	288.00	192.00	360.00	212.00	1
6	360.00	212.00	440.00	235.00	1
7	440.00	235.00	510.00	260.00	1
8	510.00	260.00	590.00	284.00	1
9	590.00	284.00	634.00	300.00	1
10	634.00	300.00	700.00	337.00	1
11	700.00	337.00	713.00	345.00	1
12	713.00	345.00	819.00	343.00	1
13	819.00	343.00	971.00	341.00	3
14	971.00	341.00	1040.00	340.00	1
15	819.00	343.00	860.00	320.00	1
16	860.00	320.00	894.00	307.00	1
17	894.00	307.00	930.00	320.00	1
18	930.00	320.00	971.00	341.00	1
19	0.00	38.00	65.00	50.00	1
20	65.00	50.00	100.00	65.00	1
21	100.00	65.00	145.00	100.00	1
22	145.00	100.00	200.00	133.00	1
23	200.00	133.00	288.00	192.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.00	0.0	1
2	125.0	130.0	200.0	29.0	0.00	0.0	1
3	125.0	130.0	300.0	30.0	0.00	0.0	0

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	183.00	170.00
2	1040.00	170.00

A Critical Failure Surface Searching Method, Using A Random

Technique For Generating Circular Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 600.00(ft)
and X = 675.00(ft)
Each Surface Terminates Between X = 715.00(ft)
and X = 825.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
15.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -30.0
And 30.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 17.420 FS Min = 1.823 FS Ave = 3.208
Standard Deviation = 1.386 Coefficient of Variation = 43.20 %
Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	612.25	292.09
2	627.24	292.52
3	642.11	294.45
4	656.72	297.87
5	670.91	302.73
6	684.54	309.00
7	697.47	316.60
8	709.58	325.46
9	720.73	335.49
10	729.10	344.70

Circle Center At X = 615.55 ; Y = 440.85 ; and Radius = 148.80
Factor of Safety
*** 1.823 ***
Individual data on the 12 slices

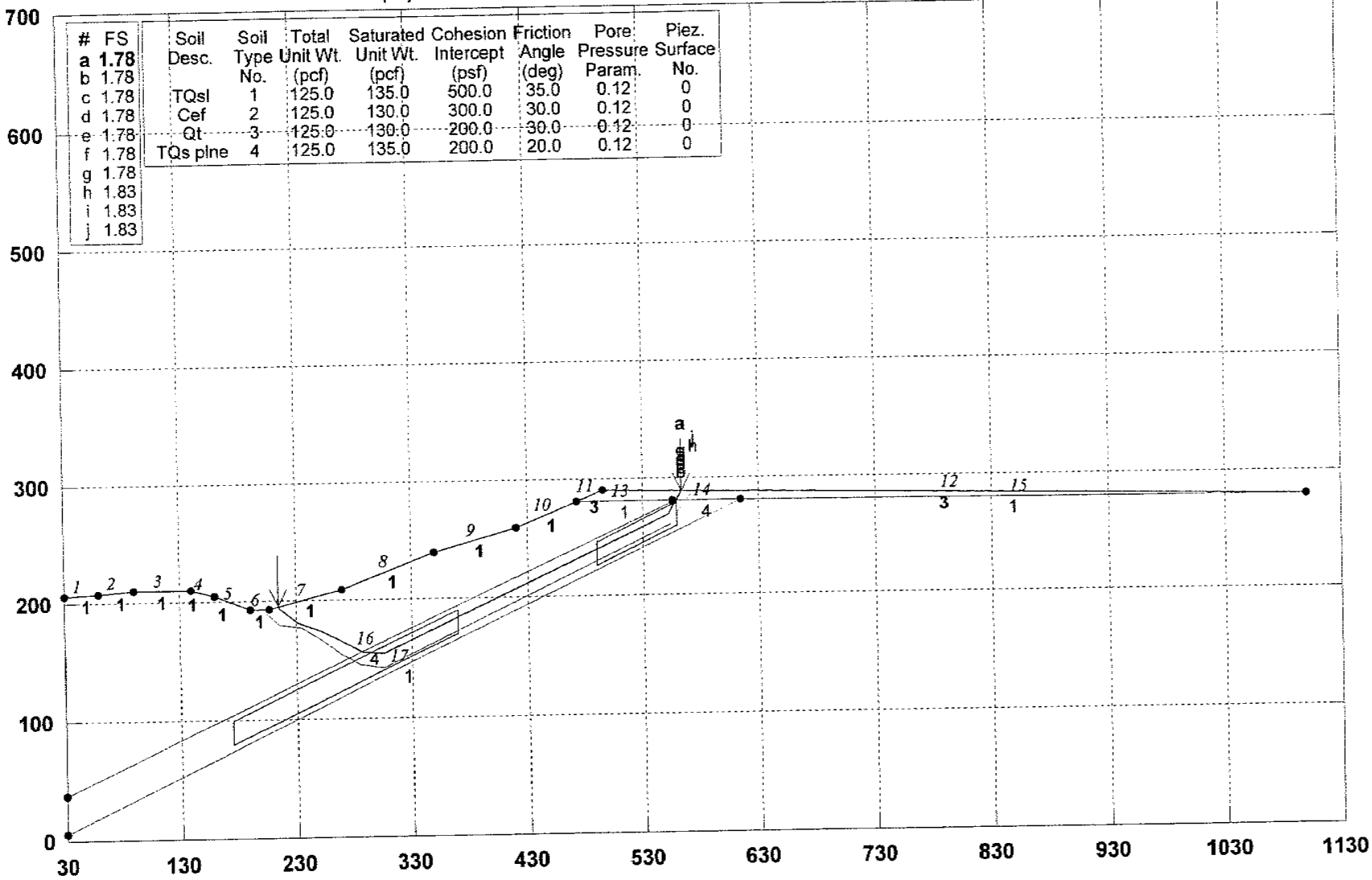
Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	15.0	4705.4	0.0	0.0	0.	0.	0.0	0.0	0.0
2	6.8	4911.2	0.0	0.0	0.	0.	0.0	0.0	0.0
3	**8.1**	**8466.6**	**0.0**	**0.0**	**0.**	**0.**	**0.0**	**0.0**	**0.0**
4	14.6	22786.5	0.0	0.0	0.	0.	0.0	0.0	0.0
5	14.2	29108.9	0.0	0.0	0.	0.	0.0	0.0	0.0
6	13.6	31766.0	0.0	0.0	0.	0.	0.0	0.0	0.0
7	12.9	30971.0	0.0	0.0	0.	0.	0.0	0.0	0.0
8	2.5	5933.7	0.0	0.0	0.	0.	0.0	0.0	0.0
9	9.6	21535.5	0.0	0.0	0.	0.	0.0	0.0	0.0
10	3.4	7256.3	0.0	0.0	0.	0.	0.0	0.0	0.0
11	7.7	12479.1	0.0	0.0	0.	0.	0.0	0.0	0.0
12	8.4	4903.8	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 10-10'; static; critical bedding plane

n:\projects\2000-2499\2023\slopes\t10s2a.pl2 Run By: KPC 6/24/2004 04:09PM

#	FS
a	**1.78**
b	1.78
c	1.78
d	1.78
e	1.78
f	1.78
g	1.78
h	1.83
i	1.83
j	1.83

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsl	1	125.0	135.0	500.0	35.0	0.12	0
Cef	2	125.0	130.0	300.0	30.0	0.12	0
Qt	3	125.0	130.0	200.0	30.0	0.12	0
TQs pine	4	125.0	135.0	200.0	20.0	0.12	0



GSTABL7 v.2 FSmin=1.78

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 18

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/24/2004
Time of Run: 04:09PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t10s2a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t10s2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope0s2a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 10-10'; static;
critical bedding plane

BOUNDARY COORDINATES
12 Top Boundaries
17 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	30.00	206.00	60.00	207.00	1
2	60.00	207.00	90.00	210.00	1
3	90.00	210.00	140.00	210.00	1
4	140.00	210.00	160.00	205.00	1
5	160.00	205.00	190.00	193.00	1
6	190.00	193.00	207.00	193.00	1
7	207.00	193.00	270.00	209.00	1
8	270.00	209.00	350.00	240.00	1
9	350.00	240.00	420.00	260.00	1
10	420.00	260.00	473.00	281.00	1
11	473.00	281.00	495.00	290.00	3
12	495.00	290.00	1100.00	280.00	3
13	473.00	281.00	555.00	281.00	1
14	555.00	281.00	615.00	281.00	4
15	615.00	281.00	1100.00	280.00	1
16	30.00	37.00	555.00	280.00	4
17	30.00	5.00	615.00	281.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	500.0	35.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.12	0.0	0
3	125.0	130.0	200.0	30.0	0.12	0.0	0
4	125.0	135.0	200.0	20.0	0.12	0.0	0

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 20.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	175.00	89.00	370.00	180.00	20.00
2	490.00	236.00	560.00	270.00	20.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are

Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 4.976 FS Min = 1.780 FS Ave = 2.713
Standard Deviation = 0.904 Coefficient of Variation = 33.33 %
Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	214.27	194.85
2	216.21	193.02
3	232.23	181.06
4	250.81	173.63
5	268.87	165.04
6	286.18	155.02
7	306.15	153.93
8	551.26	269.36
9	562.50	285.90
10	563.09	288.87

Factor of Safety
*** 1.780 ***

Individual data on the 17 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	1.9	281.2	0.0	46.3	0.	0.	0.0	0.0	0.0
2	16.0	20702.5	0.0	3100.2	0.	0.	0.0	0.0	0.0
3	18.6	56691.1	0.0	7326.3	0.	0.	0.0	0.0	0.0
4	18.1	83713.5	0.0	11123.9	0.	0.	0.0	0.0	0.0
5	1.1	6250.1	0.0	866.6	0.	0.	0.0	0.0	0.0
6	15.7	102064.3	0.0	14151.6	0.	0.	0.0	0.0	0.0
7	0.5	3947.5	0.0	547.3	0.	0.	0.0	0.0	0.0
8	20.0	161407.3	0.0	19397.9	0.	0.	0.0	0.0	0.0
9	43.9	368626.2	0.0	48894.5	0.	0.	0.0	0.0	0.0
10	70.0	515691.8	0.0	68401.2	0.	0.	0.0	0.0	0.0
11	53.0	334398.6	0.0	44354.5	0.	0.	0.0	0.0	0.0
12	22.0	131494.5	0.0	17441.4	0.	0.	0.0	0.0	0.0
13	56.3	235064.8	0.0	31178.9	0.	0.	0.0	0.0	0.0
14	3.7	7908.2	0.0	1689.3	0.	0.	0.0	0.0	0.0
15	4.2	5752.6	0.0	1228.9	0.	0.	0.0	0.0	0.0
16	3.3	2272.8	0.0	485.5	0.	0.	0.0	0.0	0.0
17	0.6	110.3	0.0	67.7	0.	0.	0.0	0.0	0.0

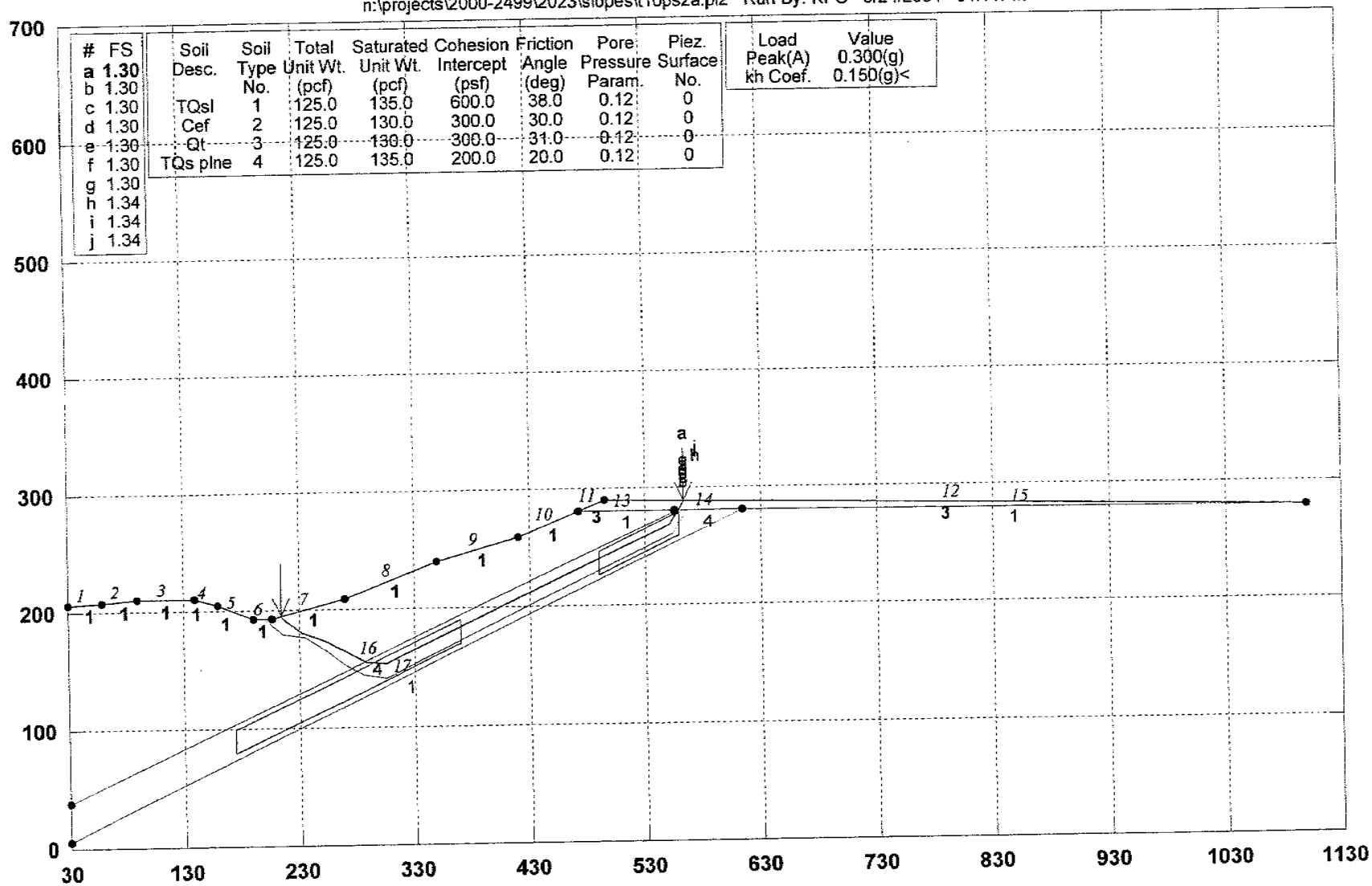
Mesas East, x-sec 10-10'; pseudostatic; critical bedding plane

n:\projects\2000-2499\2023\slopes\t10ps2a.pl2 Run By: KPC 6/24/2004 04:11PM

#	FS
a	1.30
b	1.30
c	1.30
d	1.30
e	1.30
f	1.30
g	1.30
h	1.34
i	1.34
j	1.34

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsl	1	125.0	135.0	600.0	38.0	0.12	0
Cef	2	125.0	130.0	300.0	30.0	0.12	0
Qt	3	125.0	130.0	300.0	31.0	0.12	0
TQs plne	4	125.0	135.0	200.0	20.0	0.12	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<



GSTABL7 v.2 FSmin=1.30

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 19

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/24/2004
Time of Run: 04:11PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t10ps2a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t10ps2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope0ps2a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 10-10'; pseudostatic; critical bedding plane

BOUNDARY COORDINATES
12 Top Boundaries
17 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	30.00	206.00	60.00	207.00	1
2	60.00	207.00	90.00	210.00	1
3	90.00	210.00	140.00	210.00	1
4	140.00	210.00	160.00	205.00	1
5	160.00	205.00	190.00	193.00	1
6	190.00	193.00	207.00	193.00	1
7	207.00	193.00	270.00	209.00	1
8	270.00	209.00	350.00	240.00	1
9	350.00	240.00	420.00	260.00	1
10	420.00	260.00	473.00	281.00	1
11	473.00	281.00	495.00	290.00	3
12	495.00	290.00	1100.00	280.00	3
13	473.00	281.00	555.00	281.00	1
14	555.00	281.00	615.00	281.00	4
15	615.00	281.00	1100.00	280.00	1
16	30.00	37.00	555.00	280.00	4
17	30.00	5.00	615.00	281.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	600.0	38.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.12	0.0	0
3	125.0	130.0	300.0	31.0	0.12	0.0	0
4	125.0	135.0	200.0	20.0	0.12	0.0	0

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 20.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	175.00	89.00	370.00	180.00	20.00
2	490.00	236.00	560.00	270.00	20.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 2.783 FS Min = 1.304 FS Ave = 1.831
Standard Deviation = 0.411 Coefficient of Variation = 22.42 %
Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	214.27	194.85
2	216.21	193.02
3	232.23	181.06
4	250.81	173.63
5	268.87	165.04
6	286.18	155.02
7	306.15	153.93
8	551.26	269.36
9	562.50	285.90
10	563.09	288.87

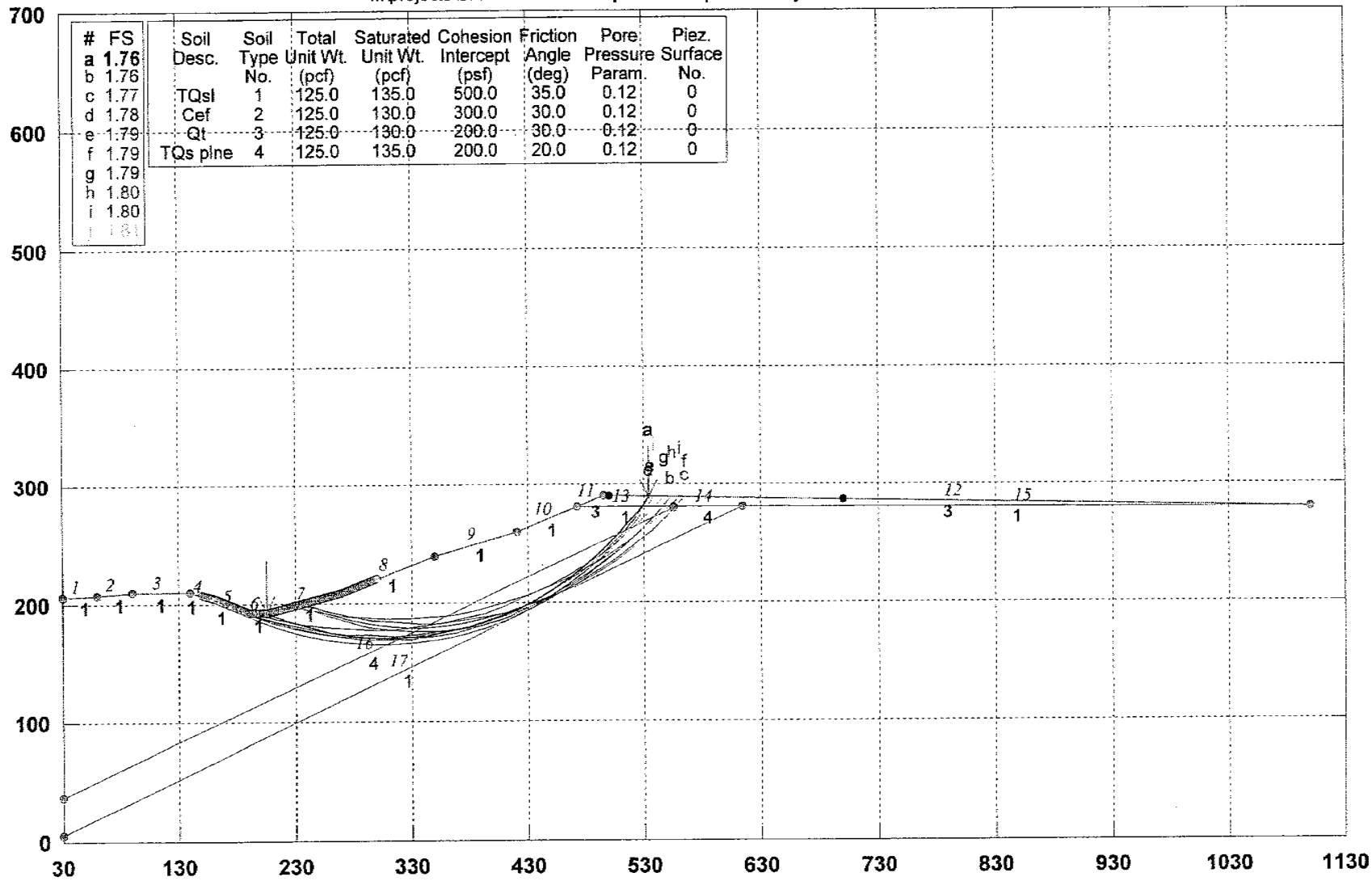
Factor of Safety
*** 1.304 ***

Individual data on the 17 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	1.9	281.2	0.0	46.3	0.	0.	42.2	0.0	0.0
2	16.0	20702.5	0.0	3100.2	0.	0.	3105.4	0.0	0.0
3	18.6	56691.1	0.0	7326.3	0.	0.	8503.7	0.0	0.0
4	18.1	83713.5	0.0	11123.9	0.	0.	12557.0	0.0	0.0
5	1.1	6250.1	0.0	866.6	0.	0.	937.5	0.0	0.0
6	15.7	102064.3	0.0	14151.6	0.	0.	15309.6	0.0	0.0
7	0.5	3947.5	0.0	547.3	0.	0.	592.1	0.0	0.0
8	20.0	161407.3	0.0	19397.9	0.	0.	24211.1	0.0	0.0
9	43.9	368626.2	0.0	48894.5	0.	0.	55293.9	0.0	0.0
10	70.0	515691.8	0.0	68401.2	0.	0.	77353.8	0.0	0.0
11	53.0	334398.6	0.0	44354.5	0.	0.	50159.8	0.0	0.0
12	22.0	131494.5	0.0	17441.4	0.	0.	19724.2	0.0	0.0
13	56.3	235064.8	0.0	31178.9	0.	0.	35259.7	0.0	0.0
14	3.7	7908.2	0.0	1689.3	0.	0.	1186.2	0.0	0.0
15	4.2	5752.6	0.0	1228.9	0.	0.	862.9	0.0	0.0
16	3.3	2272.8	0.0	485.5	0.	0.	340.9	0.0	0.0
17	0.6	110.3	0.0	67.7	0.	0.	16.5	0.0	0.0

Mesas East, x-sec 10-10'; static; circular

n:\projects\2000-2499\2023\slopes\t10s1a.pl2 Run By: KPC 6/24/2004 08:40AM



#	FS
a	1.76
b	1.76
c	1.77
d	1.78
e	1.79
f	1.79
g	1.79
h	1.80
i	1.80
j	1.81

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsl	1	125.0	135.0	500.0	35.0	0.12	0
Cef	2	125.0	130.0	300.0	30.0	0.12	0
Qt	3	125.0	130.0	200.0	30.0	0.12	0
TQs pine	4	125.0	135.0	200.0	20.0	0.12	0

GSTABL7 v.2 FSmin=1.76

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 20

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/24/2004
Time of Run: 08:40AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t10s1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t10s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope0s1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 10-10'; static; circular

BOUNDARY COORDINATES
12 Top Boundaries
17 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	30.00	206.00	60.00	207.00	1
2	60.00	207.00	90.00	210.00	1
3	90.00	210.00	140.00	210.00	1
4	140.00	210.00	160.00	205.00	1
5	160.00	205.00	190.00	193.00	1
6	190.00	193.00	207.00	193.00	1
7	207.00	193.00	270.00	209.00	1
8	270.00	209.00	350.00	240.00	1
9	350.00	240.00	420.00	260.00	1
10	420.00	260.00	473.00	281.00	1
11	473.00	281.00	495.00	290.00	3
12	495.00	290.00	1100.00	280.00	3
13	473.00	281.00	555.00	281.00	1
14	555.00	281.00	615.00	281.00	4
15	615.00	281.00	1100.00	280.00	1
16	30.00	37.00	555.00	280.00	4
17	30.00	5.00	615.00	281.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	500.0	35.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.12	0.0	0
3	125.0	130.0	200.0	30.0	0.12	0.0	0
4	125.0	135.0	200.0	20.0	0.12	0.0	0

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 150.00(ft)
and X = 300.00(ft)
Each Surface Terminates Between X = 500.00(ft)
and X = 700.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
20.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 15.0 deg.

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 6.100 FS Min = 1.762 FS Ave = 3.413
Standard Deviation = 0.843 Coefficient of Variation = 24.71 %
Failure Surface Specified By 20 Coordinate Points

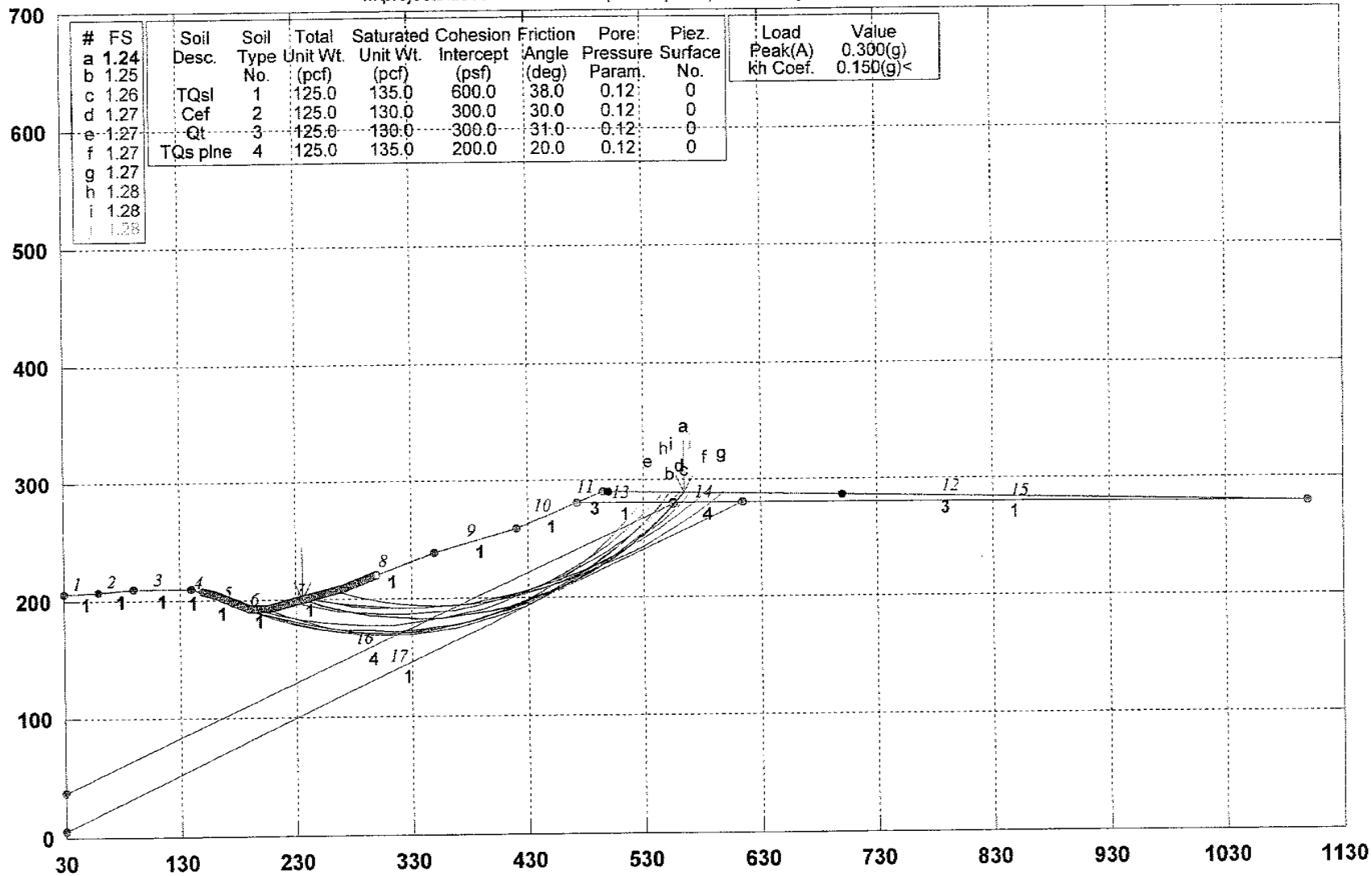
Point No.	X-Surf (ft)	Y-Surf (ft)
1	204.55	193.00
2	223.22	185.85
3	242.38	180.10
4	261.91	175.79
5	281.70	172.93
6	301.66	171.54
7	321.66	171.63
8	341.59	173.19
9	361.36	176.23
10	380.85	180.72
11	399.96	186.64
12	418.57	193.95
13	436.59	202.62
14	453.93	212.60
15	470.48	223.83
16	486.15	236.25
17	500.86	249.80
18	514.53	264.40
19	527.08	279.97
20	533.57	289.36

Circle Center At X = 310.43 ; Y = 441.38 ; and Radius = 270.01
Factor of Safety
*** 1.762 ***
Individual data on the 28 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	2.5	144.1	0.0	18.5	0.	0.	0.0	0.0	0.0
2	16.2	12379.0	0.0	1590.5	0.	0.	0.0	0.0	0.0
3	19.2	39689.2	0.0	4972.5	0.	0.	0.0	0.0	0.0
4	19.5	64735.6	0.0	7955.7	0.	0.	0.0	0.0	0.0
5	8.1	33139.5	0.0	4018.1	0.	0.	0.0	0.0	0.0
6	11.7	54853.8	0.0	6650.8	0.	0.	0.0	0.0	0.0
7	20.0	112647.9	0.0	13550.5	0.	0.	0.0	0.0	0.0
8	19.2	128147.4	0.0	15377.8	0.	0.	0.0	0.0	0.0
9	0.8	5750.2	0.0	690.0	0.	0.	0.0	0.0	0.0
10	19.9	150710.0	0.0	18141.0	0.	0.	0.0	0.0	0.0
11	8.4	67808.5	0.0	8232.4	0.	0.	0.0	0.0	0.0
12	11.4	94115.7	0.0	11426.3	0.	0.	0.0	0.0	0.0
13	19.5	164582.4	0.0	20267.0	0.	0.	0.0	0.0	0.0
14	19.1	162071.0	0.0	20360.1	0.	0.	0.0	0.0	0.0
15	18.6	155062.7	0.0	19992.0	0.	0.	0.0	0.0	0.0
16	1.4	11698.4	0.0	1557.8	0.	0.	0.0	0.0	0.0
17	16.6	134127.3	0.0	17860.4	0.	0.	0.0	0.0	0.0
18	17.3	135204.5	0.0	18720.6	0.	0.	0.0	0.0	0.0
19	16.5	121030.6	0.0	17552.9	0.	0.	0.0	0.0	0.0
20	2.5	17561.3	0.0	2689.2	0.	0.	0.0	0.0	0.0
21	13.1	86539.3	0.0	13251.8	0.	0.	0.0	0.0	0.0
22	8.9	52951.2	0.0	8638.2	0.	0.	0.0	0.0	0.0
23	5.9	31394.1	0.0	5121.5	0.	0.	0.0	0.0	0.0
24	8.5	37697.9	0.0	6618.5	0.	0.	0.0	0.0	0.0
25	5.2	18161.8	0.0	3188.6	0.	0.	0.0	0.0	0.0
26	12.6	27287.4	0.0	5216.8	0.	0.	0.0	0.0	0.0
27	0.7	799.7	0.0	168.8	0.	0.	0.0	0.0	0.0
28	5.8	3054.1	0.0	644.8	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 10-10'; pseudostatic; circular

n:\projects\2000-2499\2023\slopes\t10ps1a.pl2 Run By: KPC 6/24/2004 08:43AM



#	FS
a	1.24
b	1.25
c	1.26
d	1.27
e	1.27
f	1.27
g	1.27
h	1.28
i	1.28
j	1.28

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsl	1	125.0	135.0	600.0	38.0	0.12	0
Cef	2	125.0	130.0	300.0	30.0	0.12	0
Qt	3	125.0	130.0	300.0	31.0	0.12	0
TQs plne	4	125.0	135.0	200.0	20.0	0.12	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.24

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 21

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/24/2004
Time of Run: 08:43AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t10psla.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t10psla.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope0psla.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 10-10'; pseudostatic; circular

BOUNDARY COORDINATES
12 Top Boundaries
17 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	30.00	206.00	60.00	207.00	1
2	60.00	207.00	90.00	210.00	1
3	90.00	210.00	140.00	210.00	1
4	140.00	210.00	160.00	205.00	1
5	160.00	205.00	190.00	193.00	1
6	190.00	193.00	207.00	193.00	1
7	207.00	193.00	270.00	209.00	1
8	270.00	209.00	350.00	240.00	1
9	350.00	240.00	420.00	260.00	1
10	420.00	260.00	473.00	281.00	1
11	473.00	281.00	495.00	290.00	3
12	495.00	290.00	1100.00	280.00	3
13	473.00	281.00	555.00	281.00	1
14	555.00	281.00	615.00	281.00	4
15	615.00	281.00	1100.00	280.00	1
16	30.00	37.00	555.00	280.00	4
17	30.00	5.00	615.00	281.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	600.0	38.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.12	0.0	0
3	125.0	130.0	300.0	31.0	0.12	0.0	0
4	125.0	135.0	200.0	20.0	0.12	0.0	0

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 150.00(ft)
and X = 300.00(ft)
Each Surface Terminates Between X = 500.00(ft)
and X = 700.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)

20.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 3.720 FS Min = 1.236 FS Ave = 2.309
Standard Deviation = 0.493 Coefficient of Variation = 21.36 %
Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	236.36	200.46
2	255.43	194.42
3	274.85	189.65
4	294.55	186.19
5	314.44	184.04
6	334.42	183.22
7	354.41	183.73
8	374.33	185.57
9	394.08	188.72
10	413.58	193.18
11	432.73	198.92
12	451.47	205.93
13	469.69	214.16
14	487.33	223.58
15	504.31	234.16
16	520.55	245.84
17	535.97	258.57
18	550.51	272.30
19	564.11	286.96
20	565.63	288.83

Circle Center At X = 336.76 ; Y = 483.97 ; and Radius = 300.77

Factor of Safety
*** 1.236 ***

Individual data on the 27 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	19.1	12969.5	0.0	1632.6	0.	0.	1945.4	0.0	0.0
2	14.6	26447.5	0.0	3267.7	0.	0.	3967.1	0.0	0.0
3	4.9	11948.0	0.0	1476.2	0.	0.	1792.2	0.0	0.0
4	19.7	65928.7	0.0	8032.7	0.	0.	9889.3	0.0	0.0
5	19.9	92584.4	0.0	11174.6	0.	0.	13887.7	0.0	0.0
6	20.0	116043.5	0.0	13937.0	0.	0.	17406.5	0.0	0.0
7	12.2	80500.8	0.0	9663.2	0.	0.	12075.1	0.0	0.0
8	3.4	23808.8	0.0	2858.0	0.	0.	3571.3	0.0	0.0
9	4.4	31418.0	0.0	3771.4	0.	0.	4712.7	0.0	0.0
10	19.9	148013.1	0.0	17836.8	0.	0.	22202.0	0.0	0.0
11	19.7	154611.6	0.0	18788.5	0.	0.	23191.7	0.0	0.0
12	19.5	157018.2	0.0	19328.6	0.	0.	23552.7	0.0	0.0
13	6.4	52152.8	0.0	6533.6	0.	0.	7822.9	0.0	0.0
14	12.7	104261.8	0.0	13061.6	0.	0.	15639.3	0.0	0.0
15	18.7	155330.2	0.0	19899.5	0.	0.	23299.5	0.0	0.0
16	18.2	150458.1	0.0	19810.9	0.	0.	22568.7	0.0	0.0
17	3.3	26988.1	0.0	3671.8	0.	0.	4048.2	0.0	0.0
18	14.3	114992.2	0.0	15644.9	0.	0.	17248.8	0.0	0.0
19	7.7	59852.4	0.0	8462.0	0.	0.	8977.9	0.0	0.0
20	9.3	68267.9	0.0	9651.8	0.	0.	10240.2	0.0	0.0
21	16.2	100892.4	0.0	14914.3	0.	0.	15133.9	0.0	0.0
22	15.4	71812.5	0.0	11174.1	0.	0.	10771.9	0.0	0.0
23	14.5	43213.7	0.0	7130.8	0.	0.	6482.1	0.0	0.0
24	4.5	8035.9	0.0	1418.1	0.	0.	1205.4	0.0	0.0

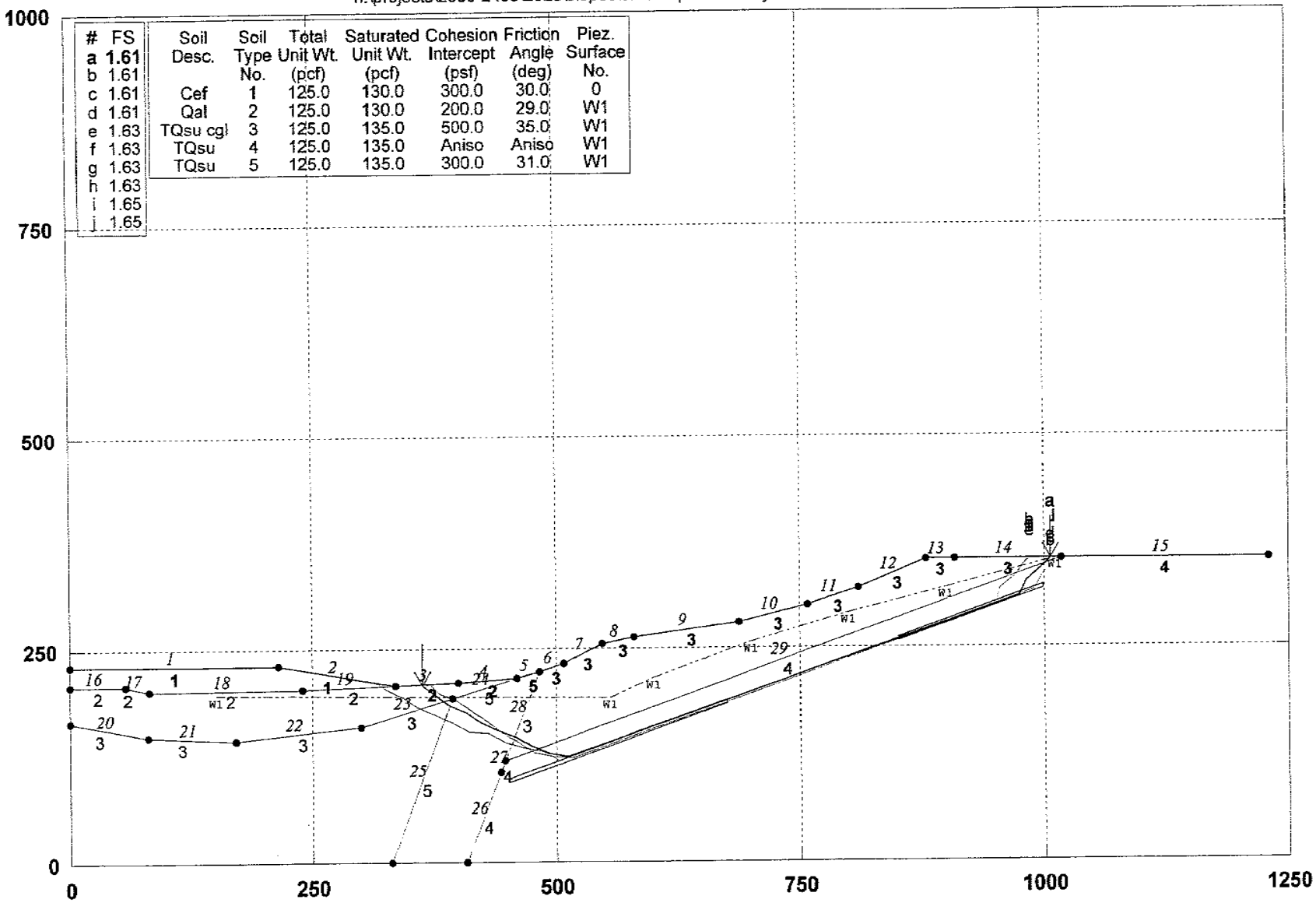
25	3.6	4441.9	0.0	783.8	0.	0.	666.3	0.0	0.0
26	5.5	3402.1	0.0	600.4	0.	0.	510.3	0.0	0.0
27	1.5	179.9	0.0	34.3	0.	0.	27.0	0.0	0.0

Mesas East, x-sec 11-11'; Static; bedding plane search

n:\projects\2000-2499\2023\slopes\t11s1a.pl2 Run By: KPC 6/25/2004 04:20PM

#	FS
a	**1.61**
b	1.61
c	1.61
d	1.61
e	1.63
f	1.63
g	1.63
h	1.63
i	1.65
j	1.65

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
Qal	2	125.0	130.0	200.0	29.0	W1
TQsu cgl	3	125.0	135.0	500.0	35.0	W1
TQsu	4	125.0	135.0	Aniso	Aniso	W1
TQsu	5	125.0	135.0	300.0	31.0	W1



GSTABL7 v.2 FSmin=1.61

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 22

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/25/2004
Time of Run: 04:20PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t11s1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t11s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope1s1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 11-11'; Static;
bedding plane search

BOUNDARY COORDINATES
15 Top Boundaries
29 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	230.00	215.00	230.00	1
2	215.00	230.00	335.00	207.00	1
3	335.00	207.00	400.00	210.00	2
4	400.00	210.00	460.00	215.00	2
5	460.00	215.00	483.00	223.00	5
6	483.00	223.00	508.00	232.00	3
7	508.00	232.00	548.00	255.00	3
8	548.00	255.00	580.00	263.00	3
9	580.00	263.00	687.00	280.00	3
10	687.00	280.00	758.00	300.00	3
11	758.00	300.00	810.00	320.00	3
12	810.00	320.00	879.00	353.00	3
13	879.00	353.00	908.00	353.00	3
14	908.00	353.00	1018.00	353.00	3
15	1018.00	353.00	1230.00	353.00	4
16	0.00	207.00	57.00	207.00	2
17	57.00	207.00	82.00	202.00	2
18	82.00	202.00	240.00	203.00	2
19	240.00	203.00	335.00	207.00	2
20	0.00	165.00	80.00	147.00	3
21	80.00	147.00	170.00	143.00	3
22	170.00	143.00	300.00	158.00	3
23	300.00	158.00	393.00	192.00	3
24	393.00	192.00	460.00	216.00	5
25	331.00	0.00	393.00	192.00	5
26	408.00	0.00	443.00	104.00	4
27	443.00	104.00	448.00	119.00	4
28	448.00	119.00	483.00	223.00	3
29	448.00	119.00	1018.00	353.00	4

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	130.0	200.0	29.0	0.00	0.0	1
3	125.0	135.0	500.0	35.0	0.00	0.0	1
4	125.0	135.0	300.0	31.0	0.00	0.0	1

5	125.0	135.0	300.0	31.0	0.00	0.0	1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 4 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	21.5	300.00	31.00
2	24.5	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 7 Coordinate Points
Pore Pressure Inclination Factor = 1.00

Point No.	X-Water (ft)	Y-Water (ft)
1	150.00	197.00
2	555.00	192.00
3	600.00	215.00
4	700.00	256.00
5	800.00	290.00
6	900.00	320.00
7	1012.00	353.00

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 20.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	450.00	95.00	675.00	187.00	5.00
2	850.00	259.00	1000.00	321.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 2.771 FS Min = 1.609 FS Ave = 1.970
Standard Deviation = 0.232 Coefficient of Variation = 11.79 %
Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	362.91	208.29
2	374.03	197.59
3	388.49	183.77
4	406.80	175.72
5	422.12	162.86
6	439.54	153.04
7	458.20	145.84
8	474.97	134.95
9	492.82	125.92
10	512.50	122.35
11	974.50	308.39
12	982.22	326.84
13	996.27	341.07

14 1007.75 353.00

Factor of Safety

*** 1.609 ***

Individual data on the 39 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	11.1	7796.6	0.0	0.0	0.	0.	0.0	0.0	0.0
2	3.6	5773.6	0.0	0.0	0.	0.	0.0	0.0	0.0
3	5.9	13214.2	0.0	1428.1	0.	0.	0.0	0.0	0.0
4	5.0	14726.5	0.0	3413.0	0.	0.	0.0	0.0	0.0
5	1.6	5440.4	0.0	1176.8	0.	0.	0.0	0.0	0.0
6	2.9	10117.0	0.0	2284.0	0.	0.	0.0	0.0	0.0
7	5.4	20397.6	0.0	4918.7	0.	0.	0.0	0.0	0.0
8	1.6	6429.5	0.0	1624.0	0.	0.	0.0	0.0	0.0
9	6.8	29227.3	0.0	7717.9	0.	0.	0.0	0.0	0.0
10	15.3	84026.5	0.0	30505.7	0.	0.	0.0	0.0	0.0
11	17.4	125126.9	0.0	44404.8	0.	0.	0.0	0.0	0.0
12	17.6	149573.9	0.0	51496.3	0.	0.	0.0	0.0	0.0
13	1.0	9357.6	0.0	3255.5	0.	0.	0.0	0.0	0.0
14	1.8	16557.6	0.0	6426.0	0.	0.	0.0	0.0	0.0
15	12.9	130659.7	0.0	50529.8	0.	0.	0.0	0.0	0.0
16	2.1	22918.8	0.0	8812.7	0.	0.	0.0	0.0	0.0
17	5.3	61356.0	0.0	22076.8	0.	0.	0.0	0.0	0.0
18	2.7	32452.6	0.0	11615.4	0.	0.	0.0	0.0	0.0
19	9.8	124608.8	0.0	44238.2	0.	0.	0.0	0.0	0.0
20	15.2	209061.5	0.0	65590.4	0.	0.	0.0	0.0	0.0
21	4.5	65294.5	0.0	19911.3	0.	0.	0.0	0.0	0.0
22	35.5	533942.5	0.0	*******	0.	0.	0.0	0.0	0.0
23	7.0	106871.6	0.0	25422.1	0.	0.	0.0	0.0	0.0
24	25.0	374026.2	0.0	90629.8	0.	0.	0.0	0.0	0.0
25	20.0	288843.0	0.0	75786.4	0.	0.	0.0	0.0	0.0
26	87.0	1115845.1	0.0	*******	0.	0.	0.0	0.0	0.0
27	13.0	148272.0	0.0	50808.5	0.	0.	0.0	0.0	0.0
28	58.0	629356.9	0.0	*******	0.	0.	0.0	0.0	0.0
29	42.0	434014.7	0.0	*******	0.	0.	0.0	0.0	0.0
30	10.0	102567.0	0.0	34554.3	0.	0.	0.0	0.0	0.0
31	69.0	726627.5	0.0	*******	0.	0.	0.0	0.0	0.0
32	21.0	215924.0	0.0	60308.0	0.	0.	0.0	0.0	0.0
33	8.0	76297.2	0.0	22161.8	0.	0.	0.0	0.0	0.0
34	66.5	506875.5	0.0	*******	0.	0.	0.0	0.0	0.0
35	7.7	36123.2	0.0	31796.1	0.	0.	0.0	0.0	0.0
36	14.0	35172.9	0.0	15401.9	0.	0.	0.0	0.0	0.0
37	4.8	5906.8	0.0	2371.7	0.	0.	0.0	0.0	0.0
38	5.0	2821.1	0.0	841.7	0.	0.	0.0	0.0	0.0
39	1.7	184.0	0.0	0.0	0.	0.	0.0	0.0	0.0

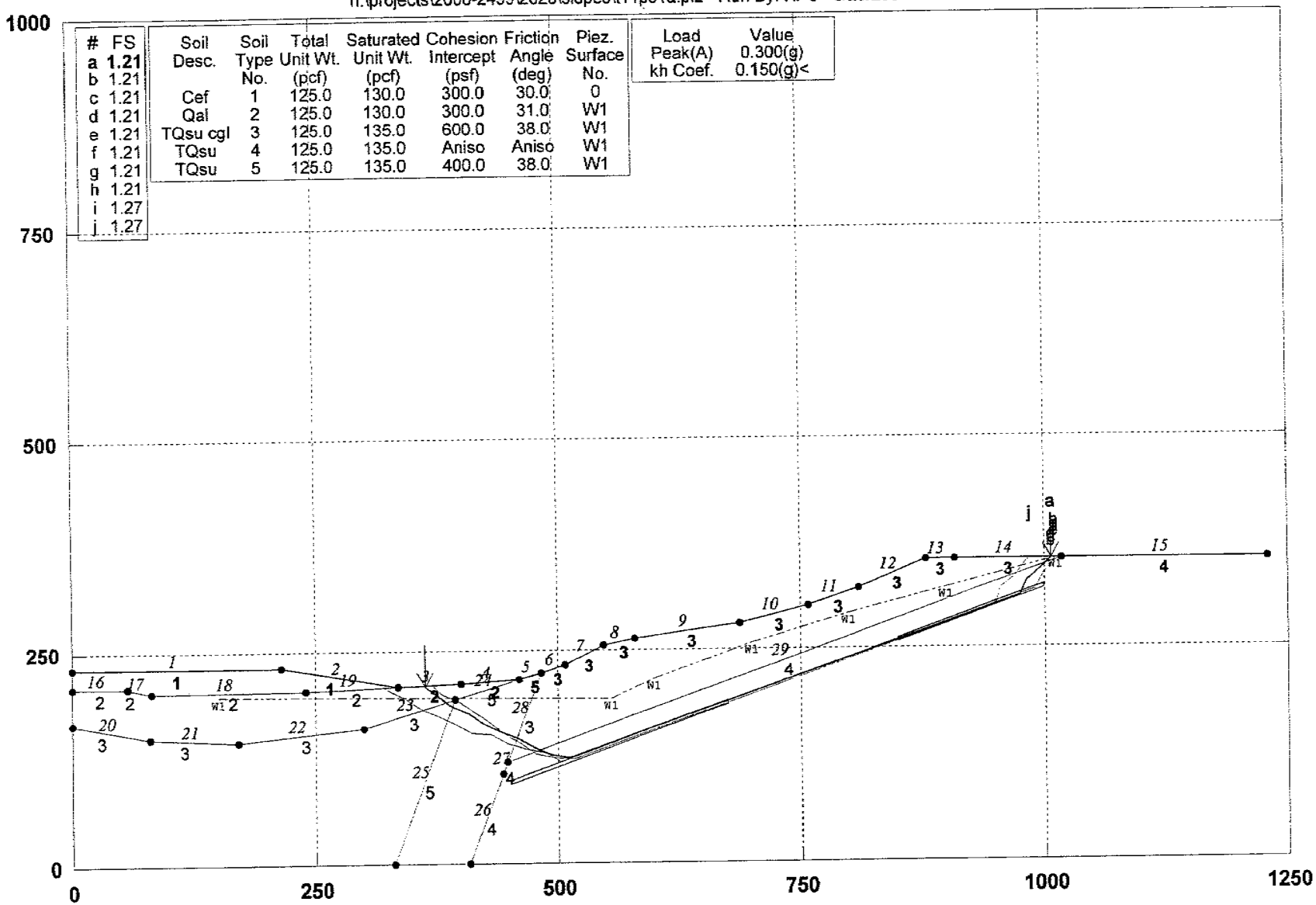
Mesas East, x-sec 11-11'; pseudostatic; bedding plane search

n:\projects\2000-2499\2023\slopes\t11ps1a.pl2 Run By: KPC 6/25/2004 04:22PM

#	FS
a	1.21
b	1.21
c	1.21
d	1.21
e	1.21
f	1.21
g	1.21
h	1.21
i	1.27
j	1.27

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
Qal	2	125.0	130.0	300.0	31.0	W1
TQsu cgl	3	125.0	135.0	600.0	38.0	W1
TQsu	4	125.0	135.0	Aniso	Aniso	W1
TQsu	5	125.0	135.0	400.0	38.0	W1

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<



GSTABL7 v.2 FSmin=1.21

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 23

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/25/2004
Time of Run: 04:22PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t11ps1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t11ps1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope1ps1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 11-11'; pseudostatic;
bedding plane search

BOUNDARY COORDINATES
15 Top Boundaries
29 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	230.00	215.00	230.00	1
2	215.00	230.00	335.00	207.00	1
3	335.00	207.00	400.00	210.00	2
4	400.00	210.00	460.00	215.00	2
5	460.00	215.00	483.00	223.00	5
6	483.00	223.00	508.00	232.00	3
7	508.00	232.00	548.00	255.00	3
8	548.00	255.00	580.00	263.00	3
9	580.00	263.00	687.00	280.00	3
10	687.00	280.00	758.00	300.00	3
11	758.00	300.00	810.00	320.00	3
12	810.00	320.00	879.00	353.00	3
13	879.00	353.00	908.00	353.00	3
14	908.00	353.00	1018.00	353.00	3
15	1018.00	353.00	1230.00	353.00	4
16	0.00	207.00	57.00	207.00	2
17	57.00	207.00	82.00	202.00	2
18	82.00	202.00	240.00	203.00	2
19	240.00	203.00	335.00	207.00	2
20	0.00	165.00	80.00	147.00	3
21	80.00	147.00	170.00	143.00	3
22	170.00	143.00	300.00	158.00	3
23	300.00	158.00	393.00	192.00	3
24	393.00	192.00	460.00	216.00	5
25	331.00	0.00	393.00	192.00	5
26	408.00	0.00	443.00	104.00	4
27	443.00	104.00	448.00	119.00	4
28	448.00	119.00	483.00	223.00	3
29	448.00	119.00	1018.00	353.00	4

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	130.0	300.0	31.0	0.00	0.0	1
3	125.0	135.0	600.0	38.0	0.00	0.0	1
4	125.0	135.0	400.0	38.0	0.00	0.0	1

```
  5   125.0    135.0     400.0     38.0    0.00       0.0      1
ANISOTROPIC STRENGTH PARAMETERS
    1 soil type(s)
 Soil Type  4 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction     Counterclockwise     Cohesion      Friction
   Range        Direction Limit    Intercept       Angle
   No.              (deg)            (psf)         (deg)
    1               21.5             400.00         38.00
    2               24.5             200.00         20.00
    3               90.0             400.00         38.00
 ANISOTROPIC SOIL NOTES:
    (1) An input value of 0.01 for C and/or Phi will cause Aniso
        C and/or Phi to be ignored in that range.
    (2) An input value of 0.02 for Phi will set both Phi and
        C equal to zero, with no water weight in the tension crack.
    (3) An input value of 0.03 for Phi will set both Phi and
        C equal to zero, with water weight in the tension crack.
 1 PIEZOMETRIC SURFACE(S) SPECIFIED
 Unit Weight of Water =  62.40 (pcf)
 Piezometric Surface No.  1 Specified by  7 Coordinate Points
 Pore Pressure Inclination Factor =  1.00
   Point       X-Water      Y-Water
   No.           (ft)         (ft)
    1          150.00       197.00
    2          555.00       192.00
    3          600.00       215.00
    4          700.00       256.00
    5          800.00       290.00
    6          900.00       320.00
    7         1012.00       353.00
 Specified Peak Ground Acceleration Coefficient (A) =   0.300(g)
 Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
 Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
 Specified Seismic Pore-Pressure Factor =   0.000
 Janbus Empirical Coef is being used for the case of  c & phi both > 0
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Sliding Block Surfaces, Has Been
 Specified.
 1000 Trial Surfaces Have Been Generated.
 2 Boxes Specified For Generation Of Central Block Base
 Length Of Line Segments For Active And Passive Portions Of
 Sliding Block Is  20.0
 Box         X-Left      Y-Left     X-Right     Y-Right      Height
 No.          (ft)        (ft)       (ft)        (ft)         (ft)
  1         450.00       95.00     675.00      187.00        5.00
  2         850.00      259.00    1000.00      321.00        5.00
 Following Are Displayed The Ten Most Critical Of The Trial
        Failure Surfaces Evaluated. They Are
        Ordered - Most Critical First.
        * * Safety Factors Are Calculated By The Simplified Janbu Method * *
        Total Number of Trial Surfaces Evaluated =  1000
        Statistical Data On All Valid FS Values:
           FS Max =   2.199   FS Min =   1.213   FS Ave =   1.510
           Standard Deviation =    0.165   Coefficient of Variation =   10.96 %
        Failure Surface Specified By 14 Coordinate Points
          Point       X-Surf       Y-Surf
          No.          (ft)         (ft)
           1         362.91       208.29
           2         374.03       197.59
           3         388.49       183.77
           4         406.80       175.72
           5         422.12       162.86
           6         439.54       153.04
           7         458.20       145.84
           8         474.97       134.95
           9         492.82       125.92
```

10	512.50	122.35
11	974.50	308.39
12	982.22	326.84
13	996.27	341.07
14	1007.75	353.00

Factor of Safety
*** 1.213 ***

Individual data on the 39 slices

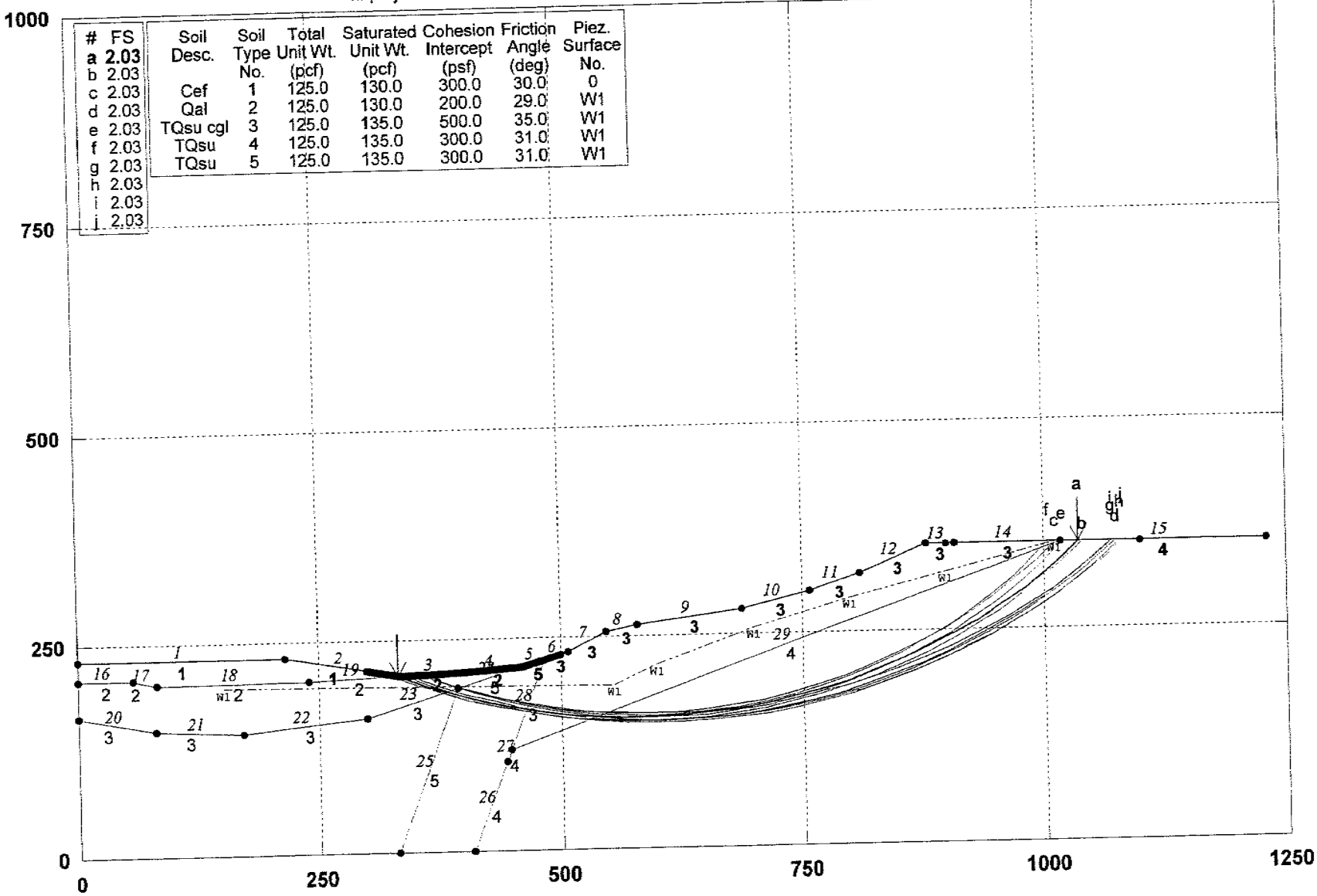
Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	11.1	7796.6	0.0	0.0	0.	0.	1169.5	0.0	0.0
2	3.6	5773.6	0.0	0.0	0.	0.	866.0	0.0	0.0
3	5.9	13214.2	0.0	1428.1	0.	0.	1982.1	0.0	0.0
4	5.0	14726.5	0.0	3413.0	0.	0.	2209.0	0.0	0.0
5	1.6	5440.4	0.0	1176.8	0.	0.	816.1	0.0	0.0
6	2.9	10117.0	0.0	2284.0	0.	0.	1517.6	0.0	0.0
7	5.4	20397.6	0.0	4918.7	0.	0.	3059.6	0.0	0.0
8	1.6	6429.5	0.0	1624.0	0.	0.	964.4	0.0	0.0
9	6.8	29227.3	0.0	7717.9	0.	0.	4384.1	0.0	0.0
10	15.3	84026.5	0.0	30505.7	0.	0.	12604.0	0.0	0.0
11	17.4	125126.9	0.0	44404.8	0.	0.	18769.0	0.0	0.0
12	17.6	149573.9	0.0	51496.3	0.	0.	22436.1	0.0	0.0
13	1.0	9357.6	0.0	3255.5	0.	0.	1403.6	0.0	0.0
14	1.8	16557.6	0.0	6426.0	0.	0.	2483.6	0.0	0.0
15	12.9	130659.7	0.0	50529.8	0.	0.	19599.0	0.0	0.0
16	2.1	22918.8	0.0	8812.7	0.	0.	3437.8	0.0	0.0
17	5.3	61356.0	0.0	22076.8	0.	0.	9203.4	0.0	0.0
18	2.7	32452.6	0.0	11615.4	0.	0.	4867.9	0.0	0.0
19	9.8	124608.8	0.0	44238.2	0.	0.	18691.3	0.0	0.0
20	15.2	209061.5	0.0	65590.4	0.	0.	31359.2	0.0	0.0
21	4.5	65294.5	0.0	19911.3	0.	0.	9794.2	0.0	0.0
22	35.5	533942.5	0.0	*******	0.	0.	80091.4	0.0	0.0
23	7.0	106871.6	0.0	25422.1	0.	0.	16030.7	0.0	0.0
24	25.0	374026.2	0.0	90629.8	0.	0.	56103.9	0.0	0.0
25	20.0	288843.0	0.0	75786.4	0.	0.	43326.5	0.0	0.0
26	87.0	1115845.1	0.0	*******	0.	0.	*******	0.0	0.0
27	13.0	148272.0	0.0	50808.5	0.	0.	22240.8	0.0	0.0
28	58.0	629356.9	0.0	*******	0.	0.	94403.5	0.0	0.0
29	42.0	434014.7	0.0	*******	0.	0.	65102.2	0.0	0.0
30	10.0	102567.0	0.0	34554.3	0.	0.	15385.1	0.0	0.0
31	69.0	726627.5	0.0	*******	0.	0.	*******	0.0	0.0
32	21.0	215924.0	0.0	60308.0	0.	0.	32388.6	0.0	0.0
33	8.0	76297.2	0.0	22161.8	0.	0.	11444.6	0.0	0.0
34	66.5	506875.5	0.0	*******	0.	0.	76031.3	0.0	0.0
35	7.7	36123.2	0.0	31796.1	0.	0.	5418.5	0.0	0.0
36	14.0	35172.9	0.0	15401.9	0.	0.	5275.9	0.0	0.0
37	4.8	5906.8	0.0	2371.7	0.	0.	886.0	0.0	0.0
38	5.0	2821.1	0.0	841.7	0.	0.	423.2	0.0	0.0
39	1.7	184.0	0.0	0.0	0.	0.	27.6	0.0	0.0

Mesas East, x-sec 11-11'; Static; circular

n:\projects\2000-2499\2023\slopes\t11s2a.pl2 Run By: KPC 6/25/2004 04:25PM

#	FS
a	**2.03**
b	2.03
c	2.03
d	2.03
e	2.03
f	2.03
g	2.03
h	2.03
i	2.03
j	2.03

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
Qal	2	125.0	130.0	200.0	29.0	W1
TQsu cgl	3	125.0	135.0	500.0	35.0	W1
TQsu	4	125.0	135.0	300.0	31.0	W1
TQsu	5	125.0	135.0	300.0	31.0	W1



GSTABL7 v.2 FSmin=2.03

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 24

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/25/2004
Time of Run: 04:25PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t11s2a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t11s2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopels2a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 11-11'; Static; circular

BOUNDARY COORDINATES
15 Top Boundaries
29 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	230.00	215.00	230.00	1
2	215.00	230.00	335.00	207.00	1
3	335.00	207.00	400.00	210.00	2
4	400.00	210.00	460.00	215.00	2
5	460.00	215.00	483.00	223.00	5
6	483.00	223.00	508.00	232.00	3
7	508.00	232.00	548.00	255.00	3
8	548.00	255.00	580.00	263.00	3
9	580.00	263.00	687.00	280.00	3
10	687.00	280.00	758.00	300.00	3
11	758.00	300.00	810.00	320.00	3
12	810.00	320.00	879.00	353.00	3
13	879.00	353.00	908.00	353.00	3
14	908.00	353.00	1018.00	353.00	3
15	1018.00	353.00	1230.00	353.00	4
16	0.00	207.00	57.00	207.00	2
17	57.00	207.00	82.00	202.00	2
18	82.00	202.00	240.00	203.00	2
19	240.00	203.00	335.00	207.00	2
20	0.00	165.00	80.00	147.00	3
21	80.00	147.00	170.00	143.00	3
22	170.00	143.00	300.00	158.00	3
23	300.00	158.00	393.00	192.00	3
24	393.00	192.00	460.00	216.00	5
25	331.00	0.00	393.00	192.00	5
26	408.00	0.00	443.00	104.00	4
27	443.00	104.00	448.00	119.00	4
28	448.00	119.00	483.00	223.00	3
29	448.00	119.00	1018.00	353.00	4

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	130.0	200.0	29.0	0.00	0.0	1
3	125.0	135.0	500.0	35.0	0.00	0.0	1
4	125.0	135.0	300.0	31.0	0.00	0.0	1

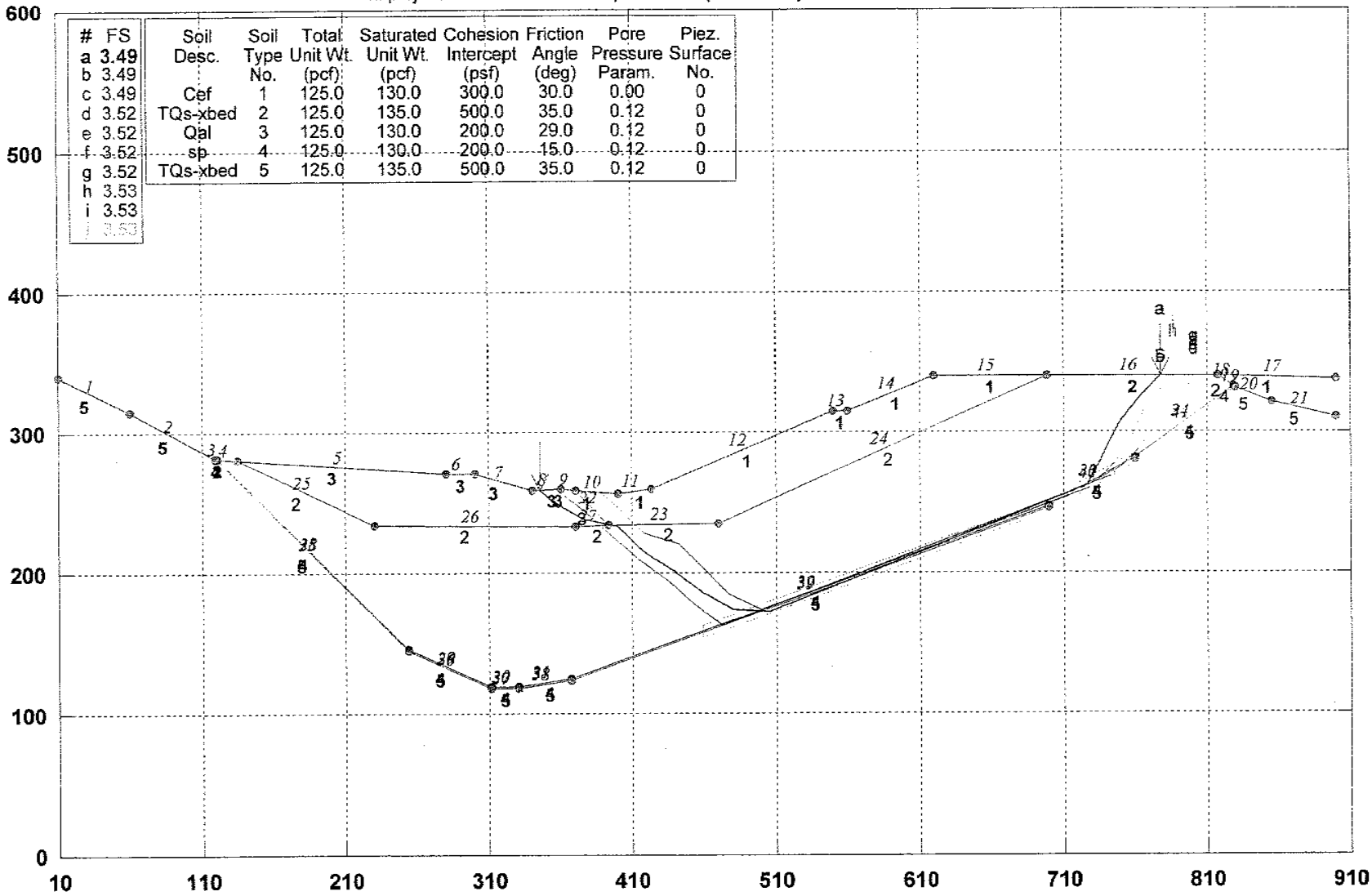
```
  5   125.0    135.0     300.0     31.0    0.00       0.0      1
1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water =  62.40 (pcf)
Piezometric Surface No.  1 Specified by  7 Coordinate Points
Pore Pressure Inclination Factor =  1.00
  Point       X-Water      Y-Water
   No.          (ft)         (ft)
    1         150.00       197.00
    2         555.00       192.00
    3         600.00       215.00
    4         700.00       256.00
    5         800.00       290.00
    6         900.00       320.00
    7        1012.00       353.00
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
  10 Surface(s) Initiate(s) From Each Of   100 Points Equally Spaced
Along The Ground Surface Between  X = 300.00(ft)
                                and  X = 500.00(ft)
Each Surface Terminates Between   X = 900.00(ft)
                                and  X =1100.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =      0.00(ft)
30.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And  15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Modified Bishop Method * *
      Total Number of Trial Surfaces Evaluated =  1000
      Statistical Data On All Valid FS Values:
         FS Max =   4.392   FS Min =   2.025   FS Ave =   2.321
         Standard Deviation =    0.272   Coefficient of Variation =   11.72 %
      Failure Surface Specified By 27 Coordinate Points
        Point       X-Surf       Y-Surf
         No.         (ft)         (ft)
          1         332.32       207.51
          2         359.99       195.91
          3         388.18       185.66
          4         416.85       176.80
          5         445.91       169.35
          6         475.30       163.33
          7         504.94       158.75
          8         534.78       155.62
          9         564.73       153.95
         10         594.73       153.74
         11         624.71       154.99
         12         654.58       157.71
         13         684.29       161.88
         14         713.76       167.49
         15         742.92       174.54
         16         771.71       182.99
         17         800.04       192.85
         18         827.86       204.07
         19         855.11       216.63
         20         881.70       230.51
         21         907.59       245.67
         22         932.71       262.08
         23         956.99       279.69
         24         980.39       298.46
         25        1002.85       318.36
         26        1024.31       339.32
         27        1037.01       353.00
      Circle Center At X =   584.01 ; Y =   768.54 ; and Radius =   614.90
```

Factor of Safety
*** 2.025 ***
Individual data on the 54 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	1.4	26.2	0.0	0.0	0.	0.	0.0	0.0	0.0
2	1.3	75.9	0.0	0.0	0.	0.	0.0	0.0	0.0
3	25.0	20080.1	0.0	0.0	0.	0.	0.0	0.0	0.0
4	4.3	6998.6	0.0	0.0	0.	0.	0.0	0.0	0.0
5	17.6	39119.0	0.0	3629.0	0.	0.	0.0	0.0	0.0
6	6.3	17973.5	0.0	3042.9	0.	0.	0.0	0.0	0.0
7	2.5	7810.2	0.0	1443.0	0.	0.	0.0	0.0	0.0
8	2.3	7400.6	0.0	1424.2	0.	0.	0.0	0.0	0.0
9	5.4	18400.7	0.0	3746.7	0.	0.	0.0	0.0	0.0
10	1.6	5737.6	0.0	1221.2	0.	0.	0.0	0.0	0.0
11	16.8	68326.9	0.0	15847.2	0.	0.	0.0	0.0	0.0
12	29.1	149559.3	0.0	38277.8	0.	0.	0.0	0.0	0.0
13	14.1	85496.9	0.0	22756.9	0.	0.	0.0	0.0	0.0
14	3.7	24038.6	0.0	6409.2	0.	0.	0.0	0.0	0.0
15	9.2	63637.3	0.0	16571.5	0.	0.	0.0	0.0	0.0
16	2.4	17510.7	0.0	4473.8	0.	0.	0.0	0.0	0.0
17	7.7	59073.5	0.0	14691.2	0.	0.	0.0	0.0	0.0
18	21.9	189507.8	0.0	44763.9	0.	0.	0.0	0.0	0.0
19	3.1	28875.7	0.0	6521.9	0.	0.	0.0	0.0	0.0
20	26.8	286230.2	0.0	59464.6	0.	0.	0.0	0.0	0.0
21	2.1	25414.6	0.0	4885.8	0.	0.	0.0	0.0	0.0
22	11.1	138022.9	0.0	25616.1	0.	0.	0.0	0.0	0.0
23	7.0	91155.0	0.0	16342.8	0.	0.	0.0	0.0	0.0
24	9.7	130144.3	0.0	24495.0	0.	0.	0.0	0.0	0.0
25	15.3	211740.5	0.0	44757.6	0.	0.	0.0	0.0	0.0
26	14.7	211338.1	0.0	50335.4	0.	0.	0.0	0.0	0.0
27	5.3	76834.9	0.0	19674.2	0.	0.	0.0	0.0	0.0
28	24.7	367228.5	0.0	*******	0.	0.	0.0	0.0	0.0
29	29.9	456056.4	0.0	*******	0.	0.	0.0	0.0	0.0
30	29.7	460893.3	0.0	*******	0.	0.	0.0	0.0	0.0
31	2.7	42206.4	0.0	15133.8	0.	0.	0.0	0.0	0.0
32	13.0	203733.0	0.0	74074.6	0.	0.	0.0	0.0	0.0
33	13.8	218114.8	0.0	80564.1	0.	0.	0.0	0.0	0.0
34	29.2	467312.9	0.0	*******	0.	0.	0.0	0.0	0.0
35	15.1	242803.3	0.0	94530.9	0.	0.	0.0	0.0	0.0
36	13.7	221736.7	0.0	86531.8	0.	0.	0.0	0.0	0.0
37	28.3	461828.2	0.0	*******	0.	0.	0.0	0.0	0.0
38	0.0	699.1	0.0	273.9	0.	0.	0.0	0.0	0.0
39	10.0	163004.8	0.0	64754.6	0.	0.	0.0	0.0	0.0
40	17.9	293478.5	0.0	*******	0.	0.	0.0	0.0	0.0
41	27.2	449737.4	0.0	*******	0.	0.	0.0	0.0	0.0
42	23.9	392447.0	0.0	*******	0.	0.	0.0	0.0	0.0
43	2.7	43890.8	0.0	16033.7	0.	0.	0.0	0.0	0.0
44	18.3	282787.8	0.0	*******	0.	0.	0.0	0.0	0.0
45	7.6	109827.2	0.0	42626.8	0.	0.	0.0	0.0	0.0
46	0.4	5808.5	0.0	2337.8	0.	0.	0.0	0.0	0.0
47	24.7	323505.3	0.0	*******	0.	0.	0.0	0.0	0.0
48	24.3	264434.0	0.0	*******	0.	0.	0.0	0.0	0.0
49	23.4	198943.7	0.0	95778.3	0.	0.	0.0	0.0	0.0
50	22.5	133828.3	0.0	72232.3	0.	0.	0.0	0.0	0.0
51	9.2	37148.9	0.0	23009.2	0.	0.	0.0	0.0	0.0
52	6.0	18446.4	330.9	12382.6	0.	0.	0.0	0.0	0.0
53	6.3	14275.2	1061.9	10709.1	0.	0.	0.0	0.0	0.0
54	12.7	11725.0	4356.2	14368.5	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 12-12'; static; bedding plane

n:\projects\2000-2499\2023\slopes\t12s1b.pl2 Run By: KPC 6/24/2004 03:13PM



#	FS
a	3.49
b	3.49
c	3.49
d	3.52
e	3.52
f	3.52
g	3.52
h	3.53
i	3.53
j	3.53

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0.00	0
TQs-xbed	2	125.0	135.0	500.0	35.0	0.12	0
Qal	3	125.0	130.0	200.0	29.0	0.12	0
sp	4	125.0	130.0	200.0	15.0	0.12	0
TQs-xbed	5	125.0	135.0	500.0	35.0	0.12	0

GSTABL7 v.2 FSmin=3.49

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 25

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/24/2004
Time of Run: 03:13PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t12s1b.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t12s1b.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope2s1b.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 12-12'; static;
bedding plane

BOUNDARY COORDINATES
17 Top Boundaries
41 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	10.00	340.00	60.00	315.00	5
2	60.00	315.00	119.00	282.00	5
3	119.00	282.00	120.00	281.00	4
4	120.00	281.00	135.00	280.00	2
5	135.00	280.00	280.00	270.00	3
6	280.00	270.00	300.00	270.00	3
7	300.00	270.00	340.00	258.00	3
8	340.00	258.00	360.00	259.00	3
9	360.00	259.00	370.00	258.00	3
10	370.00	258.00	400.00	256.00	1
11	400.00	256.00	424.00	259.00	1
12	424.00	259.00	550.00	315.00	1
13	550.00	315.00	560.00	315.00	1
14	560.00	315.00	620.00	340.00	1
15	620.00	340.00	699.00	340.00	1
16	699.00	340.00	818.00	340.00	2
17	818.00	340.00	900.00	338.00	1
18	818.00	340.00	829.00	333.00	2
19	829.00	333.00	830.00	332.00	4
20	830.00	332.00	856.00	322.00	5
21	856.00	322.00	900.00	310.00	5
22	370.00	258.00	394.00	234.00	3
23	394.00	234.00	471.00	235.00	2
24	471.00	235.00	699.00	340.00	2
25	135.00	280.00	230.00	234.00	2
26	230.00	234.00	370.00	232.00	2
27	370.00	232.00	394.00	234.00	2
28	120.00	281.00	254.00	146.00	4
29	254.00	146.00	312.00	119.00	4
30	312.00	119.00	330.00	119.00	4
31	330.00	119.00	367.00	125.00	4
32	367.00	125.00	700.00	247.00	4
33	700.00	247.00	760.00	281.00	4
34	760.00	281.00	829.00	333.00	4
35	119.00	282.00	254.00	145.00	5
36	254.00	145.00	312.00	118.00	5
37	312.00	118.00	330.00	118.00	5
38	330.00	118.00	367.00	124.00	5
39	367.00	124.00	700.00	246.00	5
40	700.00	246.00	760.00	280.00	5
41	760.00	280.00	830.00	332.00	5

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	135.0	500.0	35.0	0.12	0.0	0
3	125.0	130.0	200.0	29.0	0.12	0.0	0
4	125.0	130.0	200.0	15.0	0.12	0.0	0
5	125.0	135.0	500.0	35.0	0.12	0.0	0

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 4 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	254.00	151.00
2	420.00	151.00
3	760.00	286.00
4	824.00	333.00

WATER SURFACE DATA HAS BEEN SUPPRESSED
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 25.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	460.00	158.00	680.00	240.00	8.00
2	720.00	258.00	760.00	281.00	8.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 57.995 FS Min = 3.490 FS Ave = 7.377
Standard Deviation = 6.800 Coefficient of Variation = 92.18 %
Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	346.35	258.32
2	354.44	250.55
3	375.99	237.86
4	400.36	232.29
5	418.54	215.13
6	439.09	200.89
7	459.20	186.04
8	481.02	173.83
9	505.96	172.22
10	726.54	261.50
11	737.28	284.07
12	748.36	306.49
13	764.66	325.44
14	777.69	340.00

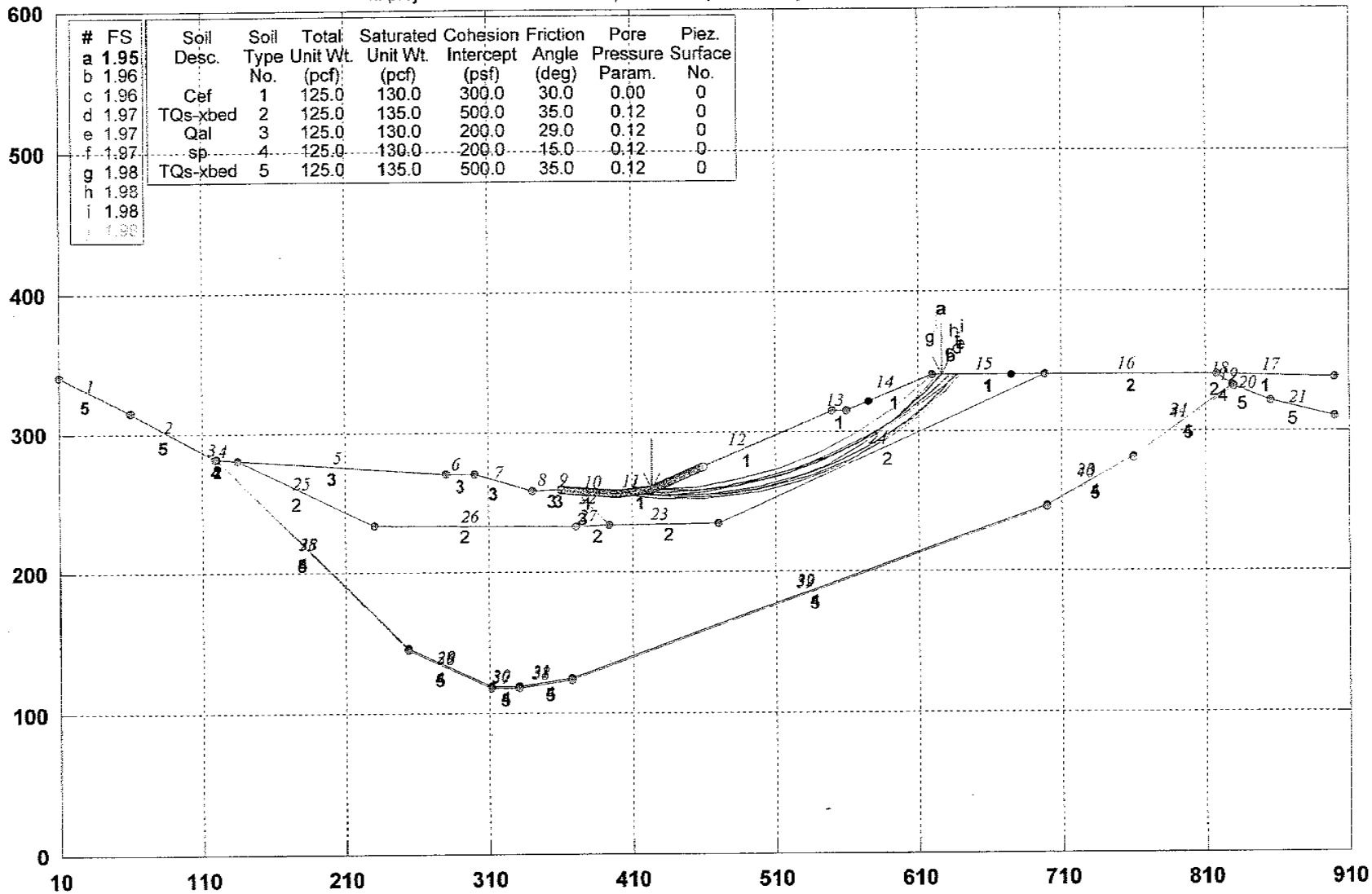
Factor of Safety
*** 3.490 ***
Individual data on the 30 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	8.1	4133.9	0.0	687.7	0.	0.	0.0	0.0	0.0

2	5.6	6908.6	0.0	962.1	0.	0.	0.0	0.0	0.0
3	10.0	17709.2	0.0	2466.2	0.	0.	0.0	0.0	0.0
4	6.0	13601.9	0.0	1894.2	0.	0.	0.0	0.0	0.0
5	17.2	45420.9	0.0	5591.1	0.	0.	0.0	0.0	0.0
6	0.8	2304.8	0.0	283.7	0.	0.	0.0	0.0	0.0
7	6.0	17355.3	0.0	2136.4	0.	0.	0.0	0.0	0.0
8	0.4	1061.7	0.0	130.7	0.	0.	0.0	0.0	0.0
9	18.2	76055.0	0.0	12551.3	0.	0.	0.0	0.0	0.0
10	5.5	31015.7	0.0	4527.5	0.	0.	0.0	0.0	0.0
11	15.1	106058.5	0.0	15482.0	0.	0.	0.0	0.0	0.0
12	20.1	192823.0	0.0	28764.9	0.	0.	0.0	0.0	0.0
13	11.8	139439.8	0.0	19174.3	0.	0.	0.0	0.0	0.0
14	10.0	132049.9	0.0	18158.2	0.	0.	0.0	0.0	0.0
15	16.4	234849.2	0.0	28240.9	0.	0.	0.0	0.0	0.0
16	2.3	34630.0	0.0	4164.3	0.	0.	0.0	0.0	0.0
17	6.2	94936.4	0.0	11416.2	0.	0.	0.0	0.0	0.0
18	44.0	683026.4	0.0	88422.8	0.	0.	0.0	0.0	0.0
19	10.0	153665.8	0.0	19893.2	0.	0.	0.0	0.0	0.0
20	16.1	243256.3	0.0	31491.3	0.	0.	0.0	0.0	0.0
21	26.0	394751.2	0.0	51103.4	0.	0.	0.0	0.0	0.0
22	17.9	271486.9	0.0	35146.0	0.	0.	0.0	0.0	0.0
23	79.0	1043145.0	0.0	*******	0.	0.	0.0	0.0	0.0
24	24.2	256474.8	0.0	33202.5	0.	0.	0.0	0.0	0.0
25	3.3	32952.4	0.0	4265.9	0.	0.	0.0	0.0	0.0
26	0.4	3431.1	0.0	958.1	0.	0.	0.0	0.0	0.0
27	10.4	86828.9	0.0	24246.6	0.	0.	0.0	0.0	0.0
28	11.1	61907.8	0.0	16769.6	0.	0.	0.0	0.0	0.0
29	16.3	48983.9	0.0	9013.6	0.	0.	0.0	0.0	0.0
30	13.0	11859.7	0.0	2133.8	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 12-12'; static; circular in Cef

n:\projects\2000-2499\2023\slopes\t12s2a.pl2 Run By: KPC 6/24/2004 03:19PM



#	FS
a	1.95
b	1.96
c	1.96
d	1.97
e	1.97
f	1.97
g	1.98
h	1.98
i	1.98
j	1.98

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0.00	0
TQs-xbed	2	125.0	135.0	500.0	35.0	0.12	0
Qal	3	125.0	130.0	200.0	29.0	0.12	0
sp	4	125.0	130.0	200.0	15.0	0.12	0
TQs-xbed	5	125.0	135.0	500.0	35.0	0.12	0

GSTABL7 v.2 FSmin=1.95

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 26

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/24/2004
Time of Run: 03:19PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t12s2a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t12s2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope2s2a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 12-12'; static;
circular in Cef

BOUNDARY COORDINATES
17 Top Boundaries
41 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	10.00	340.00	60.00	315.00	5
2	60.00	315.00	119.00	282.00	5
3	119.00	282.00	120.00	281.00	4
4	120.00	281.00	135.00	280.00	2
5	135.00	280.00	280.00	270.00	3
6	280.00	270.00	300.00	270.00	3
7	300.00	270.00	340.00	258.00	3
8	340.00	258.00	360.00	259.00	3
9	360.00	259.00	370.00	258.00	3
10	370.00	258.00	400.00	256.00	1
11	400.00	256.00	424.00	259.00	1
12	424.00	259.00	550.00	315.00	1
13	550.00	315.00	560.00	315.00	1
14	560.00	315.00	620.00	340.00	1
15	620.00	340.00	699.00	340.00	1
16	699.00	340.00	818.00	340.00	2
17	818.00	340.00	900.00	338.00	1
18	818.00	340.00	829.00	333.00	2
19	829.00	333.00	830.00	332.00	4
20	830.00	332.00	856.00	322.00	5
21	856.00	322.00	900.00	310.00	5
22	370.00	258.00	394.00	234.00	3
23	394.00	234.00	471.00	235.00	2
24	471.00	235.00	699.00	340.00	2
25	135.00	280.00	230.00	234.00	2
26	230.00	234.00	370.00	232.00	2
27	370.00	232.00	394.00	234.00	2
28	120.00	281.00	254.00	146.00	4
29	254.00	146.00	312.00	119.00	4
30	312.00	119.00	330.00	119.00	4
31	330.00	119.00	367.00	125.00	4
32	367.00	125.00	700.00	247.00	4
33	700.00	247.00	760.00	281.00	4
34	760.00	281.00	829.00	333.00	4
35	119.00	282.00	254.00	145.00	5
36	254.00	145.00	312.00	118.00	5
37	312.00	118.00	330.00	118.00	5
38	330.00	118.00	367.00	124.00	5
39	367.00	124.00	700.00	246.00	5
40	700.00	246.00	760.00	280.00	5
41	760.00	280.00	830.00	332.00	5

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	135.0	500.0	35.0	0.12	0.0	0
3	125.0	130.0	200.0	29.0	0.12	0.0	0
4	125.0	130.0	200.0	15.0	0.12	0.0	0
5	125.0	135.0	500.0	35.0	0.12	0.0	0

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 360.00(ft)
and X = 460.00(ft)
Each Surface Terminates Between X = 575.00(ft)
and X = 675.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
30.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 10.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 4.082 FS Min = 1.948 FS Ave = 2.827
Standard Deviation = 0.540 Coefficient of Variation = 19.12 %
Failure Surface Specified By 9 Coordinate Points

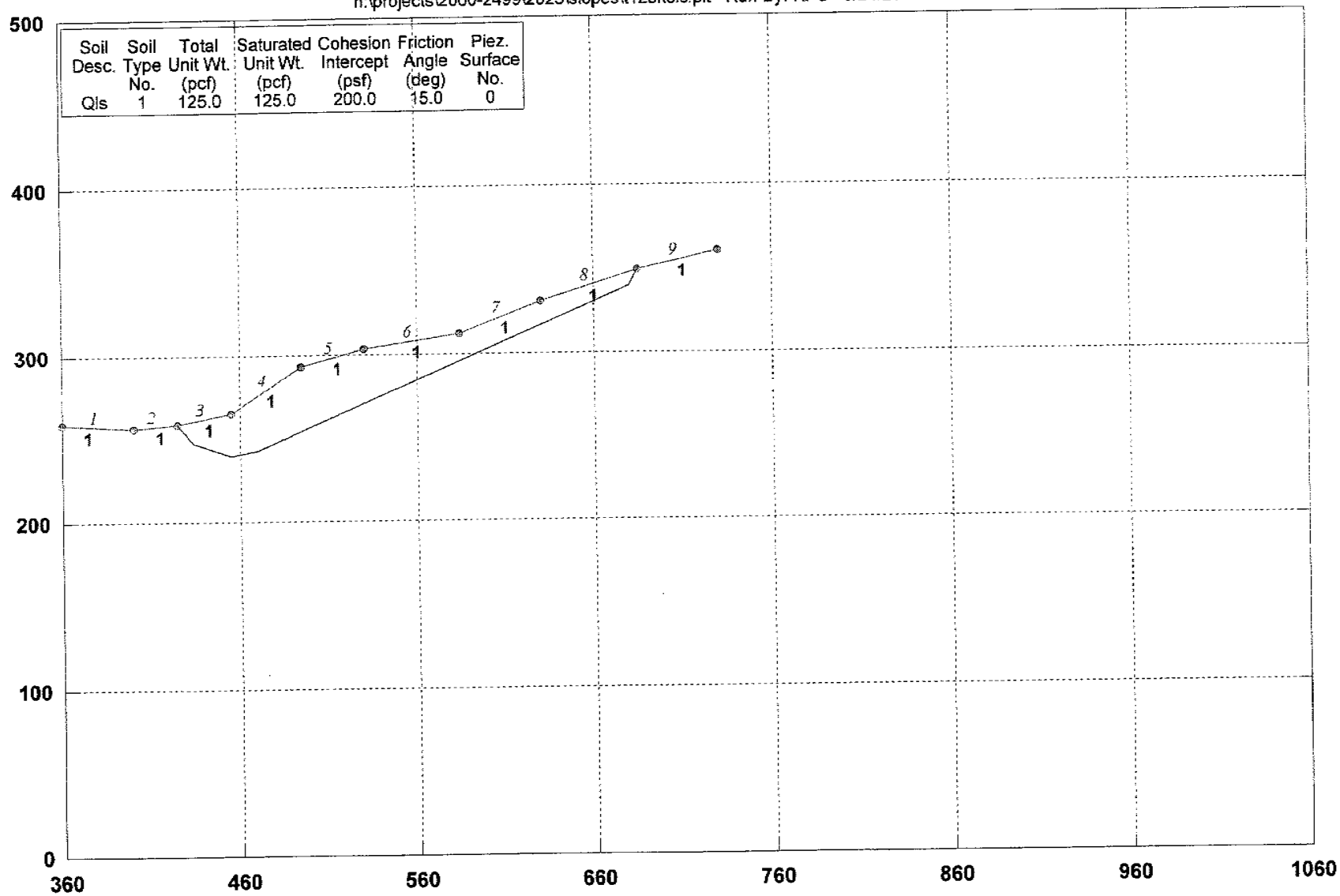
Point No.	X-Surf (ft)	Y-Surf (ft)
1	423.64	258.95
2	453.63	258.38
3	483.47	261.45
4	512.73	268.10
5	540.95	278.26
6	567.74	291.76
7	592.70	308.41
8	615.45	327.97
9	626.43	340.00

Circle Center At X = 443.36 ; Y = 505.22 ; and Radius = 247.05
Factor of Safety
*** 1.948 ***
Individual data on the 12 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	0.4	1.2	0.0	0.0	0.	0.	0.0	0.0	0.0
2	29.6	25634.0	0.0	0.0	0.	0.	0.0	0.0	0.0
3	29.8	70461.6	0.0	0.0	0.	0.	0.0	0.0	0.0
4	29.3	99302.4	0.0	0.0	0.	0.	0.0	0.0	0.0
5	28.2	111233.6	0.0	0.0	0.	0.	0.0	0.0	0.0
6	9.0	36692.2	0.0	0.0	0.	0.	0.0	0.0	0.0
7	10.0	37074.3	0.0	0.0	0.	0.	0.0	0.0	0.0
8	7.7	25941.4	0.0	0.0	0.	0.	0.0	0.0	0.0
9	25.0	72796.7	0.0	0.0	0.	0.	0.0	0.0	0.0
10	22.8	43158.9	0.0	0.0	0.	0.	0.0	0.0	0.0
11	4.5	4885.1	0.0	0.0	0.	0.	0.0	0.0	0.0
12	6.4	2830.5	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 12-12'; static; Qls back calculation

n:\projects\2000-2499\2023\slopes\t12bkcic.plt Run By: KPC 6/24/2004 03:23PM



GSTABL7 v.2 FSmin=1.04

Factor Of Safety Is Calculated By The Modified Bishop Method

GSTABL7

Run No. 27

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/24/2004
Time of Run: 03:23PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t12bkclc.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t12bkclc.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope2bkclc.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 12-12'; static;
Qls back calculation

BOUNDARY COORDINATES
Note: User origin value specified.
Add 0.00 to X-values and 0.00 to Y-values listed.

9 Top Boundaries
9 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	360.00	259.00	400.00	257.00	1
2	400.00	257.00	425.00	259.00	1
3	425.00	259.00	455.00	265.00	1
4	455.00	265.00	495.00	293.00	1
5	495.00	293.00	530.00	303.00	1
6	530.00	303.00	584.00	312.00	1
7	584.00	312.00	630.00	331.00	1
8	630.00	331.00	685.00	349.00	1
9	685.00	349.00	730.00	360.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	125.0	200.0	15.0	0.00	0.0	0

Trial Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	425.00	259.00
2	434.00	248.00
3	455.00	240.00
4	470.00	243.00
5	680.00	340.00
6	685.00	349.00

Circle Center At X = 526.557(ft) ; Y = 386.169(ft); and Radius = 162.744(ft)
* * Factor Of Safety Is Calculated By The Modified Bishop Method * *
Factor Of Safety For The Preceding Specified Surface = 1.041

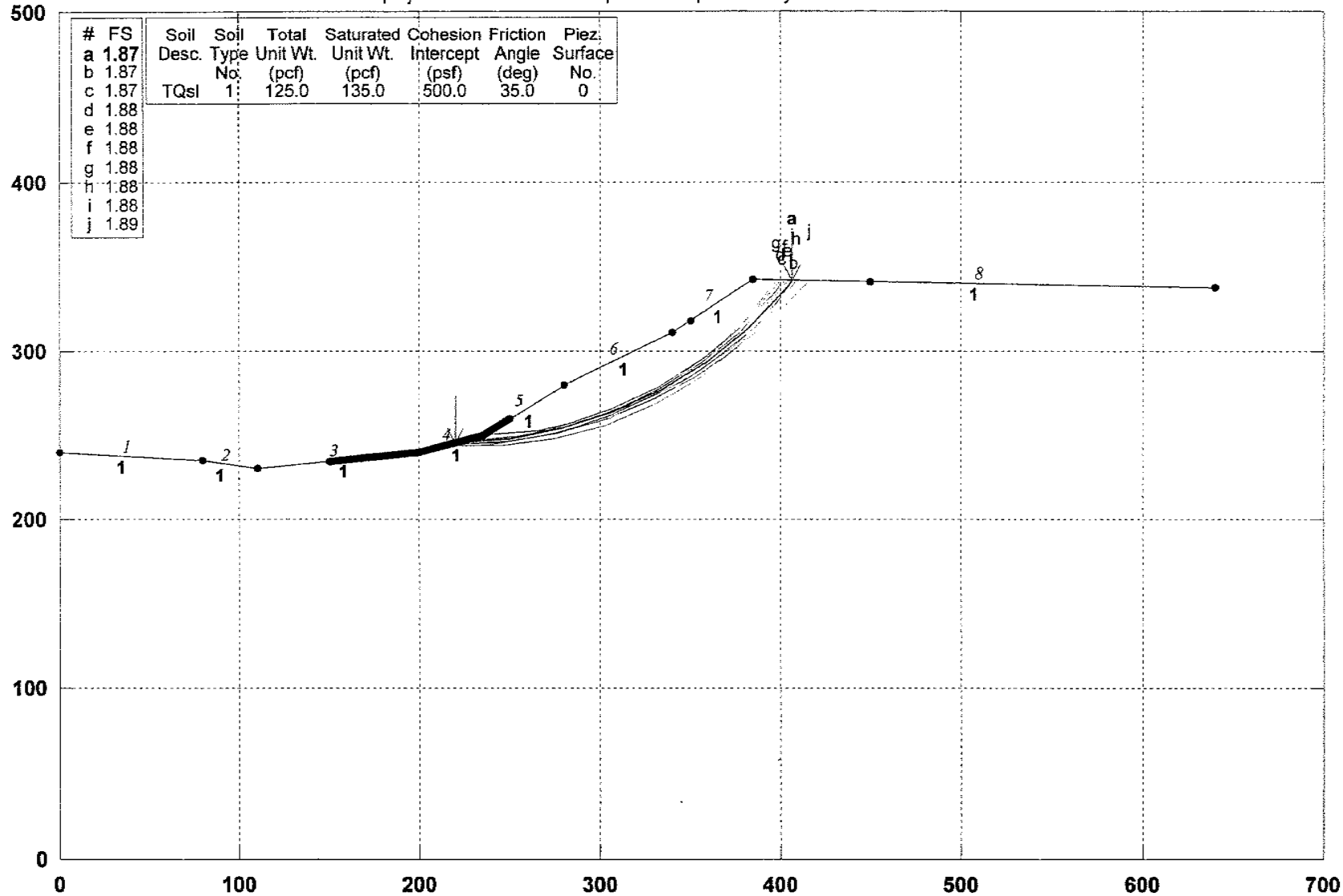
Table 1 - Individual Data on the 9 Slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	9.0	7200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	21.0	49612.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	15.0	53906.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	25.0	110863.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	35.0	154739.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0

6	54.0	164121.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	46.0	87509.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	50.0	67058.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	5.0	2301.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Mesas East, x-sec 13-13'; static; circular

n:\projects\2000-2499\2023\slopes\t13s1a.pl2 Run By: KPC 6/25/2004 01:10PM



GSTABL7 v.2 FSmin=1.87

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No. 28

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:          6/25/2004
Time of Run:                01:10PM
Run By:                     KPC
Input Data Filename:        N:\Projects\2000-2499\2023\Slopes\t13s1a.in
Output Filename:            N:\Projects\2000-2499\2023\Slopes\t13s1a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\2000-2499\2023\Slope3s1a.PLT
PROBLEM DESCRIPTION:  Mesas East, x-sec 13-13'; static;
                      circular
BOUNDARY COORDINATES
    8 Top   Boundaries
    8 Total Boundaries
Boundary     X-Left      Y-Left     X-Right     Y-Right     Soil Type
   No.        (ft)        (ft)        (ft)        (ft)     Below Bnd
    1         0.00      240.00       80.00      235.00         1
    2        80.00      235.00      110.00      230.00         1
    3       110.00      230.00      200.00      240.00         1
    4       200.00      240.00      235.00      250.00         1
    5       235.00      250.00      280.00      280.00         1
    6       280.00      280.00      340.00      311.00         1
    7       340.00      311.00      385.00      342.00         1
    8       385.00      342.00      640.00      338.00         1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 1 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   125.0    135.0     500.0     35.0    0.00       0.0      0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
  10 Surface(s) Initiate(s) From Each Of   100 Points Equally Spaced
Along The Ground Surface Between  X = 150.00(ft)
                             and  X = 250.00(ft)
Each Surface Terminates Between   X = 350.00(ft)
                             and  X = 450.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =      0.00(ft)
30.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And  10.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Modified Bishop Method * *
      Total Number of Trial Surfaces Evaluated =  1000
      Statistical Data On All Valid FS Values:
         FS Max =   3.933   FS Min =   1.872   FS Ave =   2.430
         Standard Deviation =    0.364   Coefficient of Variation =   14.98 %
      Failure Surface Specified By  9 Coordinate Points
```

Point No.	X-Surf (ft)	Y-Surf (ft)
1	219.70	245.63
2	249.59	248.14
3	278.94	254.36
4	307.29	264.17
5	334.20	277.43
6	359.25	293.94
7	382.06	313.43
8	402.26	335.60
9	406.54	341.66

Circle Center At X = 214.48 ; Y = 486.43 ; and Radius = 240.86

Factor of Safety

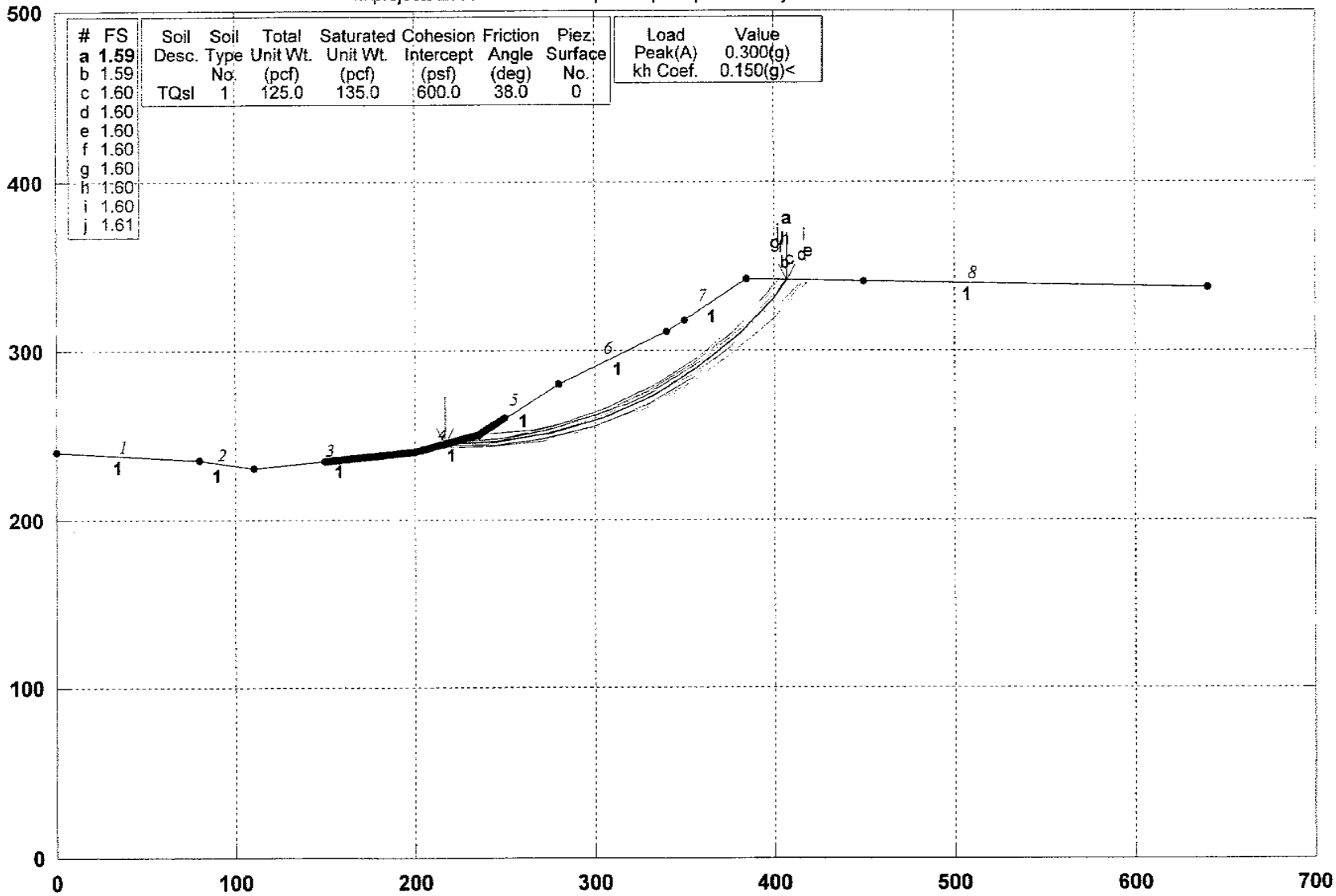
*** 1.872 ***

Individual data on the 12 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	15.3	2949.6	0.0	0.0	0.	0.	0.0	0.0	0.0
2	14.6	13375.7	0.0	0.0	0.	0.	0.0	0.0	0.0
3	29.3	66988.6	0.0	0.0	0.	0.	0.0	0.0	0.0
4	1.1	3324.1	0.0	0.0	0.	0.	0.0	0.0	0.0
5	27.3	94158.1	0.0	0.0	0.	0.	0.0	0.0	0.0
6	26.9	101749.2	0.0	0.0	0.	0.	0.0	0.0	0.0
7	5.8	21865.2	0.0	0.0	0.	0.	0.0	0.0	0.0
8	19.3	72280.4	0.0	0.0	0.	0.	0.0	0.0	0.0
9	22.8	81063.5	0.0	0.0	0.	0.	0.0	0.0	0.0
10	2.9	9540.2	0.0	0.0	0.	0.	0.0	0.0	0.0
11	17.3	33959.3	0.0	0.0	0.	0.	0.0	0.0	0.0
12	4.3	1637.2	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 13-13'; pseudostatic; circular

n:\projects\2000-2499\2023\slopes\t13ps1a.pl2 Run By: KPC 6/25/2004 01:40PM



GSTABL7 v.2 FSmin=1.59

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 29

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:          6/25/2004
Time of Run:                01:40PM
Run By:                     KPC
Input Data Filename:        N:\Projects\2000-2499\2023\Slopes\t13ps1a.in
Output Filename:            N:\Projects\2000-2499\2023\Slopes\t13ps1a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\2000-2499\2023\Slope3ps1a.PLT
PROBLEM DESCRIPTION:  Mesas East, x-sec 13-13'; pseudostatic;
                      circular
BOUNDARY COORDINATES
    8 Top   Boundaries
    8 Total Boundaries
Boundary     X-Left      Y-Left     X-Right     Y-Right     Soil Type
   No.        (ft)        (ft)        (ft)        (ft)      Below Bnd
    1         0.00      240.00       80.00      235.00          1
    2        80.00      235.00      110.00      230.00          1
    3       110.00      230.00      200.00      240.00          1
    4       200.00      240.00      235.00      250.00          1
    5       235.00      250.00      280.00      280.00          1
    6       280.00      280.00      340.00      311.00          1
    7       340.00      311.00      385.00      342.00          1
    8       385.00      342.00      640.00      338.00          1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  1 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   125.0    135.0     600.0     38.0     0.00      0.0       0
Specified Peak Ground Acceleration Coefficient (A) =    0.300(g)
Specified Horizontal Earthquake Coefficient (kh) =    0.150(g)
Specified Vertical Earthquake Coefficient (kv) =    0.000(g)
Specified Seismic Pore-Pressure Factor =    0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
  10 Surface(s) Initiate(s) From Each Of   100 Points Equally Spaced
Along The Ground Surface Between  X = 150.00(ft)
                            and   X = 250.00(ft)
Each Surface Terminates Between   X = 350.00(ft)
                            and   X = 450.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =       0.00(ft)
30.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And  10.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Modified Bishop Method * *
      Total Number of Trial Surfaces Evaluated =  1000
```

Statistical Data On All Valid FS Values:
FS Max = 3.271 FS Min = 1.592 FS Ave = 2.040
Standard Deviation = 0.304 Coefficient of Variation = 14.89 %

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	216.67	244.76
2	246.64	246.05
3	276.18	251.28
4	304.77	260.37
5	331.91	273.15
6	357.13	289.40
7	379.98	308.83
8	400.07	331.12
9	407.29	341.65

Circle Center At X = 221.94 ; Y = 471.50 ; and Radius = 226.80

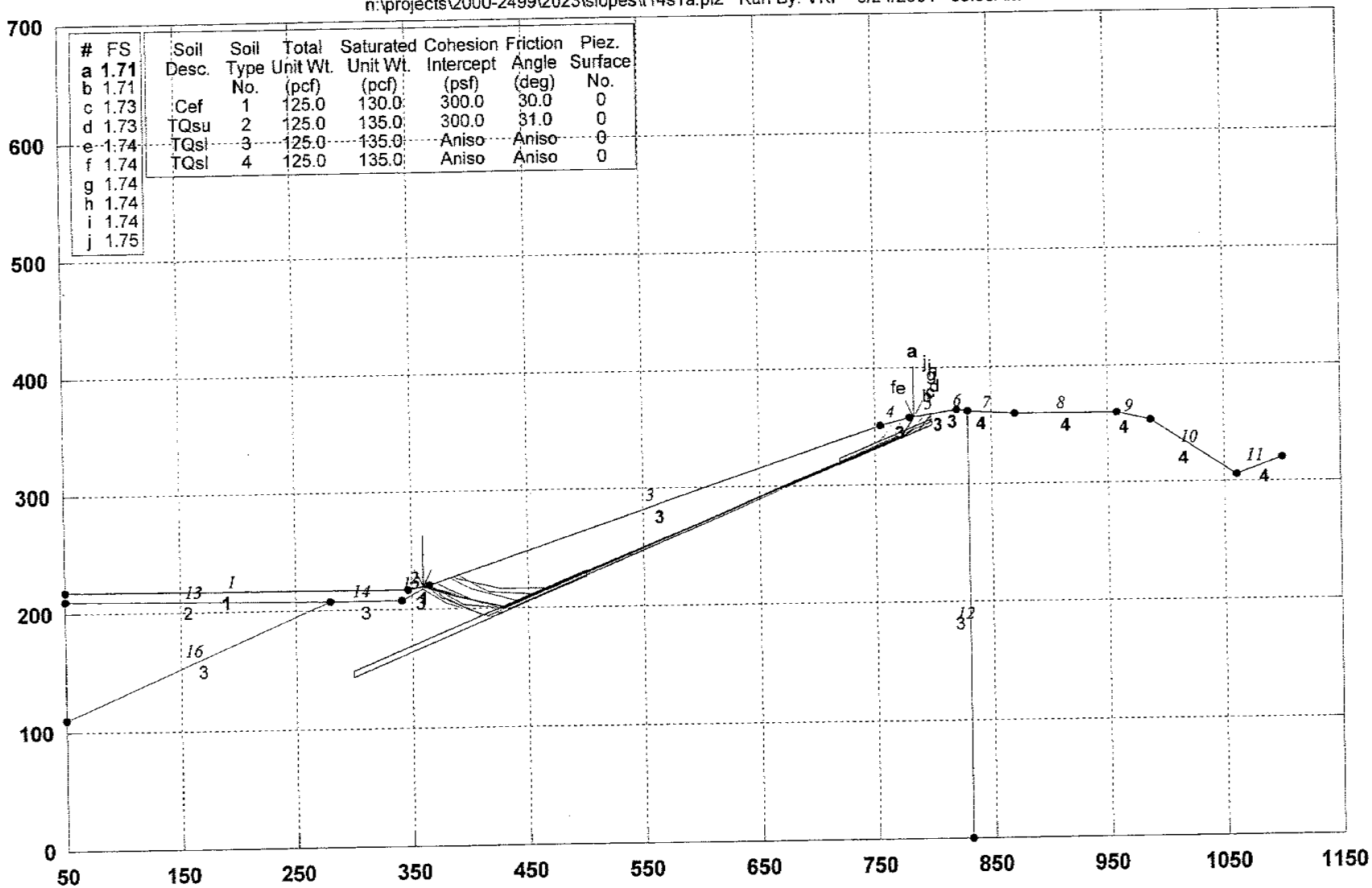
Factor of Safety
*** 1.592 ***

Individual data on the 12 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	18.3	5099.2	0.0	0.0	0.	0.	764.9	0.0	0.0
2	11.6	11755.1	0.0	0.0	0.	0.	1763.3	0.0	0.0
3	29.5	69935.2	0.0	0.0	0.	0.	10490.3	0.0	0.0
4	3.8	12817.4	0.0	0.0	0.	0.	1922.6	0.0	0.0
5	24.8	92784.0	0.0	0.0	0.	0.	13917.6	0.0	0.0
6	27.1	112133.9	0.0	0.0	0.	0.	16820.1	0.0	0.0
7	8.1	33521.2	0.0	0.0	0.	0.	5028.2	0.0	0.0
8	17.1	70704.5	0.0	0.0	0.	0.	10605.7	0.0	0.0
9	22.9	90138.0	0.0	0.0	0.	0.	13520.7	0.0	0.0
10	5.0	17973.4	0.0	0.0	0.	0.	2696.0	0.0	0.0
11	15.1	36019.1	0.0	0.0	0.	0.	5402.9	0.0	0.0
12	7.2	4807.7	0.0	0.0	0.	0.	721.1	0.0	0.0

Mesas East, x-sec 14-14', static; critical plane

n:\projects\2000-2499\2023\slopes\t14s1a.pl2 Run By: VKP 6/24/2004 09:55AM



#	FS
a	1.71
b	1.71
c	1.73
d	1.73
e	1.74
f	1.74
g	1.74
h	1.74
i	1.74
j	1.75

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
TQsu	2	125.0	135.0	300.0	31.0	0
TQsl	3	125.0	135.0	Aniso	Aniso	0
TQsl	4	125.0	135.0	Aniso	Aniso	0

GSTABL7 v.2 FSmin=1.71

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN NO. 30

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/24/2004
Time of Run: 09:55AM
Run By: VKP
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t14s1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t14s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope4s1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 14-14', static;
critical plane

BOUNDARY COORDINATES
11 Top Boundaries
16 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	50.00	218.00	346.00	217.00	1
2	346.00	217.00	365.00	220.00	1
3	365.00	220.00	755.00	350.00	3
4	755.00	350.00	780.00	357.00	3
5	780.00	357.00	820.00	363.00	3
6	820.00	363.00	830.00	362.00	3
7	830.00	362.00	870.00	359.00	4
8	870.00	359.00	958.00	360.00	4
9	958.00	360.00	987.00	353.00	4
10	987.00	353.00	1060.00	306.00	4
11	1060.00	306.00	1100.00	320.00	4
12	830.00	362.00	830.10	0.00	3
13	50.00	210.00	280.00	207.00	2
14	280.00	207.00	342.00	207.00	3
15	342.00	207.00	365.00	220.00	3
16	50.00	110.00	280.00	207.00	3

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	135.0	300.0	31.0	0.00	0.0	0
3	125.0	135.0	500.0	35.0	0.00	0.0	0
4	125.0	135.0	500.0	35.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
2 soil type(s)

Soil Type 3 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	20.5	500.00	35.00
2	23.5	200.00	20.00
3	90.0	500.00	35.00

Soil Type 4 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)

1	32.5	500.00	35.00
2	35.5	200.00	20.00
3	90.0	500.00	35.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 40.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	300.00	146.00	500.00	228.00	5.00
2	720.00	320.00	800.00	353.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 3.814 FS Min = 1.707 FS Ave = 2.182
Standard Deviation = 0.466 Coefficient of Variation = 21.36 %
Failure Surface Specified By 5 Coordinate Points

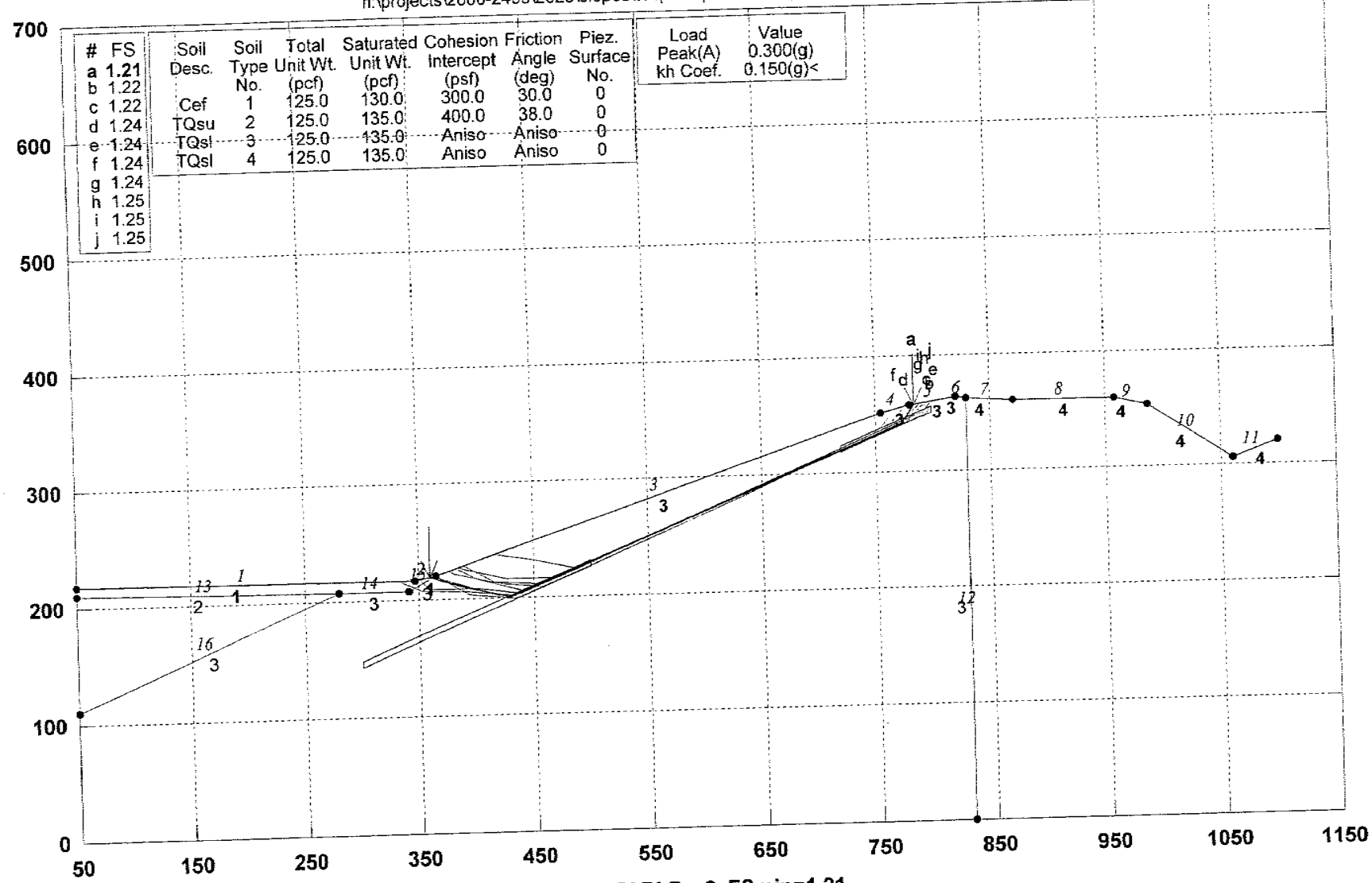
Point No.	X-Surf (ft)	Y-Surf (ft)
1	359.44	219.12
2	389.70	209.85
3	428.70	200.97
4	773.47	341.74
5	783.69	357.55

Factor of Safety
*** 1.707 ***
Individual data on the 8 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	2.6	195.9	0.0	0.0	0.	0.	0.0	0.0	0.0
2	3.0	701.1	0.0	0.0	0.	0.	0.0	0.0	0.0
3	24.7	32357.1	0.0	0.0	0.	0.	0.0	0.0	0.0
4	39.0	142946.6	0.0	0.0	0.	0.	0.0	0.0	0.0
5	326.3	1143223.2	0.0	0.0	0.	0.	0.0	0.0	0.0
6	18.5	33743.0	0.0	0.0	0.	0.	0.0	0.0	0.0
7	6.5	7583.8	0.0	0.0	0.	0.	0.0	0.0	0.0
8	3.7	1190.2	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 14-14', pseudostatic; critical plane

n:\projects\2000-2499\2023\slopes\t14ps1a.pl2 Run By: VKP 6/24/2004 10:02AM



#	FS
a	1.21
b	1.22
c	1.22
d	1.24
e	1.24
f	1.24
g	1.24
h	1.25
i	1.25
j	1.25

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
TQsu	2	125.0	135.0	400.0	38.0	0
TQsl	3	125.0	135.0	Aniso	Aniso	0
TQsl	4	125.0	135.0	Aniso	Aniso	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.21

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 31

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/24/2004
Time of Run: 10:02AM
Run By: VKP
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t14ps1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t14ps1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope4ps1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 14-14', pseudostatic; critical plane

BOUNDARY COORDINATES
11 Top Boundaries
16 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	50.00	218.00	346.00	217.00	1
2	346.00	217.00	365.00	220.00	1
3	365.00	220.00	755.00	350.00	3
4	755.00	350.00	780.00	357.00	3
5	780.00	357.00	820.00	363.00	3
6	820.00	363.00	830.00	362.00	3
7	830.00	362.00	870.00	359.00	4
8	870.00	359.00	958.00	360.00	4
9	958.00	360.00	987.00	353.00	4
10	987.00	353.00	1060.00	306.00	4
11	1060.00	306.00	1100.00	320.00	4
12	830.00	362.00	830.10	0.00	3
13	50.00	210.00	280.00	207.00	2
14	280.00	207.00	342.00	207.00	3
15	342.00	207.00	365.00	220.00	3
16	50.00	110.00	280.00	207.00	3

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	135.0	400.0	38.0	0.00	0.0	0
3	125.0	135.0	600.0	38.0	0.00	0.0	0
4	125.0	135.0	600.0	38.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
2 soil type(s)

Soil Type 3 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	20.5	600.00	38.00
2	23.5	200.00	20.00
3	90.0	600.00	38.00

Soil Type 4 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)

1	32.5	600.00	38.00
2	35.5	200.00	20.00
3	90.0	600.00	38.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 40.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	300.00	146.00	500.00	228.00	5.00
2	720.00	320.00	800.00	353.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 2.390 FS Min = 1.209 FS Ave = 1.572
Standard Deviation = 0.262 Coefficient of Variation = 16.65 %
Failure Surface Specified By 5 Coordinate Points

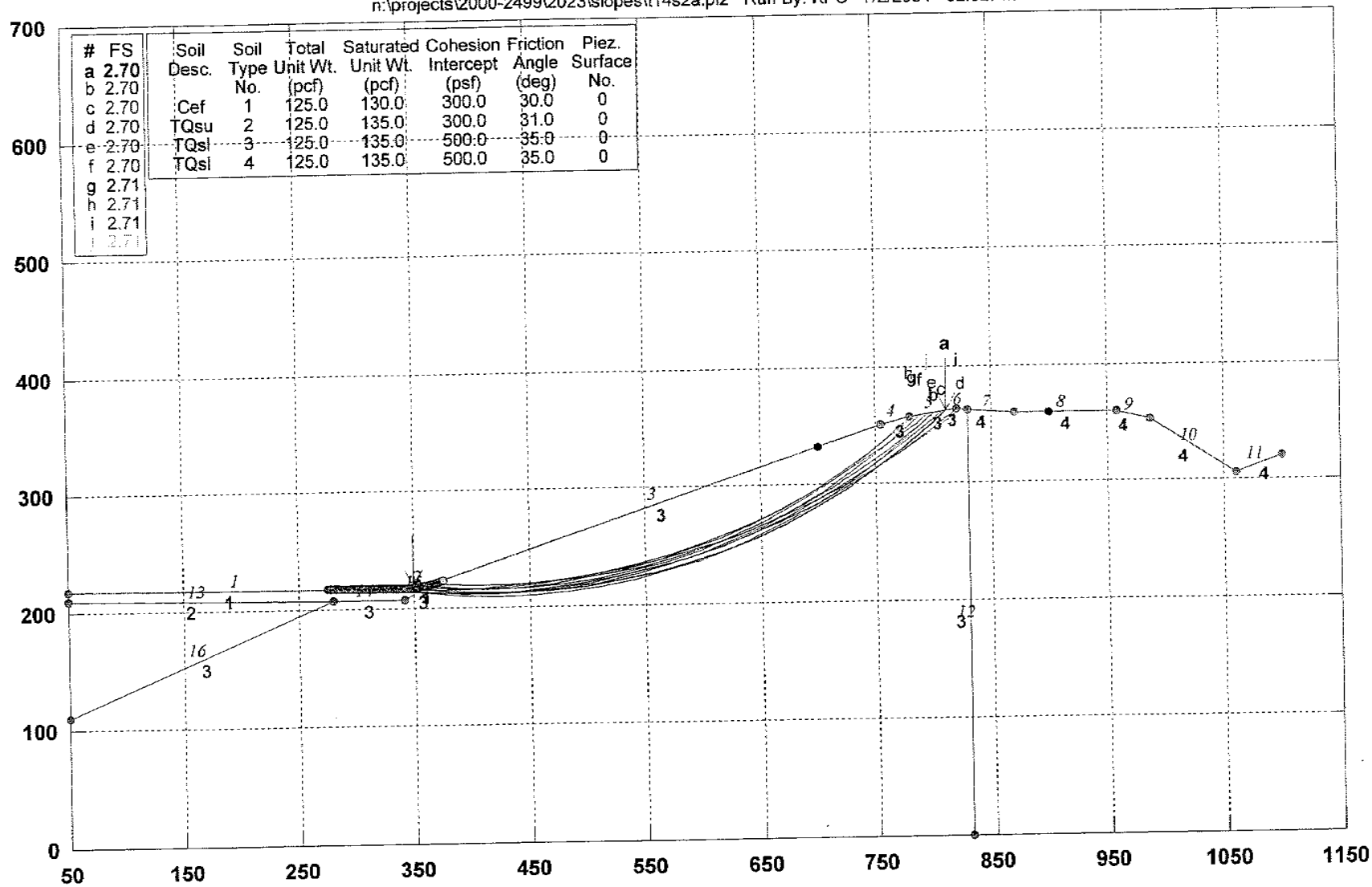
Point No.	X-Surf (ft)	Y-Surf (ft)
1	359.44	219.12
2	389.70	209.85
3	428.70	200.97
4	773.47	341.74
5	783.69	357.55

Factor of Safety
*** 1.209 ***
Individual data on the 8 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	2.6	195.9	0.0	0.0	0.	0.	29.4	0.0	0.0
2	3.0	701.1	0.0	0.0	0.	0.	105.2	0.0	0.0
3	24.7	32357.1	0.0	0.0	0.	0.	4853.6	0.0	0.0
4	39.0	142946.6	0.0	0.0	0.	0.	21442.0	0.0	0.0
5	326.3	1143223.2	0.0	0.0	0.	0.	*******	0.0	0.0
6	18.5	33743.0	0.0	0.0	0.	0.	5061.4	0.0	0.0
7	6.5	7583.8	0.0	0.0	0.	0.	1137.6	0.0	0.0
8	3.7	1190.2	0.0	0.0	0.	0.	178.5	0.0	0.0

Mesas East, x-sec 14-14', static; circular

n:\projects\2000-2499\2023\slopes\t14s2a.pl2 Run By: KPC 7/2/2004 02:52PM



#	FS
a	2.70
b	2.70
c	2.70
d	2.70
e	2.70
f	2.70
g	2.71
h	2.71
i	2.71
j	2.71

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
TQsu	2	125.0	135.0	300.0	31.0	0
TQsl	3	125.0	135.0	500.0	35.0	0
TQsl	4	125.0	135.0	500.0	35.0	0

GSTABL7 v.2 FSmin=2.70

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN NO. 32

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 7/2/2004
Time of Run: 02:52PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t14s2a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t14s2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope4s2a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 14-14', static; circular

BOUNDARY COORDINATES
11 Top Boundaries
16 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	50.00	218.00	346.00	217.00	1
2	346.00	217.00	365.00	220.00	1
3	365.00	220.00	755.00	350.00	3
4	755.00	350.00	780.00	357.00	3
5	780.00	357.00	820.00	363.00	3
6	820.00	363.00	830.00	362.00	3
7	830.00	362.00	870.00	359.00	4
8	870.00	359.00	958.00	360.00	4
9	958.00	360.00	987.00	353.00	4
10	987.00	353.00	1060.00	306.00	4
11	1060.00	306.00	1100.00	320.00	4
12	830.00	362.00	830.10	0.00	3
13	50.00	210.00	280.00	207.00	2
14	280.00	207.00	342.00	207.00	3
15	342.00	207.00	365.00	220.00	3
16	50.00	110.00	280.00	207.00	3

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	135.0	300.0	31.0	0.00	0.0	0
3	125.0	135.0	500.0	35.0	0.00	0.0	0
4	125.0	135.0	500.0	35.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
2 soil type(s)

Soil Type 3 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	20.5	500.00	35.00
2	23.5	200.00	20.00
3	90.0	500.00	35.00

Soil Type 4 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)

1	32.5	500.00	35.00
2	35.5	200.00	20.00
3	90.0	500.00	35.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

ANISOTROPIC STRENGTH DATA HAS BEEN SUPPRESSED
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.
2000 Trial Surfaces Have Been Generated.
20 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 275.00(ft)
and X = 375.00(ft)
Each Surface Terminates Between X = 700.00(ft)
and X = 900.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = 0.00(ft)
30.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0 And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 2000
Statistical Data On All Valid FS Values:
FS Max = 4.366 FS Min = 2.696 FS Ave = 3.430
Standard Deviation = 0.471 Coefficient of Variation = 13.74 %
Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	349.75	217.59
2	379.56	214.24
3	409.51	212.47
4	439.51	212.29
5	469.47	213.69
6	499.33	216.68
7	528.98	221.24
8	558.34	227.37
9	587.35	235.03
10	615.90	244.23
11	643.94	254.92
12	671.36	267.07
13	698.11	280.66
14	724.10	295.65
15	749.25	311.99
16	773.51	329.64
17	796.81	348.55
18	811.37	361.71

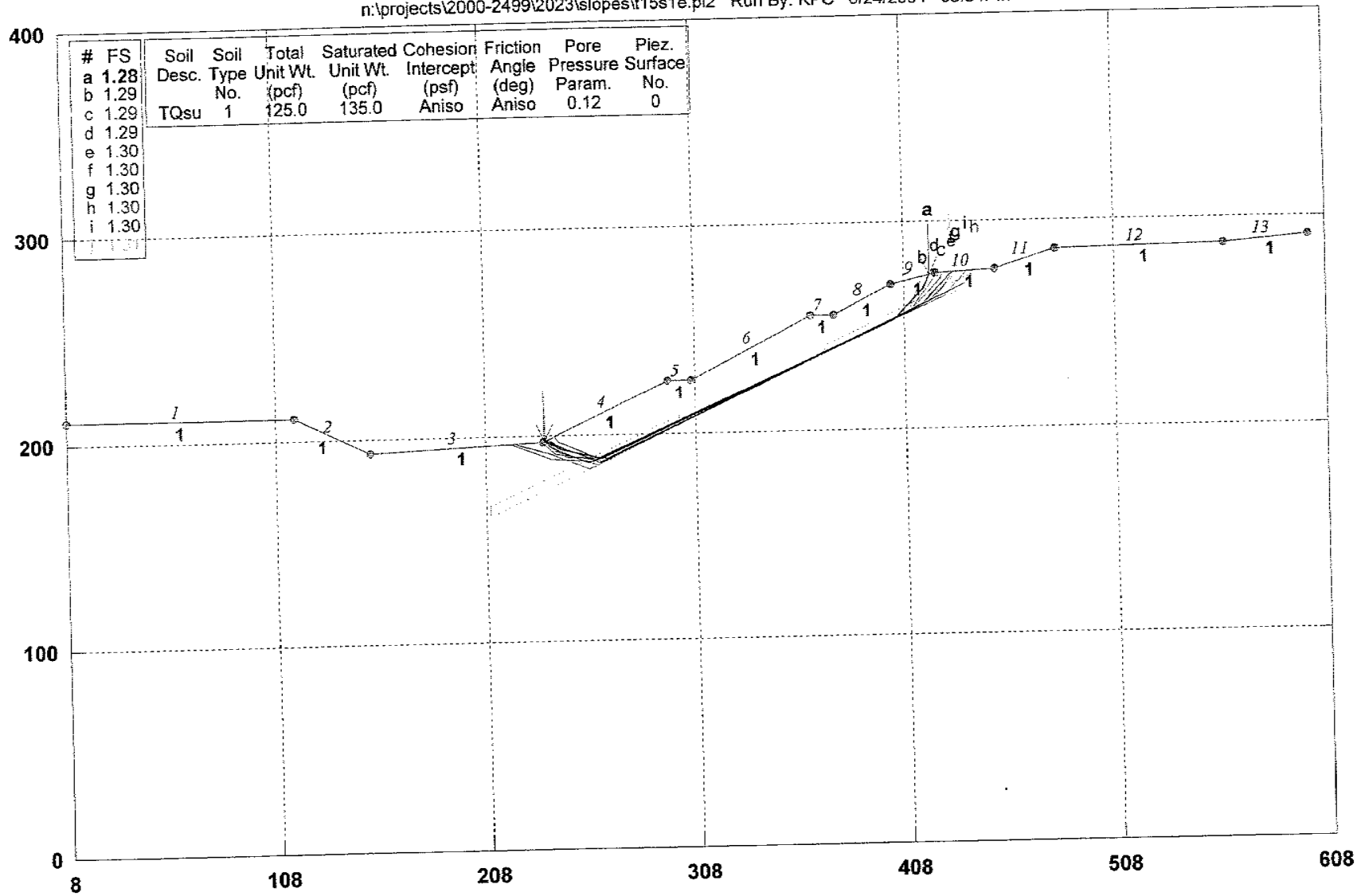
Circle Center At X = 428.03 ; Y = 778.22 ; and Radius = 566.07
Factor of Safety
*** 2.696 ***
Individual data on the 21 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	9.2	1420.1	0.0	0.0	0.	0.	0.0	0.0	0.0
2	6.1	2510.1	0.0	0.0	0.	0.	0.0	0.0	0.0
3	14.6	13408.9	0.0	0.0	0.	0.	0.0	0.0	0.0
4	29.9	61724.8	0.0	0.0	0.	0.	0.0	0.0	0.0
5	30.0	102958.4	0.0	0.0	0.	0.	0.0	0.0	0.0

6	30.0	137998.4	0.0	0.0	0.	0.	0.0	0.0	0.0
7	29.9	166471.0	0.0	0.0	0.	0.	0.0	0.0	0.0
8	29.7	188122.9	0.0	0.0	0.	0.	0.0	0.0	0.0
9	29.4	202825.0	0.0	0.0	0.	0.	0.0	0.0	0.0
10	29.0	210572.3	0.0	0.0	0.	0.	0.0	0.0	0.0
11	28.6	211483.9	0.0	0.0	0.	0.	0.0	0.0	0.0
12	28.0	205801.6	0.0	0.0	0.	0.	0.0	0.0	0.0
13	27.4	193886.0	0.0	0.0	0.	0.	0.0	0.0	0.0
14	26.7	176211.8	0.0	0.0	0.	0.	0.0	0.0	0.0
15	26.0	153361.8	0.0	0.0	0.	0.	0.0	0.0	0.0
16	25.2	126017.8	0.0	0.0	0.	0.	0.0	0.0	0.0
17	5.7	25108.8	0.0	0.0	0.	0.	0.0	0.0	0.0
18	18.5	68703.2	0.0	0.0	0.	0.	0.0	0.0	0.0
19	6.5	19311.3	0.0	0.0	0.	0.	0.0	0.0	0.0
20	16.8	34737.7	0.0	0.0	0.	0.	0.0	0.0	0.0
21	14.6	9989.7	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East - Sect 15-15', static, critical bedding plane

n:\projects\2000-2499\2023\slopes\t15s1e.pl2 Run By: KPC 6/24/2004 03:54PM



GSTABL7 v.2 FSmin=1.28

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 33

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/24/2004
Time of Run: 03:54PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t15s1e.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t15s1e.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope5s1e.PLT
PROBLEM DESCRIPTION: Mesas East - Sect 15-15', static, critical bedding plane

BOUNDARY COORDINATES
13 Top Boundaries
13 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	8.00	211.00	117.00	211.00	1
2	117.00	211.00	153.00	193.00	1
3	153.00	193.00	235.00	197.00	1
4	235.00	197.00	295.00	226.00	1
5	295.00	226.00	306.00	226.00	1
6	306.00	226.00	363.00	256.00	1
7	363.00	256.00	374.00	256.00	1
8	374.00	256.00	402.00	270.00	1
9	402.00	270.00	423.00	275.00	1
10	423.00	275.00	451.00	277.00	1
11	451.00	277.00	480.00	286.00	1
12	480.00	286.00	560.00	287.00	1
13	560.00	287.00	600.00	291.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	24.0	300.00	31.00
2	27.0	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.

500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 20.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	210.00	164.00	300.00	206.00	5.00
2	370.00	239.00	440.00	272.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 2.553 FS Min = 1.278 FS Ave = 1.612
Standard Deviation = 0.249 Coefficient of Variation = 15.43 %
Failure Surface Specified By 6 Coordinate Points

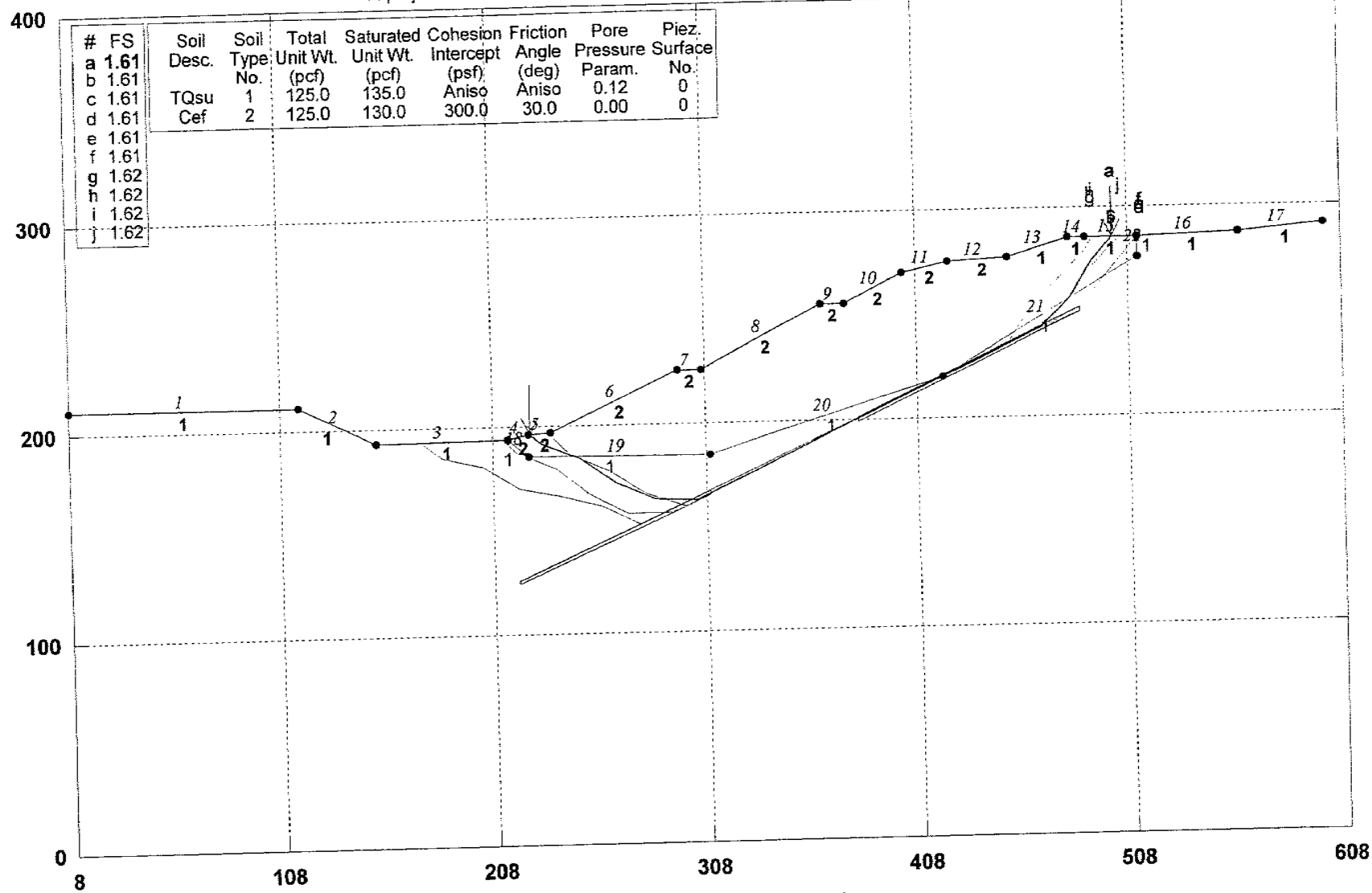
Point No.	X-Surf (ft)	Y-Surf (ft)
1	236.09	197.53
2	243.78	193.00
3	263.28	188.54
4	403.47	253.24
5	417.33	267.66
6	420.54	274.41

Factor of Safety
*** 1.278 ***
Individual data on the 10 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	7.7	3962.2	0.0	551.8	0.	0.	0.0	0.0	0.0
2	19.5	37007.0	0.0	4555.4	0.	0.	0.0	0.0	0.0
3	31.7	89105.5	0.0	11776.2	0.	0.	0.0	0.0	0.0
4	11.0	27886.0	0.0	3685.4	0.	0.	0.0	0.0	0.0
5	57.0	139587.2	0.0	18447.9	0.	0.	0.0	0.0	0.0
6	11.0	25989.8	0.0	3434.8	0.	0.	0.0	0.0	0.0
7	28.0	59161.4	0.0	7818.8	0.	0.	0.0	0.0	0.0
8	1.5	3185.1	0.0	420.9	0.	0.	0.0	0.0	0.0
9	13.9	19997.4	0.0	3464.8	0.	0.	0.0	0.0	0.0
10	3.2	1201.6	0.0	335.5	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 15-15'; static; buttress w/ 10'd by 75'w key and 2.75:1 backcut

n:\projects\2000-2499\2023\slopes\t15s3a.pl2 Run By: KPC 6/24/2004 03:38PM



#	FS
a	1.61
b	1.61
c	1.61
d	1.61
e	1.61
f	1.61
g	1.62
h	1.62
i	1.62
j	1.62

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	Aniso	Aniso	0.12	0
Cef	2	125.0	130.0	300.0	30.0	0.00	0

GSTABL7 v.2 FSmin=1.61

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 34

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/24/2004
Time of Run: 03:38PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t15s3a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t15s3a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope5s3a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 15-15'; static;
buttress w/ 10'd by 75'w key

BOUNDARY COORDINATES
17 Top Boundaries
22 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	8.00	211.00	117.00	211.00	1
2	117.00	211.00	153.00	193.00	1
3	153.00	193.00	215.00	194.00	1
4	215.00	194.00	225.00	196.00	2
5	225.00	196.00	235.00	197.00	2
6	235.00	197.00	295.00	226.00	2
7	295.00	226.00	306.00	226.00	2
8	306.00	226.00	363.00	256.00	2
9	363.00	256.00	374.00	256.00	2
10	374.00	256.00	402.00	270.00	2
11	402.00	270.00	423.00	275.00	2
12	423.00	275.00	451.00	277.00	2
13	451.00	277.00	480.00	286.00	1
14	480.00	286.00	488.00	286.00	1
15	488.00	286.00	513.00	286.00	1
16	513.00	286.00	560.00	287.00	1
17	560.00	287.00	600.00	291.00	1
18	215.00	194.00	225.10	186.00	1
19	225.10	186.00	310.10	185.00	1
20	310.10	185.00	420.00	220.00	1
21	420.00	220.00	512.90	276.00	1
22	512.90	276.00	513.00	286.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	24.0	300.00	31.00
2	27.0	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:

(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.50 (pcf)
Piezometric Surface No. 1 Specified by 5 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	186.00
2	285.00	186.00
3	295.00	197.00
4	451.00	273.00
5	600.00	273.00

WATER SURFACE DATA HAS BEEN SUPPRESSED
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 20.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	220.00	125.00	310.00	167.00	2.00
2	380.00	200.00	485.00	251.00	2.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 3.331 FS Min = 1.607 FS Ave = 1.992
Standard Deviation = 0.297 Coefficient of Variation = 14.90 %
Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	225.75	196.07
2	230.55	191.37
3	249.30	184.43
4	265.50	172.70
5	283.73	164.48
6	303.71	163.49
7	466.74	242.95
8	480.84	257.14
9	491.13	274.29
10	500.58	286.00

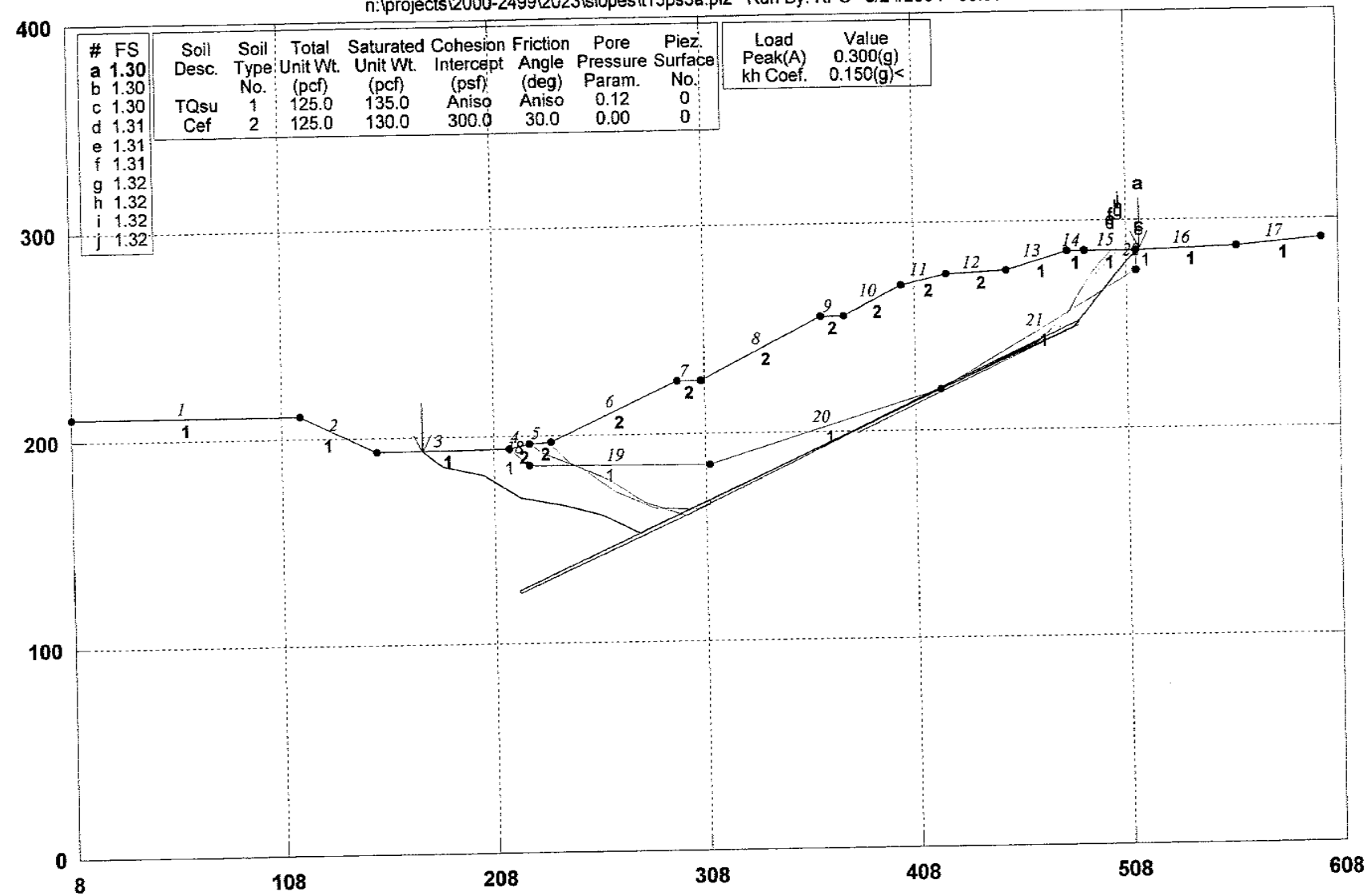
Factor of Safety
*** 1.607 ***
Individual data on the 24 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	4.8	1554.0	0.0	0.0	0.	0.	0.0	0.0	0.0
2	4.5	3467.1	0.0	0.0	0.	0.	0.0	0.0	0.0
3	10.7	15853.9	0.0	0.0	0.	0.	0.0	0.0	0.0
4	3.6	8064.9	0.0	1032.1	0.	0.	0.0	0.0	0.0
5	16.2	59274.4	0.0	8779.0	0.	0.	0.0	0.0	0.0
6	18.2	108373.6	0.0	14267.8	0.	0.	0.0	0.0	0.0
7	11.3	83192.9	0.0	9995.2	0.	0.	0.0	0.0	0.0
8	8.7	67822.8	0.0	8148.6	0.	0.	0.0	0.0	0.0
9	2.3	17730.1	0.0	2366.9	0.	0.	0.0	0.0	0.0

10	4.1	31503.4	0.0	4205.5	0.	0.	0.0	0.0	0.0
11	52.9	413810.1	0.0	55240.8	0.	0.	0.0	0.0	0.0
12	11.0	83778.2	0.0	11183.8	0.	0.	0.0	0.0	0.0
13	28.0	204490.6	0.0	27298.1	0.	0.	0.0	0.0	0.0
14	17.0	119986.8	0.0	16017.4	0.	0.	0.0	0.0	0.0
15	2.5	16746.2	0.0	0.0	0.	0.	0.0	0.0	0.0
16	1.5	10228.5	0.0	1365.4	0.	0.	0.0	0.0	0.0
17	28.0	166406.7	0.0	22214.2	0.	0.	0.0	0.0	0.0
18	15.7	79354.1	0.0	10593.2	0.	0.	0.0	0.0	0.0
19	12.9	55707.8	0.0	9484.6	0.	0.	0.0	0.0	0.0
20	0.3	1170.8	0.0	199.3	0.	0.	0.0	0.0	0.0
21	0.8	3067.4	0.0	522.2	0.	0.	0.0	0.0	0.0
22	7.2	20495.0	0.0	4780.5	0.	0.	0.0	0.0	0.0
23	3.1	5597.1	0.0	1305.5	0.	0.	0.0	0.0	0.0
24	9.4	6915.9	0.0	1321.7	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 15-15'; pseudostatic; buttress w/ 10'd by 75'w key and 2.75:1 backcut

n:\projects\2000-2499\2023\slopes\t15ps3a.pl2 Run By: KPC 6/24/2004 03:39PM



GSTABL7 v.2 FSmin=1.30

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 35

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/24/2004
Time of Run: 03:39PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t15ps3a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t15ps3a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope5ps3a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 15-15'; pseudostatic; buttress w/ 10'd by 75'w key

BOUNDARY COORDINATES
17 Top Boundaries
22 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	8.00	211.00	117.00	211.00	1
2	117.00	211.00	153.00	193.00	1
3	153.00	193.00	215.00	194.00	1
4	215.00	194.00	225.00	196.00	2
5	225.00	196.00	235.00	197.00	2
6	235.00	197.00	295.00	226.00	2
7	295.00	226.00	306.00	226.00	2
8	306.00	226.00	363.00	256.00	2
9	363.00	256.00	374.00	256.00	2
10	374.00	256.00	402.00	270.00	2
11	402.00	270.00	423.00	275.00	2
12	423.00	275.00	451.00	277.00	2
13	451.00	277.00	480.00	286.00	1
14	480.00	286.00	488.00	286.00	1
15	488.00	286.00	513.00	286.00	1
16	513.00	286.00	560.00	287.00	1
17	560.00	287.00	600.00	291.00	1
18	215.00	194.00	225.10	186.00	1
19	225.10	186.00	310.10	185.00	1
20	310.10	185.00	420.00	220.00	1
21	420.00	220.00	512.90	276.00	1
22	512.90	276.00	513.00	286.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	400.0	38.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	24.0	400.00	38.00
2	27.0	200.00	20.00
3	90.0	400.00	38.00

ANISOTROPIC SOIL NOTES:

(1) An input value of 0.01 for C and/or Phi will cause Aniso
C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and
C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and
C equal to zero, with water weight in the tension crack.

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.50 (pcf)
Piezometric Surface No. 1 Specified by 5 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	186.00
2	285.00	186.00
3	295.00	197.00
4	451.00	273.00
5	600.00	273.00

WATER SURFACE DATA HAS BEEN SUPPRESSED
Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 20.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	220.00	125.00	310.00	167.00	2.00
2	380.00	200.00	485.00	251.00	2.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 2.347 FS Min = 1.296 FS Ave = 1.637
Standard Deviation = 0.187 Coefficient of Variation = 11.43 %
Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	174.54	193.35
2	183.81	185.97
3	203.22	181.15
4	220.03	170.31
5	239.64	166.38
6	259.04	161.52
7	276.68	152.11
8	483.20	249.30
9	495.87	264.78
10	508.37	280.39
11	513.99	286.02

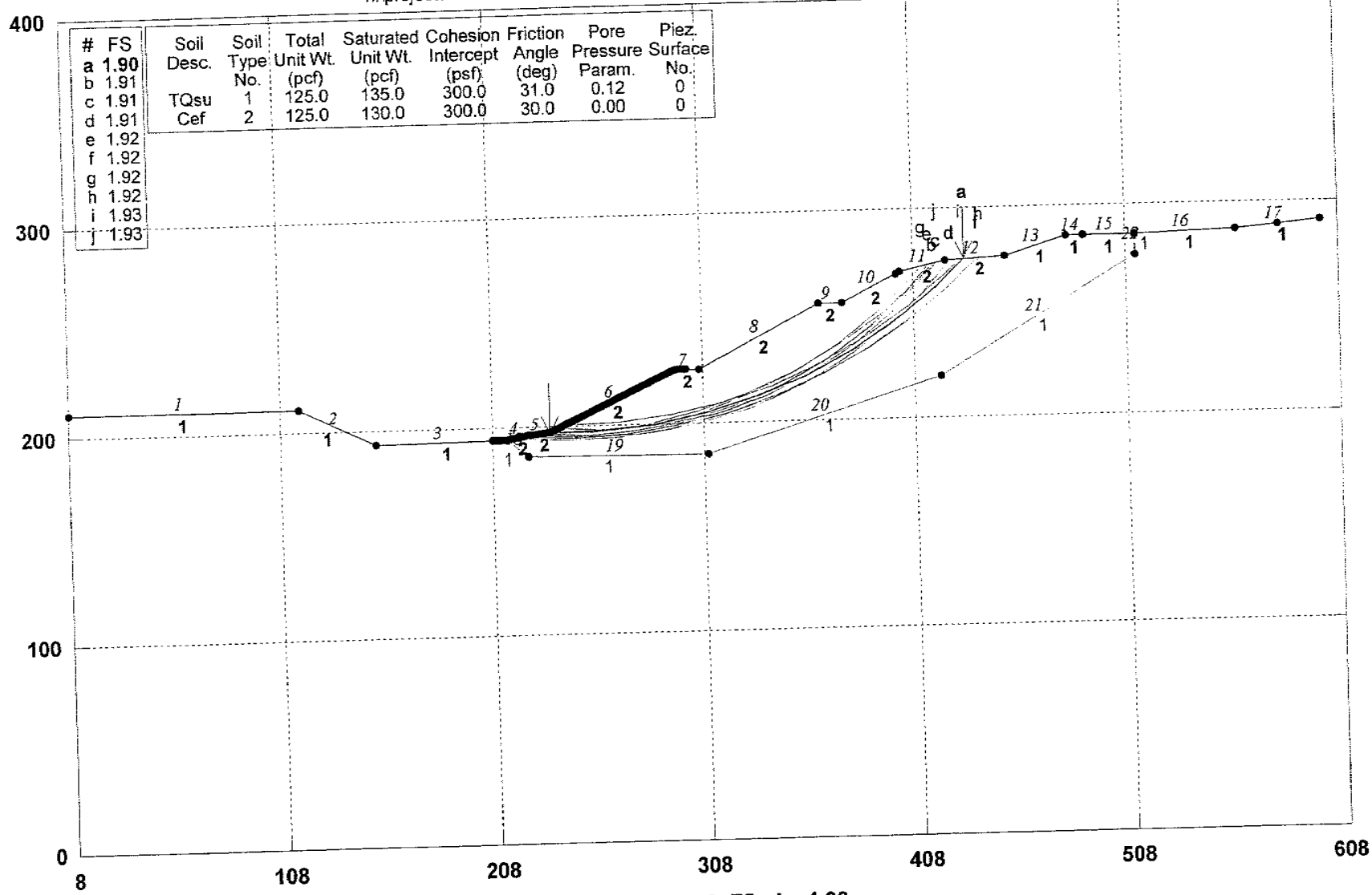
Factor of Safety
*** 1.296 ***
Individual data on the 28 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	9.3	4362.0	0.0	669.1	0.	0.	654.3	0.0	0.0
2	19.4	24492.1	0.0	3028.0	0.	0.	3673.8	0.0	0.0
3	11.8	24368.9	0.0	3479.8	0.	0.	3655.3	0.0	0.0
4	5.0	14183.9	0.0	2025.4	0.	0.	2127.6	0.0	0.0

5	5.0	15966.5	0.0	1954.2	0.	0.	2395.0	0.0	0.0
6	0.1	333.8	0.0	40.9	0.	0.	50.1	0.0	0.0
7	9.9	34903.5	0.0	4272.0	0.	0.	5235.5	0.0	0.0
8	4.6	18128.2	0.0	2218.8	0.	0.	2719.2	0.0	0.0
9	19.4	96965.2	0.0	11994.8	0.	0.	14544.8	0.0	0.0
10	17.6	123678.9	0.0	16821.2	0.	0.	18551.8	0.0	0.0
11	18.3	149180.1	0.0	19785.2	0.	0.	22377.0	0.0	0.0
12	11.0	86193.1	0.0	11431.5	0.	0.	12929.0	0.0	0.0
13	4.1	30858.4	0.0	4092.6	0.	0.	4628.8	0.0	0.0
14	52.9	408639.9	0.0	54196.3	0.	0.	61296.0	0.0	0.0
15	11.0	83437.8	0.0	11066.0	0.	0.	12515.7	0.0	0.0
16	28.0	204765.7	0.0	27157.3	0.	0.	30714.9	0.0	0.0
17	18.0	127850.6	0.0	16956.3	0.	0.	19177.6	0.0	0.0
18	3.0	20392.8	0.0	2704.6	0.	0.	3058.9	0.0	0.0
19	28.0	169550.2	0.0	22486.8	0.	0.	25432.5	0.0	0.0
20	29.0	146919.6	0.0	19485.4	0.	0.	22037.9	0.0	0.0
21	3.2	14977.0	0.0	1986.3	0.	0.	2246.6	0.0	0.0
22	4.8	20263.6	0.0	3839.1	0.	0.	3039.5	0.0	0.0
23	7.9	25595.1	0.0	4849.2	0.	0.	3839.3	0.0	0.0
24	1.5	3750.7	0.0	720.1	0.	0.	562.6	0.0	0.0
25	11.0	17212.6	0.0	3304.8	0.	0.	2581.9	0.0	0.0
26	4.6	1904.0	0.0	323.4	0.	0.	285.6	0.0	0.0
27	0.0	1.2	0.0	0.2	0.	0.	0.2	0.0	0.0
28	1.0	59.9	0.0	10.2	0.	0.	9.0	0.0	0.0

Mesas East, x-sec 15-15'; static; buttress w/ 10'd by 75'w key; circular and 2.75:1 backcut

n:\projects\2000-2499\2023\slopes\t15s4a.pl2 Run By: KPC 6/24/2004 03:41PM



#	FS
a	1.90
b	1.91
c	1.91
d	1.91
e	1.92
f	1.92
g	1.92
h	1.92
i	1.93
j	1.93

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	300.0	31.0	0.12	0
Cef	2	125.0	130.0	300.0	30.0	0.00	0

GSTABL7 v.2 FSmin=1.90

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 36

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/24/2004
Time of Run: 03:41PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t15s4a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t15s4a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope5s4a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 15-15'; static;
buttress w/ 10'd by 75'w key; circular

BOUNDARY COORDINATES
17 Top Boundaries
22 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	8.00	211.00	117.00	211.00	1
2	117.00	211.00	153.00	193.00	1
3	153.00	193.00	215.00	194.00	1
4	215.00	194.00	225.00	196.00	2
5	225.00	196.00	235.00	197.00	2
6	235.00	197.00	295.00	226.00	2
7	295.00	226.00	306.00	226.00	2
8	306.00	226.00	363.00	256.00	2
9	363.00	256.00	374.00	256.00	2
10	374.00	256.00	402.00	270.00	2
11	402.00	270.00	423.00	275.00	2
12	423.00	275.00	451.00	277.00	2
13	451.00	277.00	480.00	286.00	1
14	480.00	286.00	488.00	286.00	1
15	488.00	286.00	513.00	286.00	1
16	513.00	286.00	560.00	287.00	1
17	560.00	287.00	600.00	291.00	1
18	215.00	194.00	225.10	186.00	1
19	225.10	186.00	310.10	185.00	1
20	310.10	185.00	420.00	220.00	1
21	420.00	220.00	512.90	276.00	1
22	512.90	276.00	513.00	286.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.50 (pcf)
Piezometric Surface No. 1 Specified by 3 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	285.00	186.00
2	295.00	197.00
3	451.00	273.00

WATER SURFACE DATA HAS BEEN SUPPRESSED
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2000 Trial Surfaces Have Been Generated.
20 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 208.00(ft)
and X = 300.00(ft)
Each Surface Terminates Between X = 400.00(ft)
and X = 580.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
25.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 2000
Statistical Data On All Valid FS Values:
FS Max = 4.429 FS Min = 1.902 FS Ave = 2.816
Standard Deviation = 0.545 Coefficient of Variation = 19.36 %
Failure Surface Specified By 10 Coordinate Points

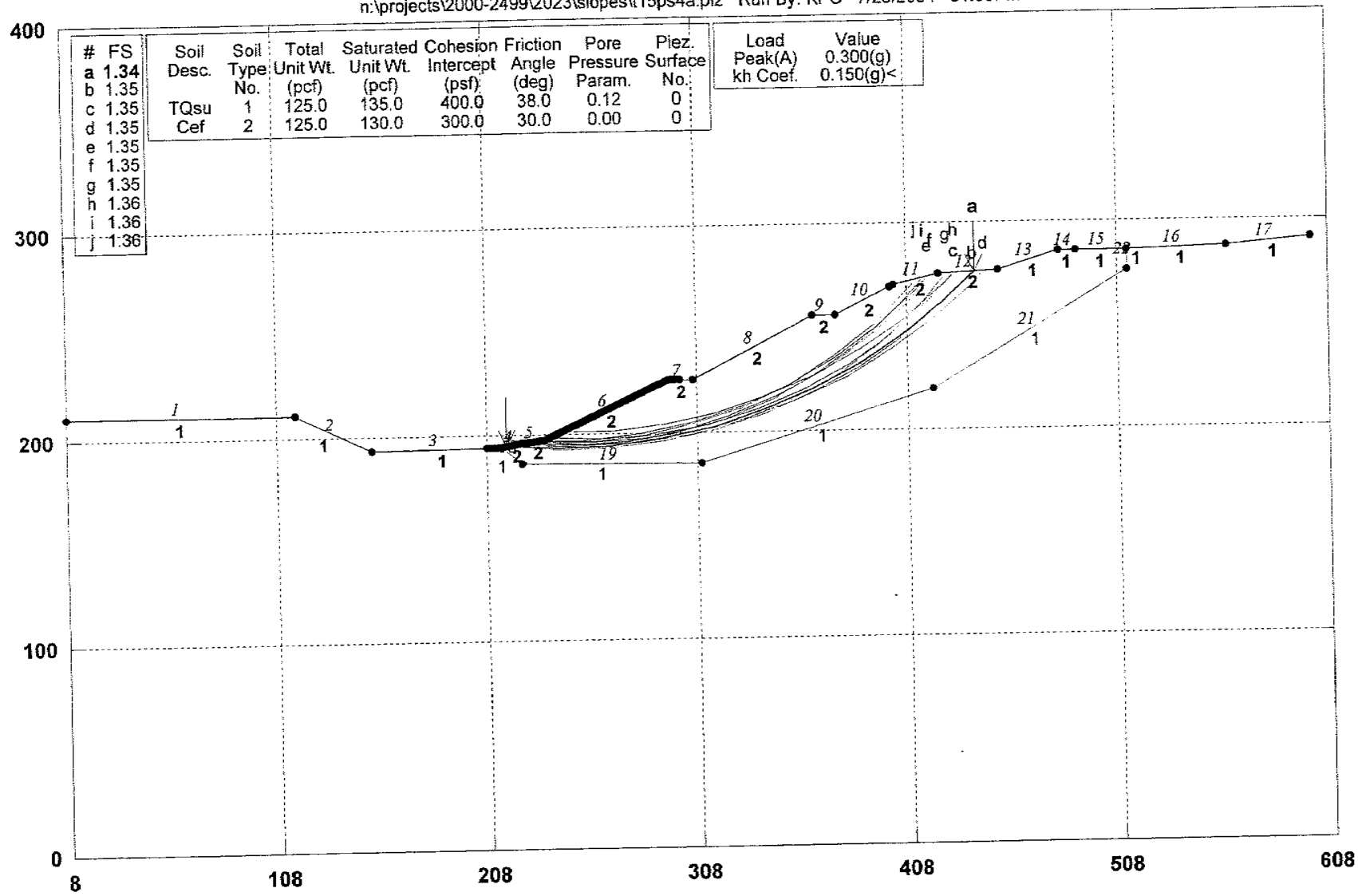
Point No.	X-Surf (ft)	Y-Surf (ft)
1	234.95	196.99
2	259.95	197.22
3	284.81	199.82
4	309.32	204.78
5	333.24	212.04
6	356.36	221.55
7	378.47	233.22
8	399.37	246.94
9	418.87	262.58
10	432.33	275.67

Circle Center At X = 245.29 ; Y = 458.00 ; and Radius = 261.20
Factor of Safety
*** 1.902 ***
Individual data on the 16 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	0.1	0.0	0.0	0.0	0.	0.	0.0	0.0	0.0
2	24.9	18468.3	0.0	0.0	0.	0.	0.0	0.0	0.0
3	24.9	51429.7	0.0	0.0	0.	0.	0.0	0.0	0.0
4	10.2	28889.9	0.0	0.0	0.	0.	0.0	0.0	0.0
5	11.0	31633.3	0.0	0.0	0.	0.	0.0	0.0	0.0
6	3.3	9298.8	0.0	0.0	0.	0.	0.0	0.0	0.0
7	23.9	76637.6	0.0	0.0	0.	0.	0.0	0.0	0.0
8	23.1	85611.6	0.0	0.0	0.	0.	0.0	0.0	0.0
9	6.6	25693.7	0.0	0.0	0.	0.	0.0	0.0	0.0
10	11.0	38557.0	0.0	0.0	0.	0.	0.0	0.0	0.0
11	4.5	14009.6	0.0	0.0	0.	0.	0.0	0.0	0.0
12	20.9	61087.6	0.0	0.0	0.	0.	0.0	0.0	0.0
13	2.6	7020.2	0.0	0.0	0.	0.	0.0	0.0	0.0
14	16.9	34150.3	0.0	0.0	0.	0.	0.0	0.0	0.0
15	4.1	5121.3	0.0	0.0	0.	0.	0.0	0.0	0.0
16	9.3	4897.9	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 15-15'; pseudostatic; buttress w/ 10'd by 75'w key; circular and 2.75:1 backcu

n:\projects\2000-2499\2023\slopes\t15ps4a.pl2 Run By: KPC 7/29/2004 01:35PM



GSTABL7 v.2 FSmin=1.34

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No. 37

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 7/29/2004
Time of Run: 01:35PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t15ps4a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t15ps4a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope5ps4a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 15-15'; pseudostatic; buttress w/ 10'd by 75'w key; circular

BOUNDARY COORDINATES
17 Top Boundaries
22 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	8.00	211.00	117.00	211.00	1
2	117.00	211.00	153.00	193.00	1
3	153.00	193.00	215.00	194.00	1
4	215.00	194.00	225.00	196.00	2
5	225.00	196.00	235.00	197.00	2
6	235.00	197.00	295.00	226.00	2
7	295.00	226.00	306.00	226.00	2
8	306.00	226.00	363.00	256.00	2
9	363.00	256.00	374.00	256.00	2
10	374.00	256.00	402.00	270.00	2
11	402.00	270.00	423.00	275.00	2
12	423.00	275.00	451.00	277.00	2
13	451.00	277.00	480.00	286.00	1
14	480.00	286.00	488.00	286.00	1
15	488.00	286.00	513.00	286.00	1
16	513.00	286.00	560.00	287.00	1
17	560.00	287.00	600.00	291.00	1
18	215.00	194.00	225.10	186.00	1
19	225.10	186.00	310.10	185.00	1
20	310.10	185.00	420.00	220.00	1
21	420.00	220.00	512.90	276.00	1
22	512.90	276.00	513.00	286.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	400.0	38.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

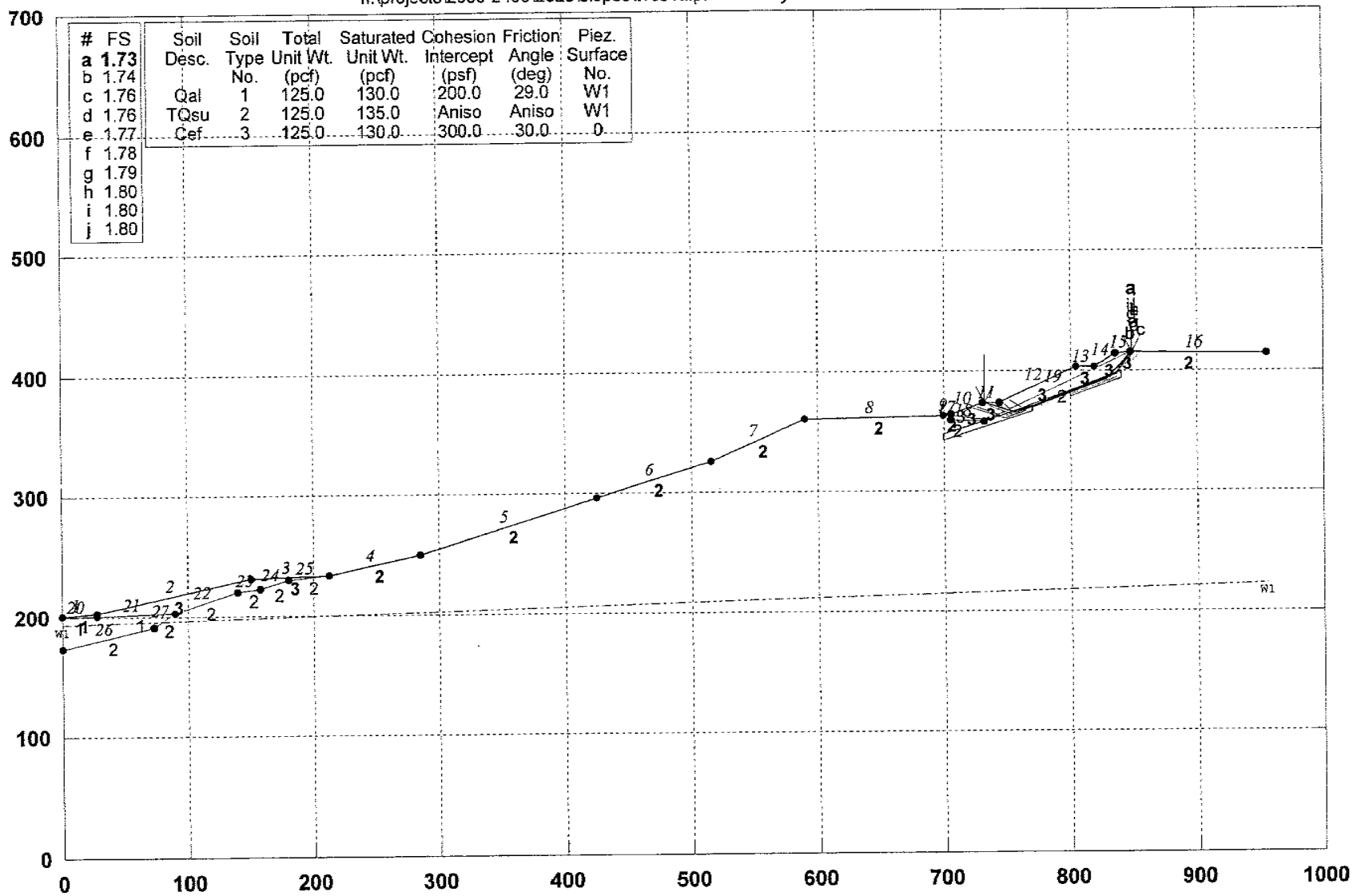
Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	24.0	300.00	31.00
2	27.0	200.00	20.00

```
   3              90.0              300.00          31.00
ANISOTROPIC SOIL NOTES:
   (1) An input value of 0.01 for C and/or Phi will cause Aniso
       C and/or Phi to be ignored in that range.
   (2) An input value of 0.02 for Phi will set both Phi and
       C equal to zero, with no water weight in the tension crack.
   (3) An input value of 0.03 for Phi will set both Phi and
       C equal to zero, with water weight in the tension crack.
ANISOTROPIC STRENGTH DATA HAS BEEN SUPPRESSED
1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water =  62.50 (pcf)
Piezometric Surface No.  1 Specified by  3 Coordinate Points
Pore Pressure Inclination Factor =  0.50
  Point       X-Water      Y-Water
   No.          (ft)         (ft)
    1         285.00       186.00
    2         295.00       197.00
    3         451.00       273.00
WATER SURFACE DATA HAS BEEN SUPPRESSED
Specified Peak Ground Acceleration Coefficient (A) =   0.300(g)
Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
Specified Seismic Pore-Pressure Factor =   0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2000 Trial Surfaces Have Been Generated.
  20 Surface(s) Initiate(s) From Each Of   100 Points Equally Spaced
Along The Ground Surface Between  X = 208.00(ft)
                             and  X = 300.00(ft)
Each Surface Terminates Between   X = 400.00(ft)
                             and  X = 600.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =      0.00(ft)
25.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And  15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Modified Bishop Method * *
      Total Number of Trial Surfaces Evaluated =  2000
      Statistical Data On All Valid FS Values:
         FS Max =   3.408   FS Min =   1.343   FS Ave =   2.278
         Standard Deviation =    0.534   Coefficient of Variation =   23.46 %
      Failure Surface Specified By 11 Coordinate Points
        Point       X-Surf       Y-Surf
         No.         (ft)         (ft)
          1         217.29       194.46
          2         242.26       193.19
          3         267.24       194.20
          4         292.02       197.49
          5         316.40       203.02
          6         340.18       210.75
          7         363.15       220.61
          8         385.13       232.52
          9         405.93       246.39
         10         425.38       262.10
         11         439.92       276.21
       Circle Center At X =   243.66 ; Y =   467.25 ; and Radius =   274.06
             Factor of Safety
            ***    1.343   ***
           Individual data on the    18  slices
                        Water  Water     Tie     Tie     Earthquake
                        Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight    Top    Bot     Norm    Tan     Hor     Ver     Load
 No.    (ft)    (lbs)   (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
```

1	7.7	931.0	0.0	0.0	0.	0.	139.7	0.0	0.0
2	10.0	3358.3	0.0	0.0	0.	0.	503.7	0.0	0.0
3	7.3	4882.5	0.0	0.0	0.	0.	732.4	0.0	0.0
4	25.0	40120.0	0.0	0.0	0.	0.	6018.0	0.0	0.0
5	24.8	70403.8	0.0	0.0	0.	0.	10560.6	0.0	0.0
6	3.0	10215.0	0.0	0.0	0.	0.	1532.2	0.0	0.0
7	11.0	36560.4	0.0	0.0	0.	0.	5484.1	0.0	0.0
8	10.4	34984.7	0.0	0.0	0.	0.	5247.7	0.0	0.0
9	23.8	91687.0	0.0	0.0	0.	0.	13753.1	0.0	0.0
10	22.8	97984.6	0.0	0.0	0.	0.	14697.7	0.0	0.0
11	0.2	673.9	0.0	0.0	0.	0.	101.1	0.0	0.0
12	10.8	44002.9	0.0	0.0	0.	0.	6600.4	0.0	0.0
13	11.1	40731.3	0.0	0.0	0.	0.	6109.7	0.0	0.0
14	16.9	58275.7	0.0	0.0	0.	0.	8741.4	0.0	0.0
15	3.9	12474.7	0.0	0.0	0.	0.	1871.2	0.0	0.0
16	17.1	42000.4	0.0	0.0	0.	0.	6300.1	0.0	0.0
17	2.4	4152.7	0.0	0.0	0.	0.	622.9	0.0	0.0
18	14.5	11877.2	0.0	0.0	0.	0.	1781.6	0.0	0.0

Mesas East, x-sec 16-16' CS-27; static; buttress w/ 5'd x 25'w key and 2.75:1 backcut

n:\projects\2000-2499\2023\slopes\t16s1a.pl2 Run By: KPC 6/24/2004 04:07PM



#	FS
a	1.73
b	1.74
c	1.76
d	1.76
e	1.77
f	1.78
g	1.79
h	1.80
i	1.80
j	1.80

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qal	1	125.0	130.0	200.0	29.0	W1
TQsu	2	125.0	135.0	Aniso	Aniso	W1
Cef	3	125.0	130.0	300.0	30.0	0

GSTABL7 v.2 FSmin=1.73

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 38

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/24/2004
Time of Run: 04:07PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t16s1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t16s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope6s1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 16-16' CS-27; static; buttress w/ 5'd x 25'w key

BOUNDARY COORDINATES
16 Top Boundaries
27 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	200.00	28.00	203.00	1
2	28.00	203.00	150.00	230.00	3
3	150.00	230.00	213.00	233.00	3
4	213.00	233.00	285.00	250.00	2
5	285.00	250.00	425.00	296.00	2
6	425.00	296.00	516.00	326.00	2
7	516.00	326.00	590.00	360.00	2
8	590.00	360.00	700.00	363.00	2
9	700.00	363.00	705.00	364.00	2
10	705.00	364.00	730.00	374.00	3
11	730.00	374.00	744.00	374.00	3
12	744.00	374.00	805.00	404.00	3
13	805.00	404.00	819.00	404.00	3
14	819.00	404.00	836.00	414.00	3
15	836.00	414.00	848.00	415.00	3
16	848.00	415.00	955.00	414.00	2
17	704.99	359.00	705.00	364.00	3
18	704.99	359.00	732.00	358.00	2
19	732.00	358.00	848.00	415.00	2
20	0.00	200.00	28.00	201.00	1
21	28.00	201.00	90.00	203.00	1
22	90.00	203.00	140.00	220.00	2
23	140.00	220.00	157.00	222.00	2
24	157.00	222.00	180.00	229.00	2
25	180.00	229.00	213.00	233.00	2
26	0.00	173.00	73.00	191.00	2
27	73.00	191.00	90.00	203.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	200.0	29.0	0.00	0.0	1
2	125.0	135.0	300.0	31.0	0.00	0.0	1
3	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction	Counterclockwise	Cohesion	Friction

Range No.	Direction Limit (deg)	Intercept (psf)	Angle (deg)
1	20.0	300.00	31.00
2	23.0	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	193.00
2	955.00	222.00

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	700.00	345.00	770.00	369.00	5.00
2	800.00	381.00	840.00	397.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 4.816 FS Min = 1.733 FS Ave = 2.323
Standard Deviation = 0.431 Coefficient of Variation = 18.55 %
Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	731.51	374.00
2	757.08	365.45
3	828.61	392.68
4	848.46	415.00

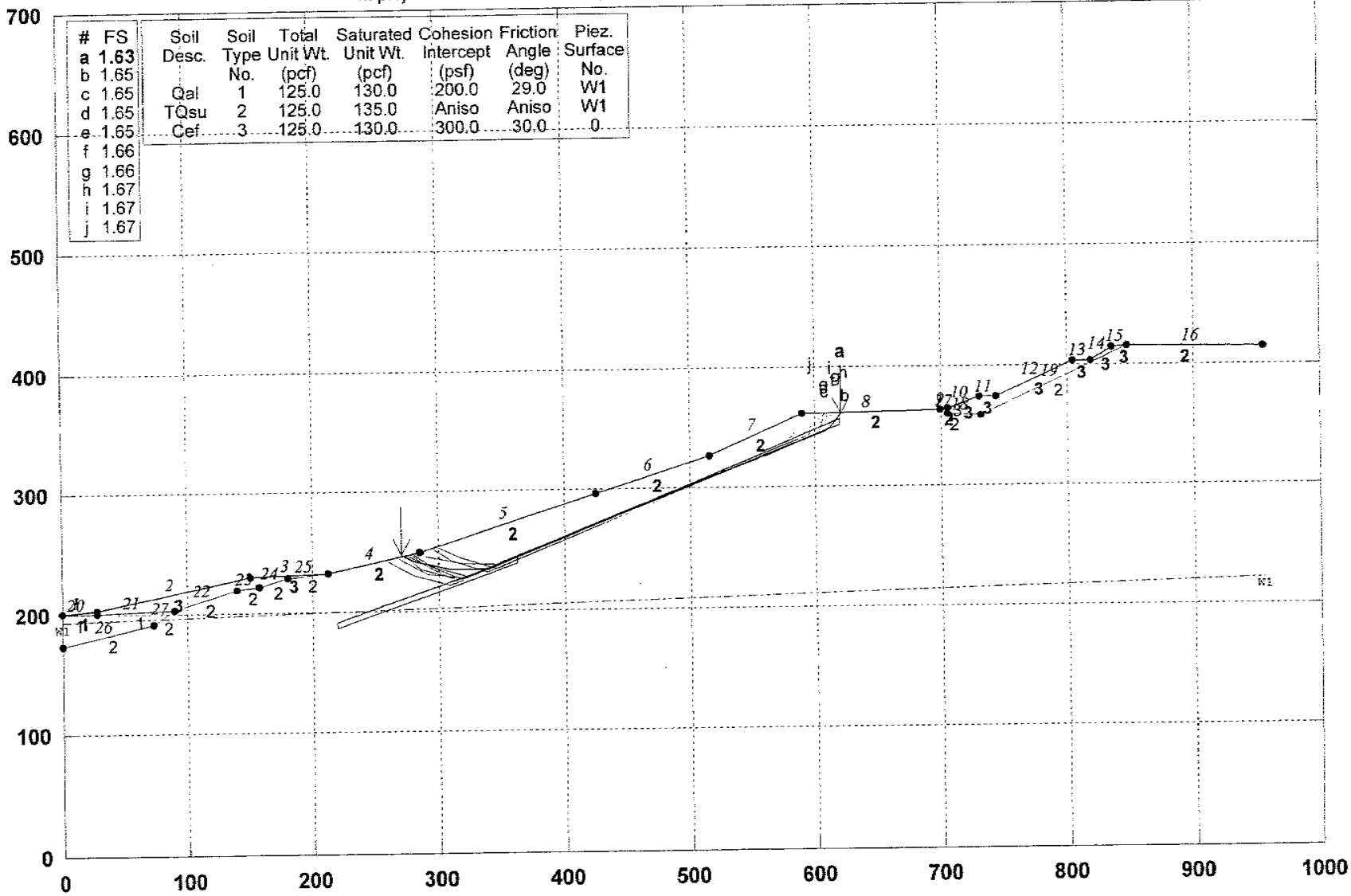
Factor of Safety
*** 1.733 ***

Individual data on the 9 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	12.5	3263.0	0.0	0.0	0.	0.	0.0	0.0	0.0
2	7.2	6405.7	0.0	0.0	0.	0.	0.0	0.0	0.0
3	5.9	9253.0	0.0	0.0	0.	0.	0.0	0.0	0.0
4	47.9	105708.6	0.0	0.0	0.	0.	0.0	0.0	0.0
5	14.0	30879.5	0.0	0.0	0.	0.	0.0	0.0	0.0
6	9.6	19196.0	0.0	0.0	0.	0.	0.0	0.0	0.0
7	7.4	13851.2	0.0	0.0	0.	0.	0.0	0.0	0.0
8	12.0	10157.0	0.0	0.0	0.	0.	0.0	0.0	0.0
9	0.5	15.3	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 16-16'; static; bedding plane search

n:\projects\2000-2499\2023\slopes\t16s1b.pl2 Run By: VKP 6/29/2004 08:11AM



#	FS
a	1.63
b	1.65
c	1.65
d	1.65
e	1.65
f	1.66
g	1.66
h	1.67
i	1.67
j	1.67

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qal	1	125.0	130.0	200.0	29.0	W1
TQsu	2	125.0	135.0	Aniso	Aniso	W1
Cef	3	125.0	130.0	300.0	30.0	0

GSTABL7 v.2 FSmin=1.63

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 39

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/29/2004
Time of Run: 08:11AM
Run By: VKP
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t16s1b.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t16s1b.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope6s1b.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 16-16'; static;
bedding plane search

BOUNDARY COORDINATES
16 Top Boundaries
27 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	200.00	28.00	203.00	1
2	28.00	203.00	150.00	230.00	3
3	150.00	230.00	213.00	233.00	3
4	213.00	233.00	285.00	250.00	2
5	285.00	250.00	425.00	296.00	2
6	425.00	296.00	516.00	326.00	2
7	516.00	326.00	590.00	360.00	2
8	590.00	360.00	700.00	363.00	2
9	700.00	363.00	705.00	364.00	2
10	705.00	364.00	730.00	374.00	3
11	730.00	374.00	744.00	374.00	3
12	744.00	374.00	805.00	404.00	3
13	805.00	404.00	819.00	404.00	3
14	819.00	404.00	836.00	414.00	3
15	836.00	414.00	848.00	415.00	3
16	848.00	415.00	955.00	414.00	2
17	704.99	359.00	705.00	364.00	3
18	704.99	359.00	732.00	358.00	2
19	732.00	358.00	848.00	415.00	2
20	0.00	200.00	28.00	201.00	1
21	28.00	201.00	90.00	203.00	1
22	90.00	203.00	140.00	220.00	2
23	140.00	220.00	157.00	222.00	2
24	157.00	222.00	180.00	229.00	2
25	180.00	229.00	213.00	233.00	2
26	0.00	173.00	73.00	191.00	2
27	73.00	191.00	90.00	203.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	200.0	29.0	0.00	0.0	1
2	125.0	135.0	300.0	31.0	0.00	0.0	1
3	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction	Counterclockwise	Cohesion	Friction

Range No.	Direction Limit (deg)	Intercept (psf)	Angle (deg)
1	20.0	300.00	31.00
2	23.0	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	193.00
2	955.00	222.00

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	220.00	189.00	363.00	242.00	5.00
2	560.00	327.00	620.00	353.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 2.714 FS Min = 1.630 FS Ave = 2.053
Standard Deviation = 0.321 Coefficient of Variation = 15.64 %
Failure Surface Specified By 6 Coordinate Points

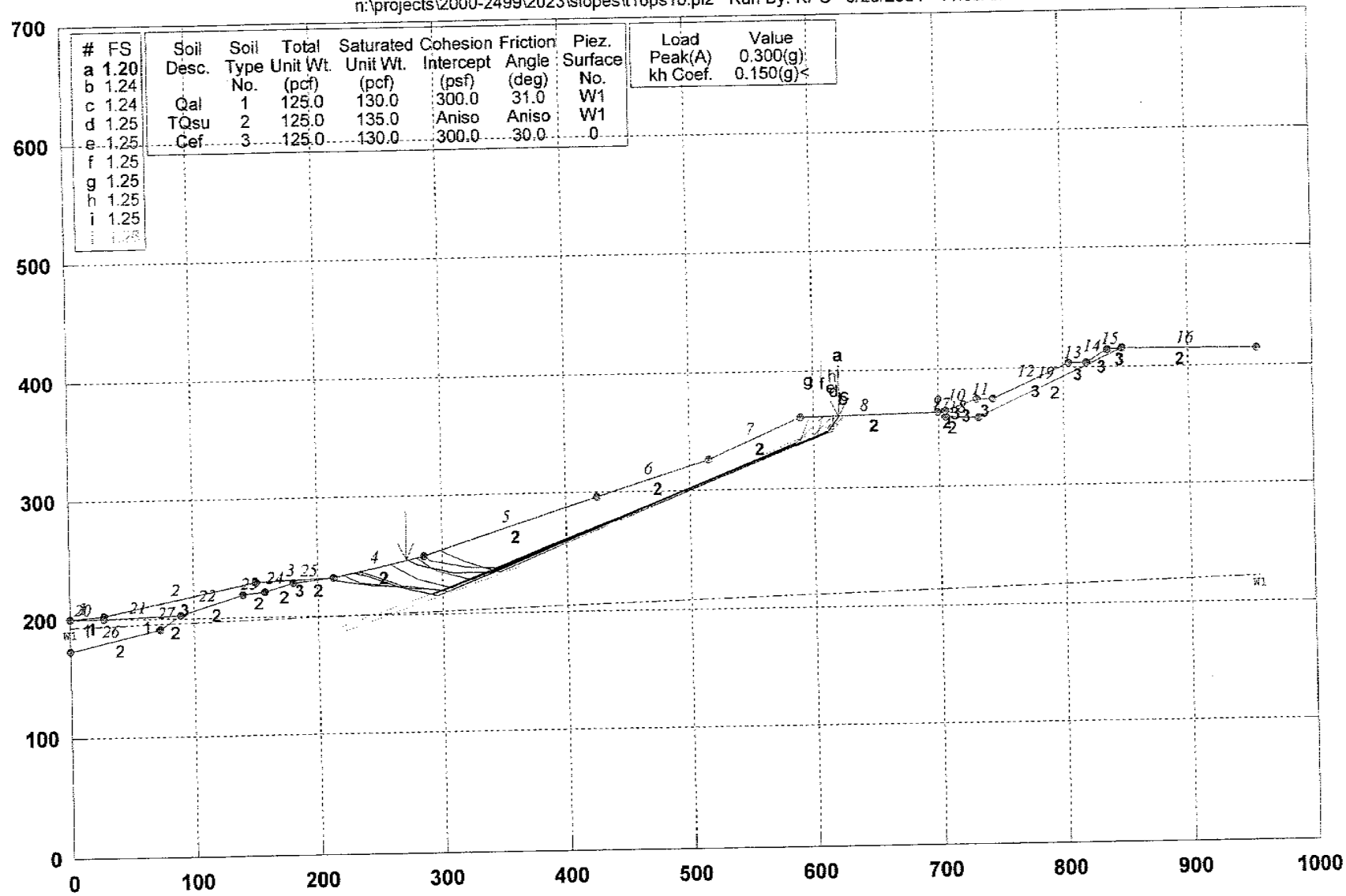
Point No.	X-Surf (ft)	Y-Surf (ft)
1	270.95	246.68
2	280.41	242.70
3	309.57	235.65
4	339.57	235.43
5	611.78	346.97
6	620.98	360.84

Factor of Safety
*** 1.630 ***
Individual data on the 9 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	9.5	3675.4	0.0	0.0	0.	0.	0.0	0.0	0.0
2	4.6	4199.6	0.0	0.0	0.	0.	0.0	0.0	0.0
3	24.6	47346.1	0.0	0.0	0.	0.	0.0	0.0	0.0
4	30.0	102986.3	0.0	0.0	0.	0.	0.0	0.0	0.0
5	85.4	310072.3	0.0	0.0	0.	0.	0.0	0.0	0.0
6	91.0	249374.9	0.0	0.0	0.	0.	0.0	0.0	0.0
7	74.0	186095.0	0.0	0.0	0.	0.	0.0	0.0	0.0
8	21.8	48436.9	0.0	0.0	0.	0.	0.0	0.0	0.0
9	9.2	7833.4	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 16-16'; pseudostatic; critical bedding plane

n:\projects\2000-2499\2023\slopes\t16ps1b.pl2 Run By: KPC 6/23/2004 11:05AM



#	FS
a	1.20
b	1.24
c	1.24
d	1.25
e	1.25
f	1.25
g	1.25
h	1.25
i	1.25
j	1.25

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qal	1	125.0	130.0	300.0	31.0	W1
TQsu	2	125.0	135.0	Aniso	Aniso	W1
Cef	3	125.0	130.0	300.0	30.0	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.20

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 40

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/23/2004
Time of Run: 11:05AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t16ps1b.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t16ps1b.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope6ps1b.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 16-16'; pseudostatic; critical bedding plane

BOUNDARY COORDINATES
16 Top Boundaries
27 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	200.00	28.00	203.00	1
2	28.00	203.00	150.00	230.00	3
3	150.00	230.00	213.00	233.00	3
4	213.00	233.00	285.00	250.00	2
5	285.00	250.00	425.00	296.00	2
6	425.00	296.00	516.00	326.00	2
7	516.00	326.00	590.00	360.00	2
8	590.00	360.00	700.00	363.00	2
9	700.00	363.00	705.00	364.00	2
10	705.00	364.00	730.00	374.00	3
11	730.00	374.00	744.00	374.00	3
12	744.00	374.00	805.00	404.00	3
13	805.00	404.00	819.00	404.00	3
14	819.00	404.00	836.00	414.00	3
15	836.00	414.00	848.00	415.00	3
16	848.00	415.00	955.00	414.00	2
17	704.99	359.00	705.00	364.00	3
18	704.99	359.00	732.00	358.00	2
19	732.00	358.00	848.00	415.00	2
20	0.00	200.00	28.00	201.00	1
21	28.00	201.00	90.00	203.00	1
22	90.00	203.00	140.00	220.00	2
23	140.00	220.00	157.00	222.00	2
24	157.00	222.00	180.00	229.00	2
25	180.00	229.00	213.00	233.00	2
26	0.00	173.00	73.00	191.00	2
27	73.00	191.00	90.00	203.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	31.0	0.00	0.0	1
2	125.0	135.0	400.0	38.0	0.00	0.0	1
3	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction	Counterclockwise	Cohesion	Friction

Range No.	Direction Limit (deg)	Intercept (psf)	Angle (deg)
1	20.0	400.00	38.00
2	23.0	200.00	20.00
3	90.0	400.00	38.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	193.00
2	955.00	222.00

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	220.00	189.00	363.00	242.00	5.00
2	560.00	327.00	620.00	353.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 2.428 FS Min = 1.204 FS Ave = 1.678
Standard Deviation = 0.366 Coefficient of Variation = 21.80 %
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	270.95	246.68
2	280.41	242.70
3	309.57	235.65
4	339.57	235.43
5	611.78	346.97
6	620.98	360.84

Factor of Safety
*** 1.204 ***

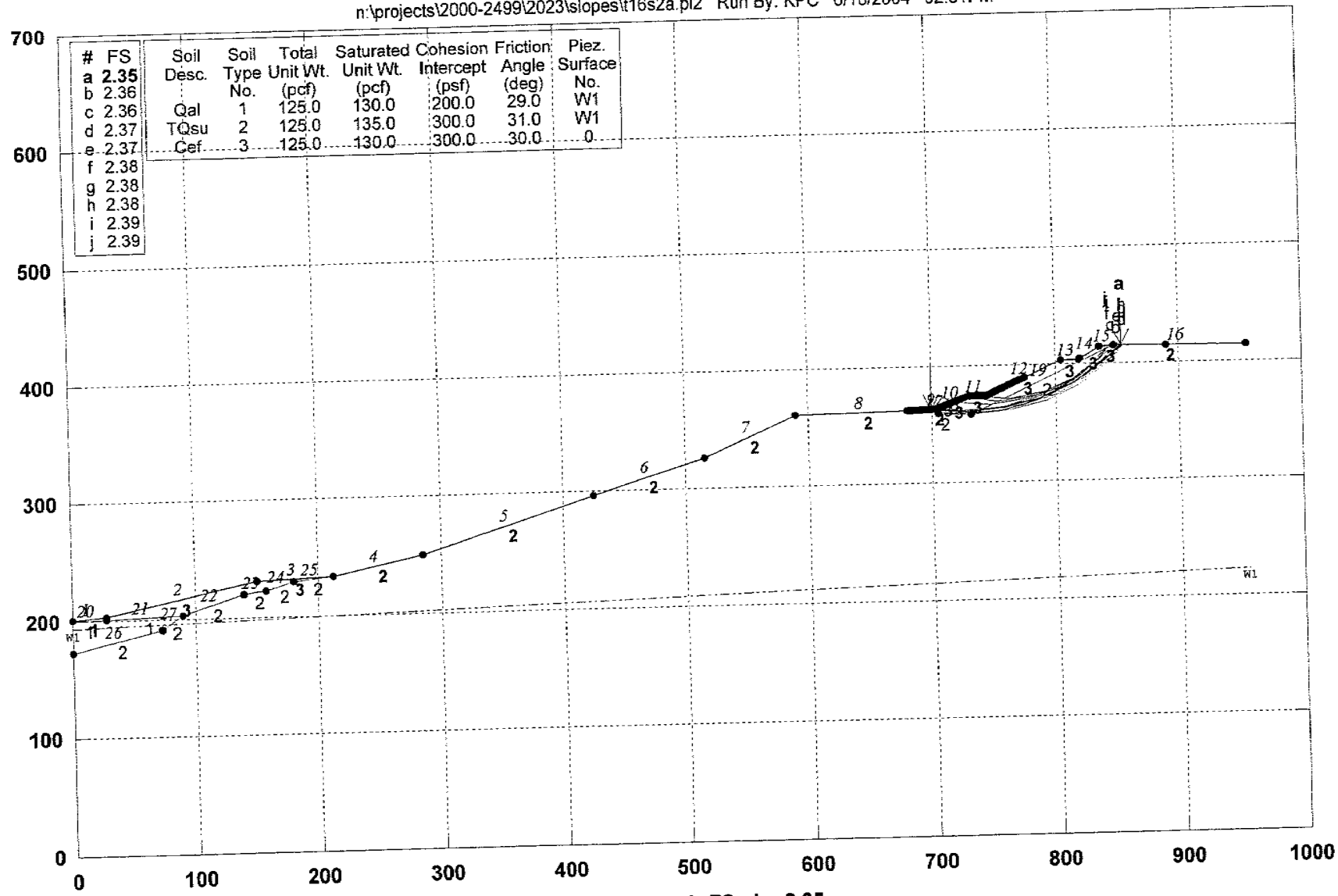
Individual data on the 9 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	9.5	3675.4	0.0	0.0	0.	0.	551.3	0.0	0.0
2	4.6	4199.6	0.0	0.0	0.	0.	629.9	0.0	0.0
3	24.6	47346.1	0.0	0.0	0.	0.	7101.9	0.0	0.0
4	30.0	102986.3	0.0	0.0	0.	0.	15448.0	0.0	0.0
5	85.4	310072.3	0.0	0.0	0.	0.	46510.9	0.0	0.0
6	91.0	249374.9	0.0	0.0	0.	0.	37406.2	0.0	0.0
7	74.0	186095.0	0.0	0.0	0.	0.	27914.3	0.0	0.0

8	21.8	48436.9	0.0	0.0	0.	0.	7265.5	0.0	0.0
9	9.2	7833.4	0.0	0.0	0.	0.	1175.0	0.0	0.0

Mesas East, x-sec 16-16'; CS-27; static;circular

n:\projects\2000-2499\2023\slopes\t16s2a.pl2 Run By: KPC 6/18/2004 02:51PM



#	FS
a	**2.35**
b	2.36
c	2.36
d	2.37
e	2.37
f	2.38
g	2.38
h	2.38
i	2.39
j	2.39

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qal	1	125.0	130.0	200.0	29.0	W1
TQsu	2	125.0	135.0	300.0	31.0	W1
Cef	3	125.0	130.0	300.0	30.0	0

GSTABL7 v.2 FSmin=2.35

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 41

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/18/2004
Time of Run: 02:51PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t16s2a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t16s2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope6s2a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 16-16'; CS-27; static; circular

BOUNDARY COORDINATES
16 Top Boundaries
27 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	200.00	28.00	203.00	1
2	28.00	203.00	150.00	230.00	3
3	150.00	230.00	213.00	233.00	3
4	213.00	233.00	285.00	250.00	2
5	285.00	250.00	425.00	296.00	2
6	425.00	296.00	516.00	326.00	2
7	516.00	326.00	590.00	360.00	2
8	590.00	360.00	700.00	363.00	2
9	700.00	363.00	705.00	364.00	2
10	705.00	364.00	730.00	374.00	3
11	730.00	374.00	744.00	374.00	3
12	744.00	374.00	805.00	404.00	3
13	805.00	404.00	819.00	404.00	3
14	819.00	404.00	836.00	414.00	3
15	836.00	414.00	848.00	415.00	3
16	848.00	415.00	955.00	414.00	2
17	704.99	359.00	705.00	364.00	3
18	704.99	359.00	732.00	358.00	2
19	732.00	358.00	848.00	415.00	2
20	0.00	200.00	28.00	201.00	1
21	28.00	201.00	90.00	203.00	1
22	90.00	203.00	140.00	220.00	2
23	140.00	220.00	157.00	222.00	2
24	157.00	222.00	180.00	229.00	2
25	180.00	229.00	213.00	233.00	2
26	0.00	173.00	73.00	191.00	2
27	73.00	191.00	90.00	203.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	200.0	29.0	0.00	0.0	1
2	125.0	135.0	300.0	31.0	0.00	0.0	1
3	125.0	130.0	300.0	30.0	0.00	0.0	0

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points

Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	193.00
2	955.00	222.00

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 680.00(ft)
and X = 775.00(ft)
Each Surface Terminates Between X = 820.00(ft)
and X = 890.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
30.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 6.198 FS Min = 2.348 FS Ave = 3.390
Standard Deviation = 0.760 Coefficient of Variation = 22.42 %
Failure Surface Specified By 7 Coordinate Points

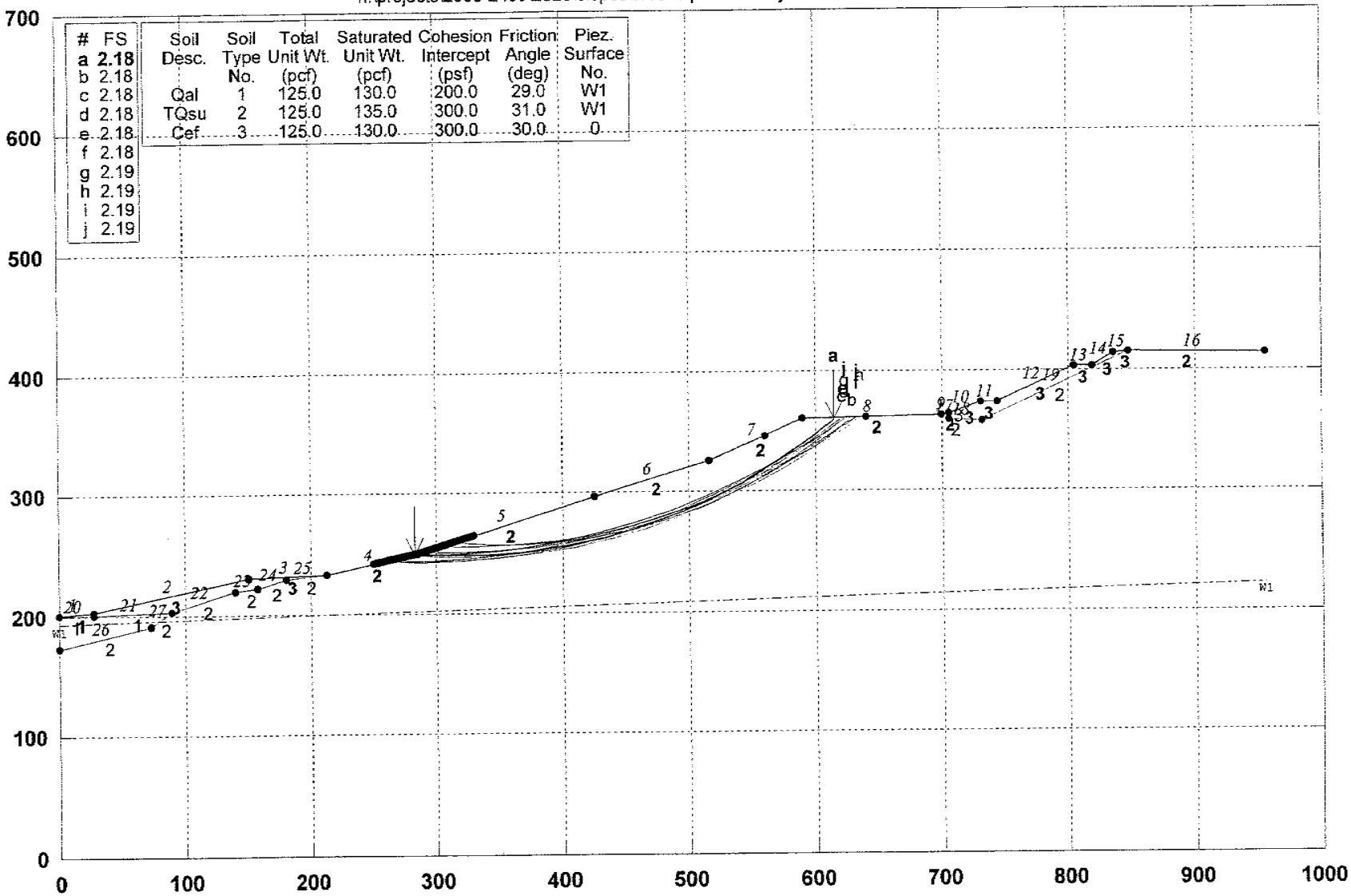
Point No.	X-Surf (ft)	Y-Surf (ft)
1	699.19	362.98
2	729.11	360.83
3	758.97	363.79
4	787.89	371.77
5	815.03	384.54
6	839.62	401.73
7	852.96	414.95

Circle Center At X = 726.73 ; Y = 536.98 ; and Radius = 176.17
Factor of Safety
*** 2.348 ***
Individual data on the 16 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	0.8	4.0	0.0	0.0	0.	0.	0.0	0.0	0.0
2	5.0	474.3	0.0	0.0	0.	0.	0.0	0.0	0.0
3	0.0	0.5	0.0	0.0	0.	0.	0.0	0.0	0.0
4	24.1	21487.3	0.0	0.0	0.	0.	0.0	0.0	0.0
5	0.9	1433.0	0.0	0.0	0.	0.	0.0	0.0	0.0
6	9.9	15643.8	0.0	0.0	0.	0.	0.0	0.0	0.0
7	4.1	6038.8	0.0	0.0	0.	0.	0.0	0.0	0.0
8	15.0	27383.8	0.0	0.0	0.	0.	0.0	0.0	0.0
9	28.9	74809.7	0.0	0.0	0.	0.	0.0	0.0	0.0
10	17.1	51333.3	0.0	0.0	0.	0.	0.0	0.0	0.0
11	10.0	27364.6	0.0	0.0	0.	0.	0.0	0.0	0.0
12	4.0	8962.0	0.0	0.0	0.	0.	0.0	0.0	0.0
13	17.0	33450.1	0.0	0.0	0.	0.	0.0	0.0	0.0
14	3.6	6187.6	0.0	0.0	0.	0.	0.0	0.0	0.0
15	8.4	9184.2	0.0	0.0	0.	0.	0.0	0.0	0.0
16	5.0	1538.7	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 16-16'; static; Circular

n:\projects\2000-2499\2023\slopes\t16s2b.pl2 Run By: KPC 6/18/2004 02:46PM



#	FS
a	2.18
b	2.18
c	2.18
d	2.18
e	2.18
f	2.18
g	2.19
h	2.19
i	2.19
j	2.19

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qal	1	125.0	130.0	200.0	29.0	W1
TQsu	2	125.0	135.0	300.0	31.0	W1
Cef	3	125.0	130.0	300.0	30.0	0

GSTABL7 v.2 FSmin=2.18

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No. 42

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/18/2004
Time of Run: 02:46PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t16s2b.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t16s2b.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope6s2b.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 16-16'; static; Circular

BOUNDARY COORDINATES
16 Top Boundaries
27 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	200.00	28.00	203.00	1
2	28.00	203.00	150.00	230.00	3
3	150.00	230.00	213.00	233.00	3
4	213.00	233.00	285.00	250.00	2
5	285.00	250.00	425.00	296.00	2
6	425.00	296.00	516.00	326.00	2
7	516.00	326.00	590.00	360.00	2
8	590.00	360.00	700.00	363.00	2
9	700.00	363.00	705.00	364.00	2
10	705.00	364.00	730.00	374.00	3
11	730.00	374.00	744.00	374.00	3
12	744.00	374.00	805.00	404.00	3
13	805.00	404.00	819.00	404.00	3
14	819.00	404.00	836.00	414.00	3
15	836.00	414.00	848.00	415.00	3
16	848.00	415.00	955.00	414.00	2
17	704.99	359.00	705.00	364.00	3
18	704.99	359.00	732.00	358.00	2
19	732.00	358.00	848.00	415.00	2
20	0.00	200.00	28.00	201.00	1
21	28.00	201.00	90.00	203.00	1
22	90.00	203.00	140.00	220.00	2
23	140.00	220.00	157.00	222.00	2
24	157.00	222.00	180.00	229.00	2
25	180.00	229.00	213.00	233.00	2
26	0.00	173.00	73.00	191.00	2
27	73.00	191.00	90.00	203.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	200.0	29.0	0.00	0.0	1
2	125.0	135.0	300.0	31.0	0.00	0.0	1
3	125.0	130.0	300.0	30.0	0.00	0.0	0

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points

Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	193.00
2	955.00	222.00

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 250.00(ft)
and X = 330.00(ft)
Each Surface Terminates Between X = 560.00(ft)
and X = 640.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
30.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 4.552 FS Min = 2.175 FS Ave = 2.795
Standard Deviation = 0.423 Coefficient of Variation = 15.14 %
Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	282.32	249.37
2	312.28	247.71
3	342.27	248.10
4	372.17	250.54
5	401.84	255.02
6	431.12	261.52
7	459.90	270.01
8	488.02	280.45
9	515.37	292.79
10	541.81	306.97
11	567.21	322.93
12	591.46	340.59
13	614.45	359.86
14	615.31	360.69

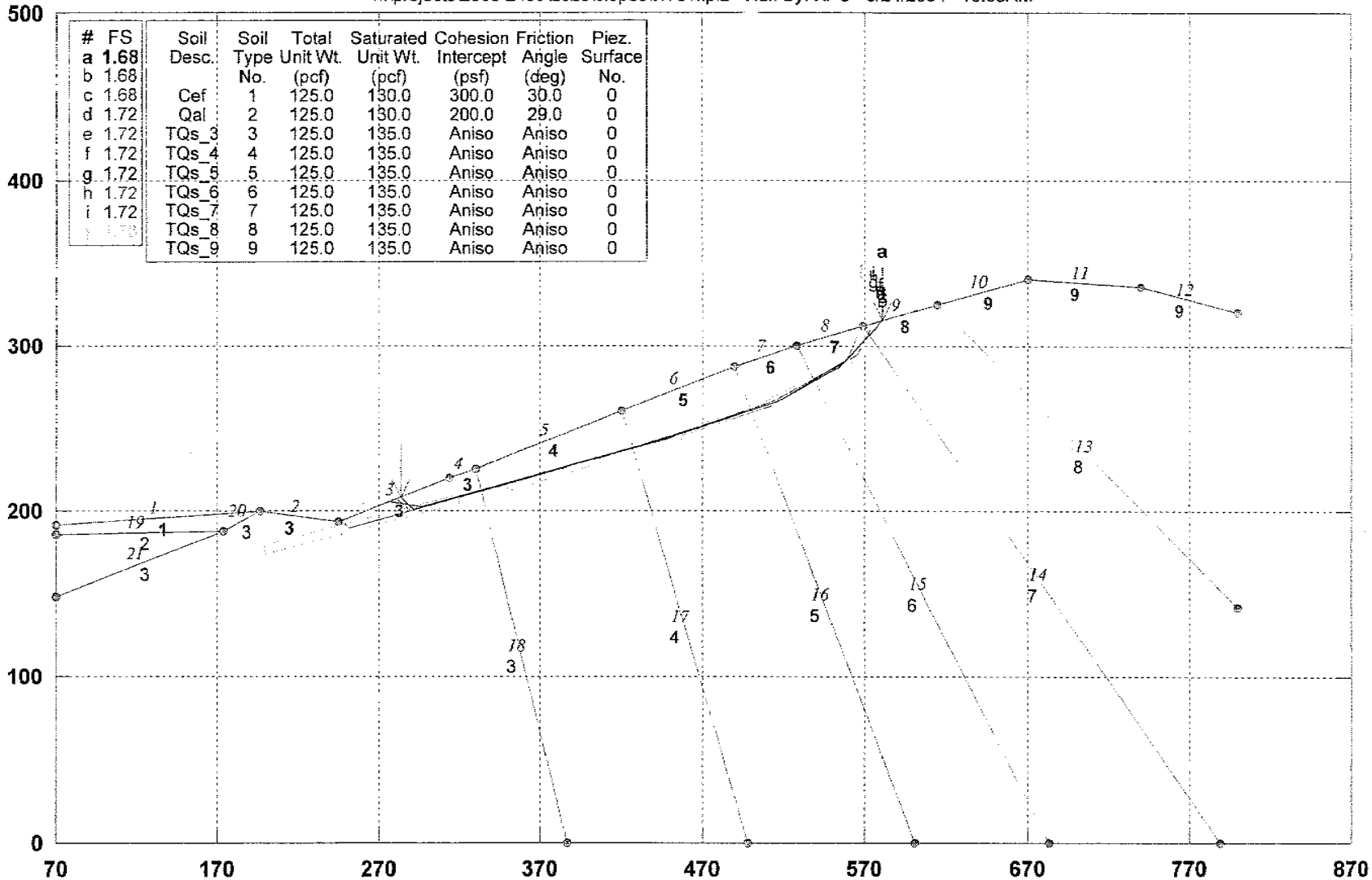
Circle Center At X = 321.60 ; Y = 685.58 ; and Radius = 437.97
Factor of Safety
*** 2.175 ***
Individual data on the 17 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	2.7	130.6	0.0	0.0	0.	0.	0.0	0.0	0.0
2	27.3	20521.6	0.0	0.0	0.	0.	0.0	0.0	0.0
3	30.0	59955.6	0.0	0.0	0.	0.	0.0	0.0	0.0
4	29.9	91245.2	0.0	0.0	0.	0.	0.0	0.0	0.0
5	29.7	113966.1	0.0	0.0	0.	0.	0.0	0.0	0.0
6	23.2	100182.0	0.0	0.0	0.	0.	0.0	0.0	0.0
7	6.1	27689.5	0.0	0.0	0.	0.	0.0	0.0	0.0
8	28.8	133054.5	0.0	0.0	0.	0.	0.0	0.0	0.0
9	28.1	129754.9	0.0	0.0	0.	0.	0.0	0.0	0.0
10	27.3	118479.9	0.0	0.0	0.	0.	0.0	0.0	0.0
11	0.6	2598.9	0.0	0.0	0.	0.	0.0	0.0	0.0
12	25.8	102824.1	0.0	0.0	0.	0.	0.0	0.0	0.0
13	25.4	91270.8	0.0	0.0	0.	0.	0.0	0.0	0.0
14	22.8	67056.9	0.0	0.0	0.	0.	0.0	0.0	0.0
15	1.5	3651.4	0.0	0.0	0.	0.	0.0	0.0	0.0

16	23.0	29105.7	0.0	0.0	0.	0.	0.0	0.0	0.0
17	0.9	43.3	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 17-17'; static; critical bedding plane

n:\projects\2000-2499\2023\slopes\t17s1f.pl2 Run By: KPC 6/24/2004 10:38AM



#	FS
a	1.68
b	1.68
c	1.68
d	1.72
e	1.72
f	1.72
g	1.72
h	1.72
i	1.72

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
Qal	2	125.0	130.0	200.0	29.0	0
TQs_3	3	125.0	135.0	Aniso	Aniso	0
TQs_4	4	125.0	135.0	Aniso	Aniso	0
TQs_5	5	125.0	135.0	Aniso	Aniso	0
TQs_6	6	125.0	135.0	Aniso	Aniso	0
TQs_7	7	125.0	135.0	Aniso	Aniso	0
TQs_8	8	125.0	135.0	Aniso	Aniso	0
TQs_9	9	125.0	135.0	Aniso	Aniso	0

GSTABL7 v.2 FSmin=1.68

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 43

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/24/2004
Time of Run: 10:38AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t17s1f.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t17s1f.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope7s1f.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 17-17'; static;
critical bedding plane

BOUNDARY COORDINATES
12 Top Boundaries
21 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	70.00	192.00	197.00	200.00	1
2	197.00	200.00	245.00	193.00	3
3	245.00	193.00	314.00	220.00	3
4	314.00	220.00	330.00	225.00	3
5	330.00	225.00	420.00	261.00	4
6	420.00	261.00	490.00	287.00	5
7	490.00	287.00	528.00	300.00	6
8	528.00	300.00	569.00	312.00	7
9	569.00	312.00	615.00	325.00	8
10	615.00	325.00	670.00	340.00	9
11	670.00	340.00	740.00	336.00	9
12	740.00	336.00	800.00	320.00	9
13	615.00	325.00	800.00	142.00	8
14	569.00	312.00	789.00	0.00	7
15	528.00	300.00	683.00	0.00	6
16	490.00	287.00	601.00	0.00	5
17	420.00	261.00	498.00	0.00	4
18	330.00	225.00	387.00	0.00	3
19	70.00	186.00	174.00	188.00	2
20	174.00	188.00	197.00	200.00	3
21	70.00	149.00	174.00	188.00	3

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
9 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	130.0	200.0	29.0	0.00	0.0	0
3	125.0	135.0	300.0	31.0	0.00	0.0	0
4	125.0	135.0	300.0	31.0	0.00	0.0	0
5	125.0	135.0	300.0	31.0	0.00	0.0	0
6	125.0	135.0	300.0	31.0	0.00	0.0	0
7	125.0	135.0	300.0	31.0	0.00	0.0	0
8	125.0	135.0	300.0	31.0	0.00	0.0	0
9	125.0	135.0	300.0	31.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
7 soil type(s)
Soil Type 3 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction	Counterclockwise	Cohesion	Friction

Range No.	Direction Limit (deg)	Intercept (psf)	Angle (deg)
1	12.0	300.00	31.00
2	14.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 4 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	14.0	300.00	31.00
2	16.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 5 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	17.0	300.00	31.00
2	19.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 6 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	24.0	300.00	31.00
2	26.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 7 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	29.0	300.00	31.00
2	31.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 8 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	39.0	300.00	31.00
2	41.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 9 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	49.0	300.00	31.00
2	51.0	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
5 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of

Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	200.00	177.00	320.00	207.00	5.00
2	350.00	214.00	410.00	232.00	5.00
3	440.00	240.00	480.00	254.00	5.00
4	510.00	265.00	530.00	275.00	5.00
5	550.00	285.00	570.00	297.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 2.736 FS Min = 1.682 FS Ave = 2.078
Standard Deviation = 0.204 Coefficient of Variation = 9.80 %
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	283.10	207.91
2	291.84	200.52
3	364.48	220.39
4	441.67	242.07
5	517.70	266.95
6	554.80	287.72
7	575.41	309.52
8	581.23	315.46

Factor of Safety
*** 1.682 ***

Individual data on the 18 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	8.7	5904.4	0.0	0.0	0.	0.	0.0	0.0	0.0
2	22.2	33564.2	0.0	0.0	0.	0.	0.0	0.0	0.0
3	16.0	27462.5	0.0	0.0	0.	0.	0.0	0.0	0.0
4	3.3	5926.9	0.0	0.0	0.	0.	0.0	0.0	0.0
5	31.2	63994.4	0.0	0.0	0.	0.	0.0	0.0	0.0
6	55.5	150635.8	0.0	0.0	0.	0.	0.0	0.0	0.0
7	6.9	21831.9	0.0	0.0	0.	0.	0.0	0.0	0.0
8	14.8	48572.2	0.0	0.0	0.	0.	0.0	0.0	0.0
9	48.3	169436.0	0.0	0.0	0.	0.	0.0	0.0	0.0
10	10.0	36470.9	0.0	0.0	0.	0.	0.0	0.0	0.0
11	17.7	65051.8	0.0	0.0	0.	0.	0.0	0.0	0.0
12	10.3	36576.9	0.0	0.0	0.	0.	0.0	0.0	0.0
13	10.9	35292.0	0.0	0.0	0.	0.	0.0	0.0	0.0
14	15.9	44107.4	0.0	0.0	0.	0.	0.0	0.0	0.0
15	14.2	26075.3	0.0	0.0	0.	0.	0.0	0.0	0.0
16	3.7	3649.0	0.0	0.0	0.	0.	0.0	0.0	0.0
17	2.7	1777.0	0.0	0.0	0.	0.	0.0	0.0	0.0
18	5.8	1561.1	0.0	0.0	0.	0.	0.0	0.0	0.0

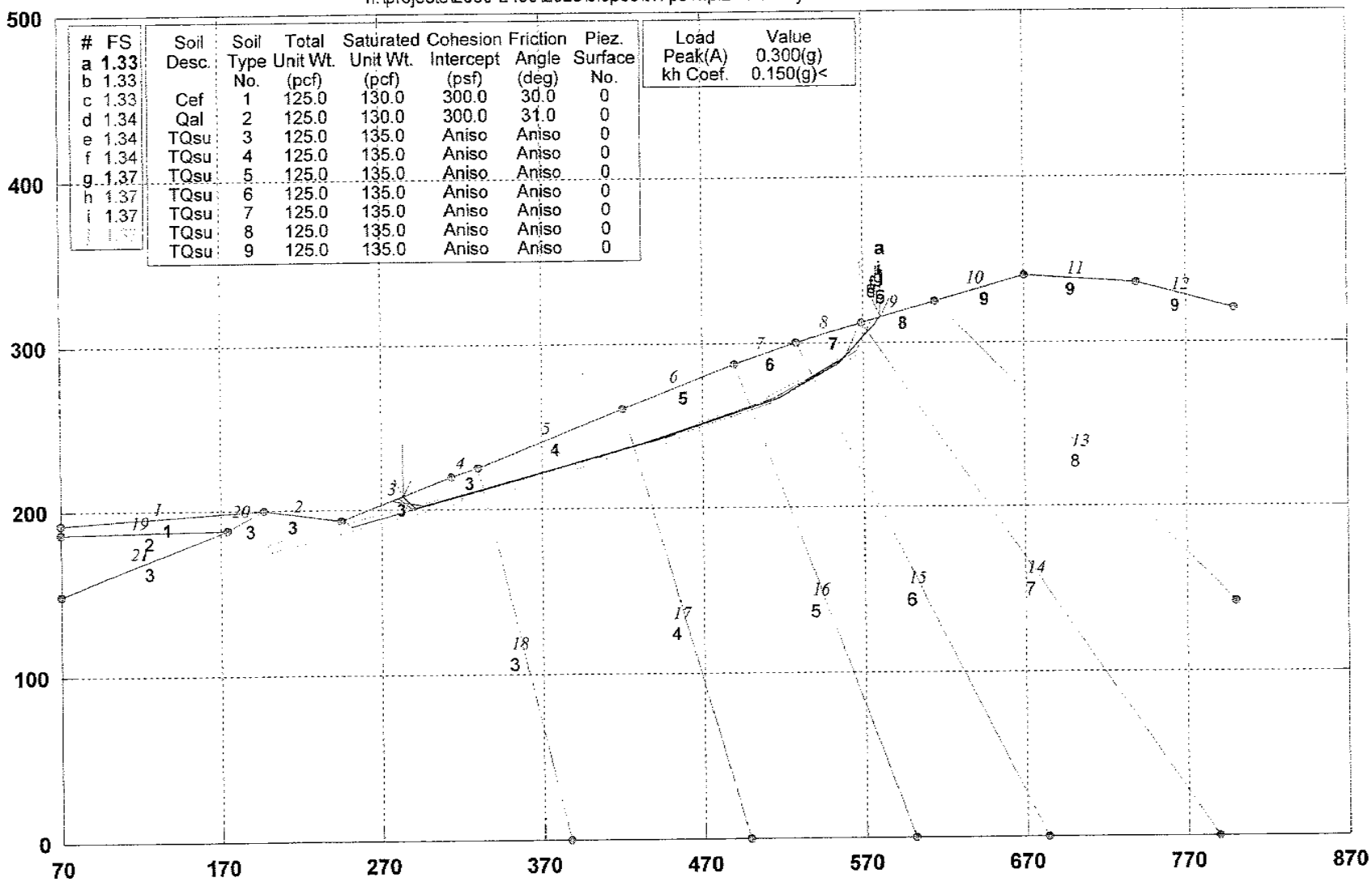
Mesas East, x-sec 17-17'; pseudostatic; critical bedding plane

n:\projects\2000-2499\2023\slopes\t17ps1f.pl2 Run By: KPC 6/24/2004 10:39AM

#	FS
a	**1.33**
b	1.33
c	1.33
d	1.34
e	1.34
f	1.34
g	1.37
h	1.37
i	1.37
j	1.37

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
Qal	2	125.0	130.0	300.0	31.0	0
TQsu	3	125.0	135.0	Aniso	Aniso	0
TQsu	4	125.0	135.0	Aniso	Aniso	0
TQsu	5	125.0	135.0	Aniso	Aniso	0
TQsu	6	125.0	135.0	Aniso	Aniso	0
TQsu	7	125.0	135.0	Aniso	Aniso	0
TQsu	8	125.0	135.0	Aniso	Aniso	0
TQsu	9	125.0	135.0	Aniso	Aniso	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<



GSTABL7 v.2 FSmin=1.33

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN NO. 44

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/24/2004
Time of Run: 10:39AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t17ps1f.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t17ps1f.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope7ps1f.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 17-17'; pseudostatic; critical bedding plane

BOUNDARY COORDINATES
12 Top Boundaries
21 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	70.00	192.00	197.00	200.00	1
2	197.00	200.00	245.00	193.00	3
3	245.00	193.00	314.00	220.00	3
4	314.00	220.00	330.00	225.00	3
5	330.00	225.00	420.00	261.00	4
6	420.00	261.00	490.00	287.00	5
7	490.00	287.00	528.00	300.00	6
8	528.00	300.00	569.00	312.00	7
9	569.00	312.00	615.00	325.00	8
10	615.00	325.00	670.00	340.00	9
11	670.00	340.00	740.00	336.00	9
12	740.00	336.00	800.00	320.00	9
13	615.00	325.00	800.00	142.00	8
14	569.00	312.00	789.00	0.00	7
15	528.00	300.00	683.00	0.00	6
16	490.00	287.00	601.00	0.00	5
17	420.00	261.00	498.00	0.00	4
18	330.00	225.00	387.00	0.00	3
19	70.00	186.00	174.00	188.00	2
20	174.00	188.00	197.00	200.00	3
21	70.00	149.00	174.00	188.00	3

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
9 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	130.0	300.0	31.0	0.00	0.0	0
3	125.0	135.0	400.0	38.0	0.00	0.0	0
4	125.0	135.0	400.0	38.0	0.00	0.0	0
5	125.0	135.0	400.0	38.0	0.00	0.0	0
6	125.0	135.0	400.0	38.0	0.00	0.0	0
7	125.0	135.0	400.0	38.0	0.00	0.0	0
8	125.0	135.0	400.0	38.0	0.00	0.0	0
9	125.0	135.0	400.0	38.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
7 soil type(s)
Soil Type 3 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction	Counterclockwise	Cohesion	Friction

Range No.	Direction Limit (deg)	Intercept (psf)	Angle (deg)
1	12.0	400.00	38.00
2	14.0	200.00	20.00
3	90.0	400.00	38.00

Soil Type 4 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	14.0	400.00	38.00
2	16.0	200.00	20.00
3	90.0	400.00	38.00

Soil Type 5 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	17.0	400.00	38.00
2	19.0	200.00	20.00
3	90.0	400.00	38.00

Soil Type 6 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	24.0	400.00	38.00
2	26.0	200.00	20.00
3	90.0	400.00	38.00

Soil Type 7 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	29.0	400.00	38.00
2	31.0	200.00	20.00
3	90.0	400.00	38.00

Soil Type 8 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	39.0	400.00	38.00
2	41.0	200.00	20.00
3	90.0	400.00	38.00

Soil Type 9 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	49.0	400.00	38.00
2	51.0	200.00	20.00
3	90.0	400.00	38.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been

Specified.
1000 Trial Surfaces Have Been Generated.
5 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	200.00	177.00	320.00	207.00	5.00
2	350.00	214.00	410.00	232.00	5.00
3	440.00	240.00	480.00	254.00	5.00
4	510.00	265.00	530.00	275.00	5.00
5	550.00	285.00	570.00	297.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 2.315 FS Min = 1.326 FS Ave = 1.735
Standard Deviation = 0.173 Coefficient of Variation = 9.99 %
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	283.10	207.91
2	291.84	200.52
3	364.48	220.39
4	441.67	242.07
5	517.70	266.95
6	554.80	287.72
7	575.41	309.52
8	581.23	315.46

Factor of Safety
*** 1.326 ***
Individual data on the 18 slices

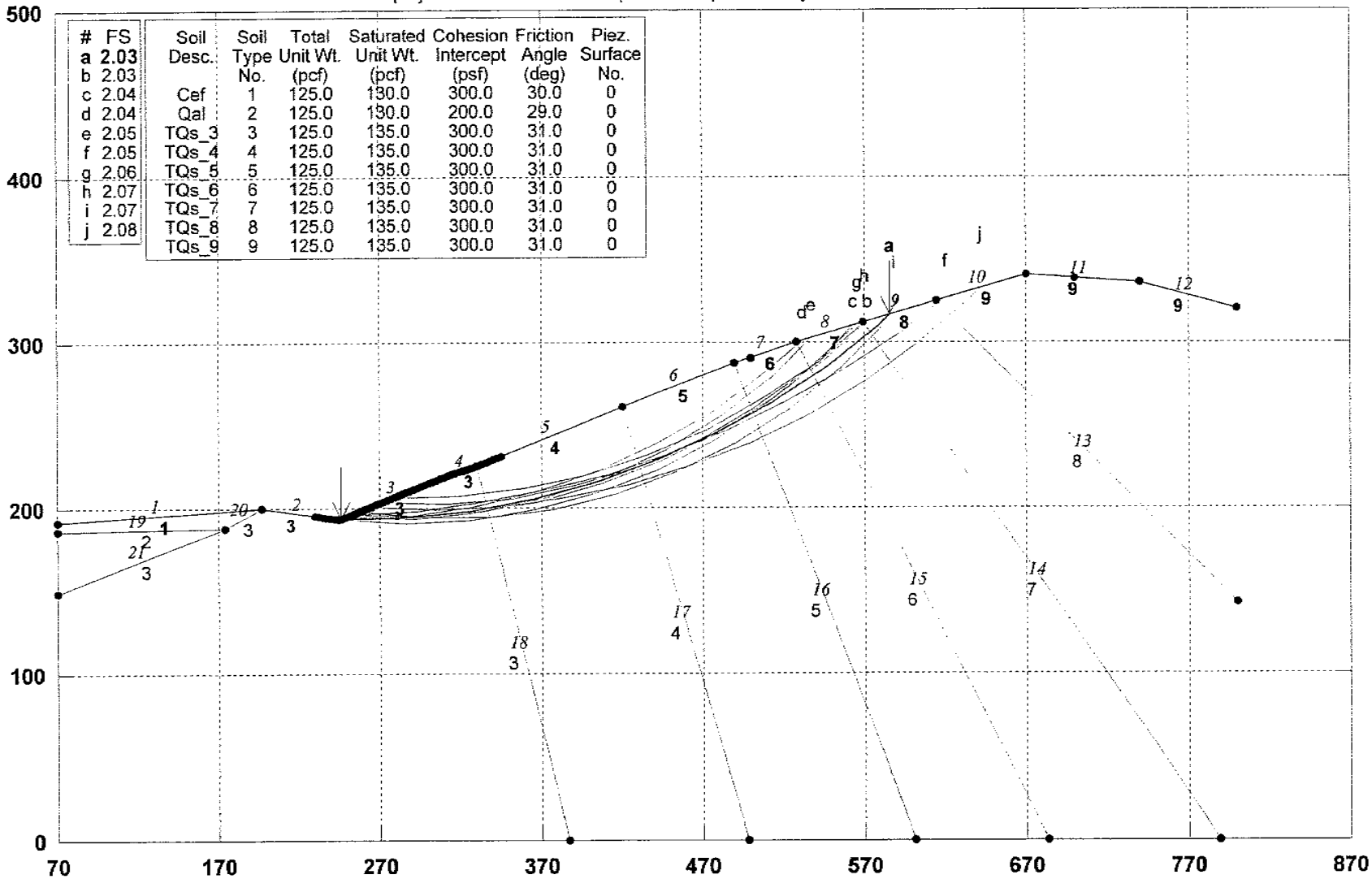
Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	8.7	5904.4	0.0	0.0	0.	0.	885.7	0.0	0.0
2	22.2	33564.2	0.0	0.0	0.	0.	5034.6	0.0	0.0
3	16.0	27462.5	0.0	0.0	0.	0.	4119.4	0.0	0.0
4	3.3	5926.9	0.0	0.0	0.	0.	889.0	0.0	0.0
5	31.2	63994.4	0.0	0.0	0.	0.	9599.2	0.0	0.0
6	55.5	150635.8	0.0	0.0	0.	0.	22595.4	0.0	0.0
7	6.9	21831.9	0.0	0.0	0.	0.	3274.8	0.0	0.0
8	14.8	48572.2	0.0	0.0	0.	0.	7285.8	0.0	0.0
9	48.3	169436.0	0.0	0.0	0.	0.	25415.4	0.0	0.0
10	10.0	36470.9	0.0	0.0	0.	0.	5470.6	0.0	0.0
11	17.7	65051.8	0.0	0.0	0.	0.	9757.8	0.0	0.0
12	10.3	36576.9	0.0	0.0	0.	0.	5486.5	0.0	0.0
13	10.9	35292.0	0.0	0.0	0.	0.	5293.8	0.0	0.0
14	15.9	44107.4	0.0	0.0	0.	0.	6616.1	0.0	0.0
15	14.2	26075.3	0.0	0.0	0.	0.	3911.3	0.0	0.0
16	3.7	3649.0	0.0	0.0	0.	0.	547.4	0.0	0.0
17	2.7	1777.0	0.0	0.0	0.	0.	266.6	0.0	0.0
18	5.8	1561.1	0.0	0.0	0.	0.	234.2	0.0	0.0

Mesas East, x-sec 17-17' CS-12b; circular; static

n:\projects\2000-2499\2023\slopes\t17s1a.pl2 Run By: KPC 7/2/2004 03:04PM

#	FS
a	**2.03**
b	2.03
c	2.04
d	2.04
e	2.05
f	2.05
g	2.06
h	2.07
i	2.07
j	2.08

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
Qal	2	125.0	130.0	200.0	29.0	0
TQs_3	3	125.0	135.0	300.0	31.0	0
TQs_4	4	125.0	135.0	300.0	31.0	0
TQs_5	5	125.0	135.0	300.0	31.0	0
TQs_6	6	125.0	135.0	300.0	31.0	0
TQs_7	7	125.0	135.0	300.0	31.0	0
TQs_8	8	125.0	135.0	300.0	31.0	0
TQs_9	9	125.0	135.0	300.0	31.0	0



GSTABL7 v.2 FSmin=2.03

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN NO. 45

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 7/2/2004
Time of Run: 03:04PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t17s1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t17s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope7s1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 17-17' CS-12b;
circular; static

BOUNDARY COORDINATES
12 Top Boundaries
21 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	70.00	192.00	197.00	200.00	1
2	197.00	200.00	245.00	193.00	3
3	245.00	193.00	314.00	220.00	3
4	314.00	220.00	330.00	225.00	3
5	330.00	225.00	420.00	261.00	4
6	420.00	261.00	490.00	287.00	5
7	490.00	287.00	528.00	300.00	6
8	528.00	300.00	569.00	312.00	7
9	569.00	312.00	615.00	325.00	8
10	615.00	325.00	670.00	340.00	9
11	670.00	340.00	740.00	336.00	9
12	740.00	336.00	800.00	320.00	9
13	615.00	325.00	800.00	142.00	8
14	569.00	312.00	789.00	0.00	7
15	528.00	300.00	683.00	0.00	6
16	490.00	287.00	601.00	0.00	5
17	420.00	261.00	498.00	0.00	4
18	330.00	225.00	387.00	0.00	3
19	70.00	186.00	174.00	188.00	2
20	174.00	188.00	197.00	200.00	3
21	70.00	149.00	174.00	188.00	3

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
9 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	130.0	200.0	29.0	0.00	0.0	0
3	125.0	135.0	300.0	31.0	0.00	0.0	0
4	125.0	135.0	300.0	31.0	0.00	0.0	0
5	125.0	135.0	300.0	31.0	0.00	0.0	0
6	125.0	135.0	300.0	31.0	0.00	0.0	0
7	125.0	135.0	300.0	31.0	0.00	0.0	0
8	125.0	135.0	300.0	31.0	0.00	0.0	0
9	125.0	135.0	300.0	31.0	0.00	0.0	0

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.

500 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 230.00(ft)
and X = 345.00(ft)
Each Surface Terminates Between X = 500.00(ft)
and X = 700.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
40.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 10.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 3.913 FS Min = 2.025 FS Ave = 2.863
Standard Deviation = 0.535 Coefficient of Variation = 18.70 %
Failure Surface Specified By 11 Coordinate Points

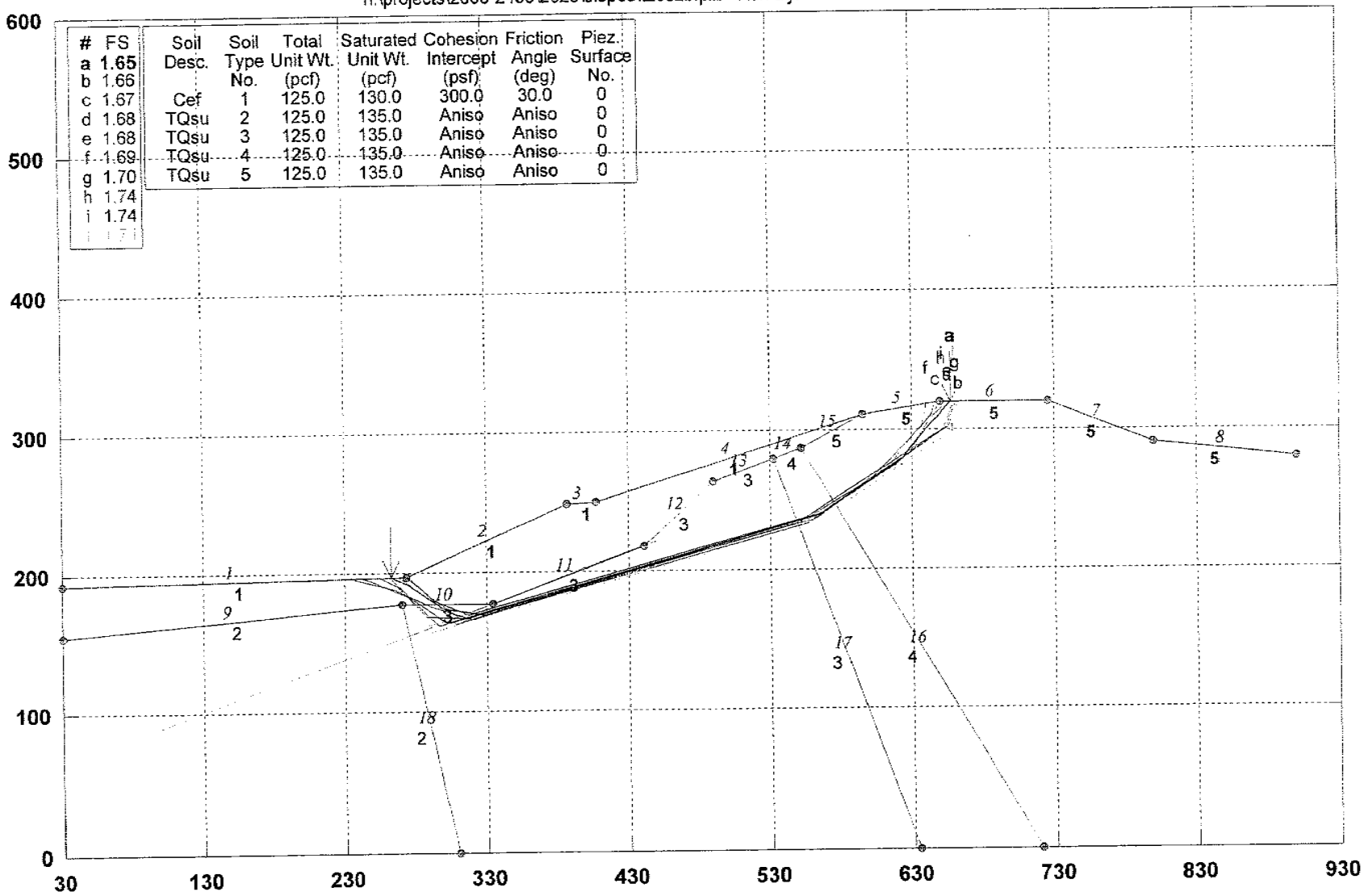
Point No.	X-Surf (ft)	Y-Surf (ft)
1	246.43	193.56
2	286.42	194.29
3	326.23	198.21
4	365.60	205.30
5	404.27	215.52
6	442.00	228.79
7	478.56	245.03
8	513.69	264.15
9	547.19	286.01
10	578.84	310.47
11	585.71	316.72

Circle Center At X = 257.31 ; Y = 693.64 ; and Radius = 500.20
Factor of Safety
*** 2.025 ***
Individual data on the 21 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	40.0	37293.7	0.0	0.0	0.	0.	0.0	0.0	0.0
2	27.6	65349.0	0.0	0.0	0.	0.	0.0	0.0	0.0
3	12.2	37148.6	0.0	0.0	0.	0.	0.0	0.0	0.0
4	3.8	12189.4	0.0	0.0	0.	0.	0.0	0.0	0.0
5	6.3	21194.5	0.0	0.0	0.	0.	0.0	0.0	0.0
6	29.3	112387.8	0.0	0.0	0.	0.	0.0	0.0	0.0
7	38.7	176755.3	0.0	0.0	0.	0.	0.0	0.0	0.0
8	15.7	77808.9	0.0	0.0	0.	0.	0.0	0.0	0.0
9	10.8	54095.2	0.0	0.0	0.	0.	0.0	0.0	0.0
10	11.2	56382.9	0.0	0.0	0.	0.	0.0	0.0	0.0
11	36.6	178426.8	0.0	0.0	0.	0.	0.0	0.0	0.0
12	11.4	52539.3	0.0	0.0	0.	0.	0.0	0.0	0.0
13	11.4	49381.9	0.0	0.0	0.	0.	0.0	0.0	0.0
14	12.3	49399.2	0.0	0.0	0.	0.	0.0	0.0	0.0
15	14.3	51391.2	0.0	0.0	0.	0.	0.0	0.0	0.0
16	10.2	31605.1	0.0	0.0	0.	0.	0.0	0.0	0.0
17	8.9	23732.2	0.0	0.0	0.	0.	0.0	0.0	0.0
18	21.8	39178.6	0.0	0.0	0.	0.	0.0	0.0	0.0
19	4.2	4226.5	0.0	0.0	0.	0.	0.0	0.0	0.0
20	5.7	4038.7	0.0	0.0	0.	0.	0.0	0.0	0.0
21	6.9	1849.7	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 20-20'; Static; buttress with 20'd x 62'w key and 2.75:1 backcut

n:\projects\2000-2499\2023\slopes\t20s2b.pl2 Run By: KPC 6/24/2004 04:40PM



#	FS
a	1.65
b	1.66
c	1.67
d	1.68
e	1.68
f	1.69
g	1.70
h	1.74
i	1.74
j	1.71

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
TQsu	2	125.0	135.0	Aniso	Aniso	0
TQsu	3	125.0	135.0	Aniso	Aniso	0
TQsu	4	125.0	135.0	Aniso	Aniso	0
TQsu	5	125.0	135.0	Aniso	Aniso	0

GSTABL7 v.2 FSmin=1.65

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 46

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/24/2004
Time of Run: 4:40PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t20s2b.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t20s2b.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope0s2b.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 20-20'; Static;
buttress with 20'd x 65'w key

BOUNDARY COORDINATES
8 Top Boundaries
18 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	30.00	193.00	274.00	197.00	1
2	274.00	197.00	387.00	248.00	1
3	387.00	248.00	407.00	249.00	1
4	407.00	249.00	596.00	311.00	1
5	596.00	311.00	650.00	320.00	5
6	650.00	320.00	726.00	320.00	5
7	726.00	320.00	800.00	290.00	5
8	800.00	290.00	900.00	280.00	5
9	30.00	155.00	270.00	177.00	2
10	270.00	177.00	335.00	177.00	3
11	335.00	177.00	441.00	217.00	3
12	441.00	217.00	490.00	263.00	3
13	490.00	263.00	532.00	279.00	3
14	532.00	279.00	552.00	287.00	4
15	552.00	287.00	596.00	311.00	5
16	552.00	287.00	720.00	0.00	4
17	532.00	279.00	634.00	0.00	3
18	270.00	177.00	309.00	0.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	135.0	300.0	31.0	0.00	0.0	0
3	125.0	135.0	300.0	31.0	0.00	0.0	0
4	125.0	135.0	300.0	31.0	0.00	0.0	0
5	125.0	135.0	300.0	31.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
4 soil type(s)

Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	7.0	300.00	31.00
2	9.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 3 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	15.0	300.00	31.00
2	17.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 4 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	24.0	300.00	31.00
2	26.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 5 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	34.0	300.00	31.00
2	36.0	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
3 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	288.00	159.00	517.00	223.00	5.00
2	552.00	233.00	568.00	242.00	5.00
3	587.00	253.00	659.00	302.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 4.624 FS Min = 1.649 FS Ave = 2.436
Standard Deviation = 0.534 Coefficient of Variation = 21.91 %
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	262.55	196.81
2	275.14	191.89
3	299.53	174.42
4	329.13	169.58
5	565.40	239.48
6	620.11	276.43
7	639.33	299.47
8	657.07	320.00

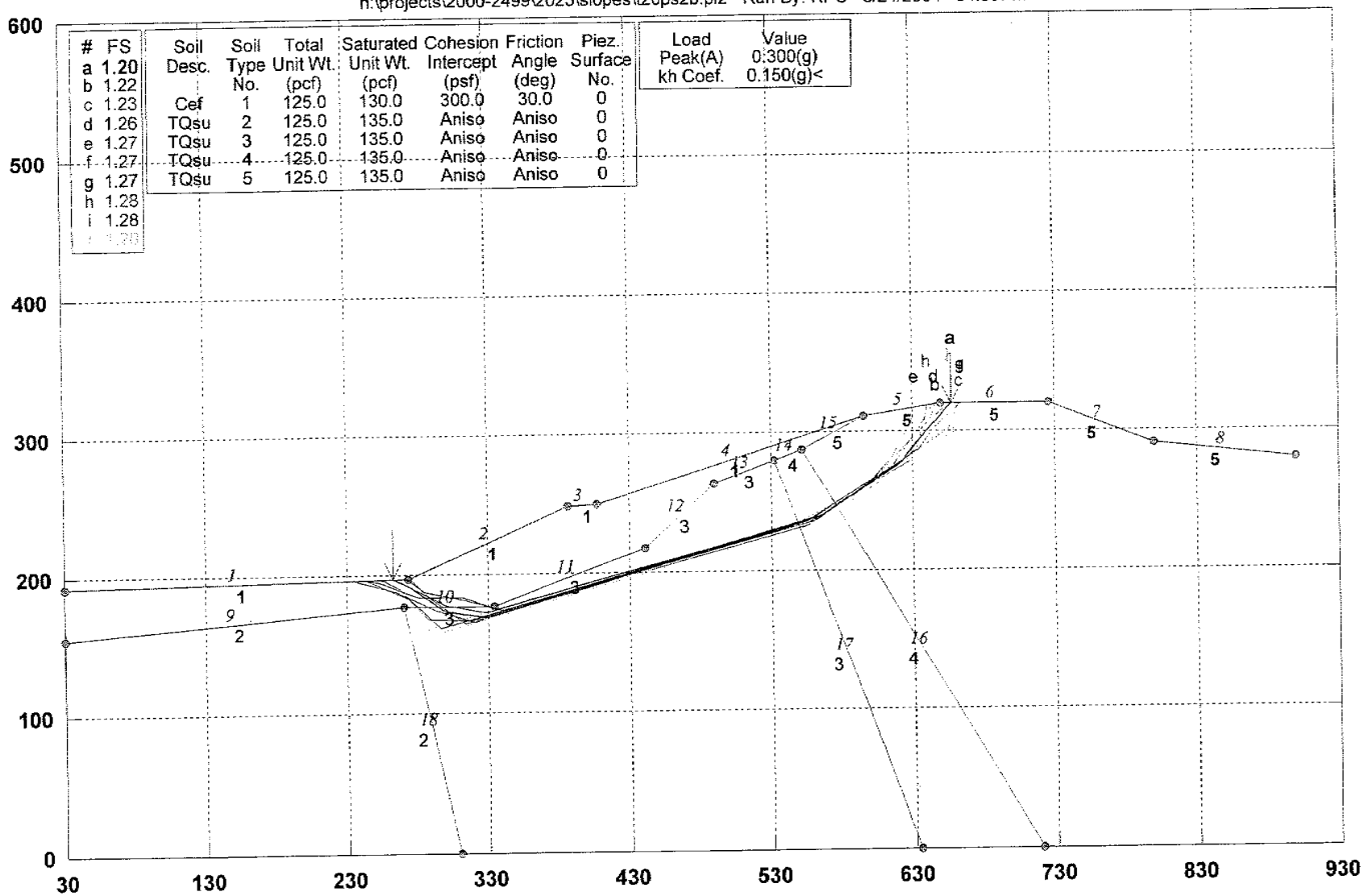
Factor of Safety
*** 1.649 ***
Individual data on the 20 slices

Slice	Width	Weight	Water Force Top	Water Force Bot	Tie Force Norm	Tie Force Tan	Earthquake Force Hor	Earthquake Force Ver	Surcharge Load

No.	(ft)	(lbs)	(lbs)	(lbs)	(lbs)	(lbs)	(lbs)	(lbs)	(lbs)
1	11.4	3340.1	0.0	0.0	0.	0.	0.0	0.0	0.0
2	1.1	731.8	0.0	0.0	0.	0.	0.0	0.0	0.0
3	20.8	46138.7	0.0	0.0	0.	0.	0.0	0.0	0.0
4	3.6	14423.1	0.0	0.0	0.	0.	0.0	0.0	0.0
5	29.6	159890.0	0.0	0.0	0.	0.	0.0	0.0	0.0
6	5.9	38680.1	0.0	0.0	0.	0.	0.0	0.0	0.0
7	52.0	372149.8	0.0	0.0	0.	0.	0.0	0.0	0.0
8	20.0	147093.4	0.0	0.0	0.	0.	0.0	0.0	0.0
9	34.0	241934.9	0.0	0.0	0.	0.	0.0	0.0	0.0
10	49.0	356851.2	0.0	0.0	0.	0.	0.0	0.0	0.0
11	42.0	313559.9	0.0	0.0	0.	0.	0.0	0.0	0.0
12	16.3	123573.6	0.0	0.0	0.	0.	0.0	0.0	0.0
13	3.7	28234.8	0.0	0.0	0.	0.	0.0	0.0	0.0
14	13.4	102592.3	0.0	0.0	0.	0.	0.0	0.0	0.0
15	10.3	77080.0	0.0	0.0	0.	0.	0.0	0.0	0.0
16	20.3	137760.2	0.0	0.0	0.	0.	0.0	0.0	0.0
17	24.1	134780.7	0.0	0.0	0.	0.	0.0	0.0	0.0
18	19.2	68848.8	0.0	0.0	0.	0.	0.0	0.0	0.0
19	10.7	17960.6	0.0	0.0	0.	0.	0.0	0.0	0.0
20	7.1	3612.5	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 20-20'; pseudostatic; buttress w/ 20'd x 65'w key

n:\projects\2000-2499\2023\slopes\t20ps2b.pl2 Run By: KPC 6/24/2004 04:39PM



#	FS
a	1.20
b	1.22
c	1.23
d	1.26
e	1.27
f	1.27
g	1.27
h	1.28
i	1.28

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
TQsu	2	125.0	135.0	Aniso	Aniso	0
TQsu	3	125.0	135.0	Aniso	Aniso	0
TQsu	4	125.0	135.0	Aniso	Aniso	0
TQsu	5	125.0	135.0	Aniso	Aniso	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.20

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 47

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/24/2004
Time of Run: 04:39PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t20ps2b.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t20ps2b.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope0ps2b.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 20-20'; pseudostatic;
buttress w/ 20'd x 65'w key

BOUNDARY COORDINATES
8 Top Boundaries
18 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	30.00	193.00	274.00	197.00	1
2	274.00	197.00	387.00	248.00	1
3	387.00	248.00	407.00	249.00	1
4	407.00	249.00	596.00	311.00	1
5	596.00	311.00	650.00	320.00	5
6	650.00	320.00	726.00	320.00	5
7	726.00	320.00	800.00	290.00	5
8	800.00	290.00	900.00	280.00	5
9	30.00	155.00	270.00	177.00	2
10	270.00	177.00	335.00	177.00	3
11	335.00	177.00	441.00	217.00	3
12	441.00	217.00	490.00	263.00	3
13	490.00	263.00	532.00	279.00	3
14	532.00	279.00	552.00	287.00	4
15	552.00	287.00	596.00	311.00	5
16	552.00	287.00	720.00	0.00	4
17	532.00	279.00	634.00	0.00	3
18	270.00	177.00	309.00	0.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	135.0	400.0	38.0	0.00	0.0	0
3	125.0	135.0	400.0	38.0	0.00	0.0	0
4	125.0	135.0	400.0	38.0	0.00	0.0	0
5	125.0	135.0	400.0	38.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
4 soil type(s)

Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	7.0	400.00	38.00
2	9.0	200.00	20.00
3	90.0	400.00	38.00

Soil Type 3 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	15.0	400.00	38.00
2	17.0	200.00	20.00
3	90.0	400.00	38.00

Soil Type 4 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	24.0	400.00	38.00
2	26.0	200.00	20.00
3	90.0	400.00	38.00

Soil Type 5 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	34.0	400.00	38.00
2	36.0	200.00	20.00
3	90.0	400.00	38.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
3 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	288.00	159.00	517.00	223.00	5.00
2	552.00	233.00	568.00	242.00	5.00
3	587.00	253.00	659.00	302.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 3.631 FS Min = 1.204 FS Ave = 1.889
Standard Deviation = 0.490 Coefficient of Variation = 25.96 %
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	262.55	196.81
2	275.14	191.89
3	299.53	174.42
4	329.13	169.58
5	565.40	239.48
6	620.11	276.43
7	639.33	299.47
8	657.07	320.00

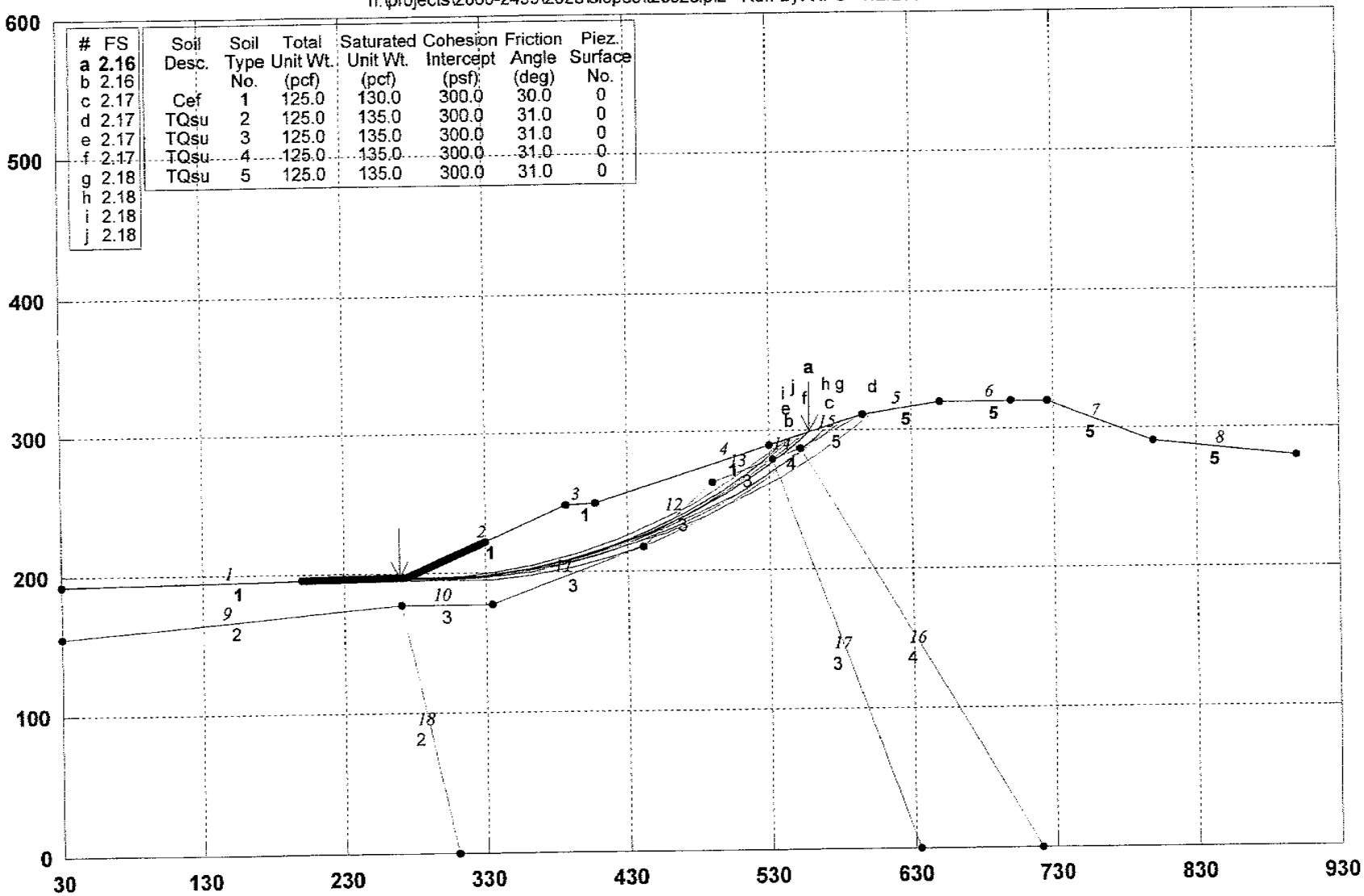
Factor of Safety
*** 1.204 ***

Individual data on the 20 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	11.4	3340.1	0.0	0.0	0.	0.	501.0	0.0	0.0
2	1.1	731.8	0.0	0.0	0.	0.	109.8	0.0	0.0
3	20.8	46138.7	0.0	0.0	0.	0.	6920.8	0.0	0.0
4	3.6	14423.1	0.0	0.0	0.	0.	2163.5	0.0	0.0
5	29.6	159890.0	0.0	0.0	0.	0.	23983.5	0.0	0.0
6	5.9	38680.1	0.0	0.0	0.	0.	5802.0	0.0	0.0
7	52.0	372149.8	0.0	0.0	0.	0.	55822.5	0.0	0.0
8	20.0	147093.4	0.0	0.0	0.	0.	22064.0	0.0	0.0
9	34.0	241934.9	0.0	0.0	0.	0.	36290.2	0.0	0.0
10	49.0	356851.2	0.0	0.0	0.	0.	53527.7	0.0	0.0
11	42.0	313559.9	0.0	0.0	0.	0.	47034.0	0.0	0.0
12	16.3	123573.6	0.0	0.0	0.	0.	18536.0	0.0	0.0
13	3.7	28234.8	0.0	0.0	0.	0.	4235.2	0.0	0.0
14	13.4	102592.3	0.0	0.0	0.	0.	15388.8	0.0	0.0
15	10.3	77080.0	0.0	0.0	0.	0.	11562.0	0.0	0.0
16	20.3	137760.2	0.0	0.0	0.	0.	20664.0	0.0	0.0
17	24.1	134780.7	0.0	0.0	0.	0.	20217.1	0.0	0.0
18	19.2	68848.8	0.0	0.0	0.	0.	10327.3	0.0	0.0
19	10.7	17960.6	0.0	0.0	0.	0.	2694.1	0.0	0.0
20	7.1	3612.5	0.0	0.0	0.	0.	541.9	0.0	0.0

Mesas East, x-sec 20-20'; Static; buttress w/ 20'd x 62'w key; circular

n:\projects\2000-2499\2023\slopes\t20s2c.pl2 Run By: KPC 7/2/2004 03:06PM



#	FS
a	2.16
b	2.16
c	2.17
d	2.17
e	2.17
f	2.17
g	2.18
h	2.18
i	2.18
j	2.18

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
TQsu	2	125.0	135.0	300.0	31.0	0
TQsu	3	125.0	135.0	300.0	31.0	0
TQsu	4	125.0	135.0	300.0	31.0	0
TQsu	5	125.0	135.0	300.0	31.0	0

GSTABL7 v.2 FSmin=2.16

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No. 48

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 7/2/2004
Time of Run: 03:06PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t20s2c.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t20s2c.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope0s2c.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 20-20'; Static;
buttress w/ 20'd x 62'w key; circular

BOUNDARY COORDINATES
8 Top Boundaries
18 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	30.00	193.00	274.00	197.00	1
2	274.00	197.00	387.00	248.00	1
3	387.00	248.00	407.00	249.00	1
4	407.00	249.00	596.00	311.00	1
5	596.00	311.00	650.00	320.00	5
6	650.00	320.00	726.00	320.00	5
7	726.00	320.00	800.00	290.00	5
8	800.00	290.00	900.00	280.00	5
9	30.00	155.00	270.00	177.00	2
10	270.00	177.00	335.00	177.00	3
11	335.00	177.00	441.00	217.00	3
12	441.00	217.00	490.00	263.00	3
13	490.00	263.00	532.00	279.00	3
14	532.00	279.00	552.00	287.00	4
15	552.00	287.00	596.00	311.00	5
16	552.00	287.00	720.00	0.00	4
17	532.00	279.00	634.00	0.00	3
18	270.00	177.00	309.00	0.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	135.0	300.0	31.0	0.00	0.0	0
3	125.0	135.0	300.0	31.0	0.00	0.0	0
4	125.0	135.0	300.0	31.0	0.00	0.0	0
5	125.0	135.0	300.0	31.0	0.00	0.0	0

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 200.00(ft)
and X = 330.00(ft)
Each Surface Terminates Between X = 530.00(ft)
and X = 700.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation

At Which A Surface Extends Is Y = 0.00(ft)
30.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 0.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 4.024 FS Min = 2.161 FS Ave = 2.991
Standard Deviation = 0.483 Coefficient of Variation = 16.16 %
Failure Surface Specified By 12 Coordinate Points

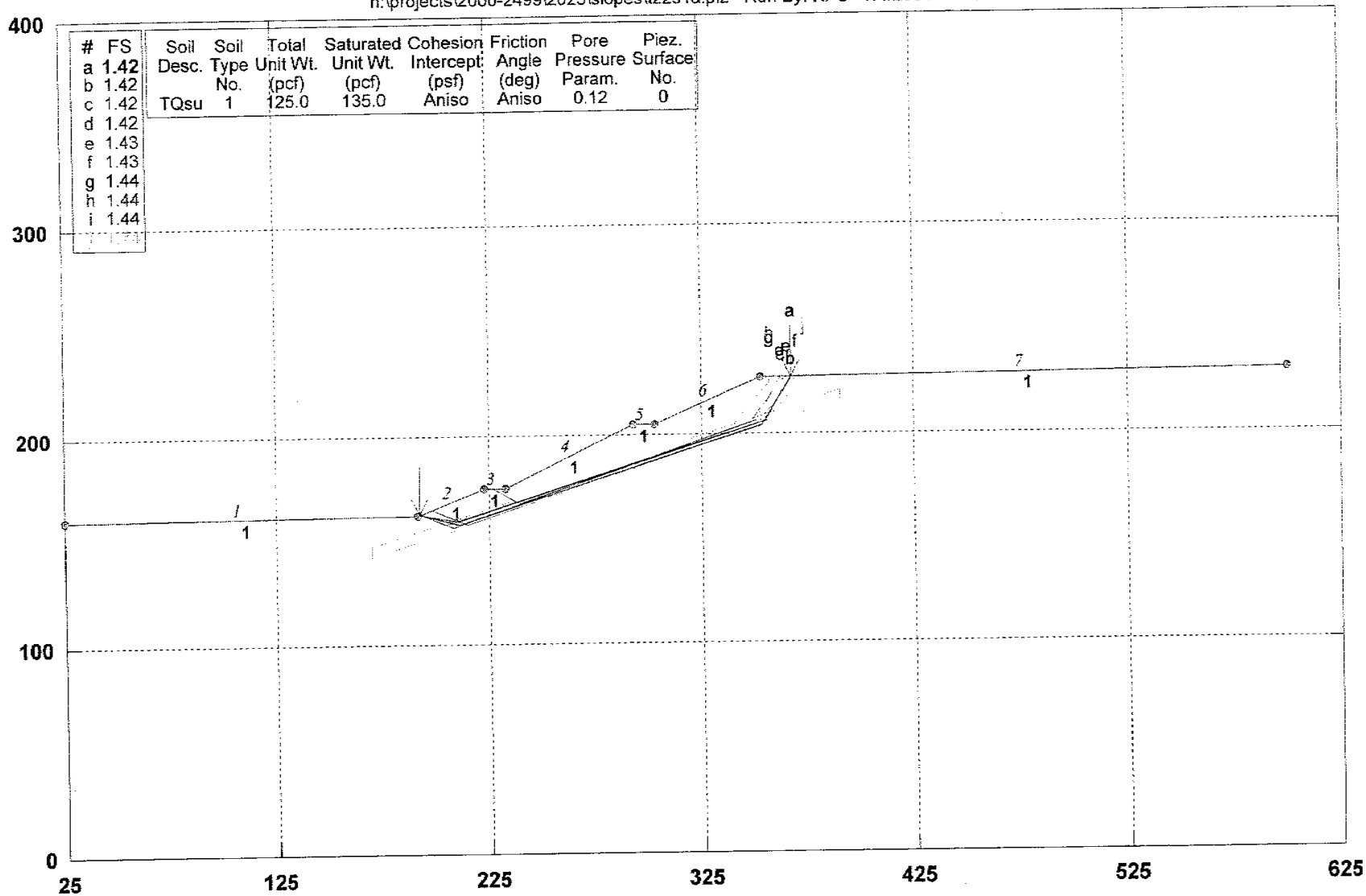
Point No.	X-Surf (ft)	Y-Surf (ft)
1	269.60	196.93
2	299.59	196.56
3	329.54	198.41
4	359.26	202.47
5	388.60	208.71
6	417.40	217.11
7	445.50	227.62
8	472.75	240.17
9	498.99	254.71
10	524.09	271.15
11	547.90	289.40
12	558.25	298.62

Circle Center At X = 289.83 ; Y = 600.02 ; and Radius = 403.60
Factor of Safety
*** 2.161 ***
Individual data on the 19 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	4.4	34.8	0.0	0.0	0.	0.	0.0	0.0	0.0
2	25.6	19386.0	0.0	0.0	0.	0.	0.0	0.0	0.0
3	29.9	66716.2	0.0	0.0	0.	0.	0.0	0.0	0.0
4	29.7	105279.0	0.0	0.0	0.	0.	0.0	0.0	0.0
5	27.7	125938.1	0.0	0.0	0.	0.	0.0	0.0	0.0
6	1.6	7914.3	0.0	0.0	0.	0.	0.0	0.0	0.0
7	18.4	85416.4	0.0	0.0	0.	0.	0.0	0.0	0.0
8	10.4	45657.6	0.0	0.0	0.	0.	0.0	0.0	0.0
9	28.1	121728.7	0.0	0.0	0.	0.	0.0	0.0	0.0
10	13.4	55368.4	0.0	0.0	0.	0.	0.0	0.0	0.0
11	13.9	54307.2	0.0	0.0	0.	0.	0.0	0.0	0.0
12	17.3	61337.6	0.0	0.0	0.	0.	0.0	0.0	0.0
13	9.0	28644.5	0.0	0.0	0.	0.	0.0	0.0	0.0
14	25.1	63883.7	0.0	0.0	0.	0.	0.0	0.0	0.0
15	7.9	14366.9	0.0	0.0	0.	0.	0.0	0.0	0.0
16	0.5	810.2	0.0	0.0	0.	0.	0.0	0.0	0.0
17	4.4	6348.6	0.0	0.0	0.	0.	0.0	0.0	0.0
18	11.0	11346.1	0.0	0.0	0.	0.	0.0	0.0	0.0
19	10.3	3766.6	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 22-22' CS-15; Static; critical surface

n:\projects\2000-2499\2023\slopes\t22s1a.pl2 Run By: KPC 7/1/2004 12:59PM



GSTABL7 v.2 FSmin=1.42

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 49

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 7/1/2004
Time of Run: 12:59PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t22s1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t22s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope2s1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 22-22' CS-15; Static; critical surface

BOUNDARY COORDINATES
7 Top Boundaries
7 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	25.00	160.00	192.00	162.00	1
2	192.00	162.00	223.00	175.00	1
3	223.00	175.00	233.00	175.00	1
4	233.00	175.00	293.00	205.00	1
5	293.00	205.00	303.00	205.00	1
6	303.00	205.00	353.00	227.00	1
7	353.00	227.00	600.00	230.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	17.5	300.00	31.00
2	20.5	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 4 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	25.00	150.00
2	190.00	150.00
3	387.00	218.00
4	600.00	218.00

WATER SURFACE DATA HAS BEEN SUPPRESSED
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	170.00	145.00	240.00	167.00	5.00
2	320.00	195.00	390.00	218.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 2.866 FS Min = 1.422 FS Ave = 1.677
Standard Deviation = 0.243 Coefficient of Variation = 14.51 %
Failure Surface Specified By 4 Coordinate Points

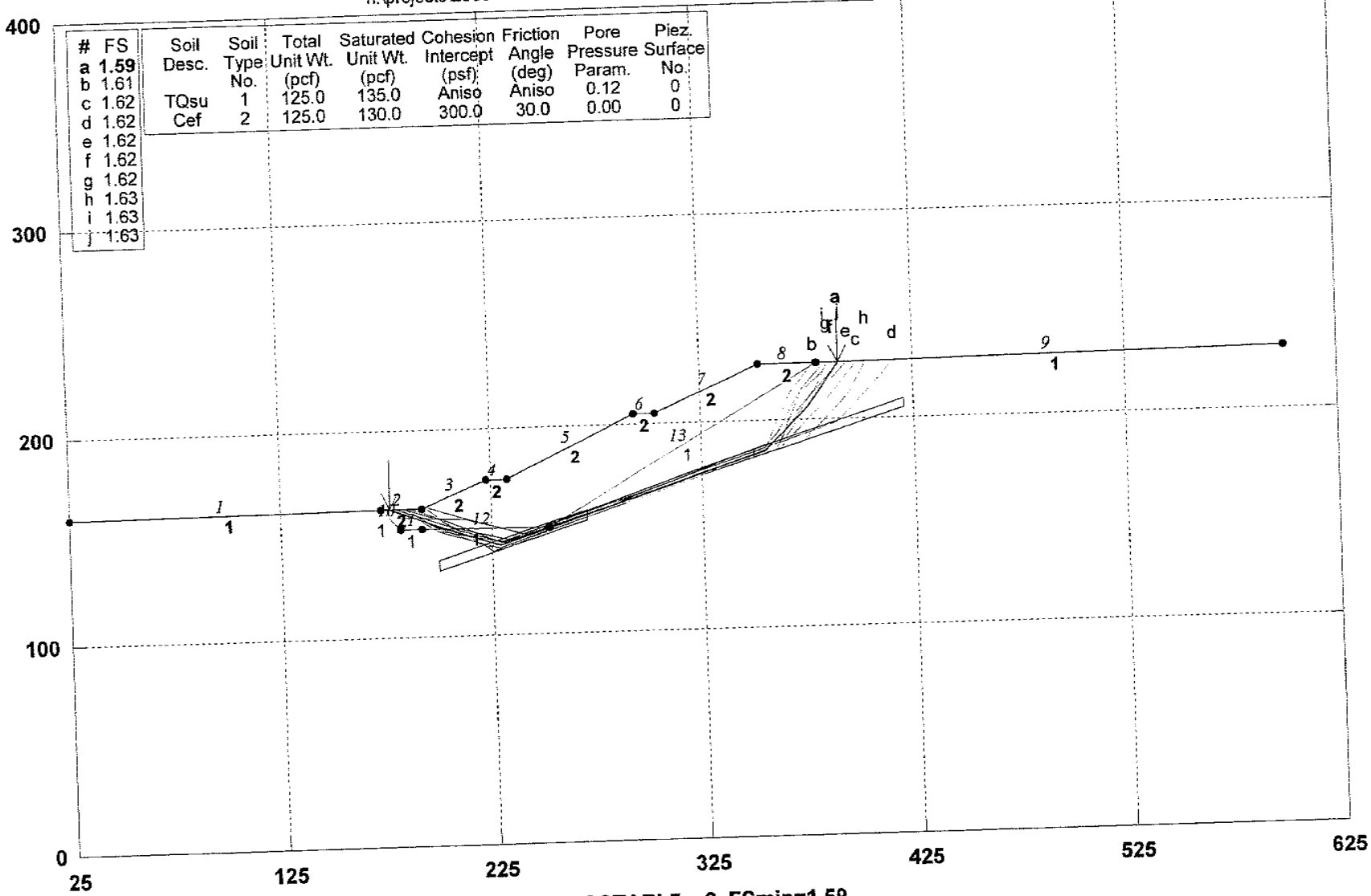
Point No.	X-Surf (ft)	Y-Surf (ft)
1	192.23	162.10
2	211.44	157.70
3	353.47	204.46
4	366.85	227.17

Factor of Safety
*** 1.422 ***
Individual data on the 8 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	19.2	14947.2	0.0	1839.9	0.	0.	0.0	0.0	0.0
2	11.6	18743.4	0.0	2367.9	0.	0.	0.0	0.0	0.0
3	10.0	14806.6	0.0	1870.6	0.	0.	0.0	0.0	0.0
4	60.0	114936.0	0.0	14520.3	0.	0.	0.0	0.0	0.0
5	10.0	23505.4	0.0	2969.5	0.	0.	0.0	0.0	0.0
6	50.0	124560.1	0.0	15736.1	0.	0.	0.0	0.0	0.0
7	0.5	1342.6	0.0	169.6	0.	0.	0.0	0.0	0.0
8	13.4	18849.6	0.0	4457.8	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 22-22' CS-15; static; 10'd x 60'w key and 1.75:1 backcut

n:\projects\2000-2499\2023\slopes\t22s2a.pl2 Run By: KPC 7/1/2004 01:16PM



#	FS
a	1.59
b	1.61
c	1.62
d	1.62
e	1.62
f	1.62
g	1.62
h	1.63
i	1.63
j	1.63

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	Aniso	Aniso	0.12	0
Cef	2	125.0	130.0	300.0	30.0	0.00	0

GSTABL7 v.2 FSmin=1.59

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 50

```
                    *** GSTABL7 ***
          ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*************************************************************************
                SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*************************************************************************
Analysis Run Date:          7/1/2004
Time of Run:                01:16PM
Run By:                     KPC
Input Data Filename:        N:\Projects\2000-2499\2023\Slopes\t22s2a.in
Output Filename:            N:\Projects\2000-2499\2023\Slopes\t22s2a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\2000-2499\2023\Slope2s2a.PLT
PROBLEM DESCRIPTION:  Mesas East, x-sec 22-22' CS-15;
                      static; 10'd x 60'w key
```

BOUNDARY COORDINATES

9 Top Boundaries
13 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	25.00	160.00	172.00	162.00	1
2	172.00	162.00	192.00	162.00	2
3	192.00	162.00	223.00	175.00	2
4	223.00	175.00	233.00	175.00	2
5	233.00	175.00	293.00	205.00	2
6	293.00	205.00	303.00	205.00	2
7	303.00	205.00	353.00	227.00	2
8	353.00	227.00	380.00	227.00	2
9	380.00	227.00	600.00	230.00	1
10	172.00	162.00	182.00	152.00	1
11	182.00	152.00	192.00	152.00	1
12	192.00	152.00	252.00	151.00	1
13	252.00	151.00	380.00	227.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	17.5	300.00	31.00
2	20.5	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:

(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	200.00	134.00	270.00	156.00	5.00
2	350.00	184.00	420.00	207.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 3.289 FS Min = 1.591 FS Ave = 1.868
Standard Deviation = 0.230 Coefficient of Variation = 12.32 %
Failure Surface Specified By 6 Coordinate Points

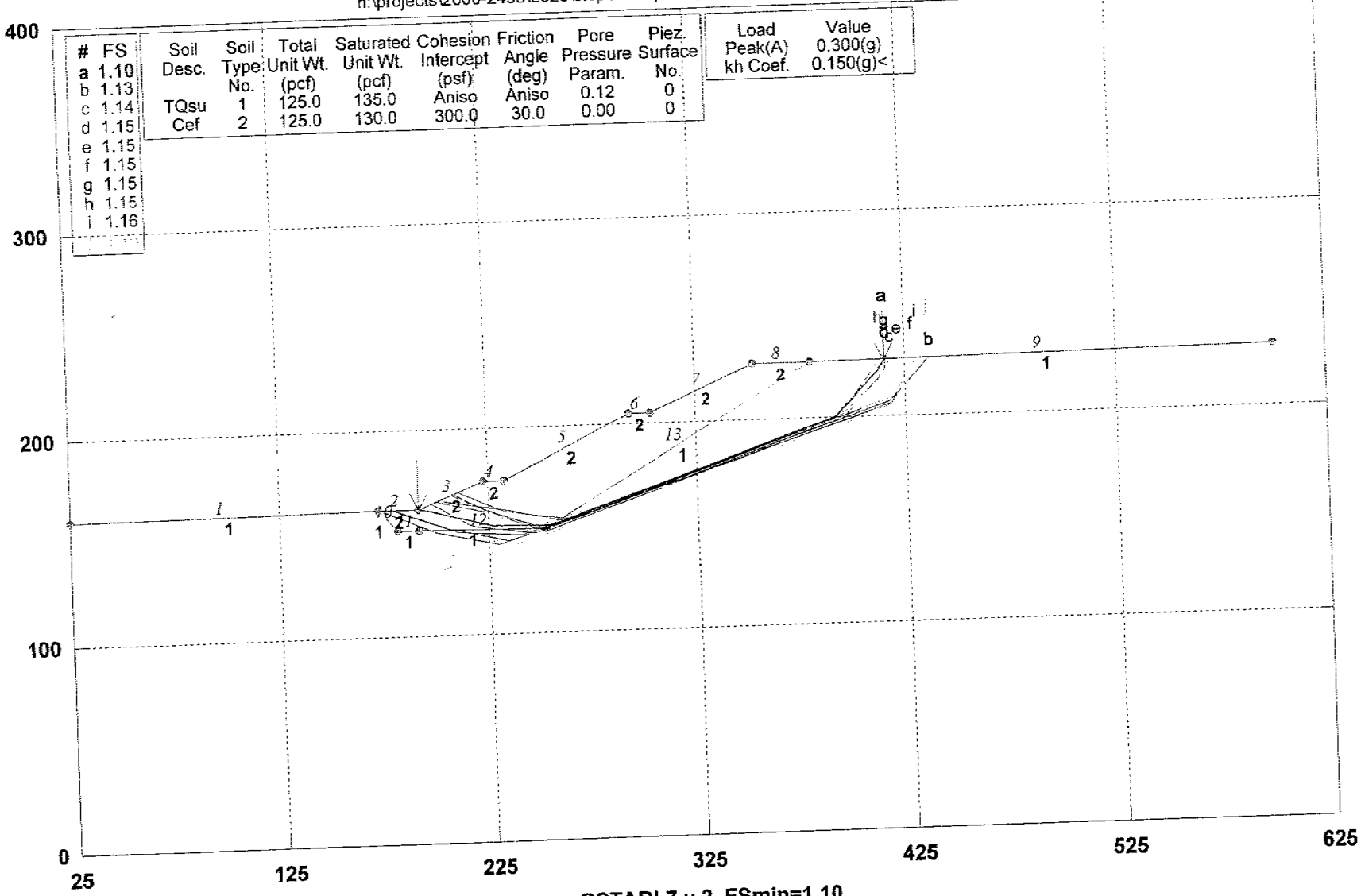
Point No.	X-Surf (ft)	Y-Surf (ft)
1	176.33	162.00
2	200.70	152.02
3	229.36	143.13
4	355.12	184.57
5	375.96	206.16
6	389.99	227.14

Factor of Safety
*** 1.591 ***
Individual data on the 14 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	15.7	6284.8	0.0	0.0	0.	0.	0.0	0.0	0.0
2	8.7	10904.8	0.0	0.0	0.	0.	0.0	0.0	0.0
3	0.6	957.6	0.0	0.0	0.	0.	0.0	0.0	0.0
4	21.7	59705.0	0.0	7501.2	0.	0.	0.0	0.0	0.0
5	6.4	24536.5	0.0	3082.7	0.	0.	0.0	0.0	0.0
6	3.6	14242.2	0.0	1799.4	0.	0.	0.0	0.0	0.0
7	19.0	76682.4	0.0	9688.5	0.	0.	0.0	0.0	0.0
8	41.0	191688.3	0.0	24219.1	0.	0.	0.0	0.0	0.0
9	10.0	49063.2	0.0	6198.9	0.	0.	0.0	0.0	0.0
10	50.0	252286.6	0.0	31875.4	0.	0.	0.0	0.0	0.0
11	2.1	11350.7	0.0	1434.1	0.	0.	0.0	0.0	0.0
12	20.8	82385.6	0.0	14236.2	0.	0.	0.0	0.0	0.0
13	4.0	9008.3	0.0	1943.9	0.	0.	0.0	0.0	0.0
14	10.0	9242.5	0.0	1994.5	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 22-22' CS-15; pseudostatic; 60'w x 10'd key

n:\projects\2000-2499\2023\slopes\t22ps2a.pl2 Run By: KPC 7/1/2004 01:14PM



GSTABL7 v.2 FSmin=1.10

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 51

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 7/1/2004
Time of Run: 01:14PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t22ps2a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t22ps2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope2ps2a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 22-22' CS-15;
pseudostatic; 60'w x 10'd key

BOUNDARY COORDINATES
9 Top Boundaries
13 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	25.00	160.00	172.00	162.00	1
2	172.00	162.00	192.00	162.00	2
3	192.00	162.00	223.00	175.00	2
4	223.00	175.00	233.00	175.00	2
5	233.00	175.00	293.00	205.00	2
6	293.00	205.00	303.00	205.00	2
7	303.00	205.00	353.00	227.00	2
8	353.00	227.00	380.00	227.00	2
9	380.00	227.00	600.00	230.00	1
10	172.00	162.00	182.00	152.00	1
11	182.00	152.00	192.00	152.00	1
12	192.00	152.00	252.00	151.00	1
13	252.00	151.00	380.00	227.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	400.0	38.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	17.5	400.00	38.00
2	20.5	200.00	20.00
3	90.0	400.00	38.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)

Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	200.00	134.00	270.00	156.00	5.00
2	350.00	184.00	420.00	207.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 2.570 FS Min = 1.103 FS Ave = 1.381
Standard Deviation = 0.229 Coefficient of Variation = 16.57 %
Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	192.10	162.04
2	196.89	160.70
3	225.92	153.16
4	255.91	152.47
5	391.80	200.13
6	412.48	221.86
7	415.17	227.48

Factor of Safety
*** 1.103 ***
Individual data on the 13 slices

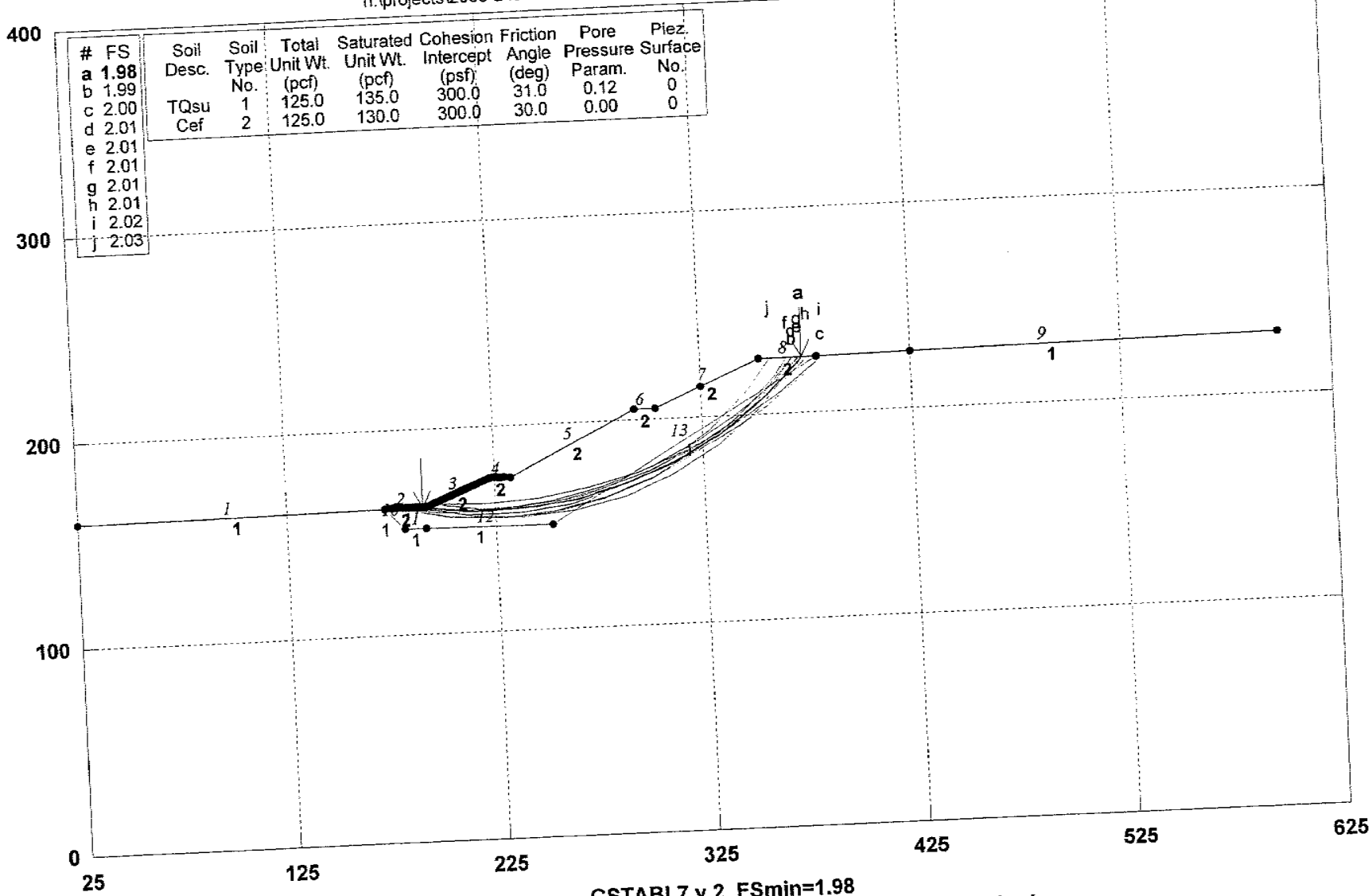
Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	4.8	1002.2	0.0	0.0	0.	0.	150.3	0.0	0.0
2	26.1	39885.0	0.0	0.0	0.	0.	5982.8	0.0	0.0
3	2.9	7839.0	0.0	0.0	0.	0.	1175.9	0.0	0.0
4	7.1	19400.0	0.0	0.0	0.	0.	2910.0	0.0	0.0
5	21.5	74355.7	0.0	0.0	0.	0.	11153.4	0.0	0.0
6	1.4	5837.2	0.0	700.6	0.	0.	875.6	0.0	0.0
7	37.1	170397.5	0.0	21669.1	0.	0.	25559.6	0.0	0.0
8	10.0	47213.3	0.0	6004.0	0.	0.	7082.0	0.0	0.0
9	50.0	239049.7	0.0	30399.4	0.	0.	35857.5	0.0	0.0
10	27.0	120635.5	0.0	15340.9	0.	0.	18095.3	0.0	0.0
11	11.8	42795.5	0.0	5442.2	0.	0.	6419.3	0.0	0.0
12	20.7	42158.1	0.0	7338.1	0.	0.	6323.7	0.0	0.0
13	2.7	940.3	0.0	260.9	0.	0.	141.0	0.0	0.0

Mesas East, x-sec 22-22' CS-15; Static; 10'd x 60'w key; circular

n:\projects\2000-2499\2023\slopes\t22s3a.pl2 Run By: KPC 7/2/2004 03:09PM

#	FS
a	**1.98**
b	1.99
c	2.00
d	2.01
e	2.01
f	2.01
g	2.01
h	2.01
i	2.02
j	2.03

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	300.0	31.0	0.12	0
Cef	2	125.0	130.0	300.0	30.0	0.00	0



GSTABL7 v.2 FSmin=1.98

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 52

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
(All Rights Reserved-Unauthorized Use Prohibited)
****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date: 7/2/2004
Time of Run: 03:09PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t22s3a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t22s3a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope2s3a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 22-22' CS-15; Static;
10'd x 60'w key; circular

BOUNDARY COORDINATES
9 Top Boundaries
13 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	25.00	160.00	172.00	162.00	1
2	172.00	162.00	192.00	162.00	2
3	192.00	162.00	223.00	175.00	2
4	223.00	175.00	233.00	175.00	2
5	233.00	175.00	293.00	205.00	2
6	293.00	205.00	303.00	205.00	2
7	303.00	205.00	353.00	227.00	2
8	353.00	227.00	380.00	227.00	2
9	380.00	227.00	600.00	230.00	1
10	172.00	162.00	182.00	152.00	1
11	182.00	152.00	192.00	152.00	1
12	192.00	152.00	252.00	151.00	1
13	252.00	151.00	380.00	227.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 175.00(ft)
and X = 230.00(ft)
Each Surface Terminates Between X = 325.00(ft)
and X = 425.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
25.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -42.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *

Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 3.610 FS Min = 1.982 FS Ave = 2.620
Standard Deviation = 0.388 Coefficient of Variation = 14.81 %
Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	190.00	162.00
2	214.82	159.02
3	239.82	159.26
4	264.58	162.71
5	288.69	169.33
6	311.75	178.98
7	333.37	191.53
8	353.20	206.75
9	370.91	224.40
10	372.92	227.00

Circle Center At X = 225.52 ; Y = 351.92 ; and Radius = 193.21

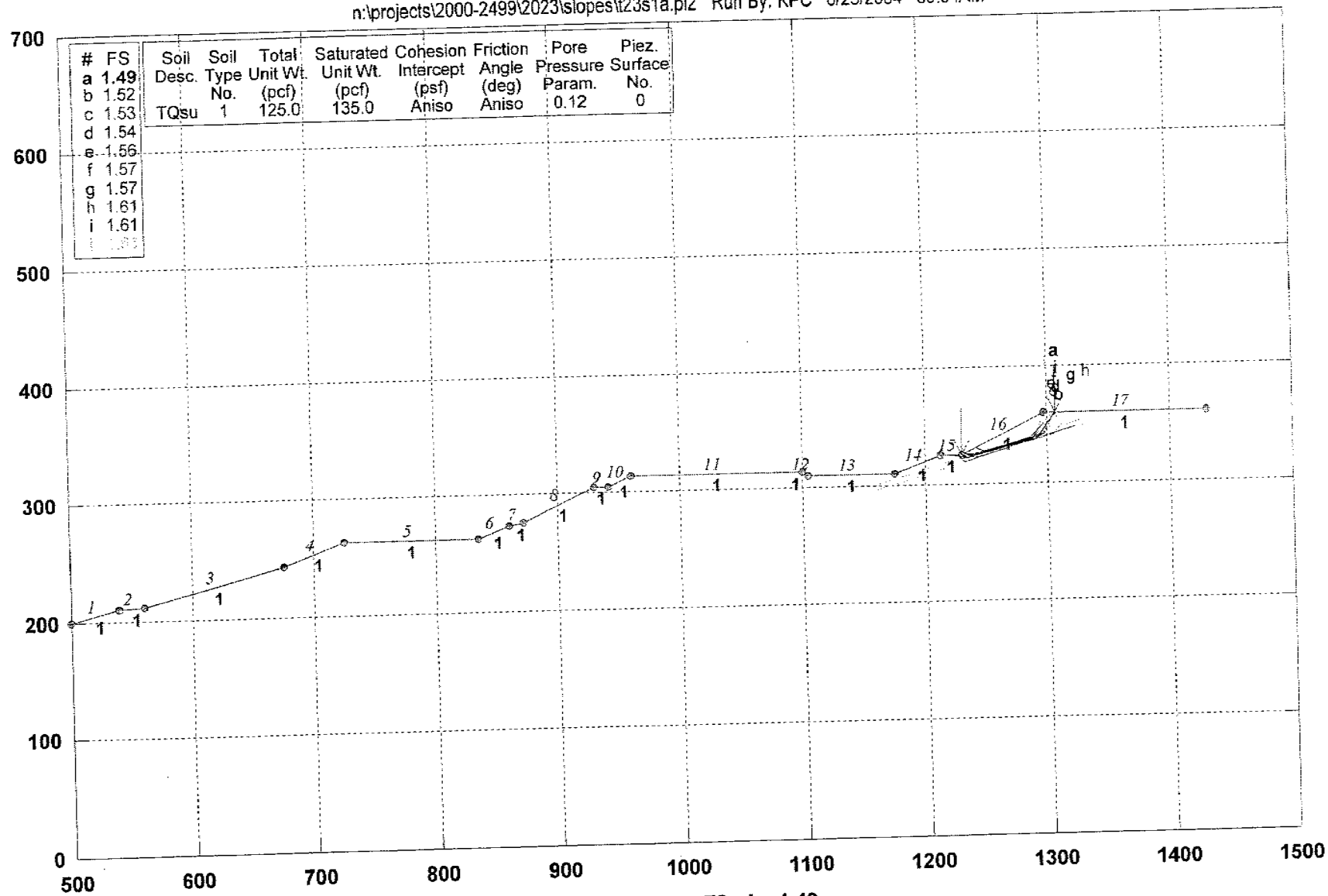
Factor of Safety
*** 1.982 ***

Individual data on the 17 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	2.0	30.0	0.0	0.0	0.	0.	0.0	0.0	0.0
2	22.8	18243.3	0.0	0.0	0.	0.	0.0	0.0	0.0
3	8.2	14542.4	0.0	0.0	0.	0.	0.0	0.0	0.0
4	10.0	19816.7	0.0	0.0	0.	0.	0.0	0.0	0.0
5	6.8	14901.7	0.0	0.0	0.	0.	0.0	0.0	0.0
6	24.8	73085.0	0.0	0.0	0.	0.	0.0	0.0	0.0
7	13.3	49101.1	0.0	0.0	0.	0.	0.0	0.0	0.0
8	10.8	43717.8	0.0	5439.8	0.	0.	0.0	0.0	0.0
9	4.3	18149.4	0.0	2361.3	0.	0.	0.0	0.0	0.0
10	10.0	39719.4	0.0	5167.6	0.	0.	0.0	0.0	0.0
11	8.7	32563.7	0.0	4236.6	0.	0.	0.0	0.0	0.0
12	21.6	76632.2	0.0	10631.4	0.	0.	0.0	0.0	0.0
13	19.6	57943.9	0.0	8766.0	0.	0.	0.0	0.0	0.0
14	0.2	518.5	0.0	78.4	0.	0.	0.0	0.0	0.0
15	10.8	20019.6	0.0	3391.9	0.	0.	0.0	0.0	0.0
16	6.9	5261.0	0.0	0.0	0.	0.	0.0	0.0	0.0
17	2.0	326.0	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 23-23' CS-28b; static; critical bedding plane

n:\projects\2000-2499\2023\slopes\t23s1a.pl2 Run By: KPC 6/25/2004 09:04AM



GSTABL7 v.2 FSmin=1.49

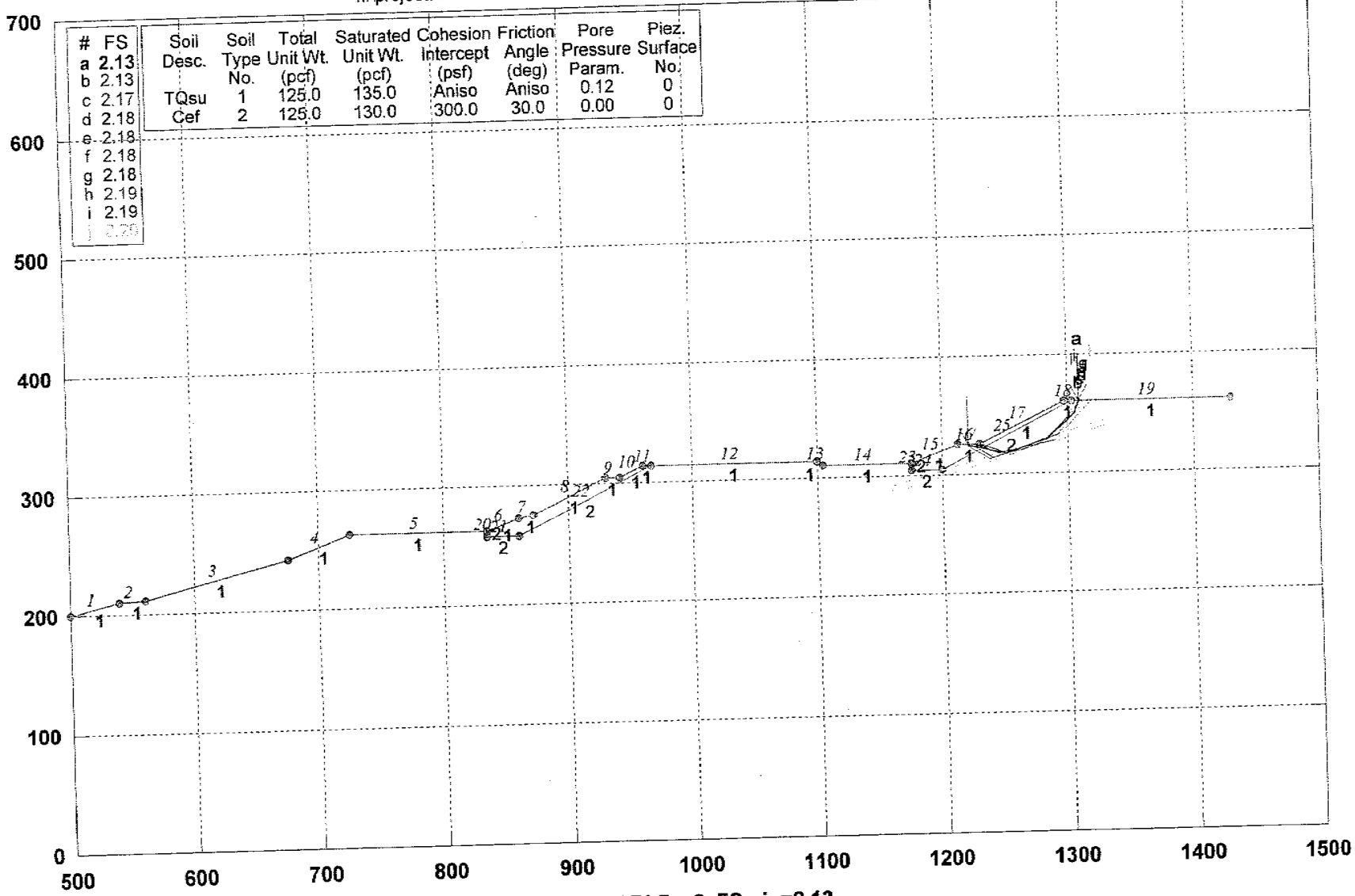
Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 53

Mesas East, x-sec 23-23' CS-28b; static; buttress w/ 5'd x 25'w keyway and 1.75:1 backcut

n:\projects\2000-2499\2023\slopes\t23s1d.pl2 Run By: KPC 6/25/2004 09:06AM



#	FS
a	2.13
b	2.13
c	2.17
d	2.18
e	2.18
f	2.18
g	2.18
h	2.19
i	2.19
j	2.20

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	Aniso	Aniso	0.12	0
Cef	2	125.0	130.0	300.0	30.0	0.00	0

GSTABL7 v.2 FSmin=2.13

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 54

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 7/1/2004
Time of Run: 08:33AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t23s1d.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t23s1d.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope3s1d.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 23-23 CS-28b; static;
buttress with 5'd x 25'w key

BOUNDARY COORDINATES
19 Top Boundaries
25 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	500.00	200.00	540.00	210.00	1
2	540.00	210.00	560.00	211.00	1
3	560.00	211.00	675.00	243.00	1
4	675.00	243.00	725.00	263.00	1
5	725.00	263.00	835.00	263.00	1
6	835.00	263.00	860.00	273.00	1
7	860.00	273.00	872.00	275.00	1
8	872.00	275.00	930.00	305.00	1
9	930.00	305.00	942.00	305.00	1
10	942.00	305.00	960.00	314.00	1
11	960.00	314.00	967.00	314.00	1
12	967.00	314.00	1100.00	314.00	1
13	1100.00	314.00	1104.00	310.00	1
14	1104.00	310.00	1175.00	310.00	1
15	1175.00	310.00	1213.00	325.00	1
16	1213.00	325.00	1230.00	325.00	1
17	1230.00	325.00	1298.00	360.00	1
18	1298.00	360.00	1303.00	360.00	1
19	1303.00	360.00	1430.00	360.00	1
20	834.99	258.00	835.00	263.00	2
21	834.99	258.00	860.00	258.00	2
22	860.00	258.00	967.00	314.00	2
23	1174.99	305.00	1175.00	310.00	2
24	1174.99	305.00	1200.00	305.00	2
25	1200.00	305.00	1303.00	360.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	15.0	300.00	31.00

2	18.0	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	500.00	99.00
2	1430.00	107.00

WATER SURFACE DATA HAS BEEN SUPPRESSED
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	1160.00	289.00	1260.00	320.00	5.00
2	1280.00	326.00	1330.00	342.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 5.718 FS Min = 2.132 FS Ave = 2.702
Standard Deviation = 0.422 Coefficient of Variation = 15.60 %
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1220.61	325.00
2	1221.57	324.35
3	1250.81	317.66
4	1284.07	328.68
5	1305.26	349.93
6	1309.21	360.00

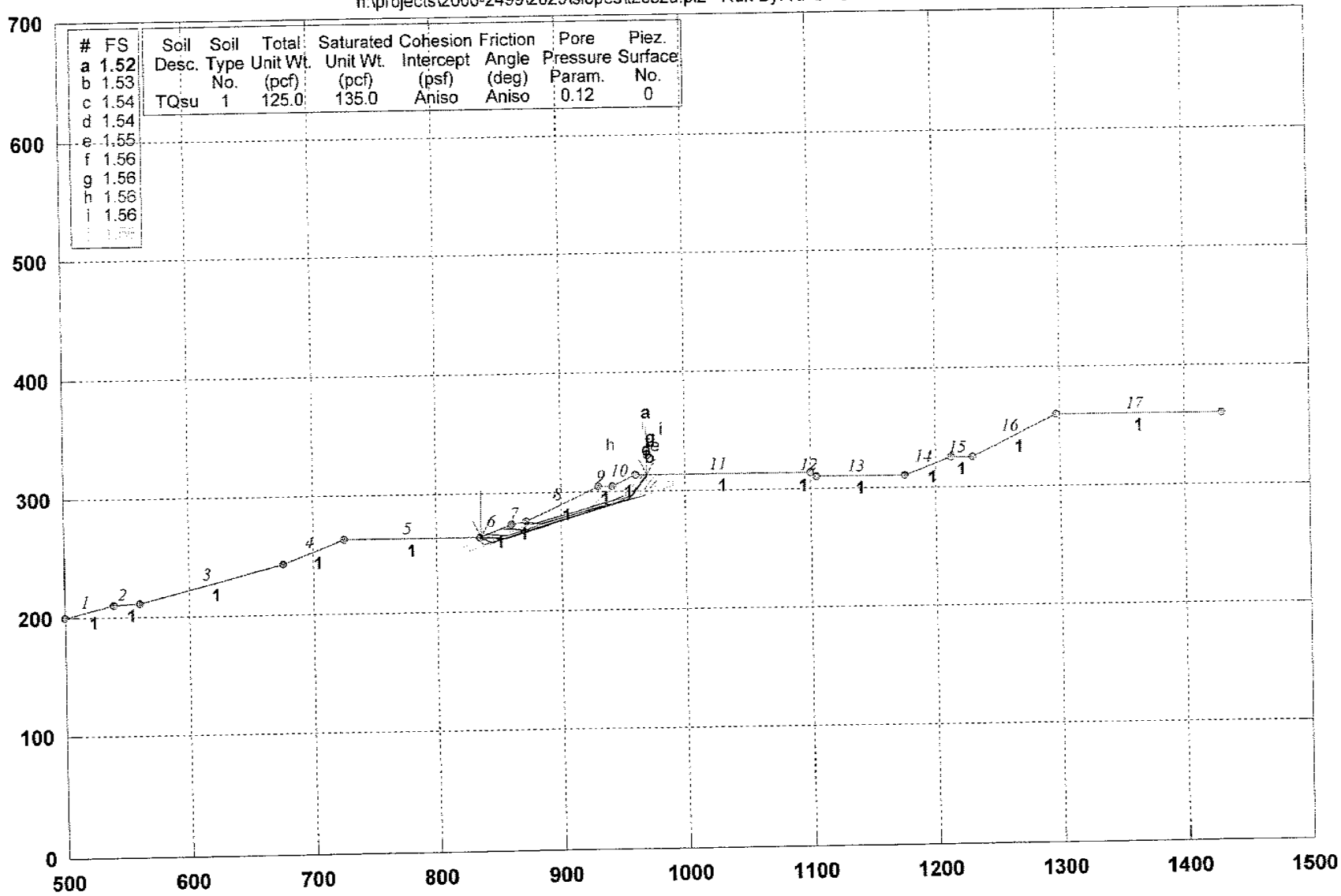
Factor of Safety
*** 2.132 ***

Individual data on the 9 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	1.0	39.0	0.0	5.7	0.	0.	0.0	0.0	0.0
2	8.4	1700.6	0.0	209.4	0.	0.	0.0	0.0	0.0
3	1.8	749.2	0.0	92.2	0.	0.	0.0	0.0	0.0
4	19.0	26095.6	0.0	0.0	0.	0.	0.0	0.0	0.0
5	33.3	87733.8	0.0	0.0	0.	0.	0.0	0.0	0.0
6	13.9	36120.9	0.0	0.0	0.	0.	0.0	0.0	0.0
7	5.0	9278.6	0.0	0.0	0.	0.	0.0	0.0	0.0
8	2.3	3164.0	0.0	537.7	0.	0.	0.0	0.0	0.0
9	3.9	2484.7	0.0	817.5	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 23-23', CS-27; critical plane; static

n:\projects\2000-2499\2023\slopes\t23s2a.pl2 Run By: KPC 6/25/2004 09:22AM



GSTABL7 v.2 FSmin=1.52

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 55

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:          6/25/2004
Time of Run:                09:22AM
Run By:                     KPC
Input Data Filename:        N:\Projects\2000-2499\2023\Slopes\t23s2a.in
Output Filename:            N:\Projects\2000-2499\2023\Slopes\t23s2a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\2000-2499\2023\Slope3s2a.PLT
PROBLEM DESCRIPTION:  Mesas East, x-sec 23-23', CS-27;
                      critical plane; static

BOUNDARY COORDINATES
   17 Top   Boundaries
   17 Total Boundaries
Boundary     X-Left     Y-Left     X-Right     Y-Right     Soil Type
```

No.	(ft)	(ft)	(ft)	(ft)	Below Bnd
1	500.00	200.00	540.00	210.00	1
2	540.00	210.00	560.00	211.00	1
3	560.00	211.00	675.00	243.00	1
4	675.00	243.00	725.00	263.00	1
5	725.00	263.00	835.00	263.00	1
6	835.00	263.00	860.00	273.00	1
7	860.00	273.00	872.00	275.00	1
8	872.00	275.00	930.00	305.00	1
9	930.00	305.00	942.00	305.00	1
10	942.00	305.00	960.00	314.00	1
11	960.00	314.00	1100.00	314.00	1
12	1100.00	314.00	1104.00	310.00	1
13	1104.00	310.00	1175.00	310.00	1
14	1175.00	310.00	1213.00	325.00	1
15	1213.00	325.00	1230.00	325.00	1
16	1230.00	325.00	1298.00	360.00	1
17	1298.00	360.00	1430.00	360.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	15.0	300.00	31.00
2	18.0	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	820.00	252.00	895.00	276.00	5.00
2	920.00	283.00	990.00	307.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 4.326 FS Min = 1.515 FS Ave = 2.071
Standard Deviation = 0.414 Coefficient of Variation = 19.97 %
Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

1	835.46	263.19
2	856.58	261.49
3	955.06	292.65
4	969.19	314.00

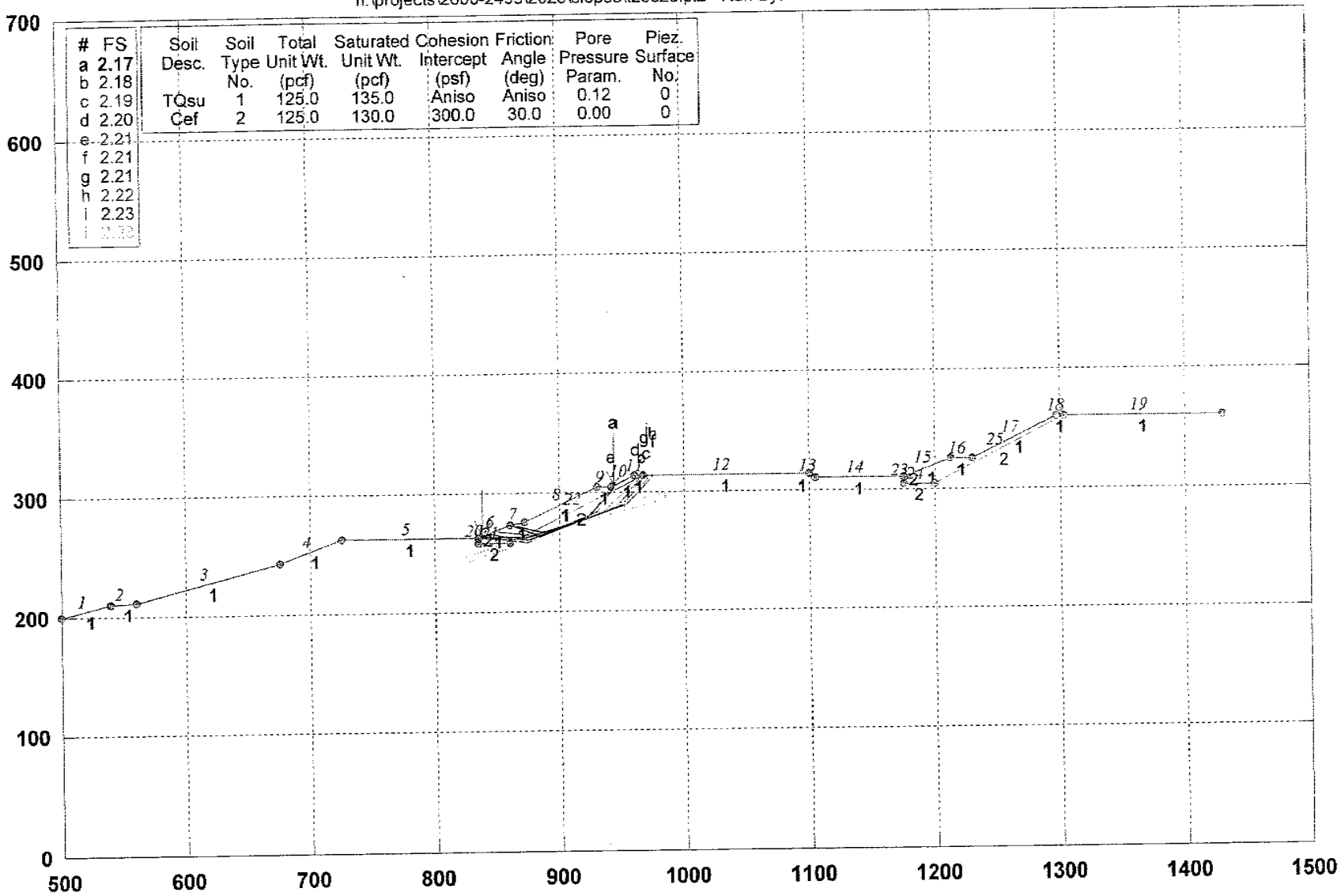
Factor of Safety
*** 1.515 ***

Individual data on the 8 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	21.1	13382.3	0.0	1611.0	0.	0.	0.0	0.0	0.0
2	3.4	4396.0	0.0	553.3	0.	0.	0.0	0.0	0.0
3	12.0	14291.4	0.0	1798.8	0.	0.	0.0	0.0	0.0
4	58.0	104795.6	0.0	13189.8	0.	0.	0.0	0.0	0.0
5	12.0	27572.3	0.0	3470.3	0.	0.	0.0	0.0	0.0
6	13.1	28876.1	0.0	3634.4	0.	0.	0.0	0.0	0.0
7	4.9	10110.8	0.0	2198.3	0.	0.	0.0	0.0	0.0
8	9.2	7983.5	0.0	1735.8	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 23-23' CS-27; static; buttress w/5'd x 25'w keyway

n:\projects\2000-2499\2023\slopes\t23s2d.pl2 Run By: KPC 6/25/2004 09:10AM



#	FS
a	2.17
b	2.18
c	2.19
d	2.20
e	2.21
f	2.21
g	2.21
h	2.22
i	2.23

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	Aniso	Aniso	0.12	0
Cef	2	125.0	130.0	300.0	30.0	0.00	0

GSTABL7 v.2 FSmin=2.17

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 56

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/25/2004
Time of Run: 09:10AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t23s2d.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t23s2d.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope3s2d.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 23-23' CS-27; static; buttress w/5'd x 25'w keyway

BOUNDARY COORDINATES
19 Top Boundaries
25 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	500.00	200.00	540.00	210.00	1
2	540.00	210.00	560.00	211.00	1
3	560.00	211.00	675.00	243.00	1
4	675.00	243.00	725.00	263.00	1
5	725.00	263.00	835.00	263.00	1
6	835.00	263.00	860.00	273.00	1
7	860.00	273.00	872.00	275.00	1
8	872.00	275.00	930.00	305.00	1
9	930.00	305.00	942.00	305.00	1
10	942.00	305.00	960.00	314.00	1
11	960.00	314.00	967.00	314.00	1
12	967.00	314.00	1100.00	314.00	1
13	1100.00	314.00	1104.00	310.00	1
14	1104.00	310.00	1175.00	310.00	1
15	1175.00	310.00	1213.00	325.00	1
16	1213.00	325.00	1230.00	325.00	1
17	1230.00	325.00	1298.00	360.00	1
18	1298.00	360.00	1303.00	360.00	1
19	1303.00	360.00	1430.00	360.00	1
20	834.99	258.00	835.00	263.00	2
21	834.99	258.00	860.00	258.00	2
22	860.00	258.00	967.00	314.00	2
23	1174.99	305.00	1175.00	310.00	2
24	1174.99	305.00	1200.00	305.00	2
25	1200.00	305.00	1303.00	360.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	15.0	300.00	31.00

2	18.0	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	185.00	93.00
2	1430.00	107.00

WATER SURFACE DATA HAS BEEN SUPPRESSED
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	820.00	243.00	895.00	268.00	5.00
2	920.00	278.00	985.00	297.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 4.436 FS Min = 2.173 FS Ave = 2.603
Standard Deviation = 0.322 Coefficient of Variation = 12.38 %
Failure Surface Specified By 6 Coordinate Points

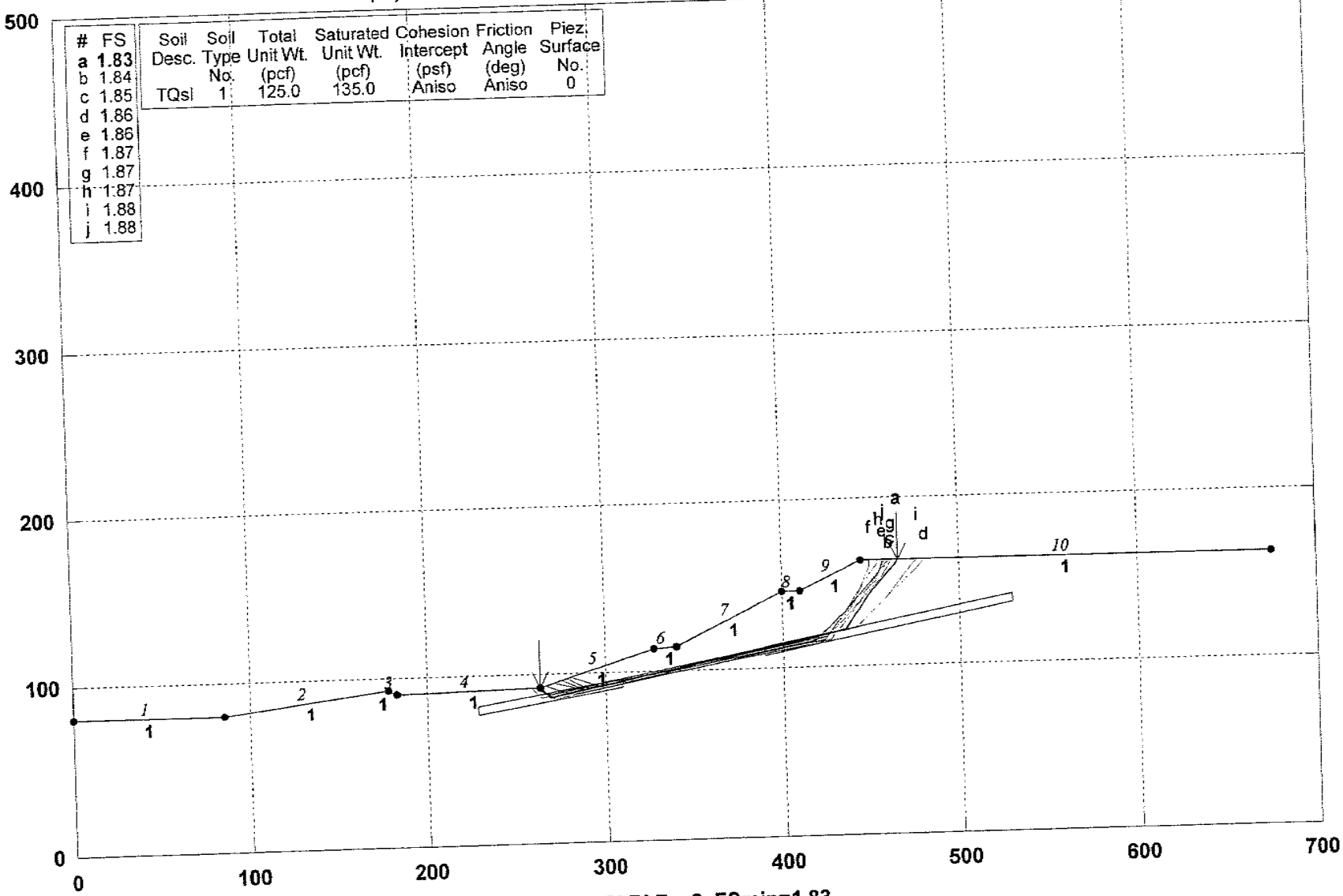
Point No.	X-Surf (ft)	Y-Surf (ft)
1	838.54	264.41
2	844.45	262.62
3	874.45	262.55
4	921.33	277.91
5	941.44	300.17
6	944.30	306.15

Factor of Safety
*** 2.173 ***
Individual data on the 11 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	5.9	1537.0	0.0	192.7	0.	0.	0.0	0.0	0.0
2	15.5	14162.8	0.0	1699.5	0.	0.	0.0	0.0	0.0
3	8.7	12156.4	0.0	1458.8	0.	0.	0.0	0.0	0.0
4	3.3	4987.9	0.0	0.0	0.	0.	0.0	0.0	0.0
5	2.5	4007.6	0.0	0.0	0.	0.	0.0	0.0	0.0
6	46.9	106418.2	0.0	0.0	0.	0.	0.0	0.0	0.0
7	8.7	21730.0	0.0	0.0	0.	0.	0.0	0.0	0.0
8	11.4	15963.6	0.0	0.0	0.	0.	0.0	0.0	0.0
9	0.3	163.8	0.0	0.0	0.	0.	0.0	0.0	0.0
10	0.3	132.4	0.0	36.8	0.	0.	0.0	0.0	0.0
11	2.3	526.8	0.0	146.6	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 24-24' CS-28b; static;bedding plane search

n:\projects\2000-2499\2023\slopes\t24s1a.pl2 Run By: KPC 6/18/2004 03:43PM



GSTABL7 v.2 FSmin=1.83

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 57

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/18/2004
Time of Run: 03:43PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t24s1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t24s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope4s1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 24-24' CS-28b; static; bedding plane search

BOUNDARY COORDINATES
10 Top Boundaries
10 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	80.00	85.00	80.00	1
2	85.00	80.00	178.00	93.00	1
3	178.00	93.00	183.00	90.00	1
4	183.00	90.00	263.00	92.00	1
5	263.00	92.00	327.00	113.00	1
6	327.00	113.00	340.00	114.00	1
7	340.00	114.00	400.00	145.00	1
8	400.00	145.00	410.00	145.00	1
9	410.00	145.00	445.00	163.00	1
10	445.00	163.00	675.00	163.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	500.0	35.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	9.5	500.00	35.00
2	12.5	200.00	20.00
3	90.0	500.00	35.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of

Sliding Block Is 25.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	229.00	79.00	310.00	94.00	5.00
2	390.00	110.00	530.00	138.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 4.591 FS Min = 1.830 FS Ave = 2.255
Standard Deviation = 0.286 Coefficient of Variation = 12.69 %
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	263.04	92.01
2	269.14	85.98
3	434.97	121.19
4	449.15	141.79
5	464.86	161.23
6	465.48	163.00

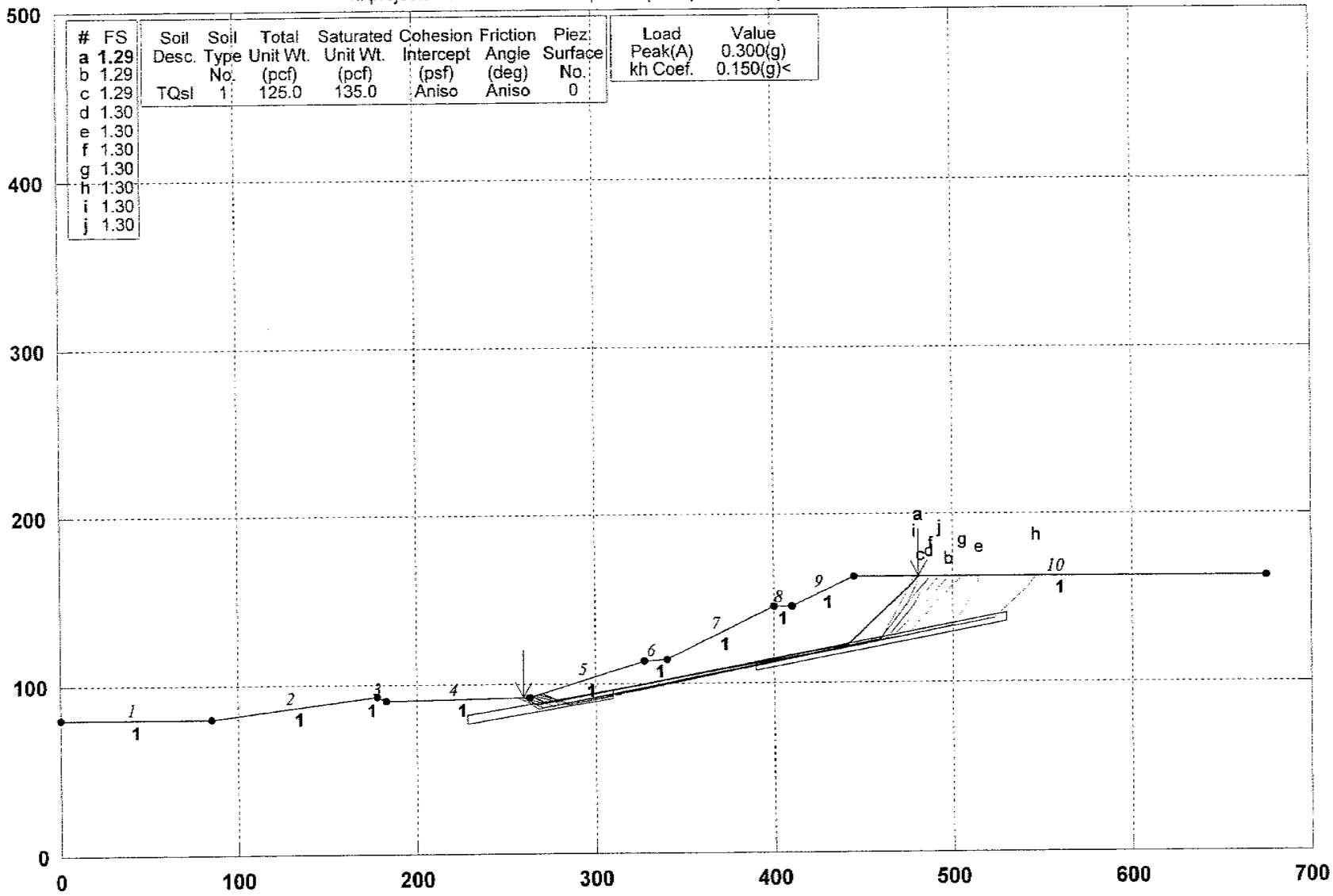
Factor of Safety
*** 1.830 ***

Individual data on the 10 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	6.1	3062.9	0.0	0.0	0.	0.	0.0	0.0	0.0
2	57.9	82352.0	0.0	0.0	0.	0.	0.0	0.0	0.0
3	13.0	22514.8	0.0	0.0	0.	0.	0.0	0.0	0.0
4	60.0	165783.0	0.0	0.0	0.	0.	0.0	0.0	0.0
5	10.0	37715.1	0.0	0.0	0.	0.	0.0	0.0	0.0
6	25.0	102635.3	0.0	0.0	0.	0.	0.0	0.0	0.0
7	10.0	40042.5	0.0	0.0	0.	0.	0.0	0.0	0.0
8	4.1	12557.0	0.0	0.0	0.	0.	0.0	0.0	0.0
9	15.7	22566.8	0.0	0.0	0.	0.	0.0	0.0	0.0
10	0.6	68.6	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 24-24' CS-28b; pseudostatic; bedding plane search

n:\projects\2000-2499\2023\slopes\t24ps1a.pl2 Run By: KPC 6/18/2004 03:45PM



GSTABL7 v.2 FSmin=1.29

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 58

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/18/2004
Time of Run: 03:45PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t24psla.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t24psla.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope4psla.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 24-24' CS-28b;
pseudostatic; bedding plane search

BOUNDARY COORDINATES
10 Top Boundaries
10 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	80.00	85.00	80.00	1
2	85.00	80.00	178.00	93.00	1
3	178.00	93.00	183.00	90.00	1
4	183.00	90.00	263.00	92.00	1
5	263.00	92.00	327.00	113.00	1
6	327.00	113.00	340.00	114.00	1
7	340.00	114.00	400.00	145.00	1
8	400.00	145.00	410.00	145.00	1
9	410.00	145.00	445.00	163.00	1
10	445.00	163.00	675.00	163.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	600.0	38.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	9.5	600.00	38.00
2	12.5	200.00	20.00
3	90.0	600.00	38.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 25.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	229.00	79.00	310.00	94.00	5.00
2	390.00	110.00	530.00	138.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 2.754 FS Min = 1.288 FS Ave = 1.486
Standard Deviation = 0.193 Coefficient of Variation = 12.96 %
Failure Surface Specified By 6 Coordinate Points

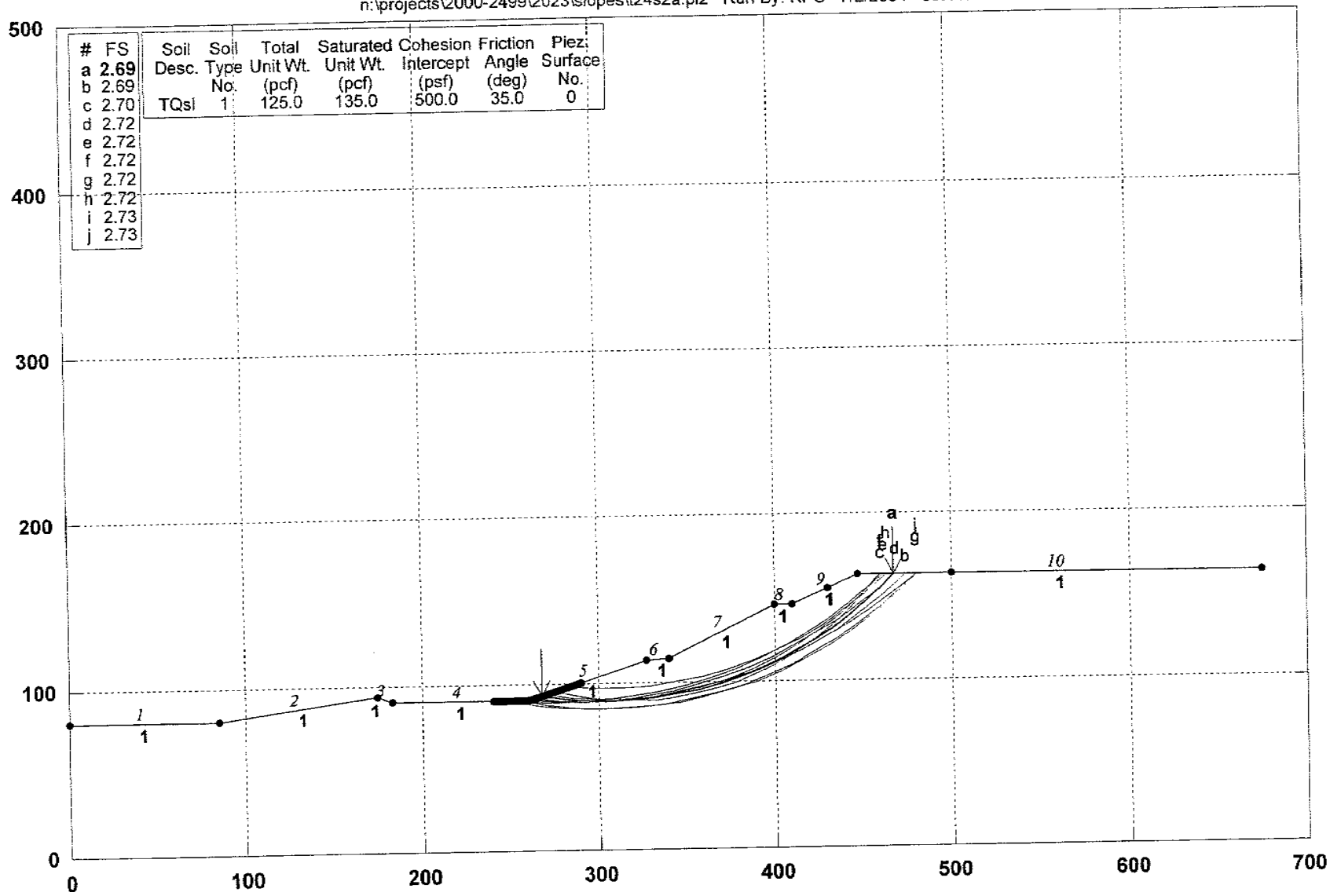
Point No.	X-Surf (ft)	Y-Surf (ft)
1	260.02	91.93
2	267.66	88.15
3	441.43	121.93
4	458.74	139.97
5	476.41	157.66
6	481.29	163.00

Factor of Safety
*** 1.288 ***
Individual data on the 11 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	3.0	289.3	0.0	0.0	0.	0.	43.4	0.0	0.0
2	4.7	2017.5	0.0	0.0	0.	0.	302.6	0.0	0.0
3	59.3	69357.2	0.0	0.0	0.	0.	10403.6	0.0	0.0
4	13.0	20399.9	0.0	0.0	0.	0.	3060.0	0.0	0.0
5	60.0	160934.0	0.0	0.0	0.	0.	24140.1	0.0	0.0
6	10.0	37691.9	0.0	0.0	0.	0.	5653.8	0.0	0.0
7	31.4	134405.4	0.0	0.0	0.	0.	20160.8	0.0	0.0
8	3.6	17079.7	0.0	0.0	0.	0.	2562.0	0.0	0.0
9	13.7	51860.2	0.0	0.0	0.	0.	7779.0	0.0	0.0
10	17.7	31335.4	0.0	0.0	0.	0.	4700.3	0.0	0.0
11	4.9	1628.8	0.0	0.0	0.	0.	244.3	0.0	0.0

Mesas East, x-sec 24-24' CS-28b; static;circular

n:\projects\2000-2499\2023\slopes\t24s2a.pl2 Run By: KPC 7/2/2004 03:11PM



GSTABL7 v.2 FSmin=2.69

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No. 59

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*****************************************************************************
Analysis Run Date:          7/2/2004
Time of Run:                03:11PM
Run By:                     KPC
Input Data Filename:        N:\Projects\2000-2499\2023\Slopes\t24s2a.in
Output Filename:            N:\Projects\2000-2499\2023\Slopes\t24s2a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\2000-2499\2023\Slope4s2a.PLT
PROBLEM DESCRIPTION:  Mesas East, x-sec 24-24' CS-28b; static;
                      circular
BOUNDARY COORDINATES
   10 Top   Boundaries
   10 Total Boundaries
Boundary     X-Left      Y-Left     X-Right     Y-Right     Soil Type
   No.        (ft)        (ft)        (ft)        (ft)     Below Bnd
    1         0.00       80.00       85.00       80.00         1
    2        85.00       80.00      175.00       94.00         1
    3       175.00       94.00      183.00       90.00         1
    4       183.00       90.00      260.00       90.00         1
    5       260.00       90.00      327.00      113.00         1
    6       327.00      113.00      340.00      114.00         1
    7       340.00      114.00      400.00      145.00         1
    8       400.00      145.00      410.00      145.00         1
    9       410.00      145.00      447.00      163.00         1
   10       447.00      163.00      675.00      163.00         1
 Default Y-Origin = 0.00(ft)
 Default X-Plus Value = 0.00(ft)
 Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  1 Type(s) of Soil
 Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
 Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
  No.  (pcf)    (pcf)     (psf)     (deg)    Param.    (psf)     No.
   1   125.0    135.0    500.0      35.0    0.00       0.0       0
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Circular Surfaces, Has Been Specified.
  500 Trial Surfaces Have Been Generated.
   10 Surface(s) Initiate(s) From Each Of    50 Points Equally Spaced
 Along The Ground Surface Between  X = 240.00(ft)
                              and  X = 290.00(ft)
 Each Surface Terminates Between   X = 430.00(ft)
                              and  X = 500.00(ft)
 Unless Further Limitations Were Imposed, The Minimum Elevation
 At Which A Surface Extends Is  Y =       0.00(ft)
 15.00(ft) Line Segments Define Each Trial Failure Surface.
 Restrictions Have Been Imposed Upon The Angle Of Initiation.
 The Angle Has Been Restricted Between The Angles Of -45.0
 And  15.0 deg.
 Following Are Displayed The Ten Most Critical Of The Trial
       Failure Surfaces Evaluated. They Are
       Ordered - Most Critical First.
       * * Safety Factors Are Calculated By The Modified Bishop Method * *
       Total Number of Trial Surfaces Evaluated =   500
       Statistical Data On All Valid FS Values:
          FS Max =   4.153   FS Min =   2.685   FS Ave =   3.331
```

Standard Deviation = 0.437 Coefficient of Variation = 13.13 %

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	267.55	92.59
2	282.41	90.51
3	297.37	89.45
4	312.37	89.44
5	327.33	90.46
6	342.19	92.52
7	356.87	95.60
8	371.30	99.68
9	385.42	104.76
10	399.15	110.80
11	412.43	117.78
12	425.19	125.66
13	437.38	134.41
14	448.93	143.97
15	459.79	154.32
16	467.73	163.00

Circle Center At X = 305.11 ; Y = 305.59 ; and Radius = 216.29

Factor of Safety

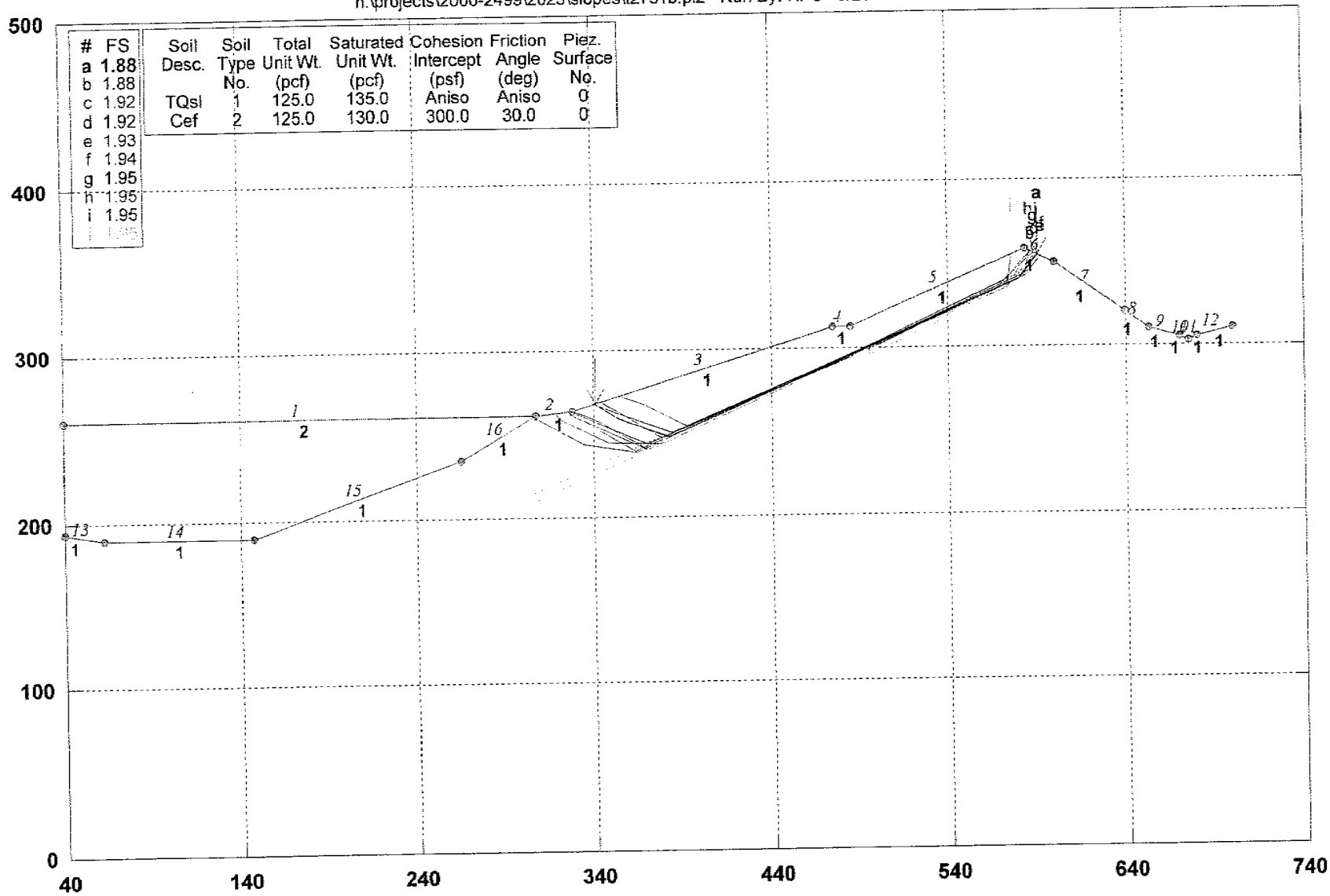
*** 2.685 ***

Individual data on the 20 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	14.9	6670.8	0.0	0.0	0.	0.	0.0	0.0	0.0
2	15.0	19227.9	0.0	0.0	0.	0.	0.0	0.0	0.0
3	15.0	29919.9	0.0	0.0	0.	0.	0.0	0.0	0.0
4	14.6	37586.8	0.0	0.0	0.	0.	0.0	0.0	0.0
5	0.3	939.9	0.0	0.0	0.	0.	0.0	0.0	0.0
6	12.7	35111.6	0.0	0.0	0.	0.	0.0	0.0	0.0
7	2.2	6082.1	0.0	0.0	0.	0.	0.0	0.0	0.0
8	14.7	45634.1	0.0	0.0	0.	0.	0.0	0.0	0.0
9	14.4	51964.3	0.0	0.0	0.	0.	0.0	0.0	0.0
10	14.1	55746.6	0.0	0.0	0.	0.	0.0	0.0	0.0
11	13.7	57028.5	0.0	0.0	0.	0.	0.0	0.0	0.0
12	0.9	3593.8	0.0	0.0	0.	0.	0.0	0.0	0.0
13	10.0	38901.1	0.0	0.0	0.	0.	0.0	0.0	0.0
14	2.4	8628.1	0.0	0.0	0.	0.	0.0	0.0	0.0
15	12.8	43976.3	0.0	0.0	0.	0.	0.0	0.0	0.0
16	12.2	38575.1	0.0	0.0	0.	0.	0.0	0.0	0.0
17	9.6	26785.9	0.0	0.0	0.	0.	0.0	0.0	0.0
18	1.9	4785.8	0.0	0.0	0.	0.	0.0	0.0	0.0
19	10.9	18815.5	0.0	0.0	0.	0.	0.0	0.0	0.0
20	7.9	4309.6	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 27-27'; static; bedding plane search

n:\projects\2000-2499\2023\slopes\t27s1b.pl2 Run By: KPC 6/25/2004 02:08PM



GSTABL7 v.2 FSmin=1.88

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 60

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/25/2004
Time of Run: 02:08PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t27s1b.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t27s1b.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope7s1b.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 27-27'; static;
bedding plane search

BOUNDARY COORDINATES
12 Top Boundaries
16 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	40.00	260.00	307.00	261.00	2
2	307.00	261.00	328.00	263.00	1
3	328.00	263.00	475.00	313.00	1
4	475.00	313.00	485.00	313.00	1
5	485.00	313.00	584.00	358.00	1
6	584.00	358.00	600.00	350.00	1
7	600.00	350.00	640.00	320.00	1
8	640.00	320.00	653.00	310.00	1
9	653.00	310.00	670.00	305.00	1
10	670.00	305.00	675.00	303.00	1
11	675.00	303.00	680.00	305.00	1
12	680.00	305.00	700.00	310.00	1
13	40.00	194.00	62.00	190.00	1
14	62.00	190.00	147.00	190.00	1
15	147.00	190.00	265.00	234.00	1
16	265.00	234.00	307.00	261.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	500.0	35.0	0.00	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	24.0	500.00	35.00
2	27.0	200.00	20.00
3	90.0	500.00	35.00

ANISOTROPIC SOIL NOTES:

(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.

(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.

(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	303.00	210.00	395.00	253.00	5.00
2	495.00	298.00	585.00	343.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 4.794 FS Min = 1.878 FS Ave = 2.565
Standard Deviation = 0.507 Coefficient of Variation = 19.78 %
Failure Surface Specified By 5 Coordinate Points

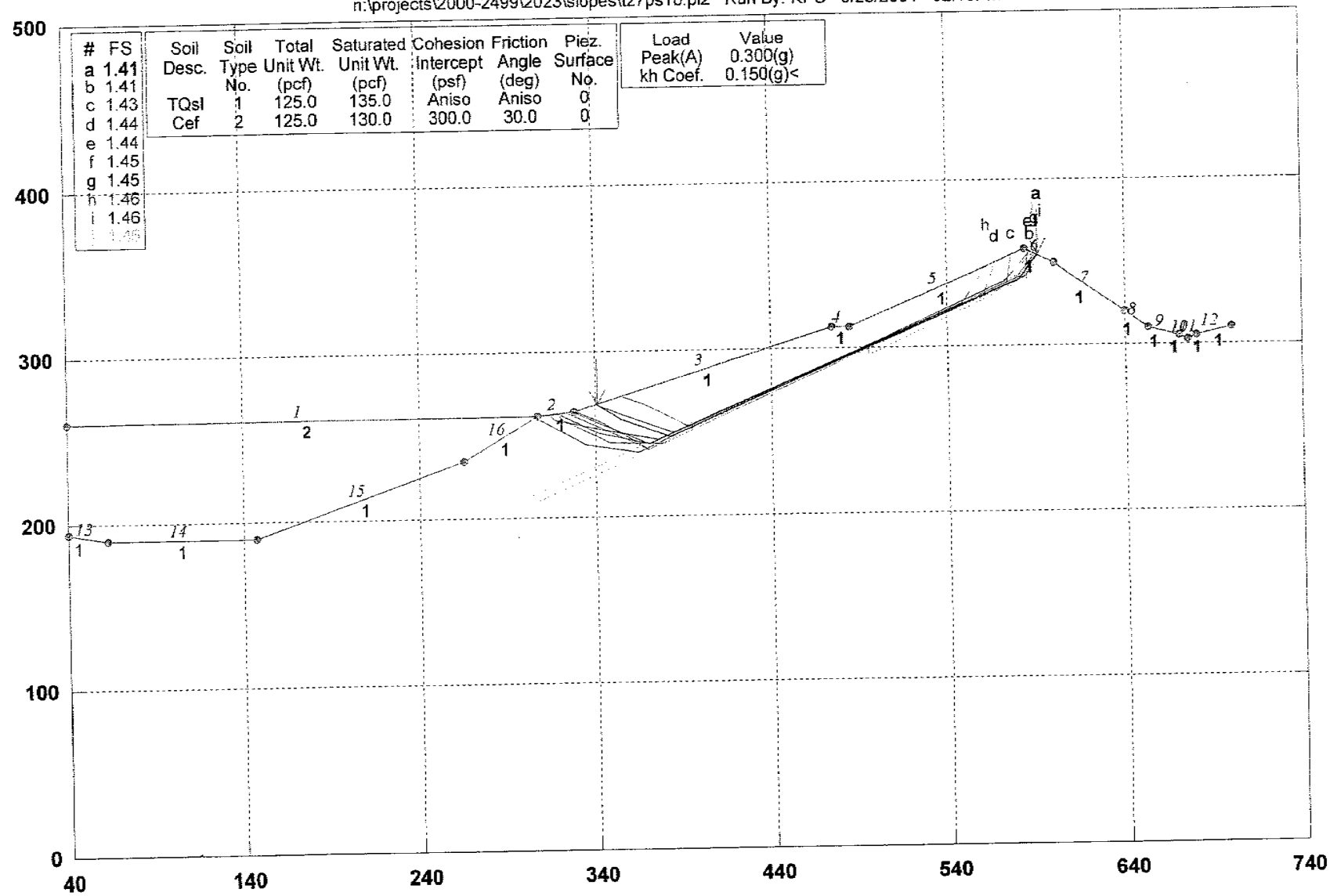
Point No.	X-Surf (ft)	Y-Surf (ft)
1	340.88	267.38
2	354.51	258.26
3	382.57	247.66
4	580.53	339.84
5	591.25	354.38

Factor of Safety
*** 1.878 ***
Individual data on the 7 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	13.6	11719.0	0.0	0.0	0.	0.	0.0	0.0	0.0
2	28.1	83601.0	0.0	0.0	0.	0.	0.0	0.0	0.0
3	92.4	324678.2	0.0	0.0	0.	0.	0.0	0.0	0.0
4	10.0	24968.8	0.0	0.0	0.	0.	0.0	0.0	0.0
5	95.5	204412.2	0.0	0.0	0.	0.	0.0	0.0	0.0
6	3.5	6508.8	0.0	0.0	0.	0.	0.0	0.0	0.0
7	7.2	6095.4	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 27-27'; pseudostatic; bedding plane search

n:\projects\2000-2499\2023\slopes\t27ps1b.pl2 Run By: KPC 6/25/2004 02:10PM



GSTABL7 v.2 FSmin=1.41

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 61

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/25/2004
Time of Run: 02:10PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t27ps1b.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t27ps1b.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope7ps1b.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 27-27'; pseudostatic;
bedding plane search

BOUNDARY COORDINATES
12 Top Boundaries
16 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	40.00	260.00	307.00	261.00	2
2	307.00	261.00	328.00	263.00	1
3	328.00	263.00	475.00	313.00	1
4	475.00	313.00	485.00	313.00	1
5	485.00	313.00	584.00	358.00	1
6	584.00	358.00	600.00	350.00	1
7	600.00	350.00	640.00	320.00	1
8	640.00	320.00	653.00	310.00	1
9	653.00	310.00	670.00	305.00	1
10	670.00	305.00	675.00	303.00	1
11	675.00	303.00	680.00	305.00	1
12	680.00	305.00	700.00	310.00	1
13	40.00	194.00	62.00	190.00	1
14	62.00	190.00	147.00	190.00	1
15	147.00	190.00	265.00	234.00	1
16	265.00	234.00	307.00	261.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	600.0	38.0	0.00	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	24.0	600.00	38.00
2	27.0	200.00	20.00
3	90.0	600.00	38.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso
C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and
C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and
C equal to zero, with water weight in the tension crack.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	303.00	210.00	395.00	253.00	5.00
2	495.00	298.00	585.00	343.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 3.213 FS Min = 1.405 FS Ave = 1.880
Standard Deviation = 0.320 Coefficient of Variation = 17.04 %
Failure Surface Specified By 5 Coordinate Points

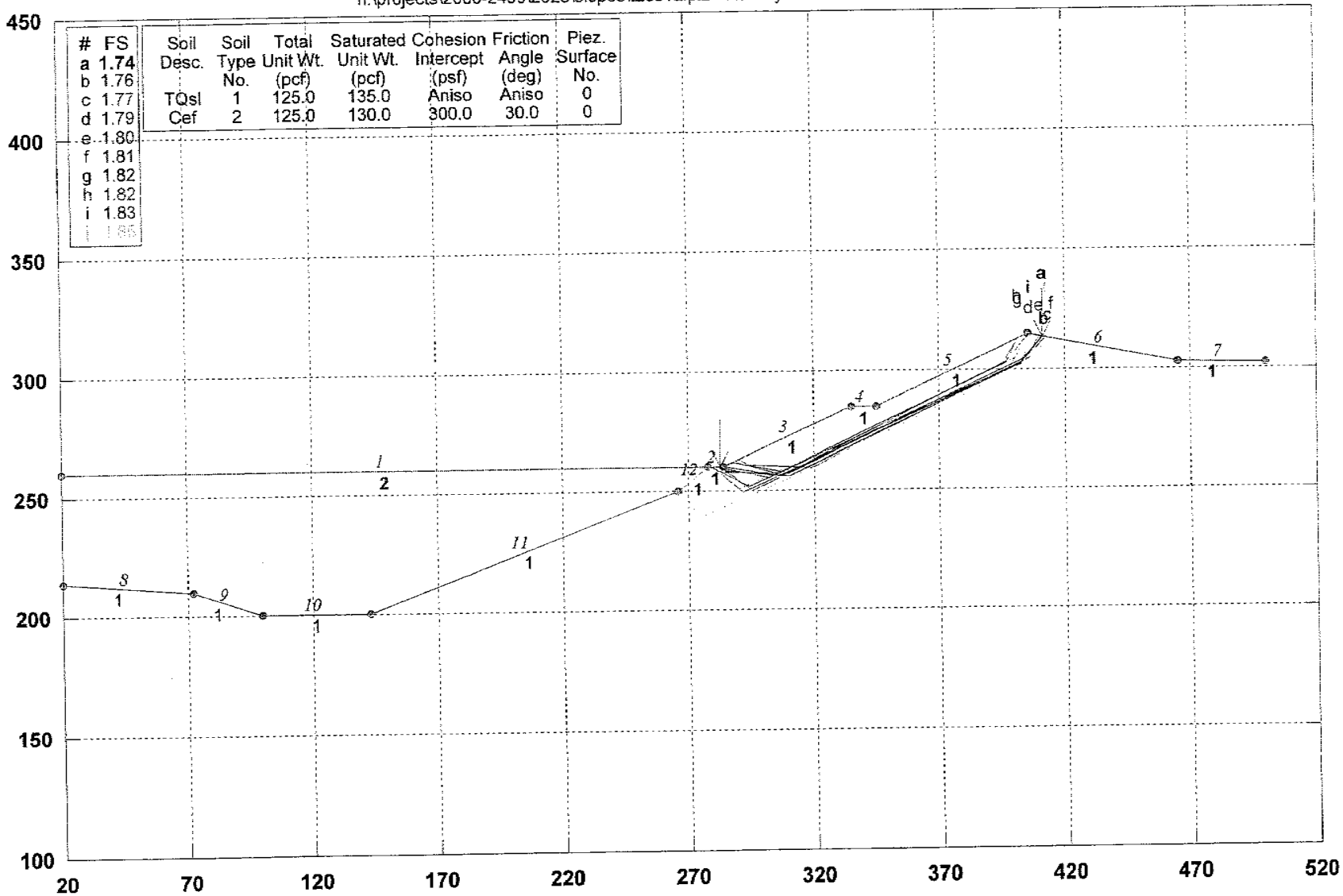
Point No.	X-Surf (ft)	Y-Surf (ft)
1	340.88	267.38
2	354.51	258.26
3	382.57	247.66
4	580.53	339.84
5	591.25	354.38

Factor of Safety
*** 1.405 ***
Individual data on the 7 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	13.6	11719.0	0.0	0.0	0.	0.	1757.8	0.0	0.0
2	28.1	83601.0	0.0	0.0	0.	0.	12540.1	0.0	0.0
3	92.4	324678.2	0.0	0.0	0.	0.	48701.7	0.0	0.0
4	10.0	24968.8	0.0	0.0	0.	0.	3745.3	0.0	0.0
5	95.5	204412.2	0.0	0.0	0.	0.	30661.8	0.0	0.0
6	3.5	6508.8	0.0	0.0	0.	0.	976.3	0.0	0.0
7	7.2	6095.4	0.0	0.0	0.	0.	914.3	0.0	0.0

Mesas East, x-sec 28-28'; static; critical plane

n:\projects\2000-2499\2023\slopes\t28s1a.pl2 Run By: KPC 6/25/2004 02:24PM



GSTABL7 v.2 FSmin=1.74

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN NO. 62

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/25/2004
Time of Run: 02:24PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t28s1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t28s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope8s1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 28-28'; static;
critical plane

BOUNDARY COORDINATES
7 Top Boundaries
12 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	20.00	260.00	278.00	260.00	2
2	278.00	260.00	284.00	260.00	1
3	284.00	260.00	335.00	285.00	1
4	335.00	285.00	345.00	285.00	1
5	345.00	285.00	405.00	315.00	1
6	405.00	315.00	465.00	303.00	1
7	465.00	303.00	500.00	302.00	1
8	20.00	214.00	72.00	210.00	1
9	72.00	210.00	100.00	200.00	1
10	100.00	200.00	143.00	200.00	1
11	143.00	200.00	266.00	250.00	1
12	266.00	250.00	278.00	260.00	1

User Specified Y-Origin = 100.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	500.0	35.0	0.00	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	25.0	500.00	35.00
2	28.0	200.00	20.00
3	90.0	500.00	35.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.

500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 25.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	270.00	239.00	330.00	267.00	5.00
2	350.00	277.00	407.00	306.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 5.649 FS Min = 1.740 FS Ave = 2.839
Standard Deviation = 0.851 Coefficient of Variation = 29.98 %
Failure Surface Specified By 5 Coordinate Points

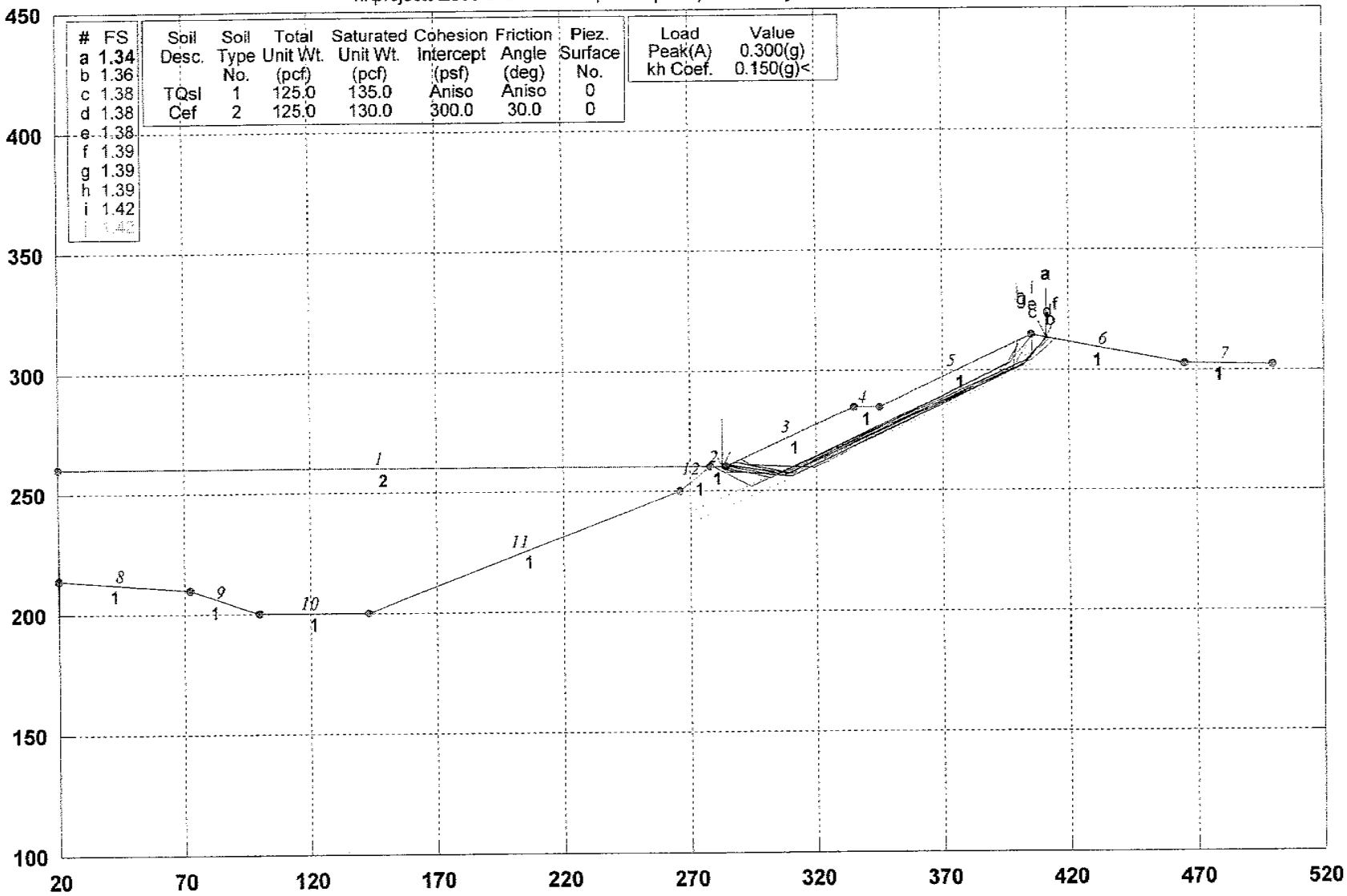
Point No.	X-Surf (ft)	Y-Surf (ft)
1	282.52	260.00
2	285.37	258.37
3	310.24	255.77
4	402.45	302.19
5	411.15	313.77

Factor of Safety
*** 1.740 ***
Individual data on the 8 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	1.5	78.5	0.0	0.0	0.	0.	0.0	0.0	0.0
2	1.4	270.0	0.0	0.0	0.	0.	0.0	0.0	0.0
3	24.9	30139.8	0.0	0.0	0.	0.	0.0	0.0	0.0
4	24.8	52399.1	0.0	0.0	0.	0.	0.0	0.0	0.0
5	10.0	17807.8	0.0	0.0	0.	0.	0.0	0.0	0.0
6	57.4	83515.9	0.0	0.0	0.	0.	0.0	0.0	0.0
7	2.6	3343.4	0.0	0.0	0.	0.	0.0	0.0	0.0
8	6.2	3620.5	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 28-28'; pseudostatic; critical plane

n:\projects\2000-2499\2023\slopes\t28ps1a.pl2 Run By: KPC 6/25/2004 02:22PM



GSTABL7 v.2 FSmin=1.34

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 63

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/25/2004
Time of Run: 02:22PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t28ps1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t28ps1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope8ps1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 28-28'; pseudostatic; critical plane

BOUNDARY COORDINATES
7 Top Boundaries
12 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	20.00	260.00	278.00	260.00	2
2	278.00	260.00	284.00	260.00	1
3	284.00	260.00	335.00	285.00	1
4	335.00	285.00	345.00	285.00	1
5	345.00	285.00	405.00	315.00	1
6	405.00	315.00	465.00	303.00	1
7	465.00	303.00	500.00	302.00	1
8	20.00	214.00	72.00	210.00	1
9	72.00	210.00	100.00	200.00	1
10	100.00	200.00	143.00	200.00	1
11	143.00	200.00	266.00	250.00	1
12	266.00	250.00	278.00	260.00	1

User Specified Y-Origin = 100.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	600.0	38.0	0.00	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	25.0	600.00	38.00
2	28.0	200.00	20.00
3	90.0	600.00	38.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 25.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	270.00	239.00	330.00	267.00	5.00
2	350.00	277.00	407.00	306.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 4.507 FS Min = 1.339 FS Ave = 2.220
Standard Deviation = 0.667 Coefficient of Variation = 30.03 %
Failure Surface Specified By 5 Coordinate Points

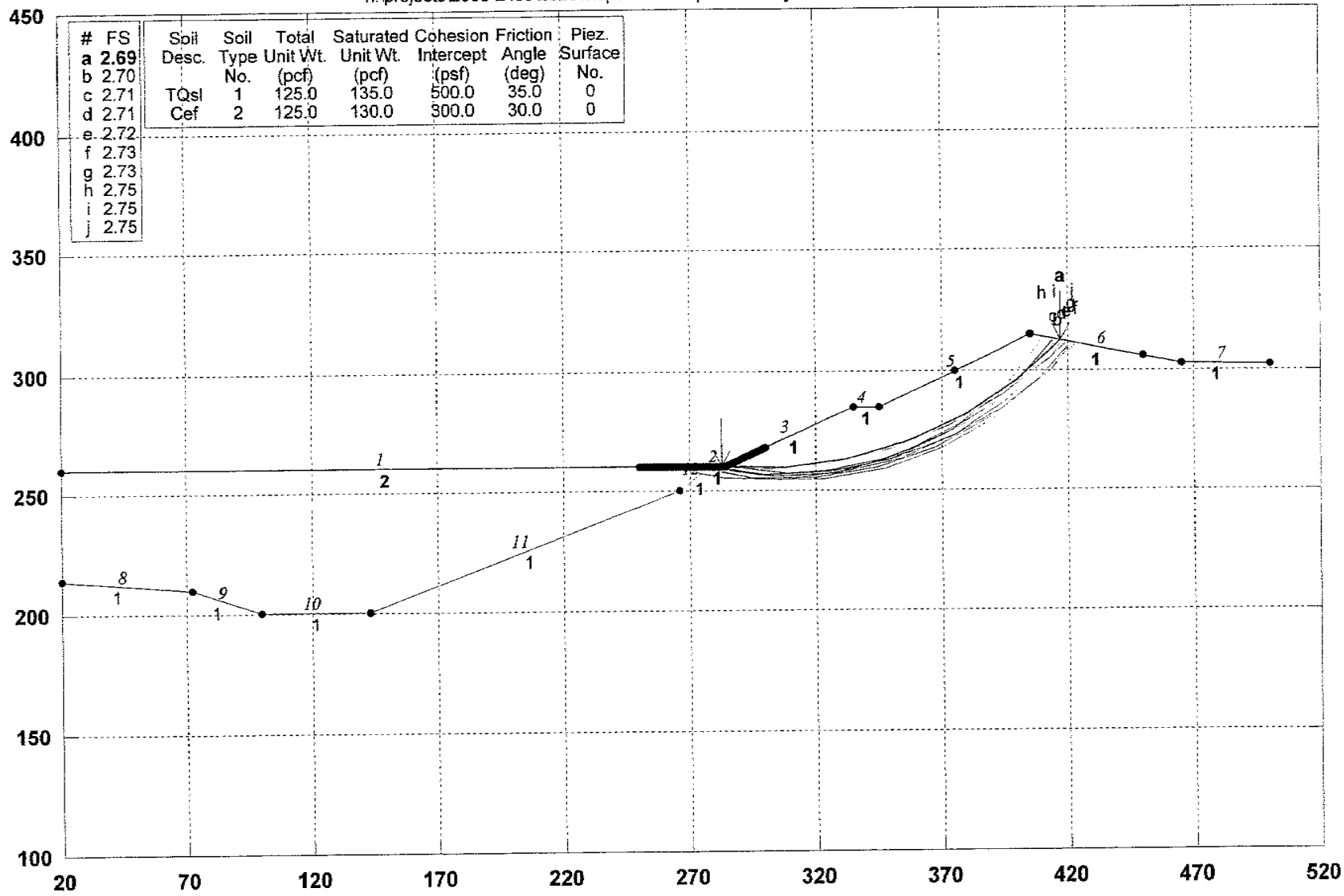
Point No.	X-Surf (ft)	Y-Surf (ft)
1	282.52	260.00
2	285.37	258.37
3	310.24	255.77
4	402.45	302.19
5	411.15	313.77

Factor of Safety
*** 1.339 ***
Individual data on the 8 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	1.5	78.5	0.0	0.0	0.	0.	11.8	0.0	0.0
2	1.4	270.0	0.0	0.0	0.	0.	40.5	0.0	0.0
3	24.9	30139.8	0.0	0.0	0.	0.	4521.0	0.0	0.0
4	24.8	52399.1	0.0	0.0	0.	0.	7859.9	0.0	0.0
5	10.0	17807.8	0.0	0.0	0.	0.	2671.2	0.0	0.0
6	57.4	83515.9	0.0	0.0	0.	0.	12527.4	0.0	0.0
7	2.6	3343.4	0.0	0.0	0.	0.	501.5	0.0	0.0
8	6.2	3620.5	0.0	0.0	0.	0.	543.1	0.0	0.0

Mesas East, x-sec 28-28'; static; circular

n:\projects\2000-2499\2023\slopes\t28s2a.pl2 Run By: KPC 7/2/2004 03:12PM



GSTABL7 v.2 FSmin=2.69

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN NO. 64

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 7/2/2004
Time of Run: 03:12PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t28s2a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t28s2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope8s2a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 28-28'; static; circular

BOUNDARY COORDINATES
7 Top Boundaries
12 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	20.00	260.00	278.00	260.00	2
2	278.00	260.00	284.00	260.00	1
3	284.00	260.00	335.00	285.00	1
4	335.00	285.00	345.00	285.00	1
5	345.00	285.00	405.00	315.00	1
6	405.00	315.00	465.00	303.00	1
7	465.00	303.00	500.00	302.00	1
8	20.00	214.00	72.00	210.00	1
9	72.00	210.00	100.00	200.00	1
10	100.00	200.00	143.00	200.00	1
11	143.00	200.00	266.00	250.00	1
12	266.00	250.00	278.00	260.00	1

User Specified Y-Origin = 100.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	500.0	35.0	0.00	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 250.00(ft)
and X = 300.00(ft)
Each Surface Terminates Between X = 375.00(ft)
and X = 450.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
25.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 5.296 FS Min = 2.693 FS Ave = 3.700

Standard Deviation = 0.604 Coefficient of Variation = 16.32 %

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	282.83	260.00
2	307.82	259.55
3	332.58	263.00
4	356.50	270.28
5	378.99	281.20
6	399.50	295.50
7	417.25	312.55

Circle Center At X = 298.20 ; Y = 418.95 ; and Radius = 159.69

Factor of Safety

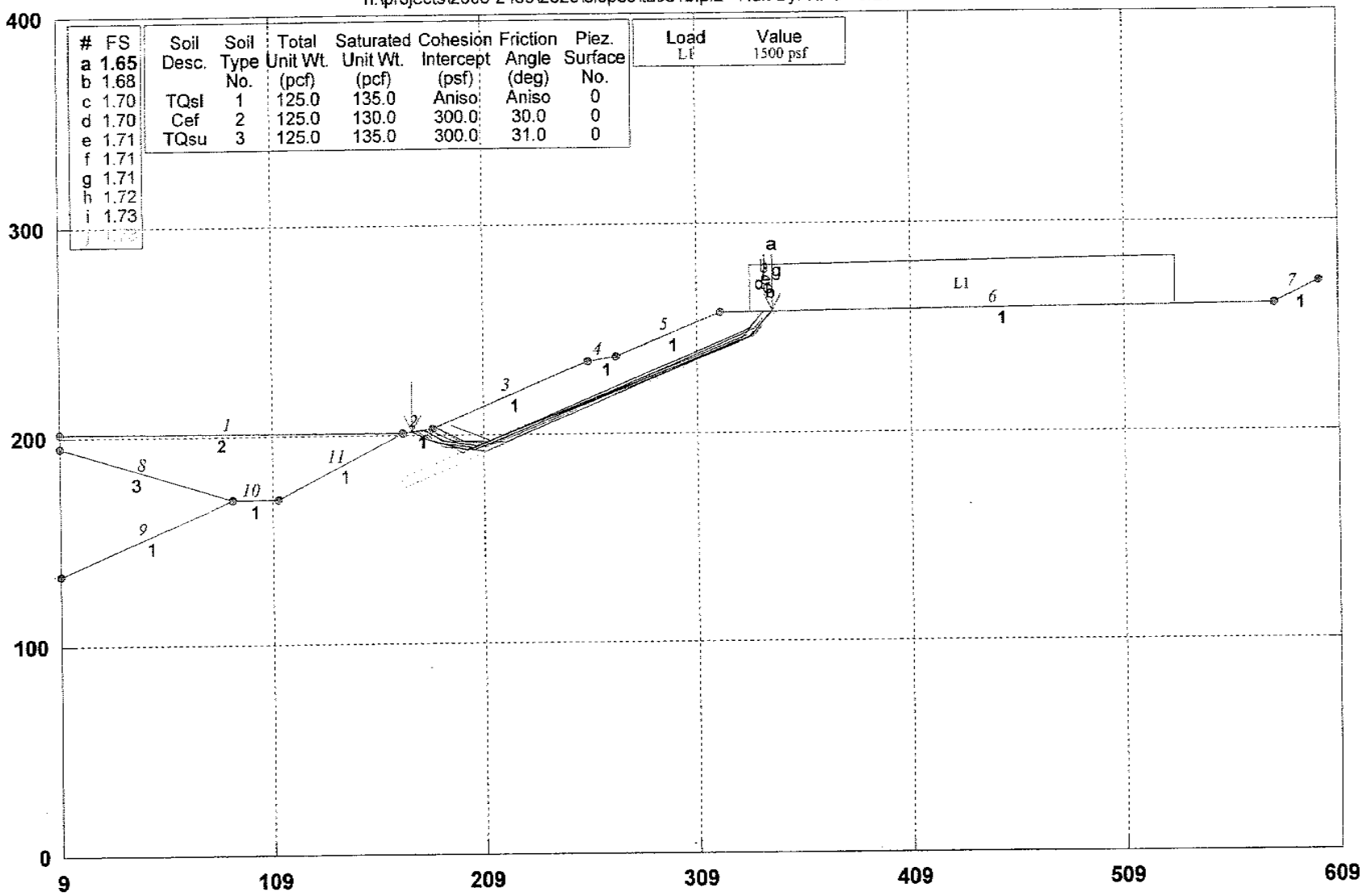
*** 2.693 ***

Individual data on the 10 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	1.2	1.6	0.0	0.0	0.	0.	0.0	0.0	0.0
2	23.8	18092.3	0.0	0.0	0.	0.	0.0	0.0	0.0
3	24.8	50977.7	0.0	0.0	0.	0.	0.0	0.0	0.0
4	2.4	6354.4	0.0	0.0	0.	0.	0.0	0.0	0.0
5	10.0	24675.2	0.0	0.0	0.	0.	0.0	0.0	0.0
6	11.5	27810.1	0.0	0.0	0.	0.	0.0	0.0	0.0
7	22.5	57998.7	0.0	0.0	0.	0.	0.0	0.0	0.0
8	20.5	48126.3	0.0	0.0	0.	0.	0.0	0.0	0.0
9	5.5	10648.2	0.0	0.0	0.	0.	0.0	0.0	0.0
10	12.2	10880.0	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 29-29'; static; CS-5b below water tank; bedplane

n:\projects\2000-2499\2023\slopes\t29s1b.pl2 Run By: KPC 6/25/2004 02:44PM



GSTABL7 v.2 FSmin=1.65

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 65

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
             (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                 *    SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:          6/25/2004
Time of Run:                02:44PM
Run By:                     KPC
Input Data Filename:        N:\Projects\2000-2499\2023\Slopes\t29s1b.in
Output Filename:            N:\Projects\2000-2499\2023\Slopes\t29s1b.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\2000-2499\2023\Slope9s1b.PLT
PROBLEM DESCRIPTION:  Mesas East, x-sec 29-29'; static;
                      CS-5b below water tank; bedplane
BOUNDARY COORDINATES
     Note: User origin value specified.
     Add 9.00 to X-values and 0.00 to Y-values listed.

    7 Top   Boundaries
   11 Total Boundaries
Boundary     X-Left      Y-Left     X-Right     Y-Right     Soil Type
   No.        (ft)        (ft)        (ft)        (ft)      Below Bnd
    1         9.00      202.00      171.00      201.00         2
    2       171.00      201.00      185.00      203.00         1
    3       185.00      203.00      258.00      235.00         1
    4       258.00      235.00      271.00      237.00         1
    5       271.00      237.00      320.00      258.00         1
    6       320.00      258.00      579.00      261.00         1
    7       579.00      261.00      600.00      271.00         1
    8         9.00      195.00       90.00      170.00         3
    9         9.00      134.00       90.00      170.00         1
   10        90.00      170.00      112.00      170.00         1
   11       112.00      170.00      171.00      201.00         1
 Default Y-Origin = 0.00(ft)
 Default X-Plus Value = 0.00(ft)
 Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  3 Type(s) of Soil
 Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
 Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
  No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
   1   125.0    135.0     500.0     35.0     0.00     0.0       0
   2   125.0    130.0     300.0     30.0     0.00     0.0       0
   3   125.0    135.0     300.0     31.0     0.00     0.0       0
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  1 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise     Cohesion     Friction
   Range       Direction Limit    Intercept      Angle
    No.            (deg)            (psf)        (deg)
     1             21.5             500.00        35.00
     2             24.5             200.00        20.00
     3             90.0             500.00        35.00
 ANISOTROPIC SOIL NOTES:
    (1) An input value of 0.01 for C and/or Phi will cause Aniso
        C and/or Phi to be ignored in that range.
    (2) An input value of 0.02 for Phi will set both Phi and
        C equal to zero, with no water weight in the tension crack.
    (3) An input value of 0.03 for Phi will set both Phi and
        C equal to zero, with water weight in the tension crack.
BOUNDARY LOAD(S)
```

1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)
1	334.00	533.00	1500.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed
Force Acting On A Horizontally Projected Surface.
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 20.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	170.00	177.00	230.00	203.00	5.00
2	287.00	227.00	337.00	249.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 4.044 FS Min = 1.653 FS Ave = 2.247
Standard Deviation = 0.444 Coefficient of Variation = 19.77 %
Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	175.29	201.61
2	181.66	197.66
3	201.04	192.69
4	334.32	246.01
5	344.19	258.28

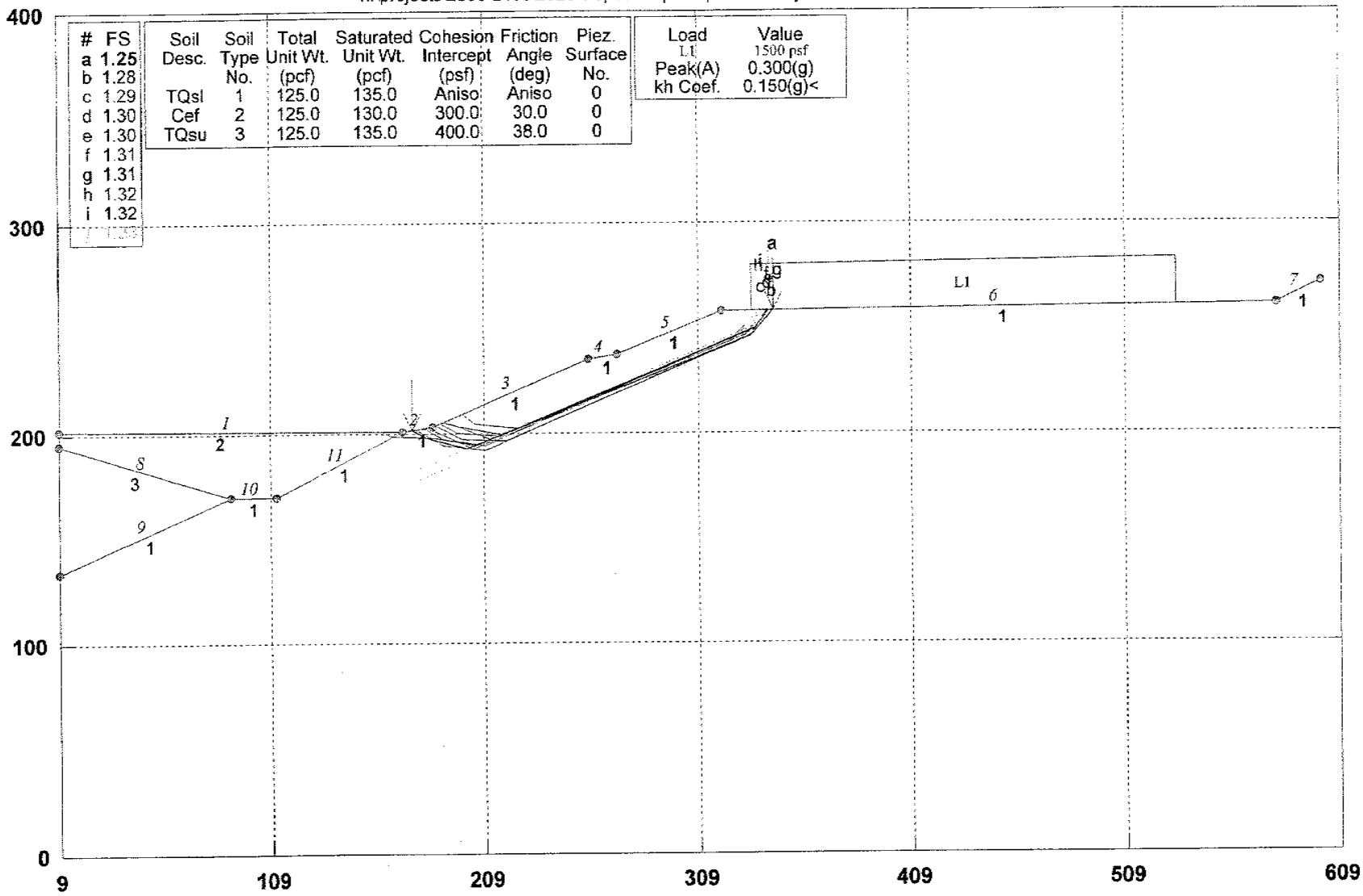
Factor of Safety
*** 1.653 ***

Individual data on the 9 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	6.4	1937.1	0.0	0.0	0.	0.	0.0	0.0	0.0
2	3.3	2305.7	0.0	0.0	0.	0.	0.0	0.0	0.0
3	16.0	23581.9	0.0	0.0	0.	0.	0.0	0.0	0.0
4	57.0	131205.1	0.0	0.0	0.	0.	0.0	0.0	0.0
5	13.0	29117.0	0.0	0.0	0.	0.	0.0	0.0	0.0
6	49.0	104231.5	0.0	0.0	0.	0.	0.0	0.0	0.0
7	14.0	26246.0	0.0	0.0	0.	0.	0.0	0.0	0.0
8	0.3	494.1	0.0	0.0	0.	0.	0.0	0.0	485.4
9	9.9	7490.7	0.0	0.0	0.	0.	0.0	0.0	14793.0

Mesas East, x-sec 29-29'; pseusdostatic;CS-5b below water tank; bedplane

n:\projects\2000-2499\2023\slopes\t29ps1b.pl2 Run By: KPC 6/25/2004 02:45PM



GSTABL7 v.2 FSmin=1.25

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 66

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/25/2004
Time of Run: 02:45PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t29ps1b.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t29ps1b.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope9ps1b.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 29-29'; pseusdostatic;
CS-5b below water tank; bedplane

BOUNDARY COORDINATES
7 Top Boundaries
11 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	9.00	202.00	171.00	201.00	2
2	171.00	201.00	185.00	203.00	1
3	185.00	203.00	258.00	235.00	1
4	258.00	235.00	271.00	237.00	1
5	271.00	237.00	320.00	258.00	1
6	320.00	258.00	579.00	261.00	1
7	579.00	261.00	600.00	271.00	1
8	9.00	195.00	90.00	170.00	3
9	9.00	134.00	90.00	170.00	1
10	90.00	170.00	112.00	170.00	1
11	112.00	170.00	171.00	201.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	600.0	38.0	0.00	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0
3	125.0	135.0	400.0	38.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	21.5	600.00	38.00
2	24.5	200.00	20.00
3	90.0	600.00	38.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

BOUNDARY LOAD(S)
1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)

1	334.00	533.00	1500.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed
Force Acting On A Horizontally Projected Surface.
Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 20.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	170.00	177.00	230.00	203.00	5.00
2	287.00	227.00	337.00	249.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 2.972 FS Min = 1.253 FS Ave = 1.723
Standard Deviation = 0.351 Coefficient of Variation = 20.39 %
Failure Surface Specified By 5 Coordinate Points

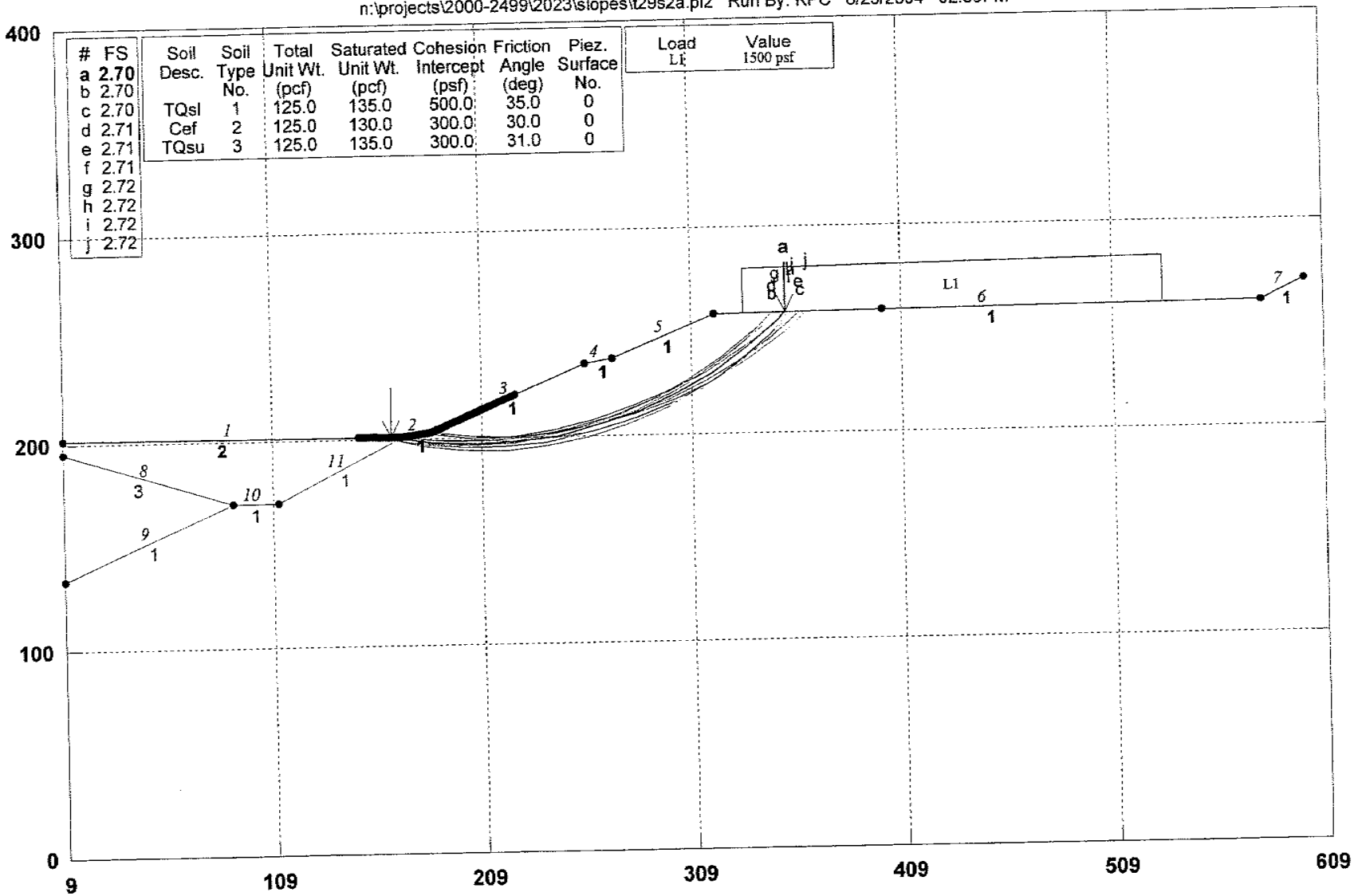
Point No.	X-Surf (ft)	Y-Surf (ft)
1	175.29	201.61
2	181.66	197.66
3	201.04	192.69
4	334.32	246.01
5	344.19	258.28

Factor of Safety
*** 1.253 ***
Individual data on the 9 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	6.4	1937.1	0.0	0.0	0.	0.	290.6	0.0	0.0
2	3.3	2305.7	0.0	0.0	0.	0.	345.9	0.0	0.0
3	16.0	23581.9	0.0	0.0	0.	0.	3537.3	0.0	0.0
4	57.0	131205.1	0.0	0.0	0.	0.	19680.8	0.0	0.0
5	13.0	29117.0	0.0	0.0	0.	0.	4367.5	0.0	0.0
6	49.0	104231.5	0.0	0.0	0.	0.	15634.7	0.0	0.0
7	14.0	26246.0	0.0	0.0	0.	0.	3936.9	0.0	0.0
8	0.3	494.1	0.0	0.0	0.	0.	74.1	0.0	485.4
9	9.9	7490.7	0.0	0.0	0.	0.	1123.6	0.0	14793.0

Mesas East, x-sec 29-29'; static; CS-5b below water tank; circular

n:\projects\2000-2499\2023\slopes\t29s2a.pl2 Run By: KPC 6/25/2004 02:56PM



#	FS
a	2.70
b	2.70
c	2.70
d	2.71
e	2.71
f	2.71
g	2.72
h	2.72
i	2.72
j	2.72

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
TQsl	1	125.0	135.0	500.0	35.0	0
Cef	2	125.0	130.0	300.0	30.0	0
TQsu	3	125.0	135.0	300.0	31.0	0

Load	Value
L1	1500 psf

GSTABL7 v.2 FSmin=2.70

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 67

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/25/2004
Time of Run: 02:56PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t29s2a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t29s2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope9s2a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 29-29'; static;
CS-5b below water tank; circular

BOUNDARY COORDINATES

Note: User origin value specified.
Add 9.00 to X-values and 0.00 to Y-values listed.

7 Top Boundaries
11 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	9.00	202.00	171.00	201.00	2
2	171.00	201.00	185.00	203.00	1
3	185.00	203.00	258.00	235.00	1
4	258.00	235.00	271.00	237.00	1
5	271.00	237.00	320.00	258.00	1
6	320.00	258.00	579.00	261.00	1
7	579.00	261.00	600.00	271.00	1
8	9.00	195.00	90.00	170.00	3
9	9.00	134.00	90.00	170.00	1
10	90.00	170.00	112.00	170.00	1
11	112.00	170.00	171.00	201.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	500.0	35.0	0.00	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0
3	125.0	135.0	300.0	31.0	0.00	0.0	0

BOUNDARY LOAD(S)

1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)
1	334.00	533.00	1500.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed
Force Acting On A Horizontally Projected Surface.

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 150.00(ft)
and X = 225.00(ft)
Each Surface Terminates Between X = 320.00(ft)
and X = 400.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
20.00(ft) Line Segments Define Each Trial Failure Surface.

Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 0.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 4.971 FS Min = 2.695 FS Ave = 3.564
Standard Deviation = 0.525 Coefficient of Variation = 14.72 %
Failure Surface Specified By 12 Coordinate Points

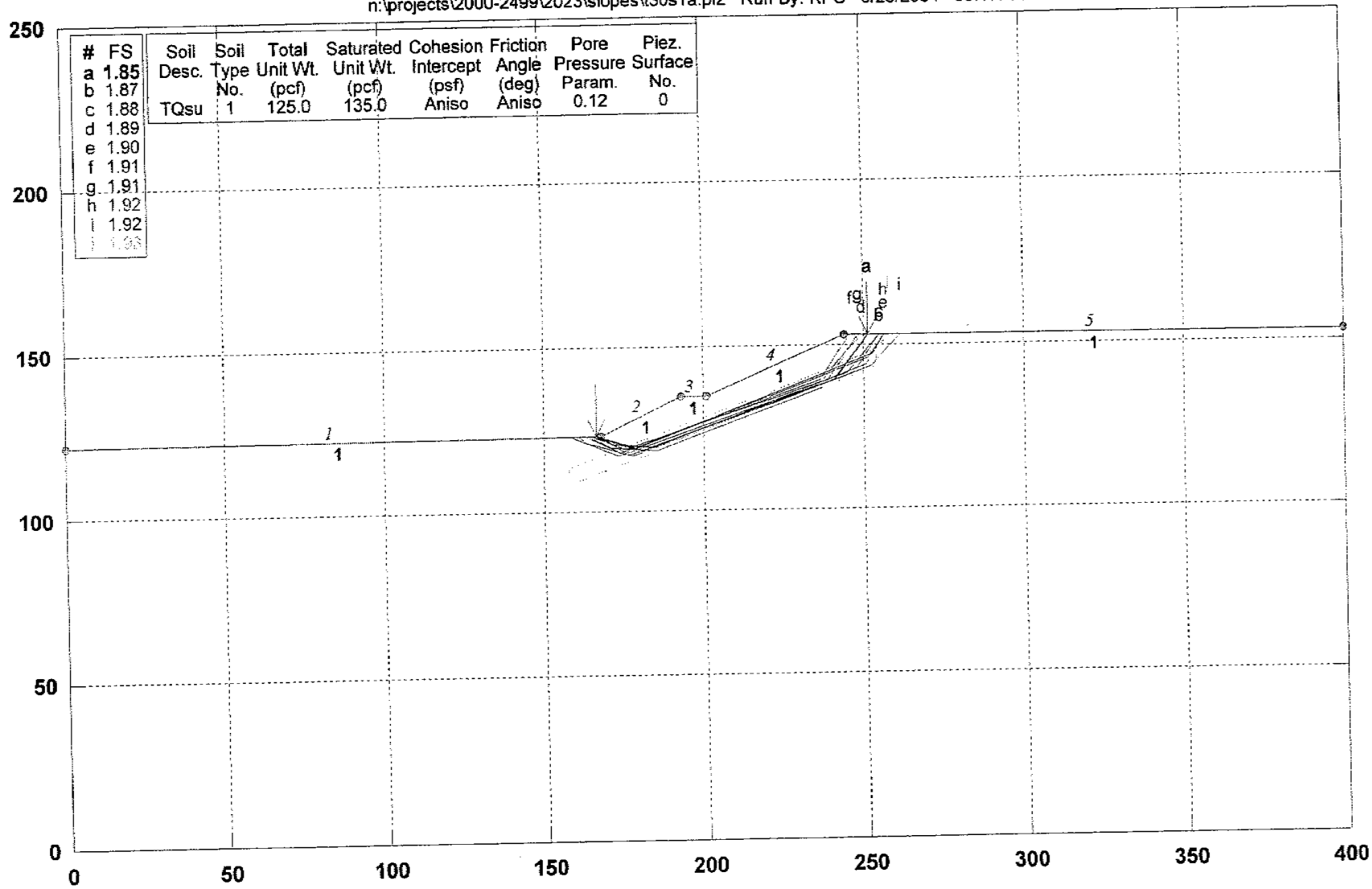
Point No.	X-Surf (ft)	Y-Surf (ft)
1	165.91	201.03
2	185.68	198.01
3	205.65	196.91
4	225.63	197.74
5	245.44	200.48
6	264.90	205.12
7	283.81	211.62
8	302.02	219.90
9	319.34	229.90
10	335.62	241.52
11	350.70	254.65
12	354.25	258.40

Circle Center At X = 207.11 ; Y = 403.63 ; and Radius = 206.75
Factor of Safety
*** 2.695 ***
Individual data on the 18 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	4.0	145.9	0.0	0.0	0.	0.	0.0	0.0	0.0
2	1.1	91.5	0.0	0.0	0.	0.	0.0	0.0	0.0
3	14.0	4925.8	0.0	0.0	0.	0.	0.0	0.0	0.0
4	0.7	432.0	0.0	0.0	0.	0.	0.0	0.0	0.0
5	20.0	25493.6	0.0	0.0	0.	0.	0.0	0.0	0.0
6	20.0	47727.2	0.0	0.0	0.	0.	0.0	0.0	0.0
7	19.8	64490.0	0.0	0.0	0.	0.	0.0	0.0	0.0
8	12.6	47506.6	0.0	0.0	0.	0.	0.0	0.0	0.0
9	6.9	26922.9	0.0	0.0	0.	0.	0.0	0.0	0.0
10	6.1	23159.6	0.0	0.0	0.	0.	0.0	0.0	0.0
11	12.8	48577.3	0.0	0.0	0.	0.	0.0	0.0	0.0
12	18.2	69707.6	0.0	0.0	0.	0.	0.0	0.0	0.0
13	17.3	63022.5	0.0	0.0	0.	0.	0.0	0.0	0.0
14	0.7	2287.1	0.0	0.0	0.	0.	0.0	0.0	0.0
15	14.0	39753.6	0.0	0.0	0.	0.	0.0	0.0	0.0
16	1.6	3487.8	0.0	0.0	0.	0.	0.0	0.0	2428.7
17	15.1	19206.8	0.0	0.0	0.	0.	0.0	0.0	22627.3
18	3.5	822.4	0.0	0.0	0.	0.	0.0	0.0	5323.6

Mesas East, x-sec 30-30' CS-9a; static; bedding plane search

n:\projects\2000-2499\2023\slopes\t30s1a.pl2 Run By: KPC 6/25/2004 03:17PM



GSTABL7 v.2 FSmin=1.85

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 68

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/25/2004
Time of Run: 03:17PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t30s1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t30s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope0s1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 30-30' CS-9a; static; bedding plane search

BOUNDARY COORDINATES
5 Top Boundaries
5 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	122.00	168.00	123.00	1
2	168.00	123.00	193.00	135.00	1
3	193.00	135.00	201.00	135.00	1
4	201.00	135.00	244.00	153.00	1
5	244.00	153.00	400.00	153.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	17.5	300.00	31.00
2	20.5	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 15.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	158.00	111.00	214.00	131.00	5.00
2	220.00	133.00	254.00	146.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 5.978 FS Min = 1.848 FS Ave = 2.896
Standard Deviation = 0.669 Coefficient of Variation = 23.12 %
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	166.60	122.99
2	166.74	122.86
3	181.09	118.50
4	240.77	139.28
5	249.83	151.24
6	251.40	153.00

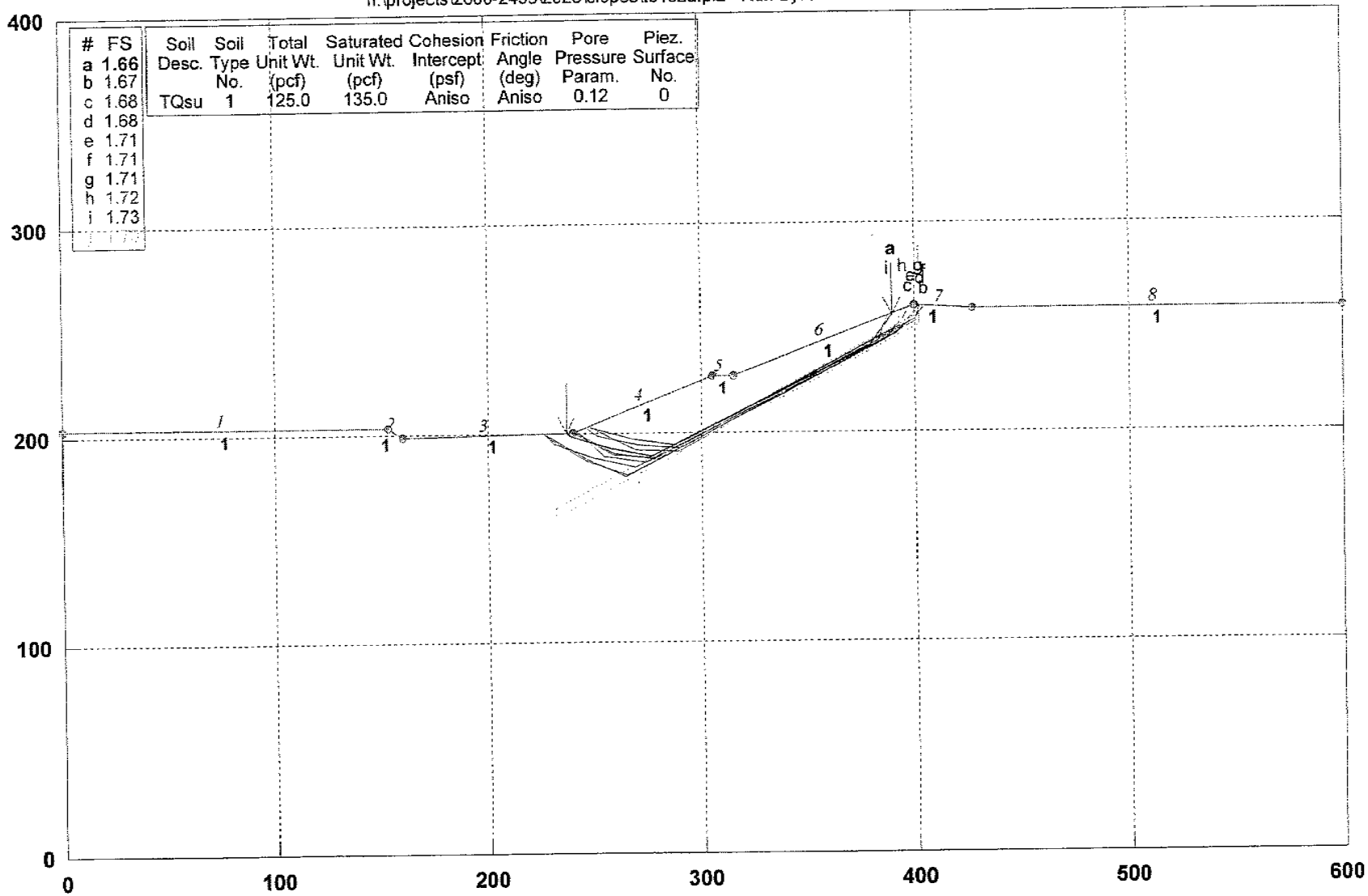
Factor of Safety
*** 1.848 ***

Individual data on the 9 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	0.1	1.2	0.0	0.2	0.	0.	0.0	0.0	0.0
2	1.3	52.4	0.0	6.6	0.	0.	0.0	0.0	0.0
3	13.1	9255.0	0.0	1160.7	0.	0.	0.0	0.0	0.0
4	11.9	17228.6	0.0	2189.2	0.	0.	0.0	0.0	0.0
5	8.0	10962.5	0.0	1393.0	0.	0.	0.0	0.0	0.0
6	39.8	54532.4	0.0	6929.4	0.	0.	0.0	0.0	0.0
7	3.2	4398.8	0.0	874.8	0.	0.	0.0	0.0	0.0
8	5.8	4081.7	0.0	811.8	0.	0.	0.0	0.0	0.0
9	1.6	173.1	0.0	31.1	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 31-31' CS-28b; static;critical plane

n:\projects\2000-2499\2023\slopes\t31s2a.pl2 Run By: KPC 6/25/2004 04:11PM



GSTABL7 v.2 FSmin=1.66

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 69

*** **GSTABL7** ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/25/2004
Time of Run: 04:11PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t31s2a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t31s2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope1s2a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 31-31' CS-28b; static; critical plane

BOUNDARY COORDINATES
8 Top Boundaries
8 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	203.00	153.00	203.00	1
2	153.00	203.00	160.00	199.00	1
3	160.00	199.00	240.00	200.00	1
4	240.00	200.00	305.00	227.00	1
5	305.00	227.00	315.00	227.00	1
6	315.00	227.00	400.00	260.00	1
7	400.00	260.00	427.00	259.00	1
8	427.00	259.00	600.00	259.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	27.0	300.00	31.00
2	30.0	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 20.0

Box	X-Left	Y-Left	X-Right	Y-Right	Height

No.	(ft)	(ft)	(ft)	(ft)	(ft)
1	232.00	162.00	302.00	200.00	5.00
2	332.00	216.00	402.00	254.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 4.712 FS Min = 1.661 FS Ave = 2.285
Standard Deviation = 0.425 Coefficient of Variation = 18.58 %
Failure Surface Specified By 6 Coordinate Points

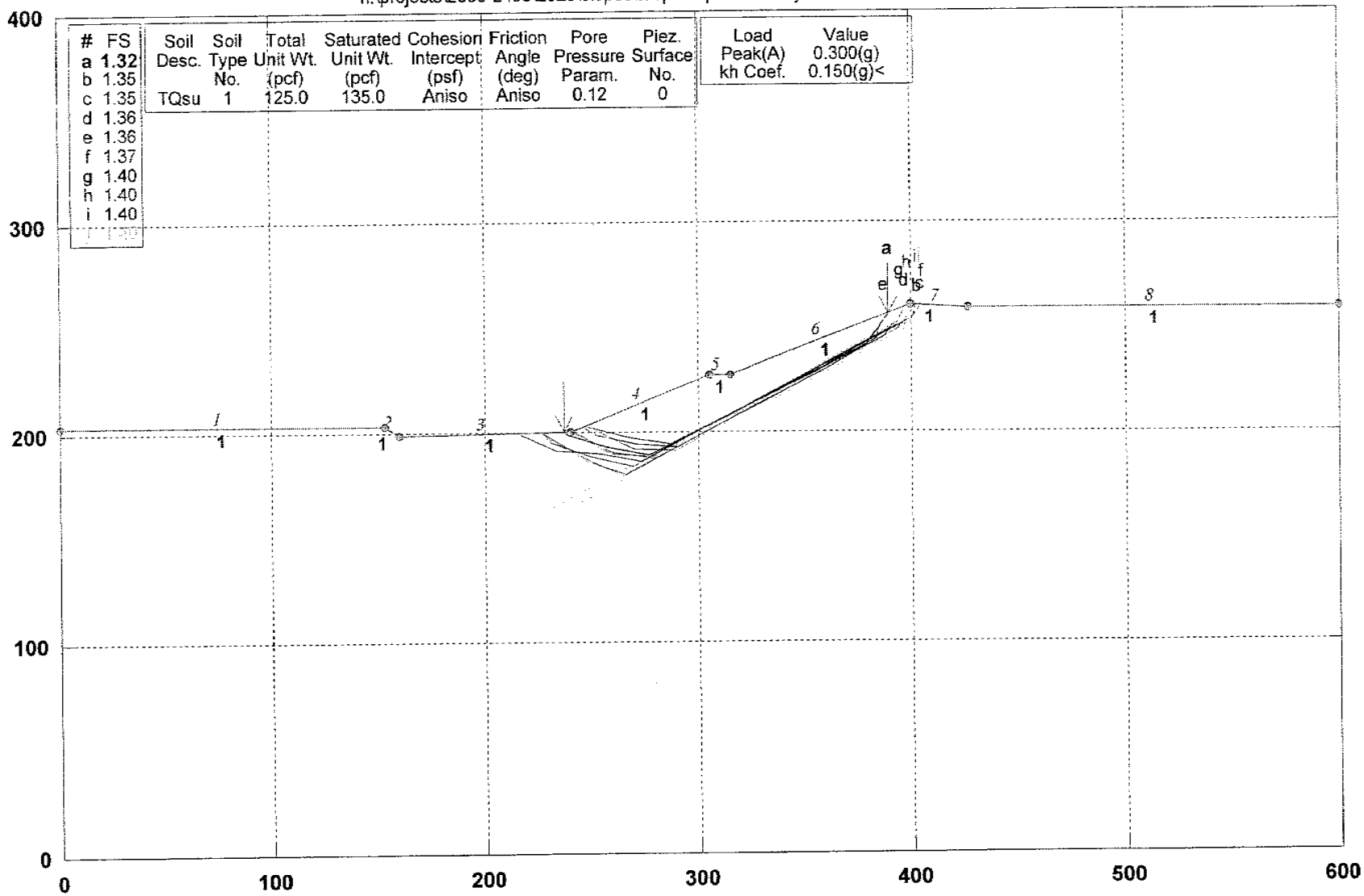
Point No.	X-Surf (ft)	Y-Surf (ft)
1	236.87	199.96
2	238.42	198.96
3	257.54	193.10
4	277.04	188.66
5	378.79	241.09
6	389.23	255.82

Factor of Safety
*** 1.661 ***
Individual data on the 8 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	1.6	99.0	0.0	14.1	0.	0.	0.0	0.0	0.0
2	1.6	251.3	0.0	31.5	0.	0.	0.0	0.0	0.0
3	17.5	17229.3	0.0	2162.4	0.	0.	0.0	0.0	0.0
4	19.5	49869.6	0.0	6137.3	0.	0.	0.0	0.0	0.0
5	28.0	88517.3	0.0	11949.2	0.	0.	0.0	0.0	0.0
6	10.0	26698.3	0.0	3604.1	0.	0.	0.0	0.0	0.0
7	63.8	117456.9	0.0	15855.9	0.	0.	0.0	0.0	0.0
8	10.4	6971.2	0.0	1446.6	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 31-31' CS-28b; pseudostatic; critical plane

n:\projects\2000-2499\2023\slopes\t31ps2a.pl2 Run By: KPC 6/25/2004 04:13PM



GSTABL7 v.2 FSmin=1.32

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 70

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/25/2004
Time of Run: 04:13PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t31ps2a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t31ps2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope1ps2a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 31-31' CS-28b;
pseudostatic; critical plane

BOUNDARY COORDINATES
8 Top Boundaries
8 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	203.00	153.00	203.00	1
2	153.00	203.00	160.00	199.00	1
3	160.00	199.00	240.00	200.00	1
4	240.00	200.00	305.00	227.00	1
5	305.00	227.00	315.00	227.00	1
6	315.00	227.00	400.00	260.00	1
7	400.00	260.00	427.00	259.00	1
8	427.00	259.00	600.00	259.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	400.0	38.0	0.12	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	27.0	400.00	38.00
2	30.0	200.00	20.00
3	90.0	400.00	38.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.

2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 20.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	232.00	162.00	302.00	200.00	5.00
2	332.00	216.00	402.00	254.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 3.845 FS Min = 1.322 FS Ave = 1.907
Standard Deviation = 0.359 Coefficient of Variation = 18.80 %
Failure Surface Specified By 6 Coordinate Points

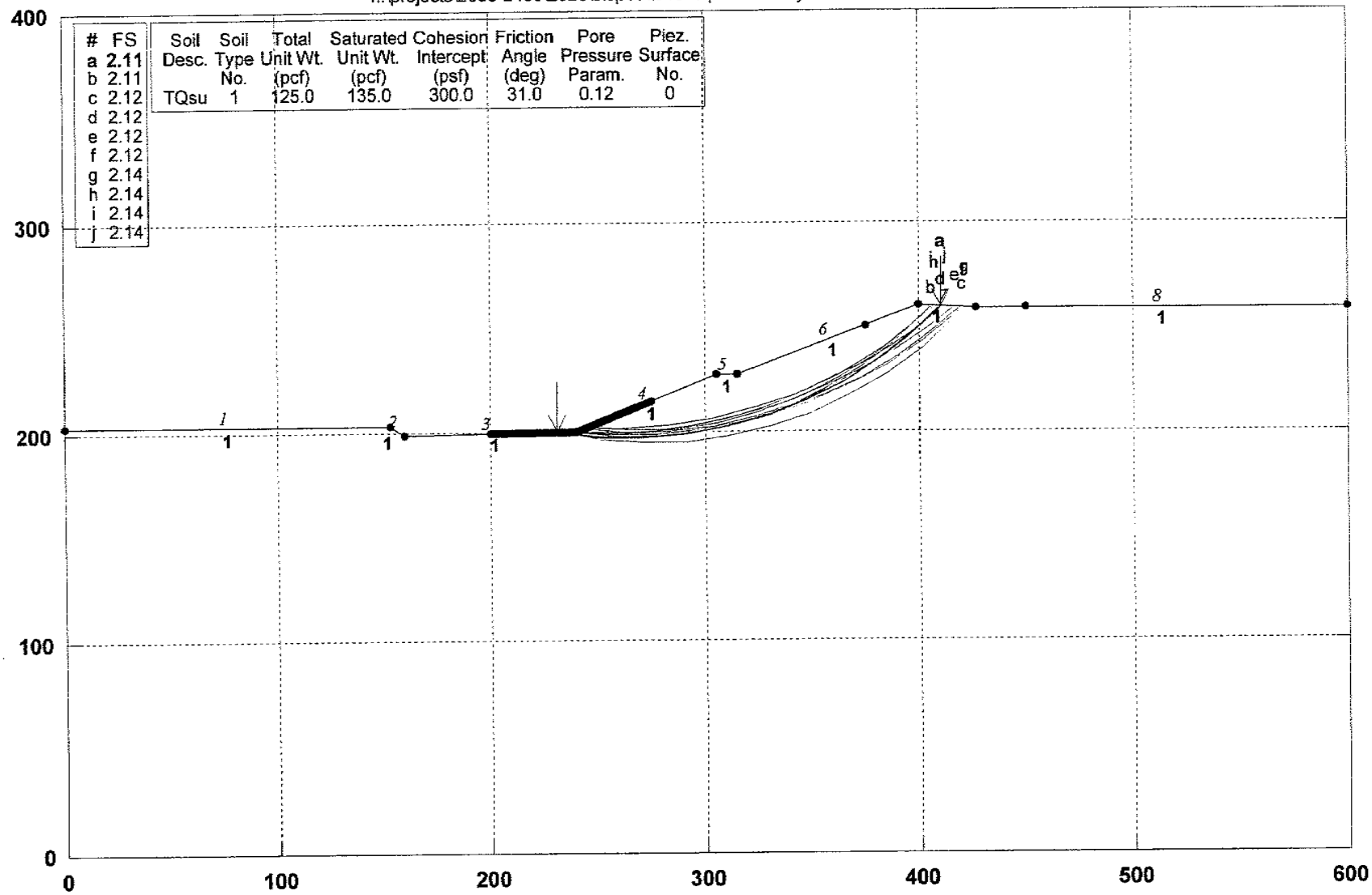
Point No.	X-Surf (ft)	Y-Surf (ft)
1	236.87	199.96
2	238.42	198.96
3	257.54	193.10
4	277.04	188.66
5	378.79	241.09
6	389.23	255.82

Factor of Safety
*** 1.322 ***
Individual data on the 8 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	1.6	99.0	0.0	14.1	0.	0.	14.8	0.0	0.0
2	1.6	251.3	0.0	31.5	0.	0.	37.7	0.0	0.0
3	17.5	17229.3	0.0	2162.4	0.	0.	2584.4	0.0	0.0
4	19.5	49869.6	0.0	6137.3	0.	0.	7480.4	0.0	0.0
5	28.0	88517.3	0.0	11949.2	0.	0.	13277.6	0.0	0.0
6	10.0	26698.3	0.0	3604.1	0.	0.	4004.7	0.0	0.0
7	63.8	117456.9	0.0	15855.9	0.	0.	17618.5	0.0	0.0
8	10.4	6971.2	0.0	1446.6	0.	0.	1045.7	0.0	0.0

Mesas East, x-sec 31-31' CS-28b; static;circular

n:\projects\2000-2499\2023\slopes\t31s2b.pl2 Run By: KPC 6/25/2004 03:49PM



GSTABL7 v.2 FSmin=2.11

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN NO. 71

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:        6/25/2004
Time of Run:              03:49PM
Run By:                   KPC
Input Data Filename:      N:\Projects\2000-2499\2023\Slopes\t31s2b.in
Output Filename:          N:\Projects\2000-2499\2023\Slopes\t31s2b.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\2000-2499\2023\Slopels2b.PLT
PROBLEM DESCRIPTION:  Mesas East, x-sec 31-31' CS-28b; static;
                      circular
BOUNDARY COORDINATES
    8 Top   Boundaries
    8 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     203.00     153.00     203.00        1
    2       153.00     203.00     160.00     199.00        1
    3       160.00     199.00     240.00     200.00        1
    4       240.00     200.00     305.00     227.00        1
    5       305.00     227.00     315.00     227.00        1
    6       315.00     227.00     400.00     260.00        1
    7       400.00     260.00     427.00     259.00        1
    8       427.00     259.00     600.00     259.00        1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 1 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   125.0    135.0     300.0     31.0     0.12      0.0      0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
  10 Surface(s) Initiate(s) From Each Of   100 Points Equally Spaced
Along The Ground Surface Between  X = 200.00(ft)
                              and  X = 275.00(ft)
Each Surface Terminates Between   X = 375.00(ft)
                              and  X = 450.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =      0.00(ft)
20.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And  15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
       Failure Surfaces Evaluated. They Are
       Ordered - Most Critical First.
       * * Safety Factors Are Calculated By The Modified Bishop Method * *
       Total Number of Trial Surfaces Evaluated =  1000
       Statistical Data On All Valid FS Values:
          FS Max =   4.346   FS Min =   2.109   FS Ave =   2.773
          Standard Deviation =    0.408   Coefficient of Variation =   14.70 %
       Failure Surface Specified By 11 Coordinate Points
         Point      X-Surf      Y-Surf
```

No.	(ft)	(ft)
1	231.06	199.89
2	250.93	197.57
3	270.92	197.24
4	290.86	198.88
5	310.53	202.48
6	329.75	208.01
7	348.33	215.42
8	366.08	224.62
9	382.84	235.54
10	398.44	248.06
11	410.23	259.62

Circle Center At X = 264.34 ; Y = 399.14 ; and Radius = 202.01

Factor of Safety

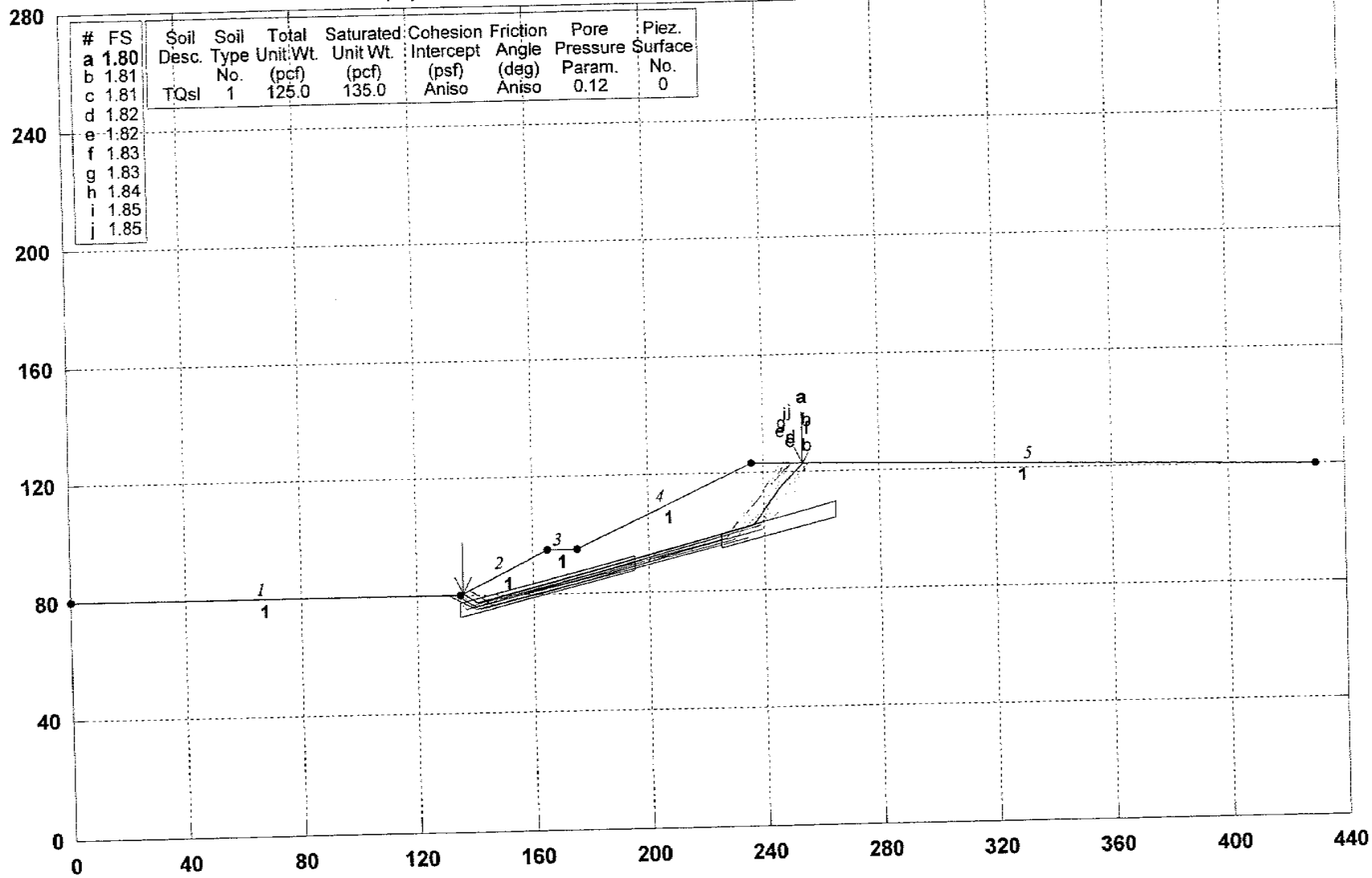
*** 2.109 ***

Individual data on the 14 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	8.9	644.3	0.0	77.8	0.	0.	0.0	0.0	0.0
2	10.9	5543.3	0.0	669.7	0.	0.	0.0	0.0	0.0
3	20.0	28213.3	0.0	3386.1	0.	0.	0.0	0.0	0.0
4	19.9	47163.0	0.0	5678.7	0.	0.	0.0	0.0	0.0
5	14.1	42239.9	0.0	5153.1	0.	0.	0.0	0.0	0.0
6	5.5	17294.7	0.0	2109.9	0.	0.	0.0	0.0	0.0
7	4.5	13346.1	0.0	1666.5	0.	0.	0.0	0.0	0.0
8	14.7	44197.6	0.0	5519.0	0.	0.	0.0	0.0	0.0
9	18.6	57174.4	0.0	7385.8	0.	0.	0.0	0.0	0.0
10	17.8	51862.6	0.0	7010.2	0.	0.	0.0	0.0	0.0
11	16.8	41909.0	0.0	6001.9	0.	0.	0.0	0.0	0.0
12	15.6	28404.0	0.0	4370.8	0.	0.	0.0	0.0	0.0
13	1.6	2123.7	0.0	356.9	0.	0.	0.0	0.0	0.0
14	10.2	6660.3	0.0	1119.2	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 33-33' CS-4; bedding plane search; static

n:\projects\2000-2499\2023\slopes\t33s1a.pl2 Run By: KPC 6/29/2004 11:33AM



GSTABL7 v.2 FSmin=1.80

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN NO. 72

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/29/2004
Time of Run: 11:33AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t33s1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t33s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope3s1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 33-33' CS-4;
bedding plane search; static

BOUNDARY COORDINATES
5 Top Boundaries
5 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	80.00	135.00	80.00	1
2	135.00	80.00	165.00	95.00	1
3	165.00	95.00	175.00	95.00	1
4	175.00	95.00	236.00	123.00	1
5	236.00	123.00	430.00	120.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	500.0	35.0	0.12	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	12.5	500.00	35.00
2	15.5	200.00	20.00
3	90.0	500.00	35.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 15.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	135.00	75.00	195.00	90.00	5.00
2	225.00	97.00	265.00	107.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 6.124 FS Min = 1.800 FS Ave = 2.710
Standard Deviation = 0.822 Coefficient of Variation = 30.33 %
Failure Surface Specified By 5 Coordinate Points

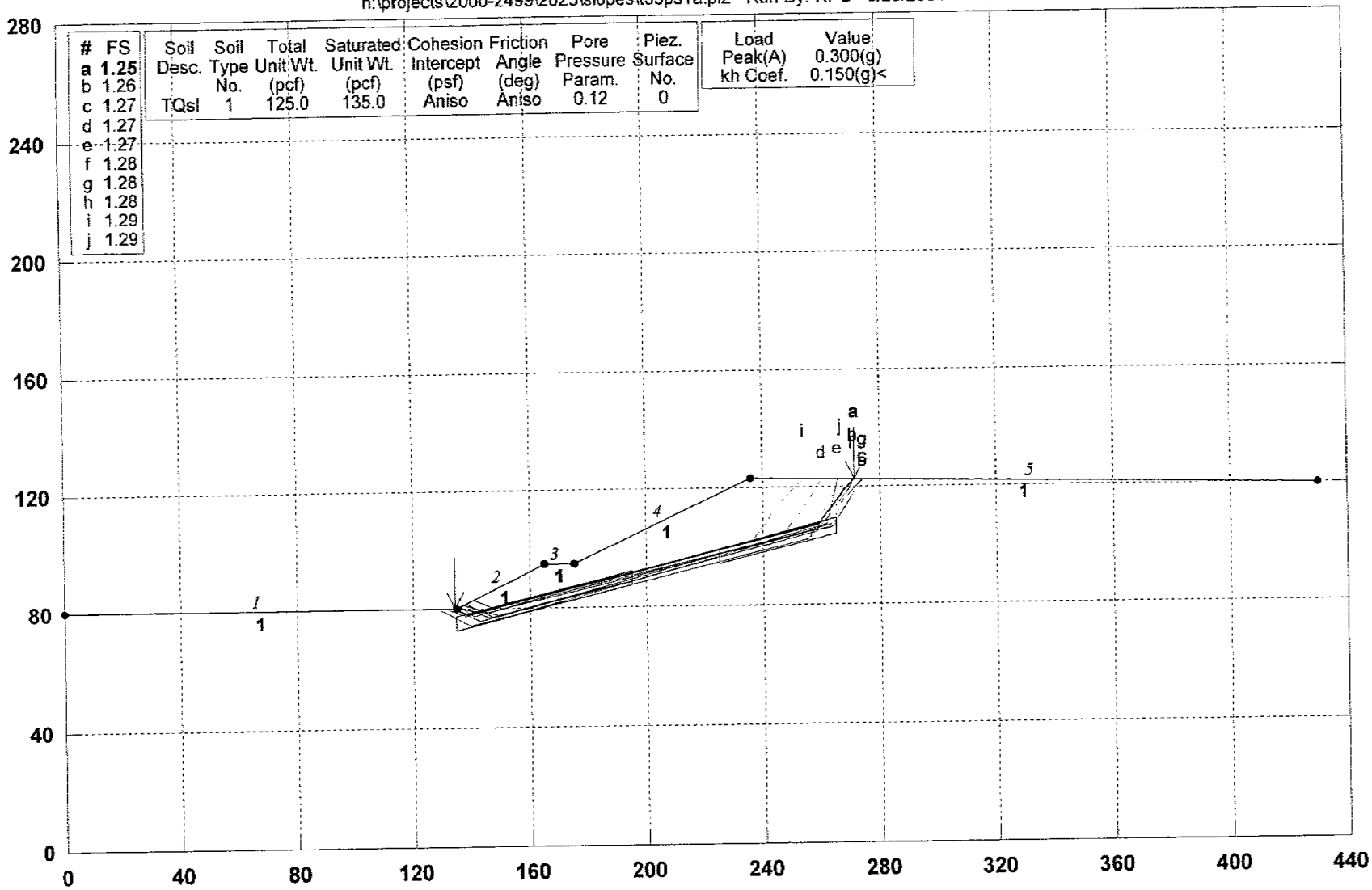
Point No.	X-Surf (ft)	Y-Surf (ft)
1	136.16	80.58
2	140.68	77.64
3	236.66	102.29
4	245.58	114.34
5	253.80	122.72

Factor of Safety
*** 1.800 ***
Individual data on the 7 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	4.5	1468.2	0.0	210.2	0.	0.	0.0	0.0	0.0
2	24.3	24794.4	0.0	3071.8	0.	0.	0.0	0.0	0.0
3	10.0	12287.3	0.0	1522.3	0.	0.	0.0	0.0	0.0
4	61.0	112197.8	0.0	13900.5	0.	0.	0.0	0.0	0.0
5	0.7	1709.5	0.0	211.8	0.	0.	0.0	0.0	0.0
6	8.9	16287.3	0.0	3286.2	0.	0.	0.0	0.0	0.0
7	8.2	4370.6	0.0	749.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 33-33' CS-4; bedding plane search; pseudostatic

n:\projects\2000-2499\2023\slopes\t33ps1a.pl2 Run By: KPC 6/29/2004 11:34AM



GSTABL7 v.2 FSmin=1.25

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN NO. 73

```
                    *** GSTABL7 ***
          ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*****************************************************************************
Analysis Run Date:          6/29/2004
Time of Run:                11:34AM
Run By:                     KPC
Input Data Filename:        N:\Projects\2000-2499\2023\Slopes\t33psla.in
Output Filename:            N:\Projects\2000-2499\2023\Slopes\t33psla.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\2000-2499\2023\Slope3psla.PLT
PROBLEM DESCRIPTION:  Mesas East, x-sec 33-33' CS-4;
                      bedding plane search; pseudostatic

BOUNDARY COORDINATES
    5 Top   Boundaries
    5 Total Boundaries
Boundary     X-Left     Y-Left     X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00      80.00      135.00      80.00        1
    2       135.00      80.00      165.00      95.00        1
    3       165.00      95.00      175.00      95.00        1
    4       175.00      95.00      236.00     123.00        1
    5       236.00     123.00      430.00     120.00        1
 Default Y-Origin = 0.00(ft)
 Default X-Plus Value = 0.00(ft)
 Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  1 Type(s) of Soil
 Soil  Total   Saturated  Cohesion Friction   Pore    Pressure   Piez.
 Type Unit Wt. Unit Wt.  Intercept  Angle  Pressure Constant Surface
  No.  (pcf)    (pcf)      (psf)    (deg)   Param.    (psf)     No.
   1   125.0    135.0     600.0     38.0    0.12      0.0       0
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  1 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction     Counterclockwise     Cohesion      Friction
   Range       Direction Limit     Intercept       Angle
    No.            (deg)             (psf)         (deg)
     1             12.5              600.00        38.00
     2             15.5              200.00        20.00
     3             90.0              600.00        38.00
  ANISOTROPIC SOIL NOTES:
     (1) An input value of 0.01 for C and/or Phi will cause Aniso
         C and/or Phi to be ignored in that range.
     (2) An input value of 0.02 for Phi will set both Phi and
         C equal to zero, with no water weight in the tension crack.
     (3) An input value of 0.03 for Phi will set both Phi and
         C equal to zero, with water weight in the tension crack.
  Specified Peak Ground Acceleration Coefficient (A) =   0.300(g)
  Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
  Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
  Specified Seismic Pore-Pressure Factor =   0.000
  Janbus Empirical Coef is being used for the case of  c & phi both > 0
  A Critical Failure Surface Searching Method, Using A Random
  Technique For Generating Sliding Block Surfaces, Has Been
  Specified.
   500 Trial Surfaces Have Been Generated.
```

2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 15.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	135.00	75.00	195.00	90.00	5.00
2	225.00	97.00	265.00	107.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 4.196 FS Min = 1.246 FS Ave = 1.955
Standard Deviation = 0.627 Coefficient of Variation = 32.09 %
Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	134.41	80.00
2	138.91	77.74
3	258.84	107.27
4	268.04	119.11
5	271.25	122.45

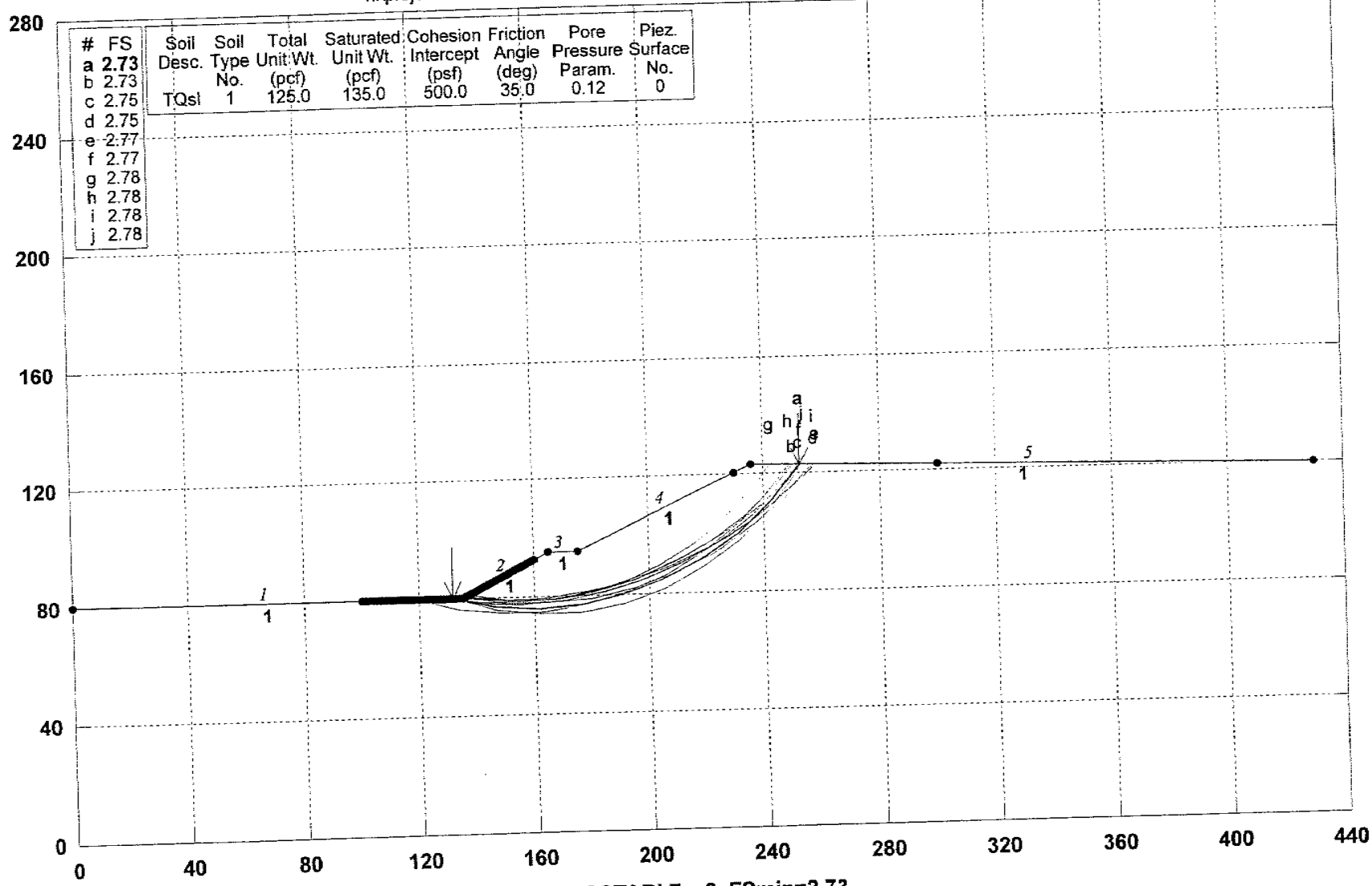
Factor of Safety
*** 1.246 ***

Individual data on the 8 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	0.6	11.1	0.0	1.5	0.	0.	1.7	0.0	0.0
2	3.9	1102.2	0.0	148.0	0.	0.	165.3	0.0	0.0
3	26.1	24544.6	0.0	3033.3	0.	0.	3681.7	0.0	0.0
4	10.0	12006.5	0.0	1483.8	0.	0.	1801.0	0.0	0.0
5	61.0	113341.7	0.0	14007.2	0.	0.	17001.3	0.0	0.0
6	22.8	52427.5	0.0	6479.2	0.	0.	7864.1	0.0	0.0
7	9.2	10801.2	0.0	2112.0	0.	0.	1620.2	0.0	0.0
8	3.2	681.0	0.0	118.0	0.	0.	102.1	0.0	0.0

Mesas East, x-sec 33-33' CS-4; circular; static

n:\projects\2000-2499\2023\slopes\t33s2a.pl2 Run By: KPC 6/29/2004 11:42AM



GSTABL7 v.2 FSmin=2.73

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 74

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:        6/29/2004
Time of Run:              11:42AM
Run By:                   KPC
Input Data Filename:      N:\Projects\2000-2499\2023\Slopes\t33s2a.in
Output Filename:          N:\Projects\2000-2499\2023\Slopes\t33s2a.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\2000-2499\2023\Slope3s2a.PLT
PROBLEM DESCRIPTION:  Mesas East, x-sec 33-33' CS-4;
                      circular; static
BOUNDARY COORDINATES
    5 Top   Boundaries
    5 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00      80.00     135.00      80.00        1
    2       135.00      80.00     165.00      95.00        1
    3       165.00      95.00     175.00      95.00        1
    4       175.00      95.00     236.00     123.00        1
    5       236.00     123.00     430.00     120.00        1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 1 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   125.0    135.0     500.0     35.0    0.12       0.0      0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
  10 Surface(s) Initiate(s) From Each Of   100 Points Equally Spaced
Along The Ground Surface Between  X = 100.00(ft)
                            and  X = 160.00(ft)
Each Surface Terminates Between   X = 230.00(ft)
                            and   X = 300.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =      0.00(ft)
15.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And  10.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Modified Bishop Method * *
      Total Number of Trial Surfaces Evaluated =  1000
      Statistical Data On All Valid FS Values:
         FS Max =   6.127   FS Min =   2.732   FS Ave =   3.642
         Standard Deviation =    0.543   Coefficient of Variation =   14.90 %
      Failure Surface Specified By 11 Coordinate Points
        Point      X-Surf      Y-Surf
         No.        (ft)        (ft)
          1        131.52       80.00
```

2	146.21	77.00
3	161.18	75.97
4	176.14	76.93
5	190.85	79.87
6	205.04	84.74
7	218.46	91.45
8	230.87	99.88
9	242.05	109.88
10	251.80	121.27
11	252.75	122.74

Circle Center At X = 161.41 ; Y = 188.78 ; and Radius = 112.82

Factor of Safety

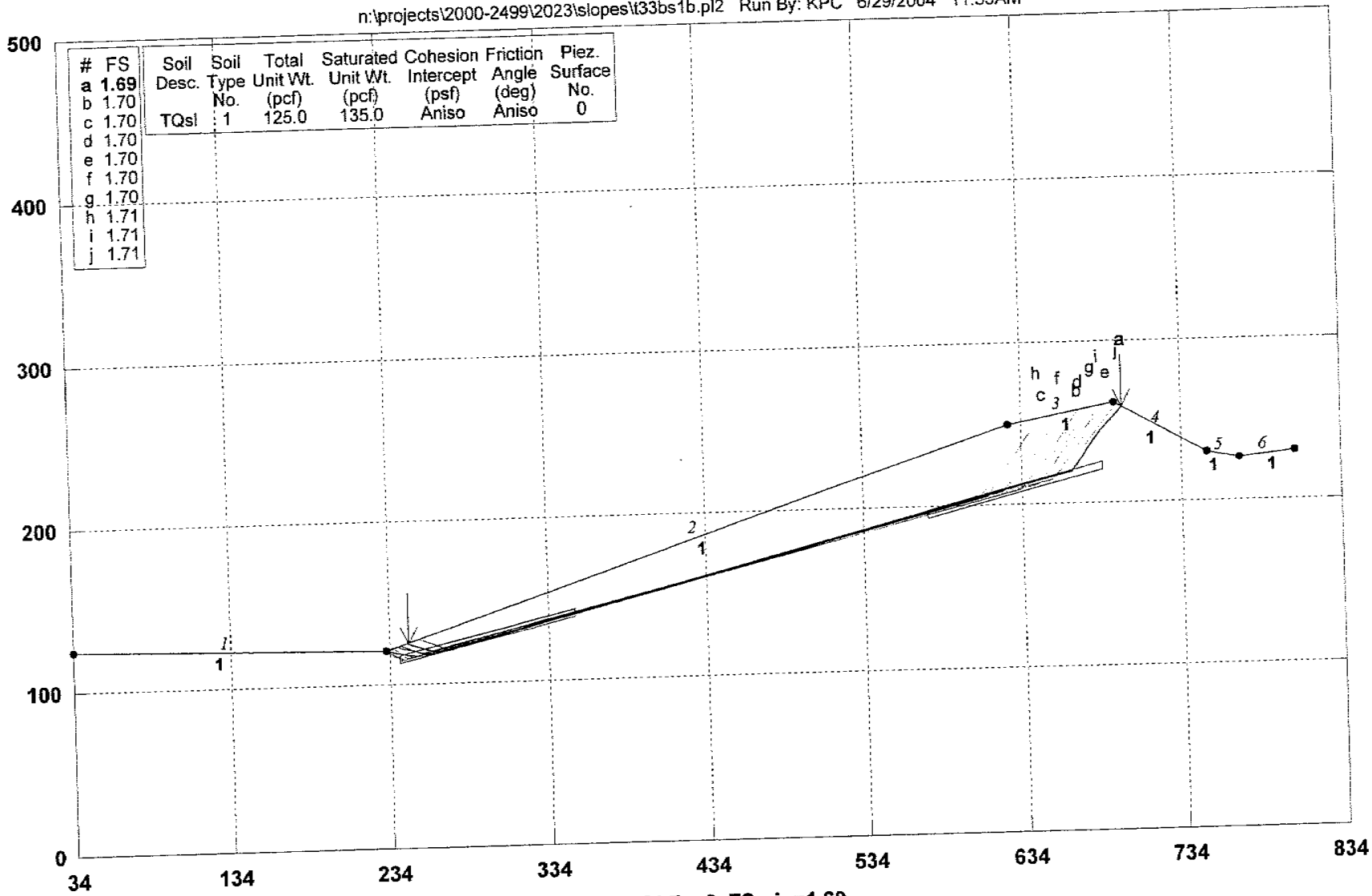
*** 2.732 ***

Individual data on the 14 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	3.5	155.2	0.0	19.0	0.	0.	0.0	0.0	0.0
2	11.2	6532.7	0.0	800.1	0.	0.	0.0	0.0	0.0
3	15.0	24067.1	0.0	2894.9	0.	0.	0.0	0.0	0.0
4	3.8	8582.3	0.0	1032.0	0.	0.	0.0	0.0	0.0
5	10.0	23080.5	0.0	2775.4	0.	0.	0.0	0.0	0.0
6	1.1	2628.5	0.0	316.1	0.	0.	0.0	0.0	0.0
7	14.7	37686.2	0.0	4612.0	0.	0.	0.0	0.0	0.0
8	14.2	41188.0	0.0	5225.4	0.	0.	0.0	0.0	0.0
9	13.4	39867.5	0.0	5348.6	0.	0.	0.0	0.0	0.0
10	12.4	34326.2	0.0	4979.5	0.	0.	0.0	0.0	0.0
11	5.1	12607.6	0.0	2029.7	0.	0.	0.0	0.0	0.0
12	6.0	11926.8	0.0	1920.1	0.	0.	0.0	0.0	0.0
13	9.8	8846.8	0.0	1632.4	0.	0.	0.0	0.0	0.0
14	1.0	88.1	0.0	19.4	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 33-33' CS-5a; bedding plane search; static

n:\projects\2000-2499\2023\slopes\t33bs1b.pl2 Run By: KPC 6/29/2004 11:53AM



GSTABL7 v.2 FSmin=1.69

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 75

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/29/2004
Time of Run: 11:53AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t33bs1b.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t33bs1b.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope3bs1b.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 33-33' CS-5a;
bedding plane search; static

BOUNDARY COORDINATES

Note: User origin value specified.
Add 34.00 to X-values and 0.00 to Y-values listed.

6 Top Boundaries
6 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	34.00	124.00	232.00	120.00	1
2	232.00	120.00	626.00	250.00	1
3	626.00	250.00	692.00	262.00	1
4	692.00	262.00	750.00	230.00	1
5	750.00	230.00	770.00	226.00	1
6	770.00	226.00	805.00	230.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS

1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	500.0	35.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	12.5	500.00	35.00
2	15.5	200.00	20.00
3	90.0	500.00	35.00

ANISOTROPIC SOIL NOTES:

(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	240.00	115.00	351.00	141.00	5.00
2	575.00	195.00	685.00	223.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 2.417 FS Min = 1.693 FS Ave = 1.828
Standard Deviation = 0.104 Coefficient of Variation = 5.69 %
Failure Surface Specified By 5 Coordinate Points

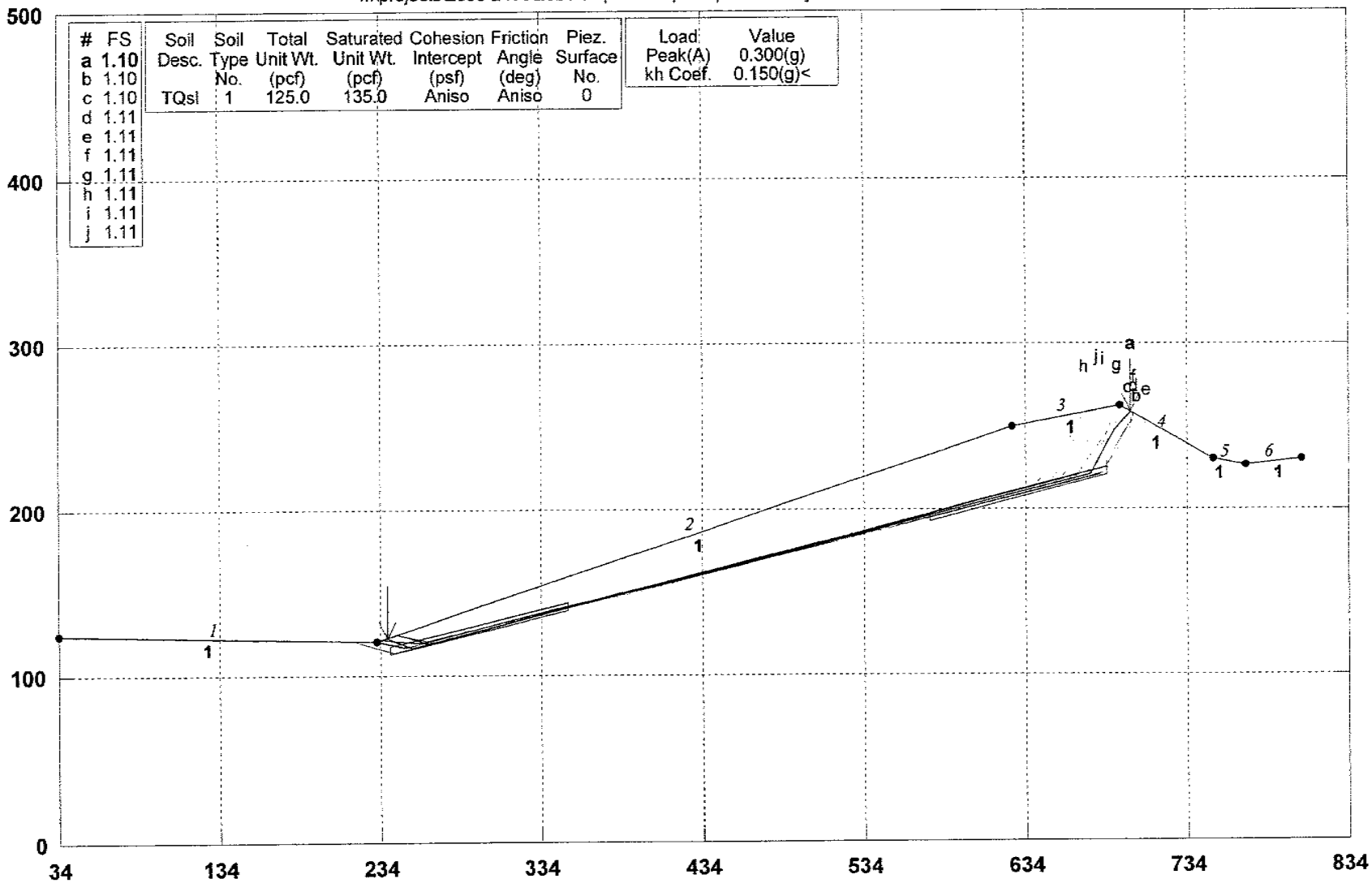
Point No.	X-Surf (ft)	Y-Surf (ft)
1	246.32	124.73
2	264.25	118.19
3	665.15	220.07
4	682.93	244.23
5	696.93	259.28

Factor of Safety
*** 1.693 ***
Individual data on the 6 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	17.9	13948.5	0.0	0.0	0.	0.	0.0	0.0	0.0
2	361.8	1183090.0	0.0	0.0	0.	0.	0.0	0.0	0.0
3	39.1	188202.2	0.0	0.0	0.	0.	0.0	0.0	0.0
4	17.8	59080.7	0.0	0.0	0.	0.	0.0	0.0	0.0
5	9.1	13685.4	0.0	0.0	0.	0.	0.0	0.0	0.0
6	4.9	2474.5	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 33-33' CS-5a; bedding plane search; pseudostatic

n:\projects\2000-2499\2023\slopes\t33bps1b.pl2 Run By: KPC 6/29/2004 11:55AM



GSTABL7 v.2 FSmin=1.10

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN NO. 76

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/29/2004
Time of Run: 11:55AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t33bps1b.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t33bps1b.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope3bps1b.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 33-33' CS-5a;
bedding plane search; pseudostatic

BOUNDARY COORDINATES
6 Top Boundaries
6 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	34.00	124.00	232.00	120.00	1
2	232.00	120.00	626.00	250.00	1
3	626.00	250.00	692.00	262.00	1
4	692.00	262.00	750.00	230.00	1
5	750.00	230.00	770.00	226.00	1
6	770.00	226.00	805.00	230.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	600.0	38.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	12.5	600.00	38.00
2	15.5	200.00	20.00
3	90.0	600.00	38.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.

500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	240.00	115.00	351.00	141.00	5.00
2	575.00	195.00	685.00	223.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 1.498 FS Min = 1.099 FS Ave = 1.211
Standard Deviation = 0.068 Coefficient of Variation = 5.62 %
Failure Surface Specified By 5 Coordinate Points

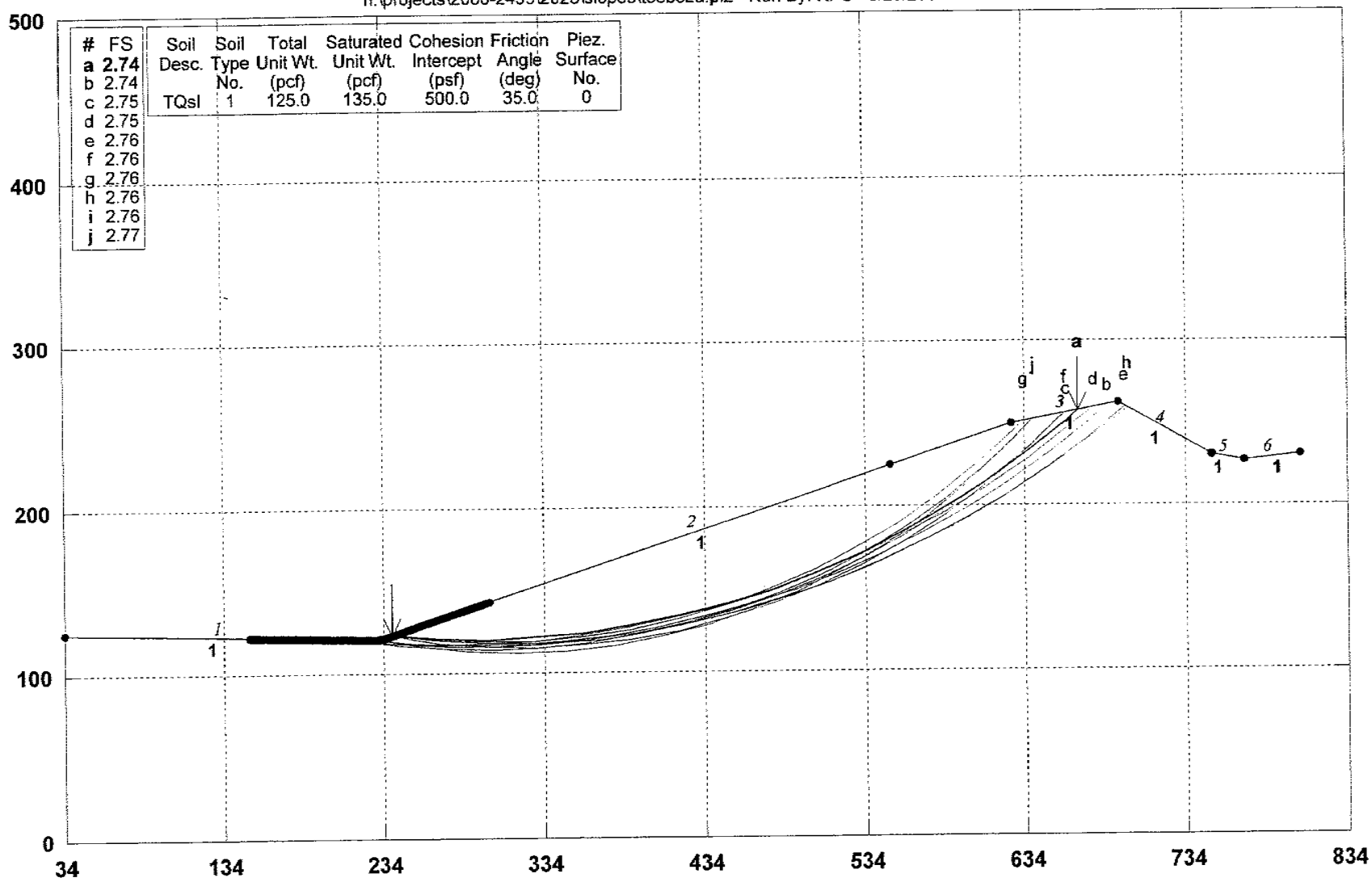
Point No.	X-Surf (ft)	Y-Surf (ft)
1	238.18	122.04
2	253.60	116.29
3	674.14	220.45
4	688.57	246.76
5	699.03	258.12

Factor of Safety
*** 1.099 ***
Individual data on the 6 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	15.4	10436.0	0.0	0.0	0.	0.	1565.4	0.0	0.0
2	372.4	1217380.8	0.0	0.0	0.	0.	*******	0.0	0.0
3	48.1	240034.4	0.0	0.0	0.	0.	36005.2	0.0	0.0
4	14.4	47696.8	0.0	0.0	0.	0.	7154.5	0.0	0.0
5	3.4	5609.6	0.0	0.0	0.	0.	841.4	0.0	0.0
6	7.0	5059.5	0.0	0.0	0.	0.	758.9	0.0	0.0

Mesas East, x-sec 33-33' CS-5a; circular; static

n:\projects\2000-2499\2023\slopes\t33bs2a.pl2 Run By: KPC 6/29/2004 12:03PM



GSTABL7 v.2 FSmin=2.74

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 77

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:          6/29/2004
Time of Run:                12:03PM
Run By:                     KPC
Input Data Filename:        N:\Projects\2000-2499\2023\Slopes\t33bs2a.in
Output Filename:            N:\Projects\2000-2499\2023\Slopes\t33bs2a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\2000-2499\2023\Slope3bs2a.PLT
PROBLEM DESCRIPTION:  Mesas East, x-sec 33-33' CS-5a;
                      circular; static
BOUNDARY COORDINATES
     Note: User origin value specified.
     Add 34.00 to X-values and 0.00 to Y-values listed.

    6 Top   Boundaries
    6 Total Boundaries
Boundary     X-Left      Y-Left     X-Right     Y-Right     Soil Type
   No.        (ft)        (ft)        (ft)        (ft)      Below Bnd
    1         34.00      124.00      232.00      120.00         1
    2        232.00      120.00      626.00      250.00         1
    3        626.00      250.00      692.00      262.00         1
    4        692.00      262.00      750.00      230.00         1
    5        750.00      230.00      770.00      226.00         1
    6        770.00      226.00      805.00      230.00         1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  1 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   125.0    135.0     500.0     35.0    0.00      0.0       0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
  10 Surface(s) Initiate(s) From Each Of   100 Points Equally Spaced
Along The Ground Surface Between  X = 150.00(ft)
                             and  X = 300.00(ft)
Each Surface Terminates Between   X = 550.00(ft)
                            and   X = 750.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =      0.00(ft)
30.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And  10.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Modified Bishop Method * *
      Total Number of Trial Surfaces Evaluated =  1000
      Statistical Data On All Valid FS Values:
         FS Max =   4.752   FS Min =   2.740   FS Ave =   3.568
         Standard Deviation =    0.484   Coefficient of Variation =   13.56 %
      Failure Surface Specified By 17 Coordinate Points
        Point      X-Surf      Y-Surf
         No.        (ft)        (ft)
```

1	239.39	122.44
2	269.33	120.44
3	299.32	119.98
4	329.30	121.09
5	359.19	123.75
6	388.89	127.95
7	418.34	133.68
8	447.45	140.94
9	476.14	149.69
10	504.34	159.92
11	531.98	171.60
12	558.97	184.69
13	585.25	199.17
14	610.74	214.98
15	635.38	232.10
16	659.09	250.47
17	667.26	257.50

Circle Center At X = 293.01 ; Y = 698.60 ; and Radius = 578.65

Factor of Safety

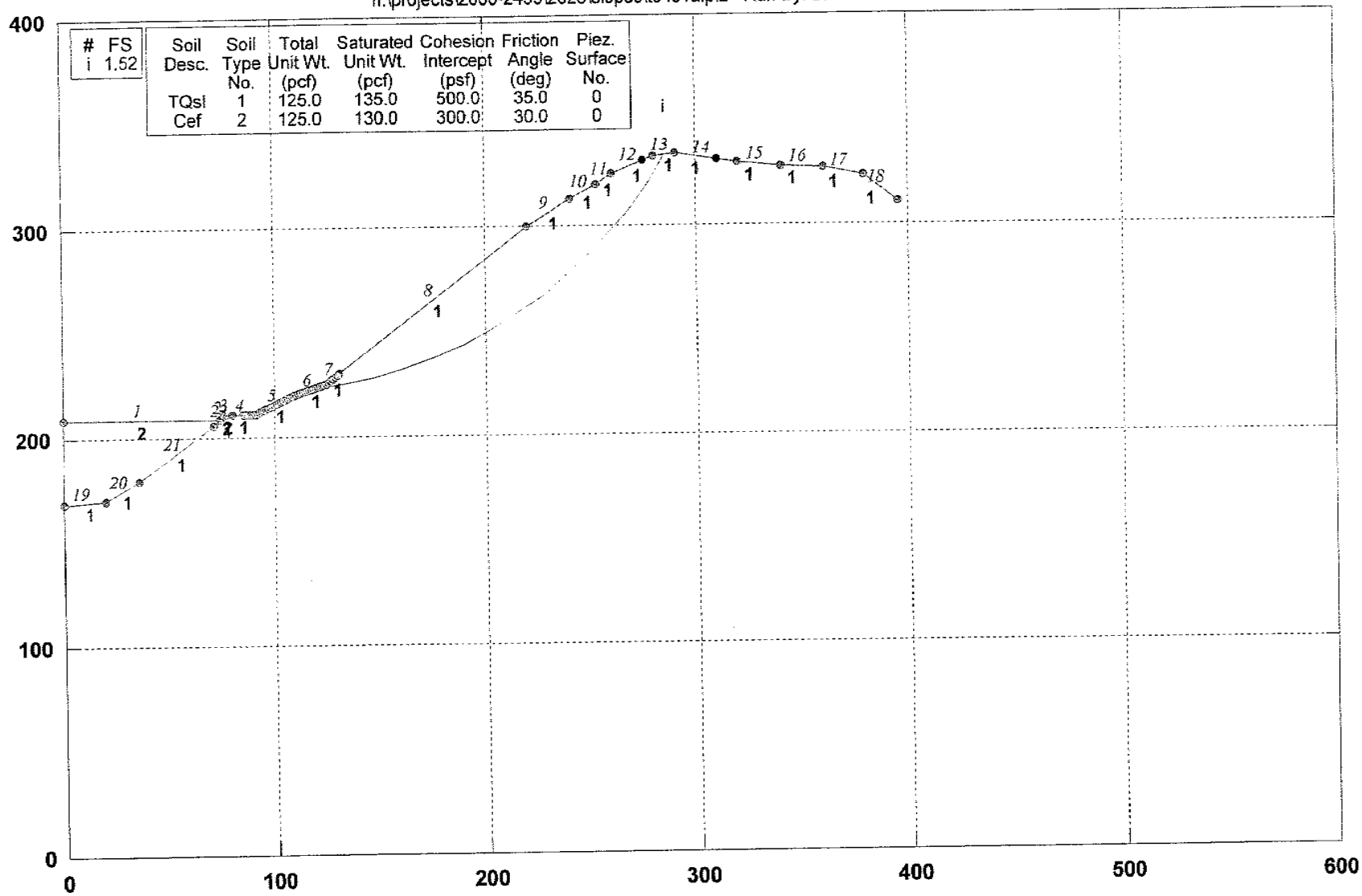
*** 2.740 ***

Individual data on the 17 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	29.9	22226.8	0.0	0.0	0.	0.	0.0	0.0	0.0
2	30.0	63948.1	0.0	0.0	0.	0.	0.0	0.0	0.0
3	30.0	99765.2	0.0	0.0	0.	0.	0.0	0.0	0.0
4	29.9	129303.1	0.0	0.0	0.	0.	0.0	0.0	0.0
5	29.7	152298.9	0.0	0.0	0.	0.	0.0	0.0	0.0
6	29.4	168605.9	0.0	0.0	0.	0.	0.0	0.0	0.0
7	29.1	178193.5	0.0	0.0	0.	0.	0.0	0.0	0.0
8	28.7	181148.6	0.0	0.0	0.	0.	0.0	0.0	0.0
9	28.2	177672.6	0.0	0.0	0.	0.	0.0	0.0	0.0
10	27.6	168079.5	0.0	0.0	0.	0.	0.0	0.0	0.0
11	27.0	152792.5	0.0	0.0	0.	0.	0.0	0.0	0.0
12	26.3	132336.5	0.0	0.0	0.	0.	0.0	0.0	0.0
13	25.5	107333.3	0.0	0.0	0.	0.	0.0	0.0	0.0
14	15.3	51887.0	0.0	0.0	0.	0.	0.0	0.0	0.0
15	9.4	25792.9	0.0	0.0	0.	0.	0.0	0.0	0.0
16	23.7	37282.3	0.0	0.0	0.	0.	0.0	0.0	0.0
17	8.2	2830.3	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 34-34' ; static Circular

n:\projects\2000-2499\2023\slopes\t34s1a.pl2 Run By: DA 7/15/2004 10:43AM



#	FS
i	1.52

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
TQsl	1	125.0	135.0	500.0	35.0	0
Cef	2	125.0	130.0	300.0	30.0	0

GSTABL7 v.2 FSmin=1.52

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No. 78

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 7/15/2004
Time of Run: 10:43AM
Run By: DA
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t34s1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t34s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope4s1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 34-34' ; static
Circular

BOUNDARY COORDINATES
18 Top Boundaries
22 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	209.00	74.00	209.00	2
2	74.00	209.00	76.00	211.00	2
3	76.00	211.00	80.00	211.00	2
4	80.00	211.00	91.00	211.00	1
5	91.00	211.00	110.00	220.00	1
6	110.00	220.00	125.00	225.00	1
7	125.00	225.00	131.00	230.00	1
8	131.00	230.00	220.00	300.00	1
9	220.00	300.00	240.00	313.00	1
10	240.00	313.00	253.00	320.00	1
11	253.00	320.00	260.00	325.00	1
12	260.00	325.00	280.00	333.00	1
13	280.00	333.00	290.00	334.00	1
14	290.00	334.00	320.00	330.00	1
15	320.00	330.00	340.00	328.00	1
16	340.00	328.00	360.00	327.00	1
17	360.00	327.00	379.00	323.00	1
18	379.00	323.00	395.00	311.00	1
19	0.00	168.00	20.00	170.00	1
20	20.00	170.00	36.00	179.00	1
21	36.00	179.00	71.00	206.00	1
22	71.00	206.00	80.00	211.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	500.0	35.0	0.00	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
4500 Trial Surfaces Have Been Generated.
100 Surface(s) Initiate(s) From Each Of 45 Points Equally Spaced
Along The Ground Surface Between X = 85.00(ft)
and X = 130.00(ft)

Each Surface Terminates Between X = 275.00(ft)
and X = 310.00(ft)

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
15.00(ft) Line Segments Define Each Trial Failure Surface.

Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 25.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 4500
Statistical Data On All Valid FS Values:
FS Max = 2.386 FS Min = 1.517 FS Ave = 1.826
Standard Deviation = 0.211 Coefficient of Variation = 11.57 %
Failure Surface Specified By 15 Coordinate Points

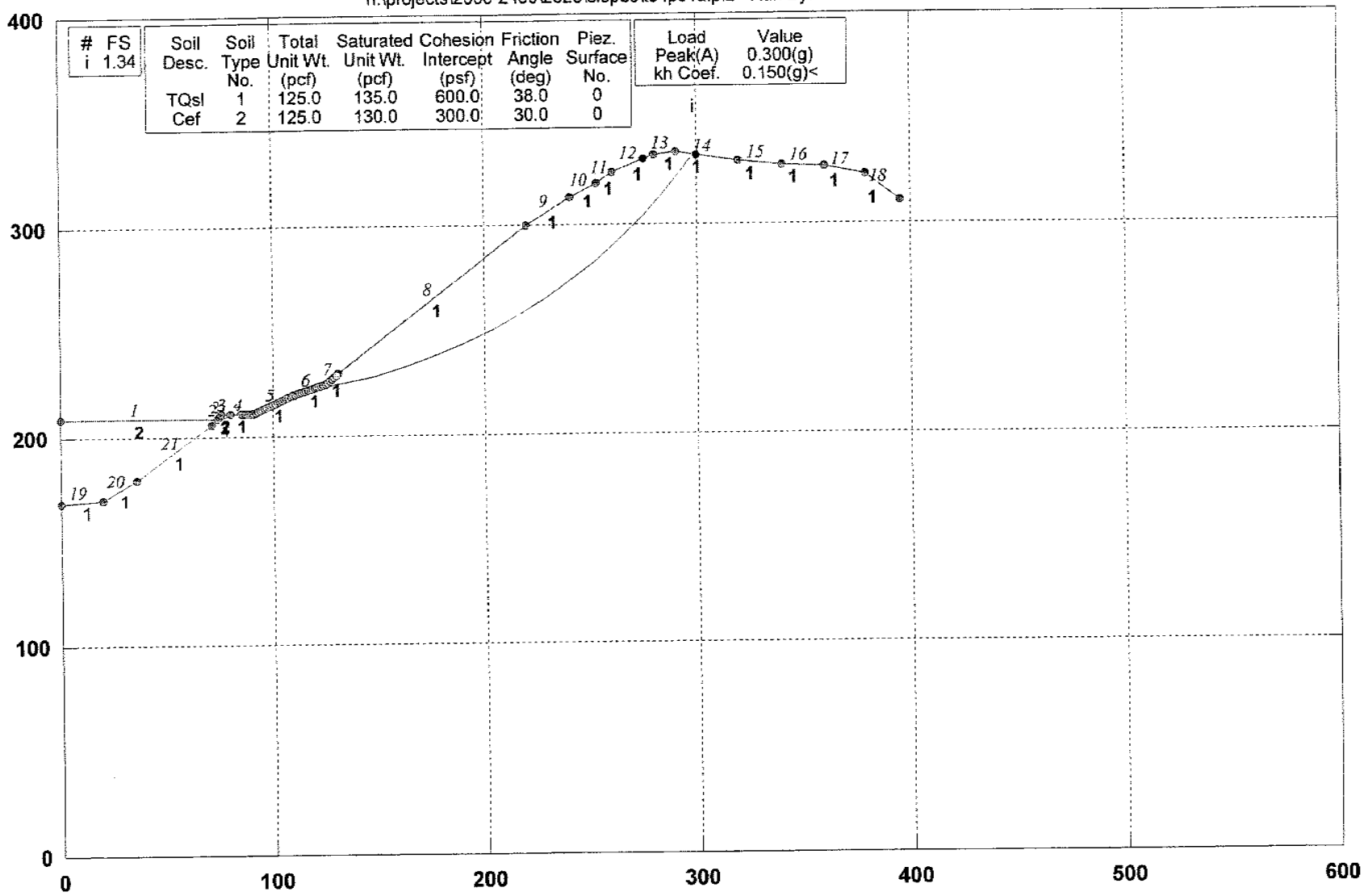
Point No.	X-Surf (ft)	Y-Surf (ft)
1	122.84	224.28
2	137.53	227.31
3	152.00	231.25
4	166.20	236.10
5	180.06	241.83
6	193.54	248.42
7	206.57	255.84
8	219.12	264.06
9	231.12	273.06
10	242.53	282.79
11	253.31	293.23
12	263.41	304.31
13	272.80	316.01
14	281.43	328.28
15	284.61	333.46

Circle Center At X = 82.03 ; Y = 459.44 ; and Radius = 238.68
Factor of Safety
*** 1.517 ***
Individual data on the 21 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	2.2	37.1	0.0	0.0	0.	0.	0.0	0.0	0.0
2	6.0	1617.2	0.0	0.0	0.	0.	0.0	0.0	0.0
3	6.5	4844.8	0.0	0.0	0.	0.	0.0	0.0	0.0
4	14.5	20889.9	0.0	0.0	0.	0.	0.0	0.0	0.0
5	14.2	32695.7	0.0	0.0	0.	0.	0.0	0.0	0.0
6	13.9	41888.6	0.0	0.0	0.	0.	0.0	0.0	0.0
7	13.5	48455.6	0.0	0.0	0.	0.	0.0	0.0	0.0
8	13.0	52446.4	0.0	0.0	0.	0.	0.0	0.0	0.0
9	12.5	53972.5	0.0	0.0	0.	0.	0.0	0.0	0.0
10	0.9	3889.8	0.0	0.0	0.	0.	0.0	0.0	0.0
11	11.1	48260.1	0.0	0.0	0.	0.	0.0	0.0	0.0
12	8.9	36928.1	0.0	0.0	0.	0.	0.0	0.0	0.0
13	2.5	10120.3	0.0	0.0	0.	0.	0.0	0.0	0.0
14	10.5	38367.1	0.0	0.0	0.	0.	0.0	0.0	0.0
15	0.3	1053.9	0.0	0.0	0.	0.	0.0	0.0	0.0
16	6.7	21499.3	0.0	0.0	0.	0.	0.0	0.0	0.0
17	3.4	9920.8	0.0	0.0	0.	0.	0.0	0.0	0.0
18	9.4	21213.1	0.0	0.0	0.	0.	0.0	0.0	0.0
19	7.2	9387.9	0.0	0.0	0.	0.	0.0	0.0	0.0
20	1.4	1041.1	0.0	0.0	0.	0.	0.0	0.0	0.0
21	3.2	966.4	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 34-34' ; static Circular

n:\projects\2000-2499\2023\slopes\t34ps1a.pl2 Run By: DA 7/15/2004 10:50AM



GSTABL7 v.2 FSmin=1.33

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No. 79

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 7/15/2004
Time of Run: 10:50AM
Run By: DA
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t34ps1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t34ps1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope4ps1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 34-34' ; static
Circular

BOUNDARY COORDINATES
18 Top Boundaries
22 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	209.00	74.00	209.00	2
2	74.00	209.00	76.00	211.00	2
3	76.00	211.00	80.00	211.00	2
4	80.00	211.00	91.00	211.00	1
5	91.00	211.00	110.00	220.00	1
6	110.00	220.00	125.00	225.00	1
7	125.00	225.00	131.00	230.00	1
8	131.00	230.00	220.00	300.00	1
9	220.00	300.00	240.00	313.00	1
10	240.00	313.00	253.00	320.00	1
11	253.00	320.00	260.00	325.00	1
12	260.00	325.00	280.00	333.00	1
13	280.00	333.00	290.00	334.00	1
14	290.00	334.00	320.00	330.00	1
15	320.00	330.00	340.00	328.00	1
16	340.00	328.00	360.00	327.00	1
17	360.00	327.00	379.00	323.00	1
18	379.00	323.00	395.00	311.00	1
19	0.00	168.00	20.00	170.00	1
20	20.00	170.00	36.00	179.00	1
21	36.00	179.00	71.00	206.00	1
22	71.00	206.00	80.00	211.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	600.0	38.0	0.00	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1800 Trial Surfaces Have Been Generated.
40 Surface(s) Initiate(s) From Each Of 45 Points Equally Spaced
Along The Ground Surface Between X = 85.00(ft)
and X = 130.00(ft)
Each Surface Terminates Between X = 275.00(ft)

and X = 300.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
15.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 25.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1800
Statistical Data On All Valid FS Values:
FS Max = 1.941 FS Min = 1.331 FS Ave = 1.545
Standard Deviation = 0.162 Coefficient of Variation = 10.46 %
Failure Surface Specified By 15 Coordinate Points

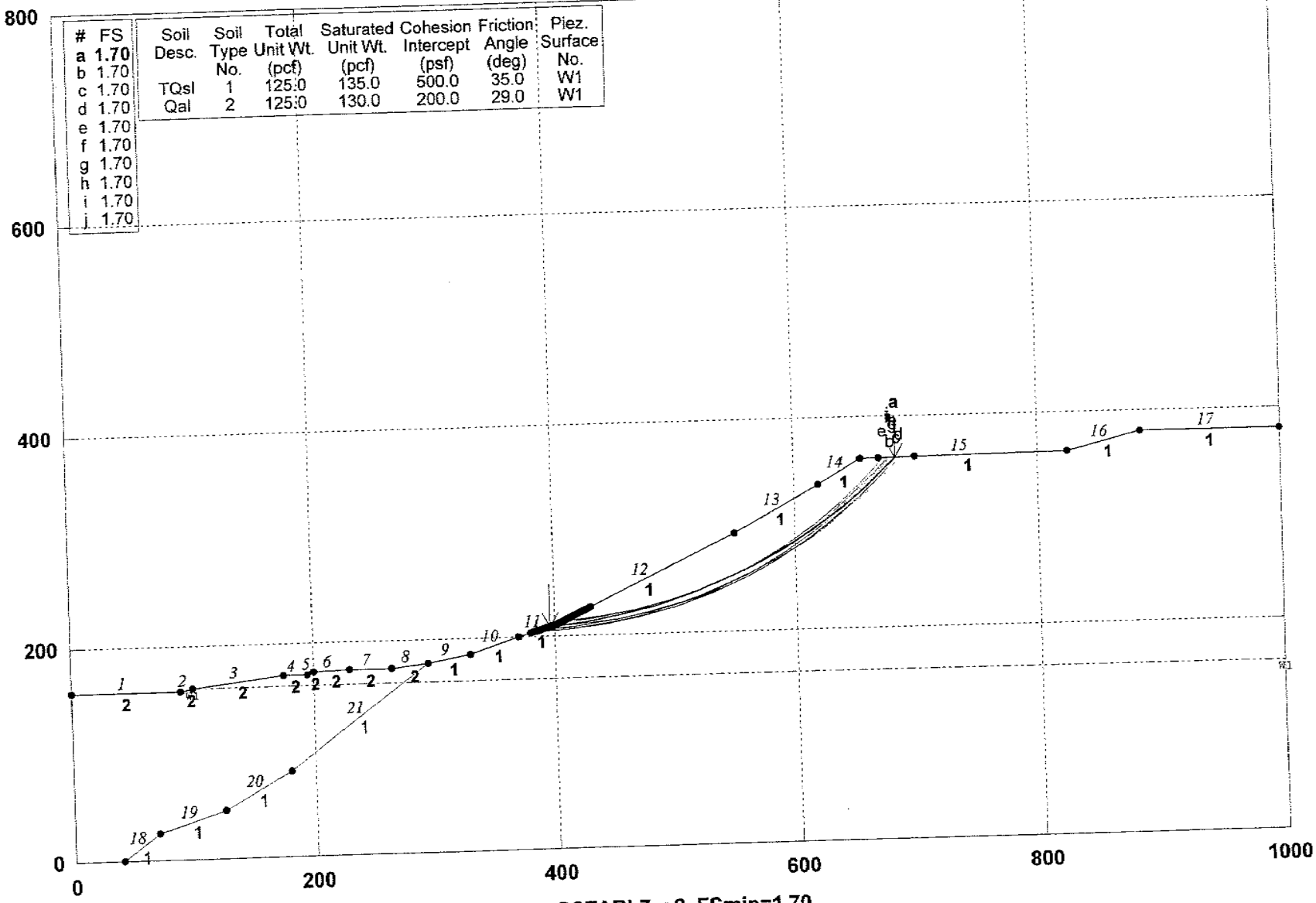
Point No.	X-Surf (ft)	Y-Surf (ft)
1	124.89	224.96
2	139.55	228.14
3	154.01	232.12
4	168.23	236.89
5	182.17	242.43
6	195.78	248.74
7	209.02	255.78
8	221.86	263.53
9	234.25	271.99
10	246.16	281.11
11	257.55	290.87
12	268.39	301.24
13	278.64	312.19
14	288.27	323.69
15	295.43	333.28

Circle Center At X = 74.44 ; Y = 492.98 ; and Radius = 272.73
Factor of Safety
*** 1.331 ***
Individual data on the 22 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	0.1	0.1	0.0	0.0	0.	0.	0.0	0.0	0.0
2	6.0	1397.0	0.0	0.0	0.	0.	209.6	0.0	0.0
3	8.5	6565.5	0.0	0.0	0.	0.	984.8	0.0	0.0
4	14.5	22195.8	0.0	0.0	0.	0.	3329.4	0.0	0.0
5	14.2	34102.7	0.0	0.0	0.	0.	5115.4	0.0	0.0
6	13.9	43732.3	0.0	0.0	0.	0.	6559.8	0.0	0.0
7	13.6	51067.0	0.0	0.0	0.	0.	7660.0	0.0	0.0
8	13.2	56131.5	0.0	0.0	0.	0.	8419.7	0.0	0.0
9	11.0	50200.2	0.0	0.0	0.	0.	7530.0	0.0	0.0
10	1.9	8762.7	0.0	0.0	0.	0.	1314.4	0.0	0.0
11	12.4	58053.4	0.0	0.0	0.	0.	8708.0	0.0	0.0
12	5.7	26533.6	0.0	0.0	0.	0.	3980.0	0.0	0.0
13	6.2	27667.2	0.0	0.0	0.	0.	4150.1	0.0	0.0
14	6.8	29161.1	0.0	0.0	0.	0.	4374.2	0.0	0.0
15	4.6	18612.3	0.0	0.0	0.	0.	2791.8	0.0	0.0
16	2.4	9817.0	0.0	0.0	0.	0.	1472.6	0.0	0.0
17	8.4	30877.4	0.0	0.0	0.	0.	4631.6	0.0	0.0
18	10.2	30344.1	0.0	0.0	0.	0.	4551.6	0.0	0.0
19	1.4	3362.1	0.0	0.0	0.	0.	504.3	0.0	0.0
20	8.3	15143.2	0.0	0.0	0.	0.	2271.5	0.0	0.0
21	1.7	1963.0	0.0	0.0	0.	0.	294.4	0.0	0.0
22	5.4	2712.4	0.0	0.0	0.	0.	406.9	0.0	0.0

Mesas East, x-sec 35-35'; static; Circular

n:\projects\2000-2499\2023\slopes\t35s1a.pl2 Run By: VKP 6/28/2004 01:59PM



#	FS
a	1.70
b	1.70
c	1.70
d	1.70
e	1.70
f	1.70
g	1.70
h	1.70
i	1.70
j	1.70

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
TQsl	1	125.0	135.0	500.0	35.0	W1
Qal	2	125.0	130.0	200.0	29.0	W1

GSTABL7 v.2 FSmin=1.70

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No. 80

*** **GSTABL7** ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/28/2004
Time of Run: 01:59PM
Run By: VKP
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t35s1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t35s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope5s1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 35-35'; static;
Circular

BOUNDARY COORDINATES
17 Top Boundaries
21 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	158.00	90.00	158.00	2
2	90.00	158.00	100.00	160.00	2
3	100.00	160.00	175.00	170.00	2
4	175.00	170.00	195.00	170.00	2
5	195.00	170.00	200.00	173.00	2
6	200.00	173.00	230.00	174.00	2
7	230.00	174.00	265.00	174.00	2
8	265.00	174.00	295.00	178.00	2
9	295.00	178.00	330.00	185.00	1
10	330.00	185.00	370.00	200.00	1
11	370.00	200.00	400.00	210.00	1
12	400.00	210.00	550.00	293.00	1
13	550.00	293.00	620.00	336.00	1
14	620.00	336.00	655.00	360.00	1
15	655.00	360.00	825.00	363.00	1
16	825.00	363.00	885.00	380.00	1
17	885.00	380.00	1000.00	380.00	1
18	40.00	0.00	70.00	25.00	1
19	70.00	25.00	125.00	45.00	1
20	125.00	45.00	180.00	80.00	1
21	180.00	80.00	295.00	178.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	500.0	35.0	0.00	0.0	1
2	125.0	130.0	200.0	29.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	100.00	160.00
2	1000.00	160.00

A Critical Failure Surface Searching Method, Using A Random

Technique For Generating Circular Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 380.00(ft)
and X = 430.00(ft)
Each Surface Terminates Between X = 670.00(ft)
and X = 700.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
30.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 2.713 FS Min = 1.699 FS Ave = 2.027
Standard Deviation = 0.271 Coefficient of Variation = 13.35 %
Failure Surface Specified By 13 Coordinate Points

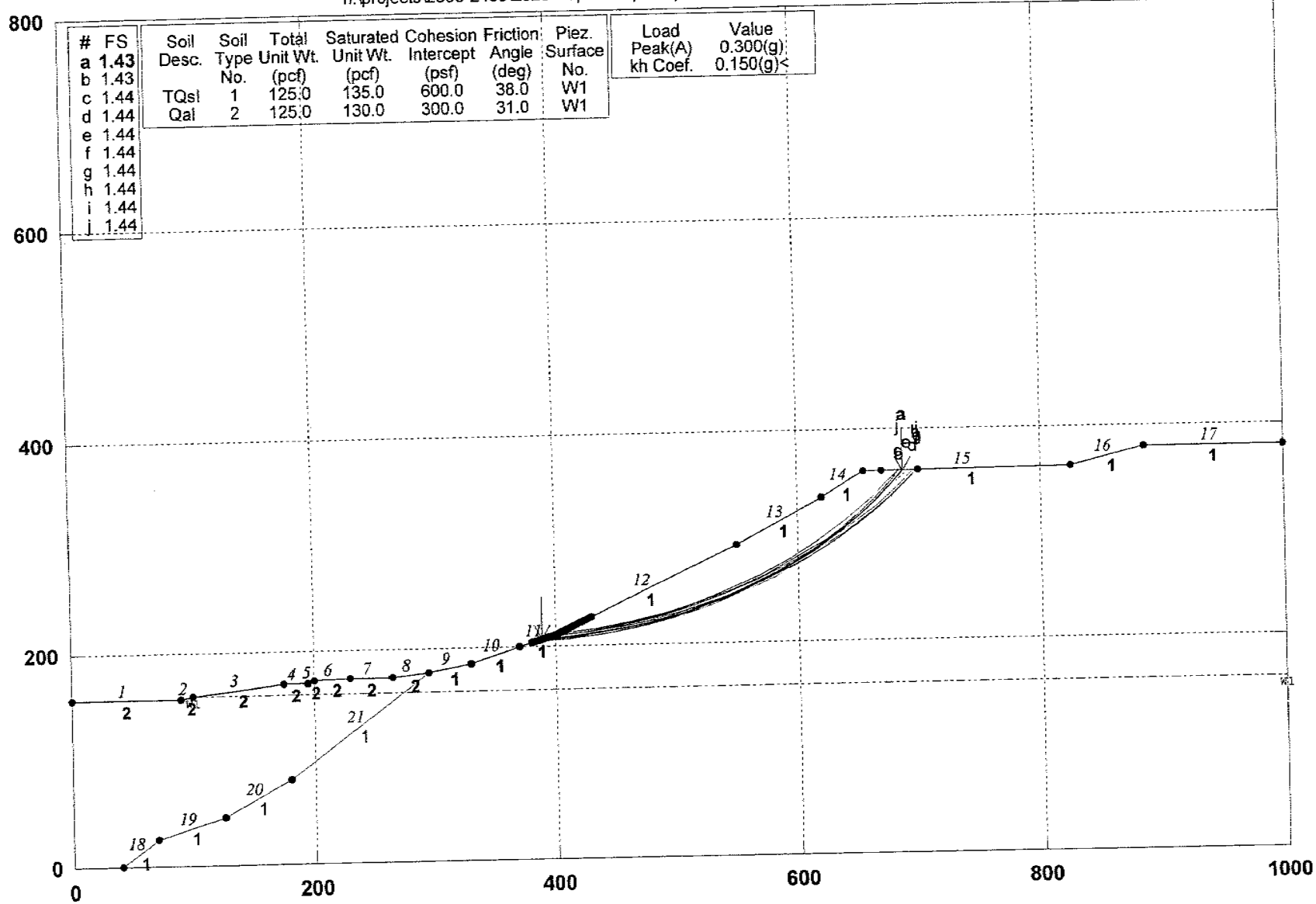
Point No.	X-Surf (ft)	Y-Surf (ft)
1	396.33	208.78
2	426.09	212.52
3	455.52	218.38
4	484.45	226.30
5	512.75	236.26
6	540.27	248.19
7	566.88	262.06
8	592.43	277.77
9	616.81	295.26
10	639.88	314.43
11	661.54	335.19
12	681.67	357.43
13	684.08	360.51

Circle Center At X = 358.42 ; Y = 629.71 ; and Radius = 422.64
Factor of Safety
*** 1.699 ***
Individual data on the 16 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	3.7	174.9	0.0	0.0	0.	0.	0.0	0.0	0.0
2	26.1	20668.2	0.0	0.0	0.	0.	0.0	0.0	0.0
3	29.4	62995.0	0.0	0.0	0.	0.	0.0	0.0	0.0
4	28.9	95434.1	0.0	0.0	0.	0.	0.0	0.0	0.0
5	28.3	117730.2	0.0	0.0	0.	0.	0.0	0.0	0.0
6	27.5	129965.1	0.0	0.0	0.	0.	0.0	0.0	0.0
7	9.7	48130.2	0.0	0.0	0.	0.	0.0	0.0	0.0
8	16.9	85496.3	0.0	0.0	0.	0.	0.0	0.0	0.0
9	25.6	131946.8	0.0	0.0	0.	0.	0.0	0.0	0.0
10	24.4	122008.8	0.0	0.0	0.	0.	0.0	0.0	0.0
11	3.2	15328.1	0.0	0.0	0.	0.	0.0	0.0	0.0
12	19.9	91099.5	0.0	0.0	0.	0.	0.0	0.0	0.0
13	15.1	62626.0	0.0	0.0	0.	0.	0.0	0.0	0.0
14	6.5	22899.0	0.0	0.0	0.	0.	0.0	0.0	0.0
15	20.1	35184.7	0.0	0.0	0.	0.	0.0	0.0	0.0
16	2.4	458.5	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 35-35'; static; Circular

n:\projects\2000-2499\2023\slopes\t35ps1a.pl2 Run By: VKP 6/28/2004 02:02PM



GSTABL7 v.2 FSmin=1.43

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 81

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/28/2004
Time of Run: 02:02PM
Run By: VKP
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t35ps1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t35ps1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope5ps1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 35-35'; static;
Circular

BOUNDARY COORDINATES
17 Top Boundaries
21 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	158.00	90.00	158.00	2
2	90.00	158.00	100.00	160.00	2
3	100.00	160.00	175.00	170.00	2
4	175.00	170.00	195.00	170.00	2
5	195.00	170.00	200.00	173.00	2
6	200.00	173.00	230.00	174.00	2
7	230.00	174.00	265.00	174.00	2
8	265.00	174.00	295.00	178.00	2
9	295.00	178.00	330.00	185.00	1
10	330.00	185.00	370.00	200.00	1
11	370.00	200.00	400.00	210.00	1
12	400.00	210.00	550.00	293.00	1
13	550.00	293.00	620.00	336.00	1
14	620.00	336.00	655.00	360.00	1
15	655.00	360.00	825.00	363.00	1
16	825.00	363.00	885.00	380.00	1
17	885.00	380.00	1000.00	380.00	1
18	40.00	0.00	70.00	25.00	1
19	70.00	25.00	125.00	45.00	1
20	125.00	45.00	180.00	80.00	1
21	180.00	80.00	295.00	178.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	600.0	38.0	0.00	0.0	1
2	125.0	130.0	300.0	31.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	100.00	160.00
2	1000.00	160.00

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)

Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 380.00(ft)
and X = 430.00(ft)
Each Surface Terminates Between X = 670.00(ft)
and X = 700.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
30.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 2.327 FS Min = 1.433 FS Ave = 1.722
Standard Deviation = 0.241 Coefficient of Variation = 13.98 %
Failure Surface Specified By 13 Coordinate Points

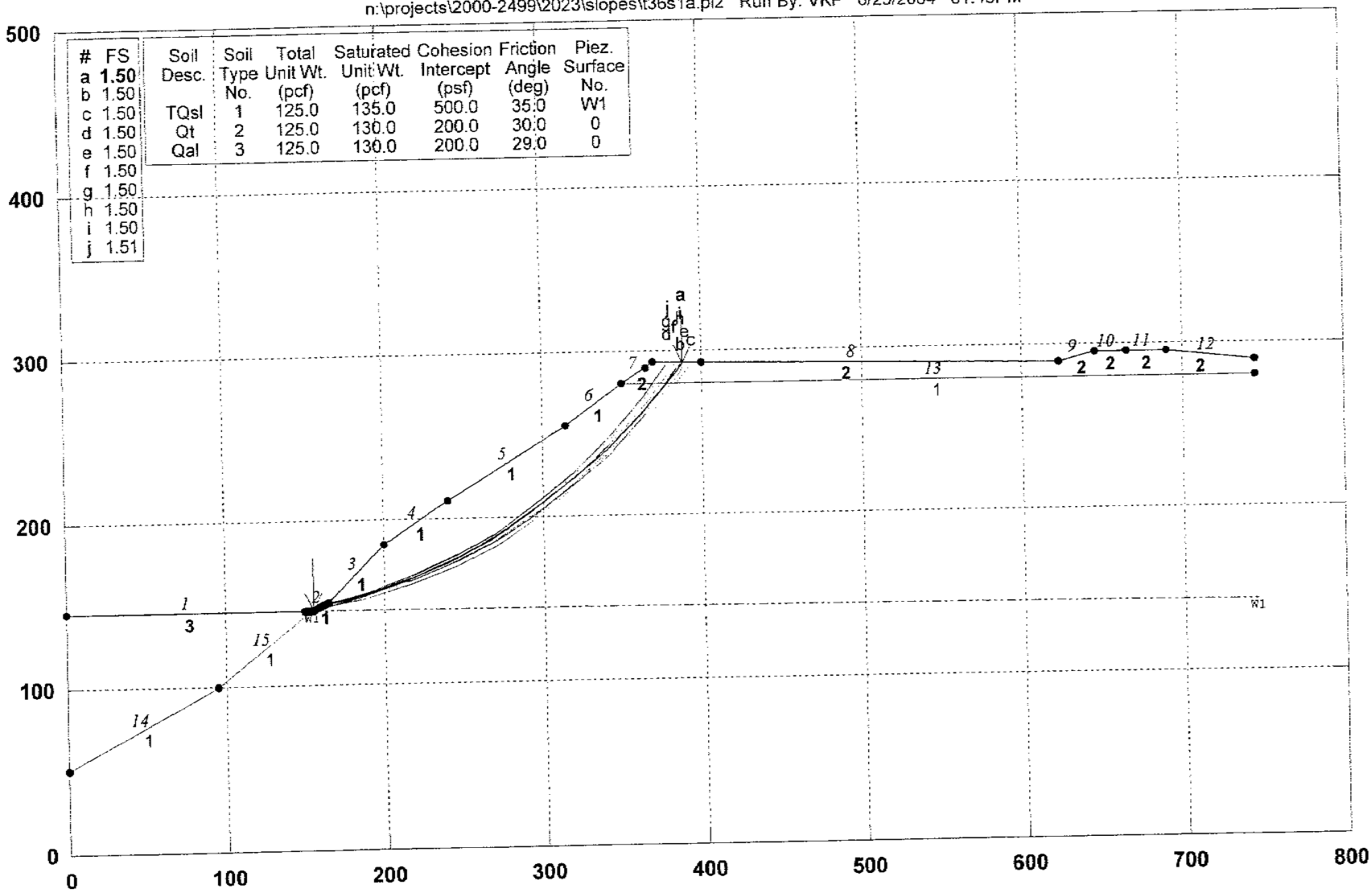
Point No.	X-Surf (ft)	Y-Surf (ft)
1	389.18	206.39
2	419.10	208.66
3	448.76	213.18
4	477.99	219.93
5	506.62	228.88
6	534.50	239.97
7	561.45	253.13
8	587.34	268.30
9	612.00	285.39
10	635.29	304.29
11	657.09	324.90
12	677.27	347.10
13	687.77	360.58

Circle Center At X = 374.27 ; Y = 602.20 ; and Radius = 396.08
Factor of Safety
*** 1.433 ***
Individual data on the 16 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	10.8	1883.9	0.0	0.0	0.	0.	282.6	0.0	0.0
2	19.1	17541.7	0.0	0.0	0.	0.	2631.3	0.0	0.0
3	29.7	66185.9	0.0	0.0	0.	0.	9927.9	0.0	0.0
4	29.2	104161.7	0.0	0.0	0.	0.	15624.3	0.0	0.0
5	28.6	131247.3	0.0	0.0	0.	0.	19687.1	0.0	0.0
6	27.9	147341.2	0.0	0.0	0.	0.	22101.2	0.0	0.0
7	15.5	87124.8	0.0	0.0	0.	0.	13068.7	0.0	0.0
8	11.5	66112.0	0.0	0.0	0.	0.	9916.8	0.0	0.0
9	25.9	152924.6	0.0	0.0	0.	0.	22938.7	0.0	0.0
10	24.7	143845.8	0.0	0.0	0.	0.	21576.9	0.0	0.0
11	8.0	44931.1	0.0	0.0	0.	0.	6739.7	0.0	0.0
12	15.3	82501.3	0.0	0.0	0.	0.	12375.2	0.0	0.0
13	19.7	97647.5	0.0	0.0	0.	0.	14647.1	0.0	0.0
14	2.1	9441.2	0.0	0.0	0.	0.	1416.2	0.0	0.0
15	20.2	61074.3	0.0	0.0	0.	0.	9161.2	0.0	0.0
16	10.5	8725.0	0.0	0.0	0.	0.	1308.7	0.0	0.0

Mesas East, x-sec 36-36'; static; Circular

n:\projects\2000-2499\2023\slopes\t36s1a.pl2 Run By: VKP 6/25/2004 01:48PM



GSTABL7 v.2 FSmin=1.50

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 82

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/25/2004
Time of Run: 01:48PM
Run By: VKP
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t36s1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t36s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope6s1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 36-36'; static;
Circular

BOUNDARY COORDINATES
12 Top Boundaries
15 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	145.00	155.00	145.00	3
2	155.00	145.00	165.00	150.00	1
3	165.00	150.00	200.00	185.00	1
4	200.00	185.00	240.00	210.00	1
5	240.00	210.00	315.00	255.00	1
6	315.00	255.00	350.00	280.00	1
7	350.00	280.00	370.00	293.00	2
8	370.00	293.00	623.00	290.00	2
9	623.00	290.00	645.00	295.00	2
10	645.00	295.00	665.00	295.00	2
11	665.00	295.00	690.00	295.00	2
12	690.00	295.00	745.00	290.00	2
13	350.00	280.00	745.00	280.00	1
14	0.00	50.00	95.00	100.00	1
15	95.00	100.00	155.00	145.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	500.0	35.0	0.00	0.0	1
2	125.0	130.0	200.0	30.0	0.00	0.0	0
3	125.0	130.0	200.0	29.0	0.00	0.0	0

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	155.00	145.00
2	745.00	143.00

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 150.00(ft)
and X = 165.00(ft)

Each Surface Terminates Between X = 365.00(ft)
and X = 400.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
30.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 2.161 FS Min = 1.496 FS Ave = 1.786
Standard Deviation = 0.165 Coefficient of Variation = 9.26 %
Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	155.20	145.10
2	184.30	152.40
3	212.76	161.89
4	240.43	173.50
5	267.13	187.17
6	292.72	202.82
7	317.06	220.36
8	340.00	239.70
9	361.41	260.71
10	381.16	283.29
11	388.28	292.78

Circle Center At X = 73.41 ; Y = 532.69 ; and Radius = 396.12
Factor of Safety
*** 1.496 ***
Individual data on the 17 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	9.8	1493.7	0.0	0.0	0.	0.	0.0	0.0	0.0
2	19.3	23328.2	0.0	0.0	0.	0.	0.0	0.0	0.0
3	15.7	43428.3	0.0	0.0	0.	0.	0.0	0.0	0.0
4	12.8	46631.5	0.0	0.0	0.	0.	0.0	0.0	0.0
5	27.2	115366.3	0.0	0.0	0.	0.	0.0	0.0	0.0
6	0.4	1955.5	0.0	0.0	0.	0.	0.0	0.0	0.0
7	26.7	126628.7	0.0	0.0	0.	0.	0.0	0.0	0.0
8	25.6	124649.7	0.0	0.0	0.	0.	0.0	0.0	0.0
9	22.3	104331.6	0.0	0.0	0.	0.	0.0	0.0	0.0
10	2.1	9296.0	0.0	0.0	0.	0.	0.0	0.0	0.0
11	22.9	99299.2	0.0	0.0	0.	0.	0.0	0.0	0.0
12	10.0	39786.1	0.0	0.0	0.	0.	0.0	0.0	0.0
13	11.4	40763.5	0.0	0.0	0.	0.	0.0	0.0	0.0
14	8.6	26408.3	0.0	0.0	0.	0.	0.0	0.0	0.0
15	8.3	18311.3	0.0	0.0	0.	0.	0.0	0.0	0.0
16	2.9	4044.9	0.0	0.0	0.	0.	0.0	0.0	0.0
17	7.1	4259.2	0.0	0.0	0.	0.	0.0	0.0	0.0

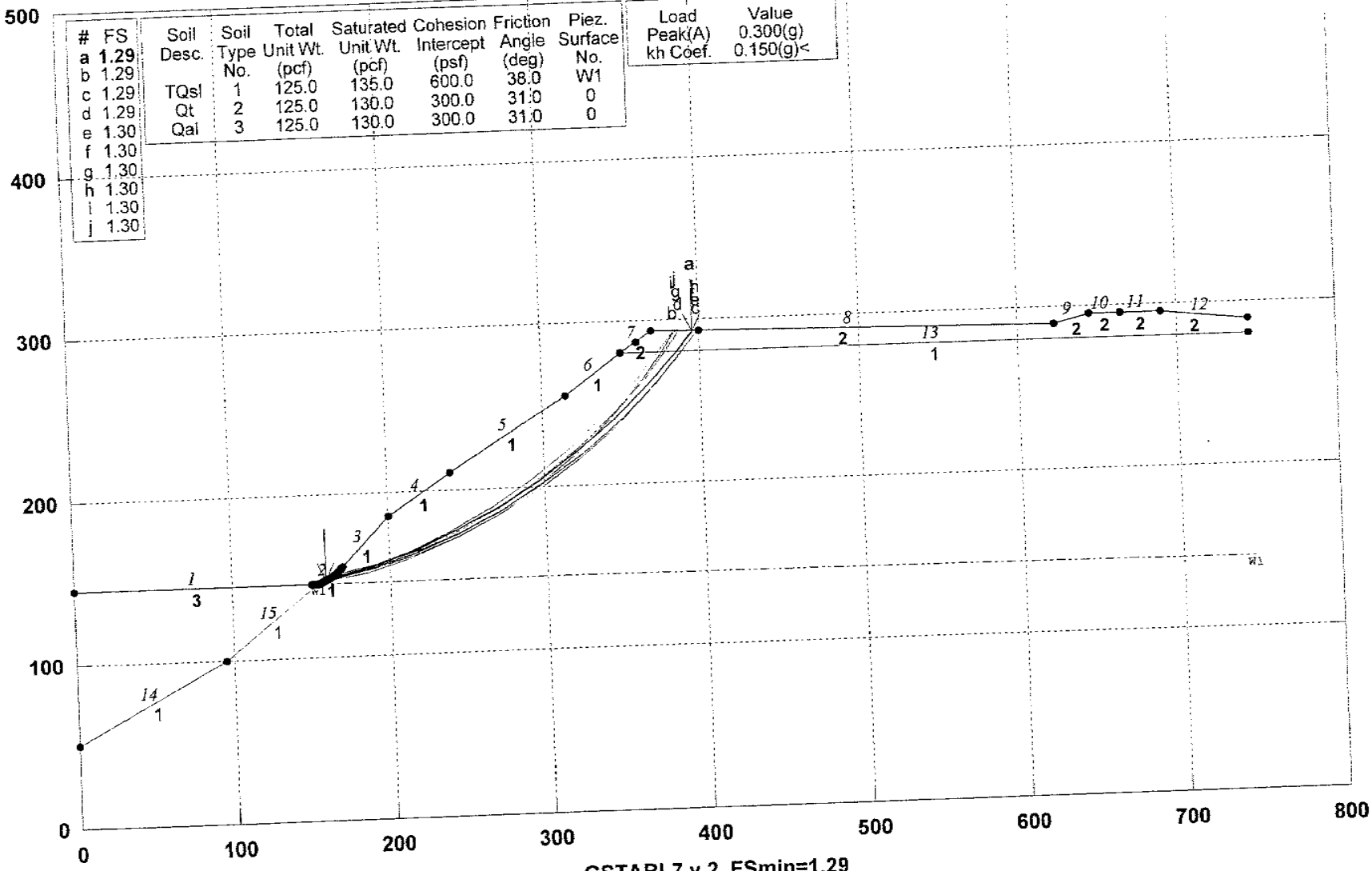
Mesas East, x-sec 36-36'; pseudostatic; Circular

n:\projects\2000-2499\2023\slopes\t36ps1a.pl2 Run By: VKP 6/25/2004 01:53PM

#	FS
a	1.29
b	1.29
c	1.29
d	1.29
e	1.30
f	1.30
g	1.30
h	1.30
i	1.30
j	1.30

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
TQsl	1	125.0	135.0	600.0	38.0	W1
Qt	2	125.0	130.0	300.0	31.0	0
Qal	3	125.0	130.0	300.0	31.0	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<



GSTABL7 v.2 FSmin=1.29

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 83

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/25/2004
Time of Run: 01:53PM
Run By: VKP
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t36ps1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t36ps1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope6ps1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 36-36'; pseudostatic; Circular

BOUNDARY COORDINATES
12 Top Boundaries
15 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	145.00	155.00	145.00	3
2	155.00	145.00	165.00	150.00	1
3	165.00	150.00	200.00	185.00	1
4	200.00	185.00	240.00	210.00	1
5	240.00	210.00	315.00	255.00	1
6	315.00	255.00	350.00	280.00	1
7	350.00	280.00	370.00	293.00	2
8	370.00	293.00	623.00	290.00	2
9	623.00	290.00	645.00	295.00	2
10	645.00	295.00	665.00	295.00	2
11	665.00	295.00	690.00	295.00	2
12	690.00	295.00	745.00	290.00	2
13	350.00	280.00	745.00	280.00	1
14	0.00	50.00	95.00	100.00	1
15	95.00	100.00	155.00	145.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	600.0	38.0	0.00	0.0	1
2	125.0	130.0	300.0	31.0	0.00	0.0	0
3	125.0	130.0	300.0	31.0	0.00	0.0	0

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	155.00	145.00
2	745.00	143.00

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.

500 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 150.00(ft)
and X = 170.00(ft)
Each Surface Terminates Between X = 360.00(ft)
and X = 400.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
30.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 1.959 FS Min = 1.290 FS Ave = 1.561
Standard Deviation = 0.161 Coefficient of Variation = 10.33 %
Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	159.39	147.19
2	188.45	154.63
3	216.91	164.12
4	244.63	175.60
5	271.46	189.01
6	297.27	204.31
7	321.93	221.39
8	345.32	240.18
9	367.31	260.59
10	387.80	282.50
11	396.05	292.69

Circle Center At X = 69.28 ; Y = 559.75 ; and Radius = 422.28
Factor of Safety
*** 1.290 ***
Individual data on the 17 slices

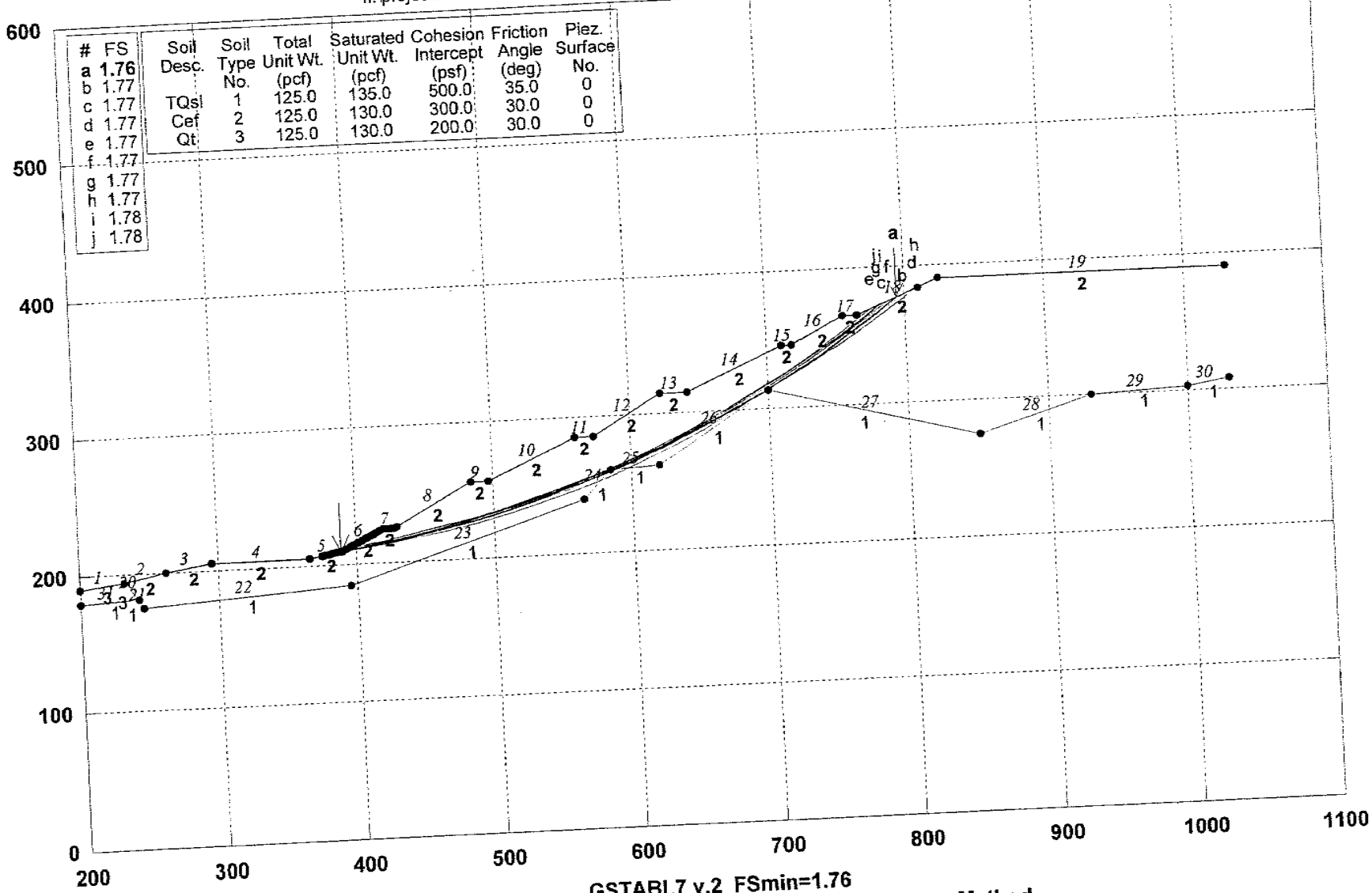
Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	5.6	480.5	0.0	0.0	0.	0.	72.1	0.0	0.0
2	23.5	29588.9	0.0	0.0	0.	0.	4438.3	0.0	0.0
3	11.5	32725.9	0.0	0.0	0.	0.	4908.9	0.0	0.0
4	16.9	61279.6	0.0	0.0	0.	0.	9191.9	0.0	0.0
5	23.1	97798.6	0.0	0.0	0.	0.	14669.8	0.0	0.0
6	4.6	21265.0	0.0	0.0	0.	0.	3189.7	0.0	0.0
7	26.8	129198.4	0.0	0.0	0.	0.	19379.8	0.0	0.0
8	25.8	128925.4	0.0	0.0	0.	0.	19338.8	0.0	0.0
9	17.7	86948.0	0.0	0.0	0.	0.	13042.2	0.0	0.0
10	6.9	33349.9	0.0	0.0	0.	0.	5002.5	0.0	0.0
11	23.4	109672.3	0.0	0.0	0.	0.	16450.8	0.0	0.0
12	4.7	21057.3	0.0	0.0	0.	0.	3158.6	0.0	0.0
13	17.3	71553.0	0.0	0.0	0.	0.	10732.9	0.0	0.0
14	2.7	10123.8	0.0	0.0	0.	0.	1518.6	0.0	0.0
15	15.5	40924.2	0.0	0.0	0.	0.	6138.6	0.0	0.0
16	2.3	3375.1	0.0	0.0	0.	0.	506.3	0.0	0.0
17	8.3	5307.4	0.0	0.0	0.	0.	796.1	0.0	0.0

Mesas East, x-sec 37-37'; static; Circular

n:\projects\2000-2499\2023\slopes\t37s1a.pl2 Run By: DA 6/23/2004 04:13PM

#	FS
a	1.76
b	1.77
c	1.77
d	1.77
e	1.77
f	1.77
g	1.77
h	1.77
i	1.78
j	1.78

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
TQsl	1	125.0	135.0	500.0	35.0	0
Cef	2	125.0	130.0	300.0	30.0	0
Qt	3	125.0	130.0	200.0	30.0	0



GSTABL7 v.2 FSmin=1.76

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 84

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/23/2004
Time of Run: 04:13PM
Run By: DA
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t37s1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t37s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope7s1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 37-37'; static;
Circular

BOUNDARY COORDINATES
19 Top Boundaries
31 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	200.00	190.00	232.00	194.00	3
2	232.00	194.00	262.00	200.00	2
3	262.00	200.00	295.00	205.00	2
4	295.00	205.00	366.00	205.00	2
5	366.00	205.00	390.00	210.00	2
6	390.00	210.00	420.00	225.00	2
7	420.00	225.00	428.00	225.00	2
8	428.00	225.00	484.00	256.00	2
9	484.00	256.00	497.00	256.00	2
10	497.00	256.00	560.00	285.00	2
11	560.00	285.00	573.00	285.00	2
12	573.00	285.00	622.00	314.00	2
13	622.00	314.00	642.00	314.00	2
14	642.00	314.00	710.00	345.00	2
15	710.00	345.00	718.00	345.00	2
16	718.00	345.00	755.00	365.00	2
17	755.00	365.00	765.00	365.00	2
18	765.00	365.00	825.00	390.00	2
19	825.00	390.00	1030.00	390.00	2
20	232.00	194.00	243.00	182.00	3
21	243.00	182.00	246.00	175.00	1
22	246.00	175.00	395.00	185.00	1
23	395.00	185.00	565.00	240.00	1
24	565.00	240.00	585.00	260.00	1
25	585.00	260.00	620.00	263.00	1
26	620.00	263.00	700.00	313.00	1
27	700.00	313.00	850.00	275.00	1
28	850.00	275.00	930.00	300.00	1
29	930.00	300.00	1000.00	303.00	1
30	1000.00	303.00	1030.00	308.00	1
31	200.00	180.00	243.00	182.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	500.0	35.0	0.00	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0
3	125.0	130.0	200.0	30.0	0.00	0.0	0

A Critical Failure Surface Searching Method, Using A Random

Technique For Generating Circular Surfaces, Has Been Specified.
550 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 55 Points Equally Spaced
Along The Ground Surface Between X = 375.00(ft)
and X = 430.00(ft)
Each Surface Terminates Between X = 765.00(ft)
and X = 810.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
25.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -15.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 550
Statistical Data On All Valid FS Values:
FS Max = 2.345 FS Min = 1.764 FS Ave = 2.133
Standard Deviation = 0.168 Coefficient of Variation = 7.88 %
Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	389.26	209.85
2	414.01	213.38
3	438.64	217.66
4	463.13	222.66
5	487.47	228.40
6	511.62	234.86
7	535.57	242.03
8	559.29	249.92
9	582.77	258.51
10	605.98	267.80
11	628.90	277.77
12	651.52	288.43
13	673.80	299.76
14	695.74	311.74
15	717.31	324.38
16	738.50	337.65
17	759.28	351.55
18	779.64	366.06
19	794.35	377.23

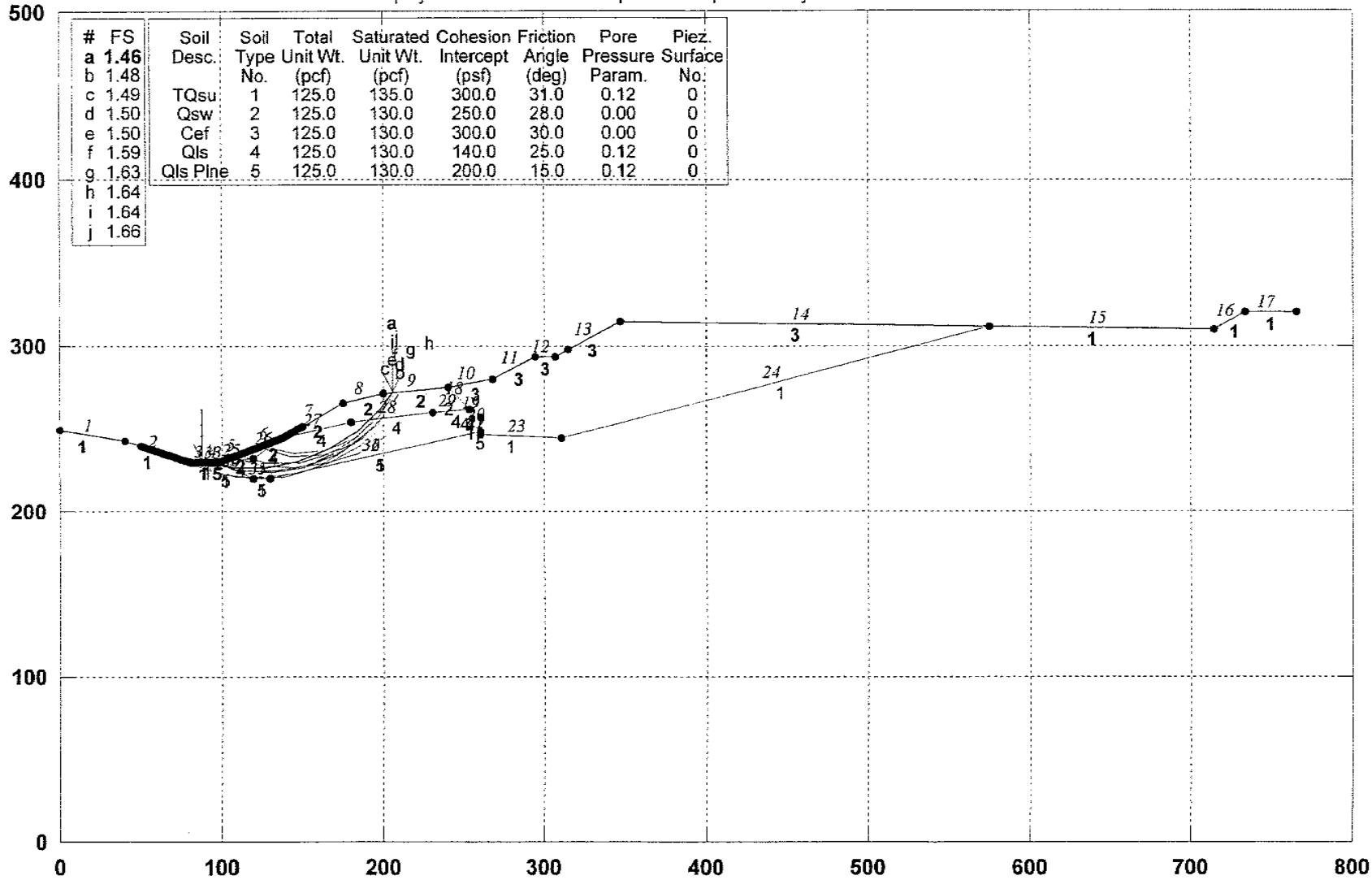
Circle Center At X = 283.12 ; Y = 1040.96 ; and Radius = 837.86
Factor of Safety
*** 1.764 ***
Individual data on the 34 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	0.7	2.2	0.0	0.0	0.	0.	0.0	0.0	0.0
2	24.0	13009.6	0.0	0.0	0.	0.	0.0	0.0	0.0
3	6.0	7190.4	0.0	0.0	0.	0.	0.0	0.0	0.0
4	8.0	9884.3	0.0	0.0	0.	0.	0.0	0.0	0.0
5	10.6	14912.4	0.0	0.0	0.	0.	0.0	0.0	0.0
6	24.5	53612.5	0.0	0.0	0.	0.	0.0	0.0	0.0
7	20.9	65478.0	0.0	0.0	0.	0.	0.0	0.0	0.0
8	3.5	12139.3	0.0	0.0	0.	0.	0.0	0.0	0.0
9	9.5	31374.1	0.0	0.0	0.	0.	0.0	0.0	0.0
10	14.6	48357.6	0.0	0.0	0.	0.	0.0	0.0	0.0
11	23.9	89200.1	0.0	0.0	0.	0.	0.0	0.0	0.0
12	23.7	98564.9	0.0	0.0	0.	0.	0.0	0.0	0.0
13	0.7	3089.4	0.0	0.0	0.	0.	0.0	0.0	0.0
14	13.0	52720.2	0.0	0.0	0.	0.	0.0	0.0	0.0
15	9.8	38051.5	0.0	0.0	0.	0.	0.0	0.0	0.0
16	1.2	5013.2	0.0	0.0	0.	0.	0.0	0.0	0.0

17	1.0	4054.5	0.0	0.0	0.	0.	0.0	0.0	0.0
18	1.9	7800.0	0.0	0.0	0.	0.	0.0	0.0	0.0
19	19.1	83213.9	0.0	0.0	0.	0.	0.0	0.0	0.0
20	16.0	76055.6	0.0	0.0	0.	0.	0.0	0.0	0.0
21	6.9	32542.9	0.0	0.0	0.	0.	0.0	0.0	0.0
22	13.1	54263.7	0.0	0.0	0.	0.	0.0	0.0	0.0
23	9.5	35662.1	0.0	0.0	0.	0.	0.0	0.0	0.0
24	22.3	81698.1	0.0	0.0	0.	0.	0.0	0.0	0.0
25	21.9	76104.6	0.0	0.0	0.	0.	0.0	0.0	0.0
26	14.3	46038.8	0.0	0.0	0.	0.	0.0	0.0	0.0
27	7.3	20816.2	0.0	0.0	0.	0.	0.0	0.0	0.0
28	0.7	1747.7	0.0	0.0	0.	0.	0.0	0.0	0.0
29	20.5	49491.0	0.0	0.0	0.	0.	0.0	0.0	0.0
30	16.5	35831.2	0.0	0.0	0.	0.	0.0	0.0	0.0
31	4.3	7963.7	0.0	0.0	0.	0.	0.0	0.0	0.0
32	5.7	8159.0	0.0	0.0	0.	0.	0.0	0.0	0.0
33	14.6	13183.5	0.0	0.0	0.	0.	0.0	0.0	0.0
34	14.7	4633.5	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 38-38'; static; circular

n:\projects\2000-2499\2023\slopes\t38s4a.pl2 Run By: VKP 6/23/2004 03:39PM



#	FS
a	**1.46**
b	1.48
c	1.49
d	1.50
e	1.50
f	1.59
g	1.63
h	1.64
i	1.64
j	1.66

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	300.0	31.0	0.12	0
Qsw	2	125.0	130.0	250.0	28.0	0.00	0
Cef	3	125.0	130.0	300.0	30.0	0.00	0
Qls	4	125.0	130.0	140.0	25.0	0.12	0
Qls Plne	5	125.0	130.0	200.0	15.0	0.12	0

GSTABL7 v.2 FSmin=1.46

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 85

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/23/2004
Time of Run: 03:39PM
Run By: VKP
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t38s4a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t38s4a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope8s4a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 38-38'; static; circular

BOUNDARY COORDINATES
17 Top Boundaries
36 Total Boundaries

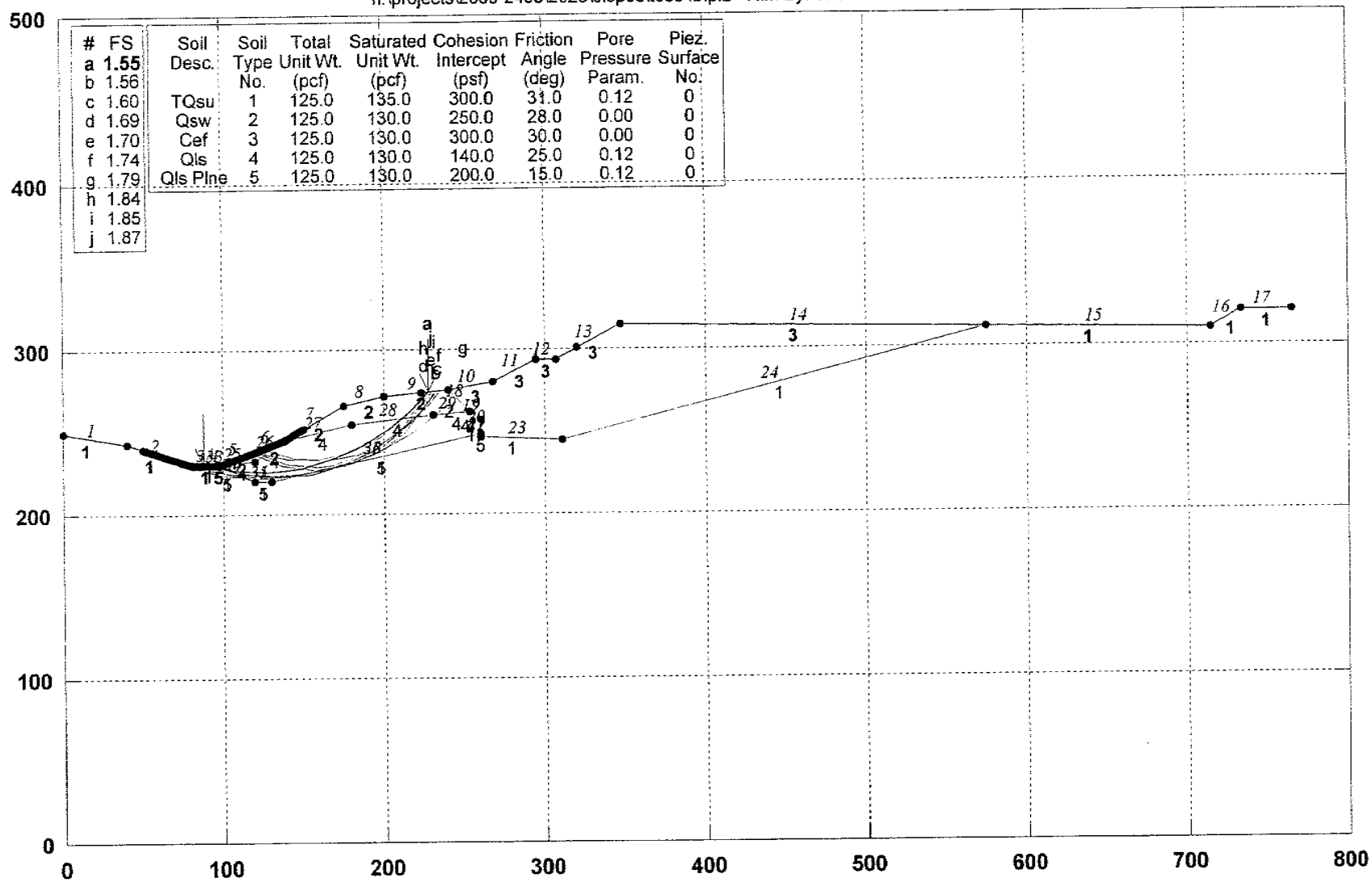
Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	250.00	40.00	243.00	1
2	40.00	243.00	80.00	230.00	1
3	80.00	230.00	97.00	230.00	1
4	97.00	230.00	98.00	230.00	5
5	98.00	230.00	120.00	238.00	2
6	120.00	238.00	138.00	245.00	2
7	138.00	245.00	175.00	266.00	2
8	175.00	266.00	200.00	272.00	2
9	200.00	272.00	240.00	275.00	2
10	240.00	275.00	268.00	280.00	3
11	268.00	280.00	295.00	294.00	3
12	295.00	294.00	307.00	294.00	3
13	307.00	294.00	347.00	315.00	3
14	347.00	315.00	575.00	312.00	3
15	575.00	312.00	714.00	310.00	1
16	714.00	310.00	733.00	320.00	1
17	733.00	320.00	765.00	320.00	1
18	240.00	275.00	253.00	262.00	2
19	253.00	262.00	260.00	257.00	4
20	260.00	257.00	260.01	249.00	4
21	260.01	249.00	260.02	248.50	5
22	260.02	248.50	260.03	247.00	1
23	260.03	247.00	311.00	245.00	1
24	311.00	245.00	575.00	312.00	1
25	98.00	230.00	120.00	232.00	4
26	120.00	232.00	138.00	245.00	4
27	138.00	245.00	180.00	254.00	4
28	180.00	254.00	230.00	260.00	4
29	230.00	260.00	253.00	262.00	4
30	98.00	230.00	120.00	220.00	5
31	120.00	220.00	130.00	220.00	5
32	130.00	220.00	260.01	249.00	5
33	97.00	230.00	98.00	229.50	1
34	98.00	229.50	120.00	219.50	1
35	120.00	219.50	130.00	219.50	1
36	130.00	219.50	260.02	248.50	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS

Mesas East, x-sec 38-38'; static; circular, 1.5 setback line

n:\projects\2000-2499\2023\slopes\t38s4b.pl2 Run By: VKP 6/23/2004 03:08PM



#	FS
a	1.55
b	1.56
c	1.60
d	1.69
e	1.70
f	1.74
g	1.79
h	1.84
i	1.85
j	1.87

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	300.0	31.0	0.12	0
Qsw	2	125.0	130.0	250.0	28.0	0.00	0
Cef	3	125.0	130.0	300.0	30.0	0.00	0
Qls	4	125.0	130.0	140.0	25.0	0.12	0
Qls Plne	5	125.0	130.0	200.0	15.0	0.12	0

GSTABL7 v.2 FSmin=1.55

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN NO. 86

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/23/2004
Time of Run: 03:08PM
Run By: VKP
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t38s4b.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t38s4b.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope8s4b.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 38-38'; static;
circular, 1.5 setback line

BOUNDARY COORDINATES
17 Top Boundaries
36 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	250.00	40.00	243.00	1
2	40.00	243.00	80.00	230.00	1
3	80.00	230.00	97.00	230.00	1
4	97.00	230.00	98.00	230.00	5
5	98.00	230.00	120.00	238.00	2
6	120.00	238.00	138.00	245.00	2
7	138.00	245.00	175.00	266.00	2
8	175.00	266.00	200.00	272.00	2
9	200.00	272.00	240.00	275.00	2
10	240.00	275.00	268.00	280.00	3
11	268.00	280.00	295.00	294.00	3
12	295.00	294.00	307.00	294.00	3
13	307.00	294.00	347.00	315.00	3
14	347.00	315.00	575.00	312.00	3
15	575.00	312.00	714.00	310.00	1
16	714.00	310.00	733.00	320.00	1
17	733.00	320.00	765.00	320.00	1
18	240.00	275.00	253.00	262.00	2
19	253.00	262.00	260.00	257.00	4
20	260.00	257.00	260.01	249.00	4
21	260.01	249.00	260.02	248.50	5
22	260.02	248.50	260.03	247.00	1
23	260.03	247.00	311.00	245.00	1
24	311.00	245.00	575.00	312.00	1
25	98.00	230.00	120.00	232.00	4
26	120.00	232.00	138.00	245.00	4
27	138.00	245.00	180.00	254.00	4
28	180.00	254.00	230.00	260.00	4
29	230.00	260.00	253.00	262.00	4
30	98.00	230.00	120.00	220.00	5
31	120.00	220.00	130.00	220.00	5
32	130.00	220.00	260.01	249.00	5
33	97.00	230.00	98.00	229.50	1
34	98.00	229.50	120.00	219.50	1
35	120.00	219.50	130.00	219.50	1
36	130.00	219.50	260.02	248.50	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS

5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0
2	125.0	130.0	250.0	28.0	0.00	0.0	0
3	125.0	130.0	300.0	30.0	0.00	0.0	0
4	125.0	130.0	140.0	25.0	0.12	0.0	0
5	125.0	130.0	200.0	15.0	0.12	0.0	0

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
5 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 50.00(ft)
and X = 150.00(ft)
Each Surface Terminates Between X = 223.00(ft)
and X = 320.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
20.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And -10.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 5.559 FS Min = 1.549 FS Ave = 3.134
Standard Deviation = 0.694 Coefficient of Variation = 22.14 %
Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	88.38	230.00
2	108.08	226.50
3	128.06	225.85
4	147.94	228.05
5	167.30	233.07
6	185.75	240.79
7	202.91	251.07
8	218.42	263.69
9	228.02	274.10

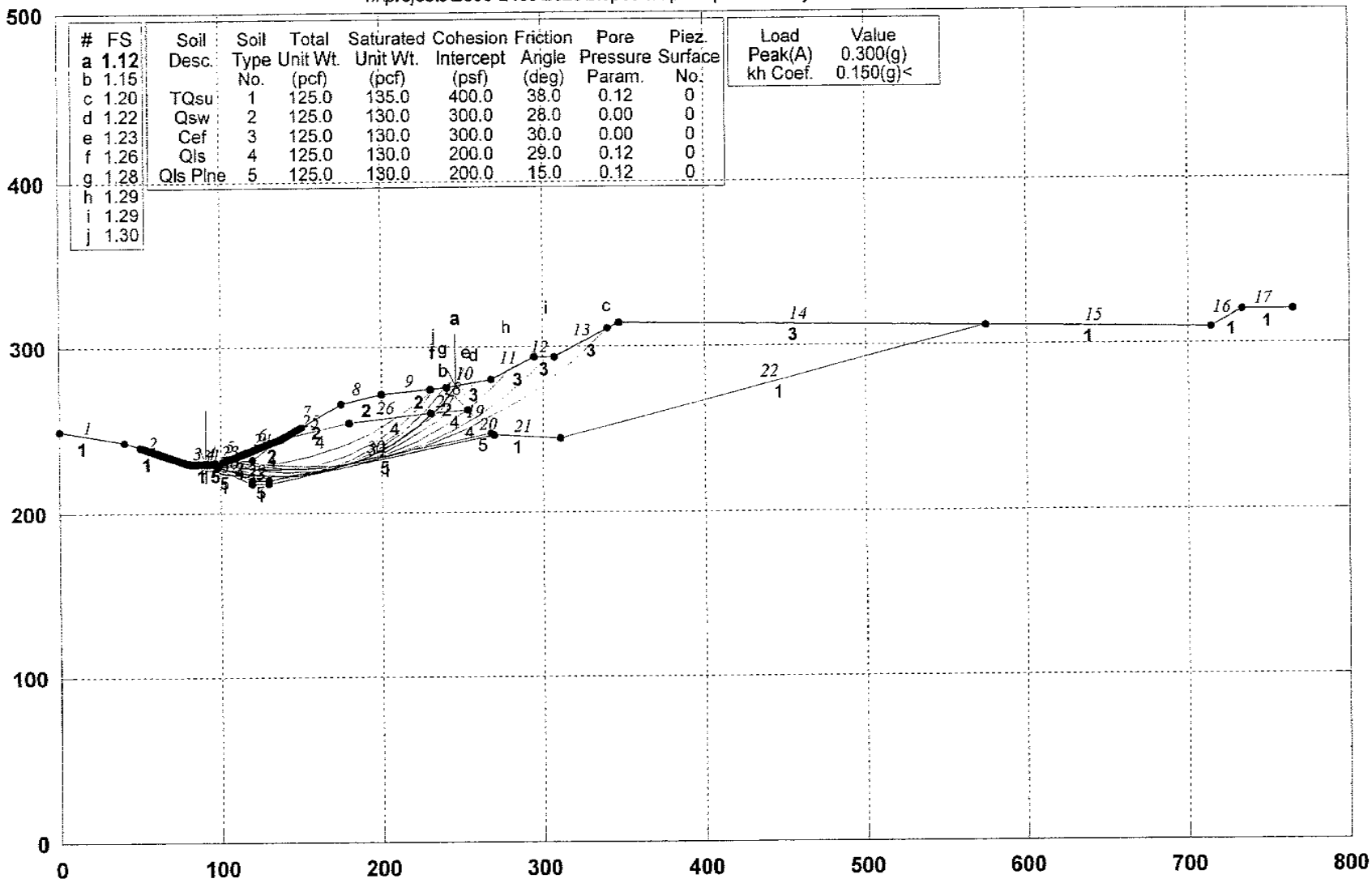
Circle Center At X = 122.63 ; Y = 365.62 ; and Radius = 139.88
Factor of Safety
*** 1.549 ***
Individual data on the 18 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	8.6	824.2	0.0	100.5	0.	0.	0.0	0.0	0.0
2	1.0	202.4	0.0	24.7	0.	0.	0.0	0.0	0.0
3	4.4	1575.5	0.0	192.0	0.	0.	0.0	0.0	0.0
4	1.8	1028.8	0.0	125.4	0.	0.	0.0	0.0	0.0
5	3.9	2981.2	0.0	363.4	0.	0.	0.0	0.0	0.0
6	11.9	14197.3	0.0	1704.6	0.	0.	0.0	0.0	0.0
7	8.1	13698.3	0.0	1644.7	0.	0.	0.0	0.0	0.0
8	9.9	20701.4	0.0	2499.4	0.	0.	0.0	0.0	0.0
9	9.9	25256.8	0.0	3049.4	0.	0.	0.0	0.0	0.0
10	19.4	61901.0	0.0	7673.4	0.	0.	0.0	0.0	0.0
11	7.7	28029.7	0.0	3646.6	0.	0.	0.0	0.0	0.0
12	5.0	18288.8	0.0	2379.4	0.	0.	0.0	0.0	0.0
13	5.8	20346.5	0.0	2647.0	0.	0.	0.0	0.0	0.0
14	14.2	44934.4	0.0	6285.6	0.	0.	0.0	0.0	0.0
15	2.9	7965.7	0.0	1114.3	0.	0.	0.0	0.0	0.0
16	8.2	18552.4	0.0	2869.7	0.	0.	0.0	0.0	0.0

17	7.3	11352.7	0.0	0.0	0.	0.	0.0	0.0	0.0
18	9.6	5814.6	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 38-38'; pseudostatic; circular

n:\projects\2000-2499\2023\slopes\t38ps4a.pl2 Run By: VKP 6/23/2004 02:43PM



#	FS
a	1.12
b	1.15
c	1.20
d	1.22
e	1.23
f	1.26
g	1.28
h	1.29
i	1.29
j	1.30

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	400.0	38.0	0.12	0
Qsw	2	125.0	130.0	300.0	28.0	0.00	0
Cef	3	125.0	130.0	300.0	30.0	0.00	0
Qls	4	125.0	130.0	200.0	29.0	0.12	0
Qls Plne	5	125.0	130.0	200.0	15.0	0.12	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.12

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN NO. 87

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/23/2004
Time of Run: 02:43PM
Run By: VKP
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t38ps4a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t38ps4a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope8ps4a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 38-38'; pseudostatic; circular

BOUNDARY COORDINATES
17 Top Boundaries
34 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	250.00	40.00	243.00	1
2	40.00	243.00	80.00	230.00	1
3	80.00	230.00	96.00	230.00	1
4	96.00	230.00	98.00	230.00	5
5	98.00	230.00	120.00	238.00	2
6	120.00	238.00	138.00	245.00	2
7	138.00	245.00	175.00	266.00	2
8	175.00	266.00	200.00	272.00	2
9	200.00	272.00	240.00	275.00	2
10	240.00	275.00	268.00	280.00	3
11	268.00	280.00	295.00	294.00	3
12	295.00	294.00	307.00	294.00	3
13	307.00	294.00	347.00	315.00	3
14	347.00	315.00	575.00	312.00	3
15	575.00	312.00	714.00	310.00	1
16	714.00	310.00	733.00	320.00	1
17	733.00	320.00	765.00	320.00	1
18	240.00	275.00	253.00	262.00	2
19	253.00	262.00	268.00	248.00	4
20	268.00	248.00	270.00	247.00	5
21	270.00	247.00	311.00	245.00	1
22	311.00	245.00	575.00	312.00	1
23	98.00	230.00	120.00	232.00	4
24	120.00	232.00	138.00	245.00	4
25	138.00	245.00	180.00	254.00	4
26	180.00	254.00	230.00	260.00	4
27	230.00	260.00	253.00	262.00	4
28	98.00	230.00	120.00	220.00	5
29	120.00	220.00	130.00	220.00	5
30	130.00	220.00	268.00	248.00	5
31	96.00	230.00	98.00	228.00	1
32	98.00	228.00	120.00	218.00	1
33	120.00	218.00	130.00	218.00	1
34	130.00	218.00	270.00	247.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	400.0	38.0	0.12	0.0	0

2	125.0	130.0	300.0	28.0	0.00	0.0	0
3	125.0	130.0	300.0	30.0	0.00	0.0	0
4	125.0	130.0	200.0	29.0	0.12	0.0	0
5	125.0	130.0	200.0	15.0	0.12	0.0	0

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 50.00(ft)
and X = 150.00(ft)
Each Surface Terminates Between X = 230.00(ft)
and X = 340.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
20.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 3.704 FS Min = 1.116 FS Ave = 2.345
Standard Deviation = 0.553 Coefficient of Variation = 23.59 %
Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	90.40	230.00
2	109.72	224.83
3	129.58	222.46
4	149.58	222.95
5	169.30	226.28
6	188.34	232.38
7	206.33	241.14
8	222.88	252.37
9	237.66	265.84
10	246.10	276.09

Circle Center At X = 136.14 ; Y = 361.51 ; and Radius = 139.23
Factor of Safety
*** 1.116 ***
Individual data on the 24 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	5.6	523.9	0.0	65.1	0.	0.	78.6	0.0	0.0
2	2.0	441.4	0.0	54.8	0.	0.	66.2	0.0	0.0
3	0.2	46.7	0.0	5.8	0.	0.	7.0	0.0	0.0
4	10.7	7392.2	0.0	918.3	0.	0.	1108.8	0.0	0.0
5	0.8	964.4	0.0	119.8	0.	0.	144.7	0.0	0.0
6	10.3	15306.1	0.0	1849.7	0.	0.	2295.9	0.0	0.0
7	9.6	20161.9	0.0	2436.6	0.	0.	3024.3	0.0	0.0
8	8.4	21883.1	0.0	2626.7	0.	0.	3282.5	0.0	0.0
9	5.8	17464.5	0.0	2096.4	0.	0.	2619.7	0.0	0.0
10	5.7	19407.1	0.0	2329.5	0.	0.	2911.1	0.0	0.0
11	19.7	80250.7	0.0	9766.4	0.	0.	12037.6	0.0	0.0
12	5.7	26506.5	0.0	3340.2	0.	0.	3976.0	0.0	0.0
13	5.0	23558.3	0.0	2968.7	0.	0.	3533.7	0.0	0.0
14	3.7	17325.5	0.0	2183.3	0.	0.	2598.8	0.0	0.0
15	4.6	21426.0	0.0	2700.0	0.	0.	3213.9	0.0	0.0
16	11.7	51551.0	0.0	6880.6	0.	0.	7732.6	0.0	0.0

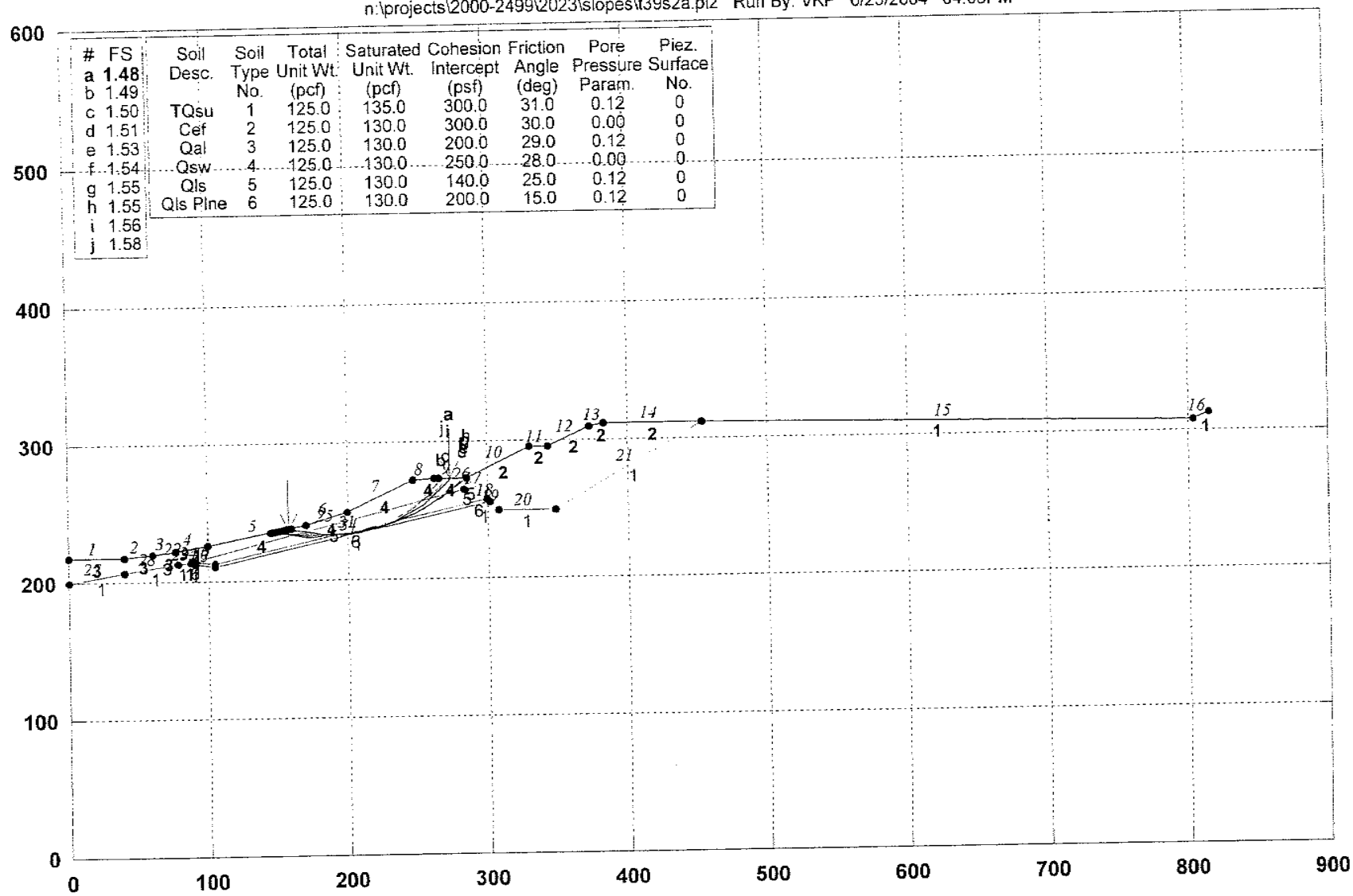
17	6.3	25804.7	0.0	3444.2	0.	0.	3870.7	0.0	0.0
18	16.6	54497.1	0.0	7902.6	0.	0.	8174.6	0.0	0.0
19	7.1	16358.6	0.0	2655.9	0.	0.	2453.8	0.0	0.0
20	1.4	2560.6	0.0	415.7	0.	0.	384.1	0.0	0.0
21	6.3	9106.1	0.0	0.0	0.	0.	1365.9	0.0	0.0
22	2.3	2239.9	0.0	0.0	0.	0.	336.0	0.0	0.0
23	2.9	1725.3	0.0	0.0	0.	0.	258.8	0.0	0.0
24	3.2	681.8	0.0	0.0	0.	0.	102.3	0.0	0.0

Mesas East, x-sec 39-39'; static; circular

n:\projects\2000-2499\2023\slopes\t39s2a.pl2 Run By: VKP 6/23/2004 04:09PM

#	FS
a	1.48
b	1.49
c	1.50
d	1.51
e	1.53
f	1.54
g	1.55
h	1.55
i	1.56
j	1.58

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	300.0	31.0	0.12	0
Cef	2	125.0	130.0	300.0	30.0	0.00	0
Qal	3	125.0	130.0	200.0	29.0	0.12	0
Qsw	4	125.0	130.0	250.0	28.0	0.00	0
Qls	5	125.0	130.0	140.0	25.0	0.12	0
Qls Plne	6	125.0	130.0	200.0	15.0	0.12	0



GSTABL7 v.2 FSmin=1.48

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No. 88

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/23/2004
Time of Run: 04:09PM
Run By: VKP
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t39s2a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t39s2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope9s2a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 39-39'; static; circular

BOUNDARY COORDINATES
16 Top Boundaries
34 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	218.00	40.00	218.00	3
2	40.00	218.00	60.00	220.00	3
3	60.00	220.00	76.00	222.00	3
4	76.00	222.00	100.00	226.00	4
5	100.00	226.00	170.00	240.00	4
6	170.00	240.00	200.00	250.00	4
7	200.00	250.00	247.00	272.00	4
8	247.00	272.00	262.00	273.00	4
9	262.00	273.00	285.00	273.00	4
10	285.00	273.00	330.00	295.00	2
11	330.00	295.00	343.00	295.00	2
12	343.00	295.00	373.00	310.00	2
13	373.00	310.00	383.00	312.00	2
14	383.00	312.00	453.00	312.00	2
15	453.00	312.00	804.00	308.00	1
16	804.00	308.00	815.00	313.00	1
17	285.00	273.00	300.00	258.00	5
18	300.00	258.00	302.00	256.00	6
19	302.00	256.00	308.00	250.00	1
20	308.00	250.00	348.00	250.00	1
21	348.00	250.00	453.00	312.00	1
22	76.00	222.00	78.00	213.00	3
23	78.00	213.00	88.00	214.00	1
24	88.00	214.00	90.00	215.00	1
25	90.00	215.00	283.00	265.00	5
26	283.00	265.00	285.00	273.00	5
27	0.00	200.00	40.00	207.00	1
28	40.00	207.00	78.00	213.00	1
29	78.00	213.00	88.00	214.00	1
30	90.00	215.00	105.00	213.00	6
31	105.00	213.00	300.00	258.00	6
32	88.00	214.00	90.00	213.00	1
33	90.00	213.00	105.00	211.00	1
34	105.00	211.00	302.00	256.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
6 Type(s) of Soil

Soil Total Saturated Cohesion Friction Pore Pressure Piez.

Type No.	Unit Wt. (pcf)	Unit Wt. (pcf)	Intercept (psf)	Angle (deg)	Pressure Param.	Constant (psf)	Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0
3	125.0	130.0	200.0	29.0	0.12	0.0	0
4	125.0	130.0	250.0	28.0	0.00	0.0	0
5	125.0	130.0	140.0	25.0	0.12	0.0	0
6	125.0	130.0	200.0	15.0	0.12	0.0	0

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
5 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 145.00(ft)
and X = 160.00(ft)
Each Surface Terminates Between X = 265.00(ft)
and X = 285.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
25.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 5.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 3.658 FS Min = 1.479 FS Ave = 2.600
Standard Deviation = 0.595 Coefficient of Variation = 22.89 %
Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	157.88	237.58
2	182.51	233.31
3	207.47	234.75
4	231.45	241.81
5	253.21	254.13
6	271.60	271.07
7	272.92	273.00

Circle Center At X = 188.74 ; Y = 342.59 ; and Radius = 109.46
Factor of Safety
*** 1.479 ***
Individual data on the 14 slices

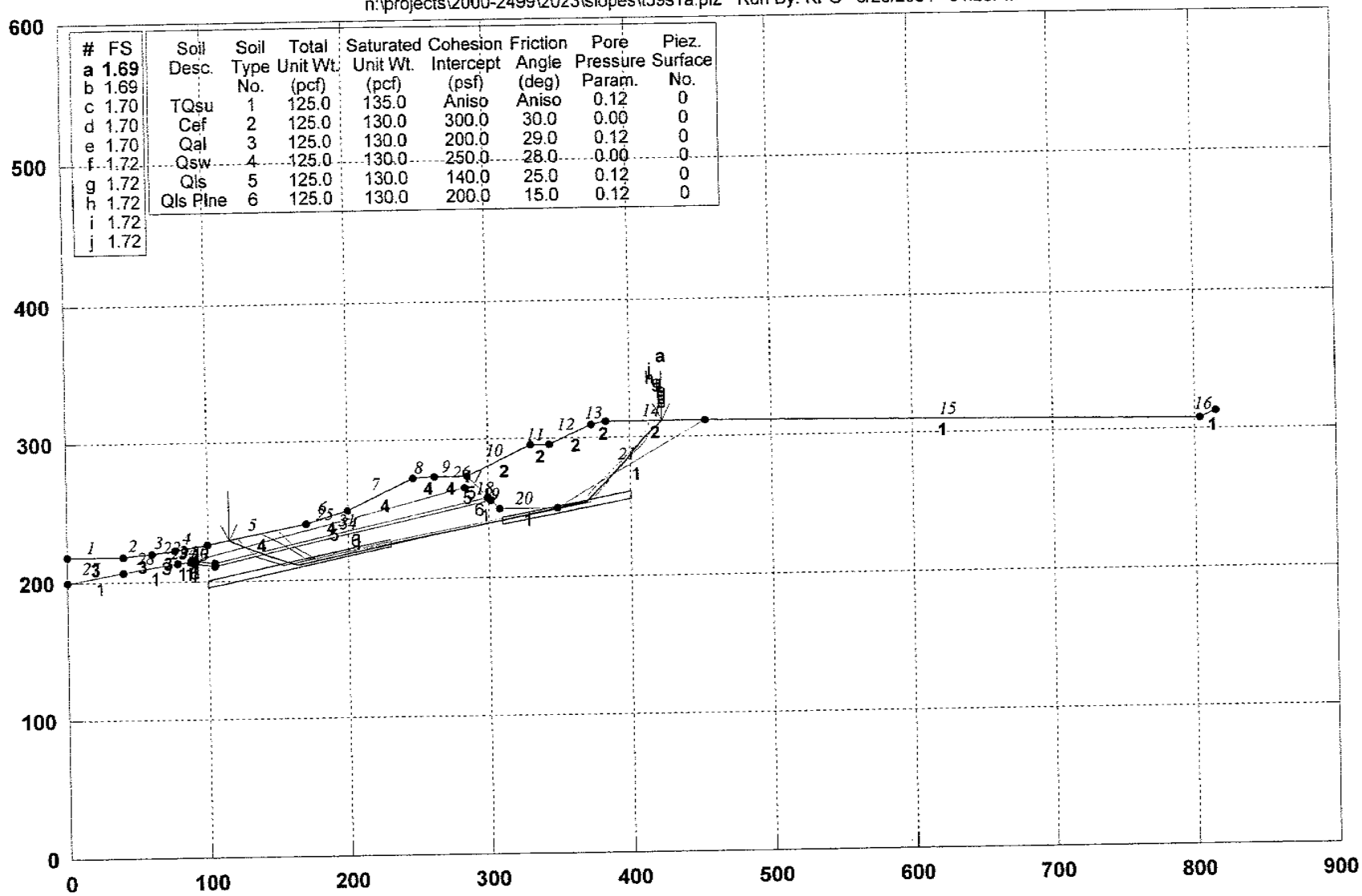
Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	11.5	3109.6	0.0	0.0	0.	0.	0.0	0.0	0.0
2	0.6	316.2	0.0	38.5	0.	0.	0.0	0.0	0.0
3	12.5	12029.0	0.0	1464.9	0.	0.	0.0	0.0	0.0
4	14.0	22375.7	0.0	2689.5	0.	0.	0.0	0.0	0.0
5	3.5	6631.6	0.0	797.1	0.	0.	0.0	0.0	0.0
6	7.5	16077.9	0.0	1932.5	0.	0.	0.0	0.0	0.0
7	24.0	62442.9	0.0	7811.3	0.	0.	0.0	0.0	0.0
8	1.1	3154.2	0.0	435.0	0.	0.	0.0	0.0	0.0
9	14.4	39887.0	0.0	5500.7	0.	0.	0.0	0.0	0.0
10	6.2	15388.4	0.0	2122.2	0.	0.	0.0	0.0	0.0
11	4.8	9671.3	0.0	1577.6	0.	0.	0.0	0.0	0.0
12	4.0	6296.6	0.0	0.0	0.	0.	0.0	0.0	0.0
13	9.6	7622.7	0.0	0.0	0.	0.	0.0	0.0	0.0
14	1.3	159.3	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 39-39'; static; bedding plane search

n:\projects\2000-2499\2023\slopes\t39s1a.pl2 Run By: KPC 6/25/2004 04:28PM

#	FS
a	**1.69**
b	1.69
c	1.70
d	1.70
e	1.70
f	1.72
g	1.72
h	1.72
i	1.72
j	1.72

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	Aniso	Aniso	0.12	0
Cef	2	125.0	130.0	300.0	30.0	0.00	0
Qal	3	125.0	130.0	200.0	29.0	0.12	0
Qsw	4	125.0	130.0	250.0	28.0	0.00	0
Qls	5	125.0	130.0	140.0	25.0	0.12	0
Qls Plne	6	125.0	130.0	200.0	15.0	0.12	0



GSTABL7 v.2 FSmin=1.69

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 89

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/25/2004
Time of Run: 04:28PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t39s1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t39s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope9s1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 39-39'; static;
bedding plane search

BOUNDARY COORDINATES
16 Top Boundaries
34 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	218.00	40.00	218.00	3
2	40.00	218.00	60.00	220.00	3
3	60.00	220.00	76.00	222.00	3
4	76.00	222.00	100.00	226.00	4
5	100.00	226.00	170.00	240.00	4
6	170.00	240.00	200.00	250.00	4
7	200.00	250.00	247.00	272.00	4
8	247.00	272.00	262.00	273.00	4
9	262.00	273.00	285.00	273.00	4
10	285.00	273.00	330.00	295.00	2
11	330.00	295.00	343.00	295.00	2
12	343.00	295.00	373.00	310.00	2
13	373.00	310.00	383.00	312.00	2
14	383.00	312.00	453.00	312.00	2
15	453.00	312.00	804.00	308.00	1
16	804.00	308.00	815.00	313.00	1
17	285.00	273.00	300.00	258.00	5
18	300.00	258.00	302.00	256.00	6
19	302.00	256.00	308.00	250.00	1
20	308.00	250.00	348.00	250.00	1
21	348.00	250.00	453.00	312.00	1
22	76.00	222.00	78.00	213.00	3
23	78.00	213.00	88.00	214.00	1
24	88.00	214.00	90.00	215.00	1
25	90.00	215.00	283.00	265.00	5
26	283.00	265.00	285.00	273.00	5
27	0.00	200.00	40.00	207.00	1
28	40.00	207.00	78.00	213.00	1
29	78.00	213.00	88.00	214.00	1
30	90.00	215.00	105.00	213.00	6
31	105.00	213.00	300.00	258.00	6
32	88.00	214.00	90.00	213.00	1
33	90.00	213.00	105.00	211.00	1
34	105.00	211.00	302.00	256.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
6 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0

2	125.0	130.0	300.0	30.0	0.00	0.0	0
3	125.0	130.0	200.0	29.0	0.12	0.0	0
4	125.0	130.0	250.0	28.0	0.00	0.0	0
5	125.0	130.0	140.0	25.0	0.12	0.0	0
6	125.0	130.0	200.0	15.0	0.12	0.0	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 1 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	10.5	300.00	31.00
2	13.5	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:

(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.

(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.

(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.

1000 Trial Surfaces Have Been Generated.

2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 20.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	100.00	198.00	230.00	226.00	5.00
2	310.00	241.00	400.00	258.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Simplified Janbu Method * *

Total Number of Trial Surfaces Evaluated = 1000

Statistical Data On All Valid FS Values:

FS Max = 4.168 FS Min = 1.691 FS Ave = 2.089

Standard Deviation = 0.361 Coefficient of Variation = 17.29 %

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.01	229.00
2	126.20	224.32
3	144.97	217.41
4	163.98	211.18
5	368.49	253.81
6	382.62	267.95
7	396.75	282.11
8	408.99	297.93
9	422.77	312.00

Factor of Safety

*** 1.691 ***

Individual data on the 26 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	11.1	4762.6	0.0	0.0	0.	0.	0.0	0.0	0.0
2	0.1	78.7	0.0	10.2	0.	0.	0.0	0.0	0.0
3	10.7	13373.2	0.0	1710.0	0.	0.	0.0	0.0	0.0
4	3.5	6090.9	0.0	778.8	0.	0.	0.0	0.0	0.0
5	4.6	9285.4	0.0	1187.3	0.	0.	0.0	0.0	0.0
6	19.0	53686.5	0.0	6779.8	0.	0.	0.0	0.0	0.0

7	6.0	20773.7	0.0	2546.4	0.	0.	0.0	0.0	0.0
8	30.0	110392.2	0.0	13531.8	0.	0.	0.0	0.0	0.0
9	47.0	219800.5	0.0	26943.0	0.	0.	0.0	0.0	0.0
10	15.0	79595.8	0.0	9756.8	0.	0.	0.0	0.0	0.0
11	21.0	102897.7	0.0	12613.1	0.	0.	0.0	0.0	0.0
12	2.0	9200.5	0.0	1127.8	0.	0.	0.0	0.0	0.0
13	15.0	72556.7	0.0	8893.9	0.	0.	0.0	0.0	0.0
14	2.0	10270.2	0.0	1258.9	0.	0.	0.0	0.0	0.0
15	6.0	31651.9	0.0	3879.9	0.	0.	0.0	0.0	0.0
16	22.0	126854.0	0.0	15549.7	0.	0.	0.0	0.0	0.0
17	13.0	77770.4	0.0	9533.0	0.	0.	0.0	0.0	0.0
18	5.0	29520.5	0.0	3618.6	0.	0.	0.0	0.0	0.0
19	20.5	130463.3	0.0	15992.1	0.	0.	0.0	0.0	0.0
20	4.5	29796.8	0.0	5058.2	0.	0.	0.0	0.0	0.0
21	9.6	57528.8	0.0	9765.8	0.	0.	0.0	0.0	0.0
22	0.4	2060.9	0.0	350.1	0.	0.	0.0	0.0	0.0
23	5.7	28943.8	0.0	4917.2	0.	0.	0.0	0.0	0.0
24	8.1	34271.4	0.0	0.0	0.	0.	0.0	0.0	0.0
25	12.2	33637.4	0.0	0.0	0.	0.	0.0	0.0	0.0
26	13.8	12116.1	0.0	0.0	0.	0.	0.0	0.0	0.0

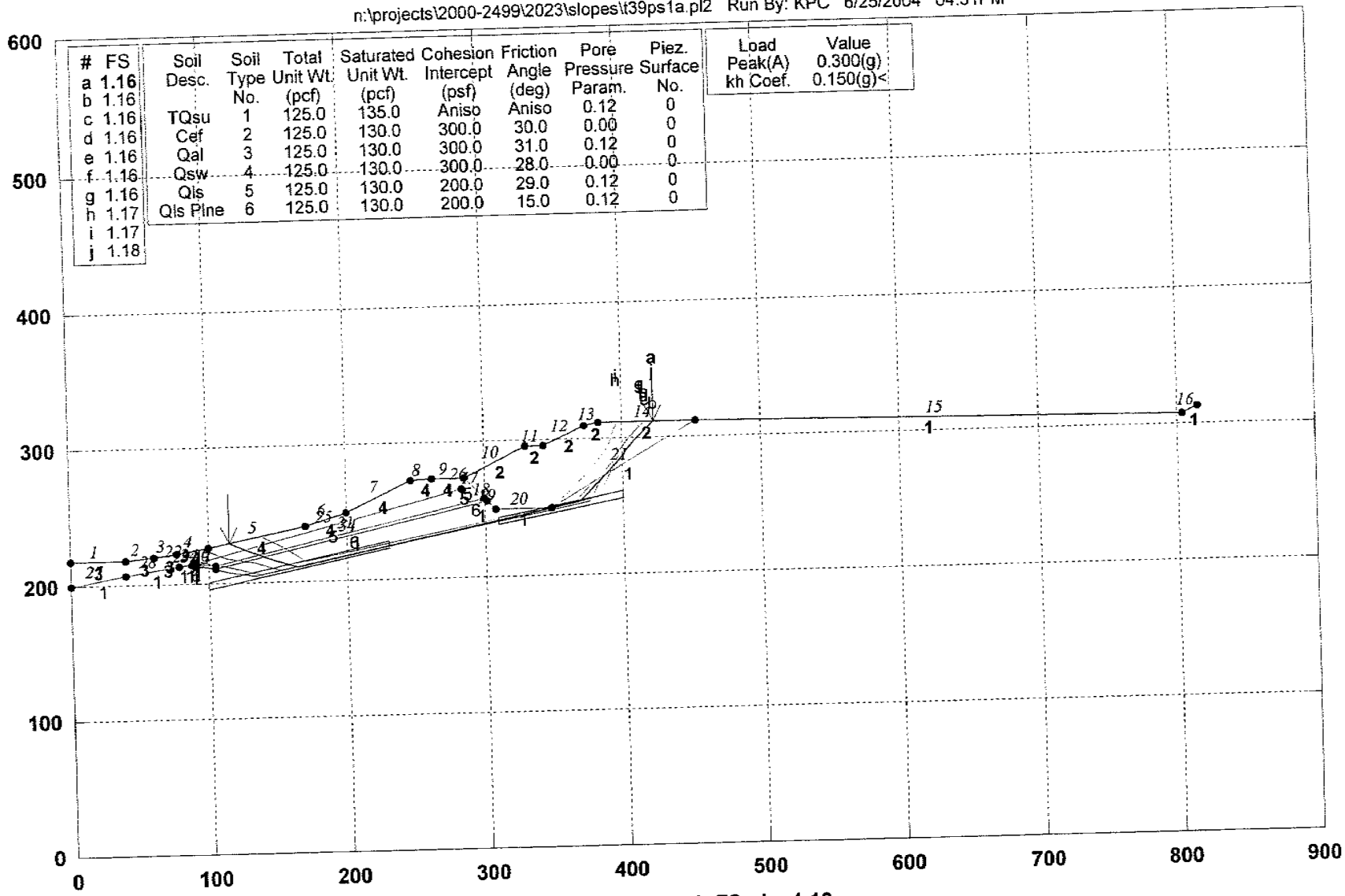
Mesas East, x-sec 39-39'; pseudostatic; bedding plane search

n:\projects\2000-2499\2023\slopes\t39ps1a.pl2 Run By: KPC 6/25/2004 04:31PM

#	FS
a	1.16
b	1.16
c	1.16
d	1.16
e	1.16
f	1.16
g	1.16
h	1.17
i	1.17
j	1.18

Soil Desc.	Soil Type No.	Total Unit Wt (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	Aniso	Aniso	0.12	0
Cef	2	125.0	130.0	300.0	30.0	0.00	0
Qal	3	125.0	130.0	300.0	31.0	0.12	0
Qsw	4	125.0	130.0	300.0	28.0	0.00	0
Qls	5	125.0	130.0	200.0	29.0	0.12	0
Qls Pine	6	125.0	130.0	200.0	15.0	0.12	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<



GSTABL7 v.2 FSmin=1.16

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 90

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/25/2004
Time of Run: 04:31PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t39psla.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t39psla.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope9psla.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 39-39'; pseudostatic; bedding plane search

BOUNDARY COORDINATES
16 Top Boundaries
34 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	218.00	40.00	218.00	3
2	40.00	218.00	60.00	220.00	3
3	60.00	220.00	76.00	222.00	3
4	76.00	222.00	100.00	226.00	4
5	100.00	226.00	170.00	240.00	4
6	170.00	240.00	200.00	250.00	4
7	200.00	250.00	247.00	272.00	4
8	247.00	272.00	262.00	273.00	4
9	262.00	273.00	285.00	273.00	4
10	285.00	273.00	330.00	295.00	2
11	330.00	295.00	343.00	295.00	2
12	343.00	295.00	373.00	310.00	2
13	373.00	310.00	383.00	312.00	2
14	383.00	312.00	453.00	312.00	2
15	453.00	312.00	804.00	308.00	1
16	804.00	308.00	815.00	313.00	1
17	285.00	273.00	300.00	258.00	5
18	300.00	258.00	302.00	256.00	6
19	302.00	256.00	308.00	250.00	1
20	308.00	250.00	348.00	250.00	1
21	348.00	250.00	453.00	312.00	1
22	76.00	222.00	78.00	213.00	3
23	78.00	213.00	88.00	214.00	1
24	88.00	214.00	90.00	215.00	1
25	90.00	215.00	283.00	265.00	5
26	283.00	265.00	285.00	273.00	5
27	0.00	200.00	40.00	207.00	1
28	40.00	207.00	78.00	213.00	1
29	78.00	213.00	88.00	214.00	1
30	90.00	215.00	105.00	213.00	6
31	105.00	213.00	300.00	258.00	6
32	88.00	214.00	90.00	213.00	1
33	90.00	213.00	105.00	211.00	1
34	105.00	211.00	302.00	256.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
6 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	400.0	38.0	0.12	0.0	0

2	125.0	130.0	300.0	30.0	0.00	0.0	0
3	125.0	130.0	300.0	31.0	0.12	0.0	0
4	125.0	130.0	300.0	28.0	0.00	0.0	0
5	125.0	130.0	200.0	29.0	0.12	0.0	0
6	125.0	130.0	200.0	15.0	0.12	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	10.5	400.00	38.00
2	13.5	200.00	20.00
3	90.0	400.00	38.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso
C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and
C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and
C equal to zero, with water weight in the tension crack.
Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 20.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	100.00	198.00	230.00	226.00	5.00
2	310.00	241.00	400.00	258.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 2.802 FS Min = 1.157 FS Ave = 1.491
Standard Deviation = 0.342 Coefficient of Variation = 22.90 %
Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.01	229.00
2	126.20	224.32
3	144.97	217.41
4	163.98	211.18
5	368.49	253.81
6	382.62	267.95
7	396.75	282.11
8	408.99	297.93
9	422.77	312.00

Factor of Safety
*** 1.157 ***
Individual data on the 26 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	11.1	4762.6	0.0	0.0	0.	0.	714.4	0.0	0.0
2	0.1	78.7	0.0	10.2	0.	0.	11.8	0.0	0.0

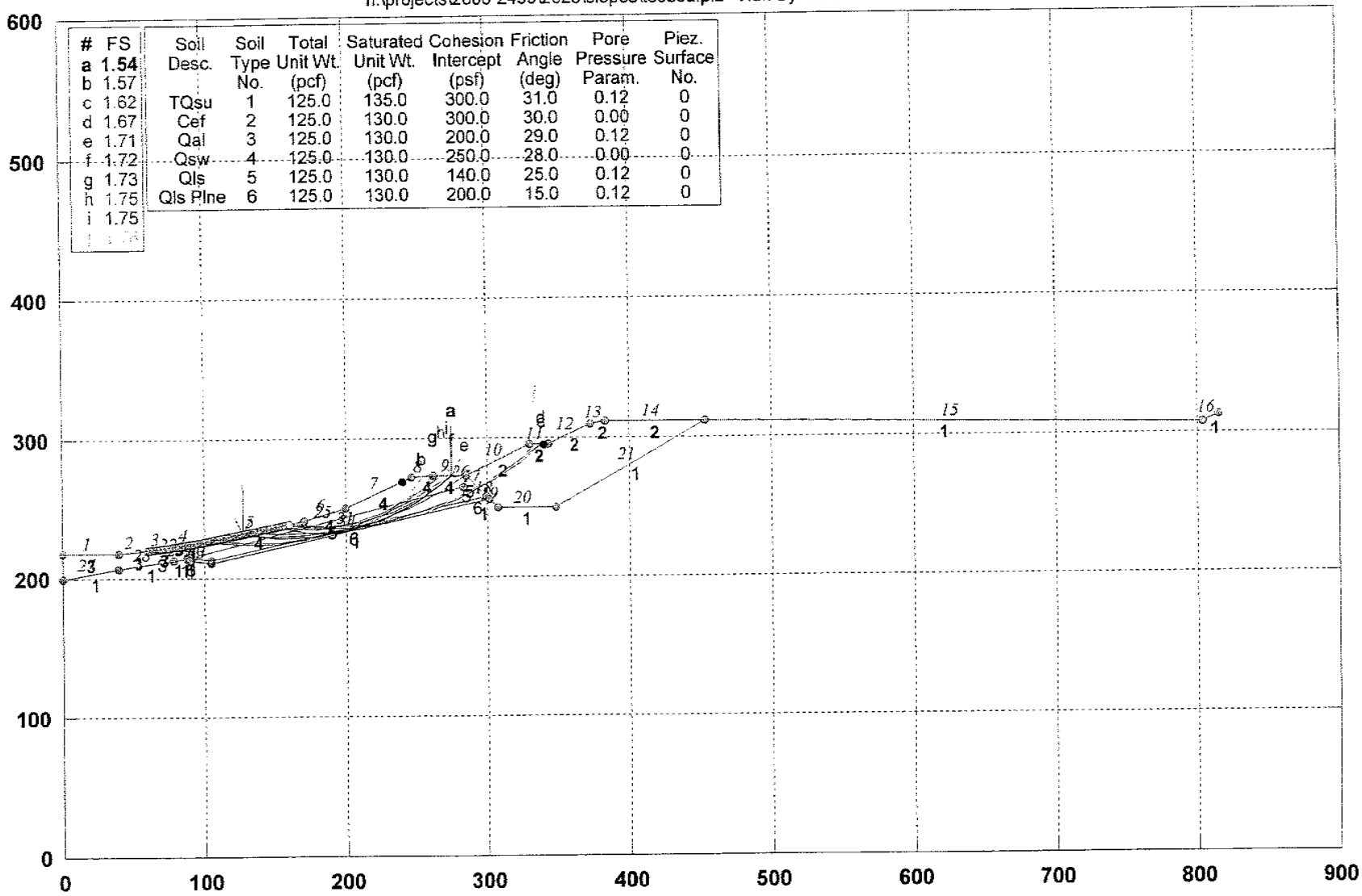
3	10.7	13373.2	0.0	1710.0	0.	0.	2006.0	0.0	0.0
4	3.5	6090.9	0.0	778.8	0.	0.	913.6	0.0	0.0
5	4.6	9285.4	0.0	1187.3	0.	0.	1392.8	0.0	0.0
6	19.0	53686.5	0.0	6779.8	0.	0.	8053.0	0.0	0.0
7	6.0	20773.7	0.0	2546.4	0.	0.	3116.1	0.0	0.0
8	30.0	110392.2	0.0	13531.8	0.	0.	16558.8	0.0	0.0
9	47.0	219800.5	0.0	26943.0	0.	0.	32970.1	0.0	0.0
10	15.0	79595.8	0.0	9756.8	0.	0.	11939.4	0.0	0.0
11	21.0	102897.7	0.0	12613.1	0.	0.	15434.7	0.0	0.0
12	2.0	9200.5	0.0	1127.8	0.	0.	1380.1	0.0	0.0
13	15.0	72556.7	0.0	8893.9	0.	0.	10883.5	0.0	0.0
14	2.0	10270.2	0.0	1258.9	0.	0.	1540.5	0.0	0.0
15	6.0	31651.9	0.0	3879.9	0.	0.	4747.8	0.0	0.0
16	22.0	126854.0	0.0	15549.7	0.	0.	19028.1	0.0	0.0
17	13.0	77770.4	0.0	9533.0	0.	0.	11665.6	0.0	0.0
18	5.0	29520.5	0.0	3618.6	0.	0.	4428.1	0.0	0.0
19	20.5	130463.3	0.0	15992.1	0.	0.	19569.5	0.0	0.0
20	4.5	29796.8	0.0	5058.2	0.	0.	4469.5	0.0	0.0
21	9.6	57528.8	0.0	9765.8	0.	0.	8629.3	0.0	0.0
22	0.4	2060.9	0.0	350.1	0.	0.	309.1	0.0	0.0
23	5.7	28943.8	0.0	4917.2	0.	0.	4341.6	0.0	0.0
24	8.1	34271.4	0.0	0.0	0.	0.	5140.7	0.0	0.0
25	12.2	33637.4	0.0	0.0	0.	0.	5045.6	0.0	0.0
26	13.8	12116.1	0.0	0.0	0.	0.	1817.4	0.0	0.0

Mesas East, x-sec 39-39'; static; circular

n:\projects\2000-2499\2023\slopes\t39s3a.pl2 Run By: KPC 6/23/2004 04:24PM

#	FS
a	1.54
b	1.57
c	1.62
d	1.67
e	1.71
f	1.72
g	1.73
h	1.75
i	1.75

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	300.0	31.0	0.12	0
Cef	2	125.0	130.0	300.0	30.0	0.00	0
Qal	3	125.0	130.0	200.0	29.0	0.12	0
Qsw	4	125.0	130.0	250.0	28.0	0.00	0
Qls	5	125.0	130.0	140.0	25.0	0.12	0
Qls Plne	6	125.0	130.0	200.0	15.0	0.12	0



GSTABL7 v.2 FSmin=1.54

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 91

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/23/2004
Time of Run: 04:24PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t39s3a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t39s3a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope9s3a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 39-39'; static; circular

BOUNDARY COORDINATES
16 Top Boundaries
34 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	218.00	40.00	218.00	3
2	40.00	218.00	60.00	220.00	3
3	60.00	220.00	76.00	222.00	3
4	76.00	222.00	100.00	226.00	4
5	100.00	226.00	170.00	240.00	4
6	170.00	240.00	200.00	250.00	4
7	200.00	250.00	247.00	272.00	4
8	247.00	272.00	262.00	273.00	4
9	262.00	273.00	285.00	273.00	4
10	285.00	273.00	330.00	295.00	2
11	330.00	295.00	343.00	295.00	2
12	343.00	295.00	373.00	310.00	2
13	373.00	310.00	383.00	312.00	2
14	383.00	312.00	453.00	312.00	2
15	453.00	312.00	804.00	308.00	1
16	804.00	308.00	815.00	313.00	1
17	285.00	273.00	300.00	258.00	5
18	300.00	258.00	302.00	256.00	6
19	302.00	256.00	308.00	250.00	1
20	308.00	250.00	348.00	250.00	1
21	348.00	250.00	453.00	312.00	1
22	76.00	222.00	78.00	213.00	3
23	78.00	213.00	88.00	214.00	1
24	88.00	214.00	90.00	215.00	1
25	90.00	215.00	283.00	265.00	5
26	283.00	265.00	285.00	273.00	5
27	0.00	200.00	40.00	207.00	1
28	40.00	207.00	78.00	213.00	1
29	78.00	213.00	88.00	214.00	1
30	90.00	215.00	105.00	213.00	6
31	105.00	213.00	300.00	258.00	6
32	88.00	214.00	90.00	213.00	1
33	90.00	213.00	105.00	211.00	1
34	105.00	211.00	302.00	256.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
6 Type(s) of Soil

Soil	Total	Saturated	Cohesion	Friction	Pore	Pressure	Piez.

Type No.	Unit Wt. (pcf)	Unit Wt. (pcf)	Intercept (psf)	Angle (deg)	Pressure Param.	Constant (psf)	Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0
3	125.0	130.0	200.0	29.0	0.12	0.0	0
4	125.0	130.0	250.0	28.0	0.00	0.0	0
5	125.0	130.0	140.0	25.0	0.12	0.0	0
6	125.0	130.0	200.0	15.0	0.12	0.0	0

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
5 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 60.00(ft)
and X = 160.00(ft)

Each Surface Terminates Between X = 240.00(ft)
and X = 340.00(ft)

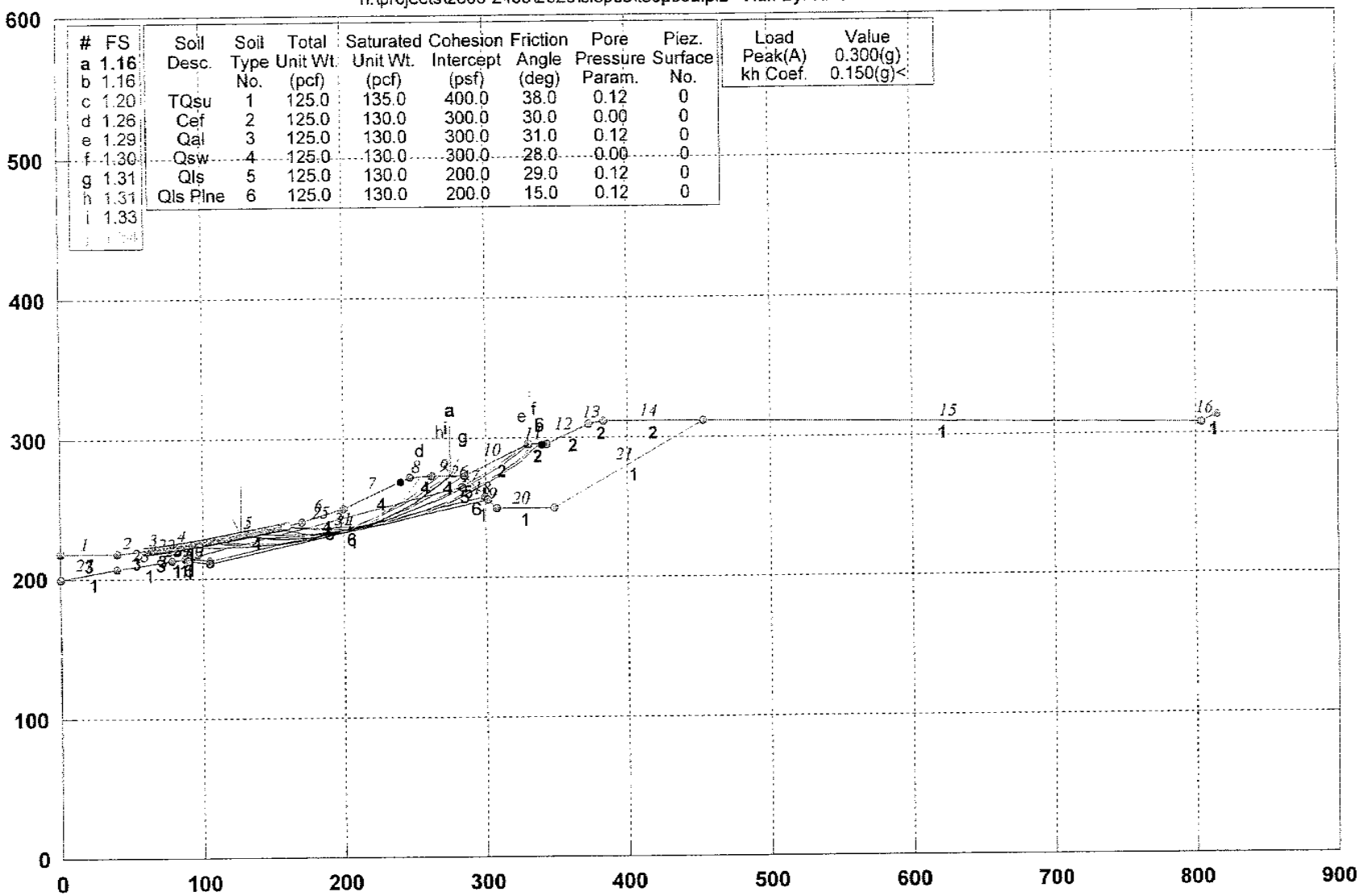
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
25.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 5.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 5.324 FS Min = 1.540 FS Ave = 2.835
Standard Deviation = 0.540 Coefficient of Variation = 19.04 %
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	127.68	231.54
2	152.47	228.36
3	177.47	228.91
4	202.10	233.19
5	225.82	241.08
6	248.10	252.42
7	268.44	266.96
8	274.67	273.00

Circle Center At X = 161.31 ; Y = 393.58 ; and Radius = 165.50
Factor of Safety
*** 1.540 ***

Mesas East, x-sec 39-39'; pseudostatic; circular

n:\projects\2000-2499\2023\slopes\t39ps3a.pl2 Run By: KPC 6/23/2004 04:25PM



#	FS
a	1.16
b	1.16
c	1.20
d	1.26
e	1.29
f	1.30
g	1.31
h	1.31
i	1.33

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	400.0	38.0	0.12	0
Cef	2	125.0	130.0	300.0	30.0	0.00	0
Qal	3	125.0	130.0	300.0	31.0	0.12	0
Qsw	4	125.0	130.0	300.0	28.0	0.00	0
Qls	5	125.0	130.0	200.0	29.0	0.12	0
Qls Plne	6	125.0	130.0	200.0	15.0	0.12	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.16

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No. 92

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/23/2004
Time of Run: 04:25PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t39ps3a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t39ps3a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope9ps3a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 39-39'; pseudostatic; circular

BOUNDARY COORDINATES
16 Top Boundaries
34 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	218.00	40.00	218.00	3
2	40.00	218.00	60.00	220.00	3
3	60.00	220.00	76.00	222.00	3
4	76.00	222.00	100.00	226.00	4
5	100.00	226.00	170.00	240.00	4
6	170.00	240.00	200.00	250.00	4
7	200.00	250.00	247.00	272.00	4
8	247.00	272.00	262.00	273.00	4
9	262.00	273.00	285.00	273.00	4
10	285.00	273.00	330.00	295.00	2
11	330.00	295.00	343.00	295.00	2
12	343.00	295.00	373.00	310.00	2
13	373.00	310.00	383.00	312.00	2
14	383.00	312.00	453.00	312.00	2
15	453.00	312.00	804.00	308.00	1
16	804.00	308.00	815.00	313.00	1
17	285.00	273.00	300.00	258.00	5
18	300.00	258.00	302.00	256.00	6
19	302.00	256.00	308.00	250.00	1
20	308.00	250.00	348.00	250.00	1
21	348.00	250.00	453.00	312.00	1
22	76.00	222.00	78.00	213.00	3
23	78.00	213.00	88.00	214.00	1
24	88.00	214.00	90.00	215.00	1
25	90.00	215.00	283.00	265.00	5
26	283.00	265.00	285.00	273.00	5
27	0.00	200.00	40.00	207.00	1
28	40.00	207.00	78.00	213.00	1
29	78.00	213.00	88.00	214.00	1
30	90.00	215.00	105.00	213.00	6
31	105.00	213.00	300.00	258.00	6
32	88.00	214.00	90.00	213.00	1
33	90.00	213.00	105.00	211.00	1
34	105.00	211.00	302.00	256.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
6 Type(s) of Soil

Soil Total Saturated Cohesion Friction Pore Pressure Piez.

Type No.	Unit Wt. (pcf)	Unit Wt. (pcf)	Intercept (psf)	Angle (deg)	Pressure Param.	Constant (psf)	Surface No.
1	125.0	135.0	400.0	38.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0
3	125.0	130.0	300.0	31.0	0.12	0.0	0
4	125.0	130.0	300.0	28.0	0.00	0.0	0
5	125.0	130.0	200.0	29.0	0.12	0.0	0
6	125.0	130.0	200.0	15.0	0.12	0.0	0

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
5 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 60.00(ft)
and X = 160.00(ft)
Each Surface Terminates Between X = 240.00(ft)
and X = 340.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
25.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 5.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 3.700 FS Min = 1.155 FS Ave = 2.363
Standard Deviation = 0.495 Coefficient of Variation = 20.93 %
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	127.68	231.54
2	152.47	228.36
3	177.47	228.91
4	202.10	233.19
5	225.82	241.08
6	248.10	252.42
7	268.44	266.96
8	274.67	273.00

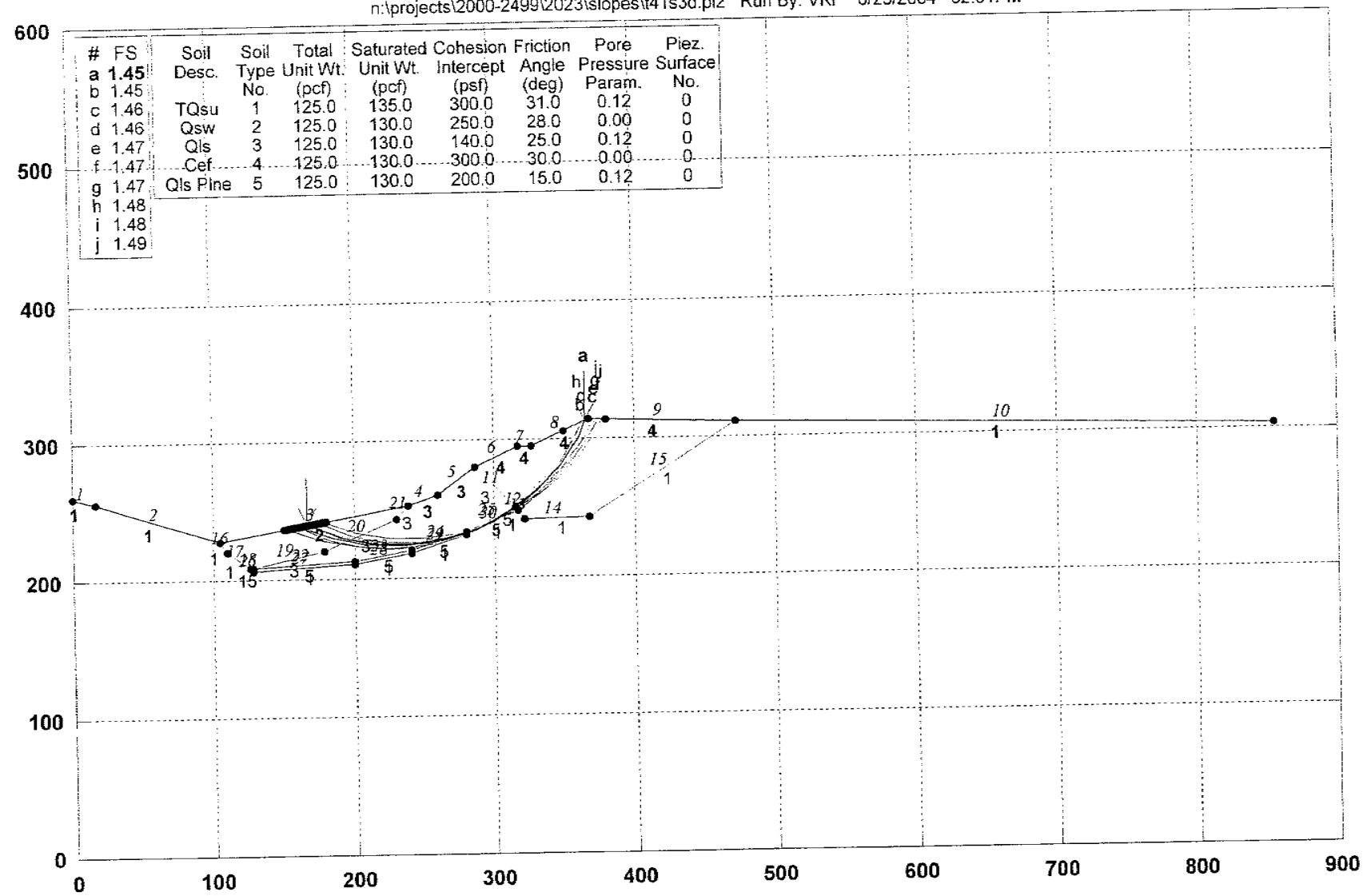
Circle Center At X = 161.31 ; Y = 393.58 ; and Radius = 165.50
Factor of Safety
*** 1.155 ***

Mesas East, x-sec 41-41'; static; circular

n:\projects\2000-2499\2023\slopes\t41s3d.pl2 Run By: VKP 6/23/2004 02:51PM

#	FS
a	1.45
b	1.45
c	1.46
d	1.46
e	1.47
f	1.47
g	1.47
h	1.48
i	1.48
j	1.49

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	300.0	31.0	0.12	0
Qsw	2	125.0	130.0	250.0	28.0	0.00	0
Qls	3	125.0	130.0	140.0	25.0	0.12	0
Cef	4	125.0	130.0	300.0	30.0	0.00	0
Qls Plne	5	125.0	130.0	200.0	15.0	0.12	0



GSTABL7 v.2 FSmin=1.45

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 93

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/23/2004
Time of Run: 02:51PM
Run By: VKP
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t41s3d.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t41s3d.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope1s3d.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 41-41'; static; circular

BOUNDARY COORDINATES
10 Top Boundaries
30 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	260.00	16.00	255.00	1
2	16.00	255.00	105.00	228.00	1
3	105.00	228.00	238.00	252.00	2
4	238.00	252.00	260.00	260.00	3
5	260.00	260.00	286.00	280.00	3
6	286.00	280.00	317.00	295.00	4
7	317.00	295.00	327.00	295.00	4
8	327.00	295.00	368.00	314.00	4
9	368.00	314.00	472.00	311.00	4
10	472.00	311.00	855.00	304.00	1
11	286.00	280.00	315.00	250.00	3
12	315.00	250.00	317.00	248.00	5
13	317.00	248.00	322.00	242.00	1
14	322.00	242.00	368.00	243.00	1
15	368.00	243.00	472.00	311.00	1
16	105.00	228.00	110.00	220.00	1
17	110.00	220.00	126.00	208.00	1
18	126.00	208.00	128.00	208.00	5
19	128.00	208.00	178.00	220.00	3
20	178.00	220.00	230.00	243.00	3
21	230.00	243.00	238.00	252.00	3
22	128.00	208.00	200.00	213.00	5
23	200.00	213.00	240.00	220.00	5
24	240.00	220.00	280.00	233.00	5
25	280.00	233.00	315.00	250.00	5
26	126.00	208.00	128.00	206.00	1
27	128.00	206.00	200.00	211.00	1
28	200.00	211.00	240.00	218.00	1
29	240.00	218.00	280.00	231.00	1
30	280.00	231.00	317.00	248.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0
2	125.0	130.0	250.0	28.0	0.00	0.0	0

3	125.0	130.0	140.0	25.0	0.12	0.0	0
4	125.0	130.0	300.0	30.0	0.00	0.0	0
5	125.0	130.0	200.0	15.0	0.12	0.0	0

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 150.00(ft)
and X = 180.00(ft)
Each Surface Terminates Between X = 350.00(ft)
and X = 380.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
25.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And -10.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 2.883 FS Min = 1.454 FS Ave = 2.166
Standard Deviation = 0.380 Coefficient of Variation = 17.54 %
Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	166.97	239.18
2	190.22	229.99
3	214.69	224.90
4	239.68	224.06
5	264.44	227.50
6	288.25	235.11
7	310.42	246.68
8	330.28	261.86
9	347.26	280.21
10	360.86	301.19
11	365.92	313.03

Circle Center At X = 232.06 ; Y = 369.78 ; and Radius = 145.92
Factor of Safety
*** 1.454 ***
Individual data on the 21 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	23.2	19454.7	0.0	0.0	0.	0.	0.0	0.0	0.0
2	7.0	13005.3	0.0	0.0	0.	0.	0.0	0.0	0.0
3	17.4	42504.3	0.0	5209.7	0.	0.	0.0	0.0	0.0
4	15.3	46943.2	0.0	5636.4	0.	0.	0.0	0.0	0.0
5	8.0	27028.8	0.0	3245.3	0.	0.	0.0	0.0	0.0
6	1.7	5923.7	0.0	711.2	0.	0.	0.0	0.0	0.0
7	20.3	78324.3	0.0	9489.1	0.	0.	0.0	0.0	0.0
8	2.0	8638.4	0.0	1046.6	0.	0.	0.0	0.0	0.0
9	2.4	10527.2	0.0	1275.4	0.	0.	0.0	0.0	0.0
10	15.6	76653.7	0.0	9657.4	0.	0.	0.0	0.0	0.0
11	6.0	33194.6	0.0	4182.1	0.	0.	0.0	0.0	0.0
12	2.3	12900.1	0.0	1625.3	0.	0.	0.0	0.0	0.0
13	22.2	126202.8	0.0	17083.2	0.	0.	0.0	0.0	0.0
14	3.9	21852.9	0.0	3300.6	0.	0.	0.0	0.0	0.0
15	0.6	3076.3	0.0	464.6	0.	0.	0.0	0.0	0.0
16	2.1	11454.3	0.0	0.0	0.	0.	0.0	0.0	0.0
17	10.0	49331.6	0.0	0.0	0.	0.	0.0	0.0	0.0
18	3.3	14406.9	0.0	0.0	0.	0.	0.0	0.0	0.0
19	17.0	62436.7	0.0	0.0	0.	0.	0.0	0.0	0.0
20	13.6	28622.7	0.0	0.0	0.	0.	0.0	0.0	0.0

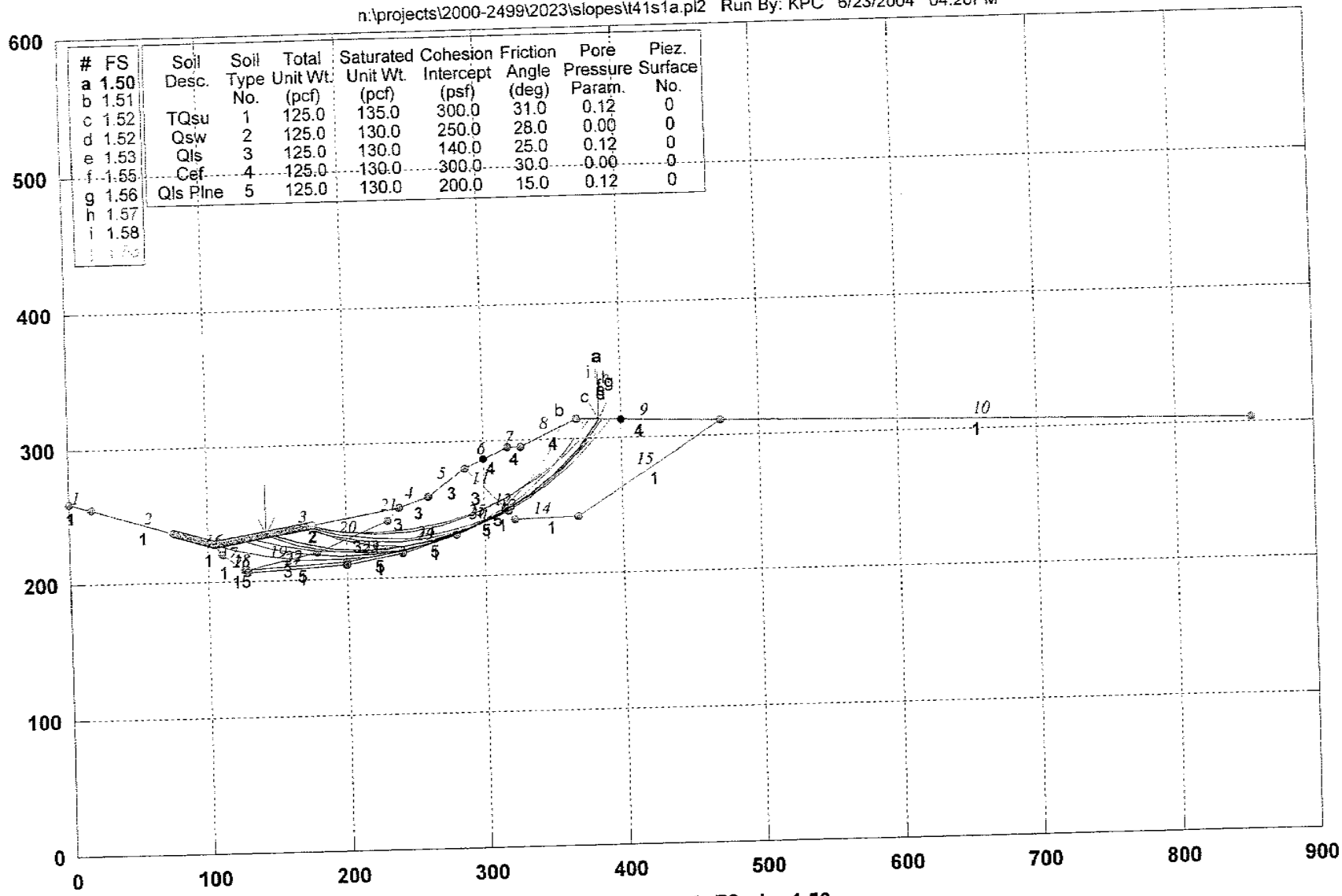
21	5.1	3003.3	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 41-41'; static; circular

n:\projects\2000-2499\2023\slopes\t41s1a.pl2 Run By: KPC 6/23/2004 04:20PM

#	FS
a	1.50
b	1.51
c	1.52
d	1.52
e	1.53
f	1.55
g	1.56
h	1.57
i	1.58

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	300.0	31.0	0.12	0
Qsw	2	125.0	130.0	250.0	28.0	0.00	0
Qls	3	125.0	130.0	140.0	25.0	0.12	0
Cef	4	125.0	130.0	300.0	30.0	0.00	0
Qls Plne	5	125.0	130.0	200.0	15.0	0.12	0



GSTABL7 v.2 FSmin=1.50

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN NO. 94

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/23/2004
Time of Run: 04:20PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t41s1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t41s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope1s1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 41-41'; static; circular

BOUNDARY COORDINATES
10 Top Boundaries
30 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	260.00	16.00	255.00	1
2	16.00	255.00	105.00	228.00	1
3	105.00	228.00	238.00	252.00	2
4	238.00	252.00	260.00	260.00	3
5	260.00	260.00	286.00	280.00	3
6	286.00	280.00	317.00	295.00	4
7	317.00	295.00	327.00	295.00	4
8	327.00	295.00	368.00	314.00	4
9	368.00	314.00	472.00	311.00	4
10	472.00	311.00	855.00	304.00	1
11	286.00	280.00	315.00	250.00	3
12	315.00	250.00	317.00	248.00	5
13	317.00	248.00	322.00	242.00	1
14	322.00	242.00	368.00	243.00	1
15	368.00	243.00	472.00	311.00	1
16	105.00	228.00	110.00	220.00	1
17	110.00	220.00	126.00	208.00	1
18	126.00	208.00	128.00	208.00	5
19	128.00	208.00	178.00	220.00	3
20	178.00	220.00	230.00	243.00	3
21	230.00	243.00	238.00	252.00	3
22	128.00	208.00	200.00	213.00	5
23	200.00	213.00	240.00	220.00	5
24	240.00	220.00	280.00	233.00	5
25	280.00	233.00	315.00	250.00	5
26	126.00	208.00	128.00	206.00	1
27	128.00	206.00	200.00	211.00	1
28	200.00	211.00	240.00	218.00	1
29	240.00	218.00	280.00	231.00	1
30	280.00	231.00	317.00	248.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0
2	125.0	130.0	250.0	28.0	0.00	0.0	0

3	125.0	130.0	140.0	25.0	0.12	0.0	0
4	125.0	130.0	300.0	30.0	0.00	0.0	0
5	125.0	130.0	200.0	15.0	0.12	0.0	0

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 75.00(ft)
and X = 175.00(ft)
Each Surface Terminates Between X = 300.00(ft)
and X = 400.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
25.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And -10.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 3.759 FS Min = 1.501 FS Ave = 2.472
Standard Deviation = 0.449 Coefficient of Variation = 18.15 %
Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	142.68	234.80
2	166.53	227.31
3	191.12	222.83
4	216.09	221.44
5	241.03	223.16
6	265.56	227.96
7	289.31	235.77
8	311.91	246.46
9	333.00	259.88
10	352.27	275.80
11	369.42	294.00
12	383.71	313.55

Circle Center At X = 214.75 ; Y = 422.44 ; and Radius = 201.01
Factor of Safety
*** 1.501 ***

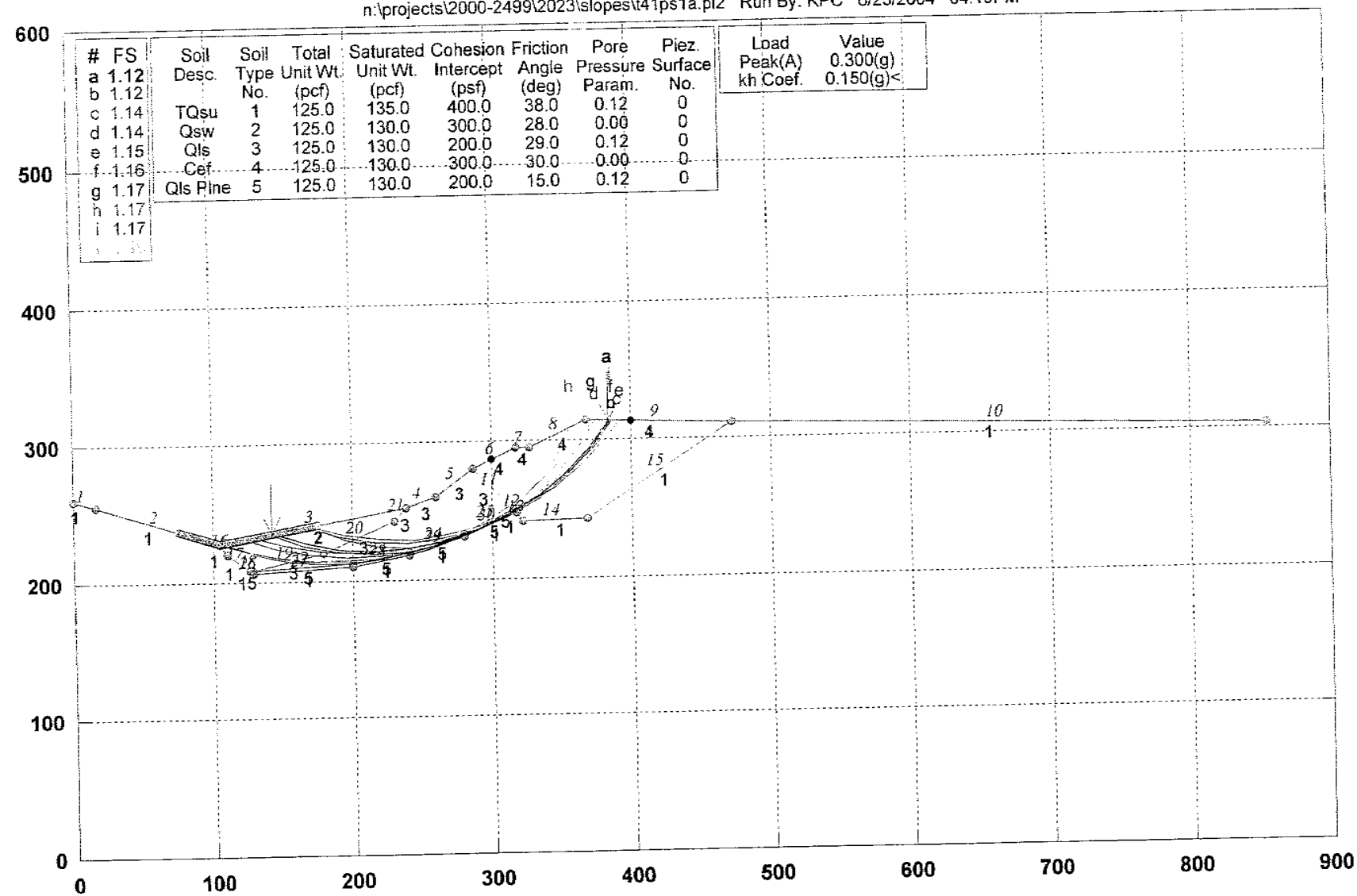
Mesas East, x-sec 41-41'; pseudostatic; circular

n:\projects\2000-2499\2023\slopes\t41ps1a.pl2 Run By: KPC 6/23/2004 04:19PM

#	FS
a	1.12
b	1.12
c	1.14
d	1.14
e	1.15
f	1.16
g	1.17
h	1.17
i	1.17

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	400.0	38.0	0.12	0
Qsw	2	125.0	130.0	300.0	28.0	0.00	0
Qls	3	125.0	130.0	200.0	29.0	0.12	0
Cef	4	125.0	130.0	300.0	30.0	0.00	0
Qls Pine	5	125.0	130.0	200.0	15.0	0.12	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<



GSTABL7 v.2 FSmin=1.12

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 95

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/23/2004
Time of Run: 04:19PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t41ps1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t41ps1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope1ps1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 41-41'; pseudostatic; circular

BOUNDARY COORDINATES
10 Top Boundaries
30 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	260.00	16.00	255.00	1
2	16.00	255.00	105.00	228.00	1
3	105.00	228.00	238.00	252.00	2
4	238.00	252.00	260.00	260.00	3
5	260.00	260.00	286.00	280.00	3
6	286.00	280.00	317.00	295.00	4
7	317.00	295.00	327.00	295.00	4
8	327.00	295.00	368.00	314.00	4
9	368.00	314.00	472.00	311.00	4
10	472.00	311.00	855.00	304.00	1
11	286.00	280.00	315.00	250.00	3
12	315.00	250.00	317.00	248.00	5
13	317.00	248.00	322.00	242.00	1
14	322.00	242.00	368.00	243.00	1
15	368.00	243.00	472.00	311.00	1
16	105.00	228.00	110.00	220.00	1
17	110.00	220.00	126.00	208.00	1
18	126.00	208.00	128.00	208.00	5
19	128.00	208.00	178.00	220.00	3
20	178.00	220.00	230.00	243.00	3
21	230.00	243.00	238.00	252.00	3
22	128.00	208.00	200.00	213.00	5
23	200.00	213.00	240.00	220.00	5
24	240.00	220.00	280.00	233.00	5
25	280.00	233.00	315.00	250.00	5
26	126.00	208.00	128.00	206.00	1
27	128.00	206.00	200.00	211.00	1
28	200.00	211.00	240.00	218.00	1
29	240.00	218.00	280.00	231.00	1
30	280.00	231.00	317.00	248.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	400.0	38.0	0.12	0.0	0
2	125.0	130.0	300.0	28.0	0.00	0.0	0

3	125.0	130.0	200.0	29.0	0.12	0.0	0
4	125.0	130.0	300.0	30.0	0.00	0.0	0
5	125.0	130.0	200.0	15.0	0.12	0.0	0

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 75.00(ft)
and X = 175.00(ft)
Each Surface Terminates Between X = 300.00(ft)
and X = 400.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
25.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And -10.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 2.975 FS Min = 1.116 FS Ave = 2.066
Standard Deviation = 0.427 Coefficient of Variation = 20.66 %
Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	142.68	234.80
2	166.53	227.31
3	191.12	222.83
4	216.09	221.44
5	241.03	223.16
6	265.56	227.96
7	289.31	235.77
8	311.91	246.46
9	333.00	259.88
10	352.27	275.80
11	369.42	294.00
12	383.71	313.55

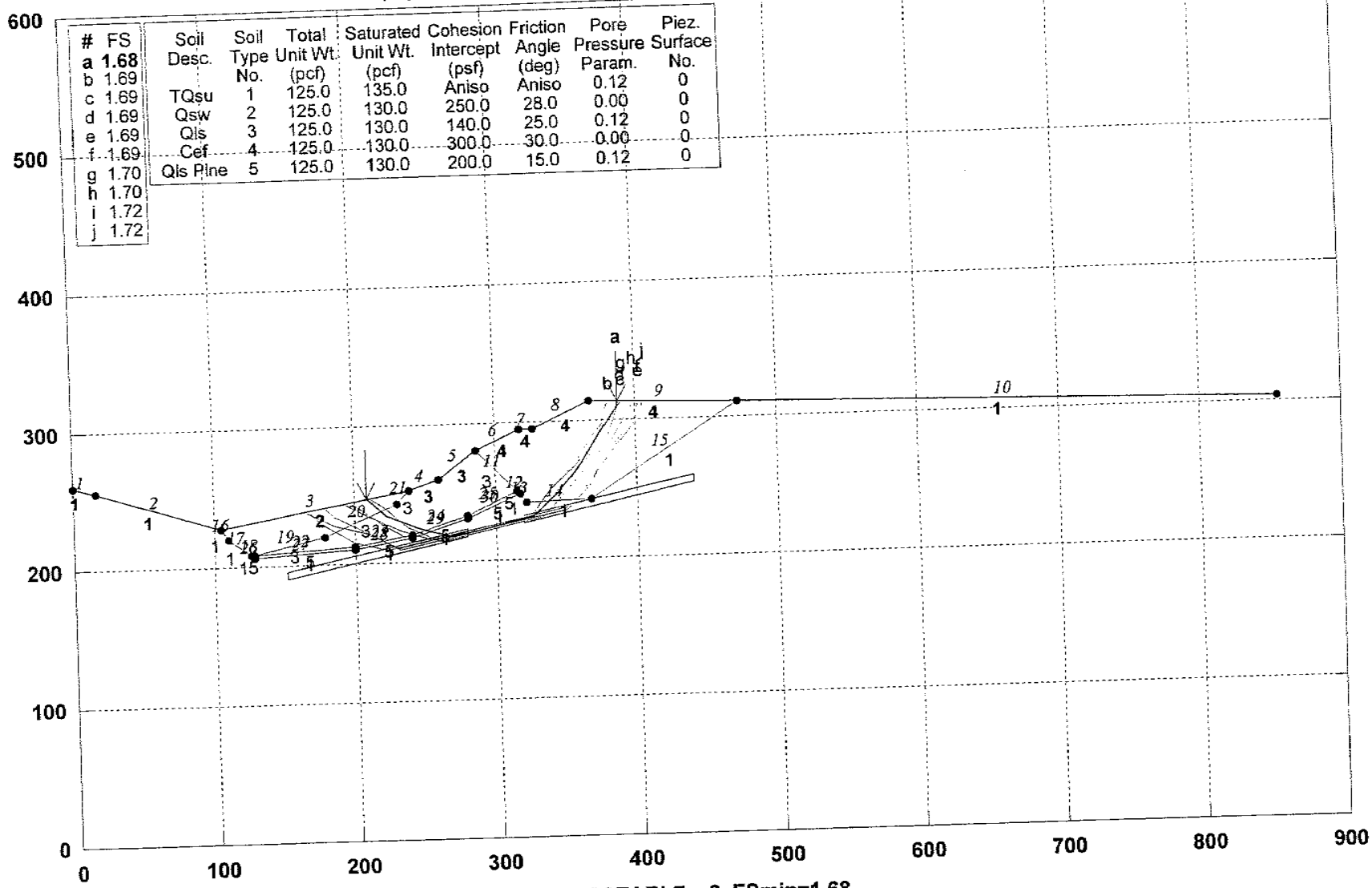
Circle Center At X = 214.75 ; Y = 422.44 ; and Radius = 201.01
Factor of Safety
*** 1.116 ***

Mesas East, x-sec 41-41'; static; bedding plane search

n:\projects\2000-2499\2023\slopes\t41s4a.pl2 Run By: KPC 6/23/2004 02:58PM

#	FS
a	**1.68**
b	1.69
c	1.69
d	1.69
e	1.69
f	1.69
g	1.70
h	1.70
i	1.72
j	1.72

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
			135.0	Aniso	Aniso	0.12	0
TQsu	1	125.0	130.0	250.0	28.0	0.00	0
Qsw	2	125.0	130.0	140.0	25.0	0.12	0
Qls	3	125.0	130.0	300.0	30.0	0.00	0
Cef	4	125.0	130.0	200.0	15.0	0.12	0
Qls Plne	5	125.0					



GSTABL7 v.2 FSmin=1.68

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 96

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/23/2004
Time of Run: 02:58PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t41s4a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t41s4a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope1s4a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 41-41'; static;
bedding plane search

BOUNDARY COORDINATES
10 Top Boundaries
30 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	260.00	16.00	255.00	1
2	16.00	255.00	105.00	228.00	1
3	105.00	228.00	238.00	252.00	2
4	238.00	252.00	260.00	260.00	3
5	260.00	260.00	286.00	280.00	3
6	286.00	280.00	317.00	295.00	4
7	317.00	295.00	327.00	295.00	4
8	327.00	295.00	368.00	314.00	4
9	368.00	314.00	472.00	311.00	4
10	472.00	311.00	855.00	304.00	1
11	286.00	280.00	315.00	250.00	3
12	315.00	250.00	317.00	248.00	5
13	317.00	248.00	322.00	242.00	1
14	322.00	242.00	368.00	243.00	1
15	368.00	243.00	472.00	311.00	1
16	105.00	228.00	110.00	220.00	1
17	110.00	220.00	126.00	208.00	1
18	126.00	208.00	128.00	208.00	5
19	128.00	208.00	178.00	220.00	3
20	178.00	220.00	230.00	243.00	3
21	230.00	243.00	238.00	252.00	3
22	128.00	208.00	200.00	213.00	5
23	200.00	213.00	240.00	220.00	5
24	240.00	220.00	280.00	233.00	5
25	280.00	233.00	315.00	250.00	5
26	126.00	208.00	128.00	206.00	1
27	128.00	206.00	200.00	211.00	1
28	200.00	211.00	240.00	218.00	1
29	240.00	218.00	280.00	231.00	1
30	280.00	231.00	317.00	248.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0
2	125.0	130.0	250.0	28.0	0.00	0.0	0
3	125.0	130.0	140.0	25.0	0.12	0.0	0
4	125.0	130.0	300.0	30.0	0.00	0.0	0
5	125.0	130.0	200.0	15.0	0.12	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	10.5	300.00	31.00
2	13.5	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 25.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	152.00	193.00	280.00	221.00	5.00
2	320.00	229.00	440.00	256.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 3.801 FS Min = 1.680 FS Ave = 2.033
Standard Deviation = 0.253 Coefficient of Variation = 12.44 %
Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	208.58	246.69
2	222.67	234.11
3	245.78	224.55
4	269.80	217.65
5	326.09	230.45
6	343.70	248.19
7	360.15	267.02
8	372.94	288.50
9	387.29	308.97
10	387.87	313.43

Factor of Safety
*** 1.680 ***
Individual data on the 23 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	9.9	6523.4	0.0	0.0	0.	0.	0.0	0.0	0.0
2	4.2	6806.3	0.0	1094.9	0.	0.	0.0	0.0	0.0
3	7.3	15844.1	0.0	2057.4	0.	0.	0.0	0.0	0.0
4	8.0	21854.7	0.0	2837.9	0.	0.	0.0	0.0	0.0
5	7.8	26497.0	0.0	3440.7	0.	0.	0.0	0.0	0.0
6	4.4	17309.1	0.0	2161.3	0.	0.	0.0	0.0	0.0
7	3.3	13950.9	0.0	1741.9	0.	0.	0.0	0.0	0.0
8	6.6	30791.3	0.0	3844.7	0.	0.	0.0	0.0	0.0
9	9.8	54803.5	0.0	6842.9	0.	0.	0.0	0.0	0.0
10	10.2	67108.2	0.0	8258.9	0.	0.	0.0	0.0	0.0

11	6.0	42783.2	0.0	5265.2	0.	0.	0.0	0.0	0.0
12	29.0	226147.6	0.0	27831.6	0.	0.	0.0	0.0	0.0
13	2.0	16589.5	0.0	2041.6	0.	0.	0.0	0.0	0.0
14	5.0	41278.4	0.0	5080.1	0.	0.	0.0	0.0	0.0
15	4.1	33208.1	0.0	4086.9	0.	0.	0.0	0.0	0.0
16	0.9	7318.5	0.0	1246.3	0.	0.	0.0	0.0	0.0
17	10.9	82626.7	0.0	14071.3	0.	0.	0.0	0.0	0.0
18	5.8	40735.6	0.0	0.0	0.	0.	0.0	0.0	0.0
19	16.4	100594.2	0.0	0.0	0.	0.	0.0	0.0	0.0
20	7.9	37860.7	0.0	0.0	0.	0.	0.0	0.0	0.0
21	4.9	18252.8	0.0	0.0	0.	0.	0.0	0.0	0.0
22	14.4	26750.4	0.0	0.0	0.	0.	0.0	0.0	0.0
23	0.6	163.1	0.0	0.0	0.	0.	0.0	0.0	0.0

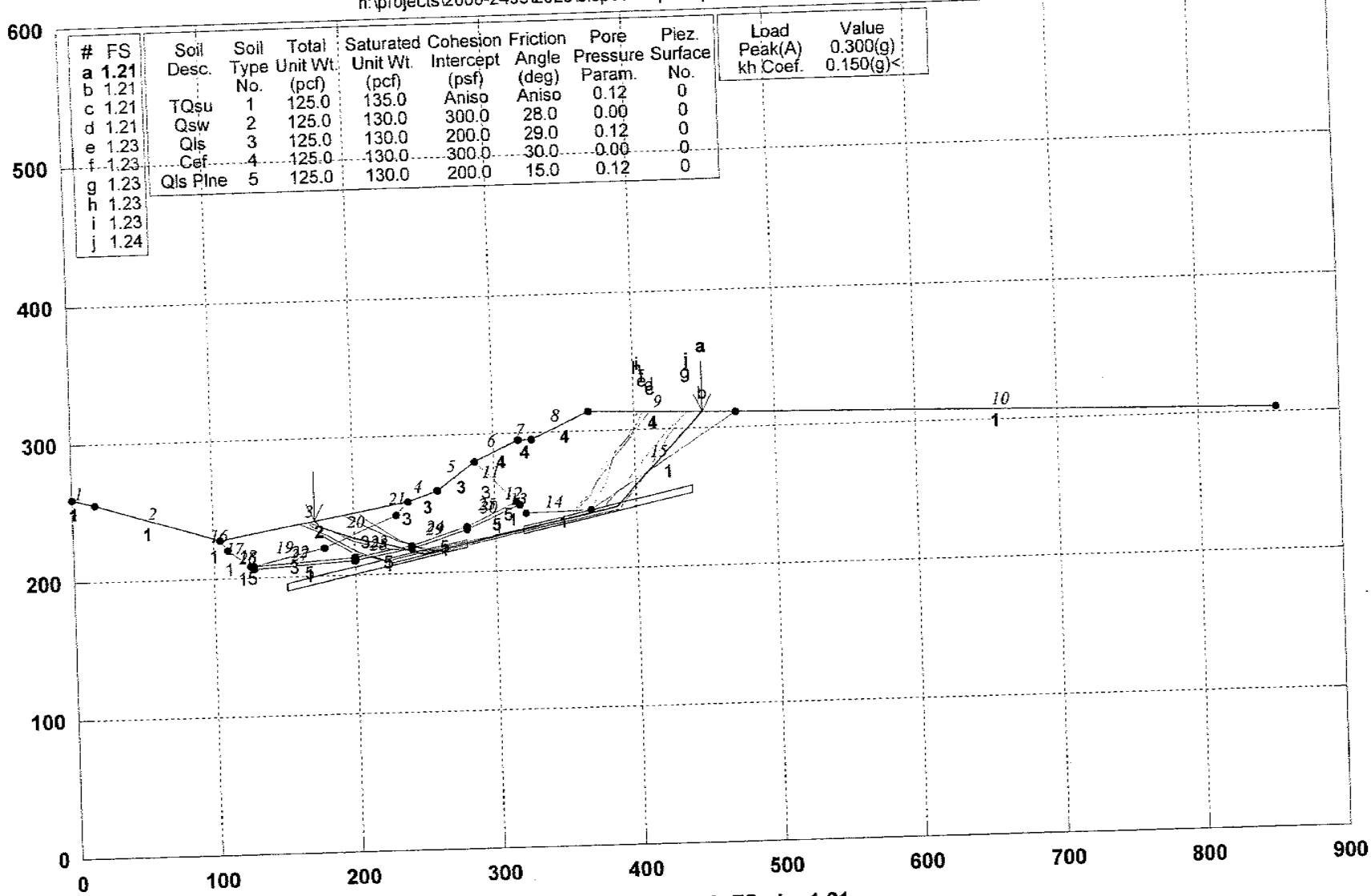
Mesas East, x-sec 41-41'; pseudostatic; bedding plane search

n:\projects\2000-2499\2023\slopes\t41ps4a.pl2 Run By: KPC 6/23/2004 03:00PM

#	FS
a	**1.21**
b	1.21
c	1.21
d	1.21
e	1.23
f	1.23
g	1.23
h	1.23
i	1.23
j	1.24

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	Aniso	Aniso	0.12	0
Qsw	2	125.0	130.0	300.0	28.0	0.00	0
Qls	3	125.0	130.0	200.0	29.0	0.12	0
Cef	4	125.0	130.0	300.0	30.0	0.00	0
Qls Plne	5	125.0	130.0	200.0	15.0	0.12	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<



GSTABL7 v.2 FSmin=1.21

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 97

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/23/2004
Time of Run: 03:00PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t41ps4a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t41ps4a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope1ps4a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 41-41'; pseudostatic; bedding plane search

BOUNDARY COORDINATES
10 Top Boundaries
30 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	260.00	16.00	255.00	1
2	16.00	255.00	105.00	228.00	1
3	105.00	228.00	238.00	252.00	2
4	238.00	252.00	260.00	260.00	3
5	260.00	260.00	286.00	280.00	3
6	286.00	280.00	317.00	295.00	4
7	317.00	295.00	327.00	295.00	4
8	327.00	295.00	368.00	314.00	4
9	368.00	314.00	472.00	311.00	4
10	472.00	311.00	855.00	304.00	1
11	286.00	280.00	315.00	250.00	3
12	315.00	250.00	317.00	248.00	5
13	317.00	248.00	322.00	242.00	1
14	322.00	242.00	368.00	243.00	1
15	368.00	243.00	472.00	311.00	1
16	105.00	228.00	110.00	220.00	1
17	110.00	220.00	126.00	208.00	1
18	126.00	208.00	128.00	208.00	5
19	128.00	208.00	178.00	220.00	3
20	178.00	220.00	230.00	243.00	3
21	230.00	243.00	238.00	252.00	3
22	128.00	208.00	200.00	213.00	5
23	200.00	213.00	240.00	220.00	5
24	240.00	220.00	280.00	233.00	5
25	280.00	233.00	315.00	250.00	5
26	126.00	208.00	128.00	206.00	1
27	128.00	206.00	200.00	211.00	1
28	200.00	211.00	240.00	218.00	1
29	240.00	218.00	280.00	231.00	1
30	280.00	231.00	317.00	248.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	400.0	38.0	0.12	0.0	0
2	125.0	130.0	300.0	28.0	0.00	0.0	0
3	125.0	130.0	200.0	29.0	0.12	0.0	0
4	125.0	130.0	300.0	30.0	0.00	0.0	0
5	125.0	130.0	200.0	15.0	0.12	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	10.5	400.00	38.00
2	13.5	200.00	20.00
3	90.0	400.00	38.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 25.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	152.00	193.00	280.00	221.00	5.00
2	320.00	229.00	440.00	256.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 2.608 FS Min = 1.210 FS Ave = 1.432
Standard Deviation = 0.205 Coefficient of Variation = 14.33 %
Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	171.64	240.02
2	176.45	235.44
3	199.80	226.49
4	224.12	220.72
5	248.21	214.03
6	386.70	244.31
7	403.18	263.10
8	420.48	281.16
9	437.58	299.40
10	449.40	311.65

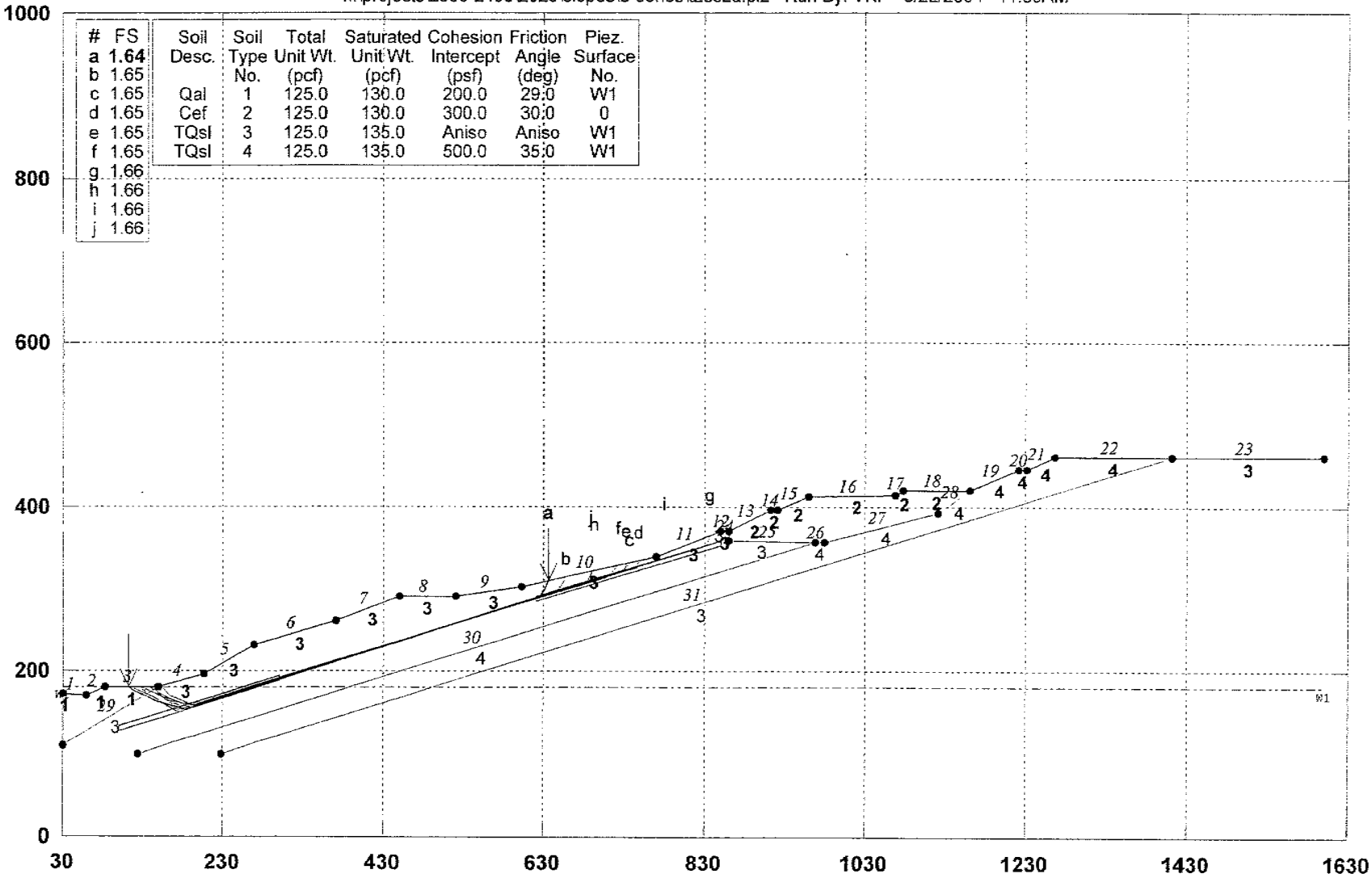
Factor of Safety
*** 1.210 ***
Individual data on the 24 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	4.8	1643.2	0.0	0.0	0.	0.	246.5	0.0	0.0
2	19.5	26749.7	0.0	0.0	0.	0.	4012.5	0.0	0.0
3	3.8	8377.2	0.0	1076.6	0.	0.	1256.6	0.0	0.0
4	24.3	72058.6	0.0	8886.7	0.	0.	10808.8	0.0	0.0
5	5.9	22127.1	0.0	2755.9	0.	0.	3319.1	0.0	0.0
6	1.8	7364.5	0.0	917.2	0.	0.	1104.7	0.0	0.0

7	4.4	18398.5	0.0	2291.5	0.	0.	2759.8	0.0	0.0
8	1.7	7540.1	0.0	939.1	0.	0.	1131.0	0.0	0.0
9	2.0	8944.5	0.0	1114.0	0.	0.	1341.7	0.0	0.0
10	8.2	40082.8	0.0	4992.2	0.	0.	6012.4	0.0	0.0
11	11.8	62690.4	0.0	7700.6	0.	0.	9403.6	0.0	0.0
12	20.0	122254.4	0.0	15017.1	0.	0.	18338.2	0.0	0.0
13	6.0	42044.4	0.0	5164.5	0.	0.	6306.7	0.0	0.0
14	29.0	223142.8	0.0	27409.8	0.	0.	33471.4	0.0	0.0
15	2.0	16416.9	0.0	2016.6	0.	0.	2462.5	0.0	0.0
16	5.0	40866.3	0.0	5019.8	0.	0.	6129.9	0.0	0.0
17	5.0	40183.0	0.0	4935.9	0.	0.	6027.4	0.0	0.0
18	41.0	352414.1	0.0	43288.8	0.	0.	52862.1	0.0	0.0
19	18.7	167068.9	0.0	20521.9	0.	0.	25060.3	0.0	0.0
20	16.5	122626.2	0.0	22318.7	0.	0.	18393.9	0.0	0.0
21	7.4	42628.9	0.0	7396.1	0.	0.	6394.3	0.0	0.0
22	9.9	45130.9	0.0	0.0	0.	0.	6769.6	0.0	0.0
23	17.1	46942.0	0.0	0.0	0.	0.	7041.3	0.0	0.0
24	11.8	9304.6	0.0	0.0	0.	0.	1395.7	0.0	0.0

Mesas East Access; x-sec 2E-2E'; static;bedding plane search

n:\projects\2000-2499\2023\slopes\e-series\t2es2a.pl2 Run By: VKP 6/22/2004 11:39AM



#	FS
a	1.64
b	1.65
c	1.65
d	1.65
e	1.65
f	1.65
g	1.66
h	1.66
i	1.66
j	1.66

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qal	1	125.0	130.0	200.0	29.0	W1
Cef	2	125.0	130.0	300.0	30.0	0
TQsl	3	125.0	135.0	Aniso	Aniso	W1
TQsl	4	125.0	135.0	500.0	35.0	W1

GSTABL7 v.2 FSmin=1.64

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 98

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/22/2004
Time of Run: 11:39AM
Run By: VKP
Input Data Filename: n:\Projects\2000-2499\2023\Slopes\E-Series\t2es2a.in
Output Filename: n:\Projects\2000-2499\2023\Slopes\E-Series\t2es2a.OUT
Unit System: English
Plotted Output Filename: n:\Projects\2000-2499\2023\SlopeSeries\t2es2a.PLT
PROBLEM DESCRIPTION: Mesas East Access; x-sec 2E-2E'; static;
bedding plane search

BOUNDARY COORDINATES
23 Top Boundaries
31 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	30.00	172.00	60.00	171.00	1
2	60.00	171.00	83.00	180.00	1
3	83.00	180.00	150.00	180.00	1
4	150.00	180.00	207.00	197.00	3
5	207.00	197.00	269.00	232.00	3
6	269.00	232.00	371.00	261.00	3
7	371.00	261.00	450.00	290.00	3
8	450.00	290.00	520.00	290.00	3
9	520.00	290.00	604.00	303.00	3
10	604.00	303.00	770.00	340.00	3
11	770.00	340.00	850.00	370.00	3
12	850.00	370.00	860.00	370.00	3
13	860.00	370.00	913.00	396.00	2
14	913.00	396.00	921.00	396.00	2
15	921.00	396.00	960.00	413.00	2
16	960.00	413.00	1068.00	414.00	2
17	1068.00	414.00	1078.00	419.00	2
18	1078.00	419.00	1160.00	419.00	2
19	1160.00	419.00	1222.00	445.00	4
20	1222.00	445.00	1232.00	445.00	4
21	1232.00	445.00	1267.00	461.00	4
22	1267.00	461.00	1411.00	461.00	4
23	1411.00	461.00	1600.00	461.00	3
24	860.00	370.00	860.01	360.00	3
25	860.01	360.00	968.00	358.00	3
26	968.00	358.00	980.00	358.00	4
27	980.00	358.00	1121.00	392.00	4
28	1121.00	392.00	1160.00	419.00	4
29	30.00	110.00	150.00	180.00	3
30	125.00	100.00	968.00	358.00	4
31	228.00	100.00	1411.00	461.00	3

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	200.0	29.0	0.00	0.0	1

2	125.0	130.0	300.0	30.0	0.00	0.0	0
3	125.0	135.0	500.0	35.0	0.00	0.0	1
4	125.0	135.0	500.0	35.0	0.00	0.0	1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 3 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	15.5	500.00	35.00
2	18.5	200.00	20.00
3	90.0	500.00	35.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	30.00	180.00
2	1600.00	180.00

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 35.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	100.00	130.00	300.00	191.00	5.00
2	620.00	287.00	850.00	356.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 2.569 FS Min = 1.640 FS Ave = 1.853
Standard Deviation = 0.192 Coefficient of Variation = 10.38 %
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	113.04	180.00
2	118.13	175.98
3	150.43	162.51
4	184.27	153.55
5	626.50	290.23
6	636.68	310.28

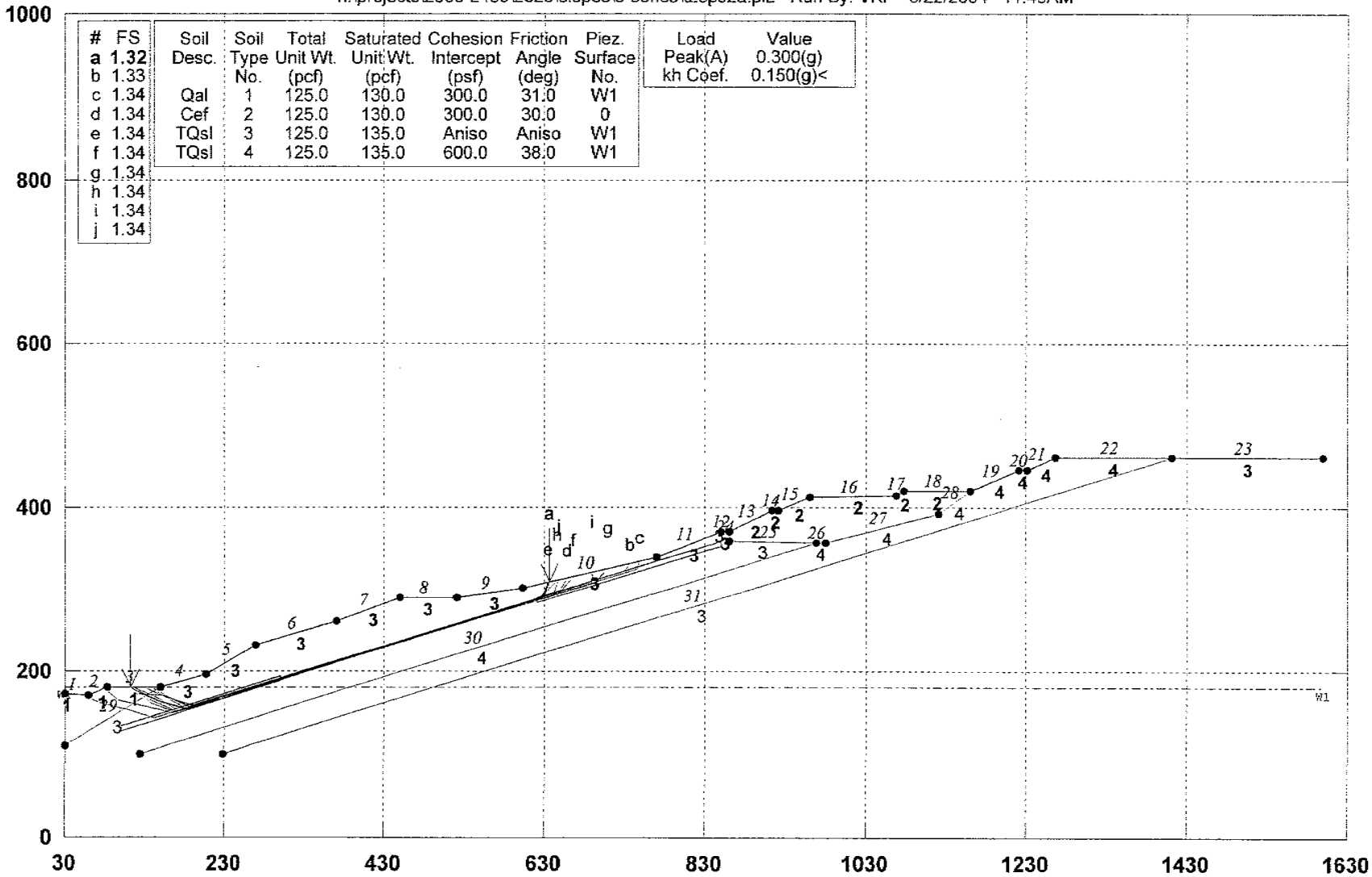
Factor of Safety
*** 1.640 ***
Individual data on the 14 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	5.1	1329.6	0.0	812.9	0.	0.	0.0	0.0	0.0
2	14.6	13359.9	0.0	6948.6	0.	0.	0.0	0.0	0.0
3	17.3	31579.3	0.0	16035.1	0.	0.	0.0	0.0	0.0

4	0.4	1016.7	0.0	507.5	0.	0.	0.0	0.0	0.0
5	33.8	122251.8	0.0	47992.1	0.	0.	0.0	0.0	0.0
6	22.7	109086.2	0.0	34063.8	0.	0.	0.0	0.0	0.0
7	62.0	349784.6	0.0	39869.4	0.	0.	0.0	0.0	0.0
8	0.9	5590.0	0.0	7.4	0.	0.	0.0	0.0	0.0
9	101.1	644681.4	0.0	0.0	0.	0.	0.0	0.0	0.0
10	79.0	513798.3	0.0	0.0	0.	0.	0.0	0.0	0.0
11	70.0	380660.4	0.0	0.0	0.	0.	0.0	0.0	0.0
12	84.0	275154.6	0.0	0.0	0.	0.	0.0	0.0	0.0
13	22.5	52746.0	0.0	0.0	0.	0.	0.0	0.0	0.0
14	10.2	11315.4	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East Access; x-sec 2E-2E'; pseudostatic; bedding plane search

n:\projects\2000-2499\2023\slopes\e-series\t2eps2a.pl2 Run By: VKP 6/22/2004 11:49AM



#	FS
a	1.32
b	1.33
c	1.34
d	1.34
e	1.34
f	1.34
g	1.34
h	1.34
i	1.34
j	1.34

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qal	1	125.0	130.0	300.0	31.0	W1
Cef	2	125.0	130.0	300.0	30.0	0
TQsl	3	125.0	135.0	Aniso	Aniso	W1
TQsl	4	125.0	135.0	600.0	38.0	W1

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.32

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 99

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/22/2004
Time of Run: 11:49AM
Run By: VKP
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\E-Series\t2eps2a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\E-Series\t2eps2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\SlopeSeries\t2eps2a.PLT
PROBLEM DESCRIPTION: Mesas East Access; x-sec 2E-2E';
pseudostatic; bedding plane search

BOUNDARY COORDINATES
23 Top Boundaries
31 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	30.00	172.00	60.00	171.00	1
2	60.00	171.00	83.00	180.00	1
3	83.00	180.00	150.00	180.00	1
4	150.00	180.00	207.00	197.00	3
5	207.00	197.00	269.00	232.00	3
6	269.00	232.00	371.00	261.00	3
7	371.00	261.00	450.00	290.00	3
8	450.00	290.00	520.00	290.00	3
9	520.00	290.00	604.00	303.00	3
10	604.00	303.00	770.00	340.00	3
11	770.00	340.00	850.00	370.00	3
12	850.00	370.00	860.00	370.00	3
13	860.00	370.00	913.00	396.00	2
14	913.00	396.00	921.00	396.00	2
15	921.00	396.00	960.00	413.00	2
16	960.00	413.00	1068.00	414.00	2
17	1068.00	414.00	1078.00	419.00	2
18	1078.00	419.00	1160.00	419.00	2
19	1160.00	419.00	1222.00	445.00	4
20	1222.00	445.00	1232.00	445.00	4
21	1232.00	445.00	1267.00	461.00	4
22	1267.00	461.00	1411.00	461.00	4
23	1411.00	461.00	1600.00	461.00	3
24	860.00	370.00	860.01	360.00	3
25	860.01	360.00	968.00	358.00	3
26	968.00	358.00	980.00	358.00	4
27	980.00	358.00	1121.00	392.00	4
28	1121.00	392.00	1160.00	419.00	4
29	30.00	110.00	150.00	180.00	3
30	125.00	100.00	968.00	358.00	4
31	228.00	100.00	1411.00	461.00	3

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	31.0	0.00	0.0	1
2	125.0	130.0	300.0	30.0	0.00	0.0	0
3	125.0	135.0	600.0	38.0	0.00	0.0	1
4	125.0	135.0	600.0	38.0	0.00	0.0	1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 3 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	15.5	600.00	38.00
2	18.5	300.00	25.00
3	90.0	600.00	38.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	30.00	180.00
2	1600.00	180.00

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 35.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	100.00	130.00	300.00	191.00	5.00
2	620.00	287.00	850.00	356.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 1.965 FS Min = 1.318 FS Ave = 1.486
Standard Deviation = 0.138 Coefficient of Variation = 9.31 %
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	113.04	180.00
2	118.13	175.98
3	150.43	162.51
4	184.27	153.55
5	626.50	290.23
6	636.68	310.28

Factor of Safety
*** 1.318 ***

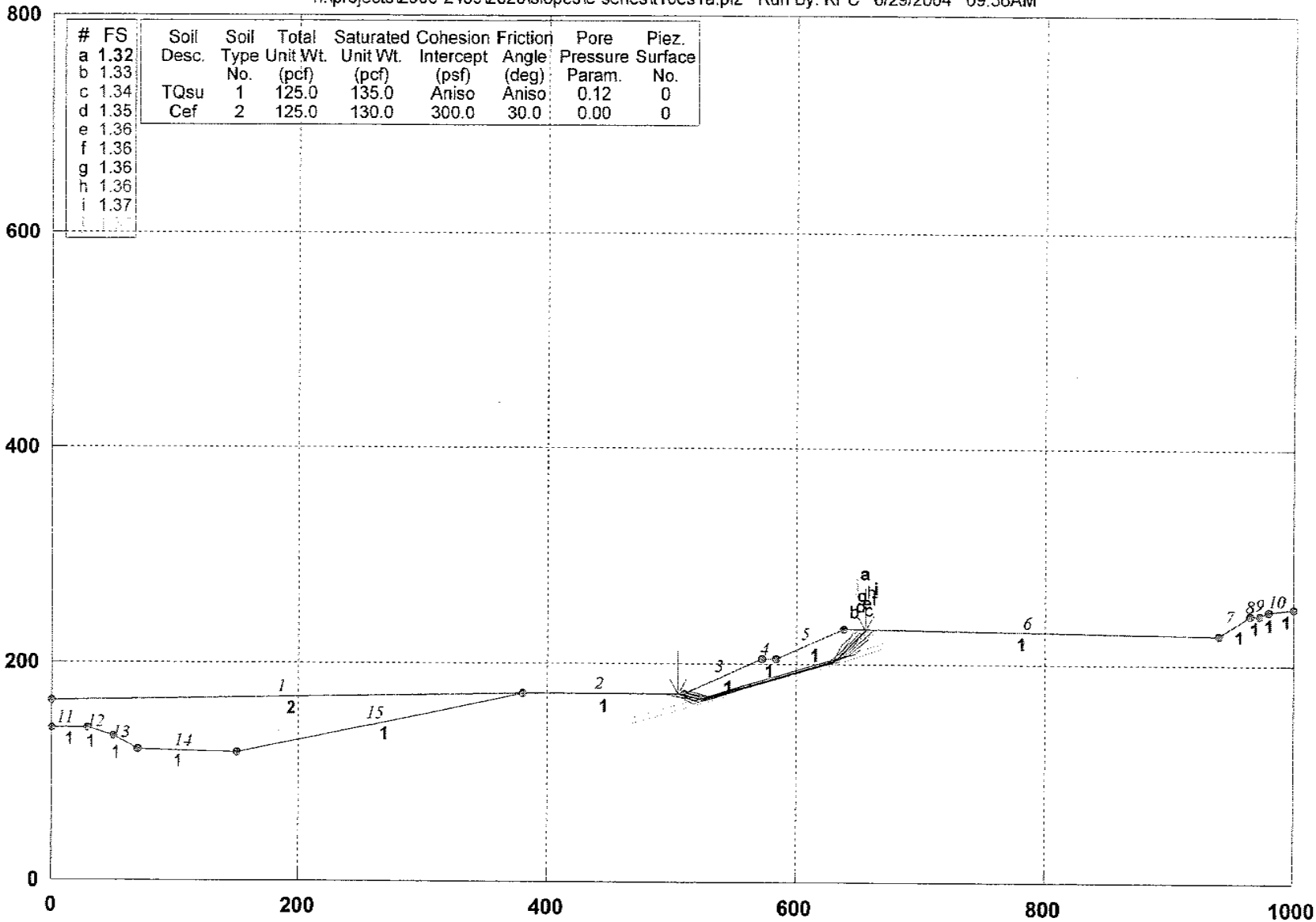
Individual data on the 14 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	5.1	1329.6	0.0	812.9	0.	0.	199.4	0.0	0.0
2	14.6	13359.9	0.0	6948.6	0.	0.	2004.0	0.0	0.0

3	17.3	31579.3	0.0	16035.1	0.	0.	4736.9	0.0	0.0
4	0.4	1016.7	0.0	507.5	0.	0.	152.5	0.0	0.0
5	33.8	122251.8	0.0	47992.1	0.	0.	18337.8	0.0	0.0
6	22.7	109086.2	0.0	34063.8	0.	0.	16362.9	0.0	0.0
7	62.0	349784.6	0.0	39869.4	0.	0.	52467.7	0.0	0.0
8	0.9	5590.0	0.0	7.4	0.	0.	838.5	0.0	0.0
9	101.1	644681.4	0.0	0.0	0.	0.	96702.2	0.0	0.0
10	79.0	513798.3	0.0	0.0	0.	0.	77069.8	0.0	0.0
11	70.0	380660.4	0.0	0.0	0.	0.	57099.1	0.0	0.0
12	84.0	275154.6	0.0	0.0	0.	0.	41273.2	0.0	0.0
13	22.5	52746.0	0.0	0.0	0.	0.	7911.9	0.0	0.0
14	10.2	11315.4	0.0	0.0	0.	0.	1697.3	0.0	0.0

Mesas East, x-sec 10E-10E' CS-14; critical bedding plane; static

n:\projects\2000-2499\2023\slopes\e-series\t10es1a.pl2 Run By: KPC 6/29/2004 09:36AM



GSTABL7 v.2 FSmin=1.32

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 100

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/29/2004
Time of Run: 09:36AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\E-Series\t10es1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\E-Series\t10es1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\SlopeSeries\t10es1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 10E-10E' CS-14;
critical bedding plane; static

BOUNDARY COORDINATES
10 Top Boundaries
15 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	165.00	380.00	172.00	2
2	380.00	172.00	510.00	173.00	1
3	510.00	173.00	573.00	205.00	1
4	573.00	205.00	584.00	205.00	1
5	584.00	205.00	639.00	232.00	1
6	639.00	232.00	940.00	228.00	1
7	940.00	228.00	965.00	246.00	1
8	965.00	246.00	973.00	246.00	1
9	973.00	246.00	980.00	250.00	1
10	980.00	250.00	1000.00	252.00	1
11	0.00	140.00	29.00	140.00	1
12	29.00	140.00	50.00	133.00	1
13	50.00	133.00	70.00	120.00	1
14	70.00	120.00	150.00	117.00	1
15	150.00	117.00	380.00	172.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	16.5	300.00	31.00
2	19.5	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 20.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	465.00	148.00	547.00	174.00	5.00
2	619.00	198.00	680.00	221.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 3.479 FS Min = 1.320 FS Ave = 1.824
Standard Deviation = 0.366 Coefficient of Variation = 20.09 %
Failure Surface Specified By 6 Coordinate Points

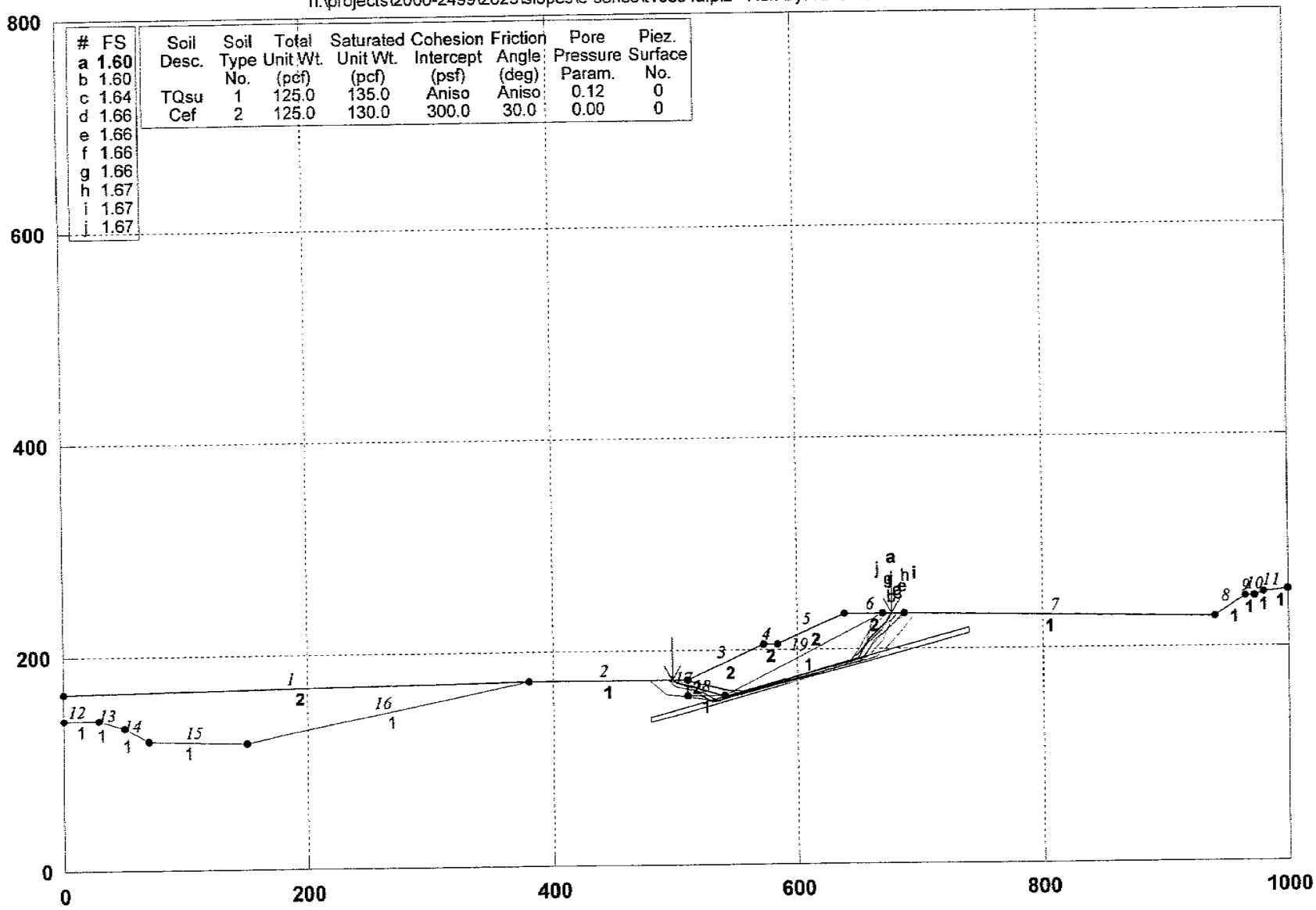
Point No.	X-Surf (ft)	Y-Surf (ft)
1	505.47	172.97
2	505.60	172.83
3	524.73	167.01
4	632.07	204.19
5	645.19	219.29
6	655.74	231.78

Factor of Safety
*** 1.320 ***
Individual data on the 9 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	0.1	1.1	0.0	0.2	0.	0.	0.0	0.0	0.0
2	4.4	450.4	0.0	56.5	0.	0.	0.0	0.0	0.0
3	14.7	13789.0	0.0	1729.5	0.	0.	0.0	0.0	0.0
4	48.3	104792.8	0.0	13308.1	0.	0.	0.0	0.0	0.0
5	11.0	26624.6	0.0	3381.2	0.	0.	0.0	0.0	0.0
6	48.1	125784.6	0.0	15973.9	0.	0.	0.0	0.0	0.0
7	6.9	19154.7	0.0	3505.7	0.	0.	0.0	0.0	0.0
8	6.2	12546.3	0.0	2296.2	0.	0.	0.0	0.0	0.0
9	10.6	8331.1	0.0	1548.2	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 10E-10E' CS-14; buttress w/ 15'd x 30'w key; static and 2:1 backcut

n:\projects\2000-2499\2023\slopes\e-series\t10es4a.pl2 Run By: KPC 6/29/2004 09:44AM



#	FS
a	1.60
b	1.60
c	1.64
d	1.66
e	1.66
f	1.66
g	1.66
h	1.67
i	1.67
j	1.67

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	Aniso	Aniso	0.12	0
Cef	2	125.0	130.0	300.0	30.0	0.00	0

GSTABL7 v.2 FSmin=1.60

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 101

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/29/2004
Time of Run: 09:44AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\E-Series\t10es4a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\E-Series\t10es4a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\SlopeSeries\t10es4a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 10E-10E' CS-14;
buttress w/ 15'd x 30'w key; static

BOUNDARY COORDINATES
11 Top Boundaries
19 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	165.00	380.00	172.00	2
2	380.00	172.00	510.00	173.00	1
3	510.00	173.00	573.00	205.00	2
4	573.00	205.00	584.00	205.00	2
5	584.00	205.00	639.00	232.00	2
6	639.00	232.00	688.00	232.00	2
7	688.00	232.00	940.00	228.00	1
8	940.00	228.00	965.00	246.00	1
9	965.00	246.00	973.00	246.00	1
10	973.00	246.00	980.00	250.00	1
11	980.00	250.00	1000.00	252.00	1
12	0.00	140.00	29.00	140.00	1
13	29.00	140.00	50.00	133.00	1
14	50.00	133.00	70.00	120.00	1
15	70.00	120.00	150.00	117.00	1
16	150.00	117.00	380.00	172.00	1
17	509.99	158.00	510.00	173.00	2
18	509.99	158.00	540.00	158.00	1
19	540.00	158.00	670.00	232.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	16.5	300.00	31.00
2	19.5	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso
C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and

C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and
C equal to zero, with water weight in the tension crack.
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 20.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	480.00	135.00	590.00	170.00	5.00
2	630.00	183.00	740.00	216.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 3.880 FS Min = 1.597 FS Ave = 2.188
Standard Deviation = 0.421 Coefficient of Variation = 19.24 %
Failure Surface Specified By 8 Coordinate Points

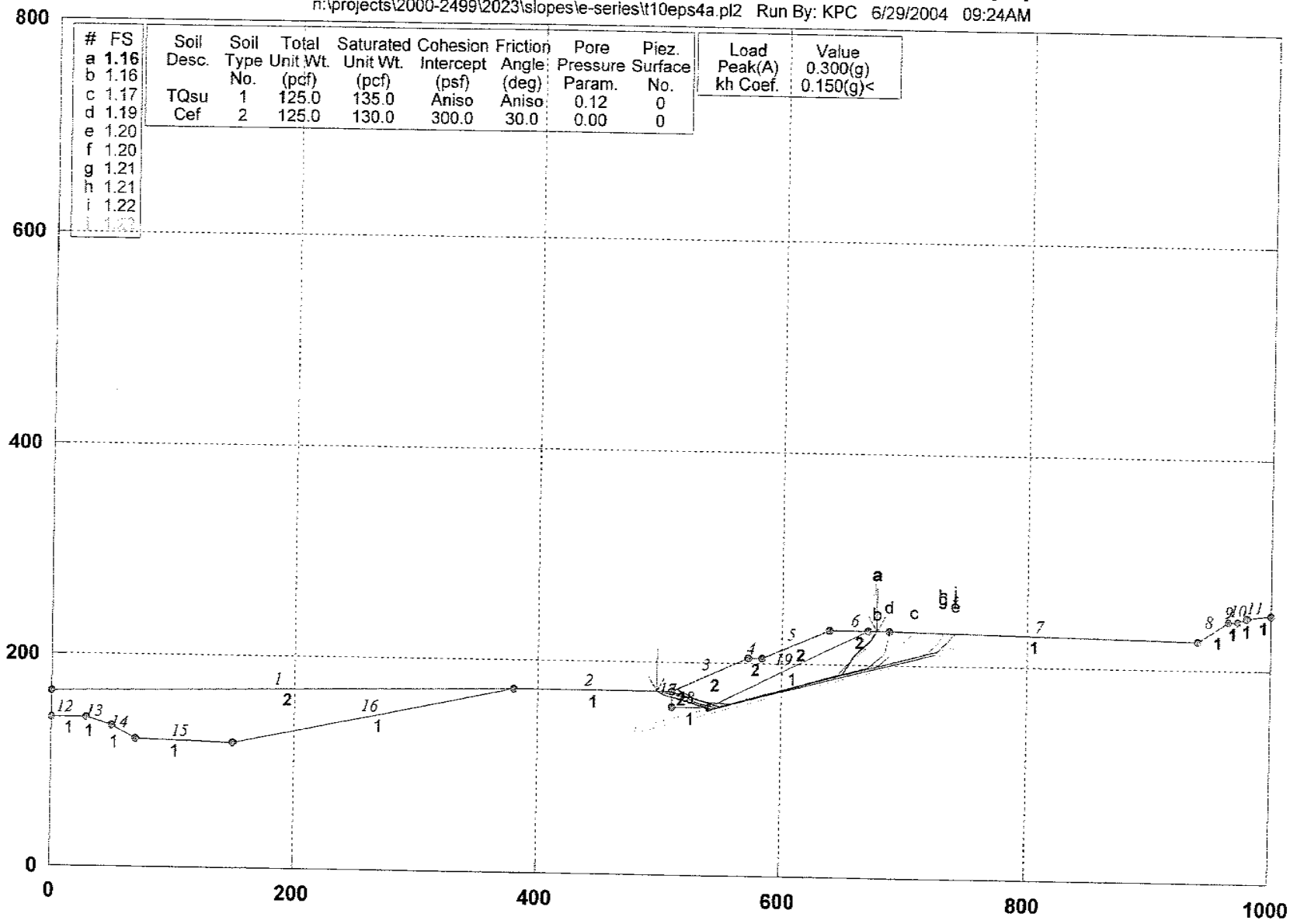
Point No.	X-Surf (ft)	Y-Surf (ft)
1	498.09	172.91
2	504.23	168.76
3	523.20	162.44
4	542.35	156.67
5	649.97	191.02
6	658.29	209.21
7	672.25	223.53
8	676.99	232.00

Factor of Safety
*** 1.597 ***
Individual data on the 15 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	6.1	1607.9	0.0	232.9	0.	0.	0.0	0.0	0.0
2	5.8	3734.2	0.0	472.4	0.	0.	0.0	0.0	0.0
3	0.0	3.2	0.0	0.0	0.	0.	0.0	0.0	0.0
4	13.2	19331.4	0.0	0.0	0.	0.	0.0	0.0	0.0
5	14.7	42812.3	0.0	0.0	0.	0.	0.0	0.0	0.0
6	2.1	7721.6	0.0	967.6	0.	0.	0.0	0.0	0.0
7	2.4	9350.3	0.0	1171.7	0.	0.	0.0	0.0	0.0
8	30.6	136585.2	0.0	17204.6	0.	0.	0.0	0.0	0.0
9	11.0	50586.6	0.0	6372.0	0.	0.	0.0	0.0	0.0
10	55.0	273342.2	0.0	34430.9	0.	0.	0.0	0.0	0.0
11	11.0	58615.8	0.0	7383.4	0.	0.	0.0	0.0	0.0
12	8.3	33128.4	0.0	9565.5	0.	0.	0.0	0.0	0.0
13	11.7	24572.6	0.0	4224.3	0.	0.	0.0	0.0	0.0
14	2.2	2701.6	0.0	0.0	0.	0.	0.0	0.0	0.0
15	4.7	2510.8	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 10E-10E' CS-14; buttress w/ 15'd x 30'w key; pseudo

n:\projects\2000-2499\2023\slopes\e-series\t10eps4a.pl2 Run By: KPC 6/29/2004 09:24AM



#	FS
a	1.16
b	1.16
c	1.17
d	1.19
e	1.20
f	1.20
g	1.21
h	1.21
i	1.22
j	1.22

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	Aniso	Aniso	0.12	0
Cef	2	125.0	130.0	300.0	30.0	0.00	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.16

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 102

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/29/2004
Time of Run: 09:24AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\E-Series\t10eps4a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\E-Series\t10eps4a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\SlopeSeries\t10eps4a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 10E-10E' CS-14;
buttress w/ 15'd x 30'w key; pseudo

BOUNDARY COORDINATES
11 Top Boundaries
19 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	165.00	380.00	172.00	2
2	380.00	172.00	510.00	173.00	1
3	510.00	173.00	573.00	205.00	2
4	573.00	205.00	584.00	205.00	2
5	584.00	205.00	639.00	232.00	2
6	639.00	232.00	688.00	232.00	2
7	688.00	232.00	940.00	228.00	1
8	940.00	228.00	965.00	246.00	1
9	965.00	246.00	973.00	246.00	1
10	973.00	246.00	980.00	250.00	1
11	980.00	250.00	1000.00	252.00	1
12	0.00	140.00	29.00	140.00	1
13	29.00	140.00	50.00	133.00	1
14	50.00	133.00	70.00	120.00	1
15	70.00	120.00	150.00	117.00	1
16	150.00	117.00	380.00	172.00	1
17	509.99	158.00	510.00	173.00	2
18	509.99	158.00	540.00	158.00	1
19	540.00	158.00	670.00	232.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	400.0	38.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	16.5	400.00	38.00
2	19.5	200.00	20.00
3	90.0	400.00	38.00

ANISOTROPIC SOIL NOTES:

(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 20.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	480.00	135.00	590.00	170.00	5.00
2	630.00	183.00	740.00	216.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 2.754 FS Min = 1.158 FS Ave = 1.588
Standard Deviation = 0.312 Coefficient of Variation = 19.63 %
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	498.09	172.91
2	504.23	168.76
3	523.20	162.44
4	542.35	156.67
5	649.97	191.02
6	658.29	209.21
7	672.25	223.53
8	676.99	232.00

Factor of Safety
*** 1.158 ***

Individual data on the 15 slices

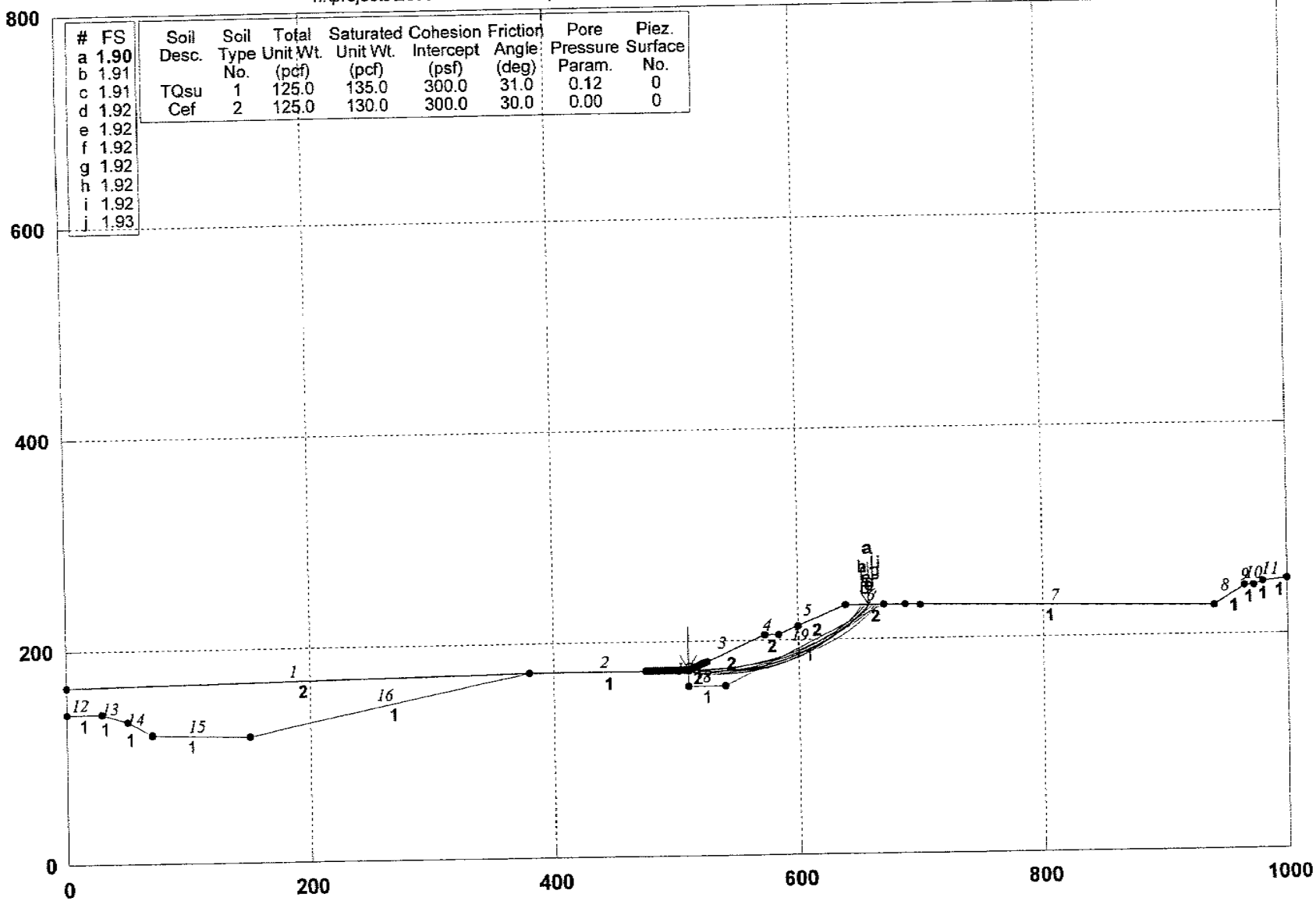
Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	6.1	1607.9	0.0	232.9	0.	0.	241.2	0.0	0.0
2	5.8	3734.2	0.0	472.4	0.	0.	560.1	0.0	0.0
3	0.0	3.2	0.0	0.0	0.	0.	0.5	0.0	0.0
4	13.2	19331.4	0.0	0.0	0.	0.	2899.7	0.0	0.0
5	14.7	42812.3	0.0	0.0	0.	0.	6421.8	0.0	0.0
6	2.1	7721.6	0.0	967.6	0.	0.	1158.2	0.0	0.0
7	2.4	9350.3	0.0	1171.7	0.	0.	1402.5	0.0	0.0
8	30.6	136585.2	0.0	17204.6	0.	0.	20487.8	0.0	0.0
9	11.0	50586.6	0.0	6372.0	0.	0.	7588.0	0.0	0.0
10	55.0	273342.2	0.0	34430.9	0.	0.	41001.3	0.0	0.0
11	11.0	58615.8	0.0	7383.4	0.	0.	8792.4	0.0	0.0
12	8.3	33128.4	0.0	9565.5	0.	0.	4969.3	0.0	0.0
13	11.7	24572.6	0.0	4224.3	0.	0.	3685.9	0.0	0.0
14	2.2	2701.6	0.0	0.0	0.	0.	405.2	0.0	0.0
15	4.7	2510.8	0.0	0.0	0.	0.	376.6	0.0	0.0

Mesas East, x-sec 10E-10E' CS-14; buttress w/ 15'd x 30'w key; circular

n:\projects\2000-2499\2023\slopes\e-series\t10es4b.pl2 Run By: KPC 7/2/2004 03:22PM

#	FS
a	1.90
b	1.91
c	1.91
d	1.92
e	1.92
f	1.92
g	1.92
h	1.92
i	1.92
j	1.93

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	300.0	31.0	0.12	0
Cef	2	125.0	130.0	300.0	30.0	0.00	0



GSTABL7 v.2 FSmin=1.90

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN NO. 103

*** GSTABL7 ***
** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 7/2/2004
Time of Run: 03:22PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\E-Series\t10es4b.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\E-Series\t10es4b.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\SlopeSeries\t10es4b.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 10E-10E' CS-14;
buttress w/ 15'd x 30'w key; circular

BOUNDARY COORDINATES
11 Top Boundaries
19 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	165.00	380.00	172.00	2
2	380.00	172.00	510.00	173.00	1
3	510.00	173.00	573.00	205.00	2
4	573.00	205.00	584.00	205.00	2
5	584.00	205.00	639.00	232.00	2
6	639.00	232.00	688.00	232.00	2
7	688.00	232.00	940.00	228.00	1
8	940.00	228.00	965.00	246.00	1
9	965.00	246.00	973.00	246.00	1
10	973.00	246.00	980.00	250.00	1
11	980.00	250.00	1000.00	252.00	1
12	0.00	140.00	29.00	140.00	1
13	29.00	140.00	50.00	133.00	1
14	50.00	133.00	70.00	120.00	1
15	70.00	120.00	150.00	117.00	1
16	150.00	117.00	380.00	172.00	1
17	509.99	158.00	510.00	173.00	2
18	509.99	158.00	540.00	158.00	1
19	540.00	158.00	670.00	232.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

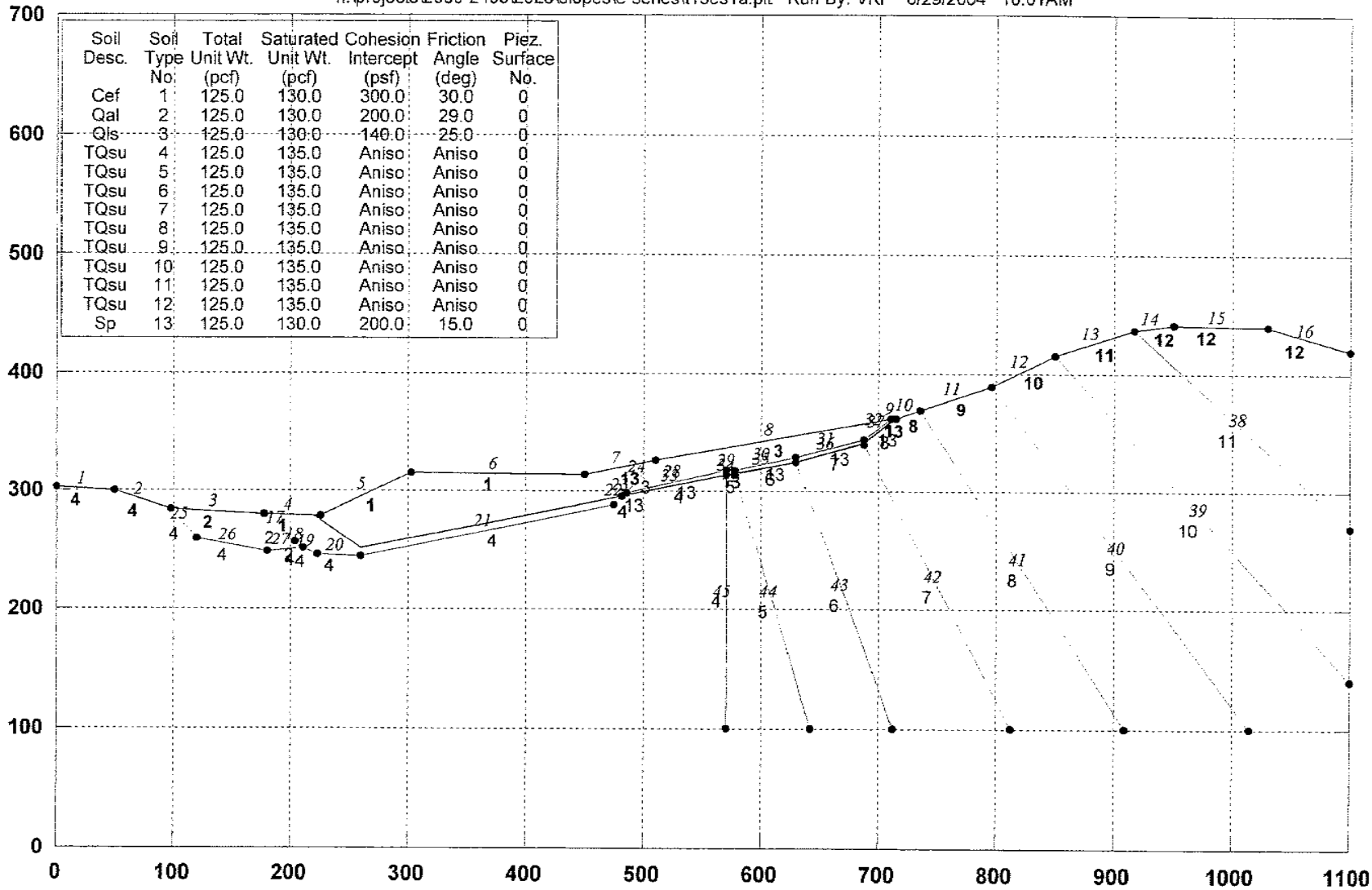
ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 475.00(ft)
and X = 525.00(ft)
Each Surface Terminates Between X = 600.00(ft)
and X = 700.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
20.00(ft) Line Segments Define Each Trial Failure Surface.

Mesas East, x-sec 13E-13E'; Along landslide plane; static

n:\projects\2000-2499\2023\slopes\e-series\t13es1a.plt Run By: VKP 6/29/2004 10:01AM



Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
Qal	2	125.0	130.0	200.0	29.0	0
Qls	3	125.0	130.0	140.0	25.0	0
TQsu	4	125.0	135.0	Aniso	Aniso	0
TQsu	5	125.0	135.0	Aniso	Aniso	0
TQsu	6	125.0	135.0	Aniso	Aniso	0
TQsu	7	125.0	135.0	Aniso	Aniso	0
TQsu	8	125.0	135.0	Aniso	Aniso	0
TQsu	9	125.0	135.0	Aniso	Aniso	0
TQsu	10	125.0	135.0	Aniso	Aniso	0
TQsu	11	125.0	135.0	Aniso	Aniso	0
TQsu	12	125.0	135.0	Aniso	Aniso	0
Sp	13	125.0	130.0	200.0	15.0	0

GSTABL7 v.2 FSmin=3.27

Factor Of Safety Is Calculated By The Modified Bishop Method

GSTABL7

RUN No. 104

*** GSTABL7 ***
** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
(All Rights Reserved-Unauthorized Use Prohibited)
****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date: 6/29/2004
Time of Run: 10:01AM
Run By: VKP
Input Data Filename: n:\Projects\2000-2499\2023\Slopes\E-Series\t13es1a.in
Output Filename: n:\Projects\2000-2499\2023\Slopes\E-Series\t13es1a.OUT
Unit System: English
Plotted Output Filename: n:\Projects\2000-2499\2023\SlopeSeries\t13es1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 13E-13E';
Along landslide plane; static

BOUNDARY COORDINATES
16 Top Boundaries
45 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	303.00	50.00	300.00	4
2	50.00	300.00	98.00	284.00	4
3	98.00	284.00	178.00	280.00	2
4	178.00	280.00	226.00	279.00	1
5	226.00	279.00	302.00	315.00	1
6	302.00	315.00	450.00	313.00	1
7	450.00	313.00	510.00	326.00	13
8	510.00	326.00	711.00	362.00	3
9	711.00	362.00	715.00	362.00	13
10	715.00	362.00	736.00	369.00	8
11	736.00	369.00	796.00	389.00	9
12	796.00	389.00	850.00	415.00	10
13	850.00	415.00	917.00	437.00	11
14	917.00	437.00	950.00	441.00	12
15	950.00	441.00	1030.00	440.00	12
16	1030.00	440.00	1100.00	420.00	12
17	178.00	280.00	204.00	257.00	2
18	204.00	257.00	210.00	252.00	2
19	210.00	252.00	223.00	246.00	4
20	223.00	246.00	260.00	245.00	4
21	260.00	245.00	475.00	289.00	4
22	475.00	289.00	481.00	295.00	4
23	481.00	295.00	485.00	299.00	13
24	485.00	299.00	510.00	326.00	3
25	98.00	284.00	120.00	260.00	4
26	120.00	260.00	180.00	249.00	4
27	180.00	249.00	210.00	252.00	4
28	485.00	299.00	570.00	317.00	13
29	570.00	317.00	577.00	318.00	13
30	577.00	318.00	630.00	328.00	13
31	630.00	328.00	688.00	344.00	13
32	688.00	344.00	711.00	362.00	13
33	481.00	295.00	570.00	313.00	4
34	570.00	313.00	577.00	314.00	5
35	577.00	314.00	630.00	324.00	6
36	630.00	324.00	688.00	340.00	7
37	688.00	340.00	715.00	362.00	8
38	917.00	437.00	1100.00	270.00	11
39	850.00	415.00	1100.00	140.00	10
40	796.00	389.00	1015.00	100.00	9
41	736.00	369.00	909.00	100.00	8

42	688.00	340.00	812.00	100.00	7
43	630.00	324.00	712.00	100.00	6
44	577.00	314.00	642.00	100.00	5
45	570.00	313.00	570.00	100.00	4

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
13 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	130.0	200.0	29.0	0.00	0.0	0
3	125.0	130.0	140.0	25.0	0.00	0.0	0
4	125.0	135.0	300.0	31.0	0.00	0.0	0
5	125.0	135.0	300.0	31.0	0.00	0.0	0
6	125.0	135.0	300.0	31.0	0.00	0.0	0
7	125.0	135.0	300.0	31.0	0.00	0.0	0
8	125.0	135.0	300.0	31.0	0.00	0.0	0
9	125.0	135.0	300.0	31.0	0.00	0.0	0
10	125.0	135.0	300.0	31.0	0.00	0.0	0
11	125.0	135.0	300.0	31.0	0.00	0.0	0
12	125.0	135.0	300.0	31.0	0.00	0.0	0
13	125.0	130.0	200.0	15.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
9 soil type(s)

Soil Type 4 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	11.0	300.00	31.00
2	13.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 5 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	14.0	300.00	31.00
2	16.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 6 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	19.0	300.00	31.00
2	21.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 7 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	24.0	300.00	31.00
2	26.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 8 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	29.0	300.00	31.00
2	31.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 9 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	34.0	300.00	31.00
2	36.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 10 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	39.0	300.00	31.00
2	41.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 11 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	44.0	300.00	31.00
2	46.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 12 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	49.0	300.00	31.00
2	51.0	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Trial Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	220.00	279.12
2	260.00	251.00
3	570.00	314.00
4	577.00	315.00
5	630.00	325.00
6	688.00	341.00
7	713.00	362.00

Circle Center At X = 209.031(ft) ; Y = 2162.922(ft); and Radius = 1883.829(ft)
* * Factor Of Safety Is Calculated By The Modified Bishop Method * *
Factor Of Safety For The Preceding Specified Surface = 3.274

Table 1 - Individual Data on the 13 Slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	6.0	1535.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	34.0	102423.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	42.0	261370.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	148.0	729377.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	32.1	94842.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	2.9	8505.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	25.0	75079.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	60.0	176024.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	7.0	20014.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	53.0	150694.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0

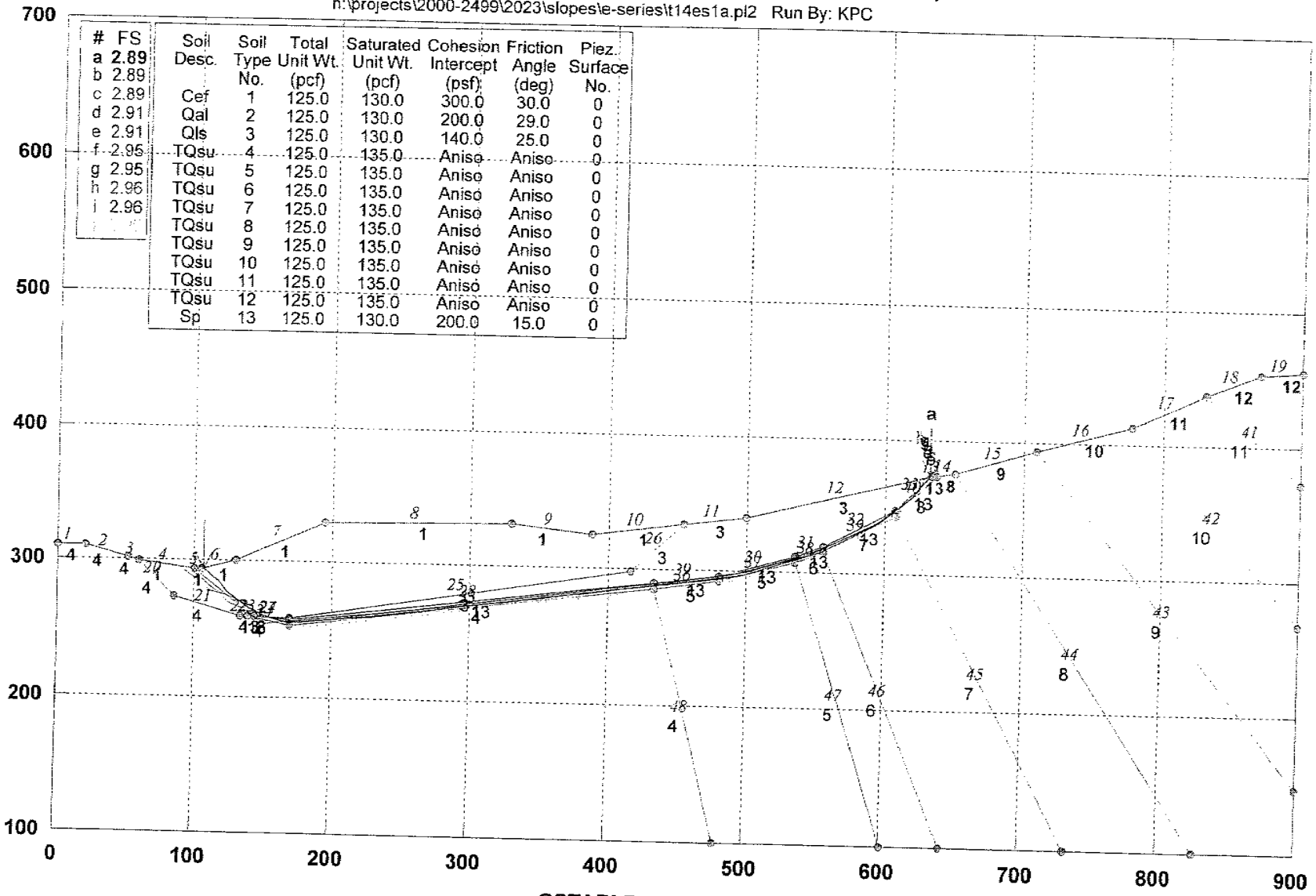
11	58.0	142727.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	23.0	26680.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	2.0	210.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Mesas East, x-sect 14E-14E'; Landslide Plane; Static

n:\projects\2000-2499\2023\slopes\e-series\t14es1a.pl2 Run By: KPC

#	FS
a	2.89
b	2.89
c	2.89
d	2.91
e	2.91
f	2.95
g	2.95
h	2.96
i	2.96

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
Qal	2	125.0	130.0	200.0	29.0	0
Qls	3	125.0	130.0	140.0	25.0	0
TQsu	4	125.0	135.0	Aniso	Aniso	0
TQsu	5	125.0	135.0	Aniso	Aniso	0
TQsu	6	125.0	135.0	Aniso	Aniso	0
TQsu	7	125.0	135.0	Aniso	Aniso	0
TQsu	8	125.0	135.0	Aniso	Aniso	0
TQsu	9	125.0	135.0	Aniso	Aniso	0
TQsu	10	125.0	135.0	Aniso	Aniso	0
TQsu	11	125.0	135.0	Aniso	Aniso	0
TQsu	12	125.0	135.0	Aniso	Aniso	0
Sp	13	125.0	130.0	200.0	15.0	0



GSTABL7 v.2 FSmin=2.89

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 105

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:
Time of Run:                09:58AM
Run By:                     KPC
Input Data Filename:        N:\Projects\2000-2499\2023\Slopes\E-Series\t14es1a.in
Output Filename:            N:\Projects\2000-2499\2023\Slopes\E-Series\t14es1a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\2000-2499\2023\SlopeSeries\t14es1a.PLT
PROBLEM DESCRIPTION:  Mesas East, x-sect 14E-14E';
                      Landslide Plane; Static
BOUNDARY COORDINATES
   19 Top   Boundaries
   48 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	310.00	20.00	310.00	4
2	20.00	310.00	52.00	301.00	4
3	52.00	301.00	60.00	299.00	4
4	60.00	299.00	100.00	293.00	1
5	100.00	293.00	106.00	293.00	1
6	106.00	293.00	130.00	300.00	1
7	130.00	300.00	195.00	330.00	1
8	195.00	330.00	330.00	332.00	1
9	330.00	332.00	388.00	325.00	1
10	388.00	325.00	454.00	334.00	1
11	454.00	334.00	500.00	340.00	3
12	500.00	340.00	633.00	373.00	3
13	633.00	373.00	637.00	373.00	13
14	637.00	373.00	650.00	376.00	8
15	650.00	376.00	709.00	394.00	9
16	709.00	394.00	777.00	413.00	10
17	777.00	413.00	830.00	437.00	11
18	830.00	437.00	870.00	453.00	12
19	870.00	453.00	900.00	456.00	12
20	60.00	299.00	86.00	273.00	4
21	86.00	273.00	134.00	260.00	4
22	134.00	260.00	140.00	260.00	4
23	140.00	260.00	144.00	260.00	13
24	144.00	260.00	170.00	259.00	3
25	170.00	259.00	416.00	298.00	3
26	416.00	298.00	454.00	334.00	3
27	144.00	260.00	170.00	257.00	13
28	170.00	257.00	433.00	290.00	13
29	433.00	290.00	480.00	296.00	13
30	480.00	296.00	535.00	311.00	13
31	535.00	311.00	556.00	319.00	13
32	556.00	319.00	607.00	347.00	13
33	607.00	347.00	633.00	373.00	13
34	140.00	260.00	170.00	253.00	4
35	170.00	253.00	433.00	286.00	4
36	433.00	286.00	480.00	292.00	5
37	480.00	292.00	535.00	307.00	5
38	535.00	307.00	556.00	315.00	6
39	556.00	315.00	607.00	343.00	7
40	607.00	343.00	637.00	373.00	8

41	830.00	437.00	900.00	372.00	11
42	777.00	413.00	900.00	268.00	10
43	709.00	394.00	900.00	147.00	9
44	650.00	376.00	827.00	100.00	8
45	607.00	343.00	733.00	100.00	7
46	556.00	315.00	644.00	100.00	6
47	535.00	307.00	601.00	100.00	5
48	433.00	286.00	479.00	100.00	4

User Specified Y-Origin = 100.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
13 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	130.0	200.0	29.0	0.00	0.0	0
3	125.0	130.0	140.0	25.0	0.00	0.0	0
4	125.0	135.0	300.0	31.0	0.00	0.0	0
5	125.0	135.0	300.0	31.0	0.00	0.0	0
6	125.0	135.0	300.0	31.0	0.00	0.0	0
7	125.0	135.0	300.0	31.0	0.00	0.0	0
8	125.0	135.0	300.0	31.0	0.00	0.0	0
9	125.0	135.0	300.0	31.0	0.00	0.0	0
10	125.0	135.0	300.0	31.0	0.00	0.0	0
11	125.0	135.0	300.0	31.0	0.00	0.0	0
12	125.0	135.0	300.0	31.0	0.00	0.0	0
13	125.0	130.0	200.0	15.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
9 soil type(s)

Soil Type 4 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	11.0	300.00	31.00
2	13.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 5 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	14.0	300.00	31.00
2	16.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 6 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	19.0	300.00	31.00
2	21.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 7 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	24.0	300.00	31.00
2	26.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 8 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range	Counterclockwise Direction Limit	Cohesion Intercept	Friction Angle

No.	(deg)	(psf)	(deg)
1	29.0	300.00	31.00
2	31.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 9 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	34.0	300.00	31.00
2	36.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 10 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	39.0	300.00	31.00
2	41.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 11 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	44.0	300.00	31.00
2	46.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 12 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	49.0	300.00	31.00
2	51.0	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
6 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 10.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	150.10	257.00	179.90	254.00	5.00
2	180.00	254.00	433.00	287.00	5.00
3	480.00	293.00	534.00	308.00	5.00
4	535.00	308.00	556.00	316.00	5.00
5	580.00	327.00	610.00	346.00	5.00
6	611.00	346.00	630.00	367.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 35.326 FS Min = 2.886 FS Ave = 3.788
Standard Deviation = 2.490 Coefficient of Variation = 65.74 %

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	107.03	293.30
2	110.63	290.98
3	117.89	284.11
4	124.96	277.04
5	132.50	270.47
6	141.07	265.32
7	150.06	260.93
8	159.35	257.22
9	169.25	255.81
10	228.29	261.29
11	497.77	296.89
12	553.92	314.69
13	595.00	337.66
14	619.93	357.20
15	625.97	365.18
16	632.39	372.84
17	632.39	372.85

Factor of Safety

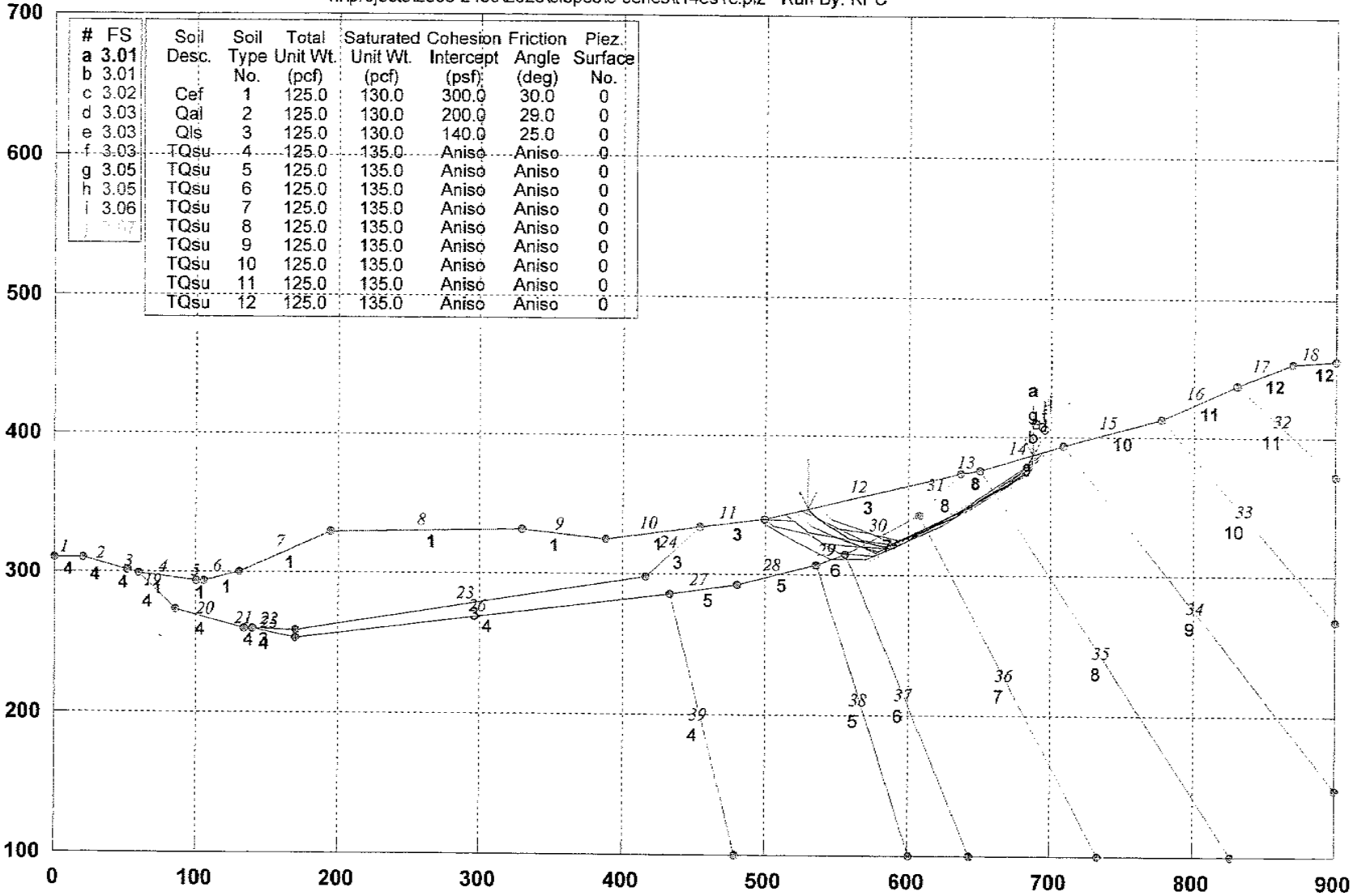
*** 2.886 ***

Mesas East, x-sect 14E-14E'; Bedding Plane; Static

n:\projects\2000-2499\2023\slopes\e-series\t14es1c.pl2 Run By: KPC

#	FS
a	3.01
b	3.01
c	3.02
d	3.03
e	3.03
f	3.03
g	3.05
h	3.05
i	3.06

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
Qal	2	125.0	130.0	200.0	29.0	0
Qls	3	125.0	130.0	140.0	25.0	0
TQsu	4	125.0	135.0	Aniso	Aniso	0
TQsu	5	125.0	135.0	Aniso	Aniso	0
TQsu	6	125.0	135.0	Aniso	Aniso	0
TQsu	7	125.0	135.0	Aniso	Aniso	0
TQsu	8	125.0	135.0	Aniso	Aniso	0
TQsu	9	125.0	135.0	Aniso	Aniso	0
TQsu	10	125.0	135.0	Aniso	Aniso	0
TQsu	11	125.0	135.0	Aniso	Aniso	0
TQsu	12	125.0	135.0	Aniso	Aniso	0



GSTABL7 v.2 FSmin=3.01

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 106

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
        Modified Bishop, Simplified Janbu, or GLE Method of Slices.
        (Includes Spencer & Morgenstern-Price Type Analysis)
        Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
        Nonlinear Undrained Shear Strength, Curved Phi Envelope,
        Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
        Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:
Time of Run:                    10:02AM
Run By:                         KPC
Input Data Filename:            N:\Projects\2000-2499\2023\Slopes\E-Series\t14es1c.in
Output Filename:                N:\Projects\2000-2499\2023\Slopes\E-Series\t14es1c.OUT
Unit System:                    English
Plotted Output Filename:        N:\Projects\2000-2499\2023\SlopeSeries\t14es1c.PLT
PROBLEM DESCRIPTION:  Mesas East, x-sect 14E-14E';
                      Bedding Plane; Static
BOUNDARY COORDINATES
   18 Top   Boundaries
   39 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	310.00	20.00	310.00	4
2	20.00	310.00	52.00	301.00	4
3	52.00	301.00	60.00	299.00	4
4	60.00	299.00	100.00	293.00	1
5	100.00	293.00	106.00	293.00	1
6	106.00	293.00	130.00	300.00	1
7	130.00	300.00	195.00	330.00	1
8	195.00	330.00	330.00	332.00	1
9	330.00	332.00	388.00	325.00	1
10	388.00	325.00	454.00	334.00	1
11	454.00	334.00	500.00	340.00	3
12	500.00	340.00	637.00	373.00	3
13	637.00	373.00	650.00	376.00	8
14	650.00	376.00	709.00	394.00	9
15	709.00	394.00	777.00	413.00	10
16	777.00	413.00	830.00	437.00	11
17	830.00	437.00	870.00	453.00	12
18	870.00	453.00	900.00	456.00	12
19	60.00	299.00	86.00	273.00	4
20	86.00	273.00	134.00	260.00	4
21	134.00	260.00	140.00	260.00	4
22	140.00	260.00	170.00	259.00	3
23	170.00	259.00	416.00	298.00	3
24	416.00	298.00	454.00	334.00	3
25	140.00	260.00	170.00	253.00	4
26	170.00	253.00	433.00	286.00	4
27	433.00	286.00	480.00	292.00	5
28	480.00	292.00	535.00	307.00	5
29	535.00	307.00	556.00	315.00	6
30	556.00	315.00	607.00	343.00	7
31	607.00	343.00	637.00	373.00	8
32	830.00	437.00	900.00	372.00	11
33	777.00	413.00	900.00	268.00	10
34	709.00	394.00	900.00	147.00	9
35	650.00	376.00	827.00	100.00	8
36	607.00	343.00	733.00	100.00	7
37	556.00	315.00	644.00	100.00	6
38	535.00	307.00	601.00	100.00	5
39	433.00	286.00	479.00	100.00	4

User Specified Y-Origin = 100.00(ft)

Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
12 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	130.0	200.0	29.0	0.00	0.0	0
3	125.0	130.0	140.0	25.0	0.00	0.0	0
4	125.0	135.0	300.0	31.0	0.00	0.0	0
5	125.0	135.0	300.0	31.0	0.00	0.0	0
6	125.0	135.0	300.0	31.0	0.00	0.0	0
7	125.0	135.0	300.0	31.0	0.00	0.0	0
8	125.0	135.0	300.0	31.0	0.00	0.0	0
9	125.0	135.0	300.0	31.0	0.00	0.0	0
10	125.0	135.0	300.0	31.0	0.00	0.0	0
11	125.0	135.0	300.0	31.0	0.00	0.0	0
12	125.0	135.0	300.0	31.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
9 soil type(s)

Soil Type 4 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	11.0	300.00	31.00
2	13.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 5 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	14.0	300.00	31.00
2	16.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 6 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	19.0	300.00	31.00
2	21.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 7 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	24.0	300.00	31.00
2	26.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 8 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	29.0	300.00	31.00
2	31.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 9 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	34.0	300.00	31.00

2	36.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 10 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	39.0	300.00	31.00
2	41.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 11 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	44.0	300.00	31.00
2	46.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 12 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	49.0	300.00	31.00
2	51.0	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
3 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 25.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	570.00	312.00	600.00	326.00	5.00
2	620.00	336.00	650.00	354.00	5.00
3	670.00	365.00	690.00	381.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 5.112 FS Min = 3.005 FS Ave = 3.672
Standard Deviation = 0.338 Coefficient of Variation = 9.21 %
Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	529.71	347.16
2	538.11	339.09
3	559.65	326.41
4	584.02	320.83
5	637.76	346.34
6	679.56	371.11
7	687.31	387.38

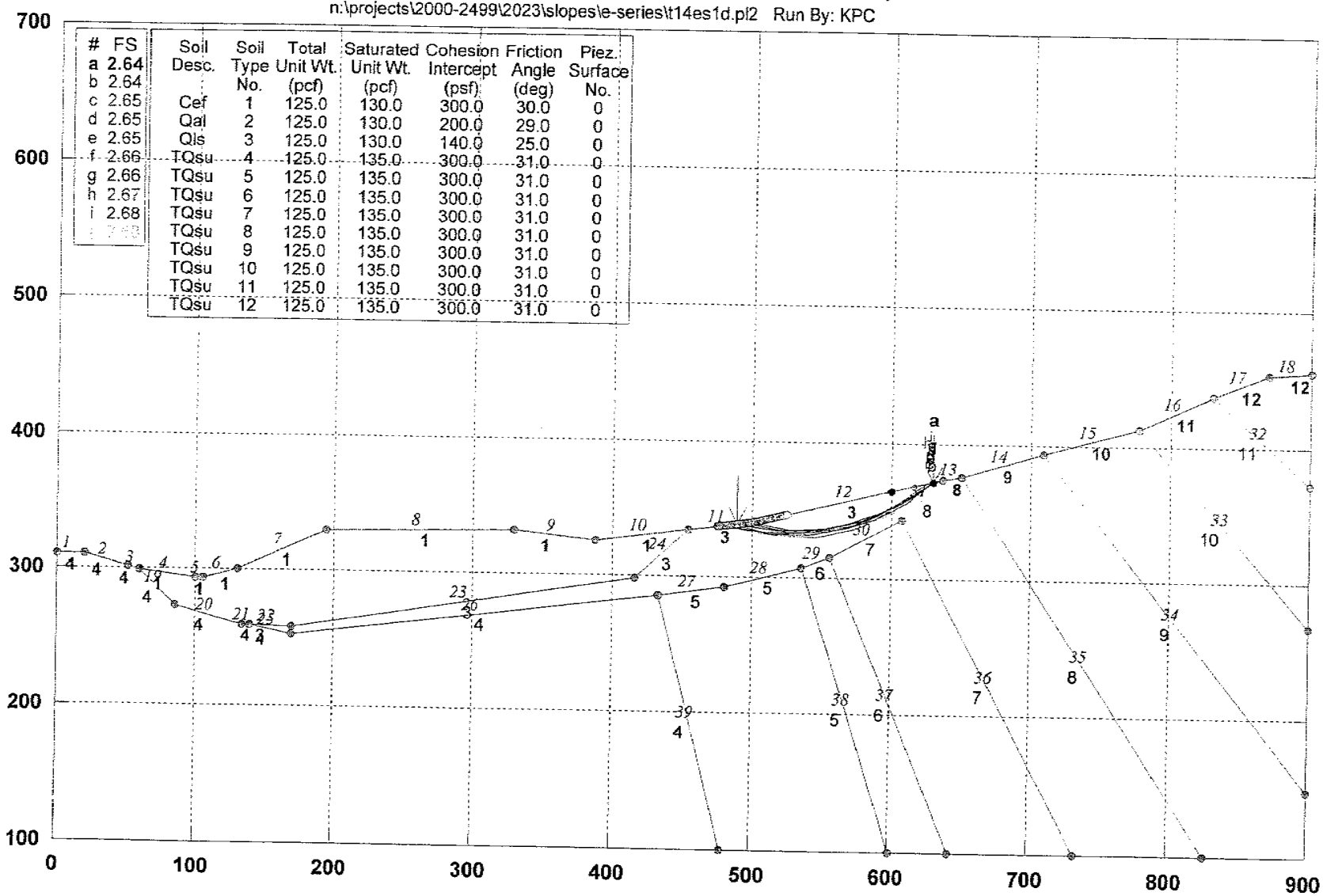
Factor of Safety
*** 3.005 ***

Mesas East, x-sect 14E-14E'; Circular; Static

n:\projects\2000-2499\2023\slopes\e-series\t14es1d.pl2 Run By: KPC

#	FS
a	2.64
b	2.64
c	2.65
d	2.65
e	2.65
f	2.66
g	2.66
h	2.67
i	2.68
j	2.68

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
Qal	2	125.0	130.0	200.0	29.0	0
Qls	3	125.0	130.0	140.0	25.0	0
TQsu	4	125.0	135.0	300.0	31.0	0
TQsu	5	125.0	135.0	300.0	31.0	0
TQsu	6	125.0	135.0	300.0	31.0	0
TQsu	7	125.0	135.0	300.0	31.0	0
TQsu	8	125.0	135.0	300.0	31.0	0
TQsu	9	125.0	135.0	300.0	31.0	0
TQsu	10	125.0	135.0	300.0	31.0	0
TQsu	11	125.0	135.0	300.0	31.0	0
TQsu	12	125.0	135.0	300.0	31.0	0



GSTABL7 v.2 FSmin=2.64

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No. 107

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:
Time of Run:                10:03AM
Run By:                     KPC
Input Data Filename:        N:\Projects\2000-2499\2023\Slopes\E-Series\t14es1d.in
Output Filename:            N:\Projects\2000-2499\2023\Slopes\E-Series\t14es1d.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\2000-2499\2023\SlopeSeries\t14es1d.PLT
PROBLEM DESCRIPTION:  Mesas East, x-sect 14E-14E';
                      Circular; Static
BOUNDARY COORDINATES
   18 Top   Boundaries
   39 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	310.00	20.00	310.00	4
2	20.00	310.00	52.00	301.00	4
3	52.00	301.00	60.00	299.00	4
4	60.00	299.00	100.00	293.00	1
5	100.00	293.00	106.00	293.00	1
6	106.00	293.00	130.00	300.00	1
7	130.00	300.00	195.00	330.00	1
8	195.00	330.00	330.00	332.00	1
9	330.00	332.00	388.00	325.00	1
10	388.00	325.00	454.00	334.00	1
11	454.00	334.00	500.00	340.00	3
12	500.00	340.00	637.00	373.00	3
13	637.00	373.00	650.00	376.00	8
14	650.00	376.00	709.00	394.00	9
15	709.00	394.00	777.00	413.00	10
16	777.00	413.00	830.00	437.00	11
17	830.00	437.00	870.00	453.00	12
18	870.00	453.00	900.00	456.00	12
19	60.00	299.00	86.00	273.00	4
20	86.00	273.00	134.00	260.00	4
21	134.00	260.00	140.00	260.00	4
22	140.00	260.00	170.00	259.00	3
23	170.00	259.00	416.00	298.00	3
24	416.00	298.00	454.00	334.00	3
25	140.00	260.00	170.00	253.00	4
26	170.00	253.00	433.00	286.00	4
27	433.00	286.00	480.00	292.00	5
28	480.00	292.00	535.00	307.00	5
29	535.00	307.00	556.00	315.00	6
30	556.00	315.00	607.00	343.00	7
31	607.00	343.00	637.00	373.00	8
32	830.00	437.00	900.00	372.00	11
33	777.00	413.00	900.00	268.00	10
34	709.00	394.00	900.00	147.00	9
35	650.00	376.00	827.00	100.00	8
36	607.00	343.00	733.00	100.00	7
37	556.00	315.00	644.00	100.00	6
38	535.00	307.00	601.00	100.00	5
39	433.00	286.00	479.00	100.00	4

User Specified Y-Origin = 100.00(ft)

Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
12 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	130.0	200.0	29.0	0.00	0.0	0
3	125.0	130.0	140.0	25.0	0.00	0.0	0
4	125.0	135.0	300.0	31.0	0.00	0.0	0
5	125.0	135.0	300.0	31.0	0.00	0.0	0
6	125.0	135.0	300.0	31.0	0.00	0.0	0
7	125.0	135.0	300.0	31.0	0.00	0.0	0
8	125.0	135.0	300.0	31.0	0.00	0.0	0
9	125.0	135.0	300.0	31.0	0.00	0.0	0
10	125.0	135.0	300.0	31.0	0.00	0.0	0
11	125.0	135.0	300.0	31.0	0.00	0.0	0
12	125.0	135.0	300.0	31.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
9 soil type(s)

Soil Type 4 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	11.0	300.00	31.00
2	13.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 5 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	14.0	300.00	31.00
2	16.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 6 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	19.0	300.00	31.00
2	21.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 7 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	24.0	300.00	31.00
2	26.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 8 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	29.0	300.00	31.00
2	31.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 9 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	34.0	300.00	31.00

```
    2              36.0              200.00          20.00
    3              90.0              300.00          31.00
Soil Type 10 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction     Counterclockwise     Cohesion      Friction
  Range        Direction Limit    Intercept       Angle
   No.             (deg)            (psf)         (deg)
    1              39.0             300.00          31.00
    2              41.0             200.00          20.00
    3              90.0             300.00          31.00
Soil Type 11 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction     Counterclockwise     Cohesion      Friction
  Range        Direction Limit    Intercept       Angle
   No.             (deg)            (psf)         (deg)
    1              44.0             300.00          31.00
    2              46.0             200.00          20.00
    3              90.0             300.00          31.00
Soil Type 12 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction     Counterclockwise     Cohesion      Friction
  Range        Direction Limit    Intercept       Angle
   No.             (deg)            (psf)         (deg)
    1              49.0             300.00          31.00
    2              51.0             200.00          20.00
    3              90.0             300.00          31.00
ANISOTROPIC SOIL NOTES:
   (1) An input value of 0.01 for C and/or Phi will cause Aniso
       C and/or Phi to be ignored in that range.
   (2) An input value of 0.02 for Phi will set both Phi and
       C equal to zero, with no water weight in the tension crack.
   (3) An input value of 0.03 for Phi will set both Phi and
       C equal to zero, with water weight in the tension crack.
ANISOTROPIC STRENGTH DATA HAS BEEN SUPPRESSED
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
 500 Trial Surfaces Have Been Generated.
  10 Surface(s) Initiate(s) From Each Of    50 Points Equally Spaced
Along The Ground Surface Between  X = 475.00(ft)
                              and  X = 525.00(ft)
Each Surface Terminates Between   X = 600.00(ft)
                              and   X = 630.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =      0.00(ft)
30.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And   0.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Modified Bishop Method * *
      Total Number of Trial Surfaces Evaluated =   500
      Statistical Data On All Valid FS Values:
         FS Max =   6.087   FS Min =   2.640   FS Ave =   3.789
         Standard Deviation =    0.907   Coefficient of Variation =   23.94 %
      Failure Surface Specified By  6 Coordinate Points
        Point       X-Surf       Y-Surf
         No.         (ft)         (ft)
          1        489.29       338.60
          2        518.91       333.85
          3        548.89       334.89
          4        578.11       341.69
          5        605.47       353.99
          6        629.91       371.29
      Circle Center At X =   528.54 ; Y =   488.56 ; and Radius =   155.01
             Factor of Safety
```

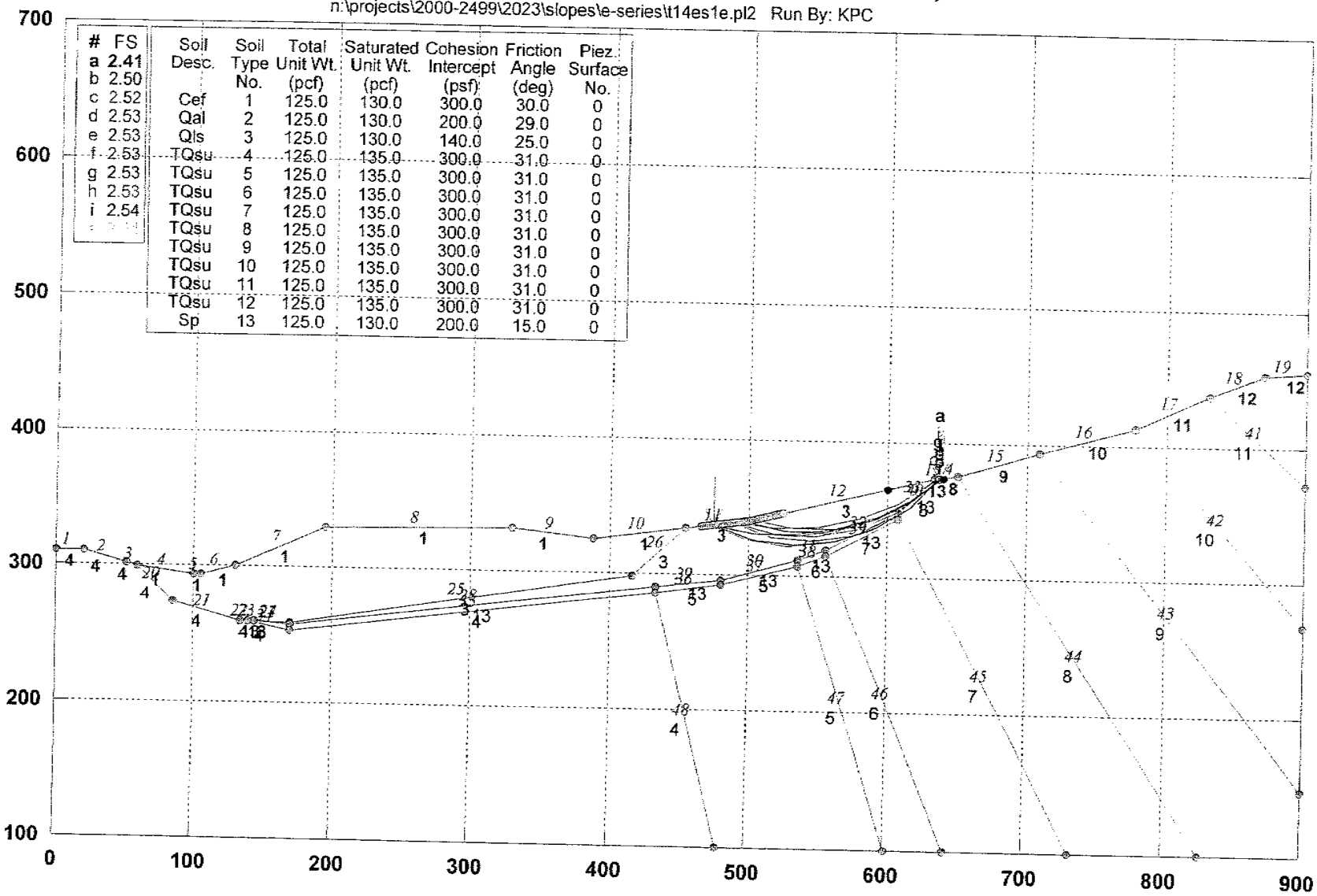
*** 2.640 ***

Mesas East, x-sect 14E-14E'; Landslide Plane; Static

n:\projects\2000-2499\2023\slopes\e-series\t14es1e.pl2 Run By: KPC

#	FS
a	2.41
b	2.50
c	2.52
d	2.53
e	2.53
f	2.53
g	2.53
h	2.53
i	2.54

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
Qal	2	125.0	130.0	200.0	29.0	0
Qls	3	125.0	130.0	140.0	25.0	0
TQsu	4	125.0	135.0	300.0	31.0	0
TQsu	5	125.0	135.0	300.0	31.0	0
TQsu	6	125.0	135.0	300.0	31.0	0
TQsu	7	125.0	135.0	300.0	31.0	0
TQsu	8	125.0	135.0	300.0	31.0	0
TQsu	9	125.0	135.0	300.0	31.0	0
TQsu	10	125.0	135.0	300.0	31.0	0
TQsu	11	125.0	135.0	300.0	31.0	0
TQsu	12	125.0	135.0	300.0	31.0	0
Sp	13	125.0	130.0	200.0	15.0	0



GSTABL7 v.2 FSmin=2.41

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No. 108

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date:
Time of Run: 10:04AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\E-Series\t14es1e.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\E-Series\t14es1e.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\SlopeSeries\t14es1e.PLT
PROBLEM DESCRIPTION: Mesas East, x-sect 14E-14E';
Landslide Plane; Static

BOUNDARY COORDINATES
19 Top Boundaries
48 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	310.00	20.00	310.00	4
2	20.00	310.00	52.00	301.00	4
3	52.00	301.00	60.00	299.00	4
4	60.00	299.00	100.00	293.00	1
5	100.00	293.00	106.00	293.00	1
6	106.00	293.00	130.00	300.00	1
7	130.00	300.00	195.00	330.00	1
8	195.00	330.00	330.00	332.00	1
9	330.00	332.00	388.00	325.00	1
10	388.00	325.00	454.00	334.00	1
11	454.00	334.00	500.00	340.00	3
12	500.00	340.00	633.00	373.00	3
13	633.00	373.00	637.00	373.00	13
14	637.00	373.00	650.00	376.00	8
15	650.00	376.00	709.00	394.00	9
16	709.00	394.00	777.00	413.00	10
17	777.00	413.00	830.00	437.00	11
18	830.00	437.00	870.00	453.00	12
19	870.00	453.00	900.00	456.00	12
20	60.00	299.00	86.00	273.00	4
21	86.00	273.00	134.00	260.00	4
22	134.00	260.00	140.00	260.00	4
23	140.00	260.00	144.00	260.00	13
24	144.00	260.00	170.00	259.00	3
25	170.00	259.00	416.00	298.00	3
26	416.00	298.00	454.00	334.00	3
27	144.00	260.00	170.00	257.00	13
28	170.00	257.00	433.00	290.00	13
29	433.00	290.00	480.00	296.00	13
30	480.00	296.00	535.00	311.00	13
31	535.00	311.00	556.00	319.00	13
32	556.00	319.00	607.00	347.00	13
33	607.00	347.00	633.00	373.00	13
34	140.00	260.00	170.00	253.00	4
35	170.00	253.00	433.00	286.00	4
36	433.00	286.00	480.00	292.00	5
37	480.00	292.00	535.00	307.00	5
38	535.00	307.00	556.00	315.00	6
39	556.00	315.00	607.00	343.00	7
40	607.00	343.00	637.00	373.00	8

41	830.00	437.00	900.00	372.00	11
42	777.00	413.00	900.00	268.00	10
43	709.00	394.00	900.00	147.00	9
44	650.00	376.00	827.00	100.00	8
45	607.00	343.00	733.00	100.00	7
46	556.00	315.00	644.00	100.00	6
47	535.00	307.00	601.00	100.00	5
48	433.00	286.00	479.00	100.00	4

User Specified Y-Origin = 100.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
13 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	130.0	200.0	29.0	0.00	0.0	0
3	125.0	130.0	140.0	25.0	0.00	0.0	0
4	125.0	135.0	300.0	31.0	0.00	0.0	0
5	125.0	135.0	300.0	31.0	0.00	0.0	0
6	125.0	135.0	300.0	31.0	0.00	0.0	0
7	125.0	135.0	300.0	31.0	0.00	0.0	0
8	125.0	135.0	300.0	31.0	0.00	0.0	0
9	125.0	135.0	300.0	31.0	0.00	0.0	0
10	125.0	135.0	300.0	31.0	0.00	0.0	0
11	125.0	135.0	300.0	31.0	0.00	0.0	0
12	125.0	135.0	300.0	31.0	0.00	0.0	0
13	125.0	130.0	200.0	15.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
9 soil type(s)

Soil Type 4 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	11.0	300.00	31.00
2	13.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 5 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	14.0	300.00	31.00
2	16.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 6 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	19.0	300.00	31.00
2	21.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 7 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	24.0	300.00	31.00
2	26.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 8 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range	Counterclockwise Direction Limit	Cohesion Intercept	Friction Angle

No.	(deg)	(psf)	(deg)
1	29.0	300.00	31.00
2	31.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 9 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	34.0	300.00	31.00
2	36.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 10 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	39.0	300.00	31.00
2	41.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 11 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	44.0	300.00	31.00
2	46.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 12 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	49.0	300.00	31.00
2	51.0	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

ANISOTROPIC STRENGTH DATA HAS BEEN SUPPRESSED
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 465.00(ft)
and X = 525.00(ft)
Each Surface Terminates Between X = 600.00(ft)
and X = 640.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
30.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 0.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 5.456 FS Min = 2.413 FS Ave = 3.643
Standard Deviation = 0.864 Coefficient of Variation = 23.73 %
Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	474.80	336.71
2	503.01	326.52
3	532.80	322.98
4	562.62	326.26
5	590.93	336.21
6	616.25	352.30
7	636.59	373.00

Circle Center At X = 533.37 ; Y = 454.76 ; and Radius = 131.78

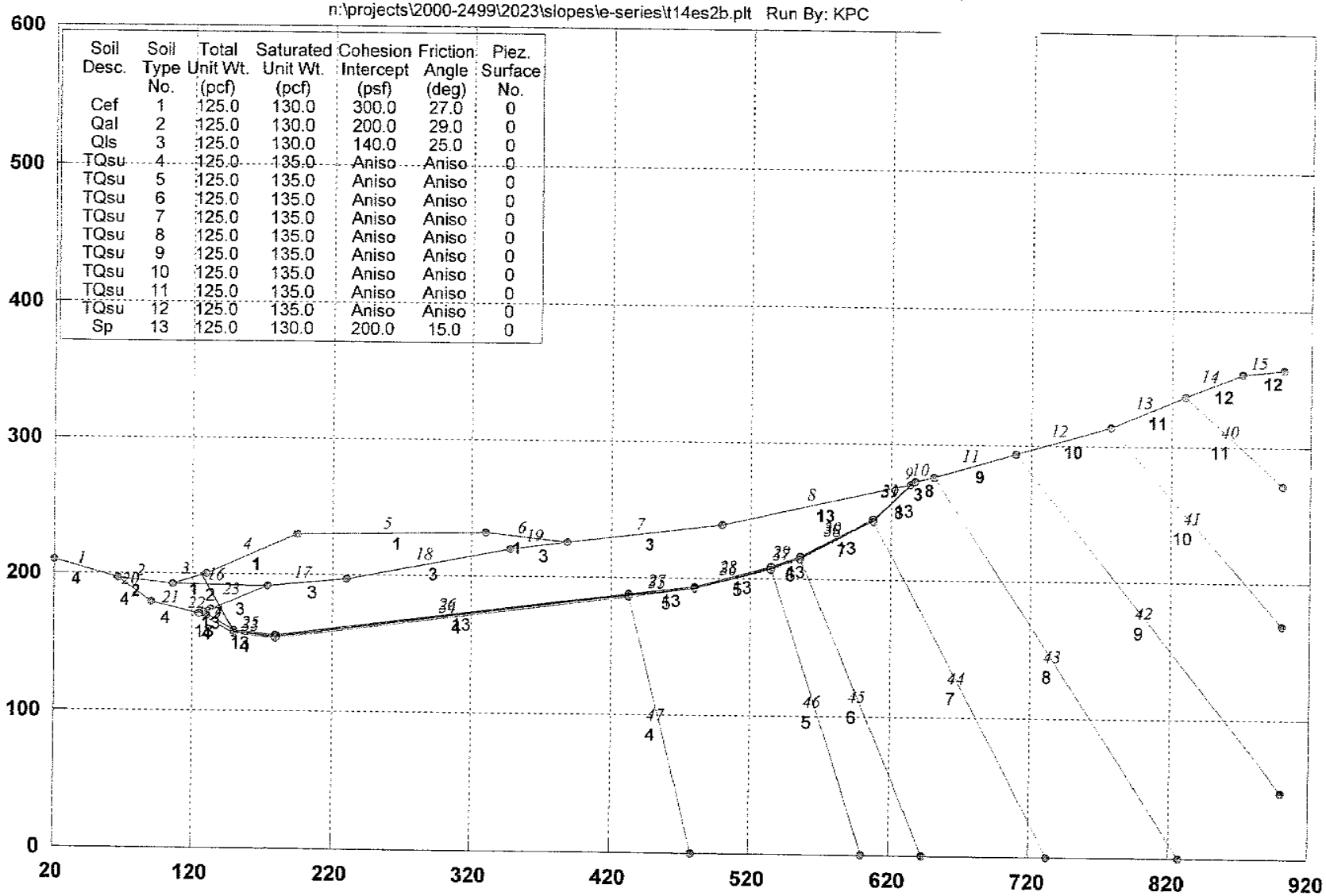
Factor of Safety

*** 2.413 ***

Mesas East - Sect 14E-14E'; Slide Plane specified; Static

n:\projects\2000-2499\2023\slopes\e-series\t14es2b.plt Run By: KPC

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	27.0	0
Qal	2	125.0	130.0	200.0	29.0	0
Qls	3	125.0	130.0	140.0	25.0	0
TQsu	4	125.0	135.0	Aniso	Aniso	0
TQsu	5	125.0	135.0	Aniso	Aniso	0
TQsu	6	125.0	135.0	Aniso	Aniso	0
TQsu	7	125.0	135.0	Aniso	Aniso	0
TQsu	8	125.0	135.0	Aniso	Aniso	0
TQsu	9	125.0	135.0	Aniso	Aniso	0
TQsu	10	125.0	135.0	Aniso	Aniso	0
TQsu	11	125.0	135.0	Aniso	Aniso	0
TQsu	12	125.0	135.0	Aniso	Aniso	0
Sp	13	125.0	130.0	200.0	15.0	0



GSTABL7 v.2 FSmin=2.50

Factor Of Safety Is Calculated By The Modified Bishop Method

GSTABL7

Run No. 109

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date:
Time of Run: 10:05AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\E-Series\t14es2b.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\E-Series\t14es2b.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\SlopeSeries\t14es2b.PLT
PROBLEM DESCRIPTION: Mesas East - Sect 14E-14E';
Slide Plane specified; Static

BOUNDARY COORDINATES
15 Top Boundaries
47 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	20.00	210.00	66.00	197.00	4
2	66.00	197.00	106.00	193.00	2
3	106.00	193.00	130.00	200.00	1
4	130.00	200.00	195.00	230.00	1
5	195.00	230.00	330.00	232.00	1
6	330.00	232.00	388.00	225.00	1
7	388.00	225.00	500.00	240.00	3
8	500.00	240.00	634.00	271.00	13
9	634.00	271.00	637.00	273.00	3
10	637.00	273.00	650.00	276.00	8
11	650.00	276.00	709.00	294.00	9
12	709.00	294.00	777.00	313.00	10
13	777.00	313.00	830.00	337.00	11
14	830.00	337.00	870.00	353.00	12
15	870.00	353.00	900.00	356.00	12
16	106.00	193.00	174.00	191.00	2
17	174.00	191.00	230.00	197.00	3
18	230.00	197.00	348.00	220.00	3
19	348.00	220.00	388.00	225.00	3
20	66.00	197.00	90.00	179.00	4
21	90.00	179.00	125.00	171.00	4
22	125.00	171.00	128.00	172.00	13
23	128.00	172.00	174.00	191.00	3
24	128.00	172.00	150.00	158.00	13
25	150.00	158.00	180.00	155.00	13
26	180.00	155.00	433.00	188.00	13
27	433.00	188.00	480.00	194.00	13
28	480.00	194.00	535.00	209.00	13
29	535.00	209.00	556.00	217.00	13
30	556.00	217.00	607.00	245.00	13
31	607.00	245.00	637.00	273.00	13
32	125.00	171.00	150.00	156.00	4
33	150.00	156.00	180.00	153.00	4
34	180.00	153.00	433.00	186.00	4
35	433.00	186.00	480.00	192.00	5
36	480.00	192.00	535.00	207.00	5
37	535.00	207.00	556.00	215.00	6
38	556.00	215.00	607.00	243.00	7
39	607.00	243.00	637.00	273.00	8
40	830.00	337.00	900.00	272.00	11

41	777.00	313.00	900.00	168.00	10
42	709.00	294.00	900.00	47.00	9
43	650.00	276.00	827.00	0.00	8
44	607.00	243.00	733.00	0.00	7
45	556.00	215.00	644.00	0.00	6
46	535.00	207.00	601.00	0.00	5
47	433.00	186.00	479.00	0.00	4

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
User Specified Y-Plus Value = -100.00(ft)

ISOTROPIC SOIL PARAMETERS
13 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	27.0	0.00	0.0	0
2	125.0	130.0	200.0	29.0	0.00	0.0	0
3	125.0	130.0	140.0	25.0	0.00	0.0	0
4	125.0	135.0	300.0	31.0	0.00	0.0	0
5	125.0	135.0	300.0	31.0	0.00	0.0	0
6	125.0	135.0	300.0	31.0	0.00	0.0	0
7	125.0	135.0	300.0	31.0	0.00	0.0	0
8	125.0	135.0	300.0	31.0	0.00	0.0	0
9	125.0	135.0	300.0	31.0	0.00	0.0	0
10	125.0	135.0	300.0	31.0	0.00	0.0	0
11	125.0	135.0	300.0	31.0	0.00	0.0	0
12	125.0	135.0	300.0	31.0	0.00	0.0	0
13	125.0	130.0	200.0	15.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
9 soil type(s)

Soil Type 4 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	11.0	300.00	31.00
2	13.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 5 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	14.0	300.00	31.00
2	16.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 6 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	19.0	300.00	31.00
2	21.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 7 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	24.0	300.00	31.00
2	26.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 8 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)

1	29.0	300.00	31.00
2	31.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 9 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	34.0	300.00	31.00
2	36.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 10 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	39.0	300.00	31.00
2	41.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 11 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	44.0	300.00	31.00
2	46.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 12 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	49.0	300.00	31.00
2	51.0	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

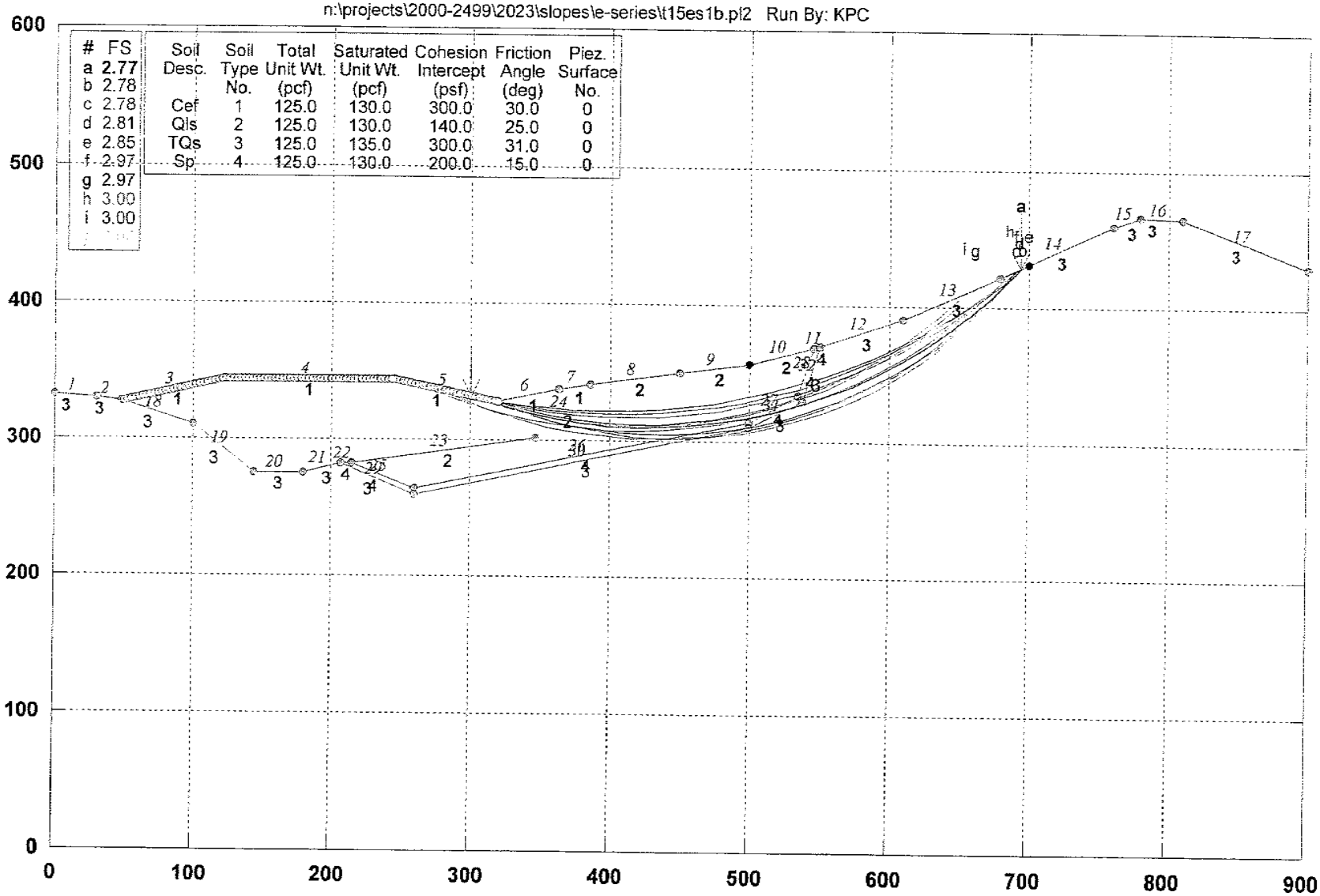
Trial Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	127.00	199.12
2	150.00	157.00
3	180.00	154.00
4	433.00	187.00
5	480.00	193.00
6	535.00	208.00
7	556.00	216.00
8	607.00	244.00
9	635.00	271.67

Circle Center At X = 306.691(ft) ; Y = 866.655(ft); and Radius = 691.292(ft)
* * Factor Of Safety Is Calculated By The Modified Bishop Method * *
Factor Of Safety For The Preceding Specified Surface = 2.499

Mesas East, x-sect 15E-15E'; Landslide Plane

n:\projects\2000-2499\2023\slopes\e-series\t15es1b.pl2 Run By: KPC



#	FS
a	2.77
b	2.78
c	2.78
d	2.81
e	2.85
f	2.97
g	2.97
h	3.00
i	3.00

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
Qls	2	125.0	130.0	140.0	25.0	0
TQs	3	125.0	135.0	300.0	31.0	0
Sp	4	125.0	130.0	200.0	15.0	0

GSTABL7 v.2 FSmin=2.77

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN NO. 110

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date:
Time of Run: 10:13AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\E-Series\t15es1b.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\E-Series\t15es1b.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\SlopeSeries\t15es1b.PLT
PROBLEM DESCRIPTION: Mesas East, x-sect 15E-15E';
Landslide Plane

BOUNDARY COORDINATES
17 Top Boundaries
32 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	332.00	30.00	330.00	3
2	30.00	330.00	48.00	327.00	3
3	48.00	327.00	123.00	344.00	1
4	123.00	344.00	245.00	344.00	1
5	245.00	344.00	320.00	328.00	1
6	320.00	328.00	363.00	338.00	1
7	363.00	338.00	386.00	341.00	1
8	386.00	341.00	450.00	350.00	2
9	450.00	350.00	500.00	357.00	2
10	500.00	357.00	546.00	369.00	2
11	546.00	369.00	550.00	370.00	4
12	550.00	370.00	610.00	390.00	3
13	610.00	390.00	680.00	422.00	3
14	680.00	422.00	760.00	460.00	3
15	760.00	460.00	780.00	467.00	3
16	780.00	467.00	810.00	466.00	3
17	810.00	466.00	900.00	430.00	3
18	48.00	327.00	100.00	310.00	3
19	100.00	310.00	144.00	276.00	3
20	144.00	276.00	180.00	276.00	3
21	180.00	276.00	207.00	282.00	3
22	207.00	282.00	215.00	282.00	4
23	215.00	282.00	347.00	302.00	2
24	347.00	302.00	386.00	341.00	2
25	215.00	282.00	260.00	264.00	4
26	260.00	264.00	500.00	314.00	4
27	500.00	314.00	534.00	334.00	4
28	534.00	334.00	546.00	369.00	4
29	207.00	282.00	260.00	260.00	3
30	260.00	260.00	500.00	310.00	3
31	500.00	310.00	538.00	330.00	3
32	538.00	330.00	550.00	370.00	3

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.

1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	130.0	140.0	25.0	0.00	0.0	0
3	125.0	135.0	300.0	31.0	0.00	0.0	0
4	125.0	130.0	200.0	15.0	0.00	0.0	0

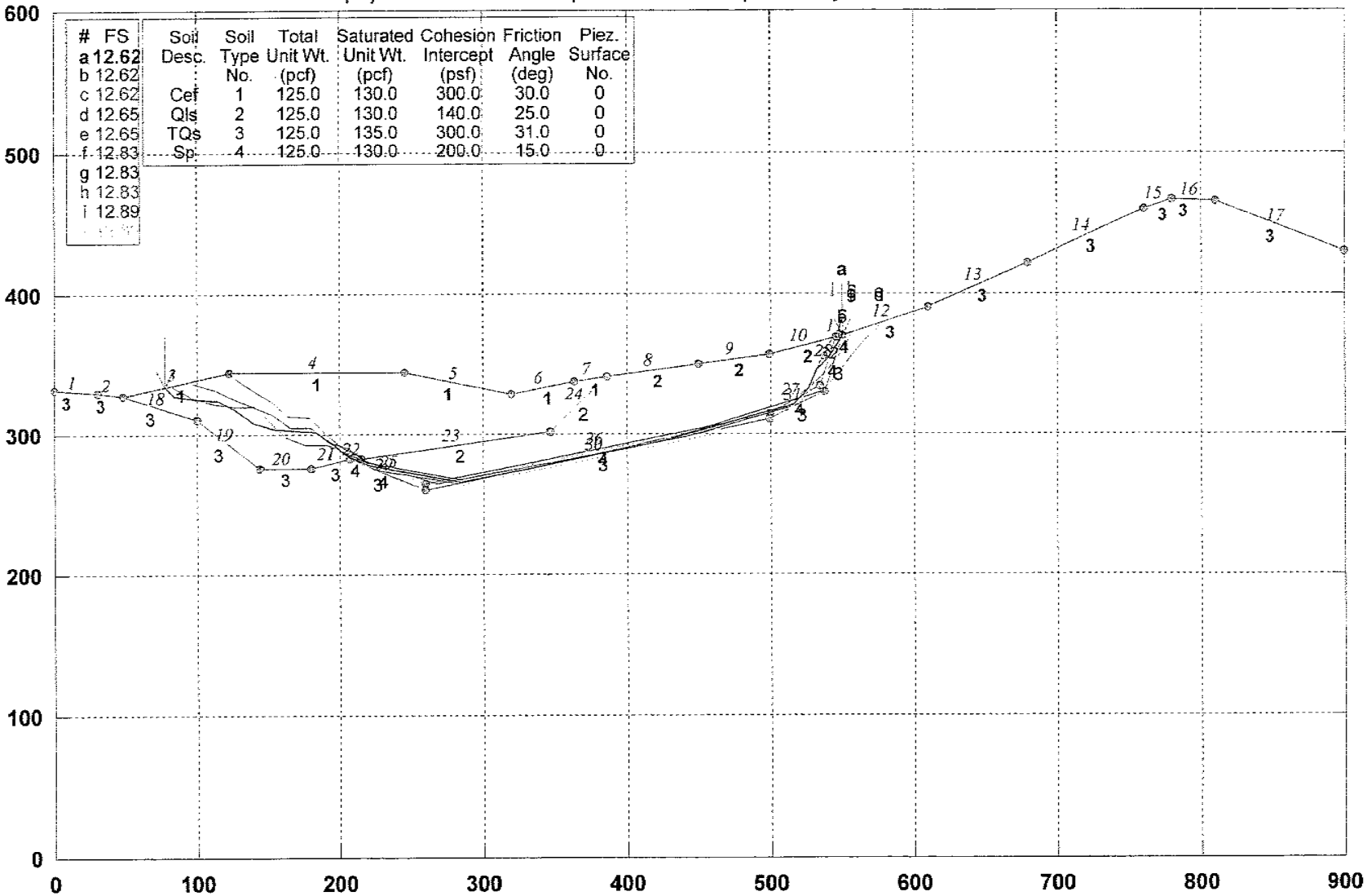
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 50.00(ft)
and X = 320.00(ft)
Each Surface Terminates Between X = 500.00(ft)
and X = 700.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
20.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -50.0
And -10.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 59.482 FS Min = 2.766 FS Ave = 9.453
Standard Deviation = 7.635 Coefficient of Variation = 80.77 %
Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	300.91	332.07
2	319.86	325.69
3	339.14	320.37
4	358.69	316.12
5	378.43	312.95
6	398.32	310.87
7	418.30	309.90
8	438.30	310.02
9	458.26	311.26
10	478.13	313.58
11	497.83	317.01
12	517.32	321.51
13	536.53	327.08
14	555.40	333.70
15	573.88	341.35
16	591.91	350.01
17	609.43	359.65
18	626.39	370.24
19	642.75	381.75
20	658.45	394.15
21	673.43	407.39
22	687.67	421.44
23	694.37	428.82

Circle Center At X = 425.98 ; Y = 672.36 ; and Radius = 362.55
Factor of Safety
*** 2.766 ***

Mesas East, x-sect 15E-15E'; Landslide Plane

n:\projects\2000-2499\2023\slopes\e-series\t15es1a.pl2 Run By: KPC



#	FS
a	12.62
b	12.62
c	12.62
d	12.65
e	12.65
f	12.83
g	12.83
h	12.83
i	12.89

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
Qls	2	125.0	130.0	140.0	25.0	0
TQs	3	125.0	135.0	300.0	31.0	0
Sp	4	125.0	130.0	200.0	15.0	0

GSTABL7 v.2 FSmin=12.62

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 111

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date:
Time of Run: 10:10AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\E-Series\t15es1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\E-Series\t15es1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\SlopeSeries\t15es1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sect 15E-15E';
Landslide Plane

BOUNDARY COORDINATES
17 Top Boundaries
32 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	332.00	30.00	330.00	3
2	30.00	330.00	48.00	327.00	3
3	48.00	327.00	123.00	344.00	1
4	123.00	344.00	245.00	344.00	1
5	245.00	344.00	320.00	328.00	1
6	320.00	328.00	363.00	338.00	1
7	363.00	338.00	386.00	341.00	1
8	386.00	341.00	450.00	350.00	2
9	450.00	350.00	500.00	357.00	2
10	500.00	357.00	546.00	369.00	2
11	546.00	369.00	550.00	370.00	4
12	550.00	370.00	610.00	390.00	3
13	610.00	390.00	680.00	422.00	3
14	680.00	422.00	760.00	460.00	3
15	760.00	460.00	780.00	467.00	3
16	780.00	467.00	810.00	466.00	3
17	810.00	466.00	900.00	430.00	3
18	48.00	327.00	100.00	310.00	3
19	100.00	310.00	144.00	276.00	3
20	144.00	276.00	180.00	276.00	3
21	180.00	276.00	207.00	282.00	3
22	207.00	282.00	215.00	282.00	4
23	215.00	282.00	347.00	302.00	2
24	347.00	302.00	386.00	341.00	2
25	215.00	282.00	260.00	264.00	4
26	260.00	264.00	500.00	314.00	4
27	500.00	314.00	534.00	334.00	4
28	534.00	334.00	546.00	369.00	4
29	207.00	282.00	260.00	260.00	3
30	260.00	260.00	500.00	310.00	3
31	500.00	310.00	538.00	330.00	3
32	538.00	330.00	550.00	370.00	3

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.

1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	130.0	140.0	25.0	0.00	0.0	0
3	125.0	135.0	300.0	31.0	0.00	0.0	0
4	125.0	130.0	200.0	15.0	0.00	0.0	0

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
500 Trial Surfaces Have Been Generated.
4 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 15.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	210.00	282.00	260.00	262.00	5.00
2	265.00	262.00	290.00	267.00	5.00
3	300.00	269.00	460.00	302.00	5.00
4	500.00	312.00	536.00	332.00	5.00

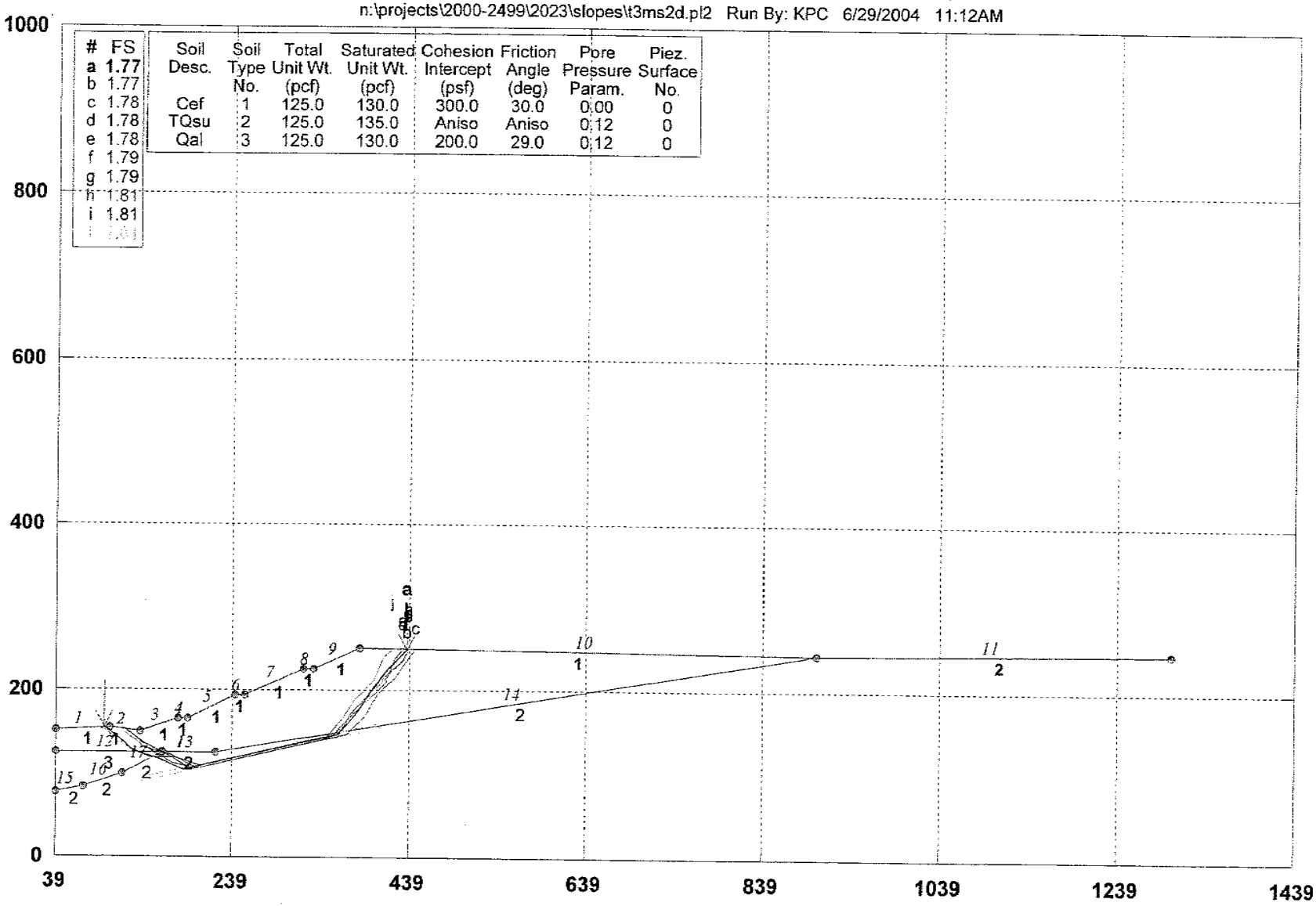
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 40.956 FS Min = 12.624 FS Ave = 17.990
Standard Deviation = 4.264 Coefficient of Variation = 23.70 %
Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	77.77	333.75
2	84.54	327.64
3	99.26	324.73
4	114.25	324.32
5	127.26	316.85
6	139.35	307.97
7	153.86	304.18
8	168.72	302.14
9	183.72	302.03
10	195.70	293.00
11	206.85	282.97
12	221.02	278.04
13	284.36	265.39
14	424.48	294.34
15	516.18	321.09
16	526.78	331.70
17	532.20	345.68
18	542.63	356.47
19	549.64	369.73
20	549.87	369.97

Factor of Safety
*** 12.624 ***

Mesas East, x-sec 3M-3M'; bedding plane search; static

n:\projects\2000-2499\2023\slopes\t3ms2d.pl2 Run By: KPC 6/29/2004 11:12AM



#	FS
a	1.77
b	1.77
c	1.78
d	1.78
e	1.78
f	1.79
g	1.79
h	1.81
i	1.81

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0.00	0
TQsu	2	125.0	135.0	Aniso	Aniso	0.12	0
Qal	3	125.0	130.0	200.0	29.0	0.12	0

GSTABL7 v.2 FSmin=1.77

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 112

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/29/2004
Time of Run: 11:12AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t3ms2d.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t3ms2d.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopems2d.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 3M-3M';
bedding plane search; static

BOUNDARY COORDINATES
11 Top Boundaries
17 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	39.00	152.00	100.00	154.00	1
2	100.00	154.00	135.00	150.00	1
3	135.00	150.00	177.00	165.00	1
4	177.00	165.00	188.00	165.00	1
5	188.00	165.00	243.00	194.00	1
6	243.00	194.00	253.00	194.00	1
7	253.00	194.00	319.00	225.00	1
8	319.00	225.00	330.00	225.00	1
9	330.00	225.00	383.00	250.00	1
10	383.00	250.00	900.00	245.00	1
11	900.00	245.00	1300.00	248.00	2
12	39.00	125.00	160.00	125.00	3
13	160.00	125.00	220.00	125.00	2
14	220.00	125.00	900.00	245.00	2
15	39.00	78.00	70.00	84.00	2
16	70.00	84.00	115.00	100.00	2
17	115.00	100.00	160.00	125.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	135.0	300.0	31.0	0.12	0.0	0
3	125.0	130.0	200.0	29.0	0.12	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	12.0	300.00	31.00
2	15.0	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.

(3) An input value of 0.03 for Phi will set both Phi and
C equal to zero, with water weight in the tension crack.
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	130.00	90.00	249.00	117.00	5.00
2	312.00	134.00	410.00	158.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 3.578 FS Min = 1.770 FS Ave = 2.156
Standard Deviation = 0.289 Coefficient of Variation = 13.39 %
Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	94.47	153.82
2	104.93	145.95
3	127.94	126.70
4	156.08	116.30
5	183.65	104.48
6	358.43	147.21
7	377.34	170.51
8	393.90	195.53
9	410.65	220.41
10	429.91	243.41
11	435.62	249.49

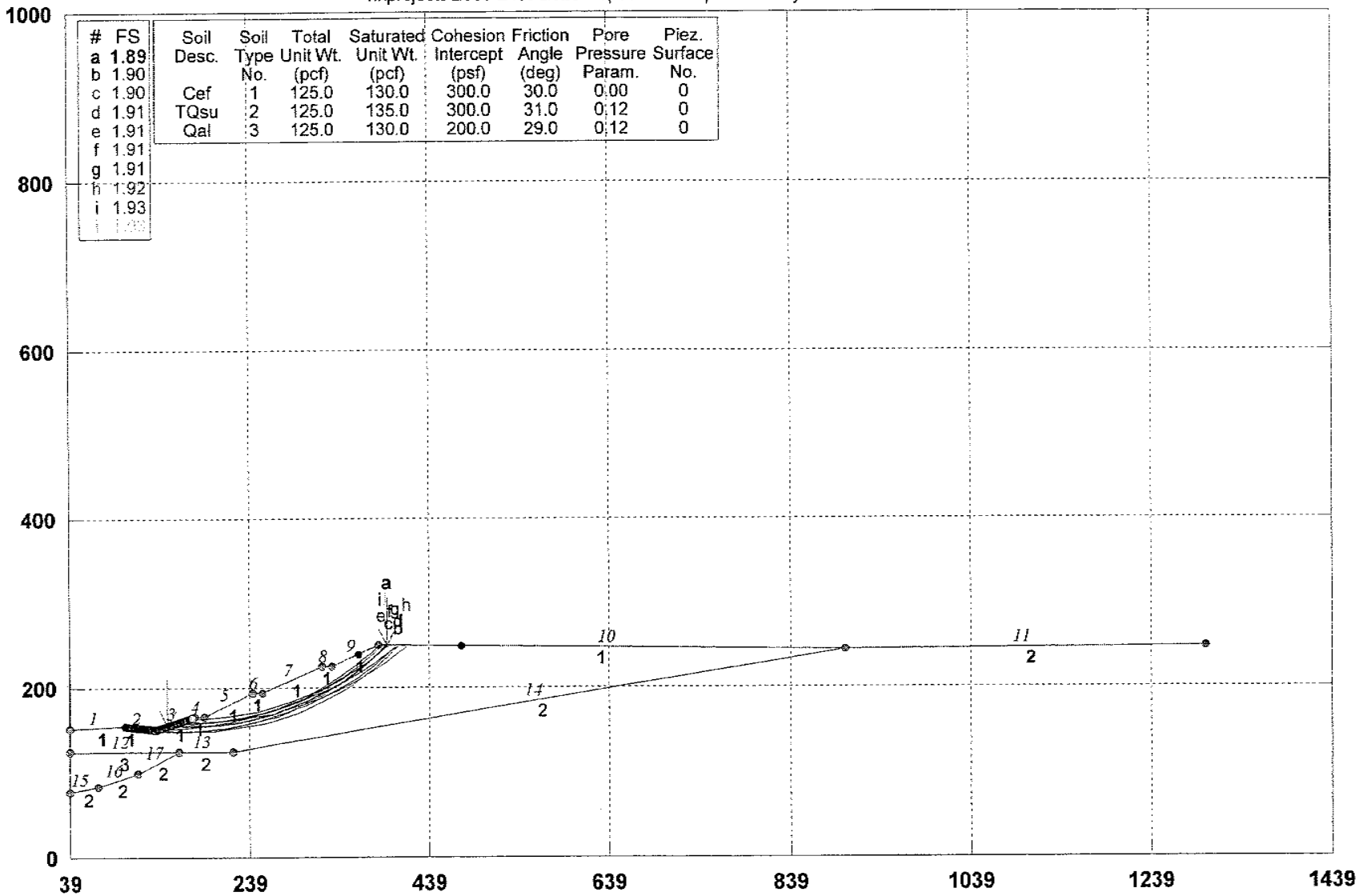
Factor of Safety
*** 1.770 ***

Individual data on the 24 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	5.5	1500.1	0.0	0.0	0.	0.	0.0	0.0	0.0
2	4.9	3646.0	0.0	0.0	0.	0.	0.0	0.0	0.0
3	23.0	45446.0	0.0	0.0	0.	0.	0.0	0.0	0.0
4	4.6	14168.5	0.0	0.0	0.	0.	0.0	0.0	0.0
5	2.5	7906.1	0.0	1011.4	0.	0.	0.0	0.0	0.0
6	14.0	54369.0	0.0	6955.5	0.	0.	0.0	0.0	0.0
7	7.1	34091.8	0.0	4361.4	0.	0.	0.0	0.0	0.0
8	3.9	20960.5	0.0	2736.6	0.	0.	0.0	0.0	0.0
9	17.0	108356.2	0.0	14147.0	0.	0.	0.0	0.0	0.0
10	6.7	49147.0	0.0	6416.6	0.	0.	0.0	0.0	0.0
11	4.3	32596.5	0.0	4026.8	0.	0.	0.0	0.0	0.0
12	32.0	255933.8	0.0	31616.8	0.	0.	0.0	0.0	0.0
13	23.0	206307.9	0.0	25486.3	0.	0.	0.0	0.0	0.0
14	10.0	92235.5	0.0	11394.3	0.	0.	0.0	0.0	0.0
15	66.0	659973.2	0.0	81529.9	0.	0.	0.0	0.0	0.0
16	11.0	118363.9	0.0	14622.1	0.	0.	0.0	0.0	0.0
17	28.4	312659.3	0.0	38624.4	0.	0.	0.0	0.0	0.0
18	2.1	23718.0	0.0	4515.7	0.	0.	0.0	0.0	0.0
19	16.8	174849.9	0.0	0.0	0.	0.	0.0	0.0	0.0
20	5.7	52249.9	0.0	0.0	0.	0.	0.0	0.0	0.0
21	10.9	85331.2	0.0	0.0	0.	0.	0.0	0.0	0.0
22	16.8	87661.5	0.0	0.0	0.	0.	0.0	0.0	0.0
23	19.3	42682.4	0.0	0.0	0.	0.	0.0	0.0	0.0
24	5.7	2187.2	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 3M-3M'; circular; static

n:\projects\2000-2499\2023\slopes\t3ms1a.pl2 Run By: KPC 6/29/2004 11:19AM



#	FS
a	1.89
b	1.90
c	1.90
d	1.91
e	1.91
f	1.91
g	1.91
h	1.92
i	1.93

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0.00	0
TQsu	2	125.0	135.0	300.0	31.0	0.12	0
Qal	3	125.0	130.0	200.0	29.0	0.12	0

GSTABL7 v.2 FSmin=1.89

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 113

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/29/2004
Time of Run: 11:19AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t3ms1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t3ms1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopems1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 3M-3M';
circular; static

BOUNDARY COORDINATES
11 Top Boundaries
17 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	39.00	152.00	100.00	154.00	1
2	100.00	154.00	135.00	150.00	1
3	135.00	150.00	177.00	165.00	1
4	177.00	165.00	188.00	165.00	1
5	188.00	165.00	243.00	194.00	1
6	243.00	194.00	253.00	194.00	1
7	253.00	194.00	319.00	225.00	1
8	319.00	225.00	330.00	225.00	1
9	330.00	225.00	383.00	250.00	1
10	383.00	250.00	900.00	245.00	1
11	900.00	245.00	1300.00	248.00	2
12	39.00	125.00	160.00	125.00	3
13	160.00	125.00	220.00	125.00	2
14	220.00	125.00	900.00	245.00	2
15	39.00	78.00	70.00	84.00	2
16	70.00	84.00	115.00	100.00	2
17	115.00	100.00	160.00	125.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	135.0	300.0	31.0	0.12	0.0	0
3	125.0	130.0	200.0	29.0	0.12	0.0	0

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 100.00(ft)
and X = 175.00(ft)
Each Surface Terminates Between X = 360.00(ft)
and X = 475.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
20.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial

Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 3.219 FS Min = 1.891 FS Ave = 2.455
Standard Deviation = 0.319 Coefficient of Variation = 12.98 %
Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	147.73	154.55
2	167.71	153.70
3	187.70	154.18
4	207.62	155.98
5	227.38	159.09
6	246.89	163.49
7	266.06	169.18
8	284.82	176.11
9	303.08	184.27
10	320.76	193.62
11	337.79	204.12
12	354.08	215.71
13	369.58	228.36
14	384.20	242.00
15	391.64	249.92

Circle Center At X = 170.47 ; Y = 456.49 ; and Radius = 302.80
Factor of Safety
*** 1.891 ***
Individual data on the 21 slices

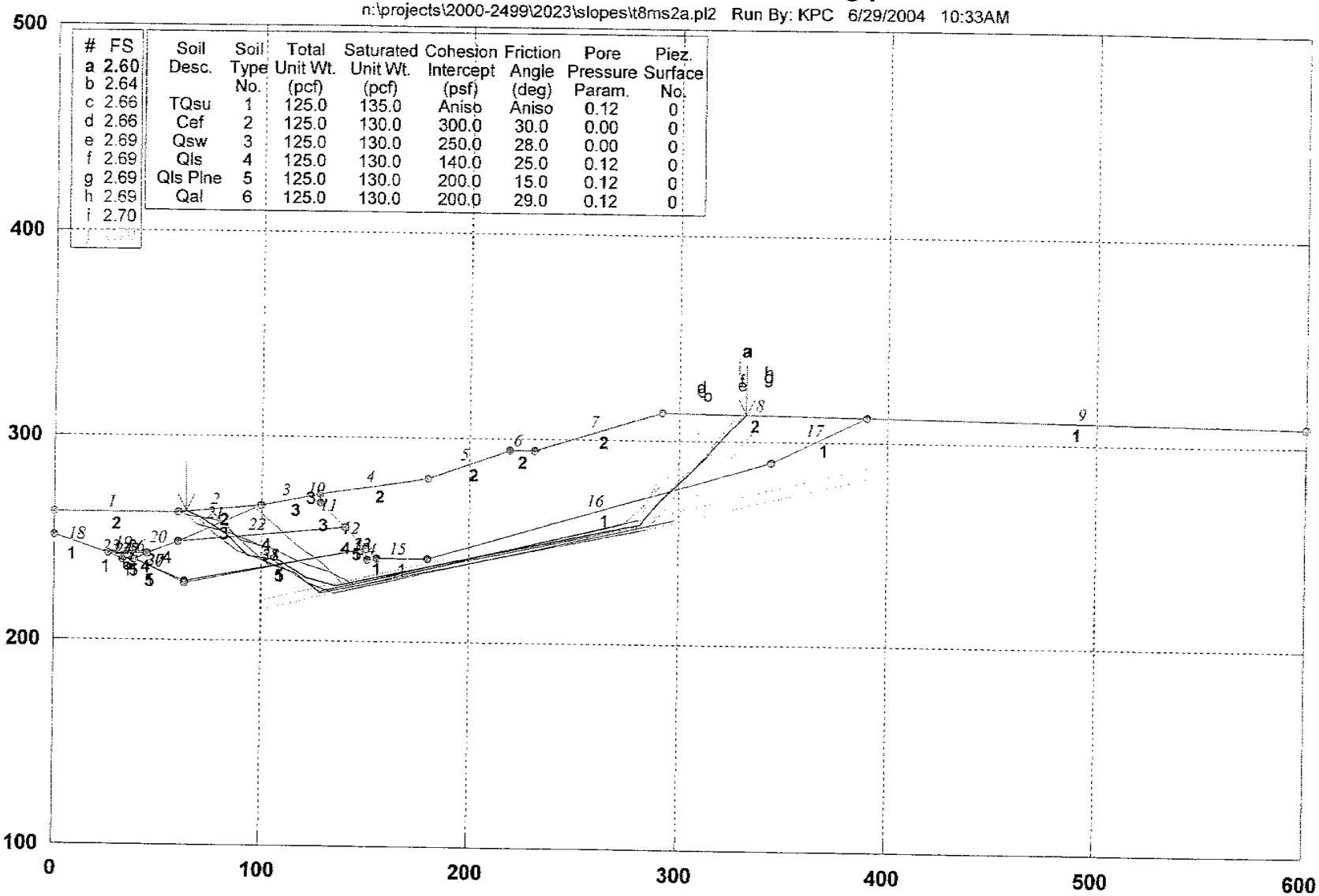
Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	20.0	9965.2	0.0	0.0	0.	0.	0.0	0.0	0.0
2	9.3	11064.2	0.0	0.0	0.	0.	0.0	0.0	0.0
3	10.7	14646.6	0.0	0.0	0.	0.	0.0	0.0	0.0
4	0.3	400.4	0.0	0.0	0.	0.	0.0	0.0	0.0
5	19.6	36989.7	0.0	0.0	0.	0.	0.0	0.0	0.0
6	19.8	56858.3	0.0	0.0	0.	0.	0.0	0.0	0.0
7	15.6	56686.0	0.0	0.0	0.	0.	0.0	0.0	0.0
8	3.9	15042.0	0.0	0.0	0.	0.	0.0	0.0	0.0
9	6.1	22614.7	0.0	0.0	0.	0.	0.0	0.0	0.0
10	13.1	48709.1	0.0	0.0	0.	0.	0.0	0.0	0.0
11	18.8	74791.9	0.0	0.0	0.	0.	0.0	0.0	0.0
12	18.3	75415.5	0.0	0.0	0.	0.	0.0	0.0	0.0
13	15.9	65226.1	0.0	0.0	0.	0.	0.0	0.0	0.0
14	1.8	7015.4	0.0	0.0	0.	0.	0.0	0.0	0.0
15	9.2	32945.1	0.0	0.0	0.	0.	0.0	0.0	0.0
16	7.8	24453.9	0.0	0.0	0.	0.	0.0	0.0	0.0
17	16.3	46039.2	0.0	0.0	0.	0.	0.0	0.0	0.0
18	15.5	34821.3	0.0	0.0	0.	0.	0.0	0.0	0.0
19	13.4	20496.7	0.0	0.0	0.	0.	0.0	0.0	0.0
20	1.2	1286.3	0.0	0.0	0.	0.	0.0	0.0	0.0
21	7.4	3712.8	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 8M-8M'; static bedding plane search

n:\projects\2000-2499\2023\slopes\t8ms2a.pl2 Run By: KPC 6/29/2004 10:33AM

#	FS
a	2.60
b	2.64
c	2.66
d	2.66
e	2.69
f	2.69
g	2.69
h	2.69
i	2.70

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	Aniso	Aniso	0.12	0
Cef	2	125.0	130.0	300.0	30.0	0.00	0
Qsw	3	125.0	130.0	250.0	28.0	0.00	0
Qls	4	125.0	130.0	140.0	25.0	0.12	0
Qls Plne	5	125.0	130.0	200.0	15.0	0.12	0
Qal	6	125.0	130.0	200.0	29.0	0.12	0



GSTABL7 v.2 FSmin=2.60

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 114

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/29/2004
Time of Run: 10:33AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t8ms2a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t8ms2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopems2a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 8M-8M'; static
bedding plane search

BOUNDARY COORDINATES
9 Top Boundaries
32 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	262.00	60.00	262.00	2
2	60.00	262.00	100.00	266.00	2
3	100.00	266.00	128.00	272.00	3
4	128.00	272.00	180.00	280.00	2
5	180.00	280.00	219.00	294.00	2
6	219.00	294.00	231.00	294.00	2
7	231.00	294.00	292.00	314.00	2
8	292.00	314.00	390.00	312.00	2
9	390.00	312.00	600.00	309.00	1
10	127.99	272.00	128.00	267.00	3
11	128.00	267.00	140.00	255.00	3
12	140.00	255.00	150.00	245.00	4
13	150.00	245.00	150.50	239.50	5
14	150.50	239.50	155.00	240.00	1
15	155.00	240.00	180.00	240.00	1
16	180.00	240.00	344.00	290.00	1
17	344.00	290.00	390.00	312.00	1
18	0.00	251.00	26.00	242.00	1
19	26.00	242.00	45.00	242.00	6
20	45.00	242.00	60.00	248.00	4
21	60.00	248.00	100.00	266.00	3
22	60.00	248.00	140.00	255.00	4
23	26.00	242.00	33.00	239.00	1
24	33.00	239.00	38.50	239.00	1
25	38.50	239.00	39.00	239.00	5
26	39.00	239.00	45.00	242.00	4
27	39.00	239.00	63.00	228.00	5
28	63.00	228.00	150.00	245.00	5
29	38.50	239.00	39.00	238.50	1
30	39.00	238.50	63.00	227.50	1
31	63.00	227.50	150.00	244.50	1
32	150.00	244.50	150.50	239.50	1

User Specified Y-Origin = 100.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
6 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0
3	125.0	130.0	250.0	28.0	0.00	0.0	0

4	125.0	130.0	140.0	25.0	0.12	0.0	0
5	125.0	130.0	200.0	15.0	0.12	0.0	0
6	125.0	130.0	200.0	29.0	0.12	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	12.0	300.00	31.00
2	14.0	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 15.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	100.00	217.00	188.00	238.00	5.00
2	269.00	255.00	390.00	285.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 4.443 FS Min = 2.601 FS Ave = 3.136
Standard Deviation = 0.396 Coefficient of Variation = 12.64 %
Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	63.78	262.38
2	70.76	259.74
3	83.12	251.24
4	93.93	240.84
5	108.83	239.11
6	121.29	230.75
7	135.83	227.08
8	281.58	258.30
9	291.10	269.89
10	301.37	280.82
11	311.85	291.55
12	321.84	302.74
13	331.97	313.18

Factor of Safety
*** 2.601 ***

Individual data on the 28 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	7.0	1456.3	0.0	0.0	0.	0.	0.0	0.0	0.0
2	6.1	4340.7	0.0	0.0	0.	0.	0.0	0.0	0.0
3	6.3	8336.9	0.0	0.0	0.	0.	0.0	0.0	0.0
4	1.2	1990.4	0.0	0.0	0.	0.	0.0	0.0	0.0

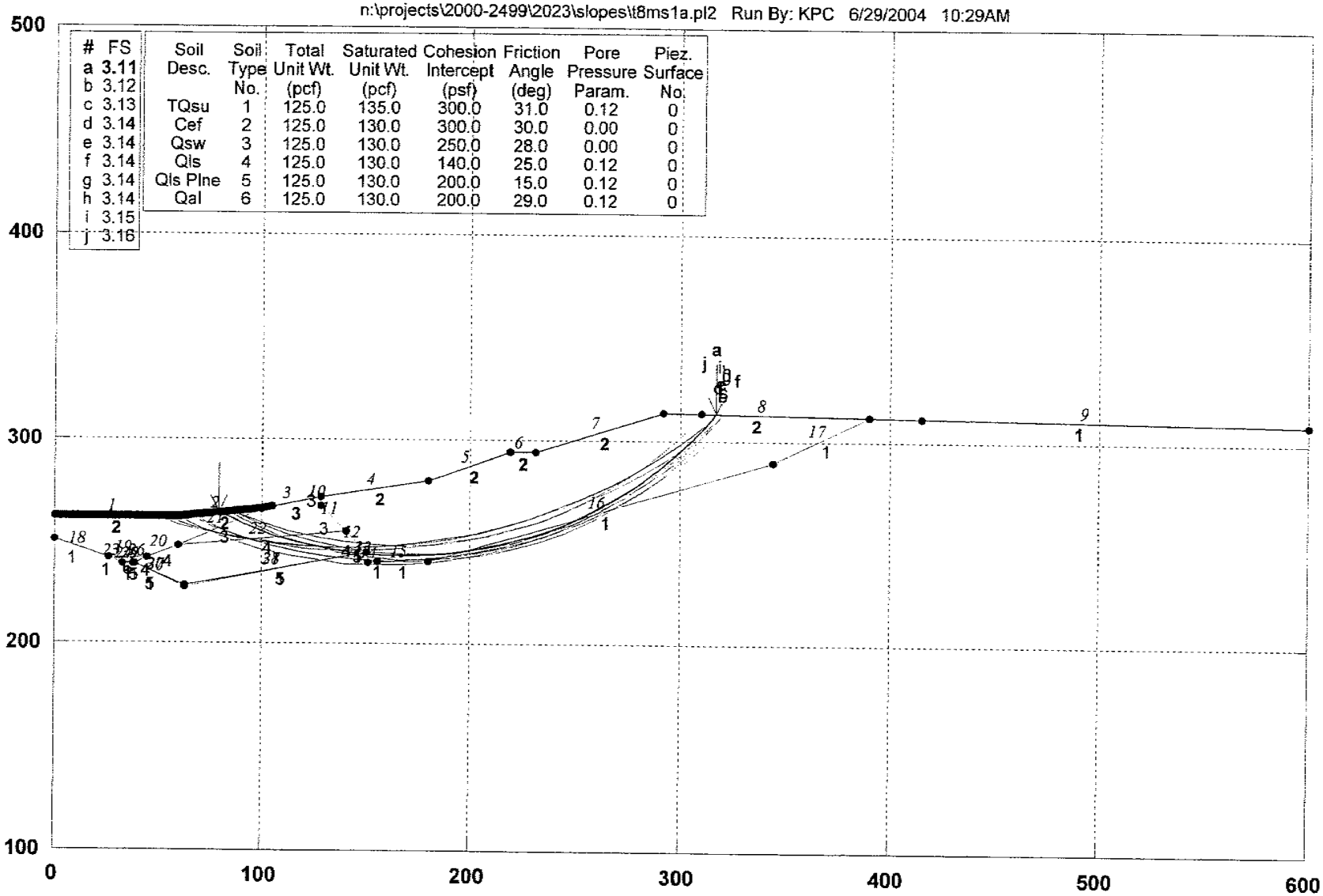
5	9.6	23423.5	0.0	3900.4	0.	0.	0.0	0.0	0.0
6	6.1	19118.5	0.0	2309.7	0.	0.	0.0	0.0	0.0
7	8.8	30160.6	0.0	3643.7	0.	0.	0.0	0.0	0.0
8	2.5	9287.1	0.0	1342.3	0.	0.	0.0	0.0	0.0
9	0.6	2252.8	0.0	325.6	0.	0.	0.0	0.0	0.0
10	9.4	41851.8	0.0	6048.9	0.	0.	0.0	0.0	0.0
11	6.7	34675.3	0.0	4291.1	0.	0.	0.0	0.0	0.0
12	0.0	53.7	0.0	6.6	0.	0.	0.0	0.0	0.0
13	7.8	43588.0	0.0	5394.1	0.	0.	0.0	0.0	0.0
14	4.2	23971.3	0.0	2941.8	0.	0.	0.0	0.0	0.0
15	10.0	56958.5	0.0	6990.0	0.	0.	0.0	0.0	0.0
16	0.5	2828.1	0.0	347.1	0.	0.	0.0	0.0	0.0
17	4.5	25368.2	0.0	3113.2	0.	0.	0.0	0.0	0.0
18	25.0	138153.1	0.0	16954.4	0.	0.	0.0	0.0	0.0
19	39.0	225605.0	0.0	27686.7	0.	0.	0.0	0.0	0.0
20	12.0	71724.1	0.0	8802.1	0.	0.	0.0	0.0	0.0
21	**50.6**	**312349.0**	**0.0**	**38332.0**	**0.**	**0.**	**0.0**	**0.0**	**0.0**
22	9.5	57213.4	0.0	10810.9	0.	0.	0.0	0.0	0.0
23	0.9	4875.8	0.0	854.4	0.	0.	0.0	0.0	0.0
24	4.3	22181.7	0.0	3887.0	0.	0.	0.0	0.0	0.0
25	5.0	22434.2	0.0	0.0	0.	0.	0.0	0.0	0.0
26	10.5	36044.9	0.0	0.0	0.	0.	0.0	0.0	0.0
27	10.0	20407.7	0.0	0.0	0.	0.	0.0	0.0	0.0
28	10.1	6737.8	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 8M-8M'; static circular

n:\projects\2000-2499\2023\slopes\t8ms1a.pl2 Run By: KPC 6/29/2004 10:29AM

#	FS
a	3.11
b	3.12
c	3.13
d	3.14
e	3.14
f	3.14
g	3.14
h	3.14
i	3.15
j	3.16

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	300.0	31.0	0.12	0
Cef	2	125.0	130.0	300.0	30.0	0.00	0
Qsw	3	125.0	130.0	250.0	28.0	0.00	0
Qls	4	125.0	130.0	140.0	25.0	0.12	0
Qls Plne	5	125.0	130.0	200.0	15.0	0.12	0
Qal	6	125.0	130.0	200.0	29.0	0.12	0



GSTABL7 v.2 FSmin=3.11

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 115

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/29/2004
Time of Run: 10:29AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\t8msla.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\t8msla.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopemsla.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 8M-8M'; static circular

BOUNDARY COORDINATES
9 Top Boundaries
32 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	262.00	60.00	262.00	2
2	60.00	262.00	100.00	266.00	2
3	100.00	266.00	128.00	272.00	3
4	128.00	272.00	180.00	280.00	2
5	180.00	280.00	219.00	294.00	2
6	219.00	294.00	231.00	294.00	2
7	231.00	294.00	292.00	314.00	2
8	292.00	314.00	390.00	312.00	2
9	390.00	312.00	600.00	309.00	1
10	127.99	272.00	128.00	267.00	3
11	128.00	267.00	140.00	255.00	3
12	140.00	255.00	150.00	245.00	4
13	150.00	245.00	150.50	239.50	5
14	150.50	239.50	155.00	240.00	1
15	155.00	240.00	180.00	240.00	1
16	180.00	240.00	344.00	290.00	1
17	344.00	290.00	390.00	312.00	1
18	0.00	251.00	26.00	242.00	1
19	26.00	242.00	45.00	242.00	6
20	45.00	242.00	60.00	248.00	4
21	60.00	248.00	100.00	266.00	3
22	60.00	248.00	140.00	255.00	4
23	26.00	242.00	33.00	239.00	1
24	33.00	239.00	38.50	239.00	1
25	38.50	239.00	39.00	239.00	5
26	39.00	239.00	45.00	242.00	4
27	39.00	239.00	63.00	228.00	5
28	63.00	228.00	150.00	245.00	5
29	38.50	239.00	39.00	238.50	1
30	39.00	238.50	63.00	227.50	1
31	63.00	227.50	150.00	244.50	1
32	150.00	244.50	150.50	239.50	1

User Specified Y-Origin = 100.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
6 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0

2	125.0	130.0	300.0	30.0	0.00	0.0	0
3	125.0	130.0	250.0	28.0	0.00	0.0	0
4	125.0	130.0	140.0	25.0	0.12	0.0	0
5	125.0	130.0	200.0	15.0	0.12	0.0	0
6	125.0	130.0	200.0	29.0	0.12	0.0	0

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 0.00(ft)
and X = 105.00(ft)
Each Surface Terminates Between X = 310.00(ft)
and X = 415.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
14.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 5.678 FS Min = 3.114 FS Ave = 3.960
Standard Deviation = 0.450 Coefficient of Variation = 11.37 %
Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	79.55	263.95
2	92.24	258.06
3	105.33	253.10
4	118.75	249.09
5	132.42	246.06
6	146.27	244.03
7	160.23	243.00
8	174.23	242.98
9	188.20	243.96
10	202.05	245.96
11	215.73	248.95
12	229.16	252.92
13	242.26	257.84
14	254.98	263.70
15	267.24	270.46
16	278.98	278.09
17	290.14	286.54
18	300.66	295.78
19	310.48	305.75
20	317.08	313.49

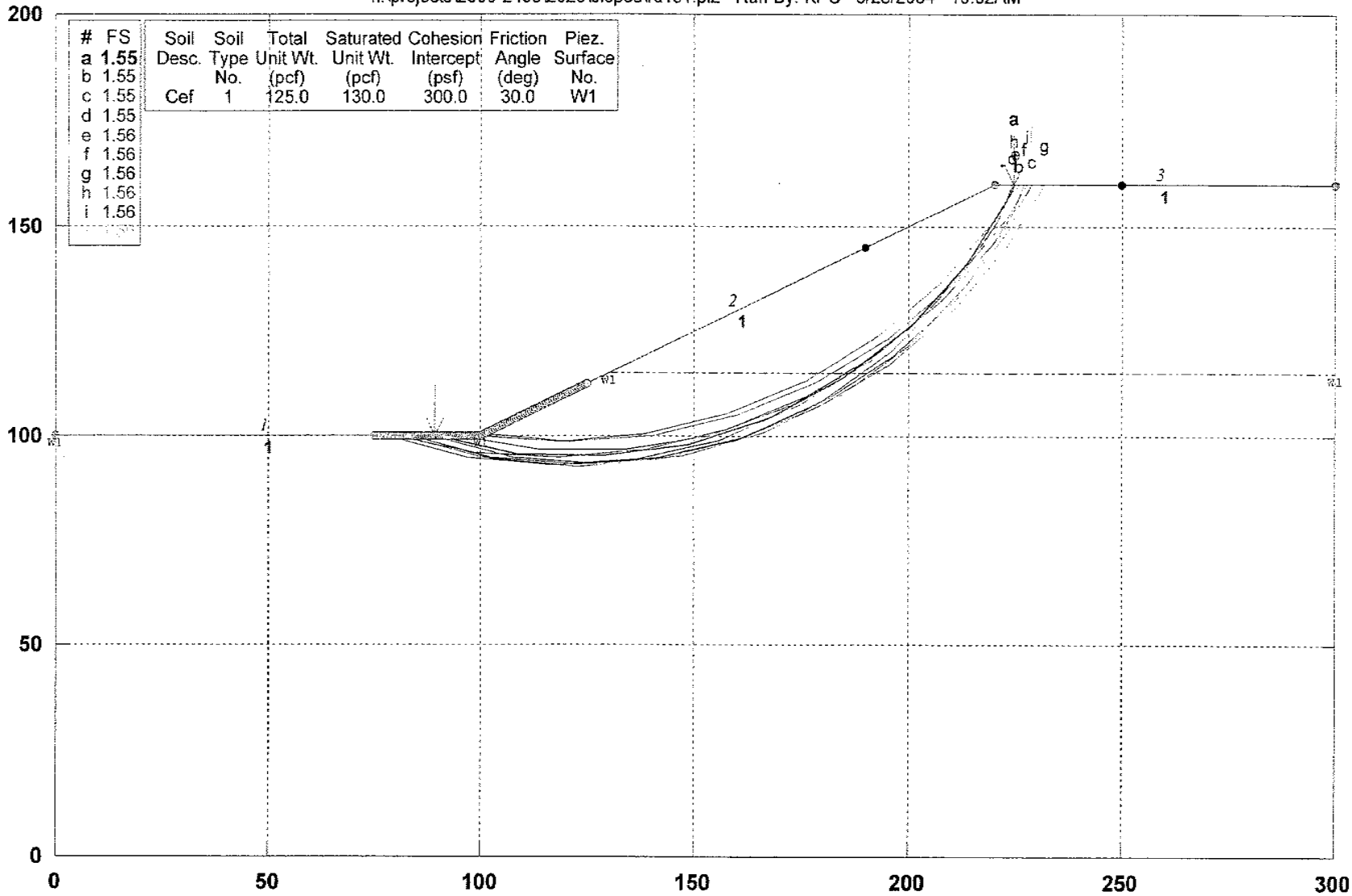
Circle Center At X = 167.48 ; Y = 436.58 ; and Radius = 193.73
Factor of Safety
*** 3.114 ***
Individual data on the 36 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	7.8	2162.4	0.0	0.0	0.	0.	0.0	0.0	0.0
2	4.9	3524.1	0.0	0.0	0.	0.	0.0	0.0	0.0
3	7.8	8748.4	0.0	0.0	0.	0.	0.0	0.0	0.0
4	5.3	8311.2	0.0	0.0	0.	0.	0.0	0.0	0.0
5	2.9	5406.4	0.0	0.0	0.	0.	0.0	0.0	0.0
6	10.5	23917.7	0.0	2995.4	0.	0.	0.0	0.0	0.0
7	9.2	26502.4	0.0	3257.4	0.	0.	0.0	0.0	0.0
8	0.0	31.2	0.0	3.8	0.	0.	0.0	0.0	0.0
9	4.4	14240.0	0.0	1750.2	0.	0.	0.0	0.0	0.0

10	7.6	26311.7	0.0	3191.3	0.	0.	0.0	0.0	0.0
11	5.6	20637.7	0.0	2503.1	0.	0.	0.0	0.0	0.0
12	0.7	2745.8	0.0	333.0	0.	0.	0.0	0.0	0.0
13	0.9	3656.6	0.0	440.0	0.	0.	0.0	0.0	0.0
14	2.8	10900.3	0.0	1311.6	0.	0.	0.0	0.0	0.0
15	0.1	298.7	0.0	35.9	0.	0.	0.0	0.0	0.0
16	0.0	153.7	0.0	18.5	0.	0.	0.0	0.0	0.0
17	10.1	41491.3	0.0	0.0	0.	0.	0.0	0.0	0.0
18	14.0	61337.5	0.0	0.0	0.	0.	0.0	0.0	0.0
19	5.8	26233.7	0.0	0.0	0.	0.	0.0	0.0	0.0
20	8.2	38720.6	0.0	0.0	0.	0.	0.0	0.0	0.0
21	9.1	45503.1	0.0	0.0	0.	0.	0.0	0.0	0.0
22	4.7	24591.8	0.0	2981.4	0.	0.	0.0	0.0	0.0
23	13.7	73373.9	0.0	9012.7	0.	0.	0.0	0.0	0.0
24	3.3	17977.2	0.0	2249.5	0.	0.	0.0	0.0	0.0
25	10.2	54061.4	0.0	6764.7	0.	0.	0.0	0.0	0.0
26	1.8	9389.8	0.0	1203.7	0.	0.	0.0	0.0	0.0
27	11.3	56473.8	0.0	7239.8	0.	0.	0.0	0.0	0.0
28	7.3	35993.6	0.0	4755.6	0.	0.	0.0	0.0	0.0
29	5.4	26002.3	0.0	0.0	0.	0.	0.0	0.0	0.0
30	12.3	56379.5	0.0	0.0	0.	0.	0.0	0.0	0.0
31	11.7	49206.8	0.0	0.0	0.	0.	0.0	0.0	0.0
32	11.2	40793.2	0.0	0.0	0.	0.	0.0	0.0	0.0
33	1.9	6139.0	0.0	0.0	0.	0.	0.0	0.0	0.0
34	8.7	23729.3	0.0	0.0	0.	0.	0.0	0.0	0.0
35	9.8	15917.0	0.0	0.0	0.	0.	0.0	0.0	0.0
36	6.6	3244.8	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, debris basin w/ 60'H 2:1 internal dike face; rapid drawdown

n:\projects\2000-2499\2023\slopes\rd1s1.pl2 Run By: KPC 6/28/2004 10:02AM



GSTABL7 v.2 FSmin=1.55

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

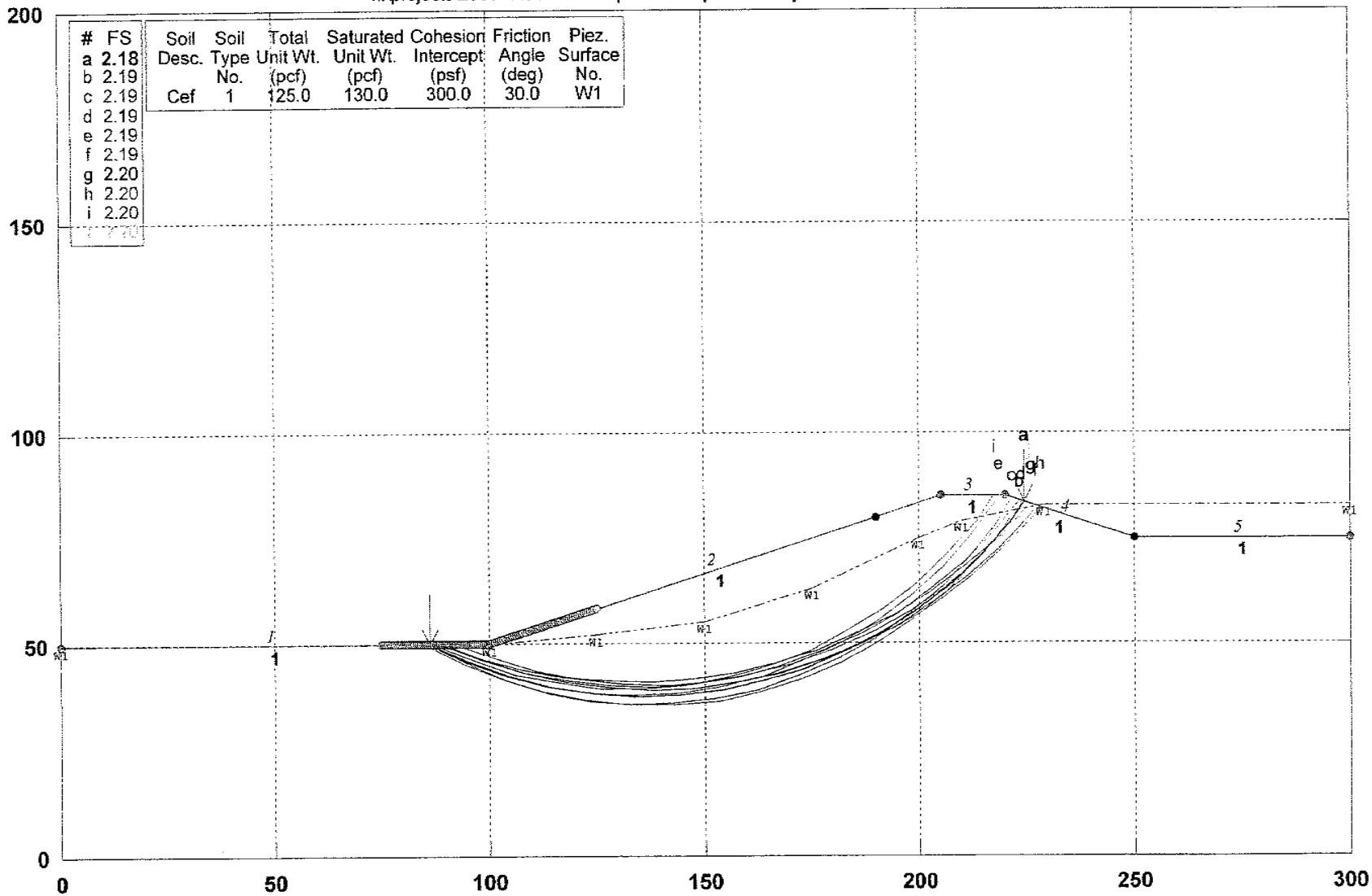
Run No. 116

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:        6/28/2004
Time of Run:              10:02AM
Run By:                   KPC
Input Data Filename:      n:\Projects\2000-2499\2023\Slopes\rd1s1.in
Output Filename:          n:\Projects\2000-2499\2023\Slopes\rd1s1.OUT
Unit System:              English
Plotted Output Filename:  n:\Projects\2000-2499\2023\Slope1s1.PLT
PROBLEM DESCRIPTION:  Mesas East, debris basin w/ 60'H 2:1
                      internal dike face; rapid drawdown
BOUNDARY COORDINATES
    3 Top   Boundaries
    3 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1          0.00     100.00     100.00     100.00        1
    2        100.00     100.00     220.00     160.00        1
    3        220.00     160.00     300.00     160.00        1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 1 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   125.0    130.0     300.0     30.0    0.00       0.0      1
1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water =  62.40 (pcf)
Piezometric Surface No.  1 Specified by  4 Coordinate Points
Pore Pressure Inclination Factor =  0.50
  Point      X-Water     Y-Water
   No.         (ft)        (ft)
    1          0.00      100.00
    2        100.00      100.00
    3        130.00      115.00
    4        300.00      115.00
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
  10 Surface(s) Initiate(s) From Each Of   100 Points Equally Spaced
Along The Ground Surface Between  X =  75.00(ft)
                             and  X = 125.00(ft)
Each Surface Terminates Between   X = 190.00(ft)
                             and  X = 250.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =      0.00(ft)
20.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And  20.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Modified Bishop Method * *
```

```
Total Number of Trial Surfaces Evaluated =  1000
Statistical Data On All Valid FS Values:
   FS Max =   3.258   FS Min =   1.549   FS Ave =   1.865
   Standard Deviation =    0.236   Coefficient of Variation =   12.66 %
```

Mesas East, debris basin w/ 35' H 3:1 external dike face; steady state seepage

n:\projects\2000-2499\2023\slopes\ss1s1.pl2 Run By: KPC 6/29/2004 01:30PM



GSTABL7 v.2 FSmin=2.18

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No. 117

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:          6/29/2004
Time of Run:                01:30PM
Run By:                     KPC
Input Data Filename:        N:\Projects\2000-2499\2023\Slopes\ss1s1.in
Output Filename:            N:\Projects\2000-2499\2023\Slopes\ss1s1.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\2000-2499\2023\Slope1s1.PLT
PROBLEM DESCRIPTION:  Mesas East, debris basin w/ 35' H 3:1
                      external dike face; steady state seepage
BOUNDARY COORDINATES
    5 Top   Boundaries
    5 Total Boundaries
Boundary     X-Left      Y-Left     X-Right     Y-Right     Soil Type
   No.        (ft)        (ft)        (ft)        (ft)     Below Bnd
    1         0.00       50.00      100.00       50.00         1
    2       100.00       50.00      205.00       85.00         1
    3       205.00       85.00      220.00       85.00         1
    4       220.00       85.00      250.00       75.00         1
    5       250.00       75.00      300.00       75.00         1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 1 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   125.0    130.0     300.0     30.0     0.00      0.0      1
1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water =  62.40 (pcf)
Piezometric Surface No.  1 Specified by  9 Coordinate Points
Pore Pressure Inclination Factor =  0.50
  Point      X-Water     Y-Water
   No.         (ft)        (ft)
    1          0.00       50.00
    2        100.00       50.00
    3        125.00       52.00
    4        150.00       55.00
    5        175.00       63.00
    6        200.00       75.00
    7        210.00       79.00
    8        229.00       83.00
    9        300.00       83.00
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
  10 Surface(s) Initiate(s) From Each Of   100 Points Equally Spaced
Along The Ground Surface Between  X =  75.00(ft)
                              and  X = 125.00(ft)
Each Surface Terminates Between   X = 190.00(ft)
                              and  X = 250.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =       0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
```

```
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And  20.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Modified Bishop Method * *
      Total Number of Trial Surfaces Evaluated =  1000
      Statistical Data On All Valid FS Values:
         FS Max =  34.185   FS Min =   2.179   FS Ave =   2.902
         Standard Deviation =    1.750   Coefficient of Variation =   60.31 %
```

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

GEOLOGIC AND GEOTECHNICAL REPORT

Review of Vesting Tentative Tract Map (Dated June 14, 2004)

Vesting Tentative Tract 61105

Mesas East

Newhall Ranch, California

VOLUME V OF VI

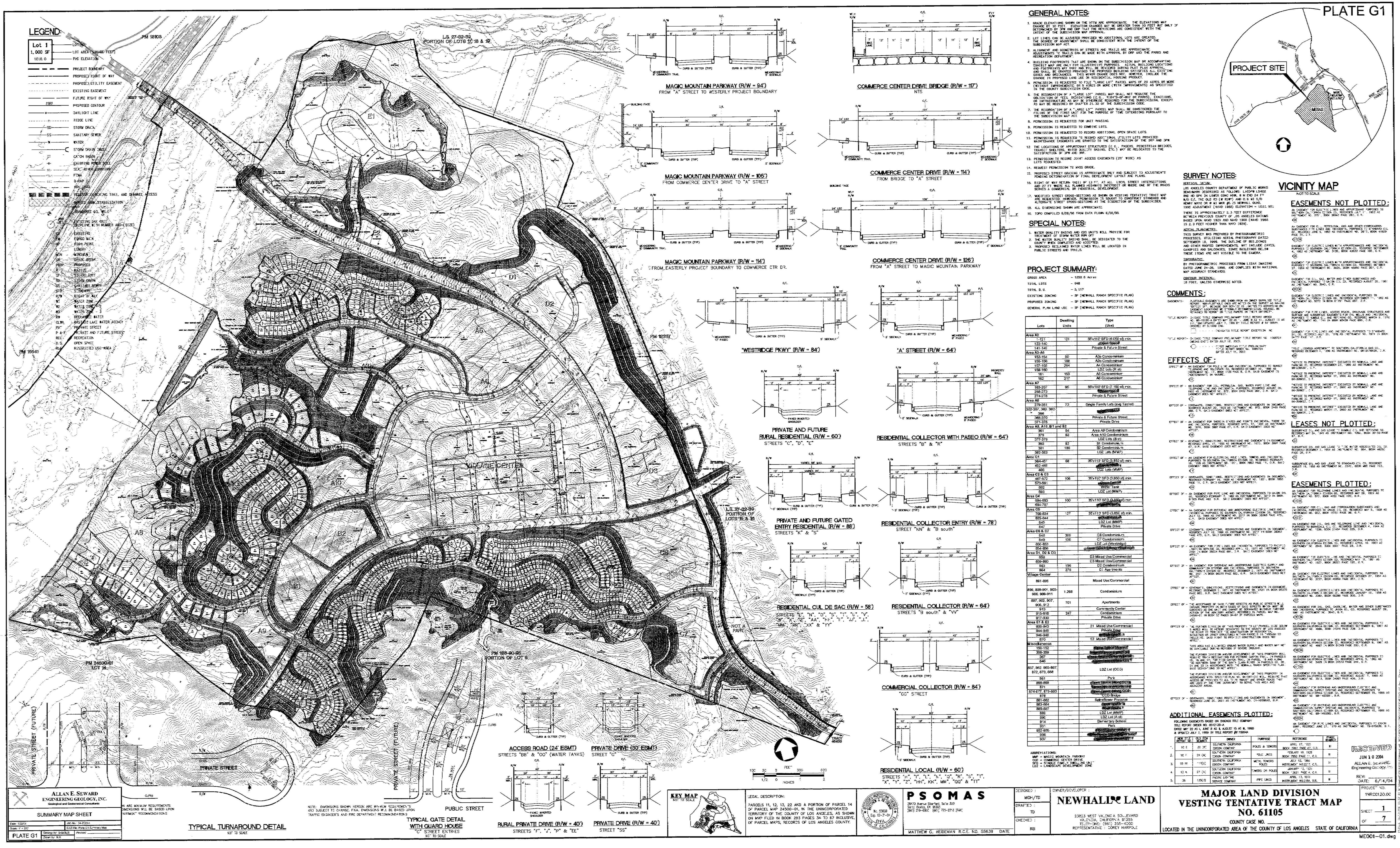
Prepared for:

The Newhall Land and Farming Company
23823 West Valencia Boulevard
Valencia, California 91355

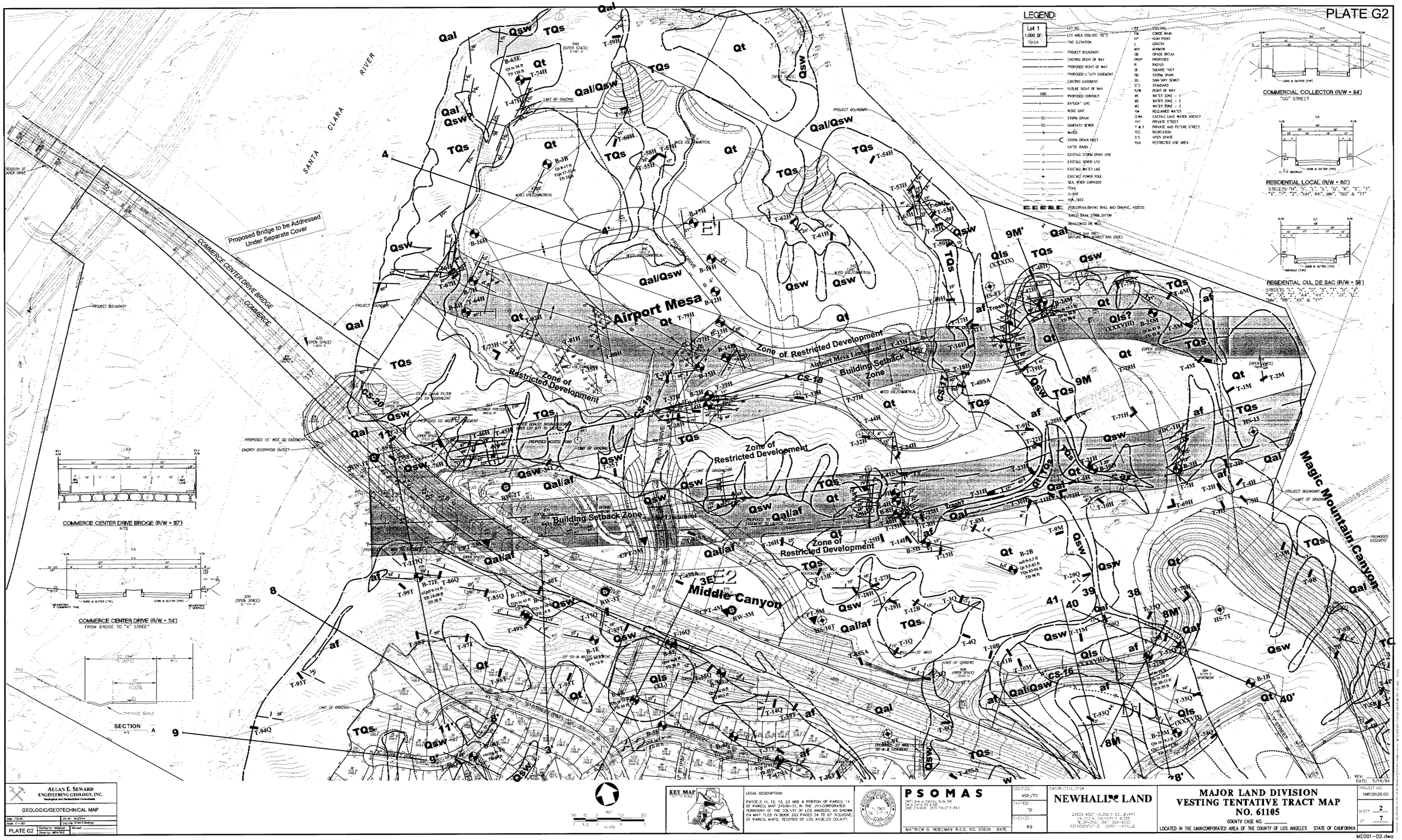
Job No: 04-2023-4
Dated July 22, 2004

27825 Smyth Drive, Valencia, California 91355 661-294-0065 FAX 661-294-0833

Appendix G



A full-size reproduction of this figure can be found at Impact Sciences.



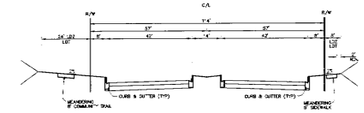
A full-size reproduction of this figure can be found at Impact Sciences.

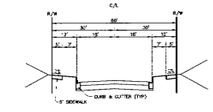
PLATE G3

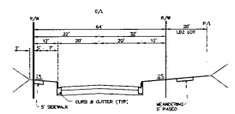
LEGEND:

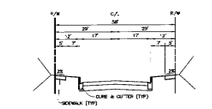
Lot 1 / 1,000 SF / 1213.0	LOT NO / LOT AREA (SQUARE FEET) / PAD ELEVATION
	PROJECT BOUNDARY
	EXISTING RIGHT OF WAY
	PROPOSED RIGHT OF WAY
	PROPOSED UTILITY EASEMENT
	EXISTING EASEMENT
	FUTURE RIGHT OF WAY
1200	PROPOSED CONTOUR
	DAYLIGHT LINE
	RIDGE LINE
SD	STORM DRAIN
SS	SANITARY SEWER
W	WATER
	STORM DRAIN "BASE"
	CATCH BASIN
	EXISTING STORM DRAIN LINE
	EXISTING SEWER LINE
	EXISTING WATER LINE
	EXISTING POWER POLE
	SEA, RIVER CORRIDOR
	FEMA
	G-CAP
	404_1603

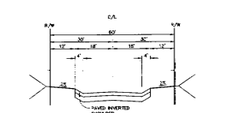
	PEDESTRIAN/BIKING TRAIL AND CHANNEL ACCESS
	BURIED BANK STABILIZATION
	ABANDONED OIL WELL
	EXISTING OAK TREE SPECIMEN WITH NUMBER AND (SIZE)
EX	EXISTING
FM	FORCE MAIN
HP	HIGH POINT
L	LENGTH
MIN	MINIMUM
GB	GRADE BREAK
PROP	PROPOSED
R	RADIUS
SF	SQUARE FOOT
SD	STORM DRAIN
SS	SANITARY SEWER
STD	STANDARD
R/W	RIGHT OF WAY
W1	WATER ZONE – 1
W2	WATER ZONE – 2
W3	WATER ZONE – 3
RW	RECLAIMED WATER
CLWA	CASTAIC LAKE WATER AGENCY
PVT	PRIVATE STREET
P & F	PRIVATE AND FUTURE STREET
REC	RECREATION
O.S.	OPEN SPACE
RLA	RESTRICTED USE AREA

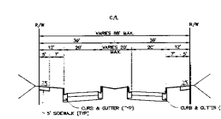

COMMERCE CENTER DRIVE (R/W = 114')
FROM BRIDGE TO "A" STREET

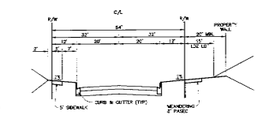

RESIDENTIAL LOCAL (R/W = 60')
STREETS "M", "T", "L", "N", "O", "S", "T", "U", "V", "W", "X", "Y", "Z", "AA", "BB", "CC", "DD", "EE", "FF", "GG", "HH", KK", MM", "QQ" & "RR"

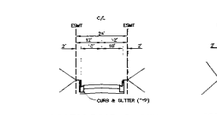

"A" STREET (R/W = 64')

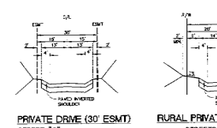

RESIDENTIAL CUL DE SAC (R/W = 58')
STREETS "E", "H", "O", "S", "T", "U", "V", "W", "X", "Z", "AA", "BB", "I", "J", "CJ", "LL", "MM", "RR", "XX" & "YY"

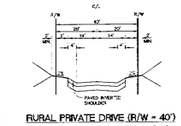

PRIVATE AND FUTURE
RURAL RESIDENTIAL (R/W = 60')
STREETS "C", "D", "E"

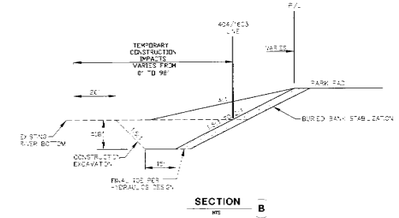

PRIVATE AND FUTURE GATED
ENTRY RESIDENTIAL (R/W = 88')
STREETS "K" & "S"


RESIDENTIAL COLLECTOR WITH PASEO (R/W = 64')
STREETS "B" & "I"


ACCESS ROAD (24' ESMT)
STREETS "BB" & "DD" (WATER TANKS)


PRIVATE DRIVE (30' ESMT)
STREET "G"


RURAL PRIVATE DRIVE (R/W = 40')
STREETS "FF", "J", "P" & "EE"


SECTION B

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

GEOLOGIC/GEOTECHNICAL MAP

PLATE G3

KEY MAP

LEGAL DESCRIPTION:
PARCELS 11, 12, 13, 22 AND A PORTION OF PARCEL 14 OF PARCEL MAP 24500-01, IN THE UNINCORPORATED TERRITORY OF THE COUNTY OF LOS ANGELES, AS SHOWN ON MAP FILED IN BOOK 293 PAGES 34 TO 67 INCLUSIVE, OF PARCEL MAPS, RECORDS OF LOS ANGELES COUNTY.

PSOMAS
23822 West Valencia Blvd.
Santa Clarita, CA 91355
Tel 661-259-1928 Fax 259-1798

MATTHEW G. HEIDEMAN R.C.E. NO. 55829 DATE

DESIGNED: WDH/TD
DRAFTED: TD
CHECKED: RB

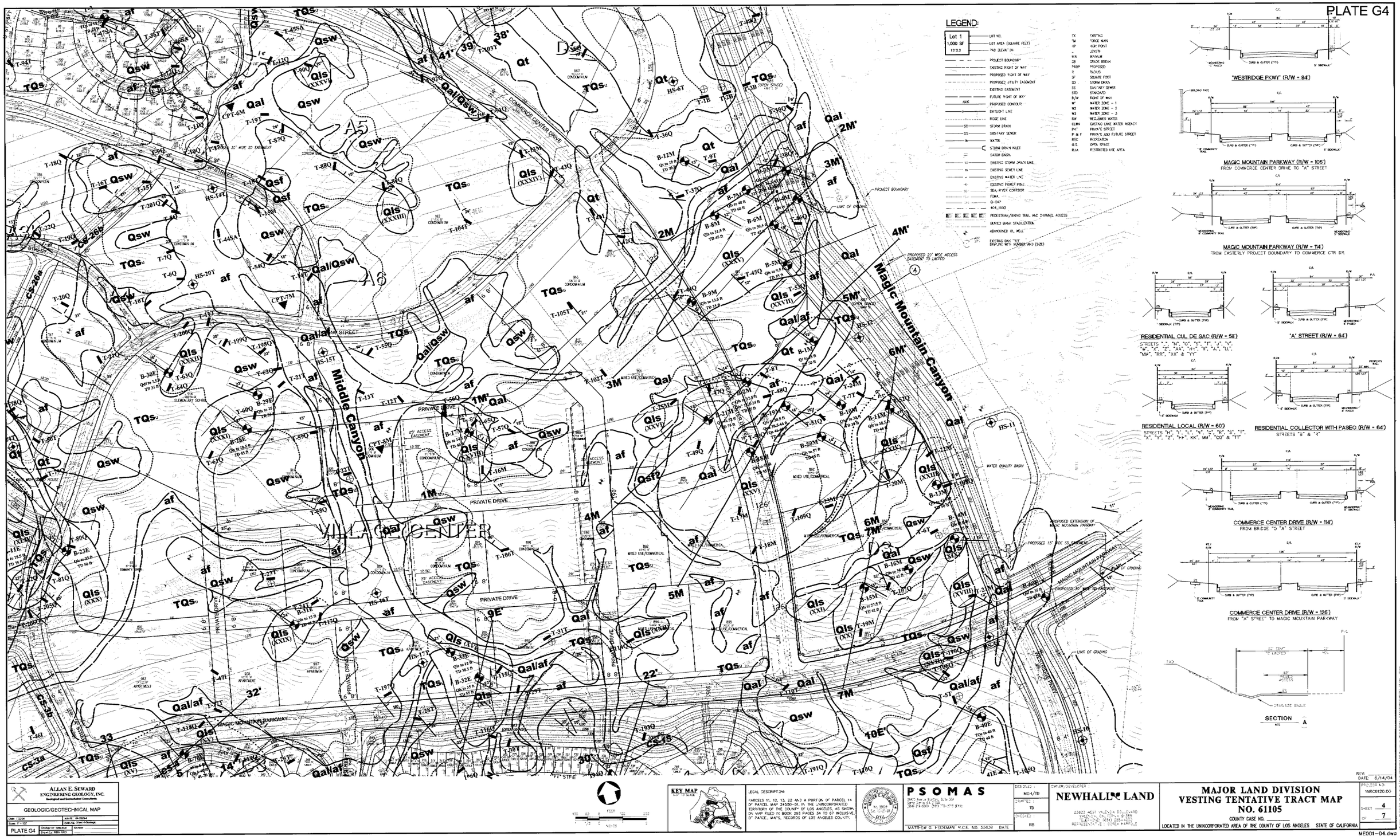
OWNER/DEVELOPER
NEWHALL LAND
23823 West Valencia Boulevard
Santa Clarita, CA 91355
Telephone (661) 259-4203
Representative: Corey Gamble

MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 61105
COUNTY CASE NO.
LOCATED IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

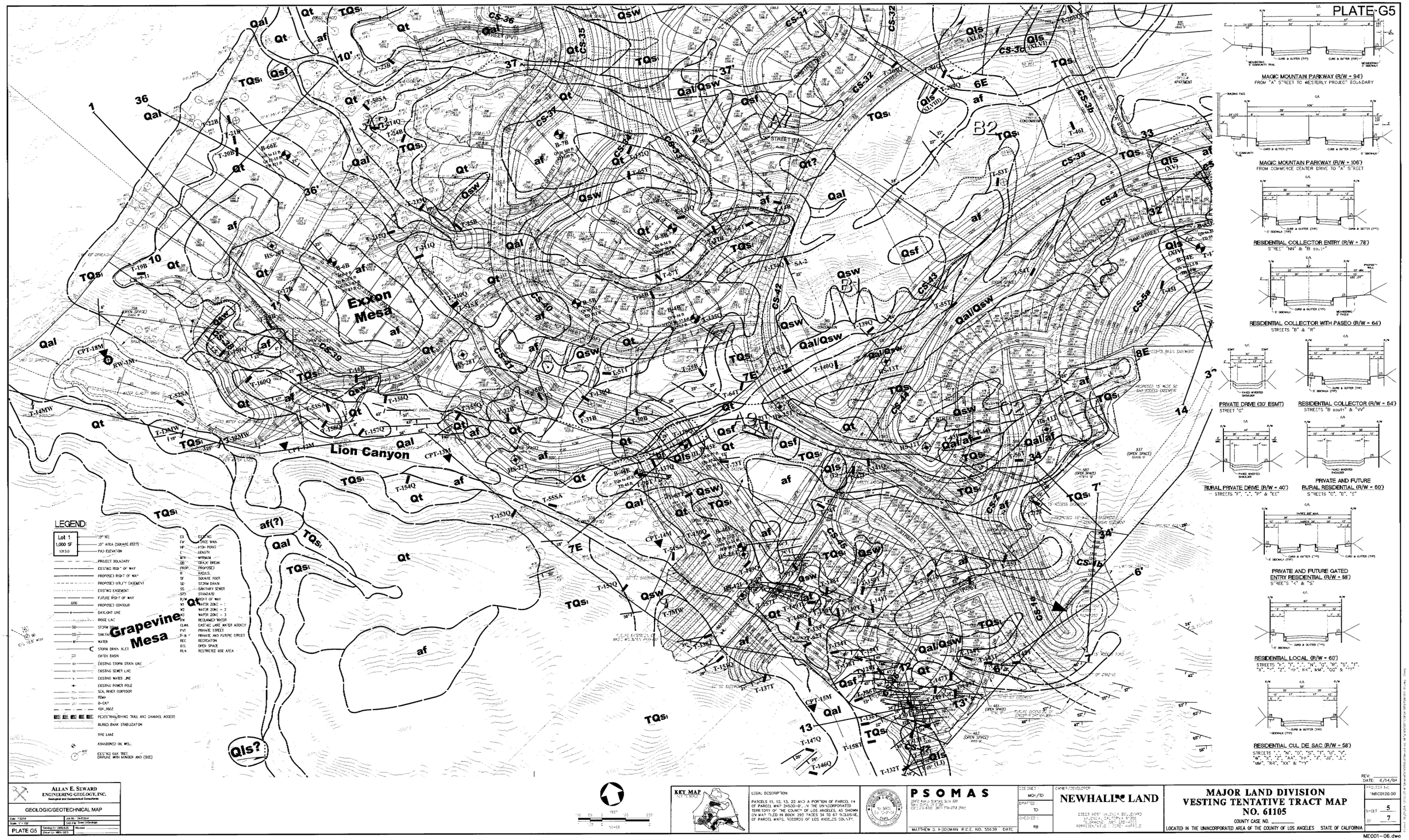
REV. DATE 6/14/04
PROJECT NO. 1NRC0120.00
SHEET 3 OF 7

ME001-03.dwo

A full-size reproduction of this figure can be found at Impact Sciences.

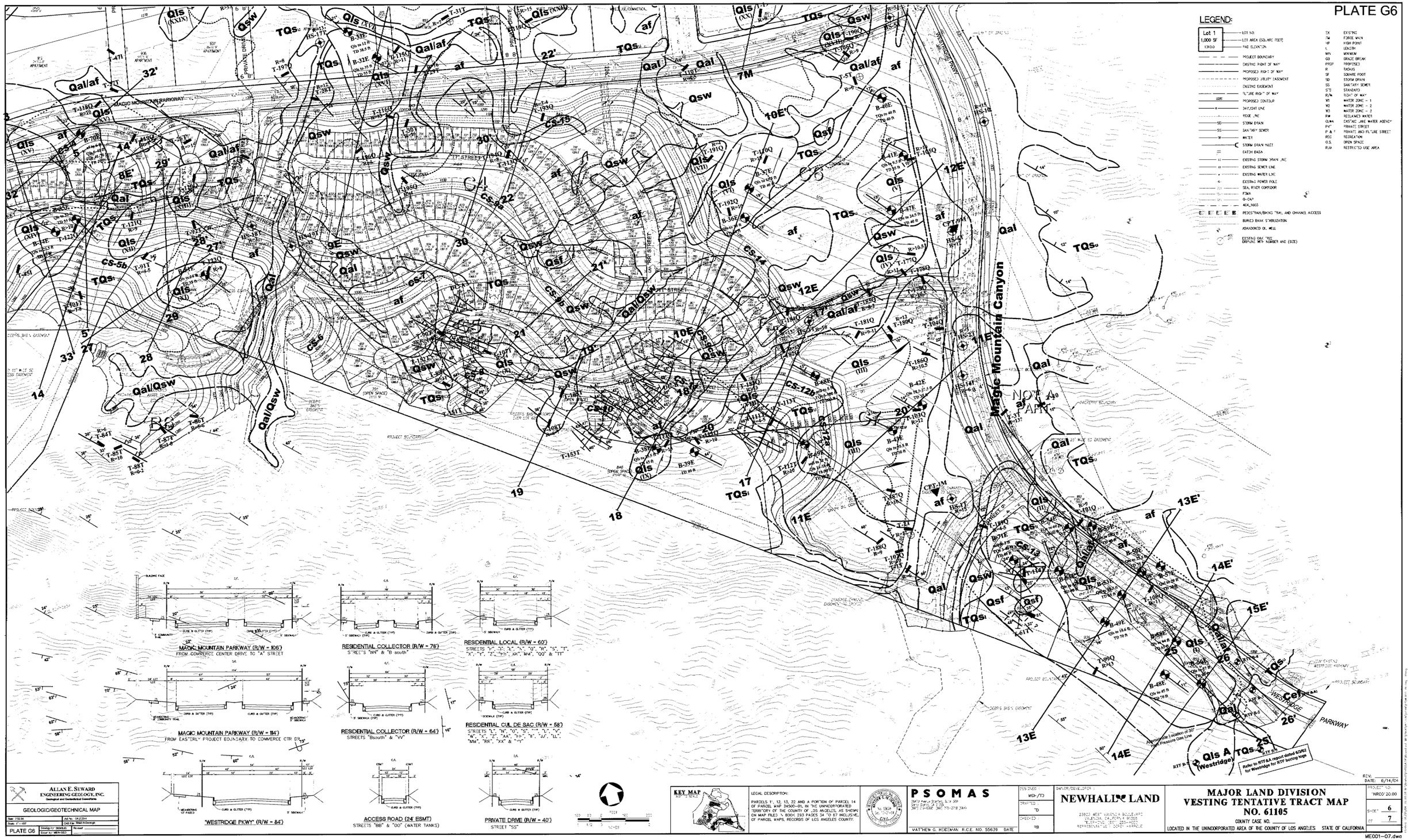


A full-size reproduction of this figure can be found at Impact Sciences.

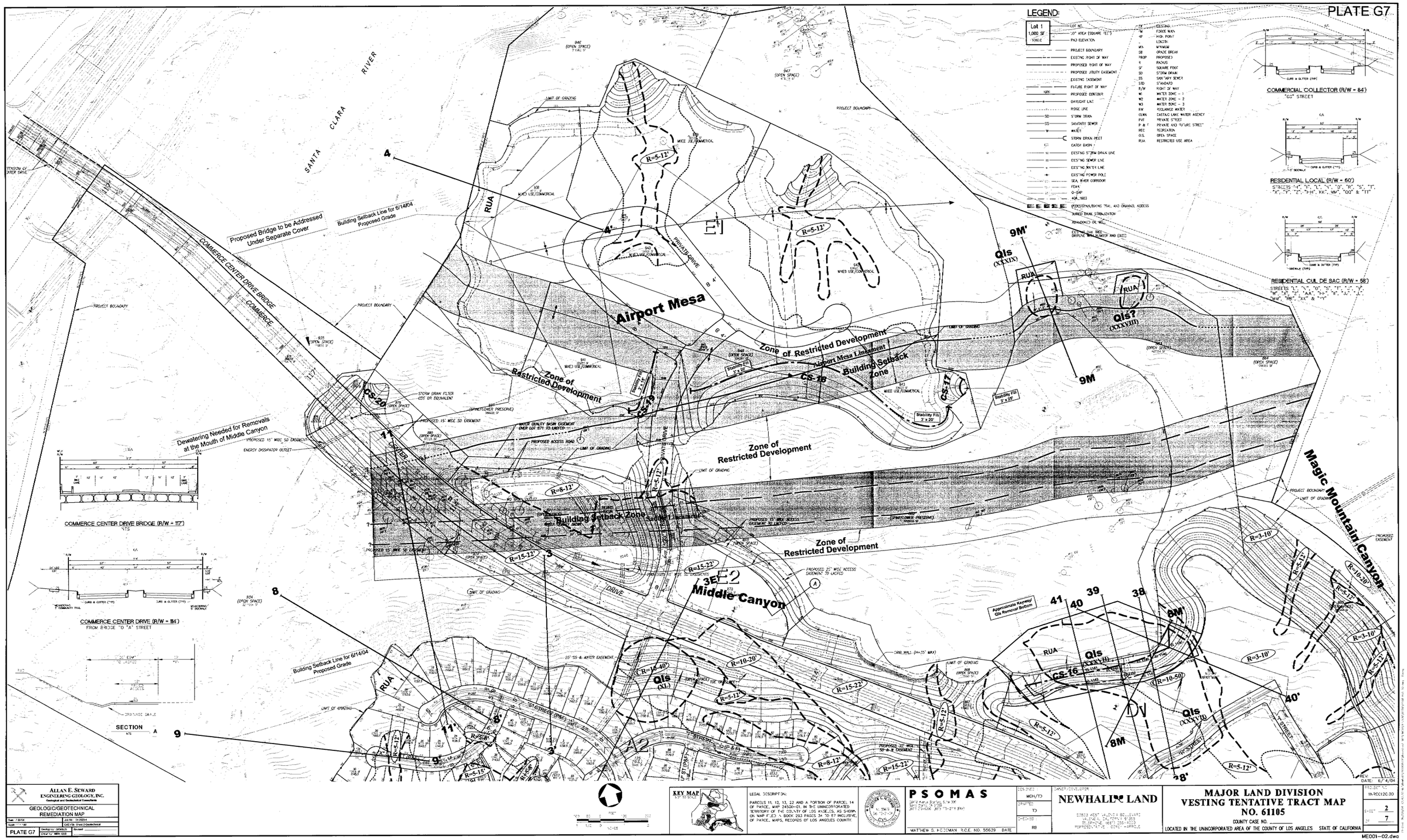


A full-size reproduction of this figure can be found at Impact Sciences.

PLATE G6



A full-size reproduction of this figure can be found at Impact Sciences.



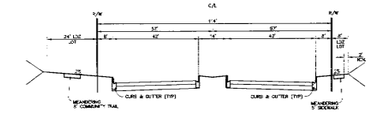
A full-size reproduction of this figure can be found at Impact Sciences.

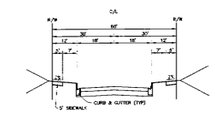
PLATE G8

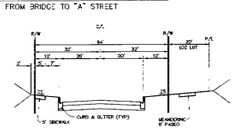
LEGEND:

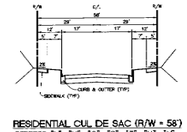
Lot 1 / 1,000 SF / 102.0	LOT NO. / LOT AREA (SQUARE FEET) / PAD ELEVATION
	PROJECT BOUNDARY
	EXISTING RIGHT OF WAY
	PROPOSED RIGHT OF WAY
	PROPOSED UTILITY EASEMENT
	EXISTING EASEMENT
	FUTURE RIGHT OF WAY
7500	PROPOSED CONTOUR
	DAYLIGHT LINE
	RIDGE LINE
SD	STORM DRAIN
SS	SANITARY SEWER
W	WATER
	STORM DRAIN PIPE
	CATCH BASIN
	EXISTING STORM DRAIN LINE
	EXISTING SEWER LINE
	EXISTING WATER LINE
	EXISTING POWER POLE
	SEA, RIVER CORRIDOR
	TEMP
	C-CAP
	434_1603
	PEDESTRIAN/BIKING TRAIL AND CHANNEL ACCESS
	BURIED BANK STABILIZATION
	ABANDONED OIL WELL
	EXISTING OAK TREE DRIPLINE WITH NUMBER AND SIZE)

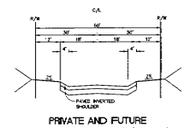
EX	EXISTING
FM	FORCE MAIN
HP	HIGH POINT
L	LENGTH
MIN	MINIMUM
GB	GRADE BREAK
PROP	PROPOSED
R	RADIUS
SF	SQUARE FOOT
SD	STORM DRAIN
SS	SANITARY SEWER
STD	STANDARD
R/W	RIGHT OF WAY
#1	WATER ZONE - 1
#2	WATER ZONE - 2
#3	WATER ZONE - 3
RW	RECLAIMED WATER
CLWA	CASTAIC LAKE WATER AGENCY
PVT	PRIVATE STREET
P & F	PRIVATE AND FUTURE STREET
REC	RECREATION
O.S.	OPEN SPACE
RUA	RESTRICTED USE AREA

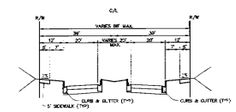


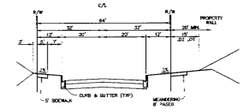


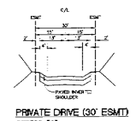


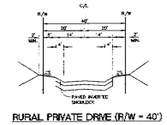


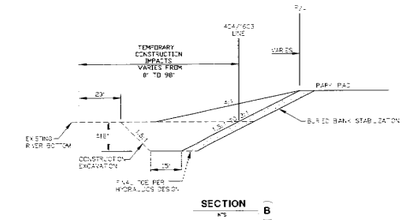












SECTION B

REV:
DATE: 6/14/04

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

GEOLOGIC/GEOTECHNICAL REMEDIATION MAP

Date: 10/04 | AP No: 04-2204
Scale: 1" = 100' | CAD File Name: 3-Geotechnical
PLATE G8 | Design by: DRAWN | Drawn by: MEA/GRD | Revision:

KEY MAP

LEGAL DESCRIPTION:
PARCELS 1, 12, 13, 22 AND A PORTION OF PARCEL 14 OF PARCEL MAP 24600-01, IN THE UNINCORPORATED TERRITORY OF THE COUNTY OF LOS ANGELES, AS SHOWN ON MAP FILED IN BOOK 293 PAGES 34 TO 87 INCLUSIVE, OF PARCEL MAPS, RECORDS OF LOS ANGELES COUNTY.

PSOMAS
MATTHEW G. HIDDEMAN R.C.E. NO. 55639 DATE

DESIGNED: MGH/TD
DRAWN: TD
CHECKED: RB

OWNER/DEVELOPER:
NEWHALL LAND
23533 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE: (661) 255-4000
REPRESENTATIVE: STEVE ABBOTT

MAJOR LAND DIVISION VESTING TENTATIVE TRACT MAP NO. 61105

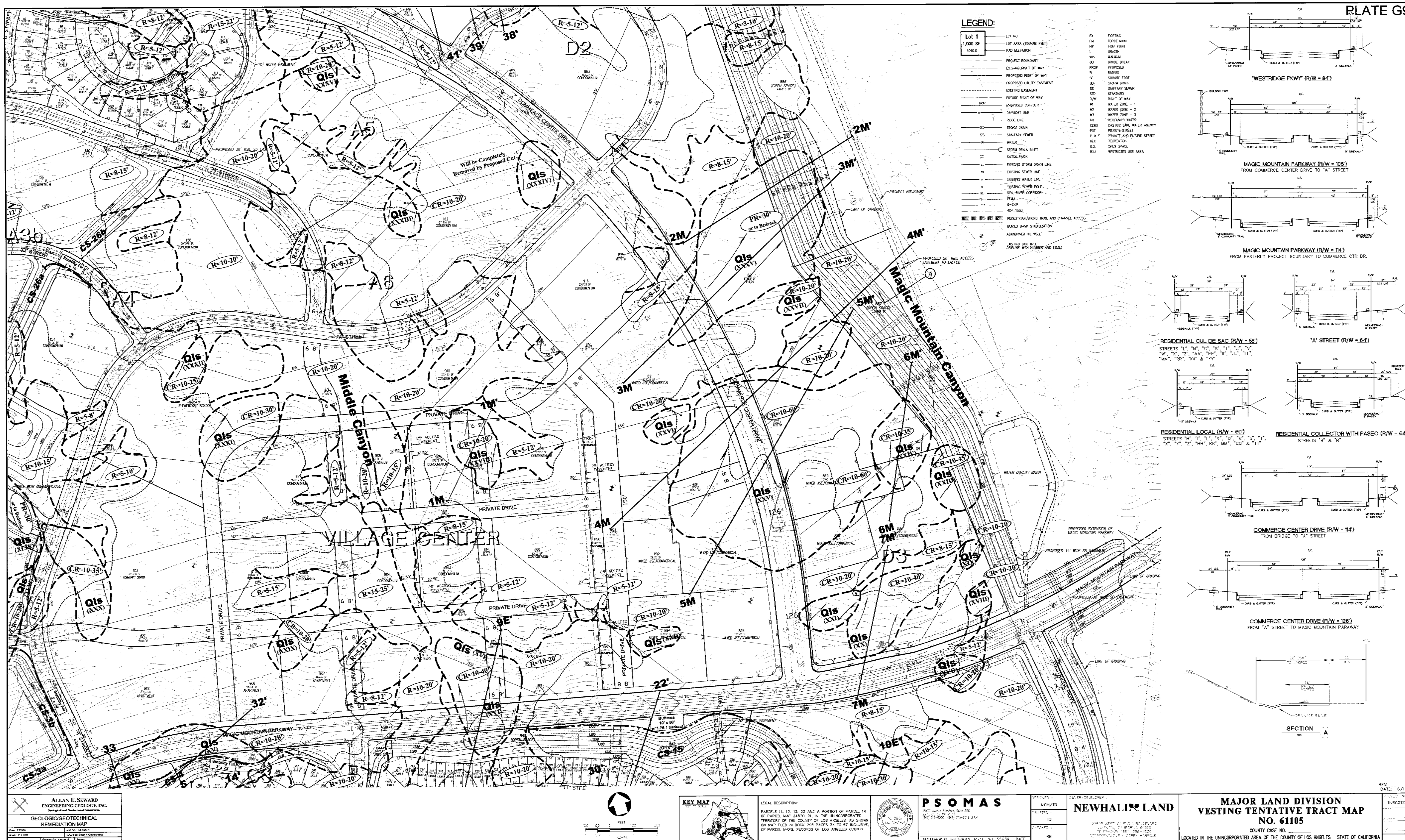
COUNTY CASE NO. _____

LOCATED IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

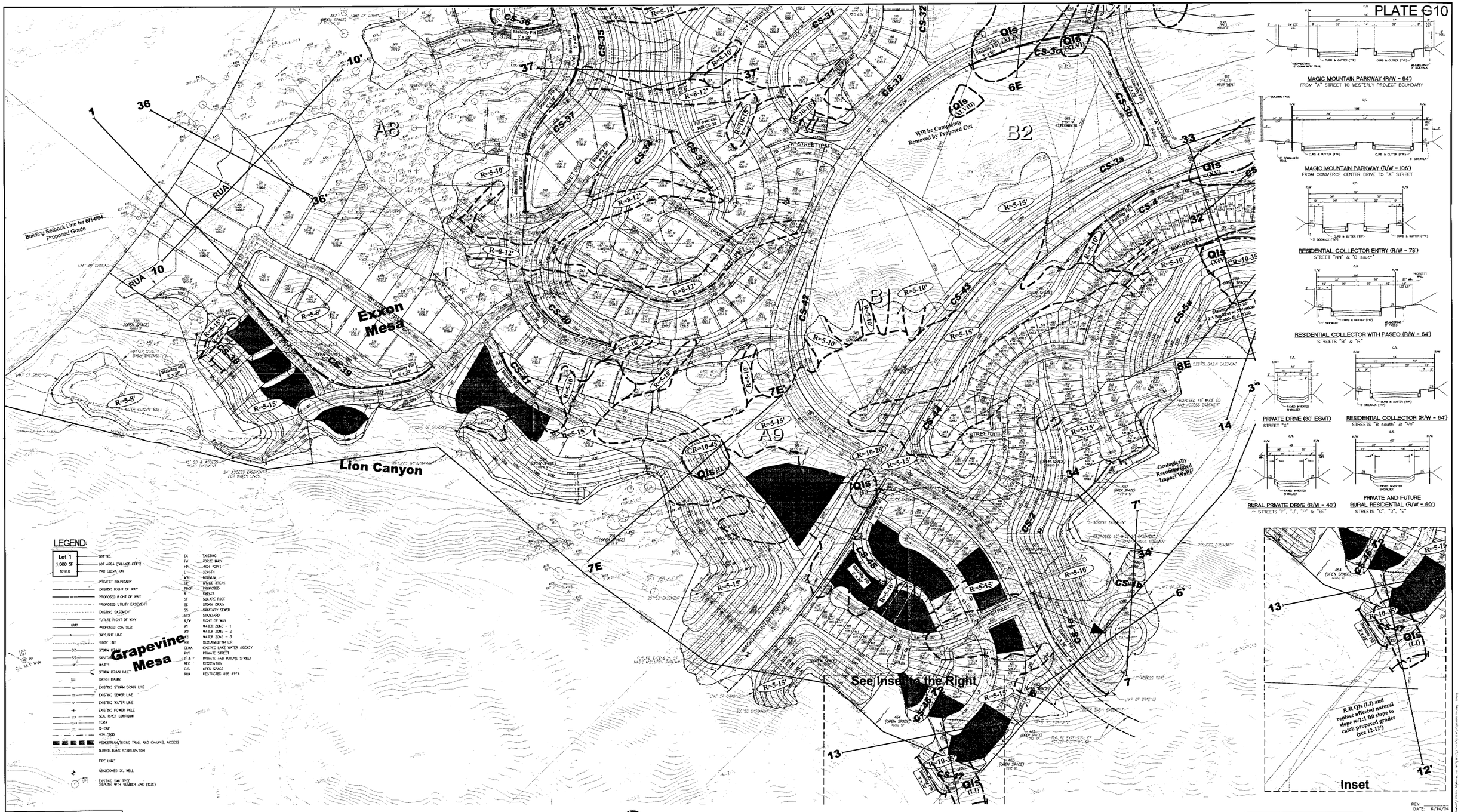
PROJECT NO. 'NRC0120.00
SHEET 3 OF 7

ME001-03.dwg

A full-size reproduction of this figure can be found at Impact Sciences.

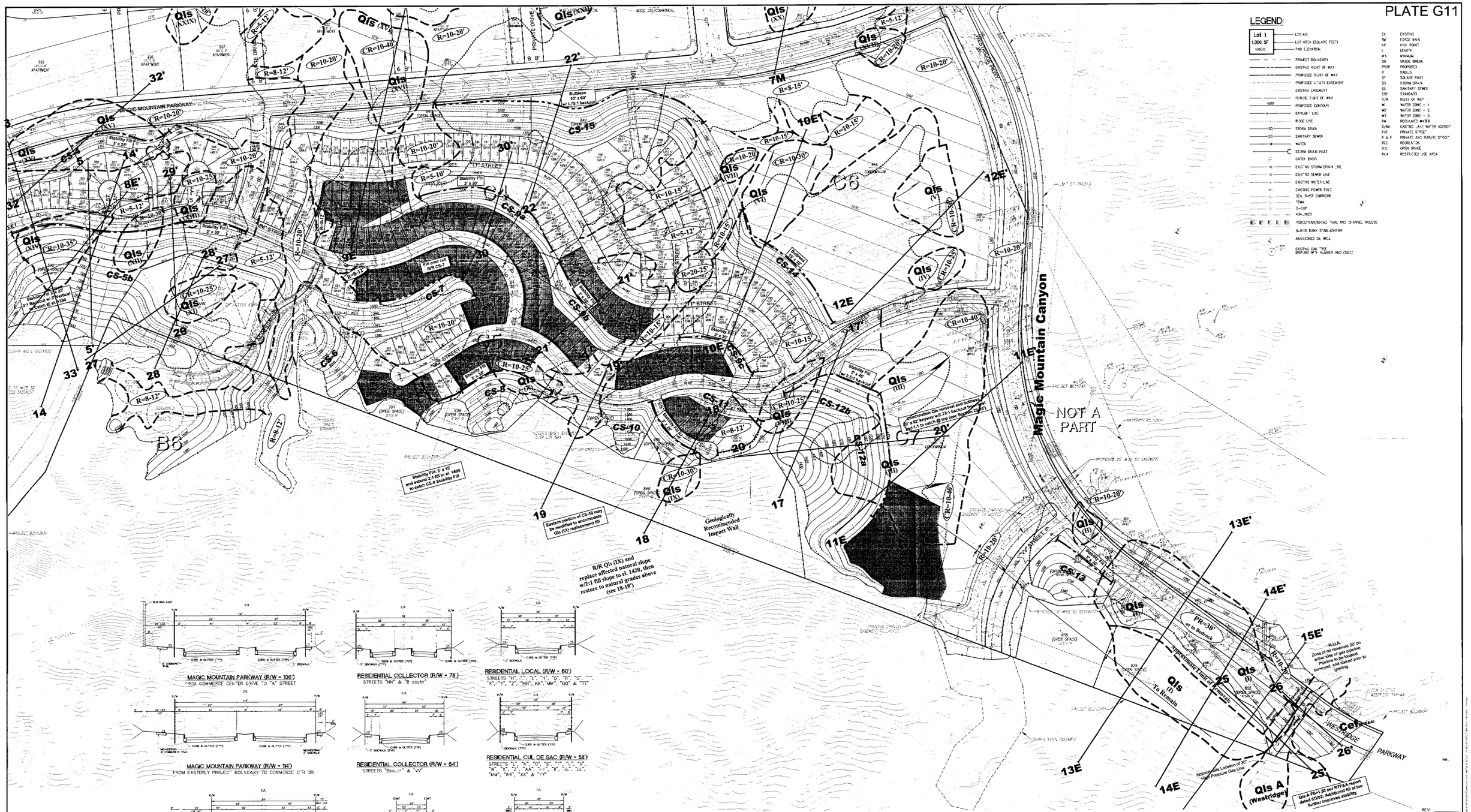


A full-size reproduction of this figure can be found at Impact Sciences.



A full-size reproduction of this figure can be found at Impact Sciences.

PLATE G11



A full-size reproduction of this figure can be found at Impact Sciences.

GEOLOGIC/GEOTECHNICAL MAPS AND REMEDIATION MAPS LEGEND

af	Artificial fill
Qsw	Quaternary slopewash; only selected, large deposits are shown
Qal	Quaternary alluvium;active and recently active alluvial material
Qsf	Quaternary surficial failure; queried where uncertain
Qls (LII)	Quaternary landslide and roman-numeral designation; queried where uncertain
Qt	Quaternary terrace deposits
TQs_u	Saugus Formation (upper unit)
TQs_l	Saugus Formation (lower unit)
TQs	Saugus Formation (undifferentiated)
?	Geologic contact; queried where inferred; dotted where concealed
?	fault trace; queried where inferred; dotted where concealed
	Trace of syncline, showing direction of plunge; the trace is concealed where it is mapped across units younger than TQs
	Trace of anticline, showing direction of plunge; the trace is concealed where it is mapped across units younger than TQs
	Trace of monoclinal warp hinge line; the trace is concealed where it is mapped across units younger than TQs
73°	Strike and dip of bedding
50°	Approximate strike and dip of bedding
12°	Average strike and dip of bedding measured in bucket-auger borings within the bedrock
⊕	Horizontal bedding
19°	Strike and dip of slide plane
47°	Strike and dip of shear
87°	Strike and dip of fracture
60°	Strike and dip of fault
75°	Strike and dip of minor fault
CS-47	Cut-slope designation
	Geotechnically recommended buttress/stability fill
	Geotechnically recommended impact wall
	Cut/Fill line
	Geotechnically recommended building setback for slopes (where greater than h/3)
	Removal boundary
R=5-12'	Recommended removal depth; "CR" indicates complete removal of landslide
PR=30' or to Bedrock	Partial Removal of landslide with removal depth of upper 30' of landslide material or to bedrock where landslide is less than 30' deep

41 — 41'	Geologic cross section
T-217Q	Location of exploratory backhoe trench for Phase I Landslide Investigation (T-1Q thru T-141Q, T-146Q thru T-160Q, T-177Q thru T-214Q, & T-217Q)
T-25M	Location of exploratory backhoe trench for Mesas Entertainment Landslide Investigation (T-1M thru T-25M)
T-158T	Location of exploratory backhoe trench for Mesas East Tentative Map Investigation (T-1T thru T-59T, T-62T thru T-112T, T-114T, T-128T thru T-150T, & T-158T)
T-157T	Location of long exploratory backhoe trench for Mesas East Tentative Map Investigation (T-60T thru T-61T, T-113T, & T-151T thru T-157T)
ET-1T	Location of exploratory excavator trench for Mesas East
T-32B	Location of exploratory backhoe trench for Boulder Assessment Investigation (T-1B thru T-32B)
T-74H	Location of exploratory backhoe trench for Holser Investigation (T-1 thru T-74H)
T-82H	Location of exploratory backhoe fault trench for Holser Investigation (T-75H thru T-82H)
DC-1H	Location of exploratory dozer cut for Holser Investigation (T-75H thru T-82H)
DC-B	Location of exploratory dozer cut for Mesas East
T-47I	Location of exploratory backhoe trench for Phase I Feasibility Evaluation - Infrastructure (T-42I thru T-47I)
T-55SA	Location of exploratory backhoe trench for Sand Aggregate Investigation (T-40SA thru T-55SA)
T-10	Location of exploratory backhoe trench for Magic Mountain Entertainment
T-14MW	Location of exploratory backhoe trench for Phase II Landslide Evauation - Mesas West (T-7MW and T-12MW thru T-14MW)
B-73E	Location of exploratory bucket-auger boring for Mesas East (B-1E thru B-60E and B-63E thru B-73E)
B-25M	Location of exploratory bucket-auger boring for Mesas Entertainment Landslide Investigation (B-1M thru B-25M)
B-8B	Location of exploratory bucket-auger boring for Boulder Assessment Investigation (B-1M thru B-25M)
B-16W	Location of exploratory bucket-auger boring for Phase II Landslide Investigation - Mesas West
RTF B-5	Location of exploratory bucket-auger boring by RTF&A; see Westridge Tract 45433-04 report dated 6/3/02 (RTF B-1 thru RTF B-5)
RW-3M	Location of rotary-wash boring for Geotechnical Evaluation - Mesas area (RW-1M thru RW-3M)
RW-3T	Location of rotary-wash boring for Mesas East Tentative Map Investigation (RW-1T thru RW-3T)
HS-29T	Location of hollow-stem-auger boring for Mesas East Tentative Map Investigation (HS-1T thru HS-29T)
HS-13	Location of hollow-stem-auger boring for Magic Mountain Entertainment (HS-10 thru HS-13)
HS-14I	Location of hollow-stem-auger boring for Phase I Feasibility Evaluation - Infrastructure (HS-12I thru HS-14I)
CPT-18M	Location of cone penetration test for Preliminary Geotechnical Evaluation - Mesas area (CPT-1M thru CPT-15M and CPT-18M)
	Building Setback Zone for faulting; subject to revision based on additional work and final grades
	Zone of Restricted Development; critical and essential facilities are not recommended in this zone and additional structural and/or geotechnical measures are recommended for any other structures in this zone
	Lots potentially affected by additional overexcavation requirements in the vicinity of the monoclinal warp and Lion Canyon Anticline (8-ft-minimum overexcavation)
RUA	Restricted Use Area

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

GEOLOGIC/GEOTECHNICAL MAPS AND REMEDIATION MAPS LEGEND

Date: 7/22/04		Job No.: 04-2023-4
Scale: 1" = 100'		CAD File: Plate G12-Legend
PLATE G12	Geology by: N/A	Revised:
	Drawn by: MBW	

A full-size reproduction of this figure can be found at Impact Sciences.

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

GEOLOGIC AND GEOTECHNICAL REPORT

Review of Vesting Tentative Tract Map (Dated June 14, 2004)

Vesting Tentative Tract 61105

Mesas East

Newhall Ranch, California

VOLUME VI OF VI

Prepared for:

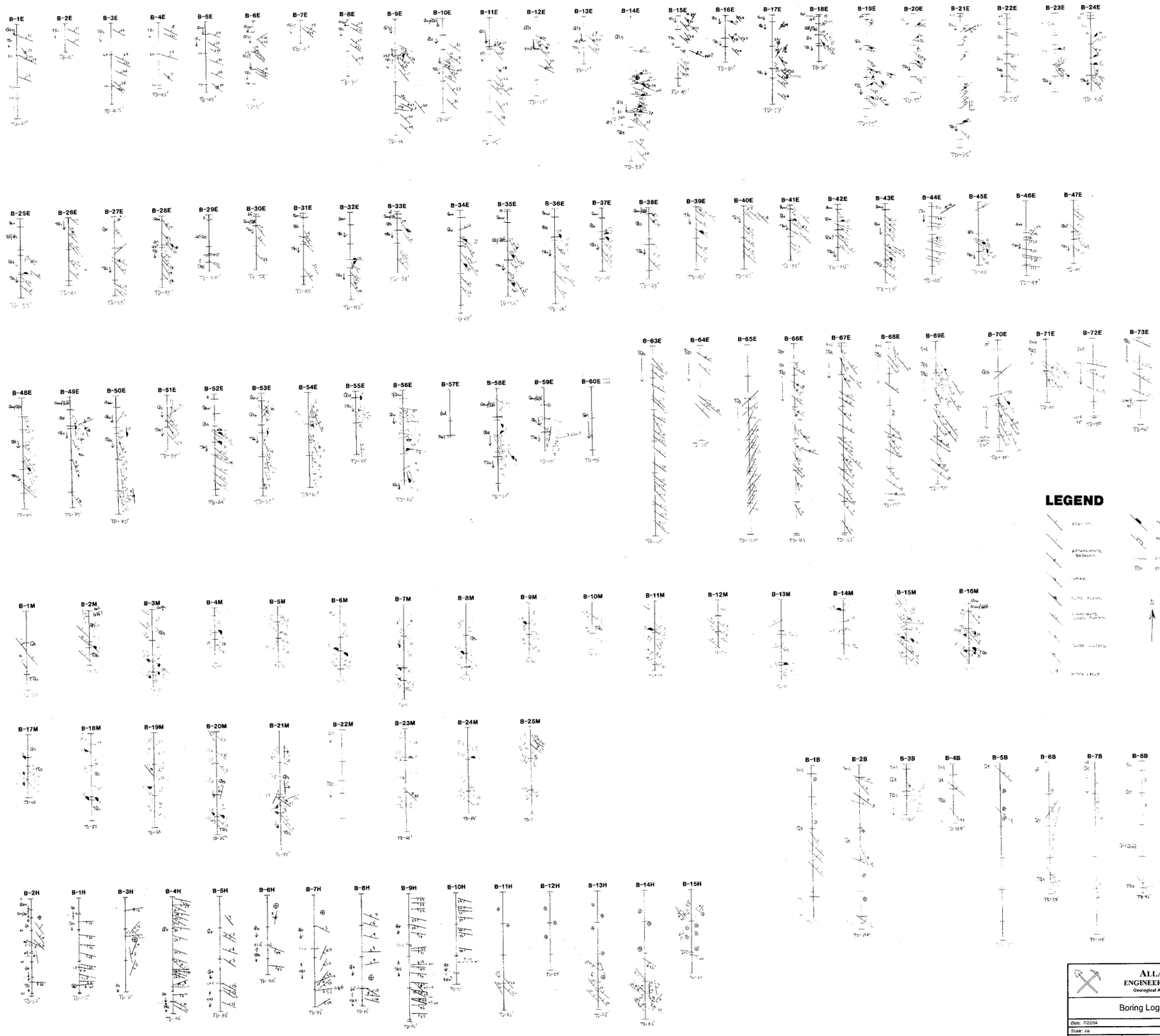
The Newhall Land and Farming Company
23823 West Valencia Boulevard
Valencia, California 91355

Job No: 04-2023-4
Dated July 22, 2004

27825 Smyth Drive, Valencia, California 91355 661-294-0065 FAX 661-294-0833

Appendix G

BORING LOG DATA SHEET

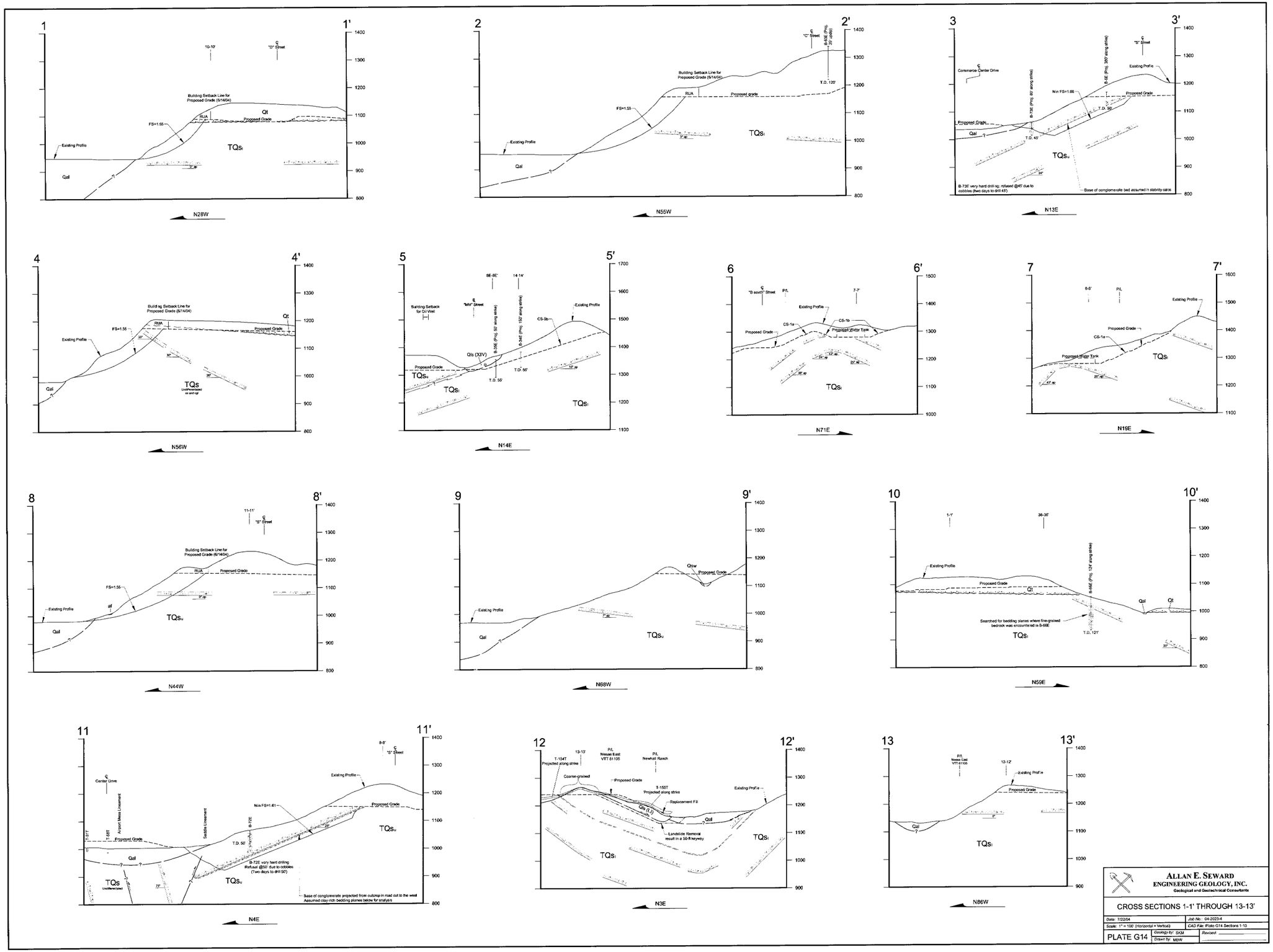


ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

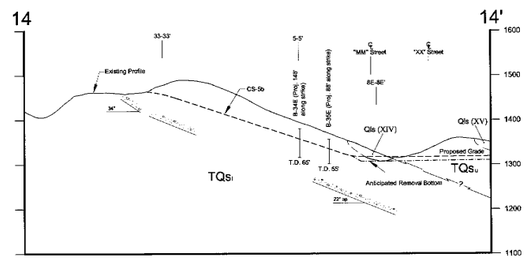
Boring Log Data Sheet

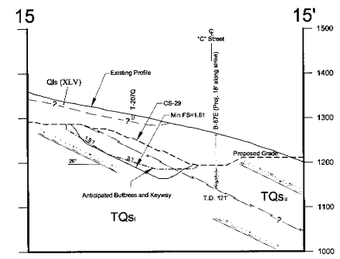
Date: 7/22/04		Job No.: 04-2023-4
Scale: na		CAD File: Boring Attitude Data File
PLATE G13	Geology by: Staff Drawn By: Staff	Reviewed:

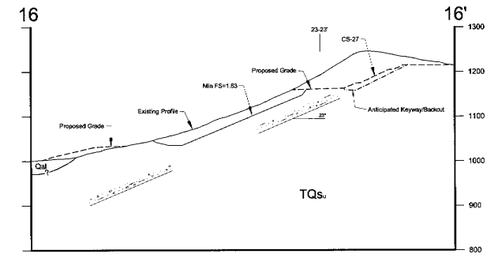
A full-size reproduction of this figure can be found at Impact Sciences.

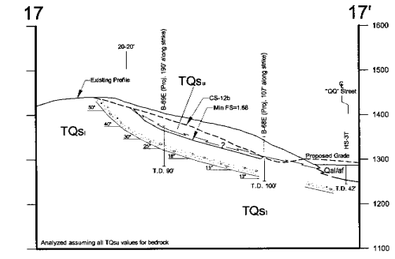


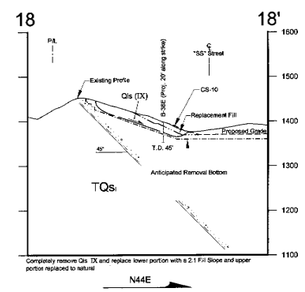
A full-size reproduction of this figure can be found at Impact Sciences.

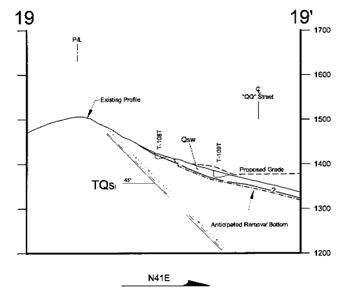


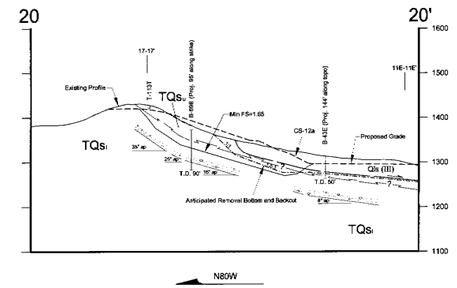


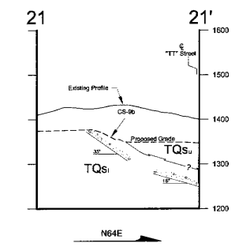


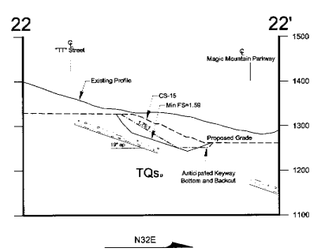


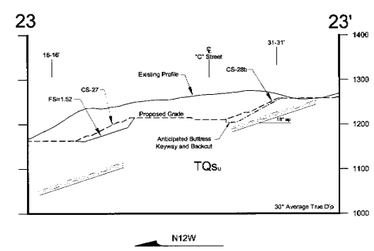


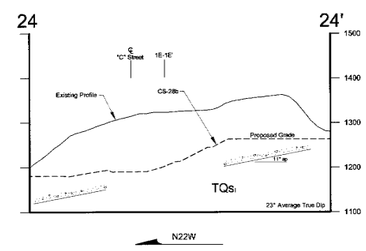


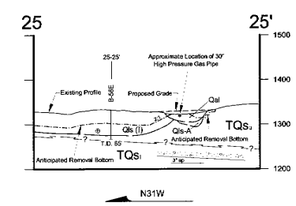


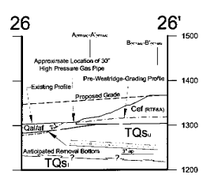


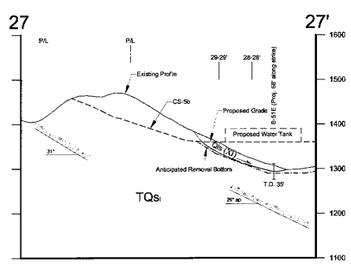


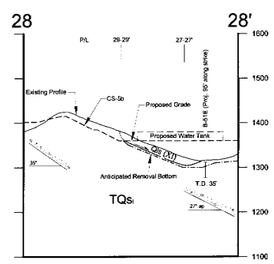


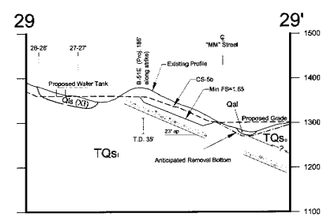










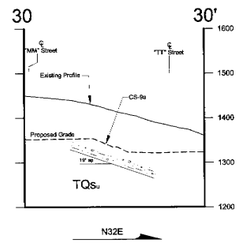


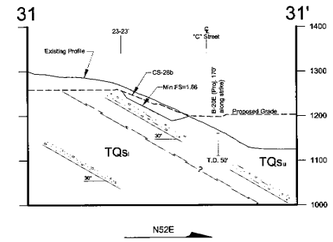
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

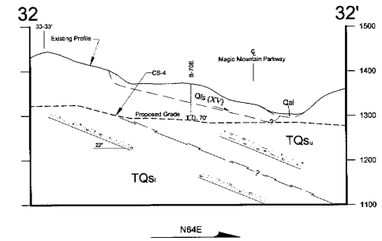
CROSS SECTIONS 14-14' THROUGH 29-29'

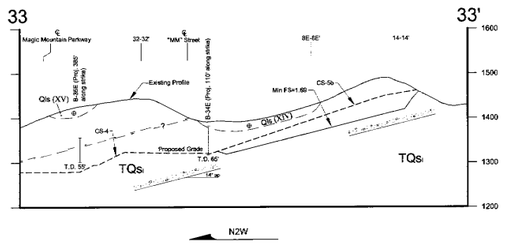
Date: 7/22/04		Job No.: 04-2023-4
Scale: 1" = 100' (Horizontal = Vertical)		CAD File: Plate G15 Sections 14-29
PLATE G15	Geology By: SKM	Reviewed:
	Drawn by: MBW	

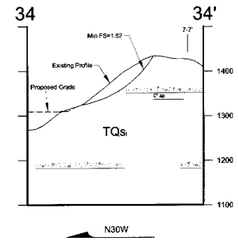
A full-size reproduction of this figure can be found at Impact Sciences.

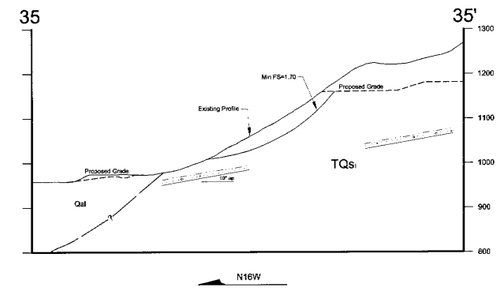


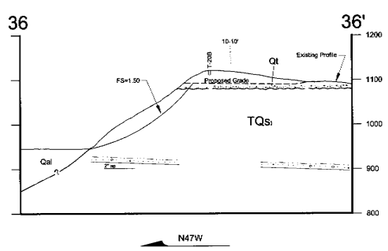


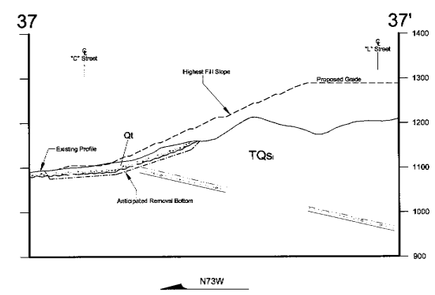


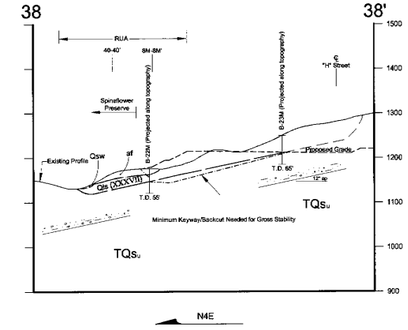


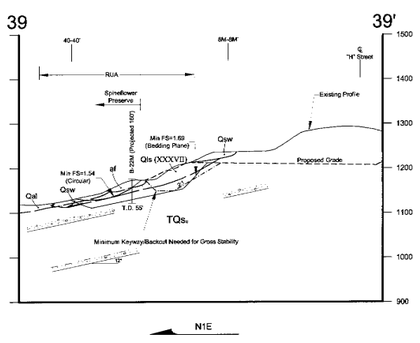


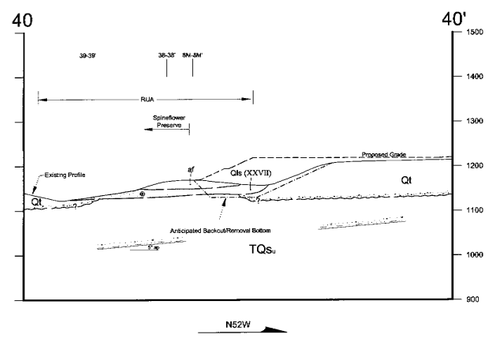


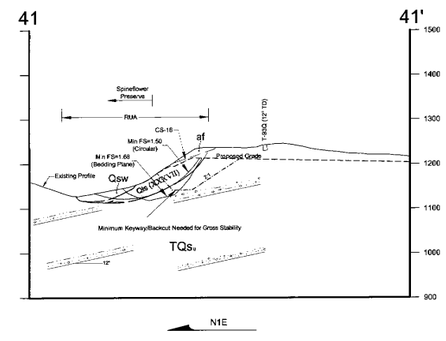










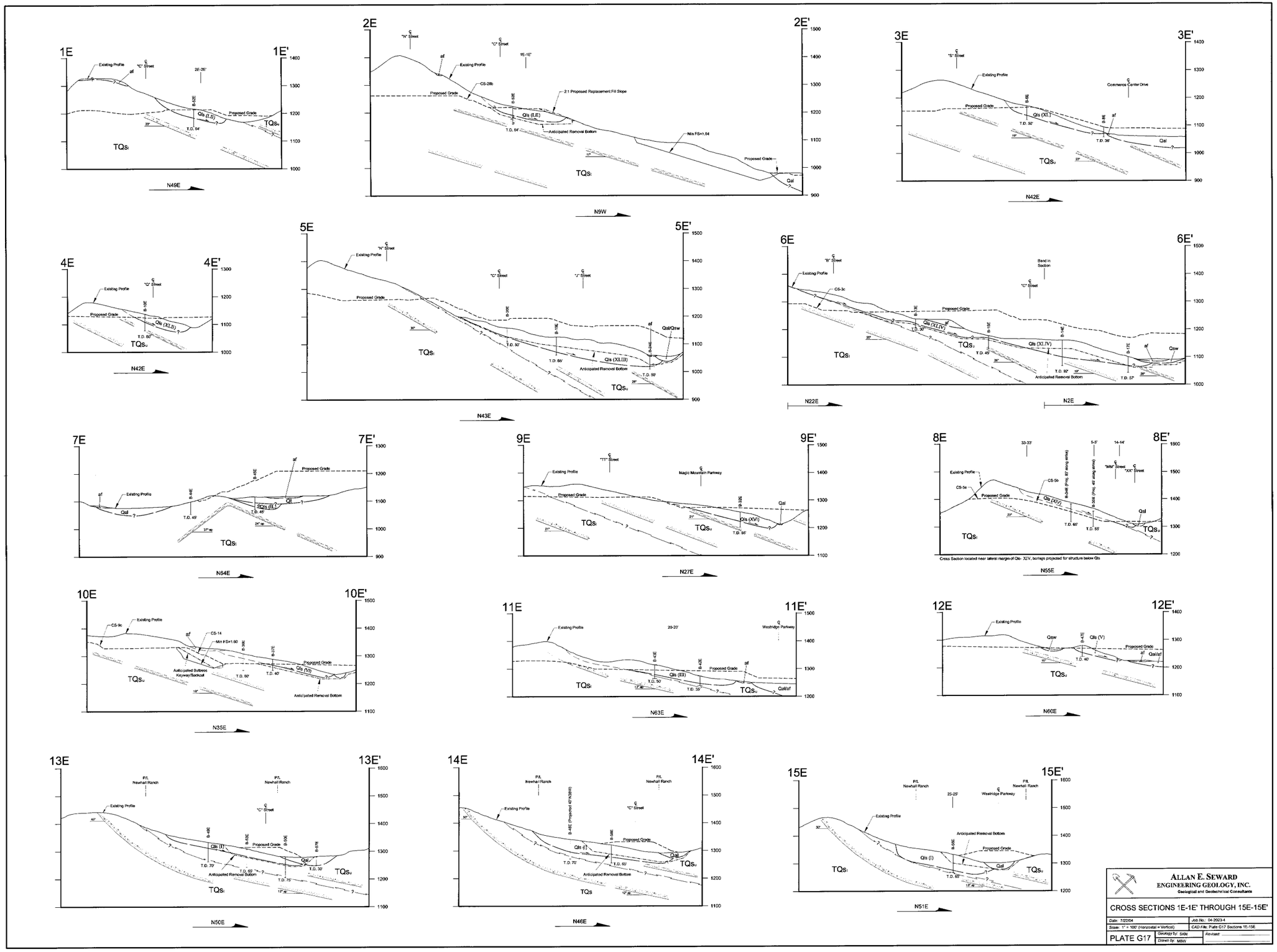


ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

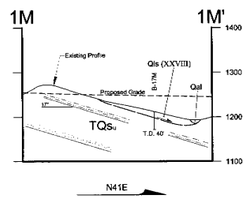
CROSS SECTIONS 30-30' THROUGH 41-41'

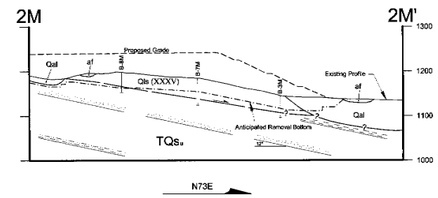
Date: 7/22/04	Job No.: 04-2023-4
Scale: 1" = 100' (Horizontal = Vertical)	CAD File: Plate G16 Sections 30-41
PLATE G16	Geology By: SKM / Drawn by: MBW / Revised:

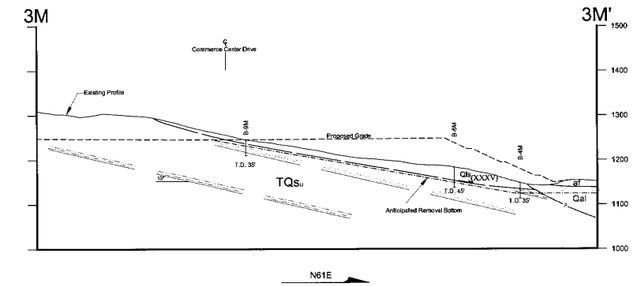
A full-size reproduction of this figure can be found at Impact Sciences.

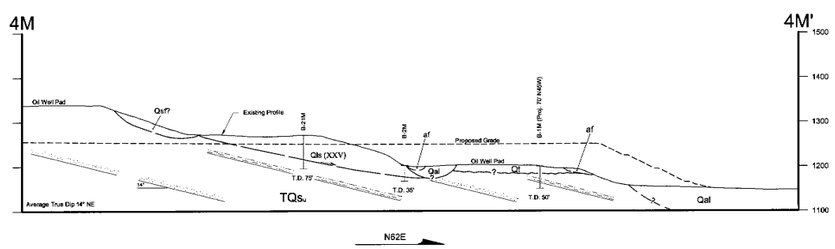


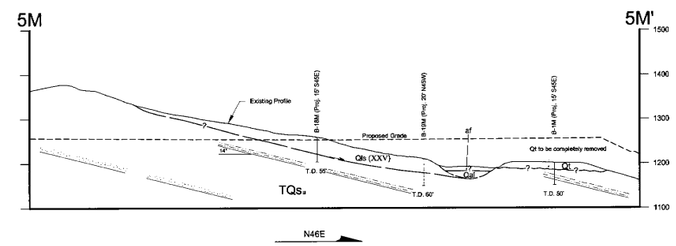
A full-size reproduction of this figure can be found at Impact Sciences.

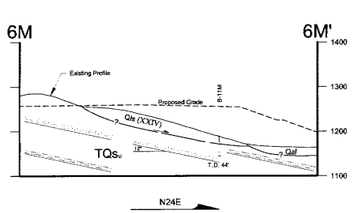


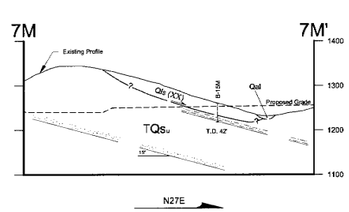


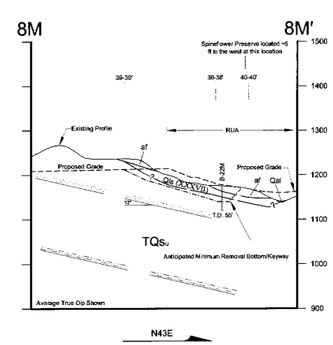


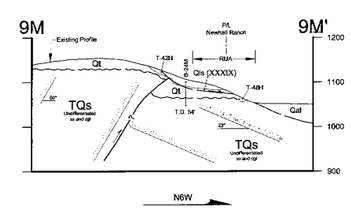












ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

CROSS SECTIONS 1M-1M' THROUGH 9M-9M'

Date: 7/22/04		Job No.: 04-2023-4
Scale: 1" = 100' (Horizontal = Vertical)		CAD File: Plate G18 Sections 1M-9M
PLATE G18	Geology by: SKM	Revised:
	Drawn by: MBW	

A full-size reproduction of this figure can be found at Impact Sciences.

Appendix H

APPENDIX H

OIL WELL ABANDONMENT

MESAS EAST

OIL WELLS: "REPORT OF WELL ABANDONMENT" LIST

EXXON MOBIL CORP 'NEWHALL LAND & FARMING CO.		EXXON MOBIL CORP 'NEWHALL CORP.
Well #'s		Well #'s
1	39	1
3	40	
5	41	
6	42	
7	43	
8	46	
10	48	
11	56	
12	58	
13	59	
14	60	
15	63	
16	64	
17	65	
19	66	
20	67	
21	69	
22	71	
23	72	
24	76	
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		
35		
37		
38		

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL ABANDONMENT

Ventura, California
November 9, 1990

L. R. Howard, Agent
EXXON Corp.
P.O. Box 5025
Thousand Oaks, CA. 91359

Your report of abandonment of well "Newhall Land & Farming Co." 71, A.P.I. No. 037-06299, Section 18, T. 4N, R. 16W, SB B.&M., Castaic Junction field, Los Angeles County, dated 10-3-90, received 10-6-90, has been examined in conjunction with records filed in this office, and we have determined that all of the requirements of this Division have been fulfilled.

MAP	MAP NOTE	CARDS	BOND	EDP	FORMS 114	FORMS 121
252	10-27-90 BH	—	BB	✓	—	✓

cc: Conservation Committee
Update

M.G. MEFFERD, State Oil and Gas Supervisor

By Patrick J. Kinnear
Patrick J. Kinnear, Deputy Supervisor

OG159

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL ABANDONMENT

Ventura, California

April 6, 1989

C. G. Lyons, Agent
EXXON CORPORATION
P.O. Box 5025
Thousand Oaks, CA 91359

Your report of abandonment of well "Newhall Land & Farming Co." 69 (Name and number), A.P.I. No. 037-16528, Section 18, T. 4N, R. 16W, SB B. & M., Castaic Junction field, Los Angeles County, dated 8-29-88, received 8-30-88, has been examined in conjunction with records filed in this office, and we have determined that all of the requirements of this Division have been fulfilled.

b

MAP	MAP BOOK	CARDS	BOND	EDP	FORMS 1-14	FORMS 12
252	BK 3/8/89	—	SB.	✓	—	✓

M. G. MEFFERD
State Oil and Gas Supervisor

By [signature]
Deputy Supervisor

for Patrick J. Kinnear

OG159 (11/82/GSR 1/8M)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL ABANDONMENT

L. R. Howard, Agent
EXXON Corp.
P.O. Box 5025
Thousand Oaks, CA. 91359

Ventura, California
January 18, 1991

Your report of abandonment of well "Newhall Land & Farming Co." 34, A.P.I. No. 037-16504, Section 19, T. 4N, R. 16W, SB B.&M., Castaic Junction field, Los Angeles County, dated 12-6-90, received 12-10-90, has been examined in conjunction with records filed in this office, and we have determined that all of the requirements of this Division have been fulfilled.

cc: Conservation Committee
Update

MAP	MAP BOOK	CARDS	BOND	GDP	FORMS 114	FORMS 139
252	12-22-90 PC	—	BB	✓	—	✓

M.G. MEFFERD, State Oil and Gas Supervisor

By Patrick J. Kinnear
Patrick J. Kinnear, Deputy Supervisor

OG159

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL ABANDONMENT

Ventura, California
January 18, 1991

L. R. Howard, Agent
EXXON Corp.
P.O. Box 5025
Thousand Oaks, CA. 91359

Your report of abandonment of well "Newhall Land & Farming Co." 39, A.P.I. No. 037-16509, Section 24, T. 4N, R. 17W, SB B.&M., Castaic Junction field, Los Angeles County, dated undated, received 1-2-91, has been examined in conjunction with records filed in this office, and we have determined that all of the requirements of this Division have been fulfilled.

MAP	MAP BOOK	CARDS	DOWN	EDP	FORMS 114	FORMS 121
253	1-12-91 BH	—	BB	✓	—	✓

cc: Conservation Committee
Update

M.G. MEFFERD, State Oil and Gas Supervisor

By Patrick J. Kinnear
Patrick J. Kinnear, Deputy Supervisor

OG159

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

L.R. Howard, Agent
EXXON Corporation
P.O. Box 5025
Thousand Oaks, CA 91359

October 6, 1992

Your report of plugging and abandonment of well Newhall Land & Farming" 40, A.P.I. No. 037-16507, Section 24, T. 4N, R. 17W, SB B.&M., Castaic Junction field, Los Angeles County, dated 5-24-92, received 6-09-92, has been examined in conjunction with operations witnessed and records filed in this office. We have determined that all of the requirements of this Division have been fulfilled.

WILLIAM F. GUERARD, Jr.,
Acting State Oil and Gas Supervisor

By Patrick J. Kinnear
Patrick J. Kinnear, Deputy Supervisor

PK:nr

cc: Conservation Committee
Update

OG159 (6/92)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California

September 21, 1994

EXXON Corporation
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, TX 79702

Your report of the plugging and abandonment of well "Newhall Land & Farming Co." 58, A.P.I. No. 037-16521, Section 13, T. 4N, R. 17W, S.B. B.& M., Castaic Junction field, Los Angeles County, dated 11-11-93, received 11-29-93, has been examined in conjunction with records filed in this office. We have determined that all of the requirements of this Division have been fulfilled relative to plugging and abandonment of the well, removal of well equipment and junk, and the filing of well records.

svl

William F. Guerard, Jr
State Oil and Gas Supervisor

By Patrick J. Kinnear
Patrick J. Kinnear
Deputy Supervisor

cc: Conservation Committee
Update

Modified OG159 (4/94)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California

September 21, 1994

EXXON Corporation
Attn: Env. & Req. Affairs
P.O. Box 1600
Midland, TX 79702

Your report of the plugging and abandonment of well "Newhall Land & Farming Co." 59, A.P.I. No. 037-16522, Section 18, T. 4N, R. 16W, S.B. B.& M., Castaic Junction field, Los Angeles County, dated 12-02-93, received 12-13-93, has been examined in conjunction with records filed in this office. We have determined that all of the requirements of this Division have been fulfilled relative to plugging and abandonment of the well, removal of well equipment and junk, and the filing of well records.

svl

William F. Guerard, Jr
State Oil and Gas Supervisor

By
Patrick J. Kinnear
Deputy Supervisor

cc: Conservation Committee
Update

Modified OG159 (4/94)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California

September 21, 1994

EXXON Corporation
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, TX 79702

Your report of the plugging and abandonment of well "Newhall Land & Farming Co." 63, A.P.I. No. 037-00147, Section 13, T. 4N, R. 17W, S.B. B.& M., Castaic Junction field, Los Angeles County, dated 12-21-93, received 12-29-93, has been examined in conjunction with records filed in this office. We have determined that all of the requirements of this Division have been fulfilled relative to plugging and abandonment of the well, removal of well equipment and junk, and the filing of well records.

svl

William F. Guerard, Jr
State Oil and Gas Supervisor

By Patrick J. Kinnear
Patrick J. Kinnear
Deputy Supervisor

cc: Conservation Committee
Update

Modified OG159 (4/94)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California

September 21, 1994

EXXON Corporation
Attn: Env. & Req. Affairs
P.O. Box 1600
Midland, TX 79702

Your report of the plugging and abandonment of well "Newhall Land & Farming Co." 64, A.P.I. No. 037-16525, Section 13, T. 4N, R. 17W, S.B. B.& M., Castaic Junction field, Los Angeles County, dated 12-14-93, received 12-21-93, has been examined in conjunction with records filed in this office. We have determined that all of the requirements of this Division have been fulfilled relative to plugging and abandonment of the well, removal of well equipment and junk, and the filing of well records.

svl

William F. Guerard, Jr
State Oil and Gas Supervisor

By
Patrick J. Kinnear
Deputy Supervisor

cc: Conservation Committee
Update

Modified OG159 (4/94)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California
April 13, 1994

EXXON Corporation
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, Texas 79702

Your report of plugging and abandonment of well "Newhall Land & Farming Co." 65, A.P.I. No. 037-16470, Section 13, T. 4N, R. 17W, SB B.&M., Castaic Junction field, Los Angeles County, dated March 22, 1993, received March 24, 1993, has been examined in conjunction with operations witnessed and records filed in this office. We have determined that all of the requirements of this Division have been fulfilled.

tkc
cc: Conservation Committee
Update

WILLIAM F. GUERARD, Jr.
State Oil and Gas Supervisor

By Patrick J. Kinnear
Patrick J. Kinnear, Deputy Supervisor

OGD159 (6/92)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL ABANDONMENT

L. R. Howard, Agent
EXXON Corp.
P.O. Box 5025
Thousand Oaks, CA. 91359

Ventura, California
November 9, 1990

Your report of abandonment of well "Newhall Land & Farming Co." 66, A.P.I. No. 037-01977, Section 18, T. 4N, R. 16W, SB B.&M., Castaic Junction field, Los Angeles County, dated 10-3-90, received 10-6-90, has been examined in conjunction with records filed in this office, and we have determined that all of the requirements of this Division have been fulfilled.

MAP	MAP BOOK	CARDS	BOND	EDP	FORM 3	
252	10-27-90 BH	—	BB	✓	114 —	120 ✓

cc: Conservation Committee
Update

M.G. MEEFERD, State Oil and Gas Supervisor

By Patrick J. Kinnear
Patrick J. Kinnear, Deputy Supervisor

OG159

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California
December 4, 1992

EXXON Corporation
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, Texas 79702

Your report of plugging and abandonment of well "Newhall Land & Farming Co." 72, A.P.I. No. 037-16530, Section 13, T. 4N, R. 17W, SB B.&M., Castaic Junction field, Los Angeles County, dated June 5, 1992, received June 9, 1992, has been examined in conjunction with operations witnessed and records filed in this office. We have determined that all of the requirements of this Division have been fulfilled.

tkc
cc: Conservation Committee
Update

WILLIAM F. GUERARD, Jr.
Acting State Oil and Gas Supervisor

By
Patrick J. Kinnear, Deputy Supervisor

OGD159 (6/92)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California

January 6, 1999

Jere Keprios, Agent
EXXON CORPORATION
818 w. Seventh Street
Los Angeles, CA 90017

Your report of the plugging and abandonment of well "Newhall Land & Farming Co." 76,

A.P.I. No. 037-16534, Section 13, T. 4N, R. 17W, SB B. & M.,

Castaic Junction field, Los Angeles County,

dated September 28, 1993, received October 6, 1993, has been

examined in conjunction with records filed in this office. We have determined that all of the requirements of this Division have been fulfilled relative to plugging and abandonment of the well, removal of well equipment and junk, and filing of well records.

NOTES: 1. Surface plugging completed on October 13, 1993.

2. Site inspection made and approved August 26, 1998.

William F. Guerard, Jr.
State Oil and Gas Supervisor

By
(Signature of Deputy Supervisor)

Patrick J. Kinnear
(Typed Name of Deputy Supervisor)

OG159 (4/98)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL ABANDONMENT

Ventura, California

Jan. 15, 1987

C. G. Lyons, Agent
Exxon Corporation
P.O. Box DO
Ventura, CA 93002

Your report of abandonment of well "Newhall Land & Farming Co." 33 (Name and number), A.P.I. No. 037-16503, Section 24, T. 4N, R. 17W, S.B. B. & M., Castaic Junction field, Los Angeles County, dated 1-14-87, received 1-14-87, has been examined in conjunction with records filed in this office, and we have determined that all of the requirements of this Division have been fulfilled.

b

MAP					FORMS	
Done 1-15-87	✓		DS	OK		✓

M. G. MEFFERD
State Oil and Gas Supervisor

By Murray W. Dosch
Deputy Supervisor

Murray W. Dosch

OG159 (11/82/CSR1/8M)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California
December 4, 1992

EXXON Corporation
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, Texas 79702

Your report of plugging and abandonment of well "Newhall Land & Farming Co." 32, A.P.I. No. 037-16502, Section 24, T. 4N, R. 17W, SB B.&M., Castaic Junction field, Los Angeles County, dated May 22, 1992, received May 27, 1992, has been examined in conjunction with operations witnessed and records filed in this office. We have determined that all of the requirements of this Division have been fulfilled.

tkc
cc: Conservation Committee
Update

WILLIAM F. GUERARD, Jr.
Acting State Oil and Gas Supervisor

By
Patrick J. Kinnear, Deputy Supervisor

OGD159 (6/92)

RESOURCES AGENCY OF CALIFORI
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL ABANDONMENT

Ventura, California
November 30, 1990

L. R. Howard, Agent
EXXON Corp.
P.O. Box 5025
Thousand Oaks, CA. 91359

Your report of abandonment of well "Newhall Land & Farming Co." 29, A.P.I. No. 037-06300, Section 19, T. 4N, R. 16W, SB B.&M., Castaic Junction field, Los Angeles County, dated 11-27-90, received 11-29-90, has been examined in conjunction with records filed in this office, and we have determined that all of the requirements of this Division have been fulfilled.

MAP	MAP BOOK	CARDS	BOND	FEE	FORMS 114	FORMS 121
map 252	BH 12/3/90	—	CB	✓	—	✓

cc: Conservation Committee
Update
bb

M.G. MEFFERD, State Oil and Gas Supervisor

By Patrick J. Kinnear
Patrick J. Kinnear, Deputy Supervisor

OG159

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California

May 8, 1996

EXXON CORPORATION
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, TX 79702

Your report of the plugging and abandonment of well "Newhall Land & Farming Co." 24, A.P.I. No. 037-16495, Section 19, T. 4N, R. 16W, S.B. B.& M., Castaic Junction field, Los Angeles County, dated 11-8-95, received 11-17-95, has been examined in conjunction with records filed in this office. We have determined that all of the requirements of this Division have been fulfilled relative to plugging and abandonment of the well, removal of well equipment and junk, and the filing of well records.

William F. Guerard, Jr
State Oil and Gas Supervisor

svl

By Patrick J. Kinnear
Patrick J. Kinnear
Deputy Supervisor

Modified OG159 (4/94)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California
December 4, 1992

EXXON Corporation
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, Texas 79702

Your report of plugging and abandonment of well "Newhall Land & Farming Co." 21, A.P.I. No. 037-16492, Section 19, T. 4N, R. 16W, SB B.&M., Castaic Junction field, Los Angeles County, dated June 18, 1992, received June 23, 1992, has been examined in conjunction with operations witnessed and records filed in this office. We have determined that all of the requirements of this Division have been fulfilled.

tkc
cc: Conservation Committee
Update

WILLIAM F. GUERARD, Jr.
Acting State Oil and Gas Supervisor

By
Patrick J. Kinnear, Deputy Supervisor

OGD159 (6/92)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California

November 8, 1995

Exxon Corporation
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, TX 79702

Your report of the plugging and abandonment of well "Newhall Land & Farming Co." 19,

A.P.I. No. 037-16490, Section 19, T. 4N, R. 16W, S.B. B.& M.,

Castaic Junction field, Los Angeles County,

dated 09-30-95, received 10-12-95, has been examined in conjunction with records filed in this office. We have determined that all of the requirements of this Division have been fulfilled relative to plugging and abandonment of the well, removal of well equipment and junk, and the filing of well records.

William F. Guerard, Jr
State Oil and Gas Supervisor

svl

By Patrick J. Kinnear
Patrick J. Kinnear
Deputy Supervisor

Modified OG159 (4/94)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California
August 12, 1993

EXXON Corporation
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, Texas 79702

Your report of plugging and abandonment of well "Newhall Land & Farming Co." 17, A.P.I. No. 037-16488, Section 24, T. 4N, R. 17W, SB B.&M., Castaic Junction field, Los Angeles County, dated October 29, 1992, received November 4, 1992, has been examined in conjunction with operations witnessed and records filed in this office. We have determined that all of the requirements of this Division have been fulfilled.

tkc
cc: Conservation Committee
Update

WILLIAM F. GUERARD, Jr.
Acting State Oil and Gas Supervisor

By Patrick J. Kinnear
Patrick J. Kinnear, Deputy Supervisor

OGD159 (6/92)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

L.R. Howard, Agent
EXXON Corporation
P.O. Box 5025
Thousand Oaks, CA 91359

October 6, 1992

Your report of plugging and abandonment of well Newhall Land & Farming" 16, A.P.I. No. 037-16487, Section 24, T. 4N, R. 17W, SB B.&M., Castaic Junction field, Los Angeles County, dated 6-05-92, received 6-09-92, has been examined in conjunction with operations witnessed and records filed in this office. We have determined that all of the requirements of this Division have been fulfilled.

WILLIAM F. GUERARD, Jr.
Acting State Oil and Gas Supervisor

By Patrick J. Kinnear
Patrick J. Kinnear, Deputy Supervisor

PK:nr

cc: Conservation Committee
Update

OG159 (6/92)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California
December 4, 1992

EXXON Corporation
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, Texas 79702

Your report of plugging and abandonment of well "Newhall Land & Farming Co." 20, A.P.I. No. 037-16491, Section 19, T. 4N, R. 16W, SB B.&M., Castaic Junction field, Los Angeles County, dated June 5, 1992, received June 9, 1992, has been examined in conjunction with operations witnessed and records filed in this office. We have determined that all of the requirements of this Division have been fulfilled.

tkc
cc: Conservation Committee
Update

WILLIAM F. GUERARD, Jr.
Acting State Oil and Gas Supervisor

By
Patrick J. Kinnear, Deputy Supervisor

OGD159 (6/92)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California
August 6, 1993

EXXON Corporation
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, Texas 79702

Your report of plugging and abandonment of well "Newhall Land & Farming Co." 15, A.P.I. No. 037-16486, Section 24, T. 4N, R. 17W, SB B.&M., Castaic Junction field, Los Angeles County, dated October 29, 1992, received November 4, 1992, has been examined in conjunction with operations witnessed and records filed in this office. We have determined that all of the requirements of this Division have been fulfilled.

tkc
cc: Conservation Committee
Update

WILLIAM F. GUERARD, Jr.
Acting State Oil and Gas Supervisor

By Patrick J. Kinnear
Patrick J. Kinnear, Deputy Supervisor

OGD159 (6/92)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California
February 16, 1994

EXXON Corporation
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, Texas 79702

Your report of plugging and abandonment of well "Newhall Land & Farming Co." 14, A.P.I. No. 037-16485, Section 24, T. 4N, R. 17W, SB B.&M., Castaic Junction field, Los Angeles County, dated June 13, 1992, received June 17, 1992, has been examined in conjunction with operations witnessed and records filed in this office. We have determined that all of the requirements of this Division have been fulfilled.

tkc
cc: Conservation Committee
Update

WILLIAM F. GUERARD, Jr.
State Oil and Gas Supervisor

By Patrick J. Kinnear
Patrick J. Kinnear, Deputy Supervisor

OGD159 (6/92)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California
December 4, 1992

EXXON Corporation
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, Texas 79702

Your report of plugging and abandonment of well "Newhall Land & Farming Co." 13, A.P.I. No. 037-16484, Section 24, T. 4N, R. 17W, SB B.&M., Castaic Junction field, Los Angeles County, dated June 29, 1992, received July 2, 1992, has been examined in conjunction with operations witnessed and records filed in this office. We have determined that all of the requirements of this Division have been fulfilled.

tkc
cc: Conservation Committee
Update

WILLIAM E. GUERARD, Jr.
Acting State Oil and Gas Supervisor

By
Patrick J. Kinnear, Deputy Supervisor

OGD159 (6/92)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL ABANDONMENT

Ventura, California

August 23, 1988

C. G. Lyons, Agent
Exxon Corporation
P.O. Box 5025
Thousand Oaks, CA 91359

Your report of abandonment of well "Newhall Land & FArming Co." 12 (Name and number),

A.P.I. No. 037-16483, Section 24, T. 4N, R. 17W, S.B. B. & M.,

Castaic Junction field, Los Angeles County,

dated 8-12-88 received 8-15-88, has been examined in conjunction with records filed in this office, and we have determined that all of the requirements of this Division have been fulfilled.

b

MAP	MAP BOOK	CARDS	BOND	EDP	FORMS 114	FORMS 123
253	Spm 8/8/87		BB	✓	—	✓

M. G. MEFFERD
State Oil and Gas Supervisor

By [signature]
Deputy Supervisor

Patrick J. Kinnear

OG159 (11/82/GSR1/8M)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California
December 4, 1992

EXXON Corporation
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, Texas 79702

Your report of plugging and abandonment of well "Newhall Land & Farming Co." 7, A.P.I. No. 037-16478, Section 24, T. 4N, R. 17W, SB B.&M., Castaic Junction field, Los Angeles County, dated June 15, 1992, received June 17, 1992, has been examined in conjunction with operations witnessed and records filed in this office. We have determined that all of the requirements of this Division have been fulfilled.

tkc
cc: Conservation Committee
Update

WILLIAM F. GUERARD, Jr.
Acting State Oil and Gas Supervisor

By
Patrick J. Kinnear, Deputy Supervisor

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California

November 8, 1995

Exxon Corporation
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, TX 79702

2 in #4 File

Your report of the plugging and abandonment of well "Newhall Land & Farming Co." 26 ?, A.P.I. No. 037-16475, Section 19, T. 4N, R. 16W, S.B. B.& M., Castaic Junction field, Los Angeles County, dated 09-20-95, received 09-29-95, has been examined in conjunction with records filed in this office. We have determined that all of the requirements of this Division have been fulfilled relative to plugging and abandonment of the well, removal of well equipment and junk, and the filing of well records.

William F. Guerard, Jr
State Oil and Gas Supervisor

By Patrick J. Kinnear
Patrick J. Kinnear
Deputy Supervisor

svl

Modified OG159 (4/94)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California

January 6, 1999

Jere Keprios, Agent
EXXON CORPORATION
818 w. Seventh Street
Los Angeles, CA 90017

Your report of the plugging and abandonment of well "Newhall Land & Farming Co." 67, A.P.I. No. 037-16526, Section 13, T. 4N, R. 17W, SB B. & M., Castaic Junction field, Los Angeles County, dated November 20, 1995, received November 29, 1995, has been examined in conjunction with records filed in this office. We have determined that all of the requirements of this Division have been fulfilled relative to plugging and abandonment of the well, removal of well equipment and junk, and filing of well records.

NOTES:

1. Surface plugging completed on November 16, 1995.
2. Site inspection made and approved August 26, 1998.

William F. Guerard, Jr.
State Oil and Gas Supervisor

By
(Signature of Deputy Supervisor)

Patrick J. Kinnear
(Typed Name of Deputy Supervisor)

OG159 (4/98)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California
May 19, 1994

EXXON Corporation
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, Texas 79702

Your report of plugging and abandonment of well "Newhall Land & Farming Co." 1, A.P.I. No. 037-16472, Section 23, T. 4N, R. 17W, SB B.&M., Castaic Junction field, Los Angeles County, dated October 15, 1993, received October 22, 1993, has been examined in conjunction with operations witnessed and records filed in this office. We have determined that all of the requirements of this Division have been fulfilled.

tkc
cc: Conservation Committee
Update

WILLIAM F. GUERARD, Jr.
State Oil and Gas Supervisor

By Patrick J. Kinnear
Patrick J. Kinnear, Deputy Supervisor

OGD159 (6/92)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL ABANDONMENT

Ventura, California
August 22, 1991

L.R. Howard, Agent
EXXON San Joaquin Production Co.
P.O. Box 5025
Thousand Oaks, CA. 91359

Your report of abandonment of well "Newhall Land & Farming Co." 46, A.P.I. No. 037-16512, Section 23, T. 4N, R. 17W, SB B.&M., Castaic Junction field, Los Angeles County, dated 3-11-91, received 3-15-91, has been examined in conjunction with records filed in this office, and we have determined that all of the requirements of this Division have been fulfilled.

bb

					FORMS	
					114	123
253	BH 8/24/91	—	33	✓	—	✓

cc: Conservation Committee
Update

M.G. MEFFERD, State Oil and Gas Supervisor

By Patrick J. Kinnear
Patrick J. Kinnear, Deputy Supervisor

OG159

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

L.R. Howard, Agent
EXXON Corporation
P.O. Box 5025
Thousand Oaks, CA 91359

October 6, 1992

Your report of plugging and abandonment of well Newhall Land & Farming" 56, A.P.I. No. 037-16519, Section 23, T. 4N, R. 17W, SB B.&M., Castaic Junction field, Los Angeles County, dated 5-13-92, received 5-22-92, has been examined in conjunction with operations witnessed and records filed in this office. We have determined that all of the requirements of this Division have been fulfilled.

WILLIAM F. GUERARD, Jr.
Acting State Oil ~~and Gas~~ Supervisor

By Patrick J. Kinnear
Patrick J. Kinnear, ~~Deputy Supervisor~~

PK:nr

cc: Conservation Committee
Update

OG159 (6/92)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL ABANDONMENT

Ventura, California

November 10, 1988

C. G. Lyons, Agent
EXXON CORPORATION
P.O. Box 5025
Thousand Oaks, CA 91359

Your report of abandonment of well "Newhall Corporation" 3 (Name and number),
A.P.I. No. ~~111~~ 037-06298, Section 24, T. 4N, R. 17W, S.B. B. & M.,
Castaic Junction field, Los Angeles County,
dated November 2, 1988, received November 3, 1988, has been examined in conjunction with records filed in this office, and we have determined that all of the requirements of this Division have been fulfilled.

MAP	MAP BOOK	CARDS	BOND	EDP	FORMS 114	FORMS 121
253	mc 12/3/88			✓		✓

M. G. MEFFERD
State Oil and Gas Supervisor

By Patrick J. Kinnear
Deputy Supervisor

Patrick J. Kinnear

ljg
Conns.Comm.

OG159 (11/82/GSR1/8M)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California

November 8, 1995

Exxon Corporation
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, TX 79702

Your report of the plugging and abandonment of well "Newhall Land & Farming Co." 5, A.P.I. No. 037-16476, Section 24, T. 4N, R. 17W, S.B. B.& M., Castaic Junction field, Los Angeles County, dated 08-16-95, received 09-22-95, has been examined in conjunction with records filed in this office. We have determined that all of the requirements of this Division have been fulfilled relative to plugging and abandonment of the well, removal of well equipment and junk, and the filing of well records.

William F. Guerard, Jr
State Oil and Gas Supervisor

svl

By
Patrick J. Kinnear
Deputy Supervisor

Modified OG159 (4/94)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California

November 8, 1995

Exxon Corporation
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, TX 79702

Your report of the plugging and abandonment of well "Newhall Land & Farming Co." 6, A.P.I. No. 037-16477, Section 24, T. 4N, R. 17W, S.B. B.& M., Castaic Junction field, Los Angeles County, dated 09-01-95, received 09-22-95, has been examined in conjunction with records filed in this office. We have determined that all of the requirements of this Division have been fulfilled relative to plugging and abandonment of the well, removal of well equipment and junk, and the filing of well records.

William F. Guerard, Jr
State Oil and Gas Supervisor

By Patrick J. Kinnear
Patrick J. Kinnear
Deputy Supervisor

svl

Modified OG159 (4/94)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California

September 21, 1994

EXXON Corporation
Attn: Env. & Req. Affairs
P.O. Box 1600
Midland, TX 79702

Your report of the plugging and abandonment of well "Newhall Land & Farming Co." 8, A.P.I. No. 037-16479, Section 24, T. 4N, R. 17W, S.B. B.& M., Castaic Junction field, Los Angeles County, dated 09-20-93, received 09-28-93, has been examined in conjunction with records filed in this office. We have determined that all of the requirements of this Division have been fulfilled relative to plugging and abandonment of the well, removal of well equipment and junk, and the filing of well records.

William F. Guerard, Jr
State Oil and Gas Supervisor

svl

By Patrick J. Kimnear
Patrick J. Kimnear
Deputy Supervisor

cc: Conservation Committee
Update

Modified OG159 (4/94)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California

November 8, 1995

Exxon Corporation
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, TX 79702

Your report of the plugging and abandonment of well "Newhall Land & Farming Co." 8,

A.P.I. No. 037-16481, Section 23, T. 4N, R. 17W, S.B. B.& M.,

Castaic Junction field, Los Angeles County,

dated 10-24-95, received 11-03-95, has been examined in conjunction with records filed in this office. We have determined that all of the requirements of this Division have been fulfilled relative to plugging and abandonment of the well, removal of well equipment and junk, and the filing of well records.

William F. Guerard, Jr
State Oil and Gas Supervisor

svl

By Patrick J. Kinnear
Patrick J. Kinnear
Deputy Supervisor

Modified OG159 (4/94)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California
December 4, 1992

EXXON Corporation
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, Texas 79702

Your report of plugging and abandonment of well "Newhall Land & Farming Co." 11, A.P.I. No. 037-16482, Section 24, T. 4N, R. 17W, SB B.&M., Castaic Junction field, Los Angeles County, dated April 23, 1992, received April 27, 1992, has been examined in conjunction with operations witnessed and records filed in this office. We have determined that all of the requirements of this Division have been fulfilled.

tkc
cc: Conservation Committee
Update

WILLIAM F. GUERARD, Jr.
Acting State Oil and Gas Supervisor

By
Patrick J. Kinnear, Deputy Supervisor

OGD159 (6/92)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

L.R. Howard, Agent
EXXON Corporation
P.O. Box 5025
Thousand Oaks, CA 91359

October 6, 1992

Your report of plugging and abandonment of well Newhall Land & Farming" 22, A.P.I. No. 037-16493, Section 24, T. 4N, R. 17W, SB B.&M., Castaic Junction field, Los Angeles County, dated 4-23-92, received 4-27-92, has been examined in conjunction with operations witnessed and records filed in this office. We have determined that all of the requirements of this Division have been fulfilled.

WILLIAM F. GUERARD, Jr.
Acting State Oil and Gas Supervisor

By Patrick J. Linnear
Patrick J. Linnear, Deputy Supervisor

PK:nr

cc: Conservation Committee
Update

OG159 (6/92)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California

November 8, 1995

Exxon Corporation
Attn: Env. & Req. Affairs
P.O. Box 1600
Midland, TX 79702

Your report of the plugging and abandonment of well "Newhall Land & Farming Co." 23, A.P.I. No. 037-16494, Section 24, T. 4N, R. 17W, S.B. B.& M., Castaic Junction field, Los Angeles County, dated 09-01-95, received 09-22-95, has been examined in conjunction with records filed in this office. We have determined that all of the requirements of this Division have been fulfilled relative to plugging and abandonment of the well, removal of well equipment and junk, and the filing of well records.

William F. Guerard, Jr
State Oil and Gas Supervisor

svl

By Patrick J. Kinnear
Patrick J. Kinnear
Deputy Supervisor

Modified OG159 (4/94)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California

December 16, 1994

EXXON Corporation
Attn: Env. & Req. Affairs
P.O. Box 1600
Midland, Texas 79702

Your report of the plugging and abandonment of well "Newhall Land & Farming Co." 25, A.P.I. No. 037-16496, Section 24, T. 4N, R. 17W, S.B. B.& M., Castaic Junction field, Los Angeles County, dated May 20, 1993, received March 14, 1994, has been examined in conjunction with records filed in this office. We have determined that all of the requirements of this Division have been fulfilled relative to plugging and abandonment of the well, removal of well equipment and junk, and the filing of well records.

svl

William F. Guerard, Jr
State Oil and Gas Supervisor

By Patrick J. Kinnear
Patrick J. Kinnear
Deputy Supervisor

cc: Conservation Committee
Update

Modified OG159 (4/94)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California

November 8, 1995

Exxon Corporation
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, TX 79702

Your report of the plugging and abandonment of well "Newhall Land & Farming Co." 26, A.P.I. No. 037-16497, Section 24, T. 4N, R. 17W, S.B. B.& M., Castaic Junction field, Los Angeles County, dated 08-08-95, received 09-22-95, has been examined in conjunction with records filed in this office. We have determined that all of the requirements of this Division have been fulfilled relative to plugging and abandonment of the well, removal of well equipment and junk, and the filing of well records.

William F. Guerard, Jr
State Oil and Gas Supervisor

svl

By Patrick J. Kinnear
Patrick J. Kinnear
Deputy Supervisor

Modified OG159 (4/94)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California

September 21, 1994

EXXON Corporation
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, TX 79702

Your report of the plugging and abandonment of well "Newhall Land & Farming Co." 42, A.P.I. No. 037-16509, Section 24, T. 4N, R. 17W, S.B. B.& M., Castaic Junction field, Los Angeles County, dated 11-11-93, received 11-29-93, has been examined in conjunction with records filed in this office. We have determined that all of the requirements of this Division have been fulfilled relative to plugging and abandonment of the well, removal of well equipment and junk, and the filing of well records.

William F. Guerard, Jr
State Oil and Gas Supervisor

svl

By Patrick J. Kinnear
Deputy Supervisor

cc: Conservation Committee
Update

Modified OG159 (4/94)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California

November 8, 1995

Exxon Corporation
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, TX 79702

Your report of the plugging and abandonment of well "Newhall Corporation" 1, A.P.I. No. 037-06359, Section 24, T. 4N, R. 17W, S.B. B.& M., Castaic Junction field, Los Angeles County, dated 10-23-95, received 11-03-95, has been examined in conjunction with records filed in this office. We have determined that all of the requirements of this Division have been fulfilled relative to plugging and abandonment of the well, removal of well equipment and junk, and the filing of well records.

William F. Guerard, Jr
State Oil and Gas Supervisor

svl

By Patrick J. Kinnear
Patrick J. Kinnear
Deputy Supervisor

Modified OG159 (4/94)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL ABANDONMENT

Ventura, California

August 23, 1988

C. G. Lyons, Agent
Exxon Corporation
P.O. Box 5025
Thousand Oaks, CA 91359

Your report of abandonment of well "Newhall Land & Farming Co." 60 (Name and number), A.P.I. No. 037-05101, Section 18, T. 4N, R. 16W, S.B. B. & M., Castaic Junction field, Los Angeles County, dated 8-12-88, received 8-15-88, has been examined in conjunction with records filed in this office, and we have determined that all of the requirements of this Division have been fulfilled.

b

MAP	MAP BOOK	CARDS	BOND	EDP	FORMS 114	FORMS 121
252			BB	✓	—	✓

M. G. MEFFERD
State Oil and Gas Supervisor

By Patrick J. Kinnear
Deputy Supervisor

Patrick J. Kinnear

OG159 (11/82/GSR1/8M)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California

November 8, 1995

Exxon Corporation
Attn: Env. & Req. Affairs
P.O. Box 1600
Midland, TX 79702

Your report of the plugging and abandonment of well "Newhall Land & Farming Co." 9,

A.P.I. No. 037-16475, Section 19, T. 4N, R. 16W, S.B. B.& M.,

Castaic Junction field, Los Angeles County,

dated 09-20-95, received 09-29-95, has been examined in conjunction with records filed in this office. We have determined that all of the requirements of this Division have been fulfilled relative to plugging and abandonment of the well, removal of well equipment and junk, and the filing of well records.

William F. Guerard, Jr
State Oil and Gas Supervisor

svl

By
Patrick J. Kinnear
Deputy Supervisor

Modified OG159 (4/94)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California
December 4, 1992

EXXON Corporation
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, Texas 79702

Your report of plugging and abandonment of well "Newhall Land & Farming Co." 28, A.P.I. No. 037-16499, Section 19, T. 4N, R. 16W, SB B.&M., Castaic Junction field, Los Angeles County, dated June 24, 1992, received June 30, 1992, has been examined in conjunction with operations witnessed and records filed in this office. We have determined that all of the requirements of this Division have been fulfilled.

tkc
cc: Conservation Committee
Update

WILLIAM F. GUERARD, Jr.
Acting State Oil and Gas Supervisor

By
Patrick J. Kinnear, Deputy Supervisor

OGD150 (6/92)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California

November 8, 1995

Exxon Corporation
Attn: Env. & Req. Affairs
P.O. Box 1600
Midland, TX 79702

Your report of the plugging and abandonment of well "Newhall Land & Farming Co." 30, A.P.I. No. 037-16500, Section 19, T. 4N, R. 16W, S.B. B.& M., Castaic Junction field, Los Angeles County, dated 10-24-95, received 11-03-95, has been examined in conjunction with records filed in this office. We have determined that all of the requirements of this Division have been fulfilled relative to plugging and abandonment of the well, removal of well equipment and junk, and the filing of well records.

William F. Guerard, Jr
State Oil and Gas Supervisor

By Patrick J. Kinnear
Patrick J. Kinnear
Deputy Supervisor

svl

Modified OG159 (4/94)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California

September 21, 1994

EXXON Corporation
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, TX 79702

Your report of the plugging and abandonment of well "Newhall Land & Farming Co." 31, A.P.I. No. 037-16501, Section 19, T. 4N, R. 16W, S.B. B.& M., Castaic Junction field, Los Angeles County, dated 07-27-93, received 08-06-93, has been examined in conjunction with records filed in this office. We have determined that all of the requirements of this Division have been fulfilled relative to plugging and abandonment of the well, removal of well equipment and junk, and the filing of well records.

William F. Guerard, Jr
State Oil and Gas Supervisor

svl

By Patrick J. Kinnear
Patrick J. Kinnear
Deputy Supervisor

cc: Conservation Committee
Update

Modified OG159 (4/94)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL ABANDONMENT

Ventura, California

Oct. 17, 1986

C. G. Lyons, Agent
EXXON CORPORATION
P.O. Box 5025
Thousand Oaks, CA 91359

Your report of abandonment of well "Newhall Land & Farming Co." 35 (Name and number),

A.P.I. No. 037-16505, Section 19, T. 4N, R. 16W, S.B. B. & M.,

Castaic Junction field, Los Angeles County,

dated 10-14-86, received 10-14-86, has been

examined in conjunction with records filed in this office, and we have determined that all of the requirements of this Division have been fulfilled.

Cons.Comm.
b

MAP	MAP BOOK	CARDS	BOND	EDP	FORMS	
					114	121
252	10-25-86 BW	—	na	OK	—	✓

M. G. MEFFERD
State Oil and Gas Supervisor

By Murray W. Dosch
Deputy Supervisor

Murray W. Dosch

OG159 (11/82/CSR1/8M)

FORM 159

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL ABANDONMENT

Santa Paula, California

February 13, 1979

Mr. E. C. Hutchinson, Agent
Exxon Corporation
P. O. Box 7033
Long Beach, CA 90807

DEAR SIR:

(037-13506)

Your report of abandonment of Well No. "Newhall Land & Farming Co." 37, Sec. 19, T. 4N, R. 16W, S. B. B. & M., ~~Newhall~~ Castaic Junction field, Los Angeles County, dated 12/15/78, received 12/28/78, has been examined in conjunction with records filed in this office.

A review of the reports and records shows that the requirements of this Division, which are based on all information filed with it, have been fulfilled.

MAP	MAP BOOK	CARDS	BOND	FORMS 114	FORMS 121
		✓	✓	✓	✓

M. G. MEFFERD
~~JOHN F. MATTHEWS, JR.~~
State Oil and Gas Supervisor

By John L. Hardoin, *Deputy Supervisor*

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California
December 4, 1992

EXXON Corporation
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, Texas 79702

Your report of plugging and abandonment of well "Newhall Land & Farming Co." 38, A.P.I. No. 037-16506, Section 19, T. 4N, R. 16W, SB B.&M., Castaic Junction field, Los Angeles County, dated June 18, 1992, received June 23, 1992, has been examined in conjunction with operations witnessed and records filed in this office. We have determined that all of the requirements of this Division have been fulfilled.

tkc
cc: Conservation Committee
Update

WILLIAM F. GUERARD, Jr.
Acting State Oil and Gas Supervisor

By
Patrick J. Kinnear, Deputy Supervisor

OGD159 (6/92)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL ABANDONMENT

Ventura, California

August 23, 1988

C. G. Lyons, Agent
Exxon Corporation
P.O. Box 5025
Thousand Oaks, CA 91359

Your report of abandonment of well "Newhall Land & Farming Co." 41 (Name and number),

A.P.I. No. 037-16508, Section 19, T. 4N, R. 16W, S.B. B. & M.,

Castaic Junction field, Los Angeles County,

dated 8-12-88, received 8-15-88, has been examined in conjunction with records filed in this office, and we have determined that all of the requirements of this Division have been fulfilled.

b

MAP	MAP BOOK	CARDS	BOND	EDP	FORMS 114	FORMS 121
252	Sm 8/18/88		BB	✓	—	✓

M. G. MEFFERD
State Oil and Gas Supervisor

By Patrick J. Kinnear
Deputy Supervisor

Patrick J. Kinnear

OG159 (11/82/GSR1/8M)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California

November 8, 1995

Exxon Corporation
Attn: Env. & Req. Affairs
P.O. Box 1600
Midland, TX 79702

Your report of the plugging and abandonment of well "Newhall Land & Farming Co." 43,

A.P.I. No. 037-16510, Section 19, T. 4N, R. 16W, S.B. B.& M.,

Castaic Junction field, Los Angeles County,

dated 10-24-95, received 11-03-95, has been examined in conjunction with records filed in this office. We have determined that all of the requirements of this Division have been fulfilled relative to plugging and abandonment of the well, removal of well equipment and junk, and the filing of well records.

William F. Guerard, Jr
State Oil and Gas Supervisor

svl

By
Patrick J. Kinnear
Deputy Supervisor

Modified OG159 (4/94)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California
February 16, 1994

EXXON Corporation
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, Texas 79702

Your report of plugging and abandonment of well "Newhall Land & Farming Co." 47, A.P.I. No. 037-06355, Section 19, T. 4N, R. 16W, SB B.&M., Castaic Junction field, Los Angeles County, dated October 29, 1992, received November 4, 1992, has been examined in conjunction with operations witnessed and records filed in this office. We have determined that all of the requirements of this Division have been fulfilled.

tkc
cc: Conservation Committee
Update

WILLIAM F. GUERARD, Jr.
State Oil and Gas Supervisor

By Patrick J. Kinnear
Patrick J. Kinnear, Deputy Supervisor

OGD159 (6/92)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California
December 4, 1992

EXXON Corporation
Attn: Env. & Reg. Affairs
P.O. Box 1600
Midland, Texas 79702

Your report of plugging and abandonment of well "Newhall Land & Farming Co." 48, A.P.I. No. 037-16513, Section 19, T. 4N, R. 16W, SB B.&M., Castaic Junction field, Los Angeles County, dated June 15, 1992, received June 17, 1992, has been examined in conjunction with operations witnessed and records filed in this office. We have determined that all of the requirements of this Division have been fulfilled.

tkc
cc: Conservation Committee
Update

WILLIAM F. GUERARD, Jr.
Acting State Oil and Gas Supervisor

By
Patrick J. Kinnear, Deputy Supervisor

OGD159 (6/92)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California

May 8, 1996

EXXON CORPORATION
Attn: Env. & Req. Affairs
P.O. Box 1600
Midland, TX 79702

Your report of the plugging and abandonment of well "Newhall Land & Farming Co." 49, A.P.I. No. 037-16514, Section 19, T. 4N, R. 16W, S.B. B.& M., Castaic Junction field, Los Angeles County, dated 11-8-95, received 11-17-95, has been examined in conjunction with records filed in this office. We have determined that all of the requirements of this Division have been fulfilled relative to plugging and abandonment of the well, removal of well equipment and junk, and the filing of well records.

svl

William F. Guerard, Jr
State Oil and Gas Supervisor

By
Patrick J. Kinnear
Deputy Supervisor

Modified OG159 (4/94)

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

GEOLOGIC AND GEOTECHNICAL REPORT - Addendum No. 1
Response to Los Angeles County Geologic Review Sheet dated October 21, 2004
and Soils Engineering Review Sheet dated October 26, 2004

GEOLOGIC AND GEOTECHNICAL REPORT
Review of Revised Vesting Tentative Tract Map (November 15, 2004)

Vesting Tentative Tract 61105
Mission Village
Newhall Ranch, California

VOLUME I

Prepared for:

The Newhall Land and Farming Company
23823 West Valencia Boulevard
Valencia, California 91355

Job No: 04-2023-4
Dated December 22, 2004

27825 Smyth Drive, Valencia, California 91355 661-294-0065 FAX 661-294-0833

TABLE OF CONTENTS

VOLUME I

Part 1

GEOLOGIC AND GEOTECHNICAL REPORT - Addendum No. 1
Response to Los Angeles County Geologic Review Sheet dated October 21, 2004 and Soils Engineering Review Sheet dated October 26, 2004

Part 2

GEOLOGIC AND GEOTECHNICAL REPORT
Revised Vesting Tentative Tract Map (November 15, 2004)

1.0 SCOPE OF WORK 10
2.0 BACKGROUND 11
3.0 REVISIONS VTTM 61105 11
3.1 Magic Mountain Parkway Extension (MMPE) 12
3.1.1 Liquefaction Analyses for MMPE 12
3.1.2 Oil Wells 13
4.0 GENERAL CONSLUSIONS AND RECOMMENDATIONS 13
4.1 Feasibility of Development 13
5.0 GENERAL DESIGN CONSIDERATIONS & RECOMMENDATIONS 14
5.1 Revised Removals 14
5.2 Stability of Proposed Slopes and Proposed Grades 14
5.2.1 Proposed Cut Slopes 14
5.2.2 Natural Slopes 15
5.2.3 Proposed Fill Slopes 15
5.2.4 Landslides 15
5.2.5 Restricted Use Areas 15
5.2.6 Exploratory Trench and Boring Backfill 15
6.0 LOS ANGELES COUNTY 111 STATEMENT 16
7.0 GEOLOGIST/GEOTECHNICAL ENGINEER OF RECORD 16
8.0 LIMITATIONS 16

Location Map/"Areal" Geologic Map ..... **Following page 11**
Geologic Review Sheet dated 10/21/04 ..... **at end of text**
Soils Engineering Review Sheet dated 10/26/04 ..... **at end of text**
Revised Summary of Landslides ..... **Table 1**
Revised Summary of Cut Slopes ..... **Table 2**
Geologic Cross Section Inventory List ..... **Table 3**

TABLE OF CONTENTS

APPENDIX A – SUBSURFACE LOGS

- Backhoe Trenches
  - T-14 thru T-17
  - T-33 thru T-39
  - T-48 thru T-50
  - T-52, T-53
  - T-55 thru T-67
  - T-115T thru T-127T
- Bucket-Auger Borings
  - B-61E, B-62E
- Hollow-Stem-Auger Borings
  - HS-4 thru HS-6, HS-8
  - HS-30T thru HS-34T
- CPT Data
  - CPT 4, CPT-6, CPT-16, CPT-18

APPENDIX B – GEOTECHNICAL LABORATORY INVESTIGATION AND TEST RESULTS

APPENDIX C – SLOPE STABILITY ANALYSES

Slope Stability Analysis Results	**Table C1**
RTF&A Cross Section A-A' (Westridge)	**Figure C1**
Slope Stability Diagrams and Data Sheets for Runs No. 1A through 33A	

APPENDIX D – LIQUEFACTION ANALYSES

VOLUME II

APPENDIX E – GEOLOGIC/GEOTECHNICAL MAPS & CROSS SECTIONS

- **Maps** (In pockets)

Summary Map Sheet (1" = 300')	**Plate**	**E1**
Geologic/Geotechnical Maps (1=100')	**Plates**	**E2 – E7**
Geologic/Geotechnical Remediation Maps (1" = 100')	**Plates**	**E8 – E13**
Geologic/Geotechnical Maps Legend	**Plate**	**E14**

TABLE OF CONTENTS

- **Cross Sections** (In pockets)
  Revised Geologic Cross Sections 2-2' 6-6', 12-12', 16-16'; 18-18', 19-19', 22-22', 24-24', 32-32', 34-34', 35-35', 37-37', and New Geologic Cross Sections 42-42', 43-43' and 44-44' **Plate E15**

  New Geologic Cross Sections 45-45' through 51-51' and Revised Geologic Cross Sections 1E-1E', 2E-2E', 7E-7E' through 12E-12E', 1M-1M', 5M-5M' and 7M-7M' **Plate E16**

APPENDIX F – OIL WELL ABANDONMENT RECORDS

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

December 22, 2004 Job No: 04-2023-4

The Newhall Land and Farming Company
23823 West Valencia Boulevard
Valencia, California 91355

Attention: Mr. Corey Harpole

Subject: **GEOLOGIC AND GEOTECHNICAL REPORT – ADDENDUM NO. 1**
Response to Los Angeles County Geologic Review Sheet dated October 21, 2004 and Soils Engineering Review Sheet dated October 26, 2004

GEOLOGIC AND GEOTECHNICAL REPORT
Revised Vesting Tentative Tract Map (dated 11/15/04)

Project: Vesting Tentative Tract 61105
Mission Village
Newhall Ranch, California

Reference: **GEOLOGIC AND GEOTECHNICAL REPORT**
Review of Vesting Tentative Tract Map 61105 (Dated June 14, 2004)
Mesas East
Newhall Ranch, California
Dated July 22, 2004 – JN: 04-2023-4

Gentlemen:

This report is divided into two parts. The **first part** presents our response to the Geologic Review Sheet dated October 21, 2004 and Soils Engineering Review Sheet dated October 26, 2004 for Vesting Tentative Tract (VTT) 61105 issued by Los Angeles County Department of Public Works Geotechnical and Materials Engineering Division. The **second part** of the report presents our opinions on the existing geologic conditions for Vesting Tentative Tract 61105 relative to the **Revised Vesting Tentative Tract Map (11/15/04)** and their affects on the proposed development. This report is supplementary to our previous report (see **Reference**) and the conclusions and recommendations presented therein are still applicable except where they are superseded in this report.

GEOLOGIC AND GEOTECHNICAL REPORT - ADDENDUM NO. 1

In order to facilitate the review process, we have listed the County's remarks in **bold** in the order in which they appear on the original review letter. Each remark is followed immediately by our response. A copy of the review letters are attached after the references.

GEOLOGIC REVIEW SHEET (Dated 10/21/04)

Remark No. 1

Depict the proposed final topography in the area of landslide removal for Qls IX and Qls L1.

Response

The revised plan shows the proposed grades as they will ultimately exist after grading operations have occurred. Landslide Qls IX is "overprinted" by a proposed sliver cut (CS-10) that will be removed and replaced by Qls IX removals to proposed grades as shown on the revised current tentative map and Geologic Cross Section 18-18'. The majority of Landslide Qls LI will remain in its natural state below the revised proposed daylight cut and has been shown as a Restricted Use Area (RUA) on the **Geologic/Geotechnical Remediation Map (Plate E5)**. Slope stability calculations utilizing subsurface data indicate that the proposed cut pads above this landslide will have a safety factor of greater than 1.5 under static conditions and 1.1 under pseudostatic conditions. Please refer to **Appendix C**, Geologic Cross Section 12-12', and the revised Landslide Summary Table for more detailed information.

Remark No. 2

Expand the Restricted Use Area discussion on page 26 to include a specific explanation of each RUA designated on the geotechnical maps, including the RUAs west of the lots 300-301 (Plate G8), lots 321-325 (Plate G10) and lots 19 and 20 (Plate G7 and G8). Verify that lot 300 has sufficient buildable area for the intended use.

Response

Restricted Use Areas have been designated on the **Geologic/Geotechnical Remediation Maps** (Plates E8 through E13) and consist of the three following categories:

1) Areas of Landslide Hazard.
2) Building Setback Areas for earthquake fault zone.
3) Building Setback Areas for slope instability.

The RUA's on the northern portion of open space Lot 980 (sheet 3 of 9 Plate E8) are for Landslides Qls XXXVIII and Qls XXXIX. The RUA on the southern portion of Open Space Lot 980 and Lot 961 (sheet 3 of 9, Plate E8) is for the portion of Qls XXXVII to remain and includes a 1:1 projection from the toe of the landslide removal/shear key to the top of the pad on Lot 961. The RUA on Lots 413 and 414 and open space Lot 468 are for Landslide Qls LI (sheet 6 of 9, Plate G11). It is our understanding that the **Supervising Civil** Engineer will **adjust the lot lines** to avoid subdividing these landslides to remain. The RUA on L.S. 27-32-39 Portion of Lots 15 and 16 Newhall Ownership (sheet 8 of 9, Plate E13) is for Landslide Qls LIII which occurs south of the proposed grading limits for Magic Mountain Parkway extension.

The RUA associated with the Airport Mesa Lineament, Saddle Lineament, and Airport Mesa anticline represent Building Setback Zones established for potential earthquake fault zones via extensive subsurface exploration (Report dated July 20, 2004 referenced in our previous report). These zones traverse portions of Mixed Use Commercial Lots 967, 1029 through 1034; Open space Lots 971, 972, 977 through 981, 1037 and 1038, Water Quality Basin Lot 968, Commerce Center Drive, "GG" – Street, and the Private Drive Loop around Lot 1031.

The RUA's associated with Lots 19 and 20, 300, 321 through 325 and 1030 are for the steep natural slopes adjacent to the Santa Clara River Valley. The RUA formerly shown on Lots 300 and 301 has been adjusted to reflect the recommended row of soldier piles designed to remediate the slope instability. This RUA is limited to the back of Lot 300 and should be evaluated along with the proposed soldier pile/pier walls in more detail at the 40-scale Grading Plan Stage. The soldier pile/pier wall was designed to provide support of the front 120 feet of Lot 300. The standard H/3 building setback for Lot 301 is considered suitable for the support of building structures, and hence does not require an RUA. The RUA's associated with Lots 19, 20, 321 through 325 and 1030 are based upon slope stability

calculations utilizing conservative factors of safety due to the overall height and steepness of the slopes.

The mislabeled RUA note previously shown near the gas pipeline on the southeastern portion of the tract was a carry over note inadvertently drafted into AutoCAD. A Restricted Use Area is not needed in this area.

Remark No. 3

Table 1.2 in the geotechnical report does not include Qls XXXVIII. Discuss and revise as necessary.

Response

Landslide Qls XXXVIII is a small questionable landslide located on open space Lot 980. A Restricted Use Area has been shown for this Landslide on **Plate E8**. The Landslide Summary Table has been revised to include this landslide.

Remark No.4

Demonstrate that the walls proposed for lots 511 and 512 will contain the entire volume and debris that may impact them. Alternatively, provide a mechanism to divert the debris into the adjacent basins, and increase their size, accordingly.

Response

The lot layouts in this vicinity have been significantly reconfigured and have been pushed to the north away from the natural slopes in conjunction with an ascending manufactured cut and fill slope proposed across the length of the natural slopes. In our opinion these revisions to the tentative map have negated the need for impact walls.

Remark No. 5

The Soils Engineering review dated 10/26/04 is attached.

Response

Acknowledged.

SOILS ENGINEERING REVIEW SHEET (Dated 10/26/04)

Remark No. 1

On Plates G11 and G15 of the submitted report, it appears that the proposed cut slope CS-13 will grade a potential landslide Qls-A (Westridge). Verify whether the proposed development will adversely affect the existing landslide and cause potential movement. Therefore provide data and slope stability analyses which clearly demonstrate that the proposed development will not increase the potential for landslide failure, as necessary. Also, provide a geotechnical cross section, for each section analyzed, showing the critical failure plane used in the analyses. Indicate the various shear strength parameters used in the analyses, in the appropriate segments of each failure plane. Show locations of the cross sections used in slope stability analyses on the geotechnical map. Recommend mitigation if factors of safety are below County minimum standards.

Response

The shaded slopes that represent proposed grading on the tentative map in the vicinity of Qls-A (Westridge) consist of 3:1 to 4:1 fill slopes descending from the proposed Westridge Parkway Extension. We have included a copy of R.T. Frankian and Associates cross section A-A' (from their report dated 6-30-02, referenced in our previous report) which has been amended to show the proposed grading configuration for VTT 61105. Per RTF&A's slope stability calculations landslide Qls-A is stable in its current state with a Factor of Safety greater than 2.0. The proposed grades for VTT 61105 at this location further improves the stability of this landslide by adding a load of fill in front of the landslide and over the toe of the landslide as illustrated on the attached Cross Section (**Figure C1**) in **Appendix C**. The anticipated future removal operations will not adversely affect Qls-A. The most significant removals in its vicinity have already occurred during the Westridge Grading Operations where alluvial removals were performed at the toe (See **Figure C1**).

Remark No. 2

On Plates G8, G10 and G11 of the submitted report, it shows that landslides Qls-LII, Qls-LI, Qls IX and a proposed stability fill (behind lots 658 and 659) have been labeled with recommended removal and recompaction/grading. Clearly show the final grade (topography) of these areas after the proposed removal of these landslides. Provide a cross-section of these areas and provide stability analyses if the final slopes are steeper than 2:1 gradient or if the slopes are greater than 30 feet in height. Indicate the various shear strength parameters used in the analyses, in the appropriate segments of each failure plane. Show locations of the cross sections used in slope stability analyses on the geotechnical map. Recommend mitigation if factors of safety are below County minimum standards.

Response

Due to the significant revisions to VTT 61105 the final proposed grades (post remedial grading) of all these areas are shown on the attached Tentative Map and Remedial measures do not go beyond proposed grades. Where appropriate additional revised slope stability analyses have been provided (Qls-LI and Qls LII). The removal of landslide Qls IX and replacement with fill to the revised proposed grades (Cross Section 18-18') is stable by comparison with Cross Section 46-46', which is more critical and calculates stable with a factor of safety greater than 1.5. The prior conditions, warranting remediation measures beyond proposed grades, in the vicinity of previously designated lots 658 and 659 no longer exists and hence the previously recommended remedial measures are no longer pertinent.

Remark No. 3

Discuss the recommendations for landslide Qls-XXXVIII in Table 1.2 as requested by the Geology Section.

Response

The Landslide Summary Table has been revised accordingly to address landslide Qls-XXXVIII.

Remark No. 4

On Plates G10 and G11 of the submitted report, it shows that impact walls are recommended to mitigate potential mudflow hazards behind Lots 511, 512, and 693. Provide volume calculations for both the potentials debris flows and the proposed catchment areas, as necessary. Per County policy, the catchment areas must be designed for 100 percent of the predicted debris flow volumes. Recommend mitigation measures as necessary.

Response

Due to the revisions to the tentative map the potential for debris flow hazards no longer exists. It is our understanding that no structures are currently proposed on Recreation Lot 856. However, if structures are proposed in the future for Recreation Lot 856 they should be evaluated with respect to debris flow potential from the natural slope located to the southeast.

Remark No. 5

Provide additional discussions on all of the "Restricted Use Areas" delineated on the geotechnical maps, as requested by the Geology Section. Also verify whether there will be adequate space for proposed development at Lot 300, considering the "Restricted Use Area" as shown on Plate G8 of the submitted report. Provide revised lot lines and/or mitigation measures as necessary.

Response

Additional discussions relative to the various Restricted Use Areas have been provided in our response to the Geology Section. Adequate space for proposed development at Lot 300 has been determined via the recommended row of soldier pile/pier wall, discussed below, which provide for a safe building site.

Soldier Pile/Pier Wall for Lot 300

Foundations within proposed Lot 300 should extend to a sufficient depth below the critical failure surface. Owing to the slope height and the use of 100 scale maps and cross sections, we have conservatively adopted a 1.65 factor of safety surface for preliminary

design. Soldier piles/piers wall may consist of steel beam/reinforced case, placed in drilled holes and, filled with concrete.

A preliminary design data for the soldier pile/pier wall are as follows:

A triangular distribution of lateral earth pressure of 60 pcf should be used. For the design of soldier piles, a minimum of two diameters on center, the allowable lateral bearing value (passive value) of the soils below the critical factor of safety line may be assumed to be equal to the pressure developed by a fluid with a density of 400 pounds per square foot per foot of depth into competent bedrock and below fixity point, up to a maximum of 4000 pounds per square foot, assuming firm contact between the soldier piles/piers and the undisturbed soils. Fixity may be taken at the critical surface location, i.e. 1.65 factor of safety surface.

For soldier piles/piers at least two feet in diameter spaced no more than six feet on center, or no more than two times their diameter, a line of friction piles may be considered to interact with the earth materials as though it were a continuous sheet pile structure.

For piles/piers spaced greater than two times their diameter, the effective width of the pile may be taken as two times its diameter in passive resistance computations. In all cases of pile/pier spacing, the structure should be considered as a continuous sheet pile structure in the active force computations. Active pressure should be considered as acting on the full height and depth of the pile shaft unless indicated as otherwise.

Structural concrete should be used for a pile/pier wall. Frictional resistance between the soldier piles and the retained earth may be used in resisting the downward component of the load. The coefficient of friction between piles/piers and the retained earth may be taken as 0.35. The piles/piers should be designed for the full anticipated pressure.

The construction and installation of the pile/pier wall should be observed by personnel of our firm or geotechnical engineer of records.

Permanent drainage devices should be installed at the top of the banks to divert water away from the banks.

Soldier pile/pier wall plans shall be prepared by a civil or structural engineer experienced in their preparation. We should review plans and specifications before bidding and are available to assist further in their preparation.

These recommendations have been provided to show feasibility of development of Lot 300. Further evaluation and refinement should be performed at the 40-scale Grading Plan stage.

Remark No. 6

Show the following on the geotechnical maps:

a. Proposed grades after landslide removal, etc.
b. Locations of buttress/stabilization fills and keyways.
c. All recommended mitigation measures.

Response

All of these items, where appropriate, have been shown on the attached Geologic/Geotechnical Remediation Maps (Plates G8-G13).

Remark No. 7

Requirements of the Geology Section are attached.

Response

Acknowledged.

Remark No. 8

Include a copy of this review sheet with your response.

Response

A copy has been provided at the end of the text.

GEOLOGIC AND GEOTECHNICAL REPORT

Review of Revised Vesting Tentative Tract Map (11/15/04)

This portion of our report presents our opinions on the existing geologic and geotechnical conditions on Vesting Tentative Tract Map (VTTM) No. 61105 relative to the revised map and their effects on the proposed development. This report is supplementary to our report dated 7/22/04 for VTTM 61105, and the conclusions and recommendations presented therein are still applicable except where they are superseded in this report.

1.0 SCOPE OF WORK

The scope of work completed during the preparation of this report included the following tasks:

1. Geologic/geotechnical review of revised Vesting Tentative Tract Map No. 61105 (11/15/04).

2. Coordination with the Supervising Civil Engineer, Psomas.

3. Additional subsurface explorations in the vicinity of Magic Mountain Parkway Extension consisting of forty-one backhoe trenches, nine (9) hollow stem-auger borings, two (2) 24" bucket-auger borings, and four (4) CPT soundings.

4. Additional laboratory testing of representative samples.

5. Geologic and geotechnical engineering analyses and preparation of Conclusions and Recommendations based on the existing site conditions and future use intended. Analyses included detailed static and pseudostatic stability analyses of proposed and modified grades, including cut slopes, natural slopes and fill slopes where appropriate. Based on the results, the need for tentative stabilization measures was explored. Liquefaction analyses and removal depth recommendations for the Magic Mountain Parkway Extension Area were also performed and provided.

6. Preparation of this report and associated revisions and additions to the Geologic/Geotechnical Maps, Cross Sections, Appendices, Tables and Legend.

2.0 BACKGROUND

Geologic and geotechnical aspects of Vesting Tentative Tract Map No. 61105 (dated 6/14/04) were previously addressed in our report dated July 22, 2004.

3.0 REVISIONS VTTM 61105

The most significant revisions occur in 1) the addition of the proposed extension of Magic Mountain Parkway from The Old Road to Westridge Parkway, which is shown on sheet 8 of 9; 2) the extensive revisions along the entire southern tract boundary, sheets 6 and 7 of 9; 3) the reconfiguration of the Park Site (Lot 1048) on sheet 4 of 9; and 4) the revisions to proposed grading on sheets 4 and 6 where grading has been reduced and open space Lot 367 enlarged. These areas have been outlined on **Plate E1** for ease of reference. The following report reviews the revisions and their effects in detail.

The extension of Magic Mountain Parkway is addressed in more detail in **Section 3.1** because it extends significantly beyond the original tract boundary.

For reference the number of total lots has changed from 948 to 1054 and the number of dwelling units has changed from 5,117 to 5,331. Estimated earthwork is 27,000,000 cubic yards. The highest proposed cut-slope is 130 feet (CS-5 and CS-35), the highest proposed fill slope is 145 feet (cross section 37-37'). The deepest cut area is approximately 200 feet in the vicinity of Lot 381 and the deepest fill area is approximately 130 feet in the vicinity of Lot 224.

Prior Geologic Cross Sections have been revised or omitted as needed to reflect the proposed grade changes and additional new cross sections have been constructed where warranted. Please refer to the Cross Section Inventory List (**Table 3**) at the end of the text for reference.

Cut slopes designations have been modified to address the revisions. The cut slope and landslide summary tables have been revised to reflect the changes in grades and recommendations. The slope stability analyses results table in this report (**Appendix C**) is provided to supplement and supersede our previous table where applicable.

3.1 Magic Mountain Parkway Extension (MMPE)

An additional sheets has been included with the revised tentative map in order to show access from the east via the extension and widening of existing Magic Mountain Parkway to proposed Westridge Parkway. Additional subsurface exploration was performed along this corridor. The exploration locations are shown on the Geologic/Geotechnical Map (**Plate E7**) and the logs are included in **Appendix A**. Geologic materials consist of soil, slopewash, Quaternary alluvium (Qal), Quaternary surficial failures (Qsf), Quaternary Landslide deposits (Qls), Quaternary Terrace deposits (Qt) and Upper Saugus Formation (TQs_u) which are the same as the units described in our July 22, 2004 report. The engineering characteristics of these materials correlate directly with those encountered and evaluated on the main body of VTT 61105. The distribution of the geologic units are shown on the attached **Geologic/Geotechnical Map (Plate E7)**. The geologic structure is a continuation of the shallow northeast dipping (5 to 15°), northwest striking upper Saugus Formation, on the western portion of Sheet 8 of 9, which is overlain by horizontally bedded Quaternary Terrace deposits, on the eastern portion.

Nine cut-slopes (CS-46 through CS-54) are proposed along this road extension and widening, ranging from 98 feet to 32 feet in height with gradients ranging from 2:1 to 4:1. Specific information for each proposed cut-slope is provided in the Cut Slope Summary Table (**Table 2**). All of these proposed cut-slopes are grossly stable.

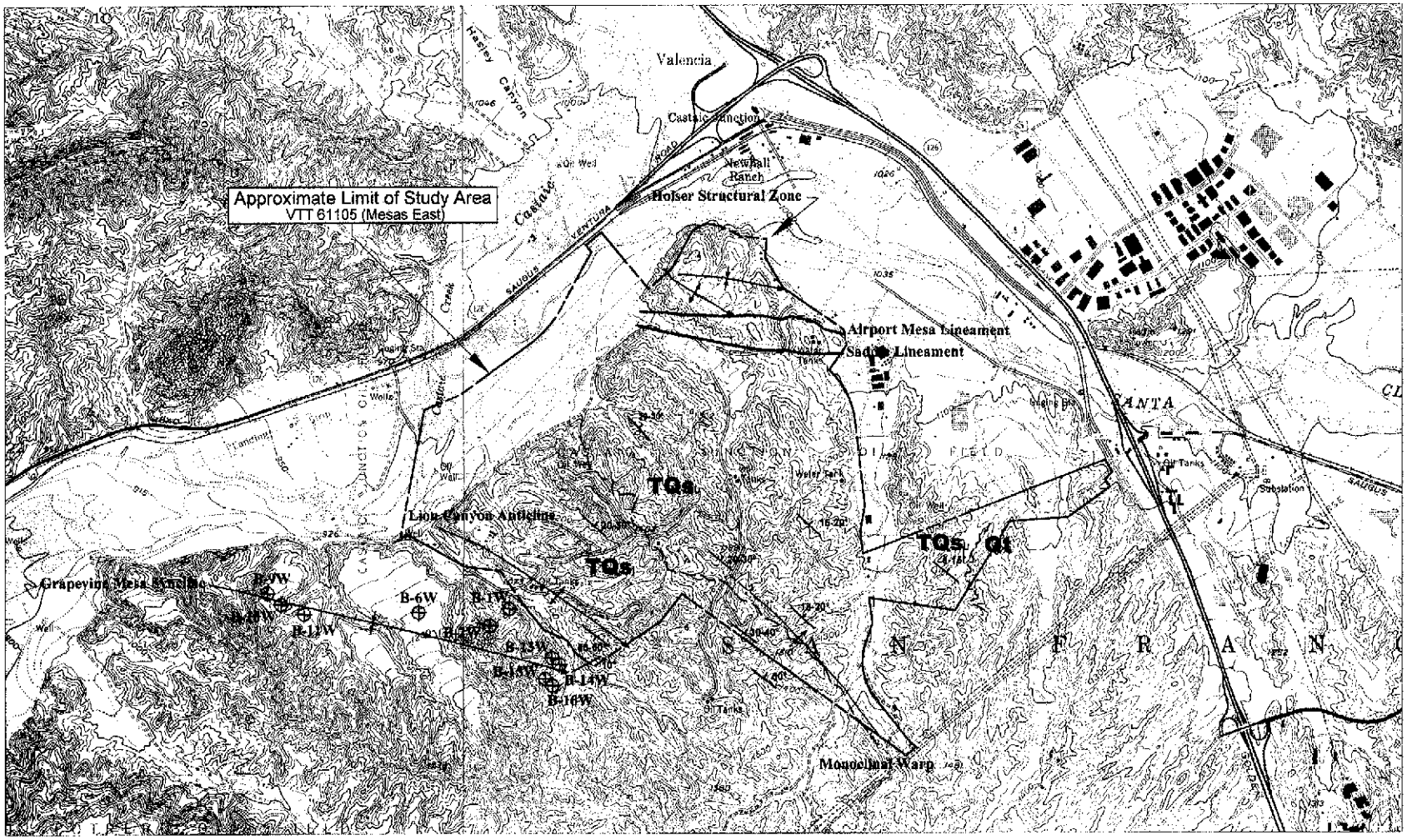
Fill slopes are proposed at gradients ranging from 2:1 to 3:1 with a maximum proposed height of approximately 40 feet.

Removal depths and limits based on our evaluation of the subsurface explorations and laboratory testing, utilizing the methodology described in our 7/22/04 report, have been shown along with remedial recommendations relative to Stability Fills and Restricted Use Areas on **Plate E13**.

3.1.1 Liquefaction Analyses for MMPE

Additional analyses relative to liquefaction and seismic settlement potential were performed for MMPE. The analyses and results are presented in **Appendix D**.

The potential for adverse impacts to the proposed development from liquefaction and other secondary seismic effects is considered to be low to non-existent provided that our



Sources:
U.S. Geological Survey Val Verde Quadrangle, Dated 1952, Photorevised 1988
U.S. Geological Survey Newhall Quadrangle, Dated 1952, Photorevised 1988

Approximate Scale: 1"=2,000'

NOTE: THIS IS NOT A SURVEY OF THE PROPERTY

N

⊕ B-16W — Location of 24"-bucket-auger boring excavated for Mesas West included in this report

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

LOCATION MAP/
"AREAL" GEOLOGIC MAP

Job No.: 04-2023-4 | *Date: 12/22/04*

recommendations are incorporated into the 40-scale Grading Plan and implemented during construction.

3.1.2 Oil Wells

Review of the 2003 Munger Map book and the California Department of Conservation Division of Oil, Gas and Geothermal Resources (DOGGR) indicates that two oil wells are present along the MMPE corridor. Oil well records on file with the DOGGR were obtained for each well. Both of these wells have been abandoned however the DOGGR will require review of the original abandonment files relative to the proposed development and possibly require re-abandonment to the latest DOGGR requirements. We have included the abandonment records for these wells in **Appendix F**. For approximate location of these oil wells, see the **Geologic/Geotechnical Map Plate E8**.

If any leaking or undocumented oil wells are encountered during grading operations, their locations should be surveyed and the current well conditions evaluated immediately. Soils in the vicinity of oil wells could be contaminated with petroleum products spilled during operation of the wells. Wells may have associated mud pits which could also contain materials considered to be hazardous under current environmental regulations. If potentially hazardous materials are encountered during future grading operations, they should be assessed and mitigated.

4.0 GENERAL CONSLUSIONS AND RECOMMENDATIONS

4.1 Feasibility of Development

Revised Tentative Tract Map No. 61105 (dated 11/15/04) is feasible for development from the standpoint of geology/geotechnical conditions provided our recommendations are followed and implemented during construction. The conclusions and recommendations presented within our previous report are still applicable, except where they are superceded in this report.

5.0 GENERAL DESIGN CONSIDERATIONS & RECOMMENDATIONS

5.1 Revised Removals

Due to the revisions to the Tentative Tract Map, we have revised our recommended removals relative to our previous report accordingly. The limits and depths of recommended removals are shown on the **Geologic/Geotechnical Maps (Plates E8 through E13).**

5.2 Stability of Proposed Slopes and Proposed Grades

Slope stability analyses were performed on new and revised cross sections of the currently proposed development grades for this project, including cut slopes, and natural slopes. Based upon the results from the analyses, the need for recommended stabilization measures was explored, where necessary, and dimensional design of these measures was performed, as needed, in a step-by-step fashion utilizing slope stability analyses (see **Appendix C**). It should be noted that we searched for potential bedding planes in the critical cross sections analyzed where no data from subsurface exploration was available. Specified planes of weakness were modeled where encountered in subsurface explorations and appropriate.

The analyzed cross sections also reflect critical conditions for stability (i.e. adverse geologic conditions and greater slope height). The analyses are presented in **Appendix C**, along with a summary of the results in **Table C1**.

5.2.1 Proposed Cut Slopes

We have re-evaluated all of the proposed cut slopes (greater than 25 feet in height) on the subject site in a case by case basis. Where possible we have kept the designations the same as our previous report however, some of the slopes required re-numbering. The current slope designations are shown on the Geologic/Geotechnical Maps. The slope geometry, anticipated geologic conditions and recommended mitigation, if necessary, for each slope are presented in the Cut Slope Summary (**Table 2**) located at the end of the text, and shown on the **Geologic/Geotechnical Remediation Maps (Plates E8 through E13)**. If any of the smaller proposed cut slopes (less than 25± feet in height) have adverse geologic or grading configurations (fill over cut) they can be

mitigated if necessary with a standard 15 to 20-foot wide keyway (depending on the proposed cut slope height) and benching similar to a Stability Fill.

5.2.2 Natural Slopes

We have updated our slope stability analyses of the natural slopes proposed on the subject site relative to revised design grades. We have revised pertinent cross sections to illustrate the most critical conditions and the remedial recommendations are provided where necessary on the Geologic/Geotechnical Remediation Maps.

5.2.3 Proposed Fill Slopes

Review of the revised tentative map indicates that fill slopes are proposed at gradients of 2:1 (h:v) or flatter and are not as high as the highest fill slope analyzed in our previous report (37-37') which calculated stable with a factor of safety greater than 1.5.

5.2.4 Landslides

We have revised the Landslide Summary table (**Table 1**) and the Geologic/Geotechnical Remediation Maps in order to reflect the revised remedial recommendations with respect to landslides. For details on Restricted Use Areas for landslides refer to **Part 1** of this report. In general these recommendations have not changed except for Landslides Qls-IX, Qls-XXXVIII, Qls-LI, Qls-LII and Qls-LIII.

5.2.5 Restricted Use Areas

The recommended Restricted Use Areas shown on the attached Geologic/Geotechnical Remediation Maps and are discussed in detail in **Part 1** of this report.

5.2.6 Exploratory Trench and Boring Backfill

The location and dimensions of the additional exploratory trenches and borings excavated for the Magic Mountain Parkway extension investigation should be noted relative to the proposed development unless the trenches or borings are removed by future grading operations. If future foundations do traverse the trenches or borings, they should be designed for potential settlement. Once 40-scale (1″=40′) Grading Plans are

available a more detailed review of the effects of boring and trench backfill should be performed.

6.0 LOS ANGELES COUNTY 111 STATEMENT

In compliance with Section 111 of the Los Angeles County Building Code, it is the finding of this firm that the Building Sites designated on the proposed Revised Vesting Tentative Tract Map 61105 (dated 11/15/04) will not affect offsite property provided all our recommendations are incorporated in the Grading Plan and implemented during construction.

7.0 GEOLOGIST/GEOTECHNICAL ENGINEER OF RECORD

This report has been prepared assuming that Allan E. Seward Engineering Geology, Inc. will refine all geology and geotechnically-related data for the Grading Plan stage. If the recommendations contained in this report are to be utilized, and expansion of the geology/geotechnical work is performed by others, the party performing the work must review this report and assume full responsibility for the recommendations contained herein. That party would then assume the title of responsibility as "Geologist/Geotechnical Engineer of Record" for the project.

At the Grading Stage, representatives of the Geology/Geotechnical Engineer of Record should be present to observe all grading operations. A report presenting the results of those observations and related testing should be issued upon completion of the operations. All footing excavations should be observed by a representative of the Geologist/Geotechnical Engineer of Record prior to placing steel or pouring concrete into the excavations.

8.0 LIMITATIONS

This report has been prepared for the exclusive use of The Newhall Land and Farming Company and their design consultants for the specific site discussed herein. This report should not be considered transferable. Prior to use by others, we should be notified, as additional work may be required to update this report.

In the event that any modifications in the design or location of the proposed development, as discussed herein, are planned, the conclusions and recommendations contained in this report will require a written review by this firm with respect to the planned modifications.

The proposed development is located in southern California, which is in a geologically and seismically active region where large magnitude, potentially destructive earthquakes are common. Therefore, it is reasonable to assume that ground motions from moderate or large magnitude earthquakes could affect the site during the life of a given structure in southern California.

It should be noted that faulting is normally confined to the area immediately adjacent to a known fault, or within a few feet of the last fault movement. Regardless of what criteria are used however, absolute assurance against future fault displacement or strong ground motion cannot be obtained in tectonically active areas. New faults can form, as the orientation and magnitude of deformational forces in the earth's crust change with time. Therefore, the location of new breaks or ground motions during a seismic event cannot be located or anticipated.

In performing these professional services, we have used the degree of care and skill ordinarily exercised, under similar circumstances, by reputable engineering geologists and geotechnical engineers practicing in this or similar localities.

The analyses and interpretations presented in this report have been based on the results of pertinent field and laboratory soil investigations. It should be recognized that subsurface conditions can vary in time and laterally and with depth at a given site. Our conclusions and recommendations are based on the data available and our interpretation of the data based on our experience and background. Hence, our **conclusions** and **recommendations** are **professional opinions** and are **not meant** to be a control of nature; therefore, **no warranty** is herein **expressed** or **implied**.

This report may not be duplicated without the written consent of this firm.

This opportunity to be of service is appreciated. Please contact us if you would like to discuss this report further.

Respectfully submitted,

Eric J. Seward, CEG 2110
Certified Engineering Geologist
Vice President

Dharmesh P. Amin, M.S., P.E., GE 2553
Principal Geotechnical Engineer

Reviewed By:

Allan E. Seward, CEG 246
Principal Engineering Geologist
President

The following attachments and appendices complete this report.

VOLUME I

Location Map/"Areal" Geologic Map	**Following page 11**
Geologic Review Sheet dated 10/21/04	**at end of text**
Soils Engineering Review Sheet dated 10/26/04	**at end of text**
Revised Summary of Landslides	**Table 1**
Revised Summary of Cut Slopes	**Table 2**
Geologic Cross Section Inventory List	**Table 3**

APPENDIX A – SUBSURFACE LOGS*

- Backhoe Trenches
  - T-14 thru T-17
  - T-33 thru T-39
  - T-48 thru T-50
  - T-52, T-53
  - T-55 thru T-67
  - T-115T thru T-127T
- Bucket-Auger Borings
  - B-61E, B-62E
- Hollow-Stem-Auger Borings
  - HS-4 thru HS-6, HS-8
  - HS-30T thru HS-34T
- CPT Data
  - CPT 4, CPT-6, CPT-16, CPT-18

APPENDIX B – GEOTECHNICAL LABORATORY INVESTIGATION AND TEST RESULTS

APPENDIX C – SLOPE STABILITY

Slope Stability Analysis Results	**Table C1**
RTF&A Cross Section A-A' (Westridge)	**Figure C1**
Slope Stability Diagrams and Data Sheets for Runs No. 1 through 33	

APPENDIX D – LIQUEFACTION ANALYSES

VOLUME II

APPENDIX E - MAPS AND CROSS SECTIONS

- **Maps** (In pockets)

Summary Map Sheet (1" = 300')	**Plate**	**E1**
Geologic/Geotechnical Maps (1=100')	**Plates**	**E2 – E7**
Geologic/Geotechnical Remediation Maps (1" = 100')	**Plates**	**E8 – E13**
Geologic/Geotechnical Maps Legend	**Plate**	**E14**

* Logs associated with Magic Mountain Parkway Extension exploration.

- **Cross Sections** (In pockets)
  Revised Geologic Cross Sections 2-2' 6-6', 12-12', 16-16'; 18-18', 19-19', 22-22', 24-24', 32-32', 34-34', 35-35', 37-37', and New Geologic Cross Sections 42-42', 43-43' and 44-44' **Plate E15**

  New Geologic Cross Sections 45-45' through 51-51' and Revised Geologic Cross Sections 1E-1E', 2E-2E', 7E-7E' through 12E-12E', 1M-1M', 5M-5M' and 7M-7M' **Plate E16**

APPENDIX F – OIL WELL ABANDONMENT RECORDS

Distribution: (1) The Newhall Land and Farming Company
Attn: Mr. Corey Harpole
(1) Psomas
Attn: Matt Heideman
(2) Los Angeles County Department of Public Works Geotechnical and Materials Engineering
1 - Soils
1 - Geology
(1) Impact Sciences
1 - Attn: Ms. Susan Tebo

County of Los Angeles Department of Public Works
GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION
GEOLOGIC REVIEW SHEET
900 So. Fremont Ave., Alhambra, CA 91803
TEL. (626) 458-4925

DISTRIBUTION
1 Geologist
__ Soils Engineer
1 GMED File
1 Subdivision

TENTATIVE TRACT 61105
SUBDIVIDER Newhall Land
ENGINEER Psomas
GEOLOGIST & SOILS ENGINEER A.E. Seward Eng. Geol., Inc.

TENTATIVE MAP DATED 6/14/04 (Tentative)
LOCATION Castaic Junction

REPORT DATE 7/22/04, 7/20/04

The Regional Planning Commission, developer, and engineer are advised that:

PRIOR TO RECOMMENDING APPROVAL OF THE TENTATIVE TRACT OR PARCEL MAP:

1. Depict the proposed final topography in the area of landslide removal for Qls IX and Qls L1.

2. Expand the Restricted Use Area discussion on page 26 to include a specific explanation of each RUA designated on the geotechnical maps, including the RUAs west of the lots 300-301 (Plate G8), lots 321-325 (Plate G10) and lots 19 and 20 (Plate G7 and G8). Verify that lot 300 has sufficient buildable area for the intended use.

3. Table 1.2 in the geotechnical report does not include Qls XXXVIII. Discuss and revise as necessary.

4. Demonstrate that the walls proposed for lots 511 and 512 will contain the entire volume of debris that may impact them. Alternatively, provide a mechanism to divert the debris into the adjacent basins, and increase their size, accordingly.

5. The Soils Engineering review dated 10/26/04 is attached.

NOTE Provide a copy of this review with your resubmittal

Prepared by Geir R. Mathisen

Reviewed by Charles T. Nestle

Date 10/21/04

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION

SOILS ENGINEERING REVIEW SHEET

Address: 900 S. Fremont Ave., Alhambra, CA 91803
Telephone: (626) 458-4925
Fax: (626) 458-4913

District Office 8.2
Job Number GMTR
Sheet 1 of 1

Review No. 1

DISTRIBUTION:
____ Drainage
____ Grading
____ Geo/Soils Central File
____ District Engineer
____ Geologist
____ Soils Engineer
____ Engineer/Architect

Tentative Tract Map 61105
Location Castaic
Developer/Owner Newhall Land and Farming Company
Engineer/Architect Psomas
Soils Engineer Allan E. Seward, Inc. (04-2023-4)
Geologist Same as above

Review of:
Tentative Tract Map Dated By Regional Planning **8/19/04**
Soils Engineering and Geologic Report Dated **7/22/04 (6 volumes)**

ACTION:
Tentative Map feasibility is not recommended for approval.

REMARKS:

1. On Plates G11 and G15 of the submitted report, it appears that the proposed cut slope CS-13 will grade a portion of landslide Qls-A (Westridge). Verify whether the proposed development will adversely affect the existing landslide and cause potential movement. Therefore provide data and slope stability analyses which clearly demonstrate that the proposed development will not increase the potential for landslide failure, as necessary. Also, provide a geotechnical cross section, for each section analyzed, showing the critical failure plane used in the analyses. Indicate the various shear strength parameters used in the analyses, in the appropriate segments of each failure plane. Show locations of the cross sections used in slope stability analyses on the geotechnical map. Recommend mitigation if factors of safety are below County minimum standards.

   On Plates G8, G10, and G11 of the submitted report, it shows that landslides Qls-LII, Qls-LI, Qls-IX and a proposed stability fill (behind lots 658 and 659) have been labeled with recommended removal and recompaction/grading. Clearly show the final grade (topography) of these areas after the proposed removal of these landslides. Provide a cross-section of these areas and provide stability analyses if the final slopes are steeper than 2:1 gradient or if the slopes are greater that 30 feet in height. Indicate the various shear strength parameters used in the analyses, in the appropriate segments of each failure plane. Show locations of the cross sections used in slope stability analyses on the geotechnical map. Recommend mitigation if factors of safety are below County minimum standards.

3. Discuss the recommendations for landslide Qls-XXXVIII in Table 1.2 as requested by the Geology Section.

4. On Plates G10 and G11 of the submitted report, it shows that impact walls are recommended to mitigate potential mudflow hazards behind Lots 511, 512, and 693. Provide volume calculations for both the potential debris flows and the proposed catchment areas, as necessary. Per County policy, the catchment areas must be designed for 100 percent of the predicted debris flow volumes. Recommend revised mitigation measures as necessary.

5. Provide additional discussions on all of the "Restricted Use Areas" delineated on the geotechnical maps, as requested by the Geology Section. Also verify whether there will be adequate space for proposed development at Lot 300, considering the "Restricted Use Area" as shown on Plate G8 of the submitted report. Provide revised lot lines and/or mitigation measures as necessary.

6. Show the following on the geotechnical maps:
   a. Proposed grades after landslide removal, etc.
   b. Locations of buttress/stabilization fills and keyways.
   c. All recommended mitigation measures.

7. Requirements of the Geology Section are attached.

8. Include a copy of this review sheet with your response.

NOTE TO THE PLAN CHECKER/BUILDING AND SAFETY DISTRICT ENGINEER:
A. THE ON-SITE SOILS ARE MODERATELY TO SEVERELY CORROSIVE TO FERROUS METALS.
B. THE ON-SITE SOILS HAVE A MEDIUM EXPANSION POTENTIAL.
C. PER THE SOILS ENGINEER, DEWATERING SHALL BE PERFORMED FOR REMOVALS IN THE VICINITY OF BORINGS B-72E AND B-73E.

REGISTERED PROFESSIONAL ENGINEER
GAN N. LEM
NO. 2328
EXP. 6/30/07
GEOTECHNICAL
STATE OF CALIFORNIA

Prepared by for Yoshiya Morisaku Reviewed by Gan Lem Date 10/26/04

NOTICE: Public safety, relative to geotechnical subsurface exploration, shall be provided in accordance with current codes for excavations, inclusive of the Los Angeles County Code, Chapter 11.48, and the State of California, Title 8, Construction Safety Orders.

P:\Yosh\61105TentTa

REVISED SUMMARY OF LANDSLIDES

LANDSLIDE NO.	TENT MAP SHEET NO.	CROSS-SECTION	REMOVAL DEPTH RANGE & COMMENTS
I	7	13E-13E' to 15E-15E' and 25-25'	PR* = 30' or to Bedrock; Results in complete removal of western ½ and partial removal of eastern ½, FS > 1.5 per stability calculations
II	7	--	CR* = 10 – 20'
III	7	11E-11E'; 20E-20E'	CR = 10 - 40'
IV	7	--	CR = 10 – 25'
V	7	12E-12E'	CR = 10 – 30'
VI	7	10E-10E'	CR = 10 – 30'
VII	7	--	CR = 10 – 20'
VIII	7	--	CR = 10-25'
IX	7	18-18'	CR = 10 – 30'; Replace with 2:1 fill slope to proposed grades as shown on revised tentative map.
X	7	--	CR = 10 – 25'
XI	7	27-27' and 28-28'	CR = 10 - 25'.
XII	7	--	CR = 10 – 30'
XIII	7	--	CR = 10 – 25'
XIV	7	8E-8E',5-5'; 14-14' and 33-33'	CR = 10 – 35'
XV	7	14-14'	CR = 10 – 20' (Approximately upper 98% will be removed by proposed cut
XVI	7,5	9E-9E'	CR = 10 – 40'
XVII	5	--	CR = 10 – 20'
XVIII	5	--	CR = 10 - 20'
XIX	5	--	CR = 10 – 20'
XX	5	7M-7M'	CR = 10 – 40'
XXI	5	--	CR = 10 – 20'
XXII	5	--	CR = 10 – 20' (Approximately 90% will be removed by proposed cut).
XXIII	5	--	CR = 10 – 45'
XXIV	5	6M-6M'	CR = 10 – 35'

REVISED SUMMARY OF LANDSLIDES

LANDSLIDE NO.	TENT MAP SHEET NO.	CROSS-SECTION	REMOVAL DEPTH RANGE & COMMENTS
XXV	5	4M-4M' and 5M-5M'	CR = 10 – 60'
XXVI	5	– –	CR = 10 – 20'
XXVII	5	– –	CR = 10 – 20'
XXVIII	5	1M-1M'	CR = 10 – 20'
XXIX	5	– –	CR = 10 – 20'
XXX	5	– –	CR = 10 – 35'
XXXI	5	– –	CR = 10 – 30'
XXXII	5	– –	CR = 10 – 25'
XXXIII	5	– –	CR = 10 – 20'
XXXIV	5	– –	Will be completely removed by proposed cut
XXXV	5	2M-2M' and 3M-3M'	PR = 30' or to Bedrock; Bedding planes below Landslide analyzed on 3M-3M' and FS > 1.50. Landslide left in place on 2M-2M' stable by inspection.
XXXVI	5	– –	CR = 10 – 20'
XXXVII	3	38-38' thru 41-41' and 8M-8M'	PR and shear key. A portion of this landslide to remain due to environmental constraints. The landslide debris below the proposed building pad will be completely removed (CR = 10-50'). A shear key is needed at the toe of the proposed manufactured fill slope/cut-slope (CS-16) as illustrated on the attached maps and cross-sections (~20 to 40' below the toe elevation). Remainder to be shown as RUA on Final Map.
XXXVIII	3	– –	No removal – located in open space and will not have an adverse affect on proposed or adjacent development. To be shown as an RUA on the Final Map.
XXXIX	3	9M-9M'	No removal – located in open space and will not have an adverse affect on proposed or adjacent development. To be shown as an RUA on the Final Map.
XL	3,4	3E-3E'	CR = 10 – 40'
XLI	4	– –	CR = 10 – 30'
XLII	4	4E-4E'	CR = 10 – 40'
XLIII	4	5E-5E'	PR = 30' or to Bedrock (stable by inspection)
XLIV	4,6	6E-6E'	PR = 30' or to Bedrock (stable by inspection)
XLV	4	15-15'	Will be completely removed by proposed cut
XLVI	4	– –	CR = 10 – 20'
XLVII	4	– –	CR = 10 – 25'

REVISED SUMMARY OF LANDSLIDES

LANDSLIDE NO.	TENT MAP SHEET NO.	CROSS-SECTION	REMOVAL DEPTH RANGE & COMMENTS
XLVIII	6	--	Will be completely removed by proposed cut
XLIX	6	7E-7E'	CR = 10 – 45'; Removals include overlying Qt deposits
L	6	--	CR – 10 – 20'
LI	6	12-12'	The upper most portion of this small landslide will be removed by the proposed daylight cut. Based on subsurface exploration (long trenches T-154T and T-155T) coarse grained bedrock underlies this landslide. The portion of landslide Qls-LI that will remain down slope of the proposed daylight cut will not adversely affect the proposed development. The standard recommended overexcavation of Lots 413 and 414 will remove virtually all of Qls- LI on these lots and the standard h/3 building setback from the descending natural slope (~30 ft) will provide sufficient remediation. The proposed development will not increase the potential for landslide failure for the following reasons: The proposed cut lots will be over excavated which will significantly reduce the infiltration of irrigation water. Any future water from these lots will be below the landslide based on the geologic structure and lithologic conditions (12-12') in this vicinity. The portion of Qls-LI that will remain within VTT 61105 will be shown as an RUA on the final map.
LII	4	1E-1E' and 2E-2E'	CR = 10 – 35' and replace to proposed grades as shown on revised tentative map.
LIII	8	--	No removal – located in open space and will not have an adverse affect on proposed development or adjacent property. To be shown as an RUA on the Final Map. Located south of proposed Magic Mountain Parkway extension.

*CR = Complete Removal Depth Range

*PR = Partial Removal Depth Range

REVISED PROPOSED CUT SLOPE SUMMARY
MESAS EAST – VTT 61105

Cut Slope	Sheet No.	Cross Section	Slope Gradient	Slope Height (Feet ±)	Slope Face Direction	Geologic Materials In Vicinity	Geologic Stability	Mitigation/Comments
CS-1a	6	6-6'	2:1	45	W	TQsl	Bedrock steeply dipping to the West Grossly stable	
CS-1b	6	7-7'	2:1	122	S and SW	TQsl	Bedrock dips into slope Grossly stable	
CS-1c	6	- -	2:1	70	W	TQsl	Bedrock dips neutral to into slope, to steeper than slope face Grossly Stable however, anticline axis traverses slope and may be susceptible to erosion	Stability Fill needed for anticline
CS-2	6	- -	2:1	73	W and NW	TQsl and af (af will be removed by proposed cut)	Bedrock dips neutral to into slope Grossly stable however the NW facing portion consists of a "sliver" Cut/fill	Stability Fill needed for NW facing portion due to "sliver" cut/fill configuration.
CS-3a	6	- -	2:1	36	S	TQsu and af (af will be removed by ~100' proposed cut)	Bedrock dips neutral to into slope Grossly stable	
CS-3b	6	- -	2:1	36	E	TQsu and af (af will be removed by ~100' proposed cut)	Daylighted bedding condition Grossly stable by inspection CS-12c (10E-10E') more critical	Stability Fill needed for daylighted bedding
CS-3c	6	- -	2:1	36	N	TQsu, Qls and af (Qls and af will be removed by ~100' proposed cut)	Daylighted bedding condition Grossly stable by inspection CS-12c (10E-10E') more critical	Stability Fill needed for daylighted bedding
CS-4	6,7	32-32'	2:1	28	N	TQsl, TQsu, Qls and af (~90 of proposed cut will remove most Qls and all af)	Daylighted bedding condition Grossly stable per stability calc in previous report (33-33') where height was 40' and now @ 28' Eastern edge will be R/R'd by Qls removal	Stability Fill needed for daylighted bedding
CS-5	6,7	48-48' 8E-8E'	2:1	130	NW	TQsl and Qls (~40 to 100' proposed cut will remove Qls)	Bedding neutral to into slope Grossly stable	
CS-6	7	49-49'	2:1	120	NNE	TQsl and Qls (~40 to 100' proposed cut will remove most Qls)	Daylighted bedding condition slope **is not grossly stable** per calc's	Buttress Fill required due to gross unstaiblity (refer to remediation maps for dimensions)
CS-7	7	- -	2:1	25	SW and SE	TQsl and af (~20 to 60' proposed cut will remove af)	Bedding dipping into slope to ne utral Grossly stable	

REVISED PROPOSED CUT SLOPE SUMMARY
MESAS EAST – VTT 61105

Cut Slope	Sheet No.	Cross Section	Slope Gradient	Slope Height (Feet ±)	Slope Face Direction	Geologic Materials In Vicinity	Geologic Stability	Mitigation/Comments
CS-8	7	47-47'	2:1	94	NW and N	TQsl and Qsw (proposed cut will remove Qsw)	Bedding neutral to a component towards slope face NW facing portion Grossly Stable; N facing portion **is not grossly stable** per calc's.	Buttress Fill required due to gross unstability on N facing portion (refer to remediation maps for dimensions)
CS-9	7	46-46'	2:1	90	NE	TQsl and Qls	Bedding dipping steeper than slope face Grossly stable per calc's	
CS-10	7	18-18' 19-19'	2:1	110	NE	TQsl and Qls	Bedding dipping steeper than slope face Grossly stable however, Qls (IX) removal results in fill slope and thin "sliver" cut will exist on eastern most portion	Backdrains required for Qls (IX) R/R. Stability fill needed for easternmost portion due to "sliver" cut.
CS-11	7	- -	2:1	43	E	TQsl	Bedding dipping neutral to steeper than slope face Grossly stable however,	
CS-12a	7	44-44' 11E-11E'	2:1	85	NE	TQsl, TQsu and Qls	Monoclinal Warp traverses the slope, bedding dipping steeper than upper slope face, to daylighted on lower portion. Grossly Stable per cal'c however, removal of Qls (III) and (VII) results in fill slope on portions	Stability Fill needed due to daylighted bedding and Qls (III) and (VIII) removal.
CS-12b	7	44-44' 11E-11E'	2:1	60	NE	TQsl, TQsu and Qls	Daylighted bedding Grossly stable per calcs's	Stability Fill needed due to daylighted bedding and Qls (VIII) and (III) removal.
CS-12c	7	10E-10E'	2:1-3:1	56	N and NE	TQsu	Daylighted bedding Grossly stable per calc's	Stability Fill needed due to daylighted bedding
CS-13	7	- -	2:1	53	NE	TQsu, Qls, and Qsf	Daylighted bedding condition to neutral bedding. Grossly stable by inspection w/CS-12c however,	Stability fill needed due to daylighted bedding, Qls (I) removal and Qsf
CS-14	7	10E-10E'	2:1	30	NE and E	TQsu, af and Qls (proposed cut will remove af and most of Qls (VI).	Daylighted bedding condition Grossly stable by inspection w/ CS-12c however,	Stability fill need for daylighted bedding and Qls (VI) removal.

REVISED PROPOSED CUT SLOPE SUMMARY
MESAS EAST – VTT 61105

Cut Slope	Sheet No.	Cross Section	Slope Gradient	Slope Height (Feet ±)	Slope Face Direction	Geologic Materials In Vicinity	Geologic Stability	Mitigation/Comments
CS-15	5,7	22-22' 45-45'	2:1	88	N	TQsu and af (proposed cut will remove af)	Daylighted bedding condition Is **not grossly stable** per calc's	Buttress Fill required on highest portions due to gross instability. Stability fill needed on lower easternmost portion due to daylighted bedding. (refer to Remediation Maps for dimensions)
CS-16	3	41-41'	2:1	32	N	Qls and af	Slope tops and toes out Within Qls (XXXVII) and is **not** grossly stable	Buttress shear key needed to support slope and pad above Qls (XXXVII) to remain (refer to Remediation Maps for dimensions)
CS-17	3	- -	2:1	50	E	Qt and TQs	Favorable bedding Grossly stable but "sliver" cut in a swale area @ Qt/TQs contact	Stability Fill needed due to "sliver" cut in soil / weathered bedrock, and Qt deposits over bedrock
CS-18	3	- -	3:1	40 and 70'	N and NW	Qt	Favorable bedding Grossly stable but Qt deposits prone to erosion	Stability Fill needed due to Qt deposits
CS-19	3	- -	2:1	30	S and SE	TQs and Qt	Favorable bedding Grossly stable but Qt deposits and bedrock near Airport Mesa Lineament prone to erosion	Stability Fill needed due to Qt deposits and Airport Mesa Lineament
CS-20	3	- -	2:1	52	S and SW	TQs	Steeply dipping bedding neutral to steeper than slope face Grossly stable	Slope is proposed in very resistant sandstone TQs (undifferentiated)
CS-21a	4	- -	2:1	30	E	TQsu	Favorable bedding Grossly stable	
CS-21b	4	- -	2:1	56	S	TQsu	Favorable bedding Grossly stable	
CS-22	4	- -	2:1	40	W and S	TQsu	Favorable bedding Grossly stable	
CS-23	4	- -	2:1	40	NW	TQsu and Qls (proposed cut will remove Qls w/ NE edge shortened by fill)	Favorable bedding Grossly stable	

REVISED PROPOSED CUT SLOPE SUMMARY
MESAS EAST – VTT 61105

Cut Slope	Sheet No.	Cross Section	Slope Gradient	Slope Height (Feet ±)	Slope Face Direction	Geologic Materials In Vicinity	Geologic Stability	Mitigation/Comments
CS-24	4	- -	2:1	47	N and NE	TQsu and Qls (Qls will be removed by proposed cut.)	Favorable bedding to daylighted bedding Grossly stable however,	Small (<20' high) NE facing portion needs a stability fill due to daylighted bedding
CS-25	4	- -	2:1	48	NW	TQsu	Favorable bedding Grossly stable	Slope will likely be R/R'd with fill during grading operations due to adjacent removals in fill area
CS-26a	4	- -	2:1	45	NW and NE	TQsu	Favorable bedding to daylighted bedding Grossly stable however,	Small (< 20' high) NE facing portion needs a stability fill due to daylighted bedding
CS-26b	4	- -	2:1	40	NW and N	TQsu	Favorable bedding to daylighted bedding Grossly stable however,	Small (<20' high) NE facing portion needs a stability fill due to daylighted bedding
CS-27	4	23-23'	2:1	52	N	TQsu	Daylighted bedding component Grossly stable per calc's however,	Stability Fill needed due to daylighted component
CS-28a	4	- -	2:1	115	W	TQsl and af (af will be under cut by proposed grade)	Favorable bedding Grossly stable	
CS-28b	4	23-23' 24-24' 31-31' 2E-2E'	2:1	83	N and NW	TQsu, TQsl, Qls and af (af and Qls will be under cut by proposed grade)	Daylighted bedding condition Western portion grossly stable per calc's (TQsl and shallow component) **Eastern** portion is **not grossly stable** per calc's	Buttress required on Eastern portion due to FS < 1.50 Stability Fill needed for Western Portion due to shallow daylighted bedding component in TQsl. Due to varying height of overall slope the Buttress dimensions are similar to the Stability Fill. (refer to Remediation Maps for dimensions)
CS-29	4	15-15'	2:1	90	NE	TQsu	Daylighted bedding condition is **not grossly stable** per calc's	Buttress required due to gross instability (refer to Remediation Maps for dimensions)
CS-30	4	- -	2:1	26	N	TQsl and Qsw (Qsw will be undercut by proposed grade)	Bedding neutral to very shallow component out-of-slope Grossly stable	

REVISED PROPOSED CUT SLOPE SUMMARY
MESAS EAST – VTT 61105

Cut Slope	Sheet No.	Cross Section	Slope Gradient	Slope Height (Feet ±)	Slope Face Direction	Geologic Materials In Vicinity	Geologic Stability	Mitigation/Comments
CS-31	4,6	--	2:1	29	N	TQsl and af (af will be undercut by propose d grade)	Bedding neutral to very shallow out-of-slope component Grossly stable	
CS-32	4,6	--	2:1	38	E	TQsl	Bedding neutral to very shallow out-of-slope component Grossly stable	
CS-33	6	--	2:1	36	W	Qt	Favorable bedding Grossly stable, however, fill over cut configuration and Qt deposits prone to erosion	Stability Fill needed for fill over cut configuration and Qt deposits
CS-34	6	--	2:1	66	NW and W	Qt and af (30' proposed cut will remove af)	Favorable bedding Grossly stable, however, Qt deposits pron e to erosion	Stability Fill needed for Qt deposits
CS-35	4,6	--	2:1	130	W	Qt and TQsl	Favorable bedding Grossly stable, however, Qt deposits prone to erosion	Stability Fill needed for Qt deposits
CS-36	Not applicable	--	N/A	N/A	N/A	N/A	N/A	CS-36 omitted, Did not re-number for continuity sake
CS-37	6	--	2:1	25	NW	Qt and af (proposed cut will remove af)	Favorable bedding Grossly stable, however, Qt deposits prone to erosion	Stability Fill needed for Qt deposits
CS-38	6	--	2:1	51	SW	TQsl	Thin "sliver" cut in larger fill area close to anticline axis Grossly stable, however,.	Stability Fill needed due to thin sliver cut and anticline. This slope will likely be R/R'd during grading operations due to proposed fill areas surrounding it
CS-39	6	--	2:1	65	SW	Qt	Favorable bedding Grossly stable, however, Qt deposits prone to erosion	Stability Fill needed for Qt deposits and partial fill over cut configuration
CS-40	6	--	2:1	48	SW	Qt and af (proposed cut will remove af)	Favorable bedding Grossly stable, however, fill overcut configuration and Qt deposits prone to erosion	Stability Fill needed for fill over cut configuration and Qt deposits

REVISED PROPOSED CUT SLOPE SUMMARY
MESAS EAST – VTT 61105

Cut Slope	Sheet No.	Cross Section	Slope Gradient	Slope Height (Feet ±)	Slope Face Direction	Geologic Materials In Vicinity	Geologic Stability	Mitigation/Comments
CS-41	6	- -	2:1	25	SW	Qt and af (proposed cut will remove af)	Favorable bedding Grossly stable, however, Qt deposits prone to erosion	Stability Fill needed for Qt deposits
CS-42	6	- -	2:1	37	W	TQsl, and af (proposed cut will remove af)	Favorable bedding Grossly stable	
CS-43	6	- -	2:1	30	SE	TQls and af (~40' proposed cut will remove af)	Favorable bedding Grossly stable	
CS-44	5	- -	2:1	40	NW	TQsl	Favorable bedding Grossly stable	
CS-45	5	- -	2:1	40	NW	TQsl	Favorable bedding Grossly stable however, anticline axis traverses slope and bedrock may be susceptible to erosion	Stability Fill needed for anticline
CS-46	8	42-42' 43-43'	2:1 3:1	98	N	TQsu and Qt (insignificant amount of Qt will remain after proposed cut)	Favorable bedding Grossly stable	Cut-slope associated with Magic Mtn Pkwy Extension
CS-47	8	--	2:1 3:1	53	S	TQsu	Favorable bedding Grossly stable	
CS-48	8	--	2:1	52	N	TQsu and Qt	Favorable bedding Grossly stable howver, Qt over TQsu may be susceptible to erosion	Stability fill need for Qt over TQsu
CS-49	8	--	2:1 3:1	43	N	Qt	Favorable bedding Grossly Stable, however (Qt deposits prone to erosion)	Stability fill needed for Qt deposits
CS-50	8	--	2:1 3:1	75	N	Qt and af/Qal	Favorable bedding Grossly Stable, however (Western most portion will expose af/Qal)	Stability Fill needed for Qt and af/Qal
CS-51	8	51-51'	2:1	75	N	Qt	Favorable bedding Grossly Stable, however (Qt deposits prone to erosion)	Stability Fill needed for Qt deposits
CS-52	8	--	3:1	32	S	Qt	Favorable bedding Grossly Stable, however (Qt deposits prone to erosion)	Stability Fill needed for Qt deposits

REVISED PROPOSED CUT SLOPE SUMMARY
MESAS EAST – VTT 61105

Cut Slope	Sheet No.	Cross Section	Slope Gradient	Slope Height (Feet ±)	Slope Face Direction	Geologic Materials In Vicinity	Geologic Stability	Mitigation/Comments
CS-53	8	--	3:1 4:1	50	S	Qt	Favorable bedding Grossly Stable, however (Qt deposits prone to erosion)	Stability Fill needed for Qt deposits
CS-54	8	--	2:1	62	SE and NE	Qt	Favorable bedding Grossly Stable, however (Qt deposits prone to erosion)	Stability Fill needed for Qt deposits

* See Geologic/Geotechnical Remediation Maps, Cross Sections and **Appendix C** for additional information (dimensions) on mitigation measures.

GEOLOGIC CROSS SECTION INVENTORY LIST

Cross-Sections from our July 22, 2004 Report omitted for this Report

5-5', 14-14', 17-17', 20-20' 21-21' 27-27' through 30-30' and 33-33'

Cross Sections from our July 22, 2004 Report Revised for this Report

2-2', 6-6' 12-12' 16-16', 18-18', 19-19', 22-22', 24-24', 32-32', 34-34', 35-35', 37-37', 1E-1E', 2E-2E', 7E-7E' through 12E-12E', 1M-1M', 5M-5M' and 7M-7M'

New Cross Sections Prepared For this Report

42-42' through 51-51'

Cross Sections that were calculated or re-calculated relative to slope stability due to plan revisions

2-2', 12-12', 22-22', 24-24', 34-34', 35-35', 2E-2E' and 10E-10E', 43-43' through 47-47' and 49-49'.

Note: 16-16' and 37-37' not re-calculated because it is very apparent that the revised grades in these areas are more favorable than these analyzed in our July 22, 2004 report.

Appendix A

JOB NO. 00-1729-1

LOGGED BY SKM

Trench Log No. T-14

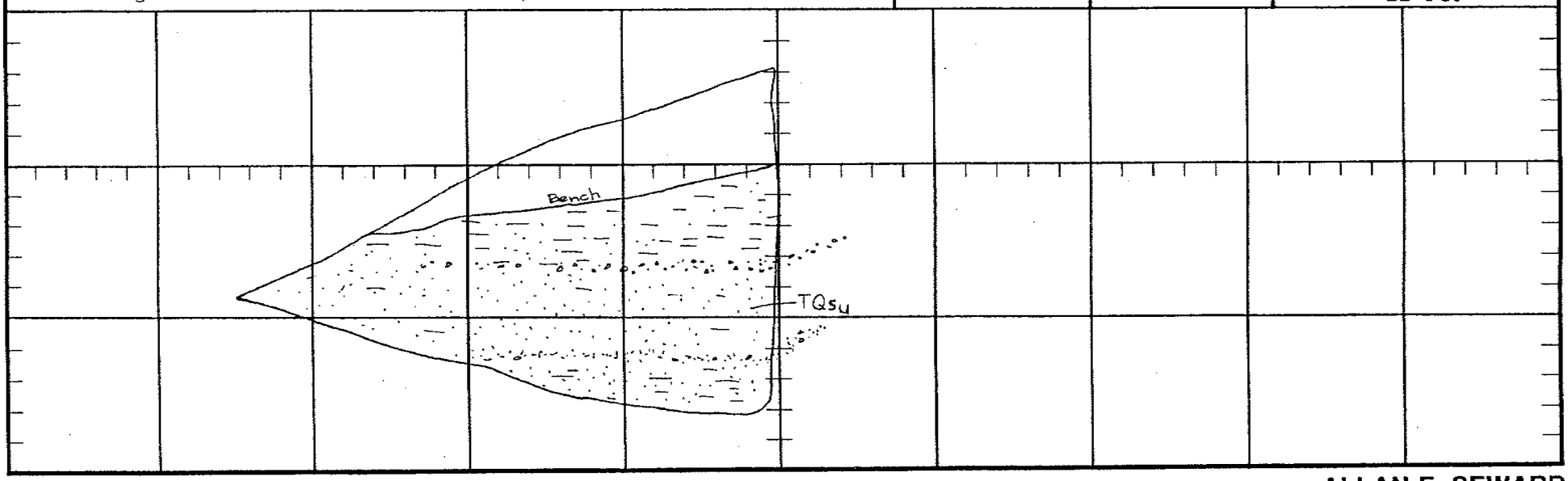
PROJECT Magic Mountain Entertainment

DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 11' BEDROCK; TQs, Light brown, light yellowish-brown and light grayish-brown siltstone, silty sandstone and pebbly sandstone; moderately hard and friable; dry to damp	N44W,14NE		Upper 2-3 ft. widened i.e. soil removed Weathered down to 3.5 ft. No Ground Water No Caving TOTAL DEPTH 11 Ft.

SCALE 1" = 5'

N 60 W



ALLAN E. SEWARD

JOB NO. 00-1729-1

LOGGED BY SKM

Trench Log No. T-15

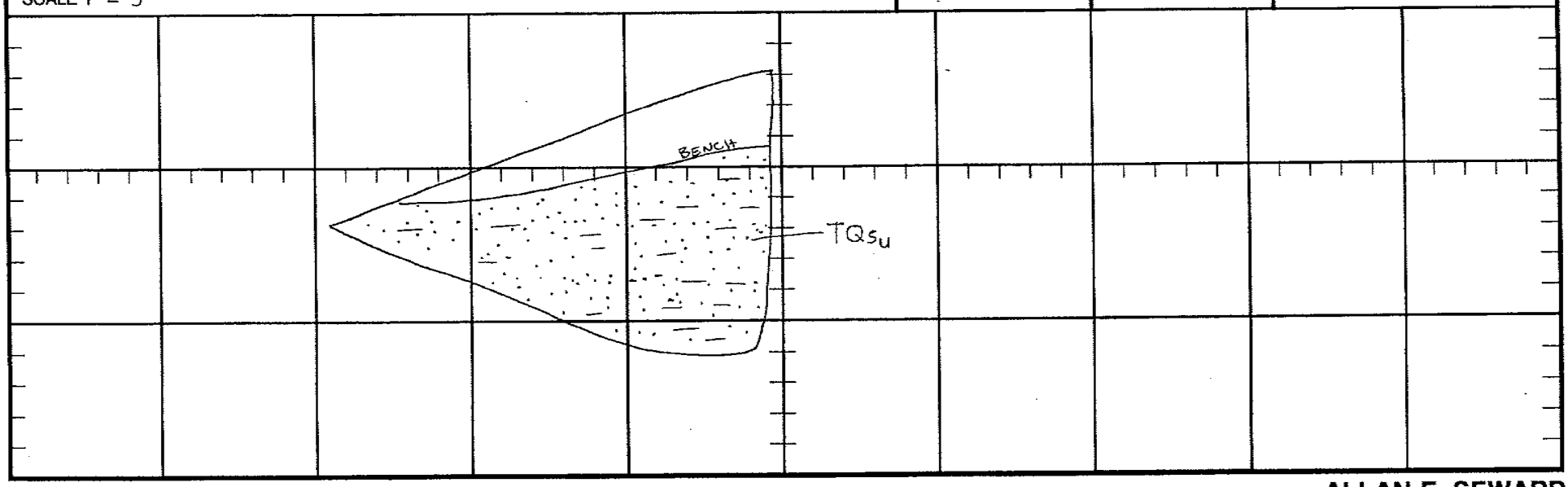
PROJECT Magic Mountain Entertainment

DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 9' BEDROCK; TQs, Light yellowish-brown silty sandstone and pebbly sandstone; moderately hard and friable; dry	N60W,10NE		Weathered down to 3.5 Ft. Upper 2-3 Ft. widened No Ground Water No Caving TOTAL DEPTH 9 Ft.

SCALE 1" = 5'

N 62 E



ALLAN E. SEWARD

JOB NO. 00-1729-1

LOGGED BY SKM

Trench Log No. T-16

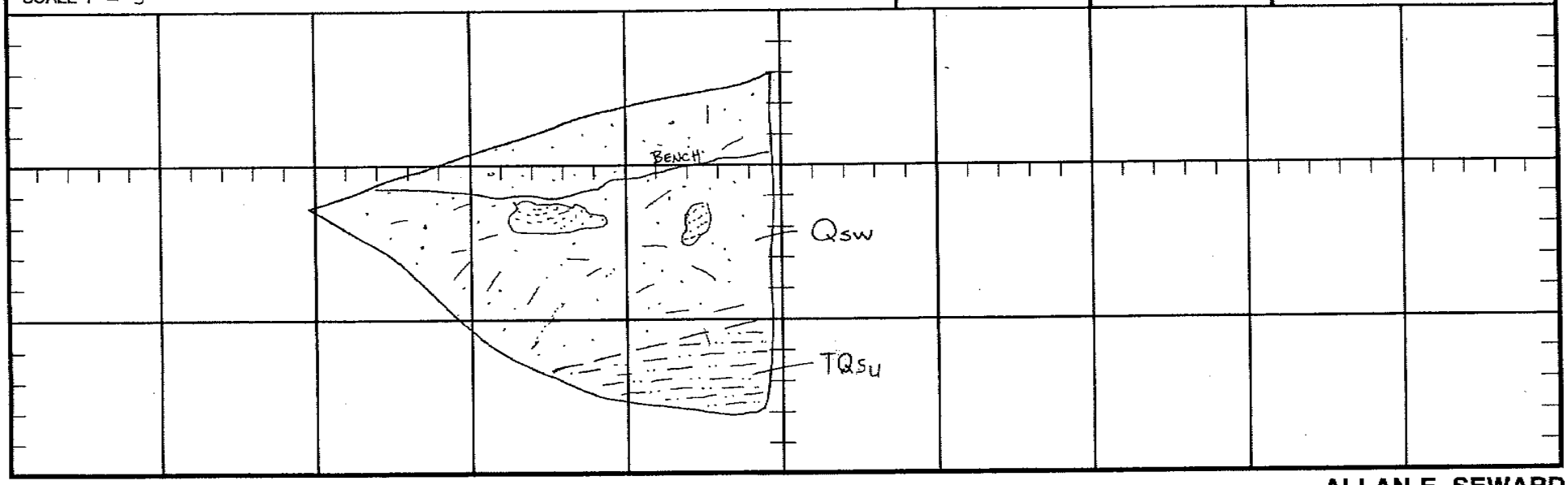
PROJECT Magic Mountain Entertainment

DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 8' SURFICIAL FAILURE; Qsw, Light yellowish-brown silty sand and laminated sands disturbed ("rotated back" laminae) loose to moderately dense; dry		Slip Surface N75W,21NE	Upper 2-3' widened Weathered down to 4 ft.
8 - 11' BEDROCK; TQs, Light yellowish-brown sandy siltstone; moderately hard; dry to damp	Massive		Softer above planar surface at 8 ft. harder below and no rotated laminae below
			No Ground Water No Caving
			TOTAL DEPTH 11 Ft.

SCALE 1" = 5'

N 24 W



ALLAN E. SEWARD

JOB NO. 00-1729-1

LOGGED BY SKM

Trench Log No. T-17

PROJECT Magic Mountain Entertainment

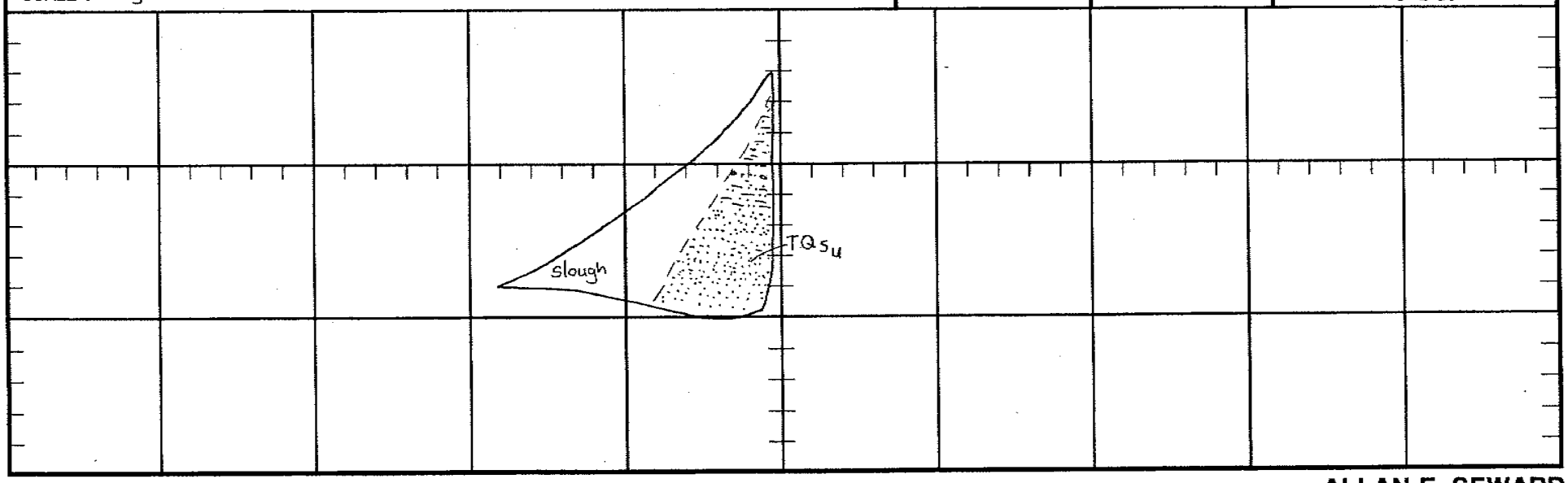
DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 8' BEDROCK; TQs, Light yellowish-brown and light grayish-brown silty sandstone, sandstone and pebbly sand to gravel, laminated lenses; friable to moderately hard; dry	a) N51W,10NE b) N38W,15NE		Excavated in oil pad "backcut" Friable at base of trench Moderately hard at top Upper portion looks like our Qp while friable lower portion has a more Qt appearance, but is dipping with regional No Ground Water No Caving

SCALE 1" = 5'

N 33 E

TOTAL DEPTH 8 Ft.



ALLAN E. SEWARD

JOB NO. 00-1729-1

LOGGED BY SKM

Trench Log No. T-33

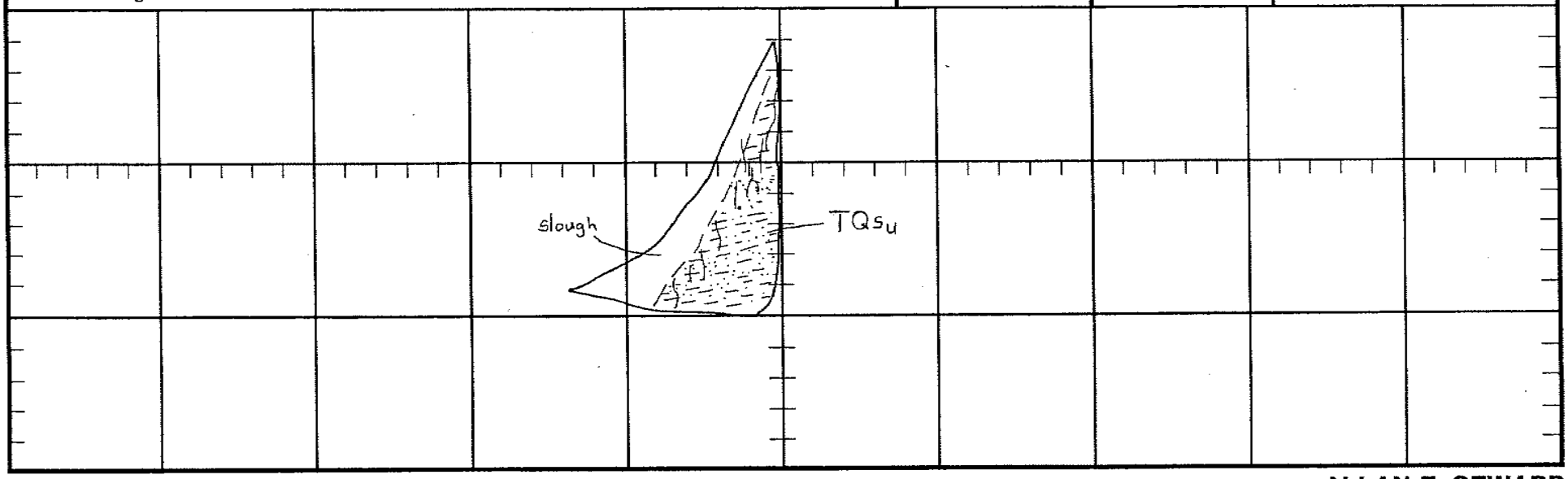
PROJECT Magic Mountain Entertainment

DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 9' BEDROCK; TQs, Light yellowish-brown and light brown silty sandstone, sandy siltstone and siltstone; moderately hard; dry to damp	N44W,15NE		Trenches T-33 thru T-46 excavated on 1/13/00 Excavated in existing road cut No Ground Water No Caving TOTAL DEPTH 9 Ft.

SCALE 1" = 5'

N 87 W



ALLAN E. SEWARD

JOB NO. 00-1729-1

LOGGED BY SKM

Trench Log No. T-34

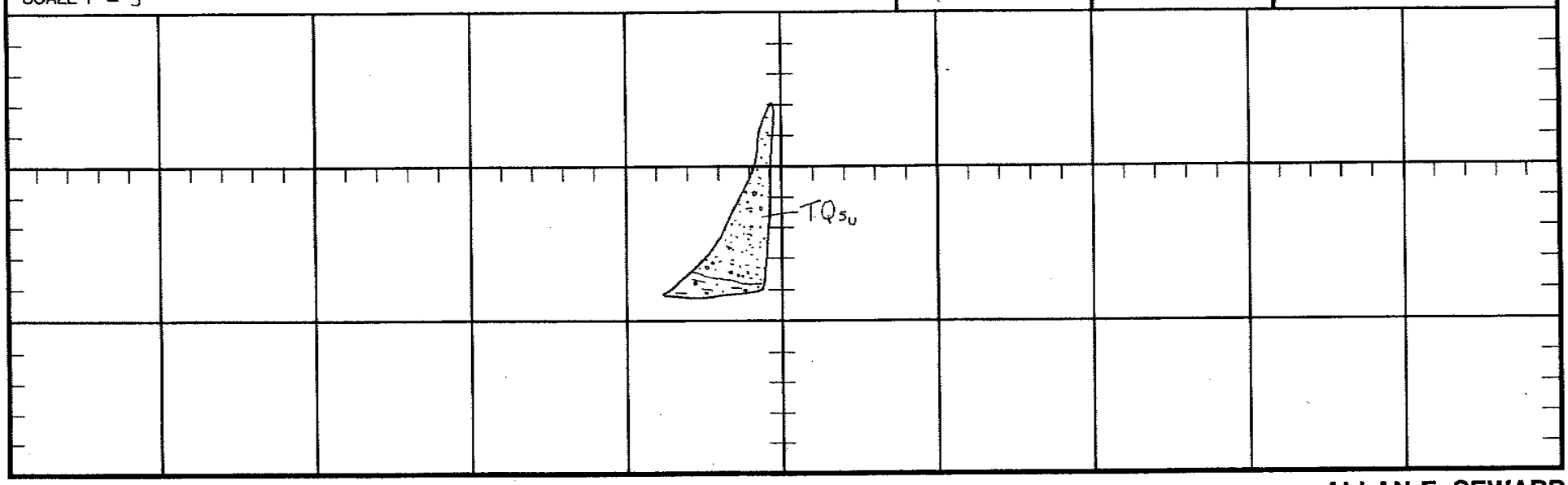
PROJECT Magic Mountain Entertainment

DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6' BEDROCK; TQs, Light yellowish-brown and light grayish-brown sandstone, pebbly sandstone and sandy pebbly siltstone; moderately friable to moderately hard; dry to damp	N57W,9NE		Excavated in oil pad "backcut" No Ground Water No Caving TOTAL DEPTH 6 Ft.

SCALE 1" = 5'

N 50 W



ALLAN E. SEWARD

JOB NO. 00-1729-1

LOGGED BY SKM

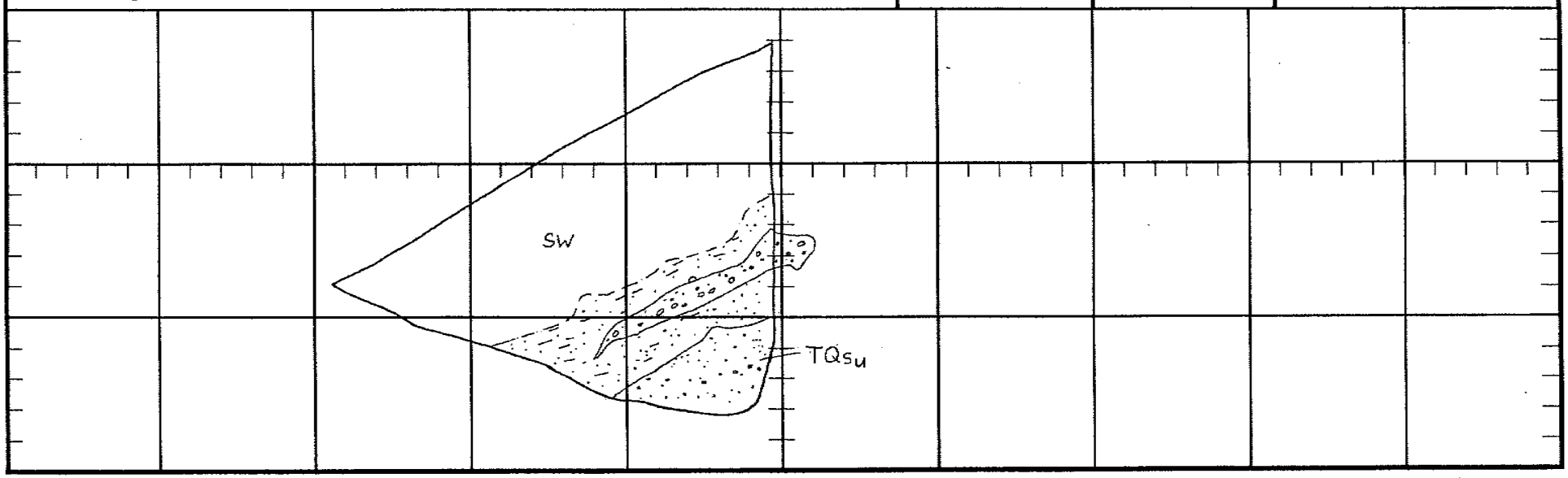
Trench Log No. T-35

PROJECT Magic Mountain Entertainmen

DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 5' SLOPEWASH; sw, Light brown to tan sandy silt with pebbles; loose; dry			From 5 to 9' appears creep affected or slumped
5 - 12' BEDROCK; TQs, Light grayish-brown and light yellowish-brown pebble conglomerate (friable) and silty sandstone (moderately friable); dry to damp	Massive		Pebbles in pebble conglomerate are subangular to sub-rounded (high pebble content, low sand content)
			No Ground Water No Caving
			TOTAL DEPTH 12 Ft.

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 00-1729-1

LOGGED BY SKM

Trench Log No. T-36

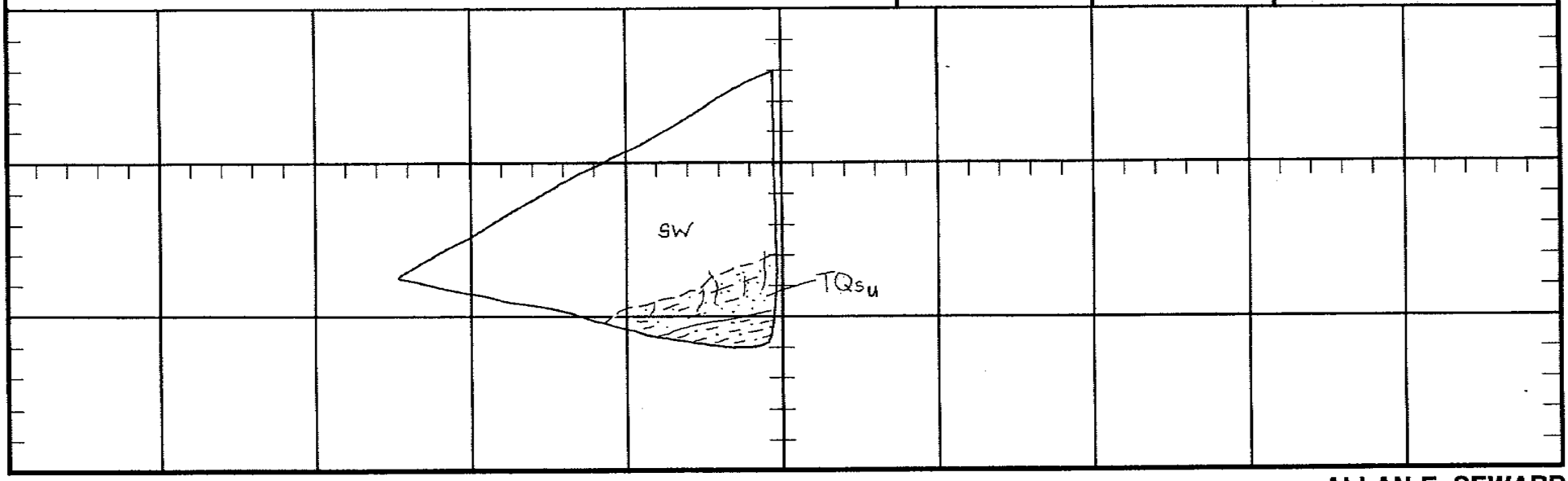
PROJECT Magic Mountain Entertainment

DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6' SLOPEWASH; sw, Light brown pebbly sandy silt; loose to dense; dry to damp			Weathered down to 7 ft.
6 - 9' BEDROCK; TQs, Light yellowish-brown and light to medium brown silty sandstone and siltstone; moderately hard to hard; dry to damp	N42W,14NE		
			No Ground Water No Caving
			TOTAL DEPTH 9 Ft.

SCALE 1" = 5'

N 72 W



ALLAN E. SEWARD

JOB NO. 00-1729-1

LOGGED BY SKM

Trench Log No. T-37

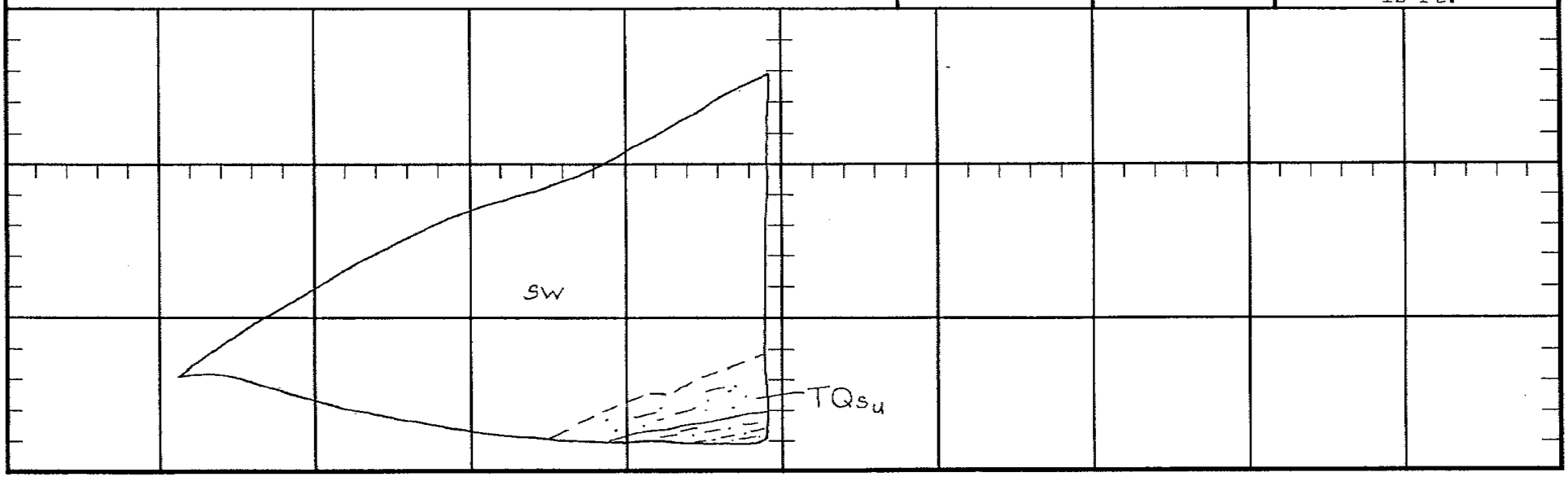
PROJECT Magic Mountain Entertainment

DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 11' SLOPEWASH; sw, Light brown to light yellowish-brown sandy silt to silty sand; loose to moderately dense; dry to damp			Upper 3-4 feet widened
11 - 12' BEDROCK; TQs, Light to medium brown siltstone; moderately hard; damp	N60W,11NE (apx)		From 9-11 ft. may be surficial failure
			No Ground Water No Caving
			TOTAL DEPTH 12 Ft.

SCALE 1" = 5'

N 83 E



ALLAN E. SEWARD

JOB NO. 00-1729-1

LOGGED BY SKM

Trench Log No. T-38

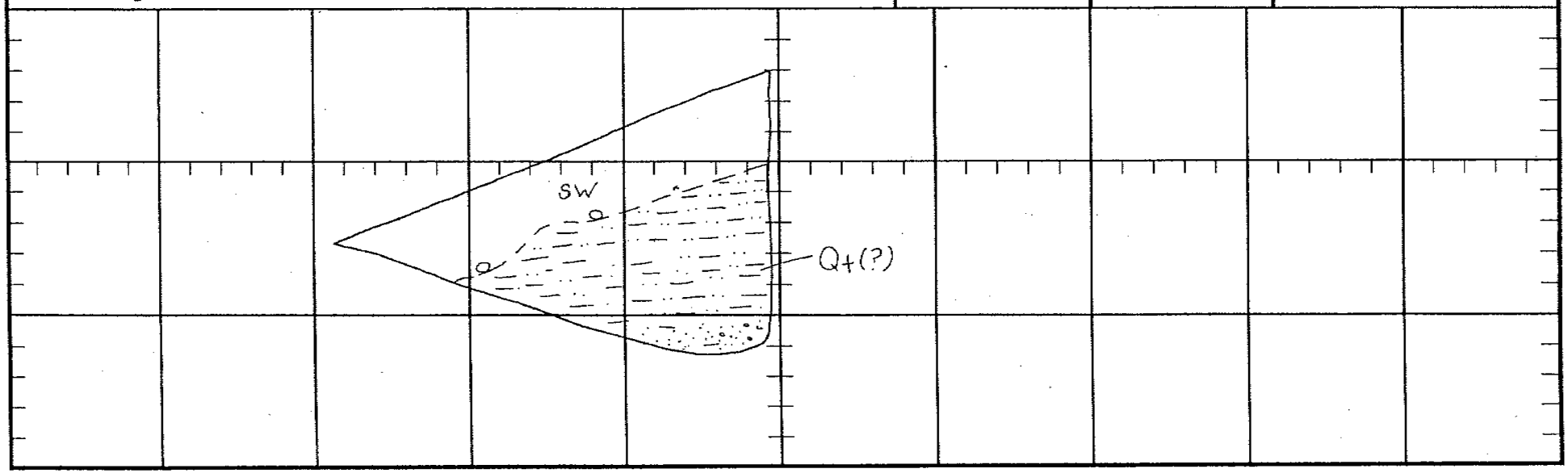
PROJECT Magic Mountain Entertainment

DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SLOPEWASH; sw, Light brown sandy silt with pebbles and cobbles; loose; dry 3 - 9' QUATERNARY TERRACE; Qt (?), Light yellowish-brown to light reddish-brown sandy siltstone, sandstone and pebbly sandstone	N70W,8NE apx		Generally massive No Ground Water No Caving TOTAL DEPTH 9 Ft.

N 80 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 00-1729-1

LOGGED BY SKM

Trench Log No. T-39

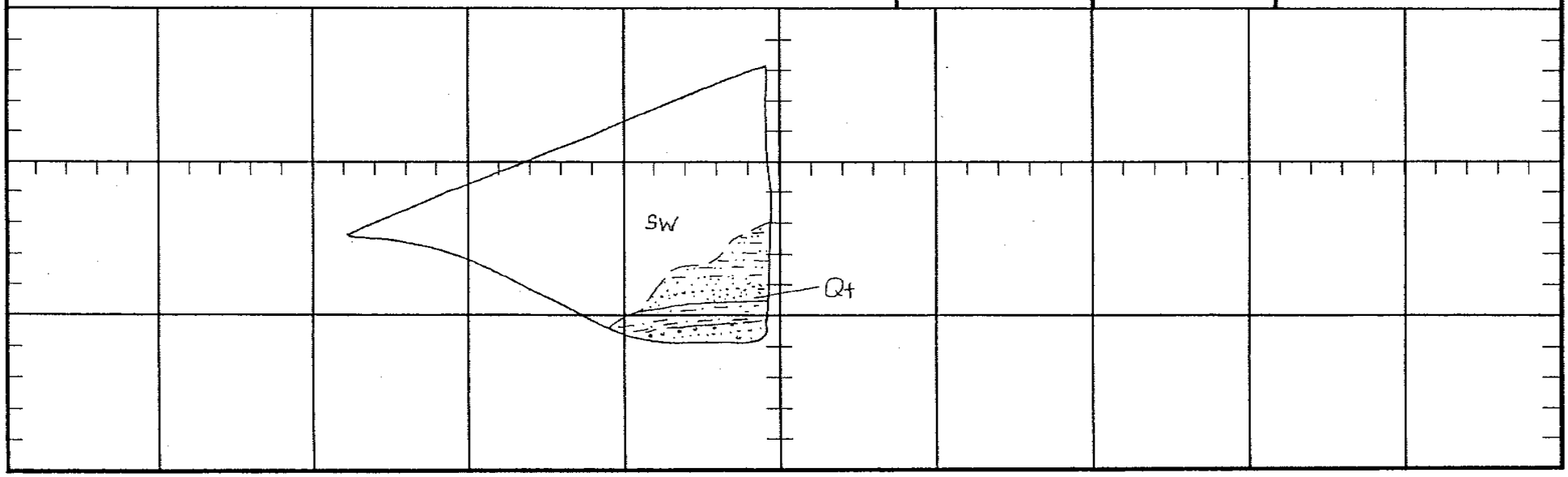
PROJECT Magic Mountain Entertainment

DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 5' SLOPEWASH; sw, Light yellowish-brown sandy silt to silty sand with pebbles and cobbles; loose to moderately dense; dry to damp 5 - 9' QUATERNARY TERRACE; Qt, Light brown and light grayish-brown sandy siltstone, siltstone and pebbly sandstone; moderately hard and friable; dry to damp	Horizontal		No Ground Water No Caving TOTAL DEPTH 9 Ft.

SCALE 1" = 5'

N 83 E



ALLAN E. SEWARD

JOB NO. 00-1729-1

LOGGED BY SKM

Trench Log No. T-48

PROJECT Magic Mountain Entertainment

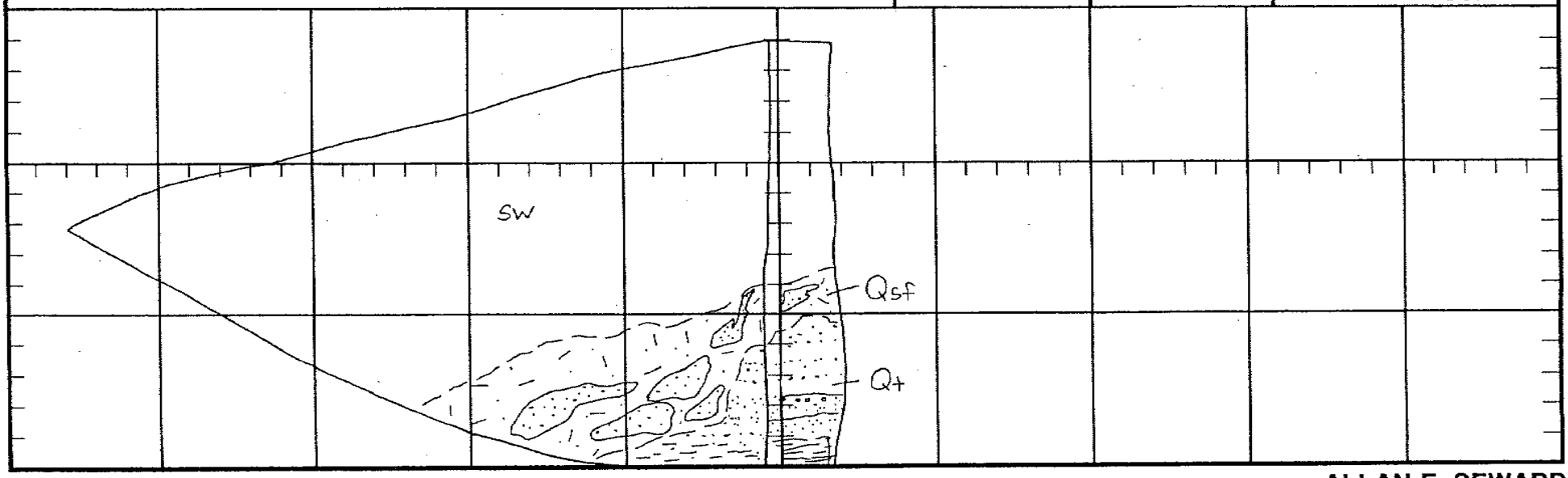
DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 8' SLOPEWASH; sw, Light brown sandy silt with pebbles; loose to moderately dense; dry to damp			
8 - 10' SURFICIAL FAILURE/LANDSLIDE; sf/Qls, Weathered Qt fragments/blocks intermixed with slopewash; loose; dry to damp			
10 - 14' QUATERNARY TERRACE; Qt, Light yellowish-brown slightly silty sandstone, pebbly sandstone and silty sandstone; moderately hard and moderately friable; damp			No Ground Water No Caving

SCALE 1" = 5'

N 72 W

TOTAL DEPTH 14 Ft.



ALLAN E. SEWARD

JOB NO. 00-1729-1

LOGGED BY SKM

Trench Log No. T-49

PROJECT Magic Mountain Entertainment

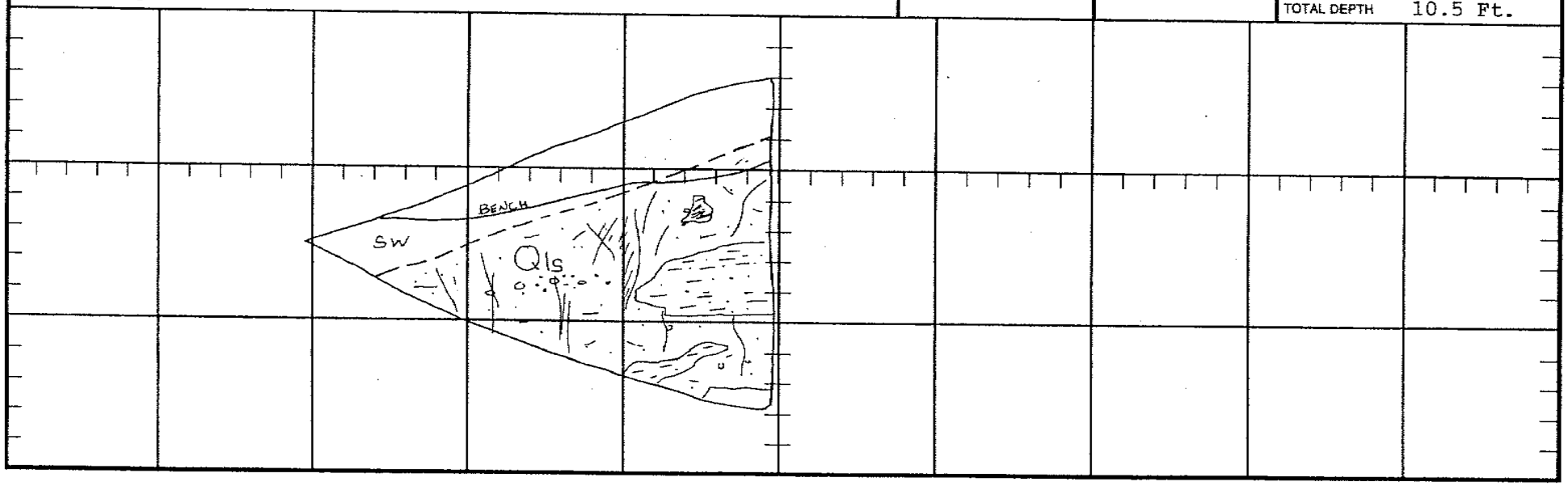
DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2' SLOPEWASH; sw, Light to medium brown, slightly sandy silt with pebbles; loose to moderately dense; dry to damp			
2 - 10.5' LANDSLIDE; Qls, Jumbled Qt lithologies and soil backfill, loose to moderately dense; dry to damp			No Ground Water No Caving

SCALE 1" = 5'

N 70 W

TOTAL DEPTH 10.5 Ft.



ALLAN E. SEWARD

JOB NO. 00-1729-1

LOGGED BY SKM

Trench Log No. T-50

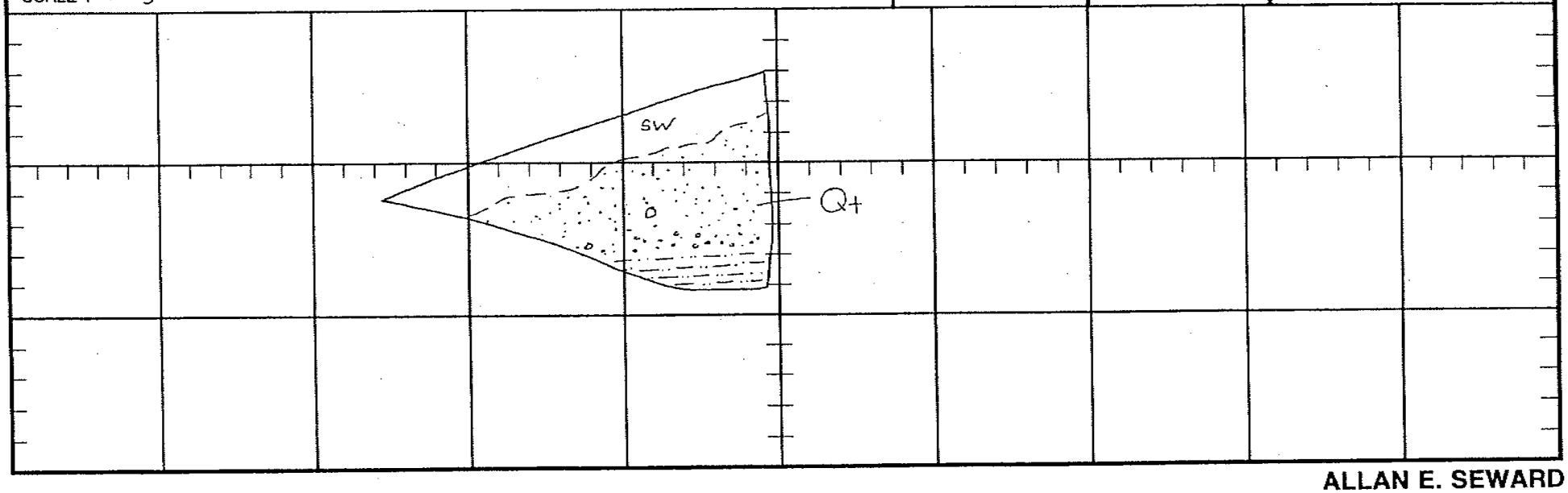
PROJECT Magic Mountain Entertainment

DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1.5' SLOPEWASH; sw, Light brown to light reddish-brown sandy silt with pebbles; loose to moderately dense; dry			
1.5 - 7' QUATERNARY TERRACE; Qt, Light reddish-brown silty pebbly sandstone, and sandy siltstone with pebbles; moderately hard to hard; damp	Horizontal		Hard siltstone at base with 2-3" grooves cut by backhoe teeth
			No Ground Water No Caving
			TOTAL DEPTH 7 Ft.

SCALE 1" = 5'

N 44 E



ALLAN E. SEWARD

JOB NO. 00-1729-1

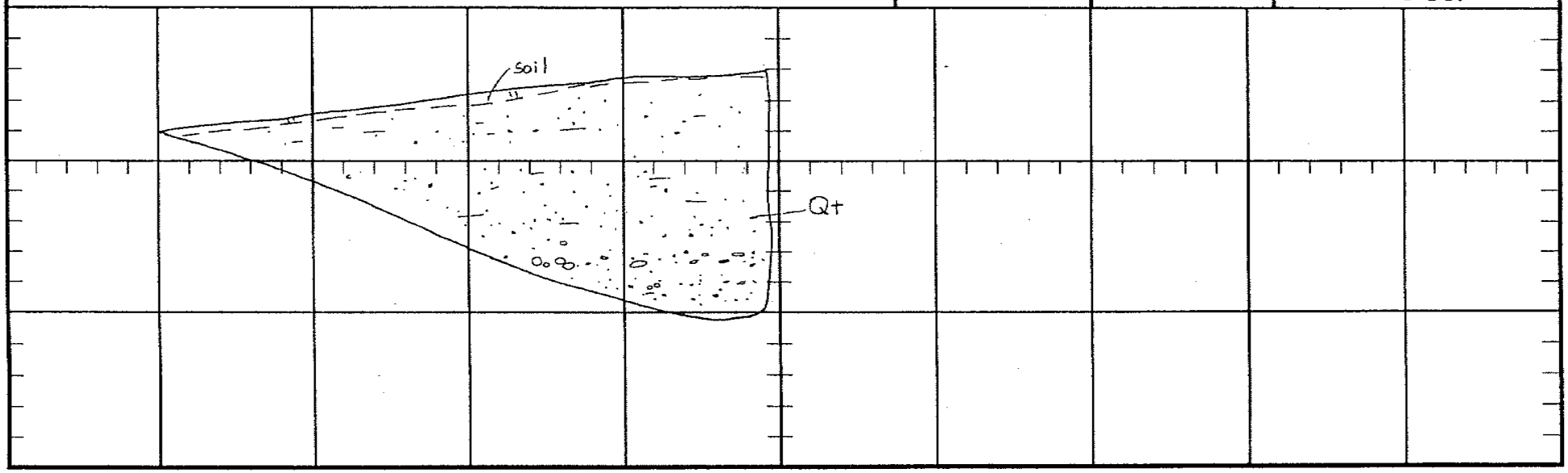
LOGGED BY SKM

Trench Log No. T-52

PROJECT Magic Mountain Entertainment

DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2" SOIL; s, Light brown silty sand to sandy silt; loose; dry			
2" - 8' QUATERNARY TERRACE; Qt, Light brown and light reddish-brown silty pebbly sandstone and pebbly sandstone; moderately hard to moderately friable; dry to damp	Horizontal		
SCALE 1" = 5' N 17 E			No Ground Water No Caving TOTAL DEPTH 8 Ft.



ALLAN E. SEWARD

JOB NO. 00-1729-1

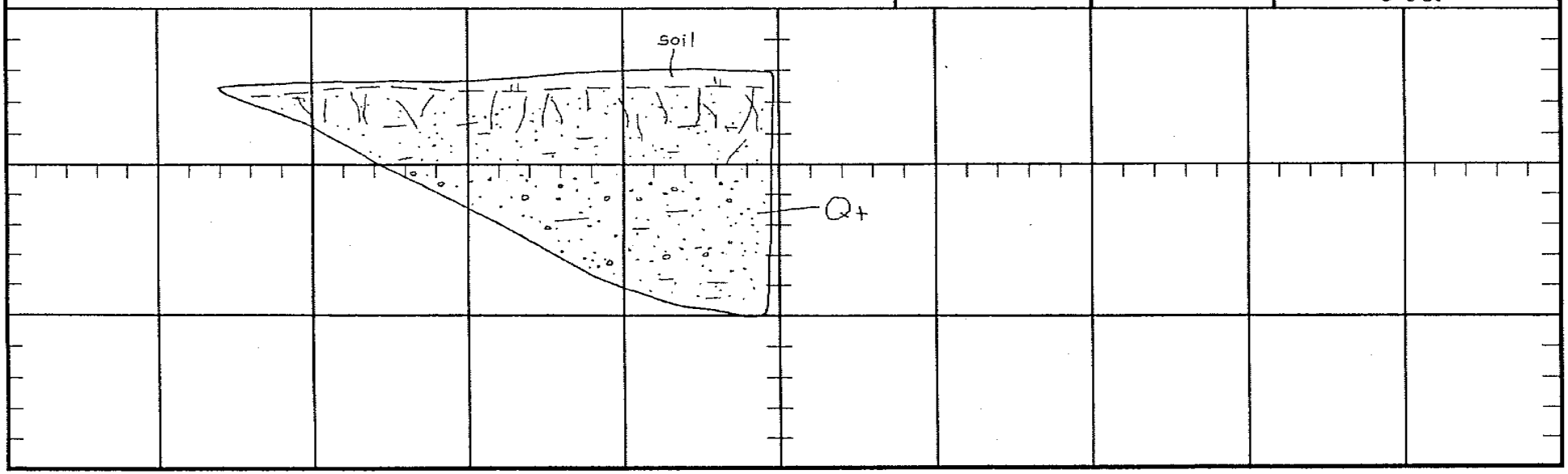
LOGGED BY SKM

Trench Log No. T-53

PROJECT Magic Mountain Entertainment

DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6" SOIL; s, Light brown sandy silt with pebbles; loose; dry			Weathered down to 2'
6" - 8' QUATERNARY TERRACE; Qt, Light brown to light reddish-brown silty sandstone and pebbly sandstone; moderately hard; friable in places; dry to damp	Horizontal		
			No Ground Water No Caving
SCALE 1" = 5' N 79 E			TOTAL DEPTH 8 Ft.



ALLAN E. SEWARD

JOB NO. 00-1703CM-1

LOGGED BY DGG

Trench Log No. T-55

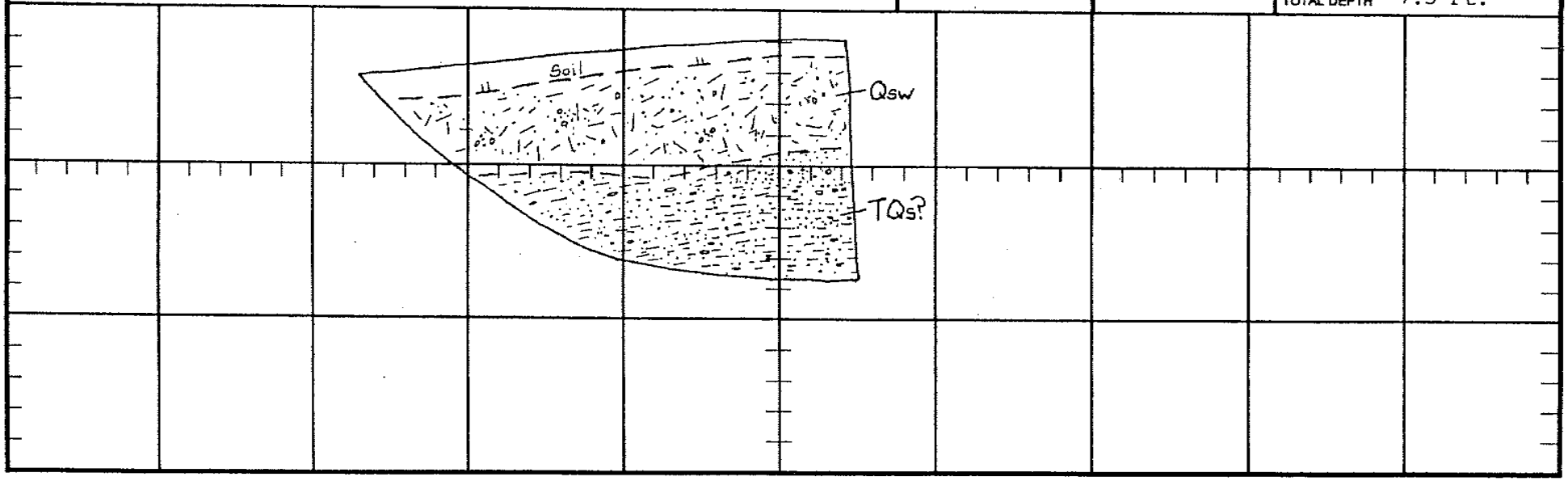
PROJECT Magic Mountain Entertainment

DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6" SOIL; s, Medium-brown silt to slightly sandy silt with rootlets and scattered pebbles; soft to firm; damp to moist			T-55 thru T-67 excavated 2/18/00 using a track mounted backhoe with a 24" bucket
6" - 3.5' SLOPEWASH; Qsw, Yellowish-brown silt to sandy silt within scattered pebbles and local pods of pebbles; loose to moderately dense; slightly damp to damp			
3.5 - 7.5' BEDROCK; TQs?, Yellowish- to light-brown siltstone, sandy siltstone with scattered pebbles, and fine- to coarse-grained pebbly sandstone; dense to slightly friable; slightly damp to damp; top 1.5' weathered	N46W,8NE		Lithology is transitional between TQs and Qt but bedding attitude indicates probable young TQs
			No Ground Water No Caving
			TOTAL DEPTH 7.5 Ft.

SCALE 1" = 5'

N 16 E



ALLAN E. SEWARD

JOB NO. 00-1703CM-1

LOGGED BY DGG

Trench Log No. T-56

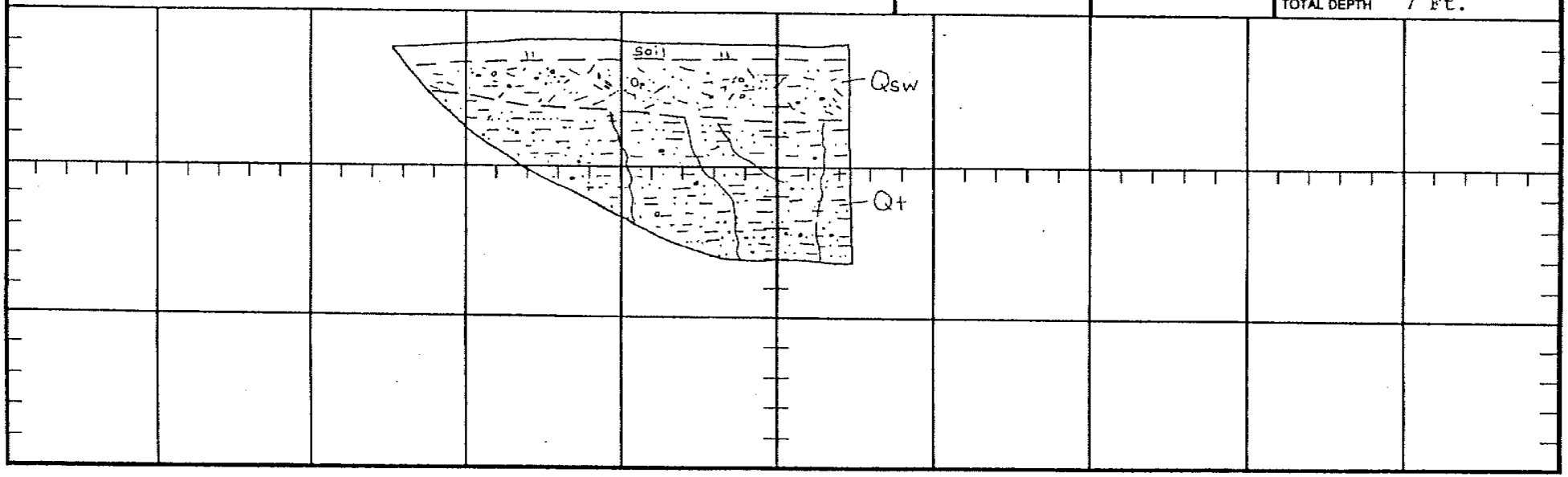
PROJECT Magic Mountain Entertainment

DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 0.5' SOIL; s, Medium-brown silt to slightly sandy silt with rootlets and scattered pebbles; soft to firm; damp to moist			
0.5 - 2.5' SLOPEWASH; Qsw, Yellowish-brown silt to sandy silt within scattered pebbles and local pods of pebbles; loose to moderately dense; slightly damp to damp		f:N34E,85NW	Fractures may be shattered ridge effects
2.5 - 7' QUATERNARY TERRACE DEPOSITS; Qt, Yellowish- to slightly pale reddish-brown siltstone to sandy siltstone with scattered pebbles; moderately dense to dense; damp; locally fractured	N82E,3NW		Lithology is transitional between TQs and Qt but bedding attitude indicates Qt
			No Ground Water No Caving
			TOTAL DEPTH 7 Ft.

SCALE 1" = 5'

N 15 E



ALLAN E. SEWARD

JOB NO. 00-1703CM-1

LOGGED BY DGG

Trench Log No. T-57

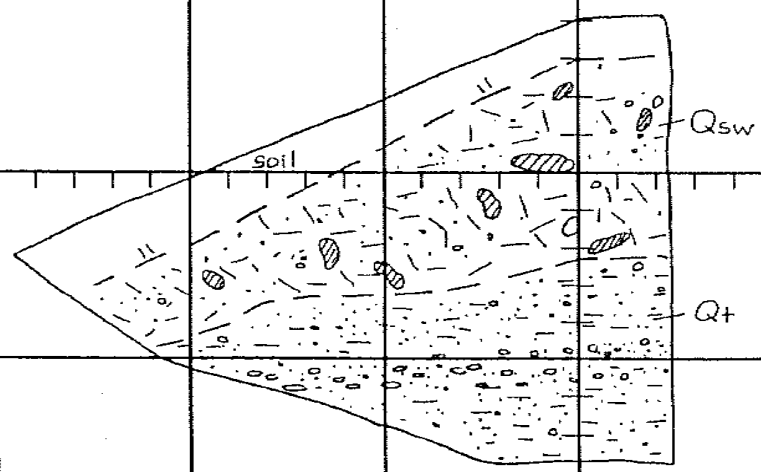
PROJECT Magic Mountain Entertainment

DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1' SOIL; s, Medium-brown silt to slightly sandy silt with rootlets and scattered pebbles; soft to firm; damp to moist			
1 - 6.5' SLOPEWASH; Qsw, Yellowish-brown silt to sandy silt with scattered pebbles and a few scattered cobbles; soft to firm; damp; abundant krotovina			
6.5 - 11.5' QUATERNARY TERRACE DEPOSITS; Qt, Yellowish-brown to light yellowish-brown siltstone, sandy siltstone and pebbly to cobbly sandstone and sandstone; moderately dense to dense but friable; damp; cross-bedding and channeling in sandstone	Apx. Horizontal		Lithology and bedding attitude indicate Qt unit
			No Ground Water No Caving
			TOTAL DEPTH 11.5 Ft.

SCALE 1" = 5'

N 65 W



ALLAN E. SEWARD

JOB NO. 00-1703CM-1

LOGGED BY DGG

Trench Log No. T-58

PROJECT Magic Mountain Entertainment

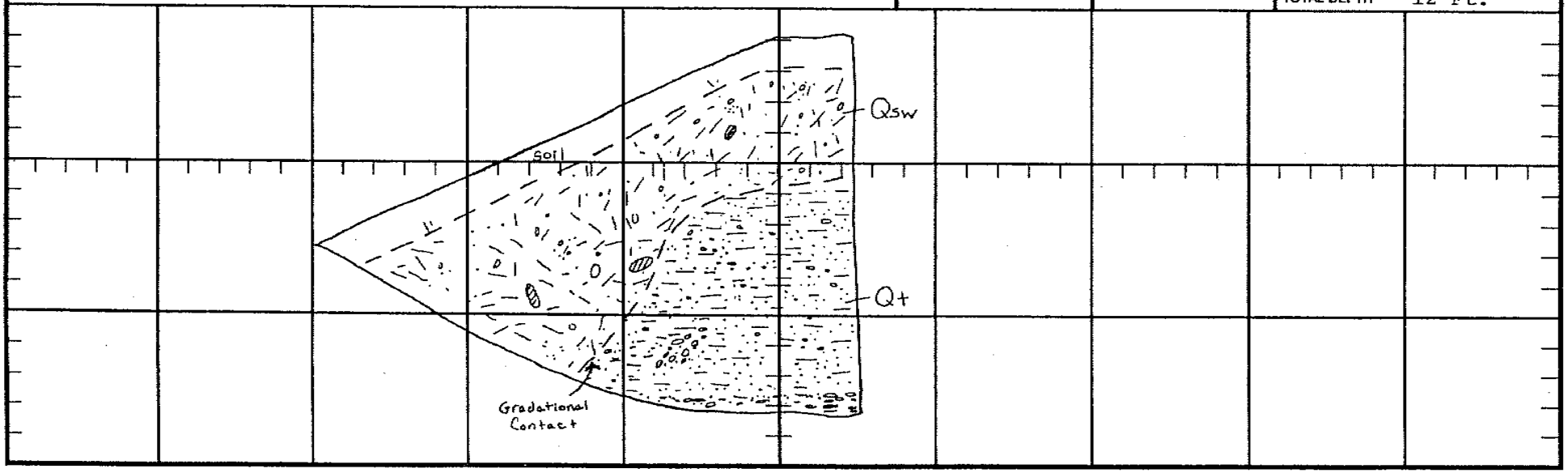
DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1.5' SOIL; s, Medium-brown silt to slightly sandy silt with rootlets and scattered pebbles; soft to firm; damp to moist			
1.5 - 4' SLOPEWASH; Qsw, Yellowish-brown silt to sandy silt with scattered pebbles and a few scattered cobbles; soft to firm; damp; scattered krotovina			
4 - 12' QUATERNARY TERRACE DEPOSITS; Qt, Yellowish-brown to light yellowish-brown siltstone, sandy siltstone; pebbly to cobbly sandstone and sandstone; moderately dense to dense but friable; damp; cross-bedding and channeling in sandstone	Apx: Horizontal		Lithology and bedding attitude indicate Qt unit
			No Ground Water No Caving

SCALE 1" = 5'

N 60 W

TOTAL DEPTH 12 Ft.



ALLAN E. SEWARD

JOB NO. 00-1703CM-1

LOGGED BY DGG

Trench Log No. T-59

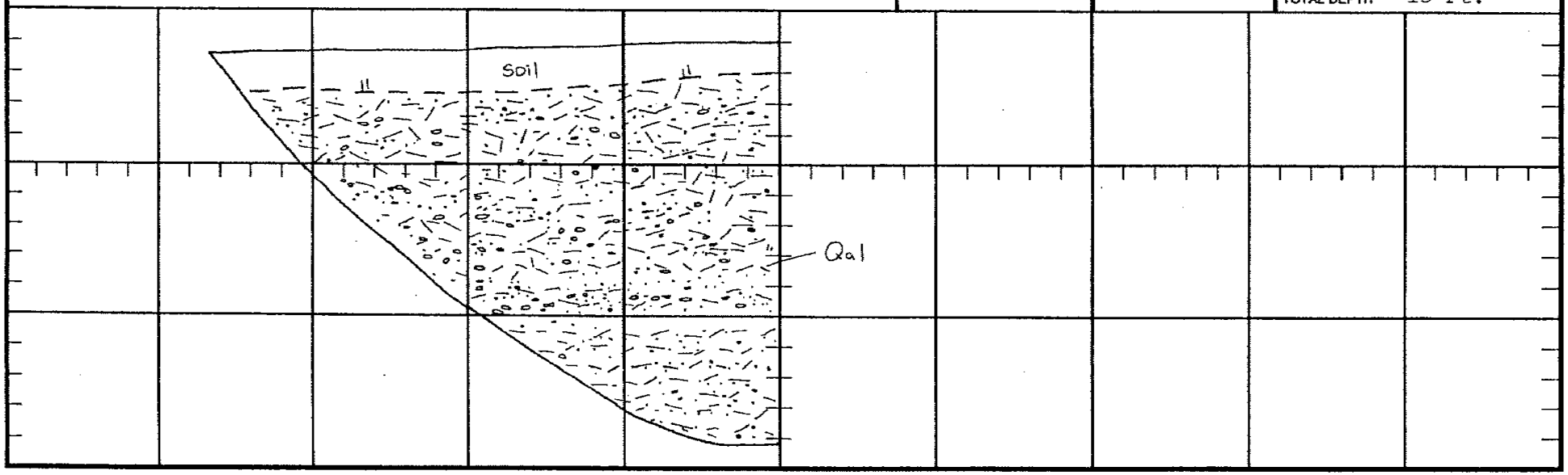
PROJECT Magic Mountain Entertainment

DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1' SOIL; s, Medium-brown silt to slightly sandy silt with rootlets and scattered pebbles; soft to firm; damp to moist			
1 - 13' QUATERNARY ALLUVIUM; Qal, Yellowish-brown to light brown silt to sandy silt with scattered pebbles and local sandy pebbly pockets; loose/soft; damp			No Ground Water No Caving TOTAL DEPTH 13 Ft.

SCALE 1" = 5'

N 40 E



ALLAN E. SEWARD

JOB NO. 00-1703CM-1

LOGGED BY DGG

Trench Log No. T-60

PROJECT Magic Mountain Entertainment

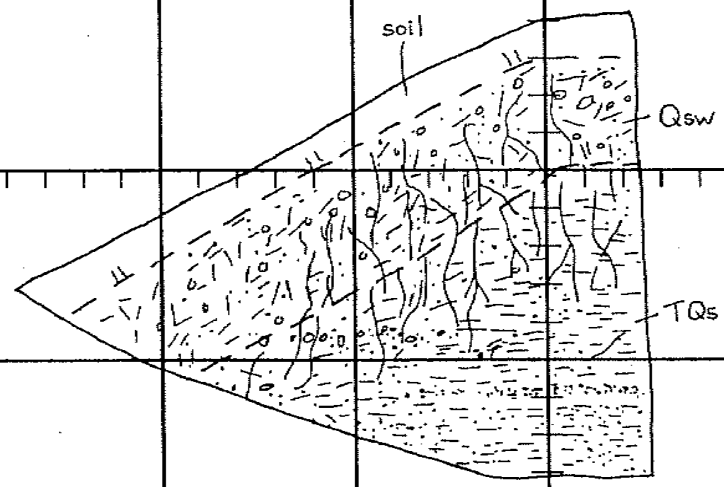
DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1' SOIL; s, Medium-brown silt to slightly sandy silt with rootlets and scattered pebbles; soft to firm; damp to moist			
1 - 4' SLOPEWASH; Qsw, Yellowish-to light-brown silt to sandy silt with pebbles and cobbles; loose; damp			
4 - 12' BEDROCK; TQs?; Yellowish-to light-brown siltstone, sandy siltstone, and sandstone, with scattered pebbles and few scattered cobbles; local concretions; moderately dense to dense but slightly loose; damp	Apx: N15W,10NE		Lithology is transitional between TQs and Qt but bedding attitude indicates TQs Upper 5' of bedrock highly fractured, weakened and creep affected No Ground Water No Caving

SCALE 1" = 5'

N 38 W

TOTAL DEPTH 12 Ft.



ALLAN E. SEWARD

JOB NO. 00-1703CM-1

LOGGED BY DGG

Trench Log No. T-61

PROJECT Magic Mountain Entertainment

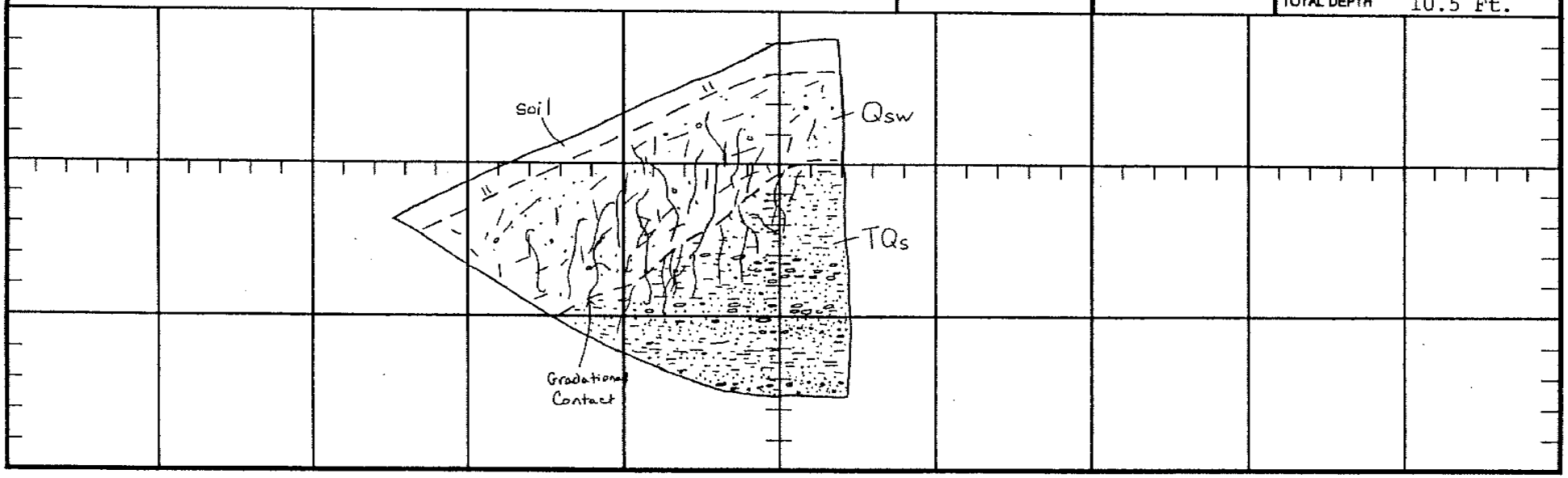
DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1' SOIL; s, Medium-brown silt to slightly sandy silt with rootlets and scattered pebbles; soft to firm; damp to moist			
1 - 4' SLOPEWASH; Qsw, Yellowish- to light-brown silt to sandy silt with scattered pebbles; loose/soft; damp; fractured			
4 - 10.5' BEDROCK; TQs?, Yellowish- to light-brown siltstone, sandy siltstone, pebbly cobbley sandstone and sandstone; loose to moderately dense; damp	N15W,8NE		Lithology is transitional between TQs and Qt but bedding attitude indicates TQs No Ground Water No Caving

SCALE 1" = 5'

N 47 W

TOTAL DEPTH 10.5 Ft.



ALLAN E. SEWARD

JOB NO. 00-1703CM-1

LOGGED BY DGG

Trench Log No. T-62

PROJECT Magic Mountain Entertainment

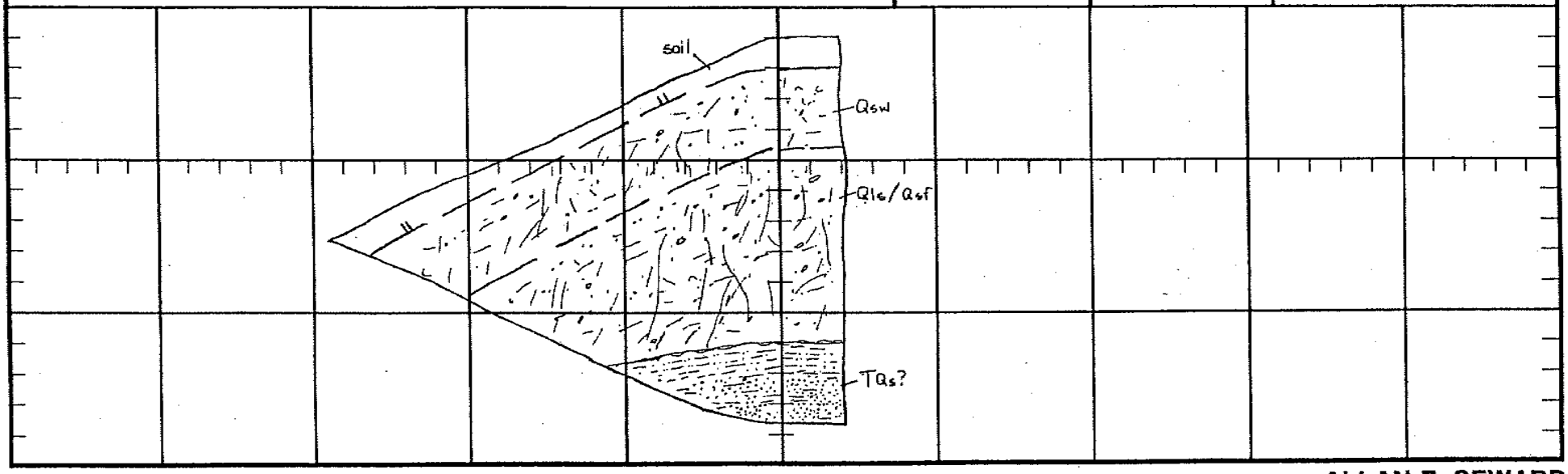
DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1' SOIL; s, Medium-brown silt to slightly sandy silt with rootlets and scattered pebbles; soft to firm; damp to moist			
1 - 3.5' SLOPEWASH; Qsw, Yellowish- to light-brown silt to sandy silt with scattered pebbles; loose; damp			
3.5 - 10' SURFICIAL FAILURE; Qsf, Yellowish-brown silt and sandy silt with scattered pebbles and few scattered cobbles; damp; 2-3% void space			
10 - 12.5' BEDROCK; TQs, Yellowish- to light-brown siltstone, sandy siltstone and fine- to coarse-grained sandstone; moderately dense to dense; damp; top 4" of bedrock sheared with caliche	N27W,5NE		Lithology and bedding attitude are transitional between TQs and Qt No Ground Water No Caving

N 71 W

SCALE 1" = 5'

TOTAL DEPTH 12.5 Ft.



ALLAN E. SEWARD

JOB NO. 00-1703CM-1

LOGGED BY DGG

Trench Log No. T-63

PROJECT Magic Mountain Entertainment

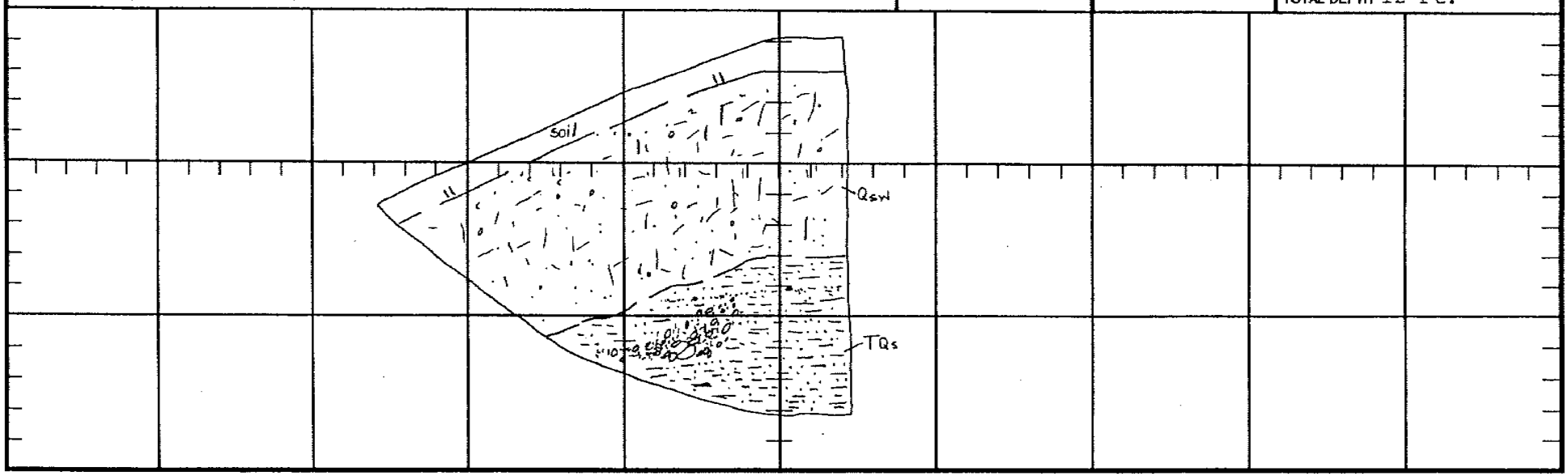
DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1' SOIL; s, Medium-brown silt to slightly sandy silt with rootlets and scattered pebbles; soft to firm; damp to moist			
1 - 6' SLOPEWASH; Qsw, Yellowish- to medium-brown silt to sandy silt with scattered pebbles; loose; damp			
6 - 12' BEDROCK; TQs?, Yellowish-brown siltstone to sandy siltstone, with lenses of fine- to medium-grained sandstone and channel of pebbly cobbly sandstone; dense; slightly damp	Apx:N60W,5NE		Lithology and bedding attitude are transitional between TQs and Qt Upper 4' of bedrock highly weathered No Ground Water No Caving

SCALE 1" = 5'

N 10 E

TOTAL DEPTH 12 Ft.



ALLAN E. SEWARD

JOB NO. 00-1703CM-1

LOGGED BY DGG

Trench Log No. T-64

PROJECT Magic Mountain Entertainment

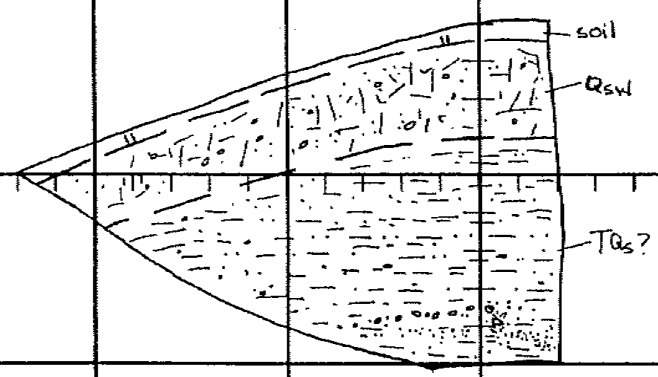
DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - .5' SOIL; s, Medium-brown silt to slightly sandy silt with rootlets and scattered pebbles; soft to firm; damp to moist			
.5 - 3' SLOPEWASH: Qsw, Yellowish- to light-brown silt to sandy silt with scattered pebbles; loose; damp			
3 - 9' BEDROCK; TQs?, Yellowish- to light-brown siltstone with scattered pebbles, sandy siltstone; fine-grained sandstone and pebbly sandstone; moderately dense to moderately hard; damp	Apx: N61W,13NE		Lithology transitional between TQs and Qt but bedding attitude indicates TQs Upper 2' of bedrock weathered No Ground Water No Caving

N 74 W

SCALE 1" = 5'

TOTAL DEPTH 9 Ft.



ALLAN E. SEWARD

JOB NO. 00-1703CM-1

LOGGED BY DGG

Trench Log No. T-65

PROJECT Magic Mountain Entertainment

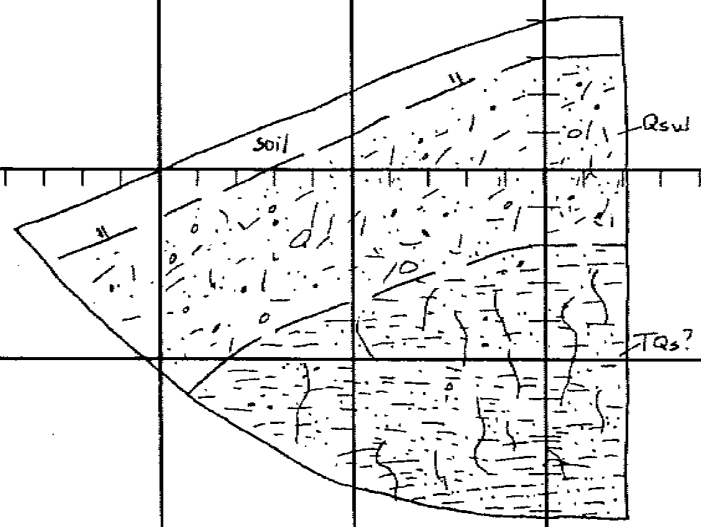
DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1' SOIL; s, Medium-brown silt to slightly sandy silt with rootlets and scattered pebbles; soft to firm; damp to moist			
1 - 6' SLOPEWASH; Qsw, Yellowish- to medium-brown silt to sandy silt with scattered pebbles and a few cobbles; loose to dense; slightly damp			
6 - 13' BEDROCK; TQs?, Yellowish- to light-brown siltstone and sandy siltstone with scattered pebbles; upper 6 ft. moderately dense, weathered and fractured, but bottom ft. moderately hard; damp; caliche along fractures	Apx:N66W,11NE		Lithology is transitional between TQs and Qt but bedding attitude indicates TQs No Ground Water No Caving

N 14 E

SCALE 1" = 5'

TOTAL DEPTH 13 Ft.



ALLAN E. SEWARD

JOB NO. 00-1703CM-1

LOGGED BY DGG

Trench Log No. T-66

PROJECT Magic Mountain Entertainment

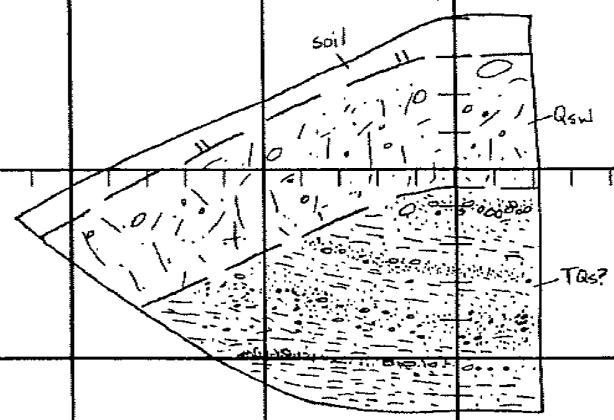
DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1' SOIL; s, Medium-brown silt to slightly sandy silt with rootlets and scattered pebbles; soft to firm; damp to moist			
1 - 4.5' SLOPEWASH: Qsw, Yellowish- to medium brown silt to sandy silt with scattered pebbles and cobbles			
4.5 - 10.5' BEDROCK; TQs?, Light-brown to light-gray fine- to coarse-grained sandstone, silty sandstone and pebbly sandstone with cobbles; dense but moderately friable; slightly damp	N63W,11NE		Lithology is transitional between TQs and Qt but bedding attitude indicates TQs

N 57 E

SCALE 1" = 5'

TOTAL DEPTH 10.5 Ft.



ALLAN E. SEWARD

JOB NO. 00-1703CM-1

LOGGED BY DGG

Trench Log No. T-67

PROJECT Magic Mountain Entertainment

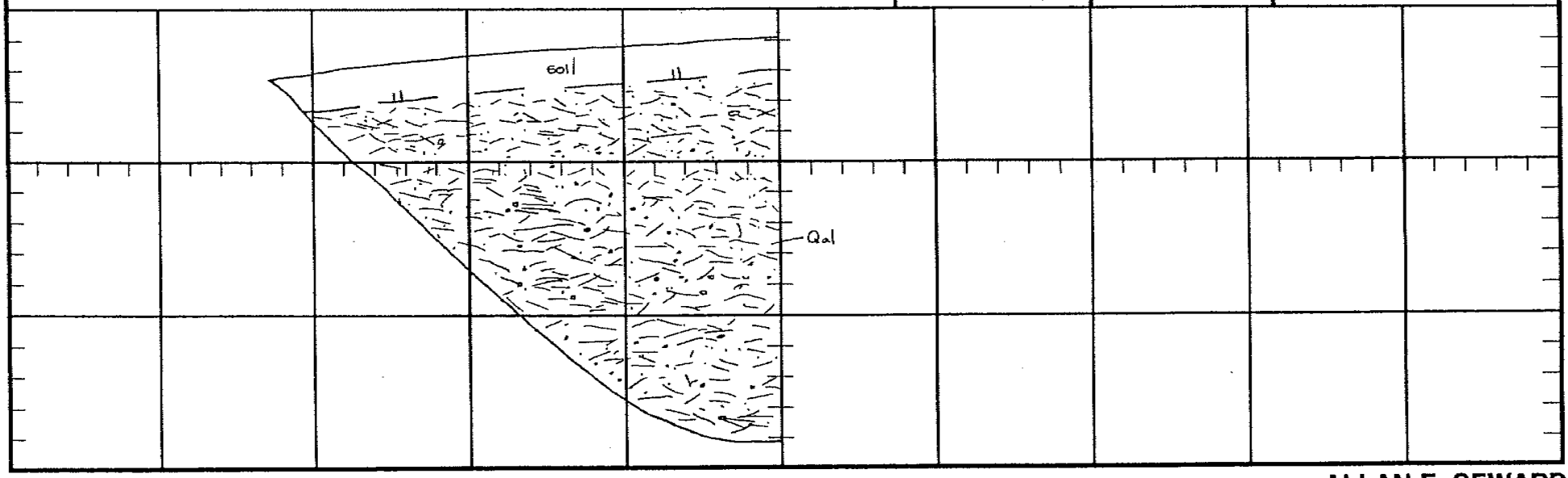
DATE 5/25/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1' SOIL; s, Medium-brown silt to slightly sandy silt with rootlets and scattered pebbles; soft to firm; damp to moist			
1 - 13' QUATERNARY ALLUVIUM; Qal, Medium-brown, locally yellowish-brown silt to sandy silt with scattered pebbles and local cobbles; loose to moderately dense; slightly damp to damp			2-3% voids; 1/4" to 3/8" diameter to bottom of trench
			No Ground Water No Caving

SCALE 1" = 5'

N 78 E

TOTAL DEPTH 13 Ft.

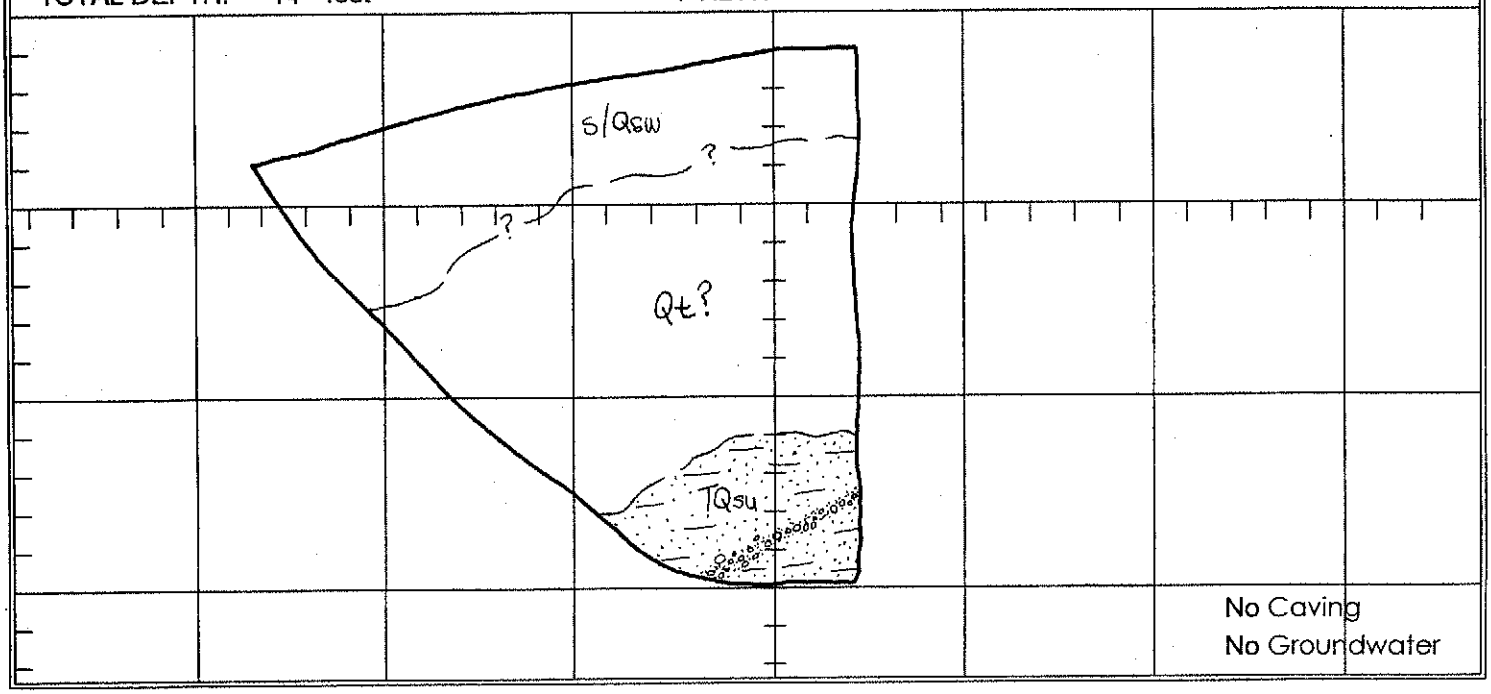


ALLAN E. SEWARD

CLIENT: Newhall Ranch Co.	JOB NO: 04-2023A-4	**TRENCH LOG NO. T-115T**	
PROJECT: Mesas East Access Road	DATE: 12/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 1/12/04		
EXCAVATION METHOD: Trackhoe	ELEVATION:		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; s/Qsw (0-2.5')** @ 0' Sandy, silty clay; soft to firm; damp; medium brown				
					QUATERNARY TERRACE DEPOSITS?; Qt? (2.5-10') @ 2.5' Pebbly, sandy silt to clay; stiff; damp; yellowish to medium brown; scattered cobbles				
5									
10					**BEDROCK; TQsu (10-14')** @ 10' Yellowish- to grayish-brown mudstone, siltstone, and pebbly silty sandstone; soft to moderately hard; damp; punky; sands are friable	(Very Apx.) B: N85W, 38NE			
					COMMENTS Highly weathered to 13'				
15									
20									

TOTAL DEPTH: 14 feet ←N21W SCALE: 1 inch = 5 feet

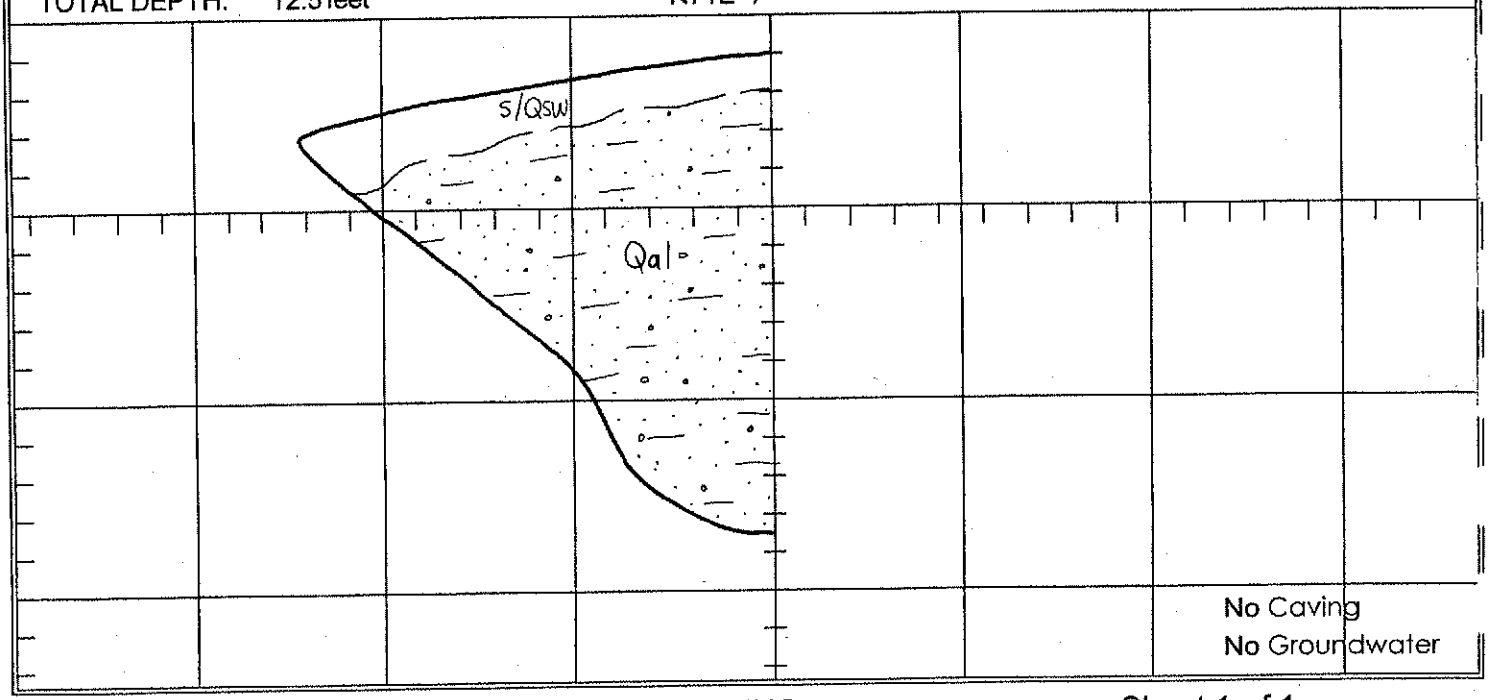


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 04-2023A-4	**TRENCH LOG NO. T-116T**	
PROJECT: Mesas East Access Road	DATE: 12/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 1/12/04		
EXCAVATION METHOD: Trackhoe	ELEVATION:		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; s/Qsw (0-1')** @ 0' Pebbly sandy silt to clay; soft; damp; grayish brown **QUATERNARY ALLUVIUM; Qal (1-12.5')** @ 1' Sandy silty clay with scattered pebbles; stiff; damp; yellowish to grayish brown				
5									
10									
					COMMENTS Surface logged below 5' Weathered down to 8'				
15									
20									

TOTAL DEPTH: 12.5 feet N71E→ SCALE: 1 inch = 5 feet



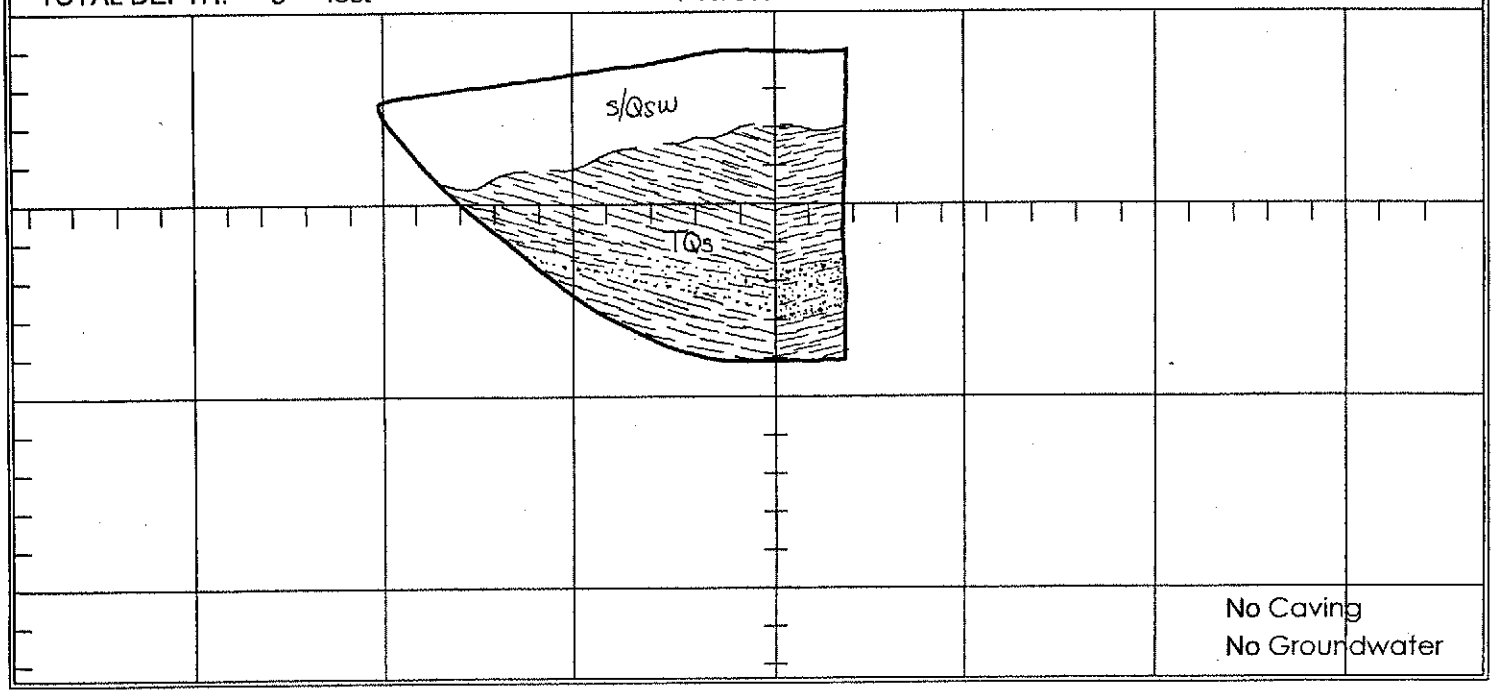
No Caving
No Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 04-2023A-4	**TRENCH LOG NO. T-117T**
PROJECT: Mesas East Access Road	DATE: 12/22/04	
	LOGGED BY: DGG	
	EXCAVATED: 1/12/04	
EXCAVATION METHOD: Trackhoe	ELEVATION:	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; s/Qsw (0-2')** @ 0' Silty clay; soft; damp; yellowish brown				
					BEDROCK; TQs (2-8') @ 2' Yellowish- to grayish-brown mudstone, siltstone, and silty sandstone; soft to moderately hard; damp				
5						XB: N26W, 18NE			
					COMMENTS Highly weathered to 5'				
10									
15									
20									

TOTAL DEPTH: 8 feet ←N79W SCALE: 1 inch = 5 feet

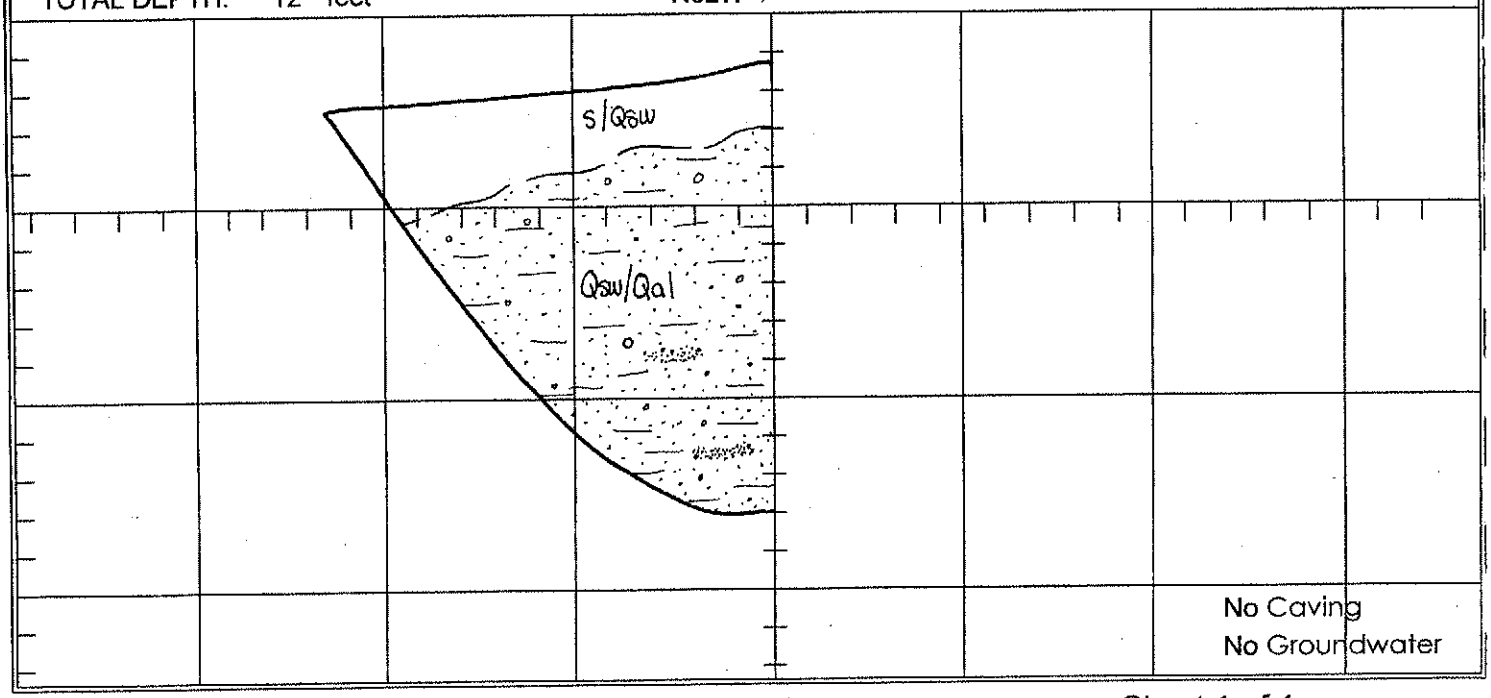


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 04-2023A-4	**TRENCH LOG NO. T-118T**	
PROJECT: Mesas East Access Road	DATE: 12-22-04		
	LOGGED BY: DGG		
	EXCAVATED: 1/12/04		
EXCAVATION METHOD: Trackhoe	ELEVATION:		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; s/Qsw (0-2')** @ 0' Pebbly silty clay; soft; damp; grayish brown **SLOPEWASH/QUATERNARY ALLUVIUM; Qsw/Qal (2 12')** @ 2' Pebbly, sandy, silt to clay with pebbly sand lenses; firm to stiff; damp; yellowish to grayish brown; few scattered cobbles				
5									
10					**COMMENTS** Highly weathered down to 7'				
15									
20									

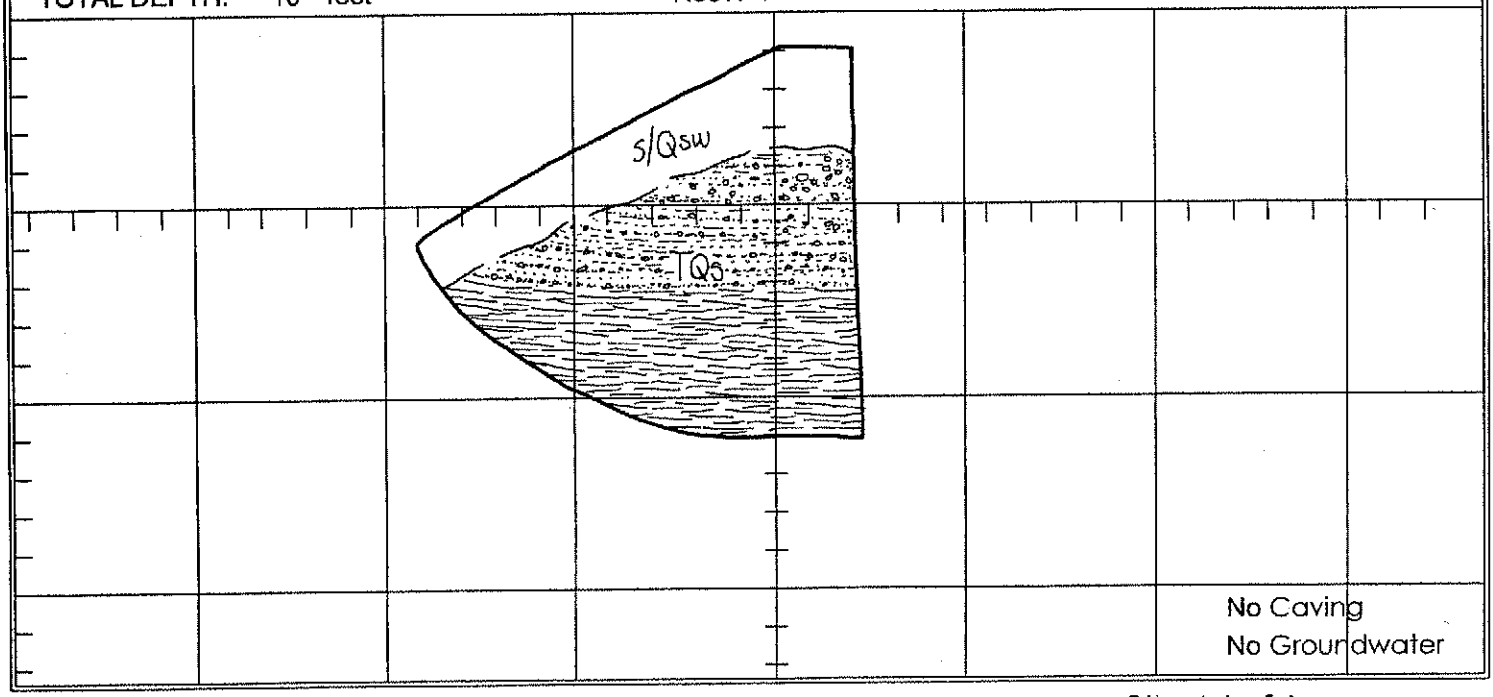
TOTAL DEPTH: 12 feet N52W→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Co.	JOB NO: 04-2023A-4	**TRENCH LOG NO. T-119T**	
PROJECT: Mesas East Access Road	DATE: 12/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 1/12/04		
EXCAVATION METHOD: Trackhoe	ELEVATION:		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; s/Qsw (0-2.5')** @ 0' Pebbly silty clay; soft; damp; grayish brown				
					BEDROCK; TQs (2.5-10') @ 2.5' Yellowish- to grayish-brown pebbly, silty sandstone and mudstone; sandstone is friable; mudstone is moderately hard to hard; damp; some fracture surfaces with caliche	Apx. B: N20W, 5NE			
5									
10					**COMMENTS** Highly weathered to 6'				
15									
20									

TOTAL DEPTH: 10 feet N55W→ SCALE: 1 inch = 5 feet

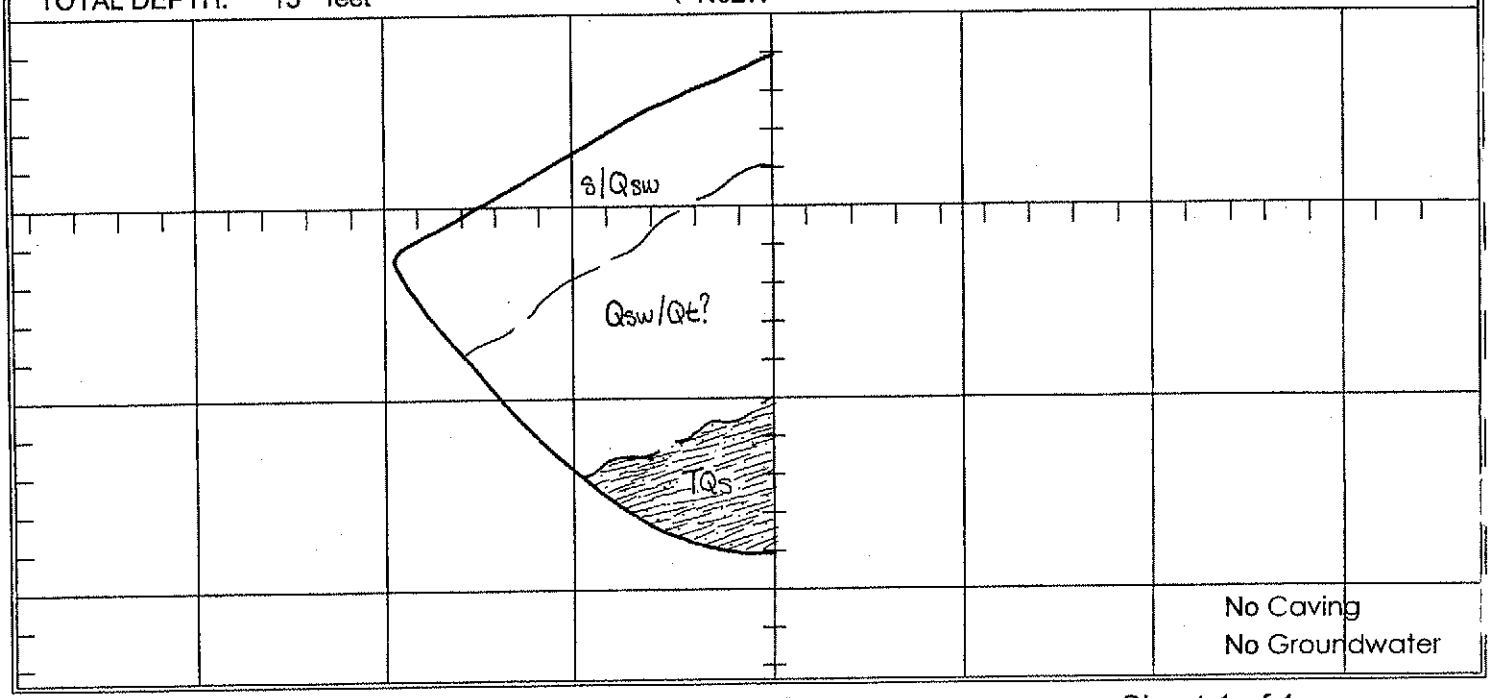


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 04-2023A-4	**TRENCH LOG NO. T-120T**	
PROJECT: Mesas East Access Road	DATE: 12/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 1/12/04		
EXCAVATION METHOD: Trackhoe	ELEVATION:		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; s/Qsw (0-3')** @ 0' Pebbly, sandy silt to clay; soft to firm; damp; dark grayish brown				
5					**SLOPEWASH?/QUATERNARY TERRACE DEPOSITS?; Qsw?/ Qt? (3-9')** @ 3' Silty clay; hard; damp; grayish-brown				
10					**BEDROCK; TQs (9-13')** @ 9' Yellowish- to grayish-brown mudstone; hard; damp				
15					**COMMENTS** Highly weathered to 3'				
20									

TOTAL DEPTH: 13 feet ←N62W SCALE: 1 inch = 5 feet

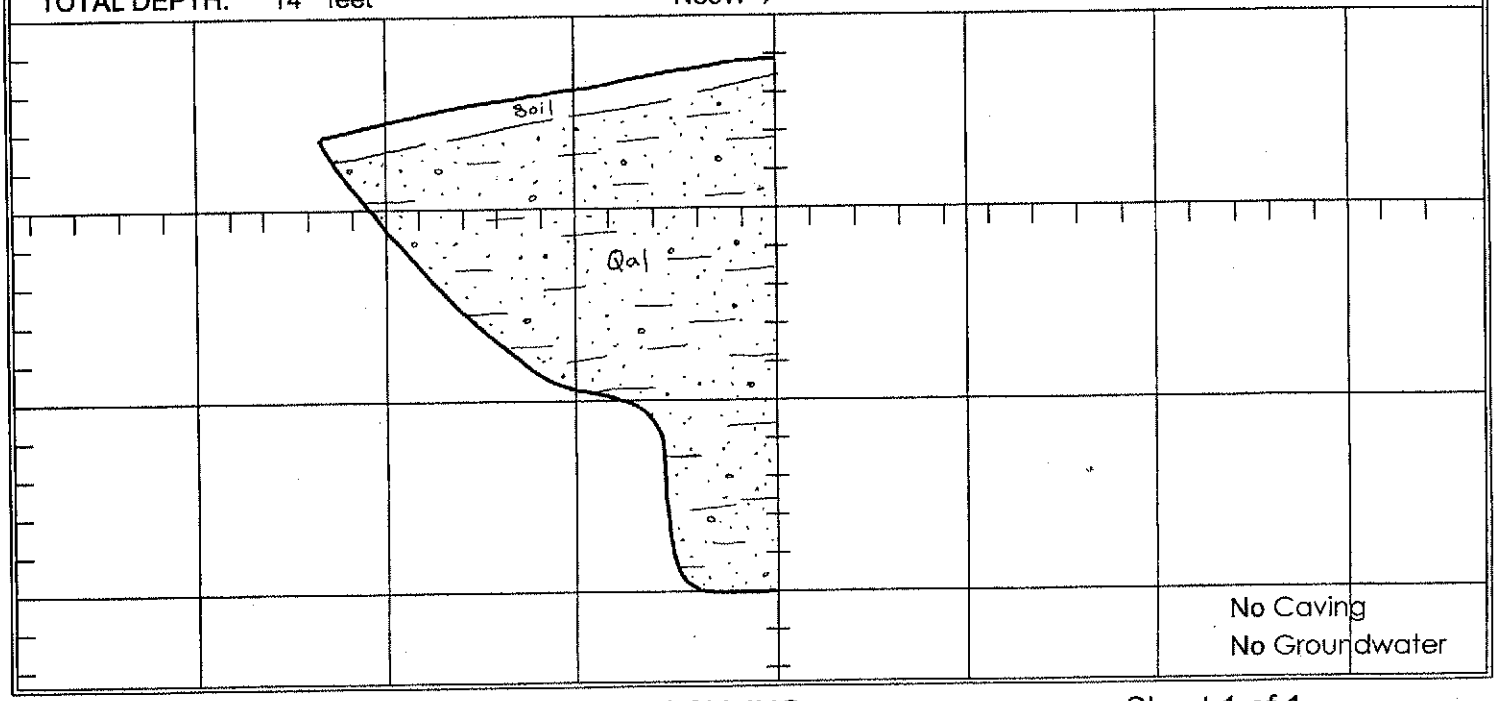


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 04-2023A-4	**TRENCH LOG NO. T-121T**	
PROJECT: Mesas East Access Road	DATE: 12/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 1/12/04		
EXCAVATION METHOD: Trackhoe	ELEVATION:		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; s (0-0.5')** @ 0' Sandy silt to clay; soft to firm; damp; grayish- brown **QUATERNARY ALLUVIUM; Qal (0.5-14')** @ 0.5' Pebbly, sandy silt to clay; stiff to very stiff; damp; yellowish to grayish brown				
5									
10									
15					**COMMENTS** Surface logged below 6'				
20									

TOTAL DEPTH: 14 feet N38W→ SCALE: 1 inch = 5 feet

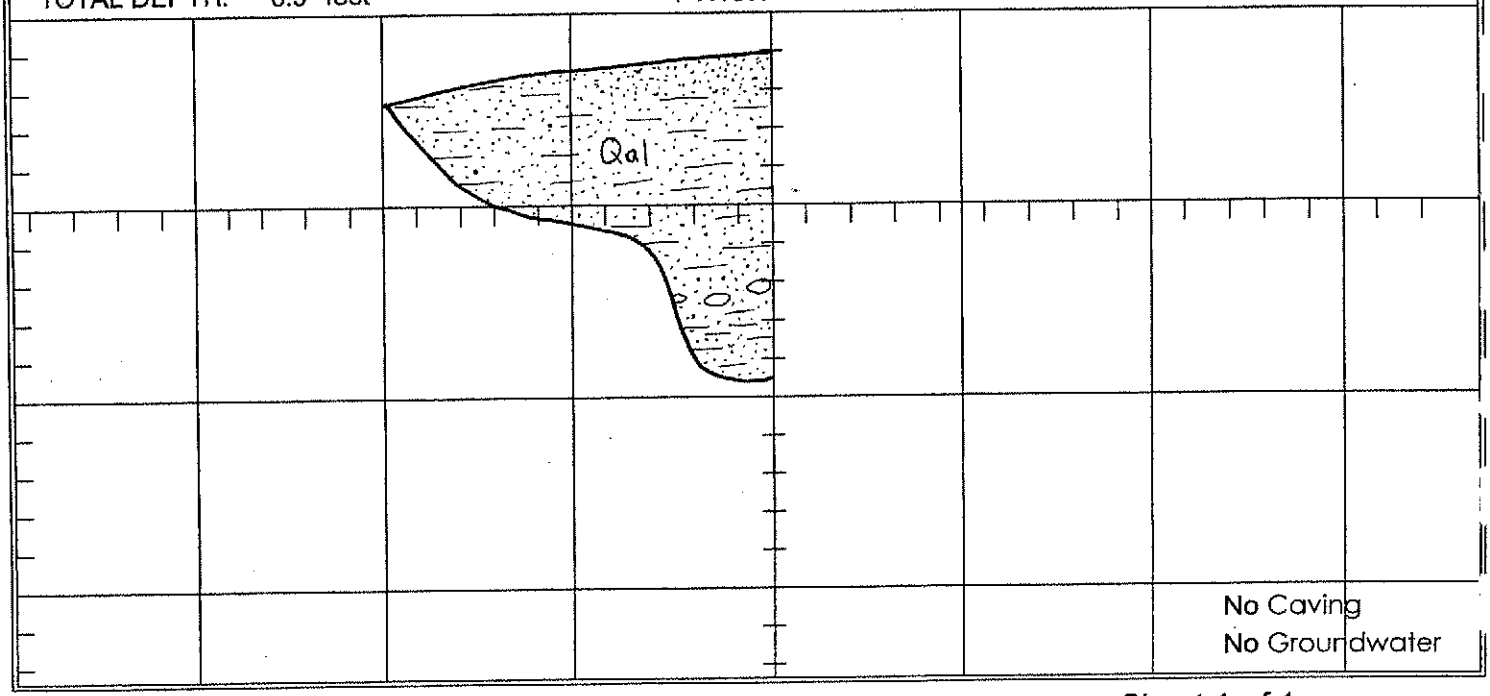


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 04-2023A-4	**TRENCH LOG NO. T-122T**	
PROJECT: Mesas East Access Road	DATE: 12/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 1/12/04		
EXCAVATION METHOD: Trackhoe	ELEVATION:		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**QUATERNARY ALLUVIUM; Qal (0-8.5')** @ 0' Clay to silt to sandy silt; soft to very stiff; damp; yellowish to grayish brown; some large cobbles	B: Horiz			
5									
10									
15									
20									

TOTAL DEPTH: 8.5 feet ←N16W SCALE: 1 inch = 5 feet

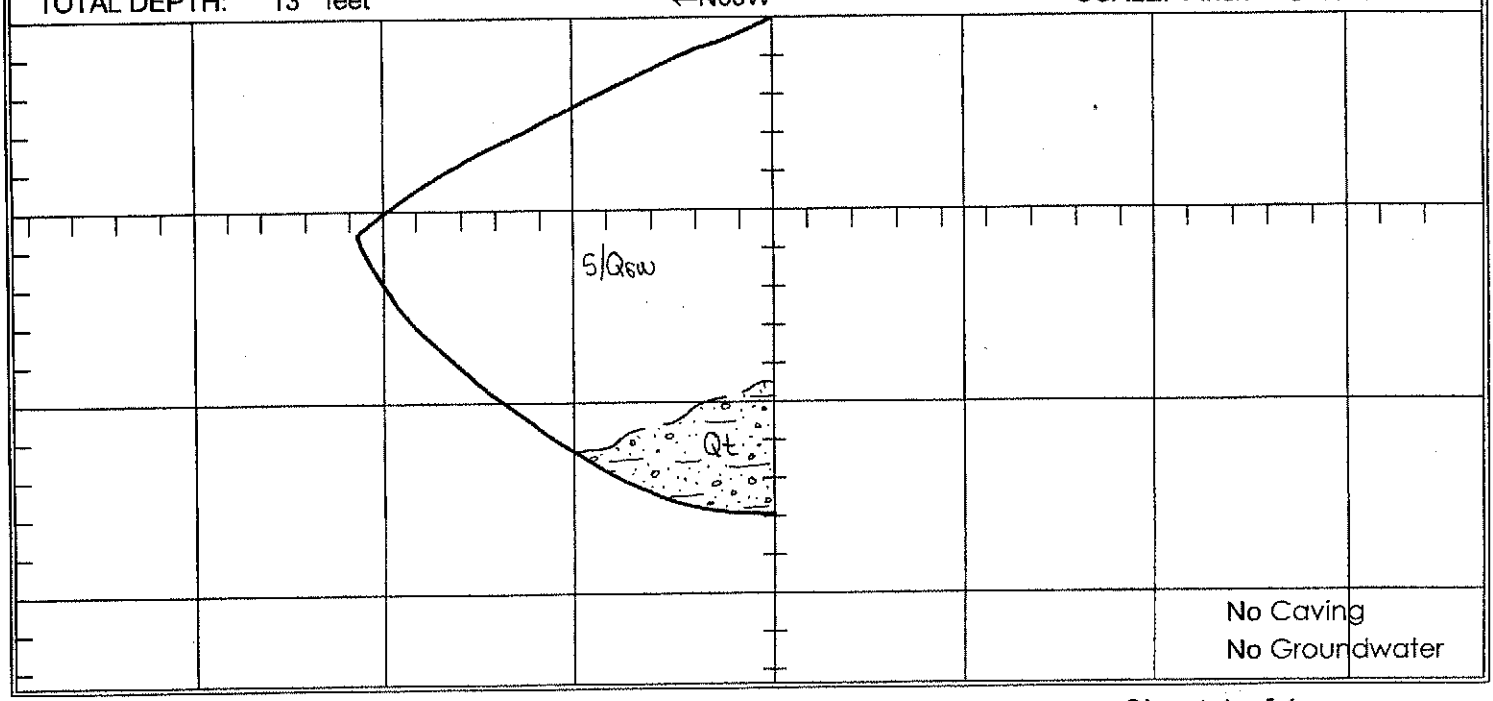


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 04-2023A-4	**TRENCH LOG NO. T-123T**	
PROJECT: Mesas East Access Road	DATE: 12/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 1/12/04		
EXCAVATION METHOD: Trackhoe	ELEVATION:		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; s/Qsw (0-9.5')** @ 0' Pebbly, sandy silt to clay; firm to stiff; damp; yellowish to grayish brown				
5									
10					**QUATERNARY TERRACE DEPOSITS; Qt (9.5-13')** @ 9.5' Pebbly, sandy silt to clay; hard; damp; grayish brown				
15									
20									

TOTAL DEPTH: 13 feet ←N60W SCALE: 1 inch = 5 feet

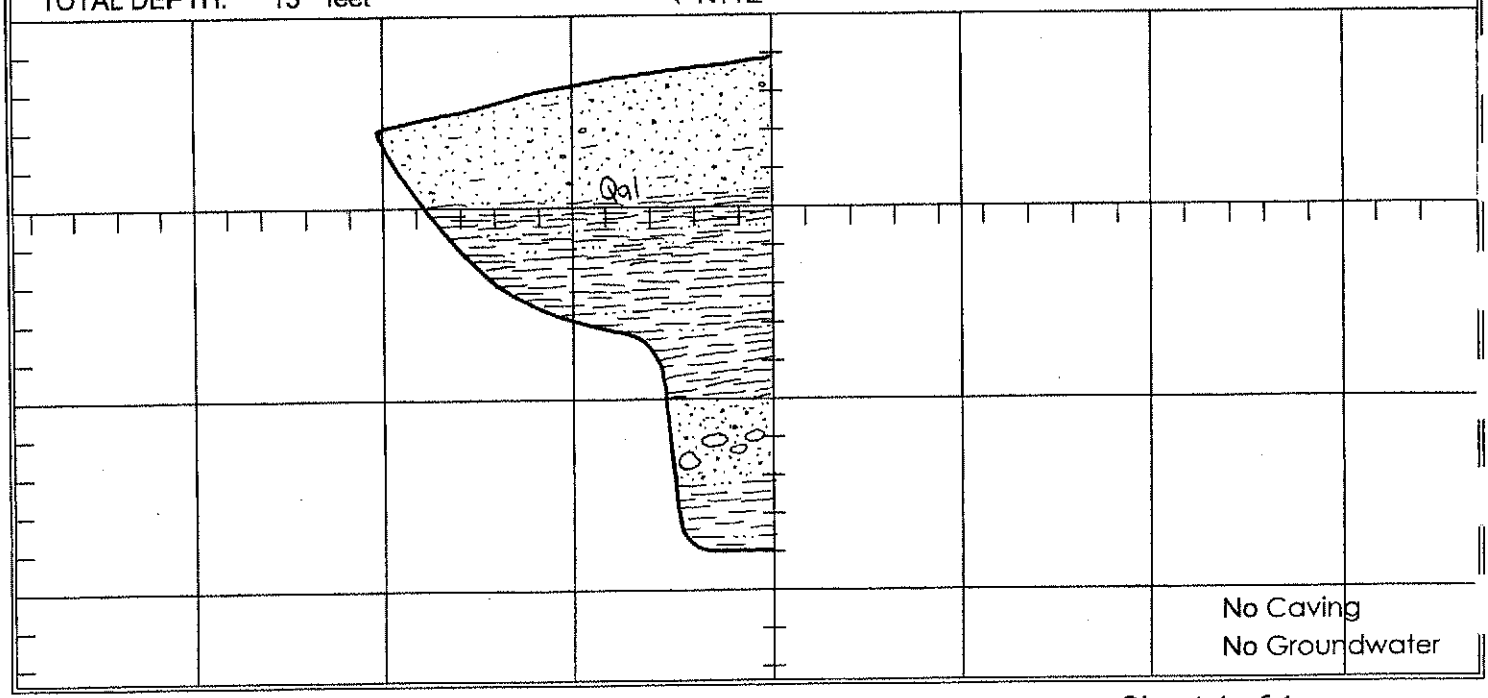


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 04-2023A-4	**TRENCH LOG NO. T-124T**	
PROJECT: Mesas East Access Road	DATE: 12/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 1/12/04		
EXCAVATION METHOD: Trackhoe	ELEVATION:		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**QUATERNARY ALLUVIUM; Qal (0-13')** @ 0' Poorly graded sand with silt and gravel, silt and sandy, silty clay; firm to very stiff; damp; light grayish brown to medium to dark brown; some large cobbles; minor belling 9-11' @ 4-8' -stiff to very stiff; friable below 8' @ 12' -tighter/harder **COMMENTS** Surface logged below 6'				
5									
10									
15									
20									

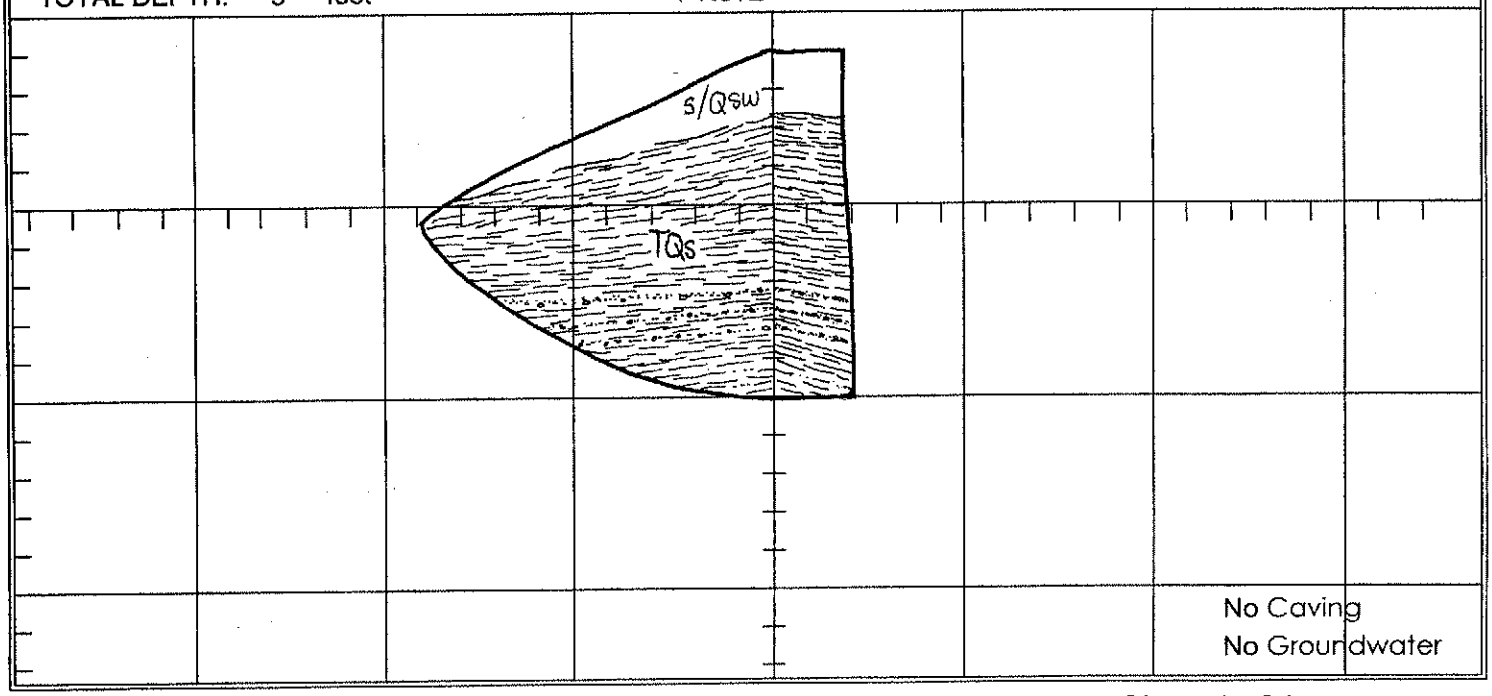
TOTAL DEPTH: 13 feet ←N11E SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Co.	JOB NO: 04-2023A-4	**TRENCH LOG NO. T-125T**	
PROJECT: Mesas East Access Road	DATE: 12/22/04		
	LOGGED BY: DGG		
	EXCAVATED: 1/12/04		
EXCAVATION METHOD: Trackhoe	ELEVATION:		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; s/Qsw (0-1.5')** @ 0' Sandy, silty clay; firm; damp; medium to dark brown **BEDROCK; TQs (1.5-9')** @ 1.5' Grayish-brown mudstone, siltstone and pebbly, silty sandstone to sandy siltstone; slightly to moderately hard; sandstones are friable; damp; caliche surfaces	B: N33W, 13NE			
5									
10					**COMMENTS** Highly weathered to 9'				
15									
20									

TOTAL DEPTH: 9 feet ←N81E SCALE: 1 inch = 5 feet

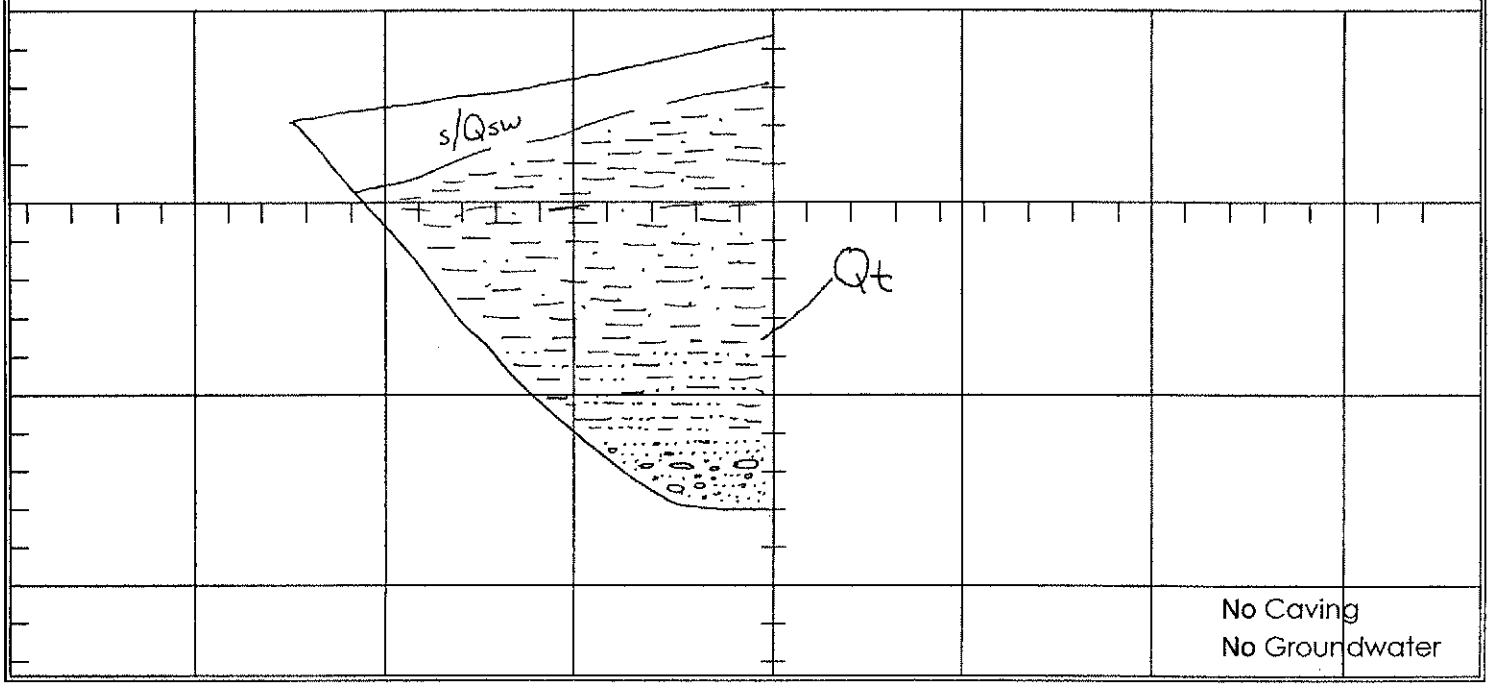


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Ranch Co.	JOB NO: 04-2023A-4	**TRENCH LOG NO. T-126T**	
PROJECT: Mesas East Access Road	DATE: 9/1/2004		
	LOGGED BY: DGG		
	EXCAVATED: 1/13/04		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1203'		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; s/Qsw (0-1')** @ 0' Sandy, silty clay; stiff to very stiff; damp; reddish- to grayish- to medium brown **QUATERNARY TERRACE DEPOSITS; Qt (1-12')** @ 1' Silty clay, silt, and poorly graded sand with gravel; soft to stiff/loose; damp; yellowish- to grayish- brown and medium gray; some large cobbles; abundant caliche at 8'; punky, disturbed above 8'; minor belling below 10'	B: Horizontal			
5									
10					**COMMENTS** Highly weathered to 8'				
15									
20									

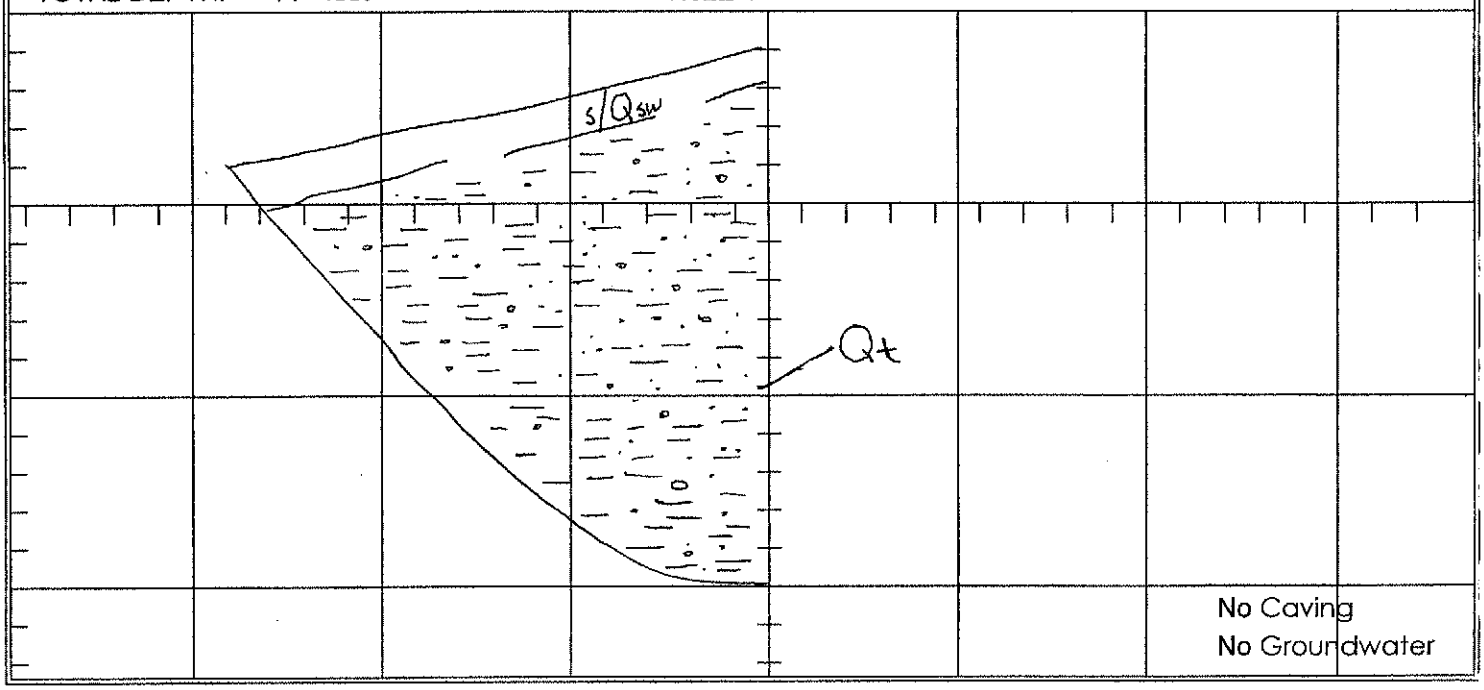
TOTAL DEPTH: 12 feet N55E→ SCALE: 1 inch = 5 feet



CLIENT: Newhall Ranch Co.	JOB NO: 04-2023A-4	**TRENCH LOG NO. T-127T**	
PROJECT: Mesas East Access Road	DATE: 9/1/2004		
	LOGGED BY: DGG		
	EXCAVATED: 1/13/04		
EXCAVATION METHOD: Trackhoe	ELEVATION: 1178'		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; s/Qsw (0-1')** @ 0' Sandy, silty clay; firm; damp; medium to dark brown **QUATERNARY TERRACE DEPOSITS; Qt (1-14')** @ 1' Sandy, silty clay with gravel; stiff to locally very stiff; damp; medium brown				
5									
10									
15									
20									

TOTAL DEPTH: 14 feet N82E→ SCALE: 1 inch = 5 feet



ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

BORING NO. B-61E

PROJECT: Newhall Ranch - Mesas East — JOB NO.: 00-1703CM-1
Phase II Landslide Investigation — DATE: 5/25/00
DRILLING COMPANY/DRILLER: Tri Valley Drilling/Danny
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket-Auger 24" (4WD Rig)
HAMMER TYPE: Telescoping Kelly Bar — AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-24'=3160 lbs, 24-47'=2040 lbs, 47-72'=1120 lbs
ELEVATION: 1300± — LOGGED BY: BJS

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						BEDROCK; TOs (0 - 65 Ft.)	Excavated and logged on 3/1/00 and 3/2/00
						@ 0' Light yellowish-brown sandy siltstone to silty sandstone with local interbeds and channels of sandstone and pebbly sandstone; finer beds dense, slightly damp to damp, not well sorted and poorly bedded; coarse beds dense but slightly friable, dry to slightly damp, cross bedded and locally laminated	Surface material removed for drill pad
				B:N16W,16NE (x-bedded)			
5						@ 2' Cross-bedded sandstone interbed	@ 0-10' Mixed Bulk Sample
						@ 5' Light yellowish-brown to yellowish-gray silty sandstone with local pebbles, concretions and sandy lenses	
						@ 9' Fine silty sandstone	
10	■	5 10 13		Consol			% fines=50.2
				B:N12W,9NE (x-bedded)		@ 13' Sandstone and pebbly sandstone channel with cross bedding	
15	■	5 8 13		116/7.0		@ 15.5' Light yellowish-brown to yellowish-gray silty sandstone with local pebbles and pebbly lenses, and rare, discontinuous muddy layers	@ 15' Bulk Sample
				Apx B:N30W,8NE			
				Apx B:N50W,13NE			
20	■	6 8 12/ 5"		B:N55W,10NE 119/3.6		@ 20' Pebbly lense; pebbly silty sandstone interbeds below	@ 20' Bulk Sample
25				B:N52W,10NE		@ 24' Pebbly to cobbly lense with underlying cross-bedded sandstone; poorly sorted silty sandstone below; dense to moderately hard; slightly damp to damp	
				B:N20W,15NE		@ 29' Thin sandstone interbed within yellowish-brown pebbly silty sandstone and local silty interbeds	
30	■	7 24		132/7.5		@ 31' Pebbly sandstone lense channeled into yellowish-brown sandy siltstone and mudstone with local pebbles; poorly sorted and poorly bedded	@ 30' Bulk Sample Bedding is poor from 30 to 50 feet
35							
						@ 37.5' Yellowish-brown to brown slightly sandy mudstone/siltstone	

DRILL HOLE LOG

BORING NO. B-61E

PROJECT: Newhall Ranch - Mesas East — JOB NO.: 00-1703CM-1
Phase II Landslide Investigation — DATE: 5/25/00
DRILLING COMPANY/DRILLER: Tri Valley Drilling/Danny
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket-Auger 24" (4WD Rig)
HAMMER TYPE: Telescoping Kelly Bar — AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-24'=3160 lbs, 24-47'=2040 lbs, 47-72'=1120 lbs
ELEVATION: 1300± — LOGGED BY: BJS

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40		5 11 23		Consol 126/11.0		@ 40' Concretions	% fines=71
45						@ 45.5' Mudstone interbed; bedding vague but shallow @ 48' Grades sandier	
50				Apx B:N20W,10NE B:N20W,8NE		@ 50' Grades siltier with local concretions; local sandstone interbeds below; bedding vague	
55							
60				B:N38W,15NE (x-bedded)		@ 59.5' Grades sandier @ 60.5' Sandstone and pebbly sandstone interbed; cross bedded and channeled; lithologically identical to coarse bed at 2 ft.	
65		11 46		120/5.7		TOTAL DEPTH 65 Ft. (Elev. 1235) No Ground Water No Caving	Backfill tamped every 10 ft.
70							
75							

DRILL HOLE LOG

BORING NO. B-62E

PROJECT: Newhall Ranch - Mesas East — JOB NO.: 00-1703CM-1
Phase II Landslide Investigation — DATE: 5/25/00
DRILLING COMPANY/DRILLER: Tri Valley Drilling/Dave
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket-Auger 24" (4WD Rig)
HAMMER TYPE: Telescoping Kelly Bar — AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-24'=3160 lbs, 24-47'=2040 lbs, 47-72'=1120 lbs
ELEVATION: 1164± — LOGGED BY: MAS/BJS

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						SLOPEWASH/ALLUVIUM; Qsw/Qal (0 - 11 Ft.) @ 0' Brown muddy sand with scattered pebbles; soft; moist to wet, roots; poorly sorted	Excavated and logged on 3/2/00
		1/ 18"		116/13.0			@ 3' Bulk Sample
5						@ 5' Grades yellowish-brown and moderately dense	@ 0-10' Mixed Bulk Sample
10		2 3 4		115/6.8			@ 10' Bulk Sample
						BEDROCK; TQs (11 - 32 Ft.) @ 11' Light yellowish-brown fine sandy siltstone; soft to moderately dense; damp; weathered with roots and bioturbation	
15						@ 15' Light yellowish-brown to yellowish-gray fine silty sandstone with sandstone and pebbly sandstone lenses and interbeds; dense; slightly damp; local caliche-filled fractures	
				B:N32W,10NE B:N52W,8NE		@ 17.5' Siltstone and sandstone interbeds; moderately well bedded and thin bedded	
20		5 3/1"				@ 19' Cross-bedded yellowish-gray sandstone and pebbly sandstone with channels; slightly to moderately friable	Drive Sample @ 20' hit rock % fines= 62
						@ 23' Coarse sandstone and pebbly sandstone lense/channel; cross bedded; moderately friable but dense	@ 20' Bulk Sample
				B:N53W,6NE			
25						@ 25' Slightly clayey sandy siltstone; dense; damp	
30							
		3 11 16		123/10.1		TOTAL DEPTH 32 Ft. (Elev. 1132) No Ground Water No Caving	Backfill Tamped every 10 ft.
35							

DRILL HOLE LOG

BORING NO. HS-4

PROJECT: Valencia Company
Magic Mountain Entertainment

JOB NO.: 00-1729-1
DATE: 5/25/00

DRILLING COMPANY/DRILLER: Valley Well Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Hollow-Stem Auger
HAMMER TYPE: Downhole
AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs.
ELEVATION: 1151
LOGGED BY: MAS

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						ARTIFICIAL FILL; af? (0 - 5 Ft.)	Excavated and logged on 3/15/00
		1 36 50		118.6/8.6	SM	@ 2' Silty sand with gravel, dense, damp, light yellowish-brown	@ 0-3' Bulk Sample
5		28 50		122.6/10.6	SC	QUATERNARY ALLUVIUM; Qal (5 - 25 Ft.) @ 5' Clayey sand with gravel, dense, moist, brown	
		9 8 9		107.0/10.3	SM	@ 8' Silty sand, loose, moist, light yellowish-brown	% fines=39.0
10							
		9 18 36		115.3/4.8		@ 11' - with gravel and medium dense	% fines=18.7
				103.1/2.9			@ 13-15' Bulk Sample
15		12 22 15				@ 15' - with gravel and medium dense	
20		5 8 19		119.9/5.7		@ 20' - medium dense	% fines=16.3
25		48 50/ 5"			SP-SM	QUATERNARY TERRACE; Qt (25 - 30 Ft.) @ 25' Poorly graded sand with silt and gravel, very dense, moist, yellowish-brown	@ 25-30' Bul Sample
30		58 56/ 2"				TOTAL DEPTH 30 Ft. (Elev. 1121) No Ground Water No Caving	
35							

DRILL HOLE LOG

BORING NO. HS-5

PROJECT: Valencia Company
Magic Mountain Entertainment

JOB NO.: 00-1729-1
DATE: 5/25/00

DRILLING COMPANY/DRILLER: Valley Well Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Hollow-Stem Auger
HAMMER TYPE: Downhole
AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs.
ELEVATION: 1180
LOGGED BY: MAS

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						QUATERNARY ALLUVIUM; Qal (0 - 12 Ft.)	Excavated and logged on 3/21/00
		3 5 7		109.1/5.0	SM	@ 2' Silty sand, loose, moist, light brown	@ 0-2' Bulk Sample
5		15 18 25		112.0/4.4		@ 5' - medium dense	
		15 19 32		110.1/6.7		@ 8' - medium dense and yellowish-brown	@ 8-11' Bulk Sample
10		50/6"					@ 11' No recovery
		50/6"		105.0/9.1		QUARTERNARY TERRANCE; Qt (12 - 20 Ft.) @ 12' - very dense, yellowish-brown	
15		31 50/4"		94.3/14.8	CL	@ 15' Lean clay, hard, moist, yellowish-brown	@ 15-20' Bulk Sample
		18 46 50/4"					
20		33 38 50/6"				@ 20' - sandy TOTAL DEPTH 20 Ft. (Elev. 1160) No Ground Water No Caving	
25							
30							
35							

DRILL HOLE LOG

BORING NO. HS-6

PROJECT: Valencia Company
Magic Mountain Entertainment

JOB NO.: 00-1729-1
DATE: 5/25/00

DRILLING COMPANY/DRILLER: Valley Well Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Hollow-Stem Auger
HAMMER TYPE: Downhole
AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs.
ELEVATION: 1184
LOGGED BY: MAS

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						QUATERNARY ALLUVIUM; Qal (0 - 30 Ft.)	Excavated and logged on 3/21/00
		3 6 9		98.5/2.9	SM	@ 2' Silty sand, loose, damp, light yellowish-brown	
5		6 7 14		98.9/2.2		@ 5' - medium dense	
		15 21 35		110.2/3.3		@ 8' - dense	
10		5 29 32		106.0/2.9	SW-SM	@ 11' Well graded sand with silt, dense, moist, light yellowish-brown	@ 11-15' Bul Sample % fines=9.2
15		25 27 27		108.8/2.7		@ 15' - medium dense	
20		15 17 19		107.2/4.4	SM	@ 20' Silty sand, medium dense, moist, light yellowish-brown	
25		28 40 50/4"				@ 25' - with gravel and very dense	
30		24 32 36				@ 30' - with gravel and dense TOTAL DEPTH 30 Ft. (Elev. 1154) No Ground Water No Caving	
35							

DRILL HOLE LOG

BORING NO. HS-8

PROJECT: Valencia Company — JOB NO.: 00-1729-1
Magic Mountain Entertainment — DATE: 5/25/00
DRILLING COMPANY/DRILLER: Valley Well Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Hollow-Stem Auger
HAMMER TYPE: Downhole — AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs.
ELEVATION: 1160 — LOGGED BY: MAS

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES. DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						QUATERNARY ALLUVIUM; Qal (0 - 30 Ft.)	Excavated and logged on 3/21/00
						@ 6" Top Soil, silty, soft, moist, brown with roots and grass	
	■	5 6 12		93.2/7.5	CL	@ 2' Sandy clay, stiff, damp, light yellowish-brown	@ 0-5' Mixed Bulk Sample
5	■	13 6 9		98.3/4.3	SM-SC	@ 5' Clayey, silty sand, loose, moist, yellowish-brown	
	■	15 27 27		101.7/3.9		@ 8' - medium dense	@ 8' Rock
10	■	5 6 8		99.3/7.7			
15	■	8 8 8		112.5/8.9			@ 15-18' Bulk Sample
20	■	9 9 9		109.9/4.8	SM	@ 20' Silty sand with gravel, loose, moist, yellowish-brown	% fines=17.0
25	◥	15 7 8			SM	@ 25' - medium dense	% fines=14.8
30	◥	19 28 40			CL	BEDROCK?; TQs? (30 Ft.) @ 30' Lean clay, hard, moist, light yellow TOTAL DEPTH 30 Ft. (Elev. 1130) No Ground Water No Caving	
35							

DRILL HOLE LOG

CLIENT:	Newhall Land and Farming Co.	JOB NO.:	04-2023A-4
PROJECT:	Mesas East Access Road	DATE:	12/22/2004
		LOGGED BY:	DGG
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	1/16/04
DRILLING METHOD:	Hollow Stem Auger	HOLE DIA:	8" O.D.
HAMMER TYPE:	Auto Hammer	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs	ELEVATION	1203'

BORING NO. HS-30T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY ALLUVIUM; Qal (0 - 25')** @ 0-5' Bulk sample				
		4 9 10		CL-ML	@ 3' CLAY with silt; very stiff; damp; yellowish brown	3.6			
5		10 20 25				3.1	117		
10		25 35 35			@ 9' -with gravel; hard				
		9 15 25			@ 12' -very stiff	1.1	109		
				SP-SM	@ 13' Poorly graded SAND with silt; medium dense; damp; yellowish brown				
15		7 13 17		CL-ML	@ 15' Silty CLAY; very stiff; damp; yellowish brown				
20		15 31 35		SP-SM	@ 20' Poorly graded SAND with silt and gravel; dense; damp; yellowish brown				
25		15 36 42			@ 25' -very dense				
					Total Depth 25' No Ground Water				
30									
35									

DRILL HOLE LOG

CLIENT:	Newhall Land and Farming Co.
PROJECT:	Mesas East Access Road
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow Stem Auger
HAMMER TYPE:	Auto Hammer
DRIVING WEIGHTS:	140 lbs
JOB NO.:	04-2023A-4
DATE:	12/22/2004
LOGGED BY:	DGG
DRILLED:	1/16/04
HOLE DIA:	8" O.D.
AVERAGE DROP (in.):	30"
ELEVATION	1210'

BORING NO. HS-31T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY ALLUVIUM; Qal (0 - 25')** @ 0-5' Bulk sample				
		3 6 12		SC-SM	@ 3' Silty, clayey SAND; loose to medium dense; damp; yellowish brown	3.8	107		
5		8 11 16			@ 6' -medium dense; sampled through cobble				
		9 14 19				4.6	121		
10		15 20 20			@ 12' -with gravel; dense				
15		18 19 20		SP-SM	@ 15' Poorly graded SAND with silt; medium dense; damp; yellowish brown	2.3	116		
20		9 18 41			@ 20' -with gravel; very dense				
25		17 34 30/3"			Total Depth 25' No Ground Water				
30									
35									

DRILL HOLE LOG

CLIENT:	Newhall Land and Farming Co.	JOB NO.:	04-2023A-4
PROJECT:	Mesas East Access Road	DATE:	12/22/2004
		LOGGED BY:	DGG
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	1/16/04
DRILLING METHOD:	Hollow Stem Auger	HOLE DIA:	8" O.D.
HAMMER TYPE:	Auto Hammer	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs	ELEVATION	1162'

BORING NO. HS-32T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY ALLUVIUM; Qal (0 - 35')** @ 0-5' Bulk sample				
		3 5 5		CL-ML	@ 3' Silty CLAY; stiff; damp; grayish brown				
5		5 7 12		SM	@ 6' Silty SAND; medium dense; damp; yellowish to grayish brown	4.0	114		
10		5 8 10							
		6 10 14				1.7	118		
15		6 7 9							
		7 18 20		SP-SM	@ 18' Poorly graded SAND with silt; medium dense; damp; yellowish brown	1.4	119		
20		5 6 7		SM	@ 21' Silty SAND; medium dense; damp; yellowish brown				
25		6 10 16		CL-ML	@ 25' Sandy, silty CLAY; stiff; damp; yellowish brown	8.3	125		
30		15 35 45		SP-SM	@ 30' Poorly graded SAND with silt; very dense; damp; yellowish brown				
35		11 50/5"		CL-ML	@ 35' Silty CLAY; hard; damp; yellowish brown				
					Total Depth 35' No Ground Water				

DRILL HOLE LOG

CLIENT:	Newhall Land and Farming Co.
PROJECT:	Mesas East Access Road
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow Stem Auger
HAMMER TYPE:	Auto Hammer
DRIVING WEIGHTS:	140 lbs
JOB NO.:	04-2023A-4
DATE:	12/22/2004
LOGGED BY:	DGG
DRILLED:	1/16/04
HOLE DIA:	8" O.D.
AVERAGE DROP (in.):	30"
ELEVATION	1186'

BORING NO. HS-33T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY ALLUVIUM; Qal (0 - 25')**				
					@ 0-5' Bulk sample				
		2 3 4		CL-ML	@ 3' Silty CLAY; soft; damp; yellowish brown	7.1	105		
5									
		1 2 2				7.1			
		2 3 5			@ 9' -firm	9.0	115		Consol
10									
		3 4 5				10.5			
15		4 7 13			@ 15' -stiff	11.5	118		Consol
		9 17 22			@ 18' -hard	15.3			
20									
		19 33 50							
25		12 22 44			Total Depth 25' No Ground Water				
30									
35									

LABORATORY TESTS

DRILL HOLE LOG

CLIENT:	Newhall Land and Farming Co.	JOB NO.:	04-2023A-4
PROJECT:	Mesas East Access Road	DATE:	9/1/2004
		LOGGED BY:	DGG
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	1/19/04
DRILLING METHOD:	Hollow Stem Auger	HOLE DIA:	8" O.D.
HAMMER TYPE:	Auto Hammer	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs	ELEVATION	1167'

BORING NO. HS-34T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY ALLUVIUM; Qal (0 - 50')** @ 0-5' Bulk sample				
		25 50		CL-ML	@ 3' Silty CLAY; hard; damp; yellowish to grayish brown				
5									
		6 18 22		SP-SM	@ 6' Poorly graded SAND with silt; medium dense; damp; yellowish brown	0.7	119		
		9 25 25		ML	@ 9' Sandy SILT with gravel; very stiff; damp; yellowish brown				
10									
		10 13 16		SP-SM	@ 12' -very stiff @ 12.5' Poorly graded SAND with silt; medium dense; damp; yellowish brown	1.8	106		Consol
15		8 13 16				2.9			
20		8 19 26		ML	@ 20.5' SILT with sand; very stiff; damp; yellowish brown				
25		15 33 35		SM	@ 25' Silty SAND; very dense; damp; yellowish brown				
30		36 50			@ 30' -no recovery; cobble in tip				
35		26 50/5"			@ 35' -with gravel				

DRILL HOLE LOG

CLIENT:	Newhall Land and Farming Co.	JOB NO.:	04-2023A-4
PROJECT:	Mesas East Access Road	DATE:	9/1/2004
		LOGGED BY:	DGG
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	1/19/04
DRILLING METHOD:	Hollow Stem Auger	HOLE DIA:	8" O.D.
HAMMER TYPE:	Auto Hammer	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs	ELEVATION	1167'

BORING NO. HS-34T

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40		40 50/2"							
45		30 50/4"							
50		25/5"			Total Depth 50' No Ground Water				
55									
60									
65									
70									
75									

KEY TO SYMBOLS

Symbol Description

Strata symbols

Low plasticity clay

Silty low plasticity clay

Poorly graded sand with silt

Poorly graded clayey silty sand

Silty sand

Soil Samplers

Standard penetration test

California sampler

Notes:

1. These logs are subject to the limitations, conclusions, and recommendations in this report.

2. Results of tests conducted on samples recovered are reported on the logs.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	Well-graded gravels, gravel-sand mixtures, little or no fines
				GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE SIZE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	Silty gravels, gravel-sand-silt mixtures
				GC	Clayey gravels, gravel-sand-clay mixtures
	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	Well-graded sands, gravelly sands, little or no fines
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE				SP	Poorly-graded sands, gravelly sands, little or no fines
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE SIZE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	Silty sands, sand-silt mixtures
				SC	Clayey sands, sand-clay mixtures
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	Inorganic silts and very fine sands, clayey silts with slight plasticity
				CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays
				OL	Organic silts and organic silty clays of low plasticity
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	Inorganic silts, micaceous or diatomaceous fine, sandy or silty soils, elastic silts
				CH	Inorganic clays of high plasticity, fat clays
				OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS				PT	Peat and other highly organic soils

Notes:
(1) Dual USCS symbol, such as SP-SM denote 5 to 12% of minor constituent.
(2) Dual USCS symbol, such as SM/ML denote borderline soil classifications.
(3) Subsurface information from boring and test pit logs depict conditions only at the specific locations. and dates indicated. Soil conditions and water levels at other locations may differ from conditions at these locations. Also, the conditions at these locations may change with time.
(4) These logs are subject to the limitations, conclusions, and recommendations in this report.
(5) Blow counts on logs are the number of blows to drive the sampler with the weight and drop height indicated on each log.

HS: Hollow-stem-auger boring
RW: Rotary-wash boring
B: Bucket-auger boring

SAMPLE TYPE

- STANDARD PENETRATION TEST Split barrel sampler in accordance with ASTM D-1558 Test Method
- CALIFORNIA DRIVE 2.42" I.D. sampler in accordance with ASTM D-3550 Test Method
- BULK SAMPLE Loose cutting from boring
- DISTURBED CALIFORNIA DRIVE
- NO RECOVERY

GROUND WATER DATA

- GROUND WATER WHILE DRILLING
- GROUND WATER AFTER DRILLING

DENSITY OF GRANULAR SOILS

DESCRIPTION	SPT BLOWS PER FOOT
Very Loose	< 4
Loose	4 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	> 50

STRENGTH OF COHESIVE SOILS

CONSISTENCY	SPT BLOWS PER FOOT
Very Soft	< 2
Soft	2 - 4
Firm	5 - 8
Stiff	9 - 15
Very Stiff	16 - 30
Hard	> 30

SPLIT-BARREL SAMPLER DRIVING RECORD

BLOW COUNT	DESCRIPTION
25	25 blows drove the sampler 12 inches, after initial 6 inches of seating
50/7"	50 blows drove the sampler 7 inches, after initial 6 inches of seating
Ref/3"	50 blows drove the sampler 3 inches during initial 6-inch seating interval

LABORATORY TESTING ABBREVIATIONS

Plasticity Index	PI	Compaction Curve	Curve
Liquid Limit	LL	Consolidation / Collapse	Consol
Hydrometer	%-5 micron	Direct Shear / Reshear / Remold	Shear
Expansion Index	EI		
Chemical Analysis	Chem		

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

USCS Soil Classification and Key to Boring Log Symbols

CPT INTERPRETATIONS

SOUNDING : CPT-04 SEIS
PROJECT : AES/MAGIC MTN
DATE/TIME: 04-08-00 10:46

PROJECT No.: 00-1729-1
CONE/RIG : 722/BH,JH/R#3

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	42.53	2.05	SANDY SILT to CLAYEY SILT	17	27		2.8	
.300	.98	48.18	2.32	SANDY SILT to CLAYEY SILT	19	31		3.2	
.450	1.48	30.51	3.15	CLAYEY SILT to SILTY CLAY	15	24		2.0	
.600	1.97	10.35	4.93	CLAY	10	17		.7	
.750	2.46	8.24	4.25	CLAY	8	13		.5	
.900	2.95	9.67	4.34	CLAY	10	15		.6	
1.050	3.44	9.96	4.32	CLAY	10	16		.7	
1.200	3.94	11.20	4.38	CLAY	11	18		.7	
1.350	4.43	20.10	4.13	CLAY to SILTY CLAY	13	21		1.3	
1.500	4.92	36.14	2.30	SANDY SILT to CLAYEY SILT	14	23		2.4	
1.650	5.41	73.85	.91	SAND to SILTY SAND	18	30	68		44.0
1.800	5.91	97.03	1.12	SAND to SILTY SAND	24	39	75		45.0
1.950	6.40	104.12	1.07	SAND to SILTY SAND	26	42	77		45.0
2.100	6.89	145.63	1.03	SAND to SILTY SAND	36	57	87		46.0
2.250	7.38	215.68	1.21	SAND	43	65	98		47.0
2.400	7.87	199.17	1.45	SAND to SILTY SAND	50	72	96		46.5
2.550	8.37	211.64	1.25	SAND to SILTY SAND	53	75	98		46.5
2.700	8.86	164.77	1.74	SAND to SILTY SAND	41	57	90		45.5
2.850	9.35	203.55	1.67	SAND to SILTY SAND	51	68	96		46.0
3.000	9.84	221.16	1.36	SAND to SILTY SAND	55	72	97		46.0
3.150	10.33	201.85	1.08	SAND	40	51	94		46.0
3.300	10.83	193.20	1.59	SAND to SILTY SAND	48	60	92		45.5
3.450	11.32	311.17	1.77	SAND to SILTY SAND	78	94	100		47.0
3.600	11.81	315.61	1.42	SAND	63	75	100		47.0
3.750	12.30	307.24	.90	SAND	61	72	100		46.5
3.900	12.80	208.05	1.92	SAND to SILTY SAND	52	59	92		45.0
4.050	13.29	117.12	2.25	SILTY SAND to SANDY SILT	39	44	75		42.5
4.200	13.78	117.63	3.36	SANDY SILT to CLAYEY SILT	47	52		6.9	
4.350	14.27	178.78	1.81	SAND to SILTY SAND	45	48	86		44.0
4.500	14.76	201.49	1.54	SAND to SILTY SAND	50	54	89		44.0
4.650	15.26	211.58	1.55	SAND to SILTY SAND	53	55	90		44.5
4.800	15.75	287.25	1.35	SAND	57	59	98		45.5
4.950	16.24	276.61	1.11	SAND	55	56	96		45.0
5.100	16.73	314.21	2.08	SAND to SILTY SAND	79	78	100		45.5
5.250	17.22	225.51	1.25	SAND	45	44	90		44.0
5.400	17.72	191.37	1.17	SAND to SILTY SAND	48	46	85		43.0
5.550	18.21	115.85	1.76	SILTY SAND to SANDY SILT	39	37	70		40.5
5.700	18.70	108.77	3.27	SANDY SILT to CLAYEY SILT	44	41		6.3	
5.850	19.19	107.73	3.12	SANDY SILT to CLAYEY SILT	43	40		6.3	
6.000	19.69	165.22	2.32	SILTY SAND to SANDY SILT	55	51	79		42.0
6.150	20.18	194.11	2.39	SILTY SAND to SANDY SILT	65	59	83		42.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 36.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-04 SEIS

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	109.20	3.59	SANDY SILT to CLAYEY SILT	44	39		6.4	
6.450	21.16	100.00	3.42	SANDY SILT to CLAYEY SILT	40	35		5.8	
6.600	21.65	96.88	3.03	SANDY SILT to CLAYEY SILT	39	34		5.6	
6.750	22.15	103.14	8.32	*VERY STIFF FINE GRAINED	100	89			
6.900	22.64	173.06	2.76	SILTY SAND to SANDY SILT	58	49	78		42.0
7.050	23.13	218.55	1.67	SAND to SILTY SAND	55	46	85		42.5
7.200	23.62	204.31	2.23	SILTY SAND to SANDY SILT	68	57	82		42.0
7.350	24.11	266.24	2.25	SILTY SAND to SANDY SILT	89	74	90		43.5
7.500	24.61	286.04	2.57	SILTY SAND to SANDY SILT	95	78	92		43.5
7.650	25.10	337.37	2.63	SILTY SAND to SANDY SILT	100	92	96		44.0
7.800	25.59	360.01	1.88	SAND to SILTY SAND	90	73	98		44.5
7.950	26.08	395.71	2.03	SAND to SILTY SAND	99	79	100		44.5
8.100	26.57	384.53	1.42	SAND	77	61	99		44.5
8.250	27.07	177.03	1.23	SAND to SILTY SAND	44	35	76		40.5
8.400	27.56	152.11	1.87	SILTY SAND to SANDY SILT	51	39	72		39.5
8.550	28.05	172.23	2.92	SILTY SAND to SANDY SILT	57	44	75		40.0
8.700	28.54	419.52	1.89	SAND to SILTY SAND	100	80	100		44.5
8.850	29.04	401.89	1.44	SAND	80	61	99		44.5
9.000	29.53	366.47	1.21	SAND	73	55	96		44.0
9.150	30.02	337.73	2.28	SAND to SILTY SAND	84	63	93		43.5
9.300	30.51	510.92	1.58	SAND	100	76	100		45.0
9.450	31.00	658.48	1.43	SAND	100	97	100		
9.600	31.50	533.52	1.39	SAND	100	78	100		
9.750	31.99	354.89	1.34	SAND	71	51	94		43.5
9.900	32.48	341.45	1.23	SAND	68	49	93		43.0
10.050	32.97	457.42	1.64	SAND to SILTY SAND	100	81	100		44.5
10.200	33.46	513.95	1.68	SAND to SILTY SAND	100	91	100		44.5
10.350	33.96	415.93	1.60	SAND to SILTY SAND	100	73	98		44.0
10.500	34.45	366.22	1.72	SAND to SILTY SAND	92	64	94		43.0
10.650	34.94	450.92	1.97	SAND to SILTY SAND	100	78	100		44.0
10.800	35.43	597.26	1.79	SAND to SILTY SAND	100	100	100		

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 36.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

CPT INTERPRETATIONS

SOUNDING : CPT-06
PROJECT : AES/MAGIC MTN.
DATE/TIME: 03-21-00 09:24

PROJECT No.: 00-1729-1
CONE/RIG : 473/BH,VO/R#3

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	17.91	1.79	SANDY SILT to CLAYEY SILT	7	11		1.4	
.300	.98	11.81	1.71	CLAYEY SILT to SILTY CLAY	6	9		.9	
.450	1.48	14.13	1.54	CLAYEY SILT to SILTY CLAY	7	11		1.1	
.600	1.97	16.06	1.73	CLAYEY SILT to SILTY CLAY	8	13		1.3	
.750	2.46	17.40	1.51	SANDY SILT to CLAYEY SILT	7	11		1.4	
.900	2.95	10.01	2.26	CLAYEY SILT to SILTY CLAY	5	8		.8	
1.050	3.44	9.39	2.64	CLAY to SILTY CLAY	6	10		.7	
1.200	3.94	25.73	2.12	SANDY SILT to CLAYEY SILT	10	16		1.7	
1.350	4.43	27.51	2.52	CLAYEY SILT to SILTY CLAY	14	22		1.8	
1.500	4.92	33.67	1.59	SANDY SILT to CLAYEY SILT	13	22		2.7	
1.650	5.41	33.14	1.87	SANDY SILT to CLAYEY SILT	13	21		2.6	
1.800	5.91	29.76	1.61	SANDY SILT to CLAYEY SILT	12	19		2.4	
1.950	6.40	35.54	1.92	SANDY SILT to CLAYEY SILT	14	23		2.3	
2.100	6.89	44.19	1.52	SILTY SAND to SANDY SILT	15	23	53		40.5
2.250	7.38	61.48	2.05	SILTY SAND to SANDY SILT	20	31	62		42.0
2.400	7.87	79.56	1.75	SILTY SAND to SANDY SILT	27	39	70		43.0
2.550	8.37	88.31	1.82	SILTY SAND to SANDY SILT	29	42	73		43.0
2.700	8.86	88.06	1.54	SILTY SAND to SANDY SILT	29	40	72		43.0
2.850	9.35	87.66	1.67	SILTY SAND to SANDY SILT	29	39	71		42.5
3.000	9.84	48.37	2.01	SANDY SILT to CLAYEY SILT	19	25		3.2	
3.150	10.33	33.80	2.90	CLAYEY SILT to SILTY CLAY	17	21		2.2	
3.300	10.83	35.10	2.02	SANDY SILT to CLAYEY SILT	14	17		2.3	
3.450	11.32	44.61	1.94	SANDY SILT to CLAYEY SILT	18	22		2.9	
3.600	11.81	63.73	1.09	SILTY SAND to SANDY SILT	21	25	59		39.5
3.750	12.30	64.01	1.61	SILTY SAND to SANDY SILT	21	25	59		39.0
3.900	12.80	54.07	1.79	SILTY SAND to SANDY SILT	18	21	53		38.5
4.050	13.29	43.34	2.15	SANDY SILT to CLAYEY SILT	17	19		2.8	
4.200	13.78	34.46	2.21	SANDY SILT to CLAYEY SILT	14	15		2.2	
4.350	14.27	31.25	2.32	SANDY SILT to CLAYEY SILT	13	14		2.0	
4.500	14.76	32.82	2.19	SANDY SILT to CLAYEY SILT	13	14		2.1	
4.650	15.26	38.84	1.95	SANDY SILT to CLAYEY SILT	16	16		2.5	
4.800	15.75	37.94	2.58	SANDY SILT to CLAYEY SILT	15	16		2.5	
4.950	16.24	34.31	2.45	SANDY SILT to CLAYEY SILT	14	14		2.2	
5.100	16.73	38.37	2.36	SANDY SILT to CLAYEY SILT	15	15		2.5	
5.250	17.22	42.04	2.08	SANDY SILT to CLAYEY SILT	17	17		2.7	
5.400	17.72	61.52	2.34	SANDY SILT to CLAYEY SILT	25	24		4.0	
5.550	18.21	43.32	2.90	SANDY SILT to CLAYEY SILT	17	17		2.8	
5.700	18.70	33.33	2.73	CLAYEY SILT to SILTY CLAY	17	16		2.1	
5.850	19.19	29.49	2.63	CLAYEY SILT to SILTY CLAY	15	14		1.9	
6.000	19.69	30.42	3.05	CLAYEY SILT to SILTY CLAY	15	14		1.9	
6.150	20.18	29.72	2.93	CLAYEY SILT to SILTY CLAY	15	14		1.9	

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 26.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-06

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	30.44	3.08	CLAYEY SILT to SILTY CLAY	15	14		1.9	
6.450	21.16	33.25	2.93	CLAYEY SILT to SILTY CLAY	17	15		2.1	
6.600	21.65	35.86	3.19	CLAYEY SILT to SILTY CLAY	18	16		2.3	
6.750	22.15	39.66	3.73	CLAYEY SILT to SILTY CLAY	20	17		2.3	
6.900	22.64	46.53	3.48	CLAYEY SILT to SILTY CLAY	23	20		2.7	
7.050	23.13	37.07	3.12	CLAYEY SILT to SILTY CLAY	19	16		2.4	
7.200	23.62	439.66	.86	SAND	88	74	100		45.5
7.350	24.11	618.73	1.10	SAND	100	100	100		
7.500	24.61	712.51	1.12	SAND	100	100	100		
7.650	25.10	697.34	1.33	SAND	100	100	100		

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 26.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

CPT INTERPRETATIONS

SOUNDING : CPT-16 SEIS
PROJECT : AES/MAGIC MTN
DATE/TIME: 04-05-90 16:36

PROJECT No.: 00-1729-1
CONE/RIG : 722/BH.GO/R#3

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	69.68	2.62	SANDY SILT to CLAYEY SILT	28	45		4.6	
.300	.98	114.59	3.24	SANDY SILT to CLAYEY SILT	46	73		6.7	
.450	1.48	47.63	4.71	CLAY to SILTY CLAY	32	51		2.8	
.600	1.97	31.91	4.31	CLAY to SILTY CLAY	21	34		1.9	
.750	2.46	27.70	4.28	CLAY to SILTY CLAY	18	30		1.6	
.900	2.95	44.61	2.22	SANDY SILT to CLAYEY SILT	18	29		3.0	
1.050	3.44	28.09	2.30	SANDY SILT to CLAYEY SILT	11	18		1.9	
1.200	3.94	38.50	2.30	SANDY SILT to CLAYEY SILT	15	25		2.6	
1.350	4.43	28.96	1.38	SANDY SILT to CLAYEY SILT	12	19		2.3	
1.500	4.92	64.84	1.90	SILTY SAND to SANDY SILT	22	35	64		44.0
1.650	5.41	86.74	.80	SAND to SILTY SAND	22	35	72		45.0
1.800	5.91	93.26	.94	SAND to SILTY SAND	23	37	74		45.0
1.950	6.40	110.41	1.29	SAND to SILTY SAND	28	44	79		45.0
2.100	6.89	173.25	.96	SAND	35	54	92		46.5
2.250	7.38	130.89	1.21	SAND to SILTY SAND	33	49	84		45.5
2.400	7.87	73.19	1.09	SAND to SILTY SAND	18	27	67		42.5
2.550	8.37	59.44	2.34	SANDY SILT to CLAYEY SILT	24	34		3.9	
2.700	8.86	44.57	3.04	CLAYEY SILT to SILTY CLAY	22	31		2.9	
2.850	9.35	57.93	2.81	SANDY SILT to CLAYEY SILT	23	31		3.8	
3.000	9.84	62.37	2.33	SANDY SILT to CLAYEY SILT	25	32		4.1	
3.150	10.33	53.64	2.10	SANDY SILT to CLAYEY SILT	21	27		3.5	
3.300	10.83	187.34	2.20	SILTY SAND to SANDY SILT	62	77	91		45.0
3.450	11.32	230.89	1.56	SAND to SILTY SAND	58	70	96		46.0
3.600	11.81	97.43	1.69	SILTY SAND to SANDY SILT	32	39	71		42.0
3.750	12.30	73.70	2.07	SILTY SAND to SANDY SILT	25	29	63		40.0
3.900	12.80	68.54	2.37	SANDY SILT to CLAYEY SILT	27	31		4.5	
4.050	13.29	71.93	2.21	SILTY SAND to SANDY SILT	24	27	61		39.5
4.200	13.78	71.00	2.03	SILTY SAND to SANDY SILT	24	26	60		39.0
4.350	14.27	96.81	1.67	SILTY SAND to SANDY SILT	32	35	68		41.0
4.500	14.76	97.15	1.14	SAND to SILTY SAND	24	26	68		40.5
4.650	15.26	128.64	2.75	SILTY SAND to SANDY SILT	43	45	75		42.0
4.800	15.75	245.61	1.48	SAND to SILTY SAND	61	63	94		44.5
4.950	16.24	278.63	1.37	SAND	56	56	97		45.0
5.100	16.73	404.65	1.36	SAND	81	81	100		46.5
5.250	17.22	335.73	1.13	SAND	67	66	100		46.0
5.400	17.72	305.59	1.57	SAND to SILTY SAND	76	74	98		45.0
5.550	18.21	342.64	1.25	SAND	69	66	100		45.5
5.700	18.70	298.51	.99	SAND	60	56	97		45.0
5.850	19.19	224.30	.88	SAND	45	42	88		43.5
6.000	19.69	81.75	3.05	SANDY SILT to CLAYEY SILT	33	30		4.7	
6.150	20.18	75.76	2.87	SANDY SILT to CLAYEY SILT	30	28		4.4	

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 40.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-16 SEIS

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	79.03	3.34	SANDY SILT to CLAYEY SILT	32	28		4.6	
6.450	21.16	74.59	3.50	CLAYEY SILT to SILTY CLAY	37	33		4.3	
6.600	21.65	65.92	3.44	CLAYEY SILT to SILTY CLAY	33	29		3.8	
6.750	22.15	77.69	2.83	SANDY SILT to CLAYEY SILT	31	27		5.1	
6.900	22.64	80.94	3.41	SANDY SILT to CLAYEY SILT	32	28		4.7	
7.050	23.13	74.87	3.76	CLAYEY SILT to SILTY CLAY	37	32		4.3	
7.200	23.62	88.85	3.38	SANDY SILT to CLAYEY SILT	36	30		5.1	
7.350	24.11	87.29	2.87	SANDY SILT to CLAYEY SILT	35	29		5.0	
7.500	24.61	119.82	2.23	SILTY SAND to SANDY SILT	40	33	67		39.0
7.650	25.10	152.30	2.40	SILTY SAND to SANDY SILT	51	41	73		40.0
7.800	25.59	126.56	2.92	SANDY SILT to CLAYEY SILT	51	41		7.4	
7.950	26.08	139.24	3.08	SANDY SILT to CLAYEY SILT	56	45		8.1	
8.100	26.57	118.42	3.52	SANDY SILT to CLAYEY SILT	47	38		6.9	
8.250	27.07	144.51	2.71	SILTY SAND to SANDY SILT	48	38	71		39.5
8.400	27.56	120.12	3.53	SANDY SILT to CLAYEY SILT	48	37		7.0	
8.550	28.05	159.97	2.57	SILTY SAND to SANDY SILT	53	41	73		39.5
8.700	28.54	252.41	1.34	SAND to SILTY SAND	63	48	86		42.5
8.850	29.04	248.33	1.46	SAND to SILTY SAND	62	47	85		42.0
9.000	29.53	153.88	1.64	SAND to SILTY SAND	38	29	71		39.0
9.150	30.02	94.69	3.36	SANDY SILT to CLAYEY SILT	38	28		5.5	
9.300	30.51	78.12	3.50	SANDY SILT to CLAYEY SILT	31	23		4.5	
9.450	31.00	72.23	3.80	CLAYEY SILT to SILTY CLAY	36	26		4.1	
9.600	31.50	92.16	3.42	SANDY SILT to CLAYEY SILT	37	27		5.3	
9.750	31.99	82.34	3.86	CLAYEY SILT to SILTY CLAY	41	30		4.7	
9.900	32.48	57.08	5.27	CLAY	57	41		3.2	
10.050	32.97	71.26	3.62	CLAYEY SILT to SILTY CLAY	36	25		4.1	
10.200	33.46	71.81	4.12	CLAYEY SILT to SILTY CLAY	36	25		4.1	
10.350	33.96	77.97	3.52	CLAYEY SILT to SILTY CLAY	39	27		4.5	
10.500	34.45	89.59	3.35	SANDY SILT to CLAYEY SILT	36	25		5.1	
10.650	34.94	80.39	3.41	SANDY SILT to CLAYEY SILT	32	22		4.6	
10.800	35.43	83.32	2.79	SANDY SILT to CLAYEY SILT	33	23		4.8	
10.950	35.93	99.32	2.53	SILTY SAND to SANDY SILT	33	23	56		37.0
11.100	36.42	130.91	3.96	*VERY STIFF FINE GRAINED	100	89			
11.250	36.91	61.67	4.35	CLAYEY SILT to SILTY CLAY	31	21		3.5	
11.400	37.40	65.90	3.97	CLAYEY SILT to SILTY CLAY	33	22		3.7	
11.550	37.89	34.01	5.06	CLAY	34	23		1.9	
11.700	38.39	29.59	6.36	CLAY	30	19		1.6	
11.850	38.88	38.45	6.77	CLAY	38	25		2.1	
12.000	39.37	298.00	2.66	SILTY SAND to SANDY SILT	99	65	86		42.0
12.150	39.86	560.10	1.73	SAND to SILTY SAND	100	91	100		
12.300	40.35	499.00	1.23	SAND	100	64	100		44.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 40.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

CPT INTERPRETATIONS

SOUNDING : CPT-18
PROJECT : AES/MAGIC MTN.
DATE/TIME: 03-23-00 04:37

PROJECT No.: 00-1729-1
CONE/RIG : 473/BH,VO/R#3

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	18.70	4.03	CLAY to SILTY CLAY	12	20		1.2	
.300	.98	8.24	4.84	CLAY	8	13		.5	
.450	1.48	3.25	5.13	CLAY	3	5		.2	
.600	1.97	9.03	3.57	CLAY	9	14		.6	
.750	2.46	9.82	2.55	CLAY to SILTY CLAY	7	10		.8	
.900	2.95	6.71	3.94	CLAY	7	11		.4	
1.050	3.44	11.17	2.80	CLAY to SILTY CLAY	7	12		.7	
1.200	3.94	14.83	2.81	CLAYEY SILT to SILTY CLAY	7	12		1.0	
1.350	4.43	37.96	3.03	CLAYEY SILT to SILTY CLAY	19	30		2.5	
1.500	4.92	53.09	2.62	SANDY SILT to CLAYEY SILT	21	34		3.5	
1.650	5.41	47.65	3.65	CLAYEY SILT to SILTY CLAY	24	38		2.8	
1.800	5.91	33.04	2.75	CLAYEY SILT to SILTY CLAY	17	26		2.2	
1.950	6.40	54.20	2.76	SANDY SILT to CLAYEY SILT	22	35		3.6	
2.100	6.89	42.87	2.78	SANDY SILT to CLAYEY SILT	17	27		2.8	
2.250	7.38	47.31	3.18	CLAYEY SILT to SILTY CLAY	24	36		3.1	
2.400	7.87	26.85	3.36	CLAYEY SILT to SILTY CLAY	13	20		1.8	
2.550	8.37	44.98	2.78	SANDY SILT to CLAYEY SILT	18	25		3.0	
2.700	8.86	48.76	2.64	SANDY SILT to CLAYEY SILT	20	27		3.2	
2.850	9.35	46.67	3.08	CLAYEY SILT to SILTY CLAY	23	31		3.1	
3.000	9.84	49.78	3.47	CLAYEY SILT to SILTY CLAY	25	32		2.9	
3.150	10.33	46.70	3.34	CLAYEY SILT to SILTY CLAY	23	30		3.1	
3.300	10.83	49.37	3.96	CLAYEY SILT to SILTY CLAY	25	31		2.9	
3.450	11.32	59.74	3.71	CLAYEY SILT to SILTY CLAY	30	36		3.5	
3.600	11.81	75.23	3.18	SANDY SILT to CLAYEY SILT	30	36		4.4	
3.750	12.30	110.41	2.07	SILTY SAND to SANDY SILT	37	43	74		42.5
3.900	12.80	155.13	2.02	SILTY SAND to SANDY SILT	52	59	83		44.0
4.050	13.29	163.46	1.08	SAND to SILTY SAND	41	46	84		44.0
4.200	13.78	78.20	1.33	SILTY SAND to SANDY SILT	26	29	63		39.5
4.350	14.27	45.68	2.98	SANDY SILT to CLAYEY SILT	18	20		3.0	
4.500	14.76	48.10	4.03	CLAYEY SILT to SILTY CLAY	24	26		2.8	
4.650	15.26	57.15	3.29	CLAYEY SILT to SILTY CLAY	29	30		3.3	
4.800	15.75	70.96	1.66	SILTY SAND to SANDY SILT	24	24	58		38.5
4.950	16.24	48.29	3.14	CLAYEY SILT to SILTY CLAY	24	24		3.2	
5.100	16.73	57.42	2.23	SANDY SILT to CLAYEY SILT	23	23		3.8	
5.250	17.22	55.87	2.79	SANDY SILT to CLAYEY SILT	22	22		3.7	
5.400	17.72	62.23	2.22	SANDY SILT to CLAYEY SILT	25	24		4.1	
5.550	18.21	65.97	3.02	SANDY SILT to CLAYEY SILT	26	25		3.8	
5.700	18.70	55.19	2.41	SANDY SILT to CLAYEY SILT	22	21		3.6	
5.850	19.19	49.29	3.28	CLAYEY SILT to SILTY CLAY	25	23		3.2	
6.000	19.69	50.88	3.24	CLAYEY SILT to SILTY CLAY	25	23		3.3	
6.150	20.18	49.39	3.37	CLAYEY SILT to SILTY CLAY	25	22		2.8	

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 42.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-18

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	50.12	2.83	SANDY SILT to CLAYEY SILT	20	18		3.3	
6.450	21.16	43.40	2.88	SANDY SILT to CLAYEY SILT	17	15		2.8	
6.600	21.65	49.14	2.53	SANDY SILT to CLAYEY SILT	20	17		3.2	
6.750	22.15	39.75	2.93	CLAYEY SILT to SILTY CLAY	20	17		2.6	
6.900	22.64	53.81	2.55	SANDY SILT to CLAYEY SILT	22	18		3.5	
7.050	23.13	68.96	2.24	SILTY SAND to SANDY SILT	23	20	52		37.5
7.200	23.62	77.35	2.29	SILTY SAND to SANDY SILT	26	22	55		38.0
7.350	24.11	84.43	2.44	SANDY SILT to CLAYEY SILT	34	28		5.5	
7.500	24.61	64.01	2.62	SANDY SILT to CLAYEY SILT	26	21		4.2	
7.650	25.10	79.58	3.12	SANDY SILT to CLAYEY SILT	32	26		4.6	
7.800	25.59	282.62	2.01	SAND to SILTY SAND	71	57	91		43.5
7.950	26.08	501.19	2.46	*SAND to CLAYEY SAND	100	100			
8.100	26.57	716.42	1.76	SAND to SILTY SAND	100	100	100		
8.250	27.07	570.49	2.53	*SAND to CLAYEY SAND	100	100			
8.400	27.56	496.07	2.27	*SAND to CLAYEY SAND	100	100			
8.550	28.05	282.87	2.06	SAND to SILTY SAND	71	55	89		43.0
8.700	28.54	164.92	3.59	SANDY SILT to CLAYEY SILT	66	50		9.6	
8.850	29.04	152.24	3.60	SANDY SILT to CLAYEY SILT	61	46		8.9	
9.000	29.53	118.14	2.16	SILTY SAND to SANDY SILT	39	30	64		38.5
9.150	30.02	135.67	1.96	SILTY SAND to SANDY SILT	45	34	67		38.5
9.300	30.51	129.32	2.22	SILTY SAND to SANDY SILT	43	32	66		38.5
9.450	31.00	150.60	2.24	SILTY SAND to SANDY SILT	50	37	70		39.0
9.600	31.50	199.85	2.64	SILTY SAND to SANDY SILT	67	48	78		40.5
9.750	31.99	157.49	4.92	*VERY STIFF FINE GRAINED	100	100			
9.900	32.48	269.89	5.56	*VERY STIFF FINE GRAINED	100	100			
10.050	32.97	282.73	5.62	*VERY STIFF FINE GRAINED	100	100			
10.200	33.46	254.58	5.56	*VERY STIFF FINE GRAINED	100	100			
10.350	33.96	333.90	4.68	*VERY STIFF FINE GRAINED	100	100			
10.500	34.45	156.32	4.23	*VERY STIFF FINE GRAINED	100	100			
10.650	34.94	119.67	3.29	SANDY SILT to CLAYEY SILT	48	33		6.9	
10.800	35.43	130.15	3.14	SANDY SILT to CLAYEY SILT	52	36		7.5	
10.950	35.93	96.22	3.33	SANDY SILT to CLAYEY SILT	38	26		5.5	
11.100	36.42	110.58	3.01	SANDY SILT to CLAYEY SILT	44	30		6.4	
11.250	36.91	92.69	2.57	SANDY SILT to CLAYEY SILT	37	25		6.0	
11.400	37.40	95.05	3.22	SANDY SILT to CLAYEY SILT	38	25		5.5	
11.550	37.89	91.54	2.52	SANDY SILT to CLAYEY SILT	37	24		6.0	
11.700	38.39	91.80	3.71	CLAYEY SILT to SILTY CLAY	46	30		5.3	
11.850	38.88	115.89	6.32	*VERY STIFF FINE GRAINED	100	76			
12.000	39.37	76.14	5.60	*VERY STIFF FINE GRAINED	76	50			
12.150	39.86	82.00	5.69	*VERY STIFF FINE GRAINED	82	53			
12.300	40.35	107.58	4.89	*VERY STIFF FINE GRAINED	100	69			
12.450	40.85	107.44	4.58	*VERY STIFF FINE GRAINED	100	69			
12.600	41.34	83.92	4.92	*VERY STIFF FINE GRAINED	84	53			
12.750	41.83	267.71	6.33	*VERY STIFF FINE GRAINED	100	100			
12.900	42.32	203.16	7.55	*VERY STIFF FINE GRAINED	100	100			
13.050	42.81	256.62	*****		0	0			.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 42.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Appendix B

APPENDIX B

GEOTECHNICAL LABORATORY INVESTIGATION

General

a. The purpose of the laboratory investigation was to evaluate the geotechnical engineering characteristics of the various materials encountered during the field investigation. The investigation program was carried out employing, wherever practical, currently accepted test procedures of the American Society of Testing and Materials (ASTM) and California Test Standards.

b. Relatively undisturbed ring samples and bag samples were obtained during the course of the field investigation. Laboratory sample identification is by project name and number, drill hole number or trench number and depth. Laboratory testing was completed entirely by this firm.

c. The results of the laboratory testing are organized into the following two major subgroups:

- Index Properties Tests
- Geotechnical Engineering Properties Tests

2. Index Properties Tests

The following Index Properties test were performed on native soils collected during the field exploration.

TEST TYPE	NO. OF TESTS PERFORMED	TESTING STANDARD
Moisture Content	19	ASTM D 2216
Dry Unit Weight	14	ASTM D 2937

The purpose of each test is briefly described below.

a. The in-situ water content and dry unit weight of soils provided an indication of their strength before additional testing was performed. These data, in conjunction with field blow count data, served in the selection of samples for additional testing. Test results are presented on the Drill Hole Logs within **Appendix A**.

APPENDIX B

3. Geotechnical Engineering Properties Tests

The following Geotechnical Engineering Property Tests were performed on relatively undisturbed ring samples, as applicable, collected at this site.

TEST TYPE	NO. OF TESTS PERFORMED	TESTING STANDARD
Consolidation	3	ASTM D 2435

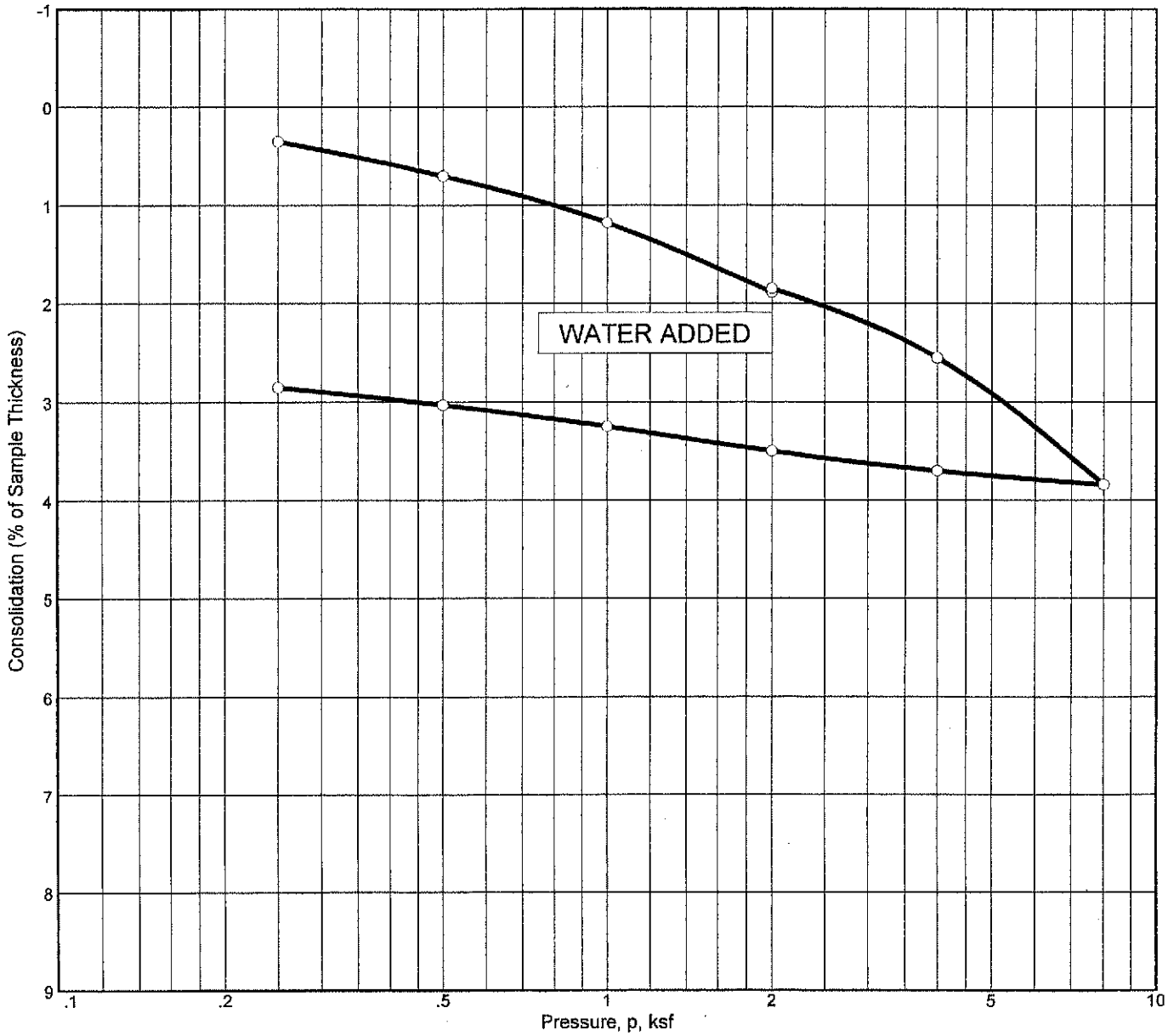
The purpose of the test is briefly described below.

a. One-dimensional consolidation tests were performed on selected ring samples to assess the soils compressibility characteristics by subjecting the specimens to loads ranging from as low as 250 psf to as high as 5,600 psf. The specimens were allowed to consolidate under each load increment until the rate of settlement was less than 0.0002 inches per hour. Time was recorded for readings under some selected loads to produce time-settlement curves. Final readings under each load increment were used to generate load-compression relationships. Test results are plotted on Lab Report **Figures B1.1** thru **B1.3** within this **Appendix**.

The following attachments complete this Appendix.

Consolidation Test Reports **Figures B1.1** thru **B1.3**

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

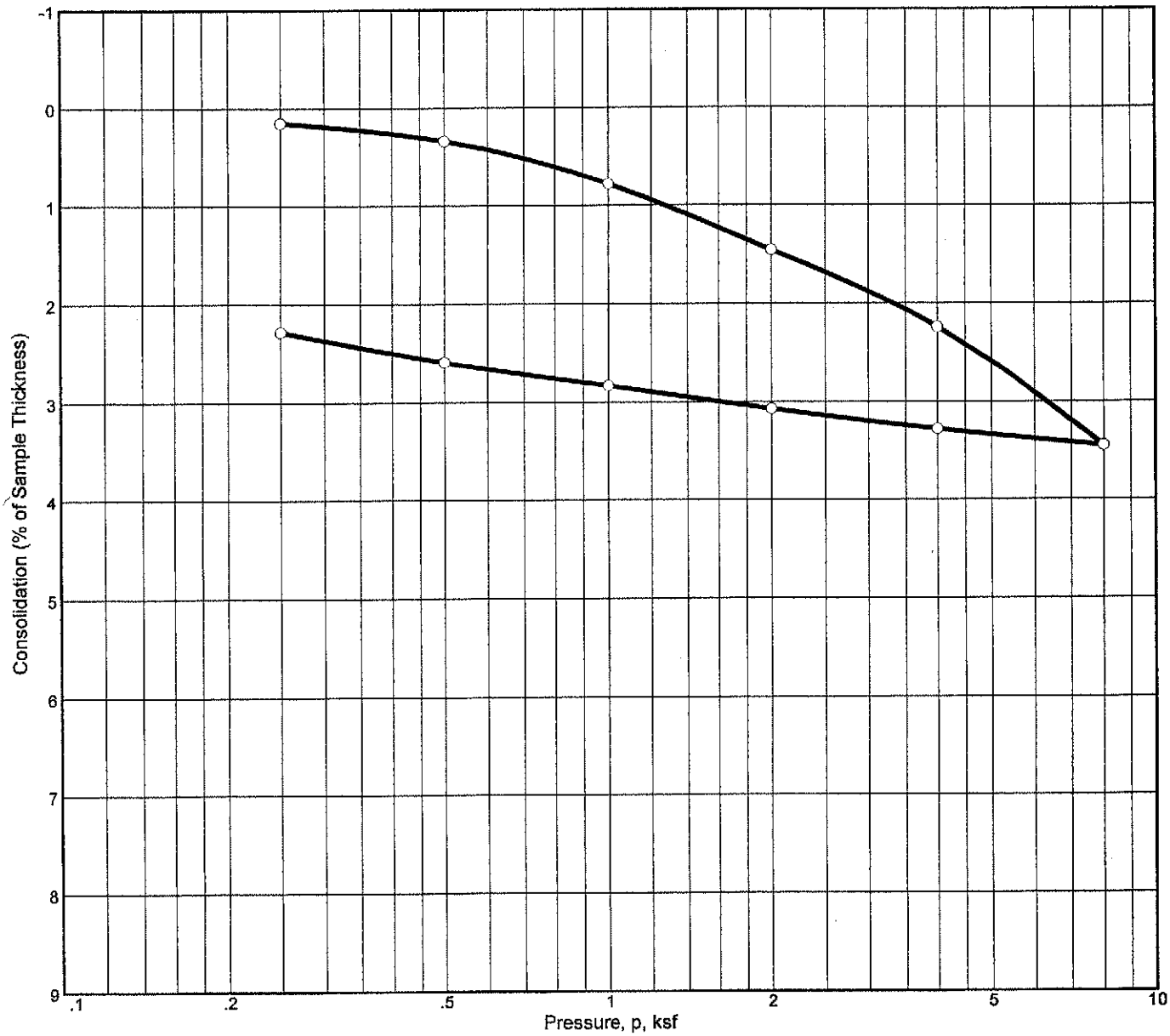
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	101.8	10.5	44.6	1.000	0.625	2.65	0.07	1.08	4.15	CL-ML
FINAL	104.8	21.8	100.0	0.971	0.579					

Source: HS-33T **Elev./Depth:** 9
Material Description: Sandy, silty CLAY with gravel
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.	**Client:** Newhall Land and Farming Co. **Project:** Mesas East Access Road **Job No.:** 04-2023A-4 **Figure** B1.1

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

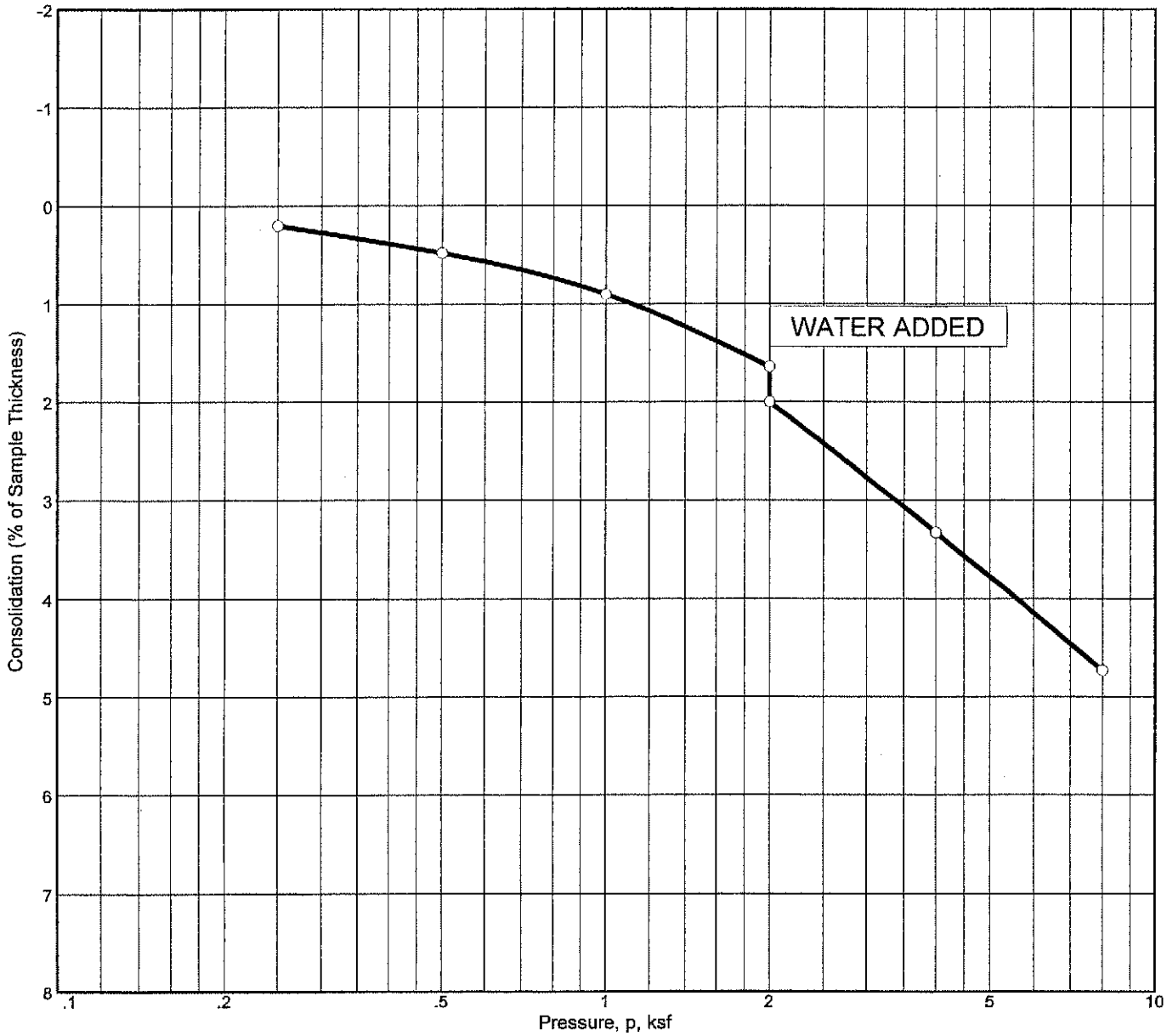
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	99.1	10.4	41.2	1.000	0.670	2.65	0.07	1.80	1.64	CL-ML
FINAL	101.4	23.9	100.0	0.977	0.632					

Source: HS-33T **Elev./Depth:** 15
Material Description: Sandy, silty CLAY
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.	**Client:** Newhall Land and Farming Co. **Project:** Mesas East Access Road **Job No.:** 04-2023A-4 **Figure** B1.2

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	92.1	6.1	20.3	1.000	0.796	2.65	0.08	1.44	1.27	ML
FINAL	96.7	26.9	100.0	0.953	0.711					

Source: HS-34T **Elev./Depth:** 12
Material Description: Sandy SILT with gravel
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.	**Client:** Newhall Land and Farming Co. **Project:** Mesas East Access Road **Job No.:** 04-2023A-4 **Figure** B1.3

CHECKED BY
APPROVED BY
DRAWN BY
DATE

Appendix C

APPENDIX C

SLOPE STABILITY ANALYSES

Introduction

Table C1 summarizes the results of state-of-the-practice computerized static and pseudo-static (i.e. with a statically-simulated seismic load) stability analyses performed on critical cross sections of cut slopes and natural slopes for the currently proposed development of the Revised Vesting Tentative Tract 61105. The total number of stability calculation runs presented in this report are thirty three. Based upon the results from the analyses, factors of safety for gross stability comply with County of Los Angeles minimum factors of safety except for Cross Section 12-12'.

Remedial Measures

On cross-section 12-12' we have recommended that landslide Qls-LI be placed within a geologically recommended Restricted Use Area (RUA). Factors of safety for gross stability below Qls-LI comply with County of Los Angeles minimum factors of safety.

Analysis Approach and Sections Analyzed

The gross stability of the proposed cut and natural slopes was evaluated. Critical fill slopes were evaluated in our previous report dated 7/22/04 and the fill slopes currently proposed are the same or less critical than those analyzed in our 7/22/04 report. Slope cases representing the critical proposed grades and subsurface conditions were selected for stability analyses. Critical conditions for stability included potential adverse bedding, slope height, slope gradient, and/or anticipated future groundwater. Based on our analyses, the respective factors of safety for gross slope stability, presented in **Table C1**, are the lowest values obtained.

Geometry and Groundwater

As shown on the respective cross sections, the analyzed geometries of cut slopes included removal of bedrock, terrace deposits and landslide materials and adding certified compacted fill to achieve the proposed grades, as needed on portions of the slopes. Analyses included cross-bedding and potential adverse bedding with dips ranging from neutral to 45 degrees depending on geologic data obtained near each cross section.

APPENDIX C

Review of ground water data in the vicinity and trench and boring log data indicates that the proposed cut-slopes in bedrock are above historic high ground water levels. Ground water was modeled in the slope stability if a significant source for future ground water existed directly up gradient (updip) of the slope being analyzed. In general a static water table was modeled where existing ground water was encountered and an assumed pore-pressure parameter (ru of 0.12) was utilized where a significant future source of ground water could exist, directly above and directly updip of the slope.

Due to elevated nature of the proposed tank sites, we are not expecting ground water. However due to the possibility of future water leak from tanks or pipes, a pore-pressure parameter (ru of 0.10) was utilized in the vicinity of proposed tank sites (See Slope Stability Analyses for Cross Sections 47-47' and 49-49').

A perched five (5) feet static ground water table was conservatively modeled on cross section 12-12' over the mudstone bed encountered in our subsurface exploration (no water was encountered in the subsurface) in order to analyze a possible future worst case situation below landslide Qls –LI.

It should be noted that ground water in the bedrock and alluvium is very rare on the subject site with the exception of the mouth of Middle Canyon.

Backdrains are proposed for all Stability Fill/Buttress slopes.

Shear Strength Parameters

The shear strength parameters utilized in the slope stability analyses are the same as the values presented and utilized in our July 22, 2004 report.

Methods of Analysis

The computer program GSTABL7, originally written by Purdue University and updated by Garry H. Gregory, Gregory Geotechnical Software was used for the analyses. This program computes the minimum factor of safety from trial failure surfaces using limit equilibrium methods of analysis, such as the Modified Bishop's Method for circular slip surfaces or Janbu's methods for both circular or planar surfaces. In many cases, exit of slip planes at the ground surface is not known. For this report, GSTABL7 method was used to determine breakage of slip planes through upper layers and their exit at the ground surface where the

failure surface is unknown. Janbu's method was used to provide the static minimum safety factor corresponding to the complete slip plane.

The pseudostatic procedure introduces a static horizontal force equal to a "seismic" (pseudostatic) coefficient times the weight of individual slices in addition to other forces acting on the slice. The seismic coefficient is an empirical number which in no way models actual seismic forces. However, the pseudostatic method provides some indication of stability or instability. We selected a seismic horizontal coefficient of 0.15 for our analyses in accordance with Los Angeles County Guidelines.

Surficial Stability Evaluation

Surficial stability of fill and cut slopes was not analyzed using the "Infinite Slope" method since the lower-bound cohesion value of bedrock and proposed fill materials is greater than 250 psf. Surficial stability calculations were not performed on natural slopes because the proposed grading configuration and our debris flow hazard mitigation measure precluded the need for analyzation.

Slope Stability Analyses in the vicinity of Qls-A (Westridge)

The shaded slopes that represent proposed grading on the tentative map in the vicinity of Qls-A (Westridge) consist of 3:1 to 4:1 fill slopes descending from the proposed Westridge Parkway Extension. We have included a copy of R. T. Frankian and Associates cross section A-A' (from their report dated 6-30-02, referenced in our previous report) which also shows the proposed grading configuration for VTT 61105. Per R.T.F.&A's slope stability calculations landslide Qls-A is stable in its current state with a Factor of Safety greater than 2.0. **We accept their findings**. The proposed grades for VTT 61105 at this location further improves the stability of this landslide by adding a load of fill in front of the landslide and over the toe of the landslide as illustrated on the attached Cross Section (**Figure C1**) in this **Appendix**. The anticipated future removal operations will not adversely affect Qls-A. The most significant removals in its vicinity have already occurred during the Westridge Grading Operations (See **Figure C1** attached in this **Appendix**).

Conclusion

The analyzed cut slopes, proposed grades, remedial grades and compacted fill slopes comply with Los Angeles County minimum requirements for gross stability under static and pseudostatic loading conditions and for surficial stability, as applicable, provided our

recommendations are followed and incorporated into project construction. The results of the stability analyses are summarized in **Table C1**.

The following attachments complete this Appendix.

Slope Stability Analyses Results	**Table C1**
RTF&A Cross Section A-A' (Westridge)	**Figure C1**
Slope Stability Diagrams and Data Sheets for **Runs No. 1A** through **33A**	

APPENDIX C

SLOPE STABILITY ANALYSES RESULTS

Cross Section	File Name	Slope Designation	Analyzed Plane	Method	Factor of Safety		Comments	Run No.
					Static	Pseudostatic[1] (Coeff = 0.15)		
2-2'	T2S2A T2PS2A	Natural slope	Circular	Modified Bishop	1.65	1.36	Natural TQs slope.	1A 2A
12-12'	T12S3A	Qls (L1)	Landslide Plane	Modified Bishop	1.07	-	Landslide plane.	3A
12-12'	T12S5A	Qls (L1)	Circular	Modified Bishop	2.38	-	Circular analyses below landslide. FS > 1.5 below landslide.	4A
12-12'	T12S4A	Qls (L1)	Bedding Plane	Janbu	3.64	-	Bedding plane analyses below landslide. FS > 1.5 below landslide.	5A
22-22'	T22S1A	CS-15	Bedding plane	Janbu	1.27	-	Minimum FS < 1.5; see recommended action below.	6A
22-22'	T22S2A T22PS2A	CS-15	Bedding plane	Janbu	1.55	1.10	Buttress with 15'd by 85'w key with 1.75:1 backcut.	7A 8A
22-22'	T22S3A	CS-15	Circular	Modified Bishop	1.82	-	Pseudostatic is not critical and therefore not performed.	9A
24-24'	T24S1A T24PS1A	CS-28b	Bedding plane	Janbu	1.68	1.18	Stability fill required due to daylighted bedding conditions.	10A 11A
24-24'	T24S2A	CS-28b	Circular	Modified Bishop	2.44	-	Pseudostatic is not critical and therefore not performed.	12A
34-34'	T34S1A T34PS1A	Natural slope	Circular	Modified Bishop	1.52	1.34	Steep natural slope adjacent to proposed development.	13A 14A

[1] Peak shear strength values were utilized.

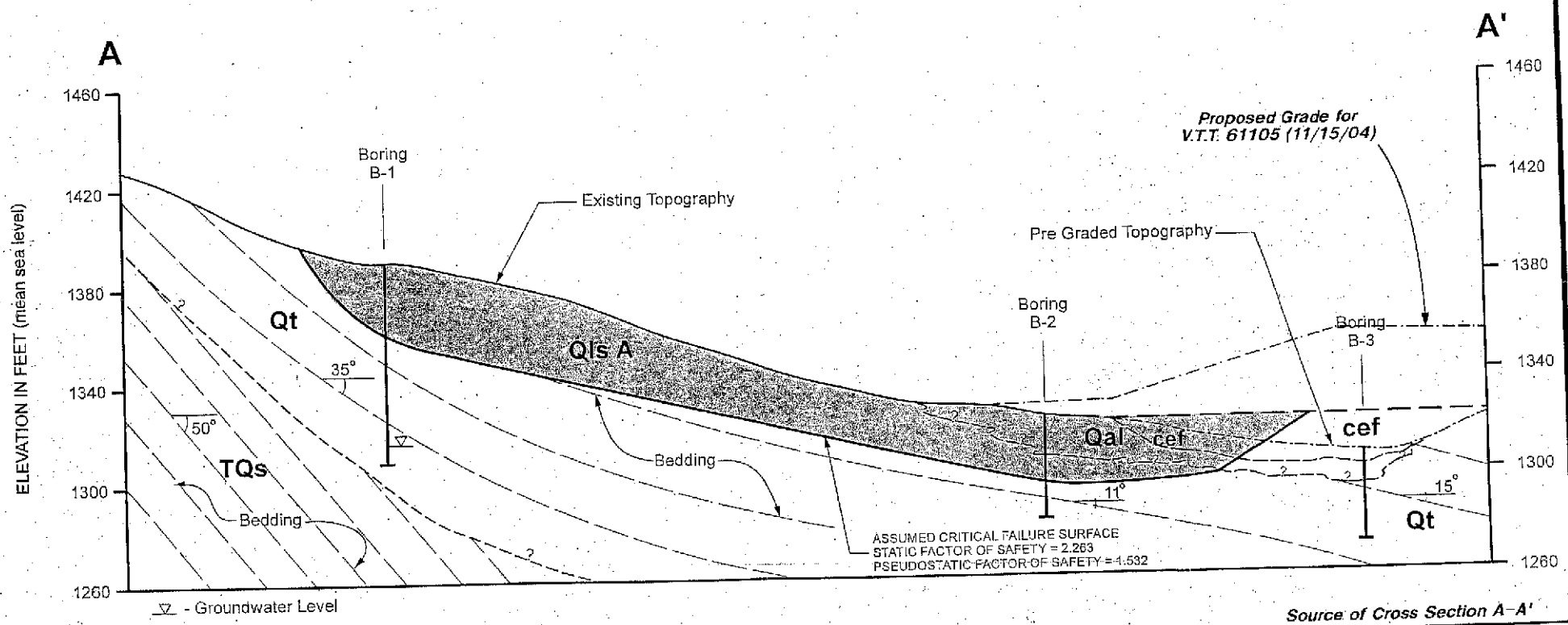
APPENDIX C

Cross Section	File Name	Slope Designation	Analyzed Plane	Method	Factor of Safety		Comments	Run No.
					Static	Pseudostatic[1] (Coeff = 0.15)		
35-35'	T35S1A T35PS1A	Natural slope	Circular	Modified Bishop	1.69	1.43	Natural slope below the proposed development. Bedding plane analyses is not critical.	15A 16A
43-43'	T43S1A	CS-46	Bedding Plane	Janbu	2.49	-	Down dip from CS-46. Pseudostatic is not critical and therefore not performed.	17A
44-44'	T44S1C	CS-12a and CS-12b	Bedding Plane	Janbu	1.99	-	Entire slope. Pseudostatic is not critical and therefore not performed.	18A
44-44'	T44S3A	CS-12a	Bedding Plane	Janbu	1.95	-	Ascending slope above the proposed road. Pseudostatic is not critical and therefore not performed.	19A
44-44'	T44S2A	CS-12b	Bedding Plane	Janbu	1.83	-	Descending slope below the proposed road. Pseudostatic is not critical and therefore not performed.	20A
45-45'	T45S1A	CS-15	Bedding Plane	Janbu	1.28	-	Minimum FS < 1.5; see recommended action below.	21A
45-45'	T45S2A T45PS2A	CS-15	Bedding Plane	Janbu	1.56	1.14	Buttress with 10'd by 80'w key with 1.5:1 backcut.	22A 23A
46-46'	T46S1A	CS-9	Bedding Plane	Janbu	1.90	-	Minimum factor of safety.	24A
47-47'	T47S1B	CS-8	Bedding Plane	Janbu	1.49	-	Minimum FS < 1.5; see recommended action below.	25A
47-47'	T47S2B T47PS2B	CS-8	Bedding Plane	Janbu	1.55	1.13	Buttress with 5'd by 110'w key with 1.5:1 backcut.	26A 27A

APPENDIX C

Cross Section	File Name	Slope Designation	Analyzed Plane	Method	Factor of Safety		Comments	Run No.
					Static	Pseudostatic[1] (Coeff = 0.15)		
49-49′	T49S1A	CS-6	Bedding Plane	Janbu	1.32	-	Minimum FS < 1.5; see recommended action below.	28A
49-49′	T49S2A T49PS2A	CS-6	Bedding Plane	Janbu	1.55	1.10	Buttress with 10′d by 100′w key with 1.5:1 backcut.	29A 30A
2E-2E′	T2ES3A	CS-28b	Bedding Plane	Janbu	2.45	-	Bedding plane below Qls removal.	31A
10E-10E′	T10ES1A T10EPS1A	CS-12c	Bedding Plane	Janbu	1.59	1.13	Minimum factor of safety.	32A 33A

GEOTECHNICAL SECTION A-A'



Source of Cross Section A–A'

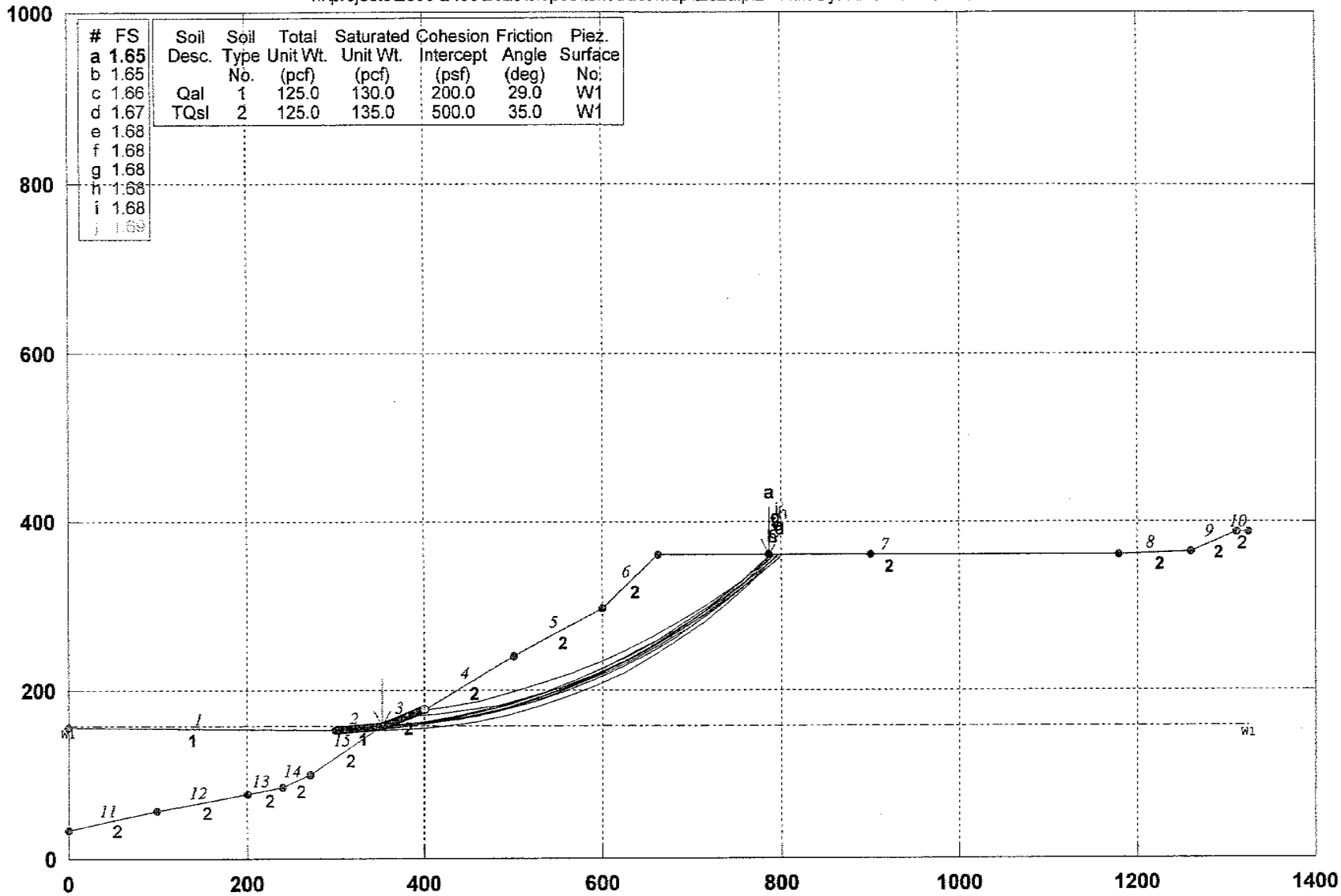
Modified portion showing proposed grade for Westridge Parkway extension on V.T.T. 61105 which results in more favorable geometry

AESEGI Figure C1

R.T. FRANKIAN & ASSOCIATES		
PREPARED FOR: Newhall Land and Farming Company		
Westridge Parkway Landslide Valencia, California		
SCALE 1" = 40'	DRAWN BY MN	CHECKED BY
DATE 6-3-02	FIGURE 4.2	JOB NO. 96-500-20

Mesas East, x-sec 2-2'; static; circular

n:\projects\2000-2499\2023\slopes\tent tract map\t2s2a.pl2 Run By: KPC 12/16/2004 02:32PM



GSTABL7 v.2 FSmin=1.65

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 1A

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:        12/16/2004
Time of Run:              02:32PM
Run By:                   KPC
Input Data Filename:      N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t2s2a.in
Output Filename:          N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t2s2a.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\2000-2499\2023\Slopent Tract Map\t2s2a.PLT
PROBLEM DESCRIPTION:  Mesas East, x-sec 2-2'; static;
                      circular
BOUNDARY COORDINATES
    9 Top   Boundaries
   15 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     156.00     300.00     152.00        1
    2       300.00     152.00     353.00     157.00        1
    3       353.00     157.00     400.00     178.00        2
    4       400.00     178.00     500.00     240.00        2
    5       500.00     240.00     600.00     297.00        2
    6       600.00     297.00     662.00     361.50        2
    7       662.00     361.50    1180.00     361.00        2
    8      1180.00     361.00    1260.00     364.00        2
    9      1260.00     364.00    1312.00     388.00        2
   10      1312.00     388.00    1325.00     388.00        2
   11         0.00      33.00     100.00      57.00        2
   12       100.00      57.00     200.00      76.00        2
   13       200.00      76.00     240.00      85.00        2
   14       240.00      85.00     272.00     100.00        2
   15       272.00     100.00     353.00     157.00        2
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 2 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   125.0    130.0     200.0     29.0    0.00       0.0      1
  2   125.0    135.0     500.0     35.0    0.00       0.0      1
1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water =  62.40 (pcf)
Piezometric Surface No.  1 Specified by  2 Coordinate Points
Pore Pressure Inclination Factor =  0.50
  Point      X-Water     Y-Water
   No.         (ft)        (ft)
    1          0.00      157.00
    2       1325.00      157.00
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
  10 Surface(s) Initiate(s) From Each Of   100 Points Equally Spaced
Along The Ground Surface Between  X = 300.00(ft)
                              and  X = 400.00(ft)
Each Surface Terminates Between   X = 786.00(ft)
```

and X = 900.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
35.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 10.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 3.487 FS Min = 1.645 FS Ave = 2.405
Standard Deviation = 0.420 Coefficient of Variation = 17.47 %
Failure Surface Specified By 16 Coordinate Points

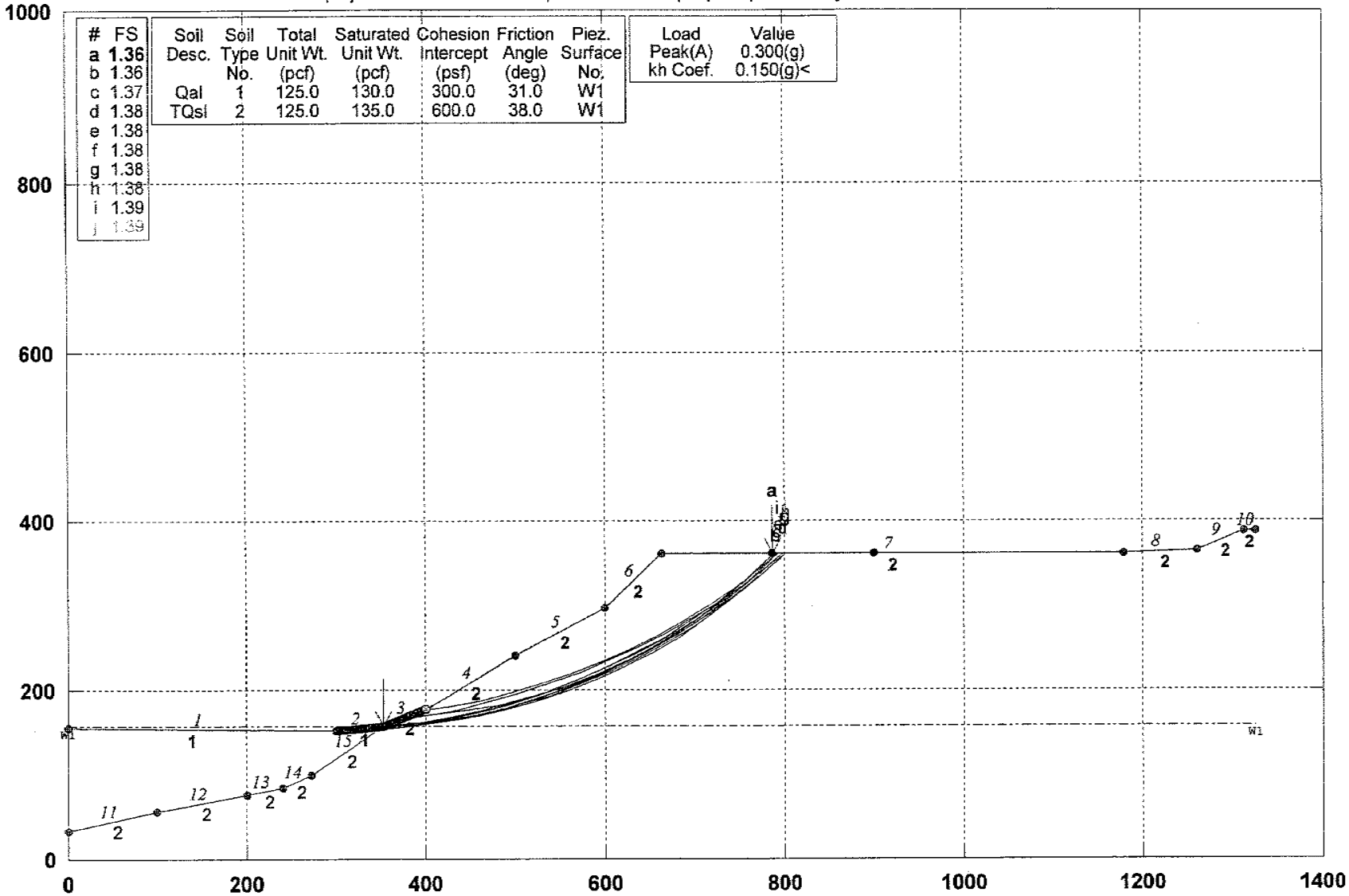
Point No.	X-Surf (ft)	Y-Surf (ft)
1	353.54	157.24
2	388.44	159.87
3	423.14	164.45
4	457.53	170.95
5	491.50	179.36
6	524.95	189.66
7	557.78	201.80
8	589.88	215.75
9	621.14	231.48
10	651.49	248.92
11	680.81	268.03
12	709.02	288.75
13	736.03	311.01
14	761.76	334.74
15	786.12	359.87
16	787.43	361.38

Circle Center At X = 323.92 ; Y = 783.38 ; and Radius = 626.84
Factor of Safety
*** 1.645 ***
Individual data on the 19 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	34.9	28273.8	0.0	0.0	0.	0.	0.0	0.0	0.0
2	11.6	21368.4	0.0	0.0	0.	0.	0.0	0.0	0.0
3	23.1	64350.1	0.0	0.0	0.	0.	0.0	0.0	0.0
4	34.4	151779.9	0.0	0.0	0.	0.	0.0	0.0	0.0
5	34.0	208273.9	0.0	0.0	0.	0.	0.0	0.0	0.0
6	8.5	60235.6	0.0	0.0	0.	0.	0.0	0.0	0.0
7	25.0	191185.3	0.0	0.0	0.	0.	0.0	0.0	0.0
8	32.8	278408.0	0.0	0.0	0.	0.	0.0	0.0	0.0
9	32.1	294107.7	0.0	0.0	0.	0.	0.0	0.0	0.0
10	10.1	95947.7	0.0	0.0	0.	0.	0.0	0.0	0.0
11	21.1	216291.4	0.0	0.0	0.	0.	0.0	0.0	0.0
12	30.3	358719.7	0.0	0.0	0.	0.	0.0	0.0	0.0
13	10.5	136251.0	0.0	0.0	0.	0.	0.0	0.0	0.0
14	18.8	234143.4	0.0	0.0	0.	0.	0.0	0.0	0.0
15	28.2	292953.8	0.0	0.0	0.	0.	0.0	0.0	0.0
16	27.0	207859.7	0.0	0.0	0.	0.	0.0	0.0	0.0
17	25.7	123954.1	0.0	0.0	0.	0.	0.0	0.0	0.0
18	24.4	42912.6	0.0	0.0	0.	0.	0.0	0.0	0.0
19	1.3	124.2	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 2-2'; pseudostatic; circular

n:\projects\2000-2499\2023\slopes\tent tract map\t2ps2a.pl2 Run By: KPC 12/16/2004 02:31PM



GSTABL7 v.2 FSmin=1.36

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN NO. 2A

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 12/16/2004
Time of Run: 02:31PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t2ps2a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t2ps2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\t2ps2a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 2-2'; pseudostatic; circular

BOUNDARY COORDINATES
10 Top Boundaries
15 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	156.00	300.00	152.00	1
2	300.00	152.00	353.00	157.00	1
3	353.00	157.00	400.00	178.00	2
4	400.00	178.00	500.00	240.00	2
5	500.00	240.00	600.00	297.00	2
6	600.00	297.00	662.00	361.50	2
7	662.00	361.50	1180.00	361.00	2
8	1180.00	361.00	1260.00	364.00	2
9	1260.00	364.00	1312.00	388.00	2
10	1312.00	388.00	1325.00	388.00	2
11	0.00	33.00	100.00	57.00	2
12	100.00	57.00	200.00	76.00	2
13	200.00	76.00	240.00	85.00	2
14	240.00	85.00	272.00	100.00	2
15	272.00	100.00	353.00	157.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	31.0	0.00	0.0	1
2	125.0	135.0	600.0	38.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	157.00
2	1325.00	157.00

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.

10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 300.00(ft)
and X = 400.00(ft)
Each Surface Terminates Between X = 786.00(ft)
and X = 900.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
35.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 10.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 2.782 FS Min = 1.362 FS Ave = 1.945
Standard Deviation = 0.340 Coefficient of Variation = 17.46 %
Failure Surface Specified By 16 Coordinate Points

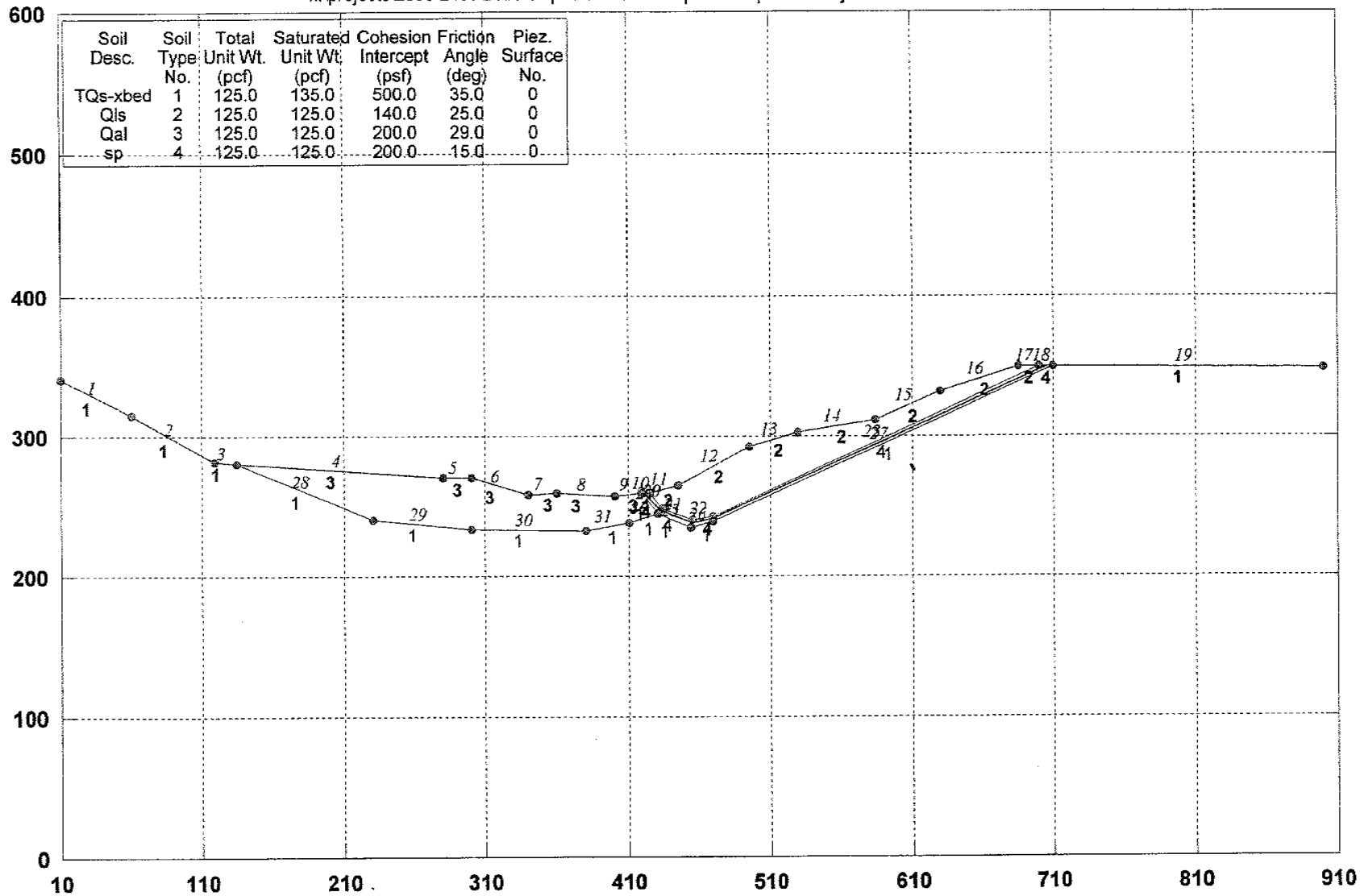
Point No.	X-Surf (ft)	Y-Surf (ft)
1	353.54	157.24
2	388.44	159.87
3	423.14	164.45
4	457.53	170.95
5	491.50	179.36
6	524.95	189.66
7	557.78	201.80
8	589.88	215.75
9	621.14	231.48
10	651.49	248.92
11	680.81	268.03
12	709.02	288.75
13	736.03	311.01
14	761.76	334.74
15	786.12	359.87
16	787.43	361.38

Circle Center At X = 323.92 ; Y = 783.38 ; and Radius = 626.84
Factor of Safety
*** 1.362 ***
Individual data on the 19 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	34.9	28273.8	0.0	0.0	0.	0.	4241.1	0.0	0.0
2	11.6	21368.4	0.0	0.0	0.	0.	3205.3	0.0	0.0
3	23.1	64350.1	0.0	0.0	0.	0.	9652.5	0.0	0.0
4	34.4	151779.9	0.0	0.0	0.	0.	22767.0	0.0	0.0
5	34.0	208273.9	0.0	0.0	0.	0.	31241.1	0.0	0.0
6	8.5	60235.6	0.0	0.0	0.	0.	9035.3	0.0	0.0
7	25.0	191185.3	0.0	0.0	0.	0.	28677.8	0.0	0.0
8	32.8	278408.0	0.0	0.0	0.	0.	41761.2	0.0	0.0
9	32.1	294107.7	0.0	0.0	0.	0.	44116.2	0.0	0.0
10	10.1	95947.7	0.0	0.0	0.	0.	14392.2	0.0	0.0
11	21.1	216291.4	0.0	0.0	0.	0.	32443.7	0.0	0.0
12	30.3	358719.7	0.0	0.0	0.	0.	53807.9	0.0	0.0
13	10.5	136251.0	0.0	0.0	0.	0.	20437.7	0.0	0.0
14	18.8	234143.4	0.0	0.0	0.	0.	35121.5	0.0	0.0
15	28.2	292953.8	0.0	0.0	0.	0.	43943.1	0.0	0.0
16	27.0	207859.7	0.0	0.0	0.	0.	31178.9	0.0	0.0
17	25.7	123954.1	0.0	0.0	0.	0.	18593.1	0.0	0.0
18	24.4	42912.6	0.0	0.0	0.	0.	6436.9	0.0	0.0
19	1.3	124.2	0.0	0.0	0.	0.	18.6	0.0	0.0

Mesas East, x-sec 12-12'; static; Qls plane

n:\projects\2000-2499\2023\slopes\tent tract map\t12s3a.plt Run By: KPC 12/20/2004 01:44PM



Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
TQs-xbed	1	125.0	135.0	500.0	35.0	0
Qls	2	125.0	125.0	140.0	25.0	0
Qal	3	125.0	125.0	200.0	29.0	0
sp	4	125.0	125.0	200.0	15.0	0

GSTABL7 v.2 FSmin=1.07

Factor Of Safety Is Calculated By The Modified Bishop Method

GSTABL7

Run No. 3A

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 12/20/2004
Time of Run: 01:44PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t12s3a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t12s3a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\t12s3a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 12-12'; static;
Qls plane

BOUNDARY COORDINATES
19 Top Boundaries
32 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	10.00	340.00	60.00	315.00	1
2	60.00	315.00	119.00	282.00	1
3	119.00	282.00	135.00	280.00	1
4	135.00	280.00	280.00	270.00	3
5	280.00	270.00	300.00	270.00	3
6	300.00	270.00	340.00	258.00	3
7	340.00	258.00	360.00	259.00	3
8	360.00	259.00	400.00	257.00	3
9	400.00	257.00	419.00	259.00	3
10	419.00	259.00	424.00	259.00	4
11	424.00	259.00	445.00	265.00	2
12	445.00	265.00	495.00	293.00	2
13	495.00	293.00	530.00	303.00	2
14	530.00	303.00	584.00	312.00	2
15	584.00	312.00	630.00	331.00	2
16	630.00	331.00	685.00	349.00	2
17	685.00	349.00	700.00	349.00	2
18	700.00	349.00	710.00	349.00	4
19	710.00	349.00	900.00	348.00	1
20	425.00	259.00	434.00	248.00	4
21	434.00	248.00	455.00	240.00	4
22	455.00	240.00	470.00	243.00	4
23	470.00	243.00	700.00	349.00	4
24	419.00	259.00	431.00	245.00	1
25	431.00	245.00	454.00	235.00	1
26	454.00	235.00	470.00	239.00	1
27	470.00	239.00	710.00	349.00	1
28	135.00	280.00	230.00	240.00	1
29	230.00	240.00	300.00	234.00	1
30	300.00	234.00	380.00	232.00	1
31	380.00	232.00	410.00	238.00	1
32	410.00	238.00	431.00	245.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.

1	125.0	135.0	500.0	35.0	0.00	0.0	0
2	125.0	125.0	140.0	25.0	0.00	0.0	0
3	125.0	125.0	200.0	29.0	0.00	0.0	0
4	125.0	125.0	200.0	15.0	0.00	0.0	0

Trial Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	420.00	259.00
2	432.50	246.50
3	454.50	238.00
4	470.00	241.00
5	705.00	349.00

Circle Center At X = 457.094(ft) ; Y = 283.594(ft); and Radius = 44.506(ft)

* * Factor Of Safety Is Calculated By The Modified Bishop Method * *

Factor Of Safety For The Preceding Specified Surface = 1.071

Table 1 - Individual Data on the 15 Slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	4.0	1000.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	1.0	580.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	7.5	9475.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	1.5	2893.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	11.0	26995.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	9.5	33041.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	0.5	2025.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	15.0	66096.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	25.0	122672.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	35.0	163922.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	54.0	178990.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	46.0	100845.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	55.0	88204.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	15.0	10771.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	5.0	718.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 2 - Base Stress Data on the 15 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-45.00	422.00	5.66	356.02	-125.00
2	-45.00	424.50	1.41	727.04	-290.18
3	-45.00	428.75	10.61	718.11	-631.70
4	-21.12	433.25	1.61	793.57	-648.52
5	-21.12	439.50	11.79	949.31	-825.03
6	-21.12	449.75	10.18	1253.02	-1169.27
7	10.95	454.75	0.51	1226.23	755.84
8	10.95	462.50	15.28	1316.96	822.07
9	24.68	482.50	27.51	1358.65	1861.85
10	24.68	512.50	38.52	1304.96	1777.09
11	24.68	557.00	59.43	975.98	1257.68
12	24.68	607.00	50.63	706.25	831.83
13	24.68	657.50	60.53	564.80	608.51
14	24.68	692.50	16.51	351.96	272.47
15	24.68	702.50	5.50	213.90	54.49

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing Soil Nail, and Applied Forces if applicable) = 279234.12 (lbs)

Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing, Soil Nail, and Applied Forces if applicable) = 884.55(psf)

Sum of the Driving Forces = 260611.58 (lbs)

Average Mobilized Shear Stress = 825.56(psf)

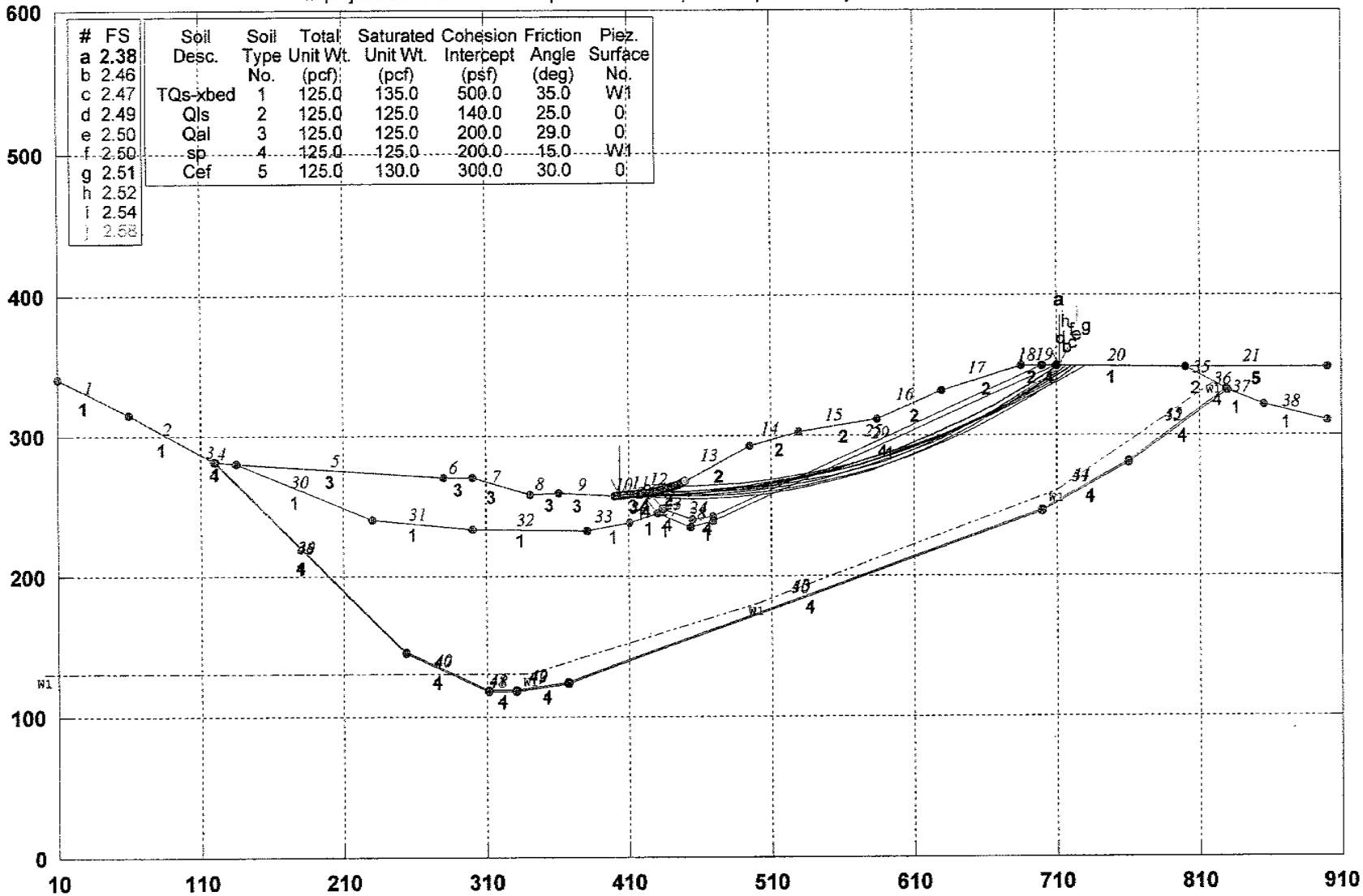
Total length of the failure surface = 315.68(ft)

CAUTION - Factor Of Safety Is Calculated By The Modified Bishop Method. This Method Is Valid Only If The Failure Surface Approximates A Circular Arc.

**** END OF GSTABL7 OUTPUT ****

Mesas East, x-sec 12-12'; static; circular

n:\projects\2000-2499\2023\slopes\tent tract map\t12s5a.pl2 Run By: KPC 12/21/2004 03:31PM



#	FS
a	2.38
b	2.46
c	2.47
d	2.49
e	2.50
f	2.50
g	2.51
h	2.52
i	2.54
j	2.58

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
TQs-xbed	1	125.0	135.0	500.0	35.0	W1
Qls	2	125.0	125.0	140.0	25.0	0
Qal	3	125.0	125.0	200.0	29.0	0
sp	4	125.0	125.0	200.0	15.0	W1
Cef	5	125.0	130.0	300.0	30.0	0

GSTABL7 v.2 FSmin=2.38

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 4A

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 12/21/2004
Time of Run: 03:31PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t12s5a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t12s5a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\t12s5a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 12-12'; static; circular

BOUNDARY COORDINATES

Note: User origin value specified.
Add 10.00 to X-values and 0.00 to Y-values listed.

21 Top Boundaries
52 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	10.00	340.00	60.00	315.00	1
2	60.00	315.00	119.00	282.00	1
3	119.00	282.00	120.00	281.00	4
4	120.00	281.00	135.00	280.00	1
5	135.00	280.00	280.00	270.00	3
6	280.00	270.00	300.00	270.00	3
7	300.00	270.00	340.00	258.00	3
8	340.00	258.00	360.00	259.00	3
9	360.00	259.00	400.00	257.00	3
10	400.00	257.00	419.00	259.00	3
11	419.00	259.00	424.00	259.00	4
12	424.00	259.00	445.00	265.00	2
13	445.00	265.00	495.00	293.00	2
14	495.00	293.00	530.00	303.00	2
15	530.00	303.00	584.00	312.00	2
16	584.00	312.00	630.00	331.00	2
17	630.00	331.00	685.00	349.00	2
18	685.00	349.00	700.00	349.00	2
19	700.00	349.00	710.00	349.00	4
20	710.00	349.00	800.00	348.00	1
21	800.00	348.00	900.00	348.00	5
22	425.00	259.00	434.00	248.00	4
23	434.00	248.00	455.00	240.00	4
24	455.00	240.00	470.00	243.00	4
25	470.00	243.00	700.00	349.00	4
26	419.00	259.00	431.00	245.00	1
27	431.00	245.00	454.00	235.00	1
28	454.00	235.00	470.00	239.00	1
29	470.00	239.00	710.00	349.00	1
30	135.00	280.00	230.00	240.00	1
31	230.00	240.00	300.00	234.00	1
32	300.00	234.00	380.00	232.00	1
33	380.00	232.00	410.00	238.00	1
34	410.00	238.00	431.00	245.00	1
35	800.00	348.00	829.00	333.00	2
36	829.00	333.00	830.00	332.00	4
37	830.00	332.00	856.00	322.00	1

38	856.00	322.00	900.00	310.00	1
39	120.00	281.00	254.00	146.00	4
40	254.00	146.00	312.00	119.00	4
41	312.00	119.00	330.00	119.00	4
42	330.00	119.00	367.00	125.00	4
43	367.00	125.00	700.00	247.00	4
44	700.00	247.00	760.00	281.00	4
45	760.00	281.00	829.00	333.00	4
46	119.00	282.00	254.00	145.00	1
47	254.00	145.00	312.00	118.00	1
48	312.00	118.00	330.00	118.00	1
49	330.00	118.00	367.00	124.00	1
50	367.00	124.00	700.00	246.00	1
51	700.00	246.00	760.00	280.00	1
52	760.00	280.00	830.00	332.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	500.0	35.0	0.00	0.0	1
2	125.0	125.0	140.0	25.0	0.00	0.0	0
3	125.0	125.0	200.0	29.0	0.00	0.0	0
4	125.0	125.0	200.0	15.0	0.00	0.0	1
5	125.0	130.0	300.0	30.0	0.00	0.0	0

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 5 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	130.00
2	340.00	130.00
3	500.00	180.00
4	710.00	260.00
5	820.00	337.00

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 400.00(ft)
and X = 450.00(ft)
Each Surface Terminates Between X = 710.00(ft)
and X = 800.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
25.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 2.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 4.919 FS Min = 2.376 FS Ave = 3.828
Standard Deviation = 0.565 Coefficient of Variation = 14.75 %
Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	403.54	257.37
2	428.54	257.40
3	453.51	258.62

4	478.39	261.03
5	503.13	264.61
6	527.67	269.38
7	551.96	275.31
8	575.94	282.38
9	599.55	290.59
10	622.74	299.92
11	645.47	310.34
12	667.67	321.83
13	689.30	334.37
14	710.31	347.92
15	711.79	348.98

Circle Center At X = 415.45 ; Y = 781.93 ; and Radius = 524.69

Factor of Safety

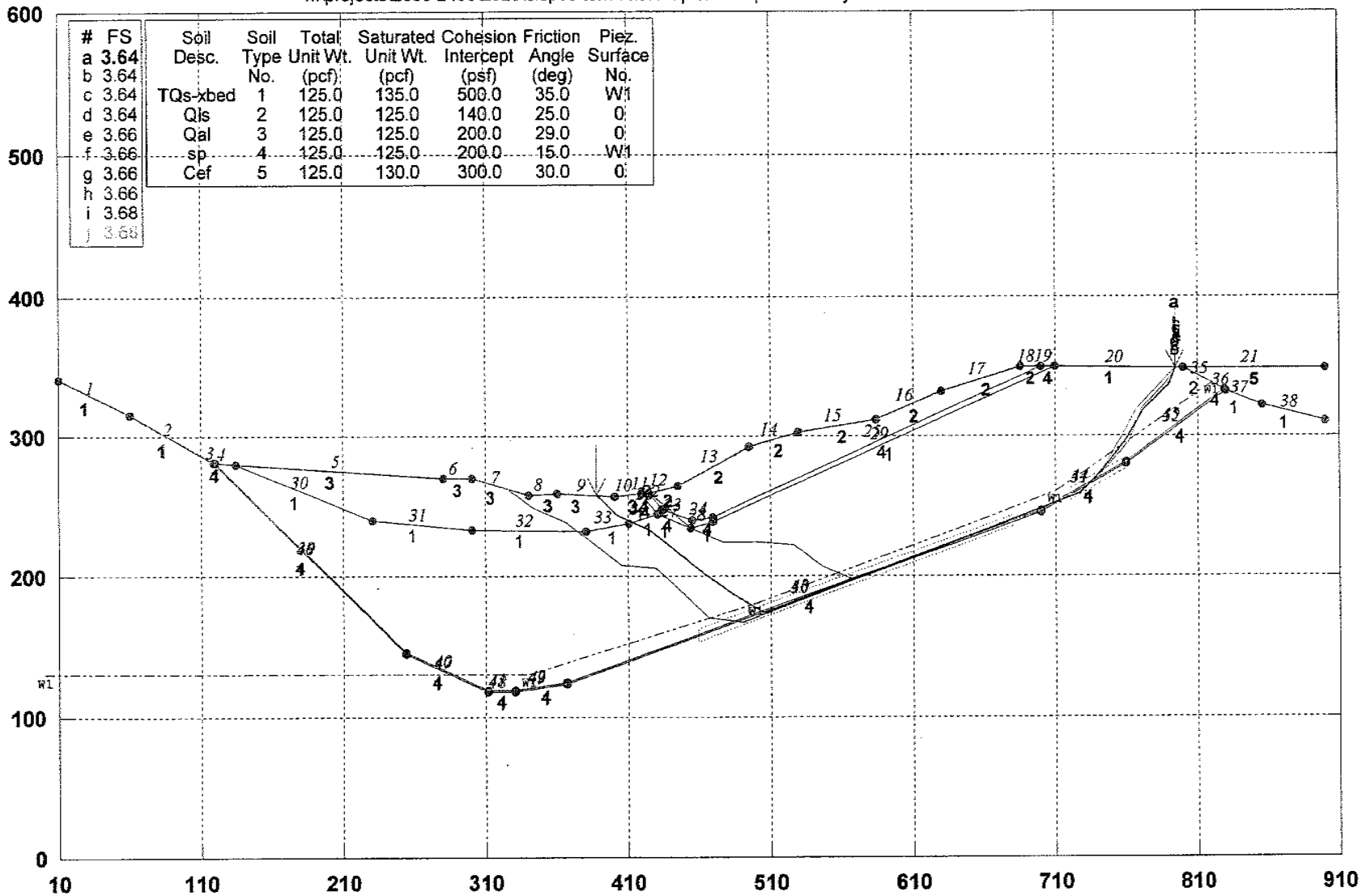
*** 2.376 ***

Individual data on the 29 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	15.5	1556.7	0.0	0.0	0.	0.	0.0	0.0	0.0
2	1.4	277.5	0.0	0.0	0.	0.	0.0	0.0	0.0
3	3.6	727.4	0.0	0.0	0.	0.	0.0	0.0	0.0
4	1.0	218.4	0.0	0.0	0.	0.	0.0	0.0	0.0
5	1.3	340.3	0.0	0.0	0.	0.	0.0	0.0	0.0
6	2.2	717.1	0.0	0.0	0.	0.	0.0	0.0	0.0
7	16.5	9973.7	0.0	0.0	0.	0.	0.0	0.0	0.0
8	8.5	9537.2	0.0	0.0	0.	0.	0.0	0.0	0.0
9	24.9	52593.6	0.0	0.0	0.	0.	0.0	0.0	0.0
10	16.6	54231.0	0.0	0.0	0.	0.	0.0	0.0	0.0
11	8.1	30627.6	0.0	0.0	0.	0.	0.0	0.0	0.0
12	23.8	94553.6	0.0	0.0	0.	0.	0.0	0.0	0.0
13	0.8	3099.7	0.0	0.0	0.	0.	0.0	0.0	0.0
14	2.3	9603.2	0.0	0.0	0.	0.	0.0	0.0	0.0
15	16.1	65203.9	0.0	0.0	0.	0.	0.0	0.0	0.0
16	5.9	23193.3	0.0	0.0	0.	0.	0.0	0.0	0.0
17	24.0	89355.8	0.0	0.0	0.	0.	0.0	0.0	0.0
18	8.1	27760.5	0.0	0.0	0.	0.	0.0	0.0	0.0
19	15.5	53102.7	0.0	0.0	0.	0.	0.0	0.0	0.0
20	23.2	81051.0	0.0	0.0	0.	0.	0.0	0.0	0.0
21	7.3	25317.6	0.0	0.0	0.	0.	0.0	0.0	0.0
22	15.5	51696.0	0.0	0.0	0.	0.	0.0	0.0	0.0
23	22.2	65514.9	0.0	0.0	0.	0.	0.0	0.0	0.0
24	17.3	41822.0	0.0	0.0	0.	0.	0.0	0.0	0.0
25	4.3	8534.5	0.0	0.0	0.	0.	0.0	0.0	0.0
26	10.7	14948.8	0.0	0.0	0.	0.	0.0	0.0	0.0
27	10.0	5626.1	0.0	0.0	0.	0.	0.0	0.0	0.0
28	0.3	45.3	0.0	0.0	0.	0.	0.0	0.0	0.0
29	1.5	99.1	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 12-12'; static; Bedding plane

n:\projects\2000-2499\2023\slopes\tent tract map\t12s4a.pl2 Run By: KPC 12/20/2004 01:42PM



#	FS
a	3.64
b	3.64
c	3.64
d	3.64
e	3.66
f	3.66
g	3.66
h	3.66
i	3.68
j	3.68

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
TQs-xbed	1	125.0	135.0	500.0	35.0	W1
Qls	2	125.0	125.0	140.0	25.0	0
Qal	3	125.0	125.0	200.0	29.0	0
sp	4	125.0	125.0	200.0	15.0	W1
Cef	5	125.0	130.0	300.0	30.0	0

GSTABL7 v.2 FSmin=3.64

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 5A

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 12/20/2004
Time of Run: 01:42PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t12s4a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t12s4a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\t12s4a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 12-12'; static;
Bedding plane

BOUNDARY COORDINATES
21 Top Boundaries
52 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	10.00	340.00	60.00	315.00	1
2	60.00	315.00	119.00	282.00	1
3	119.00	282.00	120.00	281.00	4
4	120.00	281.00	135.00	280.00	1
5	135.00	280.00	280.00	270.00	3
6	280.00	270.00	300.00	270.00	3
7	300.00	270.00	340.00	258.00	3
8	340.00	258.00	360.00	259.00	3
9	360.00	259.00	400.00	257.00	3
10	400.00	257.00	419.00	259.00	3
11	419.00	259.00	424.00	259.00	4
12	424.00	259.00	445.00	265.00	2
13	445.00	265.00	495.00	293.00	2
14	495.00	293.00	530.00	303.00	2
15	530.00	303.00	584.00	312.00	2
16	584.00	312.00	630.00	331.00	2
17	630.00	331.00	685.00	349.00	2
18	685.00	349.00	700.00	349.00	2
19	700.00	349.00	710.00	349.00	4
20	710.00	349.00	800.00	348.00	1
21	800.00	348.00	900.00	348.00	5
22	425.00	259.00	434.00	248.00	4
23	434.00	248.00	455.00	240.00	4
24	455.00	240.00	470.00	243.00	4
25	470.00	243.00	700.00	349.00	4
26	419.00	259.00	431.00	245.00	1
27	431.00	245.00	454.00	235.00	1
28	454.00	235.00	470.00	239.00	1
29	470.00	239.00	710.00	349.00	1
30	135.00	280.00	230.00	240.00	1
31	230.00	240.00	300.00	234.00	1
32	300.00	234.00	380.00	232.00	1
33	380.00	232.00	410.00	238.00	1
34	410.00	238.00	431.00	245.00	1
35	800.00	348.00	829.00	333.00	2
36	829.00	333.00	830.00	332.00	4
37	830.00	332.00	856.00	322.00	1
38	856.00	322.00	900.00	310.00	1
39	120.00	281.00	254.00	146.00	4
40	254.00	146.00	312.00	119.00	4

41	312.00	119.00	330.00	119.00	4
42	330.00	119.00	367.00	125.00	4
43	367.00	125.00	700.00	247.00	4
44	700.00	247.00	760.00	281.00	4
45	760.00	281.00	829.00	333.00	4
46	119.00	282.00	254.00	145.00	1
47	254.00	145.00	312.00	118.00	1
48	312.00	118.00	330.00	118.00	1
49	330.00	118.00	367.00	124.00	1
50	367.00	124.00	700.00	246.00	1
51	700.00	246.00	760.00	280.00	1
52	760.00	280.00	830.00	332.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	500.0	35.0	0.00	0.0	1
2	125.0	125.0	140.0	25.0	0.00	0.0	0
3	125.0	125.0	200.0	29.0	0.00	0.0	0
4	125.0	125.0	200.0	15.0	0.00	0.0	1
5	125.0	130.0	300.0	30.0	0.00	0.0	0

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 5 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	130.00
2	340.00	130.00
3	500.00	180.00
4	710.00	260.00
5	820.00	337.00

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 25.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	460.00	158.00	680.00	240.00	8.00
2	720.00	258.00	760.00	281.00	8.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 10.172 FS Min = 3.637 FS Ave = 5.056
Standard Deviation = 1.208 Coefficient of Variation = 23.90 %
Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	388.74	257.56
2	402.66	244.17
3	425.43	233.86
4	444.37	217.54
5	463.43	201.37
6	484.06	187.24
7	504.62	173.02
8	727.16	258.89

9	743.85	277.50
10	759.45	297.03
11	772.52	318.35
12	790.14	336.08
13	794.43	348.06

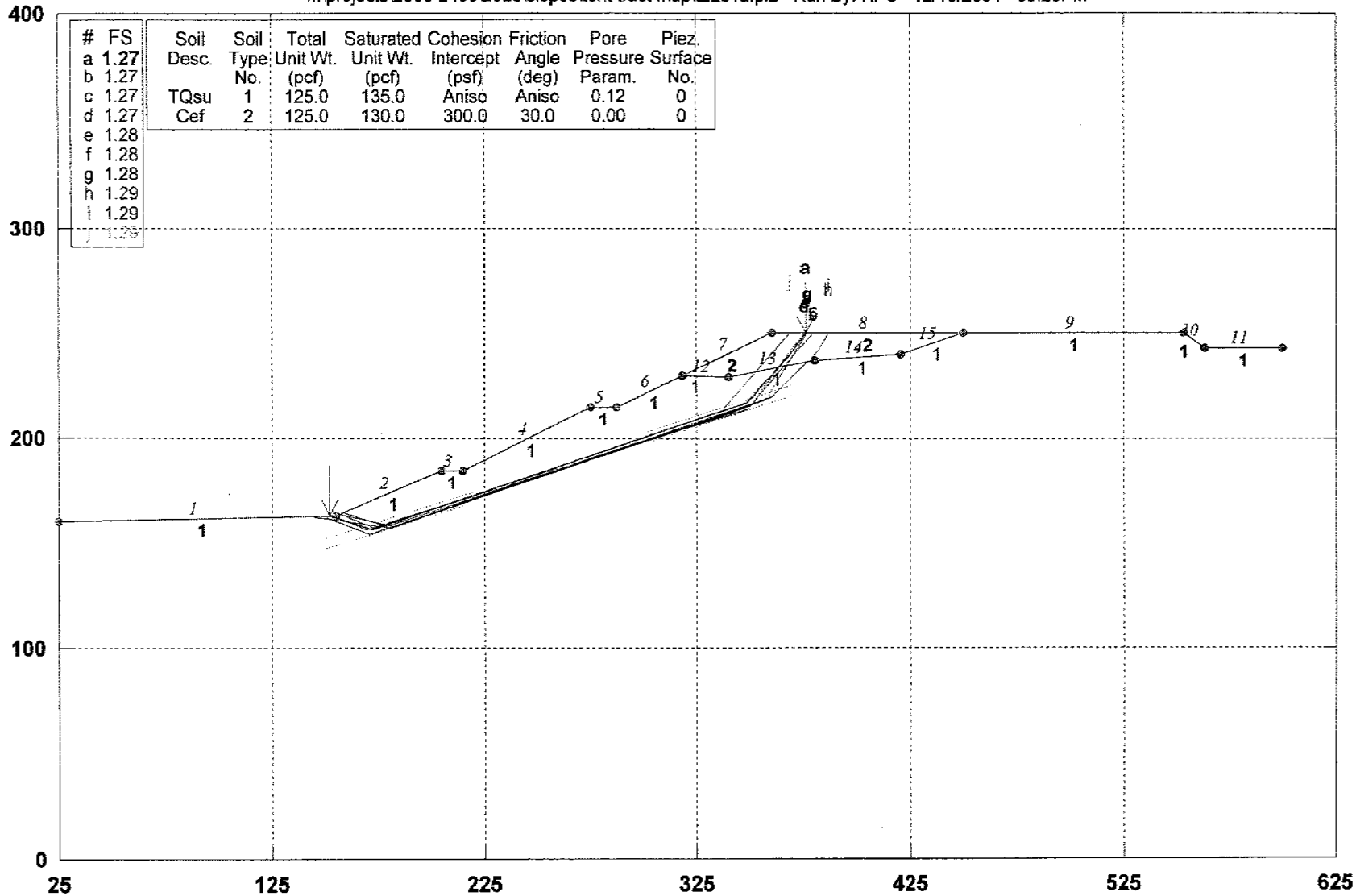
Factor of Safety
*** 3.637 ***

Individual data on the 41 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	11.3	7226.2	0.0	0.0	0.	0.	0.0	0.0	0.0
2	2.7	3882.5	0.0	0.0	0.	0.	0.0	0.0	0.0
3	11.0	22164.8	0.0	0.0	0.	0.	0.0	0.0	0.0
4	5.4	13924.1	0.0	0.0	0.	0.	0.0	0.0	0.0
5	5.0	14597.1	0.0	0.0	0.	0.	0.0	0.0	0.0
6	1.0	3107.0	0.0	0.0	0.	0.	0.0	0.0	0.0
7	0.4	1375.3	0.0	0.0	0.	0.	0.0	0.0	0.0
8	5.6	19997.3	0.0	0.0	0.	0.	0.0	0.0	0.0
9	3.0	12620.4	0.0	0.0	0.	0.	0.0	0.0	0.0
10	10.4	53572.2	0.0	0.0	0.	0.	0.0	0.0	0.0
11	0.6	3747.7	0.0	0.0	0.	0.	0.0	0.0	0.0
12	9.0	61121.2	0.0	0.0	0.	0.	0.0	0.0	0.0
13	1.0	7671.7	0.0	0.0	0.	0.	0.0	0.0	0.0
14	8.4	71683.4	0.0	0.0	0.	0.	0.0	0.0	0.0
15	6.6	64080.3	0.0	0.0	0.	0.	0.0	0.0	0.0
16	14.1	159708.1	0.0	0.0	0.	0.	0.0	0.0	0.0
17	10.9	145627.8	0.0	0.0	0.	0.	0.0	0.0	0.0
18	1.2	17546.5	0.0	0.0	0.	0.	0.0	0.0	0.0
19	3.8	54877.0	0.0	516.7	0.	0.	0.0	0.0	0.0
20	2.4	35227.6	0.0	843.9	0.	0.	0.0	0.0	0.0
21	0.9	14349.0	0.0	457.7	0.	0.	0.0	0.0	0.0
22	1.3	20253.0	0.0	754.1	0.	0.	0.0	0.0	0.0
23	25.4	387123.4	0.0	13794.9	0.	0.	0.0	0.0	0.0
24	46.3	669421.6	0.0	24654.3	0.	0.	0.0	0.0	0.0
25	7.7	105635.0	0.0	4036.4	0.	0.	0.0	0.0	0.0
26	43.6	596470.4	0.0	22493.3	0.	0.	0.0	0.0	0.0
27	2.4	33488.9	0.0	1238.2	0.	0.	0.0	0.0	0.0
28	55.0	746523.3	0.0	27518.7	0.	0.	0.0	0.0	0.0
29	15.0	195125.2	0.0	7343.3	0.	0.	0.0	0.0	0.0
30	7.8	97347.2	0.0	3798.0	0.	0.	0.0	0.0	0.0
31	2.2	26697.0	0.0	1059.0	0.	0.	0.0	0.0	0.0
32	3.3	40379.1	0.0	1543.2	0.	0.	0.0	0.0	0.0
33	13.8	161082.4	0.0	8450.2	0.	0.	0.0	0.0	0.0
34	4.6	50147.4	0.0	4329.1	0.	0.	0.0	0.0	0.0
35	1.8	19254.5	0.0	1545.4	0.	0.	0.0	0.0	0.0
36	10.3	99901.1	0.0	6710.4	0.	0.	0.0	0.0	0.0
37	11.2	90142.8	0.0	2902.9	0.	0.	0.0	0.0	0.0
38	4.4	29663.6	0.0	0.0	0.	0.	0.0	0.0	0.0
39	13.1	66451.2	0.0	0.0	0.	0.	0.0	0.0	0.0
40	17.6	46254.9	0.0	0.0	0.	0.	0.0	0.0	0.0
41	4.3	3222.4	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 22-22' CS-15; Static; critical surface

n:\projects\2000-2499\2023\slopes\tent tract map\t22s1a.pl2 Run By: KPC 12/10/2004 03:26PM



#	FS
a	1.27
b	1.27
c	1.27
d	1.27
e	1.28
f	1.28
g	1.28
h	1.29
i	1.29
j	1.29

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	Aniso	Aniso	0.12	0
Cef	2	125.0	130.0	300.0	30.0	0.00	0

GSTABL7 v.2 FSmin=1.27

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 6A

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 12/10/2004
Time of Run: 03:26PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t22s1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t22s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\t22s1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 22-22' CS-15; Static;
critical surface

BOUNDARY COORDINATES
Note: User origin value specified.
Add 25.00 to X-values and 0.00 to Y-values listed.

11 Top Boundaries
15 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	25.00	160.00	155.00	163.00	1
2	155.00	163.00	205.00	185.00	1
3	205.00	185.00	215.00	185.00	1
4	215.00	185.00	275.00	215.00	1
5	275.00	215.00	287.00	215.00	1
6	287.00	215.00	318.00	230.00	1
7	318.00	230.00	360.00	250.00	2
8	360.00	250.00	450.00	250.00	2
9	450.00	250.00	553.00	250.00	1
10	553.00	250.00	563.00	243.00	1
11	563.00	243.00	600.00	243.00	1
12	318.00	230.00	340.00	229.00	1
13	340.00	229.00	380.00	237.00	1
14	380.00	237.00	420.00	240.00	1
15	420.00	240.00	450.00	250.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

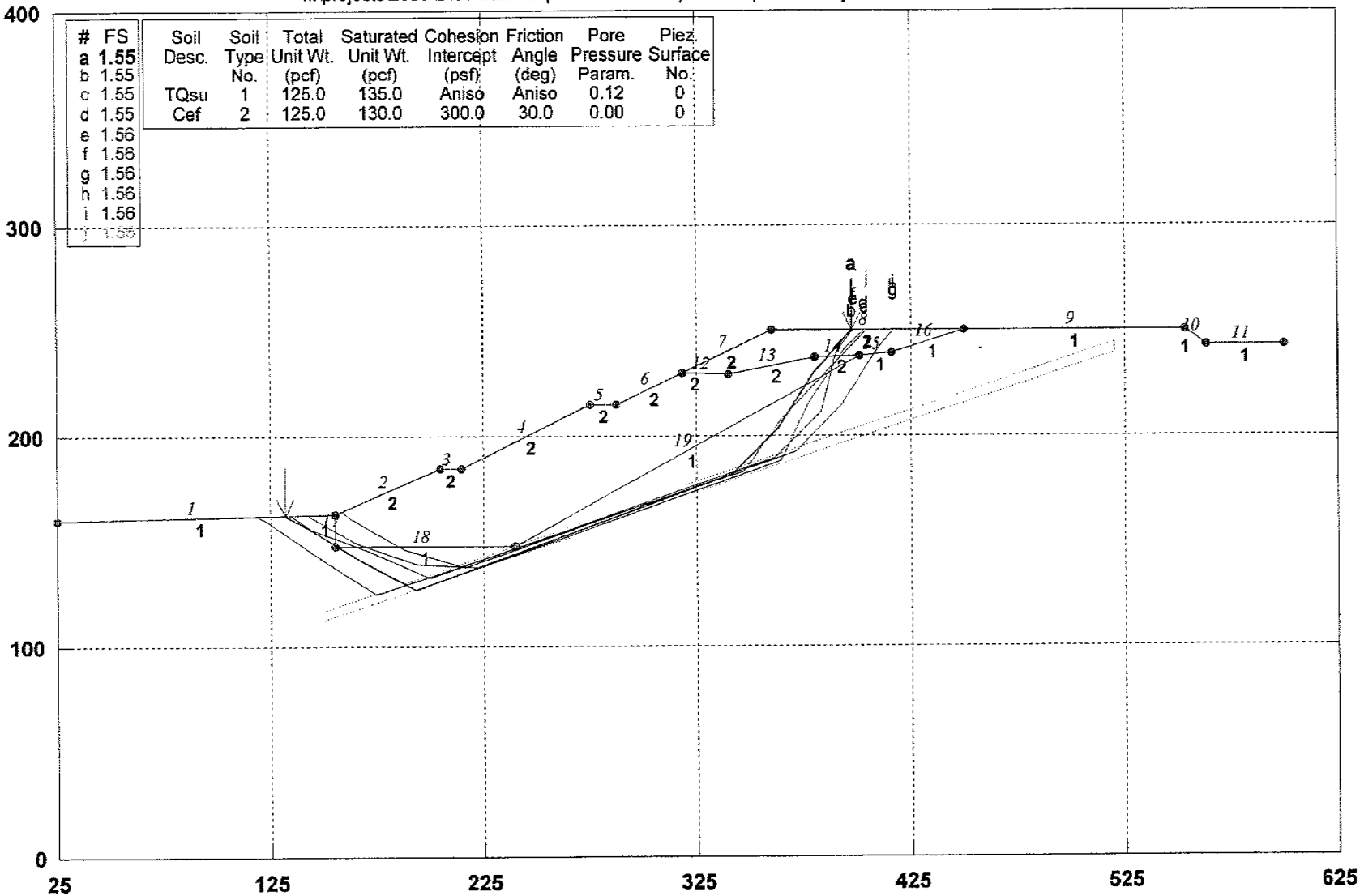
Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	17.5	300.00	31.00
2	20.5	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso
C and/or Phi to be ignored in that range.

```
   (2) An input value of 0.02 for Phi will set both Phi and
       C equal to zero, with no water weight in the tension crack.
   (3) An input value of 0.03 for Phi will set both Phi and
       C equal to zero, with water weight in the tension crack.
Janbus Empirical Coef is being used for the case of  c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is  30.0
Box        X-Left     Y-Left    X-Right    Y-Right      Height
No.         (ft)       (ft)       (ft)       (ft)        (ft)
 1        150.00     150.00     220.00     172.00       5.00
 2        300.00     200.00     370.00     223.00       5.00
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Simplified Janbu Method * *
      Total Number of Trial Surfaces Evaluated =  1000
      Statistical Data On All Valid FS Values:
         FS Max =   2.570   FS Min =   1.270   FS Ave =   1.496
         Standard Deviation =    0.195   Coefficient of Variation =   13.05 %
      Failure Surface Specified By  5 Coordinate Points
        Point      X-Surf      Y-Surf
        No.         (ft)        (ft)
         1        152.49      162.94
         2        172.14      156.81
         3        348.50      217.36
         4        368.46      239.75
         5        376.05      250.00
            Factor of Safety
          ***    1.270   ***
```

Mesas East, x-sec 22-22' CS-15; static; 15'd by 85' key

n:\projects\2000-2499\2023\slopes\tent tract map\t22s2a.pl2 Run By: KPC 12/10/2004 04:30PM



GSTABL7 v.2 FSmin=1.55

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 7A

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 12/10/2004
Time of Run: 04:30PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t22s2a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t22s2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\t22s2a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 22-22' CS-15;
static; 15'd by 85' key

BOUNDARY COORDINATES
11 Top Boundaries
19 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	25.00	160.00	155.00	163.00	1
2	155.00	163.00	205.00	185.00	2
3	205.00	185.00	215.00	185.00	2
4	215.00	185.00	275.00	215.00	2
5	275.00	215.00	287.00	215.00	2
6	287.00	215.00	318.00	230.00	2
7	318.00	230.00	360.00	250.00	2
8	360.00	250.00	450.00	250.00	2
9	450.00	250.00	553.00	250.00	1
10	553.00	250.00	563.00	243.00	1
11	563.00	243.00	600.00	243.00	1
12	318.00	230.00	340.00	229.00	2
13	340.00	229.00	380.00	237.00	2
14	380.00	237.00	401.00	238.00	2
15	401.00	238.00	416.00	239.00	1
16	416.00	239.00	450.00	250.00	1
17	155.00	163.00	155.10	148.00	1
18	155.10	148.00	240.00	148.00	1
19	240.00	148.00	401.00	238.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

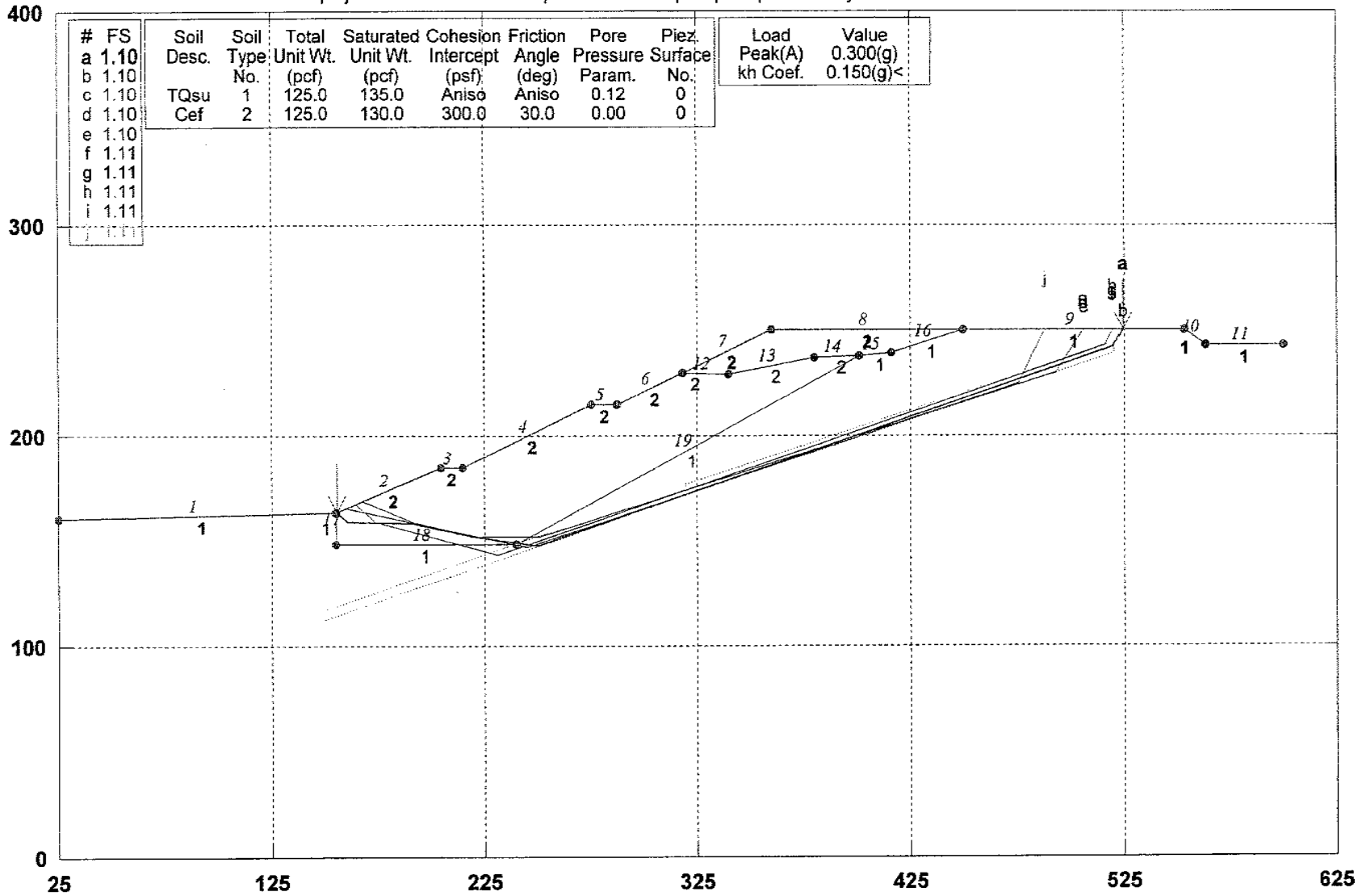
Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	17.5	300.00	31.00
2	20.5	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso

```
      C and/or Phi to be ignored in that range.
   (2) An input value of 0.02 for Phi will set both Phi and
      C equal to zero, with no water weight in the tension crack.
   (3) An input value of 0.03 for Phi will set both Phi and
      C equal to zero, with water weight in the tension crack.
Janbus Empirical Coef is being used for the case of  c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is  30.0
Box        X-Left     Y-Left    X-Right    Y-Right      Height
No.         (ft)       (ft)       (ft)       (ft)        (ft)
 1        150.00     115.00     270.00     156.00       5.00
 2        320.00     174.00     520.00     242.00       5.00
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Simplified Janbu Method * *
      Total Number of Trial Surfaces Evaluated =  1000
      Statistical Data On All Valid FS Values:
         FS Max =   3.010   FS Min =   1.550   FS Ave =   1.833
         Standard Deviation =    0.196   Coefficient of Variation =   10.71 %
      Failure Surface Specified By  8 Coordinate Points
        Point      X-Surf      Y-Surf
         No.        (ft)        (ft)
          1        132.17      162.47
          2        141.22      157.61
          3        166.43      141.34
          4        192.97      127.36
          5        341.52      182.01
          6        362.73      203.23
          7        378.32      228.86
          8        397.67      250.00
             Factor of Safety
            ***    1.550   ***
```

Mesas East, x-sec 22-22' CS-15; pseudostatic; 15'd by 85' key

n:\projects\2000-2499\2023\slopes\tent tract map\t22ps2a.pl2 Run By: KPC 12/10/2004 04:29PM



GSTABL7 v.2 FSmin=1.10

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 8A

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 12/10/2004
Time of Run: 04:29PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t22ps2a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t22ps2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\t22ps2a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 22-22' CS-15;
pseudostatic; 15'd by 85' key

BOUNDARY COORDINATES
11 Top Boundaries
19 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	25.00	160.00	155.00	163.00	1
2	155.00	163.00	205.00	185.00	2
3	205.00	185.00	215.00	185.00	2
4	215.00	185.00	275.00	215.00	2
5	275.00	215.00	287.00	215.00	2
6	287.00	215.00	318.00	230.00	2
7	318.00	230.00	360.00	250.00	2
8	360.00	250.00	450.00	250.00	2
9	450.00	250.00	553.00	250.00	1
10	553.00	250.00	563.00	243.00	1
11	563.00	243.00	600.00	243.00	1
12	318.00	230.00	340.00	229.00	2
13	340.00	229.00	380.00	237.00	2
14	380.00	237.00	401.00	238.00	2
15	401.00	238.00	416.00	239.00	1
16	416.00	239.00	450.00	250.00	1
17	155.00	163.00	155.10	148.00	1
18	155.10	148.00	240.00	148.00	1
19	240.00	148.00	401.00	238.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	400.0	38.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

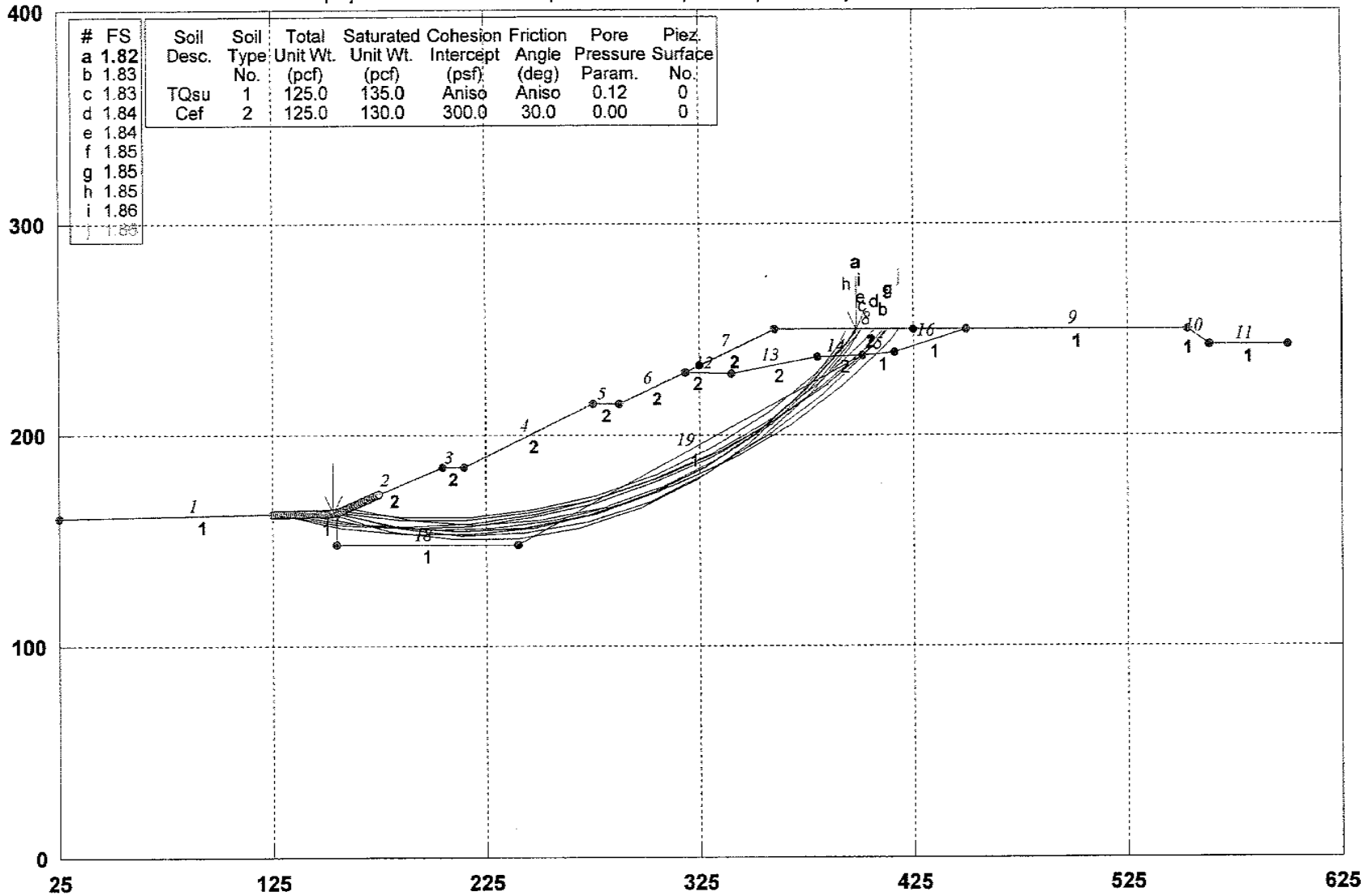
Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	17.5	400.00	38.00
2	20.5	200.00	20.00
3	90.0	400.00	38.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso

```
      C and/or Phi to be ignored in that range.
   (2) An input value of 0.02 for Phi will set both Phi and
      C equal to zero, with no water weight in the tension crack.
   (3) An input value of 0.03 for Phi will set both Phi and
      C equal to zero, with water weight in the tension crack.
Specified Peak Ground Acceleration Coefficient (A) =   0.300(g)
Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
Specified Seismic Pore-Pressure Factor =   0.000
Janbus Empirical Coef is being used for the case of  c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is  30.0
Box        X-Left     Y-Left    X-Right    Y-Right      Height
No.         (ft)       (ft)       (ft)       (ft)        (ft)
 1         150.00     115.00     270.00     156.00       5.00
 2         320.00     174.00     520.00     242.00       5.00
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Simplified Janbu Method * *
      Total Number of Trial Surfaces Evaluated =  1000
      Statistical Data On All Valid FS Values:
         FS Max =   2.450   FS Min =   1.102   FS Ave =   1.361
         Standard Deviation =    0.160   Coefficient of Variation =   11.78 %
      Failure Surface Specified By  7 Coordinate Points
        Point      X-Surf      Y-Surf
         No.        (ft)        (ft)
          1        155.89      163.39
          2        160.68      158.68
          3        190.68      158.34
          4        219.99      151.97
          5        249.63      147.33
          6        519.55      242.20
          7        524.69      250.00
             Factor of Safety
            ***    1.102   ***
```

Mesas East, x-sec 22-22' CS-15; static; circular; 15'd by 85' key

n:\projects\2000-2499\2023\slopes\tent tract map\t22s3a.pl2 Run By: KPC 12/16/2004 02:46PM



GSTABL7 v.2 FSmin=1.82

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 9A

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 12/16/2004
Time of Run: 02:46PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t22s3a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t22s3a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\t22s3a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 22-22' CS-15; static; circular; 15'd by 85' key

BOUNDARY COORDINATES
11 Top Boundaries
19 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	25.00	160.00	155.00	163.00	1
2	155.00	163.00	205.00	185.00	2
3	205.00	185.00	215.00	185.00	2
4	215.00	185.00	275.00	215.00	2
5	275.00	215.00	287.00	215.00	2
6	287.00	215.00	318.00	230.00	2
7	318.00	230.00	360.00	250.00	2
8	360.00	250.00	450.00	250.00	2
9	450.00	250.00	553.00	250.00	1
10	553.00	250.00	563.00	243.00	1
11	563.00	243.00	600.00	243.00	1
12	318.00	230.00	340.00	229.00	2
13	340.00	229.00	380.00	237.00	2
14	380.00	237.00	401.00	238.00	2
15	401.00	238.00	416.00	239.00	1
16	416.00	239.00	450.00	250.00	1
17	155.00	163.00	155.10	148.00	1
18	155.10	148.00	240.00	148.00	1
19	240.00	148.00	401.00	238.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	17.5	300.00	31.00
2	20.5	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso

C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 125.00(ft)
and X = 175.00(ft)
Each Surface Terminates Between X = 325.00(ft)
and X = 425.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
30.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 10.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 3.179 FS Min = 1.815 FS Ave = 2.355
Standard Deviation = 0.360 Coefficient of Variation = 15.31 %
Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	153.57	162.97
2	182.89	156.59
3	212.79	154.22
4	242.75	155.90
5	272.20	161.59
6	300.62	171.20
7	327.49	184.54
8	352.32	201.38
9	374.65	221.41
10	394.09	244.26
11	397.76	250.00

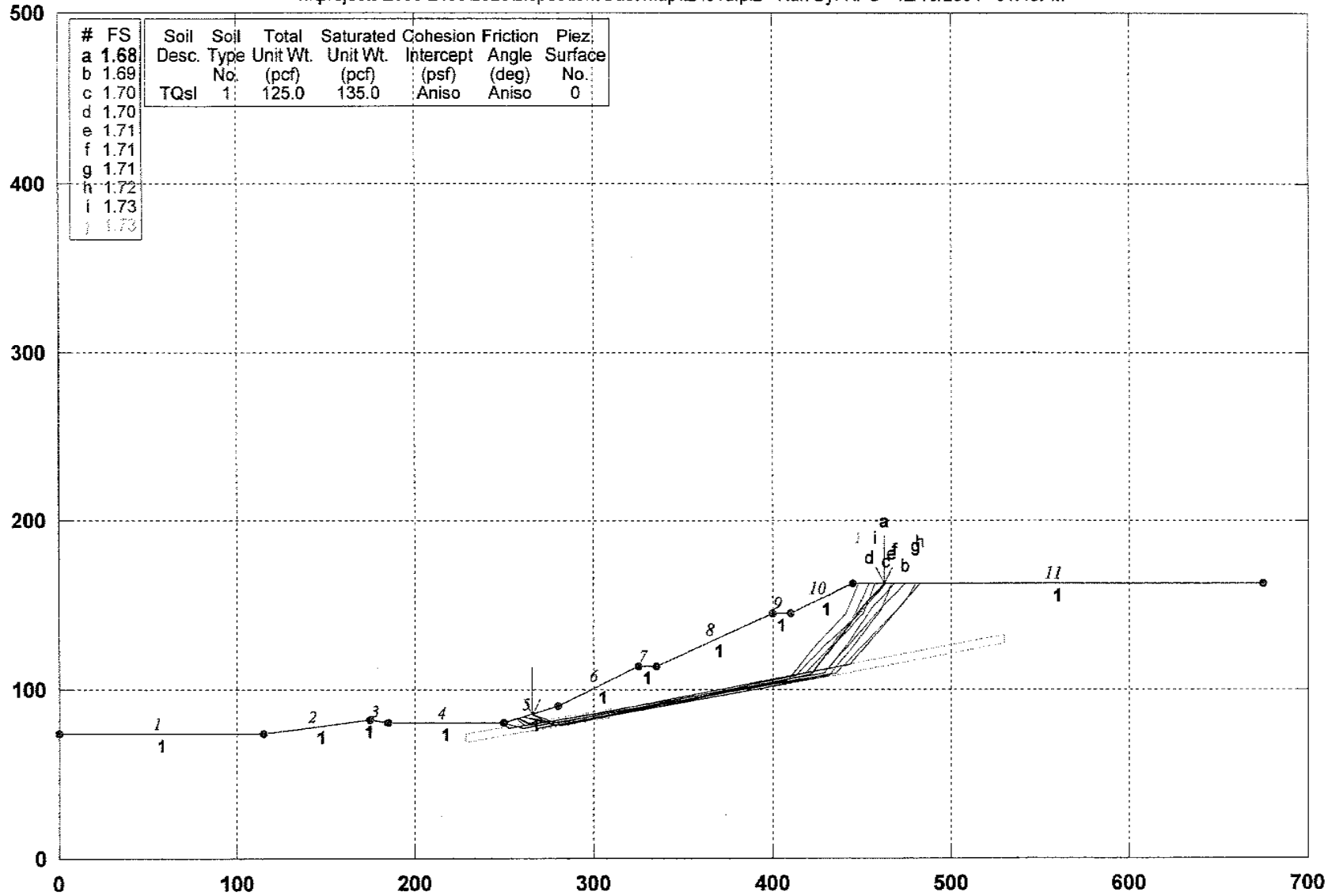
Circle Center At X = 215.37 ; Y = 376.55 ; and Radius = 222.35
Factor of Safety
*** 1.815 ***
Individual data on the 23 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	1.4	30.7	0.0	3.8	0.	0.	0.0	0.0	0.0
2	0.0	0.1	0.0	0.0	0.	0.	0.0	0.0	0.0
3	27.9	33152.8	0.0	0.0	0.	0.	0.0	0.0	0.0
4	22.1	67503.2	0.0	0.0	0.	0.	0.0	0.0	0.0
5	7.8	29678.9	0.0	0.0	0.	0.	0.0	0.0	0.0
6	2.2	8477.7	0.0	0.0	0.	0.	0.0	0.0	0.0
7	27.7	127683.7	0.0	0.0	0.	0.	0.0	0.0	0.0
8	17.4	99251.8	0.0	0.0	0.	0.	0.0	0.0	0.0
9	12.1	75610.8	0.0	9241.2	0.	0.	0.0	0.0	0.0
10	2.8	18282.5	0.0	2315.8	0.	0.	0.0	0.0	0.0
11	12.0	75653.5	0.0	9583.0	0.	0.	0.0	0.0	0.0
12	13.6	84107.4	0.0	10653.9	0.	0.	0.0	0.0	0.0
13	17.4	109237.1	0.0	14636.3	0.	0.	0.0	0.0	0.0
14	9.5	59393.5	0.0	7957.9	0.	0.	0.0	0.0	0.0
15	12.5	76182.0	0.0	11046.5	0.	0.	0.0	0.0	0.0
16	12.3	71132.6	0.0	10314.3	0.	0.	0.0	0.0	0.0
17	7.7	41630.1	0.0	6710.2	0.	0.	0.0	0.0	0.0
18	14.7	64386.8	0.0	10378.3	0.	0.	0.0	0.0	0.0

19	3.0	10104.8	0.0	1871.8	0.	0.	0.0	0.0	0.0
20	2.3	6908.6	0.0	0.0	0.	0.	0.0	0.0	0.0
21	8.2	17980.1	0.0	0.0	0.	0.	0.0	0.0	0.0
22	5.8	6699.9	0.0	0.0	0.	0.	0.0	0.0	0.0
23	3.7	1317.0	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 24-24' CS-28b; static;bedding plane search

n:\projects\2000-2499\2023\slopes\tent tract map\t24s1a.pl2 Run By: KPC 12/10/2004 01:43PM



GSTABL7 v.2 FSmin=1.68

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 10A

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 12/10/2004
Time of Run: 01:43PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t24sla.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t24sla.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\t24sla.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 24-24' CS-28b; static;
bedding plane search

BOUNDARY COORDINATES
11 Top Boundaries
11 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	73.00	115.00	73.00	1
2	115.00	73.00	175.00	82.00	1
3	175.00	82.00	185.00	80.00	1
4	185.00	80.00	250.00	80.00	1
5	250.00	80.00	280.00	90.00	1
6	280.00	90.00	325.00	114.00	1
7	325.00	114.00	335.00	114.00	1
8	335.00	114.00	400.00	145.00	1
9	400.00	145.00	410.00	145.00	1
10	410.00	145.00	445.00	163.00	1
11	445.00	163.00	675.00	163.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	500.0	35.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	9.5	500.00	35.00
2	12.5	200.00	20.00
3	90.0	500.00	35.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been

Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 25.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	229.00	71.00	310.00	86.00	5.00
2	390.00	102.00	530.00	130.00	5.00

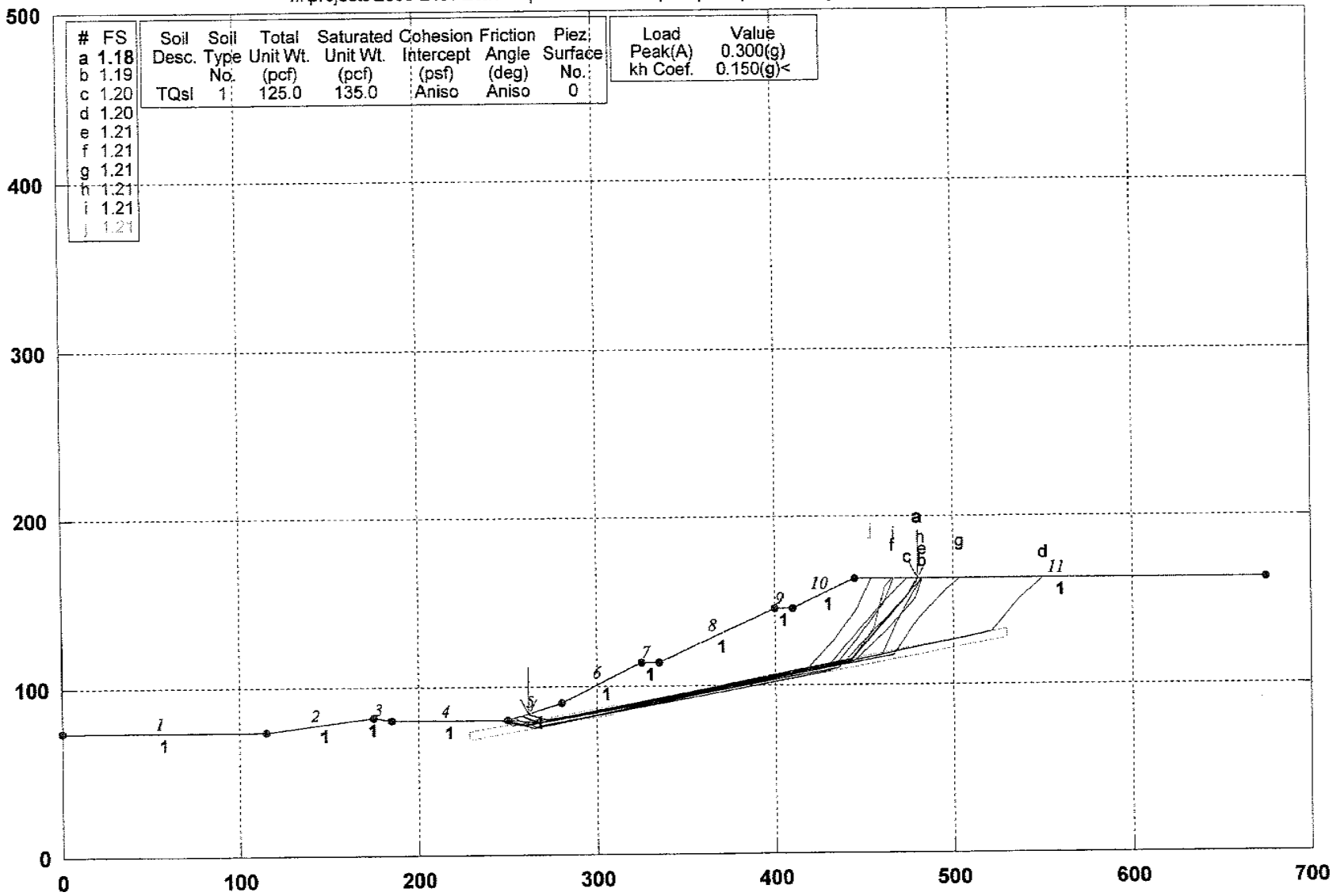
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 3.397 FS Min = 1.680 FS Ave = 2.027
Standard Deviation = 0.243 Coefficient of Variation = 12.01 %
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	265.47	85.16
2	277.41	78.09
3	421.37	109.23
4	436.36	129.24
5	450.79	149.66
6	462.40	163.00

Factor of Safety
*** 1.680 ***

Mesas East, x-sec 24-24' CS-28b; pseudostatic; bedding plane search

n:\projects\2000-2499\2023\slopes\tent tract map\t24ps1a.pl2 Run By: KPC 12/10/2004 01:48PM



GSTABL7 v.2 FSmin=1.18

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 11A

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:          12/10/2004
Time of Run:                01:48PM
Run By:                     KPC
Input Data Filename:        N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t24ps1a.in
Output Filename:            N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t24ps1a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\2000-2499\2023\Slopent Tract Map\t24ps1a.PLT
PROBLEM DESCRIPTION:  Mesas East, x-sec 24-24' CS-28b;
                      pseudostatic; bedding plane search
BOUNDARY COORDINATES
   11 Top   Boundaries
   11 Total Boundaries
Boundary     X-Left      Y-Left     X-Right     Y-Right     Soil Type
   No.        (ft)        (ft)        (ft)        (ft)     Below Bnd
    1         0.00       73.00      115.00       73.00         1
    2       115.00       73.00      175.00       82.00         1
    3       175.00       82.00      185.00       80.00         1
    4       185.00       80.00      250.00       80.00         1
    5       250.00       80.00      280.00       90.00         1
    6       280.00       90.00      325.00      114.00         1
    7       325.00      114.00      335.00      114.00         1
    8       335.00      114.00      400.00      145.00         1
    9       400.00      145.00      410.00      145.00         1
   10       410.00      145.00      445.00      163.00         1
   11       445.00      163.00      675.00      163.00         1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  1 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   125.0    135.0     600.0     38.0    0.00       0.0      0
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction     Counterclockwise     Cohesion     Friction
  Range        Direction Limit    Intercept      Angle
   No.             (deg)            (psf)        (deg)
    1               9.5             600.00        38.00
    2              12.5             200.00        20.00
    3              90.0             600.00        38.00
ANISOTROPIC SOIL NOTES:
   (1) An input value of 0.01 for C and/or Phi will cause Aniso
       C and/or Phi to be ignored in that range.
   (2) An input value of 0.02 for Phi will set both Phi and
       C equal to zero, with no water weight in the tension crack.
   (3) An input value of 0.03 for Phi will set both Phi and
       C equal to zero, with water weight in the tension crack.
Specified Peak Ground Acceleration Coefficient (A) =    0.300(g)
Specified Horizontal Earthquake Coefficient (kh) =    0.150(g)
Specified Vertical Earthquake Coefficient (kv) =    0.000(g)
```

Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 25.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	229.00	71.00	310.00	86.00	5.00
2	390.00	102.00	530.00	130.00	5.00

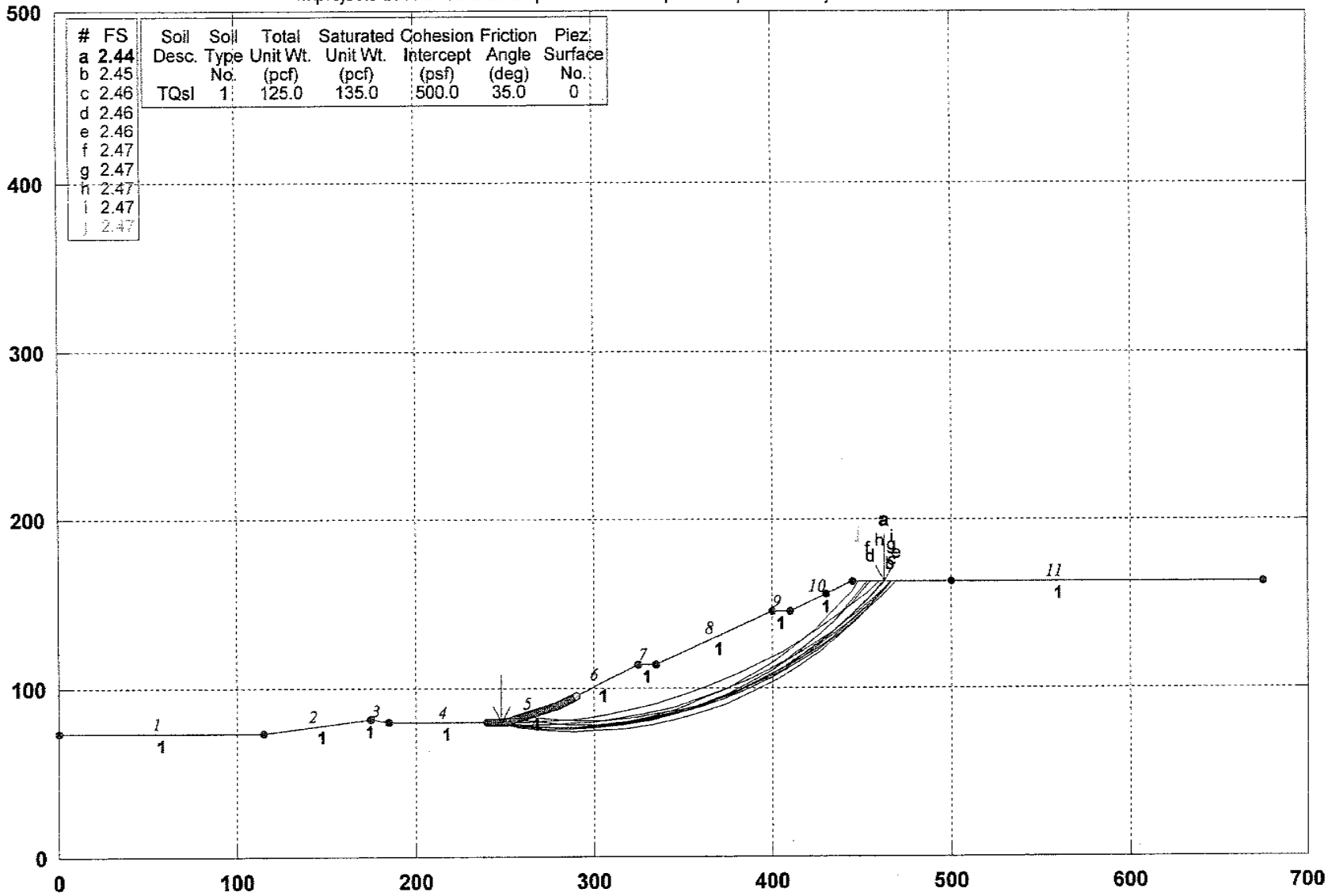
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 2.653 FS Min = 1.183 FS Ave = 1.353
Standard Deviation = 0.174 Coefficient of Variation = 12.83 %
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	261.50	83.83
2	272.46	80.32
3	442.90	115.02
4	458.70	134.40
5	474.80	153.52
6	480.19	163.00

Factor of Safety
*** 1.183 ***

Mesas East, x-sec 24-24' CS-28b; static;circular

n:\projects\2000-2499\2023\slopes\tent tract map\t24s2a.pl2 Run By: KPC 12/10/2004 01:51PM



GSTABL7 v.2 FSmin=2.44

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 12A

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 12/10/2004
Time of Run: 01:51PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t24s2a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t24s2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\t24s2a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 24-24' CS-28b; static; circular

BOUNDARY COORDINATES
11 Top Boundaries
11 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	73.00	115.00	73.00	1
2	115.00	73.00	175.00	82.00	1
3	175.00	82.00	185.00	80.00	1
4	185.00	80.00	250.00	80.00	1
5	250.00	80.00	280.00	90.00	1
6	280.00	90.00	325.00	114.00	1
7	325.00	114.00	335.00	114.00	1
8	335.00	114.00	400.00	145.00	1
9	400.00	145.00	410.00	145.00	1
10	410.00	145.00	445.00	163.00	1
11	445.00	163.00	675.00	163.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	500.0	35.0	0.00	0.0	0

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 240.00(ft)
and X = 290.00(ft)
Each Surface Terminates Between X = 430.00(ft)
and X = 500.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
15.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:

FS Max = 4.233 FS Min = 2.441 FS Ave = 3.189
Standard Deviation = 0.521 Coefficient of Variation = 16.33 %

Failure Surface Specified By 18 Coordinate Points

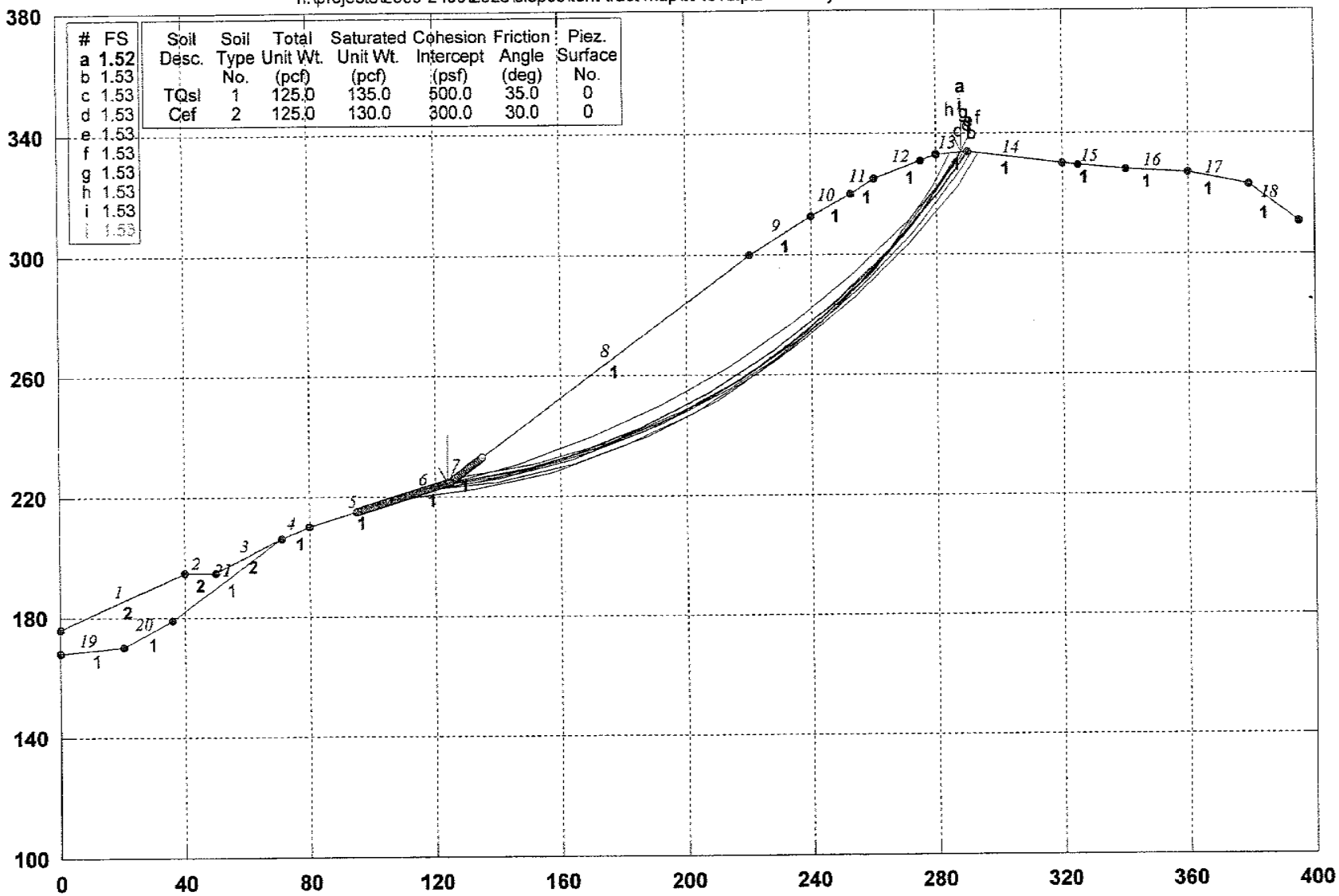
Point No.	X-Surf (ft)	Y-Surf (ft)
1	248.16	80.00
2	263.04	78.04
3	278.00	77.08
4	293.00	77.11
5	307.97	78.13
6	322.83	80.15
7	337.53	83.15
8	352.00	87.12
9	366.17	92.04
10	379.98	97.88
11	393.37	104.64
12	406.29	112.26
13	418.67	120.73
14	430.46	130.00
15	441.61	140.03
16	452.08	150.78
17	461.80	162.20
18	462.39	163.00

Circle Center At X = 285.06 ; Y = 302.73 ; and Radius = 225.76

Factor of Safety
*** 2.441 ***

Mesas East, x-sec 34-34' ; static circular

n:\projects\2000-2499\2023\slopes\tent tract map\t34s1a.pl2 Run By: KPC 12/10/2004 02:06PM



#	FS
a	1.52
b	1.53
c	1.53
d	1.53
e	1.53
f	1.53
g	1.53
h	1.53
i	1.53
j	1.53

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
TQsl	1	125.0	135.0	500.0	35.0	0
Cef	2	125.0	130.0	300.0	30.0	0

GSTABL7 v.2 FSmin=1.52

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN NO. 13A

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:        12/10/2004
Time of Run:              02:06PM
Run By:                   KPC
Input Data Filename:      N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t34s1a.in
Output Filename:          N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t34s1a.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\2000-2499\2023\Slopent Tract Map\t34s1a.PLT
PROBLEM DESCRIPTION:  Mesas East, x-sec 34-34' ; static
                      circular
BOUNDARY COORDINATES
   18 Top   Boundaries
   21 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     176.00      40.00     195.00        2
    2        40.00     195.00      50.00     195.00        2
    3        50.00     195.00      71.00     206.00        2
    4        71.00     206.00      80.00     210.00        1
    5        80.00     210.00     110.00     220.00        1
    6       110.00     220.00     125.00     225.00        1
    7       125.00     225.00     131.00     230.00        1
    8       131.00     230.00     220.00     300.00        1
    9       220.00     300.00     240.00     313.00        1
   10       240.00     313.00     253.00     320.00        1
   11       253.00     320.00     260.00     325.00        1
   12       260.00     325.00     280.00     333.00        1
   13       280.00     333.00     290.00     334.00        1
   14       290.00     334.00     320.00     330.00        1
   15       320.00     330.00     340.00     328.00        1
   16       340.00     328.00     360.00     327.00        1
   17       360.00     327.00     379.00     323.00        1
   18       379.00     323.00     395.00     311.00        1
   19         0.00     168.00      20.00     170.00        1
   20        20.00     170.00      36.00     179.00        1
   21        36.00     179.00      71.00     206.00        1
User Specified Y-Origin =        100.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.    (psf)     No.
  1   125.0    135.0     500.0     35.0     0.00      0.0       0
  2   125.0    130.0     300.0     30.0     0.00      0.0       0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1200 Trial Surfaces Have Been Generated.
  15 Surface(s) Initiate(s) From Each Of    80 Points Equally Spaced
Along The Ground Surface Between  X =  95.00(ft)
                                 and  X = 135.00(ft)
Each Surface Terminates Between   X = 275.00(ft)
                                 and  X = 325.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
```

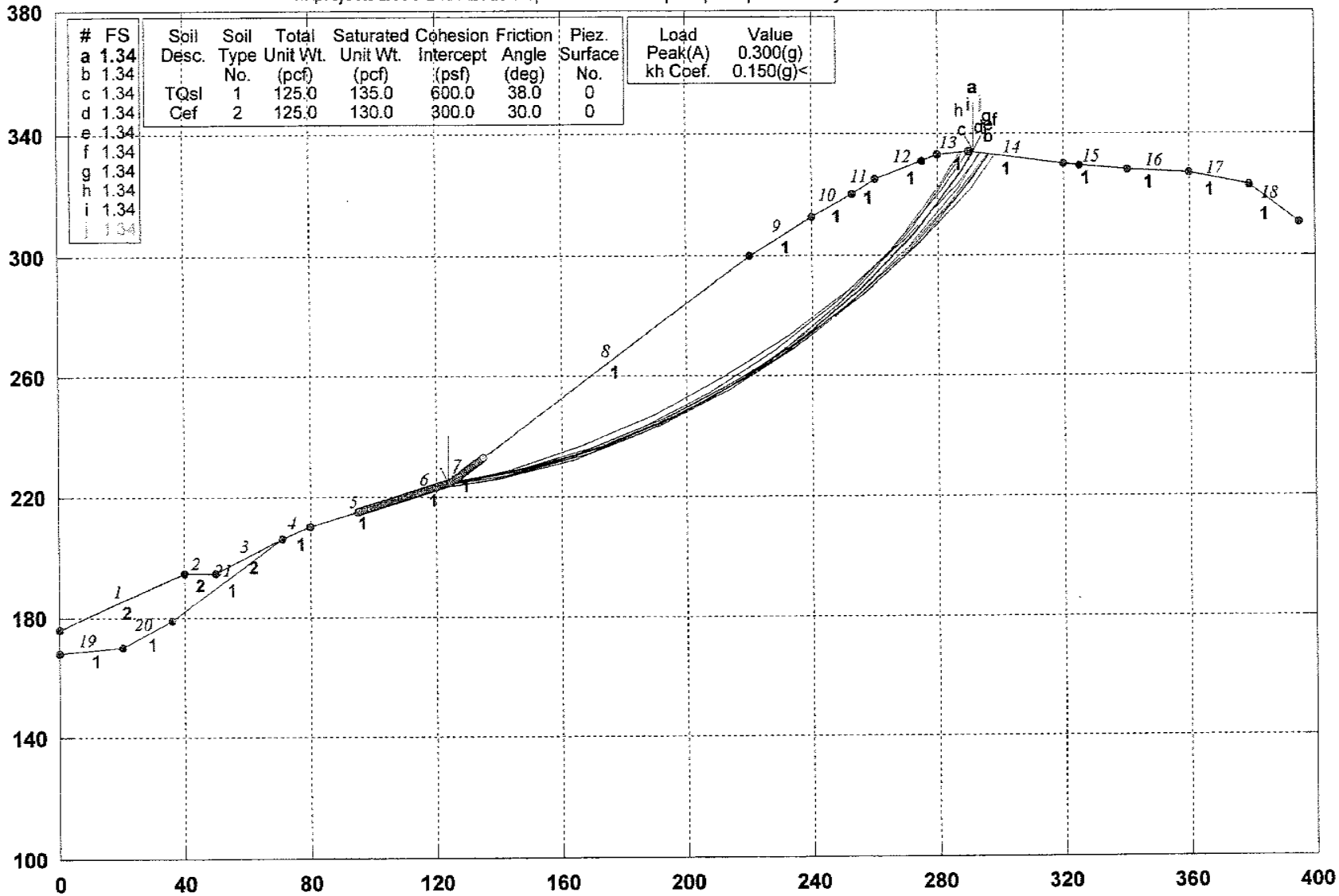
At Which A Surface Extends Is Y = 0.00(ft)
25.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 25.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1200
Statistical Data On All Valid FS Values:
FS Max = 2.844 FS Min = 1.523 FS Ave = 1.923
Standard Deviation = 0.288 Coefficient of Variation = 14.97 %
Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	123.86	224.62
2	148.45	229.11
3	172.38	236.35
4	195.34	246.24
5	217.04	258.66
6	237.20	273.45
7	255.55	290.42
8	271.88	309.36
9	285.96	330.01
10	287.96	333.80

Circle Center At X = 96.83 ; Y = 443.17 ; and Radius = 220.21
Factor of Safety
*** 1.523 ***

Mesas East, x-sec 34-34'; pseudostatic; circular

n:\projects\2000-2499\2023\slopes\tent tract map\t34ps1a.pl2 Run By: KPC 12/10/2004 02:08PM



#	FS
a	1.34
b	1.34
c	1.34
d	1.34
e	1.34
f	1.34
g	1.34
h	1.34
i	1.34
j	1.34

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
TQsl	1	125.0	135.0	600.0	38.0	0
Cef	2	125.0	130.0	300.0	30.0	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.34

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 14A

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 12/10/2004
Time of Run: 02:08PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t34psla.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t34psla.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\t34psla.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 34-34'; pseudostatic; circular

BOUNDARY COORDINATES
18 Top Boundaries
21 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	176.00	40.00	195.00	2
2	40.00	195.00	50.00	195.00	2
3	50.00	195.00	71.00	206.00	2
4	71.00	206.00	80.00	210.00	1
5	80.00	210.00	110.00	220.00	1
6	110.00	220.00	125.00	225.00	1
7	125.00	225.00	131.00	230.00	1
8	131.00	230.00	220.00	300.00	1
9	220.00	300.00	240.00	313.00	1
10	240.00	313.00	253.00	320.00	1
11	253.00	320.00	260.00	325.00	1
12	260.00	325.00	280.00	333.00	1
13	280.00	333.00	290.00	334.00	1
14	290.00	334.00	320.00	330.00	1
15	320.00	330.00	340.00	328.00	1
16	340.00	328.00	360.00	327.00	1
17	360.00	327.00	379.00	323.00	1
18	379.00	323.00	395.00	311.00	1
19	0.00	168.00	20.00	170.00	1
20	20.00	170.00	36.00	179.00	1
21	36.00	179.00	71.00	206.00	1

User Specified Y-Origin = 100.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

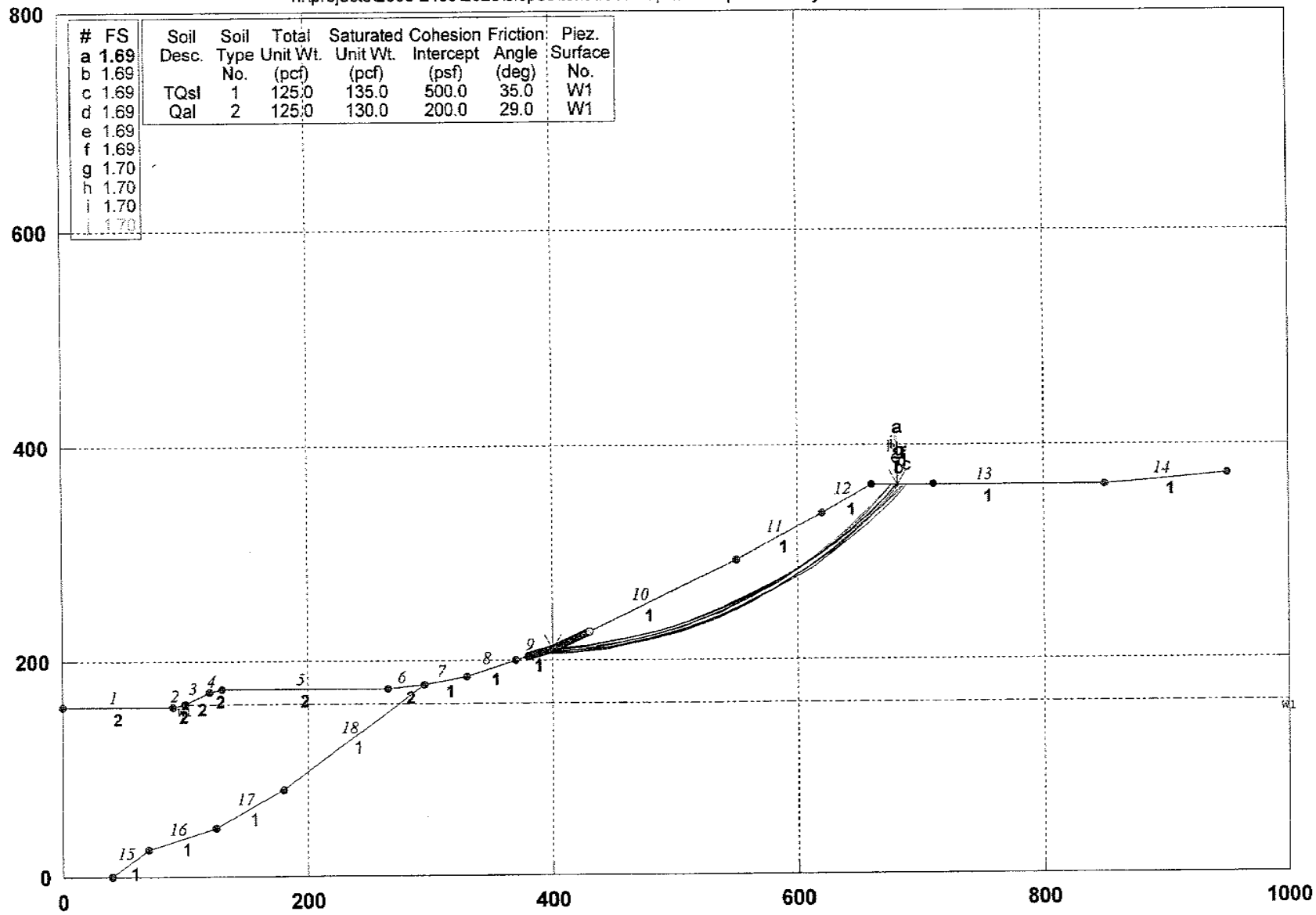
Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	600.0	38.0	0.00	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.
1200 Trial Surfaces Have Been Generated.
15 Surface(s) Initiate(s) From Each Of 80 Points Equally Spaced Along The Ground Surface Between X = 95.00(ft)

```
                                and  X = 135.00(ft)
Each Surface Terminates Between   X = 275.00(ft)
                              and   X = 325.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =      0.00(ft)
25.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And  25.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Modified Bishop Method * *
      Total Number of Trial Surfaces Evaluated =  1200
      Statistical Data On All Valid FS Values:
         FS Max =   2.480   FS Min =   1.336   FS Ave =   1.672
         Standard Deviation =    0.257   Coefficient of Variation =   15.40 %
      Failure Surface Specified By 10 Coordinate Points
        Point      X-Surf      Y-Surf
         No.        (ft)        (ft)
          1        123.86      224.62
          2        148.43      229.24
          3        172.36      236.46
          4        195.38      246.22
          5        217.22      258.40
          6        237.62      272.85
          7        256.35      289.41
          8        273.19      307.88
          9        287.95      328.06
         10        291.28      333.83
      Circle Center At X =    93.77 ; Y =   453.69 ; and Radius =   231.03
             Factor of Safety
            ***    1.336   ***
```

Mesas East, x-sec 35-35'; static; circular

n:\projects\2000-2499\2023\slopes\tent tract map\t35s1a.pl2 Run By: KPC 12/10/2004 02:20PM



GSTABL7 v.2 FSmin=1.69

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 15A

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 12/10/2004
Time of Run: 02:20PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t35s1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t35s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\t35s1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 35-35'; static; circular

BOUNDARY COORDINATES
14 Top Boundaries
18 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	158.00	90.00	158.00	2
2	90.00	158.00	100.00	160.00	2
3	100.00	160.00	120.00	171.00	2
4	120.00	171.00	130.00	174.00	2
5	130.00	174.00	265.00	174.00	2
6	265.00	174.00	295.00	178.00	2
7	295.00	178.00	330.00	185.00	1
8	330.00	185.00	370.00	200.00	1
9	370.00	200.00	400.00	210.00	1
10	400.00	210.00	550.00	293.00	1
11	550.00	293.00	620.00	336.00	1
12	620.00	336.00	660.00	363.00	1
13	660.00	363.00	850.00	363.00	1
14	850.00	363.00	950.00	372.00	1
15	40.00	0.00	70.00	25.00	1
16	70.00	25.00	125.00	45.00	1
17	125.00	45.00	180.00	80.00	1
18	180.00	80.00	295.00	178.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	500.0	35.0	0.00	0.0	1
2	125.0	130.0	200.0	29.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	100.00	160.00
2	1000.00	160.00

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced

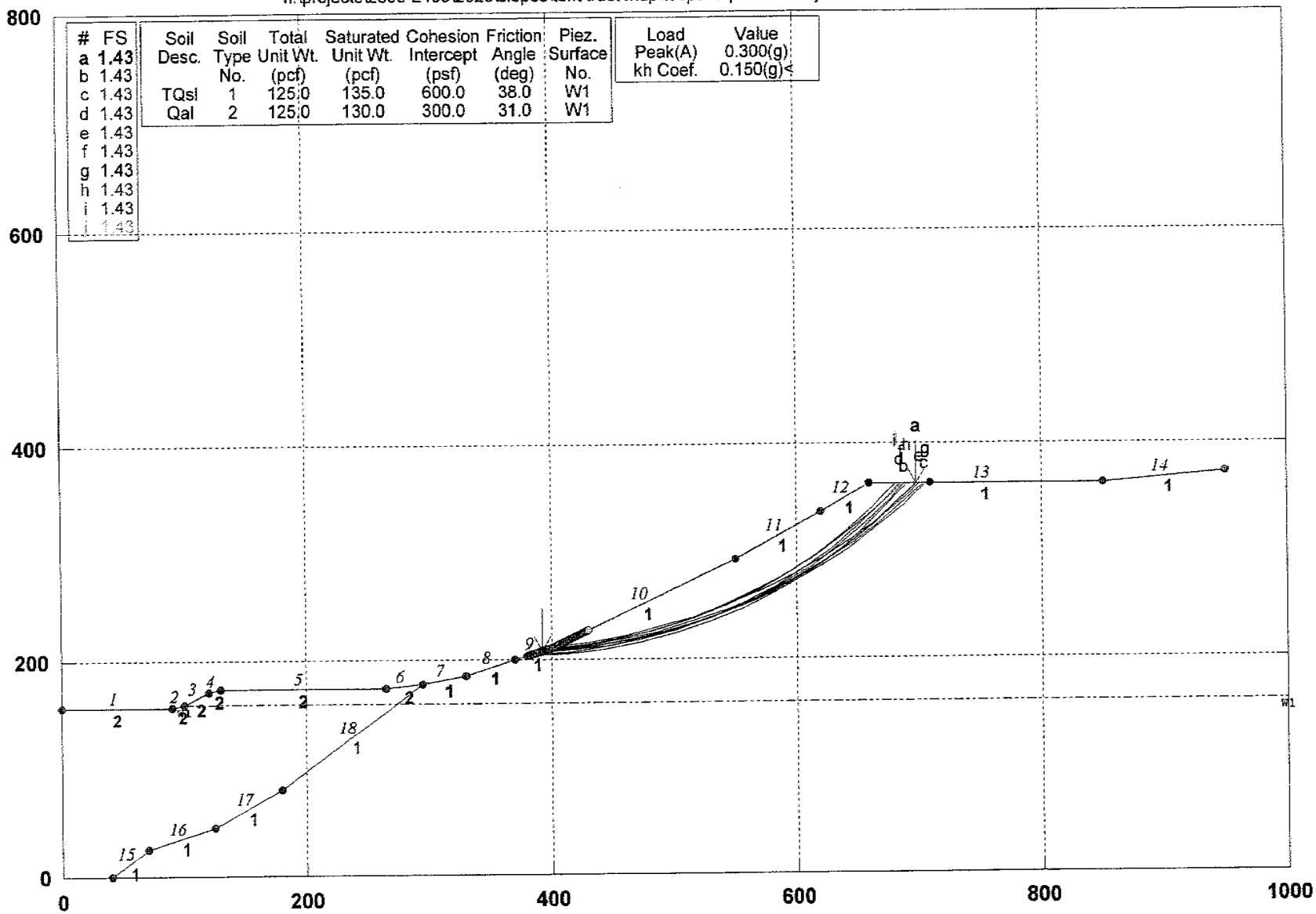
Along The Ground Surface Between X = 380.00(ft)
and X = 430.00(ft)
Each Surface Terminates Between X = 660.00(ft)
and X = 710.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
30.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 2.789 FS Min = 1.691 FS Ave = 2.016
Standard Deviation = 0.270 Coefficient of Variation = 13.41 %
Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	400.41	210.23
2	430.20	213.77
3	459.63	219.57
4	488.54	227.57
5	516.77	237.75
6	544.13	250.04
7	570.49	264.36
8	595.69	280.64
9	619.58	298.79
10	642.03	318.69
11	662.90	340.24
12	681.83	363.00

Circle Center At X = 368.61 ; Y = 604.39 ; and Radius = 395.44
Factor of Safety
*** 1.691 ***

Mesas East, x-sec 35-35'; pseudostatic; circular

n:\projects\2000-2499\2023\slopes\tent tract map\t35ps1a.pl2 Run By: KPC 12/10/2004 02:19PM



#	FS
a	1.43
b	1.43
c	1.43
d	1.43
e	1.43
f	1.43
g	1.43
h	1.43
i	1.43
j	1.43

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
TQsl	1	125.0	135.0	600.0	38.0	W1
Qal	2	125.0	130.0	300.0	31.0	W1

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.43

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. 16A

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 12/10/2004
Time of Run: 02:19PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t35ps1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t35ps1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\t35ps1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 35-35'; pseudostatic; circular

BOUNDARY COORDINATES
14 Top Boundaries
18 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	158.00	90.00	158.00	2
2	90.00	158.00	100.00	160.00	2
3	100.00	160.00	120.00	171.00	2
4	120.00	171.00	130.00	174.00	2
5	130.00	174.00	265.00	174.00	2
6	265.00	174.00	295.00	178.00	2
7	295.00	178.00	330.00	185.00	1
8	330.00	185.00	370.00	200.00	1
9	370.00	200.00	400.00	210.00	1
10	400.00	210.00	550.00	293.00	1
11	550.00	293.00	620.00	336.00	1
12	620.00	336.00	660.00	363.00	1
13	660.00	363.00	850.00	363.00	1
14	850.00	363.00	950.00	372.00	1
15	40.00	0.00	70.00	25.00	1
16	70.00	25.00	125.00	45.00	1
17	125.00	45.00	180.00	80.00	1
18	180.00	80.00	295.00	178.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	600.0	38.0	0.00	0.0	1
2	125.0	130.0	300.0	31.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	100.00	160.00
2	1000.00	160.00

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000

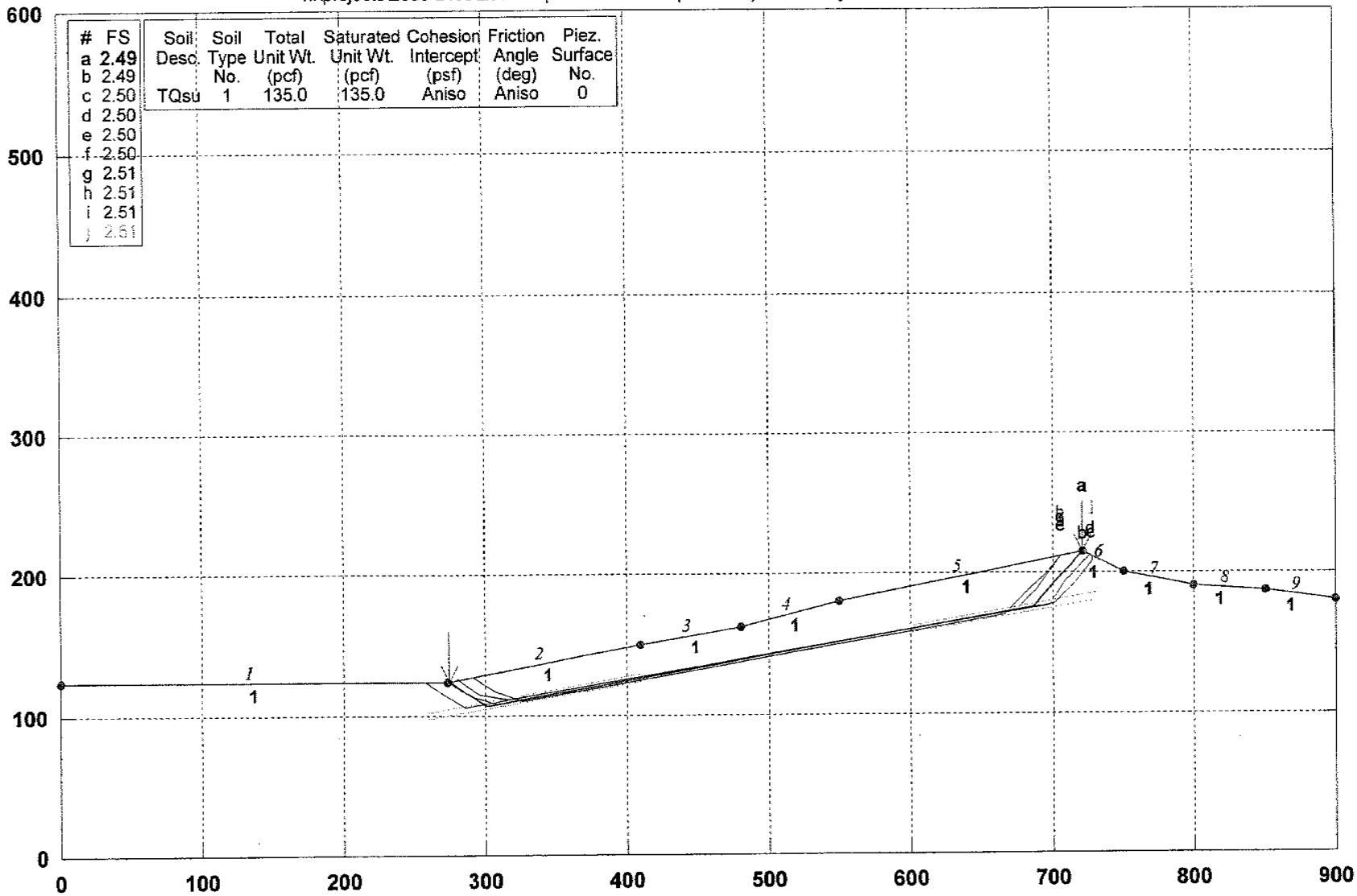
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 380.00(ft)
and X = 430.00(ft)
Each Surface Terminates Between X = 660.00(ft)
and X = 710.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
30.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 2.390 FS Min = 1.427 FS Ave = 1.713
Standard Deviation = 0.240 Coefficient of Variation = 14.00 %
Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	392.24	207.41
2	422.15	209.86
3	451.79	214.45
4	481.03	221.16
5	509.72	229.95
6	537.69	240.78
7	564.82	253.60
8	590.95	268.33
9	615.96	284.90
10	639.71	303.22
11	662.09	323.21
12	682.97	344.75
13	698.28	363.00

Circle Center At X = 373.20 ; Y = 624.13 ; and Radius = 417.15
Factor of Safety
*** 1.427 ***

Mesas Access; x-sec 43-43'; static; bedding plane

n:\projects\2000-2499\2023\slopes\tent tract map\t43s1a.pl2 Run By: KPC 12/22/2004 11:47AM



GSTABL7 v.2 FSmin=2.49

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN NO. 17A

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 12/22/2004
Time of Run: 11:47AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t43sla.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t43sla.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\t43sla.PLT
PROBLEM DESCRIPTION: Mesas Access; x-sec 43-43'; static;
bedding plane

BOUNDARY COORDINATES
9 Top Boundaries
9 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	124.00	273.00	124.00	1
2	273.00	124.00	410.00	150.00	1
3	410.00	150.00	480.00	162.00	1
4	480.00	162.00	550.00	180.00	1
5	550.00	180.00	721.00	215.00	1
6	721.00	215.00	750.00	200.00	1
7	750.00	200.00	800.00	190.00	1
8	800.00	190.00	850.00	187.00	1
9	850.00	187.00	900.00	180.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	135.0	135.0	300.0	31.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	8.5	300.00	31.00
2	11.5	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.

2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 20.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	260.00	100.00	410.00	126.40	5.00
2	600.00	160.00	730.00	182.90	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 3.659 FS Min = 2.488 FS Ave = 2.722
Standard Deviation = 0.176 Coefficient of Variation = 6.45 %
Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	274.60	124.30
2	285.01	117.42
3	301.92	106.75
4	686.54	175.89
5	699.27	191.31
6	713.31	205.56
7	721.17	214.91

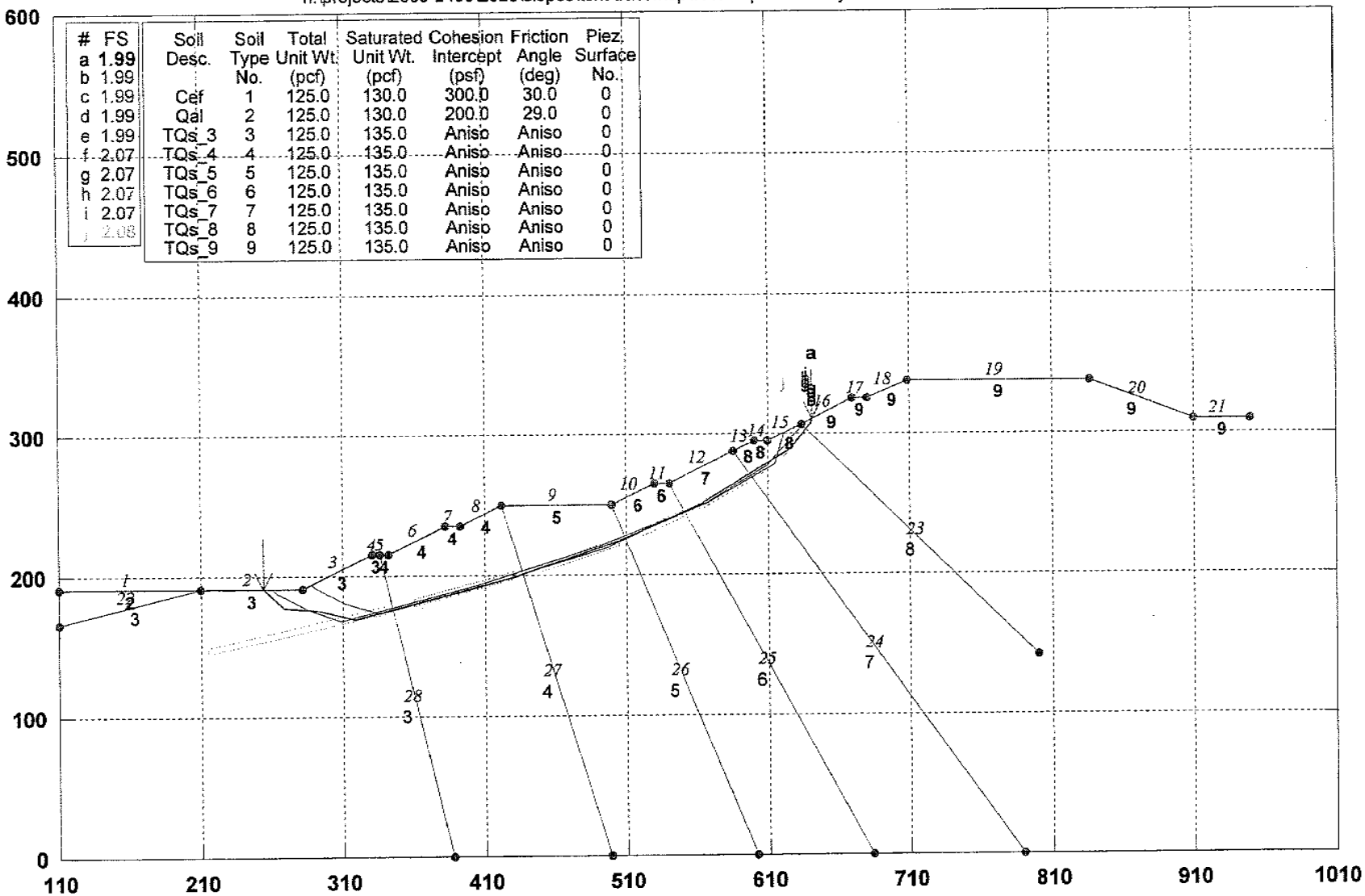
Factor of Safety
*** 2.488 ***

Individual data on the 10 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	10.4	6223.1	0.0	0.0	0.	0.	0.0	0.0	0.0
2	16.9	36087.3	0.0	0.0	0.	0.	0.0	0.0	0.0
3	108.1	339728.4	0.0	0.0	0.	0.	0.0	0.0	0.0
4	70.0	222388.5	0.0	0.0	0.	0.	0.0	0.0	0.0
5	70.0	245220.4	0.0	0.0	0.	0.	0.0	0.0	0.0
6	136.5	559591.4	0.0	0.0	0.	0.	0.0	0.0	0.0
7	12.7	44088.1	0.0	0.0	0.	0.	0.0	0.0	0.0
8	14.0	25688.0	0.0	0.0	0.	0.	0.0	0.0	0.0
9	7.7	4234.2	0.0	0.0	0.	0.	0.0	0.0	0.0
10	0.2	3.4	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 44-44'; static; bedding plane

n:\projects\2000-2499\2023\slopes\tent tract map\t44s1c.pl2 Run By: KPC 12/22/2004 11:44AM



#	FS
a	1.99
b	1.99
c	1.99
d	1.99
e	1.99
f	2.07
g	2.07
h	2.07
i	2.07
j	2.08

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
Qal	2	125.0	130.0	200.0	29.0	0
TQs_3	3	125.0	135.0	Aniso	Aniso	0
TQs_4	4	125.0	135.0	Aniso	Aniso	0
TQs_5	5	125.0	135.0	Aniso	Aniso	0
TQs_6	6	125.0	135.0	Aniso	Aniso	0
TQs_7	7	125.0	135.0	Aniso	Aniso	0
TQs_8	8	125.0	135.0	Aniso	Aniso	0
TQs_9	9	125.0	135.0	Aniso	Aniso	0

GSTABL7 v.2 FSmin=1.99

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 18A

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 12/22/2004
Time of Run: 11:44AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t44slc.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t44slc.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\t44slc.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 44-44'; static;
bedding plane

BOUNDARY COORDINATES
21 Top Boundaries
28 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	110.00	191.00	210.00	191.00	2
2	210.00	191.00	281.00	191.00	3
3	281.00	191.00	330.00	215.00	3
4	330.00	215.00	336.00	215.00	3
5	336.00	215.00	342.00	215.00	4
6	342.00	215.00	382.00	235.00	4
7	382.00	235.00	392.00	235.00	4
8	392.00	235.00	422.00	250.00	4
9	422.00	250.00	500.00	250.00	5
10	500.00	250.00	530.00	265.00	6
11	530.00	265.00	540.00	265.00	6
12	540.00	265.00	586.00	288.00	7
13	586.00	288.00	600.00	295.00	8
14	600.00	295.00	610.00	295.00	8
15	610.00	295.00	634.00	307.00	8
16	634.00	307.00	670.00	325.00	9
17	670.00	325.00	680.00	325.00	9
18	680.00	325.00	708.00	338.00	9
19	708.00	338.00	837.00	338.00	9
20	837.00	338.00	910.00	310.00	9
21	910.00	310.00	950.00	310.00	9
22	110.00	166.00	210.00	191.00	3
23	634.00	307.00	800.00	142.00	8
24	586.00	288.00	789.00	0.00	7
25	540.00	265.00	683.00	0.00	6
26	500.00	250.00	601.00	0.00	5
27	422.00	250.00	498.00	0.00	4
28	336.00	215.00	387.00	0.00	3

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
9 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	130.0	200.0	29.0	0.00	0.0	0
3	125.0	135.0	300.0	31.0	0.00	0.0	0
4	125.0	135.0	300.0	31.0	0.00	0.0	0

5	125.0	135.0	300.0	31.0	0.00	0.0	0
6	125.0	135.0	300.0	31.0	0.00	0.0	0
7	125.0	135.0	300.0	31.0	0.00	0.0	0
8	125.0	135.0	300.0	31.0	0.00	0.0	0
9	125.0	135.0	300.0	31.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
7 soil type(s)

Soil Type 3 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	12.0	300.00	31.00
2	14.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 4 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	14.0	300.00	31.00
2	16.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 5 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	17.0	300.00	31.00
2	19.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 6 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	24.0	300.00	31.00
2	26.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 7 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	29.0	300.00	31.00
2	31.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 8 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	39.0	300.00	31.00
2	41.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 9 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	49.0	300.00	31.00
2	51.0	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and

C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and
C equal to zero, with water weight in the tension crack.
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1000 Trial Surfaces Have Been Generated.
6 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 25.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	215.00	147.00	340.00	175.90	5.00
2	360.00	180.90	430.00	199.70	5.00
3	450.00	205.50	505.00	223.40	5.00
4	520.00	229.10	550.00	243.10	5.00
5	561.00	248.70	595.00	266.60	5.00
6	606.00	273.00	630.00	293.10	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 3.290 FS Min = 1.988 FS Ave = 2.540
Standard Deviation = 0.254 Coefficient of Variation = 10.01 %
Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	254.31	191.00
2	268.63	177.38
3	293.58	175.84
4	317.50	168.56
5	428.85	198.43
6	503.43	223.56
7	520.06	231.09
8	562.52	250.40
9	625.62	288.62
10	641.05	308.29
11	641.21	310.60

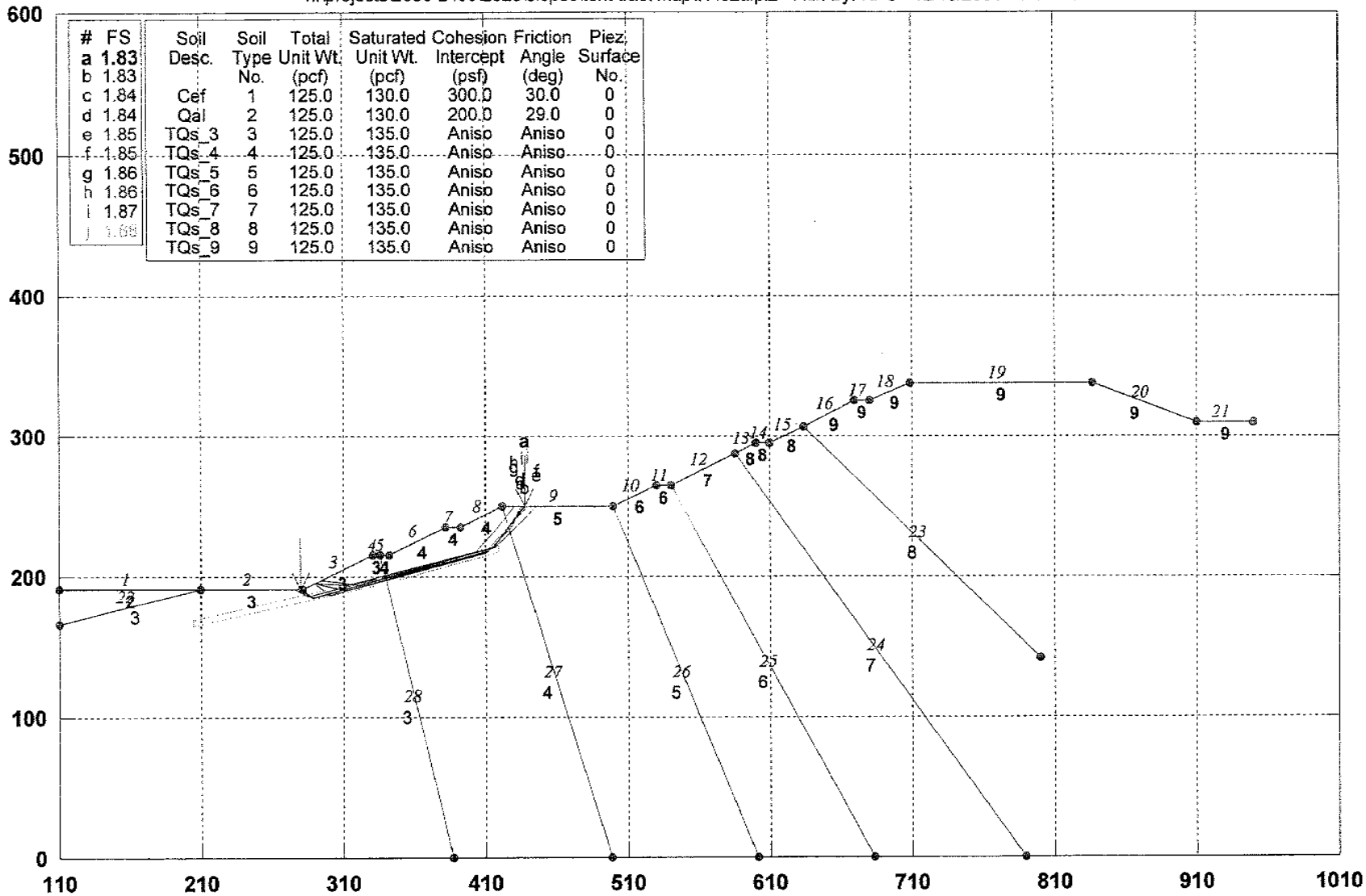
Factor of Safety
*** 1.988 ***
Individual data on the 30 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	14.3	12192.7	0.0	0.0	0.	0.	0.0	0.0	0.0
2	12.4	21641.2	0.0	0.0	0.	0.	0.0	0.0	0.0
3	12.6	28083.3	0.0	0.0	0.	0.	0.0	0.0	0.0
4	23.9	92138.7	0.0	0.0	0.	0.	0.0	0.0	0.0
5	12.5	65156.4	0.0	0.0	0.	0.	0.0	0.0	0.0
6	6.0	31712.1	0.0	0.0	0.	0.	0.0	0.0	0.0
7	6.0	30504.8	0.0	0.0	0.	0.	0.0	0.0	0.0
8	3.3	16350.9	0.0	0.0	0.	0.	0.0	0.0	0.0
9	36.7	206163.1	0.0	0.0	0.	0.	0.0	0.0	0.0
10	10.0	59744.9	0.0	0.0	0.	0.	0.0	0.0	0.0
11	30.0	187239.1	0.0	0.0	0.	0.	0.0	0.0	0.0
12	6.9	44947.0	0.0	0.0	0.	0.	0.0	0.0	0.0
13	8.0	50258.3	0.0	0.0	0.	0.	0.0	0.0	0.0
14	63.1	301780.9	0.0	0.0	0.	0.	0.0	0.0	0.0
15	3.4	11937.0	0.0	0.0	0.	0.	0.0	0.0	0.0
16	6.1	21702.0	0.0	0.0	0.	0.	0.0	0.0	0.0
17	10.5	37670.0	0.0	0.0	0.	0.	0.0	0.0	0.0
18	9.9	36219.3	0.0	0.0	0.	0.	0.0	0.0	0.0
19	10.0	33892.8	0.0	0.0	0.	0.	0.0	0.0	0.0

20	10.8	33751.3	0.0	0.0	0.	0.	0.0	0.0	0.0
21	11.8	37603.0	0.0	0.0	0.	0.	0.0	0.0	0.0
22	23.5	72270.6	0.0	0.0	0.	0.	0.0	0.0	0.0
23	11.5	32868.8	0.0	0.0	0.	0.	0.0	0.0	0.0
24	2.5	6750.1	0.0	0.0	0.	0.	0.0	0.0	0.0
25	10.0	23588.6	0.0	0.0	0.	0.	0.0	0.0	0.0
26	15.6	29323.0	0.0	0.0	0.	0.	0.0	0.0	0.0
27	8.4	11464.3	0.0	0.0	0.	0.	0.0	0.0	0.0
28	3.4	2710.7	0.0	0.0	0.	0.	0.0	0.0	0.0
29	3.7	1671.8	0.0	0.0	0.	0.	0.0	0.0	0.0
30	0.2	21.6	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 44-44'; static; bedding plane below road

n:\projects\2000-2499\2023\slopes\tent tract map\t44s2a.pl2 Run By: KPC 12/16/2004 11:40AM



#	FS
a	1.83
b	1.83
c	1.84
d	1.84
e	1.85
f	1.85
g	1.86
h	1.86
i	1.87
j	1.88

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
Qal	2	125.0	130.0	200.0	29.0	0
TQs_3	3	125.0	135.0	Aniso	Aniso	0
TQs_4	4	125.0	135.0	Aniso	Aniso	0
TQs_5	5	125.0	135.0	Aniso	Aniso	0
TQs_6	6	125.0	135.0	Aniso	Aniso	0
TQs_7	7	125.0	135.0	Aniso	Aniso	0
TQs_8	8	125.0	135.0	Aniso	Aniso	0
TQs_9	9	125.0	135.0	Aniso	Aniso	0

GSTABL7 v.2 FSmin=1.83

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 19A

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 12/16/2004
Time of Run: 11:40AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t44s2a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t44s2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\t44s2a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 44-44'; static;
bedding plane below road

BOUNDARY COORDINATES
21 Top Boundaries
28 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	110.00	191.00	210.00	191.00	2
2	210.00	191.00	281.00	191.00	3
3	281.00	191.00	330.00	215.00	3
4	330.00	215.00	336.00	215.00	3
5	336.00	215.00	342.00	215.00	4
6	342.00	215.00	382.00	235.00	4
7	382.00	235.00	392.00	235.00	4
8	392.00	235.00	422.00	250.00	4
9	422.00	250.00	500.00	250.00	5
10	500.00	250.00	530.00	265.00	6
11	530.00	265.00	540.00	265.00	6
12	540.00	265.00	586.00	288.00	7
13	586.00	288.00	600.00	295.00	8
14	600.00	295.00	610.00	295.00	8
15	610.00	295.00	634.00	307.00	8
16	634.00	307.00	670.00	325.00	9
17	670.00	325.00	680.00	325.00	9
18	680.00	325.00	708.00	338.00	9
19	708.00	338.00	837.00	338.00	9
20	837.00	338.00	910.00	310.00	9
21	910.00	310.00	950.00	310.00	9
22	110.00	166.00	210.00	191.00	3
23	634.00	307.00	800.00	142.00	8
24	586.00	288.00	789.00	0.00	7
25	540.00	265.00	683.00	0.00	6
26	500.00	250.00	601.00	0.00	5
27	422.00	250.00	498.00	0.00	4
28	336.00	215.00	387.00	0.00	3

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
9 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	130.0	200.0	29.0	0.00	0.0	0
3	125.0	135.0	300.0	31.0	0.00	0.0	0
4	125.0	135.0	300.0	31.0	0.00	0.0	0
5	125.0	135.0	300.0	31.0	0.00	0.0	0
6	125.0	135.0	300.0	31.0	0.00	0.0	0
7	125.0	135.0	300.0	31.0	0.00	0.0	0

8	125.0	135.0	300.0	31.0	0.00	0.0	0
9	125.0	135.0	300.0	31.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS

7 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	12.0	300.00	31.00
2	14.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 4 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	14.0	300.00	31.00
2	16.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 5 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	17.0	300.00	31.00
2	19.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 6 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	24.0	300.00	31.00
2	26.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 7 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	29.0	300.00	31.00
2	31.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 8 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	39.0	300.00	31.00
2	41.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 9 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	49.0	300.00	31.00
2	51.0	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:

(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.

(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.

(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 25.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	205.00	167.00	330.00	196.00	5.00
2	350.00	201.00	420.00	220.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 8.877 FS Min = 1.832 FS Ave = 2.998
Standard Deviation = 0.929 Coefficient of Variation = 30.97 %
Failure Surface Specified By 5 Coordinate Points

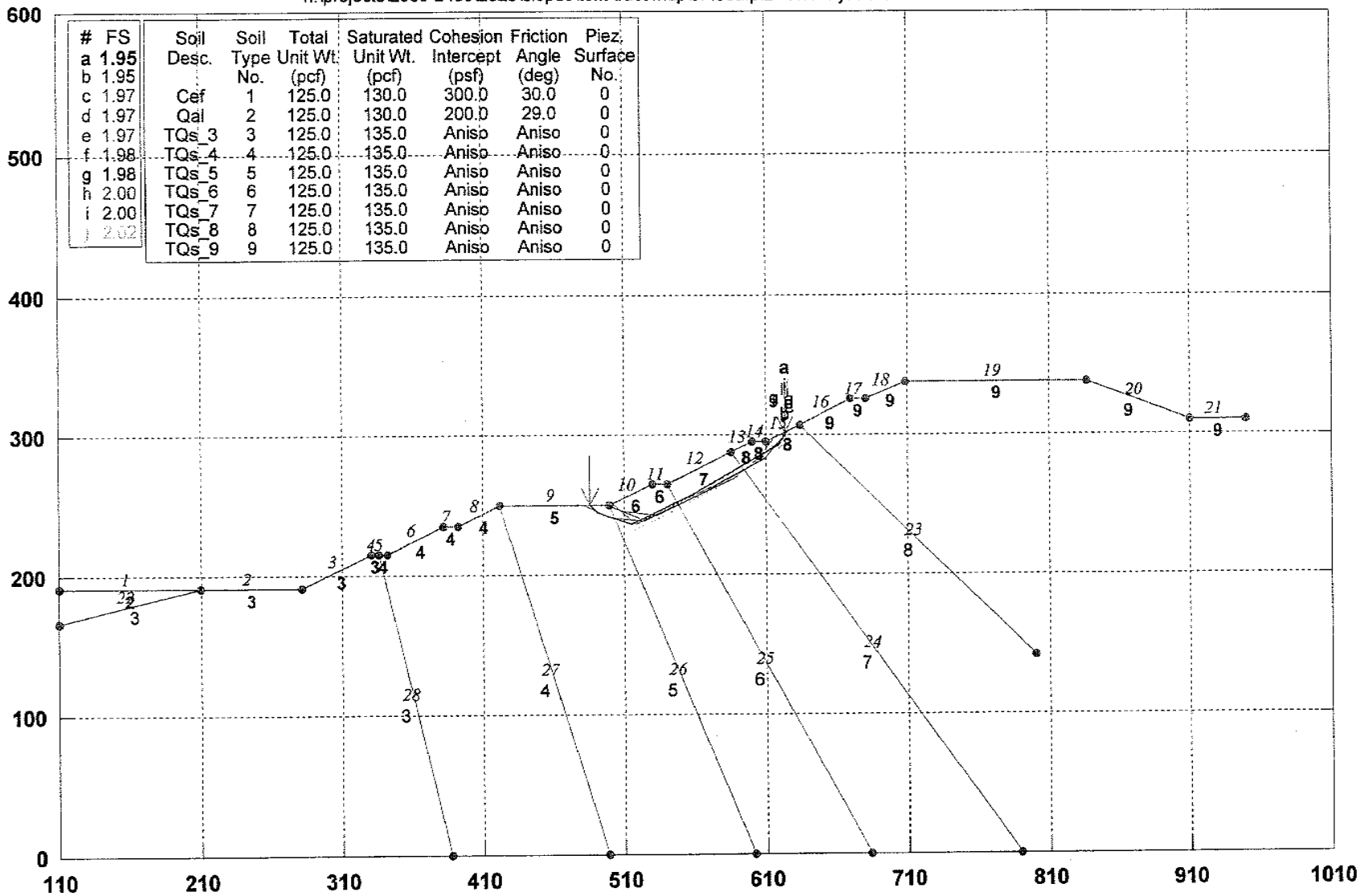
Point No.	X-Surf (ft)	Y-Surf (ft)
1	279.84	191.00
2	288.06	185.08
3	415.48	220.43
4	429.76	240.95
5	437.55	250.00

Factor of Safety
*** 1.832 ***
Individual data on the 13 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	1.2	60.2	0.0	0.0	0.	0.	0.0	0.0	0.0
2	7.1	4507.9	0.0	0.0	0.	0.	0.0	0.0	0.0
3	41.9	72523.2	0.0	0.0	0.	0.	0.0	0.0	0.0
4	6.0	13090.9	0.0	0.0	0.	0.	0.0	0.0	0.0
5	3.7	7449.3	0.0	0.0	0.	0.	0.0	0.0	0.0
6	2.3	4393.1	0.0	0.0	0.	0.	0.0	0.0	0.0
7	40.0	97042.9	0.0	0.0	0.	0.	0.0	0.0	0.0
8	10.0	28090.5	0.0	0.0	0.	0.	0.0	0.0	0.0
9	23.5	69566.6	0.0	0.0	0.	0.	0.0	0.0	0.0
10	6.5	18944.4	0.0	0.0	0.	0.	0.0	0.0	0.0
11	4.3	9156.9	0.0	0.0	0.	0.	0.0	0.0	0.0
12	3.5	5040.2	0.0	0.0	0.	0.	0.0	0.0	0.0
13	7.8	4400.8	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 44-44'; static; bedding plane above road

n:\projects\2000-2499\2023\slopes\tent tract map\t44s3a.pl2 Run By: KPC 12/16/2004 11:41AM



#	FS
a	1.95
b	1.95
c	1.97
d	1.97
e	1.97
f	1.98
g	1.98
h	2.00
i	2.00
j	2.02

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
Qal	2	125.0	130.0	200.0	29.0	0
TQs_3	3	125.0	135.0	Aniso	Aniso	0
TQs_4	4	125.0	135.0	Aniso	Aniso	0
TQs_5	5	125.0	135.0	Aniso	Aniso	0
TQs_6	6	125.0	135.0	Aniso	Aniso	0
TQs_7	7	125.0	135.0	Aniso	Aniso	0
TQs_8	8	125.0	135.0	Aniso	Aniso	0
TQs_9	9	125.0	135.0	Aniso	Aniso	0

GSTABL7 v.2 FSmin=1.95

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN NO. 20A

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 12/16/2004
Time of Run: 11:41AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t44s3a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t44s3a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\t44s3a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 44-44'; static;
bedding plane above road

BOUNDARY COORDINATES
21 Top Boundaries
28 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	110.00	191.00	210.00	191.00	2
2	210.00	191.00	281.00	191.00	3
3	281.00	191.00	330.00	215.00	3
4	330.00	215.00	336.00	215.00	3
5	336.00	215.00	342.00	215.00	4
6	342.00	215.00	382.00	235.00	4
7	382.00	235.00	392.00	235.00	4
8	392.00	235.00	422.00	250.00	4
9	422.00	250.00	500.00	250.00	5
10	500.00	250.00	530.00	265.00	6
11	530.00	265.00	540.00	265.00	6
12	540.00	265.00	586.00	288.00	7
13	586.00	288.00	600.00	295.00	8
14	600.00	295.00	610.00	295.00	8
15	610.00	295.00	634.00	307.00	8
16	634.00	307.00	670.00	325.00	9
17	670.00	325.00	680.00	325.00	9
18	680.00	325.00	708.00	338.00	9
19	708.00	338.00	837.00	338.00	9
20	837.00	338.00	910.00	310.00	9
21	910.00	310.00	950.00	310.00	9
22	110.00	166.00	210.00	191.00	3
23	634.00	307.00	800.00	142.00	8
24	586.00	288.00	789.00	0.00	7
25	540.00	265.00	683.00	0.00	6
26	500.00	250.00	601.00	0.00	5
27	422.00	250.00	498.00	0.00	4
28	336.00	215.00	387.00	0.00	3

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
9 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	130.0	200.0	29.0	0.00	0.0	0
3	125.0	135.0	300.0	31.0	0.00	0.0	0
4	125.0	135.0	300.0	31.0	0.00	0.0	0
5	125.0	135.0	300.0	31.0	0.00	0.0	0
6	125.0	135.0	300.0	31.0	0.00	0.0	0
7	125.0	135.0	300.0	31.0	0.00	0.0	0

8	125.0	135.0	300.0	31.0	0.00	0.0	0
9	125.0	135.0	300.0	31.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS

7 soil type(s)

Soil Type 3 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	12.0	300.00	31.00
2	14.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 4 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	14.0	300.00	31.00
2	16.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 5 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	17.0	300.00	31.00
2	19.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 6 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	24.0	300.00	31.00
2	26.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 7 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	29.0	300.00	31.00
2	31.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 8 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	39.0	300.00	31.00
2	41.0	200.00	20.00
3	90.0	300.00	31.00

Soil Type 9 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	49.0	300.00	31.00
2	51.0	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:

(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.

(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.

(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1000 Trial Surfaces Have Been Generated.
3 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 25.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	515.00	234.00	545.00	248.00	5.00
2	556.00	254.00	590.00	272.00	5.00
3	601.00	278.00	625.00	298.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 3.794 FS Min = 1.945 FS Ave = 2.468
Standard Deviation = 0.228 Coefficient of Variation = 9.23 %
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	485.40	250.00
2	491.54	244.13
3	515.37	236.57
4	558.00	257.27
5	618.81	293.12
6	622.95	301.47

Factor of Safety
*** 1.945 ***
Individual data on the 14 slices

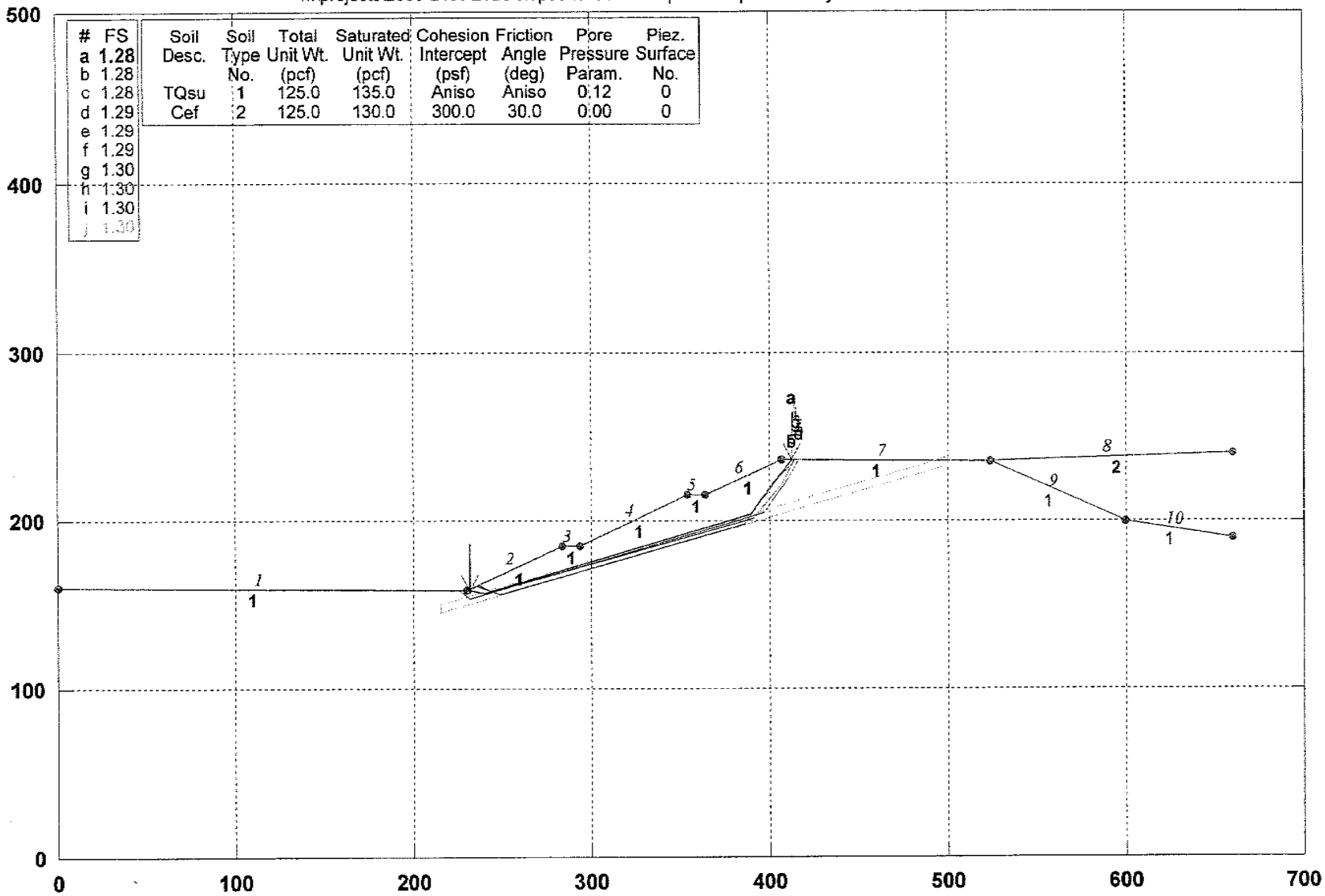
Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	6.1	2253.8	0.0	0.0	0.	0.	0.0	0.0	0.0
2	8.5	7629.6	0.0	0.0	0.	0.	0.0	0.0	0.0
3	4.0	5042.6	0.0	0.0	0.	0.	0.0	0.0	0.0
4	11.4	23463.6	0.0	0.0	0.	0.	0.0	0.0	0.0
5	14.6	38803.5	0.0	0.0	0.	0.	0.0	0.0	0.0
6	10.0	23624.1	0.0	0.0	0.	0.	0.0	0.0	0.0
7	7.0	14546.4	0.0	0.0	0.	0.	0.0	0.0	0.0
8	11.0	22804.5	0.0	0.0	0.	0.	0.0	0.0	0.0
9	28.0	54173.2	0.0	0.0	0.	0.	0.0	0.0	0.0
10	7.1	12308.7	0.0	0.0	0.	0.	0.0	0.0	0.0
11	6.9	11482.4	0.0	0.0	0.	0.	0.0	0.0	0.0
12	10.0	12524.2	0.0	0.0	0.	0.	0.0	0.0	0.0
13	8.8	7348.6	0.0	0.0	0.	0.	0.0	0.0	0.0
14	4.1	1626.7	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 45-45'; static; bedding plane

n:\projects\2000-2499\2023\slopes\tent tract map\t45s1a.pl2 Run By: KPC 12/7/2004 02:58PM

#	FS
a	1.28
b	1.28
c	1.28
d	1.29
e	1.29
f	1.29
g	1.30
h	1.30
i	1.30
j	1.30

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	Aniso	Aniso	0.12	0
Cef	2	125.0	130.0	300.0	30.0	0.00	0



GSTABL7 v.2 FSmin=1.28

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 21A

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 12/7/2004
Time of Run: 02:58PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t45s1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t45s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\t45s1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 45-45'; static;
bedding plane

BOUNDARY COORDINATES
8 Top Boundaries
10 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	160.00	230.00	158.00	1
2	230.00	158.00	284.00	185.00	1
3	284.00	185.00	294.00	185.00	1
4	294.00	185.00	354.00	215.00	1
5	354.00	215.00	364.00	215.00	1
6	364.00	215.00	407.00	236.00	1
7	407.00	236.00	524.00	235.00	1
8	524.00	235.00	660.00	240.00	2
9	524.00	235.00	600.00	200.00	1
10	600.00	200.00	660.00	190.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	16.0	300.00	31.00
2	18.0	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been

Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 25.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	215.00	148.00	300.00	174.00	5.00
2	350.00	189.30	500.00	235.10	5.00

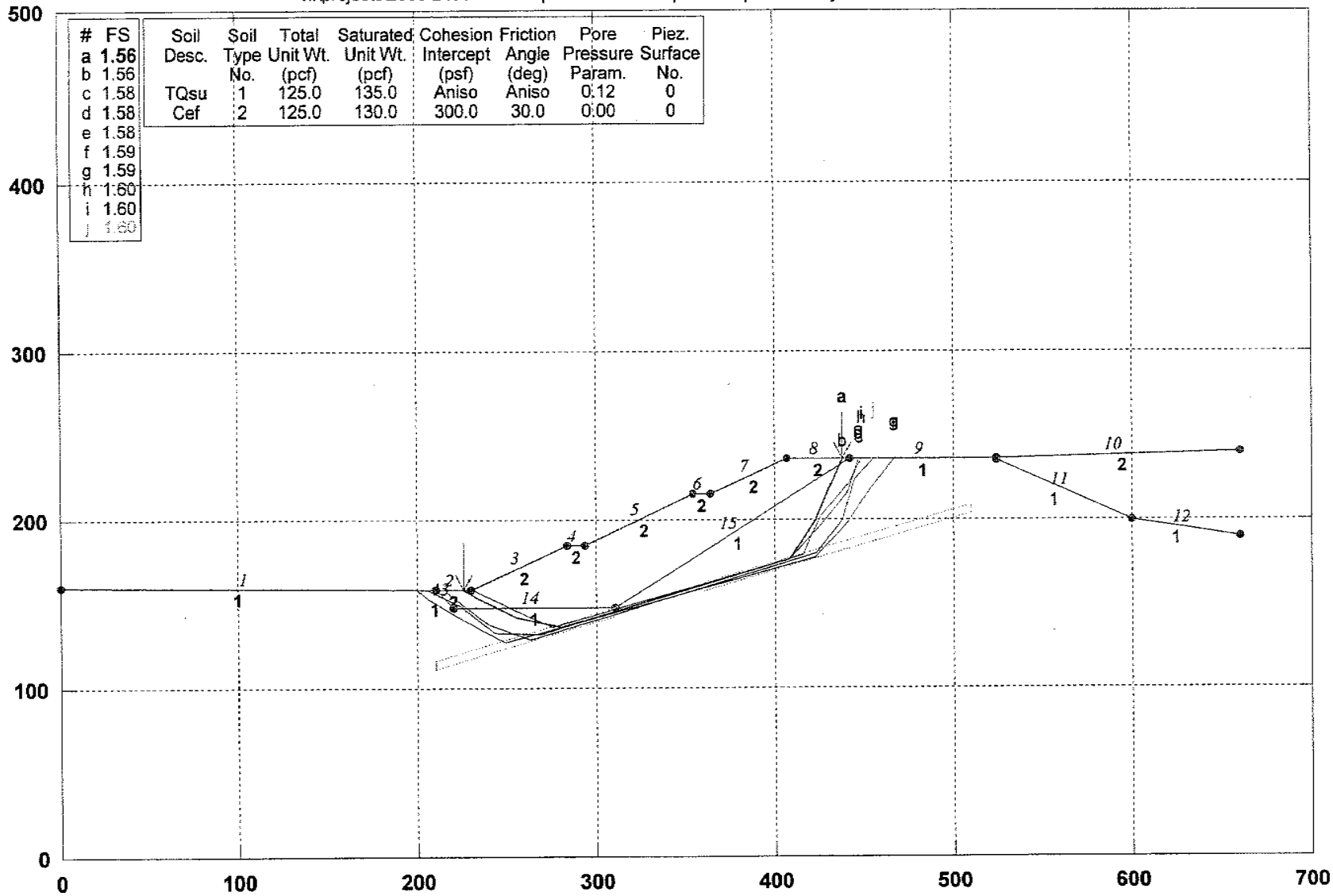
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 3.100 FS Min = 1.282 FS Ave = 1.648
Standard Deviation = 0.333 Coefficient of Variation = 20.22 %
Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	231.45	158.72
2	240.25	156.55
3	389.21	203.45
4	403.83	223.73
5	412.34	235.95

Factor of Safety
*** 1.282 ***

Mesas East, x-sec 45-45'; bedplane; 10'd by 80'w key; static

n:\projects\2000-2499\2023\slopes\tent tract map\t45s2a.pl2 Run By: KPC 12/8/2004 02:32PM



#	FS
a	1.56
b	1.56
c	1.58
d	1.58
e	1.58
f	1.59
g	1.59
h	1.60
i	1.60
j	1.60

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	Aniso	Aniso	0.12	0
Cef	2	125.0	130.0	300.0	30.0	0.00	0

GSTABL7 v.2 FSmin=1.56

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 22A

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:         12/8/2004
Time of Run:               02:32PM
Run By:                    KPC
Input Data Filename:       N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t45s2a.in
Output Filename:           N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t45s2a.OUT
Unit System:               English
Plotted Output Filename:   N:\Projects\2000-2499\2023\Slopent Tract Map\t45s2a.PLT
PROBLEM DESCRIPTION:  Mesas East, x-sec 45-45'; bedplane;
                      10'd by 80'w key; static
BOUNDARY COORDINATES
   10 Top   Boundaries
   15 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	160.00	210.00	158.00	1
2	210.00	158.00	230.00	158.00	2
3	230.00	158.00	284.00	185.00	2
4	284.00	185.00	294.00	185.00	2
5	294.00	185.00	354.00	215.00	2
6	354.00	215.00	364.00	215.00	2
7	364.00	215.00	407.00	236.00	2
8	407.00	236.00	442.00	236.00	2
9	442.00	236.00	524.00	236.00	1
10	524.00	236.00	660.00	240.00	2
11	524.00	235.00	600.00	200.00	1
12	600.00	200.00	660.00	190.00	1
13	210.00	158.00	220.00	148.00	1
14	220.00	148.00	310.00	148.00	1
15	310.00	148.00	442.00	236.00	1

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
```

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

```
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
```

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	16.0	300.00	31.00
2	18.0	200.00	20.00
3	90.0	300.00	31.00

```
ANISOTROPIC SOIL NOTES:
    (1) An input value of 0.01 for C and/or Phi will cause Aniso
        C and/or Phi to be ignored in that range.
    (2) An input value of 0.02 for Phi will set both Phi and
        C equal to zero, with no water weight in the tension crack.
    (3) An input value of 0.03 for Phi will set both Phi and
        C equal to zero, with water weight in the tension crack.
Janbus Empirical Coef is being used for the case of  c & phi both > 0
```

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 25.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	210.00	114.00	310.00	145.00	5.00
2	360.00	160.00	510.00	206.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 3.111 FS Min = 1.562 FS Ave = 1.933
Standard Deviation = 0.263 Coefficient of Variation = 13.59 %
Failure Surface Specified By 8 Coordinate Points

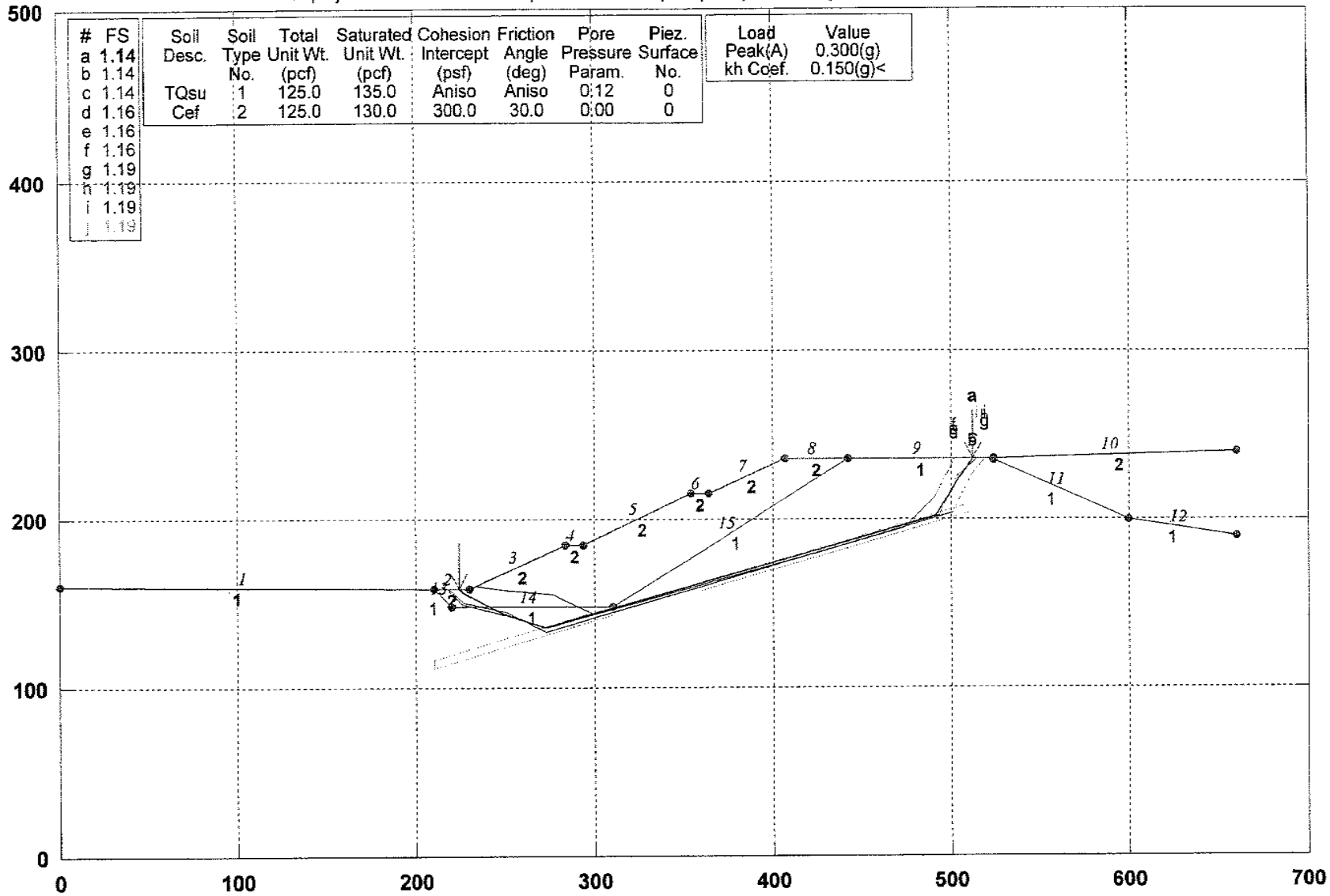
Point No.	X-Surf (ft)	Y-Surf (ft)
1	225.67	158.00
2	233.81	153.61
3	255.86	141.83
4	280.21	136.16
5	408.11	176.22
6	421.89	197.08
7	431.24	220.26
8	438.03	236.00

Factor of Safety
*** 1.562 ***
Individual data on the 16 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	4.3	631.7	0.0	0.0	0.	0.	0.0	0.0	0.0
2	3.8	2055.3	0.0	0.0	0.	0.	0.0	0.0	0.0
3	10.5	15392.9	0.0	0.0	0.	0.	0.0	0.0	0.0
4	11.5	33383.9	0.0	4542.2	0.	0.	0.0	0.0	0.0
5	24.3	115726.3	0.0	14259.2	0.	0.	0.0	0.0	0.0
6	3.8	22416.9	0.0	2818.9	0.	0.	0.0	0.0	0.0
7	10.0	57612.7	0.0	7244.7	0.	0.	0.0	0.0	0.0
8	16.0	92036.7	0.0	11573.5	0.	0.	0.0	0.0	0.0
9	44.0	283920.3	0.0	35702.6	0.	0.	0.0	0.0	0.0
10	10.0	67706.3	0.0	8514.0	0.	0.	0.0	0.0	0.0
11	43.0	302960.7	0.0	38096.9	0.	0.	0.0	0.0	0.0
12	1.1	8326.2	0.0	1047.0	0.	0.	0.0	0.0	0.0
13	13.8	85022.5	0.0	18507.6	0.	0.	0.0	0.0	0.0
14	9.3	31919.4	0.0	10248.9	0.	0.	0.0	0.0	0.0
15	5.2	6310.2	0.0	1910.1	0.	0.	0.0	0.0	0.0
16	1.6	372.6	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 45-45'; bedplane; 10'd by 80'w key; pseudostatic

n:\projects\2000-2499\2023\slopes\tent tract map\t45ps2a.pl2 Run By: KPC 12/16/2004 03:02PM



GSTABL7 v.2 FSmin=1.14

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN NO. 23A

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 12/16/2004
Time of Run: 03:02PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t45Ps2a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t45Ps2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\t45Ps2a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 45-45'; bedplane;
10'd by 80'w key; pseudostatic

BOUNDARY COORDINATES
10 Top Boundaries
15 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	160.00	210.00	158.00	1
2	210.00	158.00	230.00	158.00	2
3	230.00	158.00	284.00	185.00	2
4	284.00	185.00	294.00	185.00	2
5	294.00	185.00	354.00	215.00	2
6	354.00	215.00	364.00	215.00	2
7	364.00	215.00	407.00	236.00	2
8	407.00	236.00	442.00	236.00	2
9	442.00	236.00	524.00	236.00	1
10	524.00	236.00	660.00	240.00	2
11	524.00	235.00	600.00	200.00	1
12	600.00	200.00	660.00	190.00	1
13	210.00	158.00	220.00	148.00	1
14	220.00	148.00	310.00	148.00	1
15	310.00	148.00	442.00	236.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	400.0	38.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	16.0	400.00	38.00
2	18.0	200.00	20.00
3	90.0	400.00	38.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.

(3) An input value of 0.03 for Phi will set both Phi and
C equal to zero, with water weight in the tension crack.
Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 25.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	210.00	114.00	310.00	145.00	5.00
2	360.00	160.00	510.00	206.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 2.519 FS Min = 1.142 FS Ave = 1.491
Standard Deviation = 0.256 Coefficient of Variation = 17.20 %
Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	224.16	158.00
2	226.87	155.76
3	248.76	143.68
4	272.35	135.41
5	491.83	201.84
6	504.23	223.54
7	512.60	236.00

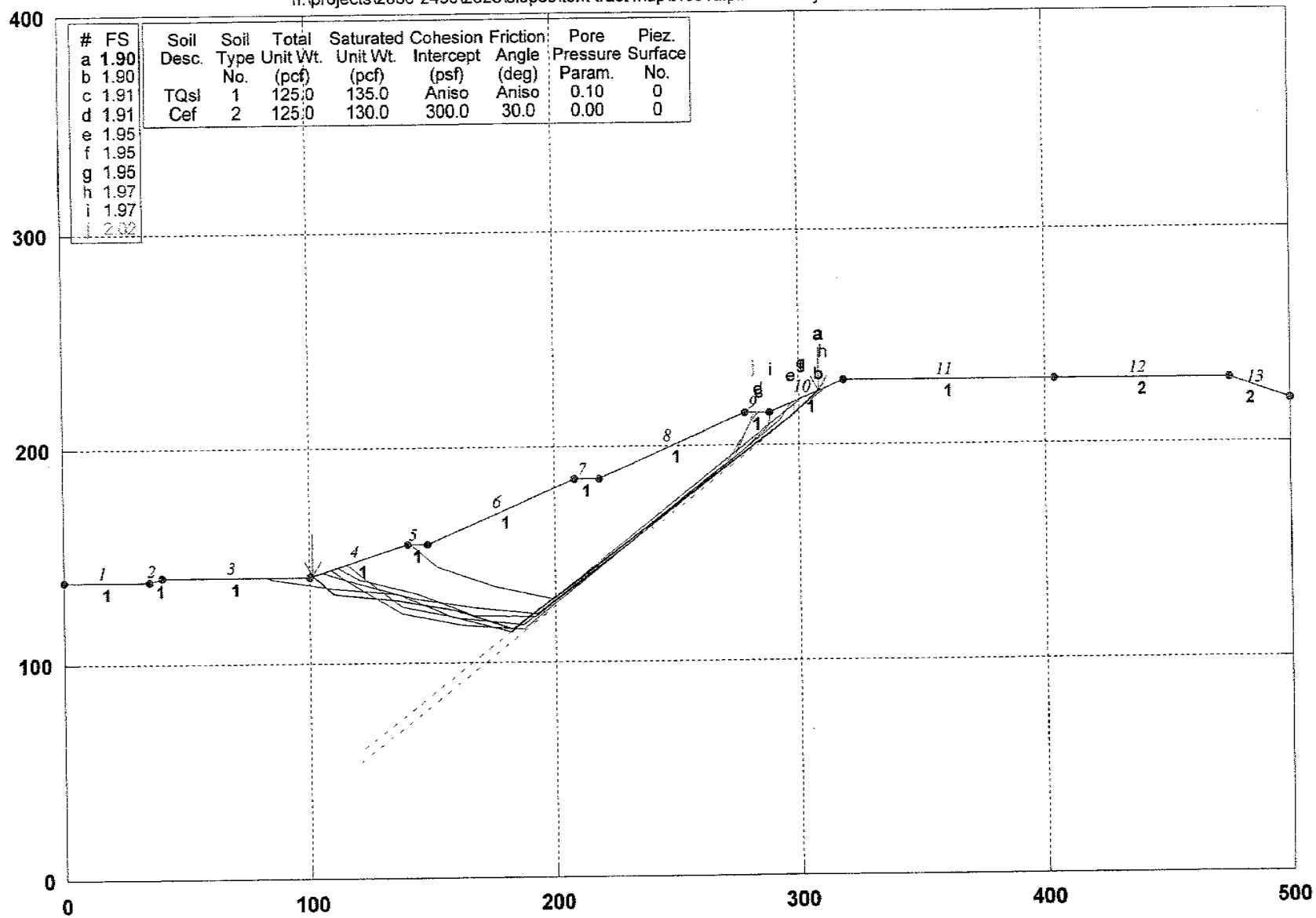
Factor of Safety
*** 1.142 ***

Individual data on the 15 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	2.7	379.6	0.0	0.0	0.	0.	56.9	0.0	0.0
2	3.1	1215.9	0.0	0.0	0.	0.	182.4	0.0	0.0
3	10.9	13274.0	0.0	0.0	0.	0.	1991.1	0.0	0.0
4	7.8	19159.6	0.0	2626.0	0.	0.	2873.9	0.0	0.0
5	23.6	99473.2	0.0	12649.7	0.	0.	14921.0	0.0	0.0
6	11.7	65425.0	0.0	8202.8	0.	0.	9813.8	0.0	0.0
7	10.0	55691.6	0.0	6982.4	0.	0.	8353.7	0.0	0.0
8	16.0	89236.8	0.0	11188.2	0.	0.	13385.5	0.0	0.0
9	44.0	277958.6	0.0	34849.5	0.	0.	41693.8	0.0	0.0
10	10.0	66706.8	0.0	8363.5	0.	0.	10006.0	0.0	0.0
11	43.0	300163.5	0.0	37633.5	0.	0.	45024.5	0.0	0.0
12	35.0	238611.4	0.0	29916.3	0.	0.	35791.7	0.0	0.0
13	49.8	259734.2	0.0	32564.6	0.	0.	38960.1	0.0	0.0
14	12.4	36139.2	0.0	8740.6	0.	0.	5420.9	0.0	0.0
15	8.4	6516.8	0.0	1401.9	0.	0.	977.5	0.0	0.0

Mesas East, x-sec 46-46'; static; critical bedding plane

n:\projects\2000-2499\2023\slopes\tent tract map\t46s1a.pl2 Run By: KPC 12/17/2004 10:59AM



GSTABL7 v.2 FSmin=1.90

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 24A

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 12/17/2004
Time of Run: 10:59AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t46s1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t46s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\t46s1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 46-46'; static;
critical bedding plane

BOUNDARY COORDINATES
13 Top Boundaries
13 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	138.00	35.00	138.00	1
2	35.00	138.00	40.00	140.00	1
3	40.00	140.00	100.00	140.00	1
4	100.00	140.00	140.00	155.00	1
5	140.00	155.00	148.00	155.00	1
6	148.00	155.00	208.00	185.00	1
7	208.00	185.00	218.00	185.00	1
8	218.00	185.00	278.00	215.00	1
9	278.00	215.00	288.00	215.00	1
10	288.00	215.00	318.00	230.00	1
11	318.00	230.00	404.00	230.00	1
12	404.00	230.00	475.00	230.00	2
13	475.00	230.00	500.00	220.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	500.0	35.0	0.10	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	40.5	500.00	35.00
2	43.5	200.00	20.00
3	90.0	500.00	35.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been

Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 25.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	120.00	56.00	200.00	128.00	5.00
2	240.00	164.00	298.00	216.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 4.354 FS Min = 1.903 FS Ave = 2.625
Standard Deviation = 0.397 Coefficient of Variation = 15.13 %
Failure Surface Specified By 7 Coordinate Points

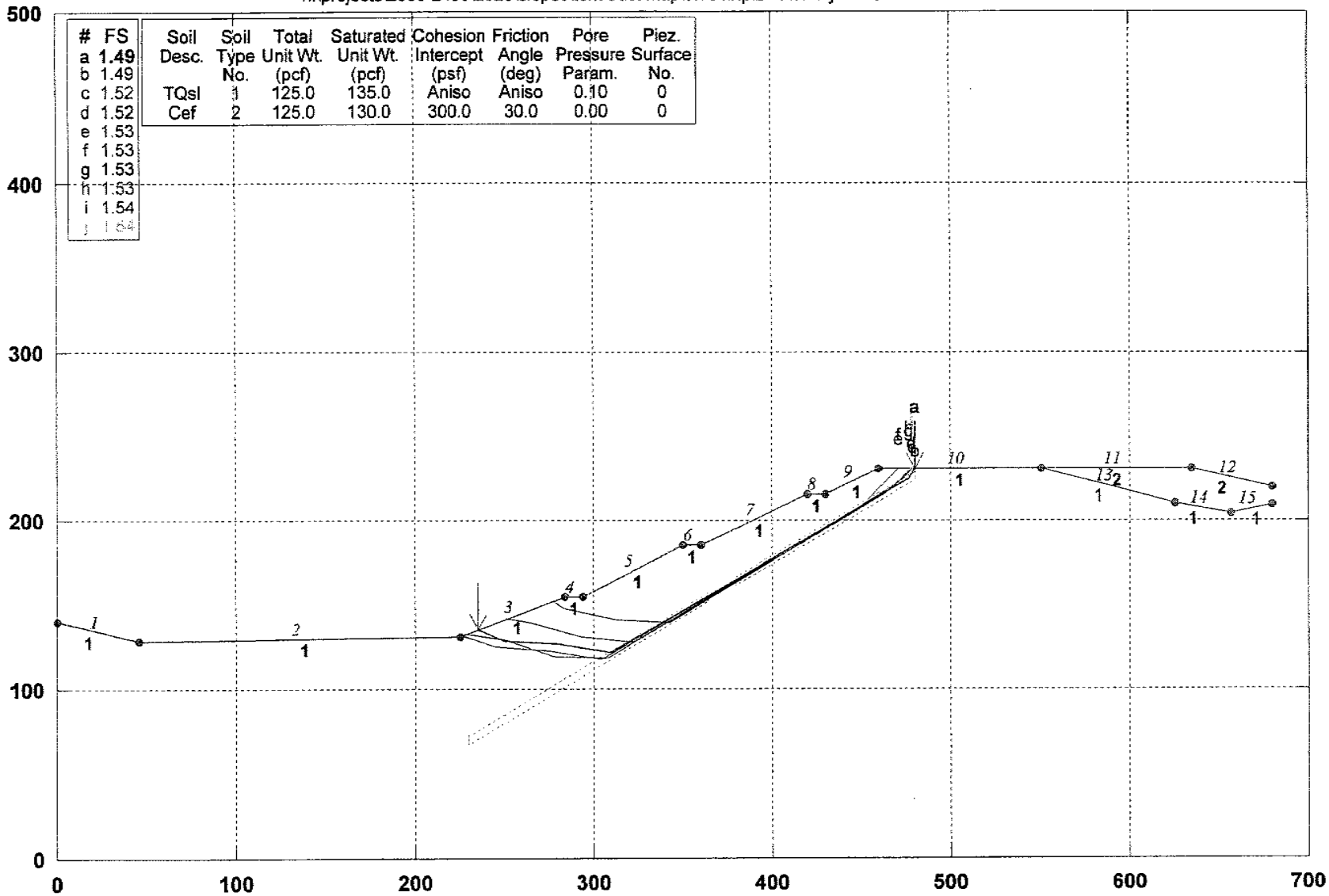
Point No.	X-Surf (ft)	Y-Surf (ft)
1	101.35	140.51
2	110.08	131.91
3	134.88	128.77
4	159.42	124.01
5	182.65	114.77
6	295.48	211.99
7	308.17	225.08

Factor of Safety
*** 1.903 ***
Individual data on the 12 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	8.7	6477.1	0.0	909.0	0.	0.	0.0	0.0	0.0
2	24.8	56080.6	0.0	5652.7	0.	0.	0.0	0.0	0.0
3	5.1	16486.7	0.0	1679.5	0.	0.	0.0	0.0	0.0
4	8.0	27998.2	0.0	2852.1	0.	0.	0.0	0.0	0.0
5	11.4	46744.6	0.0	4761.8	0.	0.	0.0	0.0	0.0
6	23.2	136857.7	0.0	14729.0	0.	0.	0.0	0.0	0.0
7	25.3	167857.4	0.0	22158.6	0.	0.	0.0	0.0	0.0
8	10.0	55102.3	0.0	7274.0	0.	0.	0.0	0.0	0.0
9	60.0	216902.5	0.0	28633.0	0.	0.	0.0	0.0	0.0
10	10.0	17198.6	0.0	2270.4	0.	0.	0.0	0.0	0.0
11	7.5	7567.4	0.0	999.0	0.	0.	0.0	0.0	0.0
12	12.7	5350.5	0.0	768.7	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 47-47'; static; critical bedding plane

n:\projects\2000-2499\2023\slopes\tent tract map\t47s1b.pl2 Run By: KPC 12/8/2004 03:05PM



#	FS
a	1.49
b	1.49
c	1.52
d	1.52
e	1.53
f	1.53
g	1.53
h	1.53
i	1.54
j	1.54

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsl	1	125.0	135.0	Aniso	Aniso	0.10	0
Cef	2	125.0	130.0	300.0	30.0	0.00	0

GSTABL7 v.2 FSmin=1.49

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 25A

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 12/8/2004
Time of Run: 03:05PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t47s1b.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t47s1b.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\t47s1b.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 47-47'; static;
critical bedding plane

BOUNDARY COORDINATES
12 Top Boundaries
15 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	140.00	46.00	128.00	1
2	46.00	128.00	225.00	131.00	1
3	225.00	131.00	284.00	155.00	1
4	284.00	155.00	294.00	155.00	1
5	294.00	155.00	350.00	185.00	1
6	350.00	185.00	360.00	185.00	1
7	360.00	185.00	420.00	215.00	1
8	420.00	215.00	430.00	215.00	1
9	430.00	215.00	460.00	230.00	1
10	460.00	230.00	551.00	230.00	1
11	551.00	230.00	635.00	230.00	2
12	635.00	230.00	680.00	219.00	2
13	551.00	230.00	626.00	210.00	1
14	626.00	210.00	657.00	204.00	1
15	657.00	204.00	680.00	209.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	500.0	35.0	0.10	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	31.0	500.00	35.00
2	33.0	200.00	20.00
3	90.0	500.00	35.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.

(3) An input value of 0.03 for Phi will set both Phi and
C equal to zero, with water weight in the tension crack.
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	230.00	70.00	365.00	154.40	5.00
2	380.00	163.70	480.00	226.20	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 7.043 FS Min = 1.486 FS Ave = 2.211
Standard Deviation = 0.567 Coefficient of Variation = 25.63 %
Failure Surface Specified By 6 Coordinate Points

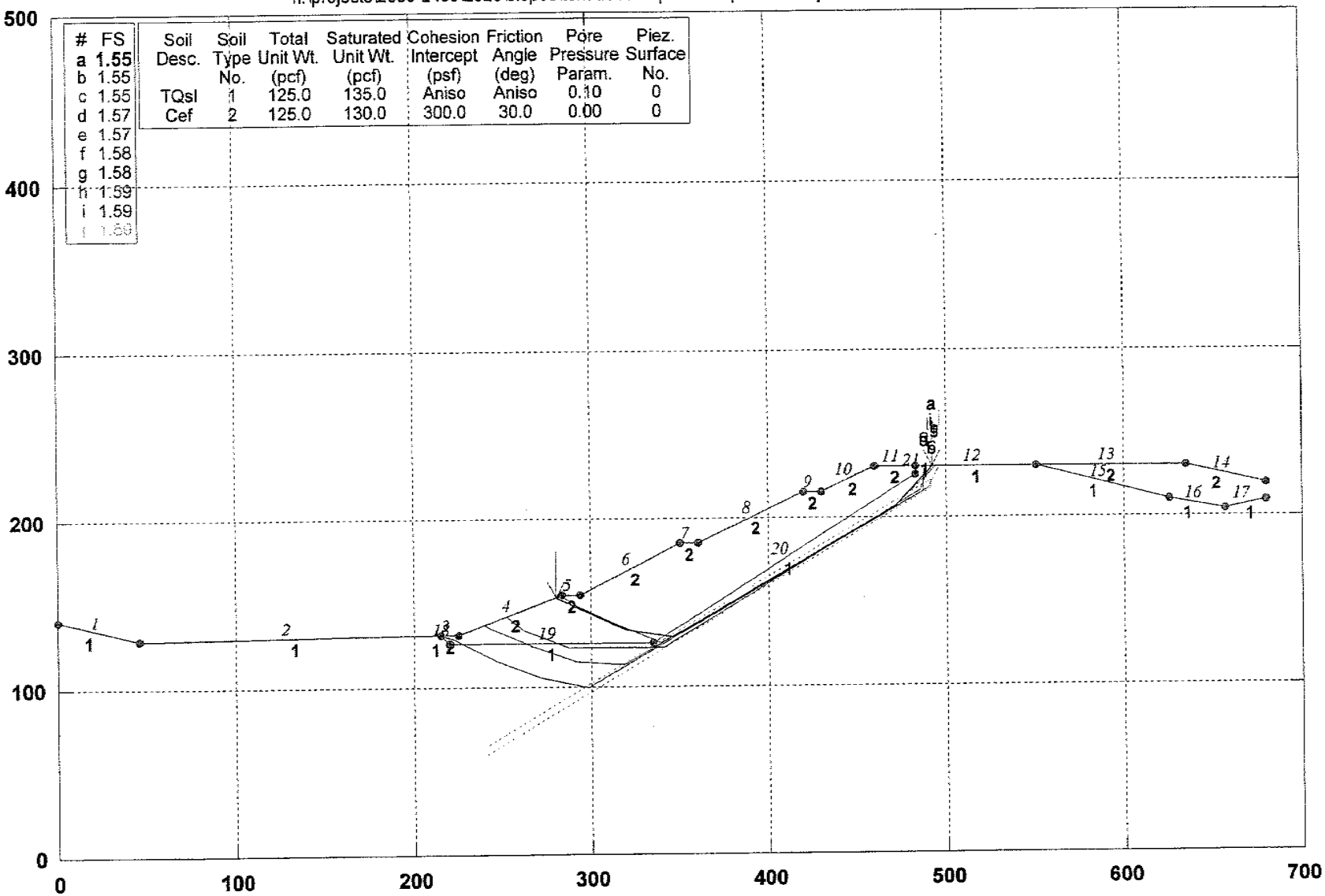
Point No.	X-Surf (ft)	Y-Surf (ft)
1	235.48	135.26
2	249.74	128.60
3	279.67	126.67
4	309.23	121.49
5	477.11	224.70
6	480.31	230.00

Factor of Safety
*** 1.486 ***
Individual data on the 12 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	14.3	11103.7	0.0	1225.9	0.	0.	0.0	0.0	0.0
2	29.9	73042.1	0.0	7319.3	0.	0.	0.0	0.0	0.0
3	4.3	15045.6	0.0	1527.5	0.	0.	0.0	0.0	0.0
4	10.0	37454.6	0.0	3802.5	0.	0.	0.0	0.0	0.0
5	15.2	68990.4	0.0	7004.0	0.	0.	0.0	0.0	0.0
6	40.8	204137.1	0.0	23962.2	0.	0.	0.0	0.0	0.0
7	10.0	44209.3	0.0	5189.4	0.	0.	0.0	0.0	0.0
8	60.0	216394.2	0.0	25400.9	0.	0.	0.0	0.0	0.0
9	10.0	27922.1	0.0	3277.6	0.	0.	0.0	0.0	0.0
10	30.0	65787.8	0.0	7722.4	0.	0.	0.0	0.0	0.0
11	17.1	22595.5	0.0	2652.3	0.	0.	0.0	0.0	0.0
12	3.2	1061.2	0.0	205.3	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 47-47'; bedplane; 5'd by 110'w key; static

n:\projects\2000-2499\2023\slopes\tent tract map\t47s2b.pl2 Run By: KPC 12/16/2004 03:20PM



#	FS
a	1.55
b	1.55
c	1.55
d	1.57
e	1.57
f	1.58
g	1.58
h	1.59
i	1.59
j	1.60

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsl	1	125.0	135.0	Aniso	Aniso	0.10	0
Cef	2	125.0	130.0	300.0	30.0	0.00	0

GSTABL7 v.2 FSmin=1.55

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 26A

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 12/16/2004
Time of Run: 03:20PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t47s2b.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t47s2b.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\t47s2b.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 47-47'; bedplane;
5'd by 110'w key; static

BOUNDARY COORDINATES
14 Top Boundaries
21 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	140.00	46.00	128.00	1
2	46.00	128.00	215.00	131.00	1
3	215.00	131.00	225.00	131.00	2
4	225.00	131.00	284.00	155.00	2
5	284.00	155.00	294.00	155.00	2
6	294.00	155.00	350.00	185.00	2
7	350.00	185.00	360.00	185.00	2
8	360.00	185.00	420.00	215.00	2
9	420.00	215.00	430.00	215.00	2
10	430.00	215.00	460.00	230.00	2
11	460.00	230.00	483.00	230.00	2
12	483.00	230.00	551.00	230.00	1
13	551.00	230.00	635.00	230.00	2
14	635.00	230.00	680.00	219.00	2
15	551.00	230.00	626.00	210.00	1
16	626.00	210.00	657.00	204.00	1
17	657.00	204.00	680.00	209.00	1
18	215.00	131.00	220.00	126.00	1
19	220.00	126.00	335.00	126.00	1
20	335.00	126.00	482.90	225.00	1
21	482.90	225.00	483.00	230.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	500.0	35.0	0.10	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	31.0	500.00	35.00
2	33.0	200.00	20.00

3 90.0 500.00 35.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 27.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	241.00	63.00	376.00	147.00	5.00
2	391.00	157.00	491.00	219.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 6.310 FS Min = 1.548 FS Ave = 2.192
Standard Deviation = 0.495 Coefficient of Variation = 22.59 %
Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	280.08	153.40
2	295.40	145.64
3	319.46	133.38
4	346.13	129.18
5	471.76	206.19
6	489.49	226.55
7	492.26	230.00

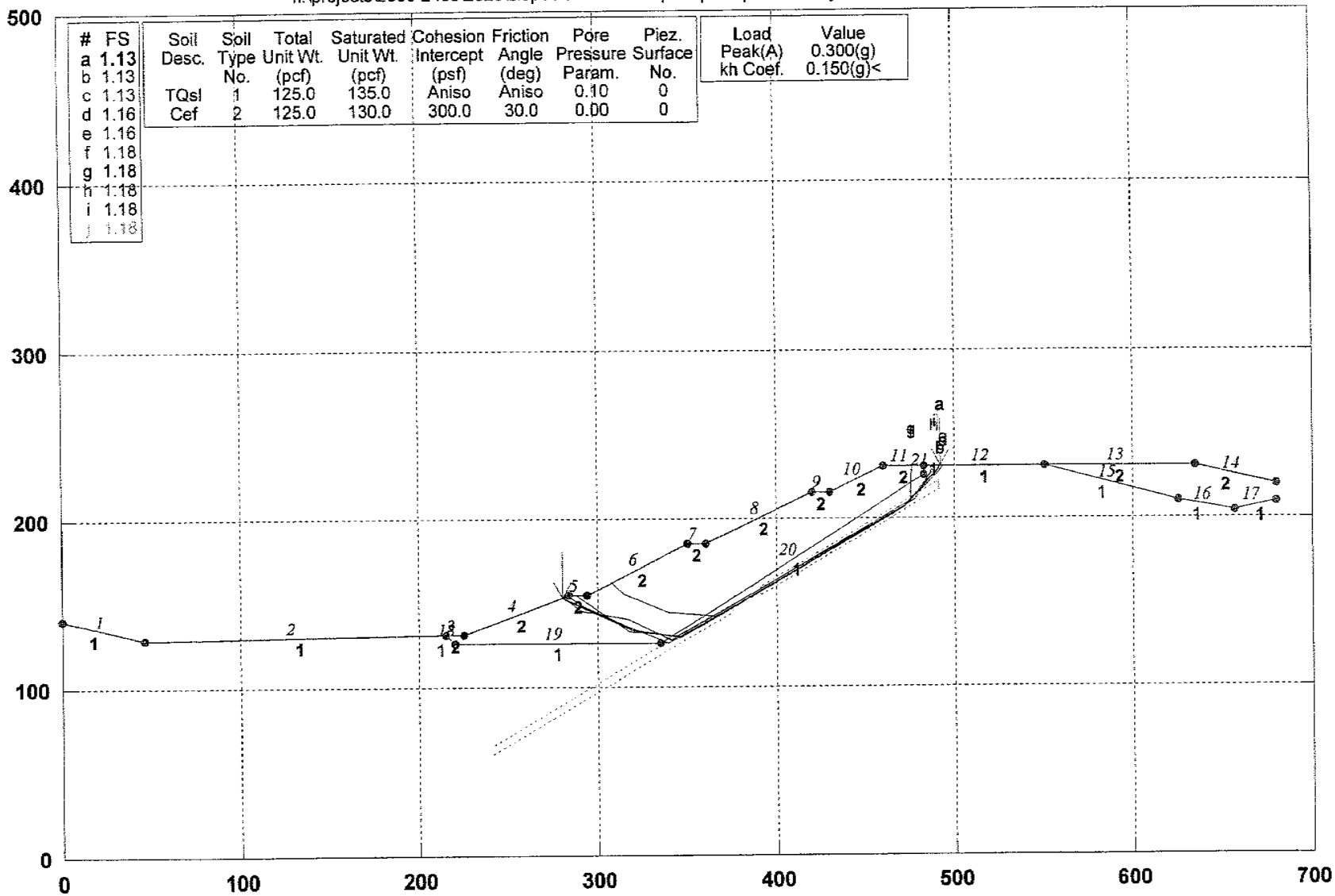
Factor of Safety
*** 1.548 ***

Individual data on the 16 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	3.9	877.9	0.0	0.0	0.	0.	0.0	0.0	0.0
2	10.0	7644.6	0.0	0.0	0.	0.	0.0	0.0	0.0
3	1.4	1644.3	0.0	0.0	0.	0.	0.0	0.0	0.0
4	24.1	68214.1	0.0	0.0	0.	0.	0.0	0.0	0.0
5	21.5	114820.7	0.0	0.0	0.	0.	0.0	0.0	0.0
6	5.2	33540.5	0.0	3395.5	0.	0.	0.0	0.0	0.0
7	3.9	25921.8	0.0	3040.5	0.	0.	0.0	0.0	0.0
8	10.0	62979.0	0.0	7387.1	0.	0.	0.0	0.0	0.0
9	60.0	329455.8	0.0	38643.3	0.	0.	0.0	0.0	0.0
10	10.0	46839.6	0.0	5494.0	0.	0.	0.0	0.0	0.0
11	30.0	122667.3	0.0	14388.2	0.	0.	0.0	0.0	0.0
12	11.8	40281.7	0.0	4724.8	0.	0.	0.0	0.0	0.0
13	11.1	24255.6	0.0	3693.1	0.	0.	0.0	0.0	0.0
14	0.1	137.0	0.0	20.9	0.	0.	0.0	0.0	0.0
15	6.5	5819.2	0.0	886.0	0.	0.	0.0	0.0	0.0
16	2.8	598.4	0.0	95.4	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 47-47'; bedplane; 5'd by 110'w key; pseudostatic

n:\projects\2000-2499\2023\slopes\tent tract map\t47ps2b.pl2 Run By: KPC 12/16/2004 03:21PM



GSTABL7 v.2 FSmin=1.13

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 27A

*** GSTABL7 ***
** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
(All Rights Reserved-Unauthorized Use Prohibited)
****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date: 12/16/2004
Time of Run: 03:21PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t47ps2b.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t47ps2b.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\t47ps2b.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 47-47'; bedplane;
5'd by 110'w key; pseudostatic

BOUNDARY COORDINATES
14 Top Boundaries
21 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	140.00	46.00	128.00	1
2	46.00	128.00	215.00	131.00	1
3	215.00	131.00	225.00	131.00	2
4	225.00	131.00	284.00	155.00	2
5	284.00	155.00	294.00	155.00	2
6	294.00	155.00	350.00	185.00	2
7	350.00	185.00	360.00	185.00	2
8	360.00	185.00	420.00	215.00	2
9	420.00	215.00	430.00	215.00	2
10	430.00	215.00	460.00	230.00	2
11	460.00	230.00	483.00	230.00	2
12	483.00	230.00	551.00	230.00	1
13	551.00	230.00	635.00	230.00	2
14	635.00	230.00	680.00	219.00	2
15	551.00	230.00	626.00	210.00	1
16	626.00	210.00	657.00	204.00	1
17	657.00	204.00	680.00	209.00	1
18	215.00	131.00	220.00	126.00	1
19	220.00	126.00	335.00	126.00	1
20	335.00	126.00	482.90	225.00	1
21	482.90	225.00	483.00	230.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	600.0	38.0	0.10	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	31.0	600.00	38.00
2	33.0	200.00	20.00

3 90.0 600.00 38.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 27.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	241.00	63.00	376.00	147.00	5.00
2	391.00	157.00	491.00	219.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 4.419 FS Min = 1.131 FS Ave = 1.722
Standard Deviation = 0.352 Coefficient of Variation = 20.46 %
Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	280.08	153.40
2	295.40	145.64
3	319.46	133.38
4	346.13	129.18
5	471.76	206.19
6	489.49	226.55
7	492.26	230.00

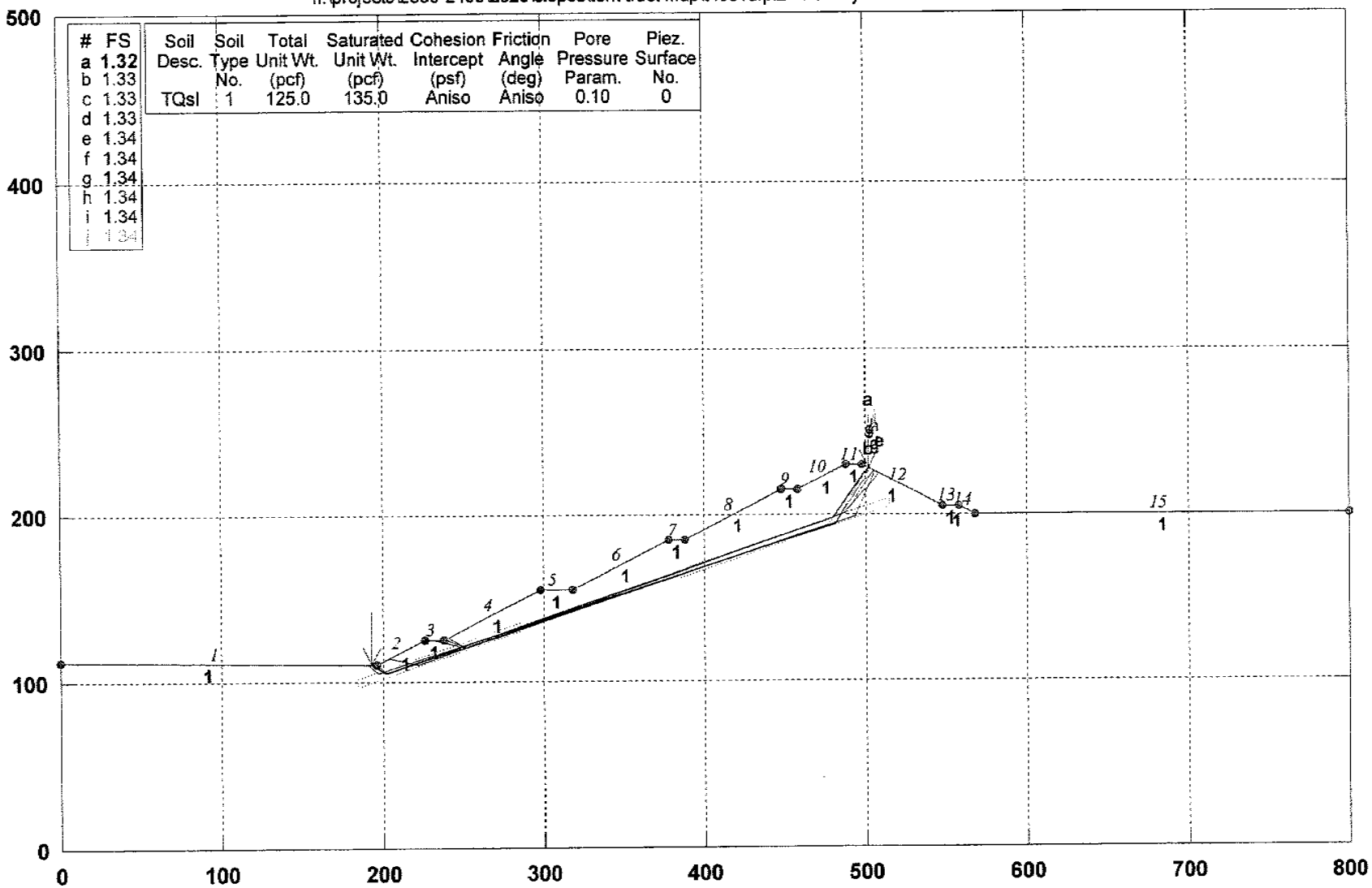
Factor of Safety
*** 1.131 ***

Individual data on the 16 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	3.9	877.9	0.0	0.0	0.	0.	131.7	0.0	0.0
2	10.0	7644.6	0.0	0.0	0.	0.	1146.7	0.0	0.0
3	1.4	1644.3	0.0	0.0	0.	0.	246.6	0.0	0.0
4	24.1	68214.1	0.0	0.0	0.	0.	10232.1	0.0	0.0
5	21.5	114820.7	0.0	0.0	0.	0.	17223.1	0.0	0.0
6	5.2	33540.5	0.0	3395.5	0.	0.	5031.1	0.0	0.0
7	3.9	25921.8	0.0	3040.5	0.	0.	3888.3	0.0	0.0
8	10.0	62979.0	0.0	7387.1	0.	0.	9446.8	0.0	0.0
9	60.0	329455.8	0.0	38643.3	0.	0.	49418.4	0.0	0.0
10	10.0	46839.6	0.0	5494.0	0.	0.	7025.9	0.0	0.0
11	30.0	122667.3	0.0	14388.2	0.	0.	18400.1	0.0	0.0
12	11.8	40281.7	0.0	4724.8	0.	0.	6042.3	0.0	0.0
13	11.1	24255.6	0.0	3693.1	0.	0.	3638.3	0.0	0.0
14	0.1	137.0	0.0	20.9	0.	0.	20.5	0.0	0.0
15	6.5	5819.2	0.0	886.0	0.	0.	872.9	0.0	0.0
16	2.8	598.4	0.0	95.4	0.	0.	89.8	0.0	0.0

Mesas East, x-sec 49-49'; static; bedding plane; shallow search

n:\projects\2000-2499\2023\slopes\tent tract map\t49s1a.pl2 Run By: KPC 12/7/2004 03:26PM



#	FS
a	1.32
b	1.33
c	1.33
d	1.33
e	1.34
f	1.34
g	1.34
h	1.34
i	1.34
j	1.34

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsl	1	125.0	135.0	Aniso	Aniso	0.10	0

GSTABL7 v.2 FSmin=1.32

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 28A

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 12/7/2004
Time of Run: 03:26PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t49s1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t49s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\t49s1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 49-49'; static;
bedding plane; shallow search

BOUNDARY COORDINATES
15 Top Boundaries
15 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	112.00	196.00	110.00	1
2	196.00	110.00	226.00	125.00	1
3	226.00	125.00	238.00	125.00	1
4	238.00	125.00	298.00	155.00	1
5	298.00	155.00	318.00	155.00	1
6	318.00	155.00	378.00	185.00	1
7	378.00	185.00	388.00	185.00	1
8	388.00	185.00	448.00	215.00	1
9	448.00	215.00	458.00	215.00	1
10	458.00	215.00	488.00	230.00	1
11	488.00	230.00	498.00	230.00	1
12	498.00	230.00	548.00	205.00	1
13	548.00	205.00	558.00	205.00	1
14	558.00	205.00	568.00	200.00	1
15	568.00	200.00	800.00	200.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	500.0	35.0	0.10	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	17.0	500.00	35.00
2	19.0	200.00	20.00
3	90.0	500.00	35.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and

C equal to zero, with water weight in the tension crack.
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	185.00	100.00	285.00	132.50	5.00
2	385.00	165.00	515.00	207.20	5.00

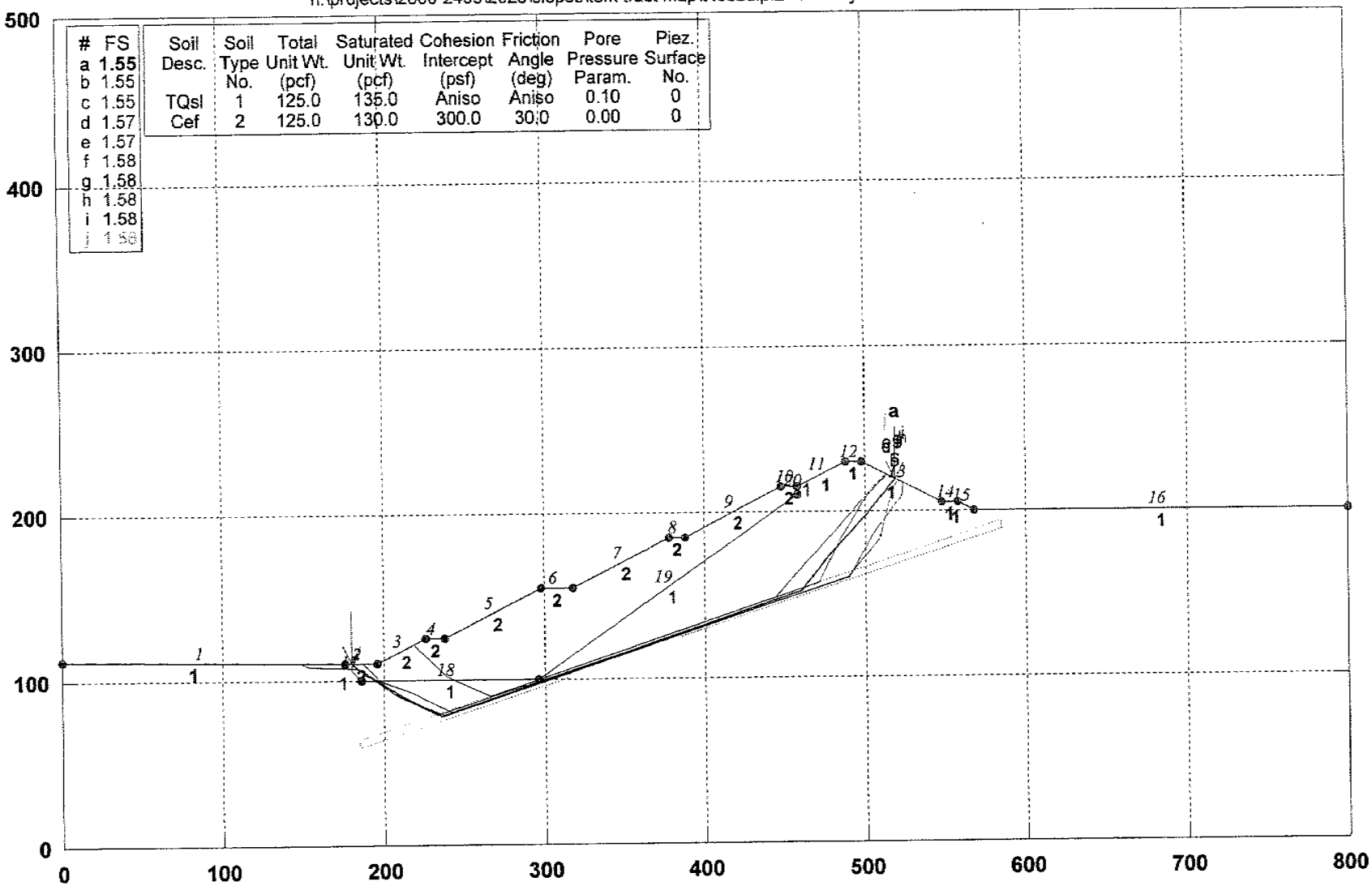
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 3.391 FS Min = 1.323 FS Ave = 1.596
Standard Deviation = 0.346 Coefficient of Variation = 21.66 %
Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	193.45	110.03
2	202.33	105.17
3	480.33	198.37
4	497.94	222.66
5	502.16	227.92

Factor of Safety
*** 1.323 ***

Mesas East, x-sec 49-49'; bedplane; 10'd by 100'w key; static

n:\projects\2000-2499\2023\slopes\tent tract map\t49s2a.pl2 Run By: KPC 12/8/2004 02:53PM



GSTABL7 v.2 FSmin=1.55

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 29A

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 12/8/2004
Time of Run: 02:53PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t49s2a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t49s2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\t49s2a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 49-49'; bedplane;
10'd by 100'w key; static

BOUNDARY COORDINATES
16 Top Boundaries
20 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	112.00	176.00	110.00	1
2	176.00	110.00	196.00	110.00	2
3	196.00	110.00	226.00	125.00	2
4	226.00	125.00	238.00	125.00	2
5	238.00	125.00	298.00	155.00	2
6	298.00	155.00	318.00	155.00	2
7	318.00	155.00	378.00	185.00	2
8	378.00	185.00	388.00	185.00	2
9	388.00	185.00	448.00	215.00	2
10	448.00	215.00	458.00	215.00	2
11	458.00	215.00	488.00	230.00	1
12	488.00	230.00	498.00	230.00	1
13	498.00	230.00	548.00	205.00	1
14	548.00	205.00	558.00	205.00	1
15	558.00	205.00	568.00	200.00	1
16	568.00	200.00	800.00	200.00	1
17	176.00	110.00	186.00	100.00	1
18	186.00	100.00	296.00	100.00	1
19	296.00	100.00	457.90	210.00	1
20	457.90	210.00	458.00	215.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	500.0	35.0	0.10	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	17.0	500.00	35.00
2	19.0	200.00	20.00
3	90.0	500.00	35.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	185.00	62.00	315.00	104.00	5.00
2	385.00	127.00	585.00	192.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 3.892 FS Min = 1.549 FS Ave = 1.880
Standard Deviation = 0.250 Coefficient of Variation = 13.32 %
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	180.17	110.00
2	184.35	107.23
3	209.73	91.22
4	236.41	77.51
5	459.69	152.10
6	478.79	175.24
7	499.85	196.61
8	519.06	219.47

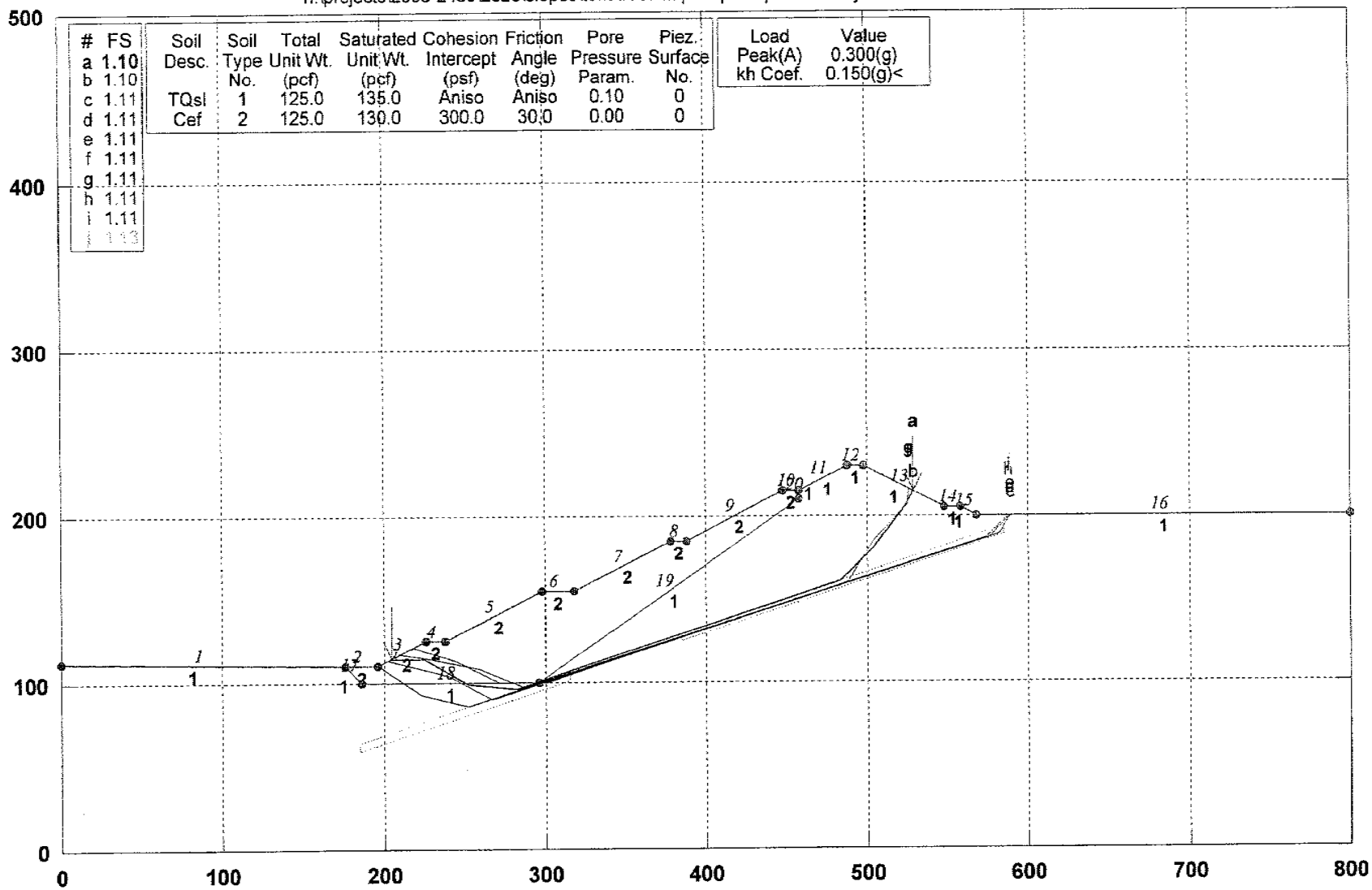
Factor of Safety
*** 1.549 ***

Individual data on the 21 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	4.2	725.7	0.0	0.0	0.	0.	0.0	0.0	0.0
2	11.5	9146.1	0.0	0.0	0.	0.	0.0	0.0	0.0
3	0.2	238.4	0.0	28.2	0.	0.	0.0	0.0	0.0
4	13.7	30680.6	0.0	3627.5	0.	0.	0.0	0.0	0.0
5	16.3	68943.3	0.0	7751.9	0.	0.	0.0	0.0	0.0
6	10.4	58309.7	0.0	6556.2	0.	0.	0.0	0.0	0.0
7	1.6	9397.9	0.0	990.8	0.	0.	0.0	0.0	0.0
8	58.0	375356.7	0.0	39575.1	0.	0.	0.0	0.0	0.0
9	2.0	14187.6	0.0	1495.8	0.	0.	0.0	0.0	0.0
10	20.0	133939.0	0.0	14121.6	0.	0.	0.0	0.0	0.0
11	60.0	414089.4	0.0	43658.8	0.	0.	0.0	0.0	0.0
12	10.0	73148.4	0.0	7712.3	0.	0.	0.0	0.0	0.0
13	60.0	463691.4	0.0	48888.5	0.	0.	0.0	0.0	0.0
14	9.9	80621.9	0.0	8500.2	0.	0.	0.0	0.0	0.0
15	0.1	793.5	0.0	83.7	0.	0.	0.0	0.0	0.0
16	1.7	13474.4	0.0	1420.6	0.	0.	0.0	0.0	0.0
17	19.1	135957.5	0.0	21356.2	0.	0.	0.0	0.0	0.0
18	9.2	54995.1	0.0	7835.1	0.	0.	0.0	0.0	0.0
19	10.0	50429.6	0.0	7184.7	0.	0.	0.0	0.0	0.0
20	1.9	7833.9	0.0	1116.1	0.	0.	0.0	0.0	0.0
21	19.2	38975.0	0.0	6059.2	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 49-49'; bedplane; 10'd by 100'w key; pseudostatic

n:\projects\2000-2499\2023\slopes\tent tract map\t49ps2a.pl2 Run By: KPC 12/16/2004 03:28PM



GSTABL7 v.2 FSmin=1.10

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. 30A

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 12/16/2004
Time of Run: 03:28PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t49ps2a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t49ps2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\t49ps2a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 49-49'; bedplane;
10'd by 100'w key; pseudostatic

BOUNDARY COORDINATES
16 Top Boundaries
20 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	112.00	176.00	110.00	1
2	176.00	110.00	196.00	110.00	2
3	196.00	110.00	226.00	125.00	2
4	226.00	125.00	238.00	125.00	2
5	238.00	125.00	298.00	155.00	2
6	298.00	155.00	318.00	155.00	2
7	318.00	155.00	378.00	185.00	2
8	378.00	185.00	388.00	185.00	2
9	388.00	185.00	448.00	215.00	2
10	448.00	215.00	458.00	215.00	2
11	458.00	215.00	488.00	230.00	1
12	488.00	230.00	498.00	230.00	1
13	498.00	230.00	548.00	205.00	1
14	548.00	205.00	558.00	205.00	1
15	558.00	205.00	568.00	200.00	1
16	568.00	200.00	800.00	200.00	1
17	176.00	110.00	186.00	100.00	1
18	186.00	100.00	296.00	100.00	1
19	296.00	100.00	457.90	210.00	1
20	457.90	210.00	458.00	215.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	600.0	38.0	0.10	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	17.0	600.00	38.00
2	19.0	200.00	20.00
3	90.0	600.00	38.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	185.00	62.00	315.00	104.00	5.00
2	385.00	127.00	585.00	192.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 2.721 FS Min = 1.101 FS Ave = 1.361
Standard Deviation = 0.203 Coefficient of Variation = 14.91 %
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	204.55	114.27
2	225.39	113.51
3	251.86	99.40
4	281.64	95.71
5	484.35	160.67
6	505.39	182.06
7	523.92	205.65
8	528.93	214.54

Factor of Safety
*** 1.101 ***

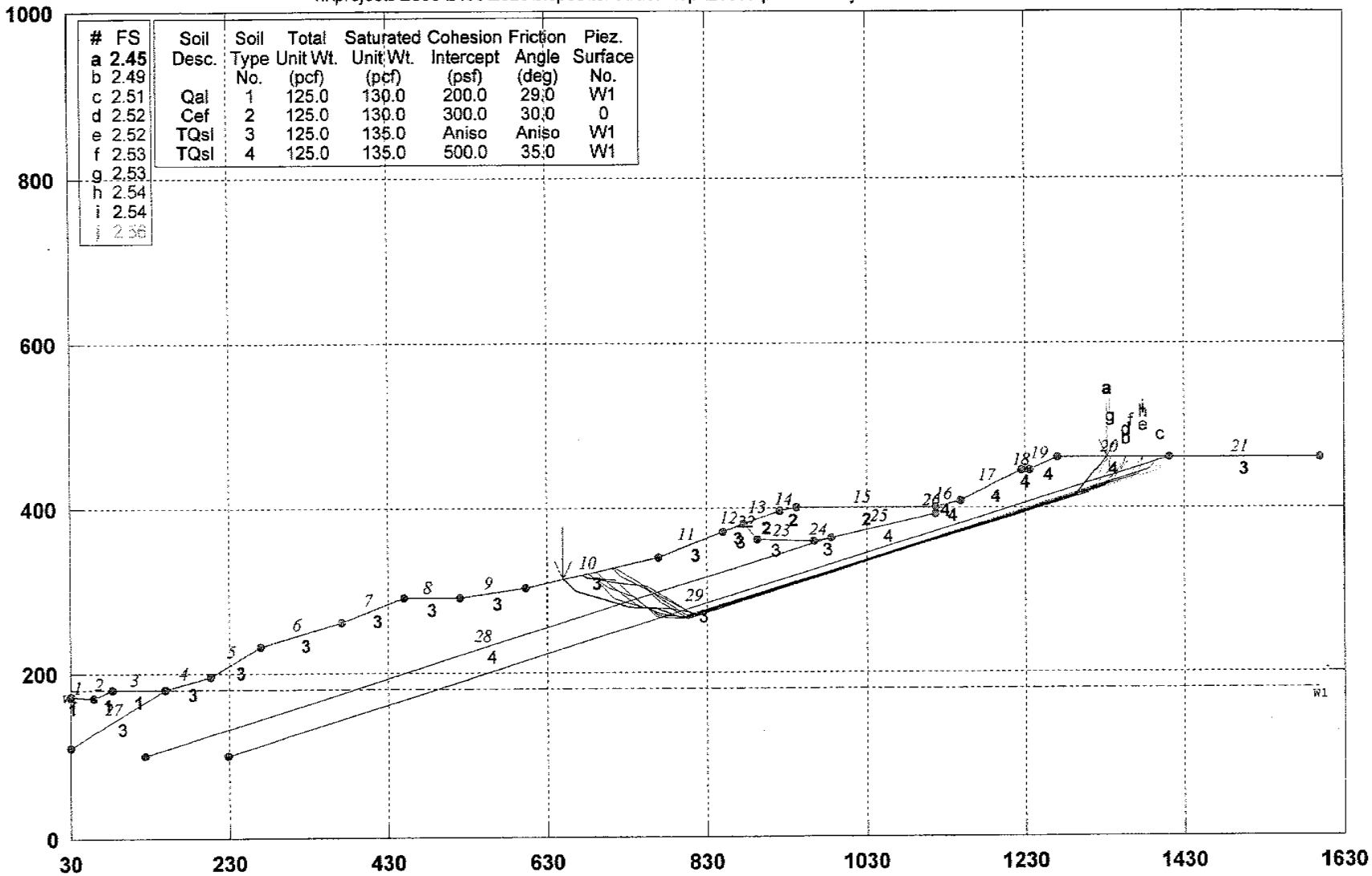
Individual data on the 21 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	20.8	14571.5	0.0	0.0	0.	0.	2185.7	0.0	0.0
2	0.6	881.4	0.0	0.0	0.	0.	132.2	0.0	0.0
3	12.0	22527.1	0.0	0.0	0.	0.	3379.1	0.0	0.0
4	12.7	39457.3	0.0	0.0	0.	0.	5918.6	0.0	0.0
5	1.1	4513.0	0.0	511.4	0.	0.	677.0	0.0	0.0
6	29.8	155640.1	0.0	15683.1	0.	0.	23346.0	0.0	0.0
7	13.4	87576.3	0.0	9196.3	0.	0.	13136.4	0.0	0.0
8	1.8	12342.9	0.0	0.0	0.	0.	1851.4	0.0	0.0
9	1.1	7636.0	0.0	801.8	0.	0.	1145.4	0.0	0.0
10	20.0	127107.5	0.0	13347.5	0.	0.	19066.1	0.0	0.0
11	60.0	397684.3	0.0	41760.6	0.	0.	59652.6	0.0	0.0
12	10.0	71010.5	0.0	7456.8	0.	0.	10651.6	0.0	0.0
13	60.0	454442.2	0.0	47720.7	0.	0.	68166.3	0.0	0.0
14	9.9	79685.3	0.0	8367.7	0.	0.	11952.8	0.0	0.0
15	0.1	784.9	0.0	82.4	0.	0.	117.7	0.0	0.0
16	26.4	214578.1	0.0	22532.7	0.	0.	32186.7	0.0	0.0
17	3.6	30344.0	0.0	4327.8	0.	0.	4551.6	0.0	0.0
18	10.0	75668.9	0.0	10792.3	0.	0.	11350.3	0.0	0.0

19	7.4	46028.9	0.0	6564.9	0.	0.	6904.3	0.0	0.0
20	18.5	64451.4	0.0	10431.1	0.	0.	9667.7	0.0	0.0
21	5.0	3560.1	0.0	725.8	0.	0.	534.0	0.0	0.0

Mesas East Access; x-sec 2E-2E'; static;bedding plane search

n:\projects\2000-2499\2023\slopes\tent tract map\t2es3a.pl2 Run By: KPC 12/20/2004 08:23AM



#	FS
a	2.45
b	2.49
c	2.51
d	2.52
e	2.52
f	2.53
g	2.53
h	2.54
i	2.54
j	2.56

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qal	1	125.0	130.0	200.0	29.0	W1
Cef	2	125.0	130.0	300.0	30.0	0
TQsi	3	125.0	135.0	Aniso	Aniso	W1
TQsl	4	125.0	135.0	500.0	35.0	W1

GSTABL7 v.2 FSmin=2.45

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN NO. 31A

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 12/20/2004
Time of Run: 08:23AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t2es3a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t2es3a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\t2es3a.PLT
PROBLEM DESCRIPTION: Mesas East Access; x-sec 2E-2E'; static;
bedding plane search

BOUNDARY COORDINATES

Note: User origin value specified.
Add 30.00 to X-values and 0.00 to Y-values listed.

21 Top Boundaries
29 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	30.00	172.00	60.00	171.00	1
2	60.00	171.00	83.00	180.00	1
3	83.00	180.00	150.00	180.00	1
4	150.00	180.00	207.00	197.00	3
5	207.00	197.00	269.00	232.00	3
6	269.00	232.00	371.00	261.00	3
7	371.00	261.00	450.00	290.00	3
8	450.00	290.00	520.00	290.00	3
9	520.00	290.00	604.00	303.00	3
10	604.00	303.00	770.00	340.00	3
11	770.00	340.00	850.00	370.00	3
12	850.00	370.00	875.00	380.00	3
13	875.00	380.00	920.00	396.00	2
14	920.00	396.00	942.00	401.00	2
15	942.00	401.00	1118.00	400.00	2
16	1118.00	400.00	1148.00	408.00	4
17	1148.00	408.00	1225.00	445.00	4
18	1225.00	445.00	1235.00	445.00	4
19	1235.00	445.00	1270.00	461.00	4
20	1270.00	461.00	1411.00	461.00	4
21	1411.00	461.00	1600.00	461.00	3
22	875.00	380.00	893.00	362.00	3
23	893.00	362.00	965.00	360.00	3
24	965.00	360.00	986.00	364.00	3
25	986.00	364.00	1117.90	392.00	4
26	1117.90	392.00	1118.00	400.00	4
27	30.00	110.00	150.00	180.00	3
28	125.00	100.00	986.00	364.00	4
29	228.00	100.00	1411.00	461.00	3

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS

4 Type(s) of Soil

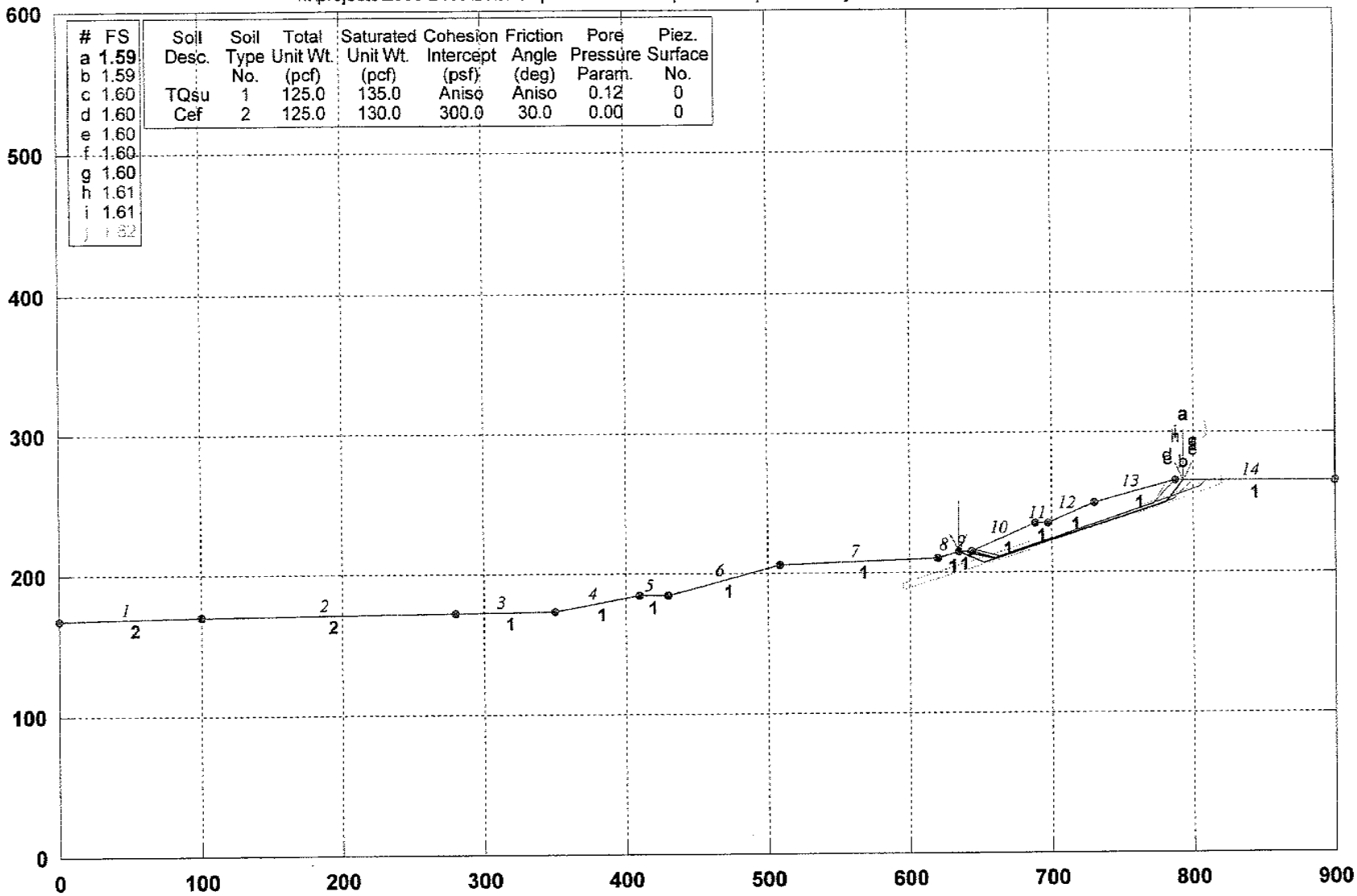
Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	200.0	29.0	0.00	0.0	1
2	125.0	130.0	300.0	30.0	0.00	0.0	0
3	125.0	135.0	500.0	35.0	0.00	0.0	1

```
   4   125.0    135.0     500.0     35.0    0.00       0.0      1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  3 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise     Cohesion     Friction
   Range       Direction Limit    Intercept       Angle
    No.            (deg)            (psf)          (deg)
     1              15.5             500.00         35.00
     2              18.5             200.00         20.00
     3              90.0             500.00         35.00
 ANISOTROPIC SOIL NOTES:
    (1) An input value of 0.01 for C and/or Phi will cause Aniso
        C and/or Phi to be ignored in that range.
    (2) An input value of 0.02 for Phi will set both Phi and
        C equal to zero, with no water weight in the tension crack.
    (3) An input value of 0.03 for Phi will set both Phi and
        C equal to zero, with water weight in the tension crack.
 1 PIEZOMETRIC SURFACE(S) SPECIFIED
 Unit Weight of Water =  62.40 (pcf)
 Piezometric Surface No.  1 Specified by  2 Coordinate Points
 Pore Pressure Inclination Factor =  0.50
   Point       X-Water      Y-Water
    No.          (ft)         (ft)
     1          30.00       180.00
     2        1600.00       180.00
 Janbus Empirical Coef is being used for the case of  c & phi both > 0
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Sliding Block Surfaces, Has Been
 Specified.
  500 Trial Surfaces Have Been Generated.
 2 Boxes Specified For Generation Of Central Block Base
 Length Of Line Segments For Active And Passive Portions Of
 Sliding Block Is  35.0
 Box         X-Left      Y-Left     X-Right     Y-Right       Height
 No.          (ft)        (ft)        (ft)        (ft)         (ft)
  1          800.00      265.00     1000.00      326.00        5.00
  2         1100.00      357.00     1400.00      448.00        5.00
 Following Are Displayed The Ten Most Critical Of The Trial
       Failure Surfaces Evaluated. They Are
       Ordered - Most Critical First.
       * * Safety Factors Are Calculated By The Simplified Janbu Method * *
       Total Number of Trial Surfaces Evaluated =    500
       Statistical Data On All Valid FS Values:
          FS Max = 107.032   FS Min =   2.445   FS Ave =   5.055
          Standard Deviation =    6.178   Coefficient of Variation =  122.22 %
       Failure Surface Specified By  9 Coordinate Points
         Point       X-Surf       Y-Surf
          No.         (ft)         (ft)
           1         649.56       313.16
           2         666.02       298.65
           3         699.55       288.63
           4         733.31       279.40
           5         768.24       277.18
           6         800.67       264.01
           7        1292.46       414.65
           8        1315.02       441.41
           9        1333.21       461.00
              Factor of Safety
             ***    2.445    ***
            Individual data on the    25  slices
                          Water  Water     Tie     Tie     Earthquake
                          Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight     Top    Bot     Norm    Tan     Hor     Ver     Load
 No.    (ft)    (lbs)    (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
  1     16.5   18695.0     0.0     0.0      0.      0.     0.0     0.0     0.0
  2     33.5  112858.4     0.0     0.0      0.      0.     0.0     0.0     0.0
```

3	21.5	110098.6	0.0	0.0	0.	0.	0.0	0.0	0.0
4	12.3	75766.1	0.0	0.0	0.	0.	0.0	0.0	0.0
5	34.9	250738.6	0.0	0.0	0.	0.	0.0	0.0	0.0
6	1.8	13828.3	0.0	0.0	0.	0.	0.0	0.0	0.0
7	15.6	135412.3	0.0	0.0	0.	0.	0.0	0.0	0.0
8	15.1	154109.5	0.0	0.0	0.	0.	0.0	0.0	0.0
9	49.3	549945.8	0.0	0.0	0.	0.	0.0	0.0	0.0
10	25.0	287669.3	0.0	0.0	0.	0.	0.0	0.0	0.0
11	18.0	210754.0	0.0	0.0	0.	0.	0.0	0.0	0.0
12	27.0	319870.4	0.0	0.0	0.	0.	0.0	0.0	0.0
13	22.0	260072.3	0.0	0.0	0.	0.	0.0	0.0	0.0
14	23.0	259078.8	0.0	0.0	0.	0.	0.0	0.0	0.0
15	21.0	218532.5	0.0	0.0	0.	0.	0.0	0.0	0.0
16	131.9	979333.4	0.0	0.0	0.	0.	0.0	0.0	0.0
17	0.1	485.0	0.0	0.0	0.	0.	0.0	0.0	0.0
18	30.0	143237.2	0.0	0.0	0.	0.	0.0	0.0	0.0
19	77.0	426472.8	0.0	0.0	0.	0.	0.0	0.0	0.0
20	10.0	61855.3	0.0	0.0	0.	0.	0.0	0.0	0.0
21	35.0	221341.0	0.0	0.0	0.	0.	0.0	0.0	0.0
22	22.5	139803.2	0.0	0.0	0.	0.	0.0	0.0	0.0
23	11.6	57050.9	0.0	0.0	0.	0.	0.0	0.0	0.0
24	11.0	35933.7	0.0	0.0	0.	0.	0.0	0.0	0.0
25	18.2	22269.5	0.0	0.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 10E-10E'; CS-12c; bedding plane; static

n:\projects\2000-2499\2023\slopes\tent tract map\t10es1a.pl2 Run By: KPC 12/16/2004 03:36PM



GSTABL7 v.2 FSmin=1.59

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN NO. 32A

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:        12/16/2004
Time of Run:              03:36PM
Run By:                   KPC
Input Data Filename:      N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t10es1a.in
Output Filename:          N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t10es1a.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\2000-2499\2023\Slopent Tract Map\t10es1a.PLT
PROBLEM DESCRIPTION:  Mesas East, x-sec 10E-10E'; CS-12c;
                      bedding plane; static
BOUNDARY COORDINATES
   14 Top   Boundaries
   14 Total Boundaries
Boundary     X-Left     Y-Left     X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00      168.00     100.00     170.00        2
    2       100.00      170.00     280.00     172.00        2
    3       280.00      172.00     350.00     173.00        1
    4       350.00      173.00     410.00     184.00        1
    5       410.00      184.00     430.00     184.00        1
    6       430.00      184.00     508.00     206.00        1
    7       508.00      206.00     620.00     210.00        1
    8       620.00      210.00     634.00     215.00        1
    9       634.00      215.00     644.00     215.00        1
   10       644.00      215.00     688.00     235.00        1
   11       688.00      235.00     698.00     235.00        1
   12       698.00      235.00     730.00     250.00        1
   13       730.00      250.00     787.00     266.00        1
   14       787.00      266.00     900.00     266.00        1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   125.0    135.0     300.0     31.0     0.12      0.0      0
  2   125.0    130.0     300.0     30.0     0.00      0.0      0
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction     Counterclockwise     Cohesion     Friction
  Range        Direction Limit    Intercept      Angle
   No.             (deg)            (psf)        (deg)
    1              16.5             300.00        31.00
    2              19.5             200.00        20.00
    3              90.0             300.00        31.00
ANISOTROPIC SOIL NOTES:
    (1) An input value of 0.01 for C and/or Phi will cause Aniso
        C and/or Phi to be ignored in that range.
    (2) An input value of 0.02 for Phi will set both Phi and
        C equal to zero, with no water weight in the tension crack.
    (3) An input value of 0.03 for Phi will set both Phi and
```

C equal to zero, with water weight in the tension crack.
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 20.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	595.00	190.00	685.00	219.00	5.00
2	760.00	244.00	820.00	265.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 2.887 FS Min = 1.594 FS Ave = 1.945
Standard Deviation = 0.285 Coefficient of Variation = 14.65 %
Failure Surface Specified By 5 Coordinate Points

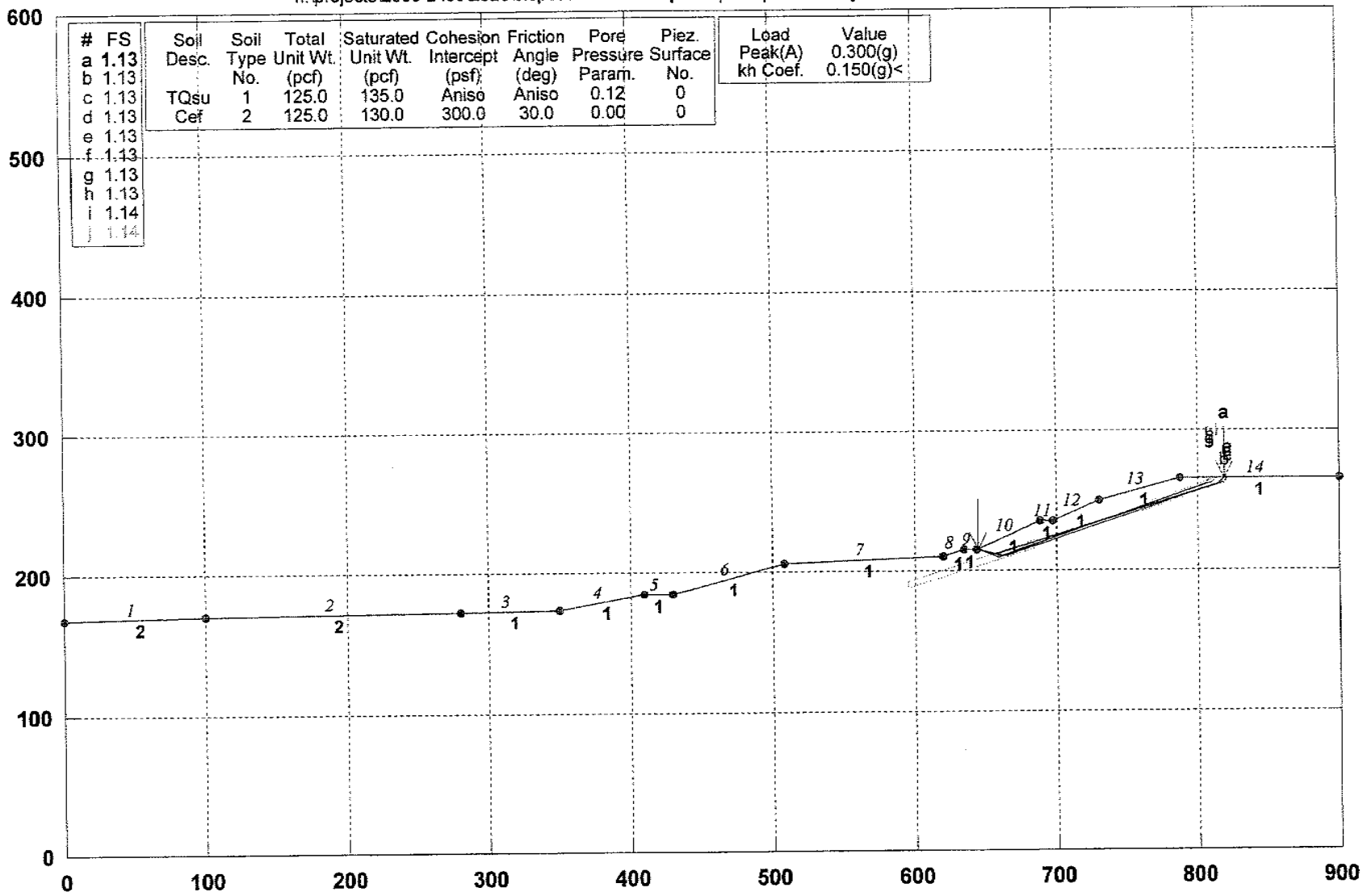
Point No.	X-Surf (ft)	Y-Surf (ft)
1	634.57	215.00
2	652.67	206.75
3	781.31	249.73
4	793.35	265.70
5	793.65	266.00

Factor of Safety
*** 1.594 ***
Individual data on the 9 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	9.4	2534.2	0.0	334.2	0.	0.	0.0	0.0	0.0
2	8.7	8938.8	0.0	1178.8	0.	0.	0.0	0.0	0.0
3	35.3	63234.5	0.0	8000.5	0.	0.	0.0	0.0	0.0
4	10.0	18470.4	0.0	2336.9	0.	0.	0.0	0.0	0.0
5	32.0	61039.2	0.0	7722.7	0.	0.	0.0	0.0	0.0
6	51.3	102898.8	0.0	13018.9	0.	0.	0.0	0.0	0.0
7	5.7	8320.4	0.0	1658.6	0.	0.	0.0	0.0	0.0
8	6.3	3580.6	0.0	713.8	0.	0.	0.0	0.0	0.0
9	0.3	5.6	0.0	1.0	0.	0.	0.0	0.0	0.0

Mesas East, x-sec 10E-10E'; CS-12c; bedding plane; pseudostatic

n:\projects\2000-2499\2023\slopes\tent tract map\t10eps1a.pl2 Run By: KPC 12/16/2004 03:35PM



GSTABL7 v.2 FSmin=1.13

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN NO. 33A

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*****************************************************************************
Analysis Run Date:        12/16/2004
Time of Run:              03:35PM
Run By:                   KPC
Input Data Filename:      N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t10epsla.in
Output Filename:          N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\t10epsla.OU
T
Unit System:              English
Plotted Output Filename:  N:\Projects\2000-2499\2023\Slopent Tract Map\t10epsla.PLT
PROBLEM DESCRIPTION:  Mesas East, x-sec 10E-10E'; CS-12c;
                      bedding plane; pseudostatic
BOUNDARY COORDINATES
   14 Top   Boundaries
   14 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     168.00     100.00     170.00        2
    2       100.00     170.00     280.00     172.00        2
    3       280.00     172.00     350.00     173.00        1
    4       350.00     173.00     410.00     184.00        1
    5       410.00     184.00     430.00     184.00        1
    6       430.00     184.00     508.00     206.00        1
    7       508.00     206.00     620.00     210.00        1
    8       620.00     210.00     634.00     215.00        1
    9       634.00     215.00     644.00     215.00        1
   10       644.00     215.00     688.00     235.00        1
   11       688.00     235.00     698.00     235.00        1
   12       698.00     235.00     730.00     250.00        1
   13       730.00     250.00     787.00     266.00        1
   14       787.00     266.00     900.00     266.00        1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   125.0    135.0     400.0     38.0    0.12      0.0       0
  2   125.0    130.0     300.0     30.0    0.00      0.0       0
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction    Counterclockwise     Cohesion     Friction
  Range       Direction Limit    Intercept      Angle
   No.            (deg)            (psf)        (deg)
    1             16.5             400.00        38.00
    2             19.5             200.00        20.00
    3             90.0             400.00        38.00
ANISOTROPIC SOIL NOTES:
    (1) An input value of 0.01 for C and/or Phi will cause Aniso
        C and/or Phi to be ignored in that range.
    (2) An input value of 0.02 for Phi will set both Phi and
        C equal to zero, with no water weight in the tension crack.
```

(3) An input value of 0.03 for Phi will set both Phi and
C equal to zero, with water weight in the tension crack.
Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 20.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	595.00	190.00	685.00	219.00	5.00
2	760.00	244.00	820.00	265.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 2.454 FS Min = 1.126 FS Ave = 1.451
Standard Deviation = 0.280 Coefficient of Variation = 19.28 %
Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	644.74	215.34
2	657.37	211.90
3	814.21	261.50
4	818.71	266.00

Factor of Safety
*** 1.126 ***
Individual data on the 7 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	12.6	7251.2	0.0	901.9	0.	0.	1087.7	0.0	0.0
2	30.6	43264.9	0.0	5445.3	0.	0.	6489.7	0.0	0.0
3	10.0	14797.5	0.0	1862.4	0.	0.	2219.6	0.0	0.0
4	32.0	50785.9	0.0	6391.8	0.	0.	7617.9	0.0	0.0
5	57.0	100625.1	0.0	12664.5	0.	0.	15093.8	0.0	0.0
6	27.2	29953.5	0.0	3769.9	0.	0.	4493.0	0.0	0.0
7	4.5	1267.3	0.0	215.1	0.	0.	190.1	0.0	0.0

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

GEOLOGIC AND GEOTECHNICAL REPORT - Addendum No. 1
Response to Los Angeles County Geologic Review Sheet dated October 21, 2004 and Soils Engineering Review Sheet dated October 26, 2004

GEOLOGIC AND GEOTECHNICAL REPORT
Review of Revised Vesting Tentative Tract Map (November 15, 2004)

Vesting Tentative Tract 61105
Mission Village
Newhall Ranch, California

VOLUME II

Prepared for:

The Newhall Land and Farming Company
23823 West Valencia Boulevard
Valencia, California 91355

Job No: 04-2023-4
Dated December 22, 2004

27825 Smyth Drive, Valencia, California 91355 661-294-0065 FAX 661-294-0833

Appendix D

APPENDIX D

LIQUEFACTION POTENTIAL ASSESSMENT AND EVALUATION OF EARTHQUAKE-INDUCED SETTLEMENTS (FOR MAGIC MOUNTAIN PARKWAY EXTENSION)

1. Introduction

Our Geologic and Geotechnical Report – Review of Vesting Tentative Tract Map dated July 22, 2004 addressed the liquefaction potential assessment and evaluation of earthquake induced settlements for the entire Mesas East Tentative Tract 61105 with the exception of the proposed Magic Mountain Parkway extension.

Based on the field and laboratory data presented in this report, the liquefaction potential and estimated seismic settlements of the Magic Mountain Parkway extension site have been performed following the procedures of the referenced 2001 NCEER/NSF *Liquefaction Resistance of Soils: Summary Report* written by Youd, Idriss, et al. The percentage of fines used in the liquefaction analyses was that determined following the procedures of the referenced *Cyclic Liquefaction and its Evaluation Based on the SPT and CPT* by Robertson and Wride, 1997. Based on the results of our calculations of liquefaction potential and seismic settlements, recommendations for removals of upper relatively weak soils have been prepared for the Magic Mountain Parkway extension site. These removals are shown on Plate E13 of the Geologic/Geotechnical Remediation Maps.

The liquefaction potential and seismic settlement analyses were performed following current criteria of the County of Los Angeles and the referenced DMG SP 117 Guidelines. Results of our analyses of CPT data for the site indicate that the in-situ subsurface soils below our recommended removal depths generally (based on cone-tip penetration resistance and interpreted soil types) reveal low potential for significant liquefaction and seismic settlements.

2. Data and Assumptions

Based on the probabilistic seismic hazard analyses (PSHA) developed for our Review of Vesting Tentative Tract Map report dated July 22, 2004, a design basis earthquake (DBE) magnitude of 6.5 generating an estimated peak horizontal ground acceleration of 0.88g and a horizontal acceleration of 0.59g corresponding to an earthquake with a weighted

magnitude of 7.5 were used for the liquefaction and earthquake-inducted settlement analyses of the Magic Mountain Parkway extension.

Data included tip resistances and friction ratios obtained from CPT sounding data, together with soil types and ground water levels obtained from nearby borings, piezometers and waterwells. As illustrated on **Figure D-6** of this **appendix**, the results from hollow-stem boring HS-6 next to CPT sounding location CPT-4 verify the soil parameters interpreted from CPT logs. Based on the field data presented in this report, the cone-tip resistances and percent fines interpreted from the CPTs used in the analyses are reasonable relative to the blow counts and the percent fines measured from the hollow-stem borings drilled at the site.

For analysis, historic ground water of 30 ft. at the locations analyzed were used. Per boring log and CPT data, ground water depths at the time of the explorations ranged between 26 feet and 42 feet at the CPT locations analyzed for the current study.

Youd, Idriss, et al (NCEER/NSF), 2001, present design curves of Cyclic Resistance Ratio (CRR) vs corrected cone-tip resistance $(q_{c\ IN})_{cs}$, based on actual field performance during earthquakes (cases where evidence of liquefaction has been observed). These curves separate liquefaction and non-liquefaction conditions. Therefore, liquefiable zones in this analysis are based upon the premise that liquefaction potential exists if the Cyclic Resistance Strength (CRR times effective overburden pressure) against liquefaction is less than the earthquake-induced Cyclic Stress (CS). This is to say that liquefiable zones are located where the CRS/CS ratio (factor of safety against liquefaction) is less than unity. In contrast, the earthquake-induced settlement analysis considers zones that may settle somewhat even though the factor of safety may be greater than one (i.e. a non-liquefaction condition).

3. <u>CPT Logs and Interpretations</u>

The interpretations of soil type and percent fines presented in this Appendix were developed following the procedures presented by the referenced 2001 NCEER/NSF *Liquefaction Resistance of Soils: Summary Report* written by Youd, Idriss, et al. The interpretations of soil types shown in the CPT logs in Appendix A follow procedures described by Robertson and Campanella, 1989. Our updated interpretations of soil type and actual tip resistance and friction ratio versus depth, together with interpreted geotechnical parameters for each CPT sounding log analyzed for this report are included

APPENDIX D

as an attachment to this appendix. Details of the CPT data interpretation procedures used to develop the recommendations presented in this report are presented in this Appendix.

4. Assessment of Liquefaction Potential

a. Method and Locations Analyzed

Liquefaction is a phenomenon whereby a saturated granular soil temporarily loses its strength because of the buildup of pore water pressure during seismic excitation. This loss of strength may cause structures founded on these soils to experience subsidence and/or lateral movement.

Liquefaction potential analyses are performed by a method first proposed by Seed, et al. (1984) and amended by Youd, Idriss, et al (NCEER/NSF), 2001 as mentioned in Section 2 above. Some data provided by the liquefaction analyses are used for the evaluation of earthquake-induced settlements. Per Seed's method as modified by Youd, Idriss, et. al. (NCEER/NSF), 2001, the earthquake-induced stresses at any depth are estimated and compared with empirically based resistances (strength) for sites where liquefaction has occurred.

The calculation of strength against liquefaction is based on nearly continuous existing soil data (cone-tip resistance, q_c, and friction ratio, f_s, vs depth) from CPTs, together with the calculated effective overburden pressure and estimated percent fines. Corrected cone-tip penetration resistance, q_c, data from continuous CPTs are utilized to determine the strength/overburden pressure ratio for 7.5 magnitude earthquakes. Correction of cone-tip penetration resistance for normalized overburden pressure is provided by Youd, Idriss et al (NCEER/NSF), 2001, by the equation $C_Q = (1/\sigma'_o)^{0.5}$, where σ'_o = effective overburden pressure in TSF. Based on data by Youd, Idriss, et al, (NCEER), 2001, we interpret a maximum value of C_Q of 1.7 and a minimum of 0.5. The corrected CPT parameter $q_{c\,1N}$ is computed as: $q_{c\,1N} = C_Q \times q_c$.

Correction for fines is provided by both Youd & Idriss and Robertson & Wride (both in NCEER, 1997). This correction provides equivalent penetration resistance, q_c, values for clean sand, which is ultimately used to assess strength against liquefaction.

APPENDIX D

The earthquake-induced stress is calculated per the following equation by Seed (1984):

Earthquake-induced stress = $\tau_{av} = 0.65\ (a_{max}/g)\ \sigma_o\ r_d$

Where a_{max}/g = ratio of peak ground acceleration and acceleration of gravity.
σ_o =Total overburden pressure
r_d = stress reduction factor to account for soil deformability

Theoretical factors of safety against liquefaction are calculated using corrected values of cone-tip resistance, $q_{c\ IN}$, from CPT data at nearly continuous 0.5 foot depth intervals, per Youd, Idriss, et.al. (NCEER/NSF) 2001.

b. Results of Liquefaction Potential Assessment

In general, the analyses indicate that after the recommended removals are implemented there exists the potential for liquefaction of isolated, thin zones, which are separated by non-liquefiable layers. Results of computer-based calculations for the assessment of liquefaction potential and seismic settlement are summarized in **Table D-1** of this **appendix** and are presented for individual CPT locations in **Figures D-2** through **D-5** of this **appendix**. We have attached the typical spreadsheet showing the factor of safety computations (see **Figure D-1**).

5. Estimation of Earthquake-Induced Settlements

a. Method of Analysis

Earthquake-induced settlements were estimated using procedures presented by Tokimatsu and Seed (1987) for dry/moist soils (above the water table) and saturated sands. Settlement analyses were performed for the same locations analyzed for liquefaction potential to estimate possible range of settlements to be expected at the project site.

Volumetric strains for soils above the water table were estimated using CPT data and estimated cyclic shear strain. **The volumetric strain was then doubled to account**

for multidirectional effects. Settlement was obtained by multiplying the thickness of the soil layer by the calculated volumetric strain.

Cone tip resistances, q_c, used in the settlement calculations above the water table were not corrected for fines content (but were corrected for other factors addressed in the liquefaction potential assessment). Although the referenced procedure applies to both silty and clean sands, the use of the cone tip resistances, q_c, without corrections for fines content produces more conservative results.

Settlements for saturated sands were estimated using the cone tip resistances, q_c, corrected for fines content (i.e. cone-tip-resistance for equivalent clean sand was used) and other factors used for liquefaction analyses. The referenced procedure applies only to saturated clean sands.

Volumetric strain for saturated sands was estimated using the calculated earthquake-induced cyclic shear stress and corrected cone tip resistances, q_c. The settlement was obtained by multiplying the thickness of the liquefied soil layer by the volumetric strain. The volumetric strain obtained from the design chart for saturated sands includes the multidirectional effect.

b. Results of Earthquake-Induced Settlement Analyses

The results of computerized cyclic settlement analyses are presented in **Figures D-2(d)** through **D-5(d)**. A maximum cumulative total seismic settlement of 0.58 inches has been estimated at the CPT-4 location after recommended removals have been performed. Considering the above results, together with the planned 5 to 20 foot thick removal and recompacted fill mats to be provided throughout the site, differential settlements are expected to be no greater than 0.39 inch (2/3 x 0.58) in a horizontal distance of 30 feet (per CDMG, Special Publication 117, 1997). The compacted fill mats (removals and recompaction of existing soils plus planned compacted fill) will help mitigate the seismic settlements estimated at the site.

6. Conclusions

The results of the liquefaction assessment indicate that some relatively thin liquefaction-prone zones locally exist at the site at isolated depth intervals (see **Figures D-2** through **D-5**).

APPENDIX D

a. The estimated seismic settlements were also analyzed as noted above. Even though some thin deposits appear to be liquefiable, **the potential seismically-induced settlements in subsurface soils at the site are small at most locations**. The maximum cumulative calculated settlement after removals is 0.58 inches, located near CPT-18, and differential settlements are expected to be not greater than 0.39 inch in a horizontal distance of 30 ft. Certified compacted fill from proposed removals and recompaction shown in the Geologic/Geotechnical Map, together with planned compacted fill to raise site grades, will help mitigate the expected seismic effects, due to expected bridging effects. Summary **Table D-1** of computed seismic settlement, approximate removal depth, groundwater table depth, thickness of non-liquefiable material below planned grade and cumulative thickness of potentially liquefiable zones for each CPT location follows the References for this appendix.

b. **Minimal lateral spreading** due to liquefaction is expected at this site for the following reasons:

- Most of the site surface has a very gentle slope to the north site boundary, and,
- Liquefaction potential and associated settlements are considered to be limited at the site.
- Thicknesses of liquefiable layers are relatively small.

7. Recommendations

Based on the expected cyclic settlements after the recommended removals of alluvial soils, no special structural reinforcement of light-framed buildings to further mitigate the above-mentioned settlements is recommended for the subject Magic Mountain Parkway extension site.

APPENDIX D

The following attachments complete this Appendix.

- Liquefaction Potential Assessment References
- Spreadsheet of Liquefaction Potential Analyses for CPT-04 **Figure D-1**
- Graphs of the Assessment of Liquefaction Potential and Earthquake-Induced Settlements for CPT-04, CPT-06, CPT-16 and CPT-18 **Figures D-2 thru D-5**
- Graph Comparing Actual SPT Blow Counts and Percentages of Fines from Borings with CPT Data from Adjacent CPT's for Boring HS-6 vs CPT-04 **Figure D-6**
- Summary Table of Computed Liquefaction Effects **Table D-1**
- Interpreted CPT data for CPT-04, CPT-06, CPT-16 and CPT-18

APPENDIX D

REFERENCES FOR LIQUEFACTION POTENTIAL ASSESSMENT

Bartlett, S.F., and Youd, T.L., "Empirical prediction of liquefaction – induced lateral spread", Journal of Geotechnical Engineering, Vol. 121, No. 4, April 1995

California Division of Mines and Geology, Special Publication 117, "Guidelines for Evaluating and Mitigating Seismic Hazards in California", adopted by the State on March 13, 1997.

Douglas, B.J., and Olsen, R.S., "Soil classification using Electric Cone Penetrometer", ASCE Special Technical Publication, ST. Louis, Missouri, October, 1981.

Douglas, B.J., Olsen, R.S., and Martin, G.R., "Evaluation of the Cone Penetrometer Test for use in SPT--Liquefaction Potential Assessment," ASCE Preprint Volume No. 81-544, St. Louis, Missouri, October 1981.

Fear and McRoberts, "Reconsideration of initiation of liquefaction in sandy soils", ASCE Geotechnical Journal, March 1995.

Housner, G.W., Chairman of Committee on Earthquake Engineering, Book, "Liquefaction of soils during earthquakes", p. 110-114, National Academy Press, 1985.

Ishihara, K., "Soil Behaviour in Earthquake Geotechnics", Clarendon Press, Oxford, 1996.

Ishihara, K., "Stability of natural deposits during earthquakes", Proceedings of the Eleventh International Conference on Soil Mechanics and Foundation Engineering, A.A. Balkema Publishers, Rotterdame, Netherlands, 1985

Liao, S.S.C., and Whitman, R.V., "Overburden correction factors for SPT in sand", Journal of Geotechnical Engineering, Vol. 112, No. 3, March 1986.

Olsen, Richard S., "Cyclic Liquefaction Based on the Cone Penetrometer Test" in the *Proceedings of the NCEER Workshop on Evaluating the Liquefaction Resistance of Soils*, edited by Youd, T.L. and Idriss, I.M., Technical Report NCEER-97-0022, pp. 225-276, 1997

Pradel, D., "Procedure to evaluate earthquake-induced settlements in dry sandy soils," Journal of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 124, No. 4, April 1998.

Proprietary charts for correction of blow-count by sampler type to N-SPT

Robertson, P.K., and Fear, C.E., "Soil liquefaction and its evaluation based on SPT and CPT" Liquefaction Workshop, University of Alberta, January 1996.

Robertson, P.K., and Fear, C.E., "Liquefaction of sands and its evaluation", First International Conference and Earthquake Geotechnical Engineering, 1995.

Robertson, P.K., and Campanella, R.G., "Guidelines for Geotechnical Design using the Cone Penetrometer Test and CPT with Pore Pressure Measurement", University of Alberta and University of British Columbia, 4th edition, 1989.

APPENDIX D

Robertson, P. K., and Wride, C.F., "Cyclic Liquefaction and its Evaluation Based on the SPT and CPT" in the *Proceedings of the NCEER Workshop on Evaluating the Liquefaction Resistance of Soils*, edited by Youd, T.L. and Idriss, I.M., Technical Report NCEER-97-0022, pp. 41-87, 1997

Seed, H.B., "Design problems in soil liquefaction," Report No. UCB/EERC-86/02, February, 1986

Seed, H.B., Tokimatsu, K., Harder, L.F., and Chung, R.M., "The influence of SPT procedures in soil liquefaction resistance evaluations", Earthquake Engineering Research Center Report No. 84/15, University of California, Berkeley, 1984.

Seed, H.B., Idriss, I.M., and Arango, I., "Evaluation of liquefaction potential using field performance data", ASCE Journal of Geotechnical Engineering, Vol. 109, No.3, March 1983.

Seed, H.B. and Idriss, I.M., "Ground motions and soil liquefaction during earthquakes", 1982, Monograph, Earthquake Engineering Research Institute.

Seed, H.B. and Idriss, I.M., "A simplified procedure for evaluating soil liquefaction potential", EERC 70-9, Nov. 1970.

Tokimatsu, K. and Seed, H.B., "Evaluation of settlements in sands due to earthquake shaking", ASCE Journal of Geotechnical Engineering, Vol. 113, No. 8, August, 1987.

University of Southern California (USC), Southern California Earthquake Center, Workshop on "Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California", USC, Los Angeles, California, June 17, 1999.

Youd, T.L. and Idriss, I.M., editors, "Proceedings of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils", Technical Report NCEER-97-0022, December, 1997.

Youd, T.L., Idriss, I.M., et al "Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils", Vol. 127, No. 10, ASCE Journal of Geotechnical and Geoenvironmental Engineering, October 2001.

Youd, T. Leslie, Hanson, Corbett M. and Bartlett, Steven F. "Revised Multilinear Regression Equations for Prediction of Lateral Spread Displacement", Vol. 128, No. 12, ASCE Journal of Geotechnical and Geoenvironmental Engineering, December 2002.

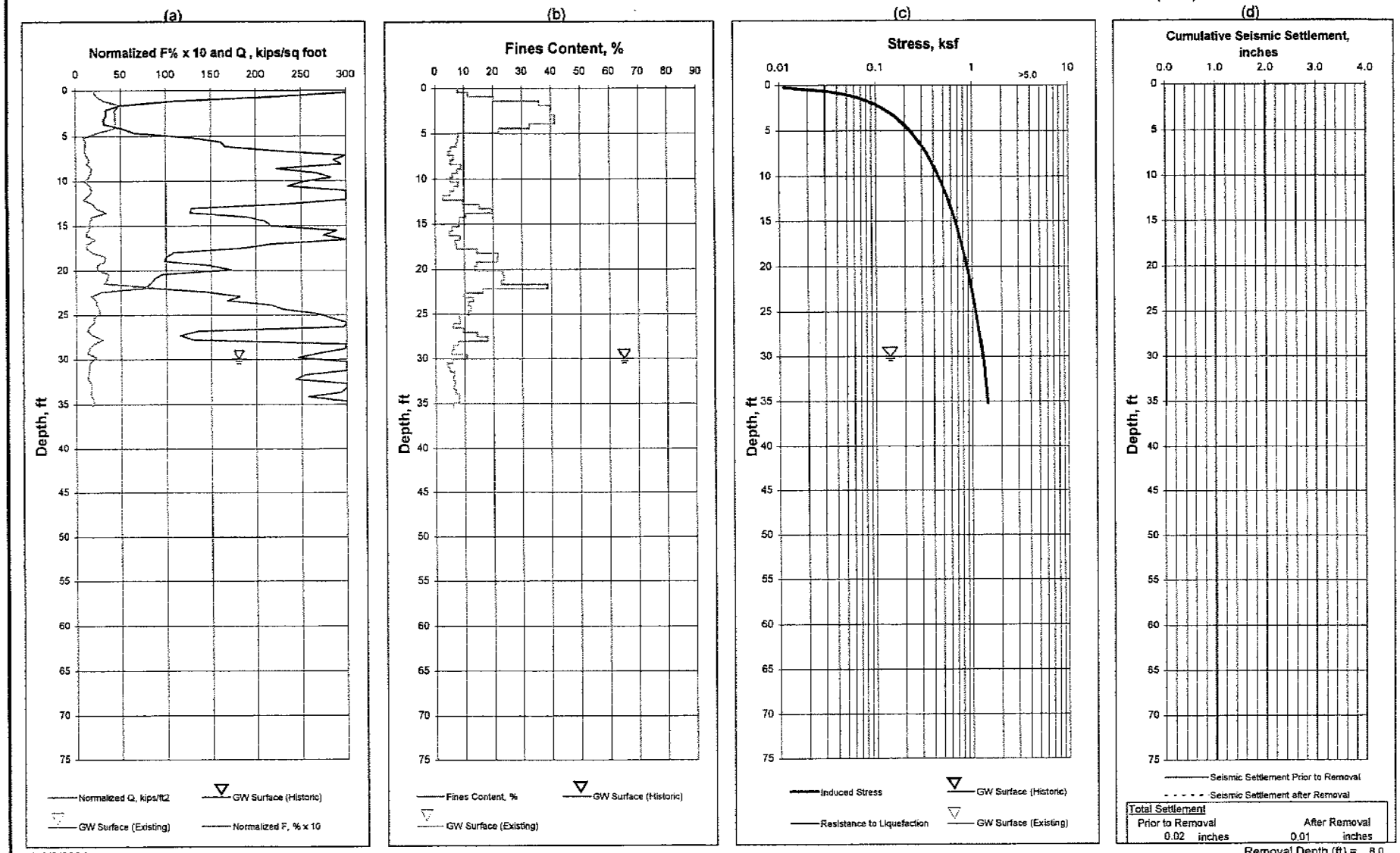
LIQUEFACTION POTENTIAL AND CYCLIC SETTLEMENT ANALYSIS

PROJECT: Magic Mountain Entertainment, Newhall Ranch
Job No.: 00-1729-1

Location	CPT-04		Basic Earthquake Magnitude	7.5	
Type of Sampler (CPT/SPT/CD)	CPT		Approx. Distance From Site (miles)	?	
Ground Surface Elevation =	1184	ft. MSL	Design Magnitude	6.5	
Existing Ground Water Depth =	30	ft. Below GL	Peak Ground Accel (M = 7.5)	0.55	g
Historic Ground Water Depth =	30.0	ft. Below GL	Design PGA (M = 6.5)	0.88	g.
			Magnification Factor	1.0	

Layer No.	Mid-layer Depth (ft)	Elevation (ft. MSL)	Depth of layer below Ground Level (ft) Top	Bottom	Total Unit Wt. (1). (kcf)	Total Stress (2) (ksf)	Effective Stress (3) (ksf)	CPT Tip Resistance (4) (kips/sq ft)	F, % normalized (5).	1st trial I_c (6)	2nd trial I_c (7)	exponent n of Final I_c and q_{c1N} (8).	q_{c1N} normalized kips/ft2 (9).	Final I_c (10)	K_c factor for fines (11).	Equivalent $(q_{c1N})_{cs}$ clean sand (12)	Percent Fines, % Estimated (13).	Lab (14).	Cyclic Resistance Ratio (15) M=7.5	Cyclic Resistance M = 7.5 (ksf) (12)	Stress Reduction Factor, r_d (13).	Induced Stress M = 7.5 (ksf) (14)	Theoretical Factor of Safety (15).
1	0.25	1183.8	0.00	0.49	0.120	0.029	0.029	86.00	2.051	1.5319	1.7881	0.50	340.71	1.796	1.104	376.08	6		>0.6	>5.0	0.999	0.011	Non Liquefiable
2	0.74	1183.3	0.49	0.98	0.120	0.088	0.088	96.40	2.522	1.6436	1.9424	0.50	273.08	1.942	1.232	274.76	11		>0.6	>5.0	0.999	0.032	Non Liquefiable
3	1.23	1182.8	0.98	1.48	0.120	0.148	0.148	81.00	3.158	1.9201	2.2376	0.50	109.13	2.239	1.764	192.50	20		>0.6	>5.0	0.997	0.054	Non Liquefiable
4	1.73	1182.3	1.48	1.97	0.120	0.207	0.207	20.80	4.680	2.4173	2.7559	0.70	50.02	2.610	3.369	Fine-Grained	39		>0.6	>5.0	0.996	0.075	Non Liquefiable
5	2.22	1181.8	1.97	2.46	0.120	0.266	0.266	16.40	4.520	2.5076	2.9251	0.70	33.11	2.692	3.936	Fine-Grained	40		>0.6	>5.0	0.995	0.096	Non Liquefiable
6	2.71	1181.3	2.46	2.95	0.120	0.325	0.325	19.40	4.414	2.5240	2.8080	0.70	34.06	2.689	3.920	Fine-Grained	40		>0.6	>5.0	0.994	0.117	Non Liquefiable
7	3.20	1180.8	2.95	3.44	0.120	0.383	0.383	20.00	4.404	2.5642	2.8256	0.70	31.24	2.718	4.113	Fine-Grained	41		>0.6	>5.0	0.993	0.138	Non Liquefiable
8	3.69	1180.3	3.44	3.94	0.120	0.443	0.443	22.40	4.488	2.5791	2.8193	0.70	31.64	2.718	4.116	Fine-Grained	41		>0.6	>5.0	0.991	0.160	Non Liquefiable
9	4.19	1179.8	3.94	4.43	0.120	0.502	0.502	40.20	4.182	2.4212	2.6309	0.70	61.99	2.543	2.896	155.77	33		0.432	0.217	0.990	0.181	1.20
10	4.68	1179.3	4.43	4.92	0.120	0.561	0.561	72.20	2.318	2.0911	2.2872	0.60	66.25	2.287	1.906	126.42	22		0.268	0.160	0.989	0.202	0.74
11	5.17	1178.8	4.92	5.41	0.120	0.620	0.620	147.80	0.914	1.8104	1.8010	0.60	128.86	1.801	1.107	142.70	8		0.350	0.217	0.988	0.223	0.97
12	5.66	1178.3	5.41	5.91	0.120	0.679	0.679	184.00	1.124	1.8299	1.7939	0.60	161.79	1.790	1.100	177.91	8		>0.6	>5.0	0.987	0.244	Non Liquefiable
13	6.16	1177.8	5.91	6.40	0.120	0.739	0.739	208.20	1.074	1.8160	1.7674	0.60	166.50	1.787	1.084	180.41	7		>0.6	>5.0	0.986	0.265	Non Liquefiable
14	6.65	1177.4	6.40	6.89	0.120	0.797	0.797	251.20	1.033	1.5326	1.6662	0.60	224.13	1.686	1.015	227.42	5		>0.6	>5.0	0.985	0.285	Non Liquefiable
15	7.14	1176.9	6.89	7.38	0.120	0.856	0.856	431.40	1.212	1.5133	1.6216	0.60	320.43	1.622	1.000	320.43	5		>0.6	>5.0	0.983	0.306	Non Liquefiable
16	7.63	1176.4	7.38	7.87	0.120	0.915	0.915	398.40	1.453	1.6136	1.7139	0.60	286.26	1.714	1.047	299.76	6		>0.6	>5.0	0.982	0.327	Non Liquefiable
17	8.12	1175.9	7.87	8.37	0.120	0.974	0.974	423.20	1.253	1.5692	1.6548	0.60	294.66	1.655	1.007	296.64	5		>0.6	>5.0	0.981	0.348	Non Liquefiable
18	8.62	1175.4	8.37	8.86	0.120	1.034	1.034	329.80	1.746	1.7632	1.8429	0.60	222.60	1.843	1.139	253.64	9		>0.6	>5.0	0.980	0.369	Non Liquefiable
19	9.11	1174.9	8.86	9.35	0.120	1.093	1.093	407.20	1.674	1.7013	1.7808	0.60	267.74	1.781	1.093	292.81	8		>0.6	>5.0	0.979	0.389	Non Liquefiable
20	9.60	1174.4	9.35	9.84	0.120	1.151	1.151	442.40	1.384	1.6190	1.6943	0.60	283.38	1.694	1.034	293.00	6		>0.6	>5.0	0.978	0.410	Non Liquefiable
21	10.09	1173.9	9.84	10.33	0.120	1.210	1.210	403.80	1.083	1.5728	1.6479	0.60	252.28	1.648	1.002	252.72	5		>0.6	>5.0	0.976	0.430	Non Liquefiable
22	10.59	1173.4	10.33	10.83	0.120	1.270	1.270	398.40	1.595	1.7323	1.7970	0.60	236.89	1.797	1.104	260.32	8		>0.6	>5.0	0.975	0.451	Non Liquefiable
23	11.08	1172.9	10.83	11.32	0.120	1.329	1.329	622.40	1.774	1.6728	1.7230	0.60	371.06	1.723	1.053	390.65	7		>0.6	>5.0	0.974	0.471	Non Liquefiable
24	11.57	1172.4	11.32	11.81	0.120	1.388	1.388	631.20	1.423	1.5058	1.6440	0.60	368.25	1.644	0.999	367.60	5		>0.6	>5.0	0.973	0.492	Non Liquefiable
25	12.06	1171.9	11.81	12.30	0.120	1.447	1.447	614.40	0.932	1.4463	1.4954	0.60	351.09	1.495	1.000	351.09	3		>0.6	>5.0	0.972	0.512	Non Liquefiable
26	12.55	1171.5	12.30	12.80	0.120	1.506	1.506	418.20	1.927	1.8237	1.8656	0.60	233.09	1.866	1.156	269.92	10		>0.6	>5.0	0.971	0.532	Non Liquefiable
27	13.05	1171.0	12.80	13.29	0.120	1.565	1.565	234.20	2.386	2.0410	2.0814	0.60	128.66	2.081	1.422	182.94	16		>0.6	>5.0	0.970	0.552	Non Liquefiable
28	13.54	1170.5	13.29	13.78	0.120	1.624	1.624	235.20	3.393	2.1866	2.2200	0.60	126.94	2.220	1.717	217.79	20		>0.6	>5.0	0.969	0.573	Non Liquefiable
29	14.03	1170.0	13.78	14.27	0.120	1.683	1.683	357.60	1.819	1.9708	1.9004	0.60	189.46	1.900	1.189	225.30	10		>0.6	>5.0	0.967	0.593	Non Liquefiable
30	14.52	1169.5	14.27	14.76	0.120	1.742	1.742	403.00	1.547	1.7926	1.8179	0.60	209.87	1.818	1.120	235.02	9		>0.6	>5.0	0.966	0.613	Non Liquefiable
31	15.01	1169.0	14.76	15.26	0.120	1.801	1.801	423.20	1.557	1.7906	1.8112	0.60	216.72	1.811	1.115	241.62	8		>0.6	>5.0	0.965	0.633	Non Liquefiable
32	15.51	1168.5	15.26	15.75	0.120	1.861	1.861	574.80	1.354	1.6706	1.6664	0.60	289.52	1.686	1.029	297.91	6		>0.6	>5.0	0.964	0.653	Non Liquefiable
33	16.00	1168.0	15.75	16.24	0.120	1.919	1.919	553.20	1.114	1.6215	1.6357	0.60	274.45	1.634	1.000	274.43	5		>0.6	>5.0	0.963	0.673	Non Liquefiable
34	16.49	1167.5	16.24	16.73	0.120	1.978	1.978	628.40	2.087	1.8192	1.8284	0.60	307.07	1.828	1.128	346.69	9		>0.6	>5.0	0.962	0.692	Non Liquefiable
35	16.98	1167.0	16.73	17.22	0.120	2.037	2.037	451.00	1.256	1.7347	1.7396	0.60	217.16	1.738	1.064	231.08	7		>0.6	>5.0	0.960	0.712	Non Liquefiable
36	17.47	1166.5	17.22	17.72	0.120	2.096	2.096	392.80	1.176	1.7897	1.7696	0.60	181.71	1.770	1.066	197.16	7		>0.6	>5.0	0.959	0.732	Non Liquefiable
37	17.97	1166.0	17.72	18.21	0.120	2.156	2.156	231.60	1.777	2.0596	2.0539	0.60	108.41	2.054	1.377	149.30	14		0.390	0.640	0.958	0.752	1.12
38	18.46	1165.5	18.21	18.70	0.120	2.215	2.215	217.80	3.304	2.2849	2.2767	0.60	100.60	2.276	1.873	188.23	22		>0.6	>5.0	0.957	0.771	Non Liquefiable
39	18.95	1165.1	18.70	19.19	0.120	2.275	2.275	216.40	3.163	2.2900	2.2868	0.60	99.19	2.287	1.847	181.32	21		>0.6	>5.0	0.956	0.791	Non Liquefiable
40	19.44	1164.6	19.19	19.69	0.120	2.333	2.333	330.40	2.336	2.0866	2.0513	0.60	148.68	2.051	1.373	204.13	14		>0.6	>5.0	0.955	0.811	Non Liquefiable
41	19.94	1164.1	19.69	20.18	0.120	2.392	2.392	398.20	2.406	2.0399	2.0210	0.60	172.60	2.021	1.328	229.14	14		>0.6	>5.0	0.954	0.830	Non Liquefiable
42	20.43	1163.6	20.18	20.67	0.120	2.451	2.451	219.40	3.031	2.3438	2.3202	0.60	95.88	2.320	2.016	193.22	23		>0.6	>5.0	0.952	0.850	Non Liquefiable
43	20.92	1163.1	20.67	21.16	0.120	2.510	2.510	200.00	3.483	2.3609	2.3328	0.60	86.77	2.333	2.058	178.60	24		>0.6	>5.0	0.951	0.869	Non Liquefiable
44	21.41	1162.6	21.16	21.65	0.120	2.569	2.569	198.80	3.071	2.3388	2.3061	0.60	83.11	2.306	1.969	163.61	25		>0.6	>5.0	0.950	0.889	Non Liquefiable
45	21.90	1162.1	21.65	22.15	0.120	2.629	2.629	206.20	6.427	2.6652	2.6652	1.00	77.48	2.665	3.750	Fine-Grained	39		>0.6	>5.0	0.949	0.908	Non Liquefiable
46	22.40	1161.6	22.15	22.64	0.120	2.687	2.687	346.20	2.782	2.1514	2.1169	0.60	145.14	2.117	1.486	215.71	16		>0.6	>5.0	0.948	0.927	Non Liquefiable
47	22.89	1161.1	22.64	23.13	0.120	2.746	2.746	437.20	1.891	1.9246	1.8860	0.60	181.32	1.886	1.176	213.23	10		>0.6	>5.0	0.947	0.946	Non Liquefiable
48	23.38	1160.6	23.13	23.62	0.120	2.805	2.805	408.80	2.246	2.0455	2.0061	0.60	167.69	2.006	1.307	219.10	13		>0.6	>5.0	0.946	0.965	Non Liquefiable
49	23.87	1160.1	23.62	24.11	0.120	2.864	2.864	532.40	2.262	1.9915	1.9410	0.60	216.23	1.941	1.230	265.97	11		>0.6	>5.0	0.944	0.984	Non Liquefiable
50	24.36	1159.6	24.11	24.61	0.120	2.923	2.923	572.00	2.693	2.0144	1.9729	0.60	229.94	1.973	1.266	291.16	12		>0.6	>5.0	0.943	1.004	Non Liquefiable
51	24.86	1159.1	24.61	25.10	0.120	2.983	2.983	674.80	2.642	1.9860	1.9441	0.60	268.66	1.944	1.233	331.22	11		>0.6	>5.0	0.942	1.023	Non Liquefiable
52	25.35	1158.7	25.10	25.59	0.120	3.041	3.041	720.00	1.899	1.9554	1.9090	0.60	283.76	1.909	1.113	315.89	8		>0.6	>5.0	0.941	1.042	Non Liquefiable
53	25.84	1158.2	25.59	26.08	0.120	3.100	3.100	791.40	2.038	1.8633	1.9164	0.60	309.82	1.916	1.119	346.60	8		>0.6	>5.0	0.940	1.060	Non Liquefiable
54	26.33	1157.7	26.08	26.57	0.120	3.159	3.159	769.00	1.428	1.7611	1.8976	0.60	297.97	1.899	1.036	308.12	6		>0.6	>5.0	0.939	1.079	Non Liquefiable
55	26.82	1157.2	26.57	27.07	0.120	3.218	3.218	364.00	1.241	1.9438	1.8760	0.60	135.62	1.876	1.166	158.19	10		0.449	1.442	0.937	1.098	1.31
56	27.32	1156.7	27.07	27.56	0.120	3.278	3.278	304.20	1.890	2.1239	2.0544	0.60	115.46	2.054	1.376	159.12	14		0.465	1.490	0.936	1.117	1.33
57	27.81	1156.2	27.56	28.05	0.120	3.337	3.337	344.40	2.949	2.2353	2.1674	0.60	129.68	2.167	1.590	206.10	18		>0.6	>5.0	0.935	1.136	Non Liquefiable
58	28.30	1155.7	28.05	28.54	0.120	3.395	3.395	839.00	1.899	1.9465	1.7073	0.60	312.94	1.707	1.068	343.45	8		>0.6	>5.0	0.934	1.154	Non Liquefiable
59	28.79	1155.2	28.54	29.04	0.120	3.455	3.455	903.80	1.448	1.7992	1.7020	0.60	297.22	1.703	1.040	309.00	6		>0.6	>5.0	0.933	1.173	Non Liquefiable
60	29.29	1154.7	29.04	29.53	0.120	3.514	3.514	733.00	1.218	1.7412	1.8690	0.60	309.74	1.869	1.017	275.23	6		>0.6	>5.0	0.932	1.192	Non Liquefiable
61	29.78	1154.2	29.53	30.02	0.120	3.573	3.573	675.40	2.282	1.9917	1.9139	0.60	245.57	1.914	1.202	295.24	11		>0.6	>5.0	0.931	1.210	Non Liquefiable
62	30.27	1153.7	30.02	30.51	0.120	3.632	3.616	1021.80	1.586	1.7487	1.6827	0.60	369.36	1.683	1.026	379.00	8		>0.6	>5.0	0.928	1.226	Non Liquefiable
63	30.76	1153.2	30.51	31.00	0.120	3.691	3.643	1317.00	1.434	1.6619	1.6891	0.60	474.21	1.688	1.000	474.21	4		>0.6	>5.0	0.924	1.241	Non Liquefiable
64	31.25	1152.8	31.00	31.50	0.120	3.750	3.672	1087.00	1.386	1.6869	1.6276	0.60	382.69	1.628	1.000	382.69	6		>0.6	>5.0	0.920	1.256	Non Liquefiable
65	31.75	1152.3	31.50	31.99	0.120	3.809	3.701	709.60	1.347	1.7066	1.7196	0.60	253.60	1.720	1.051	266.55	6		>0.6	>5.0	0.916	1.270	Non Liquefiable
66	32.24	1151.8	31.99	32.48	0.120	3.868	3.729	663.00	1.237	1.7649	1.7023	0.60	243.10	1.702	1.039	252.68	6		>0.6	>5.0	0.912	1.284	Non Liquefiable
67	32.73	1151.3	32.48	32.97	0.120	3.927	3.757	914.80	1.647	1.6006	1.7273	0.60	324.39	1.727	1.056	342.63	7		>0.6	>5.0	0.908	1.297	Non Liquefiable
68	33.22	1150.8	32.97	33.46	0.120	3.986	3.786	1028.00	1.597	1.7607	1.7093	0.60	363.15	1.709	1.044	379.18	8		>0.6	>5.0	0.904	1.311	Non Liquefiable
69	33.71	1150.3	33.46	33.96	0.120	4.046	3.814	831.80	1.608	1.8218	1.7439	0.60	292.74	1.744	1.067	312.49	7		>0.6	>5.0	0.900	1.325	Non Liquefiable
70	34.21	1149.8	33.96	34.45	0.120	4.105	3.842	732.40	1.750	1.6634	1.8026	0.60	255.90	1.803	1.108	284.72	8		>0.6	>5.0	0.896	1.338	Non Liquefiable
71	34.70	1149.3	34.45	34.94	0.120	4.163	3.870	901.80	1.978	1.8782	1.8010	0.60	315.04	1.801	1.107	348.89	8		>0.6	>5.0	0.892	1.351	Non Liquefiable
72	35.19	1148.8	34.94	35.43	0.120	4.222	3.898	1164.80	1.786	1.7733	1.7024	0.60	415.82	1.702	1.039	432.24	6		>0.6	>5.0	0.888	1.364	Non Liquefiable

Location..... **CPT-04**
Elevation (MSL)..... 1184 ft



V3d; 2/2/2004

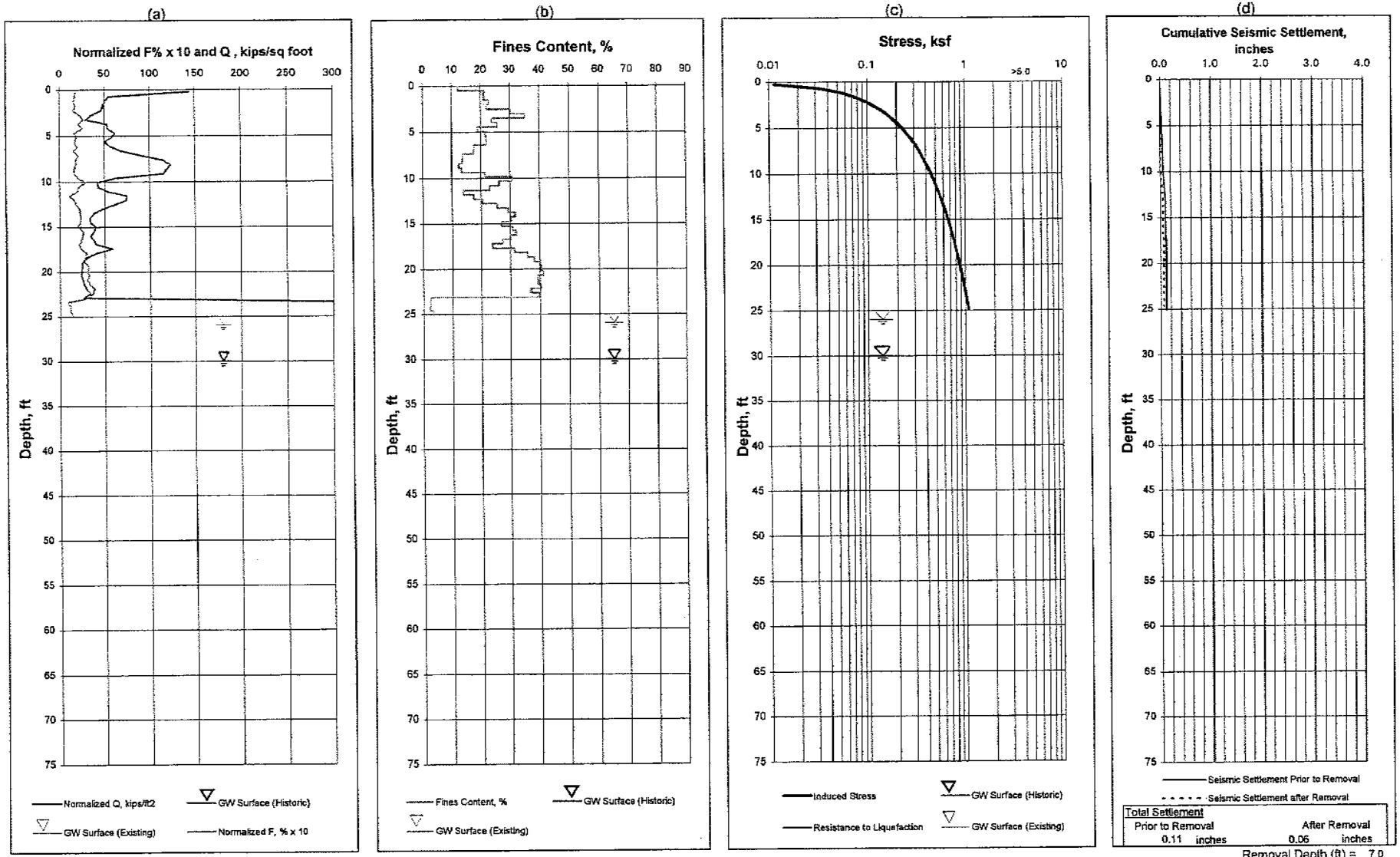
Removal Depth (ft) = 8.0

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Magic Mountain Entertainment, Newh	Weighted Gr. Acc. (M=7.5).	0.59 g	Project No.	00-1729-1
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.88 g	Figure No.	CPT-04 D-2
For: Newhall Ranch	Magnification Factor.....	1	Date.	12-22-2004

Location..... CPT-06
Elevation (MSL)..... 1156 ft



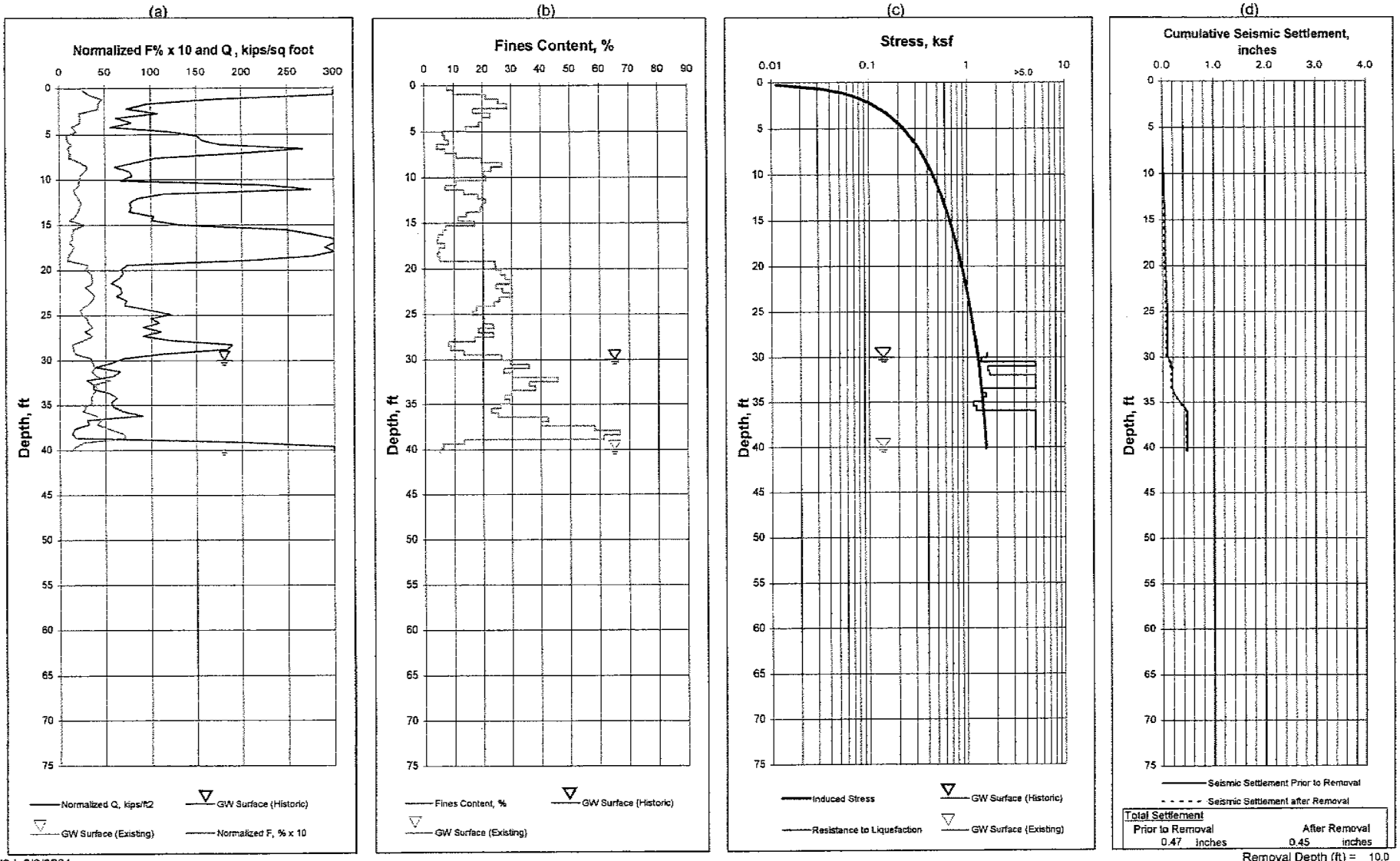
V3d; 2/2/2004

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Magic Mountain Entertainment, Newh	Weighted Gr. Acc. (M=7.5).	0.59 g	Project No.	00-1729-1
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.88 g	Figure No.	CPT-06 D-3
For: Newhall Ranch	Magnification Factor.....	1	Date.	12-22-2004

Location..... CPT-16
Elevation (MSL)..... 1176 ft



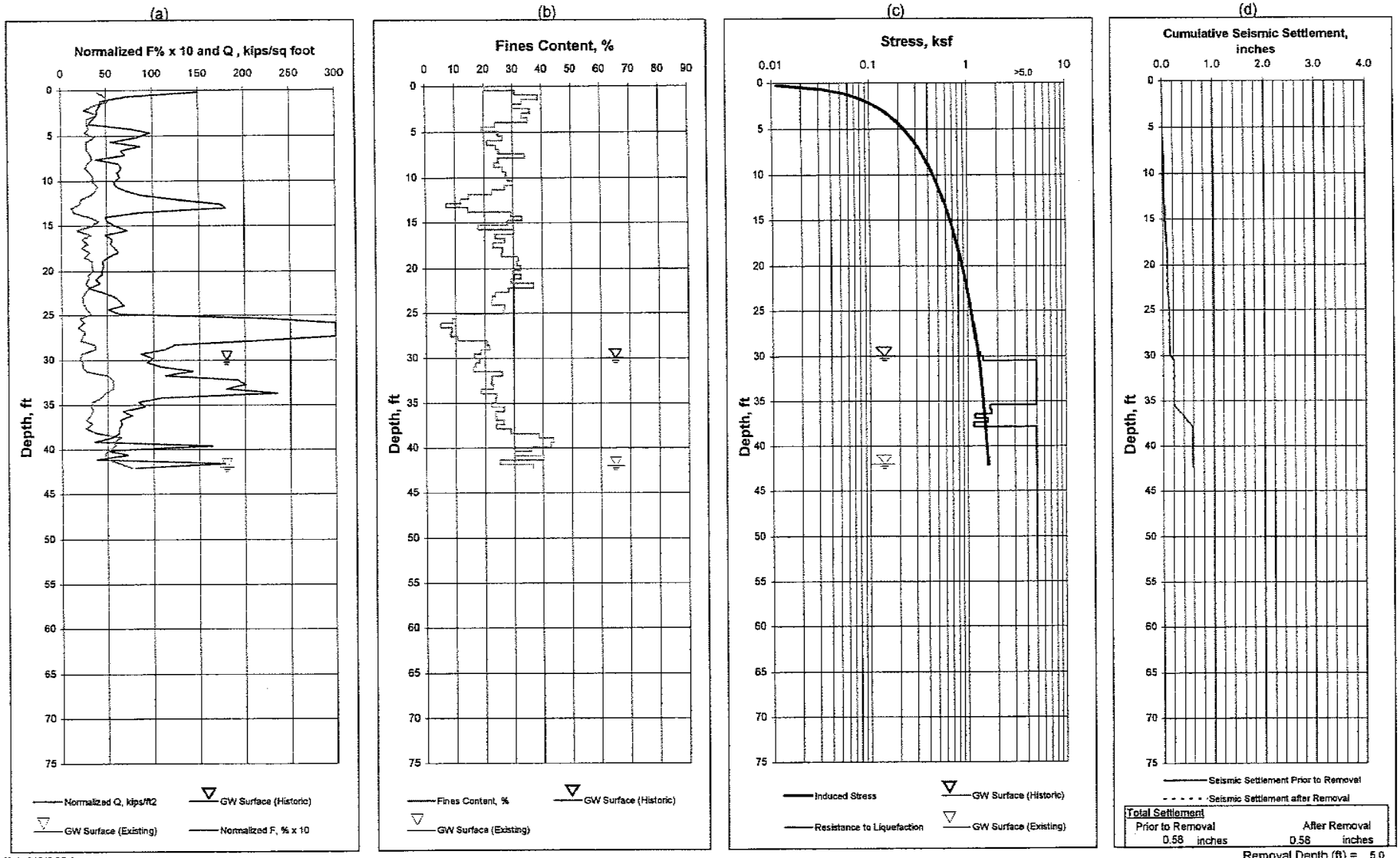
V3d; 2/2/2004

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Magic Mountain Entertainment, Newh	Weighted Gr. Acc. (M=7.5).	0.59 g	Project No.	00-1729-1
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.88 g	Figure No.	CPT-16 D-4
For: Newhall Ranch	Magnification Factor.....	1	Date.	12-22-2004

Location..... CPT-18
Elevation (MSL)..... 1174 ft



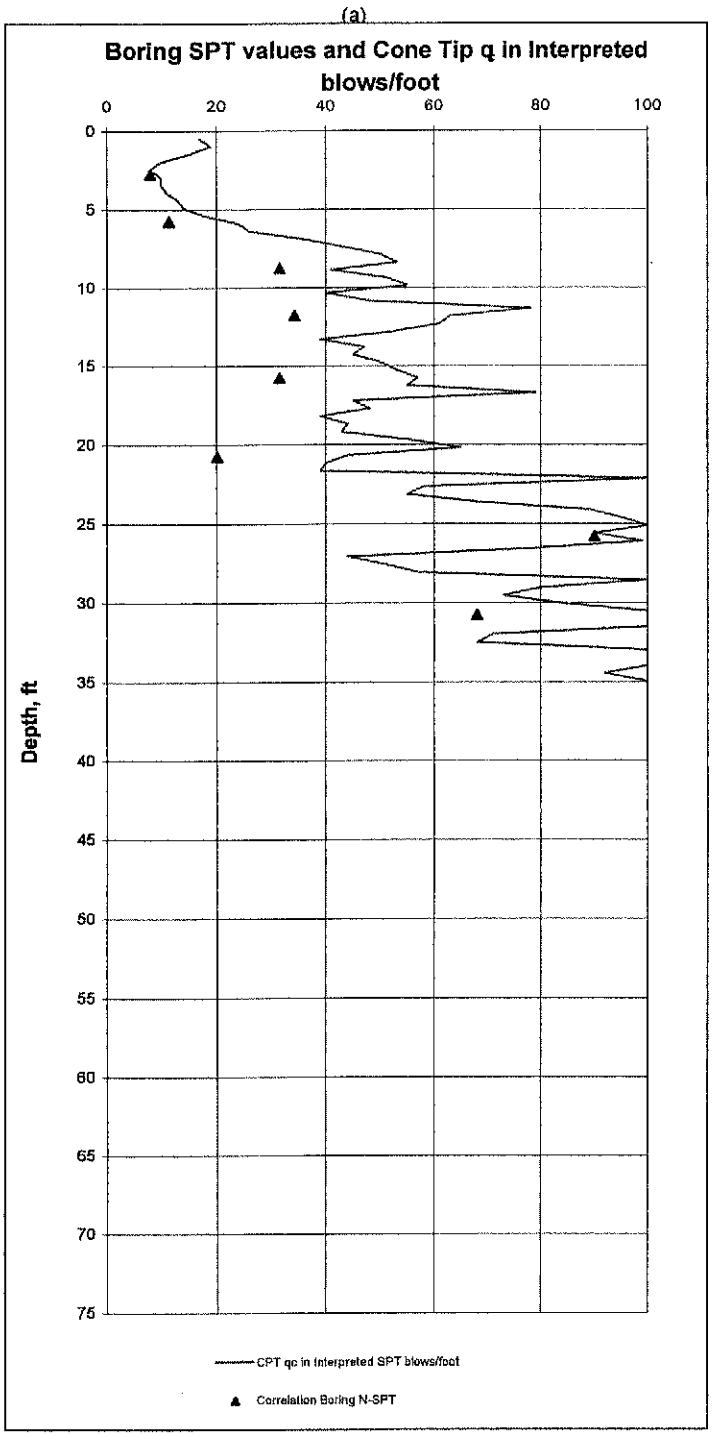
V3d; 2/2/2004

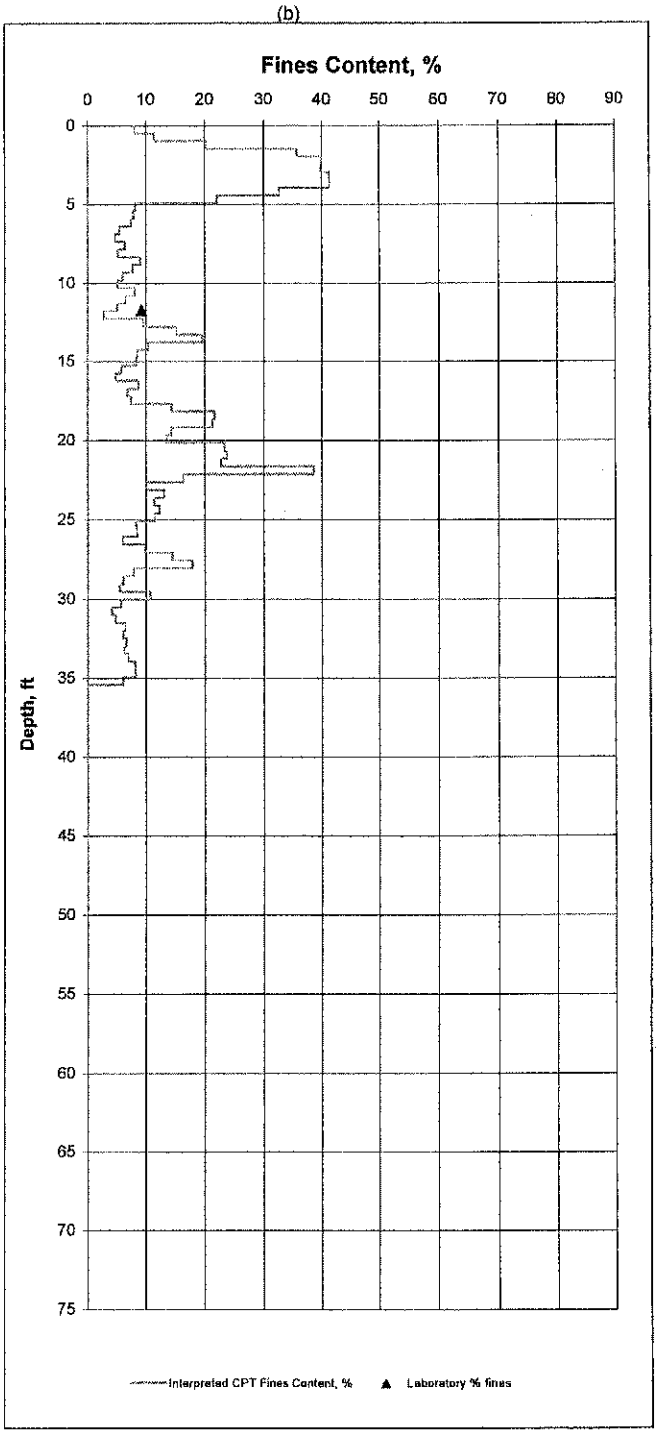
Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Magic Mountain Entertainment, Newh	Weighted Gr. Acc. (M=7.5).	0.59 g	Project No.	00-1729-1
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.88 g	Figure No.	CPT-18 D-5
For: Newhall Ranch	Magnification Factor.....	1	Date.	12-22-2004

Location..... CPT-4 and HS-6





NOTES:

1) The Interpreted SPT blows/foot presented above, based on CPT q_c and f_s data, is calculated following procedures of referenced Robertson and Campanella, 1989.

2) The Interpreted CPT fines content, percent, presented above is calculated following procedures of referenced Robertson and Wride, 1997.

REFERENCES:

1) Robertson, P.K. and Campanella, R.G., 1989, *Guidelines for Geotechnical Design Using the Cone Penetrometer and CPT with Pore-Pressure Measurement*, Hogentogler and Company, Inc.

2) Robertson, P.K. and Wride, C.E., 1997, "Cyclic Liquefaction and Its Evaluation Based on the SPT and CPT", in *Proceeding of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils*, Tech Report NCEER-97-0022, National Center for Earthquake Engineering Research

V1c; 11/13/2003

Allan E. Seward Engineering Geology, Inc. **Geological and Geotechnical Consultants** **Valencia, California**	**Correlation of SPT-Values and % Fines from Boring vs CPT Data**	
	Magic Mtn Entertainment Valencia, L.A. County, California For: Newhall Land Company	Project No.: 00-1729-1 Figure No. D-6

CPT INTERPRETATIONS

PROJECT: Magic Mountain Entertainment, Newhall Ranch CONE/RIG: 722/#3 BH,JH
DATE/TIME: 4/8/2000 10:46 ASSUMED DEPTH OF WATER TABLE: 30 feet
PROJECT NO.: 00-1729-1 SOUNDING: CPT-04

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
0.15	0.49	42.5	2.05	Sands - clean sands to silty sand	1.796	1.104	
0.3	0.98	48.2	2.32	Sands - clean sands to silty sand	1.942	1.232	
0.45	1.48	30.5	3.15	Sand mixtures - silty sand to sandy silt	2.238	1.764	
0.6	1.97	10.4	4.93	Silt mixtures - clayey silt to silty clay	2.610	3.388	1.39
0.75	2.46	8.2	4.25	Silt mixtures - clayey silt to silty clay	2.692	3.936	1.09
0.9	2.95	9.7	4.34	Silt mixtures - clayey silt to silty clay	2.689	3.920	1.29
1.05	3.44	10	4.32	Silt mixtures - clayey silt to silty clay	2.716	4.113	1.33
1.2	3.94	11.2	4.38	Silt mixtures - clayey silt to silty clay	2.716	4.115	1.49
1.35	4.43	20.1	4.13	Silt mixtures - clayey silt to silty clay	2.543	2.996	
1.5	4.92	36.1	2.3	Sand mixtures - silty sand to sandy silt	2.287	1.908	
1.65	5.41	73.8	0.91	Sands - clean sands to silty sand	1.801	1.107	
1.8	5.91	97	1.12	Sands - clean sands to silty sand	1.790	1.100	
1.95	6.40	104.1	1.07	Sands - clean sands to silty sand	1.767	1.084	
2.1	6.89	145.6	1.03	Sands - clean sands to silty sand	1.666	1.015	
2.25	7.38	215.7	1.21	Sands - clean sands to silty sand	1.622	1.000	
2.4	7.87	199.2	1.45	Sands - clean sands to silty sand	1.714	1.047	
2.55	8.37	211.6	1.25	Sands - clean sands to silty sand	1.655	1.007	
2.7	8.86	164.8	1.74	Sands - clean sands to silty sand	1.843	1.139	
2.85	9.35	203.6	1.67	Sands - clean sands to silty sand	1.781	1.093	
3	9.84	221.2	1.36	Sands - clean sands to silty sand	1.694	1.034	
3.15	10.33	201.9	1.08	Sands - clean sands to silty sand	1.648	1.002	
3.3	10.83	193.2	1.59	Sands - clean sands to silty sand	1.797	1.104	
3.45	11.32	311.2	1.77	Sands - clean sands to silty sand	1.723	1.053	
3.6	11.81	315.6	1.42	Sands - clean sands to silty sand	1.644	0.999	
3.75	12.30	307.2	0.9	Sands - clean sands to silty sand	1.495	1.000	
3.9	12.80	208.1	1.92	Sands - clean sands to silty sand	1.866	1.158	
4.05	13.29	117.1	2.25	Sand mixtures - silty sand to sandy silt	2.081	1.422	
4.2	13.78	117.6	3.36	Very stiff sand to clayey sand	2.220	1.717	
4.35	14.27	178.8	1.81	Sands - clean sands to silty sand	1.900	1.189	
4.5	14.76	201.5	1.54	Sands - clean sands to silty sand	1.818	1.120	
4.65	15.26	211.6	1.55	Sands - clean sands to silty sand	1.811	1.115	
4.8	15.75	287.3	1.35	Sands - clean sands to silty sand	1.686	1.029	
4.95	16.24	276.6	1.11	Sands - clean sands to silty sand	1.634	1.000	
5.1	16.73	314.2	2.08	Sands - clean sands to silty sand	1.826	1.126	
5.25	17.22	225.5	1.25	Sands - clean sands to silty sand	1.739	1.064	
5.4	17.72	191.4	1.17	Sands - clean sands to silty sand	1.770	1.085	
5.55	18.21	115.8	1.76	Sand mixtures - silty sand to sandy silt	2.054	1.377	
5.7	18.70	108.8	3.27	Sand mixtures - silty sand to sandy silt	2.276	1.873	
5.85	19.19	107.7	3.12	Sand mixtures - silty sand to sandy silt	2.267	1.847	
6	19.69	165.2	2.32	Sand mixtures - silty sand to sandy silt	2.051	1.373	
6.15	20.18	194.1	2.39	Sand mixtures - silty sand to sandy silt	2.021	1.328	
6.3	20.67	109.2	3.59	Sand mixtures - silty sand to sandy silt	2.320	2.015	

Interpretations based on: 1. Youd and Idriss (NCEER), 2001
2. Robertson and Wride, (NCEER), 1997
3. Olsen, R., 1997

Ic=soil behavior type index
Kc= grain characteristics cor. factor
Su= normalized undrained shear strength

PROJECT NO.: 00-1729-1 SOUNDING: CPT-04

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
6.45	21.16	100	3.42	Sand mixtures - silty sand to sandy silt	2.333	2.058	
6.6	21.65	96.9	3.03	Sand mixtures - silty sand to sandy silt	2.306	1.969	
6.75	22.15	103.1	8.32	Very stiff, fine grained	2.665	3.750	13.75
6.9	22.64	173.1	2.76	Sand mixtures - silty sand to sandy silt	2.117	1.486	
7.05	23.13	218.6	1.67	Sands - clean sands to silty sand	1.886	1.176	
7.2	23.62	204.3	2.23	Sand mixtures - silty sand to sandy silt	2.005	1.307	
7.35	24.11	266.2	2.25	Sands - clean sands to silty sand	1.941	1.230	
7.5	24.61	286	2.57	Sand mixtures - silty sand to sandy silt	1.973	1.266	
7.65	25.10	337.4	2.63	Very stiff sand to clayey sand	1.944	1.233	
7.8	25.59	360	1.88	Sands - clean sands to silty sand	1.809	1.113	
7.95	26.08	395.7	2.03	Sands - clean sands to silty sand	1.816	1.119	
8.1	26.57	384.5	1.42	Sands - clean sands to silty sand	1.698	1.036	
8.25	27.07	177	1.23	Sands - clean sands to silty sand	1.875	1.166	
8.4	27.56	152.1	1.87	Sand mixtures - silty sand to sandy silt	2.054	1.378	
8.55	28.05	172.2	2.92	Sand mixtures - silty sand to sandy silt	2.167	1.590	
8.7	28.54	419.5	1.89	Sands - clean sands to silty sand	1.787	1.098	
8.85	29.04	401.9	1.44	Sands - clean sands to silty sand	1.703	1.040	
9	29.53	366.5	1.21	Sands - clean sands to silty sand	1.669	1.017	
9.15	30.02	337.7	2.28	Sands - clean sands to silty sand	1.914	1.202	
9.3	30.51	510.9	1.58	Sands - clean sands to silty sand	1.683	1.026	
9.45	31.00	658.5	1.43	Sands - clean sands to silty sand	1.589	1.000	
9.6	31.50	533.5	1.39	Sands - clean sands to silty sand	1.628	1.000	
9.75	31.99	354.9	1.34	Sands - clean sands to silty sand	1.720	1.051	
9.9	32.48	341.5	1.23	Sands - clean sands to silty sand	1.702	1.039	
10.05	32.97	457.4	1.64	Sands - clean sands to silty sand	1.727	1.056	
10.2	33.46	514	1.68	Sands - clean sands to silty sand	1.709	1.044	
10.35	33.96	415.9	1.6	Sands - clean sands to silty sand	1.744	1.067	
10.5	34.45	366.2	1.72	Sands - clean sands to silty sand	1.803	1.109	
10.65	34.94	450.9	1.97	Sands - clean sands to silty sand	1.801	1.107	
10.8	35.43	597.3	1.79	Sands - clean sands to silty sand	1.702	1.039	

Interpretations based on: 1. Youd and Idriss (NCEER), 2001
2. Robertson and Wride, (NCEER), 1997
3. Olsen, R., 1997

Ic=soil behavior type index
Kc= grain characteristics cor. factor
Su= normalized undrained shear strength

CPT INTERPRETATIONS

PROJECT: Magic Mountain Entertainment, Newhall Ranch CONE/RIG: 473/R#3
DATE/TIME: 3/21/2000 9:24 ASSUMED DEPTH OF WATER TABLE: 26 feet
PROJECT NO.: 00-1729-1 SOUNDING: CPT-06

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
0.15	0.49	17.9	1.79	Sands - clean sands to silty sand	1.974	1.267	
0.3	0.98	11.8	1.71	Sand mixtures - silty sand to sandy silt	2.262	1.834	
0.45	1.48	14.1	1.54	Sand mixtures - silty sand to sandy silt	2.261	1.829	
0.6	1.97	16.1	1.73	Sand mixtures - silty sand to sandy silt	2.305	1.965	
0.75	2.46	17.4	1.51	Sand mixtures - silty sand to sandy silt	2.285	1.900	
0.9	2.95	10	2.26	Silt mixtures - clayey silt to silty clay	2.491	2.723	
1.05	3.44	9.4	2.64	Silt mixtures - clayey silt to silty clay	2.595	3.295	
1.2	3.94	25.7	2.12	Sand mixtures - silty sand to sandy silt	2.334	2.063	
1.35	4.43	27.5	2.52	Sand mixtures - silty sand to sandy silt	2.383	2.245	
1.5	4.92	33.7	1.59	Sand mixtures - silty sand to sandy silt	2.202	1.672	
1.65	5.41	33.1	1.87	Sand mixtures - silty sand to sandy silt	2.271	1.858	
1.8	5.91	29.8	1.61	Sand mixtures - silty sand to sandy silt	2.279	1.884	
1.95	6.40	35.5	1.92	Sand mixtures - silty sand to sandy silt	2.284	1.899	
2.1	6.89	44.2	1.52	Sand mixtures - silty sand to sandy silt	2.158	1.570	
2.25	7.38	61.5	2.05	Sand mixtures - silty sand to sandy silt	2.153	1.558	
2.4	7.87	79.6	1.75	Sand mixtures - silty sand to sandy silt	2.035	1.348	
2.55	8.37	88.3	1.82	Sand mixtures - silty sand to sandy silt	2.026	1.335	
2.7	8.86	88.1	1.54	Sands - clean sands to silty sand	1.983	1.278	
2.85	9.35	87.7	1.67	Sands - clean sands to silty sand	2.018	1.324	
3	9.84	48.4	2.01	Sand mixtures - silty sand to sandy silt	2.269	1.854	
3.15	10.33	33.8	2.9	Silt mixtures - clayey silt to silty clay	2.502	2.777	
3.3	10.83	35.1	2.02	Sand mixtures - silty sand to sandy silt	2.394	2.287	
3.45	11.32	44.6	1.94	Sand mixtures - silty sand to sandy silt	2.310	1.981	
3.6	11.81	63.7	1.09	Sands - clean sands to silty sand	2.037	1.351	
3.75	12.30	64	1.61	Sand mixtures - silty sand to sandy silt	2.151	1.556	
3.9	12.80	54.1	1.79	Sand mixtures - silty sand to sandy silt	2.244	1.781	
4.05	13.29	43.3	2.15	Sand mixtures - silty sand to sandy silt	2.377	2.219	
4.2	13.78	34.5	2.21	Sand mixtures - silty sand to sandy silt	2.467	2.608	
4.35	14.27	31.3	2.32	Silt mixtures - clayey silt to silty clay	2.520	2.873	
4.5	14.76	32.8	2.19	Sand mixtures - silty sand to sandy silt	2.494	2.740	
4.65	15.26	38.8	1.95	Sand mixtures - silty sand to sandy silt	2.411	2.356	
4.8	15.75	37.9	2.58	Silt mixtures - clayey silt to silty clay	2.502	2.781	
4.95	16.24	34.3	2.45	Silt mixtures - clayey silt to silty clay	2.527	2.909	
5.1	16.73	38.4	2.36	Silt mixtures - clayey silt to silty clay	2.483	2.686	
5.25	17.22	42	2.08	Sand mixtures - silty sand to sandy silt	2.423	2.408	
5.4	17.72	61.5	2.34	Sand mixtures - silty sand to sandy silt	2.335	2.066	
5.55	18.21	43.3	2.9	Silt mixtures - clayey silt to silty clay	2.517	2.856	
5.7	18.70	33.3	2.73	Silt mixtures - clayey silt to silty clay	2.611	3.395	4.44
5.85	19.19	29.5	2.63	Silt mixtures - clayey silt to silty clay	2.654	3.672	3.93
6	19.69	30.4	3.05	Silt mixtures - clayey silt to silty clay	2.693	3.945	4.05
6.15	20.18	29.7	2.93	Silt mixtures - clayey silt to silty clay	2.699	3.991	3.96
6.3	20.67	30.4	3.08	Silt mixtures - clayey silt to silty clay	2.713	4.095	4.05

Interpretations based on: 1. Youd and Idriss (NCEER), 2001
2. Robertson and Wride, (NCEER), 1997
3. Olsen, R., 1997

Ic=soil behavior type index
Kc= grain characteristics cor. factor
Su= normalized undrained shear strength

PROJECT NO.: 00-1729-1 SOUNDING: CPT-06

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
6.45	21.16	33.3	2.93	Silt mixtures - clayey silt to silty clay	2.675	3.820	4.44
6.6	21.65	35.9	3.19	Silt mixtures - clayey silt to silty clay	2.681	3.857	4.79
6.75	22.15	39.7	3.73	Silt mixtures - clayey silt to silty clay	2.698	3.983	5.29
6.9	22.64	46.5	3.48	Silt mixtures - clayey silt to silty clay	2.632	3.526	6.20
7.05	23.13	37.1	3.12	Silt mixtures - clayey silt to silty clay	2.686	3.898	4.95
7.2	23.62	439.7	0.86	Sands - clean sands to silty sand	1.473	1.000	
7.35	24.11	618.7	1.1	Sands - clean sands to silty sand	1.478	1.000	
7.5	24.61	712.5	1.12	Sands - clean sands to silty sand	1.456	1.000	
7.65	25.10	697.3	1.33	Sands - clean sands to silty sand	1.528	1.000	

Interpretations based on: 1. Youd and Idriss (NCEER), 2001
2. Robertson and Wride, (NCEER), 1997
3. Olsen, R., 1997

Ic=soil behavior type index
Kc= grain characteristics cor. factor
Su= normalized undrained shear strength

CPT INTERPRETATIONS

PROJECT: Magic Mountain Entertainment, Newhall Ranch CONE/RIG: 722/R#3
DATE/TIME: 4/5/2000 16:36 ASSUMED DEPTH OF WATER TABLE: 40 feet
PROJECT NO.: 00-1729-1 SOUNDING: CPT-16

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
0.15	0.49	69.7	2.62	Very stiff sand to clayey sand	1.791	1.100	
0.3	0.98	114.6	3.24	Very stiff sand to clayey sand	1.884	1.174	
0.45	1.48	47.6	4.71	Very stiff, fine grained	2.263	1.835	
0.6	1.97	31.9	4.31	Very stiff, fine grained	2.378	2.223	
0.75	2.46	27.7	4.28	Silt mixtures - clayey silt to silty clay	2.450	2.527	
0.9	2.95	44.6	2.22	Sand mixtures - silty sand to sandy silt	2.128	1.507	
1.05	3.44	28.1	2.3	Sand mixtures - silty sand to sandy silt	2.306	1.968	
1.2	3.94	38.5	2.3	Sand mixtures - silty sand to sandy silt	2.230	1.744	
1.35	4.43	29	1.38	Sand mixtures - silty sand to sandy silt	2.195	1.654	
1.5	4.92	64.8	1.9	Sand mixtures - silty sand to sandy silt	2.049	1.369	
1.65	5.41	86.7	0.8	Sands - clean sands to silty sand	1.711	1.046	
1.8	5.91	93.3	0.94	Sands - clean sands to silty sand	1.749	1.071	
1.95	6.40	110.4	1.29	Sands - clean sands to silty sand	1.808	1.113	
2.1	6.89	173.3	0.96	Sands - clean sands to silty sand	1.593	1.000	
2.25	7.38	130.9	1.21	Sands - clean sands to silty sand	1.760	1.078	
2.4	7.87	73.2	1.09	Sands - clean sands to silty sand	1.920	1.208	
2.55	8.37	59.4	2.34	Sand mixtures - silty sand to sandy silt	2.224	1.728	
2.7	8.86	44.6	3.04	Sand mixtures - silty sand to sandy silt	2.403	2.323	
2.85	9.35	57.9	2.81	Sand mixtures - silty sand to sandy silt	2.307	1.971	
3	9.84	62.4	2.33	Sand mixtures - silty sand to sandy silt	2.234	1.753	
3.15	10.33	53.6	2.1	Sand mixtures - silty sand to sandy silt	2.258	1.820	
3.3	10.83	187.3	2.2	Sands - clean sands to silty sand	1.918	1.207	
3.45	11.32	230.9	1.56	Sands - clean sands to silty sand	1.750	1.071	
3.6	11.81	97.4	1.69	Sand mixtures - silty sand to sandy silt	2.026	1.336	
3.75	12.30	73.7	2.07	Sand mixtures - silty sand to sandy silt	2.181	1.622	
3.9	12.80	68.5	2.37	Sand mixtures - silty sand to sandy silt	2.252	1.804	
4.05	13.29	71.9	2.21	Sand mixtures - silty sand to sandy silt	2.221	1.721	
4.2	13.78	71	2.03	Sand mixtures - silty sand to sandy silt	2.205	1.680	
4.35	14.27	96.8	1.67	Sand mixtures - silty sand to sandy silt	2.055	1.378	
4.5	14.76	97.2	1.14	Sands - clean sands to silty sand	1.946	1.235	
4.65	15.26	128.6	2.75	Sand mixtures - silty sand to sandy silt	2.142	1.536	
4.8	15.75	245.6	1.48	Sands - clean sands to silty sand	1.760	1.078	
4.95	16.24	278.6	1.37	Sands - clean sands to silty sand	1.704	1.040	
5.1	16.73	404.6	1.36	Sands - clean sands to silty sand	1.612	1.000	
5.25	17.22	335.7	1.13	Sands - clean sands to silty sand	1.596	1.000	
5.4	17.72	305.6	1.57	Sands - clean sands to silty sand	1.739	1.064	
5.55	18.21	342.6	1.25	Sands - clean sands to silty sand	1.633	1.000	
5.7	18.70	298.5	0.99	Sands - clean sands to silty sand	1.594	1.000	
5.85	19.19	224.3	0.88	Sands - clean sands to silty sand	1.645	1.000	
6	19.69	81.8	3.05	Sand mixtures - silty sand to sandy silt	2.344	2.099	
6.15	20.18	75.8	2.87	Sand mixtures - silty sand to sandy silt	2.352	2.128	
6.3	20.67	79	3.34	Silt mixtures - clayey silt to silty clay	2.391	2.277	

Interpretations based on: 1. Youd and Idriss (NCEER), 2001
2. Robertson and Wride, (NCEER), 1997
3. Olsen, R., 1997

Ic=soil behavior type index
Kc= grain characteristics cor. factor
Su= normalized undrained shear strength

PROJECT NO.: 00-1729-1 SOUNDING: CPT-16

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
6.45	21.16	74.6	3.5	Silt mixtures - clayey silt to silty clay	2.427	2.426	
6.6	21.65	65.9	3.44	Silt mixtures - clayey silt to silty clay	2.463	2.588	
6.75	22.15	77.7	2.83	Sand mixtures - silty sand to sandy silt	2.355	2.138	
6.9	22.64	80.9	3.41	Silt mixtures - clayey silt to silty clay	2.405	2.332	
7.05	23.13	74.9	3.76	Silt mixtures - clayey silt to silty clay	2.462	2.585	
7.2	23.62	88.8	3.38	Silt mixtures - clayey silt to silty clay	2.380	2.234	
7.35	24.11	87.3	2.87	Sand mixtures - silty sand to sandy silt	2.337	2.073	
7.5	24.61	119.8	2.23	Sand mixtures - silty sand to sandy silt	2.165	1.584	
7.65	25.10	152.3	2.4	Sand mixtures - silty sand to sandy silt	2.121	1.493	
7.8	25.59	126.6	2.92	Sand mixtures - silty sand to sandy silt	2.241	1.773	
7.95	26.08	139.2	3.08	Sand mixtures - silty sand to sandy silt	2.234	1.755	
8.1	26.57	118.4	3.52	Sand mixtures - silty sand to sandy silt	2.327	2.039	
8.25	27.07	144.5	2.71	Sand mixtures - silty sand to sandy silt	2.187	1.635	
8.4	27.56	120.1	3.53	Sand mixtures - silty sand to sandy silt	2.329	2.047	
8.55	28.05	160	2.57	Sand mixtures - silty sand to sandy silt	2.145	1.543	
8.7	28.54	252.4	1.34	Sands - clean sands to silty sand	1.803	1.109	
8.85	29.04	248.3	1.46	Sands - clean sands to silty sand	1.838	1.136	
9	29.53	153.9	1.64	Sands - clean sands to silty sand	2.021	1.328	
9.15	30.02	94.7	3.36	Silt mixtures - clayey silt to silty clay	2.396	2.297	
9.3	30.51	78.1	3.5	Silt mixtures - clayey silt to silty clay	2.470	2.621	
9.45	31.00	72.2	3.8	Silt mixtures - clayey silt to silty clay	2.613	3.405	9.63
9.6	31.50	92.2	3.42	Silt mixtures - clayey silt to silty clay	2.414	2.372	
9.75	31.99	82.3	3.86	Silt mixtures - clayey silt to silty clay	2.488	2.711	
9.9	32.48	57.1	5.27	Clays - silty clay to clay	2.797	4.761	7.61
10.05	32.97	71.3	3.62	Silt mixtures - clayey silt to silty clay	2.613	3.407	9.51
10.2	33.46	71.8	4.12	Silt mixtures - clayey silt to silty clay	2.652	3.661	9.57
10.35	33.96	78	3.52	Silt mixtures - clayey silt to silty clay	2.481	2.674	
10.5	34.45	89.6	3.35	Silt mixtures - clayey silt to silty clay	2.424	2.413	
10.65	34.94	80.4	3.41	Silt mixtures - clayey silt to silty clay	2.464	2.594	
10.8	35.43	83.3	2.79	Sand mixtures - silty sand to sandy silt	2.393	2.282	
10.95	35.93	99.3	2.53	Sand mixtures - silty sand to sandy silt	2.308	1.976	
11.1	36.42	130.9	3.96	Very stiff, fine grained	2.371	2.197	
11.25	36.91	61.7	4.35	Clays - silty clay to clay	2.737	4.274	8.23
11.4	37.40	65.9	3.97	Silt mixtures - clayey silt to silty clay	2.690	3.925	8.79
11.55	37.89	34	5.06	Clays - silty clay to clay	2.998	6.722	4.53
11.7	38.39	29.6	6.36	Clays - silty clay to clay	3.118	8.155	3.95
11.85	38.88	38.5	6.77	Clays - silty clay to clay	3.043	7.232	5.13
12	39.37	298	2.66	Sand mixtures - silty sand to sandy silt	2.019	1.325	
12.15	39.86	560.1	1.73	Sands - clean sands to silty sand	1.711	1.045	
12.3	40.35	499	1.23	Sands - clean sands to silty sand	1.634	1.000	

Interpretations based on: 1. Youd and Idriss (NCEER), 2001
2. Robertson and Wride, (NCEER), 1997
3. Olsen, R., 1997

Ic=soil behavior type index
Kc= grain characteristics cor. factor
Su= normalized undrained shear strength

CPT INTERPRETATIONS

PROJECT: Magic Mountain Entertainment, Newhall Ranch CONE/RIG: 473/R#3
DATE/TIME: 3/23/2000 16:37 ASSUMED DEPTH OF WATER TABLE: 42 feet
PROJECT NO.: 00-1729-1 SOUNDING: CPT-18

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
0.15	0.49	18.7	4.03	Very stiff sand to clayey sand	2.238	1.765	
0.3	0.98	8.2	4.84	Silt mixtures - clayey silt to silty clay	2.499	2.763	
0.45	1.48	3.3	5.13	Silt mixtures - clayey silt to silty clay	2.666	3.759	0.44
0.6	1.97	9	3.57	Silt mixtures - clayey silt to silty clay	2.554	3.056	
0.75	2.46	9.8	2.55	Silt mixtures - clayey silt to silty clay	2.484	2.690	
0.9	2.95	6.7	3.94	Silt mixtures - clayey silt to silty clay	2.610	3.389	0.89
1.05	3.44	11.2	2.8	Silt mixtures - clayey silt to silty clay	2.552	3.047	
1.2	3.94	14.8	2.81	Silt mixtures - clayey silt to silty clay	2.597	3.310	
1.35	4.43	38	3.03	Sand mixtures - silty sand to sandy silt	2.339	2.082	
1.5	4.92	53.1	2.62	Sand mixtures - silty sand to sandy silt	2.210	1.692	
1.65	5.41	47.7	3.65	Silt mixtures - clayey silt to silty clay	2.364	2.171	
1.8	5.91	33	2.75	Sand mixtures - silty sand to sandy silt	2.400	2.311	
1.95	6.40	54.2	2.76	Sand mixtures - silty sand to sandy silt	2.262	1.832	
2.1	6.89	42.9	2.78	Sand mixtures - silty sand to sandy silt	2.346	2.107	
2.25	7.38	47.3	3.18	Sand mixtures - silty sand to sandy silt	2.370	2.193	
2.4	7.87	26.9	3.36	Silt mixtures - clayey silt to silty clay	2.573	3.166	
2.55	8.37	45	2.78	Sand mixtures - silty sand to sandy silt	2.363	2.168	
2.7	8.86	48.8	2.64	Sand mixtures - silty sand to sandy silt	2.331	2.053	
2.85	9.35	46.7	3.08	Sand mixtures - silty sand to sandy silt	2.401	2.317	
3	9.84	49.8	3.47	Silt mixtures - clayey silt to silty clay	2.427	2.425	
3.15	10.33	46.7	3.34	Silt mixtures - clayey silt to silty clay	2.442	2.493	
3.3	10.83	49.4	3.96	Silt mixtures - clayey silt to silty clay	2.486	2.699	
3.45	11.32	59.7	3.71	Silt mixtures - clayey silt to silty clay	2.416	2.378	
3.6	11.81	75.2	3.18	Sand mixtures - silty sand to sandy silt	2.305	1.964	
3.75	12.30	110.4	2.07	Sand mixtures - silty sand to sandy silt	2.060	1.386	
3.9	12.80	155.1	2.02	Sands - clean sands to silty sand	1.961	1.252	
4.05	13.29	163.5	1.08	Sands - clean sands to silty sand	1.748	1.070	
4.2	13.78	78.2	1.33	Sands - clean sands to silty sand	2.050	1.371	
4.35	14.27	45.7	2.98	Silt mixtures - clayey silt to silty clay	2.467	2.605	
4.5	14.76	48.1	4.03	Silt mixtures - clayey silt to silty clay	2.548	3.025	
4.65	15.26	57.2	3.29	Silt mixtures - clayey silt to silty clay	2.437	2.470	
4.8	15.75	71	1.66	Sand mixtures - silty sand to sandy silt	2.168	1.592	
4.95	16.24	48.3	3.14	Silt mixtures - clayey silt to silty clay	2.486	2.698	
5.1	16.73	57.4	2.23	Sand mixtures - silty sand to sandy silt	2.334	2.061	
5.25	17.22	55.9	2.79	Sand mixtures - silty sand to sandy silt	2.413	2.368	
5.4	17.72	62.2	2.22	Sand mixtures - silty sand to sandy silt	2.316	2.000	
5.55	18.21	66	3.02	Sand mixtures - silty sand to sandy silt	2.395	2.290	
5.7	18.70	55.2	2.41	Sand mixtures - silty sand to sandy silt	2.388	2.263	
5.85	19.19	49.3	3.28	Silt mixtures - clayey silt to silty clay	2.520	2.872	
6	19.69	50.9	3.24	Silt mixtures - clayey silt to silty clay	2.510	2.822	
6.15	20.18	49.4	3.37	Silt mixtures - clayey silt to silty clay	2.536	2.957	
6.3	20.67	50.1	2.83	Silt mixtures - clayey silt to silty clay	2.483	2.686	

Interpretations based on: 1. Youd and Idriss (NCEER), 2001
2. Robertson and Wride, (NCEER), 1997
3. Olsen, R., 1997

Ic=soil behavior type index
Kc= grain characteristics cor. factor
Su= normalized undrained shear strength

PROJECT NO.: 00-1729-1 SOUNDING: CPT-18

Depth (m)	Depth (ft)	Tip Resistance (tsf)	Friction Ratio %	Soil Behavior Type	I_c	K_c	s_u (ksf)
6.45	21.16	43.4	2.88	Silt mixtures - clayey silt to silty clay	2.540	2.979	
6.6	21.65	49.1	2.53	Silt mixtures - clayey silt to silty clay	2.465	2.600	
6.75	22.15	39.8	2.93	Silt mixtures - clayey silt to silty clay	2.628	3.505	5.31
6.9	22.64	53.8	2.55	Sand mixtures - silty sand to sandy silt	2.445	2.506	
7.05	23.13	69	2.24	Sand mixtures - silty sand to sandy silt	2.329	2.046	
7.2	23.62	77.3	2.29	Sand mixtures - silty sand to sandy silt	2.303	1.957	
7.35	24.11	84.4	2.44	Sand mixtures - silty sand to sandy silt	2.297	1.940	
7.5	24.61	64	2.62	Sand mixtures - silty sand to sandy silt	2.410	2.355	
7.65	25.10	79.6	3.12	Silt mixtures - clayey silt to silty clay	2.398	2.303	
7.8	25.59	282.6	2.01	Sands - clean sands to silty sand	1.894	1.183	
7.95	26.08	501.2	2.46	Very stiff sand to clayey sand	1.836	1.134	
8.1	26.57	716.4	1.76	Very stiff sand to clayey sand	1.637	1.000	
8.25	27.07	570.5	2.53	Very stiff sand to clayey sand	1.824	1.124	
8.4	27.56	496.1	2.27	Very stiff sand to clayey sand	1.813	1.116	
8.55	28.05	282.9	2.06	Sands - clean sands to silty sand	1.914	1.203	
8.7	28.54	164.9	3.59	Very stiff sand to clayey sand	2.252	1.804	
8.85	29.04	152.2	3.6	Very stiff sand to clayey sand	2.277	1.877	
9	29.53	118.1	2.16	Sand mixtures - silty sand to sandy silt	2.187	1.637	
9.15	30.02	135.7	1.96	Sand mixtures - silty sand to sandy silt	2.117	1.487	
9.3	30.51	129.3	2.22	Sand mixtures - silty sand to sandy silt	2.173	1.602	
9.45	31.00	150.6	2.24	Sand mixtures - silty sand to sandy silt	2.131	1.514	
9.6	31.50	199.9	2.64	Sand mixtures - silty sand to sandy silt	2.106	1.465	
9.75	31.99	157.5	4.92	Very stiff, fine grained	2.385	2.252	
9.9	32.48	269.9	5.56	Very stiff, fine grained	2.298	1.943	
10.05	32.97	282.7	5.62	Very stiff, fine grained	2.293	1.925	
10.2	33.46	254.6	5.56	Very stiff, fine grained	2.313	1.992	
10.35	33.96	333.9	4.68	Very stiff, fine grained	2.189	1.640	
10.5	34.45	156.3	4.23	Very stiff, fine grained	2.340	2.084	
10.65	34.94	119.7	3.29	Sand mixtures - silty sand to sandy silt	2.332	2.057	
10.8	35.43	130.1	3.14	Sand mixtures - silty sand to sandy silt	2.294	1.929	
10.95	35.93	96.2	3.33	Silt mixtures - clayey silt to silty clay	2.404	2.328	
11.1	36.42	110.6	3.01	Sand mixtures - silty sand to sandy silt	2.331	2.051	
11.25	36.91	92.7	2.57	Sand mixtures - silty sand to sandy silt	2.337	2.074	
11.4	37.40	95.1	3.22	Silt mixtures - clayey silt to silty clay	2.400	2.314	
11.55	37.89	91.5	2.52	Sand mixtures - silty sand to sandy silt	2.338	2.076	
11.7	38.39	91.8	3.71	Silt mixtures - clayey silt to silty clay	2.458	2.566	
11.85	38.88	115.9	6.32	Clays - silty clay to clay	2.664	3.744	15.45
12	39.37	76.1	5.6	Clays - silty clay to clay	2.757	4.430	10.15
12.15	39.86	82	5.69	Clays - silty clay to clay	2.740	4.300	10.93
12.3	40.35	107.6	4.89	Silt mixtures - clayey silt to silty clay	2.610	3.386	14.35
12.45	40.85	107.4	4.58	Silt mixtures - clayey silt to silty clay	2.485	2.695	
12.6	41.34	83.9	4.92	Clays - silty clay to clay	2.694	3.956	11.19
12.75	41.83	267.7	6.33	Very stiff, fine grained	2.364	2.172	
12.9	42.32	203.2	7.55	Very stiff, fine grained	2.624	3.479	27.09

Interpretations based on: 1. Youd and Idriss (NCEER), 2001
2. Robertson and Wride, (NCEER), 1997
3. Olsen, R., 1997

Ic=soil behavior type index
Kc= grain characteristics cor. factor
Su= normalized undrained shear strength

APPENDIX D

SUMMARY TABLE OF COMPUTED LIQUEFACTION EFFECTS

ANALYZED LOCATION CPT	ESTIMATED SETTLEMENT INCHES		SURVEYED ELEVATION (FEET, MSL)	RECOMMENDED REMOVALS (FEET)	ADJACENT BORINGS	DEPTH TO GWT (FEET)		THICKNESS OF NON-LIQUEFIABLE SOILS BELOW EXISTING GRADES (FEET)	TOTAL THICKNESS OF POTENTIALLY LIQUEFIABLE ZONES REMAINING (FEET)
	BEFORE REMOVALS	AFTER REMOVALS				MEASURED	HISTORIC		
4	0.02	0.01	1184	8	HS-6	30	30	35	-
6	0.11	0.06	1156	7	-	26	30	25	-
16	0.47	0.45	1176	10	HS-11	40	30	39	1.0
18	0.58	0.58	1174	5	-	42	30	41	1.0

Appendix E

Areas with significant plan changes
11/15/04 vs. 6/14/04

Areas with significant plan changes
11/15/04 vs. 6/14/04

PROJECT SITE

VICINITY MAP
NOT TO SCALE

PROJECT SUMMARY:

Lot Numbers	No. of Lots	Type (Use)	Dwelling Units	Total Acres
Area A2				
1 – 27	125	SFD (6,000 s.f. min.)	125	21.5
28 – 30	3	Open Space		10.9
31 – 35	5	Private Street		2.1
Area A3-A5				
36 – 37	2	MDR (Condominiums)	30	3.1
38 – 45	2	MDR (Condominiums)	168	13.6
46 – 48	3	MDR (Condominiums)	45	12.3
49 – 50	2	Open Space (OS)		1.8
51		MDR (Condominiums)	52	13.2
52		MDR (Condominiums)	216	13.0
Area A7				
53-71, 81-258	96	45'x90' SFD (7,000 s.f. min.)	93	22.2
259		Recreation		1.4
260-273	2	Open Space		3.4
274-277	2	Private & Future Street		3.4
Area A8				
278-298	21	50'x110' SFD (5,500 s.f. min.)	23	5.8
299		Water Quality Park		7.8
300-302, 304, 323-344	1	Open Space		24.1
303	2	Private & Future Street		1.5
345-347	2	Private Drive		2.8
Area A9 A10, A11 and A12				
348		Area A9 (Condominiums)	60	3.4
349		Area A10 (Condominiums)	56	3.4
350-355	3	Open Space (OS)		2.1
356		Condominiums	42	3.7
357		Condominiums	96	10.3
358-362	2	Open Space (OS)		1.2
Area A1				
363-413	32	Zero Lot Line Attached Duplexes	32	4.1
414-442	7	50'x90' SFD (5,000 s.f. min.)	7	1.0
443-446	3	Private & Future Street		1.1
447-452	6	Private Drive		0.8
453-463	11	Open Space		2.3
464		Fire Access Road		1.5
Area A2				
465-509, 510-564	98	Zero Lot Line Attached Duplexes	66	7.5
565-580, 581-582	47	50'x90' SFD (5,000 s.f. min.)	47	5.1
583, 587, 590, 593, 602	5	Private & Future Street		1.1
584-586, 588-589, 591-592, 594-601, 603-604	15	Private Drive		2.1
605-607, 608-627	22	Open Space		5.3
628		Water Tanks		1.4
Area A3				
629-643	2	SFD (4,500 s.f. min.)	15	1.3
644-659	15	Zero Lot Line Attached Duplexes	15	1.1
660		Private & Future Street		0.1
661-663	3	Private Drive		0.3
664-672	8	Open Space		2.1
Area A4				
673-699, 700-731	59	45'x85' SFD (3,825 s.f. min.)	59	3.5
732-781	50	Zero Lot Line Attached Duplexes	50	3.1
782-784	3	Private & Future Street		0.5
785-787	3	Private Drive		0.3
788-793	3	Open Space		1.3
794-796	3	Recreation		4.8
Area A5 & A6				
797-843, 844-891, 892-939	95	45'x85' SFD (3,825 s.f. min.)	97	5.7
940-969, 970-999	55	Zero Lot Line Attached Duplexes	55	4.8
1000-1003	4	Private & Future Street		0.5
1004-1006	3	Private Drive		0.3
1007-1009	3	Open Space		10.3
1010	1	Recreation		4.1
1011	1	Condominiums (Low/Med)	40	2.8
1012	1	Condominiums (Low/Med)	24	1.7
1013	1	Open Space (OS)		2.4
Village Center				
1014-1017	2	Mixed Use Commercial (34,000 s.f.)		13.2
1018-1035	6	Mixed Use Commercial (34,000 s.f.)		17.7
1036	1	Condominiums (Low/Med)	15	1.4
1037	1	Apartments	45	3.4
1038	1	Condominiums (Low/Med)	15	1.4
1039	1	Condominiums	140	9.4
1040	1	Condominiums (Low/Med)	15	1.4
1041	1	Condominiums	251	16.8
1042	1	Apartments	204	13.6
1043	1	Condominiums	40	2.0
1044	1	Condominiums (Med)	71	4.7
1045	1	Condominiums	30	2.0
1046	1	Condominiums (Med)	81	5.4
1047	1	Apartments	110	7.0
1048	1	Apartments	74	4.9
1049	1	Condominiums	24	1.6
1050	1	Condominiums	18	1.2
1051	1	Condominiums	18	1.2
1052	1	Apartments	20	1.3
1053	1	Commercial Center		2.1
1054	1	Elementary School		9.7
1055	1	Condominiums	40	2.7
1056	1	Condominiums	200	4.4
1057-1058	14	Private Drive		3.5
Area B & C				
1059-1062	4	75' Wide Corridor Parcels (2,500 s.f. Building Pad)		42.5
1063-1065	3	Private Drive		0.8
1066-1068	4	Open Space		2.5
1069	1	Water Reservoir (6,250 s.f. Service Center)		2.5
Neighborhood				
1070	1	Park		3.4
1071-1072	2	Open Space (Low/Med)		1.1
1073	1	Open Space (Water Feature)		3.2
1074	1	Private Park		1.5
1075-1077	3	Open Space (Low/Med, & OS)		9.1
1078	1	Water Park		0.5
1079-1081	3	Open Space (Low/Med, Water Feature)		8.5
1082-1084	3	Open Space (OS)		2.3
1085	1	Park		1.0
1086-1088	3	Open Space (OS)		2.3
1089-1091	3	Open Space (Low/Med)		3.3
1092-1094	3	Open Space (Water Feature)		2.1
1095-1097	3	Open Space (OS)		4.9
1098-1099	2	Open Space (Med)		2.5
1100	1	Open Space (Water Feature)		2.1
1101	1	Water Quality Basin		2.2
1102	1	Open Space		4.4
1103	1	Park		2.4
1104	1	Open Space (Med)		6
1105	1	Open Space (OS)		5
		Public Street R/W		42.1
Total	1054		5331	1252.2

GENERAL NOTES:

LEGEND:

SURVEY NOTES:

SPECIAL NOTES:

Allan E. Seward Engineering Geology, Inc.
Geotechnical Consultants

OVERVIEW MAP

See Plate E14 for Legend

KEY MAP

PSOMAS

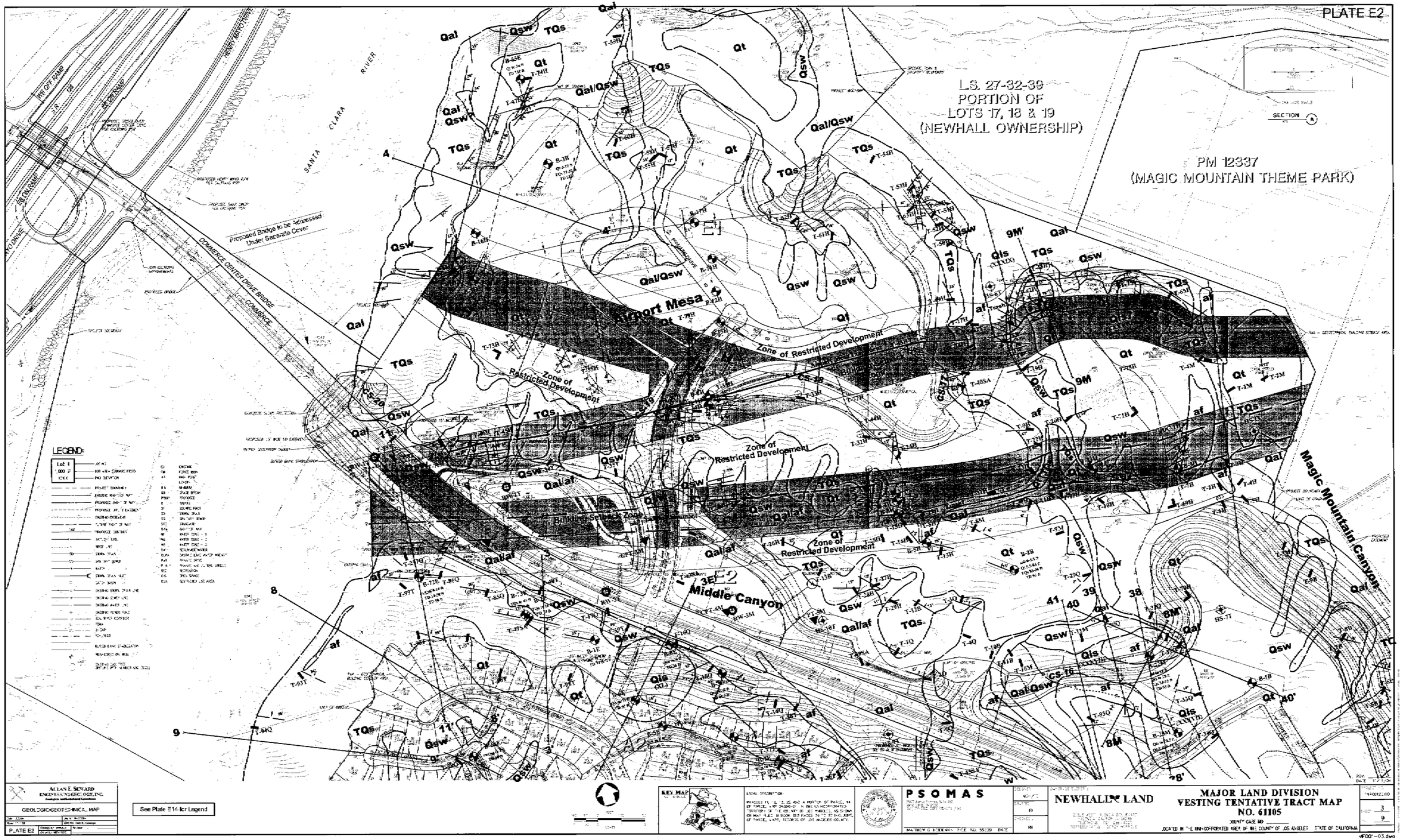
NEWHALL LAND

MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 61105

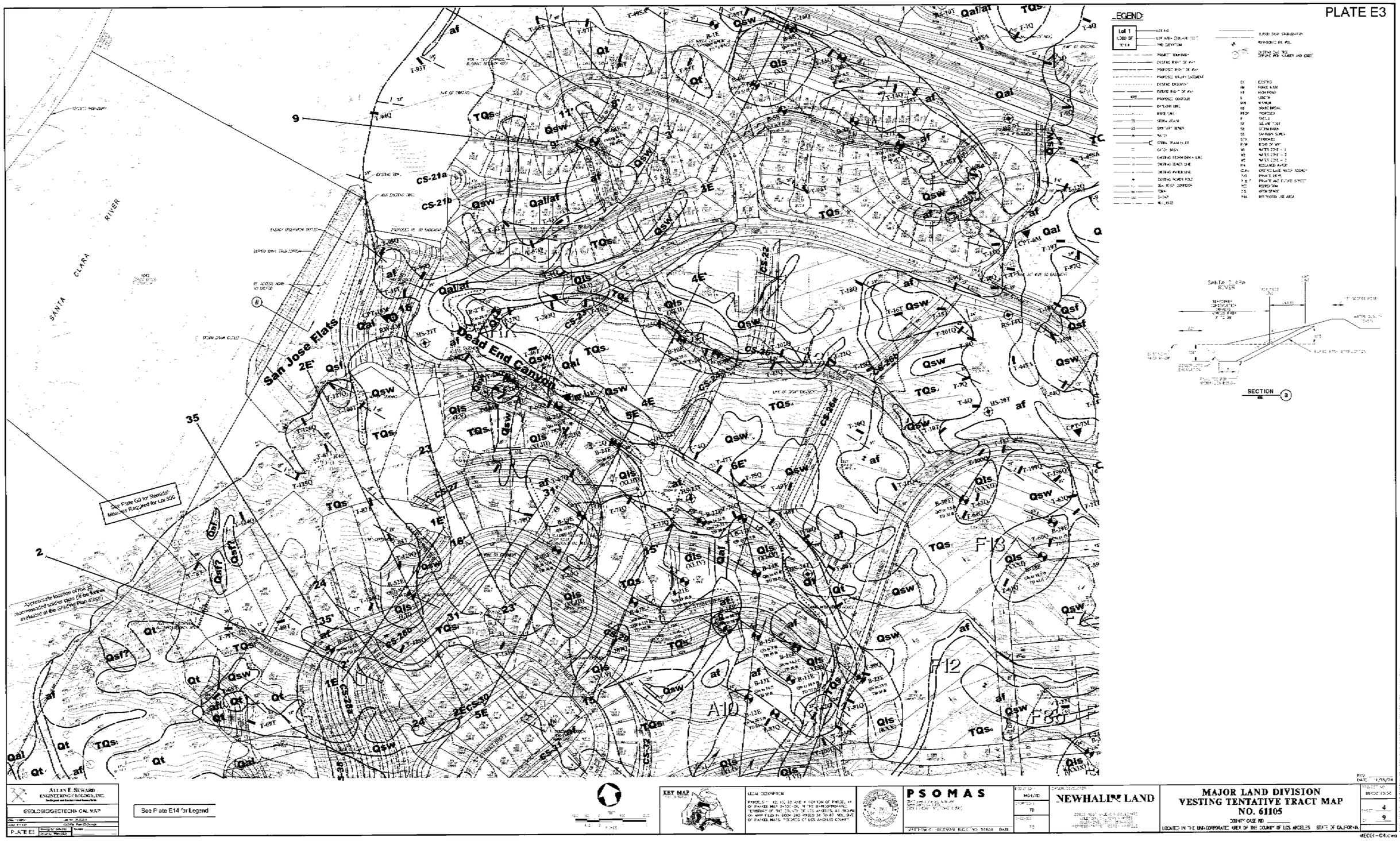
COUNTY CASE NO. _____

LOCATED IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

A full-size reproduction of this figure can be found at Impact Sciences.

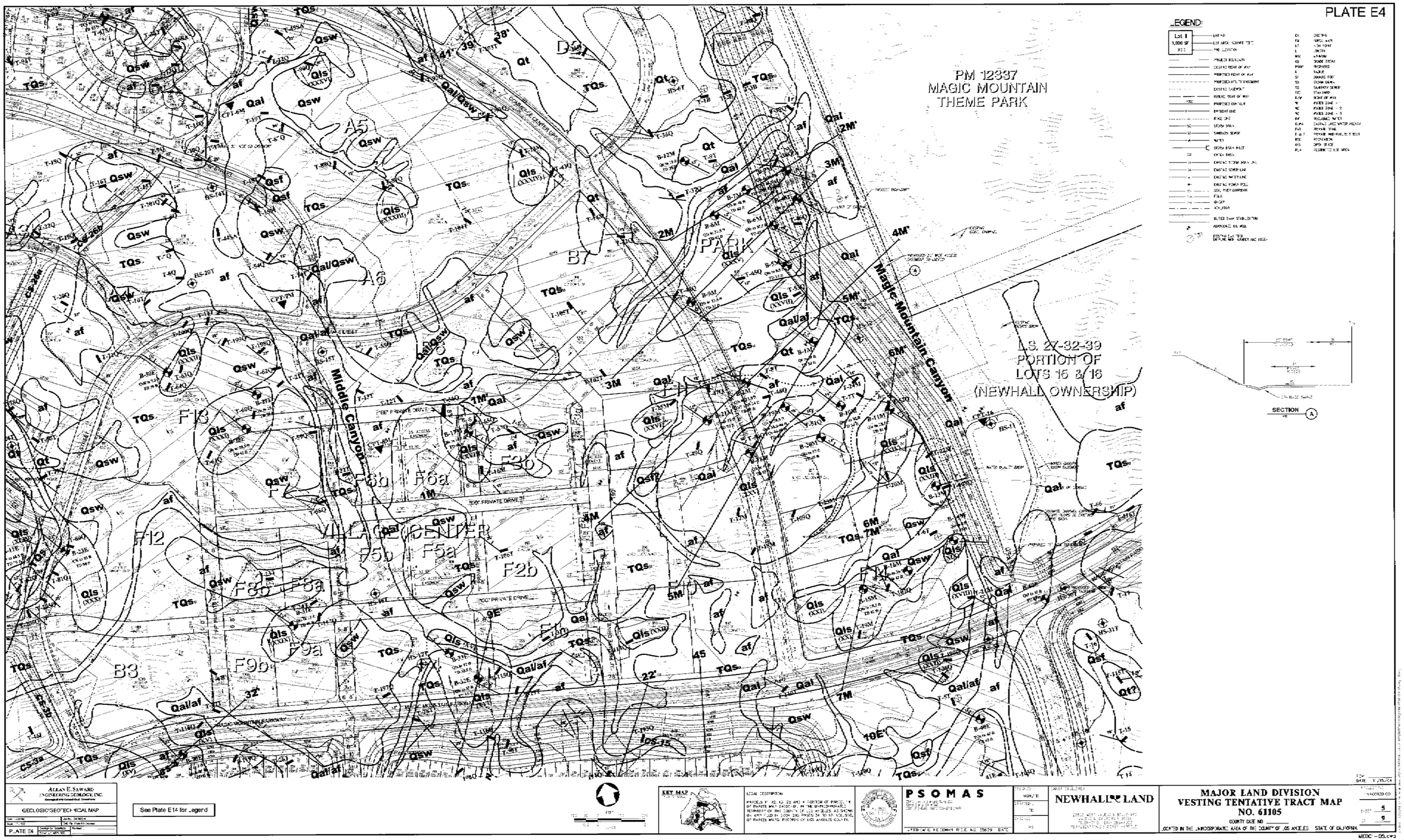


A full-size reproduction of this figure can be found at Impact Sciences.



A full-size reproduction of this figure can be found at Impact Sciences.

PLATE E4



A full-size reproduction of this figure can be found at Impact Sciences.

PLATE E5

LEGEND:

Exxon Mesa

Lion Canyon

Grapevine Mesa

PM 24500-01
LOT 12
(NEWHALL OWNERSHIP)

PM 188-90-95
PORTION OF LOT 5
(NEWHALL OWNERSHIP)

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.

GEOLOGIC/GEOTECHNICAL MAP

See Plate E14 for Legend

PLATE E5

KEY MAP

PSOMAS

NEWHALL LAND

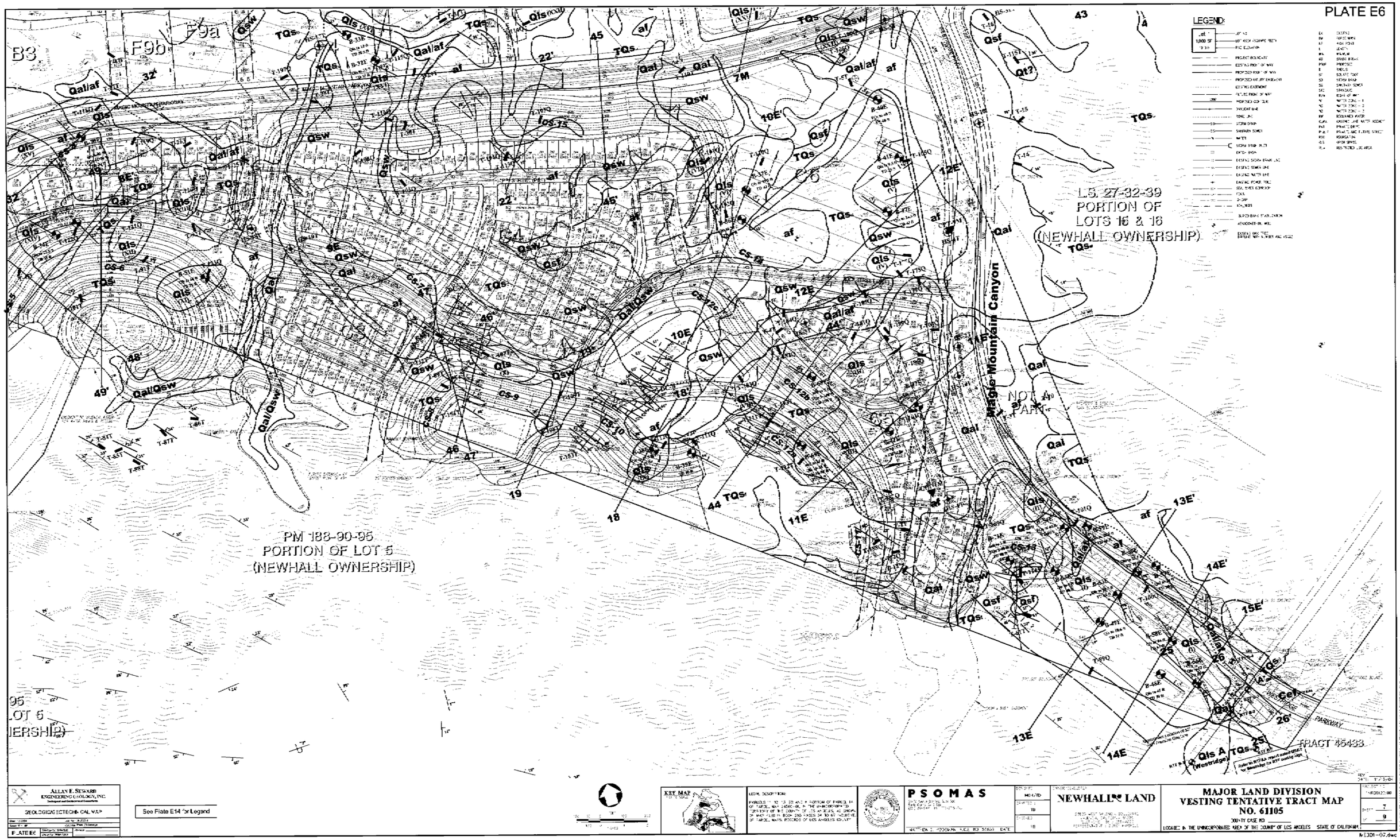
MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 61105

COUNTY CASE NO.

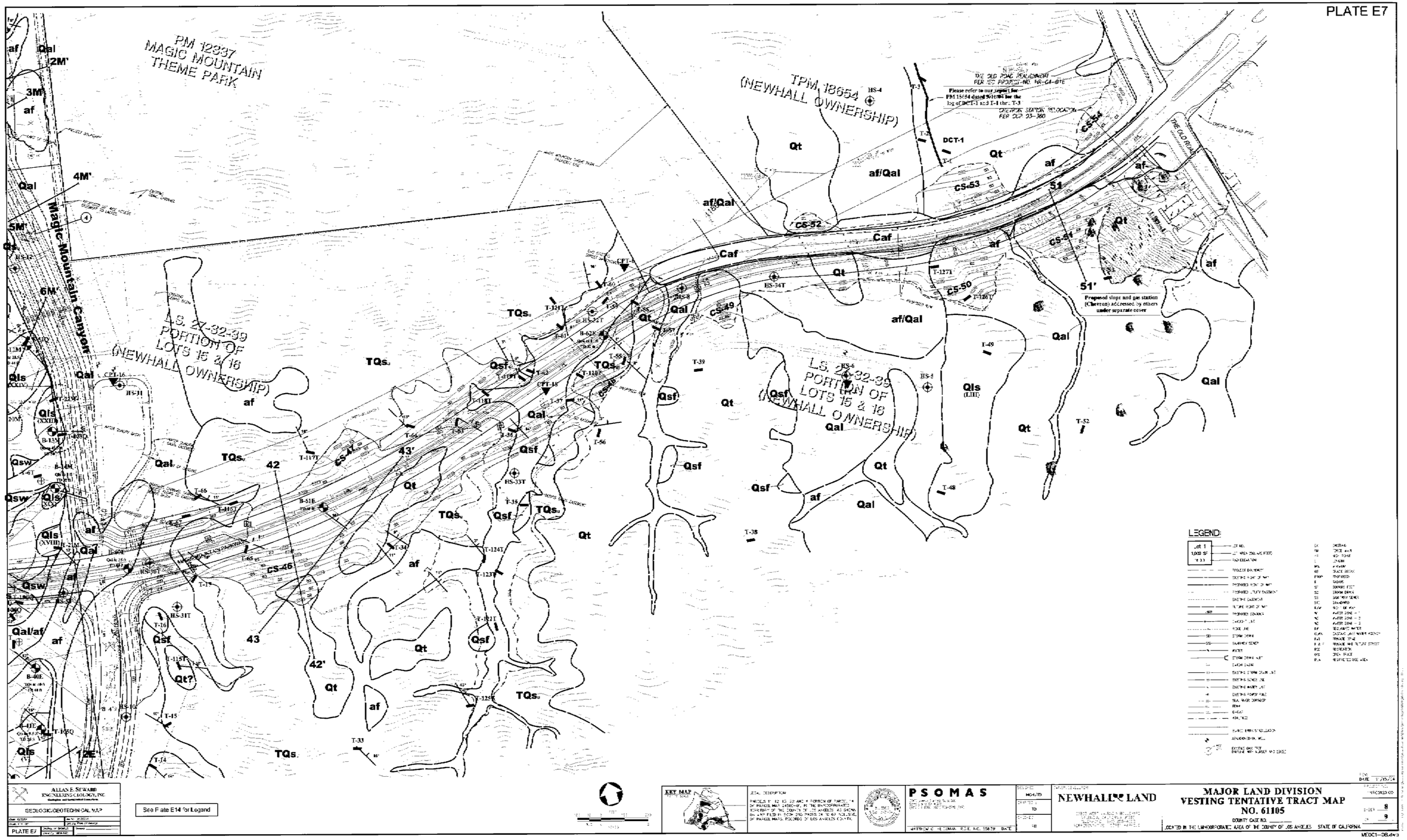
LOCATED IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

SHEET 6 OF 9

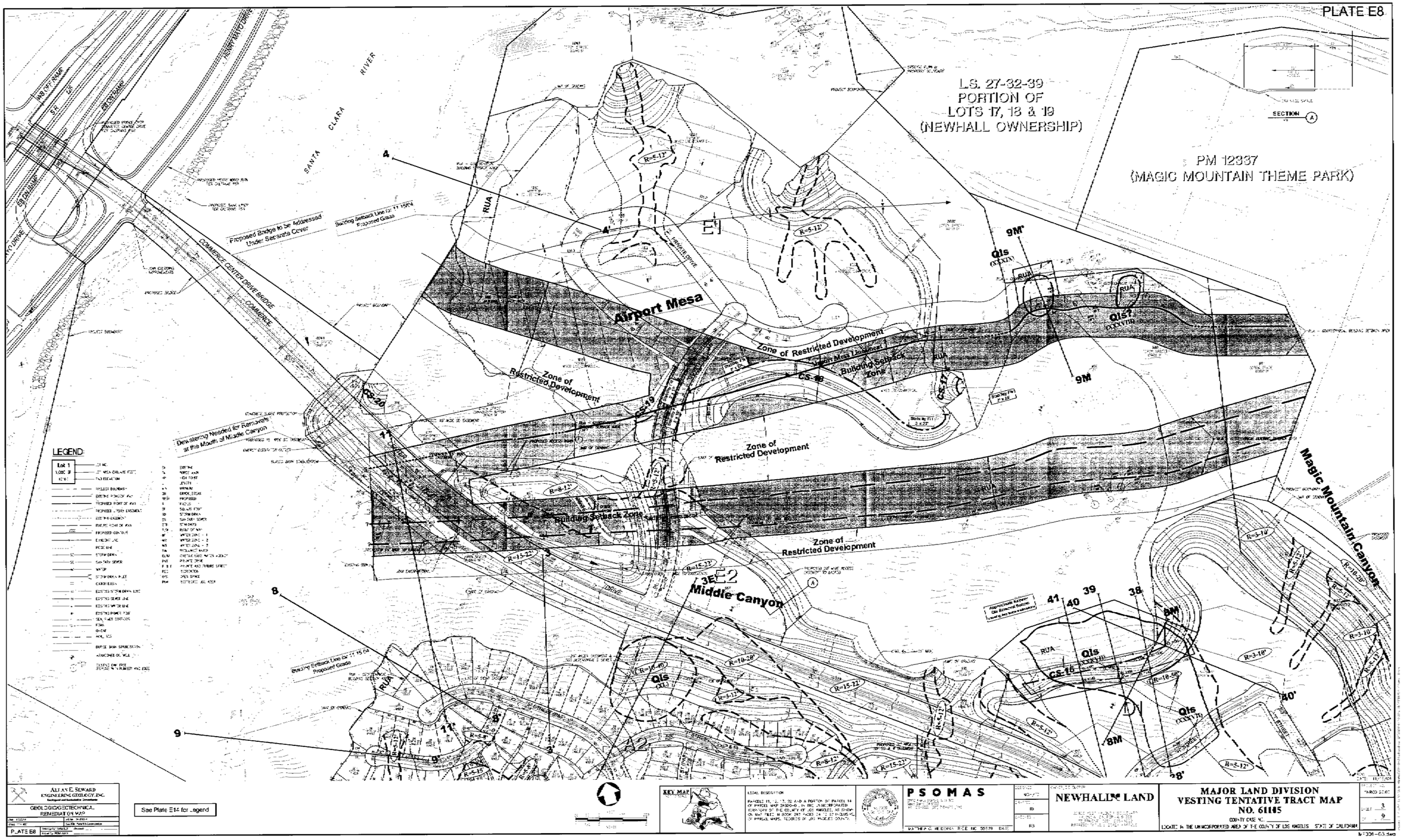
A full-size reproduction of this figure can be found at Impact Sciences.



A full-size reproduction of this figure can be found at Impact Sciences.

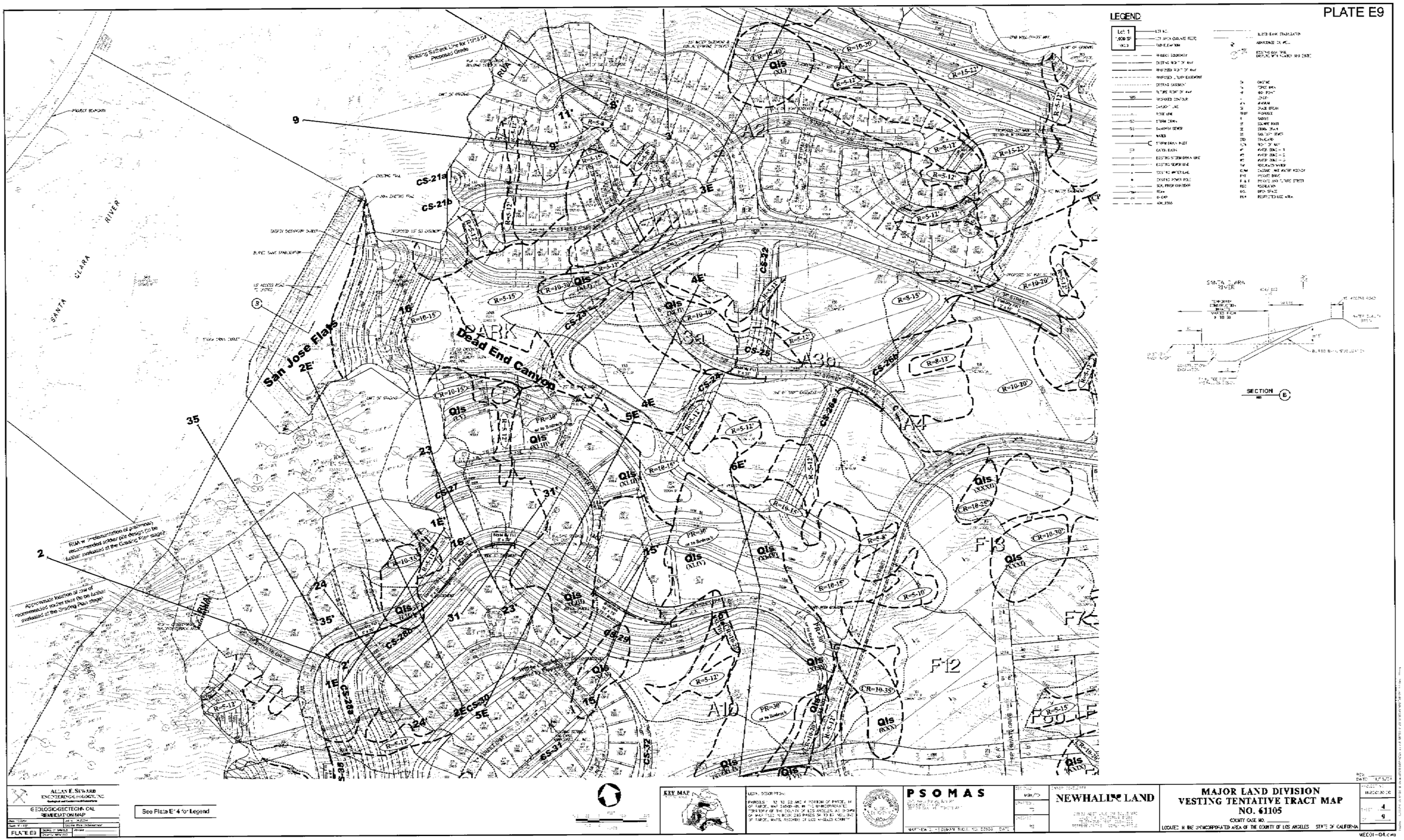


A full-size reproduction of this figure can be found at Impact Sciences.

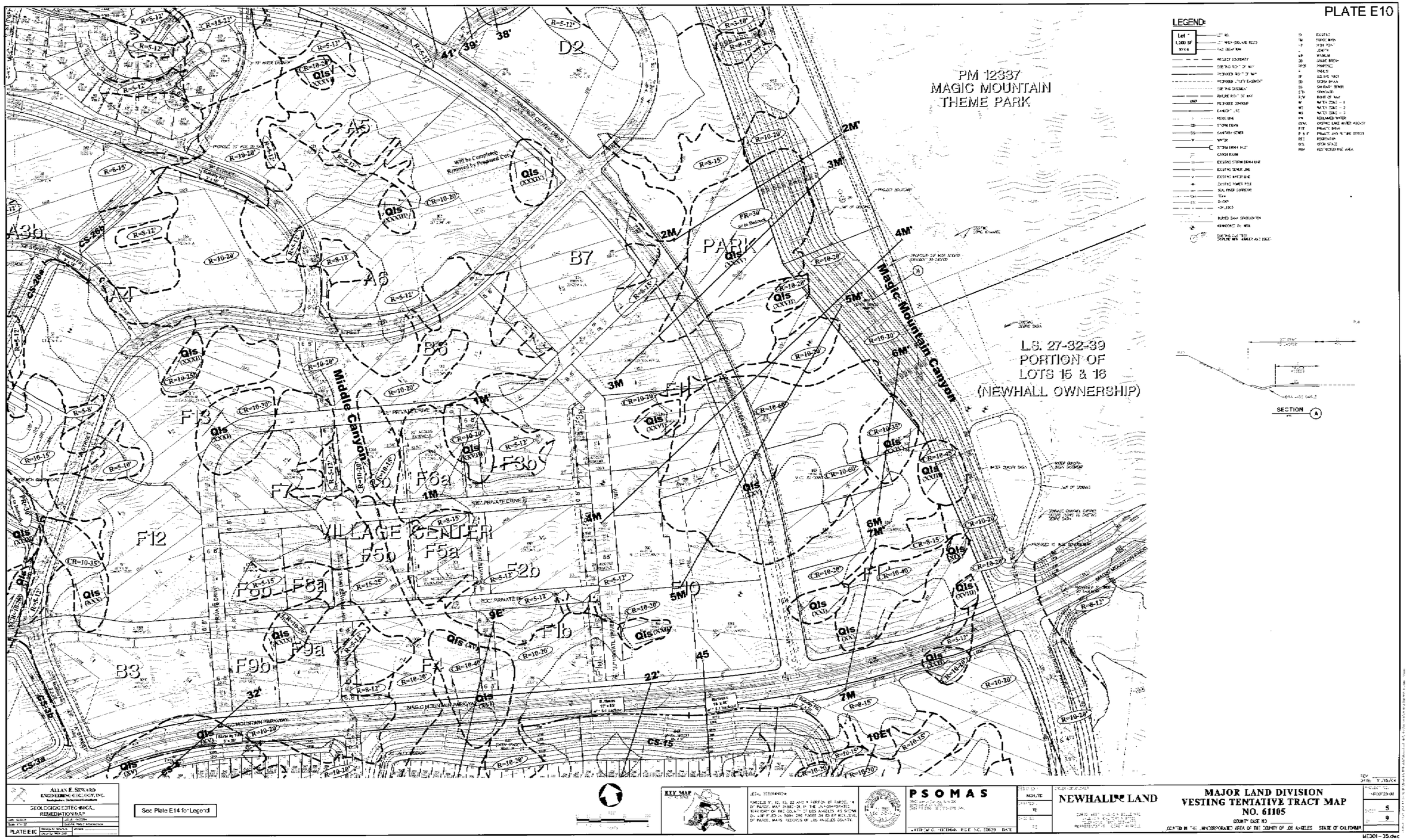


A full-size reproduction of this figure can be found at Impact Sciences.

PLATE E9



A full-size reproduction of this figure can be found at Impact Sciences.



A full-size reproduction of this figure can be found at Impact Sciences.

PLATE E11

LEGEND:

Exton Mesa

Lion Canyon

Grapevine Mesa

PM 24500-01
LOT 14
(NEWHALL OWNERSHIP)

PM 188-90-95
PORTION OF LOT 5
(NEWHALL OWNERSHIP)

A8

A9

B1

B2

B3

Building Setback Line for 1:715 Cut
Proposed Grade

See Plate E14 for Legend

ALLAN E. SEWARD
ENGINEERING GEOLOGISTS, INC.

GEOLOGIC/GEOTECHNICAL
REMEDIAL GRADING MAP

PLATE E11

KEY MAP

LEGAL DESCRIPTION:

PARCELS 1, 12, 13, 23 AND A PORTION OF PARCEL 14 OF PARCEL MAP 23500-01, IN THE UNINCORPORATED TERRITORY OF THE COUNTY OF LOS ANGELES, AS SHOWN ON MAP FILED IN BOOK 233 PAGES 91 TO 97, INCLUSIVE, OF PARCEL MAPS, RECORDS OF LOS ANGELES COUNTY.

PSOMAS

MATTHEW S. THOMAS, RCE NO. 55536

NEWHALL LAND

MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 61105

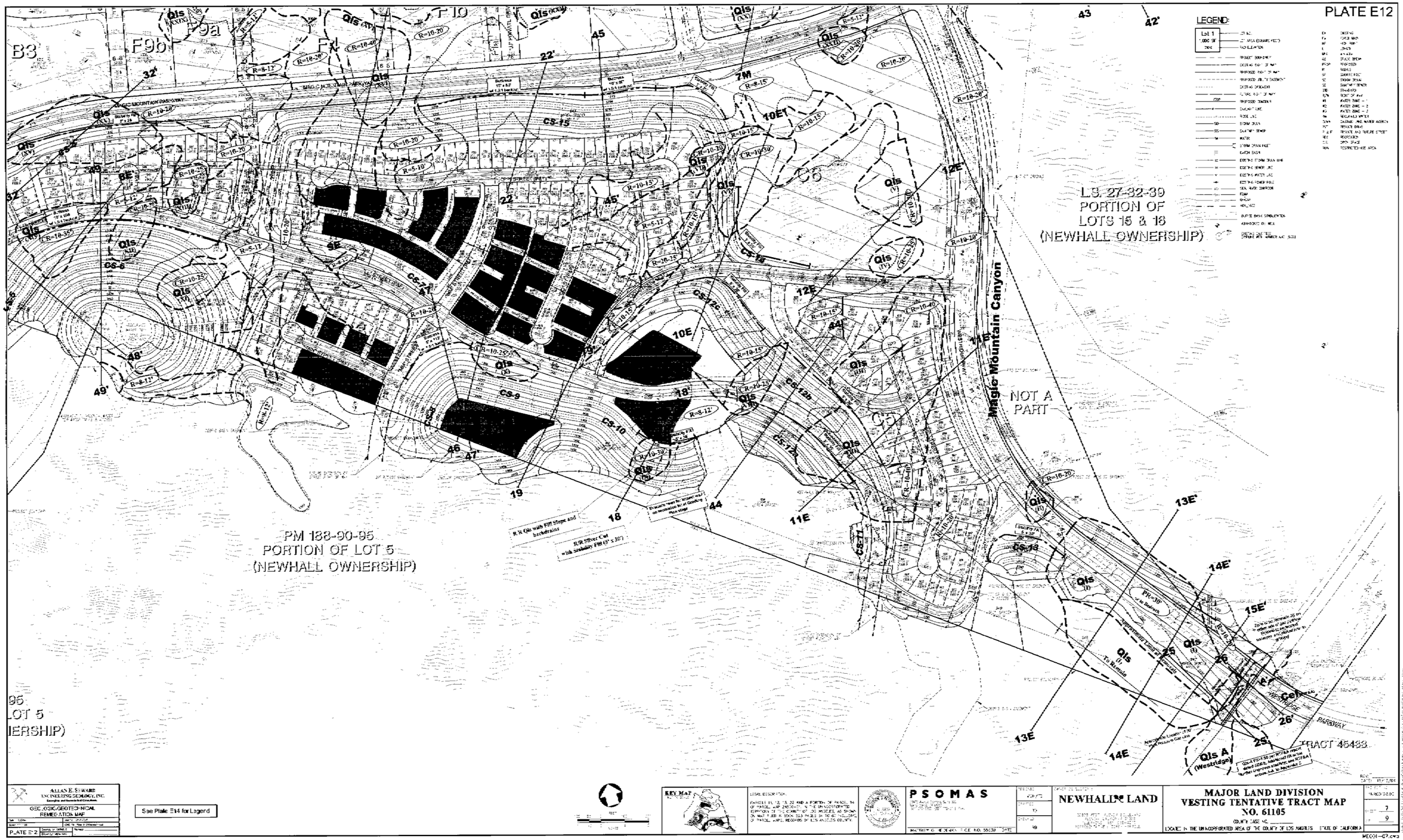
COUNTY CASE NO. _____

LOCATED IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

SHEET 6 OF 9

MECO1-06.dwg

A full-size reproduction of this figure can be found at Impact Sciences.



A full-size reproduction of this figure can be found at Impact Sciences.

PM 12337
MAGIC MOUNTAIN
THEME PARK

TPM 18654
(NEWHALL OWNERSHIP)

L.S. 27-32-39
PORTION OF
LOTS 15 & 16
(NEWHALL OWNERSHIP)

L.S. 27-32-39
PORTION OF
LOTS 15 & 16
(NEWHALL OWNERSHIP)

Magic Mountain Canyon

THE OLD ROAD REALIGNMENT
PER JEC PROJECT NO. NR-04-016

CHEVRON STATION RELOCATION
PER CUP 03-36C

THE OLD ROAD

Removals from existing-grade surface (does not account for proposed cut)

Proposed slope and gas station (Chevron) addressed by others under separate cover

RUA

Qls
(LIII)

Qls
(XXIII)

Qls
(XXIV)

Qls
(XVIII)

Qls
(V)

CS-39
CS-40
CS-41
CS-46
CS-49
CS-50
CS-52
CS-53
CS-54

2M'
3M'
4M'
5M'
6M'
12E'
42
42'
43
43'
51
51'

R=10-20'
R=10-45'
R=8-15'
R=10-20'
R=10-20'
R=8-12'
R=10-20'
R=10-20'
R=5-8'
R=8-12'
R=5-12'
R=8-12'
R=10-20'
R=10-20'
R=10-20'
R=8-12'
R=10-20'
R=10-20'

(180)

MAGIC MOUNTAIN PARKWAY

LEGEND

Lot 1 / 1,000 SF	LOT NO.	D	DITCH
	LOT AREA (SQUARE FEET)	FA	FIRST AREA
	PAD ELEVATION	HP	HIGH POINT
	PROJECT BOUNDARY	L	LENGTH
	EXISTING RIGHT OF WAY	MB	MAILBOX
	PROPOSED RIGHT OF WAY	GB	GRADE BREAK
	PROPOSED UTILITY EASEMENT	PRS	PROPOSED
	EXISTING EASEMENT	R	RADIUS
	PUBLIC RIGHT OF WAY	SF	SQUARE FEET
WQ	PROPOSED CONTOUR	SD	STORM DRAIN
	EXISTING CONTOUR	SS	SANITARY SEWER
	RIDGE LINE	SP	SPRINKLER
SD	STORM DRAIN	R/W	RIGHT OF WAY
SS	SANITARY SEWER	W	WATER ZONE – 1
W	WATER	W2	WATER ZONE – 2
	STORM DRAIN INLET	W3	WATER ZONE – 3
	CATCH BASIN	RW	RECLAIMED WATER
	EXISTING STORM DRAIN LINE	CVWD	CASTAIC VALLEY WATER AGENCY
	EXISTING SEWER LINE	PAT	PAVEMENT TAPER
	EXISTING WATER LINE	P.A.F.T.	PAVEMENT AT FUTURE STREET
	EXISTING POWER POLE	PDC	PERCOLATION
	SEA PROJECT CORRIDOR	OS	OPEN SPACE
	PCMA	NPA	PROTECTED PLANT AREA
	G-CMP		
	MAILBOXES		
	BURIED BANK STABILIZATION		
	REINFORCED FILL WALL		
	EXISTING GAS TANK (SEE LINE AND TANKER ASC 1975)		

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

GEOLOGIC/GEOTECHNICAL
REMEDIATION MAP

PLATE E12

See Plate E14 for Legend

KEY MAP

LEGAL DESCRIPTION

PARCELS 11, 12, 13, 22 AND A PORTION OF PARCEL 14 OF PARCEL MAP 24960-01, IN THE UNINCORPORATED TERRITORY OF THE COUNTY OF LOS ANGELES, AS SHOWN ON MAP FILED IN BOOK 293 PAGES 28 TO 31 INCLUSIVE, OF PARCEL MAPS, RECORDS OF LOS ANGELES COUNTY.

PSOMAS

MATTHEW D. HEIDEMAN, RCE NO. 53637

NEWHALL LAND

MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 61105

COUNTY CASE NO. _____

LOCATED IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

REV. DATE 1/12/04

SHEET 8 OF 9

MEC01-08.dwg

A full-size reproduction of this figure can be found at Impact Sciences.

GEOLOGIC/GEOTECHNICAL MAPS AND REMEDIATION MAPS LEGEND

af	Artificial fill
Qsw	Quaternary slopewash; only selected, large deposits are shown
Qal	Quaternary alluvium;active and recently active alluvial material
Qsf	Quaternary surficial failure; queried where uncertain
Qls (LIII)	Quaternary landslide and roman-numeral designation; queried where uncertain
Qt	Quaternary terrace deposits
TQs_u	Saugus Formation (upper unit)
TQs_l	Saugus Formation (lower unit)
TQs	Saugus Formation (undifferentiated)
	Geologic contact; queried where inferred; dotted where concealed
	Fault trace; queried where inferred; dotted where concealed
	Trace of syncline, showing direction of plunge; the trace is concealed where it is mapped across units younger than TQs
	Trace of anticline, showing direction of plunge; the trace is concealed where it is mapped across units younger than TQs
	Trace of monoclinal warp hinge line; the trace is concealed where it is mapped across units younger than TQs
73°	Strike and dip of bedding
60°	Approximate strike and dip of bedding
12°	Average strike and dip of bedding measured in bucket-auger borings within the bedrock
	Horizontal bedding
19°	Strike and dip of slide plane
47°	Strike and dip of shear
87°	Strike and dip of fracture
60°	Strike and dip of fault
75°	Strike and dip of minor fault
CS-54	Cut-slope designation
	Geotechnically recommended buttress
	Geotechnically recommended stability fill
	Cut/Fill line
	Geotechnically recommended building setback for slopes (where greater than h/3)
	Removal boundary
R=5-12'	Recommended removal depth; "CR" indicates complete removal of landslide
PR=30' or to Bedrock	Partial Removal of landslide with removal depth of upper 30' of landslide material or to bedrock where landslide is less than 30' deep

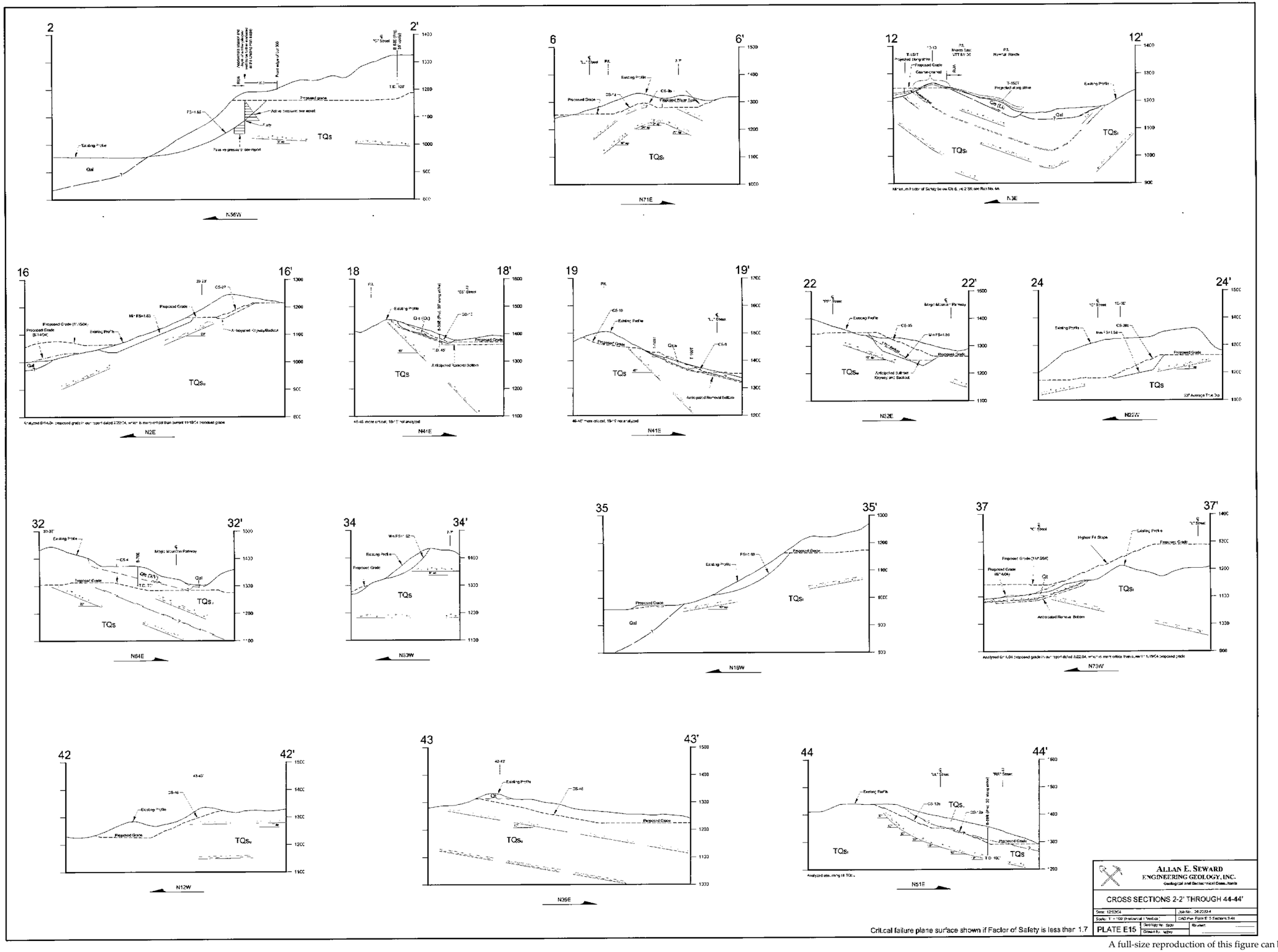
51 — 51'	Geologic cross section
$A_{(RTF\&A)}$ — $A'_{(RTF\&A)}$	Geologic cross section by RTF&A
T-217Q	Location of exploratory backhoe trench for Phase I Landslide Investigation (T-1Q thru T-141Q, T-146Q thru T-160Q, T-177Q thru T-214Q, & T-217Q)
T-25M	Location of exploratory backhoe trench for Mesas Entertainment Landslide Investigation (T-1M thru T-25M)
T-158T	Location of exploratory backhoe trench for Mesas East Tentative Map Investigation (T-1T thru T-59T, T-62T thru T-112T, T-114T, T-128T thru T-150T, & T-158T)
T-157T	Location of long exploratory backhoe trench for Mesas East Tentative Map Investigation (T-60T thru T-61T, T-113T, & T-151T thru T-157T)
ET-1T	Location of exploratory excavator trench for Mesas East
T-32B	Location of exploratory backhoe trench for Boulder Assessment Investigation (T-1B thru T-32B)
T-74H	Location of exploratory backhoe trench for Holser Investigation (T-1 thru T-74H)
T-82H	Location of exploratory backhoe fault trench for Holser Investigation (T-75H thru T-82H)
DC-1H	Location of exploratory dozer cut for Holser Investigation (T-75H thru T-82H)
DC-B	Location of exploratory dozer cut for Mesas East
T-47I	Location of exploratory backhoe trench for Phase I Feasibility Evaluation - Infrastructure (T-42 I thru T-47 I)
T-55SA	Location of exploratory backhoe trench for Sand Aggregate Investigation (T-40SA thru T-55SA)
T-67	Location of exploratory backhoe trench for Magic Mountain Entertainment (T-14 thru T-17, T-33 thru T-39, T-48, T-49, T-52, T-53, and T-55 thru T-67)
T-14MW	Location of exploratory backhoe trench for Phase II Landslide Evaluation - Mesas West (T-7MW and T-12MW thru T-14MW)
B-73E	Location of exploratory bucket-auger boring for Mesas East (B-1E thru B-73E)
B-25M	Location of exploratory bucket-auger boring for Mesas Entertainment Landslide Investigation (B-1M thru B-25M)
B-8B	Location of exploratory bucket-auger boring for Boulder Assessment Investigation (B-1M thru B-25M)
B-16W	Location of exploratory bucket-auger boring for Phase II Landslide Investigation - Mesas West
RTF B-5	Location of exploratory bucket-auger boring by RTF&A; see Westridge Tract 45433-04 report dated 6/3/02 (RTF B-1 thru RTF B-5)
RW-3M	Location of rotary-wash boring for Geotechnical Evaluation - Mesas area (RW-1M thru RW-3M)
RW-3T	Location of rotary-wash boring for Mesas East Tentative Map Investigation (RW-1T thru RW-3T)
HS-34T	Location of hollow-stem-auger boring for Mesas East Tentative Map Investigation (HS-1T thru HS-34T)
HS-13	Location of hollow-stem-auger boring for Magic Mountain Entertainment (HS-4 thru HS-6, HS-8, and HS-10 thru HS-13)
HS-14I	Location of hollow-stem-auger boring for Phase I Feasibility Evaluation - Infrastructure (HS-12 I thru HS-14I)
CPT-18	Location of cone penetration test for Magic Mountain Entertainment (CPT-4, CPT-6, CPT-16, and CPT-18)
CPT-18M	Location of cone penetration test for Preliminary Geotechnical Evaluation - Mesas area (CPT-1M thru CPT-15M and CPT-18M)
	Building Setback Zone for faulting; subject to revision based on additional work and final grades
	Zone of Restricted Development; critical and essential facilities are not recommended in this zone and additional structural and/or geotechnical measures are recommended for any other structures in this zone
	Lots potentially affected by additional overexcavation requirements in the vicinity of the monoclinal warp and Lion Canyon Anticline (8-ft-minimum overexcavation)
RUA	Restricted Use Area

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

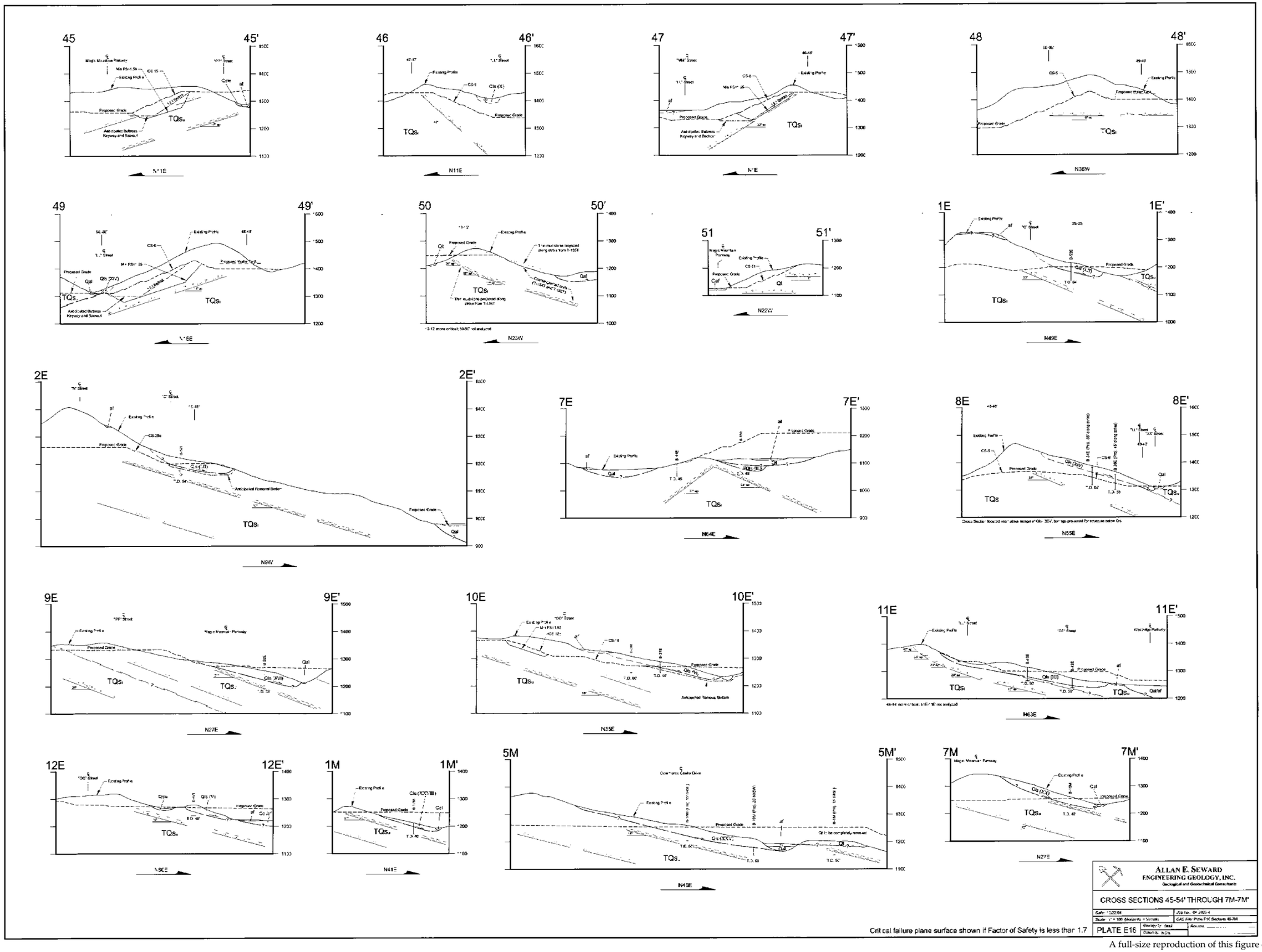
GEOLOGIC/GEOTECHNICAL MAPS AND REMEDIATION MAPS LEGEND

Date: 12/22/04	Job No.: 04-2023-1
Scale: N/A	CAD File, Plate E14-Legend
PLATE E14	Geology by: N/A; Drawn by: MEW; Revised:

A full-size reproduction of this figure can be found at Impact Sciences.



A full-size reproduction of this figure can be found at Impact Sciences.



A full-size reproduction of this figure can be found at Impact Sciences.

Appendix F

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL PLUGGING AND ABANDONMENT

Ventura, California

September 21, 1994

EXXON Corporation
Attn: Env. & Req. Affairs
P.O. Box 1600
Midland, TX 79702

Your report of the plugging and abandonment of well "Newhall Land & Farming Co." 36, A.P.I. No. 037-06353, Section 19, T. 4N, R. 16W, S.B. B.& M., Castaic Junction field, Los Angeles County, dated 03-04-94, received 03-10-94, has been examined in conjunction with records filed in this office. We have determined that all of the requirements of this Division have been fulfilled relative to plugging and abandonment of the well, removal of well equipment and junk, and the filing of well records.

svl

William F. Guerard, Jr
State Oil and Gas Supervisor

By Patrick J. Kinnear
Patrick J. Kinnear
Deputy Supervisor

cc: Conservation Committee
Update

Modified OG159 (4/94)

Dekalb Energy Co.	"N.L.& F." 1 (037-21702)	20-4N-16W	Los Angeles County

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS

REPORT ON PROPOSED OPERATIONS No. P 276-8

Mr. Walter S. Harris, Agent
DEPCO, Inc.
2131 Banbury Road
Walnut Creek, Calif. 94598

Santa Paula, Calif.
Jan. 12, 1976

DEAR SIR:
Your proposal to drill Well No. "N.L.& F." 1 (037-21502),
Section 20, T. 4N, R. 16W, S.B. B. & M., - Field, Los Angeles County,
dated 12/24/75, received 1/7/76, has been examined in conjunction with records filed in this office.

THE PROPOSAL IS APPROVED PROVIDED THAT:"

1. Sufficient cement shall be pumped back of the 10 3/4" casing to fill from the shoe to the surface.
2. The drilling fluid used shall be of a quality and in sufficient quantity to control all subsurface conditions in order to prevent blowouts; and a reserve supply of this material shall be kept on hand to meet any emergency. No contaminants or toxic material shall be used in any drilling fluid that is to be placed in an unlined sump.
3. Constant surveillance of drilling fluid characteristics and volume shall be maintaine by drilling personnel, and by the use of return monitoring equipment and a mud pit level indicator with a visual and audible alarm device.
4. Any sump used during drilling operations shall be thoroughly cleaned of all drilling materials and the site restored to its prior condition as soon as drilling operations are completed.
5. Blowout prevention equipment, at least of the Division of Oil and Gas Class III rating, shall be installed and maintained in operating condition at all times.
6. Blowout-prevention practice drills shall be conducted at least weekly for each crew, and recorded in the log book.
7. Fresh waters back of the 5 1/2" casing shall be protected with cement.
8. This Division shall be consulted before placing any plugs or sidetracking any hole.
9. THIS DIVISION SHALL BE NOTIFIED TO WITNESS:
   a. A pressure test of the blowout prevention equipment before drilling out of the shoe of the 10 3/4" casing.
   b. A test of the 5 1/2" water shut-off above the zone to be produced.

NOTE: A COPY OF THIS APPROVAL SHALL BE POSTED AT THE WELL SITE PRIOR TO COMMENCING OPERATIONS.

Blanket Bond
MD:b

HAROLD W. BERTHOLF
~~JOHN F. MATTHEWS~~, Jr., State Oil and Gas Supervisor

By M. G. Mefford, Chief Deputy

25476-705 7-74 50M ⓘD OSP
OG 111

STATE OF CALIFORNIA
DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS

DIVISION OF OIL AND GAS
RECEIVED
JUN 16 1976
SANTA PAULA, CALIFORNIA

Notice of Intention to Abandon Well

This notice must be given at least five days before work is to begin.

FOR DIVISION USE ONLY			
CARDS	BOND	FORMS 114	FORMS 121
	BB	✓	✓

DIVISION OF OIL AND GAS

In compliance with Section 3229, Division 3, Public Resources Code, notice is hereby given that it is our intention to abandon Well No. N.L. & F. No. 1, API No. _____, Sec. 20, T. 4N, R. 16W, SB B. & M., Wildcat Field, Los Angelex County, commencing work on May 24, 1976.

The present condition of the well is:

1. Total depth: 13,478' TD, 13,140' PBTD
2. Complete casing record, including plugs and perforations:
   10-3/4" OD, 40.5#, K55, ST&C set @ 1400' KB.
   Set 144 sx Class "G" cement plug from 13,478'TD to 13,140'.
3. Last produced No production (Date) (Oil, B/D) (Gas, Mcf/D) (Water, B/D)

   or
4. Last injected No injection (Date) (Water, B/D) (Gas, Mcf/D) (Surface pressure)

Additional data for dry hole (show depths)

5. Oil or gas shows
   Modello "10" Zone 11588-11730' KB
   Modello "15" Zone 12158-12680'
   Modello "21" Zone 12,995-13334'
6. Stratigraphic markers:
   Modello - 9488' KB
   Modello "10" - 11588'
   Modello "15" - 12995'
   Modello "21" 12995
7. Formation and age at total depth:
   Modello "21" Miocene Age
8. Base of fresh water sands: 2020' KB

The proposed work is as follows:

Plugging Interval	Sx Class "G" Cement	Division of O & G Witness
13,140-12,895' KB	133 sx + 37# HR7	Top & hardness
12,168-12,068' KB	68 sx + 19# HR7	Placement of plug
11,600-11,500' KB	68 sx + 19# HR7	No
1,984-1,751' KB	92 sx + 3% $CaCl_2$	Top & hardness
1,420-1,270' KB	70 sx + 3% CaC12	Top & hardness
42-17' KB	12 sx	Placement of plug

Verbal approval of above program given by Murray Dosch 5-24-76

It is understood that if changes in this plan become necessary we are to notify you immediately.

Address 1025 Petroleum Club Building (Street)
Denver (City) Colorado (State) 80202 (Zip)
Telephone Number 303-292-0980

DEPCO, Inc. (Name of Operator)
By John S. Nyle (Name) 6/11/76 (Date)
Type of Organization Corporation (Corporation, Partnership, Individual, etc.)

OG108 (12-73-GSR1-15M)

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

GEOLOGIC AND GEOTECHNICAL REPORT – ADDENDUM NO. 2
Response to Los Angeles County Geologic Review Sheet dated January 26, 2005 and Soils Engineering Review Sheet dated February 22, 2005

GEOLOGIC AND GEOTECHNICAL REPORT
Review of Revised Vesting Tentative Tract Map (dated 6/1/05)

Vesting Tentative Tract 61105
Mission Village
Newhall Ranch, California

VOLUME I OF II

Prepared for:

The Newhall Land and Farming Company
23823 West Valencia Boulevard
Valencia, California 91355

Job No: 05-2023-4
Dated June 13, 2005

27825 Smyth Drive, Valencia, California 91355 661-294-0065 FAX 661-294-0833

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

June 13, 2005 Job No: 05-2023-4

The Newhall Land and Farming Company
23823 West Valencia Boulevard
Valencia, California 91355

Attention: Mr. Corey Harpole

Subject: **GEOLOGIC AND GEOTECHNICAL REPORT – ADDENDUM NO. 2**
Response to Los Angeles County Geologic Review Sheet dated January 26, 2005 and Soils Engineering Review Sheet dated February 22, 2005

GEOLOGIC AND GEOTECHNICAL REPORT
Review of Revised Vesting Tentative Tract Map (dated 6/1/05)

Project: Vesting Tentative Tract 61105
Mission Village
Newhall Ranch, California

References: At end of text

Dear Mr. Harpole:

This report is divided into two parts. The **first part** presents our response to the Geologic Review Sheet dated January 26, 2005 and Soils Engineering Review Sheet dated February 22, 2005 for Vesting Tentative Tract (VTT) 61105 issued by Los Angeles County Department of Public Works Geotechnical and Materials Engineering Division. The **second part** of the report presents our opinions on the existing geologic conditions for Vesting Tentative Tract 61105 relative to the **Revised Vesting Tentative Tract Map (6/1/05)** and their affects on the proposed development. This report is supplementary to our previous reports (see **References**) and the procedures, conclusions and recommendations presented therein are still applicable except where they are superseded in this report.

GEOLOGIC AND GEOTECHNICAL REPORT - ADDENDUM NO. 2

In order to facilitate the review process, we have listed the County's remarks in **bold** in the order in which they appear on the original review letter. Each remark is followed immediately by our response. Copies of the review letters are attached after the references.

GEOLOGIC REVIEW SHEET (Dated 1/26/05)

Remark No. 1

Landslides Qls-L1 and Qls XXXVII are showing crossing lot boundaries. As recommended by the geotechnical consultants and per County policy, adjust lot lines to constrain the landslides on one lot or provide remediation of the landslides. The landslide hazard may not be subdivided.

Response

The lot lines in the vicinity of landslide Qls-LI have been adjusted accordingly and no longer cross the Landslide. Per our previous report, (12/22/04) the proposed development will not adversely affect or contribute to the instability of Landslide Qls-LI.

We recently excavated, logged and sampled five backhoe pits in the vicinity of Landslide Qls-XXXVII in order to respond to the soils engineering review sheet (2/22/05) comment No. 2. Results of our subsurface investigation indicate that this landslide is smaller than originally mapped and the revised landslide limits have been shown on the attached Geologic/Geotechnical Map. We have recommended a subdrain in order to drain the lower portion of the mid-slope shear key for Qls-XXXVII and CS-16 remediation. Cross-Sections 38-38', 39-39' and 41-41' have been re-analyzed with respect to the revised groundwater and landslide conditions. Slope stability calculations on the landslide to remain and underlying bedding planes indicate that landslide Qls-XXXVII will exceed the County minimum standards for static and pseudo static conditions and hence an R.U.A. is not needed.

Remark No. 2

The Soils engineering review dated 2/22/05 is attached.

Response

Acknowledged.

SOILS ENGINEERING REVIEW SHEET (Dated 2/22/05)

Remark No. 1

On Page 7 and 8 of the submitted report, it provides recommendations for proposed soldier piles to support the majority of the buildable area of Lot 300. Provide specific calculations and analyses to verify the feasibility of the proposed soldier piles (i.e. to ensure that the proposed slope / soldier pile system will have a factor of safety of greater than or equal to 1.50). In the slope stability analyses with the proposed soldier piles, the portion of the slope down slope of the soldier pile wall must assume to have failed. Indicate the various shear strength parameters and the passive resistance used in the analyses, in the appropriate segments of each failure plane. Recommended revised soldier pile embedment depths as necessary.

Response

Per the County's request, we have performed specific calculations and analyses to further verify the feasibility of the proposed soldier piles.

The slope stability analyses for Lot 300 (Geologic Cross Section 2-2') have been revised and are presented in **Appendix C**. The 1.55 factor of safety surface is approximately 48 feet below the proposed grade at the proposed critical soldier pile location.

The active earth pressure calculations were performed with two different (method of slice and method of failure) methods. The calculations are presented in **Appendix C** (see **Figures C1** and **C2**). The passive earth pressure calculations are presented in **Figure C3**. We assumed that the portion of the slope down slope of the soldier pile failed and no passive resistance are available above the 1.55 factor of safety surface. We have also reduced passive resistance due to sloping ground below the fixity point. The proposed soldier pile system design has a factor of safety greater than or equal to 1.55.

For the purposes of feasibility the estimated embedment depth will be approximately 25 feet below the 1.55 factor of safety surfaces. At the location of 2-2' on Lot 300 this equates to a total estimated soldier pile depth from proposed grade of 73 feet. Specific soldier pile embedment depths will be provided by the project structural engineer at the Grading Plan stage.

Further evaluation and refinement should be performed at the 40-scale Grading Plan stage.

The Restricted Use Area shown on the Vesting Tentative Tract base map for Lot 300 needs to be revised by the civil engineer to match our RUA designation as shown on Plate D-9.

Remark No. 2

On cross-section 41-41' of the previous report it shows that a portion of landslide Qls-XXXVII is to remain in place with a proposed stability fill placed on the landslide debris. Specifically address the suitability of the landslide debris, proposed to remain in place, to support new engineered compacted fill. Certification for new fill will only be accepted if it is benched into competent material. Address and provide sufficient data to establish the competency of the landslide debris to support certified fill and structures. If competency can not be established then the remaining landslide debris must be either mitigated or placed under "Restricted Use Area".

Response

In order to verify the competency of the landslide debris we excavated, geologically logged and sampled an additional five (5) backhoe pits. Representative California Drive (C.D.) samples of the landslide material (as well as representative Slopewash deposits) were taken. Consolidation tests were performed on these samples in our laboratory. None of the samples showed significant consolidation potential. The consolidation tests results are presented in **Appendix B**. Prior sampling and testing of B-22M soils indicated that the weakest material encountered in B-22M consisted of the artificial fill (af) deposits at 15 ft. A consolidation test was run on this sample and it did not show any significant consolidation potential (Report dated 7/22/04).

As stated in our response to the geologic review sheet, Landslide Qls-XXXVII calculates stable with factors of safety that exceed the County minimum standards for static and pseudo static conditions.

The additional laboratory test results, additional backhoe pit logs, revised slope stability calculations, cross sections and maps are included in this report.

Based on the combination of our observations in the borings and trenches, field and laboratory testing of the site samples, the ancient landslide debris (Qls-XXXVII) and other

soil materials in the vicinity of the shear key fill are considered to be competent and suitable to support new engineered compacted fill.

Remark No. 3

Independent static slope stability analysis for cross section 41-41' indicate factors of safety below County minimum standards. Verify and make revisions as necessary. Recommended mitigation if factors of safety are below County minimum standards.

Response

Cross-Section 41-41' has been revised and re-analyzed based on the findings of our additional subsurface investigation and recommendations. Slope stability calculations indicate that the proposed grades have a factor of safety greater than the County minimum standards. Please note that Landslide Qls-XXXVII boundaries have been revised in the vicinity of 41-41' based on the recent subsurface exploration.

Cross Sections 38-38' and 39-39' have also been re-analyzed based on the recommended shear key subdrain and the portion of Qls-XXXVII to remain, after grading, calculates stable with factors of safety that exceed the County minimum standards.

Remark No. 4

On the Geotechnical Map (Plate E5) provided within the submitted report, it appears that the proposed lot lines for Lots 413-414 transect landslide Qls-L1. Per County policy unmitigated landslides can not cross lot boundaries. Provide revised lot lines or mitigation measures for the landslide, as necessary.

Response

The lot lines have been adjusted in the vicinity of Qls-LI and the lot lines do not cross the landslide. The proposed development will not adversely affect or contribute to the instability of the landslide (as discussed in our report dated 12/22/04).

Remark No. 5

Show the following on the geotechnical maps:

a. Revised lot lines (Lots 413 and 414).
b. Location of keyways of buttress/stabilization fills.
c. Revised soldier pile embedment depths, as necessary.
d. All recommended mitigation measures.

Response

All of the requested information in Remark No. 5 is shown on the attached Geologic/Geotechnical Remediation Maps.

Remark No. 6

Requirements of the Geology Section are attached.

Response

Acknowledged.

Remark No. 7

Include a copy of this review sheet with your response.

Response

A copy has been provided at the end of the text.

GEOLOGIC AND GEOTECHNICAL REPORT

Review of Revised Vesting Tentative Tract Map (6/1/05)

This portion of our report presents our opinions on the existing geologic and geotechnical conditions on Vesting Tentative Tract Map (VTTM) No. 61105 relative to the revised map and their effects on the proposed development. This report is supplementary to our reports dated 7/22/04 and 12/22/04 for VTTM 61105, and the conclusions and recommendations presented therein are still applicable except where they are superseded in this report.

1.0 SCOPE OF WORK

The scope of work completed during the preparation of this report included the following tasks:

1. Geologic/Geotechnical review of revised Vesting Tentative Tract Map No. 61105 (6/1/05).

2. Coordination with the Supervising Civil Engineer, Psomas.

3. Meeting at the County of Los Angeles on April 19, 2005.

4. Additional subsurface explorations in the vicinity of Landslide Qls-XXXVII consisting of five (5) backhoe trenches.

5. Additional laboratory testing of representative samples.

6. Geologic and geotechnical engineering analyses and preparation of Conclusions and Recommendations based on the existing site conditions and future use intended. Analyses included detailed static and pseudostatic stability analyses of proposed grades, including cut slopes, natural slopes and fill slopes where appropriate. Based on the results, the need for tentative stabilization measures was explored.

7. Preparation of this report and associated revisions and additions to the Geologic/Geotechnical Maps, Cross Sections, Appendices and Legend.

2.0 BACKGROUND

Geologic and geotechnical aspects of Vesting Tentative Tract Map No. 61105 (dated 6/14/04) were previously addressed in our reports dated July 22, 2004 and December 22, 2004.

3.0 REVISIONS VTTM 61105

3.1 General

Most of the revisions consist of changes in use from single family lots to multi-family lots. For reference, the number of total lots has changed from 1054 to 594 and the number of dwelling units has remained the same at 5,331. Estimated earthwork is still 27,000,000 cubic yards.

The only significant changes to proposed grades occur where 1) the Zone 1 water tank site was deleted; 2) the natural slope between CS-10 and CS-12a has been changed to a cut slope; 3) the Water Quality Basin northeast of the intersection of Magic Mountain Parkway and Westridge Parkway has been reconfigured and a debris basin has been added east of Private Drive "LL" on the southeast portion of the subject site; 4) the 42 ft wide Access Road and Storm Drain easement to LACFCD was added at the base of the fill slope on the northeast side of Westridge Parkway; and 5) the intersection of Magic Mountain Parkway and The Old Road has been slightly re-aligned.

3.2 Revised Cut Slopes

Due to the deletion of the proposed Zone 1 Water tank pad the previously proposed cut slope CS-1b has been deleted and CS-1a has been revised. Previously designated proposed cut slope CS-1c is now designated as CS-1b. The reconfiguration of CS-1a has resulted in a slope that is oriented in the same direction but overall is 10 feet higher and is considered grossly stable based upon the steeply dipping bedrock. Geologic cross sections 6-6' and 7-7' have been revised along with the Geologic/Geotechnical Maps to reflect these changes. The previously recommended stability fills for these two proposed cut slopes are still applicable and have been revised accordingly on the attached Geologic/Geotechnical Remediation Maps.

The ascending natural slope located behind Recreation Lot 856 on the previous tentative map (Recreation Lot number 458 on the 6/1/05 tentative map) is now designated as a cut slope and a lateral easterly extension of CS-10, which will connect to CS-12a. This easterly extension of CS-10 is considered grossly stable due to the steeply dipping beds, however, due to the "sliver cut" configuration the recommended stability fill for CS-10 has been extended to include this addition and is shown on the attached Geologic/Geotechnical Remediation Maps.

3.3 Revised Water Quality Basin and Additional Basin East of "LL" Private Drive

The proposed Water Quality basin NE of the intersection of Magic Mountain Parkway extension and Westridge Parkway has been reconfigured by narrowing and lengthening its area. The debris basin added east of "LL" Private Drive is located at the toe of a proposed 2:1 Fill Slope and proposed Cut-Slopes, CS-1a and CS-1b. Our rapid drawdown analyses presented in our report dated 7/22/04 represents a more critical condition than these two basin configurations and exceeds the County minimum standards for slope stability.

3.4 42 Ft Wide Access Road and Storm Drain Easement

A combination 42 ft wide Access Road and Storm drain easement to LACFCD was added at the toe of the descending fill slope east of Westridge Parkway. Our prior removal recommendations in this area are still applicable.

3.5 The Old Road and Magic Mountain Parkway

The slight realignment of this proposed intersection has slightly shifted the toe of proposed cut slopes CS-53 and CS-54. The recommended stability fills for these two slopes have been adjusted accordingly and are shown on the attached Geologic/Geotechnical Maps.

4.0 GENERAL CONSLUSIONS AND RECOMMENDATIONS

4.1 Feasibility of Development

Revised Tentative Tract Map No. 61105 (dated 6/1/05) is feasible for development from the standpoint of geology/geotechnical conditions provided our recommendations are followed and implemented during construction. The conclusions and recommendations

presented within our previous reports are still applicable, except where they are superseded in this report.

5.0 LOS ANGELES COUNTY 111 STATEMENT

In compliance with Section 111 of the Los Angeles County Building Code, it is the finding of this firm that the Building Sites designated on the proposed Revised Vesting Tentative Tract Map 61105 (dated 6/1/05) will not affect offsite property provided all our recommendations are incorporated in the Grading Plan and implemented during construction.

6.0 GEOLOGIST/GEOTECHNICAL ENGINEER OF RECORD

This report has been prepared assuming that Allan E. Seward Engineering Geology, Inc. will refine all geology and geotechnically-related data for the Grading Plan stage. If the recommendations contained in this report are to be utilized, and expansion of the geology/geotechnical work is performed by others, the party performing the work must review this report and assume full responsibility for the recommendations contained herein. That party would then assume the title of responsibility as "Geologist/Geotechnical Engineer of Record" for the project.

At the Grading Stage, representatives of the Geology/Geotechnical Engineer of Record should be present to observe all grading operations. A report presenting the results of those observations and related testing should be issued upon completion of the operations. All footing excavations should be observed by a representative of the Geologist/Geotechnical Engineer of Record prior to placing steel or pouring concrete into the excavations.

7.0 LIMITATIONS

This report has been prepared for the exclusive use of The Newhall Land and Farming Company and their design consultants for the specific site discussed herein. This report should not be considered transferable. Prior to use by others, we should be notified, as additional work may be required to update this report.

In the event that any modifications in the design or location of the proposed development, as discussed herein, are planned, the conclusions and recommendations contained in this report will require a written review by this firm with respect to the planned modifications.

The proposed development is located in southern California, which is in a geologically and seismically active region where large magnitude, potentially destructive earthquakes are common. Therefore, it is reasonable to assume that ground motions from moderate or large magnitude earthquakes could affect the site during the life of a given structure in southern California.

It should be noted that faulting is normally confined to the area immediately adjacent to a known fault, or within a few feet of the last fault movement. Regardless of what criteria are used however, absolute assurances against future, fault displacement or strong ground motion cannot be obtained in tectonically active areas. New faults can form, as the orientation and magnitude of deformational forces in the earth's crust change with time. Therefore, the location of new breaks or ground motions during a seismic event cannot be located or anticipated.

In performing these professional services, we have used the degree of care and skill ordinarily exercised, under similar circumstances, by reputable engineering geologists and geotechnical engineers practicing in this or similar localities.

The analyses and interpretations presented in this report have been based on the results of pertinent field and laboratory soil investigations. It should be recognized that subsurface conditions can vary in time and laterally and with depth at a given site. Our conclusions and recommendations are based on the data available and our interpretation of the data based on our experience and background. Hence, our **conclusions** and **recommendations** are **professional opinions** and are **not meant** to be a control of nature; therefore, **no warranty** is herein **expressed** or **implied**.

This report may not be duplicated without the written consent of this firm.

This opportunity to be of service is appreciated. Please contact us if you would like to discuss this report further.

Respectfully submitted,

Eric J. Seward, CEG 2110
Principal Engineering Geologist
Vice President

Dharmesh P. Amin, M.S., P.E., GE 2553
Principal Geotechnical Engineer

Reviewed By:

Allan E. Seward, CEG 246
Principal Engineering Geologist
President

The following attachments and appendices complete this report.

VOLUME I

References
Geologic Review Sheet dated 1/26/05 **at end of text**
Soils Engineering Review Sheet dated 2/22/05 **at end of text**

APPENDIX A – SUBSURFACE LOGS

- Backhoe Trenches
  T-178T thru T-182T

APPENDIX B – GEOTECHNICAL LABORATORY TEST RESULTS

APPENDIX C – SLOPE STABILITY AND SOLDIER PILE DESIGN

Slope Stability Calculation Sheets

Soldier Pile Calculations

APPENDIX D - MAPS AND CROSS SECTIONS

- **Maps** (In pockets)

Overview Map (1"=300')	**Plate**	**D-1**
Geologic/Geotechnical Maps (1"=100')	**Plates**	**D-2 thru D-7**

VOLUME II

Geologic/Geotechnical Remediation Maps (1"=100')	**Plates**	**D-8 thru D-13**
Geologic/Geotechnical Maps Legend	**Plate**	**D-14**

- **Cross Sections** (In pockets)

Revised Geologic Cross Sections 2-2', 6-6'; 7-7'; 12-12'; 38-38'; 39-39'; and 41-41'; and 8M-8M'	**Plate**	**D-15**

Distribution: (1) The Newhall Land and Farming Company
Attn: Mr. Corey Harpole
(3) Psomas
Attn: Mr. Matt Heideman
Attn: Los Angeles County Department of Public Works Geotechnical and Materials Engineering
1 - Soils
1 - Geology
(1) Impact Sciences
1 - Attn: Ms. Susan Tebo

REFERENCES

Reports by Allan E. Seward Engineering Geology, Inc.

1) **Geologic and Geotechnical Report**
Review of Vesting Tentative Tract Map (Dated June 14, 2004)
Vesting Tentative Tract 61105
Mesas East
Newhall Ranch, California
Dated July 22, 2004 - JN: 04-2023-4

2) **Geologic and Geotechnical Report – Addendum No. 1**
Response to Los Angeles County Geologic Review Sheet Dated October 21, 2004 and Soils Engineering Review Sheet Dated October 26, 2004
Geologic and Geotechnical Report
Review of Revised Vesting Tentative Tract Map (November 15, 2004)
Vesting Tentative Tract 61105
Mission Village
Newhall Ranch, California
Dated December 22, 2004 - JN: 04-2023-4

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION

SOILS ENGINEERING REVIEW SHEET

Address: 900 S. Fremont Ave., Alhambra, CA 91803
Telephone: (626) 458-4925
Fax: (626) 458-4913

District Office 8.2
Job Number LX001129 & GMTR
Sheet 1 of 1

Review No. 2

DISTRIBUTION:
___ Drainage
___ Grading
___ Geo/Soils Central File
___ District Engineer
___ Geologist
___ Soils Engineer
___ Engineer/Architect

Tentative Map (Tract) 61105
Location Castaic
Developer/Owner Newhall Land and Farming Company
Engineer/Architect Psomas
Soils Engineer Allan E. Seward, Inc. (04-2023-4)
Geologist Same as above

Review of:
Revised Tentative Map (Tract) Dated By Regional Planning 11/15/04
Soils Engineering and Geologic Report Dated **12/22/04**, 7/22/04
Previous Review Sheet Dated 12/13/04

ACTION:
Tentative Map feasibility is not recommended for approval.

REMARKS:

1. On Page 7 and 8 of the submitted report, it provides recommendations for proposed soldier piles to support the majority of the buildable area of Lot 300. Provide specific calculations and analyses to verify the feasibility of the proposed soldier piles (i.e. to ensure that the proposed slope / soldier pile system will have a factor of safety of greater than or equal to 1.50). In the slope stability analyses with the proposed soldier piles, the portion of the slope down slope of the soldier pile wall must assume to have failed. Indicate the various shear strength parameters and the passive resistance used in the analyses, in the appropriate segments of each failure plane. Recommend revised soldier pile embedment depths as necessary.

2. On cross-section 41-41' of the previous report it shows that a portion of landslide Qls-XXXVII is to remain in place with a proposed stability fill placed on the landslide debris. Specifically address the suitability of the landslide debris, proposed to remain in place, to support new engineered compacted fill. Certification for new fill will only be accepted if it is benched into competent material. Address and provide sufficient data to establish the competency of the landslide debris to support certified fill and structures. If competency can not be established then the remaining landslide debris must be either mitigated or placed under "Restricted Use Area".

3. Independent static slope stability analysis for cross section 41-41' indicate factors of safety below County minimum standards. Verify and make revisions as necessary. Recommend mitigation if factors of safety are below County minimum standards.

4. On the Geotechnical Map (Plate E5) provided within the submitted report, it appears that the proposed lot lines for Lots 413-414 transect landslide Qls-L1. Per County policy unmitigated landslides can not cross lot boundaries. Provide revised lot lines or mitigation measures for the landslide, as necessary.

5. Show the following on the geotechnical maps:
   a. Revised lot lines (Lots 413 and 414).
   b. Location of keyways of buttress/stabilization fills.
   c. Revised soldier pile embedment depths, as necessary.
   d. All recommended mitigation measures.

6. Requirements of the Geology Section are attached.

7. Include a copy of this review sheet with your response.

NOTE TO THE PLAN CHECKER/BUILDING AND SAFETY DISTRICT OFFICE:
A. THE ON-SITE SOILS ARE MODERATELY TO SEVERELY CORROSIVE TO FERROUS METALS.
B. THE ON-SITE SOILS HAVE A MEDIUM EXPANSION POTENTIAL.
C. PER THE SOILS ENGINEER, DEWATERING SHALL BE PERFORMED TO REMOVE WATERS IN THE VICINITY OF BORINGS B-72E AND B-73E.

REGISTERED PROFESSIONAL ENGINEER YOSHIYA MORISAKU No. 67587 Exp. 6/30/05 CIVIL STATE OF CALIFORNIA

Prepared by Yoshiya Morisaku Date 2/22/05

NOTICE: Public safety, relative to geotechnical subsurface exploration, shall be provided in accordance with current codes for excavations, inclusive of the Los Angeles County Code, Chapter 11.48, and the State of California, Title 8, Construction Safety Orders.

P:\Yosh\61105TentTb

County of Los Angeles Department of Public Works
GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION
GEOLOGIC REVIEW SHEET
900 So. Fremont Ave., Alhambra, CA 91803
TEL. (626) 458-4925

DISTRIBUTION
1 Geologist
__ Soils Engineer
1 GMED File
1 Subdivision

TENTATIVE TRACT 61105
SUBDIVIDER Newhall Land
ENGINEER Psomas
GEOLOGIST & SOILS ENGINEER A.E. Seward Eng. Geol., Inc.

TENTATIVE MAP DATED 11/15/04 (Revised)
LOCATION Castaic Junction

REPORT DATE 12/22/04, 7/22/04, 7/20/04

The Regional Planning Commission, developer, and engineer are advised that:

PRIOR TO RECOMMENDING APPROVAL OF THE TENTATIVE TRACT OR PARCEL MAP:

1. Landslides Qls-L1 and Qls XXXVII are showing crossing lot boundaries. As recommended by the geotechnical consultants and per County policy, adjust lot lines to constrain the landslides on one lot or provide remediation of the landslides. The landslide hazard may not be subdivided.

2. The Soils Engineering review dated 2/22/05 is attached.

NOTE Provide a copy of this review with your resubmittal

Prepared by Geir R. Mathisen

Reviewed by Charles T. Nestle

Date 1/26/05

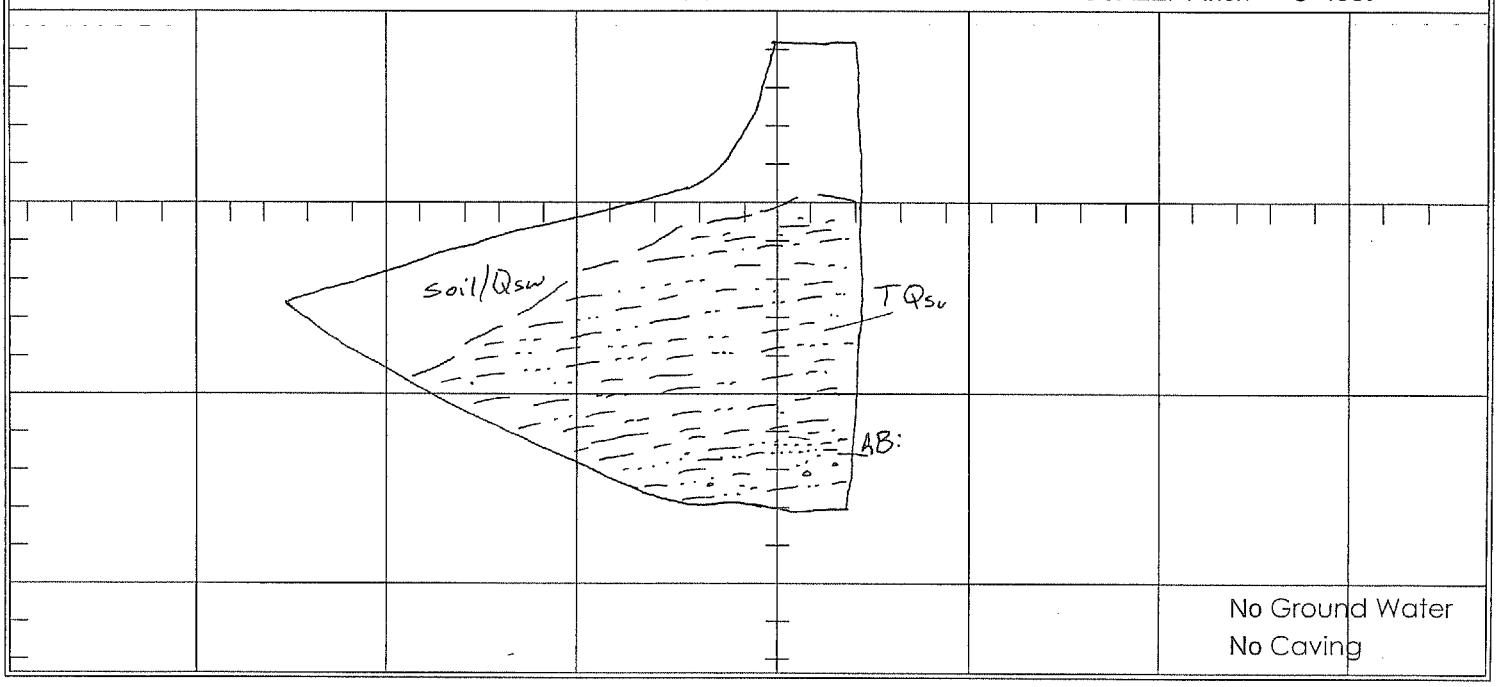
P:\Gmepub\Geology Review\Forms\Form01.doc
1/7/03

Appendix A

CLIENT: Newhall Land & Farming Co.	JOB NO: 05-2023-4(8)	**TRENCH LOG NO. T-178T**	
PROJECT: Mesas East/ Mission Village VTT 61105	DATE: 6/13/05		
	LOGGED BY: DGG/SKM		
	EXCAVATED: 5/26/05		
EXCAVATION METHOD: Trackhoe	ELEVATION:		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; soil/Qsw (0 - 4')** @ 0' Yellowish- to grayish-brown clay to silt; firm; damp				
	■						14.3	102	
					BEDROCK; TQsu (4 - 12') @ 4' Yellowish- to grayish-brown siltstone to sandy siltstone; hard; damp				
5									
10					@ 10.5' Grayish-brown silty sandstone with scattered pebbles; moderately hard; moderately friable; damp to slightly moist	Apx B:N52W,16NE			
					COMMENTS: Highly weathered to 10.5' @ 2' California Drive Material more dense with depth				
15									
20									

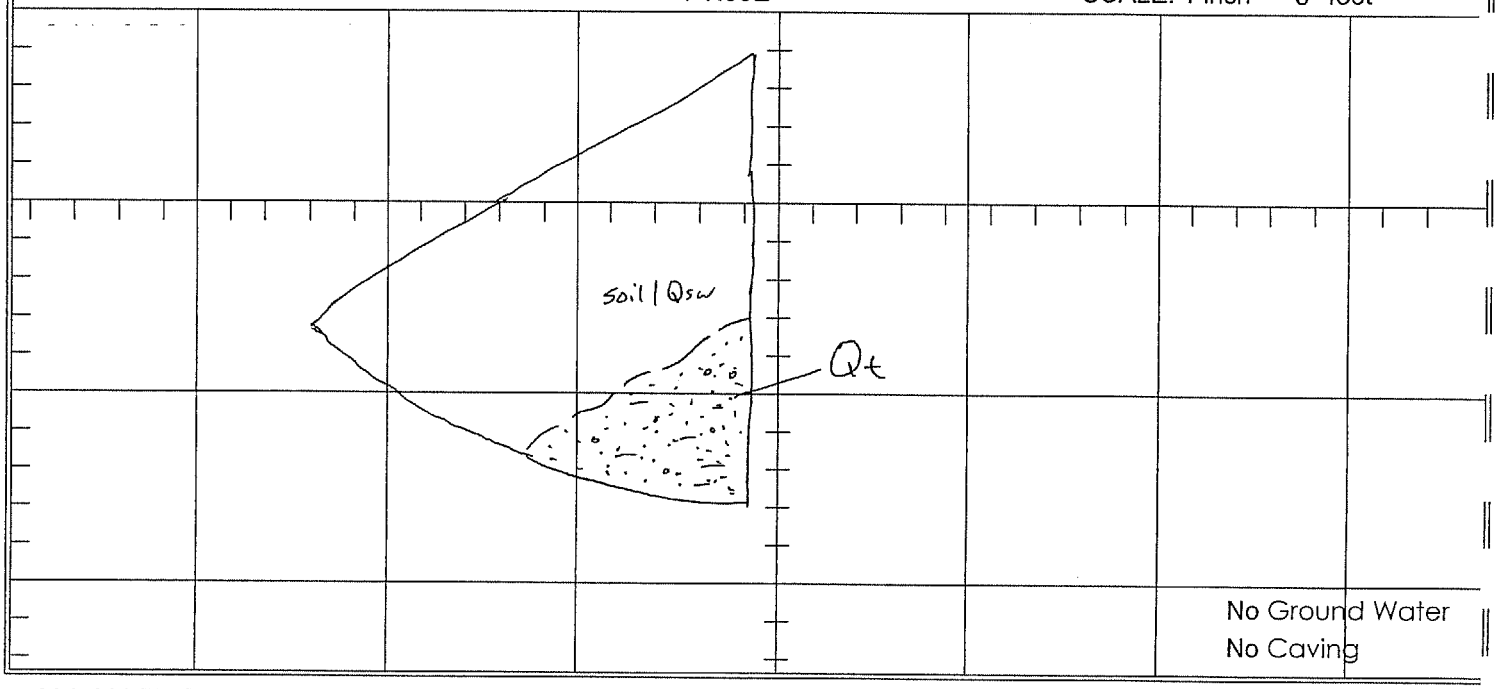
TOTAL DEPTH: 12 feet ←N22E SCALE: 1 inch = 5 feet



CLIENT: Newhall Land & Farming Co.	JOB NO: 05-2023-4(8)	**TRENCH LOG NO. T-179T**	
PROJECT: Mesas East/ Mission Village VTT 61105	DATE: 6/13/05		
	LOGGED BY: DGG/SKM		
	EXCAVATED: 5/26/05		
EXCAVATION METHOD: Trackhoe	ELEVATION:		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; soil/Qsw (0 - 7')** @ 0' Yellowish- to grayish-brown sandy clay to silt with scattered pebbles and few cobbles; stiff; damp				
5	■			SM			10.2	123	Consol
					QUATERNARY TERRACE DEPOSITS; Qt (7 - 12') @ 7' Brown to dark yellowish-brown pebbly sandy siltstone; hard; damp; few cobbles				
10									
					COMMENTS: @ 4' California Drive Material more dense with depth				
15									
20									

TOTAL DEPTH: 12 feet ←N35E SCALE: 1 inch = 5 feet

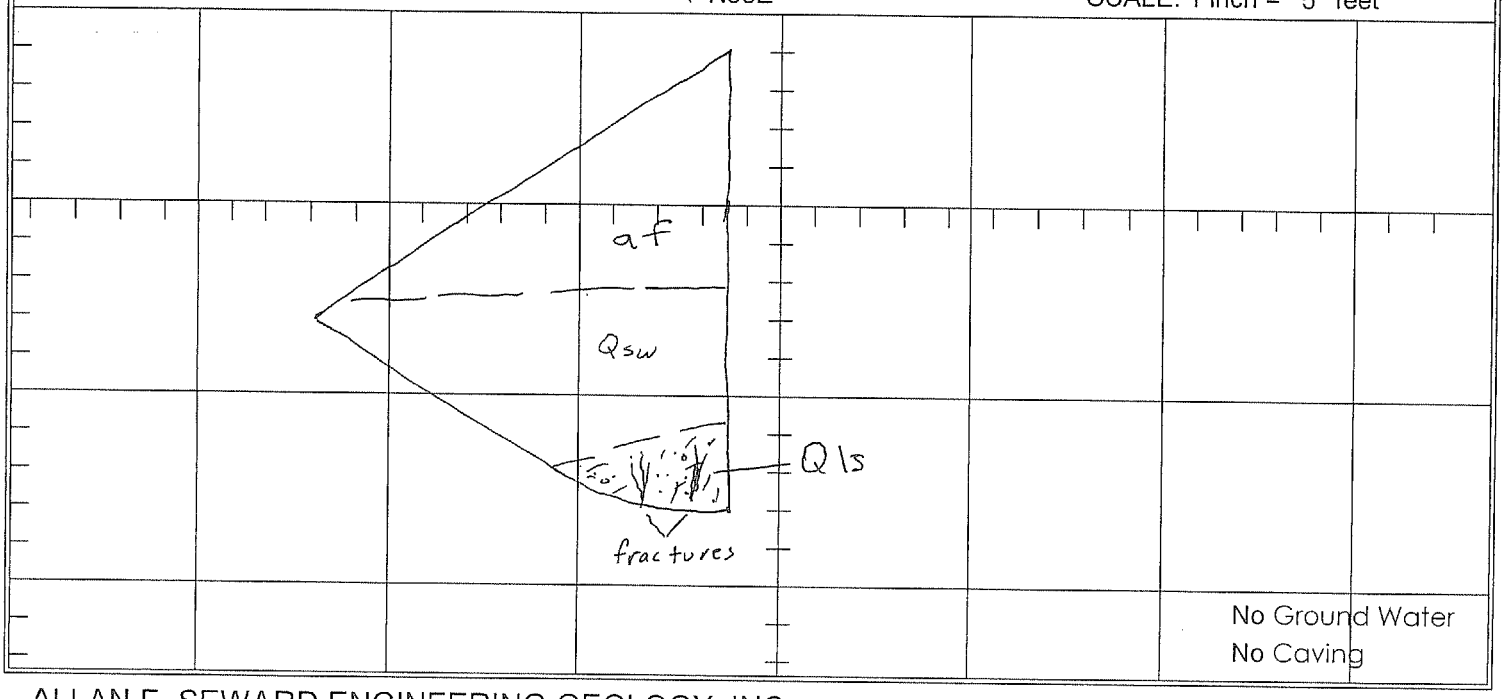


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Land & Farming Co.	JOB NO: 05-2023-4(8)	**TRENCH LOG NO. T-180T**	
PROJECT: Mesas East/ Mission Village VTT 61105	DATE: 6/13/05		
	LOGGED BY: DGG/SKM		
	EXCAVATED: 5/26/05		
EXCAVATION METHOD: Trackhoe	ELEVATION:		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**ARTIFICIAL FILL; af (0 - 6')** @ 0' Brown to yellowish- to grayish-brown sandy clay to silt with scattered pebbles; firm to stiff; damp				
5					**SLOPEWASH; Qsw (6 - 9')** @ 6' Brown to dark grayish-brown sandy clay to silt; stiff; damp				
10					**QUATERNARY LANDSLIDE; Qls (9 - 12')** @ 9' Mottled yellowish- to grayish-brown to FeO2-stained silty sandstone with scattered pebbles; moderately hard; damp to slightly moist				
	■			SM			7.0	132	Consol
15					COMMENTS: @ 12' California Drive				
20									

TOTAL DEPTH: 12 feet ←N35E SCALE: 1 inch = 5 feet

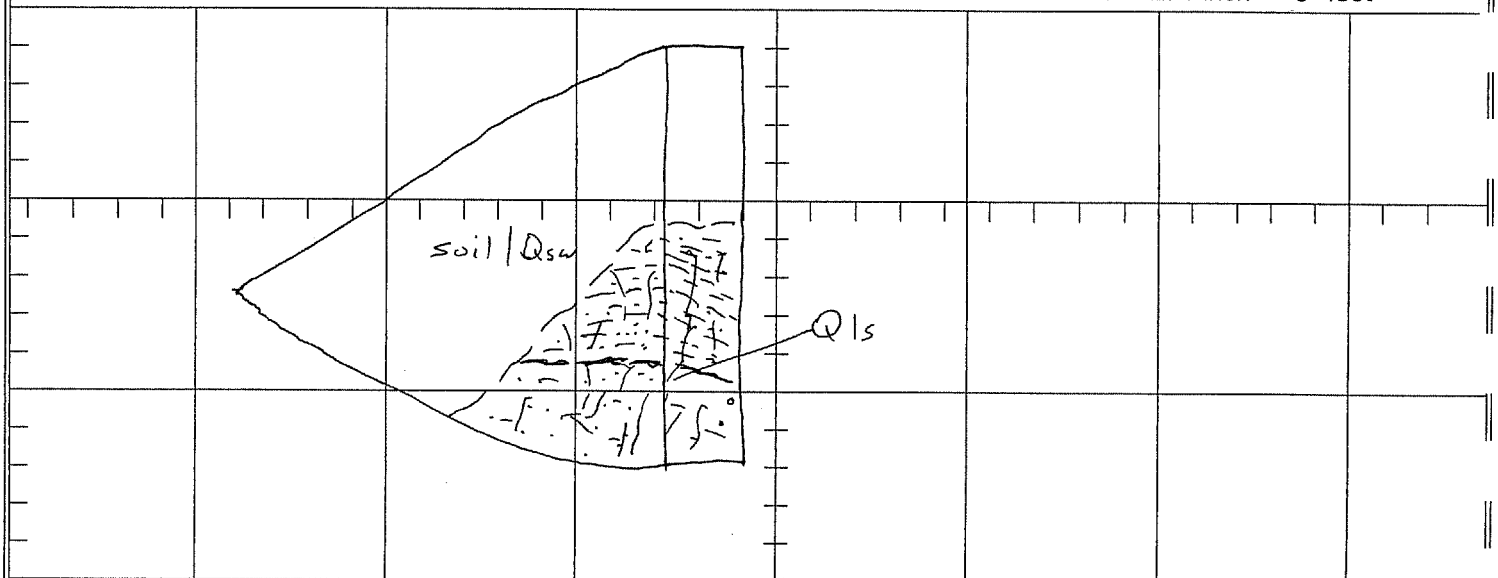


ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Land & Farming Co.	JOB NO: 05-2023-4(8)	**TRENCH LOG NO. T-181T**	
PROJECT: Mesas East/ Mission Village VTT 61105	DATE: 6/13/05		
	LOGGED BY: DGG		
	EXCAVATED: 5/26/05		
EXCAVATION METHOD: Trackhoe	ELEVATION:		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; soil/Qsw (0 - 4.5')** @ 0' Brown to yellowish- to grayish-brown pebbly sandy clay to silt; stiff; damp				
5					**QUATERNARY LANDSLIDE; Qls (4.5 - 11')** @ 4.5' Yellowish- to grayish-brown mudstone; moderately hard; damp; fractured	Apx B:N32E,25NW Apx B:N42E,25NW			
	■			CL-ML	@ 6' Yellowish-brown siltstone to sandy siltstone; moderately hard; friable; damp		13.7	101	Consol
10					@ 8.5' Yellowish- to grayish-brown pebbly silty sandstone; moderately hard; damp to slightly moist				
					COMMENTS: @ 7' California Drive Material more dense with depth				
15									
20									

TOTAL DEPTH: 11 feet ←N43E SCALE: 1 inch = 5 feet

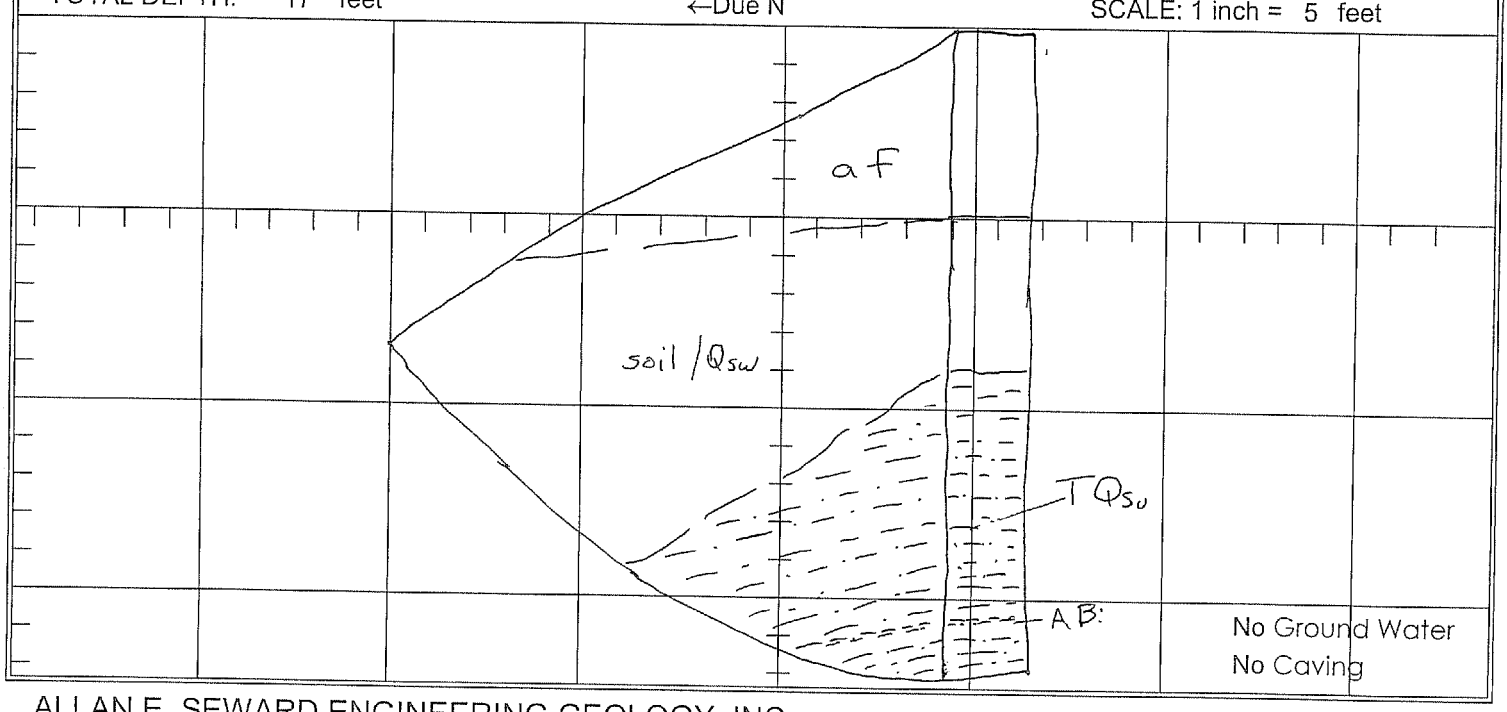


No Ground Water
No Caving

CLIENT: Newhall Land & Farming Co.	JOB NO: 05-2023-4(8)	**TRENCH LOG NO. T-182T**	
PROJECT: Mesas East/ Mission Village VTT 61105	DATE: 6/13/05		
	LOGGED BY: DGG		
	EXCAVATED: 5/26/05		
EXCAVATION METHOD: Trackhoe	ELEVATION:		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**ARTIFICIAL FILL; af (0 - 5')** @ 0' Yellowish-brown sandy clay to silt with scattered pebbles; soft to firm; damp				
5					**SLOPEWASH; Qsw (5 - 9')** @ 5' Dark-brown to grayish-brown sandy clay to silt with scattered pebbles and cobbles; firm; damp				
10					**BEDROCK; TQsu (9 - 17')** @ 9' Yellowish- to grayish-brown mudstone to siltstone to sandy siltstone; stiff to hard; damp				
15						Apx B:N40W,16NE			
					COMMENTS: Bedrock weathered but competent				
20									

TOTAL DEPTH: 17 feet ←Due N SCALE: 1 inch = 5 feet



ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

KEY TO SYMBOLS

Symbol Description

SAMPLE TYPE

CALIFORNIA DRIVE SAMPLE
Split-barrel sampler in accordance with ASTM D-3550 Standard Test Method

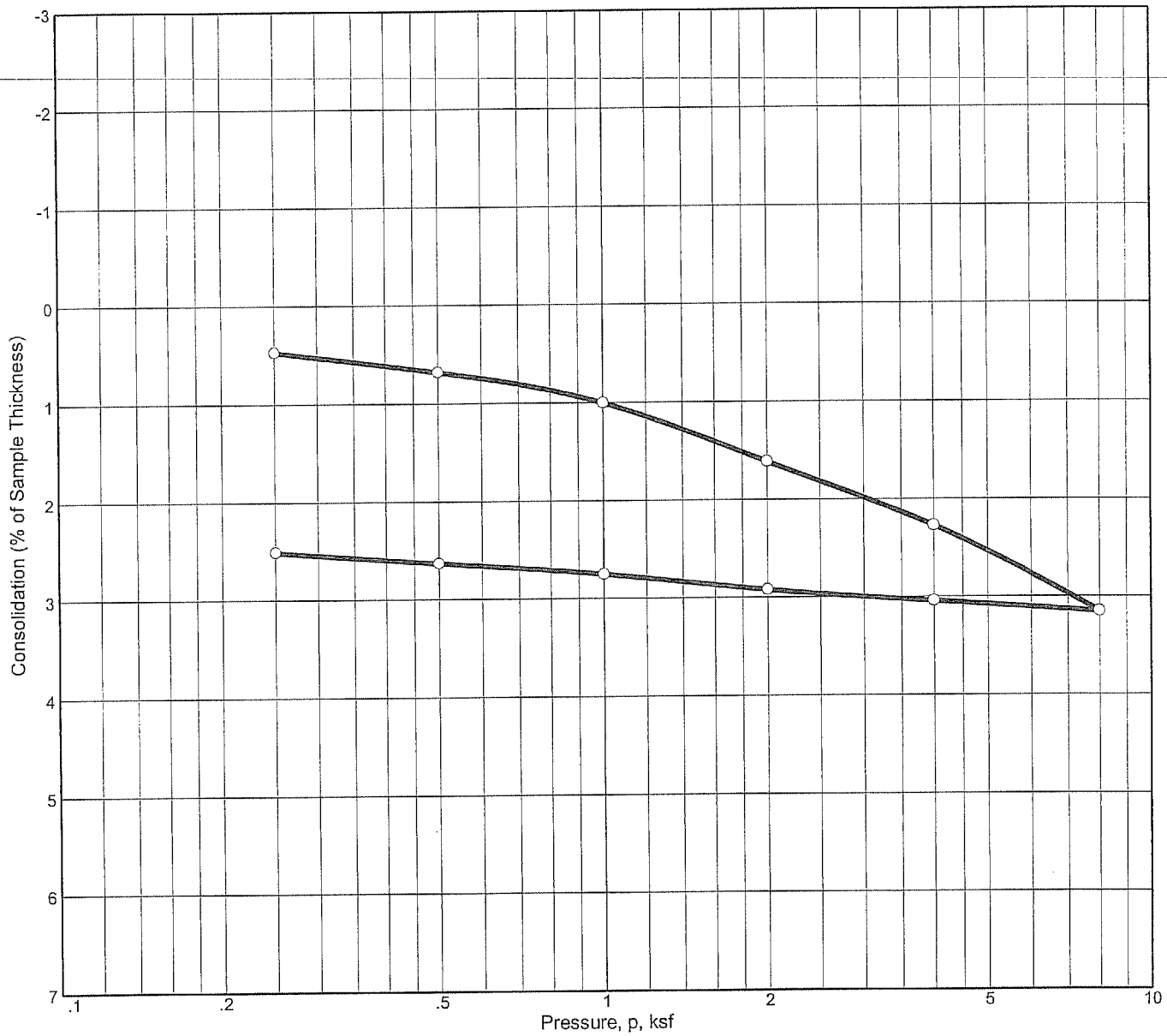
Notes:

1. These logs are subject to the limitations, conclusions, and recommendations in this report.

2. Results of tests conducted on samples recovered are reported on the logs.

Appendix B

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

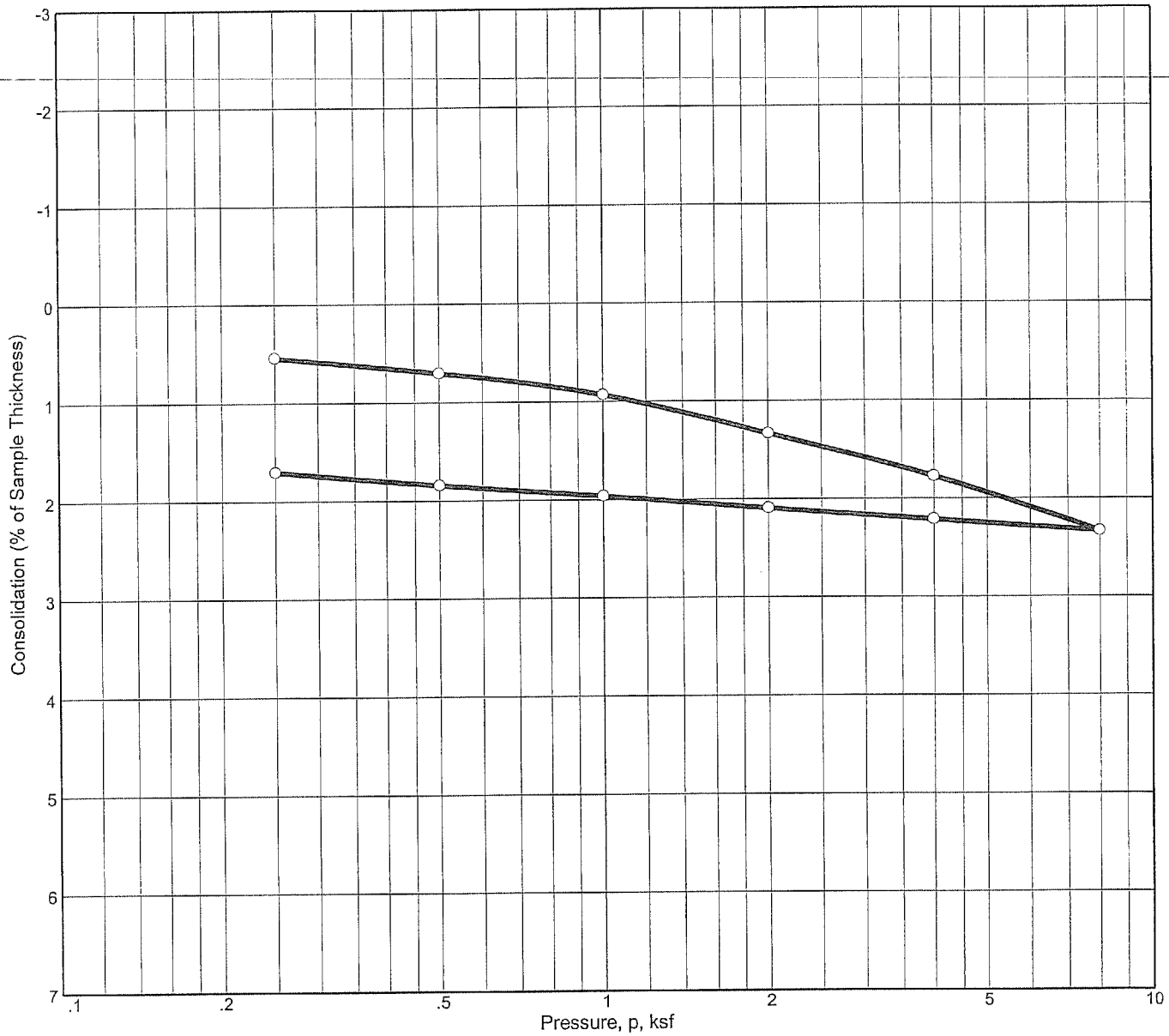
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	124.4	11.6	93.1	1.000	0.329	2.65	0.04	0.50	1.79	SM
FINAL	127.7	11.5	100.0	0.975	0.296					

Source: T-179T **Elev./Depth:** 4
Material Description: Silty SAND with gravel
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.	**Client:** Newhall Land & Farming Co. **Project:** Mesas East/ Mission Village VTT 61105 **Job No.:** 05-2023-4(8) **Figure** B1.1

DRAWN BY	CHECKED BY
DATE	APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	128.9	9.1	84.9	1.000	0.284	2.65	0.02	1.50	1.70	SM
FINAL	131.1	9.9	100.0	0.983	0.262					

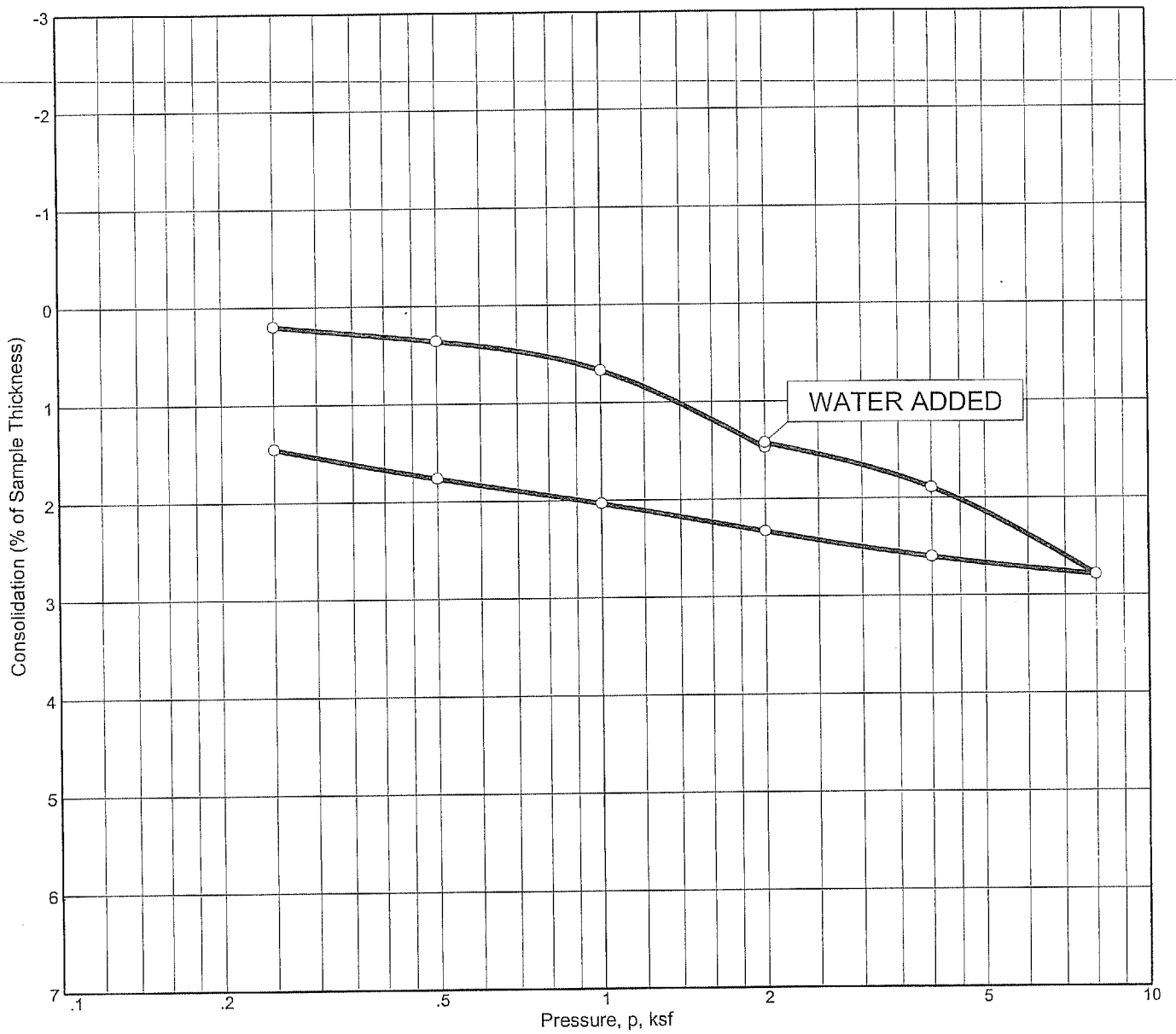
Source: T-180T
Material Description: Silty SAND with gravel
Remarks:

Elev./Depth: 12'

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.	**Client:** Newhall Land & Farming Co. **Project:** Mesas East/ Mission Village VTT 61105 **Job No.:** 05-2023-4(8) **Figure** B1.2

CHECKED BY
APPROVED BY
DRAWN BY
DATE

CONSOLIDATION TEST REPORT



DRAWN BY
DATE
CHECKED BY
APPROVED BY

SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	99.6	24.2	97.1	1.000	0.660	2.65	0.05	0.88	1.96	CL-ML
FINAL	101.1	25.2	100.0	0.985	0.636					

Source: T-181T
Material Description: Silty CLAY
Remarks:

Elev./Depth: 7'

ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

Client: Newhall Land & Farming Co.
Project: Mesas East/ Mission Village
VTT 61105
Job No.: 05-2023-4(8)

Figure B1.3

Appendix C

APPENDIX C

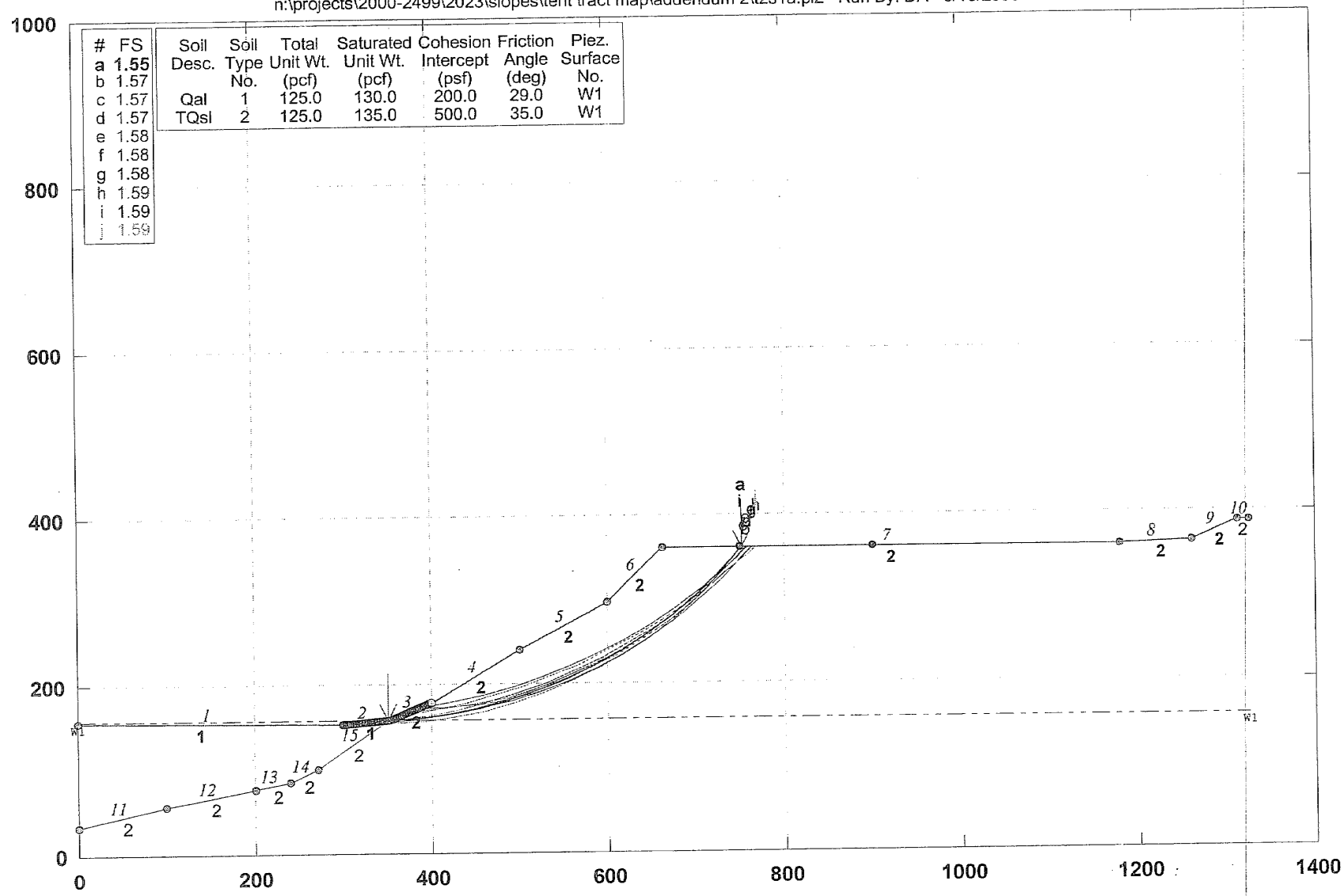
SLOPE STABILITY ANALYSES RESULTS

CROSS SECTION	FILE NAME	SLOPE DESIGNATION	ANALYZED PLANE	METHOD	FACTOR OF SAFETY		COMMENTS	RUN NO.
					STATIC	PSEUDOSTATIC[1] (COEFF = 0.15)		
2-2'	T2S1A	Natural Slope	Circular	Modified Bishop	1.55		Find 1.55 Factor of Safety surface for soldier pile design	A
38-38'	T38S1A T38PS1A	CS-16 andQls-XXXVII	Circular	Modified Bishop	1.57	1.36	Minimum factor of safety.	1 2
39-39'	T39S1A T39PS1A	CS-16 andQls-XXXVII	Circular	Modified Bishop	1.57	1.22	Minimum factor of safety.	3 4
39-39'	T39S2A	CS-16 andQls-XXXVII	Bedding Plane	Janbu	1.78	-	Pseudostatic is not critical and not performed.	5
41-41'	T41S1D T41PS1D	Fill over natural slope	Bedding Plane	Janbu	1.52	1.15	Minimum factor of safety.	6 7
41-41'	T41S2A	Fill over natural slope	Circular	Modified Bishop	1.82	-	Pseudostatic is not critical and not performed.	8

[1] Peak shear strength values were utilized

Mesas East, x-sec 2-2'; static; circular

n:\projects\2000-2499\2023\slopes\tent tract map\addendum 2\t2s1a.pl2 Run By: DA 6/13/2005 10:43AM



#	FS
a	1.55
b	1.57
c	1.57
d	1.57
e	1.58
f	1.58
g	1.58
h	1.59
i	1.59
j	1.59

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qal	1	125.0	130.0	200.0	29.0	W1
TQsl	2	125.0	135.0	500.0	35.0	W1

GSTABL7 v.2 FSmin=1.55

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No: A

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/13/2005
Time of Run: 10:43AM
Run By: DA
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\addendum 2\t2s1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\Tent Tract Map\addendum 2\t2s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slopent Tract Map\addendum 2\t2s1a.PLT

PROBLEM DESCRIPTION: Mesas East, x-sec 2-2'; static; circular

BOUNDARY COORDINATES
9 Top Boundaries
15 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	156.00	300.00	152.00	1
2	300.00	152.00	353.00	157.00	1
3	353.00	157.00	400.00	178.00	2
4	400.00	178.00	500.00	240.00	2
5	500.00	240.00	600.00	297.00	2
6	600.00	297.00	662.00	361.50	2
7	662.00	361.50	1180.00	361.00	2
8	1180.00	361.00	1260.00	364.00	2
9	1260.00	364.00	1312.00	388.00	2
10	1312.00	388.00	1325.00	388.00	2
11	0.00	33.00	100.00	57.00	2
12	100.00	57.00	200.00	76.00	2
13	200.00	76.00	240.00	85.00	2
14	240.00	85.00	272.00	100.00	2
15	272.00	100.00	353.00	157.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	200.0	29.0	0.00	0.0	1
2	125.0	135.0	500.0	35.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	157.00
2	1325.00	157.00

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 300.00(ft)
and X = 400.00(ft)
Each Surface Terminates Between X = 750.00(ft)

and X = 900.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
35.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 10.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 3.505 FS Min = 1.553 FS Ave = 2.376
Standard Deviation = 0.444 Coefficient of Variation = 18.70 %
Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	351.52	156.86
2	386.42	159.43
3	421.08	164.28
4	455.36	171.36
5	489.10	180.66
6	522.17	192.14
7	554.41	205.74
8	585.71	221.42
9	615.92	239.09
10	644.91	258.70
11	672.57	280.15
12	698.77	303.35
13	723.40	328.21
14	746.37	354.63
15	751.54	361.41

Circle Center At X = 329.44 ; Y = 694.00 ; and Radius = 537.59
Factor of Safety
*** 1.553 ***
Individual data on the 21 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	1.4	2.8	6.5	7.8	0.	0.	0.0	0.0	0.0
2	0.0	0.2	0.0	0.1	0.	0.	0.0	0.0	0.0
3	0.4	5.6	0.0	0.4	0.	0.	0.0	0.0	0.0
4	33.0	26163.3	0.0	0.0	0.	0.	0.0	0.0	0.0
5	13.6	24754.7	0.0	0.0	0.	0.	0.0	0.0	0.0
6	21.1	57277.2	0.0	0.0	0.	0.	0.0	0.0	0.0
7	34.3	145152.1	0.0	0.0	0.	0.	0.0	0.0	0.0
8	33.7	197264.7	0.0	0.0	0.	0.	0.0	0.0	0.0
9	10.9	73661.8	0.0	0.0	0.	0.	0.0	0.0	0.0
10	22.2	160767.9	0.0	0.0	0.	0.	0.0	0.0	0.0
11	32.2	253481.8	0.0	0.0	0.	0.	0.0	0.0	0.0
12	31.3	259561.5	0.0	0.0	0.	0.	0.0	0.0	0.0
13	14.3	120283.7	0.0	0.0	0.	0.	0.0	0.0	0.0
14	15.9	140934.1	0.0	0.0	0.	0.	0.0	0.0	0.0
15	29.0	289000.6	0.0	0.0	0.	0.	0.0	0.0	0.0
16	17.1	186465.1	0.0	0.0	0.	0.	0.0	0.0	0.0
17	10.6	112846.3	0.0	0.0	0.	0.	0.0	0.0	0.0
18	26.2	228367.7	0.0	0.0	0.	0.	0.0	0.0	0.0
19	24.6	140638.7	0.0	0.0	0.	0.	0.0	0.0	0.0
20	23.0	57444.4	0.0	0.0	0.	0.	0.0	0.0	0.0
21	5.2	2193.9	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	311.11	153.05
2	346.09	154.37

3	380.92	157.75
4	415.50	163.18
5	449.69	170.65
6	483.39	180.12
7	516.46	191.57
8	548.80	204.95
9	580.30	220.22
10	610.83	237.32
11	640.30	256.20
12	668.61	276.79
13	695.65	299.01
14	721.33	322.79
15	745.56	348.04
16	756.95	361.41

Circle Center At X = 306.62 ; Y = 743.84 ; and Radius = 590.81

Factor of Safety

*** 1.566 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	323.23	154.19
2	358.23	154.08
3	393.16	156.37
4	427.84	161.05
5	462.13	168.09
6	495.85	177.46
7	528.85	189.12
8	560.98	203.02
9	592.07	219.07
10	622.00	237.23
11	650.61	257.38
12	677.78	279.45
13	703.37	303.33
14	727.26	328.91
15	749.35	356.06
16	753.12	361.41

Circle Center At X = 342.45 ; Y = 663.84 ; and Radius = 510.01

Factor of Safety

*** 1.568 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	388.89	173.04
2	423.44	178.61
3	457.63	186.11
4	491.34	195.51
5	524.48	206.79
6	556.93	219.91
7	588.59	234.82
8	619.37	251.48
9	649.17	269.84
10	677.89	289.84
11	705.45	311.42
12	731.75	334.50
13	756.73	359.03
14	758.89	361.41

Circle Center At X = 306.93 ; Y = 791.59 ; and Radius = 623.96

Factor of Safety

*** 1.570 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	377.78	168.07
2	412.70	170.43
3	447.37	175.21
4	481.62	182.40
5	515.29	191.96

6	548.21	203.84
7	580.23	217.99
8	611.18	234.33
9	640.92	252.79
10	669.29	273.28
11	696.18	295.69
12	721.43	319.92
13	744.94	345.85
14	757.17	361.41

Circle Center At X = 361.80 ; Y = 668.35 ; and Radius = 500.53

Factor of Safety

*** 1.578 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	327.27	154.57
2	362.13	157.78
3	396.76	162.84
4	431.07	169.73
5	464.97	178.44
6	498.36	188.95
7	531.14	201.22
8	563.21	215.22
9	594.50	230.91
10	624.91	248.24
11	654.35	267.17
12	682.74	287.64
13	710.00	309.59
14	736.05	332.96
15	760.82	357.69
16	764.16	361.40

Circle Center At X = 284.78 ; Y = 809.17 ; and Radius = 655.98

Factor of Safety

*** 1.578 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	350.51	156.76
2	385.44	158.91
3	420.17	163.26
4	454.55	169.80
5	488.45	178.50
6	521.73	189.33
7	554.26	202.25
8	585.91	217.20
9	616.55	234.12
10	646.05	252.95
11	674.31	273.60
12	701.20	296.01
13	726.61	320.07
14	750.46	345.69
15	763.32	361.40

Circle Center At X = 334.15 ; Y = 709.18 ; and Radius = 552.66

Factor of Safety

*** 1.584 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	366.67	163.11
2	401.19	168.89
3	435.38	176.35
4	469.17	185.47
5	502.48	196.22
6	535.22	208.59
7	567.32	222.53
8	598.71	238.03
9	629.30	255.03

10	659.02	273.51
11	687.81	293.42
12	715.60	314.70
13	742.31	337.31
14	767.89	361.20
15	768.08	361.40

Circle Center At X = 265.37 ; Y = 873.63 ; and Radius = 717.71

Factor of Safety

*** 1.587 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	384.85	171.23
2	419.84	171.73
3	454.68	175.11
4	489.12	181.35
5	522.93	190.40
6	555.88	202.20
7	587.75	216.67
8	618.32	233.71
9	647.39	253.21
10	674.75	275.04
11	700.22	299.04
12	723.63	325.06
13	744.82	352.91
14	750.25	361.41

Circle Center At X = 396.50 ; Y = 594.96 ; and Radius = 423.89

Factor of Safety

*** 1.588 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	320.20	153.91
2	355.12	156.31
3	389.86	160.60
4	424.31	166.76
5	458.38	174.78
6	491.96	184.63
7	524.97	196.29
8	557.29	209.71
9	588.84	224.86
10	619.52	241.70
11	649.25	260.18
12	677.93	280.24
13	705.49	301.82
14	731.83	324.86
15	756.89	349.29
16	768.04	361.40

Circle Center At X = 293.65 ; Y = 798.26 ; and Radius = 644.90

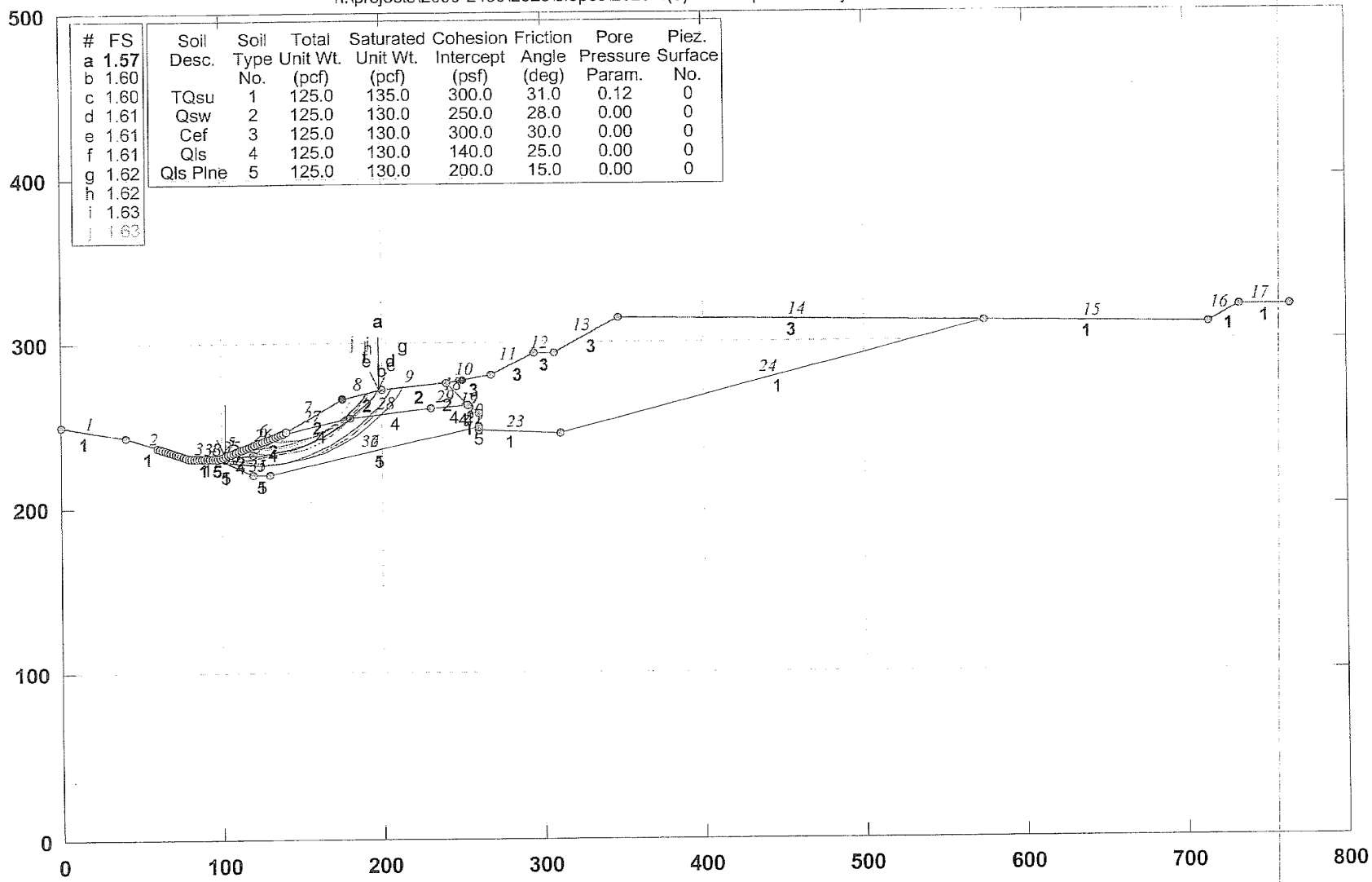
Factor of Safety

*** 1.590 ***

**** END OF GSTABL7 OUTPUT ****

Mesas East, x-sec 38-38'; static; circular

n:\projects\2000-2499\2023\slopes\2023-4(8)\t38s1a.pl2 Run By: KPC 5/5/2005 08:57AM



#	FS
a	1.57
b	1.60
c	1.60
d	1.61
e	1.61
f	1.61
g	1.62
h	1.62
i	1.63
j	1.63

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	300.0	31.0	0.12	0
Qsw	2	125.0	130.0	250.0	28.0	0.00	0
Cef	3	125.0	130.0	300.0	30.0	0.00	0
Qls	4	125.0	130.0	140.0	25.0	0.00	0
Qls Plne	5	125.0	130.0	200.0	15.0	0.00	0

GSTABL7 v.2 FSmin=1.57

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No: 1

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 5/5/2005
Time of Run: 08:57AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\2023-4(8)\t38s1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\2023-4(8)\t38s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope23-4(8)\t38s1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 38-38'; static; circular

BOUNDARY COORDINATES
17 Top Boundaries
36 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	250.00	40.00	243.00	1
2	40.00	243.00	80.00	230.00	1
3	80.00	230.00	97.00	230.00	1
4	97.00	230.00	98.00	230.00	5
5	98.00	230.00	120.00	238.00	2
6	120.00	238.00	138.00	245.00	2
7	138.00	245.00	175.00	266.00	2
8	175.00	266.00	200.00	272.00	2
9	200.00	272.00	240.00	275.00	2
10	240.00	275.00	268.00	280.00	3
11	268.00	280.00	295.00	294.00	3
12	295.00	294.00	307.00	294.00	3
13	307.00	294.00	347.00	315.00	3
14	347.00	315.00	575.00	312.00	3
15	575.00	312.00	714.00	310.00	1
16	714.00	310.00	733.00	320.00	1
17	733.00	320.00	765.00	320.00	1
18	240.00	275.00	253.00	262.00	2
19	253.00	262.00	260.00	257.00	4
20	260.00	257.00	260.01	249.00	4
21	260.01	249.00	260.02	248.50	5
22	260.02	248.50	260.03	247.00	1
23	260.03	247.00	311.00	245.00	1
24	311.00	245.00	575.00	312.00	1
25	98.00	230.00	120.00	232.00	4
26	120.00	232.00	138.00	245.00	4
27	138.00	245.00	180.00	254.00	4
28	180.00	254.00	230.00	260.00	4
29	230.00	260.00	253.00	262.00	4
30	98.00	230.00	120.00	220.00	5
31	120.00	220.00	130.00	220.00	5
32	130.00	220.00	260.01	249.00	5
33	97.00	230.00	98.00	229.50	1
34	98.00	229.50	120.00	219.50	1
35	120.00	219.50	130.00	219.50	1
36	130.00	219.50	260.02	248.50	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type	Total Unit Wt.	Saturated Unit Wt.	Cohesion Intercept	Friction Angle	Pore Pressure	Pressure Constant	Piez. Surface

No.	(pcf)	(pcf)	(psf)	(deg)	Param.	(psf)	No.
1	125.0	135.0	300.0	31.0	0.12	0.0	0
2	125.0	130.0	250.0	28.0	0.00	0.0	0
3	125.0	130.0	300.0	30.0	0.00	0.0	0
4	125.0	130.0	140.0	25.0	0.00	0.0	0
5	125.0	130.0	200.0	15.0	0.00	0.0	0

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 60.00(ft)
and X = 140.00(ft)
Each Surface Terminates Between X = 175.00(ft)
and X = 250.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 5.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 4.112 FS Min = 1.567 FS Ave = 2.432
Standard Deviation = 0.547 Coefficient of Variation = 22.51 %
Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	102.45	231.62
2	112.44	231.18
3	122.43	231.64
4	132.34	232.98
5	142.09	235.21
6	151.60	238.30
7	160.79	242.23
8	169.60	246.96
9	177.95	252.46
10	185.78	258.68
11	193.02	265.58
12	198.28	271.59

Circle Center At X = 112.38 ; Y = 342.68 ; and Radius = 111.50
Factor of Safety
*** 1.567 ***
Individual data on the 16 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	9.0	2063.7	0.0	0.0	0.	0.	0.0	0.0	0.0
2	1.0	478.4	0.0	0.0	0.	0.	0.0	0.0	0.0
3	7.6	4983.8	0.0	0.0	0.	0.	0.0	0.0	0.0
4	2.4	2092.6	0.0	0.0	0.	0.	0.0	0.0	0.0
5	9.9	10605.6	0.0	0.0	0.	0.	0.0	0.0	0.0
6	5.7	7268.9	0.0	0.0	0.	0.	0.0	0.0	0.0
7	4.1	5832.4	0.0	0.0	0.	0.	0.0	0.0	0.0
8	9.5	15769.9	0.0	0.0	0.	0.	0.0	0.0	0.0
9	9.2	17319.5	0.0	0.0	0.	0.	0.0	0.0	0.0
10	8.8	17448.4	0.0	0.0	0.	0.	0.0	0.0	0.0
11	5.4	10613.1	0.0	0.0	0.	0.	0.0	0.0	0.0
12	3.0	5491.1	0.0	0.0	0.	0.	0.0	0.0	0.0
13	1.9	3254.7	0.0	0.0	0.	0.	0.0	0.0	0.0
14	5.9	8559.1	0.0	0.0	0.	0.	0.0	0.0	0.0
15	7.2	6624.7	0.0	0.0	0.	0.	0.0	0.0	0.0
16	5.3	1559.8	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	89.39	230.00
2	99.34	229.04
3	109.34	228.89
4	119.32	229.55
5	129.21	231.02
6	138.95	233.28
7	148.47	236.33
8	157.72	240.14
9	166.62	244.69
10	175.13	249.95
11	183.18	255.88
12	190.73	262.44
13	197.72	269.59
14	199.64	271.91

Circle Center At X = 106.24 ; Y = 351.65 ; and Radius = 122.81

Factor of Safety

*** 1.597 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	100.82	231.02
2	110.51	228.58
3	120.42	227.22
4	130.42	226.97
5	140.38	227.82
6	150.19	229.77
7	159.72	232.80
8	168.86	236.87
9	177.49	241.92
10	185.51	247.89
11	192.81	254.72
12	199.32	262.31
13	204.95	270.58
14	205.94	272.45

Circle Center At X = 127.70 ; Y = 316.89 ; and Radius = 89.98

Factor of Safety

*** 1.599 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	91.02	230.00
2	100.75	227.69
3	110.66	226.33
4	120.65	225.93
5	130.63	226.50
6	140.51	228.03
7	150.20	230.52
8	159.60	233.92
9	168.63	238.22
10	177.20	243.37
11	185.23	249.33
12	192.65	256.03
13	199.39	263.43
14	205.38	271.43
15	206.00	272.45

Circle Center At X = 119.75 ; Y = 329.24 ; and Radius = 103.32

Factor of Safety

*** 1.607 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	112.24	235.18
2	121.98	232.87
3	131.95	232.11

4	141.91	232.92
5	151.63	235.26
6	160.87	239.10
7	169.40	244.32
8	177.00	250.81
9	183.50	258.41
10	188.74	266.93
11	189.84	269.56

Circle Center At X = 131.81 ; Y = 296.07 ; and Radius = 63.95

Factor of Safety

*** 1.608 ***

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.94	240.70
2	136.91	239.95
3	146.88	240.78
4	156.58	243.19
5	165.78	247.11
6	174.25	252.43
7	181.76	259.04
8	188.13	266.74
9	189.77	269.55

Circle Center At X = 136.64 ; Y = 302.80 ; and Radius = 62.86

Factor of Safety

*** 1.609 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	95.92	230.00
2	105.67	227.77
3	115.58	226.46
4	125.57	226.07
5	135.56	226.61
6	145.45	228.08
7	155.16	230.45
8	164.62	233.72
9	173.72	237.85
10	182.41	242.80
11	190.60	248.54
12	198.22	255.02
13	205.21	262.17
14	211.50	269.94
15	213.55	273.02

Circle Center At X = 124.75 ; Y = 333.78 ; and Radius = 107.71

Factor of Safety

*** 1.615 ***

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	128.57	241.33
2	138.54	240.53
3	148.51	241.31
4	158.23	243.66
5	167.45	247.53
6	175.94	252.81
7	183.49	259.36
8	189.91	267.03
9	191.68	270.00

Circle Center At X = 138.61 ; Y = 303.43 ; and Radius = 62.90

Factor of Safety

*** 1.617 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	113.88	235.77
2	123.88	235.72

```
     3        133.83      236.74
     4        143.61      238.82
     5        153.11      241.94
     6        162.22      246.06
     7        170.83      251.15
     8        178.85      257.12
     9        186.17      263.93
    10        191.39      269.93
Circle Center At X =   119.46 ; Y =   328.12 ; and Radius =    92.51
       Factor of Safety
      ***    1.625   ***
Failure Surface Specified By  9 Coordinate Points
  Point       X-Surf      Y-Surf
   No.         (ft)        (ft)
     1        115.51      236.37
     2        125.47      235.47
     3        135.45      236.13
     4        145.20      238.34
     5        154.49      242.04
     6        163.09      247.15
     7        170.78      253.54
     8        177.39      261.04
     9        181.52      267.57
Circle Center At X =   126.23 ; Y =   299.40 ; and Radius =    63.94
       Factor of Safety
      ***    1.630   ***
          **** END OF GSTABL7 OUTPUT ****
```

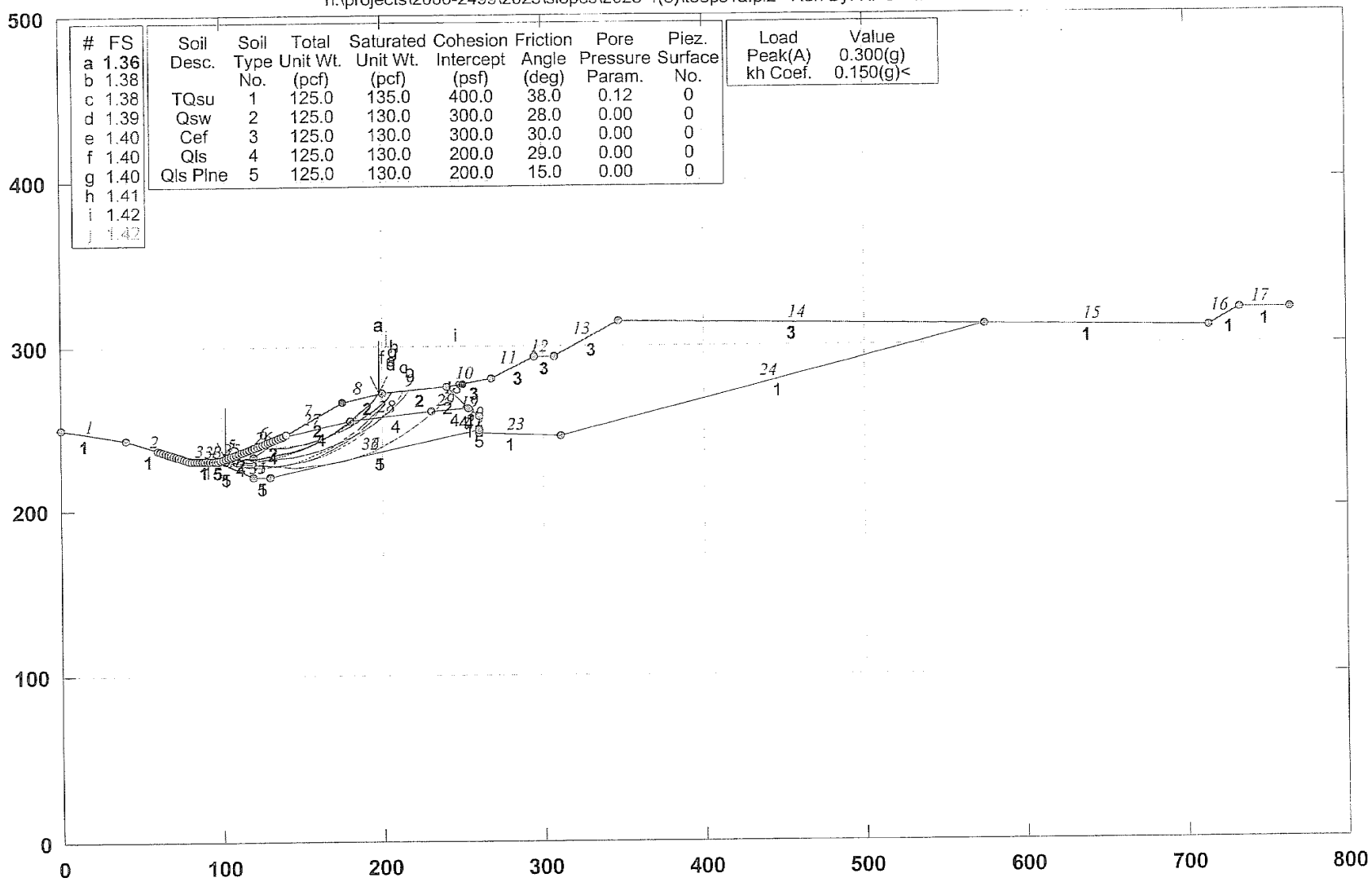
Mesas East, x-sec 38-38'; pseudostatic; circular

n:\projects\2000-2499\2023\slopes\2023-4(8)\t38ps1a.pl2 Run By: KPC 6/10/2005 08:33AM

#	FS
a	1.36
b	1.38
c	1.38
d	1.39
e	1.40
f	1.40
g	1.40
h	1.41
i	1.42
j	1.42

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	400.0	38.0	0.12	0
Qsw	2	125.0	130.0	300.0	28.0	0.00	0
Cef	3	125.0	130.0	300.0	30.0	0.00	0
Qls	4	125.0	130.0	200.0	29.0	0.00	0
Qls Plne	5	125.0	130.0	200.0	15.0	0.00	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<



GSTABL7 v.2 FSmin=1.36

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No: 2

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/10/2005
Time of Run: 08:33AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\2023-4(8)\t38ps1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\2023-4(8)\t38ps1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope23-4(8)\t38ps1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 38-38'; pseudostatic; circular

BOUNDARY COORDINATES
17 Top Boundaries
36 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	250.00	40.00	243.00	1
2	40.00	243.00	80.00	230.00	1
3	80.00	230.00	97.00	230.00	1
4	97.00	230.00	98.00	230.00	5
5	98.00	230.00	120.00	238.00	2
6	120.00	238.00	138.00	245.00	2
7	138.00	245.00	175.00	266.00	2
8	175.00	266.00	200.00	272.00	2
9	200.00	272.00	240.00	275.00	2
10	240.00	275.00	268.00	280.00	3
11	268.00	280.00	295.00	294.00	3
12	295.00	294.00	307.00	294.00	3
13	307.00	294.00	347.00	315.00	3
14	347.00	315.00	575.00	312.00	3
15	575.00	312.00	714.00	310.00	1
16	714.00	310.00	733.00	320.00	1
17	733.00	320.00	765.00	320.00	1
18	240.00	275.00	253.00	262.00	2
19	253.00	262.00	260.00	257.00	4
20	260.00	257.00	260.01	249.00	4
21	260.01	249.00	260.02	248.50	5
22	260.02	248.50	260.03	247.00	1
23	260.03	247.00	311.00	245.00	1
24	311.00	245.00	575.00	312.00	1
25	98.00	230.00	120.00	232.00	4
26	120.00	232.00	138.00	245.00	4
27	138.00	245.00	180.00	254.00	4
28	180.00	254.00	230.00	260.00	4
29	230.00	260.00	253.00	262.00	4
30	98.00	230.00	120.00	220.00	5
31	120.00	220.00	130.00	220.00	5
32	130.00	220.00	260.01	249.00	5
33	97.00	230.00	98.00	229.50	1
34	98.00	229.50	120.00	219.50	1
35	120.00	219.50	130.00	219.50	1
36	130.00	219.50	260.02	248.50	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS

5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	400.0	38.0	0.12	0.0	0
2	125.0	130.0	300.0	28.0	0.00	0.0	0
3	125.0	130.0	300.0	30.0	0.00	0.0	0
4	125.0	130.0	200.0	29.0	0.00	0.0	0
5	125.0	130.0	200.0	15.0	0.00	0.0	0

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 60.00(ft)
and X = 140.00(ft)
Each Surface Terminates Between X = 175.00(ft)
and X = 250.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 5.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 3.277 FS Min = 1.364 FS Ave = 2.127
Standard Deviation = 0.481 Coefficient of Variation = 22.61 %
Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	102.45	231.62
2	112.44	231.18
3	122.43	231.64
4	132.34	232.98
5	142.09	235.21
6	151.60	238.30
7	160.79	242.23
8	169.60	246.96
9	177.95	252.46
10	185.78	258.68
11	193.02	265.58
12	198.28	271.59

Circle Center At X = 112.38 ; Y = 342.68 ; and Radius = 111.50
Factor of Safety
*** 1.364 ***
Individual data on the 16 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	9.0	2063.7	0.0	0.0	0.	0.	309.6	0.0	0.0
2	1.0	478.4	0.0	0.0	0.	0.	71.8	0.0	0.0
3	7.6	4983.8	0.0	0.0	0.	0.	747.6	0.0	0.0
4	2.4	2092.6	0.0	0.0	0.	0.	313.9	0.0	0.0
5	9.9	10605.6	0.0	0.0	0.	0.	1590.8	0.0	0.0
6	5.7	7268.9	0.0	0.0	0.	0.	1090.3	0.0	0.0
7	4.1	5832.4	0.0	0.0	0.	0.	874.9	0.0	0.0
8	9.5	15769.9	0.0	0.0	0.	0.	2365.5	0.0	0.0
9	9.2	17319.5	0.0	0.0	0.	0.	2597.9	0.0	0.0

10	8.8	17448.4	0.0	0.0	0.	0.	2617.3	0.0	0.0
11	5.4	10613.1	0.0	0.0	0.	0.	1592.0	0.0	0.0
12	3.0	5491.1	0.0	0.0	0.	0.	823.7	0.0	0.0
13	1.9	3254.7	0.0	0.0	0.	0.	488.2	0.0	0.0
14	5.9	8559.1	0.0	0.0	0.	0.	1283.9	0.0	0.0
15	7.2	6624.7	0.0	0.0	0.	0.	993.7	0.0	0.0
16	5.3	1559.8	0.0	0.0	0.	0.	234.0	0.0	0.0

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	104.08	232.21
2	114.01	230.99
3	124.00	230.57
4	133.99	230.96
5	143.92	232.17
6	153.71	234.18
7	163.31	236.97
8	172.66	240.54
9	181.68	244.85
10	190.32	249.88
11	198.53	255.59
12	206.24	261.95
13	213.42	268.92
14	217.24	273.29

Circle Center At X = 124.16 ; Y = 353.30 ; and Radius = 122.74

Factor of Safety

*** 1.381 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	95.92	230.00
2	105.67	227.77
3	115.58	226.46
4	125.57	226.07
5	135.56	226.61
6	145.45	228.08
7	155.16	230.45
8	164.62	233.72
9	173.72	237.85
10	182.41	242.80
11	190.60	248.54
12	198.22	255.02
13	205.21	262.17
14	211.50	269.94
15	213.55	273.02

Circle Center At X = 124.75 ; Y = 333.78 ; and Radius = 107.71

Factor of Safety

*** 1.383 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	100.82	231.02
2	110.51	228.58
3	120.42	227.22
4	130.42	226.97
5	140.38	227.82
6	150.19	229.77
7	159.72	232.80
8	168.86	236.87
9	177.49	241.92
10	185.51	247.89
11	192.81	254.72
12	199.32	262.31
13	204.95	270.58
14	205.94	272.45

Circle Center At X = 127.70 ; Y = 316.89 ; and Radius = 89.98

Factor of Safety

*** 1.389 ***
Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	91.02	230.00
2	100.75	227.69
3	110.66	226.33
4	120.65	225.93
5	130.63	226.50
6	140.51	228.03
7	150.20	230.52
8	159.60	233.92
9	168.63	238.22
10	177.20	243.37
11	185.23	249.33
12	192.65	256.03
13	199.39	263.43
14	205.38	271.43
15	206.00	272.45

Circle Center At X = 119.75 ; Y = 329.24 ; and Radius = 103.32

Factor of Safety
*** 1.399 ***
Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	89.39	230.00
2	99.34	229.04
3	109.34	228.89
4	119.32	229.55
5	129.21	231.02
6	138.95	233.28
7	148.47	236.33
8	157.72	240.14
9	166.62	244.69
10	175.13	249.95
11	183.18	255.88
12	190.73	262.44
13	197.72	269.59
14	199.64	271.91

Circle Center At X = 106.24 ; Y = 351.65 ; and Radius = 122.81

Factor of Safety
*** 1.400 ***
Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	120.41	238.16
2	130.40	237.87
3	140.38	238.53
4	150.25	240.14
5	159.93	242.66
6	169.32	246.09
7	178.35	250.39
8	186.93	255.52
9	194.99	261.44
10	202.46	268.10
11	206.53	272.49

Circle Center At X = 128.41 ; Y = 343.62 ; and Radius = 105.76

Factor of Safety
*** 1.404 ***
Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	122.04	238.79
2	132.03	238.35
3	142.02	238.89
4	151.90	240.41
5	161.59	242.89

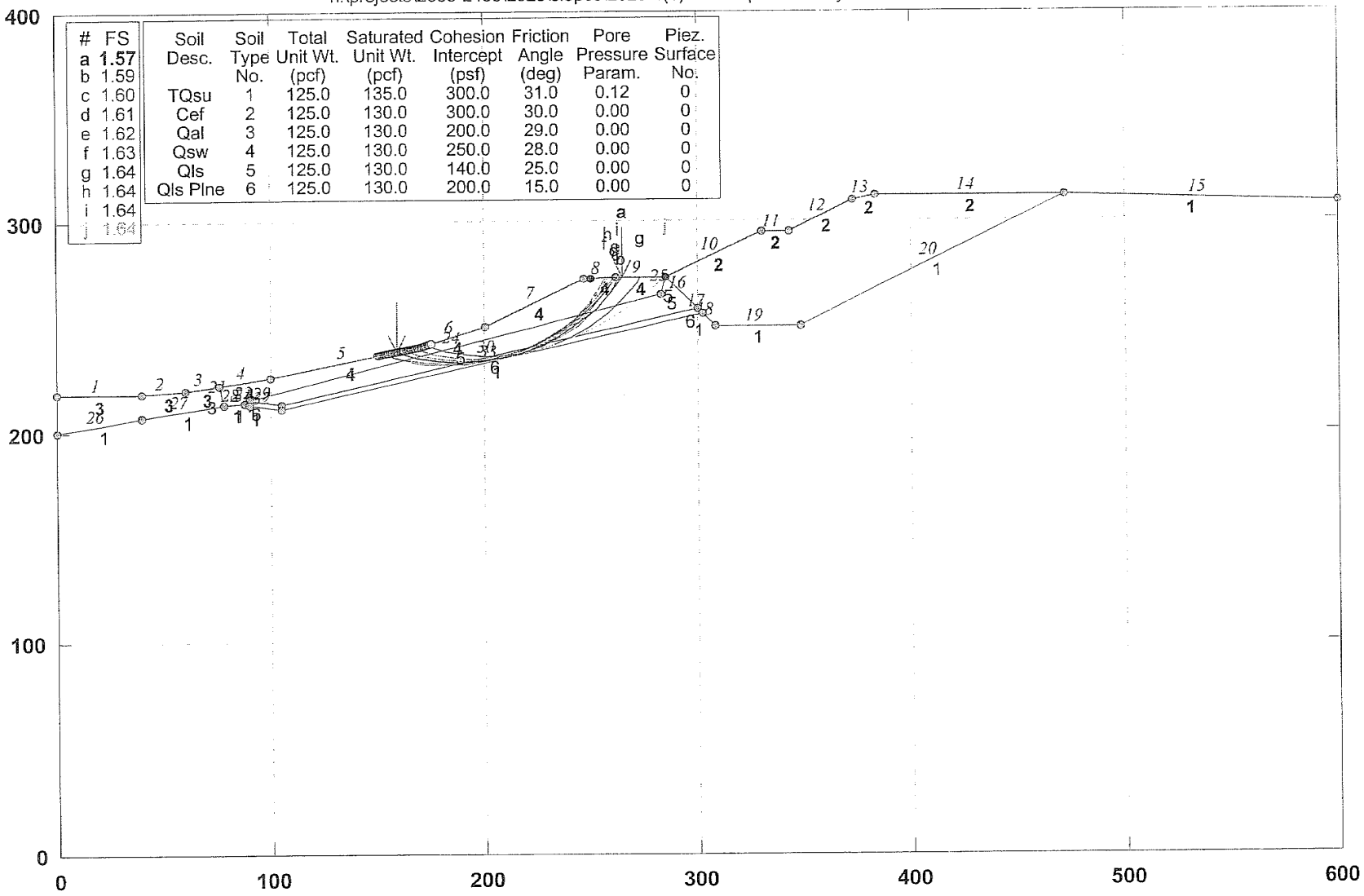
```
    6        170.98      246.32
    7        179.99      250.66
    8        188.53      255.86
    9        196.52      261.88
   10        203.87      268.66
   11        207.34      272.55
Circle Center At X =   131.56 ; Y =   339.76 ; and Radius =   101.41
       Factor of Safety
      ***    1.409   ***
Failure Surface Specified By 17 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        105.71      232.81
    2        115.30      229.95
    3        125.08      227.87
    4        135.00      226.59
    5        144.99      226.11
    6        154.98      226.43
    7        164.92      227.55
    8        174.73      229.46
    9        184.36      232.16
   10        193.74      235.62
   11        202.82      239.82
   12        211.53      244.74
   13        219.81      250.34
   14        227.62      256.59
   15        234.90      263.44
   16        241.61      270.86
   17        245.55      275.99
Circle Center At X =   146.01 ; Y =   350.58 ; and Radius =   124.47
       Factor of Safety
      ***    1.416   ***
Failure Surface Specified By 10 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        125.31      240.06
    2        135.25      239.05
    3        145.25      239.29
    4        155.14      240.81
    5        164.75      243.55
    6        173.94      247.50
    7        182.56      252.57
    8        190.46      258.70
    9        197.53      265.77
   10        202.49      272.19
Circle Center At X =   138.32 ; Y =   317.57 ; and Radius =    78.59
       Factor of Safety
      ***    1.417   ***
          **** END OF GSTABL7 OUTPUT ****
```

Mesas East, x-sec 39-39'; static; circular

n:\projects\2000-2499\2023\slopes\2023-4(8)\t39s1a.pl2 Run By: KPC 6/9/2005 08:18AM

#	FS
a	1.57
b	1.59
c	1.60
d	1.61
e	1.62
f	1.63
g	1.64
h	1.64
i	1.64
j	1.64

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	300.0	31.0	0.12	0
Cef	2	125.0	130.0	300.0	30.0	0.00	0
Qal	3	125.0	130.0	200.0	29.0	0.00	0
Qsw	4	125.0	130.0	250.0	28.0	0.00	0
Qls	5	125.0	130.0	140.0	25.0	0.00	0
Qls Plne	6	125.0	130.0	200.0	15.0	0.00	0



GSTABL7 v.2 FSmin=1.57

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No: 3

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/9/2005
Time of Run: 08:18AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\2023-4(8)\t39s1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\2023-4(8)\t39s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope23-4(8)\t39s1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 39-39'; static; circular

BOUNDARY COORDINATES
15 Top Boundaries
33 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	218.00	40.00	218.00	3
2	40.00	218.00	60.00	220.00	3
3	60.00	220.00	76.00	222.00	3
4	76.00	222.00	100.00	226.00	4
5	100.00	226.00	170.00	240.00	4
6	170.00	240.00	200.00	250.00	4
7	200.00	250.00	247.00	272.00	4
8	247.00	272.00	262.00	273.00	4
9	262.00	273.00	285.00	273.00	4
10	285.00	273.00	330.00	295.00	2
11	330.00	295.00	343.00	295.00	2
12	343.00	295.00	373.00	310.00	2
13	373.00	310.00	383.00	312.00	2
14	383.00	312.00	472.00	312.00	2
15	472.00	312.00	600.00	308.00	1
16	285.00	273.00	300.00	258.00	5
17	300.00	258.00	302.00	256.00	6
18	302.00	256.00	308.00	250.00	1
19	308.00	250.00	348.00	250.00	1
20	348.00	250.00	472.00	312.00	1
21	76.00	222.00	78.00	213.00	3
22	78.00	213.00	88.00	214.00	1
23	88.00	214.00	90.00	215.00	1
24	90.00	215.00	283.00	265.00	5
25	283.00	265.00	285.00	273.00	5
26	0.00	200.00	40.00	207.00	1
27	40.00	207.00	78.00	213.00	1
28	78.00	213.00	88.00	214.00	1
29	90.00	215.00	105.00	213.00	6
30	105.00	213.00	300.00	258.00	6
31	88.00	214.00	90.00	213.00	1
32	90.00	213.00	105.00	211.00	1
33	105.00	211.00	302.00	256.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
6 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.

1	125.0	135.0	300.0	31.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0
3	125.0	130.0	200.0	29.0	0.00	0.0	0
4	125.0	130.0	250.0	28.0	0.00	0.0	0
5	125.0	130.0	140.0	25.0	0.00	0.0	0
6	125.0	130.0	200.0	15.0	0.00	0.0	0

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 150.00(ft)
and X = 175.00(ft)
Each Surface Terminates Between X = 250.00(ft)
and X = 285.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 5.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 3.382 FS Min = 1.572 FS Ave = 2.487
Standard Deviation = 0.475 Coefficient of Variation = 19.11 %
Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	158.67	237.73
2	168.28	234.95
3	178.13	233.22
4	188.11	232.58
5	198.10	233.03
6	207.98	234.57
7	217.63	237.18
8	226.94	240.83
9	235.80	245.48
10	244.10	251.06
11	251.73	257.51
12	258.62	264.76
13	264.68	272.72
14	264.85	273.00

Circle Center At X = 188.96 ; Y = 324.02 ; and Radius = 91.45
Factor of Safety
*** 1.572 ***
Individual data on the 21 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	9.0	2480.7	0.0	0.0	0.	0.	0.0	0.0	0.0
2	0.6	346.3	0.0	0.0	0.	0.	0.0	0.0	0.0
3	1.7	1084.3	0.0	0.0	0.	0.	0.0	0.0	0.0
4	8.1	7540.2	0.0	0.0	0.	0.	0.0	0.0	0.0
5	10.0	14310.3	0.0	0.0	0.	0.	0.0	0.0	0.0
6	2.2	3734.5	0.0	0.0	0.	0.	0.0	0.0	0.0
7	7.8	14862.6	0.0	0.0	0.	0.	0.0	0.0	0.0
8	1.9	3927.2	0.0	0.0	0.	0.	0.0	0.0	0.0
9	8.0	17861.3	0.0	0.0	0.	0.	0.0	0.0	0.0
10	9.7	24269.9	0.0	0.0	0.	0.	0.0	0.0	0.0
11	9.3	24932.9	0.0	0.0	0.	0.	0.0	0.0	0.0
12	1.0	2848.2	0.0	0.0	0.	0.	0.0	0.0	0.0
13	7.8	20988.1	0.0	0.0	0.	0.	0.0	0.0	0.0
14	8.3	21192.8	0.0	0.0	0.	0.	0.0	0.0	0.0

15	2.9	6911.6	0.0	0.0	0.	0.	0.0	0.0	0.0
16	3.7	7873.3	0.0	0.0	0.	0.	0.0	0.0	0.0
17	1.0	1979.0	0.0	0.0	0.	0.	0.0	0.0	0.0
18	6.9	9826.5	0.0	0.0	0.	0.	0.0	0.0	0.0
19	3.4	2494.9	0.0	0.0	0.	0.	0.0	0.0	0.0
20	2.7	685.2	0.0	0.0	0.	0.	0.0	0.0	0.0
21	0.2	3.0	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	167.86	239.57
2	177.37	236.49
3	187.20	234.66
4	197.19	234.11
5	207.16	234.85
6	216.96	236.86
7	226.41	240.12
8	235.37	244.56
9	243.68	250.12
10	251.21	256.70
11	257.83	264.20
12	263.43	272.48
13	263.69	273.00

Circle Center At X = 196.46 ; Y = 311.73 ; and Radius = 77.62

Factor of Safety

*** 1.589 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	162.24	238.45
2	171.81	235.54
3	181.66	233.80
4	191.64	233.26
5	201.62	233.92
6	211.45	235.78
7	220.98	238.81
8	230.07	242.97
9	238.60	248.19
10	246.44	254.40
11	253.47	261.51
12	259.60	269.42
13	261.72	272.98

Circle Center At X = 191.13 ; Y = 316.15 ; and Radius = 82.89

Factor of Safety

*** 1.596 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	151.53	236.31
2	161.17	233.65
3	171.04	232.01
4	181.02	231.40
5	191.01	231.84
6	200.90	233.31
7	210.58	235.81
8	219.95	239.29
9	228.91	243.74
10	237.36	249.09
11	245.20	255.29
12	252.36	262.28
13	258.75	269.97
14	260.72	272.91

Circle Center At X = 181.83 ; Y = 327.08 ; and Radius = 95.70

Factor of Safety

*** 1.609 ***

Failure Surface Specified By 13 Coordinate Points

Point	X-Surf	Y-Surf

No.	(ft)	(ft)
1	158.67	237.73
2	168.30	235.03
3	178.17	233.42
4	188.16	232.93
5	198.14	233.55
6	207.99	235.28
7	217.58	238.11
8	226.80	241.98
9	235.53	246.87
10	243.65	252.69
11	251.08	259.39
12	257.71	266.88
13	262.01	273.00

Circle Center At X = 187.60 ; Y = 322.28 ; and Radius = 89.36

Factor of Safety

*** 1.619 ***

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	167.86	239.57
2	177.31	236.30
3	187.13	234.44
4	197.12	234.04
5	207.07	235.10
6	216.75	237.60
7	225.96	241.48
8	234.51	246.67
9	242.21	253.06
10	248.89	260.49
11	254.42	268.83
12	256.20	272.61

Circle Center At X = 194.86 ; Y = 301.98 ; and Radius = 68.00

Factor of Safety

*** 1.634 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	172.96	240.99
2	182.54	238.10
3	192.38	236.35
4	202.36	235.75
5	212.35	236.31
6	222.20	238.02
7	231.79	240.87
8	240.98	244.80
9	249.65	249.77
10	257.70	255.72
11	264.99	262.56
12	271.45	270.19
13	273.31	273.00

Circle Center At X = 202.54 ; Y = 321.91 ; and Radius = 86.16

Factor of Safety

*** 1.636 ***

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	167.35	239.47
2	176.85	236.35
3	186.69	234.59
4	196.69	234.22
5	206.63	235.23
6	216.34	237.62
7	225.63	241.34
8	234.30	246.32
9	242.20	252.45
10	249.17	259.62

```
   11        255.08      267.69
   12        257.78      272.72
Circle Center At X =   194.37 ; Y =   305.57 ; and Radius =    71.41
       Factor of Safety
      ***    1.637   ***
Failure Surface Specified By 14 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        153.06      236.61
    2        162.75      234.13
    3        172.64      232.63
    4        182.62      232.15
    5        192.61      232.68
    6        202.49      234.21
    7        212.17      236.74
    8        221.54      240.23
    9        230.51      244.65
   10        238.98      249.96
   11        246.88      256.09
   12        254.11      262.99
   13        260.61      270.59
   14        262.28      273.00
Circle Center At X =   182.42 ; Y =   330.61 ; and Radius =    98.47
       Factor of Safety
      ***    1.638   ***
Failure Surface Specified By 15 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        157.65      237.53
    2        167.46      235.56
    3        177.38      234.31
    4        187.37      233.80
    5        197.36      234.03
    6        207.32      234.99
    7        217.17      236.68
    8        226.88      239.09
    9        236.38      242.21
   10        245.62      246.02
   11        254.56      250.50
   12        263.15      255.63
   13        271.33      261.38
   14        279.07      267.71
   15        284.64      273.00
Circle Center At X =   189.31 ; Y =   369.49 ; and Radius =   135.71
       Factor of Safety
      ***    1.638   ***
          **** END OF GSTABL7 OUTPUT ****
```

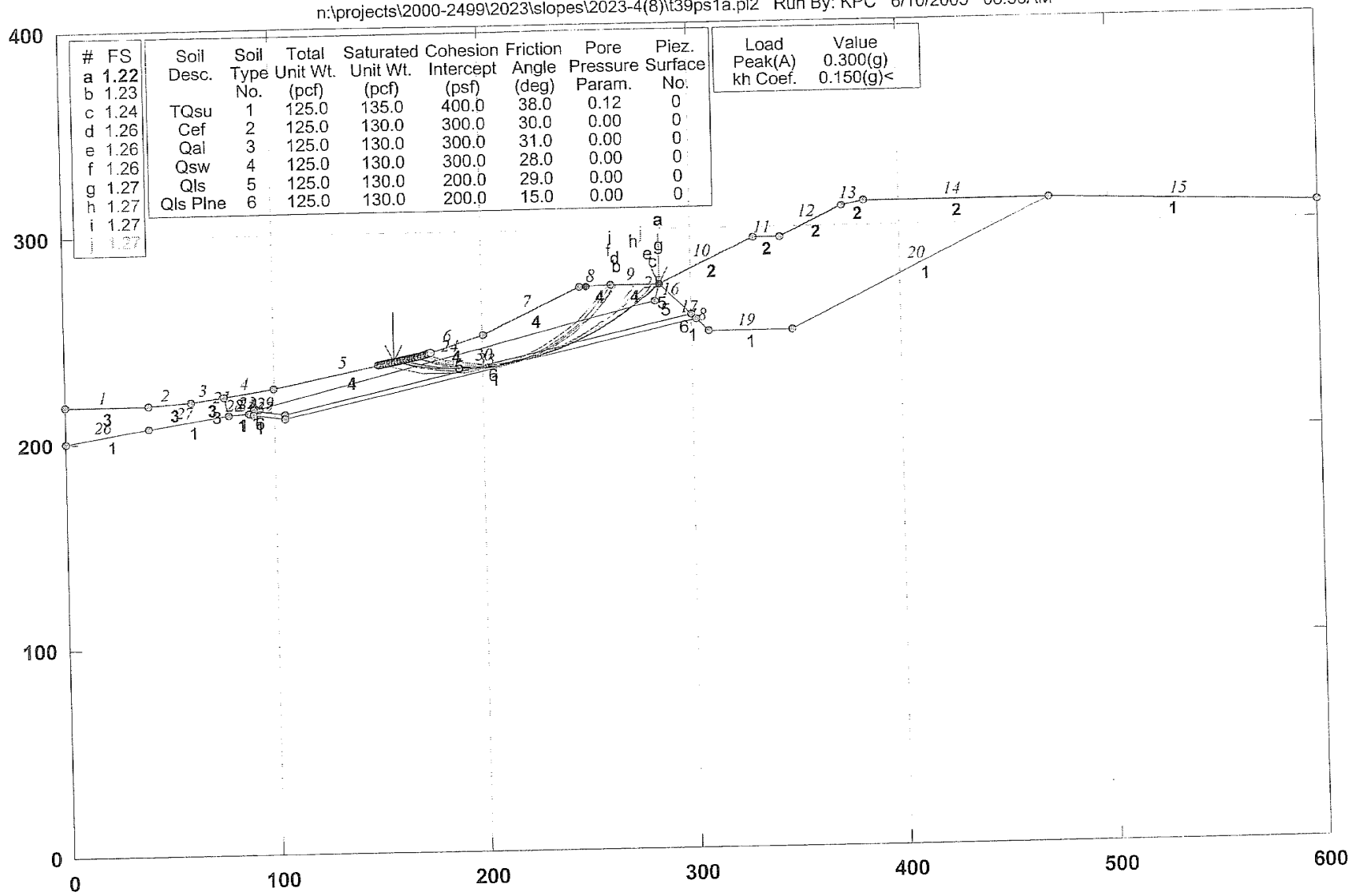
Mesas East, x-sec 39-39'; pseudostatic; circular

n:\projects\2000-2499\2023\slopes\2023-4(8)\t39ps1a.pl2 Run By: KPC 6/10/2005 08:36AM

#	FS
a	1.22
b	1.23
c	1.24
d	1.26
e	1.26
f	1.26
g	1.27
h	1.27
i	1.27
j	1.27

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	400.0	38.0	0.12	0
Cef	2	125.0	130.0	300.0	30.0	0.00	0
Qal	3	125.0	130.0	300.0	31.0	0.00	0
Qsw	4	125.0	130.0	300.0	28.0	0.00	0
Qls	5	125.0	130.0	200.0	29.0	0.00	0
Qls Plne	6	125.0	130.0	200.0	15.0	0.00	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<



GSTABL7 v.2 FSmin=1.22

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No: 4

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/10/2005
Time of Run: 08:36AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\2023-4(8)\t39ps1a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\2023-4(8)\t39ps1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope23-4(8)\t39ps1a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 39-39'; pseudostatic; circular

BOUNDARY COORDINATES
15 Top Boundaries
33 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	218.00	40.00	218.00	3
2	40.00	218.00	60.00	220.00	3
3	60.00	220.00	76.00	222.00	3
4	76.00	222.00	100.00	226.00	4
5	100.00	226.00	170.00	240.00	4
6	170.00	240.00	200.00	250.00	4
7	200.00	250.00	247.00	272.00	4
8	247.00	272.00	262.00	273.00	4
9	262.00	273.00	285.00	273.00	4
10	285.00	273.00	330.00	295.00	2
11	330.00	295.00	343.00	295.00	2
12	343.00	295.00	373.00	310.00	2
13	373.00	310.00	383.00	312.00	2
14	383.00	312.00	472.00	312.00	2
15	472.00	312.00	600.00	308.00	1
16	285.00	273.00	300.00	258.00	5
17	300.00	258.00	302.00	256.00	6
18	302.00	256.00	308.00	250.00	1
19	308.00	250.00	348.00	250.00	1
20	348.00	250.00	472.00	312.00	1
21	76.00	222.00	78.00	213.00	3
22	78.00	213.00	88.00	214.00	1
23	88.00	214.00	90.00	215.00	1
24	90.00	215.00	283.00	265.00	5
25	283.00	265.00	285.00	273.00	5
26	0.00	200.00	40.00	207.00	1
27	40.00	207.00	78.00	213.00	1
28	78.00	213.00	88.00	214.00	1
29	90.00	215.00	105.00	213.00	6
30	105.00	213.00	300.00	258.00	6
31	88.00	214.00	90.00	213.00	1
32	90.00	213.00	105.00	211.00	1
33	105.00	211.00	302.00	256.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
6 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.

1	125.0	135.0	400.0	38.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0
3	125.0	130.0	300.0	31.0	0.00	0.0	0
4	125.0	130.0	300.0	28.0	0.00	0.0	0
5	125.0	130.0	200.0	29.0	0.00	0.0	0
6	125.0	130.0	200.0	15.0	0.00	0.0	0

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 150.00(ft)
and X = 175.00(ft)
Each Surface Terminates Between X = 250.00(ft)
and X = 285.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 5.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 2.954 FS Min = 1.223 FS Ave = 2.159
Standard Deviation = 0.488 Coefficient of Variation = 22.58 %
Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	157.65	237.53
2	167.46	235.56
3	177.38	234.31
4	187.37	233.80
5	197.36	234.03
6	207.32	234.99
7	217.17	236.68
8	226.88	239.09
9	236.38	242.21
10	245.62	246.02
11	254.56	250.50
12	263.15	255.63
13	271.33	261.38
14	279.07	267.71
15	284.64	273.00

Circle Center At X = 189.31 ; Y = 369.49 ; and Radius = 135.71
Factor of Safety
*** 1.223 ***
Individual data on the 22 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	9.8	2410.3	0.0	0.0	0.	0.	361.5	0.0	0.0
2	1.3	661.0	0.0	0.0	0.	0.	99.2	0.0	0.0
3	1.3	721.3	0.0	0.0	0.	0.	108.2	0.0	0.0
4	7.4	5953.4	0.0	0.0	0.	0.	893.0	0.0	0.0
5	10.0	12568.7	0.0	0.0	0.	0.	1885.3	0.0	0.0
6	8.6	14338.1	0.0	0.0	0.	0.	2150.7	0.0	0.0
7	1.4	2585.4	0.0	0.0	0.	0.	387.8	0.0	0.0
8	2.6	5078.9	0.0	0.0	0.	0.	761.8	0.0	0.0
9	7.3	15621.1	0.0	0.0	0.	0.	2343.2	0.0	0.0

10	9.9	24517.3	0.0	0.0	0.	0.	3677.6	0.0	0.0
11	9.7	27205.8	0.0	0.0	0.	0.	4080.9	0.0	0.0
12	9.5	28687.0	0.0	0.0	0.	0.	4303.1	0.0	0.0
13	6.1	19087.8	0.0	0.0	0.	0.	2863.2	0.0	0.0
14	3.1	9892.5	0.0	0.0	0.	0.	1483.9	0.0	0.0
15	1.4	4355.7	0.0	0.0	0.	0.	653.4	0.0	0.0
16	7.6	22353.5	0.0	0.0	0.	0.	3353.0	0.0	0.0
17	7.4	18619.7	0.0	0.0	0.	0.	2793.0	0.0	0.0
18	1.1	2541.6	0.0	0.0	0.	0.	381.2	0.0	0.0
19	8.2	14830.5	0.0	0.0	0.	0.	2224.6	0.0	0.0
20	1.1	1501.8	0.0	0.0	0.	0.	225.3	0.0	0.0
21	6.7	6679.1	0.0	0.0	0.	0.	1001.9	0.0	0.0
22	5.6	1842.1	0.0	0.0	0.	0.	276.3	0.0	0.0

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	158.67	237.73
2	168.28	234.95
3	178.13	233.22
4	188.11	232.58
5	198.10	233.03
6	207.98	234.57
7	217.63	237.18
8	226.94	240.83
9	235.80	245.48
10	244.10	251.06
11	251.73	257.51
12	258.62	264.76
13	264.68	272.72
14	264.85	273.00

Circle Center At X = 188.96 ; Y = 324.02 ; and Radius = 91.45

Factor of Safety

*** 1.229 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	167.35	239.47
2	177.08	237.18
3	186.98	235.77
4	196.97	235.24
5	206.96	235.60
6	216.88	236.84
7	226.66	238.95
8	236.20	241.93
9	245.45	245.74
10	254.32	250.35
11	262.75	255.73
12	270.67	261.84
13	278.01	268.63
14	281.97	273.00

Circle Center At X = 197.94 ; Y = 347.56 ; and Radius = 112.33

Factor of Safety

*** 1.236 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	167.86	239.57
2	177.37	236.49
3	187.20	234.66
4	197.19	234.11
5	207.16	234.85
6	216.96	236.86
7	226.41	240.12
8	235.37	244.56
9	243.68	250.12
10	251.21	256.70
11	257.83	264.20

12	263.43	272.48
13	263.69	273.00

Circle Center At X = 196.46 ; Y = 311.73 ; and Radius = 77.62

Factor of Safety

*** 1.257 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	157.65	237.53
2	167.45	235.52
3	177.37	234.30
4	187.36	233.85
5	197.36	234.20
6	207.29	235.34
7	217.11	237.25
8	226.74	239.94
9	236.13	243.37
10	245.22	247.54
11	253.96	252.41
12	262.28	257.95
13	270.14	264.13
14	277.49	270.92
15	279.41	273.00

Circle Center At X = 187.96 ; Y = 360.52 ; and Radius = 126.66

Factor of Safety

*** 1.258 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	151.53	236.31
2	161.17	233.65
3	171.04	232.01
4	181.02	231.40
5	191.01	231.84
6	200.90	233.31
7	210.58	235.81
8	219.95	239.29
9	228.91	243.74
10	237.36	249.09
11	245.20	255.29
12	252.36	262.28
13	258.75	269.97
14	260.72	272.91

Circle Center At X = 181.83 ; Y = 327.08 ; and Radius = 95.70

Factor of Safety

*** 1.263 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	158.67	237.73
2	168.50	235.90
3	178.44	234.78
4	188.43	234.38
5	198.43	234.70
6	208.37	235.74
7	218.22	237.49
8	227.91	239.95
9	237.40	243.10
10	246.64	246.93
11	255.58	251.41
12	264.17	256.53
13	272.37	262.25
14	280.14	268.55
15	284.87	273.00

Circle Center At X = 189.00 ; Y = 372.96 ; and Radius = 138.59

Factor of Safety

*** 1.265 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	172.96	240.99
2	182.54	238.10
3	192.38	236.35
4	202.36	235.75
5	212.35	236.31
6	222.20	238.02
7	231.79	240.87
8	240.98	244.80
9	249.65	249.77
10	257.70	255.72
11	264.99	262.56
12	271.45	270.19
13	273.31	273.00

Circle Center At X = 202.54 ; Y = 321.91 ; and Radius = 86.16

Factor of Safety

*** 1.265 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	162.24	238.45
2	171.81	235.54
3	181.66	233.80
4	191.64	233.26
5	201.62	233.92
6	211.45	235.78
7	220.98	238.81
8	230.07	242.97
9	238.60	248.19
10	246.44	254.40
11	253.47	261.51
12	259.60	269.42
13	261.72	272.98

Circle Center At X = 191.13 ; Y = 316.15 ; and Radius = 82.89

Factor of Safety

*** 1.266 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	170.41	240.14
2	180.04	237.46
3	189.91	235.82
4	199.89	235.21
5	209.88	235.66
6	219.77	237.16
7	229.44	239.68
8	238.80	243.21
9	247.73	247.70
10	256.15	253.11
11	263.95	259.36
12	271.05	266.40
13	276.43	273.00

Circle Center At X = 200.62 ; Y = 330.31 ; and Radius = 95.10

Factor of Safety

*** 1.270 ***

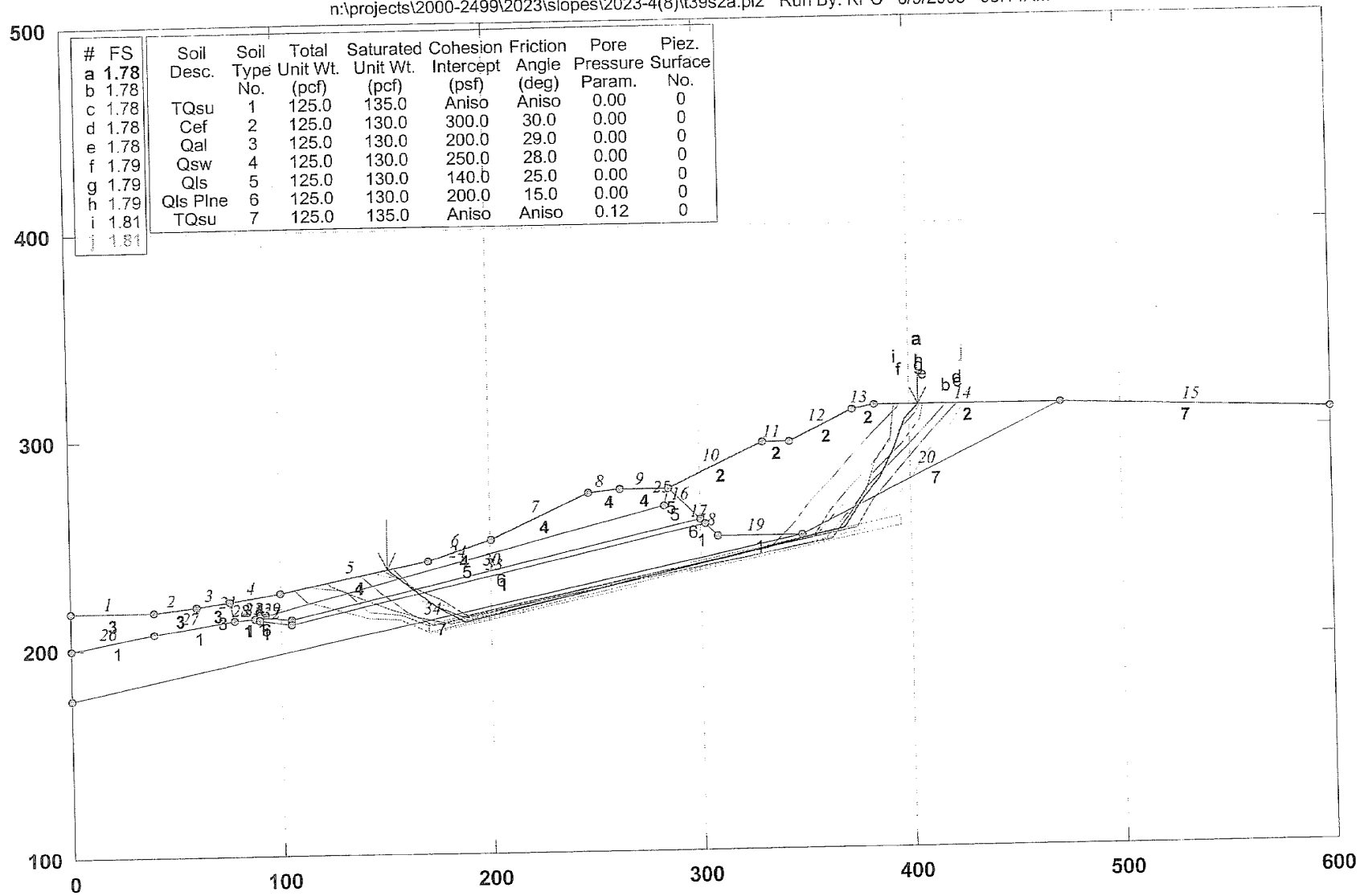
**** END OF GSTABL7 OUTPUT ****

Mesas East, x-sec 39-39'; static; bedplane

n:\projects\2000-2499\2023\slopes\2023-4(8)\t39s2a.pl2 Run By: KPC 6/9/2005 08:14AM

#	FS
a	1.78
b	1.78
c	1.78
d	1.78
e	1.78
f	1.79
g	1.79
h	1.79
i	1.81
j	1.81

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	Aniso	Aniso	0.00	0
Cef	2	125.0	130.0	300.0	30.0	0.00	0
Qal	3	125.0	130.0	200.0	29.0	0.00	0
Qsw	4	125.0	130.0	250.0	28.0	0.00	0
Qls	5	125.0	130.0	140.0	25.0	0.00	0
Qls Plne	6	125.0	130.0	200.0	15.0	0.00	0
TQsu	7	125.0	135.0	Aniso	Aniso	0.12	0



GSTABL7 v.2 FSmin=1.78

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No: 5

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/9/2005
Time of Run: 08:14AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\2023-4(8)\t39s2a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\2023-4(8)\t39s2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope23-4(8)\t39s2a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 39-39'; static; bedplane

BOUNDARY COORDINATES
15 Top Boundaries
34 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	218.00	40.00	218.00	3
2	40.00	218.00	60.00	220.00	3
3	60.00	220.00	76.00	222.00	3
4	76.00	222.00	100.00	226.00	4
5	100.00	226.00	170.00	240.00	4
6	170.00	240.00	200.00	250.00	4
7	200.00	250.00	247.00	272.00	4
8	247.00	272.00	262.00	273.00	4
9	262.00	273.00	285.00	273.00	4
10	285.00	273.00	330.00	295.00	2
11	330.00	295.00	343.00	295.00	2
12	343.00	295.00	373.00	310.00	2
13	373.00	310.00	383.00	312.00	2
14	383.00	312.00	472.00	312.00	2
15	472.00	312.00	600.00	308.00	7
16	285.00	273.00	300.00	258.00	5
17	300.00	258.00	302.00	256.00	6
18	302.00	256.00	308.00	250.00	1
19	308.00	250.00	348.00	250.00	1
20	348.00	250.00	472.00	312.00	7
21	76.00	222.00	78.00	213.00	3
22	78.00	213.00	88.00	214.00	1
23	88.00	214.00	90.00	215.00	1
24	90.00	215.00	283.00	265.00	5
25	283.00	265.00	285.00	273.00	5
26	0.00	200.00	40.00	207.00	1
27	40.00	207.00	78.00	213.00	1
28	78.00	213.00	88.00	214.00	1
29	90.00	215.00	105.00	213.00	6
30	105.00	213.00	300.00	258.00	6
31	88.00	214.00	90.00	213.00	1
32	90.00	213.00	105.00	211.00	1
33	105.00	211.00	302.00	256.00	1
34	0.00	176.00	348.00	250.00	7

User Specified Y-Origin = 100.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
7 Type(s) of Soil

Soil Type	Total Unit Wt.	Saturated Unit Wt.	Cohesion Intercept	Friction Angle	Pore Pressure	Pressure Constant	Piez. Surface

No.	(pcf)	(pcf)	(psf)	(deg)	Param.	(psf)	No.
1	125.0	135.0	300.0	31.0	0.00	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0
3	125.0	130.0	200.0	29.0	0.00	0.0	0
4	125.0	130.0	250.0	28.0	0.00	0.0	0
5	125.0	130.0	140.0	25.0	0.00	0.0	0
6	125.0	130.0	200.0	15.0	0.00	0.0	0
7	125.0	135.0	300.0	31.0	0.12	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
2 soil type(s)

Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	10.5	300.00	31.00
2	13.5	200.00	20.00
3	90.0	300.00	31.00

Soil Type 7 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	10.5	300.00	31.00
2	13.5	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 15.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	170.00	208.00	270.00	229.00	5.00
2	295.00	235.00	395.00	256.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 8.615 FS Min = 1.779 FS Ave = 2.533
Standard Deviation = 0.787 Coefficient of Variation = 31.08 %
Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	150.82	236.16
2	162.02	227.18
3	174.17	218.38
4	187.33	211.17
5	368.33	252.82
6	376.48	265.42
7	385.75	277.21
8	392.14	290.78
9	397.24	304.89
10	404.24	312.00

Factor of Safety

*** 1.779 ***

Individual data on the 28 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	5.1	1626.0	0.0	0.0	0.	0.	0.0	0.0	0.0
2	6.1	6234.5	0.0	0.0	0.	0.	0.0	0.0	0.0
3	1.1	1560.8	0.0	0.0	0.	0.	0.0	0.0	0.0
4	2.2	3711.5	0.0	0.0	0.	0.	0.0	0.0	0.0
5	4.7	9598.4	0.0	0.0	0.	0.	0.0	0.0	0.0
6	4.2	10846.0	0.0	0.0	0.	0.	0.0	0.0	0.0
7	7.0	22927.6	0.0	0.0	0.	0.	0.0	0.0	0.0
8	6.1	24456.0	0.0	3345.5	0.	0.	0.0	0.0	0.0
9	12.7	55847.0	0.0	6876.8	0.	0.	0.0	0.0	0.0
10	47.0	243832.1	0.0	30024.5	0.	0.	0.0	0.0	0.0
11	15.0	86006.7	0.0	10590.5	0.	0.	0.0	0.0	0.0
12	21.0	110849.7	0.0	13649.6	0.	0.	0.0	0.0	0.0
13	2.0	9895.6	0.0	1218.5	0.	0.	0.0	0.0	0.0
14	15.0	77424.6	0.0	9533.7	0.	0.	0.0	0.0	0.0
15	2.0	10873.2	0.0	1338.9	0.	0.	0.0	0.0	0.0
16	6.0	33396.0	0.0	4112.2	0.	0.	0.0	0.0	0.0
17	22.0	132415.3	0.0	16305.1	0.	0.	0.0	0.0	0.0
18	13.0	80440.8	0.0	9905.1	0.	0.	0.0	0.0	0.0
19	5.0	30425.7	0.0	3746.5	0.	0.	0.0	0.0	0.0
20	20.3	132423.4	0.0	16306.1	0.	0.	0.0	0.0	0.0
21	4.7	30565.7	0.0	6754.3	0.	0.	0.0	0.0	0.0
22	2.4	14227.7	0.0	3144.0	0.	0.	0.0	0.0	0.0
23	1.1	6483.1	0.0	0.0	0.	0.	0.0	0.0	0.0
24	6.5	34053.4	0.0	0.0	0.	0.	0.0	0.0	0.0
25	2.7	12539.2	0.0	0.0	0.	0.	0.0	0.0	0.0
26	6.4	22381.6	0.0	0.0	0.	0.	0.0	0.0	0.0
27	5.1	9035.2	0.0	0.0	0.	0.	0.0	0.0	0.0
28	7.0	3112.2	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	149.29	235.86
2	161.60	229.37
3	172.62	219.19
4	186.50	213.51
5	362.43	247.66
6	371.25	259.79
7	379.67	272.21
8	390.22	282.87
9	400.57	293.72
10	411.07	304.44
11	417.90	312.00

Factor of Safety

*** 1.780 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	153.62	236.72
2	162.09	228.47
3	175.73	222.24
4	188.16	213.84
5	374.24	252.98
6	381.57	266.07
7	391.46	277.35
8	401.58	288.42
9	411.29	299.85
10	421.83	310.52
11	423.09	312.00

Factor of Safety

*** 1.780 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	153.62	236.72
2	162.09	228.47
3	175.73	222.24
4	188.16	213.84
5	374.24	252.98
6	381.57	266.07
7	391.46	277.35
8	401.58	288.42
9	411.29	299.85
10	421.83	310.52
11	423.09	312.00

Factor of Safety
*** 1.780 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	113.73	228.75
2	115.93	228.25
3	130.84	226.64
4	141.47	216.05
5	156.43	214.96
6	170.53	209.85
7	354.66	249.19
8	364.82	260.23
9	374.96	271.28
10	385.52	281.93
11	396.10	292.57
12	405.08	304.58
13	406.13	312.00

Factor of Safety
*** 1.780 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	122.46	230.49
2	123.89	229.06
3	137.73	223.26
4	151.80	218.08
5	166.06	213.41
6	180.71	210.21
7	333.01	243.73
8	343.60	254.35
9	352.78	266.21
10	363.28	276.93
11	372.76	288.55
12	383.36	299.17
13	393.87	309.87
14	394.94	312.00

Factor of Safety
*** 1.785 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	106.33	227.27
2	112.63	221.72
3	127.00	217.43
4	141.47	213.47
5	156.44	212.52
6	170.34	206.87
7	359.15	247.74
8	368.82	259.21
9	379.03	270.20
10	383.54	284.51
11	392.24	296.73
12	402.72	307.46

13	405.18	312.00

Factor of Safety
*** 1.787 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	106.33	227.27
2	112.63	221.72
3	127.00	217.43
4	141.47	213.47
5	156.44	212.52
6	170.34	206.87
7	359.15	247.74
8	368.82	259.21
9	379.03	270.20
10	383.54	284.51
11	392.24	296.73
12	402.72	307.46
13	405.18	312.00

Factor of Safety
*** 1.787 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	138.31	233.66
2	147.67	225.29
3	159.44	215.99
4	172.78	209.13
5	353.00	248.86
6	361.54	261.19
7	371.15	272.71
8	381.70	283.37
9	390.60	295.45
10	392.42	310.33
11	392.65	312.00

Factor of Safety
*** 1.808 ***

Failure Surface Specified By 12 Coordinate Points

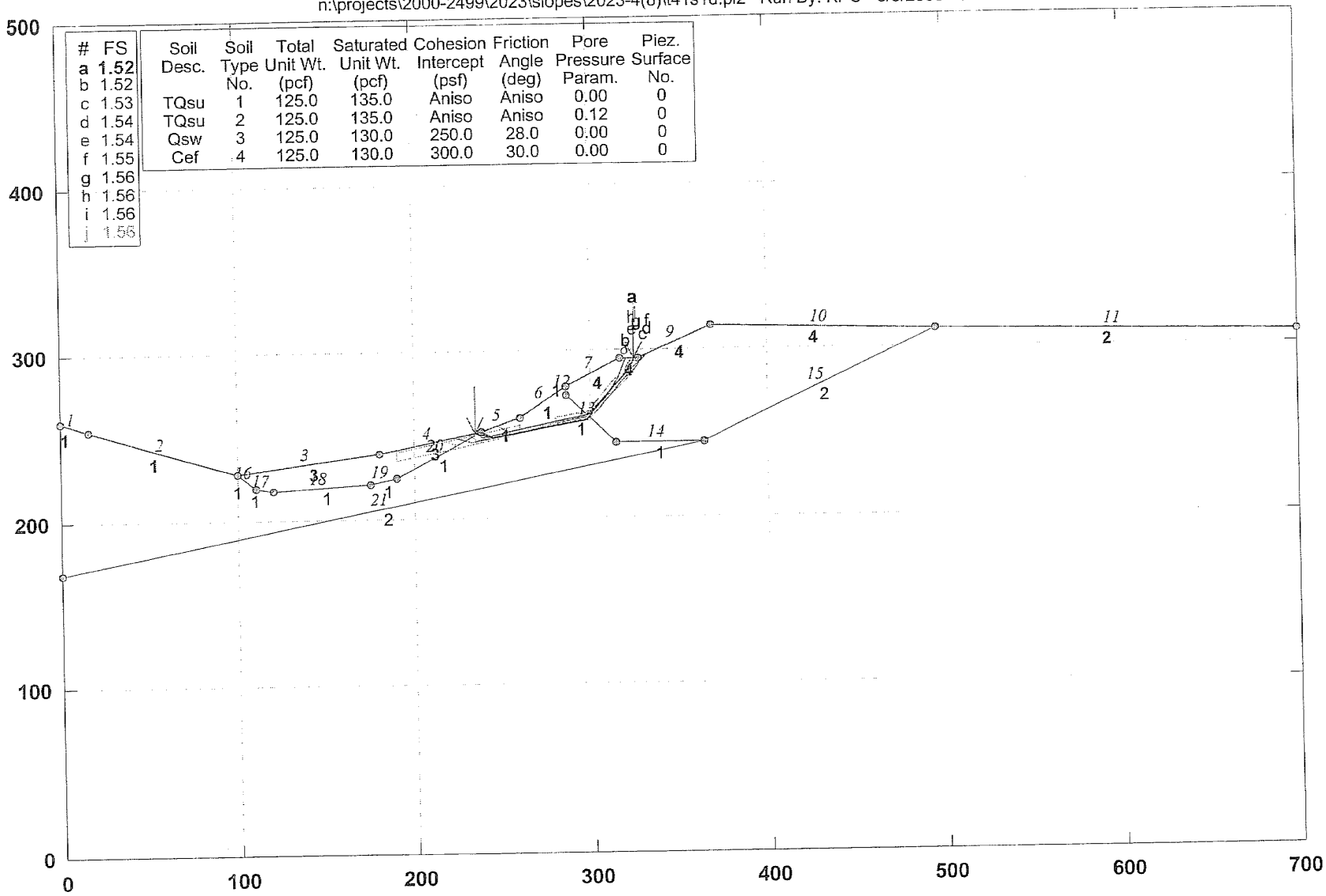
Point No.	X-Surf (ft)	Y-Surf (ft)
1	144.25	234.85
2	155.12	231.69
3	166.04	221.41
4	180.80	218.70
5	193.90	211.39
6	379.78	252.55
7	390.27	263.28
8	400.03	274.67
9	407.40	287.73
10	417.43	298.89
11	425.04	311.82
12	425.20	312.00

Factor of Safety
*** 1.811 ***

**** END OF GSTABL7 OUTPUT ****

Mesas East, x-sec 41-41'; static; bedplane

n:\projects\2000-2499\2023\slopes\2023-4(8)\t41s1d.pl2 Run By: KPC 6/3/2005 02:43PM



#	FS
a	**1.52**
b	1.52
c	1.53
d	1.54
e	1.54
f	1.55
g	1.56
h	1.56
i	1.56
j	1.56

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	Aniso	Aniso	0.00	0
TQsu	2	125.0	135.0	Aniso	Aniso	0.12	0
Qsw	3	125.0	130.0	250.0	28.0	0.00	0
Cef	4	125.0	130.0	300.0	30.0	0.00	0

GSTABL7 v.2 FSmin=1.52

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No: 6

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/3/2005
Time of Run: 02:43PM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\2023-4(8)\t41sld.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\2023-4(8)\t41sld.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope23-4(8)\t41sld.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 41-41'; static; bedplane

BOUNDARY COORDINATES
11 Top Boundaries
21 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	260.00	16.00	255.00	1
2	16.00	255.00	100.00	228.00	1
3	100.00	228.00	180.00	240.00	3
4	180.00	240.00	238.00	252.00	3
5	238.00	252.00	260.00	260.00	1
6	260.00	260.00	286.00	278.00	1
7	286.00	278.00	317.00	295.00	4
8	317.00	295.00	327.00	295.00	4
9	327.00	295.00	368.00	314.00	4
10	368.00	314.00	495.00	311.00	4
11	495.00	311.00	700.00	307.00	2
12	286.00	278.00	286.01	273.00	1
13	286.01	273.00	314.00	245.00	1
14	314.00	245.00	364.00	245.00	1
15	364.00	245.00	495.00	311.00	2
16	100.00	228.00	110.00	220.00	1
17	110.00	220.00	120.00	218.00	1
18	120.00	218.00	175.00	221.00	1
19	175.00	221.00	190.00	225.00	1
20	190.00	225.00	238.00	252.00	1
21	0.00	168.00	364.00	245.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.00	0.0	0
2	125.0	135.0	300.0	31.0	0.12	0.0	0
3	125.0	130.0	250.0	28.0	0.00	0.0	0
4	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
2 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)

1	10.5	300.00	31.00
2	13.5	200.00	20.00
3	90.0	300.00	31.00

Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	10.5	300.00	31.00
2	13.5	200.00	20.00
3	90.0	300.00	31.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 10.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	190.00	238.00	260.00	253.00	5.00
2	280.00	257.00	300.00	261.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 5.834 FS Min = 1.521 FS Ave = 2.273
Standard Deviation = 0.580 Coefficient of Variation = 25.52 %
Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	234.41	251.26
2	235.54	251.02
3	245.09	248.06
4	297.33	258.51
5	303.52	266.37
6	309.79	274.15
7	316.45	281.61
8	322.76	289.37
9	324.62	295.00

Factor of Safety
*** 1.521 ***

Individual data on the 15 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	1.1	33.3	0.0	0.0	0.	0.	0.0	0.0	0.0
2	0.5	34.2	0.0	0.0	0.	0.	0.0	0.0	0.0
3	2.0	306.1	0.0	0.0	0.	0.	0.0	0.0	0.0
4	7.1	3660.8	0.0	0.0	0.	0.	0.0	0.0	0.0
5	14.9	14415.1	0.0	0.0	0.	0.	0.0	0.0	0.0
6	26.0	49911.9	0.0	0.0	0.	0.	0.0	0.0	0.0
7	0.0	27.2	0.0	0.0	0.	0.	0.0	0.0	0.0
8	11.3	33593.0	0.0	0.0	0.	0.	0.0	0.0	0.0
9	1.4	4391.0	0.0	0.0	0.	0.	0.0	0.0	0.0
10	4.8	13748.6	0.0	0.0	0.	0.	0.0	0.0	0.0

11	6.3	14959.4	0.0	0.0	0.	0.	0.0	0.0	0.0
12	6.7	12472.0	0.0	0.0	0.	0.	0.0	0.0	0.0
13	0.6	889.4	0.0	0.0	0.	0.	0.0	0.0	0.0
14	5.8	6604.1	0.0	0.0	0.	0.	0.0	0.0	0.0
15	1.9	653.6	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	237.76	251.95
2	245.81	248.65
3	297.62	259.87
4	304.65	266.98
5	310.88	274.80
6	315.89	283.46
7	319.44	292.81
8	319.97	295.00

Factor of Safety
*** 1.523 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	247.15	255.33
2	253.11	252.11
3	297.16	260.61
4	304.12	267.79
5	311.12	274.94
6	318.19	282.01
7	325.19	289.15
8	329.79	296.29

Factor of Safety
*** 1.527 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	222.95	248.89
2	223.19	248.69
3	232.79	245.88
4	298.19	258.35
5	305.18	265.50
6	311.93	272.88
7	317.68	281.06
8	324.14	288.69
9	331.01	295.96
10	332.62	297.61

Factor of Safety
*** 1.540 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	237.11	251.82
2	242.10	248.12
3	299.49	260.98
4	306.49	268.11
5	311.35	276.85
6	318.26	284.08
7	322.43	293.17
8	323.57	295.00

Factor of Safety
*** 1.544 ***

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	231.59	250.67
2	235.37	246.91
3	298.73	259.24
4	305.68	266.43
5	312.51	273.74

6	319.58	280.81
7	325.84	288.61
8	331.73	296.69
9	332.48	297.54

Factor of Safety
*** 1.551 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	235.48	251.48
2	238.67	248.53
3	299.56	261.50
4	306.53	268.67
5	313.15	276.17
6	320.21	283.25
7	323.69	292.62
8	326.06	295.00

Factor of Safety
*** 1.556 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	239.12	252.41
2	243.49	248.18
3	292.89	258.26
4	299.79	265.50
5	306.09	273.26
6	312.70	280.77
7	319.66	287.94
8	324.13	295.00

Factor of Safety
*** 1.557 ***

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	216.07	247.46
2	217.51	246.97
3	226.93	243.59
4	299.21	260.34
5	305.52	268.10
6	312.34	275.42
7	319.41	282.49
8	324.26	291.24
9	325.92	295.00

Factor of Safety
*** 1.559 ***

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	216.07	247.46
2	217.51	246.97
3	226.93	243.59
4	299.21	260.34
5	305.52	268.10
6	312.34	275.42
7	319.41	282.49
8	324.26	291.24
9	325.92	295.00

Factor of Safety
*** 1.559 ***

**** END OF GSTABL7 OUTPUT ****

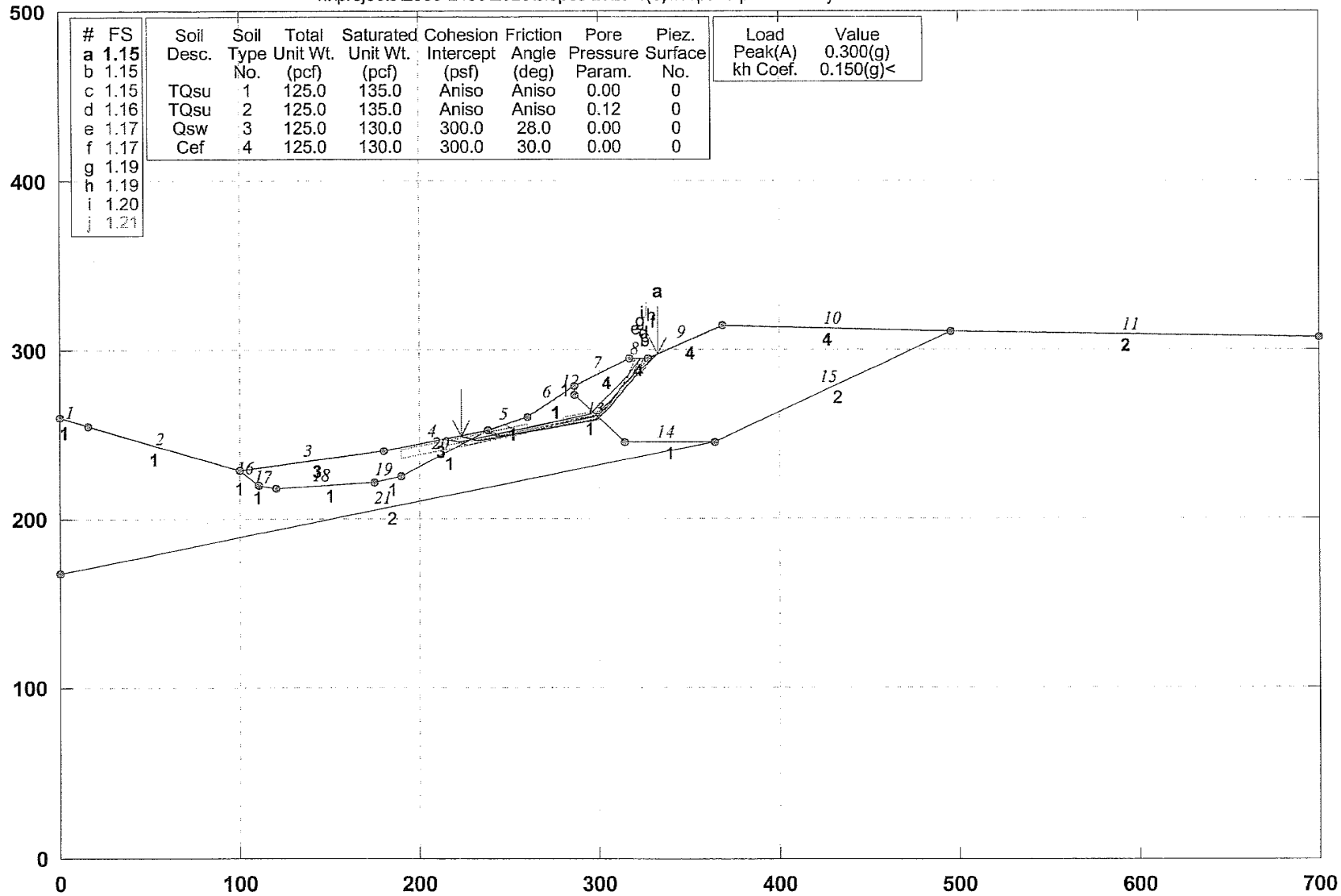
Mesas East, x-sec 41-41'; pseudostatic; bedplane

n:\projects\2000-2499\2023\slopes\2023-4(8)\t41ps1d.pl2 Run By: KPC 6/10/2005 08:42AM

#	FS
a	**1.15**
b	1.15
c	1.15
d	1.16
e	1.17
f	1.17
g	1.19
h	1.19
i	1.20
j	1.21

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	Aniso	Aniso	0.00	0
TQsu	2	125.0	135.0	Aniso	Aniso	0.12	0
Qsw	3	125.0	130.0	300.0	28.0	0.00	0
Cef	4	125.0	130.0	300.0	30.0	0.00	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<



GSTABL7 v.2 FSmin=1.15

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No: 7

*** GSTABL7 ***
** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
(All Rights Reserved-Unauthorized Use Prohibited)
****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date: 6/10/2005
Time of Run: 08:42AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\2023-4(8)\t41psld.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\2023-4(8)\t41psld.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope23-4(8)\t41psld.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 41-41'; pseudostatic; bedplane

BOUNDARY COORDINATES
11 Top Boundaries
21 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	260.00	16.00	255.00	1
2	16.00	255.00	100.00	228.00	1
3	100.00	228.00	180.00	240.00	3
4	180.00	240.00	238.00	252.00	3
5	238.00	252.00	260.00	260.00	1
6	260.00	260.00	286.00	278.00	1
7	286.00	278.00	317.00	295.00	4
8	317.00	295.00	327.00	295.00	4
9	327.00	295.00	368.00	314.00	4
10	368.00	314.00	495.00	311.00	4
11	495.00	311.00	700.00	307.00	2
12	286.00	278.00	286.01	273.00	1
13	286.01	273.00	314.00	245.00	1
14	314.00	245.00	364.00	245.00	1
15	364.00	245.00	495.00	311.00	2
16	100.00	228.00	110.00	220.00	1
17	110.00	220.00	120.00	218.00	1
18	120.00	218.00	175.00	221.00	1
19	175.00	221.00	190.00	225.00	1
20	190.00	225.00	238.00	252.00	1
21	0.00	168.00	364.00	245.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	400.0	38.0	0.00	0.0	0
2	125.0	135.0	400.0	38.0	0.12	0.0	0
3	125.0	130.0	300.0	28.0	0.00	0.0	0
4	125.0	130.0	300.0	30.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
2 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)

1	10.5	400.00	39.00
2	13.5	200.00	20.00
3	90.0	400.00	38.00

Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	10.5	400.00	38.00
2	13.5	200.00	20.00
3	90.0	400.00	38.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 10.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	190.00	238.00	260.00	253.00	5.00
2	280.00	257.00	300.00	261.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 4.545 FS Min = 1.147 FS Ave = 1.892
Standard Deviation = 0.556 Coefficient of Variation = 29.36 %
Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	222.95	248.89
2	223.19	248.69
3	232.79	245.88
4	298.19	258.35
5	305.18	265.50
6	311.93	272.88
7	317.68	281.06
8	324.14	288.69
9	331.01	295.96
10	332.62	297.61

Factor of Safety
*** 1.147 ***

Individual data on the 17 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	0.2	3.7	0.0	0.0	0.	0.	0.6	0.0	0.0
2	5.9	1255.1	0.0	0.0	0.	0.	188.3	0.0	0.0
3	3.7	1917.3	0.0	0.0	0.	0.	287.6	0.0	0.0
4	5.2	3314.4	0.0	0.0	0.	0.	497.2	0.0	0.0
5	22.0	19340.5	0.0	0.0	0.	0.	2901.1	0.0	0.0

6	26.0	50234.2	0.0	0.0	0.	0.	7535.1	0.0	0.0
7	0.0	27.5	0.0	0.0	0.	0.	4.1	0.0	0.0
8	12.2	36790.5	0.0	0.0	0.	0.	5518.6	0.0	0.0
9	1.2	3970.2	0.0	0.0	0.	0.	595.5	0.0	0.0
10	5.8	17598.7	0.0	0.0	0.	0.	2639.8	0.0	0.0
11	6.7	17855.9	0.0	0.0	0.	0.	2678.4	0.0	0.0
12	5.1	10856.3	0.0	0.0	0.	0.	1628.4	0.0	0.0
13	0.7	1225.6	0.0	0.0	0.	0.	183.8	0.0	0.0
14	6.5	8173.3	0.0	0.0	0.	0.	1226.0	0.0	0.0
15	2.9	1713.9	0.0	0.0	0.	0.	257.1	0.0	0.0
16	4.0	1046.7	0.0	0.0	0.	0.	157.0	0.0	0.0
17	1.6	90.5	0.0	0.0	0.	0.	13.6	0.0	0.0

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	216.07	247.46
2	217.51	246.97
3	226.93	243.59
4	299.21	260.34
5	305.52	268.10
6	312.34	275.42
7	319.41	282.49
8	324.26	291.24
9	325.92	295.00

Factor of Safety
*** 1.151 ***

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	216.07	247.46
2	217.51	246.97
3	226.93	243.59
4	299.21	260.34
5	305.52	268.10
6	312.34	275.42
7	319.41	282.49
8	324.26	291.24
9	325.92	295.00

Factor of Safety
*** 1.151 ***

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	234.41	251.26
2	235.54	251.02
3	245.09	248.06
4	297.33	258.51
5	303.52	266.37
6	309.79	274.15
7	316.45	281.61
8	322.76	289.37
9	324.62	295.00

Factor of Safety
*** 1.164 ***

Failure Surface Specified By 8 Coordinate Points

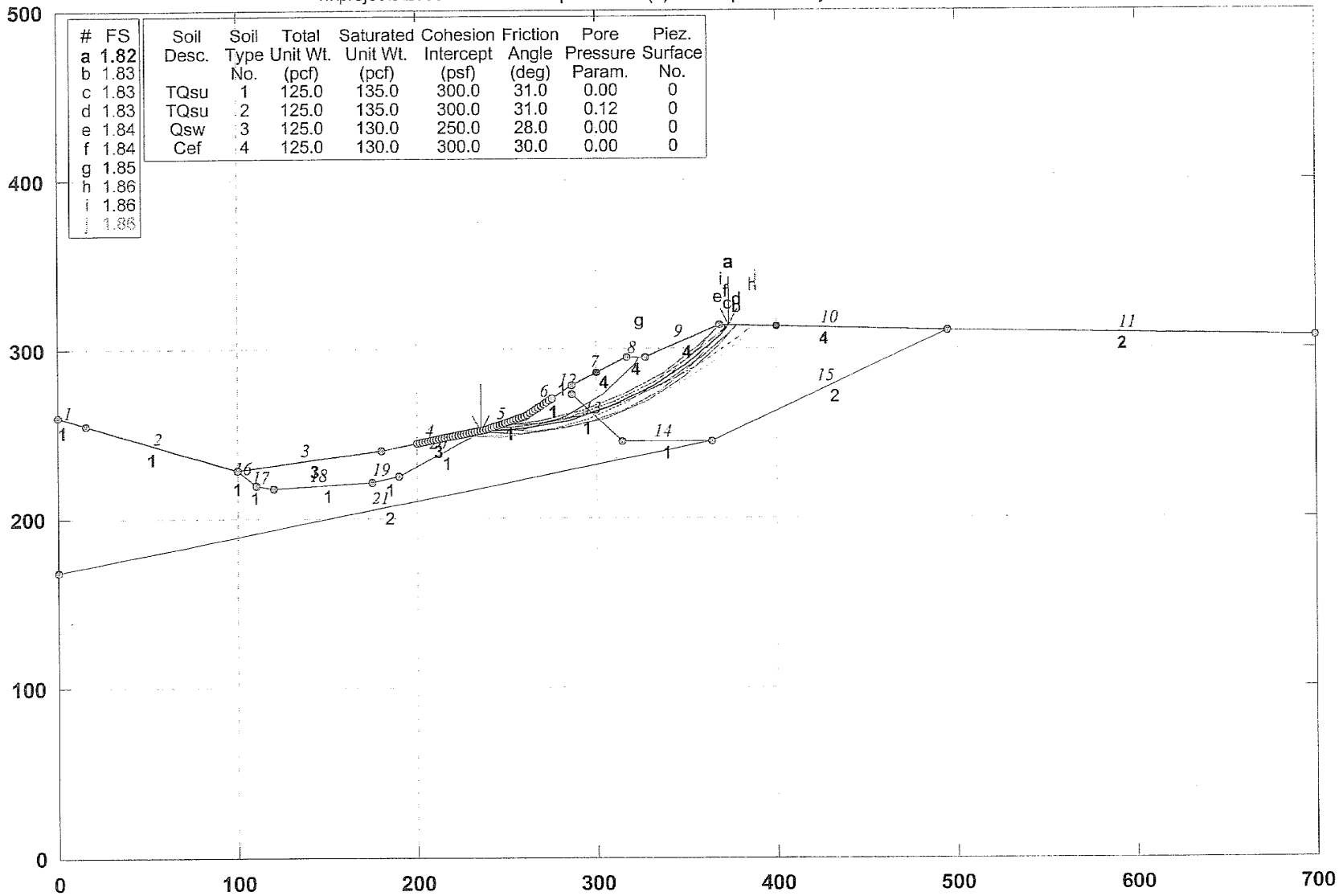
Point No.	X-Surf (ft)	Y-Surf (ft)
1	237.76	251.95
2	245.81	248.65
3	297.62	259.87
4	304.65	266.98
5	310.88	274.80
6	315.89	283.46
7	319.44	292.81
8	319.97	295.00

Factor of Safety
*** 1.170 ***

```
Failure Surface Specified By  8 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         247.15       255.33
    2         253.11       252.11
    3         297.16       260.61
    4         304.12       267.79
    5         311.12       274.94
    6         318.19       282.01
    7         325.19       289.15
    8         329.79       296.29
       Factor of Safety
      ***    1.172   ***
Failure Surface Specified By  8 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         213.75       246.98
    2         222.60       244.70
    3         295.13       261.99
    4         301.60       269.61
    5         308.67       276.68
    6         315.52       283.97
    7         321.56       291.94
    8         322.67       295.00
       Factor of Safety
      ***    1.189   ***
Failure Surface Specified By  8 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         211.87       246.59
    2         215.19       243.65
    3         298.87       259.19
    4         305.05       267.05
    5         310.95       275.12
    6         317.14       282.98
    7         323.71       290.52
    8         328.87       295.87
       Factor of Safety
      ***    1.193   ***
Failure Surface Specified By  8 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         237.11       251.82
    2         242.10       248.12
    3         299.49       260.98
    4         306.49       268.11
    5         311.35       276.85
    6         318.26       284.08
    7         322.43       293.17
    8         323.57       295.00
       Factor of Safety
      ***    1.203   ***
Failure Surface Specified By  8 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         235.48       251.48
    2         238.67       248.53
    3         299.56       261.50
    4         306.53       268.67
    5         313.15       276.17
    6         320.21       283.25
    7         323.69       292.62
    8         326.06       295.00
       Factor of Safety
      ***    1.207   ***
          **** END OF GSTABL7 OUTPUT ****
```

Mesas East, x-sec 41-41'; static; circular

n:\projects\2000-2499\2023\slopes\2023-4(8)\t41s2a.pl2 Run By: KPC 6/10/2005 08:51AM



#	FS
a	1.82
b	1.83
c	1.83
d	1.83
e	1.84
f	1.84
g	1.85
h	1.86
i	1.86
j	1.86

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
TQsu	1	125.0	135.0	300.0	31.0	0.00	0
TQsu	2	125.0	135.0	300.0	31.0	0.12	0
Qsw	3	125.0	130.0	250.0	28.0	0.00	0
Cef	4	125.0	130.0	300.0	30.0	0.00	0

GSTABL7 v.2 FSmin=1.82

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No: 8

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/10/2005
Time of Run: 08:51AM
Run By: KPC
Input Data Filename: N:\Projects\2000-2499\2023\Slopes\2023-4(8)\t41s2a.in
Output Filename: N:\Projects\2000-2499\2023\Slopes\2023-4(8)\t41s2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\2000-2499\2023\Slope23-4(8)\t41s2a.PLT
PROBLEM DESCRIPTION: Mesas East, x-sec 41-41'; static; circular

BOUNDARY COORDINATES
11 Top Boundaries
21 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	260.00	16.00	255.00	1
2	16.00	255.00	100.00	228.00	1
3	100.00	228.00	180.00	240.00	3
4	180.00	240.00	238.00	252.00	3
5	238.00	252.00	260.00	260.00	1
6	260.00	260.00	286.00	278.00	1
7	286.00	278.00	317.00	295.00	4
8	317.00	295.00	327.00	295.00	4
9	327.00	295.00	368.00	314.00	4
10	368.00	314.00	495.00	311.00	4
11	495.00	311.00	700.00	307.00	2
12	286.00	278.00	286.01	273.00	1
13	286.01	273.00	314.00	245.00	1
14	314.00	245.00	364.00	245.00	1
15	364.00	245.00	495.00	311.00	2
16	100.00	228.00	110.00	220.00	1
17	110.00	220.00	120.00	218.00	1
18	120.00	218.00	175.00	221.00	1
19	175.00	221.00	190.00	225.00	1
20	190.00	225.00	238.00	252.00	1
21	0.00	168.00	364.00	245.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	300.0	31.0	0.00	0.0	0
2	125.0	135.0	300.0	31.0	0.12	0.0	0
3	125.0	130.0	250.0	28.0	0.00	0.0	0
4	125.0	130.0	300.0	30.0	0.00	0.0	0

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 200.00(ft)
and X = 275.00(ft)
Each Surface Terminates Between X = 300.00(ft)

and X = 400.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
25.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 10.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 4.281 FS Min = 1.815 FS Ave = 2.385
Standard Deviation = 0.387 Coefficient of Variation = 16.24 %
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	235.20	251.42
2	260.17	252.75
3	284.71	257.53
4	308.34	265.68
5	330.62	277.03
6	351.10	291.36
7	369.40	308.40
8	373.83	313.86

Circle Center At X = 238.51 ; Y = 429.17 ; and Radius = 177.78
Factor of Safety
*** 1.815 ***
Individual data on the 16 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	2.0	36.6	0.0	0.0	0.	0.	0.0	0.0	0.0
2	0.8	38.5	0.0	0.0	0.	0.	0.0	0.0	0.0
3	22.0	10571.0	0.0	0.0	0.	0.	0.0	0.0	0.0
4	0.2	154.2	0.0	0.0	0.	0.	0.0	0.0	0.0
5	24.5	41311.0	0.0	0.0	0.	0.	0.0	0.0	0.0
6	1.3	3200.0	0.0	0.0	0.	0.	0.0	0.0	0.0
7	0.0	25.1	0.0	0.0	0.	0.	0.0	0.0	0.0
8	11.2	29531.3	0.0	0.0	0.	0.	0.0	0.0	0.0
9	11.2	32714.1	0.0	0.0	0.	0.	0.0	0.0	0.0
10	8.7	26774.4	0.0	0.0	0.	0.	0.0	0.0	0.0
11	10.0	27952.8	0.0	0.0	0.	0.	0.0	0.0	0.0
12	3.6	8923.8	0.0	0.0	0.	0.	0.0	0.0	0.0
13	20.5	44109.9	0.0	0.0	0.	0.	0.0	0.0	0.0
14	16.9	22925.4	0.0	0.0	0.	0.	0.0	0.0	0.0
15	1.4	1087.1	0.0	0.0	0.	0.	0.0	0.0	0.0
16	4.4	1541.5	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	232.14	250.79
2	257.12	249.68
3	281.95	252.55
4	306.02	259.33
5	328.70	269.85
6	349.42	283.84
7	367.65	300.94
8	377.57	313.77

Circle Center At X = 251.75 ; Y = 404.90 ; and Radius = 155.36
Factor of Safety
*** 1.826 ***
Failure Surface Specified By 8 Coordinate Points

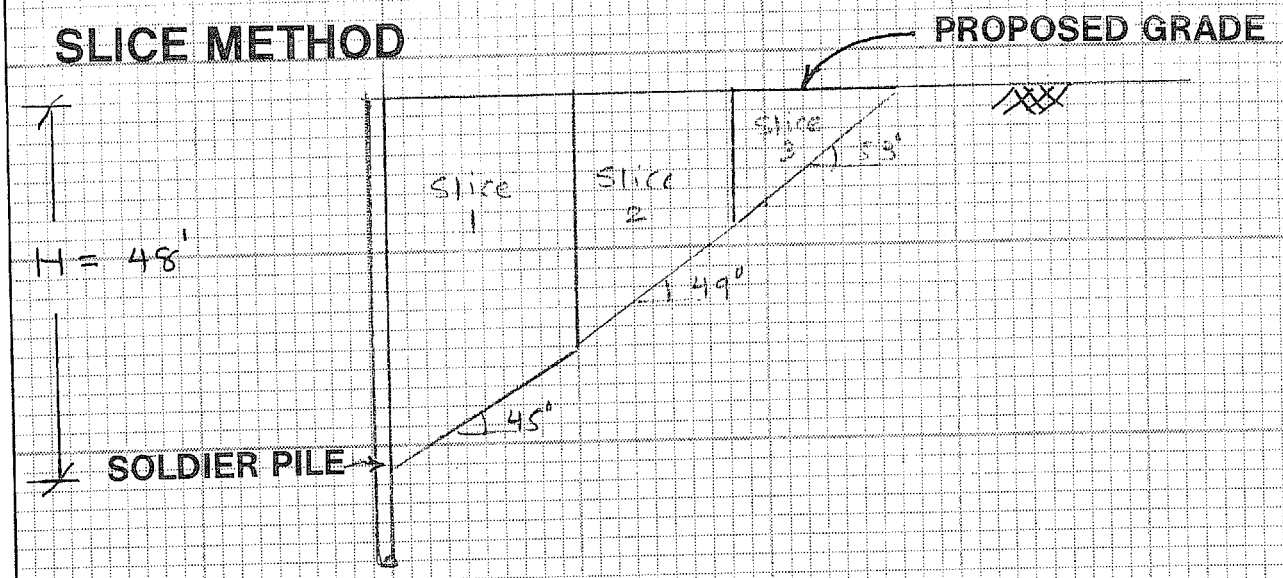
Point No.	X-Surf (ft)	Y-Surf (ft)

```
    1        236.73      251.74
    2        261.60      254.35
    3        285.94      260.05
    4        309.37      268.76
    5        331.54      280.32
    6        352.08      294.57
    7        370.68      311.28
    8        372.94      313.88
Circle Center At X =   228.65 ; Y =   449.78 ; and Radius =   198.21
       Factor of Safety
      ***    1.833   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        244.39      254.32
    2        269.34      255.91
    3        293.82      260.97
    4        317.35      269.40
    5        339.48      281.05
    6        359.75      295.67
    7        377.78      312.99
    8        378.38      313.75
Circle Center At X =   245.66 ; Y =   432.21 ; and Radius =   177.90
       Factor of Safety
      ***    1.833   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        221.43      248.57
    2        246.42      247.77
    3        271.22      250.90
    4        295.22      257.90
    5        317.82      268.58
    6        338.46      282.69
    7        356.63      299.86
    8        367.22      313.64
Circle Center At X =   239.18 ; Y =   404.65 ; and Radius =   157.09
       Factor of Safety
      ***    1.838   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        239.80      252.65
    2        264.76      251.29
    3        289.53      254.65
    4        313.22      262.63
    5        334.99      274.93
    6        354.04      291.11
    7        369.71      310.60
    8        371.47      313.92
Circle Center At X =   259.58 ; Y =   382.26 ; and Radius =   131.11
       Factor of Safety
      ***    1.841   ***
Failure Surface Specified By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        233.67      251.10
    2        258.65      252.18
    3        282.55      259.51
    4        303.84      272.62
    5        321.15      290.66
    6        323.58      295.00
Circle Center At X =   242.25 ; Y =   347.56 ; and Radius =    96.84
       Factor of Safety
      ***    1.852   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
```

```
  No.        (ft)        (ft)
   1        238.27      252.10
   2        263.14      254.57
   3        287.62      259.64
   4        311.43      267.27
   5        334.30      277.37
   6        355.98      289.82
   7        376.23      304.48
   8        386.33      313.57
Circle Center At X =   227.85 ; Y =   486.23 ; and Radius =   234.37
      Factor of Safety
     ***    1.856   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
   1        242.86      253.77
   2        267.67      256.85
   3        291.84      263.24
   4        314.93      272.81
   5        336.53      285.39
   6        356.25      300.76
   7        369.18      313.97
Circle Center At X =   232.37 ; Y =   439.39 ; and Radius =   185.92
      Factor of Safety
     ***    1.857   ***
Failure Surface Specified By  9 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
   1        222.96      248.89
   2        247.96      248.86
   3        272.79      251.74
   4        297.12      257.51
   5        320.60      266.08
   6        342.92      277.34
   7        363.78      291.13
   8        382.88      307.25
   9        388.74      313.51
Circle Center At X =   235.74 ; Y =   462.14 ; and Radius =   213.63
      Factor of Safety
     ***    1.857   ***
         **** END OF GSTABL7 OUTPUT ****
```

SOLDIER PILE WALL LOAD

SLICE METHOD



NO SCALE (SEE SLOPE STABILITY ANALYSES)

Active Pressure Calculation

Soil Parameters

y	C	ϕ
135	500	35

FS
1.5

Wall Height, ft
48

Slice No.	Width of Slice DXi, ft.	Area, ft^2	Weight of Slice DW, Kips	Angle of Slice Dd	DWsin(Dd) (DT)	DWcos(Dd) tan(Dphi) (DN)	DL, ft
1	16.00	646.30	87.25	45.00	61.70	43.20	22.63
2	14.10	342.00	46.17	49.00	34.84	21.21	21.49
3	13.30	110.94	14.98	53.00	11.96	6.31	22.10
					108.50	70.72	66.22

Factor of Safety (FS') = (N + C * L) / T = 0.96

Equivalent Fluid Pressure

Yeq = 2 * (FS - FS')Wsin(d) / H^2 = **51** pcf

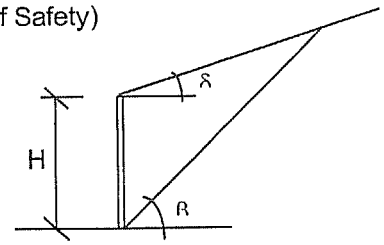
Figure - C1

PROJECT: VTT 61105		
JOB NO.: 05-2023-4	DATE: June 13, 05	SHEET 1 OF 3

FAILURE METHOD

Bedrock

C =	500	psf	(Cohesion of Soil)
ϕ =	35	degrees	(Internal Angle of Soil Friction)
γ =	135	pcf	(Saturated Unit Weight of Soil)
δ =	0	degrees	(Slope Angle)
H =	48	feet	(Height of Wall)
F.S. =	1.5		(Factor of Safety)



Cm = (C/F.S.) = 333.3 psf

ϕm = arctan((tanϕ)/F.S.) = 25.02 degree

β = (Angle of Failure Surface)

$$P\beta = ((W - Cm\ L \sin\beta)\tan(\beta - \phi m)) - (Cm\ L \cos\beta)$$

β (deg)	Area (sq. ft)	Weight (lbs.)	L (ft.)	Cm L (lbs.)	Cm L Sinβ (lbs.)	Cm L Cosβ (lbs.)	Tan (β-ϕm)	Pβ (lbs.)	EFP (pcf)
30	1995	269336	95.96	31988	16000	27699	0.09	-5637	5
32	1843	248858	90.55	30182	16000	25593	0.12	2908	3
35	1645	222088	83.66	27885	16000	22838	0.18	13423	12
37	1529	206369	79.73	26577	16000	21221	0.21	19173	17
40	1373	185334	74.65	24883	16000	19057	0.27	26256	23
42	1279	172718	71.71	23904	16000	17759	0.31	30101	26
45	1152	155520	67.86	22620	16000	15990	0.36	34745	30
47	1074	145027	65.61	21871	16000	14910	0.40	37178	32
50	967	130502	62.64	20880	16000	13416	0.47	39941	35
52	900	121512	60.90	20298	16000	12491	0.51	41238	36
55	807	108905	58.58	19527	16000	11194	0.58	42417	37
57	748	101006	57.22	19073	16000	10381	0.62	42711	37
60	665	89800	55.41	18471	16000	9229	0.70	42426	37
62	613	82703	54.35	18117	16000	8498	0.75	41748	36
65	537	72532	52.95	17650	16000	7452	0.84	39969	35
67	489	66026	52.13	17378	16000	6783	0.90	38249	33
70	419	56616	51.07	17024	16000	5815	1.00	34792	30

MAX. = 37 pcf

Use E.F.P. = 51 pcf (SEE Fig. C1

Figure - C2

PROJECT: VTT 61105			
JOB NO.: 05-2023-4	DATE: June 13, 05	SHEET 2 OF 3	

PASSIVE PRESSURE CALCULATIONS

$$K_p = \left[\frac{\cos\phi}{1-\sqrt{\sin\phi(\sin\phi + \cos\phi \tan\beta)}}\right]^2$$

ASSUMPTIONS -

Bedrock $C = 500$ psf
$\phi = 35°$
$\gamma = 135$ pcf

sloping (back slope) β = Negative
$= -48°$

$K_p \cong 0.671$

PASSIVE PRESSURE = P_p

$$P_p = K_p \frac{\gamma H^2}{2} + \sqrt{K_p} \times 2CH$$

$$= 0.671 \times \frac{135 H^2}{2} + \sqrt{0.671} * 2 * 500 H$$

$$= 45.3 H^2 + 819 H$$

$P_{p\,allow.} = 15.1 H^2 + 273 H$ (F.S. = 3)

FIXITY ASSUME = Three feet below SURFACE

F.S. 1.55

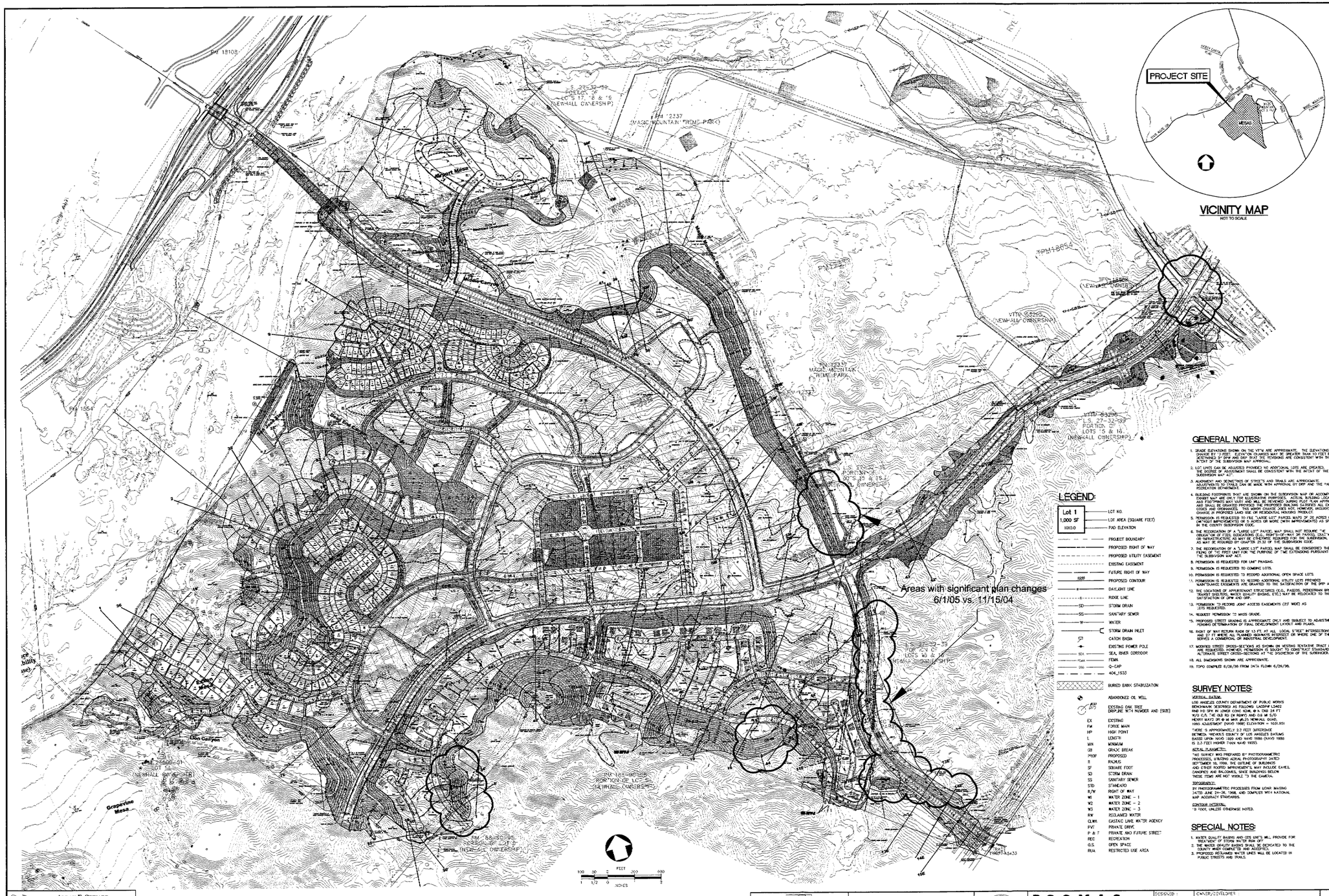
$H = 3'$ P_p allow = 954.9 pcf
$H = 5'$ " = 1742.5 pcf
$H = 10'$ " = 4240 pcf Figure - C3

O.K. TO USE 400 psf/ft to MAX. 4000 psf/ft.

PROJECT: VTT 61105		
JOB NO.: 05-2023-4	DATE: June 13, 05	SHEET 3 OF 3

Appendix D

PLATE D-1



VICINITY MAP

NOT TO SCALE

PROJECT SUMMARY:

GROSS AREA – 1252.2 Acres
TOTAL LOTS – 594
TOTAL D.U. – 5,331
EXISTING ZONING – SP (NEWHALL RANCH SPECIFIC PLAN)
PROPOSED ZONING – SP (NEWHALL RANCH SPECIFIC PLAN)
GENERAL PLAN LAND USE – SP (NEWHALL RANCH SPECIFIC PLAN)
ESTIMATED EARTHWORK – 27,000,000 CY

Lot Numbers	No. of Lots	Type (Use)	Dwelling Units	Total Acres
Area A2				
1–123	123	55'x110' SFD (6,050 sf) min.	123	27.3
124–140	17	Open Space		10.9
141–149	9	Private & Future Street		7.7
Area A3–A6				
150–154	2	A3a Condominiums	80	8.7
155–156	2	A3b Condominiums	96	13.6
157–158	2	A4 Condominiums	264	3.7
159–160	2	Open Space (LDZ)		0.9
161	1	A5 Condominiums	143	13.2
162	1	A6 Condominiums	216	13.0
Area A7				
163–176,178–258	95	55'x110' SFD (7,150 sf) min.	95	22.5
177	1	Recreation		2.1
259–273	15	Open Space		6.4
274–278	5	Private & Future Street		6.4
Area A8				
279–351	73	1ac/lot avg. SFD	73	73.0
352	1	Water Qual Ty Basin		3.9
353–357, 360, 362–366	11	Open Space		34.5
358–370	3	Private & Future Street		11.5
371–375	5	Private Drive		2.8
Area A9, A10, B1 and B2				
361	1	Area A9 Condominiums	60	8.6
376	1	Area A10 Condominiums	80	9.4
377–379	3	Open Space (LDZ)		0.9
380	1	B1 Condominiums	92	12.7
381	1	B2 Condominiums	196	4.3
382–383	2	Open Space (LDZ)		1.5
Area D1				
384–387	4	Condominiums	63	9.6
388–393	3	Private Drive		1.8
394–395	3	Open Space		0.6
		Fire Access Road		0.5
Area D2				
397–407	11	Condominiums	113	17.1
408–412	5	Private Drive		1.5
416–422	9	Open Space		24.6
413	1	Water Tanks		1.4
Area D3				
424–425	2	Condominiums	31	4.4
426	1	Private Drive		0.7
427–430	4	Open Space		2.3
Area D4				
431–443	12	Condominiums	139	21.5
444–446	3	Private Drive		4.5
447–455, 457	10	Open Space		21.3
456, 458	2	Recreation		4.8
Area D5 & D6				
463–468	6	Condominiums	80	9.4
469–470	2	Private Drive		2.6
471–479	9	Open Space		1.3
480	1	D6 Condominiums	440	22.4
481–483, 487	4	Open Space (LDZ)		2.0
488–496	4	Private Drive		13.9
Area D1, D2				
497	1	D2 Condominiums	156	8.1
498	1	D1 Apartments	314	2.5
Village Center				
F1a 432–444	3	Mixed Use Commercial 243,000 sf		13.8
F1b & F1i 533–536	3	Mixed Use Commercial 342,300 sf		7.2
F1c 537	1	Condominiums (Live/Work)	15	0.4
F1h 542	1	Apartments	145	3.2
F2a 533	1	Condominiums (Live/Work)	13	0.4
F2b 534	1	Condominiums	62	3.2
F2c 535	1	Condominiums (Live/Work)	15	0.4
F2k 538	1	Condominiums	217	3.6
F4 537	1	Apartments	214	4.1
F4 538	1	Condominiums	140	2.0
F3c 539	1	Condominiums with 8,000 sf Retail	171	2.1
F3e 540	1	Condominiums	76	2.0
F3b 541	1	Condominiums with 8,000 sf Retail	81	2.0
F3a 542	1	Apartments	114	2.0
F3b 543	1	Apartments	74	1.6
F3c 544	1	Condominiums	74	1.6
F3b 545	1	Condominiums	114	2.1
F7 546	1	Condominiums	136	3.2
B3 547	1	Apartments	172	5.5
F12 548	1	Community Center		8.4
F13 549	1	Elementary School		9.0
S6 550	1	Condominiums	180	6.4
S7 551	1	Condominiums	250	4.9
S5 552–565	14	Private Drive		19.8
Area E1 & E2				
566–571	6	E1 Mixed Use/Commercial 691,500 sf Business Park		47.7
572–573	2	Private Drive		3.8
574–577	4	Open Space		27.6
504	1	E2 Mixed Use/Commercial 6,200 sf Service Station		2.8
Miscellaneous				
150–152	3	Park		11.4
358–359	2	Open Space (Lyon Cyn)		15.6
367	1	Open Space (River Adjacent)		18.2
		D.W.R. Lot		1.5
466	1	Open Space (along LL st.)		7.0
462, 465	2	Desalt Basin		1.1
4-3, 482	2	Open Space (along Westridge)		9.3
484–486	3	Open Space (LDZ)		2.2
438–451	4	Park		20.2
452	1	Open Space (LDZ)		3.7
496, 498–501, 506–507	6			
502–503, 507–511, 513–514	9	Open Space (along CCD)		11.5
505		Water Quality/Debris Basin		6.9
512		CCD Bridge		3.3
515		Open Space-Connectivity Buffer		6.9
516		Saline/Tower Preserve		44.8
517–531	5	Open Space		50.7
532–534	3	Open Space (LDZ)		4.6
578–581	1	Open Space (River)		210.0
582	1	Open Space (Over Adjacent)		110.0
583	1	Water Qualty Basin		3.5
584	1	Open Space		4.6
585	1	Park		7.0
586	1	Sewer Pump Station		0.1
587	1	Open Space (LDZ)		0.1
592–594	3	Open Space (LDZ)		0.5
		Pub'c Street R/W		63.7
Total	**594**		**5331**	**1252.2**

ABBREVIATIONS:
MMP = MAGIC MOUNTAIN PARKWAY
CCD = COMMERCE CENTER DRIVE
SFD = SINGLE FAMILY DWELLING UNIT
LDZ = LANDSCAPE DEVELOPMENT ZONE

GENERAL NOTES:

1. GRADE ELEVATIONS SHOWN ON THE VTM ARE APPROXIMATE. THE ELEVATIONS MAY CHANGE BY 3-FEET. ELEVATION CHANGES MAY BE GREATER THAN 10 FEET BUT ONLY IF SECTIONS OF THE MAP AND DAY PLAT SHOWING ARE CONSISTENT WITH THE INTENT OF THE SUBDIVISION MAP APPROVAL.
2. LOT LINES CAN BE ADJUSTED PROVIDED NO ADDITIONAL LOTS ARE CREATED. THE DEGREE OF ADJUSTMENT SHALL BE CONSISTENT WITH THE INTENT OF THE SUBDIVISION MAP APPROVAL.
3. ALIGNMENT AND DIMENSIONS OF STREETS AND TRAILS ARE APPROXIMATE. MODIFICATIONS TO THE TRAILS CAN BE MADE WITH APPROVAL BY DPW AND THE PARKS AND RECREATION DEPARTMENT.
4. BUILDING FOOTPRINTS THAT ARE SHOWN ON THE SUBDIVISION MAP OR ACCOMPANYING EXHIBIT MAP ARE FOR ILLUSTRATIVE PURPOSES. ACTUAL BUILDING LOCATIONS AND SIZES WILL BE ADJUSTED AND WILL BE REVIEWED DURING PLOT PLAN APPROVAL AND SHALL BE GRANTED PROVIDED THE PROPOSED BUILDING SATISFIES ALL EXISTING CODES AND ORDINANCES. THIS MINOR CHANGE DOES NOT, HOWEVER, INCLUDE THE CHANGE IN PROPOSED LAND USE OR RESIDENTIAL HOUSING PRODUCT.
5. PERMISSION IS REQUESTED TO FILE "LARGE LOT" PARCEL MAPS OF 20 ACRES OR MORE (WITHOUT IMPROVEMENTS) OR 5 ACRES OR MORE (WITH IMPROVEMENTS) AS SPECIFIED IN THE COUNTY SUBDIVISION CODE.
6. THE RECORDATION OF A "LARGE LOT" PARCEL MAP SHALL NOT REQUIRE THE OBLIGATION OF FIELD DESIGNATIONS (F.D.) RIGHT-OF-WAY ON PARCELS CONTAINING 20 ACRES OR MORE (WITHOUT IMPROVEMENTS) OR 5 ACRES OR MORE (WITH IMPROVEMENTS) AS MAY BE REQUIRED BY CHAPTER 35.30 OF THE SUBDIVISION CODE.
7. THE RECORDATION OF A "LARGE LOT" PARCEL MAP SHALL BE CONSIDERED THE FILING OF THE FIRST UNIT FOR THE PURPOSE OF TIME EXTENSIONS PURSUANT TO THE SUBDIVISION MAP ACT.
8. PERMISSION IS REQUESTED FOR UNIT PHASING.
9. PERMISSION IS REQUESTED TO COMBINE LOTS.
10. PERMISSION IS REQUESTED TO RECORD ADDITIONAL OPEN SPACE LOTS.
11. PERMISSION IS REQUESTED TO RECORD ADDITIONAL UTILITY LOTS PROVIDED MAINTENANCE EASEMENTS ARE GRANTED TO THE SATISFACTION OF THE DRP AND DPW.
12. THE LOCATIONS OF APPURTENANT STRUCTURES (E.G., PARCEL, PEDESTRIAN BRIDGES, TRANSIT SHELTERS, WATER QUALITY BASINS, ETC.) MAY BE RELOCATED TO THE SATISFACTION OF DPW AND DRP.
13. PERMISSION TO RECORD JOINT ACCESS EASEMENTS (23' WIDE) AS LOTS REQUESTED.
14. REQUEST PERMISSION TO MASS GRADE.
15. PROPOSED STREET GRADING IS APPROXIMATE ONLY AND SUBJECT TO ADJUSTMENTS PENDING DETERMINATION OF FINAL DEVELOPMENT LAYOUT AND PLANS.
16. RIGHT OF WAY RETURN RADII OF 15 FT. AT ALL LOCAL STREET INTERSECTIONS AND 27 FT. WHERE ALL PLANNED HIGHWAYS INTERSECT OR WHERE ONE OF THE ROADS SERVES A COMMERCIAL OR INDUSTRIAL DEVELOPMENT.
17. MODIFIED STREET CROSS-SECTIONS AS SHOWN ON VESTING TENTATIVE TRACT MAP ARE REQUESTED. HOWEVER, PERMISSION IS SOUGHT TO CONSTRUCT STANDARD AND ALTERNATE STREET CROSS-SECTIONS AT THE DISCRETION OF THE SUBDIVIDER.
18. ALL DIMENSIONS SHOWN ARE APPROXIMATE.
19. TOPO COMPILED 6/28/96 FROM DATA FLOWN 6/26/96.

SURVEY NOTES:

VERTICAL DATUM:
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS BENCHMARK DESIGNED AS FOLLOWS: LACDPW L5402 BND FD 3PK IN LOWER CONC NOSE @ A CMP 24 FT W/O C/L "K" OLD RD (K RDWY) AND 0.4 MI S/O HENRY MAYO DR AT MP 18.6 (MAYO 1988) ELEVATION = 1426.951 1990 ADJUSTMENT (NAVD 1988) ELEVATION = 1426.951

"NOTE: IS APPROXIMATELY 2.2 FEET DIFFERENCE BETWEEN "PREVIOUS COUNTY OF LOS ANGELES DATUMS BASED UPON NGVD 1929 AND NAVD 1988 (NAVD 1988 IS 2.3 FEET HIGHER THAN NGVD 1929).

AERIAL PHOTO:
THIS SURVEY WAS PREPARED BY PHOTOGRAMMETRIC PROCESSES, UTILIZING AERIAL PHOTOGRAPHY DATED SEPTEMBER 30, 1999. THE OUTLINE OF BUILDINGS AND OTHER ROOFED IMPROVEMENTS MAY INCLUDE EAVES, CANOPIES AND BALCONIES, SINCE BUILDINGS BELOW THESE ITEMS ARE NOT VISIBLE TO THE CAMERA.

TOPOGRAPHY:
BY PHOTOGRAMMETRIC PROCESSES FROM LOAR MAPING DATED JANUARY 24-26, 1996, AND COMPILED WITH NATIONAL MAP ACCURACY STANDARDS.

CONTOUR INTERVAL:
10 FOOT, UNLESS OTHERWISE NOTED.

SPECIAL NOTES:

1. WATER QUALITY BASINS AND OTS UNITS WILL PROVIDE FOR TREATMENT OF STORM WATER RUN OFF.
2. THE WATER QUALITY BASINS SHALL BE DEDICATED TO THE COUNTY WHEN COMPLETED AND ACCEPTED.
3. PROPOSED RECLAIMED WATER LINES WILL BE LOCATED IN PUBLIC STREETS AND TRAILS.

LEGEND:

Lot 1 / 1,000 SF / 1010.0	LOT NO. / LOT AREA (SQUARE FEET) / PAD ELEVATION
	PROJECT BOUNDARY
	PROPOSED RIGHT OF WAY
	PROPOSED UTILITY EASEMENT
	EXISTING EASEMENT
	FUTURE RIGHT OF WAY
1000	PROPOSED CONTOUR
	DAYLIGHT LINE
	RIDGE LINE
SD	STORM DRAIN
SS	SANITARY SEWER
W	WATER
	STORM DRAIN INLET
	CATCH BASIN
	EXISTING POWER POLE
SEA	SEA, INNER CORRIDOR
FEMA	FEMA
Q-CAP	Q-CAP
404_1533	
	BURIED BANK STABILIZATION
	ABANDONED OIL WELL
830 / 1877	EXISTING OAK TREE GRAPHIC WITH NUMBER AND (SIZE)
EX	EXISTING
FM	FORCE MAIN
HP	HIGH POINT
L	LENGTH
MIN	MINIMUM
GB	GRADE BREAK
PROP	PROPOSED
R	RADIUS
SF	SQUARE FOOT
SD	STORM DRAIN
SS	SANITARY SEWER
STD	STANDARD
R/W	RIGHT OF WAY
W1	WATER ZONE – 1
W2	WATER ZONE – 2
W3	WATER ZONE – 3
RW	RECLAIMED WATER
CLWA	CASTAIC LAKE WATER AGENCY
PVT	PRIVATE DRIVE
P & F	PRIVATE AND FUTURE STREET
REC	RECREATION
O.S.	OPEN SPACE
RUA	RESTRICTED USE AREA

See Plate D-14 for Legend

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

OVERVIEW MAP

Date: 12/20/04 | Job No.: 04-2339-4
Scale: 1" = 200' | CAD File: Plate D-1
PLATE D-1 | Design by: SCHOLZ | Revised: 3/1/05
Drawn by: MARK COX

KEY MAP
SCALE: NTS

LEGAL DESCRIPTION:
PARCELS 11, 12, 13, 22, AND A PORTION OF PARCEL 14 OF PARCEL MAP 24500-01, IN THE UNINCORPORATED TERRITORY OF THE COUNTY OF LOS ANGELES, AS SHOWN ON MAP FILED IN BOOK 293 PAGES 34 TO 67 INCLUSIVE, OF PARCEL MAPS, RECORDS OF LOS ANGELES COUNTY.

MATTHEW C. HEJDEVAN R.C.E. NO. 53639 DATE

PSOMAS
26470 AVENIDA STATIONS, SUITE 300
SANTA CLARITA, CA 91355
(661) 259-9300 (661) 775-2775 (FAX)

DESIGNED: MGH/TD
DRAFTED: TD
CHECKED: RB

OWNER/DEVELOPER:
NEWHALL LAND
23823 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE (661) 253-6020
REPRESENTATIVE: GREG HARPOLE

MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 61105

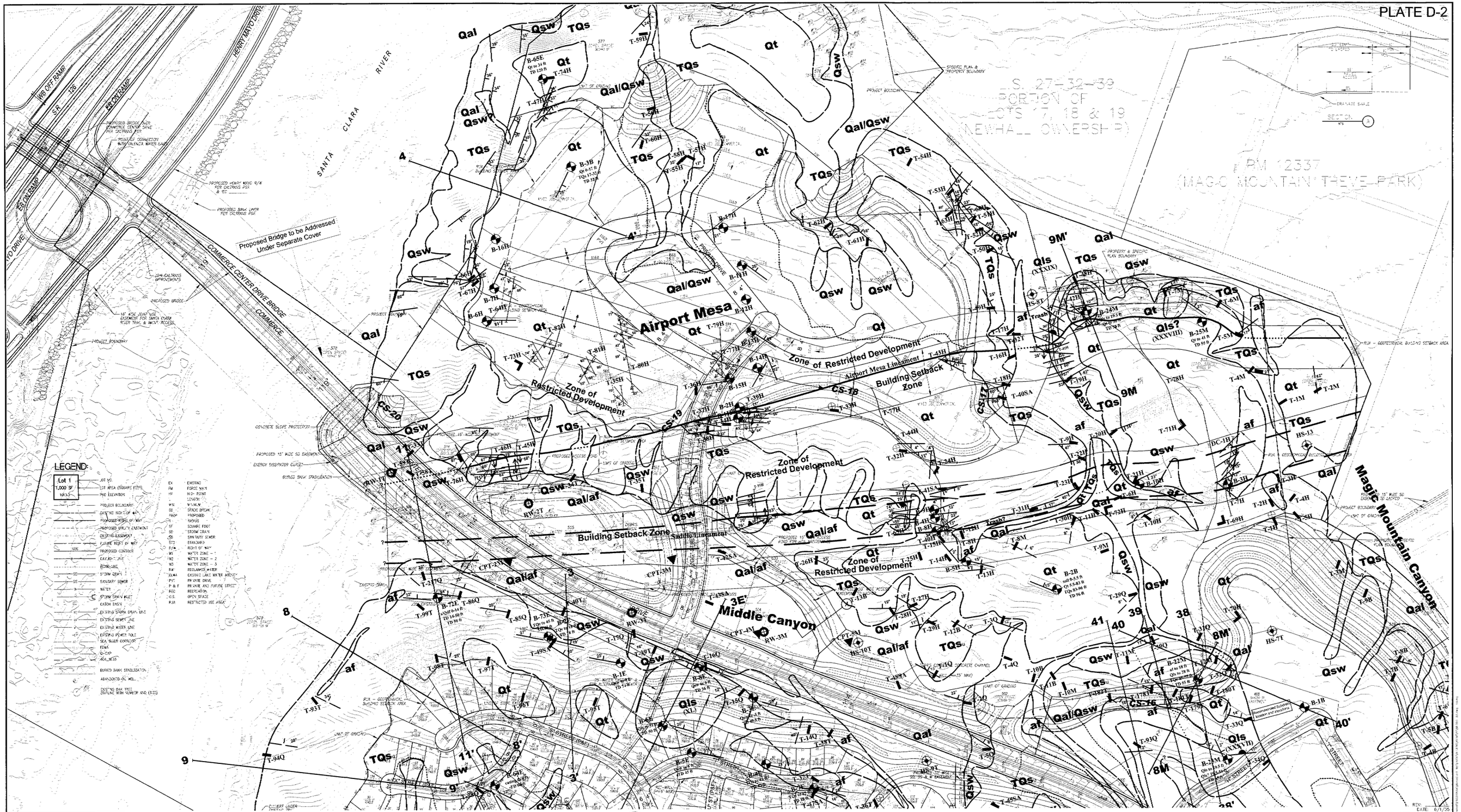
COUNTY CASE NO. _____

LOCATED IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

REV. DATE: 6/1/05
PROJECT NO. 1NR030200.00
SHEET 1 OF 9

ME001-01.dwg

PLATE D-2



ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

GEOLOGIC/GEOTECHNICAL MAP

See Plate D-14 for Legend

PLATE D-2

LEGAL DESCRIPTION:
PARCELS 11, 12, 13, 22 AND A PORTION OF PARCEL 14 OF PARCEL MAP 24600-01, IN THE UNINCORPORATED TERRITORY OF THE COUNTY OF LOS ANGELES, AS SHOWN ON MAP FILED IN BOOK 293 PAGES 34 TO 37, INCLUSIVE, OF PARCEL MAPS, RECORDS OF LOS ANGELES COUNTY.

PSOMAS
MATTHEW G. HEIDEMAN, R.C.E. NO. 55539 DATE

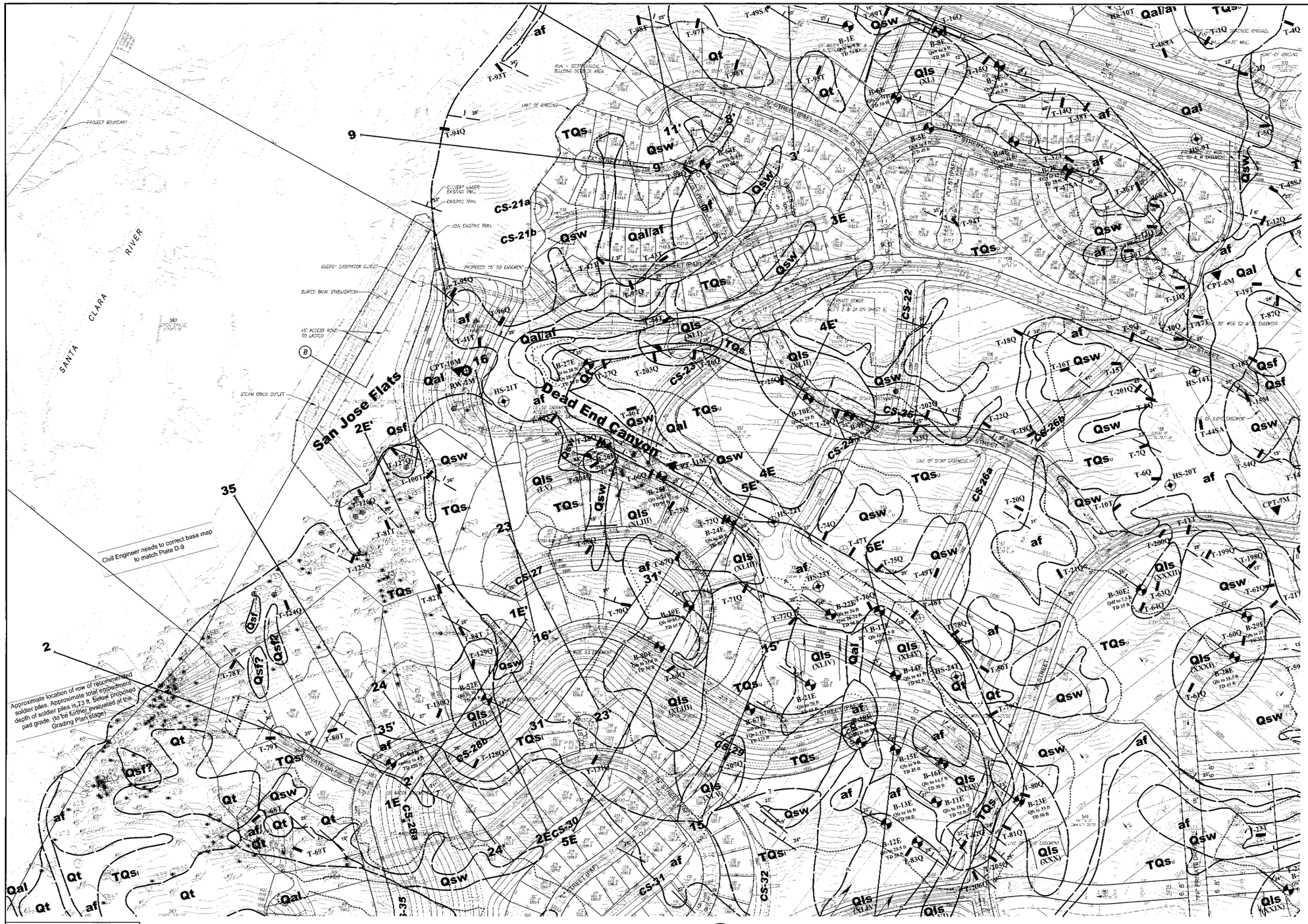
DESIGNED: MGH/TD
DRAFTED: TD
CHECKED: RB

OWNER/DEVELOPER:
NEWHALL LAND
23803 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE: (661) 255-4000
REPRESENTATIVE: CORY HARRIS

MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 61105
COUNTY CASE NO. _____
LOCATED IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

PROJECT NO. 1NRC0120-00
SHEET 3 OF 9

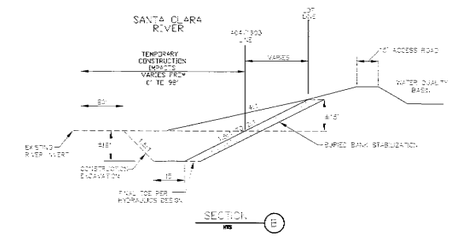
ME001-03.dwg



LEGEND:

Lot 1 / 1,000 SF	LOT NO. / LOT AREA (SQUARE FEET)
1200.0	PAD ELEVATION
	PROJECT BOUNDARY
	EXISTING RIGHT OF WAY
	PROPOSED RIGHT OF WAY
	PROPOSED UTILITY EASEMENT
	EXISTING EASEMENT
	FUTURE RIGHT OF WAY
1500	PROPOSED CONTOUR
	DAYLIGHT LINE
	RIDGE LINE
SD	STORM DRAIN
SS	SANITARY SEWER
W	WATER
	STORM DRAIN INLET
	CATCH BASIN
SD	EXISTING STORM DRAIN LINE
SS	EXISTING SEWER LINE
W	EXISTING WATER LINE
	EXISTING POWER POLE
FL	SFR, RIVER CORRIDOR
FW	FEMA
SL	SLOPE
424_1803	
	BURIED BANK STABILIZATION
	ABANDONED OIL WELL
	EXISTING OAK TREE DIAMETER IN INCHES AND (SIZE)

EX	EXISTING
FM	FORCE MAIN
HP	HIGH POINT
L	LENGTH
MIN	MINIMUM
GB	GRADE BREAK
PROP	PROPOSED
R	RADIUS
SF	SQUARE FOOT
SD	STORM DRAIN
SS	SANITARY SEWER
STD	STANDARD
R/W	RIGHT OF WAY
W1	WATER ZONE - 1
W2	WATER ZONE - 2
W3	WATER ZONE - 3
RW	RECLAIMED WATER
CLWA	SANTA CLARA WATER AGENCY
PVT	PRIVATE DRIVE
P & F	PRIVATE AND FUTURE STREET
REC	RECREATION
O.S.	OPEN SPACE
RUA	RESTRICTED USE AREA



ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

GEOLOGIC/GEOTECHNICAL MAP

See Plate D-14 for Legend

PLATE D-3

LEGAL DESCRIPTION:

PARCELS 1, 12, 13, 22 AND A PORTION OF PARCEL 14 OF PARCEL MAP 24500-01, IN THE UNINCORPORATED TERRITORY OF THE COUNTY OF LOS ANGELES, AS SHOWN ON MAP FILED IN BOOK 290 PAGES 34 TO 67 INCLUSIVE OF PARCEL MAPS, RECORDS OF LOS ANGELES COUNTY.

PSOMAS

MATTHEW G. HEIDEMAN, R.C.E. NO. 56639 DATE

DESIGNED TD
DRAFTED TD
CHECKED RB

OWNER, DEVELOPER
NEWHALL LAND
23823 WEST VALENCIA BOULEVARD
SANTA CLARITA, CALIFORNIA 91355
(661) 255-4000 (661) 259-9858
REPRESENTATIVE: DANIEL GARRISON

MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 61105
COUNTY CASE NO. _____
LOCATED IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

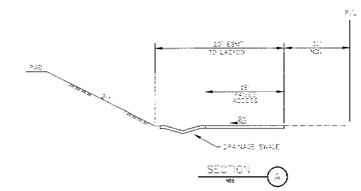
REV. DATE 6/7/05
PROJECT NO. PMR00120.00
SHEET 4 OF 9

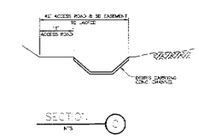
ME001-04.dwg

PLATE D-4

LEGEND:

Lot 1 / 1,000 SF / 1300	LOT NO. / LOT AREA (SQUARE FEET) / PAD ELEVATION
	PROJECT BOUNDARY
	EXISTING RIGHT OF WAY
	PROPOSED RIGHT OF WAY
	PROPOSED UTILITY EASEMENT
	EXISTING EASEMENT
	FUTURE RIGHT OF WAY
1500	PROPOSED CONTOUR
	EAVE/RIDGE LINE
	RIDGE LINE
SD	STORM DRAIN
SS	SANITARY SEWER
W	WATER
	STORM DRAIN INLET
	CATCH BASIN
10	EXISTING STORM DRAIN LINE
10	EXISTING SEWER LINE
4	EXISTING WATER LINE
	EXISTING POWER POLE
SEA	SEA WATER CORRIDOR
FEMA	FEMA
220	Q=CAP
ACAL_REC	ACAL_REC
	BURIED BASIN STABILIZATION
	ABANDONED OIL WELL
	EXISTING OAK TREE OUTLINE WITH NUMBER AND (SIZE)
EX	EXISTING
FM	FORCE MAIN
HP	HIGH POINT
L	LENGTH
MIN	MINIMUM
GB	GRADE BREAK
PROP	PROPOSED
R	RADIUS
SF	SQUARE FOOT
SD	STORM DRAIN
SS	SANITARY SEWER
STD	STANDARD
R/W	RIGHT OF WAY
WS	WATER ZONE - 1
W2	WATER ZONE - 2
W3	WATER ZONE - 3
RW	RECLAIMED WATER
ELWA	EASTERN LAKE WATER AGENCY
PDE	PRIVATE DRIVE
P & F	PRIVATE AND FUTURE STREET
REC	RECREATION
OS	OPEN SPACE
RLA	RESTRICTED USE AREA





ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

GEOLOGIC/GEOTECHNICAL MAP

Date: 12/2004 | Job No: 3420034
Scale: 1" = 100' | GIS File: tract-c-4
PLATE D-4 | Geology by: TKO/RJB | Revised: 4/3/06
Drawn by: MBK/JKO

See Plate D-14 for Legend

KEY MAP
NOT TO SCALE

LEGAL DESCRIPTION:
PARCELS 11, 12, 13, 22 AND A PORTION OF PARCEL 14 OF PARCEL MAP 24320-01, IN THE UNINCORPORATED TERRITORY OF THE COUNTY OF LOS ANGELES, AS SHOWN ON MAP FILED IN BOOK 283 PAGES 34 TO 67 INCLUSIVE, OF PARCEL MAPS, RECORDS OF LOS ANGELES COUNTY.

PSOMAS
3765 South Bristol, Suite 300
Santa Ana, California 92704
(714) 751-7373 FAX (714) 751-7888

MATTHEW G. HEDEMAN R.C.E. NO. 55639 DATE

DESIGNED: MGH/TD
DRAFTED: TD
CHECKED: RB

OWNER/DEVELOPER
NEWHALL LAND
23933 WEST VALENCIA BOULEVARD
VALENCIA, CA 91355-2085
TELEPHONE: (661) 255-4022
REPRESENTATIVE: TERRY HARRELL

MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 61105
COUNTY CASE NO. _____
LOCATED IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

REV: DATE: 6/1/06
PROJECT NO. 1NR001200-00
SHEET 5 OF 9

ME001-05.dwg

PLATE D-5

LEGEND:

Lot 1	LOT NO.
1,000 SF	LOT AREA (SQUARE FEET)
1010.0	PAD ELEVATION
	PROJECT BOUNDARY
	EXISTING RIGHT OF WAY
	PROPOSED RIGHT OF WAY
	PROPOSED UTILITY EASEMENT
	EXISTING EASEMENT
	FUTURE RIGHT OF WAY
1000	PROPOSED CONTOUR
	DAYLIGHT LINE
	RIDGE LINE
SD	STORM DRAIN
SS	SANITARY SEWER
W	WATER
	STORM DRAIN INLET
	CATCH BASIN
	EXISTING STORM DRAIN LINE
	EXISTING SEWER LINE
	EXISTING WATER LINE
	EXISTING POWER POLE
	SEA RIVER CORRIDOR
	FEMA
	Q-CAP
	404_1603
	BURIED BANK STABILIZATION
	FIRE LANE
	ABANDONED OIL WELL
	EXISTING OAK TREE DRIPLINE WITH NUMBER AND (SIZE)

EX	EXISTING
FM	FORCE MAIN
HP	HIGH POINT
L	LENGTH
MIN	MINIMUM
GB	GRADE BREAK
PROP	PROPOSED
R	RADIUS
SF	SQUARE FOOT
SD	STORM DRAIN
SS	SANITARY SEWER
STD	STANDARD
R/W	RIGHT OF WAY
W1	WATER ZONE - 1
W2	WATER ZONE - 2
W3	WATER ZONE - 3
RW	RECLAIMED WATER
CLWA	CASTAIC LAKE WATER AGENCY
PVT	PRIVATE DRIVE
P & F	PRIVATE AND FUTURE STREET
REC	RECREATION
C.S.	OPEN SPACE
RUA	RESTRICTED USE AREA

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

GEOLOGIC/GEOTECHNICAL MAP

Date: 12/22/04 | Job No: 05-2035-4
Scale: 1" = 100' | CAD File: Plate D-5
PLATE D-5 | Geology by: SKW/BJS | Drawn by: MSW/GSD | Revised: 6/13/05

See Plate D-14 for Legend

FEET 100 50 0 100 200
INCHES 1 1/2 0 1 2

KEY MAP
NOT TO SCALE

LEGAL DESCRIPTION:
PARCELS 11, 12, 13, 22 AND A PORTION OF PARCEL 14 OF PARCEL MAP 24500-01, IN THE UNINCORPORATED TERRITORY OF THE COUNTY OF LOS ANGELES, AS SHOWN ON MAP FILED IN BOOK 293 PAGES 34 TO 67 INCLUSIVE, OF PARCEL MAPS, RECORDS OF LOS ANGELES COUNTY.

PSOMAS
MATTHEW G. HEIDEMAN R.C.E. NO. 55639 DATE

DESIGNED: MGH/TD
DRAFTED: TD
CHECKED: RB

OWNER/DEVELOPER:
NEWHALL LAND
23823 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE: (661) 255-4000
REPRESENTATIVE: COREY HARPOLE

MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 61105
COUNTY CASE NO. ________
LOCATED IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

REV: ____
DATE: 5/7/05
PROJECT NO. 1NRC0120.00
SHEET 6 OF 9

ME001-06.dwg

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

GEOLOGIC/GEOTECHNICAL MAP

PLATE D-6

See Plate D-14 for Legend

LEGAL DESCRIPTION:
PARCELS 11, 12, 13, 22 AND A PORTION OF PARCEL 14 OF PARCEL MAP 24800-01, IN THE UNINCORPORATED TERRITORY OF THE COUNTY OF LOS ANGELES, AS SHOWN ON MAP FILED IN BOOK 290 PAGES 34 TO 67 INCLUSIVE, OF PARCEL MAPS, RECORDS OF LOS ANGELES COUNTY.

PSOMAS
MATTHEW G. HEIDEMAN, R.C.E. NO. 53639 DATE

DESIGNED: MGH/TD
DRAFTED: TD
CHECKED: RB

OWNER/DEVELOPER:
NEWHALL LAND
22820 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE: (661) 255-4000
REPRESENTATIVE: CONEY HARROLE

MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 61105
COUNTY CASE NO. _____
LOCATED IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

DATE: 6/1/05
PROJECT NO. 1NRC0120.00
SHEET 7 OF 9

ME001-07.dwg

Please refer to our report for PM 18654 dated 9/11/04 for the log of DCT-1 and T-1 thru T-3

Proposed survey station (Chevron) addressed by others under separate cover

MAGIC MOUNTAIN PARKWAY (R/W = 171'-182')
FROM STA. 291+00 TO STA. 296+60

MAGIC MOUNTAIN PARKWAY (R/W = 21'!)
FROM STA. 297+29 TO STA. THE OLD ROAD

MAGIC MOUNTAIN PARKWAY
MAJOR HIGHWAY, CASE I, SECTION C
NO ON STREET BIKE LANE, NO PARKING

MAGIC MOUNTAIN PARKWAY (R/W = 126'-137')
FROM STA. 265+50 TO STA. 269+00

MAGIC MOUNTAIN PARKWAY (R/W = 137')
FROM STA. 264+00 TO STA. 271+00

MAGIC MOUNTAIN PARKWAY (R/W = 159')
FROM STA. 275+50 TO 283+50

MAGIC MOUNTAIN PARKWAY (R/W = 148')
FROM STA. 272+50 TO STA. 275+50

MAGIC MOUNTAIN PARKWAY (R/W = 193')
FROM 284+00 TO STA. 287+00

MAGIC MOUNTAIN PARKWAY
MAJOR HIGHWAY, CASE I, SECTION C
WITH ON STREET BIKE LANE, NO PARKING (R/W = 114')

LEGEND:

Lot 1 / 1,000 SF / 1000.0	LOT NO. / LOT AREA (SQUARE FEET) / PAD ELEVATION
PROJECT BOUNDARY	
EXISTING RIGHT OF WAY	
PROPOSED RIGHT OF WAY	
PROPOSED UTILITY EASEMENT	
EXISTING EASEMENT	
FUTURE RIGHT OF WAY	
PROPOSED CONTOUR	
DAYLIGHT LINE	
EDGE LINE	
STORM DRAIN	
SANITARY SEWER	
WATER	
STORM DRAIN INLET	
CATCH BASIN	
EXISTING STORM DRAIN LINE	
EXISTING SEWER LINE	
EXISTING WATER LINE	
EXISTING POWER POLE	
SEAL RIVER CORRIDOR	
FEMA	
Q=CAF	
ACE_1823	
BURIED BREAK STABILIZATION	
HORIZONTAL CURVE	
EXISTING OAK TREE (BRIDGE NO. NUMBER AND TREE)	

EX EXISTING
PW PORCE WATE
FF FIN FRONT
L LENGTH
MIN MINIMUM
BB BRIDGE BREAK
PROP PROPOSED
R RADIUS
SF SQUARE FOOT
SD STORM DRAIN
SS SANITARY SEWER
STD STANDARD
R/W RIGHT OF WAY
W WATER
W1 WATER ZONE - 1
W2 WATER ZONE - 2
W3 WATER ZONE - 3
RW REGLAIMED WATER
CLWA CASTAIC LAKE WATER AGENCY
PVT PRIVATE DRIVE
P & P PRIVATE AND PUBLIC STREET
REC RECREATION
O.S. OPEN SPACE
RUA RESTRICTED USE AREA

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

GEOLOGIC/GEOTECHNICAL MAP

See Plate D-14 for Legend

PLATE D-7

KEY MAP

LEGAL DESCRIPTION:
PARCELS 11, 12, 13, 22 AND A PORTION OF PARCEL 14 OF PARCEL MAP 24600-01, IN THE UNINCORPORATED TERRITORY OF THE COUNTY OF LOS ANGELES, AS SHOWN ON MAP FILED IN BOOK 293 PAGES 34 TO 67 INCLUSIVE, OF PARCEL MAPS, RECORDS OF LOS ANGELES COUNTY.

PSOMAS
2440 Main Street, Suite 200
Santa Ana, CA 92705
(714) 542-6100 FAX: (714) 542-6101
MATTHEW C. HEIDEMAN, R.C.E. NO. 55639 DATE

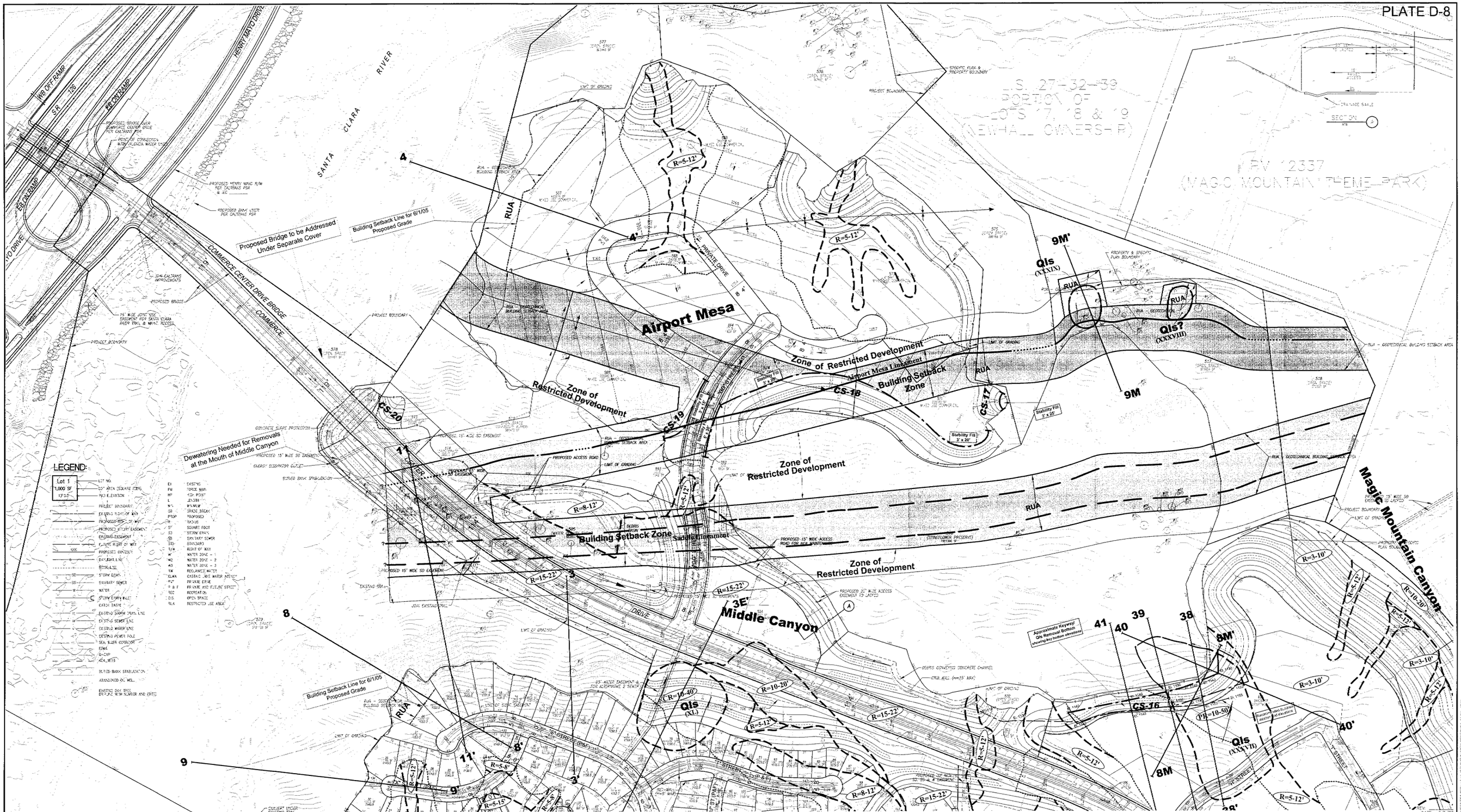
DESIGNED MSH/TID
DRAFTED TD
CHECKED MH

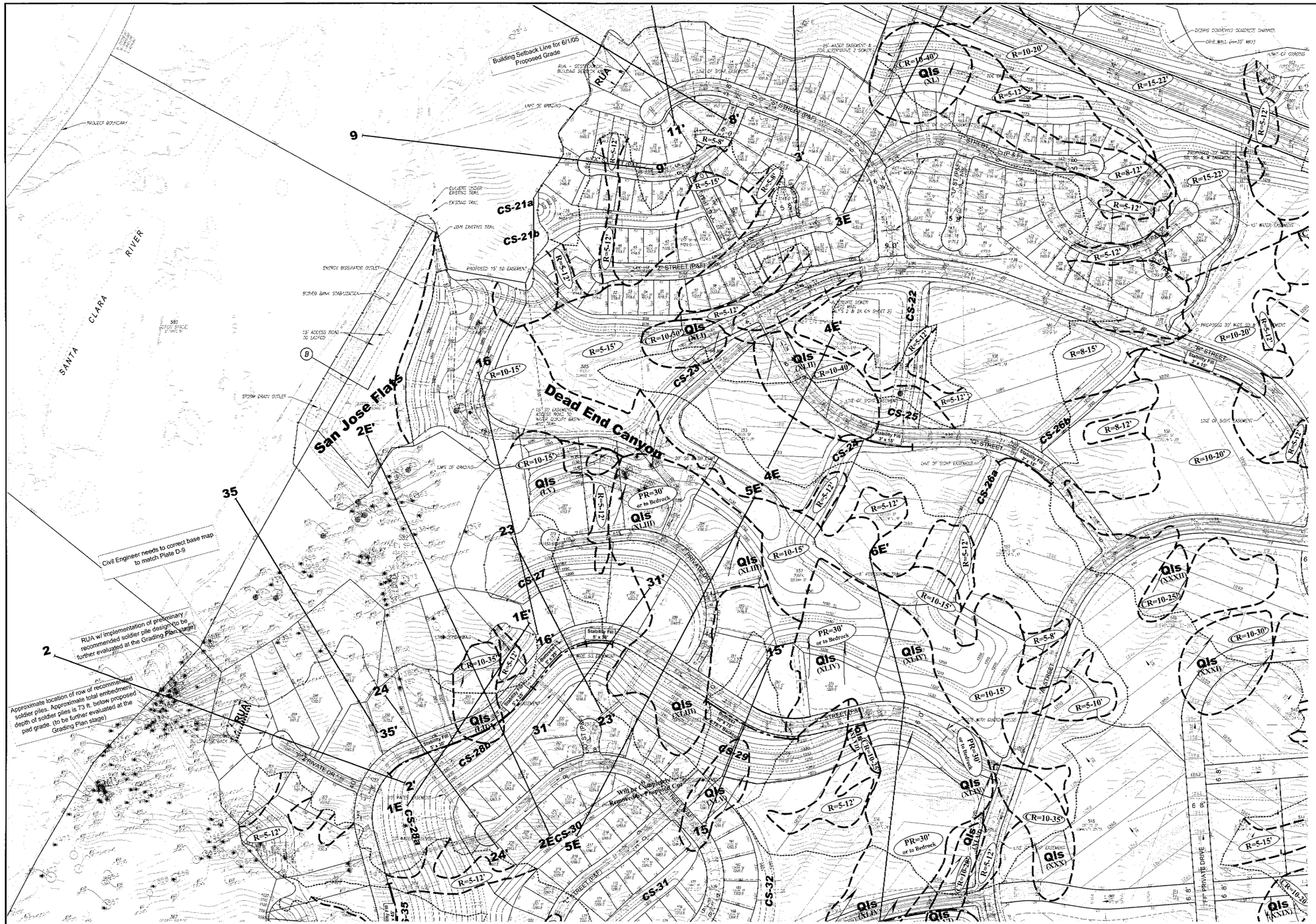
OWNER/DEVELOPER
NEWHALL LAND
23823 VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE (661) 259-7200
REPRESENTATIVE: CURT HARPLE

MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 61105
COUNTY CASE NO. _____
LOCATED IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

REV:
DATE: 8/1/05
PROJECT NO. PNR0012-002
SHEET 8 OF 9

ME001-08.dwg

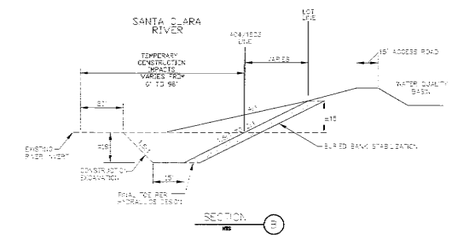

SANTA CLARA RIVER
HENRY MAYO DRIVE
WB OFF RAMP
SR 126
EB ON RAMP
EB OFF RAMP
COMMERCE CENTER DRIVE BRIDGE
COMMERCE
Proposed Bridge to be Addressed Under Separate Cover
Building Setback Line for 6/1/05 Proposed Grade
RUA
Airport Mesa
Zone of Restricted Development
Airport Mesa Embankment
Building Setback Zone
Zone of Restricted Development
Zone of Restricted Development
Dewatering Needed for Removals at the Mouth of Middle Canyon
Building Setback Zone
Saddle Embankment
Zone of Restricted Development
Middle Canyon
Magic Mountain Canyon
Approximate Keyway/ Qls Removal Bottom (showing key bottom elevations)
Building Setback Line for 6/1/05 Proposed Grade
LEGEND
Lot 1
1,000 SF
17.00'
LOT NO.
LOT AREA (SQUARE FEET)
PAD ELEVATION
PROJECT BOUNDARY
EXISTING RIGHT OF WAY
PROPOSED RIGHT OF WAY
PROPOSED UTILITY EASEMENT
EXISTING EASEMENT
FUTURE RIGHT OF WAY
PROPOSED CONTOUR
DAYLIGHT LINE
SPOT ELEVATION
STORM DRAIN
SANITARY SEWER
WATER
STORM DRAIN INLET
CATCH BASIN
EXISTING STORM DRAIN LINE
EXISTING SEWER LINE
EXISTING WATER LINE
EXISTING POWER POLE
SEA CLIFF CONTOUR
FENCE
G-CAP
ACE_MOS
BURIED BANK STABILIZATION
ABANDONED OIL WELL
EXISTING OAK TREE DESIGNATE WITH NUMBER AND (SPS)
EX EXISTING
FM TOPSIL MAR
HP HIGH POINT
L LENGTH
MIN MINIMUM
SB SINGLE BREAK
PROP PROPOSED
R RADIUS
SF SQUARE FOOT
SD STORM DRAIN
SS SANITARY SEWER
STD STANDARD
R/W RIGHT OF WAY
W WATER ZONE - 1
W2 WATER ZONE - 2
W3 WATER ZONE - 3
RW RECLAIMED WATER
CLWA CLEAN WATER AGENCY
PVT PRIVATE DRIVE
P & F PRIVATE AND FUTURE STREET
REC RECREATION
O.S. OPEN SPACE
RUA RESTRICTED USE AREA
Qls (XLIV)
Qls? (XXXVIII)
Qls (XXXVII)
Qls (XL)
CS-16
CS-17
CS-18
CS-19
CS-20
9M'
9M
8M'
8M
4
4'
3
3'
3E'
8
9
9'
11
11'
40
40'
38
39
41
Stability Fill 3' x 20'
R=5-12'
R=8-12'
R=15-22'
R=10-20'
R=3-10'
R=5-8'
R=5-15'
CR=10-40'
PR=10-50'
Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants
GEOLOGIC/GEOTECHNICAL REMEDIATION MAP
See Plate D-14 for Legend
PSOMAS
LEGAL DESCRIPTION:
PARCELS 11, 12, 13, 22 AND A PORTION OF PARCEL 14 OF PARCEL MAP 24520-01, IN THE UNINCORPORATED TERRITORY OF THE COUNTY OF LOS ANGELES, AS SHOWN ON MAP FILED IN BOOK 290 PAGES 34 TO 67 INCLUSIVE, OF PARCEL MAPS, RECORDS OF LOS ANGELES COUNTY.
MATTHEW D. HIRESMAN R.C.E. NO. 55639 DATE
DESIGNED VSP/TD
DRAFTED TD
CHECKED RB
OWNER/DEVELOPER
NEWHALL LAND
MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 61105
COUNTY CASE NO.
LOCATED IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA
DATE 6/1/05
PROJECT NO. 'NRO01.03.03
SHEET 3
OF 9
PLATE D-8
MEDO7-03.dwg



LEGEND:

Lot 1 / 5,000 SF / 1040.0	LOT NO. / LOT AREA (SQUARE FEET) / PAD ELEVATION
	PROJECT BOUNDARY
	EXISTING RIGHT OF WAY
	PROPOSED RIGHT OF WAY
	PROPOSED DRAINAGE EASEMENT
	EXISTING EASEMENT
	FUTURE RIGHT OF WAY
1090	PROPOSED CONTOUR
	DAYLIGHT LINE
	RIDGE LINE
SD	STORM DRAIN
SS	SANITARY SEWER
W	WATER
	STORM DRAIN "OUT"
	CATCH BASIN
SD	EXISTING STORM DRAIN LINE
SS	EXISTING SEWER LINE
W	EXISTING WATER LINE
	EXISTING POWER POLE
	SEAL RIVER CORRIDOR
FEMA	FEMA
QUAD	Q-QUAD
ACM_1533	ACM_1533
	BURIED BANK STABILIZATION
	ABANDONED OIL WELL
85	EXISTING OAK TREE SHOWING WITH NUMBER AND (SIZE)

EX	EXISTING
FM	FORCE MAIN
FP	FIRE POINT
EL	ELEVATION
MIN	MINIMUM
GB	GRADE BREAK
PROP	PROPOSED
R	RADIUS
SF	SQUARE FEET
SD	STORM DRAIN
SS	SANITARY SEWER
STD	STANDARD
R/W	RIGHT OF WAY
W1	WATER ZONE - 1
W2	WATER ZONE - 2
W3	WATER ZONE - 3
RW	RECLAIMED WATER
CLWA	CASTAIC LAKE WATER AGENCY
PVT	PRIVATE DRIVE
P & F	PRIVATE AND FUTURE STREET
REC	RECREATION
O.S.	OPEN SPACE
RUA	RESTRICTED USE AREA



ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

GEOLOGIC/GEOTECHNICAL REMEDIATION MAP

Date: 12-22-04	Job No.: 1-2924	
Scale: 1" = 100'	CAD File: Plate D-9	
PLATE D-9	Design by: EMB/LS	Rev. date: 2/18/05
	Drawn by: KRM/DRS	

See Plate D-14 for Legend

FEET 0 50 100 200
1" = 100'
INCHES 0 1 2 4

LEGAL DESCRIPTION

PARCELS 11, 12, 13, 22 AND A PORTION OF PARCEL 14 OF PARCEL MAP 24360-01, IN THE UNINCORPORATED TERRITORY OF THE COUNTY OF LOS ANGELES, AS SHOWN ON MAP FILED IN BOOK 290 PAGES 34 TO 67 INCLUSIVE, OF PARCEL MAPS, RECORDS OF LOS ANGELES COUNTY.

PSOMAS
3187 Airway Avenue, Suite B-2
Costa Mesa, California 92626
(714) 545-8100 FAX (714) 545-7591

MATTHEW G. PEDEMAN, P.L.S. NO. 55639 DATE

DESIGNED: MGP/TD
DRAWN: TD
CHECKED: RB

OWNER/DEVELOPER:
NEWHALL LAND
23823 WEST VALENCIA BLVD.
VALENCIA, CALIFORNIA 91355
TELEPHONE (661) 259-8411
REPRESENTATIVE: DENNIS HARPOLE

MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 61105

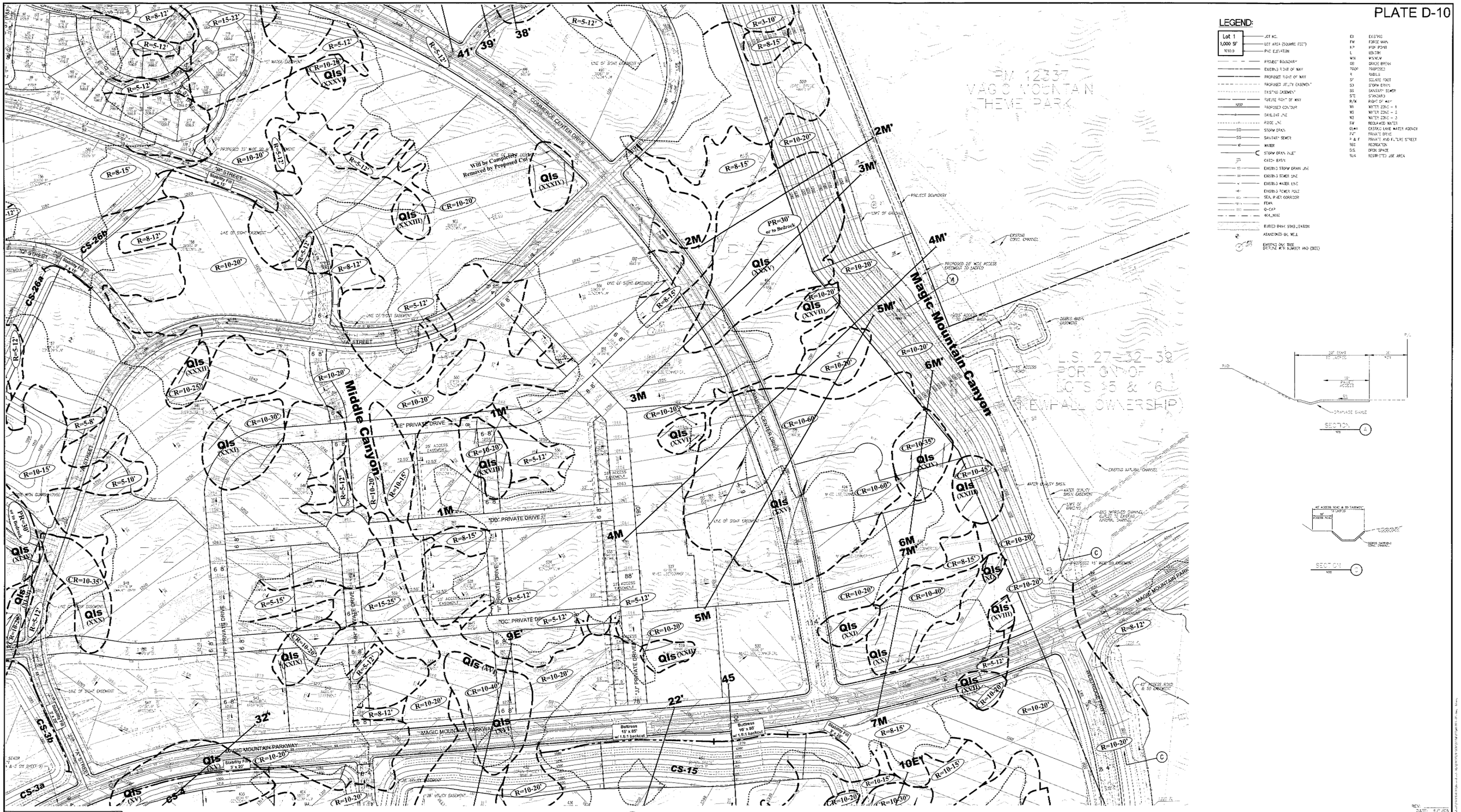
COUNTY CASE NO. _____

LOCATED IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

REV: DATE: 6/1/05
PROJECT NO. 11-RC0120.00
SHEET 4 OF 9

MEOC1-04.dwg

PLATE D-10



ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

GEOLOGIC/GEOTECHNICAL
REMEDIATION MAP

PLATE D-10

See Plate D-14 for Legend

LEGAL DESCRIPTION:

PARCELS 11, 12, 13, 22 AND A PORTION OF PARCEL 14 OF PARCEL MAP 24500-01, IN THE UNINCORPORATED TERRITORY OF THE COUNTY OF LOS ANGELES, AS SHOWN ON MAP FILED IN BOOK 293 PAGES 34 TO 67 INCLUSIVE, OF PARCEL MAPS, RECORDS OF LOS ANGELES COUNTY.

PSOMAS

MATTHEW G. HEDEMAN, R.C.E. NO. 56539 DATE

DESIGNED: MGH/TB
DRAFTED: TB
CHECKED: RB

OWNER/DEVELOPER:
NEWHALL LAND
23823 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE: (661) 255-4123
REPRESENTATIVE: JORGE HIRBLIE

MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 61105

COUNTY CASE NO. _____

LOCATED IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

REV:
DATE: 8/7/05

PROJECT NO. 1NCO120.00
SHEET 5
CT 9

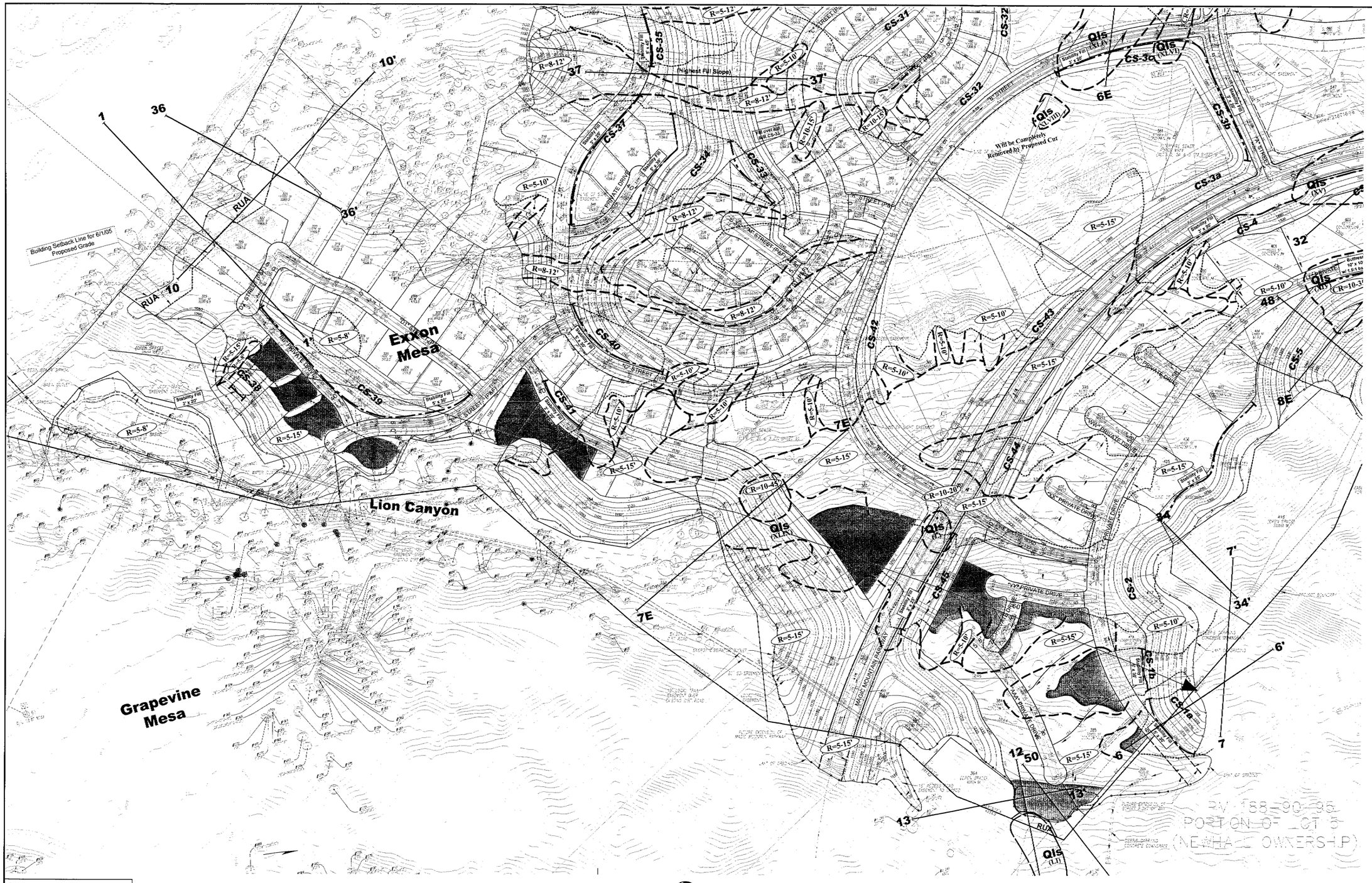
MED01-05.dwa

PLATE D-11

LEGEND:

Lot 1 / 1,000 SF / 1263	LOT NO. / LOT AREA (SQUARE FEET) / PAD ELEVATION
	PROJECT BOUNDARY
	EXISTING RIGHT OF WAY
	PROPOSED RIGHT OF WAY
	PROPOSED PUBLIC EASEMENT
	EXISTING EASEMENT
	FUTURE RIGHT OF WAY
2000	PROPOSED CONTOUR
	DAYLIGHT LINE
	RIDGE LINE
SD	STORM DRAIN
SS	SANITARY SEWER
W	WATER
	STORM DRAIN INLET
	CATCH BASIN
	EXISTING STORM DRAIN LINE
	EXISTING SEWER LINE
	EXISTING WATER LINE
	EXISTING POWER POLE
	SOIL FOR CORRIDOR
	FEMA
	Q-CAP
	404_MOD
	BURIED BANK STABILIZATION
	FIRE LANE
	ABANDONED OIL WELL
	EXISTING OAK TREE DRAWING WITH NUMBER AND (SIZE)

EX	EXISTING
FN	FENCE MAIN
HP	HIGH POINT
L	LENGTH
MVD	MIDVIEW
GB	GRADE BREAK
PROP	PROPOSED
R	RADIUS
SF	SQUARE FOOT
SD	STORM DRAIN
SS	SANITARY SEWER
STD	STANDARD
R/W	RIGHT OF WAY
W1	WATER ZONE - 1
W2	WATER ZONE - 2
W3	WATER ZONE - 3
RW	RECLAIMED WATER
CLWA	CASTAIC LAKE WATER AGENCY
PVT	PRIVATE DRIVE
F & T	PRIVATE AND FUTURE STREET
REC	RECREATION
O.S.	OPEN SPACE
RUA	RESTRICTED USE AREA



ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

GEOLOGIC/GEOTECHNICAL REMEDIATION MAP

Date: 12/2/04 | Job No. 03-0904
Scale: 1" = 100' | Sid File: Plate D-11
PLATE D-11 | Drawn by: BHB/JB | Review: S. Tilt
Plot Date: 11/15/05

See Plate D-14 for Legend

FEET 0 50 100 200
INCHES 0 1 2 4

LEGAL DESCRIPTION:

PARCELS 11, 12, 13, 22 AND A PORTION OF PARCEL 14 OF PARCEL MAP 24302-01, IN THE UNINCORPORATED TERRITORY OF THE COUNTY OF LOS ANGELES, AS SHOWN ON MAP FILED IN BOOK 333 PAGES 34 TO 47 INCLUSIVE, OF PARCEL MAPS, RECORDS OF LOS ANGELES COUNTY.

PSOMAS
3333 Michelson Drive, Suite 300
Irvine, California 92612
(949) 579-5100 (949) 579-5110 (FAX)

MATTHEW G. HEIDEMAN R.C.E. NO. 55539 DATE

DESIGNED: MGH/JB
DRAFTED: TD
CHECKED: RB

OWNER/DEVELOPER:
NEWHALL LAND
23823 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE (661) 255-4000
REPRESENTATIVE: DONALD HUMPHREY

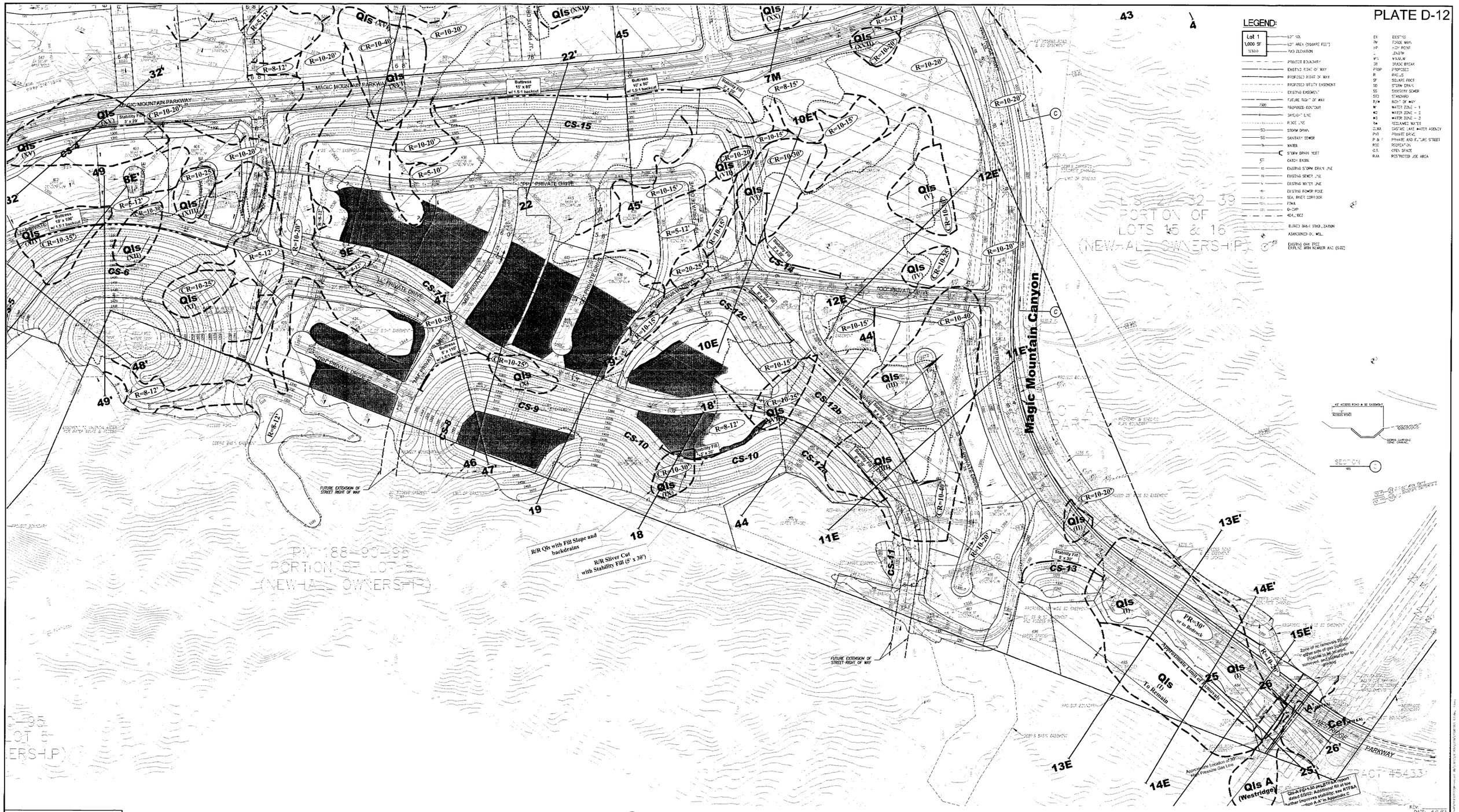
MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 61105
COUNTY CASE NO. _____
LOCATED IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

REV.
DATE: 8/1/05

PROJECT NO. 11-RC012C.00
SHEET 6 OF 9

ME001-06.dwg

PLATE D-12



ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

GEOLOGIC/GEOTECHNICAL
REMEDIATION MAP

Date: 12/22/04	Job No: 01-0204
Scale: 1" = 100'	Grid File: Plate D-12
PLATE D-12	Drawn by: 5/09/05 Kevin Sevier
	Other Ref: 1985-062

See Plate D-14 for Legend

FEET
METERS

KEY MAP
NORTH

LEGAL DESCRIPTION:

PARCELS 11, 12, 13, 22 AND A PORTION OF PARCEL 14 OF PARCEL MAP 24800-01, IN THE UNINCORPORATED TERRITORY OF THE COUNTY OF LOS ANGELES, AS SHOWN ON MAP FILED IN BOOK 293 PAGES 34 TO 67 INCLUSIVE, OF PARCEL MAPS, RECORDS OF LOS ANGELES COUNTY.

PSOMAS
3765 South Bristol Street, Suite 300
Santa Ana, California 92704
(714) 751-7373 FAX (714) 751-7888

MATTHEW C. HIDEYMAN R.C.E. NO. 55530 DATE

DESIGNED: MCH/TD
DRAFTED: TD
CHECKED: RB

OWNER/DEVELOPER
NEWHALL LAND
23823 VEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE (661) 259-7200
REPRESENTATIVE: DONNY HARPOLE

MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 61105

COUNTY CASE NO. _____

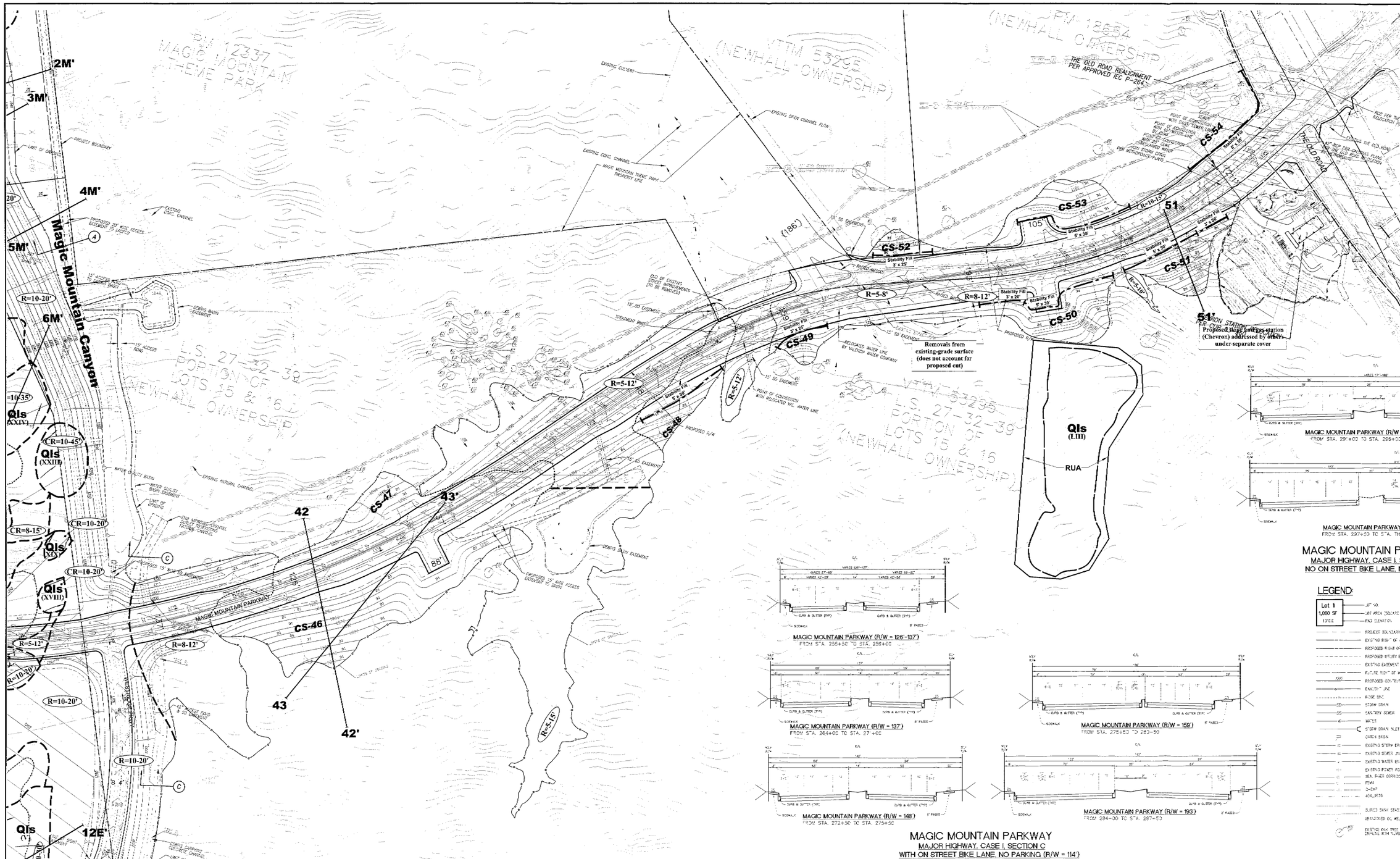
LOCATED IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

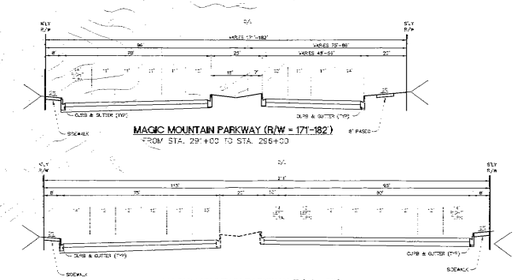
REV. DATE: 6/1/05

PROJECT NO. 'NRC0'20.00

SHEET 7 OF 9

ME001-07.dwg





MAGIC MOUNTAIN PARKWAY (R/W = 171-182')
FROM STA. 291+00 TO STA. 256+00

MAGIC MOUNTAIN PARKWAY (R/W = 211')
FROM STA. 297+50 TO STA. THE OLD ROAD

MAGIC MOUNTAIN PARKWAY (R/W = 126-137')
FROM STA. 256+50 TO STA. 256+00

MAGIC MOUNTAIN PARKWAY (R/W = 137')
FROM STA. 264+00 TO STA. 27 +00

MAGIC MOUNTAIN PARKWAY (R/W = 159')
FROM STA. 275+50 TO 282+50

MAGIC MOUNTAIN PARKWAY (R/W = 148')
FROM STA. 272+50 TO STA. 275+50

MAGIC MOUNTAIN PARKWAY (R/W = 193')
FROM 284+00 TO STA. 287+50

MAGIC MOUNTAIN PARKWAY

MAJOR HIGHWAY, CASE I, SECTION C
NO ON STREET BIKE LANE, NO PARKING

LEGEND:

Lot 1 / 1,000 SF / 123.C — LOT NO.; LOT AREA (SQUARE FEET); PAD ELEVATION

PROJECT BOUNDARY	
EXISTING RIGHT OF WAY	
PROPOSED RIGHT OF WAY	
PROPOSED UTILITY EASEMENT	
EXISTING EASEMENT	
FUTURE RIGHT OF WAY	
PROPOSED CONTOUR	
EXISTING CONTOUR	
RIDGE LINE	
STORM DRAIN	
SANITARY SEWER	
WATER	
STORM DRAIN INLET	
CATCH BASIN	
EXISTING STORM DRAIN LINE	
EXISTING SEWER LINE	
EXISTING WATER LINE	
EXISTING POWER POLE	
SEA RIDER CORRIDOR	
FEMA	
2-CAP	
404_WOS	
BURIED BANK STABILIZATION	
ABANDONED OIL WELL	
EXISTING BMP TREE (SPECIES WITH NUMBER AND SIZE)	

EX	EXISTING
PW	PORCE MAIN
HP	HIGH POINT
	ELEVATION
MIN	MINIMUM
SB	BRACE BREAK
PROP	PROPOSED
R	RADIUS
SF	SQUARE FOOT
SD	STORM DRAIN
SS	SANITARY SEWER
STD	STANDARD
R/W	RIGHT OF WAY
#1	WATER ZONE - 1
#2	WATER ZONE - 2
#3	WATER ZONE - 3
RW	RECLAIMED WATER
CLWA	EASTAD LAKE WATER AGENCY
PVT	PRIVATE DRIVE
P & F	PRIVATE AND PUBLIC STREET
REC	RECREATION
OS	OPEN SPACE
RLA	RESTRICTED USE AREA

See Plate D-14 for Legend

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

GEOLOGIC/GEOTECHNICAL REMEDIATION MAP

Date: 3-8-07 | Job No. 3A3GBP4
Scale: 1" = 100' | GEA Fig. Plate D-13

PLATE D-13 | Geologist: MKOB | Reviewed: E.S.S.B. | Draw Date: 4/18/2007

NEWHALL LAND AND FARMING

LEGAL DESCRIPTION:
PARCELS 11, 12, 13, 22 AND A PORTION OF PARCEL 14 OF PARCEL MAP 24600-01, IN THE UNINCORPORATED TERRITORY OF THE COUNTY OF LOS ANGELES, AS SHOWN ON MAP FILED IN BOOK 283 PAGES 34 TO 37 INCLUSIVE, OF PARCEL MAPS, RECORDS OF LOS ANGELES COUNTY.

PSOMAS
3347 Michelson Drive, Suite 200
Irvine, California 92612-8894
(949) 583-1010 FAX (949) 553-9291
MATTHEW G. NIEKERKAN R.C.E. NO. 55628 DATE

DESIGNED: MGN/TB
DRAFTED: TD
CHECKED: RB

OWNER-DEVELOPER:
NEWHALL LAND
23823 VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE: (661) 259-0771
REPRESENTATIVE: DANIEL HARRIS

MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 61105
COUNTY CASE NO. _____
LOCATED IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

REV. DATE: 6/1/05
PROJECT NO. NLR20120.00
SHEET 8 OF 9

ME001-08.dwg

GEOLOGIC/GEOTECHNICAL MAPS AND REMEDIATION MAPS LEGEND

af	Artificial fill
Qsw	Quaternary slopewash; only selected, large deposits are shown
Qal	Quaternary alluvium;active and recently active alluvial material
Qsf	Quaternary surficial failure; queried where uncertain
Qls (LIII)	Quaternary landslide and roman-numeral designation; queried where uncertain
Qt	Quaternary terrace deposits
TQs_u	Saugus Formation (upper unit)
TQs_l	Saugus Formation (lower unit)
TQs	Saugus Formation (undifferentiated)
	Geologic contact; queried where inferred; dotted where concealed
	Fault trace; queried where inferred; dotted where concealed
	Trace of syncline, showing direction of plunge; the trace is concealed where it is mapped across units younger than TQs
	Trace of anticline, showing direction of plunge; the trace is concealed where it is mapped across units younger than TQs
	Trace of monoclinal warp hinge line; the trace is concealed where it is mapped across units younger than TQs
73°	Strike and dip of bedding
50°	Approximate strike and dip of bedding
12°	Average strike and dip of bedding measured in bucket-auger borings within the bedrock
	Horizontal bedding
19°	Strike and dip of slide plane
47°	Strike and dip of shear
87°	Strike and dip of fracture
60°	Strike and dip of fault
75°	Strike and dip of minor fault
CS-54	Cut-slope designation
	Geotechnically recommended buttress
	Geotechnically recommended stability fill
	Cut/Fill line
	Geotechnically recommended building setback for slopes (where greater than h/3)
	Removal boundary
	Recommended Location of Subdrain
R=5-12'	Recommended removal depth; "CR" indicates complete removal of landslide
PR=30' or to Bedrock	Partial Removal of landslide with removal depth of upper 30' of landslide material or to bedrock where landslide is less than 30' deep

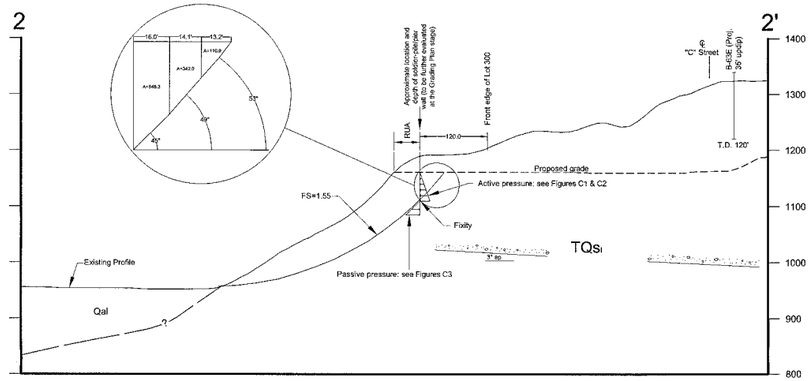
51 — 51'	Geologic cross section
A(RTF&A) — A'(RTF&A)	Geologic cross section by RTF&A
T-217Q	Location of exploratory backhoe trench for Phase I Landslide Investigation (T-1Q thru T-141Q, T-146Q thru T-160Q, T-177Q thru T-214Q, & T-217Q)
T-25M	Location of exploratory backhoe trench for Mesas Entertainment Landslide Investigation (T-1M thru T-25M)
T-182T	Location of exploratory backhoe trench for Mesas East Tentative Map Investigation (T-1T thru T-59T, T-62T thru T-112T, T-114T, T-128T thru T-150T, & T-158T, T-178T thru T-182T)
T-157T	Location of long exploratory backhoe trench for Mesas East Tentative Map Investigation (T-60T thru T-61T, T-113T, & T-151T thru T-157T)
ET-1T	Location of exploratory excavator trench for Mesas East
T-32B	Location of exploratory backhoe trench for Boulder Assessment Investigation (T-1B thru T-32B)
T-74H	Location of exploratory backhoe trench for Holser Investigation (T-1 thru T-74H)
T-82H	Location of exploratory backhoe fault trench for Holser Investigation (T-75H thru T-82H)
DC-1H	Location of exploratory dozer cut for Holser Investigation (T-75H thru T-82H)
DC-B	Location of exploratory dozer cut for Mesas East
T-47I	Location of exploratory backhoe trench for Phase I Feasibility Evaluation - Infrastructure (T-42I thru T-47I)
T-55SA	Location of exploratory backhoe trench for Sand Aggregate Investigation (T-40SA thru T-55SA)
T-67	Location of exploratory backhoe trench for Magic Mountain Entertainment (T-14 thru T-17, T-33 thru T-39, T-48, T-49, T-52, T-53, and T-55 thru T-67)
T-14MW	Location of exploratory backhoe trench for Phase II Landslide Evauation - Mesas West (T-7MW and T-12MW thru T-14MW)
B-73E	Location of exploratory bucket-auger boring for Mesas East (B-1E thru B-73E)
B-25M	Location of exploratory bucket-auger boring for Mesas Entertainment Landslide Investigation (B-1M thru B-25M)
B-8B	Location of exploratory bucket-auger boring for Boulder Assessment Investigation (B-1M thru B-25M)
B-16W	Location of exploratory bucket-auger boring for Phase II Landslide Investigation - Mesas West
RTF B-5	Location of exploratory bucket-auger boring by RTF&A; see Westridge Tract 45433-04 report dated 6/3/02 (RTF B-1 thru RTF B-5)
RW-3M	Location of rotary-wash boring for Geotechnical Evaluation - Mesas area (RW-1M thru RW-3M)
RW-3T	Location of rotary-wash boring for Mesas East Tentative Map Investigation (RW-1T thru RW-3T)
HS-34T	Location of hollow-stem-auger boring for Mesas East Tentative Map Investigation (HS-1T thru HS-34T)
HS-13	Location of hollow-stem-auger boring for Magic Mountain Entertainment (HS-4 thru HS-6, HS-8, and HS-10 thru HS-13)
HS-14I	Location of hollow-stem-auger boring for Phase I Feasibility Evaluation - Infrastructure (HS-12I thru HS-14I)
CPT-18	Location of cone penetration test for Magic Mountain Entertainment (CPT-4, CPT-6, CPT-16, and CPT-18)
CPT-18M	Location of cone penetration test for Preliminary Geotechnical Evaluation - Mesas area (CPT-1M thru CPT-15M and CPT-18M)
	Building Setback Zone for faulting; subject to revision based on additional work and final grades
	Zone of Restricted Development; critical and essential facilities are not recommended in this zone and additional structural and/or geotechnical measures are recommended for any other structures in this zone
	Lots potentially affected by additional overexcavation requirements in the vicinity of the monoclinal warp and Lion Canyon Anticline (8-ft-minimum overexcavation)
RUA	Restricted Use Area

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

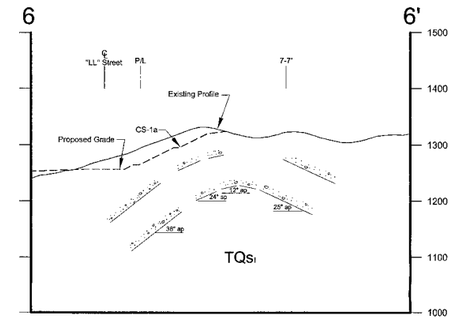
GEOLOGIC/GEOTECHNICAL MAPS AND REMEDIATION MAPS LEGEND

Date: 12/22/04	Job No.: 05-2023-4	
Scale: N/A	CAD File: Plate D-14-Legend	
PLATE D-14	Geology by: N/A	Revised: 6/13/05
	Drawn by: MBW	

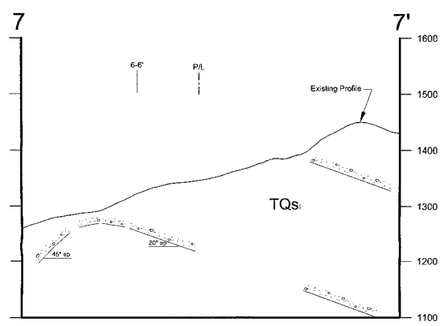
PLATE D-15



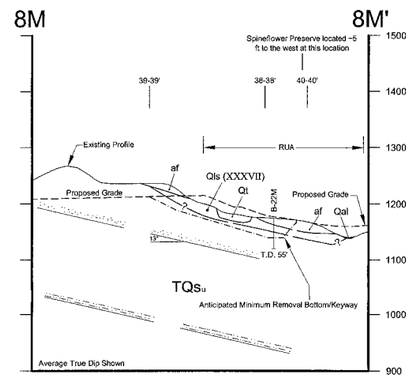
N55W



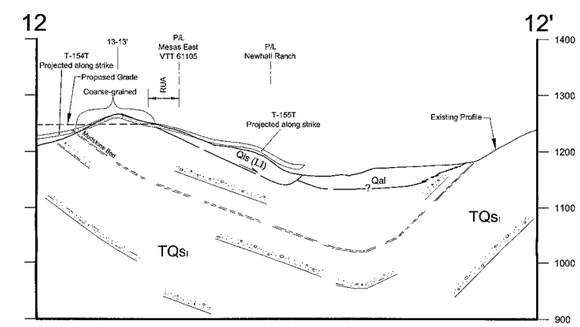
N71E



N19E

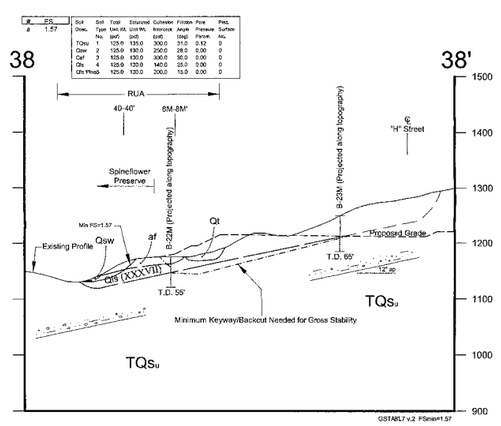


N43E

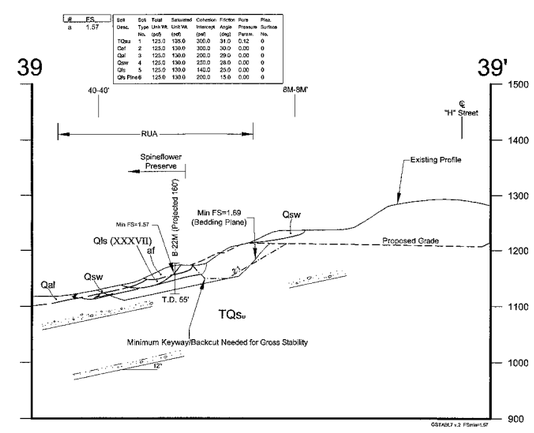


Minimum Factor of Safety below Qls (LI) is 2.38; see Run No. 4A (Rpt 12/22/04)

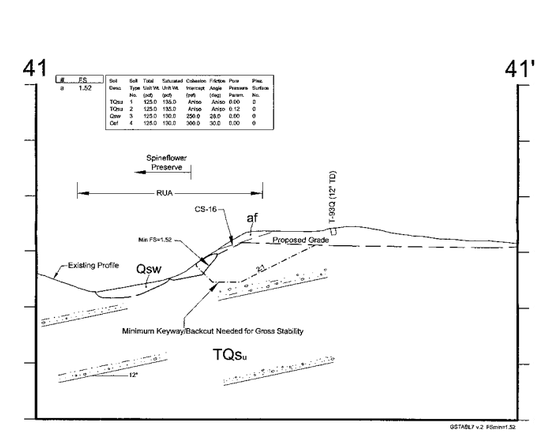
N3E



N4E



N1E



N1E

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

Cross Sections 2-2', 6-6', 7-7', 8M-8M', 38-38', 39-39', and 41-41'

Date: 6/13/05		Job No.: 05-2023-4
Scale: 1" = 100'		CAD File: Plate D-15 Sections
PLATE D-15	Geology by: Staff	Revised:
	Drawn by: GSD	

Preliminary Geologic/Geotechnical Report, Review of Utility Corridor Plans (30% Submittal), Utility Corridor Along Highway 126, Newhall Ranch WRP Site to Travel Village, Castaic, May 25, 2007

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

PRELIMINARY GEOLOGIC/GEOTECHNICAL REPORT
Review of Utility Corridor Plans (30% Submittal)
Utility Corridor along Highway 126
Newhall Ranch WRP Site to Travel Village
Castaic, California

Prepared For:

The Newhall Land and Farming Company
23823 W. Valencia Blvd.
Valencia, CA 91355

Job No: 07-2079 (0)
Dated May 25, 2007

27825 Smyth Drive, Valencia, California 91355 661-294-0065 FAX 661-294-0833

TABLE OF CONTENTS

1.0 INTRODUCTION 1
2.0 SCOPE OF WORK 2
3.0 SITE DESCRIPTION 3
4.0 PROPOSED DEVELOPMENT 4
5.0 FIELD EXPLORATION, SAMPLING AND LABORATORY TESTING 5
5.1 Subsurface Exploration 5
5.2 Sampling Procedures 6
5.3 Laboratory Testing Program 6
6.0 GEOLOGIC SETTING 7
7.0 GEOLOGIC AND GEOTECHNICAL CONDITIONS 7
7.1 Geologic Structure 7
7.2 Geologic Units 7
7.2.1 Bedrock 7
7.2.2 Surficial Units 8
7.3 Ground Water 10
7.4 Soil Compressibility and Hydro-consolidation (Collapse) Settlement Potential 12
7.5 Shear Strength Parameters 12
7.6 Expansion Potential of Soils 12
7.7 Corrosivity of Soils 13
7.8 Rippability 13
8.0 SEISMIC CONSIDERATIONS 14
8.1 Introduction 14
8.2 Ground Rupture 15
8.3 Ground Motion 15
8.3.1 Probabilistic Ground Motion Evaluation 15
8.3.2 Response Spectrum Data 16
8.4 Ground Failure 17
8.4.1 Introduction 17
8.4.2 Liquefaction Potential 17
8.4.3 Other Secondary Effects 18
9.0 EARTHWORKS 18
9.1 Grading 18
9.1.1 Site Preparation 18
9.1.2 Removals 19
9.1.3 Fill Materials 20
9.1.4 Compaction 20
9.1.5 Transitions 21

TABLE OF CONTENTS

9.1.6 Access/Maintenance Road 21
9.2 Dewatering 21
9.3 Slope Stability 21
9.3.1 Cut Slopes 21
9.3.2 Fill Slopes 22
9.4 Backdrains 22
9.5 Oil Wells and Water Wells 22
9.6 Abandoned Railroad Line 23
9.7 Shrinkage 23
10.0 UTILITY AND FOUNDATION RECOMMENDATIONS 24
10.1 Expansive Soil Considerations 24
10.1.1 Utility Pipes 24
10.1.2 Foundations for Structures 25
10.2 Corrosive Soils Considerations 25
10.2.1 Recommendations for Concrete 25
10.2.2 Recommendations for Reinforced Concrete Pipe (RCP) 25
10.2.3 Recommendations for Ferrous Metals (Other Than Reinforcement in RCP) 26
10.3 Static Settlement 26
10.4 Pipe "D" Load 26
10.5 Preliminary Parameters for Design of Retaining Walls 27
10.5.1 Retaining Wall Foundation 27
10.5.2 Retaining Wall Design Parameters 27
10.5.3 Retaining Wall Construction Provisions 29
10.5.4 Retaining Wall Backfill 29
10.6 Temporary Construction Excavations 30
10.6.1 Alluvial Soils 30
10.6.2 Bedrock 31
10.7 Bedding and Shading Backfill 31
10.8 Trench Backfill 31
11.0 SECTION 111 STATEMENT 32
12.0 CONSTRUCTION OBSERVATIONS 32
13.0 PLAN REVIEW 33
14.0 GEOLOGIST/GEOTECHNICAL ENGINEER OF RECORD 33
15.0 LIMITATIONS 34

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

May 25, 2007 Job No: 07-2079 (0)

The Newhall Land and Farming Company
23823 W. Valencia Blvd.
Valencia, CA 91355

Attention: Mr. Dennis Mak

Subject: **PRELIMINARY GEOLOGIC/GEOTECHNICAL REPORT**
Review of Utility Corridor Plans (30% Submittal)

Project: Utility Corridor along Highway 126
Newhall Ranch WRP Site to Travel Village
Castaic, California

References: See end of text

Dear Mr. Mak:

This report presents our opinions regarding existing geologic and geotechnical conditions and their potential impacts on the portion of the proposed Utility Corridor that will be constructed south of Highway 126, between the Newhall Ranch Water Reclamation Plant (WRP) site and the entrance of Travel Village.

1.0 INTRODUCTION

Grading and related improvements for the Utility Corridor proposed between the Newhall Ranch WRP site and the existing WRP (No. 32) are shown on the attached 30% submittal Plans prepared by Psomas (received May 7, 2007). The portion of the Utility Corridor addressed by this report extends from the proposed pump station at the WRP site to the entrance to Travel Village.

This report summarizes the results of our preliminary geologic and geotechnical investigation of subsurface conditions within this portion of the Utility Corridor, including our evaluation of potential geologic constraints to the proposed development and our recommendations for mitigation of geologic/geotechnical conditions within the proposed alignment.

At this time, it is not known whether grading operations for the Utility Corridor will be performed before grading operations for Landmark Village (VTTM 53108), or if the portion of the corridor adjacent to Landmark Village will be graded after grading operations for Landmark Village. The recommendations provided in this report account for both construction sequences.

2.0 SCOPE OF WORK

The scope of work performed for this study includes the following tasks:

1. Review of previous reports by this firm for sites in the vicinity of the project site.

2. Review of published reports and maps listed in the **References** section.

3. Review of information in the 2003 Munger Map Book for California-Alaska Oil and Gas Fields and of information in the Division of Oil, Gas and Geothermal Resources Map No. 253 regarding the location and status of any on-site oil wells.

4. Review of Alquist-Priolo Fault Rupture Hazard Zones in California (CDMG Special Publication 42) and the Los Angeles County Safety Element (Leighton, 1990).

5. Coordination with the Supervising Civil Engineer, Psomas.

6. Review of the Utility Corridor Plans (30% Submittal), prepared by Psomas, received May 7, 2007. These plans include a cover sheet, a notes sheet, sheets 3 through 15 (which illustrate the Utility Corridor from the proposed Newhall Ranch WRP to existing WRP Site No. 32), and sheets 6a through 9a (which illustrate the stand-alone design for the Landmark Village segment).

7. Coordination with Underground Service Alert (USA) prior to our subsurface investigation at the project site.

8. Coordination with drill rig contractors.

9. Drilling, sampling, and logging of 21 hollow-stem-auger borings to depths as great as 41 ft and one rotary-wash boring to a depth of about 50 ft.

10. Laboratory testing of selected bulk samples and of relatively undisturbed soil samples obtained in our exploratory borings. The testing included in-situ dry density and moisture content, percent finer than the #200 sieve, grain-size analysis, Atterberg Limits, compaction (Modified Proctor), direct shear, hydro-consolidation, consolidation, Expansion Index, and corrosivity (i.e., sulfate content, chloride content, pH, and resistivity).

11. Geologic and geotechnical evaluation of boring data obtained during this investigation, additional boring data obtained at locations east of the entrance to Travel Village, and data from borings and CPT soundings from previous investigations for other sites that overlap or are in close proximity to the Utility Corridor.

12. Preliminary survey of liquefaction potential.

13. Preparation of recommendations for grading removal depths for fill, at-grade, and cut areas proposed within the Utility Corridor and for the proposed access road.

14. Preparation of 11 Geologic Cross Sections at selected locations that illustrate anticipated conditions for proposed cut and fill slopes and/or critical geologic conditions.

15. Evaluation of stability of proposed cut slopes and fill slopes proposed within the Utility Corridor.

16. Preparation of Geologic/Geotechnical Maps (Sheets with our Title Block labeled "Utility Corridor and Trunk Sewer Alignment"), Location Map, Geologic Cross Sections, boring logs, and pertinent figures.

17. Preparation of this report, which summarizes the results of our investigation and presents our geologic/geotechnical conclusions and recommendations for the proposed Utility Corridor.

3.0 SITE DESCRIPTION

The portion of the proposed Utility Corridor investigated for this report extends along the south side of Highway 126, from the proposed Water Reclamation Plant (WRP) site on the west to the entrance of Travel Village on the east. A short segment of a parallel utility corridor proposed on the north side of Highway 126 at Castaic Creek was also investigated.

Elevations along the Utility Corridor range from about 850 ft at the WRP site to about 990 ft at the entrance of Travel Village. Details of the site topography are provided on the attached Location Map and Utility Corridor Plans. The Utility Corridor Plans were used as a base map to prepare the Geologic/Geotechnical Maps. No representation is made herein regarding the accuracy of this base map.

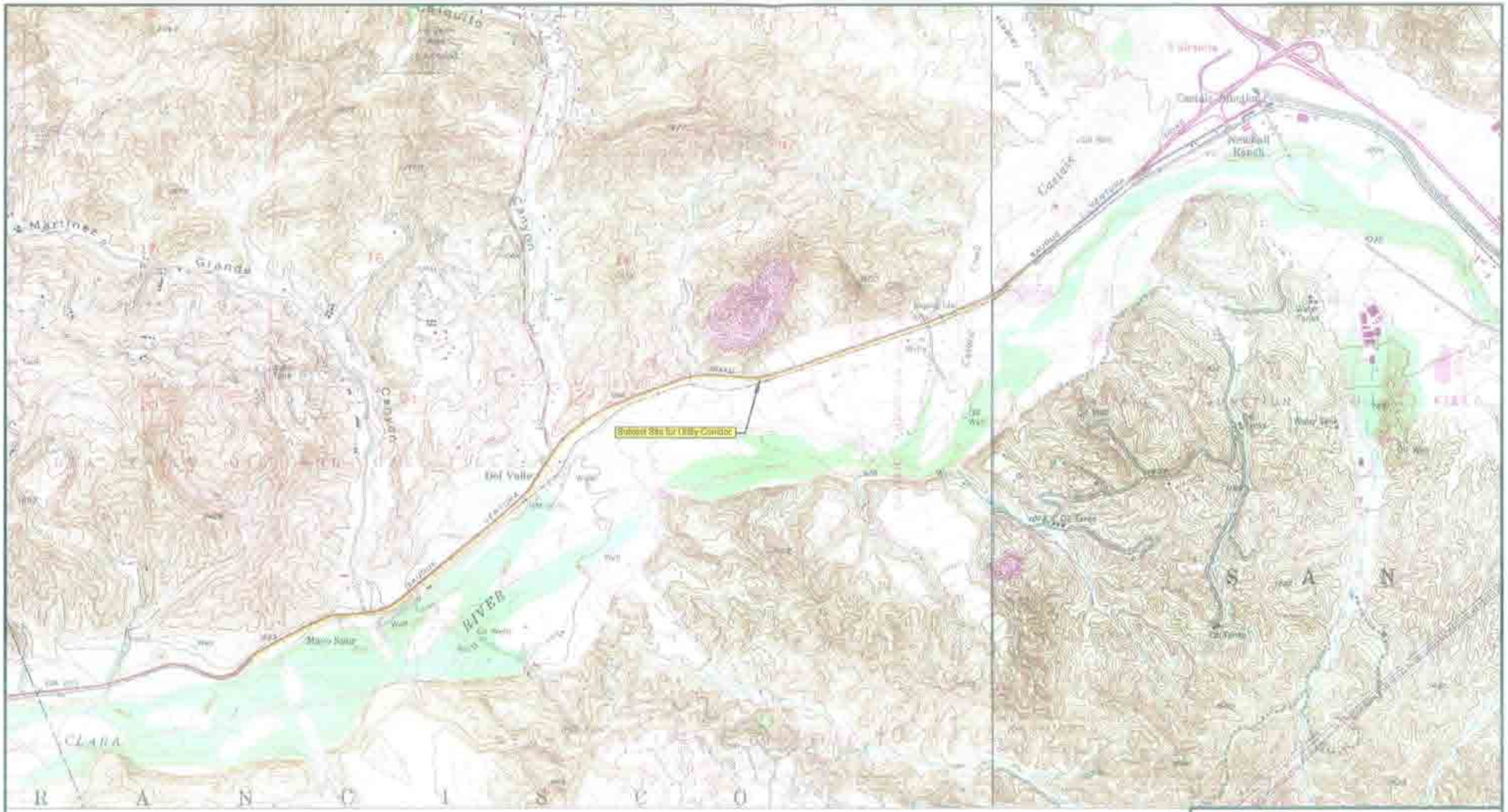
Much of the proposed Utility Corridor alignment is undeveloped. Minor cuts and fills have been made for existing dirt access roads. Disturbed areas along the alignment include an abandoned segment of Highway 126 and the Southern Pacific Railroad alignment at the WRP site, bridge abutments and associated fills along the abandoned Southern Pacific Railroad alignment on both sides of Castaic Creek and Chiquito Canyon channel, graded areas on Tract 26363, and drainage channels associated with existing culverts below Highway 126. Vegetation, which generally is sparse along most of the alignment, consists primarily of grasses and local shrubs where present.

4.0 PROPOSED DEVELOPMENT

The attached Plan and Profile by Psomas illustrate the geometry of the proposed Utility Corridor. The corridor is proposed along the south side of Highway 126 from the proposed Newhall Ranch WRP site eastward to Castaic Junction, and then proceeds south along The Old Road to existing WRP Site No. 32 at Rye Canyon Road. The portion of the Utility Corridor addressed in this report extends almost 4 miles from the Newhall Ranch WRP site on the west to the entrance of Travel Village on the east (Stations 0 to 196).

Small cuts and fills are proposed to achieve the grades for the Utility Corridor and associate maintenance road, as shown on the attached plans. The maximum proposed depth of cut is 52 ft and the maximum proposed depth of fill is 40 ft, both at Landmark Village. The maximum proposed fill slope is about 33 ft in height and about 2:1 (h:v) in inclination. The maximum proposed cut slope is about 30 ft in height and about 2:1 (h:v) in inclination.

The segment of the Utility Corridor between Chiquito Canyon and Castaic Creek coincides with the Landmark Village project (VTTM 53108). Sheets 6 through 9 of the Utility Corridor Plans illustrate the proposed Utility Corridor assuming that the grading shown on the Landmark Village Tentative Map has been completed. Sheets 6a through 9a of the Utility Corridor Plans illustrate the Utility Corridor assuming that the grading shown on the Landmark Village Tentative Map has not yet been performed (i.e, a stand-alone design).



Source: U.S. Geological Survey Newhall and Val Verde Quadrangles, Dated 1952, Photorevised 1988

Approximate Scale: 1" = 2,000'

NOTE: THIS IS NOT A SURVEY OF THE PROPERTY

N

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

Location Map

Job No.: 07-2079

Date: 05/25/07 | Figure: 08

Utilities proposed for the Utility Corridor include a 54-inch diameter Reinforced Concrete Pipe (RCP) trunk sewer line, as well as a force main, a gas line, potable, agricultural and reclaimed water lines, a storm drain, and a joint utility trench. The proposed depth below proposed grade of the trunk sewer generally ranges from 12 to 33 ft. However, the proposed trunk sewer depth reaches 60 ft adjacent to Castaic Creek.

Utility pipelines proposed to cross beneath the channel of Castaic Creek are expected to be installed using directional drilling and/or micro-tunneling. If the micro-tunneling option is used, deep construction shafts will have to be excavated on both sides of Castaic Creek to accommodate the tunneling operations. Installation of utility pipelines for another utility alignment proposed on the north side of Highway 126 may also require micro-tunneling or directional drilling below Castaic Creek.

Existing culverts that outlet on the south side of Highway 126 will be extended to the south side of the Utility Corridor as needed.

A maintenance/access road is proposed along the Utility Corridor and a Metropark easement is located between the Utility Corridor and Highway 126.

5.0 FIELD EXPLORATION, SAMPLING AND LABORATORY TESTING

5.1 Subsurface Exploration

Our geotechnical exploration included drilling, sampling, and logging of twenty-one hollow-stem-auger borings (HS-1U through HS-21U) and one rotary-wash boring (RW-5) within the proposed Utility Corridor. The log for hollow-stem-auger boring HS-22U (drilled for a separate scope of work) and the results of associated laboratory testing are appended to this report. Logs of exploratory borings and CPT soundings previously performed in areas of the Newhall Ranch project located adjacent to the proposed Utility Corridor are also appended. Locations of the exploratory borings are shown on the Geologic/Geotechnical Maps (**Sheets 3 through 10 and 6a through 9a**) and the boring logs are presented in **Appendix A**.

The rotary-wash and hollow-stem-auger borings listed above were drilled by Valley Well Drilling. All of the borings were located in the field, using a Trimble GPS survey unit, and sampled and logged by representatives of Allan E. Seward Engineering Geology, Inc.

(AESEGI). Following completion of logging and measurement of ground water levels, the borings were backfilled with the excavated materials.

The descriptions of subsurface materials provided in the boring logs in **Appendix A** are based on data recorded in the field at the time that the materials were sampled and on data from laboratory testing performed on soil samples from the borings. Contacts between geologic units shown on the boring logs are approximate and may represent gradual or interbedded transitions.

5.2 Sampling Procedures

The California-Drive Ring Sampling Method (which employs a drive sampler with brass rings) and the Standard Penetration Test (SPT) Sampling Method were used to obtain soil/rock samples from the exploratory borings (see logs in **Appendix A**). In general, the samples were obtained at 3-ft depth intervals at depths shallower than 15 ft and at 5-ft depth intervals at depths below 15 ft. Recovered California Drive Ring and SPT samples were sealed in plastic containers in order to prevent drying of the samples and brought to AESEGI's laboratory for additional examination and testing.

Bulk (disturbed) samples of near-surface soils and rock from cuttings produced during drilling/excavation of exploration borings were collected for classification and testing. The bulk samples represent a mixture of soils within the noted depths.

5.3 Laboratory Testing Program

Following visual classification in the field, the soil samples were brought to our laboratory and laboratory testing was performed on selected soil samples. This testing included in-situ Dry Density and Moisture Content, percent passing than the #200 sieve, Compaction (Modified Proctor), Direct Shear, consolidation and hydro-consolidation, Atterberg Limits, Expansion Index, sulfate content, chloride content, pH, and Resistivity tests.

Laboratory test methods used for this investigation and results of the testing are described in **Appendix B** of this report.

6.0 GEOLOGIC SETTING

The project site is located in the eastern Ventura Basin of southern California. The Ventura Basin is a westerly plunging depositional basin produced by tectonic downwarping that initiated during the early Miocene era and its axis approximately coincides with the Santa Clara River. All of the geologic formations exposed at the project site were deposited within the Ventura Basin.

Most of the Utility Corridor is underlain by older alluvium and younger alluvium associated with the Santa Clara River system. Bedrock of the Pico Formation is expected to be encountered during grading operations at the west end of the alignment and along short segments of the alignment on Landmark Village. Bedrock of the Saugus Formation will also be encountered locally on Landmark Village.

7.0 GEOLOGIC AND GEOTECHNICAL CONDITIONS

7.1 Geologic Structure

Most of the site is covered by sub-horizontal older alluvium and younger alluvium. Based on regional mapping and on limited subsurface data, the bedrock underlying the proposed Utility Corridor has been tilted along three regional folds, the "Grapevine Mesa" syncline, the "Del Valle" anticline and the "Middle Canyon" syncline. Bedrock beneath the project site is also cut by the Del Valle fault east of San Martinez Grande Canyon.

7.2 Geologic Units

7.2.1 Bedrock

7.2.1.1 Pico Formation (Tp)

Bedrock underlying the western portion of the Utility Corridor (west of Station 100+00) consists of the Pliocene marine Pico Formation. West of the Del Valle fault, this unit consists dominantly of siltstone and mudstone, with local sandstone interbeds. This bedrock is typically oxidized and weathered to an olive-gray color at shallow depths, but is hard, compact and unoxidized with a medium-gray to bluish-gray color at depth. The transition to hard, unoxidized bedrock typically occurs at a depth of 20 to 30 ft from original ground, but may be more abrupt below the

bedrock/alluvium contact owing to scour of the weathered rock prior to deposition of the alluvium. The siltstone and mudstone typically classifies as a lean clay (per USCS Classification) and has a medium Expansion Index.

The Pico Formation east of the Del Valle fault typically consists of light yellowish-gray, locally fossilized sandstone, pebbly sandstone, and silty sandstone with interbeds of light olive-gray sand siltstone and mudstone. The unweathered Pico Formation east of the fault is younger and less indurated than the older mudstone west of the fault.

7.2.1.2 Saugus Formation (TQs)

Bedrock underlying the eastern portion of the Utility Corridor (east of Station 100+00) consists of the Plio-Pleistocene nonmarine Saugus Formation. This unit typically consists of light yellowish-gray to light-brown sandstone, pebbly sandstone, and silty sandstone, interbedded with greenish-gray to pale reddish-brown siltstone and mudstone. The siltstone and mudstone units are potentially very expansive.

7.2.2 Surficial Units

7.2.2.1 Quaternary Older Alluvium (Qoa)

Uplifted older alluvium deposits underlie most of the alignment to depths of 40 ft or more. Several levels of older alluvium are present along the Utility Corridor alignment but they have not been differentiated on the attached Geologic Maps because of uncertain lateral correlation.

Soil disturbed by plowing operations and by other agricultural activities is present near the ground surface along the Utility Corridor.

In the western portion of the Utility Corridor (borings HS-1B, HS-1U, HS-2U, HS-4U to HS-7U, and HS-25HS), fine-grained soils including brown and yellowish-brown sandy silts, silty clays, and lean clays are present to depths varying from 4 to 15 ft beneath the ground surface. This upper layer of fine-grained soil is underlain by layers of sand and silty sand. The eastern portion of the utility corridor (borings HS-8U to HS-10U, HS-12U to HS-16U, HS-18U to HS-21U, HS-7, HS-12, RW-5 and RW-14) is underlain by coarse-grained older alluvial units, including light-brown,

yellowish-brown, and light to dark grayish-brown sands, silty sands, and gravelly sands, with occasional silty clay and clayey sand interbeds. These coarse-grained layers extend to depths of 40 ft or more. Interbedded brown, yellowish-brown, and grayish-brown silty sands and silty clays were observed in boring HS-17U (located at the north side of the Santa Clara floodplain at its intersection with Castaic Creek).

The fine-grained units of the older alluvium generally are firm to stiff and the coarse-grained units of the older alluvium generally are loose at depths shallower than 15 ft, medium dense at depths ranging from 15 to 30 ft, and dense to very dense at depths greater than 30 ft.

7.2.2.2 Quaternary Alluvium (Qal)

Recent alluvium underlies the active floodplain area of the Santa Clara River Channel. Portions of the proposed alignment within the active floodplain (borings HS-3U and HS-11U) will be underlain by recent alluvium to depths 30 ft or more. These alluvial units predominantly consist of light-brown to yellowish-brown sands and silty sands, and generally are loose at depths shallower than 6 ft, medium dense at depths ranging from 6 ft to 20 ft, and dense to very dense at depths greater than 20 ft.

7.2.2.3 Compacted Artificial Fill (Caf)

Compacted fill was placed along much of the northern edge of the corridor during widening and realignment of State Highway 126. Caltrans records for this fill should be reviewed and the condition of the fill should evaluated in the field in order to decide if mitigation grading is needed prior to placement of additional fill over the existing Caltrans fill.

7.2.2.4 Artificial Fill (af)

Artificial fill has been placed at several locations along the Utility Corridor to estimated depths of up to 10 ft. Most of this fill is associated with construction of State Highway 126, abandoned railroad alignments, and local agricultural activities. Since compaction of this fill is undocumented, it should not be considered to be a compacted fill or used for support of structures.

7.3 Ground Water

The depth to ground water was recorded where encountered in all of our exploratory borings and is noted on the boring logs attached in **Appendix A**. A summary of recorded ground water levels is presented on the **Ground Water Summary Table** below and is graphically shown on the trunk sewer profile on the attached plans.

The depth of historic high ground water was interpolated for the portion of the Utility Corridor addressed in this report based on data obtained during this (and previous) investigations of the site, on review of Los Angeles County Flood Control District (LACFCD) data for nearby water wells, on historic high ground water contours by Robson (1972), on historic high ground water contours interpolated for VTT 060678 and Tract 53108, and on review of historic high ground water contours prepared for the seismic hazard maps for the Newhall and Val Verde Quadrangles. Historic high groundwater depths and elevations interpolated at each boring location are summarized on the **Ground Water Summary Table** below. The interpolated historic high ground water level is also graphically illustrated on the Trunk Sewer Profile provided on the attached plans.

Ground Water Summary Table

Boring	Approximate Station No.	Total Boring Depth [ft]	Ground Water Depth Beneath Existing Grade [ft]				Approximate Height of Proposed Grade Above (+) or Below (-) Existing Grade at Boring [ft]	Invert Elevation of Adjacent Trunk Sewer [ft]	Height of Trunk Sewer Invert Above (+) or Below (-) Groundwater [ft]	
			Observed		Historic High					
			Depth [ft]	Elevation [ft]	Depth [ft]	Elevation [ft]			Observed	Historic High
HS-1B	5+10	23	15	854	12	857	8	853	-1	-4
HS-1U	12+65	40	25	857	21	861	2	857	0	-4
HS-2U	18+78	30	20	858	14	864	12	861	3	-3
HS-3U	25+01	30	11	864	6	869	23	865	1	-4
HS-4U	33+18	30	No water	No water	17	885	0	871	>-1	-14
HS-5U	40+00	30	24	875	20	879	3	876	1	-3
HS-6U	54+25	30	13	880	5	888	6	887	7	-1
HS-7U	67+28	25	No water	No water	19	895	1	893	>4	-2
HS-8U	73+61	30	11	894	5	900	6	896	2	-4
HS-9U	79+33	35	No water	No water	19	909	-3	903	>10	-6
HS-10U	87+90	35	No water	No water	34	900	17	910	>11	10
HS-11U	104+38	30	11	904	8	907	26	917	13	10
HS-12U	115+80	40	No water	No water	28	920	4	923	>15	3
HS-13U	127+65	30	25	918	17	926	3	928	10	2
HS-12	133+96	30	27	921	16	932	0	930	9	-2
HS-14U	145+52	30	30	926	20	936	3	935	9	-1
RW-14	148+20	50	29.5	928.5	21	937	0	936	7.5	-1
HS-15U	161+25	30	30	934	18	946	3	945	12	-1
HS-7	166+55	30	27	941	16	952	6	948	7	-4
HS-16U	170+30	40	23	942	12	953	7	912	-30	-41
HS-18U	177+61	40	10	953	3	956	0	923	-30	-33
HS-20U	181+40	35	17	958	15	960	0	955	-3	-5
RW-5U	188+32	50	15	970	19	966	0	963	-7	-3
HS-21U	193+20	30	23	962	15	970	0	969	7	-1

7.4 Soil Compressibility and Hydro-consolidation (Collapse) Settlement Potential

Consolidation testing was performed on selected soil samples to evaluate compressibility of soils at the site. In addition, hydro-consolidation testing was performed on selected samples to evaluate potential for hydro-consolidation (collapse) settlement of coarse-grained soils at the site. Results of these tests are provided in **Appendix B**.

Based on the results of the consolidation testing (and on penetration resistance measured during soil sampling and on in-situ densities of soils measured in our laboratory), **moderate** compression of fine-grained soils and coarse-grained soils (up to 2% with anticipated loads) is expected to depths as great as about 20 ft beneath existing grade at locations within the Utility Corridor where fill is proposed. Measures recommended to mitigate the impact of this compression are provided in **Section 9.1** of this report and the magnitude of this compression (assuming these mitigation measures are implemented) is discussed in **Section 10.3** of this report.

Based on the results of our testing, hydro-consolidation (collapse) potential of in-situ soils is considered to be **low**.

7.5 Shear Strength Parameters

Density and shear strength parameters from our Review of Vesting Tentative Tract report for Landmark (River) Village, dated September 27, 2000 were adopted to model the engineering characteristics of cut and fill slopes proposed within the Utility Corridor. These parameters are provided in **Appendix C**. Residual shear strength values were used for evaluation of static slope stability. Peak shear strength values were used for evaluation of pseudo-static (earthquake) stability, except that residual strengths were used for analysis of bedding plane surfaces within the bedrock. Direct Re-Shear testing was used to characterize shear strength of rock in the direction parallel to bedding planes.

7.6 Expansion Potential of Soils

An Expansion Index value of less than 1 was measured on two test specimens composited from alluvial soils from the upper 10 ft of the project site (see Appendix B). Based on these test results, expansion potential of these soils is **very low**.

7.7 Corrosivity of Soils

Soluble sulfate content, chloride content, pH, and resistivity were measured on two test specimens composited from alluvial materials from the upper 10 ft of the project site. Results of this testing are presented in **Appendix B** of this report and are summarized below:

TEST	TEST RESULT
Soluble Sulfate Concentration	0.015 percent
Chloride Concentration	Not detected to 2.7 ppm
pH	7.5 to 7.6
Resistivity	1661 to 2724 Ohm-cm

Based on the sulfate concentration test results and Table 19-A-4 of the 1998 edition of the California Building Code, corrosion potential of concrete in contact with fill derived from shallow alluvial materials in the proposed Utility Corridor is **negligible**.

Based on the resistivity test results and on the County of Los Angeles standards, corrosion potential of steel reinforcement and buried metal utilities by fill derived from shallow alluvial materials in the proposed Utility Corridor classifies as **moderately corrosive to corrosive**. The measured pH and chloride content values also indicate that corrosion potential of steel reinforcement and buried metal utilities by fill derived from site bedrock materials is, at most, moderate.

7.8 Rippability

Most of the proposed Utility Corridor is underlain by younger and older alluvium deposits. These deposits can be graded using conventional equipment.

Bedrock of the Pico and Saugus Formations will locally be encountered along the proposed Utility Corridor. Exposures of upper Pico Formation and Saugus Formation are locally anticipated east of the Del Valle fault, near Landmark Village (Stations 66-69, 91-100 and 117-128). This rock is anticipated to be moderately hard (P-wave velocities below 6,000 ft/sec) and, therefore, rippable with standard grading equipment. However, deep trenching with an excavator may be difficult and slow.

Near the west end of the Utility Corridor (west of Station 4), P-wave velocities ranging from 6,000 to 9,000 ft/sec were measured during geophysical rippability studies in older,

fine-grained Pico Formation bedrock. Rock in this velocity range is likely too hard to be excavated with an excavator and is marginally rippable by D-9 and D-10 dozers. Therefore, blasting may be required for the portion of the trunk sewer located within this Pico Formation bedrock. Blasting may produce oversize rock material (i.e., material larger than 8 inches in dimension). Oversized material should be broken down and processed during grading or stockpiled for disposal (see **Section 9.1.3**).

8.0 SEISMIC CONSIDERATIONS

8.1 Introduction

The project site is located in the Transverse Ranges Geomorphic Province of southern California. The Transverse Ranges consist of a series of west-trending mountains and intervening valleys, which is contrary to the northwest geomorphic trend that is typical of most of California and reflects the underlying structural (geologic) trend. These ranges are largely the result of north-south compression, which has resulted in west-trending folds and thrust faults. Associated faults in the vicinity of the site included the Santa Susana, Oak Ridge, Del Valle, and Holser reverse/thrust faults. The January 17, 1994 Northridge (M6.7) earthquake occurred on a south-dipping thrust fault which uplifted the Santa Susana Mountains at least 40 cm.

The southern California region is traversed by the San Andreas fault, which is a transform boundary between the Pacific Plate and the North American Plate. The San Andreas fault is part of a system of northwest-striking, right-lateral faults that generally are historically active, as evidenced by the June 28, 1992 Landers (M7.3) earthquake.

The southern California region is seismically active and commonly experiences strong ground shaking resulting from earthquakes along active faults. Earthquakes along these faults are part of a continuous, naturally occurring process, which has contributed to the characteristic landscape of the region.

Geologic hazards that may be produced by a seismic event (earthquake) include ground rupture, ground motion, and ground failure.

8.2 Ground Rupture

No known active faults are shown crossing the proposed Utility Corridor on Alquist-Priolo Earthquake Fault Zone maps. However based on review of the seismic safety element of the Los Angeles County General Plan, the south-dipping Holser reverse fault traverses the Utility Corridor alignment east of Travel Village. This fault is designated as active in the seismic safety element, based on interpreted connections with the active San Cayetano fault to the west and the active San Gabriel fault to the east.

The only known fault that traverses the portion of the Utility Corridor addressed by this report is the Del Valle fault. This west-southwest-dipping, right-lateral oblique reverse fault crosses the proposed Utility Corridor east of San Martinez Grande Canyon. The trace of the Del Valle fault shown on our map is projected from exposures in the hills to the north observed by this firm during our investigations for VTT 060678. The Del Valle fault is designated as potentially active in the L.A. County Seismic Safety Element. The recurrence interval of earthquakes on the Del Valle fault and the amount of potential displacement that would result have not been accurately defined at this time. However, because the fault offsets uplifted, older alluvial units with an up-to-the-west sense of movement, a setback for buildings was designated around the fault on VTT 060678.

In light of the potential for future offset along the Del Valle fault, it is recommended that pipelines within the building setback zone should be designed with flexible joints. It would also be prudent to install emergency shut-off valves for gas, water and sewer lines on both sides of the fault setback zone in case the pipes are broken by future fault movement. It is our understanding that the trunk sewer is a gravity flow line. Owing to the west-side-up sense of movement documented on the Del Valle fault, the downward gradient of the sewer could be disrupted following a future earthquake.

8.3 Ground Motion

8.3.1 Probabilistic Ground Motion Evaluation

Potential ground motions along the Utility Corridor from future earthquakes on nearby faults were previously evaluated during investigations for developments proposed along the alignment utilizing the procedures outlined by the California Geologic Survey Guidelines (Special Publication 117) and by the Los Angeles County Department of Public Works (Manual for Preparation of Geotechnical Reports and Memorandum dated

5/18/99). Fault parameters were derived from Peterson et al. (1996) and the computer program FRISKSP by Thomas F. Blake was used to perform a probabilistic ground motion evaluation. Estimated peak horizontal accelerations with a 10% chance of exceedance in 50 years for the WRP site, the Homestead Central portion of VTT 060678, and for Landmark Village are summarized below. Details of the procedures and parameters used to estimate these acceleration values are presented in the referenced reports for each area.

Area	Source Report	Peak Horizontal Ground Acceleration
West of San Martinez Grande Cyn	WRP Site	0.97g
San Martinez Grande Cyn to Chiquito Cyn	Homestead Central portion of VTT 060678	0.96g
Landmark Village and Travel Village	Landmark Village	0.87g

These accelerations would most likely be generated by a 6.5M earthquake on the Santa Susana fault.

8.3.2 Response Spectrum Data

Parameters for calculation of the California Building Code (CBC) response spectrum are listed below:

- Soil Profile Type = S_D
- Seismic Zone = 4
- Seismic Source Type = B
- Seismic Zone Factor Z = 0.4
- Near Source Factor N_a = 1.3
- Near Source Factor N_v = 1.6
- Seismic Coefficient C_a = 0.57
- Seismic Coefficient C_v = 1.02

Although there is a potential for limited liquefaction of discontinuous soil layers at the project site (as discussed in the **Liquefaction Potential** section of this report), wide spread liquefaction across the project site is not anticipated. Therefore, use of the S_D soil type (in lieu of the S_E soil type) is appropriate for calculation of the response spectrum.

8.4 Ground Failure

8.4.1 Introduction

Ground failure is a general term that describes seismically induced, secondary, permanent ground deformation caused by strong ground motion, including. liquefaction, lateral spreading, ground lurching, seismic settlement of poorly consolidated materials (dynamic densification), differential materials response, sympathetic movement on weak bedding planes or non-causative faults, slope failures, and shattered ridge effects.

8.4.2 Liquefaction Potential

Much of the Utility Corridor is located within zones where investigation is required to evaluate liquefaction hazard, as designated on the State Seismic Hazard Maps for the Val Verde and Newhall Quadrangles. Potential for liquefaction at the site was estimated using data from the exploratory borings and CPT soundings described in the **Subsurface Exploration** section of this report, in conjunction with the historic high ground water depths listed in the **Ground Water** section of this report. Based on this information, laterally discontinuous layers of potentially liquefiable sand and silt are present along the proposed Utility Corridor.

In general, post-earthquake settlement that would be caused by liquefaction of in-situ soils within most of the proposed Utility Corridor is estimated to vary from negligible to as much as about 2 inches. Differential settlement that would be caused by earthquake shaking along a 30-ft long section of conduit or retaining wall within the proposed Utility Corridor is estimated to be no greater than one-half of the total post-earthquake settlement. The preceding earthquake-induced settlements should be added to settlement associated with raising of grade and loads applied by structures such as retaining walls.

The potential for ground lurching and lateral spreading is estimated to be low because materials with significant liquefaction potential at the project site are discontinuous and constitute a small percentage of the subsurface material.

8.4.3 Other Secondary Effects

Differential materials response may occur at locations where transitions between different materials, such as bedrock and alluvium, will be exposed at grade. Mitigation measures for transitions presented in the **Transitions** subsection of the **Earthworks Recommendations** section of this report should be implemented where this condition occurs.

No high or steep natural slopes will remain along the utility corridor following completion of the proposed grading. Therefore, the potential for shattered ridge effects is considered to be **negligible**. None of the existing slopes along the Utility Corridor south of Highway 126 are designated as zones of required investigation for earthquake-induced landslides on the Seismic Hazards Map for the Newhall and Val Verde Quadrangles. Based on the results of our pseudo-static (earthquake) analyses, potential for seismically-generated slope failures is considered to be **negligible** provided that our recommendations are implemented during design and construction of the Utility Corridor. No non-causative faults or weak bedding planes are known to exist below the portion of the proposed Utility Corridor studied for this report.

9.0 EARTHWORKS

9.1 Grading

All earthworks and grading shall be observed and tested by the Project Geotechnical Engineer, Engineering Geologist, and/or their authorized representatives, in accordance with the recommendations contained herein and in accordance with the requirements of the County of Los Angeles Building Code.

9.1.1 Site Preparation

The purpose of site preparation is to remove unsuitable materials from the project site and to grade the site to provide a firm base for compacted fill, utility lines, etc. All concrete pavement, undocumented artificial fill, rubble, vegetation, topsoil, organics, unconsolidated alluvium, slopewash, and soft or disturbed soils shall be removed from ground surfaces on which compacted fill will be placed. Deleterious material, including asphalt, concrete, vegetation, and organic material should be removed from the site.

Prior to placing fill, excavated areas shall be observed by the Geotechnical Engineer or his representative.

9.1.2 Removals

Our recommendations for removals in the proposed Utility Corridor are summarized below.

- Recommended removals within the proposed Utility Corridor are shown on the Geologic/Geotechnical Maps.
- The attached plans illustrate removals in the Landmark Village segment of the Utility Corridor. These removals are based on the remedial depths previously recommended in our Tentative Map Report (dated 9/9/2000), on subsequent liquefaction analyses, and on data obtained during this investigation. If the Utility Corridor is constructed prior to Landmark Village, the removals for the Utility Corridor should extend a horizontal distance beyond the corridor equal at least to the depth of the removal (so that future removals for Landmark Village will not be impeded by the constructed utility lines).
- In-situ density and moisture content of existing compacted fill along State Highway 126 should be evaluated by review of available Caltrans data and by testing in order to aid in deciding if mitigation earthworks are need prior to placing additional fill over the existing fill. All other undocumented artificial fill and slopewash should be removed and recompacted (see **Figure D1**).
- Trenches for the proposed utility lines should be excavated to the design depth of bedding material beneath the invert elevation of the utility lines. If soft soil conditions are encountered at the bottom of the trench, the condition of the trench subgrade should be mitigated in accordance with the Standard Specifications for Public Works Construction ("Green Book").
- Removals beneath pavement subgrade elevation of the proposed access/maintenance road are not required unless the density and moisture content of the subgrade does not satisfy the requirements of the roadway (see **Section 9.1.6** of this report).
- Removals beneath a footing that supports a retaining wall should extend at least to a depth beneath the footing equal to the width of the wall footing.

The estimates of potential static settlement (**Section 10.3**) and liquefaction-induced settlement (**Section 8.4.2**) provided herein are based on the preceding removal recommendations.

Removal recommendations for areas with cut-fill transitions are provided in **Section 9.1.5** of this report and removal recommendations for areas underlain by expansive materials are provided in the **Section 10.1** of this report.

The Mayo Spur, near the WRP site, may be developed in the future. Therefore, the removal recommendations provided in this report should be evaluated to ascertain if they are sufficient for the development contemplated at the Mayo Spur.

The attached plans note an easement for the potential Metrolink Rail Line. Removals needed for this rail line have not been assessed in this report.

9.1.3 Fill Materials

Onsite soil and rock materials generated by grading operations, excluding debris and organic matter, generally may be used in compacted fill. However, granular, low cohesion soils may not be suitable for the construction of fill slopes or stability fills. Rocks between 4 inches and 8 inches in dimension shall not compose more than 25 percent of any fill lift. Preliminary recommendations for on-site disposal of non-reducible rocks larger than 8 inches in dimension are provided in **Figure D2**.

9.1.4 Compaction

All fill material should be placed in horizontal lifts about 8 inches in thickness, moisture conditioned to enable compaction, and compacted to the specified percentage of Maximum Dry Density (MDD), per ASTM Test Method D1557. Fill placed deeper than 40 ft beneath finish grade should be compacted to at least 93 percent of MDD. Fill placed shallower than 40 ft beneath finish grade should be compacted to at least 90 percent of MDD.

9.1.5 Transitions

Differential settlements may occur where abrupt transitions from one material type to another underlie the proposed utility lines. Potential transition conditions include cut in bedrock or alluvium to fill, or cut in alluvium to cut in bedrock. Where these conditions are encountered in the utility trenches, it would be prudent to implement measures to minimize the potential for damage to the proposed pipelines from differential settlement. Mitigation options include the use of flexible joints and/or shallow overexcavation (less than 5 ft) across the transition and replacement with compacted fill.

9.1.6 Access/Maintenance Road

Providing pavement section recommendations for the access/maintenance road was not part of the scope of work for this report. However, it should be assumed that the preparation of the subgrade for the road will be standard, i.e., the subgrade will be prepared to at least 90 percent of Maximum Dry Density, per ASTM Test Method D1557 and that materials that do not meet this requirement will be removed and replaced with compacted fill. If local areas of soft material are encountered, it may be possible to bridge the soft material with gravel placed over a geogrid (in lieu of removal and replacement of the soft material with compacted fill).

9.2 Dewatering

Except near the east and west ends of the Utility Corridor, the elevation of the ground water surface observed during this investigation is deeper than the invert elevation of the proposed Trunk Sewer. However, the elevation of the historic high ground water surface is shallower than the invert elevation of the proposed Trunk Sewer in the majority of the Utility Corridor alignment. Therefore, it is expected that some dewatering will be required for construction of the Trunk Sewer.

9.3 Slope Stability

9.3.1 Cut Slopes

Daylighted bedding is expected to be exposed on the proposed cut slope located on Landmark Village, as illustrated in Cross Section 8-8'. Since the grading option associated with the Landmark Village has a steeper cut-slope gradient than the stand-

alone design, it is considered to be critical for slope stability. The factor of safety values calculated for this slope satisfy the minimum requirements of the County of Los Angeles. However, an equipment width stability fill is recommended for this cut slope because daylighted bedding conditions will still remain in the slope. A stability fill should also be constructed for the cut slope at cross section 10-10' because loose, older alluvium overlies bedrock at this location.

9.3.2 Fill Slopes

Proposed fill slopes, as steep as 2:1 (h:v) and up to 33 ft in height within the Utility Corridor, satisfy the minimum requirements for gross stability of the County of Los Angeles. Fill materials used in the face of all fill slopes and stability fills should have sufficient cohesion for surficial stability. Selective grading may be needed to obtain sufficiently cohesive soils from the generally granular, alluvial materials at the site. Fill slopes should be keyed into the native soils, as illustrated on Figure D5 (**Appendix D**).

9.4 Backdrains

A backdrain should be installed to prevent the buildup of water pressures behind constructed stability fills or sliver fill slopes. A recommended detail for this backdrain is shown in Figure D3, Stability/Buttress Fill and Backdrains (Appendix D).

9.5 Oil Wells and Water Wells

Six oil wells are reported in proximity to the proposed Utility Corridor, based on review of the Division of Oil, Gas and Geothermal Resources (DOGGR) Map no. 253. All of these wells appear to be outside of the area that will be directly impacted by proposed grading for the Utility Corridor. The locations of these oil wells should be verified and their abandonment status checked, if necessary. If any leaking or undocumented oil wells are encountered during grading operations, their locations should be surveyed and current well conditions evaluated immediately.

Oil Well Designation	Sheet No.	Approximate Station No.	Remarks
Texaco E&P Inc. 'NL&F'2	4	40+50	210' South of Proposed Trunk Sewer
Texaco E&P Inc. 'Newhall' 1	7	119+50	200' North of Proposed Trunk Sewer, in Highway 126
Exxon Mobil Corp 'NL&F' 50	7	129+50	350' North of Proposed Trunk Sewer
Exxon Mobil Corp 'NL&F' 2	8	146+00	250' South of Proposed Trunk Sewer
Exxon Mobil Corp 'NL&F' 9	9	165+50	275' South of Proposed Trunk Sewer

Based on review of Los Angeles County Flood Control District (LACFCD) water well data, water wells 6977D and 6976A were located in proximity to the proposed Utility Corridor. The locations of these wells should be verified in the field. If their location(s) conflict with the proposed alignment of the Utility Corridor, their abandonment should be verified in compliance with State and County guidelines.

9.6 Abandoned Railroad Line

A now abandoned railroad line was located along the south side of Highway 126 in proximity to the proposed Utility Corridor. Remnants of bridge abutments associated with San Martinez Grande Canyon, Chiquito Canyon and Castaic Creek still remain. These abutments and any associated pilings should be removed and any resulting holes properly backfilled prior to placement of compacted fill. It is our understanding based on discussions with Mr. Dean Francuch (who works part time with the railroad in Fillmore), that the bents (piles) associated with the train trestle at Castaic Creek were removed when the railroad was abandoned.

9.7 Shrinkage

Shrinkage (decrease in volume) of alluvium at the site when excavated and replaced as compacted fill (to an average of 92 percent of Maximum Dry Density) is estimated to be about 15 to 20 percent. This shrinkage estimate is approximate. Actual shrinkage will depend on the degree of compaction achieved during grading operations.

The Supervising Civil Engineer should design grades in the Utility Corridor with sufficient flexibility to accommodate a possible overage or shortage of fill of up to 10 percent of the total volume graded.

9.8 Channel Scour

The proposed Utility Corridor traverses San Martinez Grande Canyon, Chiquito Canyon and Castaic Creek. The western portion of the alignment is also located along the bank of the existing floodplain for the Santa Clara River. The potential for scour along these channels to impact either buried utilities or proposed fills should be evaluated by a qualified Civil Engineer and mitigation options implemented where appropriate.

10.0 UTILITY AND FOUNDATION RECOMMENDATIONS

10.1 Expansive Soil Considerations

Proposed utility lines will be underlain by Pico Formation bedrock, coarse-grained and fine-grained alluvium, and compacted fills derived from these soils. Expansion potential of fills derived from the coarse-grained alluvium is expected to be very low to low. However, expansion potential of the fine-grained alluvium, Pico Formation bedrock, and fill materials derived from these materials may be high. Pipes and associated structures that will be underlain by these potentially expansive soils should incorporate the following measures.

10.1.1 Utility Pipes

Soil and rock materials exposed at the bottom of trenches in which pipe will be installed should be observed by a representative of this firm. If these soils visually appear to be potentially expansive, Expansion Index (EI) testing should be performed. If the Expansion Index measured on a trench subgrade is 91 or higher, the following recommendations should be used.

- If the bottom of a trench is less than 6 ft beneath finish grade, the bottom of the trench should be excavated to at least 6 ft below the proposed finished grade and the excavated expansive material should be replaced with non-expansive compacted fill or with concrete grout.
- If the bottom of a trench is greater than 6 ft beneath finish grade, trench bottoms should be maintained in a moist condition for 24 hours prior to placing bedding material for the pipe.

The preceding recommendations apply to utilities trenches shallower than about 15 ft. No special measures to mitigate soil expansion for utility pipes installed deeper than about 15 ft.

10.1.2 Foundations for Structures

Expansion potential of soil subgrades that will support foundations for structures other than pipes should be observed and tested on a location-specific basis. If the Expansion Index measured on these soils is 91 or higher, at least 8 ft of soil/rock beneath the foundation/structure bottom should be removed and replaced with non-expansive compacted fill.

10.2 Corrosive Soils Considerations

Applicability of the following corrosion mitigation recommendations should be checked during construction by means of corrosivity testing of subgrade materials and fill soils.

10.2.1 Recommendations for Concrete

Based on the sulfate content measured on samples of shallow alluvial soil from the project site, corrosivity of site soils to concrete classifies as **negligible** (per UBC). Conventional Type I or II Portland Cement may be used in concrete that will be in contact with these soils. However, fine-grained alluvial soils and bedrock with severe corrosivity to concrete have been encountered at project sites located adjacent to the proposed Utility Corridor. Therefore, sulfate content testing of subgrades and fill soils should be performed during construction. If a sulfate content of 0.1% or higher is measured, the cement type, the water-cement ratio, and the concrete cylinder strength of concrete in contact with the soil should satisfy the requirements of Table 19-A-4 of the 1998 edition of the California Building Code.

10.2.2 Recommendations for Reinforced Concrete Pipe (RCP)

Based on the pH measured in shallow alluvial soils in the proposed Utility Corridor, standard concrete cover over reinforcing steel may be used for reinforced concrete pipe in accordance with Section 854.1 of the Caltrans Highway Design Manual. Cast pipe wall thickness shall satisfy requirements of Section 207.2.3 of the 2003 edition of Standard Specifications for Public Works Construction.

10.2.3 Recommendations for Ferrous Metals (Other Than Reinforcement in RCP)

Corrosivity of site soils to ferrous metals should be mitigated using the following recommendations:

- Steel and wire concrete reinforcement of structures cast against site soils should have at least 3 inches of concrete cover. Reinforcement in precast structures that will be in contact with soil should have at least 2 inches of cover.
- Ferrous materials and utilities should be protected with a high quality coating, such as tape over primer per AWWA Standard C209 or C203, extruded polyethylene, hot-applied coal tar enamel, Portland Cement mortar, or as recommended by the pipe manufacturers.
- Below-grade ferrous metals should be electrically insulated (isolated) from above-grade metals, by means of dielectric fittings in utilities and exposed metal structures which extend from below-grade to above-grade.

10.3 Static Settlement

The proposed pipelines will be installed over compacted fill, loose to dense alluvium, and/or bedrock, and the only significant static load that will be applied to the pipelines is the overburden load associated with the trench backfill. Therefore if removals and placement of fill are performed as recommended herein, total static settlement in localized areas along the pipe alignments is expected to be less then 1-inch over a horizontal distance of 30 ft.

Additional potential settlement at transitions between different types of foundation materials and at locations where fill thickness transitions from shallow to deep over a relatively short horizontal distance should be mitigated by use of flexible pipe and/or flexible pipe joints at the transition locations.

10.4 Pipe "D" Load

For the design of a rigid conduit, the computed loads (dead and live) are modified to account for bedding conditions and relate maximum allowable load to the three-edge bearing "D" load test. A density of 130 pcf may be used for calculation of design "D" loads.

10.5 Preliminary Parameters for Design of Retaining Walls

No retaining walls are shown on the 30% Submittal Plans for the proposed Utility Corridor. The following sections of this report provide **preliminary** recommendations for design and construction of free-standing retaining walls. Revised recommendations for retaining walls may be required depending on the locations and dimensions selected for these structures.

10.5.1 Retaining Wall Foundation

Footing foundations of retaining walls for this project should be supported on clean, non-deleterious, competent compacted fill. Earth materials exposed at the bottom of a retaining wall footing should be observed by the Geotechnical Engineer/Engineering Geologist, or his representative. If earth materials in the bottom of a wall footing excavation appear to be disturbed, they should be removed and replaced with compacted fill.

Removals and replacement with compacted fill beneath the footing of a retaining wall should extend at least to a depth beneath the footing equal to the width of the footing.

The net static pressure that retaining wall footings may apply to fill subgrades that have been compacted at least to 90 percent of Maximum Dry Density (per ASTM Test Method D1557) is 1500 psf. This allowable bearing pressure assumes that the wall footings will be at least 2 ft wide and will be embedded at least 1 ft below the lowest adjacent grade.

10.5.2 Retaining Wall Design Parameters

The equivalent fluid density values in the following table should be used to estimate the static active lateral pressures that compacted on-site granular backfill soils will apply against the proposed retaining walls. Clayey, fine-grained soils should not be used for backfill of retaining walls.

BACKFILL SLOPE (HORIZONTAL TO VERTICAL)	EQUIVALENT FLUID DENSITY (PCF)
Level	40
2:1	65

Equivalent fluid density values for retaining walls with backfill inclinations between level and 2:1 (h:v) may be estimated by interpolation between the values provided in the preceding table.
Drainage should be provided on the backfill side of retaining walls to prevent buildup of water pressure.

The County of Los Angeles requires retaining walls higher than 12 feet to be designed for the lateral backfill pressure that would be produced by future earthquake shaking (in addition to static lateral soil pressure and water pressure). The additional pseudo-static lateral backfill pressure, $\Delta\sigma_h$, applied against the walls by earthquake shaking may be calculated assuming that $\Delta\sigma_h$ varies linearly between the bottom of the footing of the wall and the top of the backfill adjacent to the wall, as follows:

ELEVATION OF $\Delta\sigma_h$	$\Delta\sigma_h$ [PSF]
Bottom of retaining wall footing	0
Height above bottom of retaining wall footing, Z	40 * Z
[Z] = feet	

When calculating $\Delta\sigma_h$, the height Z should be measured upwards from the bottom of the foundation that supports the walls.

The active pressure and $\Delta\sigma_h$ should be assumed to act parallel to the backfill slope of the retained soil.

Additional lateral surcharge pressure should be included in wall design if the horizontal distance between the wall and traffic or material stockpiles is less than the height of the wall. Pressure due to any surcharge loads from adjacent footings, traffic, etc., should be analyzed separately and can be provided upon request.

Static lateral loads on foundations may be designed to be resisted by passive earth pressures and sliding friction. Passive earth pressure may be estimated using an

equivalent fluid density of 200 pounds per cubic foot and sliding friction may be estimated by multiplying the wall dead load by a friction coefficient of 0.2. These equivalent fluid density and friction coefficient values, which include a factor of safety of 1.5, may be used concurrently without reduction. Passive pressure should be neglected in the top 12 inches of embedment of the wall footings.

10.5.3 Retaining Wall Construction Provisions

Retaining walls should be provided with a freeboard of at least 6 inches and a standard surface backdrain swale (see **Figure D4** in **Appendix D**). All drainage should flow to the toe of the adjacent slope using non-erodible devices. In order to reduce infiltration of surface water behind retaining walls, the surface backdrain swale should be paved or the surface of the backfill covered with at least 12 inches of compacted clayey (relatively impermeable) fill for a horizontal distance equal at least to the height of the wall.

A subdrain system should be provided to prevent development of hydrostatic pressures behind retaining walls. **Figure D4** shows a recommended retaining wall drainage detail, with specifications for drainage materials behind the walls.

At locations where moisture migration through walls is undesirable, the side of the wall in contact with the backfill soils should be waterproofed. A vertical joint should be constructed in the wall at locations where the foundation crosses materials transitions (e.g., from compacted fill to bedrock).

Equipment used for compaction of backfill within 8 ft of retaining walls should be limited to hand-guided or walk-behind tampers. Use of heavier equipment for compacting backfill should be limited to areas at least 8 ft from retaining walls. If these precautions cannot be maintained, then the affected retaining walls should be braced to support the higher load during placement and compaction of backfill.

10.5.4 Retaining Wall Backfill

Retaining wall backfill to be certified by this office must be placed in accordance with the recommendations presented in this report and observed and tested by our personnel during placement. Under no circumstances will retaining wall backfill be certified by this office if our recommendations concerning backfill placement are not followed, or if our personnel do not observe installation of backdrains and test the backfill during

placement. A recommended retaining wall drainage detail is illustrated on **Figure D4** – Retaining Wall Drainage Detail.

10.6 Temporary Construction Excavations

10.6.1 Alluvial Soils

Interbedded, horizontally discontinuous layers of coarse-grained alluvial soils and fine-grained alluvial soils are present along the alignment of the proposed Utility Corridor. Also, ground water as shallow as 5 to 10 ft beneath existing grade may be present at some locations within the alignment during installation of utilities in trenches.

The following recommendations for temporary construction excavations in alluvial soils are general in nature. Supplemental, specific recommendations may be required depending on conditions observed during construction. "Temporary" refers to a period no longer than one day for granular soils, and up to 30 days for cohesive soils. Temporary excavations deeper than **3.5** ft should conform to **safety** requirements for excavations as set forth in the State Construction Safety Orders (State Division of Industrial Safety, CAL-OSHA). Temporary excavations less than 3.5 ft in depth may be vertical. The bottom 3.5 ft of temporary excavations between depths of 3.5 and 20 ft may be vertical and the upper portion of the excavations should be no steeper than 1.5:1 (h:v). Depending on soil conditions and the depth of groundwater, excavations in this depth range may need to be shored. Excavations deeper than 20 ft should be reviewed by the Project Civil Engineer. **Excavation walls of granular soils and/or dry soils should be kept <u>moist</u> at all times.**

Surcharge loads should be kept a horizontal distance of at least 5 ft or half the excavation depth (whichever is greater) from the top of temporary excavations.

Some sloughing from granular soils may occur. **Workers should be adequately protected from such sloughing, i.e., using movable shields/shoring.** Surface drainage should be controlled along the top of the slope to prevent **excessive wetting** of the soils.

10.6.2 Bedrock

Temporary excavations in bedrock may be as steep as 1:1. If favorable bedrock conditions are observed in the excavations by the Project Geologist during construction operations, steeper excavations in bedrock may be possible.

10.7 Bedding and Shading Backfill

All trench excavations should be examined by the project Geotechnical Engineer or his representative prior to placement of bedding material. Bases of excavations or trenches should be firm and unyielding prior to construction of foundations or installation of utility lines.

Future utility lines, including storm drain, sanitary sewer, water and gas, should be supported on a layer of selected granular bedding material beneath the pipe. Bedding and shading material around the pipe should consist of uniformly-graded sand or gravel with a Sand Equivalent (SE) of at least 30. To facilitate placement and compaction of the bedding, shading and clearance at spring line of pipes to trench walls should be in accordance with the current edition of the Los Angeles County Department of Public Works Standard Plans. All cobbles, boulders, and soft, loose, or disturbed soil at the bottom of trenches should be excavated and replaced with suitable bedding material.

On-site soils generally do not meet the Sand Equivalent (SE) requirements for bedding and shading materials. Therefore, Sand Equivalent testing should be performed to assess suitability of all materials proposed for use as bedding and shading materials.

10.8 Trench Backfill

On-site materials other than topsoil or soil with roots or deleterious materials may be used for trench backfill that will be placed over shading backfill. Cobbles and boulders larger than 3 inches in largest dimension should not be used in trench backfill. Backfill shall be spread in lifts no thicker than 8 inches, water-conditioned as required to enable compaction, and compacted to at least 90 percent of Maximum Dry Density, per ASTM Test Method D1557. At depths greater than 40 ft beneath design grade, backfill should be compacted to at least 93 percent of Maximum Dry Density. In difficult to compact places, cement slurry, pea gravel, or lean concrete may be used as backfill. Densification

(compaction) of backfill may be performed by mechanical compaction, jetting, or a combination of the two methods, as long as the required compaction is obtained.

Jetting may be used for on-site clean granular soils or imported sand, provided the soils have a Sand Equivalent greater than or equal to 30, per ASTM Test Method D2419.

Trench backfill should be placed in accordance with the recommendations presented in **Appendix D** of this report, in the Standard Specifications for Public Works Construction "Greenbook", and in the Los Angeles County Additions and Amendments to the Standard Specifications for Public Works Construction "Graybook". A representative of our firm should monitor and test the placement and compaction of backfill in trenches.

Any imported soils should be evaluated and tested by our firm prior to use. Imported soils should consist of material with an Expansion Index less than 30, and should be free of contaminants, organics, rubble, and rocks larger than 3 inches in largest dimension.

11.0 SECTION 111 STATEMENT

In compliance with Section 111 of the Los Angeles County Building Code, it is the finding of this firm that the proposed Utility Corridor, designated on the attached Geologic/Geotechnical maps (Sheets 3 thru 10 and 6a thru 9a), will be safe against hazards from landslide, settlement, or slippage and will not adversely affect offsite property, provided that all of our recommendations are followed and implemented during construction.

12.0 CONSTRUCTION OBSERVATIONS

All excavation bottoms and shoring installations for the proposed Utility Corridor should be observed by a representative of this firm prior to placement of bedding and installation of utility lines in order to verify that the pipes are founded on satisfactory material and that excavations are free of loose and disturbed soils. If variations in subsurface soil conditions become evident during construction, the recommendations presented herein may require revision. Placement and compaction of all backfill should be observed and tested by this office.

Please notify this office at least 48 hours in advance of any required sampling or observations, so that the appropriate personnel can be made available.

13.0 PLAN REVIEW

Allan E. Seward Engineering Geology, Inc. (AESEGI) should be retained to review grading plans, utility plans, and specifications of this project for conformance with the recommendations provided in this report. Grades of proposed utility lines, recommended removal depths, and construction details should be added to the Grading Plans. This office is required to review and approve the Grading Plans by manual signatures and date.

AESEGI should also be retained to perform on-site construction observation and testing to ascertain that conditions at the project site are consistent with the findings and conclusions presented in this report and that construction operations are performed in accordance with the recommendations presented in this report. If variations in subsurface soil conditions become evident during construction, the recommendations presented in this report may warrant revision.

The geotechnical and geological consultants should be retained to perform the testing and observation recommended in this report, including the following tasks:

1. Observation and testing of fill bottoms following excavation (and before any scarification, recompaction, and fill placement).

2. Observation and testing of all fill placement.

3. Observation and testing of utility trenches.

Please notify this office at least 48 hours in advance of the tasks listed above so that appropriate personnel can be made available to observe and test earthworks.

14.0 GEOLOGIST/GEOTECHNICAL ENGINEER OF RECORD

This report has been prepared assuming that all required geologic and geotechnical field inspections and observations will be performed by Allan E. Seward Engineering Geology, Inc. If these tasks are performed by another party, that party must review this report, assume full responsibility for recommendations contained herein, and assume the title and responsibility of "Geologist/Geotechnical Engineer of Record" for the specific work.

A representative of the Geologist/Geotechnical Engineer of Record shall be present to observe all grading operations. All excavations for footing foundations, such as footings of retaining walls, shall be observed by a representative of the Geologist/Geotechnical Engineer of Record prior to placing steel or casting concrete in the excavations. A report that presents results of these observations and related testing shall be issued at the end of grading operations using an As-Built Map as a base.

15.0 LIMITATIONS

This report has been prepared by Allan E. Seward Engineering Geology, Inc. for the exclusive use of The Newhall Land and Farming Company and their design consultants for the specific site discussed herein. This report should not be considered transferable. Prior to use by others, this firm must be notified, as additional work may be required to update this report.

In the event that any modification in the location or design of the proposed development is planned, the conclusions and recommendations contained in this report will require a written review by this firm with respect to the planned modifications.

The proposed development is located in southern California, a geologically and tectonically active region, where large magnitude, potentially destructive earthquakes are common. Therefore, ground motions from moderate or large magnitude earthquakes could affect the project site during the design life of the proposed structure(s).

Typically, faulting is confined to the area adjacent to a known fault. However, absolute assurance against future fault displacement is not possible in tectonically active regions because new faults can form over time as the orientation and magnitude of deformational forces change in the earth's crust. Therefore, the location and magnitude of new ground surface ruptures during a seismic event cannot be anticipated.

In performing these professional services, this firm has used the degree of care and skill ordinarily exercised under similar circumstances by reputable geologists and geotechnical engineers practicing in this or similar localities. The data presented in this report are based on results of pertinent field and laboratory testing. It should be recognized that subsurface conditions can vary in time, and laterally, and with depth at a given site. Since the conclusions and recommendations presented in this report are based on our observations and testing, our **conclusions** and **recommendations** are **professional opinions** and are **not**

meant to be a control of nature. Therefore, we make no other **warranty** either **expressed** or **implied.**

This report may not be duplicated without the written consent of this firm.

This opportunity to be of service is appreciated. If you have any questions regarding this report, please contact us.

Respectfully submitted,

Eric J. Seward, CEG 2110
Principal Engineering Geologist
Vice President

Martin J. Goodman, GE 2146
Principal Geotechnical Engineer

PROFESSIONAL GEOLOGIST
ERIC J. SEWARD
No. 2110
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
MARTIN J. GOODMAN
No. 2146
03-31-09
EXPIRES
GEOTECHNICAL
STATE OF CALIFORNIA

The following attachments and appendices complete this report.

Location Map Following Page 4
References

APPENDIX A – Subsurface Logs
Hollow-Stem-Auger Boring Logs and Key to Symbols
- HS-1U through HS-22U
- HS-7, HS-12
- HS-25HS
- HS-1B

Rotary-Wash Boring Logs
- RW-5U
- RW-14

Bucket-Auger Boring Logs
- BA-1R, BA-3R and B-1W through B-3W

CPT Soundings
- CPT-10, -11, -16, -24, -28, -62, -64, -90, -91 -120, -121, -125, -126, and -128
- CPT-63HS

APPENDIX B – Geotechnical Laboratory Investigation and Test Results
- Geotechnical Laboratory Investigation Summary
- Expansion Index — Table B1
- Corrosion Test Results on Soil Samples — Table B2
- Liquid and Plastic Limits Test Report — Figure B1
- Compaction Test Reports — Figures B2.1 thru B2.3
- Consolidation Test Reports — Figures B3.1 thru B3.15
- Direct Shear Test Reports — Figures B4.1 thru B4.4

APPENDIX C – Slope Stability Analyses
- Slope Stability Analyses Results — Table C1
- Slope Stability Diagrams and Data Sheets for Runs 1 through 4

APPENDIX D – General Specifications and Figures

APPENDIX E – Cross Sections and Plans (In-Pockets)
- Cross Sections 1-1' through 11-11'
- Cover Sheet and Notes Sheets — **Sheets 1 and 2**
- Utility Plans – WRP Site to Travel Village, with Geologic/Geotechnical Mapping — **Sheets 3 through 10**
- Utility Plans – Travel Village to WRP No. 32 — **Sheets 11 through 15**
- Utility Plans – Stand-Alone alternative for VTT 53108, with Geologic/Geotechnical Mapping — **Sheets 6a through 9a**

Distribution: (2) The Newhall Land and Farming Company
Attn: Mr. Dennis Mak
(3) Psomas
1 - Attn: Mr. Matt Heideman
2 - Attn: Sanitation District of Los Angeles County

REFERENCES

Published

Barrows, A.G., 1986, Landslide hazards in the east 1/2 of the Val Verde Quadrangle, Los Angeles County, California: California Division of Mines and Geology Open-File Report 86-9LA, Map Scale 1:24,000.

Blake, T.F., 2000, FRISKSP - Version 4.0: A computer program for the probabilistic estimation of peak acceleration and uniform hazard spectra using 3-D faults as earthquake sources: Thomas F. Blake, Computer Services and Software.

Blake, T.F., 1999, EQSEARCH: A computer program for the estimation of peak horizontal acceleration from California historical earthquake catalogs: Thomas F. Blake, Computer Services and Software.

Boore, D.M., Joyner, W.B., and Fumal, T.E., 1997, Equations for estimating horizontal response spectra and peak acceleration from western North American earthquakes: A summary of recent work: Seismological Research Letters, v. 68, no. 1, p. 128-153.

Campbell, K.W., 1997, Empirical near-source attenuation relationships for horizontal and vertical components of peak ground acceleration, peak ground velocity, and pseudo-absolute acceleration response spectra: Seismological Research Letters, v. 68, no. 1., p. 154-179.

CDCDMG, 1997, Guidelines for evaluating and mitigating seismic hazards in California: California Department of Conservation Division of Mines and Geology Special Publication 117.

Dibblee, T.W., Jr., 1993, Geologic map of the Val Verde Quadrangle, Los Angeles and Ventura Counties, California: Dibblee Geological Foundation, Map DF-50.

Hart, E.W., 1999, Fault-rupture hazard zones in California: California Division of Mines and Geology Special Publication 42, 24 p.

Jennings, C.W., 1988, Fault map of California with locations of volcanoes, thermal springs, and thermal wells: California Division of Mines and Geology, Geologic Data Map No. 1, 4th Printing.

Kew, W.S.W., 1924, Geology and oil resources of a part of Los Angeles and Ventura Counties, California: U.S. Geological Survey Bulletin 753, 202 p.

Leighton and Associates, Inc., 1990, L.A. County General Plan - Safety Element, including Technical Appendices: Volumes 1 and 2.

Martin, G.R., and Lew, M, 1999, Recommended procedures for implementation of DMG Special Publication 117 - Guidelines for analyzing and mitigating liquefaction hazards in California: Southern California Earthquake Center, 63p.

Morton, D.M., 1976, Reconnaissance surficial geologic maps of the Newhall, Oat Mountain, Santa Susana and Val Verde 7.5' Quadrangles, Los Angeles and Ventura Counties, southern California: U.S. Geological Survey Open File Map 76-211.

Peabody, A.W., 1969, Principles of cathodic protection, Chapter 5, NACE Corrosion Course: National Academy of Corrosion Engineers

Petersen, M.D., Bryant, W.A., Cramer, C.H., Cao, T., Reichle, M.S., Frankel, A.D., Lienkaemper, J.J., McCrory, P.A., and Schwartz, D.P., 1996, Probabilistic seismic hazard assessment for the State of

REFERENCES

California: California Department of Conservation Division of Mines and Geology Open-File Report 96-08, 33 p.

Real, C.R., Toppozada, T.R., and Parke, D.L., 1978, Earthquake epicenter map of California, showing events from 1900 through 1974 equal to or greater than magnitude 4.0 or intensity V: California Division of Mines and Geology Map Sheet 39.

Robson, S.G., 1972, Water-resources investigation using analog techniques in the Saugus-Newhall area, Los Angeles County, California: U.S. Geological Survey Open-File Report 3, 58 p.

Sadigh, K., Chang, C.Y., Egan, J.A., Makdisi, F., and Youngs, R.R., 1997, Attenuation relations for shallow crustal earthquakes based on California strong motion data: Seismological Research Letters, v. 68, no. 1, p. 180-189.

Stein, R.S., and Yeats, R.S., 1989, Hidden earthquakes, Scientific American, v. 260, no. 6, p. 48-57.

Stewart, J.P. et al., 1994, Preliminary report on the principal geotechnical aspects of the January 17, 1994 Northridge Earthquake: EERC, U.C. Berkeley, Report No. UCB/EERC-94/08, 245 pages.

Uniform Building Code (UBC), 1997.

Wells, D.L., and Coppersmith, K.J., 1994, New empirical relationships among magnitude, rupture length, rupture area, and surface displacement: Bulletin of the Seismological Society of America, v. 84, no. 4, p. 974-1002.

Winterer, E.L., and Durham, D.L., 1962, Geology of southeastern Ventura Basin, Los Angeles County, California: U.S. Geological Survey Professional Paper 334-H, p. 275-366.

Yeats, R.S., McDougal, J.W., and Stitt, L.T., 1985, Cenozoic structure of the Val Verde 7.5 minute Quadrangle and south half of the Whitaker Peak 7.5 minute Quadrangle, California: U.S. Geological Survey Open-File Report 85-587, 32 p.

Yerkes, R.F., and Campbell, R.H., 1995, Preliminary geologic map of the Val Verde 7.5' Quadrangle, southern California: U.S. Geological Survey Open-File Report 95-504.

Youd, T.L, and Idriss, I.M., eds., 1997, Proceedings of the NCEER workshop on evaluation of liquefaction resistance of soils: National Center for Earthquake Engineering Research Technical Report NCEER-97-0022, 276 p.

Ziony, J.I., and Jones, L.M., 1989, Map showing late Quaternary faults and 1978-84 seismicity of the Los Angeles region, California: Miscellaneous Field Studies Map, MF 1964, scale 1:250,000.

REFERENCES

By Allan E. Seward Engineering Geology, Inc.

1. **GEOLOGIC AND GEOTECHNICAL REPORT**
   Vesting Tentative Tract 53108, Dated 6/11/00
   River Village – Newhall Ranch
   Castaic, California
   Dated September 9, 2000 – JN: 00-1702R-4

2. **PRELIMINARY GEOLOGIC/GEOTECHNICAL REPORT**
   Proposed Water Reclamation Plant
   Newhall Ranch Project
   Castaic, California
   Dated June 10, 2004 – JN: 04-1707-1

3. **GEOLOGIC AND GEOTECHNICAL REPORT**
   Review of Vesting Tentative Tract Map 060678 (Dated 8/3/05)
   Vesting Tentative Tract 060678
   Homestead
   Newhall Ranch, California
   Dated September 30, 2005 - Job No: 05-2062-4

Appendix A

DRILL HOLE LOG

CLIENT:	The Newhall Land & Farming Company	JOB NO.:	07-2079 (0)
PROJECT:	Utility Corridor	DATE:	5/25/07
		LOGGED BY:	BMW
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	2/20/07
DRILLING METHOD:	Hollow-Stem Auger	HOLE DIA:	8"
HAMMER TYPE:	Automatic	AVERAGE DROP:	30"
DRIVING WEIGHTS:	140 lbs	ELEVATION:	882'

BORING NO. HS-1U

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY OLDER ALLUVIUM; Qoa (0 - 40')**				
		9		CL-ML	@ 3' Silty CLAY; firm; damp to moist; brown	9.0	105		
				ML	@ 4' Sandy SILT; firm; damp to moist; yellowish brown				
5		10				19.8	100		
10		6		CL	@ 9' Lean CLAY with sand; firm; moist; yellowish brown			84	
		9			@ 12' - no sand; firm; damp; brown; caliche	31.2	89		
15		11		SM	@ 16' Silty SAND; loose; moist; yellowish brown	22.0	85		
20		53		SP	@ 20' Poorly graded SAND with gravel; dense; moist; brownish yellow	3.0	123		
25		22		SM	@ 25' Silty SAND; medium dense; wet; yellowish brown				
30		20		SP	@ 30' Poorly graded SAND; medium dense; wet; brown; clay interbeds				
35		12							

DRILL HOLE LOG

CLIENT:	The Newhall Land & Farming Company	JOB NO.:	07-2079 (0)
PROJECT:	Utility Corridor	DATE:	5/25/07
		LOGGED BY:	BMW
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	2/20/07
DRILLING METHOD:	Hollow-Stem Auger	HOLE DIA:	8"
HAMMER TYPE:	Automatic	AVERAGE DROP:	30"
DRIVING WEIGHTS:	140 lbs	ELEVATION:	882'

BORING NO. HS-1U

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40		50/5"		SP-SM	@ 40' Poorly graded SAND with silt; very dense; wet; yellowish brown	9.9	126		
					TOTAL DEPTH 40' (Elev. 842') Ground Water @ 25'				
45									
50									
55									
60									
65									
70									
75									

DRILL HOLE LOG

CLIENT:	The Newhall Land & Farming Company
PROJECT:	Utility Corridor
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem Auger
HAMMER TYPE:	Automatic
DRIVING WEIGHTS:	140 lbs
JOB NO.:	07-2079 (0)
DATE:	5/25/07
LOGGED BY:	BMW
DRILLED:	2/20/07
HOLE DIA:	8"
AVERAGE DROP:	30"
ELEVATION:	878'

BORING NO. HS-2U

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY OLDER ALLUVIUM; Qoa (0 - 30')** @ 0 - 10' Bulk sample				
		25		CL-ML	@ 3' Silty CLAY; stiff; moist; brownish yellow	8.1	102		
5		15		CL-ML	@ 6' - damp; yellowish brown	19.2	90	85	Consol
10		22		SC-SM	@ 9' Silty, clayey SAND; medium dense; damp; yellowish brown	16.8	104		Consol
		7		ML	@ 12' Sandy SILT; firm; damp; yellowish brown				
15		46		SP-SM	@ 15' Poorly graded SAND with silt; medium dense; moist; yellowish brown	3.5	121		
20		21			@ 20' - wet				
25		28		SP	@ 25' Poorly graded SAND; medium dense; wet; yellowish brown				
30		33			@ 30' - with gravel; wet				
					TOTAL DEPTH 30' (Elev. 848') Ground Water @ 20'				
35									

DRILL HOLE LOG

CLIENT:	The Newhall Land & Farming Company
PROJECT:	Utility Corridor
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem Auger
HAMMER TYPE:	Automatic
DRIVING WEIGHTS:	140 lbs
JOB NO.:	07-2079 (0)
DATE:	5/25/07
LOGGED BY:	BMW
DRILLED:	2/20/07
HOLE DIA:	8"
AVERAGE DROP:	30"
ELEVATION:	875'

BORING NO. HS-3U

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY ALLUVIUM; Qal (0 - 25')**				
		15		CL-ML	@ 3' Silty CLAY; stiff; damp; yellowish brown	5.3	105		
				SP-SM	@ 4' Poorly graded SAND with silt; loose; damp; yellowish brown				Consol
5		21		SP-SM	@ 6' - medium dense; damp; yellowish brown	5.6	111		Consol Shear Test
10		11		SM	@ 9' Silty SAND; medium dense; damp; yellowish brown				
		50		SP	@ 12' Poorly graded SAND; medium dense; wet; yellowish brown; rock in tip of sampler	15.6	123		
15		33		SP-SM	@ 15' Poorly graded SAND with silt; dense; wet; yellowish brown				
20		12		SM	@ 20' Silty SAND; medium dense; wet; yellowish brown				
25		50/5"		SP-SM	**QUATERNARY OLDER ALLUVIUM?; Qoa? (25 - 30')** @ 25' Poorly graded SAND with silt; dense; wet; yellowish brown	13.0	122		
30		47							
					TOTAL DEPTH 30' (Elev. 845') Ground Water @ 11'				
35									

DRILL HOLE LOG

CLIENT:	The Newhall Land & Farming Company
PROJECT:	Utility Corridor
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem Auger
HAMMER TYPE:	Automatic
DRIVING WEIGHTS:	140 lbs
JOB NO.:	07-2079 (0)
DATE:	5/25/07
LOGGED BY:	BMW
DRILLED:	2/21/07
HOLE DIA:	8"
AVERAGE DROP:	30"
ELEVATION:	902'

BORING NO. HS-4U

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY OLDER ALLUVIUM; Qoa (0 - 30')**				
		10		CL-ML	@ 3' Silty CLAY with sand; firm; damp; brownish yellow	6.5	94	84	
5		12		SM	@ 6' Silty SAND; loose; damp; brownish yellow				
10		11				8.5	97		
		7							
15		20			@ 15' - medium dense; reddish brown	5.6	109		
20		9			@ 20' - loose; brown				
25		19			@ 25' - medium dense; reddish brown; mixed with silty clay	11.5	112		
30		31		SP-SM	@ 30' Poorly graded SAND with silt; dense; dry to damp; brownish yellow				
					TOTAL DEPTH 30' (Elev. 872') No Ground Water				
35									

DRILL HOLE LOG

CLIENT:	The Newhall Land & Farming Company
PROJECT:	Utility Corridor
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem Auger
HAMMER TYPE:	Automatic
DRIVING WEIGHTS:	140 lbs
JOB NO.:	07-2079 (0)
DATE:	5/25/07
LOGGED BY:	BMW
DRILLED:	2/21/07
HOLE DIA:	8"
AVERAGE DROP:	30"
ELEVATION:	899'

BORING NO. HS-5U

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY OLDER ALLUVIUM; Qoa (0 - 30')**				
		12		CL-ML	@ 3' Silty CLAY; firm; dry to damp; light brownish yellow; voids	6.0	90		
5		11		CL	@ 6' Lean CLAY with sand; firm; dry to damp; brownish yellow	14.1	90	78	
		13		SM	@ 9' Silty SAND; loose; damp; yellowish brown	9.1	103		
10		6							
15		15		CL-ML	@ 15' Silty CLAY; stiff; moist; yellowish brown	15.0	97	86	
20		17		SM	@ 20' Silty SAND; medium dense; damp; brown; clay interbeds				
25		28		SP	@ 25' Poorly graded SAND; medium dense; wet; yellowish brown; bluish gray clay interbeds	10.3	118		
30		43		SP-SM	@ 30' Poorly graded SAND with silt; dense; wet; yellowish brown				
					TOTAL DEPTH 30' (Elev. 869') Ground Water @ 24'				
35									

LABORATORY TESTS

DRILL HOLE LOG

CLIENT:	The Newhall Land & Farming Company
PROJECT:	Utility Corridor
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem Auger
HAMMER TYPE:	Automatic
DRIVING WEIGHTS:	140 lbs
JOB NO.:	07-2079 (0)
DATE:	5/25/07
LOGGED BY:	BMW
DRILLED:	2/20/07
HOLE DIA:	8"
AVERAGE DROP:	30"
ELEVATION:	893'

BORING NO. HS-6U

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY OLDER ALLUVIUM; Qoa (0 - 30')** @ 0 - 10' Bulk sample				
		16		SM	@ 3' Silty SAND; loose; damp; brownish yellow; poorly graded sand interbeds	2.7	115		
5		8		ML	@ 6' Sandy SILT; firm; damp; brownish yellow	24.4	90		
10		10		CL-ML	@ 9' Silty CLAY; firm; damp; olive brown	26.7	89		
		10		SM	@ 12' Silty SAND; loose; moist; dark gray				
15		37		SP-SM	@ 15' Poorly graded SAND with silt; medium dense; wet; bluish gray	9.7	126		
20		24			@ 20' - yellowish brown				
25		47/8"		SP	@ 25' Poorly graded SAND; dense; wet; brownish yellow				
30		54		SP-SM	@ 30' Poorly graded SAND with silt; dense; wet; yellowish brown				
					TOTAL DEPTH 30' (Elev. 863') Ground Water @ 13'				
35									

DRILL HOLE LOG

CLIENT:	The Newhall Land & Farming Company
PROJECT:	Utility Corridor
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem Auger
HAMMER TYPE:	Automatic
DRIVING WEIGHTS:	140 lbs
JOB NO.:	07-2079 (0)
DATE:	5/25/07
LOGGED BY:	BMW
DRILLED:	2/21/07
HOLE DIA:	8"
AVERAGE DROP:	30"
ELEVATION:	914'

BORING NO. HS-7U

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY OLDER ALLUVIUM; Qoa (0 - 15')**				
		12		CL-ML	@ 3' Sandy silty CLAY; firm; moist; brown	9.2	121	50	
5		45		SM	@ 6' Silty SAND; medium dense; damp; light brown; significant pebbles of larger size	3.7	135		
10		60		SW-SM	@ 9' Well-graded SAND with silt and gravel; very dense; dry to damp; light brown to brown				
		ref/3"			@ 12' very dense; dry to damp; brownish yellow				
15		87/11"			**BEDROCK; TQs (15 - 25')** @ 15' Silty sandstone; very dense; dry to damp; brownish yellow				
20		ref/6"				13.9	113		
25		50/5"			@ 25' - damp; light greenish gray				
					TOTAL DEPTH 25' (Elev. 889') No Ground Water				
30									
35									

DRILL HOLE LOG

CLIENT:	The Newhall Land & Farming Company
PROJECT:	Utility Corridor
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem Auger
HAMMER TYPE:	Automatic
DRIVING WEIGHTS:	140 lbs
JOB NO.:	07-2079 (0)
DATE:	5/25/07
LOGGED BY:	BMW
DRILLED:	2/21/07
HOLE DIA:	8"
AVERAGE DROP:	30"
ELEVATION:	905'
BORING NO.	HS-8U

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY OLDER ALLUVIUM; Qoa (0 - 30')**				
		8		SM	@ 3' Silty SAND; loose; dry to damp; yellowish brown	3.6	94		
5		18			@ 6' - medium dense				
10		7			@ 9' - loose; damp; clay interbeds				
		34		SP	@ 12' Poorly graded SAND with gravel; medium dense; wet; reddish brown	10.6	121		
15		17		SP-SM	@ 15' Poorly graded SAND with silt; medium dense; wet; light brown				
20		12		SC-SM	@ 20' Silty clayey SAND; loose; wet; brown; wood in sample	36.9	84		Consol
25		44		SP-SM	@ 25' Poorly graded SAND with silt; medium dense; wet; yellowish brown	19.6	107	7	
30		30							
					TOTAL DEPTH 30' (Elev. 875') Ground Water @ 11'				
35									

DRILL HOLE LOG

CLIENT:	The Newhall Land & Farming Company
PROJECT:	Utility Corridor
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem Auger
HAMMER TYPE:	Automatic
DRIVING WEIGHTS:	140 lbs
JOB NO.:	07-2079 (0)
DATE:	5/25/07
LOGGED BY:	BMW
DRILLED:	2/22/07
HOLE DIA:	8"
AVERAGE DROP:	30"
ELEVATION:	928'

BORING NO. HS-9U

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY OLDER ALLUVIUM; Qoa (0 - 35')**				
		15		SM	@ 3' Silty SAND; loose; damp; brownish yellow	1.9	112		
5		14		SM		8.9	102		Consol
10		14			@ 9' - medium dense				
		9		SP-SM	@ 12' Poorly graded SAND with silt; loose; damp; brownish yellow	2.7	111		
15		30		SM	@ 15' Silty SAND with gravel; medium dense; damp; brownish yellow				
20		17		SM	@ 20' - no gravel; loose; orangish brown	6.4	99		Consol
25		13			@ 25' - medium dense; yellowish brown				
30		21		CL-ML	@ 30' Silty CLAY; stiff; damp; reddish brown; interbedded with poorly graded sand with silt	14.7	101		
35		38		SP-SM	@ 35' Poorly graded SAND with silt; dense; moist; reddish brown				
					TOTAL DEPTH 35' (Elev. 893') No Ground Water				

DRILL HOLE LOG

CLIENT:	The Newhall Land & Farming Company
PROJECT:	Utility Corridor
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem Auger
HAMMER TYPE:	Automatic
DRIVING WEIGHTS:	140 lbs
JOB NO.:	07-2079 (0)
DATE:	5/25/07
LOGGED BY:	BMW
DRILLED:	2/27/07
HOLE DIA:	8"
AVERAGE DROP:	30"
ELEVATION:	934'

BORING NO. HS-10U

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY OLDER ALLUVIUM; Qoa (0 - 35')** @ 0 - 10' Bulk sample				
		6		SC-SM	@ 3' Silty clayey SAND; very loose; damp; brownish yellow	7.4	99	38	
5		11		SM	@ 6' Silty SAND; loose; dry to damp; yellow	1.6	99		
10		7							
		11		ML	@ 12' Sandy SILT; firm; damp; brownish yellow	5.9	94	66	
15		15		SM	@ 15' Silty SAND; medium dense; damp; yellowish brown				
20		31				4.1	107		
25		13			@ 25' - brown				
30		20			@ 30' - brownish yellow				
35		55		SP-SM	@ 35' Poorly graded SAND with silt and gravel; dense; moist; yellowish brown; minor clay beds	5.5	124		
					TOTAL DEPTH 35' (Elev. 899') No Ground Water				

DRILL HOLE LOG

CLIENT:	The Newhall Land & Farming Company
PROJECT:	Utility Corridor
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem Auger
HAMMER TYPE:	Automatic
DRIVING WEIGHTS:	140 lbs
JOB NO.:	07-2079 (0)
DATE:	5/25/07
LOGGED BY:	BMW
DRILLED:	2/21/07
HOLE DIA:	8"
AVERAGE DROP:	30"
ELEVATION:	915'

BORING NO. HS-11U

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY ALLUVIUM; Qal (0 - 30')**				
		8		SP-SM	@ 3' Poorly graded SAND with silt; loose; damp; light brown	11.0	98	9	
5		15		SP-SM	@ 6' - moist; brownish yellow	2.8	104		Consol
10		17		SP	@ 9' Poorly graded SAND; medium dense; moist; yellowish brown; clay interbeds				
		17		SP-SM	@ 12' Poorly graded SAND with silt; medium dense; wet; yellowish brown				
15		33		SP	@ 15' Poorly graded SAND; medium dense; wet; reddish brown	12.2	125		
20		36			@ 20' - dense; yellowish brown; clay interbeds				
25		ref/3"		SM	@ 25' Silty SAND with gravel; very dense; wet; yellowish brown				
30		33			@ 30' - dense				
					TOTAL DEPTH 30' (Elev. 885') Ground Water @ 11'				
35									

DRILL HOLE LOG

CLIENT:	The Newhall Land & Farming Company
PROJECT:	Utility Corridor
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem Auger
HAMMER TYPE:	Automatic
DRIVING WEIGHTS:	140 lbs
JOB NO.:	07-2079 (0)
DATE:	5/25/07
LOGGED BY:	BMW
DRILLED:	2/22/07
HOLE DIA:	8"
AVERAGE DROP:	30"
ELEVATION:	948'
BORING NO.	HS-12U

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY OLDER ALLUVIUM; Qoa (0 - 40')**				
		32		SP-SM	@ 3' Poorly graded SAND with silt; medium dense; dry to damp; brownish yellow	1.6	107		
5		5			@ 6' - very loose; damp; yellowish brown	2.6	107	8	
10		3		SM	@ 9' Silty SAND; very loose; damp; yellowish brown				
		4							
15		14			@ 15' - loose	2.2	109		
20		18			@ 20' - medium dense				
25		17			@ 25' - loose	11.5	109	29	
30		5			@ 30' - trace gravel				
35		35		SP-SM	@ 35' Poorly graded SAND with silt; medium dense; damp; yellowish brown	9.7	115		

CLIENT: The Newhall Land & Farming Company	JOB NO.: 07-2079 (0)	**DRILL HOLE LOG**	
PROJECT: Utility Corridor	DATE: 5/25/07		
	LOGGED BY: BMW		
DRILLING COMPANY: Valley Well Drilling	DRILLED: 2/22/07		
DRILLING METHOD: Hollow-Stem Auger	HOLE DIA: 8"	**BORING NO.** HS-12U	
HAMMER TYPE: Automatic	AVERAGE DROP: 30"		
DRIVING WEIGHTS: 140 lbs	ELEVATION: 948'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40		39			@ 40' - with gravel; dense; damp to moist				
					TOTAL DEPTH 40' (Elev. 908') No Ground Water				
45									
50									
55									
60									
65									
70									
75									

DRILL HOLE LOG

CLIENT:	The Newhall Land & Farming Company
PROJECT:	Utility Corridor
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem Auger
HAMMER TYPE:	Automatic
DRIVING WEIGHTS:	140 lbs
JOB NO.:	07-2079 (0)
DATE:	5/25/07
LOGGED BY:	BMW
DRILLED:	2/22/07
HOLE DIA:	8"
AVERAGE DROP:	30"
ELEVATION:	943'
BORING NO.	HS-13U

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY OLDER ALLUVIUM; Qoa (0 - 30')**				
		6		SM	@ 3' Silty SAND; very loose; damp; brown; trace of clay	12.2	96		
5		12			@ 6' - loose; reddish brown; clay interbeds	14.1	90	43	
10		6							
		15			@ 12' - no clay beds; damp to moist	7.9	106		
15		9			@ 15' - moist; brown; clay interbeds				
20		49		SP-SM	@ 20' Poorly graded SAND with silt; medium dense; moist; yellowish brown	2.6	117		
25		30			@ 25' - moist to wet; light gray				
30		66		GP	@ 30' Poorly graded GRAVEL with sand; dense; wet; dark gray to pale yellow; clay pockets	7.0	134		
					TOTAL DEPTH 30' (Elev. 913') Ground Water @ 25'				
35									

DRILL HOLE LOG

CLIENT:	The Newhall Land & Farming Company
PROJECT:	Utility Corridor
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem Auger
HAMMER TYPE:	Automatic
DRIVING WEIGHTS:	140 lbs
JOB NO.:	07-2079 (0)
DATE:	5/25/07
LOGGED BY:	RV
DRILLED:	2/23/07
HOLE DIA:	8"
AVERAGE DROP:	30"
ELEVATION:	956'

BORING NO. HS-14U

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY OLDER ALLUVIUM; Qoa (0 - 30')** @ 0 - 10' Bulk sample				
		3		CL-ML	@ 3' Silty CLAY with sand; soft; damp; dark grayish brown (10YR4/2)	23.6	82	82	
5		13		SM	@ 6' Silty SAND; loose; damp; brown (10YR 4/3)	23.9	90		
10		14			@ 9' - medium dense; yellowish brown (10YR 5/4)				
		33		SP-SM	@ 12' Poorly graded SAND with silt and gravel; medium dense; damp to dry; light yellowish brown (10YR 6/4)	1.5	112		
15		13		SM	@ 15' Silty SAND; medium dense; grayish brown (10YR 5/2); damp				
20		33		SC-SM	@ 20' Silty clayey SAND; very stiff; damp; very dark grayish brown (10YR 3/2)	21.4	101	42	
25		26		SM	@ 25' Silty SAND with gravel; medium dense; damp to moist; dark grayish brown (10YR 4/2); silty clay interbeds				
30		83/11"		SP-SM	@ 30' Poorly graded SAND with silt and gravel; very dense; moist to wet; grayish brown (10YR 5/2)	8.0	124		
					TOTAL DEPTH 30' (Elev. 926') Ground Water @ 30'				
35									

DRILL HOLE LOG

CLIENT: The Newhall Land & Farming Company	JOB NO.: 07-2079 (0)
PROJECT: Utility Corridor	DATE: 5/25/07
	LOGGED BY: RV
DRILLING COMPANY: Valley Well Drilling	DRILLED: 2/23/07
DRILLING METHOD: Hollow-Stem Auger	HOLE DIA: 8"
HAMMER TYPE: Automatic	AVERAGE DROP: 30"
DRIVING WEIGHTS: 140 lbs	ELEVATION: 964'

BORING NO. HS-15U

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY OLDER ALLUVIUM; Qoa (0 - 30')**				
					@ 0 - 10' Bulk sample				
		12		SM	@ 3' Silty SAND; loose; damp; dark yellowish brown (10YR 4/4)	4.6	105		
5									
		12			@ 6' - yellowish brown (10YR 5/4)	4.6	102		
10		13			@ 9' - with gravel; medium dense; grayish brown (10YR 5/2)				
		15			@ 12' - loose; dark grayish brown (10YR 4/2)	5.3	99		
15		17			@ 15' - medium dense; damp to moist; grayish brown (10YR 5/2)				
20		10			@ 20' - loose; very dark grayish brown (10YR 3/2); silty clay interbeds	4.0	110		
25		26			@ 25' - medium dense; grayish brown (10YR 5/2)				
30		58		SP-SM	@ 30' Poorly graded SAND with silt and gravel; dense; moist to wet; dark grayish brown (10YR 4/2)	12.2	118		
					TOTAL DEPTH 30' (Elev. 934')				
					Ground Water @ 30'				
35									

DRILL HOLE LOG

CLIENT:	The Newhall Land & Farming Company
PROJECT:	Utility Corridor
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem Auger
HAMMER TYPE:	Automatic
DRIVING WEIGHTS:	140 lbs
JOB NO.:	07-2079 (0)
DATE:	5/25/07
LOGGED BY:	BMW
DRILLED:	2/26/07
HOLE DIA:	8"
AVERAGE DROP:	30"
ELEVATION:	965'

BORING NO. HS-16U

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY OLDER ALLUVIUM; Qoa (0 - 40')** @ 0 - 10' Bulk sample				
		11		SM	@ 3' Silty SAND; loose; damp; yellowish brown; silty clay interbeds	7.8	96		
5		12		SP-SM	@ 6' Poorly graded SAND with silt; loose; damp; brownish yellow	2.0	93		
10		12			@ 9' - medium dense				
		61		SP	@ 12' Poorly graded SAND; dense; moist; reddish brown	3.4	125		
15		44		SM	@ 15' Silty SAND; dense; damp; yellowish brown				
20		30		SP-SM	@ 20' Poorly graded SAND with silt; medium dense; moist to wet; brown				
25		92			@ 25' - very dense; brownish yellow	15.0	115		Shear Test
30		10		SM	@ 30' Silty SAND with gravel; loose; wet; light brown				
35		91/11"			@ 35' - very dense; grayish brown	8.8	135		

CLIENT: The Newhall Land & Farming Company	JOB NO.: 07-2079 (0)	**DRILL HOLE LOG**	
PROJECT: Utility Corridor	DATE: 5/25/07		
	LOGGED BY: BMW		
DRILLING COMPANY: Valley Well Drilling	DRILLED: 2/26/07		
DRILLING METHOD: Hollow-Stem Auger	HOLE DIA: 8"	**BORING NO.** HS-16U	
HAMMER TYPE: Automatic	AVERAGE DROP: 30"		
DRIVING WEIGHTS: 140 lbs	ELEVATION: 965'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40		69		SP-SM	@ 40' Poorly graded SAND with silt; dense; wet; grayish brown; minor clay bed				
					TOTAL DEPTH 40' (Elev. 925') Ground Water @ 23'				
45									
50									
55									
60									
65									
70									
75									

DRILL HOLE LOG

CLIENT:	The Newhall Land & Farming Company
PROJECT:	Utility Corridor
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem Auger
HAMMER TYPE:	Automatic
DRIVING WEIGHTS:	140 lbs
JOB NO.:	07-2079 (0)
DATE:	5/25/07
LOGGED BY:	RV
DRILLED:	2/23/07
HOLE DIA:	8"
AVERAGE DROP:	30"
ELEVATION:	974'

BORING NO. HS-17U

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY OLDER ALLUVIUM; Qoa (0 - 30')** @ 0 - 10' Bulk sample				
		21		SC-SM	@ 3' Silty clayey SAND with gravel; medium dense; damp; dark yellowish brown (10YR 3/4)	7.1	121	38	
5		14		CL-ML	@ 6' Silty CLAY with sand; stiff; damp; dark yellowish brown (10YR 4/4); roots	10.8	97		
10		9		ML	@ 9' Sandy SILT; stiff; damp to dry; brown (10YR 5/3)				
		17		SM	@ 12' Silty SAND; loose; damp; yellowish brown (10YR 5/4)	6.2	102		
15		16		CL-ML	@ 15' Silty CLAY; stiff; damp; dark yellowish brown (10YR 4/ 4)	11.0	99		
20		50/5"		SM	@ 20' Silty SAND with gravel; very dense; damp to dry; light brownish gray (10YR 6/2)				
25		50/6"		CL-ML	@ 25' Silty CLAY; hard; damp; grayish brown (10YR 5/2)	21.5	110		
30		50/4"		SM	@ 30' Silty SAND; very dense; damp to moist; light brownish gray (10YR 6/2)	15.3	114		
					TOTAL DEPTH 30' (Elev. 944') No Ground Water				
35									

CLIENT: The Newhall Land & Farming Company	JOB NO.: 07-2079 (0)	**DRILL HOLE LOG**	
PROJECT: Utility Corridor	DATE: 5/25/07		
	LOGGED BY: BMW		
DRILLING COMPANY: Valley Well Drilling	DRILLED: 2/26/07		
DRILLING METHOD: Hollow-Stem Auger	HOLE DIA: 8"	**BORING NO.** HS-18U	
HAMMER TYPE: Automatic	AVERAGE DROP: 30"		
DRIVING WEIGHTS: 140 lbs	ELEVATION: 963'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY OLDER ALLUVIUM; Qoa (0 - 40')** @ 0 - 10' Bulk sample				
		17		SP-SM	@ 3' Poorly graded SAND with silt; loose; damp; yellowish brown	1.6	111		
5									
		27		SM	@ 6' Silty SAND; medium dense; damp; brown; clay interbeds	3.4	107		
				SP	@ 7' Poorly graded SAND; medium dense; damp; brown				
10		12		CL-ML	@ 9' Silty CLAY; stiff; wet; brown			61	
		39		SP	@ 12' Poorly graded SAND; medium dense; wet; yellowish brown	15.7	119		
15		27			@ 15' - brown; silt interbeds				
20		10		ML	@ 20' SILT; stiff; moist; dark gray				
25		91/11"		SP	@ 25' Poorly graded SAND; very dense; wet; light brown; silty sand interbeds	9.9	132		
30		58		SP-SM	@ 30' Poorly graded SAND with silt; very dense; wet; light brown				
35		41		SP	@ 35' Poorly graded SAND; dense; wet; light brown to light gray				

CLIENT: The Newhall Land & Farming Company	JOB NO.: 07-2079 (0)	**DRILL HOLE LOG**	
PROJECT: Utility Corridor	DATE: 5/25/07		
	LOGGED BY: BMW		
DRILLING COMPANY: Valley Well Drilling	DRILLED: 2/26/07		
DRILLING METHOD: Hollow-Stem Auger	HOLE DIA: 8"	**BORING NO.** HS-18U	
HAMMER TYPE: Automatic	AVERAGE DROP: 30"		
DRIVING WEIGHTS: 140 lbs	ELEVATION: 963'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40		37		SP-SM	@ 40' Poorly graded SAND with silt; dense; wet; light brown				
					TOTAL DEPTH 40' (Elev. 923') Ground Water 10'				
45									
50									
55									
60									
65									
70									
75									

DRILL HOLE LOG

CLIENT:	The Newhall Land & Farming Company
PROJECT:	Utility Corridor
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem Auger
HAMMER TYPE:	Automatic
DRIVING WEIGHTS:	140 lbs
JOB NO.:	07-2079 (0)
DATE:	5/25/07
LOGGED BY:	BMW
DRILLED:	2/26/07
HOLE DIA:	8"
AVERAGE DROP:	30"
ELEVATION:	968'

BORING NO. HS-19U

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY OLDER ALLUVIUM; Qoa (0 - 30')** @ 0 - 10' Bulk sample				
		23		SM	@ 3' Silty SAND; medium dense; dry; light brown	2.5			
5		27				7.2	115	41	
10		20							
		38		SP	@ 12' Poorly graded SAND; medium dense; damp; yellowish brown	3.9	123		
15		17			@ 15' - moist to wet; light brown; dark gray clay interbeds				
20		65		SP-SM	@ 20' Poorly graded SAND with silt; dense; wet; light gray to brown	13.0	115		
25		48							
30		36		SP	@ 30' Poorly graded SAND; medium dense; wet; dark gray; clay interbeds	24.2	107		
					TOTAL DEPTH 30' (Elev. 938') Ground Water @ 16'				
35									

DRILL HOLE LOG

CLIENT:	The Newhall Land & Farming Company
PROJECT:	Utility Corridor
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem Auger
HAMMER TYPE:	Automatic
DRIVING WEIGHTS:	140 lbs
JOB NO.:	07-2079 (0)
DATE:	5/25/07
LOGGED BY:	BMW
DRILLED:	2/27/07
HOLE DIA:	8"
AVERAGE DROP:	30"
ELEVATION:	975'

BORING NO. HS-20U

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY OLDER ALLUVIUM; Qoa (0 - 35')** @ 0 - 10' Bulk sample				
		18		SP-SM	@ 3' Poorly graded SAND with silt; loose; dry; reddish brown	1.6	106		
5		28			@ 6' - medium dense; damp; yellowish brown	1.6	112		
10		22		SP	@ 9' Poorly graded SAND; medium dense; damp; yellowish brown			4	
		12		SM	@ 12' Silty SAND with gravel; medium dense; damp; brown				
15		47		SP-SM	@ 15' Poorly graded SAND with silt; medium dense; moist to wet; light brown	3.3	117		
20		43			@ 20' - dense; wet; light gray				
25		3			@ 25' - clayey silt interbeds; in-situ soils disturbed to due heaving prior to sampling				
30					@ 30' - no recovery; large rock in sample tube				
35		16			@ 35' - medium dense; silt bed (approximately 3" thick)				
					TOTAL DEPTH 35' (Elev. 940') Ground Water @ 17'				

DRILL HOLE LOG

CLIENT:	The Newhall Land & Farming Company
PROJECT:	Utility Corridor
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow-Stem Auger
HAMMER TYPE:	Automatic
DRIVING WEIGHTS:	140 lbs
JOB NO.:	07-2079 (0)
DATE:	5/25/07
LOGGED BY:	BMW
DRILLED:	2/26/07
HOLE DIA:	8"
AVERAGE DROP:	30"
ELEVATION:	985'

BORING NO. HS-21U

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY OLDER ALLUVIUM; Qoa (0 - 30')** @ 0 - 10' Bulk sample				
		8		CL-ML	@ 3' Sandy, silty CLAY; firm; dry to damp; brown	6.0	92	58	
5				SM	@ 4' Silty SAND; loose; dry to damp; brown				Consol
		10		SC-SM	@ 6' Silty clayey SAND; loose; dry to damp; yellowish brown	6.1	102		Consol
10		7		SM	@ 9' Silty SAND; loose; dry to damp; brownish yellow				
		20		CL	@ 12' Sandy lean CLAY; stiff; damp; reddish brown	12.7	105	60	LL= 37 PI= 15 Consol
15		10		SM	@ 15' Silty SAND; loose; damp; light brown				
20		50		SP-SM	@ 20' Poorly graded SAND with silt and gravel; medium dense; moist; pale yellow	3.3	124		
25		52			@ 25' - very dense; wet; light gray				
30		46			@ 30' - no gravel; dense				
					TOTAL DEPTH 30' (Elev. 955') Ground Water @ 23'				
35									

DRILL HOLE LOG

CLIENT:	The Newhall Land & Farming Company	JOB NO.:	07-2079 (1)
PROJECT:	Utility Corridor Sound Wall Borings for CH_2MHill	DATE:	5/14/07
		LOGGED BY:	BMW
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	2/27/07
DRILLING METHOD:	Hollow-Stem Auger	HOLE DIA:	8"
HAMMER TYPE:	Automatic	AVERAGE DROP:	30"
DRIVING WEIGHTS:	140 lbs	ELEVATION:	986'

BORING NO. HS-22U

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY OLDER ALLUVIUM; Qoa (0 - 35')** @ 0 - 10' Bulk sample				
		5		SM	@ 3' Silty SAND; very loose; damp; brown	5.1	96		
5		13		CL-ML	@ 6' Sandy, silty CLAY; firm; damp; brown	12.8	91	69	Consol
10		6		SM	@ 9' Silty SAND; loose; damp; brownish yellow			42	
		18		SP-SM	@ 12' Poorly graded SAND with silt; loose; damp; yellowish brown; silty clay interbeds	2.7	106	5	Consol
15		27		SM	@ 15' Silty SAND; medium dense; damp; reddish brown to brown	8.3	104		Consol Shear Test
20		15			@ 20' - yellowish brown				
25		29		SM	@ 25' - moist				Consol
30		12		SP-SM	@ 30' Poorly graded SAND with silt; medium dense; wet; light brown; dark gray silt interbeds	18.9	101		
35		71			@ 35' -with gravel; dense	10.3	129		
					TOTAL DEPTH 35' (Elev. 951') Ground Water @ 28'				

DRILL HOLE LOG

BORING NO. HS-7

PROJECT: Newhall Ranch - River Village **JOB NO.:** 00-1702L-1
Ph. II Liquefaction/Cyclic Settlement Anl. **DATE:** 9/27/00
DRILLING COMPANY/DRILLER: Valley Well Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Hollow-Stem Auger/8" OD
HAMMER TYPE: Downhole **AVERAGE DROP (in.):** 30"
DRIVING WEIGHTS: 140 lbs.
ELEVATION: 968 **LOGGED BY:** MAS

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						SOIL/PLOW PAN (0 - 3.5 Ft.)	Excavated and logged on 3/20/00
		2 2 6		107/14.5	SM	@ 2' Silty sand, loose, moist, brown	% fines=27
						QUATERNARY OLDER ALLUVIUM; Qoa (3.5 - 30 Ft.)	
5		4 10 11		107/4.5	SW	@ 5' Well-graded sand with gravel, medium dense, moist, light yellowish-brown	
		11 12 17		97/7.9			
10							
		7 11 17		104/13.9	SM	@ 11' Silty sand, medium dense, moist, brown	
15		17 18 26			SP	@ 15' Poorly graded sand with gravel, medium dense, moist, light yellowish-brown	
20		14 16 25		98/26.1	CL	@ 20' Lean clay, with minor lenses of sand, hard, moist, dark-gray to light yellowish-brown	% fines=87 LL=42 PI=18
25		24 30 35			SW	@ 25' Well-graded sand with gravel, very dense, moist, light yellowish-brown	
30		24 31 35				@ 30' - wet TOTAL DEPTH 30 Ft. (Elev. 938) Ground Water @ 27 Ft. (Elev. 941) No Caving	
35							

DRILL HOLE LOG

BORING NO. HS-12

PROJECT: River Village - Newhall Ranch — JOB NO.: 00-1702R-4
Tentative Tract 53108 — DATE: 9/27/00
DRILLING COMPANY/DRILLER: Valley Well Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Hollow-Stem Auger/8" OD
HAMMER TYPE: Downhole — AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs.
ELEVATION: 948± — LOGGED BY: RMS

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						QUATERNARY OLDER ALLUVIUM; Qoa (0 - 30 Ft.)	Drilled and logged on 8/21/00
		3 4 6		108/6.7	SM	@ 3' Silty sand; loose; moist; brown	
5		5 5 7		95/4.6	SP-SM	@ 5' Poorly graded sand with silt; loose; moist; brown	% fines=8
		6 7 9					
10		7 7 9		96/5.2	SP	@ 10' Poorly graded sand; loose; moist; brown	% fines=2
15		4 11 16		106/8.0	SM	@ 15' Silty sand; medium dense; moist; brown	% fines=13
20		11 13 10			SP-SM	@ 20' Poorly graded sand with silt; medium dense; moist; yellowish-brown	% fines=9
25		11 12 12					
30		14 30 36				@ 30' - very dense; wet TOTAL DEPTH 30 Ft. (Elev. 918) Ground Water @ 27 Ft. (Elev. 921) No Caving	
35							

DRILL HOLE LOG

CLIENT:	The Newhall Land & Farming Co.	JOB NO.:	04-1702H-1
PROJECT:	Phase II Geologic Investigation Homestead Area - Newhall Ranch	DATE:	9/30/05
		LOGGED BY:	KPC
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	9/18/03
DRILLING METHOD:	Hollow Stem Auger	HOLE DIA:	8" O.D.
HAMMER TYPE:	Automatic Safety Hammer	AVERAGE DROP:	30"
DRIVING WEIGHTS:	140 lbs.	ELEVATION:	923'

BORING NO. HS-25HS

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY OLDER ALLUVIUM; Qoa (0 - 30')**				
5		3 4 4		CL	@ 5' Sandy lean CLAY; firm; moist; dark yellowish brown			63	
10		3 2 3						60	
15		33 38 39		SW	@ 15' Well graded SAND with gravel; very dense; damp; light gray; some cobbles and cementation				
20		10 19 24		SM	@ 20' Silty SAND; dense; damp; light grayish to yellowish brown; removal of rock from bit, broken teeth			21	
25		29 32 32			@ 25' -with gravel; very dense; damp to wet; grayish to yellowish brown with interbedded black layers				
30		49			@ 30' -wet; medium brown			29	
					Total Depth 30' (Elev. 893') Ground Water @ 25'				
35									

DRILL HOLE LOG

CLIENT:	The Newhall Land & Farming Co.
PROJECT:	Proposed Water Reclamation Plant Newhall Ranch Project
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Hollow Stem Auger
HAMMER TYPE:	Automatic
DRIVING WEIGHTS:	140 lbs
JOB NO.:	06-1707-1 (6)
DATE:	5/3/06
LOGGED BY:	KPC/ATG
DRILLED:	11/8/05
HOLE DIA:	8" O.D.
AVERAGE DROP:	30"
ELEVATION:	871'

BORING NO. HS-1B

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY OLDER ALLUVIUM; Qoa (0 - 21')**				
		6		CL-ML	@ 3' Silty CLAY with sand; firm; damp; light yellowish brown; rootlets				
5									
		15			@ 7' -stiff; medium to yellowish brown; voids	20.0	98	85	Shear Test
10		13			@ 10' -no rootlets, no voids				
		37		SP-SM	@ 13' Poorly graded SAND with silt; medium dense; damp; yellowish to reddish brown	13.4	120	5	
15									
		29		SP-SM	@ 17' -wet; grayish to yellowish brown			10	
20		46				3.8	111		Shear Test
					BEDROCK; Tp (21 - 23')				
		Ref/ 6"			@ 23' Claystone; hard; moist; medium gray				
25					TOTAL DEPTH 23' (Elev. 848') Ground Water @ 15'				
30									
35									

DRILL HOLE LOG

CLIENT:	The Newhall Land & Farming Company
PROJECT:	Utility Corridor
DRILLING COMPANY:	Valley Well Drilling
DRILLING METHOD:	Rotary Wash
HAMMER TYPE:	Safety Hammer
DRIVING WEIGHTS:	140 lbs
JOB NO.:	07-2079 (0)
DATE:	5/25/07
LOGGED BY:	BMW
DRILLED:	3/13/07
HOLE DIA:	5.25"
AVERAGE DROP:	30"
ELEVATION:	985'

BORING NO. RW-5U

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY OLDER ALLUVIUM; Qoa (0 - 50')**				
5		18		SM	@ 5' Silty SAND; medium dense; dry; light brown to brown	4.9	94		
10		32		ML	@ 10' Sandy SILT; hard; moist to wet; light brown				
15		50/5"		SM	@ 15' Silty SAND; very dense; moist; dark gray	13.3	113		
20		50/5"		SP	@ 20' Poorly graded SAND; very dense; wet; grayish brown				
25		85			@ 25' - light brown; dark gray silty clay interbeds				
30		50/5"							
35				GP-SP	@ 35' Gravelly SAND to poorly graded GRAVEL with cobbles; very dense; wet; no samples taken from 35 to 50 ft owing to the presence of cobbles; gravel and broken fragments of cobbles abundant in observed cuttings				

CLIENT: The Newhall Land & Farming Company	JOB NO.: 07-2079 (0)	**DRILL HOLE LOG**	
PROJECT: Utility Corridor	DATE: 5/25/07		
	LOGGED BY: BMW		
DRILLING COMPANY: Valley Well Drilling	DRILLED: 3/13/07		
DRILLING METHOD: Rotary Wash	HOLE DIA: 5.25"	**BORING NO.** RW-5U	
HAMMER TYPE: Safety Hammer	AVERAGE DROP: 30"		
DRIVING WEIGHTS: 140 lbs	ELEVATION: 985'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 12"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40									
45									
50					@ 50' Caving; unable to sample; hole abandoned				
					TOTAL DEPTH 50' (Elev. 935') Ground Water @ 15'; Equilibrium conditions suspect due to addition of drilling mud Caving @ 50'				
55									
60									
65									
70									
75									

DRILL HOLE LOG

BORING NO. RW-14

PROJECT: Newhall Ranch - River Village **JOB NO.:** 00-1702L-1
Ph. II Liquefaction/Cyclic Settlement Anl. **DATE:** 9/27/00
DRILLING COMPANY/DRILLER: Valley Well Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Rotary Wash - 5 1/2"
HAMMER TYPE: Downhole **AVERAGE DROP (in.):** 30"
DRIVING WEIGHTS: 140 lbs.
ELEVATION: 958 **LOGGED BY:** DGG

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						QUATERNARY OLDER ALLUVIUM; Qoa (0 - 50 Ft.)	Excavated and logged on 4/4/00
		4 4 3		103/13.5	SM	@ 3' Silty sand, loose, moist, brown	% fines=34
5		4 4 5					
		13 10 6		108/15.1	SP-SM	@ 8' Poorly graded sand with silt, loose, moist, grayish-brown	
10		13 12 12				@ 11' - medium dense	% fines=5
15		14 20 24		104/8.4		@ 15' - medium dense	
20		20 25 25			CL-ML	@ 20' Silty clay, hard, moist, medium brown	% fines=96 LL=26 PI=6
25		30 28 20			SW	@ 25' Well-graded sand with gravel, dense, wet, brownish-gray	
30		17 28 40			SC	@ 30' Clayey sand, very dense, wet, brownish-gray	% fines=31 LL=29 PI=11
35		50 34			SW-SM	@ 35' Well-graded sand with silt and gravel, very dense, wet, brownish-gray	

DRILL HOLE LOG

BORING NO. RW-14

PROJECT: Newhall Ranch - River Village
Ph. II Liquefaction/Cyclic Settlement Anl.
JOB NO.: 00-1702L-1
DATE: 9/27/00
DRILLING COMPANY/DRILLER: Valley Well Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Rotary Wash - 5 1/2"
HAMMER TYPE: Downhole
AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs.
ELEVATION: 958
LOGGED BY: DGG

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40		25 45 50/ 4"					
45		50			SW	@ 45' Well-graded sand with gravel, very dense, wet, brownish-gray	
50		40 50/ 4"				TOTAL DEPTH 50 Ft. (Elev. 908) Ground Water @ 29.5 Ft. (Elev. 928.5) No Caving	
55							
60							
65							
70							
75							

DRILL HOLE LOG

BORING NO. BA-1R

PROJECT: River Village - Newhall Ranch — JOB NO.: 00-1702R-4
Tentative Tract 53108 — DATE: 9/27/00
DRILLING COMPANY/DRILLER: Tri-Valley Drilling/Dave
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket-Auger/24" (86' Rig)
HAMMER TYPE: Telescoping Kelly Bar — AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs; 54-82'=950 lbs.
ELEVATION: 964± — LOGGED BY: BJS

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						ARTIFICIAL FILL; (0 - 6 in.) BEDROCK; Tp (6 in. - 35 Ft.) @ 6" Interbedded olive-gray siltstone and fine sandy siltstone; moderately hard; damp	Drilled and logged on 8/31/00 @ 0-5' Bulk Sample
				B:N66E,17SE		@ 1.5' Light olive-yellowish-gray fine silty sandstone	
5		7 7/3"		127/5.5		@ 3' Dark olive-brown mudstone with minor caliche; underlain by olive-gray siltstone and fine sandy siltstone with hard concretions	% fines=55
						@ 6.5' Grades to light-gray silty fine-grained sandstone with light-brown stains	
						@ 8.5' Cross-bedding	
10		8 7/3"		B:N61E,16SE 118/115.5		@ 9' Interbedded olive-gray siltstone and fine sandy siltstone, and light-gray to light olive-gray fine sandstone and silty sandstone	@ 10-15' Bulk Sample
						@ 10.5' Cross-bedding in sandstone and silty sandstone	
				B:N62E,17SE		@ 14' Erosional contact with olive-gray siltstone enclosing a thin (<1/4"-thick) moderate-brown mudstone interbed	
15		9 8/2"		128/10.6		@ 15.5' Olive-brown siltstone with hard concretions	
						@ 17' Yellowish-gray silty pebbly sandstone with light-brown stains	@ 17' Bulk Sample
				B:N45E,16SE		@ 18' Interbedded light-gray silty sandstone and pebbly sandstone; hard; damp; local very cemented zones	
20		13		114/4.7			@ 20' Bulk Sample % fines=15
				B:N57E,12SE			
25							
						@ 27' Pebbly sandstone	
30						@ 29' Erosional contact with light olive-gray fine-grained sandy siltstone	
35		14				TOTAL DEPTH 35 Ft. (Elev. 929) No Ground Water No Caving	Backfill tamped every 5 ft.

DRILL HOLE LOG

BORING NO. BA-3R

PROJECT: River Village - Newhall Ranch — JOB NO.: 00-1702R-4
Tentative Tract 53108 — DATE: 9/27/00
DRILLING COMPANY/DRILLER: Tri-Valley Drilling/Dave
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket-Auger/24" (86' Rig)
HAMMER TYPE: Telescoping Kelly Bar — AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-25'=2852 lbs; 25-54'=1700 lbs; 54-82'=950 lbs.
ELEVATION: 970± — LOGGED BY: BJS

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
		2 2 4		124/9.2	CL	ARTIFICIAL FILL; af (0 - 3.5 Ft.) @ 0' Sandy Lean Clay with local pebbles; very stiff; moist; yellowish-brown to dark yellowish-brown @ 3.5' Pebbles and cobbles; possible Qoa	Drilled and surface logged on 9/1/00 @ 0-2' Bulk Sample % fines=69
5						TOTAL DEPTH 3.5 Ft. (Elev. 966.5) No Ground Water No Caving	Backfill tamped
10							
15							
20							
25							
30							
35							

CLIENT: The Newhall Land & Farming Co.	JOB NO.: 07-1707-1 (14)	**DRILL HOLE LOG**	
PROJECT: Proposed Water Reclamation Plant Rippability Study	DATE: 4/11/07		
	LOGGED BY: MBW		
DRILLING COMPANY: All Ways Drilling (Danny)	DRILLED: 2/5/07		
DRILLING METHOD: Bucket Auger (117' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP: 12"	**BORING NO.** B-1W	
DRIVING WEIGHTS: 0-30' = 5619 lbs, 30-60' = 3745 lbs, 60-90' = 2280 lbs	ELEVATION: 905'±		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	DESCRIPTION	Remarks
						QUATERNARY OLDER ALLUVIUM; Qoa (0 - 20.5')	@ 0 - 2' Casing
						@ 0' Brown silty sand with pebbles; soft; damp to moist	
						@ 2' Dark yellowish-brown sandy, clay silt with pebbles; massive	
5	■	1 1		104.1/10.80		@ 4.5' Clayey, pebbly sand with cobbles	
						@ 8' Sandy, pebbly, clayey silt with scattered cobbles; firm	
10	■	1 1		112.8/13.07			
15							
						@ 16' Silty, clayey, pebbly sand with scattered cobbles; medium dense but friable	
						@ 18.5' Pebbly, cobbly coarse-grained sand; very friable; belling up to 9" laterally	
20	■	2 3		116.9/14.02		**BEDROCK; Tp (20.5 - 60')**	
						@ 20.5' Mottled olive and gray mudstone with abundant oxidation staining; moderately hard; damp; massive; moderately fractured; fractures are wispy and oxidized; moderately weathered	
25							@ 25 - 30' Bulk Sample
				fr: N55W, 18SW			
30	■	12 10/1"		fr: N80W, 16SW 121.5/12.33			
				fr: N75W, 19SW		@ 33' Dark-gray; slightly harder; slightly fractured; unoxidized to slightly weathered	
				fr: N80E, 18SE			
35							
						@ 36.5' Small seep on northern wall	

CLIENT: The Newhall Land & Farming Co.	JOB NO.: 07-1707-1 (14)	**DRILL HOLE LOG**	
PROJECT: Proposed Water Reclamation Plant Rippability Study	DATE: 4/11/07		
	LOGGED BY: MBW		
DRILLING COMPANY: All Ways Drilling (Danny)	DRILLED: 2/5/07		
DRILLING METHOD: Bucket Auger (117' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP: 12"	**BORING NO.** B-1W	
DRIVING WEIGHTS: 0-30' = 5619 lbs, 30-60' = 3745 lbs, 60-90' = 2280 lbs	ELEVATION: 905'±		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	DESCRIPTION	Remarks
40	■	29 Bounce		126.3/10.10		@ 40' Moderately hard to hard; unbedded and unfractured; unoxidized	@ 40 - 45' Bulk Sample
45							
50	■	14 10/2"					
55							@ 55' Begin crowding
60	■	37				TOTAL DEPTH 60' (Elev. 845') Minor seep @ 36.5' No Caving	Backfill tamped every 5'
65							
70							
75							

CLIENT: The Newhall Land & Farming Co.	JOB NO.: 07-1707-1 (14)	**DRILL HOLE LOG**	
PROJECT: Proposed Water Reclamation Plant Rippability Study	DATE: 4/11/07		
	LOGGED BY: MBW		
DRILLING COMPANY: All Ways Drilling	DRILLED: 2/6/07 - 2/7/07		
DRILLING METHOD: Bucket Auger (117' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP: 12"	**BORING NO.** B-2W	
DRIVING WEIGHTS: 0-30' = 5619 lbs, 30-60' = 3745 lbs, 60-90' = 2280 lbs	ELEVATION: 899'±		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	DESCRIPTION	Remarks
						ARTIFICIAL FILL, ASPHALT AND CONCRETE; af (0 - 3.25')	
						@ 0' Olive silty fine-grained sand; medium dense; damp	
						@ 1.75' Asphalt	@ 1.75' Began crowding
						@ 2.75' Concrete	@ 2.5' Core bucket used
						BEDROCK; Tp (3.25 - 60')	@ 3.5' Stopped crowding; stopped using core bucket
5	■	5 4/2"		126.5/11.65		@ 3.25' Olive mudstone; moderately hard; damp; massive; moderately fractured; moderately weathered	Asphalt and concrete from abandoned segment of Highway 126
						@ 4.5' Mottled olive and gray	
				fr: N37E, 38SE		@ 5' Dark gray; fresh to slightly weathered	
						@ 5.5' Several subparallel oxidized fractures	
						@ 8' Slightly fractured	
10	■	10/4" Bounce		122.2/10.21			
						@ 12' Moderately hard to hard; unbedded and unfractured; unoxidized	@ 12' Began crowding
15							
20	■	10		128.4/9.64			
						@ 22' Hard	
25							
30	■	11 5/1"		116.7/9.63			
35							
				B: N83E, 58SE		@ 36' 1/4"-thick black clay seam; non-plastic	

CLIENT: The Newhall Land & Farming Co.	JOB NO.: 07-1707-1 (14)	**DRILL HOLE LOG**	
PROJECT: Proposed Water Reclamation Plant Rippability Study	DATE: 4/11/07		
	LOGGED BY: MBW		
DRILLING COMPANY: All Ways Drilling	DRILLED: 2/6/07 - 2/7/07		
DRILLING METHOD: Bucket Auger (117' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP: 12"	**BORING NO.** B-2W	
DRIVING WEIGHTS: 0-30' = 5619 lbs, 30-60' = 3745 lbs, 60-90' = 2280 lbs	ELEVATION: 899'±		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	DESCRIPTION	Remarks
40	■	23/5" Bounce		117.3/8.60			
45							
50	■	15 10/2"					
55							
60	■	30/5"				TOTAL DEPTH 60' (Elev. 839') No Ground Water No Caving	Backfill tamped every 5'
65							
70							
75							

CLIENT: The Newhall Land & Farming Co.	JOB NO.: 07-1707-1 (14)	**DRILL HOLE LOG**	
PROJECT: Proposed Water Reclamation Plant Rippability Study	DATE: 4/11/07		
	LOGGED BY: MBW		
DRILLING COMPANY: All Ways Drilling	DRILLED: 2/6/07 - 2/7/07		
DRILLING METHOD: Bucket Auger (117' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP: 12"	**BORING NO.** B-3W	
DRIVING WEIGHTS: 0-30' = 5619 lbs, 30-60' = 3745 lbs, 60-90' = 2280 lbs	ELEVATION: 897'±		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	DESCRIPTION	Remarks
						ARTIFICIAL FILL, ASPHALT AND CONCRETE; af (0 - 4.5')	
						@ 0' Olive, silty, pebbly sand; soft; damp	
						@ 2.5' Asphalt	@ 2.75' Began crowding; core bucket used
						@ 4' Concrete	
5	■	P/12"		99.3/11.07		**QUATERNARY OLDER ALLUVIUM; Qoa (4.5 - 19')**	@ 4.75' Stopped crowding; stopped using core bucket
						@ 4.5' Light olive-brown clayey silt with sand; soft; damp to moist; massive	Asphalt and concrete is from abandoned Highway 126
						@ 7' Coarsers to clayey, sandy silt with pebbles; medium dense but friable	
							@ 5 - 15' Bulk Sample
10	■	2 3		112.0/10.99			
						@ 11.5' Dark yellowish-brown silty, pebbly sand; sharp contact with overlying silt	@ 11' Began crowding; core bucket used to dislodge cobbles
						@ 13' Pebbly, cobbly sand; very friable; belling up to 1.5' laterally	Downhole logged to 13' due to caving
15						@ 14' Pebbly cobbly sand	@ 13 - 19' Minor caving
						BEDROCK; Tp (19 - 45')	@ 19' Stopped crowding; stopped using core bucket
20	■	6 6/3"		124.1/12.84		@ 19' Light olive-brown mudstone; damp; some oxidation staining	
25							
						@ 26' Dark gray; unoxidized	
30	■	15/5" Bounce		117.3/10.22			
35							

CLIENT: The Newhall Land & Farming Co.	JOB NO.: 07-1707-1 (14)	**DRILL HOLE LOG**	
PROJECT: Proposed Water Reclamation Plant Rippability Study	DATE: 4/11/07		
	LOGGED BY: MBW		
DRILLING COMPANY: All Ways Drilling	DRILLED: 2/6/07 - 2/7/07		
DRILLING METHOD: Bucket Auger (117' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP: 12"	**BORING NO.** B-3W	
DRIVING WEIGHTS: 0-30' = 5619 lbs, 30-60' = 3745 lbs, 60-90' = 2280 lbs	ELEVATION: 897'±		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	DESCRIPTION	Remarks
40	■	15		119.1/10.32			
45	■	15				TOTAL DEPTH 45' (Elev. 852') No Ground Water Minor Caving @ 13 - 19'	Backfill tamped every 5'
50							
55							
60							
65							
70							
75							

CPT INTERPRETATIONS

SOUNDING : CPT-10
PROJECT : AES-NEWHALL RH.
DATE/TIME: 08-16-99 09:57

PROJECT No.: 99-A893
CONE/RIG : 473\#1 JH,JZ

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	17.80	2.53	CLAYEY SILT to SILTY CLAY	9	14		1.2	
.300	.98	22.01	3.27	CLAYEY SILT to SILTY CLAY	11	18		1.5	
.450	1.48	20.48	3.03	CLAYEY SILT to SILTY CLAY	10	16		1.4	
.600	1.97	37.73	2.70	SANDY SILT to CLAYEY SILT	15	24		2.5	
.750	2.46	36.50	2.90	CLAYEY SILT to SILTY CLAY	18	29		2.4	
.900	2.95	37.54	2.80	SANDY SILT to CLAYEY SILT	15	24		2.5	
1.050	3.44	47.72	2.20	SANDY SILT to CLAYEY SILT	19	31		3.2	
1.200	3.94	68.77	1.73	SILTY SAND to SANDY SILT	23	37	66		45.5
1.350	4.43	62.14	2.33	SANDY SILT to CLAYEY SILT	25	40		4.1	
1.500	4.92	50.03	2.00	SANDY SILT to CLAYEY SILT	20	32		3.3	
1.650	5.41	78.54	1.53	SILTY SAND to SANDY SILT	26	42	69		44.5
1.800	5.91	48.65	1.64	SILTY SAND to SANDY SILT	16	26	56		42.0
1.950	6.40	134.76	1.37	SAND to SILTY SAND	34	54	85		46.0
2.100	6.89	178.99	1.21	SAND to SILTY SAND	45	70	93		46.5
2.250	7.38	245.82	.90	SAND	49	74	100		48.0
2.400	7.87	158.97	1.77	SAND to SILTY SAND	40	58	90		46.0
2.550	8.37	150.73	1.89	SILTY SAND to SANDY SILT	50	71	88		45.5
2.700	8.86	146.76	1.84	SILTY SAND to SANDY SILT	49	67	87		45.0
2.850	9.35	144.25	1.84	SILTY SAND to SANDY SILT	48	64	86		44.5
3.000	9.84	130.89	1.25	SAND to SILTY SAND	33	43	82		44.0
3.150	10.33	121.67	1.28	SAND to SILTY SAND	30	39	79		43.5
3.300	10.83	81.92	1.27	SILTY SAND to SANDY SILT	27	34	67		42.0
3.450	11.32	45.08	1.15	SILTY SAND to SANDY SILT	15	18	50		38.5
3.600	11.81	22.80	1.62	SANDY SILT to CLAYEY SILT	9	11		1.8	
3.750	12.30	8.46	3.07	CLAY	8	10		.5	
3.900	12.80	14.68	4.02	CLAY	15	17		.9	
4.050	13.29	51.99	1.83	SILTY SAND to SANDY SILT	17	19	51		38.5
4.200	13.78	92.86	1.73	SILTY SAND to SANDY SILT	31	34	68		41.0
4.350	14.27	164.43	1.61	SAND to SILTY SAND	41	44	83		43.5
4.500	14.76	146.38	2.06	SILTY SAND to SANDY SILT	49	52	80		43.0
4.650	15.26	148.10	1.91	SILTY SAND to SANDY SILT	49	52	79		42.5
4.800	15.75	89.08	3.78	CLAYEY SILT to SILTY CLAY	45	46		5.2	
4.950	16.24	79.43	2.85	SANDY SILT to CLAYEY SILT	32	32		4.6	
5.100	16.73	58.85	3.25	SANDY SILT to CLAYEY SILT	24	23		3.4	
5.250	17.22	56.68	3.25	SANDY SILT to CLAYEY SILT	23	22		3.3	
5.400	17.72	38.50	4.16	CLAY to SILTY CLAY	26	25		2.2	
5.550	18.21	17.42	4.88	CLAY	17	17		1.1	
5.700	18.70	12.87	6.06	CLAY	13	12		.8	
5.850	19.19	37.20	3.49	CLAYEY SILT to SILTY CLAY	19	17		2.4	
6.000	19.69	26.87	5.81	CLAY	27	25		1.5	
6.150	20.18	156.91	1.95	SILTY SAND to SANDY SILT	52	48	77		42.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 25.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-10

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	181.09	1.99	SILTY SAND to SANDY SILT	60	54	81		42.5
6.450	21.16	153.83	2.57	SILTY SAND to SANDY SILT	51	46	76		41.5
6.600	21.65	168.15	2.15	SILTY SAND to SANDY SILT	56	49	78		42.0
6.750	22.15	317.40	1.88	SAND to SILTY SAND	79	69	96		44.5
6.900	22.64	302.70	1.11	SAND	61	52	94		44.0
7.050	23.13	122.58	1.08	SAND to SILTY SAND	31	26	68		39.5
7.200	23.62	44.55	3.70	CLAYEY SILT to SILTY CLAY	22	19		2.5	
7.350	24.11	190.63	1.82	SAND to SILTY SAND	48	40	80		42.0
7.500	24.61	357.72	1.56	SAND to SILTY SAND	89	74	98		44.5
7.650	25.10	316.14	1.77	SAND to SILTY SAND	79	64	94		44.0
7.800	25.59	313.70	2.07	SAND to SILTY SAND	78	64	94		44.0
7.950	26.08	293.50	2.17	SAND to SILTY SAND	73	59	92		43.5
8.100	26.57	311.22	1.64	SAND to SILTY SAND	78	63	93		44.0
8.250	27.07	325.47	1.76	SAND to SILTY SAND	81	65	94		44.0
8.400	27.56	363.35	1.46	SAND	73	58	97		44.5
8.550	28.05	376.16	1.42	SAND	75	60	98		44.5
8.700	28.54	405.14	1.42	SAND	81	64	100		44.5
8.850	29.04	350.45	1.53	SAND to SILTY SAND	88	69	96		44.0
9.000	29.53	371.57	1.99	SAND to SILTY SAND	93	73	98		44.0
9.150	30.02	313.66	.70	SAND	63	49	93		43.5
9.300	30.51	315.23	.71	SAND	63	49	93		43.5
9.450	31.00	368.94	.81	SAND	74	57	97		44.0
9.600	31.50	362.31	1.27	SAND	72	56	96		44.0
9.750	31.99	294.90	1.77	SAND to SILTY SAND	74	57	90		43.0
9.900	32.48	377.01	1.36	SAND	75	58	97		44.0
10.050	32.97	321.12	1.34	SAND	64	49	93		43.5
10.200	33.46	269.81	1.13	SAND	54	41	87		42.5
10.350	33.96	103.44	3.93	CLAYEY SILT to SILTY CLAY	52	39		6.0	
10.500	34.45	298.77	1.69	SAND to SILTY SAND	75	56	90		43.0
10.650	34.94	441.00	1.77	SAND to SILTY SAND	100	82	100		44.5
10.800	35.43	462.75	2.60	*SAND to CLAYEY SAND	100	100			
10.950	35.93	451.86	1.61	SAND to SILTY SAND	100	84	100		44.5
11.100	36.42	367.22	.83	SAND	73	54	96		44.0
11.250	36.91	304.76	1.25	SAND	61	45	90		43.0
11.400	37.40	99.45	4.11	CLAYEY SILT to SILTY CLAY	50	36		5.7	
11.550	37.89	9.20	7.17	CLAY	9	7		.5	
11.700	38.39	7.22	13.85	CLAY	7	5		.3	
11.850	38.88	169.62	1.23	SAND to SILTY SAND	42	31	73		39.5
12.000	39.37	230.27	1.64	SAND to SILTY SAND	58	42	82		41.5
12.150	39.86	183.19	2.30	SILTY SAND to SANDY SILT	61	44	75		39.5
12.300	40.35	144.32	3.55	SANDY SILT to CLAYEY SILT	58	41		8.3	
12.450	40.85	350.69	2.72	*SAND to CLAYEY SAND	100	100			
12.600	41.34	425.98	1.99	SAND to SILTY SAND	100	76	99		44.0
12.750	41.83	233.59	2.29	SILTY SAND to SANDY SILT	78	55	81		41.0
12.900	42.32	406.24	2.13	SAND to SILTY SAND	100	72	97		44.0
13.050	42.81	487.48	1.72	SAND to SILTY SAND	100	86	100		44.5
13.200	43.31	453.96	2.25	SAND to SILTY SAND	100	80	100		44.0
13.350	43.80	564.01	1.79	SAND to SILTY SAND	100	99	100		
13.500	44.29	466.51	2.69	*SAND to CLAYEY SAND	100	100			
13.650	44.78	446.80	1.12	SAND	89	62	99		44.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 25.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-10

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
13.800	45.28	376.80	1.40	SAND	75	52	94		43.0
13.950	45.77	372.10	2.14	SAND to SILTY SAND	93	64	94		43.0
14.100	46.26	454.72	1.39	SAND	91	63	100		44.0
14.250	46.75	462.35	1.26	SAND	92	63	100		44.0
14.400	47.24	470.83	1.61	SAND to SILTY SAND	100	80	100		44.0
14.550	47.74	425.19	1.43	SAND	85	58	97		43.5
14.700	48.23	358.12	1.33	SAND	72	49	92		43.0
14.850	48.72	308.22	.56	SAND	62	42	88		42.0
15.000	49.21	315.70	1.35	SAND	63	43	89		42.0
15.150	49.70	286.66	1.68	SAND to SILTY SAND	72	48	86		42.0
15.300	50.20	55.90	*****		0	0			.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 25.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

CPT INTERPRETATIONS

SOUNDING : CPT-11
PROJECT : AES-NEWHALL RNCH
DATE/TIME: 08-24-99 07:14

PROJECT No.: 99-A893
CONE/RIG : 473\#1 JH,GO

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	142.94	3.22	SANDY SILT to CLAYEY SILT	57	91		8.4	
.300	.98	80.92	2.99	SANDY SILT to CLAYEY SILT	32	52		4.8	
.450	1.48	41.15	3.53	CLAYEY SILT to SILTY CLAY	21	33		2.7	
.600	1.97	30.08	3.75	CLAYEY SILT to SILTY CLAY	15	24		2.0	
.750	2.46	31.04	2.57	SANDY SILT to CLAYEY SILT	12	20		2.1	
.900	2.95	80.84	1.44	SILTY SAND to SANDY SILT	27	43	70		47.0
1.050	3.44	82.41	1.57	SILTY SAND to SANDY SILT	27	44	71		46.5
1.200	3.94	34.91	1.53	SANDY SILT to CLAYEY SILT	14	22		2.8	
1.350	4.43	19.65	1.58	SANDY SILT to CLAYEY SILT	8	13		1.6	
1.500	4.92	11.64	3.11	CLAY to SILTY CLAY	8	12		.8	
1.650	5.41	14.70	3.69	CLAY to SILTY CLAY	10	16		1.0	
1.800	5.91	14.57	4.57	CLAY	15	23		.9	
1.950	6.40	16.00	5.32	CLAY	16	26		1.0	
2.100	6.89	20.20	3.45	CLAY to SILTY CLAY	13	21		1.3	
2.250	7.38	28.13	3.24	CLAYEY SILT to SILTY CLAY	14	21		1.8	
2.400	7.87	35.01	2.63	SANDY SILT to CLAYEY SILT	14	20		2.3	
2.550	8.37	35.05	2.56	SANDY SILT to CLAYEY SILT	14	20		2.3	
2.700	8.86	42.00	2.80	SANDY SILT to CLAYEY SILT	17	23		2.8	
2.850	9.35	46.76	2.69	SANDY SILT to CLAYEY SILT	19	25		3.1	
3.000	9.84	33.18	3.21	CLAYEY SILT to SILTY CLAY	17	22		2.2	
3.150	10.33	47.01	1.86	SANDY SILT to CLAYEY SILT	19	24		3.1	
3.300	10.83	52.47	2.24	SANDY SILT to CLAYEY SILT	21	26		3.5	
3.450	11.32	85.06	1.53	SILTY SAND to SANDY SILT	28	34	68		41.5
3.600	11.81	69.24	2.11	SILTY SAND to SANDY SILT	23	27	61		39.5
3.750	12.30	100.85	1.82	SILTY SAND to SANDY SILT	34	39	72		42.0
3.900	12.80	137.67	1.67	SAND to SILTY SAND	34	39	80		43.0
4.050	13.29	122.63	1.75	SILTY SAND to SANDY SILT	41	46	76		42.5
4.200	13.78	79.43	2.15	SILTY SAND to SANDY SILT	26	29	63		39.5
4.350	14.27	44.53	3.31	CLAYEY SILT to SILTY CLAY	22	24		2.9	
4.500	14.76	45.44	2.45	SANDY SILT to CLAYEY SILT	18	19		3.0	
4.650	15.26	31.00	3.57	CLAYEY SILT to SILTY CLAY	16	16		2.0	
4.800	15.75	56.66	2.62	SANDY SILT to CLAYEY SILT	23	23		3.7	
4.950	16.24	84.77	2.41	SILTY SAND to SANDY SILT	28	29	63		39.0
5.100	16.73	56.94	3.13	SANDY SILT to CLAYEY SILT	23	23		3.7	
5.250	17.22	35.25	3.58	CLAYEY SILT to SILTY CLAY	18	17		2.3	
5.400	17.72	22.33	3.31	CLAYEY SILT to SILTY CLAY	11	11		1.4	
5.550	18.21	17.93	3.73	CLAY to SILTY CLAY	12	11		1.1	
5.700	18.70	21.88	3.89	CLAY to SILTY CLAY	15	14		1.4	
5.850	19.19	26.17	5.56	CLAY	26	24		1.5	
6.000	19.69	146.70	2.13	SILTY SAND to SANDY SILT	49	45	76		41.5
6.150	20.18	168.79	1.85	SAND to SILTY SAND	42	38	79		42.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 27.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-11

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	95.81	3.19	SANDY SILT to CLAYEY SILT	38	34		5.6	
6.450	21.16	31.19	4.34	CLAY to SILTY CLAY	21	18		1.8	
6.600	21.65	24.62	5.18	CLAY	25	22		1.4	
6.750	22.15	88.31	2.61	SANDY SILT to CLAYEY SILT	35	31		5.8	
6.900	22.64	130.12	2.14	SILTY SAND to SANDY SILT	43	37	70		39.5
7.050	23.13	257.95	1.34	SAND to SILTY SAND	64	55	89		43.5
7.200	23.62	323.20	1.49	SAND to SILTY SAND	81	68	96		44.0
7.350	24.11	321.63	.97	SAND	64	53	95		44.0
7.500	24.61	291.37	2.65	SILTY SAND to SANDY SILT	97	80	92		43.5
7.650	25.10	297.09	1.86	SAND to SILTY SAND	74	61	92		43.5
7.800	25.59	382.56	1.45	SAND	77	62	99		44.5
7.950	26.08	365.07	1.43	SAND	73	58	98		44.5
8.100	26.57	232.29	1.73	SAND to SILTY SAND	58	46	84		42.5
8.250	27.07	310.30	2.70	SILTY SAND to SANDY SILT	100	81	92		43.5
8.400	27.56	486.31	1.43	SAND	97	76	100		45.5
8.550	28.05	475.97	.92	SAND	95	74	100		45.0
8.700	28.54	507.24	.89	GRAVELLY SAND to SAND	85	66	100		45.5
8.850	29.04	523.22	1.69	SAND to SILTY SAND	100	100	100		
9.000	29.53	424.15	1.13	SAND	85	65	100		44.5
9.150	30.02	306.41	.67	SAND	61	47	91		43.0
9.300	30.51	126.51	2.96	SANDY SILT to CLAYEY SILT	51	39		7.3	
9.450	31.00	307.54	1.00	SAND	62	47	91		43.0
9.600	31.50	542.36	1.88	SAND to SILTY SAND	100	100	100		
9.750	31.99	605.48	2.51	*SAND to CLAYEY SAND	100	100			
9.900	32.48	523.77	.91	GRAVELLY SAND to SAND	87	65	100		
10.050	32.97	487.04	.65	GRAVELLY SAND to SAND	81	61	100		45.0
10.200	33.46	527.00	.93	SAND	100	78	100		
10.350	33.96	321.60	1.11	SAND	64	48	92		43.0
10.500	34.45	77.37	4.29	CLAYEY SILT to SILTY CLAY	39	29		4.4	
10.650	34.94	30.00	7.00	CLAY	30	22		1.6	
10.800	35.43	341.47	2.22	SAND to SILTY SAND	85	63	93		43.5
10.950	35.93	366.07	.76	SAND	73	53	95		43.5
11.100	36.42	389.57	.92	SAND	78	57	97		44.0
11.250	36.91	379.30	.92	SAND	76	55	96		43.5
11.400	37.40	420.56	1.36	SAND	84	61	99		44.0
11.550	37.89	475.93	1.00	SAND	95	68	100		44.5
11.700	38.39	421.88	.99	SAND	84	60	99		44.0
11.850	38.88	428.49	.87	SAND	86	61	99		44.0
12.000	39.37	387.78	1.30	SAND	78	55	96		43.5
12.150	39.86	203.93	1.58	SAND to SILTY SAND	51	36	78		40.0
12.300	40.35	63.01	3.20	SANDY SILT to CLAYEY SILT	25	18		3.6	
12.450	40.85	22.24	3.38	CLAYEY SILT to SILTY CLAY	11	8		1.3	
12.600	41.34	100.42	1.54	SILTY SAND to SANDY SILT	33	23	57		37.5
12.750	41.83	104.12	3.27	SANDY SILT to CLAYEY SILT	42	29		6.0	
12.900	42.32	274.38	2.21	SILTY SAND to SANDY SILT	91	64	86		42.0
13.050	42.81	303.57	2.02	SAND to SILTY SAND	76	53	88		42.5
13.200	43.31	274.50	2.24	SILTY SAND to SANDY SILT	92	63	85		42.0
13.350	43.80	267.54	2.09	SAND to SILTY SAND	67	46	85		42.0
13.500	44.29	385.93	1.29	SAND	77	53	95		43.5
13.650	44.78	443.29	1.07	SAND	89	61	99		44.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 27.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-11

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
13.800	45.28	556.40	1.54	SAND	100	76	100		
13.950	45.77	501.53	1.12	SAND	100	68	100		44.5
14.100	46.26	288.67	1.87	SAND to SILTY SAND	72	49	86		42.0
14.250	46.75	341.30	1.25	SAND	68	46	91		42.5
14.400	47.24	492.45	.88	SAND	98	66	100		44.0
14.550	47.74	301.53	1.67	SAND to SILTY SAND	75	51	87		42.0
14.700	48.23	218.23	2.43	SILTY SAND to SANDY SILT	73	49	78		39.5
14.850	48.72	303.93	2.80	SILTY SAND to SANDY SILT	100	68	87		42.0
15.000	49.21	427.28	1.85	SAND to SILTY SAND	100	71	97		43.5
15.150	49.70	580.43	1.94	SAND to SILTY SAND	100	96	100		
15.300	50.20	460.80	1.25	SAND	92	61	99		44.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 27.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

CPT INTERPRETATIONS

SOUNDING : CPT-16 PROJECT No.: 99-A893
PROJECT : AES-NEWHALL RNCH CONE/RIG : 473\#1 JH,GO
DATE/TIME: 08-24-99 08:02

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	233.59	.79	SAND	47	75	100		
.300	.98	163.10	2.23	SILTY SAND to SANDY SILT	54	87	90		
.450	1.48	113.79	2.97	SANDY SILT to CLAYEY SILT	46	73		6.7	
.600	1.97	68.85	3.13	SANDY SILT to CLAYEY SILT	28	44		4.0	
.750	2.46	47.18	2.89	SANDY SILT to CLAYEY SILT	19	30		3.1	
.900	2.95	36.99	2.15	SANDY SILT to CLAYEY SILT	15	24		2.5	
1.050	3.44	34.65	2.39	SANDY SILT to CLAYEY SILT	14	22		2.3	
1.200	3.94	21.52	2.36	CLAYEY SILT to SILTY CLAY	11	17		1.4	
1.350	4.43	22.24	2.71	CLAYEY SILT to SILTY CLAY	11	18		1.5	
1.500	4.92	9.88	1.02	CLAYEY SILT to SILTY CLAY	5	8		1.0	
1.650	5.41	13.75	2.04	CLAYEY SILT to SILTY CLAY	7	11		1.1	
1.800	5.91	9.05	3.77	CLAY	9	14		.6	
1.950	6.40	10.28	3.29	CLAY to SILTY CLAY	7	11		.7	
2.100	6.89	14.34	3.50	CLAY to SILTY CLAY	10	15		.9	
2.250	7.38	14.38	3.16	CLAY to SILTY CLAY	10	14		.9	
2.400	7.87	13.34	3.41	CLAY to SILTY CLAY	9	13		.9	
2.550	8.37	18.63	4.19	CLAY	19	26		1.2	
2.700	8.86	35.80	5.32	CLAY	36	49		2.1	
2.850	9.35	70.75	5.41	*VERY STIFF FINE GRAINED	71	94			
3.000	9.84	70.96	5.06	*VERY STIFF FINE GRAINED	71	92			
3.150	10.33	87.21	4.66	*VERY STIFF FINE GRAINED	87	100			
3.300	10.83	93.86	5.07	*VERY STIFF FINE GRAINED	94	100			
3.450	11.32	105.12	4.30	*VERY STIFF FINE GRAINED	100	100			
3.600	11.81	97.64	5.56	*VERY STIFF FINE GRAINED	98	100			
3.750	12.30	132.70	4.77	*VERY STIFF FINE GRAINED	100	100			
3.900	12.80	157.72	6.00	*VERY STIFF FINE GRAINED	100	100			
4.050	13.29	168.30	5.69	*VERY STIFF FINE GRAINED	100	100			
4.200	13.78	170.79	5.33	*VERY STIFF FINE GRAINED	100	100			
4.350	14.27	161.33	4.74	*VERY STIFF FINE GRAINED	100	100			
4.500	14.76	203.55	4.34	*VERY STIFF FINE GRAINED	100	100			
4.650	15.26	195.32	4.73	*VERY STIFF FINE GRAINED	100	100			
4.800	15.75	155.19	6.11	*VERY STIFF FINE GRAINED	100	100			
4.950	16.24	219.06	3.95	*SAND to CLAYEY SAND	100	100			
5.100	16.73	269.98	3.52	*SAND to CLAYEY SAND	100	100			

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 20.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

CPT INTERPRETATIONS

SOUNDING : CPT-24
PROJECT : AES-NEWHALL RNCH
DATE/TIME: 08-23-99 16:48

PROJECT No.: 99-A893
CONE/RIG : 473\#1 JH,GO

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	310.09	2.49	SILTY SAND to SANDY SILT	100	100	100		
.300	.98	282.96	4.05	*SAND to CLAYEY SAND	100	100			
.450	1.48	176.91	3.33	SANDY SILT to CLAYEY SILT	71	100		10.4	
.600	1.97	118.95	3.14	SANDY SILT to CLAYEY SILT	48	76		7.0	
.750	2.46	86.72	2.94	SANDY SILT to CLAYEY SILT	35	55		5.1	
.900	2.95	50.07	2.96	SANDY SILT to CLAYEY SILT	20	32		3.3	
1.050	3.44	39.98	3.10	CLAYEY SILT to SILTY CLAY	20	32		2.7	
1.200	3.94	38.39	2.66	SANDY SILT to CLAYEY SILT	15	25		2.5	
1.350	4.43	43.57	2.66	SANDY SILT to CLAYEY SILT	17	28		2.9	
1.500	4.92	41.04	3.09	CLAYEY SILT to SILTY CLAY	21	33		2.7	
1.650	5.41	40.64	3.69	CLAYEY SILT to SILTY CLAY	20	32		2.4	
1.800	5.91	39.58	4.35	CLAY to SILTY CLAY	26	42		2.3	
1.950	6.40	36.03	3.64	CLAYEY SILT to SILTY CLAY	18	29		2.4	
2.100	6.89	36.86	3.66	CLAYEY SILT to SILTY CLAY	18	29		2.4	
2.250	7.38	37.41	3.69	CLAYEY SILT to SILTY CLAY	19	28		2.2	
2.400	7.87	37.28	3.41	CLAYEY SILT to SILTY CLAY	19	27		2.5	
2.550	8.37	35.50	3.24	CLAYEY SILT to SILTY CLAY	18	25		2.3	
2.700	8.86	35.39	3.00	CLAYEY SILT to SILTY CLAY	18	24		2.3	
2.850	9.35	46.61	2.49	SANDY SILT to CLAYEY SILT	19	25		3.1	
3.000	9.84	41.72	3.00	CLAYEY SILT to SILTY CLAY	21	27		2.7	
3.150	10.33	40.98	3.32	CLAYEY SILT to SILTY CLAY	20	26		2.7	
3.300	10.83	52.81	1.70	SILTY SAND to SANDY SILT	18	22	55		39.0
3.450	11.32	56.07	2.92	SANDY SILT to CLAYEY SILT	22	27		3.7	
3.600	11.81	55.19	2.37	SANDY SILT to CLAYEY SILT	22	26		3.6	
3.750	12.30	55.41	2.67	SANDY SILT to CLAYEY SILT	22	26		3.6	
3.900	12.80	95.62	2.79	SANDY SILT to CLAYEY SILT	38	44		5.6	
4.050	13.29	114.08	1.88	SILTY SAND to SANDY SILT	38	44	75		42.5
4.200	13.78	70.38	3.40	SANDY SILT to CLAYEY SILT	28	32		4.1	
4.350	14.27	49.05	4.14	CLAYEY SILT to SILTY CLAY	25	28		2.8	
4.500	14.76	78.10	2.46	SANDY SILT to CLAYEY SILT	31	35		5.1	
4.650	15.26	52.69	3.64	CLAYEY SILT to SILTY CLAY	26	29		3.0	
4.800	15.75	43.47	4.14	CLAYEY SILT to SILTY CLAY	22	24		2.5	
4.950	16.24	52.09	3.86	CLAYEY SILT to SILTY CLAY	26	28		3.0	
5.100	16.73	59.70	3.74	CLAYEY SILT to SILTY CLAY	30	32		3.5	
5.250	17.22	67.15	3.26	SANDY SILT to CLAYEY SILT	27	29		3.9	
5.400	17.72	64.03	3.31	SANDY SILT to CLAYEY SILT	26	27		3.7	
5.550	18.21	65.05	2.21	SANDY SILT to CLAYEY SILT	26	27		4.3	
5.700	18.70	68.77	2.59	SANDY SILT to CLAYEY SILT	28	29		4.5	
5.850	19.19	50.03	3.22	CLAYEY SILT to SILTY CLAY	25	26		3.3	
6.000	19.69	37.48	3.50	CLAYEY SILT to SILTY CLAY	19	19		2.4	
6.150	20.18	25.81	4.26	CLAY to SILTY CLAY	17	18		1.6	

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 12.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-24

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	40.34	2.83	SANDY SILT to CLAYEY SILT	16	16		2.6	
6.450	21.16	29.66	3.84	CLAY to SILTY CLAY	20	20		1.9	
6.600	21.65	14.79	5.88	CLAY	15	15		.9	
6.750	22.15	21.52	4.46	CLAY	22	21		1.3	
6.900	22.64	22.92	4.71	CLAY	23	23		1.4	
7.050	23.13	15.70	5.22	CLAY	16	15		1.0	
7.200	23.62	10.24	5.18	CLAY	10	10		.6	
7.350	24.11	17.27	4.86	CLAY	17	17		1.1	
7.500	24.61	14.94	6.29	CLAY	15	14		.9	
7.650	25.10	50.80	2.83	SANDY SILT to CLAYEY SILT	20	19		3.3	
7.800	25.59	30.30	4.88	CLAY	30	29		1.7	
7.950	26.08	29.89	5.05	CLAY	30	28		1.7	
8.100	26.57	20.23	6.72	CLAY	20	19		1.1	
8.250	27.07	41.53	3.61	CLAYEY SILT to SILTY CLAY	21	19		2.3	
8.400	27.56	28.04	5.74	CLAY	28	26		1.6	
8.550	28.05	29.87	5.39	CLAY	30	27		1.7	
8.700	28.54	24.07	5.77	CLAY	24	22		1.3	
8.850	29.04	32.04	5.68	CLAY	32	29		1.8	
9.000	29.53	24.03	5.66	CLAY	24	22		1.3	
9.150	30.02	22.20	6.13	CLAY	22	20		1.2	
9.300	30.51	23.62	6.77	CLAY	24	21		1.3	
9.450	31.00	33.91	6.75	CLAY	34	30		1.9	
9.600	31.50	43.70	6.52	CLAY	44	39		2.5	
9.750	31.99	61.67	7.49	CLAY	62	54		3.5	
9.900	32.48	53.90	6.29	CLAY	54	47		3.1	
10.050	32.97	32.25	5.36	CLAY	32	28		1.8	
10.200	33.46	48.16	5.61	CLAY	48	42		2.7	
10.350	33.96	120.20	5.22	*VERY STIFF FINE GRAINED	100	100			
10.500	34.45	183.24	5.67	*VERY STIFF FINE GRAINED	100	100			
10.650	34.94	145.08	5.85	*VERY STIFF FINE GRAINED	100	100			
10.800	35.43	240.24	4.74	*VERY STIFF FINE GRAINED	100	100			

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 12.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

CPT INTERPRETATIONS

SOUNDING : CPT-28
PROJECT : AES-NEWHALL RNCH
DATE/TIME: 08-23-99 12:46

PROJECT No.: 99-A893
CONE/RIG : 473\#1 JH,GO

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	259.70	2.33	SILTY SAND to SANDY SILT	87	100	100		
.300	.98	441.55	2.86	*SAND to CLAYEY SAND	100	100			
.450	1.48	345.91	3.22	*SAND to CLAYEY SAND	100	100			
.600	1.97	177.63	3.44	SANDY SILT to CLAYEY SILT	71	100		10.4	
.750	2.46	161.50	2.79	SILTY SAND to SANDY SILT	54	86	90		
.900	2.95	131.74	2.15	SILTY SAND to SANDY SILT	44	70	84		49.0
1.050	3.44	105.76	2.15	SILTY SAND to SANDY SILT	35	56	78		47.5
1.200	3.94	91.95	2.26	SILTY SAND to SANDY SILT	31	49	74		46.5
1.350	4.43	92.44	1.56	SILTY SAND to SANDY SILT	31	49	74		46.0
1.500	4.92	71.00	2.40	SANDY SILT to CLAYEY SILT	28	45		4.7	
1.650	5.41	83.17	1.80	SILTY SAND to SANDY SILT	28	44	71		44.5
1.800	5.91	94.31	2.42	SILTY SAND to SANDY SILT	31	50	75		45.0
1.950	6.40	60.78	2.27	SANDY SILT to CLAYEY SILT	24	39		4.0	
2.100	6.89	49.88	2.18	SANDY SILT to CLAYEY SILT	20	31		3.3	
2.250	7.38	52.39	2.15	SANDY SILT to CLAYEY SILT	21	31		3.5	
2.400	7.87	85.68	2.56	SANDY SILT to CLAYEY SILT	34	50		5.7	
2.550	8.37	143.42	1.61	SAND to SILTY SAND	36	51	87		45.0
2.700	8.86	138.90	1.32	SAND to SILTY SAND	35	48	85		45.0
2.850	9.35	84.79	2.27	SILTY SAND to SANDY SILT	28	38	71		42.5
3.000	9.84	45.34	2.19	SANDY SILT to CLAYEY SILT	18	24		3.0	
3.150	10.33	31.14	3.17	CLAYEY SILT to SILTY CLAY	16	20		2.0	
3.300	10.83	32.06	2.58	SANDY SILT to CLAYEY SILT	13	16		2.1	
3.450	11.32	98.24	1.50	SILTY SAND to SANDY SILT	33	40	72		42.5
3.600	11.81	65.46	1.55	SILTY SAND to SANDY SILT	22	26	60		39.5
3.750	12.30	49.52	2.99	SANDY SILT to CLAYEY SILT	20	23		3.3	
3.900	12.80	72.21	1.36	SILTY SAND to SANDY SILT	24	27	61		39.5
4.050	13.29	255.75	.78	SAND	51	57	97		46.0
4.200	13.78	353.75	1.45	SAND	71	78	100		46.5
4.350	14.27	386.95	1.41	SAND	77	84	100		47.0
4.500	14.76	411.24	1.48	SAND	82	87	100		47.0
4.650	15.26	352.41	1.24	SAND	70	74	100		46.5
4.800	15.75	290.78	1.60	SAND to SILTY SAND	73	75	98		45.5
4.950	16.24	395.28	1.50	SAND	79	80	100		46.5
5.100	16.73	433.80	1.45	SAND	87	87	100		46.5
5.250	17.22	385.17	.79	SAND	77	76	100		46.0
5.400	17.72	244.85	1.76	SAND to SILTY SAND	61	59	92		44.5
5.550	18.21	170.38	1.82	SAND to SILTY SAND	43	41	81		42.5
5.700	18.70	170.43	3.19	SANDY SILT to CLAYEY SILT	68	64		10.0	
5.850	19.19	170.28	1.66	SAND to SILTY SAND	43	40	80		42.5
6.000	19.69	123.11	1.81	SILTY SAND to SANDY SILT	41	38	71		40.0
6.150	20.18	99.28	1.93	SILTY SAND to SANDY SILT	33	30	64		39.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 44.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-28

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	109.64	1.75	SILTY SAND to SANDY SILT	37	33	67		39.5
6.450	21.16	106.59	2.09	SILTY SAND to SANDY SILT	36	32	65		39.0
6.600	21.65	117.44	1.57	SILTY SAND to SANDY SILT	39	34	68		39.5
6.750	22.15	46.12	3.56	CLAYEY SILT to SILTY CLAY	23	20		2.6	
6.900	22.64	102.29	2.00	SILTY SAND to SANDY SILT	34	29	63		38.5
7.050	23.13	56.30	2.56	SANDY SILT to CLAYEY SILT	23	19		3.7	
7.200	23.62	53.24	3.35	CLAYEY SILT to SILTY CLAY	27	22		3.0	
7.350	24.11	44.87	3.76	CLAYEY SILT to SILTY CLAY	22	19		2.6	
7.500	24.61	49.54	4.38	CLAY to SILTY CLAY	33	27		2.8	
7.650	25.10	42.85	3.52	CLAYEY SILT to SILTY CLAY	21	17		2.4	
7.800	25.59	41.17	4.50	CLAY to SILTY CLAY	27	22		2.3	
7.950	26.08	36.24	5.07	CLAY	36	29		2.0	
8.100	26.57	24.35	6.42	CLAY	24	19		1.3	
8.250	27.07	135.20	1.88	SILTY SAND to SANDY SILT	45	35	69		39.0
8.400	27.56	204.08	1.57	SAND to SILTY SAND	51	40	80		41.5
8.550	28.05	160.61	1.86	SILTY SAND to SANDY SILT	54	41	73		39.5
8.700	28.54	153.11	1.99	SILTY SAND to SANDY SILT	51	39	71		39.5
8.850	29.04	184.53	1.53	SAND to SILTY SAND	46	35	77		40.5
9.000	29.53	183.47	1.58	SAND to SILTY SAND	46	34	76		40.0
9.150	30.02	151.28	1.35	SAND to SILTY SAND	38	28	70		39.0
9.300	30.51	45.27	3.46	CLAYEY SILT to SILTY CLAY	23	17		2.6	
9.450	31.00	55.62	2.49	SANDY SILT to CLAYEY SILT	22	16		3.6	
9.600	31.50	183.32	1.35	SAND to SILTY SAND	46	33	75		39.5
9.750	31.99	280.88	1.44	SAND to SILTY SAND	70	51	87		42.5
9.900	32.48	314.47	2.76	SILTY SAND to SANDY SILT	100	75	90		42.5
10.050	32.97	326.38	2.62	SILTY SAND to SANDY SILT	100	77	91		43.0
10.200	33.46	329.89	1.62	SAND to SILTY SAND	82	58	91		43.0
10.350	33.96	208.35	2.30	SILTY SAND to SANDY SILT	69	49	78		40.0
10.500	34.45	195.43	3.08	SILTY SAND to SANDY SILT	65	45	76		39.5
10.650	34.94	300.04	2.18	SAND to SILTY SAND	75	52	88		42.0
10.800	35.43	323.09	1.88	SAND to SILTY SAND	81	55	90		42.5
10.950	35.93	320.80	2.27	SILTY SAND to SANDY SILT	100	73	89		42.5
11.100	36.42	344.95	2.11	SAND to SILTY SAND	86	58	91		42.5
11.250	36.91	374.93	1.86	SAND to SILTY SAND	94	63	93		43.0
11.400	37.40	346.93	1.87	SAND to SILTY SAND	87	58	91		42.5
11.550	37.89	376.22	1.21	SAND	75	50	93		43.0
11.700	38.39	412.23	1.93	SAND to SILTY SAND	100	68	96		43.0
11.850	38.88	482.79	1.22	SAND	97	63	100		44.0
12.000	39.37	527.38	1.32	SAND	100	69	100		
12.150	39.86	356.96	1.16	SAND	71	46	91		42.5
12.300	40.35	353.45	1.06	SAND	71	45	90		42.5
12.450	40.85	369.91	.66	GRAVELLY SAND to SAND	62	39	92		42.5
12.600	41.34	222.26	1.12	SAND	44	28	77		39.5
12.750	41.83	132.38	3.40	SANDY SILT to CLAYEY SILT	53	33		7.6	
12.900	42.32	184.96	1.92	SAND to SILTY SAND	46	29	71		38.5
13.050	42.81	33.08	4.31	CLAY to SILTY CLAY	22	14		1.8	
13.200	43.31	150.50	2.83	SILTY SAND to SANDY SILT	50	31	65		38.0
13.350	43.80	102.63	4.64	*VERY STIFF FINE GRAINED	100	63			
13.500	44.29	162.78	2.05	SILTY SAND to SANDY SILT	54	33	67		38.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 44.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

CPT INTERPRETATIONS

SOUNDING : CPT-62
PROJECT : AES-NEWHALL RNCH
DATE/TIME: 08-25-99 14:03

PROJECT No.: 99-A893
CONE/RIG : 408\#1 JH,GO

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	133.37	1.59	SAND to SILTY SAND	33	53	85		
.300	.98	144.34	4.05	*VERY STIFF FINE GRAINED	100	100			
.450	1.48	103.27	5.72	*VERY STIFF FINE GRAINED	100	100			
.600	1.97	53.83	7.05	CLAY	54	86		3.2	
.750	2.46	45.38	5.62	CLAY	45	73		2.7	
.900	2.95	36.75	6.46	CLAY	37	59		2.2	
1.050	3.44	44.34	6.21	CLAY	44	71		2.6	
1.200	3.94	44.17	5.06	CLAY	44	71		2.6	
1.350	4.43	47.44	5.63	CLAY	47	76		2.8	
1.500	4.92	39.37	5.51	CLAY	39	63		2.3	
1.650	5.41	57.91	4.44	CLAY to SILTY CLAY	39	62		3.4	
1.800	5.91	71.30	4.86	*VERY STIFF FINE GRAINED	71	100			
1.950	6.40	44.08	6.01	CLAY	44	70		2.6	
2.100	6.89	44.70	5.39	CLAY	45	71		2.6	
2.250	7.38	35.18	5.35	CLAY	35	56		2.0	
2.400	7.87	31.80	6.39	CLAY	32	51		1.8	
2.550	8.37	31.55	6.24	CLAY	32	50		1.8	
2.700	8.86	29.83	6.38	CLAY	30	47		1.7	
2.850	9.35	27.81	7.83	CLAY	28	43		1.6	
3.000	9.84	34.78	6.52	CLAY	35	52		2.0	
3.150	10.33	43.42	6.50	CLAY	43	64		2.5	
3.300	10.83	52.92	5.90	CLAY	53	77		3.1	
3.450	11.32	34.71	7.71	CLAY	35	50		2.0	
3.600	11.81	42.77	7.78	CLAY	43	61		2.5	
3.750	12.30	59.89	6.31	CLAY	60	84		3.5	
3.900	12.80	73.10	6.25	*VERY STIFF FINE GRAINED	73	100			
4.050	13.29	69.02	6.41	*VERY STIFF FINE GRAINED	69	94			
4.200	13.78	61.14	6.93	CLAY	61	82		3.5	
4.350	14.27	82.75	6.49	*VERY STIFF FINE GRAINED	83	100			
4.500	14.76	82.51	6.41	*VERY STIFF FINE GRAINED	83	100			
4.650	15.26	88.63	5.94	*VERY STIFF FINE GRAINED	89	100			
4.800	15.75	83.28	6.45	*VERY STIFF FINE GRAINED	83	100			
4.950	16.24	59.27	6.68	CLAY	59	75		3.4	
5.100	16.73	104.48	4.31	*VERY STIFF FINE GRAINED	100	100			
5.250	17.22	98.58	4.90	*VERY STIFF FINE GRAINED	99	100			
5.400	17.72	76.25	4.83	*VERY STIFF FINE GRAINED	76	93			
5.550	18.21	175.35	2.10	SILTY SAND to SANDY SILT	58	71	89		44.5
5.700	18.70	171.96	1.59	SAND to SILTY SAND	43	52	88		44.5
5.850	19.19	111.96	1.93	SILTY SAND to SANDY SILT	37	44	75		42.5
6.000	19.69	63.37	2.68	SANDY SILT to CLAYEY SILT	25	30		4.1	
6.150	20.18	128.21	1.88	SILTY SAND to SANDY SILT	43	50	78		43.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 5.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-62

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	283.68	2.90	SILTY SAND to SANDY SILT	95	100	100		46.5
6.450	21.16	331.16	1.68	SAND to SILTY SAND	83	95	100		46.5
6.600	21.65	340.81	1.21	SAND	68	77	100		47.0
6.750	22.15	491.39	2.29	*SAND to CLAYEY SAND	100	100			
6.900	22.64	286.91	1.61	SAND to SILTY SAND	72	80	100		46.0
7.050	23.13	303.18	1.30	SAND	61	67	100		46.0
7.200	23.62	280.77	1.26	SAND	56	61	99		46.0
7.350	24.11	308.43	1.40	SAND	62	67	100		46.0
7.500	24.61	287.27	1.48	SAND to SILTY SAND	72	77	99		46.0
7.650	25.10	273.17	1.32	SAND	55	58	98		45.5
7.800	25.59	249.69	1.60	SAND to SILTY SAND	62	66	95		45.0
7.950	26.08	303.82	1.49	SAND to SILTY SAND	76	80	100		46.0
8.100	26.57	243.78	2.98	SILTY SAND to SANDY SILT	81	85	94		45.0
8.250	27.07	209.07	2.90	SILTY SAND to SANDY SILT	70	72	89		44.0
8.400	27.56	320.54	1.29	SAND	64	66	100		46.0
8.550	28.05	290.29	1.38	SAND	58	59	98		45.5
8.700	28.54	291.16	1.68	SAND to SILTY SAND	73	74	98		45.5
8.850	29.04	254.90	1.61	SAND to SILTY SAND	64	64	94		44.5
9.000	29.53	217.14	1.34	SAND to SILTY SAND	54	54	89		44.0
9.150	30.02	174.87	1.64	SAND to SILTY SAND	44	43	83		43.0
9.300	30.51	135.20	2.16	SILTY SAND to SANDY SILT	45	44	75		42.0
9.450	31.00	91.16	2.14	SILTY SAND to SANDY SILT	30	30	64		39.0
9.600	31.50	37.43	3.26	CLAYEY SILT to SILTY CLAY	19	18		2.4	
9.750	31.99	18.61	3.46	CLAY to SILTY CLAY	12	12		1.1	
9.900	32.48	31.06	1.68	SANDY SILT to CLAYEY SILT	12	12		2.3	
10.050	32.97	50.90	3.75	CLAYEY SILT to SILTY CLAY	25	24		2.9	
10.200	33.46	73.00	4.97	*VERY STIFF FINE GRAINED	73	69			
10.350	33.96	336.77	1.49	SAND to SILTY SAND	84	79	100		45.5
10.500	34.45	336.56	1.71	SAND to SILTY SAND	84	79	100		45.5
10.650	34.94	358.25	1.74	SAND to SILTY SAND	90	83	100		45.5
10.800	35.43	445.52	1.48	SAND	89	82	100		46.5
10.950	35.93	463.43	1.90	SAND to SILTY SAND	100	100	100		46.5
11.100	36.42	559.91	2.13	SAND to SILTY SAND	100	100	100		
11.250	36.91	513.27	2.35	*SAND to CLAYEY SAND	100	100			

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 5.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

CPT INTERPRETATIONS

SOUNDING : CPT-64
PROJECT : AES-NEWHALL RNCH
DATE/TIME: 08-27-99 08:36

PROJECT No.: 99-A893
CONE/RIG : 408\#1 JH,GO

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	261.99	.41	SAND	52	84	100		
.300	.98	115.17	1.45	SAND to SILTY SAND	29	46	80		
.450	1.48	46.91	3.16	CLAYEY SILT to SILTY CLAY	23	38		3.1	
.600	1.97	27.09	3.25	CLAYEY SILT to SILTY CLAY	14	22		1.8	
.750	2.46	22.52	2.56	CLAYEY SILT to SILTY CLAY	11	18		1.5	
.900	2.95	20.42	2.68	CLAYEY SILT to SILTY CLAY	10	16		1.3	
1.050	3.44	22.97	1.82	SANDY SILT to CLAYEY SILT	9	15		1.8	
1.200	3.94	20.76	2.44	CLAYEY SILT to SILTY CLAY	10	17		1.4	
1.350	4.43	23.92	2.50	CLAYEY SILT to SILTY CLAY	12	19		1.6	
1.500	4.92	38.54	3.16	CLAYEY SILT to SILTY CLAY	19	31		2.5	
1.650	5.41	39.09	3.19	CLAYEY SILT to SILTY CLAY	20	31		2.6	
1.800	5.91	35.59	3.32	CLAYEY SILT to SILTY CLAY	18	28		2.3	
1.950	6.40	27.17	2.17	SANDY SILT to CLAYEY SILT	11	17		1.8	
2.100	6.89	27.68	2.42	SANDY SILT to CLAYEY SILT	11	18		1.8	
2.250	7.38	22.29	2.89	CLAYEY SILT to SILTY CLAY	11	18		1.5	
2.400	7.87	27.87	4.43	CLAY to SILTY CLAY	19	30		1.6	
2.550	8.37	31.12	3.85	CLAYEY SILT to SILTY CLAY	16	25		2.0	
2.700	8.86	28.00	4.36	CLAY to SILTY CLAY	19	29		1.6	
2.850	9.35	33.57	4.31	CLAY to SILTY CLAY	22	34		1.9	
3.000	9.84	39.22	3.64	CLAYEY SILT to SILTY CLAY	20	30		2.3	
3.150	10.33	52.75	2.72	SANDY SILT to CLAYEY SILT	21	31		3.5	
3.300	10.83	22.75	4.26	CLAY to SILTY CLAY	15	22		1.5	
3.450	11.32	19.12	6.02	CLAY	19	28		1.1	
3.600	11.81	21.58	5.53	CLAY	22	31		1.2	
3.750	12.30	19.23	5.68	CLAY	19	27		1.1	
3.900	12.80	17.23	5.85	CLAY	17	24		1.1	
4.050	13.29	19.95	5.33	CLAY	20	27		1.1	
4.200	13.78	24.67	4.48	CLAY to SILTY CLAY	16	22		1.4	
4.350	14.27	38.28	2.36	SANDY SILT to CLAYEY SILT	15	20		2.5	
4.500	14.76	50.82	2.37	SANDY SILT to CLAYEY SILT	20	27		3.3	
4.650	15.26	60.55	1.67	SILTY SAND to SANDY SILT	20	26	60		40.0
4.800	15.75	3.63	31.86	ORGANIC MATERIAL	4	5		.3	
4.950	16.24	17.25	4.24	CLAY	17	22		1.1	
5.100	16.73	53.92	2.63	SANDY SILT to CLAYEY SILT	22	27		3.5	
5.250	17.22	24.22	4.89	CLAY	24	30		1.4	
5.400	17.72	105.93	1.80	SILTY SAND to SANDY SILT	35	43	74		42.5
5.550	18.21	196.71	1.74	SAND to SILTY SAND	49	60	92		45.0
5.700	18.70	244.63	1.47	SAND to SILTY SAND	61	73	98		46.0
5.850	19.19	202.40	1.07	SAND	40	48	92		45.0
6.000	19.69	223.09	.80	SAND	45	52	95		45.5
6.150	20.18	224.58	.96	SAND	45	52	95		45.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 5.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-64

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	308.69	.86	SAND	62	71	100		46.5
6.450	21.16	313.55	1.05	SAND	63	72	100		46.5
6.600	21.65	319.90	.98	SAND	64	72	100		46.5
6.750	22.15	343.53	.62	GRAVELLY SAND to SAND	57	64	100		46.5
6.900	22.64	333.54	1.41	SAND	67	74	100		46.5
7.050	23.13	309.30	.90	SAND	62	68	100		46.0
7.200	23.62	318.40	.54	GRAVELLY SAND to SAND	53	58	100		46.5
7.350	24.11	477.18	2.49	*SAND to CLAYEY SAND	100	100			
7.500	24.61	429.57	2.80	*SAND to CLAYEY SAND	100	100			
7.650	25.10	447.33	*****		0	0			45.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 5.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

CPT INTERPRETATIONS

SOUNDING : CPT-90
PROJECT : AES-NEWHALL RNCH
DATE/TIME: 08-25-99 15:01

PROJECT No.: 99-A893
CONE/RIG : 408\#1 JH, GO

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	127.45	2.14	SILTY SAND to SANDY SILT	42	68	83		
.300	.98	211.79	3.93	*SAND to CLAYEY SAND	100	100			
.450	1.48	120.18	5.43	*VERY STIFF FINE GRAINED	100	100			
.600	1.97	94.92	5.36	*VERY STIFF FINE GRAINED	95	100			
.750	2.46	81.45	5.56	*VERY STIFF FINE GRAINED	81	100			
.900	2.95	73.63	4.40	CLAYEY SILT to SILTY CLAY	37	59		4.3	
1.050	3.44	80.31	2.78	SANDY SILT to CLAYEY SILT	32	51		5.3	
1.200	3.94	72.95	3.02	SANDY SILT to CLAYEY SILT	29	47		4.3	
1.350	4.43	62.46	3.00	SANDY SILT to CLAYEY SILT	25	40		4.1	
1.500	4.92	73.74	2.40	SANDY SILT to CLAYEY SILT	29	47		4.9	
SM/ML t=0.5 1.650	5.41	84.04	2.32	SILTY SAND to SANDY SILT	28	45	71		44.5
1.800	5.91	93.39	2.02	SILTY SAND to SANDY SILT	31	50	74		45.0
1.950	6.40	95.58	1.84	SILTY SAND to SANDY SILT	32	51	75		44.5
2.100	6.89	101.15	1.77	SILTY SAND to SANDY SILT	34	52	77		44.5
2.250	7.38	66.35	2.48	SANDY SILT to CLAYEY SILT	27	40		4.4	
2.400	7.87	18.44	5.06	CLAY	18	27		1.2	
2.550	8.37	12.32	4.39	CLAY	12	17		.8	
2.700	8.86	6.05	3.63	CLAY	6	8		.4	
2.850	9.35	5.88	3.10	CLAY	6	8		.4	
3.000	9.84	5.95	6.46	CLAY	6	8		.4	
3.150	10.33	7.52	4.77	CLAY	8	10		.5	
3.300	10.83	7.61	4.91	CLAY	8	9		.5	
3.450	11.32	8.52	6.11	CLAY	9	10		.5	
3.600	11.81	17.87	3.83	CLAY to SILTY CLAY	12	14		1.1	
3.750	12.30	15.21	4.03	CLAY	15	18		1.0	
3.900	12.80	21.67	3.51	CLAY to SILTY CLAY	14	16		1.4	
4.050	13.29	25.79	3.86	CLAY to SILTY CLAY	17	19		1.7	
4.200	13.78	9.14	5.39	CLAY	9	10		.6	
4.350	14.27	10.13	5.61	CLAY	10	11		.6	
4.500	14.76	22.56	4.58	CLAY	23	24		1.4	
SP/SM t=0.5 4.650	15.26	92.39	1.32	SAND to SILTY SAND	23	24	66		40.0
4.800	15.75	165.62	1.00	SAND to SILTY SAND	41	43	82		43.0
4.950	16.24	188.70	1.19	SAND to SILTY SAND	47	48	86		43.5
5.100	16.73	250.46	.98	SAND	50	50	93		44.5
5.250	17.22	214.85	.71	SAND	43	42	88		44.0
5.400	17.72	216.80	.89	SAND	43	42	88		44.0
5.550	18.21	260.25	1.58	SAND to SILTY SAND	65	62	93		44.5
5.700	18.70	248.63	.62	SAND	50	47	91		44.0
5.850	19.19	290.33	2.80	SILTY SAND to SANDY SILT	97	90	95		44.5
6.000	19.69	271.64	1.14	SAND	54	50	93		44.0
6.150	20.18	304.84	1.14	SAND	61	55	96		44.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 27.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on ROBERTSON and CAMPANELLA, 1989

SOUNDING : CPT-90

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	346.16	.90	SAND	69	62	99		45.0
6.450	21.16	321.46	.87	SAND	64	57	97		44.5
6.600	21.65	323.39	1.11	SAND	65	57	97		44.5
6.750	22.15	363.60	1.14	SAND	73	63	100		45.0
6.900	22.64	462.46	1.81	SAND to SILTY SAND	100	99	100		46.0
7.050	23.13	564.62	2.13	*SAND to CLAYEY SAND	100	100			
7.200	23.62	446.07	2.27	SAND to SILTY SAND	100	94	100		45.5
7.350	24.11	593.28	1.69	SAND to SILTY SAND	100	100	100		
7.500	24.61	558.29	1.08	SAND	100	92	100		
7.650	25.10	414.74	1.00	SAND	83	68	100		45.0
7.800	25.59	379.69	1.77	SAND to SILTY SAND	95	77	99		44.5
7.950	26.08	439.98	1.39	SAND	88	70	100		45.0
8.100	26.57	573.95	1.37	SAND	100	91	100		
8.250	27.07	522.77	1.84	SAND to SILTY SAND	100	100	100		
8.400	27.56	433.12	1.58	SAND to SILTY SAND	100	85	100		45.0
8.550	28.05	338.71	1.99	SAND to SILTY SAND	85	66	95		44.0
8.700	28.54	328.81	2.07	SAND to SILTY SAND	82	64	94		43.5
8.850	29.04	328.23	1.62	SAND to SILTY SAND	82	63	94		43.5
9.000	29.53	305.10	1.62	SAND to SILTY SAND	76	59	91		43.0
9.150	30.02	242.66	2.14	SILTY SAND to SANDY SILT	81	62	85		42.0
9.300	30.51	303.40	1.05	SAND	61	46	91		43.0
9.450	31.00	173.12	1.72	SAND to SILTY SAND	43	33	75		40.0
9.600	31.50	28.28	5.21	CLAY	28	21		1.6	
9.750	31.99	143.76	2.34	SILTY SAND to SANDY SILT	48	36	69		39.0
9.900	32.48	260.99	1.91	SAND to SILTY SAND	65	49	86		42.5
10.050	32.97	332.01	1.67	SAND to SILTY SAND	83	62	93		43.5
10.200	33.46	358.89	2.40	SILTY SAND to SANDY SILT	100	89	95		43.5
10.350	33.96	493.88	2.44	*SAND to CLAYEY SAND	100	100			
10.500	34.45	610.85	1.97	SAND to SILTY SAND	100	100	100		
10.650	34.94	410.87	1.43	SAND	82	60	99		44.0
10.800	35.43	389.93	1.24	SAND	78	57	97		44.0
10.950	35.93	395.79	1.80	SAND to SILTY SAND	99	72	97		44.0
11.100	36.42	382.96	2.45	SILTY SAND to SANDY SILT	100	93	96		44.0
11.250	36.91	440.23	1.92	SAND to SILTY SAND	100	80	100		44.5
11.400	37.40	483.49	1.93	SAND to SILTY SAND	100	87	100		44.5
11.550	37.89	551.62	1.39	SAND	100	79	100		
11.700	38.39	427.06	1.56	SAND to SILTY SAND	100	76	99		44.0
11.850	38.88	530.93	1.60	SAND	100	76	100		
12.000	39.37	527.17	1.16	SAND	100	75	100		
12.150	39.86	542.08	2.22	*SAND to CLAYEY SAND	100	100			

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 27.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

CPT INTERPRETATIONS

SOUNDING : CPT-91
PROJECT : AES-NEWHALL RNCH
DATE/TIME: 08-24-99 16:24

PROJECT No.: 99-A893
CONE/RIG : 473\#1 JH,80

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	115.85	2.25	SILTY SAND to SANDY SILT	39	62	81		
.300	.98	89.59	3.18	SANDY SILT to CLAYEY SILT	36	57		5.3	
.450	1.48	60.74	2.52	SANDY SILT to CLAYEY SILT	24	39		4.0	
.600	1.97	44.21	3.06	CLAYEY SILT to SILTY CLAY	22	35		2.9	
.750	2.46	38.69	2.53	SANDY SILT to CLAYEY SILT	15	25		2.6	
.900	2.95	29.13	2.99	CLAYEY SILT to SILTY CLAY	15	23		1.9	
1.050	3.44	32.87	3.18	CLAYEY SILT to SILTY CLAY	16	26		2.2	
1.200	3.94	32.78	3.13	CLAYEY SILT to SILTY CLAY	16	26		2.2	
1.350	4.43	35.01	2.59	SANDY SILT to CLAYEY SILT	14	22		2.3	
5' 1.500	4.92	41.11	4.26	CLAY to SILTY CLAY	27	44		2.4	5'
1.650	5.41	32.67	1.96	SANDY SILT to CLAYEY SILT	13	21		2.6	
SM/ML E=0.5 1.800	5.91	44.78	1.74	SILTY SAND to SANDY SILT	15	24	53		42.0
1.950	6.40	45.00	3.72	CLAYEY SILT to SILTY CLAY	23	36		2.6	
2.100	6.89	52.16	1.65	SILTY SAND to SANDY SILT	17	27	58		42.0
ML/ML E=1.0 2.250	7.38	47.69	1.67	SILTY SAND to SANDY SILT	16	24	55		40.5
SP/SM E=0.5 2.400	7.87	96.73	1.25	SAND to SILTY SAND	24	35	75		44.0
2.550	8.37	124.22	1.26	SAND to SILTY SAND	31	44	83		44.5
2.700	8.86	152.28	1.03	SAND to SILTY SAND	38	52	88		45.0
2.850	9.35	133.33	1.39	SAND to SILTY SAND	33	45	83		44.5
SP/SM E=0.5 3.000	9.84	114.68	1.03	SAND to SILTY SAND	29	37	78		43.5
3.150	10.33	24.84	3.60	CLAYEY SILT to SILTY CLAY	12	16		1.6	
3.300	10.83	14.38	5.57	CLAY	14	18		.9	
3.450	11.32	169.49	1.44	SAND to SILTY SAND	42	51	88		44.5
3.600	11.81	130.23	1.92	SILTY SAND to SANDY SILT	43	52	79		43.5
ML/ML E=0.5 3.750	12.30	87.63	1.61	SILTY SAND to SANDY SILT	29	34	68		41.0
3.900	12.80	21.90	4.31	CLAY to SILTY CLAY	15	17		1.4	
4.050	13.29	8.39	4.68	CLAY	8	9		.5	
4.200	13.78	13.49	3.97	CLAY	13	15		.8	
4.350	14.27	23.84	3.73	CLAY to SILTY CLAY	16	17		1.5	
4.500	14.76	137.71	1.07	SAND to SILTY SAND	34	37	78		42.5
4.650	15.26	188.78	1.10	SAND	38	39	86		44.0
4.800	15.75	166.90	1.12	SAND to SILTY SAND	42	43	82		43.0
4.950	16.24	95.18	1.68	SILTY SAND to SANDY SILT	32	32	66		39.5
5.100	16.73	33.95	4.06	CLAY to SILTY CLAY	23	23		1.9	
5.250	17.22	14.98	5.94	CLAY	15	15		.9	
5.400	17.72	20.27	4.70	CLAY	20	20		1.3	
5.550	18.21	9.82	3.75	CLAY	10	9		.6	
5.700	18.70	12.77	3.05	CLAY to SILTY CLAY	9	8		.8	
5.850	19.19	203.53	1.47	SAND to SILTY SAND	51	47	85		43.0
6.000	19.69	274.84	.82	SAND	55	51	94		44.5
6.150	20.18	393.22	.87	SAND	79	71	100		46.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 27.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on ROBERTSON and CAMPANELLA, 1989

SOUNDING : CPT-91

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	376.71	.62	GRAVELLY SAND to SAND	63	56	100		45.5
6.450	21.16	285.64	.44	SAND	57	51	94		44.0
6.600	21.65	196.56	.57	SAND	39	34	83		42.5
6.750	22.15	135.78	1.63	SAND to SILTY SAND	34	29	72		40.0
6.900	22.64	129.68	1.01	SAND to SILTY SAND	32	28	70		39.5
7.050	23.13	242.36	.68	SAND	48	41	88		43.0
7.200	23.62	355.85	.31	GRAVELLY SAND to SAND	59	50	98		44.5
7.350	24.11	442.19	.91	SAND	88	74	100		45.5
7.500	24.61	429.40	.77	GRAVELLY SAND to SAND	72	59	100		45.5
7.650	25.10	357.57	.76	SAND	72	58	98		44.5
7.800	25.59	347.57	.93	SAND	70	56	97		44.0
7.950	26.08	380.28	.79	SAND	76	61	99		44.5
8.100	26.57	389.65	.21	GRAVELLY SAND to SAND	65	51	99		44.5
8.250	27.07	372.00	.37	GRAVELLY SAND to SAND	62	49	98		44.0
8.400	27.56	380.96	.37	GRAVELLY SAND to SAND	63	50	98		44.5
8.550	28.05	357.32	.63	GRAVELLY SAND to SAND	60	46	96		44.0
8.700	28.54	311.39	.35	GRAVELLY SAND to SAND	52	40	92		43.5
8.850	29.04	291.46	.46	SAND	58	45	90		43.0
9.000	29.53	251.35	.61	SAND	50	39	86		42.5
9.150	30.02	254.24	.13	GRAVELLY SAND to SAND	42	32	86		42.5
9.300	30.51	236.43	.37	SAND	47	36	84		42.0
9.450	31.00	236.35	.46	SAND	47	36	84		42.0
9.600	31.50	267.45	.42	SAND	53	40	87		42.5
9.750	31.99	270.23	1.02	SAND	54	41	87		42.5
9.900	32.48	337.94	.69	SAND	68	51	94		43.5
10.050	32.97	520.14	.67	GRAVELLY SAND to SAND	87	65	100		45.5
10.200	33.46	393.03	1.25	SAND	79	58	98		44.0
10.350	33.96	382.56	1.53	SAND to SILTY SAND	96	71	97		44.0
10.500	34.45	378.96	1.41	SAND	76	56	96		44.0
10.650	34.94	352.30	1.54	SAND to SILTY SAND	88	65	94		43.5
10.800	35.43	357.55	1.66	SAND to SILTY SAND	89	65	95		43.5
10.950	35.93	357.15	1.73	SAND to SILTY SAND	89	65	94		43.5
11.100	36.42	391.10	1.13	SAND	78	57	97		44.0
11.250	36.91	377.44	1.50	SAND	75	55	96		43.5
11.400	37.40	369.66	1.75	SAND to SILTY SAND	92	67	95		43.5
11.550	37.89	438.83	.78	GRAVELLY SAND to SAND	73	53	100		44.0
11.700	38.39	445.61	.38	GRAVELLY SAND to SAND	74	53	100		44.0
11.850	38.88	413.06	.31	GRAVELLY SAND to SAND	69	49	98		44.0
12.000	39.37	324.62	.21	GRAVELLY SAND to SAND	54	38	91		43.0
12.150	39.86	226.00	1.36	SAND to SILTY SAND	57	40	80		41.0
12.300	40.35	168.37	3.89	*SAND to CLAYEY SAND	84	59			
12.450	40.85	426.89	.88	SAND	85	60	98		44.0
12.600	41.34	484.59	.50	GRAVELLY SAND to SAND	81	57	100		44.5
12.750	41.83	390.33	.35	GRAVELLY SAND to SAND	65	45	96		43.5
12.900	42.32	208.69	.68	SAND	42	29	78		40.0
13.050	42.81	54.37	4.85	CLAY to SILTY CLAY	36	25		3.0	
13.200	43.31	120.67	2.35	SILTY SAND to SANDY SILT	40	28	62		38.0
13.350	43.80	144.09	2.81	SILTY SAND to SANDY SILT	48	33	67		38.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 27.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

CPT INTERPRETATIONS

SOUNDING : CPT-120
PROJECT : AES/NEWHALL RCH
DATE/TIME: 03-23-00 02:01

PROJECT No.: 1729
CONE/RIG : 473/BH,VO/R#3

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	29.21	.75	SILTY SAND to SANDY SILT	10	16	41		
.300	.98	37.79	1.35	SILTY SAND to SANDY SILT	13	20	48		48.5
.450	1.48	64.80	1.77	SILTY SAND to SANDY SILT	22	35	64		49.0
.600	1.97	45.61	1.75	SILTY SAND to SANDY SILT	15	24	54		46.5
.750	2.46	21.22	2.69	CLAYEY SILT to SILTY CLAY	11	17		1.4	
.900	2.95	12.30	2.28	CLAYEY SILT to SILTY CLAY	6	10		1.0	
1.050	3.44	17.06	1.58	SANDY SILT to CLAYEY SILT	7	11		1.3	
1.200	3.94	26.64	2.03	SANDY SILT to CLAYEY SILT	11	17		2.1	
1.350	4.43	19.35	2.74	CLAYEY SILT to SILTY CLAY	10	15		1.3	
1.500	4.92	11.07	2.80	CLAY to SILTY CLAY	7	12		.7	
1.650	5.41	17.10	1.93	CLAYEY SILT to SILTY CLAY	9	14		1.3	
1.800	5.91	11.68	3.17	CLAY to SILTY CLAY	8	12		.8	
1.950	6.40	25.56	1.92	SANDY SILT to CLAYEY SILT	10	16		2.0	
2.100	6.89	40.77	1.86	SANDY SILT to CLAYEY SILT	16	25		2.7	
2.250	7.38	33.01	2.42	SANDY SILT to CLAYEY SILT	13	20		2.2	
2.400	7.87	52.01	1.88	SILTY SAND to SANDY SILT	17	25	58		40.5
2.550	8.37	79.14	1.71	SILTY SAND to SANDY SILT	26	37	70		42.5
2.700	8.86	104.84	.94	SAND to SILTY SAND	26	36	77		43.5
2.850	9.35	209.39	2.11	SILTY SAND to SANDY SILT	70	93	96		46.0
3.000	9.84	226.07	1.53	SAND to SILTY SAND	57	74	98		46.5
3.150	10.33	203.29	1.76	SAND to SILTY SAND	51	65	94		46.0
3.300	10.83	205.10	1.77	SAND to SILTY SAND	51	64	94		45.5
3.450	11.32	226.85	1.72	SAND to SILTY SAND	57	69	96		46.0
3.600	11.81	256.83	1.83	SAND to SILTY SAND	64	76	99		46.0
3.750	12.30	258.34	1.10	SAND	52	60	99		46.0
3.900	12.80	223.86	1.47	SAND to SILTY SAND	56	64	94		45.5
4.050	13.29	261.29	1.53	SAND to SILTY SAND	65	73	98		46.0
4.200	13.78	150.65	2.45	SILTY SAND to SANDY SILT	50	55	81		43.5
4.350	14.27	75.97	2.57	SANDY SILT to CLAYEY SILT	30	33		5.0	
4.500	14.76	63.78	2.20	SANDY SILT to CLAYEY SILT	26	27		4.2	
4.650	15.26	51.99	2.02	SANDY SILT to CLAYEY SILT	21	22		3.4	
4.800	15.75	37.94	2.27	SANDY SILT to CLAYEY SILT	15	16		2.5	
4.950	16.24	123.50	1.12	SAND to SILTY SAND	31	31	73		42.0
5.100	16.73	189.25	1.32	SAND to SILTY SAND	47	47	85		43.5
5.250	17.22	162.82	1.70	SAND to SILTY SAND	41	40	80		42.5
5.400	17.72	194.77	1.79	SAND to SILTY SAND	49	47	85		43.5
5.550	18.21	208.79	1.70	SAND to SILTY SAND	52	50	87		43.5
5.700	18.70	187.95	2.02	SILTY SAND to SANDY SILT	63	59	83		43.0
5.850	19.19	162.97	1.65	SAND to SILTY SAND	41	38	79		42.0
6.000	19.69	85.68	2.81	SANDY SILT to CLAYEY SILT	34	32		5.0	
6.150	20.18	66.37	2.68	SANDY SILT to CLAYEY SILT	27	24		4.3	

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 28.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-120

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	43.19	3.10	CLAYEY SILT to SILTY CLAY	22	19		2.8	
6.450	21.16	37.37	2.68	SANDY SILT to CLAYEY SILT	15	13		2.4	
6.600	21.65	24.03	2.87	CLAYEY SILT to SILTY CLAY	12	11		1.5	
6.750	22.15	21.39	4.86	CLAY	21	19		1.3	
6.900	22.64	37.56	3.62	CLAYEY SILT to SILTY CLAY	19	16		2.4	
7.050	23.13	149.14	1.37	SAND to SILTY SAND	37	32	74		40.5
7.200	23.62	75.91	3.12	SANDY SILT to CLAYEY SILT	30	26		4.4	
7.350	24.11	123.90	2.14	SILTY SAND to SANDY SILT	41	34	68		39.0
7.500	24.61	376.61	3.21	*SAND to CLAYEY SAND	100	100			
7.650	25.10	296.39	2.84	SILTY SAND to SANDY SILT	99	81	92		43.5
7.800	25.59	264.20	.75	SAND	53	43	89		43.0
7.950	26.08	249.29	2.01	SAND to SILTY SAND	62	50	87		42.5
8.100	26.57	546.42	1.94	SAND to SILTY SAND	100	100	100		
8.250	27.07	396.15	1.89	SAND to SILTY SAND	99	78	99		44.5
8.400	27.56	277.73	1.78	SAND to SILTY SAND	69	54	89		43.0
8.550	28.05	361.82	1.38	SAND	72	56	96		44.0
8.700	28.54	450.54	2.39	*SAND to CLAYEY SAND	100	100			
8.850	29.04	348.73	2.54	SILTY SAND to SANDY SILT	100	88	95		44.0
9.000	29.53	399.53	2.41	SILTY SAND to SANDY SILT	100	100	99		44.0
9.150	30.02	424.32	1.53	SAND	85	64	100		44.5
9.300	30.51	362.86	1.15	SAND	73	55	96		44.0
9.450	31.00	406.88	1.01	SAND	81	61	99		44.0
9.600	31.50	334.03	1.76	SAND to SILTY SAND	84	62	93		43.5
9.750	31.99	378.14	1.65	SAND to SILTY SAND	95	70	97		44.0
9.900	32.48	462.31	1.55	SAND	92	68	100		44.5
10.050	32.97	425.07	1.32	SAND	85	63	100		44.5
10.200	33.46	427.21	1.41	SAND	85	63	100		44.5
10.350	33.96	481.68	1.48	SAND	96	71	100		44.5
10.500	34.45	487.53	1.52	SAND	98	71	100		44.5
10.650	34.94	571.89	1.39	SAND	100	83	100		
10.800	35.43	472.78	1.17	SAND	95	68	100		44.5
10.950	35.93	445.72	1.06	SAND	89	64	100		44.5
11.100	36.42	471.15	1.54	SAND	94	68	100		44.5
11.250	36.91	542.25	1.76	SAND to SILTY SAND	100	97	100		
11.400	37.40	469.87	1.73	SAND to SILTY SAND	100	84	100		44.5
11.550	37.89	510.73	.68	GRAVELLY SAND to SAND	85	60	100		44.5
11.700	38.39	428.08	1.08	SAND	86	61	99		44.0
11.850	38.88	455.98	1.13	SAND	91	64	100		44.0
12.000	39.37	429.53	1.15	SAND	86	60	99		44.0
12.150	39.86	180.01	1.07	SAND	36	25	74		39.5
12.300	40.35	97.90	2.54	SILTY SAND to SANDY SILT	33	23	56		37.0
12.450	40.85	45.76	3.39	CLAYEY SILT to SILTY CLAY	23	16		2.9	
12.600	41.34	241.83	2.21	SILTY SAND to SANDY SILT	81	56	82		41.0
12.750	41.83	274.29	3.08	*SAND to CLAYEY SAND	100	95			
12.900	42.32	275.89	2.92	SILTY SAND to SANDY SILT	92	63	85		42.0
13.050	42.81	211.19	1.26	SAND to SILTY SAND	53	36	78		40.0
13.200	43.31	42.89	11.66	CLAY	43	29		2.4	
13.350	43.80	325.90	1.11	SAND	65	44	90		42.5
13.500	44.29	368.68	1.57	SAND to SILTY SAND	92	63	93		43.0
13.650	44.78	415.00	1.35	SAND	83	56	97		43.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 28.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-120

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
13.800	45.28	371.40	1.37	SAND	74	50	93		43.0
13.950	45.77	402.29	1.42	SAND	80	54	96		43.5
14.100	46.26	407.86	1.78	SAND to SILTY SAND	100	68	96		43.5
14.250	46.75	448.84	3.15	*SAND to CLAYEY SAND	100	100			

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 28.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

CPT INTERPRETATIONS

SOUNDING : CPT-121
PROJECT : SEWARD-RIVER VLG
DATE/TIME: 08-23-00 08:18

PROJECT No.: 1702R
CONE/RIG : 471\#1 JH,VO

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	15.21	3.79	CLAY to SILTY CLAY	10	16		1.0	
.300	.98	13.36	2.94	CLAY to SILTY CLAY	9	14		.9	
.450	1.48	28.79	2.17	SANDY SILT to CLAYEY SILT	12	18		1.9	
.600	1.97	10.35	3.11	CLAY to SILTY CLAY	7	11		.7	
.750	2.46	46.59	1.59	SILTY SAND to SANDY SILT	16	25	54		45.5
.900	2.95	60.23	2.53	SANDY SILT to CLAYEY SILT	24	39		4.0	
1.050	3.44	176.27	2.03	SILTY SAND to SANDY SILT	59	94	93		49.5
1.200	3.94	200.02	2.37	SILTY SAND to SANDY SILT	67	100	96		49.5
1.350	4.43	196.22	2.25	SILTY SAND to SANDY SILT	65	100	96		49.0
1.500	4.92	192.31	2.70	SILTY SAND to SANDY SILT	64	100	95		48.5
1.650	5.41	176.57	1.81	SAND to SILTY SAND	44	71	93		47.5
1.800	5.91	137.09	1.58	SAND to SILTY SAND	34	55	85		46.5
1.950	6.40	84.87	1.38	SILTY SAND to SANDY SILT	28	45	72		44.0
2.100	6.89	73.00	1.14	SILTY SAND to SANDY SILT	24	38	67		43.0
2.250	7.38	133.27	.61	SAND	27	40	85		45.5
2.400	7.87	100.40	1.03	SAND to SILTY SAND	25	37	76		44.0
2.550	8.37	55.92	1.49	SILTY SAND to SANDY SILT	19	26	60		40.5
2.700	8.86	165.14	1.49	SAND to SILTY SAND	41	57	90		45.5
2.850	9.35	146.40	1.27	SAND to SILTY SAND	37	49	86		45.0
3.000	9.84	185.47	1.47	SAND to SILTY SAND	46	60	92		45.5
3.150	10.33	198.13	1.62	SAND to SILTY SAND	50	63	93		45.5
3.300	10.83	178.67	.60	SAND	36	44	90		45.0
3.450	11.32	183.36	.56	SAND	37	44	90		45.0
3.600	11.81	234.29	.60	SAND	47	56	97		46.0
3.750	12.30	272.02	.71	SAND	54	64	100		46.5
3.900	12.80	222.48	.61	SAND	44	52	94		45.5
4.050	13.29	418.76	.81	SAND	84	97	100		48.0
4.200	13.78	276.76	1.29	SAND	55	64	100		46.0
4.350	14.27	188.46	1.09	SAND	38	43	89		44.5
4.500	14.76	338.88	1.02	SAND	68	77	100		46.5
4.650	15.26	259.34	.58	SAND	52	58	98		46.0
4.800	15.75	244.21	.40	SAND	49	54	96		45.5
4.950	16.24	222.58	.60	SAND	45	49	93		45.0
5.100	16.73	248.46	1.06	SAND	50	54	96		45.5
5.250	17.22	268.81	.63	SAND	54	58	98		45.5
5.400	17.72	300.66	1.19	SAND	60	65	100		46.0
5.550	18.21	307.84	.89	SAND	62	66	100		46.0
5.700	18.70	322.81	.78	SAND	65	68	100		46.0
5.850	19.19	281.13	1.36	SAND	56	59	98		45.5
6.000	19.69	275.61	1.21	SAND	55	57	97		45.5
6.150	20.18	234.35	.62	SAND	47	48	92		44.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 11.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-121

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	29.96	3.66	CLAYEY SILT to SILTY CLAY	15	15		1.9	
6.450	21.16	52.75	1.82	SILTY SAND to SANDY SILT	18	18	49		38.0
6.600	21.65	26.51	4.33	CLAY to SILTY CLAY	18	18		1.5	
6.750	22.15	201.46	1.49	SAND to SILTY SAND	50	50	87		44.0
6.900	22.64	373.25	1.15	SAND	75	74	100		46.0
7.050	23.13	397.62	1.08	SAND	80	79	100		46.5
7.200	23.62	311.11	.81	SAND	62	61	99		45.5
7.350	24.11	220.50	1.96	SAND to SILTY SAND	55	54	89		44.0
7.500	24.61	367.20	1.43	SAND	73	71	100		46.0
7.650	25.10	415.78	1.39	SAND	83	80	100		46.5
7.800	25.59	390.99	.71	GRAVELLY SAND to SAND	65	62	100		46.0
7.950	26.08	376.90	.88	SAND	75	72	100		46.0
8.100	26.57	270.68	1.06	SAND	54	51	94		44.5
8.250	27.07	355.94	2.05	SAND to SILTY SAND	89	83	100		45.5
8.400	27.56	406.12	1.25	SAND	81	76	100		46.0
8.550	28.05	356.98	.75	SAND	71	66	100		45.5
8.700	28.54	327.04	.45	GRAVELLY SAND to SAND	55	50	99		45.0
8.850	29.04	290.44	.50	SAND	58	53	95		44.5
9.000	29.53	344.19	1.74	SAND to SILTY SAND	86	78	100		45.0
9.150	30.02	266.69	2.19	SILTY SAND to SANDY SILT	89	80	92		44.0
9.300	30.51	272.23	1.66	SAND to SILTY SAND	68	61	93		44.0
9.450	31.00	345.84	2.13	SAND to SILTY SAND	86	77	99		45.0
9.600	31.50	168.92	2.66	SILTY SAND to SANDY SILT	56	50	79		42.0
9.750	31.99	299.40	1.34	SAND	60	53	95		44.5
9.900	32.48	312.13	1.50	SAND to SILTY SAND	78	69	96		44.5
10.050	32.97	375.18	1.87	SAND to SILTY SAND	94	82	100		45.0
10.200	33.46	306.46	1.33	SAND	61	53	95		44.5
10.350	33.96	103.84	3.68	SANDY SILT to CLAYEY SILT	42	36		6.0	
10.500	34.45	324.58	1.48	SAND to SILTY SAND	81	70	96		44.5
10.650	34.94	415.46	2.56	*SAND to CLAYEY SAND	100	100			
10.800	35.43	592.52	2.82	*SAND to CLAYEY SAND	100	100			

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 11.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

CPT INTERPRETATIONS

SOUNDING : CPT-125 PROJECT No.: 1702R
PROJECT : SEWARD-RIVER VLG CONE/RIG : 491/#1/JH,VO
DATE/TIME: 08-23-00 13:48

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	17.63	1.52	SANDY SILT to CLAYEY SILT	7	11		1.4	
.300	.98	28.47	2.00	SANDY SILT to CLAYEY SILT	11	18		2.3	
.450	1.48	60.06	1.70	SILTY SAND to SANDY SILT	20	32	62		48.5
.600	1.97	135.20	2.23	SILTY SAND to SANDY SILT	45	72	85		
.750	2.46	124.18	2.16	SILTY SAND to SANDY SILT	41	66	83		49.5
.900	2.95	121.31	1.82	SILTY SAND to SANDY SILT	40	65	82		48.5
1.050	3.44	82.43	1.90	SILTY SAND to SANDY SILT	27	44	71		46.5
1.200	3.94	116.89	1.00	SAND to SILTY SAND	29	47	81		47.5
1.350	4.43	140.22	.91	SAND to SILTY SAND	35	56	86		47.5
1.500	4.92	170.02	1.17	SAND to SILTY SAND	43	68	92		48.0
1.650	5.41	220.05	1.32	SAND to SILTY SAND	55	88	99		48.5
1.800	5.91	118.40	1.25	SAND to SILTY SAND	30	47	81		46.0
1.950	6.40	61.25	2.89	SANDY SILT to CLAYEY SILT	25	39		4.1	
2.100	6.89	74.06	1.83	SILTY SAND to SANDY SILT	25	38	68		43.0
2.250	7.38	34.50	4.59	CLAY to SILTY CLAY	23	35		2.0	
2.400	7.87	184.98	1.51	SAND to SILTY SAND	46	67	94		46.5
2.550	8.37	299.08	1.54	SAND to SILTY SAND	75	100	100		48.0
2.700	8.86	326.62	1.71	SAND to SILTY SAND	82	100	100		48.0
2.850	9.35	334.07	1.75	SAND to SILTY SAND	84	100	100		48.0
3.000	9.84	303.38	1.79	SAND to SILTY SAND	76	99	100		47.5
3.150	10.33	273.65	1.60	SAND to SILTY SAND	68	87	100		47.0
3.300	10.83	270.64	.93	SAND	54	67	100		46.5
3.450	11.32	247.16	.39	SAND	49	60	99		46.0
3.600	11.81	252.79	1.42	SAND to SILTY SAND	63	76	99		46.0
3.750	12.30	318.16	1.87	SAND to SILTY SAND	80	95	100		47.0
3.900	12.80	341.40	.90	SAND	68	81	100		47.0
4.050	13.29	375.54	.89	SAND	75	88	100		47.5
4.200	13.78	295.86	.99	SAND	59	69	100		46.5
4.350	14.27	223.30	1.09	SAND	45	51	94		45.5
4.500	14.76	247.37	.56	SAND	49	56	97		46.0
4.650	15.26	174.02	1.20	SAND to SILTY SAND	44	49	86		44.0
4.800	15.75	186.72	.70	SAND	37	42	88		44.5
4.950	16.24	146.36	.79	SAND	29	33	81		43.0
5.100	16.73	128.13	1.45	SAND to SILTY SAND	32	35	77		42.5
5.250	17.22	307.94	.56	SAND	62	67	100		46.0
5.400	17.72	369.09	.69	SAND	74	80	100		46.5
5.550	18.21	385.17	.79	SAND	77	83	100		47.0
5.700	18.70	363.56	.76	SAND	73	77	100		46.5
5.850	19.19	300.76	.93	SAND	60	64	100		46.0
6.000	19.69	254.70	.77	SAND	51	53	95		45.0
6.150	20.18	158.53	1.85	SILTY SAND to SANDY SILT	53	55	81		43.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 11.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-125

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	287.95	.91	SAND	58	59	98		45.5
6.450	21.16	243.34	1.16	SAND	49	50	93		44.5
6.600	21.65	230.80	1.88	SAND to SILTY SAND	58	59	91		44.5
6.750	22.15	256.42	1.47	SAND to SILTY SAND	64	65	94		45.0
6.900	22.64	270.66	1.35	SAND	54	54	96		45.0
7.050	23.13	330.34	1.11	SAND	66	66	100		46.0
7.200	23.62	352.83	1.30	SAND	71	70	100		46.0
7.350	24.11	372.38	1.10	SAND	74	73	100		46.0
7.500	24.61	374.69	1.10	SAND	75	73	100		46.0
7.650	25.10	397.79	.91	SAND	80	77	100		46.0
7.800	25.59	339.00	.70	SAND	68	65	100		45.5
7.950	26.08	286.78	.63	SAND	57	55	96		45.0
8.100	26.57	267.43	.62	SAND	53	51	94		44.5
8.250	27.07	297.36	1.15	SAND	59	56	97		45.0
8.400	27.56	257.89	.70	SAND	52	48	92		44.0
8.550	28.05	223.47	.83	SAND	45	42	88		43.5
8.700	28.54	256.68	.89	SAND	51	48	92		44.0
8.850	29.04	307.33	1.23	SAND	61	57	97		45.0
9.000	29.53	259.23	.70	SAND	52	47	92		44.0
9.150	30.02	264.24	1.82	SAND to SILTY SAND	66	60	92		44.0
9.300	30.51	259.89	.69	SAND	52	47	91		44.0
9.450	31.00	266.35	.53	SAND	53	48	92		44.0
9.600	31.50	256.91	.81	SAND	51	46	91		44.0
9.750	31.99	307.35	1.46	SAND to SILTY SAND	77	68	96		44.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 11.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

CPT INTERPRETATIONS

SOUNDING : CPT-126 PROJECT No.: 1702R
PROJECT : SEWARD-RIVER VLG CONE/RIG : 491/#1/JH,VO
DATE/TIME: 08-23-00 14:24

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	80.96	1.37	SILTY SAND to SANDY SILT	27	43	70		
.300	.98	106.52	1.75	SILTY SAND to SANDY SILT	36	57	78		
.450	1.48	61.29	2.05	SILTY SAND to SANDY SILT	20	33	62		48.5
.600	1.97	111.17	2.20	SILTY SAND to SANDY SILT	37	59	79		
.750	2.46	112.51	2.32	SILTY SAND to SANDY SILT	38	60	80		49.0
.900	2.95	111.64	2.00	SILTY SAND to SANDY SILT	37	60	79		48.0
1.050	3.44	30.70	4.16	CLAY to SILTY CLAY	20	33		1.8	
1.200	3.94	10.64	4.38	CLAY	11	17		.7	
1.350	4.43	20.29	2.41	CLAYEY SILT to SILTY CLAY	10	16		1.3	
1.500	4.92	17.61	2.73	CLAYEY SILT to SILTY CLAY	9	14		1.2	
1.650	5.41	8.69	3.96	CLAY	9	14		.6	
1.800	5.91	12.94	3.83	CLAY	13	21		.8	
1.950	6.40	39.88	2.46	SANDY SILT to CLAYEY SILT	16	26		2.6	
2.100	6.89	52.11	1.90	SILTY SAND to SANDY SILT	17	27	58		42.0
2.250	7.38	106.18	1.32	SAND to SILTY SAND	27	40	78		44.5
2.400	7.87	100.00	1.17	SAND to SILTY SAND	25	36	76		44.0
2.550	8.37	68.98	1.28	SILTY SAND to SANDY SILT	23	32	66		42.0
2.700	8.86	56.66	1.15	SILTY SAND to SANDY SILT	19	26	60		40.5
2.850	9.35	51.45	1.14	SILTY SAND to SANDY SILT	17	23	56		39.5
3.000	9.84	112.11	1.15	SAND to SILTY SAND	28	36	78		43.5
3.150	10.33	120.03	.79	SAND to SILTY SAND	30	38	79		43.5
3.300	10.83	199.32	.96	SAND	40	49	93		45.5
3.450	11.32	142.66	1.61	SAND to SILTY SAND	36	43	83		44.0
3.600	11.81	104.80	1.56	SILTY SAND to SANDY SILT	35	41	73		42.5
3.750	12.30	183.05	1.59	SAND to SILTY SAND	46	53	89		44.5
3.900	12.80	256.91	1.76	SAND to SILTY SAND	64	73	98		46.0
4.050	13.29	279.48	1.53	SAND to SILTY SAND	70	78	100		46.0
4.200	13.78	301.83	1.31	SAND	60	66	100		46.0
4.350	14.27	302.55	.99	SAND	61	66	100		46.0
4.500	14.76	278.39	1.06	SAND	56	60	98		46.0
4.650	15.26	300.87	.65	SAND	60	64	100		46.0
4.800	15.75	344.51	1.04	SAND	69	73	100		46.5
4.950	16.24	408.50	.69	GRAVELLY SAND to SAND	68	72	100		47.0
5.100	16.73	381.03	1.14	SAND	76	80	100		46.5
5.250	17.22	302.67	.52	SAND	61	63	100		46.0
5.400	17.72	287.38	.69	SAND	57	59	98		45.5
5.550	18.21	275.86	.68	SAND	55	56	97		45.0
5.700	18.70	256.02	.80	SAND	51	52	94		45.0
5.850	19.19	222.62	.77	SAND	45	45	90		44.0
6.000	19.69	198.19	.92	SAND	40	40	87		43.5
6.150	20.18	179.77	.64	SAND	36	36	84		43.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 14.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-126

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	142.79	.48	SAND	29	28	77		42.0
6.450	21.16	148.16	.44	SAND	30	29	78		42.0
6.600	21.65	153.58	.57	SAND	31	30	78		42.5
6.750	22.15	135.01	.36	SAND	27	26	75		41.5
6.900	22.64	124.58	.67	SAND	25	24	72		41.0
7.050	23.13	226.66	3.73	*SAND to CLAYEY SAND	100	100			
7.200	23.62	156.87	4.63	*VERY STIFF FINE GRAINED	100	100			
7.350	24.11	135.35	5.98	*VERY STIFF FINE GRAINED	100	100			
7.500	24.61	242.83	7.96	*VERY STIFF FINE GRAINED	100	100			
7.650	25.10	179.71	6.99	*VERY STIFF FINE GRAINED	100	100			
7.800	25.59	212.41	6.07	*VERY STIFF FINE GRAINED	100	100			
7.950	26.08	286.08	5.23	*VERY STIFF FINE GRAINED	100	100			
8.100	26.57	292.22	5.00	*VERY STIFF FINE GRAINED	100	100			
8.250	27.07	298.11	5.61	*VERY STIFF FINE GRAINED	100	100			
8.400	27.56	315.80	5.18	*VERY STIFF FINE GRAINED	100	100			
8.550	28.05	288.99	5.02	*VERY STIFF FINE GRAINED	100	100			
8.700	28.54	299.25	*****		0	0			.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 14.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

CPT INTERPRETATIONS

SOUNDING : CPT-128 PROJECT No.: 1702R
PROJECT : SEWARD-RIVER VLG CONE/RIG : 491/#1/JH,VO
DATE/TIME: 08-23-00 15:00

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	81.98	.63	SAND to SILTY SAND	20	33	71		
.300	.98	104.72	1.83	SILTY SAND to SANDY SILT	35	56	78		
.450	1.48	80.60	1.52	SILTY SAND to SANDY SILT	27	43	70		
.600	1.97	79.29	1.48	SILTY SAND to SANDY SILT	26	42	70		48.5
.750	2.46	42.57	1.11	SILTY SAND to SANDY SILT	14	23	52		45.0
.900	2.95	26.02	.63	SILTY SAND to SANDY SILT	9	14	38		42.5
1.050	3.44	19.89	.69	SANDY SILT to CLAYEY SILT	8	13		2.0	
1.200	3.94	12.15	.54	SANDY SILT to CLAYEY SILT	5	8		1.2	
1.350	4.43	7.69	1.43	CLAYEY SILT to SILTY CLAY	4	6		.6	
1.500	4.92	4.40	6.17	CLAY	4	7		.3	
1.650	5.41	4.72	1.40	SENSITIVE FINE GRAINED	2	4		.4	
1.800	5.91	3.53	2.82	CLAY	4	6		.3	
1.950	6.40	3.36	4.77	CLAY	3	5		.2	
2.100	6.89	1.76	9.47	ORGANIC MATERIAL	2	3		.1	
2.250	7.38	1.17	9.40	ORGANIC MATERIAL	1	2		.1	
2.400	7.87	8.69	2.65	CLAY to SILTY CLAY	6	8		.7	
2.550	8.37	12.98	5.73	CLAY	13	18		.8	
2.700	8.86	8.60	3.99	CLAY	9	12		.5	
2.850	9.35	34.65	1.66	SANDY SILT to CLAYEY SILT	14	19		2.7	
3.000	9.84	25.03	2.11	SANDY SILT to CLAYEY SILT	10	13		2.0	
3.150	10.33	26.75	3.26	CLAYEY SILT to SILTY CLAY	13	17		1.7	
3.300	10.83	91.25	1.65	SILTY SAND to SANDY SILT	30	38	71		42.0
3.450	11.32	82.77	2.46	SANDY SILT to CLAYEY SILT	33	40		5.5	
3.600	11.81	56.38	3.84	CLAYEY SILT to SILTY CLAY	28	33		3.3	
3.750	12.30	14.32	7.43	CLAY	14	17		.9	
3.900	12.80	8.92	7.49	CLAY	9	10		.5	
4.050	13.29	7.75	7.13	CLAY	8	9		.5	
4.200	13.78	8.82	9.32	CLAY	9	10		.5	
4.350	14.27	76.82	1.70	SILTY SAND to SANDY SILT	26	28	62		39.5
4.500	14.76	159.82	1.52	SAND to SILTY SAND	40	42	82		43.0
4.650	15.26	278.37	1.63	SAND to SILTY SAND	70	73	98		45.5
4.800	15.75	296.56	1.74	SAND to SILTY SAND	74	76	99		45.5
4.950	16.24	286.02	1.64	SAND to SILTY SAND	72	72	97		45.5
5.100	16.73	267.11	1.66	SAND to SILTY SAND	67	67	95		45.0
5.250	17.22	302.31	1.47	SAND to SILTY SAND	76	74	98		45.5
5.400	17.72	302.48	1.14	SAND	60	59	98		45.0
5.550	18.21	242.57	1.43	SAND to SILTY SAND	61	58	91		44.0
5.700	18.70	136.14	1.60	SAND to SILTY SAND	34	32	74		41.5
5.850	19.19	95.28	2.05	SILTY SAND to SANDY SILT	32	30	64		39.0
6.000	19.69	49.46	2.44	SANDY SILT to CLAYEY SILT	20	18		3.2	
6.150	20.18	23.01	2.61	CLAYEY SILT to SILTY CLAY	12	10		1.5	

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 26.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-128

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	25.75	2.58	CLAYEY SILT to SILTY CLAY	13	12		1.6	
6.450	21.16	33.50	2.27	SANDY SILT to CLAYEY SILT	13	12		2.1	
6.600	21.65	35.14	2.68	SANDY SILT to CLAYEY SILT	14	12		2.3	
6.750	22.15	10.47	5.28	CLAY	10	9		.6	
6.900	22.64	5.48	8.16	CLAY	5	5		.3	
7.050	23.13	10.30	5.01	CLAY	10	9		.6	
7.200	23.62	7.29	6.28	CLAY	7	6		.4	
7.350	24.11	62.50	2.01	SILTY SAND to SANDY SILT	21	17	48		36.5
7.500	24.61	144.70	2.49	SILTY SAND to SANDY SILT	48	40	72		40.0
7.650	25.10	337.71	1.36	SAND	68	55	96		44.0
7.800	25.59	411.96	1.70	SAND to SILTY SAND	100	83	100		45.0
7.950	26.08	450.67	1.98	SAND to SILTY SAND	100	90	100		45.0
8.100	26.57	351.58	1.73	SAND to SILTY SAND	88	70	96		44.0
8.250	27.07	337.35	1.79	SAND to SILTY SAND	84	67	95		44.0
8.400	27.56	379.98	1.46	SAND	76	60	98		44.5
8.550	28.05	403.10	1.06	SAND	81	63	100		44.5
8.700	28.54	401.42	1.16	SAND	80	63	100		44.5
8.850	29.04	364.11	1.30	SAND	73	57	97		44.0
9.000	29.53	352.52	1.47	SAND	71	55	96		44.0
9.150	30.02	376.86	1.03	SAND	75	58	98		44.0
9.300	30.51	376.48	1.39	SAND	75	58	97		44.0
9.450	31.00	463.26	1.04	SAND	93	71	100		45.0
9.600	31.50	436.16	.70	GRAVELLY SAND to SAND	73	55	100		44.5
9.750	31.99	426.94	1.44	SAND	85	65	100		44.5
9.900	32.48	485.13	1.06	SAND	97	73	100		45.0
10.050	32.97	493.79	1.95	SAND to SILTY SAND	100	93	100		45.0
10.200	33.46	480.88	1.15	SAND	96	72	100		45.0
10.350	33.96	476.67	.97	SAND	95	71	100		45.0
10.500	34.45	571.06	1.16	SAND	100	85	100		
10.650	34.94	426.38	1.16	SAND	85	63	100		44.5
10.800	35.43	391.07	1.66	SAND to SILTY SAND	98	72	97		44.0
10.950	35.93	382.73	1.62	SAND to SILTY SAND	96	70	97		44.0
11.100	36.42	389.40	1.74	SAND to SILTY SAND	97	71	97		44.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 26.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

CPT INTERPRETATIONS

SOUNDING : CPT-63HS
PROJECT : HOMESTEAD
DATE/TIME: 09-23-03 09:56

PROJECT No.: 1702H
CONE/RIG : 786/BH-ML/R#3

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	83.56	3.91	CLAYEY SILT to SILTY CLAY	42	67		4.9	
.300	.98	52.86	3.42	CLAYEY SILT to SILTY CLAY	26	42		3.1	
.450	1.48	31.06	4.55	CLAY to SILTY CLAY	21	33		1.8	
.600	1.97	16.66	4.15	CLAY	17	27		1.1	
.750	2.46	16.91	3.78	CLAY to SILTY CLAY	11	18		1.1	
.900	2.95	16.76	4.18	CLAY	17	27		1.1	
1.050	3.44	21.33	3.29	CLAYEY SILT to SILTY CLAY	11	17		1.4	
1.200	3.94	25.81	3.56	CLAYEY SILT to SILTY CLAY	13	21		1.7	
1.350	4.43	32.89	3.38	CLAYEY SILT to SILTY CLAY	16	26		2.2	
1.500	4.92	43.47	2.70	SANDY SILT to CLAYEY SILT	17	28		2.9	
1.650	5.41	59.59	1.74	SILTY SAND to SANDY SILT	20	32	61		43.5
1.800	5.91	38.35	1.63	SANDY SILT to CLAYEY SILT	15	25		3.0	
1.950	6.40	25.39	3.18	CLAYEY SILT to SILTY CLAY	13	20		1.7	
2.100	6.89	24.90	3.23	CLAYEY SILT to SILTY CLAY	12	19		1.6	
2.250	7.38	18.36	3.27	CLAY to SILTY CLAY	12	18		1.2	
2.400	7.87	14.45	3.38	CLAY to SILTY CLAY	10	14		.9	
2.550	8.37	20.90	3.40	CLAYEY SILT to SILTY CLAY	10	15		1.4	
2.700	8.86	21.22	3.45	CLAY to SILTY CLAY	14	19		1.4	
2.850	9.35	20.18	3.71	CLAY to SILTY CLAY	13	18		1.3	
3.000	9.84	20.86	3.54	CLAY to SILTY CLAY	14	18		1.4	
3.150	10.33	23.16	2.97	CLAYEY SILT to SILTY CLAY	12	15		1.5	
3.300	10.83	23.65	3.64	CLAY to SILTY CLAY	16	20		1.5	
3.450	11.32	22.05	3.38	CLAYEY SILT to SILTY CLAY	11	13		1.4	
3.600	11.81	21.86	3.38	CLAYEY SILT to SILTY CLAY	11	13		1.4	
3.750	12.30	20.06	4.68	CLAY	20	23		1.3	
3.900	12.80	18.16	3.18	CLAYEY SILT to SILTY CLAY	9	10		1.2	
4.050	13.29	21.22	2.99	CLAYEY SILT to SILTY CLAY	11	12		1.4	
4.200	13.78	36.88	3.95	CLAYEY SILT to SILTY CLAY	18	20		2.1	
4.350	14.27	51.01	2.32	SANDY SILT to CLAYEY SILT	20	22		3.3	
4.500	14.76	30.83	2.57	SANDY SILT to CLAYEY SILT	12	13		2.0	
4.650	15.26	19.59	2.60	CLAYEY SILT to SILTY CLAY	10	10		1.2	
4.800	15.75	29.36	2.02	SANDY SILT to CLAYEY SILT	12	12		2.3	
4.950	16.24	53.41	2.10	SANDY SILT to CLAYEY SILT	21	22		3.5	
5.100	16.73	120.90	1.32	SAND to SILTY SAND	30	30	72		41.5
5.250	17.22	163.08	1.46	SAND to SILTY SAND	41	40	81		42.5
5.400	17.72	196.28	2.39	SILTY SAND to SANDY SILT	65	63	85		43.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 51.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Appendix B

APPENDIX B

GEOTECHNICAL LABORATORY INVESTIGATION

1. General

   a. The laboratory investigation used current, accepted test procedures of the American Society of Testing and Materials (ASTM) and/or California Test Standards, wherever practical.

   b. Bulk samples and relatively undisturbed ring samples were obtained during the course of the field investigation. Laboratory sample identification is by project name and number, boring number or trench number, and depth.

2. Index Parameters Tests

The following Index Parameters tests were performed on samples of in-situ soil/rock collected during the field exploration.

TEST TYPE	NUMBER OF TESTS PERFORMED	TESTING STANDARD
Moisture Content & Dry Unit Weight	96	ASTM D2216 and D2937
Percent-Finer Than #200 Sieve	24	ASTM D1140
Atterberg Limits	1	ASTM D4318
Expansion Index	2	ASTM D4829

The purpose of each test is briefly described below.

   a. Natural Moisture Content (ASTM D2216) and Dry Density (ASTM D2937) testing of soils provide an indication of the strength of in-situ soils. These data, in conjunction with sampler blow count data, aid in evaluation of soil consistency and in selection of samples for additional laboratory testing. Results of Moisture Content and Dry Density testing are recorded on the Boring Logs in **Appendix A**.

   b. Percent Finer than #200 Sieve (ASTM D1140) testing aid in classifying the soils in accordance with the Unified Soil Classification System (USCS). Results of Percent Finer than #200 Sieve testing performed on selected soil samples are recorded on the Boring Logs in **Appendix A**.

APPENDIX B

c. Liquid Limit and Plastic Limit (ASTM D4318) tests were aid in classifying soil in accordance with the USCS. Results of the Liquid Limit and Plastic Limit testing performed on selected soil samples are presented on Lab Report **Figure B1** in this Appendix.

d. Expansion Index (ASTM D4829) tests aid in assessing expansion potential of site soils when inundated with water. Results of Expansion Index testing performed on selected soil samples are presented in **Table B1** in this Appendix.

3. Geotechnical Engineering Properties Tests

The following Geotechnical Engineering Property Tests were performed on relatively undisturbed ring samples of soil/rock collected at the project site.

TEST TYPE	NUMBER OF TESTS PERFORMED	TESTING STANDARD
Modified Proctor	3	ASTM D1557
Consolidation	15	ASTM D2435
Direct Shear	4	ASTM D3080

The purpose of each test is briefly described below.

a. Modified Proctor (ASTM D1557) tests were performed on selected bulk samples to assess their moisture-density relationship for future use in defining compaction parameters during grading operations. Results of the Modified Proctor tests are presented on Lab Report **Figures B2.1** through **B2.3** within this Appendix.

b. One-dimensional Consolidation (ASTM D2435) tests were performed on selected ring samples to assess the soil's compressibility characteristics by subjecting the specimens to loads ranging from 125 psf to 9,600 psf. The test specimens were allowed to consolidate under each load increment until the rate of settlement was less than 0.0002 inches per hour. Hydro-consolidation potential was assessed on test specimens by inundating the specimens with water after consolidation was completed under a pressure which approximately equals the overburden pressure at the sample depth. The percent settlement due to the addition of water is referred to as "Hydro-consolidation". Results of the consolidation testing are presented on **Figures B3.1** through **B3.15** in this Appendix.

APPENDIX B

c. Direct Shear (ASTM D3080) tests were performed on a ring sample of in-situ soil and on a remolded soil sample using a displacement-controlled Direct Shear machine. Prior to testing, the samples were inundated and consolidated under a normal load. Thereafter, the samples were sheared horizontally at a controlled displacement rate until the horizontal shear force reduced to a stable value. Testing was performed at vertical (normal) pressures ranging from about 1,000 psf to 6,000 psf. Results of testing, including interpreted peak strength and residual shear strength parameters, are recorded on **Figures B4.1** through **B4.4** in this Appendix.

4. Corrosion Tests

The following corrosivity tests were performed on a mixture of bulk samples of alluvial soil obtained at the project site.

TEST TYPE	NUMBER OF TESTS PERFORMED	TESTING STANDARD
Sulfate-Content	2	California Test Method 417
Chloride-Content	2	California Test Method 422
Resistivity	2	California Test Method 532
pH	2	

Soluble Sulfates Content, Chloride Content, Resistivity, and pH tests were performed to evaluate corrosivity of soil/rock material from the project site to concrete, ferrous metals, and non-ferrous metals. Results of the testing are presented in **Table B2** in this Appendix.

The following attachments completed this Appendix

LABORATORY TEST RESULTS

- Expansion Index — Table B1
- Corrosion Test Results on Soil Samples — Table B2
- Liquid and Plastic Limits Test Report — Figure B1
- Compaction Test Reports — Figures B2.1 thru B2.3
- Consolidation Test Reports — Figures B3.1 thru B3.15
- Direct Shear Test Reports — Figures B4.1 thru B4.4

APPENDIX B

EXPANSION INDEX TEST SUMMARY

SAMPLE LOCATION	SOIL TYPE - USCS	% FINES	EXPANSION INDEX	EXPANSION POTENTIAL
HS-16U, HS-18U, HS-19U @ 0-10' Mix	SC	28.8	< 1	Very Low
HS-20U, HS-21U, HS-22U @ 0-10' Mix	SC	28.4	< 1	Very Low

APPENDIX B

CORROSION TEST SUMMARY

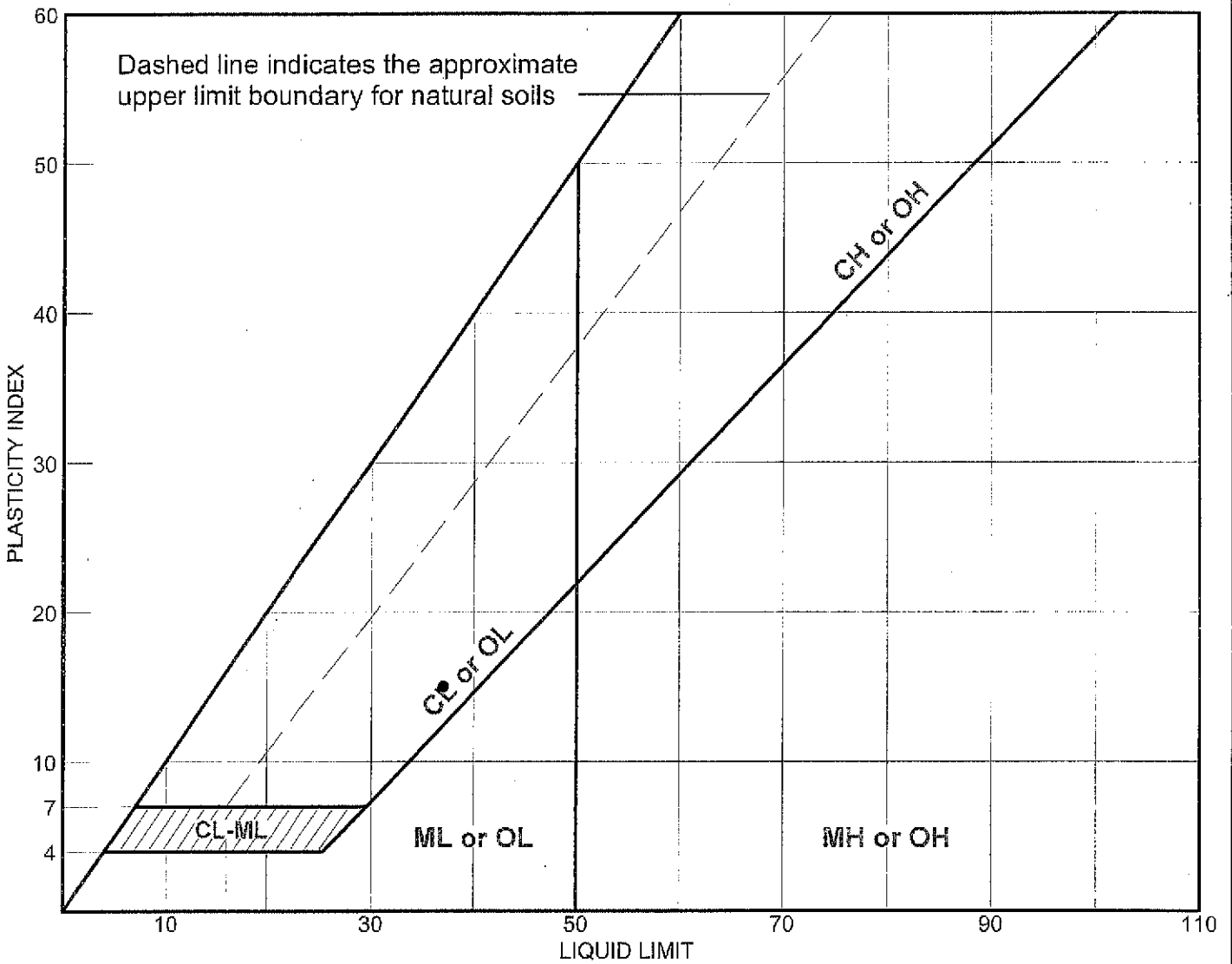
SAMPLE LOCATION	SOIL TYPE USCS	CHLORIDE Cl_2 (PPM)	SULFATE SO_4 (%)	CONCRETE EXPOSURE TO SULFATE[1]
HS-16U, HS-18U, HS-19U @ 0-10' Mix	SC	ND	0.015	Negligible
HS-20U, HS-21U, HS-22U @ 0-10' Mix	SC	2.7	0.015	Negligible

ND = not detected

SAMPLE LOCATION	SOIL TYPE USCS	PH	RESISTIVITY (Ω-CM)	REMARK
HS-16U, HS-18U, HS-19U @ 0-10' Mix	SC	7.5	2724	Moderately Corrosive
HS-20U, HS-21U, HS-22U @ 0-10' Mix	SC	7.6	1661	Corrosive

[1] Per 1997 UBC – Table 19-A-4

LIQUID AND PLASTIC LIMITS TEST REPORT

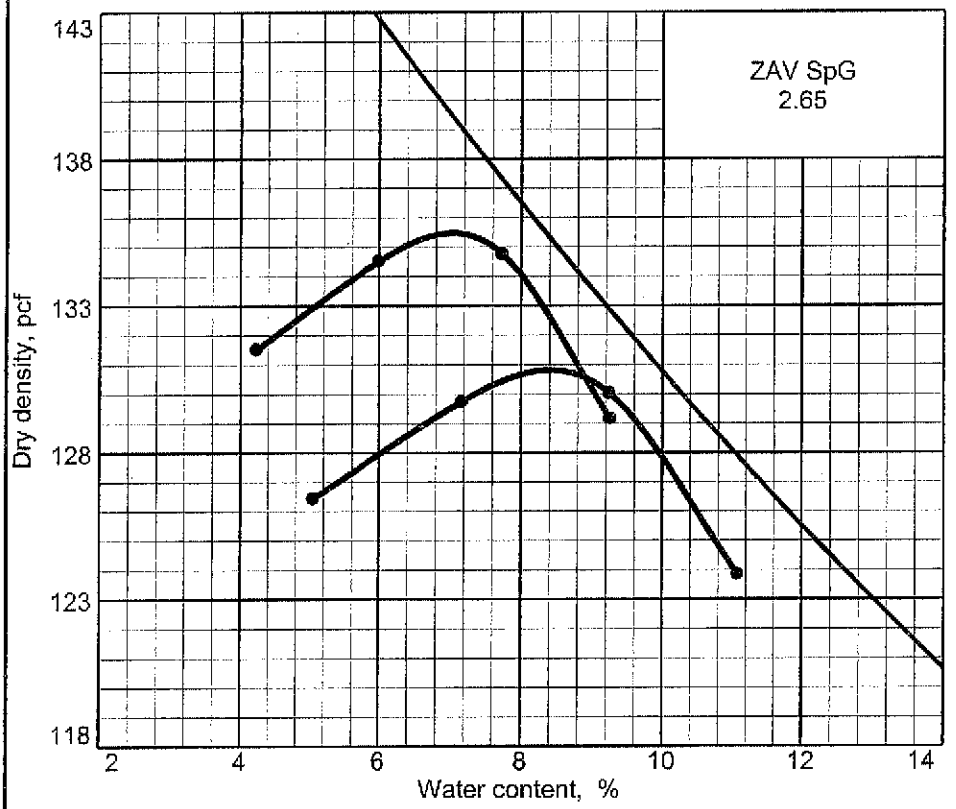


SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	HS-21U		12'	12.7	22	37	15	CL

LIQUID AND PLASTIC LIMITS TEST REPORT **ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.** **Valencia, California**	**Client:** The Newhall Land & Farming Company **Project:** Utility Corridor **Project No.:** 07-2079 (0) **Figure** B1

COMPACTION TEST REPORT



Curve No.

A

Test Specification:
ASTM D 1557-02 Method A Modified
Oversize correction applied to each point

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: 5
Blows per Layer: 25
Mold Size: .03333 cu.ft.

Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL		**PI**	
%>No.4	16.4	**%<#200**	28.4
USCS	SC	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.86	9.07	9.17	9.02		
WM	4.43	4.43	4.43	4.43		
WW + T #1	495.85	516.46	530.76	538.52		
WD + T #1	473.43	483.89	488.50	488.04		
TARE #1	29.63	29.50	31.39	32.12		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	4.2	6.0	7.7	9.3		
DRY DENSITY	131.5	134.5	134.8	129.2		

ROCK CORRECTED TEST RESULTS	**Material Description**
Maximum dry density = 135.5 pcf Optimum moisture = 7.0 %	Dark yellowish-brown, clayey SAND with gravel

Project No. 07-2079 (0) **Client:** The Newhall Land & Farming Company
Project: Utility Corridor

• **Location:** HS-20U, HS-21U, HS-22U Mix

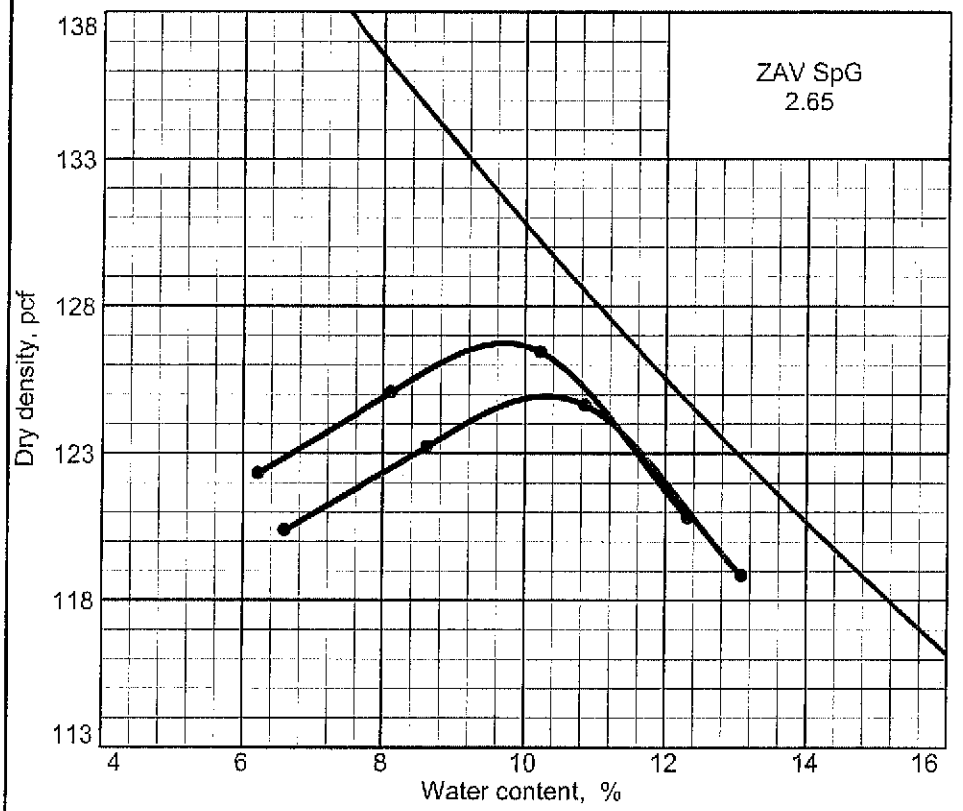
Remarks:
Qal derived

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Valencia, California

Figure B2.1

COMPACTION TEST REPORT



Curve No.
B

Test Specification:
ASTM D 1557-02 Method A Modified
Oversize correction applied to each point

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: 5
Blows per Layer: 25
Mold Size: .03333 cu.ft.

Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM ____ **Sp.G.** 2.65
LL ____ **PI** ____
%>No.4 5.8 **%<#200** 57.3
USCS CL-ML **AASHTO** ____

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.71	8.89	9.04	8.91		
WM	4.43	4.43	4.43	4.43		
WW + T #1	502.53	516.29	554.02	561.43		
WD + T #1	473.28	477.83	505.01	500.24		
TARE #1	29.26	31.17	53.29	32.28		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	6.2	8.1	10.2	12.3		
DRY DENSITY	122.3	125.1	126.4.	120.8		

ROCK CORRECTED TEST RESULTS

Maximum dry density = 127.0 pcf

Optimum moisture = 9.5 %

Material Description

Yellowish-brown, sandy, silty CLAY

Project No. 07-2079 (0) **Client:** The Newhall Land & Farming Company
Project: Utility Corridor

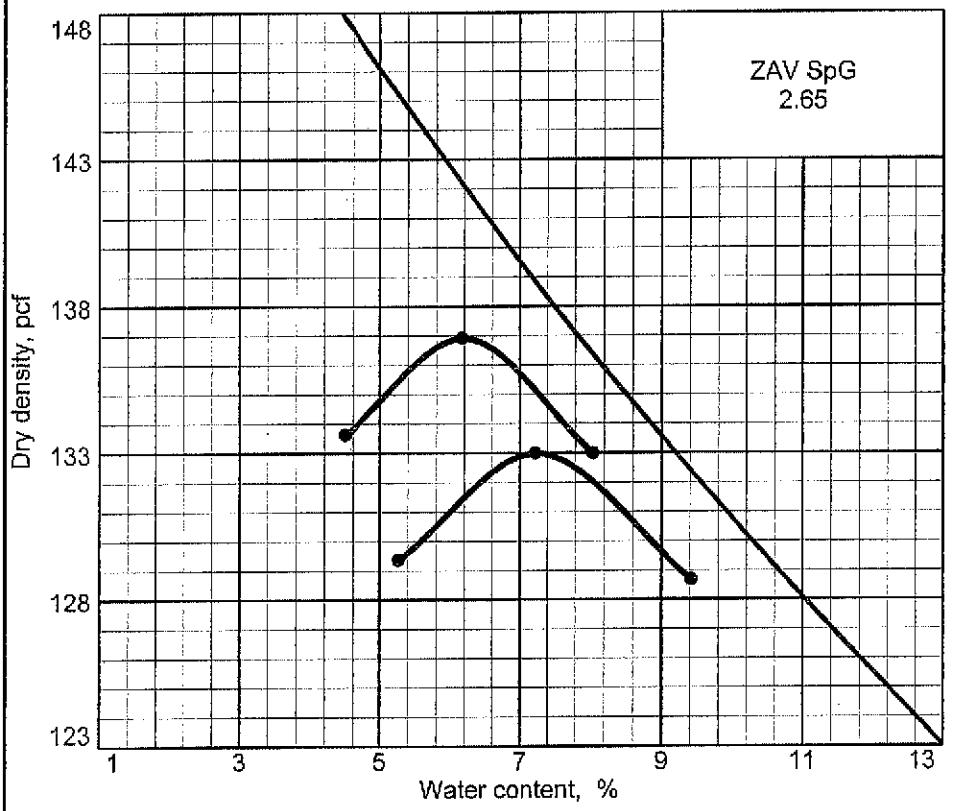
- **Location:** HS-2U, HS-6U, HS-10U Mix

Remarks:
Qal derived

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.
Valencia, California

Figure B2.2

COMPACTION TEST REPORT



Curve No.
C

Test Specification:
ASTM D 1557-02 Method A Modified
Oversize correction applied to each point

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: 5
Blows per Layer: 25
Mold Size: .03333 cu.ft.

Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL		**PI**	
%>No.4	14.6	**%<#200**	28.8
USCS	SC	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.97	9.19	9.13			
WM	4.43	4.43	4.43			
WW + T #1	505.40	518.79	529.43			
WD + T #1	481.72	485.95	486.75			
TARE #1	32.21	31.52	33.84			
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	4.5	6.2	8.0			
DRY DENSITY	133.6	136.9	133.0			

ROCK CORRECTED TEST RESULTS	**Material Description**
Maximum dry density = 137.0 pcf Optimum moisture = 6.0 %	Dark yellowish-brown, clayey SAND

Project No. 07-2079 (0) **Client:** The Newhall Land & Farming Company
Project: Utility Corridor

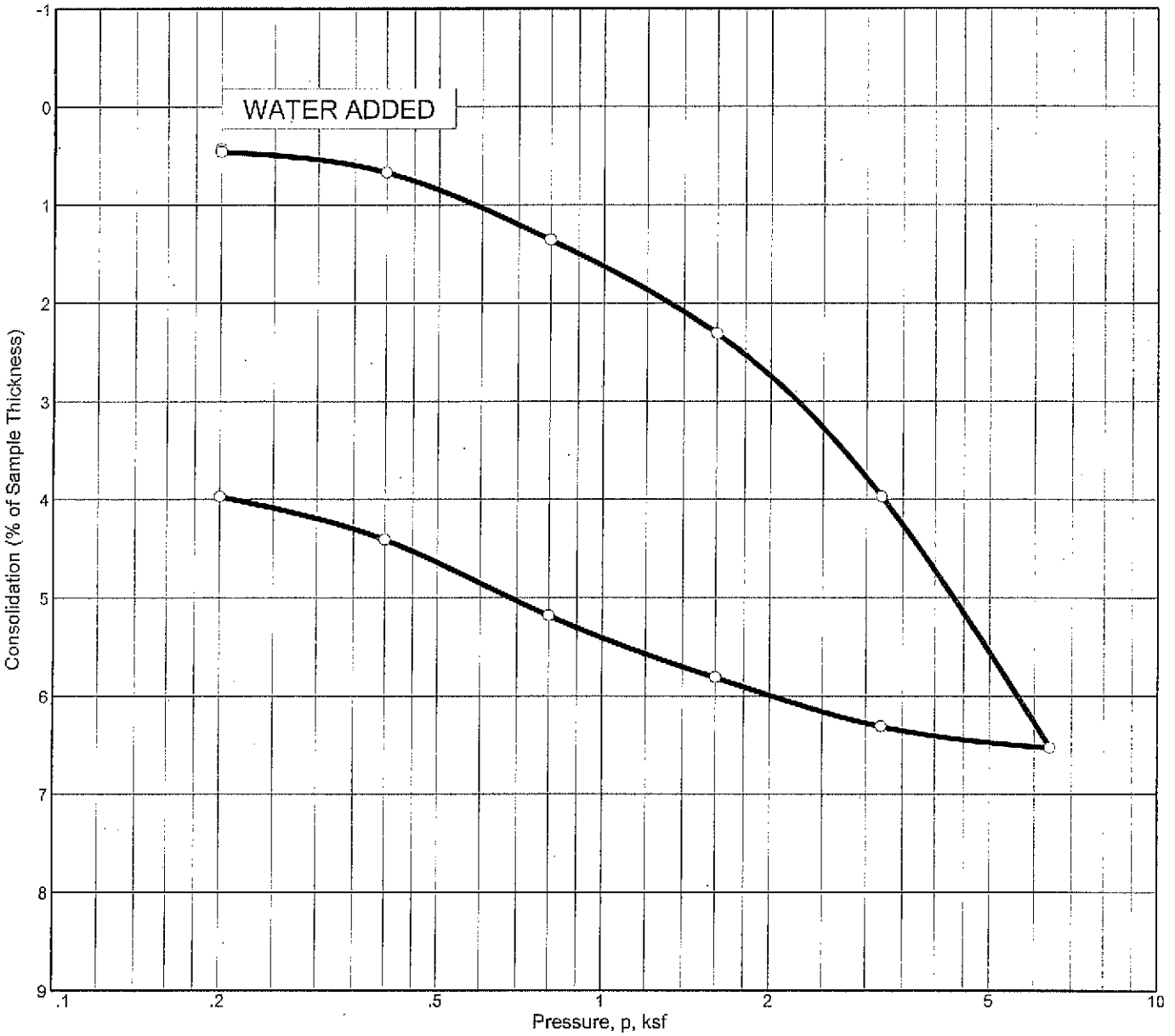
- **Location:** HS-16U, HS-18U, HS-19U Mix

Remarks:
Qal derived

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.
Valencia, California

Figure B2.3

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

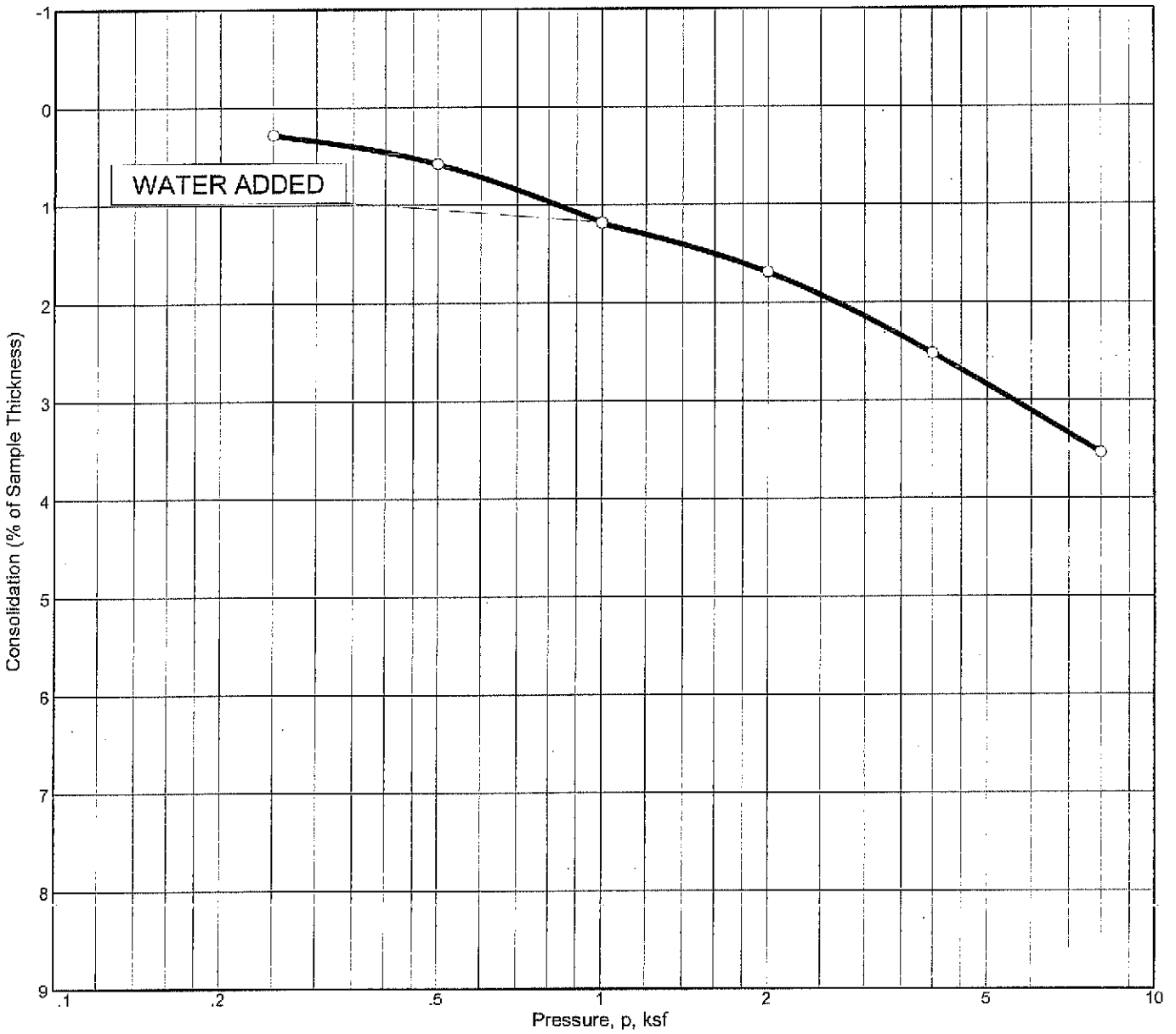
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	86.5	33.5	97.3	1.000	0.913	2.65		0.72		CL-ML
FINAL	90.1	32.9	100.0	0.960	0.837					

Source: HS-2U **Elev./Depth:** 6'
Material Description: Yellowish-brown, silty CLAY
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC. Valencia, California	**Client:** The Newhall Land & Farming Company **Project:** Utility Corridor **Job No.:** 07-2079 (0) **Figure** B3.1

CHECKED BY
APPROVED BY
DRAWN BY
DATE

CONSOLIDATION TEST REPORT



CHECKED BY
APPROVED BY
DRAWN BY
DATE

SUMMARY OF TEST RESULTS

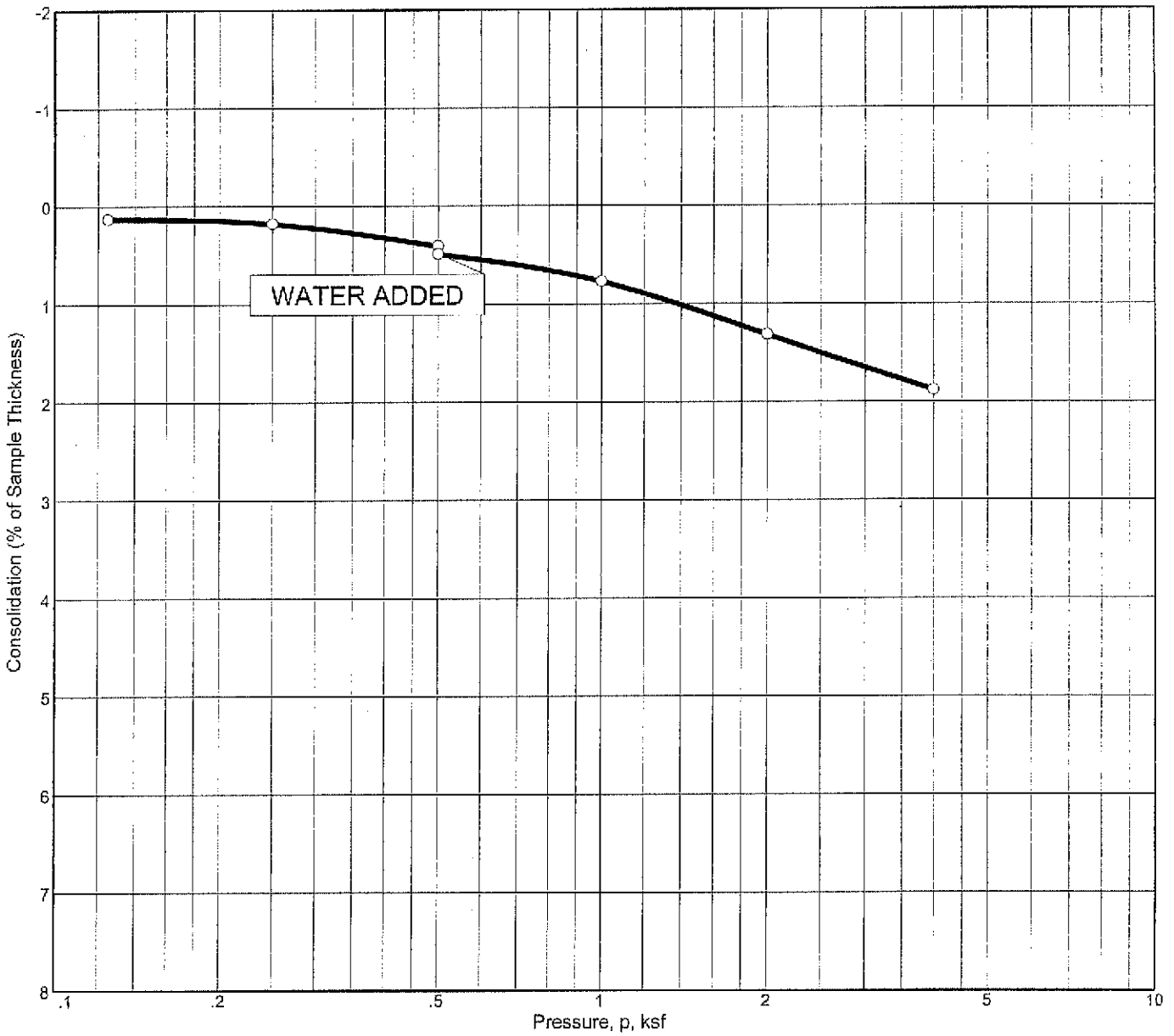
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	101.7	20.8	87.7	1.000	0.627	2.65		1.08		SC-SM
FINAL	105.4	21.5	100.0	0.965	0.570					

Source: HS-2U **Elev./Depth:** 9'
Material Description: Yellowish-brown, silty, clayey SAND
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.
Valencia, California

Client: The Newhall Land & Farming Company
Project: Utility Corridor
Job No.: 07-2079 (0) **Figure** B3.2

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

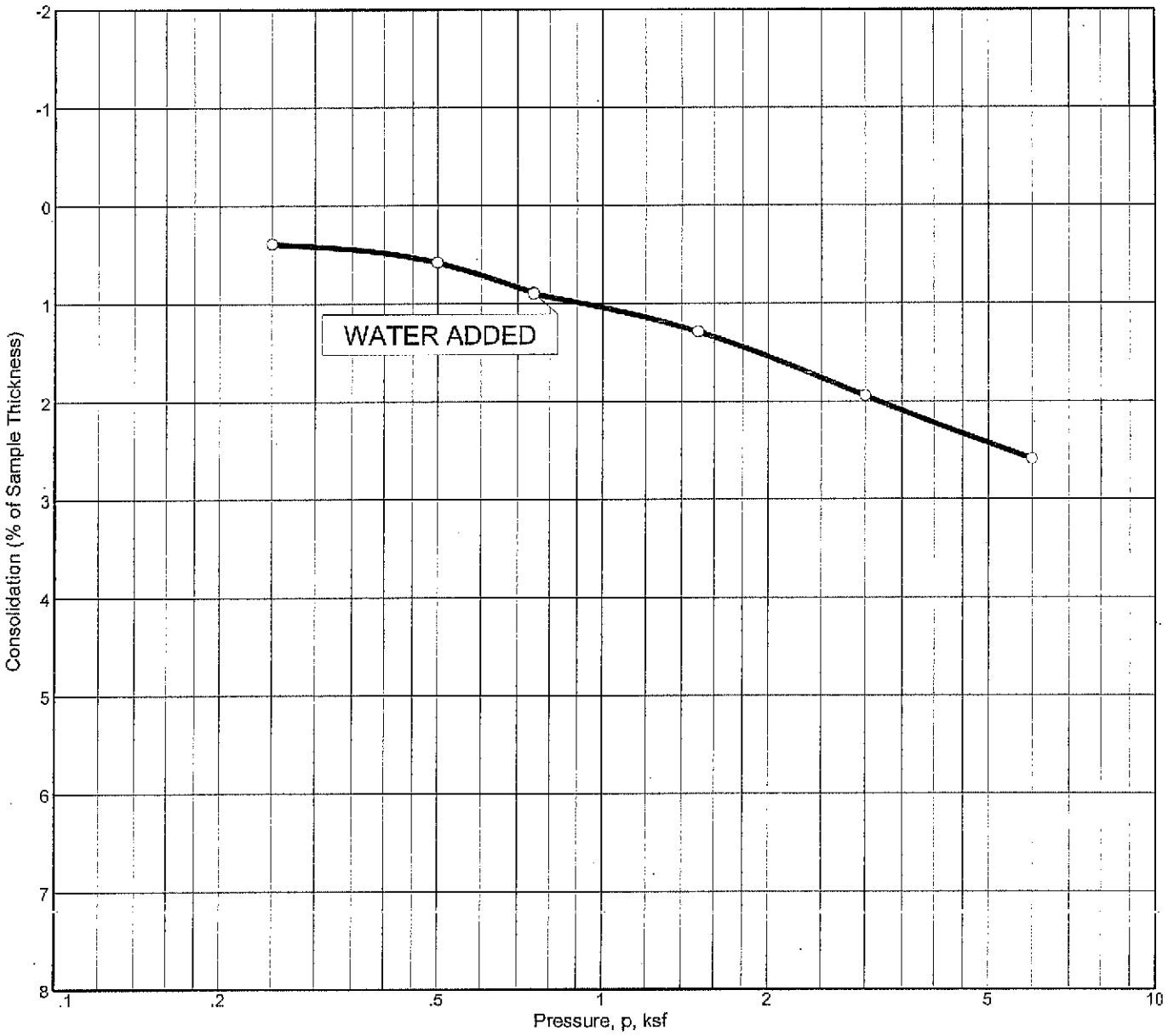
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	99.6	9.1	36.5	1.000	0.660	2.65		0.36		SP-SM
FINAL	101.6	23.8	100.0	0.981	0.629					

Source: HS-3U **Elev./Depth:** 4'
Material Description: Yellowish-brown, poorly graded SAND with silt
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC. Valencia, California	**Client:** The Newhall Land & Farming Company **Project:** Utility Corridor **Job No.:** 07-2079 (0) **Figure** B3.3

DRAWN BY | DATE | CHECKED BY | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

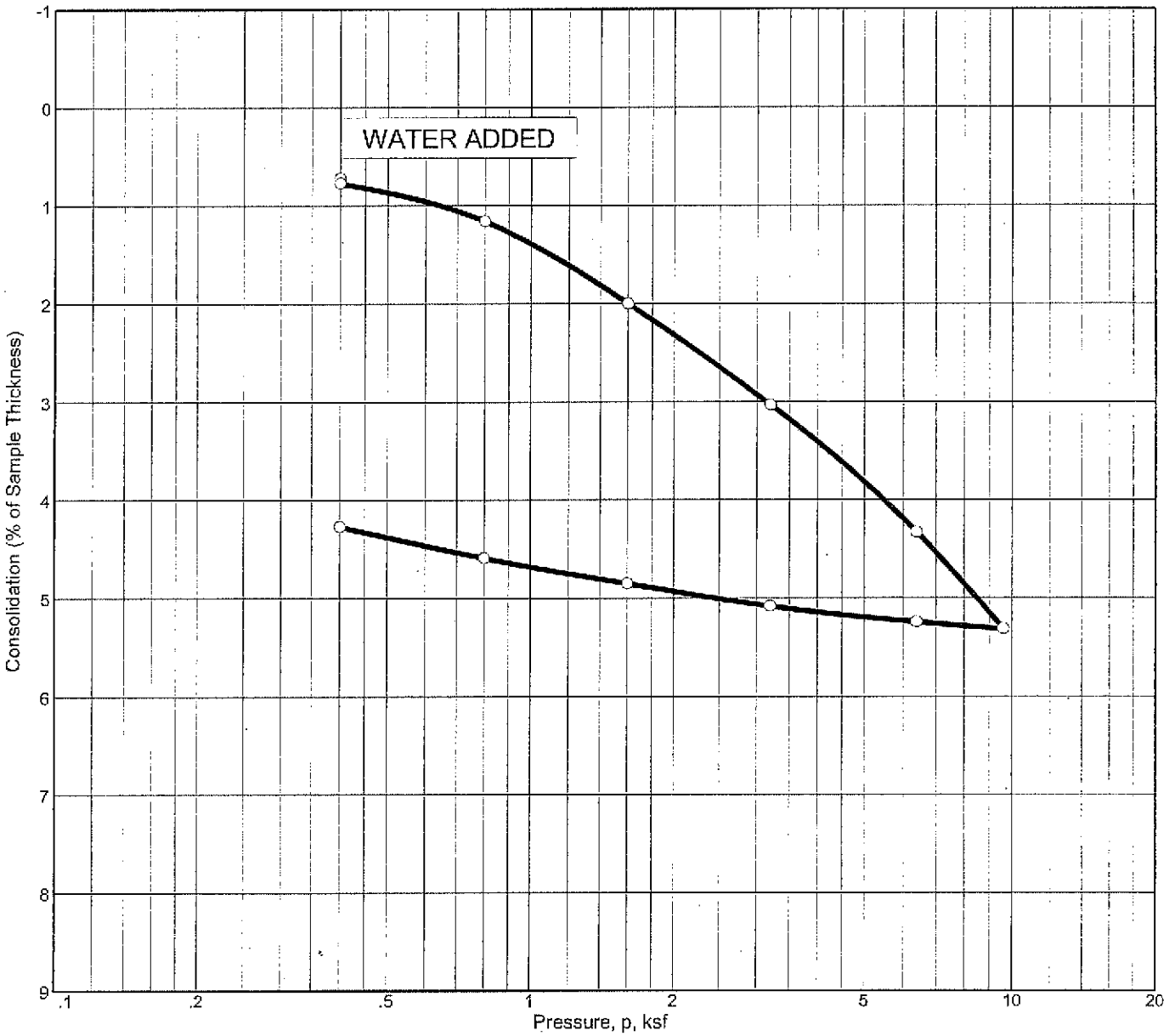
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	98.6	6.8	26.7	1.000	0.678	2.65		0.72		SP-SM
FINAL	101.2	23.9	100.0	0.974	0.634					

Source: HS-3U **Elev./Depth:** 6'
Material Description: Yellowish-brown, poorly graded SAND with silt
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC. Valencia, California	**Client:** The Newhall Land & Farming Company **Project:** Utility Corridor **Job No.:** 07-2079 (0) **Figure** B3.4

DRAWN BY | DATE | CHECKED BY | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

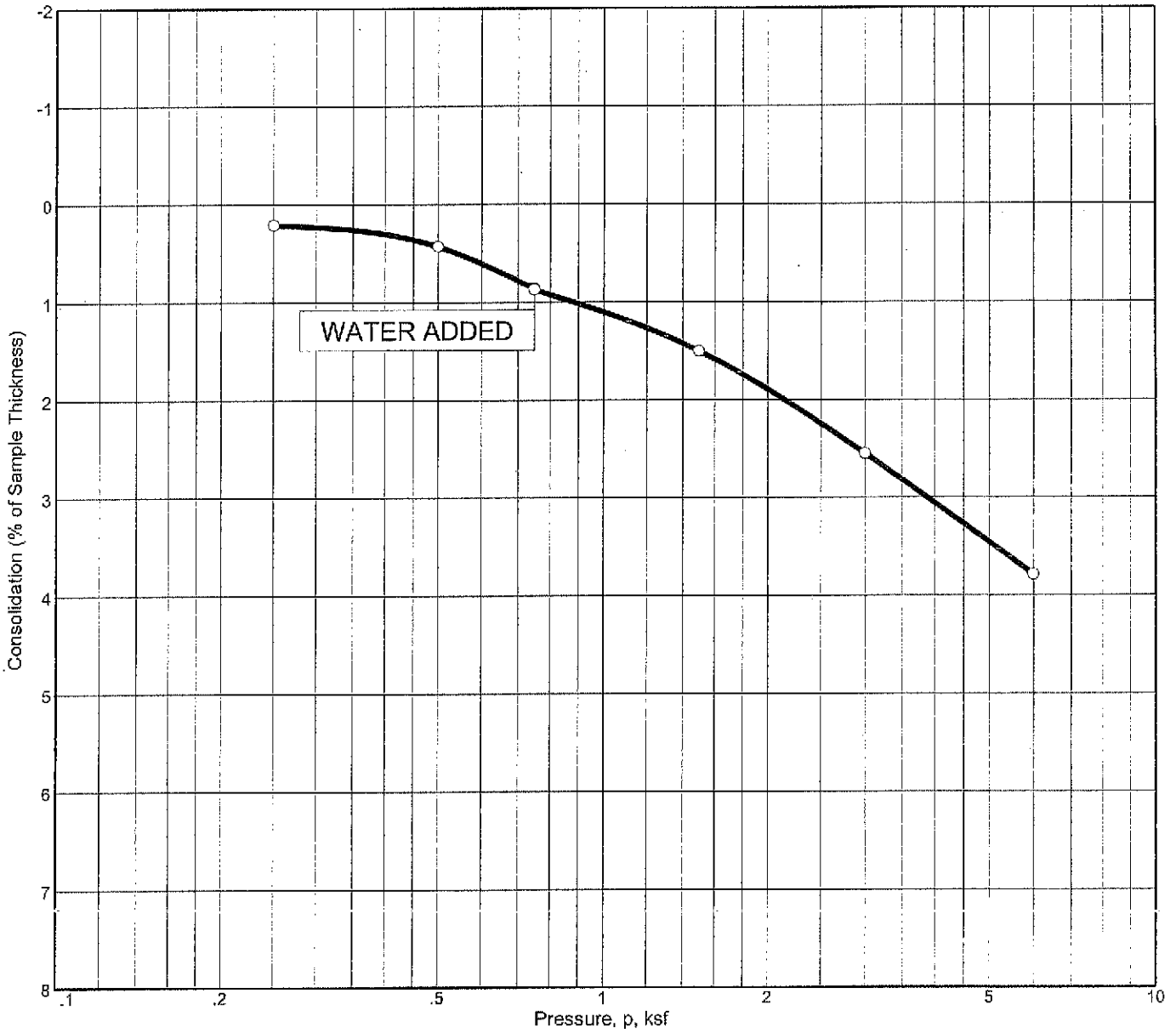
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	93.1	27.6	94.3	1.000	0.776	2.65		2.40		SC-SM
FINAL	97.3	26.5	100.0	0.957	0.700					

Source: HS-8U **Elev./Depth:** 20'
Material Description: Brown, silty, clayey SAND
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC. Valencia, California	**Client:** The Newhall Land & Farming Company **Project:** Utility Corridor **Job No.:** 07-2079 (0) **Figure** B3.5

DRAWN BY | DATE | CHECKED BY | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

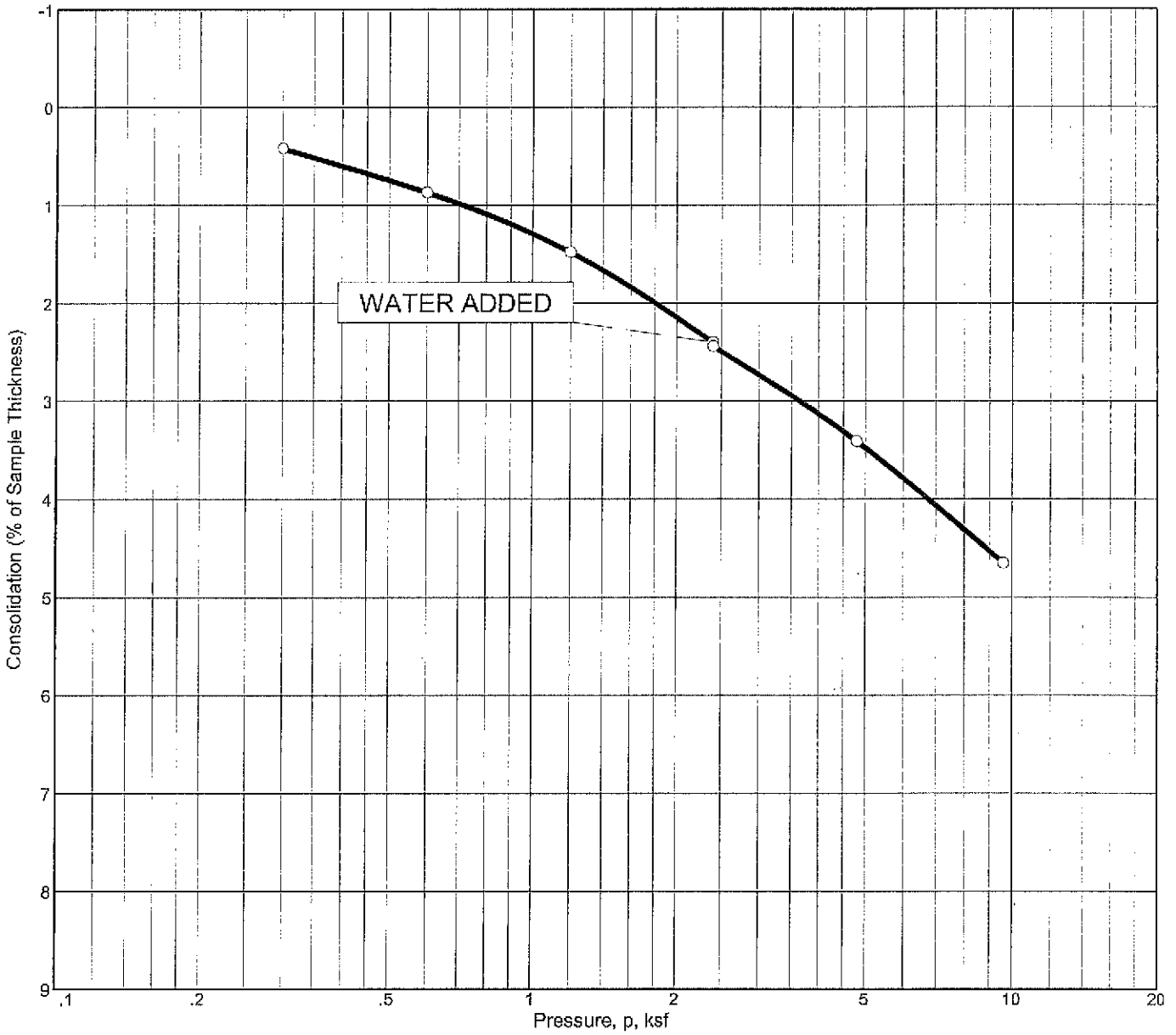
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	97.8	12.2	46.5	1.000	0.692	2.65		0.72		SM
FINAL	101.6	23.7	100.0	0.962	0.628					

Source: HS-9U **Elev./Depth:** 6'
Material Description: Brownish-yellow, silty SAND
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC. Valencia, California	**Client:** The Newhall Land & Farming Company **Project:** Utility Corridor **Job No.:** 07-2079 (0) **Figure** B3.6

DRAWN BY
DATE
CHECKED BY
APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

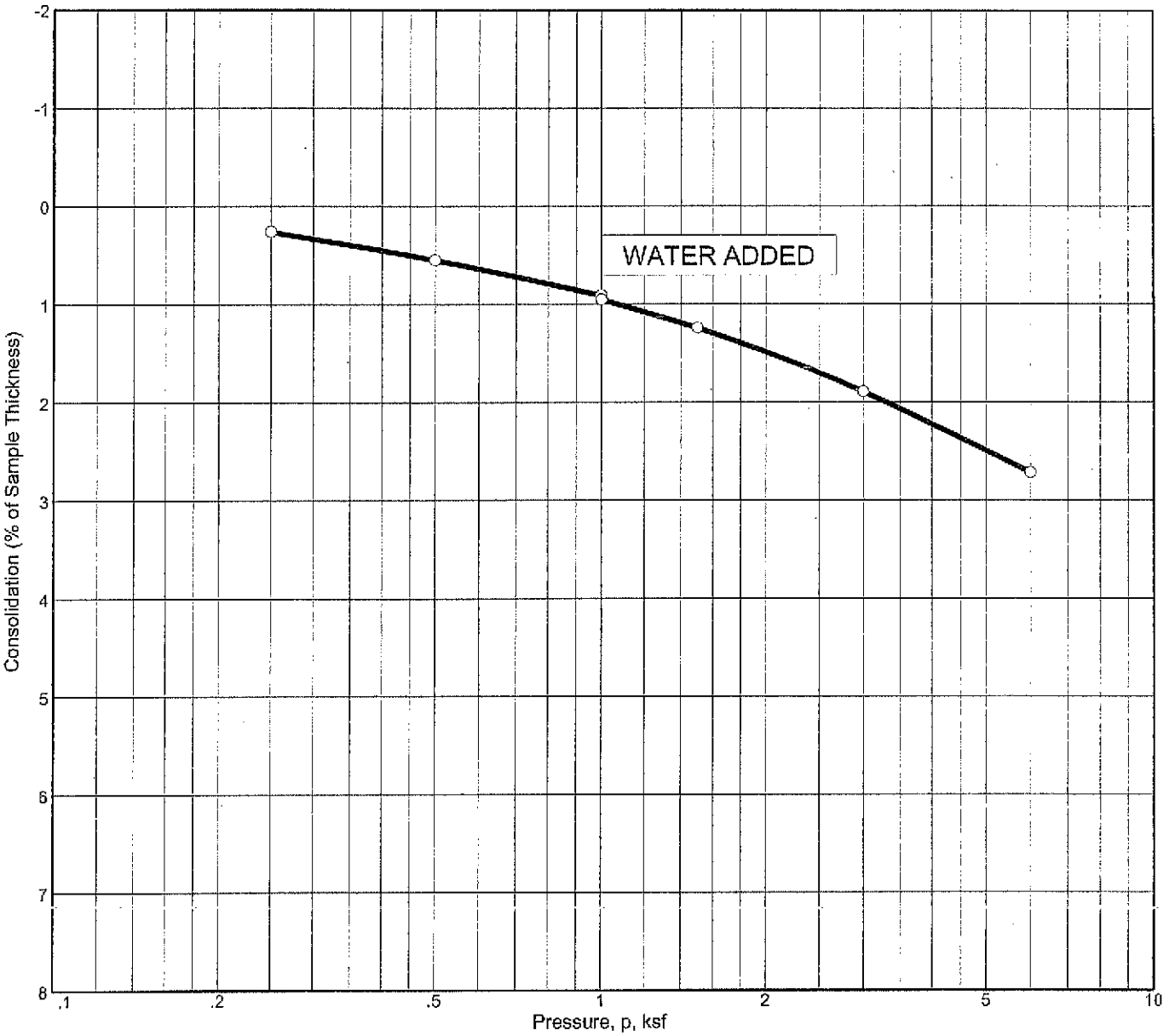
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	92.1	9.0	29.8	1.000	0.796	2.65		2.40		SM
FINAL	96.6	26.9	100.0	0.953	0.713					

Source: HS-9U **Elev./Depth:** 20'
Material Description: Orangish-brown, silty SAND
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC. Valencia, California	**Client:** The Newhall Land & Farming Company **Project:** Utility Corridor **Job No.:** 07-2079 (0) **Figure** B3.7

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

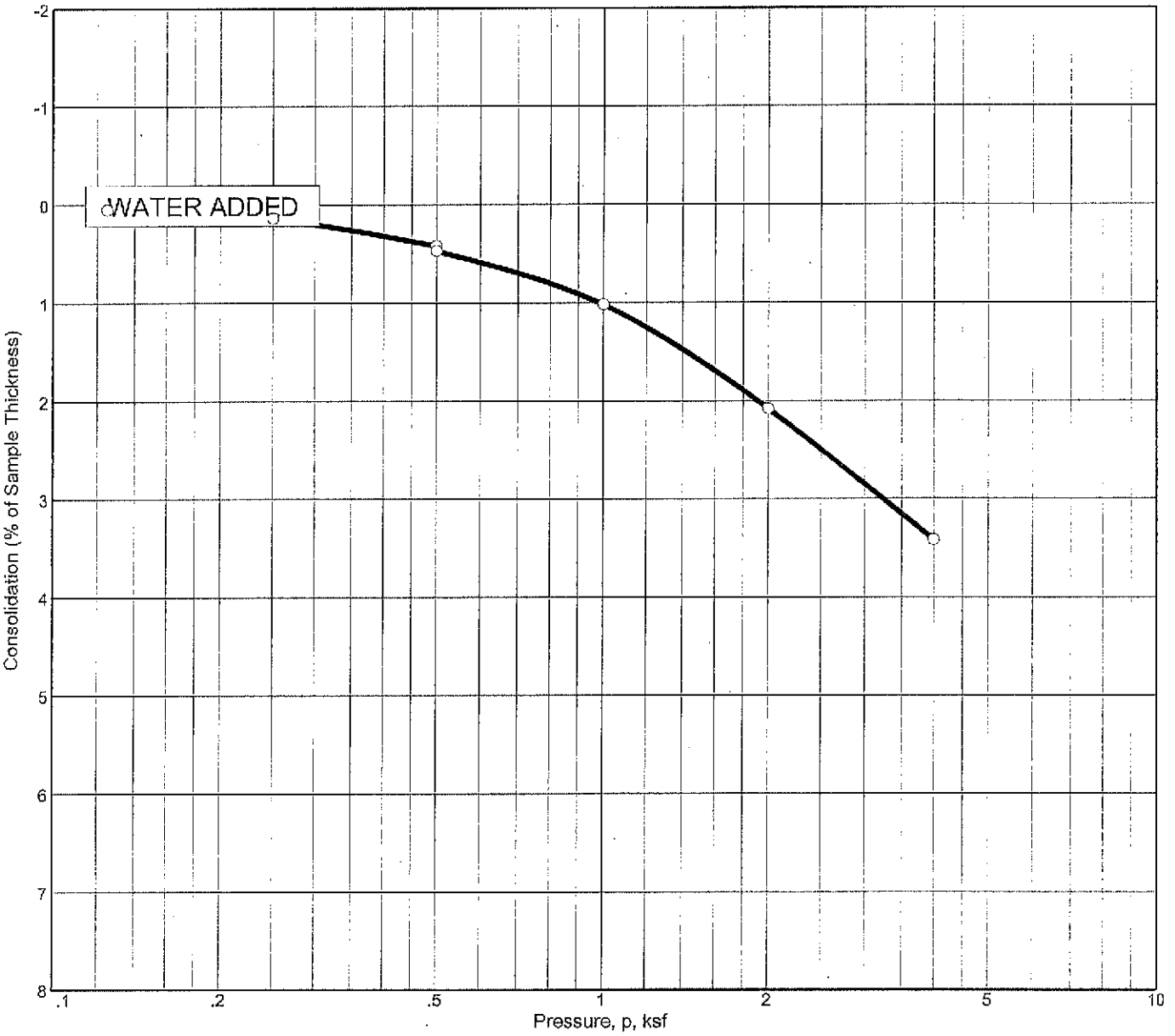
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	98.3	5.2	20.0	1.000	0.683	2.65		0.72		SP-SM
FINAL	101.1	24.1	100.0	0.973	0.637					

Source: HS-11U **Elev./Depth:** 6'
Material Description: Brownish-yellow, poorly graded SAND with silt
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC. Valencia, California	**Client:** The Newhall Land & Farming Company **Project:** Utility Corridor **Job No.:** 07-2079 (0) **Figure** B3.8

DRAWN BY | DATE | CHECKED BY | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

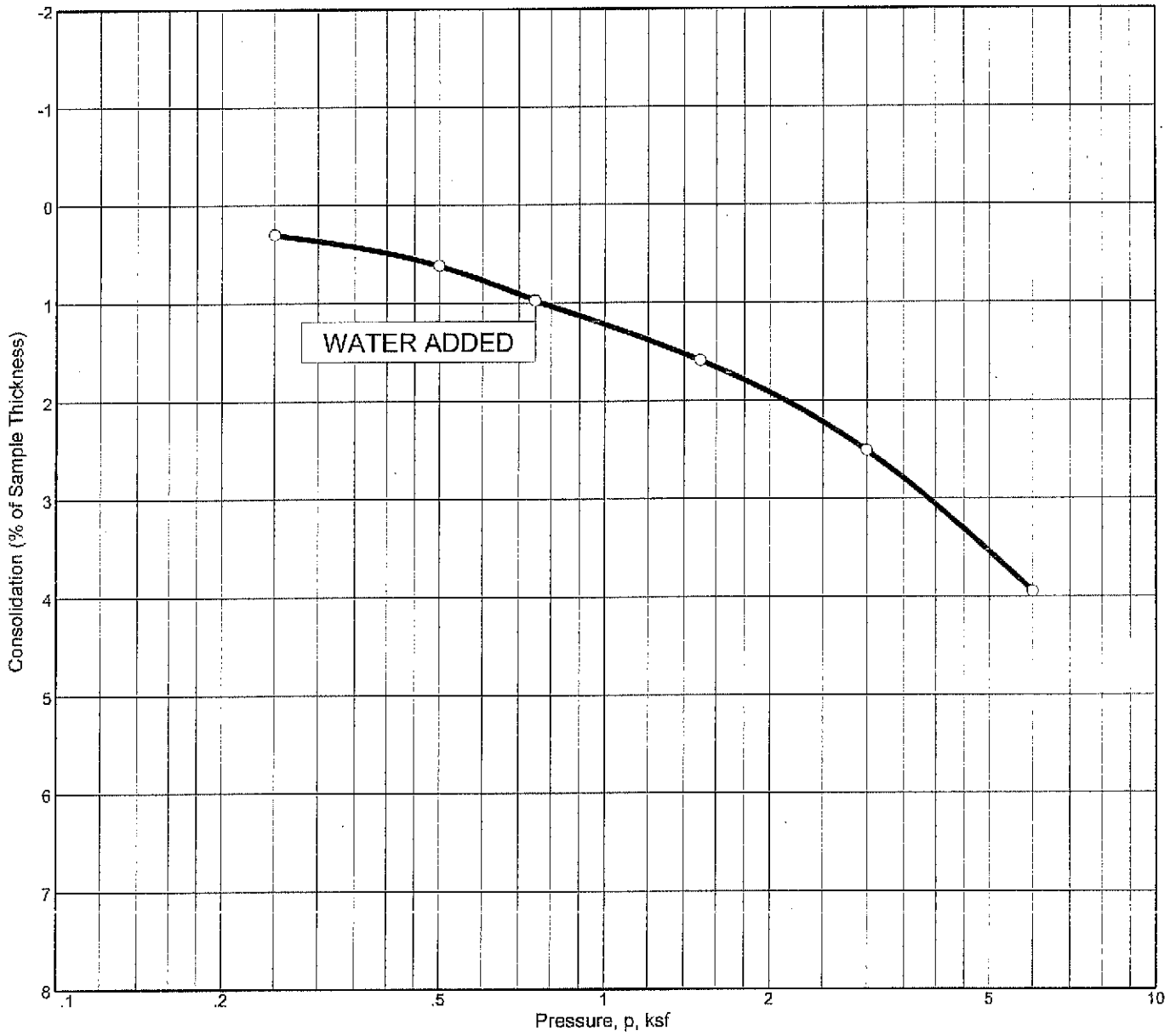
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	86.5	6.9	19.9	1.000	0.912	2.65		0.36		SM
FINAL	89.6	32.0	100.0	0.966	0.846					

Source: HS-21U **Elev./Depth:** 4'
Material Description: Brown, silty SAND
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC. Valencia, California	**Client:** The Newhall Land & Farming Company **Project:** Utility Corridor **Job No.:** 07-2079 (0) **Figure** B3.9

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

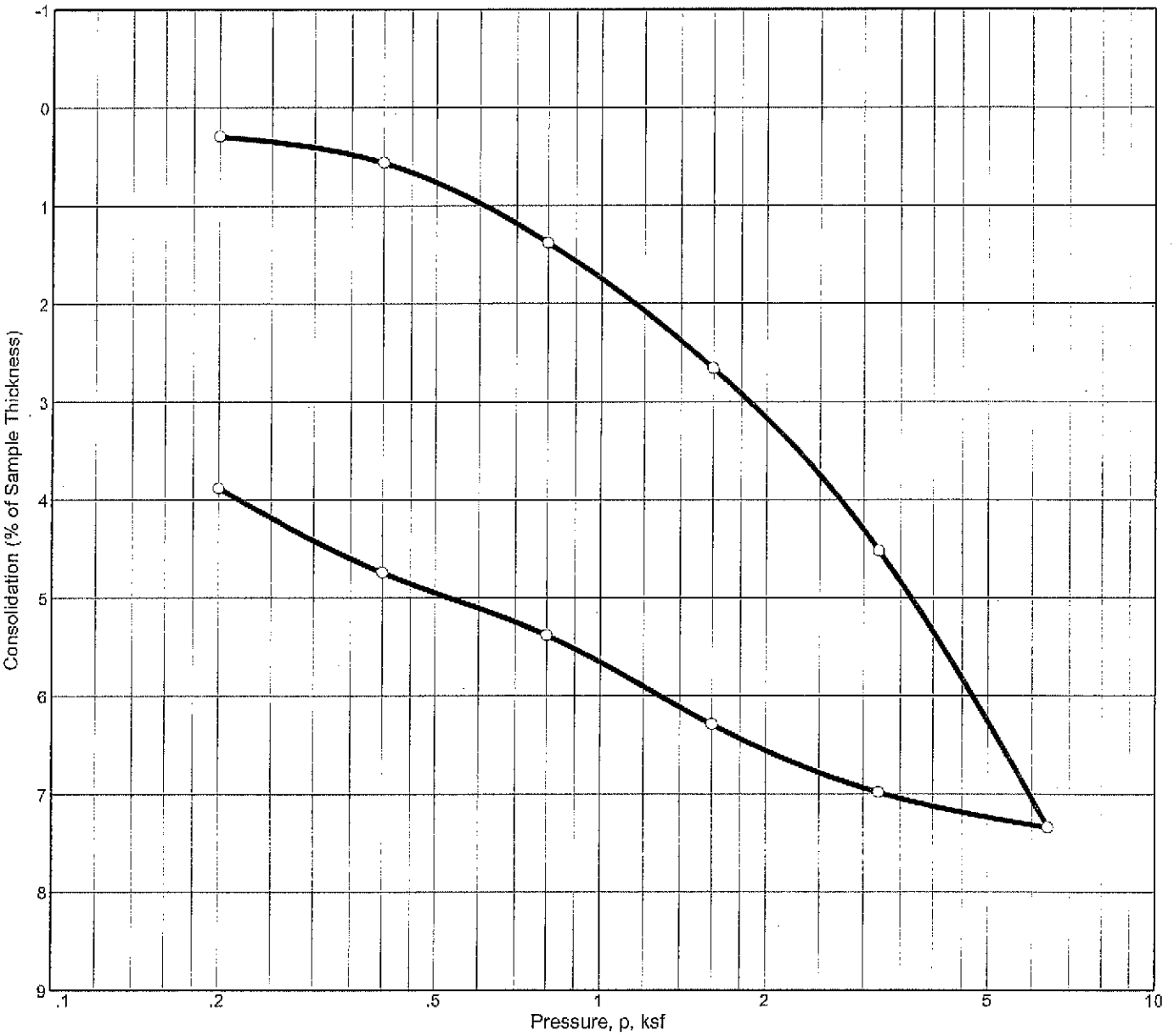
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	91.1	11.9	38.5	1.000	0.816	2.65		0.72		SC-SM
FINAL	94.8	28.2	100.0	0.960	0.744					

Source: HS-21U **Elev./Depth:** 6'
Material Description: Yellowish-brown, silty, clayey SAND
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC. Valencia, California	**Client:** The Newhall Land & Farming Company **Project:** Utility Corridor **Job No.:** 07-2079 (0) **Figure** B3.10

DRAWN BY | DATE | CHECKED BY | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

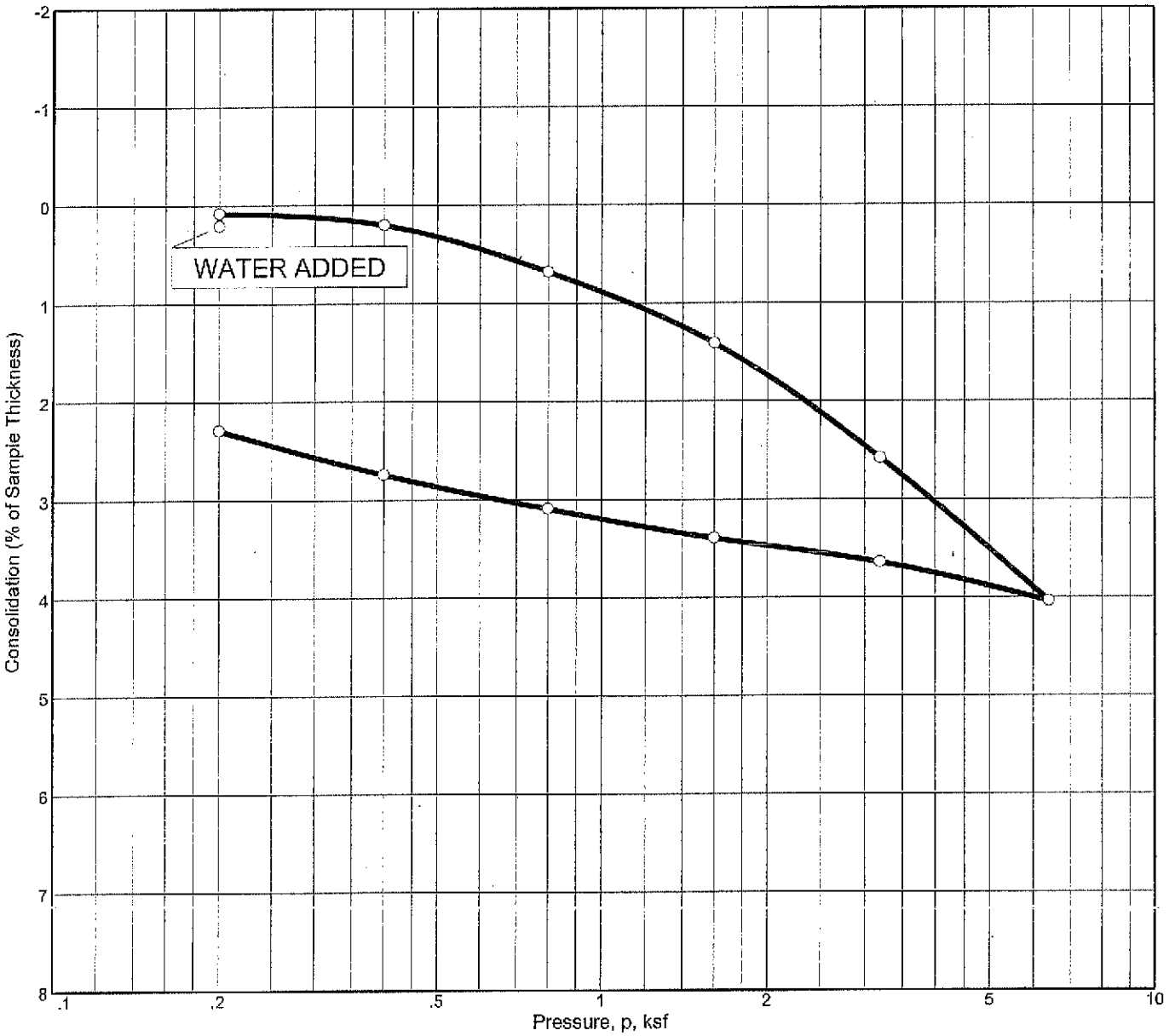
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	86.6	34.8	100.0	1.000	0.910	2.65		1.44		CL
FINAL	90.1	33.3	100.0	0.961	0.836					

Source: HS-21U **Elev./Depth:** 12'
Material Description: Reddish-brown, sandy lean CLAY
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC. Valencia, California	**Client:** The Newhall Land & Farming Company **Project:** Utility Corridor **Job No.:** 07-2079 (0) **Figure** B3.11

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	91.2	14.3	46.4	1.000	0.815	2.65		0.72		CL-ML
FINAL	93.3	29.2	100.0	0.977	0.773					

Source: HS-22U
Material Description: Sandy, silty CLAY
Remarks:

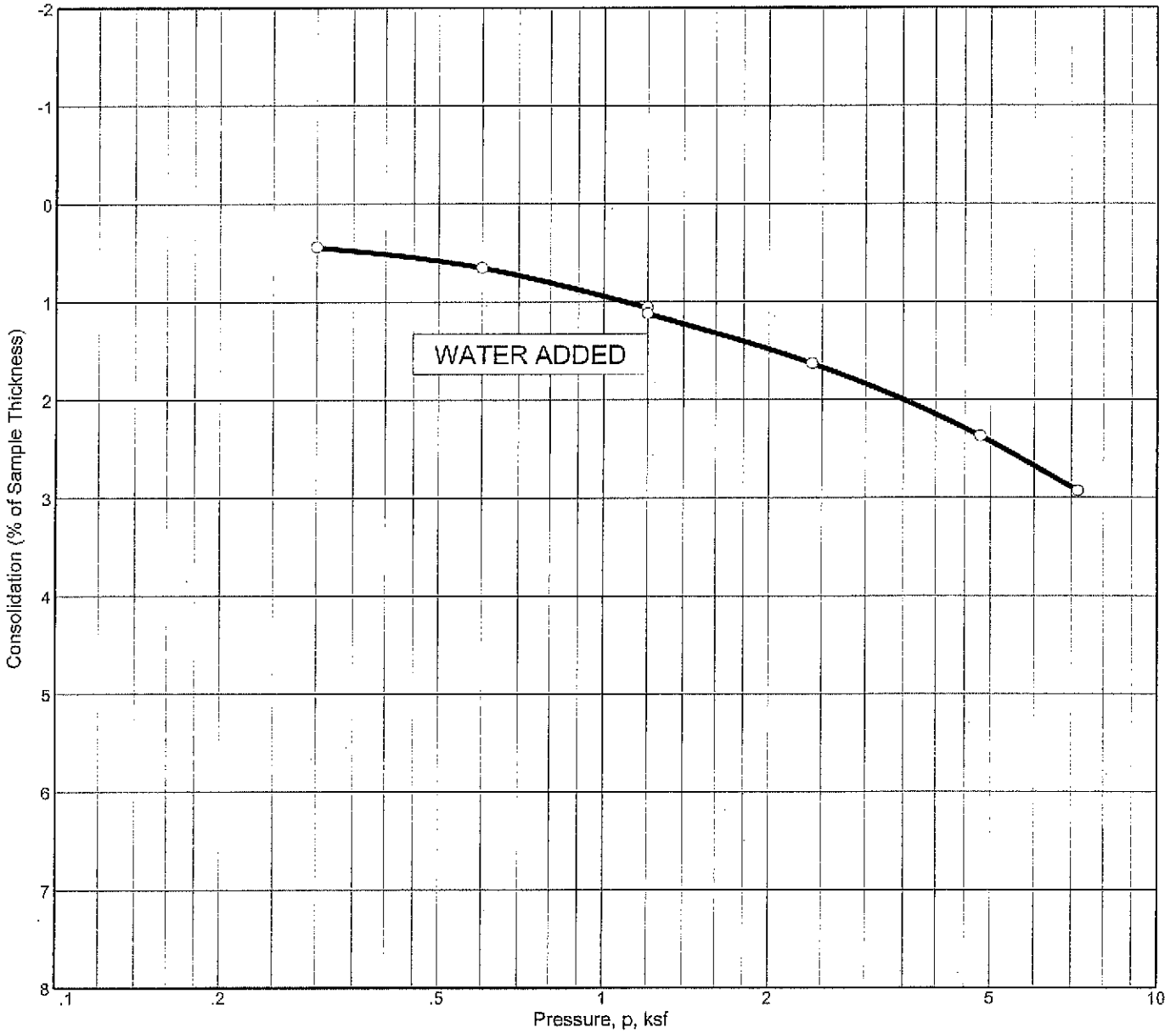
Elev./Depth: 6'

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.
Valencia, California

Client: The Newhall Land & Farming Company
Project: Utility Corridor Sound Wall
Borings for CH_2MHill
Job No.: 07-2079 (1)
Figure B3.12

DRAWN BY
DATE
CHECKED BY
APPROVED BY

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

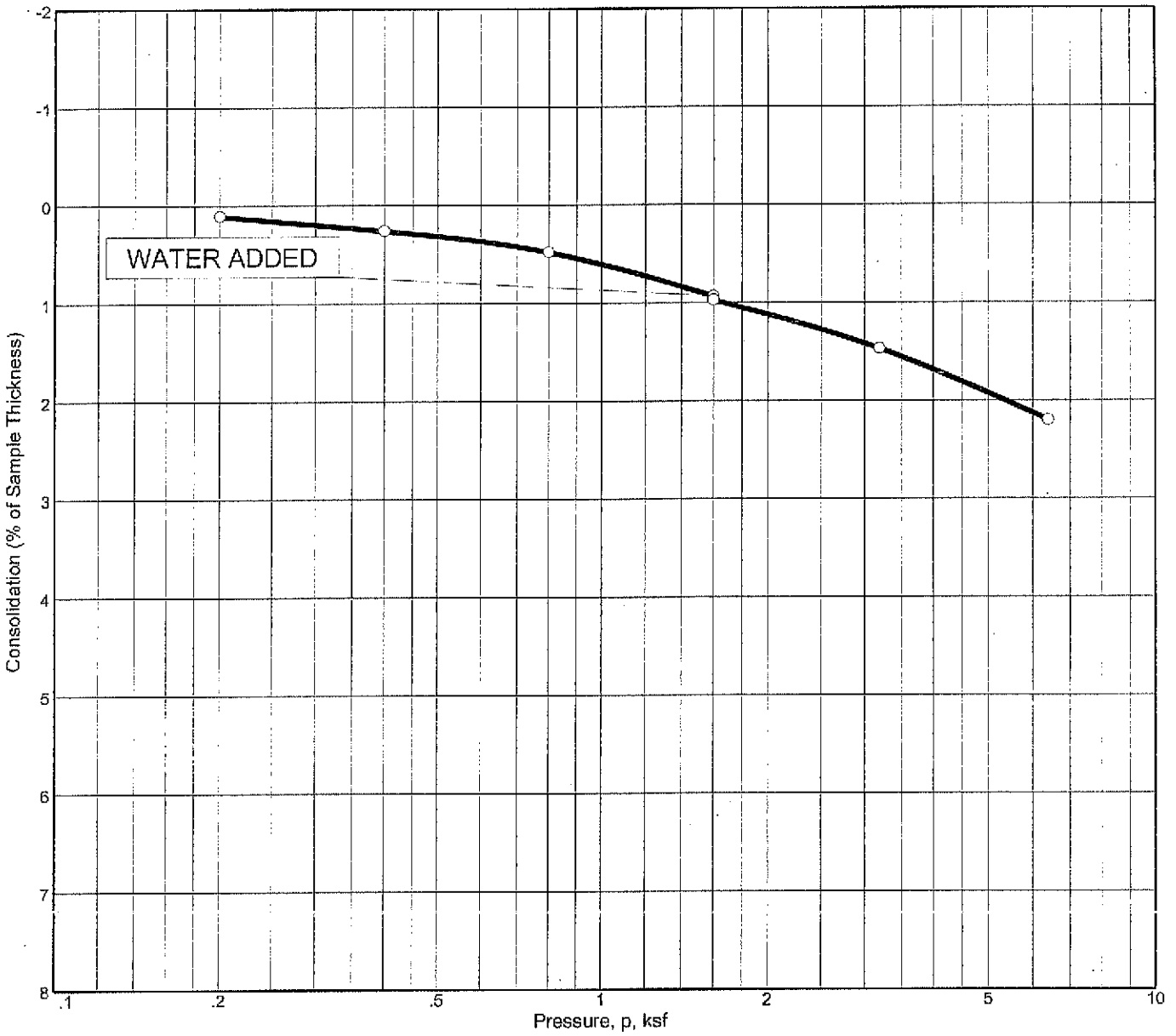
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	102.6	3.1	13.5	1.000	0.613	2.65		1.44		SP-SM
FINAL	105.7	21.4	100.0	0.971	0.566					

Source: HS-22U **Elev./Depth:** 12'
Material Description: Yellowish-brown, poorly graded SAND with silt
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC. Valencia, California	**Client:** The Newhall Land & Farming Company **Project:** Utility Corridor Sound Wall Borings for CH_2MHill **Job No.:** 07-2079 (1) **Figure** B3.13

CHECKED BY
APPROVED BY
DRAWN BY
DATE

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

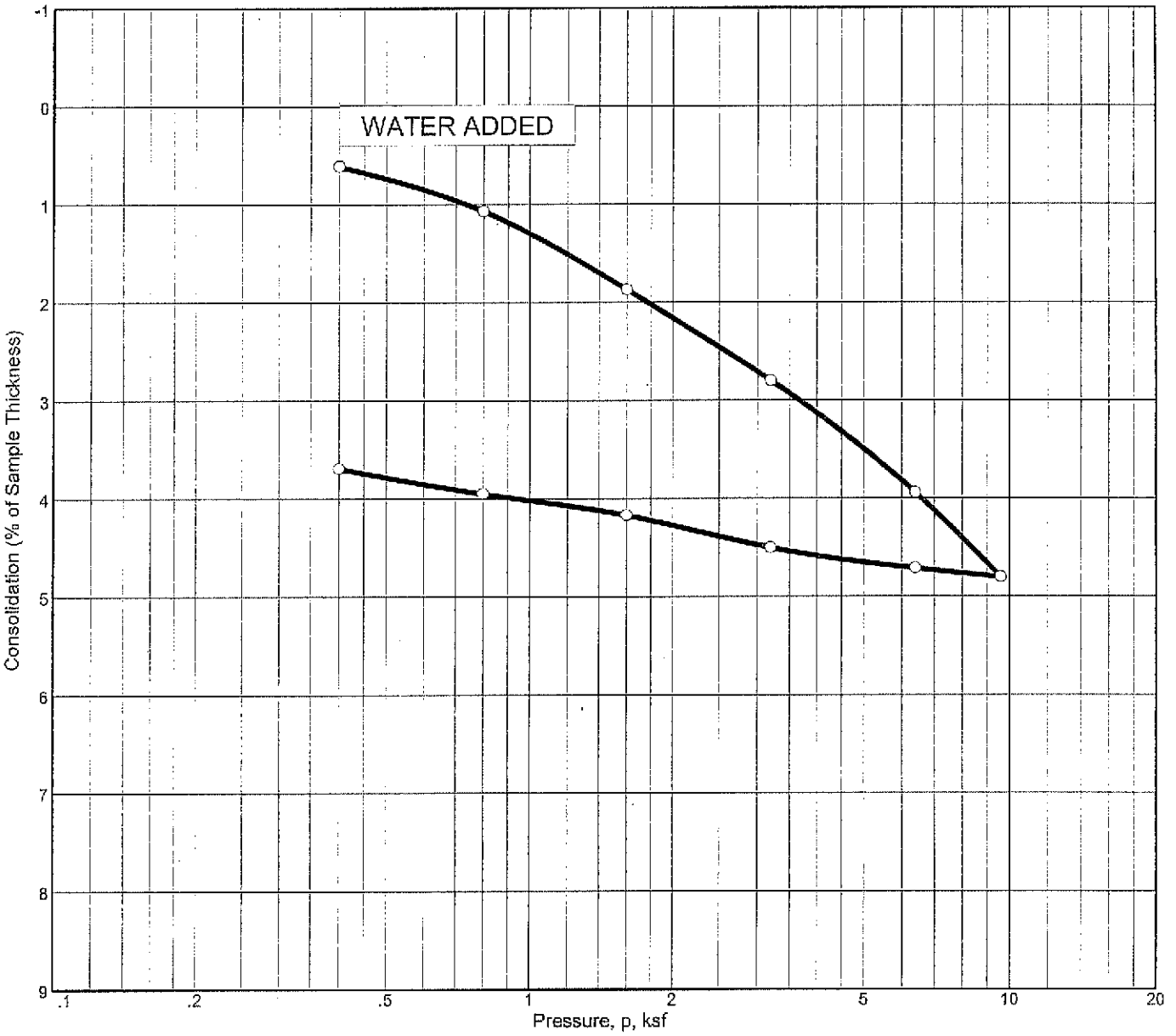
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	101.5	9.2	38.9	1.000	0.630	2.65		1.80		SM
FINAL	103.8	22.5	100.0	0.978	0.594					

Source: HS-22U **Elev./Depth:** 15'
Material Description: Reddish-brown, silty SAND
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC. Valencia, California	**Client:** The Newhall Land & Farming Company **Project:** Utility Corridor Sound Wall Borings for CH_2MHill **Job No.:** 07-2079 (1) **Figure** B3.14

DRAWN BY | CHECKED BY
DATE | APPROVED BY

CONSOLIDATION TEST REPORT



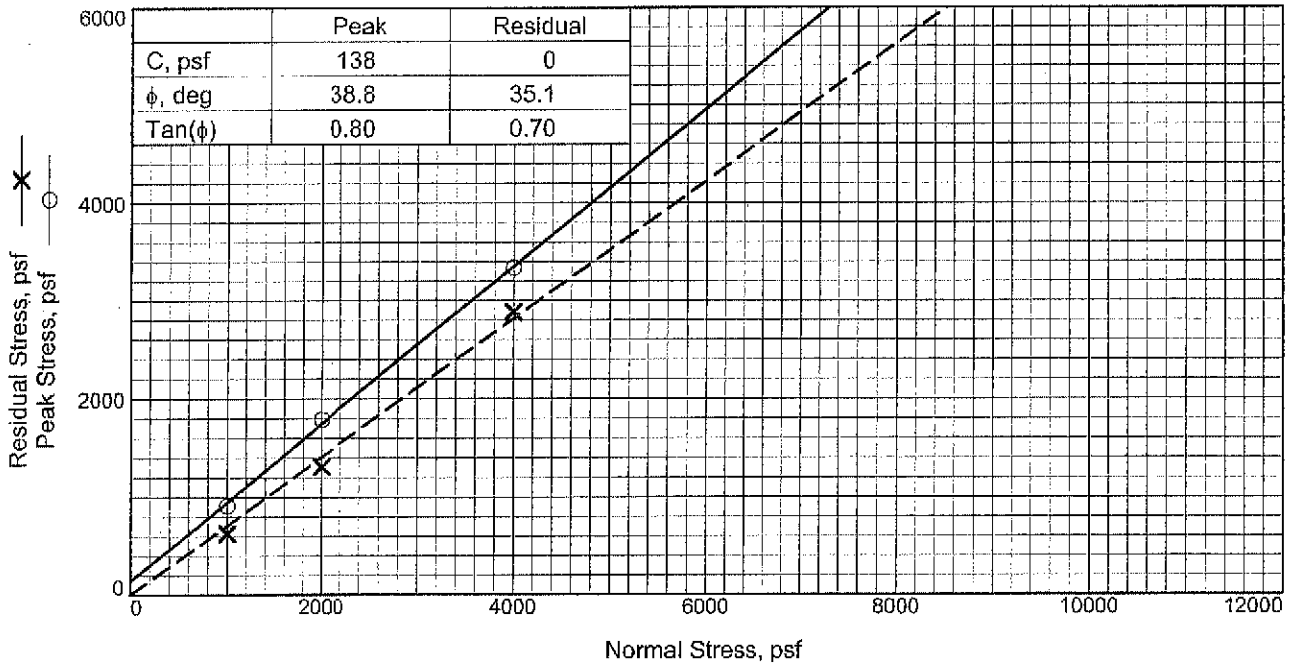
SUMMARY OF TEST RESULTS

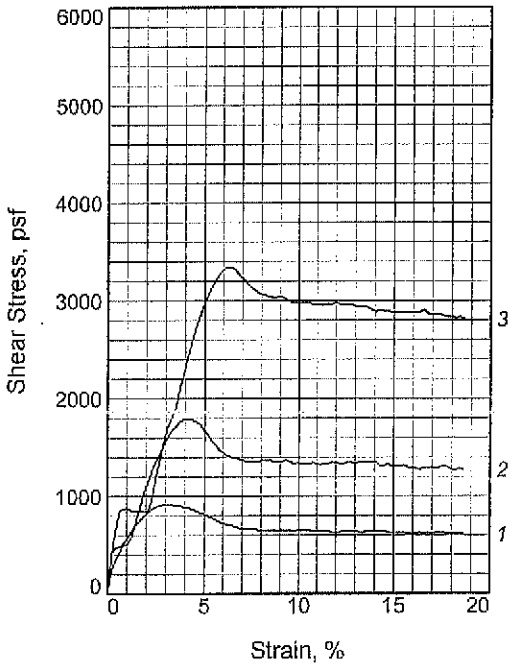
	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	97.4	25.9	98.1	1.000	0.698	2.65		3.00		SM
FINAL	101.1	24.8	100.0	0.963	0.636					

Source: HS-22U **Elev./Depth:** 25'
Material Description: Yellowish-brown, silty SAND
Remarks:

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC. Valencia, California	**Client:** The Newhall Land & Farming Company **Project:** Utility Corridor Sound Wall Borings for CH_2MHill **Job No.:** 07-2079 (1) **Figure** B3.15

DRAWN BY	CHECKED BY
DATE	APPROVED BY





Sample No.		1	2	3
Initial	Water Content, %	7.0	7.1	8.7
	Dry Density, pcf	105.8	105.1	107.4
	Saturation, %	32.9	32.6	42.5
	Void Ratio	0.5638	0.5736	0.5404
	Diameter, in.	2.42	2.42	2.42
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	20.9	20.9	19.4
	Dry Density, pcf	106.5	106.5	109.3
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.5528	0.5535	0.5139
	Diameter, in.	2.42	2.42	2.42
	Height, in.	0.99	0.99	0.98
Normal Stress, psf		1000	2000	4000
Peak Stress, psf		912	1788	3336
Strain, %		2.9	3.9	6.2
Residual Stress, psf		624	1308	2880
Strain, %		15.1	15.1	15.1
Strain rate, %/min.		0.01	0.01	0.01

Sample Type: Undisturbed

Description: Poorly graded SAND with silt (SP-SM)

Specific Gravity= 2.65

Remarks: Quaternary Alluvium (Qal)

Client: The Newhall Land & Farming Company

Project: Utility Corridor

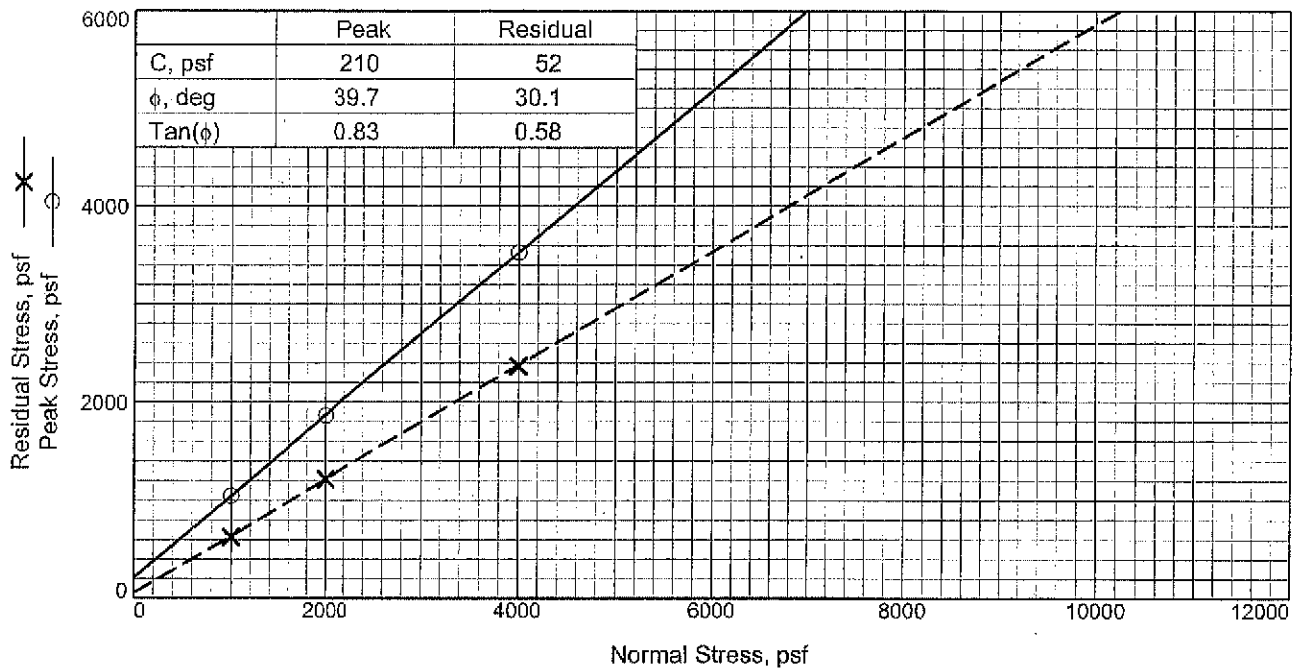
Source of Sample: HS-3U **Depth:** 6'

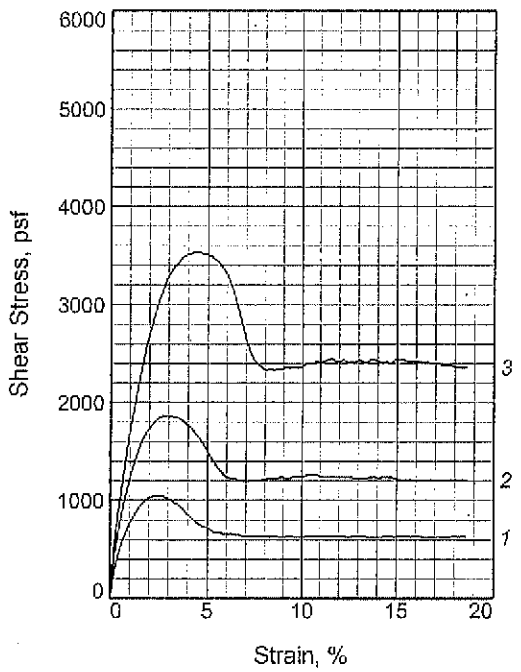
Proj. No.: 07-2079 (0) **Date:** 5/25/07

DIRECT SHEAR TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B4.1





Sample No.		1	2	3
Initial	Water Content, %	17.7	20.7	20.9
	Dry Density, pcf	108.2	104.5	104.8
	Saturation, %	88.7	94.2	95.8
	Void Ratio	0.5287	0.5829	0.5779
	Diameter, in.	2.42	2.42	2.42
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	19.4	21.0	20.5
	Dry Density, pcf	109.2	106.3	107.2
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.5146	0.5569	0.5436
	Diameter, in.	2.42	2.42	2.42
	Height, in.	0.99	0.98	0.98
Normal Stress, psf		1000	2000	4000
Peak Stress, psf		1044	1860	3528
Strain, %		2.3	2.7	4.3
Residual Stress, psf		624	1212	2364
Strain, %		18.6	18.6	18.6
Strain rate, %/min.		0.01	0.01	0.01

Sample Type: Undisturbed

Description: Poorly graded SAND with silt (SP-SM)

Specific Gravity= 2.65

Remarks: Quaternary Older Alluvium (Qoa)

Client: The Newhall Land & Farming Company

Project: Utility Corridor

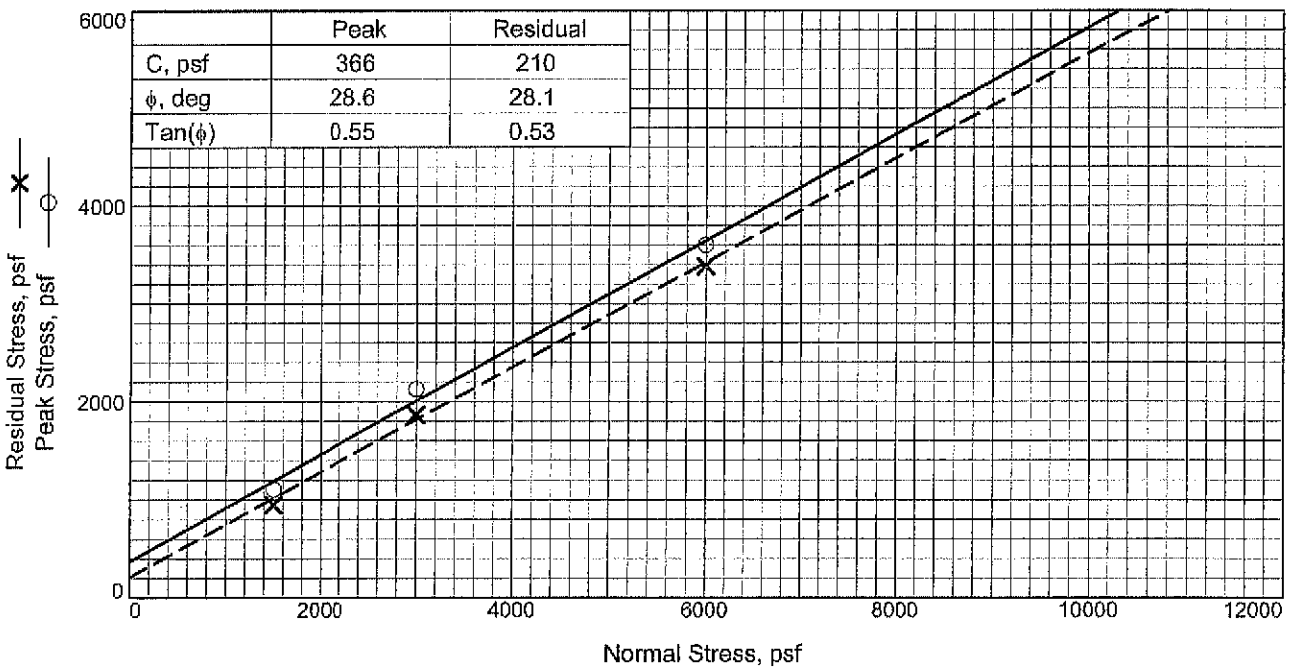
Source of Sample: HS-16U **Depth:** 25'

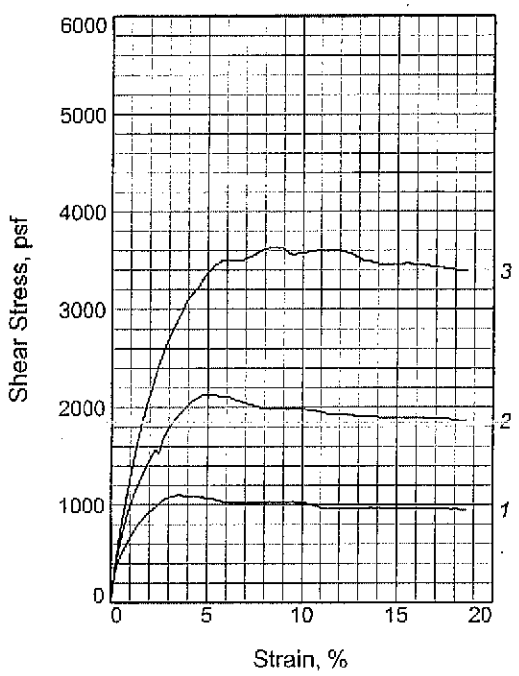
Proj. No.: 07-2079 (0) **Date:** 5/25/07

DIRECT SHEAR TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B4.2





Sample No.		1	2	3
Initial	Water Content, %	8.7	10.9	11.4
	Dry Density, pcf	99.5	101.2	97.4
	Saturation, %	34.9	45.3	43.4
	Void Ratio	0.6622	0.6346	0.6985
	Diameter, in.	2.42	2.42	2.42
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	24.0	22.6	23.9
	Dry Density, pcf	101.1	103.4	101.3
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.6371	0.6001	0.6338
	Diameter, in.	2.42	2.42	2.42
	Height, in.	0.98	0.98	0.96
Normal Stress, psf		1500	3000	6000
Peak Stress, psf		1104	2124	3600
Strain, %		3.5	4.8	10.8
Residual Stress, psf		948	1860	3384
Strain, %		18.6	18.6	18.6
Strain rate, %/min.		0.01	0.01	0.01

Sample Type: Undisturbed
Description: Reddish-brown, silty SAND (SM)

Specific Gravity= 2.65
Remarks: Older Alluvium (Qoa)

Client: The Newhall Land & Farming Company

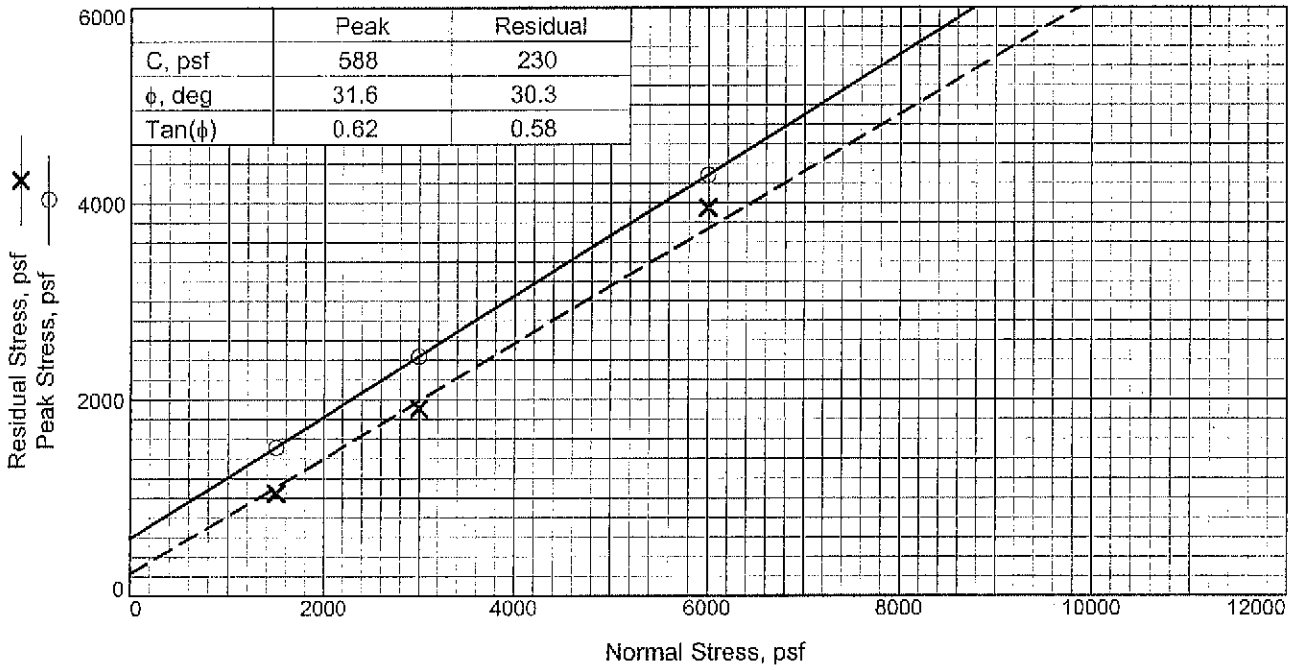
Project: Utility Corridor Sound Wall
Borings for CH_2MHill
Source of Sample: HS-22U **Depth:** 15'

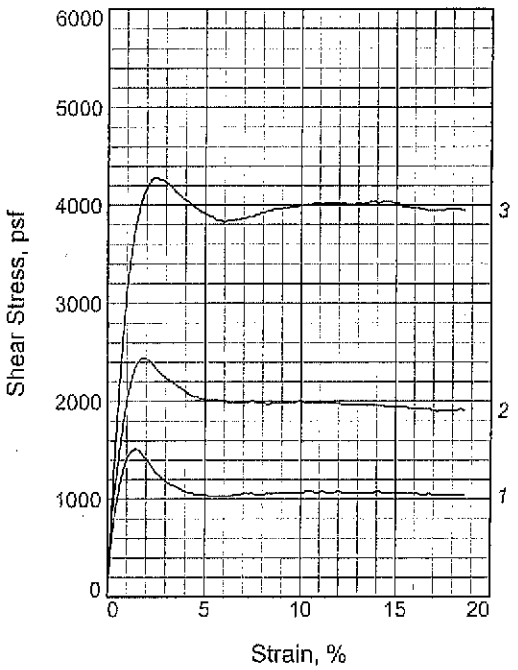
Proj. No.: 07-2079 (1) **Date:** 5/25/07

DIRECT SHEAR TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B4.3





Sample No.		1	2	3
Initial	Water Content, %	8.3	8.4	8.5
	Dry Density, pcf	122.6	122.7	122.4
	Saturation, %	63.2	64.0	64.0
	Void Ratio	0.3496	0.3481	0.3511
	Diameter, in.	2.42	2.42	2.42
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	12.8	12.7	12.4
	Dry Density, pcf	123.5	123.7	124.4
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.3398	0.3369	0.3297
	Diameter, in.	2.42	2.42	2.42
	Height, in.	0.99	0.99	0.98
Normal Stress, psf		1500	3000	6000
Peak Stress, psf		1512	2436	4284
Strain, %		1.4	1.9	2.5
Residual Stress, psf		1044	1908	3948
Strain, %		18.6	18.6	18.6
Strain rate, %/min.		0.01	0.01	0.01

Sample Type: Remold

Description: Dark yellowish-brown, clayey SAND with gravel

Specific Gravity= 2.65

Remarks: Remolded to 92% of MDD
Qoa derived
% Fines = 28.4

Figure B4.4

Client: The Newhall Land & Farming Company

Project: Utility Corridor

Location: HS-20U, HS-21U, HS-22U Mix

Sample Number: A

Proj. No.: 07-2079 (0) **Date:** 5/25/07

DIRECT SHEAR TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Appendix C

APPENDIX C

SLOPE STABILITY ANALYSES

General

Overall (gross) static stability and pseudo-static (earthquake) stability were evaluated for the following proposed slopes shown on the Utility Corridor Plans:

- The cut slope located in the vicinity of Station 96+20 in the Landmark Village area (see Cross Section 8-8'). This is the highest proposed cut slope and will also expose the most adverse geologic conditions expected along the portion of the Utility Corridor addressed in this report.

- The fill slope located in the vicinity of Station 87+90 on the alternate, stand-alone design for the Utility Corridor (**Sheet 6a**), see **cross section 7-7'**. Although this fill slope will not be constructed if Landmark Village is graded before the Utility Corridor, it is higher and therefore more critical than any other fill slopes proposed along the Utility Corridor.

These slopes are representative of the most critical slope heights and gradients along the proposed Utility Corridor. Results of overall stability analyses performed for the preceding slopes are summarized in **Table C1, Results of Slope Stability Analyses.**

The GSTABL7 computer program by Garry H. Gregory (Gregory Geotechnical Software) was used to calculate the factor of safety of the slopes at the project site. Output from the slope stability analysis runs (including a slope cross-section that shows the surface with the lowest factor of safety, geotechnical parameters of soil layers, and other pertinent data) are appended. The surfaces with lowest factor of safety value are plotted on the Cross Sections in **Appendix F**.

Geometry

- Cut Slopes

The 2:1 (h:v), ±30-ft high cut slope illustrated on Cross Section 8-8' is expected to expose adversely bedded Pico Formation bedrock (Tp) with a dip of about 18 degrees. The overall (gross) static and pseudostatic factor of safety values for this slope exceed the minimum allowable factor of safety required by the Los Angeles County Department of Public Works (1.5 static and 1.1 pseudo-static).

APPENDIX C

- Fill Slopes

The overall (gross) static factor of safety values for the 2:1 (h:v), 33-ft high (alternate option) fill slope illustrated on Cross Section 7-7' exceeds the minimum allowable factor of safety values (1.5 static and 1.1 pseudo-static) required by the Los Angeles County Department of Public Works.

Groundwater

Due to the elevated locations of the slopes described above, ground water was not modeled in the slope stability analyses.

Shear Strength Parameters

The following shear strength parameters from our Review of Vesting Tentative Tract report for Landmark (River) Village, dated September 27, 2000, were used to model shear strength of soil and rock materials in our slope stability analyses.

MATERIALS	UNIT WEIGHT (PCF)	RESIDUAL SHEAR STRENGTH		PEAK SHEAR STRENGTH	
		PHI (DEG)	COHESION (PSF)	PHI (DEG)	COHESION (PSF)
Bedrock (Tp), Cross-bedding	130	31	185	45	203
Bedrock (Tp), Parallel to bedding	130	18	200	18	200
Older Alluvium (Qoa)	125	28.5	150	30	200
Compacted Fill (Cef)	130	29	300	29	300

Residual shear strength values were used for evaluation of static slope stability. Peak shear strength values were used for evaluation of pseudo-static earthquake stability, with the exception of analysis surface oriented parallel to bedrock bedding. Direct Re-Shear testing was used to characterize shear strength of rock in the direction parallel to bedding planes.

Methods of Analysis

The Simplified Janbu factor of safety definition was used for analysis of stability of wedge-shaped surfaces in the cut slopes analyzed. The ANISOTROPIC feature of the GSTABL7 program was used to locate the depth and orientation of low-strength, sheared beds of Pico formation rock that yield the minimum factor of safety.

APPENDIX C

The Simplified Bishop factor of safety definition was used for analysis of stability of circular-shaped surfaces in the fill slopes analyzed.

In accordance with Los Angeles County guidelines, a pseudo-static horizontal acceleration coefficient, K_h, of 0.15g was used herein to model the forces applied to slopes during an earthquake. In this model, a pseudo-static earthquake force acts on each soil slice above an analysis surface equal to K_h times the weight of the individual slice (in addition to other forces acting on the slice).

Conclusion

Proposed slopes shown on the Utility Corridor Plans (for the proposed grades and for the alternate proposed grades) comply with requirements of the Los Angeles County Department of Public Works, provided that the recommendations presented in this report are followed and incorporated during project construction.

The following attachments complete this Appendix.

Slope Stability Analyses Results — Table C1
Slope Stability Diagrams and Data Sheets for Runs 1 through 4

APPENDIX C

RESULTS OF SLOPE STABILITY ANALYSES

CROSS SECTION	FILE NAME	SLOPE TYPE	ANALYZED SURFACE	SAFETY FACTOR CALCULATION METHOD	FACTOR OF SAFETY		COMMENTS	RUN NO.
					STATIC	PSEUDOSTATIC (K_H = 0.15G)[1]		
7-7'	F7S1A	Fill slope	Circular Arc	Bishop	1.88	-	Alternate Grade - Minimum safety factor for highest fill slope.	1
7-7'	F7S1A	Fill slope	Circular Arc	Bishop	-	1.44	Alternate Grade - Minimum safety factor for highest fill slope.	2
8-8'	F8S1B	Cut slope	Bedding Plane	Janbu	1.61	-	Remedial grading configuration; see cross section	3
8-8'	F8PS1B	Cut slope	Bedding Plane	Janbu	-	1.23	Pseudo-static analysis of remedial grading configuration.	4

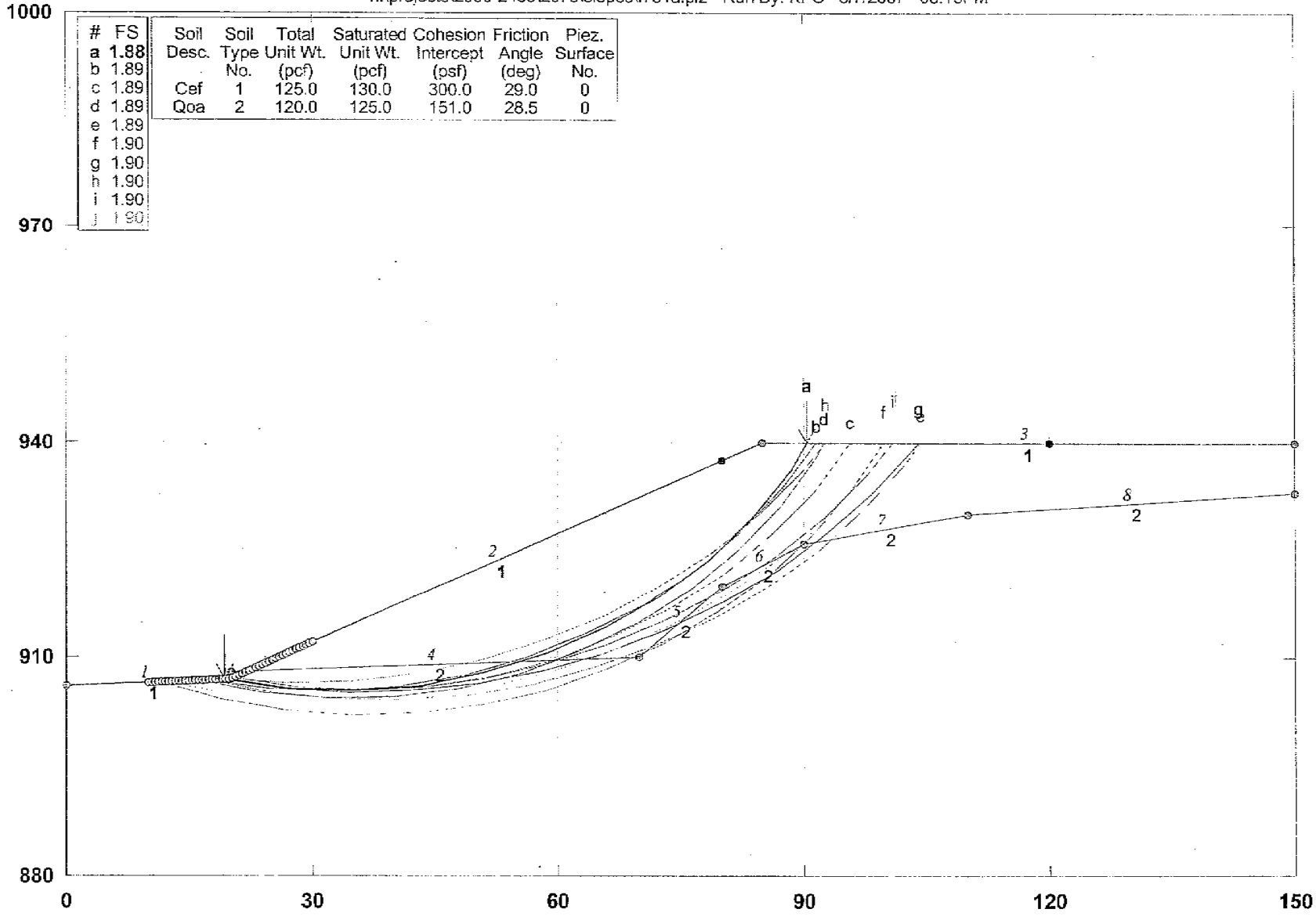
[1] Residual shear strength values were used in analysis of pseudo-static slope stability.

Utility Corridor; Section 7-7'; fill slope; circular; static; min FS

n:\projects\2000-2499\2079\slopes\f7s1a.pl2 Run By: KPC 5/7/2007 03:15PM

#	FS
a	1.88
b	1.89
c	1.89
d	1.89
e	1.89
f	1.90
g	1.90
h	1.90
i	1.90
j	1.90

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	29.0	0
Qoa	2	120.0	125.0	151.0	28.5	0



GSTABL7 v.2 FSmin=1.88

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN 1

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:          5/7/2007
Time of Run:                03:15PM
Run By:                     KPC
Input Data Filename:        N:\Projects\2000-2499\2079\Slopes\f7s1a.in
Output Filename:            N:\Projects\2000-2499\2079\Slopes\f7s1a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\2000-2499\2079\Slopes1a.PLT
PROBLEM DESCRIPTION:  Utility Corridor; Section 7-7';
                      fill slope; circular; static; min FS
BOUNDARY COORDINATES
    3 Top   Boundaries
    8 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     906.00      20.00     907.00        1
    2        20.00     907.00      85.00     940.00        1
    3        85.00     940.00     150.00     940.00        1
    4        20.00     908.00      70.00     910.00        2
    5        70.00     910.00      80.00     920.00        2
    6        80.00     920.00      90.00     926.00        2
    7        90.00     926.00     110.00     930.00        2
    8       110.00     930.00     150.00     933.00        2
User Specified Y-Origin =       880.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 2 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   125.0    130.0     300.0     29.0     0.00      0.0      0
  2   120.0    125.0     151.0     28.5     0.00      0.0      0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
 500 Trial Surfaces Have Been Generated.
  10 Surface(s) Initiate(s) From Each Of    50 Points Equally Spaced
Along The Ground Surface Between  X =  10.00(ft)
                            and  X =  30.00(ft)
Each Surface Terminates Between   X =  80.00(ft)
                            and   X = 120.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =      0.00(ft)
 8.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -35.0
And  20.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Modified Bishop Method * *
      Total Number of Trial Surfaces Evaluated =   500
      Statistical Data On All Valid FS Values:
         FS Max =   4.874   FS Min =   1.880   FS Ave =   2.295
         Standard Deviation =    0.289   Coefficient of Variation =   12.58 %
```

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	19.39	906.97
2	27.29	905.70
3	35.28	905.43
4	43.25	906.15
5	51.07	907.85
6	58.61	910.50
7	65.77	914.08
8	72.43	918.51
9	78.49	923.74
10	83.85	929.67
11	88.44	936.23
12	90.43	940.00

Circle Center At X = 33.53 ; Y = 969.47 ; and Radius = 64.08

Factor of Safety

*** 1.880 ***

Individual data on the 14 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	0.6	4.9	0.0	0.0	0.	0.	0.0	0.0	0.0
2	7.3	2266.1	0.0	0.0	0.	0.	0.0	0.0	0.0
3	8.0	7043.4	0.0	0.0	0.	0.	0.0	0.0	0.0
4	8.0	10830.7	0.0	0.0	0.	0.	0.0	0.0	0.0
5	7.8	13394.3	0.0	0.0	0.	0.	0.0	0.0	0.0
6	4.5	8517.7	0.0	0.0	0.	0.	0.0	0.0	0.0
7	3.1	6097.8	0.0	0.0	0.	0.	0.0	0.0	0.0
8	7.2	14431.1	0.0	0.0	0.	0.	0.0	0.0	0.0
9	6.7	13013.5	0.0	0.0	0.	0.	0.0	0.0	0.0
10	6.1	10626.1	0.0	0.0	0.	0.	0.0	0.0	0.0
11	5.4	7609.6	0.0	0.0	0.	0.	0.0	0.0	0.0
12	1.1	1323.6	0.0	0.0	0.	0.	0.0	0.0	0.0
13	3.4	2675.4	0.0	0.0	0.	0.	0.0	0.0	0.0
14	2.0	469.8	0.0	0.0	0.	0.	0.0	0.0	0.0

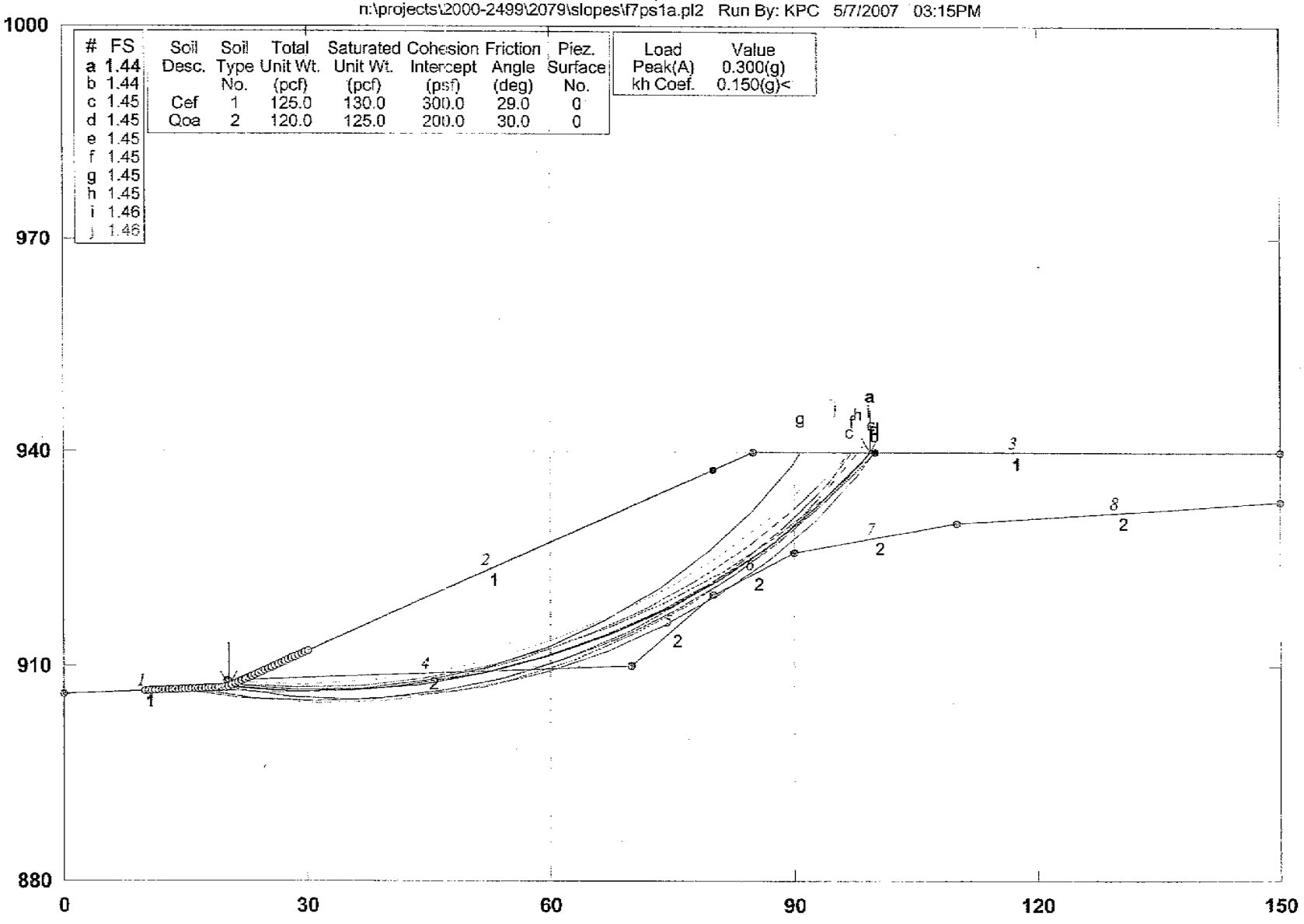
Utility Corridor; Section 7-7'; fill slope; circular; pseudo

n:\projects\2000-2499\2079\slopes\f7ps1a.pl2 Run By: KPC 5/7/2007 03:15PM

#	FS
a	1.44
b	1.44
c	1.45
d	1.45
e	1.45
f	1.45
g	1.45
h	1.45
i	1.46
j	1.46

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	29.0	0
Qoa	2	120.0	125.0	200.0	30.0	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<



GSTABL7 v.2 FSmin=1.44

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

PLATE 7

```
                    ***  GSTABL7  ***
            ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:        5/7/2007
Time of Run:              03:15PM
Run By:                   KPC
Input Data Filename:      N:\Projects\2000-2499\2079\Slopes\f7psla.in
Output Filename:          N:\Projects\2000-2499\2079\Slopes\f7psla.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\2000-2499\2079\Slopepsla.PLT
PROBLEM DESCRIPTION:  Utility Corridor; Section 7-7';
                      fill slope; circular; pseudo
BOUNDARY COORDINATES
    3 Top   Boundaries
    8 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     906.00      20.00     907.00        1
    2        20.00     907.00      85.00     940.00        1
    3        85.00     940.00     150.00     940.00        1
    4        20.00     908.00      70.00     910.00        2
    5        70.00     910.00      80.00     920.00        2
    6        80.00     920.00      90.00     926.00        2
    7        90.00     926.00     110.00     930.00        2
    8       110.00     930.00     150.00     933.00        2
User Specified Y-Origin =       880.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 2 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   125.0    130.0     300.0     29.0    0.00       0.0      0
  2   120.0    125.0     200.0     30.0    0.00       0.0      0
Specified Peak Ground Acceleration Coefficient (A) =   0.300(g)
Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
Specified Seismic Pore-Pressure Factor =   0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
 500 Trial Surfaces Have Been Generated.
  10 Surface(s) Initiate(s) From Each Of    50 Points Equally Spaced
Along The Ground Surface Between  X =  10.00(ft)
                             and  X =  30.00(ft)
Each Surface Terminates Between   X =  80.00(ft)
                            and   X = 100.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =      0.00(ft)
 8.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -35.0
And  20.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Modified Bishop Method * *
```

Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 3.692 FS Min = 1.443 FS Ave = 1.713
Standard Deviation = 0.206 Coefficient of Variation = 12.02 %
Failure Surface Specified By 13 Coordinate Points

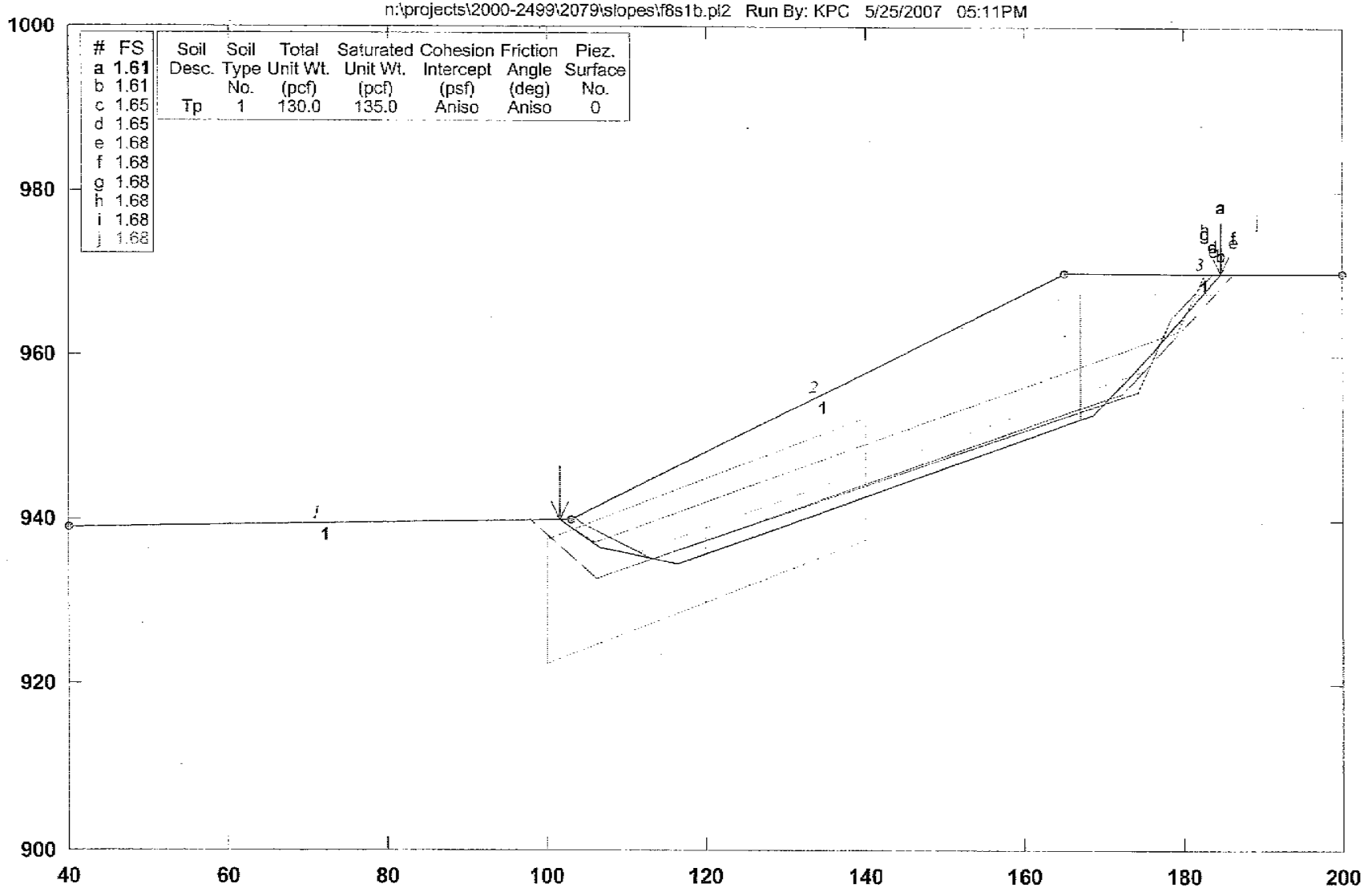
Point No.	X-Surf (ft)	Y-Surf (ft)
1	20.20	907.10
2	28.18	906.47
3	36.18	906.57
4	44.13	907.41
5	51.98	908.98
6	59.64	911.28
7	67.06	914.27
8	74.17	917.93
9	80.92	922.23
10	87.23	927.14
11	93.07	932.62
12	98.37	938.61
13	99.39	940.00

Circle Center At X = 31.07 ; Y = 992.87 ; and Radius = 86.45
Factor of Safety
*** 1.443 ***
Individual data on the 14 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	8.0	2280.3	0.0	0.0	0.	0.	342.0	0.0	0.0
2	8.0	6585.8	0.0	0.0	0.	0.	987.9	0.0	0.0
3	8.0	10114.1	0.0	0.0	0.	0.	1517.1	0.0	0.0
4	7.8	12755.2	0.0	0.0	0.	0.	1913.3	0.0	0.0
5	1.1	2046.6	0.0	0.0	0.	0.	307.0	0.0	0.0
6	6.5	12372.5	0.0	0.0	0.	0.	1855.9	0.0	0.0
7	7.4	15061.7	0.0	0.0	0.	0.	2259.3	0.0	0.0
8	7.1	14757.9	0.0	0.0	0.	0.	2213.7	0.0	0.0
9	6.7	13598.2	0.0	0.0	0.	0.	2039.7	0.0	0.0
10	4.1	7728.2	0.0	0.0	0.	0.	1159.2	0.0	0.0
11	2.2	3830.5	0.0	0.0	0.	0.	574.6	0.0	0.0
12	5.8	7380.8	0.0	0.0	0.	0.	1107.1	0.0	0.0
13	5.3	2909.7	0.0	0.0	0.	0.	436.4	0.0	0.0
14	1.0	89.0	0.0	0.0	0.	0.	13.3	0.0	0.0

Utility Corridor; Section 8-8'; cut slope; planar; static

n:\projects\2000-2499\2079\slopes\f8s1b.pl2 Run By: KPC 5/25/2007 05:11PM



#	FS
a	1.61
b	1.61
c	1.65
d	1.65
e	1.68
f	1.68
g	1.68
h	1.68
i	1.68
j	1.68

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Tp	1	130.0	135.0	Aniso	Aniso	0

GSTABL7 v.2 FSmin=1.61

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

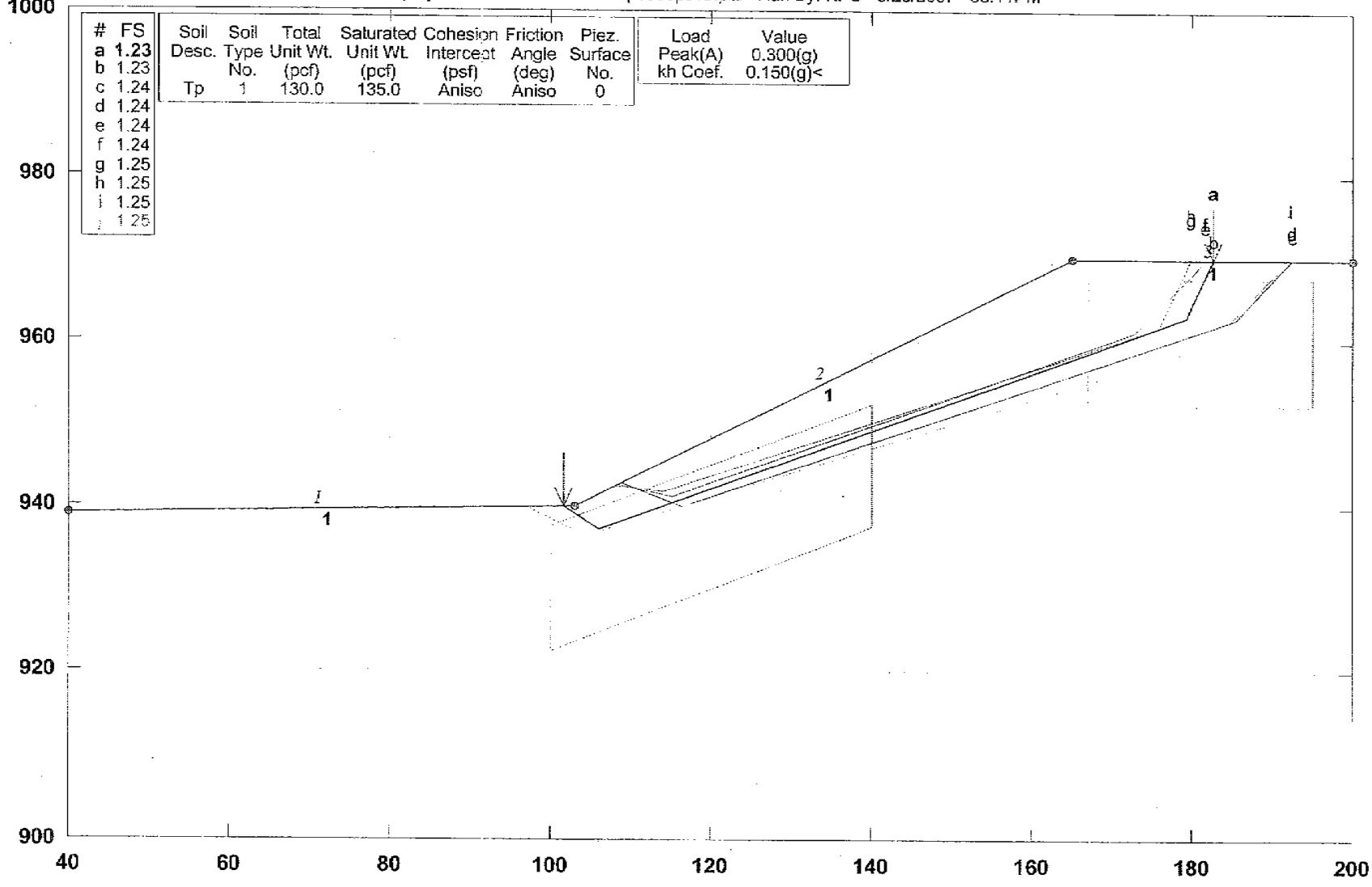
```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgensterh-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*****************************************************************************
Analysis Run Date:          5/25/2007
Time of Run:                05:11PM
Run By:                     KPC
Input Data Filename:        N:\Projects\2000-2499\2079\Slopes\f8s1b.in
Output Filename:            N:\Projects\2000-2499\2079\Slopes\f8s1b.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\2000-2499\2079\Slopes1b.PLT
PROBLEM DESCRIPTION:  Utility Corridor; Section 8-8';
                      cut slope; planar; static
BOUNDARY COORDINATES
    3 Top   Boundaries
    3 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1        40.00     939.00     103.00     940.00        1
    2       103.00     940.00     165.00     970.00        1
    3       165.00     970.00     200.00     970.00        1
User Specified Y-Origin =       900.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 1 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   130.0    135.0     185.0     31.0    0.00      0.0       0
ANISOTROPIC STRENGTH PARAMETERS
    1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction    Counterclockwise     Cohesion     Friction
  Range       Direction Limit    Intercept      Angle
   No.            (deg)            (psf)        (deg)
    1             16.5             185.00        31.00
    2             19.5             200.00        18.00
    3             90.0             185.00        31.00
ANISOTROPIC SOIL NOTES:
   (1) An input value of 0.01 for C and/or Phi will cause Aniso
       C and/or Phi to be ignored in that range.
   (2) An input value of 0.02 for Phi will set both Phi and
       C equal to zero, with no water weight in the tension crack.
   (3) An input value of 0.03 for Phi will set both Phi and
       C equal to zero, with water weight in the tension crack.
Janbus Empirical Coef is being used for the case of  c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is  10.0
Box        X-Left     Y-Left    X-Right    Y-Right      Height
No.         (ft)       (ft)       (ft)       (ft)        (ft)
 1        100.00     930.00     140.00     945.00      15.00
```

```
 2          167.00     960.00     195.00     960.00      15.00
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Simplified Janbu Method * *
      Total Number of Trial Surfaces Evaluated =  1000
      Statistical Data On All Valid FS Values:
         FS Max =  11.492   FS Min =   1.611   FS Ave =   2.587
         Standard Deviation =    0.670   Coefficient of Variation =   25.89 %
      Failure Surface Specified By  7 Coordinate Points
        Point      X-Surf      Y-Surf
         No.        (ft)        (ft)
          1        101.55      939.98
          2        106.57      936.57
          3        116.36      934.56
          4        168.65      952.73
          5        175.58      959.94
          6        182.16      967.47
          7        184.69      970.00
             Factor of Safety
            ***    1.611   ***
           Individual data on the     8  slices
```

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	1.5	95.3	0.0	0.0	0.	0.	0.0	0.0	0.0
2	3.6	1430.2	0.0	0.0	0.	0.	0.0	0.0	0.0
3	9.8	10864.9	0.0	0.0	0.	0.	0.0	0.0	0.0
4	48.6	96258.1	0.0	0.0	0.	0.	0.0	0.0	0.0
5	3.7	8501.9	0.0	0.0	0.	0.	0.0	0.0	0.0
6	6.9	12307.3	0.0	0.0	0.	0.	0.0	0.0	0.0
7	6.6	5387.6	0.0	0.0	0.	0.	0.0	0.0	0.0
8	2.5	415.1	0.0	0.0	0.	0.	0.0	0.0	0.0

Utility Corridor; Section 8-8'; cut slope; planar; pseudo

n:\projects\2000-2499\2079\slopes\f8ps1b.pl2 Run By: KPC 5/25/2007 05:11PM



GSTABL7 v.2 FSmin=1.23

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:        5/25/2007
Time of Run:              05:11PM
Run By:                   KPC
Input Data Filename:      N:\Projects\2000-2499\2079\Slopes\f8ps1b.in
Output Filename:          N:\Projects\2000-2499\2079\Slopes\f8ps1b.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\2000-2499\2079\Slopeps1b.PLT
PROBLEM DESCRIPTION:  Utility Corridor; Section 8-8';
                      cut slope; planar; pseudo
BOUNDARY COORDINATES
    3 Top   Boundaries
    3 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1        40.00     939.00     103.00     940.00        1
    2       103.00     940.00     165.00     970.00        1
    3       165.00     970.00     200.00     970.00        1
User Specified Y-Origin =      900.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 1 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)   Param.   (psf)     No.
  1   130.0    135.0     203.0     45.0    0.00      0.0      0
ANISOTROPIC STRENGTH PARAMETERS
    1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction     Counterclockwise     Cohesion     Friction
  Range        Direction Limit    Intercept      Angle
   No.            (deg)             (psf)        (deg)
    1             16.5              203.00        45.00
    2             19.5              200.00        18.00
    3             90.0              203.00        45.00
ANISOTROPIC SOIL NOTES:
   (1) An input value of 0.01 for C and/or Phi will cause Aniso
       C and/or Phi to be ignored in that range.
   (2) An input value of 0.02 for Phi will set both Phi and
       C equal to zero, with no water weight in the tension crack.
   (3) An input value of 0.03 for Phi will set both Phi and
       C equal to zero, with water weight in the tension crack.
Specified Peak Ground Acceleration Coefficient (A) =   0.300(g)
Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
Specified Seismic Pore-Pressure Factor =   0.000
Janbus Empirical Coef is being used for the case of  c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
```

Sliding Block Is 10.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	100.00	930.00	140.00	945.00	15.00
2	167.00	960.00	195.00	960.00	15.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 5.755 FS Min = 1.234 FS Ave = 2.574
Standard Deviation = 0.605 Coefficient of Variation = 23.53 %
Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	101.53	939.98
2	105.93	937.29
3	179.23	962.98
4	182.66	970.00

Factor of Safety
*** 1.234 ***

Individual data on the 5 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	1.5	88.6	0.0	0.0	0.	0.	13.3	0.0	0.0
2	2.9	960.2	0.0	0.0	0.	0.	144.0	0.0	0.0
3	59.1	61946.3	0.0	0.0	0.	0.	9291.9	0.0	0.0
4	14.2	17595.7	0.0	0.0	0.	0.	2639.4	0.0	0.0
5	3.4	1564.1	0.0	0.0	0.	0.	234.6	0.0	0.0

Appendix D

APPENDIX D

RECOMMENDED EARTHWORK SPECIFICATIONS

The following specifications are recommended to provide a basis for quality control during the placement of compacted fill or backfill, as applicable.

1. Areas on which compacted fill will be placed shall be observed by Allan E. Seward Engineering Geology, Inc. (AESEGI) prior to the placement of fill.

2. All drainage devices shall be properly installed and observed by AESEGI and/or the owner's representative(s) prior to placement of backfill.

3. Fill soils shall consist of imported soils or on-site soils which are free of organics, cobbles, and deleterious material, provided that each material is approved by AESEGI. AESEGI shall evaluate and/or test the import material for its conformance with the report recommendations prior to its delivery to the site. The contractor shall notify AESEGI at least 72 hours prior to importing material to the site

4. The thickness of the controlled lifts in which Fill is placed shall be compatible with the type of compaction equipment used. The fill materials shall be brought to Optimum Moisture Content or above, thoroughly mixed during spreading to obtain a near uniform water content and a uniform blend of materials, and then placed in lifts with a pre-compaction thickness not exceeding 8 inches. Each lift shall be compacted to the specified percentage of Maximum Dry Density determined in accordance with ASTM Test Method D1557. Density testing shall be performed by AESEGI to verify relative compaction. The contractor shall provide proper access and level areas for testing.

5. Rocks or rock fragments less than eight (8) inches in the largest dimension may be utilized in the fill, provided they are not placed in concentrated pockets. However, rocks larger than four (4) inches in dimension shall not be placed within three (3) feet of finish grade.

6. Rocks greater than eight (8) inches in largest dimension shall be taken offsite, or placed in areas designated by the Geotechnical Engineer to be suitable for rock disposal.

7. Where space limitations do not allow for conventional fill compaction operations, special backfill materials and procedures may be required. Pea gravel or other select fill can be used in areas of limited space. A sand and Portland Cement slurry (2 sacks per

APPENDIX D

cubic-yard of slurry mix) shall be used in limited space areas for shallow backfill near final pad grade, and pea gravel shall be placed in deeper backfill near drainage systems.

8. AESEGI shall observe the placement of fill and conduct in-place field density tests on the compacted fill in order to check adequacy of in-situ water content and relative compaction. Where measured in-situ density of compacted fill soil is lower than the required relative compaction, the soil shall be water-conditioned and recompacted until adequate relative compaction is achieved.

9. The Contractor shall achieve with the specified relative compaction out to the finish slope face of fill slopes, buttresses, and stabilization fills, as set forth in the specifications for compacted fill. This may be achieved either by overbuilding the slope and cutting back as necessary, by direct compaction of the slope face with suitable equipment, or by other procedures which produce the required result.

10. Any abandoned underground structures such as cesspools, cisterns, mining shafts, tunnels, septic tanks, wells, pipelines, or others not discovered prior to grading are to be removed or treated to the satisfaction of the Geotechnical Engineer and/or the controlling agency for the project.

11. The Contractor shall have suitable and sufficient equipment during a particular operation to handle the volume of fill being placed. When necessary, fill placement equipment shall be shut down temporarily in order to permit proper compaction of fill, correction of deficient areas, or to facilitate required field testing.

12. The Contractor shall be responsible for the satisfactory completion of all earthwork in accordance with the project plans and specifications.

13. Final reports shall be submitted after completion of earthwork and after the Geotechnical Engineer and Engineering Geologist have finished their observations of the work. No additional excavation or filling shall be performed without prior notification to the Geotechnical Engineer and/or Engineering Geologist.

14. Whenever the words "supervision", "inspection", or "control" are used, they shall mean <u>observation</u> of the work and/or testing of the compacted fill by AESEGI to assess whether substantial compliance with plans, specifications and design concepts has been

APPENDIX D

achieved. However, these words do not refer to direction by AESEGI of the actual work of the Contractor or the Contractor's workers.

APPENDIX D

RECOMMENDED SPECIFICATIONS FOR PLACEMENT OF TRENCH BACKFILL

Trench excavations in which backfill will be placed shall be free of trash, debris or other deleterious materials prior to backfill placement, and shall be observed by a representative of Allan E. Seward Engineering Geology, Inc. (AESEGI).

Except as stipulated herein, soils obtained from the excavation may be used as backfill if they are free of organics and other deleterious materials.

Rocks generated by trench excavation operations that do not exceed three (3) inches in largest dimension may be used as trench backfill material. However, material larger than 3-inches in dimension may not be placed within 12 inches of the top of pipes. No more than 30 percent of the backfill volume shall contain particles larger than 1-½ inches in dimension, and particles larger than 1-½ inches in dimension shall be well mixed with finer soil.

Soils (other than aggregates) with a Sand Equivalent (SE) greater than or equal to 30 (as determined by ASTM Standard Test Method D2419) or other soils authorized by the Geotechnical Engineer or his representative in the field, may be used for bedding and shading material in pipe trenches.

Trench backfill other than bedding and shading shall be compacted by mechanical methods as tamping sheepsfoot, vibrating or pneumatic rollers, or other mechanical tampers to achieve the specified density. The backfill materials shall be brought to Optimum Moisture Content or above, thoroughly mixed during spreading to obtain a near uniform water content and uniform blend of materials, and then placed in horizontal lifts with a pre-compaction thickness not exceeding 8 inches. Trench backfills shall be compacted to the specified percentage of Maximum Dry Density determined in accordance with ASTM Test Method D1557.

The Contractor shall select the equipment and procedure for achieving the specified density without damage to the pipe, the adjacent ground, existing improvements, or completed work.

Observations and field tests shall be performed during construction by AESEGI to confirm that the required degree of compaction has been achieved. Where achieved compaction is less than that specified value, the water content shall be adjusted as necessary and additional compactive effort shall be made until the specified compaction is achieved. Field density

APPENDIX D

tests may be omitted at the discretion of the Geotechnical Engineer or his representative in the field.

Whenever, in the opinion of AESEGI or the Owner's Representative(s), an unstable condition is being created either by cutting or filling, the work shall not proceed until an investigation has been made and the excavation plan has been revised, if deemed necessary.

Fill material shall not be placed, spread, or rolled during unfavorable weather conditions. When the work is interrupted by heavy rain, fill operations shall not be resumed until field tests by AESEGI indicate the water content and density of the fill materials and of the fill surface over which they are to be compacted satisfy the requirements of the specifications.

Whenever the words "supervision", "inspection", or "control" are used, they shall mean observation of the work and/or testing of the compacted fill by AESEGI to assess whether substantial compliance with plans, specifications and design concepts has been achieved.

APPENDIX D

DRAINAGE AND EROSION CONTROL RECOMMENDATIONS

Slopes and pads for this project shall be designed to direct surficial runoff away from structures and to reduce water-induced surficial erosion/sloughing. Permanent erosion control measures shall be initiated immediately following completion of grading. All constructed slopes will undergo some erosion when subjected to sustained water influx. To maintain appropriate long-term drainage and erosion control, the following points shall be incorporated in slope protection, landscaping, irrigation, and modifications to slopes, pads and structures:

1. All interceptor ditches, drainage terraces, down-drains and any other drainage devices shall be maintained and kept clear of debris. A qualified Engineer should review any proposed additions or revisions to these systems in order to evaluate their impact on slope erosion.

2. Retaining walls shall have adequate freeboard to provide a catchment area for minor slope erosion. Periodic inspection, and if necessary, cleanout of deposited soil and debris shall be performed, particularly during and after periods of rainfall.

3. The future developers shall be made aware of the **potential problems**, which may develop **when drainage is altered** by landscaping and/or by construction of retaining walls and paved walkways. Ponded water, water directed over slope faces, leaking irrigation systems, **over-watering,** or other conditions which could lead to excessive soil moisture, **must be avoided.**

4. Surficial slope soils may be subject to water-induced mass erosion. Therefore, a suitable proportion of slope planting shall have root systems which will extend well below three feet. We suggest consideration of drought-resistant shrubs and low trees for this purpose. Intervening areas can then be planted with lightweight surface plants with shallower root systems. All plants shall be lightweight and require low moisture. Any loose slough generated during planting of shrubs, trees, and other surface plants shall be removed from slope faces.

5. Construction delays, climate/weather conditions, and plant growth rates may necessitate additional short-term, non-plant erosion control measures such as matting, netting, plastic sheets, deep (5-feet) staking, etc.

APPENDIX D

6. Significant erosion can be initiated by seemingly insignificant events such as rodent burrowing, human trespass (footprints, etc.), small concentrations of uncontrolled surface/subsurface water, or poor compaction of utility trench backfill on slopes.

7. High and/or fluctuating water content in slope materials is a major factor in slope erosion and/or slope failures. Therefore, all possible precautions shall be taken to maintain moderate and uniform soil moisture in soil and rock slopes. Slope irrigation systems shall be properly operated and maintained and irrigation system controls shall be placed under strict control.

APPENDIX D

EROSION CONTROL REFERENCES

1. "Slope Protection for Residential Developments", National Academy of Sciences, Washington D.C. (1969).

2. "Guide for Erosion and Debris Control in Hillside Areas", Department of Building and Safety, City of Los Angeles. (1970).

3. "Slope Stability Report", Orange County Department of Building and Safety (1973).

4. "Guides for Erosion and Sediment Control", Soil Conservation Service, Davis, California, U.S. Department of Agriculture (1977).

5. "Rain-Care and Protection of Hillside Homes", brochure undated, published by Building and Safety Division, Los Angeles County Engineer.

6. "Guidelines for Erosion and Sediment Control Planning and Implementation: Office of Research and Monitoring", U.S. Environmental Protection Agency (1972).

7. "Resource Conservation Glossary", Soil Conservation Society of America (1970).

8. "Standards and Specifications for Soil Erosion and Sediment Control Developing Areas", Soil Conservation Service, U.S. Department of Agriculture (1975).

9. "Homeowners Guide for Debris and Erosion Control", Los Angeles County Flood Control District (undated).

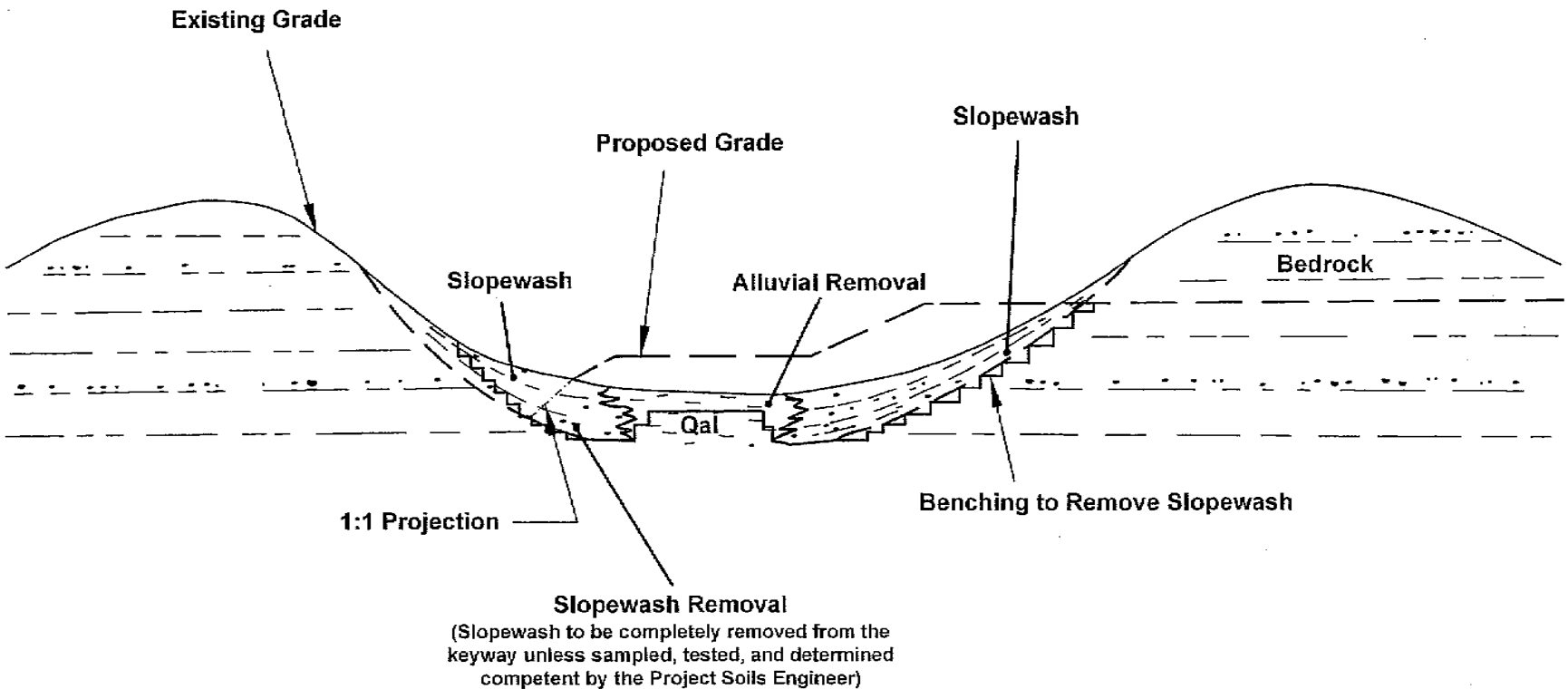
10. "Grading Guidelines (8 pages, stapled sheets)", Building and Safety Division, Department of County Engineer, County of Los Angeles (undated, but probably about 1977).

11. "Biotechnical Slope Protection and Erosion Control", Donald H. Gray and Andrew T. Leiser, Robert E. Krieger Publishing Company, Malabuv, Florida, 1989.

APPENDIX D

CONSTRUCTION DIAGRAMS

Schematic Alluvial/Slopewash Detail	Figure D1
Rock Disposal Windrows	Figure D2
Stability/Buttress Fill and Backdrain Detail	Figure D3
Retaining Wall Drainage Detail	Figure D4
Fill Slope Toeing Out on Flat Alluviated Canyon	Figure D5

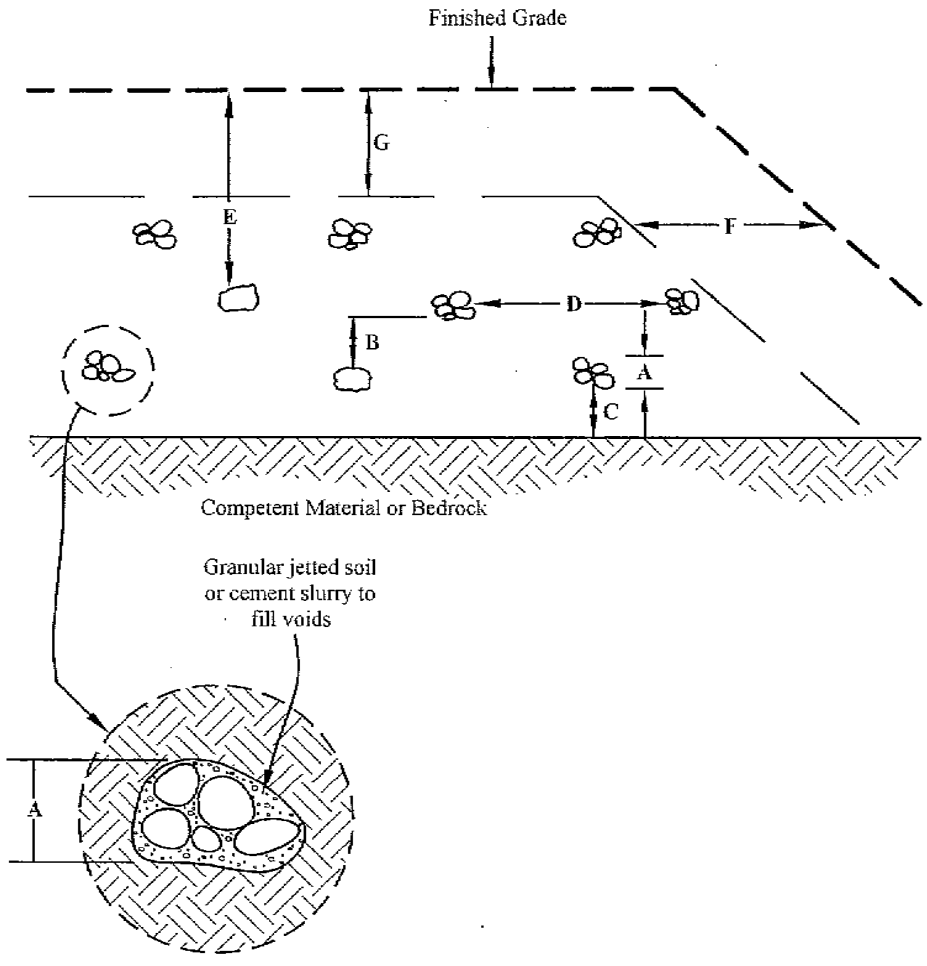


ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

SCHEMATIC ALLUVIAL/ SLOPEWASH DETAIL

Job No.: 07-2079 (0)

Date: 5/25/07 | *Figure:* D1



EXPLANATION

A) ±4 ft, Height and Width may vary depending on rock size

B) Minimum of 4 ft from stagger windrow

C) Minimum of 5 ft from first set of windrow to competent material or bedrock

D) Minimum of 15 ft between windrows

E) Minimum of 23 ft from oversized rocks (> 4 ft in its largest dimension) to finished subgrade;all oversized rocks must be individually placed

F) Minimum of 25 ft from projected windrow area to finished slope surface

G) Minimum of 15 ft to clear for foundations and pools or 5 ft below the deepest adjacent utility trench, whichever is deepest

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

ROCK DISPOSAL (WINDROWS)

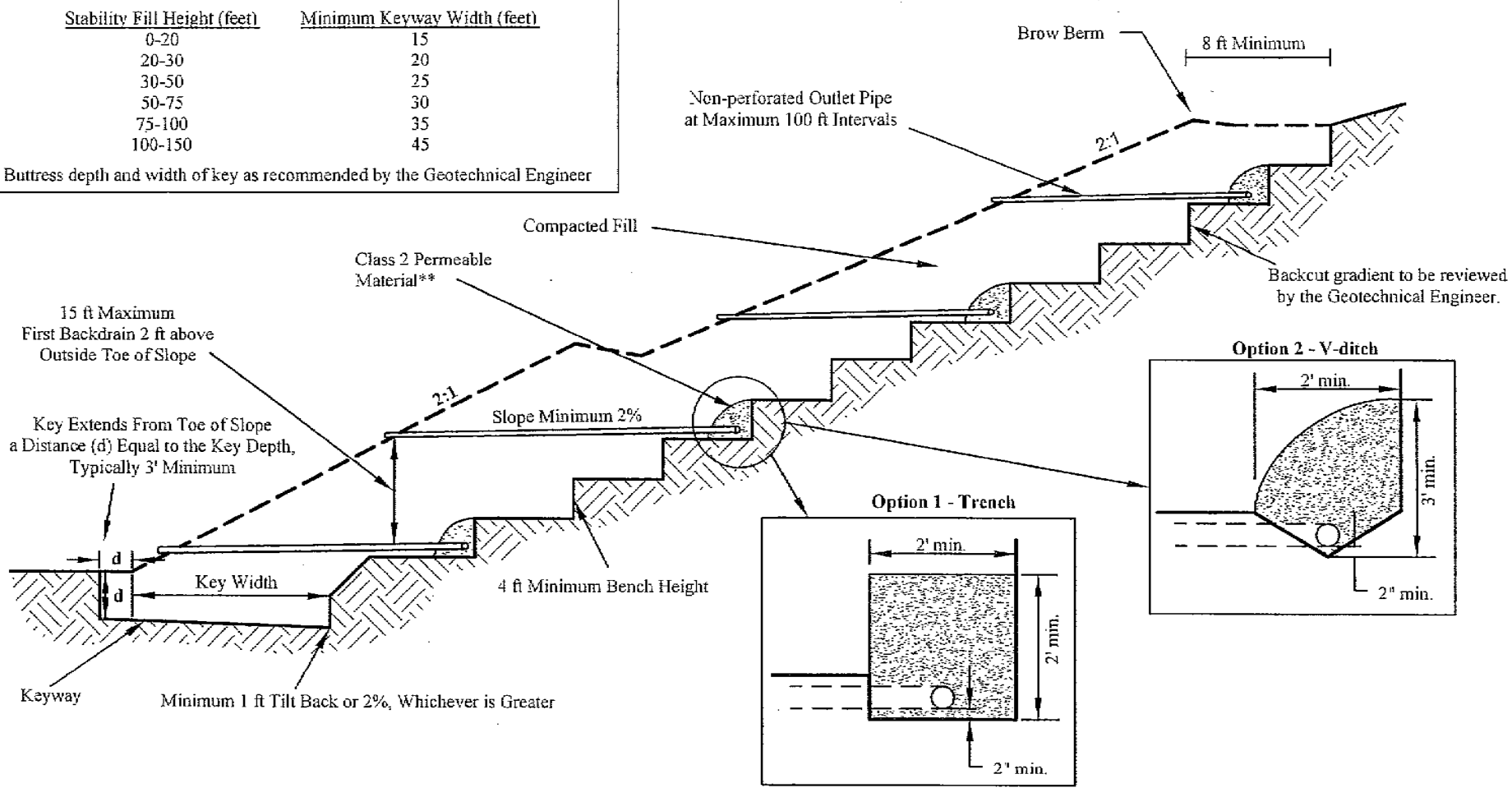
Job No.: 07-2079 (0)

Date: 5/25/07 | *Figure:* D2

Standard Keyway Width vs. Slope Height for Stability Fill

Stability Fill Height (feet)	Minimum Keyway Width (feet)
0-20	15
20-30	20
30-50	25
50-75	30
75-100	35
100-150	45

Buttress depth and width of key as recommended by the Geotechnical Engineer



All backdrains and outlet pipes to be 4" diameter PVC pipe (SDR 35 or Schedule 40); Backdrain Perforations positioned down; Upper ends of backdrains to be sealed with an approved cap.

**Specifications for CalTrans Class 2 Permeable Material

U.S. Standard Sieve Size	% Passing
1"	100
3/4"	90-100
3/8"	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

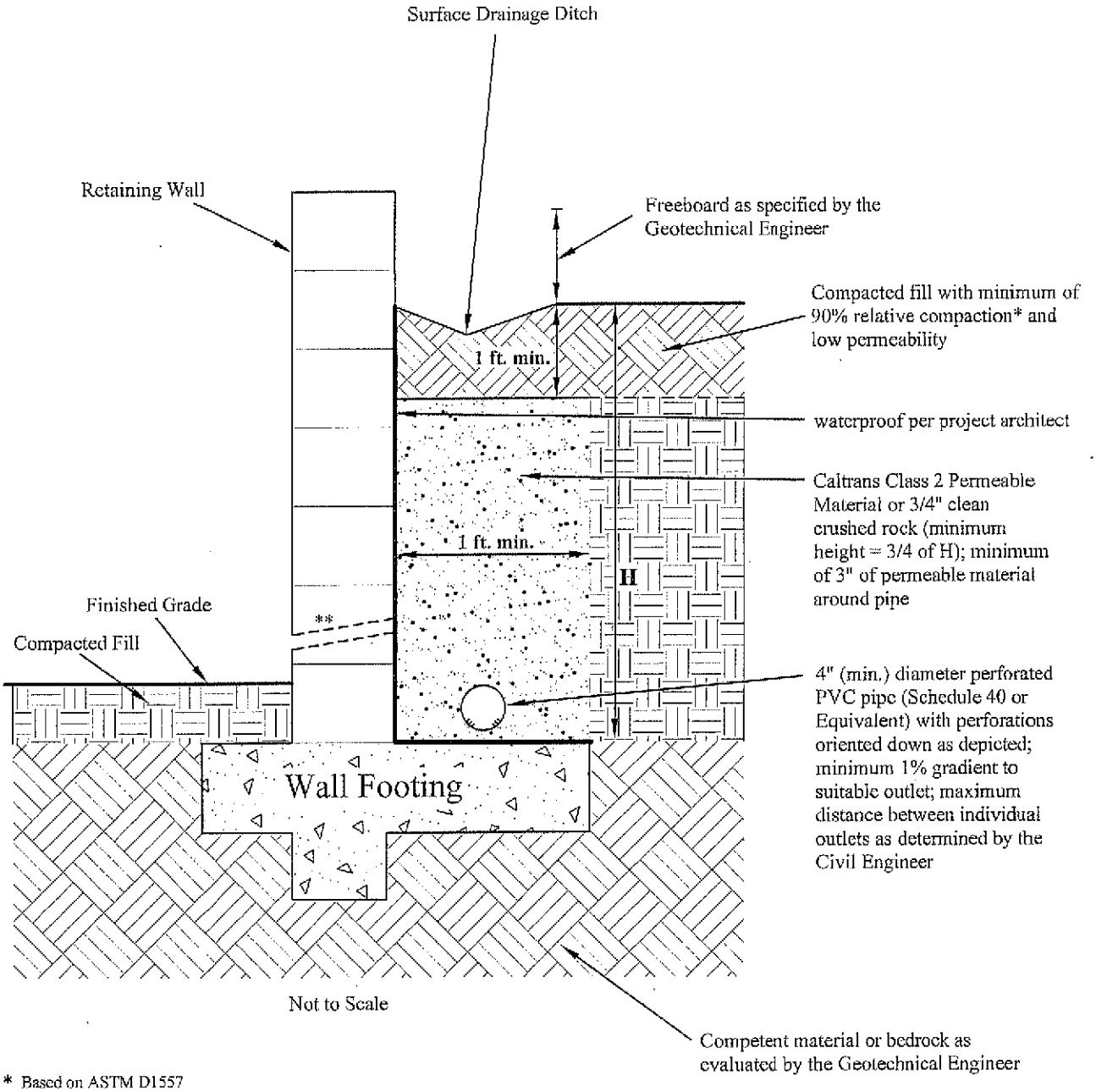
Sand Equivalent >75

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

STABILITY/BUTTRESS FILL AND BACKDRAINS

Job No.: 07-2079 (0)

Date: 5/25/07 | *Figure:* D3



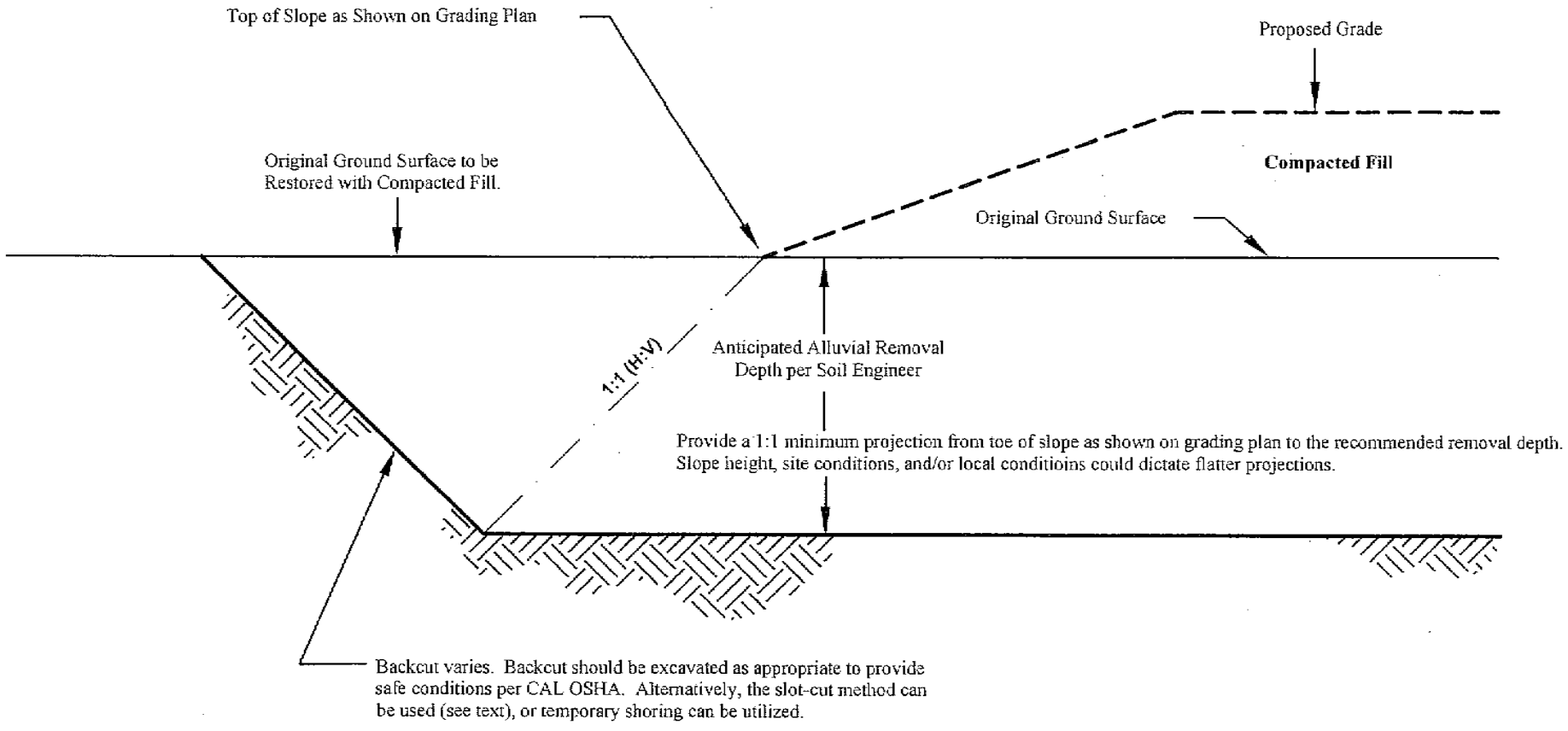
* Based on ASTM D1557

** Weepholes are optional and additional to, not in lieu of, the drainage pipe

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

RETAINING WALL DRAINAGE DETAIL

Job No.: 07-2079 (0)	
Date: 5/25/07	*Figure:* D4



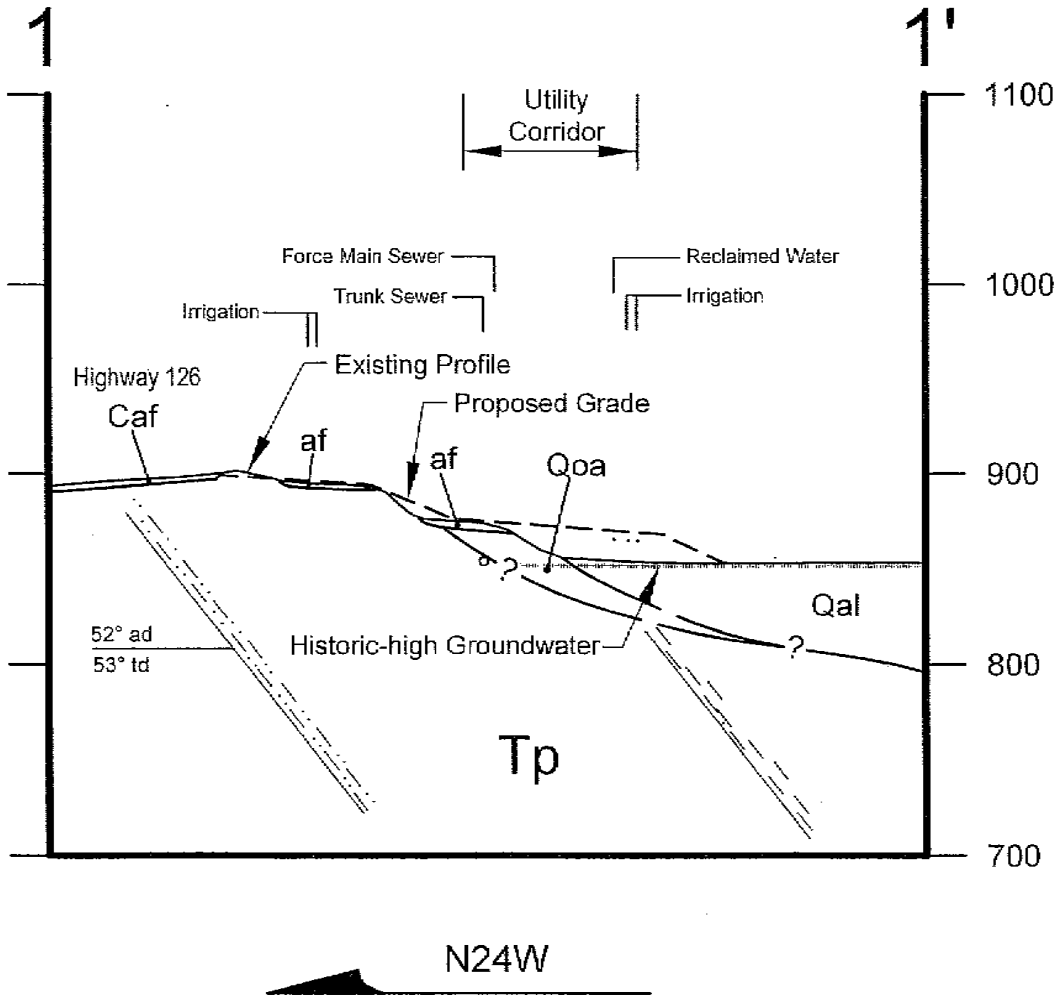
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

FILL SLOPE TOEING OUT ON FLAT ALLUVIATED CANYON

Job No.: 07-2079 (0)

Date: 5/25/07 | *Figure:* D5

Appendix E

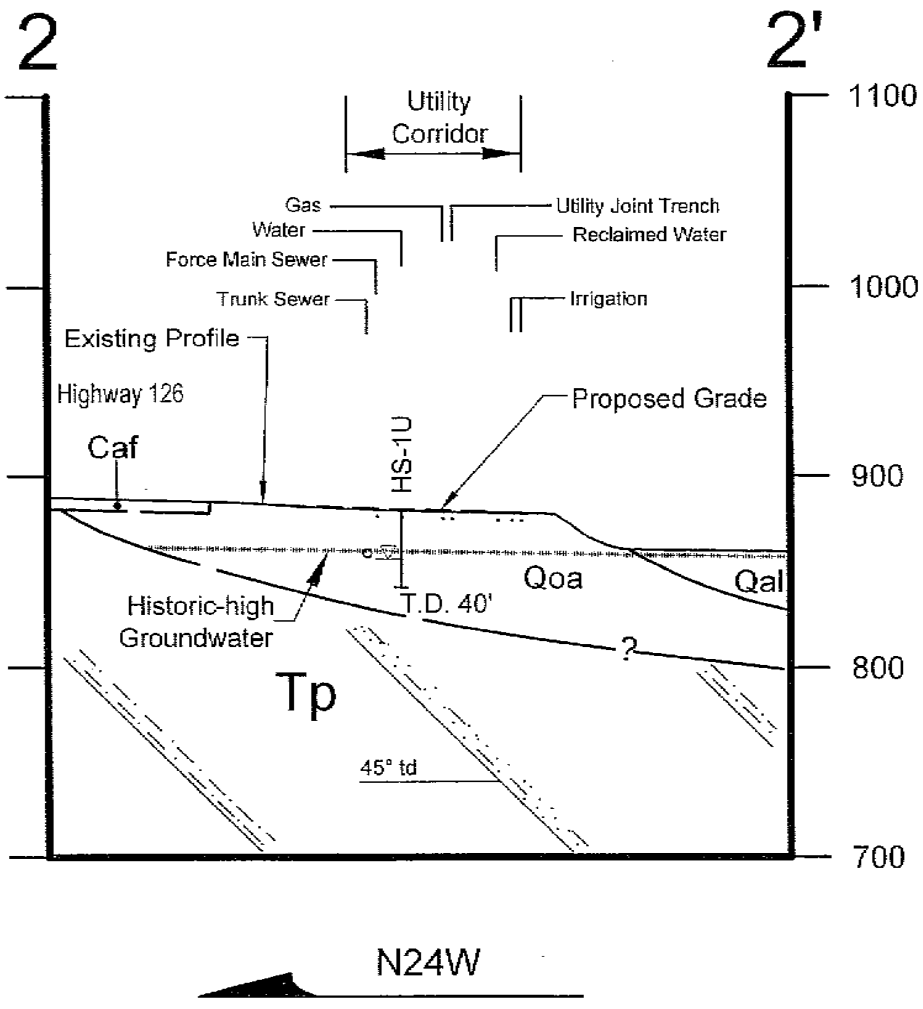


ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

Geologic Cross Section 1-1'

Job No.: 07-2079

Date: 5/25/07 | *Scale:* 1"=100' (H=V)

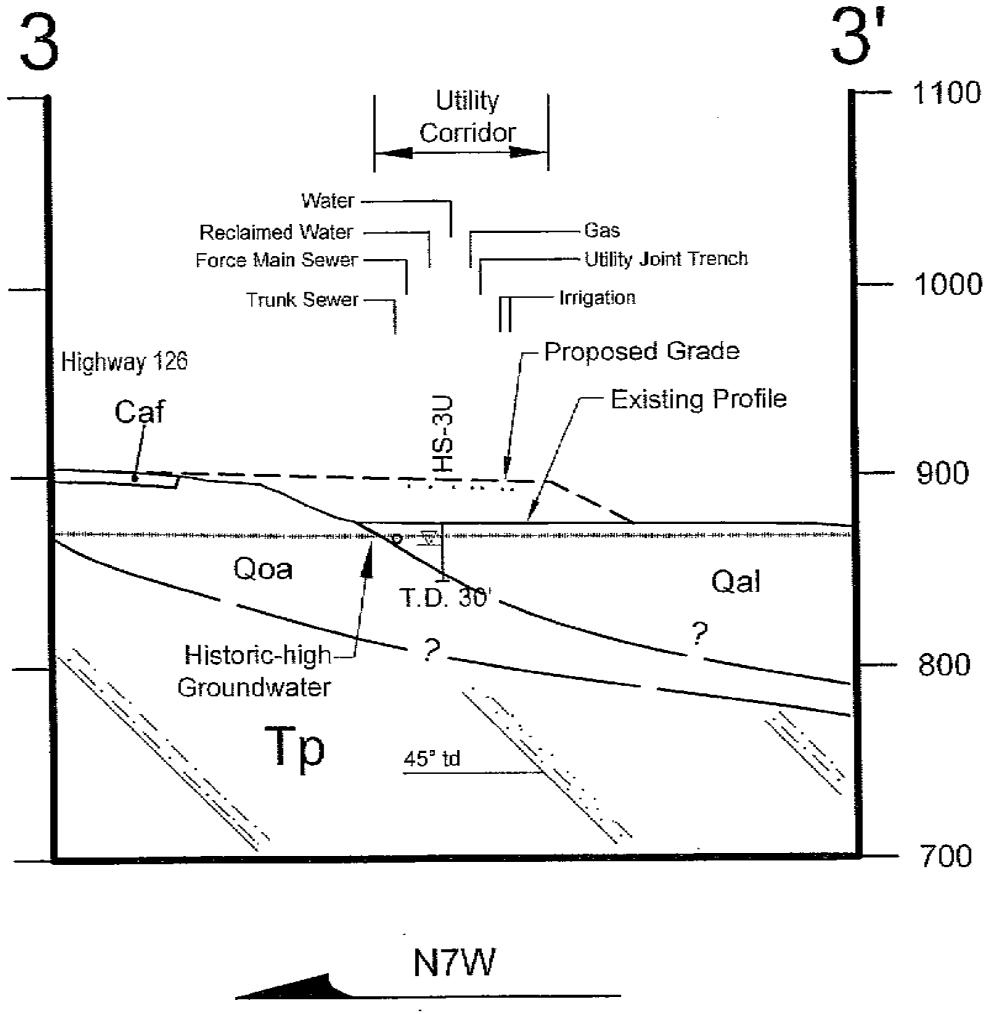


ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

Geologic Cross Section 2-2'

Job No.: 07-2079

Date: 5/25/07 | *Scale:* 1"=100' (H=V)

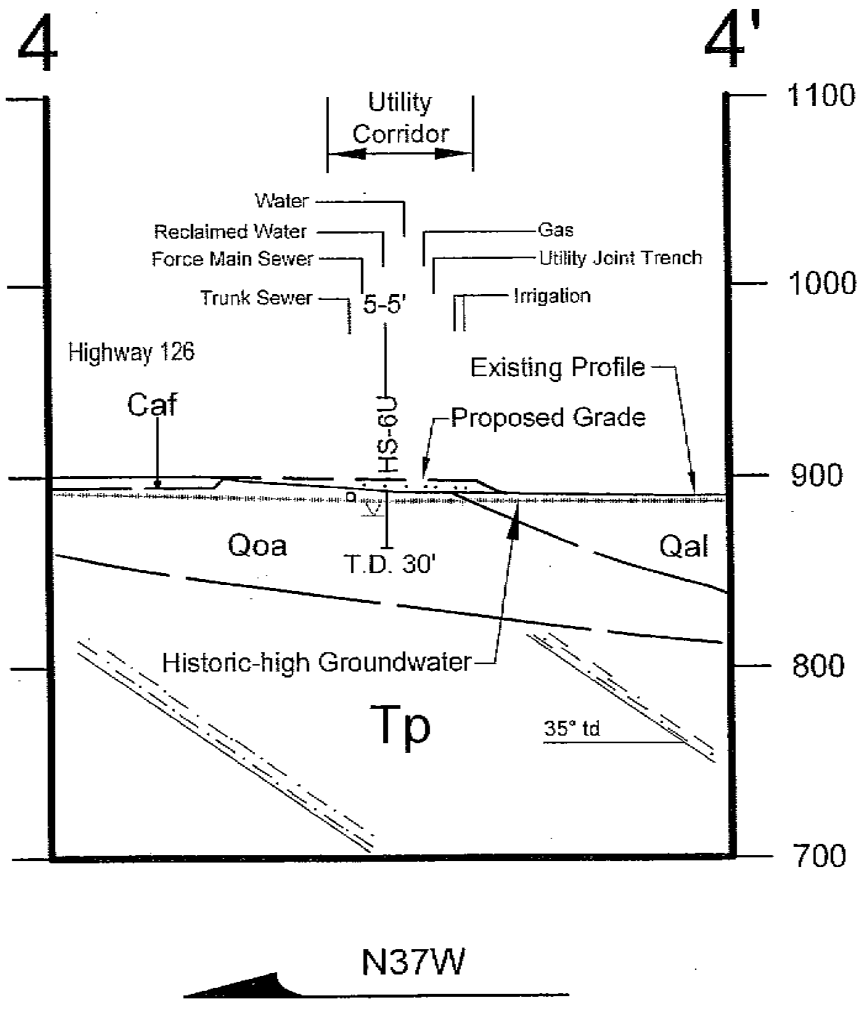


ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

Geologic Cross Section 3-3'

Job No.: 07-2079

Date: 5/25/07 | *Scale:* 1"=100' (H=V)

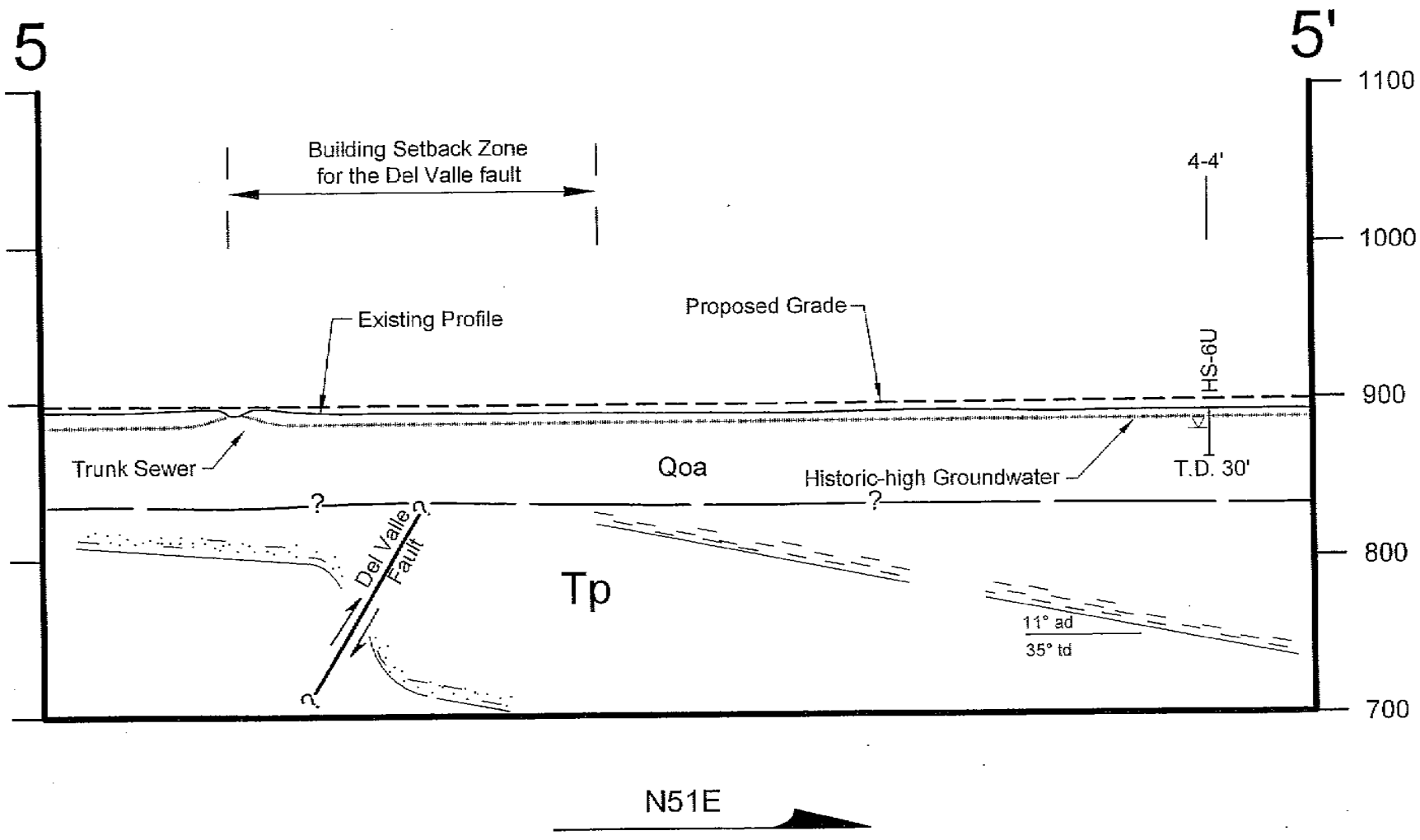


ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

Geologic Cross Section 4-4'

Job No.: 07-2079

Date: 5/25/07 | *Scale:* 1"=100' (H=V)

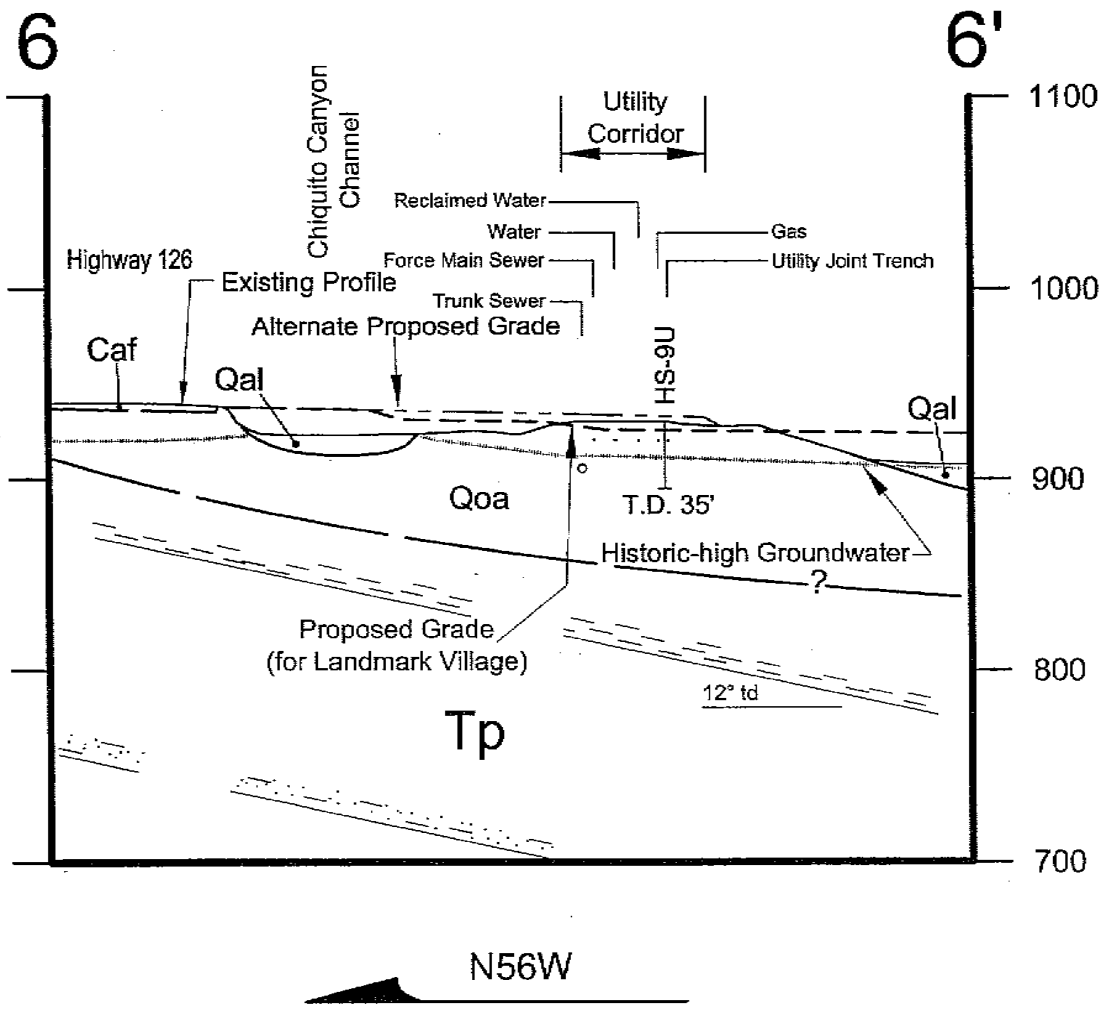


ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

Geologic Cross Section 5-5'

Job No.: 07-2079

Date: 5/25/07 | *Scale:* 1"=100' (H=V)

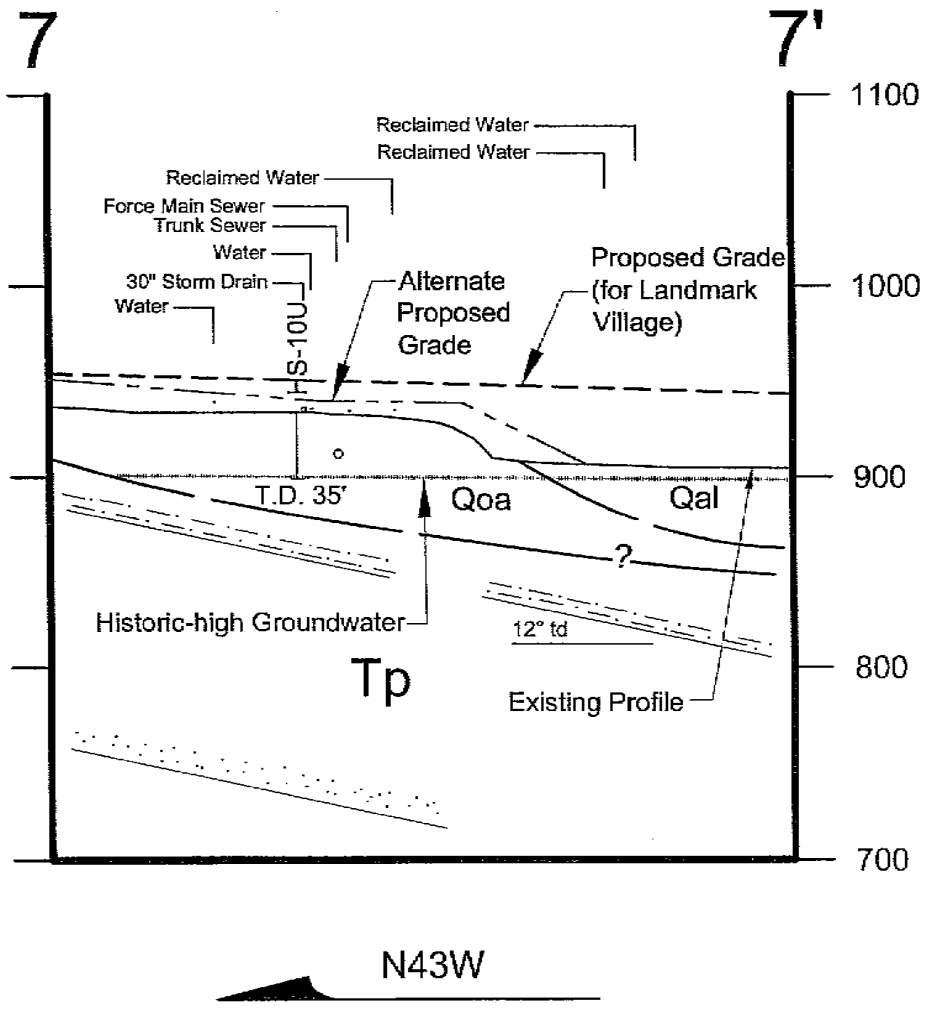


ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

Geologic Cross Section 6-6'

Job No.: 07-2079

Date: 5/25/07 | *Scale:* 1"=100' (H=V)

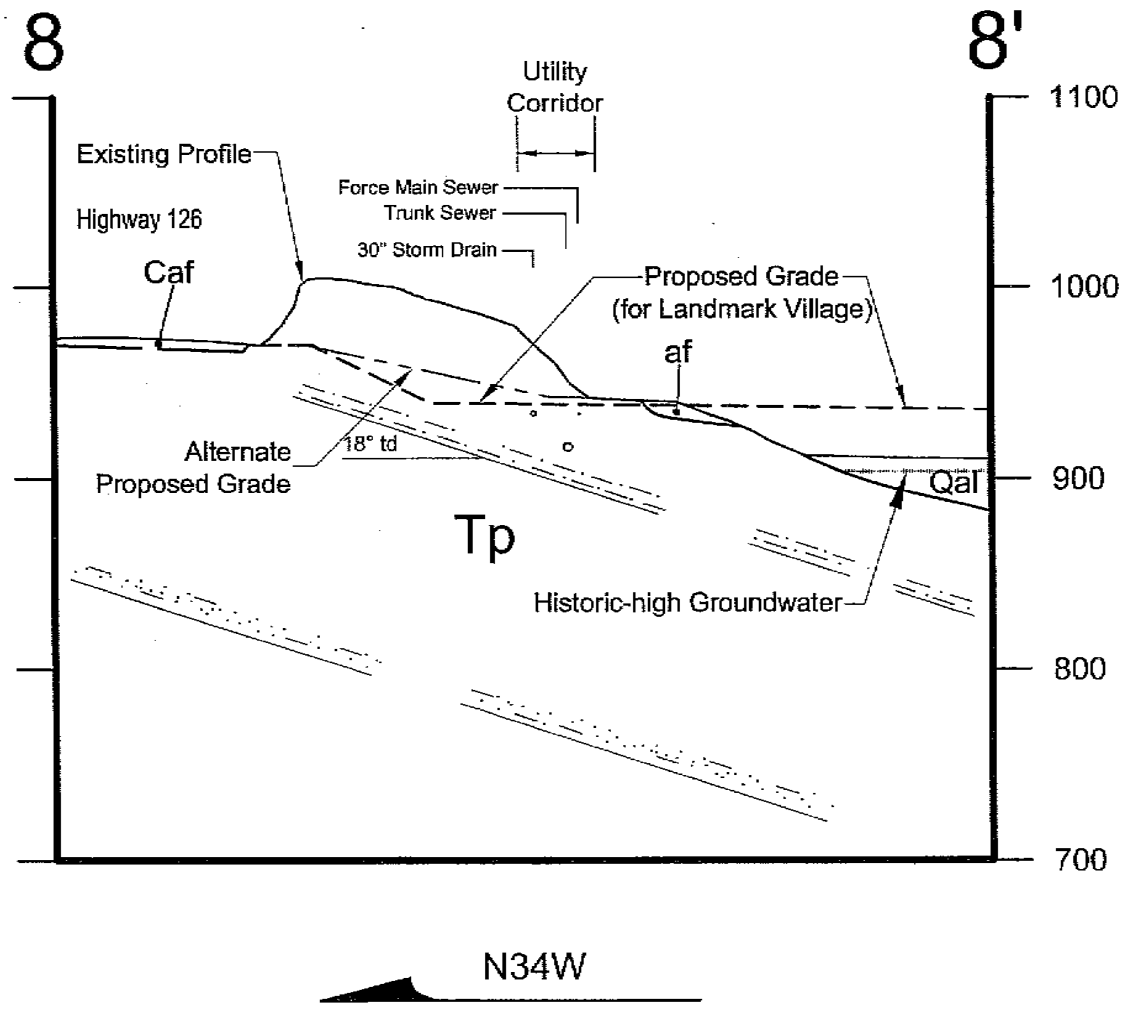


ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

Geologic Cross Section 7-7'

Job No.: 07-2079

Date: 5/25/07 | *Scale:* 1"=100' (H=V)

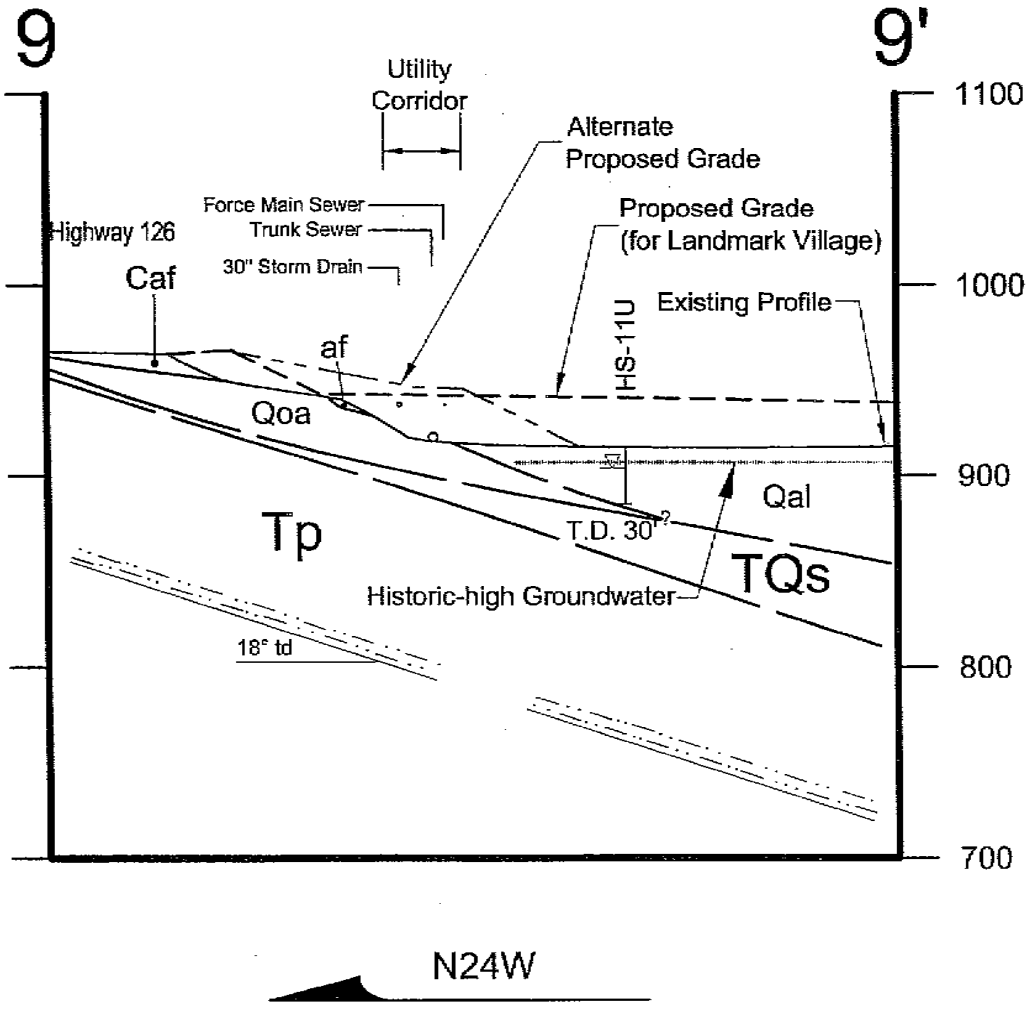


ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

Geologic Cross Section 8-8'

Job No.: 07-2079

Date: 5/25/07 | *Scale:* 1"=100' (H=V)

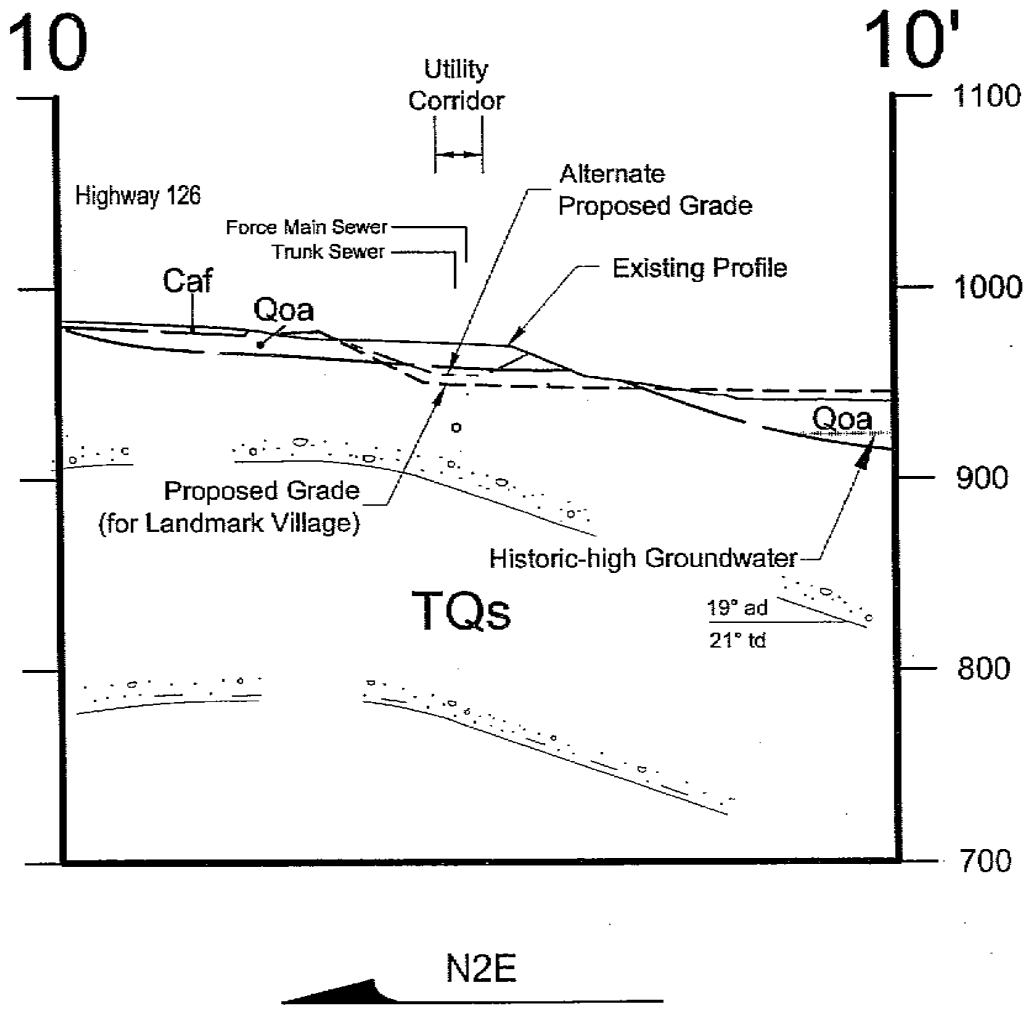


ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

Geologic Cross Section 9-9'

Job No.: 07-2079

Date: 5/25/07 | *Scale:* 1"=100' (H=V)



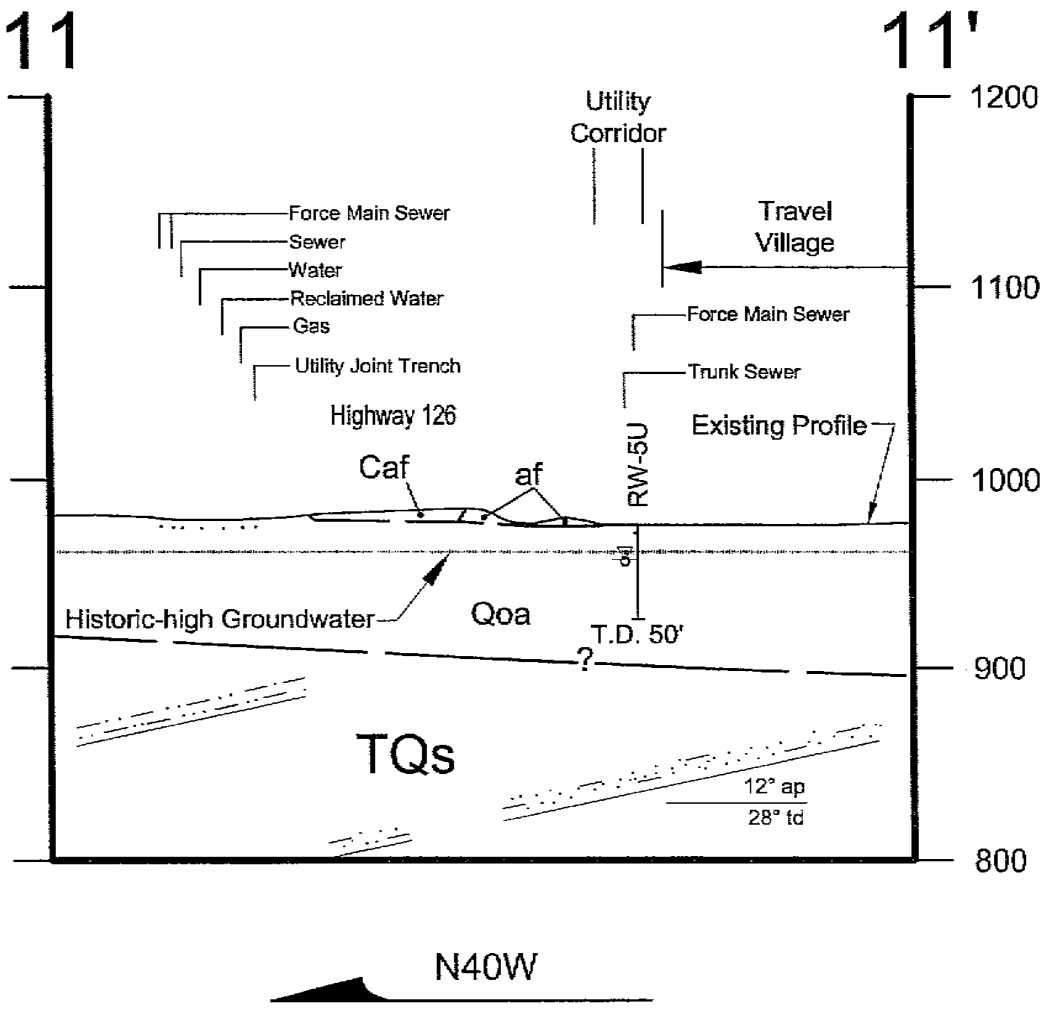
GW source: Landmark

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

Geologic Cross Section 10-10'

Job No.: 07-2079

Date: 5/25/07 | *Scale:* 1"=100' (H=V)



ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

Geologic Cross Section 11-11'

Job No.: 07-2079

Date: 5/25/07 | *Scale:* 1"=100' (H=V)

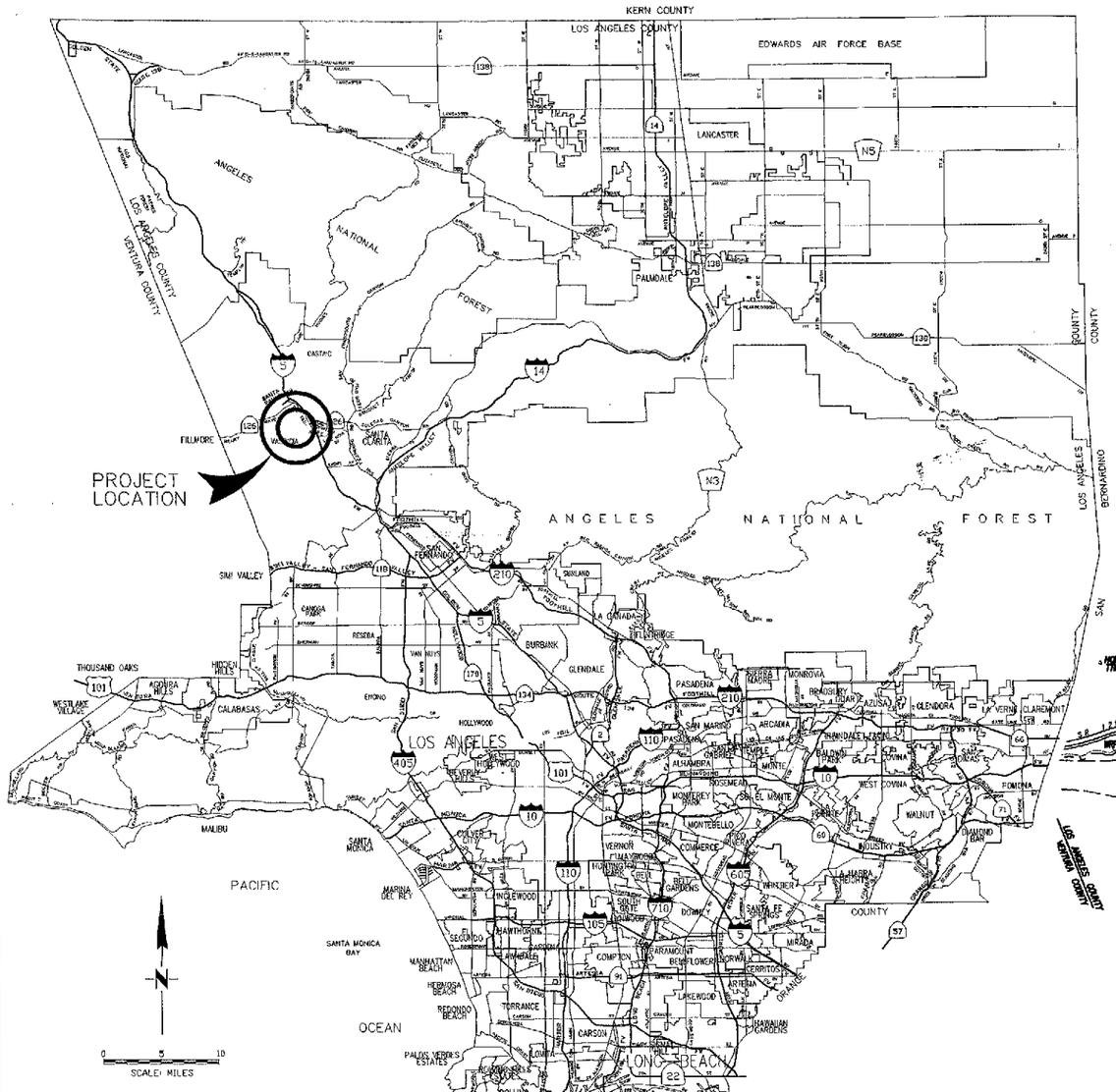
SANTA CLARITA VALLEY SANITATION DISTRICT

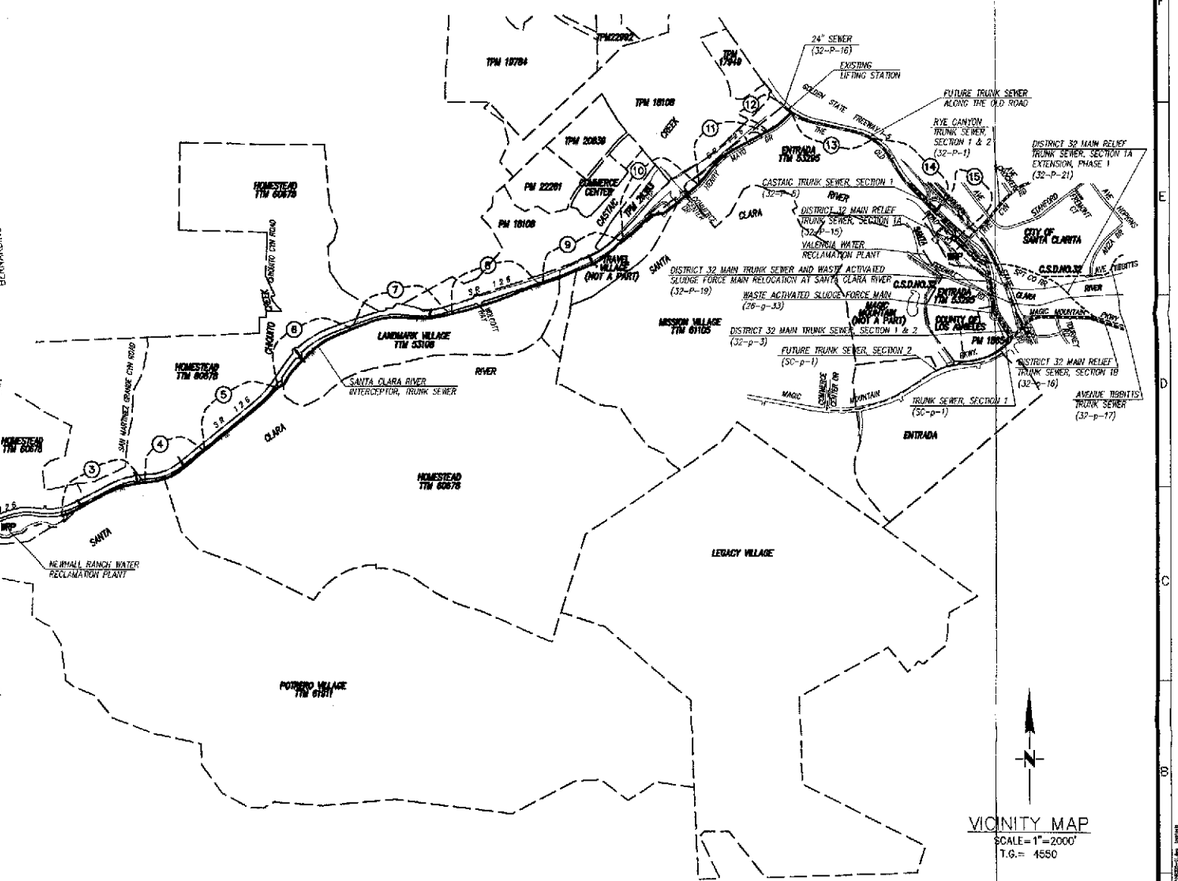
OF LOS ANGELES COUNTY, CALIFORNIA

OFFICE OF CHIEF ENGINEER

CONTRACT DRAWINGS

SANTA CLARA RIVER INTERCEPTOR





APPROVED: SANTA CLARITA VALLEY SANITATION DISTRICT
OF LOS ANGELES COUNTY, CALIFORNIA
STEPHEN R. MAGUIN – CHIEF ENGINEER AND GENERAL MANAGER

BY: _____ DATE: _____
OFFICE ENGINEER

REGISTERED PROFESSIONAL ENGINEER
PETER D. MIESSNER
NO. C-42592
EXP. 03/31/08
CIVIL
STATE OF CALIFORNIA

PLANS PREPARED BY:

PSOMAS

28470 Avenue Stanford, Suite 300
Santa Clarita, CA 91355
(661) 259-6000 (661) 775-2718 (FAX)

PETER MIESSNER DATE

NO	SHEET	REVISION	INITIAL	DATE

30% SUBMITTAL

SHEET NO. 1
OF 15 SHEETS

STANDARD DRAWINGS

THE 2006 EDITION OF THE DISTRICTS' STANDARD DRAWINGS FOR CONSTRUCTION, LISTED BELOW, ARE HEREBY MADE A PART OF THE PLANS FOR THE WORK. COPIES ARE AVAILABLE AT THE DISTRICTS' JOINT ADMINISTRATION OFFICE, 1955 WORKMAN MILL ROAD, WHITTIER, CA 90601 AND CAN BE DOWNLOADED FROM THE DISTRICTS' WEB SITE (WWW.LACSD.ORG)

DRAWING NO.	TITLE
S-a-79	STANDARD METHOD OF INSTALLING SADDLES
S-a-86	STANDARD METHOD FOR CONNECTION TO PIPE AND STRUCTURES
S-a-201	STANDARD MANHOLE, TYPE "A"
S-a-202	STANDARD MANHOLE, TYPE "B"
S-a-203	STANDARD MANHOLE, TYPE "C"
S-a-204	STANDARD MANHOLE, TYPE "D"
S-a-205	STANDARD DROP MANHOLE
S-a-206	STANDARD MANHOLE, TYPE "E"
S-a-207	STANDARD 24" LOCKING MANHOLE FRAME & COVER
S-a-208	STANDARD PRESSURE MANHOLE FRAME & COVER
S-a-209	STANDARD MANHOLE STEP
S-a-210	STANDARD TRAP MANHOLE BASE
S-a-211	STANDARD TRAP CASTING
S-a-212	STANDARD CONCRETE CRADLES & ENCASEMENTS
S-a-213	STANDARD "T" FOUNDATION
S-a-214	STANDARD CHIMNEY PIPE
S-a-215	STANDARD 36" MANHOLE FRAME & COVER
S-a-216	STANDARD HOUSE CONNECTION GAS TRAP
S-a-217	STANDARD CONCRETE PIPE SUPPORT
S-a-218	STANDARD ABANDONMENT OF EXISTING MANHOLES TYPE "A" OR "D"
S-a-219	STANDARD RECONSTRUCTION OF BRICK MANHOLES
S-a-220	STANDARD PULL RING
S-a-221	STANDARD PROJECT SIGN
S-a-222	STANDARD TEMPORARY PIPE SUPPORT
S-a-223	STANDARD 30" MANHOLE FRAME & COVER
S-a-224	STANDARD PIPE BARREL DETAIL
S-a-225	STANDARD CONCRETE COLLAR
S-a-226	STANDARD 36" MANHOLE FRAME WITH 30" COVER
S-a-227	STANDARD CONCRETE BEAM FOR HOUSE CONNECTIONS
S-a-228	STANDARD 24" TRAFFIC MANHOLE FRAME & COVER
S-a-229	STANDARD 36" PRESSURE MANHOLE FRAME AND COVER
S-a-230	STANDARD LIFTING EYE

LIST OF DRAWINGS

SHEET NO.	TITLE
1	COVER SHEET
2	LEGEND, STANDARD DRAWINGS & SHEET INDEX
3 - 12	PLAN AND PROFILE - STA 0+00 TO 258+52
13 - 15	PLAN AND PROFILE - STA 0+00 TO 65+44 (FUTURE ALONG THE OLD ROAD)

Underground Service Alert of Southern California
Call: TOLL FREE
1-800 422-4133
TWO WORKING DAYS BEFORE YOU DIG

LEGEND

	PROPOSED TRUNK SEWER
	PROPOSED TRUNK SEWER REHABILITATION
	EXISTING TRUNK SEWER
	FUTURE OR UNDER CONSTRUCTION
SS	EXISTING LOCAL SEWER
FM	" FORCE MAIN SEWER
HC	" HOUSE CONNECTION
W	" WATER LINE
IRR	" IRRIGATION LINE
SD	" STORM DRAIN
G	" GAS LINE
GASO	" GASOLINE LINE
O	" OIL LINE
P	" PIPE LINE
TC	" TELEPHONE CONDUIT
EC	" ELECTRICAL CONDUIT
TV	" TV CABLE
TS	" TRAFFIC SIGNAL
E	" ELECTRICAL LINE
T	" TELEPHONE LINE
FM	PROPOSED FORCE MAIN SEWER LINE
AG	" AGRICULTURAL WATER LINE
WCL	" WATER COLLECTION LINE
RW	" RECLAIMED WATER LINE
W-Z1	" POTABLE WATER LINE (ZONE 1)
W-Z2	" POTABLE WATER LINE (ZONE 2)
G	" GAS MAIN LINE
JT	" JOINT UTILITY TRENCH
T	" TELEPHONE LINE
2	PLAN AND PROFILE SHEET INDEX

TP DM	EXISTING TELEPHONE POLE AND DEAD MAN
EP DM	" POWER POLE AND DEAD MAN
GP	" GUY POLE
LP	" LIGHT POLE
FH	" FIRE HYDRANT
WV GV	" WATER AND GAS VALVE
WM GM	" WATER AND GAS METER
TS	" TRAFFIC SIGNAL
X X X	" FENCE
	" AC PAVEMENT
	" CONCRETE
	" C.S.D. BOUNDARY
	" CITY BOUNDARY
	RIGHT OF WAY
	OCCUPATIONAL RIGHT OF WAY
	BENCH MARK
	TEST HOLE
	CONTROL POINTS (SPIKE ON THE OLD ROAD EXISTING CENTERLINE)

SD	STORM DRAIN
SS	SANITARY SEWER
SST	TRUNK SEWER
FM	FORCE MAIN SEWER
W	WATER
RW	RECLAIMED WATER
AG/IRRI	AGRICULTURAL WATER
G	GAS
OIL	OIL
JT	JOINT TRENCH
E	ELECTRIC (SCE)
T	TELEPHONE LINE
E-OH	ELECTRIC - OVERHEAD
T-OH	TELEPHONE - OVERHEAD
W-Z1	WATER ZONE 1
W-Z1A	WATER ZONE 1A
W-Z2	WATER ZONE 2
W-Z2A	WATER ZONE 2A
WCL	WATER COLLECTION LINE
ACP	ASBESTOS CONCRETE PIPE
ALT	ALTERNATE
FUTR	FUTURE
TEMP	TEMPORARY
VWC	VALENCIA WATER COMPANY
FW	FLOODWAY
FP	FLOOD PLAIN
CAP	C-CAP

FINAL SURVEY	FIELD BOOK	PLOTTED	CHECKED	DATE

NO.	REVISIONS	INITIALS	DATE

COUNTY OF LOS ANGELES SANITATION DISTRICT NO. 32
CALIFORNIA

REFERENCE DWG. NO.

DESIGNED D. MARTIN, PSOMAS — DATE
DRAWN T. CUSTODIO, PSOMAS — DATE
CHECKED D. MARTIN, PSOMAS — DATE
REVIEWED P. MIESSNER, PSOMAS — DATE

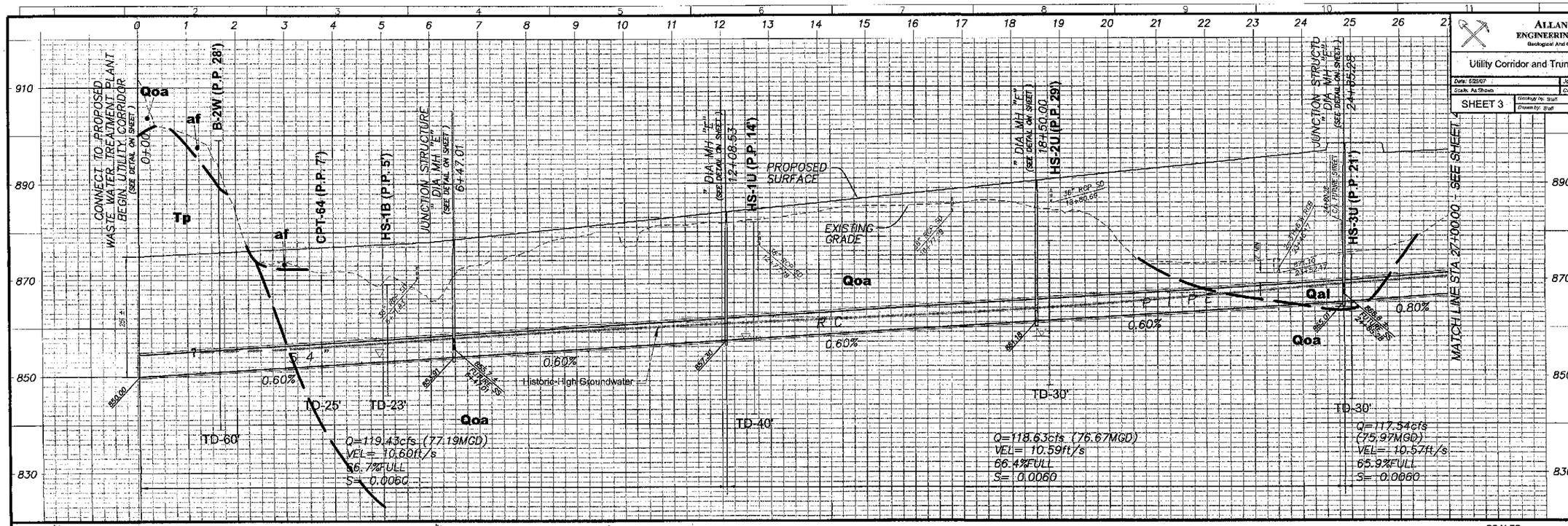
FIELD BOOK NO. S-

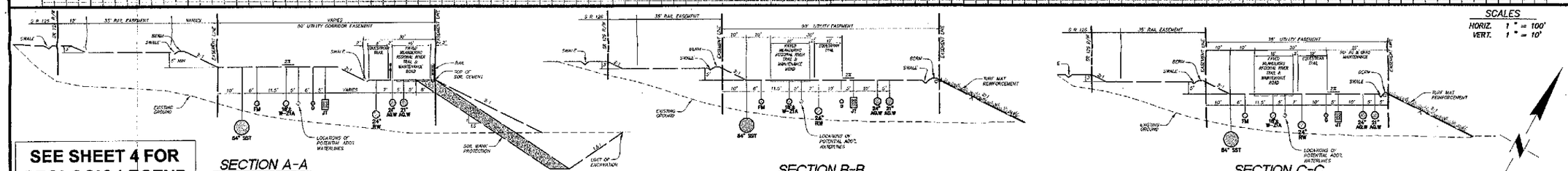
SANTA CLARA RIVER INTERCEPTOR

LEGEND, STANDARD DRAWINGS AND SHEET INDEX

SHEET NO. 2
OF 15 SHEETS

DWG. NO.



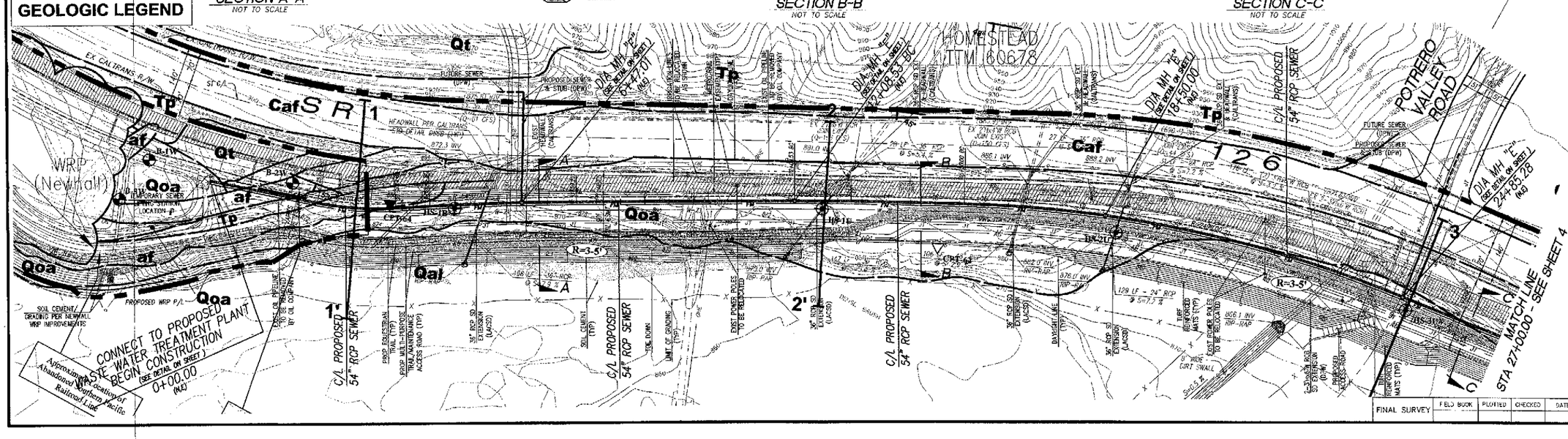


SEE SHEET 4 FOR GEOLOGIC LEGEND

SECTION A-A
NOT TO SCALE

SECTION B-B
NOT TO SCALE

SECTION C-C
NOT TO SCALE



ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

Utility Corridor and Trunk Sewer Alignment

Date: 5/25/07 | Job No.: 07-2079
Scale: As Shown | CAD File: Sheet-03 Utility Sewer Align
SHEET 3 | Geology by: Staff | Drawn by: Staff | Revised:

COUNTY SANITATION DISTRICT NO. 32
OF LOS ANGELES COUNTY, CALIFORNIA

DESIGNED -
DRAWN T. CUSTODIO, PSOMAS
CHECKED -
REVIEWED P. MIESSNER, PSOMAS

SANTA CLARA RIVER INTERCEPTOR

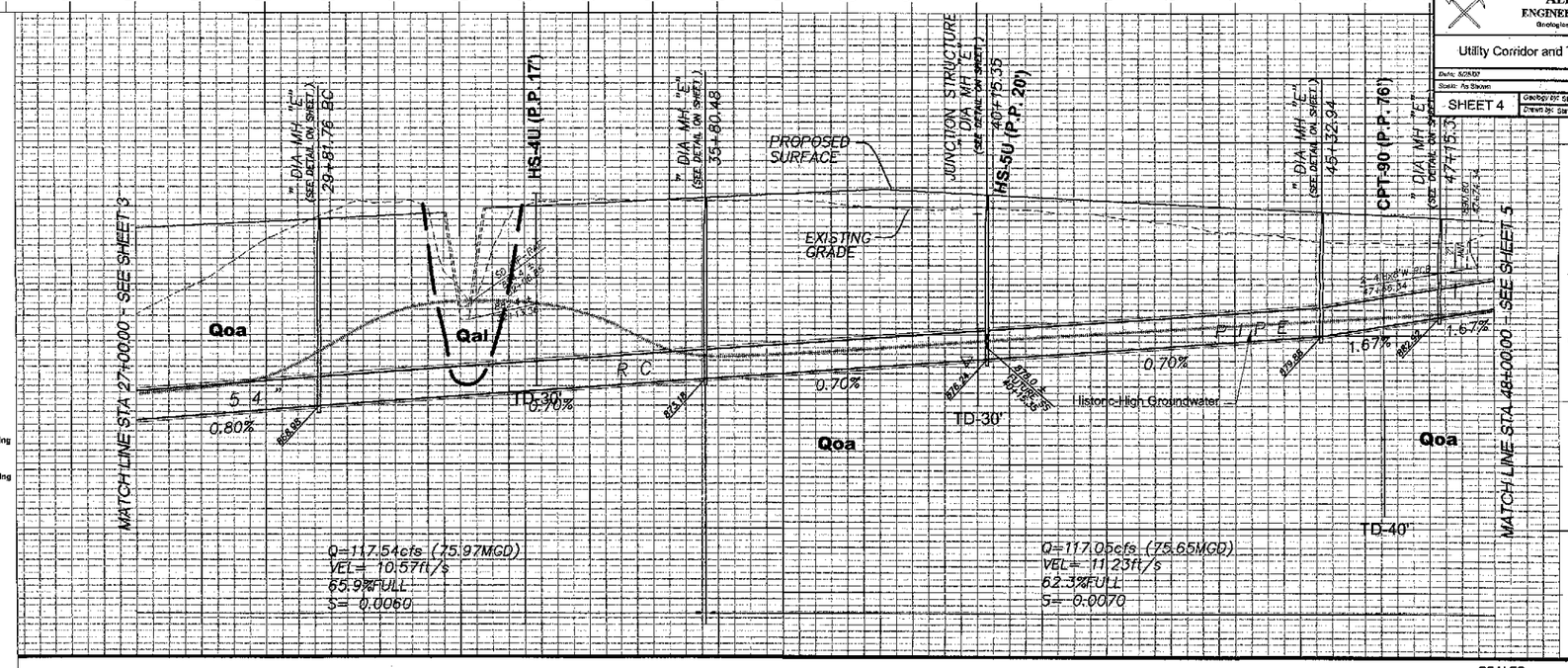
PLAN AND PROFILE

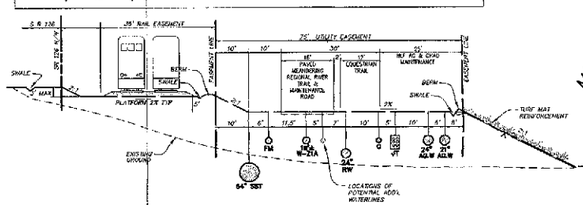
SHEET NO. 3
OF 15 SHEETS
DWG. NO. #

FINAL SURVEY | FIELD BOOK | PLOTTED | CHECKED | DATE

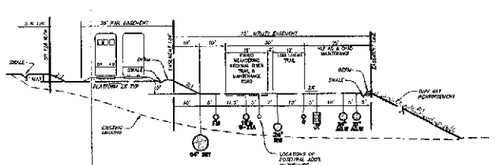
GEOLOGIC LEGEND

af	Artificial fill
af/debris	Artificial fill and earthquake debris on Landmark Village
Caf	Compacted artificial fill associated with Highway 126
Qal	Quaternary alluvium; active and recently active alluvial material
Qoa	Quaternary older alluvium
Qt	Quaternary terrace deposits
TQs	Saugus Formation
Tp	Pico Formation
	Geologic contact; queried where inferred; dotted where concealed
	Buried trace of Del Valle fault; queried where uncertain; with associated Building Setback
	Trace of syncline, showing direction of plunge; concealed where traversing units younger than the Saugus Formation
	Trace of anticline, showing direction of plunge; concealed where traversing units younger than the Saugus Formation
73°	Strike and dip of bedding
	Approximate location of oil well obtained from DOGGR Map No. 253
HS-21U	Location of hollow-stem-auger boring completed for the Utility Corridor Investigation
HS-12	Location of hollow-stem-auger boring completed for Landmark Village
HS-25HS	Location of hollow-stem-auger boring completed for VTT 060678
HS-1B	Location of hollow-stem-auger boring completed for the WRP soil-cement liner investigation
RW-5U	Location of rotary-wash boring completed for the Utility Corridor Investigation
RW-14	Location of rotary-wash boring completed for Landmark Village
CPT-12B	Location of cone penetration test completed for Phase I Investigation of areas north of the Santa Clara River and subsequent investigations of Landmark Village
CPT-63HS	Location of cone penetration test completed for VTT 060678
B-3W	Location of bucket-auger boring completed for the WRP site
BA-3R	Location of bucket-auger boring completed for Landmark Village
11 — 11'	Geologic/geotechnical cross section
R=12-16'	Recommended removal depth for alluvium in areas of proposed fill and for Landmark Village

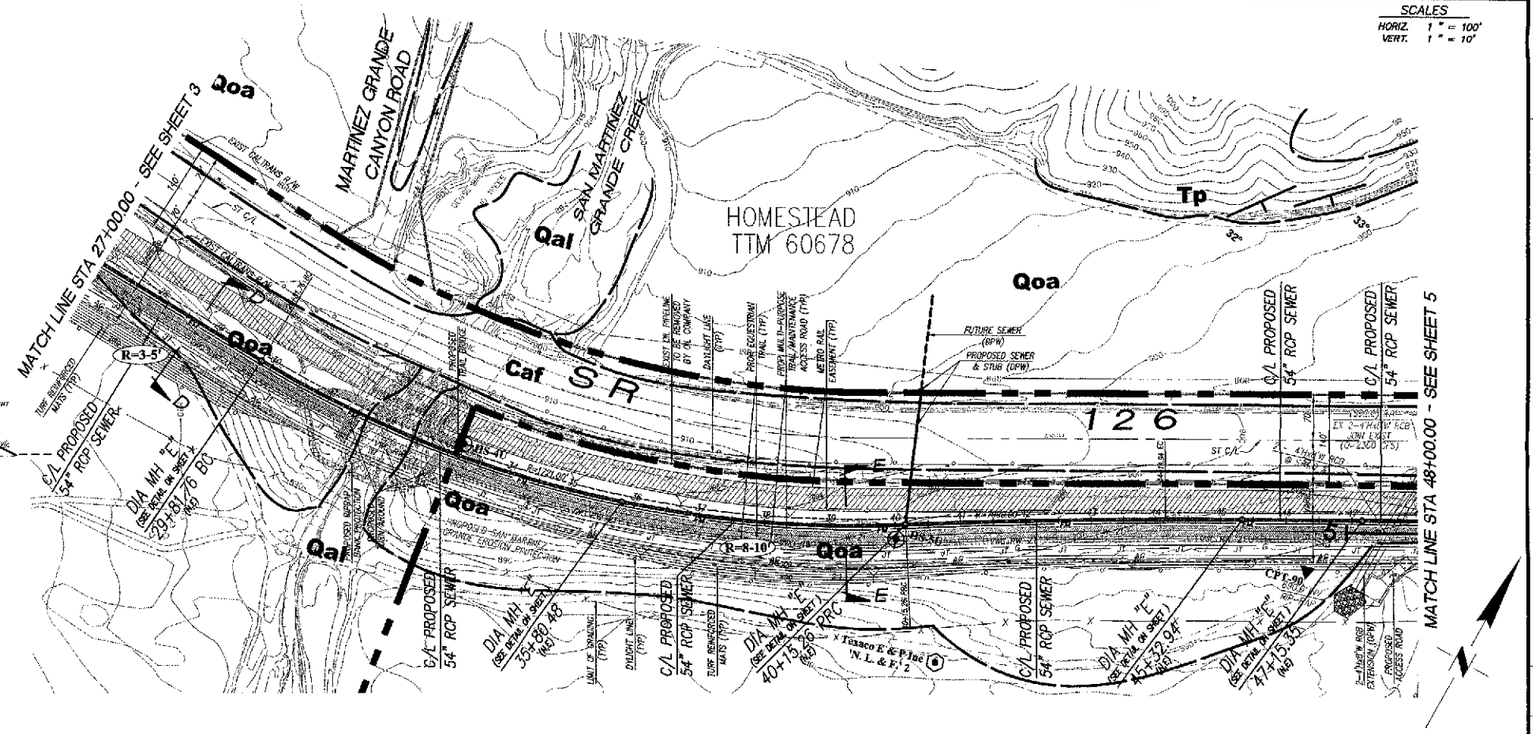




TYPICAL SECTION D-D
NOT TO SCALE



TYPICAL SECTION E-E
NOT TO SCALE



SCALES
HORIZ. 1" = 100'
VERT. 1" = 10'

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

Utility Corridor and Trunk Sewer Alignment

Date: 8/28/07 | Job No.: 07-2079
Scale: As Shown | CAD File: Sheet-04 Utility Sewer Align.
SHEET 4 | Geology BY: Staff | Drawn BY: Staff | Revised:

COUNTY SANITATION DISTRICT NO. 32
OF LOS ANGELES COUNTY, CALIFORNIA

REFERENCE DWG. NO.
FIELD BOOK NO.

DESIGNED — DATE
DRAWN T. CUSTODIO, PSOMAS — DATE
CHECKED — DATE
REVIEWED P. MIESSNER, PSOMAS — DATE

REVISIONS

SANTA CLARA RIVER INTERCEPTOR

PLAN AND PROFILE

SHEET NO. 4
OF 15 SHEETS

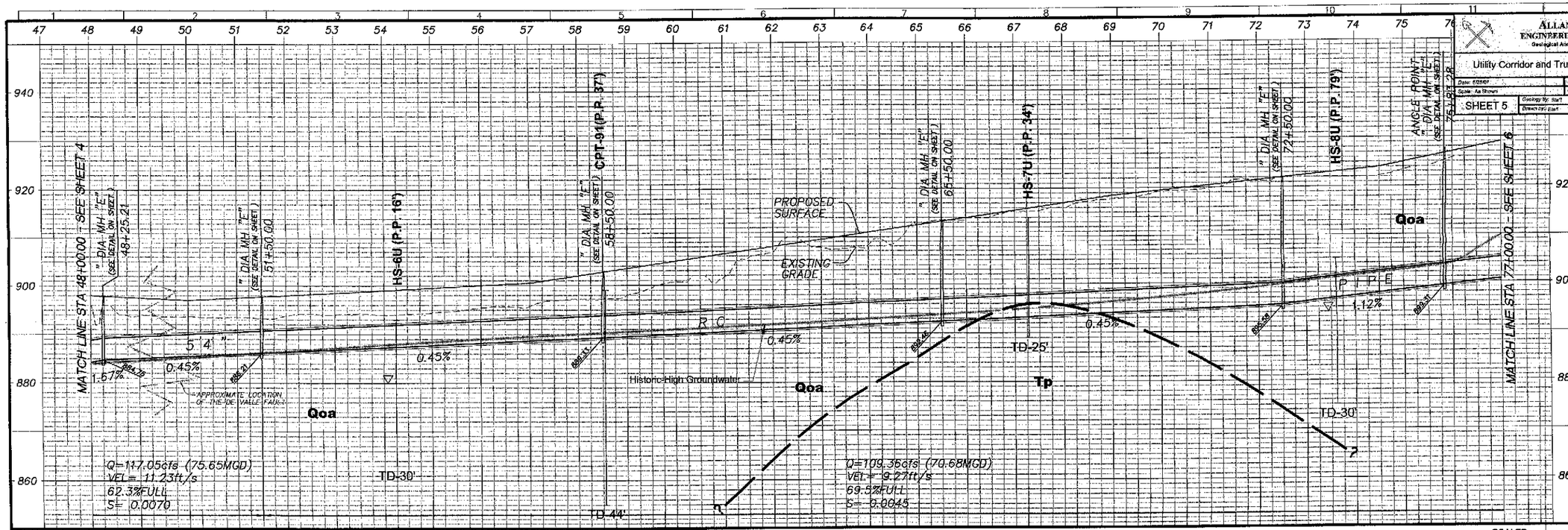
DWG. NO.
#

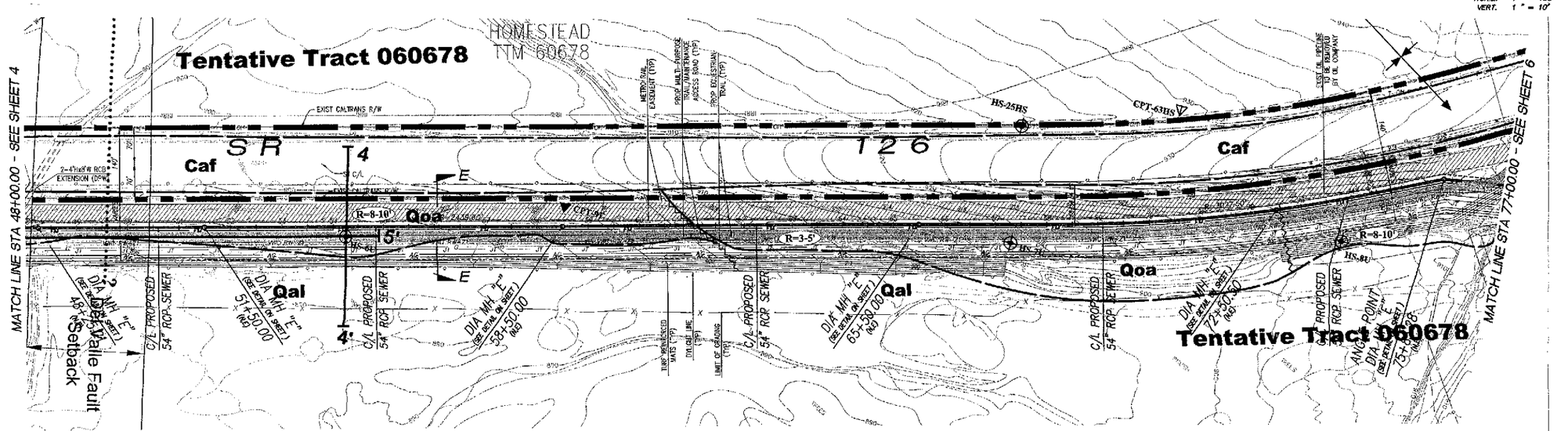
FINAL SURVEY	FIELD BOOK	PLOTTED	CHECKED	DATE

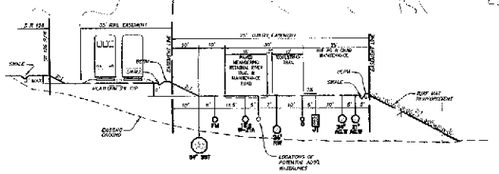
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

Utility Corridor and Trunk Sewer Alignment

Date: 6/28/07 | Job No.: 07-2070
Scale: As Shown | CAD File: Sheet-05 Utility-Sewer Align
SHEET 5 | Geology By: Staff | Drawn By: Staff | Re-Reach:







TYPICAL SECTION E-E
NOT TO SCALE

SEE SHEET 4 FOR GEOLOGIC LEGEND

FINAL SURVEY	FIELD BOOK	PLOTTED	CHECKED	DATE

COUNTY SANITATION DISTRICT NO. 32
OF LOS ANGELES COUNTY, CALIFORNIA

DESIGNED – DATE
DRAWN T. CUSTODIO, PSOMAS DATE
CHECKED – DATE
REVIEWED P. MESSNER, PSOMAS DATE

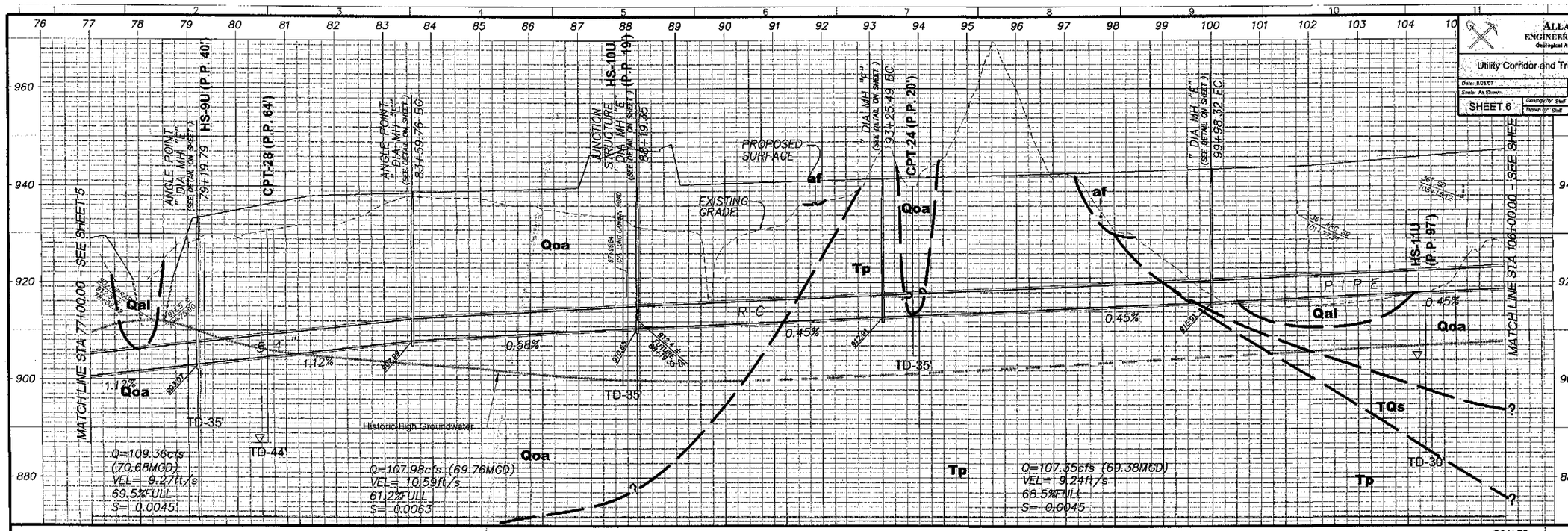
REFERENCE DWG. NO.
FIELD BOOK NO.
REVISIONS

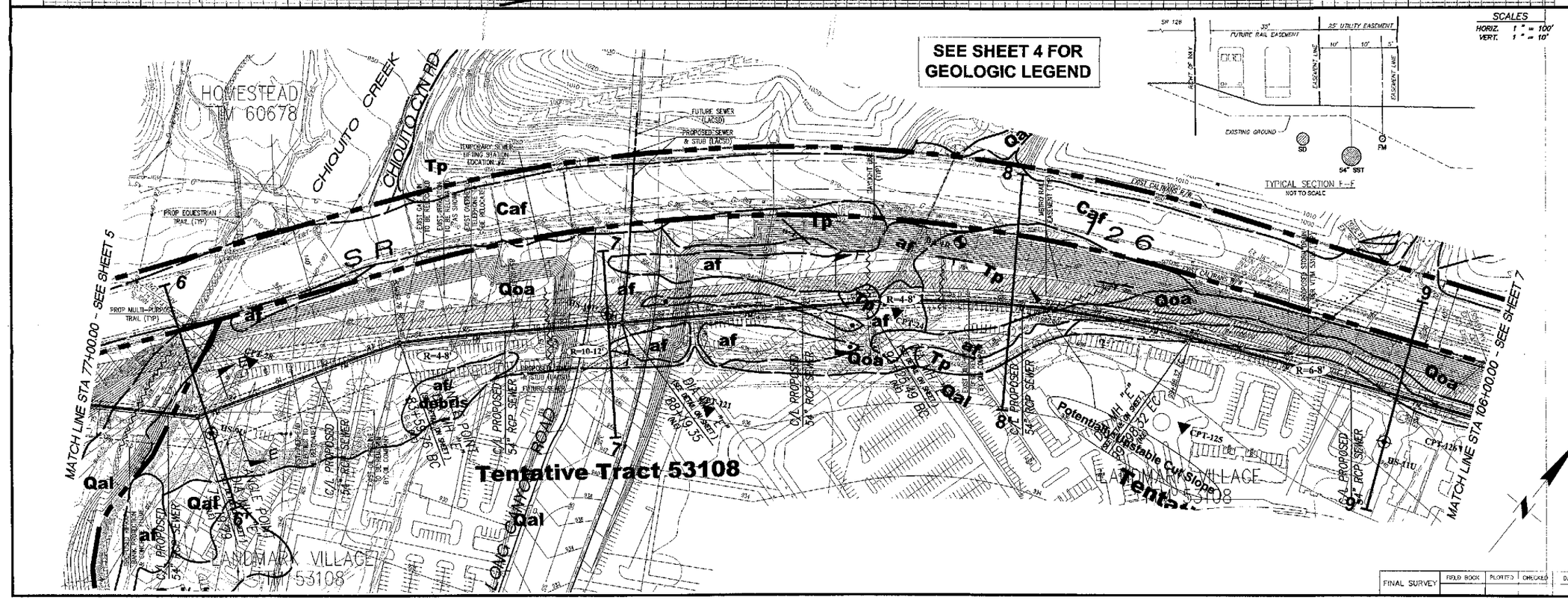
SANTA CLARA RIVER INTERCEPTOR

PLAN AND PROFILE

SHEET NO. 5
OF 15 SHEETS

DWG. NO.
#





ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

Utility Corridor and Trunk Sewer Alignment

SHEET 6

COUNTY SANITATION DISTRICT NO. 32 OF LOS ANGELES COUNTY, CALIFORNIA

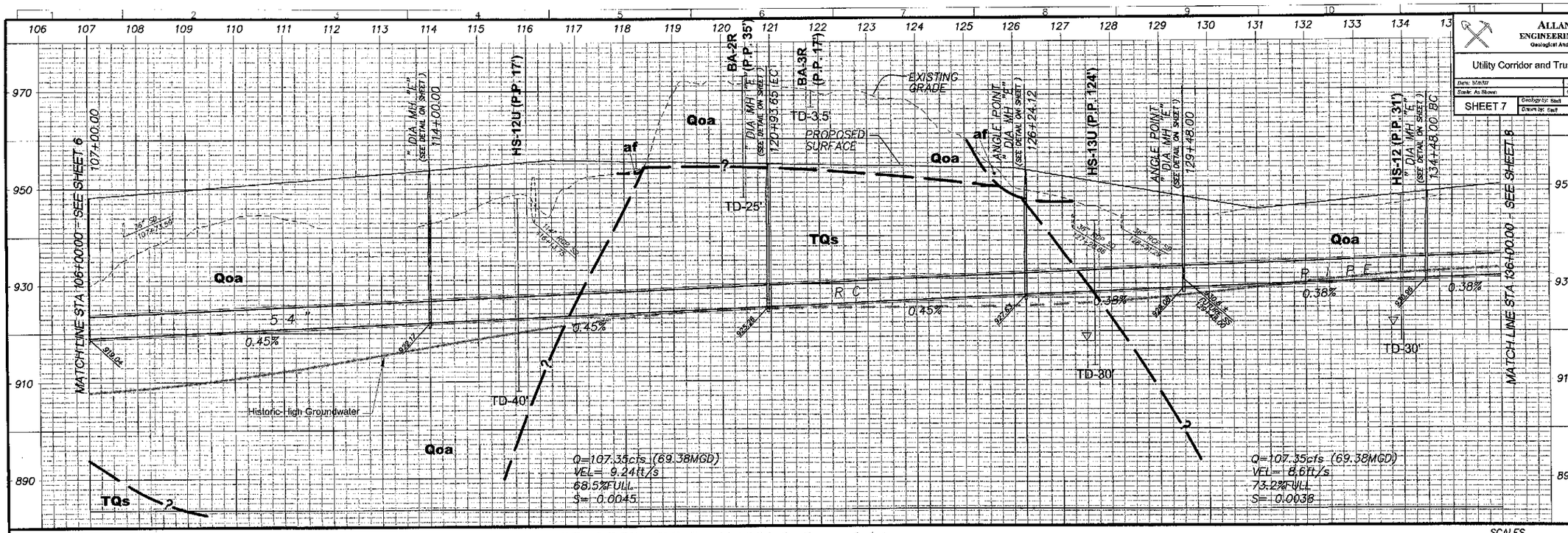
DESIGNED T. CUSTODIO, PSOMAS
DRAWN
CHECKED
REVIEWED P. MESSNER, PSOMAS

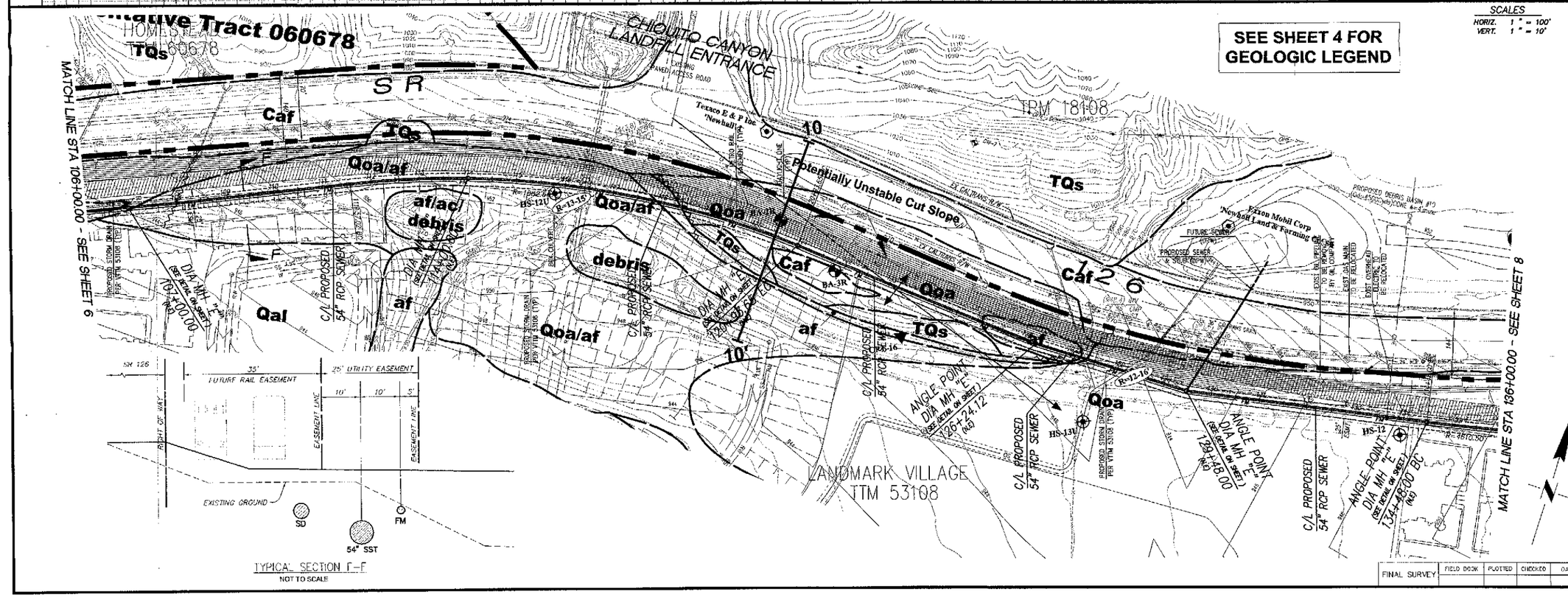
SANTA CLARA RIVER INTERCEPTOR

PLAN AND PROFILE

SHEET NO. 6
OF 15 SHEETS
DWG. NO. #

FINAL SURVEY | FIELD BOOK | PLOTTED | CHECKED | DATE





ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

Utility Corridor and Trunk Sewer Alignment

Date: 1/26/07 | Job No.: 07-2079
Scale: As Shown | CAD File: Sheet 07 (Cty-Sewer Algn)
SHEET 7 | Geology by: Staff | Drawn by: Staff | Revised: ...

COUNTY SANITATION DISTRICT NO. 32
OF LOS ANGELES COUNTY, CALIFORNIA

DESIGNED — | DATE
DRAWN T. CUSTODIO, PSOMAS | DATE
CHECKED — | DATE
REVIEWED P. MESSNER, PSOMAS | DATE

REFERENCE DWG. NO.
FIELD BOOK NO.
REVISIONS

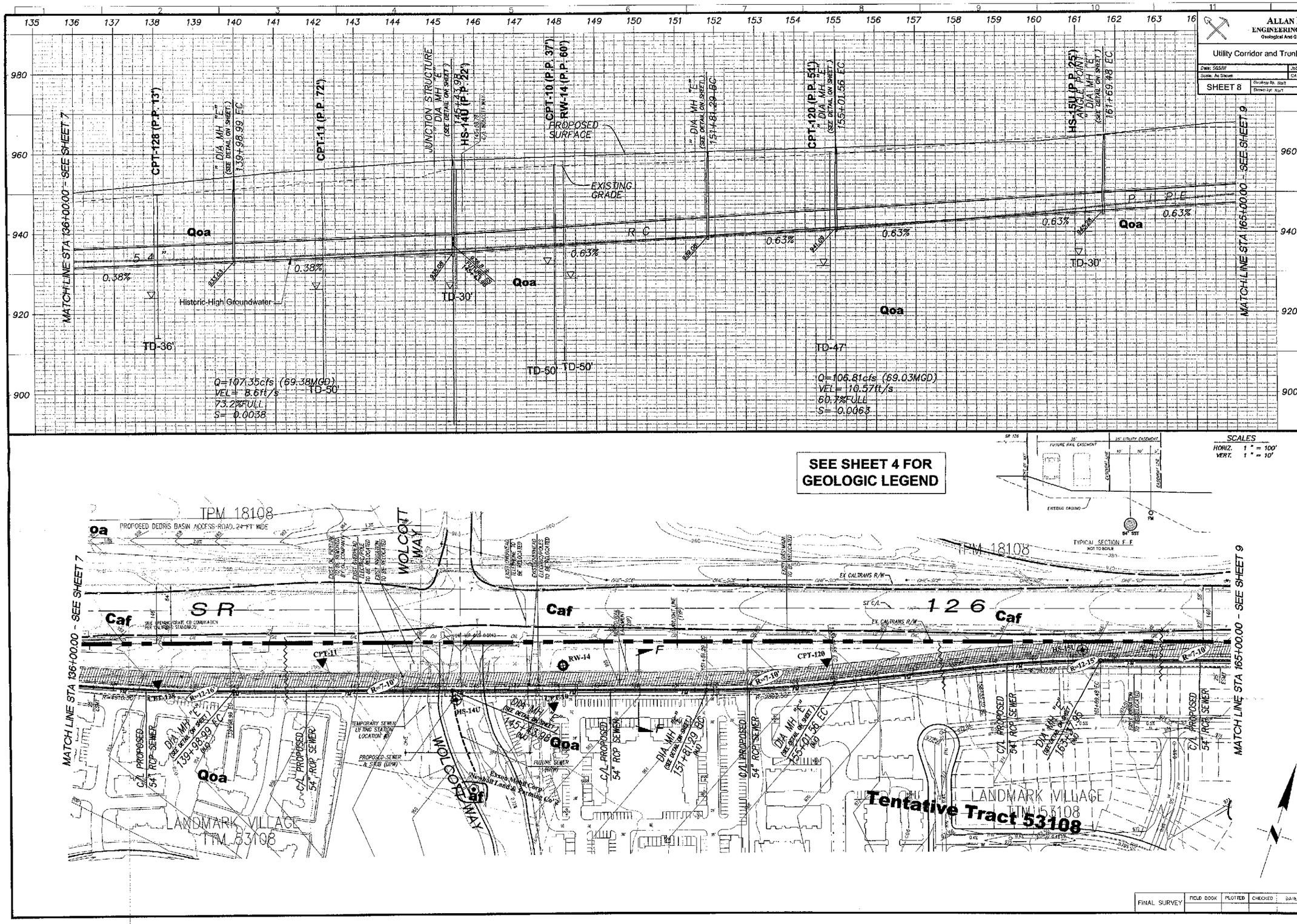
SANTA CLARA RIVER INTERCEPTOR

PLAN AND PROFILE

SHEET NO. 7
OF 15 SHEETS

DWG. NO.
#

FINAL SURVEY	FIELD BOOK	PLOTTED	CHECKED	DATE



ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

Utility Corridor and Trunk Sewer Alignment

SHEET 8

COUNTY SANITATION DISTRICT NO. 32
OF LOS ANGELES COUNTY, CALIFORNIA

DESIGNED T. CUSTODIO, PSOMAS
DRAWN
CHECKED
REVIEWED P. MIESSNER, PSOMAS

SANTA CLARA RIVER INTERCEPTOR

PLAN AND PROFILE

SHEET NO. 8
OF 15 SHEETS

DWG. NO. #

FINAL SURVEY | FIELD BOOK | PLOTTED | CHECKED | DATE

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

Utility Corridor and Trunk Sewer Alignment

Date: 5/22/07 | Job No.: 07-2070
Scale: A.Sturm | CAD File: Sheet-09-Utility Sewer Align
SHEET 9 | Geology By: Staff | Drawn By: Staff | Revised:

MATCH LINE STA 165+00.00 - SEE SHEET 8

HS-7 | HS-16U | HS-18U (P.P. 16) | HS-20U (P.P. 8) | RW-5U

" DIA. MH "E" (SEE DETAIL ON SHEET) 168+40.37
BORE PIT (SEE DETAIL ON SHEET) 170+37.34
BORE PIT (SEE DETAIL ON SHEET) 176+74.38
" DIA. MH "E" (SEE DETAIL ON SHEET) 179+22.81 BC
JUNCTION STRUCTURE " DIA. MH "E" (SEE DETAIL ON SHEET) 181+78.12
" DIA. MH "E" (SEE DETAIL ON SHEET) 187+28.61 EC

PROPOSED SURFACE
EXISTING GRADE
Historic High Groundwater

Qoa | af | Qal

54" RCP | 54" RC PIPE | 54" RC PIPE

0.63% | 0.0% | 0.88% | 1.19% | 1.19%

TD-30' | TD-40' | TD-40' | TD-35' | TD-50'

Q=106.81cfs (69.03MGD)
VEL= 10.57ft/s
60.7%FULL
S= 0.0063

Q=104.89cfs (67.78MGD)
VEL= 13.41ft/s
49.3%FULL
S= 0.0119

Q=104.
(67.78M
VEL= 1
49.3%FU
S= 0.0

MATCH LINE STA 193+00.00 - SEE SHEET 10

SEE SHEET 4 FOR GEOLOGIC LEGEND

SR 126 | 35' FUTURE RAIL EASEMENT | 25' UTILITY EASEMENT | 10' | 10' | 5' | RIGHT OF WAY | EASEMENT LINE | EXISTING GROUND | FM | 54" SST

TYPICAL SECTION F-F
NOT TO SCALE

SCALES
HORIZ. 1" = 100'
VERT. 1" = 10'

COMMERCE CENTER
TPM 26363
Tract 26363
(Grading In Progress)

TPM 18108

Qal | CREEK | Qoa | Caf | af | af/Qoa?

S R 126 | Castaic Creek Bridge | EX. CALTRANS R/W | PROPOSED SEWER (DRW) | CONNECT TO EXISTING MH

HS-7U | HS-17U | HS-16U | HS-18U | HS-20U | RW-5U

BORING PIT (SEE DETAIL ON SHEET) 170+52.89
BORING PIT (SEE DETAIL ON SHEET) 176+87.49
DIA. MH "E" (SEE DETAIL ON SHEET) 179+22.81 BC
DIA. MH "E" (SEE DETAIL ON SHEET) 181+78.12
ANGLE POINT DIA. MH "E" (SEE DETAIL ON SHEET) 187+28.61 EC

C/L PROPOSED 54" RCP SEWER | FUTURE SEWER | PROP. MAIN. ACCESS ROAD (TYP) | PROP. TRAVEL PASSAGE TRAIL | MAINTENANCE ACCESS ROAD TURN AROUND | REGIONAL TRAIL (TYP) | EX. ESTRANG TRAIL (TYP) | EXISTING VEHICLE ELECTRIC POLES TO RE-PELOCATED

CASTAIC

TRAVEL VILLAGE
TPM 15541

ANDERSON VILLAGE
TPM 53198

Exxon Mobil Corp.
Newhall Land & Farming

MATCH LINE STA 165+00.00 - SEE SHEET 8

MATCH LINE STA 193+00.00 - SEE SHEET 10

COUNTY SANITATION DISTRICT NO. 32
OF LOS ANGELES COUNTY, CALIFORNIA

DESIGNED — | DRAWN T. CUSTODIO, PSOMAS | CHECKED — | REVIEWED P. MESSNER, PSOMAS

REFERENCE DWG. NO. | FIELD BOOK NO. | REVISIONS

SANTA CLARA RIVER INTERCEPTOR

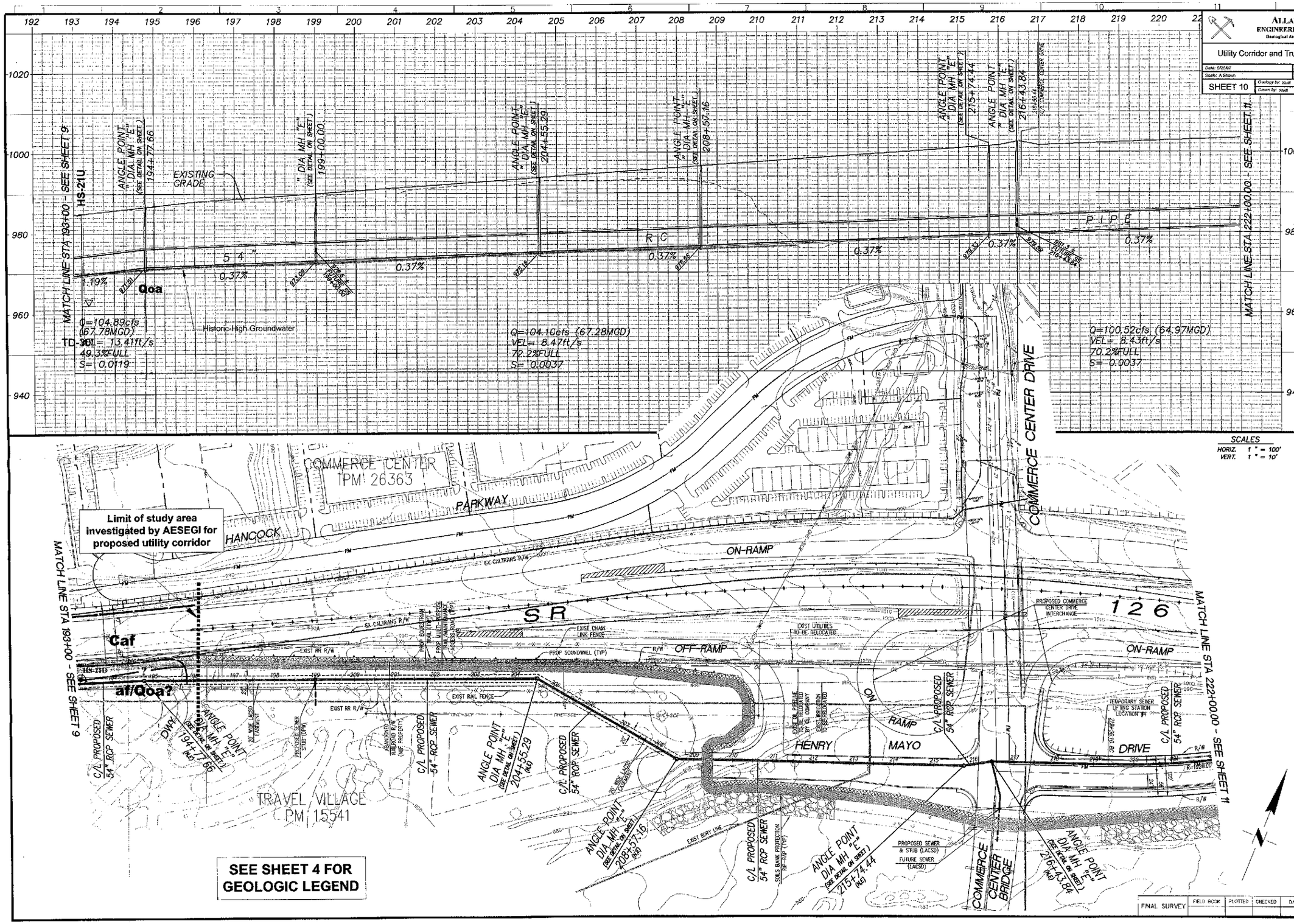
PLAN AND PROFILE

SHEET NO. 9 OF 15 SHEETS

DWG. NO. #

FINAL SURVEY | FIELD BOOK | PLOTTED | CHECKED | DATE

Plotted: 05/02/07 12:39:35 V:\Market\PROJDATA\24600-MP\ENG\Sections\Sturm\P\VR126-09.dwg



ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

Utility Corridor and Trunk Sewer Alignment

SHEET 10

COUNTY SANITATION DISTRICT NO. 32
OF LOS ANGELES COUNTY, CALIFORNIA

DESIGNED T. CUSTODIO, PSOMAS
DRAWN
CHECKED P. MESSNER, PSOMAS
REVIEWED

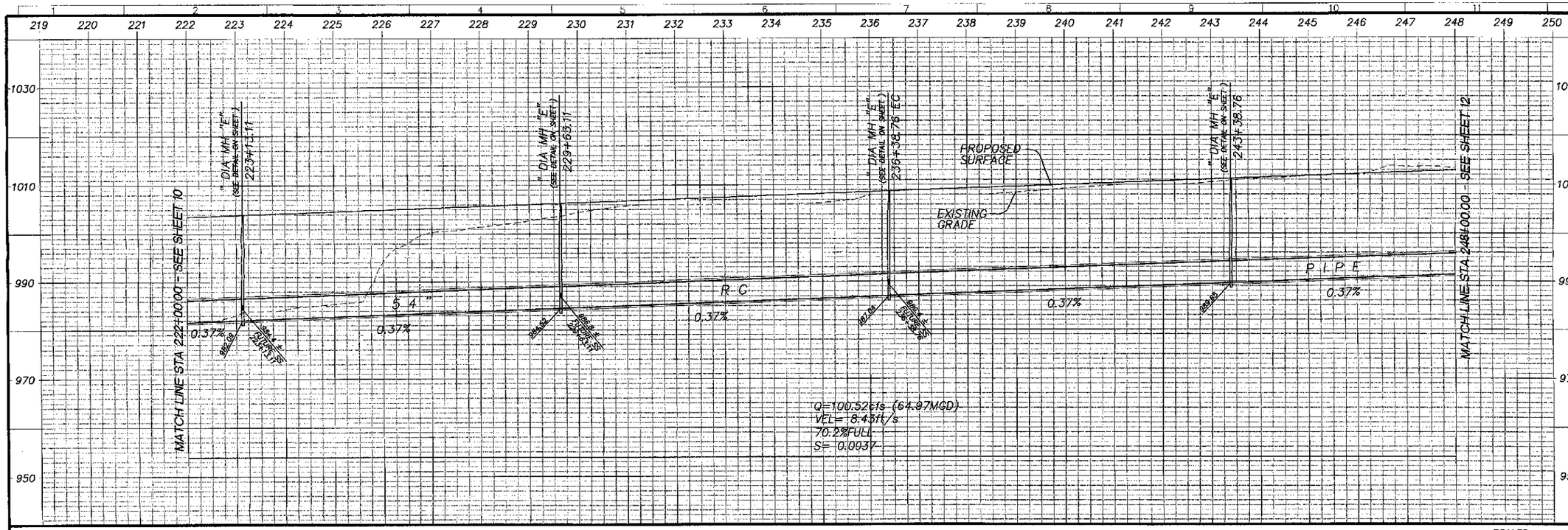
SANTA CLARA RIVER INTERCEPTOR

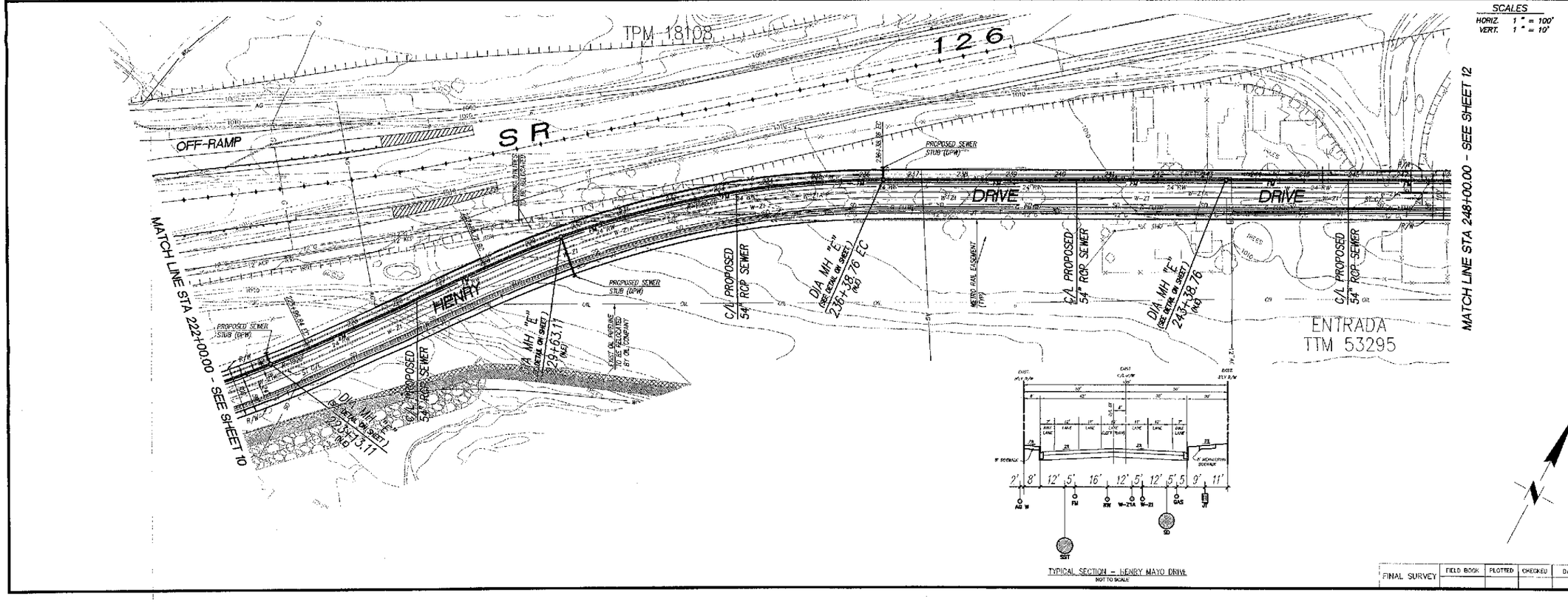
PLAN AND PROFILE

SHEET NO. 10
OF 15 SHEETS

DWG. NO.
#

FINAL SURVEY	FIELD BOOK	PLOTTED	CHECKED	DATE





COUNTY SANITATION DISTRICT NO. 32
OF LOS ANGELES COUNTY, CALIFORNIA

DESIGNED T. CUSTODIO, PSOMAS
DRAWN
CHECKED
REVIEWED R. MIESSNER, PSOMAS

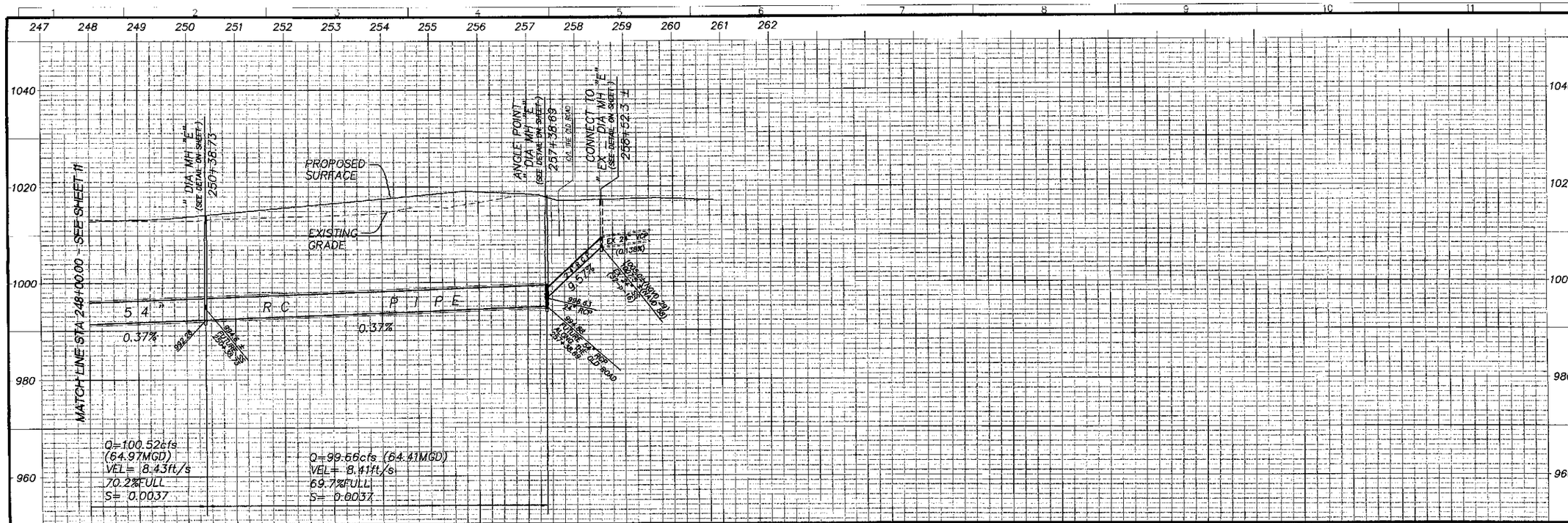
SANTA CLARA RIVER INTERCEPTOR

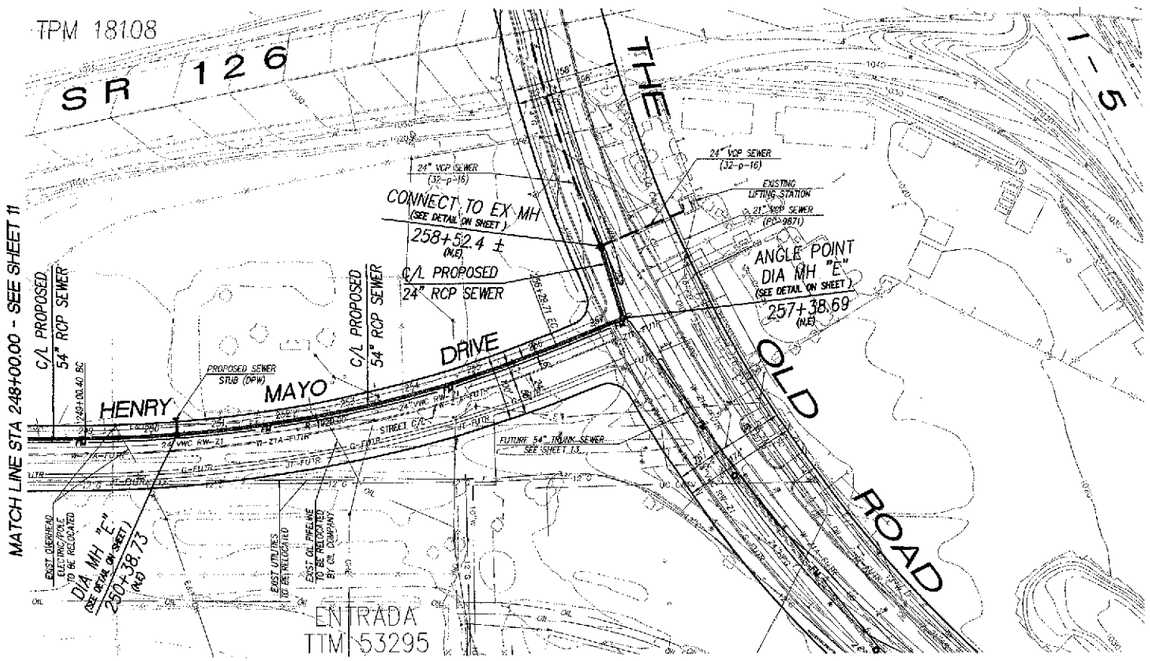
PLAN AND PROFILE

SHEET NO. 11
OF 15 SHEETS

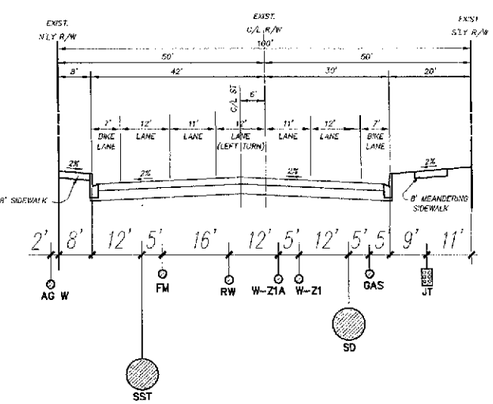
DWG. NO. #

FINAL SURVEY	FIELD BOOK	PLOTTED	CHECKED	DATE





SCALES
HORIZ. 1" = 100'
VERT. 1" = 10'



TYPICAL SECTION – HENRY MAYO DRIVE
NOT TO SCALE

COUNTY SANITATION DISTRICT NO. 32
OF LOS ANGELES COUNTY, CALIFORNIA

DESIGNED – DATE
DRAWN T. CUSTODIO, PSOMAS DATE
CHECKED – DATE
REVIEWED P. MESSNER, PSOMAS DATE

SANTA CLARA RIVER INTERCEPTOR

PLAN AND PROFILE

SHEET NO. 12
OF 15 SHEETS

DWG. NO.
#

FINAL SURVEY	FIELD BOOK	PLOTTED	CHECKED	DATE

NO.	REVISIONS	DATE

REFERENCE DWG. NO.
FIELD BOOK NO.

SCALES
HORIZ. 1" = 100'
VERT. 1" = 10'

FINAL SURVEY	FIELD BOOK	PLOTTED	CHECKED	DATE

COUNTY SANITATION DISTRICT NO. 32
OF LOS ANGELES COUNTY, CALIFORNIA

DESIGNED — BAR
DRAWN T. CUSTODIO, PSOMAS — BDF
CHECKED — CDT
REVIEWED P. MESSNER, PSOMAS — EAS

REFERENCE DWG. NO.
FIELD BOOK NO.

NO.	REVISIONS	INITIALS	DATE

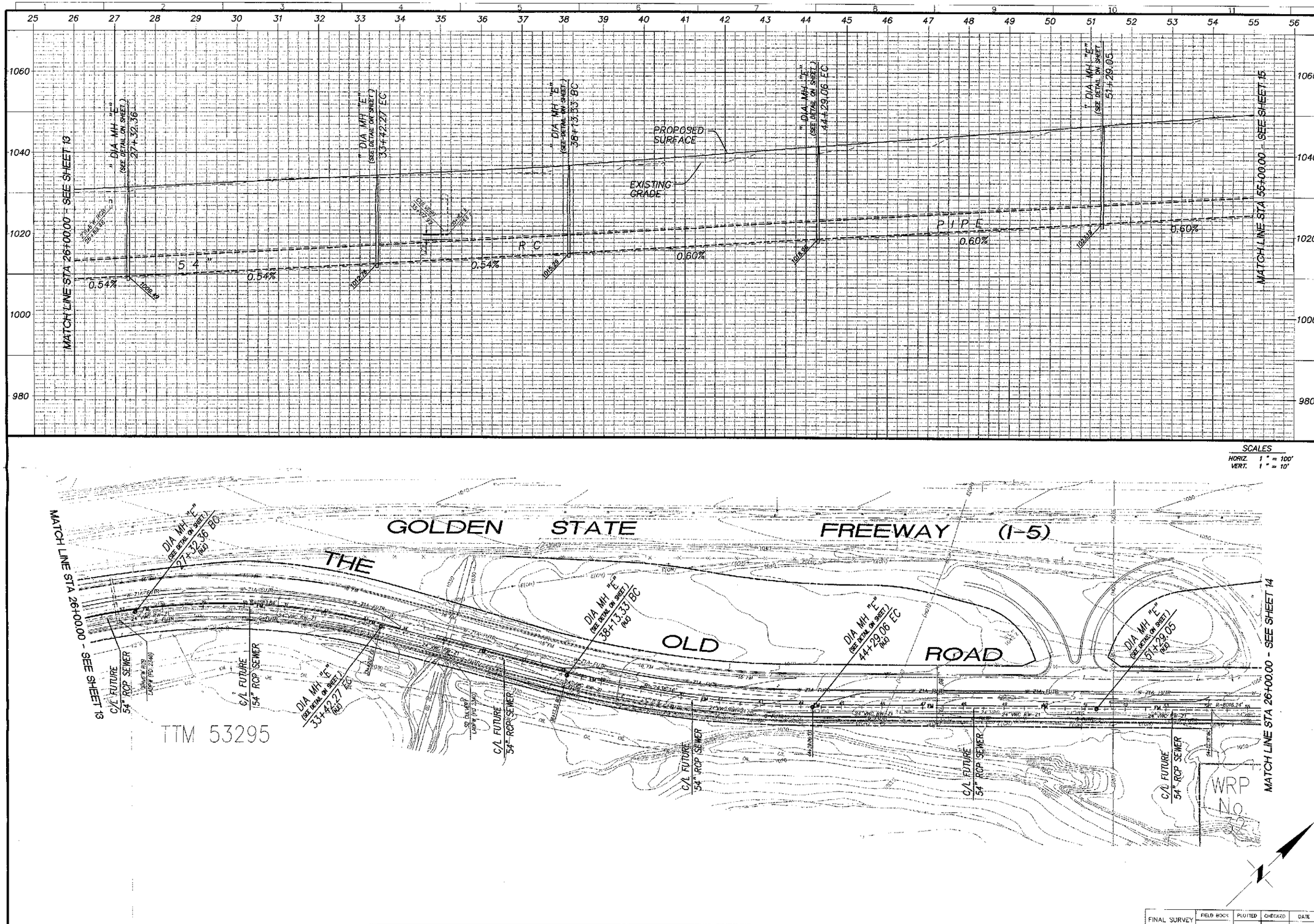
SANTA CLARA RIVER INTERCEPTOR

PLAN AND PROFILE

SHEET NO. 13
OF 15 SHEETS

DWG. NO.
#

Plotted: 05/08/07 14:42:58 \\Vhecfs1\PROJDATA\24100-WP\PCR\vantest\Cent\P\X0905-13.dwg tcustodio



FINAL SURVEY	FIELD BOOK	PLOTTED	CHECKED	DATE

COUNTY SANITATION DISTRICT NO. 32
OF LOS ANGELES COUNTY, CALIFORNIA

DESIGNED — DATE
DRAWN T. CUSTODIO, PSOMAS DATE
CHECKED — DATE
REVIEWED P. MIESSNER, PSOMAS DATE

REFERENCE DWG. NO.

FIELD BOOK NO. S-

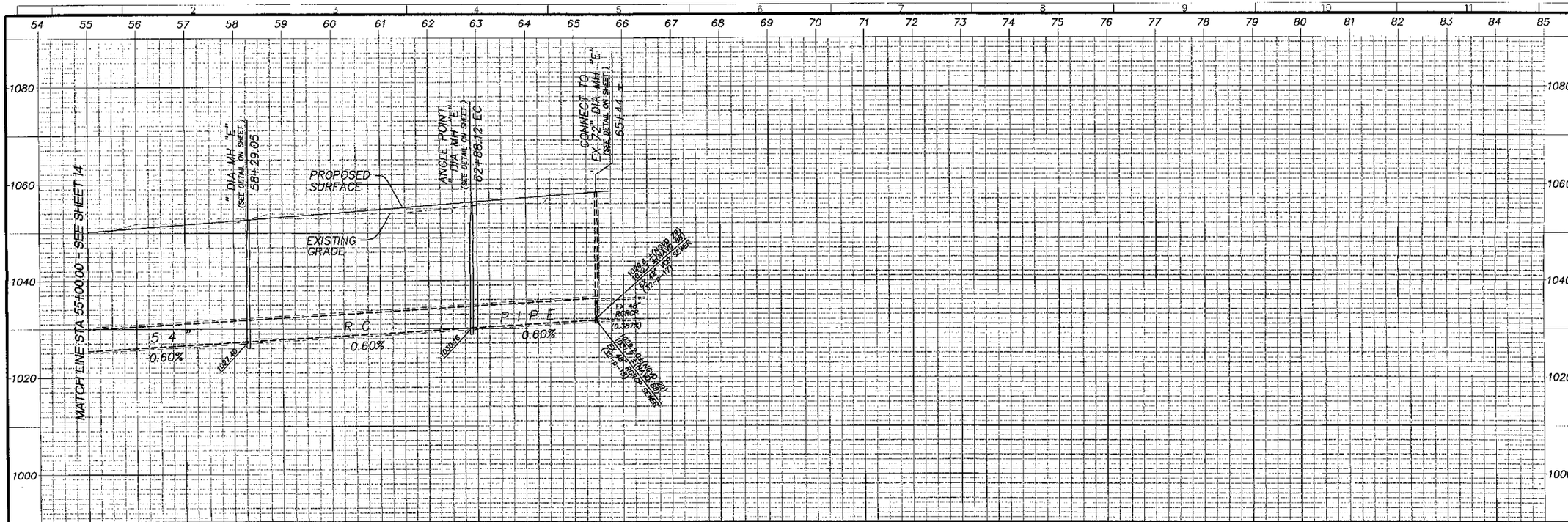
SANTA CLARA RIVER INTERCEPTOR

PLAN AND PROFILE

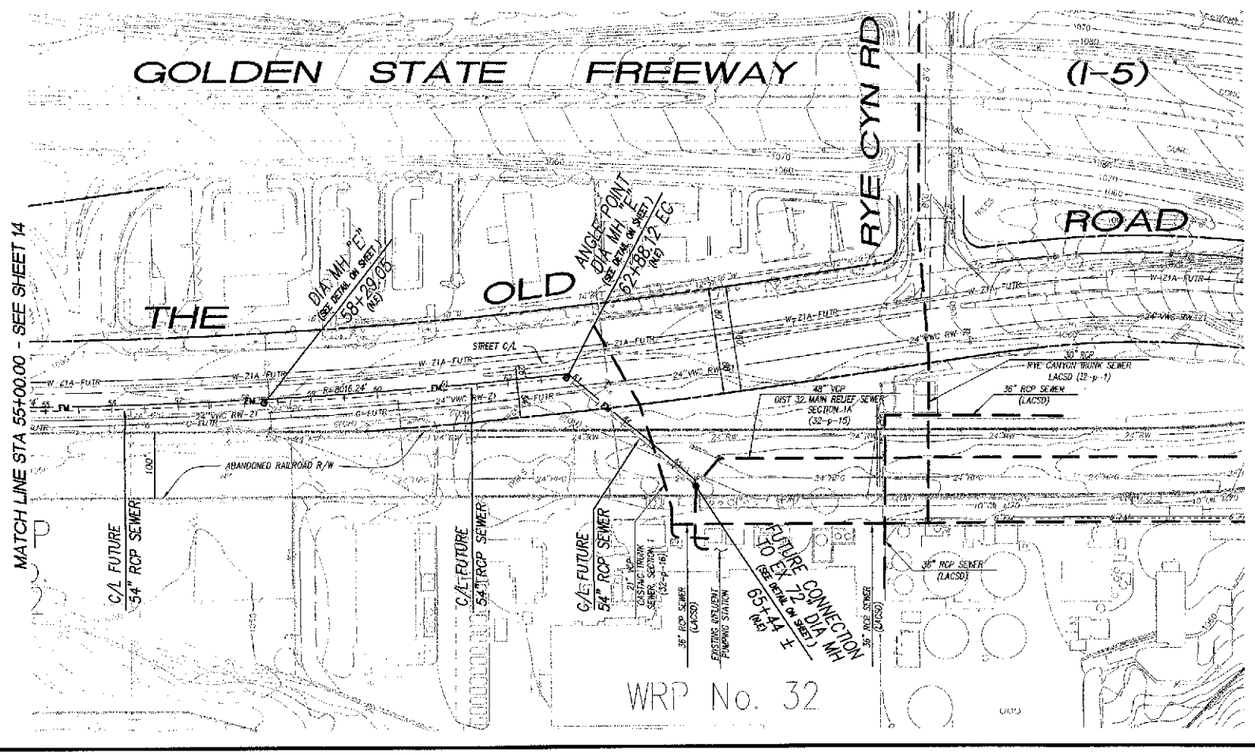
SHEET NO. 14
OF 15 SHEETS

DWG. NO.
#

NO.	REVISIONS	INITIALS	DATE



SCALES
HORIZ. 1" = 100'
VERT. 1" = 10'



FINAL SURVEY	FIELD BOOK	PLOTTED	CHECKED	DATE

COUNTY SANITATION DISTRICT NO. 32
OF LOS ANGELES COUNTY, CALIFORNIA

REFERENCE DWG. NO.

DESIGNED T. CUSTODIO, PSOMAS DATE
DRAWN — DATE
CHECKED — DATE
REVIEWED P. MESSNER, PSOMAS DATE

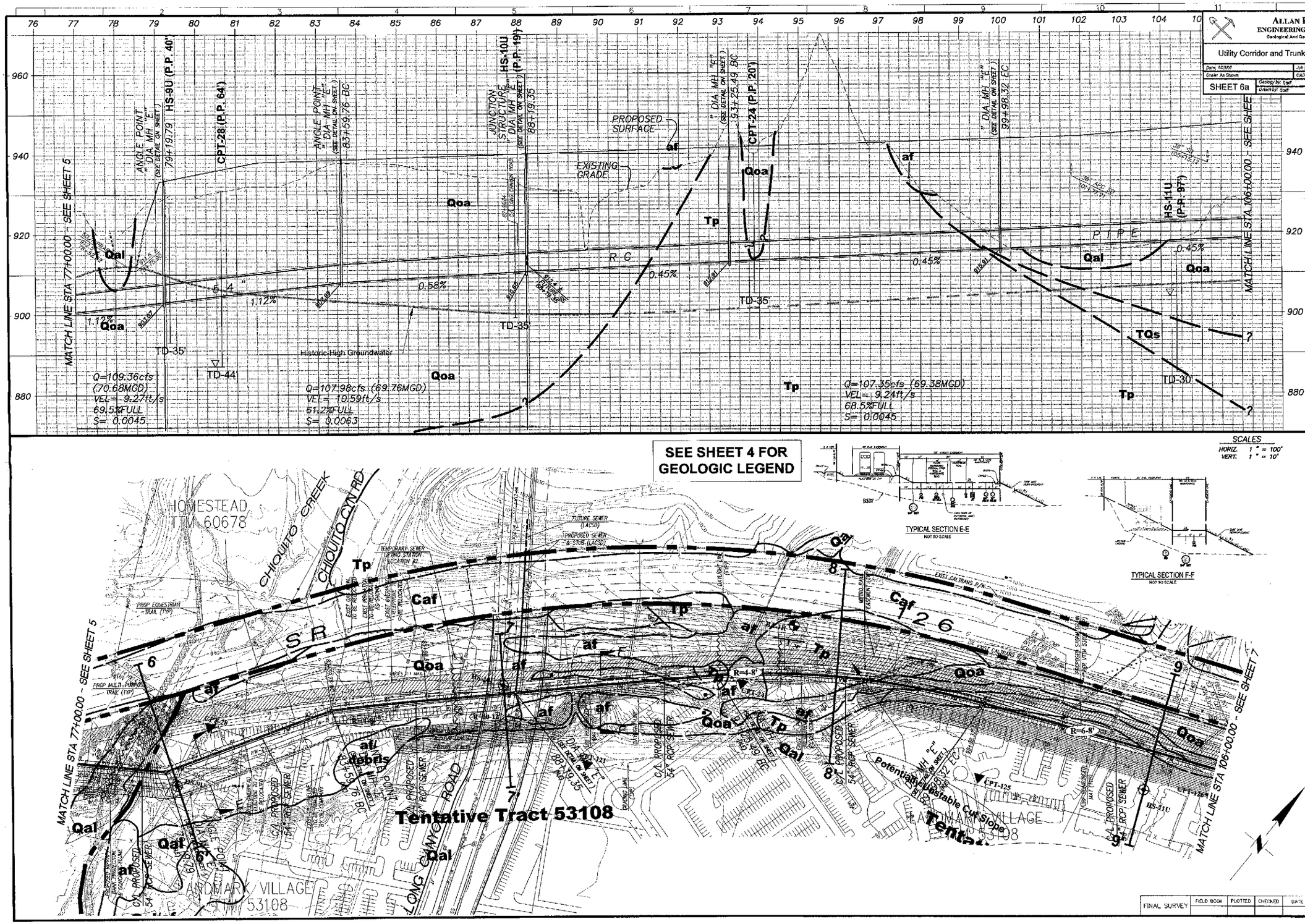
SANTA CLARA RIVER INTERCEPTOR

PLAN AND PROFILE

SHEET NO. 15
OF 15 SHEETS

DWG. NO.
#

NO.	REVISIONS	INITIALS	DATE



ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

Utility Corridor and Trunk Sewer Alignment

Date: 5/25/07 | Job No.: 07-2070
Scale: As Shown | CAD File: Sheet-06a-Utility-Sewer Align
SHEET 6a | Geology by: Staff | Drawn by: Staff | Revision:

COUNTY SANITATION DISTRICT NO. 32
OF LOS ANGELES COUNTY, CALIFORNIA

DESIGNED: - | DRAWN: T. CUSTODIO, PSOMAS | CHECKED: - | REVIEWED: P. MIESSNER, PSOMAS

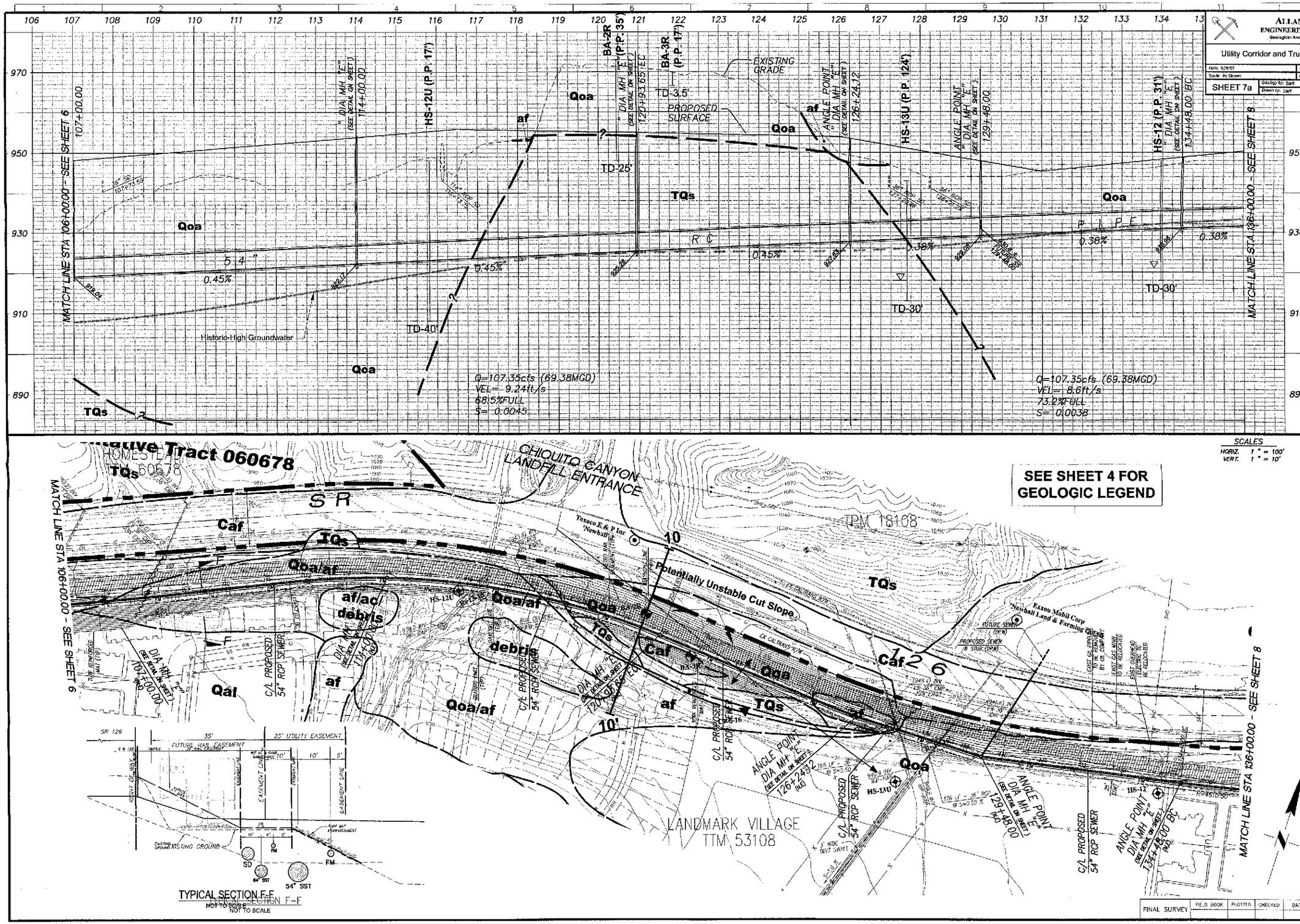
SANTA CLARA RIVER INTERCEPTOR

PLAN AND PROFILE

SHEET NO. 6A
OF 15 SHEETS

DWG. NO. #

FINAL SURVEY	FIELD BOOK	PLOTTED	CHECKED	DATE



ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

Utility Corridor and Trunk Sewer Alignment

Date: 5/28/07 | Job No.: 07-2019
Scale: As Shown | CAD File: Sheet-07a Utility-Sewer Align
SHEET 7a | Geology By: Staff | Drawn by: Staff | Revised:

COUNTY SANITATION DISTRICT NO. 32
OF LOS ANGELES COUNTY, CALIFORNIA

DESIGNED T. CUSTODIO, PSOMAS
DRAWN
CHECKED
REVIEWED P. MIESSNER, PSOMAS

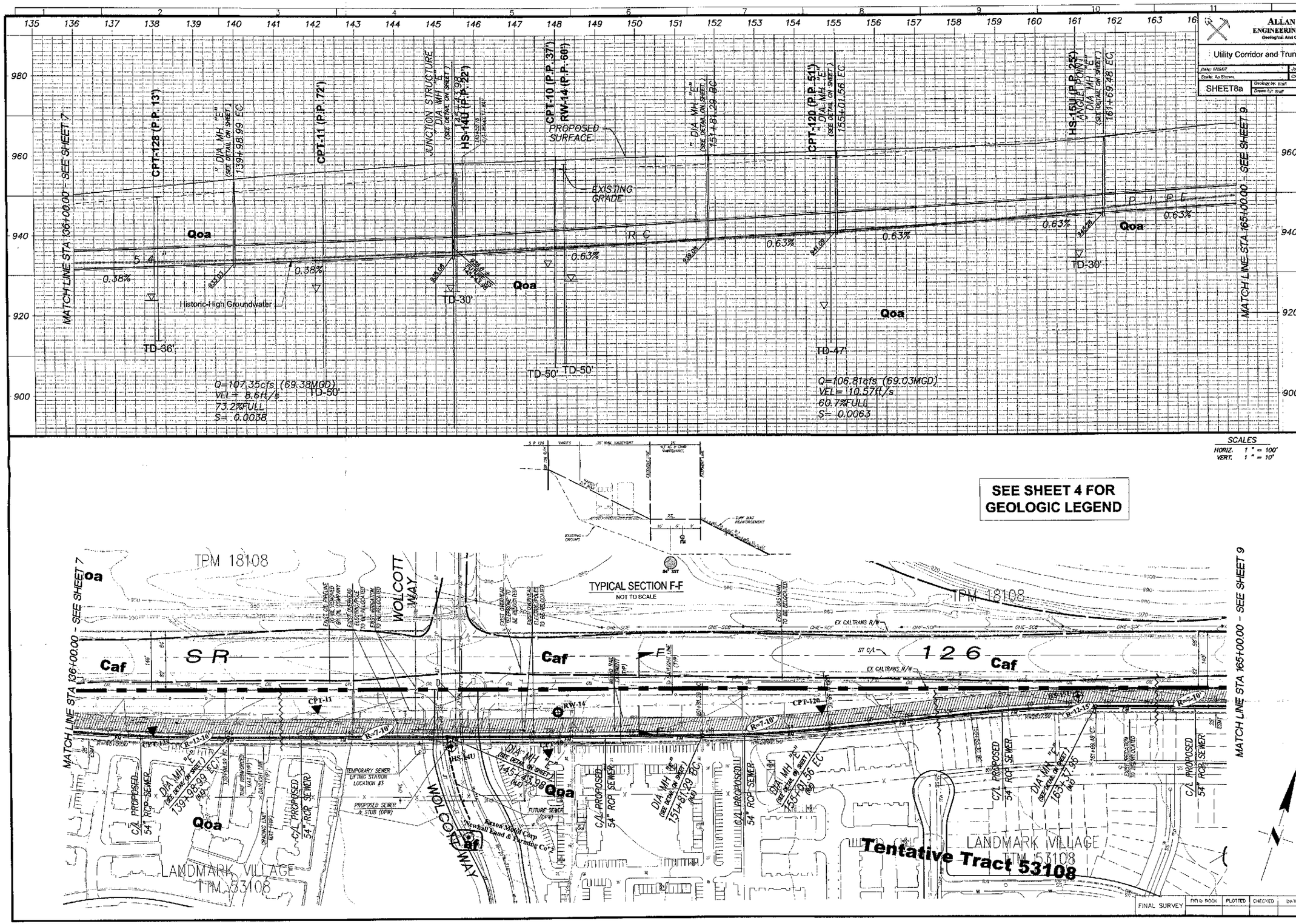
SANTA CLARA RIVER INTERCEPTOR

PLAN AND PROFILE

SHEET NO. 7A
OF 15 SHEETS

DWG. NO.
#

FINAL SURVEY | FIELD BOOK | PLOTTED | CHECKED | DATE



ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

Utility Corridor and Trunk Sewer Alignment

SHEET8a

COUNTY SANITATION DISTRICT NO. 32
OF LOS ANGELES COUNTY, CALIFORNIA

DESIGNED T. CUSTODIO, PSOMAS
DRAWN
CHECKED
REVIEWED P. MIESSNER, PSOMAS

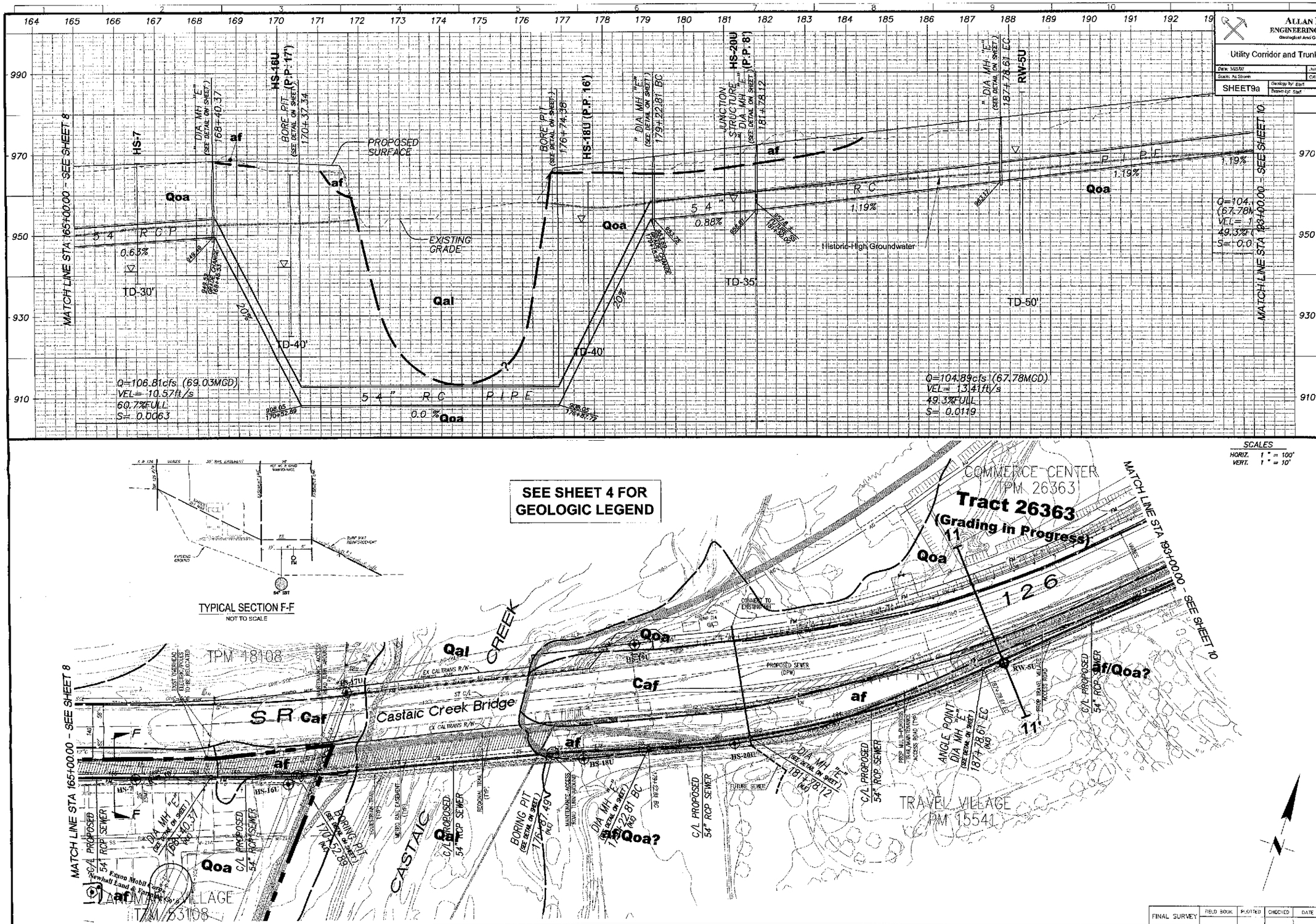
SANTA CLARA RIVER INTERCEPTOR

PLAN AND PROFILE

SHEET NO. 8A
OF 15 SHEETS

DWG. NO. #

FINAL SURVEY | FIELD BOOK | PLOTTED | CHECKED | DATE



ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

Utility Corridor and Trunk Sewer Alignment

SHEET9a

COUNTY SANITATION DISTRICT NO. 32
OF LOS ANGELES COUNTY, CALIFORNIA

DESIGNED T. CUSTODIO, PSOMAS
DRAWN
CHECKED
REVIEWED P. MIESSNER, PSOMAS

SANTA CLARA RIVER INTERCEPTOR

PLAN AND PROFILE

SHEET NO. 9A
OF 15 SHEETS

DWG. NO. #

FINAL SURVEY | FIELD BOOK | PLOTTED | CHECKED | DATE

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

December 4, 2007 Job No: 07-2023-4 (19)

The Newhall Land and Farming Company
23823 West Valencia Boulevard
Valencia, California 91355

Attention: Mr. Corey Harpole

Subject: **GEOLOGIC AND GEOTECHNICAL REPORT – ADDENDUM NO. 3**
Response to Los Angeles County Geologic Review Sheet dated September 17, 2007 and Soils Engineering Review Sheet dated September 19, 2007

Project: Vesting Tentative Tract 61105 (dated 8/9/2007)
Mission Village
Newhall Ranch, California

References: At end of text

Dear Mr. Harpole:

This report presents our responses to the Geologic Review Sheet dated September 17, 2007 and the Soils Engineering Review Sheet dated September 19, 2007 for Vesting Tentative Tract Map (VTTM) 61105, both issued by the Los Angeles County Department of Public Works Geotechnical and Materials Engineering Division. As you know, the Los Angeles County review sheets refer to the offsite proposed Southern California Edison (SCE) substation grading alternatives #1 and #2 that are shown on Sheet 9 of the Tentative Map. The area associated with these grading alternatives is located about two miles southwest from the main area of Mission Village, between Potrero Canyon and Legacy Village (VTTM 061996). Geologic/geotechnical investigations for Potrero Canyon and Legacy Village are currently being performed by Leighton and Associates. Per your request, Leighton and Associates evaluated proposed grading alternatives #1 and #2 for the substation and presented their geologic/geotechnical conclusions and recommendations for the substation alternatives in their report dated November 26, 2007.

Since Allan E. Seward Engineering Geology, Inc. (AESEGI) is the Engineering Geologist/Geotechnical Engineer of Record for VTTM 61105, we are providing this letter

report (in conjunction with the report by Leighton and Associates dated November 26, 2007) in support of the proposed offsite grading for SCE substation alternatives #1 and #2.

GEOLOGIC AND GEOTECHNICAL REPORT - ADDENDUM NO. 3

In order to facilitate the review process, we have listed the County's remarks in **bold** in the order in which they appear on the original review letter. Each remark is followed immediately by our response. Copies of the review letters are attached after the references.

GEOLOGIC REVIEW SHEET (Dated September 17, 2007)

Remark No. 1

An updated engineering geology report is required to evaluate the changes to the Tentative Map. (Note: Proposed off-site grading for SCE substation shown on sheet 9 on the Tentative Map).

Response

Please refer to Leighton's report dated November 26, 2007, which addresses the proposed SCE substation alternatives #1 and #2 shown on Sheet 9.

Remark No. 2

The Soils Engineering review dated 9/19/07 is attached.

Response

Acknowledged.

SOILS ENGINEERING REVIEW SHEET (Dated September 19, 2007)

Remark No. 1

Provide static, seismic and surficial slope stability analyses for all slopes steeper than 2:1 gradient or subject to adverse bedding conditions at the proposed SCE substation alternatives shown on Sheet No.9 of the tentative tract map. Also, provide a

geotechnical cross-section, for each section analyzed, showing the critical failure plane used in the analyses. Indicate the various shear strength parameters used in the analyses, in the appropriate segments of each failure plane. Show locations of the cross sections used in slope stability analyses on the geotechnical map. Recommend mitigation if factors of safety are below County minimum standards.

Response

Please refer to Leighton's report for slope stability analyses for the proposed SCE substation alternatives #1 and #2 shown on Sheet 9 of the tentative map.

Remark No. 2

Show the following on the geotechnical map:

a. **Approximate limits and depth of removal and recompaction of unsuitable soils, as necessary.**
b. **Grading required for construction of buttress/stabilization fills, as necessary.**
c. **All recommended mitigation measures, as necessary.**

Response

Leighton and Associates Preliminary Geotechnical Map - Plate 1 shows the recommended remedial measures for proposed SCE substation alternatives #1 and #2.

Remark No. 3

Requirements of the Geology Section are attached.

Response

Acknowledged.

Remark No. 4

Include a copy of this review sheet with your response.

Response

A copy of each of the review sheets is attached to this report.

1.0 CONCLUSIONS

We have reviewed the referenced report by Leighton and Associates, dated November 26, 2007, and accept that the findings, conclusions, and recommendations presented therein are acceptable for the proposed use. Additional studies should be performed at the Grading Plan stage to refine the remedial measures for the proposed offsite grading for SCE substation alternatives #1 and #2 at a scale of 1”=40’.

2.0 LIMITATIONS

This report has been prepared by Allan E. Seward Engineering Geology, Inc. for the exclusive use of The Newhall Land and Farming Company and its design consultants for the specific site discussed herein. This report should not be considered transferable. Prior to use by others, this firm must be notified, as additional work may be required to update this report.

In the event that any modification in the location or design of the proposed development is planned, the conclusions and recommendations contained in this report will require a written review by this firm with respect to the planned modifications.

The proposed development is located in southern California, a geologically and tectonically active region, where large magnitude, potentially destructive earthquakes are common. Therefore, ground motions from moderate or large magnitude earthquakes could affect the project site during the design life of the proposed structure(s).

Typically, faulting is confined to the area adjacent to a known fault. However, absolute assurance against future fault displacement is not possible in tectonically active regions because new faults can form over time as the orientation and magnitude of deformational forces change in the earth's crust. Therefore, the location and magnitude of new ground surface ruptures during a seismic event cannot be anticipated.

In performing these professional services, this firm has used the degree of care and skill ordinarily exercised under similar circumstances by reputable geologists and geotechnical

engineers practicing in this or similar localities. The data presented in this report are based on results of pertinent field and laboratory testing. It should be recognized that subsurface conditions can vary in time, and laterally, and with depth at a given site. Since the conclusions and recommendations presented in this report are based on our observations and testing, our **conclusions** and **recommendations** are **professional opinions** and are **not meant** to be a control of nature. Therefore, we make no other **warranty** either **expressed** or **implied**.

This report may not be duplicated without the written consent of this firm.

This opportunity to be of service is appreciated. Please contact us if you would like to discuss this report further.

Respectfully submitted,

Stuart Mayes, CEG 2169
Senior Associate Geologist

Martin J. Goodman, GE 2146
Principal Geotechnical Engineer

REGISTERED GEOLOGIST
STUART K. MAYES
No. 2169
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
MARTIN J. GOODMAN
No. 2146
03-31-09
EXPIRES
GEOTECHNICAL
STATE OF CALIFORNIA

The following attachments and appendices complete this report.

References

Geologic Review Sheet dated 9/17/07	at end of text
Soils Engineering Review Sheet dated 9/19/07	at end of text

Distribution: (1) The Newhall Land and Farming Company
Attn: Mr. Corey Harpole
(3) Psomas
Attn: Mr. Matt Heideman
Attn: Los Angeles County Department of Public Works Geotechnical and Materials Engineering
1 - Soils
1 - Geology
(1) Impact Sciences
Attn: Ms. Susan Tebo
(1) Leighton and Associates, Inc.
Attn: Mr. Jose Sanchez

REFERENCES

Reports by Allan E. Seward Engineering Geology, Inc.

1. **Geologic and Geotechnical Report**
Review of Vesting Tentative Tract Map (Dated June 14, 2004)
Vesting Tentative Tract 61105
Mesas East
Newhall Ranch, California
Dated July 22, 2004 - JN: 04-2023-4

2. **Geologic and Geotechnical Report – Addendum No. 1**
Response to Los Angeles County Geologic Review Sheet Dated October 21, 2004 and Soils Engineering Review Sheet Dated October 26, 2004
Geologic and Geotechnical Report
Review of Revised Vesting Tentative Tract Map (November 15, 2004)
Vesting Tentative Tract 61105
Mission Village
Newhall Ranch, California
Dated December 22, 2004 - JN: 04-2023-4

3. **Geologic and Geotechnical Report – Addendum No. 2**
Response to Los Angeles County Geologic Review Sheet dated January 26, 2005 and Soils Engineering Review Sheet dated February 22, 2005
Geologic and Geotechnical Report
Review of Revised Vesting Tentative Tract Map (Dated 6/1/05)
Vesting Tentative Tract 61105
Mission Village
Newhall Ranch, California
Dated June 13, 2005 – JN: 05-2023-4

Report by Leighton and Associates, Inc.

4. "Geotechnical Report, Off-site Grading for Proposed Southern California Edison Substation Alternatives, Responses to the County of Los Angeles Department of Public Works Geologic and Soils Engineering Review Sheets dated September 17 and September 19, 2007 for Tentative Tract Map No. 61105 (Mission village Project), County of Los Angeles, California"
Dated November 26, 2007 – Project No. 062273-001

County of Los Angeles Department of Public Works
GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION
GEOLOGIC REVIEW SHEET
900 So. Fremont Ave., Alhambra, CA 91803
TEL. (626) 458-4925

DISTRIBUTION
1 Geologist
__ Soils Engineer
1 GMED File
1 Subdivision

TENTATIVE TRACT MAP 61105
SUBDIVIDER Newhall Land
ENGINEER Psomas
GEOLOGIST & SOILS ENGINEER A.E. Seward Eng. Geol., Inc.

TENTATIVE MAP DATED 8/9/07 (Revised)
LOCATION Castaic Junction
GRADING BY SUBDIVIDER [Y] (Y or N)
REPORT DATE 6/13/05, 12/22/04, 7/22/04, 7/20/04

The Regional Planning Commission, developer, and engineer are advised that:

PRIOR TO RECOMMENDING APPROVAL OF THE TENTATIVE TRACT OR PARCEL MAP:

1. An updated engineering geology report is required to evaluate the changes to the Tentative Map. (Note: Proposed off-site grading for SCE substation shown on sheet 9 on the Tentative Map).

2. The Soils Engineering review dated 9/19/07 is attached.

Prepared by Geir Mathisen Reviewed by _____ Date 9/17/07

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION

SOILS ENGINEERING REVIEW SHEET

Address: 900 S. Fremont Ave., Alhambra, CA 91803
Telephone: (626) 458-4925
Fax: (626) 458-4913

District Office 8.2
PCA LX001129
Sheet 1 of 1

DISTRIBUTION:
___ Drainage
___ Grading
___ Geo/Soils Central File
___ District Engineer
___ Geologist
___ Soils Engineer
___ Engineer/Architect

Tentative Tract Map	61105
Location	Castaic Junction
Developer/Owner	Newhall Land & Farming Co.
Engineer/Architect	Psomas
Soils Engineer	Allan E. Seward Engineering Geology, Inc. (04-2023-4)
Geologist	Allan E. Seward Engineering Geology, Inc.

Review of:

Tentative Map and Exhibit Dated by Regional Planning **8/9/07 (rev.)**
Soils Engineering and Geologic Report and Addenda Dated 6/13/05, 12/22/04, 7/22/04
Previous Review Sheet Dated 2/22/07

ACTION:

Tentative Map feasibility is not recommended for approval.

REMARKS:

1. Provide static, seismic and surficial slope stability analyses for all slopes steeper than 2:1 gradient or subject to adverse bedding conditions at the proposed SCE substation alternatives shown on Sheet No. 9 of the tentative tract map. Also, provide a geotechnical cross-section, for each section analyzed, showing the critical failure plane used in the analyses. Indicate the various shear strength parameters used in the analyses, in the appropriate segments of each failure plane. Show locations of the cross sections used in slope stability analyses on the geotechnical map. Recommend mitigation if factors of safety are below County minimum standards.

2. Show the following on the geotechnical map:
   a. Approximate limits and depth of removal and recompaction of unsuitable soils, as necessary.
   b. Grading required for construction of buttress/stabilization fills, as necessary.
   c. All recommended mitigation measures, as necessary.

3. Requirements of the Geology Section are attached.

4. Include a copy of this review sheet with your response.

NOTE(S) TO THE PLAN CHECKER/BUILDING AND SAFETY ENGINEER:
A. ONSITE SOILS ARE CORROSIVE TO FERROUS MATERIALS.
B. ONSITE SOILS HAVE A MEDIUM EXPANSION POTENTIAL.
C. PER THE SOILS ENGINEER, DEWATERING SHALL BE PERFORMED FOR REMOVALS IN THE VICINITY OF BORINGS B-72E AND B-73E.

REGISTERED PROFESSIONAL ENGINEER JEREMY WAN NO. C67563 EXP. 6/30/09 CIVIL STATE OF CALIFORNIA

Prepared by Jeremy Wan Date 9/19/07

Please complete a Customer Service Survey at http://dpw.lacounty.gov/go/gmedsurvey.
NOTICE: Public safety, relative to geotechnical subsurface exploration, shall be provided in accordance with current codes for excavations, inclusive of

Geologic and Geotechnical Report – Addendum No. 4, Response to Los Angeles County Geologic Review Sheet dated January 16, 2008; March 13, 2008

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

March 13, 2008

Job No: 08-2023-4 (19)

The Newhall Land and Farming Company
23823 West Valencia Boulevard
Valencia, California 91355

Attention: Mr. Corey Harpole

Subject: **GEOLOGIC AND GEOTECHNICAL REPORT – ADDENDUM NO. 4**
Response to Los Angeles County Geologic Review Sheet dated January 16, 2008 and Soils Engineering Review Sheet dated January 17, 2008

Project: Vesting Tentative Tract 61105 (dated 8/9/2007)
Mission Village
Newhall Ranch, California

References: At end of text

Dear Mr. Harpole:

This addendum report presents our responses to the Geologic Review Sheet dated January 16, 2008 and the Soils Engineering Review Sheet dated January 17, 2008 for Vesting Tentative Tract Map (VTTM) 61105, both issued by the Los Angeles County Department of Public Works Geotechnical and Materials Engineering Division.

Since Allan E. Seward Engineering Geology, Inc. (AESEGI) is the Engineering Geologist/Geotechnical Engineer of Record for VTTM 61105, we are providing this addendum report (in conjunction with the report by Leighton and Associates dated March 11, 2008) in support of the proposed offsite grading for SCE Substation Alternative 1.

GEOLOGIC AND GEOTECHNICAL REPORT - ADDENDUM NO. 3

In order to facilitate the review process, we have listed the County's remarks in **bold** in the order in which they appear on the original review letter. Each remark is followed immediately by our response. Copies of the review letters are attached after the references.

GEOLOGIC REVIEW SHEET (Dated January 16, 2008)

Remark No. 1

According to the Leighton report dated 11/26/07, the natural swales north of Substation Alternative 1 may have the potential for debris flow hazards. Provide mitigation recommendations as necessary. If grading is required to mitigate a potential hazard, then the required grading must be depicted on the Tentative Map. If catchment areas are required, the volume of debris required for containment must be determined, and the containment area must be shown on the Tentative Map.

Response

Please refer to Leighton's report dated March 11, 2008, which addresses debris flow hazards in the natural swales north of Substation Alternative 1.

Remark No. 2

The Soils Engineering review dated 1/17/08 is attached.

Response

Acknowledged.

SOILS ENGINEERING REVIEW SHEET (Dated January 17, 2008)

Remark No. 1

Page 12 of the Leighton & Associates soils report dated 11/26/2007 states that the natural swales north of Substation Alternative 1 may have the potential for debris flow hazards. Therefore, provide surficial slope stability analyses for the natural swales north of Substation Alternative 1. Recommend mitigation if factors of safety are below County minimum standards.

Response

Please refer to Leighton's report dated March 11, 2008 for analyses of stability of slopes in natural swales located north of Substation Alternative 1 and for structural setback required to mitigate surficial stability of slopes with safety factor values below County of Los Angeles minimum standards.

Remark No. 2

Show all recommended mitigation measures on the geotechnical map, as necessary.

Response

The revised Preliminary Geotechnical Map - Plate 1 provided in the Leighton and Associates report dated March 11, 2008 shows a structural setback for mitigation of debris flow hazard for the site of Substation Alternative 1.

Remark No. 3

Requirements of the Geology Section are attached.

Response

Acknowledged.

Remark No. 4

Include a copy of this review sheet with your response.

Response

A copy of each of the Soils Engineering Review Sheet and a copy of the Geologic Review Sheet are attached to this report.

1.0 CONCLUSIONS

We have reviewed the referenced report by Leighton and Associates, dated March 11, 2008, and accept that the findings, conclusions, and recommendations presented therein are acceptable for the proposed use. Additional studies should be performed at the Grading Plan stage to refine the remedial measures for the proposed offsite grading for Substation Alternatives 1 and 2 at a scale of 1"=40'.

2.0 LIMITATIONS

This report has been prepared by Allan E. Seward Engineering Geology, Inc. for the exclusive use of The Newhall Land and Farming Company and its design consultants for the specific site discussed herein. This report should not be considered transferable. Prior to use by others, this firm must be notified, as additional work may be required to update this report.

In the event that any modification in the location or design of the proposed development is planned, the conclusions and recommendations contained in this report will require a written review by this firm with respect to the planned modifications.

The proposed development is located in southern California, a geologically and tectonically active region, where large magnitude, potentially destructive earthquakes are common. Therefore, ground motions from moderate or large magnitude earthquakes could affect the project site during the design life of the proposed structure(s).

Typically, faulting is confined to the area adjacent to a known fault. However, absolute assurance against future fault displacement is not possible in tectonically active regions because new faults can form over time as the orientation and magnitude of deformational forces change in the earth's crust. Therefore, the location and magnitude of new ground surface ruptures during a seismic event cannot be anticipated.

In performing these professional services, this firm has used the degree of care and skill ordinarily exercised under similar circumstances by reputable geologists and geotechnical engineers practicing in this or similar localities. The data presented in this report are based on results of pertinent field and laboratory testing. It should be recognized that subsurface conditions can vary in time, and laterally, and with depth at a given site. Since the conclusions and recommendations presented in this report are based on our observations and

testing, our **conclusions** and **recommendations** are **professional opinions** and are **not meant** to be a control of nature. Therefore, we make no other **warranty** either **expressed** or **implied**.

This report may not be duplicated without the written consent of this firm.

This opportunity to be of service is appreciated. Please contact us if you would like to discuss this report further.

Respectfully submitted,

Stuart Mayes, CEG 2169
Senior Associate Geologist

REGISTERED GEOLOGIST
STUART K. MAYES
No. 2169
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

Martin J. Goodman, GE 2146
Principal Geotechnical Engineer

REGISTERED PROFESSIONAL ENGINEER
MARTIN J. GOODMAN
No. 2146
03-31-09
EXPIRES
GEOTECHNICAL
STATE OF CALIFORNIA

The following attachments and appendices complete this report.

References
Geologic Review Sheet dated 1/16/08
Soils Engineering Review Sheet dated 1/16/08

Distribution: (1) The Newhall Land and Farming Company
Attn: Mr. Corey Harpole
(3) Psomas
Attn: Mr. Matt Heideman
Attn: Los Angeles County Department of Public Works Geotechnical and Materials Engineering
1 - Soils
1 - Geology
(1) Impact Sciences
Attn: Ms. Susan Tebo
(1) Leighton and Associates, Inc.
Attn: Mr. Jose Sanchez

REFERENCES

Reports by Allan E. Seward Engineering Geology, Inc.

1. **Geologic and Geotechnical Report**
Review of Vesting Tentative Tract Map (Dated June 14, 2004)
Vesting Tentative Tract 61105
Mesas East
Newhall Ranch, California
Dated July 22, 2004 - JN: 04-2023-4

2. **Geologic and Geotechnical Report – Addendum No. 1**
Response to Los Angeles County Geologic Review Sheet Dated October 21, 2004 and Soils Engineering Review Sheet Dated October 26, 2004
Geologic and Geotechnical Report
Review of Revised Vesting Tentative Tract Map (November 15, 2004)
Vesting Tentative Tract 61105
Mission Village
Newhall Ranch, California
Dated December 22, 2004 - JN: 04-2023-4

3. **Geologic and Geotechnical Report – Addendum No. 2**
Response to Los Angeles County Geologic Review Sheet dated January 26, 2005 and Soils Engineering Review Sheet dated February 22, 2005
Geologic and Geotechnical Report
Review of Revised Vesting Tentative Tract Map (Dated 6/1/05)
Vesting Tentative Tract 61105
Mission Village
Newhall Ranch, California
Dated June 13, 2005 – JN: 05-2023-4

4. **Geologic and Geotechnical Report – Addendum No. 3**
Response to Los Angeles County Geologic Review Sheet dated September 17, 2007 and Soils Engineering Review Sheet dated September 19, 2007
Vesting Tentative Tract 61105 (dated 8/9/07)
Mission Village
Newhall Ranch, California
Dated December 4, 2007 – JN: 07-2023-4 (19)

Report by Leighton and Associates, Inc.

5. "Geotechnical Report, Off-site Grading for Proposed Southern California Edison Substation Alternatives, Responses to the County of Los Angeles Department of Public Works Geologic and Soils Engineering Review Sheets dated September 17 and September 19, 2007 for Tentative Tract Map No. 61105 (Mission village Project), County of Los Angeles, California"
Dated November 26, 2007 – Project No. 062273-001

6. "Responses to County of Los Angeles Department of Public Works Geologic an Soils Engineering for Leighton's Geotechnical Report Dated November 26, 2007 Off-Site Grading for Proposed Southern California Edison Substation Alternatives. Tentative Tract Map No. 61105 (Mission village Project), County of Los Angeles, California"
Dated March 11, 2008 – Project No. 062273-001

County of Los Angeles Department of Public Works
GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION
GEOLOGIC REVIEW SHEET
900 So. Fremont Ave., Alhambra, CA 91803
TEL. (626) 458-4925

DISTRIBUTION
1 Geologist
__ Soils Engineer
1 GMED File
1 Subdivision

TENTATIVE TRACT MAP 61105
SUBDIVIDER Newhall Land
ENGINEER Psomas
GEOLOGIST & SOILS ENGINEER A.E. Seward Eng. Geol., Inc.

TENTATIVE MAP DATED 10/16/07 (Revised)
LOCATION Castaic Junction
GRADING BY SUBDIVIDER [Y] (Y or N)
REPORT DATE 12/4/07, 6/13/05, 12/22/04, 7/22/04, 7/20/04

Other report(s) reviewed: 11/26/07 (Leighton & Associates, Inc.)

The Regional Planning Commission, developer, and engineer are advised that:

PRIOR TO RECOMMENDING APPROVAL OF THE TENTATIVE TRACT OR PARCEL MAP:

According to the Leighton report dated 11/26/07, the natural swales north of Substation Alternative 1 may have the potential for debris flow hazards. Provide mitigation recommendations as necessary. If grading is required to mitigate a potential hazard, then the required grading must be depicted on the Tentative Map. If catchment areas are required, the volume of debris required for containment must be determined, and the containment area must be shown on the Tentative Map.

2. The Soils Engineering review dated 1/17/08 is attached.

Prepared by _____ Reviewed by _____ Date 1/16/08
Geir Mathisen

Please complete a Customer Service Survey at http://dpw.lacounty.gov/go/gmedsurvey
:\gmepub\Geology_Review\Geir\Review Sheets\District 8.2 (Santa Clarita)\Tracts\61105, TM11 NA.doc

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION

SOILS ENGINEERING REVIEW SHEET

Address: 900 S. Fremont Ave., Alhambra, CA 91803
Telephone: (626) 458-4925
Fax: (626) 458-4913

District Office 8.2
PCA GMPH
Sheet 1 of 1

DISTRIBUTION:
___ Drainage
___ Grading
___ Geo/Soils Central File
___ District Engineer
___ Geologist
___ Soils Engineer
___ Engineer/Architect

Tentative Tract Map	61105
Location	Castaic Junction
Developer/Owner	Newhall Land & Farming Co.
Engineer/Architect	Psomas
Soils Engineer	Allan E. Seward Engineering Geology, Inc. (04-2023-4)
Geologist	Allan E. Seward Engineering Geology, Inc.

Review of:

Tentative Map and Exhibit Dated by Regional Planning 10/16/07 (rev.)
Soils Engineering and Geologic Report Dated 7/22/04
Soils Engineering and Geologic Addenda Dated **12/4/07**, 6/13/05, 12/22/04
Additional Soils Engineering and Geologic Report by Leighton & Associates, Inc. Dated **11/26/07**
Previous Review Sheet Dated 11/15/07

ACTION:

Tentative Map feasibility is not recommended for approval.

REMARKS:

1. Page 12 of the Leighton & Associates soils report dated 11/26/07 states that the natural swales north of Substation Alternative 1 may have the potential for debris flow hazards. Therefore, provide surficial slope stability analyses for the natural swales north of Substation Alternative 1. Recommend mitigation if factors of safety are below County minimum standards.

2. Show all recommended mitigation measures on the geotechnical map, as necessary.

3. Requirements of the Geology Section are attached.

4. Include a copy of this review sheet with your response.

NOTE(S) TO THE PLAN CHECKER/BUILDING AND SAFETY ENGINEER:
A. ONSITE SOILS ARE CORROSIVE TO FERROUS MATERIALS.
B. PER THE SOILS ENGINEER, ON-SITE SOILS HAVE A LOW TO VERY HIGH EXPANSION POTENTIAL.
C. PER THE SOILS ENGINEER, DEWATERING SHALL BE PERFORMED FOR REMOVALS IN THE VICINITY OF BORINGS B-72E AND B-73E.
D. THE SOILS REPORT BY LEIGHTON & ASSOCIATES DATED 11/26/07 INDICATES THERE MAY BE ENVIRONMENTAL CONCERNS REGARDING THE ABANDONED OIL WELLS LOCATED WITHIN THE LIMITS AND NEAR THE PROPOSED SUBSTATION ALTERNATIVE 2 AND FILL DISPOSAL SITE.

REGISTERED PROFESSIONAL ENGINEER
JEREMY WAN
NO. C67563
EXP. 6/30/09
CIVIL
STATE OF CALIFORNIA

Prepared by Jeremy Wan Date 1/17/08

Please complete a Customer Service Survey at http://dpw.lacounty.gov/gd/gmedsurvey.
NOTICE: Public safety, relative to geotechnical subsurface exploration, shall be provided in accordance with current codes for excavations, inclusive of the Los Angeles County Code, Chapter 11.48, and the State of California, Title 8, Construction Safety Orders.
P:\gmepub\Soils Review\Jeremy\TR 61105, Castaic Junction, TTM-NA_11.doc

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

GEOLOGIC AND GEOTECHNICAL REPORT
Review of Revised Vesting Tentative Tract Map 53108
(Dated 12/21/09)
Landmark Village
Newhall Ranch, Los Angeles County, California

VOLUME I

Prepared for:

The Newhall Land and Farming Company
23823 West Valencia Boulevard
Valencia, California 91355

Job No: 09-1702R-4
Dated December 21, 2009

27825 Smyth Drive, Valencia, California 91355 661-294-0065 FAX 661-294-0833

TABLE OF CONTENTS

1.0 INTRODUCTION 1
2.0 SCOPE OF WORK 2
3.0 SITE DESCRIPTION 3
4.0 PROPOSED DEVELOPMENT 4
5.0 GEOLOGY 5
6.0 SEISMIC CONSIDERATIONS 5
6.1 California Building Code Response Spectrum 5
6.2 Liquefaction 6
7.0 GENERAL CONCLUSIONS AND RECOMMENDATIONS 6
7.1 Feasibility of Development 6
7.2 Earthworks Recommendations 7
7.2.1 Removals 7
7.2.2 Fill Compaction for Roadways 7
7.2.3 Proposed Fill Slopes 7
7.2.4 Proposed Cut Slopes 8
7.3 Retaining Walls 8
7.4 Buried Bank Stabilization 9
8.0 OFF-SITE GRADING 9
8.1 Onion Field Levee 9
8.2 Zone 1A Water Tank at PM 18108 10
8.3 Utility Corridor to WRP Site 10
8.4 Interchange at Highway 126 and Chiquito Canyon Road/Long Canyon Road 10
8.4.1 Introduction 10
8.4.2 Cut Slopes 11
8.4.3 Disposal Fills 13
8.5 Adobe Canyon Borrow Site and Water Tank Site 15
9.0 LOS ANGELES COUNTY 111 STATEMENT 15
10.0 GEOLOGIST/GEOTECHNICAL ENGINEER OF RECORD 16
11.0 LIMITATIONS 16

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

December 21, 2009 Job No: 09-1702R-4

The Newhall Land and Farming Company
23823 West Valencia Boulevard
Valencia, California 91355

Attention: Mr. Fred MacMurdo

Subject: **GEOLOGIC AND GEOTECHNICAL REPORT**
Review of Revised Vesting Tentative Tract Map 53108 (Dated 12/21/09)

Project: Landmark Village
Newhall Ranch
Los Angeles County, California

References: See end of text

Dear Mr. MacMurdo:

This report presents our opinions regarding the existing geologic and geotechnical conditions at the above-referenced site and their effects on the proposed development.

1.0 INTRODUCTION

The following report has been prepared at the request of The Newhall Land and Farming Company (Newhall Land) to address the revised tentative map design for Landmark Village. This firm previously prepared a Geologic and Geotechnical report dated September 27, 2000 and a subsequent addendum report dated February 10, 2001 addressing the tentative map dated June 11, 2000. This tentative map was subsequently approved from a geologic and geotechnical standpoint in review sheets dated March 1, 2001 and March 19, 2001, respectively. The revised tentative map design addressed herein was prepared by Psomas and consists of 13 sheets, dated December 21, 2009. The revised plans now include off-site grading for a borrow site and associated water tank site at Adobe Canyon to the south, a levee at Onion Field to the south, interim grading for the construction of an interchange at the intersection of Highway 126 and Chiquito Canyon Road/Long Canyon Road and associated widening of Highway 126, a utility corridor to the proposed Newhall Ranch Water Reclamation Plant (WRP) site to the west, and construction of a water tank site on PM 18108

to the northeast. All of this adjacent (off-site) property is currently owned by Newhall Land. The geologic and geotechnical conditions at the proposed borrow site, levee, and proposed improvements north of Highway 126 at Chiquito Canyon Road were previously described in our report for The Homestead project, VTT 060678 (see referenced report dated 9/30/05). The proposed Utility Corridor was addressed from a geotechnical standpoint in our referenced report (dated 5/25/07). The conclusions and recommendations presented in our previous referenced reports remain applicable, except where superceded in this report.

2.0 SCOPE OF WORK

The scope of work performed for this study included the following tasks:

1. Coordination with Newhall Land and the project supervising Civil Engineer, Psomas.

2. Review of the tentative map plans dated 12/21/09 prepared by Psomas, which utilizes updated topography prepared by Hunsaker and Associates, flown on 5/24/06 and compiled on 11/15/06.

3. Review of our previous reports for Landmark Village, the subject portions of the adjacent Homestead development (VTTM 060678), the proposed Utility Corridor, and the proposed Newhall Ranch WRP site.

4. Review of updated liquefaction analyses and incorporation of the results into our conclusions and recommendations for the site.

5. Revision of our geologic cross sections to reflect the revised, proposed grades and updated topography.

6. Updating of previous slope stability analyses at critical cross sections, based on the revised grades and topography.

7. Geologic and geotechnical review of the off-site grading proposed north of Highway 126, east of Chiquito Canyon Road, and of previous mapping and analyses for the Homestead project in this area. Preparation of pertinent cross sections, geologic and geotechnical analyses, completion of appropriate stability analyses, and development of conclusions and recommendations for the proposed grading.

8. Geologic and Geotechnical review of grading proposed for the off-site borrow area and for the associated tank site at Adobe Canyon, located south of the Santa Clara River, and of previous mapping and analyses for the Homestead project in this area. Preparation of pertinent cross sections, geologic and geotechnical analyses, completion of appropriate stability analyses, and development of conclusions and recommendations for the proposed grading.

9. Geologic and geotechnical review of the temporary levee proposed south of the Santa Clara River at the Onion Field portion of The Homestead project, based on data from our referenced report.

10. Geologic and geotechnical review of the proposed grading for the Utility Corridor design and incorporation of data and conclusions presented in our referenced report.

11. Review of the water tank site proposed at Parcel Map 18108 and a report prepared by R.T. Frankian & Associates dated 3/28/08, addressing the geologic and geotechnical conditions at the site.

12. Preparation of updated geologic/geotechnical maps for the site utilizing the revised tentative map as a base.

13. Preparation of the text of this report, which summarizes the results of our analyses and updated conclusions and recommendations for the development of the site.

14. Preparation of this report and associated figures, logs, and tables in hard copy and digital (Pdf) format.

3.0 SITE DESCRIPTION

Vesting Tentative Tract 53108, also known as Landmark Village, is a portion of the Newhall Ranch Development located in northwestern Los Angeles County. This 292.6 acre site is located south of Highway 126, north of the Santa Clara River, west of Castaic Creek and east of the Chiquito Canyon drainage. The limits of development adjacent to the Santa Clara River and Castaic Creek channels have been modified from the 6/11/00 design to provide a wider buffer between areas proposed for development and the river habitat. The site is generally flat except for existing banks between younger and older alluvium, and ascending fill slopes and local bedrock outcrops along the south side of Highway 126. The site ranges

in elevation from approximately 900 feet along the Santa Clara River on the southwestern portion of the site to a high point of 1005 ft on a knob along Highway 126 (see Tentative Map for details of the site topography). Much of the site is currently used for agricultural purposes. Portions of the northern margin of the site have been disturbed by construction associated with Highway 126, the abandoned Southern Pacific railroad line, and various pipelines. Debris, including concrete and asphalt concrete blocks, has been placed on several portions of the site. There are five abandoned oil wells and at least 13 water wells on or immediately adjacent to the site. The revised tentative map plans also include off-site grading on the Adobe Canyon, Onion Field, and Chiquito Canyon portions of the adjacent Homestead Project (VTT 060678), along the south side of Highway 126 westward to the proposed WRP site, and to the north at PM 18108 (see attached plans for details).

4.0 PROPOSED DEVELOPMENT

Vesting Tentative Tract 53108 is proposed as a residential and commercial development consisting of 422 lots that are to provide 1444 dwelling units (see Sheets 3 and 4). In addition to residential and commercial buildings, a school, a fire station, park site, open space and recreational areas, and a fire station are proposed. A lot summary of the proposed development is provided on Sheet 1 of the Tentative Map. A buried, soil-cement liner is proposed to provide bank protection along the edges of the channels of the Santa Clara River, Castaic Creek, and Chiquito Canyon drainage. A variable gradient (not steeper than 3:1) fill slope is proposed in front of the channel liner. Access to the site will be provided along Highway 126 at Wolcott Road and at Chiquito Canyon/Long Canyon Road. Final grade will be raised from 1 to 18 ft over much of the site, requiring the import of approximately 5.92 million yd^3 of fill. The tallest proposed cut and fill slopes on Landmark Village are located along the south side of Highway 126. Retaining walls up to 12 ft in height are now incorporated into the slope design, as shown on the Tentative Map. All of the proposed cut and fill slopes are less than 28 ft in height.

Additional grading has now been incorporated into the tentative map design for VTT 53108 at several off-site locations. The off-site improvements include grading to construct an interchange between Highway 126 and Chiquito Canyon Road/Long Canyon Road and associated widening of Highway 126 for an off ramp (see Sheets 3 and 11). Grading for a borrow site and associated water tank site at the Adobe Canyon portion of the Homestead project (VTT 060678) located south of the Santa Clara River, is shown on Sheet 11. A temporary levee with a soil cement liner is proposed along the south side of the Santa Clara River at the Onion Field portion of the Homestead project (See Sheet 5). A Utility Corridor

is proposed extending along the south side of Highway 126 from the west end of Landmark Village westward to the proposed WRP site (see Sheets 9 and 10). Off-site debris basins associated with the WRP site are also shown on Sheet 9. A Zone 1A water tank site is proposed on the adjacent PM 18108, as shown on Sheet 6. Geologic and geotechnical conditions at Chiquito Canyon Road, Adobe Canyon, and Onion Fields are presented in the referenced report by AESEGI for the Homestead project. The interim conditions proposed on the Landmark Village tentative map for these off-site areas are addressed herein utilizing data from our 9/30/05 Homestead report (see References). The anticipated geologic conditions for the proposed Utility Corridor are described in our referenced report (dated 5/25/07) and the proposed off-site debris basins associated with the WRP site are addressed in our referenced reports (dated 6/19/06, 9/8/06, and 1/25/08). The Zone 1A Tank site at PM 18108 has been addressed by the project geotechnical consultant for PM 18108. A copy of their report is included as **Appendix D** of this report.

5.0 GEOLOGY

The subject site is in the eastern Ventura Basin of southern California. The Ventura Basin is a westerly plunging depositional basin produced by tectonic downwarping initiated during the early Miocene and its axis approximately coincides with the Santa Clara River. All of the geologic formations exposed on the subject site were deposited within the Ventura Basin. Most of the subject site is covered by alluvium and older alluvium. Bedrock of the Pico Formation and Saugus Formation locally crops out on the site along the south side of Highway 126. The bedrock exposed at the site has been warped into an east-plunging anticinal fold. Details of the geologic units and structural at the site are provided in the referenced reports for VTT 53108 and in the referenced reports for the associated off-site areas.

6.0 SEISMIC CONSIDERATIONS

6.1 California Building Code Response Spectrum

The following parameters should be used for calculation of the California Building Code (CBC) response spectrum:

- Site Class = D [CBC, Table 1613A.5.2]
- S_s = 2.242g
- S_1 = 0.685g
- F_a = 1.0 [CBC, Table 1613.5.3 (1)]
- F_v = 1.5 [CBC, Table 1613.5.3 (2)]

The values for S_s and S_1 listed above were obtained using the Seismic Hazard Curves and Uniform Hazard Response Spectra computer program developed by the United States Geologic Survey (USGS).

6.2 Liquefaction

The potential for liquefaction at the Landmark Village site and for associated post-earthquake liquefaction-induced settlement was originally assessed for 8 of the 64 CPT soundings presented in our referenced report dated 9/27/00. We subsequently analyzed the potential for liquefaction in 21 CPT soundings utilizing current procedures set forth by the California Geological Survey and in the 2007 California Building Code. Details of our liquefaction analyses are presented in **Appendix C**.

Our analyses indicate that potential liquefaction-induced settlement will be less than one inch at 11 of the 21 CPT sounding locations that we analyzed and that potential liquefaction-induced settlement between about one and two inches could occur in the vicinity of CPT soundings 5, 13, 19, 96, 105, 106, 108, 109, 111, and 115. We have made minor revisions to the recommended alluvial removal depths shown on the attached Geotechnical Map in order to mitigate potential liquefaction-induced settlements in the vicinity of these CPT soundings.

7.0 GENERAL CONCLUSIONS AND RECOMMENDATIONS

7.1 Feasibility of Development

Vesting Tentative Tract 53108 is feasible for development from a geologic/geotechnical standpoint, provided that the recommendations presented in our prior reports and in this report are incorporated into the Tentative Map design and implemented during construction. The earthworks recommendations provided in our previous reports remain applicable, except where superceded in this report.

7.2 Earthworks Recommendations

7.2.1 Removals

Removal depth recommendations are provided on the attached Geologic/Geotechnical Map for VTT 53108 based on our previous review of the site alluvial conditions and on our updated liquefaction analyses. Ground water may be encountered during grading removals, as discussed in our previous reports. The grading contractor should be prepared to implement dewatering measures as necessary, to achieve the recommended removals. Anticipated removal depths for off-site grading are based on previous, site-specific investigations, as described herein.

7.2.2 Fill Compaction for Roadways

Roads with gradients as shallow as 0.5% are proposed at the site. As discussed in our referenced Geotechnical Letter Report (dated 8/27/07), fill depths and underlying dense alluvial deposits are expected to be relatively uniform across the site and the fill materials are anticipated to be dominantly granular in nature. Therefore, potential differential settlement is expected to have a negligible impact on the constructed gradients of the proposed roadway alignments, provided that our recommendations for removal of unsuitable soils and fill placement are followed during the grading operations. In order to further limit potential affects of fill settlement on the roadway gradients, the top 2 ft of fill materials below the road base should be compacted to at least 95% of Maximum Dry Density (per ASTM D1557).

7.2.3 Proposed Fill Slopes

Review of the revised Tentative Map indicates that no fill slopes greater than 28 ft in height are proposed on Landmark Village. All fill slopes are proposed at a gradient of 2:1 (h:v) or shallower. Based on the shear strengths of site materials and of anticipated import materials, gross stability of these fill slopes is expected to be satisfactory. However, granular alluvial soils at the site have a low cohesion and are not expected to provide satisfactory surficial stability. Therefore, the fill material within one equipment width (12 ft minimum) of the slope face should be constructed with cohesive material obtained by selective grading of on-site or imported cohesive materials.

7.2.4 Proposed Cut Slopes

Review of the revised Tentative Map design for VTT 53108 indicates that no cut slopes greater than 28 ft in height are proposed.

A 27 ft high cut slope is proposed along Highway 126 on the western portion of the site. Based on conditions observed in Bucket-Auger Boring BA-1R, a daylighted bedding component will be exposed in the Pico Formation bedrock, as shown on Cross Sections 1-1' and 2-2' (see Sheet 3). Slope stability analyses of Cross Sections 1-1' and 2-2' are presented in **Appendix B**. Results of these analyses indicate a factor of safety under static loading conditions greater than 1.5 for Cross Section 1-1'. However, owing to fill-over-cut conditions that would exist over most of this slope, a 15 ft wide stability fill with a 3 ft deep keyway is recommended. Slope stability results for Cross Section 2-2' indicate a factor of safety less than 1.5 under static loading conditions for this slope. Therefore, a 15 ft wide buttress with a 3 ft deep keyway is recommended for this slope.

Daylighted bedding conditions and older alluvium are also anticipated to be exposed in a small, 28 ft high composite cut slope located farther to the east, based on conditions observed in Boring BA-2R. Slope stability analysis of Cross Section 3-3' also indicates a factor of safety less than 1.5 under static loading conditions. In order to satisfy minimum safety factor requirements and to prevent potential surficial instability from fill-over-cut and older alluvium-over-bedrock conditions, a 15 ft wide buttress with a 3 ft deep keyway is recommended for this slope.

Minor cut slopes are proposed elsewhere on the site that will expose alluvium or artificial fill. These materials should be removed and replaced with a compacted stability fill. Therefore, no cut slopes will remain on the site following completion of grading. Selective grading and stockpiling of cohesive soils for subsequent placement in stability fills and buttress fills is recommended, as discussed in the Proposed Fill Slope section above.

7.3 Retaining Walls

Retaining walls up to 12 ft in height are now proposed along much of the proposed slope descending from Highway 126. Specific parameters for the design of these retaining walls will be provided at the grading plan stage. Gross slope stability of slopes behind and in

front of the proposed retaining walls has been evaluated. The results of these analyses are provided in **Appendix B**.

7.4 Buried Bank Stabilization

A buried soil cement liner is proposed along the southern, eastern, and western boundaries of the project in order to protect the development from erosion and damage resulting from potential storm flow events along the Santa Clara River, Castaic Creek, and Chiquito Canyon drainages respectively. The bank protection alignment and design has been modified from the Tentative Map layout addressed in our referenced 9/27/00 report. A Geotechnical report will be provided under separate cover addressing the proposed soil-cement design.

8.0 OFF-SITE GRADING

The recommendations provided below for specific off-site locations supplement the general recommendations provided in the preceding section of this report.

8.1 Onion Field Levee

A levee with buried bank stabilization is proposed along the south bank of the Santa Clara River (see Sheet 5) to protect the Onion Field area from erosion damage during storm flows. The levee is underlain by granular alluvium and older alluvium. This area was addressed from a geotechnical standpoint in our report for VTT 060678 (dated 9/30/05). Pertinent subsurface exploration locations and recommended removal depths in the vicinity of the proposed levee are shown on Sheet 5 of the attached Geologic/Geotechnical Map. Ground water may be encountered within the removal excavation for the levee. The grading contractor should be prepared to implement dewatering measures, if necessary. Removals should extend a horizontal distance equal to the removal depth behind the toe of the 5:1 (h:v) levee back slope in order to provide lateral support for the fill and to avoid the need to undercut the 5:1 fill slope during future removals for the adjacent Onion Field area. None of the recommended removals are anticipated to be deeper than the excavation for the buried liner. A detailed geotechnical report addressing the buried bank protection will be provided under separate cover.

8.2 Zone 1A Water Tank at PM 18108

A Zone 1A Water Tank is proposed at elevation 1172.0 above Franklin Parkway on PM 18108 as part of the Tentative Map for Landmark Village (see Sheet 6). A Geotechnical Report addressing the tank site was completed by the Project Geotechnical Engineer for PM 18108, R.T. Frankian and Associates dated 3/28/08. A copy of their report is attached in **Appendix D**. We have reviewed this report and accept that the findings, conclusions and recommendations presented therein are acceptable for the proposed use.

8.3 Utility Corridor to WRP Site

Sheets 9 and 10 illustrate a proposed Utility Corridor alignment extending along the south side of Highway 126 from the west end of Landmark Village to the proposed Newhall Ranch Water Reclamation Plant (WRP) site, west of San Martinez Grande Canyon. This segment of the proposed Utility Corridor was evaluated in our referenced report dated 5/25/07. Soil-cement and turf reinforcement mat are proposed along portions of the Utility Corridor to protect the utility lines from damage during storm flows along the Santa Clara River. A geotechnical evaluation of the proposed bank protection will be provided under separate cover. Proposed mass grading for the WRP Site and for the desilting basins located to the north of Highway 126 were addressed in our referenced reports for the WRP site and the associated storm drains (dated 6/19/06, 9/8/06, and 1/25/08).

8.4 Interchange at Highway 126 and Chiquito Canyon Road/Long Canyon Road

8.4.1 Introduction

Sheet 11 of the attached Tentative Map illustrates proposed grading to allow for construction of an interchange where Highway 126 crosses the ultimate alignment of Chiquito Canyon Road/Long Canyon Road. The proposed design includes widening of Highway 126 to the north to allow for construction of on ramps and off ramps. The proposed grading includes construction of south-facing cut slopes and fill slopes and small north-facing cut slopes adjacent to Highway 126, placement of disposal fill in adjacent tributary canyons and on the east side of Chiquito Canyon, and construction of necessary debris basins. Landslide Qls-XVIII(B) will be completely removed by the proposed grading.

8.4.2 Cut Slopes

Cut slopes are proposed along the north side of Highway 126 at gradients ranging from 2:1 to 3.5:1 (h:v). The large, south-facing cut slopes are designated as CS-1 through CS-4 on the attached Geotechnical Map for ease of reference. Bedding structure dips in the direction of these south-facing slopes, producing potentially adverse conditions. Four geologic cross sections (4-4' through 7-7') were therefore constructed to illustrate the subsurface bedrock geometry at critical locations for analysis. Data from two new borings (designated as B-1 and B-2) were used to help define the stratigraphy and structure of the bedrock and ground water conditions in this area. The location of the interfingering contact between the Saugus and Pico Formations was revised based on these borings.

Cut-slope CS-1: A small (30 ft high maximum), south-facing cut slope is proposed west of Chiquito Canyon Road and north of the proposed on ramp. This slope is anticipated to expose daylighted bedding conditions within the Pico Formation. Owing to the small size of the slope, a stability/buttress fill with a 15 ft wide, 3 ft deep keyway is considered adequate to provide global and surficial stability. Cut-slope CS-1 bends northward along Chiquito Canyon Road. This portion of the slope will expose neutral bedding conditions and is expected to be grossly stable.

Cut-slope CS-2: A large (175 ft high), south-facing cut slope is proposed east of Chiquito Canyon Road and north of the proposed off ramp. The lower 20 to 25 ft of this slope is proposed at a 2:1 (h:v) gradient, in general conformance with future proposed grades for VTT 060678 (in-progress). The upper portion of the slope is above future proposed grades for VTT 060678 and is designed at a gradient of 3.5:1 (h:v). Cross section 4-4' was constructed to illustrate the subsurface geologic conditions and to use for evaluating the stability of this slope. The cut slope is in close proximity to the interfingering contact between the Pico and Saugus Formations. The more conservative cross bedding strength (from the Pico Formation) and the more conservative bedding plane strength (from the Saugus Formation) were used in our stability analyses.

Analysis of cross section 4-4' indicates that cut-slope CS-2 meets minimum Los Angeles County factor of safety requirements (see **Appendix B**). However, a buttress was previously recommended for the lower portion of this slope relative to design grades for VTT 060678 and potential subsurface water conditions that were analyzed in our referenced report, dated 9/30/05. The design and need for this buttress should be

confirmed relative to the final Tentative Map design for VTT 060678. A stability fill with a 5 ft deep by 25 ft wide keyway may be needed on the lower 2:1 (h:v) portion of the slope as a precaution relative to the daylighted bedding conditions and because of potential exposure of weak interbeds along the Pico/Saugus Formation contact. Portions of Landslides Qls-XVI(B) and Qls-XVII(B) will be exposed on the eastern portion of CS-2. It is recommended that this slope be expanded to the east to allow for removal and replacement of the landslide material. Landslide Qls-XVI(B) is up slope of the proposed debris basin and should be removed to eliminate potential impacts to this basin.

Cut-slope CS-3: A 125 ft high cut slope is proposed east of CS-2. The lower two-thirds of this slope is proposed at a 2:1 (h:v) gradient in general conformance with future proposed grades for VTT 060678. The upper third of the slope is above future proposed grade for VTT 060678 and is designed at a 3.5:1 (h:v) gradient. This slope is expected to dominantly expose bedrock of the Saugus Formation. However, the Pico Formation may locally be exposed owing to the interfingering nature of the Pico/Saugus contact. The more conservative of the two formational strengths for bedding plane and cross bedding conditions were therefore used in our stability analyses. The geometry of the proposed slope relative to existing topographic and geologic conditions is illustrated on cross section 7-7', which was modified from cross section 9B-9B' from our referenced report for VTT 060678. Based on our analyses, the slope does not meet the minimum required factor of safety for stability (see **Appendix B**). A buttress with a keyway 7 ft deep and 75 ft wide will increase the factor of safety above Los Angeles County's minimum requirements. This recommended buttress design is shown on geologic cross section 7-7' (**Plate I**) and on the attached Geologic/Geotechnical Map for Sheet 11 (see **Appendix E**). A buttress was also recommended for the lower portion of this slope during our investigation for VTT 060678 (see referenced report dated 9/30/05). The design of this buttress should be confirmed relative to the final Tentative Map design for VTT 060678.

Cut-slope CS-4: A 215-ft high, composite cut and fill slope is proposed east of CS-3 on the north side of Highway 126. The cut slope areas are dissected by three narrow canyons. Placement of fill will be required in these canyons to achieve the proposed slope grades. This slope is proposed at a 2.5:1 (h:v) gradient. Cross section 5-5' and 6-6' were constructed to illustrate critical bedrock conditions relative to the proposed slope. This cut slope is expected to expose bedrock of the Saugus Formation. Analysis of cross section 5-5' indicates that the western portion of the slope does not meet the Los

Angeles County minimum factor of safety requirement for pseudo-static conditions (see **Appendix B**). A buttress with a 7 ft deep and 75 ft wide keyway will increase the factor of safety of the subject portion of CS-4 above the Los Angeles County minimum requirements. This buttress design is illustrated on geologic cross section 5-5' (see **Plate I**) and on the attached Geologic/Geotechnical Map for Sheet 11 (See **Appendix E**). Analysis of cross section 6-6' indicates that the eastern portion of the slope will have factors of safety in excess of Los Angeles County minimum requirements. However, owing to the sliver cuts and fills proposed at this slope and potentially adverse bedding conditions, a stability fill with a 55 ft wide and 5 ft deep keyway is recommended for the eastern portion of the slope.

The small, north-facing cut slopes between Highway 126 and the proposed off ramps are expected to expose antidip bedding and are anticipated to be grossly stable.

8.4.3 Disposal Fills

Disposal fill areas are proposed at four locations north of Highway 126, designated as DF-1 through DF-4 for reference (see Sheet 11 for locations). Canyon subdrains will be required for these disposal fills. The design of these drains should be addressed at the Grading Plan stage.

Disposal fill DF-1: This disposal fill is located in the small tributary canyon between cut-slopes CS-3 and CS-4 and includes construction of a fill slope connecting the two cut slopes. Much of this canyon is underlain by artificial fill associated with a pad for the Exxon Mobil Corp Castaic Junction Gas Unit #1' well. The portions of the artificial fill and any loose soil or slopewash underlying the proposed fill slope should be removed prior to placement of compacted fill. The artificial fill and any underlying soils and slopewash behind the slope should also be removed to allow placement of structural fill for future use as part of VTT 060678. Alternatively, if the artificial fill is not removed (for the intended use as a disposal fill only), the area of nonstructural fill should be designated with a Geotechnical Note to address potential future settlement. Any remaining artificial fill should be removed and recompacted prior to future development for VTT 060678. The well should be tested in the field during grading to check for leaks and abandoned in compliance with the requirements of the California Division of Oil and Gas.

Disposal fill DF-2: This disposal fill is proposed in the tributary canyon located between cut-slopes CS-2 and CS-3, and includes construction of a fill slope connecting the two cut slopes. This disposal fill overlies portions of Landslides Qls-XIII(B), Qls-XIV(B) and Qls-XVI(B). Analyses of cross sections 8-8' and 9-9' (modified from cross sections 7B-7B' and 10B-10B' for VTT 060678) indicate that these landslides do not meet the minimum Los Angeles County factor of safety requirements with placement of the proposed disposal fill. For the current intended use as a disposal fill, it is our understanding that these landslides will not be mitigated. Therefore, the landslides have been designated within a recommended Restricted Use Area on the attached Geologic/Geotechnical Map. Recommendations to mitigate these landslides relative to future proposed development for VTT 060678 are provided in our referenced report dated 9/30/05. All compressible landslide material, slopewash and alluvium must be removed prior to placement of future structural fills.

Qls-XVI(B) is a shallow landslide located on the east margin of cut-slope CS-2. Disposal fill and a debris basin are proposed to overlie this landslide. In order to mitigate potential impacts to the proposed debris basin from settlement and potential accumulation of landslide debris, it is recommended that this landslide be completely removed and the slope reconstructed as an extension of CS-2.

Disposal fill DF-3: This disposal fill is proposed to the northwest of CS-2 on the east side of Chiquito Canyon Road. A 4:1 (h:v) fill slope roughly 90 ft high is proposed with this disposal site. Based on previous analyses of higher, steeper fill slopes in this area for VTT 060678, this slope will be grossly stable per Los Angeles County criteria. This fill will overlie alluvium and Pico Formation bedrock. The alluvial removals within the footprint of this disposal fill that are recommended in our referenced report for VTT 060678 dated 9/30/05 should be completed prior to placement of compacted fill (see Sheet 11 for details).

Disposal fill DF-4: This disposal fill is proposed on the east side of Chiquito Canyon Road, roughly 1500 ft north of Highway 126. A 70-ft high 4:1 (h:v) fill slope is proposed at this site. This fill will overlie Pico Formation bedrock, landslides Qls-X(B) and Qls-XI(B), surficial failures, and alluvium. All unsuitable landslide material, artificial fill, and surficial failures within the disposal fill footprint should be removed prior to placement of compacted fill. The alluvial removals recommended in our referenced report for VTT 060678 should also be completed prior to placement of compacted fill (see Sheet 11 for details). Additional removals will likely be required

beyond the proposed disposal fill footprint at Qls-XI(B) in order to tie the fill slope into competent material.

8.5 Adobe Canyon Borrow Site and Water Tank Site

A borrow site is proposed at the Adobe Canyon portion of VTT 060678, on the south side of the Santa Clara River. This borrow site is designed to generate 6,468,500 cubic yards of raw cut and a net export of 6,322,200 cubic yards of export fill. The borrow materials will be generated almost entirely from the granular, lower member of the Saugus Formation. The fills will be generated by cutting of ridges on the flanks of Adobe Canyon, which will produce cut slopes to heights of up to 175 ft. All of these cut slopes are expected to expose antidip to neutral bedding conditions or bedding dipping steeper that the slope. The slopes will expose the lower member of the Saugus Formation, with local exposure of subhorizontal terraced deposits (see cross sections 28L-28L' through 37L-37L' on **Plate I** in **Appendix E**, which are revised from our referenced report for VTT 060678). Analysis of the highest cut slope (CS-34L) with cross section 28L-28L indicates that the antidip cut slopes will be grossly stable per Los Angeles County requirements.

Two small landslides (Qls-XIL and Qls-XIIL) are within the borrow site footprint. Most of the landslide material will be removed by proposed borrow site grading. The remainder of these landslides will be removed by the proposed grading for VTT 060678. The alluvial and artificial fill removals recommended in our referenced report for VTT 060678 for Adobe Canyon should be completed prior to future development of the site.

A water tank site is proposed at an elevation of 1170 ft near the top of cut-slope CS-36La. The cut slopes proposed adjacent to the tanks site will expose antidip to neutral bedding conditions and will be grossly stable based on analysis of the more critical conditions at cut-slope CS-34L.

9.0 LOS ANGELES COUNTY 111 STATEMENT

In compliance with Section 111 of the Los Angeles County Building Code, it is the finding of this firm that the proposed development designated on Vesting Tentative Tract 53108 will be safe against hazard from landslide, settlement or slippage and will not affect off-site property provided that all our recommendations are incorporated into the Grading Plan and implemented during construction. It is also our finding that the proposed grading shown on

off-site areas associated with the Landmark Tentative Map will be safe for the uses intended and will not affect off-site property provided that all our recommendations are incorporated in the Grading Plan and implemented during construction.

10.0 GEOLOGIST/GEOTECHNICAL ENGINEER OF RECORD

This report has been prepared assuming that Allan E. Seward Engineering Geology, Inc. will refine all geologic and geotechnical data, as required, for the Grading Plan phase of this project. If this work is performed by another party, that party must review this report, assume full responsibility for recommendations contained herein, and assume the title of responsibility as "Geologist/Geotechnical Engineer of Record" for the specific work.

11.0 LIMITATIONS

This report has been prepared by Allan E. Seward Engineering Geology, Inc. for the exclusive use of The Newhall Land and Farming Company and its design consultants for the specific site discussed herein. This report should not be considered transferable. Prior to use by others, this firm must be notified, as additional work may be required to update this report.

In the event that any modification in the location or design of the proposed development is planned, the conclusions and recommendations contained in this report will require a written review by this firm with respect to the planned modifications.

The proposed development is located in southern California, a geologically and tectonically active region, where large magnitude, potentially destructive earthquakes are common. Therefore, ground motions from moderate or large magnitude earthquakes could affect the subject site during the design life of the proposed structures.

Typically, faulting is confined to the area adjacent to a known fault. However, absolute assurance against future fault displacement in other areas is not possible in tectonically active regions because new faults can form over time and long inactive (pre-Holocene) faults may be reactivated in response to evolving tectonic stresses and geologic conditions in the earth's crust. Therefore, the location and magnitude of new ground surface ruptures during a seismic event cannot be anticipated.

In performing these professional services, this firm has used the degree of care and skill ordinarily exercised under similar circumstances by reputable geologists and geotechnical engineers practicing in this or similar localities. The data presented in this report are based on results of pertinent field and laboratory testing. It should be recognized that subsurface conditions can vary in time, and laterally, and with depth at a given site. Since the conclusions and recommendations presented in this report are based on our observations and testing, our **conclusions** and **recommendations** are **professional opinions** and are **not meant** to be a control of nature. Therefore, we make no other **warranty** either **expressed** or **implied**.

This report may not be duplicated without the written consent of this firm.

This opportunity to be of service is appreciated. Please contact us if you would like to discuss this report further.

Respectfully submitted,

Brian Swanson, CEG 2055
Associate Geologist

Kevin Callahan, PE 72202
Senior Staff Engineer

Reviewed By:

Eric J. Seward, CEG 2110
Principal Engineering Geologist
Vice President

Martin Goodman, GE 2146
Principal Geotechnical Engineer

The following attachments and appendices complete this report.

VOLUME I

References

APPENDIX A – SUBSURFACE LOGS

Bucket-Auger Borings

- B-1 and B-2

APPENDIX B – SLOPE STABILITY

APPENDIX C – LIQUEFACTION ANALYSIS

APPENDIX D – ZONE 1A TANK SITE REPORT

- Geotechnical Grading Plan Review
  Proposed Offsite Zone 1A Water Tank Site
  Vesting Tentative Tract Map No. 53108
  Los Angeles County, California
  Dated March, 28, 2008 – JN: 99-802-21
  By R.T. Frankian & Associates

VOLUME II

APPENDIX E – CROSS SECTIONS AND MAPS

Geologic Cross Sections	Plate I
• 1-1' through 3-3': Landmark Village	
• 4-4' through 9-9': Off-site Grading at Chiquito Canyon	
• 28L-28L', 29L-29L', 31L-31L', 32L-32L', 33L-33L', 36L-36L' & 37L-37L': Off-site Grading @ Adobe Canyon Borrow Site	
Vesting Tentative Tract Map 53108	
• Cover Sheet and Notes	Sheet 1
• Typical Sections and Details	Sheet 2
• Tentative Map Plan with Geologic/Geotechnical Mapping (1"=100')	Sheets 3 and 4
• South Bank Temporary Levee with Geologic/Geotechnical Mapping	Sheet 5
• Sewer and Water Key Maps, Zone 1A Water Tank Site, and Profiles	Sheet 6
• Interim Design at Long Canyon Road and Typical Sections	Sheet 7

VOLUME III

• Wolcott Road Interchange and Chiquito Canyon Outlet Details	Sheet 8
• Off-site Improvements for Trunk Sewer/Utility Corridor to WRP Site with Geologic/Geotechnical Mapping	Sheets 9 and 10
• Off-site Grading for Chiquito and Adobe Canyons with Geologic and Geotechnical Mapping	Sheet 11
• Details and Sections	Sheet 12
• Large Lot Conveyance Map, Phasing Map & Detail Plan	Sheet 13

Distribution: (2) The Newhall Land and Farming Company
Attn: Mr. Fred MacMurdo
(3) Psomas (Hardcopy and Electronic Copy)
1 - Attn: Mr. Ross Barker
2 - County of Los Angeles Department of Public Works
Geotechnical and Materials Engineering
Attn: Soils
Attn: Geology

REFERENCES

Published

Barrows, A.G., 1986, Landslide hazards in the east 1/2 of the Val Verde Quadrangle, Los Angeles County, California: California Division of Mines and Geology Open-File Report 86-9LA, Map Scale 1:24,000.

Blake, T.F., 2000, FRISKSP - Version 4.0: A computer program for the probabilistic estimation of peak acceleration and uniform hazard spectra using 3-D faults as earthquake sources: Thomas F. Blake, Computer Services and Software.

Blake, T.F., 1999, EQSEARCH: A computer program for the estimation of peak horizontal acceleration from California historical earthquake catalogs: Thomas F. Blake, Computer Services and Software.

Boore, D.M., Joyner, W.B., and Fumal, T.E., 1997, Equations for estimating horizontal response spectra and peak acceleration from western North American earthquakes: A summary of recent work: Seismological Research Letters, v. 68, no. 1, p. 128-153.

California Building Code (CBC), 2007

Campbell, K.W., 1997, Empirical near-source attenuation relationships for horizontal and vertical components of peak ground acceleration, peak ground velocity, and pseudo-absolute acceleration response spectra: Seismological Research Letters, v. 68, no. 1., p. 154-179.

CDCDMG, 1997, Guidelines for evaluating and mitigating seismic hazards in California: California Department of Conservation Division of Mines and Geology Special Publication 117.

Dibblee, T.W., Jr., 1993, Geologic map of the Val Verde Quadrangle, Los Angeles and Ventura Counties, California: Dibblee Geological Foundation, Map DF-50.

Hart, E.W., 1999, Fault-rupture hazard zones in California: California Division of Mines and Geology Special Publication 42, 24 p.

Jennings, C.W., 1988, Fault map of California with locations of volcanoes, thermal springs, and thermal wells: California Division of Mines and Geology, Geologic Data Map No. 1, 4th Printing.

Kew, W.S.W., 1924, Geology and oil resources of a part of Los Angeles and Ventura Counties, California: U.S. Geological Survey Bulletin 753, 202 p.

Leighton and Associates, Inc., 1990, L.A. County General Plan - Safety Element, including Technical Appendices: Volumes 1 and 2.

Martin, G.R., and Lew, M, 1999, Recommended procedures for implementation of DMG Special Publication 117 - Guidelines for analyzing and mitigating liquefaction hazards in California: Southern California Earthquake Center, 63p.

Morton, D.M., 1976, Reconnaissance surficial geologic maps of the Newhall, Oat Mountain, Santa Susana and Val Verde 7.5' Quadrangles, Los Angeles and Ventura Counties, southern California: U.S. Geological Survey Open File Map 76-211.

Peabody, A.W., 1969, Principles of cathodic protection, Chapter 5, NACE Corrosion Course: National Academy of Corrosion Engineers

REFERENCES

Petersen, M.D., Bryant, W.A., Cramer, C.H., Cao, T., Reichle, M.S., Frankel, A.D., Lienkaemper, J.J., McCrory, P.A., and Schwartz, D.P., 1996, Probabilistic seismic hazard assessment for the State of California: California Department of Conservation Division of Mines and Geology Open-File Report 96-08, 33 p.

Real, C.R., Toppozada, T.R., and Parke, D.L., 1978, Earthquake epicenter map of California, showing events from 1900 through 1974 equal to or greater than magnitude 4.0 or intensity V: California Division of Mines and Geology Map Sheet 39.

Robson, S.G., 1972, Water-resources investigation using analog techniques in the Saugus-Newhall area, Los Angeles County, California: U.S. Geological Survey Open-File Report 3, 58 p.

Sadigh, K., Chang, C.Y., Egan, J.A., Makdisi, F., and Youngs, R.R., 1997, Attenuation relations for shallow crustal earthquakes based on California strong motion data: Seismological Research Letters, v. 68, no. 1, p. 180-189.

Stewart, J.P. et al., 1994, Preliminary report on the principal geotechnical aspects of the January 17, 1994 Northridge Earthquake: EERC, U.C. Berkeley, Report No. UCB/EERC-94/08, 245 pages.

Winterer, E.L., and Durham, D.L., 1962, Geology of southeastern Ventura Basin, Los Angeles County, California: U.S. Geological Survey Professional Paper 334-H, p. 275-366.

Yeats, R.S., McDougal, J.W., and Stitt, L.T., 1985, Cenozoic structure of the Val Verde 7.5 minute Quadrangle and south half of the Whitaker Peak 7.5 minute Quadrangle, California: U.S. Geological Survey Open-File Report 85-587, 32 p.

Yerkes, R.F., and Campbell, R.H., 1995, Preliminary geologic map of the Val Verde 7.5' Quadrangle, southern California: U.S. Geological Survey Open-File Report 95-504.

REFERENCES

By Allan E. Seward Engineering Geology, Inc.

1. **GEOLOGIC/GEOTECHNICAL REPORT**
   Vesting Tentative Tract 53108, dated 6/11/00
   River Village, Newhall Ranch
   Castaic, California
   Dated September 27, 2000 – JN: 00-1702R-4

2. **GEOLOGIC AND GEOTECHNICAL REPORT – ADDENDUM NO. 1**
   Response to County Comments (Review Sheets dated 12/12/00 and 1/2/01)
   Vesting Tentative Tract 53108, Map Dated 6/11/00
   River Village, Newhall Ranch
   Castaic, California
   Dated February 10, 2001 – JN: 01-1702R-4

3. **GEOLOGIC AND GEOTECHNICAL REPORT**
   Review of Vesting Tentative Tract Map 060678 (Dated 8/3/05)
   Vesting Tentative Tract 060678
   Homestead
   Newhall Ranch, California
   Dated September 30, 2005 - Job No: 05-2062-4

4. **GEOLOGIC AND GEOTECHNICAL REPORT**
   Review of Grading Plans (Dated 3/13/06)
   Proposed Water Reclamation Plant
   Newhall Ranch Project
   Castaic, Los Angeles County, California
   Dated June 19, 2006 - Job No: 06-1707-1

5. **GEOTECHNICAL REPORT**
   Review of Storm Drain Plans
   P.D. No. 2606
   Proposed Water Reclamation Plant
   Castaic area, Los Angeles County, California
   Dated September 8, 2006 - Job No: 06-1707-1

6. **PRELIMINARY GEOLOGIC/GEOTECHNICAL REPORT**
   Review of Utility Corridor Plans (30% Submittal)
   Utility Corridor along Highway 126
   Newhall Ranch WRP Site to Travel Village
   Castaic, California
   Dated May 25, 2007 – JN: 07-2079 (0)

7. **GEOTECHNICAL LETTER REPORT**
   Review of Impacts of Potential Differential Settlement on Proposed Road Gradients
   Landmark Village – VTTM 53108
   Newhall Ranch
   Los Angeles County, California
   Dated August 27, 2007 – JN: 07-1702R (12)

REFERENCES

8. **GEOTECHNICAL REPORT – ADDENDUM NO. 1**
Response to Los Angeles County Geologic Review Sheet dated October 30, 2006
And Soils Engineering Review Sheet dated October 31, 2006
GEOTECHNICAL REPORT
Review of Revised Storm Drain Plans (undated) and
Rough Grading Plan (undated) for P.D. No. 2606
P.D. No. 2606
Proposed Water Reclamation Plant
Castaic Area, Los Angeles County, California
Dated January 25, 2008 – JN: 08-1707-1

Appendix A

DRILL HOLE LOG

CLIENT:	The Newhall Land & Farming Company
PROJECT:	Highway 126 Widening
DRILLING COMPANY:	All Ways Drilling
DRILLING METHOD:	Bucket Auger
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-30'=5619 lb, 31-60'=3745 lb, 61-90'=2280 lb, 91-120'=1223 lb
JOB NO.:	05-2088-1 (0)
DATE:	12/21/09
LOGGED BY:	MBW
DRILLED:	10/10-12/05
HOLE DIA:	24"
AVERAGE DROP:	12"
ELEVATION:	971'
BORING NO.	B-1

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	DESCRIPTION	Remarks
						QUATERNARY ALLUVIUM; Qal (0 - 16.5')	@ 0-3' Casing
						@ 0' Yellowish-brown silty sand; loose; damp	
						@ 4' Grades to pebbly sand	
5		Push/ 18"		115/5.2		@ 4.5' Sandy silt	
						@ 5' Pebbly sand	
						@ 5.5' Sandy silt with local pebbly sand channels	
			Qal				
						@ 9' Stiff	
10		1 1 1		122/8.1			
15		2 3 3		94/6.6			
						BEDROCK; TQs (16.5 - 99')	
						@ 16.5' Light-gray, silty, fine-grained sandstone; hard; damp	
				fr: N53W,33NE		@ 18' Gray to olive-brown clayey mudstone; abundant caliche-lined fractures	@ 18-22' Moderately fractured
				B: N88E,26SE			
20		2 5		fr: N53E,23SE 112/16.6 B: N85E,26SE		@ 19.5' Interbedded gray to yellowish-brown, silty, fine-grained sandstone and brown mudstone	
							@ 22-27' Slightly fractured
			TQs	B: N87W,30SW		@ 24' Approximately 5-inch-thick gray mudstone interbed with iron-oxide staining	
25				B: N78E,26SE		@ 25' Slightly sheared mudstone interbed	
						@ 25.5' Brown mudstone; massive	
30		5 10 15		B: N82E,24SW 126/12.9		@ 30' Slightly sheared mudstone interbed; slightly plastic	@ 30' Bulk sample Shear Test
35				Apx B: E-W,24S		@ 35' Gray silty sandstone to sandy siltstone; gradational contact with overlying and underlying units	LL= 51 PI= 24
						@ 36' Brown mudstone; moist; massive	

DRILL HOLE LOG

CLIENT:	The Newhall Land & Farming Company
PROJECT:	Highway 126 Widening
DRILLING COMPANY:	All Ways Drilling
DRILLING METHOD:	Bucket Auger
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-30'=5619 lb, 31-60'=3745 lb, 61-90'=2280 lb, 91-120'=1223 lb
JOB NO.:	05-2088-1 (0)
DATE:	12/21/09
LOGGED BY:	MBW
DRILLED:	10/10-12/05
HOLE DIA:	24"
AVERAGE DROP:	12"
ELEVATION:	971'
BORING NO.	B-1

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	DESCRIPTION	Remarks
				B: N83E,23SE			
40		10				@ 39' Grades to gray to yellowish-brown pebbly sandstone; massive; coarsens down; southward imbrication of pebbles	Shear Test
45							
							@ 47-99' Surface logged due to water
50		6 8/5"		127/8.6			
						@ 52' Standing water	
55							
						@ 56' Brown, fine-grained sandstone; wet	
						@ 59' Silty, fine-grained sandstone	
60		8/5"					
65							
						@ 66' Bluish-gray, silty, fine-grained sandstone	
						@ 67' Bluish-gray siltstone	@ 67' Bulk sample
						@ 68' Brown, medium- to coarse-grained sandstone	
70		10 10/1"		114/16.1			
						@ 72' Brown, coarse-grained pebbly sandstone	
75							

DRILL HOLE LOG

CLIENT:	The Newhall Land & Farming Company
PROJECT:	Highway 126 Widening
DRILLING COMPANY:	All Ways Drilling
DRILLING METHOD:	Bucket Auger
HAMMER TYPE:	Telescoping Kelly Bar
DRIVING WEIGHTS:	0-30'=5619 lb, 31-60'=3745 lb, 61-90'=2280 lb, 91-120'=1223 lb
JOB NO.:	05-2088-1 (0)
DATE:	12/21/09
LOGGED BY:	MBW
DRILLED:	10/10-12/05
HOLE DIA:	24"
AVERAGE DROP:	12"
ELEVATION:	971'

BORING NO. B-1

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	DESCRIPTION	Remarks
						@ 77' Difficult to drill due to hardness	
						@ 78' Gray, pebbly, coarse-grained sandstone	
80							
		10 8/1"					
85							
90							
		20/5"		119/16.5		@ 91' Grayish-brown mudstone	@ 92' Top 2" of sample is disturbed
95						@ 94' Gray to bluish-gray siltstone	
						@ 97' Gray mudstone	
100		29				@ 99' No recovery	
						TOTAL DEPTH 99' (Elev. 872') Ground Water @ 52' (Elev. 919') Minor Caving from 58 to 64'	
105							
110							

CLIENT: The Newhall Land & Farming Company	JOB NO.: 05-2088-1 (0)	**DRILL HOLE LOG**	
PROJECT: Highway 126 Widening	DATE: 12/21/09		
	LOGGED BY: MBW		
DRILLING COMPANY: All Ways Drilling	DRILLED: 10/12 & 13/05		
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP: 12"	**BORING NO.** B-2	
DRIVING WEIGHTS: 0-30'=5619 lb, 31-60'=3745 lb, 61-90'=2280 lb, 91-120'=1223 lb	ELEVATION: 971'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	DESCRIPTION	Remarks
						BEDROCK; TQs (0 - 116')	@ 0-5' Bulk sample
						@ 0' Yellowish-brown, sandy siltstone with pebbles; moderately hard; damp; generally massive with some faint laminations; moderately weathered	
				Apx B: N63E,11SE		@ 4' 6"-thick, brown mudstone interbed; some roots; possible old soil layer; not fully planar	
5		3 7		123/3.8			
				Apx B: N58E,17SE		@ 8' Grades sandier	
10		3 4		102/4.6		@ 10' Silty sandtone with pebbles	
15		2 3		115/2.4		@ 16' Cobbly, very friable	
20		2 2		116/4.2		@ 20' Local caliche stringers	
25						@ 24' Yellowish-brown, silty, pebbly sandstone with local cobbles; damp; hard; massive	
30		5 6		115/3.5			
35						@ 35' Grayish-brown siltstone; gradational contact with overlying and underlying units	

CLIENT: The Newhall Land & Farming Company	JOB NO.: 05-2088-1 (0)	**DRILL HOLE LOG**	
PROJECT: Highway 126 Widening	DATE: 12/21/09		
	LOGGED BY: MBW		
DRILLING COMPANY: All Ways Drilling	DRILLED: 10/12 & 13/05		
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP: 12"	**BORING NO.** B-2	
DRIVING WEIGHTS: 0-30'=5619 lb, 31-60'=3745 lb, 61-90'=2280 lb, 91-120'=1223 lb	ELEVATION: 971'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	DESCRIPTION	Remarks
						@ 38' Yellowish-brown, pebbly sandstone	
40		Bounce					
45							
						@ 47' Cobbly; local mudstone ripups	
				Apx B: N46E,10SE		@ 48' Contact between sandstone and mudstone may be channelized	
				B: N53E,15SE			
50		17					
				Apx B: N49E,14SE		@ 52' Minor seepage	
55				Apx B: N59E,14SE		@ 55' 6"-thick, sandy mudstone interbed	
				B: N58E,16SE		@ 58' Yellowish-brown to gray, pebbly sandstone; massive; locally laminated	
60		25/4"		101/8.5			
65							
70		20					
						@ 71' Pebbly, cobbly, coarse-grained sandstone; wet	
75							

CLIENT: The Newhall Land & Farming Company	JOB NO.: 05-2088-1 (0)	**DRILL HOLE LOG**	
PROJECT: Highway 126 Widening	DATE: 12/21/09		
	LOGGED BY: MBW		
DRILLING COMPANY: All Ways Drilling	DRILLED: 10/12 & 13/05		
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP: 12"	**BORING NO.** B-2	
DRIVING WEIGHTS: 0-30'=5619 lb, 31-60'=3745 lb, 61-90'=2280 lb, 91-120'=1223 lb	ELEVATION: 971'		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	DESCRIPTION	Remarks
80		25		B: N58E,15SE 108/16.4		@ 80' 4"-thick, reddish-brown to gray mudstone interbed	
				B: N54E, 17SE		@ 82' 5"-thick, reddish-brown mudstone interbed	
				B: N58E,23SE		@ 83' Slightly sheared mudstone interbed; steeper than overlying laminated sandstone	
85						@ 84' Gray to reddish-brown mudstone; moist; massive	
				B: N55E,14SE			
90		25		Apx B: N60E,14SE			
95							
100							
105							@ 105-116' Surface logged due to water
110						@ 112' Greenish-gray, fine- to medium-grained sandstone; wet	

DRILL HOLE LOG

CLIENT: The Newhall Land & Farming Company	JOB NO.: 05-2088-1 (0)
PROJECT: Highway 126 Widening	DATE: 12/21/09
	LOGGED BY: MBW
DRILLING COMPANY: All Ways Drilling	DRILLED: 10/12 & 13/05
DRILLING METHOD: Bucket Auger	HOLE DIA: 24"
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP: 12"
DRIVING WEIGHTS: 0-30'=5619 lb, 31-60'=3745 lb, 61-90'=2280 lb, 91-120'=1223 lb	ELEVATION: 971'

BORING NO. B-2

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	DESCRIPTION	Remarks
115			TQs				
						TOTAL DEPTH 116' (Elev. 855') Minor Seep @ 52' Ground Water @ 71' (Elev. 900') No Caving	
120							
125							
130							
135							
140							
145							
150							

Appendix B

APPENDIX B

SLOPE STABILITY ANALYSES

Introduction

Static stability and pseudo-static stability were analyzed for cut slopes along the south side of Highway 126 and for cut slopes and natural slopes in off-site areas, including portions of Chiquito Canyon and Adobe Canyon of the adjacent Homestead Project, VTT 060678 (see attached plans in **Appendix E** for details). Cross sections that illustrate critical bedding geometry and/or slope height were selected for analysis. The Spencer method was used for calculation of the factor of safety of the analyzed slopes. A horizontal acceleration of 0.15g was used in the pseudo-static (earthquake) stability analyses. Results of the stability analyses, including slope geometry parameters, are summarized in **Table B1** – Results of Slope Stability Analyses. Slope stability diagrams that graphically illustrate the results of our analyses are attached for review.

The GSTABL7 computer program by Garry H. Gregory (Gregory Geotechnical Software) was used to calculate the factor of safety of slopes at the project site. Output is appended from the slope stability analysis runs (including a slope cross section that shows the surface with the lowest factor of safety, geotechnical parameters of soil layers, and other pertinent data). The analysis surfaces with the lowest factor of safety value are also plotted on the cross sections in **Appendix E**.

Slope Geometries and Subsurface Conditions

Stability analyses performed on the following slopes included cross-bedding and potential adverse bedding conditions, based on geologic data obtained near each cross section listed in **Table B1**. Buttresses were used in the stability analyses as mitigation for proposed cut slopes with calculated factors of safety lower than the minimum values required by Los Angeles County. The geometries of proposed cut slopes at the site include the removal of vegetation, surficial soil, Terrace Deposits, and/or bedrock materials, and placement of compacted fill on portions of slopes where buttresses or stability fills are recommended.

- **Landmark Village (VTT 53108)**

  Analyzed cut slopes within Landmark Village are shown on cross sections 1-1', 2-2', and 3-3', and are located along the south side of Highway 126. Fill-over-cut conditions are shown on cross sections 1-1' and 3-3' with retaining walls proposed at top and/or bottom of slope on each cross section. These slopes are about 20 to 28 ft in height, with

APPENDIX B

2:1 (h:v) gradients and with daylighted bedding dipping out of the slope at about 15 to 17 degrees. In order to meet Los Angeles County requirements for gross and surficial slope stability, a buttress/stability fill with a 3 ft deep by 15 ft wide keyway is recommended for each slope.

- **Adobe Canyon (VTT 060678)**

  Proposed cut-slope CS-34L, shown on cross section 28L-28L', is the highest 2:1 (h:v) cut slope in the Adobe Canyon off-site grading area (175 ft). Since favorable (antidip) bedding conditions are anticipated to be exposed in this cut slope, it meets Los Angeles County requirements for gross stability.

- **North of Highway 126 (VTT 060678)**

  Proposed cut-slopes CS-2 and CS-3 are shown on cross sections 4-4' and 7-7', respectively. Cut-slope CS-2 is a 175 ft high, combination 2:1 (h:v) and 3.5:1 (h:v) slope with potential adverse bedding dipping at about 15 degrees in the direction of the slope face. Cut-slope CS-3 is a 125 ft high, combination 2:1 (h:v) and 3.5:1 (h:v) slope with daylighted bedding dipping out of slope at about 18 degrees. In order to meet Los Angeles County requirements for gross slope stability, a buttress with a 7 ft deep by 75 ft wide keyway is recommended for cut-slope CS-3.

  Proposed cut-slope CS-4 is shown on cross sections 5-5' and 6-6'. Based on cross section 5-5', CS-4 is 215 ft in height, with a 2.5:1 (h:v) gradient and with daylighted bedding dipping out of the slope at about 17 to 21 degrees. The natural portion of the slope in the additional 20 ft above CS-4 has a 5:1 (h:v) gradient (total slope height of 236 ft). In order to meet Los Angeles County requirements for gross slope stability, a buttress with a keyway 7 ft deep by 75 ft wide is recommended for the western portion of cut-slope CS-4 per analysis of cross section 5-5'. A 5 ft deep by 55 ft wide stability fill is recommended on the eastern portion of CS-4 owing to fill-over-cut and sliver cut and fill conditions.

  Landslides Qls-XIV(B) and Qls-XIII(B) and the proposed disposal fills are shown on cross sections 8-8' and 9-9', respectively. Our analyses indicate that although the proposed fills will improve stability of these landslides, the slopes that include these landslides will not satisfy the factor of safety requirements of Los Angeles County. It is our understanding that Landslides Qls-XIV(B) and Qls-XIII(B) will not be removed or mitigated relative to the future intended use as a fill disposal site. Therefore, Restricted

APPENDIX B

Use Areas are recommended on the attached Geotechnical Maps for landslides Qls-XIV(B) and Qls-XIII(B). Recommendations for mitigation of these landslides relative to future development of the site for VTT 060678 are provided in our referenced report dated 9/30/05.

Ground Water

Review of ground water data obtained during our previous investigations and from Bucket-Auger borings B1 and B2 indicates that the proposed cut slopes in bedrock (Adobe Canyon and North of Highway 126) are above historic high ground water levels. Ground water was modeled in the slope stability analyses using a pore pressure parameter (r_u=0.12) at locations where a potential source for future ground water existed directly up gradient (updip) of the slope being analyzed.

Shear Strength and Density Parameters

Shear strength and density parameters developed for our original Review of Tentative Tract Map report for VTT 53108 (dated September 27, 2000) were used for on-site slopes located within the subject VTT 53108 and an assumed shear strength and density were adopted for select fill materials recommended for use in the stability fills and buttresses. These parameters are summarized in the following table:

Shear Strength Parameters – VTT 53108

Materials	Unit Density (PCF)	Static		Pseudo-static	
		Phi (deg)	c (psf)	Phi (deg)	c (psf)
Bedrock (Tp), parallel to bedding	130	18	200	18	200
Bedrock (Tp), cross bedding	130	31	185	45	203
Older Alluvium (Qoa)	125	28.5	151	30	200
Compacted Fill (Cef)	135	30.6	100	31	154
Select Fill	135	30	300	30	300

Shear strength and density parameters developed for our Review of Tentative Tract Map report for VTT 060678 (dated September 30, 2005) were used for slopes located within VTT 060678. These parameters are summarized in the following table:

APPENDIX B

Shear Strength Parameters – VTT 060678

MATERIALS	UNIT WEIGHT (PCF)	STATIC		PSEUDO-STATIC	
		PHI (DEG)	C (PSF)	PHI (DEG)	C (PSF)
Bedrock (TQs_L), parallel to bedding	130	20	200	29	500
Bedrock (TQs_L), cross bedding	130	35	500	38	600
Bedrock (Tp), parallel to bedding	125	22	275	28	400
Bedrock (Tp), cross bedding	125	30	350	36	500
Terrace Deposits (Qt)	125	28	250	28	300
Older Alluvium (Qoa)	120	28	250	29	300
Compacted Fill (Cef)	130	30	300	30	300
Landslide Mass (Qls)	125	25	200	29	300
Slide Plane	125	12	125	15	250

The strength parameters provided above for static loading conditions are residual values and the strength values for pseudo-static loading conditions are peak values.

Surficial Stability

Permanent cut slopes that expose cut/fill transitions, daylighted bedrock, or Terrace Deposits should be constructed as stability fills. The need for additional stability fills should be evaluated during grading operations.

Conclusions

The analyzed cut slopes comply with Los Angeles County minimum requirements for gross stability under static and pseudo-static loading conditions and for surficial stability, as applicable, provided that our recommendations are followed and incorporated into project construction. The analyzed landslides do not comply with Los Angeles County minimum requirements for gross stability. The results of the stability analyses are summarized in **Table B1.**

The following attachments are located within this Appendix.

Slope Stability Analyses Results Table B1
Slope Stability Diagrams and Data Sheets for Runs 1 to 31

APPENDIX B

SLOPE STABILITY ANALYSES RESULTS

CROSS SECTION	FILE NAME	SLOPE DESIGNATION	ANALYZED SURFACE	METHOD	FACTOR OF SAFETY		COMMENTS	RUN NO.
					STATIC	PSEUDOSTATIC (COEFF = 0.15)		
1-1′	T1S1A T1PS1A	Cut slope	Bedding Plane	Spencer	1.70	1.22	Minimum safety factor for daylighted slope behind proposed retaining wall; recommended stability fill with 15′w by 3′d keyway for surficial stability.	1 2
2-2′	T2S1A T2PS1A	Cut slope	Bedding Plane	Spencer	1.52	1.06	Daylighted slope behind proposed retaining wall; Pseudo-static safety factor < 1.10; see recommended mitigation below.	3 4
2-2′	T2S2A T2PS2A	Cut slope	Circular	Spencer	1.51	1.61	Circular failure through slope less critical than bedding plane failure.	5 6
2-2′	T2S1B T2PS1B	Cut slope	Bedding Plane	Spencer	1.68	1.22	Analyses including proposed buttress / stability fill with 15′w by 3′d keyway.	7 8
3-3′	T3S1A T3PS1A	Cut slope	Bedding Plane	Spencer	1.40	1.05	Safety factor < minimum requirements; see recommended mitigation below.	9 10
3-3′	T3S2A T3PS2A	Cut slope	Circular	Spencer	1.50	1.58	Circular failure through slope less critical than bedding plane failure.	11 12
3-3′	T3S1B T3PS1B	Cut slope	Bedding Plane	Spencer	1.66	1.34	Analyses including proposed buttress / stability fill with 15′w by 3′d keyway.	13 14
4-4′	T4S1A T4PS1A	Cut slope CS-2	Bedding Plane	Spencer	1.68	1.10	Minimum safety factor.	15 16
5-5′	T5S2B T5PS2B	Cut slope CS-4	Bedding Plane	Spencer	1.56	1.07	Pseudo-static safety factor < 1.10; see recommended mitigation below.	17 18
5-5′	T5S1B T5PS1B	Cut slope CS-4	Bedding Plane	Spencer	1.66	1.14	Analyses including proposed buttress with 75′w by 7′d keyway.	19 20
6-6′	T6S1B T6PS1B	Cut slope CS-4	Bedding Plane	Spencer	1.78	1.28	Minimum safety factor.	21 22
7-7′	T7S1A	Cut slope CS-3	Bedding Plane	Spencer	1.48	--	Current design with day-lighted bedding. Minimum safety factor < 1.5. See mitigation below.	23

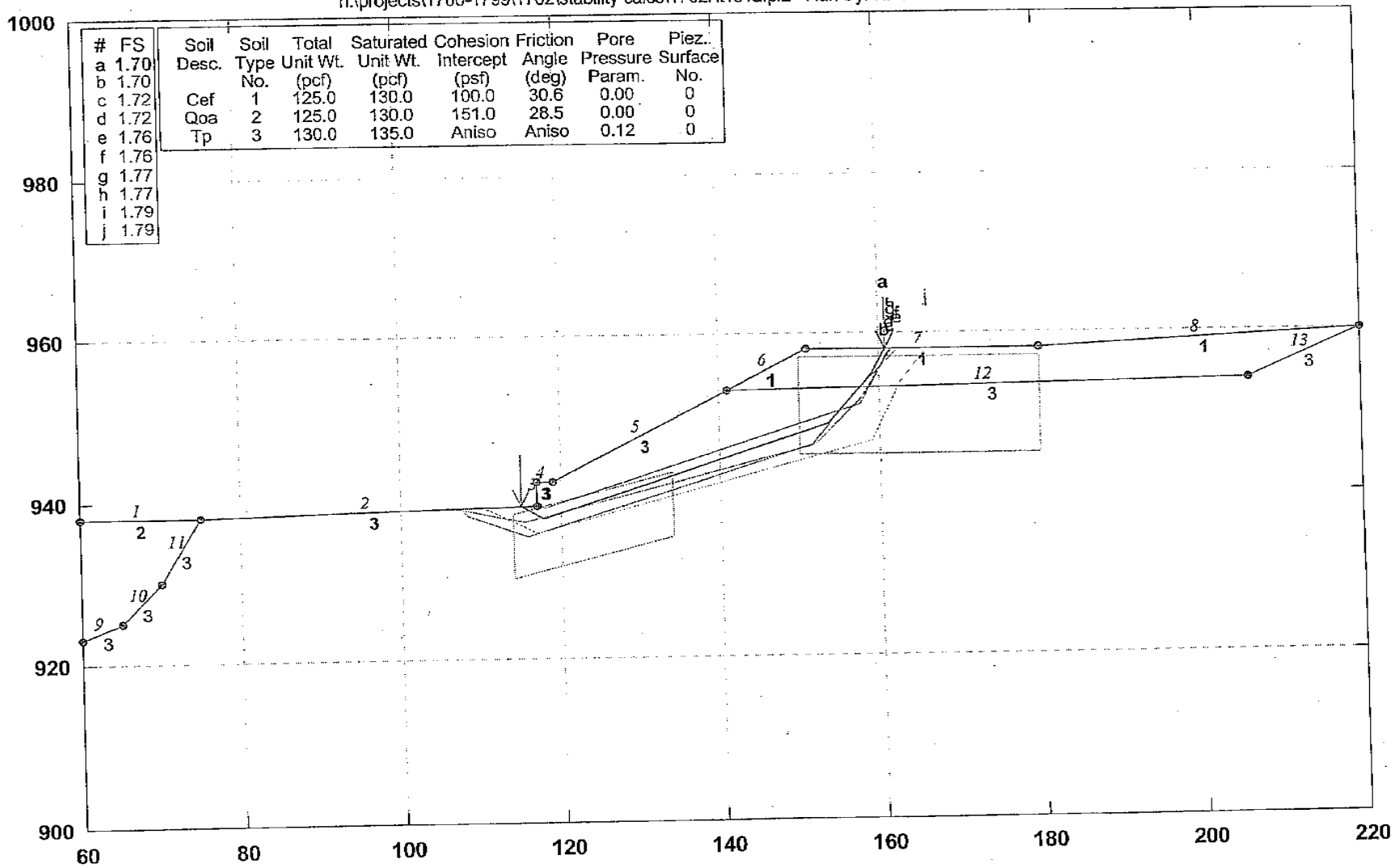
APPENDIX B

SLOPE STABILITY ANALYSES RESULTS

CROSS SECTION	FILE NAME	SLOPE DESIGNATION	ANALYZED SURFACE	METHOD	FACTOR OF SAFETY		COMMENTS	RUN NO.
					STATIC	PSEUDOSTATIC (COEFF = 0.15)		
7-7′	T7S2A T7PS2A	Cut slope CS-3	Bedding Plane	Spencer	1.64	1.13	Analyses including proposed buttress with 75′w by 7′d keyway.	24 25
8-8′	T8S1A	Qls-XIV(B)	Landslide Plane	Spencer	2.40		Failure surface along entire basal slide plane.	26
8-8′	T8S4B	Qls-XIV(B)	Landslide Plane	Spencer	1.43	--	Failure surface along upper portion of basal slide plane. FS < 1.5; place Qls in RUA.	27
9-9′	T9S2A	Qls-XIII(B)	Landslide Plane	Spencer	1.42	--	Failure surface along entire basal slide plane. FS < 1.5; place Qls in RUA.	28
28L-28L′	T28LS1A T28LPS1A	Cut slope CS-34L	Circular	Spencer	2.27	1.75	Highest 2:1 cut slope in Adobe Canyon area. Minimum safety factor.	29 30

TT 53108, 1-1'; static; planar; daylighted bedding w/ Ru=0.12

n:\projects\1700-1799\1702\stability calcs\1702r\t1s1a.pl2 Run By: KPC 7/9/2008 03:24PM



#	FS
a	1.70
b	1.70
c	1.72
d	1.72
e	1.76
f	1.76
g	1.77
h	1.77
i	1.79
j	1.79

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
Cef	1	125.0	130.0	100.0	30.6	0.00	0
Qoa	2	125.0	130.0	151.0	28.5	0.00	0
Tp	3	130.0	135.0	Aniso	Aniso	0.12	0

GSTABL7 v.2 FSmin=1.70

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

Run No. 1

```
                    ***  GSTABL7  ***
          ** GSTABL7 by Garry H. Gregory, P.E. **
  ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:          7/9/2008
Time of Run:                03:24PM
Run By:                     KPC
Input Data Filename:        N:\Projects\1700-1799\1702\Stability Calcs\1702R\t1s1a.in
Output Filename:            N:\Projects\1700-1799\1702\Stability Calcs\1702R\t1s1a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t1s1a.PLT
PROBLEM DESCRIPTION:  TT 53108, 1-1'; static; planar;
                      daylighted bedding w/ Ru=0.12

BOUNDARY COORDINATES
    8 Top   Boundaries
   13 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	60.00	938.00	75.00	938.00	2
2	75.00	938.00	117.00	939.00	3
3	117.00	939.00	117.01	942.00	3
4	117.01	942.00	119.00	942.00	3
5	119.00	942.00	141.00	953.00	3
6	141.00	953.00	151.00	958.00	1
7	151.00	958.00	180.00	958.00	1
8	180.00	958.00	220.00	960.00	1
9	60.00	923.00	65.00	925.00	3
10	65.00	925.00	70.00	930.00	3
11	70.00	930.00	75.00	938.00	3
12	141.00	953.00	206.00	954.00	3
13	206.00	954.00	220.00	960.00	3

```
User Specified Y-Origin =        900.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  3 Type(s) of Soil
```

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	100.0	30.6	0.00	0.0	0
2	125.0	130.0	151.0	28.5	0.00	0.0	0
3	130.0	135.0	185.0	31.0	0.12	0.0	0

```
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  3 Is Anisotropic
 Number Of Direction Ranges Specified =  3
```

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	14.0	185.00	31.00
2	18.0	200.00	18.00
3	90.0	185.00	31.00

```
 ANISOTROPIC SOIL NOTES:
    (1) An input value of 0.01 for C and/or Phi will cause Aniso
        C and/or Phi to be ignored in that range.
    (2) An input value of 0.02 for Phi will set both Phi and
        C equal to zero, with no water weight in the tension crack.
    (3) An input value of 0.03 for Phi will set both Phi and
```

C equal to zero, with water weight in the tension crack.
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 8.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	114.00	934.00	134.00	939.00	8.00
2	150.00	951.00	180.00	951.00	12.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2) * *
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
The option of no water in the tension crack on
the last slice has been selected.
Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.
Total Number of Trial Surfaces Evaluated = 1000
WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.
Number of Trial Surfaces with Non-Converged FS = 34
Number of Trial Surfaces with Misleading FS = 2
Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Evaluated = 3.6 %
Statistical Data On All Valid FS Values:
FS Max = 7.342 FS Min = 1.697 FS Ave = 2.871
Standard Deviation = 0.651 Coefficient of Variation = 22.66 %
((Simplified Janbu FS for Critical Surface = 1.572))
Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.09	938.95
2	117.89	937.37
3	153.59	948.76
4	158.94	954.71
5	160.88	958.00

*** FOS = 1.697 Theta (ki=1.0) = 19.00 ***
Lambda = 0.344
Individual data on the 10 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	1.9	139.4	0.0	19.2	0.	0.	0.0	0.0	0.0
2	0.0	3.4	0.0	0.5	0.	0.	0.0	0.0	0.0
3	0.9	501.0	0.0	69.0	0.	0.	0.0	0.0	0.0
4	1.1	641.7	0.0	80.8	0.	0.	0.0	0.0	0.0
5	22.0	17913.9	0.0	2256.3	0.	0.	0.0	0.0	0.0
6	10.0	11788.1	0.0	1484.8	0.	0.	0.0	0.0	0.0
7	2.6	3192.9	0.0	402.2	0.	0.	0.0	0.0	0.0
8	4.0	3576.1	0.0	641.9	0.	0.	0.0	0.0	0.0
9	1.3	656.5	0.0	0.0	0.	0.	0.0	0.0	0.0
10	1.9	398.0	0.0	0.0	0.	0.	0.0	0.0	0.0

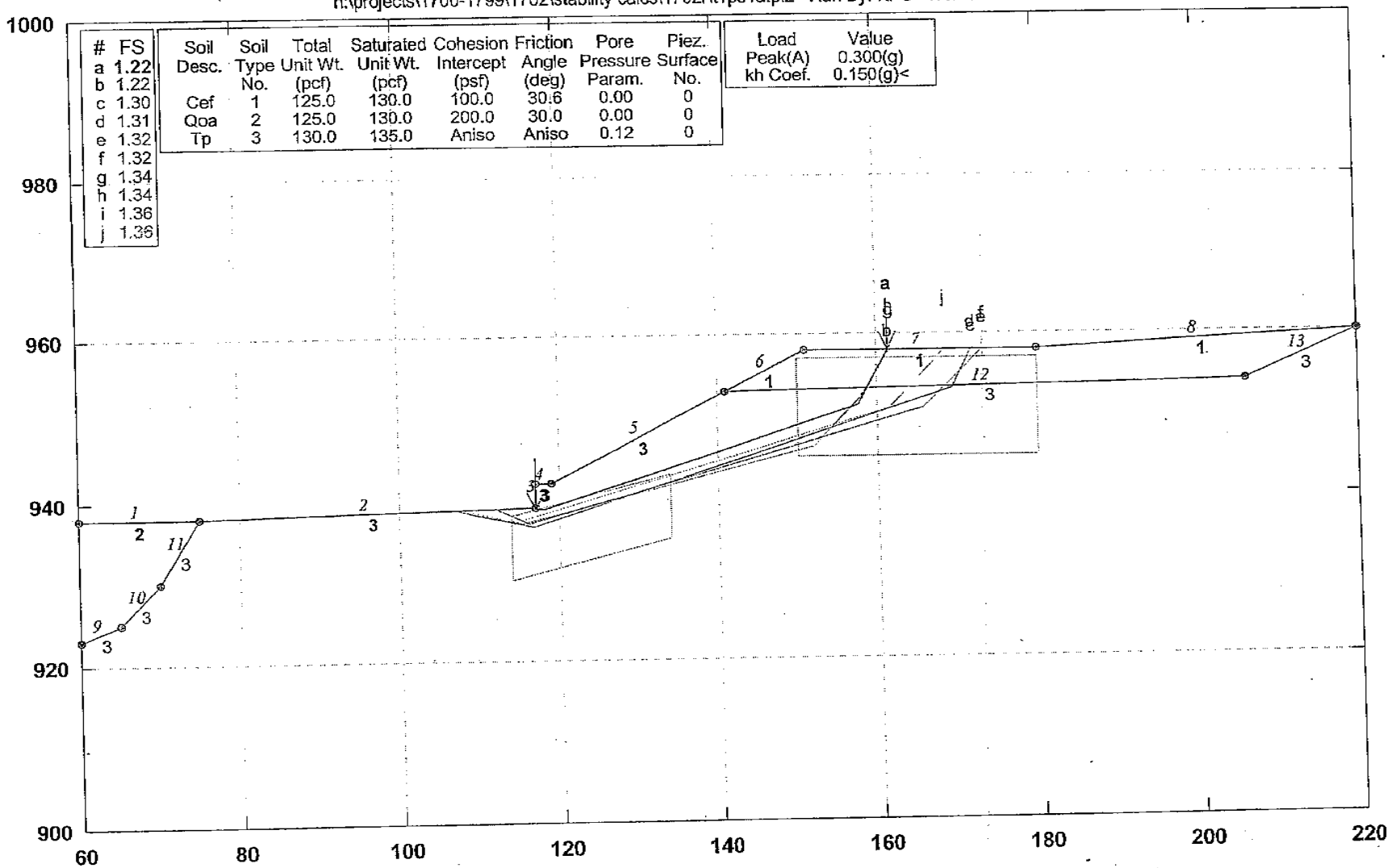
Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	115.09	938.95
2	117.89	937.37
3	153.59	948.76
4	158.94	954.71

```
    5          160.88        958.00
***  FOS =      1.697   Theta (ki=1.0) =     19.00  ***
                      Lambda =   0.344
```

TT 53108, 1-1'; pseudo; planar; daylighted bedding w/ Ru=0.12

n:\projects\1700-1799\1702\stability calcs\1702r\t1ps1a.pl2 Run By: KPC 7/9/2008 03:25PM



#	FS
a	1.22
b	1.22
c	1.30
d	1.31
e	1.32
f	1.32
g	1.34
h	1.34
i	1.36
j	1.36

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
Cef	1	125.0	130.0	100.0	30.6	0.00	0
Qoa	2	125.0	130.0	200.0	30.0	0.00	0
Tp	3	130.0	135.0	Aniso	Aniso	0.12	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.22

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

Run No. 2

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:          7/9/2008
Time of Run:                03:25PM
Run By:                     KPC
Input Data Filename:        N:\Projects\1700-1799\1702\Stability Calcs\1702R\t1ps1a.in
Output Filename:            N:\Projects\1700-1799\1702\Stability Calcs\1702R\t1ps1a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t1ps1a.PLT
PROBLEM DESCRIPTION:   TT 53108, 1-1'; pseudo; planar;
                       daylighted bedding w/ Ru=0.12

BOUNDARY COORDINATES
    8 Top   Boundaries
   13 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	60.00	938.00	75.00	938.00	2
2	75.00	938.00	117.00	939.00	3
3	117.00	939.00	117.01	942.00	3
4	117.01	942.00	119.00	942.00	3
5	119.00	942.00	141.00	953.00	3
6	141.00	953.00	151.00	958.00	1
7	151.00	958.00	180.00	958.00	1
8	180.00	958.00	220.00	960.00	1
9	60.00	923.00	65.00	925.00	3
10	65.00	925.00	70.00	930.00	3
11	70.00	930.00	75.00	938.00	3
12	141.00	953.00	206.00	954.00	3
13	206.00	954.00	220.00	960.00	3

```
User Specified Y-Origin =        900.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  3 Type(s) of Soil
```

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	100.0	30.6	0.00	0.0	0
2	125.0	130.0	200.0	30.0	0.00	0.0	0
3	130.0	135.0	203.0	45.0	0.12	0.0	0

```
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  3 Is Anisotropic
 Number Of Direction Ranges Specified =  3
```

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	14.0	203.00	45.00
2	18.0	200.00	18.00
3	90.0	203.00	45.00

```
 ANISOTROPIC SOIL NOTES:
    (1) An input value of 0.01 for C and/or Phi will cause Aniso
        C and/or Phi to be ignored in that range.
    (2) An input value of 0.02 for Phi will set both Phi and
        C equal to zero, with no water weight in the tension crack.
    (3) An input value of 0.03 for Phi will set both Phi and
```

C equal to zero, with water weight in the tension crack.
Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 8.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	114.00	934.00	134.00	939.00	8.00
2	150.00	951.00	180.00	951.00	12.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2) * *
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
The option of no water in the tension crack on
the last slice has been selected.
Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.
Total Number of Trial Surfaces Evaluated = 1000
WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.
Number of Trial Surfaces with Non-Converged FS = 145
Number of Trial Surfaces with Misleading FS = 10
Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Evaluated = 15.5 %
Statistical Data On All Valid FS Values:
FS Max = 6.485 FS Min = 1.215 FS Ave = 2.891
Standard Deviation = 0.667 Coefficient of Variation = 23.08 %
((Simplified Janbu FS for Critical Surface = 1.183))
Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	117.00	938.89
2	118.10	938.71
3	157.60	951.13
4	161.35	958.00

*** FOS = 1.215 Theta (ki=1.0) = 18.53 ***
Lambda = 0.335
Individual data on the 8 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	0.0	2.1	0.0	0.3	0.	0.	0.3	0.0	0.0
2	1.1	454.3	0.0	55.2	0.	0.	68.1	0.0	0.0
3	0.9	368.7	0.0	46.4	0.	0.	55.3	0.0	0.0
4	22.0	14450.1	0.0	1817.7	0.	0.	2167.5	0.0	0.0
5	10.0	10307.5	0.0	1296.6	0.	0.	1546.1	0.0	0.0
6	6.6	6631.3	0.0	834.2	0.	0.	994.7	0.0	0.0
7	1.2	855.5	0.0	214.5	0.	0.	128.3	0.0	0.0
8	2.6	761.3	0.0	0.0	0.	0.	114.2	0.0	0.0

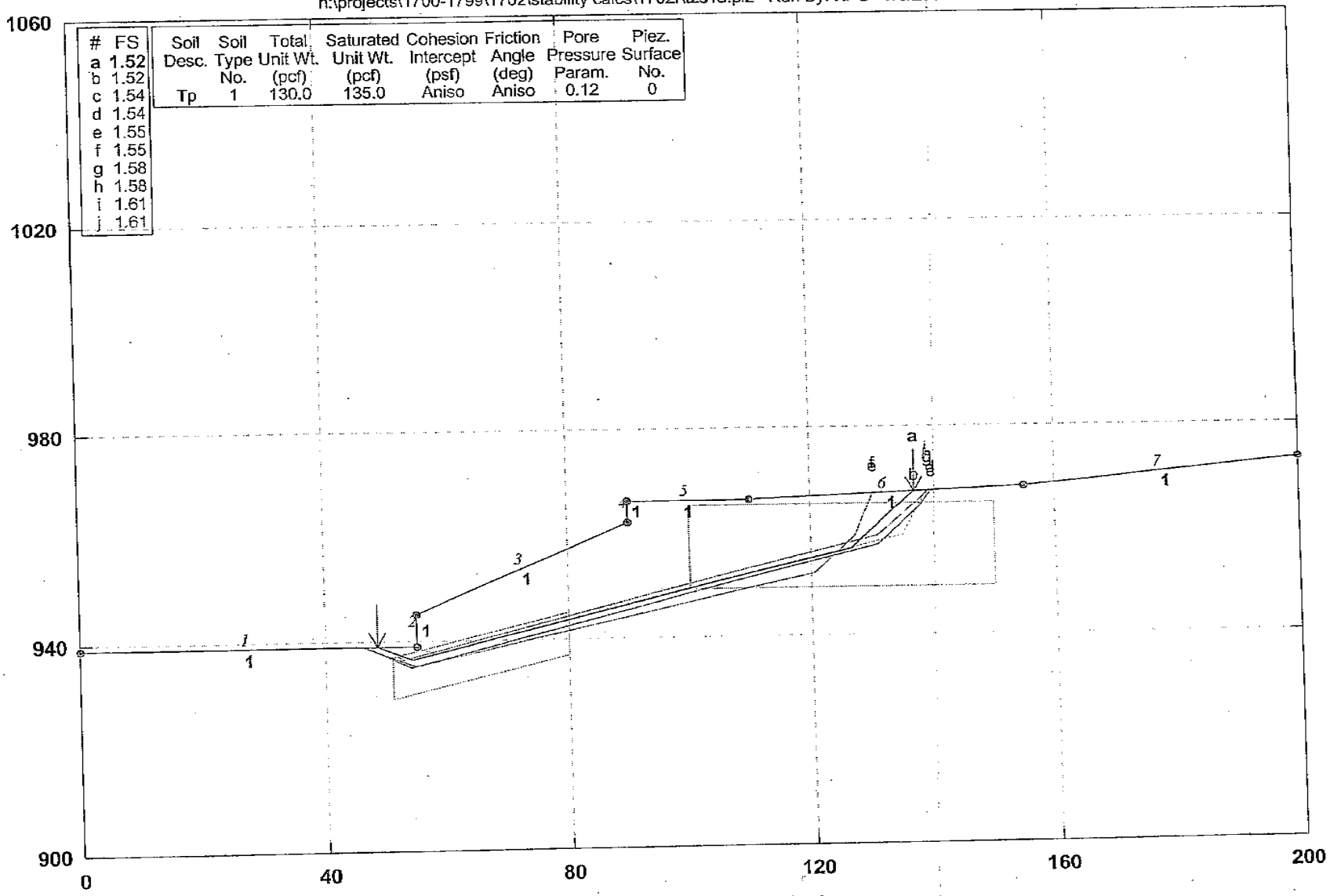
Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	117.00	938.89
2	118.10	938.71
3	157.60	951.13

```
    4          161.35       958.00
***  FOS =      1.215   Theta (ki=1.0) =     18.53   ***
                     Lambda =   0.335
```

TT 53108, 2-2'; static; planar; daylighted bedding w/ Ru=0.12

n:\projects\1700-1799\1702\stability calcs\1702r\t2s1a.pl2 Run By: KPC 7/9/2008 03:06PM



#	FS
a	1.52
b	1.52
c	1.54
d	1.54
e	1.55
f	1.55
g	1.58
h	1.58
i	1.61
j	1.61

	Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
	Tp	1	130.0	135.0	Aniso	Aniso	0.12	0

GSTABL7 v.2 FSmin=1.52

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

Run No. 3

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:          7/9/2008
Time of Run:                03:06PM
Run By:                     KPC
Input Data Filename:        N:\Projects\1700-1799\1702\Stability Calcs\1702R\t2s1a.in
Output Filename:            N:\Projects\1700-1799\1702\Stability Calcs\1702R\t2s1a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t2s1a.PLT
PROBLEM DESCRIPTION:  TT 53108, 2-2'; static; planar;
                      daylighted bedding w/ Ru=0.12
BOUNDARY COORDINATES
    7 Top   Boundaries
    7 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	939.00	55.00	939.00	1
2	55.00	939.00	55.01	945.00	1
3	55.01	945.00	90.00	962.00	1
4	90.00	962.00	90.01	966.00	1
5	90.01	966.00	110.00	966.00	1
6	110.00	966.00	155.00	968.00	1
7	155.00	968.00	200.00	973.00	1

```
User Specified Y-Origin =        900.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  1 Type(s) of Soil
```

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	130.0	135.0	185.0	31.0	0.12	0.0	0

```
ANISOTROPIC STRENGTH PARAMETERS
    1 soil type(s)
 Soil Type  1 Is Anisotropic
 Number Of Direction Ranges Specified =  3
```

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	13.5	185.00	31.00
2	16.5	200.00	18.00
3	90.0	185.00	31.00

```
 ANISOTROPIC SOIL NOTES:
    (1) An input value of 0.01 for C and/or Phi will cause Aniso
        C and/or Phi to be ignored in that range.
    (2) An input value of 0.02 for Phi will set both Phi and
        C equal to zero, with no water weight in the tension crack.
    (3) An input value of 0.03 for Phi will set both Phi and
        C equal to zero, with water weight in the tension crack.
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Sliding Block Surfaces, Has Been
 Specified.
 1000 Trial Surfaces Have Been Generated.
 2 Boxes Specified For Generation Of Central Block Base
 Length Of Line Segments For Active And Passive Portions Of
 Sliding Block Is  10.0
```

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	51.00	933.00	80.00	941.00	8.00
2	100.00	957.00	150.00	957.00	16.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2) * *
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
The option of no water in the tension crack on
the last slice has been selected.
Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.
Total Number of Trial Surfaces Evaluated = 1000
WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.
Number of Trial Surfaces with Non-Converged FS = 21
Number of Trial Surfaces with Misleading FS = 2
Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Evaluated = 2.3 %
Statistical Data On All Valid FS Values:
FS Max = 6.622 FS Min = 1.516 FS Ave = 2.738
Standard Deviation = 0.758 Coefficient of Variation = 27.70 %
((Simplified Janbu FS for Critical Surface = 1.428))

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	48.52	939.00
2	54.23	936.41
3	126.45	956.62
4	133.52	963.70
5	137.02	967.20

*** FOS = 1.516 Theta (ki=1.0) = 15.36 ***
Lambda = 0.275

Individual data on the 9 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	5.7	961.3	0.0	126.7	0.	0.	0.0	0.0	0.0
2	0.8	247.2	0.0	30.8	0.	0.	0.0	0.0	0.0
3	0.0	7.0	0.0	0.9	0.	0.	0.0	0.0	0.0
4	35.0	54470.0	0.0	6787.6	0.	0.	0.0	0.0	0.0
5	0.0	22.9	0.0	2.8	0.	0.	0.0	0.0	0.0
6	20.0	43600.2	0.0	5433.1	0.	0.	0.0	0.0	0.0
7	16.4	25754.5	0.0	3209.3	0.	0.	0.0	0.0	0.0
8	7.1	6184.6	0.0	1049.6	0.	0.	0.0	0.0	0.0
9	3.5	762.6	0.0	129.5	0.	0.	0.0	0.0	0.0

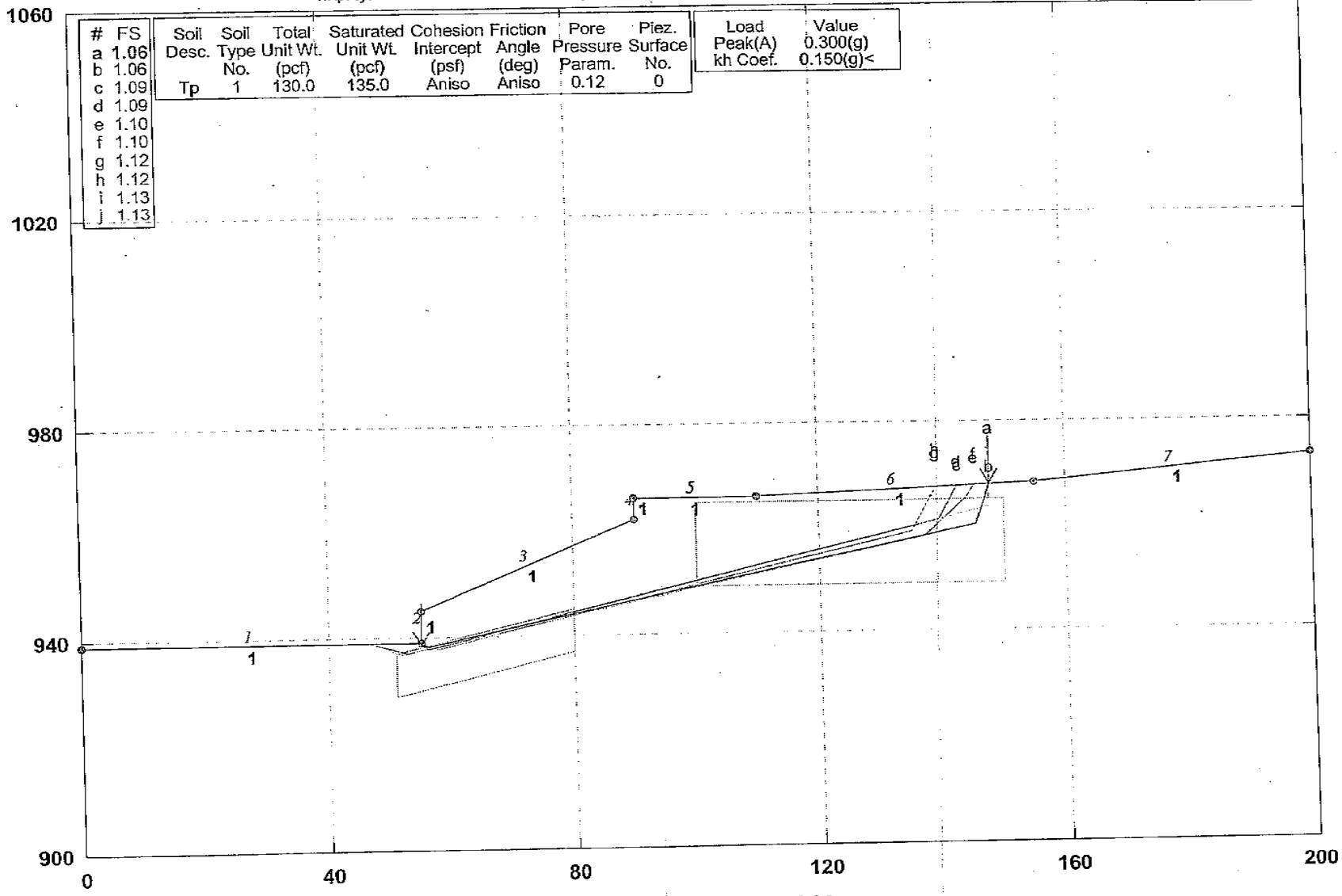
Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	48.52	939.00
2	54.23	936.41
3	126.45	956.62
4	133.52	963.70
5	137.02	967.20

*** FOS = 1.516 Theta (ki=1.0) = 15.36 ***
Lambda = 0.275

TT 53108, 2-2'; pseudo; planar; daylighted bedding w/ Ru=0.12

n:\projects\1700-1799\1702\stability calcs\1702r\t2ps1a.pl2 Run By: KPC 7/9/2008 03:07PM



GSTABL7 v.2 FSmin=1.06

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

RUN No. 4

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*****************************************************************************
Analysis Run Date:        7/9/2008
Time of Run:              03:07PM
Run By:                   KPC
Input Data Filename:      N:\Projects\1700-1799\1702\Stability Calcs\1702R\t2ps1a.in
Output Filename:          N:\Projects\1700-1799\1702\Stability Calcs\1702R\t2ps1a.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t2ps1a.PLT
PROBLEM DESCRIPTION:  TT 53108, 2-2'; pseudo; planar;
                      daylighted bedding w/ Ru=0.12

BOUNDARY COORDINATES
    7 Top   Boundaries
    7 Total Boundaries
Boundary     X-Left      Y-Left     X-Right     Y-Right     Soil Type
   No.        (ft)        (ft)        (ft)        (ft)      Below Bnd
    1         0.00       939.00      55.00       939.00        1
    2        55.00       939.00      55.01       945.00        1
    3        55.01       945.00      90.00       962.00        1
    4        90.00       962.00      90.01       966.00        1
    5        90.01       966.00     110.00       966.00        1
    6       110.00       966.00     155.00       968.00        1
    7       155.00       968.00     200.00       973.00        1
User Specified Y-Origin =        900.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 1 Type(s) of Soil
Soil  Total  Saturated  Cohesion  Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   130.0    135.0    203.0      45.0     0.12      0.0      0
ANISOTROPIC STRENGTH PARAMETERS
    1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction     Counterclockwise     Cohesion      Friction
  Range        Direction Limit    Intercept       Angle
   No.            (deg)             (psf)         (deg)
    1             13.5             203.00         45.00
    2             16.5             200.00         18.00
    3             90.0             203.00         45.00
ANISOTROPIC SOIL NOTES:
   (1) An input value of 0.01 for C and/or Phi will cause Aniso
       C and/or Phi to be ignored in that range.
   (2) An input value of 0.02 for Phi will set both Phi and
       C equal to zero, with no water weight in the tension crack.
   (3) An input value of 0.03 for Phi will set both Phi and
       C equal to zero, with water weight in the tension crack.
Specified Peak Ground Acceleration Coefficient (A) =   0.300(g)
Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
Specified Seismic Pore-Pressure Factor =   0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
```

1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 10.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	51.00	933.00	80.00	941.00	8.00
2	100.00	957.00	150.00	957.00	16.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2) * *
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
The option of no water in the tension crack on
the last slice has been selected.
Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.
Total Number of Trial Surfaces Evaluated = 1000
WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.
Number of Trial Surfaces with Non-Converged FS = 163
Number of Trial Surfaces with Misleading FS = 7
Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Evaluated = 17.0 %
Statistical Data On All Valid FS Values:
FS Max = 5.922 FS Min = 1.064 FS Ave = 2.738
Standard Deviation = 0.685 Coefficient of Variation = 25.03 %
((Simplified Janbu FS for Critical Surface = 1.018))
Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	55.00	938.53
2	56.27	938.29
3	145.59	960.25
4	147.77	967.68

*** FOS = 1.064 Theta (ki=1.0) = 13.00 ***
Lambda = 0.231
Individual data on the 7 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	0.0	4.5	0.0	0.6	0.	0.	0.7	0.0	0.0
2	1.3	1132.9	0.0	138.4	0.	0.	169.9	0.0	0.0
3	33.7	49869.1	0.0	6162.6	0.	0.	7480.4	0.0	0.0
4	0.0	22.7	0.0	2.8	0.	0.	3.4	0.0	0.0
5	20.0	44074.6	0.0	5446.5	0.	0.	6611.2	0.0	0.0
6	35.6	50513.1	0.0	6242.1	0.	0.	7577.0	0.0	0.0
7	2.2	1037.1	0.0	442.8	0.	0.	155.6	0.0	0.0

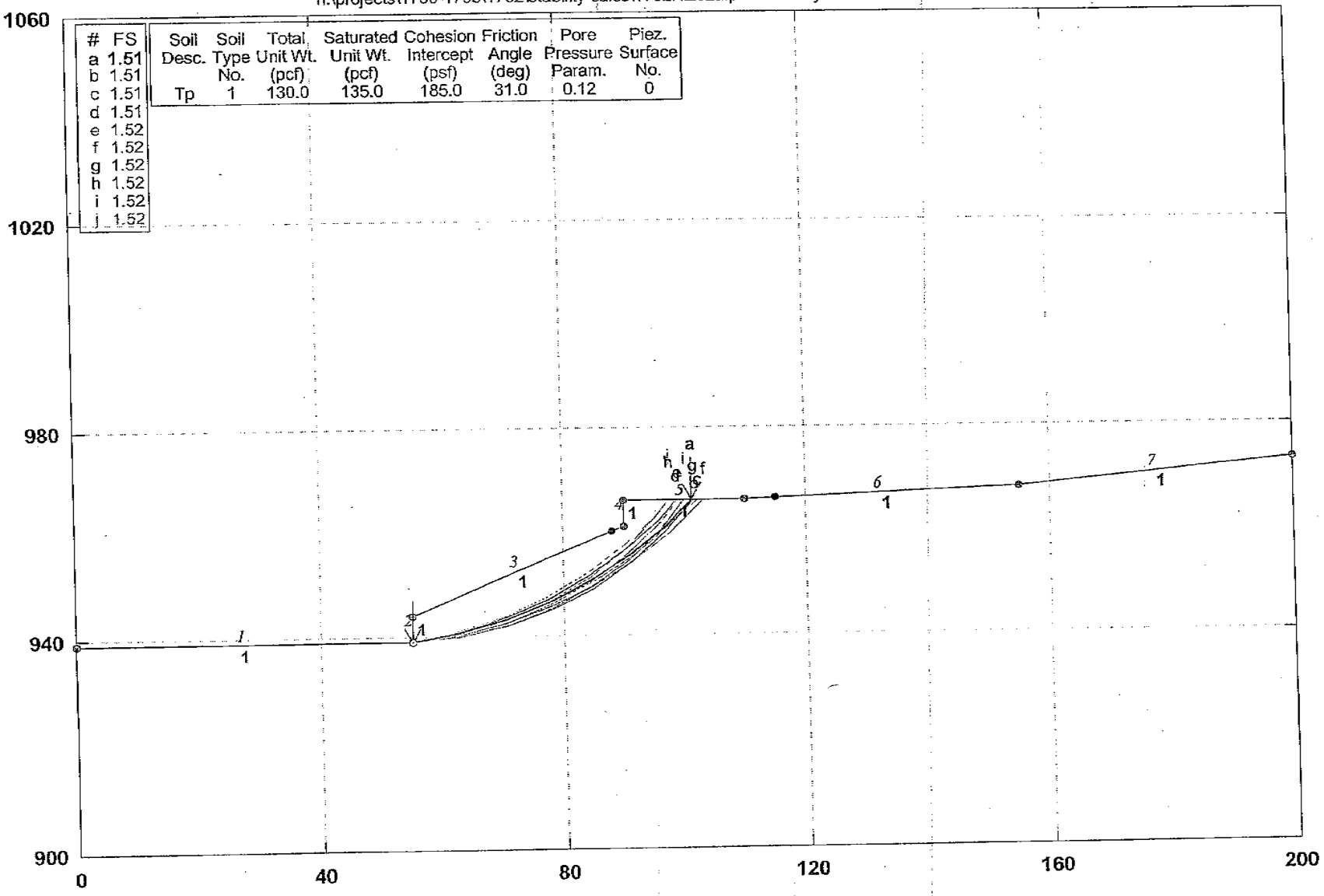
Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	55.00	938.53
2	56.27	938.29
3	145.59	960.25
4	147.77	967.68

*** FOS = 1.064 Theta (ki=1.0) = 13.00 ***
Lambda = 0.231

TT 53108, 2-2'; static; circular; daylighted bedding w/ Ru=0.12

n:\projects\1700-1799\1702\stability calcs\1702r\t2s2a.pl2 Run By: KPC 7/8/2008 09:24AM



GSTABL7 v.2 FSmin=1.51

Safety Factors Are Calculated By GLE (Spencer's) Method (0-2)

GSTABL7

Run No. 5

```
                    ***  GSTABL7  ***
          ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*************************************************************************
Analysis Run Date:          7/8/2008
Time of Run:                09:24AM
Run By:                     KPC
Input Data Filename:        N:\Projects\1700-1799\1702\Stability Calcs\1702R\t2s2a.in
Output Filename:            N:\Projects\1700-1799\1702\Stability Calcs\1702R\t2s2a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t2s2a.PLT
PROBLEM DESCRIPTION:  TT 53108, 2-2'; static; circular;
                      daylighted bedding w/ Ru=0.12

BOUNDARY COORDINATES
    7 Top   Boundaries
    7 Total Boundaries
Boundary     X-Left      Y-Left     X-Right     Y-Right    Soil Type
   No.        (ft)        (ft)       (ft)        (ft)      Below Bnd
    1         0.00       939.00      55.00      939.00        1
    2        55.00       939.00      55.01      944.00        1
    3        55.01       944.00      90.00      961.00        1
    4        90.00       961.00      90.01      966.00        1
    5        90.01       966.00     110.00      966.00        1
    6       110.00       966.00     155.00      968.00        1
    7       155.00       968.00     200.00      973.00        1
User Specified Y-Origin =        900.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 1 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept  Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)    (deg)   Param.    (psf)     No.
  1   130.0    135.0    185.0     31.0    0.12      0.0       0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
 500 Trial Surfaces Have Been Generated.
 500 Surface(s) Initiate(s) From Each Of    1 Points Equally Spaced
Along The Ground Surface Between  X =  55.00(ft)
                             and  X =  55.00(ft)
Each Surface Terminates Between   X =  88.00(ft)
                             and  X = 115.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =      0.00(ft)
 8.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -25.0
And  15.0 deg.

Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2) * *
      Selected ki function = Bi-linear
      Selected Lambda Coefficient =  1.00
      The option of no water in the tension crack on
      the last slice has been selected.
      Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
```

(if applicable) have been applied to the slice base(s)
on which they intersect.
Total Number of Trial Surfaces Evaluated = 500
WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.
Number of Trial Surfaces with Non-Converged FS = 1
Number of Trial Surfaces with Misleading FS = 1
Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Evaluated = 0.4 %
Statistical Data On All Valid FS Values:
FS Max = 2.363 FS Min = 1.507 FS Ave = 1.962
Standard Deviation = 0.260 Coefficient of Variation = 13.26 %
((Modified Bishop FS for Critical Surface = 1.508))
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	55.00	939.00
2	62.82	940.70
3	70.41	943.22
4	77.69	946.54
5	84.57	950.62
6	90.97	955.42
7	96.82	960.87
8	101.26	966.00

Circle Center At X = 43.25 ; Y = 1012.25 ; and Radius = 74.18
*** FOS = 1.507 Theta (ki=1.0) = 27.07 ***
Lambda = 0.511
Individual data on the 10 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	0.0	3.2	0.0	0.4	0.	0.	0.0	0.0	0.0
2	7.8	6139.5	0.0	753.9	0.	0.	0.0	0.0	0.0
3	7.6	7581.0	0.0	958.6	0.	0.	0.0	0.0	0.0
4	7.3	7920.0	0.0	1044.7	0.	0.	0.0	0.0	0.0
5	6.9	7251.8	0.0	1011.9	0.	0.	0.0	0.0	0.0
6	5.4	4959.8	0.0	743.6	0.	0.	0.0	0.0	0.0
7	0.0	11.5	0.0	1.7	0.	0.	0.0	0.0	0.0
8	1.0	1366.1	0.0	204.8	0.	0.	0.0	0.0	0.0
9	5.9	5974.9	0.0	980.2	0.	0.	0.0	0.0	0.0
10	4.4	1477.7	0.0	271.0	0.	0.	0.0	0.0	0.0

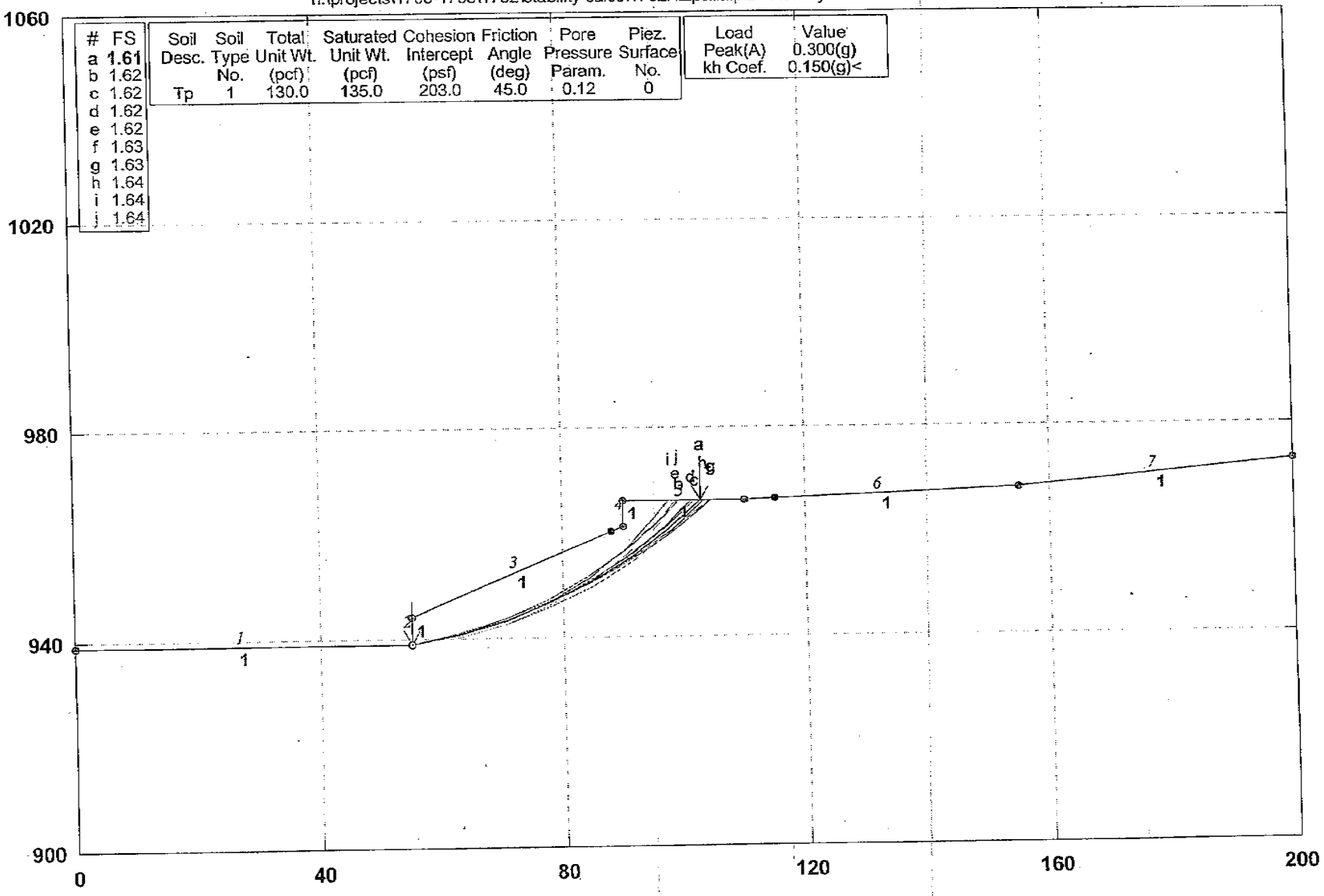
TT 53108, 2-2'; cut slope; pseudo; circular; Ru=0.12

n:\projects\1700-1799\1702\stability calcs\1702n\t2ps2a.pl2 Run By: KPC 7/8/2008 09:41AM

#	FS
a	1.61
b	1.62
c	1.62
d	1.62
e	1.62
f	1.63
g	1.63
h	1.64
i	1.64
j	1.64

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
Tp	1	130.0	135.0	203.0	45.0	0.12	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<



GSTABL7 v.2 FSmin=1.61

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

Run No. 6

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*****************************************************************************
Analysis Run Date:          7/8/2008
Time of Run:                09:41AM
Run By:                     KPC
Input Data Filename:        N:\Projects\1700-1799\1702\Stability Calcs\1702R\t2ps2a.in
Output Filename:            N:\Projects\1700-1799\1702\Stability Calcs\1702R\t2ps2a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t2ps2a.PLT
PROBLEM DESCRIPTION:  TT 53108, 2-2'; cut slope; pseudo;
                      circular; Ru=0.12
BOUNDARY COORDINATES
    7 Top   Boundaries
    7 Total Boundaries
Boundary     X-Left      Y-Left     X-Right     Y-Right     Soil Type
  No.         (ft)        (ft)        (ft)        (ft)      Below Bnd
   1          0.00      939.00       55.00      939.00         1
   2         55.00      939.00       55.01      944.00         1
   3         55.01      944.00       90.00      961.00         1
   4         90.00      961.00       90.01      966.00         1
   5         90.01      966.00      110.00      966.00         1
   6        110.00      966.00      155.00      968.00         1
   7        155.00      968.00      200.00      973.00         1
User Specified Y-Origin =        900.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 1 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept  Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)   Param.    (psf)     No.
  1   130.0    135.0     203.0     45.0    0.12       0.0      0
Specified Peak Ground Acceleration Coefficient (A) =   0.300(g)
Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
Specified Seismic Pore-Pressure Factor =   0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
 500 Trial Surfaces Have Been Generated.
 500 Surface(s) Initiate(s) From Each Of     1 Points Equally Spaced
Along The Ground Surface Between  X =  55.00(ft)
                              and  X =  55.00(ft)
Each Surface Terminates Between   X =  88.00(ft)
                              and  X = 115.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =       0.00(ft)
 8.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -25.0
And  15.0 deg.
Factor Of Safety Calculation By GLE (Spencer`s) Method of Slices
Has Gone Through 20 Iterations
 Theta        FOS        FOS
 (deg)      (Moment)   (Force)
(ki=1.0)    (Equil.)   (Equil.)   Lambda
 13.00       1.772      1.592     0.231
```

19.50	1.730	1.605	0.354
39.02	2.159	1.658	0.810
10.90	1.781	1.588	0.193
0.00	1.809	1.569	0.000
73.73	1.812	1.809	3.426
75.02	1.354	0.692	3.737
73.72	1.294	1.295	3.424
73.29	-0.769	1.198	3.332
73.86	1.319	1.331	3.457
73.87	1.098	1.726	3.458
13.17	1.771	1.593	0.234
10.84	1.781	1.588	0.192
52.56	2.334	1.725	1.306
0.00	1.809	1.569	0.000
0.00	1.809	1.569	0.000
0.00	1.809	1.564	0.000
0.00	1.809	1.564	0.000
0.00	1.809	1.564	0.000
0.00	1.809	1.564	0.000

The Trial Failure Surface In Question Is Defined
By The Following 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	55.00	939.00
2	62.83	940.66
3	70.44	943.13
4	77.75	946.38
5	84.68	950.37
6	91.15	955.07
7	97.10	960.41
8	102.14	966.00

Factor Of Safety Calculation By GLE (Spencer`s) Method of Slices
Has Gone Through 20 Iterations

Theta (deg) (ki=1.0)	FOS (Moment) (Equil.)	FOS (Force) (Equil.)	Lambda
13.00	1.742	1.594	0.231
19.50	1.714	1.606	0.354
43.37	2.078	1.668	0.945
8.10	1.755	1.586	0.142
0.00	1.769	1.573	0.000
77.37	1.637	1.655	4.464
68.81	2.214	1.885	2.580
76.79	1.745	1.811	4.259
75.01	2.289	2.069	3.735
76.24	1.264	1.263	4.083
76.25	0.042	1.048	4.087
17.61	1.724	1.603	0.317
6.47	1.758	1.583	0.113
54.64	2.393	1.723	1.409
0.00	1.769	1.573	0.000
0.00	1.769	1.573	0.000
40.63	1.635	1.659	0.858
34.74	1.473	1.641	0.693
43.90	1.809	1.670	0.962
38.37	1.125	1.651	0.792

The Trial Failure Surface In Question Is Defined
By The Following 8 Coordinate Points

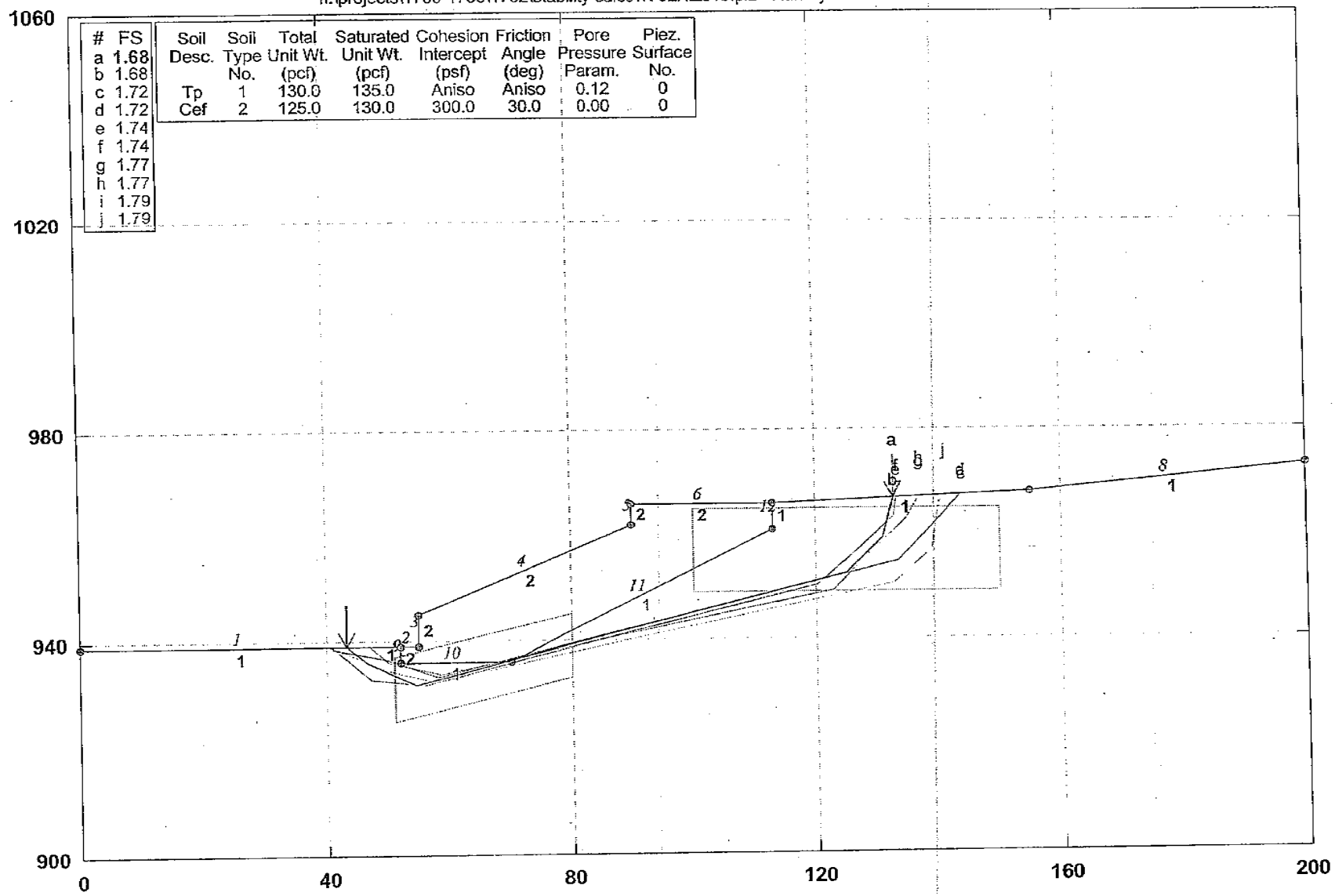
Point No.	X-Surf (ft)	Y-Surf (ft)
1	55.00	939.00
2	62.76	940.95
3	70.24	943.78
4	77.34	947.46
5	83.97	951.94
6	90.03	957.17
7	95.45	963.05

```
    8          97.58       966.00
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2) * *
      Selected ki function = Bi-linear
      Selected Lambda Coefficient =  1.00
      The option of no water in the tension crack on
      the last slice has been selected.
      Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
      (if applicable) have been applied to the slice base(s)
      on which they intersect.
      Total Number of Trial Surfaces Evaluated =   500
      WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
      Did Not Converge in 20 Iterations.
      Number of Trial Surfaces with Non-Converged FS =    2
      Percentage of Trial Surfaces With Non-Valid FS Solutions
      of the Total Evaluated =   0.4 %
      Statistical Data On All Valid FS Values:
         FS Max =   2.463   FS Min =   1.608   FS Ave =   2.094
         Standard Deviation =    0.258   Coefficient of Variation =   12.31 %
                 ((Modified Bishop FS for Critical Surface =  1.639))
      Failure Surface Specified By  8 Coordinate Points
        Point       X-Surf       Y-Surf
         No.         (ft)         (ft)
          1          55.00       939.00
          2          62.81       940.73
          3          70.41       943.22
          4          77.73       946.46
          5          84.69       950.41
          6          91.22       955.02
          7          97.26       960.27
          8         102.68       966.00
      Circle Center At X =    41.54 ; Y =  1018.37 ; and Radius =    80.50
      ***  FOS =     1.608   Theta (ki=1.0) =    19.47  ***
                          Lambda =   0.353
            Individual data on the    10  slices
```

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	0.0	3.2	0.0	0.4	0.	0.	0.5	0.0	0.0
2	7.8	6115.0	0.0	751.5	0.	0.	917.2	0.0	0.0
3	7.6	7569.9	0.0	956.1	0.	0.	1135.5	0.0	0.0
4	7.3	8007.0	0.0	1050.7	0.	0.	1201.0	0.0	0.0
5	7.0	7504.0	0.0	1035.2	0.	0.	1125.6	0.0	0.0
6	5.3	5128.6	0.0	753.6	0.	0.	769.3	0.0	0.0
7	0.0	12.1	0.0	1.8	0.	0.	1.8	0.0	0.0
8	1.2	1793.8	0.0	263.6	0.	0.	269.1	0.0	0.0
9	6.0	6563.2	0.0	1042.7	0.	0.	984.5	0.0	0.0
10	5.4	2017.9	0.0	352.7	0.	0.	302.7	0.0	0.0

TT 53108, 2-2'; static; planar; Ru=0.12; stab. fill w/ 3'd by 15'w key

n:\projects\1700-1799\1702\stability calcs\1702r\t2s1b.pl2 Run By: KPC 7/10/2008 11:29AM



#	FS
a	1.68
b	1.68
c	1.72
d	1.72
e	1.74
f	1.74
g	1.77
h	1.77
i	1.79
j	1.79

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
Tp	1	130.0	135.0	Aniso	Aniso	0.12	0
Cef	2	125.0	130.0	300.0	30.0	0.00	0

GSTABL7 v.2 FSmin=1.68

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

RUN No. 7

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*************************************************************************
Analysis Run Date:          7/10/2008
Time of Run:                11:29AM
Run By:                     KPC
Input Data Filename:        N:\Projects\1700-1799\1702\Stability Calcs\1702R\t2s1b.in
Output Filename:            N:\Projects\1700-1799\1702\Stability Calcs\1702R\t2s1b.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t2s1b.PLT
PROBLEM DESCRIPTION:  TT 53108, 2-2'; static; planar;
                      Ru=0.12; stab. fill w/ 3'd by 15'w key
BOUNDARY COORDINATES
    8 Top   Boundaries
   12 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	939.00	52.00	939.00	1
2	52.00	939.00	55.00	939.00	2
3	55.00	939.00	55.01	945.00	2
4	55.01	945.00	90.00	962.00	2
5	90.00	962.00	90.01	966.00	2
6	90.01	966.00	113.00	966.00	2
7	113.00	966.00	155.00	968.00	1
8	155.00	968.00	200.00	973.00	1
9	52.00	939.00	52.01	936.00	1
10	52.01	936.00	70.00	936.00	1
11	70.00	936.00	112.99	961.00	1
12	112.99	961.00	113.00	966.00	1

```
User Specified Y-Origin =        900.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
```

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	130.0	135.0	185.0	31.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

```
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
```

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	13.5	185.00	31.00
2	16.5	200.00	18.00
3	90.0	185.00	31.00

```
ANISOTROPIC SOIL NOTES:
    (1) An input value of 0.01 for C and/or Phi will cause Aniso
        C and/or Phi to be ignored in that range.
    (2) An input value of 0.02 for Phi will set both Phi and
        C equal to zero, with no water weight in the tension crack.
    (3) An input value of 0.03 for Phi will set both Phi and
        C equal to zero, with water weight in the tension crack.
A Critical Failure Surface Searching Method, Using A Random
```

Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 9.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	51.00	931.00	80.00	939.00	12.00
2	100.00	957.00	150.00	957.00	16.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2) * *
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
The option of no water in the tension crack on
the last slice has been selected.
Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.
Total Number of Trial Surfaces Evaluated = 1000
WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.
Number of Trial Surfaces with Non-Converged FS = 44
Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Evaluated = 4.4 %
Statistical Data On All Valid FS Values:
FS Max = 8.709 FS Min = 1.682 FS Ave = 3.037
Standard Deviation = 0.904 Coefficient of Variation = 29.78 %
((Simplified Janbu FS for Critical Surface = 1.539))
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	43.24	939.00
2	46.56	935.93
3	54.59	931.86
4	124.91	952.48
5	130.95	959.15
6	132.69	966.94

*** FOS = 1.682 Theta (ki=1.0) = 13.02 ***
Lambda = 0.231
Individual data on the 15 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	3.3	662.3	0.0	108.3	0.	0.	0.0	0.0	0.0
2	5.4	3145.9	0.0	423.3	0.	0.	0.0	0.0	0.0
3	0.0	7.5	0.0	1.0	0.	0.	0.0	0.0	0.0
4	2.6	2135.0	0.0	287.3	0.	0.	0.0	0.0	0.0
5	0.4	373.2	0.0	46.7	0.	0.	0.0	0.0	0.0
6	0.0	12.7	0.0	1.6	0.	0.	0.0	0.0	0.0
7	13.7	24687.9	0.0	3087.2	0.	0.	0.0	0.0	0.0
8	2.6	5172.9	0.0	0.0	0.	0.	0.0	0.0	0.0
9	18.7	42203.1	0.0	5277.5	0.	0.	0.0	0.0	0.0
10	0.0	27.5	0.0	3.4	0.	0.	0.0	0.0	0.0
11	23.0	59563.4	0.0	7448.4	0.	0.	0.0	0.0	0.0
12	0.0	22.0	0.0	2.8	0.	0.	0.0	0.0	0.0
13	11.9	24085.2	0.0	3011.9	0.	0.	0.0	0.0	0.0
14	6.0	8559.9	0.0	1530.3	0.	0.	0.0	0.0	0.0
15	1.7	869.6	0.0	479.9	0.	0.	0.0	0.0	0.0

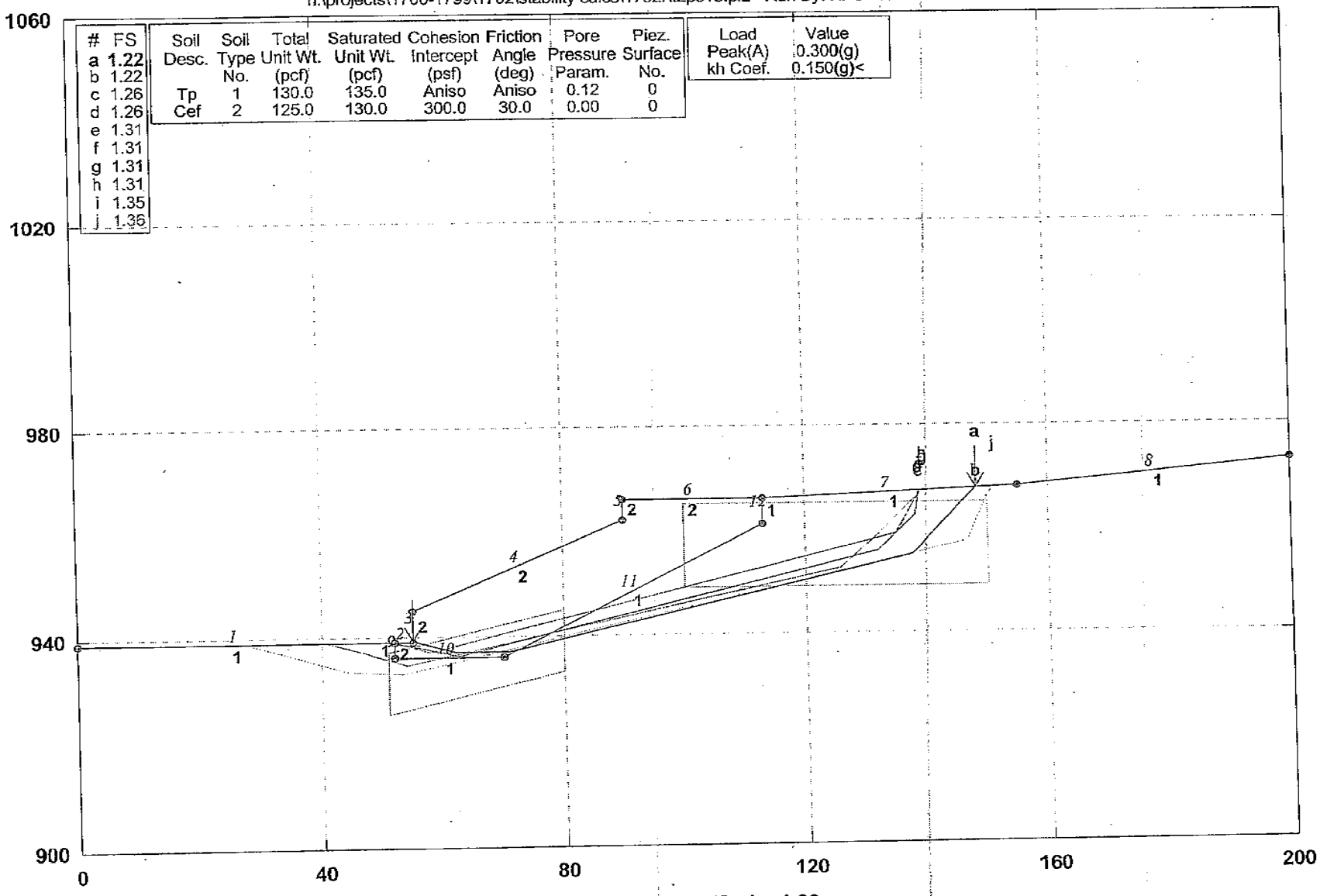
TT 53108, 2-2'; pseudo; planar; Ru=0.12; stab. fill w/ 3'd by 15'w key

n:\projects\1700-1799\1702\stability calcs\1702r\t2ps1b.pl2 Run By: KPC 7/10/2008 11:31AM

#	FS
a	1.22
b	1.22
c	1.26
d	1.26
e	1.31
f	1.31
g	1.31
h	1.31
i	1.35
j	1.36

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
Tp	1	130.0	135.0	Aniso	Aniso	0.12	0
Cef	2	125.0	130.0	300.0	30.0	0.00	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<



GSTABL7 v.2 FSmin=1.22

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

Run No. 8

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*************************************************************************
Analysis Run Date:          7/10/2008
Time of Run:                11:31AM
Run By:                     KPC
Input Data Filename:        N:\Projects\1700-1799\1702\Stability Calcs\1702R\t2ps1b.in
Output Filename:            N:\Projects\1700-1799\1702\Stability Calcs\1702R\t2ps1b.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t2ps1b.PLT
PROBLEM DESCRIPTION:  TT 53108, 2-2'; pseudo; planar;
                      Ru=0.12; stab. fill w/ 3'd by 15'w key
BOUNDARY COORDINATES
    8 Top   Boundaries
   12 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	939.00	52.00	939.00	1
2	52.00	939.00	55.00	939.00	2
3	55.00	939.00	55.01	945.00	2
4	55.01	945.00	90.00	962.00	2
5	90.00	962.00	90.01	966.00	2
6	90.01	966.00	113.00	966.00	2
7	113.00	966.00	155.00	968.00	1
8	155.00	968.00	200.00	973.00	1
9	52.00	939.00	52.01	936.00	1
10	52.01	936.00	70.00	936.00	1
11	70.00	936.00	112.99	961.00	1
12	112.99	961.00	113.00	966.00	1

```
User Specified Y-Origin =        900.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
```

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	130.0	135.0	203.0	45.0	0.12	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0

```
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  1 Is Anisotropic
 Number Of Direction Ranges Specified =  3
```

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	13.5	203.00	45.00
2	16.5	200.00	18.00
3	90.0	203.00	45.00

```
 ANISOTROPIC SOIL NOTES:
    (1) An input value of 0.01 for C and/or Phi will cause Aniso
        C and/or Phi to be ignored in that range.
    (2) An input value of 0.02 for Phi will set both Phi and
        C equal to zero, with no water weight in the tension crack.
    (3) An input value of 0.03 for Phi will set both Phi and
        C equal to zero, with water weight in the tension crack.
 Specified Peak Ground Acceleration Coefficient (A) =    0.300(g)
```

Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 9.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	51.00	931.00	80.00	939.00	12.00
2	100.00	957.00	150.00	957.00	16.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2) * *
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
The option of no water in the tension crack on
the last slice has been selected.
Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.
Total Number of Trial Surfaces Evaluated = 1000
WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.
Number of Trial Surfaces with Non-Converged FS = 157
Number of Trial Surfaces with Misleading FS = 13
Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Evaluated = 17.0 %
Statistical Data On All Valid FS Values:
FS Max = 5.607 FS Min = 1.221 FS Ave = 2.639
Standard Deviation = 0.710 Coefficient of Variation = 26.89 %
((Simplified Janbu FS for Critical Surface = 1.170))
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	55.00	939.35
2	61.97	937.11
3	70.97	936.95
4	137.73	955.05
5	143.42	962.02
6	148.18	967.68

*** FOS = 1.221 Theta (ki=1.0) = 11.76 ***
Lambda = 0.208
Individual data on the 11 slices

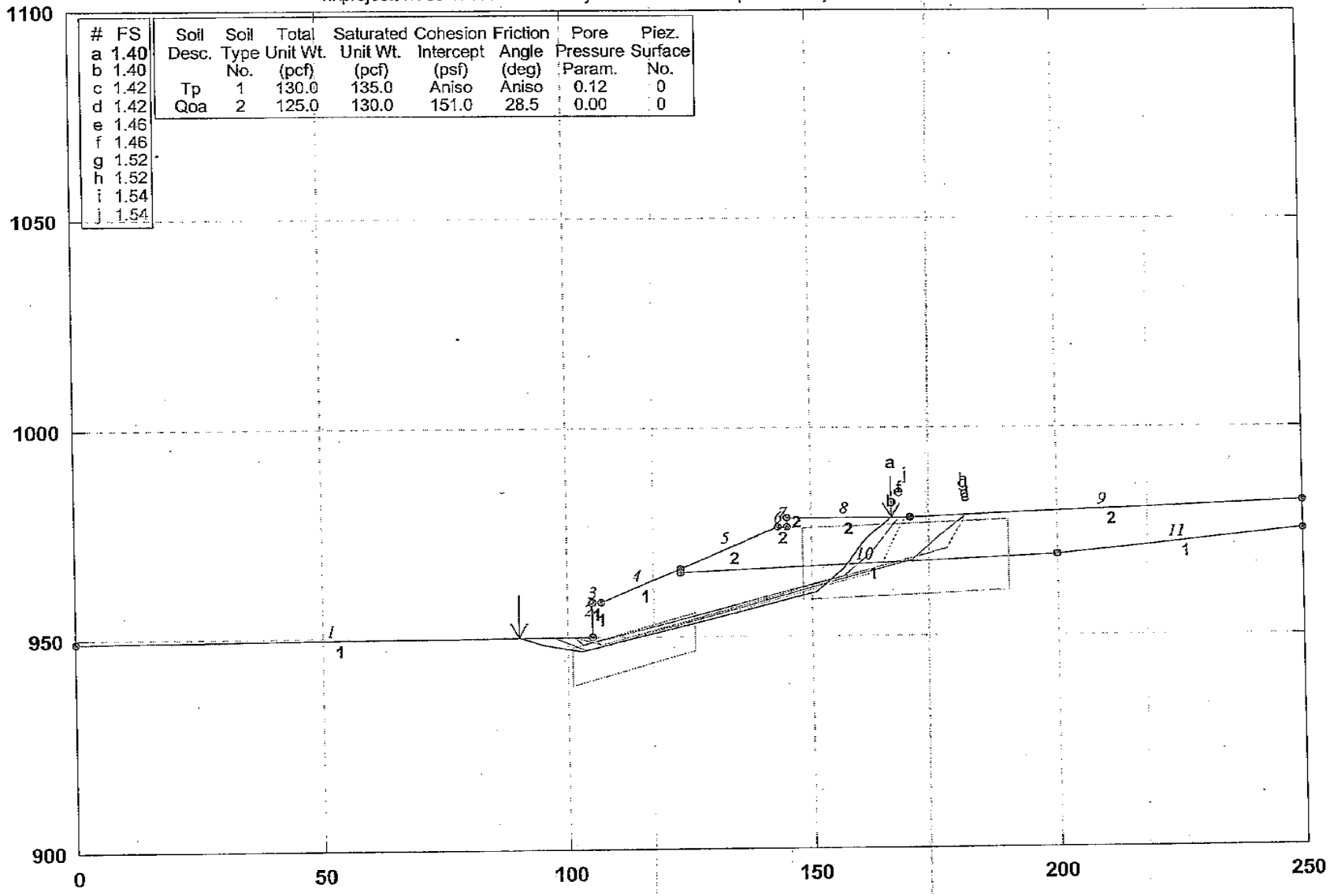
Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	0.0	3.3	0.0	0.0	0.	0.	0.5	0.0	0.0
2	7.0	7367.3	0.0	0.0	0.	0.	1105.1	0.0	0.0
3	9.0	15229.7	0.0	0.0	0.	0.	2284.5	0.0	0.0
4	1.2	2459.8	0.0	0.0	0.	0.	369.0	0.0	0.0
5	17.8	40244.2	0.0	5003.6	0.	0.	6036.6	0.0	0.0
6	0.0	27.6	0.0	3.4	0.	0.	4.1	0.0	0.0
7	23.0	60723.1	0.0	7549.8	0.	0.	9108.5	0.0	0.0
8	0.0	22.8	0.0	2.8	0.	0.	3.4	0.0	0.0
9	24.7	47883.4	0.0	5953.4	0.	0.	7182.5	0.0	0.0
10	5.7	6492.1	0.0	1232.7	0.	0.	973.8	0.0	0.0
11	4.8	1679.9	0.0	313.0	0.	0.	252.0	0.0	0.0

TT 53108, 3-3'; static; planar; daylighted bedding w/ Ru=0.12

n:\projects\1700-1799\1702\stability calcs\1702r\t3s1a.pl2 Run By: KPC 7/9/2008 02:51PM

#	FS
a	1.40
b	1.40
c	1.42
d	1.42
e	1.46
f	1.46
g	1.52
h	1.52
i	1.54
j	1.54

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
Tp	1	130.0	135.0	Aniso	Aniso	0.12	0
Qoa	2	125.0	130.0	151.0	28.5	0.00	0



GSTABL7 v.2 FSmin=1.40

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

Run No. 9

```
                    ***  GSTABL7  ***
            ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:          7/9/2008
Time of Run:                02:51PM
Run By:                     KPC
Input Data Filename:        N:\Projects\1700-1799\1702\Stability Calcs\1702R\t3s1a.in
Output Filename:            N:\Projects\1700-1799\1702\Stability Calcs\1702R\t3s1a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t3s1a.PLT
PROBLEM DESCRIPTION:   TT 53108, 3-3'; static; planar;
                       daylighted bedding w/ Ru=0.12
BOUNDARY COORDINATES
    9 Top   Boundaries
   11 Total Boundaries
Boundary     X-Left      Y-Left      X-Right     Y-Right     Soil Type
   No.        (ft)        (ft)        (ft)        (ft)      Below Bnd
    1         0.00       949.00      105.00      950.00        1
    2       105.00       950.00      105.01      958.00        1
    3       105.01       958.00      107.00      958.00        1
    4       107.00       958.00      123.00      966.00        1
    5       123.00       966.00      143.00      976.00        2
    6       143.00       976.00      145.00      976.00        2
    7       145.00       976.00      145.01      978.00        2
    8       145.01       978.00      170.00      978.00        2
    9       170.00       978.00      250.00      982.00        2
   10       123.00       965.00      200.00      969.00        1
   11       200.00       969.00      250.00      975.00        1
 User Specified Y-Origin =        900.00(ft)
 Default X-Plus Value = 0.00(ft)
 Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
 Soil  Total  Saturated  Cohesion  Friction   Pore    Pressure   Piez.
 Type Unit Wt. Unit Wt. Intercept   Angle   Pressure Constant Surface
  No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
   1   130.0    135.0     185.0     31.0     0.12      0.0      0
   2   125.0    130.0     151.0     28.5     0.00      0.0      0
ANISOTROPIC STRENGTH PARAMETERS
    1 soil type(s)
 Soil Type  1 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise    Cohesion     Friction
   Range       Direction Limit   Intercept      Angle
   No.            (deg)            (psf)        (deg)
    1             15.5            185.00        31.00
    2             18.5            200.00        18.00
    3             90.0            185.00        31.00
 ANISOTROPIC SOIL NOTES:
    (1) An input value of 0.01 for C and/or Phi will cause Aniso
        C and/or Phi to be ignored in that range.
    (2) An input value of 0.02 for Phi will set both Phi and
        C equal to zero, with no water weight in the tension crack.
    (3) An input value of 0.03 for Phi will set both Phi and
        C equal to zero, with water weight in the tension crack.
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Sliding Block Surfaces, Has Been
```

Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 8.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	101.00	943.00	126.00	951.00	9.00
2	148.00	967.00	190.00	969.00	17.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2) * *
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
The option of no water in the tension crack on
the last slice has been selected.
Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.
Total Number of Trial Surfaces Evaluated = 1000
WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.
Number of Trial Surfaces with Non-Converged FS = 62
Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Evaluated = 6.2 %
Statistical Data On All Valid FS Values:
FS Max = 6.363 FS Min = 1.401 FS Ave = 2.752
Standard Deviation = 0.744 Coefficient of Variation = 27.04 %
((Simplified Janbu FS for Critical Surface = 1.313))
Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	89.85	949.86
2	94.93	948.06
3	102.79	946.60
4	150.91	960.37
5	156.54	966.06
6	160.92	972.75
7	166.16	978.00

*** FOS = 1.401 Theta (ki=1.0) = 16.72 ***
Lambda = 0.300
Individual data on the 14 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	5.1	607.7	0.0	77.3	0.	0.	0.0	0.0	0.0
2	7.9	2667.3	0.0	325.5	0.	0.	0.0	0.0	0.0
3	2.2	881.0	0.0	110.0	0.	0.	0.0	0.0	0.0
4	0.0	8.8	0.0	1.1	0.	0.	0.0	0.0	0.0
5	2.0	2710.6	0.0	338.3	0.	0.	0.0	0.0	0.0
6	16.0	24761.7	0.0	3090.6	0.	0.	0.0	0.0	0.0
7	20.0	40415.6	0.0	5044.4	0.	0.	0.0	0.0	0.0
8	2.0	4479.1	0.0	559.1	0.	0.	0.0	0.0	0.0
9	0.0	23.3	0.0	2.9	0.	0.	0.0	0.0	0.0
10	5.9	13824.5	0.0	1725.5	0.	0.	0.0	0.0	0.0
11	5.6	10493.7	0.0	1790.8	0.	0.	0.0	0.0	0.0
12	0.5	675.2	0.0	147.8	0.	0.	0.0	0.0	0.0
13	3.9	4040.6	0.0	0.0	0.	0.	0.0	0.0	0.0
14	5.2	1721.0	0.0	0.0	0.	0.	0.0	0.0	0.0

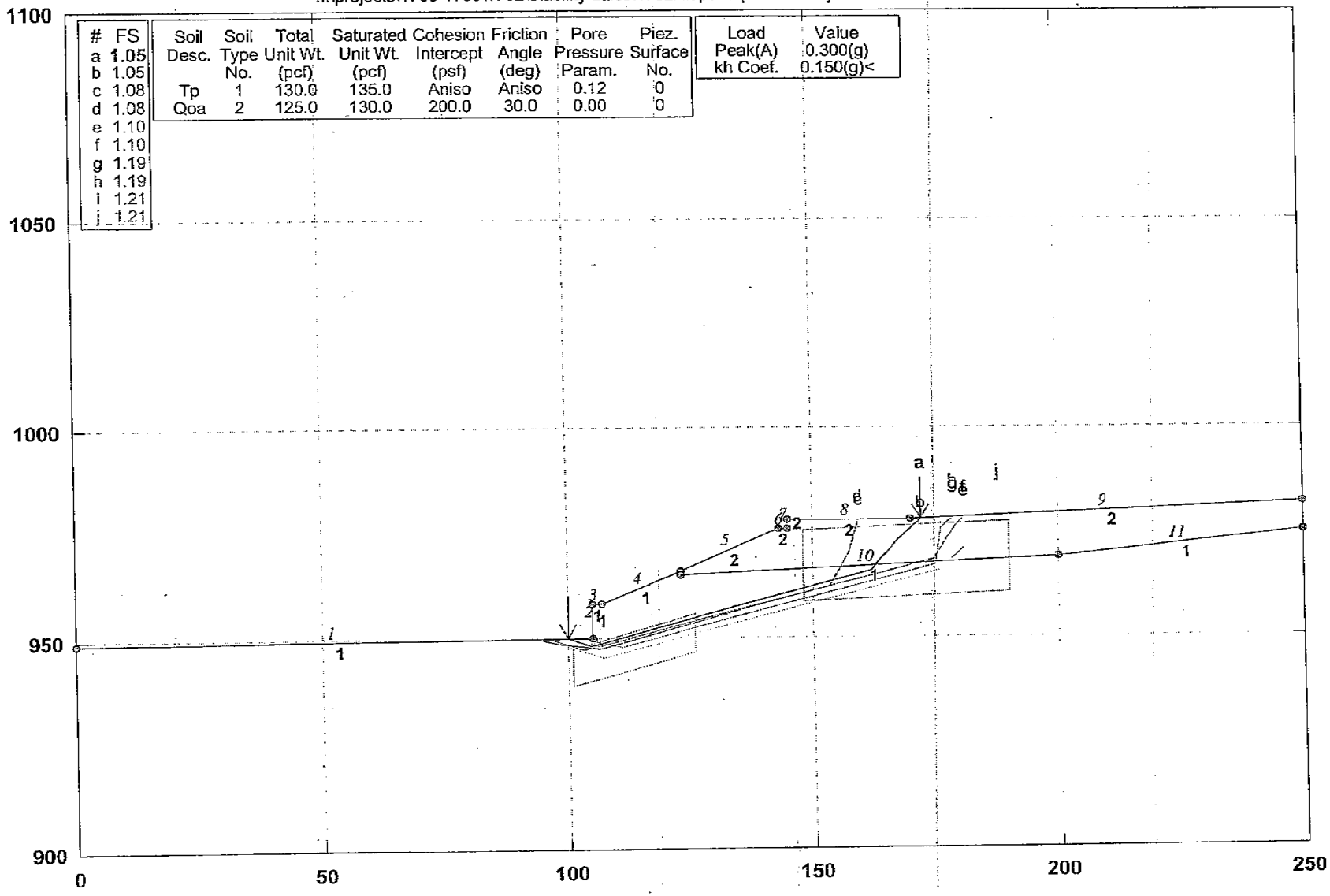
TT 53108, 3-3'; pseudo; planar; daylighted bedding w/ Ru=0.12

n:\projects\1700-1799\1702\stability calcs\1702r\t3ps1a.pl2 Run By: KPC 7/9/2008 02:51PM

#	FS
a	1.05
b	1.05
c	1.08
d	1.08
e	1.10
f	1.10
g	1.19
h	1.19
i	1.21
j	1.21

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
Tp	1	130.0	135.0	Aniso	Aniso	0.12	0
Qoa	2	125.0	130.0	200.0	30.0	0.00	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<



GSTABL7 v.2 FSmin=1.05

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

Run No. 10

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*****************************************************************************
Analysis Run Date:          7/9/2008
Time of Run:                02:51PM
Run By:                     KPC
Input Data Filename:        N:\Projects\1700-1799\1702\Stability Calcs\1702R\t3ps1a.in
Output Filename:            N:\Projects\1700-1799\1702\Stability Calcs\1702R\t3ps1a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t3ps1a.PLT
PROBLEM DESCRIPTION:  TT 53108, 3-3'; pseudo; planar;
                      daylighted bedding w/ Ru=0.12
BOUNDARY COORDINATES
    9 Top   Boundaries
   11 Total Boundaries
Boundary     X-Left      Y-Left     X-Right     Y-Right    Soil Type
   No.        (ft)        (ft)        (ft)        (ft)     Below Bnd
    1         0.00       949.00      105.00      950.00        1
    2       105.00       950.00      105.01      958.00        1
    3       105.01       958.00      107.00      958.00        1
    4       107.00       958.00      123.00      966.00        1
    5       123.00       966.00      143.00      976.00        2
    6       143.00       976.00      145.00      976.00        2
    7       145.00       976.00      145.01      978.00        2
    8       145.01       978.00      170.00      978.00        2
    9       170.00       978.00      250.00      982.00        2
   10       123.00       965.00      200.00      969.00        1
   11       200.00       969.00      250.00      975.00        1
User Specified Y-Origin =        900.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
Soil  Total  Saturated  Cohesion  Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle   Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   130.0    135.0     203.0     45.0     0.12      0.0      0
  2   125.0    130.0     200.0     30.0     0.00      0.0      0
ANISOTROPIC STRENGTH PARAMETERS
    1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction    Counterclockwise     Cohesion      Friction
  Range       Direction Limit    Intercept       Angle
   No.            (deg)            (psf)         (deg)
    1             15.5             203.00        45.00
    2             18.5             200.00        18.00
    3             90.0             203.00        45.00
ANISOTROPIC SOIL NOTES:
   (1) An input value of 0.01 for C and/or Phi will cause Aniso
       C and/or Phi to be ignored in that range.
   (2) An input value of 0.02 for Phi will set both Phi and
       C equal to zero, with no water weight in the tension crack.
   (3) An input value of 0.03 for Phi will set both Phi and
       C equal to zero, with water weight in the tension crack.
Specified Peak Ground Acceleration Coefficient (A) =   0.300(g)
Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
```

Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 9.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	101.00	943.00	126.00	951.00	9.00
2	148.00	967.00	190.00	969.00	17.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2) * *
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
The option of no water in the tension crack on
the last slice has been selected.
Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.
Total Number of Trial Surfaces Evaluated = 1000
WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.
Number of Trial Surfaces with Non-Converged FS = 214
Number of Trial Surfaces with Misleading FS = 14
Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Evaluated = 22.8 %
Statistical Data On All Valid FS Values:
FS Max = 6.754 FS Min = 1.052 FS Ave = 2.797
Standard Deviation = 0.676 Coefficient of Variation = 24.17 %
((Simplified Janbu FS for Critical Surface = 0.932))
Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	100.00	949.95
2	104.54	947.98
3	161.97	965.85
4	167.41	973.03
5	172.21	978.11

*** FOS = 1.052 Theta (ki=1.0) = 15.48 ***
Lambda = 0.277
Individual data on the 13 slices

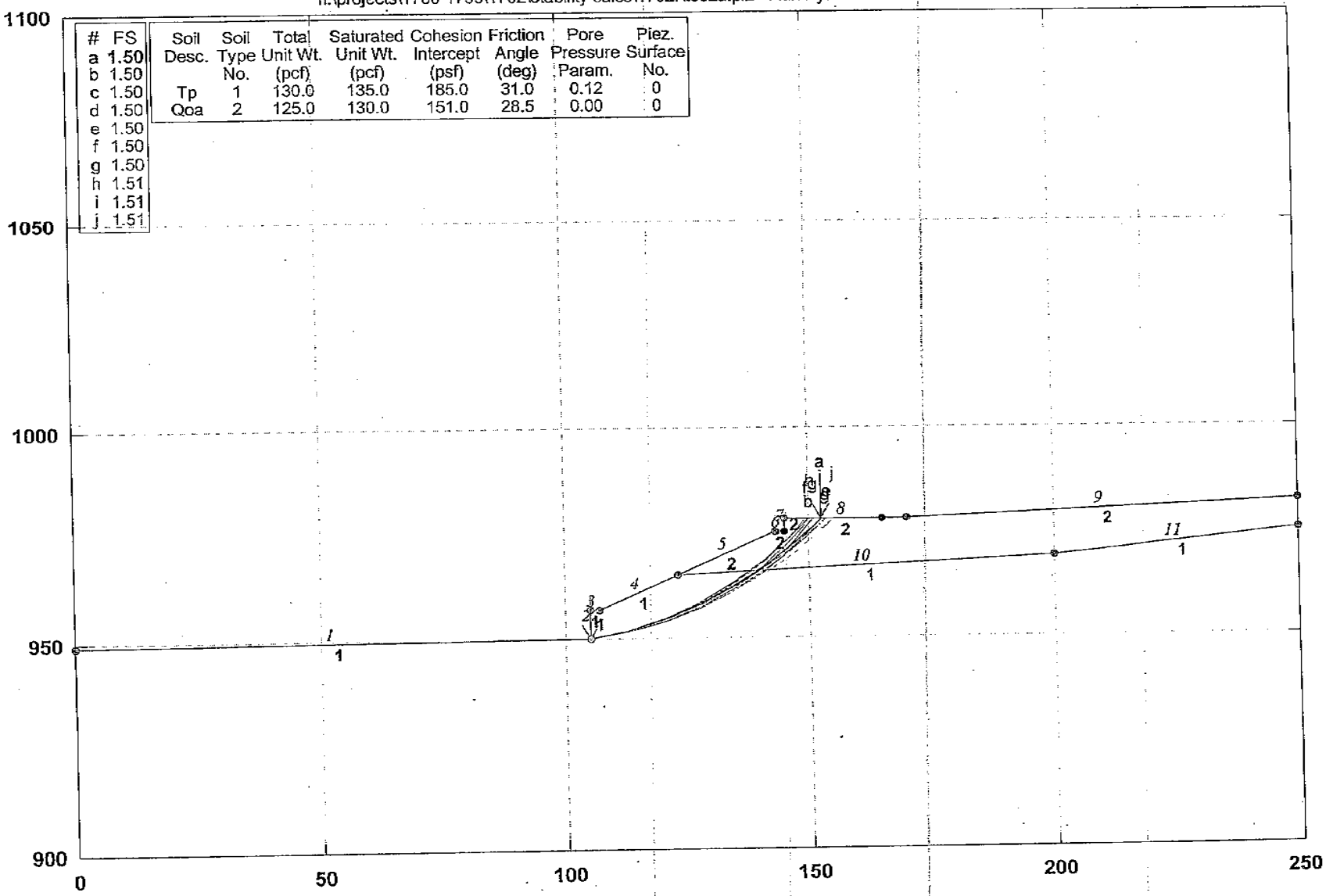
Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	4.5	595.6	0.0	77.9	0.	0.	89.3	0.0	0.0
2	0.5	115.3	0.0	14.5	0.	0.	17.3	0.0	0.0
3	0.0	7.6	0.0	1.0	0.	0.	1.1	0.0	0.0
4	2.0	2474.8	0.0	311.0	0.	0.	371.2	0.0	0.0
5	16.0	22394.5	0.0	2814.5	0.	0.	3359.2	0.0	0.0
6	20.0	36277.7	0.0	4559.3	0.	0.	5441.7	0.0	0.0
7	2.0	3993.3	0.0	501.9	0.	0.	599.0	0.0	0.0
8	0.0	20.8	0.0	2.6	0.	0.	3.1	0.0	0.0
9	17.0	31637.2	0.0	3976.1	0.	0.	4745.6	0.0	0.0
10	0.9	1331.8	0.0	264.8	0.	0.	199.8	0.0	0.0
11	4.5	4480.9	0.0	0.0	0.	0.	672.1	0.0	0.0
12	2.6	1167.1	0.0	0.0	0.	0.	175.1	0.0	0.0
13	2.2	308.0	0.0	0.0	0.	0.	46.2	0.0	0.0

TT 53108, 3-3'; static; circular; daylighted bedding w/ Ru=0.12

n:\projects\1700-1799\1702\stability calcs\1702r\t3s2a.pl2 Run By: KPC 7/9/2008 02:19PM

#	FS
a	1.50
b	1.50
c	1.50
d	1.50
e	1.50
f	1.50
g	1.50
h	1.51
i	1.51
j	1.51

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
Tp	1	130.0	135.0	185.0	31.0	0.12	0
Qoa	2	125.0	130.0	151.0	28.5	0.00	0



GSTABL7 v.2 FSmin=1.50

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

Run No. 11

```
                    ***  GSTABL7  ***
          ** GSTABL7 by Garry H. Gregory, P.E. **
  ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
     Modified Bishop, Simplified Janbu, or GLE Method of Slices.
     (Includes Spencer & Morgenstern-Price Type Analysis)
     Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
     Nonlinear Undrained Shear Strength, Curved Phi Envelope,
     Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
     Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*****************************************************************************
Analysis Run Date:          7/9/2008
Time of Run:                02:19PM
Run By:                     KPC
Input Data Filename:        N:\Projects\1700-1799\1702\Stability Calcs\1702R\t3s2a.in
Output Filename:            N:\Projects\1700-1799\1702\Stability Calcs\1702R\t3s2a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\1700-1799\1702\Stabi-Calcs\1702R\t3s2a.PLT
PROBLEM DESCRIPTION:  TT 53108, 3-3'; static; circular;
                      daylighted bedding w/ Ru=0.12

BOUNDARY COORDINATES
   9 Top   Boundaries
  11 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	949.00	105.00	950.00	1
2	105.00	950.00	105.01	957.00	1
3	105.01	957.00	107.00	957.00	1
4	107.00	957.00	123.00	965.00	1
5	123.00	965.00	143.00	975.00	2
6	143.00	975.00	145.00	975.00	2
7	145.00	975.00	145.01	978.00	2
8	145.01	978.00	170.00	978.00	2
9	170.00	978.00	250.00	982.00	2
10	123.00	965.00	200.00	969.00	1
11	200.00	969.00	250.00	975.00	1

```
User Specified Y-Origin =        900.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
```

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	130.0	135.0	185.0	31.0	0.12	0.0	0
2	125.0	130.0	151.0	28.5	0.00	0.0	0

```
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
 750 Trial Surfaces Have Been Generated.
 750 Surface(s) Initiate(s) From Each Of     1 Points Equally Spaced
Along The Ground Surface Between  X = 105.00(ft)
                              and  X = 105.00(ft)
Each Surface Terminates Between   X = 145.00(ft)
                              and  X = 165.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =       0.00(ft)
 8.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -20.0
And  15.0 deg.
Factor Of Safety Calculation By GLE (Spencer`s) Method of Slices
Has Gone Through 20 Iterations
 Theta        FOS        FOS
 (deg)      (Moment)   (Force)
 (ki=1.0)   (Equil.)   (Equil.)   Lambda
```

13.00	1.606	1.473	0.231
19.50	1.577	1.481	0.354
40.81	25.987	1.517	0.863
19.39	1.577	1.481	0.352
12.14	1.609	1.471	0.215
44.04	2.823	1.524	0.967
7.10	1.622	1.465	0.125
0.00	1.633	1.456	0.000
83.69	1.428	20.000	9.047
1.05	1.631	1.457	0.018
0.00	1.633	1.456	0.000
89.94	1.408	307.372	*****
0.07	1.633	1.456	0.001
0.00	1.633	1.456	0.000
89.94	1.408	0.434	*****
0.00	1.633	1.456	0.000
0.00	1.633	1.456	0.000
0.00	1.631	1.456	0.000
0.00	1.631	1.456	0.000
0.00	1.631	1.456	0.000

The Trial Failure Surface In Question Is Defined
By The Following 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	105.00	950.00
2	112.74	952.03
3	120.24	954.81
4	127.43	958.31
5	134.24	962.52
6	140.60	967.37
7	146.45	972.83
8	151.00	978.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2) * *
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
The option of no water in the tension crack on
the last slice has been selected.
Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.
Total Number of Trial Surfaces Evaluated = 750
WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.
Number of Trial Surfaces with Non-Converged FS = 1
Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Evaluated = 0.1 %
Statistical Data On All Valid FS Values:
FS Max = 2.241 FS Min = 1.496 FS Ave = 1.905
Standard Deviation = 0.225 Coefficient of Variation = 11.81 %
((Modified Bishop FS for Critical Surface = 1.493))
Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	105.00	950.00
2	112.76	951.96
3	120.29	954.65
4	127.54	958.04
5	134.43	962.11
6	140.90	966.81
7	146.90	972.10
8	152.36	977.94
9	152.41	978.00

Circle Center At X = 88.26 ; Y = 1032.50 ; and Radius = 84.18
*** FOS = 1.496 Theta (ki=1.0) = 27.12 ***

Lambda = 0.512

Individual data on the 15 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	0.0	4.6	0.0	0.6	0.	0.	0.0	0.0	0.0
2	2.0	1745.1	0.0	216.0	0.	0.	0.0	0.0	0.0
3	5.8	5391.0	0.0	667.3	0.	0.	0.0	0.0	0.0
4	7.5	8281.0	0.0	1055.1	0.	0.	0.0	0.0	0.0
5	2.7	3183.5	0.0	421.8	0.	0.	0.0	0.0	0.0
6	4.5	5372.3	0.0	711.9	0.	0.	0.0	0.0	0.0
7	6.9	7860.9	0.0	1095.2	0.	0.	0.0	0.0	0.0
8	5.2	5225.3	0.0	774.9	0.	0.	0.0	0.0	0.0
9	1.3	1189.0	0.0	0.0	0.	0.	0.0	0.0	0.0
10	2.1	1769.7	0.0	0.0	0.	0.	0.0	0.0	0.0
11	2.0	1363.2	0.0	0.0	0.	0.	0.0	0.0	0.0
12	0.0	7.6	0.0	0.0	0.	0.	0.0	0.0	0.0
13	1.9	1586.6	0.0	0.0	0.	0.	0.0	0.0	0.0
14	5.5	2034.4	0.0	0.0	0.	0.	0.0	0.0	0.0
15	0.0	0.2	0.0	0.0	0.	0.	0.0	0.0	0.0

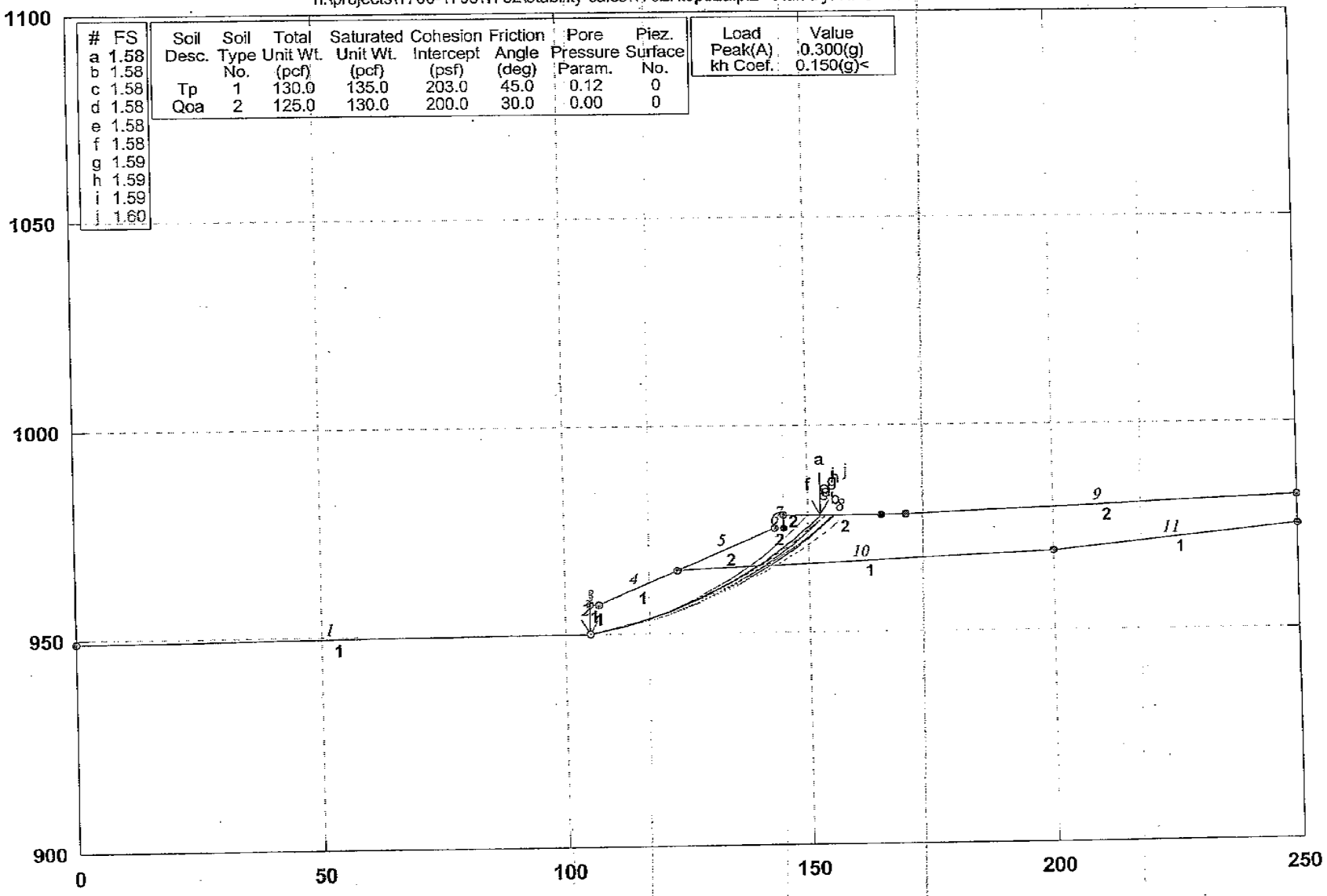
TT 53108, 3-3'; pseudo; circular; daylighted bedding w/ Ru=0.12

n:\projects\1700-1799\1702\stability calcs\1702r\t3ps2a.pl2 Run By: KPC 7/9/2008 02:21PM

#	FS
a	1.58
b	1.58
c	1.58
d	1.58
e	1.58
f	1.58
g	1.59
h	1.59
i	1.59
j	1.60

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
Tp	1	130.0	135.0	203.0	45.0	0.12	0
Qoa	2	125.0	130.0	200.0	30.0	0.00	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<



GSTABL7 v.2 FSmin=1.58

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

Run No. 12

```
                    *** GSTABL7 ***
            ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*****************************************************************************
Analysis Run Date:          7/9/2008
Time of Run:                02:21PM
Run By:                     KPC
Input Data Filename:        N:\Projects\1700-1799\1702\Stability Calcs\1702R\t3ps2a.in
Output Filename:            N:\Projects\1700-1799\1702\Stability Calcs\1702R\t3ps2a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t3ps2a.PLT
PROBLEM DESCRIPTION:  TT 53108, 3-3'; pseudo; circular;
                      daylighted bedding w/ Ru=0.12
BOUNDARY COORDINATES
    9 Top   Boundaries
   11 Total Boundaries
Boundary     X-Left      Y-Left     X-Right     Y-Right     Soil Type
   No.        (ft)        (ft)       (ft)        (ft)      Below Bnd
    1         0.00      949.00     105.00      950.00         1
    2       105.00      950.00     105.01      957.00         1
    3       105.01      957.00     107.00      957.00         1
    4       107.00      957.00     123.00      965.00         1
    5       123.00      965.00     143.00      975.00         2
    6       143.00      975.00     145.00      975.00         2
    7       145.00      975.00     145.01      978.00         2
    8       145.01      978.00     170.00      978.00         2
    9       170.00      978.00     250.00      982.00         2
   10       123.00      965.00     200.00      969.00         1
   11       200.00      969.00     250.00      975.00         1
User Specified Y-Origin =        900.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   130.0    135.0     203.0     45.0     0.12      0.0      0
  2   125.0    130.0     200.0     30.0     0.00      0.0      0
Specified Peak Ground Acceleration Coefficient (A) =   0.300(g)
Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
Specified Seismic Pore-Pressure Factor =   0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
 750 Trial Surfaces Have Been Generated.
 750 Surface(s) Initiate(s) From Each Of     1 Points Equally Spaced
Along The Ground Surface Between  X = 105.00(ft)
                             and  X = 105.00(ft)
Each Surface Terminates Between   X = 145.00(ft)
                             and  X = 165.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =      0.00(ft)
 8.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -20.0
And  15.0 deg.
```

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2) * *
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
The option of no water in the tension crack on
the last slice has been selected.
Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.
Total Number of Trial Surfaces Evaluated = 750
WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.
Number of Trial Surfaces with Non-Converged FS = 9
Number of Trial Surfaces with Misleading FS = 2
Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Evaluated = 1.5 %
Statistical Data On All Valid FS Values:
FS Max = 2.361 FS Min = 1.575 FS Ave = 2.028
Standard Deviation = 0.232 Coefficient of Variation = 11.45 %
((Modified Bishop FS for Critical Surface = 1.580))
Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	105.00	950.00
2	112.76	951.96
3	120.29	954.65
4	127.54	958.04
5	134.43	962.11
6	140.90	966.81
7	146.90	972.10
8	152.36	977.94
9	152.41	978.00

Circle Center At X = 88.26 ; Y = 1032.50 ; and Radius = 84.18
*** FOS = 1.575 Theta (ki=1.0) = 27.56 ***
Lambda = 0.522
Individual data on the 15 slices

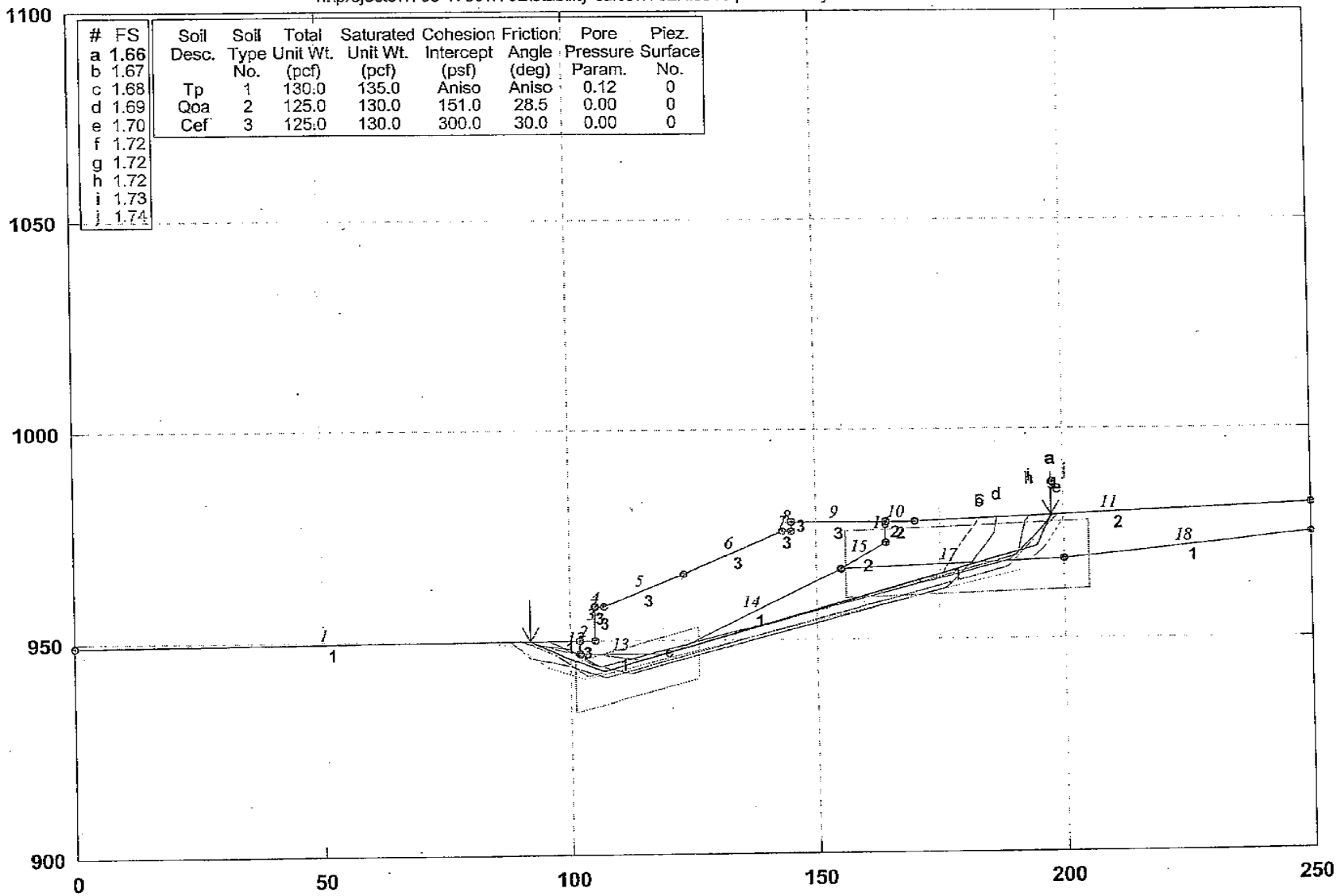
Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	0.0	4.6	0.0	0.6	0.	0.	0.7	0.0	0.0
2	2.0	1745.1	0.0	216.0	0.	0.	261.8	0.0	0.0
3	5.8	5391.0	0.0	667.3	0.	0.	808.6	0.0	0.0
4	7.5	8281.0	0.0	1055.1	0.	0.	1242.2	0.0	0.0
5	2.7	3183.5	0.0	421.8	0.	0.	477.5	0.0	0.0
6	4.5	5372.3	0.0	711.9	0.	0.	805.8	0.0	0.0
7	6.9	7860.9	0.0	1095.2	0.	0.	1179.1	0.0	0.0
8	5.2	5225.3	0.0	774.9	0.	0.	783.8	0.0	0.0
9	1.3	1189.0	0.0	0.0	0.	0.	178.3	0.0	0.0
10	2.1	1769.7	0.0	0.0	0.	0.	265.5	0.0	0.0
11	2.0	1363.2	0.0	0.0	0.	0.	204.5	0.0	0.0
12	0.0	7.6	0.0	0.0	0.	0.	1.1	0.0	0.0
13	1.9	1586.6	0.0	0.0	0.	0.	238.0	0.0	0.0
14	5.5	2034.4	0.0	0.0	0.	0.	305.2	0.0	0.0
15	0.0	0.2	0.0	0.0	0.	0.	0.0	0.0	0.0

TT 53108, 3-3'; static; planar; Ru=0.12; stab fill w/ 3' x 15' key

n:\projects\1700-1799\1702\stability calcs\1702r\t3s1b.pl2 Run By: KPC 7/10/2008 11:32AM

#	FS
a	1.66
b	1.67
c	1.68
d	1.69
e	1.70
f	1.72
g	1.72
h	1.72
i	1.73
j	1.74

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
Tp	1	130.0	135.0	Aniso	Aniso	0.12	0
Qoa	2	125.0	130.0	151.0	28.5	0.00	0
Cef	3	125.0	130.0	300.0	30.0	0.00	0



GSTABL7 v.2 FSmin=1.66

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

Run No. 13

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*****************************************************************************
Analysis Run Date:          7/10/2008
Time of Run:                11:32AM
Run By:                     KPC
Input Data Filename:        N:\Projects\1700-1799\1702\Stability Calcs\1702R\t3s1b.in
Output Filename:            N:\Projects\1700-1799\1702\Stability Calcs\1702R\t3s1b.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t3s1b.PLT
PROBLEM DESCRIPTION:  TT 53108, 3-3'; static; planar;
                      Ru=0.12; stab fill w/ 3' x 15' key
BOUNDARY COORDINATES
   11 Top   Boundaries
   18 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	949.00	102.00	950.00	1
2	102.00	950.00	105.00	950.00	3
3	105.00	950.00	105.01	958.00	3
4	105.01	958.00	107.00	958.00	3
5	107.00	958.00	123.00	966.00	3
6	123.00	966.00	143.00	976.00	3
7	143.00	976.00	145.00	976.00	3
8	145.00	976.00	145.01	978.00	3
9	145.01	978.00	164.00	978.00	3
10	164.00	978.00	170.00	978.00	2
11	170.00	978.00	250.00	982.00	2
12	102.00	950.00	102.01	947.00	1
13	102.01	947.00	120.00	947.00	1
14	120.00	947.00	155.00	967.00	1
15	155.00	967.00	163.99	973.00	2
16	163.99	973.00	164.00	978.00	2
17	155.00	967.00	200.00	969.00	1
18	200.00	969.00	250.00	975.00	1

```
User Specified Y-Origin =        900.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  3 Type(s) of Soil
```

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	130.0	135.0	185.0	31.0	0.12	0.0	0
2	125.0	130.0	151.0	28.5	0.00	0.0	0
3	125.0	130.0	300.0	30.0	0.00	0.0	0

```
ANISOTROPIC STRENGTH PARAMETERS
    1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
```

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	15.5	185.00	31.00
2	18.5	200.00	18.00
3	90.0	185.00	31.00

```
ANISOTROPIC SOIL NOTES:
```

(1) An input value of 0.01 for C and/or Phi will cause Aniso
C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and
C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and
C equal to zero, with water weight in the tension crack.

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
750 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 8.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	101.00	939.00	126.00	947.00	12.00
2	156.00	968.00	205.00	970.00	16.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By GLE (Spencer's) Method (0-2) * *
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
The option of no water in the tension crack on
the last slice has been selected.
Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.
Total Number of Trial Surfaces Evaluated = 750
WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.
Number of Trial Surfaces with Non-Converged FS = 7
Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Evaluated = 0.9 %
Statistical Data On All Valid FS Values:
FS Max = 6.536 FS Min = 1.655 FS Ave = 2.853
Standard Deviation = 0.722 Coefficient of Variation = 25.30 %
((Simplified Janbu FS for Critical Surface = 1.445))
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	91.72	949.90
2	92.19	949.55
3	99.39	946.06
4	106.77	942.96
5	194.65	972.23
6	197.42	979.37

*** FOS = 1.655 Theta (ki=1.0) = 12.89 ***
Lambda = 0.229
Individual data on the 21 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	0.5	10.8	0.0	1.6	0.	0.	0.0	0.0	0.0
2	7.2	1995.7	0.0	266.2	0.	0.	0.0	0.0	0.0
3	2.6	1517.6	0.0	197.6	0.	0.	0.0	0.0	0.0
4	0.0	6.5	0.0	0.8	0.	0.	0.0	0.0	0.0
5	3.0	2158.8	0.0	281.0	0.	0.	0.0	0.0	0.0
6	0.0	13.0	0.0	1.7	0.	0.	0.0	0.0	0.0
7	1.8	3253.1	0.0	423.5	0.	0.	0.0	0.0	0.0
8	0.2	442.9	0.0	56.0	0.	0.	0.0	0.0	0.0
9	11.9	23843.1	0.0	3015.7	0.	0.	0.0	0.0	0.0
10	2.6	5681.0	0.0	0.0	0.	0.	0.0	0.0	0.0
11	1.5	3190.5	0.0	403.5	0.	0.	0.0	0.0	0.0
12	20.0	48528.2	0.0	6137.9	0.	0.	0.0	0.0	0.0
13	2.0	5213.0	0.0	659.4	0.	0.	0.0	0.0	0.0

14	0.0	26.9	0.0	3.4	0.	0.	0.0	0.0	0.0
15	10.0	26110.3	0.0	3302.5	0.	0.	0.0	0.0	0.0
16	9.0	19939.6	0.0	2522.0	0.	0.	0.0	0.0	0.0
17	0.0	20.3	0.0	2.6	0.	0.	0.0	0.0	0.0
18	6.0	11368.0	0.0	1437.8	0.	0.	0.0	0.0	0.0
19	12.6	19353.9	0.0	2447.9	0.	0.	0.0	0.0	0.0
20	12.0	13078.2	0.0	0.0	0.	0.	0.0	0.0	0.0
21	2.8	1210.3	0.0	0.0	0.	0.	0.0	0.0	0.0
	***								

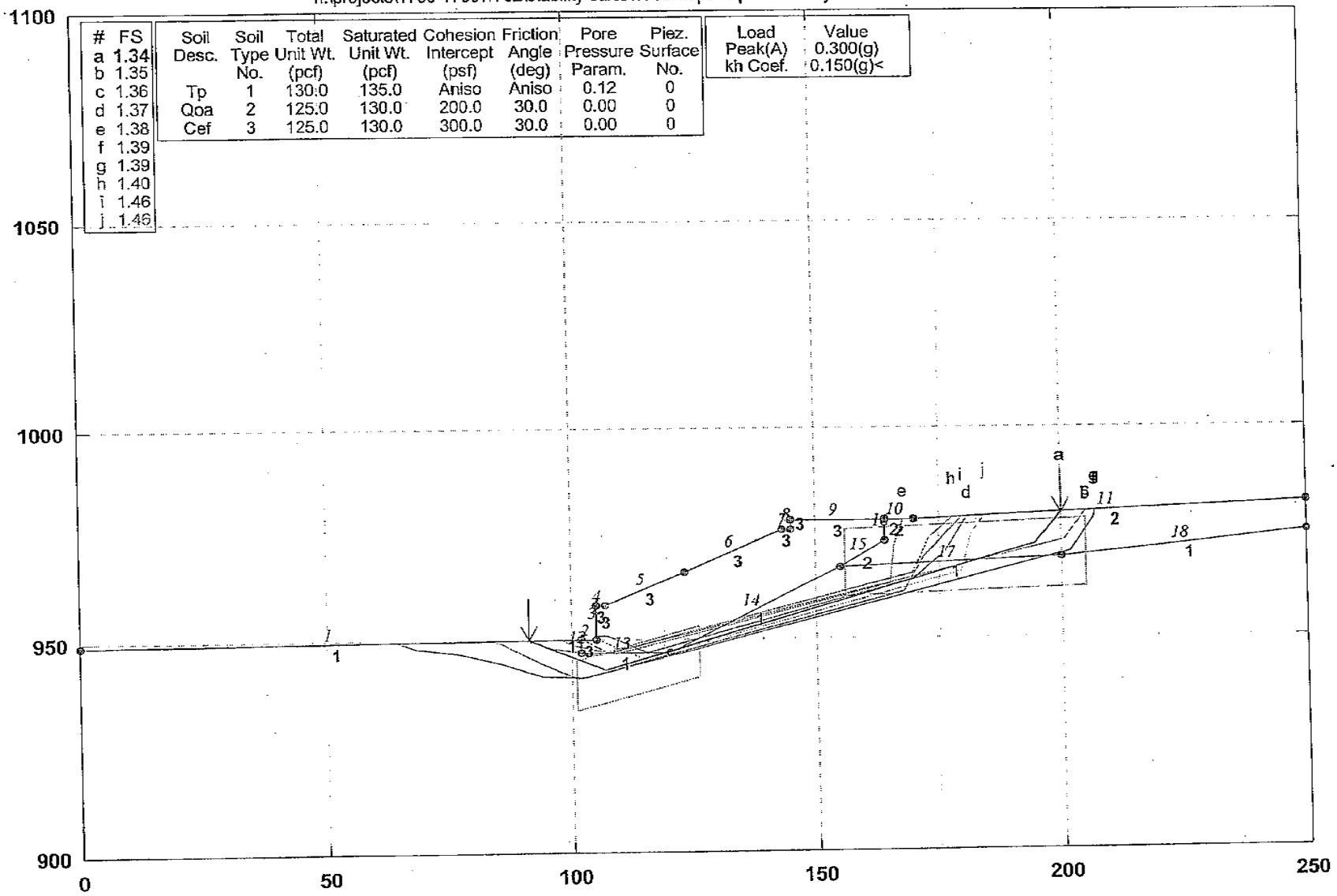
TT 53108, 3-3'; pseudo; planar; Ru=0.12; stab fill w/ 3' x 15' key

n:\projects\1700-1799\1702\stability calcs\1702rt\t3ps1b.pl2 Run By: KPC 7/10/2008 11:33AM

#	FS
a	1.34
b	1.35
c	1.36
d	1.37
e	1.38
f	1.39
g	1.39
h	1.40
i	1.46
j	1.46

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
Tp	1	130.0	135.0	Aniso	Aniso	0.12	0
Qoa	2	125.0	130.0	200.0	30.0	0.00	0
Cef	3	125.0	130.0	300.0	30.0	0.00	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<



GSTABL7 v.2 FSmin=1.34

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

Run No: 14

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:          7/10/2008
Time of Run:                11:33AM
Run By:                     KPC
Input Data Filename:        N:\Projects\1700-1799\1702\Stability Calcs\1702R\t3ps1b.in
Output Filename:            N:\Projects\1700-1799\1702\Stability Calcs\1702R\t3ps1b.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t3ps1b.PLT
PROBLEM DESCRIPTION:  TT 53108, 3-3'; pseudo; planar;
                      Ru=0.12; stab fill w/ 3' x 15' key
BOUNDARY COORDINATES
   11 Top   Boundaries
   18 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	949.00	102.00	950.00	1
2	102.00	950.00	105.00	950.00	3
3	105.00	950.00	105.01	958.00	3
4	105.01	958.00	107.00	958.00	3
5	107.00	958.00	123.00	966.00	3
6	123.00	966.00	143.00	976.00	3
7	143.00	976.00	145.00	976.00	3
8	145.00	976.00	145.01	978.00	3
9	145.01	978.00	164.00	978.00	3
10	164.00	978.00	170.00	978.00	2
11	170.00	978.00	250.00	982.00	2
12	102.00	950.00	102.01	947.00	1
13	102.01	947.00	120.00	947.00	1
14	120.00	947.00	155.00	967.00	1
15	155.00	967.00	163.99	973.00	2
16	163.99	973.00	164.00	978.00	2
17	155.00	967.00	200.00	969.00	1
18	200.00	969.00	250.00	975.00	1

```
User Specified Y-Origin =       900.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  3 Type(s) of Soil
```

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	130.0	135.0	203.0	45.0	0.12	0.0	0
2	125.0	130.0	200.0	30.0	0.00	0.0	0
3	125.0	130.0	300.0	30.0	0.00	0.0	0

```
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  1 Is Anisotropic
 Number Of Direction Ranges Specified =  3
```

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	15.5	203.00	45.00
2	18.5	200.00	18.00
3	90.0	203.00	45.00

```
 ANISOTROPIC SOIL NOTES:
```

(1) An input value of 0.01 for C and/or Phi will cause Aniso
C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and
C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and
C equal to zero, with water weight in the tension crack.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
750 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 9.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	101.00	939.00	126.00	947.00	12.00
2	156.00	968.00	205.00	970.00	16.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2) * *
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
The option of no water in the tension crack on
the last slice has been selected.
Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.
Total Number of Trial Surfaces Evaluated = 750
WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.
Number of Trial Surfaces with Non-Converged FS = 153
Number of Trial Surfaces with Misleading FS = 12
Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Evaluated = 22.0 %
Statistical Data On All Valid FS Values:
FS Max = 5.687 FS Min = 1.337 FS Ave = 2.675
Standard Deviation = 0.601 Coefficient of Variation = 22.45 %
((Simplified Janbu FS for Critical Surface = 1.152))
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	91.36	949.90
2	98.47	946.45
3	106.77	942.96
4	194.65	972.23
5	199.98	979.49
6	199.98	979.50

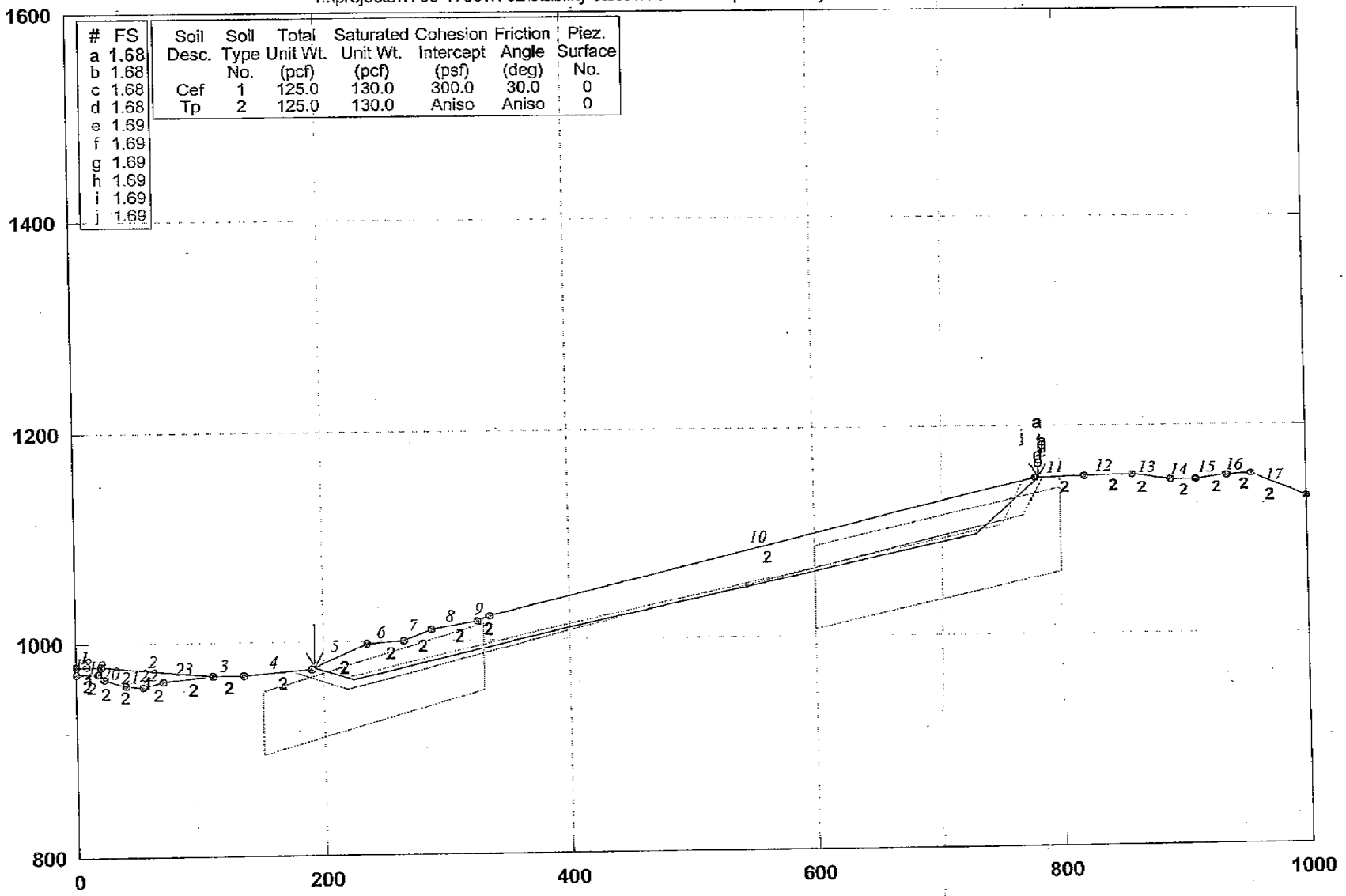
*** FOS = 1.337 Theta (ki=1.0) = 12.87 ***
Lambda = 0.229
Individual data on the 21 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	7.1	1624.8	0.0	216.7	0.	0.	243.7	0.0	0.0
2	3.5	1962.9	0.0	255.5	0.	0.	294.4	0.0	0.0
3	0.0	6.5	0.0	0.8	0.	0.	1.0	0.0	0.0
4	3.0	2158.8	0.0	281.0	0.	0.	323.8	0.0	0.0
5	0.0	13.0	0.0	1.7	0.	0.	2.0	0.0	0.0
6	1.8	3253.1	0.0	423.5	0.	0.	488.0	0.0	0.0
7	0.2	442.9	0.0	56.0	0.	0.	66.4	0.0	0.0

8	11.9	23843.1	0.0	3015.7	0.	0.	3576.5	0.0	0.0
9	2.6	5681.0	0.0	0.0	0.	0.	852.1	0.0	0.0
10	1.5	3190.5	0.0	403.5	0.	0.	478.6	0.0	0.0
11	20.0	48528.2	0.0	6137.9	0.	0.	7279.2	0.0	0.0
12	2.0	5213.0	0.0	659.4	0.	0.	782.0	0.0	0.0
13	0.0	26.9	0.0	3.4	0.	0.	4.0	0.0	0.0
14	10.0	26110.3	0.0	3302.5	0.	0.	3916.5	0.0	0.0
15	9.0	19939.6	0.0	2522.0	0.	0.	2990.9	0.0	0.0
16	0.0	20.3	0.0	2.6	0.	0.	3.0	0.0	0.0
17	6.0	11368.0	0.0	1437.8	0.	0.	1705.2	0.0	0.0
18	12.6	19353.9	0.0	2447.9	0.	0.	2903.1	0.0	0.0
19	12.0	13078.2	0.0	0.0	0.	0.	1961.7	0.0	0.0
20	5.3	2333.6	0.0	0.0	0.	0.	350.0	0.0	0.0
21	0.0	0.0	0.0	0.0	0.	0.	0.0	0.0	0.0

Landmark off-site grading; 4-4'; CS-2; static; planar

n:\projects\1700-1799\1702\stability calcs\1702r\t4s1a.pl2 Run By: KPC 7/10/2008 09:51AM



#	FS
a	1.68
b	1.68
c	1.68
d	1.68
e	1.69
f	1.69
g	1.69
h	1.69
i	1.69
j	1.69

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
Tp	2	125.0	130.0	Aniso	Aniso	0

GSTABL7 v.2 FSmin=1.68

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

Run No. 15

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*****************************************************************************
Analysis Run Date:          7/10/2008
Time of Run:                09:51AM
Run By:                     KPC
Input Data Filename:        N:\Projects\1700-1799\1702\Stability Calcs\1702R\t4s1a.in
Output Filename:            N:\Projects\1700-1799\1702\Stability Calcs\1702R\t4s1a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t4s1a.PLT
PROBLEM DESCRIPTION:  Landmark off-site grading; 4-4'; CS-2;
                      static; planar
BOUNDARY COORDINATES
   17 Top   Boundaries
   23 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	979.00	20.00	979.00	1
2	20.00	979.00	110.00	970.00	1
3	110.00	970.00	135.00	970.00	2
4	135.00	970.00	190.00	975.00	2
5	190.00	975.00	235.00	998.00	2
6	235.00	998.00	265.00	1000.00	2
7	265.00	1000.00	288.00	1010.00	2
8	288.00	1010.00	325.00	1017.00	2
9	325.00	1017.00	335.00	1022.00	2
10	335.00	1022.00	780.00	1150.00	2
11	780.00	1150.00	820.00	1151.00	2
12	820.00	1151.00	859.00	1153.00	2
13	859.00	1153.00	890.00	1148.00	2
14	890.00	1148.00	910.00	1148.00	2
15	910.00	1148.00	935.00	1151.00	2
16	935.00	1151.00	955.00	1153.00	2
17	955.00	1153.00	1000.00	1130.00	2
18	0.00	973.00	17.00	972.00	2
19	17.00	972.00	23.00	967.00	2
20	23.00	967.00	40.00	961.00	2
21	40.00	961.00	54.00	960.00	2
22	54.00	960.00	70.00	965.00	2
23	70.00	965.00	110.00	970.00	2

```
User Specified Y-Origin =        800.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
```

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	130.0	350.0	30.0	0.00	0.0	0

```
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  2 Is Anisotropic
Number Of Direction Ranges Specified =  3
```

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)

1	13.5	350.00	30.00
2	16.5	200.00	20.00
3	90.0	350.00	30.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
2000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 50.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	150.00	925.00	330.00	985.00	60.00
2	600.00	1046.00	800.00	1100.00	80.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2) * *
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
The option of no water in the tension crack on the last slice has been selected.
Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces (if applicable) have been applied to the slice base(s) on which they intersect.
Total Number of Trial Surfaces Evaluated = 2000
WARNING! The Factor of Safety Calculation for one or More Trial Surfaces Did Not Converge in 20 Iterations.
Number of Trial Surfaces with Non-Converged FS = 46
Percentage of Trial Surfaces With Non-Valid FS Solutions of the Total Evaluated = 2.3 %
Statistical Data On All Valid FS Values:
FS Max = 5.018 FS Min = 1.681 FS Ave = 2.688
Standard Deviation = 0.538 Coefficient of Variation = 20.01 %
((Simplified Janbu FS for Critical Surface = 1.607))
Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	192.50	976.28
2	223.86	965.35
3	731.19	1096.57
4	766.19	1132.28
5	783.08	1150.08

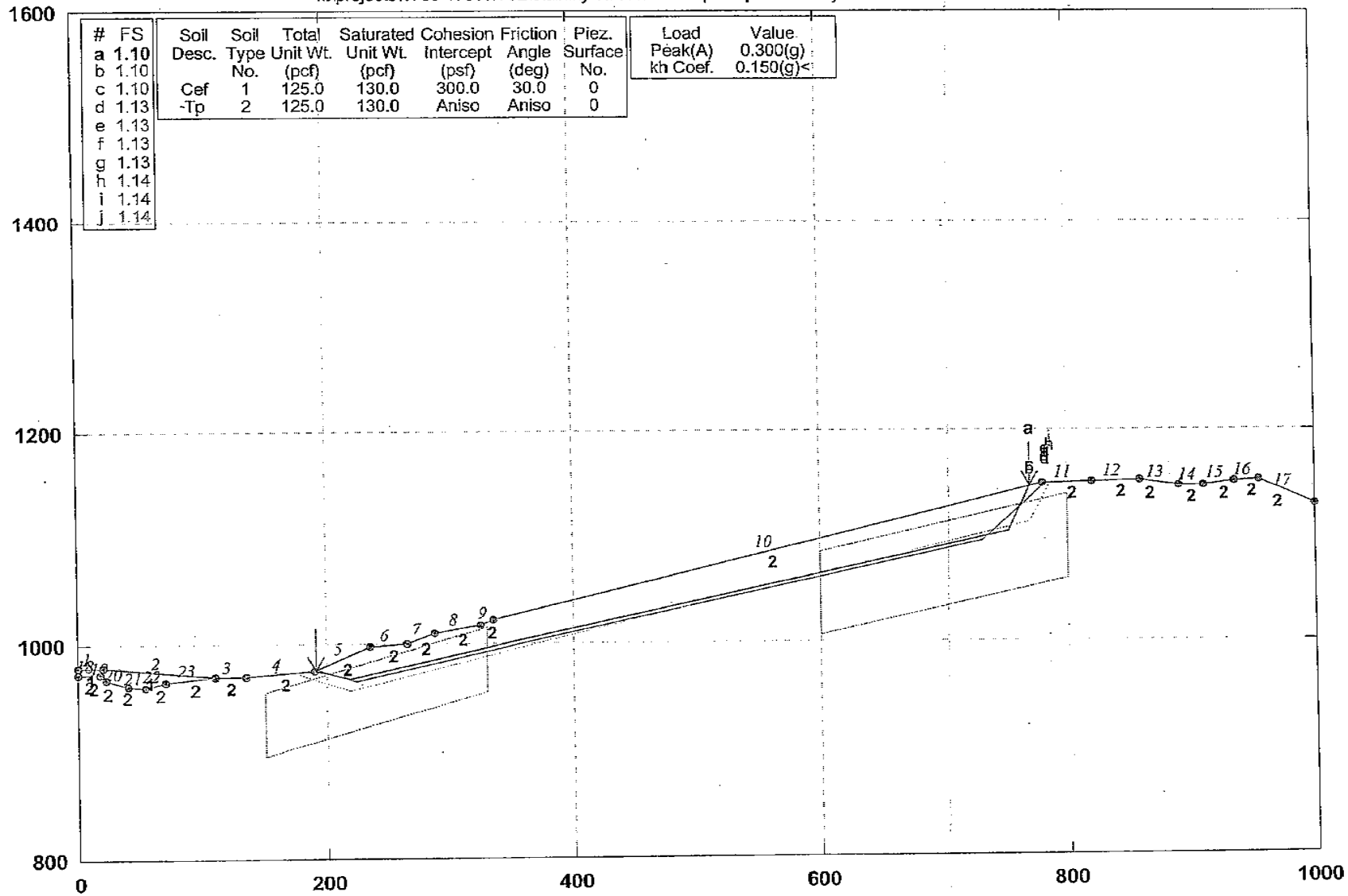
*** FOS = 1.681 Theta (ki=1.0) = 17.55 ***
Lambda = 0.316
Individual data on the 10 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	31.4	52839.8	0.0	0.0	0.	0.	0.0	0.0	0.0
2	11.1	39492.6	0.0	0.0	0.	0.	0.0	0.0	0.0
3	30.0	100837.1	0.0	0.0	0.	0.	0.0	0.0	0.0
4	23.0	74852.1	0.0	0.0	0.	0.	0.0	0.0	0.0
5	37.0	123838.4	0.0	0.0	0.	0.	0.0	0.0	0.0
6	10.0	33371.8	0.0	0.0	0.	0.	0.0	0.0	0.0
7	396.2	1666265.5	0.0	0.0	0.	0.	0.0	0.0	0.0
8	35.0	116237.7	0.0	0.0	0.	0.	0.0	0.0	0.0
9	13.8	14603.5	0.0	0.0	0.	0.	0.0	0.0	0.0
10	3.1	610.7	0.0	0.0	0.	0.	0.0	0.0	0.0

```
Failure Surface Specified By  5 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1        192.50       976.28
    2        223.86       965.35
    3        731.19      1096.57
    4        766.19      1132.28
    5        783.08      1150.08
***  FOS =     1.681   Theta (ki=1.0) =    17.55  ***
                     Lambda =   0.316
```

Landmark off-site grading; 4-4'; CS-2; pseudo; planar

n:\projects\1700-1799\1702\stability calcs\1702r\t4ps1a.pl2 Run By: KPC 7/10/2008 09:52AM



GSTABL7 v.2 FSmin=1.10

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

Run No. 16

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*****************************************************************************
Analysis Run Date:          7/10/2008
Time of Run:                09:52AM
Run By:                     KPC
Input Data Filename:        N:\Projects\1700-1799\1702\Stability Calcs\1702R\t4ps1a.in
Output Filename:            N:\Projects\1700-1799\1702\Stability Calcs\1702R\t4ps1a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t4ps1a.PLT
PROBLEM DESCRIPTION:  Landmark off-site grading; 4-4'; CS-2;
                      pseudo; planar
BOUNDARY COORDINATES
   17 Top   Boundaries
   23 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	979.00	20.00	979.00	1
2	20.00	979.00	110.00	970.00	1
3	110.00	970.00	135.00	970.00	2
4	135.00	970.00	190.00	975.00	2
5	190.00	975.00	235.00	998.00	2
6	235.00	998.00	265.00	1000.00	2
7	265.00	1000.00	288.00	1010.00	2
8	288.00	1010.00	325.00	1017.00	2
9	325.00	1017.00	335.00	1022.00	2
10	335.00	1022.00	780.00	1150.00	2
11	780.00	1150.00	820.00	1151.00	2
12	820.00	1151.00	859.00	1153.00	2
13	859.00	1153.00	890.00	1148.00	2
14	890.00	1148.00	910.00	1148.00	2
15	910.00	1148.00	935.00	1151.00	2
16	935.00	1151.00	955.00	1153.00	2
17	955.00	1153.00	1000.00	1130.00	2
18	0.00	973.00	17.00	972.00	2
19	17.00	972.00	23.00	967.00	2
20	23.00	967.00	40.00	961.00	2
21	40.00	961.00	54.00	960.00	2
22	54.00	960.00	70.00	965.00	2
23	70.00	965.00	110.00	970.00	2

```
User Specified Y-Origin =       800.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
```

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	125.0	130.0	500.0	36.0	0.00	0.0	0

```
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  2 Is Anisotropic
Number Of Direction Ranges Specified =  3
```

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)

1	13.5	500.00	36.00
2	16.5	200.00	20.00
3	90.0	500.00	36.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
2000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 50.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	150.00	925.00	330.00	985.00	60.00
2	600.00	1046.00	800.00	1100.00	80.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2) * *
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
The option of no water in the tension crack on the last slice has been selected.
Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces (if applicable) have been applied to the slice base(s) on which they intersect.
Total Number of Trial Surfaces Evaluated = 2000
WARNING! The Factor of Safety Calculation for one or More Trial Surfaces Did Not Converge in 20 Iterations.
Number of Trial Surfaces with Non-Converged FS = 221
Number of Trial Surfaces with Misleading FS = 17
Percentage of Trial Surfaces With Non-Valid FS Solutions of the Total Evaluated = 11.9 %
Statistical Data On All Valid FS Values:
FS Max = 3.149 FS Min = 1.103 FS Ave = 2.108
Standard Deviation = 0.435 Coefficient of Variation = 20.61 %
((Simplified Janbu FS for Critical Surface = 1.070))
Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	190.87	975.44
2	219.11	967.58
3	752.48	1105.52
4	770.61	1147.30

*** FOS = 1.103 Theta (ki=1.0) = 14.97 ***
Lambda = 0.267
Individual data on the 8 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	28.2	39378.7	0.0	0.0	0.	0.	5906.8	0.0	0.0
2	15.9	48271.7	0.0	0.0	0.	0.	7240.7	0.0	0.0
3	30.0	87886.0	0.0	0.0	0.	0.	13182.9	0.0	0.0
4	23.0	64924.4	0.0	0.0	0.	0.	9738.7	0.0	0.0
5	37.0	107870.0	0.0	0.0	0.	0.	16180.5	0.0	0.0

6	10.0	29056.5	0.0	0.0	0.	0.	4358.5	0.0	0.0
7	417.5	1591947.1	0.0	0.0	0.	0.	*******	0.0	0.0
8	18.1	41429.2	0.0	0.0	0.	0.	6214.4	0.0	0.0

Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	190.87	975.44
2	219.11	967.58
3	752.48	1105.52
4	770.61	1147.30

*** FOS = 1.103 Theta (ki=1.0) = 14.97 ***

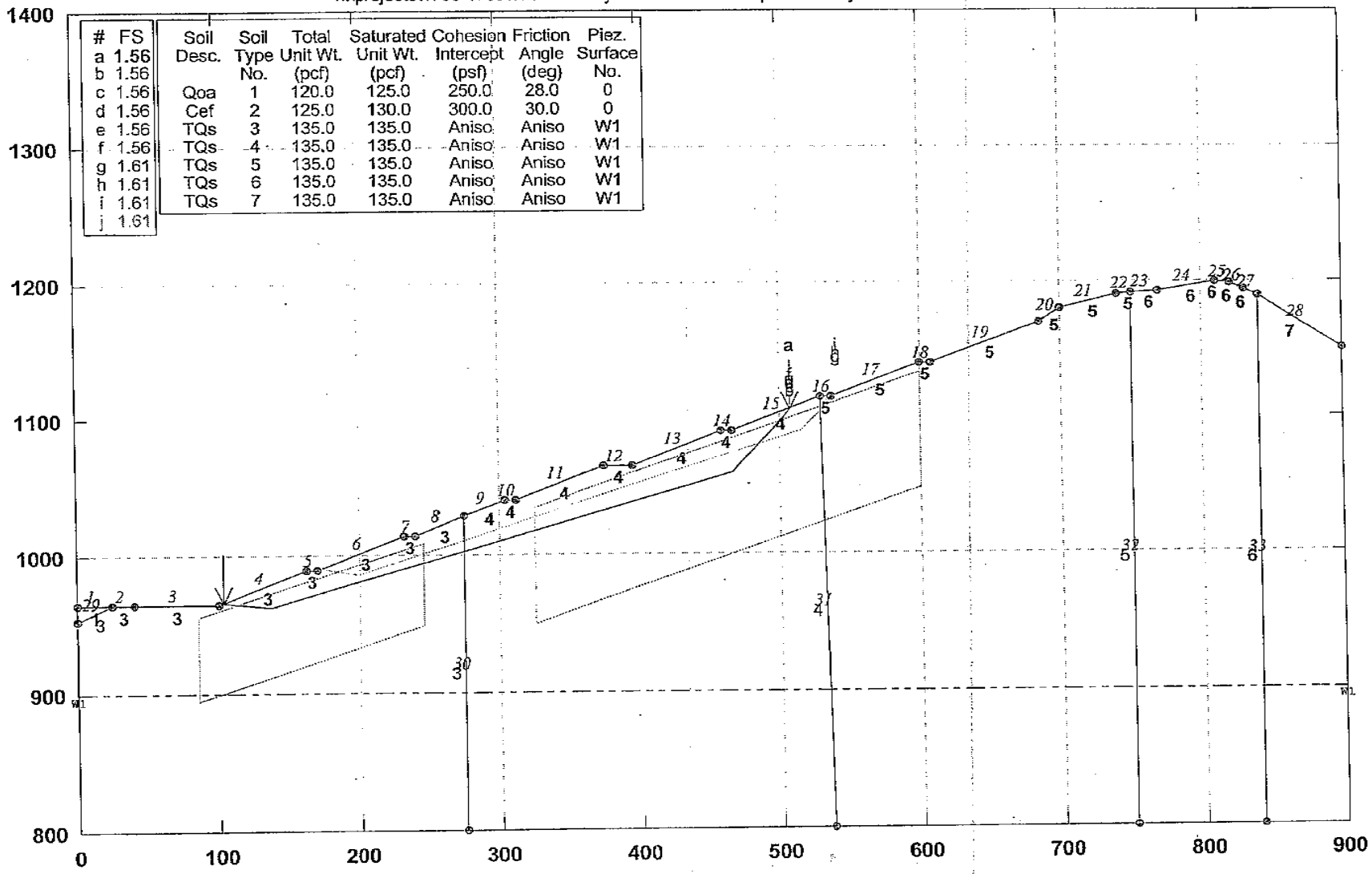
Lambda = 0.267

Lndmrk off-site grading; 5-5'; CS-4; static; planar

n:\projects\1700-1799\1702\stability calcs\1702r\t5s2b.pl2 Run By: KPC 7/9/2008 10:29AM

#	FS
a	1.56
b	1.56
c	1.56
d	1.56
e	1.56
f	1.56
g	1.61
h	1.61
i	1.61
j	1.61

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qoa	1	120.0	125.0	250.0	28.0	0
Cef	2	125.0	130.0	300.0	30.0	0
TQs	3	135.0	135.0	Aniso	Aniso	W1
TQs	4	135.0	135.0	Aniso	Aniso	W1
TQs	5	135.0	135.0	Aniso	Aniso	W1
TQs	6	135.0	135.0	Aniso	Aniso	W1
TQs	7	135.0	135.0	Aniso	Aniso	W1



GSTABL7 v.2 FSmin=1.56

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

Run No. 17

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:        7/9/2008
Time of Run:              10:29AM
Run By:                   KPC
Input Data Filename:      N:\Projects\1700-1799\1702\Stability Calcs\1702R\t5s2b.in
Output Filename:          N:\Projects\1700-1799\1702\Stability Calcs\1702R\t5s2b.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1700-1799\1702\Stabl Calcs\1702R\t5s2b.PLT
PROBLEM DESCRIPTION:  Lndmrk off-site grading; 5-5'; CS-4;
                      static; planar
BOUNDARY COORDINATES
   28 Top   Boundaries
   33 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	964.00	25.00	964.00	1
2	25.00	964.00	40.00	964.00	3
3	40.00	964.00	100.00	964.00	3
4	100.00	964.00	162.00	989.00	3
5	162.00	989.00	170.00	989.00	3
6	170.00	989.00	232.00	1014.00	3
7	232.00	1014.00	240.00	1014.00	3
8	240.00	1014.00	275.00	1028.00	3
9	275.00	1028.00	304.00	1040.00	4
10	304.00	1040.00	312.00	1040.00	4
11	312.00	1040.00	375.00	1064.00	4
12	375.00	1064.00	395.00	1064.00	4
13	395.00	1064.00	458.00	1090.00	4
14	458.00	1090.00	466.00	1090.00	4
15	466.00	1090.00	529.00	1115.00	4
16	529.00	1115.00	537.00	1115.00	5
17	537.00	1115.00	600.00	1140.00	5
18	600.00	1140.00	608.00	1140.00	5
19	608.00	1140.00	685.00	1170.00	5
20	685.00	1170.00	700.00	1180.00	5
21	700.00	1180.00	740.00	1190.00	5
22	740.00	1190.00	750.00	1191.00	5
23	750.00	1191.00	770.00	1193.00	6
24	770.00	1193.00	810.00	1199.00	6
25	810.00	1199.00	820.00	1198.00	6
26	820.00	1198.00	830.00	1194.00	6
27	830.00	1194.00	840.00	1189.00	6
28	840.00	1189.00	900.00	1150.00	7
29	0.00	953.00	25.00	964.00	3
30	275.00	1028.00	275.01	800.00	3
31	529.00	1115.00	535.00	800.00	4
32	750.00	1191.00	750.01	800.00	5
33	840.00	1189.00	840.01	800.00	6

```
 User Specified Y-Origin =        800.00(ft)
 Default X-Plus Value = 0.00(ft)
 Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  7 Type(s) of Soil
 Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
 Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
```

No.	(pcf)	(pcf)	(psf)	(deg)	Param.	(psf)	No.
1	120.0	125.0	250.0	28.0	0.00	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0
3	135.0	135.0	500.0	35.0	0.00	0.0	1
4	135.0	135.0	500.0	35.0	0.00	0.0	1
5	135.0	135.0	500.0	35.0	0.00	0.0	1
6	135.0	135.0	500.0	35.0	0.00	0.0	1
7	135.0	135.0	500.0	35.0	0.00	0.0	1

ANISOTROPIC STRENGTH PARAMETERS

5 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	15.5	500.00	35.00
2	18.5	200.00	20.00
3	90.0	500.00	35.00

Soil Type 4 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	16.5	500.00	35.00
2	19.5	200.00	20.00
3	90.0	500.00	35.00

Soil Type 5 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	19.5	500.00	35.00
2	22.5	200.00	20.00
3	90.0	500.00	35.00

Soil Type 6 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	13.5	500.00	35.00
2	16.5	200.00	20.00
3	90.0	500.00	35.00

Soil Type 7 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	8.5	500.00	35.00
2	11.5	200.00	20.00
3	90.0	500.00	35.00

ANISOTROPIC SOIL NOTES:

(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.

(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.

(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1 PIEZOMETRIC SURFACE(S) SPECIFIED

Unit Weight of Water = 62.40 (pcf)

Piezometric Surface No. 1 Specified by 2 Coordinate Points

Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	900.00
2	900.00	900.00

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been

Specified.
3000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 45.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	85.00	925.00	245.00	978.00	60.00
2	325.00	992.00	600.00	1090.00	85.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2) * *
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
The option of no water in the tension crack on
the last slice has been selected.
Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.
Total Number of Trial Surfaces Evaluated = 3000
WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.
Number of Trial Surfaces with Non-Converged FS = 48
Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Evaluated = 1.6 %
Statistical Data On All Valid FS Values:
FS Max = 9.245 FS Min = 1.559 FS Ave = 3.226
Standard Deviation = 0.872 Coefficient of Variation = 27.04 %
((Simplified Janbu FS for Critical Surface = 1.521))
Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	103.98	965.60
2	136.87	961.47
3	466.11	1059.28
4	496.38	1092.58
5	507.41	1106.43

*** FOS = 1.559 Theta (ki=1.0) = 16.56 ***
Lambda = 0.297
Individual data on the 16 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	32.9	38619.7	0.0	0.0	0.	0.	0.0	0.0	0.0
2	25.1	63555.9	0.0	0.0	0.	0.	0.0	0.0	0.0
3	8.0	20386.4	0.0	0.0	0.	0.	0.0	0.0	0.0
4	62.0	175593.2	0.0	0.0	0.	0.	0.0	0.0	0.0
5	8.0	24928.0	0.0	0.0	0.	0.	0.0	0.0	0.0
6	35.0	111956.6	0.0	0.0	0.	0.	0.0	0.0	0.0
7	0.0	3.9	0.0	0.0	0.	0.	0.0	0.0	0.0
8	29.0	106438.3	0.0	0.0	0.	0.	0.0	0.0	0.0
9	8.0	29907.9	0.0	0.0	0.	0.	0.0	0.0	0.0
10	63.0	247891.9	0.0	0.0	0.	0.	0.0	0.0	0.0
11	20.0	77809.2	0.0	0.0	0.	0.	0.0	0.0	0.0
12	63.0	250811.3	0.0	0.0	0.	0.	0.0	0.0	0.0
13	8.0	34499.5	0.0	0.0	0.	0.	0.0	0.0	0.0
14	0.1	451.4	0.0	0.0	0.	0.	0.0	0.0	0.0
15	30.3	82226.7	0.0	0.0	0.	0.	0.0	0.0	0.0
16	11.0	7058.3	0.0	0.0	0.	0.	0.0	0.0	0.0

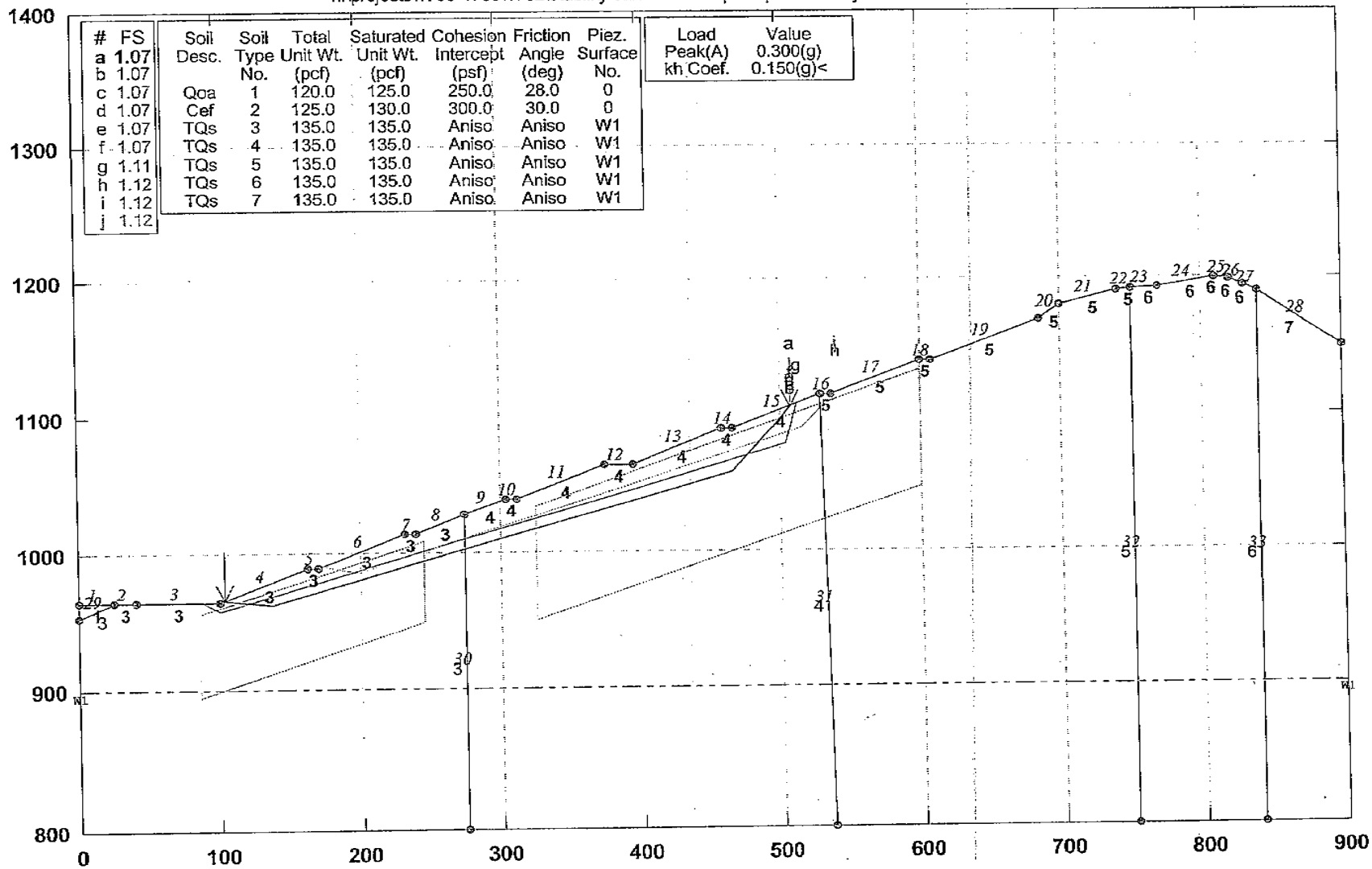
Lndmrk off-site grading; 5-5'; CS-4; pseudo; planar

n:\projects\1700-1799\1702\stability calcs\1702r\t5ps2b.pl2 Run By: KPC 7/9/2008 10:30AM

#	FS
a	1.07
b	1.07
c	1.07
d	1.07
e	1.07
f	1.07
g	1.11
h	1.12
i	1.12
j	1.12

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qca	1	120.0	125.0	250.0	28.0	0
Cef	2	125.0	130.0	300.0	30.0	0
TQs	3	135.0	135.0	Aniso	Aniso	W1
TQs	4	135.0	135.0	Aniso	Aniso	W1
TQs	5	135.0	135.0	Aniso	Aniso	W1
TQs	6	135.0	135.0	Aniso	Aniso	W1
TQs	7	135.0	135.0	Aniso	Aniso	W1

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<



GSTABL7 v.2 FSmin=1.07

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

Run No. 18

```
                    *** GSTABL7 ***
            ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:        7/9/2008
Time of Run:              10:30AM
Run By:                   KPC
Input Data Filename:      N:\Projects\1700-1799\1702\Stability Calcs\1702R\t5ps2b.in
Output Filename:          N:\Projects\1700-1799\1702\Stability Calcs\1702R\t5ps2b.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t5ps2b.PLT
PROBLEM DESCRIPTION:  Lndmrk off-site grading; 5-5'; CS-4;
                      pseudo; planar
BOUNDARY COORDINATES
   28 Top   Boundaries
   33 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	964.00	25.00	964.00	1
2	25.00	964.00	40.00	964.00	3
3	40.00	964.00	100.00	964.00	3
4	100.00	964.00	162.00	989.00	3
5	162.00	989.00	170.00	989.00	3
6	170.00	989.00	232.00	1014.00	3
7	232.00	1014.00	240.00	1014.00	3
8	240.00	1014.00	275.00	1028.00	3
9	275.00	1028.00	304.00	1040.00	4
10	304.00	1040.00	312.00	1040.00	4
11	312.00	1040.00	375.00	1064.00	4
12	375.00	1064.00	395.00	1064.00	4
13	395.00	1064.00	458.00	1090.00	4
14	458.00	1090.00	466.00	1090.00	4
15	466.00	1090.00	529.00	1115.00	4
16	529.00	1115.00	537.00	1115.00	5
17	537.00	1115.00	600.00	1140.00	5
18	600.00	1140.00	608.00	1140.00	5
19	608.00	1140.00	685.00	1170.00	5
20	685.00	1170.00	700.00	1180.00	5
21	700.00	1180.00	740.00	1190.00	5
22	740.00	1190.00	750.00	1191.00	5
23	750.00	1191.00	770.00	1193.00	6
24	770.00	1193.00	810.00	1199.00	6
25	810.00	1199.00	820.00	1198.00	6
26	820.00	1198.00	830.00	1194.00	6
27	830.00	1194.00	840.00	1189.00	6
28	840.00	1189.00	900.00	1150.00	7
29	0.00	953.00	25.00	964.00	3
30	275.00	1028.00	275.01	800.00	3
31	529.00	1115.00	535.00	800.00	4
32	750.00	1191.00	750.01	800.00	5
33	840.00	1189.00	840.01	800.00	6

```
User Specified Y-Origin =        800.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  7 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
```

No.	(pcf)	(pcf)	(psf)	(deg)	Param.	(psf)	No.
1	120.0	125.0	250.0	28.0	0.00	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0
3	135.0	135.0	600.0	38.0	0.00	0.0	1
4	135.0	135.0	600.0	38.0	0.00	0.0	1
5	135.0	135.0	600.0	38.0	0.00	0.0	1
6	135.0	135.0	600.0	38.0	0.00	0.0	1
7	135.0	135.0	600.0	38.0	0.00	0.0	1

ANISOTROPIC STRENGTH PARAMETERS

5 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	15.5	600.00	38.00
2	18.5	200.00	20.00
3	90.0	600.00	38.00

Soil Type 4 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	16.5	600.00	38.00
2	19.5	200.00	20.00
3	90.0	600.00	38.00

Soil Type 5 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	19.5	600.00	38.00
2	22.5	200.00	20.00
3	90.0	600.00	38.00

Soil Type 6 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	13.5	600.00	38.00
2	16.5	200.00	20.00
3	90.0	600.00	38.00

Soil Type 7 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	8.5	600.00	38.00
2	11.5	200.00	20.00
3	90.0	600.00	38.00

ANISOTROPIC SOIL NOTES:

(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.

(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.

(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1 PIEZOMETRIC SURFACE(S) SPECIFIED

Unit Weight of Water = 62.40 (pcf)

Piezometric Surface No. 1 Specified by 2 Coordinate Points

Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	900.00
2	900.00	900.00

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)

Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)

Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
3000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 45.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	85.00	925.00	245.00	978.00	60.00
2	325.00	992.00	600.00	1090.00	85.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By GLE (Spencer's) Method (0-2) * *
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
The option of no water in the tension crack on
the last slice has been selected.
Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.
Total Number of Trial Surfaces Evaluated = 3000
WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.
Number of Trial Surfaces with Non-Converged FS = 300
Number of Trial Surfaces with Misleading FS = 5
Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Evaluated = 10.2 %
Statistical Data On All Valid FS Values:
FS Max = 5.443 FS Min = 1.067 FS Ave = 2.380
Standard Deviation = 0.542 Coefficient of Variation = 22.78 %
((Simplified Janbu FS for Critical Surface = 1.035))
Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	103.98	965.60
2	136.87	961.47
3	466.11	1059.28
4	496.38	1092.58
5	507.41	1106.43

*** FOS = 1.067 Theta (ki=1.0) = 14.63 ***
Lambda = 0.261
Individual data on the 16 slices

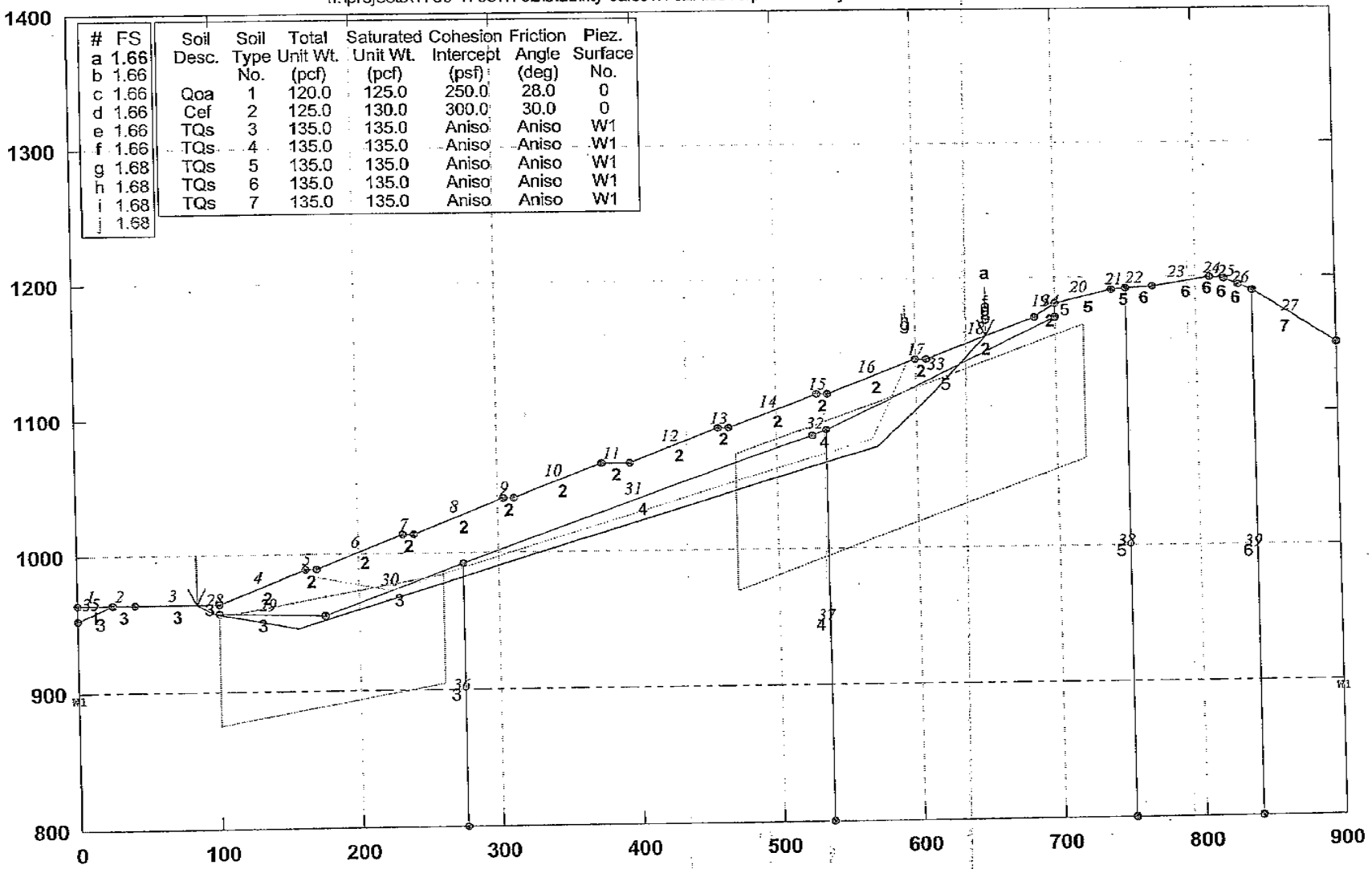
Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	32.9	38619.7	0.0	0.0	0.	0.	5792.9	0.0	0.0
2	25.1	63555.9	0.0	0.0	0.	0.	9533.4	0.0	0.0
3	8.0	20386.4	0.0	0.0	0.	0.	3058.0	0.0	0.0
4	62.0	175593.2	0.0	0.0	0.	0.	26339.0	0.0	0.0
5	8.0	24928.0	0.0	0.0	0.	0.	3739.2	0.0	0.0
6	35.0	111956.6	0.0	0.0	0.	0.	16793.5	0.0	0.0
7	0.0	3.9	0.0	0.0	0.	0.	0.6	0.0	0.0
8	29.0	106438.3	0.0	0.0	0.	0.	15965.7	0.0	0.0
9	8.0	29907.9	0.0	0.0	0.	0.	4486.2	0.0	0.0
10	63.0	247891.9	0.0	0.0	0.	0.	37183.8	0.0	0.0
11	20.0	77809.2	0.0	0.0	0.	0.	11671.4	0.0	0.0
12	63.0	250811.3	0.0	0.0	0.	0.	37621.7	0.0	0.0
13	8.0	34499.5	0.0	0.0	0.	0.	5174.9	0.0	0.0
14	0.1	451.4	0.0	0.0	0.	0.	67.7	0.0	0.0
15	30.3	82226.7	0.0	0.0	0.	0.	12334.0	0.0	0.0
16	11.0	7058.3	0.0	0.0	0.	0.	1058.8	0.0	0.0

Lndmrk off-site grading; 5-5'; CS-4 w/ 7x75 buttress; static; planar

n:\projects\1700-1799\1702\stability calcs\1702r\t5s1b.pl2 Run By: KPC 7/10/2008 11:36AM

#	FS
a	1.66
b	1.66
c	1.66
d	1.66
e	1.66
f	1.66
g	1.68
h	1.68
i	1.68
j	1.68

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qoa	1	120.0	125.0	250.0	28.0	0
Cef	2	125.0	130.0	300.0	30.0	0
TQs	3	135.0	135.0	Aniso	Aniso	W1
TQs	4	135.0	135.0	Aniso	Aniso	W1
TQs	5	135.0	135.0	Aniso	Aniso	W1
TQs	6	135.0	135.0	Aniso	Aniso	W1
TQs	7	135.0	135.0	Aniso	Aniso	W1



GSTABL7 v.2 FSmin=1.66

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

Run No. 19

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*****************************************************************************
Analysis Run Date:          7/10/2008
Time of Run:                11:36AM
Run By:                     KPC
Input Data Filename:        N:\Projects\1700-1799\1702\Stability Calcs\1702R\t5s1b.in
Output Filename:            N:\Projects\1700-1799\1702\Stability Calcs\1702R\t5s1b.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t5s1b.PLT
PROBLEM DESCRIPTION:  Lndmrk off-site grading; 5-5'; CS-4
                      w/ 7x75 buttress; static; planar

BOUNDARY COORDINATES
   27 Top   Boundaries
   39 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	964.00	25.00	964.00	1
2	25.00	964.00	40.00	964.00	3
3	40.00	964.00	100.00	964.00	3
4	100.00	964.00	162.00	989.00	2
5	162.00	989.00	170.00	989.00	2
6	170.00	989.00	232.00	1014.00	2
7	232.00	1014.00	240.00	1014.00	2
8	240.00	1014.00	304.00	1040.00	2
9	304.00	1040.00	312.00	1040.00	2
10	312.00	1040.00	375.00	1064.00	2
11	375.00	1064.00	395.00	1064.00	2
12	395.00	1064.00	458.00	1090.00	2
13	458.00	1090.00	466.00	1090.00	2
14	466.00	1090.00	529.00	1115.00	2
15	529.00	1115.00	537.00	1115.00	2
16	537.00	1115.00	600.00	1140.00	2
17	600.00	1140.00	608.00	1140.00	2
18	608.00	1140.00	685.00	1170.00	2
19	685.00	1170.00	700.00	1180.00	2
20	700.00	1180.00	740.00	1190.00	5
21	740.00	1190.00	750.00	1191.00	5
22	750.00	1191.00	770.00	1193.00	6
23	770.00	1193.00	810.00	1199.00	6
24	810.00	1199.00	820.00	1198.00	6
25	820.00	1198.00	830.00	1194.00	6
26	830.00	1194.00	840.00	1189.00	6
27	840.00	1189.00	900.00	1150.00	7
28	100.00	964.00	100.01	957.00	3
29	100.01	957.00	175.00	955.50	3
30	175.00	955.50	275.00	992.00	3
31	275.00	992.00	525.00	1083.00	4
32	525.00	1083.00	535.00	1088.00	4
33	535.00	1088.00	699.99	1170.00	5
34	699.99	1170.00	700.00	1180.00	5
35	0.00	953.00	25.00	964.00	3
36	275.00	992.00	275.01	800.00	3
37	535.00	1088.00	535.01	800.00	4
38	750.00	1191.00	750.01	800.00	5
39	840.00	1189.00	840.01	800.00	6

User Specified Y-Origin = 800.00(ft)

Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS

7 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	125.0	250.0	28.0	0.00	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0
3	135.0	135.0	500.0	35.0	0.00	0.0	1
4	135.0	135.0	500.0	35.0	0.00	0.0	1
5	135.0	135.0	500.0	35.0	0.00	0.0	1
6	135.0	135.0	500.0	35.0	0.00	0.0	1
7	135.0	135.0	500.0	35.0	0.00	0.0	1

ANISOTROPIC STRENGTH PARAMETERS

5 soil type(s)

Soil Type 3 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	15.5	500.00	35.00
2	18.5	200.00	20.00
3	90.0	500.00	35.00

Soil Type 4 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	16.5	500.00	35.00
2	19.5	200.00	20.00
3	90.0	500.00	35.00

Soil Type 5 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	19.5	500.00	35.00
2	22.5	200.00	20.00
3	90.0	500.00	35.00

Soil Type 6 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	13.5	500.00	35.00
2	16.5	200.00	20.00
3	90.0	500.00	35.00

Soil Type 7 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	8.5	500.00	35.00
2	11.5	200.00	20.00
3	90.0	500.00	35.00

ANISOTROPIC SOIL NOTES:

(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	900.00
2	900.00	900.00

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
3000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 60.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	100.00	915.00	260.00	945.00	80.00
2	470.00	1020.00	720.00	1114.00	100.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By GLE (Spencer's) Method (0=2) * *
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
The option of no water in the tension crack on
the last slice has been selected.
Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.
Total Number of Trial Surfaces Evaluated = 3000
WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.
Number of Trial Surfaces with Non-Converged FS = 14
Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Evaluated = 0.5 %
Statistical Data On All Valid FS Values:
FS Max = 6.727 FS Min = 1.663 FS Ave = 3.089
Standard Deviation = 0.747 Coefficient of Variation = 24.19 %
((Simplified Janbu FS for Critical Surface = 1.575))
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	84.21	964.00
2	97.25	957.93
3	156.08	946.16
4	571.67	1074.21
5	613.93	1116.80
6	649.73	1156.26

*** FOS = 1.663 Theta (ki=1.0) = 16.11 ***
Lambda = 0.289
Individual data on the 27 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	13.0	5342.7	0.0	0.0	0.	0.	0.0	0.0	0.0
2	2.7	2355.6	0.0	0.0	0.	0.	0.0	0.0	0.0
3	0.0	8.1	0.0	0.0	0.	0.	0.0	0.0	0.0
4	2.1	1898.1	0.0	0.0	0.	0.	0.0	0.0	0.0
5	54.0	165746.9	0.0	0.0	0.	0.	0.0	0.0	0.0
6	5.9	30645.4	0.0	0.0	0.	0.	0.0	0.0	0.0
7	8.0	40306.7	0.0	0.0	0.	0.	0.0	0.0	0.0
8	5.0	24463.2	0.0	0.0	0.	0.	0.0	0.0	0.0
9	57.0	300339.6	0.0	0.0	0.	0.	0.0	0.0	0.0
10	8.0	43778.2	0.0	0.0	0.	0.	0.0	0.0	0.0
11	35.0	194080.1	0.0	0.0	0.	0.	0.0	0.0	0.0
12	29.0	172708.5	0.0	0.0	0.	0.	0.0	0.0	0.0
13	8.0	47917.3	0.0	0.0	0.	0.	0.0	0.0	0.0
14	63.0	386954.1	0.0	0.0	0.	0.	0.0	0.0	0.0

15	20.0	121336.9	0.0	0.0	0.	0.	0.0	0.0	0.0
16	63.0	385343.5	0.0	0.0	0.	0.	0.0	0.0	0.0
17	8.0	51152.3	0.0	0.0	0.	0.	0.0	0.0	0.0
18	59.0	388557.0	0.0	0.0	0.	0.	0.0	0.0	0.0
19	4.0	27821.0	0.0	0.0	0.	0.	0.0	0.0	0.0
20	6.0	41234.6	0.0	0.0	0.	0.	0.0	0.0	0.0
21	2.0	13444.3	0.0	0.0	0.	0.	0.0	0.0	0.0
22	34.7	239679.8	0.0	0.0	0.	0.	0.0	0.0	0.0
23	28.3	169538.7	0.0	0.0	0.	0.	0.0	0.0	0.0
24	8.0	34448.5	0.0	0.0	0.	0.	0.0	0.0	0.0
25	5.9	20988.6	0.0	0.0	0.	0.	0.0	0.0	0.0
26	17.2	42622.1	0.0	0.0	0.	0.	0.0	0.0	0.0
27	18.6	15354.7	0.0	0.0	0.	0.	0.0	0.0	0.0

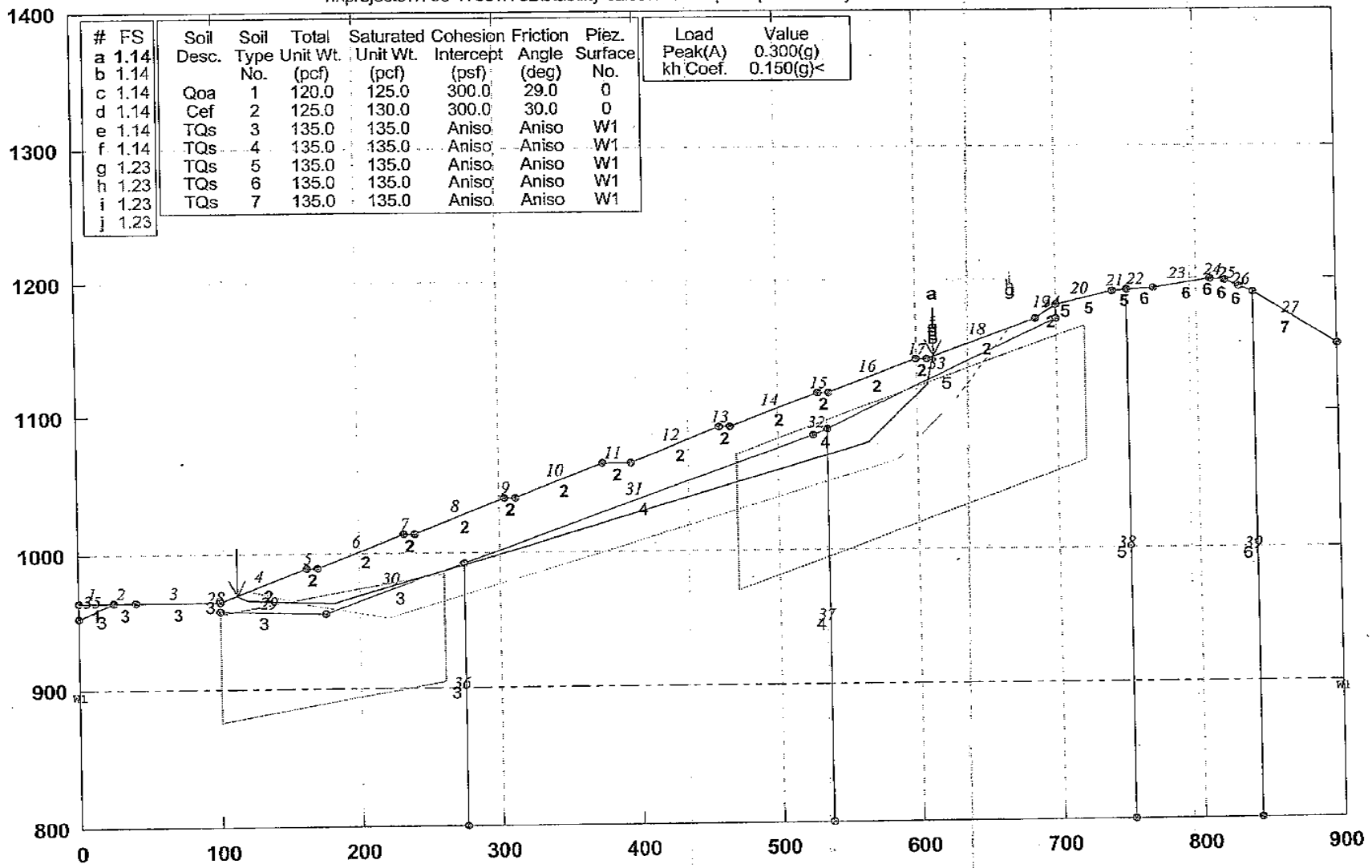
Lndmrk off-site grading; 5-5'; CS-4 w/ 7x75 buttress; pseduo; planar

n:\projects\1700-1799\1702\stability calcs\1702r\t5ps1b.pl2 Run By: KPC 7/10/2008 01:13PM

#	FS
a	**1.14**
b	1.14
c	1.14
d	1.14
e	1.14
f	1.14
g	1.23
h	1.23
i	1.23
j	1.23

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qoa	1	120.0	125.0	300.0	29.0	0
Cef	2	125.0	130.0	300.0	30.0	0
TQs	3	135.0	135.0	Aniso	Aniso	W1
TQs	4	135.0	135.0	Aniso	Aniso	W1
TQs	5	135.0	135.0	Aniso	Aniso	W1
TQs	6	135.0	135.0	Aniso	Aniso	W1
TQs	7	135.0	135.0	Aniso	Aniso	W1

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<



GSTABL7 v.2 FSmin=1.14

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

Run No. 20

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:          7/10/2008
Time of Run:                01:13PM
Run By:                     KPC
Input Data Filename:        N:\Projects\1700-1799\1702\Stability Calcs\1702R\t5ps1b.in
Output Filename:            N:\Projects\1700-1799\1702\Stability Calcs\1702R\t5ps1b.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t5ps1b.PLT
PROBLEM DESCRIPTION:  Lndmrk off-site grading; 5-5'; CS-4
                      w/ 7x75 buttress; pseduo; planar

BOUNDARY COORDINATES
   27 Top   Boundaries
   39 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	964.00	25.00	964.00	1
2	25.00	964.00	40.00	964.00	3
3	40.00	964.00	100.00	964.00	3
4	100.00	964.00	162.00	989.00	2
5	162.00	989.00	170.00	989.00	2
6	170.00	989.00	232.00	1014.00	2
7	232.00	1014.00	240.00	1014.00	2
8	240.00	1014.00	304.00	1040.00	2
9	304.00	1040.00	312.00	1040.00	2
10	312.00	1040.00	375.00	1064.00	2
11	375.00	1064.00	395.00	1064.00	2
12	395.00	1064.00	458.00	1090.00	2
13	458.00	1090.00	466.00	1090.00	2
14	466.00	1090.00	529.00	1115.00	2
15	529.00	1115.00	537.00	1115.00	2
16	537.00	1115.00	600.00	1140.00	2
17	600.00	1140.00	608.00	1140.00	2
18	608.00	1140.00	685.00	1170.00	2
19	685.00	1170.00	700.00	1180.00	2
20	700.00	1180.00	740.00	1190.00	5
21	740.00	1190.00	750.00	1191.00	5
22	750.00	1191.00	770.00	1193.00	6
23	770.00	1193.00	810.00	1199.00	6
24	810.00	1199.00	820.00	1198.00	6
25	820.00	1198.00	830.00	1194.00	6
26	830.00	1194.00	840.00	1189.00	6
27	840.00	1189.00	900.00	1150.00	7
28	100.00	964.00	100.01	957.00	3
29	100.01	957.00	175.00	955.50	3
30	175.00	955.50	275.00	992.00	3
31	275.00	992.00	525.00	1083.00	4
32	525.00	1083.00	535.00	1088.00	4
33	535.00	1088.00	699.99	1170.00	5
34	699.99	1170.00	700.00	1180.00	5
35	0.00	953.00	25.00	964.00	3
36	275.00	992.00	275.01	800.00	3
37	535.00	1088.00	535.01	800.00	4
38	750.00	1191.00	750.01	800.00	5
39	840.00	1189.00	840.01	800.00	6

User Specified Y-Origin = 800.00(ft)

Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
7 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	125.0	300.0	29.0	0.00	0.0	0
2	125.0	130.0	300.0	30.0	0.00	0.0	0
3	135.0	135.0	600.0	38.0	0.00	0.0	1
4	135.0	135.0	600.0	38.0	0.00	0.0	1
5	135.0	135.0	600.0	38.0	0.00	0.0	1
6	135.0	135.0	600.0	38.0	0.00	0.0	1
7	135.0	135.0	600.0	38.0	0.00	0.0	1

ANISOTROPIC STRENGTH PARAMETERS
5 soil type(s)

Soil Type 3 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	15.5	600.00	38.00
2	18.5	200.00	20.00
3	90.0	600.00	38.00

Soil Type 4 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	16.5	600.00	38.00
2	19.5	200.00	20.00
3	90.0	600.00	38.00

Soil Type 5 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	19.5	600.00	38.00
2	22.5	200.00	20.00
3	90.0	600.00	38.00

Soil Type 6 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	13.5	600.00	38.00
2	16.5	200.00	20.00
3	90.0	600.00	38.00

Soil Type 7 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	8.5	600.00	38.00
2	11.5	200.00	20.00
3	90.0	600.00	38.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	900.00
2	900.00	900.00

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
3000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 60.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	100.00	915.00	260.00	945.00	80.00
2	470.00	1020.00	720.00	1114.00	100.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2) * *
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
The option of no water in the tension crack on
the last slice has been selected.
Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.
Total Number of Trial Surfaces Evaluated = 3000
WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.
Number of Trial Surfaces with Non-Converged FS = 403
Number of Trial Surfaces with Misleading FS = 39
Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Evaluated = 14.7 %
Statistical Data On All Valid FS Values:
FS Max = 4.829 FS Min = 1.141 FS Ave = 2.275
Standard Deviation = 0.500 Coefficient of Variation = 21.99 %
((Simplified Janbu FS for Critical Surface = 1.074))
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	112.12	968.89
2	120.67	965.34
3	180.62	962.71
4	565.08	1078.08
5	607.01	1121.00
6	612.22	1141.64

*** FOS = 1.141 Theta (ki=1.0) = 15.85 ***
Lambda = 0.284
Individual data on the 24 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	8.6	3738.3	0.0	0.0	0.	0.	560.7	0.0	0.0
2	41.3	83854.6	0.0	0.0	0.	0.	12578.2	0.0	0.0
3	8.0	25649.2	0.0	0.0	0.	0.	3847.4	0.0	0.0
4	10.6	37416.9	0.0	0.0	0.	0.	5612.5	0.0	0.0
5	51.4	213388.0	0.0	0.0	0.	0.	32008.2	0.0	0.0
6	8.0	34671.4	0.0	0.0	0.	0.	5200.7	0.0	0.0
7	20.1	86729.5	0.0	0.0	0.	0.	13009.4	0.0	0.0
8	14.9	67906.4	0.0	0.0	0.	0.	10186.0	0.0	0.0
9	29.0	140930.5	0.0	0.0	0.	0.	21139.6	0.0	0.0

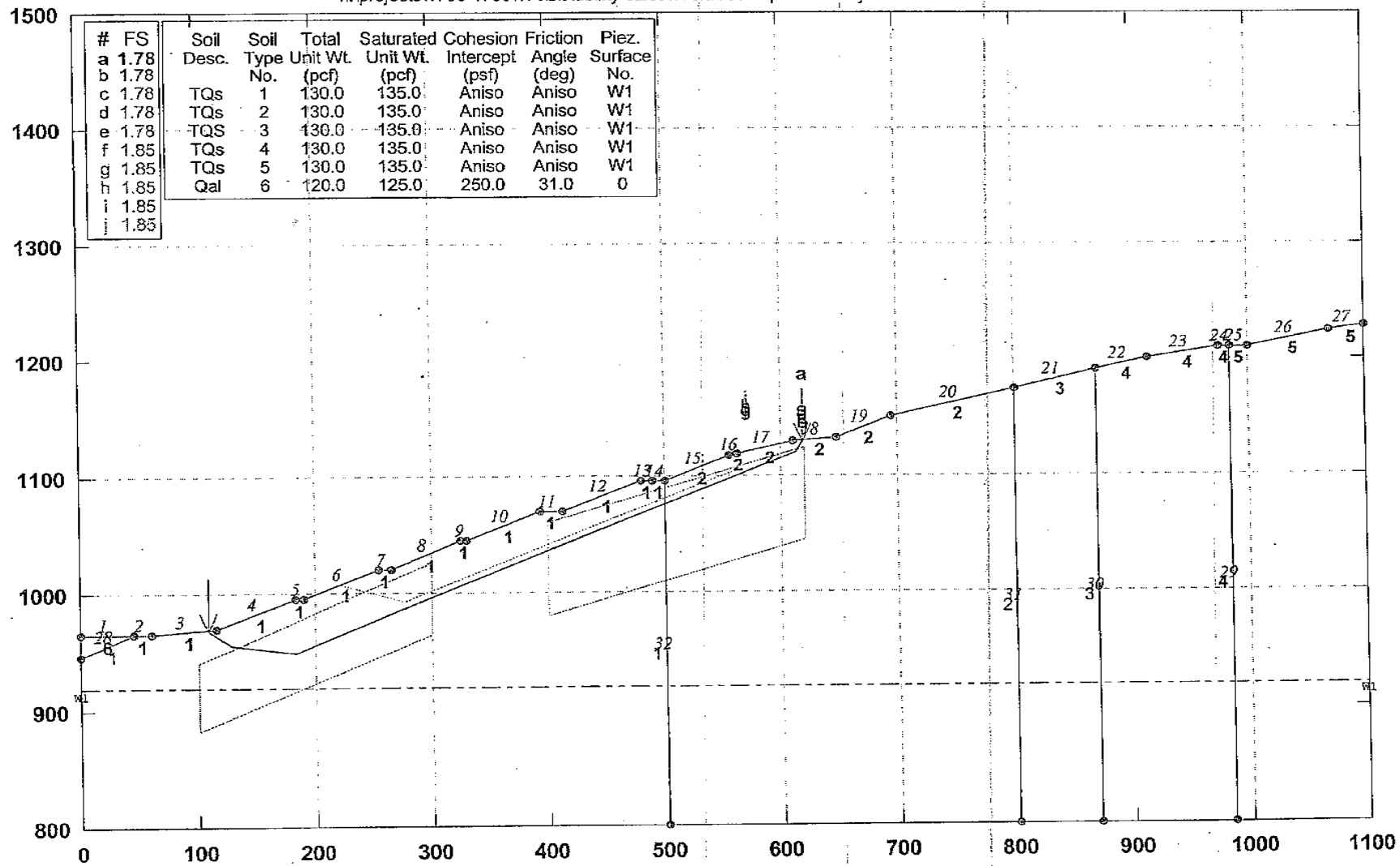
10	8.0	39311.0	0.0	0.0	0.	0.	5896.6	0.0	0.0
11	63.0	321608.8	0.0	0.0	0.	0.	48241.3	0.0	0.0
12	20.0	101494.0	0.0	0.0	0.	0.	15224.1	0.0	0.0
13	63.0	325678.8	0.0	0.0	0.	0.	48851.8	0.0	0.0
14	8.0	43884.2	0.0	0.0	0.	0.	6582.6	0.0	0.0
15	59.0	337102.4	0.0	0.0	0.	0.	50565.4	0.0	0.0
16	4.0	24469.4	0.0	0.0	0.	0.	3670.4	0.0	0.0
17	6.0	36237.9	0.0	0.0	0.	0.	5435.7	0.0	0.0
18	2.0	11789.8	0.0	0.0	0.	0.	1768.5	0.0	0.0
19	28.1	170114.9	0.0	0.0	0.	0.	25517.2	0.0	0.0
20	34.9	167504.9	0.0	0.0	0.	0.	25125.7	0.0	0.0
21	7.0	20116.0	0.0	0.0	0.	0.	3017.4	0.0	0.0
22	0.8	1763.3	0.0	0.0	0.	0.	264.5	0.0	0.0
23	0.2	358.5	0.0	0.0	0.	0.	53.8	0.0	0.0
24	4.2	3975.0	0.0	0.0	0.	0.	596.3	0.0	0.0

Lndmrk off-site grading; 6-6'; CS-4; static; planar

n:\projects\1700-1799\1702\stability calcs\1702r\t6s1b.pl2 Run By: KPC 7/09/2008 01:20PM

#	FS
a	1.78
b	1.78
c	1.78
d	1.78
e	1.78
f	1.85
g	1.85
h	1.85
i	1.85
j	1.85

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
TQs	1	130.0	135.0	Aniso	Aniso	W1
TQs	2	130.0	135.0	Aniso	Aniso	W1
TQS	3	130.0	135.0	Aniso	Aniso	W1
TQs	4	130.0	135.0	Aniso	Aniso	W1
TQs	5	130.0	135.0	Aniso	Aniso	W1
Qal	6	120.0	125.0	250.0	31.0	0



GSTABL7 v.2 FSmin=1.78

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

Run No. 21

```
                    ***  GSTABL7  ***
            ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*****************************************************************************
Analysis Run Date:          7/09/2008
Time of Run:                01:20PM
Run By:                     KPC
Input Data Filename:        N:\Projects\1700-1799\1702\Stability Calcs\1702R\t6s1b.in
Output Filename:            N:\Projects\1700-1799\1702\Stability Calcs\1702R\t6s1b.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t6s1b.PLT
PROBLEM DESCRIPTION:  Lndmrk off-site grading; 6-6'; CS-4;
                      static; planar
```

BOUNDARY COORDINATES

27 Top Boundaries
32 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	967.00	45.00	967.00	6
2	45.00	967.00	60.00	967.00	1
3	60.00	967.00	115.00	970.00	1
4	115.00	970.00	183.00	995.00	1
5	183.00	995.00	190.00	995.00	1
6	190.00	995.00	255.00	1020.00	1
7	255.00	1020.00	265.00	1020.00	1
8	265.00	1020.00	325.00	1045.00	1
9	325.00	1045.00	330.00	1045.00	1
10	330.00	1045.00	393.00	1069.00	1
11	393.00	1069.00	413.00	1070.00	1
12	413.00	1070.00	480.00	1095.00	1
13	480.00	1095.00	490.00	1096.00	1
14	490.00	1096.00	500.00	1096.00	1
15	500.00	1096.00	555.00	1118.00	2
16	555.00	1118.00	562.00	1119.00	2
17	562.00	1119.00	610.00	1130.00	2
18	610.00	1130.00	647.00	1133.00	2
19	647.00	1133.00	695.00	1150.00	2
20	695.00	1150.00	800.00	1174.00	2
21	800.00	1174.00	870.00	1190.00	3
22	870.00	1190.00	915.00	1200.00	4
23	915.00	1200.00	975.00	1210.00	4
24	975.00	1210.00	985.00	1210.00	4
25	985.00	1210.00	1000.00	1210.00	5
26	1000.00	1210.00	1070.00	1223.00	5
27	1070.00	1223.00	1100.00	1228.00	5
28	0.00	947.00	45.00	967.00	1
29	985.00	1210.00	985.01	800.00	4
30	870.00	1190.00	870.01	800.00	3
31	800.00	1174.00	800.01	800.00	2
32	500.00	1096.00	500.01	800.00	1

User Specified Y-Origin = 800.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS

6 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.

1	130.0	135.0	500.0	35.0	0.00	0.0	1
2	130.0	135.0	500.0	35.0	0.00	0.0	1
3	130.0	135.0	500.0	35.0	0.00	0.0	1
4	130.0	135.0	500.0	35.0	0.00	0.0	1
5	130.0	135.0	500.0	35.0	0.00	0.0	1
6	120.0	125.0	250.0	31.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS

5 soil type(s)

Soil Type 1 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	21.5	500.00	35.00
2	24.5	200.00	20.00
3	90.0	500.00	35.00

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	19.5	500.00	35.00
2	22.5	200.00	20.00
3	90.0	500.00	35.00

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	14.5	500.00	35.00
2	17.5	200.00	20.00
3	90.0	500.00	35.00

Soil Type 4 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	10.5	500.00	35.00
2	13.5	200.00	20.00
3	90.0	500.00	35.00

Soil Type 5 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	5.5	500.00	35.00
2	8.5	200.00	20.00
3	90.0	500.00	35.00

ANISOTROPIC SOIL NOTES:

(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.

(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.

(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1 PIEZOMETRIC SURFACE(S) SPECIFIED

Unit Weight of Water = 62.40 (pcf)

Piezometric Surface No. 1 Specified by 2 Coordinate Points

Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	920.00
2	1100.00	920.00

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.

2500 Trial Surfaces Have Been Generated.

2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 55.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	100.00	912.00	300.00	995.00	60.00
2	400.00	1020.00	620.00	1085.00	80.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2) * *
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
The option of no water in the tension crack on
the last slice has been selected.
Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.
Total Number of Trial Surfaces Evaluated = 2500
WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.
Number of Trial Surfaces with Non-Converged FS = 17
Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Evaluated = 0.7 %
Statistical Data On All Valid FS Values:
FS Max = 5.601 FS Min = 1.778 FS Ave = 3.383
Standard Deviation = 0.610 Coefficient of Variation = 18.04 %
((Simplified Janbu FS for Critical Surface = 1.576))
Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	108.91	969.67
2	127.93	956.52
3	182.60	950.51
4	613.22	1120.78
5	618.26	1130.67

*** FOS = 1.778 Theta (ki=1.0) = 16.49 ***
Lambda = 0.296
Individual data on the 19 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	6.1	1797.3	0.0	0.0	0.	0.	0.0	0.0	0.0
2	12.9	19147.2	0.0	0.0	0.	0.	0.0	0.0	0.0
3	54.7	222376.0	0.0	0.0	0.	0.	0.0	0.0	0.0
4	0.4	2276.9	0.0	0.0	0.	0.	0.0	0.0	0.0
5	7.0	39083.6	0.0	0.0	0.	0.	0.0	0.0	0.0
6	65.0	348257.2	0.0	0.0	0.	0.	0.0	0.0	0.0
7	10.0	50551.2	0.0	0.0	0.	0.	0.0	0.0	0.0
8	60.0	292857.5	0.0	0.0	0.	0.	0.0	0.0	0.0
9	5.0	24176.5	0.0	0.0	0.	0.	0.0	0.0	0.0
10	63.0	292795.0	0.0	0.0	0.	0.	0.0	0.0	0.0
11	20.0	82784.9	0.0	0.0	0.	0.	0.0	0.0	0.0
12	67.0	240740.3	0.0	0.0	0.	0.	0.0	0.0	0.0
13	10.0	33040.5	0.0	0.0	0.	0.	0.0	0.0	0.0
14	10.0	28551.8	0.0	0.0	0.	0.	0.0	0.0	0.0
15	55.0	143787.3	0.0	0.0	0.	0.	0.0	0.0	0.0
16	7.0	17610.7	0.0	0.0	0.	0.	0.0	0.0	0.0
17	48.0	90344.4	0.0	0.0	0.	0.	0.0	0.0	0.0
18	3.2	4177.3	0.0	0.0	0.	0.	0.0	0.0	0.0
19	5.0	3103.8	0.0	0.0	0.	0.	0.0	0.0	0.0

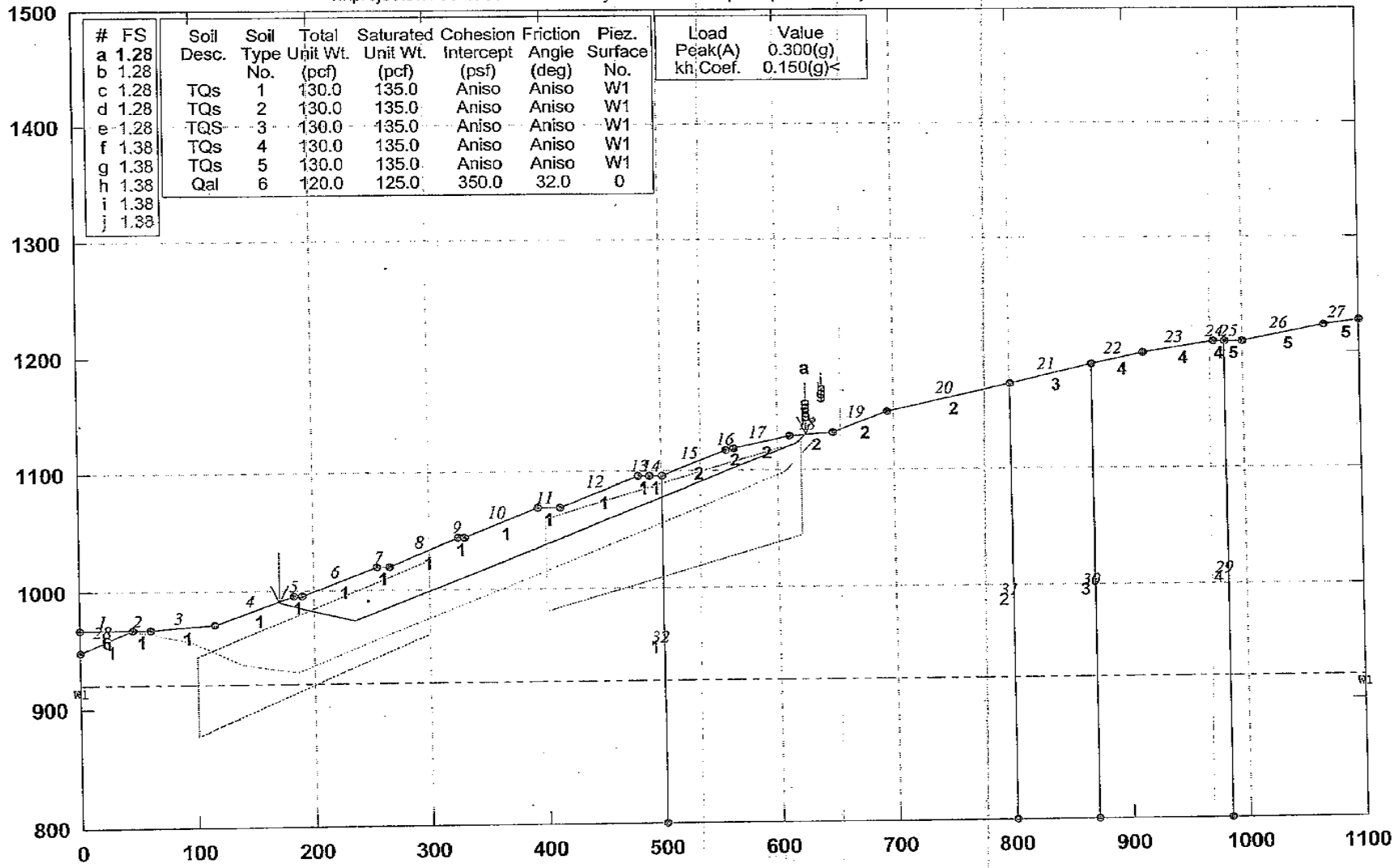
Lndmrk off-site grading; 6-6'; CS-4; pseudo; planar

n:\projects\1700-1799\1702\stability calcs\1702r\t6ps1b.pl2 Run By: KPC 7/09/2008 01:24PM

#	FS
a	1.28
b	1.28
c	1.28
d	1.28
e	1.28
f	1.38
g	1.38
h	1.38
i	1.38
j	1.38

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
TQs	1	130.0	135.0	Aniso	Aniso	W1
TQs	2	130.0	135.0	Aniso	Aniso	W1
TQS	3	130.0	135.0	Aniso	Aniso	W1
TQs	4	130.0	135.0	Aniso	Aniso	W1
TQs	5	130.0	135.0	Aniso	Aniso	W1
Qal	6	120.0	125.0	350.0	32.0	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<



GSTABL7 v.2 FSmin=1.28

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

Run No. 22

```
                    ***  GSTABL7  ***
            ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:          7/09/2008
Time of Run:                01:24PM
Run By:                     KPC
Input Data Filename:        N:\Projects\1700-1799\1702\Stability Calcs\1702R\t6ps1b.in
Output Filename:            N:\Projects\1700-1799\1702\Stability Calcs\1702R\t6ps1b.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t6ps1b.PLT
PROBLEM DESCRIPTION:  Lndmrk off-site grading; 6-6'; CS-4;
                      pseudo; planar
BOUNDARY COORDINATES
   27 Top   Boundaries
   32 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	967.00	45.00	967.00	6
2	45.00	967.00	60.00	967.00	1
3	60.00	967.00	115.00	970.00	1
4	115.00	970.00	183.00	995.00	1
5	183.00	995.00	190.00	995.00	1
6	190.00	995.00	255.00	1020.00	1
7	255.00	1020.00	265.00	1020.00	1
8	265.00	1020.00	325.00	1045.00	1
9	325.00	1045.00	330.00	1045.00	1
10	330.00	1045.00	393.00	1069.00	1
11	393.00	1069.00	413.00	1070.00	1
12	413.00	1070.00	480.00	1095.00	1
13	480.00	1095.00	490.00	1096.00	1
14	490.00	1096.00	500.00	1096.00	1
15	500.00	1096.00	555.00	1118.00	2
16	555.00	1118.00	562.00	1119.00	2
17	562.00	1119.00	610.00	1130.00	2
18	610.00	1130.00	647.00	1133.00	2
19	647.00	1133.00	695.00	1150.00	2
20	695.00	1150.00	800.00	1174.00	2
21	800.00	1174.00	870.00	1190.00	3
22	870.00	1190.00	915.00	1200.00	4
23	915.00	1200.00	975.00	1210.00	4
24	975.00	1210.00	985.00	1210.00	4
25	985.00	1210.00	1000.00	1210.00	5
26	1000.00	1210.00	1070.00	1223.00	5
27	1070.00	1223.00	1100.00	1228.00	5
28	0.00	947.00	45.00	967.00	1
29	985.00	1210.00	985.01	800.00	4
30	870.00	1190.00	870.01	800.00	3
31	800.00	1174.00	800.01	800.00	2
32	500.00	1096.00	500.01	800.00	1

```
User Specified Y-Origin =        800.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  6 Type(s) of Soil
```

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.

1	130.0	135.0	600.0	38.0	0.00	0.0	1
2	130.0	135.0	600.0	38.0	0.00	0.0	1
3	130.0	135.0	600.0	38.0	0.00	0.0	1
4	130.0	135.0	600.0	38.0	0.00	0.0	1
5	130.0	135.0	600.0	38.0	0.00	0.0	1
6	120.0	125.0	350.0	32.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS

5 soil type(s)

Soil Type 1 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	21.5	600.00	38.00
2	24.5	200.00	20.00
3	90.0	600.00	38.00

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	19.5	600.00	38.00
2	22.5	200.00	20.00
3	90.0	600.00	38.00

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	14.5	600.00	38.00
2	17.5	200.00	20.00
3	90.0	600.00	38.00

Soil Type 4 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	10.5	600.00	38.00
2	13.5	200.00	20.00
3	90.0	600.00	38.00

Soil Type 5 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	5.5	600.00	38.00
2	8.5	200.00	20.00
3	90.0	600.00	38.00

ANISOTROPIC SOIL NOTES:

(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.

(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.

(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1 PIEZOMETRIC SURFACE(S) SPECIFIED

Unit Weight of Water = 62.40 (pcf)

Piezometric Surface No. 1 Specified by 2 Coordinate Points

Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	920.00
2	1100.00	920.00

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)

Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)

Specified Vertical Earthquake Coefficient (kv) = 0.000(g)

Specified Seismic Pore-Pressure Factor = 0.000

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
2500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 47.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	100.00	910.00	300.00	993.00	65.00
2	400.00	1020.00	620.00	1085.00	80.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2) * *
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
The option of no water in the tension crack on
the last slice has been selected.
Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.
Total Number of Trial Surfaces Evaluated = 2500
WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.
Number of Trial Surfaces with Non-Converged FS = 214
Number of Trial Surfaces with Misleading FS = 21
Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Evaluated = 9.4 %
Statistical Data On All Valid FS Values:
FS Max = 5.626 FS Min = 1.279 FS Ave = 2.468
Standard Deviation = 0.403 Coefficient of Variation = 16.32 %
((Simplified Janbu FS for Critical Surface = 1.123))
Failure Surface Specified By 5 Coordinate Points

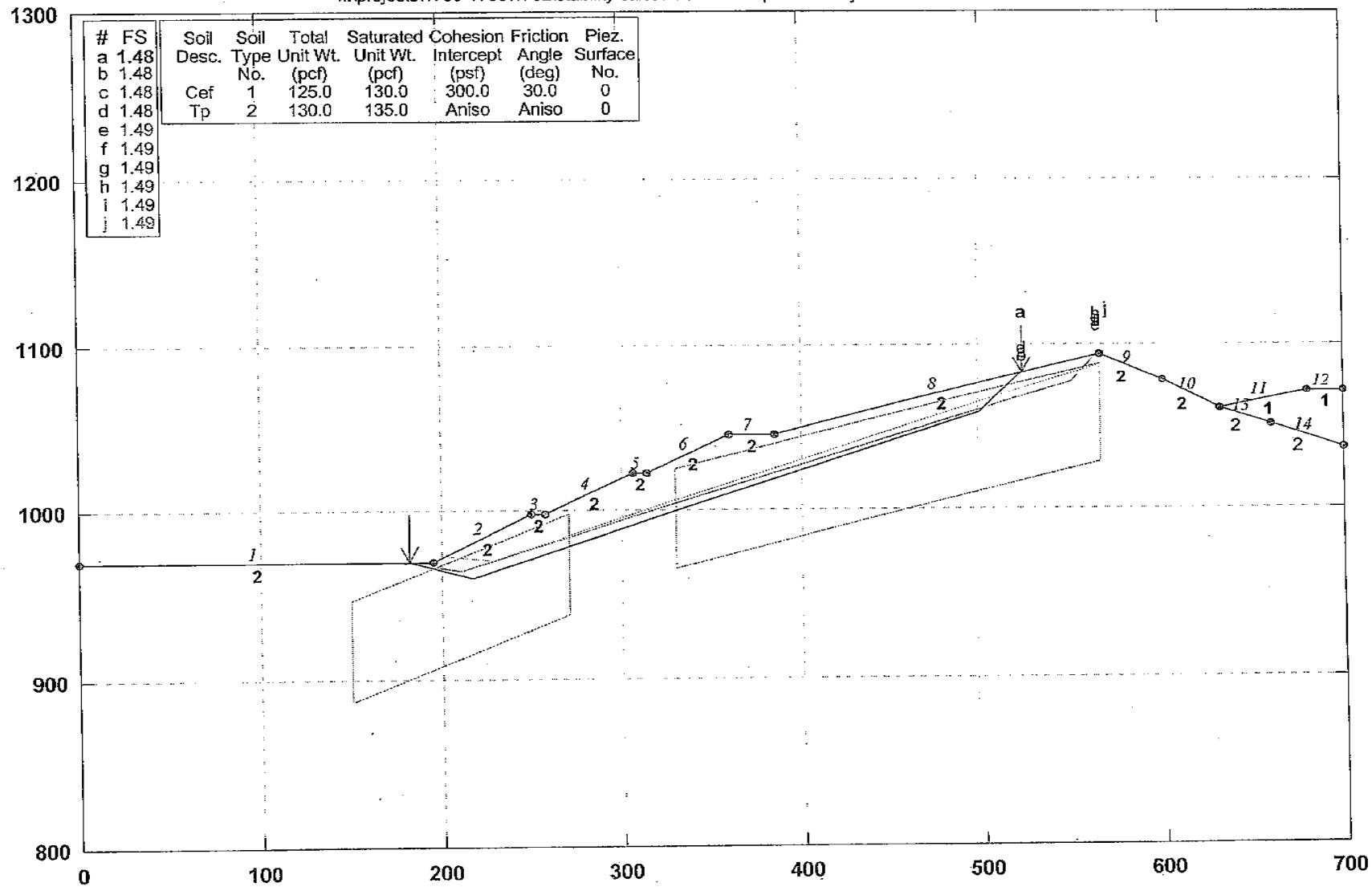
Point No.	X-Surf (ft)	Y-Surf (ft)
1	169.93	990.19
2	190.29	984.48
3	235.78	972.66
4	615.42	1122.47
5	623.64	1131.11

*** FOS = 1.279 Theta (ki=1.0) = 15.95 ***
Lambda = 0.286
Individual data on the 18 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	13.1	7201.2	0.0	0.0	0.	0.	1080.2	0.0	0.0
2	7.0	8608.1	0.0	0.0	0.	0.	1291.2	0.0	0.0
3	0.3	395.1	0.0	0.0	0.	0.	59.3	0.0	0.0
4	45.5	149563.3	0.0	0.0	0.	0.	22434.5	0.0	0.0
5	19.2	99577.9	0.0	0.0	0.	0.	14936.7	0.0	0.0
6	10.0	49116.5	0.0	0.0	0.	0.	7367.5	0.0	0.0
7	60.0	284471.0	0.0	0.0	0.	0.	42670.7	0.0	0.0
8	5.0	23494.8	0.0	0.0	0.	0.	3524.2	0.0	0.0
9	63.0	284431.5	0.0	0.0	0.	0.	42664.7	0.0	0.0
10	20.0	80217.6	0.0	0.0	0.	0.	12032.6	0.0	0.0
11	67.0	232447.1	0.0	0.0	0.	0.	34867.1	0.0	0.0
12	10.0	31843.3	0.0	0.0	0.	0.	4776.5	0.0	0.0
13	10.0	27365.1	0.0	0.0	0.	0.	4104.8	0.0	0.0
14	55.0	137450.0	0.0	0.0	0.	0.	20617.5	0.0	0.0
15	7.0	16826.9	0.0	0.0	0.	0.	2524.0	0.0	0.0
16	48.0	85109.9	0.0	0.0	0.	0.	12766.5	0.0	0.0
17	5.4	6215.1	0.0	0.0	0.	0.	932.3	0.0	0.0
18	8.2	4257.1	0.0	0.0	0.	0.	638.6	0.0	0.0

Lndmrk off-site grading; 7-7'; CS-3; planar; static

n:\projects\1700-1799\1702\stability calcs\1702r\t7s1a.pl2 Run By: KPC 7/9/2008 03:56PM



#	FS
a	1.48
b	1.48
c	1.48
d	1.48
e	1.49
f	1.49
g	1.49
h	1.49
i	1.49
j	1.49

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
Tp	2	130.0	135.0	Aniso	Aniso	0

GSTABL7 v.2 FSmin=1.48

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

Run No. 23

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:          7/9/2008
Time of Run:                03:56PM
Run By:                     KPC
Input Data Filename:        N:\Projects\1700-1799\1702\Stability Calcs\1702R\t7s1a.in
Output Filename:            N:\Projects\1700-1799\1702\Stability Calcs\1702R\t7s1a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t7s1a.PLT
PROBLEM DESCRIPTION:  Lndmrk off-site grading; 7-7'; CS-3;
                      planar; static
BOUNDARY COORDINATES
  12 Top   Boundaries
  14 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	970.00	195.00	970.00	2
2	195.00	970.00	249.00	998.00	2
3	249.00	998.00	257.00	998.00	2
4	257.00	998.00	306.00	1022.00	2
5	306.00	1022.00	314.00	1022.00	2
6	314.00	1022.00	360.00	1045.00	2
7	360.00	1045.00	385.00	1045.00	2
8	385.00	1045.00	565.00	1094.00	2
9	565.00	1094.00	600.00	1077.00	2
10	600.00	1077.00	632.00	1060.00	2
11	632.00	1060.00	680.00	1070.00	1
12	680.00	1070.00	700.00	1070.00	1
13	632.00	1060.00	660.00	1050.00	2
14	660.00	1050.00	700.00	1036.00	2

```
User Specified Y-Origin =        800.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
```

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	130.0	135.0	350.0	30.0	0.00	0.0	0

```
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  2 Is Anisotropic
Number Of Direction Ranges Specified =  3
```

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	16.5	350.00	30.00
2	19.5	200.00	20.00
3	90.0	350.00	30.00

```
ANISOTROPIC SOIL NOTES:
   (1) An input value of 0.01 for C and/or Phi will cause Aniso
       C and/or Phi to be ignored in that range.
   (2) An input value of 0.02 for Phi will set both Phi and
       C equal to zero, with no water weight in the tension crack.
   (3) An input value of 0.03 for Phi will set both Phi and
```

C equal to zero, with water weight in the tension crack.
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
2000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 50.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	150.00	917.00	270.00	968.00	60.00
2	330.00	995.00	565.00	1058.00	60.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2) * *
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
The option of no water in the tension crack on
the last slice has been selected.
Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.
Total Number of Trial Surfaces Evaluated = 2000
WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.
Number of Trial Surfaces with Non-Converged FS = 82
Number of Trial Surfaces with Misleading FS = 1
Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Evaluated = 4.2 %
Statistical Data On All Valid FS Values:
FS Max = 6.905 FS Min = 1.476 FS Ave = 2.941
Standard Deviation = 0.892 Coefficient of Variation = 30.32 %
((Simplified Janbu FS for Critical Surface = 1.411))
Failure Surface Specified By 4 Coordinate Points

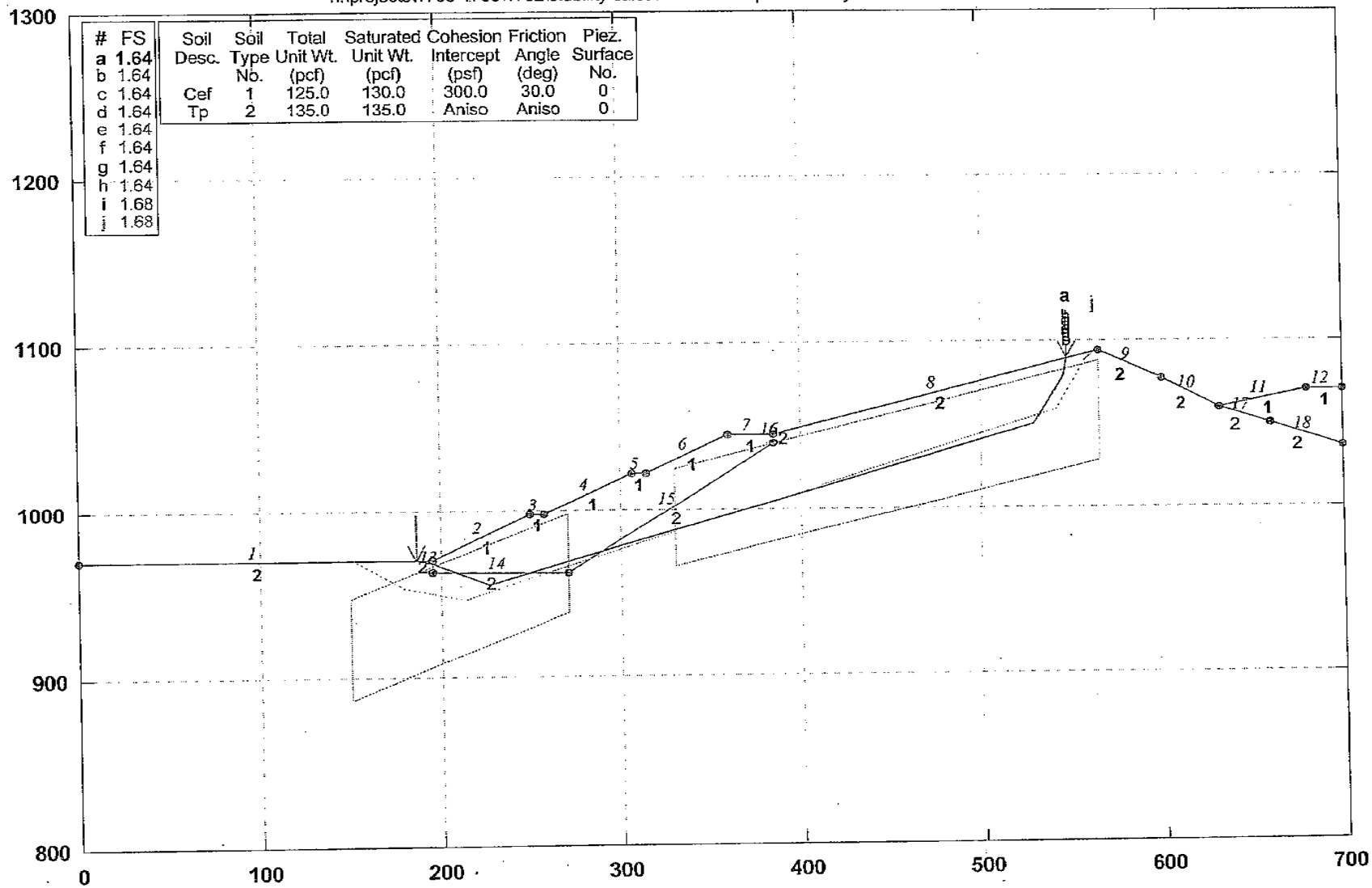
Point No.	X-Surf (ft)	Y-Surf (ft)
1	182.18	970.00
2	217.17	959.69
3	499.06	1058.07
4	522.37	1082.40

*** FOS = 1.476 Theta (ki=1.0) = 16.89 ***
Lambda = 0.304
Individual data on the 10 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	12.8	3146.5	0.0	0.0	0.	0.	0.0	0.0	0.0
2	22.2	36859.2	0.0	0.0	0.	0.	0.0	0.0	0.0
3	31.8	101375.2	0.0	0.0	0.	0.	0.0	0.0	0.0
4	8.0	26833.6	0.0	0.0	0.	0.	0.0	0.0	0.0
5	49.0	177437.0	0.0	0.0	0.	0.	0.0	0.0	0.0
6	8.0	31105.1	0.0	0.0	0.	0.	0.0	0.0	0.0
7	46.0	191275.7	0.0	0.0	0.	0.	0.0	0.0	0.0
8	25.0	101063.8	0.0	0.0	0.	0.	0.0	0.0	0.0
9	114.1	331495.9	0.0	0.0	0.	0.	0.0	0.0	0.0
10	23.3	27237.8	0.0	0.0	0.	0.	0.0	0.0	0.0

Lndmrk off-site grading; 7-7'; CS-3; planar; static; buttress w/ 7'dx75'w key

n:\projects\1700-1799\1702\stability calcs\1702r\t7s2a.pl2 Run By: KPC 7/21/2008 02:08PM



#	FS
a	1.64
b	1.64
c	1.64
d	1.64
e	1.64
f	1.64
g	1.64
h	1.64
i	1.68
j	1.68

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
Tp	2	135.0	135.0	Aniso	Aniso	0

GSTABL7 v.2 FSmin=1.64

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

Run No. 24

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:          7/21/2008
Time of Run:                02:09PM
Run By:                     KPC
Input Data Filename:        N:\Projects\1700-1799\1702\Stability Calcs\1702R\t7s2a.in
Output Filename:            N:\Projects\1700-1799\1702\Stability Calcs\1702R\t7s2a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t7s2a.PLT
PROBLEM DESCRIPTION:  Lndmrk off-site grading; 7-7'; CS-3;
                      planar; static; buttress w/ 7'dx75'w key
BOUNDARY COORDINATES
   12 Top   Boundaries
   18 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	970.00	195.00	970.00	2
2	195.00	970.00	249.00	998.00	1
3	249.00	998.00	257.00	998.00	1
4	257.00	998.00	306.00	1022.00	1
5	306.00	1022.00	314.00	1022.00	1
6	314.00	1022.00	360.00	1045.00	1
7	360.00	1045.00	385.00	1045.00	1
8	385.00	1045.00	565.00	1094.00	2
9	565.00	1094.00	600.00	1077.00	2
10	600.00	1077.00	632.00	1060.00	2
11	632.00	1060.00	680.00	1070.00	1
12	680.00	1070.00	700.00	1070.00	1
13	195.00	970.00	195.01	963.00	2
14	195.01	963.00	270.00	962.00	2
15	270.00	962.00	384.99	1040.00	2
16	384.99	1040.00	385.00	1045.00	2
17	632.00	1060.00	660.00	1050.00	2
18	660.00	1050.00	700.00	1036.00	2

```
User Specified Y-Origin =        800.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
```

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	135.0	135.0	350.0	30.0	0.00	0.0	0

```
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  2 Is Anisotropic
Number Of Direction Ranges Specified =  3
```

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	16.5	350.00	30.00
2	19.5	200.00	20.00
3	90.0	350.00	30.00

```
ANISOTROPIC SOIL NOTES:
   (1) An input value of 0.01 for C and/or Phi will cause Aniso
```

C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
3000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 34.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	150.00	917.00	270.00	968.00	60.00
2	330.00	995.00	565.00	1058.00	60.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2) * *
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
The option of no water in the tension crack on the last slice has been selected.
Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces (if applicable) have been applied to the slice base(s) on which they intersect.
Total Number of Trial Surfaces Evaluated = 3000
WARNING! The Factor of Safety Calculation for one or More Trial Surfaces Did Not Converge in 20 Iterations.
Number of Trial Surfaces with Non-Converged FS = 24
Percentage of Trial Surfaces With Non-Valid FS Solutions of the Total Evaluated = 0.8 %
Statistical Data On All Valid FS Values:
FS Max = 12.401 FS Min = 1.638 FS Ave = 3.023
Standard Deviation = 1.078 Coefficient of Variation = 35.67 %
((Simplified Janbu FS for Critical Surface = 1.510))
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	186.16	970.00
2	194.79	967.63
3	226.28	954.82
4	529.30	1049.82
5	546.40	1079.21
6	547.55	1089.25

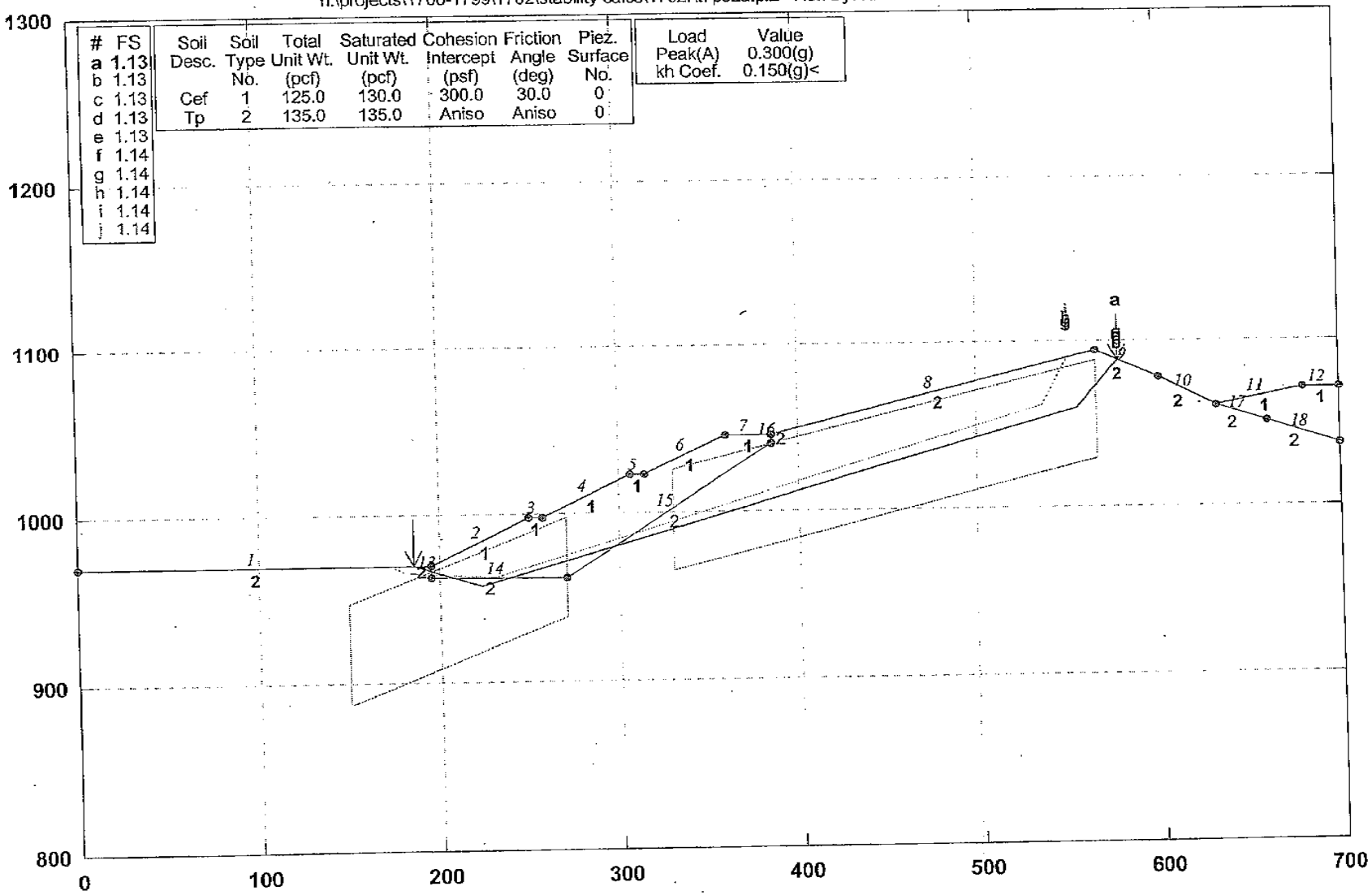
*** FOS = 1.638 Theta (ki=1.0) = 17.13 ***
Lambda = 0.308
Individual data on the 17 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	8.6	1378.9	0.0	0.0	0.	0.	0.0	0.0	0.0
2	0.2	69.2	0.0	0.0	0.	0.	0.0	0.0	0.0
3	0.0	1.1	0.0	0.0	0.	0.	0.0	0.0	0.0
4	11.5	11262.5	0.0	0.0	0.	0.	0.0	0.0	0.0
5	19.7	55689.1	0.0	0.0	0.	0.	0.0	0.0	0.0
6	22.7	96699.1	0.0	0.0	0.	0.	0.0	0.0	0.0
7	1.0	4621.8	0.0	0.0	0.	0.	0.0	0.0	0.0
8	7.0	30182.5	0.0	0.0	0.	0.	0.0	0.0	0.0
9	30.9	140057.3	0.0	0.0	0.	0.	0.0	0.0	0.0
10	18.1	92481.0	0.0	0.0	0.	0.	0.0	0.0	0.0
11	8.0	41578.3	0.0	0.0	0.	0.	0.0	0.0	0.0
12	46.0	261060.6	0.0	0.0	0.	0.	0.0	0.0	0.0
13	25.0	146223.2	0.0	0.0	0.	0.	0.0	0.0	0.0

14	0.0	54.4	0.0	0.0	0.	0.	0.0	0.0	0.0
15	144.3	729396.8	0.0	0.0	0.	0.	0.0	0.0	0.0
16	17.1	51005.9	0.0	0.0	0.	0.	0.0	0.0	0.0
17	1.2	756.2	0.0	0.0	0.	0.	0.0	0.0	0.0

Lndmrk off-site grading; 7-7'; CS-3; planar; pseudo; buttress w/ 7'dx75'w key

n:\projects\1700-1799\1702\stability calcs\1702r\t7ps2a.pl2 Run By: KPC 7/21/2008 02:10PM



#	FS
a	1.13
b	1.13
c	1.13
d	1.13
e	1.13
f	1.14
g	1.14
h	1.14
i	1.14
j	1.14

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	130.0	300.0	30.0	0
Tp	2	135.0	135.0	Aniso	Aniso	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.13

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

Run No. 25

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*********************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*********************************************************************************
Analysis Run Date:          7/21/2008
Time of Run:                02:10PM
Run By:                     KPC
Input Data Filename:        N:\Projects\1700-1799\1702\Stability Calcs\1702R\t7ps2a.in
Output Filename:            N:\Projects\1700-1799\1702\Stability Calcs\1702R\t7ps2a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t7ps2a.PLT
PROBLEM DESCRIPTION:  Lndmrk off-site grading; 7-7'; CS-3;
                      planar; pseudo; buttress w/ 7'dx75'w key
```

BOUNDARY COORDINATES

12 Top Boundaries
18 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	970.00	195.00	970.00	2
2	195.00	970.00	249.00	998.00	1
3	249.00	998.00	257.00	998.00	1
4	257.00	998.00	306.00	1022.00	1
5	306.00	1022.00	314.00	1022.00	1
6	314.00	1022.00	360.00	1045.00	1
7	360.00	1045.00	385.00	1045.00	1
8	385.00	1045.00	565.00	1094.00	2
9	565.00	1094.00	600.00	1077.00	2
10	600.00	1077.00	632.00	1060.00	2
11	632.00	1060.00	680.00	1070.00	1
12	680.00	1070.00	700.00	1070.00	1
13	195.00	970.00	195.01	963.00	2
14	195.01	963.00	270.00	962.00	2
15	270.00	962.00	384.99	1040.00	2
16	384.99	1040.00	385.00	1045.00	2
17	632.00	1060.00	660.00	1050.00	2
18	660.00	1050.00	700.00	1036.00	2

User Specified Y-Origin = 800.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	300.0	30.0	0.00	0.0	0
2	135.0	135.0	500.0	36.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)
Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	16.5	500.00	36.00
2	19.5	200.00	20.00
3	90.0	500.00	36.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso

C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
3000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 50.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	150.00	917.00	270.00	968.00	60.00
2	330.00	995.00	565.00	1058.00	60.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2) * *
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
The option of no water in the tension crack on the last slice has been selected.
Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces (if applicable) have been applied to the slice base(s) on which they intersect.
Total Number of Trial Surfaces Evaluated = 3000
WARNING! The Factor of Safety Calculation for one or More Trial Surfaces Did Not Converge in 20 Iterations.
Number of Trial Surfaces with Non-Converged FS = 129
Number of Trial Surfaces with Misleading FS = 5
Percentage of Trial Surfaces With Non-Valid FS Solutions of the Total Evaluated = 4.5 %
Statistical Data On All Valid FS Values:
FS Max = 5.951 FS Min = 1.125 FS Ave = 2.315
Standard Deviation = 0.645 Coefficient of Variation = 27.85 %
((Simplified Janbu FS for Critical Surface = 1.057))
Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	185.54	970.00
2	223.12	957.29
3	554.31	1058.93
4	577.19	1088.08

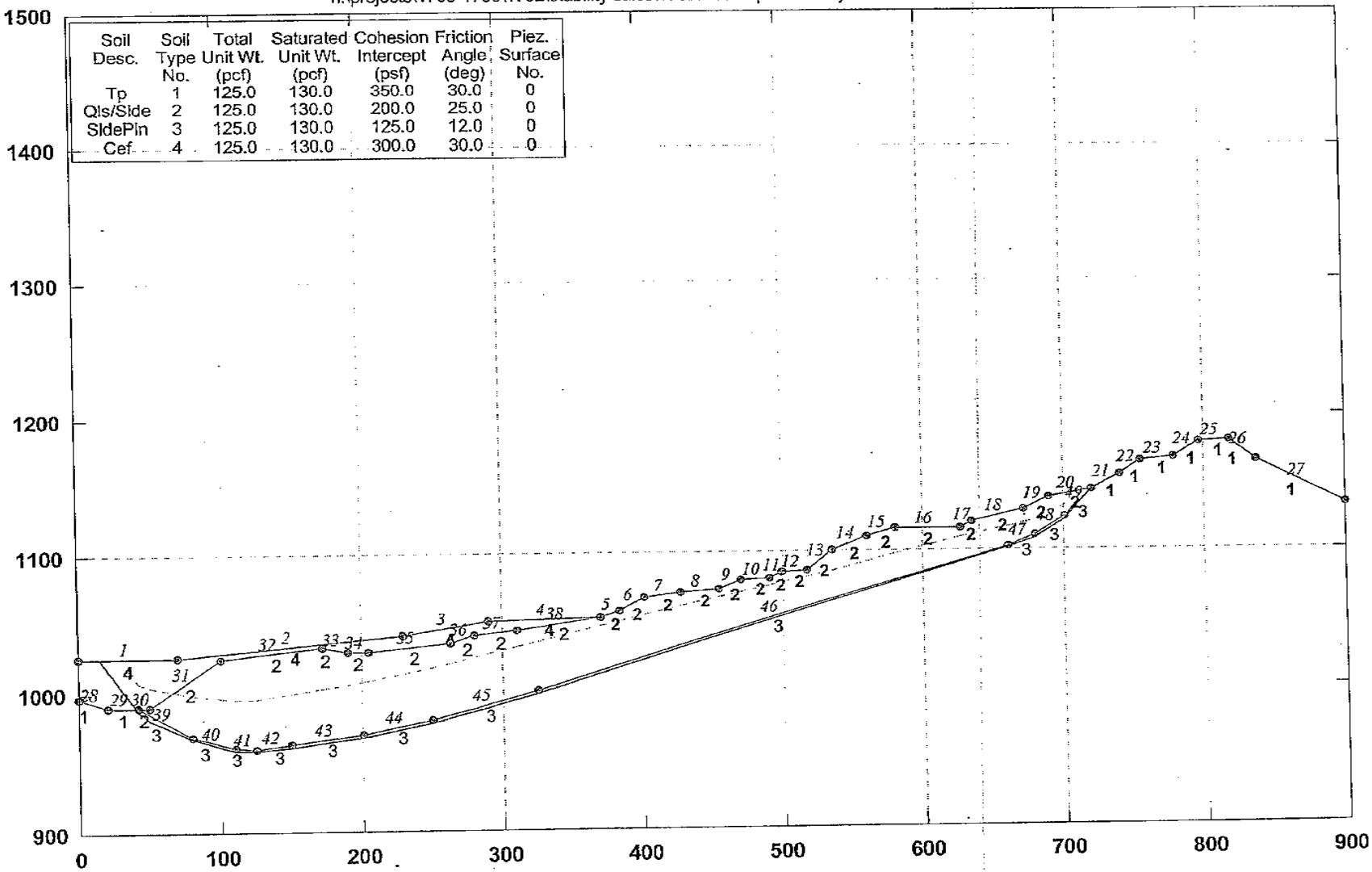
*** FOS = 1.125 Theta (ki=1.0) = 15.79 ***
Lambda = 0.283
Individual data on the 16 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	9.5	2044.3	0.0	0.0	0.	0.	306.7	0.0	0.0
2	0.0	1.9	0.0	0.0	0.	0.	0.3	0.0	0.0
3	11.7	11990.7	0.0	0.0	0.	0.	1798.6	0.0	0.0
4	16.4	42037.5	0.0	0.0	0.	0.	6305.6	0.0	0.0
5	16.7	61017.6	0.0	0.0	0.	0.	9152.6	0.0	0.0
6	9.2	36593.4	0.0	0.0	0.	0.	5489.0	0.0	0.0
7	8.0	31544.2	0.0	0.0	0.	0.	4731.6	0.0	0.0
8	39.0	165378.6	0.0	0.0	0.	0.	24806.8	0.0	0.0
9	10.0	47943.1	0.0	0.0	0.	0.	7191.5	0.0	0.0
10	8.0	38466.4	0.0	0.0	0.	0.	5770.0	0.0	0.0

11	46.0	244275.4	0.0	0.0	0.	0.	36641.3	0.0	0.0
12	25.0	137896.0	0.0	0.0	0.	0.	20684.4	0.0	0.0
13	0.0	51.1	0.0	0.0	0.	0.	7.7	0.0	0.0
14	169.3	802300.7	0.0	0.0	0.	0.	*******	0.0	0.0
15	10.7	38679.2	0.0	0.0	0.	0.	5801.9	0.0	0.0
16	12.2	17663.8	0.0	0.0	0.	0.	2649.6	0.0	0.0

Lndmrk off-site grading; 8-8'; Qls-XIV(B); static; basal Qls plane - no removals

n:\projects\1700-1799\1702\stability calcs\1702r\t8s1a.plt Run By: MJG 7/17/2008 03:57PM



Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Tp	1	125.0	130.0	350.0	30.0	0
Qls/Side	2	125.0	130.0	200.0	25.0	0
SldePln	3	125.0	130.0	125.0	12.0	0
Cef	4	125.0	130.0	300.0	30.0	0

GSTABL7 v.2 FSmin=2.40

Factor Of Safety Is Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

Run No. 26

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*************************************************************************
Analysis Run Date:          7/17/2008
Time of Run:                03:57PM
Run By:                     MJG
Input Data Filename:        N:\Projects\1700-1799\1702\Stability Calcs\1702R\t8s1a.in
Output Filename:            N:\Projects\1700-1799\1702\Stability Calcs\1702R\t8s1a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t8s1a.PLT
PROBLEM DESCRIPTION:  Lndmrk off-site grading; 8-8'; Qls-XIV(B
                      ); static; basal Qls plane - no removals

BOUNDARY COORDINATES
   27 Top   Boundaries
   49 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	1025.00	70.00	1025.00	4
2	70.00	1025.00	230.00	1040.00	4
3	230.00	1040.00	290.00	1050.00	4
4	290.00	1050.00	370.00	1052.00	4
5	370.00	1052.00	384.00	1056.00	2
6	384.00	1056.00	402.00	1066.00	2
7	402.00	1066.00	428.00	1070.00	2
8	428.00	1070.00	455.00	1072.00	2
9	455.00	1072.00	470.00	1079.00	2
10	470.00	1079.00	490.00	1080.00	2
11	490.00	1080.00	500.00	1085.00	2
12	500.00	1085.00	517.00	1086.00	2
13	517.00	1086.00	535.00	1100.00	2
14	535.00	1100.00	560.00	1110.00	2
15	560.00	1110.00	580.00	1116.00	2
16	580.00	1116.00	627.00	1116.00	2
17	627.00	1116.00	634.00	1120.00	2
18	634.00	1120.00	672.00	1130.00	2
19	672.00	1130.00	690.00	1138.00	2
20	690.00	1138.00	720.00	1144.00	2
21	720.00	1144.00	740.00	1155.00	1
22	740.00	1155.00	755.00	1166.00	1
23	755.00	1166.00	779.00	1168.00	1
24	779.00	1168.00	796.00	1179.00	1
25	796.00	1179.00	818.00	1180.00	1
26	818.00	1180.00	837.00	1165.00	1
27	837.00	1165.00	900.00	1133.00	1
28	0.00	997.00	20.00	990.00	1
29	20.00	990.00	42.00	990.00	1
30	42.00	990.00	50.00	990.00	2
31	50.00	990.00	100.00	1024.00	2
32	100.00	1024.00	172.00	1032.00	2
33	172.00	1032.00	190.00	1028.00	2
34	190.00	1028.00	205.00	1028.00	2
35	205.00	1028.00	263.00	1034.00	2
36	263.00	1034.00	280.00	1039.00	2
37	280.00	1039.00	310.00	1043.00	2
38	310.00	1043.00	370.00	1052.00	2
39	42.00	990.00	80.00	969.00	3
40	80.00	969.00	110.00	961.00	3

41	110.00	961.00	125.00	960.00	3
42	125.00	960.00	150.00	963.00	3
43	150.00	963.00	200.00	970.00	3
44	200.00	970.00	250.00	980.00	3
45	250.00	980.00	325.00	1000.00	3
46	325.00	1000.00	660.00	1103.00	3
47	660.00	1103.00	680.00	1110.00	3
48	680.00	1110.00	701.00	1124.00	3
49	701.00	1124.00	720.00	1144.00	3

User Specified Y-Origin = 900.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS

4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	350.0	30.0	0.00	0.0	0
2	125.0	130.0	200.0	25.0	0.00	0.0	0
3	125.0	130.0	125.0	12.0	0.00	0.0	0
4	125.0	130.0	300.0	30.0	0.00	0.0	0

Trial Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	15.00	1025.00
2	42.00	988.00
3	50.00	981.00
4	80.00	967.00
5	110.00	959.00
6	125.00	958.00
7	150.00	961.00
8	200.00	968.00
9	250.00	978.00
10	325.00	998.00
11	660.00	1101.00
12	680.00	1108.00
13	701.00	1122.00
14	720.00	1144.00

Theta (deg) (ki=1.0)	FOS (Moment) (Equil.)	FOS (Force) (Equil.)	Lambda
9.00	2.146	2.544	0.158
13.50	0.001	3.040	0.240
8.10	2.286	2.469	0.142
5.83	2.556	2.308	0.102
6.82	2.451	2.374	0.120
7.41	2.379	2.416	0.130
7.15	2.411	2.398	0.125
7.22	2.403	2.403	0.127

((Simplified Janbu FS for Specified Surface = 2.008))
Factor Of Safety For The Preceding Specified Surface = 2.403
Theta (ki = 1.0) = 7.22 Deg Lambda = 0.127
Factor Of Safety Is Calculated By GLE (Spencer`s) Method (0-2)
Forces from Reinforcement, Piers/Piles, Applied Forces, and Soil Nails
(if applicable) have been applied to the slice base(s)
on which they intersect.
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
Tension Crack Water Force = 0.00(lbs)
Specified Tension Crack Water Force Factor = 0.000
Depth of Tension Crack (zo) at Center of Last Slice = 0.905(ft)

*** Line of Thrust and Slice Force Data ***

Slice No.	X Coord.	Y Coord.	L/H	Side Force (lbs)	ki	Force Angle (Deg)	Vert. Shear Force(lbs)
1	40.54	1009.12	0.546	214205.	1.000	7.22	27134.9
2	42.00	1007.25	0.520	238376.	1.000	7.22	30196.9
3	50.00	1004.23	0.528	288434.	1.000	7.22	36538.1

4	70.00	1000.55	0.542	366506.	1.000	7.22	46428.1
5	80.00	998.34	0.532	411423.	1.000	7.22	52118.1
6	100.00	996.30	0.524	472722.	1.000	7.22	59883.2
7	110.00	995.16	0.518	505968.	1.000	7.22	64094.8
8	125.00	995.48	0.519	528128.	1.000	7.22	66902.0
9	150.00	999.06	0.532	522408.	1.000	7.22	66177.4
10	172.00	1002.50	0.545	513611.	1.000	7.22	65063.0
11	190.00	1005.31	0.556	506519.	1.000	7.22	64164.6
12	200.00	1006.88	0.562	502621.	1.000	7.22	63670.7
13	205.00	1007.86	0.566	498192.	1.000	7.22	63109.7
14	230.00	1012.75	0.587	476590.	1.000	7.22	60373.2
15	250.00	1016.67	0.592	459760.	1.000	7.22	58241.3
16	263.00	1019.80	0.599	442412.	1.000	7.22	56043.6
17	280.00	1023.91	0.608	420272.	1.000	7.22	53239.0
18	290.00	1026.34	0.614	407539.	1.000	7.22	51626.0
19	310.00	1031.16	0.658	383323.	1.000	7.22	48558.5
20	325.00	1034.72	0.694	366524.	1.000	7.22	46430.3
21	370.00	1045.85	0.847	314218.	1.000	7.22	39804.4
22	384.00	1049.14	0.828	300329.	1.000	7.22	38044.9
23	402.00	1053.52	0.718	281491.	1.000	7.22	35658.6
24	428.00	1059.99	0.752	254120.	1.000	7.22	32191.3
25	455.00	1066.43	0.836	229333.	1.000	7.22	29051.3
26	470.00	1069.95	0.752	216329.	1.000	7.22	27404.1
27	490.00	1074.62	0.828	199714.	1.000	7.22	25299.2
28	500.00	1076.91	0.756	191828.	1.000	7.22	24300.2
29	517.00	1080.76	0.819	178933.	1.000	7.22	22666.8
30	535.00	1085.01	0.600	164282.	1.000	7.22	20810.8
31	560.00	1091.61	0.537	140408.	1.000	7.22	17786.6
32	580.00	1097.32	0.528	120753.	0.993	7.17	15080.5
33	627.00	1109.45	0.739	83884.	0.660	4.78	4622.8
34	634.00	1110.97	0.666	79537.	0.610	4.42	3748.2
35	660.00	1116.55	0.602	63111.	0.426	3.09	1447.7
36	672.00	1119.33	0.570	54382.	0.340	2.47	798.4
37	680.00	1121.18	0.516	48581.	0.284	2.06	495.3
38	690.00	1126.20	0.494	33055.	0.213	1.54	189.6
39	701.00	1132.71	0.589	18549.	0.135	0.98	42.7
40	720.00	1314.67	0.000	-13.	0.000	0.00	0.0

Table 1 - Individual data on the 40 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	25.5	55869.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	1.5	6567.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	8.0	40500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	20.0	121666.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	10.0	70169.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	20.0	156354.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	10.0	84934.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	15.0	133037.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	25.0	224462.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	22.0	195226.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	18.0	157649.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	10.0	86773.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	5.0	43076.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	25.0	210400.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	20.0	164166.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	13.0	105110.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	17.0	134264.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	10.0	77291.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	20.0	147291.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	15.0	102539.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	45.0	261672.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	14.0	70020.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	18.0	94708.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	26.0	137567.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	27.0	125484.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0

26	15.0	66044.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	20.0	84608.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	10.0	40289.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29	17.0	66046.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	18.0	74699.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31	25.0	120592.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32	20.0	99179.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33	47.0	190183.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34	7.0	22811.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35	26.0	85858.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36	12.0	37981.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
37	8.0	25177.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
38	10.0	30555.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
39	11.0	28554.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40	19.0	21612.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0

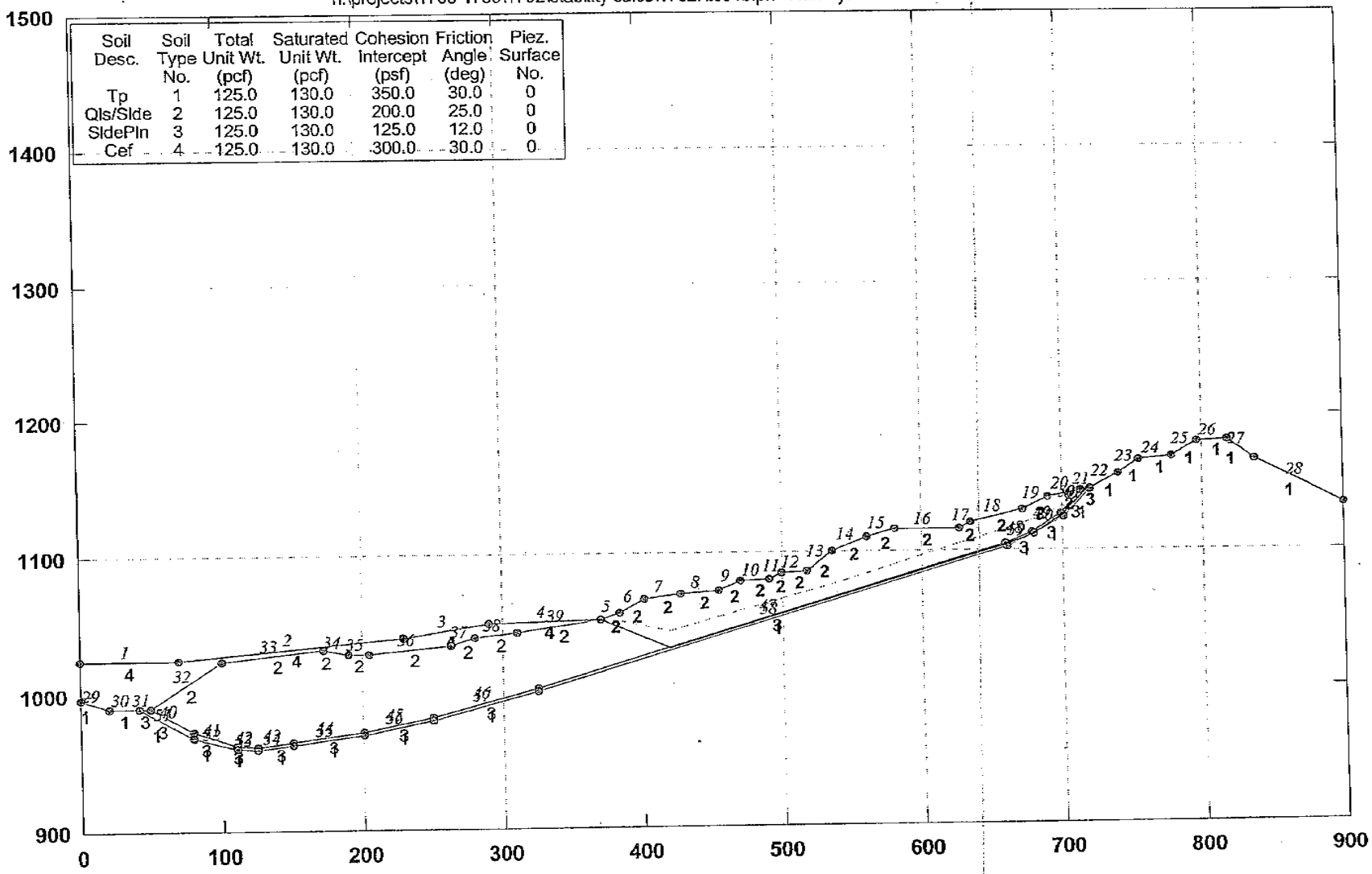
- TABLE 2 - Base Stress Data on the 40 Slices -

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Total Normal Stress (psf)	Total Vert. Stress (psf)	Mobilized Shear Stress (psf)
1	-53.88	27.77	43.33	5088.22	1289.46	1347.61
2	-53.88	41.27	2.48	10110.49	2652.61	2575.31
3	-41.19	46.00	10.63	6388.98	3809.92	617.27
4	-25.02	60.00	22.07	6882.35	5512.62	660.92
5	-25.02	75.00	11.04	7933.23	6358.62	753.89
6	-14.93	90.00	20.70	8415.30	7553.75	796.54
7	-14.93	105.00	10.35	9140.84	8206.71	860.73
8	-3.81	117.50	15.03	9112.02	8849.50	858.18
9	6.84	137.50	25.18	8849.57	8914.56	834.96
10	7.97	161.00	22.21	8708.51	8788.20	822.48
11	7.97	181.00	18.18	8595.02	8673.69	812.44
12	7.97	195.00	10.10	8515.59	8593.54	805.41
13	11.31	202.50	5.10	8345.83	8447.93	790.40
14	11.31	217.50	25.50	8152.76	8252.58	773.31
15	11.31	240.00	20.40	7951.48	8048.93	755.51
16	14.93	256.50	13.45	7721.65	7812.41	735.17
17	14.93	271.50	17.59	7542.43	7631.24	719.32
18	14.93	285.00	10.35	7381.13	7468.19	705.05
19	14.93	300.00	20.70	7032.64	7115.92	674.22
20	14.93	317.50	15.52	6527.32	6605.12	629.51
21	17.09	347.50	47.08	5503.18	5558.16	538.90
22	17.09	377.00	14.65	4732.09	4780.63	470.68
23	17.09	393.00	18.83	4978.62	5029.22	492.49
24	17.09	415.00	27.20	5006.56	5057.40	494.97
25	17.09	441.50	28.25	4396.60	4442.33	441.00
26	17.09	462.50	15.69	4164.75	4208.55	420.49
27	17.09	480.00	20.92	4001.17	4043.60	406.02
28	17.09	495.00	10.46	3810.17	3851.00	389.12
29	17.09	508.50	17.79	3673.81	3713.51	377.06
30	17.09	526.00	18.83	3924.94	3966.73	399.27
31	17.09	547.50	26.15	4563.56	4610.69	455.77
32	17.09	570.00	20.92	4686.67	4739.97	466.66
33	17.09	603.50	49.17	3756.25	3867.76	384.35
34	17.09	630.50	7.32	3037.67	3114.87	320.77
35	17.09	647.00	27.20	3097.02	3156.44	326.03
36	19.29	666.00	12.71	2967.20	2987.44	314.54
37	19.29	676.00	8.48	2962.50	2970.54	314.12
38	33.69	685.00	12.02	2771.96	2542.38	297.27
39	33.69	695.50	13.22	2369.22	2159.86	261.64
40	49.18	710.50	29.07	962.04	743.49	137.14

**** END OF GSTABL7 OUTPUT ****

Lndmrk off-site grading; 8-8'; Qls-XIV(B); static; basal Qls plane - no removals

n:\projects\1700-1799\1702\stability calcs\1702r\t8s4b.plt Run By: KPC 7/21/2008 09:04AM



Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Tp	1	125.0	130.0	350.0	30.0	0
Qls/Slde	2	125.0	130.0	200.0	25.0	0
SldePln	3	125.0	130.0	125.0	12.0	0
Cef	4	125.0	130.0	300.0	30.0	0

GSTABL7 v.2 FSmin=1.43

Factor Of Safety Is Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

Run No. 27

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 7/21/2008
Time of Run: 09:04AM
Run By: KPC
Input Data Filename: N:\Projects\1700-1799\1702\Stability Calcs\1702R\t8s4b.in
Output Filename: N:\Projects\1700-1799\1702\Stability Calcs\1702R\t8s4b.OUT
Unit System: English
Plotted Output Filename: N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t8s4b.PLT
PROBLEM DESCRIPTION: Lndmrk off-site grading; 8-8'; Qls-XIV(B
); static; basal Qls plane - no removals

BOUNDARY COORDINATES
28 Top Boundaries
61 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	1025.00	70.00	1025.00	4
2	70.00	1025.00	230.00	1040.00	4
3	230.00	1040.00	290.00	1050.00	4
4	290.00	1050.00	370.00	1052.00	4
5	370.00	1052.00	384.00	1056.00	2
6	384.00	1056.00	402.00	1066.00	2
7	402.00	1066.00	428.00	1070.00	2
8	428.00	1070.00	455.00	1072.00	2
9	455.00	1072.00	470.00	1079.00	2
10	470.00	1079.00	490.00	1080.00	2
11	490.00	1080.00	500.00	1085.00	2
12	500.00	1085.00	517.00	1086.00	2
13	517.00	1086.00	535.00	1100.00	2
14	535.00	1100.00	560.00	1110.00	2
15	560.00	1110.00	580.00	1116.00	2
16	580.00	1116.00	627.00	1116.00	2
17	627.00	1116.00	634.00	1120.00	2
18	634.00	1120.00	672.00	1130.00	2
19	672.00	1130.00	690.00	1138.00	2
20	690.00	1138.00	713.00	1143.00	2
21	713.00	1143.00	720.00	1144.00	3
22	720.00	1144.00	740.00	1155.00	1
23	740.00	1155.00	755.00	1166.00	1
24	755.00	1166.00	779.00	1168.00	1
25	779.00	1168.00	796.00	1179.00	1
26	796.00	1179.00	818.00	1180.00	1
27	818.00	1180.00	837.00	1165.00	1
28	837.00	1165.00	900.00	1133.00	1
29	0.00	997.00	20.00	990.00	1
30	20.00	990.00	42.00	990.00	1
31	42.00	990.00	50.00	990.00	3
32	50.00	990.00	100.00	1024.00	2
33	100.00	1024.00	172.00	1032.00	2
34	172.00	1032.00	190.00	1028.00	2
35	190.00	1028.00	205.00	1028.00	2
36	205.00	1028.00	263.00	1034.00	2
37	263.00	1034.00	280.00	1039.00	2
38	280.00	1039.00	310.00	1043.00	2
39	310.00	1043.00	370.00	1052.00	2
40	50.00	990.00	80.00	973.00	3

41	80.00	973.00	110.00	963.00	3
42	110.00	963.00	125.00	962.00	3
43	125.00	962.00	150.00	965.00	3
44	150.00	965.00	200.00	972.00	3
45	200.00	972.00	250.00	982.00	3
46	250.00	982.00	325.00	1002.00	3
47	325.00	1002.00	659.00	1105.00	3
48	659.00	1105.00	678.00	1113.00	3
49	678.00	1113.00	699.00	1126.00	3
50	699.00	1126.00	713.00	1143.00	3
51	42.00	990.00	80.00	969.00	1
52	80.00	969.00	110.00	961.00	1
53	110.00	961.00	125.00	960.00	1
54	125.00	960.00	150.00	963.00	1
55	150.00	963.00	200.00	970.00	1
56	200.00	970.00	250.00	980.00	1
57	250.00	980.00	325.00	1000.00	1
58	325.00	1000.00	660.00	1103.00	1
59	660.00	1103.00	680.00	1111.00	1
60	680.00	1111.00	701.00	1124.00	1
61	701.00	1124.00	720.00	1144.00	1

User Specified Y-Origin = 900.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS

4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	350.0	30.0	0.00	0.0	0
2	125.0	130.0	200.0	25.0	0.00	0.0	0
3	125.0	130.0	125.0	12.0	0.00	0.0	0
4	125.0	130.0	300.0	30.0	0.00	0.0	0

Trial Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	370.00	1052.00
2	420.00	1031.00
3	659.50	1104.00
4	679.00	1112.00
5	700.00	1125.00
6	716.50	1143.50

Theta (deg) (ki=1.0)	FOS (Moment) (Equil.)	FOS (Force) (Equil.)	Lambda
9.00	1.560	1.354	0.158
13.50	1.433	1.424	0.240
13.76	1.422	1.429	0.245
13.64	1.427	1.427	0.243

((Simplified Janbu FS for Specified Surface = 1.245))
Factor Of Safety For The Preceding Specified Surface = 1.427
Theta (ki = 1.0) = 13.64 Deg Lambda = 0.243
Factor Of Safety Is Calculated By GLE (Spencer`s) Method (0-2)
Forces from Reinforcement, Piers/Piles, Applied Forces, and Soil Nails
(if applicable) have been applied to the slice base(s)
on which they intersect.
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
Tension Crack Water Force = 0.00(lbs)
Specified Tension Crack Water Force Factor = 0.000
Depth of Tension Crack (zo) at Center of Last Slice = 1.631(ft)

*** Line of Thrust and Slice Force Data ***

Slice No.	X Coord.	Y Coord.	L/H	Side Force (lbs)	ki	Force Angle (Deg)	Vert. Shear Force(lbs)
1	384.00	1050.76	0.470	13236.	1.000	13.64	3212.6
2	402.00	1046.68	0.296	65067.	1.000	13.64	15793.2
3	419.59	1043.05	0.317	150022.	1.000	13.64	36413.4

4	420.00	1043.03	0.319	151478.	1.000	13.64	36767.0
5	428.00	1045.36	0.326	146705.	1.000	13.64	35608.3
6	455.00	1053.11	0.377	132451.	1.000	13.64	32148.7
7	470.00	1057.40	0.341	125060.	1.000	13.64	30354.8
8	490.00	1063.10	0.389	115699.	1.000	13.64	28082.7
9	500.00	1065.94	0.356	111310.	1.000	13.64	27017.2
10	517.00	1070.75	0.401	104198.	1.000	13.64	25291.1
11	535.00	1075.95	0.292	95947.	1.000	13.64	23288.3
12	560.00	1083.57	0.273	81967.	1.000	13.64	19895.1
13	580.00	1089.96	0.281	70361.	1.000	13.64	17078.0
14	627.00	1105.08	0.502	49356.	1.000	13.64	11979.8
15	634.00	1107.31	0.466	47035.	1.000	13.64	11416.3
16	659.00	1115.06	0.493	38446.	0.830	11.39	6424.4
17	659.50	1115.20	0.493	38279.	0.823	11.29	6285.6
18	672.00	1119.50	0.497	31390.	0.642	8.86	3141.6
19	678.00	1121.42	0.466	28235.	0.556	7.68	2115.2
20	679.00	1121.73	0.461	27706.	0.541	7.48	1969.1
21	690.00	1126.91	0.422	17691.	0.382	5.30	627.9
22	699.00	1131.38	0.449	10640.	0.253	3.51	164.7
23	700.00	1131.90	0.454	9954.	0.238	3.31	137.0
24	713.00	1127.07	-3.652	30.	0.051	0.70	0.0
25	716.50	1597.46	0.000	-1.	0.000	0.00	0.0

Table 1 - Individual data on the 25 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	14.0	8644.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	18.0	41985.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	17.6	71444.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.4	1915.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	8.0	37165.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	27.0	112882.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	15.0	59148.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	20.0	75529.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	10.0	35799.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	17.0	58490.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	18.0	66804.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	25.0	109805.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	20.0	90699.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	47.0	170779.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	7.0	19984.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	25.0	72662.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	0.5	1420.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	12.5	34048.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	6.0	15730.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	1.0	2636.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	11.0	27707.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	9.0	19555.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	1.0	1921.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	13.0	15111.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	3.5	749.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0

- TABLE 2 - Base Stress Data on the 25 Slices -

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Total Normal Stress (psf)	Total Vert. Stress (psf)	Mobilized Shear Stress (psf)
1	-22.78	377.00	15.18	1042.47	569.32	480.90
2	-22.78	393.00	19.52	3559.15	2150.53	1303.44
3	-22.78	410.80	19.08	6095.59	3744.15	2132.45
4	-22.78	419.80	0.44	5960.79	4339.36	975.66
5	16.95	424.00	8.36	4283.70	4443.83	725.81
6	16.95	441.50	28.23	3854.59	3999.20	661.88
7	16.95	462.50	15.68	3635.24	3771.91	629.20
8	16.95	480.00	20.91	3481.30	3612.41	606.26
9	16.95	495.00	10.45	3299.89	3424.45	579.24
10	16.95	508.50	17.77	3171.24	3291.14	560.07
11	16.95	526.00	18.82	3421.19	3550.13	597.31

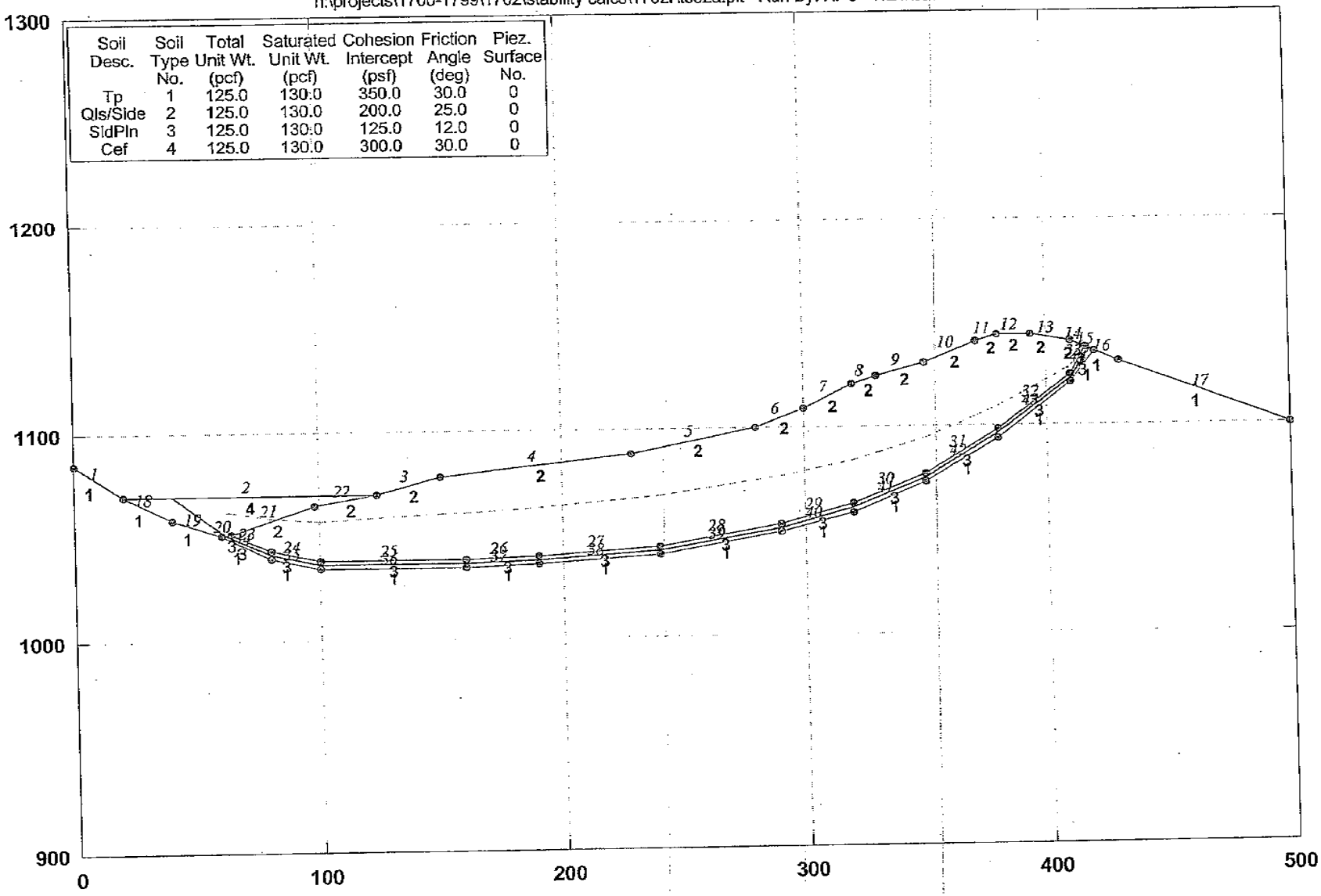
12	16.95	547.50	26.14	4049.73	4201.40	690.95
13	16.95	570.00	20.91	4181.50	4337.94	710.58
14	16.95	603.50	49.13	3349.39	3475.74	586.61
15	16.95	630.50	7.32	2630.52	2730.87	479.51
16	16.95	646.50	26.14	2620.62	2780.20	478.04
17	16.95	659.25	0.52	2507.06	2716.72	461.12
18	22.31	665.75	13.51	2332.57	2520.06	435.12
19	22.31	675.00	6.49	2270.29	2425.60	425.84
20	22.31	678.50	1.08	2295.26	2439.44	429.56
21	31.76	684.50	12.94	2092.28	2141.69	399.32
22	31.76	694.50	10.58	1839.65	1847.53	361.69
23	31.76	699.50	1.18	1639.71	1634.08	331.90
24	48.27	706.50	19.53	874.01	773.70	217.82
25	48.27	714.75	5.26	99.13	142.45	102.38

**** END OF GSTABL7 OUTPUT ****

Lndmrk off-site grading; 9-9'; Qls-XIII(B); static; Qls plane - no removals

n:\projects\1700-1799\1702\stability calcs\1702r\t9s2a.plt Run By: KPC 7/21/2008 08:41AM

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Tp	1	125.0	130.0	350.0	30.0	0
Qls/Side	2	125.0	130.0	200.0	25.0	0
SldPln	3	125.0	130.0	125.0	12.0	0
Cef	4	125.0	130.0	300.0	30.0	0



GSTABL7 v.2 FSmin=1.42

Factor Of Safety Is Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

Run No. 28

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
Analysis Run Date:          7/21/2008
Time of Run:                08:41AM
Run By:                     KPC
Input Data Filename:        N:\Projects\1700-1799\1702\Stability Calcs\1702R\t9s2a.in
Output Filename:            N:\Projects\1700-1799\1702\Stability Calcs\1702R\t9s2a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t9s2a.PLT
PROBLEM DESCRIPTION:  Lndmrk off-site grading; 9-9'; Qls-XIII(
                      B); static; Qls plane - no removals
```

BOUNDARY COORDINATES

17 Top Boundaries

44 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	1085.00	20.00	1070.00	1
2	20.00	1070.00	124.00	1070.00	4
3	124.00	1070.00	150.00	1078.00	2
4	150.00	1078.00	229.00	1088.00	2
5	229.00	1088.00	280.00	1100.00	2
6	280.00	1100.00	300.00	1109.00	2
7	300.00	1109.00	320.00	1120.00	2
8	320.00	1120.00	330.00	1124.00	2
9	330.00	1124.00	350.00	1130.00	2
10	350.00	1130.00	371.00	1140.00	2
11	371.00	1140.00	380.00	1143.00	2
12	380.00	1143.00	394.00	1143.00	2
13	394.00	1143.00	410.00	1140.00	2
14	410.00	1140.00	416.00	1137.00	2
15	416.00	1137.00	420.00	1135.00	3
16	420.00	1135.00	430.00	1130.00	1
17	430.00	1130.00	500.00	1100.00	1
18	20.00	1070.00	40.00	1059.00	1
19	40.00	1059.00	60.00	1051.00	1
20	60.00	1051.00	64.00	1052.00	3
21	64.00	1052.00	98.00	1065.00	2
22	98.00	1065.00	124.00	1070.00	2
23	64.00	1052.00	80.00	1044.00	3
24	80.00	1044.00	100.00	1039.00	3
25	100.00	1039.00	160.00	1039.00	3
26	160.00	1039.00	190.00	1040.00	3
27	190.00	1040.00	240.00	1044.00	3
28	240.00	1044.00	290.00	1054.00	3
29	290.00	1054.00	320.00	1063.00	3
30	320.00	1063.00	350.00	1077.00	3
31	350.00	1077.00	380.00	1098.00	3
32	380.00	1098.00	410.00	1124.00	3
33	410.00	1124.00	416.00	1137.00	3
34	60.00	1051.00	80.00	1040.00	1
35	80.00	1040.00	100.00	1035.00	1
36	100.00	1035.00	160.00	1035.00	1
37	160.00	1035.00	190.00	1036.00	1
38	190.00	1036.00	240.00	1040.00	1
39	240.00	1040.00	290.00	1050.00	1
40	290.00	1050.00	320.00	1059.00	1

41	320.00	1059.00	350.00	1073.00	1
42	350.00	1073.00	380.00	1094.00	1
43	380.00	1094.00	410.00	1120.00	1
44	410.00	1120.00	420.00	1135.00	1

User Specified Y-Origin = 900.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS

4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	130.0	350.0	30.0	0.00	0.0	0
2	125.0	130.0	200.0	25.0	0.00	0.0	0
3	125.0	130.0	125.0	12.0	0.00	0.0	0
4	125.0	130.0	300.0	30.0	0.00	0.0	0

Trial Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	40.00	1070.00
2	62.00	1051.50
3	80.00	1042.00
4	100.00	1037.00
5	160.00	1037.00
6	190.00	1038.00
7	240.00	1042.00
8	290.00	1052.00
9	320.00	1061.00
10	350.00	1075.00
11	380.00	1096.00
12	410.00	1122.00
13	418.00	1136.00

Theta (deg) (ki=1.0)	FOS (Moment) (Equil.)	FOS (Force) (Equil.)	Lambda
9.00	1.394	1.431	0.158
13.50	1.063	1.546	0.240
8.51	1.421	1.420	0.150
6.87	1.507	1.385	0.120
8.53	1.420	1.420	0.150

((Simplified Janbu FS for Specified Surface = 1.267))
Factor Of Safety For The Preceding Specified Surface = 1.420
Theta (ki = 1.0) = 8.53 Deg Lambda = 0.150
Factor Of Safety Is Calculated By GLE (Spencer`s) Method (0-2)
Forces from Reinforcement, Piers/Piles, Applied Forces, and Soil Nails
(if applicable) have been applied to the slice base(s)
on which they intersect.
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
Tension Crack Water Force = 0.00(lbs)
Specified Tension Crack Water Force Factor = 0.000
Depth of Tension Crack (zo) at Center of Last Slice = 1.527(ft)

*** Line of Thrust and Slice Force Data ***

Slice No.	X Coord.	Y Coord.	L/H	Side Force (lbs)	ki	Force Angle (Deg)	Vert. Shear Force(lbs)
1	62.00	1062.40	0.589	85159.	1.000	8.53	12773.0
2	64.00	1062.15	0.599	89414.	1.000	8.53	13411.1
3	80.00	1059.08	0.610	131394.	1.000	8.53	19707.7
4	98.00	1057.69	0.621	163755.	1.000	8.53	24561.5
5	100.00	1057.51	0.622	167630.	1.000	8.53	25142.8
6	124.00	1059.00	0.667	185144.	1.000	8.53	27769.6
7	150.00	1060.46	0.572	206129.	1.000	8.53	30917.3
8	160.00	1060.95	0.567	215097.	1.000	8.53	32262.4
9	190.00	1063.05	0.556	237312.	1.000	8.53	35594.3
10	229.00	1066.92	0.550	256567.	1.000	8.53	38482.4
11	240.00	1068.01	0.535	262168.	1.000	8.53	39322.5
12	280.00	1074.85	0.497	253649.	1.000	8.53	38044.8

13	290.00	1076.57	0.468	251399.	1.000	8.53	37707.3
14	300.00	1078.91	0.443	242830.	1.000	8.53	36422.0
15	320.00	1083.73	0.385	224534.	1.000	8.53	33677.9
16	330.00	1087.31	0.371	204468.	1.000	8.53	30668.2
17	350.00	1094.37	0.352	166132.	0.899	7.68	20160.0
18	371.00	1104.50	0.294	104953.	0.622	5.33	6084.3
19	380.00	1108.93	0.275	80377.	0.503	4.31	3045.9
20	394.00	1117.49	0.268	39290.	0.317	2.73	593.9
21	410.00	1127.44	0.302	8973.	0.106	0.91	15.1
22	416.00	1141.19	1.931	152.	0.026	0.23	0.0
23	418.00	1295.07	0.000	7.	0.000	0.00	0.0

Table 1 - Individual data on the 23 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	22.0	25437.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	2.0	4757.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	16.0	47555.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	18.0	68062.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	2.0	8187.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	24.0	99000.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	26.0	120250.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	10.0	52041.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	30.0	163742.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	39.0	224111.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	11.0	65634.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	40.0	246470.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	10.0	64062.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	10.0	66562.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	20.0	141250.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	10.0	73333.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	20.0	141666.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	21.0	138206.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	9.0	54731.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	14.0	71633.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	16.0	52866.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	6.0	8437.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	2.0	562.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0

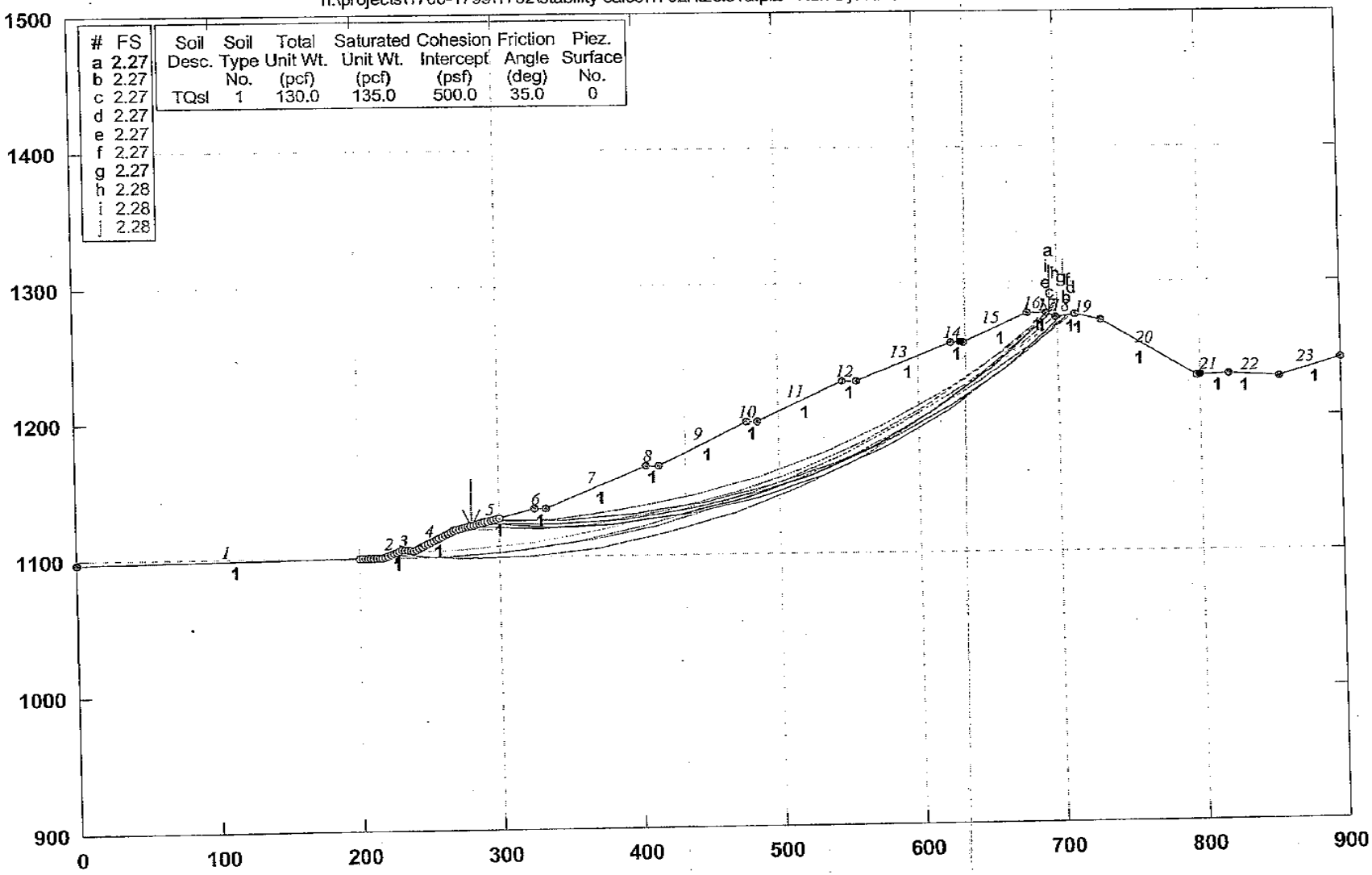
- TABLE 2 - Base Stress Data on the 23 Slices -

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Total Normal Stress (psf)	Total Vert. Stress (psf)	Mobilized Shear Stress (psf)
1	-40.06	51.00	28.74	2899.28	884.95	1390.00
2	-27.82	63.00	2.26	2975.55	2103.49	533.41
3	-27.82	72.00	18.09	3700.18	2628.59	641.87
4	-14.04	89.00	18.55	4228.14	3668.35	720.89
5	-14.04	99.00	2.06	4574.36	3971.52	772.72
6	0.00	112.00	24.00	4233.24	4125.00	721.66
7	0.00	137.00	26.00	4744.72	4625.00	798.22
8	0.00	155.00	10.00	5337.14	5204.12	886.89
9	1.91	175.00	30.02	5537.34	5455.04	916.86
10	4.57	209.50	39.12	5743.86	5728.14	947.77
11	4.57	234.50	11.04	5963.83	5947.75	980.69
12	11.31	260.00	40.79	5934.90	6042.10	976.36
13	11.31	285.00	10.20	6170.55	6281.84	1011.64
14	16.70	295.00	10.44	6223.28	6375.53	1019.53
15	16.70	310.00	20.88	6603.86	6764.65	1076.49
16	25.02	325.00	11.04	6537.93	6645.34	1066.62
17	25.02	340.00	22.07	6203.11	6418.79	1016.51
18	34.99	360.50	25.63	5363.93	5391.57	890.90
19	34.99	375.50	10.99	5076.44	4981.96	847.87
20	40.91	387.00	18.53	4197.71	3866.61	716.34
21	40.91	402.00	21.17	2761.73	2496.92	501.40
22	60.26	413.00	12.09	973.56	697.70	233.75
23	60.26	417.00	4.03	100.56	139.54	103.08

**** END OF GSTABL7 OUTPUT ****

Lndmrk off-site grading; 28L-28L'; CS-34L; circular; static

n:\projects\1700-1799\1702\stability calcs\1702r\t28ls1a.pl2 Run By: KPC 7/14/2008 02:57PM



GSTABL7 v.2 FSmin=2.27

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

Run No. 29

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*************************************************************************
Analysis Run Date:          7/14/2008
Time of Run:                02:57PM
Run By:                     KPC
Input Data Filename:        N:\Projects\1700-1799\1702\Stability Calcs\1702R\t28ls1a.in
Output Filename:            N:\Projects\1700-1799\1702\Stability Calcs\1702R\t28ls1a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t28ls1a.PLT
PROBLEM DESCRIPTION:  Lndmrk off-site grading; 28L-28L';
                      CS-34L; circular; static
BOUNDARY COORDINATES
   23 Top   Boundaries
   23 Total Boundaries
Boundary     X-Left     Y-Left     X-Right    Y-Right    Soil Type
  No.         (ft)       (ft)       (ft)       (ft)      Below Bnd
   1          0.00     1097.00     217.00     1100.00       1
   2        217.00     1100.00     231.00     1106.00       1
   3        231.00     1106.00     239.00     1105.00       1
   4        239.00     1105.00     268.00     1120.00       1
   5        268.00     1120.00     325.00     1135.00       1
   6        325.00     1135.00     333.00     1135.00       1
   7        333.00     1135.00     405.00     1167.00       1
   8        405.00     1167.00     414.00     1167.00       1
   9        414.00     1167.00     477.00     1198.00       1
  10        477.00     1198.00     485.00     1198.00       1
  11        485.00     1198.00     546.00     1227.00       1
  12        546.00     1227.00     556.00     1227.00       1
  13        556.00     1227.00     623.00     1256.00       1
  14        623.00     1256.00     632.00     1256.00       1
  15        632.00     1256.00     678.00     1277.00       1
  16        678.00     1277.00     692.00     1277.00       1
  17        692.00     1277.00     699.00     1274.00       1
  18        699.00     1274.00     712.00     1276.00       1
  19        712.00     1276.00     730.00     1271.00       1
  20        730.00     1271.00     798.00     1230.00       1
  21        798.00     1230.00     820.00     1231.00       1
  22        820.00     1231.00     856.00     1228.00       1
  23        856.00     1228.00     900.00     1242.00       1
 User Specified Y-Origin =        900.00(ft)
 Default X-Plus Value = 0.00(ft)
 Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  1 Type(s) of Soil
 Soil  Total   Saturated  Cohesion Friction   Pore   Pressure   Piez.
 Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
  No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
   1   130.0    135.0     500.0     35.0     0.00      0.0      0
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Circular Surfaces, Has Been Specified.
 1500 Trial Surfaces Have Been Generated.
   30 Surface(s) Initiate(s) From Each Of    50 Points Equally Spaced
 Along The Ground Surface Between  X = 200.00(ft)
                              and  X = 300.00(ft)
 Each Surface Terminates Between   X = 630.00(ft)
                              and  X = 800.00(ft)
```

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
50.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -25.0
And 15.0 deg.

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By GLE (Spencer's) Method (0-2) * *
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
The option of no water in the tension crack on
the last slice has been selected.
Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.
Total Number of Trial Surfaces Evaluated = 1500
WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.
Number of Trial Surfaces with Non-Converged FS = 9
Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Evaluated = 0.6 %
Statistical Data On All Valid FS Values:
FS Max = 3.703 FS Min = 2.265 FS Ave = 2.792
Standard Deviation = 0.307 Coefficient of Variation = 10.99 %
((Modified Bishop FS for Critical Surface = 2.266))
Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	279.59	1123.05
2	329.52	1120.32
3	379.47	1122.60
4	428.94	1129.86
5	477.43	1142.03
6	524.47	1158.99
7	569.57	1180.57
8	612.29	1206.55
9	652.20	1236.67
10	688.90	1270.63
11	693.83	1276.21

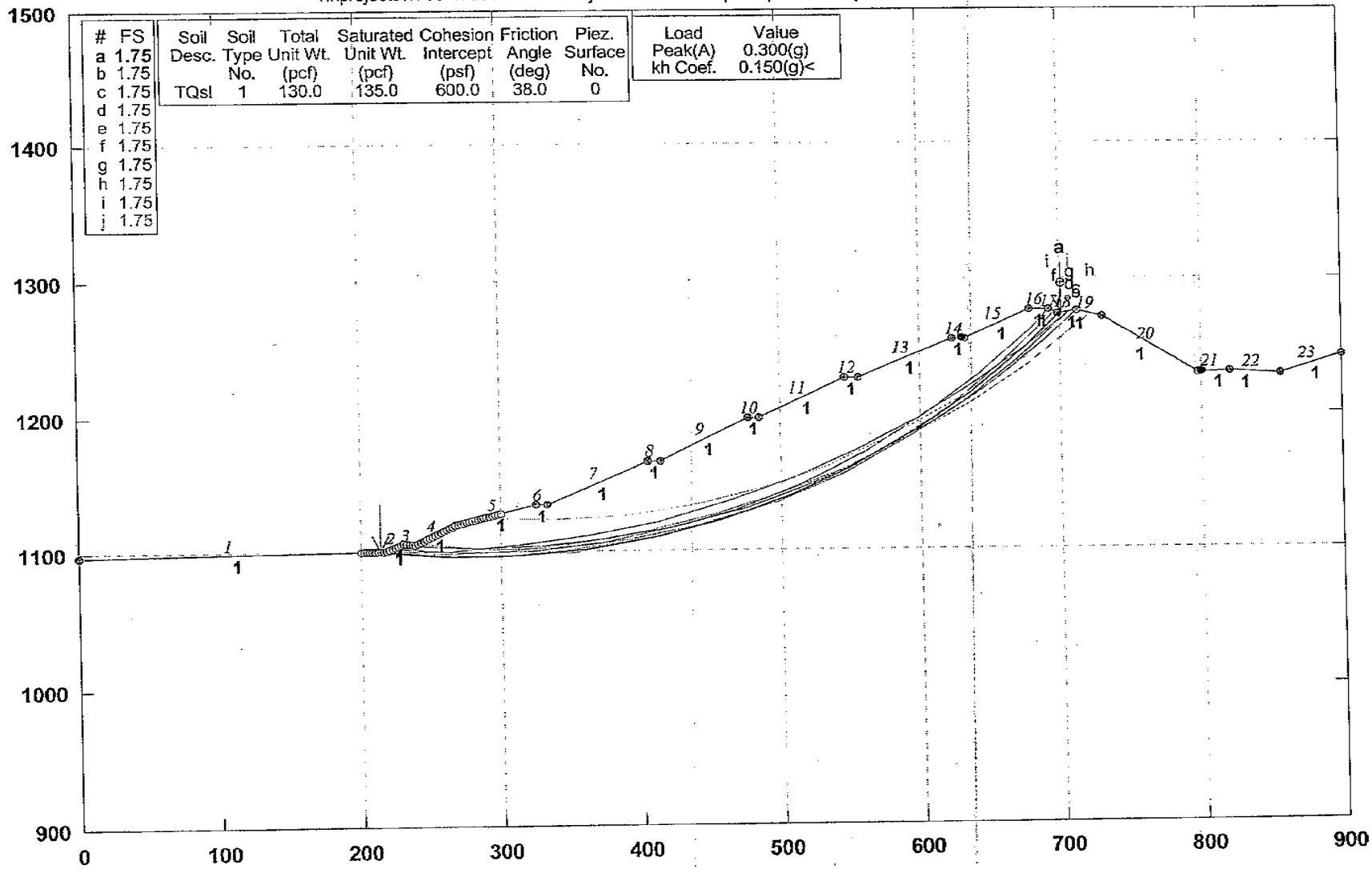
Circle Center At X = 331.78 ; Y = 1619.69 ; and Radius = 499.38
*** FOS = 2.265 Theta (ki=1.0) = 19.65 ***
Lambda = 0.357
Individual data on the 22 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	45.4	42597.0	0.0	0.0	0.	0.	0.0	0.0	0.0
2	4.5	8547.4	0.0	0.0	0.	0.	0.0	0.0	0.0
3	3.5	6610.2	0.0	0.0	0.	0.	0.0	0.0	0.0
4	46.5	143682.0	0.0	0.0	0.	0.	0.0	0.0	0.0
5	25.5	122336.2	0.0	0.0	0.	0.	0.0	0.0	0.0
6	9.0	46792.9	0.0	0.0	0.	0.	0.0	0.0	0.0
7	14.9	81376.3	0.0	0.0	0.	0.	0.0	0.0	0.0
8	48.1	314199.8	0.0	0.0	0.	0.	0.0	0.0	0.0
9	0.4	3142.0	0.0	0.0	0.	0.	0.0	0.0	0.0
10	7.6	53728.1	0.0	0.0	0.	0.	0.0	0.0	0.0
11	39.5	284797.8	0.0	0.0	0.	0.	0.0	0.0	0.0
12	21.5	161635.0	0.0	0.0	0.	0.	0.0	0.0	0.0
13	10.0	71913.2	0.0	0.0	0.	0.	0.0	0.0	0.0
14	13.6	92831.2	0.0	0.0	0.	0.	0.0	0.0	0.0
15	42.7	269700.2	0.0	0.0	0.	0.	0.0	0.0	0.0
16	10.7	59990.1	0.0	0.0	0.	0.	0.0	0.0	0.0
17	9.0	44429.7	0.0	0.0	0.	0.	0.0	0.0	0.0

18	20.2	82889.9	0.0	0.0	0.	0.	0.0	0.0	0.0
19	25.8	75474.8	0.0	0.0	0.	0.	0.0	0.0	0.0
20	10.9	16163.4	0.0	0.0	0.	0.	0.0	0.0	0.0
21	3.1	1861.6	0.0	0.0	0.	0.	0.0	0.0	0.0
22	1.8	340.3	0.0	0.0	0.	0.	0.0	0.0	0.0

Lndmrk off-site grading; 28L-28L'; CS-34L; circular; pseudo

n:\projects\1700-1799\1702\stability calcs\1702r\t28lps1a.pl2 Run By: KPC 7/14/2008 02:58PM



GSTABL7 v.2 FSmin=1.75

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2)

GSTABL7

Run No. 30

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
     Modified Bishop, Simplified Janbu, or GLE Method of Slices.
     (Includes Spencer & Morgenstern-Price Type Analysis)
     Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
     Nonlinear Undrained Shear Strength, Curved Phi Envelope,
     Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
     Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*****************************************************************************
Analysis Run Date:          7/14/2008
Time of Run:                02:58PM
Run By:                     KPC
Input Data Filename:        N:\Projects\1700-1799\1702\Stability Calcs\1702R\t28lps1a.in
Output Filename:            N:\Projects\1700-1799\1702\Stability Calcs\1702R\t28lps1a.OUT
Unit System:                English
Plotted Output Filename:    N:\Projects\1700-1799\1702\Stabi Calcs\1702R\t28lps1a.PLT
PROBLEM DESCRIPTION:  Lndmrk off-site grading; 28L-28L';
                      CS-34L; circular; pseudo

BOUNDARY COORDINATES
   23 Top   Boundaries
   23 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	1097.00	217.00	1100.00	1
2	217.00	1100.00	231.00	1106.00	1
3	231.00	1106.00	239.00	1105.00	1
4	239.00	1105.00	268.00	1120.00	1
5	268.00	1120.00	325.00	1135.00	1
6	325.00	1135.00	333.00	1135.00	1
7	333.00	1135.00	405.00	1167.00	1
8	405.00	1167.00	414.00	1167.00	1
9	414.00	1167.00	477.00	1198.00	1
10	477.00	1198.00	485.00	1198.00	1
11	485.00	1198.00	546.00	1227.00	1
12	546.00	1227.00	556.00	1227.00	1
13	556.00	1227.00	623.00	1256.00	1
14	623.00	1256.00	632.00	1256.00	1
15	632.00	1256.00	678.00	1277.00	1
16	678.00	1277.00	692.00	1277.00	1
17	692.00	1277.00	699.00	1274.00	1
18	699.00	1274.00	712.00	1276.00	1
19	712.00	1276.00	730.00	1271.00	1
20	730.00	1271.00	798.00	1230.00	1
21	798.00	1230.00	820.00	1231.00	1
22	820.00	1231.00	856.00	1228.00	1
23	856.00	1228.00	900.00	1242.00	1

```
User Specified Y-Origin =        900.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 1 Type(s) of Soil
```

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	130.0	135.0	600.0	38.0	0.00	0.0	0

```
Specified Peak Ground Acceleration Coefficient (A) =   0.300(g)
Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
Specified Seismic Pore-Pressure Factor =   0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1500 Trial Surfaces Have Been Generated.
  30 Surface(s) Initiate(s) From Each Of    50 Points Equally Spaced
```

Along The Ground Surface Between X = 200.00(ft)
and X = 300.00(ft)
Each Surface Terminates Between X = 630.00(ft)
and X = 800.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
50.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -25.0
And 15.0 deg.

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-2) * *
Selected ki function = Bi-linear
Selected Lambda Coefficient = 1.00
The option of no water in the tension crack on
the last slice has been selected.
Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.
Total Number of Trial Surfaces Evaluated = 1500
WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.
Number of Trial Surfaces with Non-Converged FS = 6
Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Evaluated = 0.4 %
Statistical Data On All Valid FS Values:
FS Max = 2.721 FS Min = 1.745 FS Ave = 2.010
Standard Deviation = 0.141 Coefficient of Variation = 7.03 %
((Modified Bishop FS for Critical Surface = 1.764))
Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	214.29	1099.96
2	264.14	1096.19
3	314.14	1096.73
4	363.91	1101.58
5	413.07	1110.69
6	461.26	1124.01
7	508.13	1141.43
8	553.32	1162.82
9	596.50	1188.03
10	637.35	1216.87
11	675.56	1249.12
12	700.59	1274.25

Circle Center At X = 283.10 ; Y = 1673.59 ; and Radius = 577.74
*** FOS = 1.745 Theta (ki=1.0) = 18.63 ***
Lambda = 0.337
Individual data on the 28 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	2.7	42.8	0.0	0.0	0.	0.	6.4	0.0	0.0
2	14.0	6865.4	0.0	0.0	0.	0.	1029.8	0.0	0.0
3	8.0	7388.4	0.0	0.0	0.	0.	1108.3	0.0	0.0
4	25.1	46938.3	0.0	0.0	0.	0.	7040.7	0.0	0.0
5	3.9	11426.4	0.0	0.0	0.	0.	1714.0	0.0	0.0
6	46.1	177484.5	0.0	0.0	0.	0.	26622.7	0.0	0.0
7	10.9	51263.2	0.0	0.0	0.	0.	7689.5	0.0	0.0
8	8.0	38295.7	0.0	0.0	0.	0.	5744.3	0.0	0.0
9	30.9	167925.2	0.0	0.0	0.	0.	25188.8	0.0	0.0
10	41.1	280379.5	0.0	0.0	0.	0.	42056.9	0.0	0.0
11	8.1	59837.9	0.0	0.0	0.	0.	8975.7	0.0	0.0
12	0.9	6812.6	0.0	0.0	0.	0.	1021.9	0.0	0.0

13	47.3	375697.3	0.0	0.0	0.	0.	56354.6	0.0	0.0
14	15.7	137483.7	0.0	0.0	0.	0.	20622.5	0.0	0.0
15	8.0	69320.9	0.0	0.0	0.	0.	10398.1	0.0	0.0
16	23.1	199542.8	0.0	0.0	0.	0.	29931.4	0.0	0.0
17	37.9	332839.1	0.0	0.0	0.	0.	49925.9	0.0	0.0
18	7.3	62717.4	0.0	0.0	0.	0.	9407.6	0.0	0.0
19	2.7	22088.6	0.0	0.0	0.	0.	3313.3	0.0	0.0
20	40.5	313555.8	0.0	0.0	0.	0.	47033.4	0.0	0.0
21	26.5	182169.5	0.0	0.0	0.	0.	27325.4	0.0	0.0
22	9.0	53918.1	0.0	0.0	0.	0.	8087.7	0.0	0.0
23	5.3	29363.0	0.0	0.0	0.	0.	4404.4	0.0	0.0
24	38.2	169743.5	0.0	0.0	0.	0.	25461.5	0.0	0.0
25	2.4	8286.2	0.0	0.0	0.	0.	1242.9	0.0	0.0
26	14.0	33501.2	0.0	0.0	0.	0.	5025.2	0.0	0.0
27	7.0	5795.3	0.0	0.0	0.	0.	869.3	0.0	0.0
28	1.6	140.5	0.0	0.0	0.	0.	21.1	0.0	0.0

Appendix C

APPENDIX C

EVALUATION OF POTENTIAL FOR LIQUEFACTION, EARTHQUAKE-INDUCED SETTLEMENT, AND LATERAL SPREADING

1. Introduction

The potential for liquefaction, earthquake-induced settlement, and lateral spreading at the Landmark Village site were previously assessed and presented in our Geologic and Geotechnical Report - Vesting Tentative Tract 53108, dated 9/27/00. We have subsequently updated our liquefaction assessment in conformance with the current criteria of the State of California and reassessed our recommendation for removal depths and potential grading constraints.

Potentials for liquefaction and for earthquake-induced settlement were reassessed (in accordance with current criteria of the County of Los Angeles and the DMG SP117 Guidelines referenced in those criteria) for 21 of the 64 CPT soundings that were previously performed at the site. The procedures presented in the following references were used for this evaluation:

- *Liquefaction Resistance of Soils: Summary Report* (NCEER/NSF, 2001), by Youd, Idriss, et al.

- *Cyclic Liquefaction and its Evaluation Based on the SPT and CPT,* by Robertson and Wride, 1997.

- *Revised Multilinear Regression Equations for Prediction of Lateral Spread Displacement,* Youd, Hanson, Corbett and Bartlett, ASCE Journal of Geotechnical and Geoenvironmental Engineering, December 2002.

- *Evaluation of Settlements In Sands Due To Earthquake Shaking,* Tokimatsu and Seed, ASCE Journal of Geotechnical Engineering, August, 1987.

Field and laboratory data obtained during previous investigations were used in our analyses.

The liquefaction potential and seismic settlement analyses were performed in accordance with current criteria of the County of Los Angeles and the DMG SP117 Guidelines referenced in those criteria and updated in conformance with the requirements of the

APPENDIX C

2007 edition of the California Building Code (CBC). Our analyses indicate that potential liquefaction-induced settlement will be less than one inch at 11 of the 21 CPT sounding locations that we analyzed and that potential liquefaction-induced settlement between about one and two inches could occur in the vicinity of CPT soundings 5, 13, 19, 96, 105, 106, 108, 109, 111, and 115. We have made minor revisions to the recommended alluvial removal depths shown on the attached Geotechnical Map in order to mitigate potential liquefaction-induced settlements in the vicinity of these CPT soundings.

Potential for lateral spreading at the project site is believed to be low since laterally continuous, potentially liquefiable soil layers with a relative density corresponding to $N1_{60} \leq 15$ are not present at the site.

2. Data and Assumptions

Factors that affect potential for liquefaction and seismic settlements at the project site include estimated ground motion parameters, engineering characteristics of site soils, and groundwater depth.

a. Estimated Ground Motion Parameters

In compliance with new criteria presented in the 2007 CBC, an updated Probabilistic Seismic Hazard Analysis (PSHA) was completed to evaluate the design basis ground acceleration at the site for use in our liquefaction analysis. The computer program FRISKSP (version 4.0) by Thomas Blake was used in the analysis. Per CBC criteria, we assessed potential accelerations with a 2% chance of exceedance in a 50 year period, i.e. a 2475 year return period. Per CBC criteria, two-thirds of this acceleration should be used for analysis.

The unweighted acceleration with a 2% chance of exceedance in 50 years at the site is estimated to be 1.24g, and two-thirds of this value is 0.83g. The most likely scenario generating this acceleration is a 6.5 magnitude earthquake on the Santa Susana fault. This design acceleration value is nearly the same as, but slightly lower than, the acceleration value of 0.87g with a 10% chance of exceedance in 50 years estimated during our previous analyses of the site. The acceleration weighted for a standardized 7.5 magnitude earthquake is 0.56g, which is also slightly lower than the 0.59g value estimated in our previous analyses. The reported accelerations are

APPENDIX C

the unweighted average of the three accelerations indicated by the attention relationships of Boore et al (1997) for site Class D, Sadigh et al (1997) for deep soil, and Campbell and Bozorgnia (1997) for alluvium (see summary **Table C2** and sample output file for Boore et al (2007) run for details). Weighted and unweighted accelerations of 0.56g and 0.83g, respectively, were used in our updated liquefaction analyses.

It should be emphasized that the ground acceleration values presented in our report are based on simplified curves of fault rupture area to magnitude, and ground motion attenuation relationship which represent averages of highly variable data measured during historic earthquakes. Predicted accelerations should be considered rough estimates rather than precise facts and, therefore, ground accelerations at the subject site from future seismic events may exceed the predicted accelerations. Due to the dip-slip nature of most of the faults in southern California, vertical accelerations may equal horizontal accelerations. Ground motions may originate from virtually any direction due to the presence of major faults in all directions from the site.

b. Engineering Characteristics of Site Soils

Engineering characteristics of site soils were interpreted principally from data from Cone Penetration Test (CPT) soundings. These data include tip resistance (q_c), friction ratio (f_s), interpreted soil types and fines contents, and groundwater levels from dynamic groundwater pressure dissipation tests. As noted in our referenced 9/27/00 report, there is substantial consistency between the soil types and the SPT blow counts observed in rotary-wash borings RW-11 and RW-13 and the soil types and SPT blow counts interpreted at adjacent locations in CPT soundings CPT-103 and CPT-109, respectively.

c. Ground Water Depth

Existing ground water depths and Historic High ground water depths at the locations of the CPT soundings are provided in **Table C1**.

Historic High Ground Water depth was adopted herein for evaluation of liquefaction potential and associated phenomena.

APPENDIX C

In-situ ground water depths were used for correcting SPT blow count data measured during sampling of boreholes to the standard effective overburden pressure (1.0 tsf) used in liquefaction analyses. Effective vertical soil pressure based on the historic high ground water depth was used to estimate cyclic shear stress induced in site soils by earthquake shaking.

3. CPT Logs and Interpretations

Two versions of CPT logs and soil type interpretations have been prepared for each CPT sounding. Soil type interpretation in the first version of the CPT logs, which were prepared by the company that performed the CPT soundings, is based on the procedures described by Robertson and Campanella, 1989. This version is presented in our referenced 9/27/00 report. The interpreted soil types from this version are used herein for estimation of equivalent SPT blow count values (for comparison with SPT blow count data from exploration borings).

The second version of the CPT logs was prepared by AESEGI. The interpreted soil types and percent fines provided in these logs were evaluated based on the procedures presented in *Liquefaction Resistance of Soils: Summary Report* (NCEER/NSF, 2001), by Youd, Idriss, et al. Measured cone-tip resistance (q_c), friction ratio (f_s), and interpreted corrected SPT resistance ($N1_{60}$) from the first version of the CPT logs were used to evaluate the interpreted soil types and normalized q_c and f_s values shown on the second version of the CPT logs. This version is presented as an attachment at the end of this appendix.

4. Methods of Analysis

a. Assessment of Liquefaction Potential

Liquefaction is a phenomenon in which porewater pressure generated by earthquake shaking causes sudden, temporary loss of shear strength in saturated, typically granular soils. Foundations founded on liquefied soils may settle and/or move laterally.

Liquefaction potential analyses generally are performed by a method first proposed by Seed and Idriss (1970) and subsequently revised by Youd, Idriss, et al (NCEER/NSF, 2001). In these methods, earthquake-induced cyclic shear stresses in

APPENDIX C

the ground are estimated and compared with empirically based cyclic shear strength (resistance) derived from data from case histories in which liquefaction was observed and case histories in which liquefaction was not observed.

Estimation of cyclic shear strength against liquefaction is based on measured CPT tip resistance (q_c) and friction ratio (f_s), percent fines estimated from CPT data, and estimated in-situ effective overburden pressure. CPT tip penetration resistance data corrected to 1.0 tsf pressure (q_{c1N}) are used to calculate the Cyclic Resistance Ratio (CRR) for clean sandy soils subjected Magnitude 7.5 earthquakes. The overburden pressure correction for the CPT tip resistance is calculated using the following equations from Youd, Idriss, et al (NCEER/NSF, 2001):

$$C_Q = (1/\sigma'_o)^{0.5}, \quad 0.5 \leq C_Q \leq 1.7$$
$$q_{c1N} = C_Q \cdot q_c$$

where: σ'_o = effective overburden pressure [tsf or kg/cm^2]
q_c = uncorrected CPT tip resistance [tsf or kg/cm^2]

The overburden pressure corrected CPT tip resistance (q_{c1N}) is further corrected for fines content in order to obtain an equivalent clean sand CPT tip resistance value, as recommended by Youd, Idriss, et al (NCEER/NSF, 2001) and by Robertson & Wride (NCEER, 1997). The fines content corrected CPT tip resistance, $(q_{c1N})_{cs}$, is used to calculate the Cyclic Resistance Ratio (CRR) against liquefaction, in accordance with Youd, Idriss, et al (NCEER/NSF, 2001).

The earthquake-induced cyclic shear stress ratio (CSR or τ_{av}/σ'_v) for each depth in question is calculated using the following equation by Youd, Idriss, et al (NCEER/NSF, 2001):

$$\tau_{av}/\sigma'_v = 0.65 \cdot (a_{max}/g) \cdot \sigma_o/\sigma'_v \cdot r_d$$

Where: a_{max}/g = Peak horizontal ground surface acceleration (PGHA) divided by the acceleration of gravity
σ_o = Total overburden pressure at the depth in question
σ'_v = Effective overburden pressure at the depth in question
r_d = Shear stress reduction factor which accounts for soil deformability at the depth in question

APPENDIX C

Cyclic Resistance Ratio (CRR) vs. corrected cone-tip resistance $(q_{c1N})_{cs}$ curves are presented by Youd, Idriss, et al (NCEER/NSF, 2001). These curves are based on case histories in which liquefaction was observed / not observed in clean sands subjected to earthquakes with a magnitude of about 7.5. Soils with $(q_{c1N})_{cs}$ and CSR values that plot above these curves are potentially liquefiable and soils with $(q_{c1N})_{cs}$ and CSR values that plot below these curves generally are not liquefiable. In accordance with the requirements of the County of Los Angeles Department of Public Works, a soil deposit is considered to be liquefiable if its factor of safety against liquefaction (i.e., CRR divided by CSR) is less than 1.3.

Values of the factor of safety against liquefaction for the soil profiles in each of the CPT logs were calculated using fines content corrected values of tip resistance (q_{c1N}) at 6-inch depth intervals, per Youd, Idriss, et al (NCEER/NSF, 2001). A typical spreadsheet that illustrates the factor of safety calculations is shown on **Figure C22** – Typical Spreadsheet of Liquefaction Potential Analyses. Non-liquefiable soil deposits may settle as a result of earthquake shaking. This non-liquefied, earthquake-induced settlement is included in our settlement estimates, as discussed in the following section.

b. Estimation of Earthquake-Induced Settlements

Tokimatsu and Seed (1987) provide procedures for estimation of earthquake-induced settlement of unsaturated sands and of saturated sands. These procedures were used herein to estimate the distribution of potential earthquake-induced settlement vs. depth. The Tokimatsu and Seed method for estimation of earthquake-induced settlement is described below.

One-dimensional volumetric strain of unsaturated sandy soils caused by earthquake shaking is estimated based on estimated cyclic shear strain and $N1_{60}$ values (estimated from the CPT soundings). This one-dimensional strain is doubled in order to estimate strain produced by multi-directional earthquake shaking. Settlement is calculated by multiplying the volumetric strain value by the thickness of the soil layer. Although this procedure for estimating earthquake-induced settlement was developed based on data from clean to slightly silty sands, CPT tip resistances (q_c) used herein to estimate $N1_{60}$ values of unsaturated soils were not

corrected for fines content. Omitting the fines content correction yields conservative (i.e., higher) settlement estimates for silty sands and silts.

Volumetric strain of saturated sands caused by earthquake shaking is estimated using earthquake-induced cyclic shear stress (τ_{av}) and $N1_{60}$ values derived from CPT tip resistance (q_c) values. Since the design chart for volumetric strain of saturated sands includes the effect of multi-directional earthquake shaking, it is not necessary to double the volumetric strain calculated for saturated sand deposits. Although the referenced procedure strictly applies only to saturated clean sands, it may also be used to estimate settlement in silty sands because the interpreted $N1_{60}$ values used to estimate volumetric strain are based on q_c values which have been corrected for fines content (i.e., an equivalent CPT tip resistance that corresponds to clean sand is used to estimate $N1_{60}$ for silty sand and silt deposits). Settlement is calculated by multiplying the thickness of the saturated soil layer by the volumetric strain.

c. Estimation of Potential For Lateral Spreading

Regression equations for estimation of potential magnitude of lateral spread displacement that can occur if liquefaction occurs in soils beneath flat to gently sloping sites were developed by Youd, Hanson, Corbett, and Bartlett (ASCE, December 2002). According to these equations, the magnitude of lateral spreading displacement depends on earthquake magnitude, site to fault distance, slope of the site surface, thickness of potentially liquefiable deposits at the site with an $N1_{60} \leq 15$ (T_{15}), and the median grain size and percent fines in the T_{15} layer. The data base used to develop the regression equations was limited to T_{15} values between 1 and 15 meters. It may be inferred from this that significant lateral spreading was not observed by the researchers at sites with less than about 1 meter of potentially liquefiable soils with $N1_{60} \leq 15$ blows/foot. Accordingly, it is assumed herein that earthquake shaking will not cause lateral spreading at a site unless it is underlain by a liquefiable layer that is at least about 1 meter in total thickness and which has an $N1_{60} \leq 15$ blows/foot.

In addition, the data base used to develop the regression equations for the magnitude of lateral spread displacement is based on case histories in which the liquefiable (T_{15}) layers extended laterally for substantial distances without being impeded by boundary effects. It may be inferred that significant lateral spreading has not been

observed at narrow sites that are bounded by denser soils or bedrock, or at sites where liquefiable (T_{15}) layers are laterally discontinuous. Accordingly, it is assumed herein that earthquake shaking will not cause lateral spreading at a site that does not have a laterally continuous, liquefiable layer with $N1_{60} \leq 15$ blows/foot.

5. Results of Analyses

a. Liquefaction Potential Assessment

Results of our liquefaction analyses using data from the selected CPT soundings are graphically summarized herein on individual sheets (Analysis of Liquefaction Potential Based q_c and f_s from CPT Data - **Figures C1 through C21**). These sheets present plots of depth vs. normalized CPT tip resistance and friction ratio, fines content interpreted from the CPT data, cyclic shear stress induced by earthquake shaking, maximum resistance to cyclic shear stress interpreted from the CPT data, and cumulative settlement that would be caused by earthquake shaking. The sheets also display groundwater depth at the time of the CPT soundings and estimated historic high groundwater depths.

b. Earthquake-Induced Settlement

Potential earthquake-induced settlement that could result from liquefaction prior to proposed grading was calculated (per CDMG Special Publication 117, 1997) to vary from 0 to about 1.9 inches at the locations of 21 CPT soundings (see Table C1). At the locations of CPT soundings 5, 13, 19, 96, 105, 106, 108, 111, and 115, potential liquefaction-induced settlements range from 1.0 to about 1.9 inches. Potential liquefaction-induced *differential* settlements at the locations of these CPT soundings varies from about 0.6 to 1.2 inches. Options to mitigate these potential differential settlements are provided below.

c. Lateral Spreading

As stated above, significant lateral spreading is expected only if a site is underlain by a laterally continuous, liquefiable layer that is at least about 1 meter thick and that has a relative density that corresponds to an $N1_{60}$ value of about 15 blows/ft, or less. Potential for lateral spreading due to liquefaction at the project site is low

because there is no laterally continuous, potentially liquefiable layer with a relative density that corresponds to $N1_{60} \leq 15$ blows/foot.

6. Conclusions

Our analyses indicate that potential liquefaction-induced settlement will be less than one inch at 11 of the 21 CPT sounding locations that we analyzed and that potential liquefaction-induced settlement between about one and two inches could occur in the vicinity of CPT soundings 5, 13, 19, 96, 105, 106, 108, 109, 111, and 115. We have made minor revisions to the recommended alluvial removal depths shown on the attached Geotechnical Map in order to mitigate potential liquefaction-induced settlements in the vicinity of these CPT soundings. Of the ten CPT sounding locations where potential liquefaction-induced settlements exceed one inch, seven can be mitigated with standard grading (removal and recompaction) techniques without dewatering. At two closely spaced locations (CPT soundings 105 and 106) removals to reduce to the seismic settlements to less than one inch would extend up to 4.5 ft below the observed ground water depth. Considering the granular nature of the soils, the shallow intrusion into the water table, and proposed deeper removals and dewatering for the adjacent channel liner, it is anticipated that the recommended removals will be feasible by means of grading and minor dewatering with slot trenches.
At the location of CPT-13, a removal depth of 23 ft is indicated to limit total seismic settlements to less than 1 in. Ground water depth was not accurately measured at this CPT because the sounding hole caved at 12 ft depth. For purposes of analysis, we assumed existing ground water depth to be 15 ft. However, subsequent measurements from the nearby CPT-96 and Piezometer P-32F indicate that the depth of existing ground water is probably at least 20 ft. deep in the vicinity of CPT-13. Therefore, the recommended removals probably extend only 3 ft below the existing water table. In light of the limited extent of recommended removals below the water table at this location, it is anticipated that shallow dewatering with slot trenches will be sufficient for excavation and dewatering of the nearby channel liner. If the recommended removals below the water table cannot be performed, buildings in the vicinity of CPT-13 should be designed for 1.2 in of total seismic settlement in addition to static settlement.

In summary, if the recommended removals are performed total seismic settlements will be less than 1 in and the differential seismic settlements will be 0.67 in or less. Following the grading, static differential settlements are anticipated to be 0.25 in or less.

APPENDIX C

Therefore, total differential settlement between adjacent footing foundations is anticipated to be less than 1 in.

Potential for lateral spreading at the project site is low because there is no laterally continuous, potentially liquefiable layer with a relative density that corresponds to $N1_{60}$ ≤ 15 blows/foot.

The following attachments complete this Appendix.

- Liquefaction Potential Assessment References
- Summary Table of Subsurface Data, Potential Earthquake-Induced Settlements, and Removal Depths — Table C1
- Graphs of Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data) — Figures C1 thru C21
- Typical Spreadsheet of Liquefaction Potential Analyses — Figure C22
- AESEGI Interpreted CPT Data
- Output File for Boore et al (1997) FRISKSP Run
- Summary of Calculated Peak Horizontal Ground Accelerations — Table C2

APPENDIX C

LIQUEFACTION POTENTIAL ASSESSMENT REFERENCES

Bartlett, S.F., and Youd, T.L., "Empirical prediction of liquefaction – induced lateral spread", Journal of Geotechnical Engineering, Vol. 121, No. 4, April 1995

California Division of Mines and Geology, Special Publication 117, "Guidelines for Evaluating and Mitigating Seismic Hazards in California", adopted by the State on March 13, 1997.

Douglas, B.J., and Olsen, R.S., "Soil classification using Electric Cone Penetrometer", ASCE Special Technical Publication, ST. Louis, Missouri, October, 1981.

Douglas, B.J., Olsen, R.S., and Martin, G.R., "Evaluation of the Cone Penetrometer Test for use in SPT--Liquefaction Potential Assessment," ASCE Preprint Volume No. 81-544, St. Louis, Missouri, October 1981.

Fear and McRoberts, "Reconsideration of initiation of liquefaction in sandy soils", ASCE Geotechnical Journal, March 1995.

Housner, G.W., Chairman of Committee on Earthquake Engineering, Book, "Liquefaction of soils during earthquakes", p. 110-114, National Academy Press, 1985.

Ishihara, K., "Soil Behaviour in Earthquake Geotechnics", Clarendon Press, Oxford, 1996.

Ishihara, K., "Stability of natural deposits during earthquakes", Proceedings of the Eleventh International Conference on Soil Mechanics and Foundation Engineering, A.A. Balkema Publishers, Rotterdame, Netherlands, 1985

Liao, S.S.C., and Whitman, R.V., "Overburden correction factors for SPT in sand", Journal of Geotechnical Engineering, Vol. 112, No. 3, March 1986.

Los Angeles County, 2009, "Review of Geotechnical Reports Addressing Liquefaction Memorandum", Los Angeles County Department of Public Works, February 24, 2009.

Olsen, Richard S., "Cyclic Liquefaction Based on the Cone Penetrometer Test" in the *Proceedings of the NCEER Workshop on Evaluating the Liquefaction Resistance of Soils*, edited by Youd, T.L. and Idriss, I.M., Technical Report NCEER-97-0022, pp. 225-276, 1997

Pradel, D., "Procedure to evaluate earthquake-induced settlements in dry sandy soils," Journal of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 124, No. 4, April 1998.

Proprietary charts for correction of blow-count by sampler type to N-SPT

Robertson, P.K., and Fear, C.E., "Soil liquefaction and its evaluation based on SPT and CPT" Liquefaction Workshop, University of Alberta, January 1996.

Robertson, P.K., and Fear, C.E., "Liquefaction of sands and its evaluation", First International Conference and Earthquake Geotechnical Engineering, 1995.

Robertson, P.K., and Campanella, R.G., "Guidelines for Geotechnical Design using the Cone Penetrometer Test and CPT with Pore Pressure Measurement", University of Alberta and University of British Columbia, 4th edition, 1989.

APPENDIX C

Robertson, P. K., and Wride, C.F., "Cyclic Liquefaction and its Evaluation Based on the SPT and CPT" in the *Proceedings of the NCEER Workshop on Evaluating the Liquefaction Resistance of Soils*, edited by Youd, T.L. and Idriss, I.M., Technical Report NCEER-97-0022, pp. 41-87, 1997

Seed, H.B., "Design problems in soil liquefaction," Report No. UCB/EERC-86/02, February, 1986

Seed, H.B., Tokimatsu, K., Harder, L.F., and Chung, R.M., "The influence of SPT procedures in soil liquefaction resistance evaluations", Earthquake Engineering Research Center Report No. 84/15, University of California, Berkeley, 1984.

Seed, H.B., Idriss, I.M., and Arango, I., "Evaluation of liquefaction potential using field performance data", ASCE Journal of Geotechnical Engineering, Vol. 109, No.3, March 1983.

Seed, H.B. and Idriss, I.M., "Ground motions and soil liquefaction during earthquakes", 1982, Monograph, Earthquake Engineering Research Institute.

Seed, H.B. and Idriss, I.M., "A simplified procedure for evaluating soil liquefaction potential", EERC 70-9, Nov. 1970.

Tokimatsu, K. and Seed, H.B., "Evaluation of settlements in sands due to earthquake shaking", ASCE Journal of Geotechnical Engineering, Vol. 113, No. 8, August, 1987.

University of Southern California (USC), Southern California Earthquake Center, Workshop on "Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California", USC, Los Angeles, California, June 17, 1999.

Youd, T.L. and Idriss, I.M., editors, "Proceedings of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils", Technical Report NCEER-97-0022, December, 1997.

Youd, T.L., Idriss, I.M., et al "Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils", Vol. 127, No. 10, ASCE Journal of Geotechnical and Geoenvironmental Engineering, October 2001.

Youd, T. Leslie, Hanson, Corbett M. and Bartlett, Steven F. "Revised Multilinear Regression Equations for Prediction of Lateral Spread Displacement", Vol. 128, No. 12, ASCE Journal of Geotechnical and Geoenvironmental Engineering, December 2002.

APPENDIX C

Analyzed Location CPT	Potential Earthquake-Induced Settlement (Inches)		Proposed Additional Fill (feet)	Recommended Removals (feet)	Total Compacted Fill Cap Thickness (feet)	Thickness of Non-Liquefiable soils below proposed grades (feet)	Total Thickness of Potentially Liquefiable Soils Following Removals (feet)	Ground water Table Depth (feet)	
	Before Removals	After Removals						Existing GWT	Historic GWT
2	0.91	0.88	6	5	11	19	5	28	10
5	1.49	0.82	3.5 cut	14 [1]	10.5	9.5	6.5	24	11
7	0.48	0.48	7	5	12	24	3.5	20	17
13	1.58	0.98	3.5	23	19.5	17.5	7	15 [2]	12
15	0.43	0.42	1.5	4	5.5	14.5	3.5	27	16
19	1.04	1.00	12	5	17	25	7.5	15	9
96	1.45	0.95	4	22	26	25.5	6	22.2	15
101	0.37	0.37	18	4	22	27.5	3.5	9.3	4
103	0.66	0.58	29	8	37	37	5	9.5	3
105	1.35	0.74	20	9	29	29	4.5	7.4	3
106	1.49	0.99	20	11	31	34	4	7.5	2
108	1.14	1.00	1	13	14	19	5.5	25.1	16
109	1.11	0.91	7	16	23	22	6.5	25	15
110	0.76	0.75	10.5	5	15.5	22.5	4.5	24	12
111	1.23	0.97	8.5	13	21.5	21.5	6	21.9	11
114	0.64	0.62	11.5	5	16.5	23.5	3	22.4	12
115	1.84	0.94	10	16	26	40	6.5	21.5	11
118	0.50	0.50	16	4	20	25	4	10.5	4

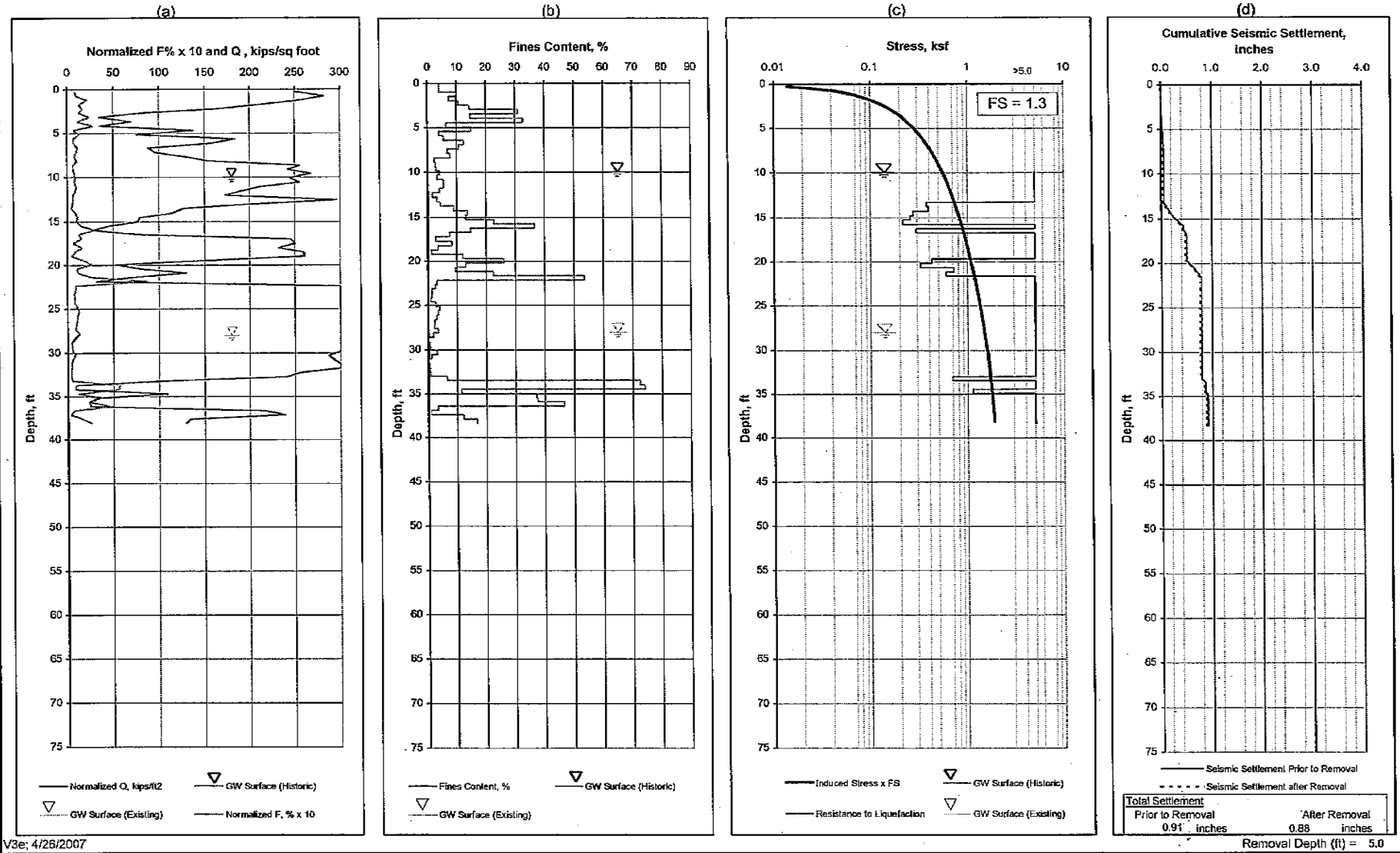
[1] Indicates removal depth in River Bank Slope Protection zone. In this area, excavation for placement of the typical Slope Protection system would be substantially deeper than the removal depth for mitigating potential seismic structural settlement at the respective CPT-5 location indicated in the table.

[2] A ground water depth of 15 ft was conservatively estimated. Subsequent data indicated that the existing ground water depth is probably at least 20 ft.

APPENDIX C

Analyzed Location CPT	Potential Earthquake-Induced Settlement (Inches)		Proposed Additional Fill (feet)	Recommended Removals (feet)	Total Compacted Fill Cap Thickness (feet)	Thickness of Non-Liquefiable soils below proposed grades (feet)	Total Thickness of Potentially Liquefiable Soils Following Removals (feet)	Ground water Table Depth (feet)	
	Before Removals	After Removals						Existing GWT	Historic GWT
122A	0.73	0.73	29	4	33	34.5	6.5	4	4
125	0.00	0.00	20	4	24	32	<1	11	9
128	0.28	0.24	0	9	9	19	1.5	26	20

Location..... CPT-02
Elevation (MSL)..... 964 ft



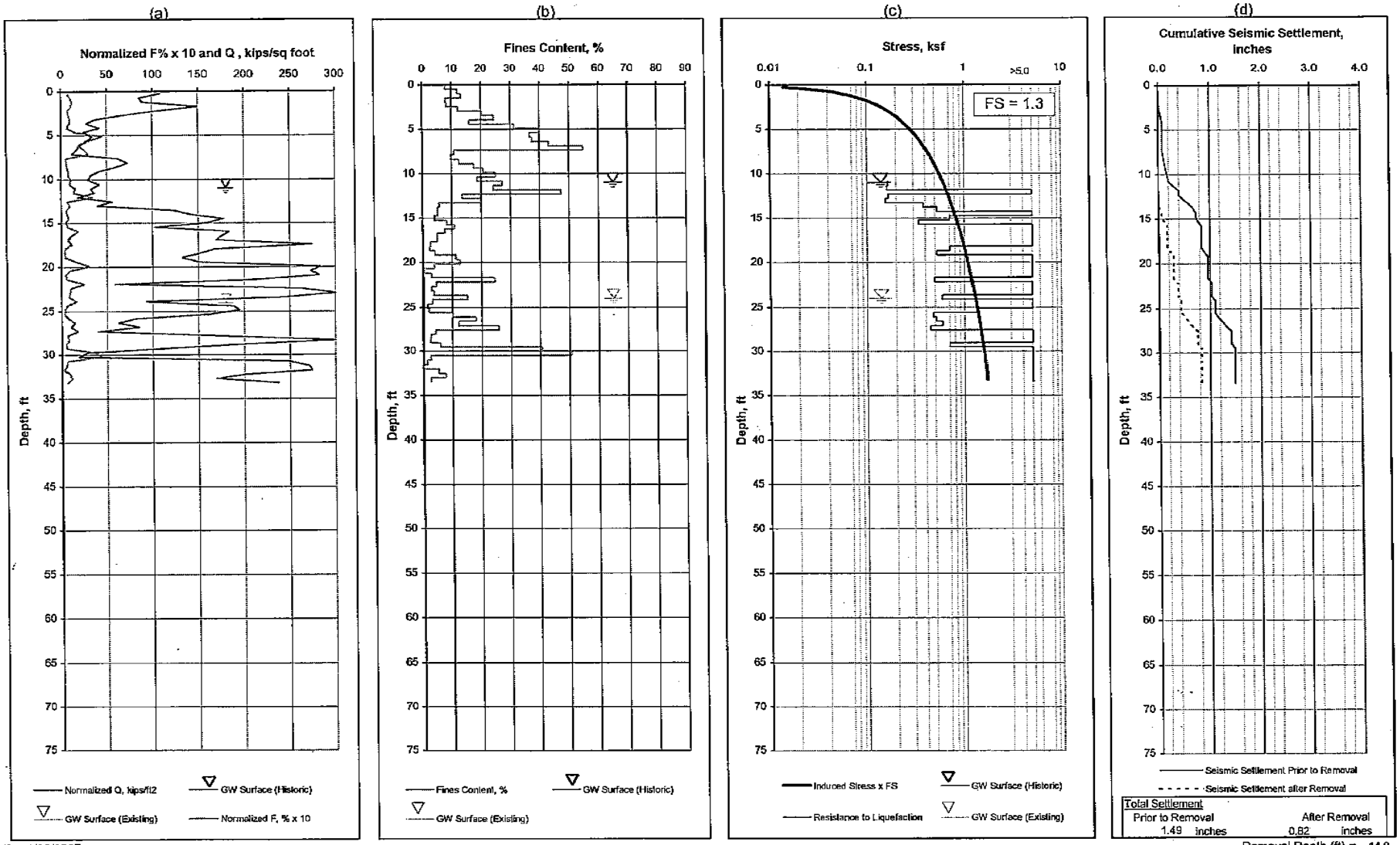
V3e; 4/26/2007

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Riverwood Village, VTT 53108	Weighted Gr. Acc. (M=7.5).	0.56 g	Project No.	1702R-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.83 g	Figure No.	C1
For: Newhall Land & Farming Co.	Magnification Factor.....	1	Date.	12-21-2009

Location..... CPT-05
Elevation (MSL)..... 954 ft



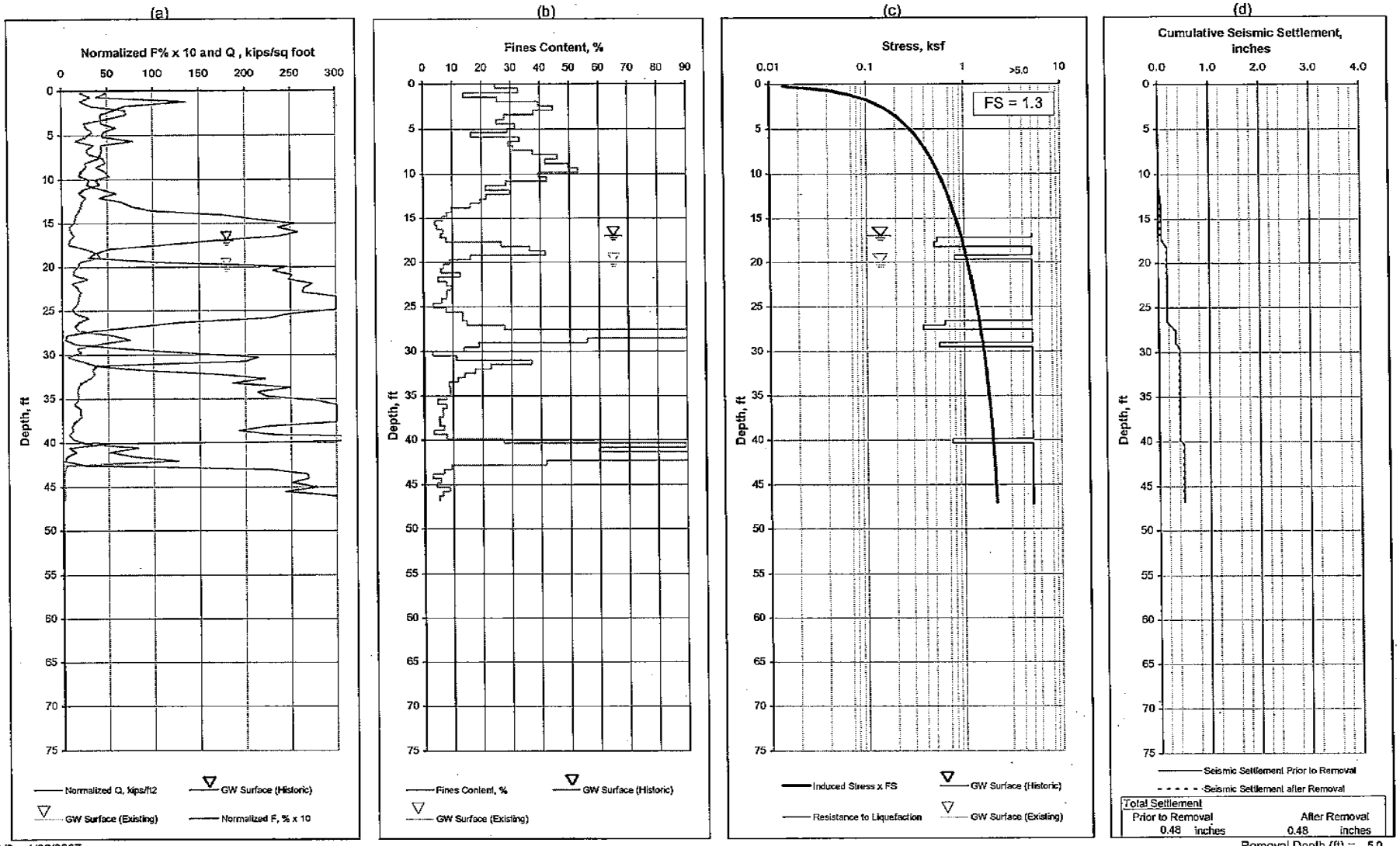
V3e; 4/26/2007

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Riverwood Village, VTT 53108	Weighted Gr. Acc. (M=7.5).	0.56 g	Project No.	1702R-4
Castaic, L.A County, California	Design Gr. Acc.(M= 6.5)...	0.83 g	Figure No.	C2
For: Newhall Land & Farming Co.	Magnification Factor.....	1	Date.	12-21-2009

Location..... **CPT-07**
Elevation (MSL)..... 955 ft



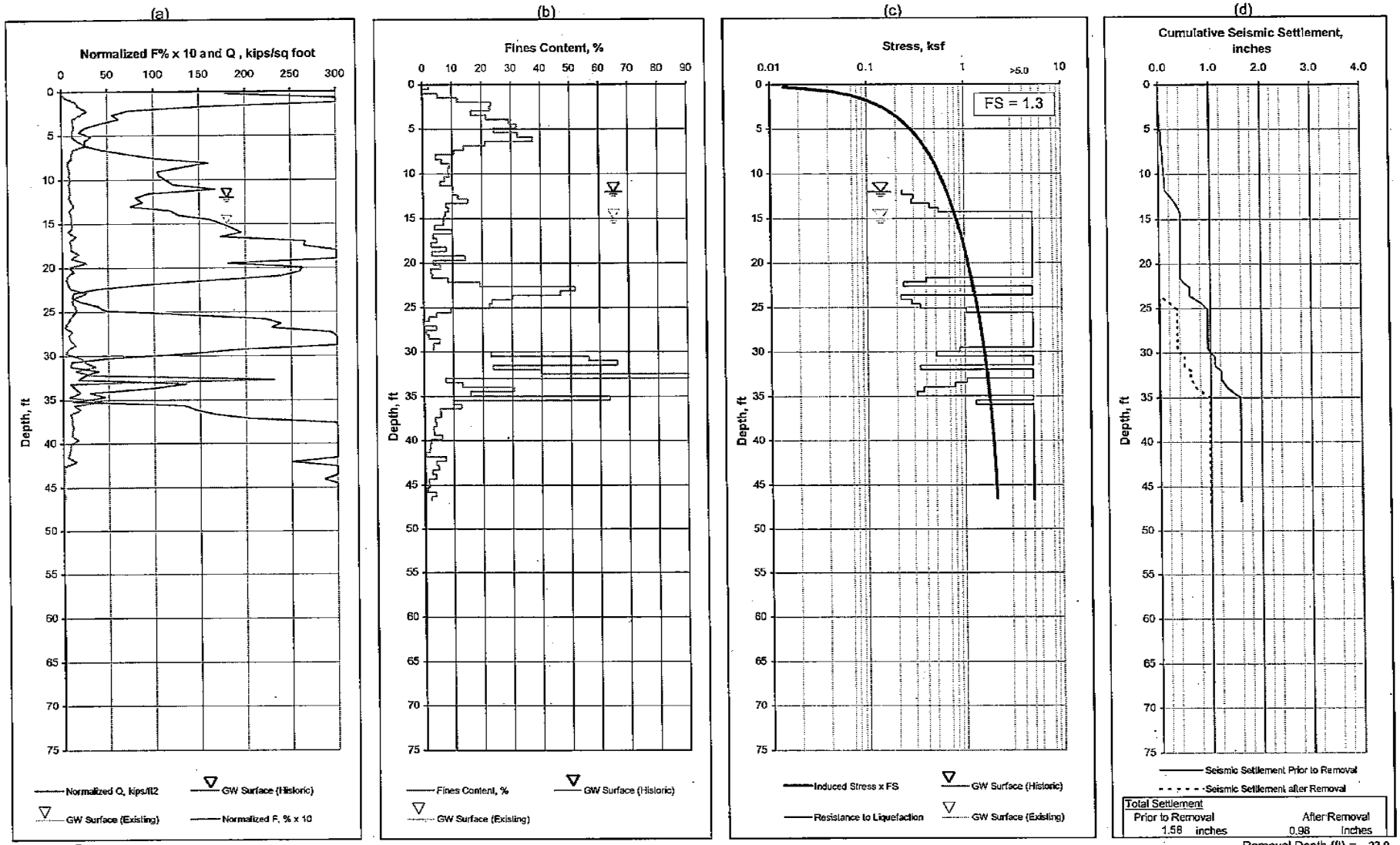
V3e; 4/26/2007

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Riverwood Village, VTT 53108	Weighted Gr. Acc. (M=7.5).	0.56 g	Project No.	1702R-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.83 g	Figure No..	C3
For: Newhall Land & Farming Co.	Magnification Factor.....	1	Date.	12-21-2009

Location..... CPT-13
Elevation (MSL)..... 940 ft



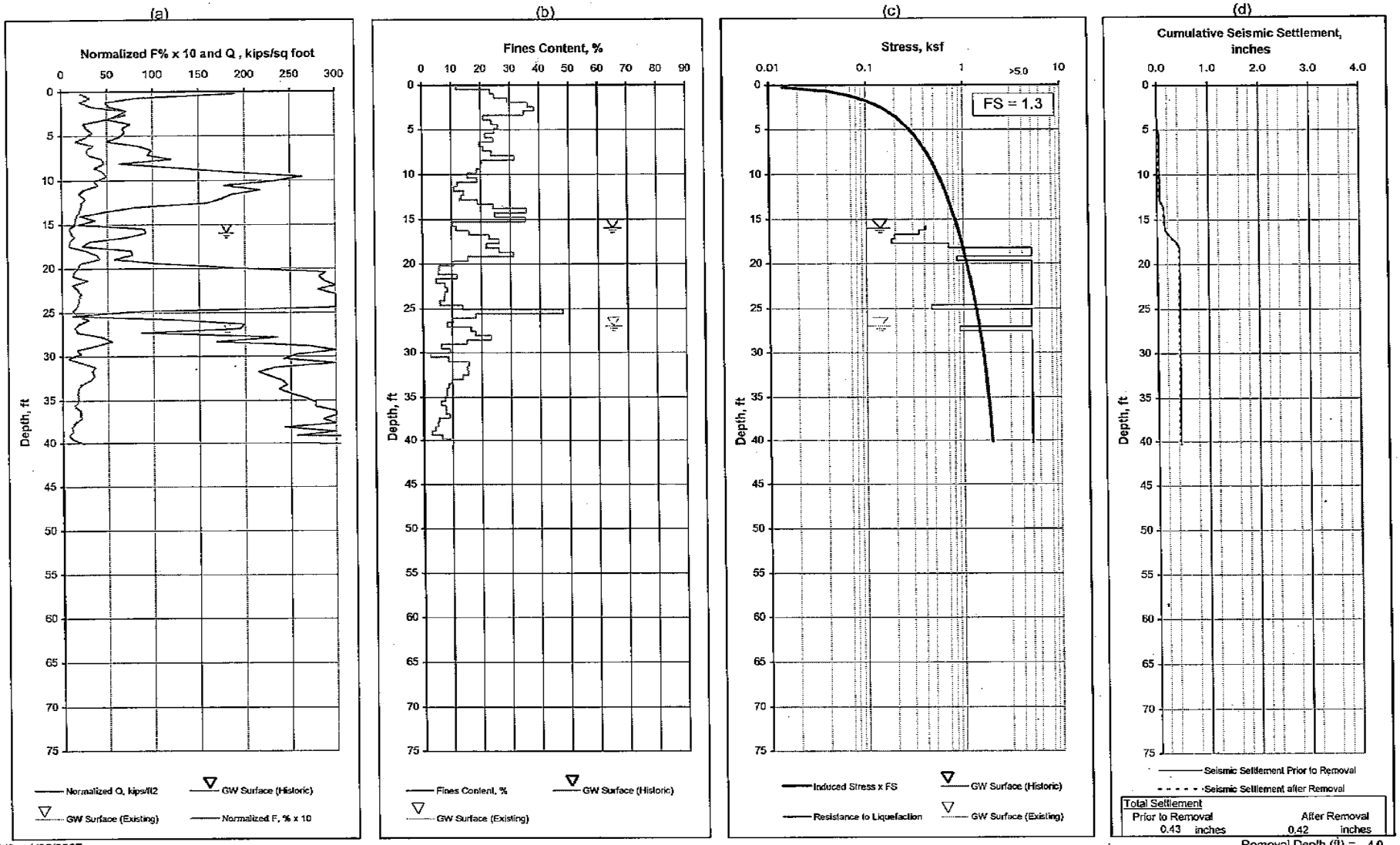
V3e; 4/26/2007

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Riverwood Village, VTT 53108	Weighted Gr. Acc. (M=7.5).	0.56 g	Project No.	1702R-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.83 g	Figure No.	C4
For: Newhall Land & Farming Co.	Magnification Factor.....	1	Date.	12-21-2009

Location..... CPT-15
Elevation (MSL)..... 946 ft



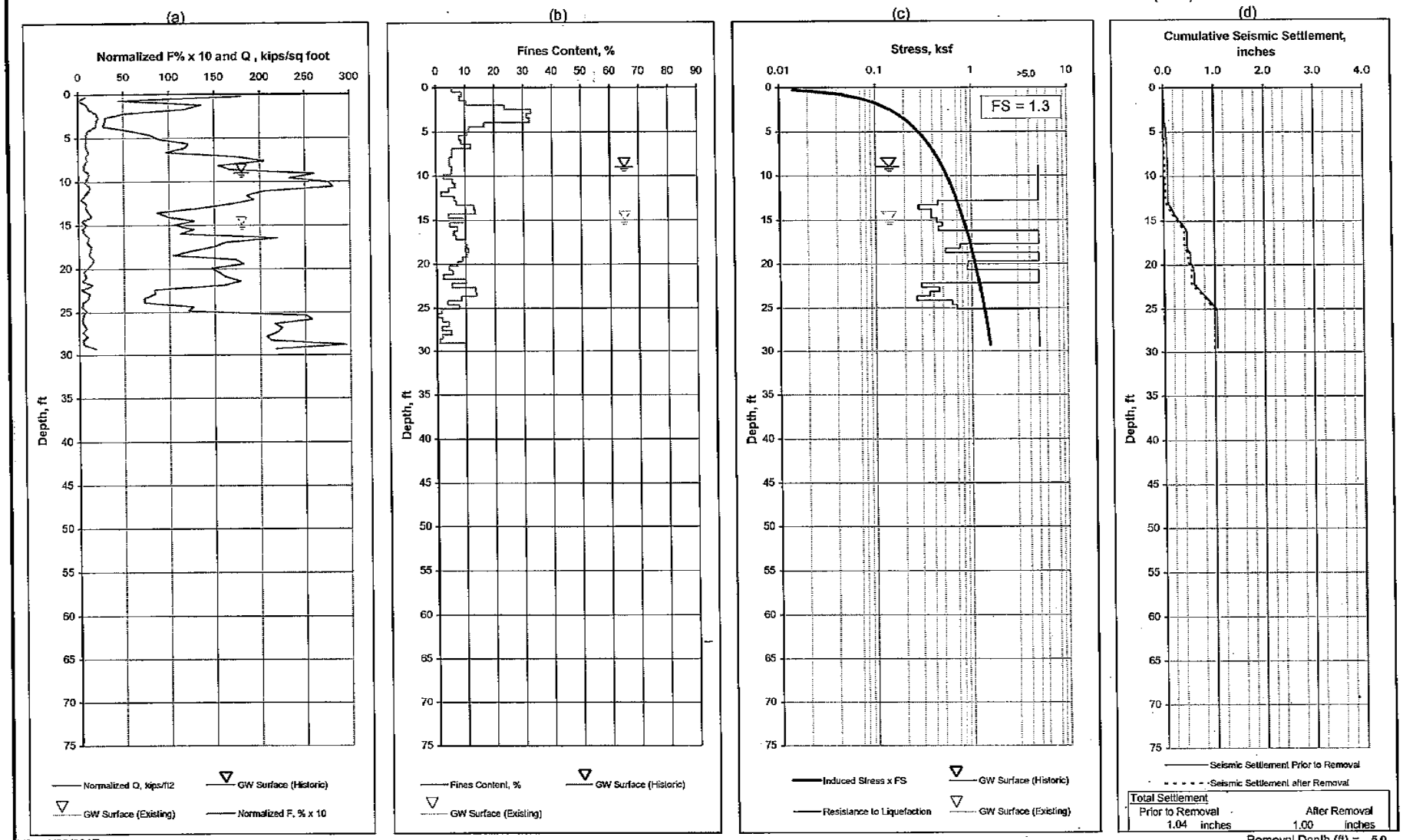
V3e; 4/26/2007

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Riverwood Village, VTT 53108	Weighted Gr. Acc. (M=7.5).	0.56 g	Project No.	1702R-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.83 g	Figure No.	C5
For: Newhall Land & Farming Co.	Magnification Factor.....	1	Date.	12-21-2009

Location..... CPT-19
Elevation (MSL)..... 923 ft



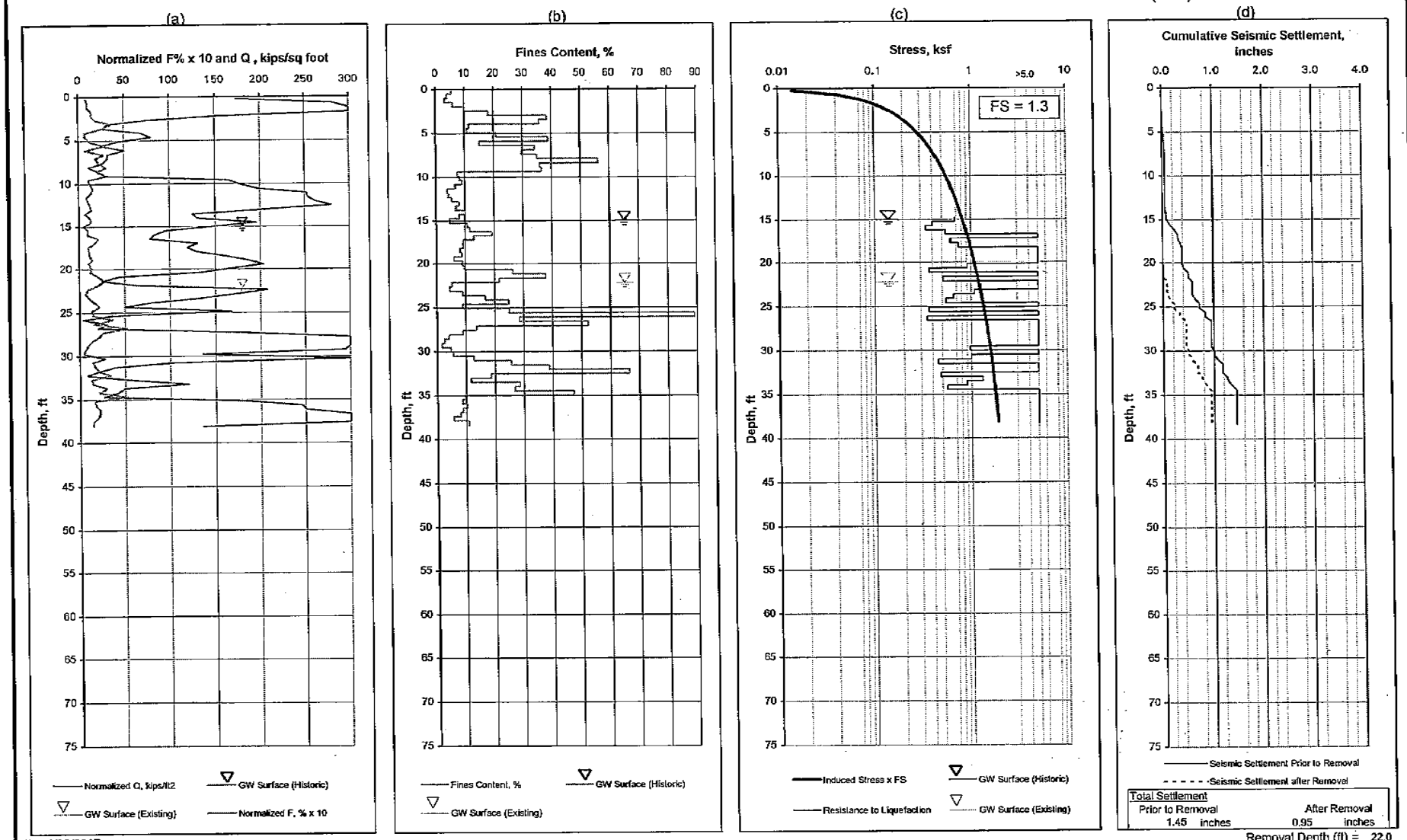
V3e; 4/26/2007

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Riverwood Village, VTT 53108	Weighted Gr. Acc. (M=7.5). 0.56 g	Project No.	1702R-4
Castaic, L.A County, California	Design Gr. Acc.(M= 6.5)... 0.83 g	Figure No.	C6
For: Newhall Land & Farming Co.	Magnification Factor..... 1	Date.	12-21-2009

Location..... CPT-96
Elevation (MSL)..... 964 ft



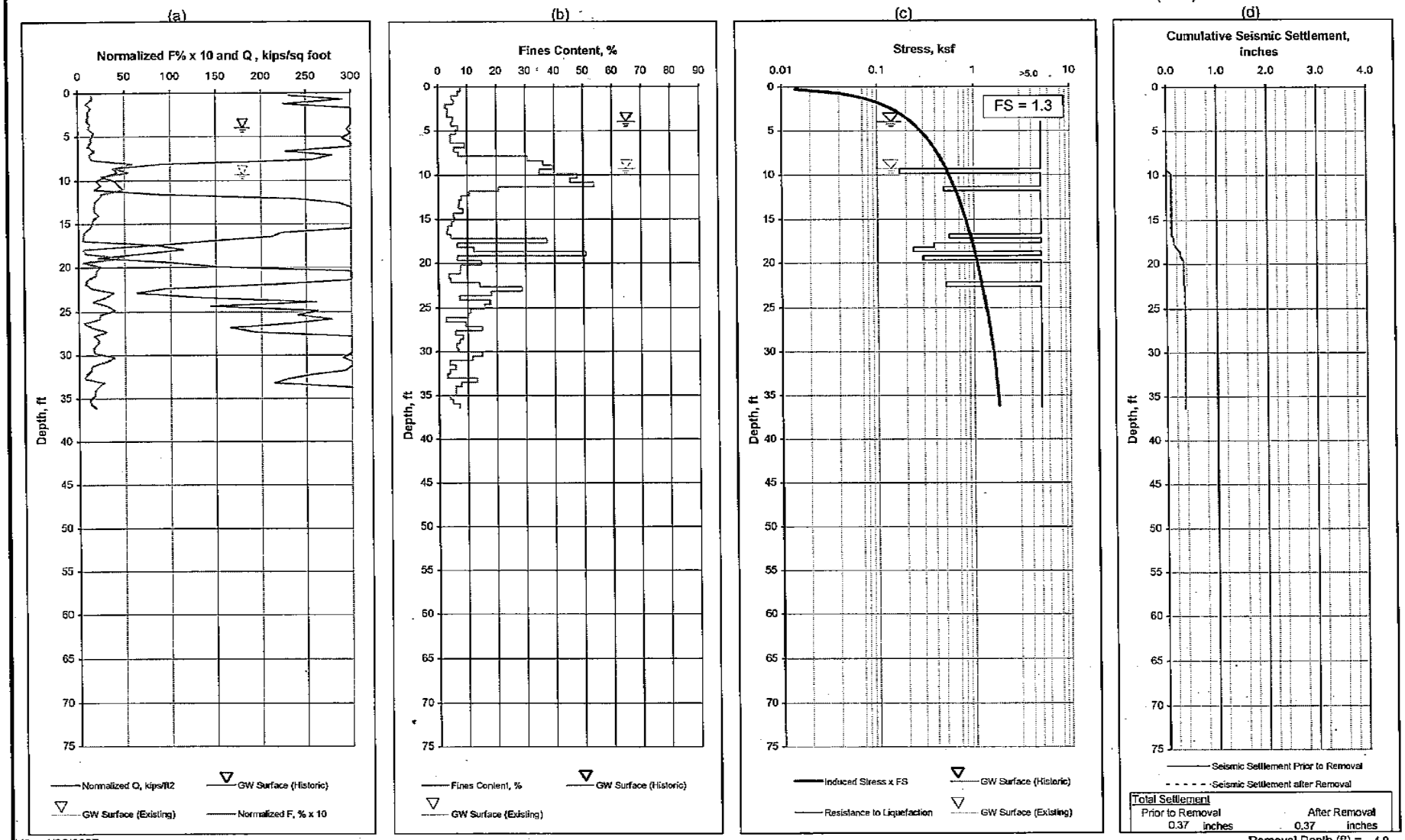
V3e; 4/26/2007

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Riverwood Village, VTT 53108	Weighted Gr. Acc. (M=7.5).	0.56 g	Project No.	1702R-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.83 g	Figure No.	C7
For: Newhall Land & Farming Co.	Magnification Factor.....	1	Date.	12-21-2009

Location..... CPT-101
Elevation (MSL)..... 914 ft



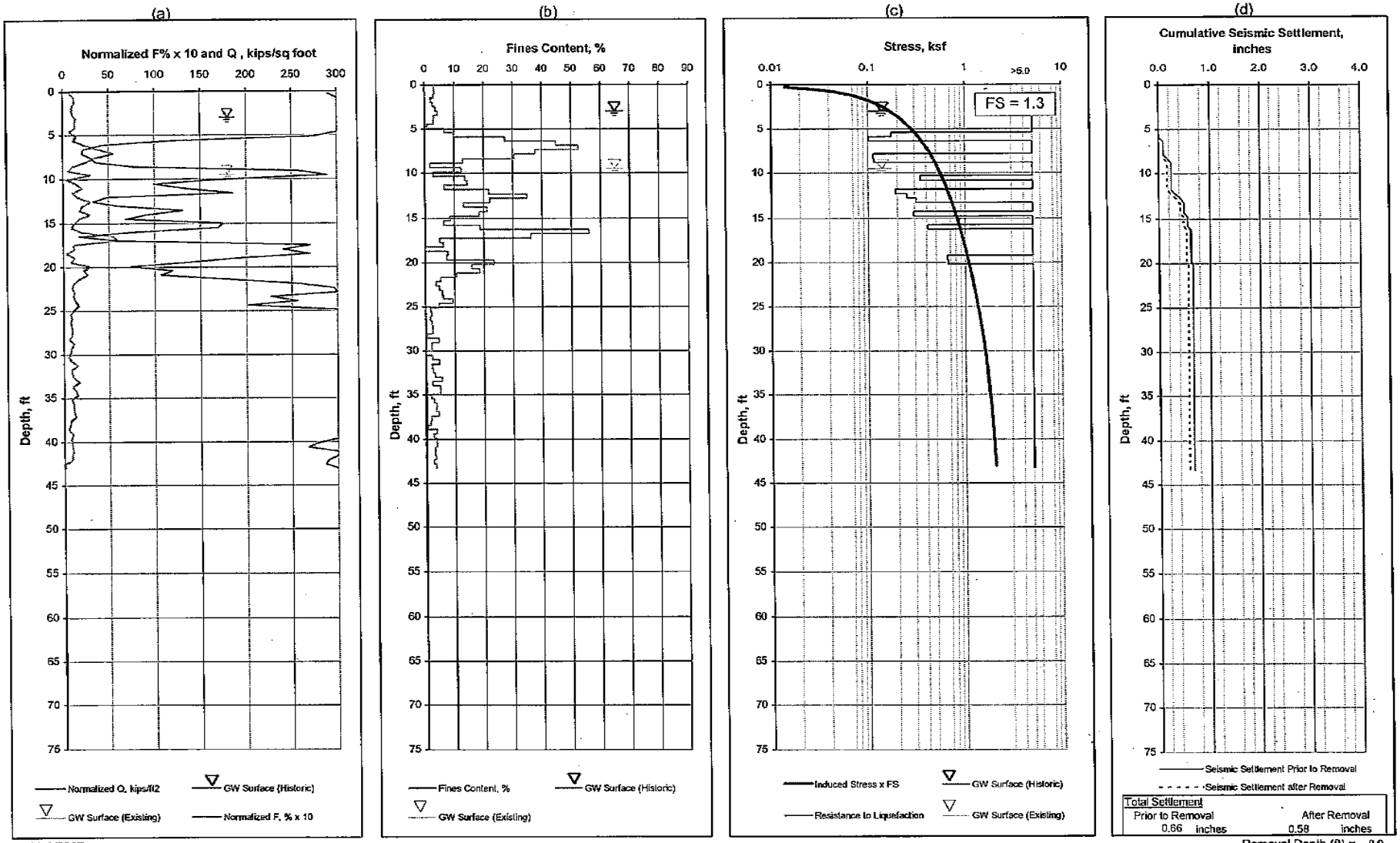
V3e; 4/26/2007

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Riverwood Village, VTT 53108	Weighted Gr. Acc. (M=7.5). 0.56 g	Project No.	1702R-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)... 0.83 g	Figure No.	C8
For: Newhall Land & Farming Co.	Magnification Factor..... 1	Date.	12-21-2009

Location..... CPT-103
Elevation (MSL)..... 905 ft



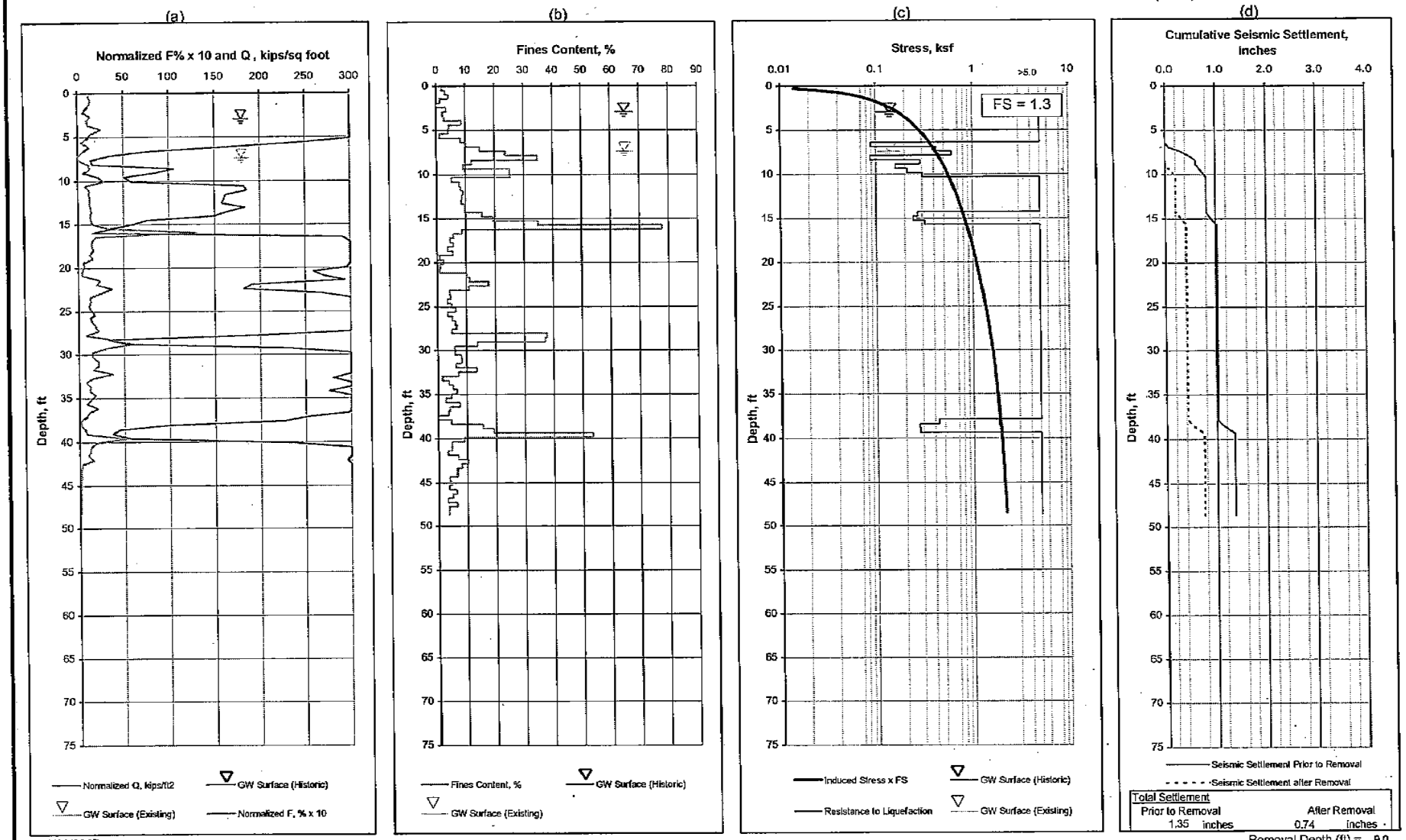
V3e; 4/26/2007

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Riverwood Village, VTT 53108	Weighted Gr. Acc. (M=7.5).	0.56 g	Project No.	1702R-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.83 g	Figure No.	C9
For: Newhall Land & Farming Co.	Magnification Factor.....	1	Date.	12-21-2009

Location..... CPT-105
Elevation (MSL)..... 907 ft



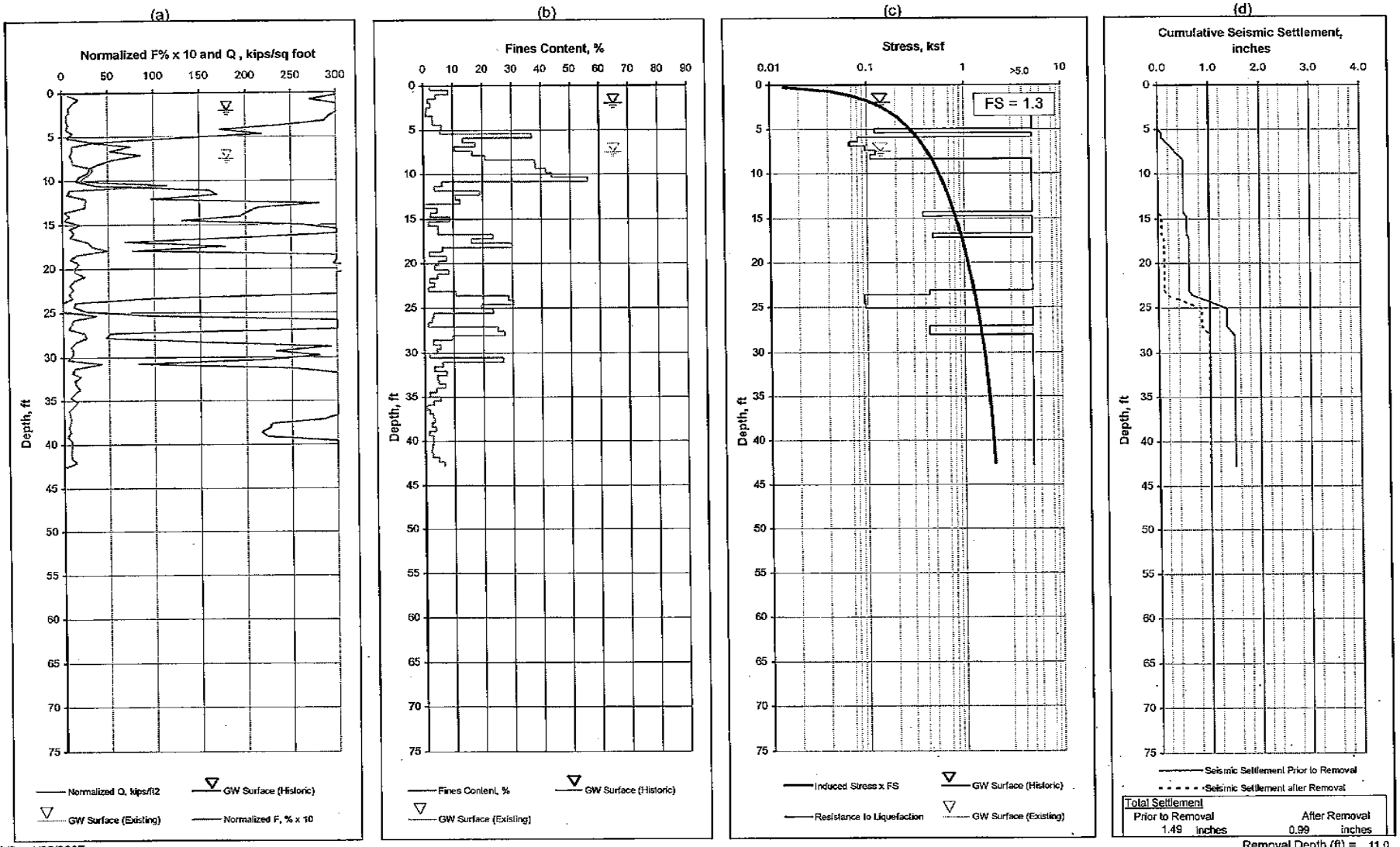
V3e; 4/26/2007

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Riverwood Village, VTT 53108	Weighted Gr. Acc. (M=7.5).	0.56 g	Project No.	1702R-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.83 g	Figure No.	C10
For: Newhall Land & Farming Co.	Magnification Factor.....	1	Date.	12-21-2009

Location..... CPT-106
Elevation (MSL)..... 905 ft



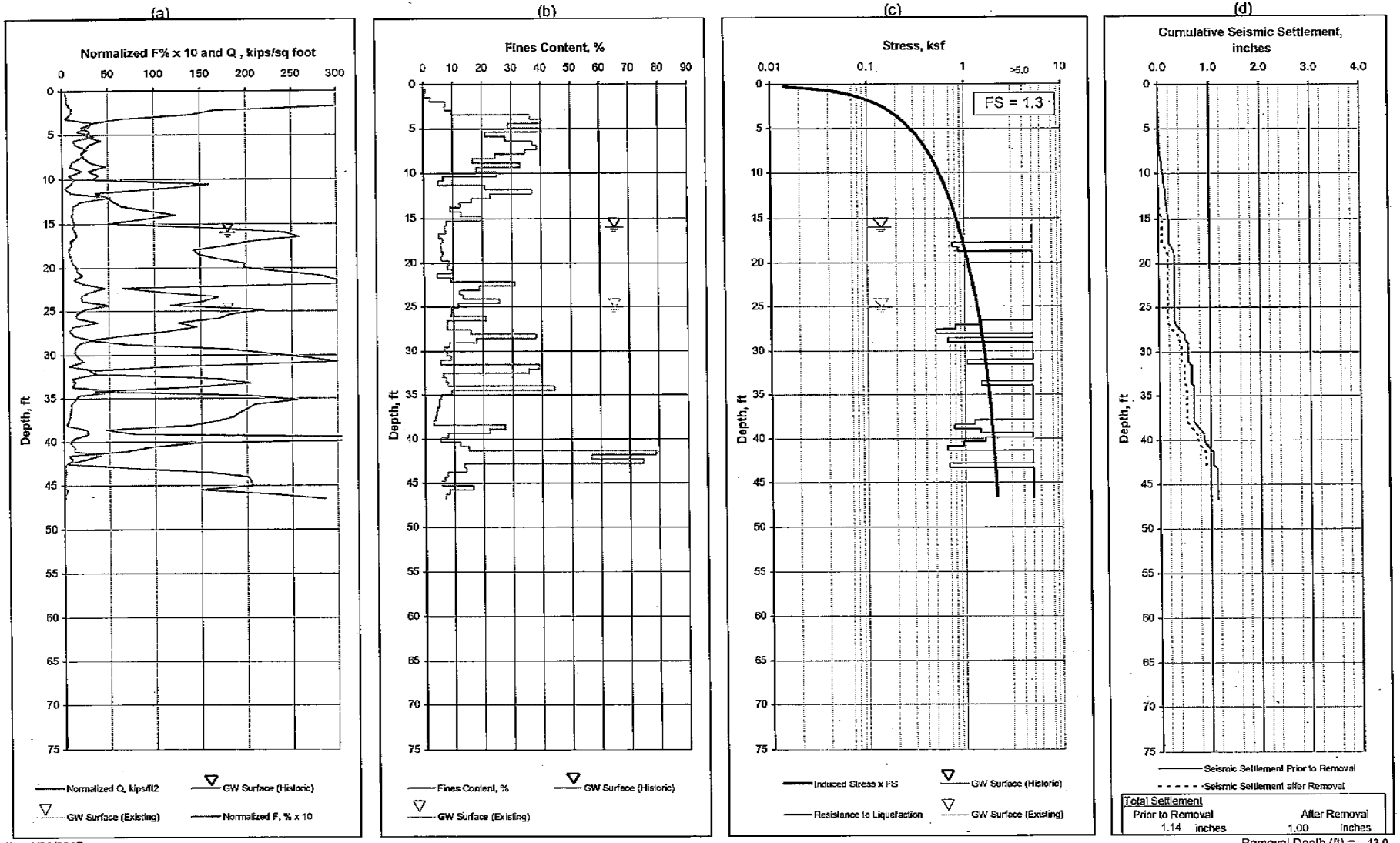
V3e; 4/26/2007

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Riverwood Village, VTT 53108	Weighted Gr. Acc. (M=7.5).	0.56 g	Project No.	1702R-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.83 g	Figure No.	C11
For: Newhall Land & Farming Co.	Magnification Factor.....	1	Date.	12-21-2009

Location..... CPT-108
Elevation (MSL)..... 951 ft



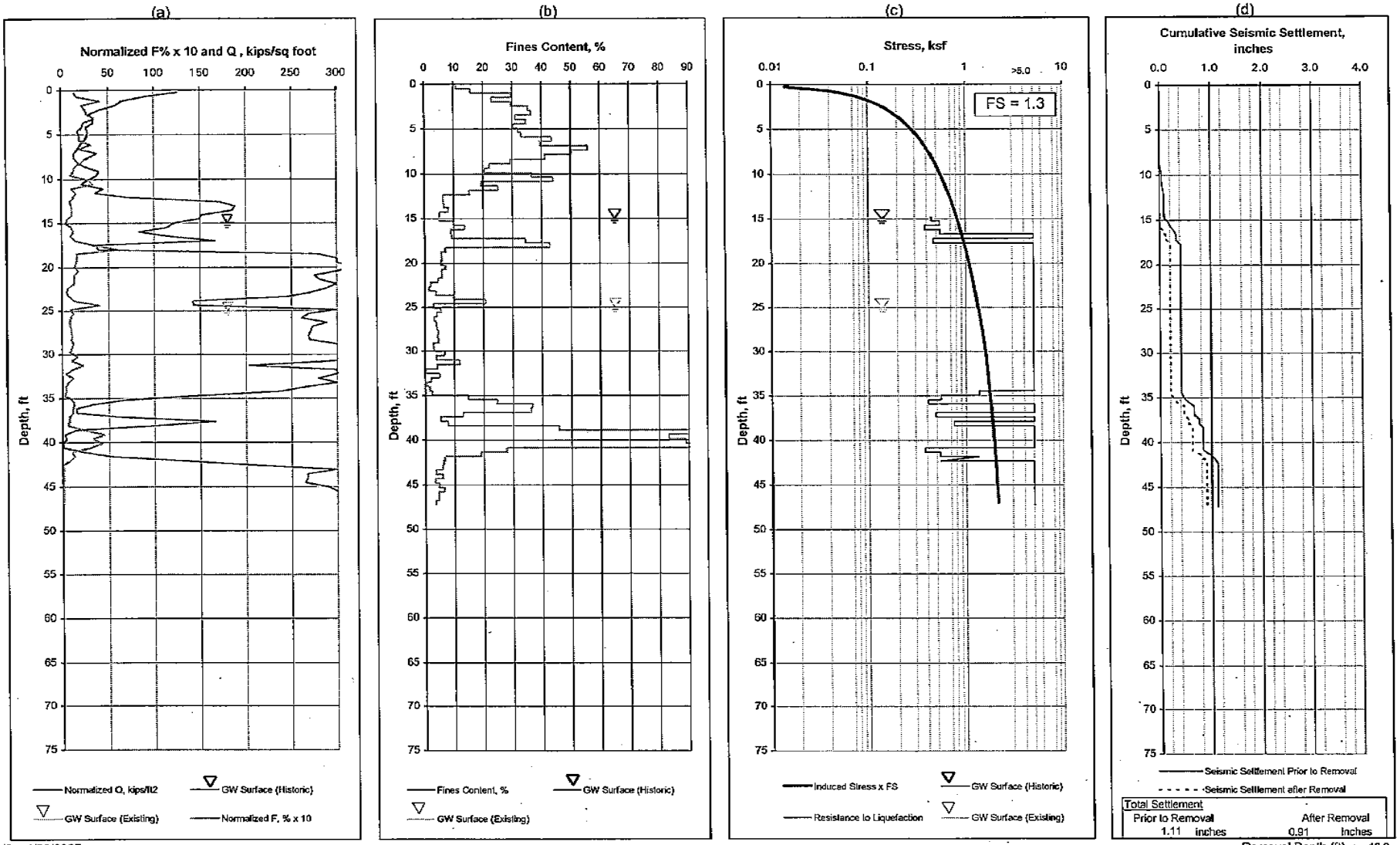
V3e; 4/26/2007

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

Riverwood Village, VTT 53108	Weighted Gr. Acc. (M=7.5).	0.56 g	Project No.	1702R-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.83 g	Figure No.	C12
For: Newhall Land & Farming Co.	Magnification Factor.....	1	Date.	12-21-2009

Location..... CPT-109
Elevation (MSL)..... 952 ft



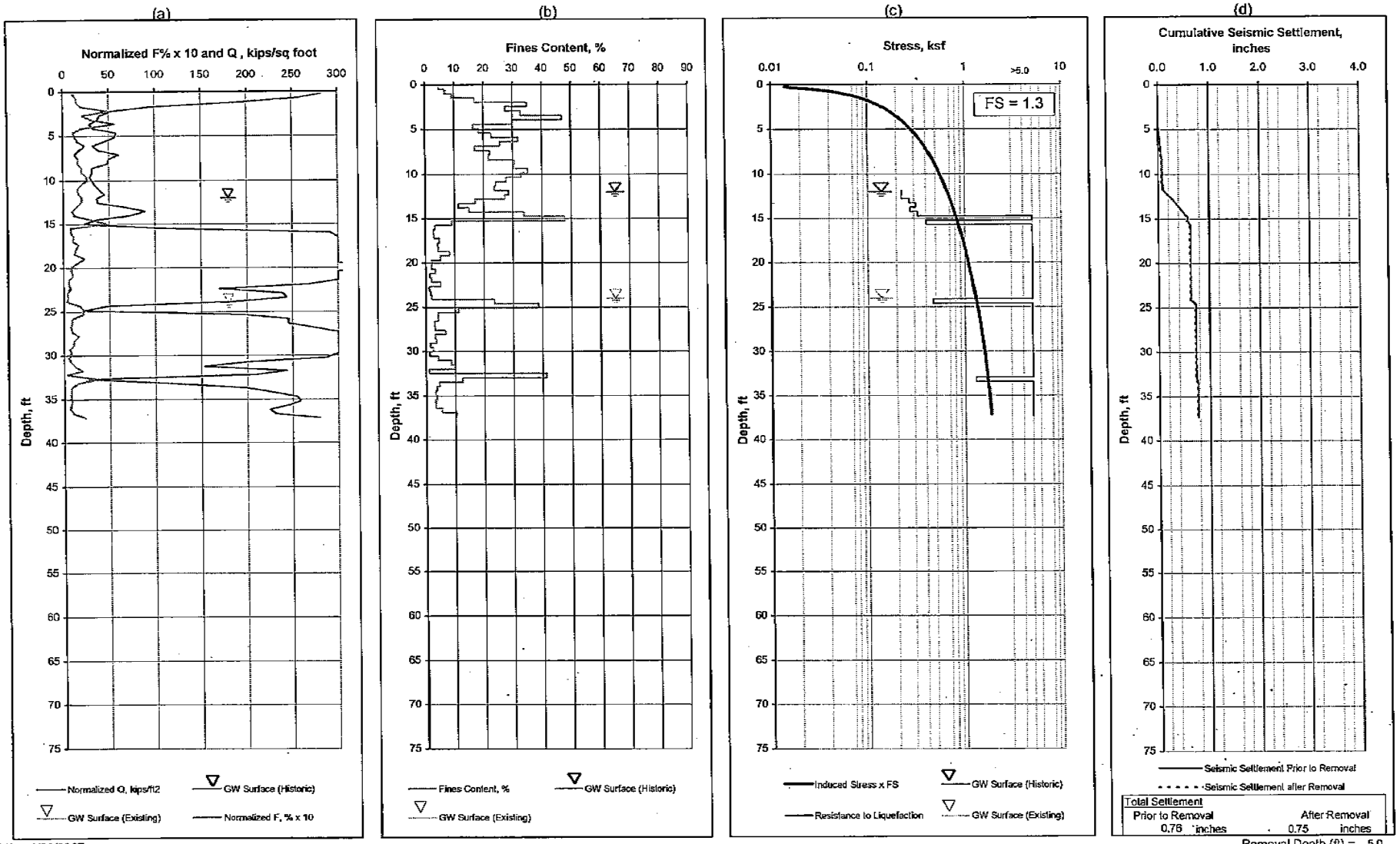
V3e; 4/26/2007

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

River Village, VTT 53108	Weighted Gr. Acc. (M=7.5).	0.56 g	Project No.	1702R-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.83 g	Figure No.	C13
For: Newhall Land & Farming Co.	Magnification Factor.....	1	Date.	12-21-2009

Location..... CPT-110
Elevation (MSL)..... 953 ft



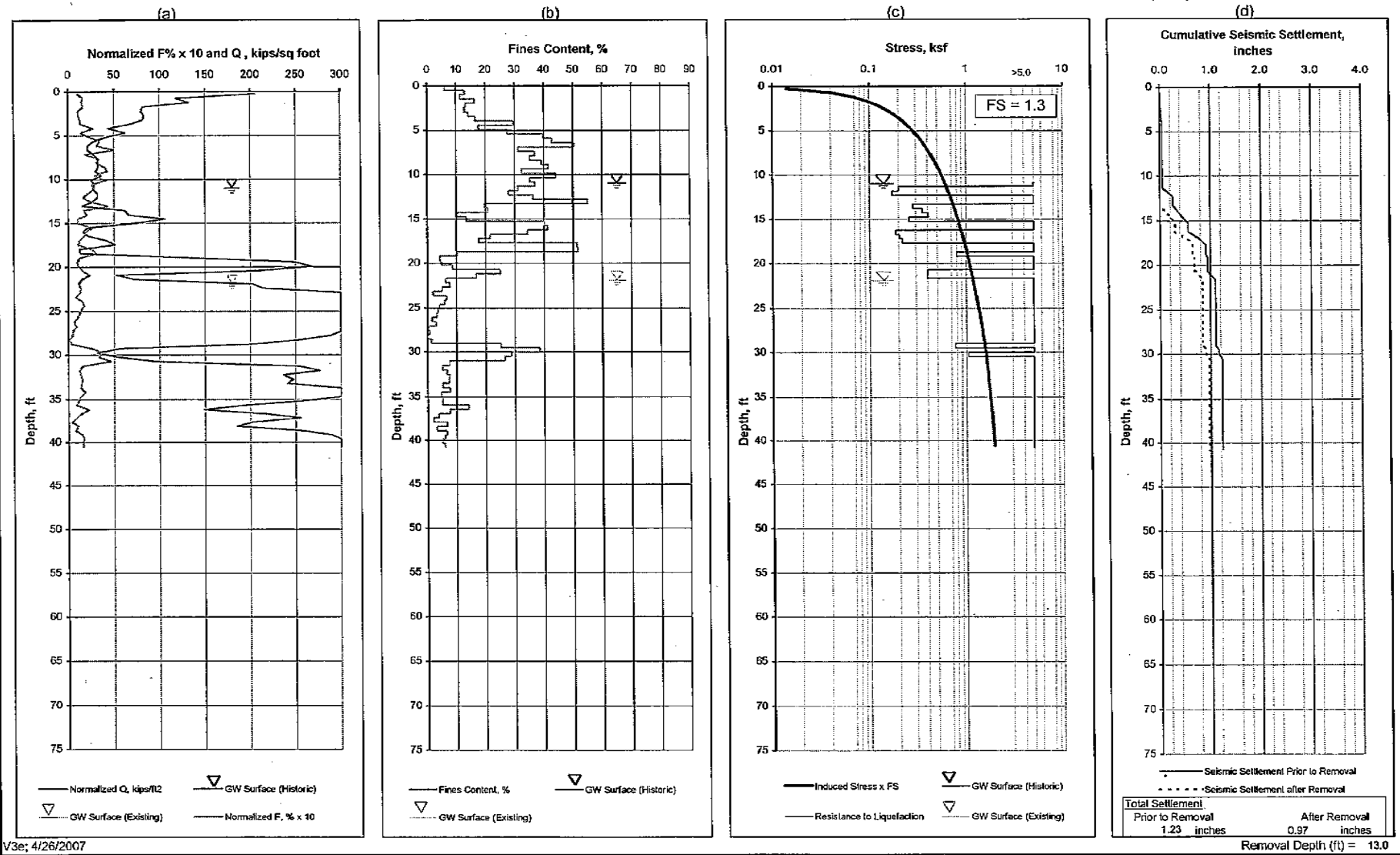
V3e; 4/26/2007

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

River Village, VTT 53108	Weighted Gr. Acc. (M=7.5).	0.56 g	Project No.	1702R-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.83 g	Figure No.	C14
For: Newhall Land & Farming Co.	Magnification Factor.....	1	Date.	12-21-2009

Location..... **CPT-111**
Elevation (MSL)..... 953 ft



V3e; 4/26/2007

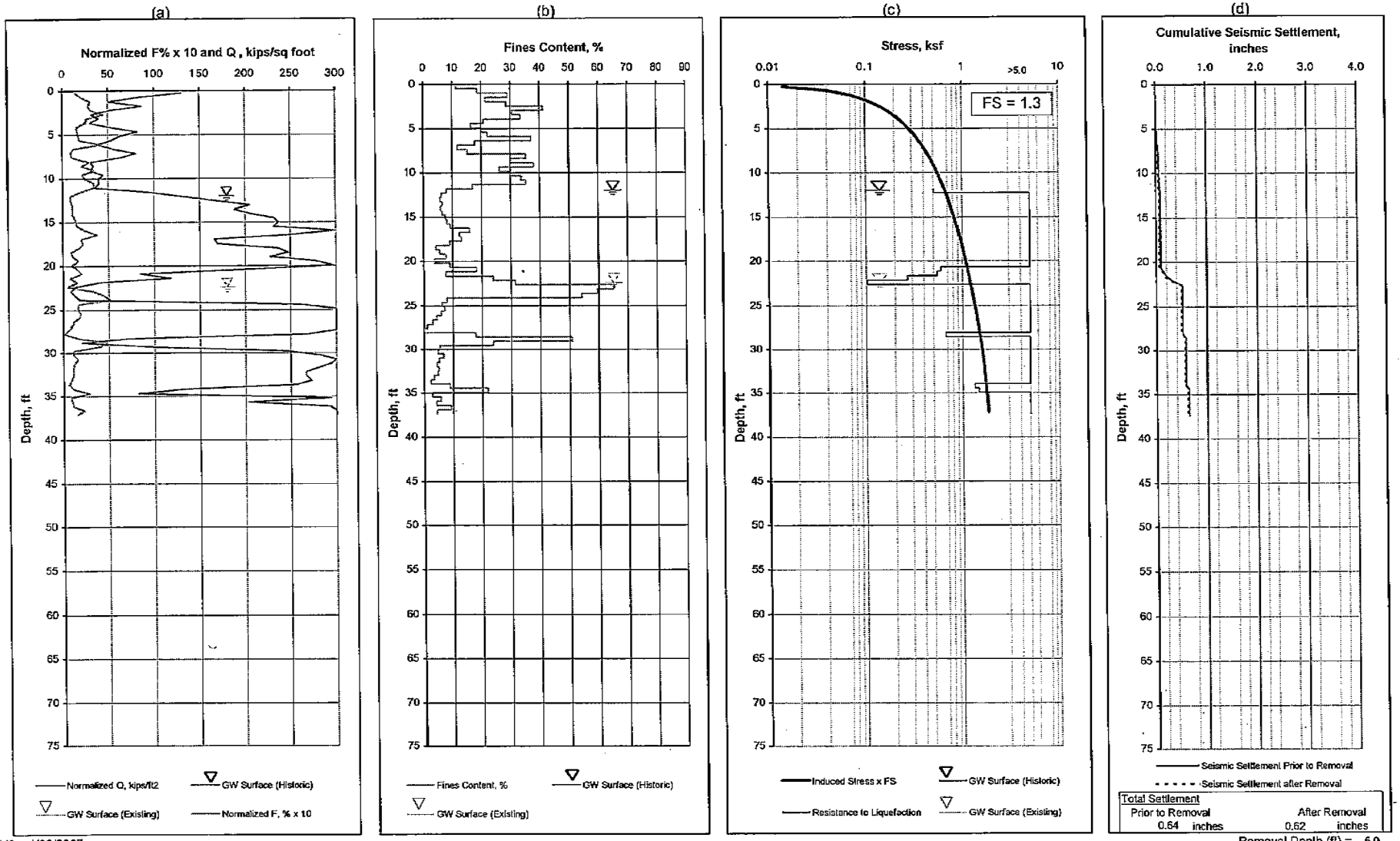
Removal Depth (ft) = 13.0

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

River Village, VTT 53108	Weighted Gr. Acc. (M=7.5). 0.56 g	Project No.	1702R-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)... 0.83 g	Figure No.	C15
For: Newhall Land & Farming Co.	Magnification Factor..... 1	Date.	12-21-2009

Location..... CPT-114
Elevation (MSL)..... 954 ft



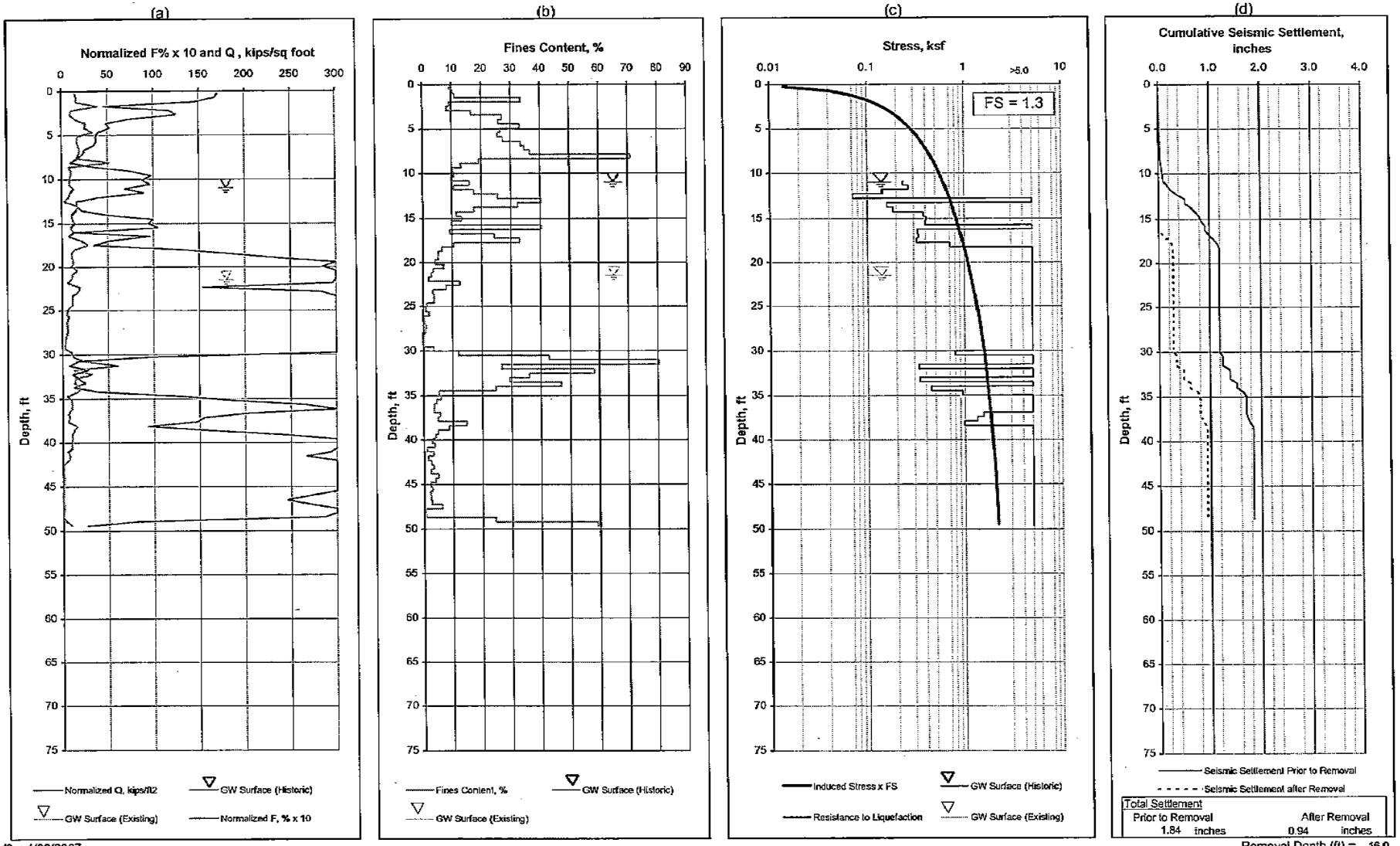
V3e; 4/26/2007

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

River Village, VTT 53108	Weighted Gr. Acc. (M=7.5).	0.56 g	Project No.	1702R-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.83 g	Figure No.	C16
For: Newhall Land & Farming Co.	Magnification Factor.....	1	Date.	12-21-2009

Location..... CPT-115
Elevation (MSL)..... 954 ft



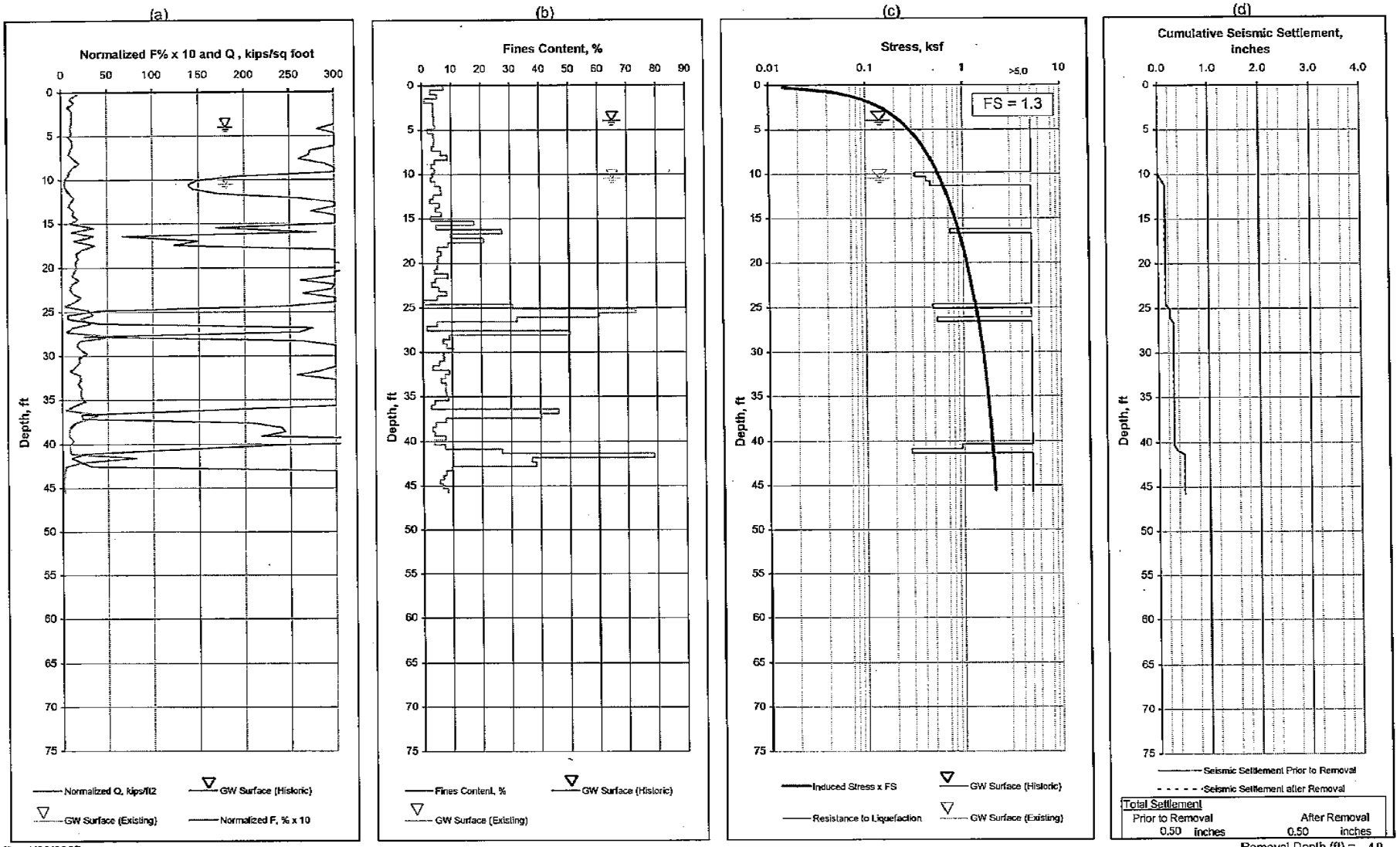
V3e; 4/26/2007

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

River Village, VTT 53108	Weighted Gr. Acc. (M=7.5). 0.56 g	Project No.	1702R-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)... 0.83 g	Figure No.	C17
For: Newhall Land & Farming Co.	Magnification Factor..... 1	Date.	12-21-2009

Location..... CPT-118
Elevation (MSL)..... 920 ft



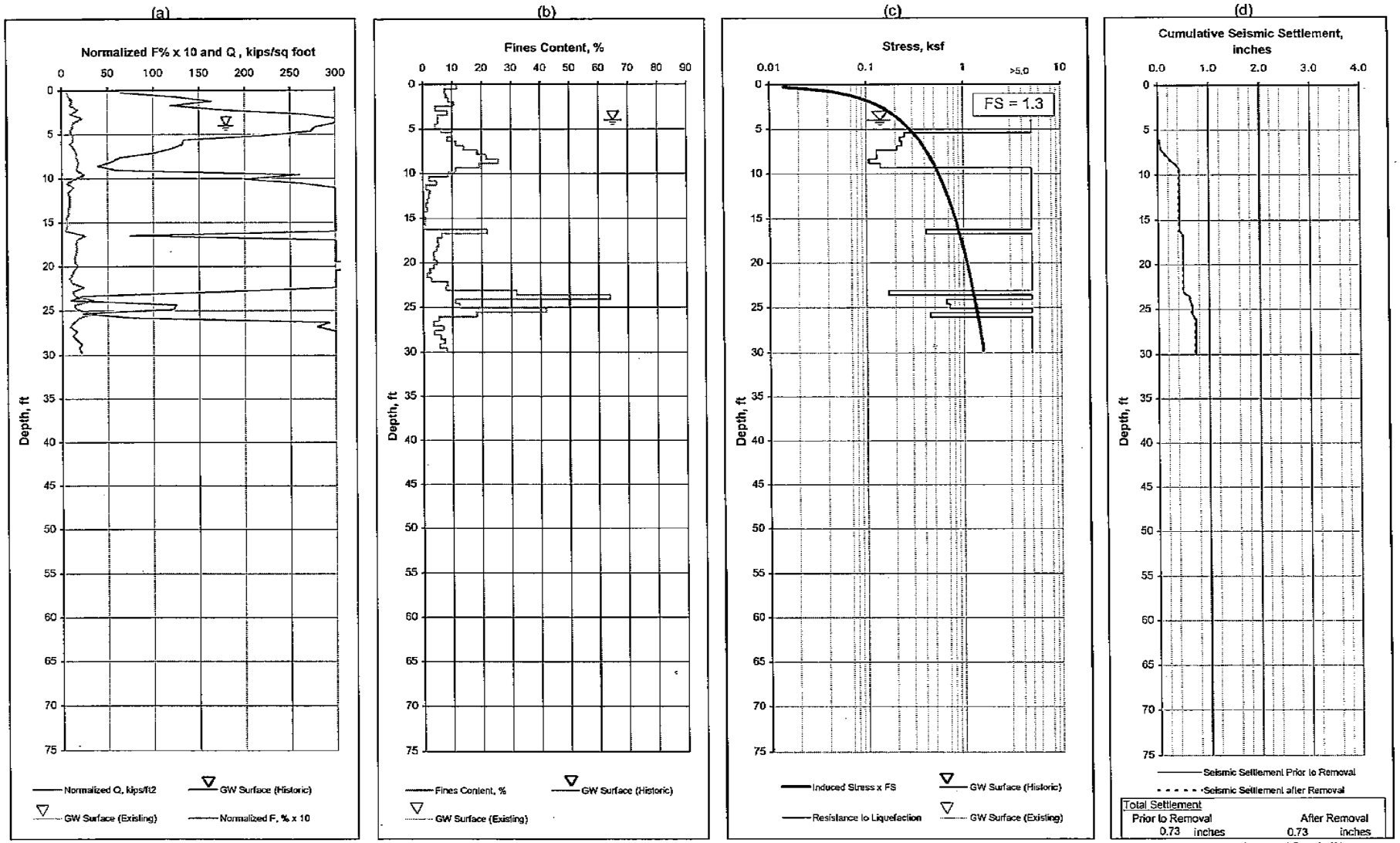
V3e; 4/26/2007

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

River Village, VTT 53108	Weighted Gr. Acc. (M=7.5).	0.56 g	Project No.	1702R-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)...	0.83 g	Figure No.	C18
For: Newhall Land & Farming Co.	Magnification Factor.....	1	Date.	12-21-2009

Location..... CPT-122A
Elevation (MSL)..... 906 ft



V3e; 4/26/2007

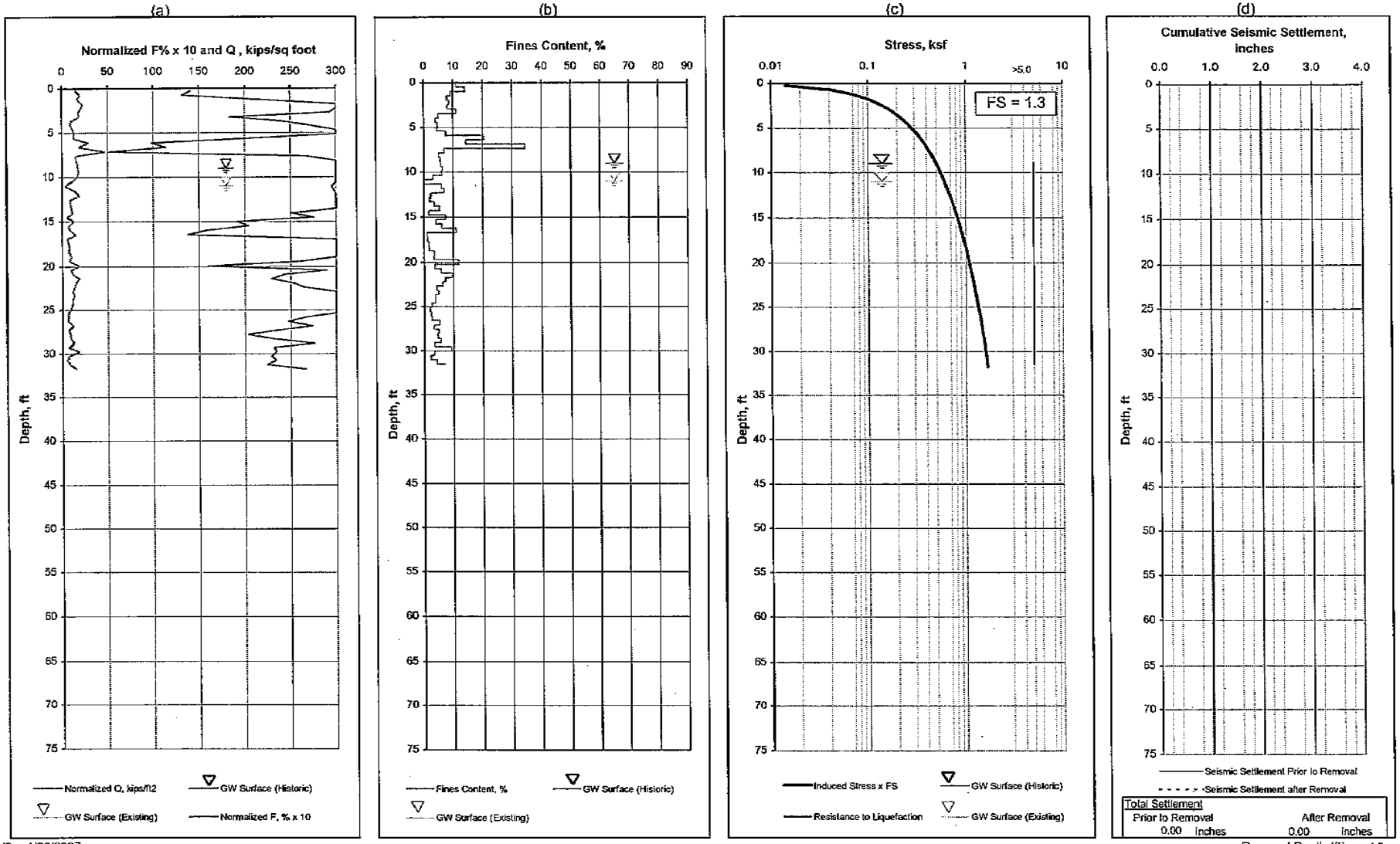
Removal Depth (ft) = 4.0

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

River Village, VTT 53108	Weighted Gr. Acc. (M=7.5). 0.56 g	Project No.	1702R-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)... 0.83 g	Figure No.	C19
For: Newhall Land & Farming Co.	Magnification Factor..... 1	Date.	12-21-2009

Location..... CPT-125
Elevation (MSL)..... 913 ft



V3e; 4/26/2007

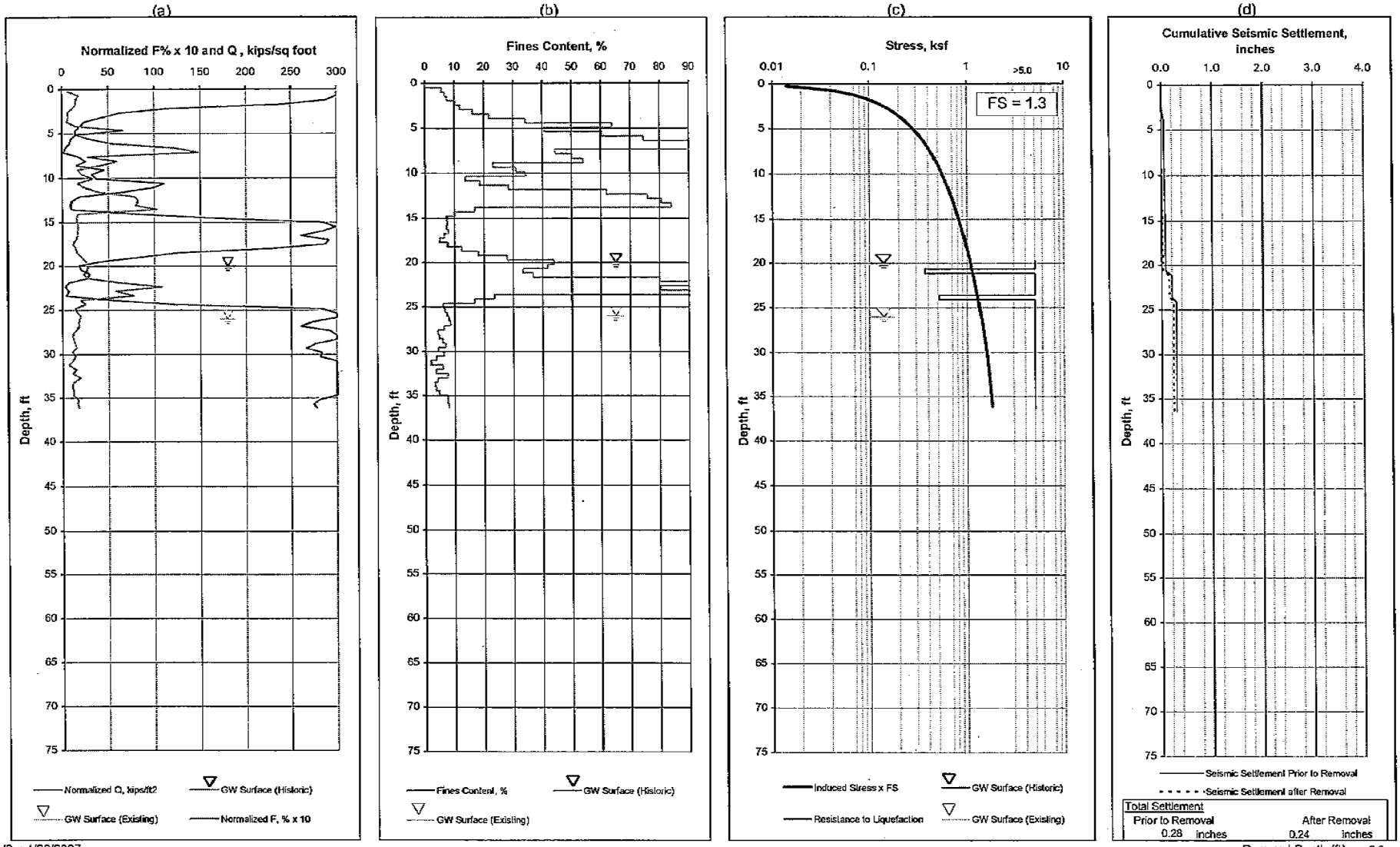
Removal Depth (ft) = 4.0

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data.

River Village, VTT 53108	Weighted Gr. Acc. (M=7.5). 0.56 g	Project No.	1702R-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)... 0.83 g	Figure No.	C20
For: Newhall Land & Farming Co.	Magnification Factor..... 1	Date.	12-21-2009

Location..... CPT-128
Elevation (MSL)..... 951 ft



V3e; 4/26/2007

Removal Depth (ft) = 9.0

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on q_c and f_s from CPT Data

River Village, VTT 53108	Weighted Gr. Acc. (M=7.5). 0.56 g	Project No.	1702R-4
Castaic, L A County, California	Design Gr. Acc.(M= 6.5)... 0.83 g	Figure No.	C21
For: Newhall Land & Farming Co.	Magnification Factor..... 1	Date.	12-21-2009

LIQUEFACTION POTENTIAL AND CYCLIC SETTLEMENT ANALYSIS

PROJECT: River Village, VTT 53108
Job No.: 1702R-4

Location	CPT-115	Basic Earthquake Magnitude	7.5		Conditions:	Existing conditions with historic groundwater level	
Type of Sampler (CPT/SPT/CD)	CPT	Approx. Distance From Site (miles)	2.5				
Ground Surface Elevation	954 ft. MSL	Design Magnitude	6.5		1.30	Specified Factor of Safety	
Existing Ground Water Depth	21.5 ft. Below GL	Peak Ground Accel (M =7.5)	0.59 g.			FS = 1.3	
Historic Ground Water Depth	11.0 ft. Below GL	Design PGA (M =6.5)	0.87 g.				
		Magnification Factor	1.0				

Layer No.	Mid-layer Depth (ft)	Elevation (ft. MSL)	Depth of layer below Ground Level (ft) Top	Bottom	Total Unit Wt. (1) (kcf)	Total Stress (2) (ksf)	Effective Stress (3) (ksf)	CPT Tip Resistance (4) (ksf)	F, % normalized (5)	1st trial I_c (6)	2nd trial I_c (7)	exponent n of Final I_c and q_{c1N} (8)	q_{c1N} normalized (9) (ksf)	Final I_c (10)	K_c factor for fines (11)	Equivalent $(q_{c1N})_{cs}$ clean sand (12)	Percent Fines, % Estimated (13)	Lab (14)	Cyclic Resistance Ratio (15) M=7.5	Cyclic Resistance M = 7.5 (16) (ksf)	Stress Reduction Factor, r_d (17)	Specified FS x Induced Cyclic Stress (18) M=7.5 (ksf)	Calculated Factor of Safety (19)	Cumulative Settlement after Removals (inches)	Thickness of Potentially Liquefiable Layers After Removals (ft)
1	0.25	953.8	0	0.49	0.120	0.029	0.029	42.66	1.451	1.42	1.85	0.50	171.00	1.85	1.15	196.44	9		>0.6	>5.0	0.999	0.015	Non Liquefiable	0.00	
2	0.74	953.3	0.49	0.98	0.120	0.088	0.088	72.24	1.632	1.54	1.90	0.50	167.18	1.90	1.19	198.64	10		>0.6	>5.0	0.998	0.044	Non Liquefiable	0.00	
3	1.23	952.8	1.0	1.48	0.120	0.148	0.148	81.12	1.553	1.59	1.92	0.50	145.12	1.92	1.21	175.97	11		>0.6	>5.0	0.997	0.073	Non Liquefiable	0.00	
4	1.73	952.3	1.48	1.97	0.120	0.207	0.207	30.30	3.917	2.24	2.56	0.50	45.77	2.56	3.10	141.82	34		0.345	0.071	0.996	0.103	0.90	0.00	
5	2.22	951.8	1.97	2.46	0.120	0.266	0.266	88.20	0.983	1.54	1.85	0.50	117.58	1.85	1.15	134.81	9		0.308	0.082	0.995	0.132	0.81	0.00	
6	2.71	951.3	2.46	2.95	0.120	0.325	0.325	103.72	0.893	1.52	1.80	0.50	125.12	1.80	1.11	138.84	8		0.329	0.107	0.994	0.161	0.86	0.00	
7	3.20	950.8	2.95	3.44	0.120	0.383	0.383	65.30	1.479	1.86	2.13	0.50	72.48	2.13	1.51	109.11	17		0.201	0.077	0.993	0.190	0.53	0.00	
8	3.69	950.3	3.44	3.94	0.120	0.443	0.443	47.00	2.574	2.18	2.42	0.50	48.54	2.42	2.38	115.66	27		0.224	0.099	0.991	0.219	0.59	0.00	
9	4.19	949.8	3.94	4.43	0.120	0.502	0.502	53.92	2.513	2.17	2.39	0.50	52.29	2.39	2.26	117.99	26		0.233	0.117	0.990	0.248	0.61	0.00	
10	4.68	949.3	4.43	4.92	0.120	0.561	0.561	33.56	3.336	2.44	2.64	0.70	40.16	2.55	3.05	122.69	33		0.252	0.141	0.989	0.277	0.66	0.00	
11	5.17	948.8	4.92	5.41	0.120	0.620	0.620	42.44	1.766	2.20	2.40	0.50	37.05	2.40	2.32	85.88	26		0.139	0.086	0.988	0.305	0.37	0.00	
12	5.66	948.3	5.41	5.91	0.120	0.679	0.679	45.38	1.655	2.19	2.38	0.50	37.84	2.38	2.22	84.03	25		0.135	0.092	0.987	0.334	0.36	0.00	
13	6.16	947.8	5.91	6.40	0.120	0.739	0.739	44.02	1.800	2.25	2.42	0.50	35.20	2.42	2.41	84.96	27		0.137	0.101	0.986	0.363	0.36	0.00	
14	6.65	947.4	6.40	6.89	0.120	0.797	0.797	26.66	1.928	2.47	2.63	0.70	24.96	2.56	3.10	77.36	34		0.123	0.098	0.985	0.391	0.33	0.00	
15	7.14	946.9	6.89	7.38	0.120	0.856	0.856	26.00	1.913	2.50	2.65	0.70	23.14	2.59	3.24	75.07	35		0.119	0.102	0.983	0.420	0.32	0.00	
16	7.63	946.4	7.38	7.87	0.120	0.915	0.915	17.46	1.572	2.63	2.63	1.00	18.08	2.63	3.50	Fine-Grained	37		>0.6	>5.0	0.982	0.448	Non Liquefiable	0.00	
17	8.12	945.9	7.87	8.37	0.120	0.974	0.974	9.78	5.220	3.17	3.17	1.00	9.04	3.17	8.89	Fine-Grained	71		>0.6	>5.0	0.981	0.477	Non Liquefiable	0.00	
18	8.62	945.4	8.37	8.86	0.120	1.034	1.034	53.66	0.765	2.08	2.21	0.50	36.27	2.21	1.68	61.02	19		0.101	0.105	0.980	0.505	0.27	0.00	
19	9.11	944.9	8.86	9.35	0.120	1.093	1.093	114.30	0.989	1.90	2.00	0.50	75.15	2.00	1.31	98.15	13		0.168	0.183	0.979	0.533	0.45	0.00	
20	9.60	944.4	9.35	9.84	0.120	1.151	1.151	151.68	0.917	1.80	1.90	0.50	97.15	1.90	1.19	115.16	10		0.222	0.256	0.978	0.561	0.59	0.00	
21	10.09	943.9	9.84	10.33	0.120	1.210	1.210	141.16	0.847	1.82	1.91	0.50	88.19	1.91	1.20	105.56	11		0.189	0.229	0.976	0.589	0.51	0.00	
22	10.58	943.4	10.33	10.83	0.120	1.270	1.270	157.60	0.817	1.76	1.87	0.50	96.13	1.87	1.16	111.60	10		0.209	0.266	0.975	0.617	0.56	0.00	
23	11.08	942.9	10.83	11.32	0.120	1.329	1.324	115.56	1.295	2.03	2.11	0.50	69.03	2.11	1.47	101.17	16		0.176	0.233	0.974	0.645	0.47	0.00	0.49
24	11.57	942.4	11.32	11.81	0.120	1.388	1.353	151.52	0.868	1.84	1.91	0.50	89.54	1.91	1.20	107.27	11		0.195	0.263	0.973	0.673	0.51	0.00	0.49
25	12.06	941.9	11.81	12.30	0.120	1.447	1.381	68.66	0.715	2.08	2.15	0.50	40.16	2.15	1.56	62.65	17		0.103	0.142	0.972	0.701	0.26	0.00	0.49
26	12.55	941.5	12.30	12.80	0.120	1.506	1.409	27.32	0.307	2.32	2.38	0.50	15.62	2.38	2.23	35.21	26		0.050	0.071	0.971	0.729	0.13	0.00	0.5
27	13.05	941.0	12.8	13.29	0.120	1.565	1.438	24.56	1.741	2.70	2.70	1.00	15.99	2.70	3.97	Fine-Grained	40		>0.6	>5.0	0.970	0.757	Non Liquefiable	0.00	-
28	13.54	940.5	13.29	13.78	0.120	1.624	1.466	39.90	1.512	2.48	2.54	0.50	22.65	2.54	2.96	66.98	32		0.108	0.158	0.968	0.784	0.26	0.00	0.49
29	14.03	940.0	13.78	14.27	0.120	1.683	1.494	87.70	0.999	2.10	2.16	0.50	49.31	2.16	1.56	77.13	18		0.123	0.183	0.967	0.812	0.29	0.00	0.49
30	14.52	939.5	14.27	14.76	0.120	1.742	1.522	178.08	1.101	1.89	1.94	0.50	99.19	1.94	1.23	121.89	11		0.248	0.378	0.966	0.839	0.59	0.00	0.49
31	15.01	939.0	14.76	15.26	0.120	1.801	1.551	171.70	1.344	1.97	2.01	0.50	94.76	2.01	1.32	124.71	13		0.260	0.404	0.965	0.867	0.61	0.00	0.5
32	15.51	938.5	15.26	15.75	0.120	1.861	1.579	191.80	0.929	1.83	1.87	0.50	104.89	1.87	1.17	122.22	10		0.250	0.395	0.964	0.894	0.57	0.00	0.49
33	16.00	938.0	15.75	16.24	0.120	1.919	1.608	23.12	1.276	2.70	2.70	1.00	13.19	2.70	3.98	Fine-Grained	40		>0.6	>5.0	0.963	0.921	Non Liquefiable	0.00	-
34	16.49	937.5	16.24	16.73	0.120	1.978	1.636	177.18	0.738	1.81	1.85	0.50	95.21	1.85	1.14	108.72	9		0.200	0.326	0.962	0.948	0.45	0.07	0.49
35	16.98	937.0	16.73	17.22	0.120	2.037	1.664	97.34	2.165	2.31	2.35	0.50	51.86	2.35	2.10	109.04	24		0.201	0.334	0.960	0.975	0.44	0.15	0.49
36	17.47	936.5	17.22	17.72	0.120	2.096	1.693	65.68	2.799	2.52	2.55	0.50	34.70	2.55	3.03	105.29	33		0.189	0.319	0.959	1.003	0.41	0.24	0.5
37	17.97	936.0	17.72	18.21	0.120	2.156	1.721	244.24	1.291	1.88	1.91	0.50	127.95	1.91	1.19	152.73	11		0.411	0.708	0.958	1.030	0.89	0.28	0.49
38	18.46	935.5	18.21	18.70	0.120	2.215	1.749	353.72	0.996	1.69	1.71	0.50	183.60	1.71	1.05	192.50	6		>0.6	>5.0	0.957	1.057	Non Liquefiable	0.28	-
39	18.95	935.1	18.7	19.19	0.120	2.273	1.778	460.92	1.045	1.63	1.65	0.50	237.60	1.65	1.01	238.92	5		>0.6	>5.0	0.956	1.083	Non Liquefiable	0.28	-
40	19.44	934.6	19.19	19.69	0.120	2.333	1.806	593.24	1.245	1.63	1.64	0.50	303.38	1.64	1.00	303.29	5		>0.6	>5.0	0.955	1.110	Non Liquefiable	0.28	-
41	19.94	934.1	19.69	20.18	0.120	2.392	1.835	562.82	0.984	1.56	1.58	0.50	285.58	1.58	1.00	285.58	4		>0.6	>5.0	0.954	1.137	Non Liquefiable	0.28	-
42	20.43	933.6	20.18	20.67	0.120	2.451	1.863	603.90	1.647	1.73	1.74	0.50	304.10	1.74	1.07	324.42	7		>0.6	>5.0	0.952	1.164	Non Liquefiable	0.28	-
43	20.92	933.1	20.67	21.16	0.120	2.510	1.891	801.48	1.103	1.52	1.53	0.50	400.57	1.53	1.00	400.57	3		>0.6	>5.0	0.951	1.190	Non Liquefiable	0.28	-
44	21.41	932.6	21.16	21.65	0.120	2.569	1.919	821.58	0.983	1.48	1.49	0.50	407.58	1.49	1.00	407.58	3		>0.6	>5.0	0.950	1.217	Non Liquefiable	0.28	-
45	21.90	932.1	21.65	22.15	0.120	2.628	2.603	696.20	0.642	1.47	1.43	0.50	296.57	1.43	1.00	296.57	2		>0.6	>5.0	0.949	1.243	Non Liquefiable	0.28	-
46	22.40	931.6	22.15	22.64	0.120	2.687	2.632	362.82	1.954	2.02	1.98	0.50	153.72	1.98	1.28	196.41	12		>0.6	>5.0	0.948	1.270	Non Liquefiable	0.28	-
47	22.89	931.1	22.64	23.13	0.120	2.746	2.660	673.24	1.747	1.81	1.78	0.50	283.72	1.78	1.09	310.17	8		>0.6	>5.0	0.947	1.296	Non Liquefiable	0.28	-

LIQUEFACTION POTENTIAL AND CYCLIC SETTLEMENT ANALYSIS

Layer No.	Mid-layer Depth (ft)	Elevation (ft. MSL)	Depth of layer below Ground Level (ft) Top	Bottom	Total Unit Wt. (1) (kcf)	Total Stress (2) (ksf)	Effective Stress (3) (ksf)	CPT Tip Resistance (4) (ksf)	F, % normalized (5)	1st trial I_c (6)	2nd trial I_c (7)	exponent n of Final I_c and q_{c1N} (8)	q_{c1N} normalized (9) (ksf)	Final I_c (10)	K_c factor for fines (11)	Equivalent $(q_{c1N})_{cs}$ clean sand (12)	Percent Fines, % Estimated (13)	Percent Fines, % Lab (14)	Cyclic Resistance Ratio (15) M=7.5	Cyclic Resistance M = 7.5 (16) (ksf)	Stress Reduction Factor, r_d (17)	Specified FS x Induced Cyclic Stress (18) M=7.5 (ksf)	Calculated Factor of Safety (19)	Cumulative Settlement after Removals (inches)	Thickness of Potentially Liquefiable Layers After Removals (ft)
48	23.38	930.6	23.13	23.62	0.120	2.805	2.688	910.68	1.063	1.56	1.53	0.50	381.76	1.53	1.00	381.76	3		>0.6	>5.0	0.945	1.322	Non Liquefiable	0.28	-
49	23.87	930.1	23.62	24.11	0.120	2.864	2.716	878.82	1.094	1.58	1.55	0.50	366.49	1.55	1.00	366.49	4		>0.6	>5.0	0.944	1.348	Non Liquefiable	0.28	-
50	24.36	929.6	24.11	24.61	0.120	2.923	2.745	873.96	1.084	1.59	1.55	0.50	362.56	1.55	1.00	362.56	4		>0.6	>5.0	0.943	1.375	Non Liquefiable	0.28	-
51	24.86	929.1	24.61	25.10	0.120	2.983	2.773	824.94	0.612	1.42	1.38	0.50	340.46	1.38	1.00	340.46	1		>0.6	>5.0	0.942	1.401	Non Liquefiable	0.28	-
52	25.35	928.7	25.10	25.59	0.120	3.041	2.801	790.52	0.522	1.39	1.34	0.50	324.61	1.34	1.00	324.61	1		>0.6	>5.0	0.941	1.427	Non Liquefiable	0.28	-
53	25.84	928.2	25.59	26.08	0.120	3.100	2.830	786.66	0.693	1.48	1.43	0.50	321.41	1.43	1.00	321.41	2		>0.6	>5.0	0.940	1.452	Non Liquefiable	0.28	-
54	26.33	927.7	26.08	26.57	0.120	3.159	2.858	885.62	0.502	1.34	1.30	0.50	360.05	1.30	1.00	360.05	0		>0.6	>5.0	0.939	1.478	Non Liquefiable	0.28	-
55	26.82	927.2	26.57	27.07	0.120	3.218	2.886	900.62	0.522	1.35	1.31	0.50	364.33	1.31	1.00	364.33	0		>0.6	>5.0	0.937	1.504	Non Liquefiable	0.28	-
56	27.32	926.7	27.07	27.56	0.120	3.278	2.915	871.00	0.592	1.41	1.36	0.50	350.62	1.36	1.00	350.62	1		>0.6	>5.0	0.936	1.530	Non Liquefiable	0.28	-
57	27.81	926.2	27.56	28.05	0.120	3.337	2.943	846.06	0.522	1.38	1.33	0.50	338.95	1.33	1.00	338.95	1		>0.6	>5.0	0.935	1.556	Non Liquefiable	0.28	-
58	28.30	925.7	28.05	28.54	0.120	3.395	2.971	887.48	0.341	1.25	1.19	0.50	353.85	1.19	1.00	353.85	0		>0.6	>5.0	0.934	1.581	Non Liquefiable	0.28	-
59	28.79	925.2	28.54	29.04	0.120	3.455	3.000	888.00	0.341	1.25	1.19	0.50	352.37	1.19	1.00	352.37	0		>0.6	>5.0	0.933	1.607	Non Liquefiable	0.28	-
60	29.29	924.7	29.04	29.53	0.120	3.514	3.028	860.16	0.231	1.17	1.11	0.50	339.71	1.11	1.00	339.71	0		>0.6	>5.0	0.932	1.632	Non Liquefiable	0.28	-
61	29.78	924.2	29.53	30.02	0.120	3.573	3.057	837.72	0.974	1.59	1.54	0.50	329.32	1.54	1.00	329.32	3		>0.6	>5.0	0.931	1.658	Non Liquefiable	0.28	-
62	30.27	923.7	30.02	30.51	0.120	3.632	3.085	252.00	1.187	2.03	1.96	0.50	98.61	1.96	1.25	123.74	12		0.256	0.790	0.928	1.680	0.61	0.34	0.49
63	30.76	923.2	30.51	31.00	0.120	3.691	3.113	56.18	2.290	2.74	2.74	1.00	16.86	2.74	4.33	Fine-Grained	43		>0.6	>5.0	0.924	1.700	Non Liquefiable	0.34	-
64	31.25	922.8	31.00	31.50	0.120	3.750	3.142	26.30	6.030	3.29	3.29	1.00	7.18	3.29	10.59	Fine-Grained	80		>0.6	>5.0	0.920	1.719	Non Liquefiable	0.34	-
65	31.75	922.3	31.5	31.99	0.120	3.809	3.170	71.56	1.183	2.50	2.41	0.50	27.62	2.41	2.34	64.52	27		0.105	0.333	0.916	1.739	0.25	0.48	0.49
66	32.24	921.8	31.99	32.48	0.120	3.868	3.198	37.48	3.211	3.00	3.00	1.00	10.51	3.00	6.70	Fine-Grained	58		>0.6	>5.0	0.912	1.758	Non Liquefiable	0.48	-
67	32.73	921.3	32.48	32.97	0.120	3.927	3.227	60.64	1.411	2.61	2.61	1.00	17.58	2.61	3.41	Fine-Grained	36		>0.6	>5.0	0.908	1.777	Non Liquefiable	0.48	-
68	33.22	920.8	32.97	33.46	0.120	3.986	3.255	64.42	1.290	2.57	2.47	0.50	24.54	2.47	2.62	64.24	29		0.105	0.341	0.904	1.796	0.25	0.61	0.49
69	33.71	920.3	33.46	33.96	0.120	4.045	3.283	44.10	1.894	2.81	2.81	1.00	12.20	2.81	4.91	Fine-Grained	47		>0.6	>5.0	0.900	1.814	Non Liquefiable	0.61	-
70	34.21	919.8	33.96	34.45	0.120	4.105	3.312	103.88	1.583	2.45	2.35	0.50	39.23	2.35	2.13	83.55	25		0.134	0.445	0.896	1.833	0.32	0.73	0.49
71	34.70	919.3	34.45	34.94	0.120	4.163	3.340	344.04	0.516	1.73	1.65	0.50	129.38	1.65	1.00	129.60	5		0.282	0.943	0.892	1.851	0.66	0.80	0.49
72	35.19	918.8	34.94	35.43	0.120	4.222	3.368	498.40	0.918	1.76	1.68	0.50	186.64	1.68	1.03	191.71	6		>0.6	>5.0	0.888	1.869	Non Liquefiable	0.80	-
73	35.68	918.3	35.43	35.93	0.120	4.282	3.397	716.92	0.986	1.67	1.60	0.50	267.35	1.60	1.00	267.35	4		>0.6	>5.0	0.884	1.886	Non Liquefiable	0.80	-
74	36.18	917.8	35.93	36.42	0.120	4.341	3.425	806.08	0.935	1.62	1.55	0.50	299.34	1.55	1.00	299.34	4		>0.6	>5.0	0.880	1.904	Non Liquefiable	0.80	-
75	36.67	917.3	36.42	36.91	0.120	4.400	3.454	545.86	0.615	1.63	1.54	0.50	201.88	1.54	1.00	201.88	3		>0.6	>5.0	0.876	1.921	Non Liquefiable	0.80	-
76	37.16	916.8	36.91	37.40	0.120	4.459	3.482	420.52	0.718	1.76	1.67	0.50	154.89	1.67	1.02	157.81	6		0.445	1.551	0.872	1.937	1.04	0.81	0.49
77	37.65	916.4	37.40	37.89	0.120	4.517	3.510	401.48	0.576	1.72	1.63	0.50	147.28	1.63	1.00	147.28	5		0.377	1.324	0.868	1.954	0.88	0.84	0.49
78	38.14	915.9	37.89	38.39	0.120	4.577	3.538	253.80	1.538	2.15	2.06	0.50	92.73	2.06	1.38	128.38	15		0.277	0.979	0.864	1.971	0.65	0.94	0.5
79	38.64	915.4	38.39	38.88	0.120	4.636	3.567	441.00	1.223	1.90	1.82	0.50	160.48	1.82	1.12	179.85	9		>0.6	>5.0	0.860	1.987	Non Liquefiable	0.94	-
80	39.13	914.9	38.88	39.37	0.120	4.695	3.595	667.64	0.987	1.71	1.63	0.50	242.00	1.63	1.00	242.00	5		>0.6	>5.0	0.856	2.003	Non Liquefiable	0.94	-
81	39.62	914.4	39.37	39.86	0.120	4.754	3.623	861.64	1.026	1.65	1.57	0.50	311.10	1.57	1.00	311.10	4		>0.6	>5.0	0.852	2.018	Non Liquefiable	0.94	-
82	40.11	913.9	39.86	40.35	0.120	4.813	3.652	967.70	0.894	1.57	1.49	0.50	348.05	1.49	1.00	348.05	3		>0.6	>5.0	0.848	2.034	Non Liquefiable	0.94	-
83	40.60	913.4	40.35	40.85	0.120	4.872	3.680	905.96	1.015	1.64	1.56	0.50	324.58	1.56	1.00	324.58	4		>0.6	>5.0	0.844	2.049	Non Liquefiable	0.94	-
84	41.10	912.9	40.85	41.34	0.120	4.931	3.709	824.68	0.503	1.45	1.36	0.50	294.32	1.36	1.00	294.32	1		>0.6	>5.0	0.840	2.064	Non Liquefiable	0.94	-
85	41.59	912.4	41.34	41.83	0.120	4.990	3.737	751.52	0.775	1.61	1.52	0.50	267.19	1.52	1.00	267.19	3		>0.6	>5.0	0.836	2.079	Non Liquefiable	0.94	-
86	42.08	911.9	41.83	42.32	0.120	5.049	3.765	895.72	0.593	1.48	1.39	0.50	317.27	1.39	1.00	317.27	1		>0.6	>5.0	0.832	2.093	Non Liquefiable	0.94	-
87	42.57	911.4	42.32	42.81	0.120	5.108	3.793	857.52	0.734	1.56	1.47	0.50	302.60	1.47	1.00	302.60	2		>0.6	>5.0	0.828	2.107	Non Liquefiable	0.94	-
88	43.06	910.9	42.81	43.31	0.120	5.167	3.822	924.62	0.935	1.61	1.53	0.50	325.06	1.53	1.00	325.06	3		>0.6	>5.0	0.824	2.122	Non Liquefiable	0.94	-
89	43.56	910.4	43.31	43.80	0.120	5.227	3.850	1046.22	0.824	1.54	1.45	0.50	366.45	1.45	1.00	366.45	2		>0.6	>5.0	0.820	2.135	Non Liquefiable	0.94	-
90	44.05	910.0	43.80	44.29	0.120	5.285	3.879	1082.08	1.397	1.71	1.63	0.50	377.63	1.63	1.00	377.63	5		>0.6	>5.0	0.816	2.149	Non Liquefiable	0.94	-
91	44.54	909.5	44.29	44.78	0.120	5.344	3.907	1107.06	1.176	1.64	1.56	0.50	384.95	1.56	1.00	384.95	4		>0.6	>5.0	0.812	2.162	Non Liquefiable	0.94	-
92	45.03	909.0	44.78	45.28	0.120	5.404	3.935	1030.28	0.794	1.54	1.45	0.50	356.95	1.45	1.00	356.95	2		>0.6	>5.0	0.808	2.175	Non Liquefiable	0.94	-
93	45.53	908.5	45.28	45.77	0.120	5.463	3.964	923.18	0.825	1.59	1.49	0.50	318.69	1.49	1.00	318.69	3		>0.6	>5.0	0.804	2.188	Non Liquefiable	0.94	-
94	46.02	908.0	45.77	46.26	0.120	5.522	3.992	792.10	0.604	1.54	1.44	0.50	272.47	1.44	1.00	272.47	2		>0.6	>5.0	0.800	2.201	Non Liquefiable	0.94	-
95	46.51	907.5	46.26	46.75	0.120	5.581	4.020	716.12	0.564	1.56	1.45	0.50	245.47	1.45	1.00	245.47	2		>0.6	>5.0	0.796	2.213	Non Liquefiable	0.94	-
96	47.00	907.0	46.75	47.24	0.120	5.639	4.049	788.30	0.675	1.58	1.48	0.50	269.27	1.48	1.00	269.27	3		>0.6	>5.0	0.792	2.225	Non Liquefiable	0.94	-
97	47.49	906.5	47.24	47.74	0.120	5.699	4.077	896.14	1.449	1.78	1.70	0.50	305.03	1.70	1.04	315.91	6		>0.6	>5.0	0.788	2.237	Non Liquefiable	0.94	-
98	47.99	906.0	47.74	48.23	0.120	5.758	4.106	986.44	0.463	1.41	1.30	0.50	334.60	1.30	1.00	334.60	0		>0.6	>5.0	0.783	2.249	Non Liquefiable	0.94	-
99	48.48	905.5	48.23	48.72	0.120	5.817	4.134	849.50	0.443	1.45	1.33	0.50	287.16	1.33	1.00	287.16	1		>0.6	>5.0	0.780	2.261	Non Liquefiable	0.94	-
100	48.97	905.0	48.72	49.21	0.120	5.876	4.162	245.80	3.463	2.45	2.35	0.50	82.81	2.35	2.11	174.35	24		>0.6	>5.0	0.776	2.272	Non Liquefiable	0.94	-
101	49.46	904.5	49.21	49.70	0.120	5.935	4.190	114.72	9.491	3.01	3.01	1.00	25.96	3.01	6.84	Fine-Grained	59		>0.6	>5.0	0.772	2.283	Non Liquefiable	0.94	-

Total Thickness of Potentially Liquefiable Zones Remaining = 10.3

```
*****************************************
*                                       *
*        FRISKSP - IBM-PC VERSION       *
*                                       *
*  Modified from *FRISK* (McGuire 1978) *
*   To Perform Probabilistic Earthquake *
*  Hazard Analyses Using Multiple Forms *
* of Ground-Motion-Attenuation Relations *
*                                       *
*   Modifications by:  Thomas F. Blake  *
*             - 1988-2000 -             *
*                                       *
*              VERSION 4.00             *
*             (Visual Fortran)          *
*****************************************
```

TITLE: LandMark Village - Boore et al (1997) Site Class D

IPR_FILE
0

IPLOT
0

SITE CONDITION
0.00

BASEMENT DEPTH (km)
5.00

RHGA FACTOR RHGA DIST (km)
1.000 0.000

NFLT NSITE NPROB NATT LCD

```
 21       1       2       6       1

ATT        C1        C2        C3        C4        C5        C6        C7        C8        C9       C10
C11       C12       C13       C14
  1   -0.3130    0.5270    0.0000   -0.7780   -0.3710 1396.0000    5.5700  250.0000    0.0000    0.0000
0.0000    0.0000    0.0000    0.0000
ATT       C15       C16       C17       C18       C19       C20       C21       C22       C23       PER
DSMIN      SIGA    IRELAF      ICHK
  1    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
0.0000    0.5200        35         0

ATT        C1        C2        C3        C4        C5        C6        C7        C8        C9       C10
C11       C12       C13       C14
  2   -0.1170    0.5270    0.0000   -0.7780   -0.3710 1396.0000    5.5700  250.0000    0.0000    0.0000
0.0000    0.0000    0.0000    0.0000
ATT       C15       C16       C17       C18       C19       C20       C21       C22       C23       PER
DSMIN      SIGA    IRELAF      ICHK
  2    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
0.0000    0.5200        35         0

ATT        C1        C2        C3        C4        C5        C6        C7        C8        C9       C10
C11       C12       C13       C14
  3   -0.3130    0.5270    0.0000   -0.7780   -0.3710 1396.0000    5.5700  250.0000    0.0000    0.0000
0.0000    0.0000    0.0000    0.0000
ATT       C15       C16       C17       C18       C19       C20       C21       C22       C23       PER
DSMIN      SIGA    IRELAF      ICHK
  3    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
0.0000    0.5200        35         0

ATT        C1        C2        C3        C4        C5        C6        C7        C8        C9       C10
C11       C12       C13       C14
  4   -0.1170    0.5270    0.0000   -0.7780   -0.3710 1396.0000    5.5700  250.0000    0.0000    0.0000
0.0000    0.0000    0.0000    0.0000
ATT       C15       C16       C17       C18       C19       C20       C21       C22       C23       PER
DSMIN      SIGA    IRELAF      ICHK
  4    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
0.0000    0.5200        35         0

ATT        C1        C2        C3        C4        C5        C6        C7        C8        C9       C10
C11       C12       C13       C14
  5   -0.1170    0.5270    0.0000   -0.7780   -0.3710 1396.0000    5.5700  250.0000    0.0000    0.0000
0.0000    0.0000    0.0000    0.0000
ATT       C15       C16       C17       C18       C19       C20       C21       C22       C23       PER
DSMIN      SIGA    IRELAF      ICHK
  5    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
0.0000    0.5200        35         0

ATT        C1        C2        C3        C4        C5        C6        C7        C8        C9       C10
```

```
C11        C12        C13        C14
  6   -0.1170    0.5270    0.0000   -0.7780   -0.3710 1396.0000    5.5700  250.0000    0.0000    0.0000
0.0000    0.0000    0.0000    0.0000
ATT       C15        C16        C17        C18        C19        C20        C21        C22        C23        PER
DSMIN      SIGA     IRELAF      ICHK
  6    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
0.0000    0.5200       35         0

 PROBLEM DATA:

 BOORE ET AL(1997) NEHRP D (250)1 AMPLITUDES:
     15        0.100    0.200    0.300    0.400    0.500    0.600    0.700    0.800    0.900    1.000
               1.100    1.200    1.300    1.400    1.500

      MAGNITUDE WEIGHTING FACTORS:     MWF:   0    MWF MAGNITUDE:     0.00

 BOORE ET AL(1997) NEHRP D (250)2 AMPLITUDES:
     15        0.100    0.200    0.300    0.400    0.500    0.600    0.700    0.800    0.900    1.000
               1.100    1.200    1.300    1.400    1.500

      MAGNITUDE WEIGHTING FACTORS:     MWF:   2    MWF MAGNITUDE:     7.50

 RISKS SPECIFIED:
   5     0.010000  0.005000  0.002105  0.001000  0.000404

 SITE COORDINATES:
  1    -118.6386   34.4243


 FAULT INFORMATION:

 ---------------------------------------------------------------------------

 FAULT  1

 FAULT NAME:  HOLSER


 NFP     NRL    ATTENUATION CODES:
  5      10       2  4

 AMMIN    AMSTEP  IRATE    RATE    BETA    ECTR    ECDP    COEF
 5.000    0.1000      1  0.4000  2.072   1.000   2.000   1.000

 NMAX AMMAX  PMAX
  1    6.50  1.00
```

```
  dmchar ampchar dmpchar
    0.50    6.00    1.00

 Slip Rate (  0.4000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.280E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.5000  1.0000   0.00212   0.00097   0.00115


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1    -118.7533   34.4386
  2    -118.7345   34.4386
  3    -118.6741   34.4499
  4    -118.6427   34.4487
  5    -118.5483   34.4172

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       5.9000   12.7000

 Computed Total Fault Area = 0.26E+03

 ---------------------------------------------------------------------------

 FAULT  2

 FAULT NAME:  NORTHRIDGE (E. Oak Ridge)


 NFP    NRL   ATTENUATION CODES:
  2     10      5  6

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  1.5000  2.072  1.500  2.000  1.000

 NMAX AMMAX  PMAX
  1    6.90  1.00
```

```
  dmchar ampchar dmpchar
    0.50    6.40    1.00

 Slip Rate (  1.5000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.360E+12
 Input Fault Area    - cm**2
0.682E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.9000  1.0000   0.00891   0.00602   0.00288


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1    -118.7027   34.4057
  2    -118.4078   34.2781

 NDP
   3
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    4.9900
  2       0.0000    5.0000
  3      16.3000   19.7000

 Computed Total Fault Area = 0.67E+03

 ---------------------------------------------------------------------------

 FAULT  3

 FAULT NAME:  SAN GABRIEL


 NFP    NRL   ATTENUATION CODES:
 10     10      1  3

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  1.0000  2.072  3.600  2.000  1.000

 NMAX AMMAX  PMAX
  1    7.00  1.00
```

```
  dmchar ampchar dmpchar
    0.50    6.50    1.00

 Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.936E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  7.0000  1.0000   0.00616   0.00445   0.00171


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1    -118.2802   34.3179
  2    -118.3118   34.3394
  3    -118.3904   34.3598
  4    -118.4577   34.3853
  5    -118.5587   34.4363
  6    -118.5975   34.4649
  7    -118.6873   34.5536
  8    -118.7026   34.5700
  9    -118.7312   34.5792
 10    -118.8761   34.7139

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       0.0000   13.0000

 Computed Total Fault Area = 0.93E+03

 ---------------------------------------------------------------------------

 FAULT  4

 FAULT NAME:  OAK RIDGE (Onshore)


 NFP    NRL   ATTENUATION CODES:
```

```
 9     10      2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  4.0000  2.072  2.500  2.000  1.000

NMAX AMMAX  PMAX
 1    6.90  1.00


  dmchar ampchar dmpchar
    0.50    6.40    1.00

Slip Rate (  4.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.700E+13
LOG10[Mo(m)]        = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  6.9000  1.0000   0.02235   0.01511   0.00723


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -119.2050   34.2481
 2    -119.1582   34.2630
 3    -119.0974   34.3165
 4    -119.0402   34.3522
 5    -118.9589   34.3631
 6    -118.8805   34.3813
 7    -118.8104   34.3850
 8    -118.7742   34.4013
 9    -118.7227   34.3978

NDP
  3
ORIGINAL FAULT CROSS SECTION
 1       0.0000    1.0000
 2       0.0000    1.1000
 3       5.9000   13.7000

Computed Total Fault Area = 0.67E+03

--------------------------------------------------------------------------
```

```
FAULT  5

FAULT NAME:  SANTA SUSANA


NFP     NRL    ATTENUATION CODES:
 8      10       2  4

AMMIN    AMSTEP  IRATE     RATE   BETA   ECTR   ECDP   COEF
5.000    0.1000      1  5.0000  2.072  1.300  2.000  1.000

NMAX AMMAX  PMAX
 1    6.60  1.00


  dmchar ampchar dmpchar
    0.50    6.10    1.00

Slip Rate (  5.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.432E+13
LOG10[Mo(m)]        = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  6.6000  1.0000  0.03249   0.01677   0.01573


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.4950   34.3242
 2    -118.4955   34.3242
 3    -118.5340   34.3030
 4    -118.5811   34.3204
 5    -118.6163   34.3229
 6    -118.6339   34.3330
 7    -118.7081   34.3506
 8    -118.7672   34.3594

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
```

```
 2        9.2000    13.1000

Computed Total Fault Area = 0.41E+03

-----------------------------------------------------------------------------

FAULT  6

FAULT NAME:  SAN CAYETANO


NFP     NRL    ATTENUATION CODES:
 9      10       2  4

AMMIN    AMSTEP  IRATE     RATE    BETA    ECTR    ECDP    COEF
5.000    0.1000      1   6.0000   2.072   2.200   2.000   1.000

NMAX AMMAX   PMAX
 1    6.80   1.00


  dmchar ampchar dmpchar
    0.50    6.30    1.00

Slip Rate (  6.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area     - cm**2
0.660E+13
LOG10[Mo(m)]         = (1.50)m + (16.05)
  IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
     1   6.8000   1.0000    0.03867    0.02422    0.01445


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA     SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.7621   34.4361
 2    -118.8313   34.4047
 3    -118.9130   34.4172
 4    -118.9281   34.4587
 5    -118.9382   34.4612
 6    -118.9835   34.4348
 7    -119.0690   34.4361
 8    -119.1067   34.4386
```

```
 9    -119.1708   34.4625

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1        0.0000    0.0000
 2        7.5000   13.0000

Computed Total Fault Area = 0.60E+03

-----------------------------------------------------------------------------

FAULT  7

FAULT NAME:  SIERRA MADRE (San Fernando)


NFP     NRL    ATTENUATION CODES:
 8      10       2  4

AMMIN    AMSTEP  IRATE     RATE   BETA   ECTR   ECDP   COEF
5.000    0.1000      1  2.0000  2.072  0.900  2.000  1.000

NMAX AMMAX  PMAX
 1    6.70  1.00


   dmchar ampchar dmpchar
     0.50    6.20    1.00

 Slip Rate (  2.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.324E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.7000  1.0000   0.00781   0.00447   0.00334


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA     SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1    -118.2940   34.2782
  2    -118.2951   34.2782
```

```
 3    -118.3196   34.2745
 4    -118.3956   34.2905
 5    -118.4189   34.3039
 6    -118.4520   34.2940
 7    -118.4778   34.3027
 8    -118.4790   34.3027

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2      12.7000   12.7000

Computed Total Fault Area = 0.33E+03

-------------------------------------------------------------------------------

FAULT  8

FAULT NAME:  SIMI-SANTA ROSA


NFP    NRL   ATTENUATION CODES:
 5     10      2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  1.0000  2.072  1.500  2.000  1.000

NMAX AMMAX  PMAX
 1    6.70  1.00


  dmchar ampchar dmpchar
    0.50    6.20    1.00

 Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.450E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.7000  1.0000   0.00543   0.00311   0.00232


 IND_RL
      2
```

```
RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.7982   34.2901
 2    -118.9084   34.2578
 3    -118.9364   34.2615
 4    -118.9680   34.2615
 5    -119.1147   34.2261

NDP
  3
ORIGINAL FAULT CROSS SECTION
 1       0.0000    1.0000
 2       0.0000    1.1000
 3       7.5000   14.0000

Computed Total Fault Area = 0.45E+03

-----------------------------------------------------------------------------

FAULT  9

FAULT NAME:  VERDUGO


NFP    NRL   ATTENUATION CODES:
 7     10      2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  0.5000  2.072  1.400  2.000  1.000

NMAX AMMAX  PMAX
 1    6.70  1.00


  dmchar ampchar dmpchar
    0.50    6.20    1.00

 Slip Rate (  0.5000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.522E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.7000  1.0000   0.00315   0.00180   0.00135
```

```
IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.1536   34.1313
 2    -118.1865   34.1496
 3    -118.2285   34.1551
 4    -118.2907   34.1971
 5    -118.3657   34.2227
 6    -118.4077   34.2538
 7    -118.4206   34.2612

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2      12.7000   12.7000

Computed Total Fault Area = 0.52E+03

-----------------------------------------------------------------------------

FAULT 10

FAULT NAME:  SANTA YNEZ (East)


NFP    NRL   ATTENUATION CODES:
 6     10      1  3

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  2.0000  2.072  3.400  2.000  1.000

NMAX AMMAX  PMAX
 1    7.00  1.00


  dmchar ampchar dmpchar
    0.50    6.50    1.00

 Slip Rate (  2.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.884E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
```

```
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  7.0000  1.0000   0.01164   0.00840   0.00323


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -119.6298   34.4939
 2    -119.5091   34.4864
 3    -119.3783   34.5065
 4    -119.1972   34.5367
 5    -119.1167   34.5317
 6    -118.9055   34.5870

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       2.3000   12.8000

Computed Total Fault Area = 0.89E+03

-----------------------------------------------------------------------------

FAULT 11

FAULT NAME:  SAN ANDREAS - 1857 Rupture


NFP    NRL   ATTENUATION CODES:
12     10      1  3

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1 34.0000  2.072 17.200  2.000  0.500

NMAX AMMAX  PMAX
 1    7.80  1.00


  dmchar ampchar dmpchar
    0.50    7.30    1.00

 Slip Rate ( 34.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.300E+12
```

```
Input Fault Area     - cm**2
0.414E+14
LOG10[Mo(m)]         = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  7.8000  1.0000   0.22372   0.20895   0.01477


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -120.5605   36.0019
 2    -120.2928   35.7488
 3    -119.8632   35.3106
 4    -119.8598   35.3072
 5    -119.6673   35.1336
 6    -119.4061   34.9395
 7    -119.2103   34.8639
 8    -118.9010   34.8175
 9    -118.5075   34.7006
10    -118.5024   34.6989
11    -118.0075   34.5116
12    -117.5298   34.3106

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       0.0000   12.0000

Computed Total Fault Area = 0.41E+04

-----------------------------------------------------------------------------

FAULT 12

FAULT NAME:  SAN ANDREAS - Mojave


NFP    NRL   ATTENUATION CODES:
 3     10      1  3

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1 30.0000  2.072  4.900  2.000  0.500

NMAX AMMAX  PMAX
```

```
 1    7.10  1.00


  dmchar ampchar dmpchar
    0.50    6.60    1.00

 Slip Rate ( 30.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.300E+12
 Input Fault Area    - cm**2
0.119E+14
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  7.1000  1.0000   0.17754   0.13551   0.04202


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1    -118.5024   34.6989
  2    -118.0075   34.5116
  3    -117.5298   34.3106

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       0.0000   12.0000

 Computed Total Fault Area = 0.12E+04

 ---------------------------------------------------------------------------

 FAULT 13

 FAULT NAME:  SAN ANDREAS - Carrizo


 NFP    NRL   ATTENUATION CODES:
  6     10      1  3

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1 34.0000  2.072  7.200  2.000  0.500

 NMAX AMMAX  PMAX
```

```
 1    7.20  1.00


  dmchar ampchar dmpchar
    0.50    6.70    1.00

 Slip Rate ( 34.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.300E+12
 Input Fault Area    - cm**2
0.174E+14
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  7.2000  1.0000   0.24626   0.19696   0.04930


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1    -119.8598   35.3072
  2    -119.6673   35.1336
  3    -119.4061   34.9395
  4    -119.2103   34.8639
  5    -118.9010   34.8175
  6    -118.5075   34.7006

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       0.0000   12.0000

 Computed Total Fault Area = 0.17E+04

 ---------------------------------------------------------------------------

 FAULT 14

 FAULT NAME:  SIERRA MADRE


 NFP    NRL   ATTENUATION CODES:
 12     10      2  4

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
```

```
5.000   0.1000      1  3.0000  2.072  2.800  2.000  1.000

NMAX AMMAX  PMAX
 1    7.00  1.00


  dmchar ampchar dmpchar
    0.50    6.50    1.00

Slip Rate (  3.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.103E+14
LOG10[Mo(m)]        = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  7.0000  1.0000   0.02034   0.01469   0.00565


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -117.7397   34.1231
 2    -117.7691   34.1317
 3    -117.8176   34.1323
 4    -117.8807   34.1470
 5    -117.9402   34.1501
 6    -118.0027   34.1752
 7    -118.0683   34.1758
 8    -118.1118   34.2010
 9    -118.1492   34.2028
10    -118.2461   34.2279
11    -118.2896   34.2751
12    -118.2960   34.2751

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2      12.7000   12.7000

Computed Total Fault Area = 0.11E+04

-----------------------------------------------------------------------------
```

```
FAULT 15

FAULT NAME:  MALIBU COAST


NFP     NRL    ATTENUATION CODES:
 4      10       2  4

AMMIN    AMSTEP  IRATE     RATE    BETA    ECTR    ECDP    COEF
5.000    0.1000      1  0.3000  2.072   1.800   2.000   1.000

NMAX AMMAX   PMAX
 1    6.70   1.00


  dmchar ampchar dmpchar
    0.50    6.20    1.00

Slip Rate (  0.3000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.481E+13
LOG10[Mo(m)]        = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  6.7000  1.0000   0.00174   0.00100   0.00074


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.5333   34.0299
 2    -118.6339   34.0412
 3    -118.6666   34.0387
 4    -118.9332   34.0513

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       3.4000   12.6000

Computed Total Fault Area = 0.48E+03

-----------------------------------------------------------------------------
```

```
FAULT 16

FAULT NAME:  HOLLYWOOD


NFP     NRL    ATTENUATION CODES:
 4      10       2  4

AMMIN    AMSTEP  IRATE     RATE   BETA   ECTR   ECDP   COEF
5.000    0.1000      1  1.0000  2.072  0.800  2.000  1.000

NMAX AMMAX  PMAX
 1    6.40  1.00


  dmchar ampchar dmpchar
    0.50    5.90    1.00

Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.238E+13
LOG10[Mo(m)]        = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  6.4000  1.0000   0.00575   0.00229   0.00346


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.2302   34.1192
 2    -118.3170   34.1104
 3    -118.3723   34.0991
 4    -118.4063   34.0827

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       4.8000   13.2000

Computed Total Fault Area = 0.25E+03
```

```
FAULT 17

FAULT NAME:  SANTA MONICA


NFP     NRL    ATTENUATION CODES:
 3      10       2  4

AMMIN    AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000    0.1000      1  1.0000  2.072  1.400  2.000  1.000

NMAX AMMAX  PMAX
 1    6.60  1.00


  dmchar ampchar dmpchar
    0.50    6.10    1.00

 Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.360E+12
 Input Fault Area    - cm**2
0.364E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.6000  1.0000   0.00597   0.00308   0.00289


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1    -118.4085   34.0814
  2    -118.5244   34.0263
  3    -118.6855   33.9896

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       3.4000   12.6000

 Computed Total Fault Area = 0.35E+03
```

```
FAULT 18

FAULT NAME:  VENTURA - PITAS POINT


NFP     NRL    ATTENUATION CODES:
 6      10       2  4

AMMIN    AMSTEP  IRATE     RATE   BETA   ECTR   ECDP   COEF
5.000    0.1000      1  1.0000  2.072  2.000  2.000  1.000

NMAX AMMAX  PMAX
 1    6.80  1.00


  dmchar ampchar dmpchar
    0.50    6.30    1.00

 Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.533E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.8000  1.0000   0.00520   0.00326   0.00195


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1    -119.1411   34.3453
  2    -119.1940   34.3088
  3    -119.2243   34.2928
  4    -119.3034   34.2892
  5    -119.4040   34.3166
  6    -119.5527   34.3093

 NDP
   3
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    1.0000
  2       0.0000    1.1000
```

```
 3        3.4000    13.6000

Computed Total Fault Area = 0.51E+03

-----------------------------------------------------------------------------

FAULT 19

FAULT NAME:  M.RIDGE-ARROYO PARIDA-SANTA ANA


NFP     NRL    ATTENUATION CODES:
14      10       2  4

AMMIN    AMSTEP  IRATE    RATE    BETA    ECTR    ECDP    COEF
5.000    0.1000      1  0.4000  2.072   3.200   2.000   1.000

NMAX AMMAX   PMAX
 1    6.70   1.00


  dmchar ampchar dmpchar
    0.50    6.20    1.00

Slip Rate (  0.4000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area     - cm**2
0.975E+13
LOG10[Mo(m)]         = (1.50)m + (16.05)
  IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
     1   6.7000   1.0000    0.00470    0.00269    0.00201


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA     SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -119.1658   34.4701
 2    -119.2878   34.4298
 3    -119.3456   34.4235
 4    -119.4261   34.4160
 5    -119.4714   34.4273
 6    -119.5104   34.4311
 7    -119.6110   34.4411
 8    -119.6914   34.4499
```

```
 9    -119.7430   34.4424
10    -119.7506   34.4411
11    -119.7857   34.4336
12    -119.8071   34.4336
13    -119.8688   34.4248
14    -119.8977   34.4298

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       7.5000   13.0000

Computed Total Fault Area = 0.10E+04

-------------------------------------------------------------------------------

FAULT 20

FAULT NAME:  ANACAPA-DUME


NFP    NRL   ATTENUATION CODES:
 6     10      2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  3.0000  2.072  3.700  2.000  1.000

NMAX AMMAX  PMAX
 1    7.30  1.00


  dmchar ampchar dmpchar
    0.50    6.80    1.00

 Slip Rate (  3.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.210E+14
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  7.3000  1.0000   0.02430   0.02021   0.00409


 IND_RL
      2
```

```
RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.6945   33.9849
 2    -118.7913   33.9530
 3    -118.9120   33.9508
 4    -119.1410   33.9838
 5    -119.3403   33.9792
 6    -119.4963   33.9883

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2      19.8000   19.8000

Computed Total Fault Area = 0.20E+04

-----------------------------------------------------------------------------

FAULT 21

FAULT NAME:  NEWPORT-INGLEWOOD (L.A.Basin)


NFP    NRL   ATTENUATION CODES:
 5     10      1  3

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  1.0000  2.072  3.200  2.000  1.000

NMAX AMMAX  PMAX
 1    6.90  1.00


  dmchar ampchar dmpchar
    0.50    6.40    1.00

 Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.832E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.9000  1.0000   0.00664   0.00449   0.00215
```

```
IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.3723   34.0337
 2    -118.1862   33.8073
 3    -118.1510   33.7822
 4    -118.1208   33.7746
 5    -117.9246   33.6061

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       0.0000   13.0000

Computed Total Fault Area = 0.83E+03

-----------------------------------------------------------------------------------------------------------------------
-------

SITE 1 COORDINATES: -118.6386  34.4243

BOORE ET AL(1997) NEHRP D (250)1
     AMPLITUDES (g):
0.1000E+000.2000E+000.3000E+000.4000E+000.5000E+000.6000E+000.7000E+000.8000E+000.9000E+000.1000E+01
     LN (AMPLITUDE):       -2.30     -1.61     -1.20     -0.92     -0.69     -0.51     -0.36     -0.22
-0.11      0.00
   FAULT   1 E(NO/YR)
0.2096E-020.1835E-020.1429E-020.1046E-020.7423E-030.5192E-030.3612E-030.2514E-030.1756E-030.1233E-03
   FAULT   2 E(NO/YR)
0.7261E-020.4503E-020.2916E-020.1941E-020.1304E-020.8798E-030.5967E-030.4074E-030.2802E-030.1943E-03
   FAULT   3 E(NO/YR)
0.4270E-020.2436E-020.1491E-020.9303E-030.5836E-030.3680E-030.2339E-030.1501E-030.9735E-040.6388E-04
   FAULT   4 E(NO/YR)
0.1342E-010.6350E-020.3254E-020.1752E-020.9773E-030.5616E-030.3311E-030.1998E-030.1231E-030.7731E-04
   FAULT   5 E(NO/YR)
0.3130E-010.2544E-010.1903E-010.1378E-010.9808E-020.6921E-020.4869E-020.3429E-020.2423E-020.1720E-02
   FAULT   6 E(NO/YR)
0.2448E-010.1084E-010.4953E-020.2358E-020.1169E-020.6021E-030.3212E-030.1769E-030.1002E-030.5828E-04
   FAULT   7 E(NO/YR)
0.5602E-020.2581E-020.1143E-020.5135E-030.2380E-030.1144E-030.5706E-040.2945E-040.1569E-040.8602E-05
   FAULT   8 E(NO/YR)
0.3152E-020.1138E-020.4131E-030.1580E-030.6418E-040.2762E-040.1252E-040.5948E-050.2944E-050.1511E-05
   FAULT   9 E(NO/YR)
```

```
0.1477E-020.4019E-030.1151E-030.3625E-040.1252E-040.4693E-050.1887E-050.8056E-060.3624E-060.1707E-06
   FAULT  10 E(NO/YR)
0.2786E-020.5931E-030.1496E-030.4321E-040.1397E-040.4963E-050.1907E-050.7832E-060.3405E-060.1555E-06
   FAULT  11 E(NO/YR)
0.1320E-010.3970E-020.1530E-020.6243E-030.2670E-030.1196E-030.5601E-040.2731E-040.1381E-040.7223E-05
   FAULT  12 E(NO/YR)
0.1959E-010.4129E-020.1037E-020.2973E-030.9531E-040.3355E-040.1278E-040.5200E-050.2241E-050.1015E-05
   FAULT  13 E(NO/YR)
0.2047E-010.4221E-020.1079E-020.3169E-030.1041E-030.3746E-040.1456E-040.6035E-050.2646E-050.1217E-05
   FAULT  14 E(NO/YR)
0.5994E-020.1403E-020.3847E-030.1192E-030.4093E-040.1532E-040.6163E-050.2637E-050.1190E-050.5622E-06
   FAULT  15 E(NO/YR)
0.7029E-030.1489E-030.3453E-040.9145E-050.2731E-050.9025E-060.3249E-060.1257E-060.5174E-070.2247E-07
   FAULT  16 E(NO/YR)
0.2275E-020.3994E-030.7818E-040.1807E-040.4826E-050.1453E-050.4824E-060.1739E-060.6724E-070.2760E-07
   FAULT  17 E(NO/YR)
0.2328E-020.4461E-030.9489E-040.2346E-040.6624E-050.2088E-050.7220E-060.2696E-060.1076E-060.4541E-07
   FAULT  18 E(NO/YR)
0.1298E-020.2083E-030.4044E-040.9409E-050.2539E-050.7729E-060.2596E-060.9464E-070.3698E-070.1533E-07
   FAULT  19 E(NO/YR)
0.8252E-030.9859E-040.1589E-040.3249E-050.7960E-060.2244E-060.7073E-070.2444E-070.9113E-080.3626E-08
   FAULT  20 E(NO/YR)
0.6369E-020.1683E-020.5410E-030.1908E-030.7268E-040.2963E-040.1282E-040.5840E-050.2785E-050.1382E-05
   FAULT  21 E(NO/YR)
0.8024E-030.8572E-040.1274E-040.2437E-050.5642E-060.1514E-060.4570E-070.1519E-070.5467E-080.2107E-08
   TOTAL     E(NO/YR)
0.1697E+000.7291E-010.3974E-010.2417E-010.1551E-010.1024E-010.6891E-020.4699E-020.3241E-020.2259E-02
   TOTAL RISK
0.1561E+000.7031E-010.3896E-010.2388E-010.1539E-010.1019E-010.6867E-020.4688E-020.3236E-020.2257E-02

      AMPLITUDES (g):      0.1100E+010.1200E+010.1300E+010.1400E+010.1500E+01
      LN (AMPLITUDE):         0.10      0.18      0.26      0.34      0.41
   FAULT   1 E(NO/YR)      0.8713E-040.6200E-040.4444E-040.3209E-040.2334E-04
   FAULT   2 E(NO/YR)      0.1359E-030.9586E-040.6819E-040.4891E-040.3537E-04
   FAULT   3 E(NO/YR)      0.4241E-040.2848E-040.1934E-040.1327E-040.9201E-05
   FAULT   4 E(NO/YR)      0.4942E-040.3211E-040.2118E-040.1416E-040.9591E-05
   FAULT   5 E(NO/YR)      0.1229E-020.8832E-030.6392E-030.4657E-030.3417E-03
   FAULT   6 E(NO/YR)      0.3470E-040.2110E-040.1309E-040.8264E-050.5303E-05
   FAULT   7 E(NO/YR)      0.4844E-050.2795E-050.1648E-050.9923E-060.6085E-06
   FAULT   8 E(NO/YR)      0.8017E-060.4379E-060.2456E-060.1411E-060.8287E-07
   FAULT   9 E(NO/YR)      0.8367E-070.4250E-070.2229E-070.1203E-070.6663E-08
   FAULT  10 E(NO/YR)      0.7414E-070.3672E-070.1882E-070.9937E-080.5394E-08
   FAULT  11 E(NO/YR)      0.3892E-050.2155E-050.1224E-050.7105E-060.4212E-06
   FAULT  12 E(NO/YR)      0.4802E-060.2361E-060.1201E-060.6297E-070.3395E-07
   FAULT  13 E(NO/YR)      0.5842E-060.2910E-060.1499E-060.7954E-070.4336E-07
   FAULT  14 E(NO/YR)      0.2765E-060.1410E-060.7421E-070.4019E-070.2234E-07
   FAULT  15 E(NO/YR)      0.1023E-070.4849E-080.2385E-080.1212E-080.6346E-09
   FAULT  16 E(NO/YR)      0.1193E-070.5398E-080.2542E-080.1241E-080.6254E-09
```

```
FAULT  17 E(NO/YR)      0.2014E-070.9328E-080.4489E-080.2236E-080.1149E-08
FAULT  18 E(NO/YR)      0.6692E-080.3055E-080.1452E-080.7146E-090.3631E-09
FAULT  19 E(NO/YR)      0.1526E-080.6738E-090.3105E-090.1486E-090.7346E-10
FAULT  20 E(NO/YR)      0.7109E-060.3775E-060.2062E-060.1156E-060.6634E-07
FAULT  21 E(NO/YR)      0.8604E-090.3697E-090.1660E-090.7749E-100.3739E-10
TOTAL     E(NO/YR)      0.1590E-020.1129E-020.8091E-030.5846E-030.4258E-03
TOTAL RISK              0.1589E-020.1129E-020.8088E-030.5844E-030.4257E-03

  SPECIFIED RISKS:        0.010000  0.005000  0.002105  0.001000  0.000404
  ESTIMATED LN AMP.  :     -0.503    -0.246     0.019     0.211 *********
   ESTIMATED AMP. (g):    0.60448   0.78217   1.01906   1.23539 *********

BOORE ET AL(1997) NEHRP D (250)2
     AMPLITUDES (g):
0.1000E+000.2000E+000.3000E+000.4000E+000.5000E+000.6000E+000.7000E+000.8000E+000.9000E+000.1000E+01
     LN (AMPLITUDE):       -2.30     -1.61     -1.20     -0.92     -0.69     -0.51     -0.36     -0.22
-0.11      0.00
   FAULT   1 E(NO/YR)
0.1738E-020.1123E-020.6868E-030.4049E-030.2359E-030.1380E-030.8161E-040.4899E-040.2989E-040.1854E-04
   FAULT   2 E(NO/YR)
0.4338E-020.2605E-020.1647E-020.1019E-020.6249E-030.3842E-030.2383E-030.1497E-030.9526E-040.6148E-04
   FAULT   3 E(NO/YR)
0.2454E-020.1417E-020.8425E-030.4866E-030.2787E-030.1606E-030.9378E-040.5566E-040.3361E-040.2065E-04
   FAULT   4 E(NO/YR)
0.7471E-020.3306E-020.1544E-020.7469E-030.3748E-030.1949E-030.1048E-030.5810E-040.3311E-040.1935E-04
   FAULT   5 E(NO/YR)
0.2384E-010.1538E-010.9810E-020.6045E-020.3670E-020.2227E-020.1362E-020.8429E-030.5288E-030.3364E-03
   FAULT   6 E(NO/YR)
0.1337E-010.5016E-020.1918E-020.7723E-030.3300E-030.1491E-030.7081E-040.3513E-040.1812E-040.9671E-05
   FAULT   7 E(NO/YR)
0.3100E-020.1082E-020.3656E-030.1297E-030.4917E-040.1990E-040.8541E-050.3862E-050.1829E-050.9016E-06
   FAULT   8 E(NO/YR)
0.1606E-020.4132E-030.1111E-030.3322E-040.1100E-040.3979E-050.1553E-050.6464E-060.2844E-060.1313E-06
   FAULT   9 E(NO/YR)
0.6755E-030.1211E-030.2480E-040.6002E-050.1675E-050.5248E-060.1809E-060.6753E-070.2696E-070.1140E-07
   FAULT  10 E(NO/YR)
0.1407E-020.2469E-030.5098E-040.1250E-040.3532E-050.1120E-050.3906E-060.1473E-060.5937E-070.2533E-07
   FAULT  11 E(NO/YR)
0.7694E-020.3460E-020.1511E-020.6601E-030.2967E-030.1385E-030.6717E-040.3380E-040.1759E-040.9442E-05
   FAULT  12 E(NO/YR)
0.1022E-010.1920E-020.4115E-030.1032E-030.2960E-040.9488E-050.3334E-050.1265E-050.5121E-060.2193E-06
   FAULT  13 E(NO/YR)
0.1116E-010.2221E-020.5100E-030.1358E-030.4104E-040.1376E-040.5028E-050.1975E-050.8255E-060.3638E-06
   FAULT  14 E(NO/YR)
0.2973E-020.5964E-030.1362E-030.3613E-040.1090E-040.3654E-050.1337E-050.5263E-060.2204E-060.9740E-07
   FAULT  15 E(NO/YR)
0.2870E-030.3726E-040.5980E-050.1194E-050.2844E-060.7788E-070.2388E-070.8035E-080.2923E-080.1136E-08
   FAULT  16 E(NO/YR)
```

```
0.6740E-030.5163E-040.5846E-050.9027E-060.1754E-060.4059E-070.1078E-070.3200E-080.1041E-080.3663E-09
   FAULT  17 E(NO/YR)
0.8541E-030.8899E-040.1232E-040.2207E-050.4821E-060.1229E-060.3546E-070.1131E-070.3925E-080.1462E-08
   FAULT  18 E(NO/YR)
0.5311E-030.5530E-040.7768E-050.1414E-050.3138E-060.8121E-070.2375E-070.7677E-080.2696E-080.1016E-08
   FAULT  19 E(NO/YR)
0.2739E-030.1921E-040.2148E-050.3341E-060.6583E-070.1549E-070.4184E-080.1263E-080.4179E-090.1492E-09
   FAULT  20 E(NO/YR)
0.3366E-020.1017E-020.3126E-030.1036E-030.3727E-040.1446E-040.5991E-050.2628E-050.1212E-050.5834E-06
   FAULT  21 E(NO/YR)
0.3218E-030.2317E-040.2596E-050.4019E-060.7865E-070.1836E-070.4923E-080.1476E-080.4847E-090.1719E-09
   TOTAL     E(NO/YR)
0.9835E-010.4020E-010.1992E-010.1070E-010.5996E-020.3459E-020.2045E-020.1235E-020.7613E-030.4779E-03
   TOTAL RISK
0.9367E-010.3940E-010.1972E-010.1064E-010.5978E-020.3453E-020.2043E-020.1235E-020.7610E-030.4778E-03
```

AMPLITUDES (g):	0.1100E+01	0.1200E+01	0.1300E+01	0.1400E+01	0.1500E+01
LN (AMPLITUDE):	0.10	0.18	0.26	0.34	0.41
FAULT 1 E(NO/YR)	0.1168E-04	0.7474E-05	0.4852E-05	0.3194E-05	0.2129E-05
FAULT 2 E(NO/YR)	0.4022E-04	0.2666E-04	0.1789E-04	0.1216E-04	0.8351E-05
FAULT 3 E(NO/YR)	0.1290E-04	0.8191E-05	0.5279E-05	0.3450E-05	0.2286E-05
FAULT 4 E(NO/YR)	0.1157E-04	0.7066E-05	0.4398E-05	0.2786E-05	0.1793E-05
FAULT 5 E(NO/YR)	0.2171E-03	0.1420E-03	0.9409E-04	0.6314E-04	0.4287E-04
FAULT 6 E(NO/YR)	0.5322E-05	0.3010E-05	0.1745E-05	0.1034E-05	0.6256E-06
FAULT 7 E(NO/YR)	0.4609E-06	0.2433E-06	0.1322E-06	0.7373E-07	0.4211E-07
FAULT 8 E(NO/YR)	0.6326E-07	0.3163E-07	0.1635E-07	0.8704E-08	0.4761E-08
FAULT 9 E(NO/YR)	0.5071E-08	0.2356E-08	0.1138E-08	0.5687E-09	0.2932E-09
FAULT 10 E(NO/YR)	0.1135E-07	0.5314E-08	0.2584E-08	0.1300E-08	0.6744E-09
FAULT 11 E(NO/YR)	0.5212E-05	0.2952E-05	0.1711E-05	0.1014E-05	0.6121E-06
FAULT 12 E(NO/YR)	0.9860E-07	0.4627E-07	0.2254E-07	0.1136E-07	0.5903E-08
FAULT 13 E(NO/YR)	0.1679E-06	0.8071E-07	0.4022E-07	0.2070E-07	0.1097E-07
FAULT 14 E(NO/YR)	0.4509E-07	0.2174E-07	0.1087E-07	0.5611E-08	0.2982E-08
FAULT 15 E(NO/YR)	0.4674E-09	0.2022E-09	0.9135E-10	0.4292E-10	0.2087E-10
FAULT 16 E(NO/YR)	0.1376E-09	0.5436E-10	0.2237E-10	0.9563E-11	0.4092E-11
FAULT 17 E(NO/YR)	0.5789E-09	0.2417E-09	0.1057E-09	0.4778E-10	0.2243E-10
FAULT 18 E(NO/YR)	0.4064E-09	0.1713E-09	0.7554E-10	0.3462E-10	0.1635E-10
FAULT 19 E(NO/YR)	0.5680E-10	0.2279E-10	0.9525E-11	0.4094E-11	0.1780E-11
FAULT 20 E(NO/YR)	0.2920E-06	0.1512E-06	0.8071E-07	0.4429E-07	0.2492E-07
FAULT 21 E(NO/YR)	0.6505E-10	0.2595E-10	0.1077E-10	0.4619E-11	0.1953E-11
TOTAL E(NO/YR)	0.3051E-03	0.1979E-03	0.1303E-03	0.8694E-04	0.5876E-04
TOTAL RISK	0.3051E-03	0.1979E-03	0.1303E-03	0.8694E-04	0.5876E-04

SPECIFIED RISKS:	0.010000	0.005000	0.002105	0.001000	0.000404
ESTIMATED LN AMP. :	-0.892	-0.634	-0.365	-0.172	0.036
ESTIMATED AMP. (g):	0.40978	0.53058	0.69387	0.84212	1.03628

CLOSEST DISTANCES BETWEEN SITE AND FAULT RUPTURES

NO.	FAULT NAME	CD_1DRP	CD_2DRP	CDIST	CLODIS	CD_EPI	CD_HYPO	
1	HOLSER	2.4	0.0	2.2	2.2	0.1	2.2	km
2	NORTHRIDGE (E. Oak Ridge)	4.6	4.6	6.8	6.8	5.4	7.8	km
3	SAN GABRIEL	5.9	5.9	5.9	5.9	5.9	6.1	km
4	OAK RIDGE (Onshore)	8.3	8.3	8.3	8.3	9.4	9.6	km
5	SANTA SUSANA	9.6	0.4	7.9	7.9	1.1	7.9	km
6	SAN CAYETANO	11.4	11.4	11.4	11.4	12.6	12.6	km
7	SIERRA MADRE (San Fernando)	19.9	14.8	17.5	17.5	15.9	18.5	km
8	SIMI-SANTA ROSA	20.9	18.9	20.6	20.6	20.0	21.6	km
9	VERDUGO	27.0	26.8	26.9	26.9	27.9	28.0	km
10	SANTA YNEZ (East)	30.4	28.6	30.1	30.1	29.4	30.8	km
11	SAN ANDREAS - 1857 Rupture	33.0	33.0	33.0	33.0	33.0	33.2	km
12	SAN ANDREAS - Mojave	33.0	33.0	33.0	33.0	33.0	33.0	km
13	SAN ANDREAS - Carrizo	33.0	33.0	33.0	33.0	33.0	33.0	km
14	SIERRA MADRE	35.5	31.6	33.5	33.5	32.8	34.6	km
15	MALIBU COAST	42.6	39.2	41.1	41.1	39.5	41.1	km
16	HOLLYWOOD	43.5	38.7	40.9	40.9	39.1	41.0	km
17	SANTA MONICA	43.6	40.2	42.1	42.1	40.5	42.1	km
18	VENTURA - PITAS POINT	46.9	46.9	46.9	46.9	48.0	48.0	km
19	M.RIDGE-ARROYO PARIDA-SANTA ANA	48.6	48.6	48.6	48.6	49.8	49.8	km
20	ANACAPA-DUME	49.1	32.9	38.4	38.4	34.2	39.2	km
21	NEWPORT-INGLEWOOD (L.A.Basin)	49.8	49.8	49.8	49.8	50.9	50.9	km

EXPLANATION

CD_1DRP = Closest distance to projection of rupture area along fault trace.
CD_2DRP = Closest distance to surface projection of the rupture area.
CDIST = Closest distance to seismogenic rupture.
CLODIS = Closest distance to subsurface rupture.
CD_EPI = Closest epicentral distance.
CD_HYPO = Closest hypocentral distance.

APPENDIX C

Attenuation Relationship	Unweighted Peak Acceleration (6.5M)				Weighted Peak Acceleration (7.5M)		
	475 Yr Return Period (g)	2475 Yr Return Period			475 Yr Return Period (g)	2475 Yr Return Period	
		Raw Data (g)	Two-Thirds (g)			Raw Data (g)	Two-Thirds (g)
Boore et al (1997)	1.01906	1.51646	1.01096		0.69387	1.03628	0.69085
Sadigh et al (1997)	0.78175	1.13498	0.75665		0.52372	0.75463	0.50308
Campbell & Bozorgnia	0.80553	1.10252	0.73501		0.54633	0.74883	0.49922
Average	0.87	1.25132	0.83		0.59	0.84658	0.56

Appendix D

GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

March 28, 2008

Newhall Land and Farming Company
23823 West Valencia Boulevard
Valencia, California 91355

Job No. 99-802-21

Attention: Mr. Fred MacMurdo

Subject: Geotechnical Grading Plan Review
Proposed Offsite Zone 1A Water Tank Site
Vesting Tentative Tract Map No. 53108
Los Angeles County, California

References: See Attached List

Gentlemen:

This report presents the results of our geotechnical grading plan review conducted for the Zone 1A Water Tank Site (herein referred to as the tank site), Vesting Tentative Tract Map No. 53108, located in Los Angeles County, California. The scope of this study was planned in consultation with Mr. Fred MacMurdo of Newhall Land and Farming Company (NLF) as outlined in our proposal dated March 12, 2008 (Proposal No. P025-2008-21). We are in receipt of the *Proposed Offsite Zone 1A Water Tank Grading Exhibit* prepared by Psomas. This plan, prepared at a scale of 1 inch equals 100 feet (1"=100'), is designated as Sheet 6 of 13 of the "Major Land Division, Vesting Tentative Tract Map No. 53108" plan. The geotechnical data collected as part of our investigation is presented on the Psomas plan and included in this report as the Geotechnical Map, Figure 1.

R. T. FRANKIAN & ASSOCIATES
1329 SCOTT ROAD BURBANK CALIFORNIA 91504
TEL. (818) 531-1501 FAX (818) 531-1511 WWW.RTFRANKIAN.COM

SCOPE OF WORK

The scope of work for the geotechnical grading plan review was described in our March 12, 2008 proposal to NLF. The rough grading plan review consisted of the following:

- a review of data, aerial photographs, geologic literature, and previous geotechnical and engineering geologic reports;
- engineering geologic evaluation of the site to asses the impact of geologic conditions on future site development;
- engineering evaluation of the geotechnical data to develop recommendations for mass grading earthwork; and
- drafting and report preparation.

PROPOSED CONSTRUCTION

The proposed tank site is located along an easterly descending ridge approximately ¼ mile north of Franklin Parkway, west of the U.S. Postal Service Distribution Center. Based on plans provided our office by Psomas, the proposed tank site pad will be graded to an approximate elevation of 1,172 feet above mean sea level (msl). Based on the proposed grading, a 2:1 (horizontal:vertical) cut slope on the order of 110 feet high will ascend from the north and west sides of the tank pad. A 20± feet high 2:1 combination cut and fill slope will descend from the south side of the tank pad. The proposed pad will support a water tank approximately 120 feet in diameter. The tank access road will extend along the south side of the tank and will include a 10±feet high, 2:1 graded slope along the north side of the road.

SUBSURFACE EXPLORATIONS

Subsurface data was available for the site and adjacent areas from a prior R. T. Frankian & Associates (RTF&A) investigation (RTF&A, 2001b). The logs of the RTF&A borings and test pits pertinent to the tank site are presented in Appendix A.

LABORATORY TESTS

Laboratory tests were performed on selected samples obtained from prior borings drilled on the site. The prior laboratory data has been presented in our prior investigation (RTF&A, 2001b) and is included in this report as Appendix B.

GEOLOGY

REGIONAL GEOLOGY

The tank site is located at the eastern end of the Ventura basin within the Transverse Ranges geomorphic province of California. The Ventura basin consists of a narrow, elongate sedimentary trough extending from the Santa Barbara Channel on the west to the San Gabriel fault on the east. The axis of the trough trends east-west, reflecting the overall east-west trend of the Transverse Ranges, and generally coincides with the Santa Clara River Valley. The Ventura basin has been an area of subsidence and sediment accumulation since the beginning of the Tertiary period, with the present trough-like form developing near the beginning of the Miocene epoch (Winterer and Durham, 1962).

The structure of the basin is defined as a highly folded "synclinorium" formed by north-south compressional forces (Kew, 1924), and containing a maximum 50,000± feet of marine and nonmarine Tertiary through Quaternary age sedimentary

rocks (Bailey and Jahns, 1954). Within the Santa Clarita Valley the primary sedimentary rock formations are the Pico and Saugus Formations. The Pico Formation outcrops along the northern flanks of the Santa Susana Mountains and in the Hasley Canyon-Val Verde area. The Saugus Formation overlies the Pico Formation and comprises most of the hills of the valley between Newhall and Castaic. Other geologic materials exposed within the valley include Pleistocene fanglomerate and terrace deposits (Oakeshott, 1958; Winterer and Durham, 1962), exposed in the southern and southwestern portion of the valley, and Holocene alluvium mantling the valley floor.

The Pico and Saugus Formations have been deformed into a series of closely spaced anticlines and synclines whose moderately to steeply dipping flanks are broken by the Holser fault and cut off diagonally by the San Gabriel fault (Bailey and Jahns, 1954). The San Gabriel fault, the dominant geologic feature in the Santa Clarita Valley, forms the eastern Ventura basin boundary, and separates the Ventura basin from the structurally similar Soledad basin.

SITE GEOLOGY

General: The tank site is situated on the northerly limb of the Ventura basin "synclinorium", approximately 0.6 mile southwest of the Holser fault. Bedrock beneath the site, and in the surrounding area, has been deformed along the Holser fault, as indicated by several tight folds that trend subparallel to the fault trace. The east-west trend of the Holser fault, and the subparallel fold axes reflect the north-south compressional tectonic forces that have shaped the region.

The seismically active San Gabriel fault zone, trending northwest-southeast through the Santa Clarita Valley, is located approximately 3 miles northeast of the tank site.

Geologic Materials: Geologic materials observed within the tank site include the Saugus Formation, terrace deposits, landslide deposits, and man-made deposits. The areal extent of the various geologic units are depicted on the Geotechnical Map, (Figure 1) and are described below.

Saugus Formation (TQs): The Plio-Pleistocene age Saugus Formation (map unit "TQs") underlies the tank site. As observed in outcrops and exploratory borings and test pits, the Saugus Formation is composed of poorly sorted, weakly cemented to moderately well cemented sandstone and pebbly sandstone, with alternating beds of poorly to moderately indurated siltstone, sandy siltstone/silty sandstone, and claystone. Sandstone, pebbly sandstone, and siltstone constitute the dominant rock types. Sandstones are primarily light brown to light gray/yellowish gray fine to coarse grained, with some thin interbedded very fine to fine grained laminated and cross-bedded sandstone. The siltstone and claystone are generally reddish-brown.

Terrace Deposits (Qt): Remnant stream-terrace deposits (map unit "Qt") are situated along the west side of the existing water tank access road and east of the proposed tank site. The Pleistocene age deposits are composed of yellowish brown to brown, poorly bedded friable sand, gravel and silt.

Landslides (Qls): Numerous landslides (map unit "Qls") were identified within the area of the tank site, with two landslides occurring within the area of the proposed tank site and access road grading. The landslides are generally composed of disturbed bedrock materials derived from the underlying Saugus Formation.

As well as the bedrock landslides, a surficial failure was identified northeast of the tank site. The surficial failure is probably limited to five to eight feet in depth and incorporates weathered, less competent near-surface earth materials.

Man-made Deposits (af and cef): Man-made deposits include artificial fill and certified engineered fill (map units "af" and "cef", respectively) placed during construction of the existing tank site and the Post Office. The artificial fill is located in the existing debris basins along the north side of the existing tank access road, and bordering the Post Office site. The certified engineered fill is located beneath the existing water tank, and along potions of the tank access road.

Geologic Structure: Saugus Formation units beneath the tank site have been folded into an east-west trending, easterly-plunging syncline. Sedimentary beds forming the north limb of the synclinal fold strike east-northeast and dip 37 to 60 degrees southerly towards the fold axis. Beds on the south limb strike west-northwest to northwest, dipping northerly 24 to 37 degrees towards the axis.

The approximate location of the axial trace of the syncline is shown on Figure 1. A stereonet analyses of the structural configuration of the syncline indicates that the syncline plunges approximately 12 to 15 degrees to the east.

SLOPE STABILITY

GENERAL

Grading for the proposed tank site will include a cut pad at an approximate elevation of 1,172 feet, which will create an ascending cut slope on the north and west side of the tank pad (designated Cut Slope CS-1), and a descending cut slope

from the south side (Cut Slope CS-2). A 2:1 combination fill and cut slope (CS-3) will be graded along the north side of the tank site access road.

The maximum cut slope height is approximately 110 feet. Fill slopes are planned at gradients of 2:1. The maximum proposed fill slope height is approximately 20 feet.

SHEAR STRENGTH PARAMETERS

Direct shear tests were performed for the previous geotechnical investigation of the tank site (RTF&A, 2001a and 2001b). In addition, we reviewed shear strength parameters for other jobs we have done in the vicinity of the site. Presented below are the recommended shear strengths for use at the subject site.

SUMMARY OF SHEAR STRENGTH PARAMETERS

MATERIAL	Static Cohesion (psf)	Static ϕ (degrees)
Landslide Failure Plane Material	200	16
Clayey Bedding Plane Material	250	20
Clayey Bedding Plane Material (Seismic)	375	19
Saugus Cross Bedding	640	32
Alluvium	100	40
Compacted Fill	300	32

CUT SLOPE CS-1

Cut Slope CS-1 will be graded as a 110 feet high, east- to south-facing 2:1 cut slope. This slope will be underlain by sedimentary rock units of the Saugus Formation. The Saugus Formation can range from massive to thinly bedded sedimentary rock units of sandstone, conglomerate, siltstone, and

claystone/mudstone. Bedding planes within the Saugus Formation are poorly to moderately-well developed, and can constitute planes of weakness, particularly where sandstone/conglomerate beds are in contact with claystone. Where bedding is adversely oriented, or "daylighted," with respect to natural or cut slopes, potential for bedding plane, or "block-glide," failure exists.

The subsurface geologic conditions relative to CS-1 are depicted on Geologic Sections A-A' and B-B' (Figures 2.1 and 2.2, respectively). Geologic Section A-A' illustrates geologic conditions parallel to the axis of the easterly-plunging syncline, for the segment of the cut slope facing to the east. Bedding in this area strikes northeast and dips 40 degrees to 45 degrees to the southeast. The apparent dip, with respect to the east-facing cut slope segment, is 32 degrees towards the east. As illustrated, the proposed east-facing segment of the cut slope is considered to be grossly stable from a geologic standpoint, as the angle of apparent dip (32 degrees) is steeper than the proposed 2:1 (or approximately 26 degrees) cut-slope.

Geologic Section B-B' depicts the geologic conditions for CS-1 perpendicular to the synclinal axis, and across the south-facing portion of the cut-slope. Bedding with respect to the south-facing segment of CS-1 exhibits an apparent dip of 37 degrees to the south. This bedding orientation dips steeper than the 2:1 (26 degrees) cut slope gradient and the south-facing segment of CS-1 is considered grossly stable from a geologic standpoint.

CUT SLOPE CS-2

Cut Slope CS-2 is planned as a 20 feet high, south-facing combination cut and fill slope that will descend from the tank pad to the tank access road. Cut slope CS-2

will expose landslide debris and, at depth, Saugus Formation units. The landslide debris is loose and inherently unstable. As depicted on Geologic Section B-B', a portion of CS-2, and the south edge of the proposed cut pad, will expose landslide deposits which have failed in the trough of the syncline.

The landslide debris should be completely removed and the entire slope constructed as a 2:1 stability fill slope which will mitigate the existing landslide. The estimated landslide depth, based on Test Pit TP-7, is 5 to 10 feet. The landslide removal will likely extend into a portion of the tank pad. Accordingly, construction of the fill slope should include fill placement to restore the pad grade. The keyway for the proposed 2:1 stability fill should measure a minimum of 15 feet wide, and be founded at least 3 feet into competent bedrock. Backdrains should be constructed at the fill/bedrock interface as addressed in the "CONLUSIONS AND RECOMMENDATIONS" section of the report and as shown on Figure 4 – Stability Fill Details for Grossly Stable Slopes.

CUT SLOPE CS-3

Cut Slope CS-3 will consist of a 10 feet high variable 2:1 to 3:1 combination fill and cut slope. The slope will likely encounter Saugus Formation units, landslide debris, and terrace deposits. The terrace deposits primarily consist of weakly to moderately cemented, massive to thickly bedded sand, silty sand, and gravel. Where noted, bedding in the terrace deposits is generally flat-lying. The terrace deposits are very granular and tend to lack cementation. Accordingly, these materials may be subject to erosion from water.

Geologic Section C-C' (Figure 2.3) depicts the proposed cut slope relative to the landslide. The landslide is potentially unstable, and the terrace deposits are susceptible to erosion. Therefore, it is recommended that the landslide be removed and the entire slope constructed as a stability fill slope which will mitigate the existing landslide. The estimated landslide depth, based on Test Pit TP-5, is 15 to 20 feet. The keyway for stability fill should measure a minimum of 15 feet wide, and be founded at least 3 feet into competent bedrock or terrace deposits. Backdrains should be constructed at the fill/bedrock interface. The stability fill, and backdrains, should be constructed in accordance with the recommendations presented in this report and as shown on Figure 4 – Stability Fill Details for Grossly Stable Slopes.

CONCLUSIONS AND RECOMMENDATIONS

GEOLOGIC CONSIDERATIONS

General: Based on the geologic data developed during the geotechnical investigation pertinent to the Zone 1A Water Tank Site, it is our opinion that the site may be developed as planned provided our recommendations are incorporated in the design of the project.

Faulting: No mapped active or potentially active faults underlie the proposed tank site, and the site is not within an Alquist-Priolo Earthquake Fault Zone, as established by California Division of Mines and Geology (CDMG) (1999). The closest active fault to the site is the San Gabriel fault, located approximately 3 miles northwest of the tank site.

Landslides: Two small landslides are located along the southern edge of the tank site and a portion of the tank access road. Complete removal of these landslides

will be required during grading operations. The estimated depth of these landslides ranges from 10 to 20 feet.

Liquefaction: The proposed tank pad is not within a liquefaction-mapped zone and by inspection of the materials encountered in the boring is not susceptible to liquefaction.

Erosion Protection: Friable sandstone beds are common within the Saugus Formation and have been identified at the site. If exposed in graded slopes, these beds could be subject to erosion and rilling, due to the lack of cementation. Under most circumstances, the erosion can be controlled by the establishment of vegetative cover over the slope upon completion of grading. Extensive or thick deposits of the friable beds may warrant construction of stability fills. The abundance of erosion susceptible beds should be determined during grading.

In order to reduce the potential for erosion, all graded slopes should be seeded or planted with proper ground cover as soon as possible, following grading. The ground cover should consist of drought-resistant, deep-rooting vegetation. A landscaping expert should be consulted for ground cover recommendations. If the potential for some erosion of the slopes is acceptable, at a minimum, a 3-foot deep, 5-foot wide ditch may be excavated at the toe of all slopes so when the materials do erode down the slope they do not threaten the tank or any other adjoining structures.

Drainage from the proposed slopes should be directed to non-erosive drainage devices. Surface drainage for the tank pad should be controlled and directed to drainage devices to minimize erosion of the slopes that descend from the proposed tank pad.

Rippability: Grading operations can be performed using conventional grading equipment. Heavy ripping may be needed when excavating well-cemented sandstone or conglomerate beds.

RESTRICTED USE AREAS

Based upon the geologic conditions and proposed grading, there are no Restricted Use Areas (RUAs) at the subject site.

GRADING

Site Preparation: Prior to performing earthwork, the existing vegetation and any deleterious debris should be removed from the site. Existing utility lines should be relocated or properly protected in-place. All unsuitable soils, landslide material, and uncertified fills in the areas of grading receiving new fill should be removed to competent earth materials and replaced with engineered fill.

Material for Fill: The on-site soils, less any debris or organic matter, may be used in required fills. Any expansive clays discovered should be mixed with non-expansive soils to result in a mixture having an expansion index less than 30 if they are to be placed within the upper 8 feet beneath proposed rough grades.

Rocks or hard fragments larger than 8 inches may not be placed in the fill without special treatment. Rocks or hard fragments larger than 4 inches shall not compose more than 25% of the fill or a lift. Soils containing more than 25% rock or hard fragments larger than 4 inches must be compacted with successive passes (e.g., with a sheepsfoot roller) until rock or hard fragments larger than 4 inches constitute less than 25% of the fill or lift.

Import material should consist of relatively non-expansive soils with an expansion index less than 30. The imported materials should contain sufficient fines (binder material) so as to be relatively impermeable and result in a stable subgrade when compacted. The import material should be free of organic materials, debris, and cobbles larger than 8 inches. A bulk sample of potential import material, weighing at least 25 pounds, should be submitted to the Geotechnical Consultant of Record at least 48 hours in advance of fill operations. All proposed import materials should be approved by the Geotechnical Consultant of Record prior to being placed at the site.

Compaction: After the site is cleared and excavated as recommended, the exposed soils should be carefully observed for the removal of all unsuitable deposits. Next, the exposed soils should be scarified to a depth of 6 inches, brought to about 2% above optimum moisture content, and rolled with heavy compaction equipment. The upper 6 inches of exposed soils should be compacted to at least 90% of the maximum dry density obtainable by the ASTM D 1557-02 Method of Compaction.

After compacting the exposed soils, all required fills should be placed in loose lifts, not more than 8 inches in thickness, and compacted to at least 90%. The moisture content of the fill soils at the time of compaction should be about 2 to 4% above optimum moisture content. Compacted fill should not be allowed to dry out before subsequent lifts are placed.

Rough exterior grades should be sloped so as not to direct water flow over slope faces. Finished exterior grades should be sloped to drain away from building foundations to prevent ponding of water.

Backfill: All required backfill should be mechanically compacted in layers; flooding should not be permitted. Proper compaction of backfill will be necessary to reduce settlement of the backfill and any overlying slabs and paving. Backfill should be compacted to at least 90% of the maximum dry density obtainable by the ASTM D 1557-02 Method of Compaction.

Proposed Tank Pad Subgrade: It is anticipated that Saugus Formation bedrock materials exposed at pad grade may contain expansive claystone beds that could cause differential expansion. An 8-foot deep fill cap extending at least 8 feet outside of the footprint of the proposed water tank is recommended to reduce the effects of expansive soil conditions and the presence of the transition zone, associated with the recommended stability fill along the south side of the tank pad (see Figure 3). It is also recommended that the bedrock be removed and recompacted to a depth of at least 3 feet below proposed soil subgrade in exposed Saugus Formation areas to be paved. The soils generated by these over-excavations should be mixed with non-expansive soils to yield a relatively non-expansive mixture. Should the resulting fill soil still be expansive, special construction techniques and procedures may be required to reduce the potential for expansive soil related distress.

Tank Subdrain System: A subdrain system should be installed under the proposed water tank. A synthetic geomembrane (such as high-density polyethylene-HDPE) with a coefficient of permeability of 10^{-6} cm/sec or less be placed beneath the proposed tank site. A leakage collection and removal system should be provided between the tank bottom and the geomembrane. The tank manufacturer may also have other similar or equivalent drainage systems, which could be used in lieu of the

system recommended above. We should review the tank foundation and drainage plans after completion of rough grading operations.

Subdrains: A canyon subdrain is recommended to intercept and remove groundwater within the proposed canyon fill near the west end of the access road. The subdrain should extend up-canyon, with the drain inlet carried to within 15 feet of final pad grade. Specific subdrain location and length should be determined in the field during grading operations.

The subdrain should be surveyed by the Project Surveyor to establish line and grade during construction, and for future location reference. Subdrain excavation and placement should be observed by our geologist.

The subdrains should be installed in accordance with the manufacturer's specifications. A minimum 2% gradient is to be maintained in the subdrain pipes. There should be at least 8 uniformly spaced sets of 2 perforations per lineal foot of pipe. The width of the perforations should not exceed 1/16 of an inch. If PVC pipe with drilled perforations is utilized, the diameter of the holes should not exceed 3/8 of an inch, if gravel and filter fabric is used or 1/8 inch diameter if Los Angeles County Flood Control District (LACFCD) Designation F-1 Filter Material is used. When constructing the subdrain, the pipe should be placed so that the drilled perforations are positioned on the bottom half of the pipe. The upstream end of subdrains should be capped. The final 20 feet of pipe at the downstream end of canyon, stabilization, buttress, and side hill fills shall not be slotted or perforated. Provisions should be made at all times during construction to prevent damage to the subdrain from construction equipment, and to prevent soils from being washed into an exposed subdrain by surface waters.

For runs up to 500 feet, subdrains for the bottom of canyon fills should consist of at least 6-inch diameter pipe. For runs of 500 to 1,500 feet, 8-inch diameter pipe shall be used. For runs over 1,500 feet, 10-inch diameter pipe shall be used.

Canyon subdrains should be installed in a rectangular trench excavated to expose competent material and shall be approved by the Geotechnical Consultant of Record. The slotted subdrains should be surrounded by at least 3 cubic feet per lineal foot of granular filter material. The granular filter material for subdrains should meet the LACFCD Designation F1, or have a gradation approved by the Geotechnical Consultant of Record prior to placement. There should be at least 6 inches of compacted granular filter material on all sides of the pipe (See Figure 5). As an alternative, drains may be placed in a "V" ditch only after approval by the Engineering Geologist (see Figure 6).

As an alternative to the granular filter material, ¾ inch diameter gravel may be placed around the pipe. The gravel should be separated from the surrounding soils by a filter fabric such as Mirafi 140N, or equivalent, wrapped around the gravel ("burrito wrapped").

Stability Fill Backdrains: Backdrains should be installed at the backcut of the stability fills. The backdrains should consist of 4-inch diameter, or larger, perforated pipe surrounded by filter material. Non-perforated drain outlets should be provided at vertical intervals not exceeding 15 feet and horizontal intervals not exceeding 100 feet. The exact location of subdrains should be determined in the field by the Geotechnical Consultant of Record after the backcut has been made.

Geotechnical Observation: The grading operations should be observed by the Geotechnical Consultant of Record. The Geotechnical Consultant of Record's representative should have at least the following duties:

- observe the excavation so that any necessary modifications based on variations in the soil/rock conditions encountered can be made;
- observe the exposed subgrade in areas to receive fill and in areas where excavation has resulted in the desired finished subgrade. The representative should also observe proof-rolling and delineation of areas requiring overexcavation;
- evaluate the suitability of on-site and import soils for fill placement; collect and submit soil samples for required or recommended laboratory testing where necessary;
- observe the fill and backfill for uniformity during placement;
- test fill for field density and compaction to determine the percentage of compaction achieved during fill placement; and,
- geologic observation of all cut slopes, keyways, backcuts and geologic exposures during grading to ascertain that conditions conform to those anticipated in the report.

Once the necessary grading permits are obtained, the governmental agencies having jurisdiction over the project should be notified prior to commencement of grading so that arrangements can be made for required inspection(s). The contractor should be familiar with the inspection requirements of the regulatory agencies.

FOUNDATIONS

General: The proposed water tank and footings for auxiliary structures or retaining walls may be supported on continuous or individual spread footings established in properly compacted fill. It is recommended that a formal review of foundation plans and foundation loading details be performed by the Geotechnical Consultant of Record when plans become available to verify the applicability of the recommendations contained herein. The recommendations presented below should be considered preliminary and should be finalized after review of foundation plans. The preliminary design values are based upon this investigation, our experience with the soils in the area, and with the site preparation and grading recommendations for this project.

Bearing Capacity: It is assumed that the proposed water tank will be founded at approximately final planned grades shown on the Geotechnical Map. Individual or continuous footings should have a width of at least 12 inches and be placed at a depth of at least 24 inches below the lowest final adjacent grade.

Shallow footings established in certified compacted fill may be designed using a bearing value of 2,500 pounds per square foot (psf). The recommended bearing value is a net value, and the weight of concrete in the footings may be taken as 50 pounds per cubic foot (pcf). The weight of soil backfill may be neglected when determining the downward loads from the footings. A one-third increase in the bearing value may be used when considering wind or seismic loads.

While the actual bearing value of the fill placed at the site will depend on the materials used and the compaction methods employed, the quoted bearing value will

be applicable if acceptable soils are used and are compacted as recommended. The bearing value of the fill should be confirmed during grading.

Lateral Resistance: Lateral loads may be resisted by soil friction and by the passive resistance of the soils. A coefficient of friction of 0.4 applied to the dead loads may be used between the footings, floor slabs and the supporting soils. The passive resistance of properly compacted fill soils may be assumed to be equal to the pressure developed by a fluid with a density of 250 pcf. A one-third increase in the passive value may be used for wind or seismic loads. The frictional resistance and the passive resistance of the soils may be combined without reduction in determining the total lateral resistance.

Settlement: Provided that foundations are underlain by compacted fill soils as recommended, and maximum loads do not exceed 3.5 kips per lineal foot, we estimate that the maximum settlement will be about 1 inch (at the center) and differential settlement within a horizontal distance of 30 feet will be less than 0.75 inches.

Foundation Observations: To verify the presence of satisfactory soils at foundation design elevations, the excavations should be observed by the Geotechnical Consultant of Record. Excavations should be deepened as necessary to extend into satisfactory soils. Where the foundation excavations are deeper than four feet, the sides of the excavations should be sloped back at ¾:1 or shored for safety.

RETAINING WALLS

Lateral Earth Pressures: For design of cantilevered walls below grade, where the surface of the backfill is level and the retained height of soils is less than 15 feet,

it may be assumed that drained, nonexpansive soils will exert a lateral pressure equal to that developed by a fluid with a density of 30 pcf. Where the surface of the backfill is inclined at 2:1, it may be assumed that drained soils will exert a lateral pressure equal to that developed by a fluid with a density of 45 pcf. In addition to the recommended earth pressure, the walls should be designed to resist any applicable surcharges due to buildings, walls, and storage or traffic loads. A drainage system, such as weepholes or a perforated pipe should be provided behind the walls to prevent the development of hydrostatic pressure. Recommendations for wall drains are presented as follows.

If a drainage system is not installed, the walls should be designed to resist a hydrostatic pressure equal to that developed by a fluid with a density of 80 pcf against the full height of the wall.

In addition to the recommended earth and hydrostatic pressures, the upper 10 feet of walls adjacent to vehicular traffic areas should be designed to resist a uniform lateral pressure of 100 psf. This pressure is based on an assumed 300 psf surcharge behind the walls due to normal traffic. If the traffic is kept back at least 10 feet from the walls, the traffic surcharge may be neglected. Special recommendations will be required where expansive soils are to be retained.

Retaining Wall Drainage: A drainage system should be provided behind retaining walls, or the walls should be designed to resist hydrostatic pressures. The drainage system could consist of a 4-inch diameter perforated pipe placed 6 inches from the base of the wall, with the perforations down, and connected to an outlet device. The pipe should be sloped at least 1 inch per 50 feet and surrounded on all sides by at least 6 inches of clean gravel. The gravel should be "burrito-wrapped"

with filter fabric, such as Mirafi 140N, or equivalent. As an alternative to the gravel and filter fabric, filter material meeting the requirements of Los Angeles County Flood Control District Designated F-1 Filter Material, and slotted pipe, may be used. The backside of the wall should be waterproofed.

A vertical six-inch wide gravel chimney drain, or a drainage geocomposite such as Miradrain, should be placed against and behind retaining walls that are higher than 3 feet. The top of the back drain should be capped with 18 inches of on-site soils. Details regarding the drainage system, chimney drain, Miradrain, waterproofing, and soil cap as shown on the attached Retaining Wall Details, Figures 7.1 and 7.2.

The installed drainage system should be observed by the Geotechnical Consultant of Record prior to backfilling the system. Inspection of the drainage system may also be required by the reviewing governmental agencies.

The drainage system should be observed by the Geotechnical Consultant of Record prior to backfilling the system. Inspection of the drainage system may also be required by the reviewing governmental agencies.

PAVEMENT DESIGN

Following the completion of grading operations, samples of the on-site soil should be obtained from near final grade in pavement areas to perform R-value tests. The following preliminary pavement section recommendations are based on the assumption that the on-site soils have an R-value of 18. The final pavement section recommendations could vary depending on the results of the actual R-value test results obtained from samples obtained from the pavement areas.

TRAFFIC INDEX	ASPHALT THICKNESS (INCHES)	BASE COURSE (CAB) THICKNESS (INCHES)	BASE COURSE (CMB) THICKNESS (INCHES)
4	3	4	6
6	4	7	9
8	5	11	13
10	7	18	20
11	7	21	23

Base course material should consist of crushed aggregate base (CAB), as defined by Section 200-2.2 of the Standard Specifications for Public Works Construction ("Greenbook"). If crushed miscellaneous base (CMB) is used, it should meet the specifications outlined in Section 200-2.4 of the "Greenbook". Base course should be compacted to at least 95% of the maximum dry density of that material.

Base course material should be purchased from a supplier who will certify that the base course will meet or exceed the specifications in the "Greenbook", as indicated. We could, at your request, perform sieve analysis and sand equivalency tests on material delivered to the site which appears suspect. Additional tests could be performed, upon request, to determine if the material is in compliance with the specifications.

The pavement section recommendations presented above are based upon assumed Traffic Index values. RTF&A does not take responsibility for the numerical determination of the Traffic Index values or the areas where they apply within the site. We would be pleased to provide pavement section recommendations for alternative Traffic Index values upon request.

GEOTECHNICAL CONSULTANT OF RECORD

This report has been prepared assuming that RTF&A will perform all geologic and geotechnically-related field observations and testing. If the recommendations presented in this report are to be utilized, but observation of the grading activities is performed by others, the parties performing the work must review this report and assume responsibility for recommendations contained herein or provide their own recommendations. That party would then assume the title "Geotechnical Consultant of Record" for the project.

A representative of the Geotechnical Consultant of Record should be present to observe all grading operations as well as test compacted fills. A report presenting the results of these observations and related testing should be issued upon completion of these operations.

-oOo-

The following are attached and complete this report.

- References
- Geotechnical Map – Figure 1 (in pocket)
- Geotechnical Sections - Figures 2.1 through 2.3
- Transition Zone Detail - Figure 3
- Stability Fill Details for Grossly Stable Slopes – Figure 4
- Typical Canyon Subdrain - Figure 5
- Alternate Canyon Subdrain - Figure 6
- Retaining Wall Details – Figure 7.1 and 7.2
- Appendix - Field Explorations and Laboratory Testing
  - Log of Boring B-1
  - Test Pit Logs TP-1 through TP-9
  - Summary of Shear Test Data – (2 pages)

REGISTERED PROFESSIONAL ENGINEER
ALAN W. RASPLICKA
No. GE 2558
Exp. 6/30/2007
GEOTECHNICAL
STATE OF CALIFORNIA

Respectfully submitted,

R. T. FRANKIAN & ASSOCIATES

PROFESSIONAL GEOLOGIST NO. 3749
TIMOTHY P. LATIOLAIT
#1140
CERTIFIED
ENGINEERING
GEOLOGIST
Expires 12-31-2009
STATE OF CALIFORNIA

by: Alan W. Rasplicka
Principal Geotechnical Engineer

and: Timothy P. Latiolait
Principal Engineering Geologist

AWR/TPL/sjc

Distribution: (3) Newhall Land and Farming Company
Attn: Mr. Fred MacMurdo
(4) Psomas
Attn: Mr. Erik Winata
(with 3 wet-signed copies and 1 CD in PDF Format for submittal to Los Angeles County Department of Public Works)

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

REFERENCES

Bailey, T. L., and Jahns, R. H., 1954, "Geology of the Transverse Range Province, Southern California", in Geology of Southern California, California Division of Mines Bull 170, Vol. 1, pp. 83-106.

Dibblee, T. W., Jr., 1996, "Geologic Map of the Newhall Quadrangle, Los Angeles County, California", Dibblee Geological Foundation Map #DF-56.

Frankian, R. T., and Associates, 2001a, Geologic Reconnaissance Study, Alternate Water Tank Sites 1&2, Parcel Map 18108, Castaic California, Job No. 99-802-02, dated March 16, 2001.

Frankian, R. T., and Associates, 2001b, Geotechnical Investigation, Proposed Water Tank Site – Alternate 2, Parcel Map 18108, Santa Clarita, California," Job No. 99-802-02, dated July 19, 2001.

Hart, E. W., and Bryant, W.A., 1999, "Fault-Rupture Hazard Zones in California," California Division of Mines and Geology, Special Publication 42, 32p.

Jahns, R. H., and Muehlberger, W. R., 1954, "Geology of the Soledad Basin, Los Angeles County", in Geology of Southern California, California Division of Mines Bull 170, Map Sheet No. 6.

Weber, F. H., Jr., 1979, "Geologic and Geomorphic Investigation of the San Gabriel Fault Zone, Los Angeles and Ventura Counties, California," California Division of Mines and Geology Open-File Report 79-17, 78p.

Winterer, E. L. and Durham, D. L., 1962, "Geology of the Southeastern Ventura Basin", U.S. Geological Survey Professional Paper 334-H, pp. 275-366.

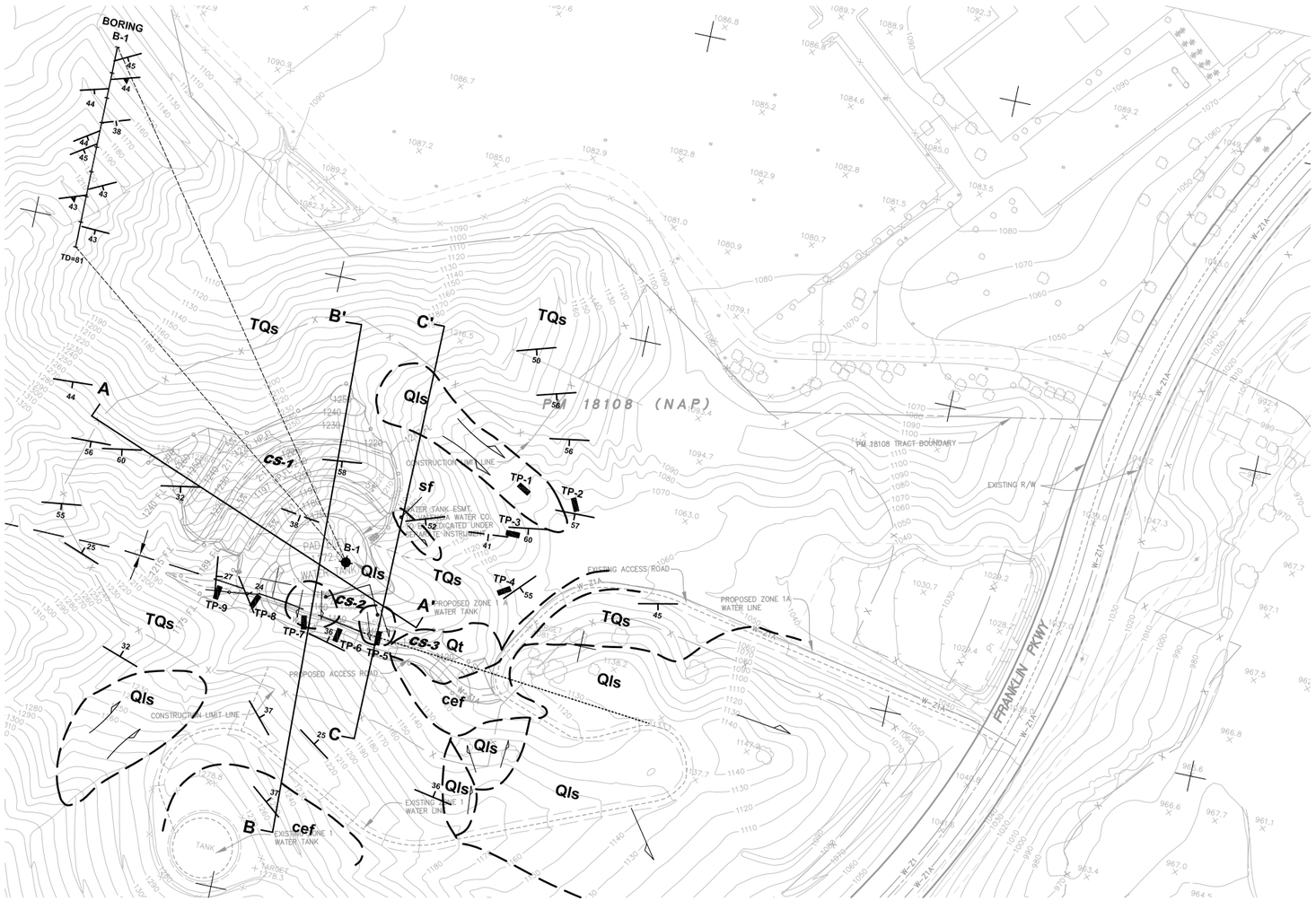
Geotechnical Map

PREPARED FOR
Newhall Land and Farming Company

Project Location
Zone 1A Water Tank Site Grading
Castaic, California

SCALE	DRAWN BY	CHECKED BY
AS SHOWN	MN	
DATE 3-28-08	Figure 1	JOB NO. 99-802-21

1329 SCOTT ROAD
BURBANK, CA. 91504
TEL: (818) 531-1501
FAX: (818) 531-1511
www.rtfrankian.com
RTFA



EXPLANATION

cef	Certified Engineered Fill
sf	Surficial Failure
QIs	Landslide Deposits
Qt	Terrace Deposits
TQs	Saugus Formation
	Geologic Contact, approximately located; queried where questionable
	Axial Trace of Syncline; dashed where approximate, dotted where concealed, queried where questionable; arrow on fold axis denotes direction of plunge
49	Strike and Dip of Bedding
41	Approximate Bedding
24	Strike and Dip of Bedding Shear
C — C'	Geologic Section Line
B-1	Boring Location and Number
TP-9	Test Pit Location and Number
CS-3	Cut Slope Designation
	Subdrain

OFFSITE ZONE 1A WATER TANK SITE	
RAW CUT	87,000 CUBIC YARDS
RAW FILL	2,000 CUBIC YARDS
EXPORT	87,000 CUBIC YARDS

100' 50' 0' 100' 200'
GRAPHIC SCALE
Note: For reduced sized prints, original scale is in inches

NEWHALL RANCH.

PROPOSED OFFSITE
ZONE 1A WATER TANK GRADING
EXHIBIT

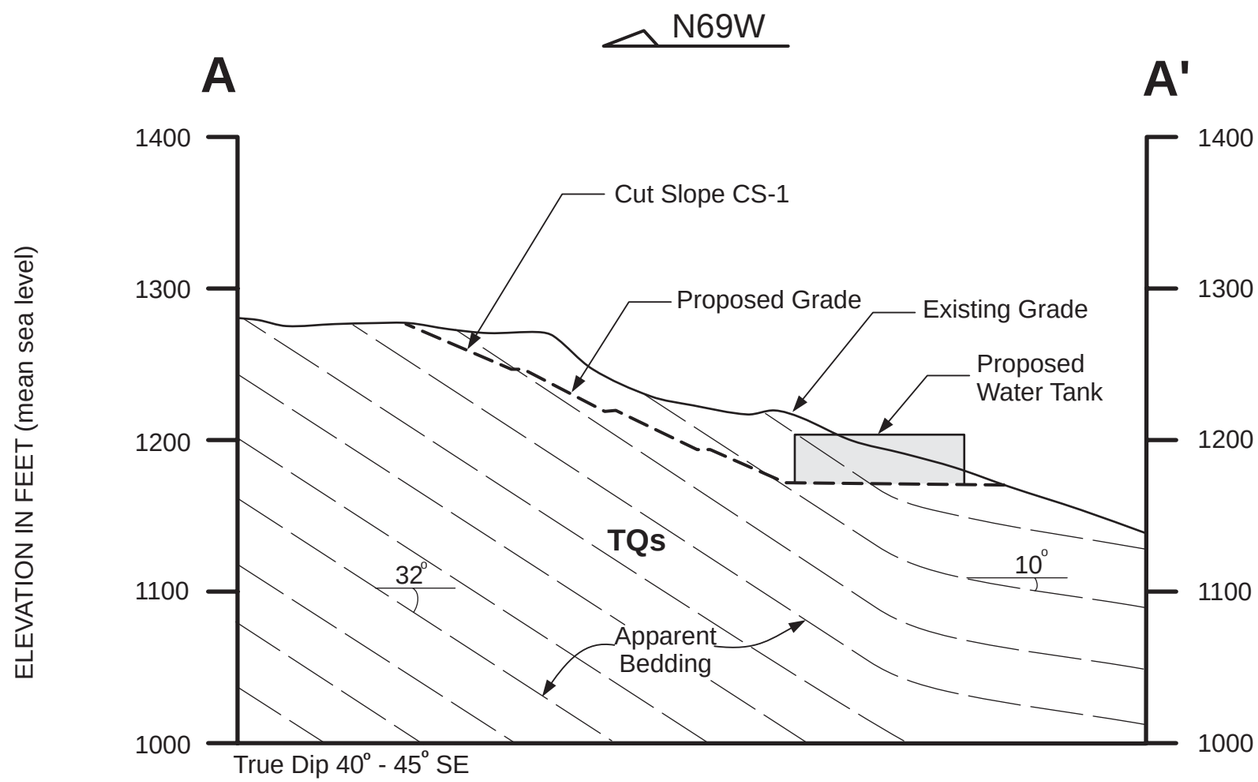
PSOMAS

DATE: 03-07-08 REVISED ON:
JOB No:1NRC010708

SHEET 1 OF 1
RV122-01

Plotted - 4/2/2008 10:45:03 AM :: Saved - 4/2/2008 10:44:25 AM :: C:\Documents and Settings\Mohammed\My Documents\DRAFTING\Jobs\1999\998527\3-28-08\RV122-01.dwg :: Mohammed

GEOLOGIC SECTION A-A'



Geologic Section

PREPARED FOR
Newhall Land and Farming Company

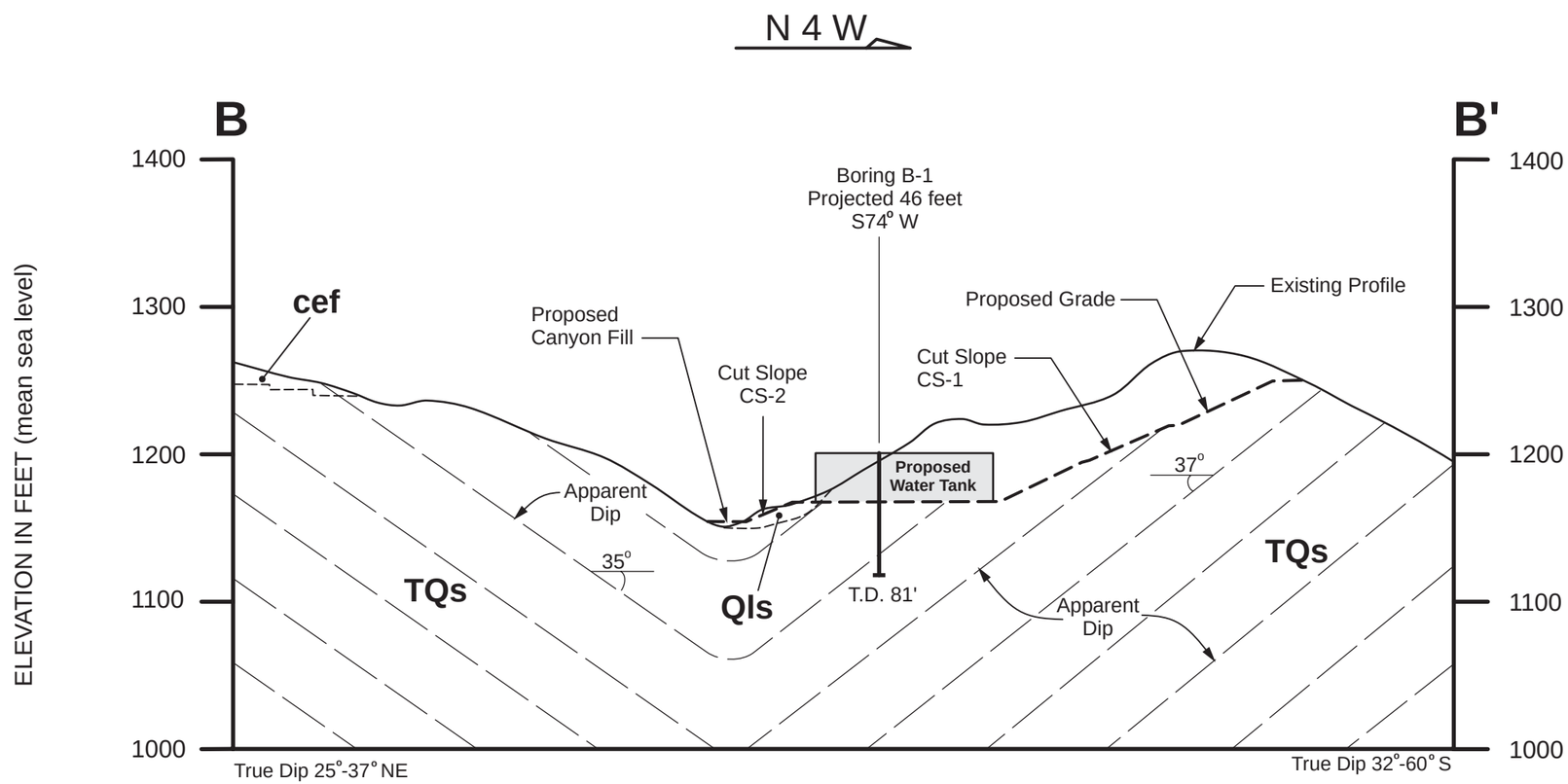
PROJECT LOCATION
Zone 1A Water Tank Site Grading
Vesting Tentative Tract Map No. 53108
Castaic, California

SCALE	DRAWN BY	CHECKED BY
1" = 100'	MN	
DATE 3-28-08	FIGURE 2.1	JOB NO. 99-802-21

1329 SCOTT ROAD
BURBANK, CA, 91504
TEL: (818) 531-1501
FAX: (818) 531-1511
www.rtfrankian.com

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

GEOLOGIC SECTION B-B'



Geologic Section

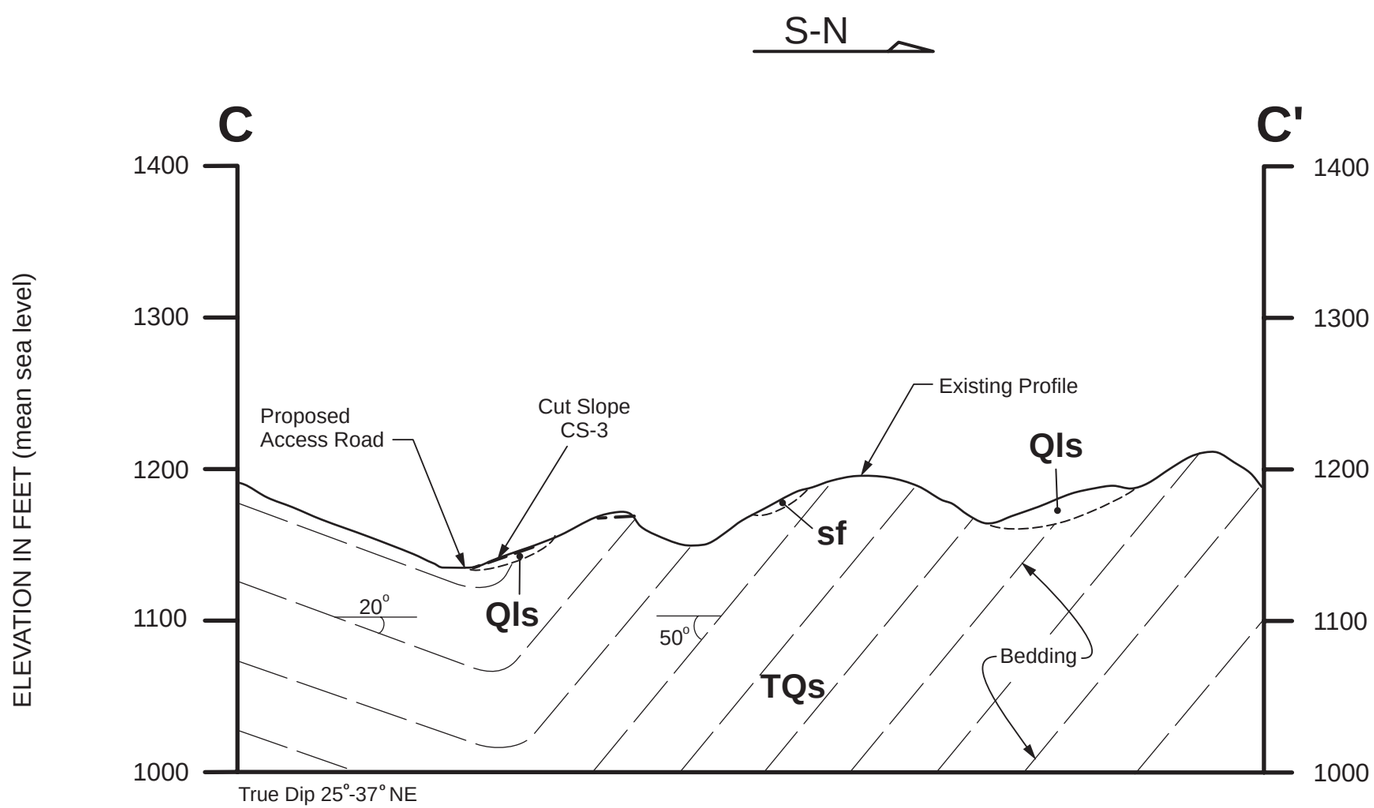
PREPARED FOR
Newhall Land and Farming Company

PROJECT LOCATION
Zone 1A Water Tank Site Grading
Vesting Tentative Tract Map No. 53108
Castaic, California

SCALE	DRAWN BY	CHECKED BY
1" = 100'	MN	
DATE		JOB NO.
3-28-08	FIGURE 2.2	99-802-21

1329 SCOTT ROAD
BURBANK, CA, 91504
TEL: (818) 531-1501
FAX: (818) 531-1511
www.rtfrankian.com
RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

GEOLOGIC SECTION C-C'



Geologic Section

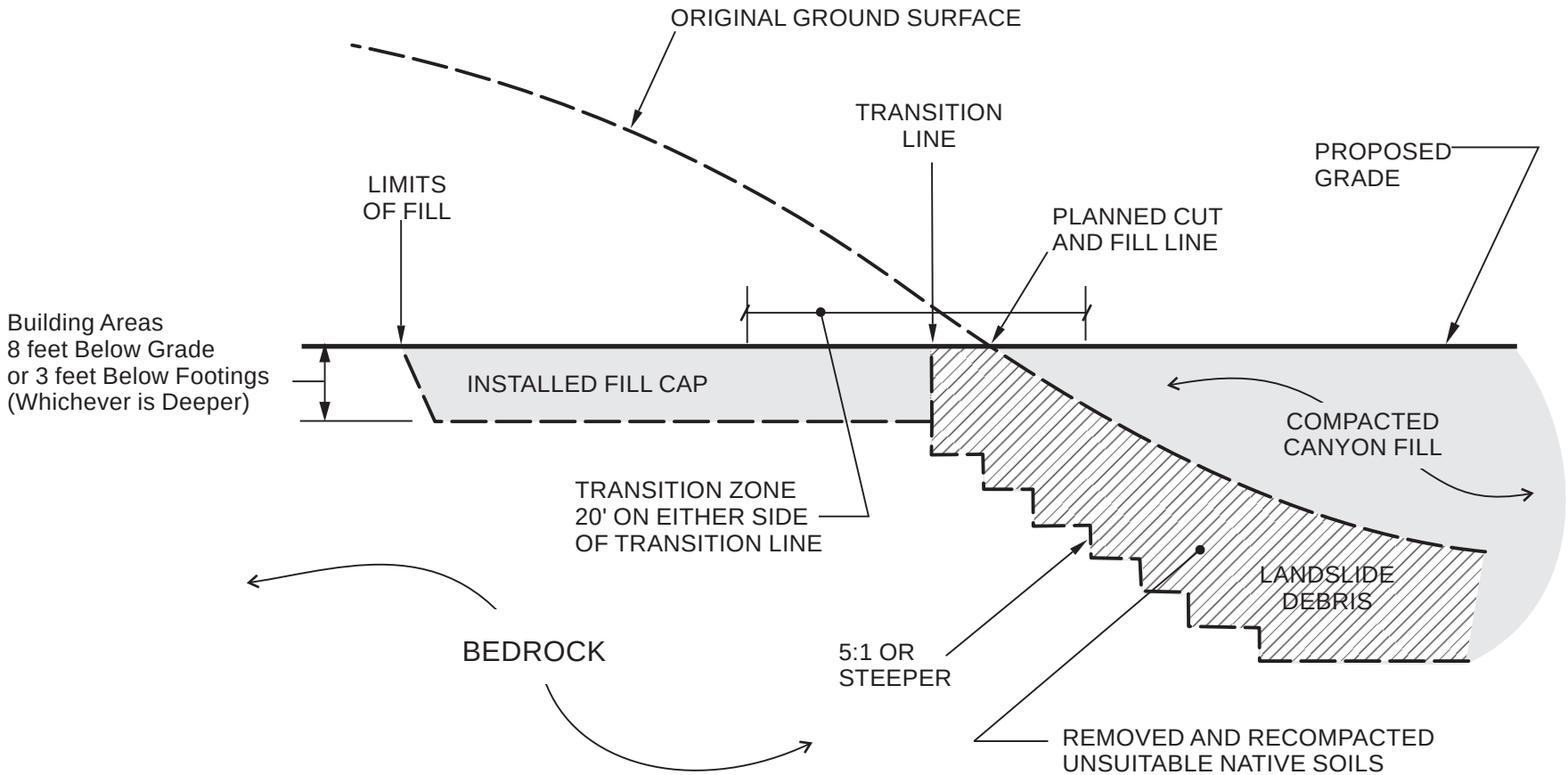
PREPARED FOR
Newhall Land and Farming Company

PROJECT LOCATION
Zone 1A Water Tank Site Grading
Vesting Tentative Tract Map No. 53108
Castaic, California

SCALE	DRAWN BY	CHECKED BY
1" = 100'	MN	
DATE		JOB NO.
3-28-08	FIGURE 2.3	99-802-21

1329 SCOTT ROAD
BURBANK, CA, 91504
TEL: (818) 531-1501
FAX: (818) 531-1511
www.rtfrankian.com

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

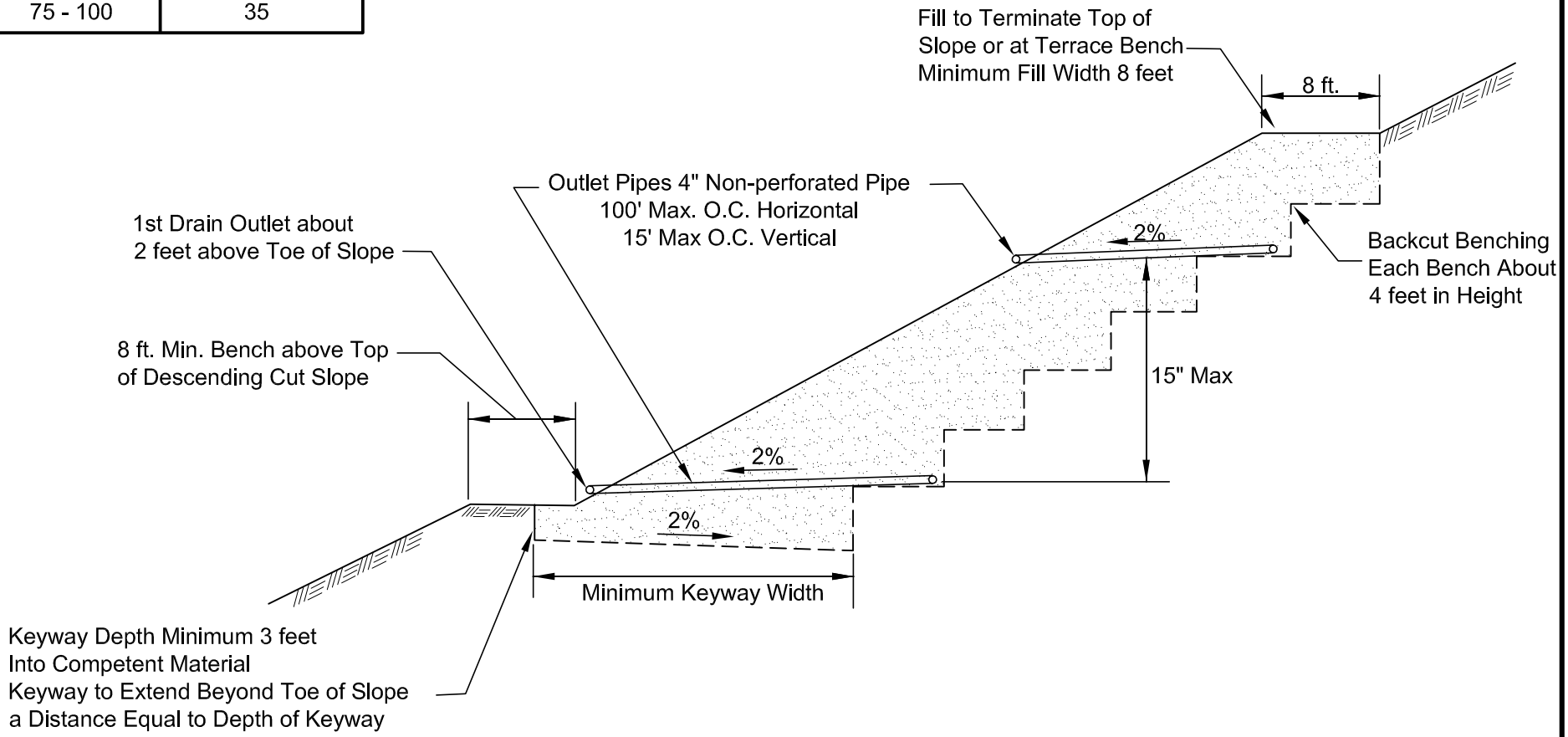


TRANSITION ZONE DETAIL

NOT TO SCALE

TRANSION2

Stability Fill Height (feet)	Minimum Width of Keyway (feet)
0 - 20	15
20 - 30	20
30 - 50	25
50 - 75	30
75 - 100	35

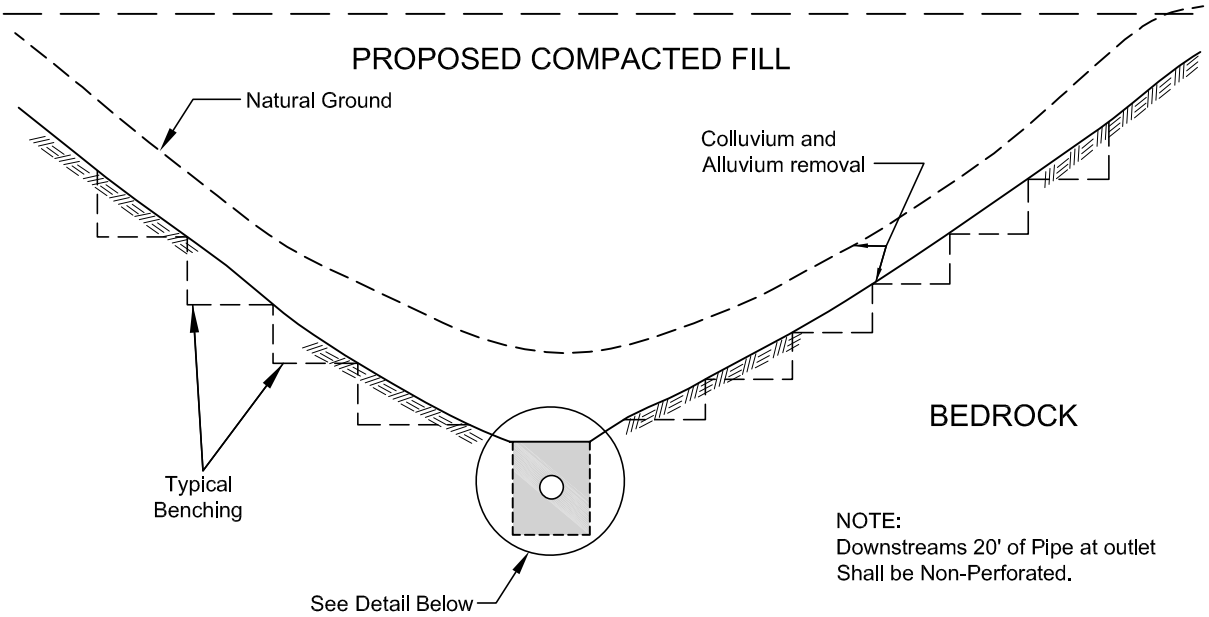


STABILITY FIIL DETAILS FOR GROSSLY STABLE SLOPES

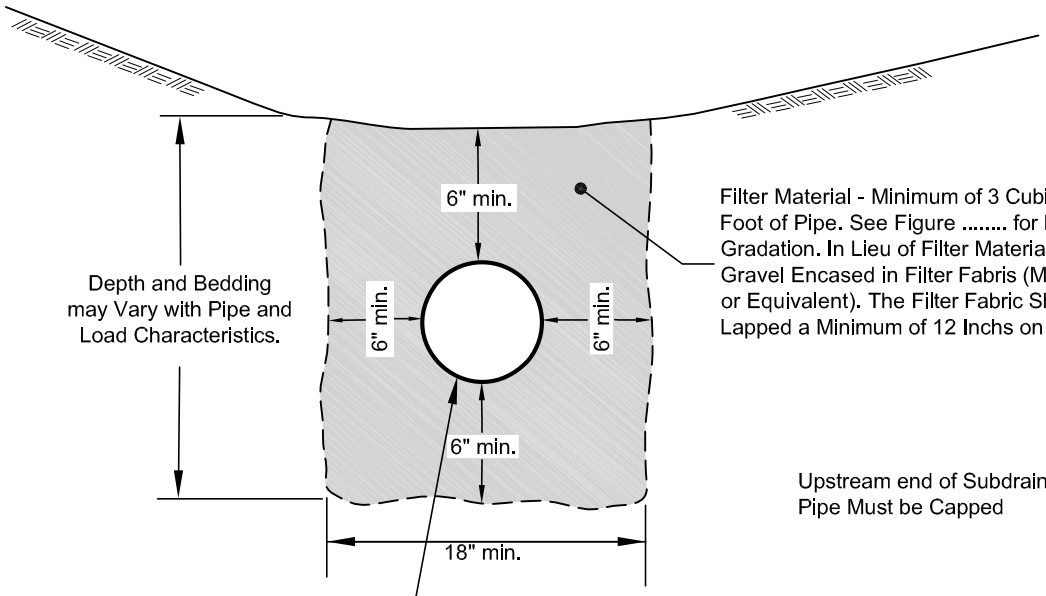
N.T.S.

TYPICAL CANYON SUBDRAIN

MINIMUM STANDARD GRADING SPECIFICATIONS



NOTE:
Downstreams 20' of Pipe at outlet
Shall be Non-Perforated.



Filter Material - Minimum of 3 Cubic Feet per Foot of Pipe. See Figure ..... for Required Gradation. In Lieu of Filter Material Use Gravel Encased in Filter Fabris (Mirafi 140N or Equivalent). The Filter Fabric Shall be Lapped a Minimum of 12 Inchs on all Joints.

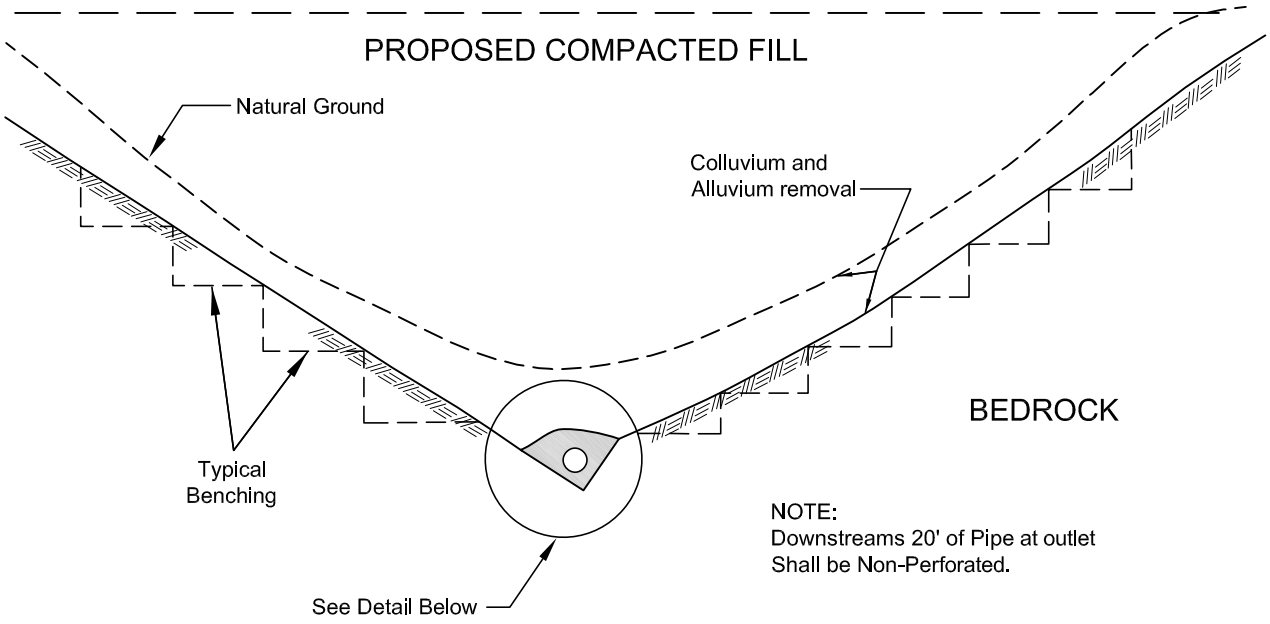
Upstream end of Subdrain
Pipe Must be Capped

Minimum 4-inch Diameter, ADS Corrugated or ABS Class SDR 35 with a Crushing Strength of at Least 1000 Pound, with Minimum of 8 Uniformly Spaced Perforations per Foot of Pipe, Installed with Perforations on Bottom of Pipe.

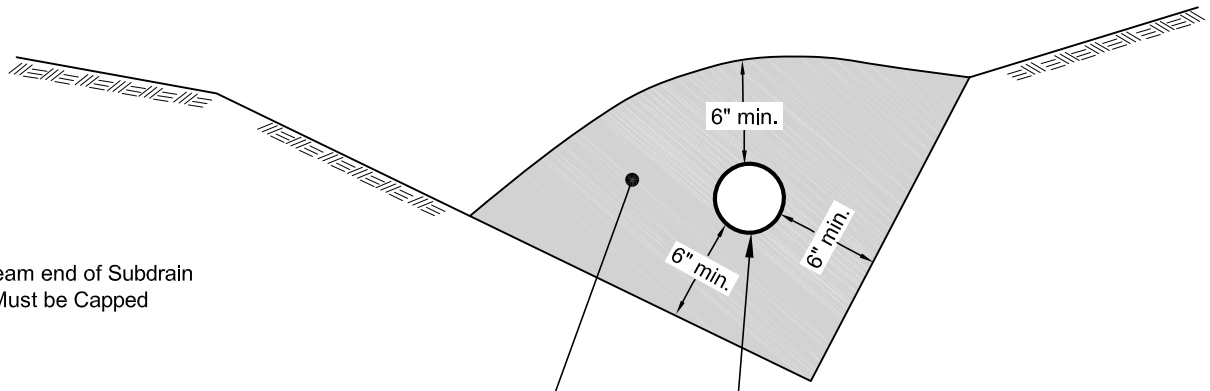
NOTE:
For Runs up to 500 feet Use 6-Inch Diameter Pipe
For Runs up to 500-1500 feet Use 8-Inch Diameter Pipe
For Runs Grather Than 1500 feet Use 10-Inch Diameter Pipe

TYPICAL CANYON SUBDRAIN

MINIMUM STANDARD GRADING SPECIFICATIONS



NOTE:
Downstreams 20' of Pipe at outlet
Shall be Non-Perforated.



Upstream end of Subdrain
Pipe Must be Capped

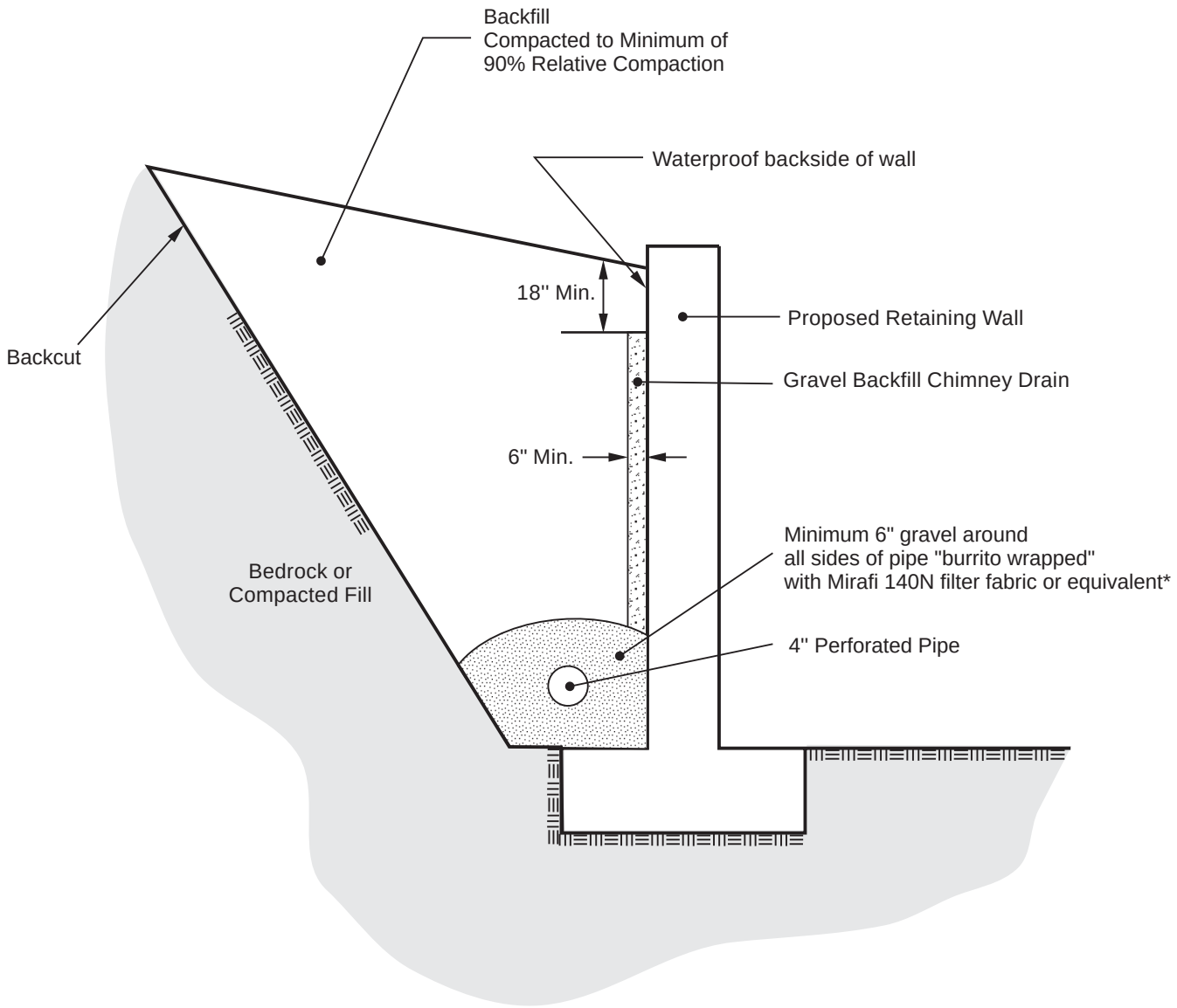
Filter Material - Minimum of 3 Cubic Feet per Foot of Pipe. In Lieu of Filter Material Use Gravel Encased in Filter Fabric (Mirafi 140N or Equivalent). The Filter Fabric Shall be Lapped a Minimum of 12 Inches on all Joints.

Minimum 4-inch Diameter, ADS Corrugated or ABS Class SDR 35 with a Crushing Strength of at Least 1000 Pound, with Minimum of 8 Uniformly Spaced Perforations per Foot of Pipe, Installed with Perforations on Bottom of Pipe.

NOTE:
For Runs up to 500 feet Use 6-Inch Diameter Pipe
For Runs up to 500-1500 feet Use 8-Inch Diameter Pipe
For Runs Grater Than 1500 feet Use 10-Inch Diameter Pipe

RETAINING WALL DETAIL

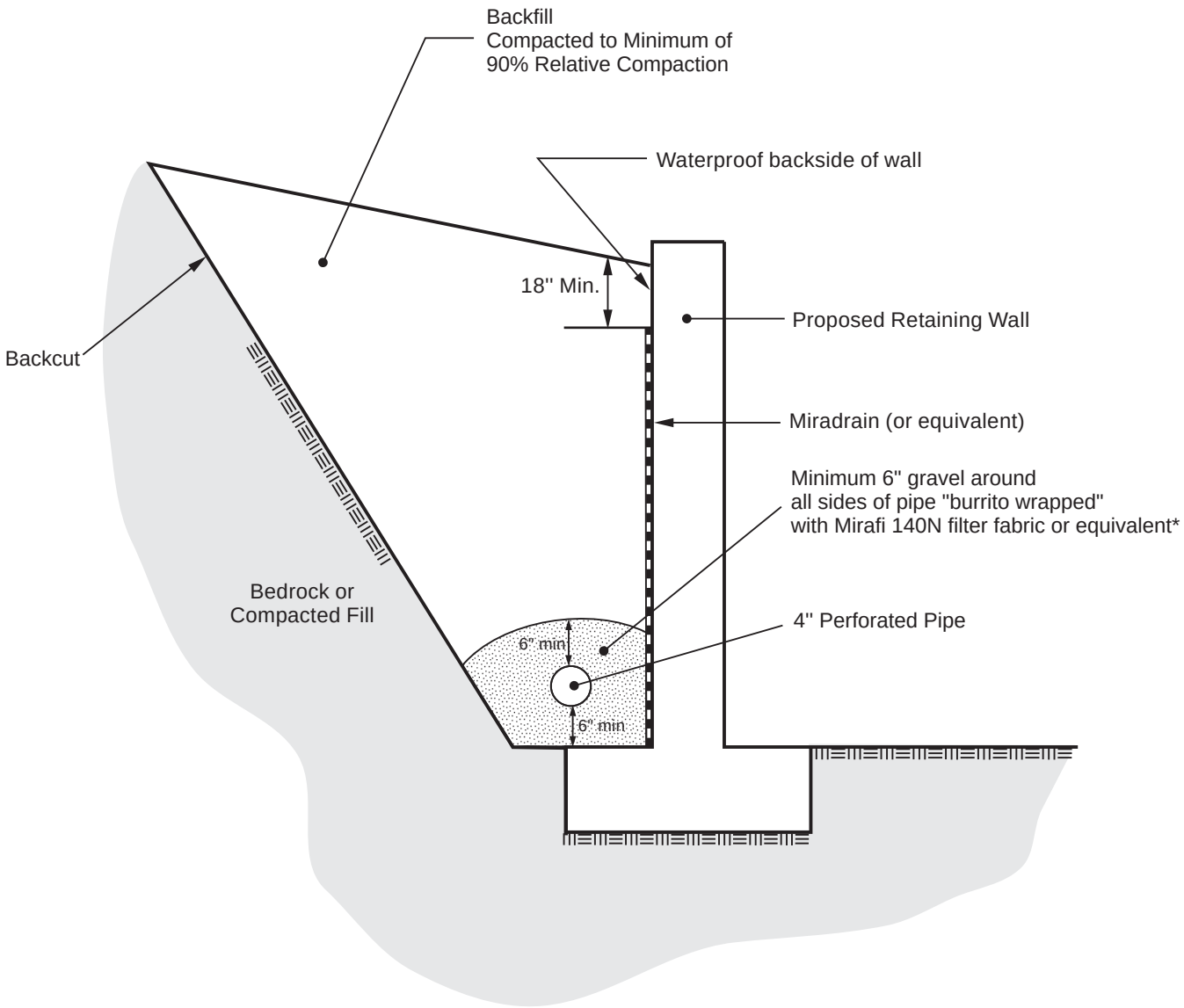
WITH CHIMNEY DRAIN



*F-1 Filter Material
may be used as an alternative
to gravel and filter fabric with
slotted pipe

RETAINING WALL DETAIL

WITH MIRADRAIN



*F-1 Filter Material
may be used as an alternative
to gravel and filter fabric with
slotted pipe

R.T. FRANKIAN & ASSOCIATES
Figure 7.2

Newhall Land and Farming Company
March 28, 2008
99-802-21

APPENDIX

FIELD EXPLORATIONS AND LABORATORY TESTING

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

APPENDIX

FIELD EXPLORATIONS

The bedrock conditions beneath the site were explored in 2001 by drilling one bucket boring and excavation of test pits at the locations shown on the Geotechnical Map. The boring was drilled using a 24-inch-diameter bucket auger-type drilling equipment. The rock encountered was logged by our field geologist and undisturbed samples were obtained for laboratory inspection and testing. The lined-barrel sampler used to take undisturbed samples has an external diameter of 3.0 inches and an internal diameter of 2.625 inches. The depths at which the undisturbed samples were obtained are indicated on the logs. The sampler was driven using a hammer; the number of blows required to drive the sampler 12 inches are shown on the boring log. The driving weights are 3,160 pounds from 0 to 24 feet, 2,040 pounds from 24 feet to 47 feet, 1,120 pounds from 47 feet to 72 feet and 1,520 pounds from 72 feet to 81 feet.

LABORATORY TESTING

Laboratory tests were performed on selected samples obtained from the borings to aid in the classification of the soils and to determine their engineering properties. The field moisture content and dry density of the soils encountered were determined by performing tests on the undisturbed samples. The results of the tests are shown to the left of the boring log.

Direct shear tests were performed on selected undisturbed samples to determine the strength of the site materials. In addition, shear test data were also available from our prior investigations at and nearby the site. The tests were performed after soaking the samples to near-saturated moisture content and at various surcharge pressures. The yield strength values determined from the direct shear tests are presented on Summary of Shear Test Data.

The optimum moisture content and maximum dry density of the existing fill soils were determined by performing compaction tests on a bulk sample bag obtained

from the boring. The test was performed in accordance with the ASTM Designation D1557-02 method of compaction. The results of the tests are presented below.

Soil Description and Classification	Maximum Dry Density (lbs./cu. ft.)	Optimum Moisture Content (%)
Light gray brown fine to medium sand (SP)	131	8
Light brown silty fine to medium sand (SM)	126	9.5

The optimum moisture contents are indicated in percent of dry weight, and the maximum dry densities are in pounds per cubic foot (pcf). The double-letter soil classifications that follow the Soil Descriptions are in accordance with the Uniform Soil Classification System (ASTM D 2487-00).

BORING B-1

JOB NUMBER: 99-802-01
DATE DRILLED: 6-4-01
EQUIPMENT USED: 24"-Diameter Bucket Auger
ELEVATION: 1200 +/-
SURFACE CONDITIONS: Graded Pad

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	SOIL TYPE
17	3	120	-	5		**SAUGUS FORMATION (TQs)** SANDSTONE, very fine to fine, slight iron-oxide staining, soft, dry, yellowish orange to light gray 1" thick clayey silt bed: N56E, 56SE @ 2.5 feet: fine to coarse, some laminations
17	4	126	-	10		SANDY SILTSTONE to SILTY SANDSTONE, very fine very soft, slightly moist, light brownish gray @ 6.5 feet: Bedding-N60E, 45SE mafic mineral laminations: Bedding-N65E, 60SE
15	5	122	-	15		PEBBLY SANDSTONE, fine to very coarse with pebbles and gravel, slightly clayey in upper 6 inches, soft, slightly moist, yellowish gray @ 12.5 feet: 1/8" pale red clay shear: N72E, 24SE; truncates laminations
-	-	-	-	20		CONGLOMERATIC SANDSTONE, very coarse, abundant pebbles, small cobbles, soft, slightly moist, moderate yellowish brown @ 17 feet: 1" thick grayish brown clay seam (possible bedding shear): N55E, 50SE Bedding-N73E, 43S
25	4	122	-	25		Interbedded PEBBLY SANDSTONE and CONGLOMERATIC SANDSTONE, coarse to very coarse with abundant pebbles and small cobbles, soft, slightly moist, pale yellowish brown to moderate yellowish brown, average bed thickness 1½ to 2 feet
24	11	124	-	30		approximate bedding-N70E, 44SE SILTY CLAYSTONE, very soft, moist, moderate reddish brown, soft sediment deformation at contact with overlaying SANDSTONE
22	5	123	-	35		SANDSTONE, very fine to fine, finely laminated with laminations defined by mafic minerals, soft, slightly moist, moderate yellowish brown to yellowish gray Bedding-N52E, 44SE fine to coarse Bedding-N54E, 45SE
				40		

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-1 (continued)

JOB NUMBER: 99-802-01
DATE DRILLED: 6-4-01

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	SOIL TYPE
30	4	123	-			SANDSTONE, very coarse, soft, slightly moist, yellowish gray
20	5	119	-	45		trace cobbles
25	5	112	-	50		SANDSTONE to PEBBLY SANDSTONE, very coarse with pebbles, soft, slightly moist, yellowish gray to very pale orange
38	-	-	-	55		CONGLOMERATE, very coarse sand matrix, abundant gravel and small cobbles, massive, soft, slightly moist, yellowish gray to pale yellowish brown Bedding-N62E, 43SE
17	9	119	-	60		SANDSTONE to PEBBLY SANDSTONE, fine to very coarse, massive soft, slightly moist, pale yellowish brown 1" thick brownish gray clay seam (possible bedding shear): N68E, 43SE
22	4	112	-	65		SANDSTONE, fine to very coarse, soft, slightly moist, pale yellowish brown
29	4	113	-	70		some cross bedding Bedding-N86W, 43SW
20	8	112	-	75 80		PEBBLY SANDSTONE, coarse to very coarse, abundant pebbles and gravel, soft, slightly moist, pale yellowish brown to black yellowish orange END OF BORING AT 81 FEET. No water. No caving. slightly silty

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

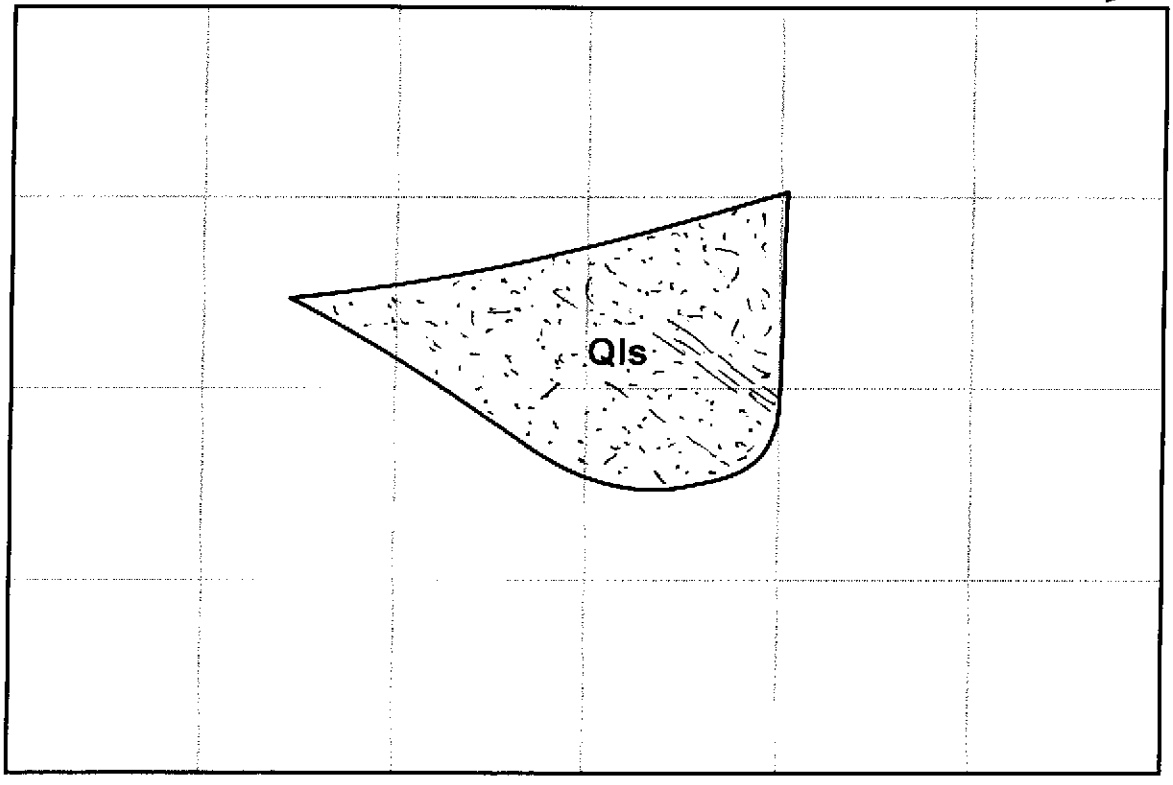
LOG OF TEST PIT TP-1

JOB NUMBER 99-802-01 CLIENT VALENCIA WATER COMPANY LOGGED BY DGF

LOCATION P.M. 18108 ELEVATION 1090' DATE LOGGED 5-15-01

0'-7' **LANDSLIDE (Qls):** fine grained sand with discontinued beds of siltstone, soft, dry, Pale yellowish brown (10YR 6/2)

BEARING: N72W



SCALE: 1" = 5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

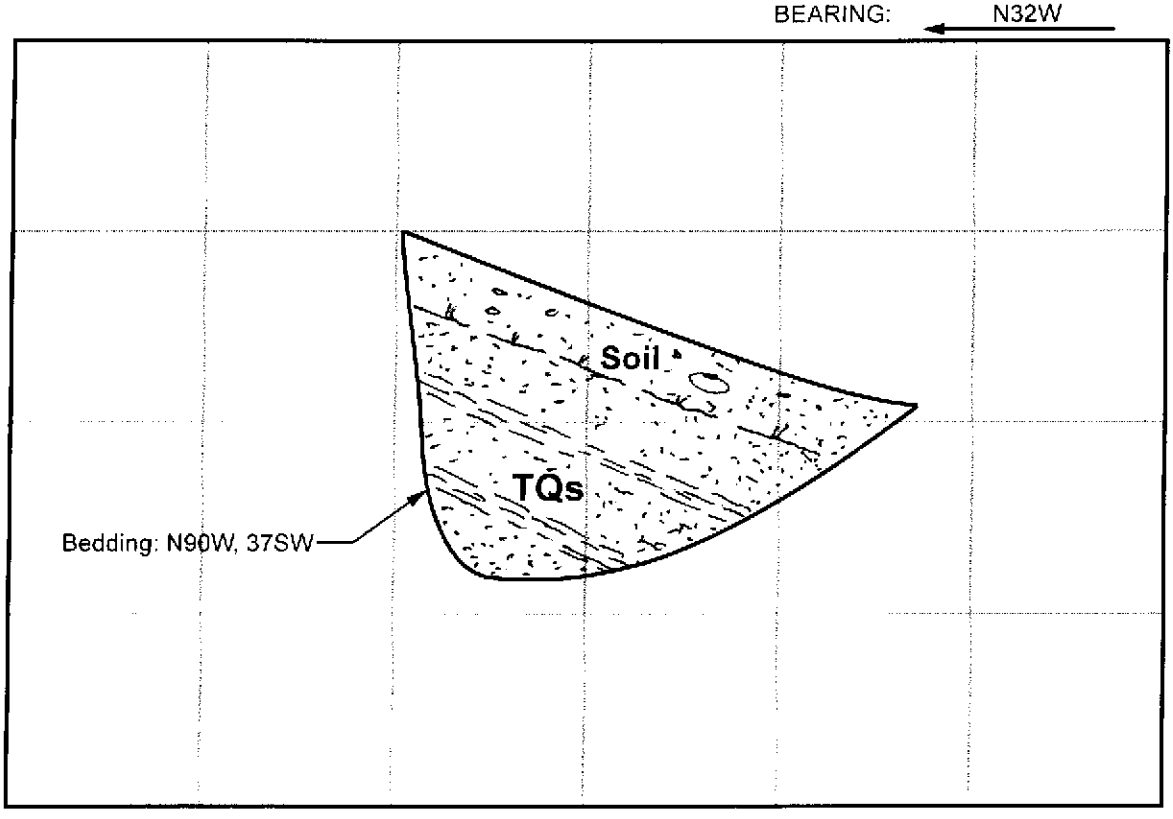
LOG OF TEST PIT TP-2

JOB NUMBER 99-802-01 CLIENT VALENCIA WATER COMPANY LOGGED BY DGF

LOCATION P.M. 18108 ELEVATION 1070' DATE LOGGED 5-15-01

0'-2' **SOIL / COLLUVIUM (Qc):** fine to coarse grained silty sand with sandstone cobbles, soft, dry, pale yellowish brown (10YR 6/2)

2'-9' **SAUGUS FORMATION (TQs):** fine to coarse grained sandstone, hard, moist, pinkish gray (5YR 8/1), clayey siltstone, moderately hard, moist, moderate brown (5YR 4/4)



SCALE: 1" = 5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES

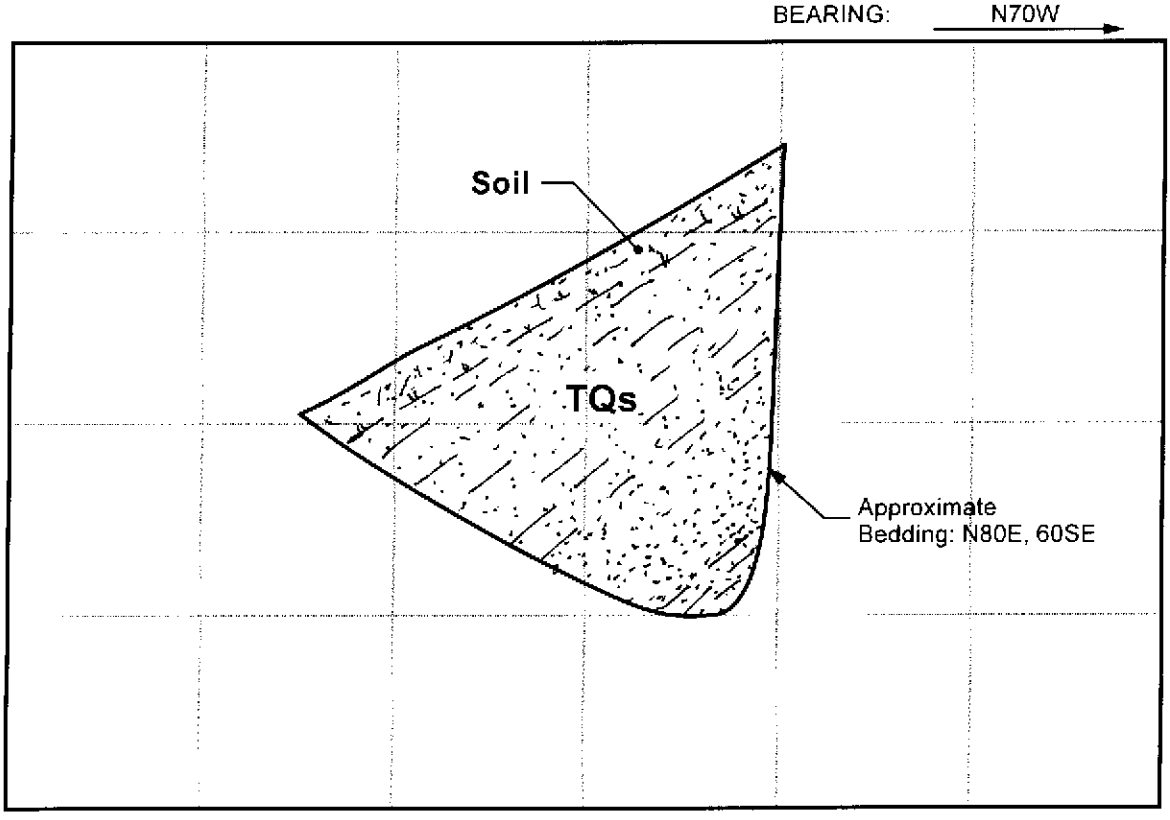
LOG OF TEST PIT TP-3

JOB NUMBER 99-802-01 CLIENT VALENCIA WATER COMPANY LOGGED BY DGF

LOCATION P.M. 18108 ELEVATION 1105' DATE LOGGED 5-15-01

0'-2' **SOIL:** fine to coarse grained silty sand to silt, loose, dry, pale yellowish brown (10YR 6/2)

1'-12' **SAUGUS FORMATION (TQs):** fine grained sandy siltstone, moderately hard, moist, moderate yellowish brown (10YR 5/4),random fractures, no well define bedding



SCALE: 1" = 5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

R.T. FRANKIAN & ASSOCIATES

For use with report dated 03/28/2008; RTF Job No. 99-802-21

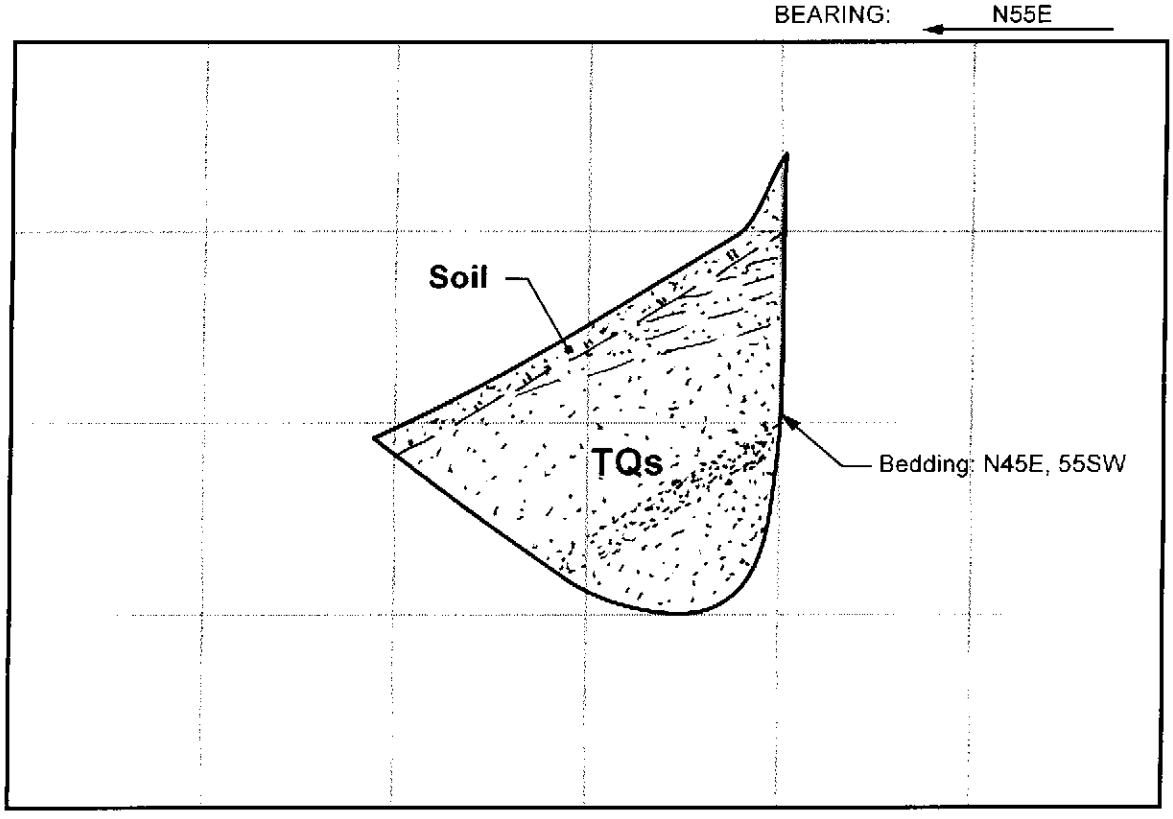
LOG OF TEST PIT TP-4

JOB NUMBER 99-802-01 CLIENT VALENCIA WATER COMPANY LOGGED BY DGF

LOCATION P.M. 18108 ELEVATION 1080' DATE LOGGED 5-15-01

0'-0.5' **SOIL:** mostly sand, some silt, pale yellowish brown (10YR 6/2),loose, dry

2'-9' **SAUGUS FORMATION (TQs):** fine to medium grained sandstone, moderately hard, dry, pinkish gray (5YR 8/1) , well bedded



SCALE: 1" = 5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF TEST PIT TP-5

JOB NUMBER 99-802-01 CLIENT VALENCIA WATER COMPANY LOGGED BY DGF

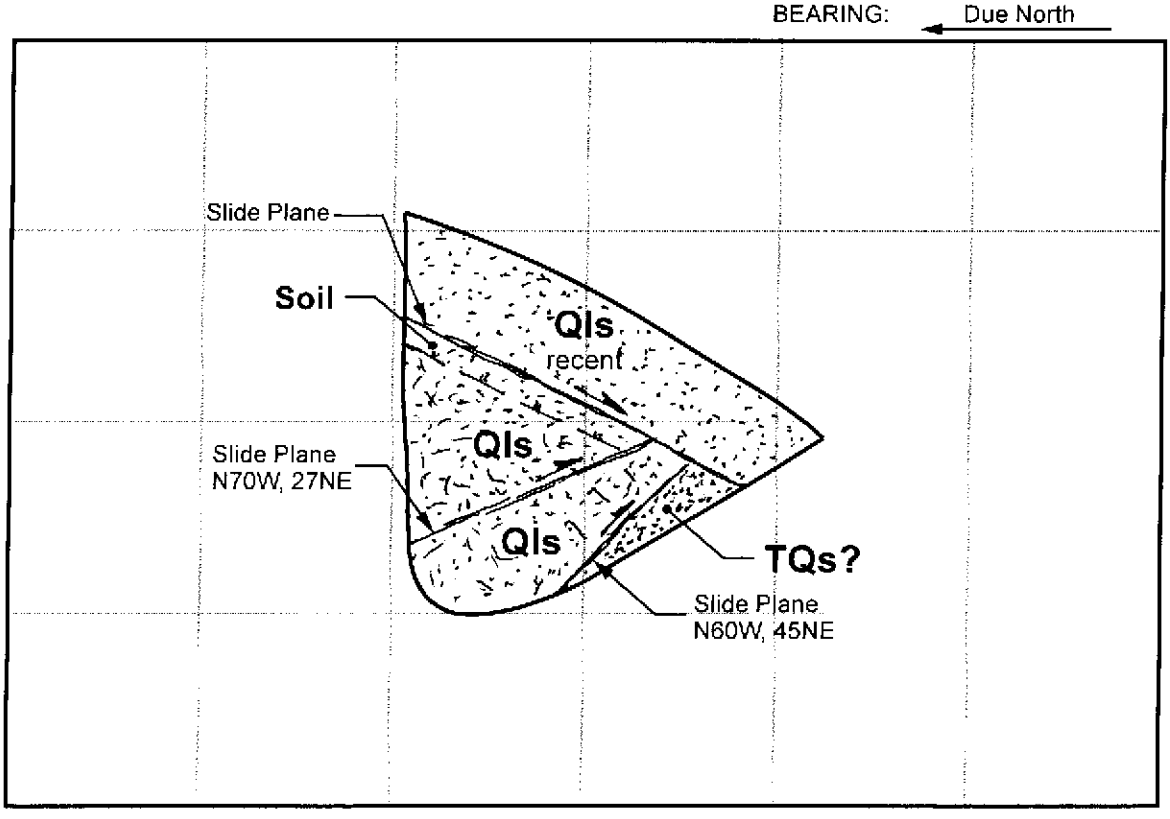
LOCATION P.M. 18108 ELEVATION 1135' DATE LOGGED 5-15-01

0'-10' **LANDSLIDE (Qls):**

0'-2' fine grained silty sand, loose, dry, grayish orange (10YR 7/4)

2'-2.5' **SOIL**

4'-10' silty sandstone, moderately hard, dry to moist, pale yellowish brown (10YR 6/2), fractured



SCALE: 1" = 5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

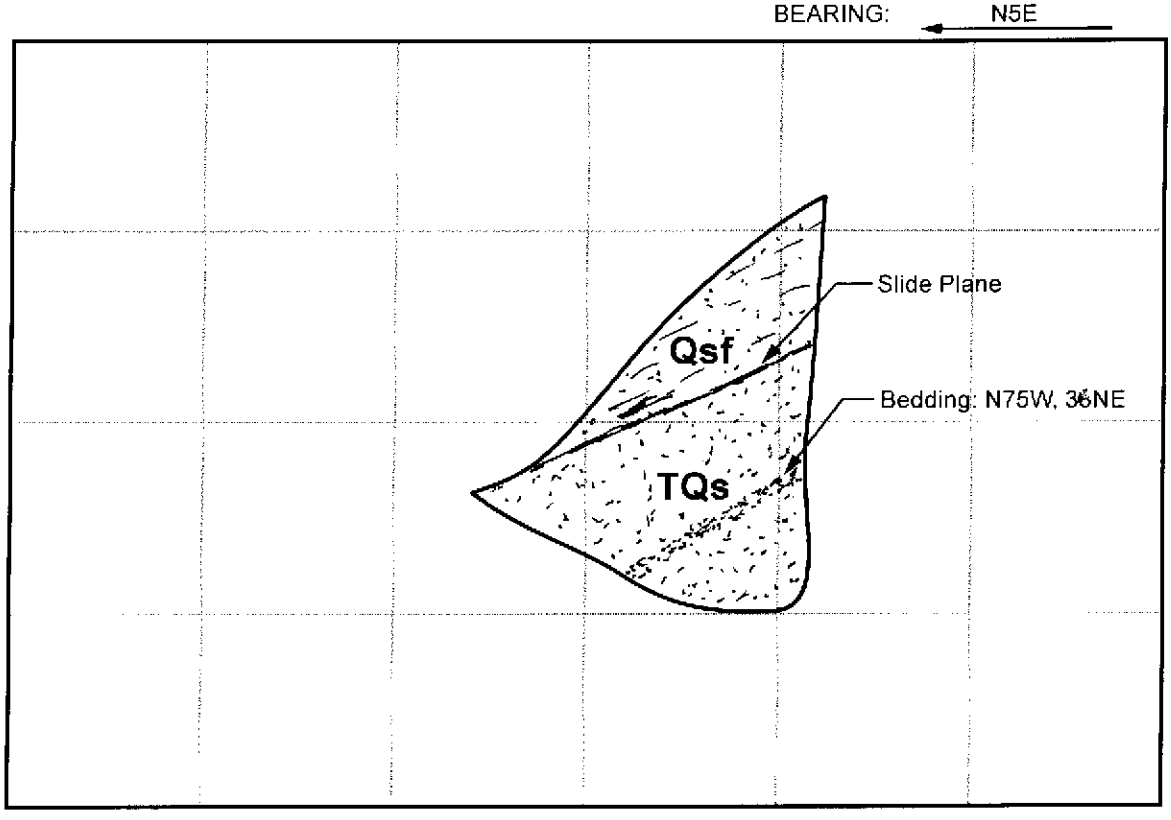
LOG OF TEST PIT TP-6

JOB NUMBER 99-802-01 CLIENT VALENCIA WATER COMPANY LOGGED BY DGF

LOCATION P.M. 18108 ELEVATION 1140' DATE LOGGED 5-15-01

0'-4' **SURFICIAL FAILURE (Qsf):** clayey siltstone moderately hard, moist, dark yellowish brown (10YR 4/2)

4'-11' **SAUGUS FORMATION (TQs):** fine grained silty sand, hard, moist, grayish orange (10YR 7/4)



SCALE: 1" = 5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

R.T. FRANKIAN & ASSOCIATES

For use with report dated 03/28/2008; RTF Job No. 99-802-21

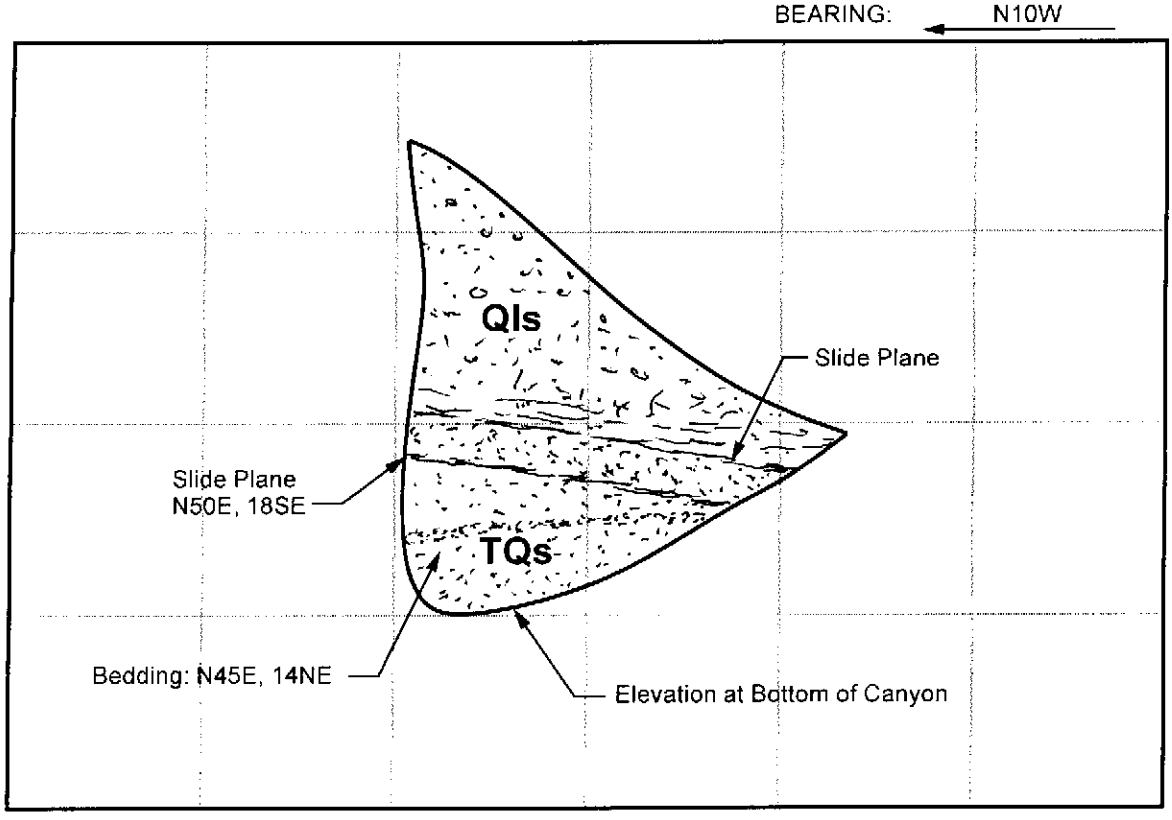
LOG OF TEST PIT TP-7

JOB NUMBER 99-802-01 CLIENT VALENCIA WATER COMPANY LOGGED BY DGF

LOCATION P.M. 18108 ELEVATION 1155' DATE LOGGED 5-15-01

0'-7' **LANDSLIDE (Qls):** fine grained silty sand with beds and scattered cobbles, loose, dry, grayish orange (10YR 7/4)

7'-12' **SAUGUS FORMATION (TQs):** sandy siltstone, moderately hard, moist, pale yellowish brown (10YR 6/2), with coarse grained sandstone bed



SCALE: 1" = 5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF TEST PIT TP-8

JOB NUMBER 99-802-01 CLIENT VALENCIA WATER COMPANY LOGGED BY DGF

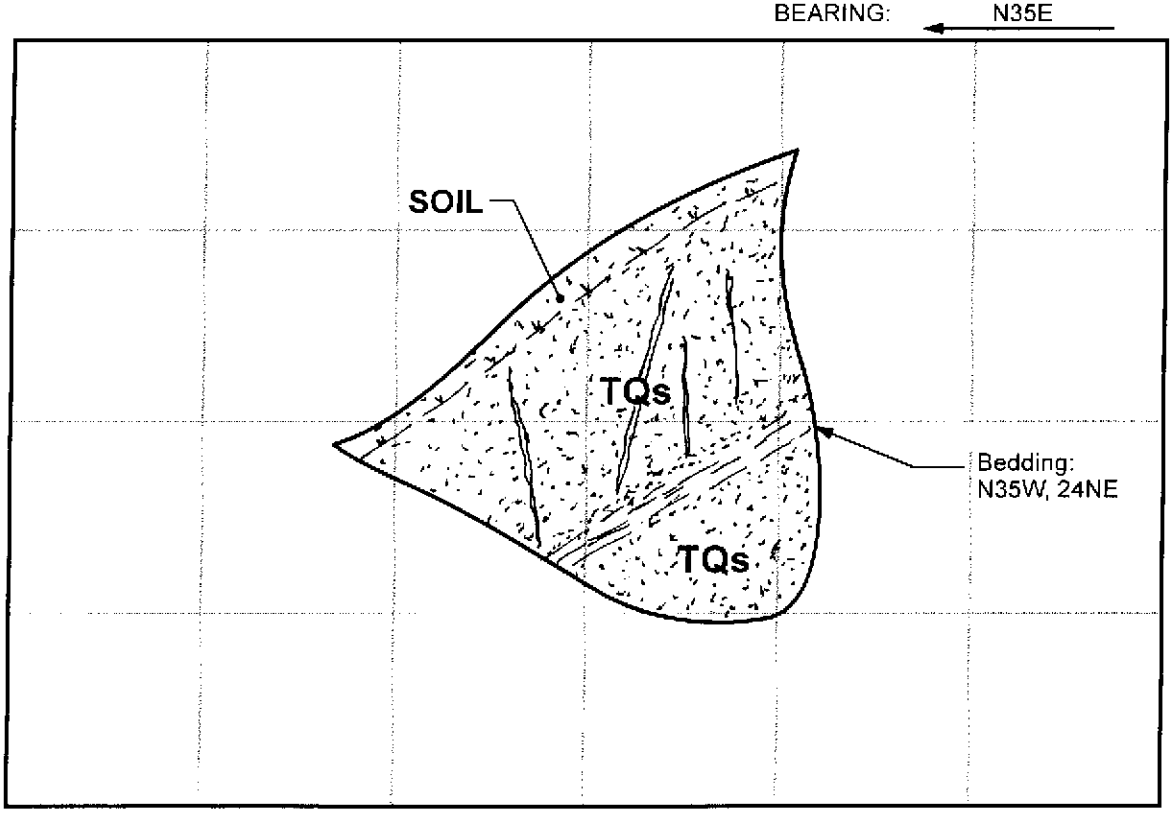
LOCATION P.M. 18108 ELEVATION 1160' DATE LOGGED 5-15-01

0'-0.5' **SOIL:** fine to coarse grained sand, loose, dry, pale yellowish brown (10YR 6/2)

0.5'-12.5' **SAUGUS FORMATION (TQs):**

0.5'-6' fine to coarse grained sandstone, loose, moist, pinkish gray (5YR 8/1), highly weathered, moderately well defined bedding at 6 feet

6'-12.5' fine grained silty sand, moderately hard, moist, grayish orange (10YR 7/4), with siltstone interbed



SCALE: 1" = 5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

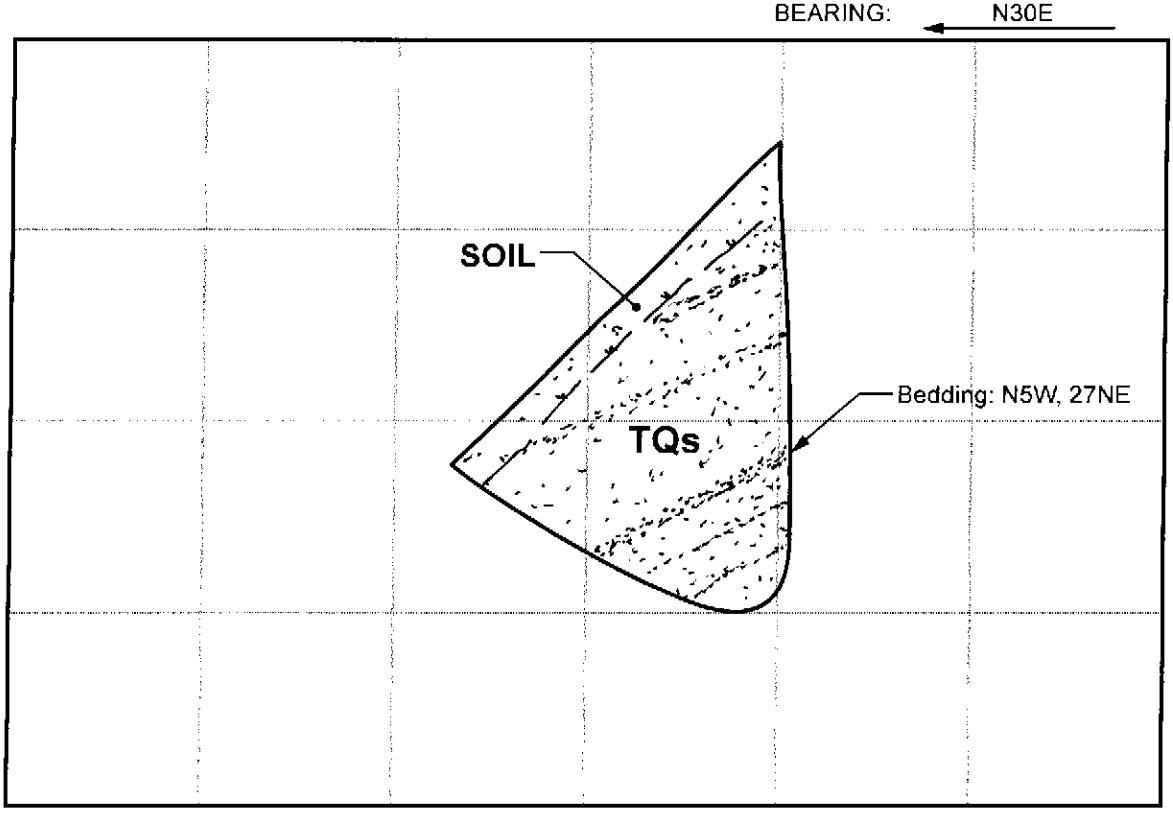
LOG OF TEST PIT TP-9

JOB NUMBER 99-802-01 CLIENT VALENCIA WATER COMPANY LOGGED BY DGF

LOCATION P.M. 18108 ELEVATION 1170' DATE LOGGED 5-15-01

0'-1' **SOIL:** fine to coarse grained sand with silt, loose, dry, pale brown (5YR 5/2),

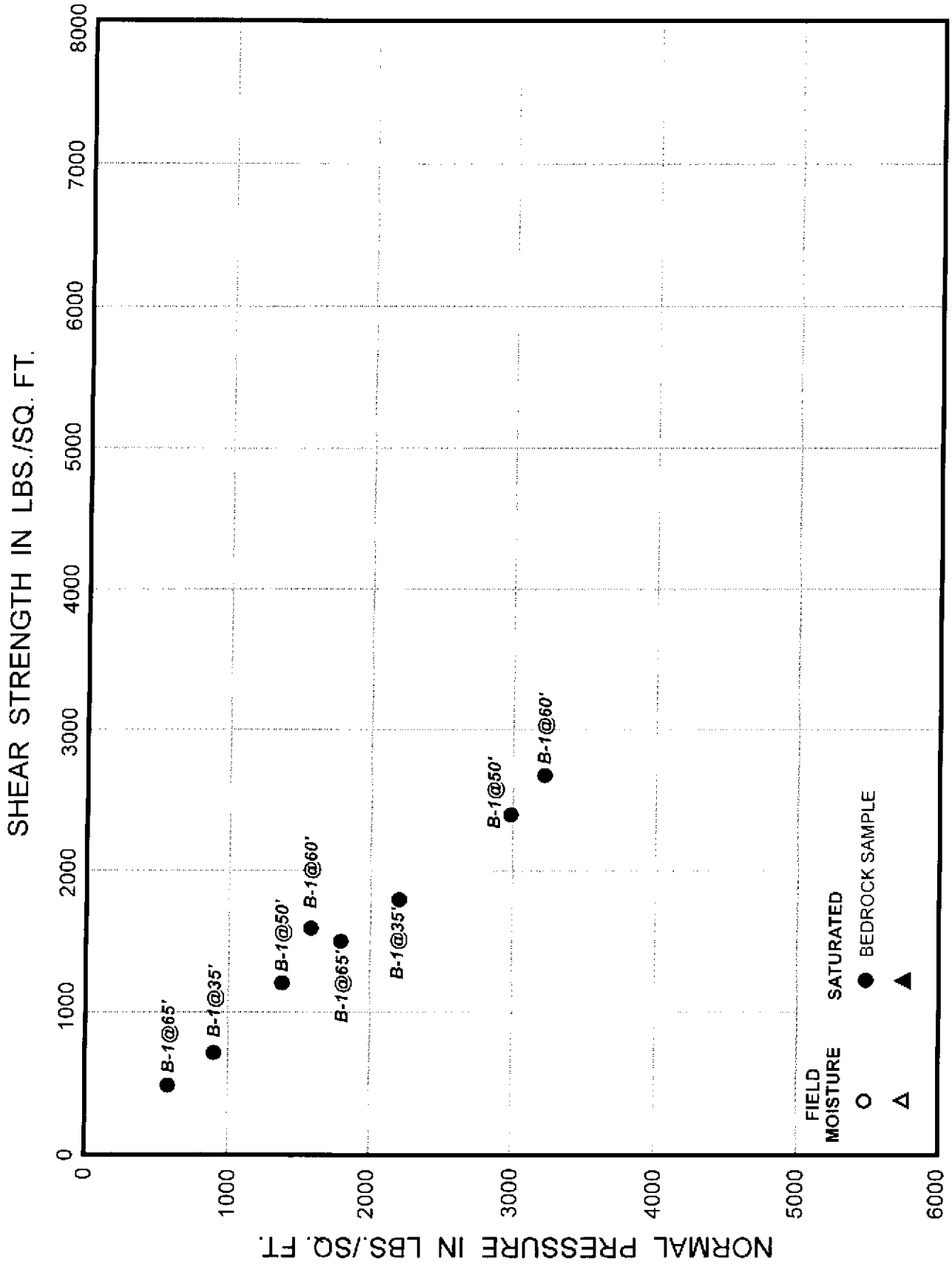
1'-13' **SAUGUS FORMATION (TQs):** fine to coarse grained sandstone with pebble conglomerate interbeds, soft, moist, pinkish gray (5YR 8/1), poorly cemented, well bedded, rock very poorly cemented possibly disturbed or creep affected



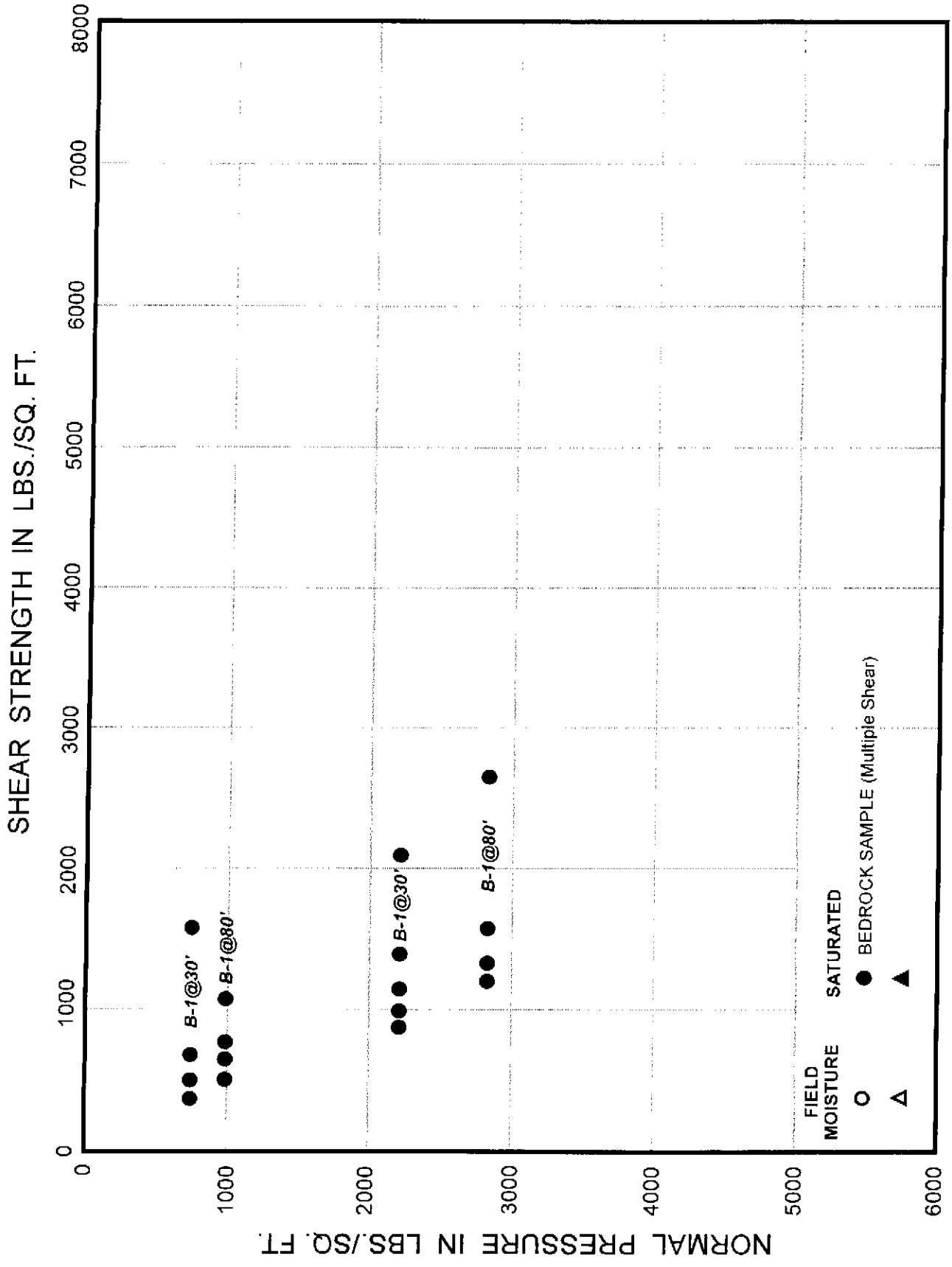
SCALE: 1" = 5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

SUMMARY OF SHEAR TEST DATA

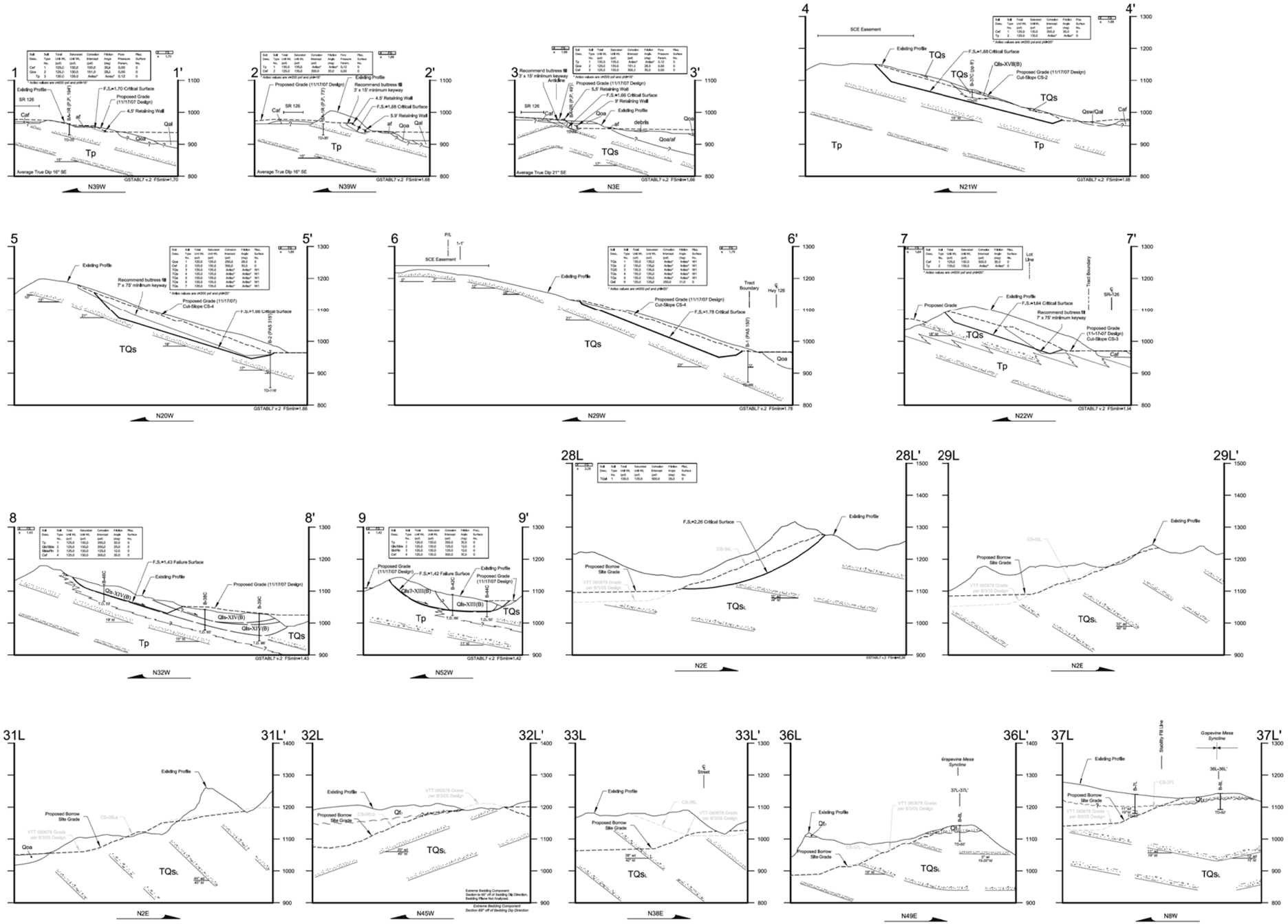


SUMMARY OF SHEAR TEST DATA



R.T. FRANKIAN & ASSOCIATES
FIGURE A-1b

Appendix E



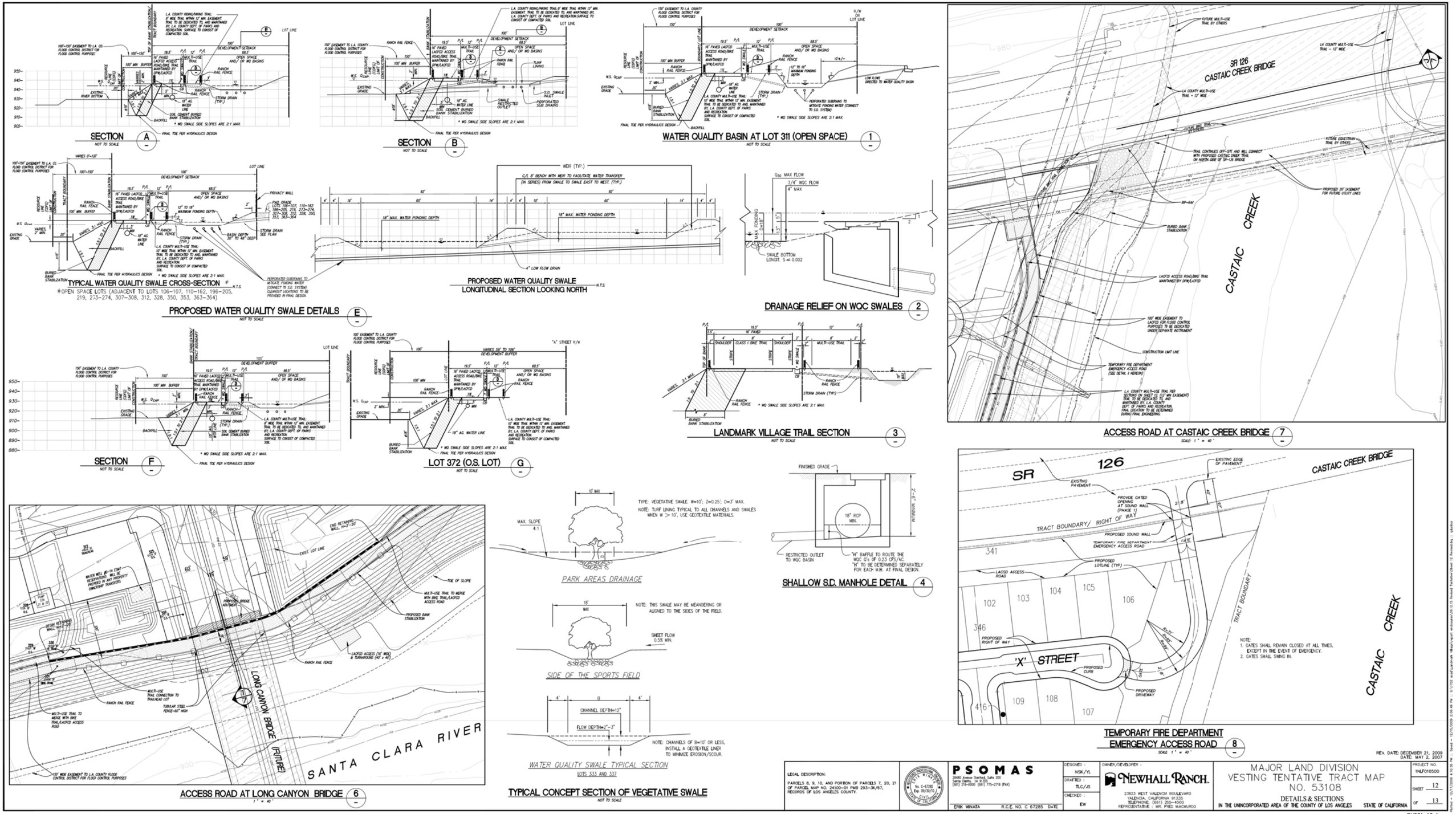
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

GEOLOGIC CROSS SECTIONS

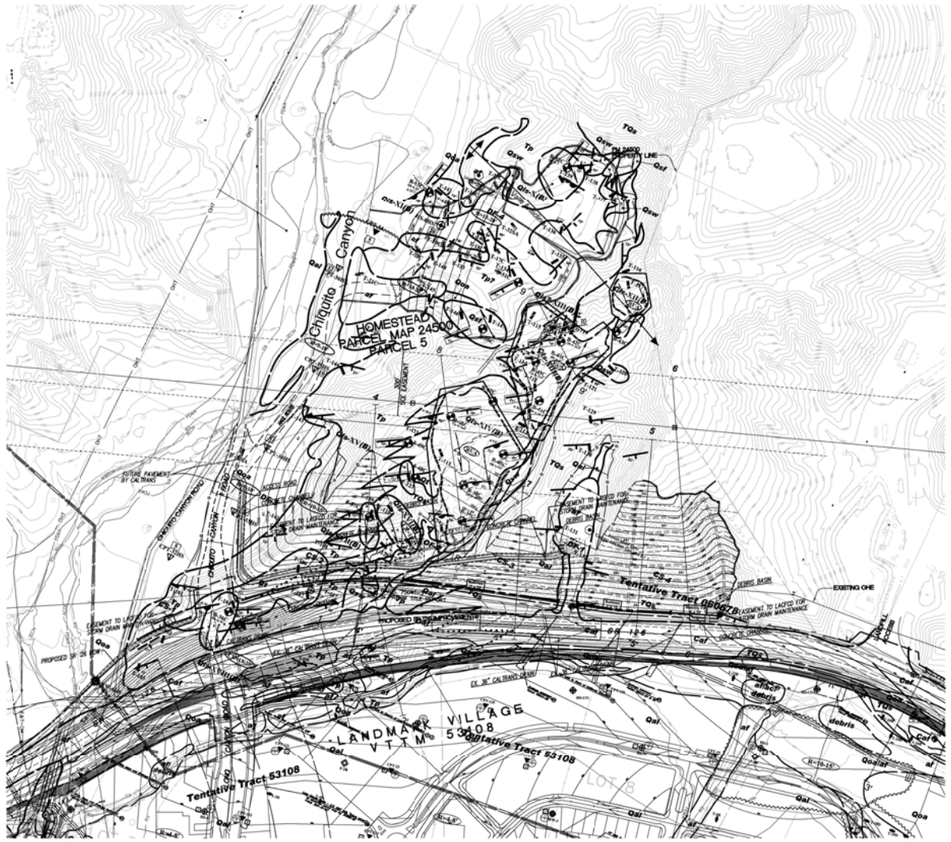
Date: 12/21/09	Job No.: 09-1702R
Scale: 1" = 100'	CAD File: Revised Sections Plate
PLATE I	Geology by: staff / Drawn by: staff / Revised:

A full-size reproduction of this figure can be found at Impact Sciences.

A full-size reproduction of this figure can be found at Impact Sciences.

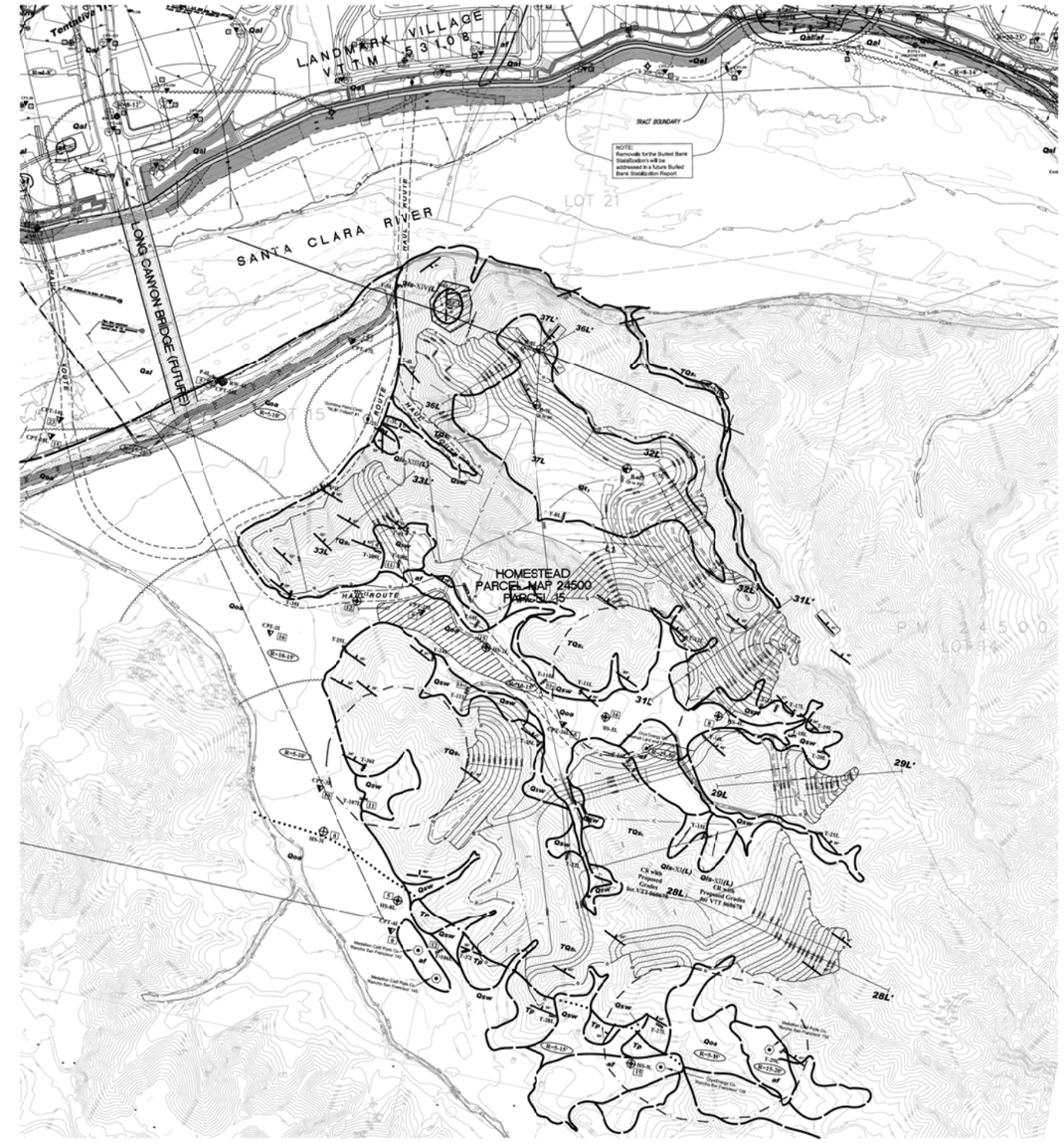


A full-size reproduction of this figure can be found at Impact Sciences.



OFFSITE GRADING
CHIQUITO CANYON

CHIQUITO CANYON EARTHWORK VOLUMES	
RAW CUT	1,190,000 Cubic Yards
RAW FILL	1,071,000 Cubic Yards
NET CUT	1,190,000 Cubic Yards
NET FILL	1,190,000 Cubic Yards
EXPORT	0 Cubic Yards



OFFSITE GRADING
ADOBE CANYON

ADOBE CANYON EARTHWORK VOLUMES	
RAW CUT	6,468,500 Cubic Yards
RAW FILL	133,000 Cubic Yards
NET CUT	6,468,500 Cubic Yards
NET FILL	146,300 Cubic Yards
EXPORT	6,322,200 Cubic Yards

REV. DATE: DECEMBER 21, 2009
DATE: MAY 2, 2007

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

Geologic/Geotechnical Map

Date: 11/21/09	Job No.: 99-17029-4
Scale: 1" = 100'	CAD File: Sheet 11 Revised Geologic Map
Sheet 11	Geology by: BJS / Drawn by: GSDUCH / Revised:

SEE 9/30/05 REPORT FOR VTT 060678 AND SHEET 3 FOR GEOLOGIC LEGEND

LEGAL DESCRIPTION:
PARCELS 8, 9, 10, AND PORTION OF PARCELS 7, 20, 21 OF PARCEL MAP NO. 24500-01 PMB 293-34/67, RECORDS OF LOS ANGELES COUNTY.

REGISTERED PROFESSIONAL ENGINEER No. C-67285 Exp. 06/30/10 STATE OF CALIFORNIA CIVIL

PSOMAS
28460 Avenue Stanford, Suite 200
Santa Clarita, CA 91355
(661) 219-6000 (661) 775-2718 (FAX)
ERIK WINAIA R.C.E. NO. C 67285 DATE

DESIGNED: NSK/YL
DRAFTED: TLC/JS
CHECKED: EW

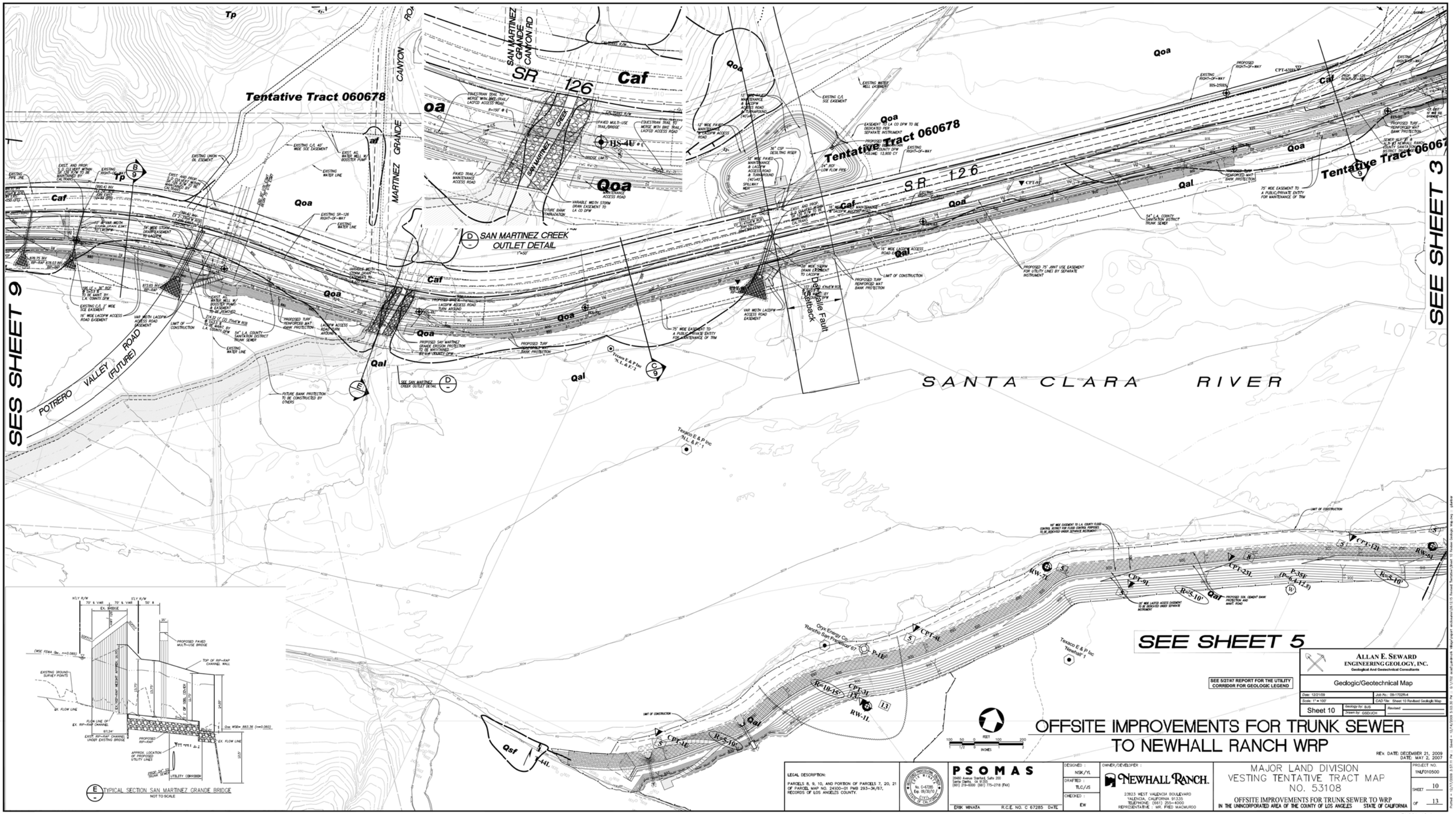
OWNER/DEVELOPER:
NEWHALL RANCH
23823 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE: (661) 255-4000
REPRESENTATIVE: MR. FRED MACMURDO

MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 53108
CHIQUITO CANYON & ADOBE CANYON OFFSITE GRADING
IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

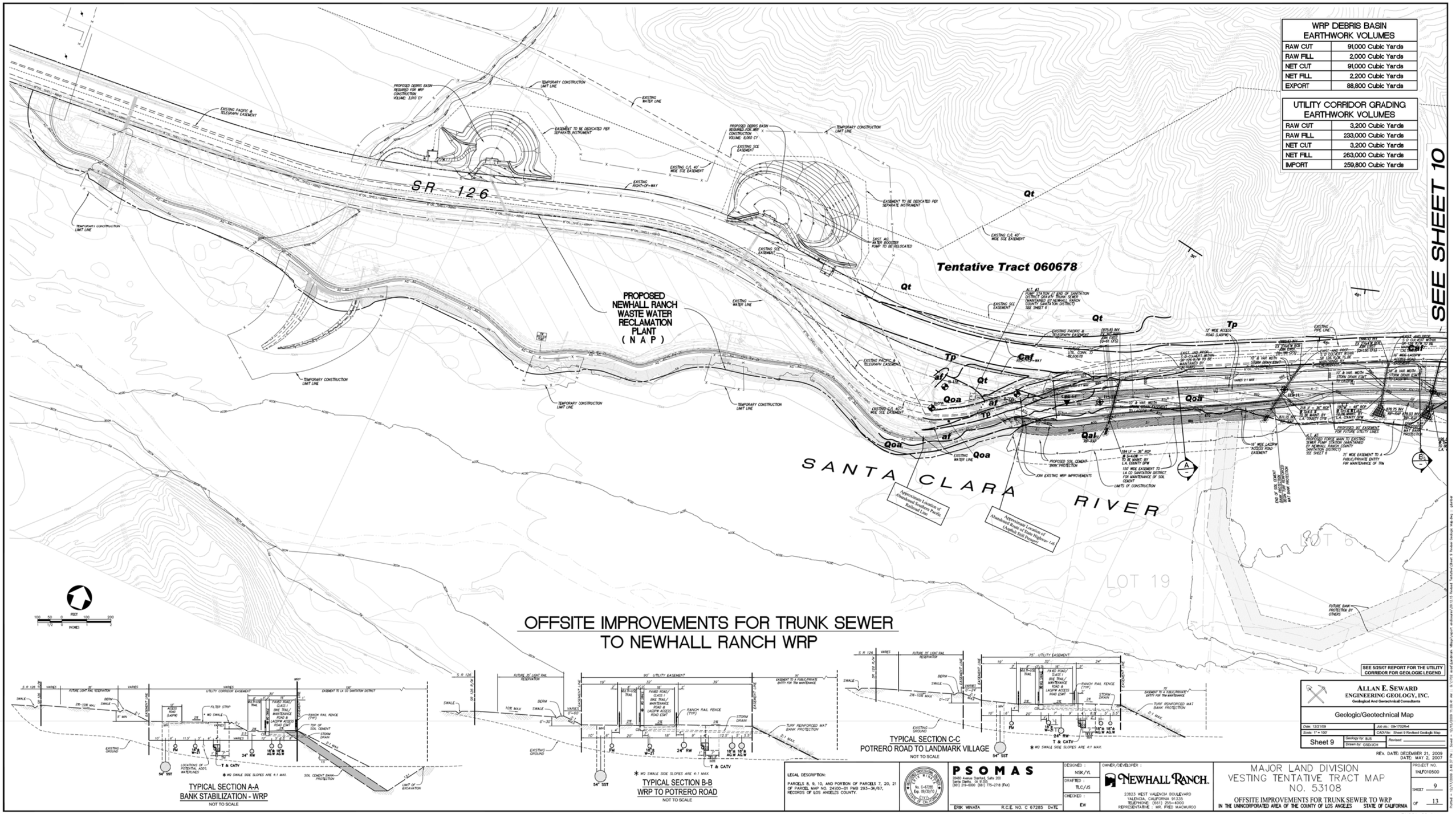
PROJECT NO. 1NLF010500
SHEET 11 OF 13

RVD01-11.dwg

A full-size reproduction of this figure can be found at Impact Sciences.



A full-size reproduction of this figure can be found at Impact Sciences.



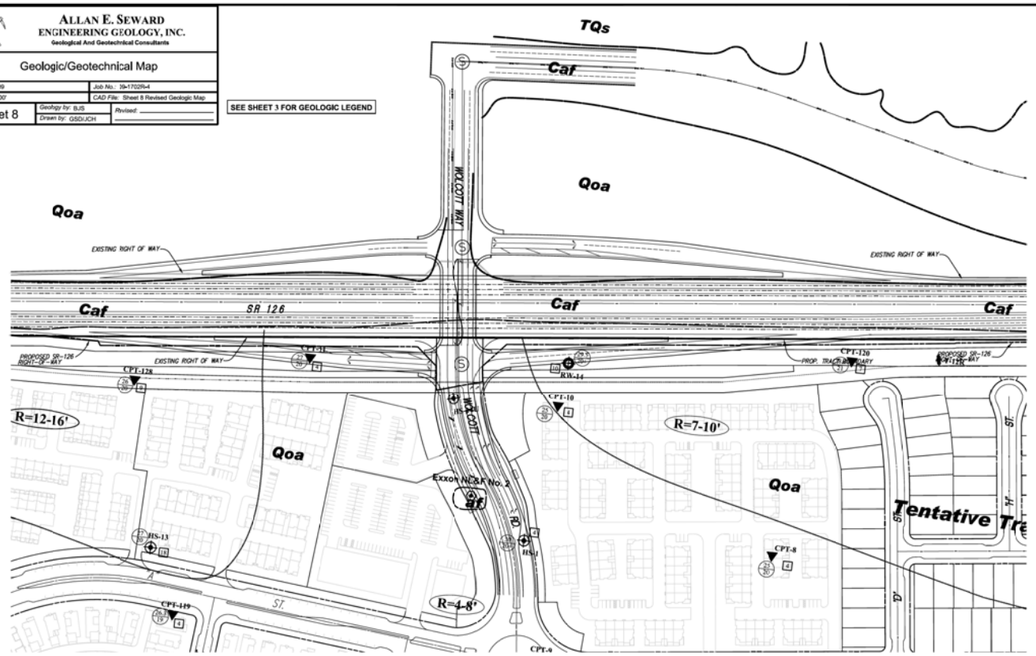
A full-size reproduction of this figure can be found at Impact Sciences.

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

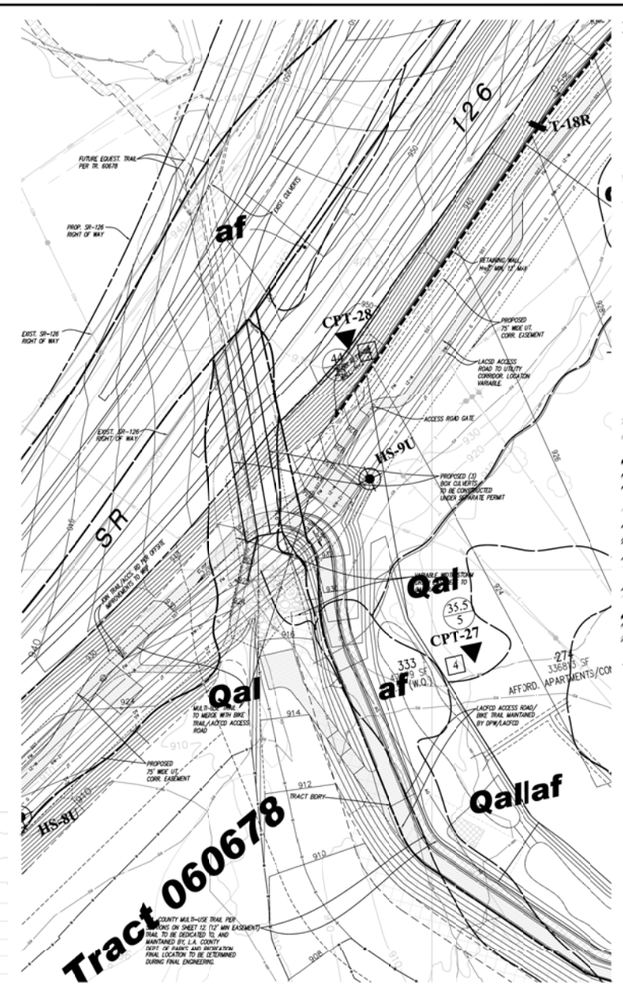
Geologic/Geotechnical Map

Date: 11/21/09 | Job No.: 39-170296-4
Scale: 1" = 100' | CAD File: Sheet 8 Revised Geologic Map
Sheet 8 | Geology by: BJS | Drawn by: GSD/JCH | Revised:

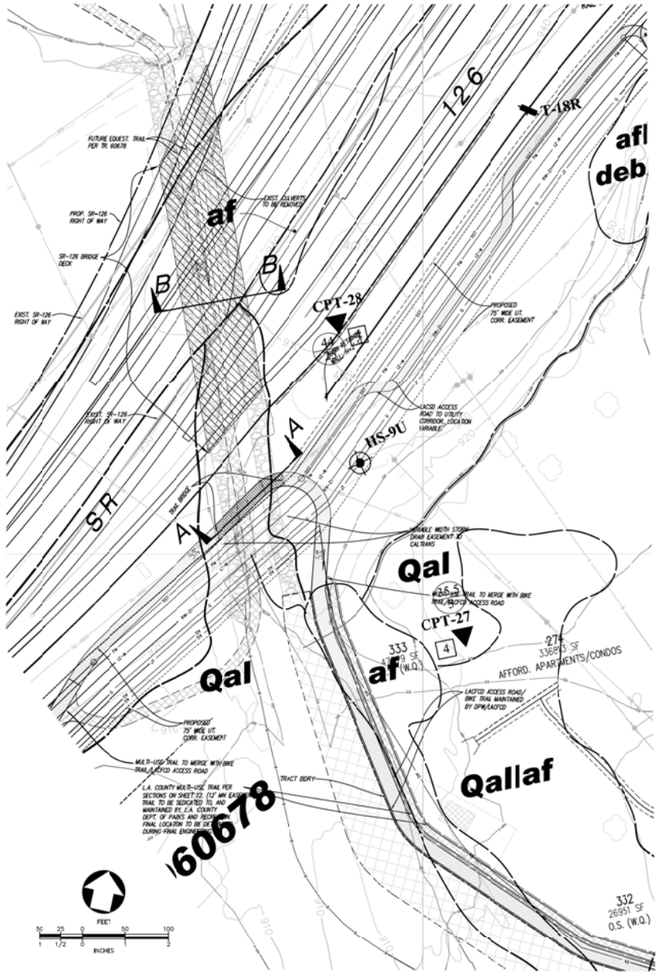
SEE SHEET 3 FOR GEOLOGIC LEGEND



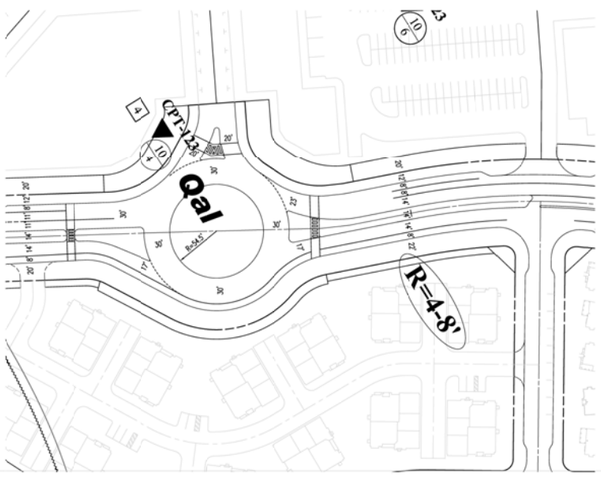
POSSIBLE LAYOUT OF FUTURE INTERCHANGE
WOLCOTT ROAD - SR 126
1
-



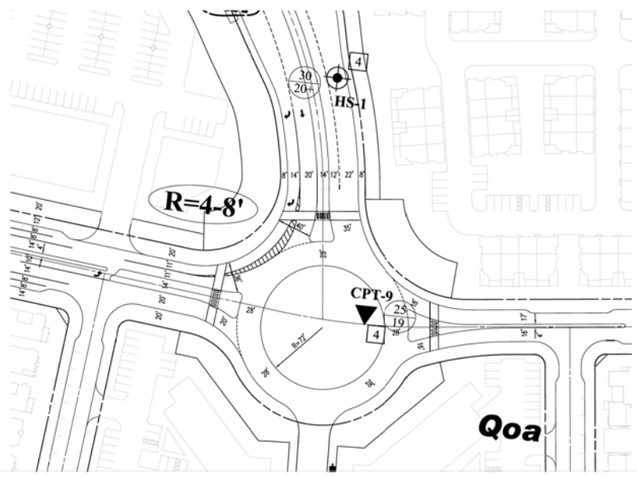
CHIQUITO CYN OUTLET DETAIL
2
-



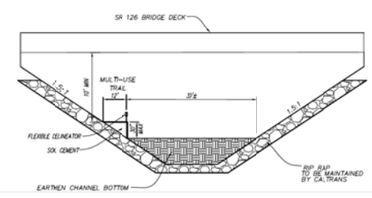
CHIQUITO CYN OUTLET DETAIL
BRIDGE ALTERNATE
3
-



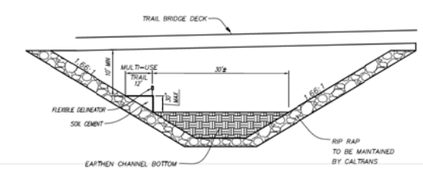
WESTERLY ROUNDABOUT DETAIL
4
-



EASTERLY ROUNDABOUT DETAIL
5
-



SECTION B-B
NOT TO SCALE



SECTION A-A
NOT TO SCALE

REV. DATE: DECEMBER 21, 2009
DATE: MAY 2, 2007

LEGAL DESCRIPTION:
PARCELS 8, 9, 10, AND PORTION OF PARCELS 7, 20, 21 OF PARCEL MAP NO. 24500-01 PMB 293-34/67, RECORDS OF LOS ANGELES COUNTY.

PROFESSIONAL ENGINEER ERIK WINATA No. C-67285 Exp. 09/30/10 CIVIL STATE OF CALIFORNIA

PSOMAS
28480 Avenue Stanford, Suite 200
Santa Clarita, CA 91355
(661) 259-9200 (661) 775-2718 (FAX)
ERIK WINATA R.C.E. NO. C 67285 DATE

DESIGNED: NSK/YL
DRAFTED: TLC/JS
CHECKED: EW

OWNER/DEVELOPER:
NEWHALL RANCH.
23823 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE: (661) 255-4000
REPRESENTATIVE: MR. FRED MACMURDO

MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 53108
CHIQUITO LANDFILL DEBRIS BASIN & ALT. WOLCOTT/SR 126 INTERCHANGE DETAILS
IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

PROJECT NO. 1NAL010500
SHEET 8 OF 13

RV001-08.dwg

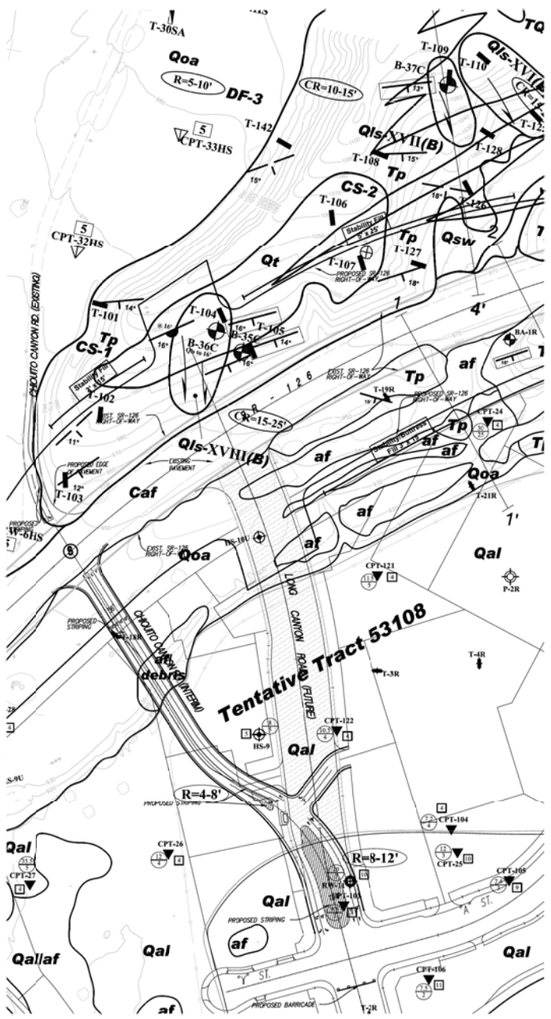
A full-size reproduction of this figure can be found at Impact Sciences.

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

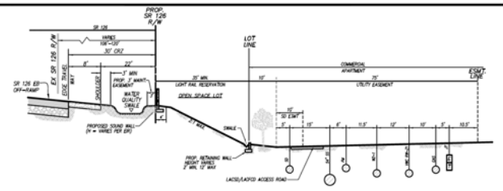
Geologic/Geotechnical Map

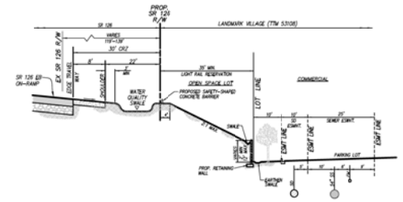
Date: 12/21/09	Job No.: 39-170294
Scale: 1" = 100'	CAD File: Sheet 7 Revised Geologic Map
Sheet 7	Geology by: BJS / Drawn by: GSDUCH / Revised:

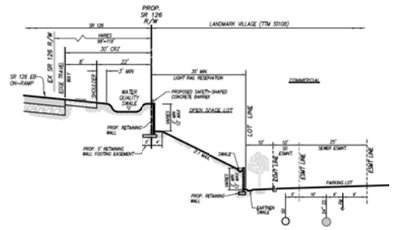
SEE SHEET 3 FOR GEOLOGIC LEGEND

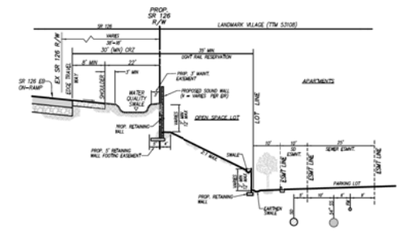


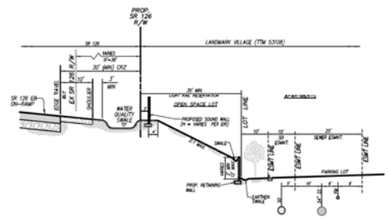
1 INTERIM DESIGN CHIQUITO CANYON RD. - SR 126 INTERCHANGE

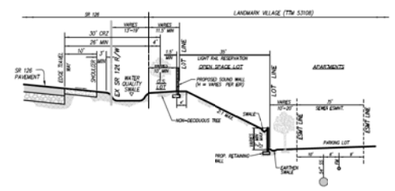

TYPICAL SECTION O–O
NOT TO SCALE

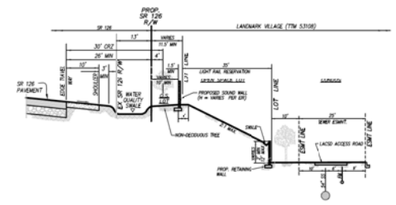

TYPICAL SECTION N–N
NOT TO SCALE

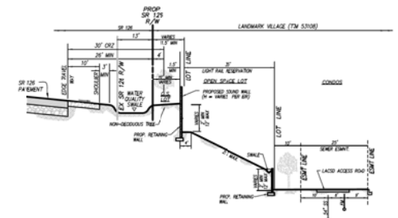

TYPICAL SECTION M–M
NOT TO SCALE

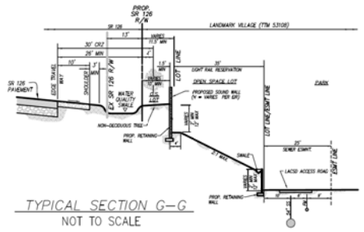

TYPICAL SECTION L–L
NOT TO SCALE

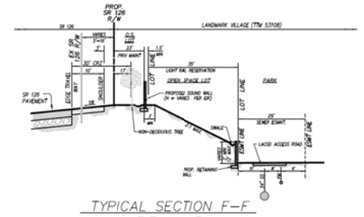

TYPICAL SECTION K–K
NOT TO SCALE

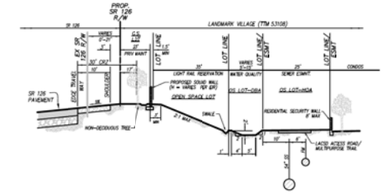

TYPICAL SECTION J–J
NOT TO SCALE

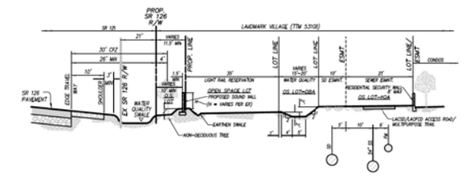

TYPICAL SECTION I–I
NOT TO SCALE

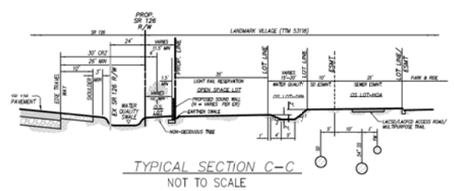

TYPICAL SECTION H–H
NOT TO SCALE

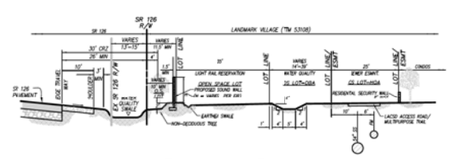

TYPICAL SECTION G–G
NOT TO SCALE

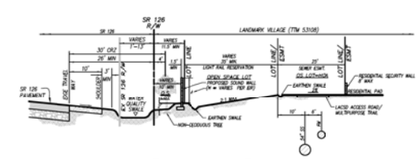

TYPICAL SECTION F–F
NOT TO SCALE

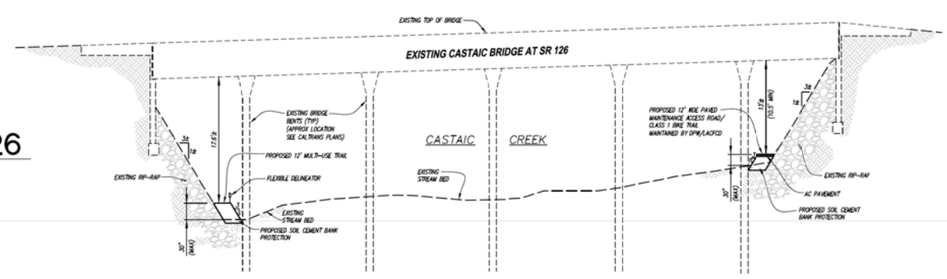

TYPICAL SECTION E–E
NOT TO SCALE


TYPICAL SECTION D–D
NOT TO SCALE

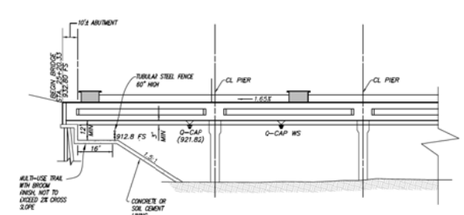

TYPICAL SECTION C–C
NOT TO SCALE


TYPICAL SECTION B–B
NOT TO SCALE


TYPICAL SECTION A–A
NOT TO SCALE



TRAIL SECTION AT CASTAIC CREEK BRIDGE J
NOT TO SCALE



TRAIL SECTION AT LONG CANYON BRIDGE II
NOT TO SCALE

FEET
100 50 0 100 200
1 1/2 0 1 2
INCHES

LEGAL DESCRIPTION:

PARCELS 8, 9, 10, AND PORTION OF PARCELS 7, 20, 21 OF PARCEL MAP NO. 24500-01 PMB 293-34/67, RECORDS OF LOS ANGELES COUNTY.

No. C-67285 Exp. 09/30/10 CIVIL STATE OF CALIFORNIA

PSOMAS
28480 Avenue Stanford, Suite 200
Santa Clarita, CA 91355
(661) 219-6000 (661) 775-2718 (FAX)

ERIK WINAFA R.C.E. NO. C 67285 DATE

DESIGNED: NSK/YL
DRAFTED: TLC/JS
CHECKED: EW

OWNER/DEVELOPER:
NEWHALL RANCH.
23823 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE: (661) 255-4000
REPRESENTATIVE: MR. RYKO MACMURDO

MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 53108

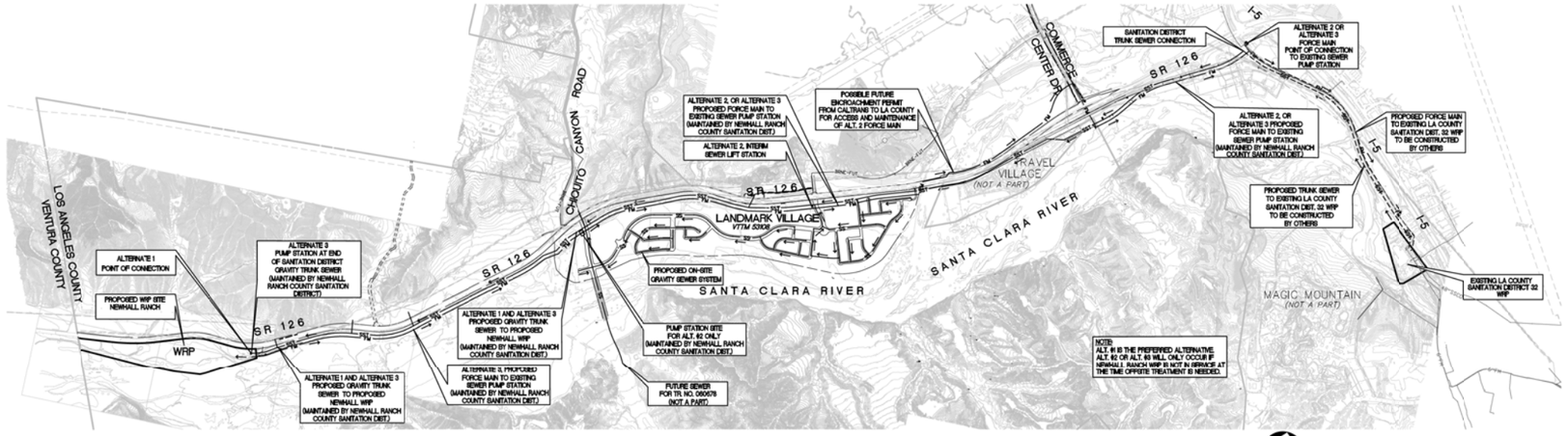
INTERIM DESIGN LONG CANYON - SR 126; UTIL. CORR. SECTIONS
IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

REV. DATE: DECEMBER 21, 2009
DATE: MAY 2, 2007

PROJECT NO. 1NLF010500
SHEET 7 OF 13

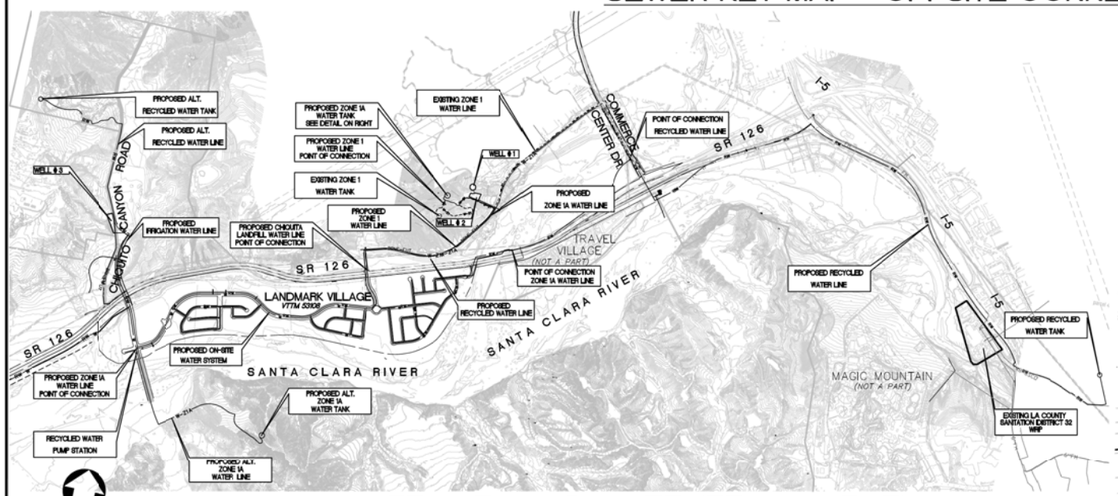
RV001-07.dwg

A full-size reproduction of this figure can be found at Impact Sciences.

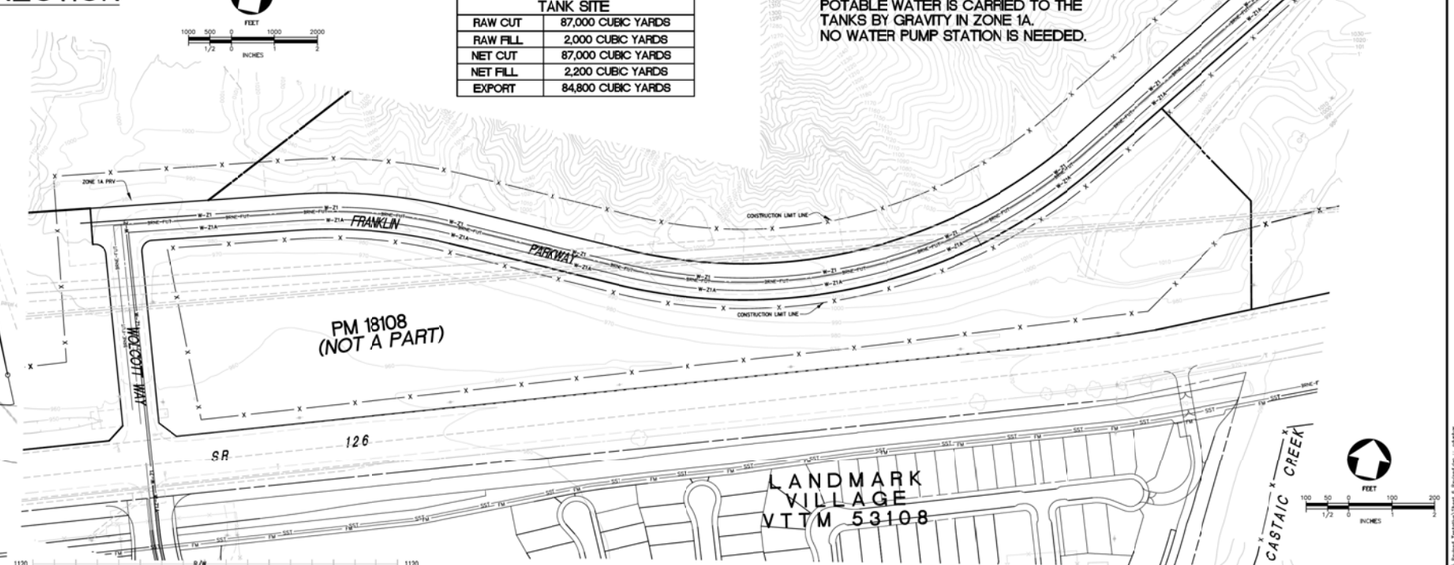


SEWER KEY MAP - OFFSITE CONNECTION

OFFSITE ZONE 1A WATER TANK SITE	
RAW CUT	87,000 CUBIC YARDS
RAW FILL	2,000 CUBIC YARDS
NET CUT	87,000 CUBIC YARDS
NET FILL	2,200 CUBIC YARDS
EXPORT	84,800 CUBIC YARDS

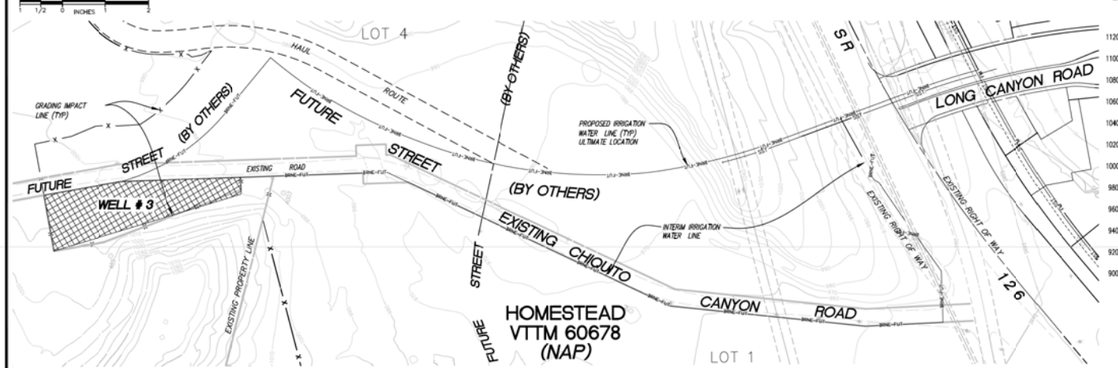


WATER KEY MAP - OFFSITE CONNECTION

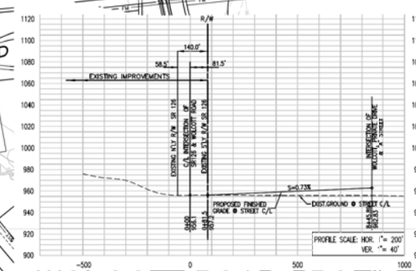


NOTE:
POTABLE WATER IS CARRIED TO THE TANKS BY GRAVITY IN ZONE 1A.
NO WATER PUMP STATION IS NEEDED.

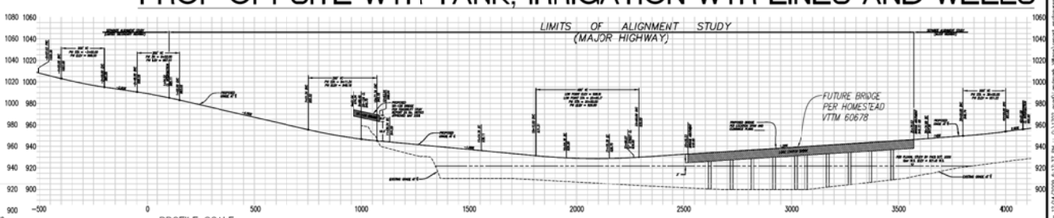
PROP OFFSITE WTR TANK, IRRIGATION WTR LINES AND WELLS



PROPOSED OFFSITE IRRIGATION WATER LINES AND WELLS



WOLCOTT ROAD PROFILE



PROFILE SCALE:
HORIZ: 1"=200'
VERT: 1"=40'

LONG CANYON ROAD PROFILE

REV. DATE: DECEMBER 21, 2009
DATE: MAY 2, 2007

LEGAL DESCRIPTION:
PARCELS 8, 9, 10, AND PORTION OF PARCELS 7, 20, 21 OF PARCEL MAP NO. 24500-01 PMB 293-34/67, RECORDS OF LOS ANGELES COUNTY.

PSOMAS
25800 Avenue Stanford, Suite 200
Santa Clarita, CA 91355
(661) 259-8000 (661) 775-2718 (FAX)
ERIK WINATA R.C.E. NO. C 67285 DATE

DESIGNED: NSK/YL
DRAFTED: TLC/JS
CHECKED: EW

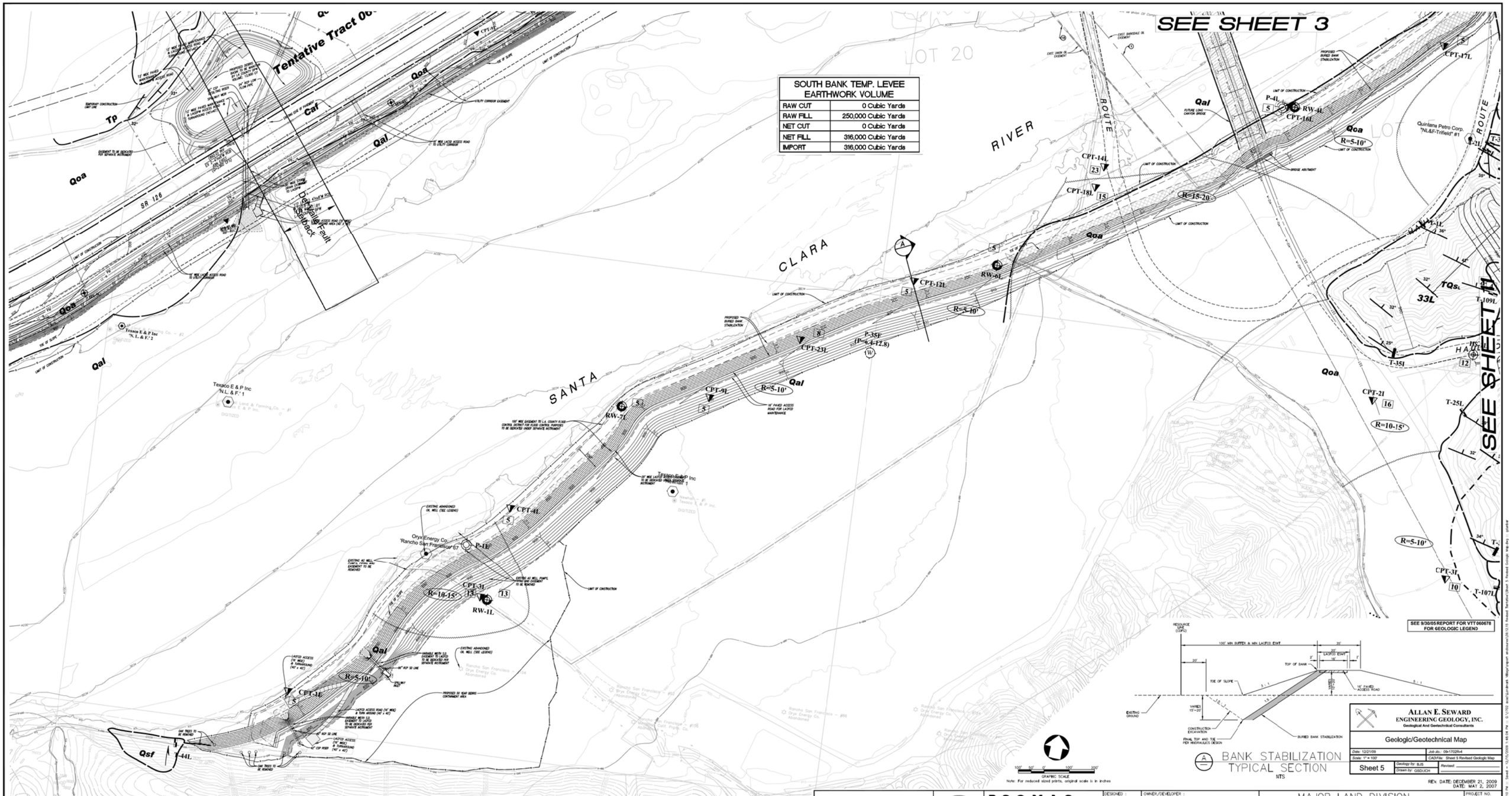
OWNER/DEVELOPER:
NEWHALL RANCH.
23823 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE: (661) 255-4000
REPRESENTATIVE: MR. FRED MACMURDO

MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 53108
SEWER & WATER KEY MAPS, LONG CANYON RD & WOLCOTT RD PROFILES
PROPOSED OFFSITE IRRIGATION WATER LINES AND WELLS
IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

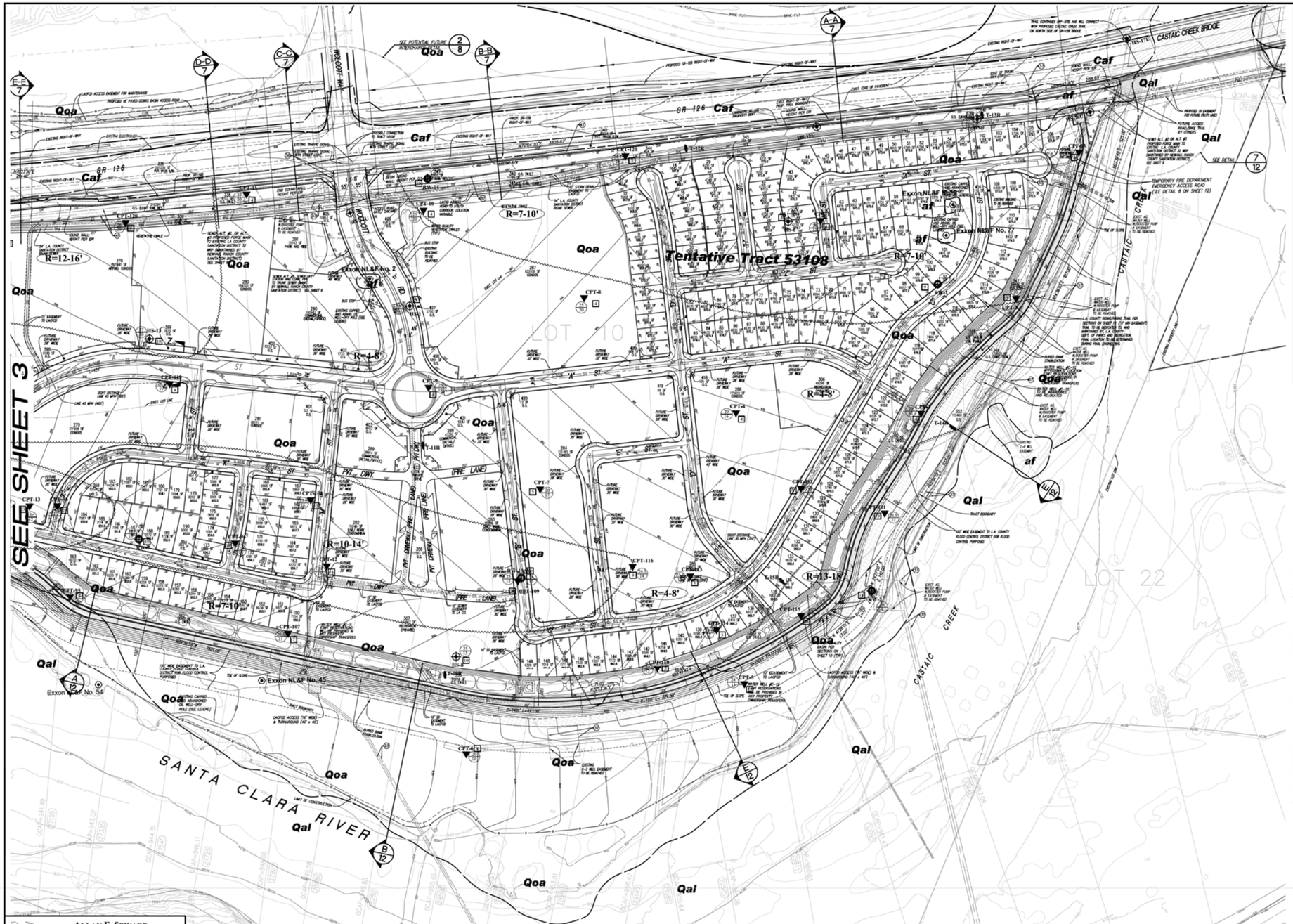
PROJECT NO. 1NLF010500
SHEET 6 OF 13

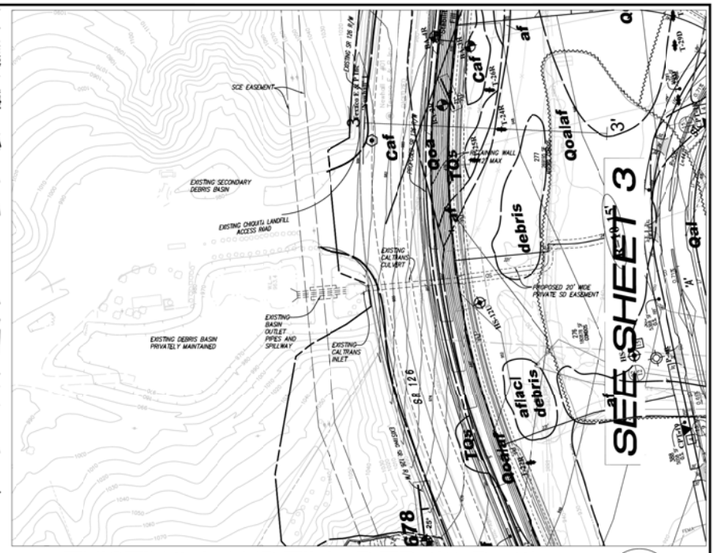
RV001-06.dwg

A full-size reproduction of this figure can be found at Impact Sciences.



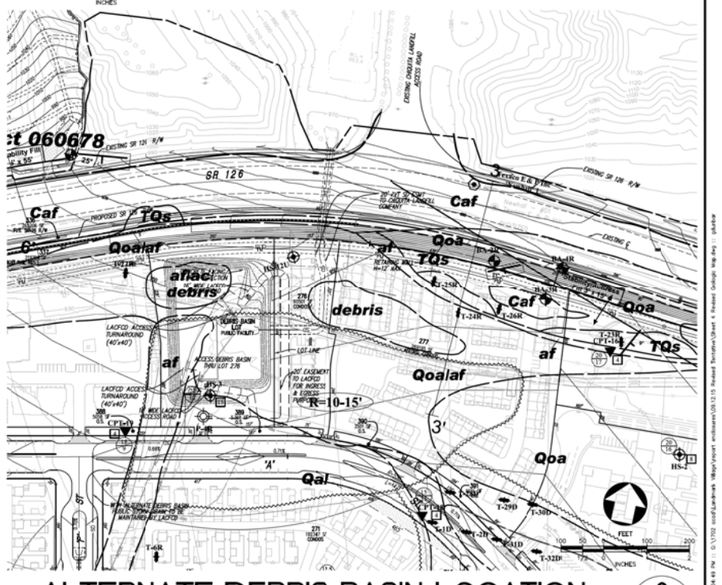
A full-size reproduction of this figure can be found at Impact Sciences.





EXISTING LANDFILL DEBRIS BASIN
AS SHOWN ON VTTM

5
-



ALTERNATE DEBRIS BASIN LOCATION

6
-

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

Geologic/Geotechnical Map

Date: 12/21/09	Job No.: 39-170295-4
Scale: 1" = 100'	CAD File: Sheet 4 Revised Geologic Map
Sheet 4	Geology by: BJS / Drawn by: GSDUCH / Revised:

SEE SHEET 3 FOR GEOLOGIC LEGEND

GRAPHIC SCALE
Note: For reduced sized prints, original scale is in inches

LEGAL DESCRIPTION:
PARCELS 8, 9, 10, AND PORTION OF PARCELS 7, 20, 21 OF PARCEL MAP NO. 24100-01 PMB 293-34/67, RECORDS OF LOS ANGELES COUNTY.

REGISTERED PROFESSIONAL ENGINEER ERIK WINATA No. C-67285 Exp. 06/30/10 CIVIL STATE OF CALIFORNIA

PSOMAS
3840 Avenue Stanford, Suite 200
Santa Clarita, CA 91355
(661) 259-6000 (661) 775-2718 (FAX)

ERIK WINATA R.C.E. NO. C 67285 DATE

DESIGNED: NSK/YL
DRAFTED: TLC/JS
CHECKED: EW

OWNER/DEVELOPER:
NEWHALL RANCH
23823 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE: (661) 255-4000
REPRESENTATIVE: MR. FRED MACMURDO

MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 53108

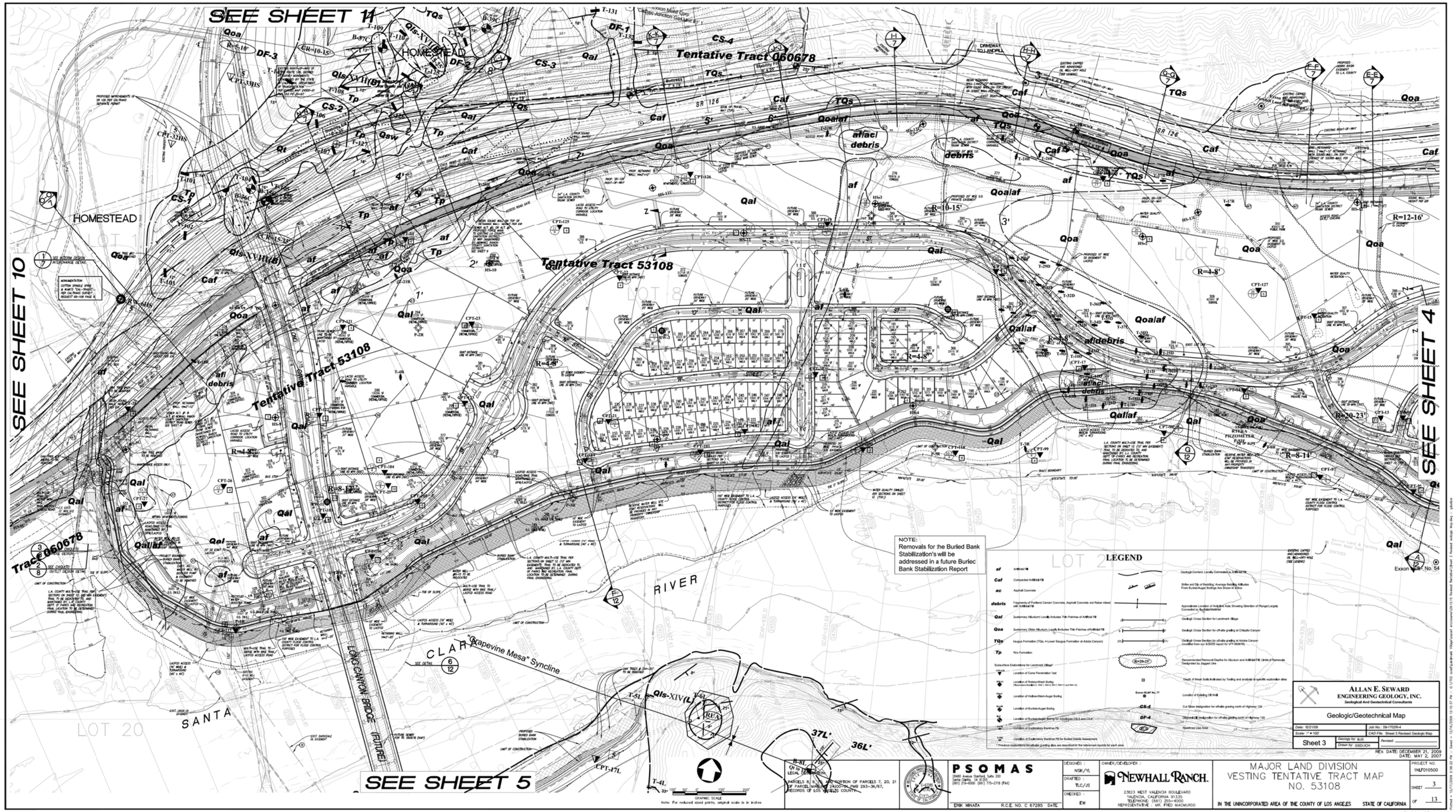
IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

REV. DATE: DECEMBER 21, 2009
DATE: MAY 2, 2007

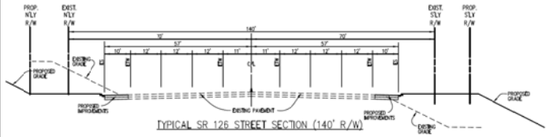
PROJECT NO. 1NLF010500
SHEET 4 OF 13

RV001-04.dwg

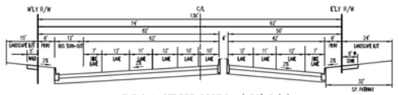
A full-size reproduction of this figure can be found at Impact Sciences.



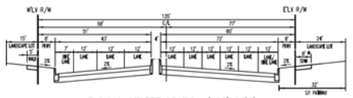
A full-size reproduction of this figure can be found at Impact Sciences.



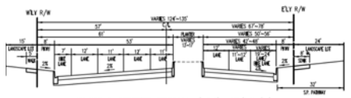
TYPICAL SR 126 STREET SECTION (140' R/W)



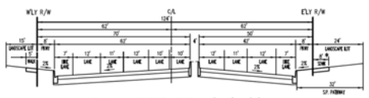
TYPICAL STREET SECTION (136' R/W)
LONG CANYON ROAD (North Side of 'A' Street)
Major Highway, Case 1, Section C
With Bus Turn-Out, On Street Bike Lane
No On Street Parking
60 MPH Design Speed



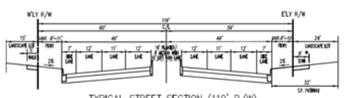
TYPICAL STREET SECTION (135' R/W)
LONG CANYON ROAD (South Side of SR 126)
Major Highway, Case 1, Section C
With On Street Bike Lane
No On Street Parking
60 MPH Design Speed



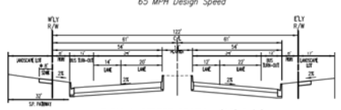
TYPICAL STREET SECTION (124'-135' R/W)
LONG CANYON ROAD (Betwen SR 126 & 'A' Street)
Major Highway, Case 1, Section C
With On Street Bike Lane
No On Street Parking
60 MPH Design Speed



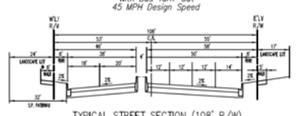
TYPICAL STREET SECTION (124' R/W)
LONG CANYON ROAD (North Side of 'A' Street)
Major Highway, Case 1, Section C
With On Street Bike Lane
No On Street Parking
60 MPH Design Speed



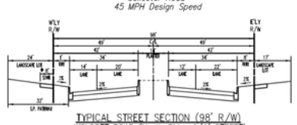
TYPICAL STREET SECTION (119' R/W)
LONG CANYON ROAD (South Side of 'A' STREET)
Major Highway, Case 1, Section C
With On Street Bike Lane
No On Street Parking
65 MPH Design Speed



TYPICAL STREET SECTION (98' R/W)
WOLCOTT ROAD (North Side of 'A' STREET)
Collector Road
With Bus Turn-Out
45 MPH Design Speed



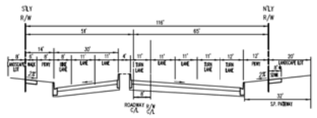
TYPICAL STREET SECTION (108' R/W)
WOLCOTT ROAD (South Side of SR 126)
Collector Road
45 MPH Design Speed



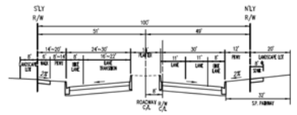
TYPICAL STREET SECTION (98' R/W)
WOLCOTT ROAD (North Side of 'A' STREET)
Collector Road
45 MPH Design Speed

NOTE:
* 6' SIDEWALK WILL BE MEANDERING ENTIRELY WITHIN THE 24' OR 20' WIDE LANDSCAPE LOT

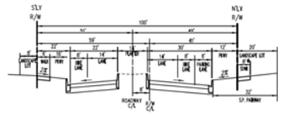
STREET TYPICAL SECTIONS
NOT TO SCALE



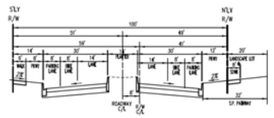
TYPICAL STREET SECTION (116' R/W)
"A" STREET (Spine Road Collector)
From Long Canyon Road to 200' East of Long Canyon Road
Local Access – 45 MPH Design Speed
With On Street Bike Lane
No On Street Parking



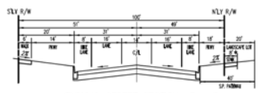
TYPICAL STREET SECTION (100' R/W)
"A" STREET (Spine Road Collector)
From 200' East of Long Canyon Road to Westerly Round About
Local Access – 45 MPH Design Speed
With On Street Bike Lane
No On Street Parking



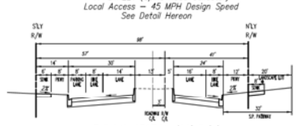
TYPICAL STREET SECTION (100' R/W)
"A" STREET (Spine Road Collector)
From Westerly Round About to "N" Street and
Local Access – 45 MPH Design Speed
With On Street Parking and On Street Bike Lane



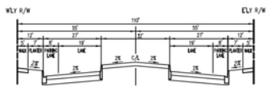
TYPICAL STREET SECTION (100' R/W)
"A" STREET (Spine Road Collector)
From "N" Street to "J" Street
From "J" Street to Wolcott Rd.
Local Access – 45 MPH Design Speed
With On Street Parking and On Street Bike Lane



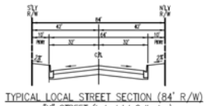
TYPICAL STREET SECTION Z – Z
"A" STREET (Spine Road Collector)
Local Access – 45 MPH Design Speed
See Detail Hereon



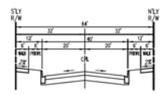
TYPICAL SECTION (98' R/W)
"A" STREET (Spine Road Collector)
From "T" Street TO "C" Street
Local Access – 45 MPH Design Speed
With On Street Parking Lane (South Side) and On Street Bike Lane



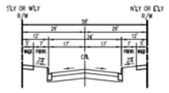
TYPICAL SECTION (110' R/W)
"P" DRIVE
Local Access – 30 MPH Design Speed



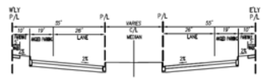
TYPICAL LOCAL STREET SECTION (84' R/W)
"Y" STREET (Industrial Collector)
Local Access – 30 MPH Design Speed



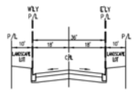
TYPICAL LOCAL STREET SECTION (64' R/W)
"A" STREET (From Wolcott Road to "D" Street)
Local Access – 30 MPH Design Speed



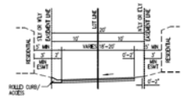
TYPICAL LOCAL STREET SECTION (58' R/W)
"A" STREET (FROM "D" STREET TO "C" STREET), "B", "C", "D", "E", "F", "H", "I", "J", "K", "L", "M", "N", "O", "Q", "R", "S", "T", "W", "X", "Z" STREETS
Local Access – 30 MPH Design Speed



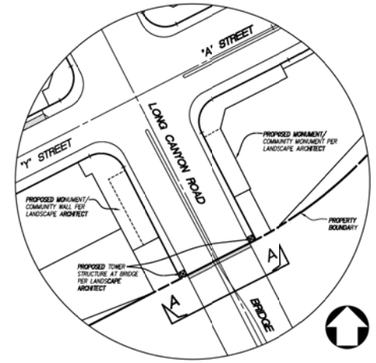
TYPICAL CONCEPT SECTION
Private Driveway South of "A" Street
at Wolcott Road
Local Access – 30 MPH Design Speed



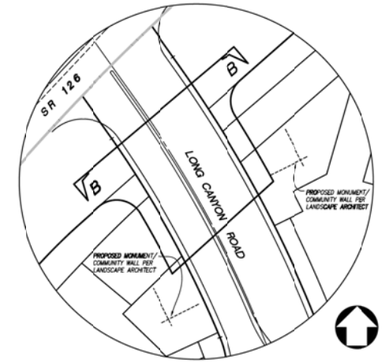
TYPICAL CONCEPT SECTION
Private Driveway South of "A" Street
at Wolcott Road
With No Median
Local Access – 30 MPH Design Speed



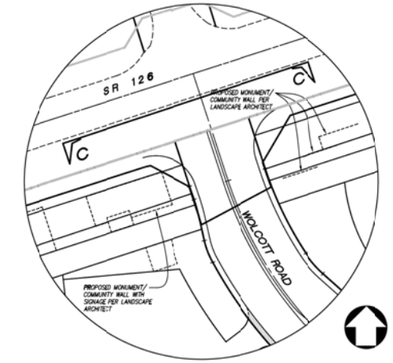
TYPICAL PRIVATE DRIVEWAY (20' EASEMENT)



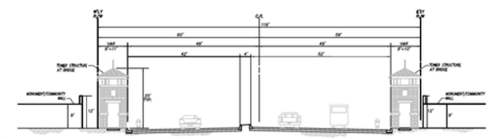
ENTRY AT LONG CANYON BRIDGE
SCALE: 1" = 60'



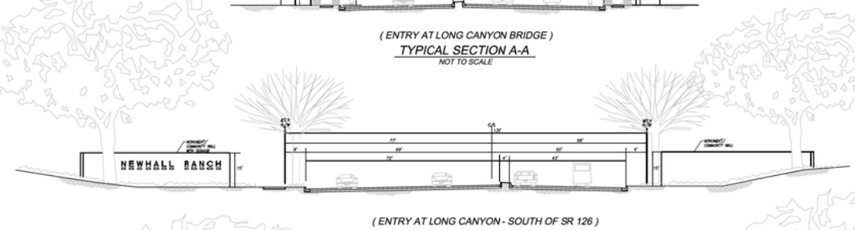
ENTRY AT LONG CANYON - SOUTH SR 126
SCALE: 1" = 60'



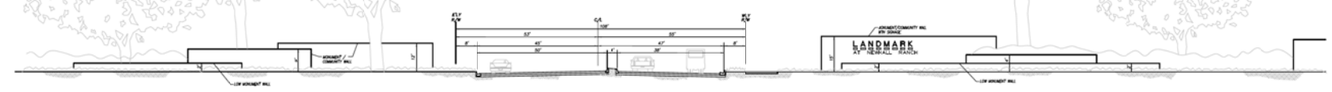
LANDMARK VILLAGE ENTRY AT WOLCOTT ROAD
SCALE: 1" = 60'



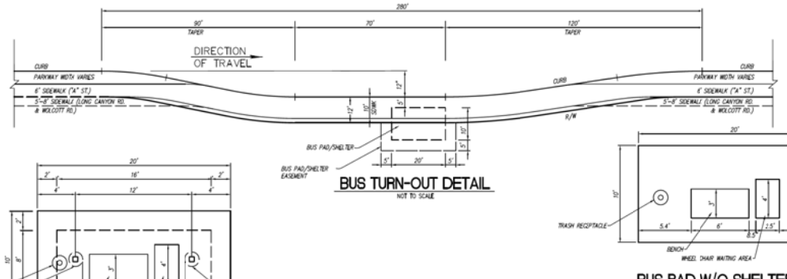
(ENTRY AT LONG CANYON BRIDGE)
TYPICAL SECTION A-A
NOT TO SCALE



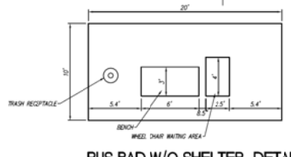
(ENTRY AT LONG CANYON - SOUTH OF SR 126)
TYPICAL SECTION B-B
NOT TO SCALE



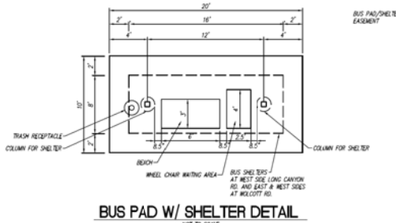
(LANDMARK VILLAGE ENTRY AT WOLCOTT ROAD SOUTH OF SR-126)
TYPICAL SECTION C-C
NOT TO SCALE



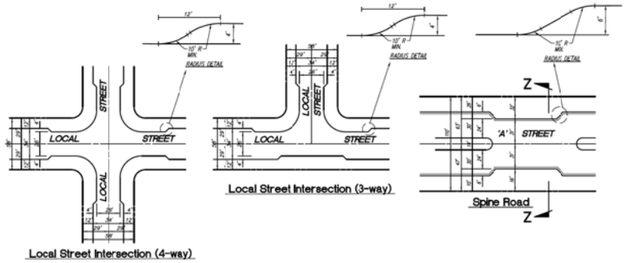
BUS TURN-OUT DETAIL
NOT TO SCALE



BUS PAD W/O SHELTER DETAIL
NOT TO SCALE



BUS PAD W/ SHELTER DETAIL
NOT TO SCALE



Local Street Intersection (4-way)
Local Street Intersection (3-way)
Spine Road

SPINE ROAD AND LOCAL STREET INTERSECTION DETAIL
NOT TO SCALE

REV. DATE: DECEMBER 21, 2009
DATE: MAY 2, 2007

LEGAL DESCRIPTION:
PARCELS 8, 9, 10, AND PORTION OF PARCELS 7, 20, 21 OF PARCEL MAP NO. 24100-01 PMB 293-34/67, RECORDS OF LOS ANGELES COUNTY.

REGISTERED PROFESSIONAL ENGINEER — No. C-67285 — Exp. 06/30/10 — CIVIL — STATE OF CALIFORNIA

PSOMAS
25800 Avenue Stanford, Suite 200
Santa Clarita, CA 91355
(661) 259-4000 (661) 775-2718 (FAX)
ERIK WINAFA R.C.E. NO. C 67285 DATE

DESIGNED : NSK/YL
DRAFTED : TLC/JS
CHECKED : EW

OWNER/DEVELOPER :
NEWHALL RANCH.
23823 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE: (661) 255-4000
REPRESENTATIVE : MR. FRED MACMURDO

MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 53108

IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

PROJECT NO. 1NUF010500
SHEET 2 OF 13

RV001-02.dwg

A full-size reproduction of this figure can be found at Impact Sciences.

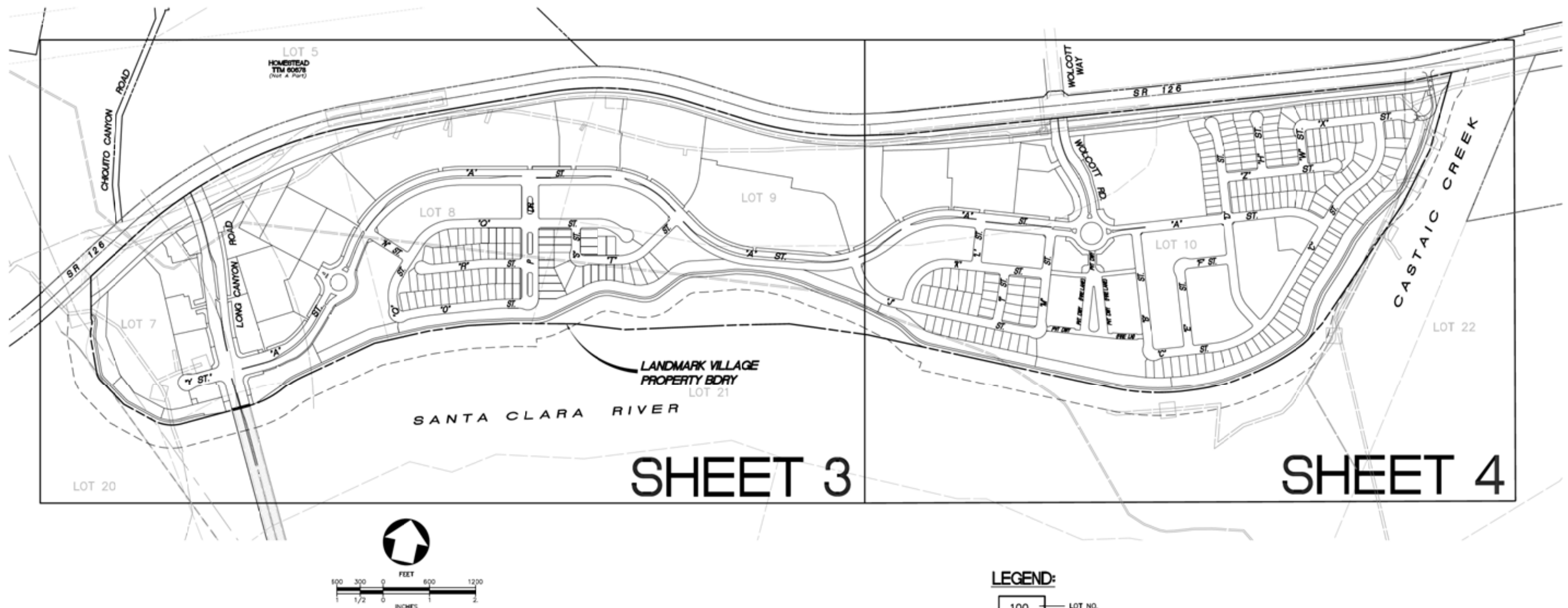
LOT SUMMARY

LOT NUMBERS	TOTAL LOTS/ BLDGS	TYPE (USE)	LOT SIZE	TOTAL D.U.	TOTAL S.F.D. or DET. CONDOS D.U.	MF D.U.s in bldgs w/1-4 D.U.s/bldg	MF D.U.s in bldgs w/5+ D.U.s/bldg
1–93	93/93	S.F.D 45' x 100' 4,500 S.F.	472,574 S.F.	93	93	0	0
94–190	97/97	S.F.D 55' x 100' 5,500 S.F.	663,229 S.F.	97	97	0	0
191–270	80/80	S.F.D 50' x 100' 5,000 S.F.	485,758 S.F.	80	80	0	0
271, 272, 279, 281	4/124	CONDOMINIUM	671,128 S.F.	124	124	0	0
285–286	2/89	CONDOMINIUM	330,719 S.F.	89	89	0	0
273, 284	2/40	CONDOMINIUM	398,791 S.F.	120	0	120	0
276, 280, 287	3/42	CONDOMINIUM	788,159 S.F.	239	0	60	179
277, 278	2/27	AFFORDABLE CONDOMINIUM	444,636 S.F.	161	0	0	161
274	1/14	AFFORDABLE CONDO/APARTMENT (FOR LEASE)**	336,813 S.F.	140	0	0	140
275	1/15	CONDO/APARTMENT (FOR LEASE)**	479,250 S.F.	232	0	0	232
282, 283	2/14	CONDO/APARTMENT (FOR LEASE)**	160,132 S.F.	69	0	11	58
288,289	2/2	COMMERCIAL (FOR LEASE)**	82,206 S.F.	–	–	–	–
290	1/2	COMMERCIAL (FOR LEASE)**	100,942 S.F.	–	–	–	–
292–301	10/9	COMMERCIAL (FOR LEASE)**	763,848 S.F.	–	–	–	–
303–305	3/3	COMMERCIAL (FOR LEASE)**	147,490 S.F.	–	–	–	–
422	*1/0	PRIVATE DRIVEWAY & FIRE LANE	93,194 S.F.	–	–	–	–
306–308	3/3	RECREATION	253,595 S.F.	–	–	–	–
310	*1/NA	COMMUNITY PARK SITE	430,072 S.F.	–	–	–	–
309	*1/NA	SCHOOL SITE	423,951 S.F.	–	–	–	–
313–327, 344–346, 350, 352–353, 356–361, 363, 365–371, 374–421	*83/0	OPEN SPACE	1,040,689 S.F.	–	–	–	–
364	*1/0	PRIVATE PARK	24,053 S.F.	–	–	–	–
335, 336, 340	*3/0	SR 126 FUTURE R/W	407,000 S.F.	–	–	–	–
311, 329, 332, 333, 338, 342, 347, 351, 354, 355, 362, 372, 373	*13/0	OPEN SPACE (WATER QUALITY)	777,807 S.F.	–	–	–	–
339, 343	*2/0	OPEN SPACE (UTILITY CORRIDOR)	114,213 S.F.	–	–	–	–
331, 349	*2/0	OPEN SPACE (CL.1 BIKE TRAIL/ MAINT.ACCS.ROAD)	203,596 S.F.	–	–	–	–
330, 348	*2/0	OPEN SPACE (MULTI–USE TRAIL)	117,342 S.F.	–	–	–	–
334, 337, 341	*3/0	OPEN SPACE (LIGHT RAIL RESERVATION)	349,556 S.F.	–	–	–	–
302	*1/NA	FIRE STATION	58,404 S.F.	–	–	–	–
312	*1/NA	TRAIL HEAD	19,617 S.F.	–	–	–	–
291	1/NA	PARK & RIDE	35,143 S.F.	–	–	–	–
328	*1/NA	RECYCLED WATER BOOSTER PUMP STATION	1,226 S.F.	–	–	–	–
N/A	NA/NA	PUBLIC ROADS	2,072,022 S.F.	–	–	–	–
TOTAL	422		12,747,155 SF	1,444	483	191	770

* NO DEVELOPMENT PLANNED ON THESE LOTS
** TOTAL NUMBER OF LEASE RESIDENTIAL BUILDINGS = 43
TOTAL NUMBER OF LEASE COMMERCIAL BUILDINGS = 16

UNIT SUMMARY:

S.F.D. UNITS: – 270 UNITS
CONDOMINIUM UNITS: – 744
APARTMENTS UNITS: – 430
COMMERCIAL LOT ACREAGE: 25.13 ACCRES



PROJECT SUMMARY:

GROSS AREA – 292.6 Acres
TOTAL LOTS – 422
TOTAL D.U. – 1,444
EXISTING ZONING – SP (NEWHALL RANCH SPECIFIC PLAN)
PROPOSED ZONING – SP (NEWHALL RANCH SPECIFIC PLAN)
GENERAL PLAN LAND USE – SP (NEWHALL RANCH SPECIFIC PLAN)

GRADING SUMMARY

ONSITE
RAW CUT 343,000 CY
RAW FILL 5,590,000 CY
NET CUT 343,000 CY
NET FILL 6,263,000 CY
IMPORT 5,920,000 CY

OFFSITE (ADOBE CANYON)
RAW CUT 6,468,500 CY
RAW FILL 133,000 CY
NET CUT 6,468,500 CY
NET FILL 146,300 CY
EXPORT 6,322,200 CY

OFFSITE (CHIQUITO CANYON)
RAW CUT 1,190,000 CY
RAW FILL 1,071,000 CY
NET CUT 1,190,000 CY
NET FILL 1,190,000 CY
EXPORT 0 CY

OFFSITE (SOUTH BANK TEMP. LEVEE)
RAW CUT 0 CY
RAW FILL 250,000 CY
NET CUT 0 CY
NET FILL 316,000 CY
EXPORT 316,000 CY

OFFSITE (UTILITY CORRIDOR GRADING)
RAW CUT 3,200 CY
RAW FILL 233,000 CY
NET CUT 3,200 CY
NET FILL 263,000 CY
IMPORT 259,800 CY

OFFSITE (WRP DEBRIS BASINS)
RAW CUT 91,000 CY
RAW FILL 2,000 CY
NET CUT 91,000 CY
NET FILL 2,200 CY
EXPORT 88,800 CY

OFFSITE (ZONE 1A WATER TANK SITE)
RAW CUT 87,000 CY
RAW FILL 2,000 CY
NET CUT 87,000 CY
NET FILL 2,200 CY
EXPORT 84,800 CY

TOTAL EARTHWORK
RAW CUT 8,182,700 CY
RAW FILL 7,281,000 CY
NET CUT 8,182,700 CY
NET FILL 8,182,700 CY
IMPORT/ EXPORT: 0 CY

NOTE:
STATE ROUTE 126 (SR126) IS DESIGNATED BY LOS ANGELES COUNTY AS "HENRY MAYO DRIVE".

OFFSITE IMPROVEMENTS ASSOCIATED WITH VTTM 53108

1. LA COUNTY SANITATION DISTRICT TRUNK SEWER WESTERLY TO NEWHALL RANCH WRP
2. WATER MAIN EXTENSION TO VALENCIA WATER CO. STORAGE TANKS AND EXISTING PIPES
3. SEWER FORCE MAIN EASTERLY TO LA COUNTY SANITATION DISTRICT 32 WRP
4. BORROW SITE GRADING PER C.U.P. NO.200500112
5. DEBRIS BASINS NORTH OF SR 126
6. OFFSITE GRADING AS DEPICTED
7. OFFSITE IMPROVEMENTS FOR IRRIGATION WATER LINES AND WELLS

UTILITY PROVIDERS:

SEWER: L.A. COUNTY SANITATION DIST. 32 AND NEWHALL RANCH WRP
WATER: VALENCIA WATER COMPANY
ELECTRICAL: SOUTHERN CALIFORNIA EDISON
GAS: SOUTHERN CALIFORNIA GAS CO.
TELEPHONE: AT&T
CABLE TV: TIME WARNER CABLE

EASEMENTS:

EASEMENTS....... PLOTTABLE EASEMENTS ARE SHOWN FROM AN OWNER SUPPLIED TITLE REPORT. NON–PLOTTABLE ITEMS ARE NOTED BELOW AS INDETERMINATE OR DOES NOT AFFECT.

TITLE REPORT.... NORTH AMERICAN TITLE COMPANY REPORT NO. 7004810–23, DATED OCTOBER 31, 2007. THIS TITLE REPORT COVERS THIS PROPERTY.

(9) INDICATES TITLE REPORT EXCEPTION No

EXCEPTION NO.	OWNER	PURPOSE	REFERENCE	STATUS
2	COUNTY OF LOS ANGELES	PUBLIC ROAD & HIGHWAY	JUNE 27, 1910 INSTRUMENT NO. 47 BOOK 4230, PAGE 2, DEEDS	PLOTTED
3	COUNTY OF LOS ANGELES	PUBLIC ROAD & HIGHWAY	APRIL 6, 1920 INSTRUMENT NO. 621 BOOK 7171, PAGE 90, DEEDS	PLOTTED
6	STATE OF CALIFORNIA	PUBLIC HIGHWAY, SLOPES/DRAINAGE	JANUARY 12, 1939 DOCUMENT NO. 7144 CERT. NO. JJ 84561, TORRENS	PLOTTED
7	AGREEMENT BETWEEN: NEWHALL LAND & FARMING CO. AUGUST A. & MARY J. RUBEL	SEE DOCUMENTS FOR FULL PARTICULARS	JUNE 14, 1949 INSTR. NO. 988 MODIFIED NOVEMBER 19, 1980 INSTR. NO. 80–1162907	INDETERMINATE
9	BARNSDALL OIL COMPANY	PIPE LINES	DEC. 4, 1944 INSTR. NO. 1236 AMENDED DECEMBER 4, 1944 INSTR. NO. 1236, O.R.	PLOTTED
13	SOUTHERN CALIFORNIA EDISON COMPANY	ELECTRIC LINES	APRIL 10, 1951 INSTRUMENT NO. 2549 BOOK 36011, PAGE 33, O.R.	INDETERMINATE
14	UNION OIL COMPANY OF CALIFORNIA	PIPE LINES & APPURTENANCES	JUNE 19, 1951 INSTRUMENT NO. 2670 BOOK 36565, PAGE 60, O.R.	INDETERMINATE
15	SOUTHERN CALIFORNIA EDISON COMPANY	ELECTRIC LINES	MAY 9, 1952 INSTRUMENT NO. 2456 BOOK 38895, PAGE 359, O.R.	INDETERMINATE
16	SOUTHERN CALIFORNIA EDISON COMPANY	ELECTRIC LINES	DECEMBER 21, 1953 INSTRUMENT NO. 1702 BOOK 43431, PAGE 69, O.R.	INDETERMINATE
17	SOUTHERN CALIFORNIA EDISON COMPANY	ELECTRIC LINES	DECEMBER 21, 1953 INSTRUMENT NO. 2788 BOOK 43504, PAGE 347, O.R.	INDETERMINATE
18	UNION OIL COMPANY OF CALIFORNIA	POWER POLES & APPURTENANCES	JUNE 13, 1958 INSTRUMENT NO. 3434 BOOK D127, PAGE 71, O.R.	PLOTTED
20	SOUTHERN CALIFORNIA EDISON COMPANY	ELECTRIC LINES	NOVEMBER 25, 1958 INSTRUMENT NO. 3316 BOOK D286, PAGE 279, O.R.	INDETERMINATE
21	UNION OIL COMPANY OF CALIFORNIA	PIPE LINES & APPURTENANCES	AUGUST 29, 1961 INSTRUMENT NO. 3943, O.R.	INDETERMINATE
23	UNION OIL COMPANY OF CALIFORNIA	PIPE LINES	FEBRUARY 7, 1962 INSTRUMENT NO. 3210 BOOK D1505, PAGE 463, O.R.	PLOTTED
24	SOUTHERN CALIFORNIA EDISON COMPANY	ELECTRIC LINES, INGRESS, EGRESS	JULY 23, 1964 INSTRUMENT NO. 5047, O.R.	DOES NOT AFFECT PROPERTY
26	HUMBLE OIL AND REFINING COMPANY	PIPE LINES, ACCESS ROADS, WELLS	MARCH 9, 1970 INSTRUMENT NO. 1741 BOOK M3439, PAGE 696, O.R.	INDETERMINATE
27	SOUTHERN CALIFORNIA EDISON COMPANY	ELECTRICAL & COMMUNICATION SYSTEMS	MAY 27, 1971 INSTRUMENT NO. 3947 BOOK D5071, PAGE 131, O.R.	INDETERMINATE
28	TEXACO INC.	PUMP STATION, PIPE LINES, & APPURTENANCES	OCTOBER 14, 1971 INSTRUMENT NO. 3990 BOOK D5223, PAGE 940, O.R.	PLOTTED
30	SOUTHERN CALIFORNIA EDISON COMPANY	ELECTRICAL & COMMUNICATION SYSTEMS	DECEMBER 2, 1971 INSTRUMENT NO. 2421 BOOK D5275, PAGE 682, O.R.	INDETERMINATE
31	EXXON CORPORATION	PIPE LINES & APPURTENANCES	JUNE 21, 1979 INSTRUMENT NO. 79–675839, O.R.	PLOTTED
33	THE PACIFIC TELEPHONE AND TELEGRAPH COMPANY	POLE LINES & APPURTENANCES	MARCH 6, 1981 INSTRUMENT NO. 81–2238554, O.R.	PLOTTED
34	TEXACO CALIFORNIA PIPELINES, INC.	PIPE LINE & PUMP STATION	SEPTEMBER 8, 1993 INSTRUMENT NO. 93–1746382, O.R.	INDETERMINATE
36	STATE OF CALIFORNIA	TRAFFIC CONTROL DEVICES	MARCH 21, 1997 INSTRUMENT NO. 97–434774, O.R.	PLOTTED
37	THE NEWHALL LAND AND FARMING COMPANY	WATER PIPELINES PUMP STATIONS & APPURTENANCES	DECEMBER 23, 1999 INSTRUMENT NO.s 99–2360380 & 99–2360381, O.R. DECEMBER 29, 1999 INSTRUMENT NO. 99–2375698, O.R. MARCH 17, 2000 INSTRUMENT NO.s 00–399620, 00–399621, 00–399622, 00–399623, 00–399624, 00–399625, O.R.	PLOTTED
38	County of Los Angeles	INGRESS & EGRESS RESTRICTIONS	PARCEL MAP NO. 24500–01 P.M.B. 293–34–67	PLOTTED
39	LONG CANYON ROAD	FUTURE STREET	PARCEL MAP NO. 24500–01 P.M.B. 293–34–67	PLOTTED
47	STATE OF CALIFORNIA	SLOPES & DRAINAGE	SEPTEMBER 15, 2000 INSTRUMENT NO. 00–1445425, O.R.	PLOTTED

LEGEND:

100 – LOT NO.
5000 SF – LOT AREA (SQUARE FEET)
1210.5 – PAD ELEVATION
O.S. – OPEN SPACE
P.F. – PUBLIC FACILITY
PROJECT BOUNDARY
EXISTING RIGHT OF WAY
PROPOSED EASEMENT
EXISTING EASEMENT
PROPOSED RIGHT OF WAY
950 – PROPOSED CONTOUR
DAYLIGHT LINE
SD – STORM DRAIN
SS – SANITARY SEWER (SERVICE LOCAL)
SST – SANITARY SEWER (TRUNK SEWER)
FM – SANITARY SEWER (FORCE MAIN)
W – WATER
RW – RECLAIMED WATER
IRRI – IRRIGATION LINE
W – EXISTING WATER LINE
E – EXISTING POWER LINE
COM – EXISTING COMMUNICATION LINE
VIREO_HABITAT – EXISTING VIREO HABITAT LINE
EXISTING CMP INLET
CATCH BASIN
WATER GATE VALVE
RC03 – RIVER CORRIDOR–2003
FEMA – FEMA
EXISTING Q–CAP
RS – RESOURCE LINE
ACOE – ARMY CORPS OF ENGINEERS JURISDICTION LINE
OIL WELL GPS POSITIONED
OIL WELL DEPT. OF OIL AND GAS CALCULATED POSITION
OIL WELL DIGITIZED POSITION
OIL WELL DEPT. OF OIL AND GAS METAL DETECTOR POSITION
COAST LIVE OAK (Quercus agrifolia)
VALLEY OAK (Quercus lobata)
EXISTING TREE CANOPY
EXISTING POWER POLE
W.S. – WATER SURFACE
BIKE TRAIL/ LACFCD ACCESS ROAD/LACSD ACCESS ROAD
LA COUNTY RIDING/HIKING TRAIL
BURIED BANK STABILIZATION
SIGHT DISTANCE LINE
RETAINING WALL
SOUND WALL

SURVEY NOTES:

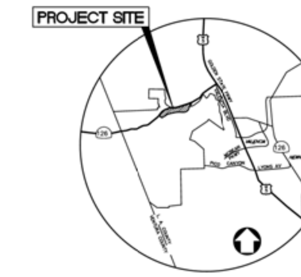
VERTICAL DATUM:
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS BENCHMARK DESCRIBED AS FOLLOWS: LACDPW L5402 RND HD SPK IN LOWER CONC HDWL @ N END 24 FT W/O C/L THE OLD RD (W RDWY) AND 0.6 MI S/O HENRY MAYO DR @ MI MKR #6.25 NEWHALL QUAD, 1995 ADJUSTMENT (NAVD 1988) ELEVATION = 1031.951

THERE IS APPROXIMATELY 2.3 FEET DIFFERENCE BETWEEN PREVIOUS COUNTY OF LOS ANGELES DATUMS BASED UPON NAVD 1929 AND NAVD 1988 (NAVD 1988 IS 2.3 FEET HIGHER THAN NAVD 1929).

AERIAL PLANIMETRY:
THIS SURVEY WAS PREPARED BY PHOTOGRAMMETRIC PROCESSES, UTILIZING AERIAL PHOTOGRAPHY DATED NOVEMBER 15, 2006. THE OUTLINE OF BUILDINGS AND OTHER ROOFED IMPROVEMENTS, MAY INCLUDE EAVES, CANOPIES AND BALCONIES, SINCE BUILDINGS BELOW THESE ITEMS ARE NOT VISIBLE TO THE CAMERA.

TOPOGRAPHY:
BY PHOTOGRAMMETRIC PROCESSES FROM LIDAR IMAGING DATED NOVEMBER 15, 2006, AND COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS.

CONTOUR INTERVAL:
10 FOOT, UNLESS OTHERWISE NOTED.



VICINITY MAP
NOT TO SCALE

GENERAL NOTES:

1. GRADE ELEVATIONS ON THE VTTM ARE APPROXIMATE. CHANGES IN THE ELEVATIONS DEPICTED ON THE TENTATIVE MAP WHICH WILL NOT RESULT IN PAD ELEVATION CHANGES OF MORE THAN 5 FEET ARE PERMITTED SUBJECT TO THE PROVISIONS OF SECTION 5.2 OF THE NEWHALL RANCH SPECIFIC PLAN, WHICH MAY REQUIRE AN AMENDED MAP.
2. PERMISSION IS REQUESTED FOR LOT LINES TO BE ADJUSTED TO THE SATISFACTION OF DRP AND DPW PROVIDED NO ADDITIONAL DEVELOPABLE LOTS ARE CREATED. THE DEGREE OF ADJUSTMENT SHALL BE CONSISTENT WITH THE INTENT OF THE SUBDIVISION MAP APPROVAL AND THE SUBDIVISION MAP ACT.
3. ALIGNMENT AND GEOMETRICS OF STREETS AND TRAILS ARE APPROXIMATE. PERMISSION IS REQUESTED FOR ADJUSTMENTS TO STREETS TO BE MADE PROVIDED THE DEPARTMENT OF PUBLIC WORKS AND DRP DETERMINE THAT THE ADJUSTMENTS ARE CONSISTENT WITH THE INTENT OF THE SUBDIVISION APPROVAL. ADJUSTMENTS TO TRAILS CAN BE MADE WITH APPROVAL BY DRP, DPW AND THE DEPARTMENT OF PARKS AND RECREATION.
4. BUILDING FOOTPRINTS SHOWN ON THE TENTATIVE MAP OR ACCOMPANYING SITE PLAN ARE ONLY FOR ILLUSTRATIVE PURPOSES. RELOCATION OF BUILDINGS, OR ADJUSTMENTS IN BUILDING SQUARE FOOTAGE, NUMBER OF BUILDINGS, PARKING REQUIREMENTS AND OTHER FEATURES WHICH WILL NOT RESULT IN AN INCREASE IN TOTAL SQUARE FOOTAGE OR THE NUMBER OF DWELLING UNITS ARE PERMITTED SUBJECT TO THE PROVISIONS OF SECTION 5.2 OF THE NEWHALL RANCH SPECIFIC PLAN.
5. PERMISSION IS REQUESTED TO FILE "LARGE LOT" PARCEL MAPS OF 20 ACRES OR MORE (WITHOUT IMPROVEMENTS) OR 5 ACRES OR MORE (WITH IMPROVEMENTS) AS THE FIRST UNIT FINAL MAP. RECORDATION OF A LARGE LOT PARCEL MAP SHALL BE CONSIDERED THE FILING OF THE FIRST UNIT MAP FOR THE PURPOSES OF TIME EXTENSIONS PUSUANT TO THE SUBDIVISION MAP ACT BUT SHALL NOT REQUIRE THE OBLIGATION OF FEES, DEDICATIONS (EG. RIGHTS OF WAY OR PARKS) EXACTIONS OR INFRASTRUCTURE EXCEPT AS MAY BE REQUIRED BY CHAPTER 21.32 OF THE SUBDIVISION MAP ACT.
6. PERMISSION IS REQUESTED FOR UNIT MAP PHASING.
7. PERMISSION IS REQUESTED TO COMBINE LOTS.
8. PERMISSION IS REQUESTED TO CREATE AND RECORD ADDITIONAL OPEN SPACE LOTS.
9. PERMISSION IS REQUESTED TO RECORD ADDITIONAL UTILITY LOTS AND PROVIDE MAINTENANCE EASEMENTS TO THE SATISFACTION OF THE DRP AND DPW.
10. THE LOCATIONS OF APPURTENANT STRUCTURES (E.G., PASEOS, PEDESTRIAN BRIDGES, TRANSIT SHELTERS) MAY BE RELOCATED IF DETERMINED TO BE CONSISTENT WITH THE APPROVED TENTATIVE MAP BY DRP AND DPW.
11. REQUEST PERMISSION TO PHASE MASS GRADE TO THE SATISFACTION OF DRP AND DPW AND THE PROVISIONS OF THE COUNTY CODE, APPROVED PROJECT CONDITIONS AND MITIGATION MEASURES.
12. PROPOSED STREET GRADES ARE APPROXIMATE AND SUBJECT TO ADJUSTMENTS PENDING DETERMINATION OF FINAL DEVELOPMENT LAYOUT AND PLANS. ANY CHANGES SHALL BE TO THE SATISFACTION OF DPW.
13. LOCATION OF TRAILS TO BE FINALIZED PRIOR TO FINAL MAP APPROVAL.
14. PROVIDE PROPERTY LINE RETURN RADII OF 13 FEET AT ALL LOCAL STREET AND PRIVATE DRIVE INTERSECTIONS, AND 27 FT AT THE INTERSECTION OF LOCAL STREETS OR PRIVATE DRIVES WITH PLANNED HIGHWAYS (THOSE ON THE COUNTY HIGHWAY PLAN) AND WHERE ALL PLANNED HIGHWAYS INTERSECT OR WHERE ONE OF THE ROADS SERVES A COMMERCIAL OR INDUSTRIAL DEVELOPMENT PLUS ADDITIONAL RIGHT OF WAY FOR CORNER CUT OFF TO MEET CURRENT GUIDELINES OF THE AMERICANS WITH DISABILITIES ACT (ADA) TO THE SATISFACTION OF PUBLIC WORKS.
15. MODIFIED STREET CROSS–SECTIONS AS SHOWN ON VESTING TENTATIVE TRACT MAP ARE REQUESTED. HOWEVER, PERMISSION IS SOUGHT TO CONSTRUCT STANDARD AND ALTERNATE STREET CROSS–SECTIONS AT THE DISCRETION OF THE SUBDIVIDER.
16. ALL DIMENSIONS SHOWN ARE APPROXIMATE.
17. TOPO COMPILED 11/15/06 BY HUNSAKER FROM DATA FLOWN 5/24/06.
18. ADDITIONAL RIGHT OF WAY WILL BE DEDICATED AS REQUIRED AT ALL PROPOSED ROUNDABOUT LOCATIONS ALONG "A" STREET AND ALONG WOLCOTT ROAD TO THE SATISFACTION OF PUBLIC WORKS.
19. AS A DEDICATION TO PUBLIC USE, WHILE ALL OF LONG CANYON ROAD, WOLCOTT ROAD, AND "A" STREET WITHIN THIS SUBDIVISION REMAINS A PUBLIC STREET, WE HEREBY GRANT TO THE COUNTY OF LOS ANGELES THE RIGHT TO RESTRICT DIRECT VEHICULAR INGRESS AND EGRESS TO SAID STREET.
20. RELATED ENTITLEMENTS:
    - SEA/SMA, PROJECT & OFF–SITE GRADING CUP 00–196
    - GPA 00–196 (MASTER PLAN OF HIGHWAYS)
    - LPA 00–196 (CIRCULATION PLAN)
    - SPA 00–196 (MASTER CIRCULATION PLAN & TEXT)
    - OAK TREE PERMIT 00–196
21. PERMISSION IS REQUESTED TO ALLOW OFFICE & RETAIL SPACE TO BE INTERCHANGEABLE PROVIDED THE REQUIRED PARKING IS SATISFIED.
22. PERMISSION IS REQUESTED TO ADJUST LOT LINES BETWEEN RESIDENTIAL OR COMMERCIAL LOTS AND OPEN SPACE LOTS SUBSEQUENT TO ANY UNIT MAP RECORDATION PROVIDED THE TOTAL OPEN SPACE IS EQUAL TO OR GREATER THAN 30%.
23. REQUEST MODIFICATION OF STREET FRONTAGE REQUIREMENTS PER SECTION 21–24–040 OF THE L.A. COUNTY CODE.
24. SHARED AND RECIPROCAL PARKING IS DEDICATED PER THE PROVISIONS OF THE NEWHALL RANCH SPECIFIC PLANS SUBJECT TO CONFORMANCE REVIEW OR APPROVAL OF A PARKING PROGRAM.
25. ALL DETAILS RELATED TO THE CONSTRUCTION OF ALTERNATIVE WATER QUALITY DEVICES, SUCH AS WATER QUALITY SWALES, ARE SUBJECT TO REVIEW DURING THE IMPROVEMENT PLAN STAGE.
26. ALL STREETS ARE PUBLIC STREETS UNLESS NOTED "PRIVATE DRIVEWAY AND FIRE LANE".
27. LOCATION AND DETAILS OF WATER QUALITY DEVICES AND DEBRIS BASINS ARE APPROXIMATE. PERMISSION IS REQUESTED TO ADJUST DESIGNS OF THESE FACILITIES PROVIDED DPW AND DRP DETERMINE THAT THE ADJUSTMENTS ARE CONSISTENT WITH THE INTENT OF THE SUBDIVISION APPROVAL.

NOTE:
THE ABOVE MENTIONED GENERAL NOTES (THAT ADDRESS MINOR MODIFICATION) MAY REQUIRE REVIEW AND APPROVAL OF A REVISED EXHIBIT MAP.

SPECIAL NOTES:

1. WATER QUALITY BASINS AND BIOSWALES WILL PROVIDE FOR TREATMENT OF STORM WATER RUN OFF PER THE APPROVED DRAINAGE CONCEPT.
2. THE WATER QUALITY BASINS SHALL BE DEDICATED TO THE COUNTY WHEN COMPLETED AND ACCEPTED.
3. PROPOSED RECLAIMED WATER LINES WILL BE LOCATED IN PUBLIC STREETS AND TRAILS.
4. THE FOLLOWING LOTS ARE SUBJECT TO R/W DEDICATION FOR FUTURE SR–126 IMPROVEMENTS: 335, 336 AND 340.
5. ACCESS WILL BE PROVIDED TO OPEN SPACE LOTS 328,330–333,348–349,351, AND 354–356 BY ACCESS EASEMENTS THROUGH ADJOINING LOTS.
6. ACCESS WILL BE PROVIDED TO COMMERCIAL LOTS 292–301, AND 303–305 BY RECIPROCAL ACCESS EASEMENTS THROUGH ADJOINING LOTS.
7. PROPOSED PRIVATE AGRICULTURAL WATER FACILITIES WILL BE LOCATED WITHIN OPEN SPACE LOTS ACCESSABLE BY TRAILS AND ACCESS DRIVES. EASEMENTS WILL BE RESERVED FOR THESE FACILITIES IN ANY LAND TRANSACTIONS.

REV. DATE: DECEMBER 21, 2009
DATE: MAY 2, 2007

LEGAL DESCRIPTION:
PARCELS 8, 9, 10, AND PORTION OF PARCELS 7, 20, 21 OF PARCEL MAP NO. 24500–01 PMB 293–34/67, RECORDS OF LOS ANGELES COUNTY.

REGISTERED PROFESSIONAL ENGINEER ERIK WINATA No. C-67285 Exp. 09/30/10 CIVIL STATE OF CALIFORNIA

PSOMAS
28480 Avenue Stanford, Suite 200
Santa Clarita, CA 91355
(661) 219–6000 (661) 775–2718 (FAX)
ERIK WINATA R.C.E. NO. C 67285 DATE

DESIGNED : NSK/YL
DRAFTED : TLC/JS
CHECKED : EW

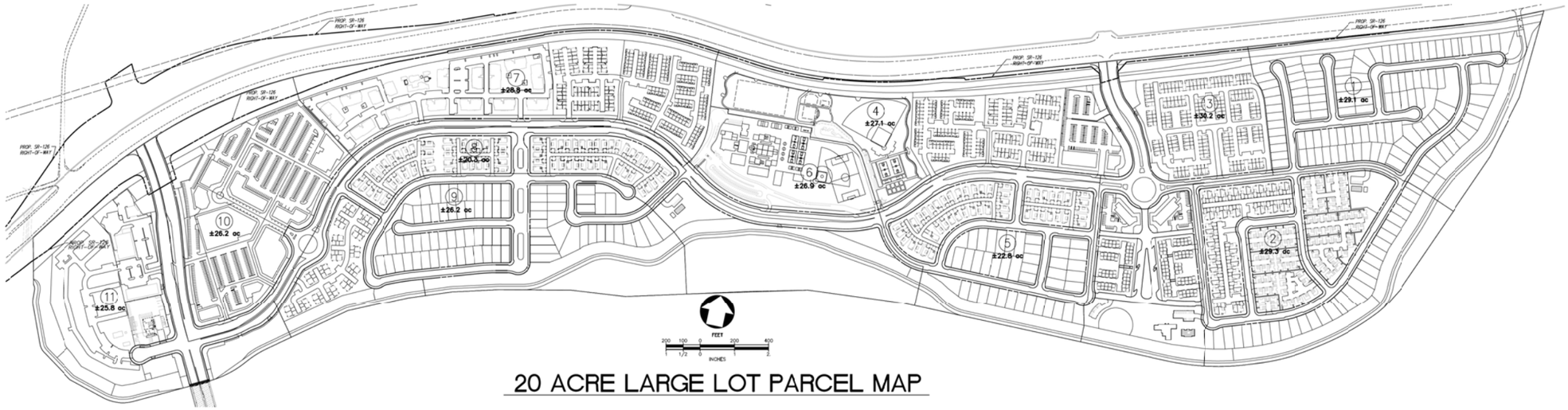
OWNER/DEVELOPER :
NEWHALL RANCH.
23823 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91335
TELEPHONE: (661) 255–4000
REPRESENTATIVE : MR. FRED MACMURDO

MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 53108

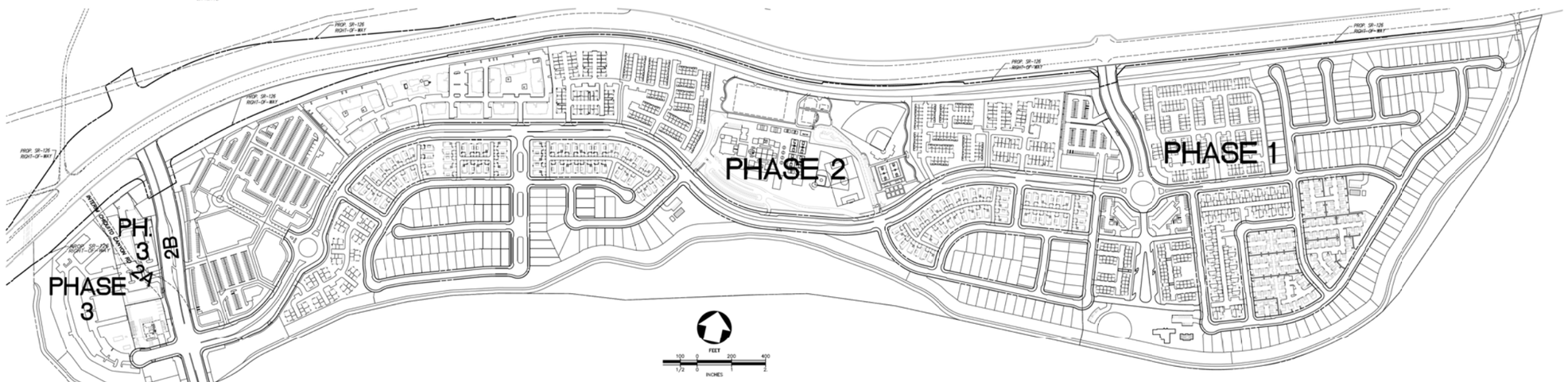
IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

PROJECT NO. 1NLF010500
SHEET 1 OF 13

Plotted = 12/17/2009 2:44:08 PM :: Saved = 12/15/2009 8:45:27 AM :: G:\1702 acad\Landmark Village\report enclosures\09.12.15 Revised Tentative\Sheet 1 Revised.dwg :: gdunbar



20 ACRE LARGE LOT PARCEL MAP

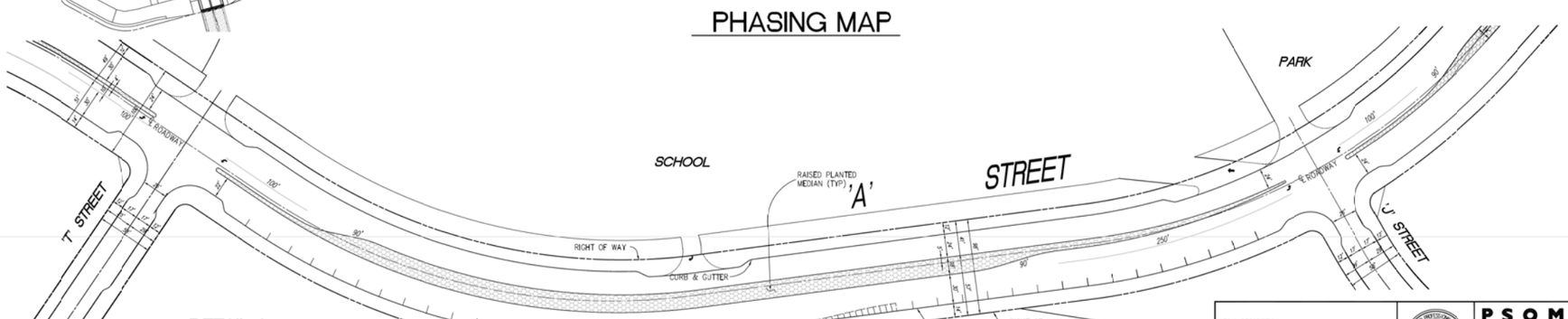


PHASING MAP

PHASE 1	
Total Ac	89.64 AC
Total Du	502 DU
SFD	149 DU
Condo's	353 DU
Total Commercial Sf	30,800 SF
Total Open Space	27.07 AC
Park and Ride	0.81 AC

PHASE 2	
Total Ac	184.95 AC
Total Du	802 DU
SFD	121 DU
Condo's	681 DU
Total Commercial Sf	592,400 SF
Total Open Space	40.83 AC
Public Park	11.26 AC
School	9.73 AC

PHASE 3	
Total Ac	18.08 AC
Total Du	140 DU
SFD	0 DU
Condo's	140 DU
Total Commercial Sf	29,250 SF
Total Open Space	6.66 AC
Fire Station	1.34 AC



DETAIL A

Intersection w/ Extended Parkways
And 25 ft. Curb Return Radius
SCALE 1" = 40'

REV. DATE: DECEMBER 21, 2009
DATE: MAY 2, 2007

LEGAL DESCRIPTION:
PARCELS 8, 9, 10, AND PORTION OF PARCELS 7, 20, 21 OF PARCEL MAP NO. 24500-01 PMB 293-34/67, RECORDS OF LOS ANGELES COUNTY.

REGISTERED PROFESSIONAL ENGINEER ERIK WINATA No. C-67285 Exp. 09/30/10 CIVIL STATE OF CALIFORNIA

PSOMAS
28480 Avenue Stanford, Suite 200
Santa Clarita, CA 91355
(661) 219-6000 (661) 775-2718 (FAX)
ERIK WINATA R.C.E. NO. C 67285 DATE

DESIGNED: NSK/YL
DRAFTED: TLC/JS
CHECKED: EW

OWNER/DEVELOPER:
NEWHALL RANCH.
23823 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91335
TELEPHONE: (661) 255-4000
REPRESENTATIVE: MR. FRED MACMURDO

MAJOR LAND DIVISION
VESTING TENTATIVE TRACT MAP
NO. 53108
LARGE LOT CONVEYANCE MAP, PHASING MAP & DETAIL PLAN
IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES STATE OF CALIFORNIA

PROJECT NO. 1NLF010500
SHEET 13 OF 13

RV001-13.dwg

A full-size reproduction of this figure can be found at Impact Sciences.