LOS VALLES PROJECT

Draft Environmental Impact Report

Volume IX – Appendices

SCH No. 2013121056
Project No. 98-034
Revised Vesting Tentative Tract No. 52584
Variance No. 201300003
Conditional Use Permit No. 201300081
Oak Tree Permit No. 201300023
Environmental Assessment No. 201300138

Lead Agency:

County of Los Angeles
Department of Regional Planning
Land Divisions
320 West Temple Street, Room 1362
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Prepared by:

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March 2016

APPENDIX 5.6-3

Allan E. Seward Engineering Geology, Inc.,
Geologic and Geotechnical Report, October 22, 1999.

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

GEOLOGIC AND GEOTECHNICAL REPORT - Addendum No. 1
Response to County Comments
(Review Sheets dated 3/3/99, 3/4/99, 5/6/99, 9/9/99 and 9/16/99)
GEOLOGIC AND GEOTECHNICAL REPORT - Revised Map
Revised Vesting Tentative Tract No. 52584 (Revised 10/99)
Castaic, California

Prepared For:

Hasley Canyon Land Company, L.L.C.
C/O Palmer Investments

Dated October 22, 1999

Job No: 99-1617-4

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

October 22, 1999 Job No: 99-1617-4

Hasley Canyon Land Company, L.L.C.
C/O Palmer Investments
1999 Avenue of the Stars
15th Floor
Los Angeles, CA 90067

Attention: Mr. Dan Palmer

Subject: **GEOLOGIC AND GEOTECHNICAL REPORT - Addendum No. 1**
Response to County Comments (Review Sheets dated 3/3/99, 3/4/99, 5/6/99, 9/9/99 and 9/16/99)
GEOLOGIC AND GEOTECHNICAL REPORT - Revised Map
Revised Vesting Tentative Tract No. 52584 (Revised 10/99)
Castaic, California

References: At End of Text

Gentlemen:

This report is divided into two parts. The **first part** presents our Response to the Geologic and Geotechnical Review Sheets dated March 3, 1999, March 4, 1999, May 6, 1999, September 9, 1999 and September 16, 1999 for VTT 52584 issued by the Los Angeles County Department of Public Works, Engineering Geology and Geotechnical Sections. The **second part** of the report presents our opinions on the existing geologic conditions for VTT 52584 relative to the **Revised Map** dated October, 1999 and their effects on the proposed development. This report is supplementary to our January 15, 1998 report for VTT 52584 and the Conclusions and Recommendations presented therein are still applicable except where they are superceded in this report.

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

GEOLOGIC REPORT - ADDENDUM NO. 1

This addendum report has been prepared in response to County of Los Angeles Geologic and Geotechnical Review Comments referenced above, all of which have been comprehensively restated in the review sheets respectively dated September 9, 1999 and September 16, 1999.

(The March 1999 review sheets are in response to our original tentative map report and the following May and September 1999 review sheets are in response to the subsequent Revised Tentative Maps.)

To facilitate the review process, we are presenting the County review 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 in **Appendix A**.

GEOLOGIC REVIEW SHEET (9/9/99)

Remark No. 1

An engineering geologic report will be required to evaluate the feasibility of the revised map.

Response

Please refer to the geologic and geotechnical review of the revised Tentative Map presented in Part Two of this report.

Remark No. 2

A soils report will be required to evaluate the feasibility of the revised map.

Response

Please refer to the geologic and geotechnical review of the Revised Tentative Map presented in Part Two of this report.

Remark No. 3

The Geotechnical Engineering Unit's review dated 9/16/99 is attached.

Response

Our response to the Geotechnical Engineering Unit's review sheet is presented below.

GEOTECHNICAL ENGINEERING REVIEW SHEET (9/16/99)

Remark No. 1

Provide an updated soils report which addresses and evaluates the latest proposed tentative map and current site conditions.

Response

Please refer to the geotechnical and geologic review of the revised Tentative Map presented in Part Two of this report.

Remark No. 2

Upon receipt of the soils report requested, a complete review will be conducted.

Response

Acknowledged

Remark No. 3

Review of data from adjacent Tracts 44374 and 44800 indicates that shear strength parameters used in the slope stability analyses for compacted fill (40.3°, 130 psf) and alluvium (37.8°, 160 psf) appear high. Verify and provide revised slope stability analyses as necessary.

Response

We have revised some of the shear strength data including compacted fill and alluvium, and have added new tests. For more details please see the pertinent discussion in the second part of this report (Section 7.2.1). Due to the Revised Tentative Map and shear strength parameters, we have completely reanalyzed the entire site relative to slope stability.

Remark No. 4

Provide revised slope stability analyses for Cross Sections 7-7' and 19-19', assuming a perched water condition at the slide plane for Qls-5 and Qls-6, which are proposed to be partially left in place.

Response

7-7'

We have revised our slope stability analyses for Cross Section 7-7' per the revised plan and assuming a perched water condition at the slide plane for Qls-6 and have provided the Supervising Civil Engineer with appropriate mitigation measures (in order to attain a safety factor greater than 1.5) which he has incorporated into the Revised Tentative Map. Please refer to the slope stability section in the second part of this report.

19-19'

We have recommended that Landslide Qls-5, depicted in Cross Section 19-19'; be completely removed thereby negating the need for stability analysis.

Remark No. 5

Address the suitability of the landslide debris at Qls-5 and Qls-6, for supporting the compacted fill proposed to be placed on top of the slide debris. Provide substantiating consolidation and density data.

Response

Qls-5

All of Qls-5 will be completely removed prior to the placement of fill. (See Removals Map Plate V).

Qls-6

No fill or structures are proposed on Qls-6 on VTT 52584.

Remark No. 6

All geotechnical hazards not mitigated to minimum County standards must be designated as "Restricted Use Area." Clearly delineate landslide Qls-8 and the golf course areas as "Restricted Use Area."

Response

We have shown all known geotechnical hazards not mitigated to minimum County standards and Golf Course Areas as Restricted Use Areas on the attached Geotechnical/Geologic Maps.

Remark No. 7

Show the following on the geotechnical map:

a. All recommended mitigation measures.
b. Approximate limits and depth of removal and recompaction of soils subject to slide debris and unsuitable soils.
c. Location of "Restricted Use Areas."

Response

All of the above items under Remark No. 7 (a, b and c) have been shown on the Recommendations and Removal Maps (Plates IV through VI).

Remark No. 8

Requirements of the Geology Section are attached.

Response

Our response to the requirements of the Geology Section are in the previous section of this report.

Remark No. 9

Include a copy of this review sheet with your response.

Response

We have attached a copy of the review sheets in Appendix A.

GEOLOGIC & GEOTECHNICAL REVIEW REVISED MAP (DATED 10/99)

This portion of our report presents our opinions on the existing geologic and geotechnical conditions on VTT 52584 relative to the revised map dated October, 1999 and their effects on the proposed development. This report supplements and updates our January 15, 1999 report for VTT 52584, hereinafter called "Previous Report", and the conclusions and recommendations presented therein are still applicable except where they are superseded in this report.

1.0 SCOPE OF WORK FOR REVISED VTT 52584 (8/10/99)

1. Geologic/Geotechnical Review of Revised Tentative Tract Map 52584 dated October, 1999.

2. Geologic logging of an additional 11 (eleven) backhoe trenches, T-221 through T-231, to a maximum depth of approximately 12 feet.

3. Geologic logging (downhole) and sampling of **additional four** bucket-auger (24") borings to a maximum depth of 90 feet.

4. Coordination with the Supervising Civil Engineer, Land Design Consultants.

5. Additional laboratory testing on samples obtained for this phase of work and on other samples obtained during the previous phase of work (e.g. for remolded specimens).

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 and modified grades, including cut-slopes, natural slopes and temporary backcut slopes where appropriate. Based on the results, the need for tentative stabilization measures was explored.

7. Preparation of the Revised Geologic/Geotechnical Maps, Revised Recommendations and Removal Maps (includes RUA's and remedial recommendations), Revised Geologic Legend, Geotechnical Cross Sections (slope stability), revised Cross Sections, additional **nineteen (19) new Cross Sections**, additional Trench and Boring Logs, and this report.

2.0 BACKGROUND

Geologic and geotechnical aspects of the Tentative Map for VTT 52584 dated December 10, 1998 were previously addressed in our report dated January 15, 1999. Our response to the L.A. County Review Sheets addressing our report is presented in the first part of this report. A revised tentative map dated October, 1999 was subsequently prepared by Land Design Consultants, Inc. and is attached as the base map for our Geologic/Geotechnical Maps as well as our Recommendations, Restricted Use Areas and Removal Maps (Plates I through VI).

3.0 REVISIONS VTTM 52584 (10//99)

We have reviewed the latest Revised Tentative Tract Map dated October, 1999. Major revisions are proposed on the latest Tentative Map. The street alignments, cut-slope locations and orientations, residential lot locations and numbering designations and the location of the golf course fairways have been redesigned. The total number of proposed buildable lots has remained the same.

The most significant changes in proposed grading and/or design have occurred in the vicinity of golf course hole number three and along the northern portion of the tract where major cut-slopes have been redesigned and/or reoriented. The area located north of proposed Lots 86 through 97 was originally proposed as a large cut-slope. This area is now proposed as a natural slope.

We have re-designated the proposed cut-slopes greater than 30 feet in height as CS-1 through CS-36 on the Revised Tentative Tract Map. Seven Cross Sections have been revised from our January 15, 1999 report and additional nineteen cross sections have been constructed to illustrate the anticipated geologic/geotechnical conditions relative to the Revised Tentative Tract design.

4.0 ENGINEERING GEOLOGY

4.1 Proposed Grading

The proposed Grading Concept for VTT 52584 still consists of typical cut and fill grading techniques to produce building pads and a golf course with grades generally rising from south to north away from Hasley Canyon Road. The maximum proposed cut-slope (CS-7) height is approximately 165 ft. The maximum proposed cut from existing grade is approximately 115 feet and occurs on Plate II in the vicinity of Lots 166 through 169. The maximum proposed fill (thickness) over existing grade is approximately 87 feet and occurs on Plate I in the vicinity of Lot 32.

4.2 Landslides

No “new” landslides were encountered during our most recent subsurface investigation. We have revised the Landslide Summary (Table I) to reflect the Revised Tentative Map conditions and the effects of the landslides on the proposed revised grade changes. All landslide removals should be completed under continuous observations by the Project Geologist.

4.3 Surficial Failures

Surficial failures identified on VTT 52584 are shown on the Geologic/Geotechnical Maps. All surficial failure material in areas to receive fill must be completely removed prior to the placement of fill.

4.4 Terrace Deposits

We have revised some of the terrace deposits contacts based on new data from our most recent subsurface investigation; these are shown on the Geologic/Geotechnical Maps.

4.5 Natural Slopes

We constructed cross sections where natural slopes exhibited daylighted bedding conditions or where steeper than 2:1 (h:v) gradients existed, above or below proposed building pads, in order to analyze their stability. Natural slopes above or below nonbuilding pad areas and/or golf course areas were not analyzed but have been put into Restricted Use Areas where appropriate.

The steepest proposed natural slope is located south of Lots 23 and 24 and east of proposed Cut-Slope CS-33 (Plate I) and faces south. Cross Section 45-45' has been constructed to illustrate the three dimensional geometry of the underlying bedrock. Geotechnical analysis indicates this natural slope is grossly stable with a factor of safety greater than 1.5.

The proposed natural slope located west and northwest of Cut-Slope CS-13 (Plate II) descends to the golf course area. This natural slope faces west and southwest. Saugus Formation bedrock is oriented essentially neutral to the west-facing portions of the natural slope face and is dipping steeper than the natural topography in the southerly-facing portions of the natural slope. This natural slope is grossly stable.

The natural slope located easterly of Lots 98 through 100 (Plates I and II) is illustrated by Cross Section 34-34'. This slope is fairly steep (1.5:1) and high (±175 ft.) with favorable geology (beds dip approximately 16° into slope) and calculates stable with a factor of safety greater than 1.5 (see Stability Calculations in Appendix E).

The natural slope located north of Lots 90 to 97 (Plate I) was analyzed, with the proposed remedial cut (at Cross Section 31-31') added by the Supervising Civil Engineer to the revised plan; this natural slope calculates stable with a factor of safety greater than 1.5. We drilled, sampled and tested representative bedrock or bedrock correlative to bedrock encountered in this area so that the stability calculations on this slope could be performed using site specific strength parameters. See discussion under Slope Stability (Section 7.2) for details on analysis approach.

The natural slope located east of CS-5 (Plate II) should be laid back to a gradient of 3:1 and incorporated into CS-5. We have communicated this to the Supervising Civil Engineer and it is our understanding that he will show this natural slope as a proposed cut-slope on the following revised tentative map.

4.6 Potential Debris Flow Hazard

The potential for debris flow hazard exists on Lots 98 through 100 on the proposed tennis courts and on the proposed clubhouse. The Civil Engineer has included debris walls in these areas eliminating the potential for debris flow hazard to the proposed structures. Soil accumulations are very thin on the slope adjacent to Lots 89 through 97 and the standard calculations for flood control abatement may be utilized by the Supervising Civil Engineer to design containment structures (walls, dispersion areas and/or basins) where necessary.

4.7 Restricted Use Areas

Since a large portion of VTT 52584 is proposed as a golf course area we have designated large portions of it as **Restricted Use Areas** in order to more efficiently develop the property and to minimize the impacts of grading to the property. The zone of tectonic deformation has also been placed within a Restricted Use Area (See our previous report for discussion). We have shown all of the Restricted Use Areas on Plates IV through VI.

5.0 FIELD EXPLORATION AND LABORATORY TEST RESULTS

For this report we performed additional geologic mapping and geologic logging of backhoe trenches and bucket-auger borings. We also reviewed our previous geologic and geotechnical data as it applied to the Revised Tentative Map. Additional field explorations consisted of four bucket-auger borings (30") and eleven backhoe trenches. See Scope of

Work for more details. The approximate locations of the additional borings and trenches are shown on the Geologic/Geotechnical Maps (Plates I through III). The logs of these additional explorations are included in **Appendix B** of this report.

A large portion of the scope of this investigation was to refine the lithologic characteristics of bedrock via deep borings in the area of the large natural slope located north of Lots 89 through 97, and to dig backhoe trenches near the toe of the revised cut-slopes along the northern portion of the tract.

Our previous explorations were sufficient to analyze the remaining portion of the Revised Tentative Map relative to geologic and geotechnical considerations.

California-Drive, relatively undisturbed ring samples, and bulk samples were obtained from borings at various depths. The borings and trenches were backfilled with the excavated material immediately after logging was completed.

The additional laboratory soil testing was limited to providing supplemental data for our analyses for this report and was principally planned for determination of the shear strength characteristics of the existing subsurface soils. Direct shear tests were principally conducted for determination of strength values for bedding and other materials for our stability analyses. Other tests performed consisted of In-Situ dry density, percent passing the No. 200 sieve, Atterberg Limits, Laboratory Compaction.

The laboratory test results are presented on the boring logs and in **Appendix C**.

6.0 GEOTECHNICAL SUBSURFACE CONDITIONS AND SOIL PROPERTIES

General description of geologic units (i.e. TQs, Qt, Qal, and sw), topsoil, landslides, artificial fill were presented in the Geology and Engineering Geology sections of our previous report.

The subsurface soils (alluvium) encountered in the hollow-stem auger borings, and the rotary wash borings, generally consist of interlayers of sands and silty sands with occasional gravels, and occasional silts at depth. Generalized soil properties were discussed in the previous report.

7.0 GEOTECHNICAL DISCUSSION, CONCLUSIONS & RECOMMENDATIONS

The proposed development is feasible for construction from the geological and geotechnical viewpoints, provided our recommendations contained in this report and our previous report are followed. General discussions and recommendations applicable to the Revised Tentative Map are presented below.

All of our recommendations in our report dated January 15, 1999 are still applicable except where superceded by this report.

7.1 Removals

We have revised the removal maps based on the Revised Tentative Map dated October 10, 1999 and included these revised maps (Plates IV, V and VI) in this report

We have revised Cross Section 21-21' and added 46-46' to show the relationship between removals under proposed structural fills that "grade" down slope into non-structural fills.

7.2 Slope Stability of Proposed and Modified Grades

7.2.1 Discussion of Strength Parameters

7.2.1.1 Introduction

The following discussion has been prepared to clarify the strengths used in our stability analyses and how they were derived. A summary of the selected shear strength parameters used in our analyses is presented in the table below. All of our direct shear test reports and a complete summary table are presented in Appendix C. It should be noted that an error was discovered in the computer default pressure units, which affected some of the results presented in our previous report dated January 15, 1999. Additional tests have been performed for this report. The complete summary table of shear strength test data presented in the appendix indicates which tests were affected and revised and also includes the results of additional tests.

SHEAR STRENGTH PARAMETERS USED FOR STABILITY ANALYSES

MATERIALS	UNIT WEIGHT (PCF)	STATIC		PSEUDOSTATIC	
		PHI (DEG.)	C (PSF)	PHI (DEG.)	C (PSF)
Landslide Slip Plane (Qls)	130	7	290	28	210
Landslide Debris (Qls)	133	26	510	29	1800
Bedding Planes:					
▪ Silty Claystone (weakest bedding plane material)	122	17.5	200	30	290
▪ Claystone (mapped top plane in Section 31-31' correlates to clay sample from B-2 @ 62 ft.)	129	12	1570	28	1270
Bedrock (TQs) (across bedding sandstone)	119	40.5	410	42	880
Terrace Deposits (Qt)	120	41	200	42	290
Compacted Fill (Cef)	125	29	300	32	316
Alluvium (Qal)	119	34	169	38	338
Slopewash (sw)	104	29	190	30	290

7.2.1.2 Bedrock Strengths

The bedrock at the site is comprised almost entirely of massive sandstone and conglomerate with minor interbeds and lenses of silty sandstone, sandy siltstone, siltstone, clayey siltstone and claystone. Sandstone across bedding strength parameters reported in our previous report were in error as mentioned above. The parameters included in this report have been corrected. The selected values in the above table were utilized in our stability analyses. Where unknown, the weakest bedding plane material (silty claystone) was assumed to exist at the critical location. Where known (via subsurface) appropriate parameters were utilized as discussed below.

Claystone was identified in an upper bedding plane of Section 31-31' (via BA-7 at 52 ft.). Correlative materials (BA-2 @ 62 Ft.) and were tested under saturated conditions and the results are presented in the above table. The silty claystone (BA-1 @ 75.4 ft.) and claystone parameters did not change from the previous report.

7.2.1.3 Landslide Strengths

The **landslide plane** strength parameters have not changed from our previous report.

The strength of the mass of **landslide debris materials** used previously increased and has been corrected due to the previously mentioned error in the computer default pressure units. As a consequence, parameters of landslide debris used for our analyses of this report correspond to other values previously reported but that were not in error and are lower than the corrected values.

7.2.1.4 Slopewash Strength

Previous strength parameters for slopewash have also been corrected. However, slopewash materials were not included in the analyses for this report.

7.2.1.5 Alluvium Strength

For this report and to respond to L.A. County Review Sheet (9/16/99) we performed an additional test for alluvium, which resulted in lower values than those used previously. These lower parameters were used for this report.

7.2.1.6 Compacted Fill Strength

To respond to L.A. County Review Sheet (9/16/99) on our previous report, we performed several additional tests on specimens remolded to 90% Relative Compaction. Based on these test results, we selected lower parameters for compacted fill for this report than the values previously used.

7.2.1.7 Terrace Deposits

Corrected strength parameters for terrace deposits are shown in the above table. The strength values increased in comparison with previously used parameters.

7.2.2 Stability Analyses

Stability analyses were performed on numerous cross sections of the currently proposed development grades for this project, including natural slopes, fill slopes, cut slopes and temporary backcut slopes, and some modifications of existing conditions for stability reasons. Based upon the results from the analyses, the need for tentative stabilization measures was explored and dimensional design of these measures was performed, as needed, in a step-by-step fashion utilizing slope stability analyses. The analyzed cross sections reflect critical conditions for stability (i.e. steeper adverse potential bedding plane(s), significant slope height and inclination). The analyses are presented in **Appendix E**, which includes a summary table of the results.

Based upon geologic data, we modeled multiple potential bedding planes in the critical cross sections analyzed; representative shear strength parameters for the bedding planes were used. These values are included in the table provided in the previous section.

After appropriate modifications from proposed geometries, analyzed cut-slopes and grades, natural slopes, compacted fill slopes, and temporary backcut slopes comply with Los Angeles County requirements for stability under static and pseudostatic loading conditions, as applicable. Additional discussion is presented in Section 7.3 of this report.

7.3 Proposed Cut-Slopes

Cut-slopes at the site will be sloped at a 2:1 (h:v) inclination or flatter. Sandy materials will be susceptible to erosion; therefore, cut-slopes should be sodded or planted, if practicable, as soon as the grading work is completed in order to minimize erosion.

7.3.1 Proposed Cut-Slopes

We have identified 36 proposed cut-slopes (30± ft. or higher) on Revised VTT 52584 and designated them as CS-1 through CS-36. The slope geometry, anticipated geologic conditions, and recommended mitigation, if necessary, for each slope are presented in the Revised Cut-Slope Summary - **Table 2**. **It has been assumed for the purposes of stability analysis that clay-rich bedding planes may occur anywhere in the proposed cut-slopes.** The exception to this

assumption occurs in the analysis of the large natural slope north of Lots 86 through 97 and CS-11 where extensive borings were excavated, downhole logged and sampled to confirm the presence or lack of weak bedding plane materials. Where weaker fine-grained beds were found, their locations and geometry were plotted on the cross sections for analysis. Representative materials encountered were correlated to shear tests on similar or worse case materials and utilized in the slope stability analyses. Where no fine-grained beds were encountered, we utilized in our analysis the rock strengths of the massive bedrock, representative of the site specific materials encountered. If any of the smaller proposed cut-slopes (less than 25± ft. in height) have adverse geologic or grading configurations (fill over cut) they can be mitigated if necessary with a standard stability fill with a 20 ft. wide key.

8.0 LOS ANGELES COUNTY 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 grading for Revised Vesting Tentative Tract 52584 (dated October, 1999) and the proposed Building Sites will be safe against hazards from landslide, settlement, or slippage and will not adversely affect offsite property, provided all of our recommendations are followed and implemented during construction.

9.0 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 recommendations contained herein. That party would then assume the title of responsibility as “Geologist/Geotechnical Engineer of Record” for the project.

10.0 LIMITATIONS

This report has been prepared for the exclusive use of Palmer Investments 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.

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**.

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.

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

Respectfully submitted,

Allan E. Seward, CEG 246
Principal Engineering Geologist
President

Edward Castellanos, RCE 30279, RGE 191
Principal Geotechnical Engineer

The following attachments and appendices complete this report.

References

APPENDIX A

Review Sheets

APPENDIX B

FIELD INVESTIGATION

Geologic Trench Logs TP-221 thru TP-231
Geologic Boring Lots BA-7 thru BA-10
Key to Symbols

APPENDIX C

LABORATORY INVESTIGATION

APPENDIX D

GENERAL FIGURES AND TABLES

Summary of Landslides	Table 1
Summary of Cut-Slopes	Table 2

APPENDIX E

SLOPE STABILITY ANALYSES

APPENDIX F

REVISED CROSS SECTIONS

1-1', 3-3', 7-7', 9-9', 17-17', 19-19' and 21-21'

APPENDIX G

NEW CROSS SECTIONS

27-27' thru 45-45'

Geologic/Geotechnical Maps	Plates I, II & III	(In Pocket)
Geologic/Geotechnical Recommendations and Removal Maps	Plates IV, V & VI	(In Pocket)
Geologic/Geotechnical Legend	Plate VII	(In Pocket)

Distribution: (5) Addressee

(2) Los Angeles County Department of Public Works

Attn: Geotechnical Section - Mr. Amir Alam

Attn: Geology Section - Mr. Charles Nestle

(1) Land Design Consultants

Attn: Mr. Bob Sims

REFERENCES

By Allan E. Seward Engineering Geology, Inc.

1. **Geologic Report**
Tentative Tract 44945
Hasley Canyon
Saugus, California
Dated October 30, 1987 - JN: 6-806-4

2. **Geologic Report**
Tentative Tract 44945
Revised June 11, 1992
Dated June 24, 1992 - JN: 92-806-4

3. **Geologic Review**
Tentative Tract 44945
Revised June 11, 1992
Dated August 19, 1992 - JN: 92-806-4

4. **Geologic Response - County Review Sheets dated 9/29/82 & 9/30/92**
Tentative Tract 44945
Revised June 11, 1992
Dated December 3, 1992 - JN: 92-806-4

5. **Geologic and Geotechnical Report**
Vesting Tentative Tract 52584
Castaic, California
Dated January 15, 1999 - JN: 99-1617-4

Report by Jeffrey S. Gordon Geotechnical Engineering

6. **Soils Engineering Investigation**
Tentative Tract 44945
Dated October 30, 1987 - JN: 7-187

Reports by Solus Geotechnical Corporation

7. **Geotechnical Evaluation**
   Tentative Tract 44945
   Dated August 21, 1992 - JN: AES-1015

8. **Response to County of Los Angeles Geotechnical Review**
   Tentative Tract 44945
   County of Los Angeles, California
   Dated March 11, 1993 - JN: AES-1015

9. **Response to County of Los Angeles Geotechnical Review**
   Tentative Tract 44945
   County of Los Angeles, California
   Dated September 29, 1993 - JN: AES-1015

REFERENCES

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Appendix A

DEPARTMENT OF PUBLIC WORKS
MATERIALS ENGINEERING DIVISION
GEOLOGIC REVIEW

1617

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TENTATIVE TRACT/MINOR LAND SUBDIVISION 52584
SUBDIVIDER Hasley Canyon Land Co., LLC
ENGINEER Land Design Consultants
GEOLOGIST AND SOILS ENGINEER Allan Seward

TENTATIVE MAP DATED 12/23/98 (Revision)
LOCATION Hasley Canyon
REPORT DATE 1/15/99

The Regional Planning Commission, developer and engineer are advised that:

PRIOR TO APPROVAL OF TENTATIVE TRACT OR MINOR LAND SUBDIVISION MAP:

1. The Geotechnical Engineering Unit's review dated 3/3/99 is attached.

NOTE: Provide a copy of this review with your resubmittal.

Prepared by _____ Reviewed by _____ Date ~~2/11/99~~ 3/4/99
Charles Nestle

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 and Safety Orders.

F-RS:FORM.1
7/15/96

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
MATERIALS ENGINEERING DIVISION

SOILS ENGINEERING REVIEW SHEET

Address: 900 S. Fremont Ave.
Alhambra, CA 91803
Telephone: (626) 458-4925
Fax: (626) 458-4913
Calling hours - Monday through Thursday 8-9 a.m. & 3-4 p.m.

District Office 8.2

Tentative Tract 52584
Location Castaic
Developer/Owner Hasley Canyon Land Co.
Engineer/Architect Land Design Consultants
Soils Engineer Allan E. Seward (98-1617-4)
Geologist Same as above

Review of:

Tentative Tract Map Dated By Regional Planning 12/23/98
Soils Engineering Report Dated 1/15/99 Geologic Report Dated 1/15/99

Previous review sheet dated 1/13/99

ACTION:

Tentative Map feasibility is not recommended for approval.

REMARKS:

1. Grading recommended in the geotechnical report and that shown on the tentative map must conform. Several recommended mitigation measures, including revised cut slopes, buttresses, and stability fills are not shown on the tentative map.

2. Review of data from adjacent Tracts 44373 and 44800 indicates that shear strength parameters used in the slope stability analyses for compacted fill (40.3°, 130 psf) and alluvium (37.8°, 160 psf) appear high. Verify and provide revised slope stability analyses as necessary.

3. Provide revised slope stability analyses for cross sections 7-7' and 19-19', assuming a perched water condition at the slide plane for Qls-5 and Qls-6, which are proposed to be partially left in place.

4. Address the suitability of the landslide debris at Qls-5 and Qls-6, for supporting the compacted fill proposed to be placed on top of the slide debris. Provide substantiating consolidation and density data.

5. All geotechnical hazards not mitigated to minimum County standards must be designated as "Restricted Use Area." Clearly delineate landslide Qls-8 and the golf course area as "Restricted Use Area."

6. Show the following on the geotechnical map:

   a. All recommended mitigation measures.

   b. Approximate limits and depth of removal and recompaction of soils subject to slide debris and unsuitable soils.

   c. Location of "Restricted Use Areas."

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
MATERIALS ENGINEERING DIVISION

SOILS ENGINEERING REVIEW SHEET

Tentative Tract 52584

REMARKS (cont.):

7. Requirements of the Geology Section are attached.

8. Include a copy of this review sheet with your response.

NOTE TO THE PLAN CHECKER: ON-SITE SOILS ARE CORROSIVE TO FERROUS METALS.

REGISTERED PROFESSIONAL ENGINEER
AMIR M. ALAM
No. C48738
Exp. 9-30-00
CIVIL
STATE OF CALIFORNIA

Prepared by _____ Date 3/3/99
Amir M. Alam

NOTICE: Public safety, relative to geotechnical subsurface exploration, shall be provided in accordance with current codes for excavations, including of the Los Angeles County Code, Chapter 11.48, and the State of California, Title 8, Construction Safety Orders.

P:Amir/52584

DEPARTMENT OF PUBLIC WORKS
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TENTATIVE TRACT/MINOR LAND SUBDIVISION 52584
SUBDIVIDER Hasley Canyon Land Co., LLC
ENGINEER Land Design Consultants
GEOLOGIST AND SOILS ENGINEER Allan Seward

TENTATIVE MAP DATED 4/20/99 (Revision)
LOCATION Hasley Canyon
REPORT DATE 1/15/99

The Regional Planning Commission, developer and engineer are advised that:

PRIOR TO APPROVAL OF TENTATIVE TRACT OR MINOR LAND SUBDIVISION MAP:

1. The Geotechnical Engineering Unit's review dated 5/6/99 is attached.

NOTE: Provide a copy of this review with your resubmittal.

Prepared by _____ Reviewed by _____ Date 5/6/99
Charles Nestle

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 and Safety Orders.

F-RS:FORM.1
7/15/96

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District Office 8.2

Tentative Map (Tract) 52584
Location Castaic
Developer/Owner Hasley Canyon Land Co.
Engineer/Architect Land Design Consultants
Soils Engineer Allan E. Seward (98-1617-4)
Geologist Same as above

Review of:

Revised Tentative Map (Tract) Dated By Regional Planning 4/20/99

Previous review sheet dated 3/3/99

ACTION:

Tentative Map feasibility is not recommended for approval.

REMARKS:

As Previously Requested:

1. Grading recommended in the geotechnical report and that shown on the tentative map must conform. Several recommended mitigation measures, including revised cut slopes, buttresses, and stability fills are not shown on the tentative map.

2. Review of data from adjacent Tracts 44373 and 44800 indicates that shear strength parameters used in the slope stability analyses for compacted fill (40.3°, 130 psf) and alluvium (37.8°, 160 psf) appear high. Verify and provide revised slope stability analyses as necessary.

3. Provide revised slope stability analyses for cross sections 7-7' and 19-19', assuming a perched water condition at the slide plane for Qls-5 and Qls-6, which are proposed to be partially left in place.

4. Address the suitability of the landslide debris at Qls-5 and Qls-6, for supporting the compacted fill proposed to be placed on top of the slide debris. Provide substantiating consolidation and density data.

5. All geotechnical hazards not mitigated to minimum County standards must be designated as "Restricted Use Area." Clearly delineate landslide Qls-8 and the golf course area as "Restricted Use Area."

6. Show the following on the geotechnical map:

   a. All recommended mitigation measures.

   b. Approximate limits and depth of removal and recompaction of soils subject to slide debris and unsuitable soils.

   c. Location of "Restricted Use Areas."

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
MATERIALS ENGINEERING DIVISION

SOILS ENGINEERING REVIEW SHEET

Tentative Tract 52584

REMARKS (cont.):

7. Requirements of the Geology Section are attached.

8. Include a copy of this review sheet with your response.

NOTE TO THE PLAN CHECKER: ON-SITE SOILS ARE CORROSIVE TO FERROUS METALS.

REGISTERED PROFESSIONAL ENGINEER
AMIR M. ALAM
No. C48738
Exp. 9-30-00
CIVIL
STATE OF CALIFORNIA

Prepared by _____ Date 5/6/99
Amir M. Alam

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:Amir/52584

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TENTATIVE TRACT/MINOR LAND SUBDIVISION 52584
SUBDIVIDER Hasley Canyon Land Co., LLC
ENGINEER Land Design Consultants
GEOLOGIST AND SOILS ENGINEER Allan Seward

TENTATIVE MAP DATED 8/23/99 (Revision)
LOCATION Hasley Canyon

REPORT DATE 1/15/99

The Regional Planning Commission, developer and engineer are advised that:

PRIOR TO APPROVAL OF TENTATIVE TRACT OR MINOR LAND SUBDIVISION MAP:

[X] An engineering geologic report will be required to evaluate the feasibility of the revised map.

[X] A soils report will be required to evaluate the feasibility of the revised map.

[ ] Sufficient evidence must be submitted to show that the sustained use of private sewage disposal system is possible without inducing a geologic hazard. The Health Department and developer are advised that geologic conditions within this tract may severely limit or prohibit the use of private sewage disposal system that will introduce water into the subsurface.

[ ] Based on the State of California Seismic Hazard Maps, the subject site is located in an area with a potential for liquefaction. The above requested reports must address the potential for liquefaction and ground failure. Please refer to the attached Materials Engineering Division's "Interim Geology Review Guidelines for Ground Failure/Liquefaction" (GS045 Rev. 5/18/99). Provide this office with two (2) original copies of the reports for review and distribution to the State of California Division of Mines and Geology.

[X] The Geotechnical Engineering Unit's review dated 9/16/99 is attached.

Prepared by _____ Reviewed by _____ Date 9/9/99
Charles Nestle

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 and Safety Orders.

F-RS:FORM.1
7/15/96

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Tentative Map (Tract) 52584
Location Castaic
Developer/Owner Hasley Canyon Land Co.
Engineer/Architect Land Design Consultants
Soils Engineer Allan E. Seward (98-1617-4)
Geologist Same as above

Review of:

Revised Tentative Map (Tract) Dated By Regional Planning 8/23/99

Previous review sheet dated 5/6/99

ACTION:

Tentative Map feasibility is not recommended for approval.

REMARKS:

1. Provide an updated soils report which addresses and evaluates the latest proposed tentative map and current site conditions.

2. Upon receipt of the soils report requested, a complete review will be conducted.

As Previously Requested:

3. Review of data from adjacent Tracts 44373 and 44800 indicates that shear strength parameters used in the slope stability analyses for compacted fill (40.3°, 130 psf) and alluvium (37.8°, 160 psf) appear high. Verify and provide revised slope stability analyses as necessary.

4. Provide revised slope stability analyses for cross sections 7-7' and 19-19', assuming a perched water condition at the slide plane for Qls-5 and Qls-6, which are proposed to be partially left in place.

5. Address the suitability of the landslide debris at Qls-5 and Qls-6, for supporting the compacted fill proposed to be placed on top of the slide debris. Provide substantiating consolidation and density data.

6. All geotechnical hazards not mitigated to minimum County standards must be designated as "Restricted Use Area." Clearly delineate landslide Qls-8 and the golf course area as "Restricted Use Area."

7. Show the following on the geotechnical map:

   a. All recommended mitigation measures.
   b. Approximate limits and depth of removal and recompaction of soils subject to slide debris and unsuitable soils.
   c. Location of "Restricted Use Areas."

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
MATERIALS ENGINEERING DIVISION

SOILS ENGINEERING REVIEW SHEET

Tentative Tract 52584

REMARKS (cont.):

8. Requirements of the Geology Section are attached.

9. Include a copy of this review sheet with your response.

NOTE TO THE PLAN CHECKER: ON-SITE SOILS ARE CORROSIVE TO FERROUS METALS.

REGISTERED PROFESSIONAL ENGINEER
AMIR M. ALAM
No. C48738
Exp. 9-30-00
CIVIL
STATE OF CALIFORNIA

Prepared by _____ Date 9/16/99
Amir M. Alam

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:Amir/52584

Appendix B

JOB NO. 99-1617-4

LOGGED BY VCG

Trench Log No. T-221

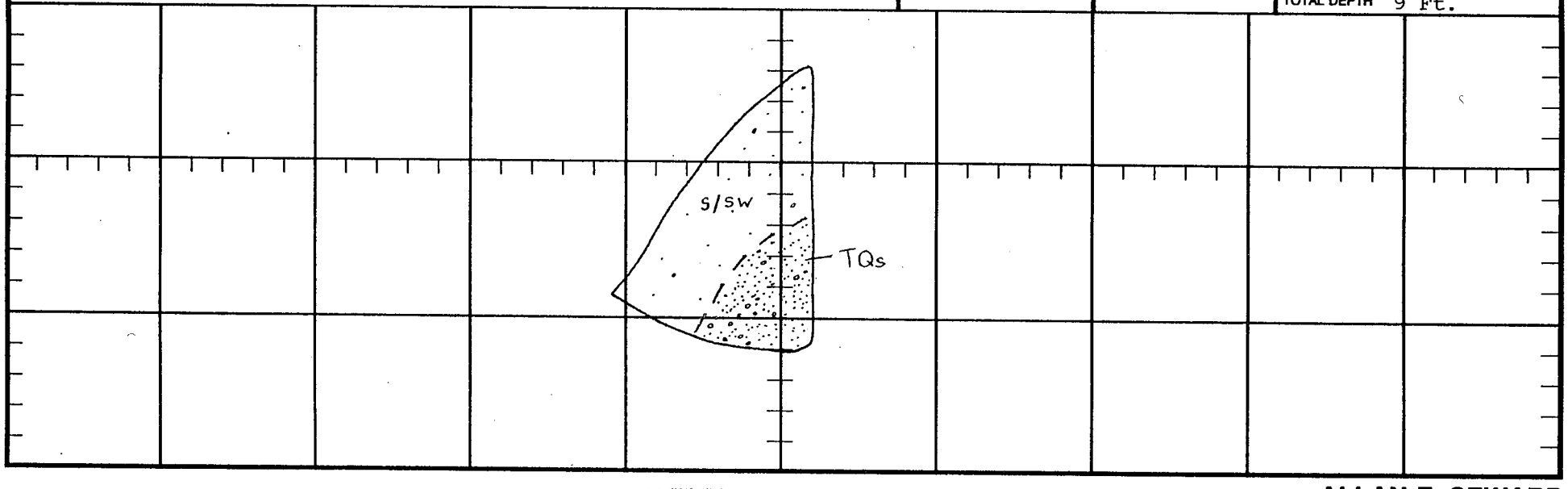
PROJECT Hasley Cyn. Golf/Residential

DATE 10/22/99

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 5' SOIL/SLOPEWASH; s/sw, Medium- to yellowish-brown fine- to coarse-grained sand with scattered pebbles; loose; dry			Trenches T-221 thru T-231 excavated 9/27/99 with a crawlerhoe and a 24" wide bucket
5 - 9' BEDROCK; TQs, Tan, fine- to coarse-grained sandstone and pebbly sandstone, friable; moderately dense; dry	N85E,35SE		
			No Ground Water No Caving
			TOTAL DEPTH 9 Ft.

SCALE 1" = 5'

N 64 W



ALLAN E. SEWARD

JOB NO. 99-1617-4

LOGGED BY VCG

Trench Log No. T-222

PROJECT Hasley Cyn. - Golf/Residential

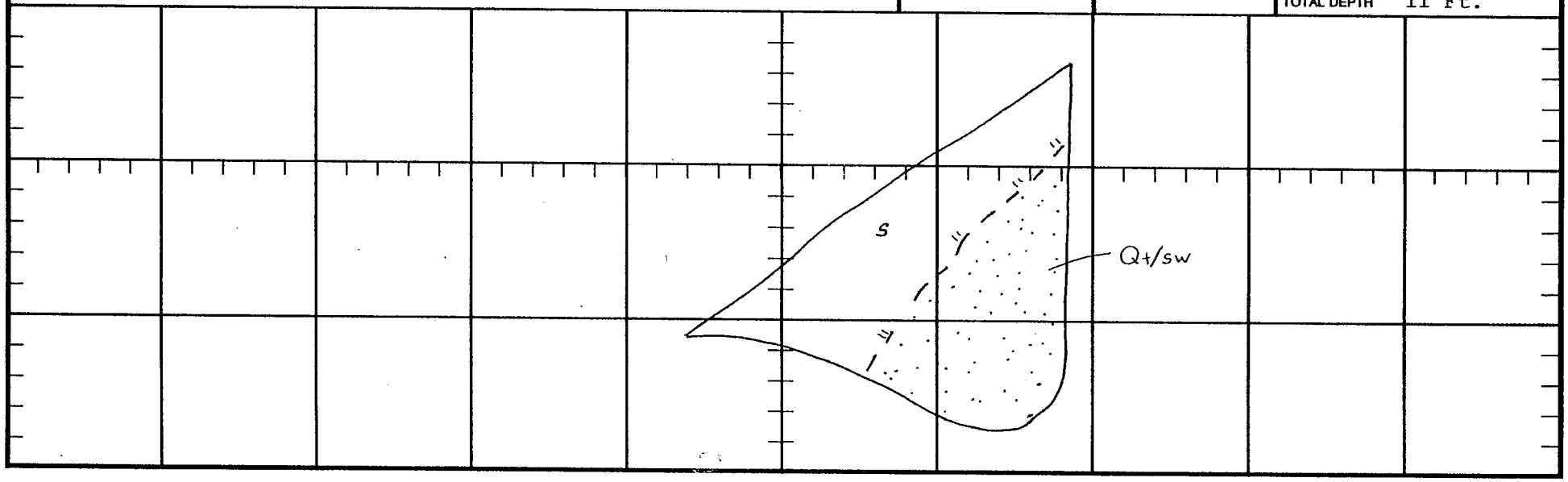
DATE 10/22/99

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6' SOIL; s, Medium- to yellowish-brown, fine- to coarse-grained sand with scattered pebbles; loose; dry			
6 - 11' QUATERNARY TERRACE/SLOPEWASH; Qt/sw, Light reddish-brown, fine- to coarse-grained sandstone with scattered pebbles, faint horizontal stratigraphic horizons, but mostly discontinuous; loose; dry to damp; no visible fractures, friable			No Ground Water No Caving

SCALE 1" = 5'

N 75 E

TOTAL DEPTH 11 Ft.



ALLAN E. SEWARD

JOB NO. 99-1617-4

LOGGED BY VCG

Trench Log No. T-223

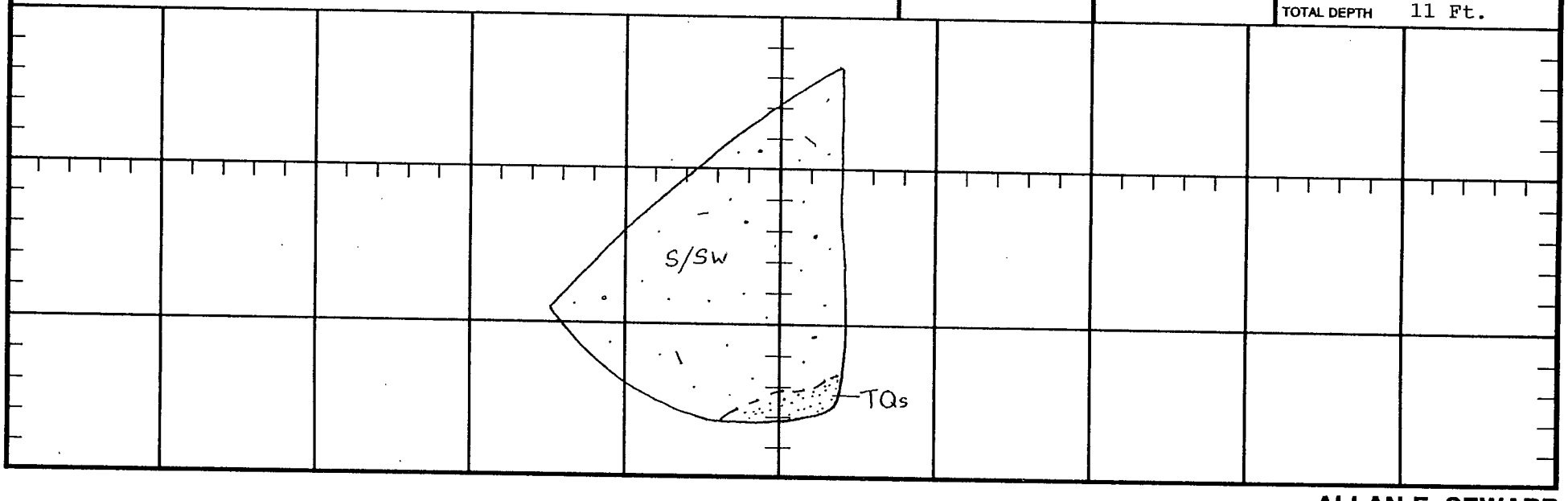
PROJECT Hasley Cyn. Golf/Residential

DATE 10/22/99

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 9' SOIL/SLOPEWASH; s/sw, Light reddish-brown, fine- to coarse-grained pebbly sand with minor silt; loose; friable; dry			
9 - 10' BEDROCK; TQs, Tan to yellow, fine- to medium-grained sandstone; friable; loose; dry	N68E,33SE		
			No Ground Water No Caving TOTAL DEPTH 11 Ft.

SCALE 1" = 5'

N 35 E



ALLAN E. SEWARD

JOB NO. 99-1617-4

LOGGED BY VCG

Trench Log No. T-224

PROJECT Hasley Cyn. Golf/Residential

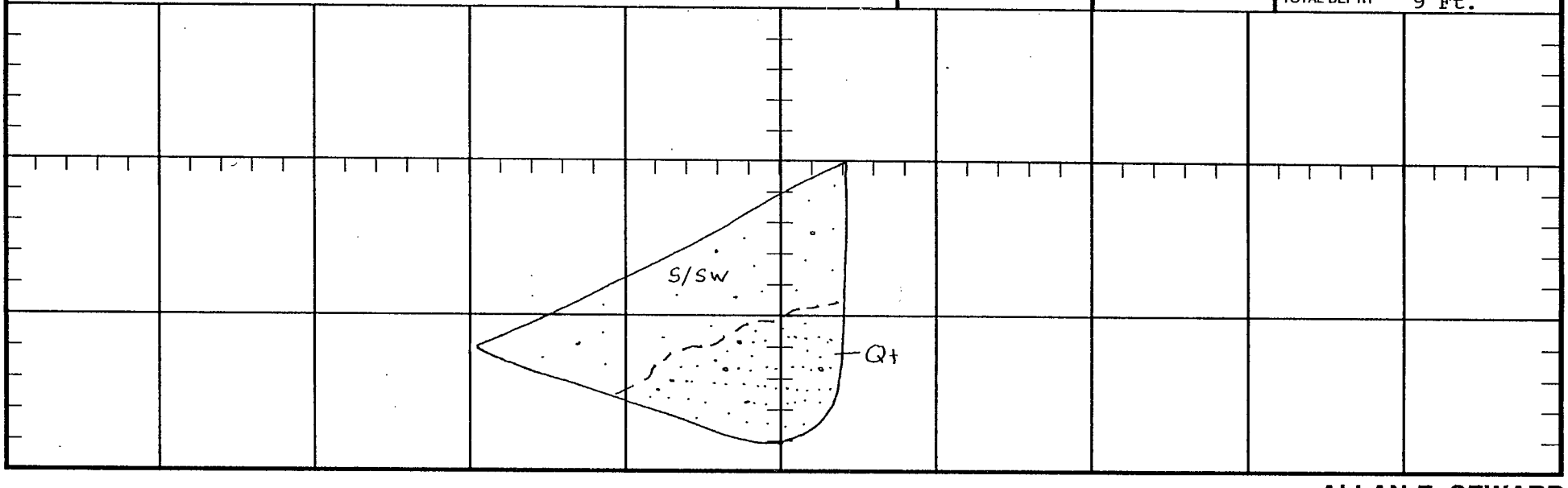
DATE 10/22/99

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 4.5' SOIL/SLOPEWASH; s/sw, Medium- to light-reddish-brown, fine- to coarse-grained pebbly sandstone; loose; friable; dry			
4.5 - 9' Quat. Terrace ~~BEDROCK~~; Qt, Light yellowish-brown to reddish-brown, fine- to coarse-grained pebbly sandstone; loose to moderately dense; dry to damp	Faint Horizontal Stratification		No Ground Water No Caving

SCALE 1" = 5'

N 26 W

TOTAL DEPTH 9 Ft.



ALLAN E. SEWARD

JOB NO. 99-1617-4

LOGGED BY VCG

Trench Log No. T-225

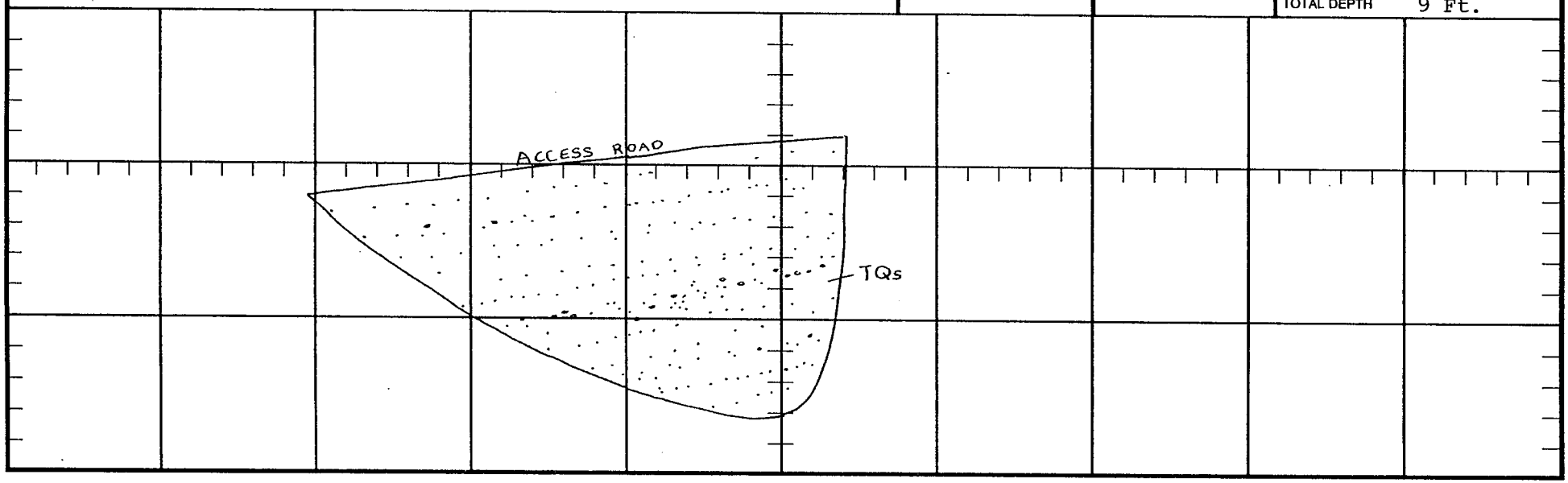
PROJECT Hasley Cyn Golf/Residential

DATE 10/22/99

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 9' BEDROCK; TQs, Light reddish-brown to tan, fine- to coarse-grained pebbly sandstone, moderately dense; friable; damp	N89E,35NW		No Ground Water No Caving TOTAL DEPTH 9 Ft.

SCALE 1" = 5'

N 82 E



ALLAN E. SEWARD

JOB NO. 99-1617-4

LOGGED BY VCG

Trench Log No. T-226

PROJECT Hasley Cyn. Golf/Residential

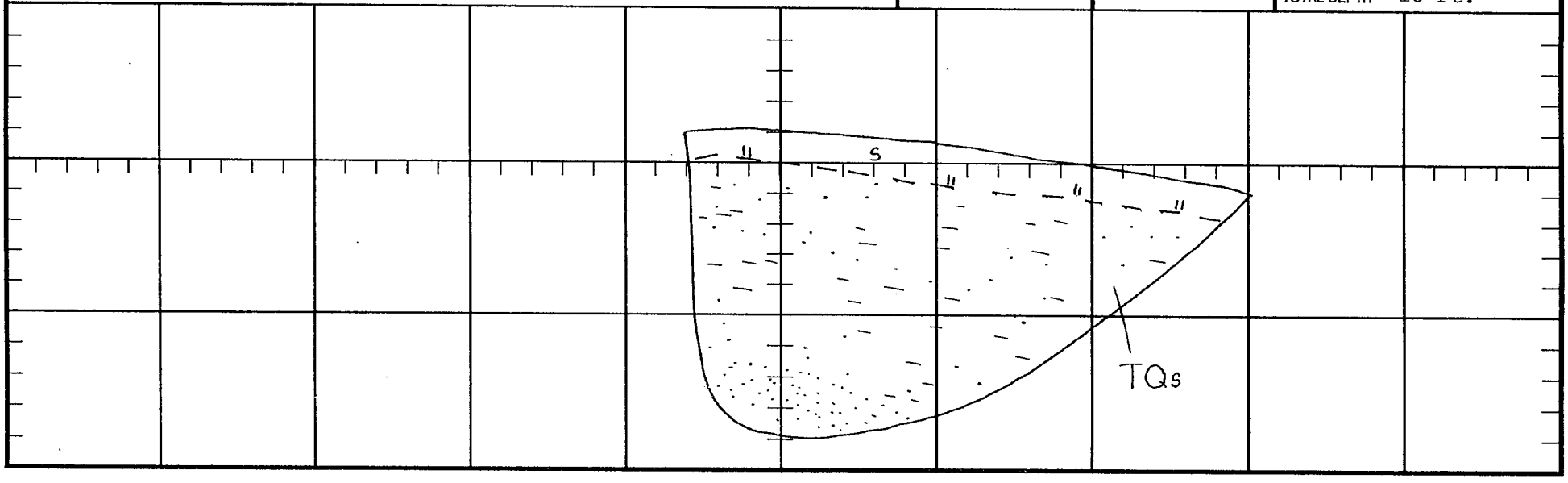
DATE 10/22/99

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1' SOIL; s, Medium- to light-brown, fine- to coarse-grained silty sand with scattered pebbles; loose; dry; abundant roots			
1 - 10' BEDROCK; TQs, Light reddish-brown, fine- to coarse-grained silty pebbly sandstone and tan to yellowish-brown, fine- to coarse-grained pebbly sandstone; friable; damp; dense	N80E,27NW		

SCALE 1" = 5'

N 54 W

TOTAL DEPTH 10 Ft.



ALLAN E. SEWARD

JOB NO. 99-1617-4

LOGGED BY VCG

Trench Log No. T-227

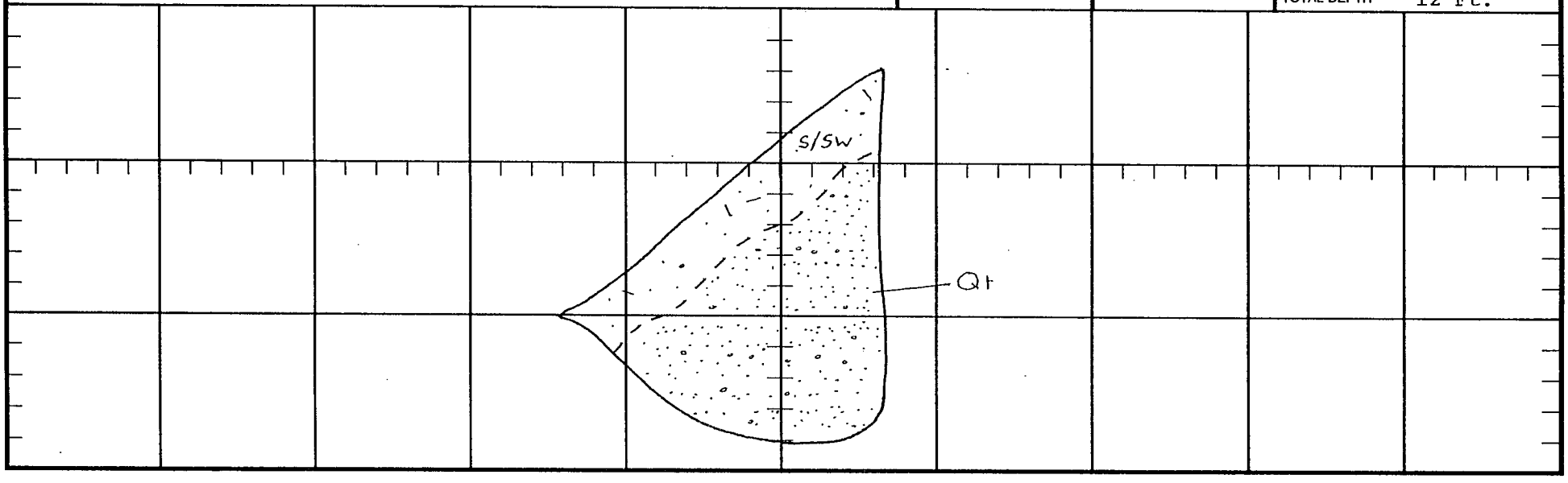
PROJECT Halsey Cyn. Golf/Residential

DATE 10/22/99

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SOIL/SLOPEWASH; s/sw, Grayish-brown, fine- to coarse-grained silty pebbly sand with isolated pebbles; loose; dry 3 - 12' BEDROCK; Qt, Light reddish-brown, fine- to coarse-grained sandstone and pebbly sandstone; loose to moderately dense; dry to damp	Approximately horizontal		No Ground Water No Caving TOTAL DEPTH 12 Ft.

SCALE 1" = 5'

N 80 W



ALLAN E. SEWARD

JOB NO. 99-1617-4

LOGGED BY VCG

Trench Log No. T-228

PROJECT Hasley Cyn. Golf/Residential

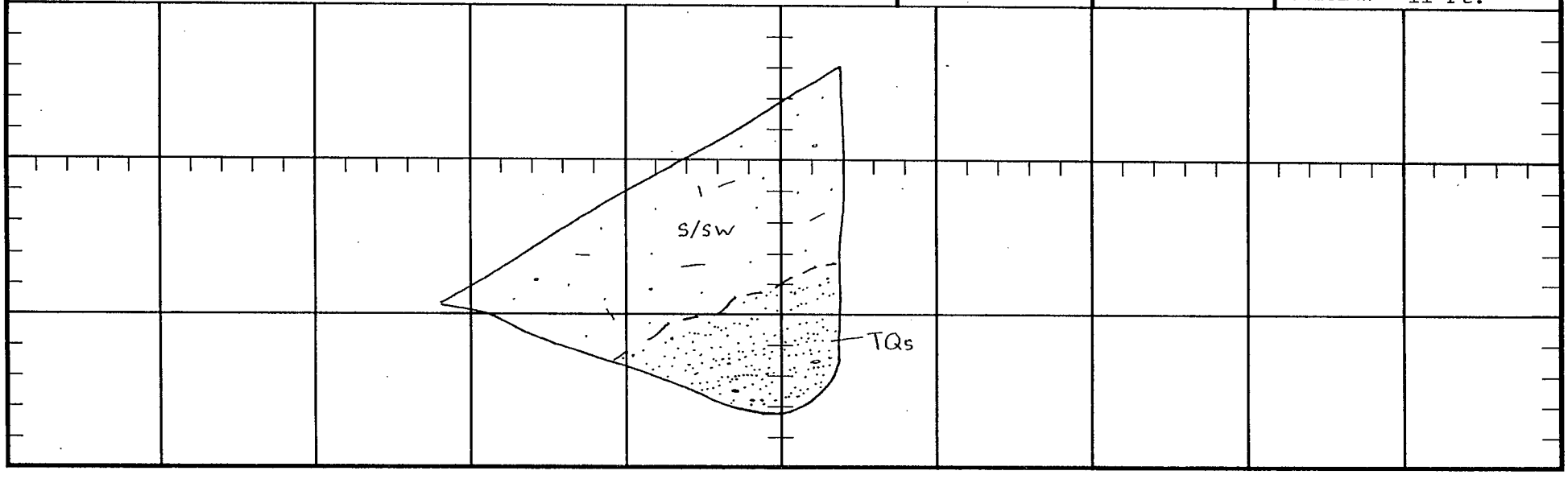
DATE 10/22/99

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6' SOIL/SLOPEWASH; s/sw, Medium- to light reddish-brown, fine- to coarse-grained silty pebbly sand; loose; dry			
6 - 11' BEDROCK; TQs, Light reddish-brown fine- to coarse-grained pebbly sandstone and sandstone; moderately dense; damp	N74E,34SE		No Ground Water No Caving

SCALE 1" = 5'

N 67 E

TOTAL DEPTH 11 Ft.



ALLAN E. SEWARD

JOB NO. 99-1617-4

LOGGED BY VCG

Trench Log No. T-229

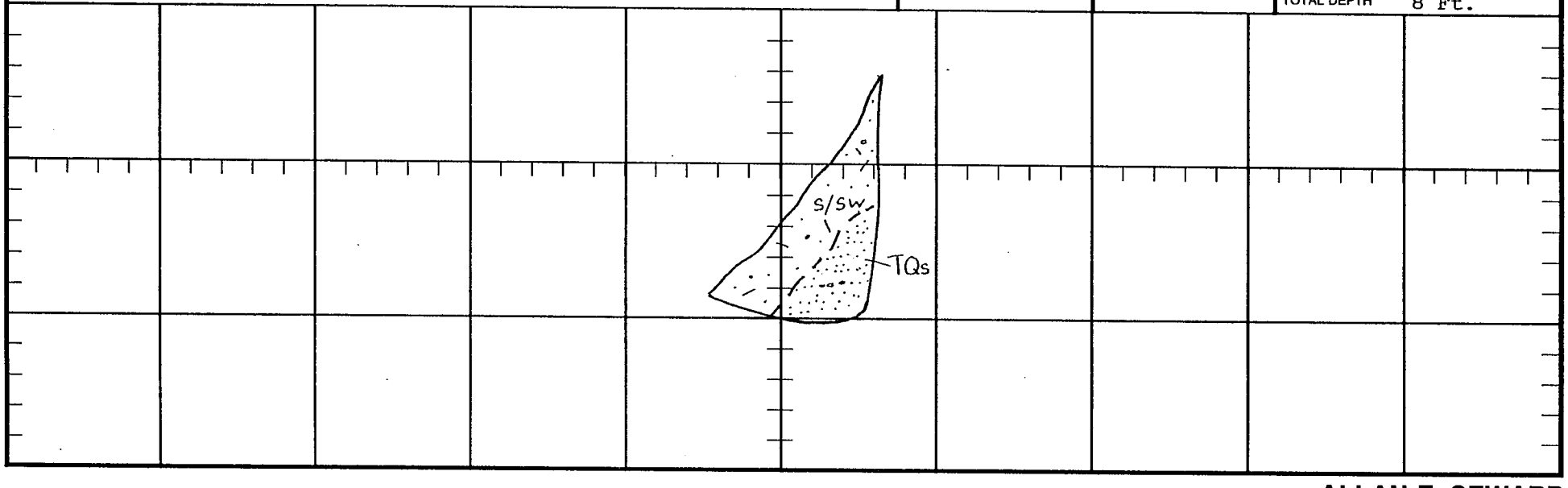
PROJECT Hasley Cyn. Golf/Residential

DATE 10/22/99

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SOIL/SLOPEWASH; s/sw, Medium brown, fine- to coarse-grained silty pebbly sand; loose; dry			
3 - 8' BEDROCK; TQs, Tan fine- to coarse-grained pebbly sandstone and sandstone; moderately dense; slightly friable; dry to damp	N81E,32SE		No Ground Water No Caving TOTAL DEPTH 8 Ft.

SCALE 1" = 5'

N 70 E



ALLAN E. SEWARD

JOB NO. 99-1617-4

LOGGED BY VCG

Trench Log No. T-230

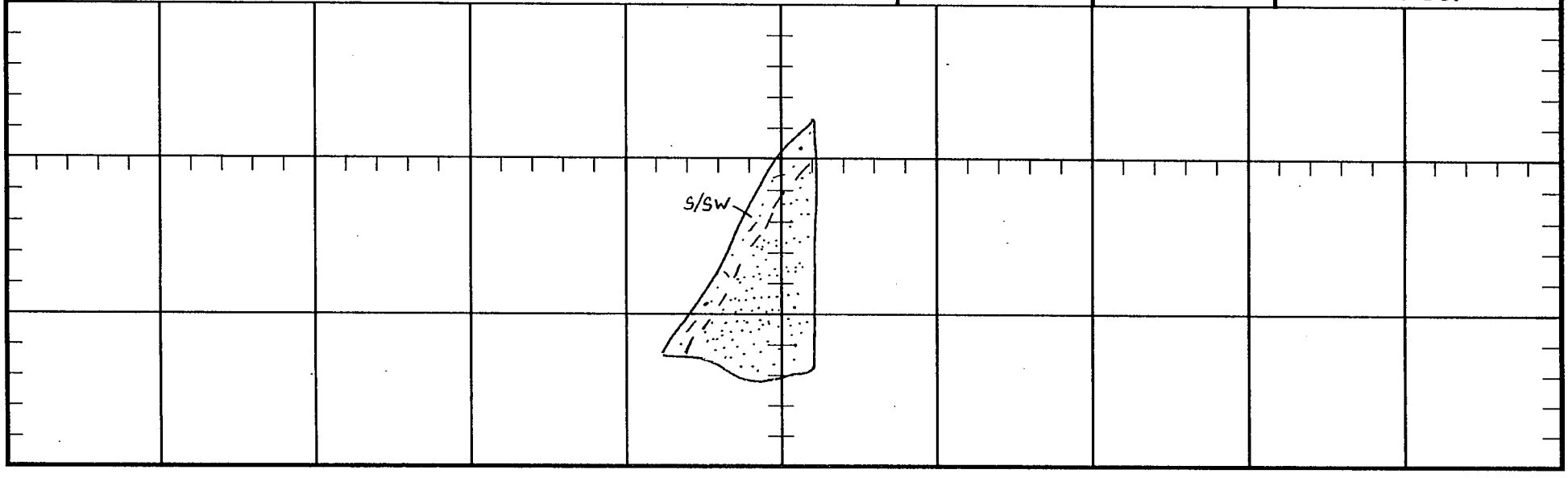
PROJECT Hasley Cyn. Golf/Residential

DATE 10/22/99

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1' SOIL/SLOPEWASH; s/sw, Light reddish-brown, fine- to coarse-grained silty sand with abundant pebbles; loose; dry			
1 - 8' BEDROCK; TQs, Yellowish-tan to light brown, medium- to coarse-grained sandstone, pebbly sandstone and pebble conglomerate; moderately dense; dry to damp	N80E,29SE		No Ground Water No Caving TOTAL DEPTH 8 Ft.

SCALE 1" = 5'

N 38 E



ALLAN E. SEWARD

JOB NO. 99-1617-4

LOGGED BY VCG

Trench Log No. T-231

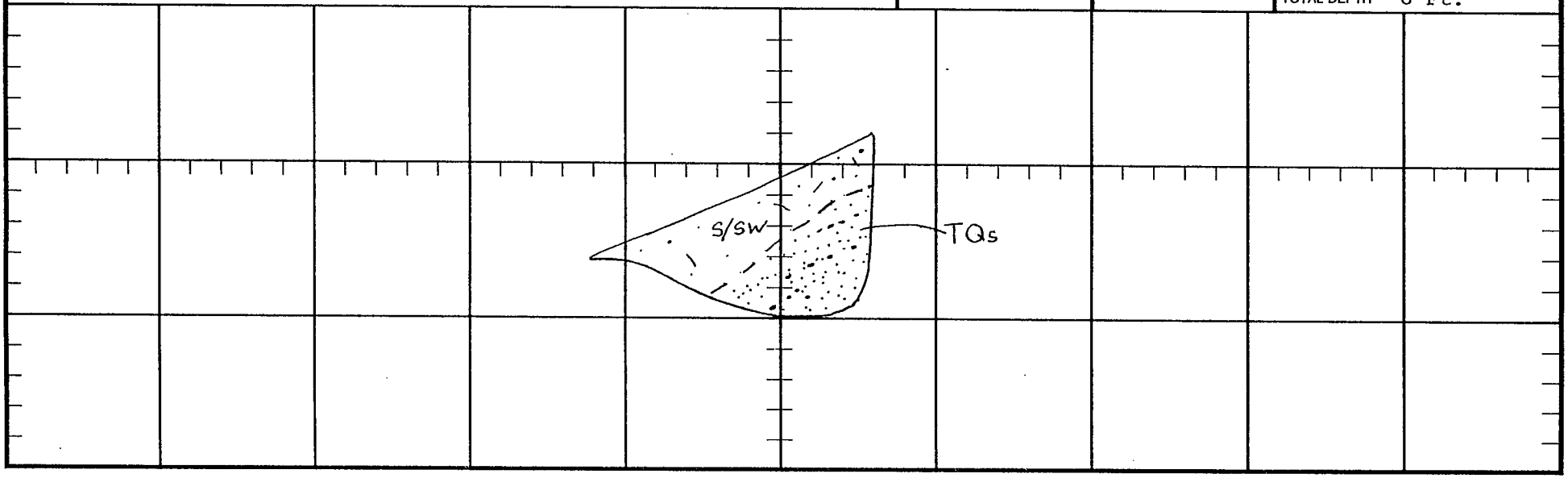
PROJECT Hasley Cyn. Golf/Residential

DATE 10/22/99

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 2' SOIL/SLOPEWASH; s/sw, Medium- to grayish-brown, fine- to coarse-grained silty pebbly sand; loose; dry			
2 - 6' BEDROCK; TQs, Tan, fine- to coarse-grained sandstone and pebbly sandstone; moderately dense; dry to damp	N86W,27SW		No Ground Water No Caving TOTAL DEPTH 6 Ft.

SCALE 1" = 5'

N 25 W



ALLAN E. SEWARD

DRILL HOLE LOG

BORING NO. BA-7

PROJECT: Hasley Canyon Land Company, L.L.C. T.T. 52584 **JOB NO.:** 98-1617-4 **DATE:** 10/22/99

DRILLING COMPANY/DRILLER: LEDEZMA DRILLING

METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket Auger 30"

HAMMER TYPE: Telescoping Kelly Bar **AVERAGE DROP (in.):** 12"

DRIVING WEIGHTS: 0-24' 3548#; 24-47' 2577#; 47-73' 1648#; 73-93 810#

ELEVATION: 1562 **LOGGED BY:** DGG/SKM

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG (N S)	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 - 90 Ft.) @ 0' Medium reddish-brown fine- to coarse-grained pebbly sandstone with scattered cobbles; moderately friable; damp	BA-7 drilled, logged and backfilled on 8/5/99 Bulk Sample @ 0-15'
5							
10	■	3 3 4	TQs	-/108/7.3			
15				N84W,6SW (apx)			
20	■	2 2 4				@ 21.4' 1/2" thick olive brown siltstone interbed; moderately hard	
				N68E,6SE (apx)			
25							
30	■	2 2 5				@ 30' 1/2" to 1 1/2" thick siltstone interbed	
35				N5E,5NW (apx)		@ 34.3' 1" thick siltstone interbed @ 36' Boulders	
							@ 38.2'

DRILL HOLE LOG

BORING NO. BA-7

PROJECT: Hasley Canyon Land Company, L.L.C.
T.T. 52584

JOB NO.: 98-1617-4
DATE: 10/22/99

DRILLING COMPANY/DRILLER: LEDEZMA DRILLING
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket Auger 30"
HAMMER TYPE: Telescoping Kelly Bar **AVERAGE DROP (in.):** 12"
DRIVING WEIGHTS: 0-24' 3548#; 24-47' 2577#; 47-73' 1648#; 73-93 810#
ELEVATION: 1562 **LOGGED BY:** DGG/SKM

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG (N / S)	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40		3 4 6				@ 38.2' Siltstone to sandy siltstone	erosional contact
				N75E;7SE (contact)		@ 42.5' Medium olive-gray siltstone minor to no sand; moderately hard; damp	
45		3 3 3				@ 45' Grades to light reddish-brown sandy siltstone	87% fines @ 45'
50							
						@ 52.2' 1/4" thick medium brown fat clay @ 52.3' Silty sandstone to sandy siltstone	
55		5 10 8-2"	Qs			@ 55' Grades to pebbly sandstone and conglomerate; moderately friable	
						@ 58' Cobble (4-6" diameter) lense	
60		3 10 10/ 2"		N55E;13SE (contact)			@ 60' erosional contact
65						@ 65' Siltstone rip up clasts within pebble conglomerate	
70						@ 69.5' Medium olive gray to brown siltstone; moderately hard @ 70.5' Light gray pebbly sandstone; moderately friable	
75		10 20 10/ 2"		N70E;40SE (contact)			@ 73.6' to 76' steep erosional contact
						@ 76' Siltstone	

DRILL HOLE LOG

BORING NO. BA-7

PROJECT: Hasley Canyon Land Company, L.L.C. **JOB NO.:** 98-1617-4
T.T. 52584 **DATE:** 10/22/99
DRILLING COMPANY/DRILLER: LEDEZMA DRILLING
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket Auger 30"
HAMMER TYPE: Telescoping Kelly Bar **AVERAGE DROP (in.):** 12"
DRIVING WEIGHTS: 0-24' 3548#; 24-47' 2577#; 47-73' 1648#; 73-93 810#
ELEVATION: 1562 **LOGGED BY:** DGG/SKM

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG (N S)	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						@ 77.6' (low point) Light reddish-brown clayey siltstone (brittle) @ 77.7' Sandy siltstone to silty sand	@ 78' Erosional contact
80							
			TQs			@ 81' Sandstone with pebbly sandstone lenses; moderately friable	@ 81' Erosional Contact
85	■	16 40		N77E;12SE (contact)			
90							
	■	13 40- 5"				TOTAL DEPTH 90 Feet (Elev. 1472) No Caving No Ground Water	
95							
100							
105							
110							
115							

DRILL HOLE LOG

BORING NO. BA-8

PROJECT: Hasley Canyon Land Company, L.L.C. **JOB NO.:** 98-1617-4
T.T. 52584 **DATE:** 10/22/99
DRILLING COMPANY/DRILLER: LEDEZMA DRILLING
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket Auger 30"
HAMMER TYPE: Telescoping Kelly Bar **AVERAGE DROP (in.):** 12"
DRIVING WEIGHTS: 0-24' 3548#; 24-47' 2577#; 47-73' 1648#; 73-93 810#
ELEVATION: 1526 **LOGGED BY:** DGG/SKM

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG (N S)	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 - 85 Ft.) @ 0' Tan to light brown pebbly sandstone and conglomerate; moderately friable to friable; dry	Drilled, logged and backfilled on 8/6/99 Bulk Sample of 1-15'
5						@ 5' Interbed of silty sandstone and sandy siltstone; moderately hard; dry to damp @ 6' Interbedded silty sandstone and fine- to medium grained sandstone with minor pebbles; slightly friable; damp	Friable and caving upper 5 feet
10	■	3 4	TQs	-/119/1.9			@ 10' Slough tube full - 12" only in sample
15				N68E;29NW (contact)			
20	■	2 6 8	TQs				
25				N77E;32NW (contact)		@ 24' Interbedded pebbly sandstone and conglomerate; moderately friable; damp	
30	■	3 6 9		N80E;33NW (contact)		@ 30' Pebble to cobble conglomerate (2-5" diameter)	
35				N75E;31NW (contact)			

DRILL HOLE LOG

BORING NO. BA-8

PROJECT: Hasley Canyon Land Company, L.L.C. **JOB NO.:** 98-1617-4
T.T. 52584 **DATE:** 10/22/99
DRILLING COMPANY/DRILLER: LEDEZMA DRILLING
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket Auger 30"
HAMMER TYPE: Telescoping Kelly Bar **AVERAGE DROP (in.):** 12"
DRIVING WEIGHTS: 0-24' 3548#; 24-47' 2577#; 47-73' 1648#; 73-93 810#
ELEVATION: 1526 **LOGGED BY:** DGG/SKM

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG (N S)	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40		3 5 7		N84E,34NW (contact)		@ 40' Light reddish-brown to rust colored sandstone with scattered pebbles	
						@ 43' Pebble conglomerate with scattered cobbles	
45		3 7 10				@ 45' Pebble conglomerate (still sands and gravel)	@ 45' sample tip dimpled due to pebbles and cobbles
50						@ 50' Interbedded pebble to cobble conglomerate and pebbly sandstone to bottom of boring	Only downhole logged down to 45 ft. Hole was not vertical below this depth and large igneous clasts were protruding
55							
60		5 16					@ 60' Sandier, attempted a sample, 12" only then refusal
65							
70							
75							

DRILL HOLE LOG

BORING NO. BA-8

PROJECT: Hasley Canyon Land Company, L.L.C.
T.T. 52584

JOB NO.: 98-1617-4
DATE: 10/22/99

DRILLING COMPANY/DRILLER: LEDEZMA DRILLING
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket Auger 30"
HAMMER TYPE: Telescoping Kelly Bar
AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-24' 3548#; 24-47' 2577#; 47-73' 1648#; 73-93 810#
ELEVATION: 1526
LOGGED BY: DGG/SKM

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG (N S)	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
80							Still in pebbly, cobbly material so no samples attempted
85						TOTAL DEPTH 85 Ft. (Elev. 1441) Minor Caving @ 0-5 Ft. No Ground Water	@ 85' Refusal bucket bouncing on cobbles/ boulder?
90							
95							
100							
105							
110							
115							

DRILL HOLE LOG

BORING NO. BA-9

PROJECT: Hasley Canyon Land Company, L.L.C.
T.T. 52584

JOB NO.: 98-1617-4
DATE: 10/22/99

DRILLING COMPANY/DRILLER: LEDEZMA DRILLING
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket Auger 30"
HAMMER TYPE: Telescoping Kelly Bar **AVERAGE DROP (in.):** 12"
DRIVING WEIGHTS: 0-24' 3548#; 24-47' 2577#; 47-73' 1648#; 73-93 810#
ELEVATION: 1387 **LOGGED BY:** DGG

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG (S N)	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 - 5 Ft.) @ 1' Orangish- to reddish-brown fine- to medium-grained silty sand with pebbles; friable; dry to slightly damp	Drilled and logged 8/9/99 Bulk Sample @ 0-15 ft.
5						BEDROCK; TQs (5 - 80 Ft.) @ 5' Interbedded light orangish-brown fine- to medium-grained slightly silty sandstone with pebbles and light orangish-brown pebble cobble conglomerate with medium- to coarse-grained sand matrix; friable to moderately friable; dry to slightly damp	
10		1 2 2					
15			TQs				
20		1 2 3					10% fines @ 20'
25						@ 25' Slightly damp to damp	
30		1 3 5				@ 30' Damp	

DRILL HOLE LOG

BORING NO. BA-9

PROJECT: Hasley Canyon Land Company, L.L.C. **JOB NO.:** 98-1617-4
T.T. 52584 **DATE:** 10/22/99
DRILLING COMPANY/DRILLER: LEDEZMA DRILLING
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket Auger 30"
HAMMER TYPE: Telescoping Kelly Bar **AVERAGE DROP (in.):** 12"
DRIVING WEIGHTS: 0-24' 3548#; 24-47' 2577#; 47-73' 1648#; 73-93 810#
ELEVATION: 1387 **LOGGED BY:** DGG

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG (S N)	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 6 4-1"		N74E,22SE (contact)			
45						@ 44.6' Siltstone rip-up clast (4" diameter)	
				N74E,24SE (contact) 18/14.2		@ 48.4' Medium olive-brown sandy siltstone to silty claystone; moderately hard; damp	50.5% fines @ 49'
50		6 19				@ 50' Light yellowish-tan pebbly cobbly medium- to coarse-grained sandstone; friable; damp	
				N76E,26SE (contact)		@ 51.2' - siltstone to sandy siltstone	
						@ 52.5' - sandstone; moderately friable	
				N82E,24SE (contact)		@ 53.2' - interbedded siltstone to sandy siltstone and sandstone; moderately hard	
55							
60		7 15 9/2"				@ 59' Pebbly cobbly sandstone; moderately friable	
				N79E,23SE (contact)		@ 62' Siltstone to sandy siltstone; moderately hard	
65							
				N76E,14SE (contact)		@ 68.8' Fine- to medium-grained sandstone; moderately friable	
70		6 20/ 5"				@ 70' Pebbly sandstone	
				N85W,21SW (contact)			
				N75W,16SW (contact)		@ 72.5' Siltstone to sandy siltstone interbed; moderately hard	
75						@ 73.2' Sandstone and pebble conglomerate	

DRILL HOLE LOG

BORING NO. BA-9

PROJECT: Hasley Canyon Land Company, L.L.C.
T.T. 52584

JOB NO.: 98-1617-4
DATE: 10/22/99

DRILLING COMPANY/DRILLER: LEDEZMA DRILLING
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket Auger 30"
HAMMER TYPE: Telescoping Kelly Bar **AVERAGE DROP (in.):** 12"
DRIVING WEIGHTS: 0-24' 3548#; 24-47' 2577#; 47-73' 1648#; 73-93 810#
ELEVATION: 1387 **LOGGED BY:** DGG

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG (S N)	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
80						TOTAL DEPTH 80 Ft. (Elev. 1307) No Ground Water No Caving	
85							
90							
95							
100							
105							
110							
115							

DRILL HOLE LOG

BORING NO. BA-10

PROJECT: Hasley Canyon Land Company, L.L.C.
T.T. 52584

JOB NO.: 98-1617-4
DATE: 10/22/99

DRILLING COMPANY/DRILLER: LEDEZMA DRILLING
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket Auger 30"
HAMMER TYPE: Telescoping Kelly Bar **AVERAGE DROP (in.):** 12"
DRIVING WEIGHTS: 0-24' 3548#; 24-47' 2577#; 47-73' 1648#; 73-93 810#
ELEVATION: 1449 **LOGGED BY:** SKM

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG (S N)	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 - 50 Ft.) @ 0' Tan sandstone and pebble conglomerate; friable; weathered; dry	Drilled, logged and backfilled in 8/6/79 Upper 5 feet weathered
5						@ 5' Tan interbedded pebbly sandstone and conglomerate moderately friable; dry to damp	Bulk mix of 1-15'
				N68E;33NW (contact)			
10	■	5 4/3"		-/127/2.5			
15						@ 16' Mostly pebble conglomerate	@ 17' digging "u-bar" pulled boulder out
20	■	6 6/5"		N72E;31NW (contact)			
25							
30				N70E,30NW (contact)		@ 29' Pebble conglomerate to cobble conglomerate with large cobbles	@ 29' digging with "inverted u-bar" to loosen large cobble, no sampling slow drilling
				N74E,31NW (contact)			

DRILL HOLE LOG

BORING NO. BA-10

PROJECT: Hasley Canyon Land Company, L.L.C.
T.T. 52584

JOB NO.: 98-1617-4
DATE: 10/22/99

DRILLING COMPANY/DRILLER: LEDEZMA DRILLING
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket Auger 30"
HAMMER TYPE: Telescoping Kelly Bar **AVERAGE DROP (in.):** 12"
DRIVING WEIGHTS: 0-24' 3548#; 24-47' 2577#; 47-73' 1648#; 73-93 810#
ELEVATION: 1449 **LOGGED BY:** SKM

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG (S N)	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' Less large cobbles	
45						@ 43' Pebble conglomerate with cobbles	
50	■	7 20/ 5"				TOTAL DEPTH 50 Ft. (Elev. 1399) No Caving No Ground Water	
55							
60							
65							
70							
75							

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	High plasticity clay (CH : C)
	Inorganic silts and clays (CH-MH : MC)
	Low plasticity clay (CL : O)
	Low-high plasticity clays (CL-CH : CO)
	Silty low plasticity clay (CL-ML : CZ)
	Low plasticity clay to silt (CL/ML : O)
	Silt to low plasticity clay (ML/CL : Z)
	Fill (FILL : F)
	Clayey gravel (GC : O8)
	Clayey sand and gravel (GC-SC : DO8)
	Silty gravel (GM : Z8)
	Silty clayey gravel (GM-GC : ZO8)
	Silty sand and gravel (GM-SM : 08)
	Silty gravel to silty sand (GM/SM : Z8)
	Poorly graded gravel (GP : G)
	Poorly graded gravel with clay (GP-GC : DGO3)
	Poorly graded gravel with silt (GP-GM : DGZ3)

Symbol	Description
	Poorly graded gravel and sand (GP-SP : :G)
	Well graded gravel (GW : 83)
	Well graded gravel with clay (GW-GC : 83O)
	Well graded gravel with silt (GW-GM : 83Z)
	Well graded gravel/ clayey gravel (GW-GP : 83G)
	Well graded gravel and sand (GW-SW : 83D)

KEY TO SYMBOLS

Symbol	Description
	Well graded gravel to well graded sand (GW/SW : 83)
	Elastic silt (MH : M)
	Silt (ML : Z)
	High plasticity organic clays (OH : 5)
	Silt to silty clay (ML/CL-ML : Z)
	Low plasticity organic silts (OL : 4)
	Basalt (or generic rock) (ROCK :])
	Clayey sand (SC : DO)
	Clayey sand to sandy clay (SC/CL : DO)
	Sandy clay to clayey sand (CL/SC : O)
	Silty sand (SM : 0)
	Poorly graded clayey silty sand (SM-SC : :ZO)
	Poorly graded silty fine sand (SM-ML : :Z)
	Poorly graded sand (SP : :)
	Poorly graded sand with clay (SP-SC : :R)
	Poorly graded sand with silt (SP-SM : :=)
	Well graded sand (SW : D)

Symbol	Description
	Well graded sand with clay (SW-SC : DR)
	Well graded sand with silt (SW-SM : D=)

KEY TO SYMBOLS

Symbol	Description
	Interlayered well/poorly graded sand (SW-SP : D:)
	Silty sandy clay (CL : 0C)
	Variable gravel and silty sand mix (GM-SM : 0G)
	Silty sand to silt (SM/ML : 0)
	Silt to silty sand (ML/SM : Z)
	Agglomerate (\)
	Blank (E)
	CH fraction (U)
	CL fraction (R)
	Claystone (H)
	Cobble frac (A)
	Cobbles (B)
	Competent (K)
	Dolomite (()
	Extra fine gravel (3)
	Fine gravel (Y)
	Frac rock (X)
	Granite (/)
	Gravel (8)
	Gravel frac (9)
	Intrusive (V)
	Limestone (L)
	Metamorphic rocks ())
	MH fraction (?)
	ML fraction (=)
	Mudstone (7)
	Organics (J)
	Paving (P)
	Peat (Q)
	Sand (S)
	Sandstone (N)
	Schist ($)
	Sediment (2)
	Shale (>)
	Shell fragments (&)
	Siltstone (I)
	Topsoil (T)
	Weathered (W)
	EXTRA: alternating dot-dash pattern (|)
	EXTRA: dashed horizontal lines (%)

KEY TO SYMBOLS

Symbol	Description
	EXTRA: medium closely-spaced dots (6)
	EXTRA: narrow-spaced horizontal dashed lines (-)
	EXTRA: random dot pattern (1)
	EXTRA: regularly spaced "V"'s (<)
	EXTRA: very narrow cross-hatching (!)
	EXTRA: dashed lines with 3 dots above each dash (.)
	EXTRA: large widely-spaced dots (*)
	EXTRA: small filled triangles ([)
	EXTRA: semi-random triangle pattern (')
	EXTRA: zigzag lines (#)
	EXTRA: grass pattern ({)
	EXTRA: tilde sign (})
	EXTRA: randomly arranged square boxes (;)

Symbol	Description
Misc. Symbols	
	Water table at boring completion (LWATER)
	Water table during drilling (WATER)
Soil Samplers	
	Auger (A)
	Bulk sample (B)
	California sampler (C)
	Bulk/Grab sample (F)
	Pitcher (L)
	Denison (O)
	Standard penetration test (P)
	No recovery (X)

Appendix C

GEOTECHNICAL LABORATORY INVESTIGATION

1. General

a. The purpose of the laboratory investigation was to expand the evaluation of the geotechnical engineering characteristics of the various materials at the site with main focus on obtaining additional direct shear test data. 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. Additional relatively undisturbed ring samples and bag samples were obtained during the course of the field investigation for this report. Laboratory sample identification is by project name and number, drill hole number or trench number and depth.

c. Geotechnical laboratory testing is classified in two major subgroups:
- Index Properties Tests, and
- Geotechnical Engineering Properties Tests

2. Index Properties Tests

The following additional Index Properties tests were performed on native soils collected during the field explorations.

Test Type	No. of Tests Performed	Testing Standard
Moisture Content & Unit Weight	3	ASTM D 2216 (Water Content)
Percent-Finer Than # 200	5	ASTM D 1140
Atterberg Limits	1	ASTM D 4318

The purpose of each test is briefly described below.

a. The natural water content and in-situ unit dry weight of soils provided an indication of the strength of natural soils 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 B**.

b. Minus No. 200 wash-sieve analyses were performed on some samples to evaluate only the percentage of fine particles smaller than 75 microns 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 B** and on **Figure C1 in Appendix C**.

c. Liquid and plastic limit tests (Atterberg limits) were conducted on selected samples to aid in classifying the soils in accordance with USCS (by evaluating soil plasticity). Test results are presented on **Figure C1 within this Appendix**.

3. Geotechnical Engineering Properties Tests

The following Geotechnical Engineering Property Tests were performed on bulk and relatively undisturbed ring samples collected at this site.

Test Type	Test No.	Testing Standard
Compaction	1	ASTM D1557-91
Direct Shear	20	ASTM D 3080

The purpose of each test is briefly described below.

a. An additional compaction test was performed on a selected sample to assess the moisture-density relationship of materials that may be used for recompaction at removal areas. Test results are presented on **Figure C2** within this **Appendix.**

b. Direct shear tests were performed on relatively undisturbed specimens using a displacement-controlled direct shear machine. Samples were tested at normal pressures ranging from approximately 1.4 ksf to 8.4 ksf in order to define both the peak 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. Test results are plotted on **Figures C3.1 through C3.20** within **this Appendix**. **Table C1** summarizes all of the shear strength data based on these tests. Some data from the January 15, 1999 report have been repeated in this table, with some revisions as explained in the main text of this report.

The following attachments completed this Appendix

Laboratory Test Results

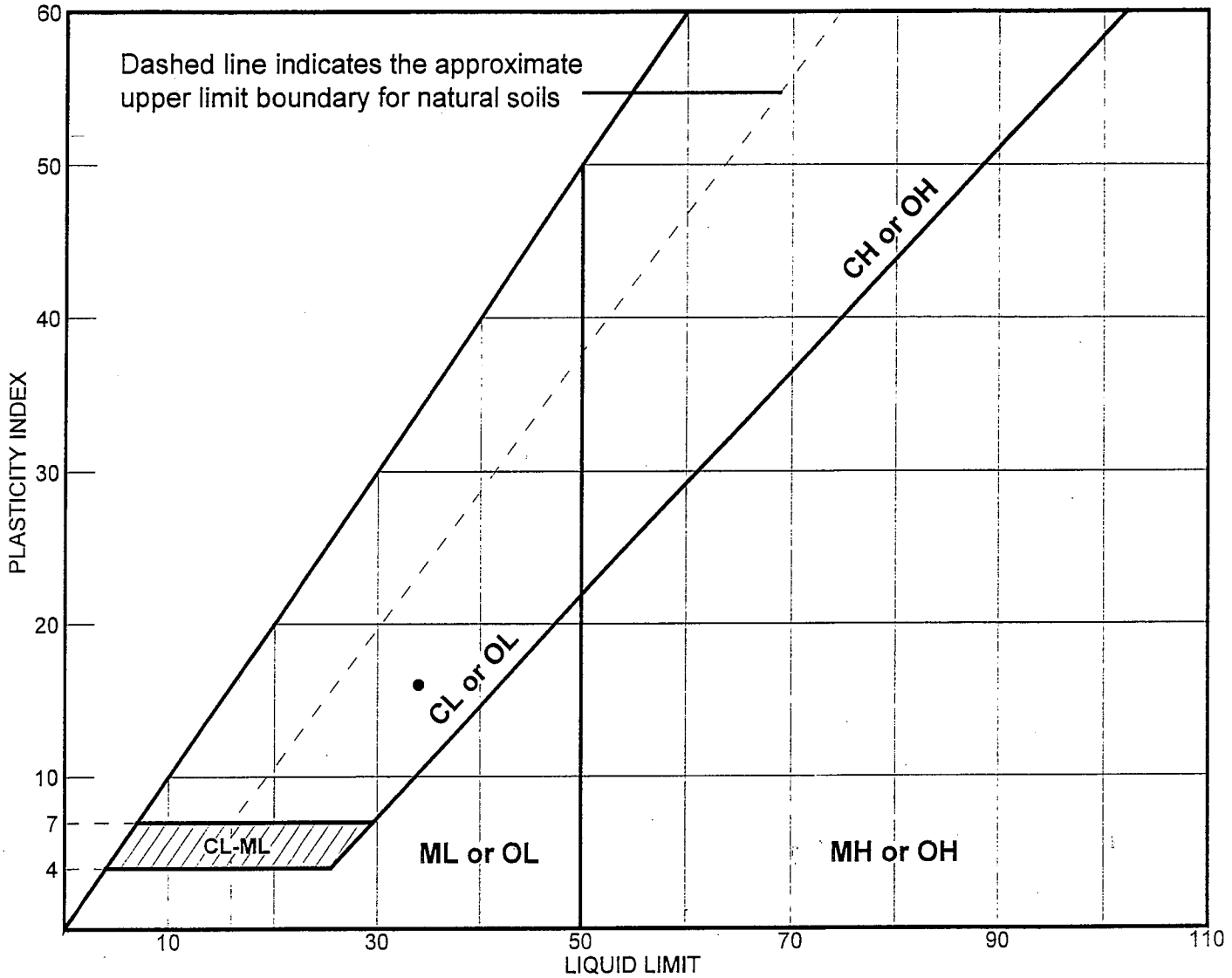
• Summary of Shear Strength Test Data	Table C1
• Liquid and Plastic Limits Test Report	Figure C1
• Compaction Test Reports	Figure C2
• Direct Shear Test Results	Figures C3.1-C3.20

SUMMARY OF SHEAR STRENGTH TEST DATA[1]

Boring or Test Pit No.	Revisions[2] or New Tests	Material	Peak[3]		Residual[3]		Unit Wt. (pcf)
			Cohesion (psf)	Phi ϕ (deg)	Cohesion (psf)	Phi ϕ	
BA-1 @ 69.7′		Landslide Plane (Qls)	**210**	**28°**	**290**	**7°**	**130**
BA-1 @ 10′		Landslide Debris (Qls)	**1800**	**29°**	**510**	**26°**	**133**
BA-3 @ 5′	r	Landslide Debris (Qls)	470	37.5°	400	36°	--
BA-1 @ 75.4′		Bedding Plane (Silty Claystone)	**290**	**30°**	**200**	**17.5°**	**122**
BA-2 @ 62′		Bedding Plane (Claystone)	**1270**	**28°**	**1570**	**12°**	**129**
BA-4 @ 10′	r	Bedding Plane (silty Claystone)	2500	33°	430	29°	--
BA-7 @ 44′	n	Siltstone Lense	1168	27°	347	22°	129
BA-9 @ 49′	n	Bedding Plane (Silty Claystone)	591	44°	327	23°	--
BA-5 @ 50′	r	Bedrock(TQs)	**880**	**42°**	**410**	**40.5°**	**119**
BA-6 @ 20′	r	Bedrock (TQs)	740	49°	510	45°	--
HS-2 @ 20′	r	Terrace Deposits (Qt)	**290**	**42°**	**200**	**41°**	**120**
BA-4 @ 24′		Compacted Fill (Cef)	310	40°	310	40°	--
BA-4 @ 37′	n	Compacted Fill (Cef)	360	38°	340	38°	--
BA-5 @ 12′		Compacted Fill (Cef)	190	40°	130	40°	--
Blend (B7-B10) @ 0-	n	Compacted Fill (Cef)	**316**	**32°**	**300**	**29°**	**125**
15′	n	Compacted Fill (Cef)	392	32°	315	29.5°	--
T-209 @ 9′							
HS-4 @ 10′		Alluvium (Qal)	320	38°	160	38°	--
RW-1 @ 6′		Alluvium (Qal)	360	48°	170	47°	--
RW-1 @ 9′	n	Alluvium (Qal)	**338**	**38°**	**169**	**34°**	**119**
T-156 @ 3.5′	r	Slopewash (sw)	**290**	**30°**	**190**	**29°**	**104**

[1] Cohesion data was rounded to the nearest whole number, and friction angle to the nearest 0.5°.
[2] n=New test was run; r=data was revised due to error discovered in the computer default pressure units.
[3] Data in **bold** were selected for stability analyses, as applicable.

LIQUID AND PLASTIC LIMITS TEST REPORT

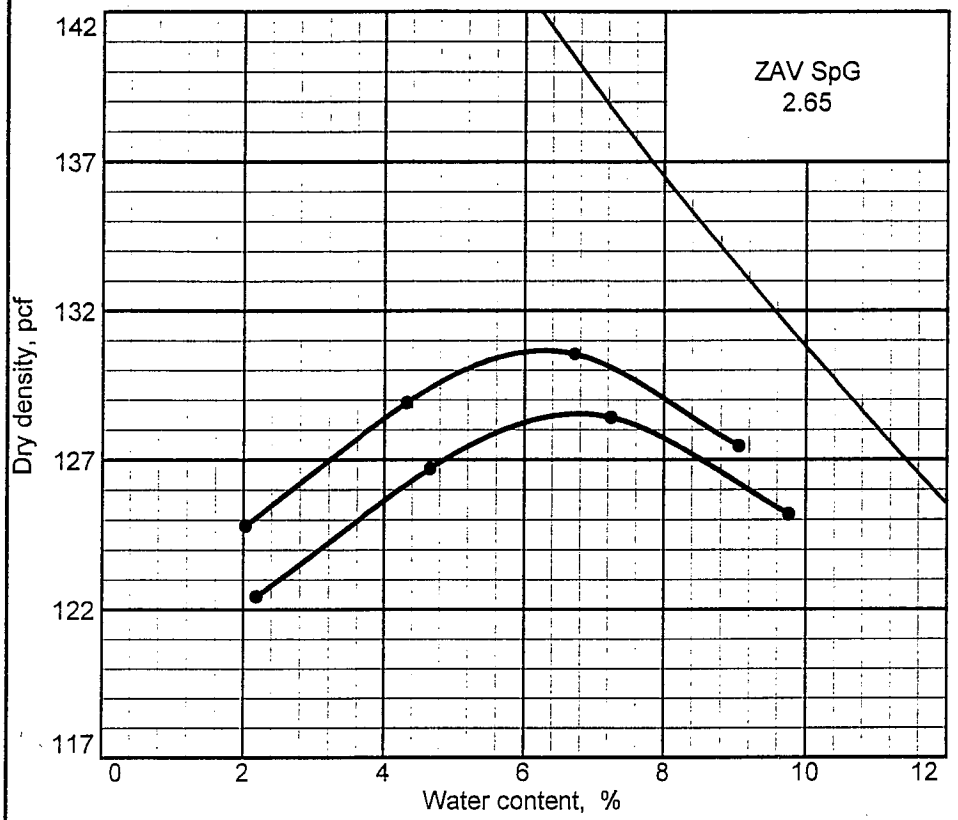


SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	HS-1	1	15'		18	34	16	CL (52% fines)

LIQUID AND PLASTIC LIMITS TEST REPORT **ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.**	**Client:** Hasley Canyon Land Company, L.L.C. **Project:** TT 52584 **Project No.:** 98-1617-4 **Figure** C1

COMPACTION TEST REPORT



Curve No.

F

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	7.3	**%<#200**	17.8
USCS	SM	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.67	8.92	9.09	9.08		
WM	4.50	4.50	4.50	4.50		
WW + T #1	235.00	246.86	254.25	260.65		
WD + T #1	230.65	237.30	239.25	240.32		
TARE #1	31.97	32.19	32.24	32.18		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	2.0	4.3	6.7	9.1		
DRY DENSITY	124.8	128.9	130.5	127.4		

ROCK CORRECTED TEST RESULTS	UNCORRECTED	Material Description
Maximum dry density = 130.5 pcf	128.5 pcf	Yellowish brown silty Sand
Optimum moisture = 6.5 %	7 %	

Project No. 98-1617-4 **Client:** Hasley Canyon Land Company, L.L.C.
Project: TT 52584

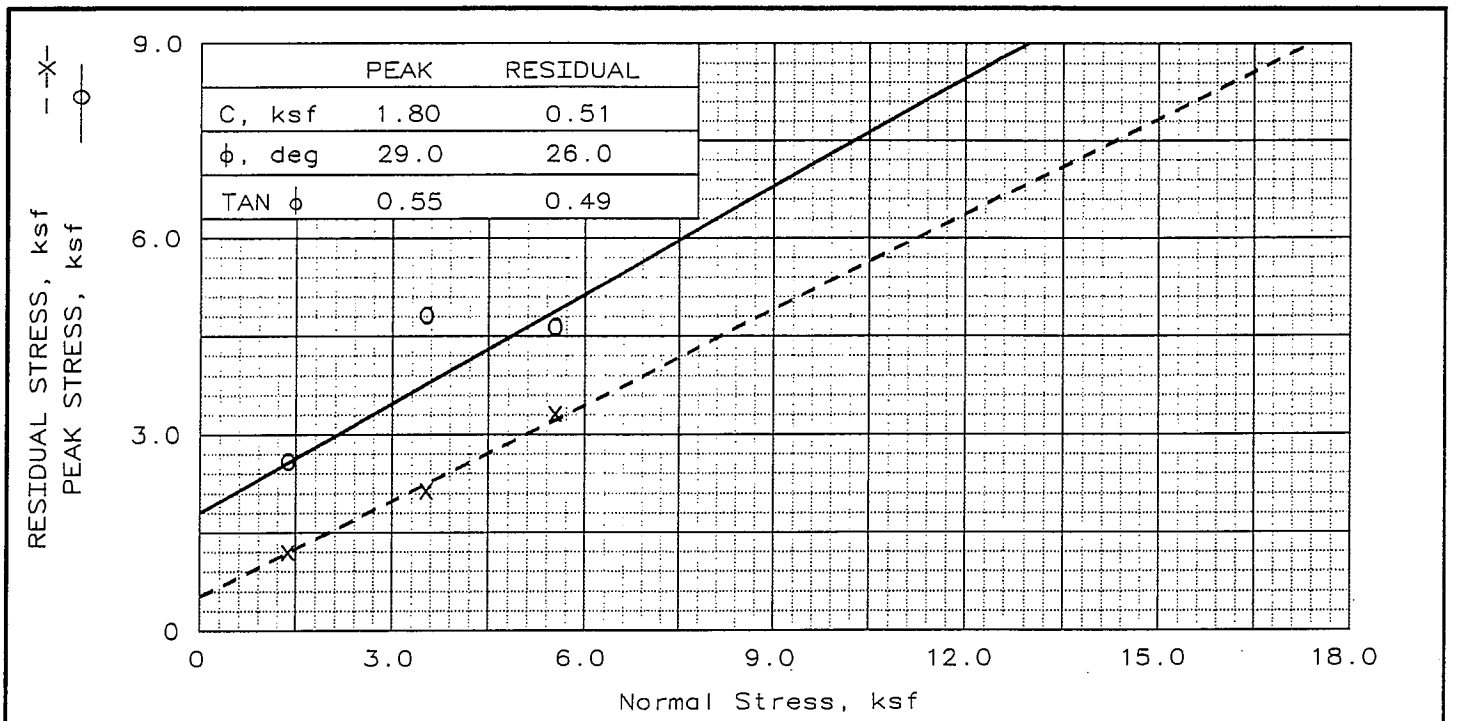
● **Source:** **Sample No.:** F **Elev./Depth:** 0-15'

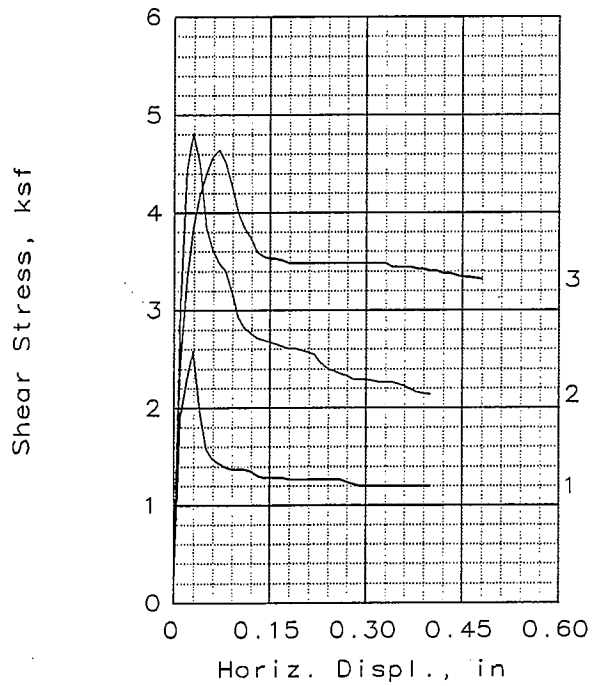
Remarks:
Composite Sample of BA-7 @ 0-15', BA-8 @ 1-15', BA-9 @ 0-15' and BA-10 @ 1-15'

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure C2





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	13.7	15.5	12.0
	DRY DENSITY, pcf	117.7	115.5	118.6
	SATURATION, %	85.8	91.2	76.8
	VOID RATIO	0.432	0.460	0.421
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	15.7	16.1	14.0
	DRY DENSITY, pcf	118.2	116.9	121.1
	SATURATION, %	99.4	98.3	96.6
	VOID RATIO	0.426	0.442	0.392
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	0.99	0.98
NORMAL STRESS, ksf		1.42	3.58	5.58
PEAK STRESS, ksf		2.59	4.81	4.64
DISPLACEMENT, in		0.03	0.03	0.07
RESIDUAL STRESS, ksf		1.20	2.14	3.32
DISPLACEMENT, in		0.40	0.40	0.48
Strain rate, in/min		0.0079	0.0079	0.0079

SAMPLE TYPE: Undisturbed
DESCRIPTION: Silt

SPECIFIC GRAVITY= 2.7
REMARKS: landslide debris (Qls)

CLIENT: Hasley Canyon Land Company, L.L.C.

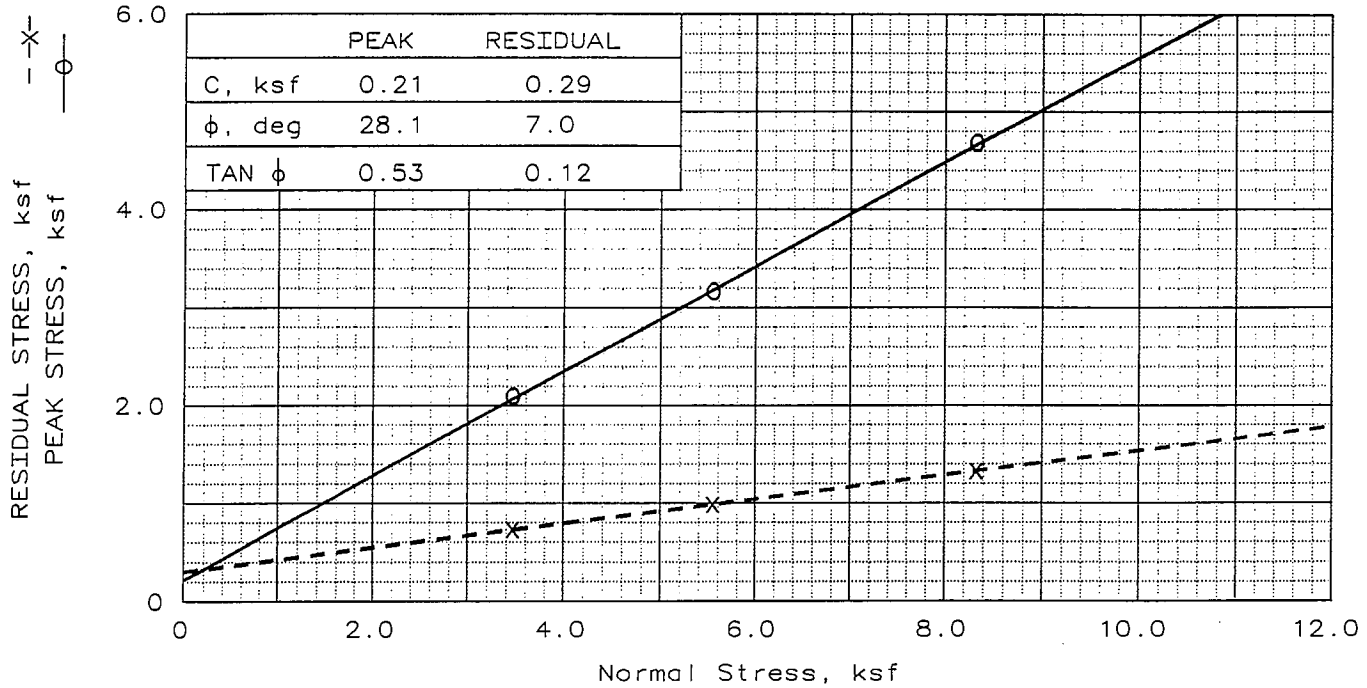
PROJECT: T.T. 52584

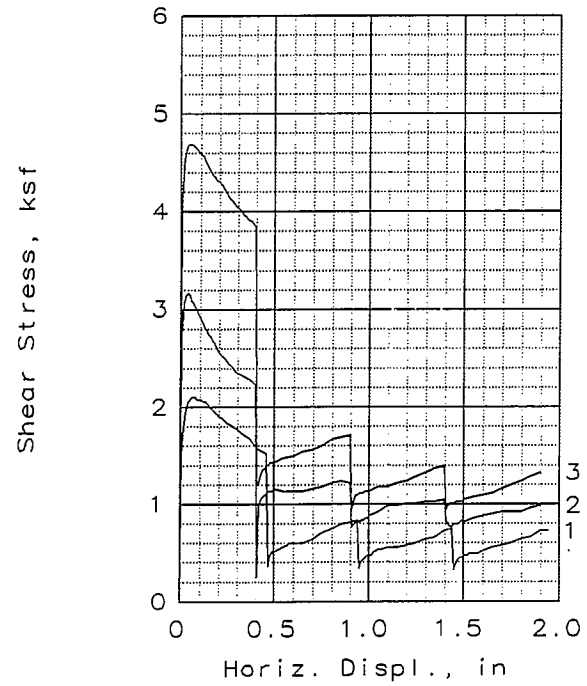
SAMPLE LOCATION: BA-1 @ 10 ft.

PROJ. NO.: 98-1617-4 DATE: 1/15/99

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.

Fig. No.: C3.1





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	20.4	20.3	19.6
	DRY DENSITY, pcf	108.7	108.2	108.7
	SATURATION, %	100.0	98.2	95.9
	VOID RATIO	0.550	0.557	0.551
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	19.4	19.1	18.5
	DRY DENSITY, pcf	110.7	111.2	112.3
	SATURATION, %	100.0	100.0	99.8
	VOID RATIO	0.523	0.516	0.501
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.98	0.97	0.97
NORMAL STRESS, ksf		3.50	5.58	8.36
PEAK STRESS, ksf		2.10	3.17	4.68
DISPLACEMENT, in		0.06	0.04	0.04
RESIDUAL STRESS, ksf		0.73	0.98	1.33
DISPLACEMENT, in		1.94	1.90	1.90
Strain rate, in/min		0.0079	0.0079	0.0079

SAMPLE TYPE: Undisturbed
DESCRIPTION: Fat Clay

LL= 67 PL= 22 PI= 45
SPECIFIC GRAVITY= 2.7
REMARKS: landslide plane (Qls)

CLIENT: Hasley Canyon Land Company L.L.C.

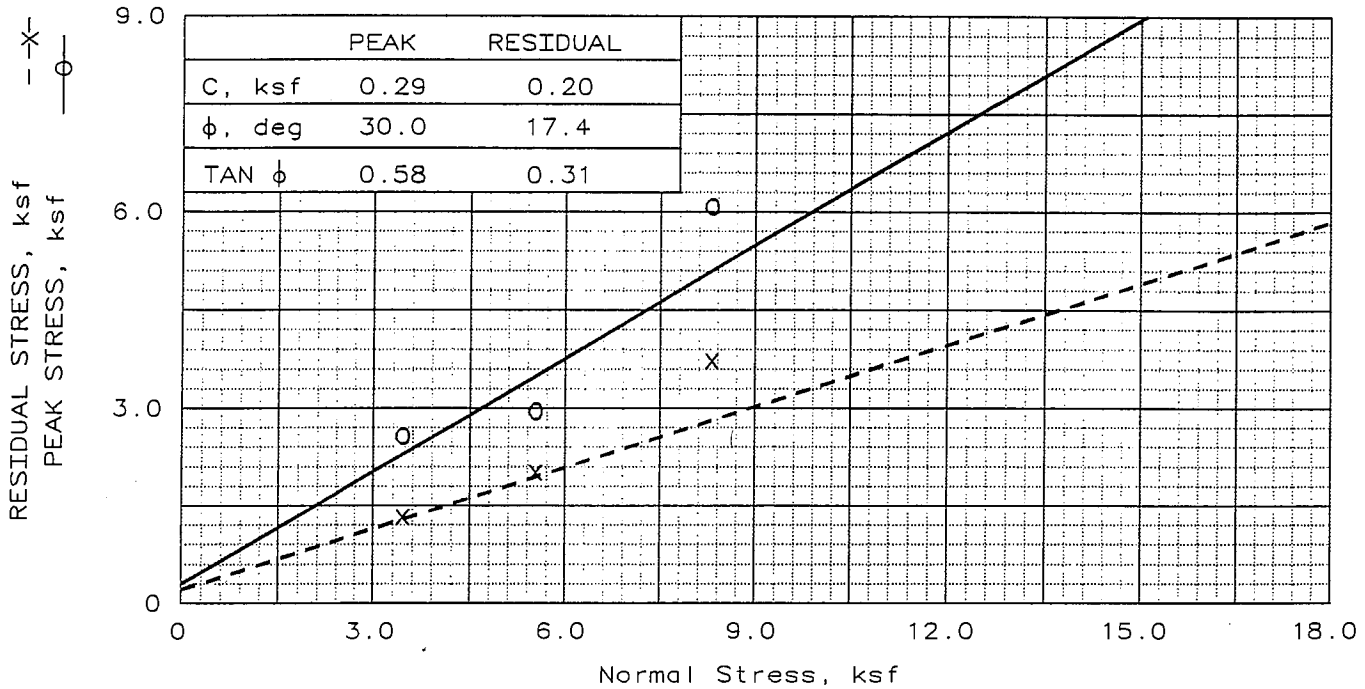
PROJECT: T.T. 52584

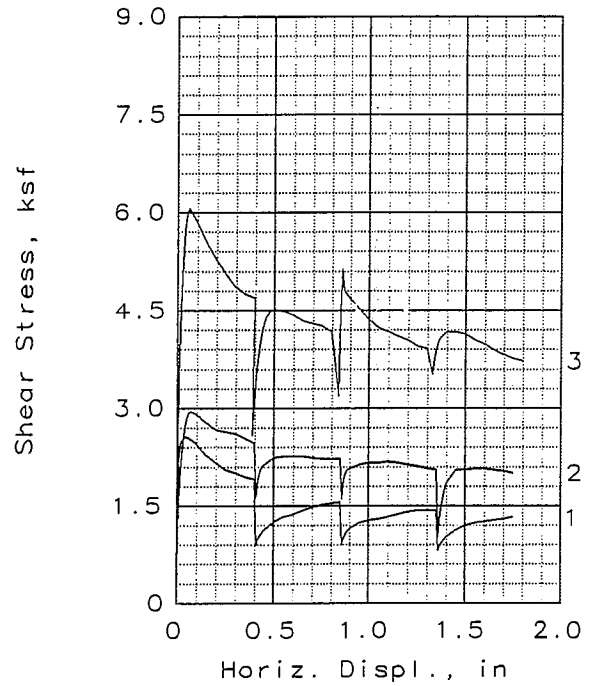
SAMPLE LOCATION: BA-1 @ 69.7 ft.

PROJ. NO.: 98-1617-4 DATE: 1/15/99

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.

Fig. No.: C3.2





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	25.7	18.1	13.0
	DRY DENSITY, pcf	95.8	106.8	107.3
	SATURATION, %	91.5	84.5	61.6
	VOID RATIO	0.759	0.578	0.571
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	27.0	20.4	19.1
	DRY DENSITY, pcf	97.4	108.3	111.2
	SATURATION, %	99.7	99.1	99.7
	VOID RATIO	0.731	0.557	0.516
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.98	0.99	0.97
NORMAL STRESS, ksf		3.50	5.58	8.36
PEAK STRESS, ksf		2.57	2.95	6.07
DISPLACEMENT, in		0.04	0.07	0.06
RESIDUAL STRESS, ksf		1.33	2.01	3.72
DISPLACEMENT, in		1.75	1.75	1.80
Strain rate, in/min		0.0079	0.0079	0.0079

SAMPLE TYPE: Undisturbed
DESCRIPTION: Fat Clay (CH)

LL= 64 PL= 28 PI= 36
SPECIFIC GRAVITY= 2.7
REMARKS: Bedding plane
(Silty claystone)

Fig. No.: C3.3

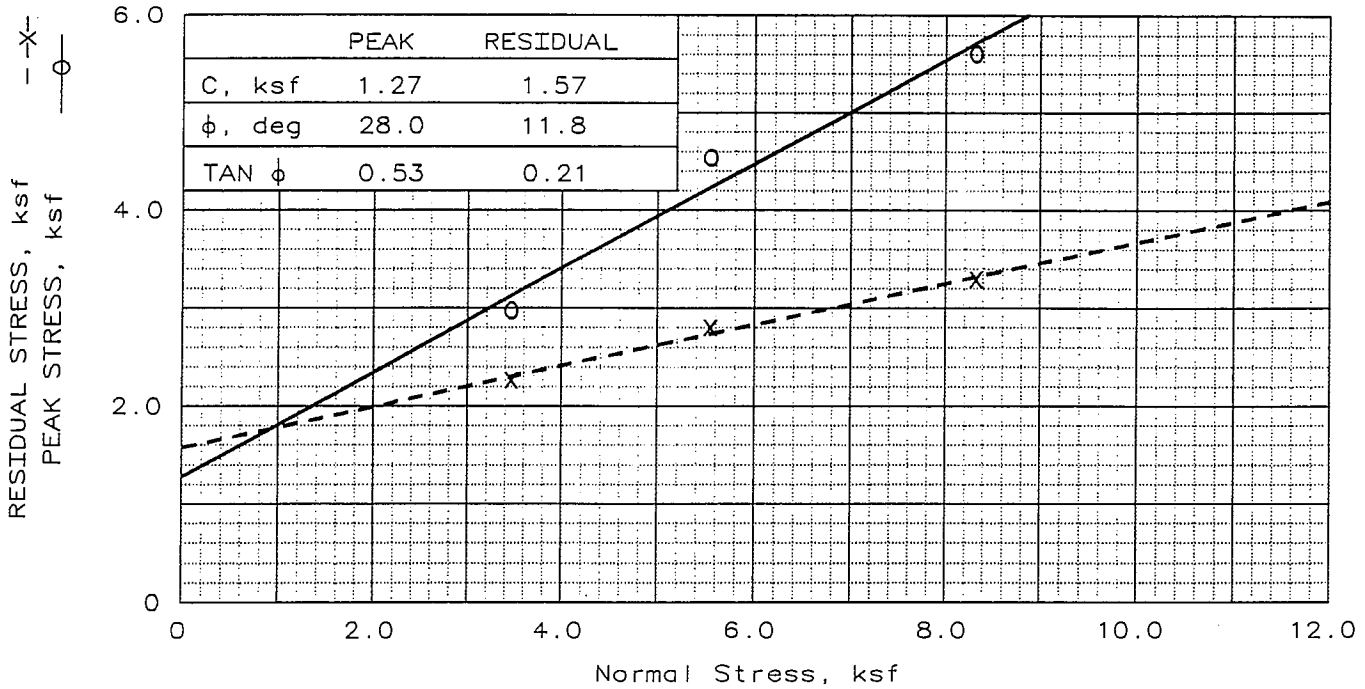
CLIENT: Hasley Canyon Land Company, L.L.C.

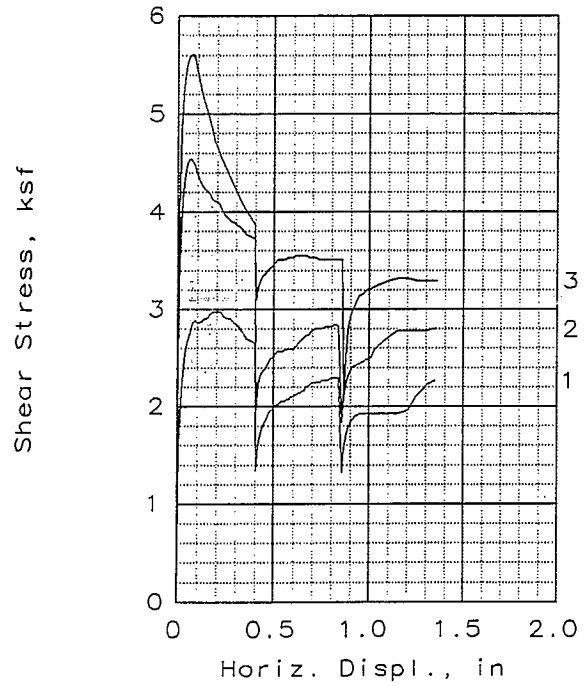
PROJECT: T.T. 52584

SAMPLE LOCATION: BA-1 @ 75.4 ft.

PROJ. NO.: 99-1617-4 DATE: 1/15/99

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	19.2	19.7	17.9
	DRY DENSITY, pcf	106.4	109.9	109.7
	SATURATION, %	88.6	99.8	90.1
	VOID RATIO	0.584	0.533	0.537
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	20.5	18.5	17.8
	DRY DENSITY, pcf	108.5	112.4	113.8
	SATURATION, %	99.7	100.0	100.0
	VOID RATIO	0.554	0.499	0.481
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.98	0.98	0.96
NORMAL STRESS, ksf		3.50	5.58	8.36
PEAK STRESS, ksf		2.97	4.53	5.60
DISPLACEMENT, in		0.18	0.07	0.07
RESIDUAL STRESS, ksf		2.27	2.80	3.29
DISPLACEMENT, in		1.35	1.35	1.36
Strain rate, in/min		0.0079	0.0079	0.0079

SAMPLE TYPE: Undisturbed
DESCRIPTION: Fat clay

SPECIFIC GRAVITY= 2.7
REMARKS: Bedding plane
(Claystone)
Hand driven rings

Fig. No.: C3.4

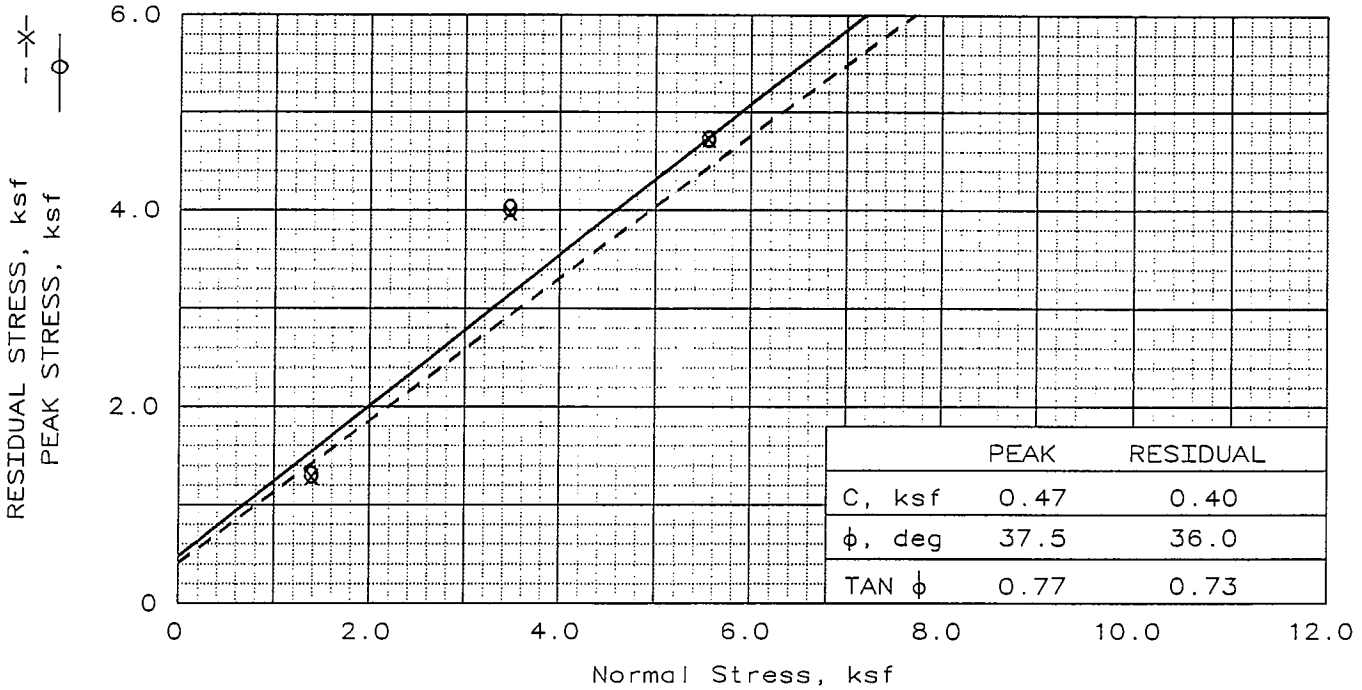
CLIENT: Hasley Canyon Land Company, L.L.C.

PROJECT: T.T. 52584

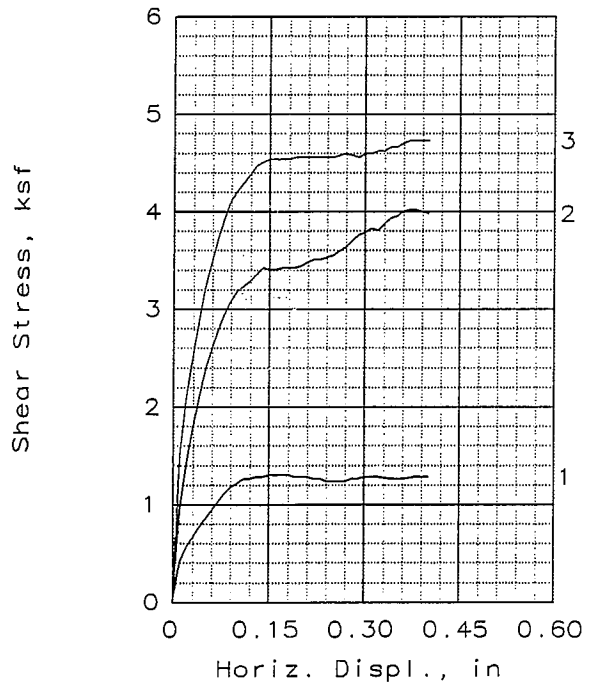
SAMPLE LOCATION: BA-2 @ 62 ft.

PROJ. NO.: 99-1617-4 DATE: 1/15/99

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.



	PEAK	RESIDUAL
C, ksf	0.47	0.40
ϕ, deg	37.5	36.0
TAN ϕ	0.77	0.73



SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	5.6	5.5	4.8
	DRY DENSITY, pcf	109.6	110.1	110.8
	SATURATION, %	28.1	28.0	24.9
	VOID RATIO	0.538	0.531	0.521
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	18.6	17.7	17.0
	DRY DENSITY, pcf	111.7	113.8	115.1
	SATURATION, %	98.5	99.4	98.6
	VOID RATIO	0.509	0.482	0.464
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.98	0.97	0.96
NORMAL STRESS, ksf		1.42	3.50	5.58
PEAK STRESS, ksf		1.30	4.02	4.73
DISPLACEMENT, in		0.15	0.37	0.37
RESIDUAL STRESS, ksf		1.28	3.98	4.73
DISPLACEMENT, in		0.40	0.40	0.40
Strain rate, in/min		0.0197	0.0197	0.0197

SAMPLE TYPE: Undisturbed
DESCRIPTION: Well-graded sand w/trace of gravel

SPECIFIC GRAVITY= 2.7
REMARKS: landslide debris (Qls)

CLIENT: Hasley Canyon Land Company, L.L.C.

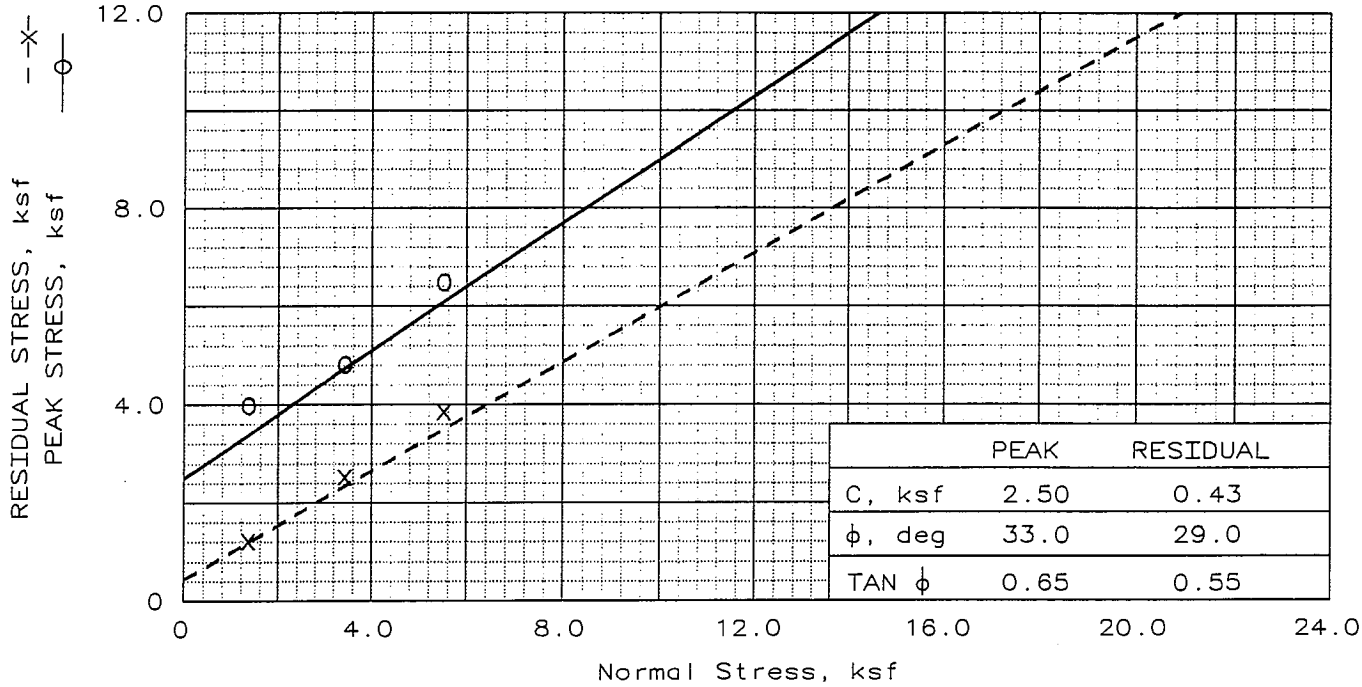
PROJECT: T.T. 52584

SAMPLE LOCATION: BA-3 @ 5 ft.

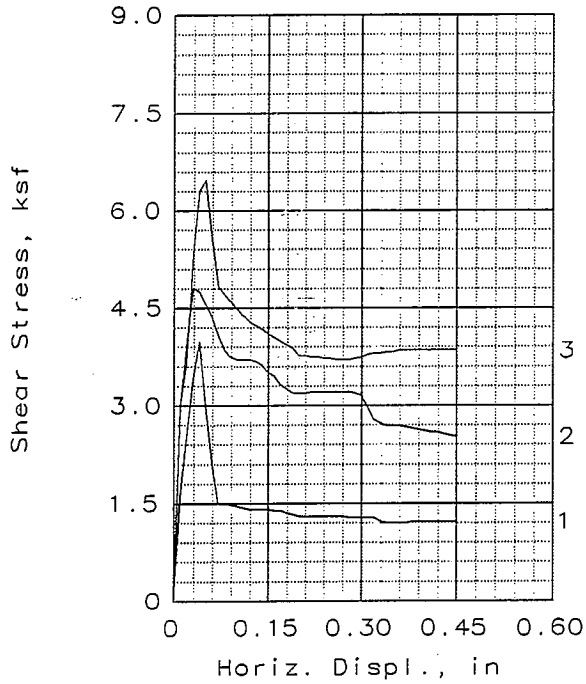
PROJ. NO.: 98-1617-4 DATE: 10/22/99

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.

Fig. No.: C3.5



	PEAK	RESIDUAL
C, ksf	2.50	0.43
ϕ, deg	33.0	29.0
TAN ϕ	0.65	0.55



	SAMPLE NO.:	1	2	3
INITIAL	WATER CONTENT, %	14.5	17.0	15.5
	DRY DENSITY, pcf	117.8	112.7	114.6
	SATURATION, %	90.6	92.6	89.2
	VOID RATIO	0.431	0.496	0.470
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	15.7	16.6	15.3
	DRY DENSITY, pcf	118.3	116.0	118.1
	SATURATION, %	99.8	99.2	96.9
	VOID RATIO	0.425	0.453	0.427
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	0.97	0.97
	NORMAL STRESS, ksf	1.42	3.50	5.58
	PEAK STRESS, ksf	3.98	4.81	6.48
	DISPLACEMENT, in	0.04	0.03	0.05
	RESIDUAL STRESS, ksf	1.22	2.52	3.85
	DISPLACEMENT, in	0.45	0.45	0.45
	Strain rate, in/min	0.0197	0.0197	0.0197

SAMPLE TYPE: Undisturbed
DESCRIPTION: Silty clay

SPECIFIC GRAVITY= 2.7
REMARKS: Bedding plane
(Silty claystone)

Fig. No.: C3.6

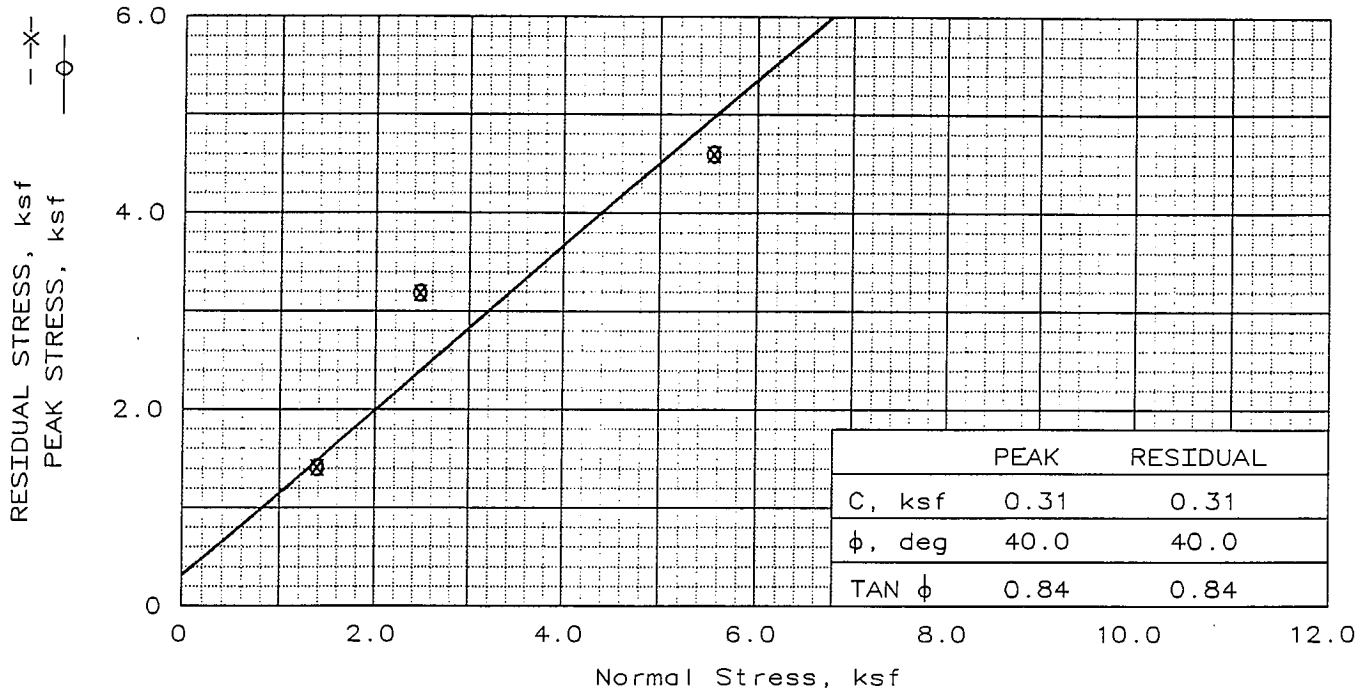
CLIENT: Hasley Canyon Land Company, L.L.C.

PROJECT: T.T. 52584

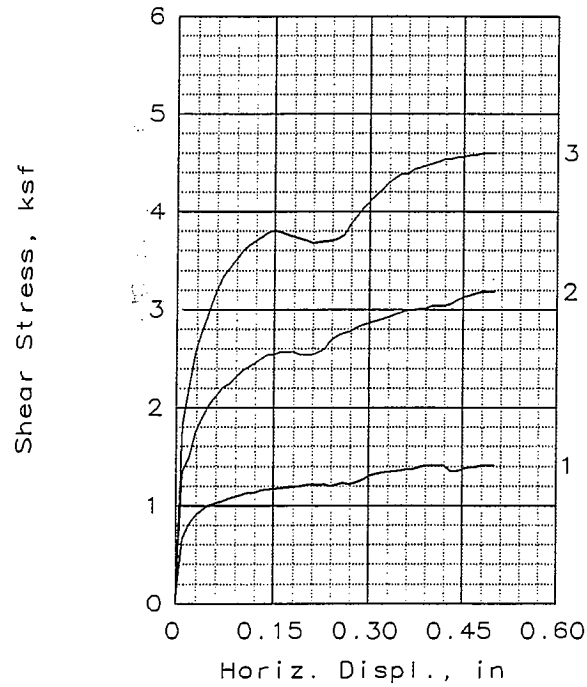
SAMPLE LOCATION: BA-4 @ 10 ft.

PROJ. NO.: 99-1617-4 DATE: 10/22/99

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.



	PEAK	RESIDUAL
C, ksf	0.31	0.31
ϕ, deg	40.0	40.0
TAN ϕ	0.84	0.84



SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	7.3	7.3	7.4
	DRY DENSITY, pcf	109.8	109.8	109.8
	SATURATION, %	36.8	36.8	37.3
	VOID RATIO	0.535	0.534	0.535
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	18.7	18.7	18.0
	DRY DENSITY, pcf	110.7	111.5	112.2
	SATURATION, %	96.8	98.5	96.7
	VOID RATIO	0.522	0.512	0.502
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.99	0.98
NORMAL STRESS, ksf		1.42	2.50	5.58
PEAK STRESS, ksf		1.41	3.19	4.60
DISPLACEMENT, in		0.50	0.48	0.50
RESIDUAL STRESS, ksf		1.41	3.19	4.60
DISPLACEMENT, in		0.50	0.50	0.50
Strain rate, in/min		0.0197	0.0197	0.0197

SAMPLE TYPE: Remolded
DESCRIPTION: Well graded sand w/silt & gravel (SW-SM)

SPECIFIC GRAVITY= 2.7
REMARKS: Remolded to 90% R/C Compacted Fill (Cef)

CLIENT: Hasley Canyon Land Company, L.L.C.

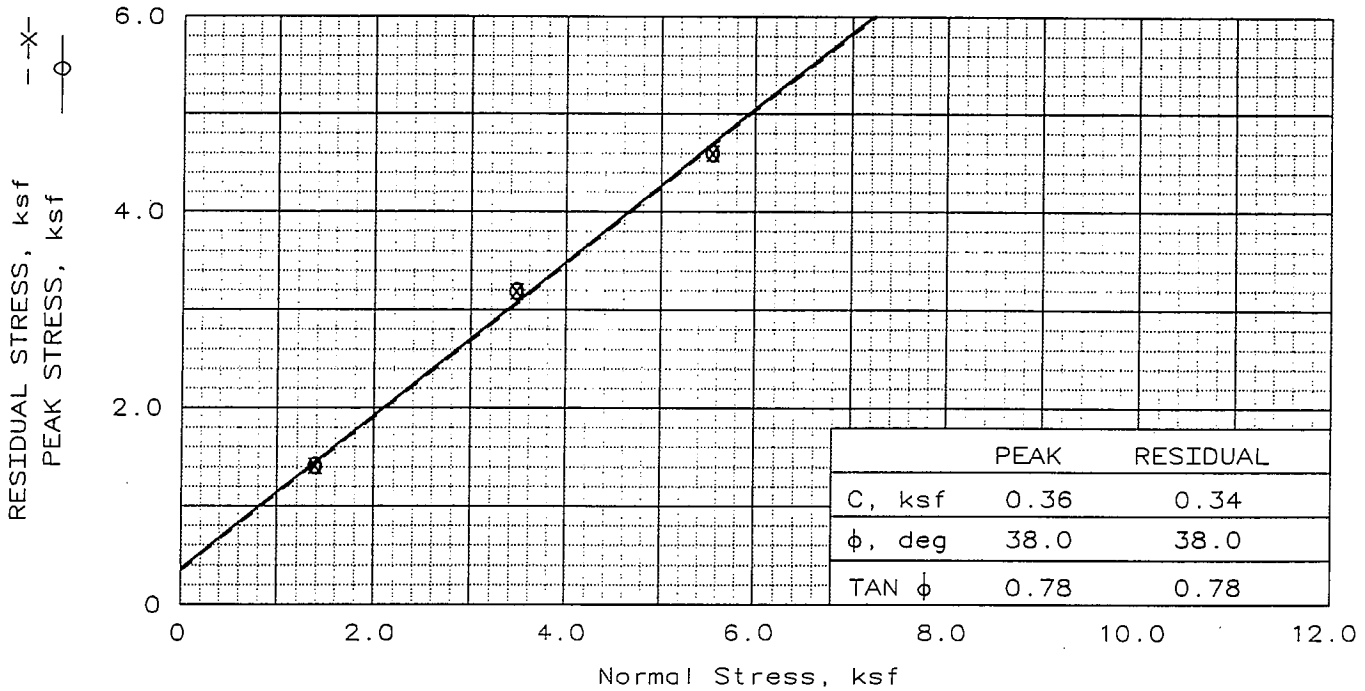
PROJECT: T.T. 52584

SAMPLE LOCATION: BA-4 @ 24 ft.

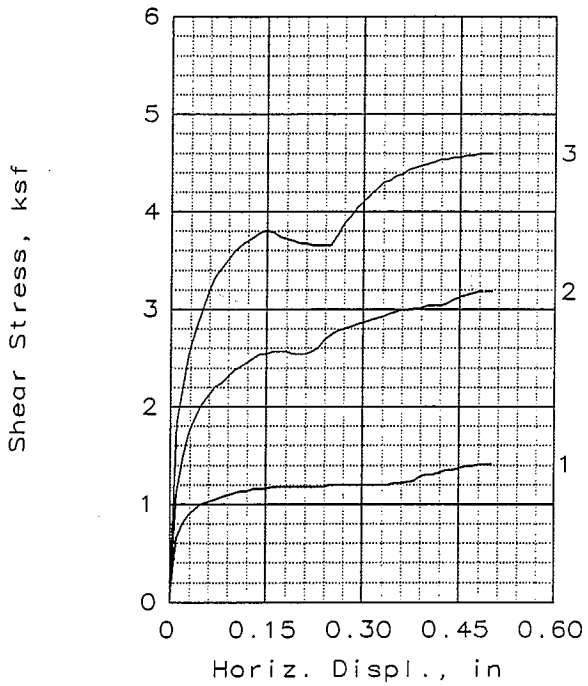
PROJ. NO.: 99-1617-4 DATE: 1/15/99

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.

Fig. No.: C3.7



	PEAK	RESIDUAL
C, ksf	0.36	0.34
ϕ, deg	38.0	38.0
TAN ϕ	0.78	0.78



	SAMPLE NO.:	1	2	3
INITIAL	WATER CONTENT, %	7.3	7.3	7.4
	DRY DENSITY, pcf	109.8	109.8	109.8
	SATURATION, %	36.8	36.8	37.3
	VOID RATIO	0.535	0.534	0.535
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	19.1	18.7	18.0
	DRY DENSITY, pcf	110.7	111.5	112.2
	SATURATION, %	98.7	98.5	96.7
	VOID RATIO	0.522	0.512	0.502
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.99	0.98
	NORMAL STRESS, ksf	1.42	3.50	5.58
	PEAK STRESS, ksf	1.41	3.19	4.60
	DISPLACEMENT, in	0.48	0.48	0.48
	RESIDUAL STRESS, ksf	1.41	3.19	4.60
	DISPLACEMENT, in	0.50	0.50	0.50
	Strain rate, in/min	0.0197	0.0197	0.0197

SAMPLE TYPE: Remolded
DESCRIPTION: Well-graded sand with silt and gravel

SPECIFIC GRAVITY= 2.7
REMARKS: Remolded to 90% R/C Compacted Fill (Cef)

CLIENT: Hasley Canyon Land Company, L.L.C

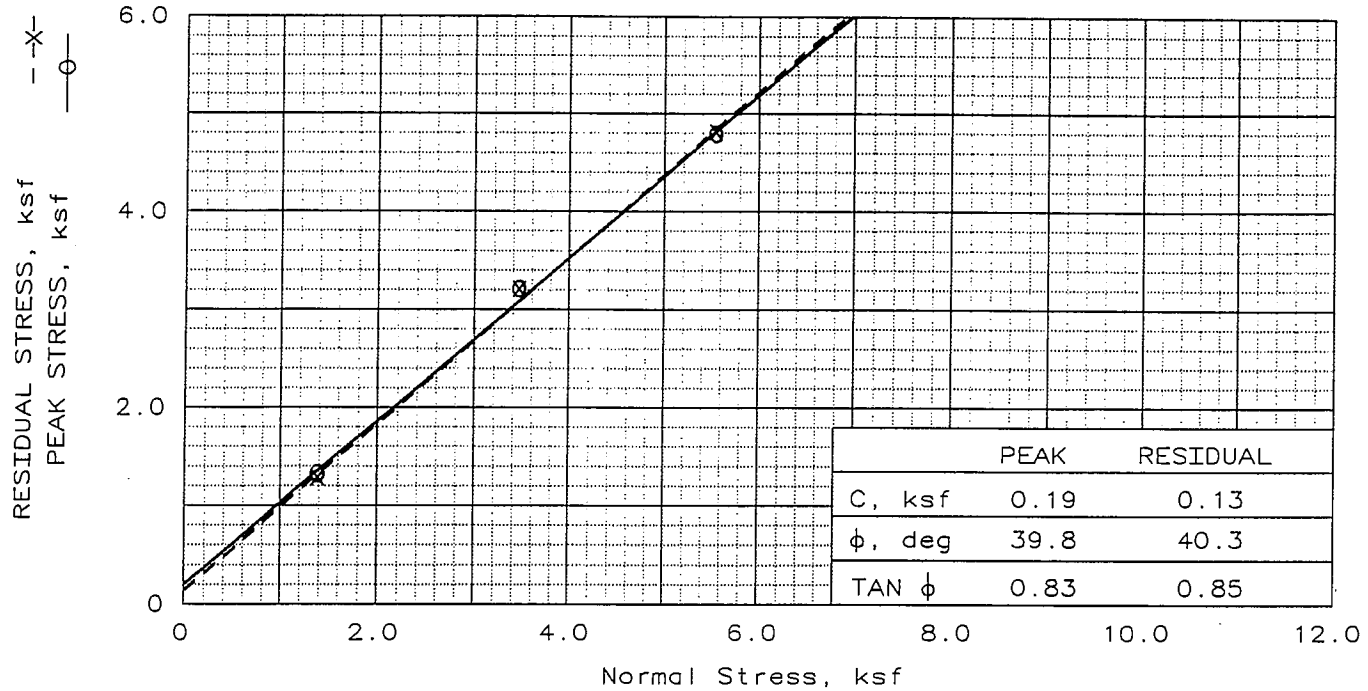
PROJECT: T.T. 52584

SAMPLE LOCATION: BA-4 @ 37 ft.

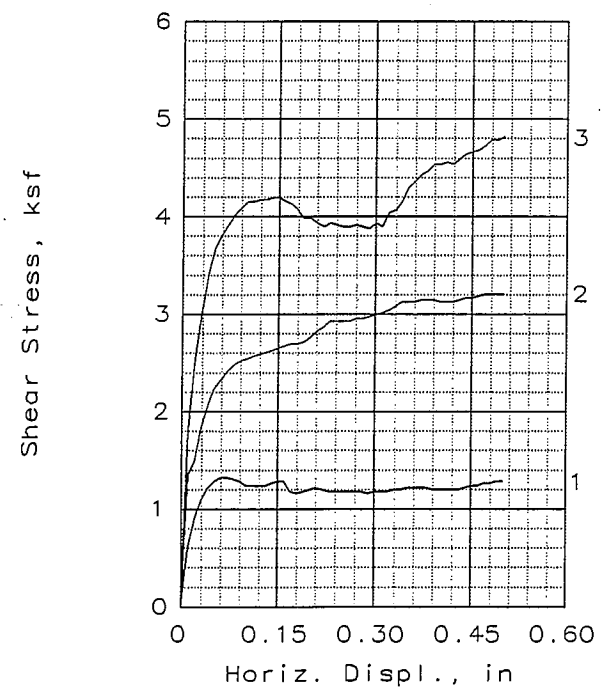
PROJ. NO.: 99-1617-4 DATE: 10/22/99

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.

Fig. No.: C3.8



	PEAK	RESIDUAL
C, ksf	0.19	0.13
ϕ, deg	39.8	40.3
TAN ϕ	0.83	0.85



SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	6.2	6.2	6.4
	DRY DENSITY, pcf	114.2	114.2	119.2
	SATURATION, %	35.3	35.0	41.7
	VOID RATIO	0.476	0.476	0.414
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	16.9	16.7	14.6
	DRY DENSITY, pcf	115.4	116.0	120.9
	SATURATION, %	99.3	99.4	99.8
	VOID RATIO	0.461	0.452	0.394
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.98	0.99
NORMAL STRESS, ksf		1.42	3.50	5.58
PEAK STRESS, ksf		1.33	3.21	4.79
DISPLACEMENT, in		0.06	0.50	0.49
RESIDUAL STRESS, ksf		1.28	3.21	4.81
DISPLACEMENT, in		0.50	0.50	0.50
Strain rate, in/min		0.0197	0.0197	0.0197

SAMPLE TYPE: Remolded
DESCRIPTION: Well graded sand with silt and gravel

SPECIFIC GRAVITY= 2.7
REMARKS: Remolded to 90% R/C Compacted Fill (Cef)

Fig. No.: C3.9

CLIENT: Hasley Canyon Land Company, L.L.C.

PROJECT: T.T. 52584

SAMPLE LOCATION: BA-5 @ 12 ft.

PROJ. NO.: 99-1617-4 DATE: 1/15/99

DIRECT SHEAR TEST REPORT
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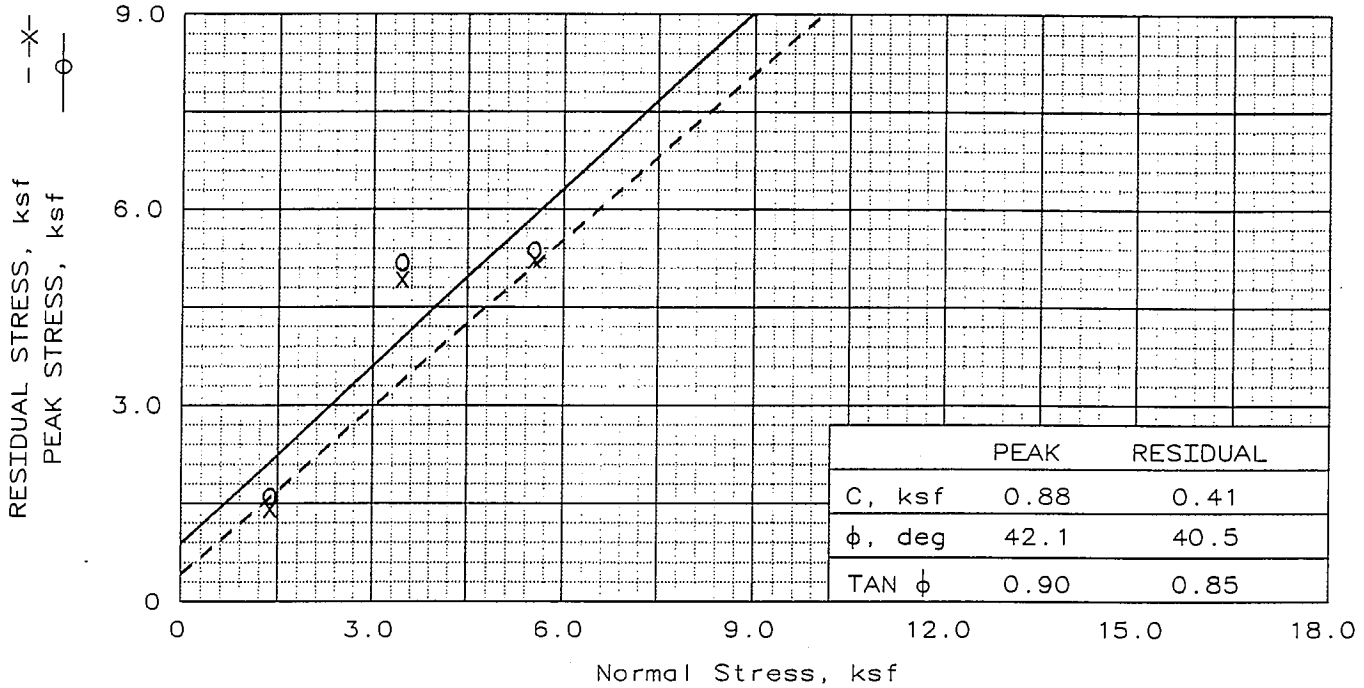
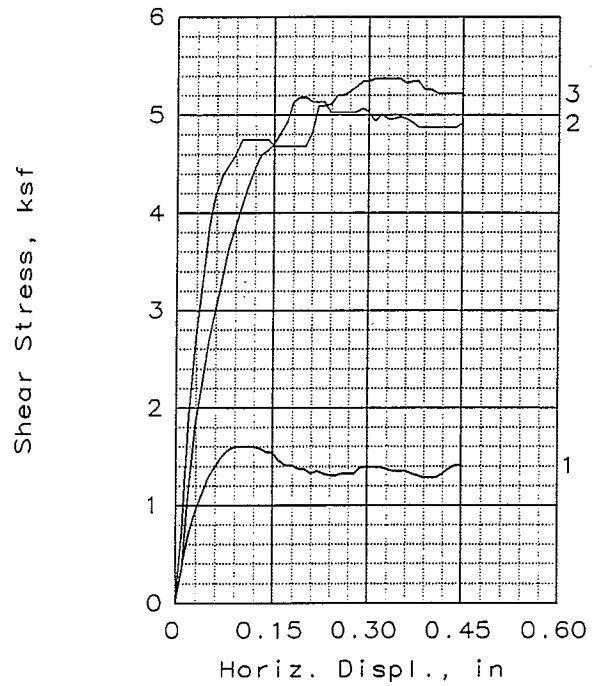


	PEAK	RESIDUAL
C, ksf	0.88	0.41
ϕ, deg	42.1	40.5
TAN ϕ	0.90	0.85



	SAMPLE NO.:	1	2	3
INITIAL	WATER CONTENT, %	4.8	5.6	4.8
	DRY DENSITY, pcf	112.8	115.3	112.8
	SATURATION, %	26.5	32.5	26.5
	VOID RATIO	0.495	0.461	0.495
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	17.3	15.3	16.2
	DRY DENSITY, pcf	114.5	118.9	117.2
	SATURATION, %	98.7	99.1	99.6
	VOID RATIO	0.472	0.417	0.438
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.98	0.97	0.96
	NORMAL STRESS, ksf	1.42	3.50	5.58
	PEAK STRESS, ksf	1.60	5.18	5.37
	DISPLACEMENT, in	0.09	0.19	0.31
	RESIDUAL STRESS, ksf	1.41	4.92	5.22
	DISPLACEMENT, in	0.45	0.45	0.45
	Strain rate, in/min	0.0197	0.0197	0.0197

SAMPLE TYPE: Undisturbed
DESCRIPTION: Sand w/Silt (SP/SM)

SPECIFIC GRAVITY= 2.7
REMARKS: Cross bedding (TQs) (Sandstone)

Fig. No.: C3.10

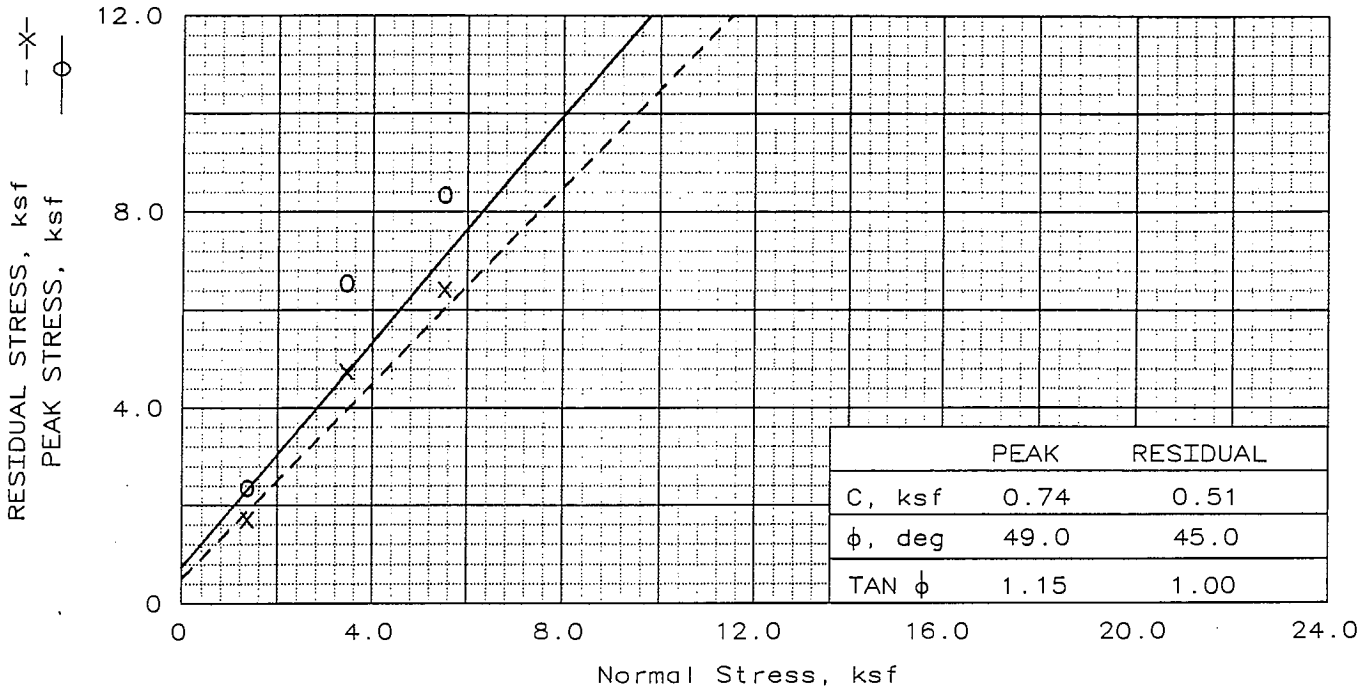
CLIENT: Hasley Canyon Land Company, L.L.C.

PROJECT: T.T. 52584

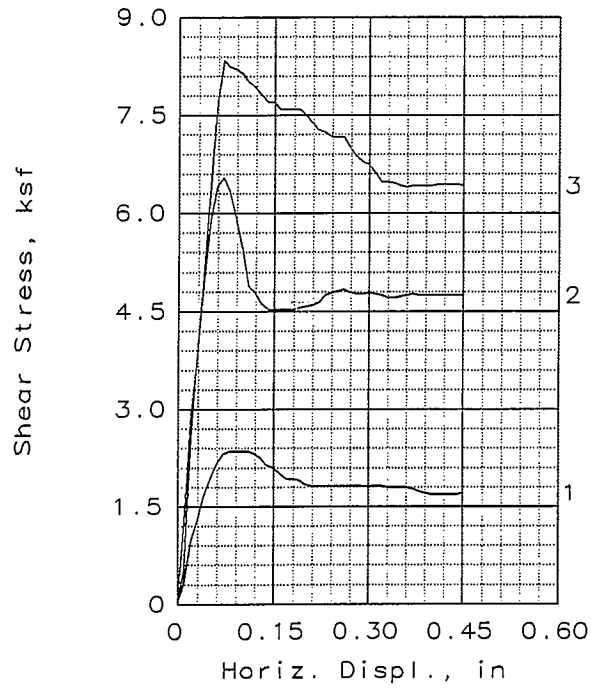
SAMPLE LOCATION: BA-5 @ 50 ft.

PROJ. NO.: 99-1617-4 DATE: 10/22/99

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.



	PEAK	RESIDUAL
C, ksf	0.74	0.51
ϕ, deg	49.0	45.0
TAN ϕ	1.15	1.00



SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	6.3	6.7	7.0
	DRY DENSITY, pcf	120.7	125.6	123.9
	SATURATION, %	42.7	52.6	52.5
	VOID RATIO	0.396	0.342	0.361
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	13.7	11.0	11.7
	DRY DENSITY, pcf	122.9	129.5	127.9
	SATURATION, %	99.6	98.4	99.2
	VOID RATIO	0.372	0.301	0.317
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.98	0.97	0.97
NORMAL STRESS, ksf		1.42	3.50	5.58
PEAK STRESS, ksf		2.35	6.55	8.34
DISPLACEMENT, in		0.08	0.07	0.07
RESIDUAL STRESS, ksf		1.71	4.75	6.42
DISPLACEMENT, in		0.45	0.45	0.45
Strain rate, in/min		0.0197	0.0197	0.0197

SAMPLE TYPE: Undisturbed
DESCRIPTION: Well graded sand with gravel

SPECIFIC GRAVITY= 2.7
REMARKS: Cross bedding (TQs) (Sandstone)

CLIENT: Hasley Canyon Land Comapny, L.L.C.

PROJECT: T.T. 52584

SAMPLE LOCATION: BA-6 @ 20 ft.

PROJ. NO.: 99-1617-4 DATE: 10/22/99

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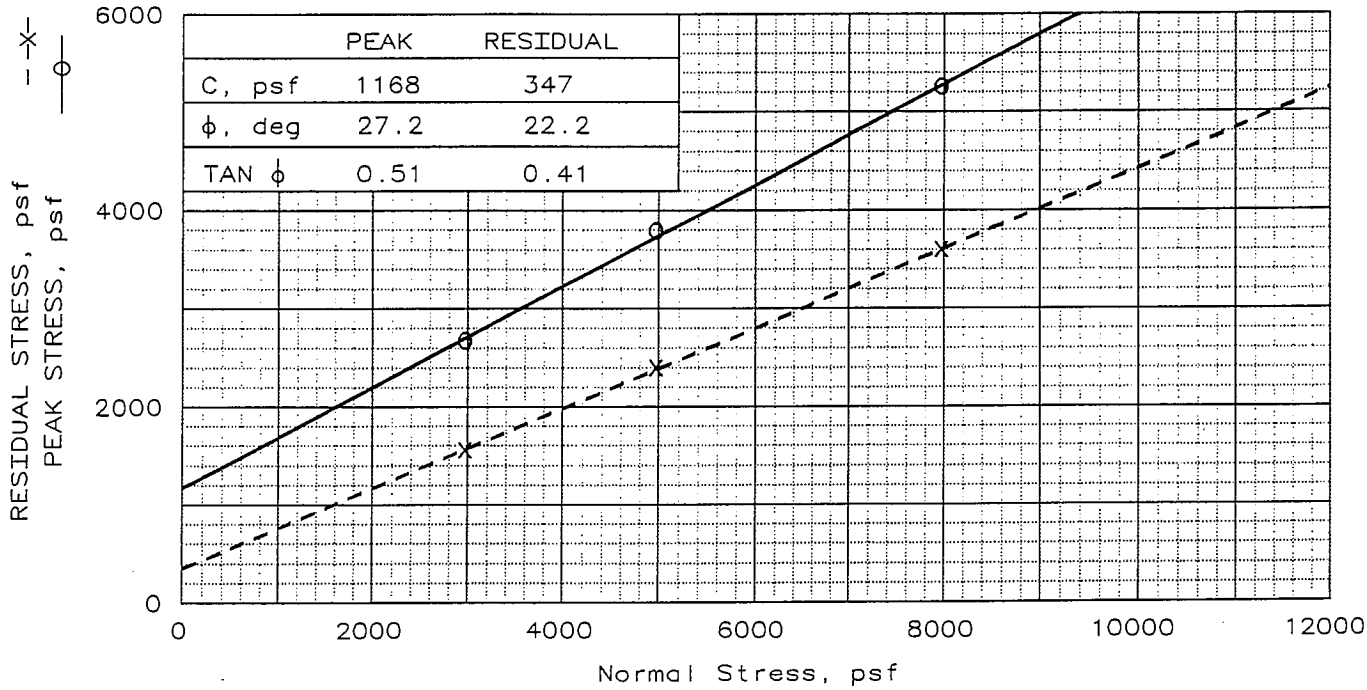
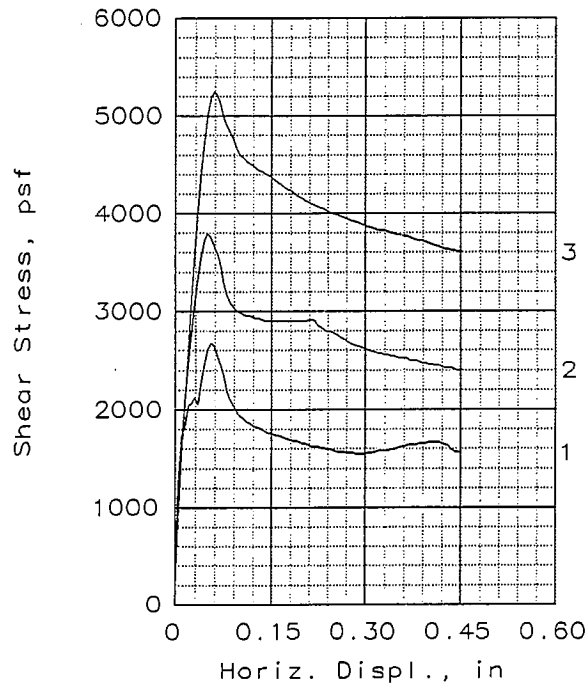
Fig. No.: C3.11





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	20.4	19.4	19.5
	DRY DENSITY, pcf	107.4	108.4	108.0
	SATURATION, %	99.8	97.8	97.0
	VOID RATIO	0.541	0.526	0.531
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	19.8	18.6	18.4
	DRY DENSITY, pcf	108.5	110.7	111.1
	SATURATION, %	99.9	99.9	99.7
	VOID RATIO	0.525	0.494	0.489
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.98	0.97
NORMAL STRESS, psf		3000	5000	8000
PEAK STRESS, psf		2676	3792	5256
DISPLACEMENT, in		0.06	0.05	0.06
RESIDUAL STRESS, psf		1560	2400	3600
DISPLACEMENT, in		0.45	0.45	0.45
Strain rate, in/min		0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed
DESCRIPTION: Silt (ML)

SPECIFIC GRAVITY= 2.65
REMARKS: Siltstone Lense

CLIENT: Hasley Canyon Land Company, L.L.C

PROJECT: T.T. 52584

SAMPLE LOCATION: BA-7 @ 44 ft.

PROJ. NO.: 99-1617-4 DATE: 10/22/99

DIRECT SHEAR TEST REPORT
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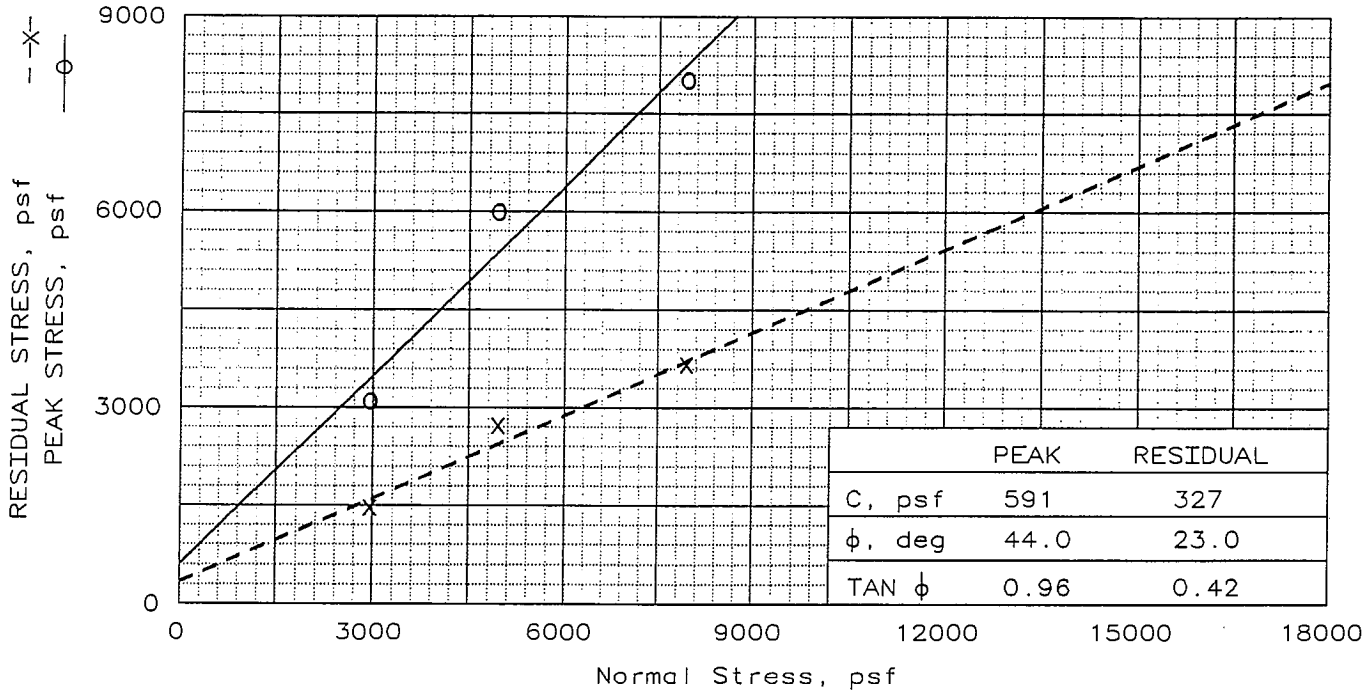
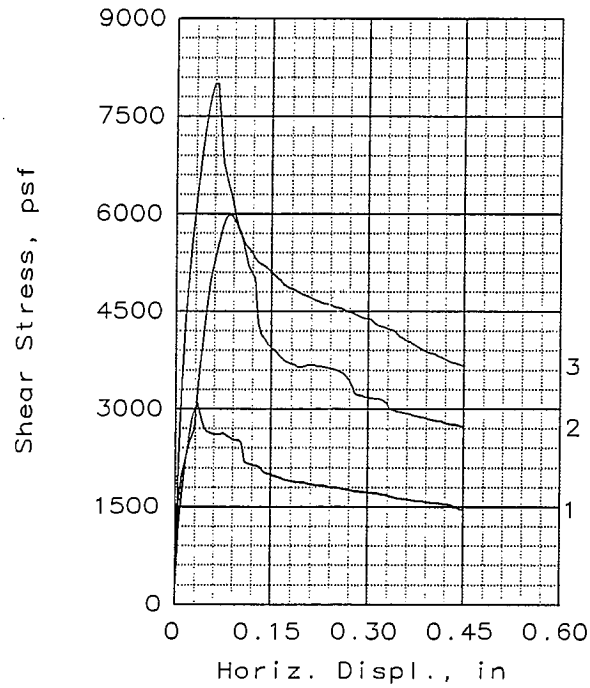
ENGINEERING GEOLOGY, INC.

Fig. No.: C3.12



	PEAK	RESIDUAL
C, psf	591	327
ϕ, deg	44.0	23.0
TAN ϕ	0.96	0.42



	SAMPLE NO.:	1	2	3
INITIAL	WATER CONTENT, %	13.6	15.1	13.9
	DRY DENSITY, pcf	116.4	117.3	119.3
	SATURATION, %	85.9	97.5	95.3
	VOID RATIO	0.421	0.411	0.386
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	15.6	14.7	14.0
	DRY DENSITY, pcf	117.1	118.6	120.6
	SATURATION, %	100.0	98.9	99.7
	VOID RATIO	0.413	0.395	0.372
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.99	0.99
	NORMAL STRESS, psf	3000	5000	8000
	PEAK STRESS, psf	3096	5987	8003
	DISPLACEMENT, in	0.04	0.09	0.06
	RESIDUAL STRESS, psf	1464	2724	3660
	DISPLACEMENT, in	0.45	0.45	0.45
	Strain rate, in/min	0.0100	0.0100	0.0100

SAMPLE TYPE: Undisturbed
DESCRIPTION: Silty Clay (CL-ML)

SPECIFIC GRAVITY= 2.65
REMARKS: #200 = 50.4%
Bedding plane
(Silty Claystone)

Fig. No.: C3.13

CLIENT: Hasley Canyon Land Company, L.L.C.

PROJECT: T.T. 52584

SAMPLE LOCATION: BA-9 @ 49 ft.

PROJ. NO.: 99-1617-4 DATE: 10/22/99

DIRECT SHEAR TEST REPORT
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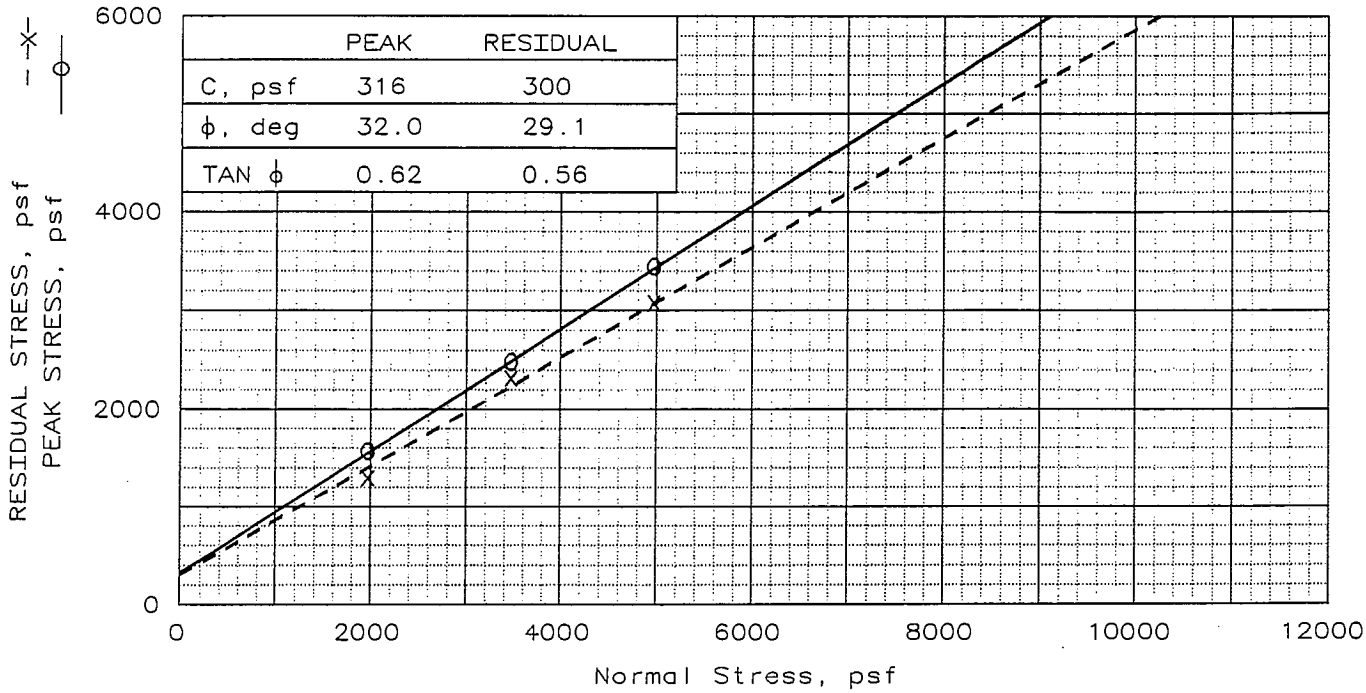
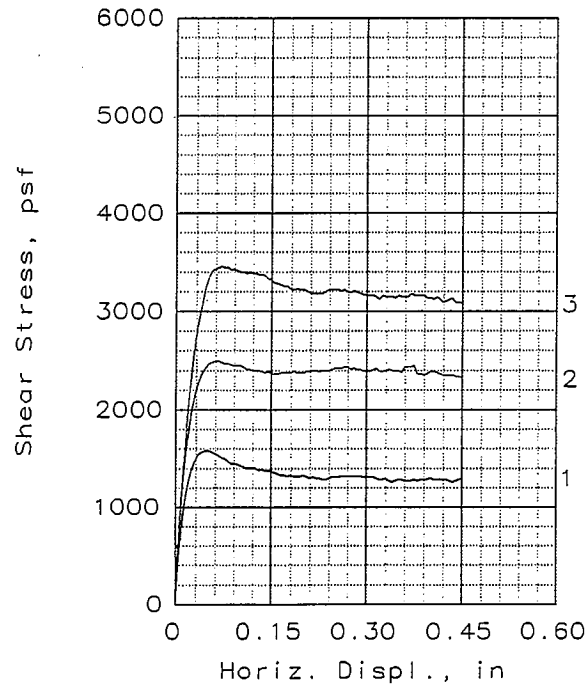
ENGINEERING GEOLOGY, INC.





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	7.5	8.0	7.9
	DRY DENSITY, pcf	115.8	115.4	115.4
	SATURATION, %	46.2	48.8	48.6
	VOID RATIO	0.428	0.434	0.433
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	15.1	15.1	15.1
	DRY DENSITY, pcf	117.6	117.3	118.1
	SATURATION, %	98.1	97.4	99.4
	VOID RATIO	0.407	0.410	0.401
	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		1572	2484	3444
DISPLACEMENT, in		0.06	0.07	0.08
RESIDUAL STRESS, psf		1296	2316	3072
DISPLACEMENT, in		0.45	0.45	0.45
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Remolded
DESCRIPTION: Silty sand

SPECIFIC GRAVITY= 2.65
REMARKS: Remolded to 90% R/C
Compacted Fill (Cef)

Fig. No.: C3.14

CLIENT: Hasley Canyon Land Company, L.L.C.

PROJECT: T.T. 52584

SAMPLE LOCATION: BA-7,BA-8,BA-9 & BA-10
@ 0-15 ft.

PROJ. NO.: 99-1617-4 DATE: 10/22/99

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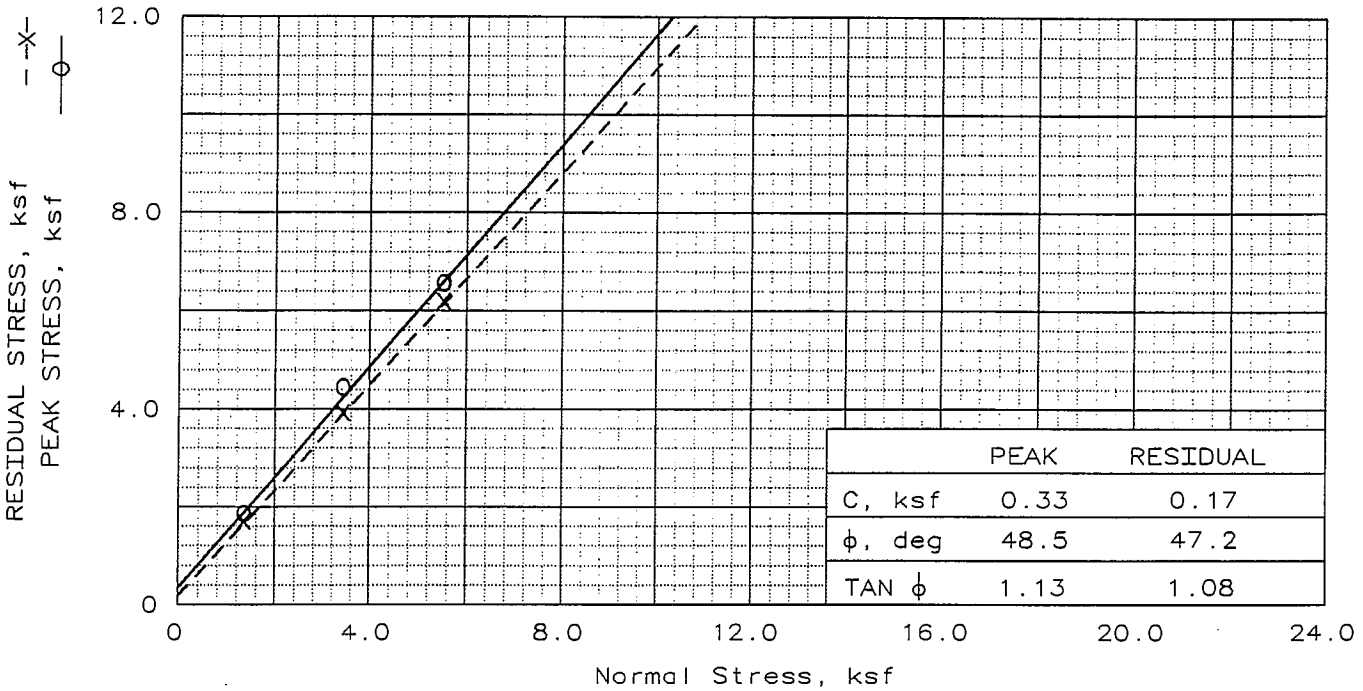
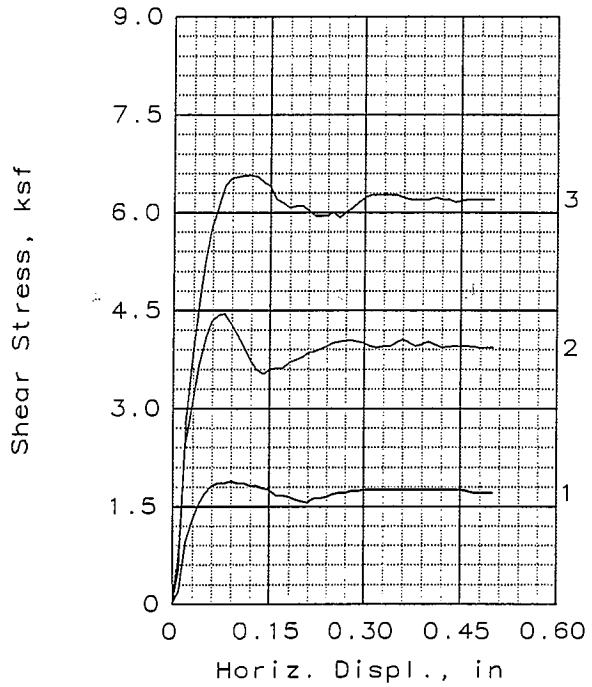


	PEAK	RESIDUAL
C, ksf	0.33	0.17
ϕ, deg	48.5	47.2
TAN ϕ	1.13	1.08



SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	12.2	13.2	12.2
	DRY DENSITY, pcf	113.7	114.2	115.7
	SATURATION, %	67.9	74.7	71.8
	VOID RATIO	0.483	0.476	0.457
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	16.5	16.5	14.8
	DRY DENSITY, pcf	114.5	115.5	118.3
	SATURATION, %	94.2	97.1	94.1
	VOID RATIO	0.472	0.459	0.425
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.99	0.98
NORMAL STRESS, ksf		1.42	3.50	5.58
PEAK STRESS, ksf		1.86	4.45	6.57
DISPLACEMENT, in		0.07	0.08	0.11
RESIDUAL STRESS, ksf		1.71	3.94	6.20
DISPLACEMENT, in		0.50	0.50	0.50
Strain rate, in/min		0.0079	0.0079	0.0079

SAMPLE TYPE: Undisturbed
DESCRIPTION: Well graded sand with gravel

SPECIFIC GRAVITY= 2.7
REMARKS: Alluvium (Qal)

CLIENT: Hasley Canyon Land Company, L.L.C.

PROJECT: T.T. 52584

SAMPLE LOCATION: RW-1 @ 6 ft.

PROJ. NO.: 99-1617-4 DATE: 1/15/99

DIRECT SHEAR TEST REPORT
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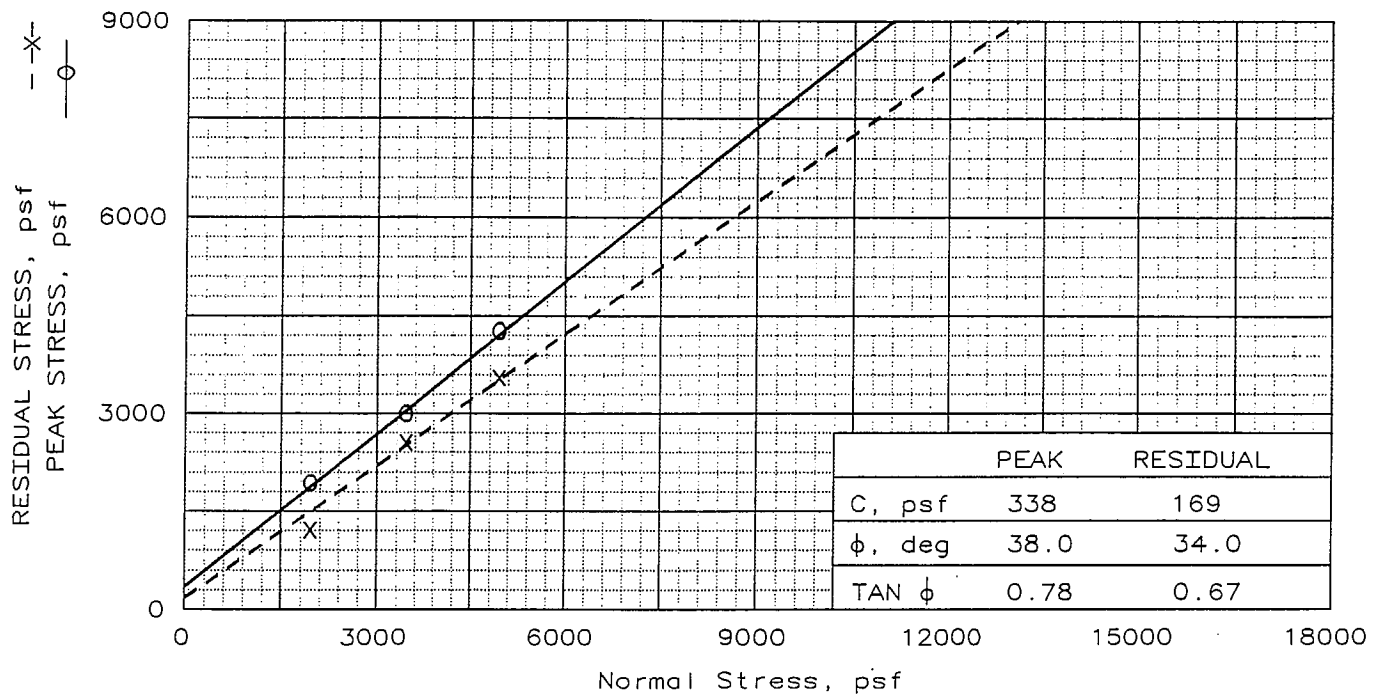
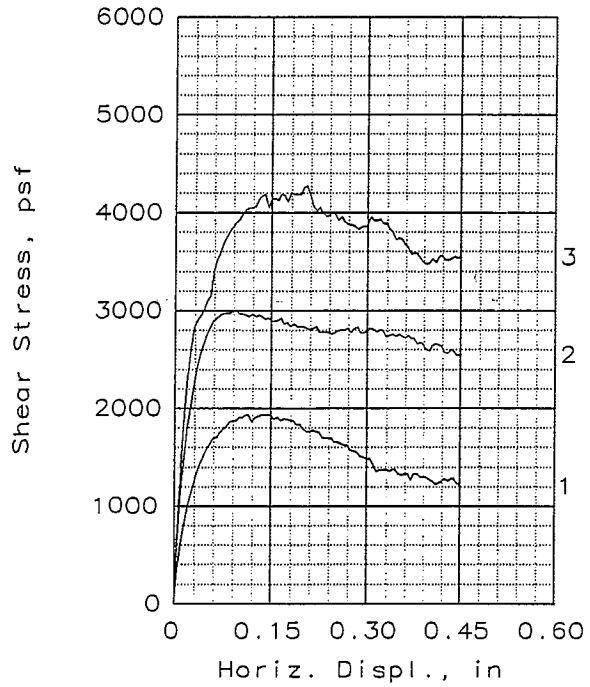
Fig. No.: C3.15



	PEAK	RESIDUAL
C, psf	338	169
ϕ, deg	38.0	34.0
TAN ϕ	0.78	0.67



SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	5.9	8.2	5.3
	DRY DENSITY, pcf	112.4	110.4	113.3
	SATURATION, %	32.9	43.3	30.4
	VOID RATIO	0.472	0.499	0.460
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	16.2	17.2	15.8
	DRY DENSITY, pcf	114.6	112.9	115.9
	SATURATION, %	96.7	97.7	97.9
	VOID RATIO	0.444	0.465	0.428
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.98	0.98	0.98
NORMAL STRESS, psf		2000	3500	5000
PEAK STRESS, psf		1932	3000	4272
DISPLACEMENT, in		0.11	0.09	0.21
RESIDUAL STRESS, psf		1212	2556	3552
DISPLACEMENT, in		0.45	0.45	0.45
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Undisturbed
DESCRIPTION: Sand w/Silt (SP-SM)

SPECIFIC GRAVITY= 2.65
REMARKS: Alluvium (Qal)

CLIENT: Hasley Canyon Land Company, L.L.C.

PROJECT: T.T. 52584

SAMPLE LOCATION: RW-1 @ 9 ft.

PROJ. NO.: 99-1617-4 DATE: 10/22/99

DIRECT SHEAR TEST REPORT
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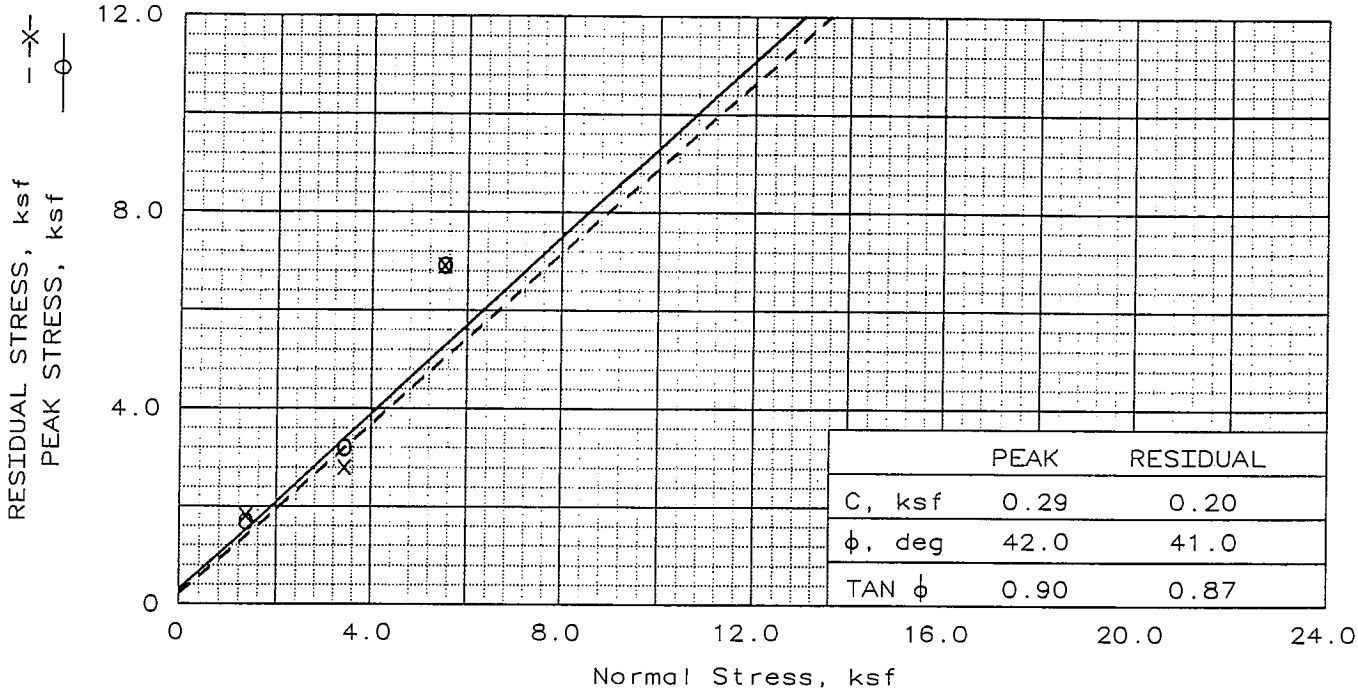
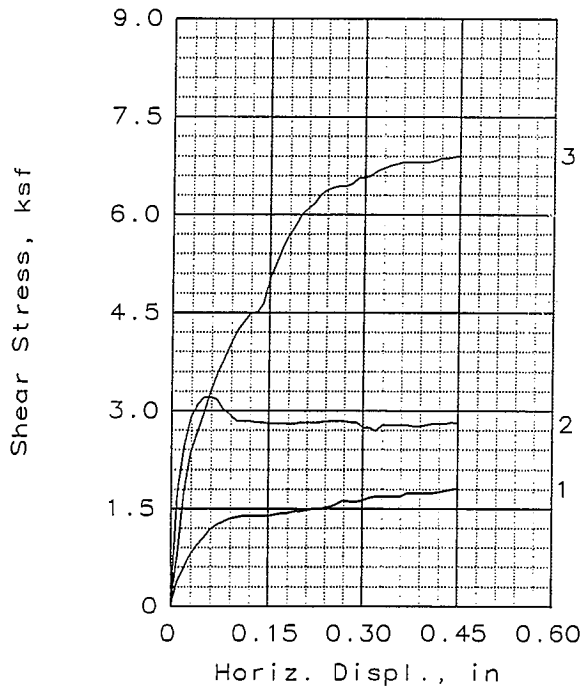
ENGINEERING GEOLOGY, INC.

Fig. No.: C3.16



	PEAK	RESIDUAL
C, ksf	0.29	0.20
ϕ, deg	42.0	41.0
TAN ϕ	0.90	0.87



	SAMPLE NO.:	1	2	3
INITIAL	WATER CONTENT, %	2.4	5.3	5.7
	DRY DENSITY, pcf	118.5	110.9	114.7
	SATURATION, %	15.5	27.4	32.8
	VOID RATIO	0.422	0.519	0.469
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	14.7	17.9	15.4
	DRY DENSITY, pcf	120.2	113.4	118.9
	SATURATION, %	99.1	99.5	99.2
	VOID RATIO	0.402	0.486	0.418
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.98	0.97
	NORMAL STRESS, ksf	1.42	3.50	5.58
	PEAK STRESS, ksf	1.69	3.21	6.91
	DISPLACEMENT, in	0.34	0.05	0.45
	RESIDUAL STRESS, ksf	1.82	2.80	6.91
	DISPLACEMENT, in	0.45	0.45	0.45
	Strain rate, in/min	0.0197	0.0197	0.0197

SAMPLE TYPE: Undisturbed
DESCRIPTION: Well-graded sand w/gravel

SPECIFIC GRAVITY= 2.7
REMARKS: Terrace Deposits (Qt)

CLIENT: Hasley Canyon Land Company, L.L.C.

PROJECT: T.T. 52584

SAMPLE LOCATION: HS-2 @ 20 ft.

PROJ. NO.: 99-1617-4 DATE: 10/22/99

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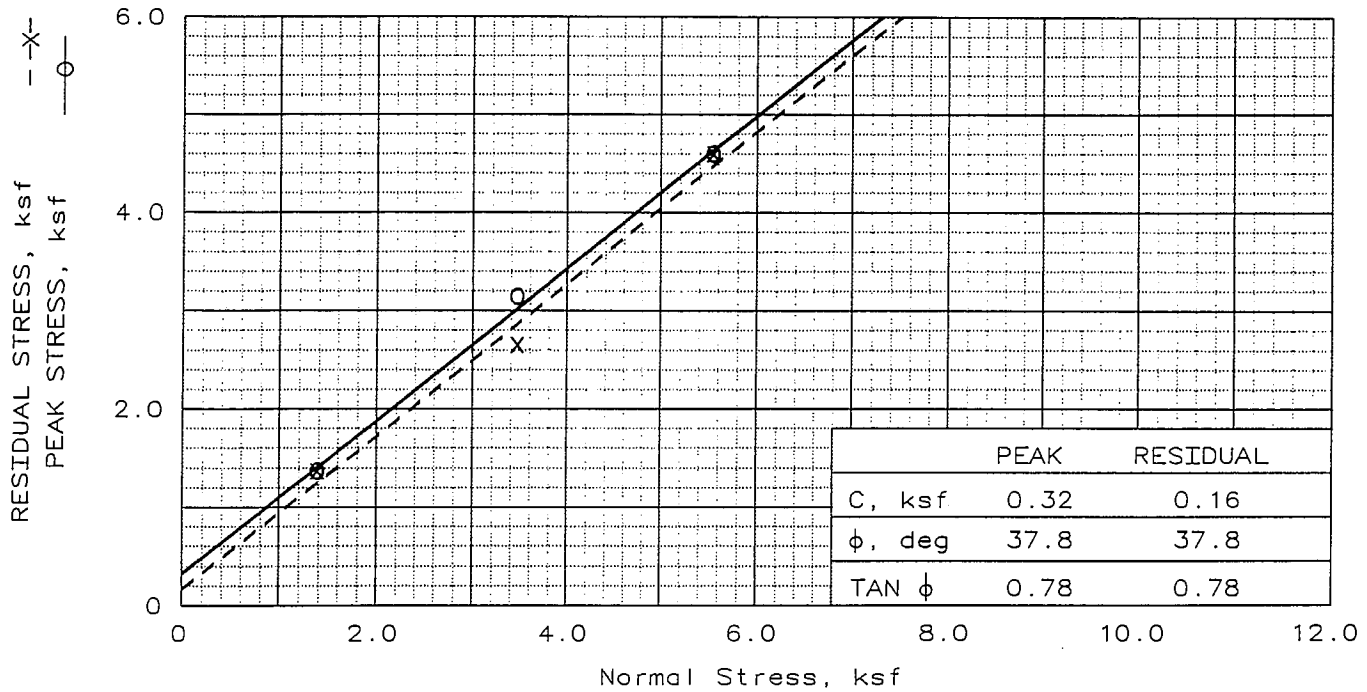
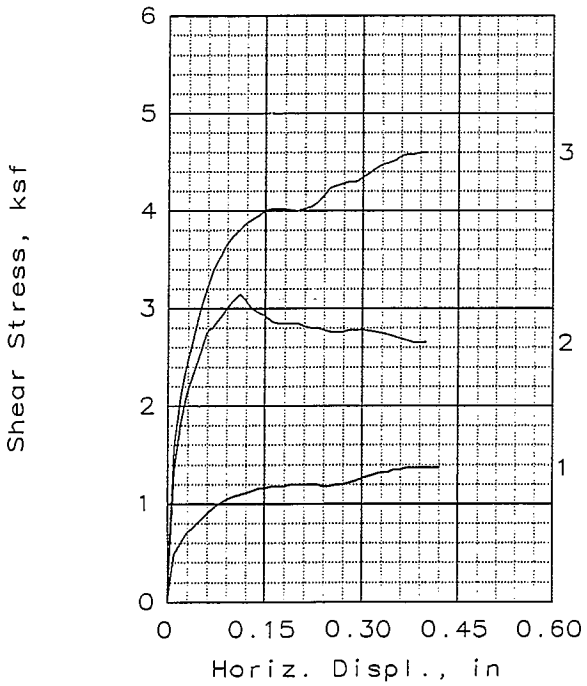
ENGINEERING GEOLOGY, INC.

Fig. No.: C3.17



	PEAK	RESIDUAL
C, ksf	0.32	0.16
ϕ, deg	37.8	37.8
TAN ϕ	0.78	0.78



SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	6.7	9.4	6.4
	DRY DENSITY, pcf	115.6	115.1	117.4
	SATURATION, %	39.6	54.9	39.6
	VOID RATIO	0.458	0.465	0.436
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	16.2	16.2	14.1
	DRY DENSITY, pcf	117.0	117.2	121.7
	SATURATION, %	99.2	99.8	98.6
	VOID RATIO	0.441	0.439	0.385
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.98	0.96
NORMAL STRESS, ksf		1.42	3.50	5.58
PEAK STRESS, ksf		1.37	3.14	4.60
DISPLACEMENT, in		0.37	0.11	0.40
RESIDUAL STRESS, ksf		1.37	2.65	4.60
DISPLACEMENT, in		0.42	0.40	0.40
Strain rate, in/min		0.0079	0.0079	0.0079

SAMPLE TYPE: Undisturbed
DESCRIPTION: Silty Sand

SPECIFIC GRAVITY= 2.7
REMARKS: alluvium (Qal)

CLIENT: Hasley Canyon Land Company, L.L.C.

PROJECT: T.T. 52584

SAMPLE LOCATION: HS-4 @ 10 ft.

PROJ. NO.: 98-1617-4 DATE: 1/15/99

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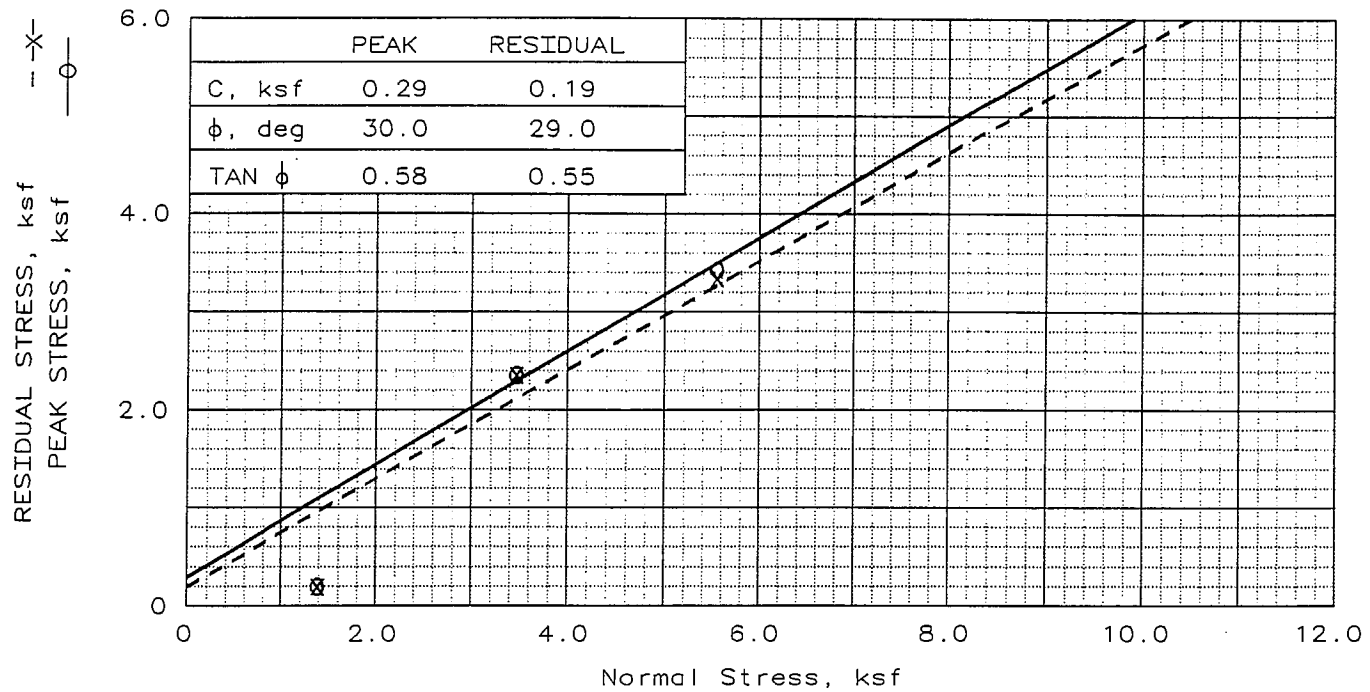
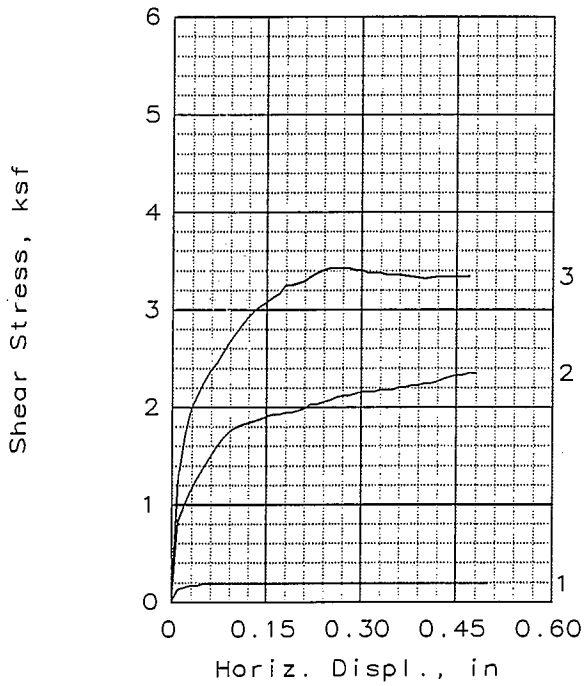
Fig. No.: C3.18





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	11.7	20.7	12.0
	DRY DENSITY, pcf	90.0	83.3	98.7
	SATURATION, %	36.2	54.6	45.8
	VOID RATIO	0.873	1.024	0.707
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	29.6	31.2	19.5
	DRY DENSITY, pcf	93.6	91.5	110.4
	SATURATION, %	99.8	99.8	99.9
	VOID RATIO	0.801	0.843	0.527
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.96	0.91	0.89
NORMAL STRESS, ksf		1.42	3.50	5.58
PEAK STRESS, ksf		0.19	2.35	3.42
DISPLACEMENT, in		0.10	0.47	0.25
RESIDUAL STRESS, ksf		0.19	2.35	3.34
DISPLACEMENT, in		0.50	0.48	0.47
Strain rate, in/min		0.0197	0.0197	0.0197

SAMPLE TYPE: undisturbed
DESCRIPTION: silty sand

SPECIFIC GRAVITY= 2.7
REMARKS: slopewash (sw)

CLIENT: Hasley Canyon Land Comapny, L.L.C.

PROJECT: T.T. 52584

SAMPLE LOCATION: T-156 @ 3.5 ft.

PROJ. NO.: 98-1617-4 DATE: 10/22/99

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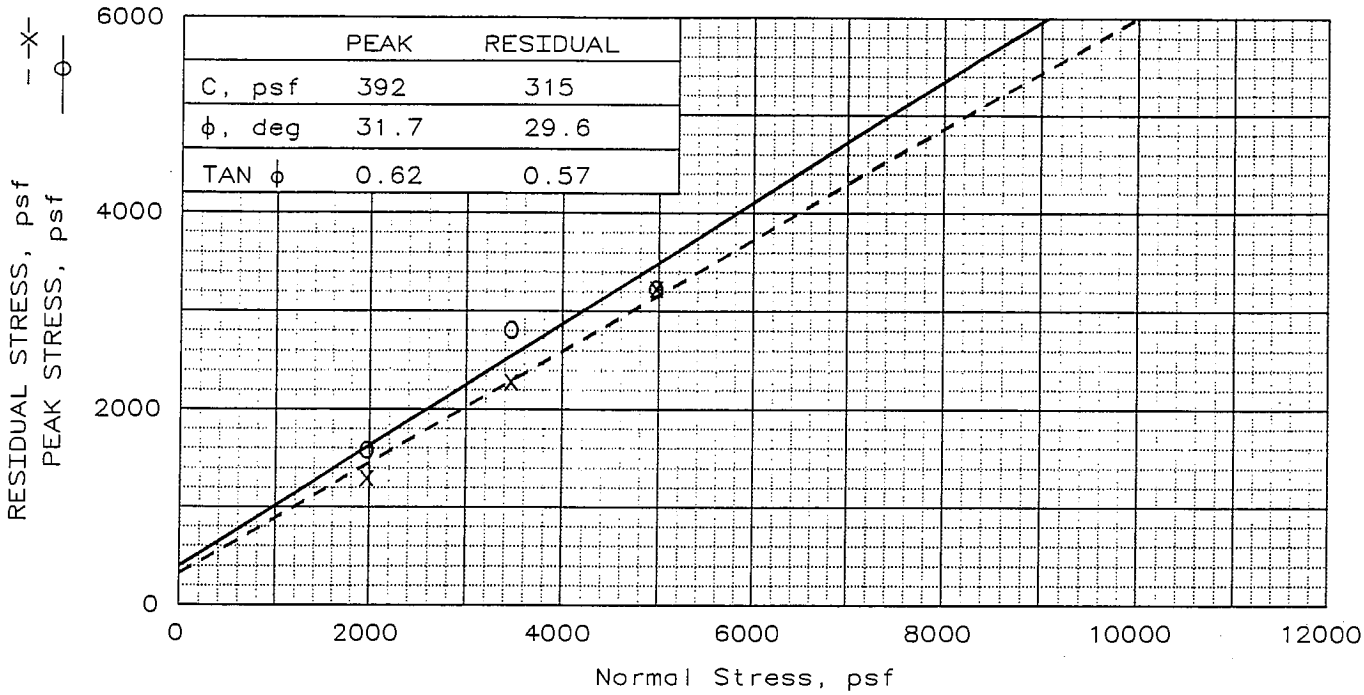
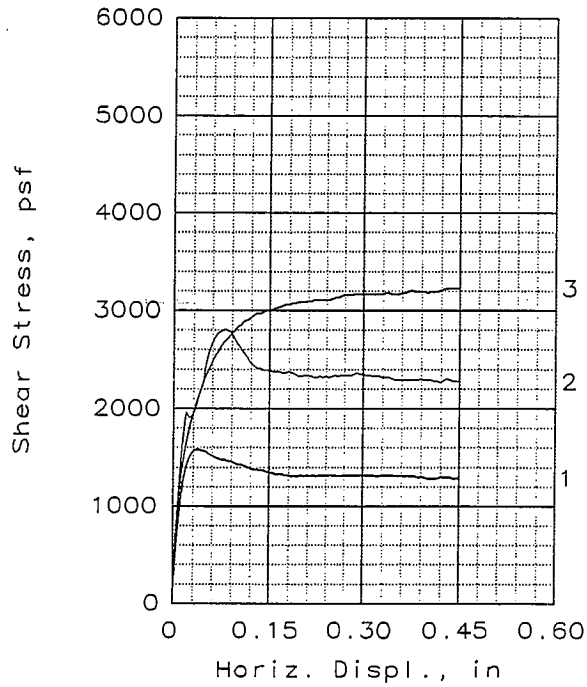
Fig. No.: C3.19





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	7.2	7.6	7.6
	DRY DENSITY, pcf	120.9	120.4	120.6
	SATURATION, %	51.5	53.7	54.0
	VOID RATIO	0.369	0.374	0.372
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	13.1	13.2	13.0
	DRY DENSITY, pcf	122.8	122.5	122.6
	SATURATION, %	99.9	99.6	98.6
	VOID RATIO	0.348	0.350	0.349
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.98	0.98	0.98
NORMAL STRESS, psf		2000	3500	5000
PEAK STRESS, psf		1584	2808	3228
DISPLACEMENT, in		0.04	0.08	0.43
RESIDUAL STRESS, psf		1296	2280	3228
DISPLACEMENT, in		0.45	0.45	0.45
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Remolded
DESCRIPTION: Silty Sand (SM)

SPECIFIC GRAVITY= 2.65
REMARKS: Remolded to 90% R/C
Compacted Fill (cef)
#200 = 30.2%

Fig. No.: C3.20

CLIENT: Hasley Canyon Land Company, L.L.C.

PROJECT: T.T. 52584

SAMPLE LOCATION: T-209 @ 9 ft.

PROJ. NO.: 99-1617-4 DATE: 10/22/99

DIRECT SHEAR TEST REPORT
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ENGINEERING GEOLOGY, INC.

Appendix D

SUMMARY OF LANDSLIDES

TABLE 1

LANDSLIDE NO.	PLATE NO.	MITIGATION
1	I	Landslide located mostly within proposed natural slope area west of Lots 27 through 31. A golf course fairway (hole #3) separates the residential lots from the natural slope and the landslide. The tentative design indicates an ascending slope from the fairway to the residential Lots (27 through 31). This landslide will be included within the **Restricted Use Area** for the proposed golf course. This landslide poses no hazard to the existing residential lots. Cross Section 17-17' illustrates the three-dimensional geometry of this slide.
2	I	Relatively small landslide complex located directly east of Landslide Qls-1 west of Lots 27 through 29. Most of this landslide complex is located within the golf course area (hole no. 3). The proposed Tentative Map indicates this **landslide** will be **entirely removed beneath the pad areas** and will pose no hazard to the existing residential lots. The remaining landslide will be included within the **Restricted Use Area** for the proposed golf course.
3	II	Landslide located within a fill canyon beneath proposed Lots 66 through 70. It is recommended that this landslide be **completely removed** from beneath the proposed lots under the continuous observation of the Project Engineering Geologist. In areas to receive fill, the landslide removal bottom should be surveyed in order to document the removal for future reference.

LANDSLIDE NO.	PLATE NO.	MITIGATION
4	I	Small landslide located beneath proposed Lot 18 and within the proposed golf course area (hole no. 7). The proposed grading concept will remove approximately half this landslide. It is recommended that the **remaining portion** of this **small landslide affecting the proposed lot be completely removed** under the observation of the Project Engineering Geologist. The remaining portion of this landslide will be located within the Restricted Use Area for the proposed golf course. In areas to receive fill, the landslide removal bottom should be surveyed in order to document the removal for future reference.
5	II	Landslide located beneath proposed Lots 218, 219 and 220. Cross Section 19-19' illustrates the three-dimensional geometry of this landslide. It is recommended that this **landslide** be **completely removed** under the observation of the Project Engineering Geologist. In areas to receive fill, the landslide removal bottom should be surveyed in order to document the removal for future reference.
6	II	Landslide located southwest of Lot 1. Based on geotechnical engineering analysis of Cross Section 7-7' Landslide Qls-6 calculates **stable** with a factor of safety greater than 1.5. See discussion in the Cut-Slope Summary (Table 2) for data on Proposed Cut-Slope CS-18.

LANDSLIDE NO.	PLATE NO.	MITIGATION
7	II	Landslide located beneath proposed Lots 51 thru 54. The proposed grading concept will remove approximately 85% of this landslide. It is recommended that the remaining portion of **this landslide be completely removed** under the observation of the Project Engineering Geologist. In areas to receive fill, the landslide removal bottom should be surveyed in order to document the removal for future reference.
8	II	Small probable landslide located east of Lots 75 and 76 within the proposed golf course area (hole no. 6). This probable landslide poses no hazard to the future residential lots and the golf course and is safe for the use intended. This landslide will be included within the **Restricted Use Area** for the proposed golf course.

SUMMARY OF CUT-SLOPES
Table 2

PROPOSED CUT-SLOPE CS-1

Location:	Plate II - West of golf hole #13
Direction Slope Faces:	Southeast
Slope Parameters:	90± ft. High; 3:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	Axis of syncline anticipated to be exposed within the proposed cut-slope face. TQs bedrock north of the axial trace is anticipated to be dipping 0 to 26° out-of-slope. South of the axial trace TQs bedrock is anticipated to be dipping into the proposed cut-slope face.
Mitigation Measures:	None - This cut-slope will be included within the **Restricted Use Area** for the Golf Course Area and is safe for the use intended.

PROPOSED CUT-SLOPE CS-2

Location:	Plate II - East of golf hole #14 and west of Lot 131
Direction Slope Faces:	West
Slope Parameters:	55± ft. high; 3:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock anticipated to be oriented neutral to the proposed cut-slope face; **grossly stable**
Mitigation Measures:	None

PROPOSED CUT-SLOPE CS-3

Location:	Plate II - East of golf hole #14 and west of Lots 122-126
Direction Slope Faces:	West
Slope Parameters:	65± ft. high; 2:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock anticipated to be oriented neutral to the proposed cut-slope face; **grossly stable**
Mitigation Measures:	None

PROPOSED CUT-SLOPE CS-4

Location:	Plate II - East of Lots 124-126 and west of Lots 113-115
Direction Slope Faces:	West
Slope Parameters:	29± ft. high; 2:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock anticipated to be oriented essentially neutral to proposed cut-slope face; **grossly stable**
Mitigation Measures:	None

PROPOSED CUT-SLOPE CS-5

Location:	Plate II - North of "D" Street in the vicinity of golf hole #17
Direction Slope Faces:	South to Southwest
Slope Parameters:	105± ft. high; 2.7:1 to 3:1 gradient
Geologic Cross Sections:	1-1' and 35-35'
Anticipated Geologic Conditions:	TQs bedrock dipping 18° on the southwest facing portion and 30° to the south on the south-facing portion.
Mitigation Measures:	Analysis of Cross Section 35-35' indicates that the southwest facing portion of CS-5 (which is steeper than 3:1) does not meet the minimum County requirements. Further analysis of Cross Section 35-35' indicates that at a 3:1 gradient CS-5 will be grossly stable with a factor of safety greater than 1.5 (See attached Stability Calculations). This cut-slope is currently labeled as a 3:1 and will be designed as a 3:1 when the final engineering design is completed.

PROPOSED CUT-SLOPE CS-6

Location:	Plate II - North of "D" Street in the vicinity of Lots 149 thru 151 and 178
Direction Slope Faces:	Southwest
Slope Parameters:	145± ft. high; 3:1 gradient
Geologic Cross Sections:	33-33'
Anticipated Geologic Conditions:	TQs bedrock dipping 21° which is steeper than the proposed 3:1 cut-slope; **grossly stable**
Mitigation Measures:	None

PROPOSED CUT-SLOPE CS-7

Location:	Plate II - Northwest of "E" Street in the vicinity of Lots 103 thru 105; merges with CS-6 to the west
Direction Slope Faces:	Southeast
Slope Parameters:	±165 ft. high; 2:1 gradient
Geologic Cross Sections:	32-32'
Anticipated Geologic Conditions:	TQs bedrock dipping an average of 30° towards the south which is steeper than the proposed cut-slope face; **grossly stable**
Mitigation Measures:	None

PROPOSED CUT-SLOPE CS-8

Location:	Plate II - North of Lot 107 and golf hole #2
Direction Slope Faces:	South to Southwest
Slope Parameters:	±155 ft. high; 3:1 gradient
Geologic Cross Sections:	3-3' and 36-36'
Anticipated Geologic Conditions:	TQs bedrock dipping an average of average 32° south which is steeper than the proposed cut-slope face; **grossly stable**
Mitigation Measures:	None

PROPOSED CUT-SLOPE CS-9

Location:	Plate II - Southeast of Lots 178-182
Direction Slope Faces:	Southeast
Slope Parameters:	30± ft. high; 2:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock dipping steeper than the proposed cut-slope slope face; **grossly stable**. The artificial fill mapped in this vicinity will be removed by the proposed grading.
Mitigation Measures:	None required

PROPOSED CUT-SLOPE CS-10

Location:	Plate II - Northwest of Lots 183-186, east of golf hole #1
Direction Slope Faces:	Northwest
Slope Parameters:	25± ft. high; 3:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock dipping neutral to into the proposed cut-slope face; **grossly stable**
Mitigation Measures:	None required

PROPOSED CUT-SLOPE CS-11

Location:	Plate II - North of "D" Street in vicinity of Lots 86-89
Direction Slope Faces:	Southwest
Slope Parameters:	80± ft. high; 2:1 gradient
Geologic Cross Sections:	30-30'
Anticipated Geologic Conditions:	TQs bedrock dipping 20° out-of-slope. Boring information from B-5 and B-9 indicate that only sandstone and conglomerate will be exposed in the slope face and down to 40± ft. below the proposed toe of slope; **grossly stable**.
Mitigation Measures:	None

PROPOSED CUT-SLOPE CS-12

Location:	Plate II - Southeast of Lots 168 and 169 adjacent to golf hole #1
Direction Slope Faces:	Southeast
Slope Parameters:	±65 ft. high; 3:1 gradient
Geologic Cross Sections:	41-41'
Anticipated Geologic Conditions:	TQs bedrock anticipated to be dipping 28° towards the south, which is steeper than the proposed cut-slope face; **grossly stable**
Mitigation Measures:	None

PROPOSED CUT-SLOPE CS-13

Location:	Plate II - South of Lots 163-165 and north of golf hole #9
Direction Slope Faces:	South and Southeast
Slope Parameters:	90± ft. high; 3:1 gradient
Geologic Cross Sections:	40-40'
Anticipated Geologic Conditions:	Axial trace of syncline traverses the southern portion of the proposed cut-slope. Geotechnical Engineering analysis indicates this slope is **grossly stable** with a factor of safety >1.5.
Mitigation Measures:	None.

PROPOSED CUT-SLOPE CS-14

Location:	Plate II - adjacent to golf hole #10
Direction Slope Faces:	South
Slope Parameters:	45± ft. high; 2:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock anticipated to be dipping steeper than the proposed cut-slope face; **grossly stable**
Mitigation Measures:	None

PROPOSED CUT-SLOPE CS-15

Location:	Plate II - between club house parking and golf hole #9
Direction Slope Faces:	East and Southeast
Slope Parameters:	35± ft. high; 3:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock dipping neutral to slope face but partially within zone of tectonic deformation - safe for use intended within golf course area.
Mitigation Measures:	None - This cut slope will be included within the **Restricted Use Area** for the Golf Course.

PROPOSED CUT-SLOPE CS-16

Location:	Plate II - East of golf hole #9 and west of Lots 195-201
Direction Slope Faces:	West to Southwest
Slope Parameters:	50± ft. high; 3:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock dipping neutral to slopeface but partially within zone of tectonic deformation. Fill over bedrock situation anticipated westerly of Lots 196, 197, 200 and 201 and a portion is within the zone of tectonic deformation.
Mitigation Measures:	We recommend that CS-16 be removed and replaced with a 20-ft. wide **Stability Fill** due to the fill over cut configuration and its proximity to the zone of tectonic deformation.

PROPOSED CUT-SLOPE CS-17

Location:	Plate II - Southwest of Lots 216-220
Direction Slope Faces:	Southwest
Slope Parameters:	40± ft. high; 2:1 gradient
Geologic Cross Sections:	19-19'
Anticipated Geologic Conditions:	The western portion of the proposed cut-slope is anticipated to expose TQs bedrock dipping into the proposed cut-slope face as well as a small sliver fill located south of Lot 217. The eastern portion of the slope is anticipated to expose landslide debris (Qls-5).
Mitigation Measures:	Due to the recommended complete removal of Qls-5 and the small sliver fill configuration, most of CS-17 will be replaced as a fill slope while the remaining westernmost portion will be replaced with a 20 ft. wide **Stability Fill**.

PROPOSED CUT-SLOPE CS-18

Location:	Plate II - adjacent to Hasley Canyon Road and golf hole #8
Direction Slope Faces:	Southwest
Slope Parameters:	70± ft. high overall; 3:1 gradient
Geologic Cross Sections:	7-7'
Anticipated Geologic Conditions:	TQs bedrock dipping 0 to 10° (near anticline axis) out-of-slope on the upper portion and landslide debris on the lower portion.
Mitigation Measures:	CS-18 was designed to stabilize Landslide Qls-6 utilizing a bench cut (as shown on the map). The portion of CS-18 above the bench cut was analyzed at a 2:1 gradient and found to be stable (safety factor >1.5) with a 30-ft. wide buttress. Subsequently, the **upper portion** has been laid back to a 3:1 gradient to maintain uniformity of the 3:1 slope which further enhances the stability but requires that a **50-ft. wide buttress** be constructed in order to remove Qls-6 landslide debris from the backcut (See Cross Section 7-7'). The portion of CS-18 **below** the **bench** requires a **20-ft. wide Stability Fill** to prevent surficial erosion of the landslide material.

PROPOSED CUT-SLOPE CS-19

Location:	Plate II - West of golf hole #8
Direction Slope Faces:	Northwest
Slope Parameters:	40± ft. high; 3:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock neutral to slope face but within zone of tectonic deformation and along the northern limb of anticline.
Mitigation Measures:	Recommend a 20-ft. wide **Stability Fill** to prevent potential surficial instability due to tectonic deformation.

PROPOSED CUT-SLOPE CS-20

Location:	Plate II - Between Hasley Cyn. Road and golf hole #8
Direction Slope Faces:	Southwest
Slope Parameters:	75± ft. high; 3:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock generally dipping steeper than the slope face but locally deformed due to the presence of an anticline.
Mitigation Measures:	Recommend a 20-ft. wide **Stability Fill** to prevent potential surficial instability

PROPOSED CUT-SLOPE CS-21

Location:	Plate II - Between golf hole #8 and Lots 1-3
Direction Slope Faces:	Southwest
Slope Parameters:	33± ft. high; 3:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock generally dipping into slope but locally deformed with zone of tectonic deformation.
Mitigation Measures:	Recommend a 20-ft. wide **Stability Fill** to prevent potential surficial instability due to tectonically deformed bedrock.

PROPOSED CUT-SLOPE CS-22

Location:	Plate II and III - West of golf hole #7 and south of Lots 8-9
Direction Slope Faces:	Southwest
Slope Parameters:	50± ft. high; 3:1 gradient or less
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock generally dipping into slope but locally deformed within zone of tectonic deformation.
Mitigation Measures:	Recommend a 20-ft. wide **Stability Fill** to prevent potential surficial instability due to tectonically deformed bedrock.

PROPOSED CUT-SLOPE CS-23

Location:	Plate II - West of golf hole #6
Direction Slope Faces:	West
Slope Parameters:	40± ft. high; 3:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock dipping 24-37° towards the northwest; **grossly stable**
Mitigation Measures:	None

PROPOSED CUT-SLOPE CS-24

Location:	Plate II - North of golf hole #6 and south of Lots 56-59
Direction Slope Faces:	South
Slope Parameters:	85± ft. high; 3:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock dipping 32-37° into the proposed cut-slope face; **grossly stable**.
Mitigation Measures:	None

PROPOSED CUT-SLOPE CS-25

Location:	Plate I - North of golf hole #2
Direction Slope Faces:	Southwest
Slope Parameters:	160± ft. high; 2:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock anticipated to be dipping 17° out of the proposed slope face.
Mitigation Measures:	None - safe for use intended and will be included within the **Restricted Use Area** for the Golf Course.

PROPOSED CUT-SLOPE CS-26

Location:	Plate I - West of Lots 25-27
Direction Slope Faces:	Southeast
Slope Parameters:	160± ft. high; 2:1 (upper portion) to 3:1 gradient (lower portion)
Geologic Cross Sections:	44-44’
Anticipated Geologic Conditions:	TQs bedrock component dipping 22° out of slope
Mitigation Measures:	None; safe for use intended and will be included within the **Restricted Use Area** for the golf course. Any debris derived from erosion on this slope will be accommodated by the proposed debris berm and directed to the golf course area away from the proposed building lots.

PROPOSED CUT-SLOPE CS-27

Location:	Plate I - North of Lots 25-28
Direction Slope Faces:	South
Slope Parameters:	100± ft. high; 3:1 gradient
Geologic Cross Sections:	38-38’
Anticipated Geologic Conditions:	TQs bedrock dipping 30° to the south, which is steeper than the proposed south-facing slope; **grossly stable.**
Mitigation Measures:	None

PROPOSED CUT-SLOPE CS-28

Location:	Plate I - Northeast corner of Tract
Direction Slope Faces:	South
Slope Parameters:	135± ft. high; 3:1 gradient
Geologic Cross Sections:	9-9’
Anticipated Geologic Conditions:	TQs bedrock dipping 30° to the south, which is steeper than the proposed south-facing slope; **grossly stable**.
Mitigation Measures:	None

PROPOSED CUT-SLOPE CS-29

Location:	Plate I - West of golf hole #3
Direction Slope Faces:	East
Slope Parameters:	60± ft. high; 3:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	Proposed Cut-Slope CS-29 is anticipated to expose roughly horizontally bedded Quaternary Terrace deposits.
Mitigation Measures:	None - this slope will be safe for the use intended and will be included within the **Restricted Use Area** for the proposed golf course

PROPOSED CUT-SLOPE CS-30

Location:	Plate - West of golf hole #3 and east of Lot 97
Direction Slope Faces:	Southeast
Slope Parameters:	95± ft. high; 3:1 gradient
Geologic Cross Sections:	31-31’
Anticipated Geologic Conditions:	Synclinal axial trace traverses the northern portion of the proposed cut-slope. North of the axial trace bedding is anticipated to be dipping 25 to 27° towards the south. South of the axial trace bedding is anticipated to be dipping 0 to 34° towards the north. Slope stability calculations indicate that this slope will be **grossly stable** with a factor of safety greater than 1.5
Mitigation Measures:	None

PROPOSED CUT-SLOPE CS-31

Location:	Plate I - East of golf hole #3 and west of Lots 34-42
Direction Slope Faces:	West
Slope Parameters:	45± ft. high; 2:1 gradient
Geologic Cross Sections:	42-42' and 43-43'
Anticipated Geologic Conditions:	TQs bedrock anticipated to be dipping out-of-slope at angles ranging from 16 to 21° (apparent). Slope stability calculations indicate a factor of safety greater than 1.5. It is anticipated that a fill over bedrock configuration will be exposed along portions of the proposed cut slope.
Mitigation Measures:	Recommended 20 ft. wide **Stability Fill** for areas exposing fill over bedrock.

PROPOSED CUT-SLOPE CS-32

Location:	Plate I - East of Lots 34-36
Direction Slope Faces:	West
Slope Parameters:	30± ft. high; 3:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock anticipated to be dipping steeper than the proposed cut-slope face; **grossly stable**.
Mitigation Measures:	None

PROPOSED CUT-SLOPE CS-33

Location:	Plate I - South of Lots 19-24
Direction Slope Faces:	South
Slope Parameters:	35± ft. high; 3:1gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock anticipated to be dipping into the proposed cut-slope face; **grossly stable**
Mitigation Measures:	None

PROPOSED CUT-SLOPE CS-34

Location:	Plate I - East of golf hole #7
Direction Slope Faces:	West
Slope Parameters:	40± ft. high; 3:1gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock anticipated to be dipping 14 to 28° towards the north, neutral to the slope face; **grossly stable**
Mitigation Measures:	None. This cut-slope will be included within the **Restricted Use Area** for the proposed golf course area

PROPOSED CUT-SLOPE CS-35

Location:	Plate I - South of Lots 62 and 63, west of Lots 16-18
Direction Slope Faces:	West and Southwesterly
Slope Parameters:	64± ft. high; 3:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock oriented neutral to dipping into the proposed cut-slope face; **grossly stable**.
Mitigation Measures:	None

PROPOSED CUT-SLOPE CS-36

Location:	Plate J - North of Lots 96 and 97
Direction Slope Faces:	Southeast
Slope Parameters:	90 ft. high; 3:1 gradient
Geologic Cross Sections:	27-27' and 31-31'
Anticipated Geologic Conditions:	TQs bedrock anticipated to be dipping steeper than the proposed cut-slope face; **grossly stable**
Mitigation Measures:	None; This cut-slope was designed to improve the stability of the natural slope above Lots 96 and 97 to a factor of safety greater than 1.5. Analysis was performed on a slope with a bench cut at elev. 1600 combined with a 2.5:1 ascending slope gradient (see attached Slope Stability Calculations). CS-36 is shown with bench cut elevation of 1600 combined with a 3:1 ascending slope, which further improves slope stability of the natural slope.

Appendix E

SLOPE STABILITY ANALYSES

Introduction

Table E1 summarizes the results of state-of-the-art computerized static and pseudostatic (i.e. with a statically-simulated seismic load) stability analyses performed on several cross sections of the currently proposed development of the vesting Tentative Tract 52584. Table E2 includes the results of surficial (Infinite Slope) analyses. Based upon the results from the analyses, the need for tentative stabilization measures or slope modification were explored and dimensional design of these measures was performed, as needed, by a step-by-step fashion utilizing slope stability analyses.

Stabilization Fills have been recommended to prevent erosion of cuts exposing landslide debris, tectonically deformed bedrock, daylighted bedding and fill over cut conditions.

Analysis Approach

The stability of the proposed cut, fill slopes and natural slopes was evaluated. Cross sections representing the critical three-dimensional geometry of the subsurface conditions were selected for stability analyses, based upon critical conditions for stability (i.e. potential adverse bedding and slope height and slope inclination). Temporary cut conditions during construction were also analyzed for buttress or stabilization fill backcut slopes, where applicable. Surficial stability for fill, natural and cut (in TQs) slopes, landslide materials and terrace deposits were analyzed using the "Infinite Slope" method using lower-bound cohesion values of these materials, as applicable.

Geometry and Groundwater

The analyzed geometries of cut slopes included removal of existing landslides and slopewash material and replacement with certified compacted fill to currently proposed grades, as needed. Analyses also included natural slopes and cuts in bedrock with cross bedding and potential adverse bedding. Geometries were modified as analyses progressed since some of the proposed grades did not comply with County standards for minimum factors of safety.

Review of groundwater data in the vicinity of the site and exploratory trench and boring log data indicate that ground water is not present in the elevated portion of the site. Therefore, ground water was not modeled in the slope stability analyses except in Cross Section 7-7' as

requested in the Los Angeles County Review Sheet dated September 16, 1999. Backdrains are proposed for all **Stability Fill And Buttress Fill** slopes.

Shear Strength Parameters

A significant number of shear strength tests were performed for this project including new tests for this report. The shear strength values obtained are summarized in **Table C1**. A summary of values used in our analyses is presented within the main text.

In our analyses, residual shear strengths were used for static analysis while peak strengths were used for pseudostatic analysis.

Sections Analyzed

We have performed analysis on several cross sections considered the most critical. The cross sections and the subject of each analysis are presented in **Table E1**. Surficial stability analyses are presented in **Table E2**.

Methods of Analysis

The computer program PCSTABL5M, originally written by Purdue University 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 and Spencer'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, PCSTABLSM 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. Bishop's Modified Method was used for circular slip surfaces.

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.

As indicated previously, the "Infinite Slope" method was used for surficial stability of natural and cut-slopes in TQs, fill slopes, landslide materials, and terrace deposits.

Results of Stability Analyses

Analyzed cut-slopes and grades, natural slopes, compacted fill slopes, temporary backcut slopes and surficial stability comply with Los Angeles County requirements for stability under static and pseudostatic loading conditions, as applicable, with some mitigating modifications. The results of the stability analyses are summarized in **Table E1**.

A complete package of computer output cross sections corresponding to the stability analyses performed are included in **this Appendix**. The critical failure surfaces and their corresponding factors of safety are plotted on the respective cross sections. Output files of only the runs with final mitigation are provided in **this Appendix**.

The following attachments complete this Appendix.

Slope Stability Analysis Results	Table E1
Analysis of Infinite Slope with Parallel Seepage	Table E2
Computer Output Sheets	

TT 52584 - Hasley Canyon
Slope Stability Analyses Results[1] (Revised)

Cut-Slope No.	File Name	Cross Section (Revised)	Analyzed Plane	Method	Factor of Safety		Comments	Run No.
					Static	Pseudostatic[2] (Coeff=0.15)		
N/A	HASL7B.IN	7-7′	Full Slide Plane	Janbu's	3.51	~	Cut in landslide debris	1
CS-18	HASL7A.IN	7-7′	Partial Slide Plane	Janbu's	1.19	~	Cut in landslide debris - search for downslope failure surface break	2
CS-18	HASL7BTB.IN	7-7′	Buttress Backcut Toe Bedding Plane	Janbu's	2.01		Temporary stability -Cut in landslide debris with bench @ EL 1235 & 2:1 upper stabilization fill backcut	3
CS-18	HASL7BTC.IN	7-7′	Slide Plane (Upper Area)	Janbu's	1.52	--	Temporary stability -Cut in landslide debris with bench @ EL 1235 & 2:1 upper stabilization fill backcut	4
CS-18	HASL7BTD.IN	7-7′	Slide Plane (Full Search)	Janbu's	2.18	--	Temporary stability -Cut in landslide debris with bench @ EL 1235 & 2:1 upper stabilization fill backcut	5
CS-18	HASL7BA.IN	7-7′	Bedding Plane at Toe of Buttress Backcut	Janbu's	2.00		Cut in landslide debris with bench @ EL 1235 & 2:1 upper stability fill	6
CS-18	HASL7BB.IN	7-7′	Slide Plane (Full Search)	Janbu's	1.74	--	Cut in landslide debris with bench @ EL 1235 & 2:1 upper stability fill	7
CS-18	HASL7BC.IN	7-7′	Slide Plane (Upper Area)	Janbu's	1.68	2.32	**Cut in landslide debris with bench @ EL 1235 & 2:1 upper stability fill[3]**	8 & 9
N/A	HAS27BR2.IN	27-27′[4]	Contact #3 from top	Janbu's	2.34	1.95	**Analysis of proposed natural slope**	10 & 11
N/A	HAS27AR2.IN	27-27′[4]	Contact #1 from top	Janbu's	2.68	~	Analysis of proposed natural slope	12
CS-30	HAS31CB.IN	31-31′	First Bedding Plane from Top	Janbu's	3.31	~	Proposed lowered existing grade at toe of natural slope - Full search	13

[1] The above results for static conditions are based upon residual, site-specific shear strength test results presented in the Table of "Summary of Shear Strength Test Data".
[2] Based on peak shear strength values for short-term simulated earthquake loading. For peak values, see Table of "Summary of Shear Strength Test Data".
[3] Final recommended mitigation for tentative tract.
[4] Analyzed without cutting top of hill. Safety factors will be higher with the top cut.

CS-30	HAS31CA.IN	31-31′	First Bedding Plane from Top	Janbu's	3.55	~	Proposed lowered existing grade at toe of natural slope - Lower half of bedding plane	14
CS-30/ natural	HAS31C.IN	31-31′	First Bedding Plane from Top	Janbu's	8.53	~	Proposed lowered existing grade at toe of natural slope - Upper half of bedding plane	15
CS-30	SEC31 (2A).IN	31-31′	Plane 2A-Third Bedding Plane from Top	Janbu's	1.32	~	Proposed lowered existing grade at toe of natural slope and a 75-ft. wide buttress at toe of natural slope	16
CS-30	SEC 31 (3).IN	31-31′	Plane 3-Fourth Bedding Plane from Top	Janbu's	1.80	~	Proposed lowered existing grade at toe of natural slope and a 75-ft. wide buttress at toe of natural slope	17
CS-30	SEC31(1).IN	31-31′	First Bedding Plane from Top	Janbu's	3.35	~	Proposed lowered existing grade at toe of natural slope and a 75-ft. wide buttress at toe of natural slope	18
N/A	SC31(2).IN	31-31′	Second Bedding Plane from Top	Janbu's	1.97	2.08	**Lowered existing grade at toe of natural slope, and cut of the natural slope with bench @ Elev. 1600 and 2.5:1 cut above[3]**	19 & 20
N/A	SC31(2A).IN	31-31′	Plane 2A-Third Bedding Plane from Top	Janbu's	2.36	~	Lowered existing grade at toe of natural slope, and cut of the natural slope with bench @ Elev. 1600 and 2.5:1 cut above	21
CS-36	SC31(3).IN	31-31′	Plane3-Fourth Bedding Plane From Top	Janbu's	3.07	~	Lowered existing grade at toe of natural slope, and cut of the natural slope with bench @ Elev. 1600 and 2.5:1 cut above	22
CS-7	HC32S5.IN/P5	32-32′	Search	Janbu's	1.69	1.79	**2:1 Cut with bench[3]**	23 & 24
N/A	HC34S1.IN/P1	34-34′	Search (circular)	Bishop's Modified	1.78	1.62	**Highest natural slope steeper than 2:1**	25 & 26
CS-5	HC35S2.IN/P2	35-35′	Search	Janbu's	1.49	1.55	2.7:1 Cut Slope	27 & 28
CS-5	HS35S2.IN/P2	35-35′	Search	Janbu's	1.69	1.83	**3:1 Cut Slope[3]**	29 & 30
CS-13	HC40S1.IN/P1	40-40′	Search	Janbu's	1.67	1.63	**3:1 cut slope[3]**	31 & 32

CS-31	HC43S1.IN/P1	43-43′	Search	Janbu's	1.89	1.76	**2:1 cut slope with daylighted bedding component**	33 & 34
N/A	HC45S1.IN/P1	45-45′	Search (circle)	Bishop's Modified	1.91	1.97	**Steepest natural slope**	35 & 36
N/A	--	--	4′ Deep from Surface	Infinite Slope	1.50	--	Minimum factor of safety from 5 analyses including compacted fill, steepest exposed TQs slope, landslide material, and terrace deposits	

TABLE E2

ANALYSIS OF INFINITE SLOPE WITH PARALLEL SEEPAGE

By: EC Date: 10/22/1999**(revised)**

Project: TT 52584 - Hasley Canyon Project No.: 99-1617-4

Required vertical depth of saturation (LA County) = h = 4 feet

$$FS = [c' + (Gamma_t - Gamma_{H2O})*h*Cos^2Alpha*TanPhi']/(Gamma_t*h*CosAlpha*SinAlpha)$$

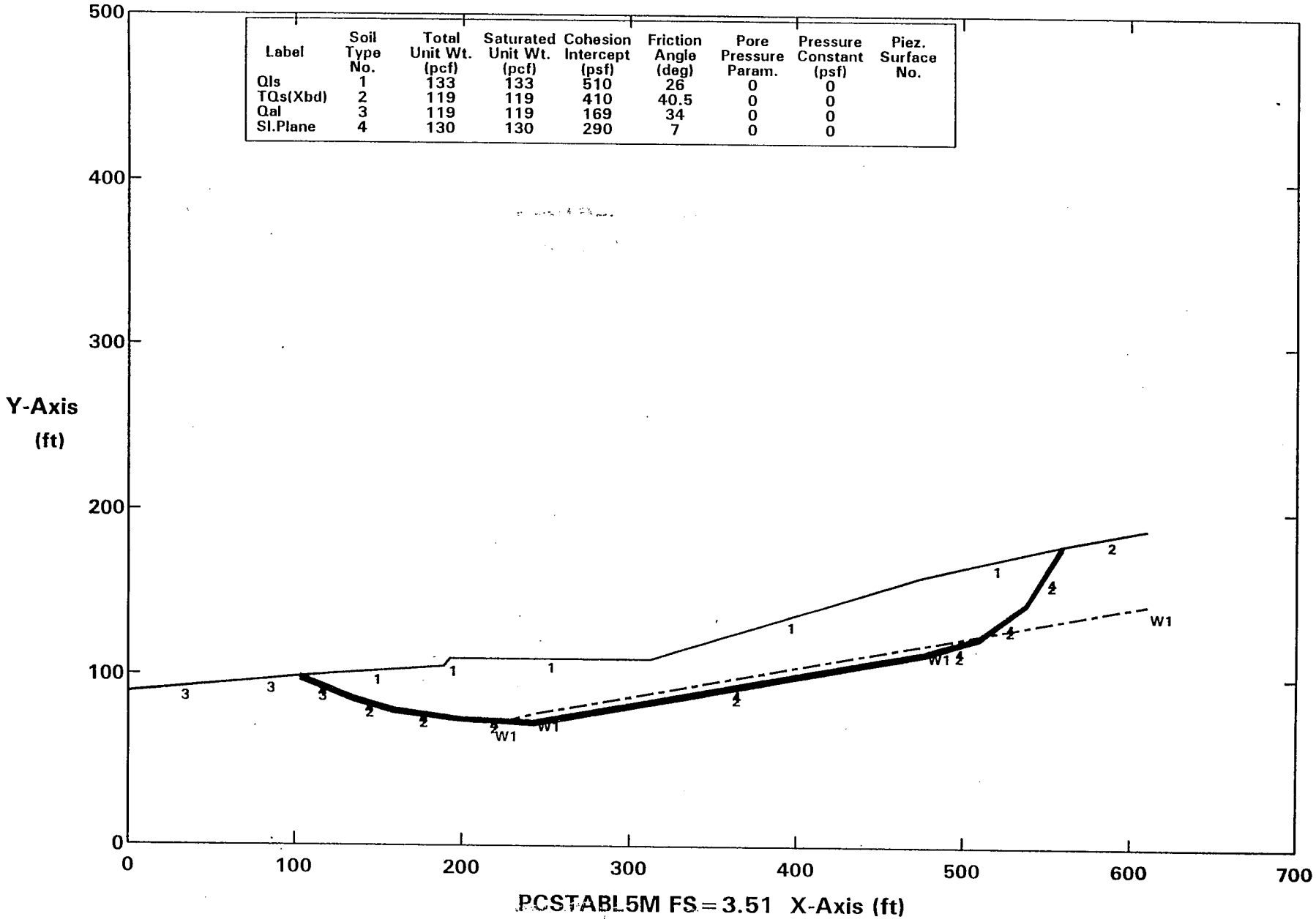
c' (psf)	Phi' (deg)	$Gamma_{t\ (pcf)}$	$Gamma_{H2O\ (pcf)}$	h (ft)	Alpha (deg)	Safety Factor	Comments
130	40	123	62.4	4	26.6	**1.5**	**Lowest cohesion value for fill(1)**
300	29	125	62.4	4	26.6	**2.1**	per additional strength data for fill
410	40.5	119	62.4	4	30.5	**2.7**	**Lower-bound cohesion for TQs**
							steepest exposed slope
400	36	120	62.4	4	26.6	**2.8**	**Landslide mat'l (lower cohesion)**
200	41	120	62.4	4	26.6	**1.9**	**Terrace deposits**

(1): Strength parameters correspond to lower-bound residual values from site-specific tests on specimens remolded to 90% Relative Compaction.

TT52584-Hasley Cyn-Sec.7-7'-3:1 Cut in Qls-Full Slide Plane Analysis-Static

Specified Surface. C:HASL7B.PLT By: AC 10/11/99 4:50pm

Label	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.
Qls	1	133	133	510	26	0	0	
TQs(Xbd)	2	119	119	410	40.5	0	0	
Qal	3	119	119	169	34	0	0	
Sl.Plane	4	130	130	290	7	0	0	



PCSTABL5M FS=3.51 X-Axis (ft)

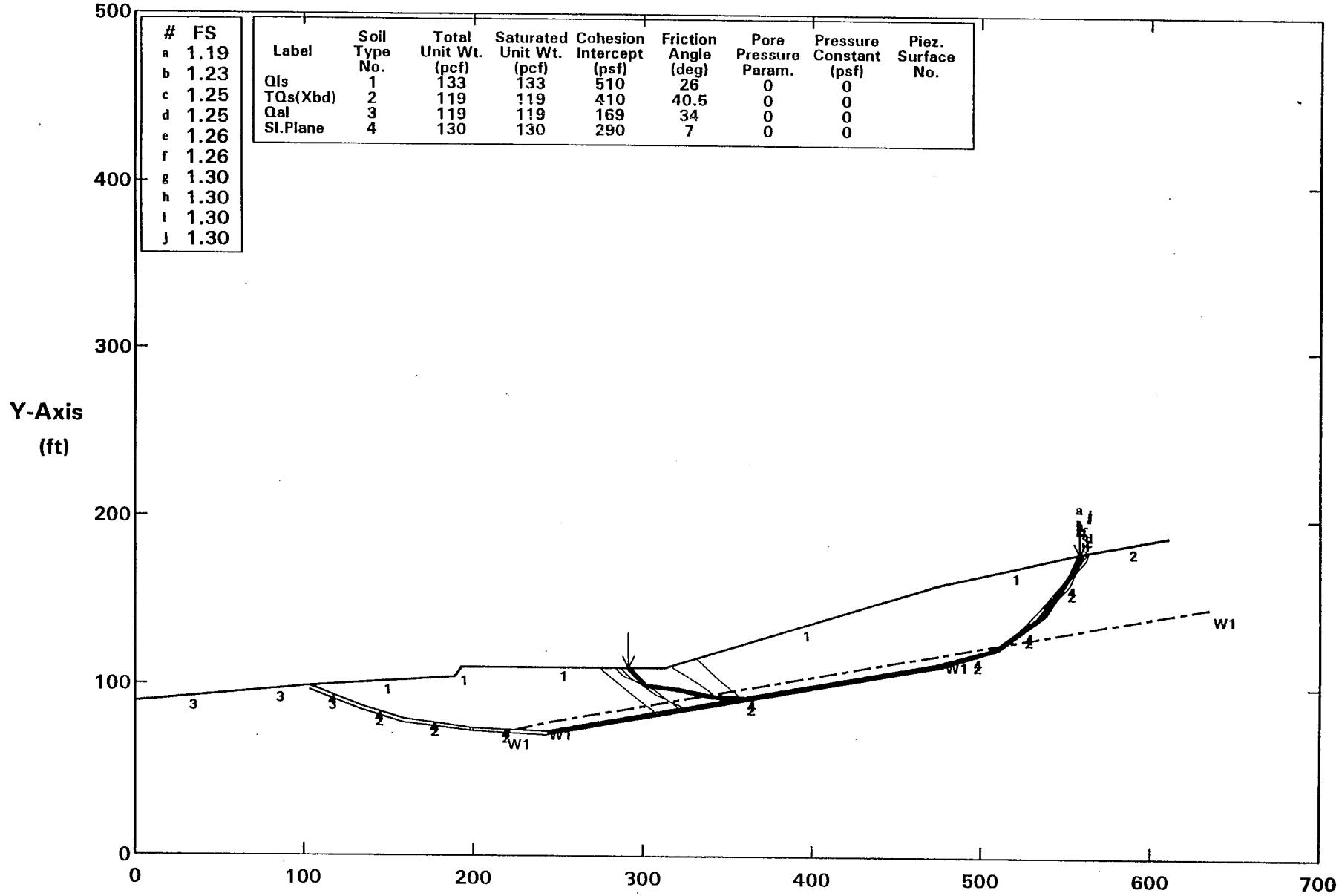
Run No. 1

TT52584-Hasley Cyn-Sec.7-7'-3:1 Cut in Qls-Slide Plane Analysis-Search-Static

Ten Most Critical. C:HASL7A.PLT By: AC 10/11/99 4:55pm

#	FS
a	1.19
b	1.23
c	1.25
d	1.25
e	1.26
f	1.26
g	1.30
h	1.30
i	1.30
j	1.30

Label	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.
Qls	1	133	133	510	26	0	0	
TQs(Xbd)	2	119	119	410	40.5	0	0	
Qal	3	119	119	169	34	0	0	
Sl.Plane	4	130	130	290	7	0	0	



PCSTABL5M FSmin = 1.19 X-Axis (ft)

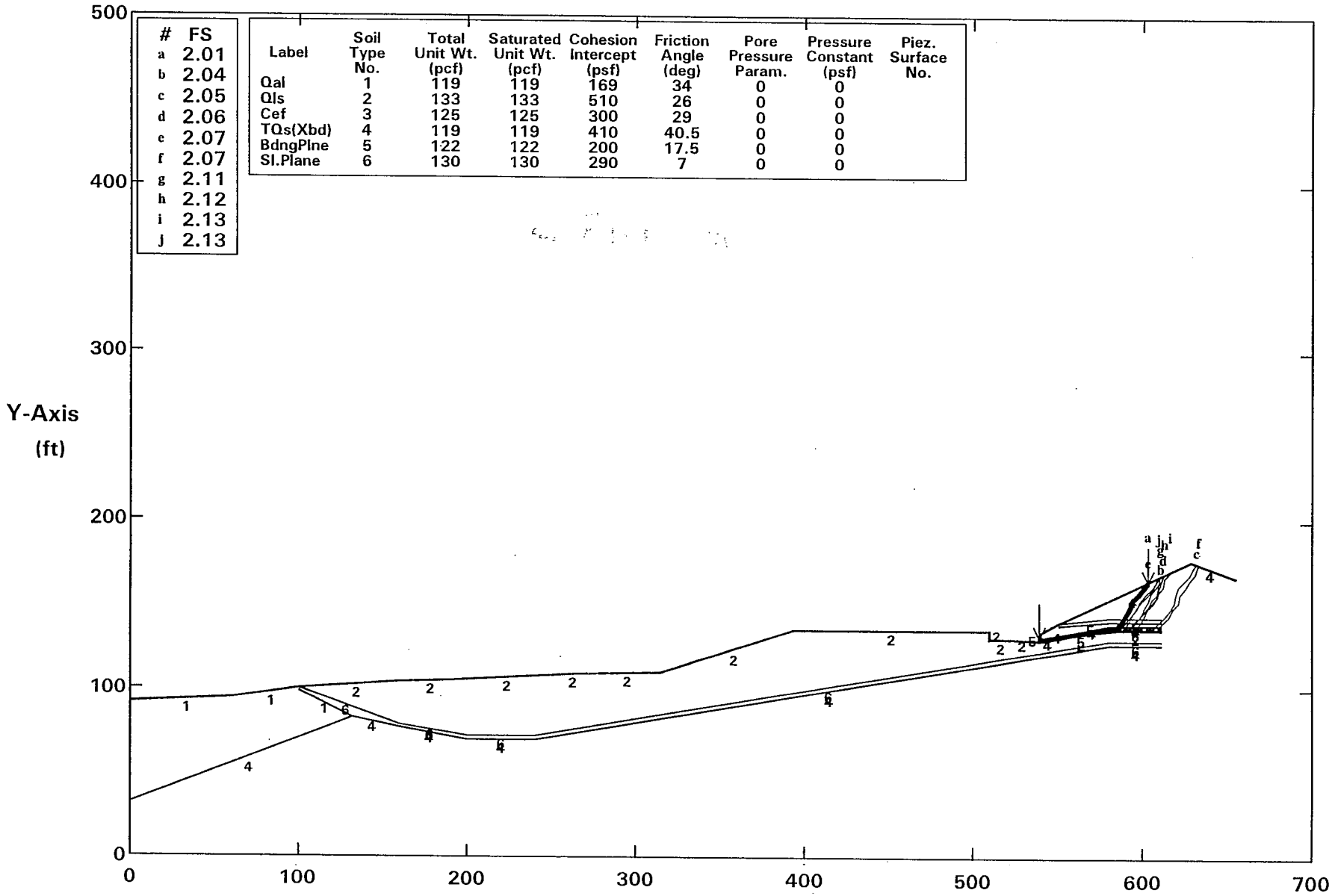
Factors Of Safety Calculated By The Modified Janbu Method

Run No. 2

TT52584-Hasley Cyn-Sec.7-7'-Upper(EL1235)Stab.Fill backcut TEMP.STABILITY-Static
Ten Most Critical. C:HASL7BTB.PLT By: EC 10/07/99 3:18pm

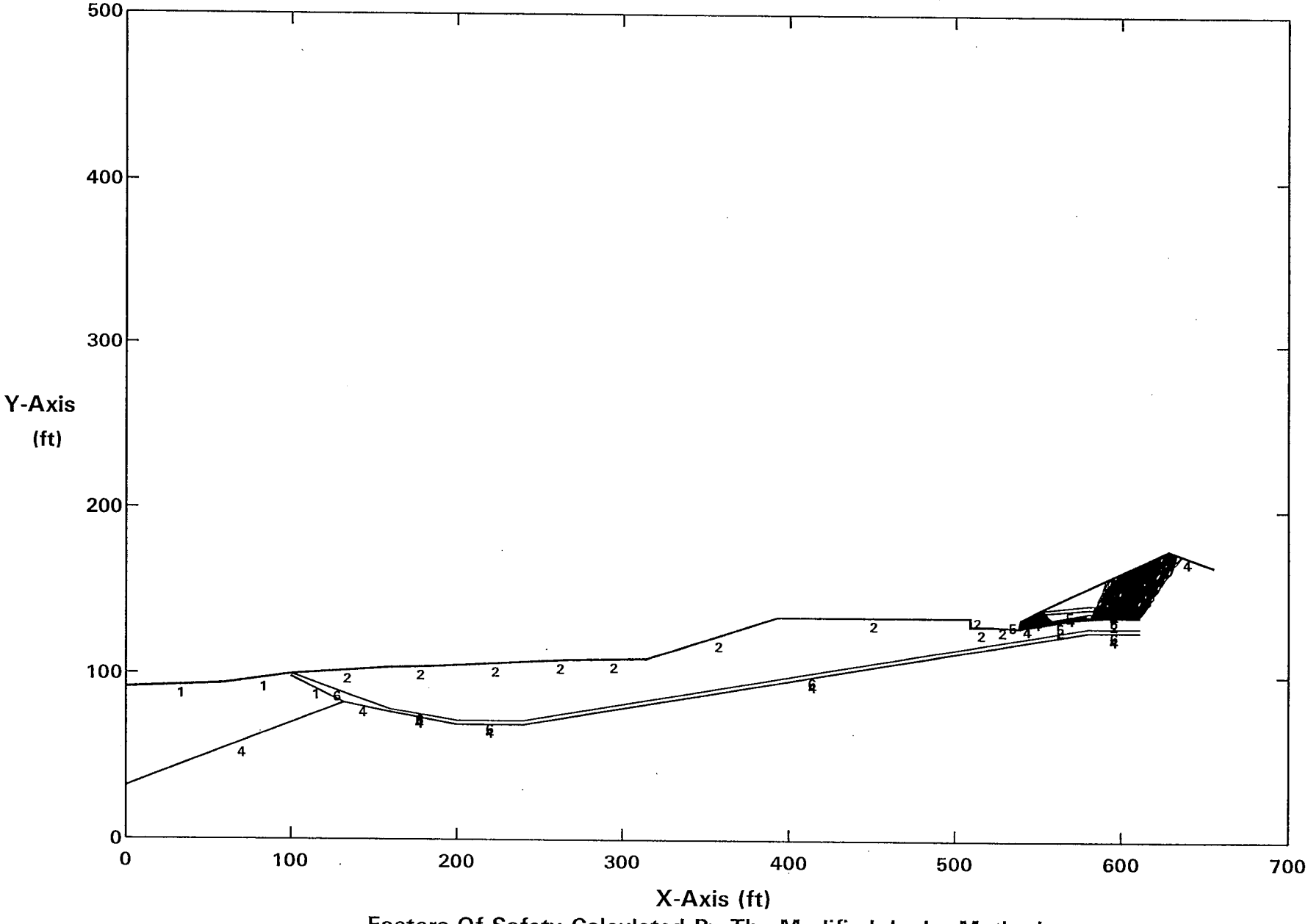
#	FS
a	2.01
b	2.04
c	2.05
d	2.06
e	2.07
f	2.07
g	2.11
h	2.12
i	2.13
j	2.13

Label	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.
Qal	1	119	119	169	34	0	0	
Qls	2	133	133	510	26	0	0	
Cef	3	125	125	300	29	0	0	
TQs(Xbd)	4	119	119	410	40.5	0	0	
BdngPlne	5	122	122	200	17.5	0	0	
Sl.Plane	6	130	130	290	7	0	0	



PCSTABL5M FSmin = 2.01 X-Axis (ft)
Factors Of Safety Calculated By The Modified Janbu Method

TT52584-Hasley Cyn-Sec.7-7'-Upper(EL1235)Stab.Fill backcut TEMP.STABILITY-Static
All surfaces evaluated. C:HASL7BTB.PLT By: EC 10/07/99 3:18pm

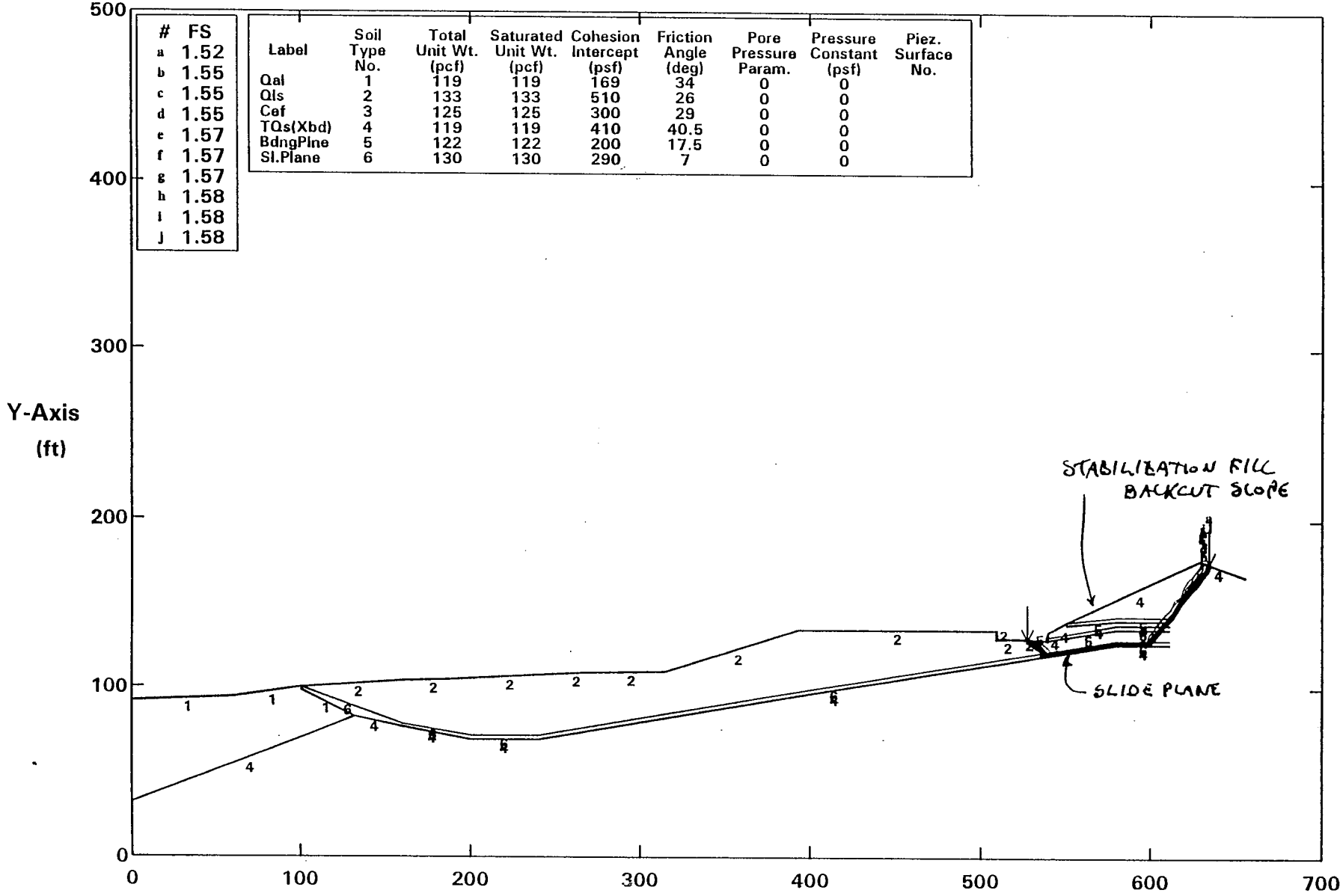


Factors Of Safety Calculated By The Modified Janbu Method

TT52584-Hasley Cyn-Sec.7-7'-Upper(EL1235)Stab.Fill backcut TEMP.STABILITY-Static
Ten Most Critical. C:HASL7BTC.PLT By: EC 10/07/99 1:29pm

#	FS
a	1.52
b	1.55
c	1.55
d	1.55
e	1.57
f	1.57
g	1.57
h	1.58
i	1.58
j	1.58

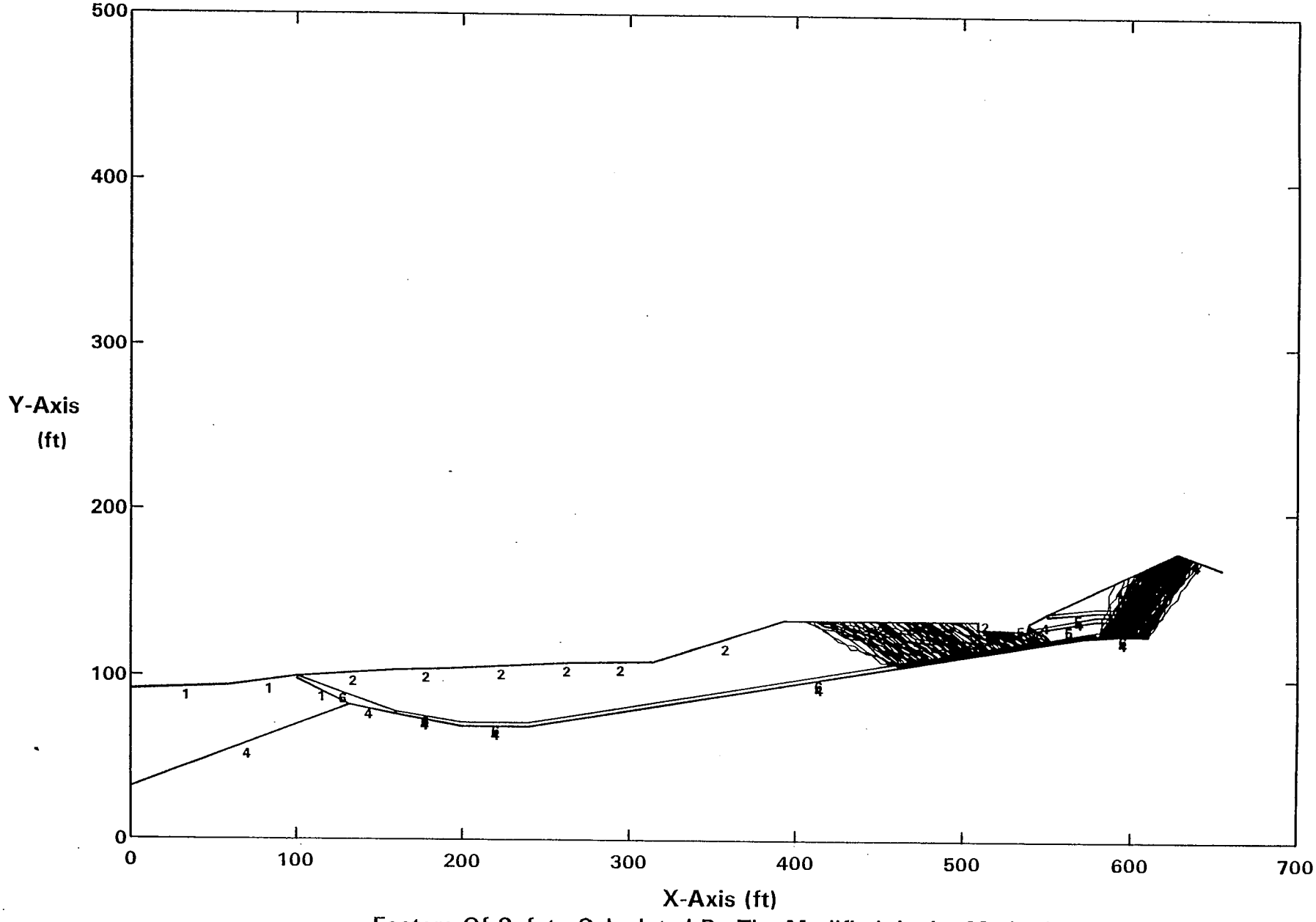
Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Qal	1	119	119	169	34	0	0	
Qls	2	133	133	510	26	0	0	
Cef	3	125	125	300	29	0	0	
TQs(Xbd)	4	119	119	410	40.5	0	0	
BdngPlne	5	122	122	200	17.5	0	0	
Sl.Plane	6	130	130	290	7	0	0	



PCSTABL5M FSmin = 1.52 X-Axis (ft)
Factors Of Safety Calculated By The Modified Janbu Method

Run No. 4

TT52584-Hasley Cyn-Sec.7-7'-Upper(EL1235)Stab.Fill backcut TEMP.STABILITY-Static
All surfaces evaluated. C:HASL7BTC.PLT By: EC 10/07/99 11:52am



Factors Of Safety Calculated By The Modified Janbu Method

** PCSTABL5M **

by
Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date:	10/07/99
Time of Run:	1:29pm
Run By:	EC
Input Data Filename:	C:HASL7BTC.IN
Output Filename:	C:HASL7BTC.OUT
Plotted Output Filename:	C:HASL7BTC.PLT

PROBLEM DESCRIPTION TT52584-Hasley Cyn-Sec.7-7'-Upper(EL1235)Stab.Fill backcut TEMP.STABILITY-Static

BOUNDARY COORDINATES

17 Top Boundaries
37 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	92.00	60.00	94.00	1
2	60.00	94.00	100.00	100.00	1
3	100.00	100.00	160.00	104.00	2
4	160.00	104.00	188.00	105.00	2
5	188.00	105.00	250.00	108.00	2
6	250.00	108.00	267.00	109.00	2
7	267.00	109.00	314.00	110.00	2
8	314.00	110.00	393.00	135.00	2
9	393.00	135.00	509.00	135.00	2
10	509.00	135.00	509.10	130.00	2
11	509.10	130.00	522.00	130.00	2
12	522.00	130.00	539.00	129.00	2
13	539.00	129.00	539.10	131.00	5
14	539.10	131.00	539.20	134.00	4
15	539.20	134.00	550.00	140.00	4
16	550.00	140.00	628.00	177.00	4
17	628.00	177.00	655.00	167.00	4
18	550.00	140.00	580.00	143.00	5
19	580.00	143.00	611.00	143.00	5
20	550.00	138.00	580.00	141.00	4
21	580.00	141.00	611.00	141.00	4
22	539.00	131.00	580.00	138.00	5

23	580.00	138.00	611.00	138.00	5
24	539.00	129.00	580.00	136.00	2
25	580.00	136.00	611.00	136.00	2
26	100.00	100.00	160.00	79.00	6
27	160.00	79.00	200.00	72.00	6
28	200.00	72.00	240.00	72.00	6
29	240.00	72.00	580.00	129.00	6
30	580.00	129.00	611.00	129.00	6
31	100.00	98.00	132.00	83.00	1
32	132.00	83.00	160.00	77.00	4
33	160.00	77.00	200.00	70.00	4
34	200.00	70.00	240.00	70.00	4
35	240.00	70.00	580.00	127.00	4
36	580.00	127.00	611.00	127.00	4
37	.00	32.00	132.00	83.00	4

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	119.0	119.0	169.0	34.0	.00	.0	0
2	133.0	133.0	510.0	26.0	.00	.0	0
3	125.0	125.0	300.0	29.0	.00	.0	0
4	119.0	119.0	410.0	40.5	.00	.0	0
5	122.0	122.0	200.0	17.5	.00	.0	0
6	130.0	130.0	290.0	7.0	.00	.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.

300 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 5.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	535.00	120.50	545.00	122.10	.00

2	580.00	128.00	580.00	128.00	.00
3	590.00	128.00	600.00	128.00	.00

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	520.12	130.00
2	524.76	128.88
3	529.27	126.72
4	533.64	124.28
5	537.29	120.87
6	580.00	128.00
7	596.69	128.00
8	596.72	133.00
9	596.86	138.00
10	597.31	142.98
11	600.44	146.88
12	600.75	151.87
13	604.25	155.44
14	607.58	159.17
15	611.11	162.71
16	612.22	167.58
17	613.19	169.97

Factor Of Safety For The Preceding Specified Surface = 3.482

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	520.12	130.00
2	524.76	128.88
3	529.27	126.72
4	533.64	124.28

5	537.29	120.87
6	580.00	128.00
7	596.69	128.00
8	596.72	133.00
9	596.86	138.00
10	597.31	142.98
11	600.44	146.88
12	600.75	151.87
13	604.25	155.44
14	607.58	159.17
15	611.11	162.71
16	612.22	167.58
17	613.19	169.97

Factor Of Safety For The Preceding Specified Surface = 3.482

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	527.54	129.67
2	530.49	126.81
3	534.86	124.36
4	538.63	121.08
5	580.00	128.00
6	598.23	128.00
7	601.76	131.54
8	604.69	135.59
9	607.91	139.41
10	611.43	142.96
11	614.06	147.21
12	616.51	151.58
13	619.66	155.46
14	622.82	159.33
15	626.17	163.05
16	629.05	167.13
17	632.00	171.17
18	633.35	175.02

*** 1.518 ***

Individual data on the 28 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	3.0	529.5	.0	.0	.0	.0	.0	.0	.0
2	4.4	2196.1	.0	.0	.0	.0	.0	.0	.0
3	2.8	2263.5	.0	.0	.0	.0	.0	.0	.0
4	.9	951.0	.0	.0	.0	.0	.0	.0	.0
5	.4	390.4	.0	.0	.0	.0	.0	.0	.0
6	.1	116.3	.0	.0	.0	.0	.0	.0	.0
7	.1	146.2	.0	.0	.0	.0	.0	.0	.0
8	10.8	20399.9	.0	.0	.0	.0	.0	.0	.0
9	30.0	80806.8	.0	.0	.0	.0	.0	.0	.0
10	18.2	68476.8	.0	.0	.0	.0	.0	.0	.0
11	1.0	4234.6	.0	.0	.0	.0	.0	.0	.0
12	2.5	10397.5	.0	.0	.0	.0	.0	.0	.0
13	2.9	11163.4	.0	.0	.0	.0	.0	.0	.0
14	.3	1246.9	.0	.0	.0	.0	.0	.0	.0
15	1.7	5939.0	.0	.0	.0	.0	.0	.0	.0
16	1.2	4045.9	.0	.0	.0	.0	.0	.0	.0
17	1.6	5189.6	.0	.0	.0	.0	.0	.0	.0
18	1.5	4835.4	.0	.0	.0	.0	.0	.0	.0
19	.4	1354.8	.0	.0	.0	.0	.0	.0	.0
20	2.6	7726.0	.0	.0	.0	.0	.0	.0	.0
21	2.4	6270.7	.0	.0	.0	.0	.0	.0	.0
22	3.2	7044.8	.0	.0	.0	.0	.0	.0	.0
23	3.2	6167.4	.0	.0	.0	.0	.0	.0	.0
24	3.3	5637.0	.0	.0	.0	.0	.0	.0	.0
25	1.8	2665.2	.0	.0	.0	.0	.0	.0	.0
26	1.1	1305.3	.0	.0	.0	.0	.0	.0	.0
27	2.9	2427.3	.0	.0	.0	.0	.0	.0	.0
28	1.3	348.5	.0	.0	.0	.0	.0	.0	.0

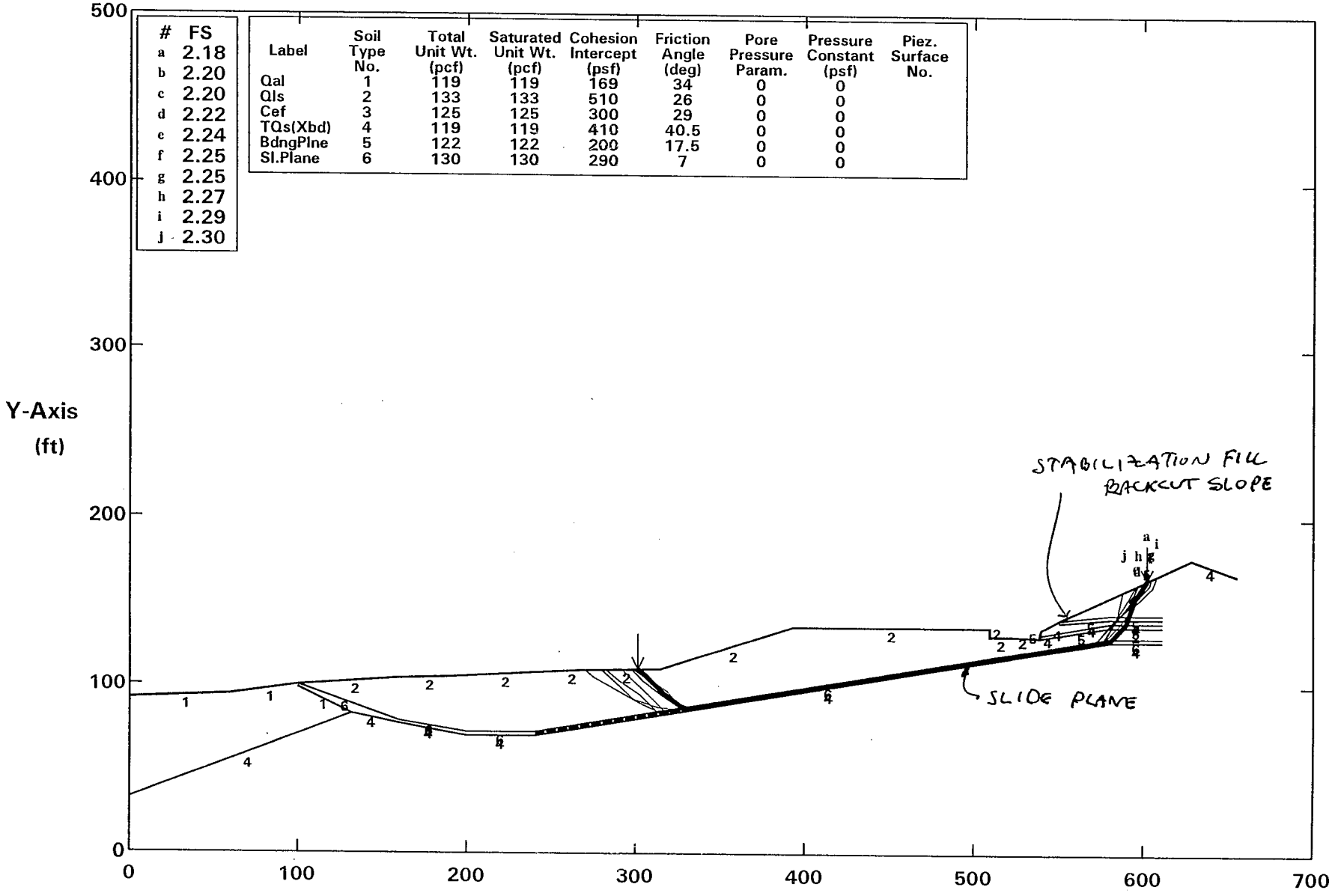
Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	530.23	129.52
2	532.74	128.00
3	536.28	124.46
4	540.17	121.33
5	580.00	128.00
6	598.25	128.00
7	601.74	131.57
8	605.26	135.13
9	608.64	138.81
10	611.56	142.88
11	614.54	146.89
12	615.55	151.79
13	618.10	156.09
14	621.41	159.83

TT52584-Hasley Cyn-Sec.7-7'-Upper(EL1235)Stab.Fill backcut TEMP.STABILITY-Static
Ten Most Critical. C:HASL7BTD.PLT By: EC 10/07/99 1:35pm

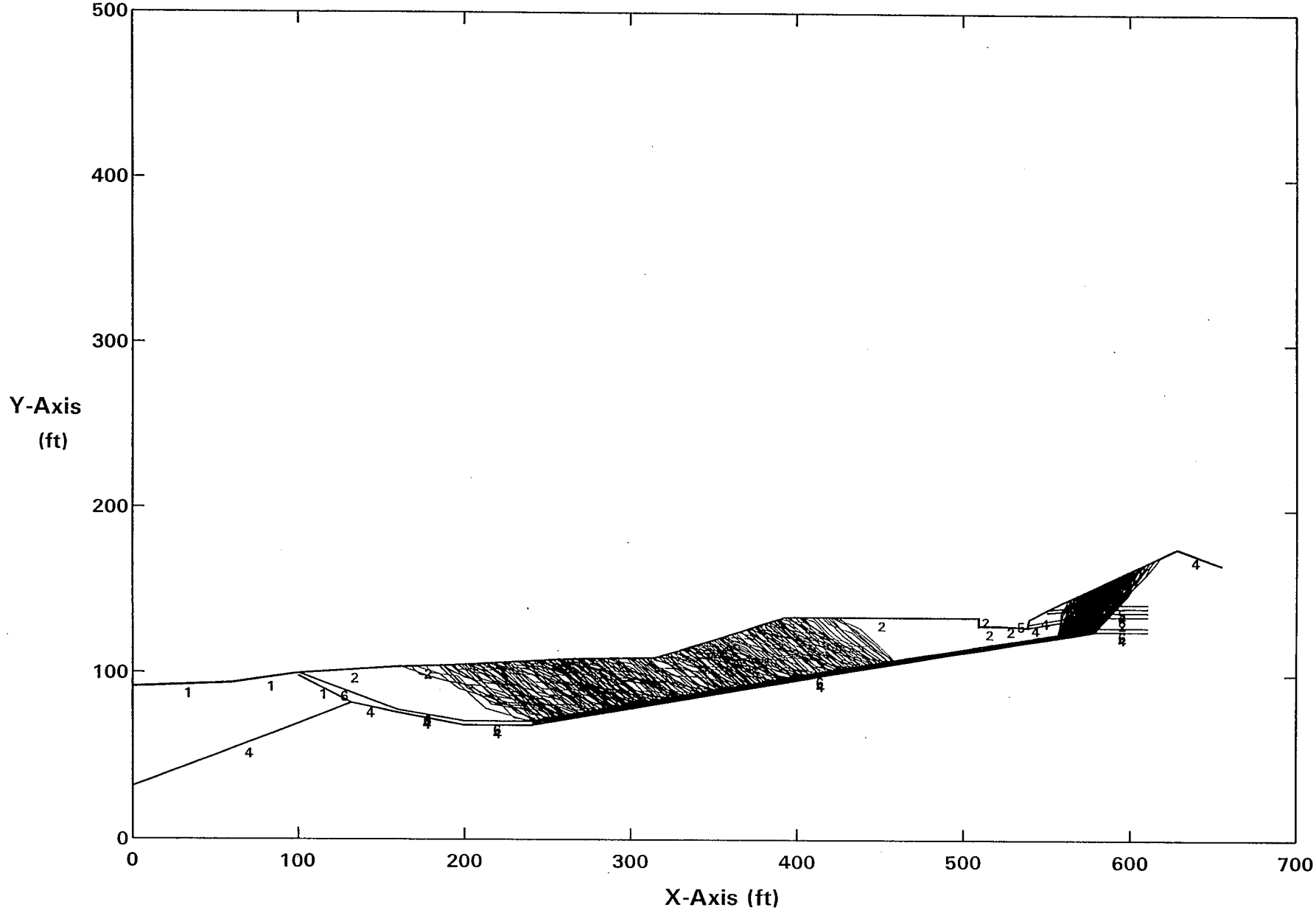
#	FS
a	2.18
b	2.20
c	2.20
d	2.22
e	2.24
f	2.25
g	2.25
h	2.27
i	2.29
j	2.30

Label	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.
Qal	1	119	119	169	34	0	0	
Qls	2	133	133	510	26	0	0	
Cef	3	125	125	300	29	0	0	
TQs(Xbd)	4	119	119	410	40.5	0	0	
BdngPlne	5	122	122	200	17.5	0	0	
Sl.Plane	6	130	130	290	7	0	0	



PCSTABL5M FSmin = 2.18 X-Axis (ft)
Factors Of Safety Calculated By The Modified Janbu Method

TT52584-Hasley Cyn-Sec.7-7'-Upper(EL1235)Stab.Fill backcut TEMP.STABILITY-Static
All surfaces evaluated. C:HASL7BTD.PLT By: EC 10/07/99 1:35pm



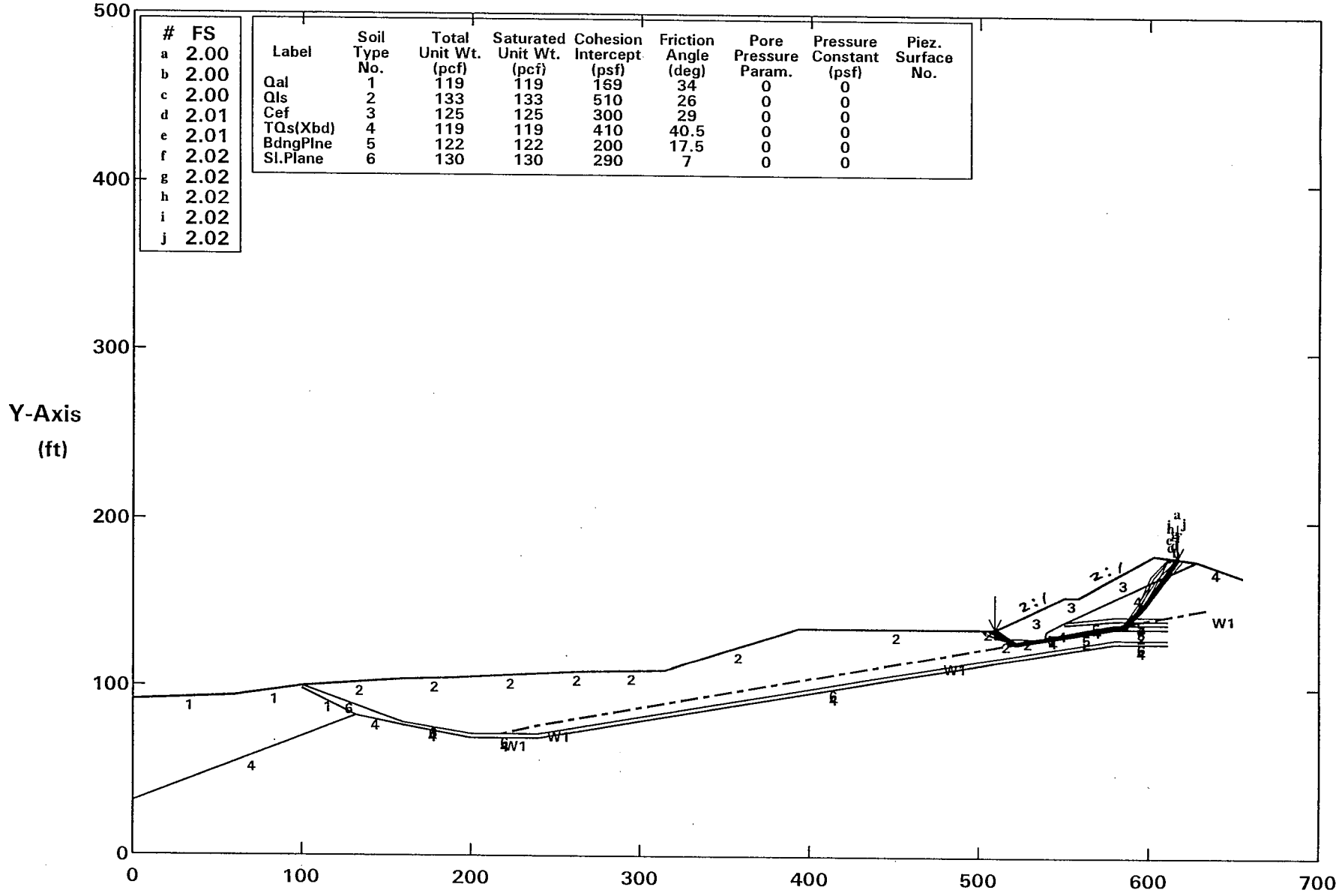
Factors Of Safety Calculated By The Modified Janbu Method

TT52584-Hasley Cyn-Sec.7-7'-w/bench(El. 1235) & 2:1 Stab.Fill(El 1235)-Static

Ten Most Critical. C:HASL7BA.PLT By: EC 10/07/99 5:33pm

#	FS
a	2.00
b	2.00
c	2.00
d	2.01
e	2.01
f	2.02
g	2.02
h	2.02
i	2.02
j	2.02

Label	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.
Qal	1	119	119	169	34	0	0	
Qls	2	133	133	510	26	0	0	
Cef	3	125	125	300	29	0	0	
TQs(Xbd)	4	119	119	410	40.5	0	0	
BdngPlne	5	122	122	200	17.5	0	0	
Sl.Plane	6	130	130	290	7	0	0	



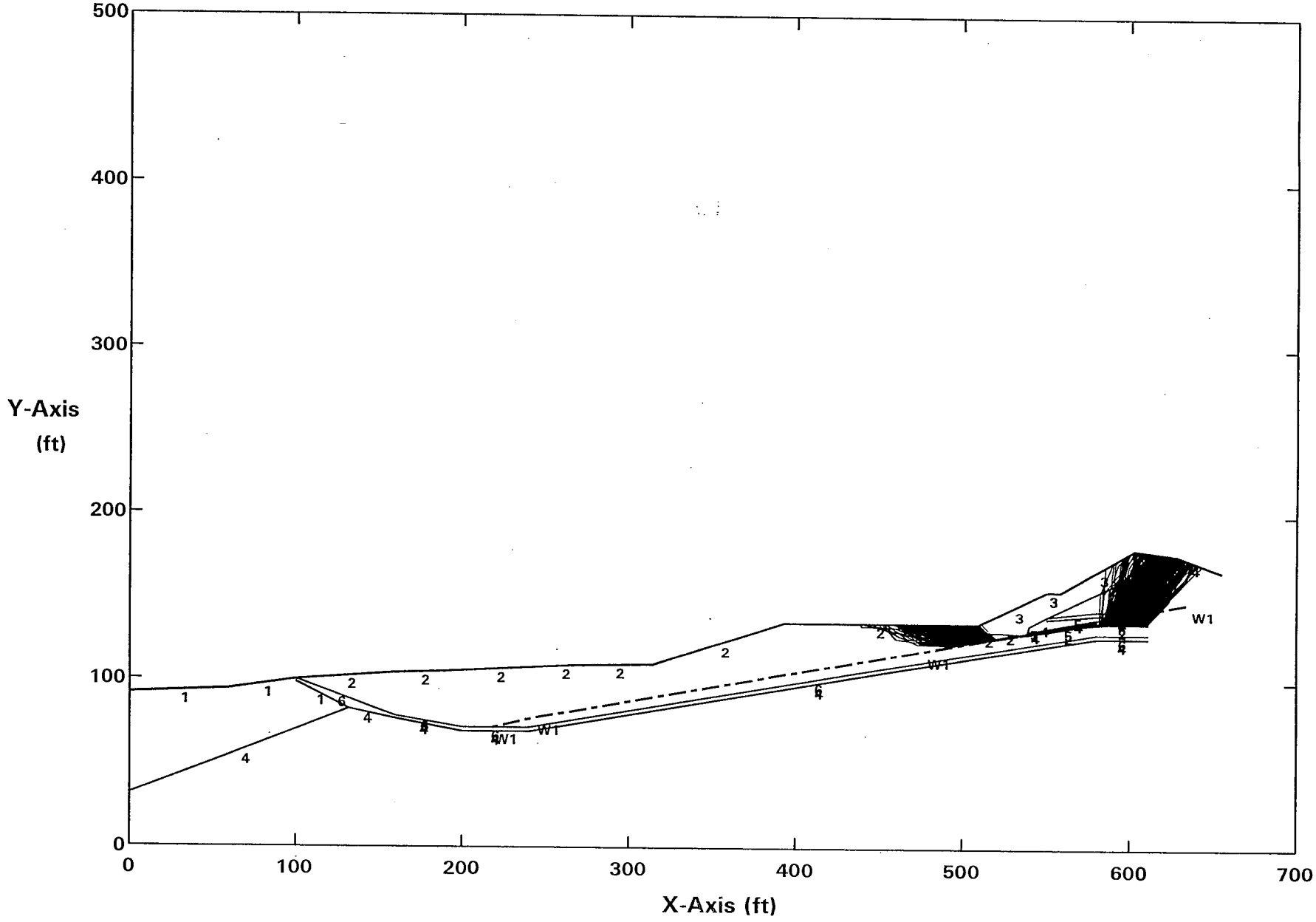
PCSTABL5M FSmin = 2.00 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run No. 6

TT52584-Hasley Cyn-Sec.7-7'-w/bench(El. 1235) & 2:1 Stab.Fill(El 1235)-Static

All surfaces evaluated. C:HASL7BA.PLT By: EC 10/07/99 5:20pm



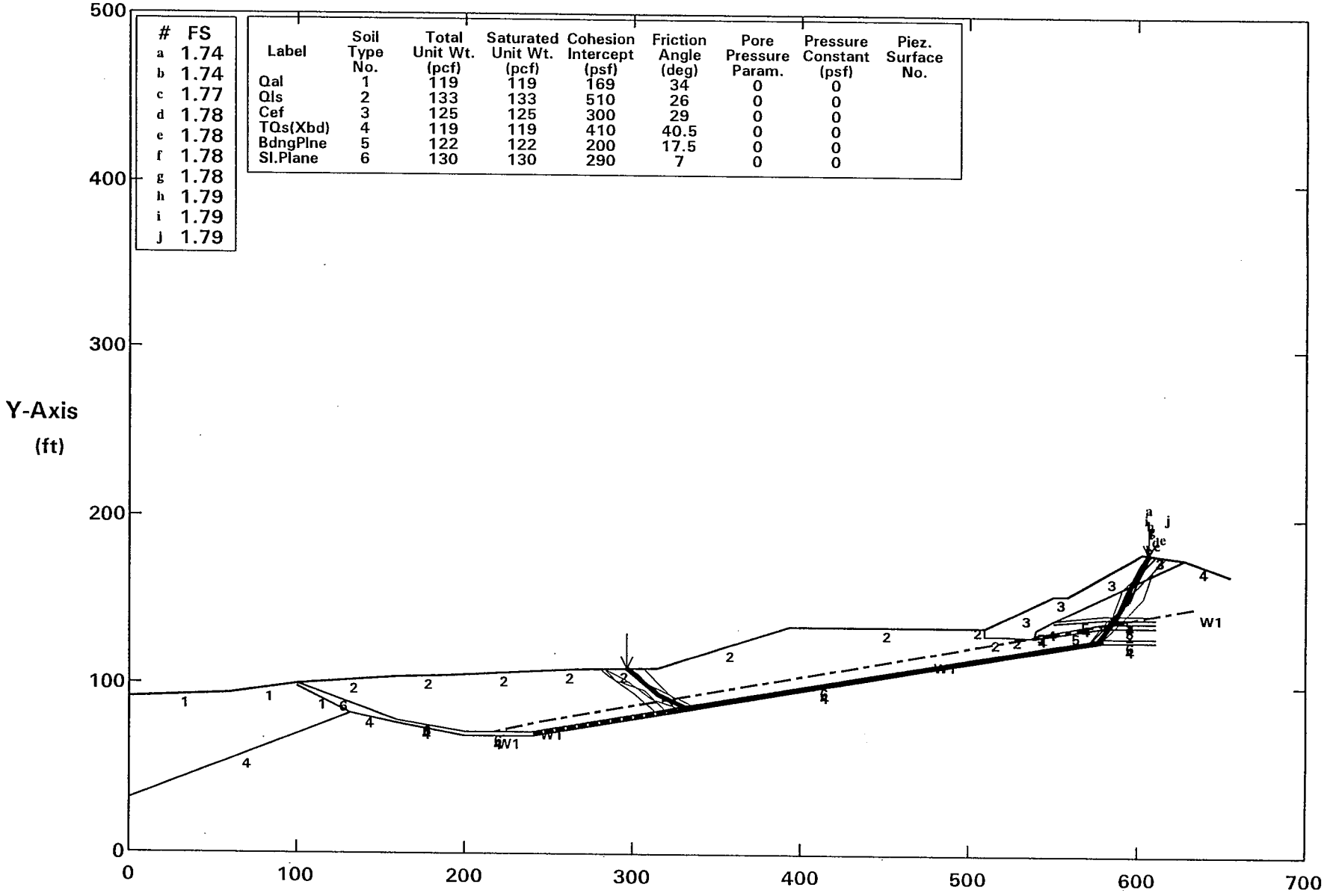
Factors Of Safety Calculated By The Modified Janbu Method

TT52584-Hasley Cyn-Sec.7-7'-w/bench(El. 1235) & 2:1 Stab.Fill(El 1235)-Static

Ten Most Critical. C:HASL7BB.PLT By: EC 10/07/99 5:53pm

#	FS
a	1.74
b	1.74
c	1.77
d	1.78
e	1.78
f	1.78
g	1.78
h	1.79
i	1.79
j	1.79

Label	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.
Qal	1	119	119	169	34	0	0	
Qls	2	133	133	510	26	0	0	
Cef	3	125	125	300	29	0	0	
TQs(Xbd)	4	119	119	410	40.5	0	0	
BdngPlne	5	122	122	200	17.5	0	0	
Sl.Plane	6	130	130	290	7	0	0	



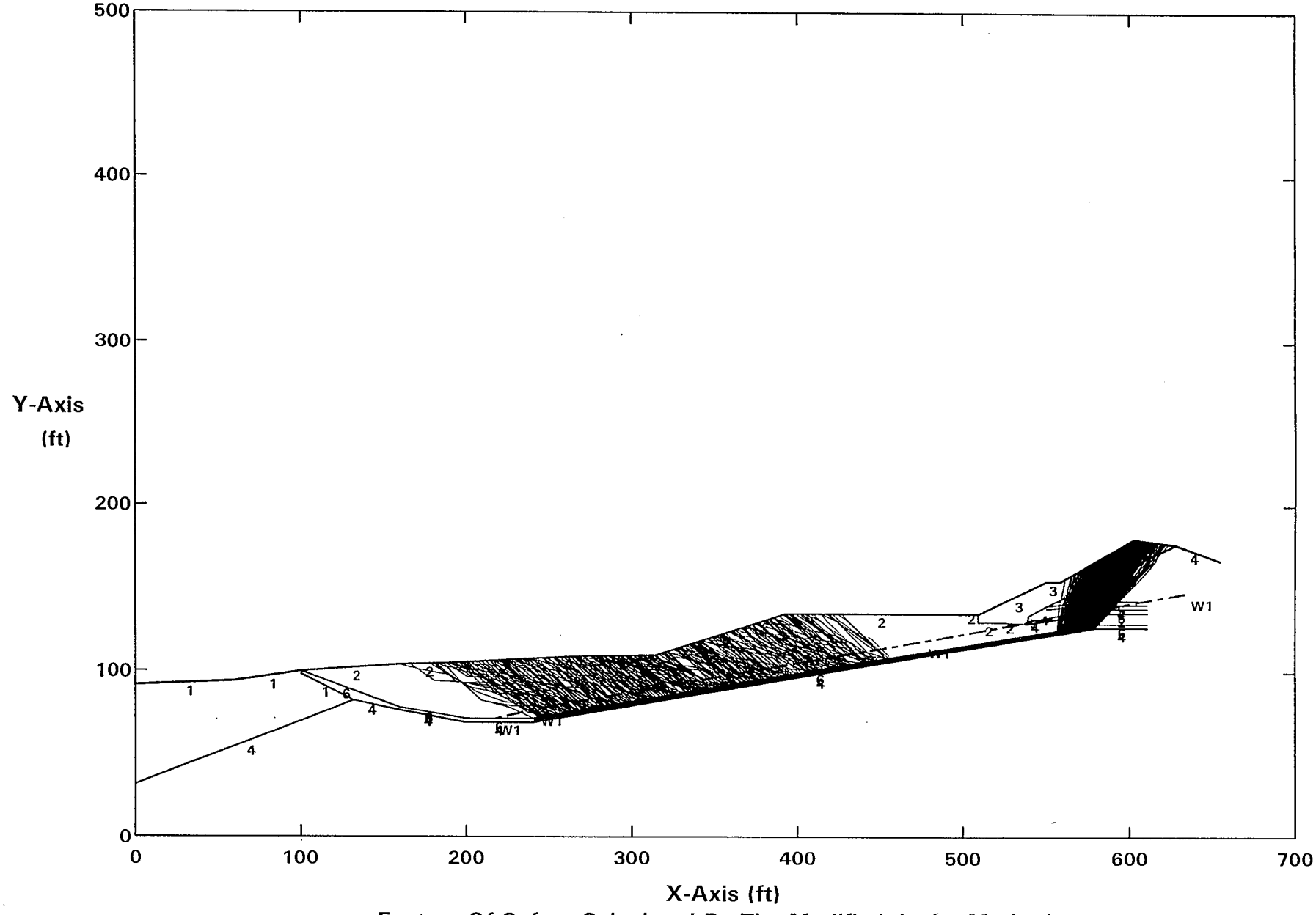
PCSTABL5M FSmin = 1.74 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run No. 7

TT52584-Hasley Cyn-Sec.7-7'-w/bench(El. 1235) & 2:1 Stab.Fill(El 1235)-Static

All surfaces evaluated. C:HASL7BB.PLT By: EC 10/07/99 5:53pm



Factors Of Safety Calculated By The Modified Janbu Method

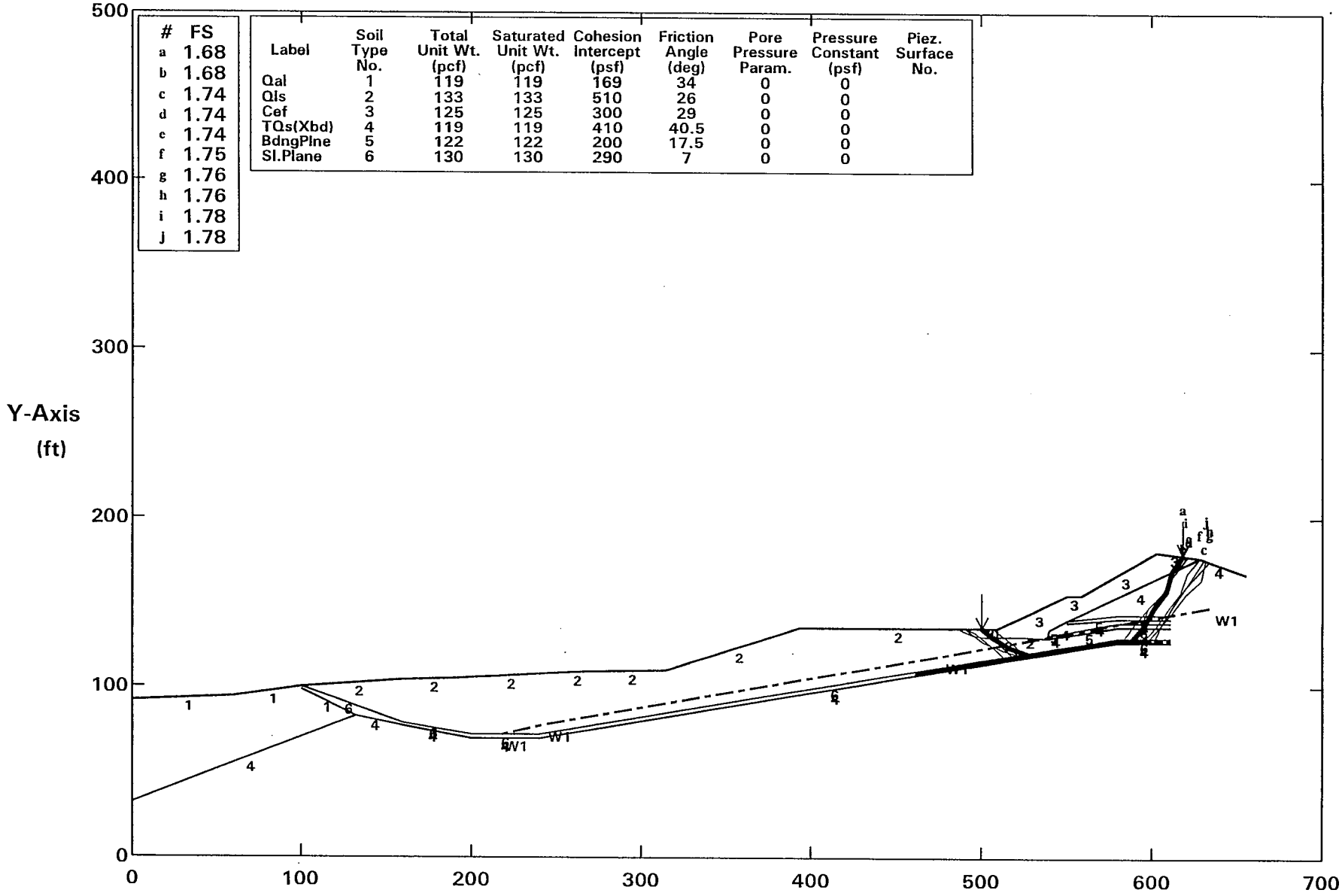
7

TT52584-Hasley Cyn-Sec.7-7'-w/bench(El. 1235) & 2:1 Stab.Fill(El 1235)-Static

Ten Most Critical. C:HASL7BC.PLT By: EC 10/07/99 7:13pm

#	FS
a	1.68
b	1.68
c	1.74
d	1.74
e	1.74
f	1.75
g	1.76
h	1.76
i	1.78
j	1.78

Label	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.
Qal	1	119	119	169	34	0	0	
Qls	2	133	133	510	26	0	0	
Cef	3	125	125	300	29	0	0	
TQs(Xbd)	4	119	119	410	40.5	0	0	
BdngPlne	5	122	122	200	17.5	0	0	
Sl.Plane	6	130	130	290	7	0	0	



PCSTABL5M FSmin = 1.68 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

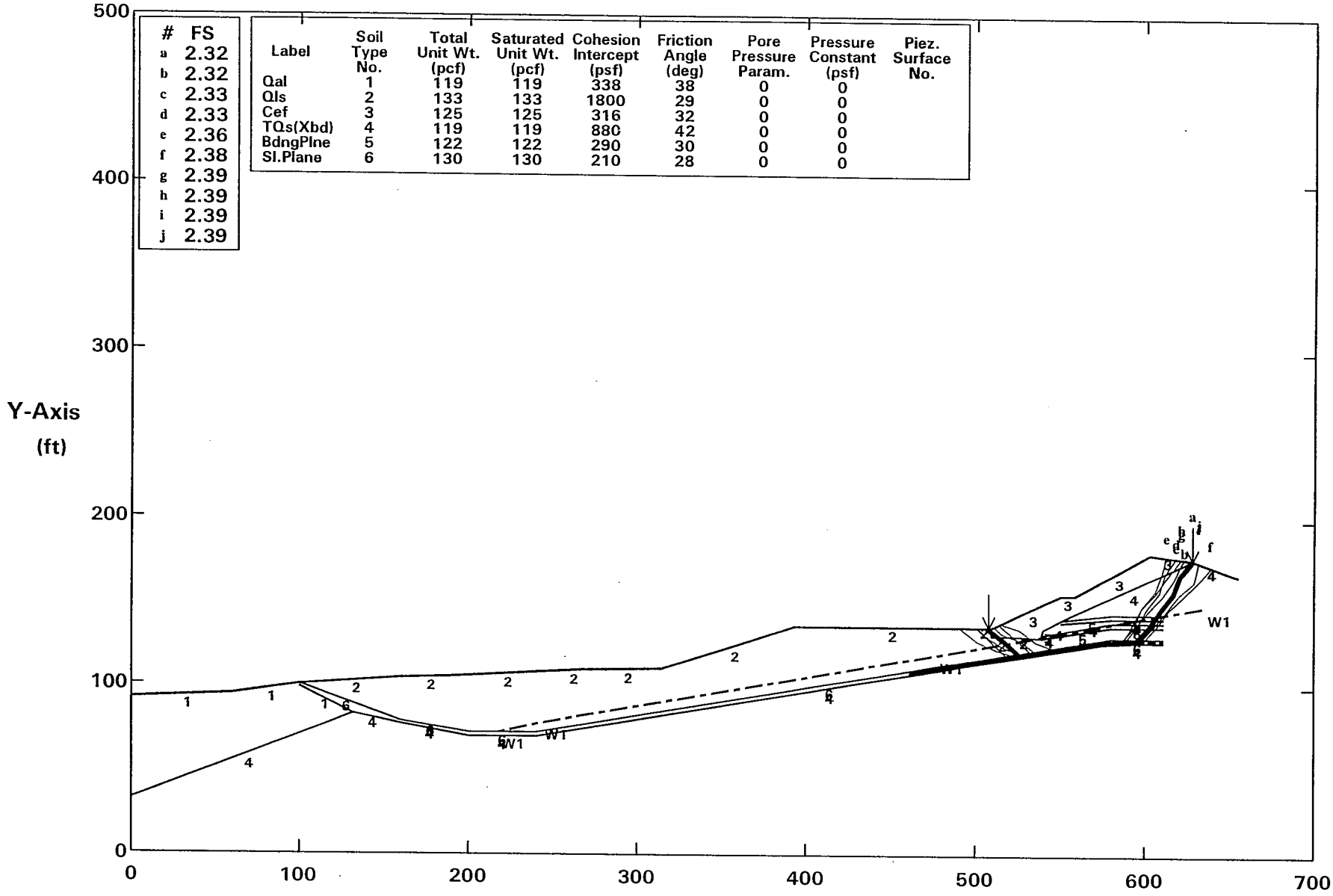
Run No. 8

TT52584-Hasley Cyn-Sec.7-7'-w/bench(El. 1235) & 2:1 Stab.Fill(El 1235)-Seismic

Ten Most Critical. C:HASL7BC'.PLT By: EC 10/18/99 4:12pm

#	FS
a	2.32
b	2.32
c	2.33
d	2.33
e	2.36
f	2.38
g	2.39
h	2.39
i	2.39
j	2.39

Label	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.
Qal	1	119	119	338	38	0	0	
Qls	2	133	133	1800	29	0	0	
Cef	3	125	125	316	32	0	0	
TQs(Xbd)	4	119	119	880	42	0	0	
BdngPlne	5	122	122	290	30	0	0	
Sl.Plane	6	130	130	210	28	0	0	



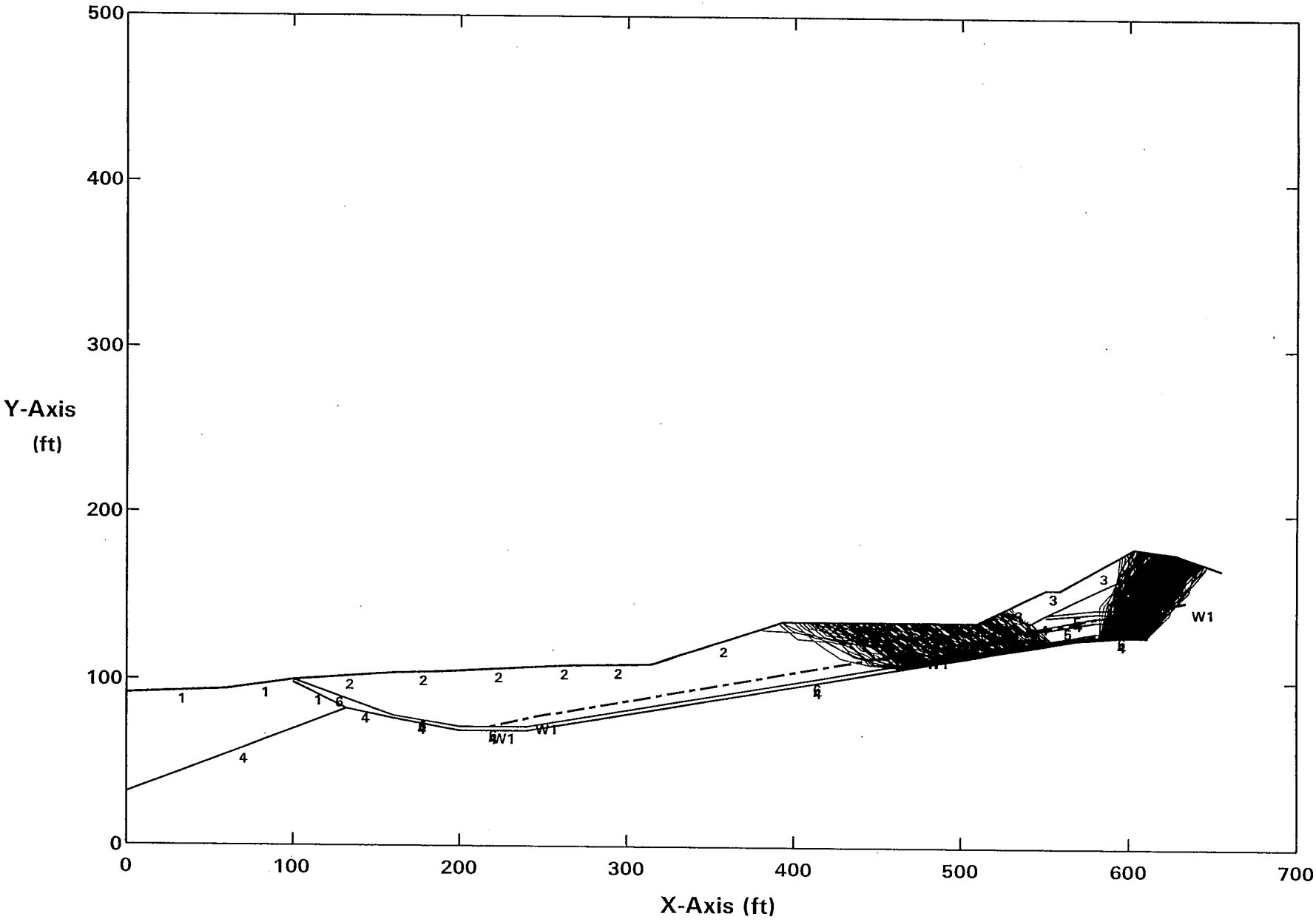
PCSTABL5M FSmin = 2.32 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

N-9

TT52584-Hasley Cyn-Sec.7-7'-w/bench(El. 1235) & 2:1 Stab.Fill(El 1235)-Static

All surfaces evaluated. C:HASL7BC.PLT By: EC 10/07/99 6:03pm



Factors Of Safety Calculated By The Modified Janbu Method

** PCSTABL5M **

by
Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date:	10/07/99
Time of Run:	7:13pm
Run By:	EC
Input Data Filename:	C:HASL7BC.IN
Output Filename:	C:HASL7BC.OUT
Plotted Output Filename:	C:HASL7BC.PLT

PROBLEM DESCRIPTION TT52584-Hasley Cyn-Sec.7-7'-w/bench(El. 1235) & 2:1 Stab.Fill(El 1235)-Static

BOUNDARY COORDINATES

14 Top Boundaries
41 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	92.00	60.00	94.00	1
2	60.00	94.00	100.00	100.00	1
3	100.00	100.00	160.00	104.00	2
4	160.00	104.00	188.00	105.00	2
5	188.00	105.00	250.00	108.00	2
6	250.00	108.00	267.00	109.00	2
7	267.00	109.00	314.00	110.00	2
8	314.00	110.00	393.00	135.00	2
9	393.00	135.00	509.00	135.00	2
10	509.00	135.00	550.00	155.00	3
11	550.00	155.00	558.00	155.00	3
12	558.00	155.00	603.00	180.00	3
13	603.00	180.00	628.00	177.00	3
14	628.00	177.00	655.00	167.00	4
15	509.00	135.00	509.10	130.00	2
16	509.10	130.00	522.00	130.00	2
17	522.00	130.00	539.00	129.00	2
18	539.00	129.00	539.10	131.00	5
19	539.10	131.00	539.20	134.00	4
20	539.20	134.00	550.00	140.00	4
21	550.00	140.00	628.00	177.00	4
22	550.00	140.00	580.00	143.00	5

Dwg No. 8

23	580.00	143.00	611.00	143.00	5
24	550.00	138.00	580.00	141.00	4
25	580.00	141.00	611.00	141.00	4
26	539.10	131.00	580.00	138.00	5
27	580.00	138.00	611.00	138.00	5
28	539.10	129.00	580.00	136.00	2
29	580.00	136.00	611.00	136.00	2
30	100.00	100.00	160.00	79.00	6
31	160.00	79.00	200.00	72.00	6
32	200.00	72.00	240.00	72.00	6
33	240.00	72.00	580.00	129.00	6
34	580.00	129.00	611.00	129.00	6
35	100.00	98.00	132.00	83.00	1
36	132.00	83.00	160.00	77.00	4
37	160.00	77.00	200.00	70.00	4
38	200.00	70.00	240.00	70.00	4
39	240.00	70.00	580.00	127.00	4
40	580.00	127.00	611.00	127.00	4
41	.00	32.00	132.00	83.00	4

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	119.0	119.0	169.0	34.0	.00	.0	0
2	133.0	133.0	510.0	26.0	.00	.0	0
3	125.0	125.0	300.0	29.0	.00	.0	0
4	119.0	119.0	410.0	40.5	.00	.0	0
5	122.0	122.0	200.0	17.5	.00	.0	0
6	130.0	130.0	290.0	7.0	.00	.0	0

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 4 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	218.00	72.00
2	243.00	78.00
3	477.00	119.00
4	635.00	148.00

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.

3 Boxes Specified For Generation Of Central Block Base

Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 12.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	461.00	108.10	555.00	123.80	.00
2	556.00	124.00	580.00	128.00	.00
3	581.00	128.00	611.00	128.00	.00

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined By The Following 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	412.43	135.00
2	421.67	132.78
3	432.49	127.59
4	442.97	121.74
5	451.73	113.53
6	462.55	108.36
7	558.12	124.35
8	586.62	128.00
9	586.70	140.00
10	587.03	152.00
11	588.12	163.95
12	595.62	173.31
13	595.78	175.99

Factor Of Safety For The Preceding Specified Surface = 6.924

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	512.38	136.65
2	521.02	134.37
3	530.58	127.12
4	541.18	121.49
5	558.41	124.40
6	585.70	128.00
7	585.72	140.00
8	588.09	151.76
9	595.60	161.12
10	601.46	171.60
11	606.69	179.56

Factor Of Safety For The Preceding Specified Surface = 3.807

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	523.75	142.20
2	529.32	138.96
3	538.14	130.82
4	546.71	122.42
5	576.93	127.49
6	596.96	128.00
7	597.00	140.00
8	602.32	150.75
9	610.81	159.24
10	614.33	170.71
11	620.14	177.94

Factor Of Safety For The Preceding Specified Surface = 4.265

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	412.43	135.00
2	421.67	132.78
3	432.49	127.59
4	442.97	121.74
5	451.73	113.53
6	462.55	108.36
7	558.12	124.35
8	586.62	128.00
9	586.70	140.00
10	587.03	152.00
11	588.12	163.95
12	595.62	173.31
13	595.78	175.99

Factor Of Safety For The Preceding Specified Surface = 6.924

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	512.38	136.65
2	521.02	134.37
3	530.58	127.12
4	541.18	121.49
5	558.41	124.40

6	585.70	128.00
7	585.72	140.00
8	588.09	151.76
9	595.60	161.12
10	601.46	171.60
11	606.69	179.56

Factor Of Safety For The Preceding Specified Surface = 3.807

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	500.32	135.00
2	506.37	129.92
3	516.41	123.35
4	527.68	119.24
5	577.65	127.61
6	587.49	128.00
7	595.26	137.14
8	601.31	147.50
9	608.10	157.40
10	611.34	168.95
11	617.83	178.22

*** 1.682 ***

Individual data on the 33 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	6.1	2044.8	.0	.0	.0	.0	.0	.0	.0
2	2.6	2079.0	.0	.0	.0	.0	.0	.0	.0
3	.1	89.2	.0	.0	.0	.0	.0	.0	.0
4	3.9	4505.2	.0	.0	.0	.0	.0	.0	.0
5	3.4	5880.3	.0	.0	.0	.0	.0	.0	.0

6	5.6	12676.7	.0	.0	.0	.0	.0	.0	.0
7	3.8	10627.9	.0	.0	.0	.0	.0	.0	.0
8	1.9	5759.9	.0	.0	.0	.0	.0	.0	.0
9	5.6	18540.4	.0	.0	.0	.0	.0	.0	.0
10	5.7	20002.9	.0	.0	.0	.0	.0	.0	.0
11	.1	246.7	.0	.0	.0	.0	.0	.0	.0
12	.0	107.8	.0	.0	.0	.0	.0	.0	.0
13	.1	361.5	.0	.0	.0	.0	.0	.0	.0
14	10.8	41152.4	.0	.0	.0	.0	.0	.0	.0
15	8.0	31435.0	.0	.0	.0	.0	.0	.0	.0
16	19.7	84466.7	.0	.0	.0	.0	.0	.0	.0
17	2.3	11329.3	.0	.0	.0	.0	.0	.0	.0
18	.5	2545.2	.0	.0	.0	.0	.0	.0	.0
19	7.0	35903.2	.0	.0	.0	.0	.0	.0	.0
20	.9	4533.2	.0	.0	.0	.0	.0	.0	.0
21	6.0	29924.8	.0	.0	.0	.0	.0	.0	.0
22	1.0	4576.6	.0	.0	.0	.0	.0	.0	.0
23	.5	2333.5	.0	.0	.0	.0	.0	.0	.0
24	1.1	4973.2	.0	.0	.0	.0	.0	.0	.0
25	.7	2889.3	.0	.0	.0	.0	.0	.0	.0
26	.1	342.6	.0	.0	.0	.0	.0	.0	.0
27	1.1	4661.7	.0	.0	.0	.0	.0	.0	.0
28	2.6	10576.8	.0	.0	.0	.0	.0	.0	.0
29	1.7	6337.1	.0	.0	.0	.0	.0	.0	.0
30	5.1	16211.1	.0	.0	.0	.0	.0	.0	.0
31	3.2	6369.0	.0	.0	.0	.0	.0	.0	.0
32	.1	184.6	.0	.0	.0	.0	.0	.0	.0
33	6.3	3890.3	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	500.32	135.00
2	506.37	129.92
3	516.41	123.35
4	527.68	119.24
5	577.65	127.61
6	587.49	128.00
7	595.26	137.14
8	601.31	147.50
9	608.10	157.40
10	611.34	168.95
11	617.83	178.22

*** 1.682 ***

Failure Surface Specified By 11 Coordinate Points

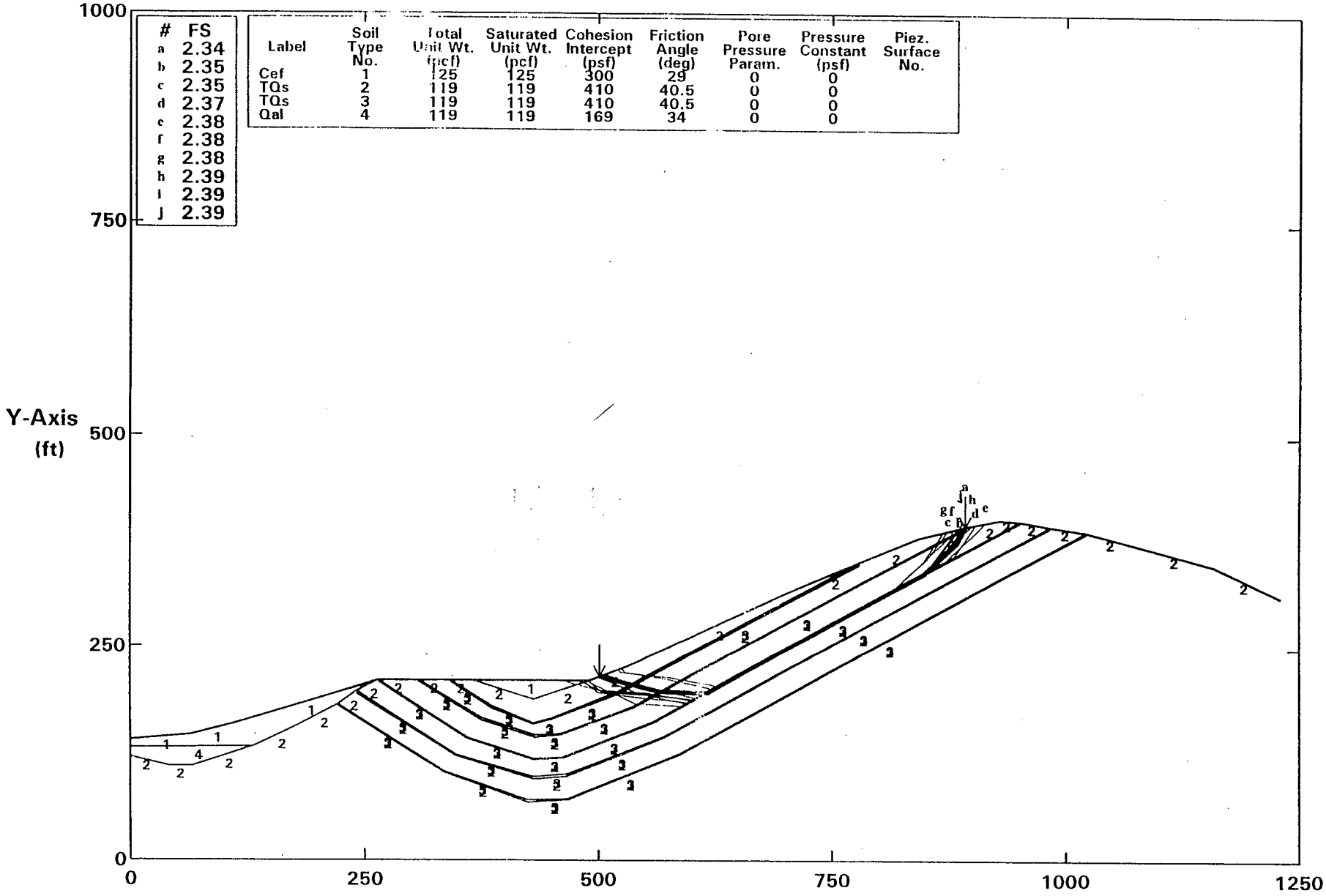
Point	X-Surf	Y-Surf

Hasley Cyn. X-Section 27-27' Contact #3, Static

Ten Most Critical. C:HAS27BR2.PLT By: AC 10/11/99 5:10pm

#	FS
a	2.34
b	2.35
c	2.35
d	2.37
e	2.38
f	2.38
g	2.38
h	2.39
i	2.39
j	2.39

Label	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.
Cef	1	125	125	300	29	0	0	
TQs	2	119	119	410	40.5	0	0	
TQs	3	119	119	410	40.5	0	0	
Qal	4	119	119	169	34	0	0	



PCSTABL5M FSmin = 2.34 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

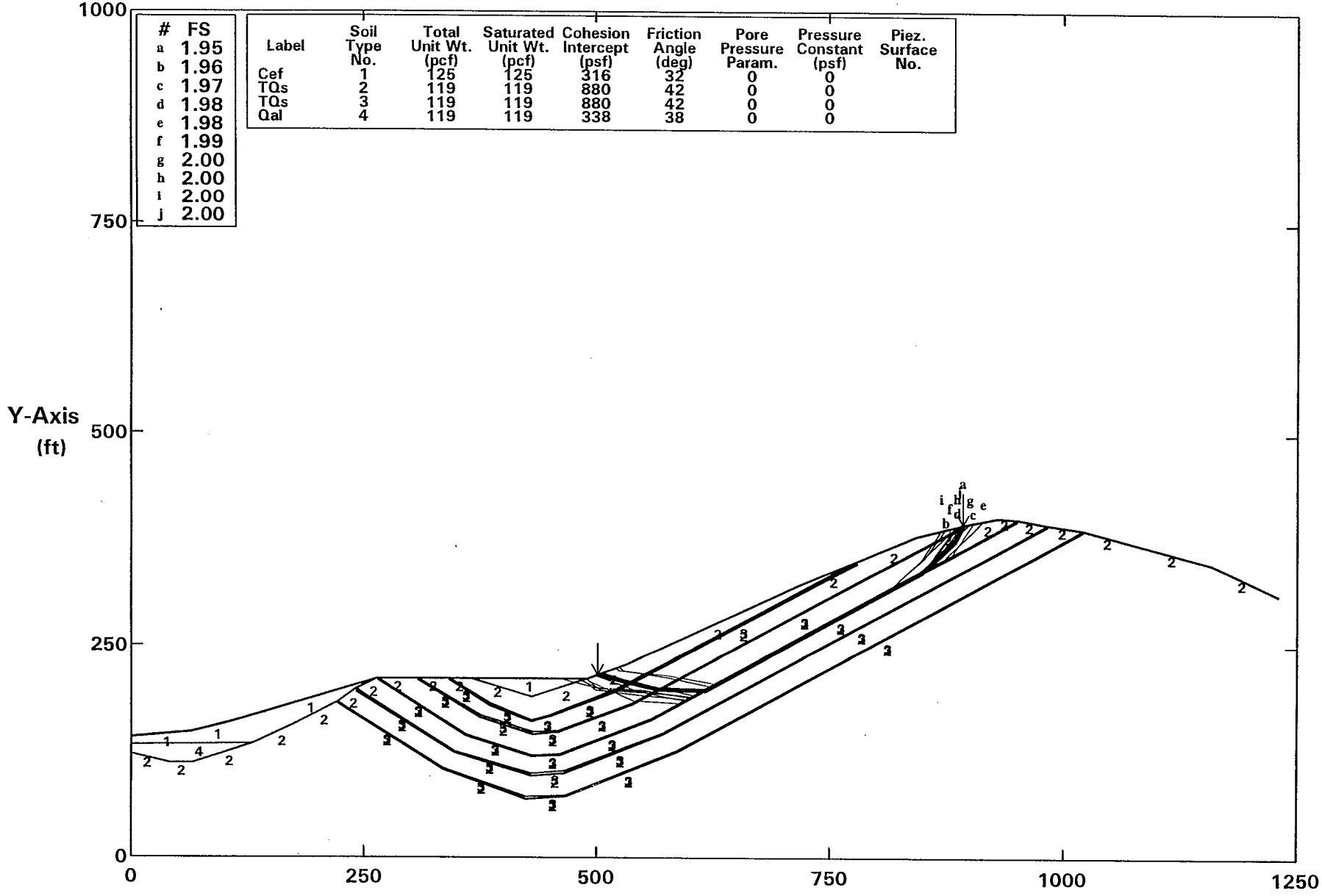
Dwg No. 10

Hasley Cyn. X-Section 27-27'- Contact #3, Pseudostatic

Ten Most Critical. C:HS27BR2'.PLT By: AC 10/18/99 4:33pm

#	FS
a	1.95
b	1.96
c	1.97
d	1.98
e	1.98
f	1.99
g	2.00
h	2.00
i	2.00
j	2.00

Label	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.
Cef	1	125	125	316	32	0	0	
TQs	2	119	119	880	42	0	0	
TQs	3	119	119	880	42	0	0	
Qal	4	119	119	338	38	0	0	



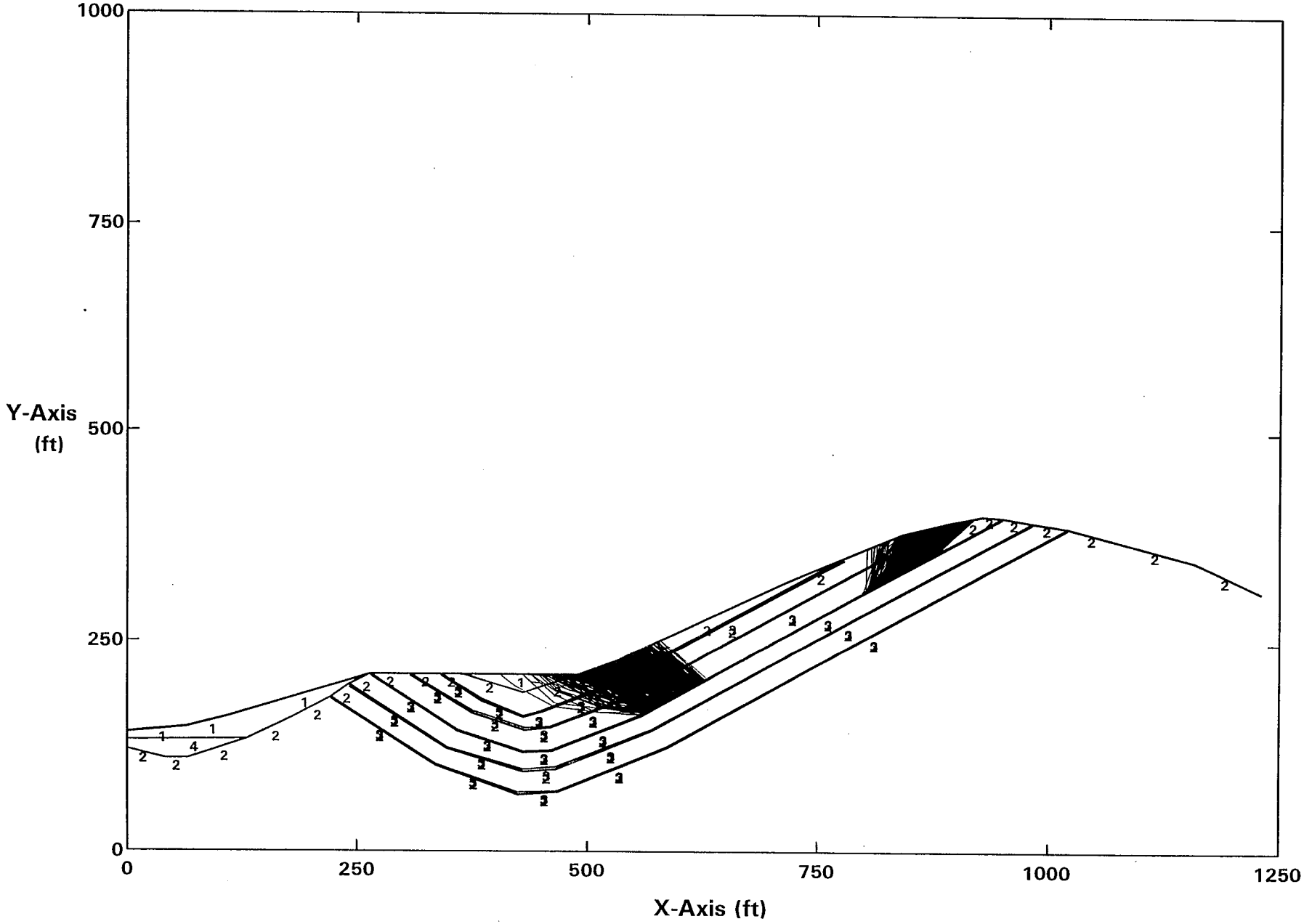
PCSTABL5M FSmin = 1.95 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

D.11 Ag 11

Hasley Cyn. X-Section 27-27' Contact #3, Static

All surfaces evaluated. C:HAS27BR2.PLT By: AC 10/11/99 5:10pm



Factors Of Safety Calculated By The Modified Janbu Method

10 of 11

** PCSTABL5M **

by
Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date: 10/11/99
Time of Run: 5:10pm
Run By: AC
Input Data Filename: C:HAS27BR2.IN
Output Filename: C:HAS27BR2.OUT
Plotted Output Filename: C:HAS27BR2.PLT

PROBLEM DESCRIPTION Hasley Cyn. X-Section 27-27'
Contact #3, Static

BOUNDARY COORDINATES

19 Top Boundaries
79 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	142.00	65.00	147.00	1
2	65.00	147.00	109.00	160.00	1
3	109.00	160.00	264.00	211.00	1
4	264.00	211.00	308.00	211.00	2
5	308.00	211.00	341.00	211.00	2
6	341.00	211.00	364.00	211.00	2
7	364.00	211.00	490.00	211.00	1
8	490.00	211.00	532.00	228.00	2
9	532.00	228.00	714.00	320.00	2
10	714.00	320.00	780.00	350.00	2
11	780.00	350.00	842.00	380.00	2
12	842.00	380.00	893.00	394.00	2
13	893.00	394.00	928.00	401.00	2
14	928.00	401.00	950.00	400.00	2
15	950.00	400.00	982.00	394.00	2
16	982.00	394.00	1021.00	388.00	2
17	1021.00	388.00	1079.00	370.00	2
18	1079.00	370.00	1158.00	348.00	2
19	1158.00	348.00	1230.00	311.00	2
20	364.00	211.00	430.00	189.00	2
21	430.00	189.00	490.00	211.00	2
22	341.00	211.00	386.00	181.00	3

Dwg No. 10

23	386.00	181.00	431.00	162.00	3
24	431.00	162.00	451.00	168.00	3
25	451.00	168.00	521.00	198.00	3
26	521.00	198.00	780.00	350.00	3
27	341.00	209.00	386.00	179.00	2
28	386.00	179.00	431.00	160.00	2
29	431.00	160.00	451.00	166.00	2
30	451.00	166.00	521.00	196.00	2
31	521.00	196.00	780.00	348.00	2
32	308.00	211.00	375.00	167.00	3
33	375.00	167.00	432.00	147.00	3
34	432.00	147.00	460.00	149.00	3
35	460.00	149.00	538.00	182.00	3
36	538.00	182.00	893.00	394.00	3
37	308.00	209.00	375.00	165.00	2
38	375.00	165.00	432.00	145.00	2
39	432.00	145.00	460.00	147.00	2
40	460.00	147.00	538.00	180.00	2
41	538.00	180.00	893.00	392.00	2
42	264.00	211.00	360.00	145.00	3
43	360.00	145.00	430.00	120.00	3
44	430.00	120.00	462.00	122.00	3
45	462.00	122.00	558.00	163.00	3
46	558.00	163.00	950.00	400.00	3
47	264.00	209.00	360.00	143.00	2
48	360.00	143.00	430.00	118.00	2
49	430.00	118.00	462.00	120.00	2
50	462.00	120.00	558.00	161.00	2
51	558.00	161.00	950.00	398.00	2
52	241.00	198.00	264.00	211.00	2
53	241.00	198.00	348.00	125.00	3
54	348.00	125.00	430.00	98.00	3
55	430.00	98.00	466.00	101.00	3
56	466.00	101.00	570.00	146.00	3
57	570.00	146.00	982.00	394.00	3
58	241.00	196.00	348.00	123.00	2
59	348.00	123.00	430.00	96.00	2
60	430.00	96.00	466.00	99.00	2
61	466.00	99.00	570.00	144.00	2
62	570.00	144.00	982.00	392.00	2
63	221.00	183.00	241.00	198.00	2
64	221.00	183.00	335.00	105.00	3
65	335.00	105.00	425.00	70.00	3
66	425.00	70.00	468.00	72.00	3
67	468.00	72.00	587.00	126.00	3
68	587.00	126.00	1021.00	388.00	3
69	221.00	181.00	335.00	103.00	2
70	335.00	103.00	425.00	68.00	2
71	425.00	68.00	468.00	70.00	2
72	468.00	70.00	587.00	124.00	2
73	587.00	124.00	1021.00	386.00	2
74	.00	132.00	130.00	133.00	4
75	130.00	133.00	178.00	159.00	2
76	178.00	159.00	221.00	183.00	2
77	.00	121.00	41.00	110.00	2
78	41.00	110.00	66.00	110.00	2
79	66.00	110.00	130.00	133.00	2

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	125.0	300.0	29.0	.00	.0	0
2	119.0	119.0	410.0	40.5	.00	.0	0
3	119.0	119.0	410.0	40.5	.00	.0	0
4	119.0	119.0	169.0	34.0	.00	.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.

400 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	560.00	163.20	630.00	205.60	.00
2	800.00	308.40	880.00	356.80	.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

1	500.97	215.44
2	517.53	210.78
3	565.93	198.21
4	615.91	197.07
5	847.77	337.30
6	882.24	373.52
7	891.92	393.70

*** 2.335 ***

Individual data on the 18 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	16.6	11197.5	.0	.0	.0	.0	.0	.0	.0
2	14.5	27831.5	.0	.0	.0	.0	.0	.0	.0
3	3.0	8000.5	.0	.0	.0	.0	.0	.0	.0
4	2.4	6803.3	.0	.0	.0	.0	.0	.0	.0
5	28.0	119274.8	.0	.0	.0	.0	.0	.0	.0
6	.5	3004.4	.0	.0	.0	.0	.0	.0	.0
7	2.5	14036.4	.0	.0	.0	.0	.0	.0	.0
8	46.0	330626.4	.0	.0	.0	.0	.0	.0	.0
9	1.5	13092.9	.0	.0	.0	.0	.0	.0	.0
10	98.1	799300.3	.0	.0	.0	.0	.0	.0	.0
11	66.0	460618.6	.0	.0	.0	.0	.0	.0	.0
12	62.0	368447.5	.0	.0	.0	.0	.0	.0	.0
13	5.8	31052.8	.0	.0	.0	.0	.0	.0	.0
14	2.0	10349.5	.0	.0	.0	.0	.0	.0	.0
15	32.5	116424.4	.0	.0	.0	.0	.0	.0	.0
16	8.1	9828.1	.0	.0	.0	.0	.0	.0	.0
17	1.3	262.5	.0	.0	.0	.0	.0	.0	.0
18	.2	5.9	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	489.23	211.00
2	504.16	196.09
3	554.07	192.97
4	603.97	189.83
5	811.77	315.52
6	846.48	351.52
7	881.62	387.08
8	884.95	391.79

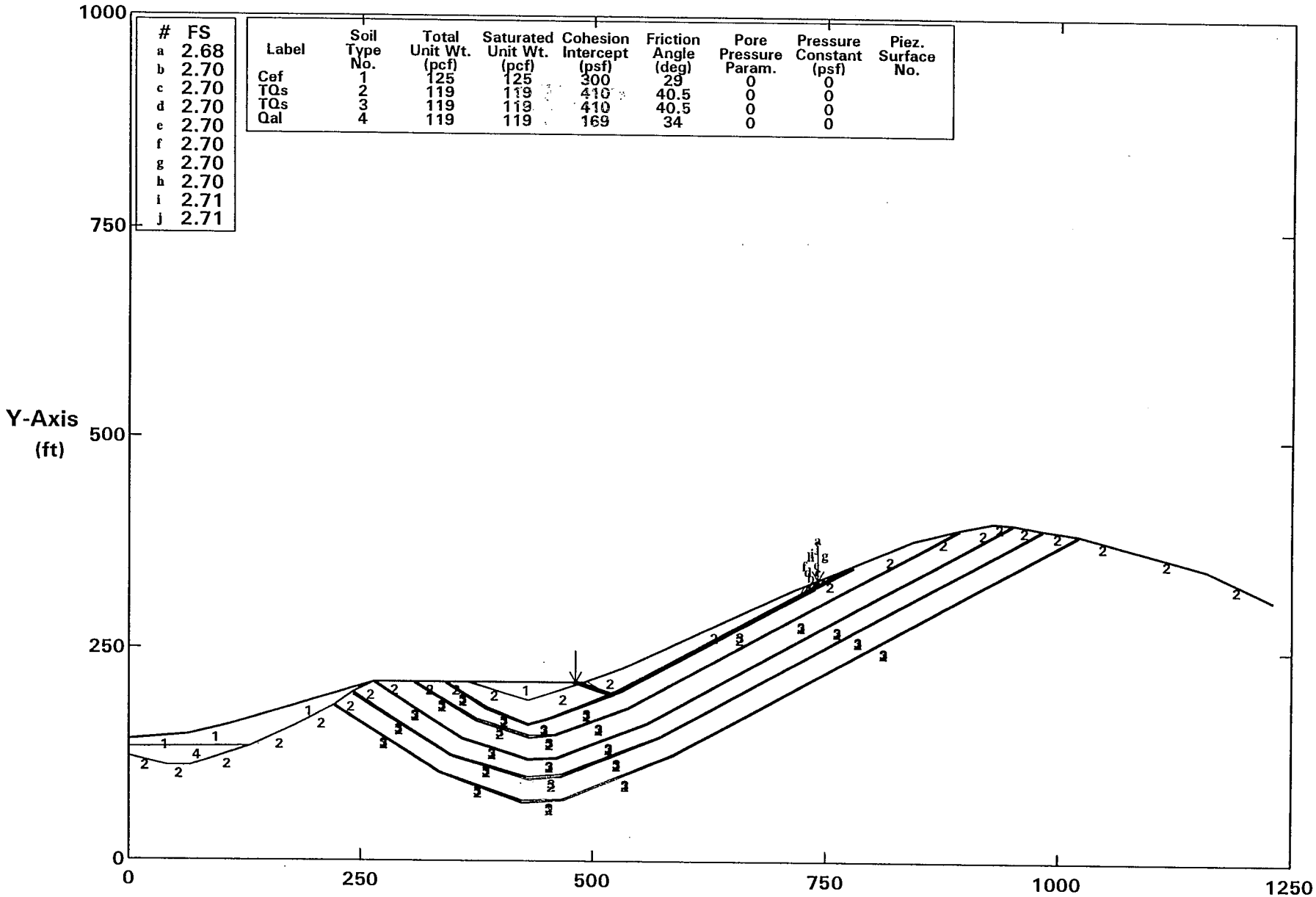
*** 2.345 ***

Hasley Cyn. X-Section 27-27' Contact #1, Static

Ten Most Critical. C:HAS27AR2.PLT By: AC 10/11/99 5:13pm

#	FS
a	2.68
b	2.70
c	2.70
d	2.70
e	2.70
f	2.70
g	2.70
h	2.70
i	2.71
j	2.71

Label	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.
Cef	1	125	125	300	29	0	0	
TQs	2	119	119	410	40.5	0	0	
TQs	3	119	119	410	40.5	0	0	
Qal	4	119	119	169	34	0	0	



PCSTABL5M FSmin = 2.68 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

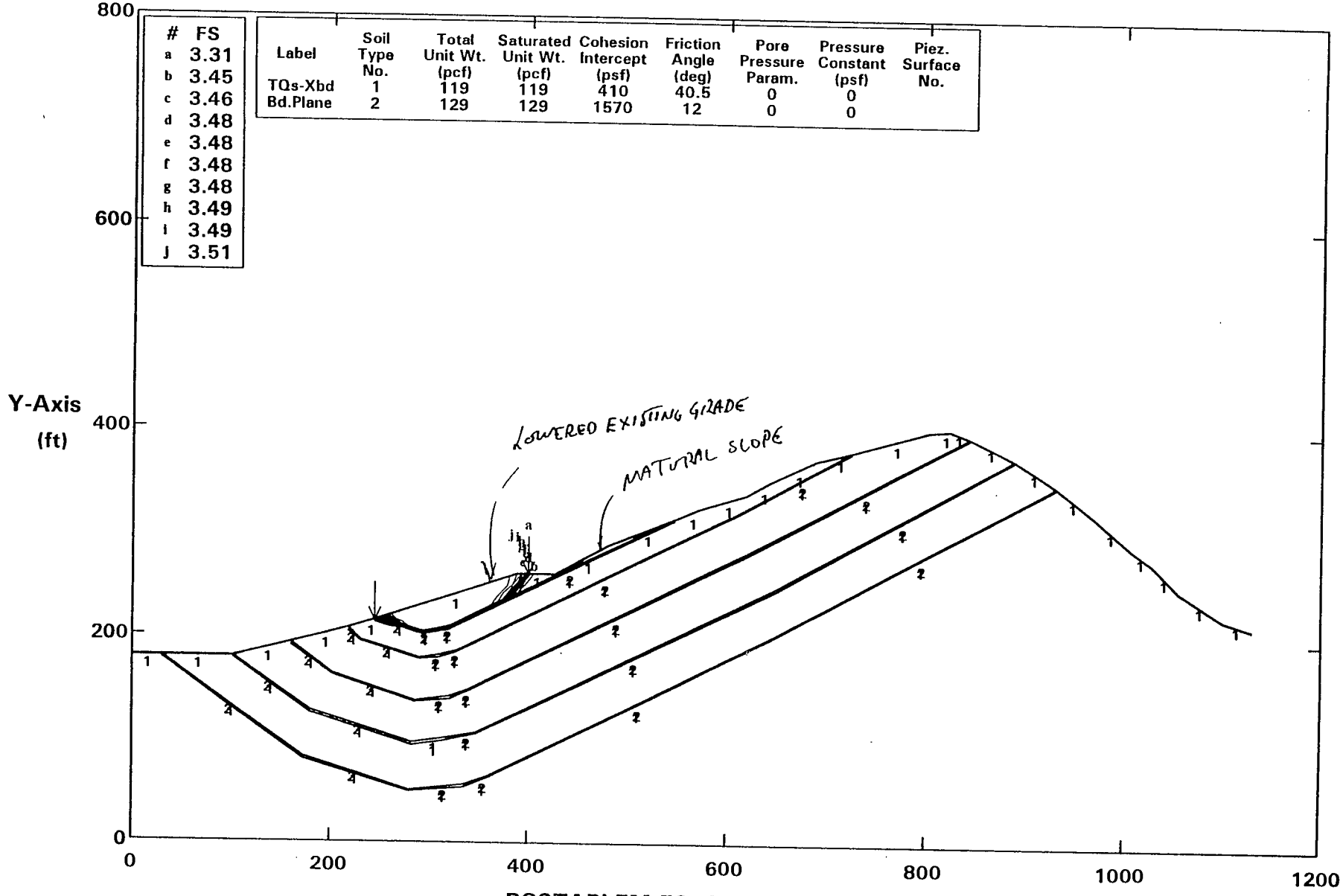
Run No. 12

Hasley Cyn-Sect.31-31'-Bedding Plane #1 (from top)(full search) - Static

Ten Most Critical. C:HAS31CB.PLT By: AC 10/05/99 12:23pm

#	FS
a	3.31
b	3.45
c	3.46
d	3.48
e	3.48
f	3.48
g	3.48
h	3.49
i	3.49
j	3.51

Label	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.
TQs-Xbd	1	119	119	410	40.5	0	0	
Bd.Plane	2	129	129	1570	12	0	0	

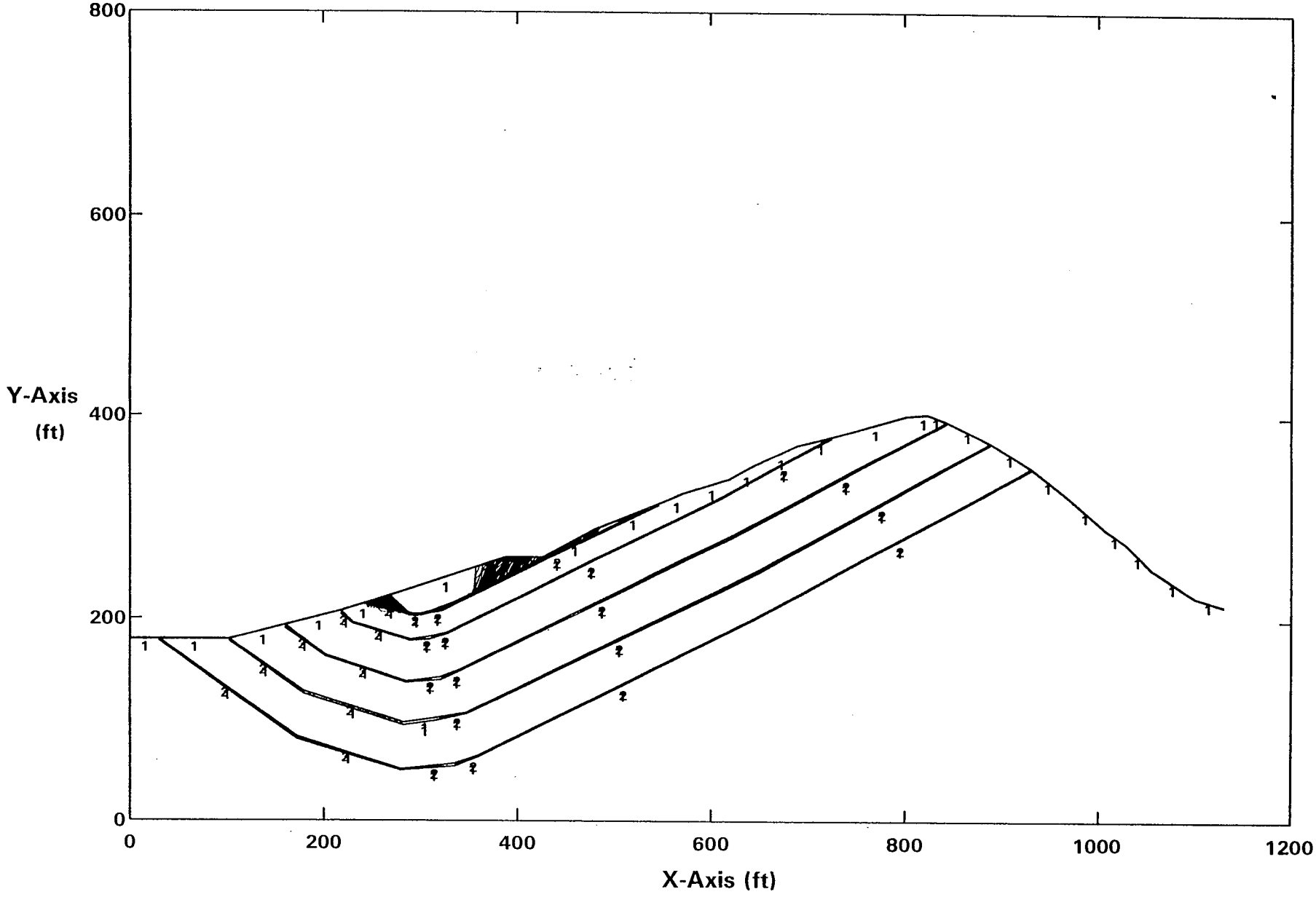


PCSTABL5M FSmin = 3.31 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Hasley Cyn-Sect.31-31'-Bedding Plane #1 (from top)(full search) - Static

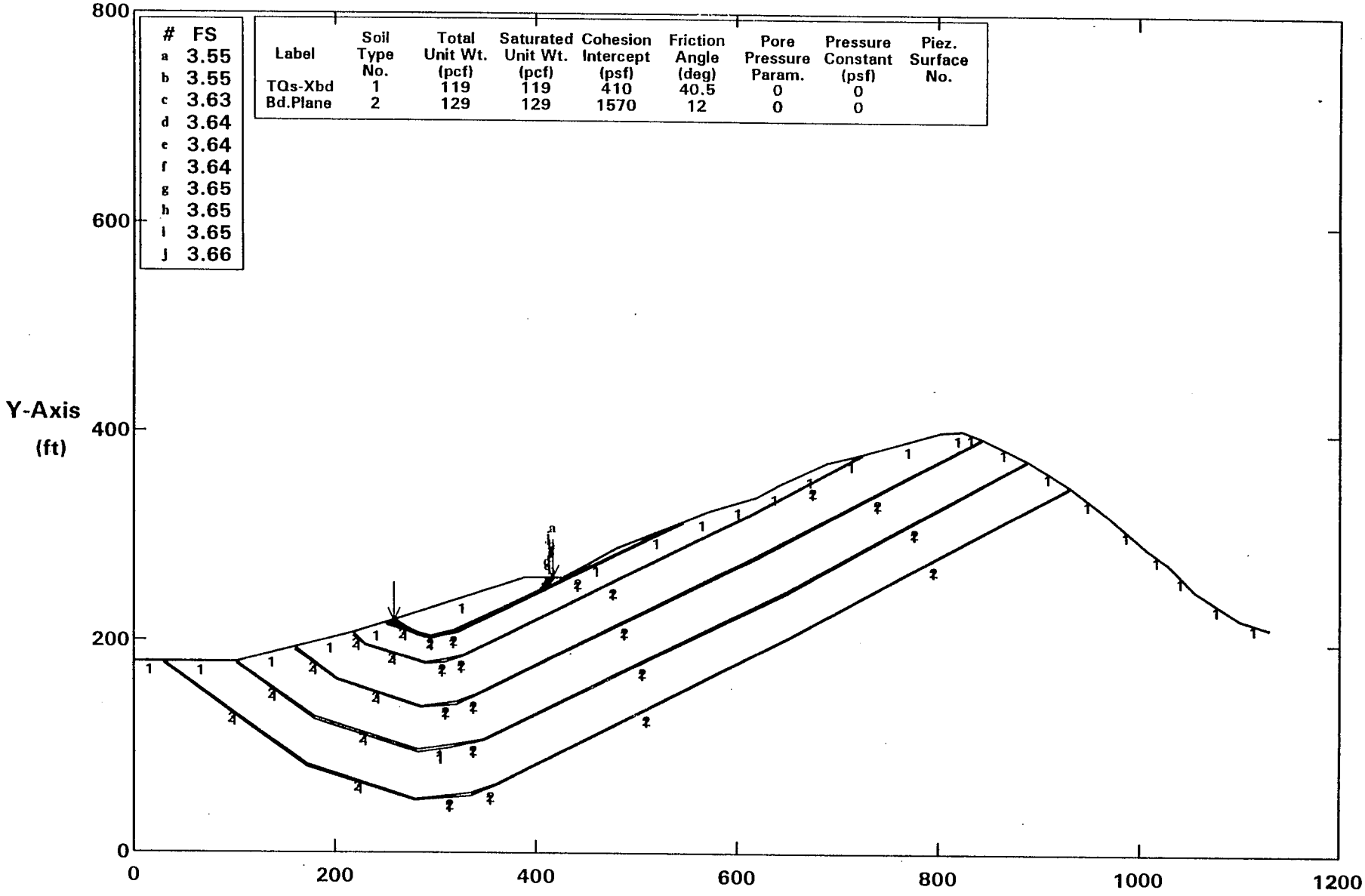
All surfaces evaluated. C:HAS31CB.PLT By: EC 8/20/99 3:16pm



Factors Of Safety Calculated By The Modified Janbu Method

Hasley Cyn-Sect.31-31'-Bedding Plane #1 (from top)(and lower half)- Static

Ten Most Critical. C:HAS31CA.PLT By: AC 10/05/99 12:20pm



#	FS
a	3.55
b	3.55
c	3.63
d	3.64
e	3.64
f	3.64
g	3.65
h	3.65
i	3.65
j	3.66

Label	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.
TQs-Xbd	1	119	119	410	40.5	0	0	
Bd.Plane	2	129	129	1570	12	0	0	

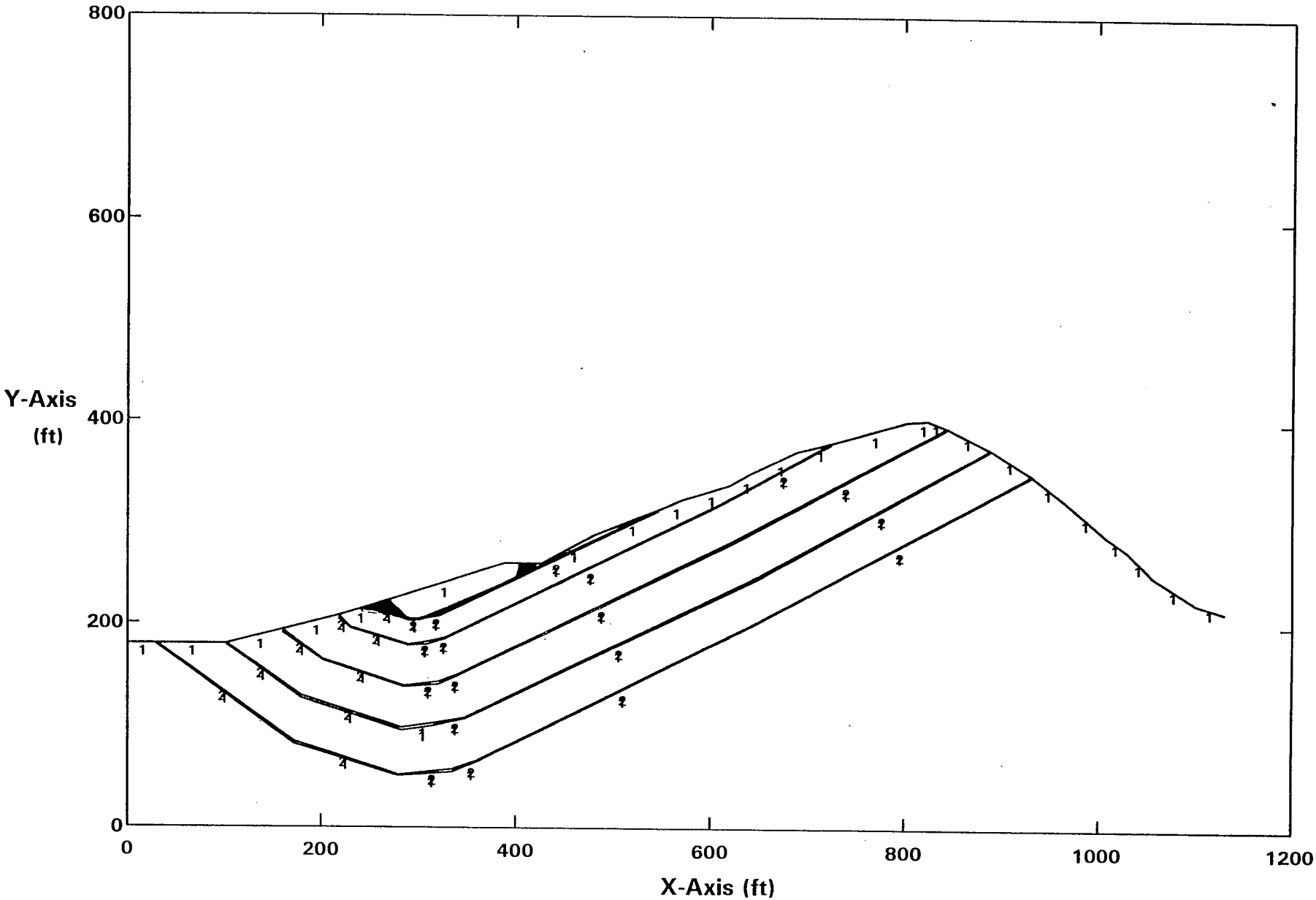
PCSTABL5M FSmin = 3.55 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run No. 14

Hasley Cyn-Sect.31-31'-Bedding Plane #1 (from top)(and lower half)- Static

All surfaces evaluated. C:HAS31CA.PLT By: EC 8/20/99 3:19pm

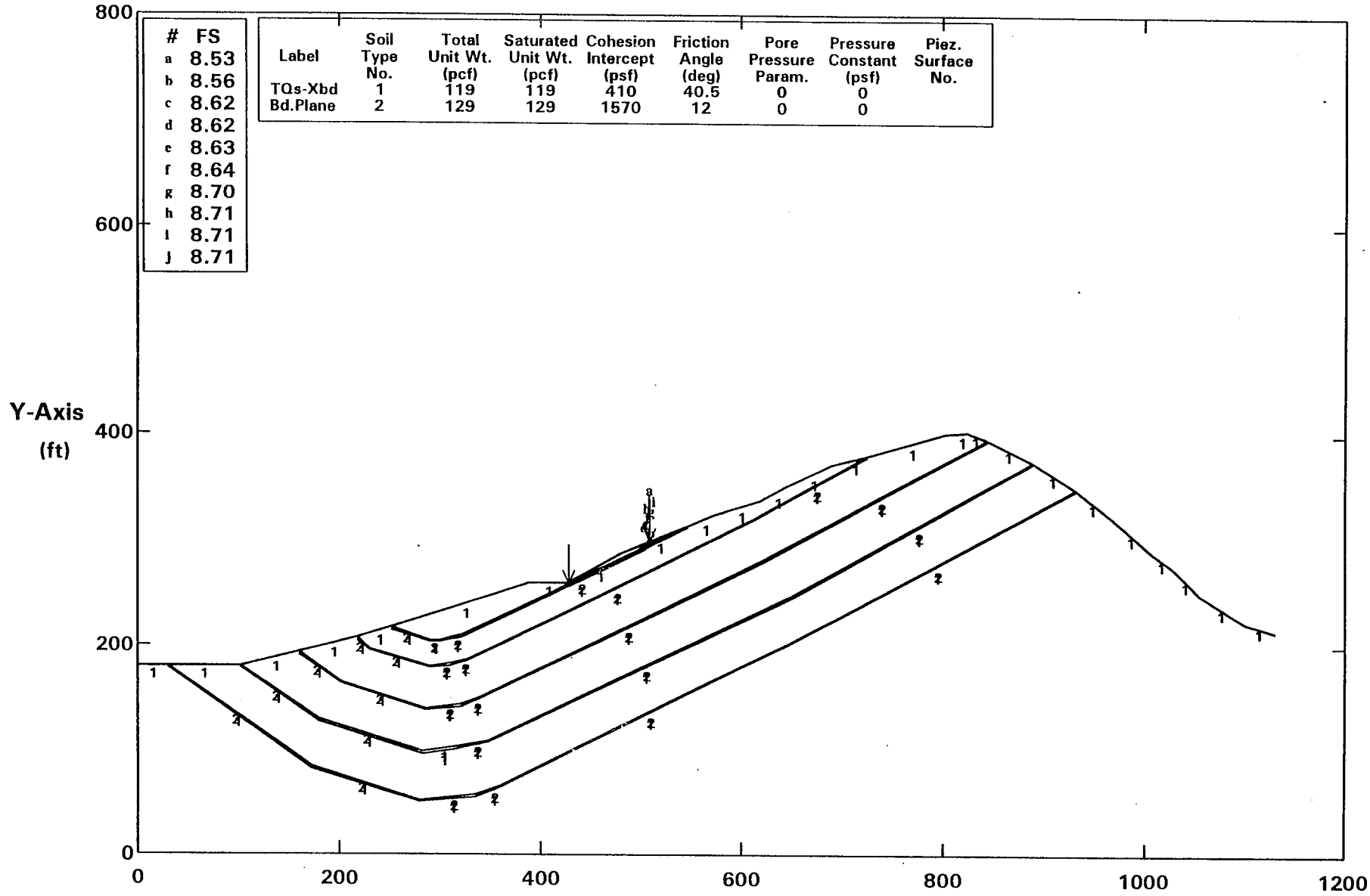


Factors Of Safety Calculated By The Modified Janbu Method

14

Hasley Cyn-Sect.31-31'-Bedding Plane #1 (from top)- Static

Ten Most Critical. C:HAS31C.PLT By: AC 10/05/99 12:14pm



#	FS
a	8.53
b	8.56
c	8.62
d	8.62
e	8.63
f	8.64
g	8.70
h	8.71
i	8.71
j	8.71

Label	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.
TQs-Xbd	1	119	119	410	40.5	0	0	
Bd.Plane	2	129	129	1570	12	0	0	

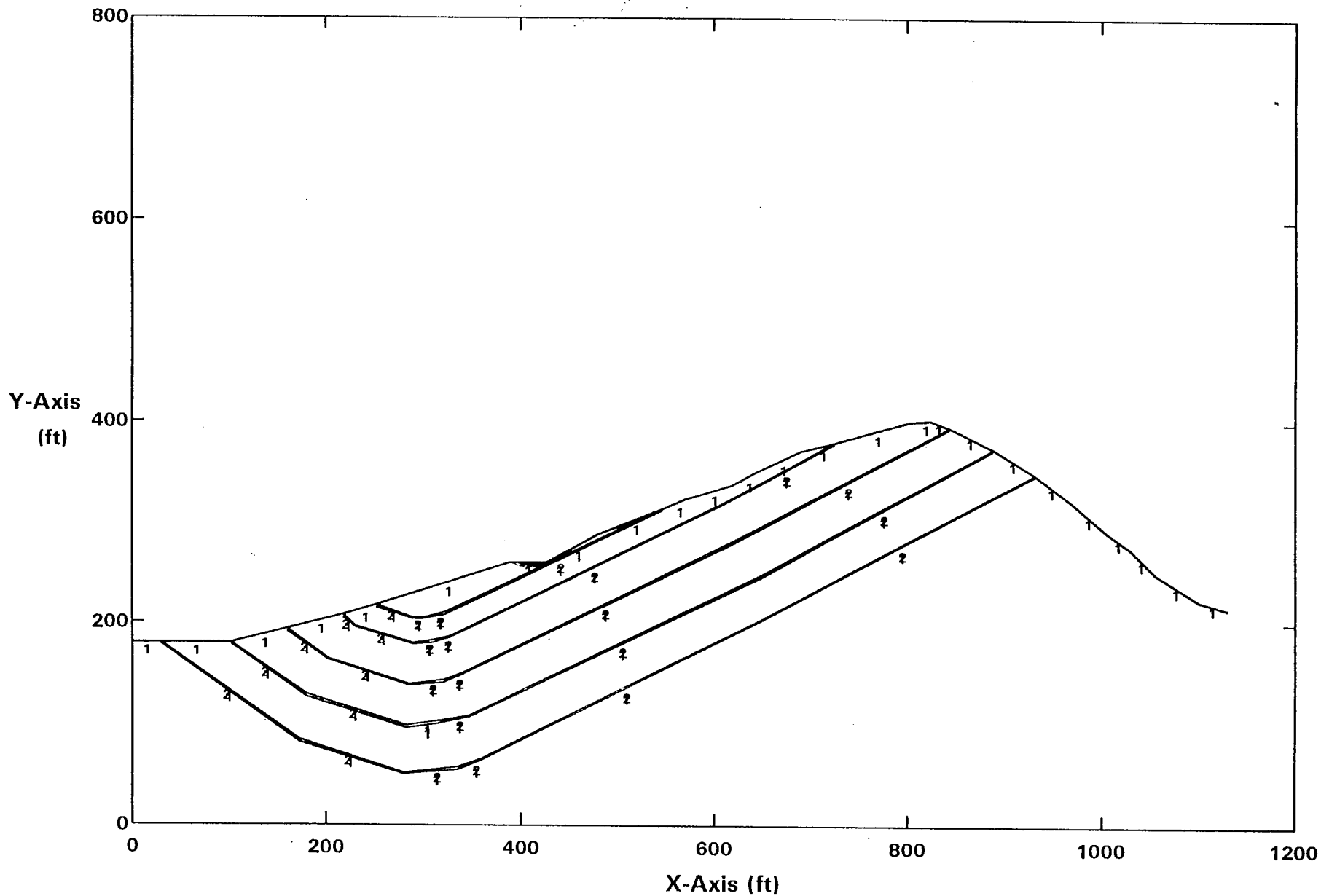
PCSTABL5M FSmin = 8.53 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run No. 15

Hasley Cyn-Sect.31-31'-Bedding Plane #1 (from top)- Static

All surfaces evaluated. C:HAS31C.PLT By: EC 8/20/99 3:21pm

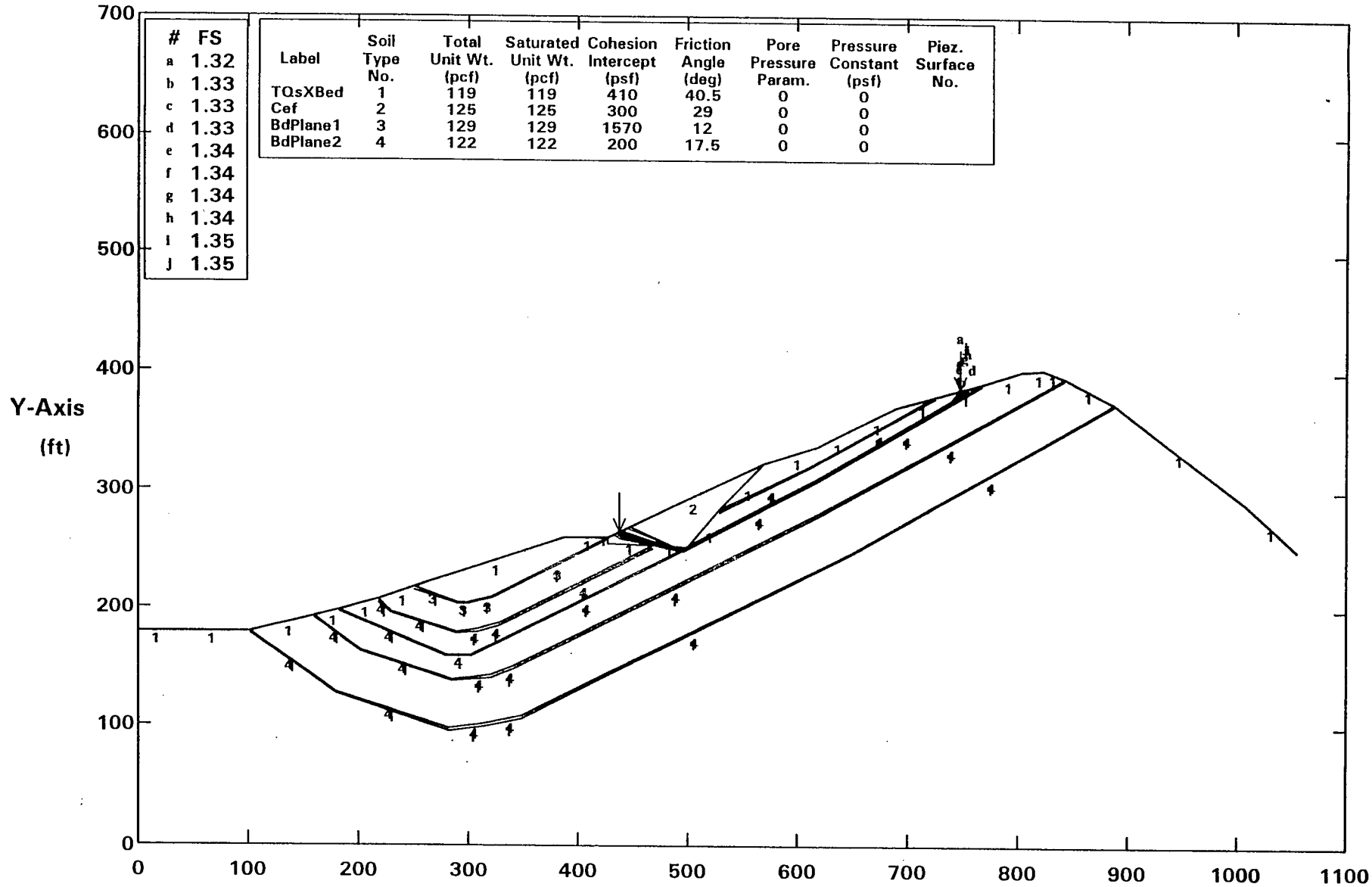


Factors Of Safety Calculated By The Modified Janbu Method

15

TT52584-Sec.31-31'-Plane 2A-Search- Static

Ten Most Critical. C:SEC31(2A.PLT By: AC 10/05/99 12:09pm



#	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	1.35
j	1.35

Label	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.
TQsXBed	1	119	119	410	40.5	0	0	
Cef	2	125	125	300	29	0	0	
BdPlane1	3	129	129	1570	12	0	0	
BdPlane2	4	122	122	200	17.5	0	0	

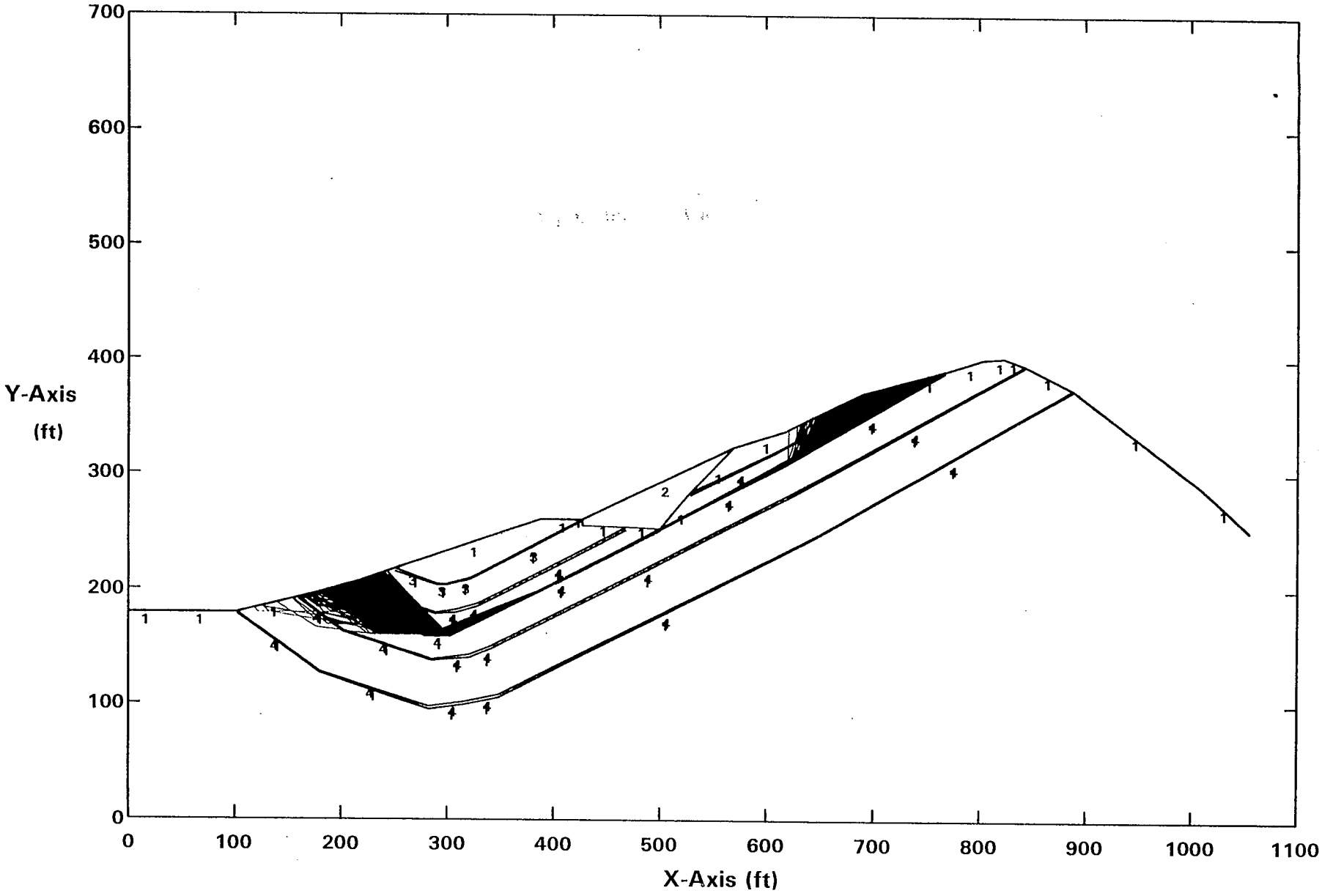
PCSTABL5M FSmin = 1.32 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run No. 16

TT52584-Sec.31-31'-Plane 2A-Search- Static

All surfaces evaluated. C:SEC31(2A.PLT By: AC 8/30/99 12:22pm



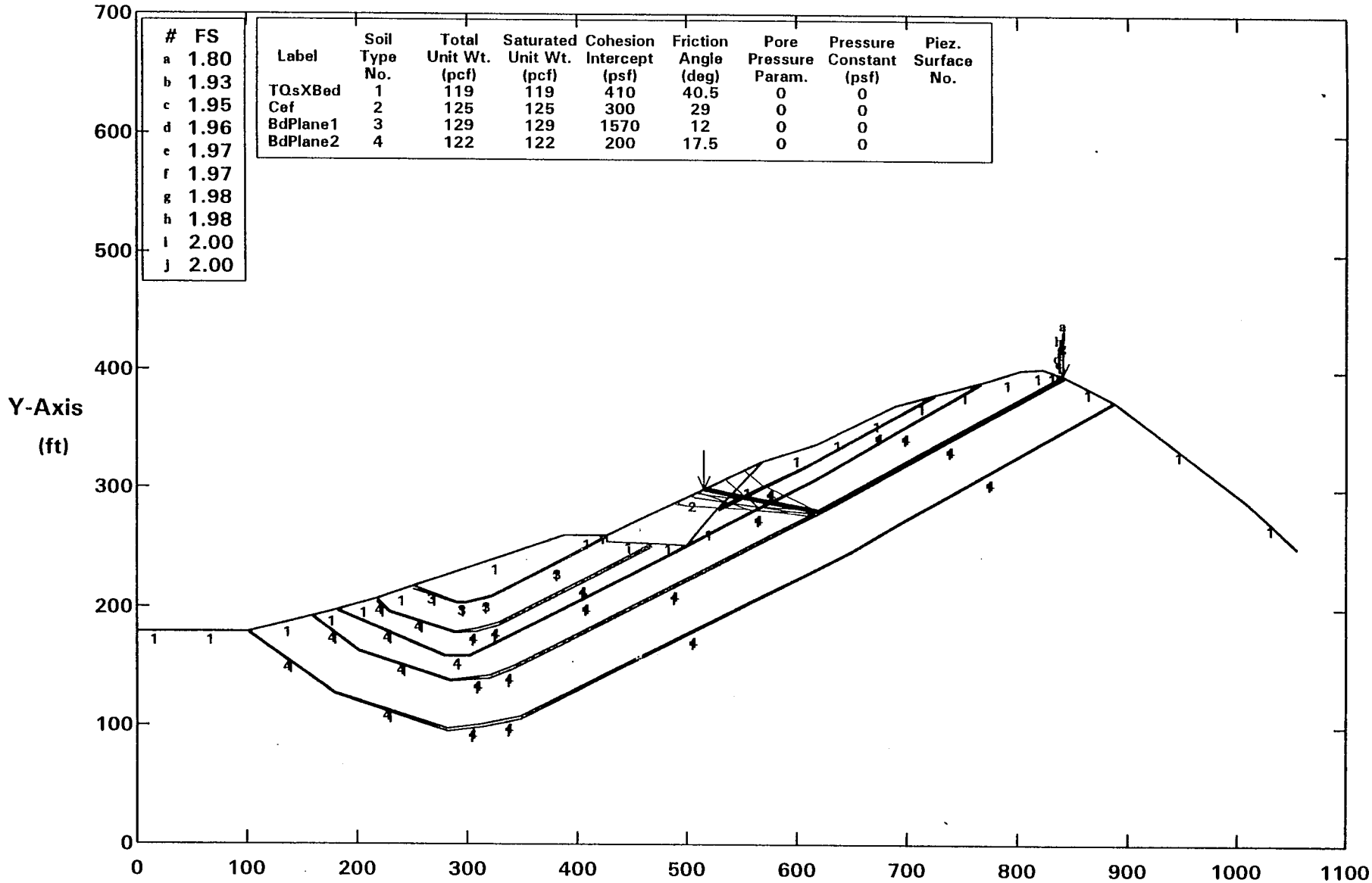
Factors Of Safety Calculated By The Modified Janbu Method

TT52584-Sec.31-31'-Plane 3-Search-Static

Ten Most Critical. C:SEC31(3).PLT By: AC 10/05/99 12:06pm

#	FS
a	1.80
b	1.93
c	1.95
d	1.96
e	1.97
f	1.97
g	1.98
h	1.98
i	2.00
j	2.00

Label	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.
TQsXBed	1	119	119	410	40.5	0	0	
Cef	2	125	125	300	29	0	0	
BdPlane1	3	129	129	1570	12	0	0	
BdPlane2	4	122	122	200	17.5	0	0	



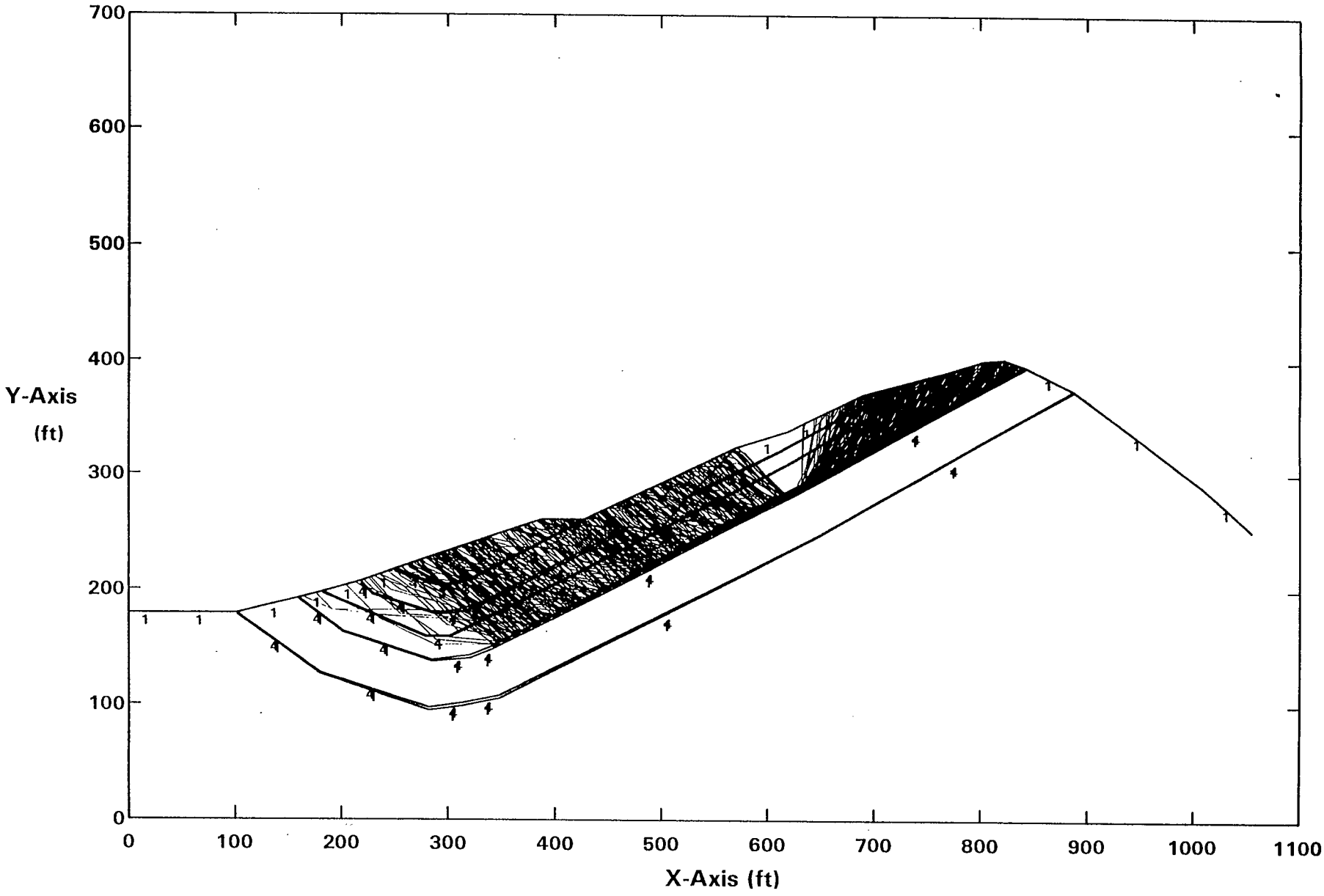
PCSTABL5M FSmin = 1.80 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run No. 17

TT52584-Sec.31-31'-Plane 3-Search-Static

All surfaces evaluated. C:SEC31(3).PLT By: AC 8/30/99 4:38pm

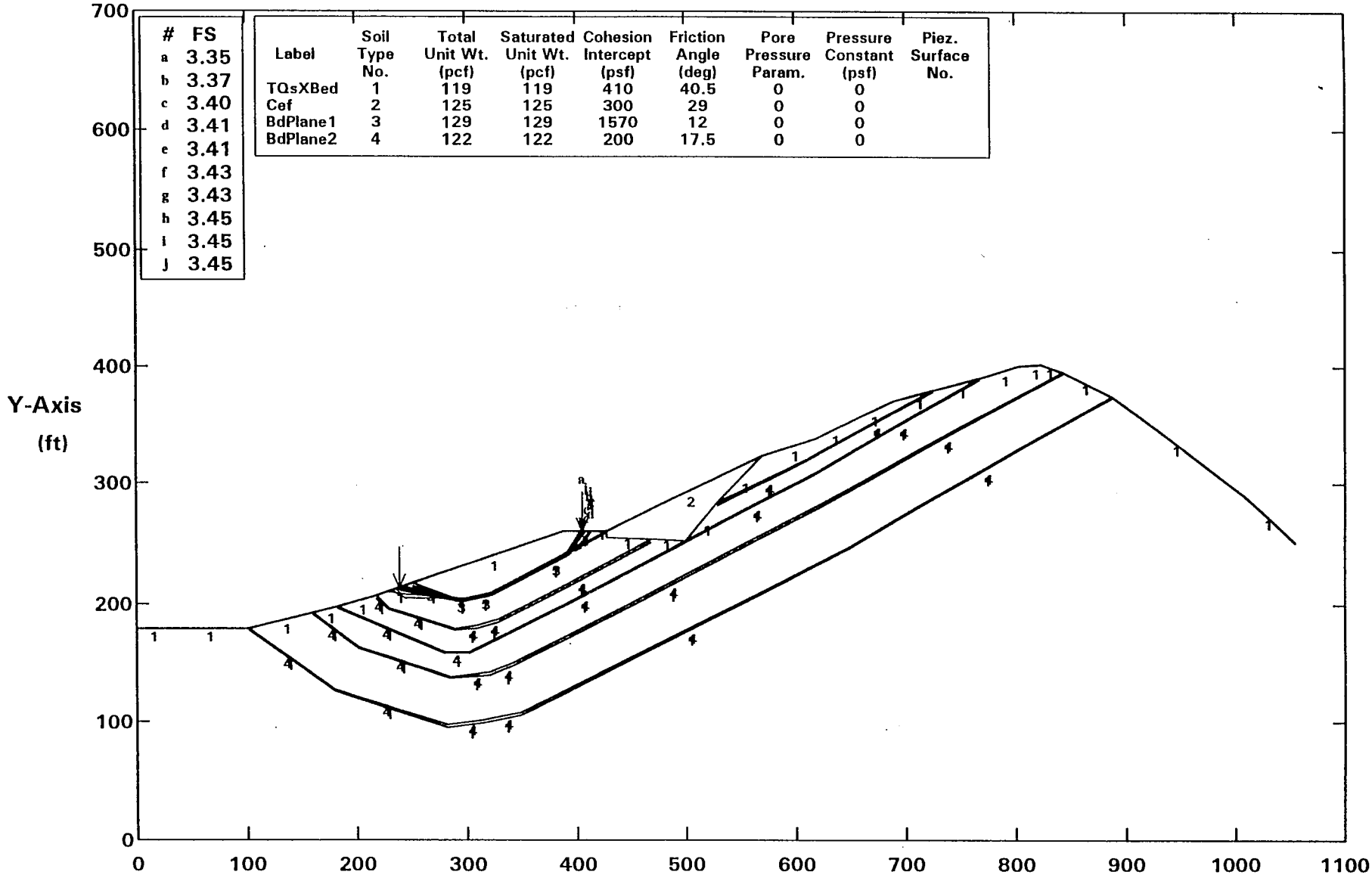


Factors Of Safety Calculated By The Modified Janbu Method

17.

TT52584-Sec.31-31'-Plane 1-Search-Static

Ten Most Critical. C:SEC31(1).PLT By: AC 10/05/99 12:02pm



#	FS
a	3.35
b	3.37
c	3.40
d	3.41
e	3.41
f	3.43
g	3.43
h	3.45
i	3.45
j	3.45

Label	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.
TQsXBed	1	119	119	410	40.5	0	0	
Cef	2	125	125	300	29	0	0	
BdPlane1	3	129	129	1570	12	0	0	
BdPlane2	4	122	122	200	17.5	0	0	

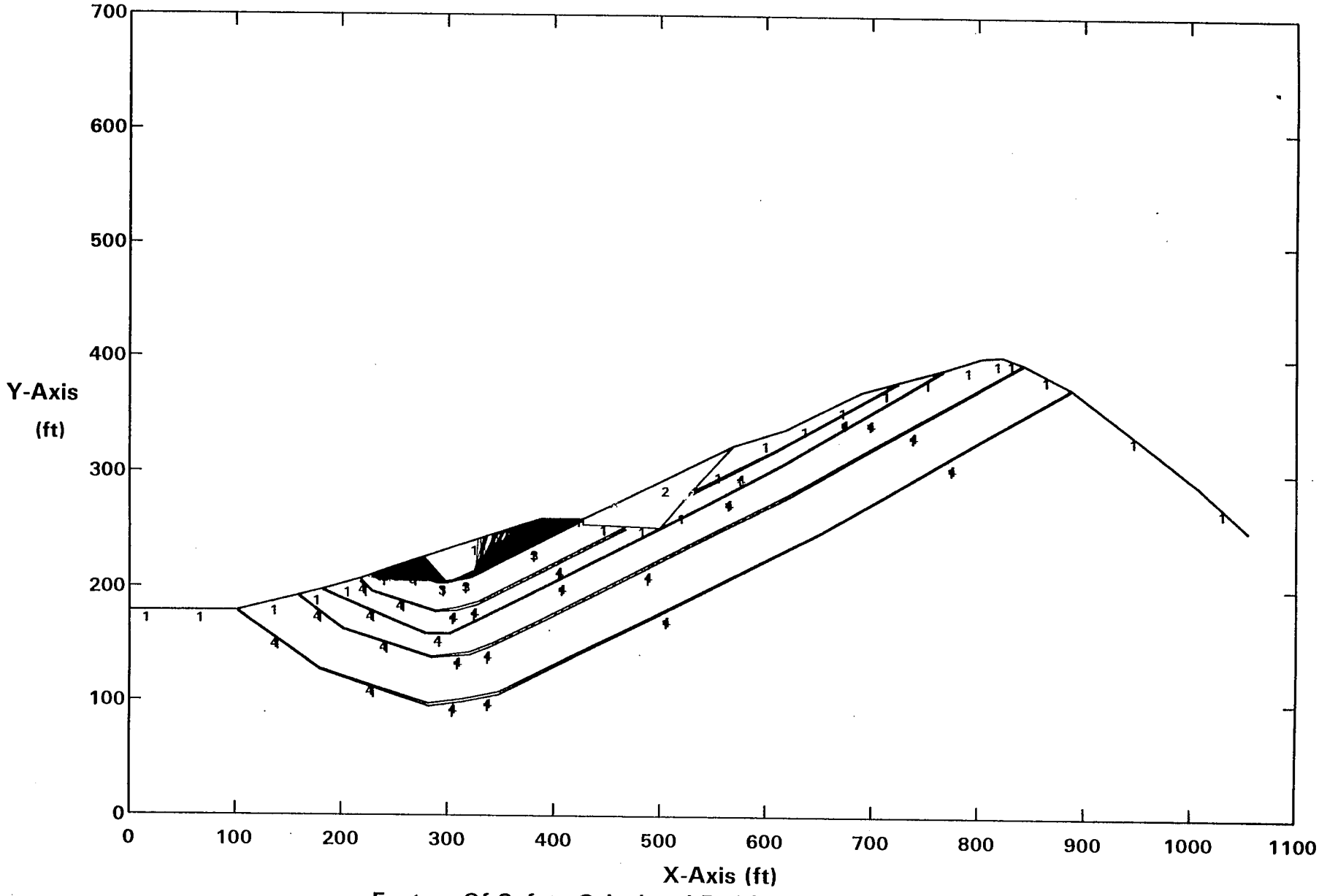
PCSTABL5M FSmin = 3.35 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Rev No. 18

TT52584-Sec.31-31'-Plane 1-Search-Static

All surfaces evaluated. C:SEC31(1).PLT By: AC 8/27/99 2:57pm



Factors Of Safety Calculated By The Modified Janbu Method

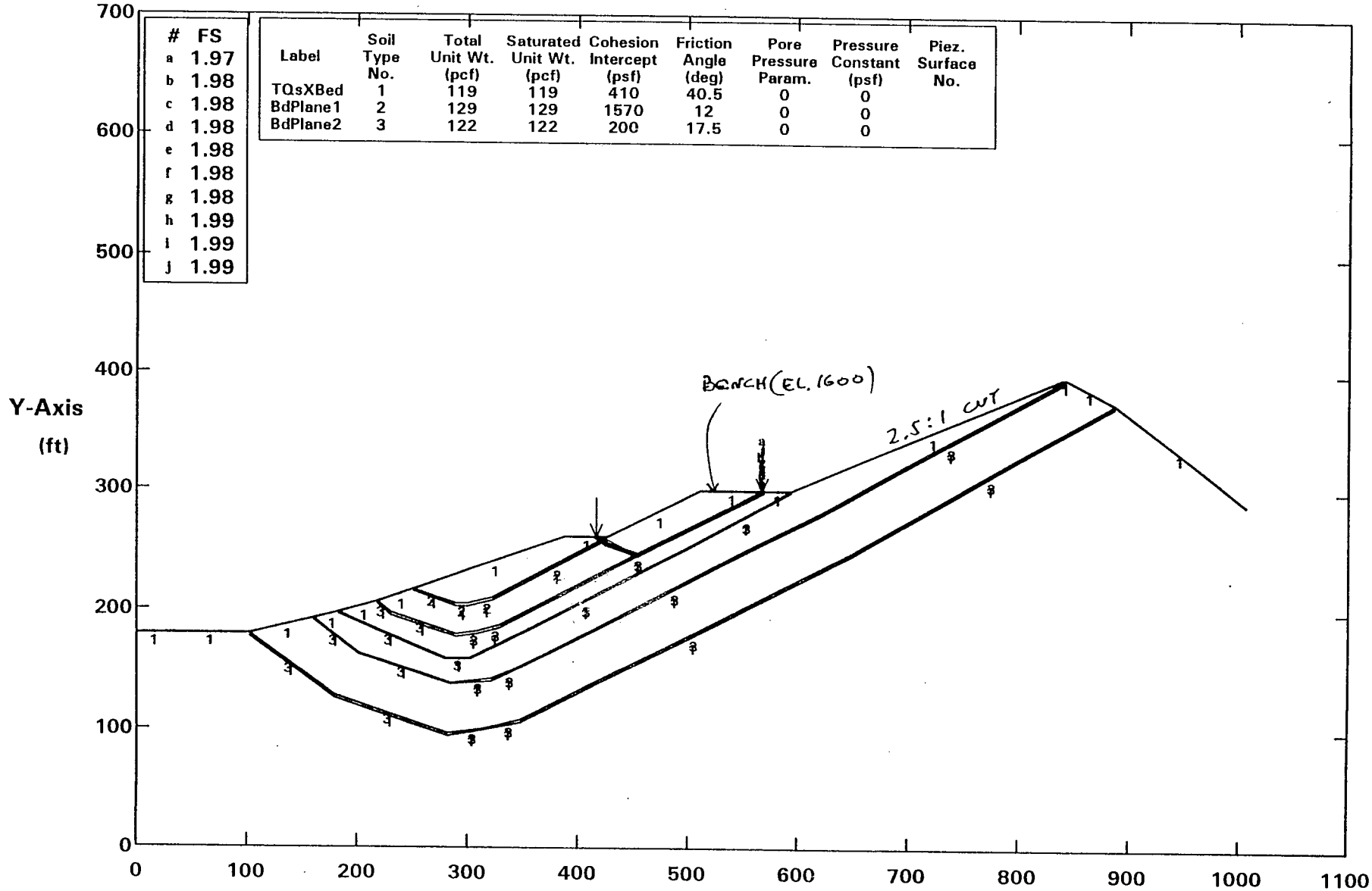
18

TT52584-Sec.31-31'w/BENCH @El.1600 & 2.5 :1 cut above-Plane 2-Search-Static

Ten Most Critical. C:SC31(2).PLT By: AC 10/05/99 11:58am

#	FS
a	1.97
b	1.98
c	1.98
d	1.98
e	1.98
f	1.98
g	1.98
h	1.99
i	1.99
j	1.99

Label	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.
TQsXBed	1	119	119	410	40.5	0	0	
BdPlane1	2	129	129	1570	12	0	0	
BdPlane2	3	122	122	200	17.5	0	0	

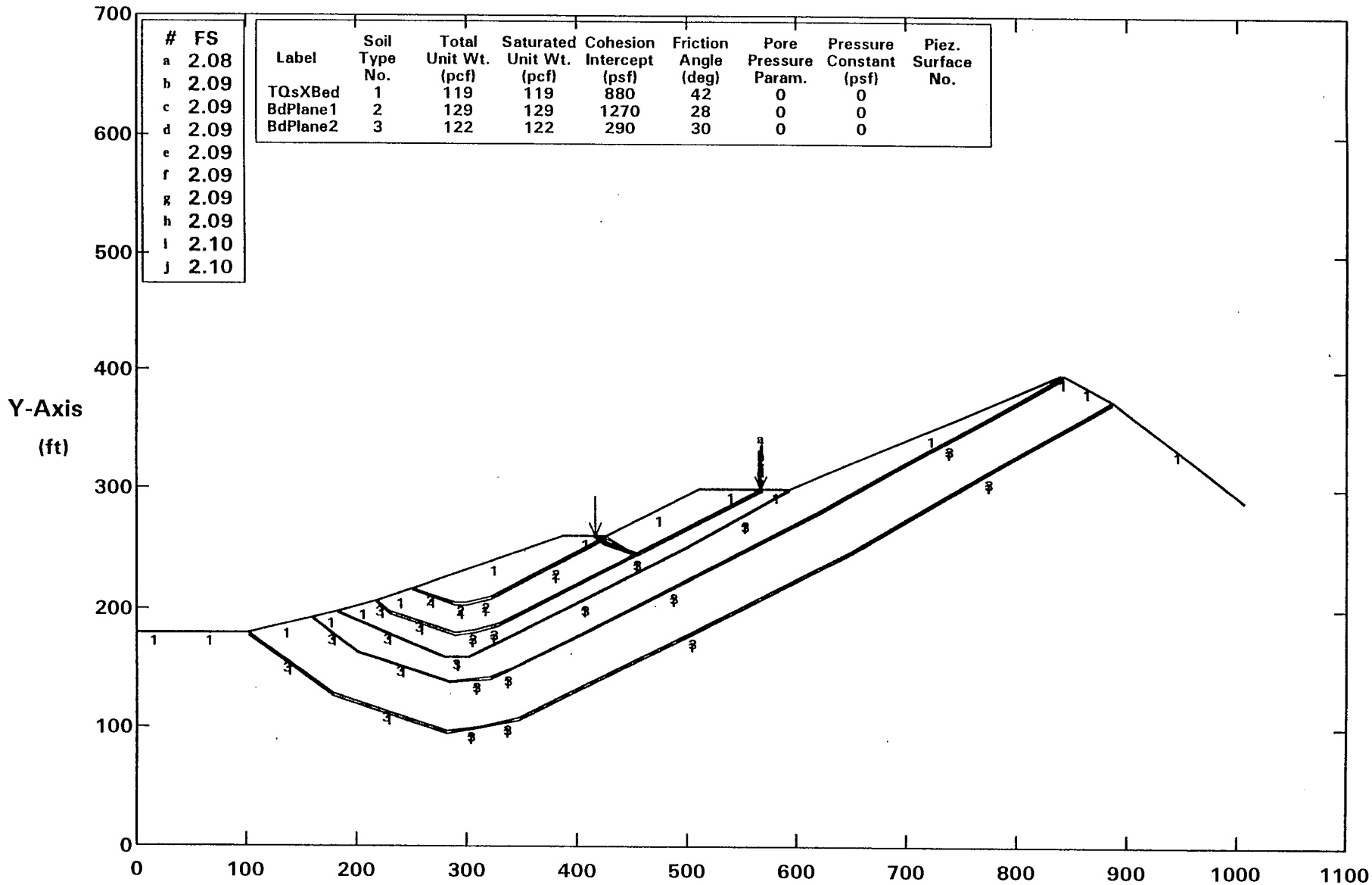


PCSTABL5M FSmin = 1.97 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run No. 19

TT52584-Sec.31-31'w/BENCH @El.1600 & 2.5:1 cut above-Plane 2-Search-Pseudostatic
Ten Most Critical. C:SC31(2)'.PLT By: AC 10/18/99 3:37pm



#	FS
a	2.08
b	2.09
c	2.09
d	2.09
e	2.09
f	2.09
g	2.09
h	2.09
i	2.10
j	2.10

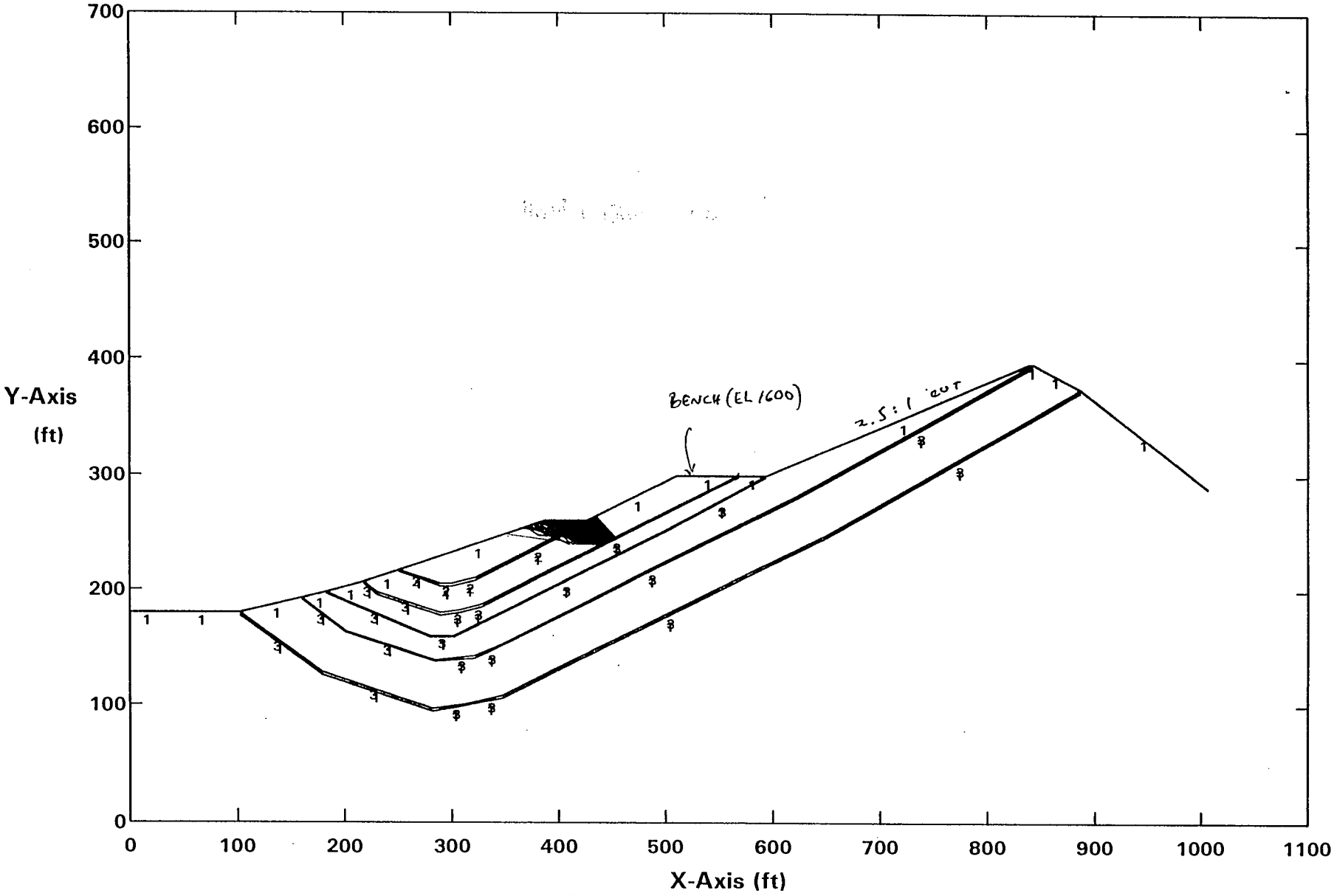
Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
TQsXBed	1	119	119	880	42	0	0	
BdPlane1	2	129	129	1270	28	0	0	
BdPlane2	3	122	122	290	30	0	0	

PCSTABL5M FSmin = 2.08 X-Axis (ft)
Factors Of Safety Calculated By The Modified Janbu Method

Run No. 20

TT52584-Sec.31-31'w/BENCH @El.1600 & 2.5 :1 cut above-Plane 2-Search-Static

All surfaces evaluated. C:SC31(2).PLT By: AC 9/02/99 6:02pm



Factors Of Safety Calculated By The Modified Janbu Method

C-19

** PCSTABL5M **

by
Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	10/05/99
Time of Run:	11:58am
Run By:	AC
Input Data Filename:	C:SC31(2).IN
Output Filename:	C:SC31(2).OUT
Plotted Output Filename:	C:SC31(2).PLT

PROBLEM DESCRIPTION TT52584-Sec.31-31'w/BENCH @El.1600 & 2.5
:1 cut above-Plane 2-Search-Static

BOUNDARY COORDINATES

15 Top Boundaries
65 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	180.00	30.00	180.00	1
2	30.00	180.00	102.00	180.00	1
3	102.00	180.00	160.00	193.00	1
4	160.00	193.00	182.00	198.00	1
5	182.00	198.00	218.00	207.00	1
6	218.00	207.00	251.00	217.00	1
7	251.00	217.00	388.00	260.00	1
8	388.00	260.00	427.00	260.00	1
9	427.00	260.00	511.00	300.00	1
10	511.00	300.00	568.00	300.00	1
11	568.00	300.00	594.00	300.00	1
12	594.00	300.00	840.00	397.00	1
13	840.00	397.00	843.00	396.00	1
14	843.00	396.00	888.00	375.00	1
15	888.00	375.00	1007.00	290.00	1
16	251.00	217.00	290.00	205.00	2
17	290.00	205.00	300.00	205.00	2
18	300.00	205.00	322.00	210.00	2
19	322.00	210.00	427.00	260.00	2
20	251.00	215.00	290.00	203.00	1
21	290.00	203.00	300.00	203.00	1
22	300.00	203.00	322.00	208.00	1

RUN No 19

23	322.00	208.00	427.00	258.00	1
24	218.00	207.00	230.00	197.00	3
25	230.00	197.00	289.00	180.00	3
26	289.00	180.00	309.00	182.00	3
27	309.00	182.00	328.00	187.00	3
28	328.00	187.00	568.00	300.00	3
29	218.00	205.00	230.00	195.00	1
30	230.00	195.00	289.00	178.00	1
31	289.00	178.00	309.00	180.00	1
32	309.00	180.00	328.00	185.00	1
33	328.00	185.00	568.00	298.00	1
34	182.00	198.00	280.00	160.00	3
35	280.00	160.00	302.00	160.00	3
36	302.00	160.00	500.00	252.00	3
37	500.00	252.00	594.00	300.00	3
38	182.00	196.00	280.00	158.00	1
39	280.00	158.00	302.00	158.00	1
40	302.00	158.00	500.00	250.00	1
41	500.00	250.00	594.00	298.00	1
42	160.00	193.00	202.00	164.00	3
43	202.00	164.00	285.00	139.00	3
44	285.00	139.00	321.00	142.00	3
45	321.00	142.00	341.00	150.00	3
46	341.00	150.00	622.00	282.00	3
47	622.00	282.00	843.00	396.00	3
48	160.00	191.00	202.00	162.00	1
49	202.00	162.00	285.00	137.00	1
50	285.00	137.00	321.00	140.00	1
51	321.00	140.00	341.00	148.00	1
52	341.00	148.00	622.00	280.00	1
53	622.00	280.00	843.00	394.00	1
54	102.00	180.00	179.00	128.00	3
55	179.00	128.00	282.00	97.00	3
56	282.00	97.00	314.00	101.00	3
57	314.00	101.00	348.00	108.00	3
58	348.00	108.00	650.00	248.00	3
59	650.00	248.00	888.00	375.00	3
60	102.00	178.00	179.00	126.00	1
61	179.00	126.00	282.00	95.00	1
62	282.00	95.00	314.00	99.00	1
63	314.00	99.00	348.00	106.00	1
64	348.00	106.00	650.00	246.00	1
65	650.00	246.00	888.00	373.00	1

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	119.0	119.0	410.0	40.5	.00	.0	0
2	129.0	129.0	1570.0	12.0	.00	.0	0

3	122.0	122.0	200.0	17.5	.00	.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.

400 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	440.00	238.70	455.00	245.80	.10
2	565.00	297.60	568.00	299.00	.10

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	416.59	260.00
2	425.89	254.12
3	454.68	245.69
4	567.11	298.62
5	568.23	300.00

*** 1.974 ***

Individual data on the 10 slices

Slice	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	4.5	753.1	.0	.0	.0	.0	.0	.0	.0
2	1.8	748.0	.0	.0	.0	.0	.0	.0	.0
3	3.0	1831.6	.0	.0	.0	.0	.0	.0	.0
4	1.1	817.2	.0	.0	.0	.0	.0	.0	.0
5	26.4	51476.1	.0	.0	.0	.0	.0	.0	.0
6	1.3	4022.9	.0	.0	.0	.0	.0	.0	.0
7	56.3	185413.6	.0	.0	.0	.0	.0	.0	.0
8	56.1	97556.2	.0	.0	.0	.0	.0	.0	.0
9	.9	89.9	.0	.0	.0	.0	.0	.0	.0
10	.2	4.0	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	416.13	260.00
2	424.54	254.31
3	453.00	244.82
4	567.72	298.90
5	568.22	300.00

*** 1.978 ***

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	422.32	260.00
2	425.79	257.03
3	453.26	244.97
4	566.15	298.10
5	567.63	300.00

*** 1.978 ***

Failure Surface Specified By 5 Coordinate Points

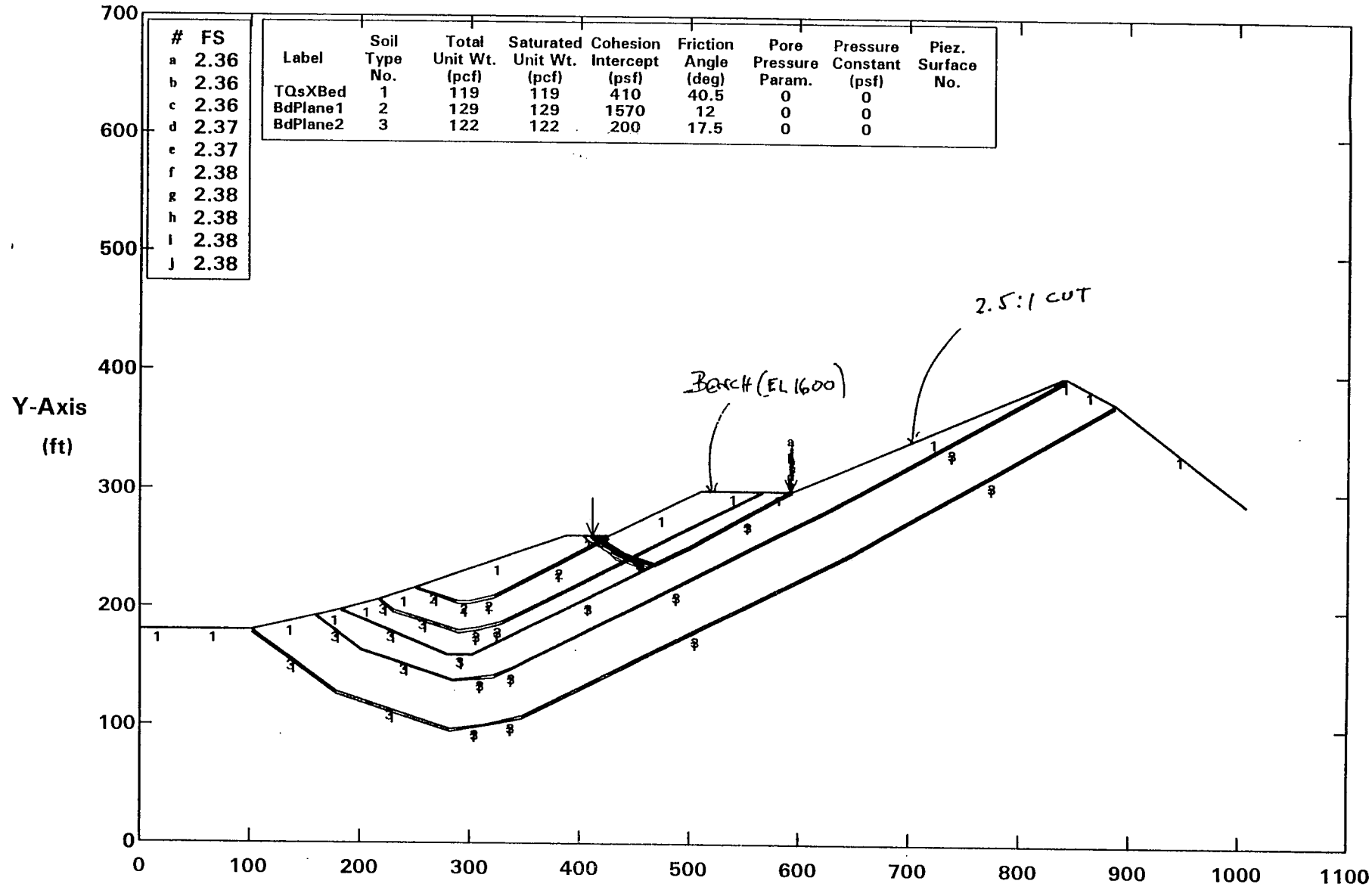
Point No.	X-Surf (ft)	Y-Surf (ft)

TT52584-Sec.31-31'w/BENCH @El.1600 & 2.5 :1 cut above-Plane 2A-Search-Static

Ten Most Critical. C:SC31(2A).PLT By: AC 10/05/99 11:54am

#	FS
a	2.36
b	2.36
c	2.36
d	2.37
e	2.37
f	2.38
g	2.38
h	2.38
i	2.38
j	2.38

Label	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.
TQsXBed	1	119	119	410	40.5	0	0	
BdPlane1	2	129	129	1570	12	0	0	
BdPlane2	3	122	122	200	17.5	0	0	



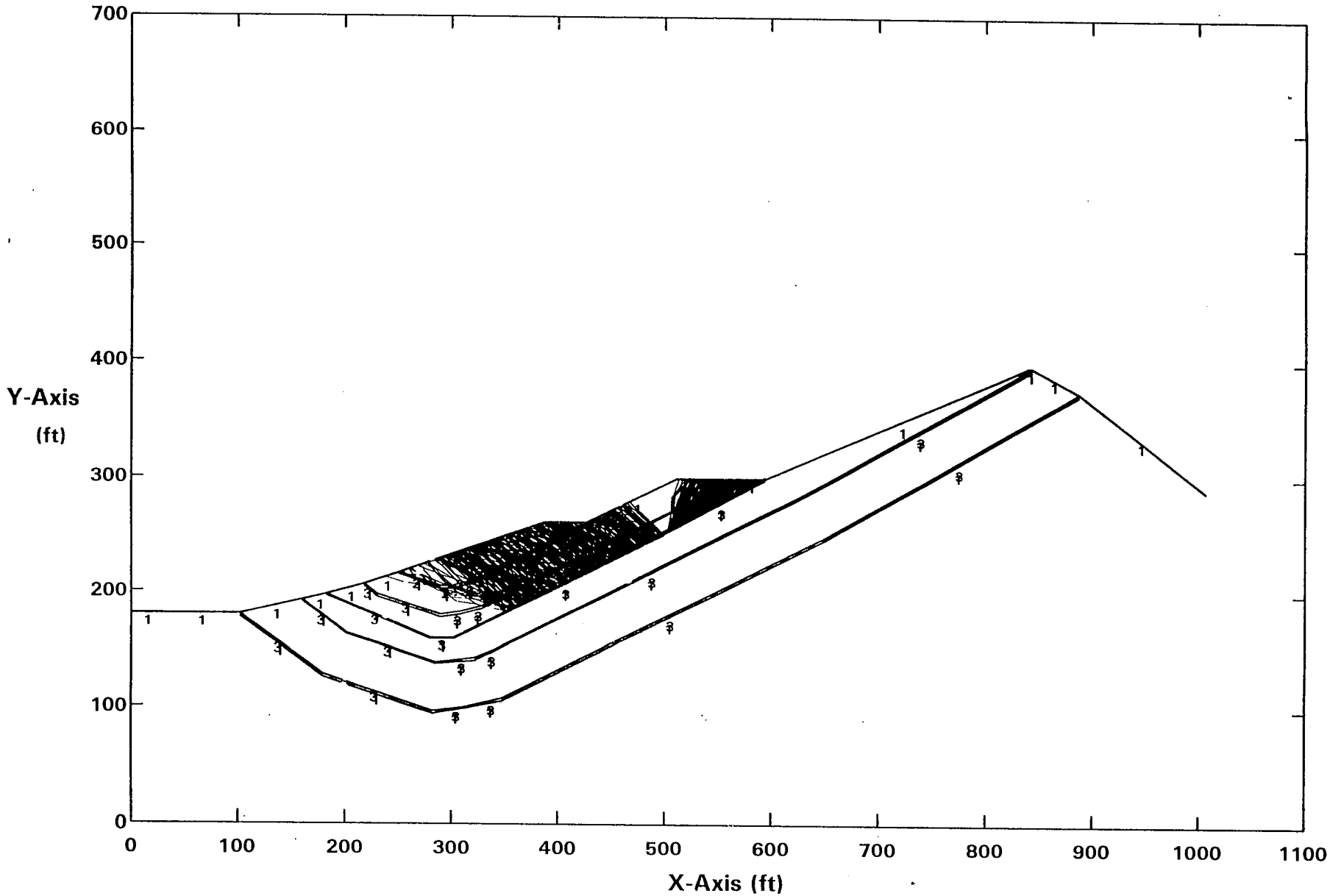
PCSTABL5M FSmin = 2.36 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run No. 21

TT52584-Sec.31-31'w/BENCH @El.1600 & 2.5 :1 cut above-Plane 2A-Search-Static

All surfaces evaluated. C:SC31(2A).PLT By: AC 9/02/99 6:22pm



Factors Of Safety Calculated By The Modified Janbu Method

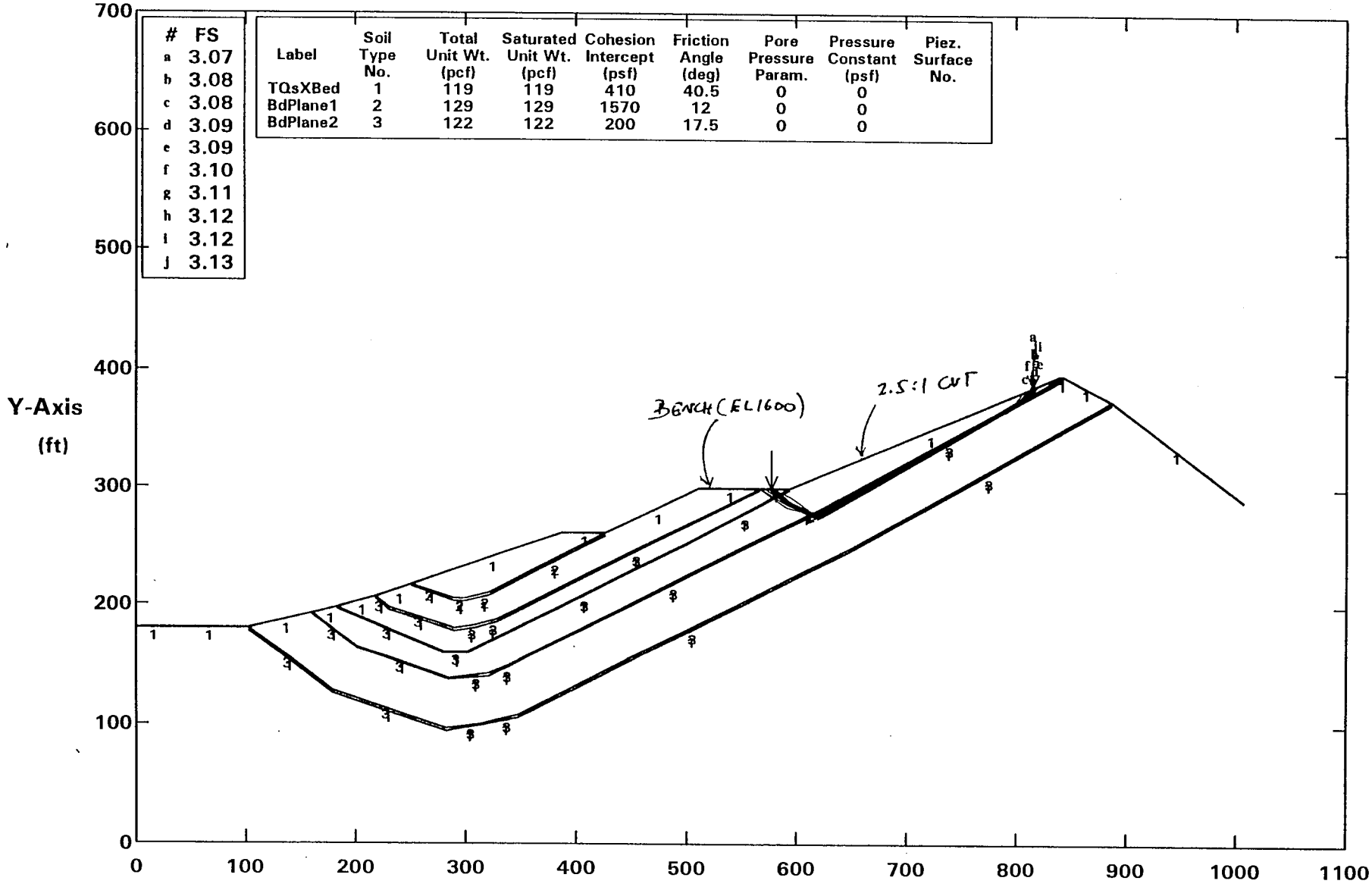
21

TT52584-Sec.31-31'w/BENCH @El.1600 & 2.5 :1 cut above-Plane 3-Search-Static

Ten Most Critical. C:SC31(3).PLT By: AC 10/05/99 11:32am

#	FS
a	3.07
b	3.08
c	3.08
d	3.09
e	3.09
f	3.10
g	3.11
h	3.12
i	3.12
j	3.13

Label	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.
TQsXBed	1	119	119	410	40.5	0	0	
BdPlane1	2	129	129	1570	12	0	0	
BdPlane2	3	122	122	200	17.5	0	0	



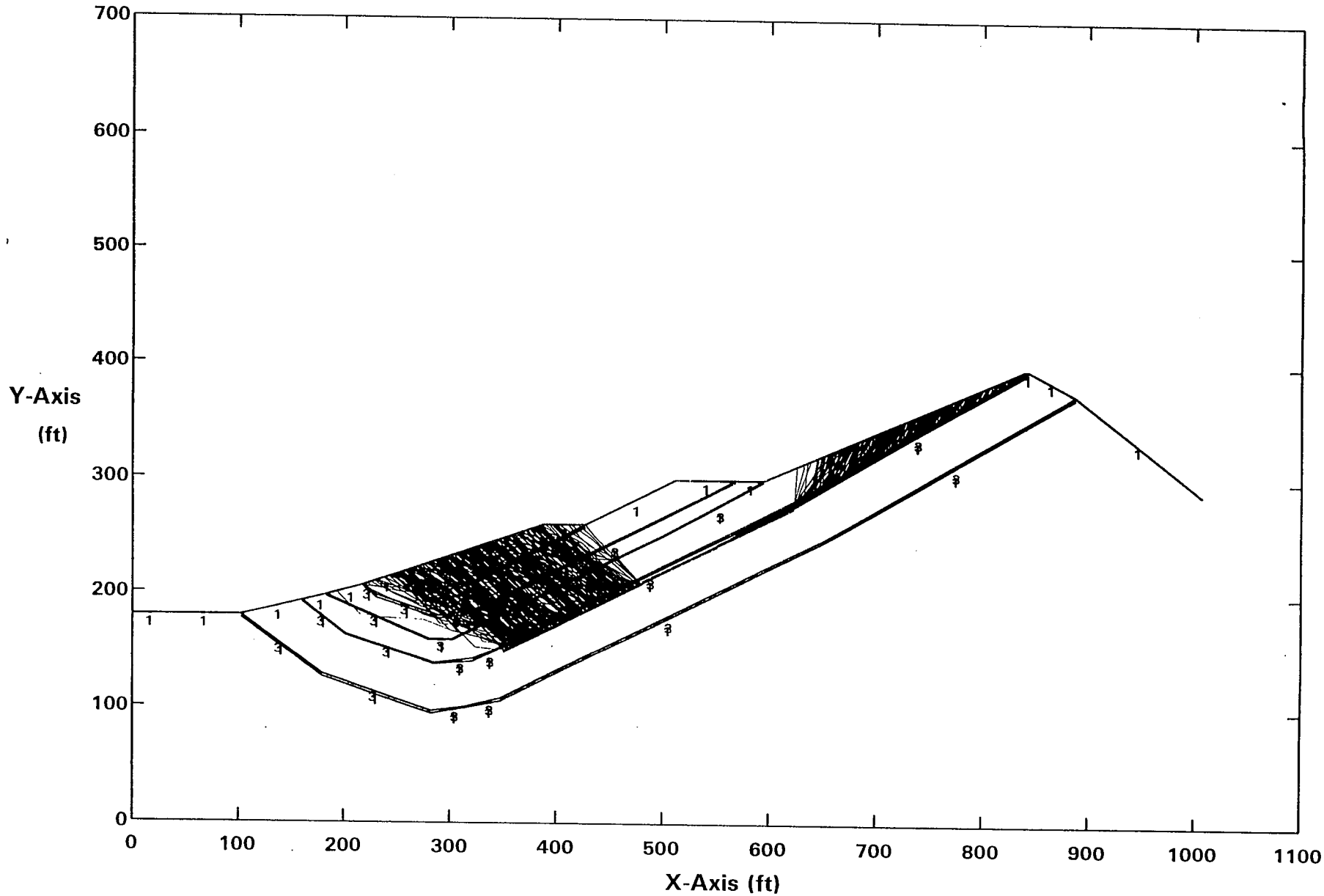
PCSTABL5M FSmin = 3.07 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run No. 22

TT52584-Sec.31-31'w/BENCH @El.1600 & 2.5 :1 cut above-Plane 3-Search-Static

All surfaces evaluated. C:SC31(3).PLT By: AC 9/03/99 10:09am

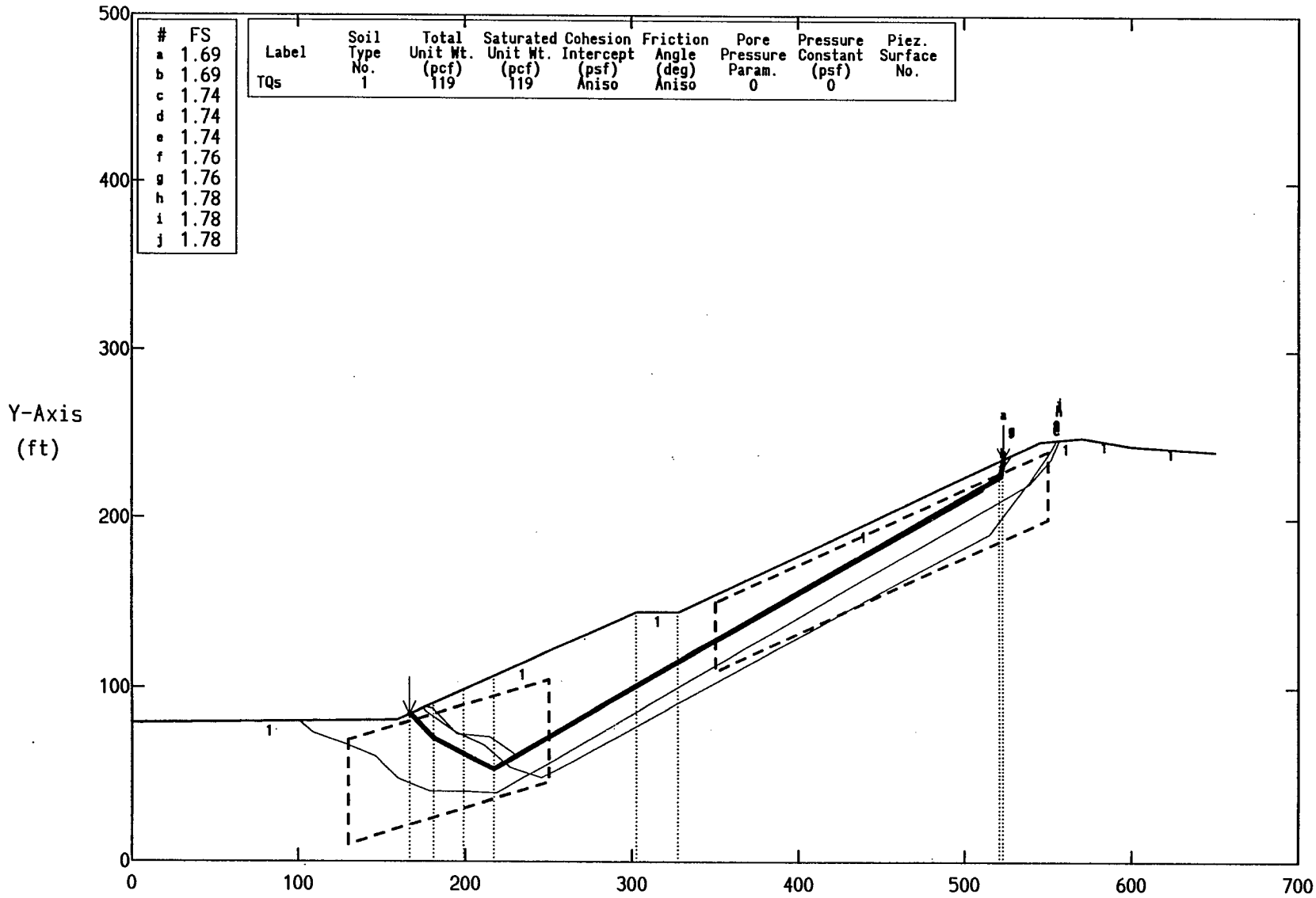


Factors Of Safety Calculated By The Modified Janbu Method

22

Hasley Canyon Cross Section 32-32' Cut Slope 7, 2:1, Static

Ten Most Critical. C:HC32S5.PLT By: DCS 10/01/99 3:08pm



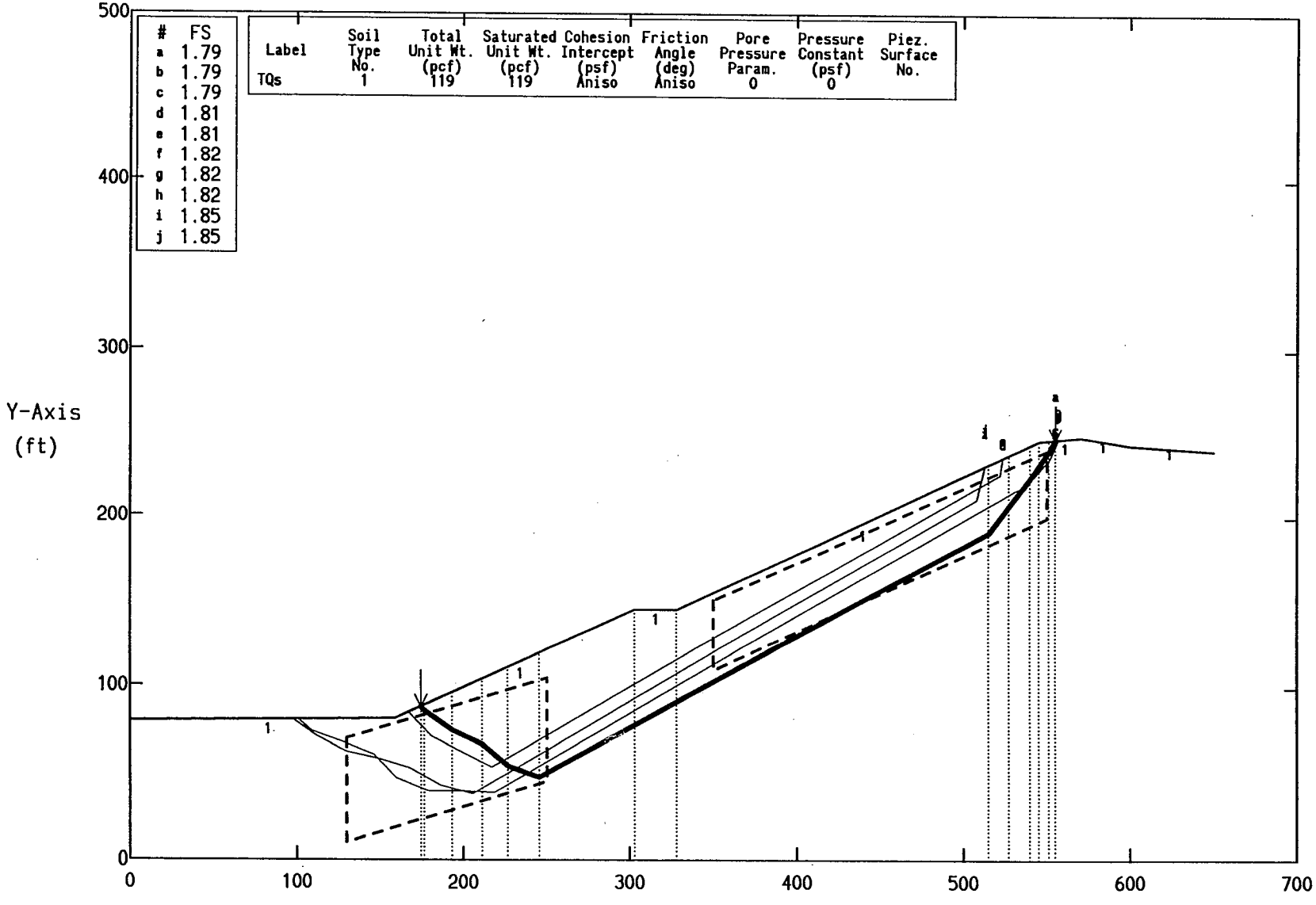
PCSTABL5M/SI FSmin=1.69 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run No. 23

Hasley Canyon Cross Section 32-32' Cut Slope 7, 2:1, Pseudostatic

Ten Most Critical. C:HC32P5.PLT By: DCS 10/01/99 3:20pm



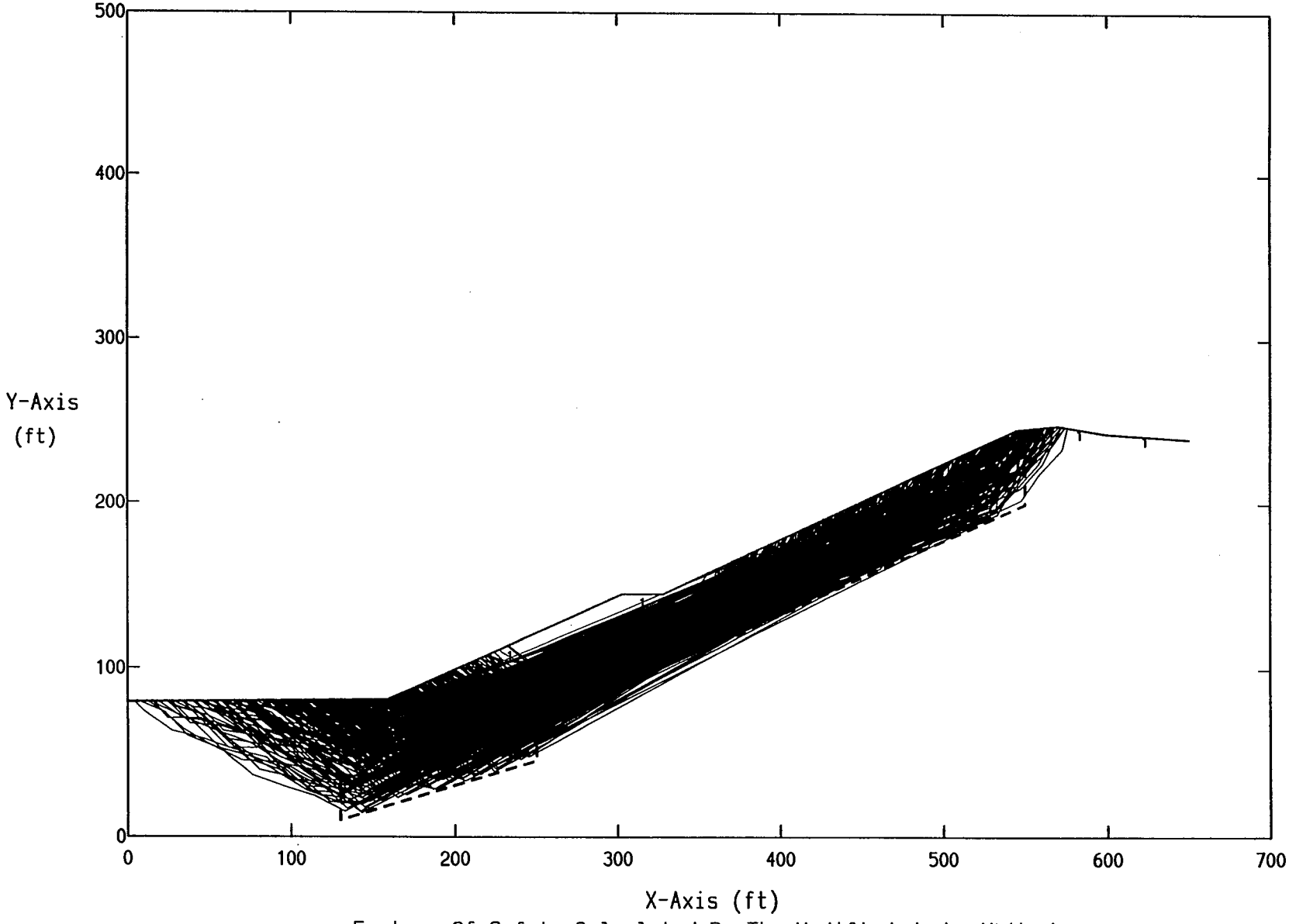
PCSTABL5M/SI FSmin=1.79 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run No. 24

Hasley Canyon Cross Section 32-32' Cut Slope 7, 2:1, Static

All surfaces evaluated. C:HC32S5.PLT By: DCS 10/01/99 3:08pm



Factors Of Safety Calculated By The Modified Janbu Method

23 of 24

** PCSTABL5M **

by
Purdue University

1

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date: 10/01/99

Time of Run: 3:08pm
Run By: DCS

Input Data Filename: C:HC32S5.IN
Output Filename: C:HC32S5.OUT
Unit: ENGLISH
Plotted Output Filename: C:HC32S5.PLT

PROBLEM DESCRIPTION Hasley Canyon Cross Section 32-32'

Cut Slope 7, 2:1, Static

BOUNDARY COORDINATES

7 Top Boundaries
7 Total Boundaries

Soil Type Below Bnd	Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)
	1	.00	80.00	159.00	81.00
1	2	159.00	81.00	303.00	145.00
1	3	303.00	145.00	328.00	145.00

Rup No. 23

```
    1
                4        328.00     145.00     545.00     245.00
    1
                5        545.00     245.00     570.00     248.00
    1
                6        570.00     248.00     600.00     243.00
    1
                7        600.00     243.00     650.00     240.00
    1
1
```

ISOTROPIC SOIL PARAMETERS

1 Type(s) of Soil

```
          Soil  Total  Saturated  Cohesion Friction   Pore   Press
ure   Piez.
          Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Const
ant Surface
           No.  (pcf)    (pcf)     (psf)     (deg)   Param.    (ps
f)    No.

            1   119.0    119.0     410.0     40.5     .00        .
0      0
```

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 1 Is Anisotropic

Number Of Direction Ranges Specified = 4

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	.0	410.0	40.5
2	28.0	410.0	40.5
3	32.0	200.0	17.4
4	90.0	410.0	40.5

Janbus Empirical Coef is being used for the case of c &
phi both > 0
1

A Critical Failure Surface Searching Method, Using A Ran
dom
Technique For Generating Sliding Block Surfaces, Has Bee
n
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	130.00	40.00	250.00	75.00	60.00
2	350.00	130.00	550.00	220.00	40.00

1

Following Are Displayed The Ten Most Critical Of The Tri
al
Failure Surfaces Examined. They Are Ordered - Most Crit
ical
First.

* * Safety Factors Are Calculated By The Modified Janbu
Method * *

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	166.97	84.54
2	167.03	84.48
3	181.25	70.42
4	199.33	61.85
5	217.33	53.13
6	521.23	224.98
7	523.09	234.90

*** 1.694 ***

Individual data on the 8 slices

Slice No.	Surcharge Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Ver (lbs)	Load (lbs)
1	.1	.3	.0	.0	.0	.0	.0	.0	.0
2	14.2	17404.7	.0	.0	.0	.0	.0	.0	.0
3	18.1	61880.2	.0	.0	.0	.0	.0	.0	.0
4	18.0	97316.9	.0	.0	.0	.0	.0	.0	.0
5	85.7	495544.2	.0	.0	.0	.0	.0	.0	.0
6	25.0	108150.9	.0	.0	.0	.0	.0	.0	.0
7	193.2	440914.7	.0	.0	.0	.0	.0	.0	.0
8	1.9	1002.5	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	166.97	84.54
2	167.03	84.48
3	181.25	70.42
4	199.33	61.85
5	217.33	53.13
6	521.23	224.98
7	523.09	234.90

*** 1.694 ***

1

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	174.75	88.00
2	176.56	86.21
3	193.17	75.07
4	211.22	66.47
5	226.52	53.59
6	245.54	47.40
7	514.73	191.11
8	527.03	206.88
9	539.73	222.34
10	550.93	238.90
11	554.93	246.19

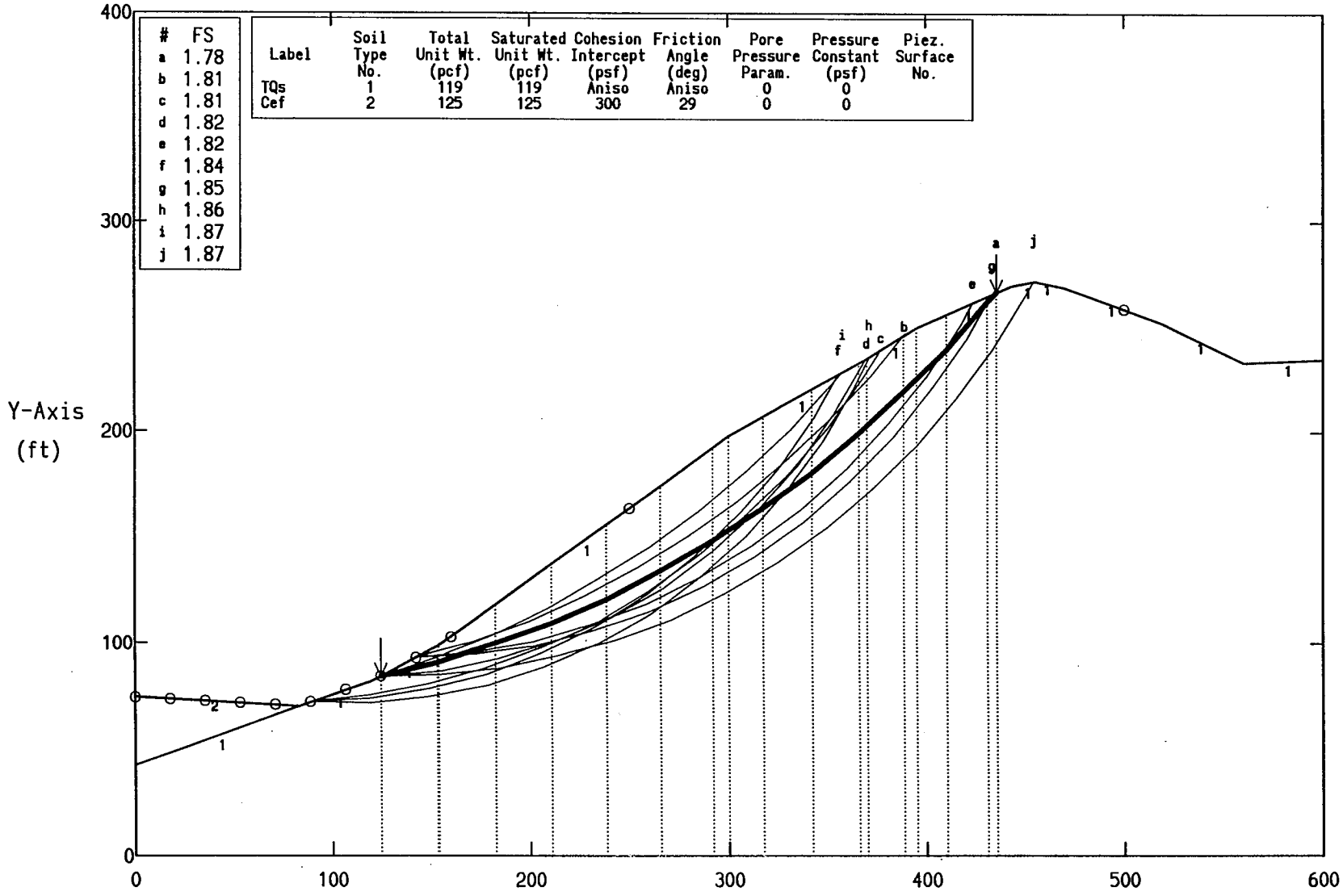
*** 1.743 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

Hasley Canyon Cross Section 34-34' Natural Slope, Static

Ten Most Critical. C:HC34S1.PLT By: DCS 10/05/99 2:46pm



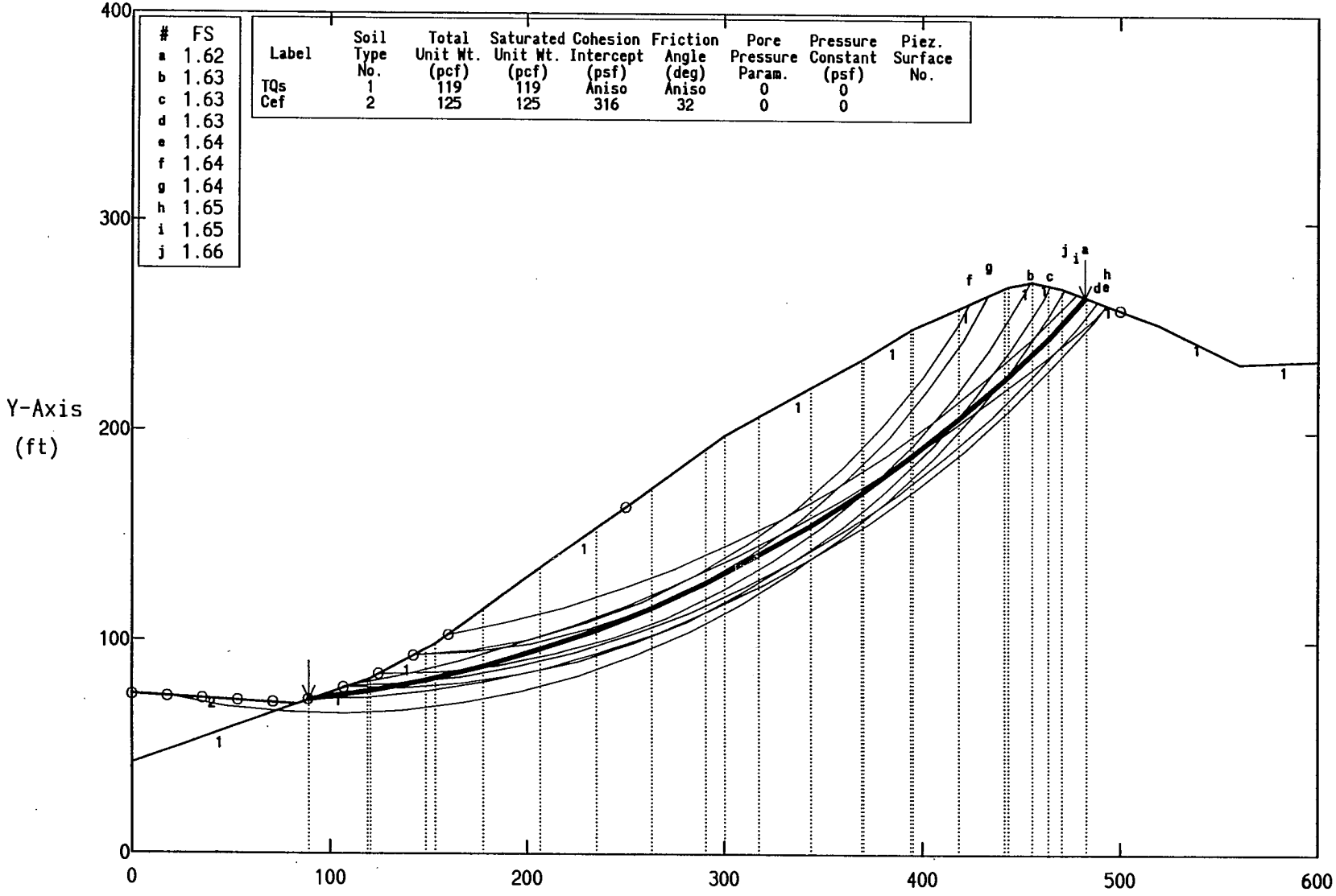
PCSTABL5M/SI FSmin=1.78 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

Run No. 25

Hasley Canyon Cross Section 34-34' Natural Slope, Pseudostatic

Ten Most Critical. C:HC34P1.PLT By: DCS 10/05/99 2:53pm



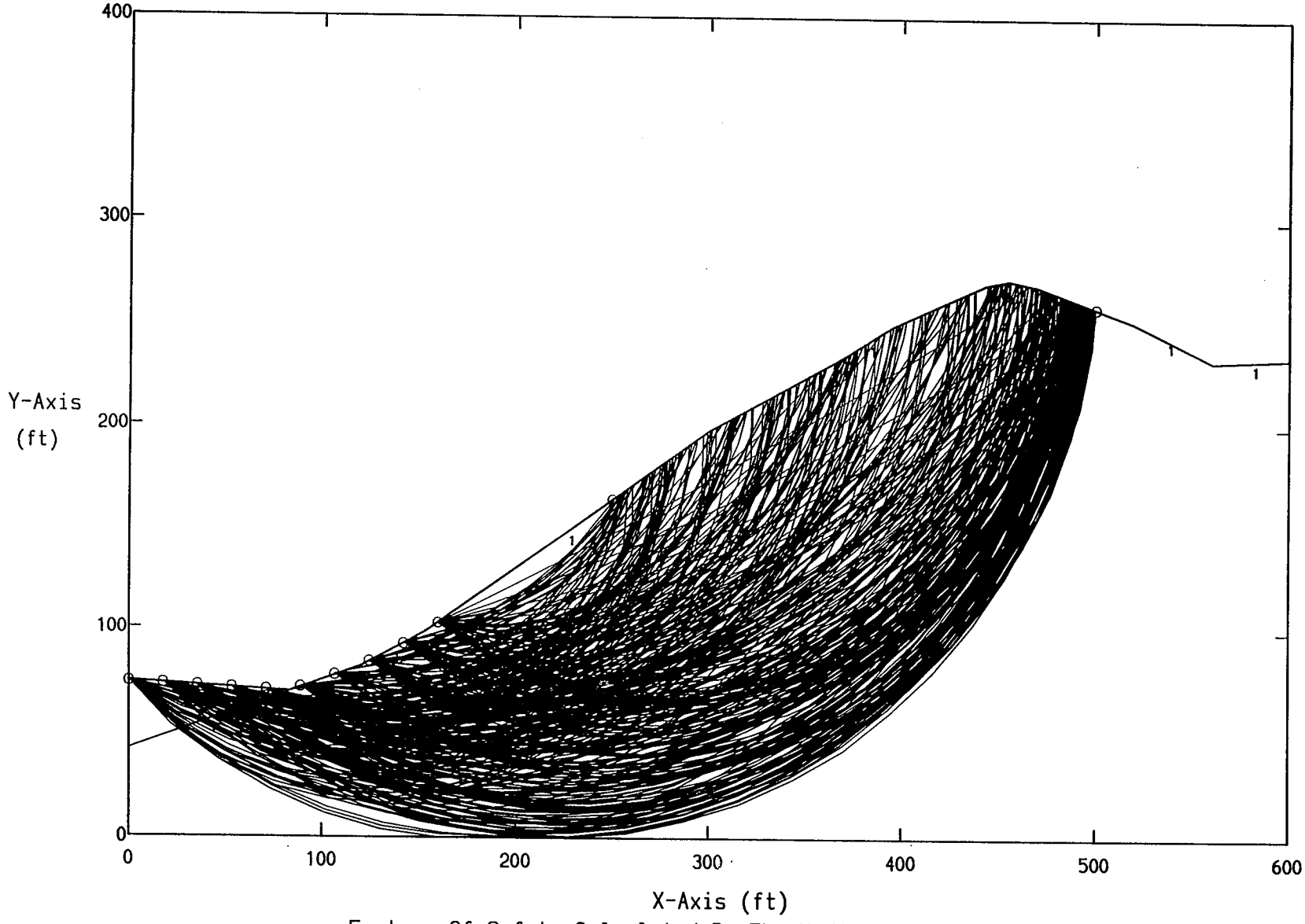
PCSTABL5M/SI FSmin=1.62 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

Run No. 26

Hasley Canyon Cross Section 34-34' Natural Slope, Static

All surfaces evaluated. C:HC34S1.PLT By: DCS 10/05/99 2:46pm



Factors Of Safety Calculated By The Modified Bishop Method

25 of 26

** PCSTABL5M **

by
Purdue University

1

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date:	10/05/99
Time of Run:	2:46pm
Run By:	DCS
Input Data Filename:	C:HC34S1.IN
Output Filename:	C:HC34S1.OUT
Unit:	ENGLISH
Plotted Output Filename:	C:HC34S1.PLT

PROBLEM DESCRIPTION Hasley Canyon Cross Section 34-34'

Natural Slope, Static

BOUNDARY COORDINATES

12 Top Boundaries
13 Total Boundaries

Soil Type Below Bnd	Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)
	1	.00	74.00	83.00	70.00
2	2	83.00	70.00	120.00	82.00
1	3	120.00	82.00	153.00	98.00

Run No. 25

```
    1
                4        153.00      98.00     300.00     198.00
    1
                5        300.00     198.00     370.00     235.00
    1
                6        370.00     235.00     395.00     250.00
    1
                7        395.00     250.00     443.00     270.00
    1
                8        443.00     270.00     455.00     272.00
    1
                9        455.00     272.00     470.00     269.00
    1
               10        470.00     269.00     520.00     252.00
    1
               11        520.00     252.00     560.00     233.00
    1
               12        560.00     233.00     600.00     235.00
    1
               13           .00      42.00      83.00      70.00
    1
1

          ISOTROPIC SOIL PARAMETERS

            2 Type(s) of Soil

           Soil  Total  Saturated  Cohesion Friction   Pore   Press
ure   Piez.
           Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Const
ant Surface
            No.  (pcf)    (pcf)     (psf)     (deg)   Param.    (ps
f)    No.

             1   119.0    119.0     410.0     40.5     .00        .
0      0
             2   125.0    125.0     300.0     29.0     .00        .
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	-18.0	410.0	40.5
2	-14.0	200.0	17.5
3	90.0	410.0	40.5

1

A Critical Failure Surface Searching Method, Using A Ran
dom
Technique For Generating Circular Surfaces, Has Been Spe
cified.

400 Trial Surfaces Have Been Generated.

40 Surfaces Initiate From Each Of 10 Points Equally Spa
ced
Along The Ground Surface Between X = .00 ft.
and X = 160.00 ft.

Each Surface Terminates Between X = 250.00 ft.
and X = 500.00 ft.

Unless Further Limitations Were Imposed, The Minimum Ele
vation
At Which A Surface Extends Is Y = .00 ft.

30.00 ft. Line Segments Define Each Trial Failure Surfac
e.

1

Following Are Displayed The Ten Most Critical Of The Tri
al
Failure Surfaces Examined. They Are Ordered - Most Crit

ical
First.

* * Safety Factors Are Calculated By The Modified Bishop
Method * *

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	124.44	84.16
2	153.64	91.08
3	182.42	99.54
4	210.71	109.51
5	238.44	120.97
6	265.52	133.88
7	291.87	148.21
8	317.43	163.92
9	342.12	180.96
10	365.88	199.28
11	388.63	218.83
12	410.31	239.57
13	430.86	261.42
14	435.45	266.86

Circle Center At X = 9.0 ; Y = 636.7 and Radius, 5
64.5

*** 1.783 ***

Individual data on the 17 slices

Slice	Width	Weight	Water Force Top	Water Force Bot	Tie Force Norm	Tie Force Tan	Earthquake Force Hor	Ver	Surcharge Load

No.	(ft)	(lbs)	(lbs)	(lbs)	(lbs)	(lbs)	(lbs)	(lbs)	(lbs)
1	28.6	12017.2	.0	.0	.0	.0	.0	.0	.0
2	.6	545.4	.0	.0	.0	.0	.0	.0	.0
3	28.8	44233.7	.0	.0	.0	.0	.0	.0	.0
4	28.3	77815.3	.0	.0	.0	.0	.0	.0	.0
5	27.7	103761.8	.0	.0	.0	.0	.0	.0	.0
6	27.1	122145.4	.0	.0	.0	.0	.0	.0	.0
7	26.4	133173.0	.0	.0	.0	.0	.0	.0	.0
8	8.1	43065.2	.0	.0	.0	.0	.0	.0	.0
9	17.4	91374.8	.0	.0	.0	.0	.0	.0	.0
10	24.7	121366.2	.0	.0	.0	.0	.0	.0	.0
11	23.8	102971.1	.0	.0	.0	.0	.0	.0	.0
12	4.1	16114.6	.0	.0	.0	.0	.0	.0	.0
13	18.6	65976.3	.0	.0	.0	.0	.0	.0	.0
14	6.4	19869.5	.0	.0	.0	.0	.0	.0	.0
15	15.3	38154.7	.0	.0	.0	.0	.0	.0	.0
16	20.6	24860.7	.0	.0	.0	.0	.0	.0	.0
17	4.6	961.6	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	142.22	92.77
2	171.17	100.66
3	199.53	110.43
4	227.20	122.03
5	254.05	135.42

6	279.96	150.53
7	304.83	167.31
8	328.55	185.68
9	351.02	205.56
10	372.14	226.86
11	389.24	246.54

Circle Center At X = 36.2 ; Y = 538.7 and Radius, 4
58.3

*** 1.805 ***

1

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	88.89	71.91
2	118.76	74.70
3	148.30	79.93
4	177.31	87.56
5	205.60	97.54
6	232.98	109.81
7	259.26	124.27
8	284.27	140.85
9	307.84	159.41
10	329.80	179.84
11	350.02	202.00
12	368.36	225.75
13	377.14	239.28

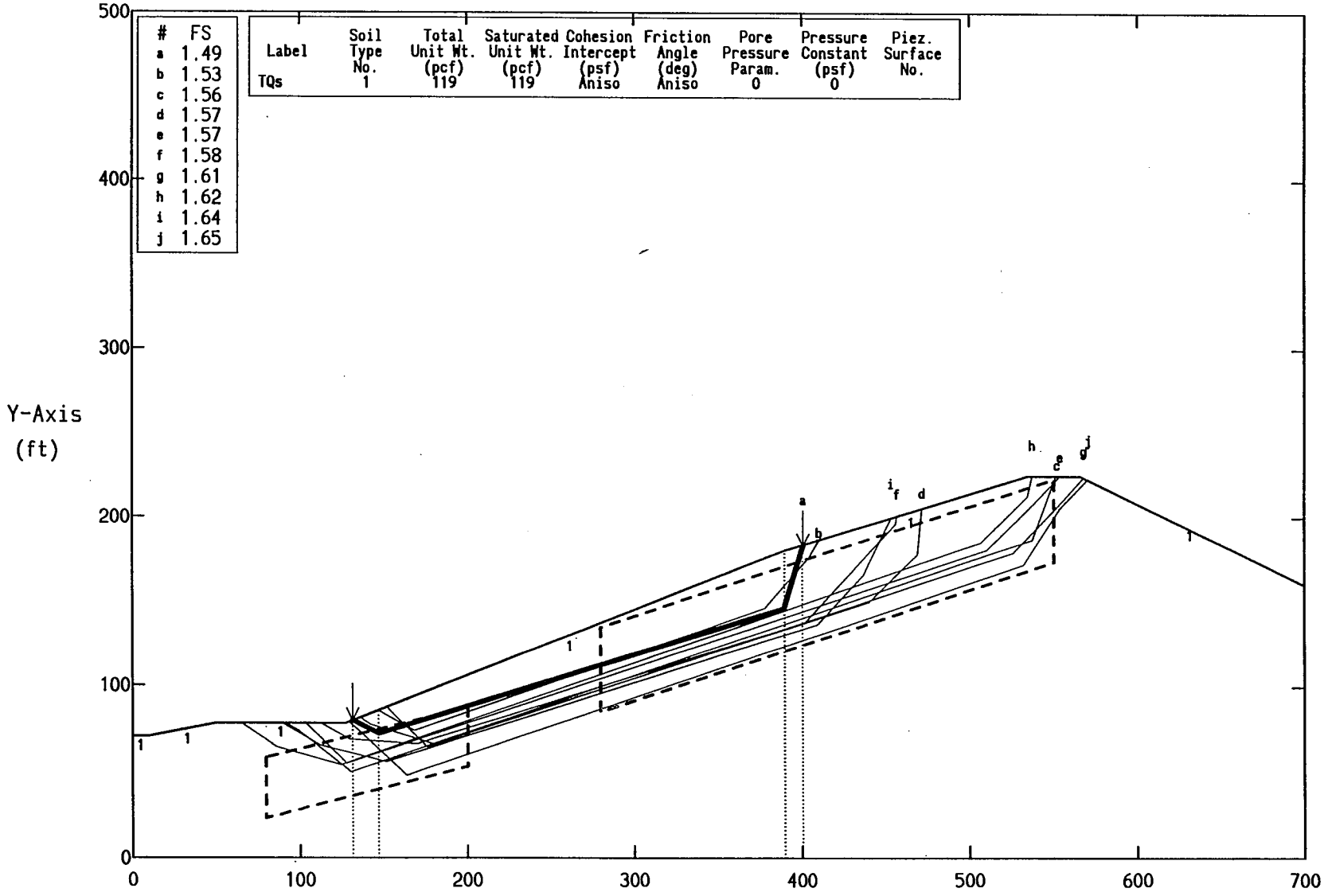
Circle Center At X = 69.8 ; Y = 437.3 and Radius, 3
65.9

*** 1.813 ***

Failure Surface Specified By 12 Coordinate Points

Hasley Canyon Cross Section 35-35' Cut Slope 5, Static

Ten Most Critical. C:HC35S2.PLT By: DCS 10/22/99 3:20pm



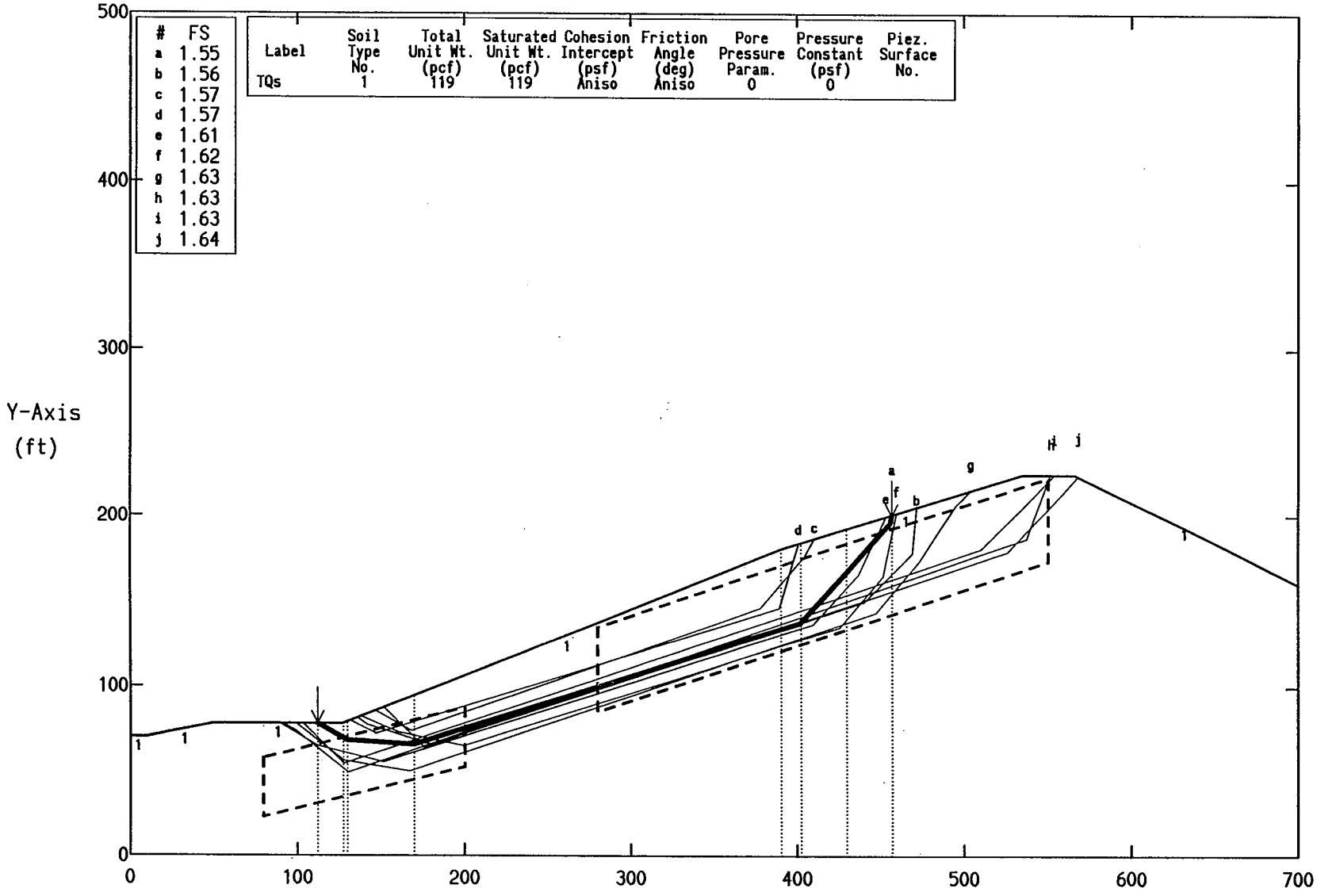
PCSTABL5M/SI FSmin=1.49 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run No. 27

Hasley Canyon Cross Section 35-35' Cut Slope 5, Pseudostatic

Ten Most Critical. C:HC35P2.PLT By: DCS 10/22/99 3:31pm



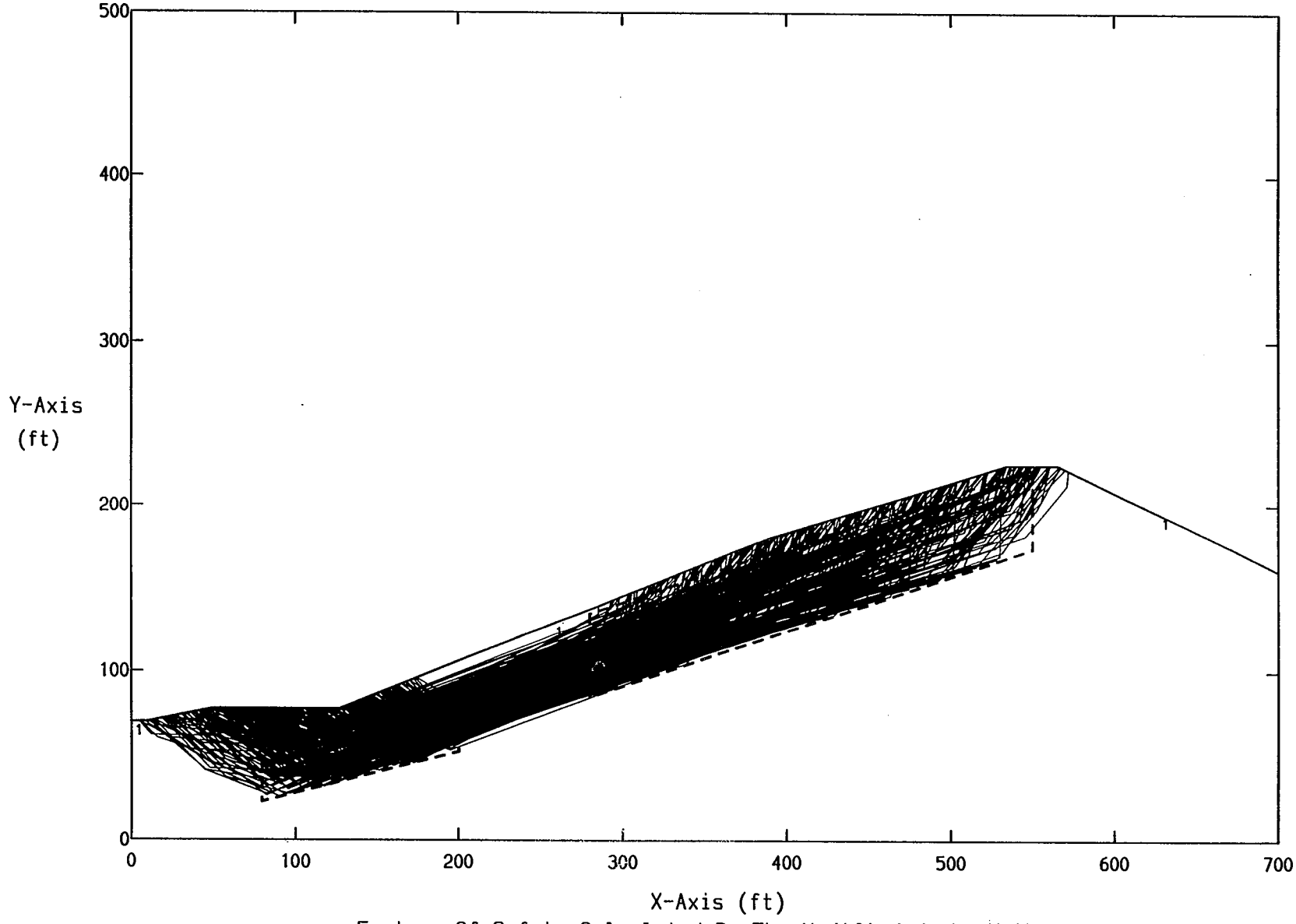
PCSTABL5M/SI FSmin=1.55 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run No. 28

Hasley Canyon Cross Section 35-35' Cut Slope 5, Static

All surfaces evaluated. C:HC35S2.PLT By: DCS 10/22/99 3:20pm



Factors Of Safety Calculated By The Modified Janbu Method

** PCSTABL5M **

by
Purdue University

1

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date:	10/22/99
Time of Run:	3:20pm
Run By:	DCS
Input Data Filename:	C:HC35S2.IN
Output Filename:	C:HC35S2.OUT
Unit:	ENGLISH
Plotted Output Filename:	C:HC35S2.PLT

PROBLEM DESCRIPTION Hasley Canyon Cross Section 35-35'

Cut Slope 5, Static

BOUNDARY COORDINATES

7 Top Boundaries
7 Total Boundaries

Soil Type Below Bnd	Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)
	1	.00	70.00	10.00	70.00
1	2	10.00	70.00	50.00	78.00
1	3	50.00	78.00	127.00	78.00

Run No. 27

```
    1
                4        127.00      78.00     390.00     180.00
    1
                5        390.00     180.00     535.00     225.00
    1
                6        535.00     225.00     566.00     225.00
    1
                7        566.00     225.00     700.00     160.00
    1
1

          ISOTROPIC SOIL PARAMETERS

            1 Type(s) of Soil

           Soil  Total  Saturated  Cohesion Friction   Pore   Press
ure   Piez.
           Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Const
ant Surface
            No.  (pcf)    (pcf)     (psf)     (deg)   Param.    (ps
f)    No.

             1   119.0    119.0     410.0     40.5     .00        .
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              17.0              410.0          40.5
             2              19.0              200.0          17.4
             3              90.0              410.0          40.5

          Janbus Empirical Coef is being used for the case of  c &
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phi both > 0
1

A Critical Failure Surface Searching Method, Using A Ran
dom
Technique For Generating Sliding Block Surfaces, Has Bee
n
Specified.

300 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	80.00	40.00	200.00	70.00	35.00
2	280.00	110.00	550.00	198.00	50.00

1

Following Are Displayed The Ten Most Critical Of The Tri
al
Failure Surfaces Examined. They Are Ordered - Most Crit
ical
First.

* * Safety Factors Are Calculated By The Modified Janbu
Method * *

Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	131.35	79.69
2	146.85	71.67
3	389.67	146.39
4	400.51	183.26

*** 1.493 ***

Individual data on the 4 slices

Slice No.	Surcharge Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Ver (lbs)	Surcharge Load (lbs)
1	15.5	12934.7	.0	.0	.0	.0	.0	.0	.0
2	242.8	686416.2	.0	.0	.0	.0	.0	.0	.0
3	.3	1291.4	.0	.0	.0	.0	.0	.0	.0
4	10.5	20312.0	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	146.11	85.41
2	167.94	73.80
3	378.07	145.93
4	404.69	175.79
5	410.80	186.45

*** 1.527 ***

1

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	91.05	78.00
2	98.59	73.73
3	130.30	49.34
4	537.53	186.07
5	551.19	223.66
6	551.70	225.00

*** 1.556 ***

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	135.78	81.41
2	141.49	77.43
3	179.78	65.86
4	440.56	149.55
5	468.84	177.84
6	471.57	205.32

*** 1.570 ***

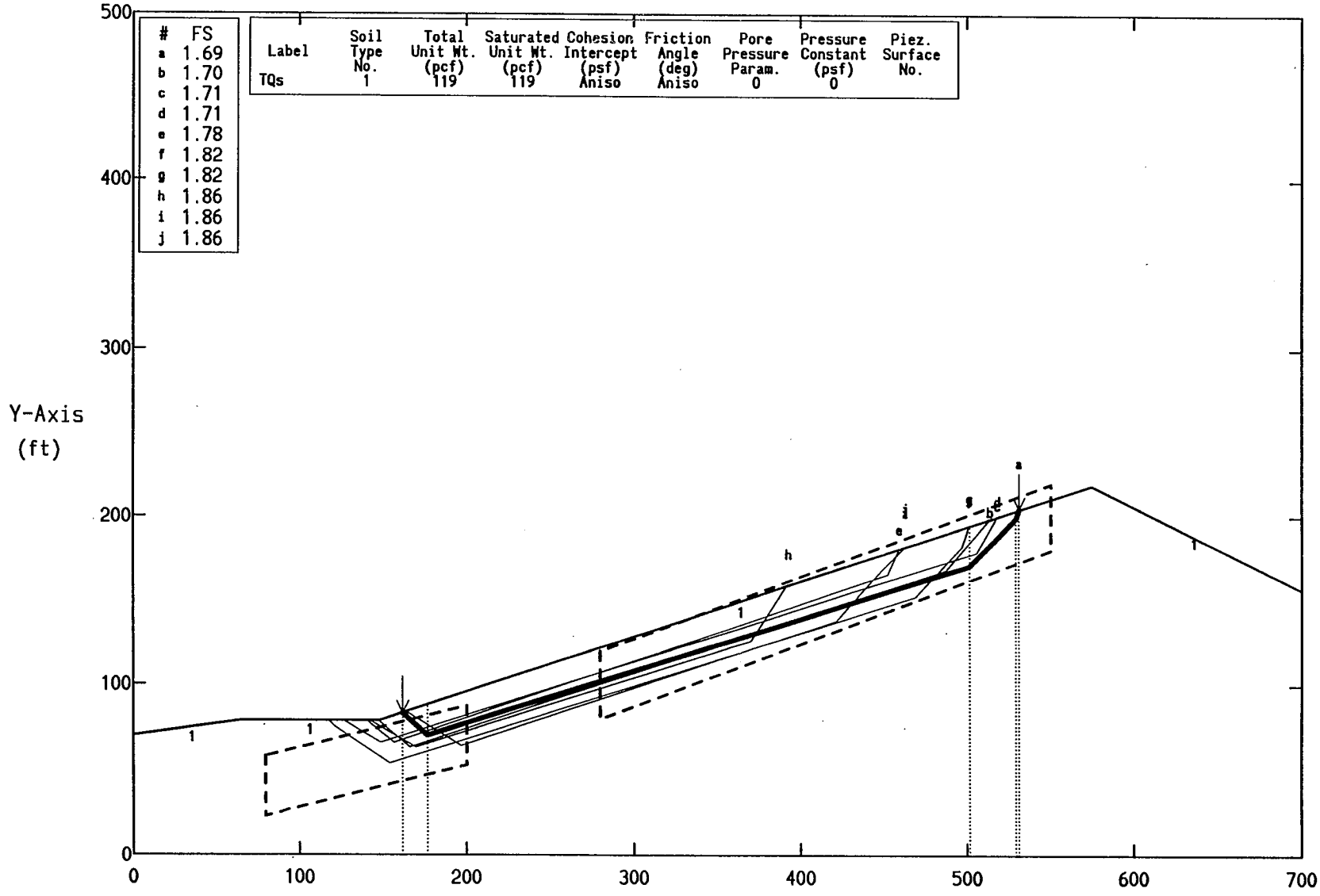
1

Failure Surface Specified By 5 Coordinate Points

Point	X-Surf	Y-Surf

Hasley Canyon Cross Section 35-35' Cut Slope 5, 3:1, Static

Ten Most Critical. C:HC35S2.PLT By: DCS 10/22/99 10:57am



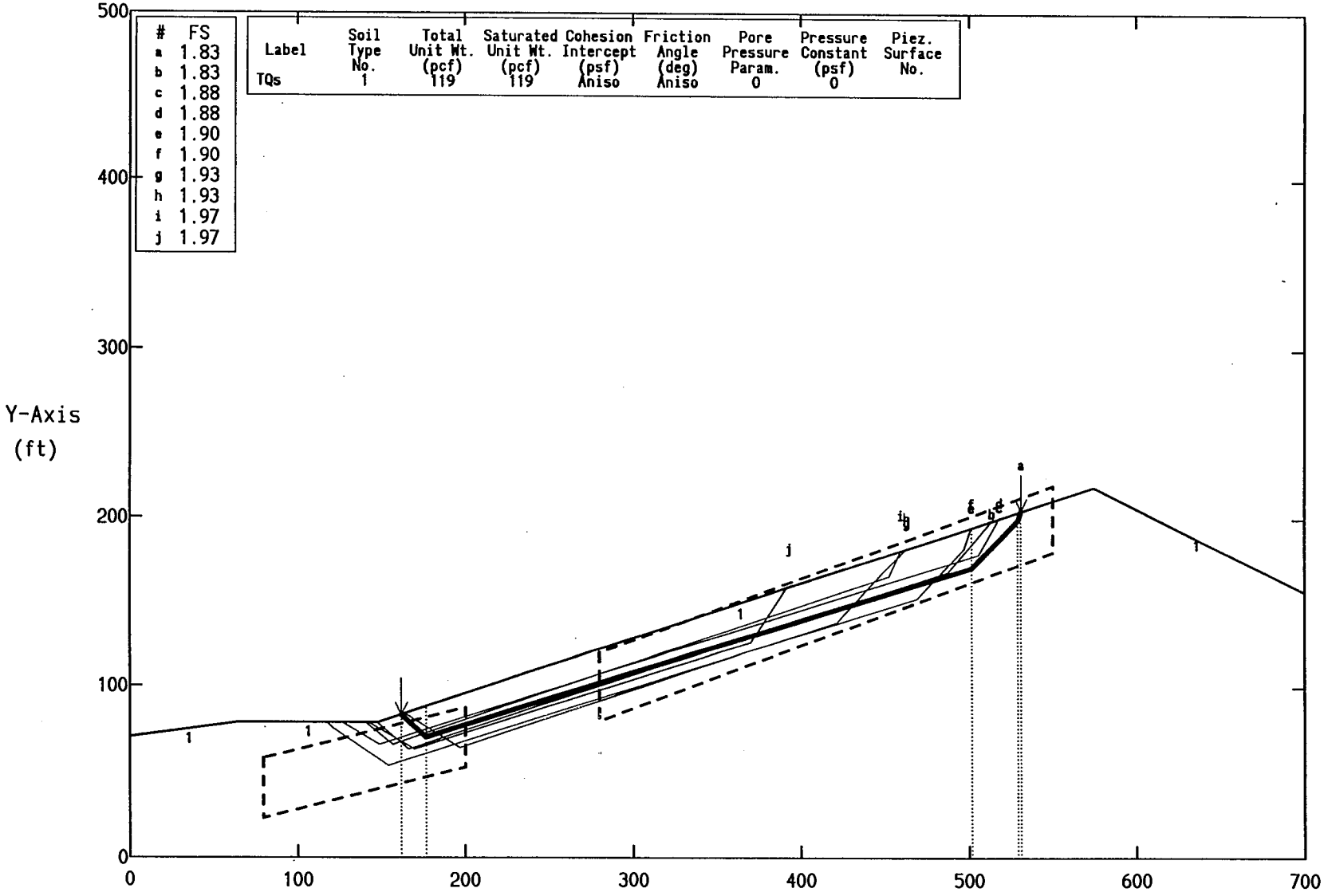
PCSTABL5M/SI FSmin=1.69 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run No. 29

Hasley Canyon Cross Section 35-35' Cut Slope 5, 3:1, Pseudostatic

Ten Most Critical. C:HC35P2.PLT By: DCS 10/22/99 10:58am



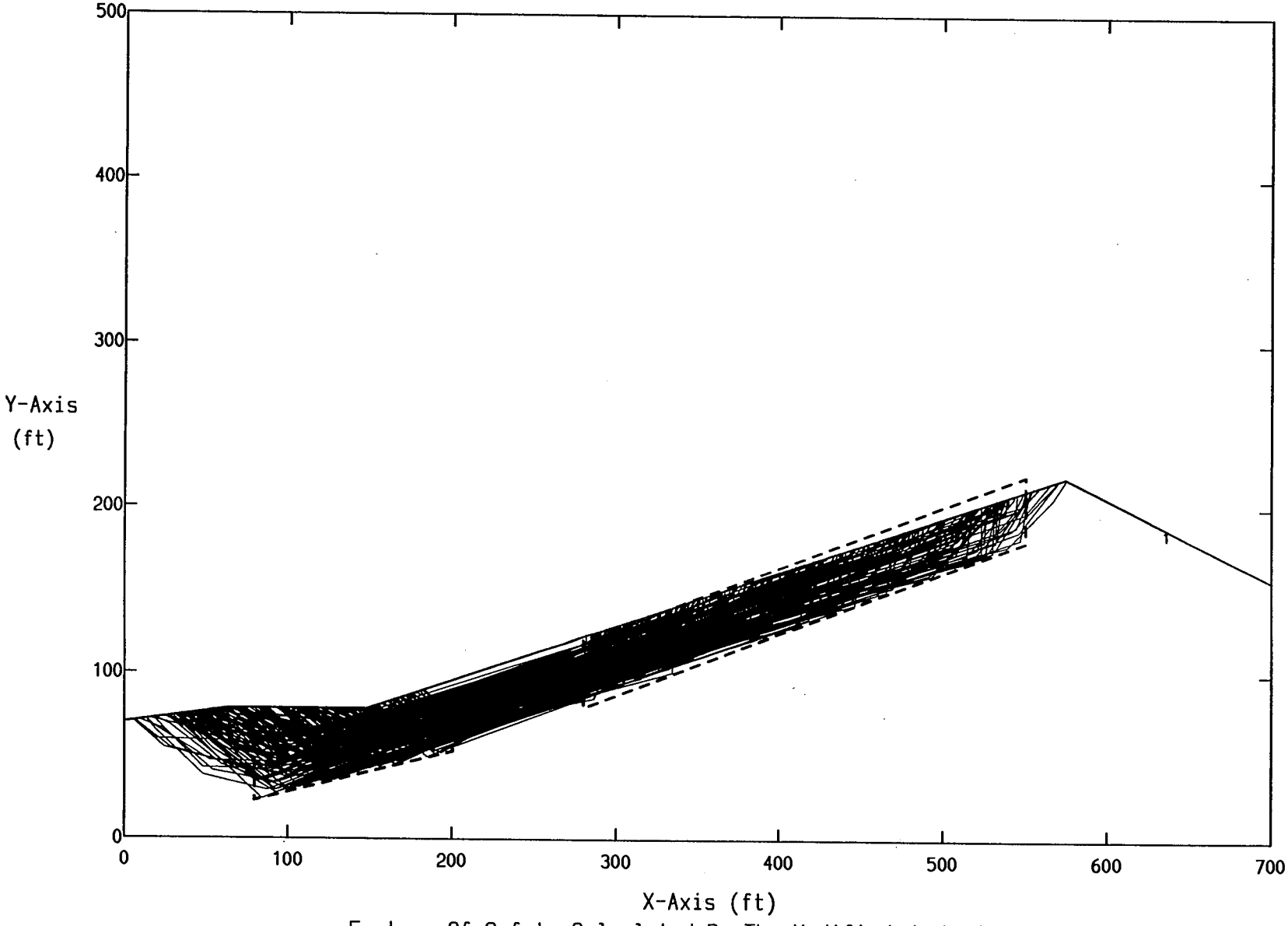
PCSTABL5M/SI FSmin=1.83 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Rev No. 30

Hasley Canyon Cross Section 35-35' Cut Slope 5, 3:1, Static

All surfaces evaluated. C:HC35S2.PLT By: DCS 10/22/99 10:57am



Factors Of Safety Calculated By The Modified Janbu Method

29 of 30

** PCSTABL5M **

by
Purdue University

1

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date:	10/22/99
Time of Run:	10:57am
Run By:	DCS
Input Data Filename:	C:HC35S2.IN
Output Filename:	C:HC35S2.OUT
Unit:	ENGLISH
Plotted Output Filename:	C:HC35S2.PLT

PROBLEM DESCRIPTION Hasley Canyon Cross Section 35-35'

Cut Slope 5, 3:1, Static

BOUNDARY COORDINATES

4 Top Boundaries
4 Total Boundaries

Soil Type Below Bnd	Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)
	1	.00	70.00	65.00	79.00
1	2	65.00	79.00	148.00	79.00
1	3	148.00	79.00	575.00	219.00

RUN No. 29

```
    1
              4        575.00     219.00     700.00     157.00
    1
1


          ISOTROPIC SOIL PARAMETERS


            1 Type(s) of Soil


           Soil  Total  Saturated  Cohesion Friction   Pore   Press
ure   Piez.
           Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Const
ant Surface
            No.  (pcf)     (pcf)      (psf)     (deg)   Param.     (ps
f)    No.

            1   119.0    119.0     410.0     40.5     .00        .
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              17.0             410.0         40.5
               2              19.0             200.0         17.4
               3              90.0             410.0         40.5

           Janbus Empirical Coef is being used for the case of  c &
 phi both > 0
1


           A Critical Failure Surface Searching Method, Using A Ran
dom
```

Technique For Generating Sliding Block Surfaces, Has Bee
n
Specified.

300 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	80.00	40.00	200.00	70.00	35.00
2	280.00	100.00	550.00	200.00	40.00

1

Following Are Displayed The Ten Most Critical Of The Tri
al
Failure Surfaces Examined. They Are Ordered - Most Crit
ical
First.

* * Safety Factors Are Calculated By The Modified Janbu
Method * *

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	161.86	83.54
2	176.64	69.87
3	501.53	170.82

4	529.11	199.79
5	530.94	204.55

*** 1.691 ***

Individual data on the 4 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)	Surcharge Ver (lbs)	Surcharge Load (lbs)
1	14.8	16294.2	.0	.0	.0	.0	.0	.0	.0
2	324.9	823898.9	.0	.0	.0	.0	.0	.0	.0
3	27.6	46359.1	.0	.0	.0	.0	.0	.0	.0
4	1.8	453.3	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 5 Coordinate Points

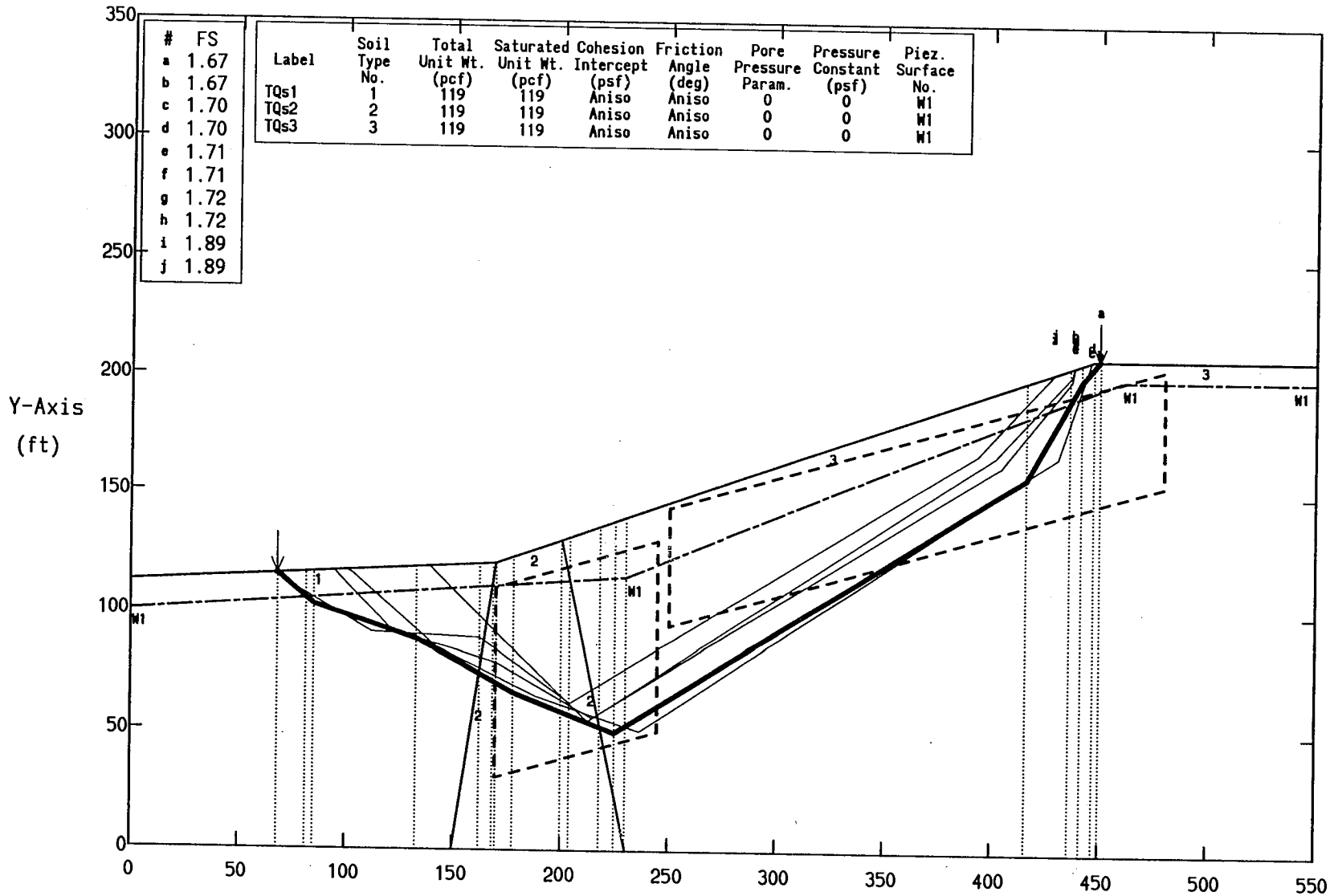
Point No.	X-Surf (ft)	Y-Surf (ft)
1	147.21	79.00
2	165.83	63.09
3	487.23	167.66
4	513.10	198.16
5	513.62	198.87

*** 1.696 ***

1

Hasley Canyon Cross Section 40-40' Cut Slope 13, 3:1, Static

Ten Most Critical. C:HC40S1.PLT By: DCS 10/25/99 11:43am



#	FS
a	1.67
b	1.67
c	1.70
d	1.70
e	1.71
f	1.71
g	1.72
h	1.72
i	1.89
j	1.89

Label	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.
TQs1	1	119	119	Aniso	Aniso	0	0	W1
TQs2	2	119	119	Aniso	Aniso	0	0	W1
TQs3	3	119	119	Aniso	Aniso	0	0	W1

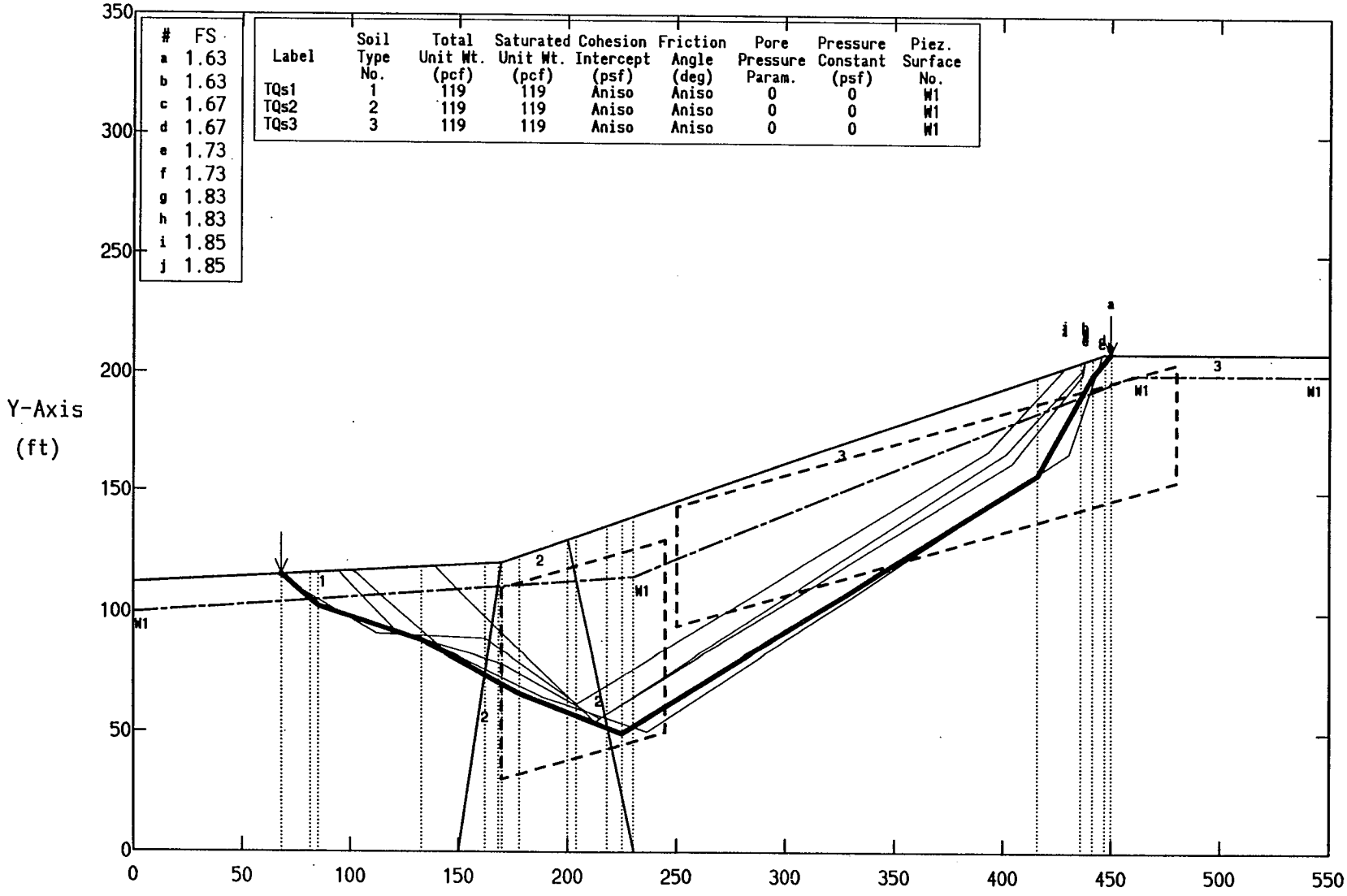
PCSTABL5M/SI FSmin=1.67 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run No. 31

Hasley Canyon Cross Section 40-40' Cut Slope 13,3:1, Pseudostatic

Ten Most Critical. C:HC40P1.PLT By: DCS 10/25/99 11:47am



#	FS
a	1.63
b	1.63
c	1.67
d	1.67
e	1.73
f	1.73
g	1.83
h	1.83
i	1.85
j	1.85

Label	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.
TQs1	1	119	119	Aniso	Aniso	0	0	W1
TQs2	2	119	119	Aniso	Aniso	0	0	W1
TQs3	3	119	119	Aniso	Aniso	0	0	W1

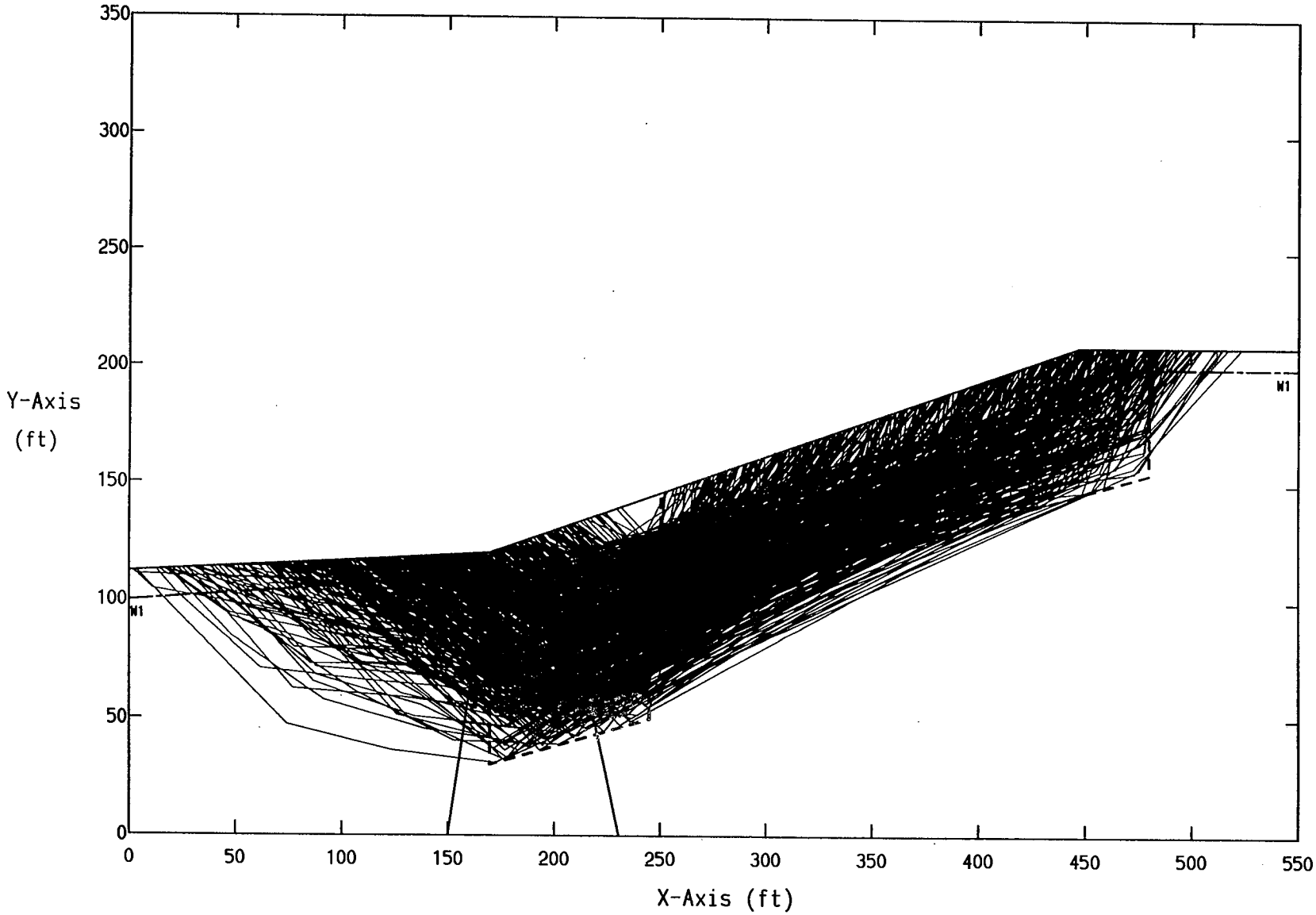
PCSTABL5M/SI FSmin=1.63 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run No. 32

Hasley Canyon Cross Section 40-40' Cut Slope 13, 3:1, Static

All surfaces evaluated. C:HC40S1.PLT By: DCS 10/25/99 11:43am



Factors Of Safety Calculated By The Modified Janbu Method

31 # 32

** PCSTABL5M **

by
Purdue University

1

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date: 10/25/99

Time of Run: 11:43am
Run By: DCS

Input Data Filename: C:HC40S1.IN
Output Filename: C:HC40S1.OUT
Unit: ENGLISH
Plotted Output Filename: C:HC40S1.PLT

PROBLEM DESCRIPTION Hasley Canyon Cross Section 40-40'

Cut Slope 13, 3:1, Static

BOUNDARY COORDINATES

4 Top Boundaries
6 Total Boundaries

Soil Type Below Bnd	Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)
	1	.00	112.00	170.00	120.00
1					
	2	170.00	120.00	200.00	130.00
2					
	3	200.00	130.00	447.00	209.00

Run No. 31

```
    3
                4        447.00     209.00     550.00     209.00
    3
                5        150.00        .00     170.00     120.00
    2
                6        200.00     130.00     230.00        .00
    2
1
```

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 Piez. Constant (psf)	Surface No.
1	119.0	119.0	410.0	40.5	.00	.0	1
2	119.0	119.0	410.0	40.5	.00	.0	1
3	119.0	119.0	410.0	40.5	.00	.0	1

ANISOTROPIC STRENGTH PARAMETERS
3 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	-41.0	410.0	40.5
2	-39.0	200.0	17.4
3	90.0	410.0	40.5

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	-41.0	410.0	40.5
2	29.0	200.0	17.5
3	90.0	410.0	40.5

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	29.0	410.0	40.5
2	31.0	200.0	17.5
3	90.0	410.0	40.5

1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 4 Coordinate Po
ints

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	100.00
2	230.00	115.00
3	460.00	200.00

4 550.00 200.00

Janbus Empirical Coef is being used for the case of c & phi both > 0
1

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 50.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	170.00	70.00	245.00	90.00	80.00
2	250.00	119.00	480.00	180.00	50.00

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 4 Coordinate Points

Point	X-Surf	Y-Surf

No.	(ft)	(ft)
1	190.67	126.89
2	213.28	117.81
3	295.02	114.32
4	295.93	160.68

Factor Of Safety For The Preceding Specified Surface = 2
0.970

Factor Of Safety Calculation Has Gone Through Ten Iterat
ions

The Trial Failure Surface In Question Is Defined
By The Following 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	190.67	126.89
2	213.28	117.81
3	295.02	114.32
4	295.93	160.68

Factor Of Safety For The Preceding Specified Surface = 2
0.970
1

Following Are Displayed The Ten Most Critical Of The Tri
al
Failure Surfaces Examined. They Are Ordered - Most Crit
ical
First.

* * Safety Factors Are Calculated By The Modified Janbu

Method * *

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	68.19	115.21
2	85.19	102.54
3	133.11	88.27
4	177.90	66.04
5	225.02	49.32
6	415.92	157.19
7	441.30	200.27
8	449.92	209.00

*** 1.665 ***

Individual data on the 17 slices

Slice No.	Surcharge Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Ver (lbs)	Surcharge Load (lbs)
1	13.3	8312.3	.0	.0	.0	.0	.0	.0	.0
2	3.7	5309.2	.0	435.4	.0	.0	.0	.0	.0
3	47.9	123923.1	.0	36469.3	.0	.0	.0	.0	.0
4	29.2	131717.1	.0	58038.6	.0	.0	.0	.0	.0
5	6.2	35078.5	.0	16613.3	.0	.0	.0	.0	.0
6	1.5	8869.9	.0	4249.5	.0	.0	.0	.0	.0

7	7.9	50116.2	.0	23800.0	.0	.0	.0	.0	.0
8	22.1	168841.3	.0	73313.6	.0	.0	.0	.0	.0
9	3.9	33536.7	.0	14177.0	.0	.0	.0	.0	.0
10	14.2	133762.3	.0	55753.5	.0	.0	.0	.0	.0
11	7.0	71608.9	.0	29426.4	.0	.0	.0	.0	.0
12	5.0	52210.0	.0	22842.8	.0	.0	.0	.0	.0
13	185.9	********	.0	*******	.0	.0	.0	.0	.0
14	20.0	66810.6	.0	30595.8	.0	.0	.0	.0	.0
15	5.4	6843.2	.0	.0	.0	.0	.0	.0	.0
16	5.7	3347.4	.0	.0	.0	.0	.0	.0	.0
17	2.9	514.2	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	68.19	115.21
2	85.19	102.54
3	133.11	88.27
4	177.90	66.04
5	225.02	49.32
6	415.92	157.19
7	441.30	200.27
8	449.92	209.00

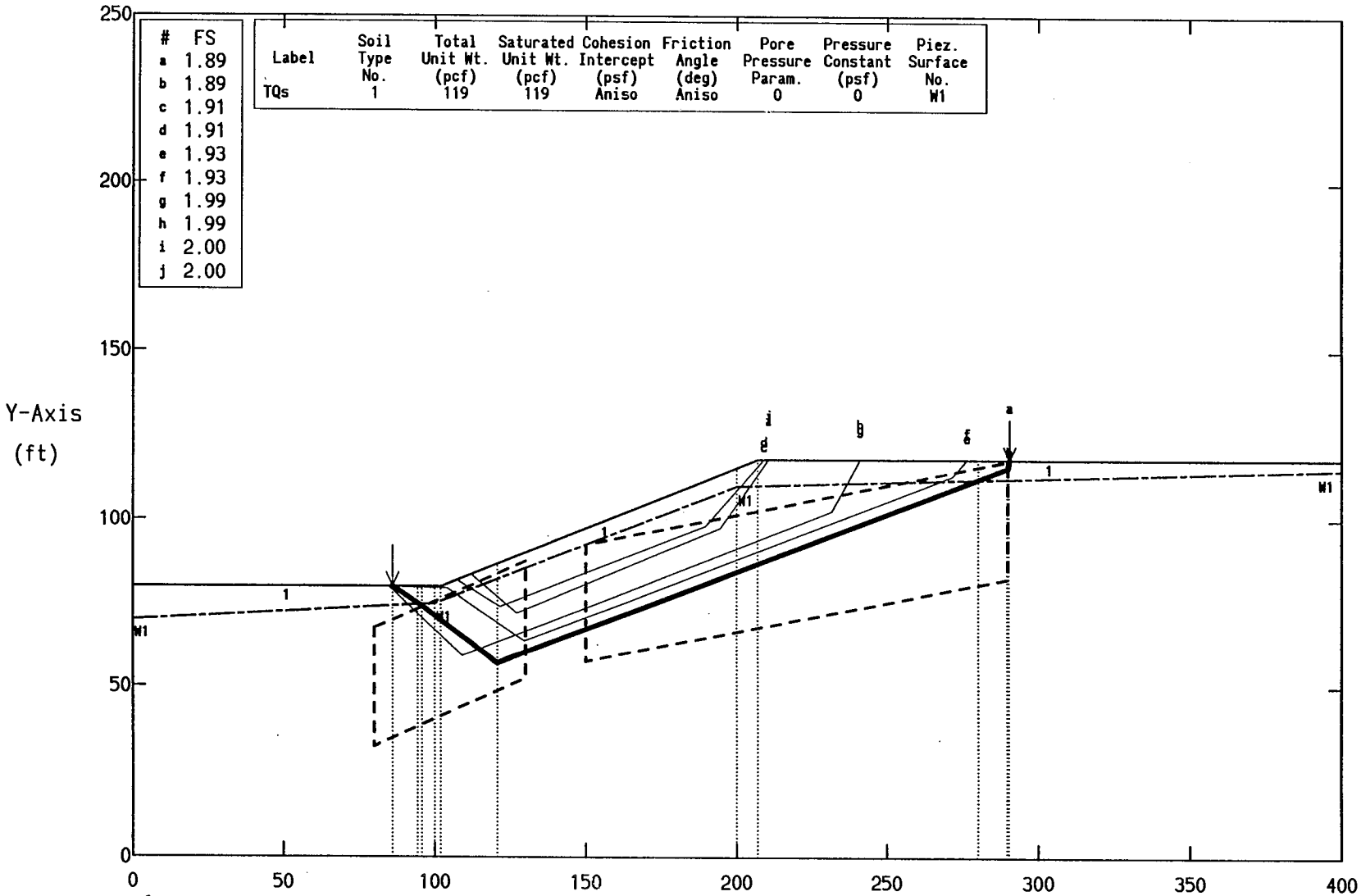
*** 1.665 ***

1

Failure Surface Specified By 7 Coordinate Points

Hasley Canyon Cross Section 43-43' Cut Slope 31, 2:1, Static

Ten Most Critical. C:HC43S1.PLT By: DCS 10/22/99 9:04am



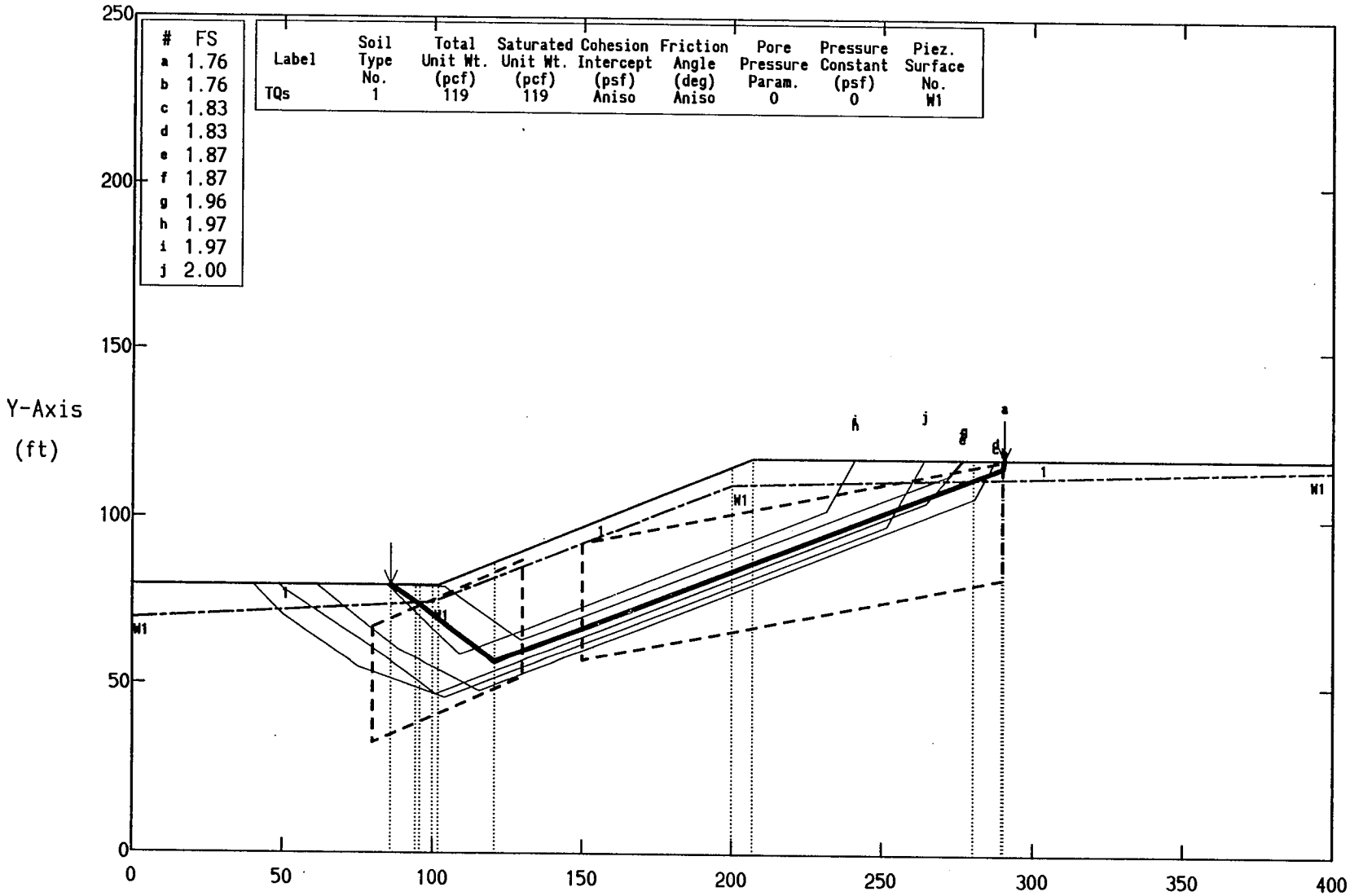
PCSTABL5M/SI FSmin=1.89 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run No. 33

Hasley Canyon Cross Section 43-43' Cut Slope 31, 2:1, Pseudostatic

Ten Most Critical. C:HC43P1.PLT By: DCS 10/22/99 9:14am



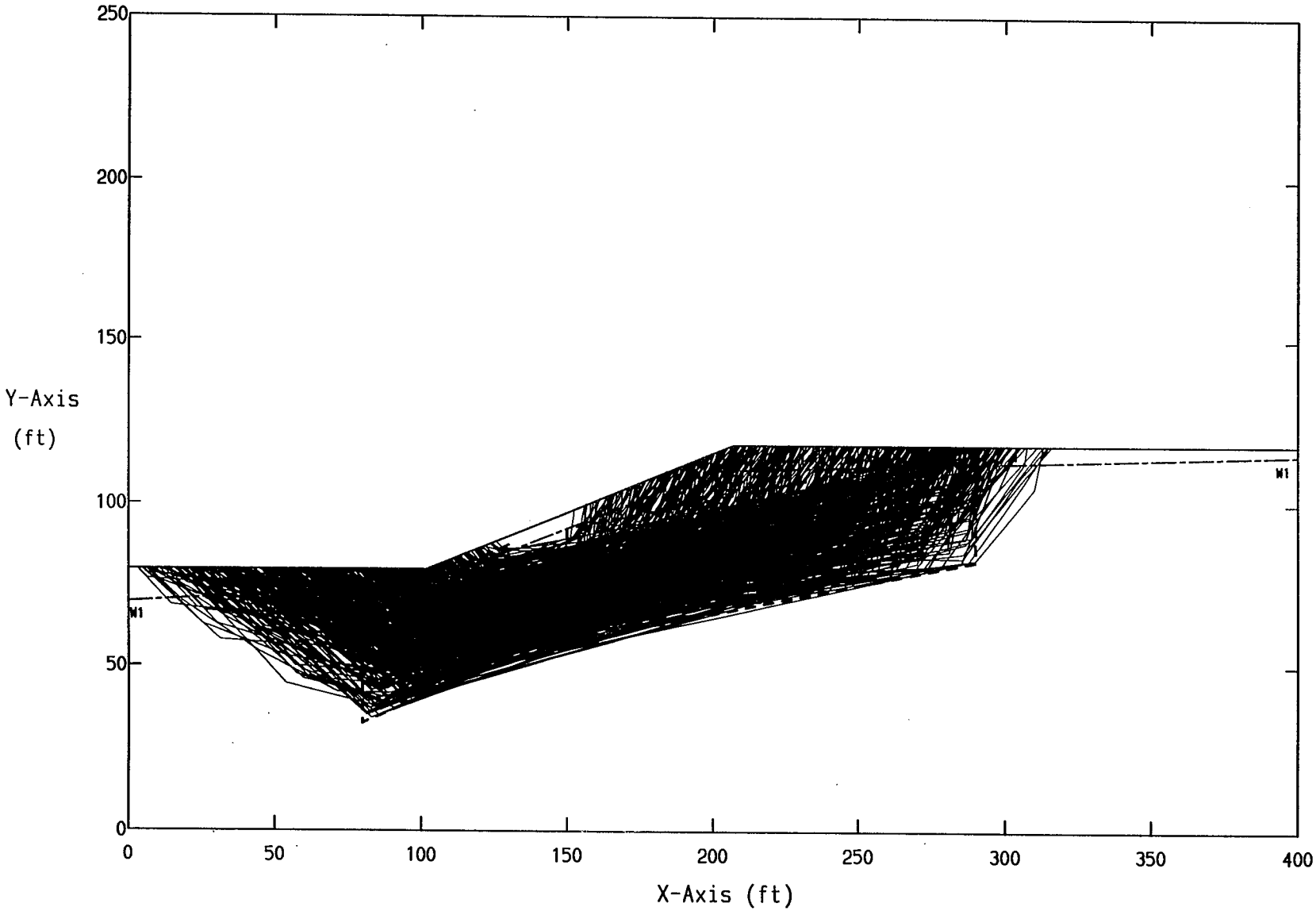
PCSTABL5M/SI FSmin=1.76 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run No. 34

Hasley Canyon Cross Section 43-43' Cut Slope 31, 2:1, Static

All surfaces evaluated. C:HC43S1.PLT By: DCS 10/22/99 9:04am



Factors Of Safety Calculated By The Modified Janbu Method

33 of 34

** PCSTABL5M **

by
Purdue University

1

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date:	10/22/99
Time of Run:	9:04am
Run By:	DCS
Input Data Filename:	C:HC43S1.IN
Output Filename:	C:HC43S1.OUT
Unit:	ENGLISH
Plotted Output Filename:	C:HC43S1.PLT

PROBLEM DESCRIPTION Hasley Canyon Cross Section 43-43'

Cut Slope 31, 2:1, Static

BOUNDARY COORDINATES

3 Top Boundaries
3 Total Boundaries

Soil Type Below Bnd	Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)
	1	.00	80.00	102.00	80.00
1	2	102.00	80.00	207.00	118.00
1	3	207.00	118.00	400.00	118.00

Run No. 32

1
1

ISOTROPIC SOIL PARAMETERS

1 Type(s) of Soil

Soil Total Saturated Cohesion Friction Pore Press
ure Piez.
Type Unit Wt. Unit Wt. Intercept Angle Pressure Const
ant Surface
No. (pcf) (pcf) (psf) (deg) Param. (ps
f) No.

1 119.0 119.0 410.0 40.5 .00 .
0 1

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	19.0	410.0	40.5
2	23.0	200.0	17.4
3	90.0	410.0	40.5

1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 4 Coordinate Po
ints

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	70.00
2	100.00	75.00
3	200.00	110.00
4	400.00	115.00

Janbus Empirical Coef is being used for the case of c &
phi both > 0
1

A Critical Failure Surface Searching Method, Using A Ran
dom
Technique For Generating Sliding Block Surfaces, Has Bee
n
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	80.00	50.00	130.00	70.00	35.00
2	150.00	75.00	290.00	100.00	35.00

Factor Of Safety Calculation Has Gone Through Ten Iterat
ions

The Trial Failure Surface In Question Is Defined
By The Following 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	81.66	80.00
2	94.22	67.70
3	157.48	70.21
4	157.92	100.24

Factor Of Safety For The Preceding Specified Surface = 1
3.925

Factor Of Safety Calculation Has Gone Through Ten Iterat
ions

The Trial Failure Surface In Question Is Defined
By The Following 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	81.66	80.00
2	94.22	67.70
3	157.48	70.21
4	157.92	100.24

Factor Of Safety For The Preceding Specified Surface = 1
3.925

1

Following Are Displayed The Ten Most Critical Of The Tri
al
Failure Surfaces Examined. They Are Ordered - Most Crit
ical
First.

* * Safety Factors Are Calculated By The Modified Janbu
Method * *

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	86.14	80.00
2	95.85	73.82
3	120.70	57.00
4	289.85	115.29
5	290.31	118.00

*** 1.888 ***

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)	Surcharge Load (lbs)	Ver (lbs)
1	8.3	2602.5	.0	.0	.0	.0	.0	.0	.0
2	1.4	970.1	.0	51.4	.0	.0	.0	.0	.0
3	4.2	3750.4	.0	776.7	.0	.0	.0		

```
 .0       .0
 4       2.0   2301.6       .0   715.2        .0       .0       .0
 .0       .0
 5      18.7  44615.2       .0 20830.5        .0       .0       .0
 .0       .0
 6      79.3 287349.1       .0 *******        .0       .0       .0
 .0       .0
 7       7.0  25986.4       .0 11338.8        .0       .0       .0
 .0       .0
 8      73.3 162502.3       .0 56678.5        .0       .0       .0
 .0       .0
 9       9.5   4934.3       .0      .0        .0       .0       .0
 .0       .0
10        .5     72.7       .0      .0        .0       .0       .0
 .0       .0
```

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	86.14	80.00
2	95.85	73.82
3	120.70	57.00
4	289.85	115.29
5	290.31	118.00

*** 1.888 ***

1

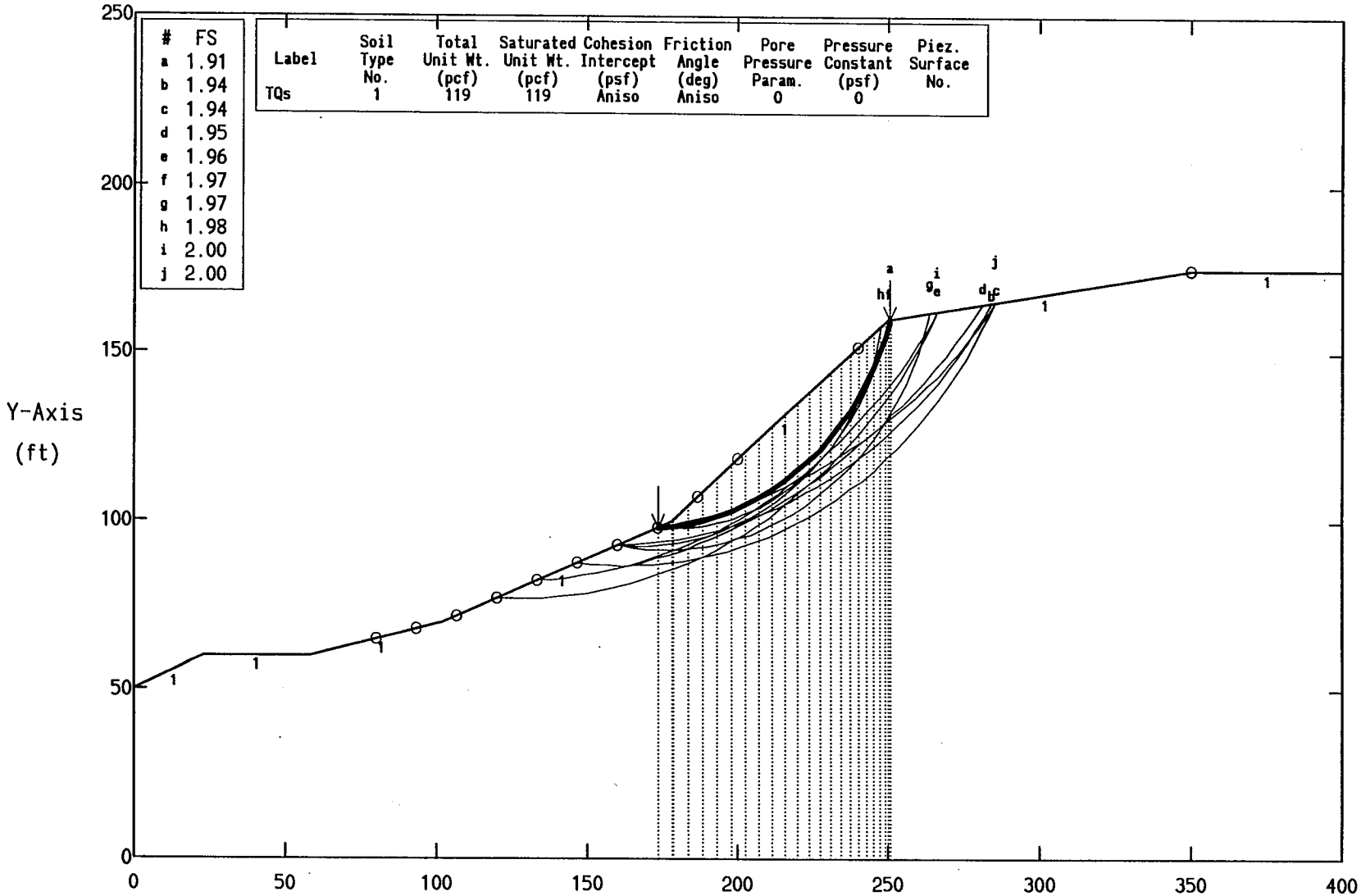
Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	106.95	81.79
2	121.44	74.20
3	189.40	98.18
4	208.86	118.00

*** 1.914 ***

Hasley Canyon Cross Section 45-45' Natural Slope, Static

Ten Most Critical. C:HC45S1.PLT By: DCS 10/11/99 11:42am



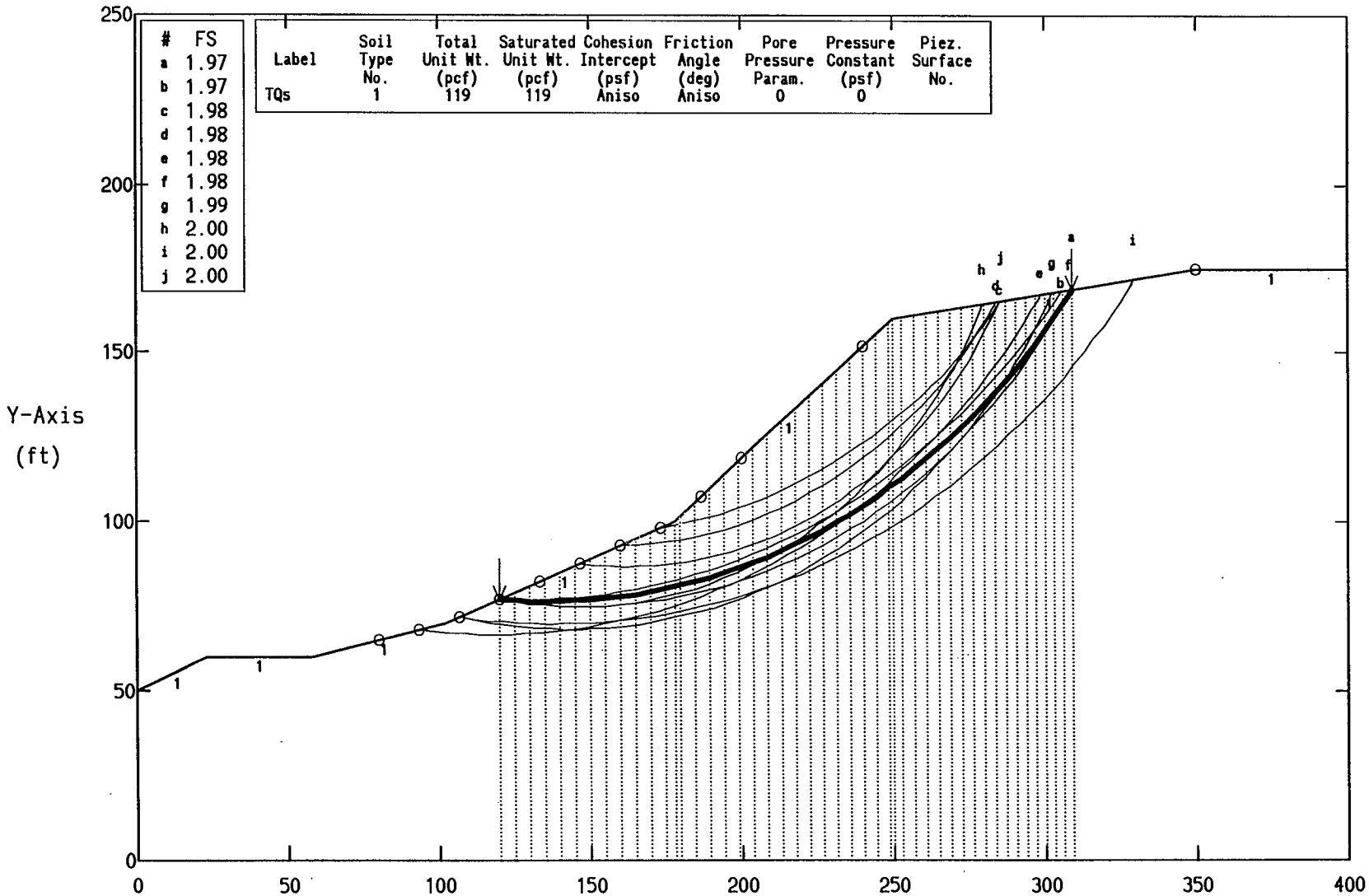
PCSTABL5M/SI FSmin=1.91 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

Run No. 35

Hasley Canyon Cross Section 45-45' Natural Slope, Pseudostatic

Ten Most Critical. C:HC45P1.PLT By: DCS 10/11/99 11:41am



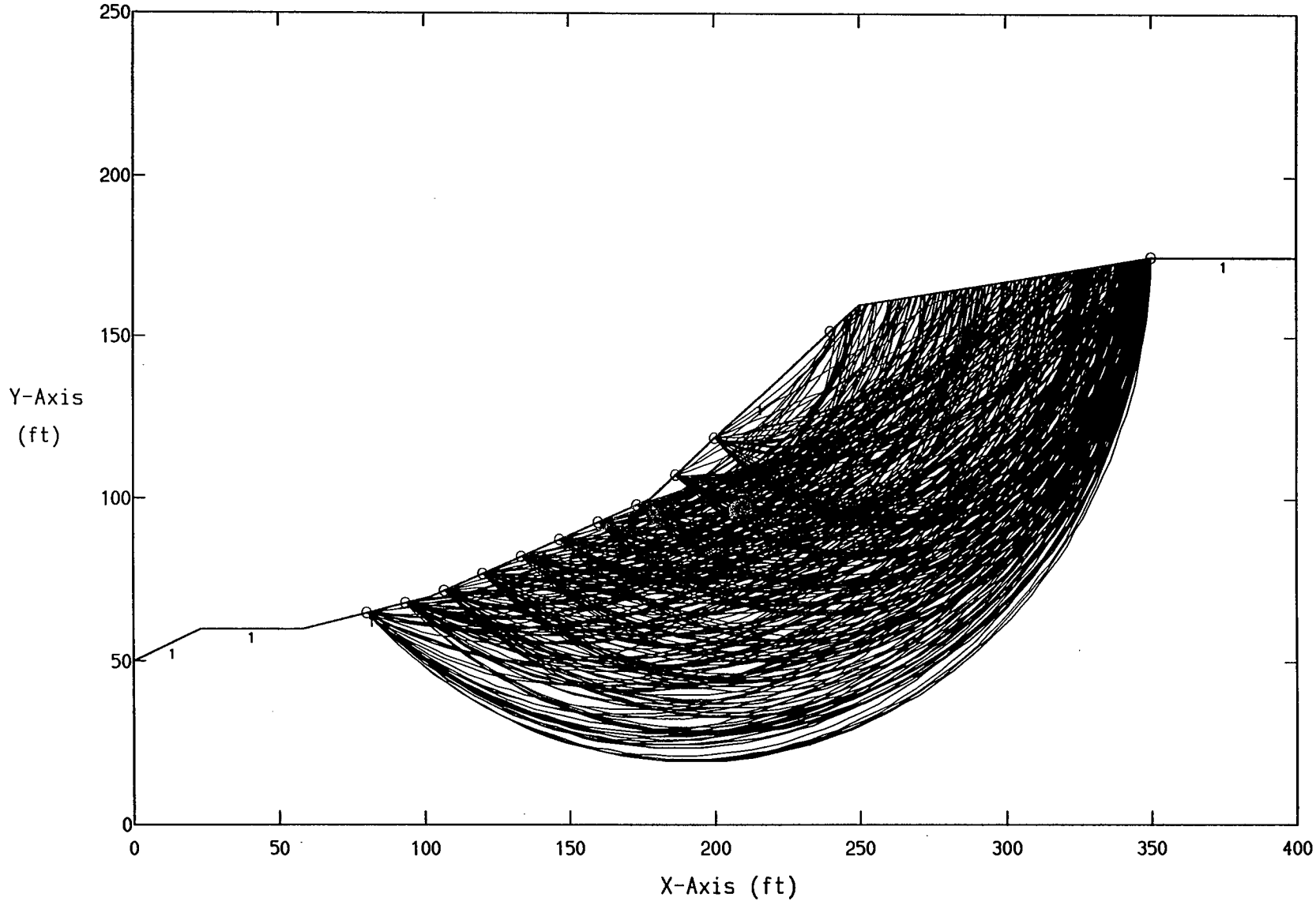
PCSTABL5M/SI FSmin=1.97 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

Run No. 36

Hasley Canyon Cross Section 45-45' Natural Slope, Static

All surfaces evaluated. C:HC45S1.PLT By: DCS 10/11/99 11:42am



Factors Of Safety Calculated By The Modified Bishop Method

35 of 36

** PCSTABL5M **

by
Purdue University

1

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date: 10/11/99

Time of Run: 11:42am
Run By: DCS

Input Data Filename: C:HC45S1.IN
Output Filename: C:HC45S1.OUT
Unit: ENGLISH
Plotted Output Filename: C:HC45S1.PLT

PROBLEM DESCRIPTION Hasley Canyon Cross Section 45-45'

Natural Slope, Static

BOUNDARY COORDINATES

7 Top Boundaries
7 Total Boundaries

Soil Type Below Bnd	Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)
1	1	.00	50.00	23.00	60.00
1	2	23.00	60.00	58.00	60.00
	3	58.00	60.00	102.00	70.00

Run No. 35

A Critical Failure Surface Searching Method, Using A Ran
dom
Technique For Generating Circular Surfaces, Has Been Spe
cified.

400 Trial Surfaces Have Been Generated.

40 Surfaces Initiate From Each Of 10 Points Equally Spa
ced
Along The Ground Surface Between X = 80.00 ft.
and X = 200.00 ft.

Each Surface Terminates Between X = 240.00 ft.
and X = 350.00 ft.

Unless Further Limitations Were Imposed, The Minimum Ele
vation
At Which A Surface Extends Is Y = .00 ft.

5.00 ft. Line Segments Define Each Trial Failure Surfac
e.

1

Following Are Displayed The Ten Most Critical Of The Tri
al
Failure Surfaces Examined. They Are Ordered - Most Crit
ical
First.

* * Safety Factors Are Calculated By The Modified Bishop
Method * *

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

1	173.33	98.16
2	178.32	98.55
3	183.27	99.24
4	188.17	100.21
5	193.01	101.48
6	197.77	103.03
7	202.42	104.85
8	206.96	106.95
9	211.37	109.31
10	215.63	111.93
11	219.72	114.80
12	223.64	117.90
13	227.37	121.23
14	230.90	124.77
15	234.21	128.52
16	237.30	132.45
17	240.15	136.56
18	242.75	140.83
19	245.09	145.25
20	247.17	149.80
21	248.97	154.46
22	250.50	159.22
23	250.73	160.11

Circle Center At X = 169.2 ; Y = 182.7 and Radius, 84.6

*** 1.907 ***

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)	Surcharge Load Ver (lbs)
1	4.7	409.5	.0	.0	.0	.0	.0	.0
2	.3	60.4	.0	.0	.0	.0	.0	

.0	.0						
3	5.0	2025.1	.0	.0	.0	.0	.0
.0	.0						
4	4.9	3916.2	.0	.0	.0	.0	.0
.0	.0						
5	4.8	5554.3	.0	.0	.0	.0	.0
.0	.0						
6	4.8	6924.0	.0	.0	.0	.0	.0
.0	.0						
7	4.7	8015.3	.0	.0	.0	.0	.0
.0	.0						
8	4.5	8824.4	.0	.0	.0	.0	.0
.0	.0						
9	4.4	9352.8	.0	.0	.0	.0	.0
.0	.0						
10	4.3	9608.1	.0	.0	.0	.0	.0
.0	.0						
11	4.1	9603.0	.0	.0	.0	.0	.0
.0	.0						
12	3.9	9356.0	.0	.0	.0	.0	.0
.0	.0						
13	3.7	8890.1	.0	.0	.0	.0	.0
.0	.0						
14	3.5	8233.2	.0	.0	.0	.0	.0
.0	.0						
15	3.3	7417.2	.0	.0	.0	.0	.0
.0	.0						
16	3.1	6477.7	.0	.0	.0	.0	.0
.0	.0						
17	2.8	5453.1	.0	.0	.0	.0	.0
.0	.0						
18	2.6	4384.5	.0	.0	.0	.0	.0
.0	.0						
19	2.3	3314.4	.0	.0	.0	.0	.0
.0	.0						
20	2.1	2286.7	.0	.0	.0	.0	.0
.0	.0						
21	1.8	1345.3	.0	.0	.0	.0	.0
.0	.0						
22	1.0	428.9	.0	.0	.0	.0	.0
.0	.0						
23	.5	94.8	.0	.0	.0	.0	.0
.0	.0						
24	.2	11.5	.0	.0	.0	.0	.0
.0	.0						

Failure Surface Specified By 31 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	160.00	92.89
2	165.00	93.08
3	169.98	93.44
4	174.96	93.97
5	179.91	94.66
6	184.83	95.52
7	189.73	96.55
8	194.58	97.74
9	199.40	99.10
10	204.16	100.61
11	208.87	102.29
12	213.52	104.13
13	218.11	106.12
14	222.62	108.26
15	227.07	110.56
16	231.43	113.01
17	235.70	115.60
18	239.89	118.33
19	243.98	121.21
20	247.97	124.22
21	251.86	127.36
22	255.64	130.63
23	259.30	134.03
24	262.85	137.56
25	266.28	141.20
26	269.59	144.95
27	272.76	148.81
28	275.80	152.78
29	278.71	156.85
30	281.48	161.01
31	284.00	165.10

Circle Center At X = 156.9 ; Y = 240.8 and Radius, 1
47.9

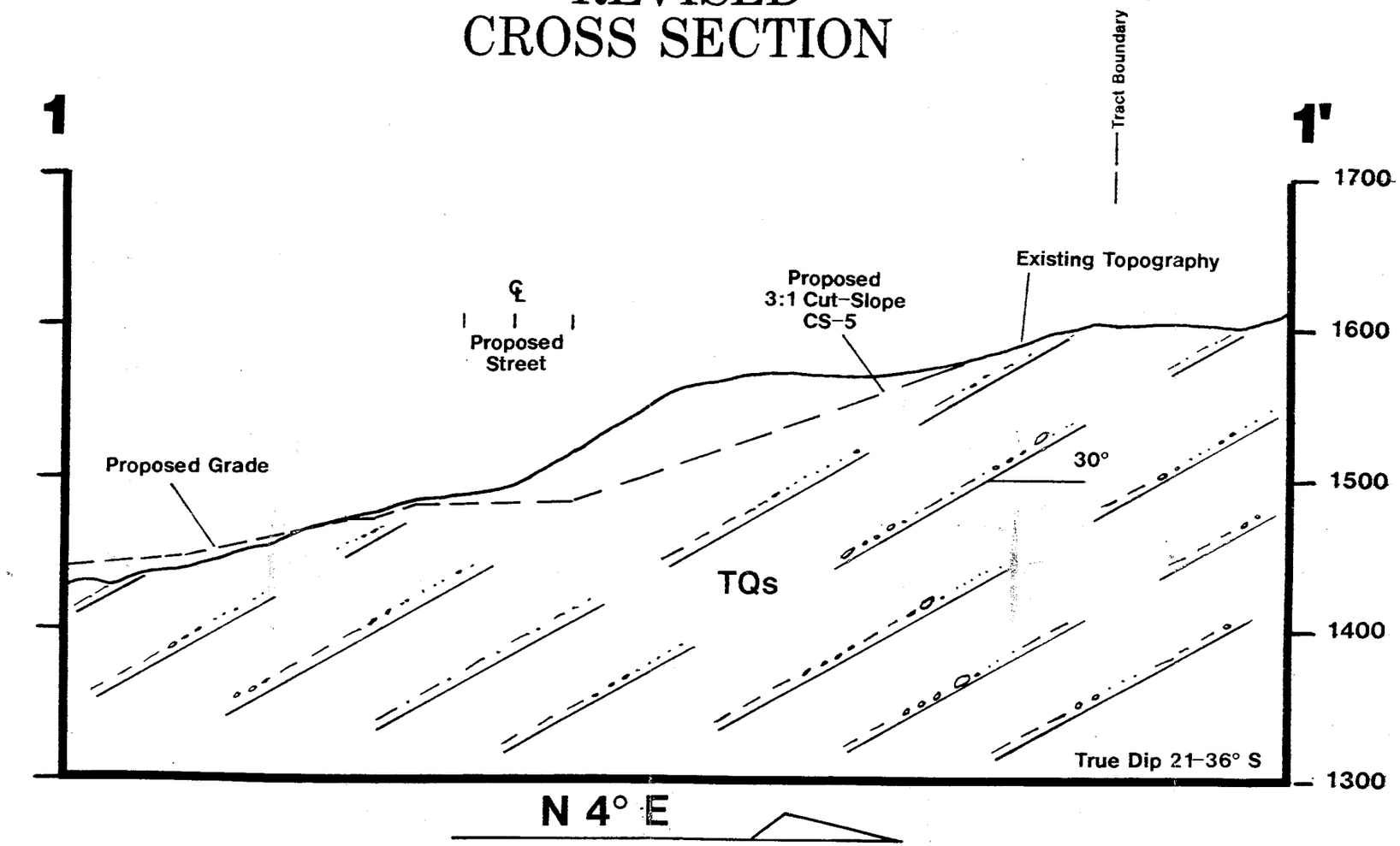
*** 1.935 ***

1

Failure Surface Specified By 28 Coordinate Points

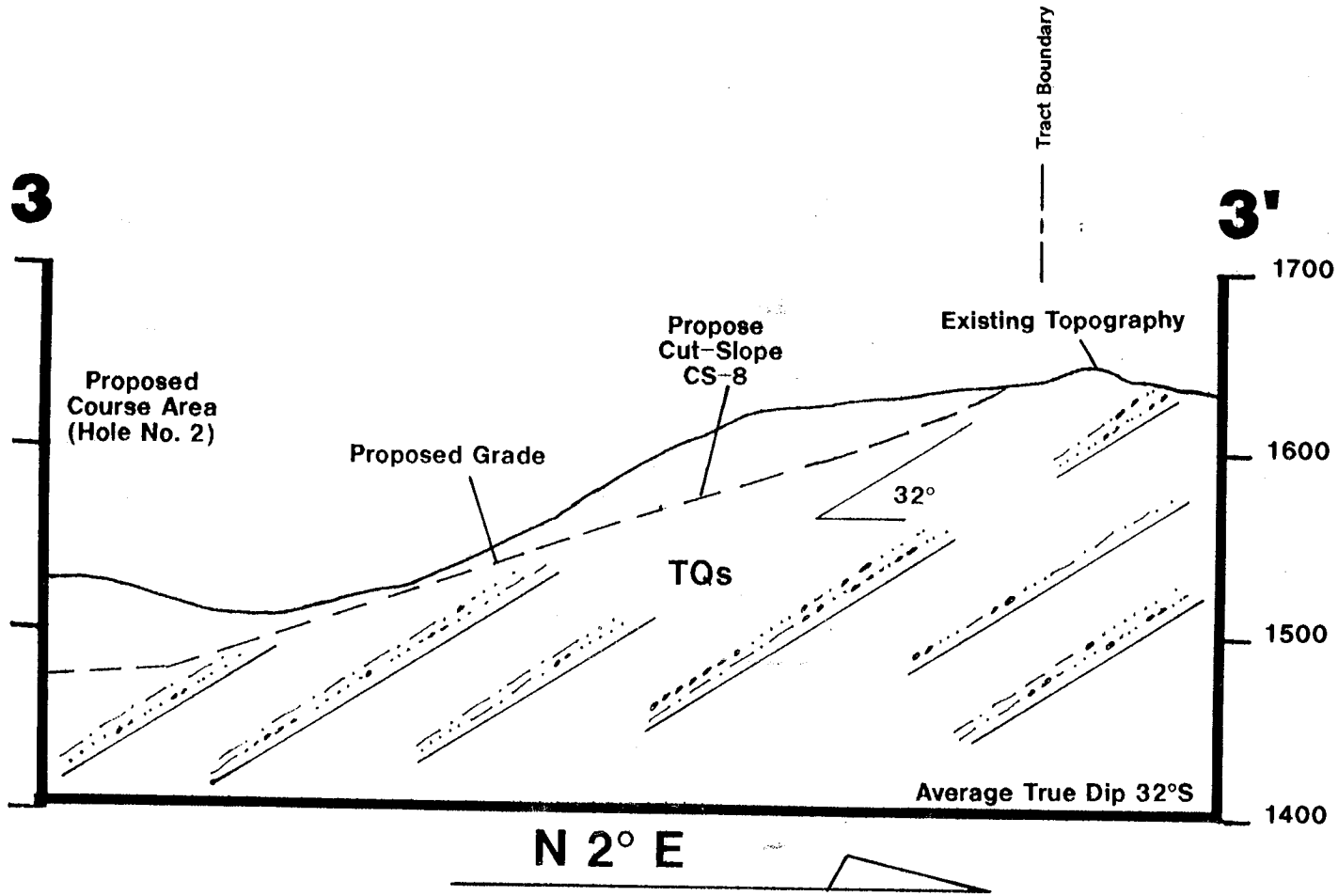
Appendix F

REVISED CROSS SECTION



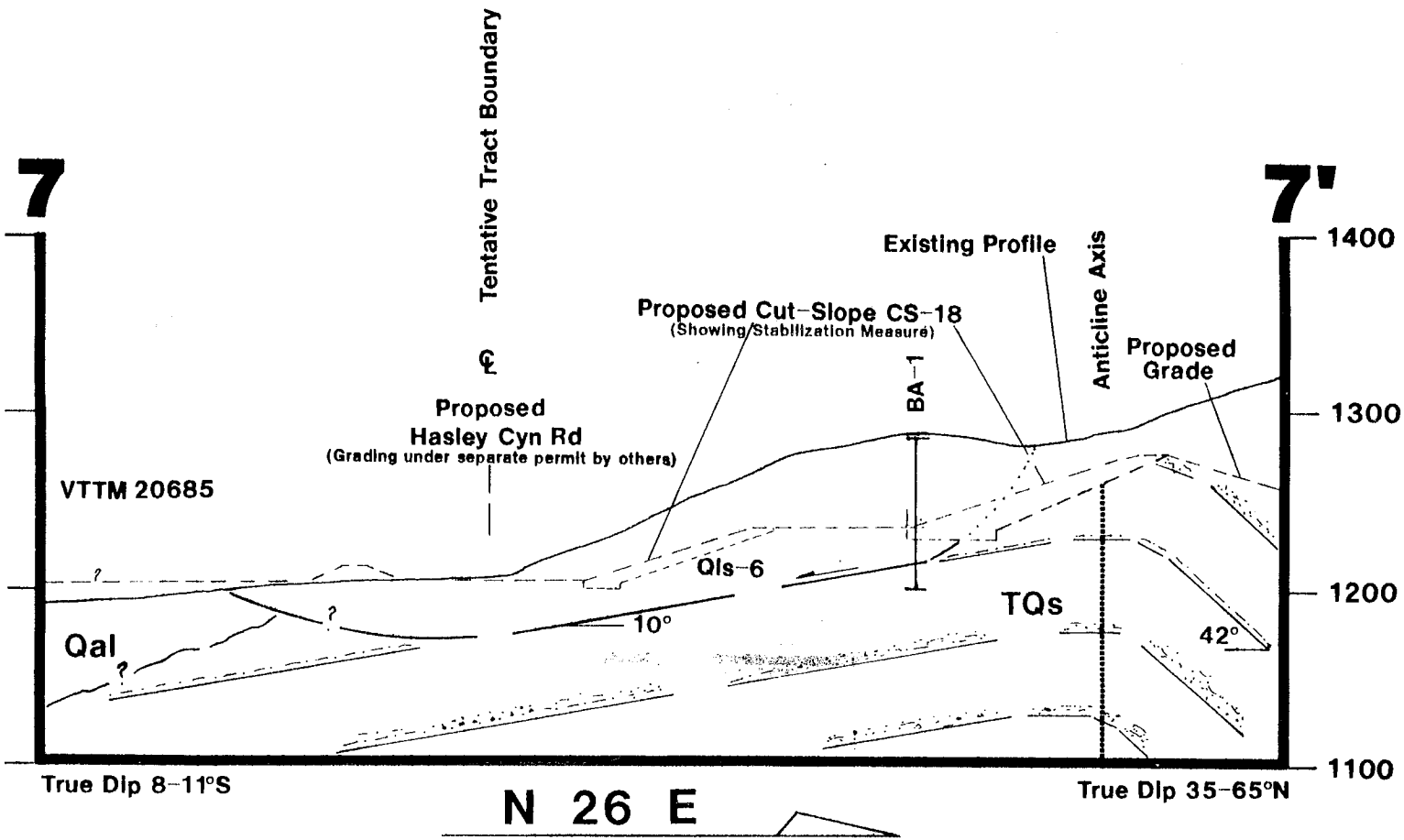
ALLAN E. SEWARD ENGINEERING GEOLOGY		
JOB NUMBER: 99-1617-4	DATE: 1/15/99	
SCALE: 1"=100'		DRAWN BY: Staff REVISED: 10/22/99

REVISED CROSS SECTION



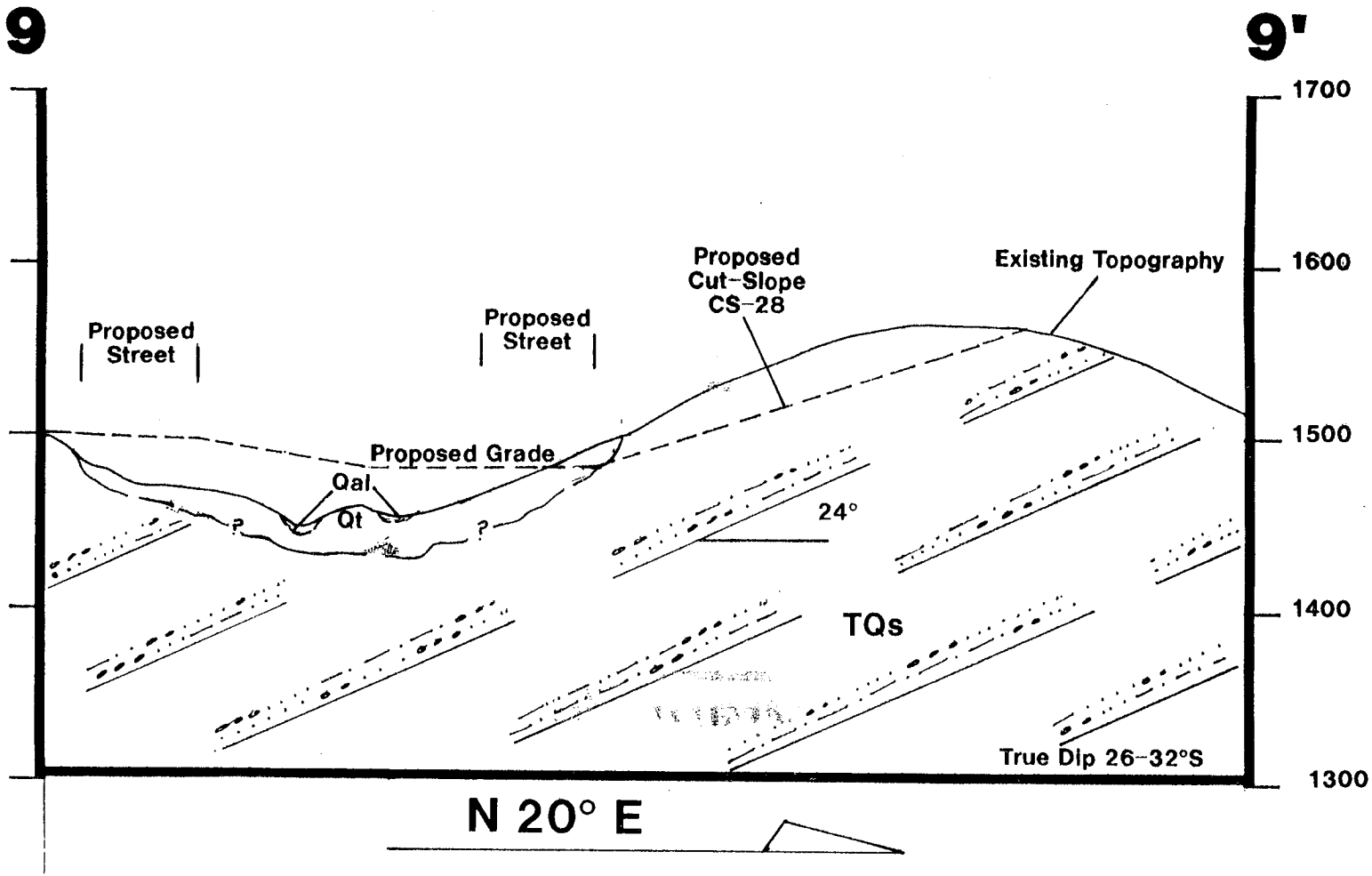
ALLAN E. SEWARD ENGINEERING GEOLOGY			
JOB NUMBER: 99-1617-4		DATE: 1/15/99	
SCALE: 1"=100'		DRAWN BY: Staff	
		REVISED: 10/22/99	

REVISED CROSS SECTION



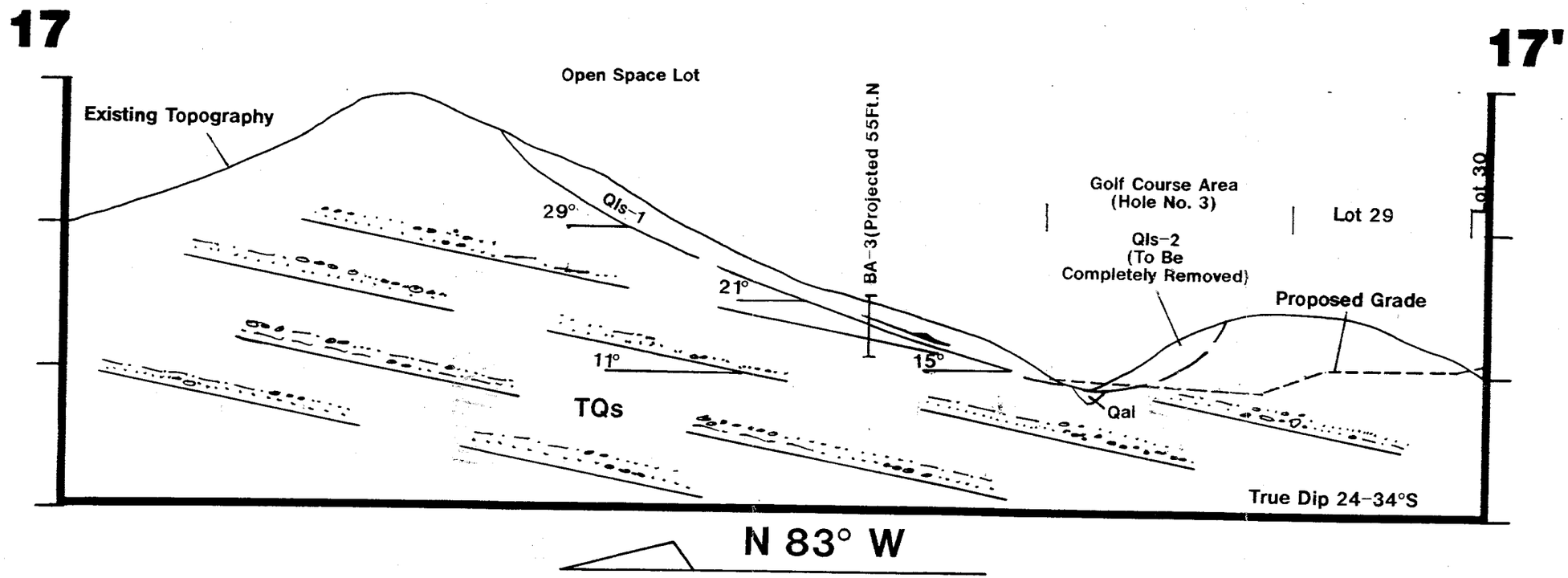
ALLAN E. SEWARD ENGINEERING GEOLOGY		
JOB NUMBER: 99-1617-4	DATE: 1/15/99	
SCALE: 1"=100'		DRAWN BY: staff REVISED: 10/22/99

REVISED CROSS SECTION



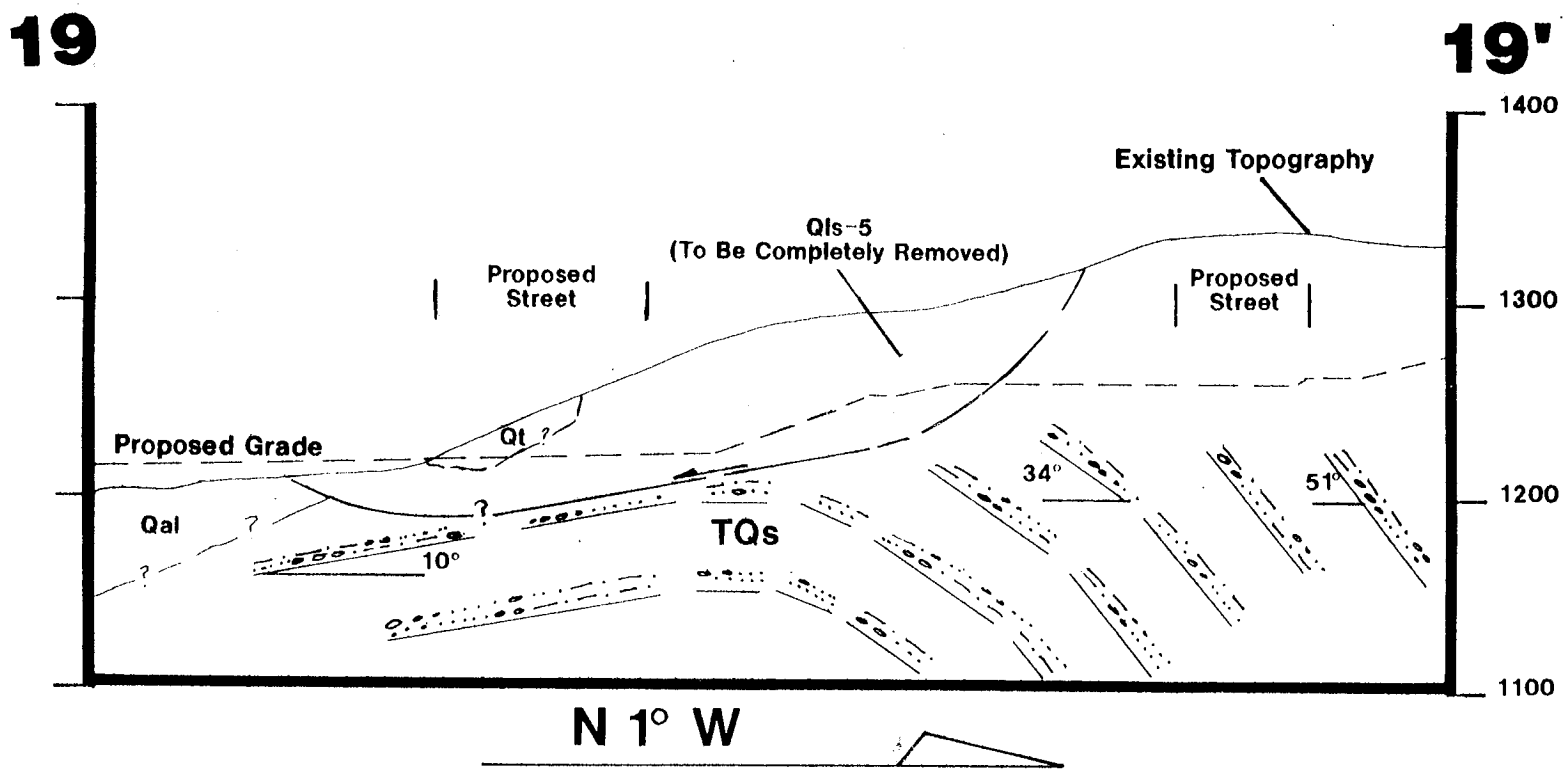
ALLAN E. SEWARD ENGINEERING GEOLOGY		
JOB NUMBER: 99-1617-4	DATE: 1/15/99	
SCALE: 1"=100'		DRAWN BY: Staff REVISED: 10/22/99

REVISED CROSS SECTION



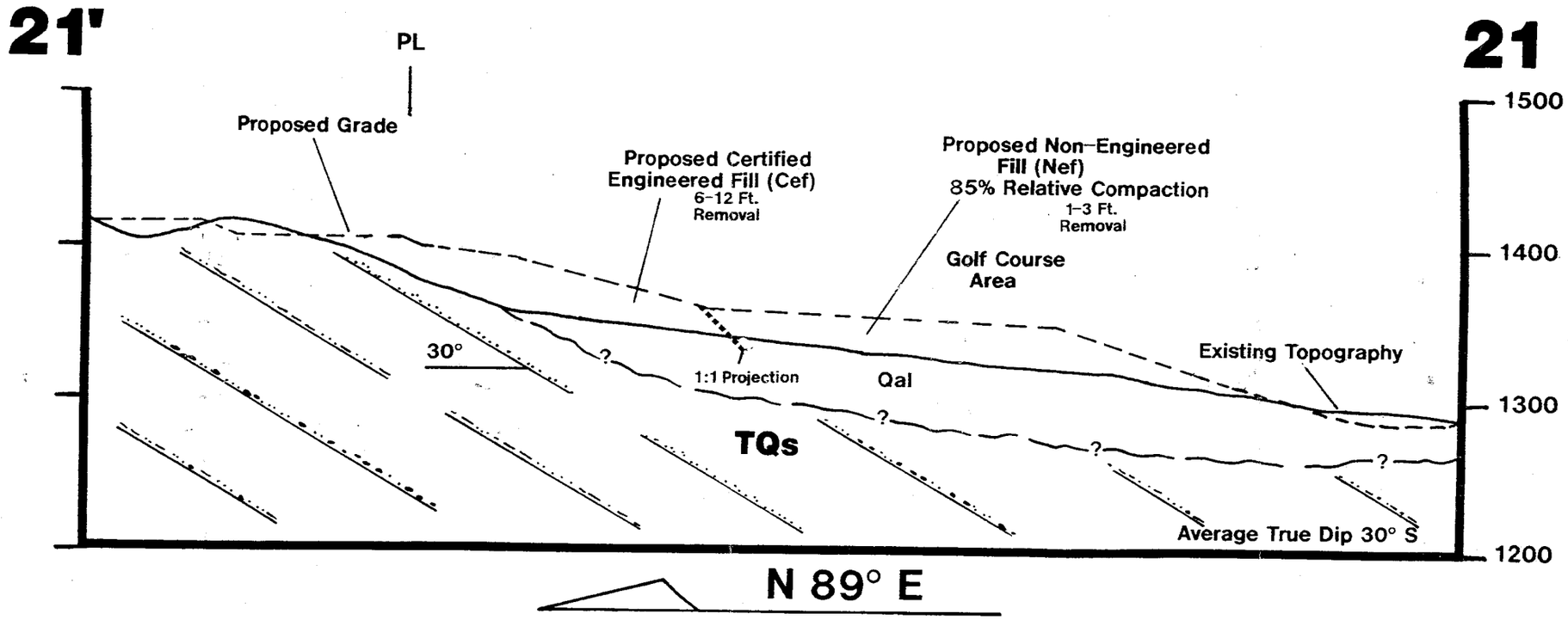
ALLAN E. SEWARD ENGINEERING GEOLOGY		
JOB NUMBER: 99-1617-4	DATE: 1/15/99	
SCALE: 1"=100'		DRAWN BY: Staff REVISED: 10/22/99

REVISED CROSS SECTION



ALLAN E. SEWARD ENGINEERING GEOLOGY			
JOB NUMBER: 99-1617-4		DATE: 1/15/99	
SCALE: 1"=100'		DRAWN BY: Staff REVISED: 10/22/99	

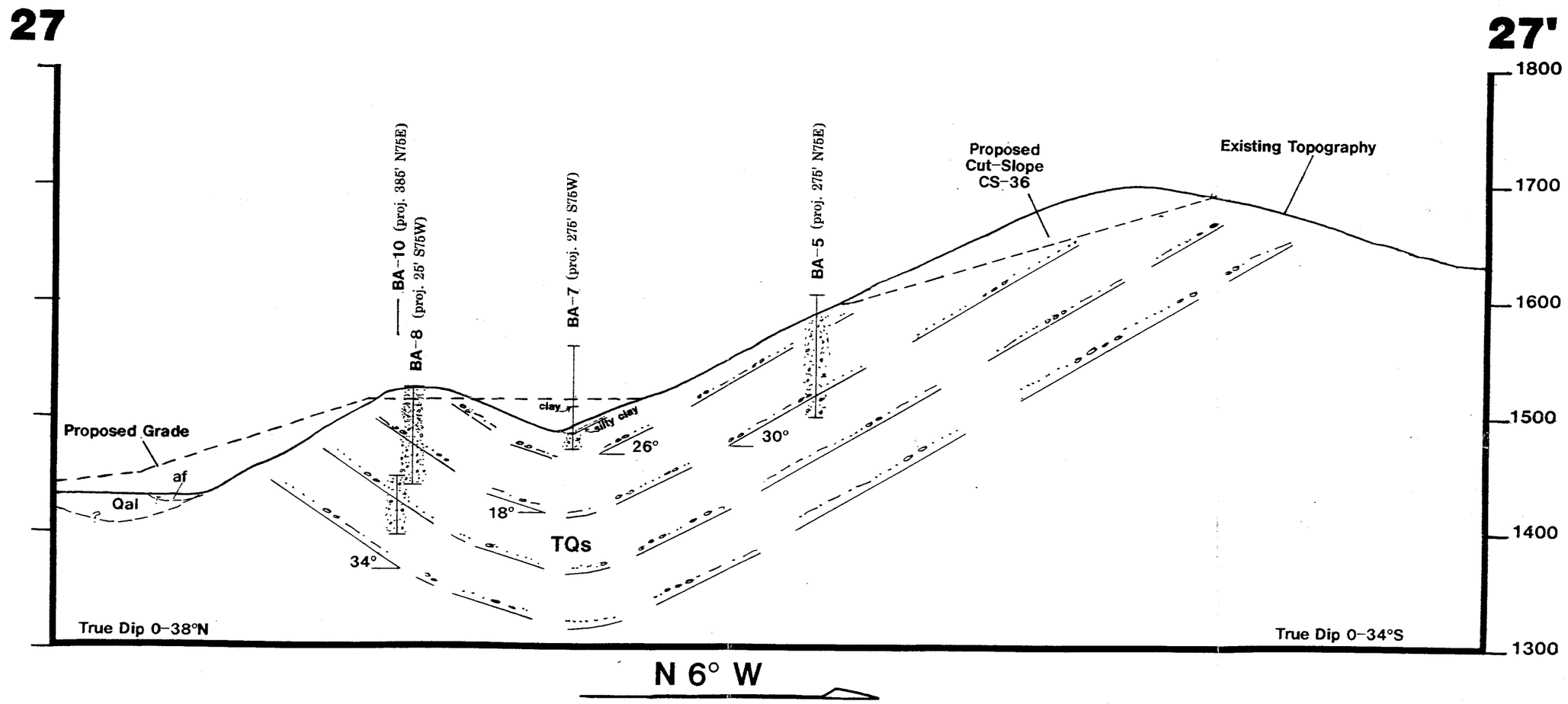
REVISED CROSS SECTION



ALLAN E. SEWARD ENGINEERING GEOLOGY			
JOB NUMBER:	99-1617-4	DATE:	1/15/99
SCALE:	1"=100'	DRAWN BY:	Staff
		REVISED:	10/22/99

Appendix G

CROSS SECTION



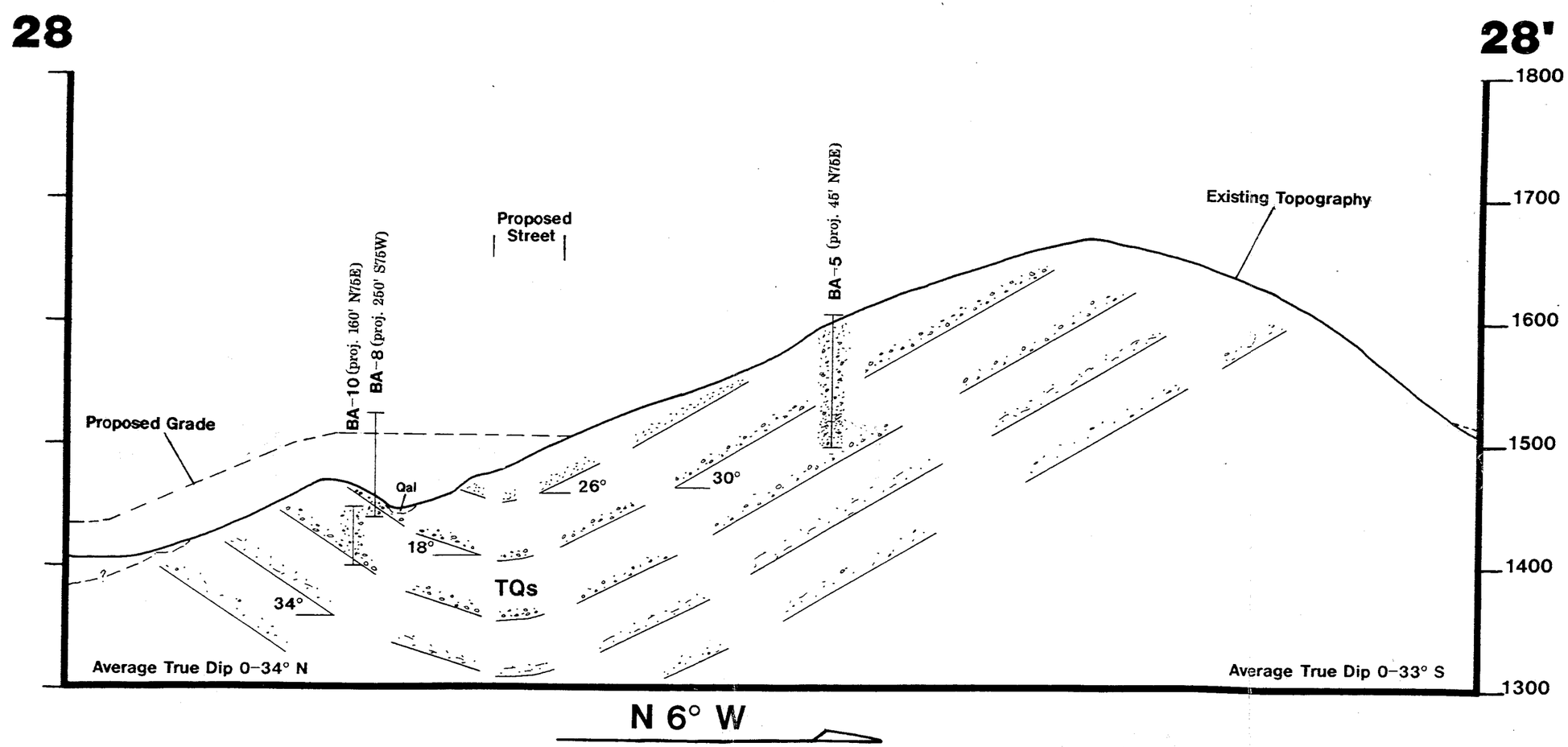
1"=100'

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1958

Date: 10/22/99

Job No.: 99-1617-4

CROSS SECTION



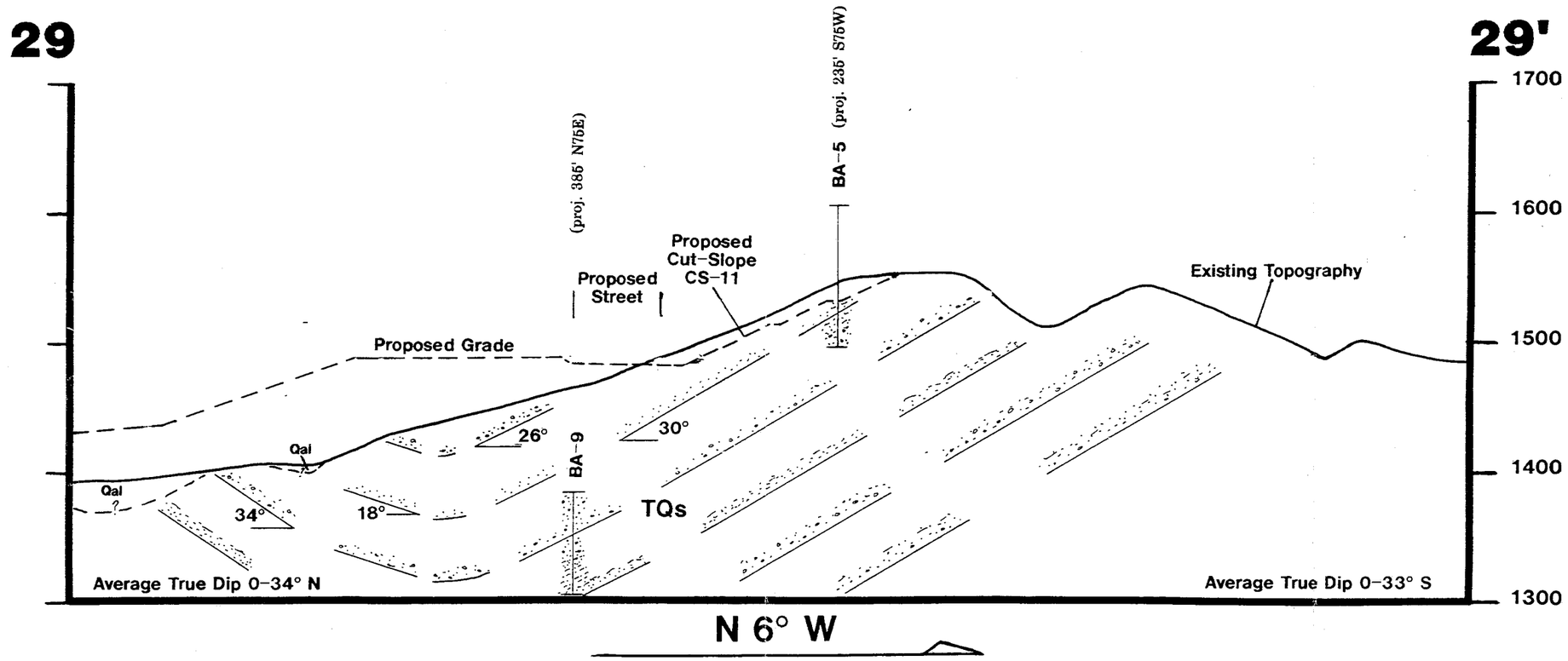
1"=100'

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1958

Date: 10/22/99

Job No.: 99-1617-4

CROSS SECTION



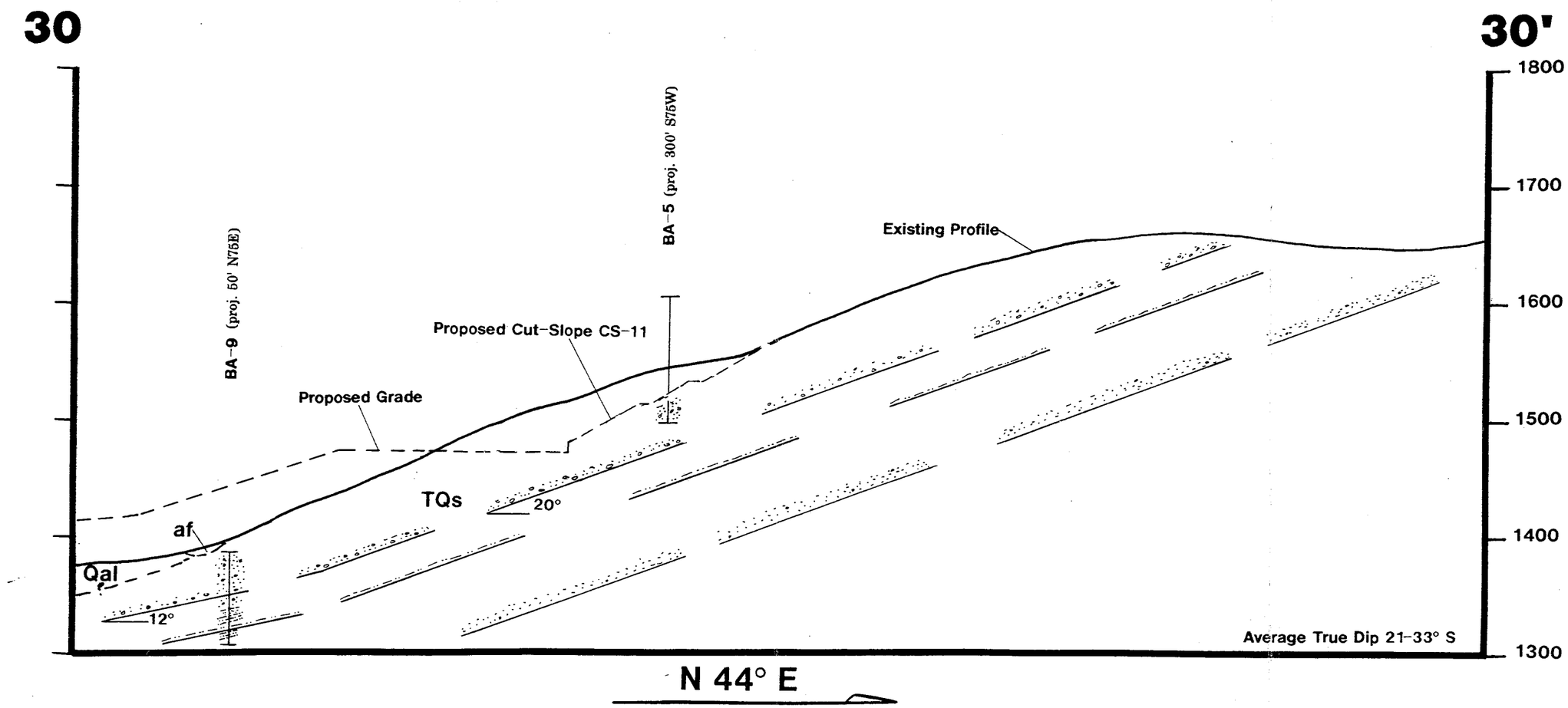
1"=100'

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1958

Date: 10/22/99

Job No.: 99-1617-4

CROSS SECTION



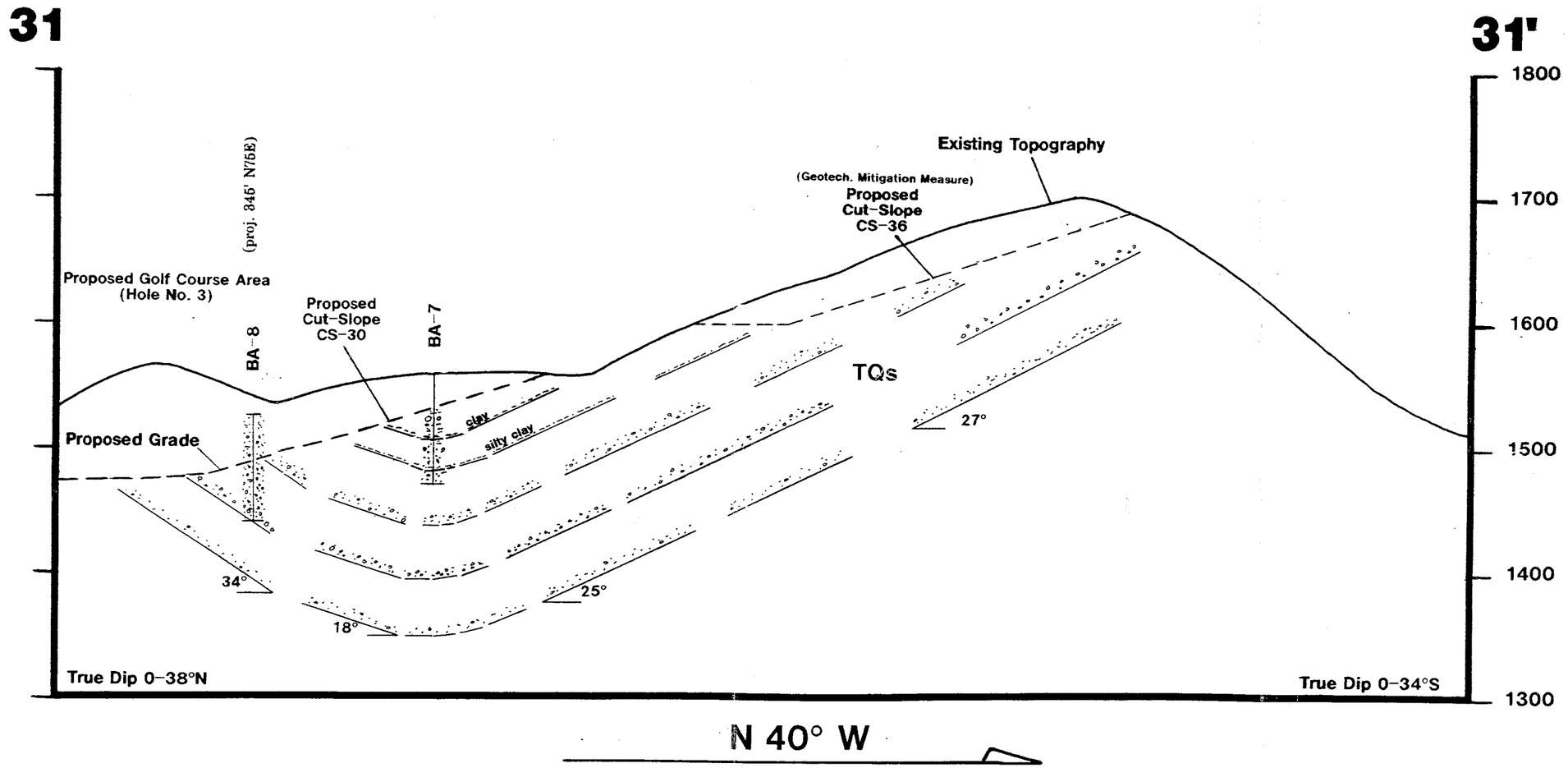
1"=100'

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1958

Date: 10/22/99

Job No.: 99-1617-4

CROSS SECTION



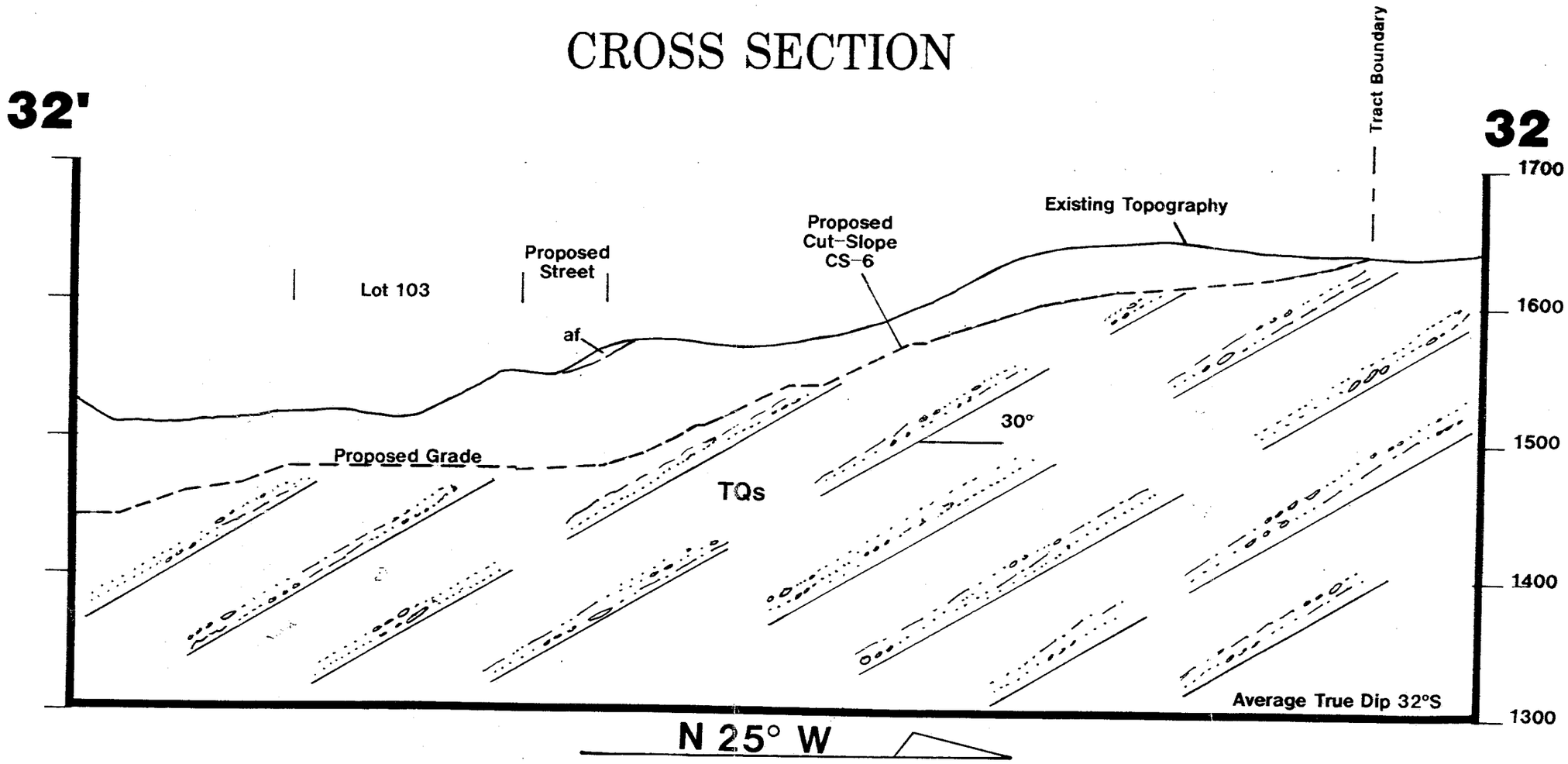
1"=100'

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1958

Date: 10/22/99

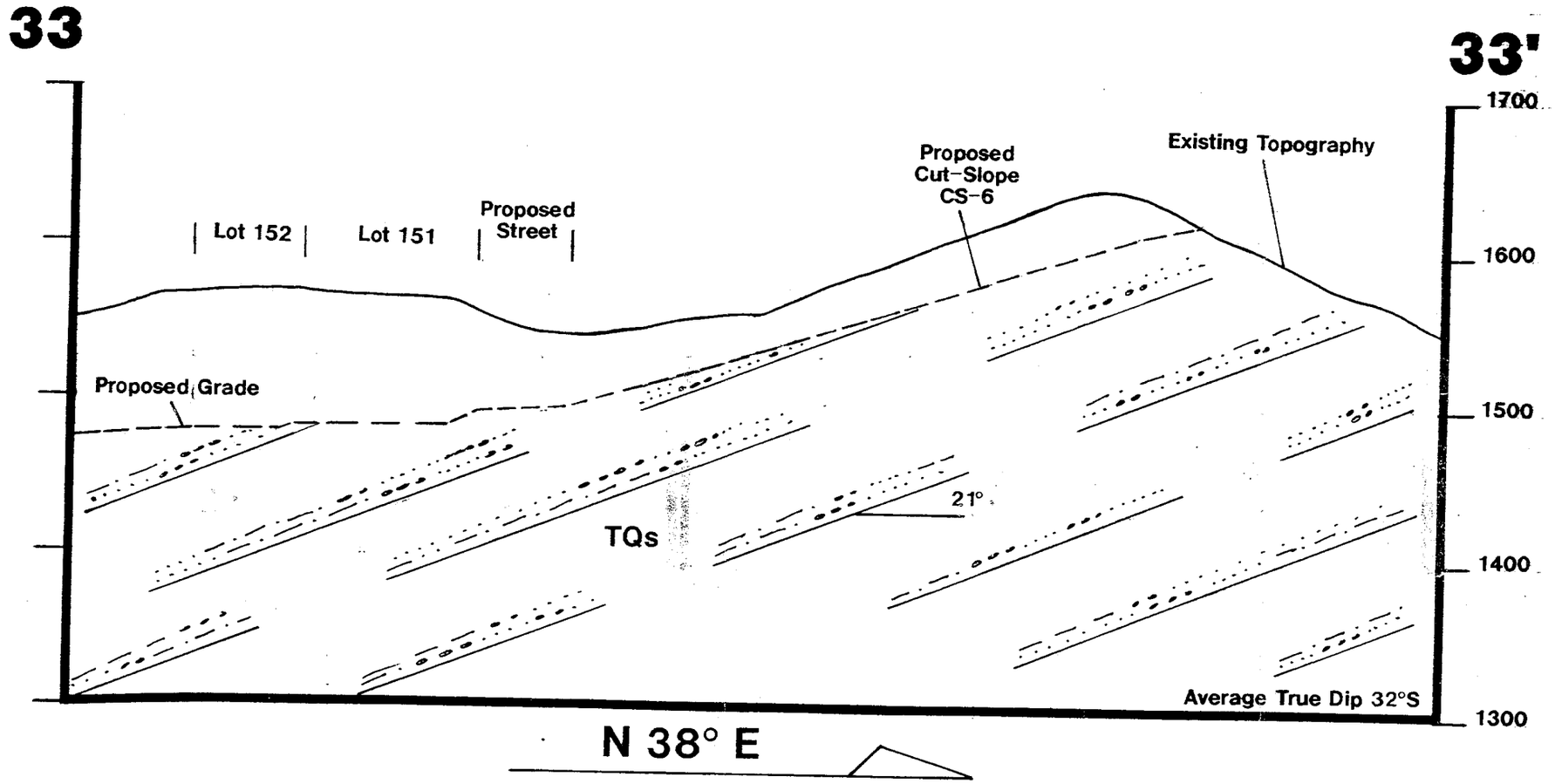
Job No.: 99-1617-4

CROSS SECTION



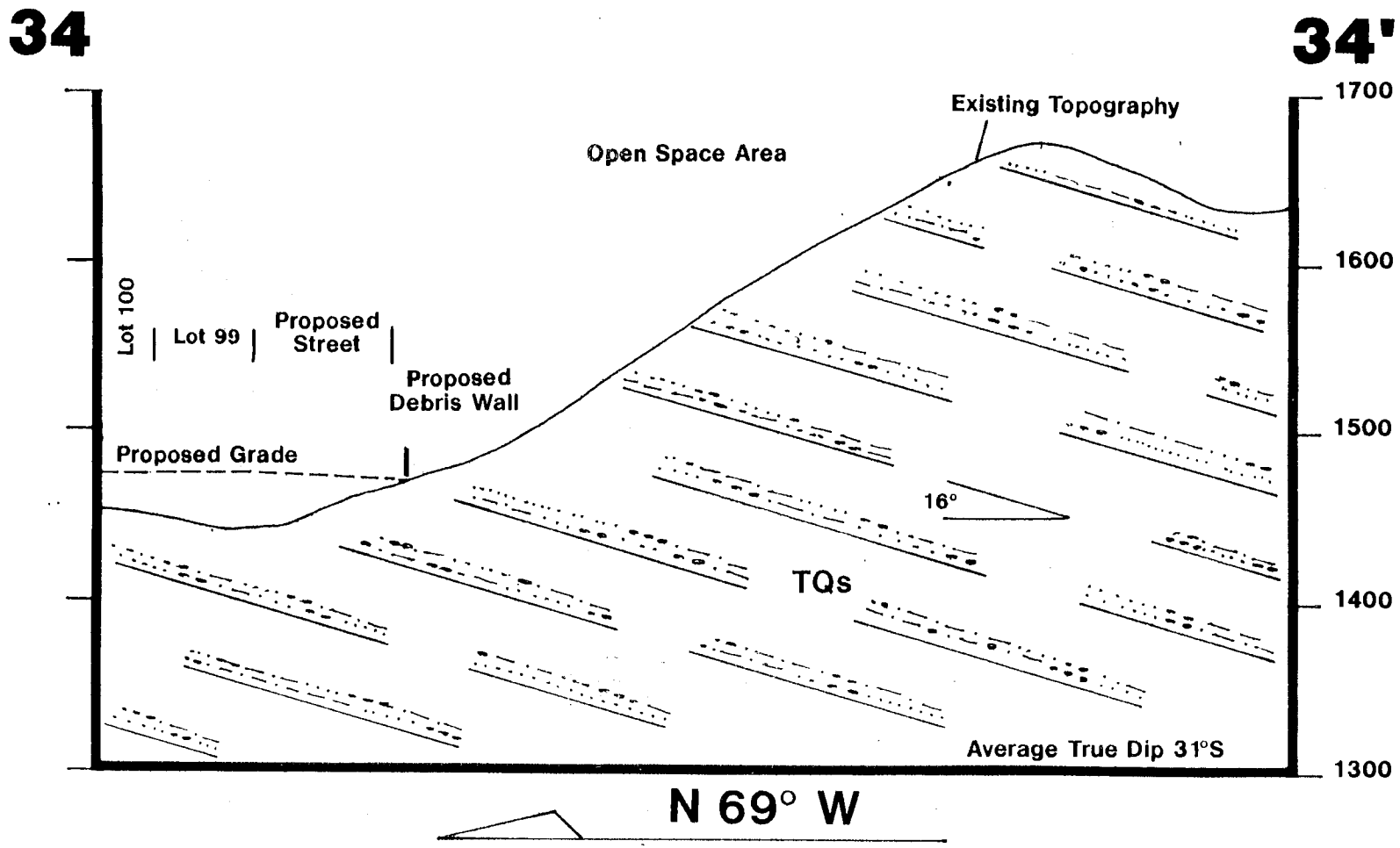
ALLAN E. SEWARD ENGINEERING GEOLOGY			
JOB NUMBER:	99-1617-4	DATE:	10/22/99
SCALE:	1"=100'	DRAWN BY:	Staff
		REVISED:	

CROSS SECTION



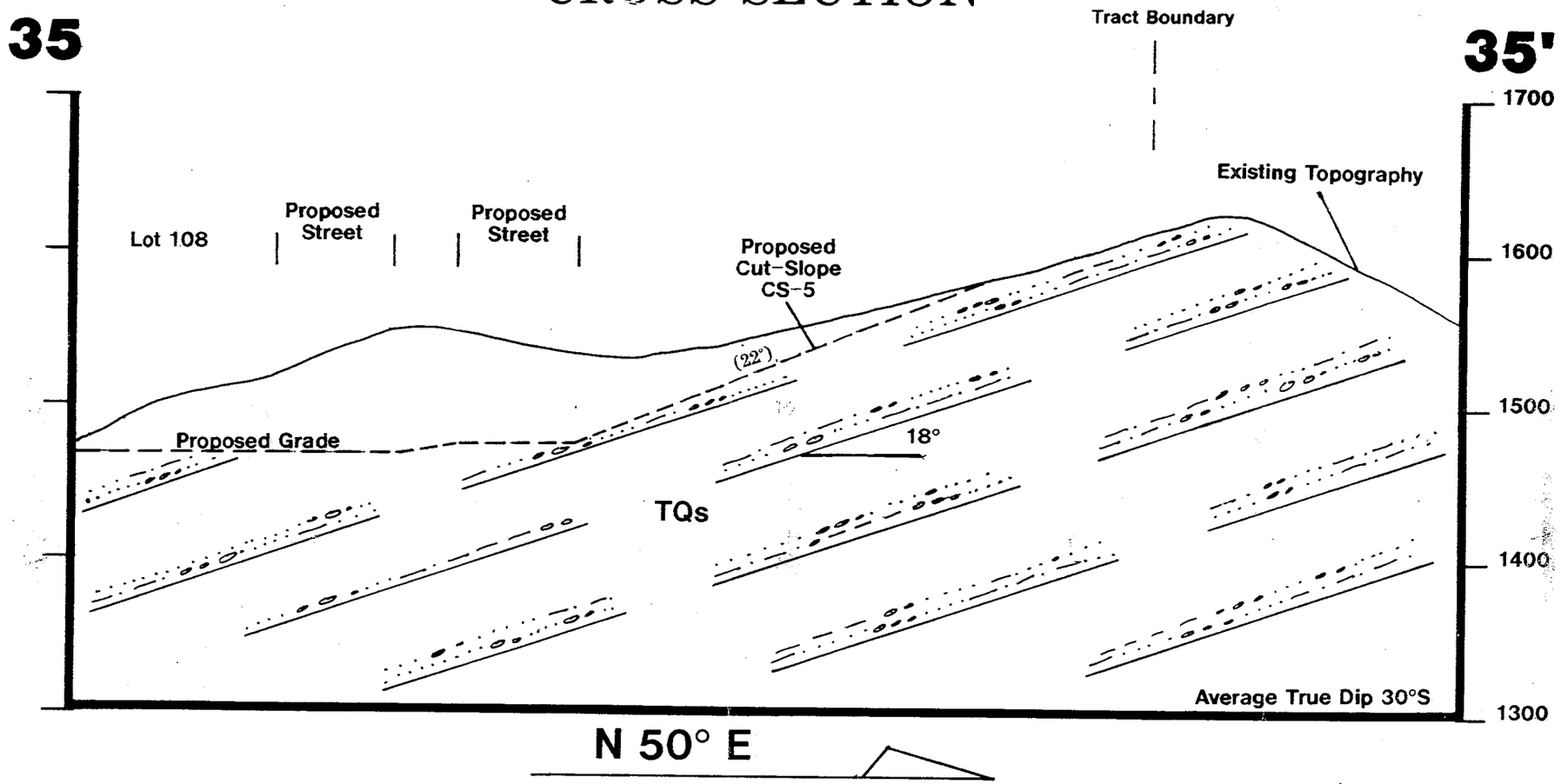
ALLAN E. SEWARD ENGINEERING GEOLOGY			
JOB NUMBER: 99-1617-4		DATE: 10/22/99	
SCALE: 1"=100'		DRAWN BY: Staff	
		REVISED:	

CROSS SECTION



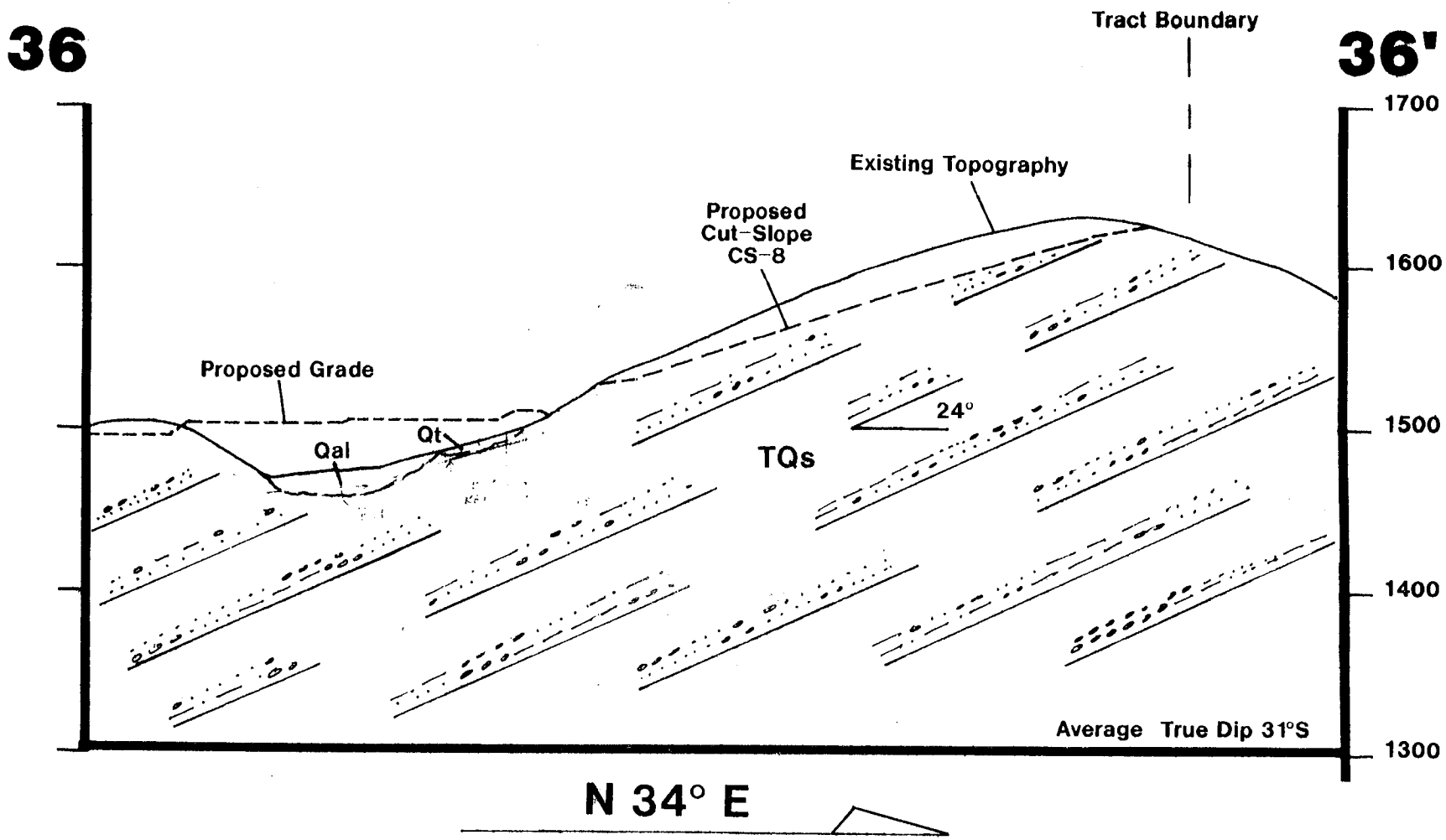
ALLAN E. SEWARD ENGINEERING GEOLOGY			
JOB NUMBER: 99-1617-4		DATE: 10/22/99	
SCALE: 1"=100'		DRAWN BY: Staff	
		REVISED:	

CROSS SECTION



ALLAN E. SEWARD ENGINEERING GEOLOGY			
JOB NUMBER:	99-1617-4	DATE:	10/22/99
SCALE:	1"=100'	DRAWN BY:	Staff
		REVISED:	

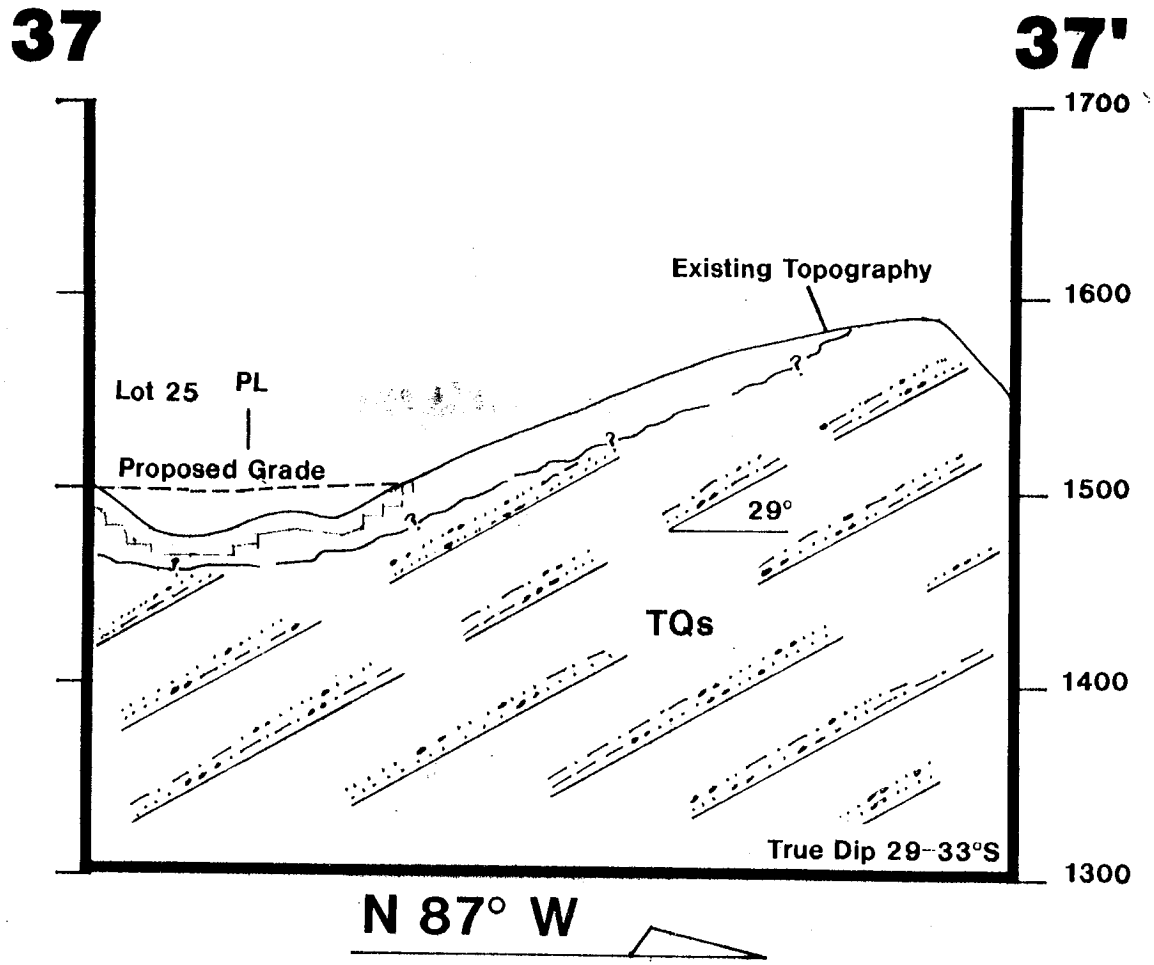
CROSS SECTION



ALLAN E. SEWARD
ENGINEERING GEOLOGY

JOB NUMBER:	99-1617-4	DATE:	10/22/99
SCALE:	1"=100'	DRAWN BY:	Staff
		REVISED:	

CROSS SECTION



ALLAN E. SEWARD ENGINEERING GEOLOGY			
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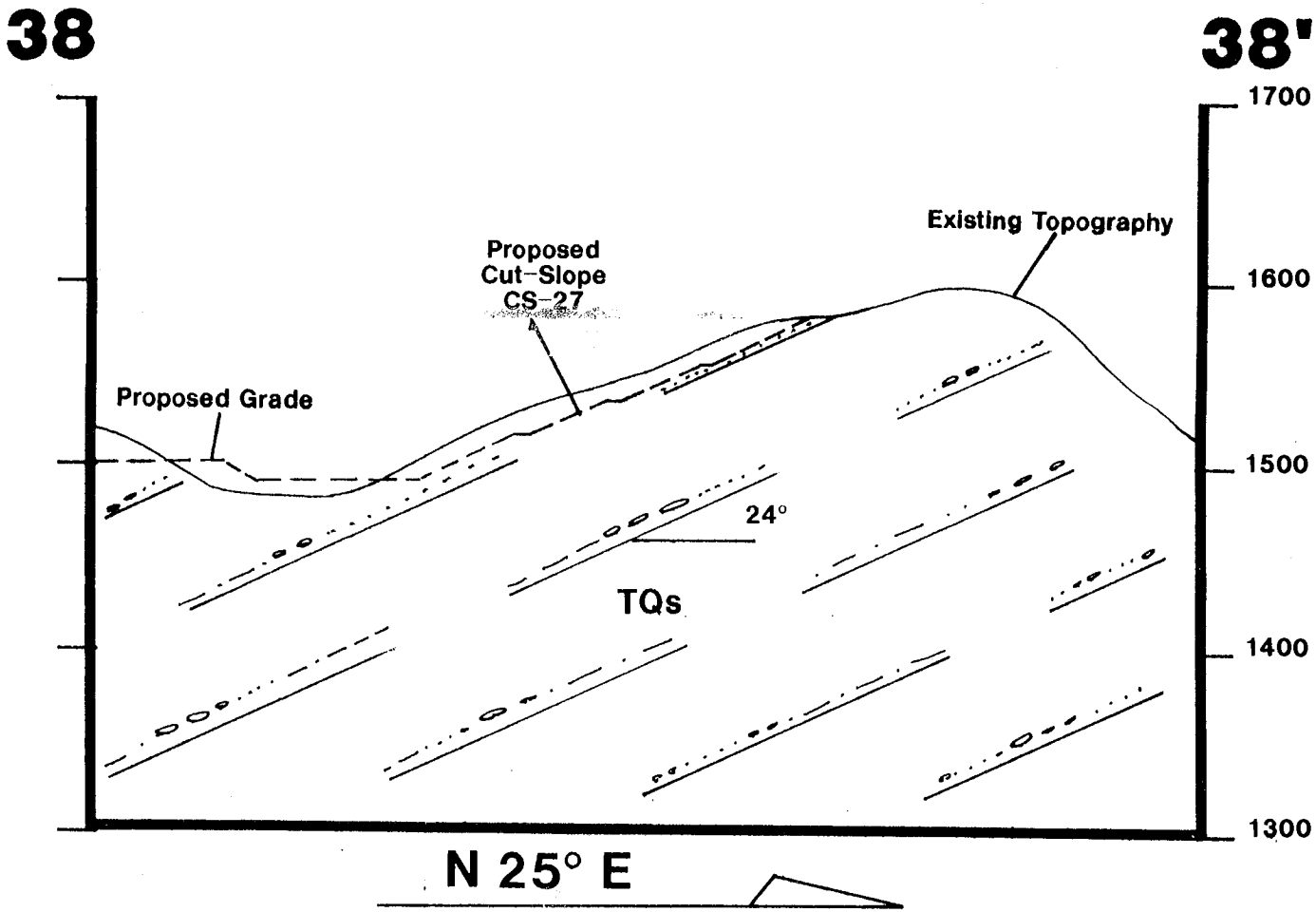
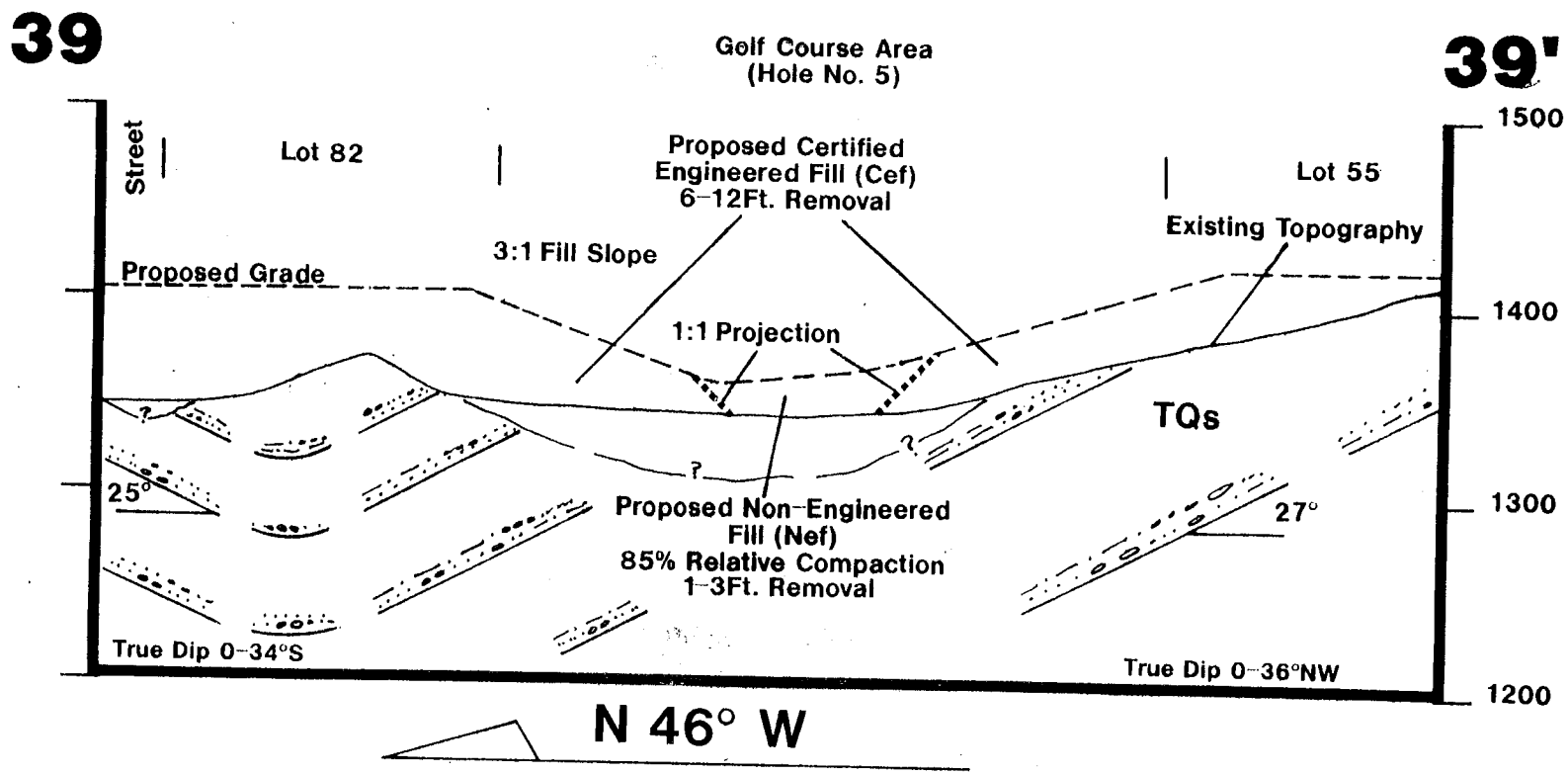
CROSS SECTION



ALLAN E. SEWARD ENGINEERING GEOLOGY			
JOB NUMBER: 99-1617-4		DATE: 10/22/99	
SCALE: 1"=100'		DRAWN BY: Staff	
		REVISED:	

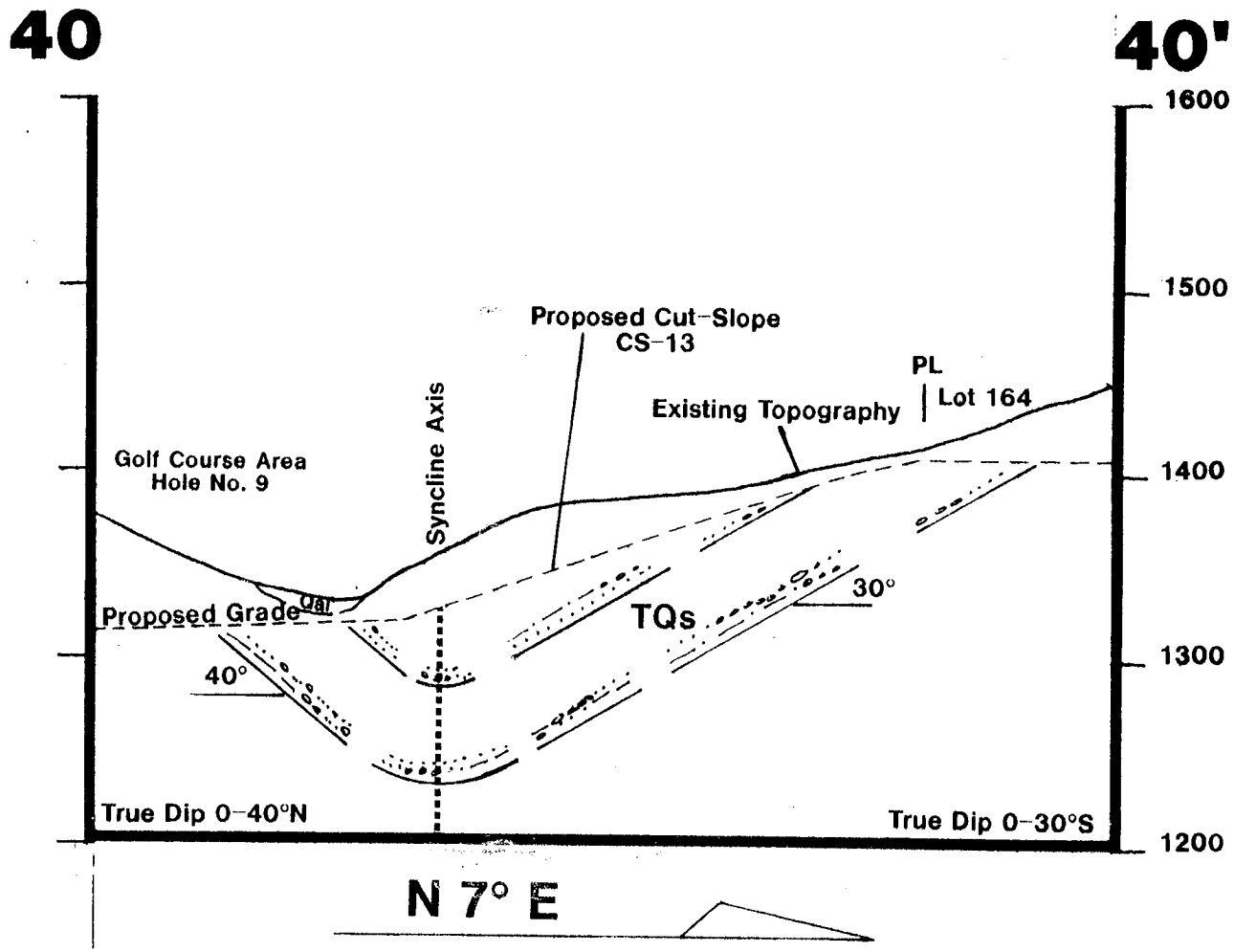
CROSS SECTION



ALLAN E. SEWARD
ENGINEERING GEOLOGY

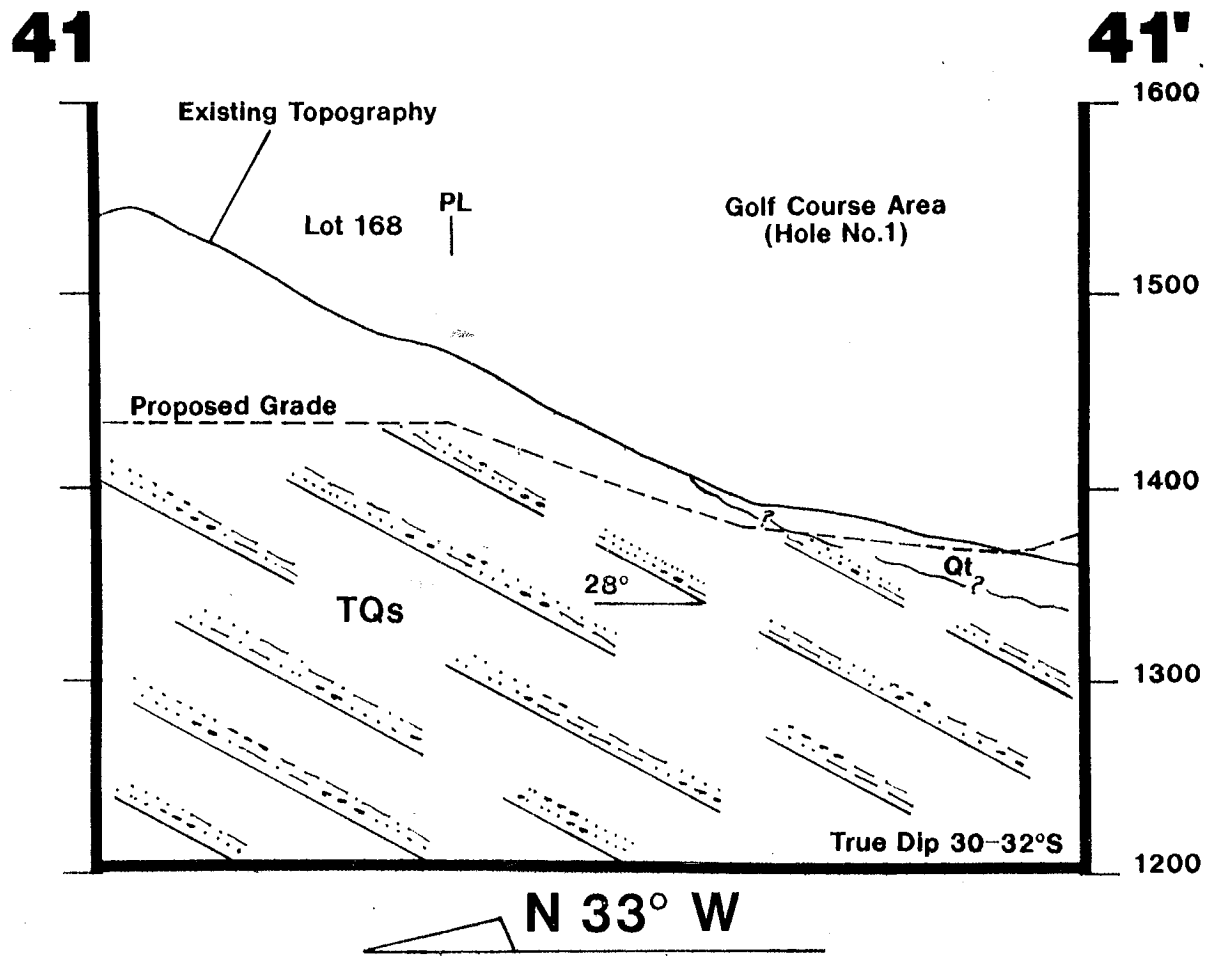
JOB NUMBER:	99-1617-4	DATE:	10/22/99
SCALE:	1"=100'	DRAWN BY:	Staff
		REVISED:	

CROSS SECTION



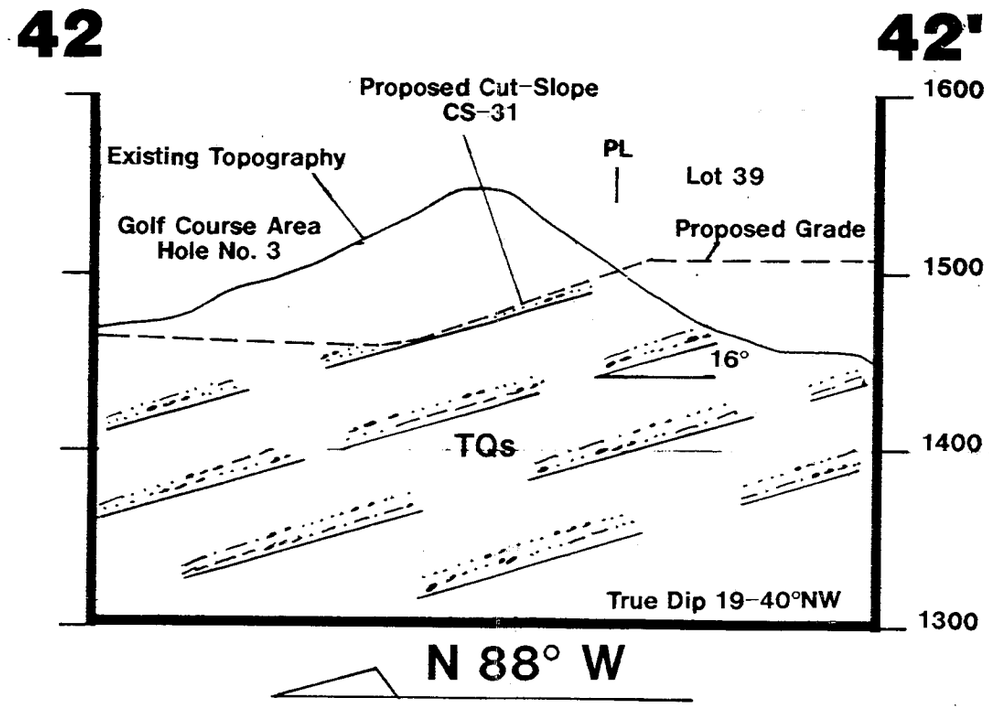
ALLAN E. SEWARD ENGINEERING GEOLOGY		
JOB NUMBER: 99-1617-4	DATE: 10/22/99	
SCALE: 1"=100'		DRAWN BY: Staff REVISED:

CROSS SECTION



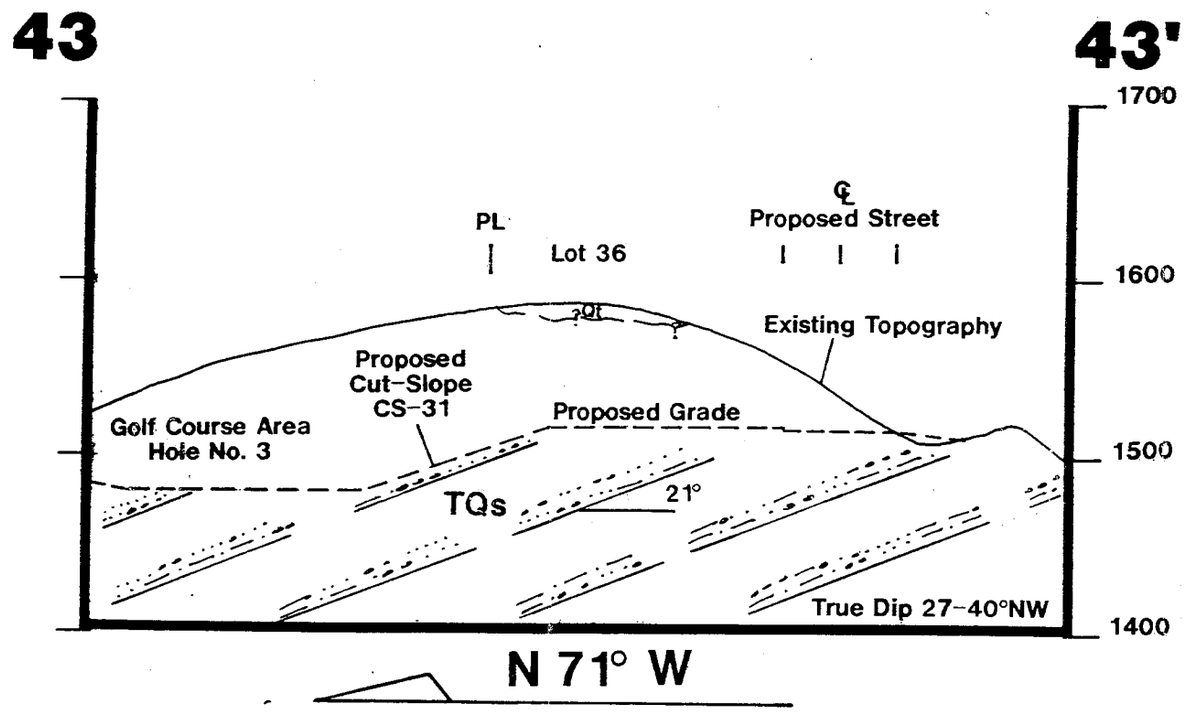
ALLAN E. SEWARD ENGINEERING GEOLOGY			
JOB NUMBER: 99-1617-4		DATE: 10/22/99	
SCALE: 1"=100'		DRAWN BY: Staff	
		REVISED:	

CROSS SECTION



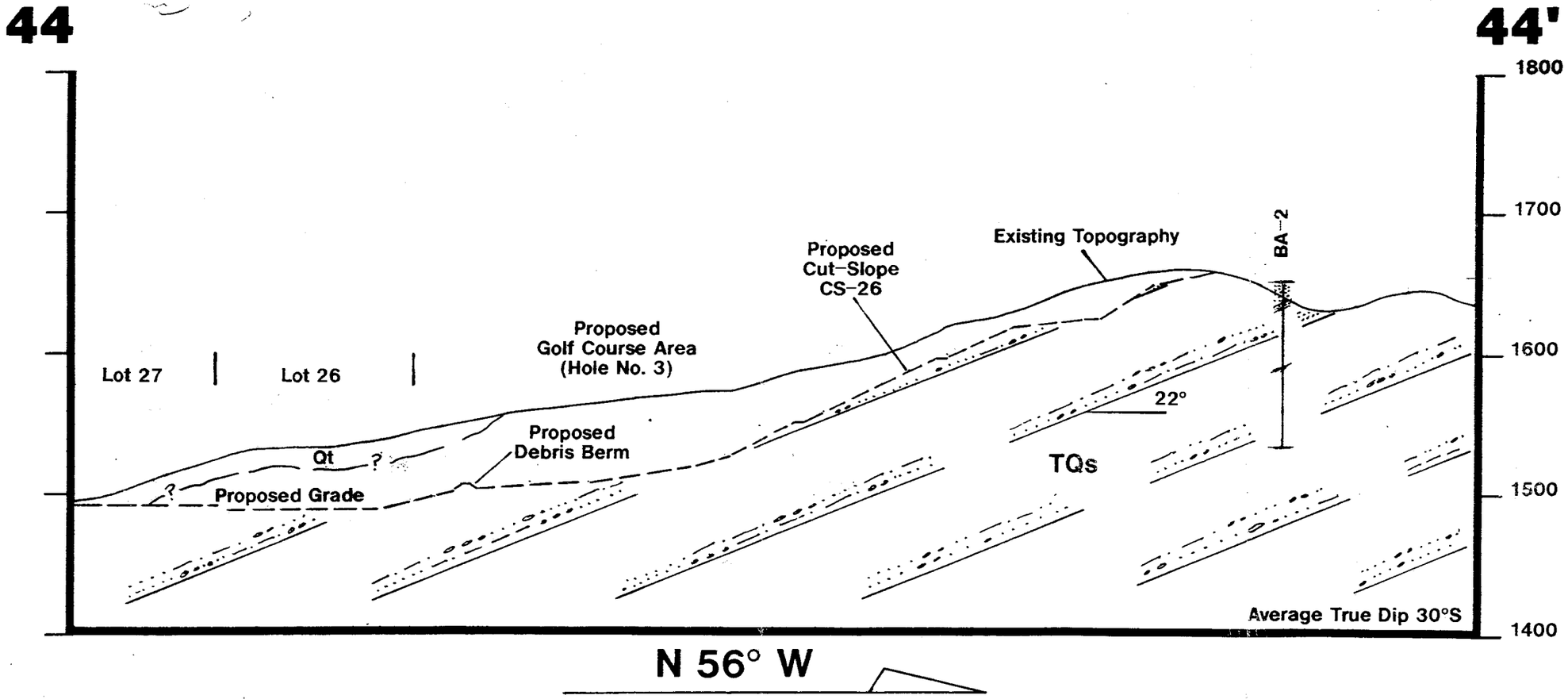
ALLAN E. SEWARD ENGINEERING GEOLOGY			
JOB NUMBER: 99-1617-4		DATE: 10/22/99	
SCALE: 1"=100'		DRAWN BY: Staff	
		REVISED:	

CROSS SECTION



ALLAN E. SEWARD ENGINEERING GEOLOGY		
JOB NUMBER: 99-1617-4	DATE: 10/22/99	
SCALE: 1"=100'		DRAWN BY: Staff REVISED:

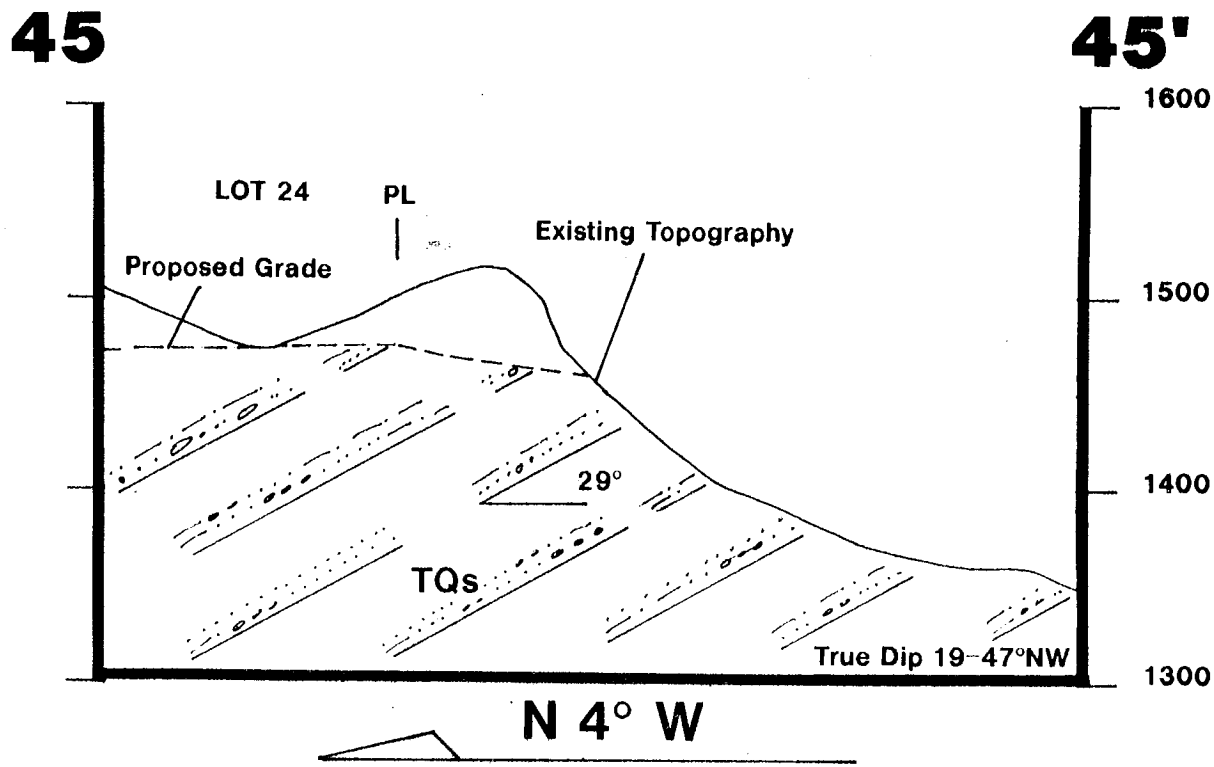
CROSS SECTION



ALLAN E. SEWARD
ENGINEERING GEOLOGY

JOB NUMBER:	99-1617-4	DATE:	10/22/99
SCALE:	1"=100'	DRAWN BY:	Staff
		REVISED:	

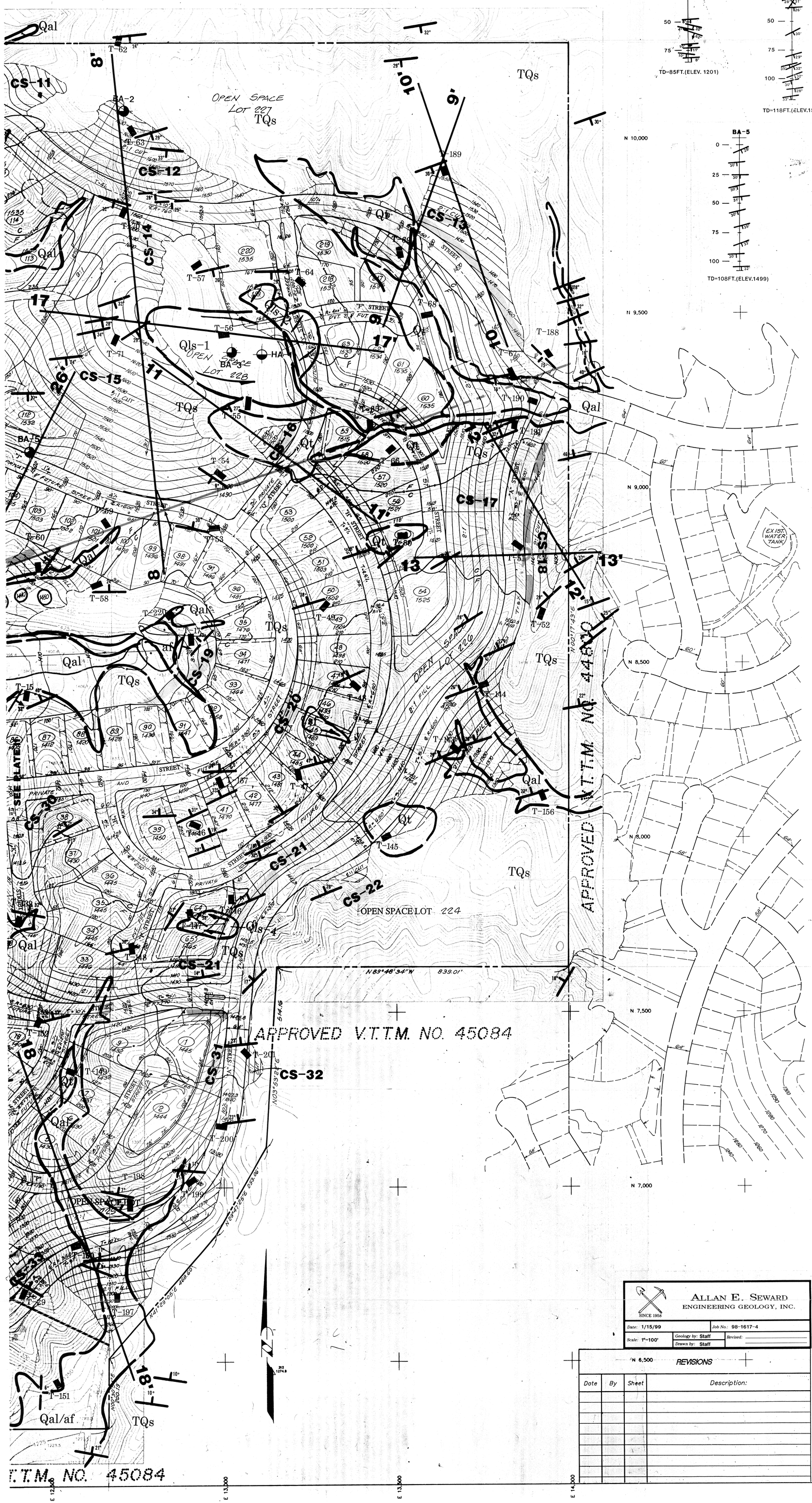
CROSS SECTION



ALLAN E. SEWARD ENGINEERING GEOLOGY			
JOB NUMBER: 99-1617-4		DATE: 10/22/99	
SCALE: 1"=100'		DRAWN BY: Staff	
		REVISED:	

PLATE I
GEOLOGIC/GEOTECHNICAL MAP

For Legend See Plate VII



ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1958

Date: 1/15/99		Job No.: 98-1617-4
Scale: 1"=100'	Geology by: Staff Drawn by: Staff	Revised:

REVISIONS

Date	By	Sheet	Description:

SCALE IN FEET: 0 100 200 300

Developer:
PALMER INVESTMENTS
1999 AVENUE OF THE STARS, 15TH FLOOR
LOS ANGELES, CALIFORNIA 90067
Ph.: (310) 772-7799
Fax: (310) 772-7790

Owner:
HASLEY CANYON LAND COMPANY, L.L.C.
1999 AVENUE OF THE STARS, 15TH FLOOR
LOS ANGELES, CALIFORNIA 90067

Legal Description:
PORTION OF THE NORTHWEST QUARTER OF SECTION 2 & THE NORTHEAST QUARTER OF SECTION 3, T4N, R17W, SBM IN THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA.

VESTING TENTATIVE TRACT MAP NO.

52584

IN THE UNINCORPORATED TERRITORY OF LOS ANGELES COUNTY
COUNTY CASE NO. _____

Prepared by:
LAND DESIGN CONSULTANTS, INC.
Land Planning Civil Engineering, Surveying & Environmental Services
225 South Lake Ave., Suite 600, Pasadena, California 91101
Ph. (626) 578-7000 Fax: (626) 578-7373
http://www.ldcla.com

R.C.E. No. 21649 Robert R. Sims — April 1998 Date

LDC

Proj. No.: 97017-005

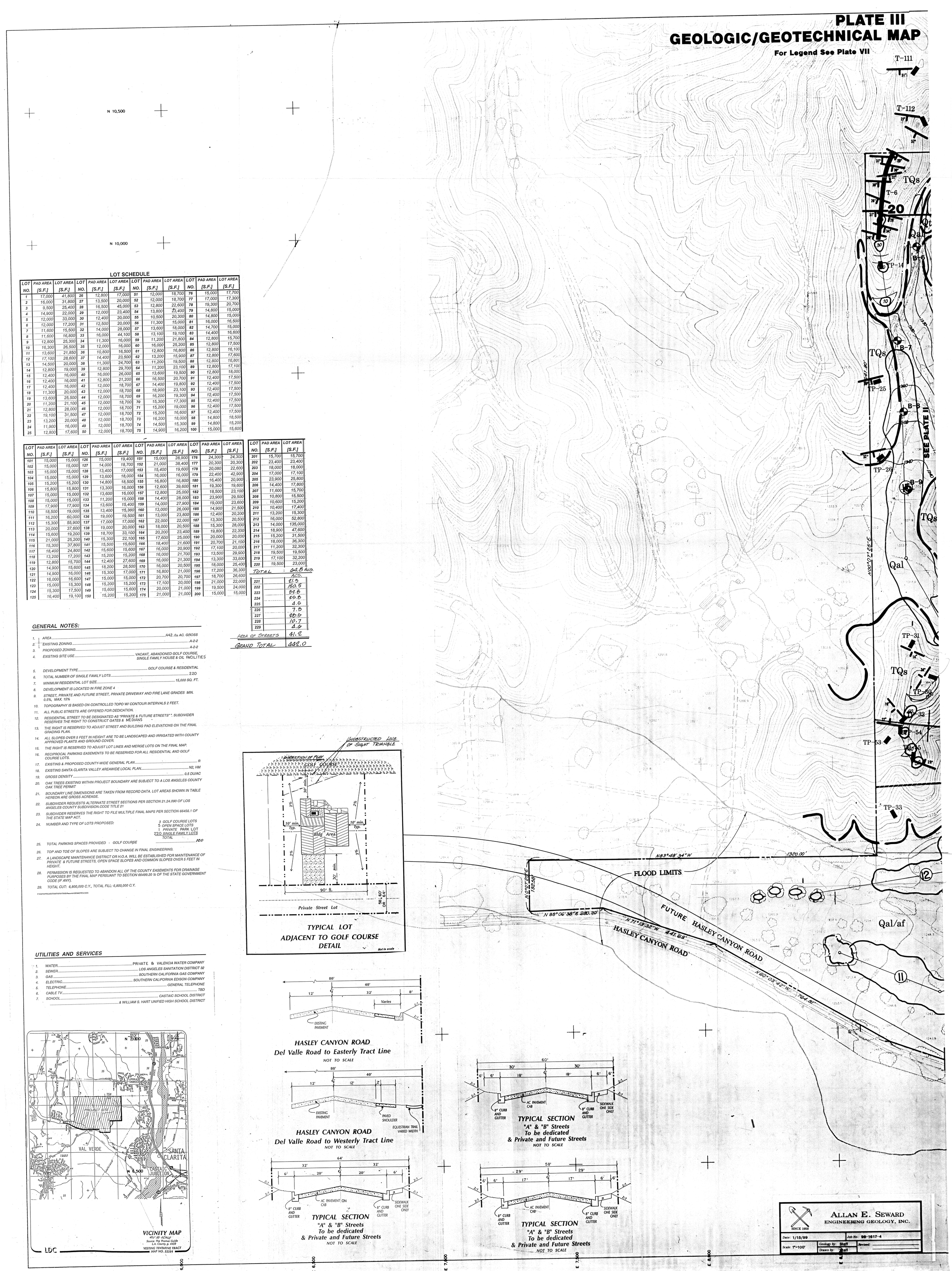
Sht: 1 of 1

PLATE II
GEOLOGIC/GEOTECHNICAL MAP

For Legend See Plate VII

PLATE III
GEOLOGIC/GEOTECHNICAL MAP

For Legend See Plate VII



LOT SCHEDULE

LOT NO.	PAD AREA [S.F.]	LOT AREA [S.F.]	LOT NO.	PAD AREA [S.F.]	LOT AREA [S.F.]	LOT NO.	PAD AREA [S.F.]	LOT AREA [S.F.]	LOT NO.	PAD AREA [S.F.]	LOT AREA [S.F.]
1	17,000	41,800	26	12,800	17,000	51	12,000	18,700	76	15,000	17,700
2	16,000	31,800	27	13,500	20,000	52	12,000	18,700	77	17,000	17,300
3	9,500	25,400	28	16,500	45,000	53	12,800	22,600	78	19,300	20,700
4	14,900	22,000	29	12,000	23,400	54	13,800	23,400	79	14,800	15,000
5	12,000	33,000	30	12,400	20,000	55	10,500	20,300	80	14,800	15,000
6	12,000	17,200	31	12,500	20,000	56	11,300	15,000	81	16,000	16,500
7	11,600	15,500	32	14,000	28,000	57	13,600	18,000	82	14,700	15,000
8	11,600	16,800	33	16,000	44,100	58	13,100	19,100	83	14,400	16,600
9	12,800	25,300	34	11,300	16,000	59	11,200	21,800	84	12,800	15,700
10	16,300	26,500	35	12,000	16,000	60	16,000	25,200	85	12,800	17,500
11	13,600	21,850	36	10,800	16,500	61	12,800	16,800	86	12,800	16,100
12	17,100	28,600	37	14,400	23,500	62	13,200	15,900	87	12,800	17,600
13	14,500	20,000	38	11,300	24,700	63	11,200	19,500	88	12,800	16,800
14	12,800	19,000	39	12,800	29,700	64	11,200	23,100	89	12,800	17,100
15	12,400	16,000	40	16,000	26,000	65	13,600	19,500	90	12,800	18,000
16	12,400	16,000	41	12,800	21,200	66	16,500	20,700	91	12,400	17,500
17	12,400	16,000	42	12,000	18,700	67	14,400	19,800	92	12,400	17,500
18	11,300	20,000	43	12,000	18,700	68	18,900	23,100	93	12,400	17,500
19	13,600	25,500	44	12,000	18,700	69	16,200	19,300	94	12,400	17,500
20	11,200	21,100	45	12,000	18,700	70	15,300	17,300	95	12,400	17,500
21	12,800	28,000	46	12,000	18,700	71	15,200	19,000	96	12,400	17,500
22	19,100	31,500	47	12,000	18,700	72	15,200	16,600	97	12,400	17,500
23	13,200	20,000	48	12,000	18,700	73	16,200	18,000	98	14,800	18,500
24	11,900	16,000	49	12,000	18,700	74	14,500	15,300	99	14,800	15,200
25	12,800	17,600	50	12,000	18,700	75	14,900	16,200	100	15,000	15,600

LOT NO.	PAD AREA [S.F.]	LOT AREA [S.F.]	LOT NO.	PAD AREA [S.F.]	LOT AREA [S.F.]	LOT NO.	PAD AREA [S.F.]	LOT AREA [S.F.]	LOT NO.	PAD AREA [S.F.]	LOT AREA [S.F.]
101	15,000	15,000	126	15,000	19,400	151	15,000	28,900	176	24,300	24,300
102	15,000	15,000	127	14,000	18,700	152	21,000	38,400	177	20,300	20,300
103	15,000	15,000	128	13,400	17,000	153	15,400	19,600	178	20,080	22,600
104	15,000	15,000	129	13,600	18,000	154	16,000	16,000	179	22,400	42,900
105	15,200	15,200	130	14,800	18,500	155	16,800	16,800	180	16,400	20,900
106	15,800	15,800	131	13,300	16,000	156	12,600	39,600	181	19,300	19,600
107	15,000	15,000	132	13,600	16,000	157	12,800	25,000	182	18,500	23,100
108	15,000	15,000	133	11,200	15,000	158	14,400	28,000	183	23,900	29,500
109	17,900	17,900	134	13,600	15,400	159	14,000	27,900	184	19,000	23,600
110	18,500	19,000	135	13,400	15,300	160	13,000	26,000	185	14,900	21,500
111	16,200	60,000	136	19,000	19,500	161	13,000	23,800	186	12,400	20,200
112	15,300	55,900	137	17,000	17,000	162	22,000	22,000	187	13,300	20,500
113	20,000	37,600	138	19,000	20,000	163	18,000	20,500	188	15,300	28,000
114	15,600	19,200	139	18,700	33,100	164	20,200	23,400	189	19,800	22,300
115	21,000	25,200	140	15,300	22,100	165	17,600	25,000	190	20,000	20,000
116	15,300	37,800	141	15,500	15,500	166	18,400	21,600	191	20,700	21,100
117	18,400	24,800	142	15,600	15,600	167	16,000	20,900	192	17,100	20,000
118	13,200	17,200	143	15,200	15,200	168	16,000	21,700	193	13,500	29,900
119	12,800	15,700	144	12,400	27,600	169	16,000	21,300	194	13,300	33,600
120	14,900	15,600	145	18,200	28,500	170	16,000	20,500	195	18,000	25,400
121	14,900	16,000	146	15,300	17,000	171	16,800	21,000	196	17,200	36,300
122	16,000	16,600	147	15,000	15,000	172	20,700	20,700	197	18,700	26,600
123	15,000	15,300	148	15,200	15,200	173	17,100	20,000	198	21,000	22,000
124	15,300	17,500	149	15,600	15,600	174	20,000	21,000	199	19,500	24,000
125	16,400	19,100	150	15,200	15,200	175	21,000	21,000	200	15,000	15,000

LOT NO.	PAD AREA [S.F.]	LOT AREA [S.F.]
201	15,700	15,700
202	23,400	23,400
203	18,000	18,000
204	17,000	17,100
205	23,900	25,800
206	14,400	17,800
207	11,600	15,700
208	10,800	15,500
209	10,600	15,200
210	10,400	17,400
211	13,200	15,300
212	16,000	52,800
213	14,000	135,000
214	18,900	47,600
215	15,200	31,500
216	18,000	36,300
217	11,200	32,300
218	19,500	19,500
219	17,100	32,200
220	19,500	23,000
TOTAL		64.8 ACS.

	ACS.
221	21.3
222	150.5
223	88.8
224	29.8
225	4.5
226	7.3
227	28.9
228	10.7
229	4.6
AREA OF STREETS	41.2
GRAND TOTAL	442.0

GENERAL NOTES:

1. AREA ..... 442.0± AC. GROSS
2. EXISTING ZONING A-2-2
3. PROPOSED ZONING A-2-2
4. EXISTING SITE USE ..... VACANT, ABANDONED GOLF COURSE, SINGLE FAMILY HOUSE & OIL FACILITIES
5. DEVELOPMENT TYPE ..... GOLF COURSE & RESIDENTIAL
6. TOTAL NUMBER OF SINGLE FAMILY LOTS 220
7. MINIMUM RESIDENTIAL LOT SIZE ..... 15,000 SQ. FT.
8. DEVELOPMENT IS LOCATED IN FIRE ZONE 4
9. STREET, PRIVATE AND FUTURE STREET, PRIVATE DRIVEWAY AND FIRE LANE GRADES MIN. 0.5%, MAX. 15%
10. TOPOGRAPHY IS BASED ON CONTROLLED TOPO W/ CONTOUR INTERVALS 2 FEET.
11. ALL PUBLIC STREETS ARE OFFERED FOR DEDICATION.
12. RESIDENTIAL STREET TO BE DESIGNATED AS "PRIVATE & FUTURE STREETS" ". SUBDIVIDER RESERVES THE RIGHT TO CONSTRUCT GATES & MEDIANS
13. THE RIGHT IS RESERVED TO ADJUST STREET AND BUILDING PAD ELEVATIONS ON THE FINAL GRADING PLAN.
14. ALL SLOPES OVER 5 FEET IN HEIGHT ARE TO BE LANDSCAPED AND IRRIGATED WITH COUNTY APPROVED PLANTS AND GROUND COVER.
15. THE RIGHT IS RESERVED TO ADJUST LOT LINES AND MERGE LOTS ON THE FINAL MAP.
16. RECIPROCAL PARKING EASEMENTS TO BE RESERVED FOR ALL RESIDENTIAL AND GOLF COURSE LOTS.
17. EXISTING & PROPOSED COUNTY-WIDE GENERAL PLAN ..... R
18. EXISTING SANTA CLARITA VALLEY AREAWIDE LOCAL PLAN ..... N2, HM
19. GROSS DENSITY ..... 0.5 DU/AC
20. OAK TREES EXISTING WITHIN PROJECT BOUNDARY ARE SUBJECT TO A LOS ANGELES COUNTY OAK TREE PERMIT
21. BOUNDARY LINE DIMENSIONS ARE TAKEN FROM RECORD DATA. LOT AREAS SHOWN IN TABLE HEREON ARE GROSS ACREAGE.
22. SUBDIVIDER REQUESTS ALTERNATE STREET SECTIONS PER SECTION 21.24.090 OF LOS ANGELES COUNTY SUBDIVISION.CODE TITLE 21
23. SUBDIVIDER RESERVES THE RIGHT TO FILE MULTIPLE FINAL MAPS PER SECTION 66456.1 OF THE STATE MAP ACT.
24. NUMBER AND TYPE OF LOTS PROPOSED:
    - 3 GOLF COURSE LOTS
    - 5 OPEN SPACE LOTS
    - 1 PRIVATE PARK LOT
    - 220 SINGLE FAMILY LOTS
    - TOTAL
25. TOTAL PARKING SPACES PROVIDED - GOLF COURSE 120
26. TOP AND TOE OF SLOPES ARE SUBJECT TO CHANGE IN FINAL ENGINEERING.
27. A LANDSCAPE MAINTENANCE DISTRICT OR H.O.A. WILL BE ESTABLISHED FOR MAINTENANCE OF PRIVATE & FUTURE STREETS, OPEN SPACE SLOPES AND COMMON SLOPES OVER 5 FEET IN HEIGHT.
28. PERMISSION IS REQUESTED TO ABANDON ALL OF THE COUNTY EASEMENTS FOR DRAINAGE PURPOSES BY THE FINAL MAP PERSUANT TO SECTION 66499.20 ½ OF THE STATE GOVERNMENT CODE (IF ANY).
29. TOTAL CUT: 6,800,000 C.Y., TOTAL FILL: 6,800,000 C.Y.

F:\DATA\PROJECTS\97\97017005\Reports\GENNOTES.DOC

UTILITIES AND SERVICES

1. WATER ..... PRIVATE & VALENCIA WATER COMPANY
2. SEWER ..... LOS ANGELES SANITATION DISTRICT 32
3. GAS ..... SOUTHERN CALIFORNIA GAS COMPANY
4. ELECTRIC ..... SOUTHERN CALIFORNIA EDISON COMPANY
5. TELEPHONE ..... GENERAL TELEPHONE
6. CABLE TV ..... TBD
7. SCHOOL ..... CASTAIC SCHOOL DISTRICT
   ..... & WILLIAM S. HART UNIFIED HIGH SCHOOL DISTRICT

VICINITY MAP
NOT TO SCALE
Source: The Thomas Guide L.A. County, p. 4459
VESTING TENTATIVE TRACT MAP NO. 52584

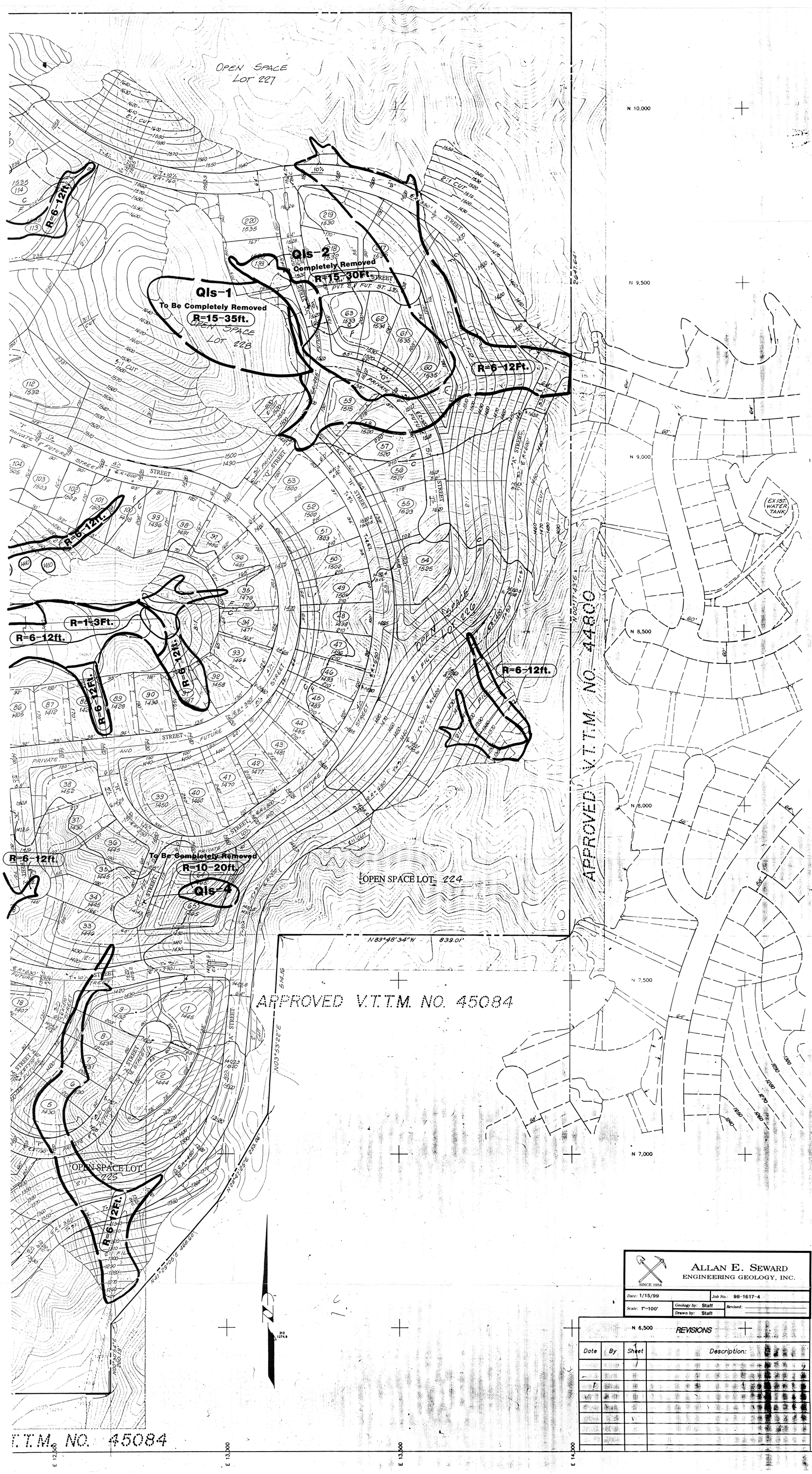
LDC

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1958

Date: 1/15/99	Job No.: 98-1617-4
Scale: 1"=100'	Geology by: Staff; Drawn by: Staff; Revised:

PLATE IV
GEOLOGIC/GEOTECHNICAL REMOVAL MAP

For Legend See Plate VII



SCALE IN FEET: 0 100 200 300

Developer:
PALMER INVESTMENTS
1999 AVENUE OF THE STARS, 15TH FLOOR
LOS ANGELES, CALIFORNIA 90067
Ph.: (310) 772-7799
Fax: (310) 772-7790

Owner:
HASLEY CANYON LAND COMPANY, L.L.C.
1999 AVENUE OF THE STARS, 15TH FLOOR
LOS ANGELES, CALIFORNIA 90067

Legal Description:
PORTION OF THE NORTHWEST QUARTER OF SECTION 2 & THE NORTHEAST QUARTER OF SECTION 3, T4N, R17W, SBM IN THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA.

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1958

Date: 1/15/99	Job No.: 98-1617-4
Scale: 1"=100'	Geology by: Staff / Drawn by: Staff / Revised:

REVISIONS

Date	By	Sheet	Description:

VESTING TENTATIVE TRACT MAP NO.

52584

IN THE UNINCORPORATED TERRITORY OF LOS ANGELES COUNTY
COUNTY CASE NO. _____

Prepared by:
LAND DESIGN CONSULTANTS, INC.
Land Planning Civil Engineering, Surveying & Environmental Services
225 South Lake Ave., Suite 600, Pasadena, California 91101
Ph. (626) 578-7000 Fax: (626) 578-7373
http://www.ldcla.com

R.C.E. No. 21649 Robert R. Sims — April 1998 Date

LDC

Proj. No.: 97017-005
Sht: 1 of 1

PLATE V
GEOLOGIC/GEOTECHNICAL REMOVAL MAP

For Legend See Plate VII

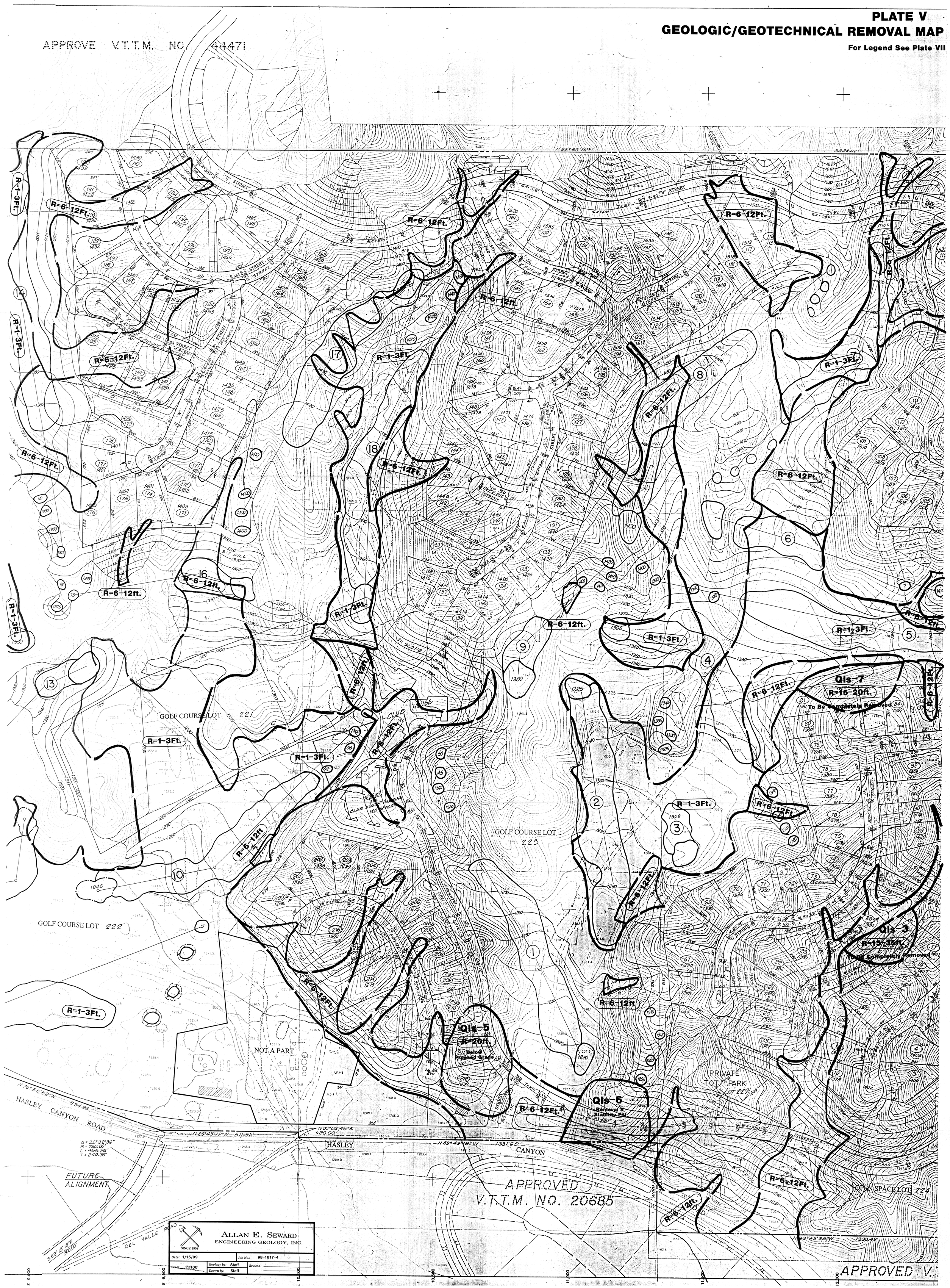


PLATE VI
GEOLOGIC/GEOTECHNICAL REMOVAL MAP
For Legend See Plate VII

LOT SCHEDULE

LOT NO.	PAD AREA [S.F.]	LOT AREA [S.F.]	LOT NO.	PAD AREA [S.F.]	LOT AREA [S.F.]	LOT NO.	PAD AREA [S.F.]	LOT AREA [S.F.]	LOT NO.	PAD AREA [S.F.]	LOT AREA [S.F.]
1	17,000	41,800	26	12,800	17,000	51	12,000	18,700	76	15,000	17,700
2	16,000	31,800	27	13,500	20,000	52	12,000	18,700	77	17,000	17,300
3	9,500	25,400	28	16,500	45,000	53	12,800	22,600	78	19,300	20,700
4	14,900	22,000	29	12,000	23,400	54	13,800	23,400	79	14,800	15,000
5	12,000	33,000	30	12,400	20,000	55	10,500	20,300	80	14,800	15,000
6	12,000	17,200	31	12,500	20,000	56	11,300	15,000	81	16,000	16,500
7	11,600	15,500	32	14,000	28,000	57	13,600	18,000	82	14,700	15,000
8	11,600	16,800	33	16,000	44,100	58	13,100	19,100	83	14,400	16,600
9	12,800	25,300	34	11,300	16,000	59	11,200	21,800	84	12,800	15,700
10	16,300	26,500	35	12,000	16,000	60	16,000	25,200	85	12,800	17,500
11	13,600	21,850	36	10,800	16,500	61	12,800	16,800	86	12,800	16,100
12	17,100	28,600	37	14,400	23,500	62	13,200	15,900	87	12,800	17,600
13	14,500	20,000	38	11,300	24,700	63	11,200	19,500	88	12,800	16,800
14	12,800	19,000	39	12,800	29,700	64	11,200	23,100	89	12,800	17,100
15	12,400	16,000	40	16,000	26,000	65	13,600	19,500	90	12,800	18,000
16	12,400	16,000	41	12,800	21,200	66	16,500	20,700	91	12,400	17,500
17	12,400	16,000	42	12,000	18,700	67	14,400	19,800	92	12,400	17,500
18	11,300	20,000	43	12,000	18,700	68	18,900	23,100	93	12,400	17,500
19	13,600	25,500	44	12,000	18,700	69	16,200	19,300	94	12,400	17,500
20	11,200	21,100	45	12,000	18,700	70	15,300	17,300	95	12,400	17,500
21	12,800	28,000	46	12,000	18,700	71	15,200	19,000	96	12,400	17,500
22	19,100	31,500	47	12,000	18,700	72	15,200	16,600	97	12,400	17,500
23	13,200	20,000	48	12,000	18,700	73	16,200	18,000	98	14,800	18,500
24	11,900	16,000	49	12,000	18,700	74	14,500	15,300	99	14,800	15,200
25	12,800	17,600	50	12,000	18,700	75	14,900	16,200	100	15,000	15,600

LOT NO.	PAD AREA [S.F.]	LOT AREA [S.F.]	LOT NO.	PAD AREA [S.F.]	LOT AREA [S.F.]	LOT NO.	PAD AREA [S.F.]	LOT AREA [S.F.]	LOT NO.	PAD AREA [S.F.]	LOT AREA [S.F.]
101	15,000	15,000	126	15,000	19,400	151	15,000	28,900	176	24,300	24,300
102	15,000	15,000	127	14,000	18,700	152	21,000	38,400	177	20,300	20,300
103	15,000	15,000	128	13,400	17,000	153	15,400	19,600	178	20,080	22,600
104	15,000	15,000	129	13,600	18,000	154	16,000	16,000	179	22,400	42,900
105	15,200	15,200	130	14,800	18,500	155	16,800	16,800	180	16,400	20,900
106	15,800	15,800	131	13,300	16,000	156	12,600	39,600	181	19,300	19,600
107	15,000	15,000	132	13,600	16,000	157	12,800	25,000	182	18,500	23,100
108	15,000	15,000	133	11,200	15,000	158	14,400	28,000	183	23,900	29,500
109	17,900	17,900	134	13,600	15,400	159	14,000	27,900	184	19,000	23,600
110	18,500	19,000	135	13,400	15,300	160	13,000	26,000	185	14,900	21,500
111	16,200	60,000	136	19,000	19,500	161	13,000	23,800	186	12,400	20,200
112	15,300	55,900	137	17,000	17,000	162	22,000	22,000	187	13,300	20,500
113	20,000	37,600	138	19,000	20,000	163	18,000	20,500	188	15,300	28,000
114	15,600	19,200	139	18,700	33,100	164	20,200	23,400	189	19,800	22,300
115	21,000	25,200	140	15,300	22,100	165	17,600	25,000	190	20,000	20,000
116	15,300	37,800	141	15,500	15,500	166	18,400	21,600	191	20,700	21,100
117	18,400	24,800	142	15,600	15,600	167	16,000	20,900	192	17,100	20,000
118	13,200	17,200	143	15,200	15,200	168	16,000	21,700	193	13,500	29,900
119	12,800	15,700	144	12,400	27,600	169	16,000	21,300	194	13,300	33,800
120	14,900	15,600	145	18,200	28,500	170	16,000	20,500	195	18,000	25,400
121	14,900	16,000	146	15,300	17,000	171	16,800	21,000	196	17,200	36,300
122	16,000	16,600	147	15,000	15,000	172	20,700	20,700	197	18,700	26,600
123	15,000	15,300	148	15,200	15,200	173	17,100	20,000	198	21,000	22,000
124	15,300	17,500	149	15,600	15,600	174	20,000	21,000	199	19,500	24,000
125	16,400	19,100	150	15,200	15,200	175	21,000	21,000	200	15,000	15,000

LOT NO.	PAD AREA [S.F.]	LOT AREA [S.F.]
201	15,700	15,700
202	23,400	23,400
203	18,000	18,000
204	17,000	17,100
205	23,900	25,800
206	14,400	17,800
207	11,600	15,700
208	10,800	15,500
209	10,600	15,200
210	10,400	17,400
211	13,200	15,300
212	16,000	52,800
213	14,000	135,000
214	18,900	47,600
215	15,200	31,500
216	18,000	36,300
217	11,200	32,300
218	19,500	19,500
219	17,100	32,200
220	19,500	23,000
TOTAL	:	64.8 ACS.
		ACS.
221		21.3
222		150.5
223		82.8
224		25.8
225		4.5
226		7.3
227		28.5
228		10.7
229		4.6
AREA OF STREETS		41.2
GRAND TOTAL		442.0

GENERAL NOTES:

1. AREA .... 442.0± AC. GROSS
2. EXISTING ZONING A-2-2
3. PROPOSED ZONING A-2-2
4. EXISTING SITE USE .... VACANT, ABANDONED GOLF COURSE, SINGLE FAMILY HOUSE & OIL FACILITIES
5. DEVELOPMENT TYPE .... GOLF COURSE & RESIDENTIAL
6. TOTAL NUMBER OF SINGLE FAMILY LOTS 220
7. MINIMUM RESIDENTIAL LOT SIZE .... 15,000 SQ. FT.
8. DEVELOPMENT IS LOCATED IN FIRE ZONE 4
9. STREET, PRIVATE AND FUTURE STREET, PRIVATE DRIVEWAY AND FIRE LANE GRADES MIN. 0.5%, MAX. 15%
10. TOPOGRAPHY IS BASED ON CONTROLLED TOPO W/ CONTOUR INTERVALS 2 FEET.
11. ALL PUBLIC STREETS ARE OFFERED FOR DEDICATION.
12. RESIDENTIAL STREET TO BE DESIGNATED AS "PRIVATE & FUTURE STREETS". SUBDIVIDER RESERVES THE RIGHT TO CONSTRUCT GATES & MEDIANS
13. THE RIGHT IS RESERVED TO ADJUST STREET AND BUILDING PAD ELEVATIONS ON THE FINAL GRADING PLAN.
14. ALL SLOPES OVER 5 FEET IN HEIGHT ARE TO BE LANDSCAPED AND IRRIGATED WITH COUNTY APPROVED PLANTS AND GROUND COVER.
15. THE RIGHT IS RESERVED TO ADJUST LOT LINES AND MERGE LOTS ON THE FINAL MAP.
16. RECIPROCAL PARKING EASEMENTS TO BE RESERVED FOR ALL RESIDENTIAL AND GOLF COURSE LOTS.
17. EXISTING & PROPOSED COUNTY-WIDE GENERAL PLAN .... R
18. EXISTING SANTA CLARITA VALLEY AREAWIDE LOCAL PLAN .... N2, HM
19. GROSS DENSITY .... 0.5 DU/AC
20. OAK TREES EXISTING WITHIN PROJECT BOUNDARY ARE SUBJECT TO A LOS ANGELES COUNTY OAK TREE PERMIT
21. BOUNDARY LINE DIMENSIONS ARE TAKEN FROM RECORD DATA. LOT AREAS SHOWN IN TABLE HEREON ARE GROSS ACREAGE.
22. SUBDIVIDER REQUESTS ALTERNATE STREET SECTIONS PER SECTION 21.24.090 OF LOS ANGELES COUNTY SUBDIVISION.CODE TITLE 21
23. SUBDIVIDER RESERVES THE RIGHT TO FILE MULTIPLE FINAL MAPS PER SECTION 66456.1 OF THE STATE MAP ACT.
24. NUMBER AND TYPE OF LOTS PROPOSED: 3 GOLF COURSE LOTS; 5 OPEN SPACE LOTS; 1 PRIVATE PARK LOT; 220 SINGLE FAMILY LOTS; TOTAL
25. TOTAL PARKING SPACES PROVIDED - GOLF COURSE 120
26. TOP AND TOE OF SLOPES ARE SUBJECT TO CHANGE IN FINAL ENGINEERING.
27. A LANDSCAPE MAINTENANCE DISTRICT OR H.O.A. WILL BE ESTABLISHED FOR MAINTENANCE OF PRIVATE & FUTURE STREETS, OPEN SPACE SLOPES AND COMMON SLOPES OVER 5 FEET IN HEIGHT.
28. PERMISSION IS REQUESTED TO ABANDON ALL OF THE COUNTY EASEMENTS FOR DRAINAGE PURPOSES BY THE FINAL MAP PERSUANT TO SECTION 66499.20 ½ OF THE STATE GOVERNMENT CODE (IF ANY).
29. TOTAL CUT: 6,800,000 C.Y., TOTAL FILL: 6,800,000 C.Y.

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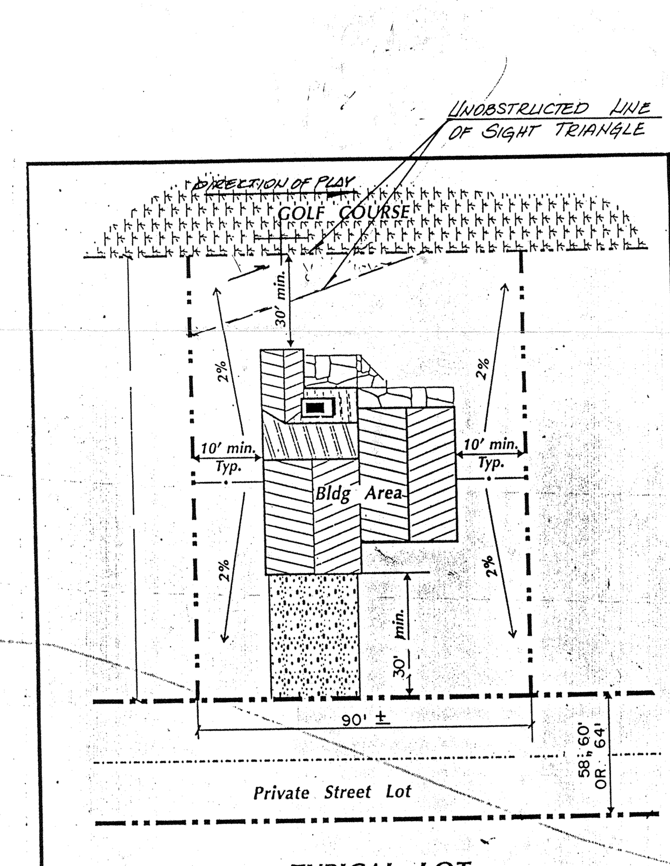
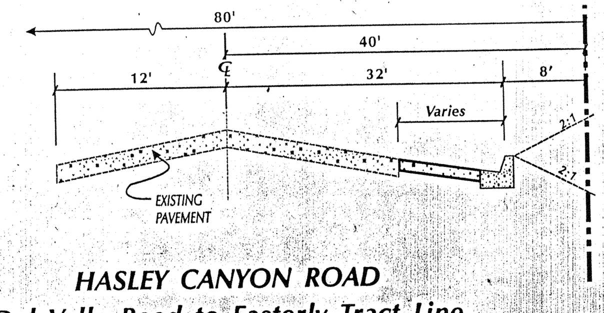


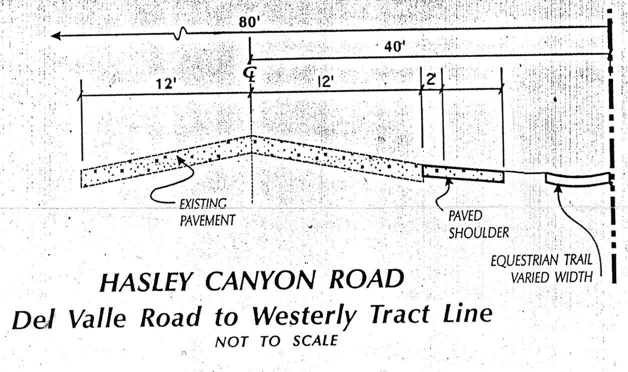
TYPICAL LOT ADJACENT TO GOLF COURSE DETAIL
Not to scale

UTILITIES AND SERVICES

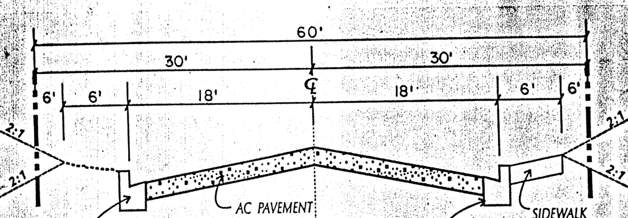
1. WATER .... PRIVATE & VALENCIA WATER COMPANY
2. SEWER .... LOS ANGELES SANITATION DISTRICT 32
3. GAS .... SOUTHERN CALIFORNIA GAS COMPANY
4. ELECTRIC .... SOUTHERN CALIFORNIA EDISON COMPANY
5. TELEPHONE .... GENERAL TELEPHONE
6. CABLE TV .... TBD
7. SCHOOL .... CASTAIC SCHOOL DISTRICT .... & WILLIAM S. HART UNIFIED HIGH SCHOOL DISTRICT



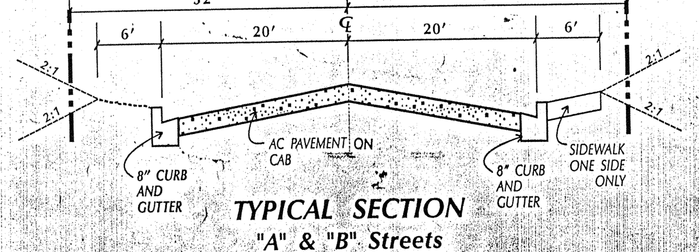
HASLEY CANYON ROAD
Del Valle Road to Easterly Tract Line
NOT TO SCALE



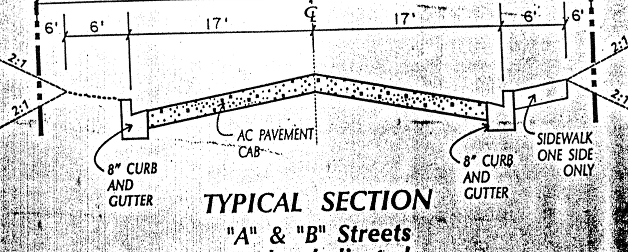
HASLEY CANYON ROAD
Del Valle Road to Westerly Tract Line
NOT TO SCALE



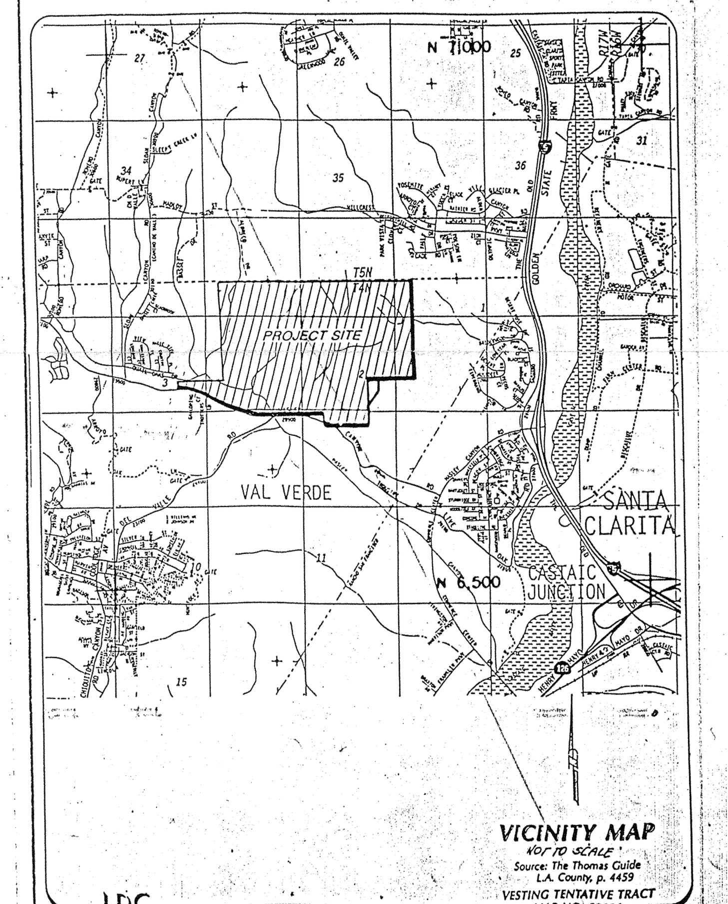
TYPICAL SECTION
"A" & "B" Streets
To be dedicated
& Private and Future Streets
NOT TO SCALE



TYPICAL SECTION
"A" & "B" Streets
To be dedicated
& Private and Future Streets
NOT TO SCALE



TYPICAL SECTION
"A" & "B" Streets
To be dedicated
& Private and Future Streets
NOT TO SCALE



VICINITY MAP
NOT TO SCALE
Source: The Thomas Guide L.A. County, p. 4459
LDC
VESTING TENTATIVE TRACT MAP NO. 52584

E 6,000 — E 6,500 — E 7,000 — E 7,500 — E 8,000 — E 8,500

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1958

Date: 1/15/99		Job No.: 98-1617-4	
Scale: 1"=100'	Geology by: Staff	Revised:	
	Drawn by: Staff		

PLATE VII

GEOLOGIC/GEOTECHNICAL LEGEND

af	Artificial Fill	55° 55° 10°	Orientation of Fault; Shear; Slip Surface
Cef	Certified Engineered Fill		Approximate Location of Surface Trace of Axis of Syncline; Anticline; Dotted Where Inferred
Qal	Quaternary Alluvium	T-220	Approximate Location of Exploratory Trench
sf	Surficial Failure	TP-55	Approximate Location of Test Pit from AES Report dated 10/30/87
Qls-8	Quaternary Landslide	RW-1	Approximate Location of Rotary Wash Boring
Qt	Quaternary Terrace	BA-6	Approximate Location of Exploratory Bucket Auger Boring
TQs	Saugus Formation	HS-5	Approximate Location of Hollow Stem Auger Boring
35° 66° 85°	Orientation of Bedding; Approximate Bedding; Overturned Bedding	HA-1	Approximate Location of Hand Auger Boring
		B-18	Approximate Location of Exploratory Bucket Auger Boring from AES Report dated 10/30/87

12	Approximate Location of Existing Oil/Gas Well
CS-40	Proposed Cut-Slope with Designation
26 26'	Cross Section
	Geologic Contact; Dotted Where Concealed
	Recommended Building Setback
R=6-12Ft.	Recommended Removal Depth per Designated Area (Alluvial or Landslide Material)
	Proposed Stability Fill (Color Coded Green)
	Proposed Buttress (Color Coded Red)

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1958

Date: 1/15/99		Job No.: 98-1617-4	
Scale: N/A	Geology by: N/A	Revised:	
	Drawn by: Staff		

APPENDIX 5.6-4

Allan E. Seward Engineering Geology, Inc.,
Geologic and Geotechnical Report, March 31, 2000.

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

GEOLOGIC AND GEOTECHNICAL REPORT - Addendum No. 2
Response to County Comments (Review Sheets dated 11/18/99 and 12/28/99)
Castaic, California

VOLUME I of II

Prepared for:
Hasley Canyon Land Company, L.LC.
C/O Palmer Investments

Job No: 00-1617-4

Dated March 31, 2000

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

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

March 31, 2000 Job No: 00-1617-4

Hasley Canyon Land Company, L.L.C.
C/O Palmer Investments
1999 Avenue of the Stars
15th Floor
Los Angeles, CA 90067

Attention: Mr. Dan Palmer

Subject: **GEOLOGIC AND GEOTECHNICAL REPORT - Addendum No. 2**
Response to County Comments (Review Sheets dated 11/18/99 and 12/28/99)
Castaic, California

References: at end of text

Gentlemen:

This report presents our Response to the Geologic and Geotechnical Review Sheets respectively dated November 11, 1999 and December 28, 1999, respectively, for VTT 52584 issued by the Los Angeles County Department of Public Works, Engineering Geology and Geotechnical Sections.

BACKGROUND

Review of our previous direct shear test results, in conjunction with our latest direct shear tests performed for this report, has led to the revision of two of our bedding plane strength parameters. These two bedding plane strength parameters were revised to reflect direct **single** shear test results as opposed to **re-sheared** test results (See the noted revisions in the Revised Summary of Strength Test Data in **Appendix C**). Per L.A. County representatives, the use of single direct shear values are more appropriate than re-shear values on uniform bedrock materials when the sampled uniform material completely fills the sample ring (BA-1 @ 75.4 ft.) or on materials that are sampled normal to the bedding plane (BA-2 @ 62 ft.). Re-sheared values are more appropriate for landslide planes or samples that are platy/very thinly bedded to laminated and that are not sampled normal to the planar bedrock material

and can not be oriented properly in the shear machine for direct shear testing. The revised parameters correspond to single shearing of the specimens. (See the noted revisions in the Revised Summary of Strength Test Data in Appendix C.)

All of the conclusions and recommendations in our previous report dated October 22, 1999 are still applicable except where superseded by this report.

GEOLOGIC REVIEW SHEET (11/18/99)

Remark No. 1

None of the proposed graded areas, including the golf course, may be impacted by landslides. Therefore, Qls-1 must be mitigated, or the consultants must demonstrate that the landslide will have no impact on the proposed grading.

Response

Due to the above requirements we have recommended that Qls-1 be completely removed. The Supervising Civil Engineer has shown a 3:1 cut-slope (CS-36) on the Tentative Map that will **completely remove the landslide**.

Remark No. 2

The Soils Engineering review dated December 28, 1999 is attached.

Response

Our response to the Soils Engineering review is attached.

GEOTECHNICAL ENGINEERING REVIEW SHEET (12/28/99)

Remark No. 1

Verify that the appropriate perched ground water condition is considered in the slope stability analyses, where applicable.

Response

Appropriate perched ground water conditions were assumed where applicable and were based upon the following assumptions:

1. Proposed cut-slopes with no proposed grading above them were not modeled or analyzed with ground water because no water was encountered in any of our subsurface explorations and because no source of water is likely to exist in the future because these slopes are located upslope and updip of proposed development and associated irrigation water.

2. Proposed cut-slopes with proposed development grading above them were modeled and analyzed assuming geologically conservative future ground water conditions.

   None of the natural slopes analyzed were modeled with perched water conditions. All of the natural slopes analyzed ascend up from proposed development with the exception of the natural slope shown on Cross Section 45-45', which has steep antidip bedding planes. Therefore, from the standpoint of geology, perched ground water conditions were not modeled on the natural slope shown on Cross-Section 45-45' due to the anti-dip structure.

Remark No. 2

Per the Soils Engineer, Qls1 within the proposed golf course will not be mitigated and will be included within the Restricted Use Area for the proposed golf course. However, the landslide must be mitigated or be shown to meet County minimum factors of safety and be shown not to adversely affect the proposed grading or cross lot lines. Also, it must be clearly demonstrated that the proposed development (e.g. grading, irrigation, etc.) will not adversely affect or contribute to the instability of the landslide in the future. Provide substantiating analyses and recommend mitigation accordingly. Revise limits of Restricted Use Areas on the geotechnical map accordingly.

Response

Due to the above requirements we have recommended that Qls-1 be completely removed. The Supervising Civil Engineer has shown a 3:1 cut-slope (CS-36) on the Tentative Map that will **completely remove the landslide**.

Remark No. 3

Verify that grading of Cut-Slope 29 will not adversely affect the stability of Qls-1.

Response

As stated earlier, Qls-1 will be completely removed by the proposed grading.

Remark No. 4

Provide cross-sections showing the portions of Qls-2 and Qls-4 remaining in place within the Restricted Use Area of the proposed golf course. The remaining portions of the landslides must be mitigated or be shown to meet County minimum factors of safety and be shown not to adversely affect the proposed grading or cross lot lines. Also, it must be clearly demonstrated that the proposed development (e.g. grading, irrigation, etc.) will not adversely affect or contribute to the instability of the landslide in the future. Provide substantiating analyses and recommend mitigation accordingly. Revise limits of Restricted Use Areas on the geotechnical map accordingly.

Response

Review of the geologic map and proposed grading clearly shows that these landslides will be almost entirely removed by proposed grading and that the only portions remaining, after the recommended removals under proposed building areas, would be very minor and completely buried by golf course fill in the canyon flanks and bottoms and would pose no hazards to the proposed development. In order to avoid unnecessary analysis and future comments by the County of Los Angeles, we are recommending that the minor remaining portion of these landslides be **completely removed** resulting in the complete removal of Landslides Qls-2 and Qls-4.

Remark No. 5

Provide a cross-section showing Qls-8 included within the Restricted Use Area of the proposed golf course. Landslides must be mitigated or be shown to meet County minimum factors of safety and be shown not to adversely affect the proposed grading. Also, it must be clearly demonstrated that the proposed development (e.g. grading, irrigation, etc.) will not adversely affect or contribute to the instability of the landslide

in the future. Provide substantiating analyses and recommend mitigation accordingly. Revise limits of Restricted Use Areas on the geotechnical map accordingly.

Response

Review of geologic map and proposed grading at Landslide Qls-8 clearly shows that nearly all of Qls-8 will be removed by the proposed grading and any remaining portion would be very minor and buried by golf course fill and would pose no hazard to the proposed development. In order to avoid unnecessary analysis and future comments by the County of Los Angeles, we are recommending that Landslide Qls-8 be **completely removed**.

Remark No. 6

Per the Soils Engineer, Cut Slopes 1, 25 and 26 (44-44') will be graded to expose potential adverse bedding and will be included within the Restricted Use Area of the proposed golf course. However, proposed grading must be safe and stable in compliance with Section 110/111 of the County Building Code (e.g. proposed grading cannot create potential geotechnical hazards). Provide substantiating analyses and recommend mitigation accordingly. Revise limits of Restricted Use Areas on the geotechnical map accordingly.

Response

We have analyzed proposed cut-slopes CS-1, CS-25 and CS-26 (CS-26 has been laid back to a 3:1 gradient) and all of these slopes have a minimum factor of safety greater than 1.5 (See Slope Stability Section of this report).

Remark No. 7

The Restricted Use Area limits transect Cut Slope 36. Verify and revise limits of Restricted Use Areas on the geotechnical map accordingly.

Response

We have revised the limits of Restricted Use Areas on the geotechnical map so that they do not transect CS-36 (note that CS-36 has been revised in order to eliminate Qls-1).

Remark No. 8

Per the Soils Engineer, the following cut slopes are grossly stable without providing substantiating analyses:

a. Provide static and seismic slope stability analyses for all slopes with bedding steeper than the proposed gradient, considering passive failure mode (Cut Slopes 6, 8, 9, 12, 14, 20, 27, 28, 29, 32).

b. Provide static and seismic slope stability analyses for Cut Slope 11 (30-30') along the sandstone and conglomerate bedding.

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

a. We have provided static slope stability analyses for all slopes with bedding steeper than the proposed gradient considering passive failure mode and the results of our stability analyses indicate factors of safety greater than minimum County standards. We performed seismic slope stability analyses only on the more critical cross sections since some of the cut-slopes resulted in high factors of safety (2.30 to 4.62) (See the additional calculations provided in the Slope Stability Section of this report.)

b. We analyzed the 2:1 CS-11 slope along sandstone and/or conglomerate contacts and obtained a minimum factor of safety of 2.35 (Janbu). We also analyzed the stability of CS-11 (at 2:1 gradient) relative to the silty claystone bed 40 feet below the toe and the OMS factor of safety was 1.46. Due to the low factor of safety obtained using the OMS method (as **required by the County**) this slope needed to be laid back to a **3:1 gradient** which we believe is unnecessary (Janbu Factor of Safety relative to the silty claystone bed 40 ft. below the toe of 2:1 CS-11 is 1.68). The OMS method, which is considered inappropriate by modern slope stability text books and experts' papers and lectures, governs the lowest factor of safety accepted per current Los Angeles County

policy. CS-11 which has been revised to a 3:1 gradient resulted in a minimum factor of safety of 1.86 Janbu and 1.66 OMS (static).

We have drawn the critical failure planes and shown the shear strength parameters on all of the geotechnical cross sections analyzed.

Remark No. 9

Geotechnical cross sections utilized in slope stability analyses must be drawn to an undistorted scale (e.g. horizontal and vertical axes must be drawn to the same scale). Provide revised cross sections accordingly (27-27', 34-34', 40-40', 43-43', 45-45'). Upon receipt of the cross sections requested, a complete review of slope stability analyses will be conducted.

Response

Our geotechnical cross sections are always drawn to an undistorted scale (horizontal=vertical); however, the Purdue University slope stability program (PCSTABL5M) automatically prints cross sections to a slightly distorted scale, which is beyond our control. Per Remark No. 8 we have drawn the critical failure planes on our geotechnical cross sections, in response to L.A. County requests.

Remark No. 10

Independent analysis of CS-5 (35-35', 3:1 gradient) indicates static factor of safety below the minimum standard. Verify and provide substantiating analysis or recommend mitigation accordingly.

Response

We drilled and downhole logged an **additional** bucket-auger boring (BA-11) in order to verify lithologic conditions in the vicinity of CS-5. BA-11 (80 ft. deep) consisted almost entirely of sandstone and conglomerate except for a silty claystone at 30 ft. (1.5 ft. thick) and a fat plastic clay (1/2 to 1" thick) at 63 feet. Minor lenses of sandy siltstone were encountered near the top (at 7.5 ft.) and bottom of the boring (~70 ft.). We ran an additional direct shear on the silty claystone at 30 feet and the results are shown in Appendix C. The clay bed at 63 feet is the same as the clay encountered in BA-2 at 62 feet (reddish-brown ½"

thick, plastic clay). The clay bed and the silty claystone are considered to be the most critical materials in this slope.

We utilized the clay bed strength parameters from BA-2 at 62 feet and the additional direct shear of the silty claystone at 30 feet in BA-11 for our analysis of CS-5 (See Revised Cross Section 35-35') and the minimum factors of safety calculated using Janbu are 2.38 (silty claystone at 30 ft.) and 2.22 (claybed at 63 ft.). Our OMS calculation on the clay bed at 63 ft. utilizing Janbu's critical plane, resulted in a factor of safety of 1.96 (1.66 seismic). Due to the additional subsurface exploration and slope stability calculations, proposed cut-slope **CS-5 does not require mitigation measures**.

Remark No. 11

Provide static and seismic stability analyses for the most critical fill slope and desilting basin (rapid drawdown analysis), utilizing the revised strength parameters. Recommend mitigation if factors of safety are below County minimum standards.

Response

We have re-analyzed the most critical fill slope and desilting basin (rapid drawdown analysis) and the minimum factors of safety are greater than County minimum standards (see Slope Stability Section and Cross Sections 55-55' and 58-58').

Remark No. 12

Per the Soils Engineer, *"Natural slopes above nonbuilding pad areas and/or golf course areas were not analyzed but have been put into Restricted Use Areas where appropriate."* However, it must be shown that the proposed development (e.g. grading, irrigation, etc.) will not adversely affect or contribute to the instability of the natural slopes, where applicable. Provide substantiating analyses and recommend mitigation accordingly.

Response

We have analyzed the most critical natural slopes and where necessary mitigated them (see Slope Stability Section and Cross Sections 27-27', 31-31', 34-34', 37-37', 45-45' and 57-57').

Remark No. 13

Per the Soils Engineer, landslide debris will be adequate to support the proposed roadway (7-7'). However, proposed grading including access must be safe and stable in compliance with Section 110/111 of the County Building Code. Recommend mitigation accordingly.

Response

Our analysis of 7-7' shows Qls-6 to be stable with factors of safety above minimum County standards. No buildings or structures are proposed over Landslide Qls-6 within the limits of VTT 52584. It is our understanding that any future grading of Hasley Canyon Road is not a condition for TT 52584 but falls under VTTM 20685.

Remark No. 14

Show the following on the on the geotechnical map:

a. Per the Soils Engineer, the natural slope located east of CS-5 shall be laid back to a gradient of 3:1 and incorporated in to CS-5 (Seward 10/22/99 p. 10).

b. Revised limits of Restricted Use Areas (Remarks 1-7).

Response

a. Since our last report (10/22/99) we drilled and downhole logged BA-11 (at CS-5) which is located directly adjacent to this natural slope. Cross Section 57-57' was constructed and analyzed, along with our analysis of CS-5, utilizing the information obtained in BA-11 (see Response No. 10). As stated previously, the rock within this slope consists almost entirely of sandstone and conglomerate with the exception of a silty claystone at 30-ft. (1.5-ft. thick) and a ½-1" thick clay bed at 63 feet encountered in BA-11.

Slope stability analysis of this natural slope (Section 57-57') utilizing Janbu resulted in a factor of safety of 2.15 for the silty claystone at 30 feet and 2.23 for the plastic clay at 63 feet. Due to the additional subsurface exploration and testing and slope stability calculations this **natural slope does not require mitigation**.

b. Restricted Use Area limits have been revised where appropriate.

Remark No. 15

Comply with the following at the grading plan stage.

a. Golf course water hazard locations must be shown not to adversely affect landslides in place.

b. Due to environmental concerns regarding oil wells on site, provide copy of permit, letter of non-objection, processed application, etc., as applicable, obtained from the appropriate State Agencies, i.e. Division of Oil, Gas and Geothermal Resources Department of Toxic Substances Control, South Coast Air Quality Management District, Regional Water Quality Control Board, etc.

c. The surficial factor safety for proposed fill slopes is below the minimum standard (e.g. the calculated factor of safety cannot be rounded up). Recommend mitigation accordingly.

d. Provide calculations to verify proposed debris wall capacities.

Response

The above items shall be complied with at the Grading Plan stage, including providing measures for surficial stability of proposed fill slopes.

Remark No. 16

Requirements of the Geology Section are attached.

Response

See our response to the Geology Section earlier in this report.

Remark No. 17

Include a copy of this review sheet with your response.

Response

We have attached a copy of this review sheet to this report.

RESTRICTED USE AREAS

Since all of the natural slopes and cut-slopes in question have been calculated stable per County standards and all of the landslides are being completely removed, except for Qls-6 which has been analyzed and mitigated via CS-18, we have removed all of the Restricted Use Areas limits from our Geotechnical Maps. It is our understanding that the Supervising Civil Engineer will be delineating the Restricted Use Areas for the Golf Course Areas, on the tentative map.

Respectfully submitted,

Allan E. Seward, CEG 246
Principal Engineering Geologist
President

Allan E. Seward
No. 246
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

Edward Castellanos, RCE 30279, RGE 191
Principal Geotechnical Engineer

REGISTERED PROFESSIONAL ENGINEER
EDWARD CASTELLANOS
3/04
NO. 191
GEOTECHNICAL
STATE OF CALIFORNIA

The following attachments and appendices complete this report.

VOLUME I

APPENDIX A

Review Sheets

APPENDIX B

FIELD INVESTIGATION

Geologic Trench Logs TP-232 thru TP-234
Geologic Boring Log BA-11
Key to Symbols

APPENDIX C

GEOTECHNICAL LABORATORY INVESTIGATION

Summary of Shear Strength Test Data
Direct Shear Test Reports

APPENDIX D

GENERAL FIGURES AND TABLES

Summary of Landslides (Revised 3/31/00) Table D1
Summary of Cut-Slopes (Revised 3/31/00) Table D2

APPENDIX E

SLOPE STABILITY ANALYSES

Slope Stability Analyses Results (Revised) Table E1
Analyses of Infinite Slope With Parallel Seepage Table E2
Computer Output Sheets

VOLUME II

APPENDIX F

REVISED CROSS SECTIONS

7-7', 17-17', 27-27', 28-28', 30-30', 31-31', 32-32', 34-34', 35-35'
36-36', 37-37', 40-40', 41-41', 42-42', 43-43', 44-44', 45-45'

APPENDIX G

NEW CROSS SECTIONS

46-46' through 58-58'

Geologic/Geotechnical Maps Plates I, II & III
Geologic/Geotechnical Recommendations and Removal Maps Plates IV, V & VI
Geologic/Geotechnical Legend Plate VI

Distribution: (5) Addressee
(3) Land Design Consultants
1-Attn: Mr. Bob Sims
2-Los Angeles County Dept. of Public Works
Attn: Geotechnical Section
Attn: Geology Section

Appendix A

REVIEWER CALLING HOURS
8-9 a.m. & 3-4 p.m. Mon.-Thurs.

County of Los Angeles Department of Public Works
LAND DEVELOPMENT DIVISION
GEOLOGIC REVIEW SHEET
900 S. Fremont Ave., Alhambra, CA 91803
TEL. (626) 458-4925

DISTRIBUTION
1 Geologist
__ Soils Engineer
1 LDMA/Proc. Center
1 Section File
1 Subdivision

TENTATIVE TRACT/MINOR LAND SUBDIVISION 52584
SUBDIVIDER Hasley Canyon Land Co., LLC
ENGINEER Land Design Consultants
GEOLOGIST & SOILS ENGINEER Allan Seward

TENTATIVE MAP DATED 10/22/99 (Revised)
LOCATION Hasley Canyon
REPORT DATE 10/22/99, 1/15/99

The Regional Planning Commission, developer and engineer are advised that:

PRIOR TO RECOMMENDING APPROVAL OF TENTATIVE TRACT OR MINOR LAND SUBDIVISION MAP:

1. None of the proposed graded areas, including the golf course, may be impacted by landslides. Therefore, Qls-1 must be mitigated, or the consultants must demonstrate that the landslide will have no impact on the proposed grading.

2. The Soils Engineering review dated 12/28/99 is attached.

NOTE: Provide a copy of this review with your resubmittal.

Prepared by _____ Reviewed by _____ Date 11/18/99
Charles Nestle

NOTE: **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 and Safety Orders.**

The "**Manual for Preparation of Geotechnical Reports**" prepared by County of Los Angeles, Department of Public Works is available on the Internet at the following address: http://dpw.co.la.ca.us/med/manual.pdf

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

SOILS ENGINEERING REVIEW SHEET

Address: 900 S. Fremont Ave.
Alhambra, CA 91803
Telephone: (626) 458-4925
Fax: (626) 458-4913
Calling hours - Monday through Thursday 8-9 a.m. & 3-4 p.m.

District Office 8.2

Tentative Tract 52584
Location Castaic
Developer/Owner Hasley Canyon Land Co.
Engineer/Architect Land Design Consultants
Soils Engineer Allan E. Seward (98-1617-4)
Geologist Same as above

Review of:

Soils/Geologic Addendum Dated 10/22/99

Previous review sheet dated 11/9/99

ACTION:

Tentative Map feasibility is not recommended for approval.

REMARKS:

1. Verify that the appropriate perched groundwater condition is considered in the slope stability analyses, where applicable.
2. Per the Soils Engineer, Qls1 within the proposed golf course will not be mitigated and will be included within the Restricted Use Area for the proposed golf course. However, the landslide must be mitigated or be shown to meet County minimum factors of safety and be shown not to adversely affect the proposed grading or cross lot lines. Also, it must be clearly demonstrated that the proposed development (e.g. grading, irrigation, etc.) will not adversely affect or contribute to the instability of the landslide in the future. Provide substantiating analyses and recommend mitigation accordingly. Revise limits of Restricted Use Areas on the geotechnical map accordingly.
3. Verify that grading of Cut Slope 29 will not adversely affect the stability of Qls-1.
4. Provide cross-sections showing the portions of Qls-2 and Qls-4 remaining in place within the Restricted Use Area of the proposed golf course. The remaining portions of the landslides must be mitigated or be shown to meet County minimum factors of safety and be shown not to adversely affect the proposed grading or cross lot lines. Also, it must be clearly demonstrated that the proposed development (e.g. grading, irrigation, etc.) will not adversely affect or contribute to the instability of the landslide in the future. Provide substantiating analyses and recommend mitigation accordingly. Revise limits of Restricted Use Areas on the geotechnical map accordingly.
5. Provide a cross-section showing Qls-8 included within the Restricted Use Area of the proposed golf course. Landslides must be mitigated or be shown to meet County minimum factors of safety and be shown not to adversely affect the proposed grading. Also, it must be clearly demonstrated that the proposed development (e.g. grading, irrigation, etc.) will not adversely affect or contribute to the instability of the landslide in the future. Provide substantiating analyses and recommend mitigation accordingly. Revise limits of Restricted Use Areas on the geotechnical map accordingly.
6. Per the Soils Engineer, Cut Slopes 1. 25 and 26 (44-44') will be graded to expose potential adverse bedding and will be included within the Restricted Use Area of the proposed golf course. However, proposed grading must be safe and stable in compliance with Section 110/111 of the County Building Code (e.g. proposed grading cannot create potential geotechnical hazards). Provide substantiating analyses and recommend mitigation accordingly. Revise limits of Restricted Use Areas on the geotechnical map accordingly.
7. The Restricted Use Area limits transect Cut Slope 36. Verify and revise limits of Restricted Use Areas on the geotechnical map accordingly.

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

SOILS ENGINEERING REVIEW SHEET

Tentative Tract 52584

8. Per the Soils Engineer, the following cut slopes are grossly stable without providing substantiating analyses:
   a. Provide static and seismic slope stability analyses for all slopes with bedding steeper than the proposed gradient, considering passive failure mode (Cut Slopes 6, 8, 9, 12, 14, 20, 27, 28, 29, 32).
   b. Provide static and seismic slope stability analyses for Cut Slope 11 (30-30') along the sandstone and conglomerate bedding.

   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.
9. Geotechnical cross sections utilized in slope stability analyses must be drawn to an undistorted scale (e.g. horizontal and vertical axes must be drawn to the same scale). Provide revised cross sections accordingly (27-27', 34-34', 40-40', 43-43', 45-45'). Upon receipt of the cross sections requested, a complete review of slope stability analyses will be conducted.
10. Independent analysis of CS-5 (35-35', 3:1 gradient) indicates static factor of safety below the minimum standard. Verify and provide substantiating analysis or recommend mitigation accordingly.
11. Provide static and seismic stability analyses for the most critical fill slope and desilting basin (rapid drawdown analysis), utilizing the revised strength parameters. Recommend mitigation if factors of safety are below County minimum standards.
12. Per the Soils Engineer, *"Natural slopes above nonbuilding pad areas and/or golf course areas were not analyzed but have been put into Restricted Use Areas where appropriate."* However, it must be shown that the proposed development (e.g. grading, irrigation, etc.) will not adversely affect or contribute to the instability of the natural slopes, where applicable. Provide substantiating analyses and recommend mitigation accordingly.
13. Per the Soils Engineer, landslide debris will be adequate to support the proposed roadway (7-7'). However, proposed grading including access must be safe and stable in compliance with Section 110/111 of the County Building Code. Recommend mitigation accordingly.
14. Show the following on the geotechnical map:
   a. Per the Soils Engineer, the natural slope located east of CS-5 shall be laid back to a gradient of 3:1 and incorporated into CS-5 (Seward 10.22/99, p. 10).
   b. Revised limits of Restricted Use Areas (Remarks 1-7).
15. Comply with the following at the grading plan stage:
   a. Golf course water hazard locations must be shown not to adversely affect landslides remaining in place.
   b. Due to environmental concerns regarding oil wells on site, provide copy of permit, letter of non-objection, processed application, etc., as applicable, obtained from the appropriate State Agencies, i.e. Division of Oil, Gas and Geothermal Resources, Department of Toxic Substances Control, South Coast Air Quality Management District, Regional Water Quality Control Board, etc.
   c. The surficial factor of safety for proposed fill slopes is below the minimum standard (e.g. the calculated factor of safety cannot be rounded up). Recommend mitigation accordingly.
   d. Provide calculations to verify proposed debris wall capacities.
16. Requirements of the Geology Section are attached.
17. Include a copy of this review sheet with your response.

NOTE TO THE PLAN CHECKER: ON-SITE SOILS ARE CORROSIVE TO FERROUS METALS.

Prepared by Maria T. Janoyan Date 12/28/99

REGISTERED PROFESSIONAL ENGINEER MARIA T. JANOYAN No. C53079 CIVIL STATE OF CALIFORNIA

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.
Maia:52584a

Appendix B

JOB NO. 00-1617-4

LOGGED BY VCG

Trench Log No. T-232

PROJECT Hasley Canyon - Golf Course

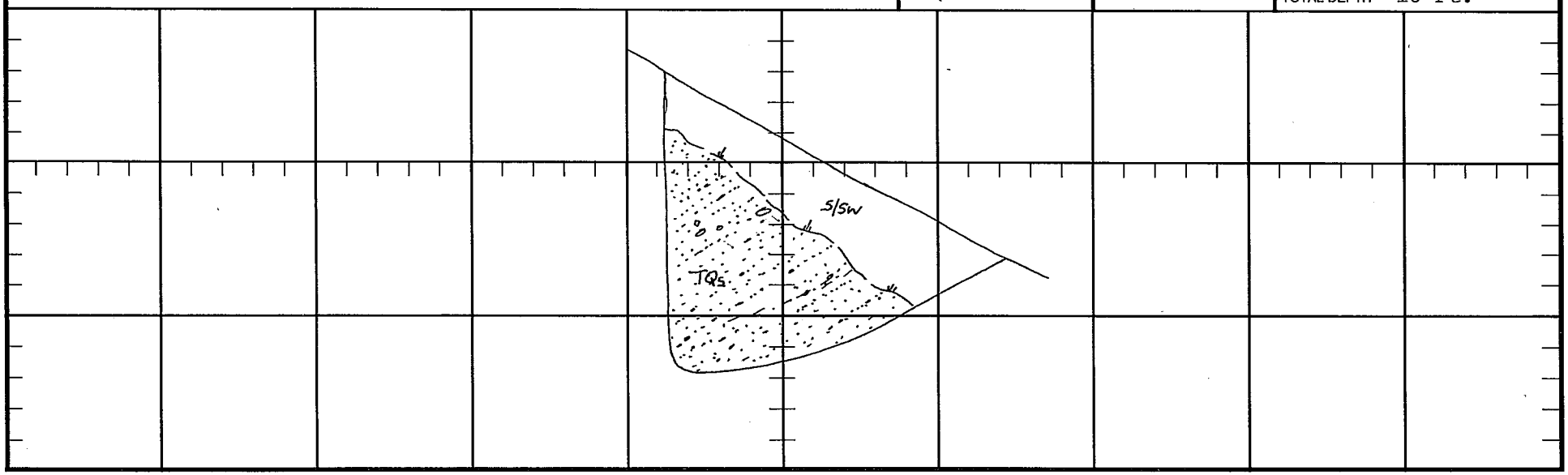
DATE 3/31/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SOIL/SLOPEWASH; s/sw, Medium- to grayish-brown fine- to coarse-grained pebbly sandstone; loose; damp; abundant roots	N71E,31SE N83E,33SE		Trenches T-232 thru T-234
3 - 10' BEDROCK; TQs, Yellowish-brown to tan fine- to medium-grained sandstone and medium- to very coarse-grained pebbly sandstone with isolated cobbles; friable; dense; damp			No Ground Water No Caving

SCALE 1" = 5'

N 74 E

TOTAL DEPTH 10 Ft.



ALLAN E. SEWARD

JOB NO. 00-1617-4

LOGGED BY VCG

Trench Log No. T-233

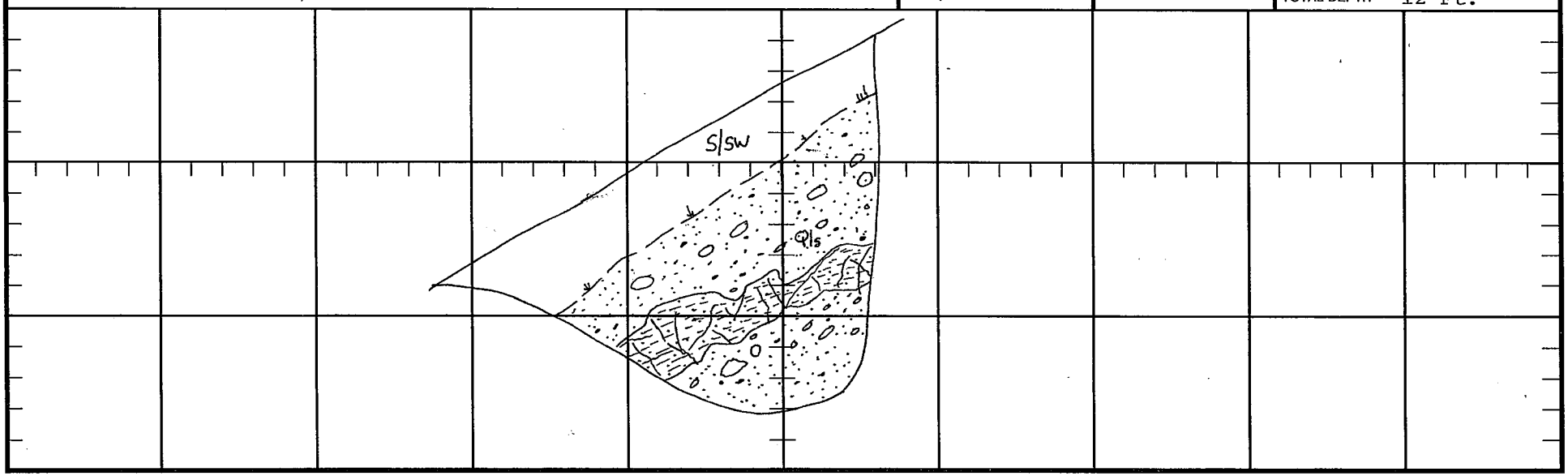
PROJECT Hasley Canyon - Golf Course

DATE 3/31/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 3' SOIL/SLOPEWASH; Medium- to grayish-brown fine- to coarse-grained pebbly sand; loose; damp			
3 - 12' LANDSLIDE; Qls, Light reddish-brown to tan medium- to coarse-grained pebbly sandstone and pebble to cobble conglomerate with a sandy mudstone/muddy sandstone interbed; mudstone appears highly fractured and blocky; bedding discontinuous; trench walls generally loose and friable	B:N60E,22SE Appx. General appearance of bedding		No Ground Water No Caving TOTAL DEPTH 12 Ft.

SCALE 1" = 5'

N 70 E



ALLAN E. SEWARD

JOB NO. 00-1617-4

LOGGED BY VCG

Trench Log No. T-234

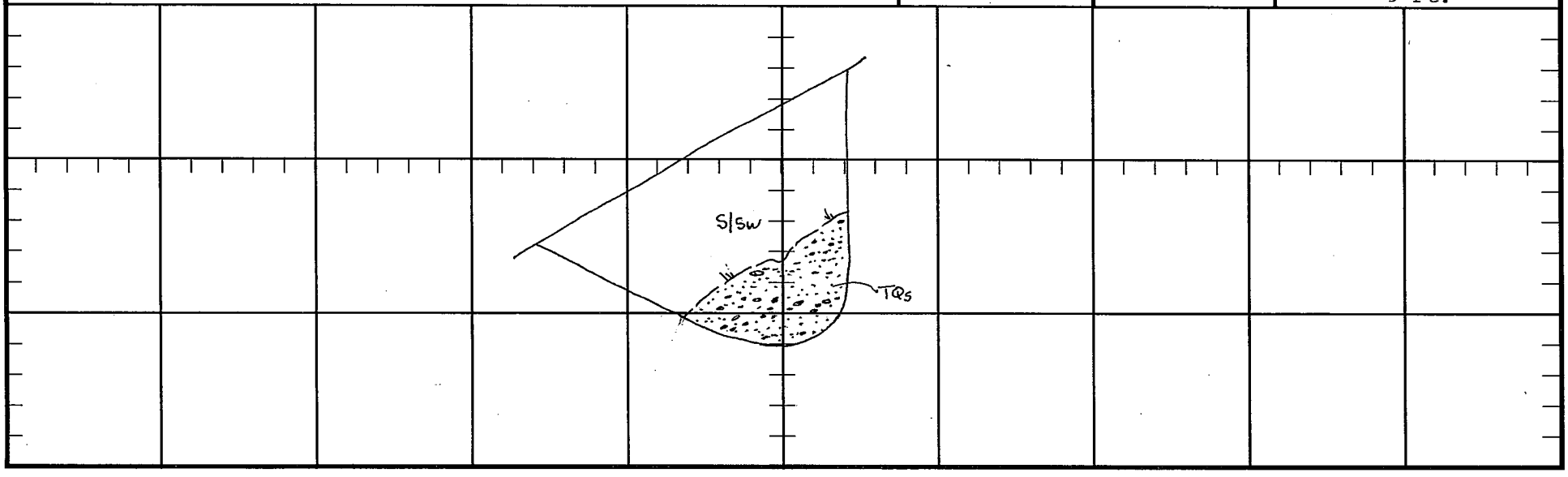
PROJECT Hasley Canyon-- Golf Course

DATE 3/31/00

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 5' SOIL/SLOPEWASH; s/sw, Medium to grayish-brown fine- to coarse-grained silty pebbly sand with scattered pebbles and cobbles BEDROCK; TQs, Light reddish-brown medium- to coarse-grained pebbly sandstone and cobble conglomerate, crudely bedded, moderately dense; damp	N72E,27SE N84E,32SE		No Ground Water No Caving TOTAL DEPTH 9 Ft.

SCALE 1" = 5'

N 66 E



ALLAN E. SEWARD

DRILL HOLE LOG

BORING NO. BA-11

PROJECT: Palmer Investments — **JOB NO.:** 00-1617-4
Tr. 52584 — **DATE:** 3/31/00
DRILLING COMPANY/DRILLER: Tri Valley Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) 30" Bucket Auger
HAMMER TYPE: Telescoping Kelly Bar — **AVERAGE DROP (in.):** 6"
DRIVING WEIGHTS: 0-30'=5952 lbs, 30-57'=3921 lbs, 57-86'=2531 lbs
ELEVATION: 1572± — **LOGGED BY:** VGG

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 - 80 Ft.) @ 0' Pale yellow to tan fine-grained sandstone with minor silt; moderately dense; dry to damp @ 2.5' Silty sandstone interbed	BA-11 drilled 1/31/00
5							
				B:N84W,31SW (contact)		@ 7.5' Light reddish-brown fine-grained sandy siltstone	
10	■	3 6 8				@ 11' Fine-grained silty sandstone	
15				B:N80E,28SE (contact)		@ 14' Grades to a pale yellow to tan to grayish-white fine to coarse-grained pebbly sandstone; friable; damp @ 15.5' Grades to a reddish-brown fine- to medium-grained silty sandstone @ 17' Grades to a pale yellow to white to gray coarse-grained sandstone, pebbly sandstone and pebble to cobble conglomerate; matrix of conglomeratic units generally friable	
20	■	3 8 6/4"				@ 22' Grades to light reddish-brown medium- to coarse-grained pebbly sandstone	
25				B:N84W,30SW (contact)		@ 24' Pebble conglomerate with lenses of coarse-grained sandstone	
30	■	4 6 12		B:N87W,28SW (contact) 118/14.7		@ 30' Reddish-brown silty claystone @ 31.5' Grades to fine- to coarse-grained pebbly sandstone and pebble and cobble conglomerate; matrix friable sandstone	
35				B:N82E,33SE (contact)		@ 36' Medium-grained sandstone interbed	

DRILL HOLE LOG

BORING NO. BA-11

PROJECT: Palmer Investments — **JOB NO.:** 00-1617-4
Tr. 52584 — **DATE:** 3/31/00
DRILLING COMPANY/DRILLER: Tri Valley Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) 30" Bucket Auger
HAMMER TYPE: Telescoping Kelly Bar — **AVERAGE DROP (in.):** 6"
DRIVING WEIGHTS: 0-30'=5952 lbs, 30-57'=3921 lbs, 57-86'=2531 lbs
ELEVATION: 1572± — **LOGGED BY:** VGG

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							
	■	4 18/ 4"					
45							
				B:N85E,34SE (contact)			
50							
	■	8 18/ 5"					
55							
				B:N88W,30SW (contact)			
60							
	■	8 18 11/ 3"				@ 61' Grades to a reddish-brown micaceous silty sandstone @ 62' Silty sandstone/sandy siltstone @ 63' Reddish-brown 1/2-1" thick fat plastic clay within the silty sandstone/sandy siltstone	
				B:N83E,30SE (contact)			
65						@ 64.5' Grades to a fine- to coarse-grained pebbly sandstone	
				B:N87E,31SE (contact)		@ 68.5' 2" thick sandy siltstone lense	
70							
	■	10 18				@ 71' 2" thick sandy siltstone lense	
						@ 72.5' Reddish-brown fine- to coarse-grained silty sandstone	
75							
						@ 75' Medium- to coarse-grained pebbly sandstone	

DRILL HOLE LOG

BORING NO. BA-11

PROJECT: Palmer Investments — **JOB NO.:** 00-1617-4
Tr. 52584 — **DATE:** 3/31/00
DRILLING COMPANY/DRILLER: Tri Valley Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) 30" Bucket Auger
HAMMER TYPE: Telescoping Kelly Bar — **AVERAGE DROP (in.):** 6"
DRIVING WEIGHTS: 0-30'=5952 lbs, 30-57'=3921 lbs, 57-86'=2531 lbs
ELEVATION: 1572± — **LOGGED BY:** VGG

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	■	19 19/ 3"				TOTAL DEPTH 80 Ft. (Elev. 1492) No Ground Water No Caving	
85							
90							
95							
100							
105							
110							
115							

KEY TO SYMBOLS

Symbol	Description
<u>Strata symbols</u>	
	High plasticity clay (CH : C)
	Inorganic silts and clays (CH-MH : MC)
	Low plasticity clay (CL : O)
	Low-high plasticity clays (CL-CH : CO)
	Silty low plasticity clay (CL-ML : CZ)
	Low plasticity clay to silt (CL/ML : O)
	Silt to low plasticity clay (ML/CL : Z)
	Fill (FILL : F)
	Clayey gravel (GC : O8)
	Clayey sand and gravel (GC-SC : DO8)
	Silty gravel (GM : Z8)
	Silty clayey gravel (GM-GC : ZO8)
	Silty sand and gravel (GM-SM : 08)
	Silty gravel to silty sand (GM/SM : Z8)
	Poorly graded gravel (GP : G)
	Poorly graded gravel with clay (GP-GC : DGO3)
	Poorly graded gravel with silt (GP-GM : DGZ3)

Symbol	Description
	Poorly graded gravel and sand (GP-SP : :G)
	Well graded gravel (GW : 83)
	Well graded gravel with clay (GW-GC : 83O)
	Well graded gravel with silt (GW-GM : 83Z)
	Well graded gravel/ clayey gravel (GW-GP : 83G)
	Well graded gravel and sand (GW-SW : 83D)

KEY TO SYMBOLS

Symbol	Description
	Well graded gravel to well graded sand (GW/SW : 83)
	Elastic silt (MH : M)
	Silt (ML : Z)
	High plasticity organic clays (OH : 5)
	Silt to silty clay (ML/CL-ML : Z)
	Low plasticity organic silts (OL : 4)
	Basalt (or generic rock) (ROCK :])
	Clayey sand (SC : DO)
	Clayey sand to sandy clay (SC/CL : DO)
	Sandy clay to clayey sand (CL/SC : O)
	Silty sand (SM : 0)
	Poorly graded clayey silty sand (SM-SC : :ZO)
	Poorly graded silty fine sand (SM-ML : :Z)
	Poorly graded sand (SP : :)
	Poorly graded sand with clay (SP-SC : :R)
	Poorly graded sand with silt (SP-SM : :=)
	Well graded sand (SW : D)
	Well graded sand with clay (SW-SC : DR)
	Well graded sand with silt (SW-SM : D=)

KEY TO SYMBOLS

Symbol	Description
	Interlayered well/poorly graded sand (SW-SP : D:)
	Silty sandy clay (CL : 0C)
	Variable gravel and silty sand mix (GM-SM : 0G)
	Silty sand to silt (SM/ML : 0)
	Silt to silty sand (ML/SM : Z)
	Agglomerate (\)
	Blank (E)
	CH fraction (U)
	CL fraction (R)
	Claystone (H)
	Cobble frac (A)
	Cobbles (B)
	Competent (K)
	Dolomite (()
	Extra fine gravel (3)
	Fine gravel (Y)
	Frac rock (X)
	Granite (/)
	Gravel (8)
	Gravel frac (9)
	Intrusive (V)
	Limestone (L)
	Metamorphic rocks ())
	MH fraction (?)
	ML fraction (=)
	Mudstone (7)
	Organics (J)
	Paving (P)
	Peat (Q)
	Sand (S)
	Sandstone (N)
	Schist ($)
	Sediment (2)
	Shale (>)
	Shell fragments (&)
	Siltstone (I)
	Topsoil (T)
	Weathered (W)
	EXTRA: alternating dot-dash pattern (|)
	EXTRA: dashed horizontal lines (%)

KEY TO SYMBOLS

Symbol	Description
	EXTRA: medium closely-spaced dots (6)
	EXTRA: narrow-spaced horizontal dashed lines (-)
	EXTRA: random dot pattern (1)
	EXTRA: regularly spaced "V"'s (<)
	EXTRA: very narrow cross-hatching (!)
	EXTRA: dashed lines with 3 dots above each dash (.)
	EXTRA: large widely-spaced dots (*)
	EXTRA: small filled triangles ([)
	EXTRA: semi-random triangle pattern (')
	EXTRA: zigzag lines (#)
	EXTRA: grass pattern ({)
	EXTRA: tilde sign (})
	EXTRA: randomly arranged square boxes (;)

Symbol	Description
Misc. Symbols	
	Water table at boring completion (LWATER)
	Water table during drilling (WATER)
Soil Samplers	
	Auger (A)
	Bulk sample (B)
	California sampler (C)
	Bulk/Grab sample (F)
	Pitcher (L)
	Denison (O)
	Standard penetration test (P)
	No recovery (X)

Appendix C

GEOTECHNICAL LABORATORY INVESTIGATION

1. General

   a. The purpose of the laboratory investigation was to better constrain the geotechnical engineering characteristics of the bedrock material at the site with main focus on obtaining additional direct shear test data on suspected weakest material types considered to comprise bedding planes within the bedrock. 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. Additional relatively undisturbed ring samples were obtained from the additional boring (BA-11) drilled for this report.

2. Direct Shear Tests

   Direct shear tests were performed in accordance with ASTM D3080 standard on relatively undisturbed specimens using a displacement-controlled direct shear machine. Samples were tested at normal pressures ranging from approximately 1.4 ksf to 8.4 ksf in order to define both the peak 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. Test results are plotted on **Figures C3.1 through C3.21** within **this Appendix**. **Table C1** summarizes all of the shear strength data based on these tests. Some data from the October 22, 1999 report have been repeated in this table, with some revisions based on the procedures explained below and in the report text.

   We ran direct shear tests on representative silty claystone bedding plane material from BA-11 at 30 ft. in order to add to our data base of strength parameters. Specimens were run as a single direct shear and not resheared, as they were uniform and filled the entire sample rings with the same material (See discussion under Background). Per our conversations with Mr. Fred Gharib during a meeting at L.A. Co. on June 11, 1997, this procedure is acceptable standard of practice provided the sample contains the same material in each of the three representative ring samples sheared or if the sample is taken normal to the bedding plane.

After running our direct shears on the silty claystone bedding plane material encountered in BA-11 (@ 30 ft.) we reviewed and compared these results with our previous shear strength parameters for bedding plane material. We had been utilizing resheared values for two bedrock bedding planes where direct single shear values were actually more appropriate.

Therefore, we have revised these shear strength values accordingly and noted them in the Revised Shear Strength Test Data Table (Table C1), and presented the corresponding single direct shear test reports in Appendix C. We have performed an extensive amount of subsurface work on this project and have observed large exposures of bedrock materials (esp. in the 6,000+ lineal ft. of seismic trenches) at the site and believe that we have a very good grasp of the material types and their anticipated performance at this site.

The following attachments completed this Appendix

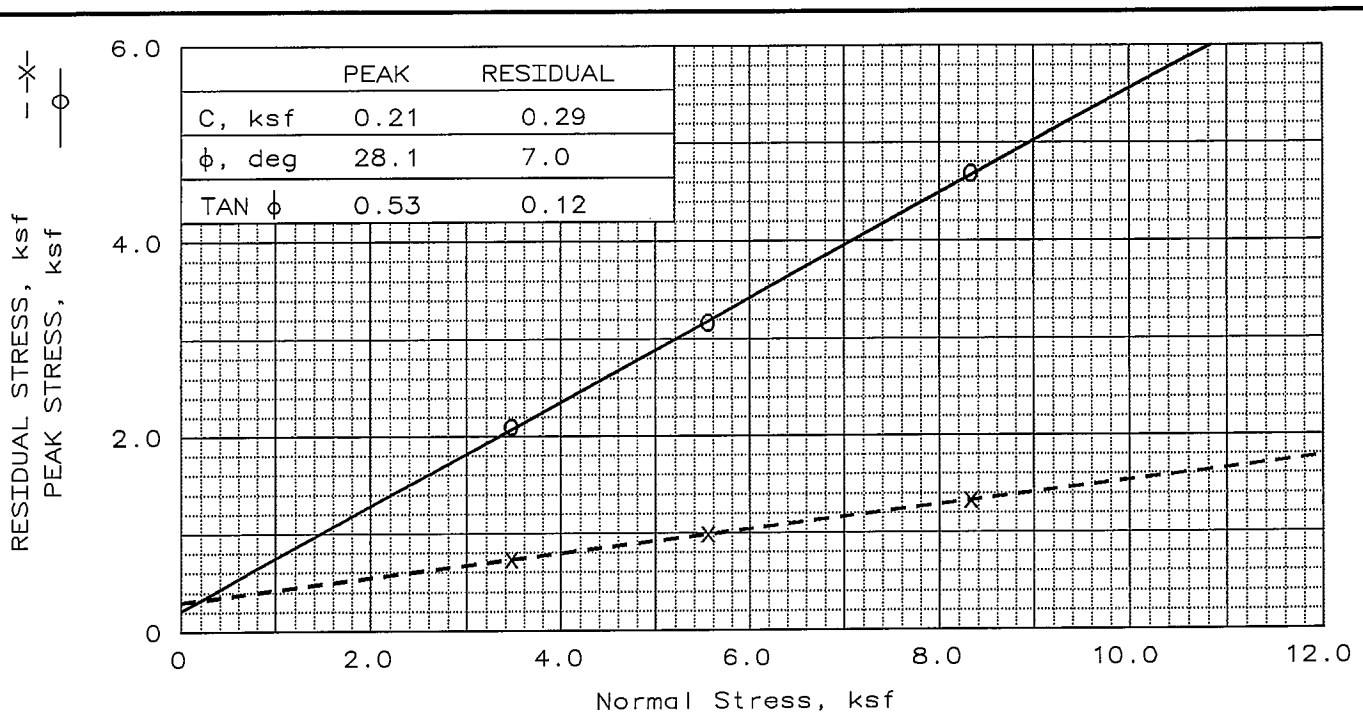
Laboratory Test Results

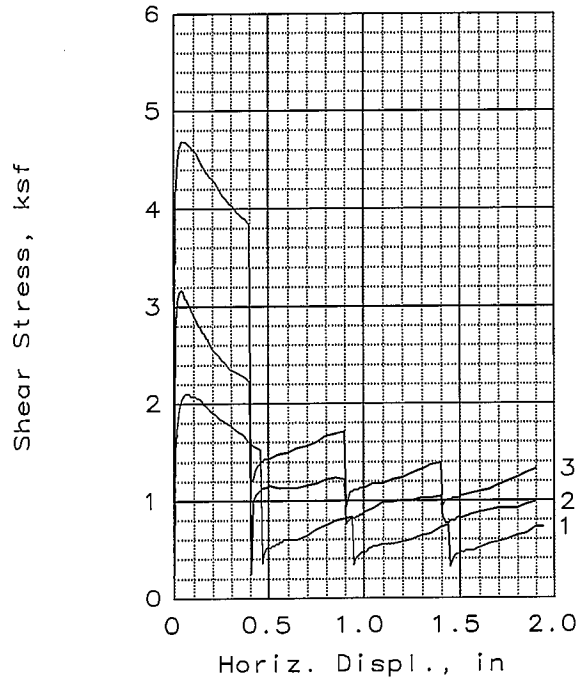
- Summary of Shear Strength Test Data — Table C1
- Direct Shear Test Results — Figures C3.1 - C3.21

SUMMARY OF SHEAR STRENGTH TEST DATA[1]

Boring or Test Pit No.	Revisions[2] or New Tests	Material	Peak[3]		Residual[3]		Unit Wt. (pcf)
			Cohesion (psf)	Phi ϕ (deg)	Cohesion (psf)	Phi ϕ	
BA-1 @ 69.7′		Landslide Plane (Qls)	**210**	**28°**	**290**	**7°**	**130**
BA-1 @ 10′		Landslide Debris (Qls)	**1800**	**29°**	**510**	**26°**	**133**
BA-3 @ 5′		Landslide Debris (Qls)	470	37.5°	400	36°	--
BA-1 @ 75.4′	r	Bedding Plane (Silty Claystone)	290	30°	460	22°	--
BA-2 @ 62′	r	Bedding Plane (Claystone)	**1270**	**28°**	**1650**	**17°**	**129**
BA-4 @ 10′		Bedding Plane (Silty Claystone)	2500	33°	430	29°	--
BA-7 @ 44′		Bedding Plane (Silty Claystone)	**1168**	**27°**	**347**	**22°**	**129**
BA-9 @ 49′		Bedding Plane (Silty Claystone)	591	44°	327	23°	--
BA-11 @ 30′	n	Bedding Plane (Silty Claystone)	**2687**	**34°**	**480**	**22.5°**	**136**
BA-5 @ 50′		Bedrock(TQs)	**880**	**42°**	**410**	**40.5°**	**119**
BA-6 @ 20′		Bedrock (TQs)	740	49°	510	45°	--
HS-2 @ 20′		Terrace Deposits (Qt)	**290**	**42°**	**200**	**41°**	**120**
BA-4 @ 24′		Compacted Fill (Cef)	310	40°	310	40°	--
BA-4 @ 37′		Compacted Fill (Cef)	360	38°	340	38°	--
BA-5 @ 12′		Compacted Fill (Cef)	190	40°	130	40°	--
Blend (B7-B10) @ 0-		Compacted Fill (Cef)	**316**	**32°**	**300**	**29°**	**125**
15′		Compacted Fill (Cef)	392	32°	315	29.5°	--
T-209 @ 9′							
HS-4 @ 10′		Alluvium (Qal)	320	38°	160	38°	--
RW-1 @ 6′		Alluvium (Qal)	330	48°	170	47°	--
RW-1 @ 9′		Alluvium (Qal)	**338**	**38°**	**169**	**34°**	**119**
T-156 @ 3.5′		Slopewash (sw)	**290**	**30°**	**190**	**29°**	**104**

[1] Cohesion data was rounded to the nearest whole number, and friction angle to the nearest 0.5°.
[2] n=New test run for this report; r=data revised from the 10/22/99 report.
[3] Data in **bold** were selected for stability analyses, as applicable.





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	20.4	20.3	19.6
	DRY DENSITY, pcf	108.7	108.2	108.7
	SATURATION, %	100.0	98.2	95.9
	VOID RATIO	0.550	0.557	0.551
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	19.4	19.1	18.5
	DRY DENSITY, pcf	110.7	111.2	112.3
	SATURATION, %	100.0	100.0	99.8
	VOID RATIO	0.523	0.516	0.501
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.98	0.97	0.97
NORMAL STRESS, ksf		3.50	5.58	8.36
PEAK STRESS, ksf		2.10	3.17	4.68
DISPLACEMENT, in		0.06	0.04	0.04
RESIDUAL STRESS, ksf		0.73	0.98	1.33
DISPLACEMENT, in		1.94	1.90	1.90
Strain rate, in/min		0.0079	0.0079	0.0079

SAMPLE TYPE: Undisturbed
DESCRIPTION: Fat Clay

LL= 67 PL= 22 PI= 45
SPECIFIC GRAVITY= 2.7
REMARKS: landslide plane (Qls)

Fig. No.: C3.1

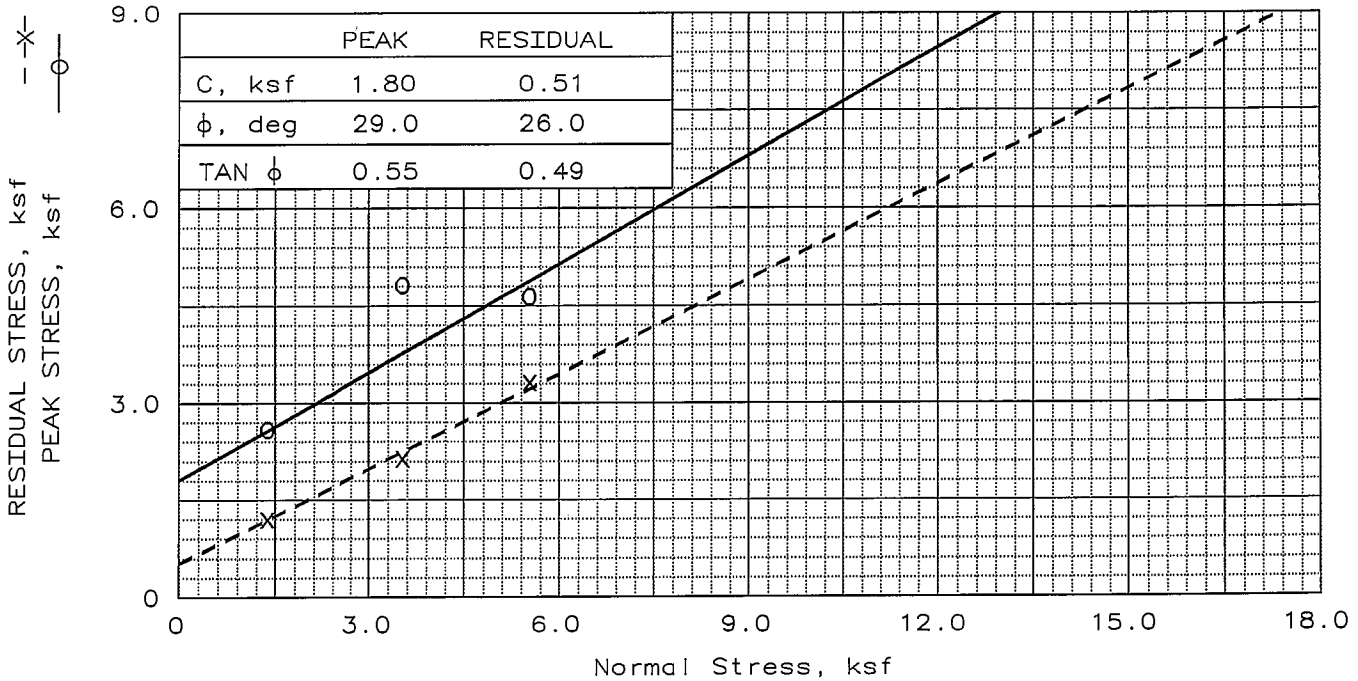
CLIENT: Hasley Canyon Land Company L.L.C.

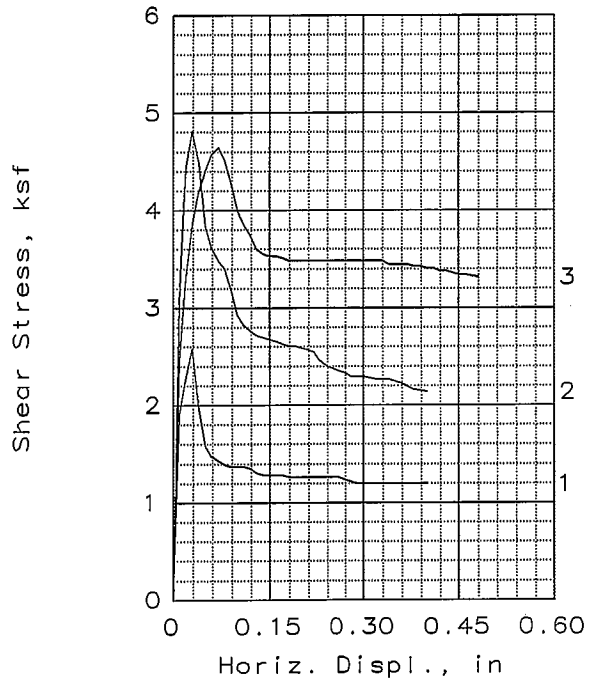
PROJECT: T.T. 52584

SAMPLE LOCATION: BA-1 @ 69.7 ft.

PROJ. NO.: 98-1617-4 DATE: 1/15/99

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	13.7	15.5	12.0
	DRY DENSITY, pcf	117.7	115.5	118.6
	SATURATION, %	85.8	91.2	76.8
	VOID RATIO	0.432	0.460	0.421
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	15.7	16.1	14.0
	DRY DENSITY, pcf	118.2	116.9	121.1
	SATURATION, %	99.4	98.3	96.6
	VOID RATIO	0.426	0.442	0.392
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	0.99	0.98
NORMAL STRESS, ksf		1.42	3.58	5.58
PEAK STRESS, ksf		2.59	4.81	4.64
DISPLACEMENT, in		0.03	0.03	0.07
RESIDUAL STRESS, ksf		1.20	2.14	3.32
DISPLACEMENT, in		0.40	0.40	0.48
Strain rate, in/min		0.0079	0.0079	0.0079

SAMPLE TYPE: Undisturbed
DESCRIPTION: Silt

SPECIFIC GRAVITY= 2.7
REMARKS: landslide debris (Qls)

Fig. No.: C3.2

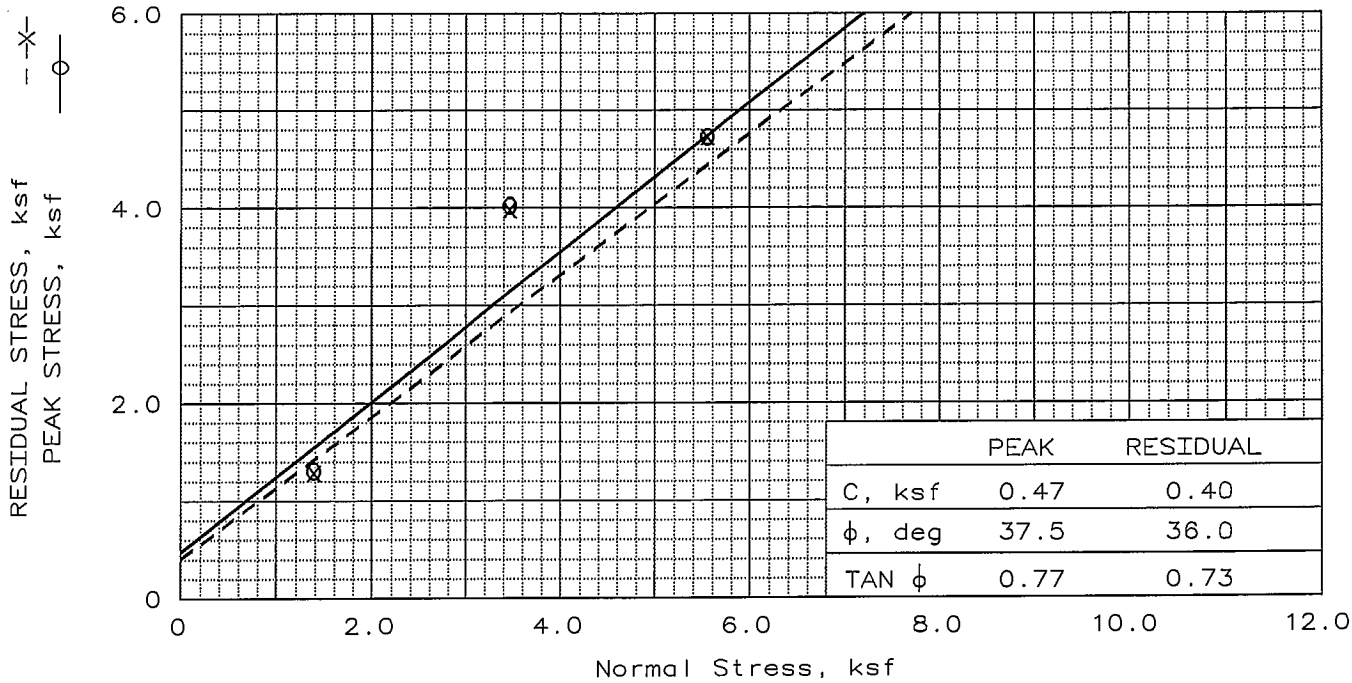
CLIENT: Hasley Canyon Land Company, L.L.C.

PROJECT: T.T. 52584

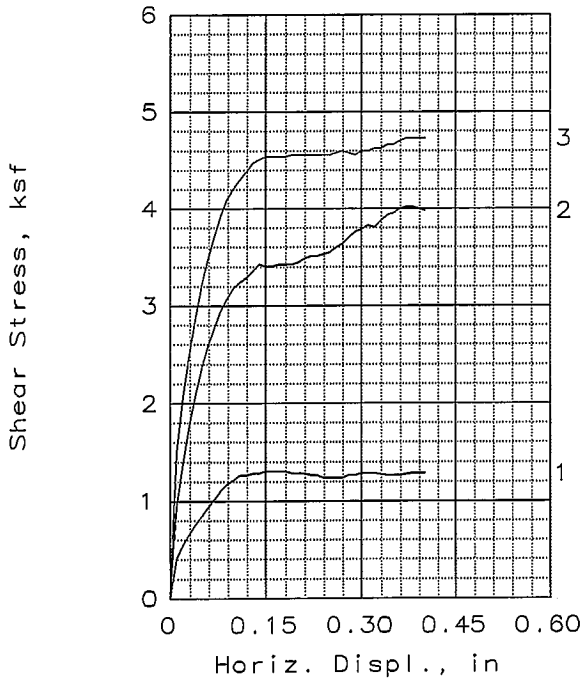
SAMPLE LOCATION: BA-1 @ 10 ft.

PROJ. NO.: 98-1617-4 DATE: 1/15/99

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.



	PEAK	RESIDUAL
C, ksf	0.47	0.40
ϕ, deg	37.5	36.0
TAN ϕ	0.77	0.73



SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	5.6	5.5	4.8
	DRY DENSITY, pcf	109.6	110.1	110.8
	SATURATION, %	28.1	28.0	24.9
	VOID RATIO	0.538	0.531	0.521
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	18.6	17.7	17.0
	DRY DENSITY, pcf	111.7	113.8	115.1
	SATURATION, %	98.5	99.4	98.6
	VOID RATIO	0.509	0.482	0.464
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.98	0.97	0.96
NORMAL STRESS, ksf		1.42	3.50	5.58
PEAK STRESS, ksf		1.30	4.02	4.73
DISPLACEMENT, in		0.15	0.37	0.37
RESIDUAL STRESS, ksf		1.28	3.98	4.73
DISPLACEMENT, in		0.40	0.40	0.40
Strain rate, in/min		0.0197	0.0197	0.0197

SAMPLE TYPE: Undisturbed
DESCRIPTION: Well-graded sand w/trace of gravel

SPECIFIC GRAVITY= 2.7
REMARKS: landslide debris (Qls)

CLIENT: Hasley Canyon Land Company, L.L.C.

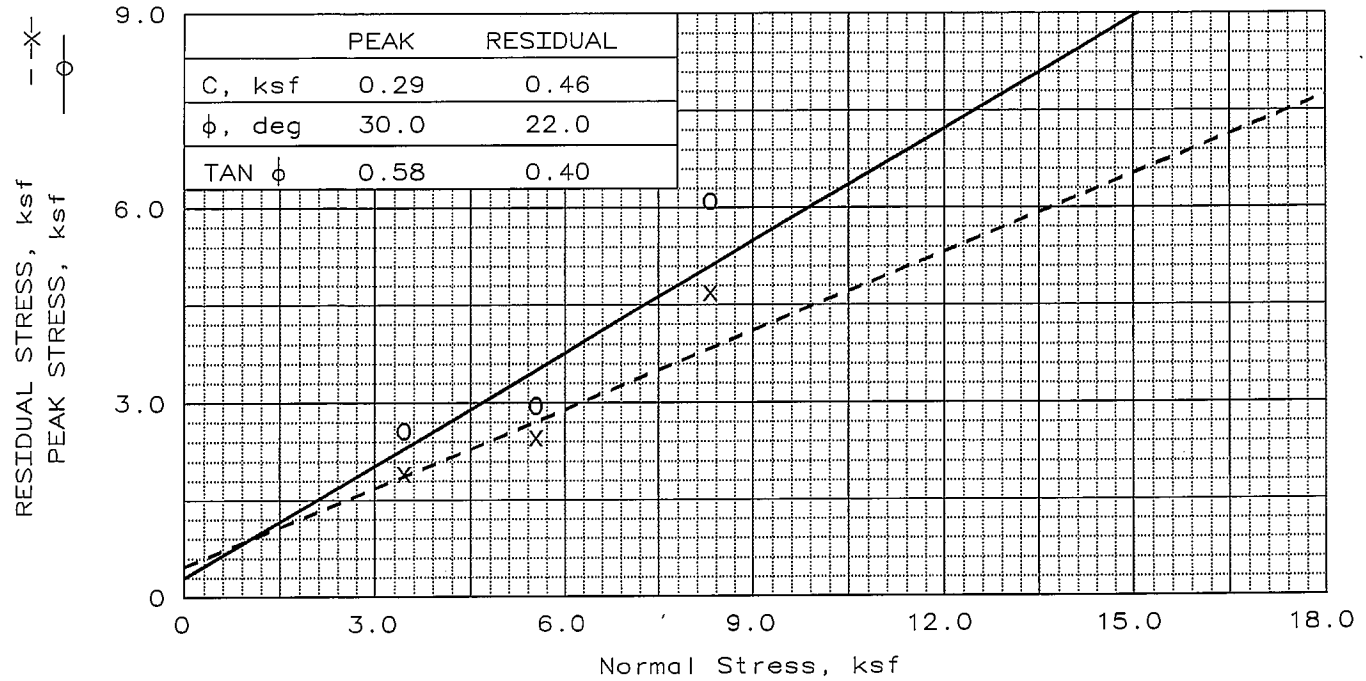
PROJECT: T.T. 52584

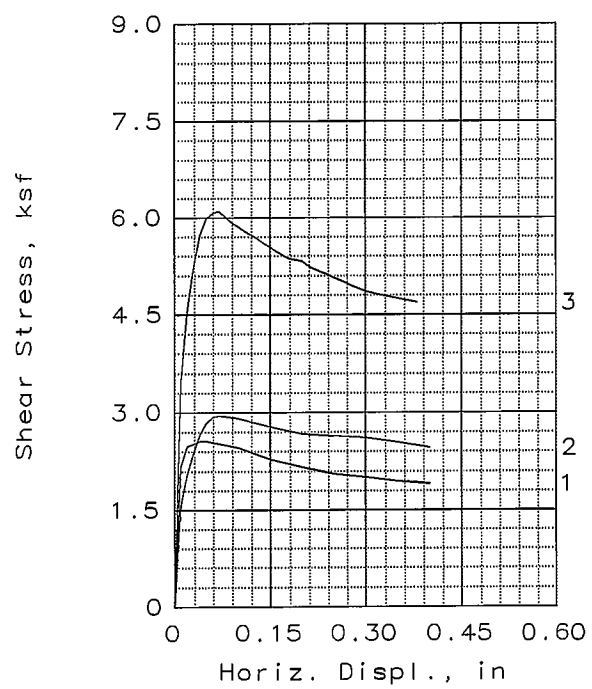
SAMPLE LOCATION: BA-3 @ 5 ft.

PROJ. NO.: 98-1617-4 DATE: 10/22/99

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.

Fig. No.: C3.3





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	25.7	18.1	13.0
	DRY DENSITY, pcf	95.8	106.8	107.3
	SATURATION, %	91.5	84.5	61.6
	VOID RATIO	0.759	0.578	0.571
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	27.0	20.4	19.1
	DRY DENSITY, pcf	97.4	108.3	111.2
	SATURATION, %	99.7	99.1	99.7
	VOID RATIO	0.731	0.557	0.516
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.98	0.99	0.97
NORMAL STRESS, ksf		3.50	5.58	8.36
PEAK STRESS, ksf		2.57	2.95	6.10
DISPLACEMENT, in		0.04	0.07	0.07
RESIDUAL STRESS, ksf		1.90	2.46	4.68
DISPLACEMENT, in		0.40	0.40	0.38
Strain rate, in/min		0.0079	0.0079	0.0079

SAMPLE TYPE: Undisturbed
DESCRIPTION: Fat Clay

LL= 64 PL= 28 PI= 36
SPECIFIC GRAVITY= 2.7
REMARKS: Bedding plane
(Silty claystone)
Hand-driven rings

Fig. No.: C3.4

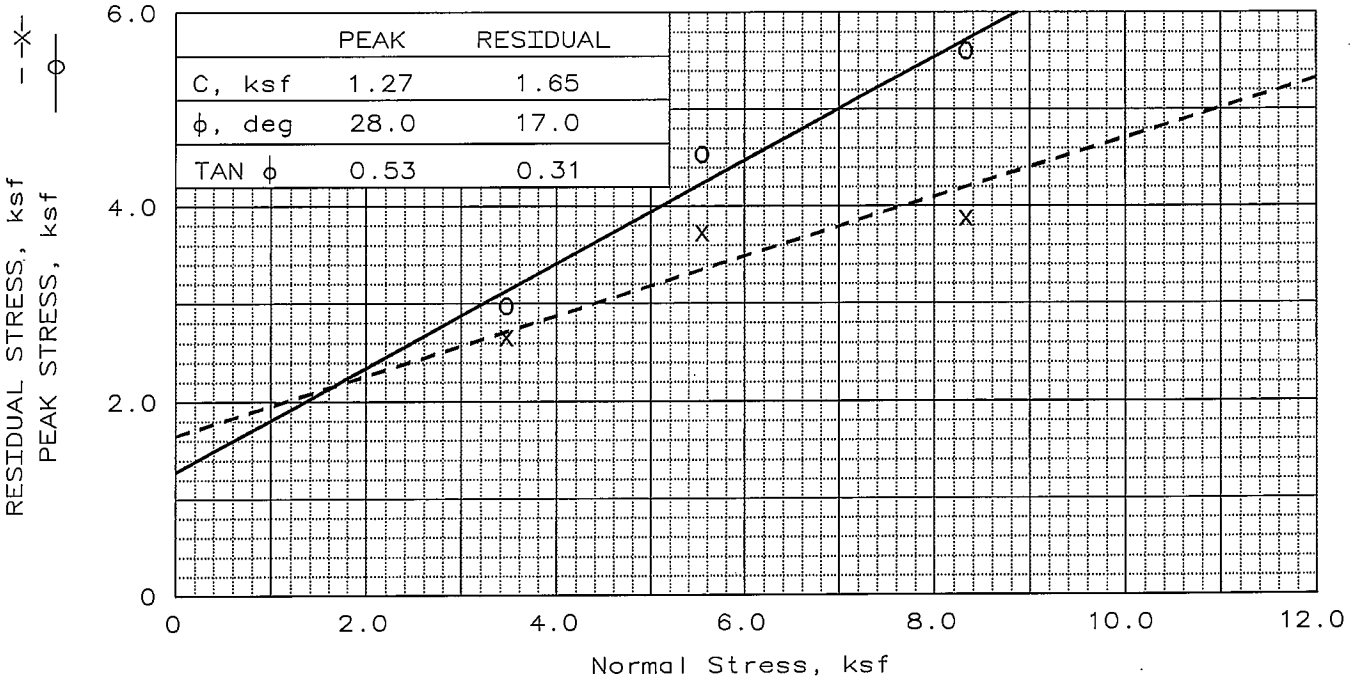
CLIENT: Hasley Canyon Land Company, L.L.C.

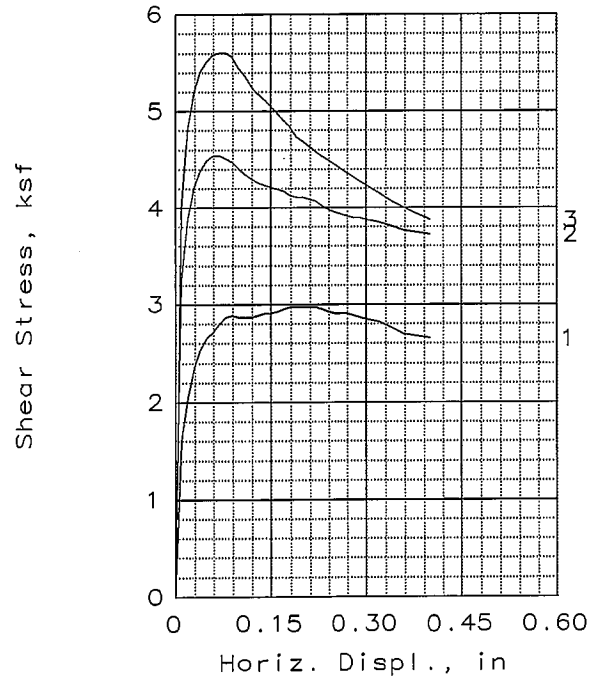
PROJECT: T.T. 52584

SAMPLE LOCATION: BA-1 @ 75.4 ft.

PROJ. NO.: 99-1617-4 DATE: 3/31/00

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	19.2	19.7	17.9
	DRY DENSITY, pcf	106.4	109.9	109.7
	SATURATION, %	88.6	99.8	90.1
	VOID RATIO	0.584	0.533	0.537
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	20.5	18.5	17.8
	DRY DENSITY, pcf	108.5	112.4	113.8
	SATURATION, %	99.7	100.0	100.0
	VOID RATIO	0.554	0.499	0.481
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.98	0.98	0.96
NORMAL STRESS, ksf		3.50	5.58	8.36
PEAK STRESS, ksf		2.97	4.53	5.60
DISPLACEMENT, in		0.18	0.07	0.07
RESIDUAL STRESS, ksf		2.65	3.72	3.87
DISPLACEMENT, in		0.40	0.40	0.40
Strain rate, in/min		0.0079	0.0079	0.0079

SAMPLE TYPE: Undisturbed
DESCRIPTION: Fat clay

SPECIFIC GRAVITY= 2.7
REMARKS: Bedding plane
(Claystone)
Hand driven rings

Fig. No.: C3.5

CLIENT: Hasley Canyon Land Company, L.L.C.

PROJECT: T.T. 52584

SAMPLE LOCATION: BA-2 @ 62 ft.

PROJ. NO.: 99-1617-4 DATE: 3/31/00

DIRECT SHEAR TEST REPORT
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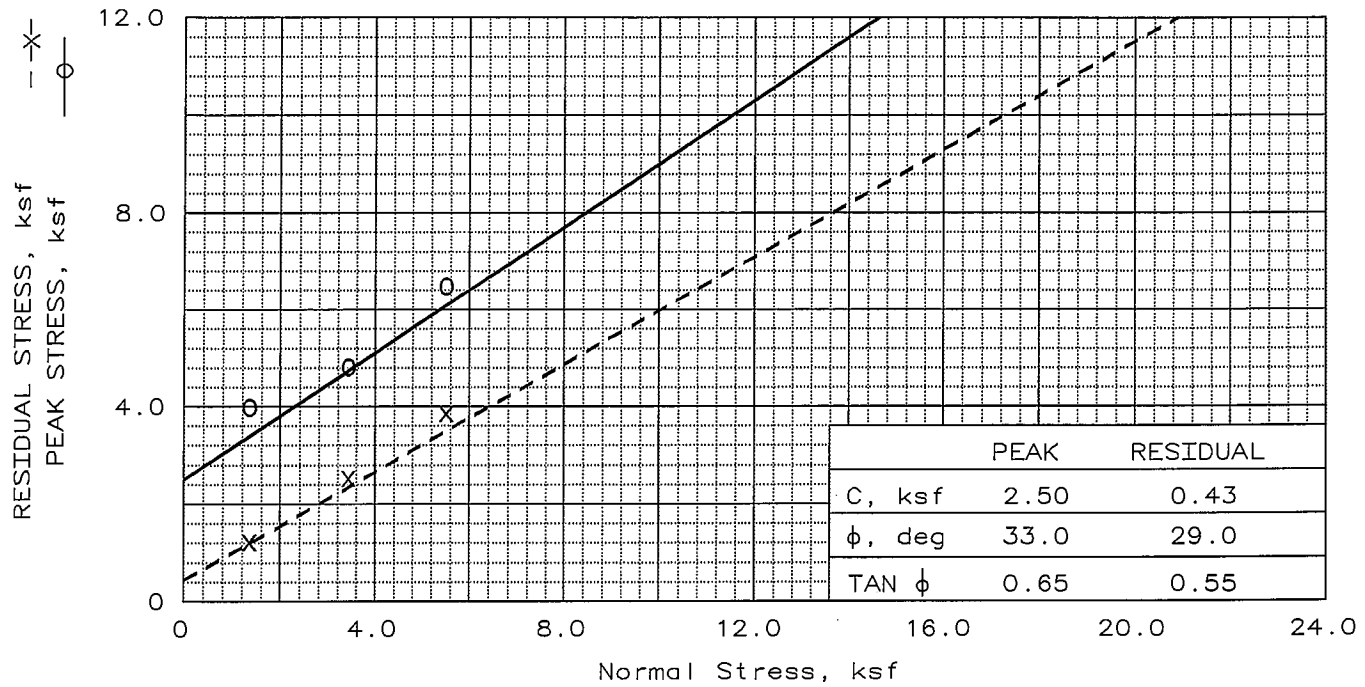
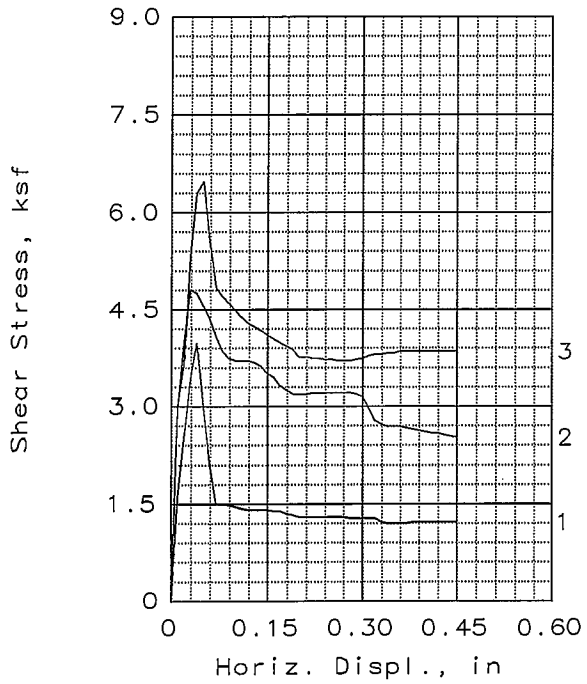


	PEAK	RESIDUAL
C, ksf	2.50	0.43
ϕ, deg	33.0	29.0
TAN ϕ	0.65	0.55



	SAMPLE NO.:	1	2	3
INITIAL	WATER CONTENT, %	14.5	17.0	15.5
	DRY DENSITY, pcf	117.8	112.7	114.6
	SATURATION, %	90.6	92.6	89.2
	VOID RATIO	0.431	0.496	0.470
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	15.7	16.6	15.3
	DRY DENSITY, pcf	118.3	116.0	118.1
	SATURATION, %	99.8	99.2	96.9
	VOID RATIO	0.425	0.453	0.427
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	0.97	0.97
	NORMAL STRESS, ksf	1.42	3.50	5.58
	PEAK STRESS, ksf	3.98	4.81	6.48
	DISPLACEMENT, in	0.04	0.03	0.05
	RESIDUAL STRESS, ksf	1.22	2.52	3.85
	DISPLACEMENT, in	0.45	0.45	0.45
	Strain rate, in/min	0.0197	0.0197	0.0197

SAMPLE TYPE: Undisturbed
DESCRIPTION: Silty clay

SPECIFIC GRAVITY= 2.7
REMARKS: Bedding plane
(Silty claystone)

Fig. No.: C3.6

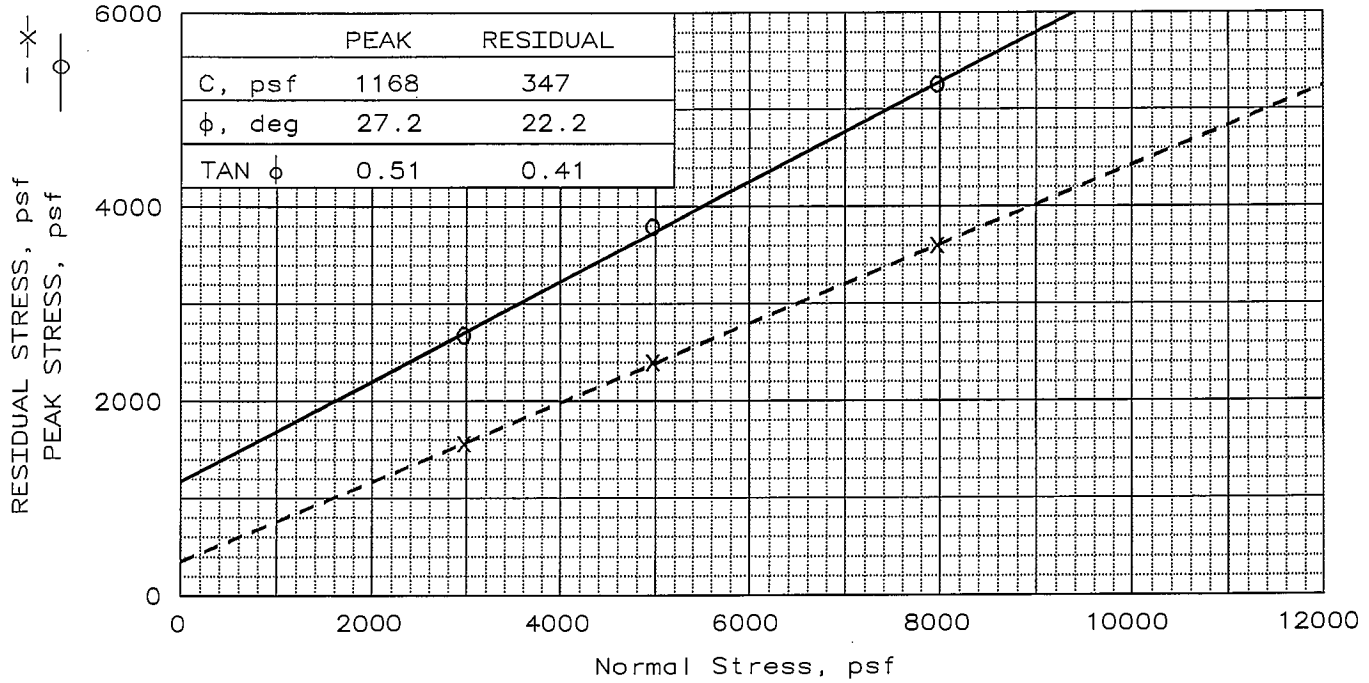
CLIENT: Hasley Canyon Land Company, L.L.C.

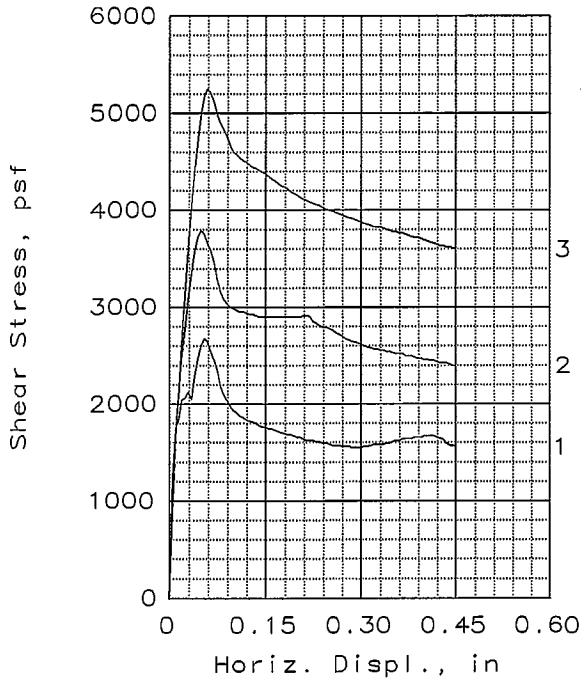
PROJECT: T.T. 52584

SAMPLE LOCATION: BA-4 @ 10 ft.

PROJ. NO.: 99-1617-4 DATE: 10/22/99

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.





SAMPLE No:		1	2	3
INITIAL	WATER CONTENT, %	20.4	19.4	19.5
	DRY DENSITY, pcf	107.4	108.4	108.0
	SATURATION, %	99.8	97.8	97.0
	VOID RATIO	0.541	0.526	0.531
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	19.8	18.6	18.4
	DRY DENSITY, pcf	108.5	110.7	111.1
	SATURATION, %	99.9	99.9	99.7
	VOID RATIO	0.525	0.494	0.489
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.98	0.97
NORMAL STRESS, psf		3000	5000	8000
PEAK STRESS, psf		2676	3792	5256
DISPLACEMENT, in		0.06	0.05	0.06
RESIDUAL STRESS, psf		1560	2400	3600
DISPLACEMENT, in		0.45	0.45	0.45
Strain rate, in/min		0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed
DESCRIPTION: Silty Clay

SPECIFIC GRAVITY= 2.65
REMARKS: Bedding Plane
(Silty Claystone)

Fig. No.: C3.7

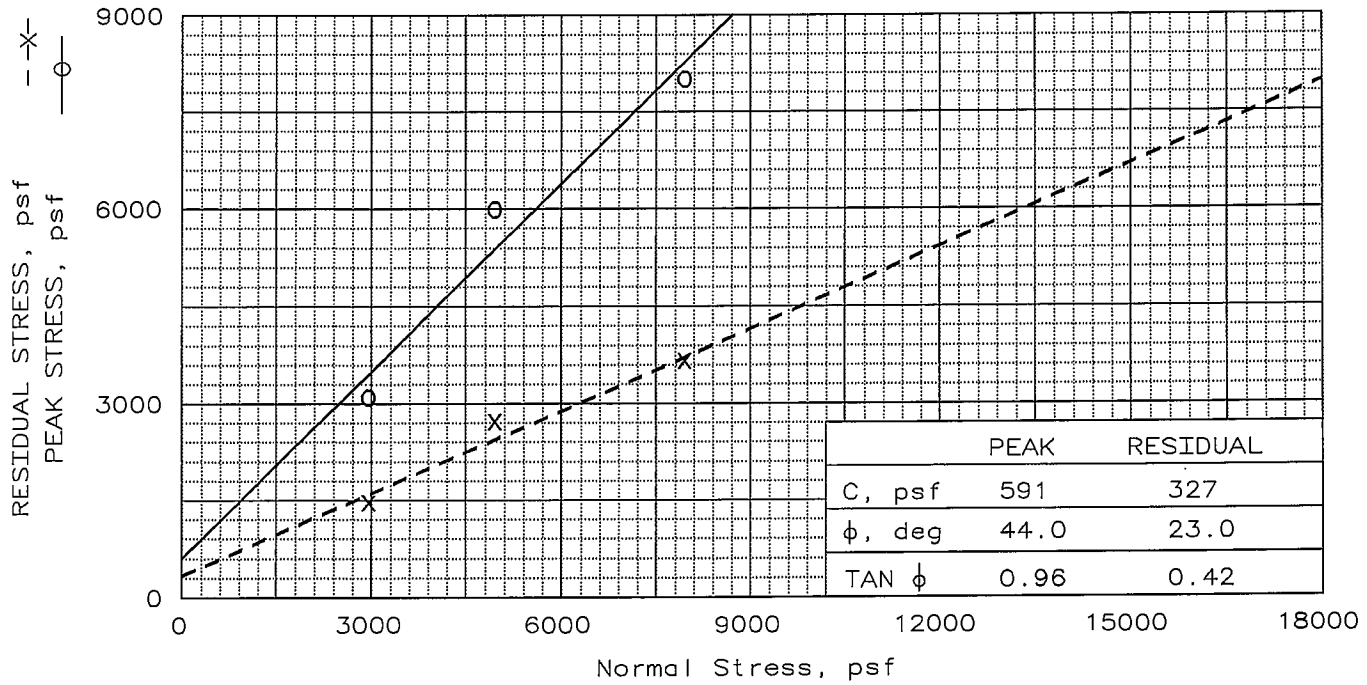
CLIENT: Hasley Canyon Land Company, L.L.C

PROJECT: T.T. 52584

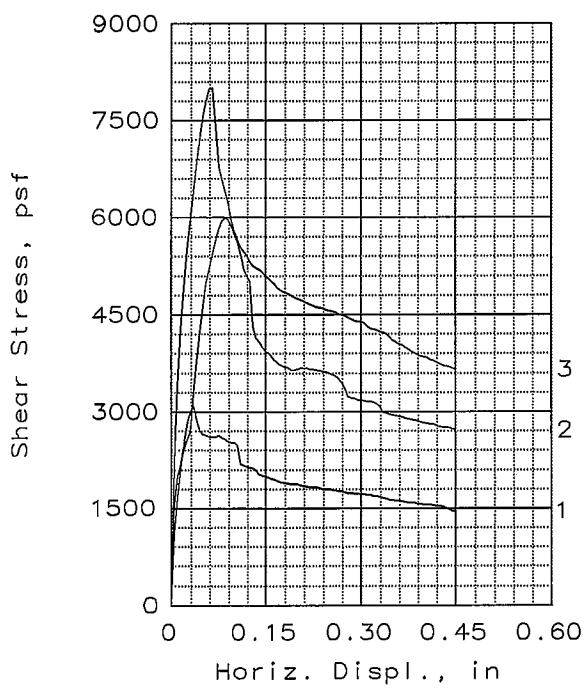
SAMPLE LOCATION: BA-7 @ 44 ft.

PROJ. NO.: 99-1617-4 DATE: 10/22/99

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.



	PEAK	RESIDUAL
C, psf	591	327
ϕ, deg	44.0	23.0
TAN ϕ	0.96	0.42



SAMPLE No:		1	2	3
INITIAL	WATER CONTENT, %	13.6	15.1	13.9
	DRY DENSITY, pcf	116.4	117.3	119.3
	SATURATION, %	85.9	97.5	95.3
	VOID RATIO	0.421	0.411	0.386
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	15.6	14.7	14.0
	DRY DENSITY, pcf	117.1	118.6	120.6
	SATURATION, %	100.0	98.9	99.7
	VOID RATIO	0.413	0.395	0.372
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.99	0.99
NORMAL STRESS, psf		3000	5000	8000
PEAK STRESS, psf		3096	5987	8003
DISPLACEMENT, in		0.04	0.09	0.06
RESIDUAL STRESS, psf		1464	2724	3660
DISPLACEMENT, in		0.45	0.45	0.45
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Undisturbed
DESCRIPTION: Silty Clay

SPECIFIC GRAVITY= 2.65
REMARKS: -#200 = 50.4%
Bedding plane
(Silty Claystone)

Fig. No.: C3.8

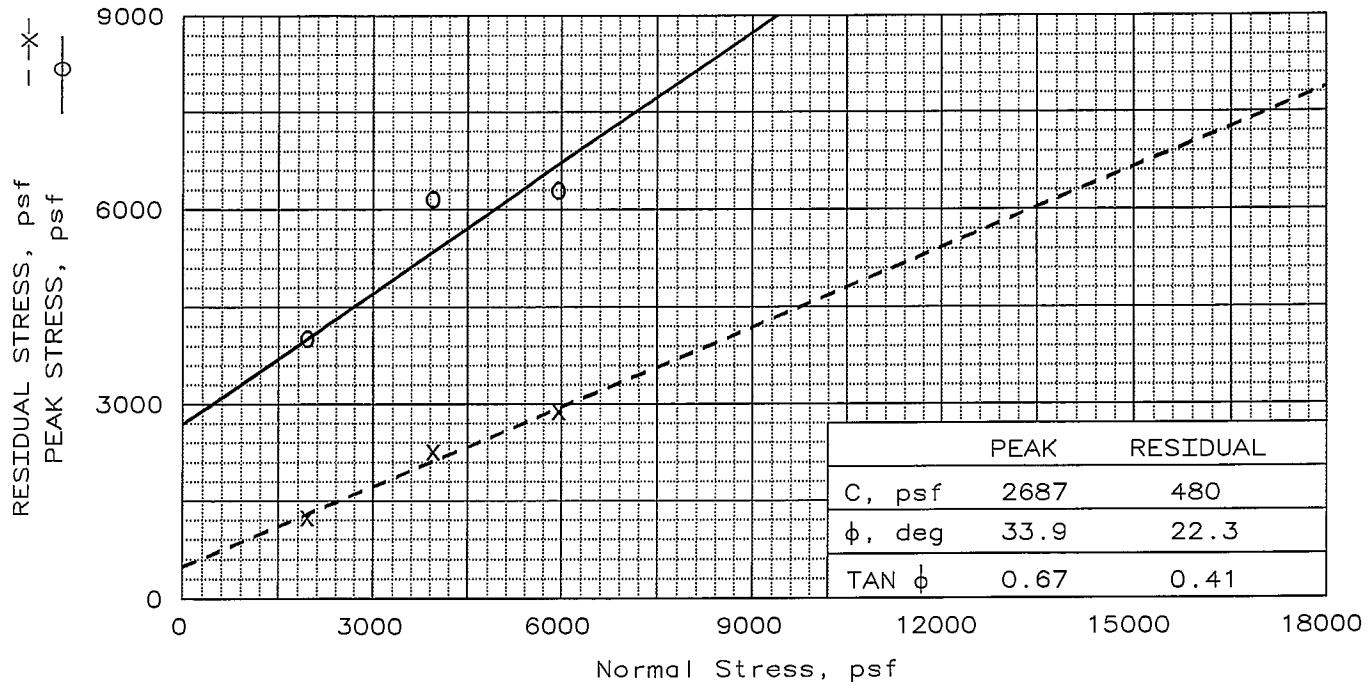
CLIENT: Hasley Canyon Land Company, L.L.C.

PROJECT: T.T. 52584

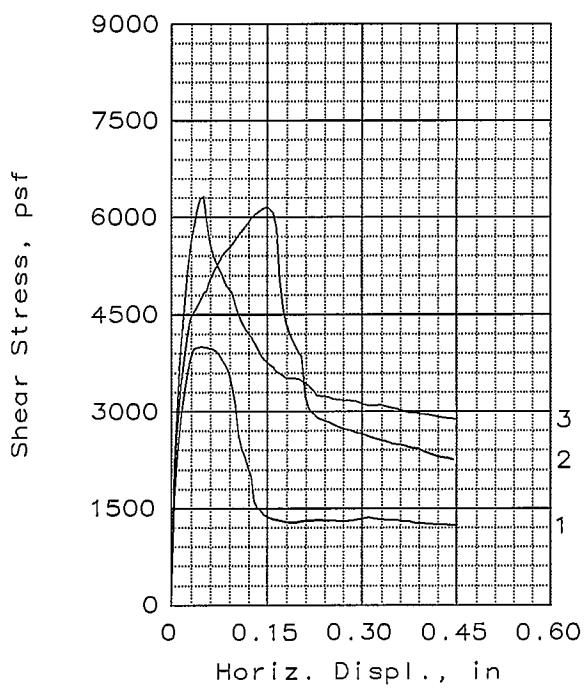
SAMPLE LOCATION: BA-9 @ 49 ft.

PROJ. NO.: 99-1617-4 DATE: 10/22/99

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.



	PEAK	RESIDUAL
C, psf	2687	480
ϕ, deg	33.9	22.3
TAN ϕ	0.67	0.41



SAMPLE No:		1	2	3
INITIAL	WATER CONTENT, %	15.2	14.3	14.6
	DRY DENSITY, pcf	117.5	119.7	117.8
	SATURATION, %	98.6	99.4	95.8
	VOID RATIO	0.407	0.382	0.404
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	15.0	14.1	14.3
	DRY DENSITY, pcf	118.2	120.4	120.0
	SATURATION, %	99.6	99.8	99.8
	VOID RATIO	0.400	0.374	0.378
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.99	0.98
NORMAL STRESS, psf		2000	4000	6000
PEAK STRESS, psf		4008	6155	6288
DISPLACEMENT, in		0.05	0.15	0.05
RESIDUAL STRESS, psf		1236	2256	2880
DISPLACEMENT, in		0.45	0.45	0.45
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Undisturbed
DESCRIPTION: Fat Clay

SPECIFIC GRAVITY= 2.65
REMARKS: Bedding Plane
(Silty Claystone)

Fig. No.: C3.9

CLIENT: Hasley Canyon Land Company, L.L.C.

PROJECT: T.T. 52584

SAMPLE LOCATION: BA-11 @ 30'

PROJ. NO.: 00-1617-4 DATE: 3/31/00

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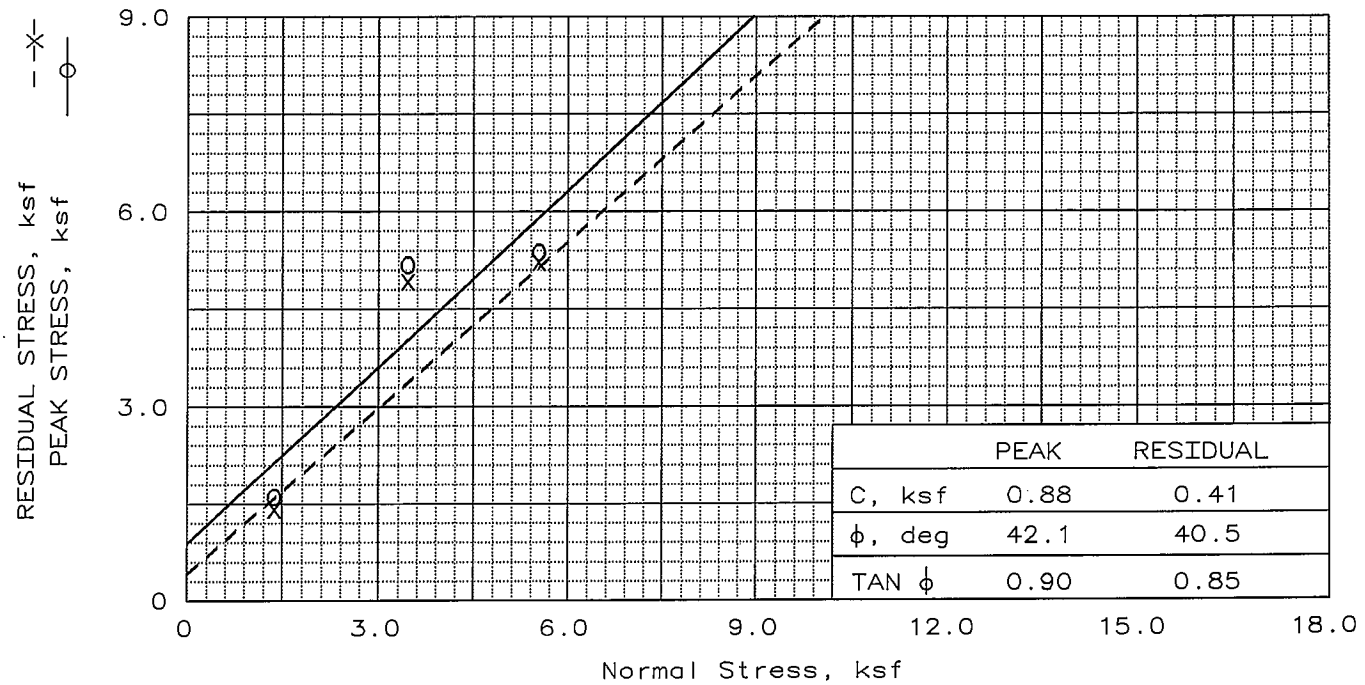
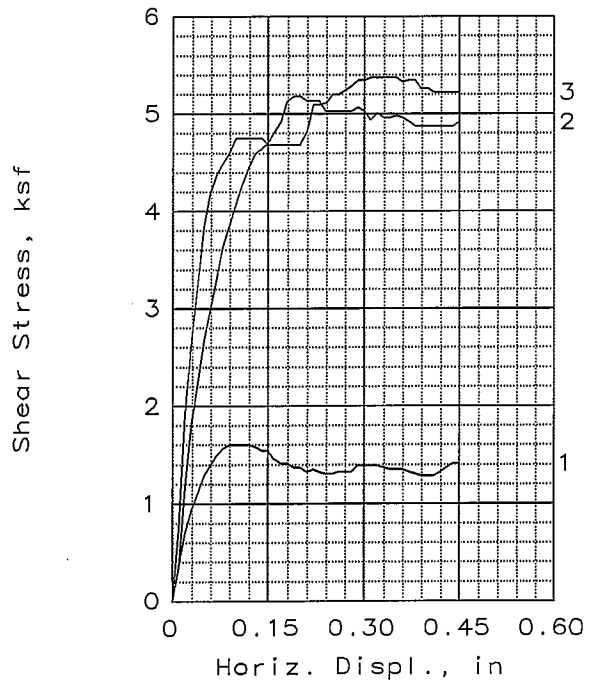


	PEAK	RESIDUAL
C, ksf	0.88	0.41
ϕ, deg	42.1	40.5
TAN ϕ	0.90	0.85



SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	4.8	5.6	4.8
	DRY DENSITY, pcf	112.8	115.3	112.8
	SATURATION, %	26.5	32.5	26.5
	VOID RATIO	0.495	0.461	0.495
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	17.3	15.3	16.2
	DRY DENSITY, pcf	114.5	118.9	117.2
	SATURATION, %	98.7	99.1	99.6
	VOID RATIO	0.472	0.417	0.438
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.98	0.97	0.96
NORMAL STRESS, ksf		1.42	3.50	5.58
PEAK STRESS, ksf		1.60	5.18	5.37
DISPLACEMENT, in		0.09	0.19	0.31
RESIDUAL STRESS, ksf		1.41	4.92	5.22
DISPLACEMENT, in		0.45	0.45	0.45
Strain rate, in/min		0.0197	0.0197	0.0197

SAMPLE TYPE: Undisturbed
DESCRIPTION: Sand w/Silt (SP/SM)

SPECIFIC GRAVITY= 2.7
REMARKS: Cross bedding (TQs) (Sandstone)

Fig. No.: C3.10

CLIENT: Hasley Canyon Land Company, L.L.C.

PROJECT: T.T. 52584

SAMPLE LOCATION: BA-5 @ 50 ft.

PROJ. NO.: 99-1617-4 DATE: 10/22/99

DIRECT SHEAR TEST REPORT
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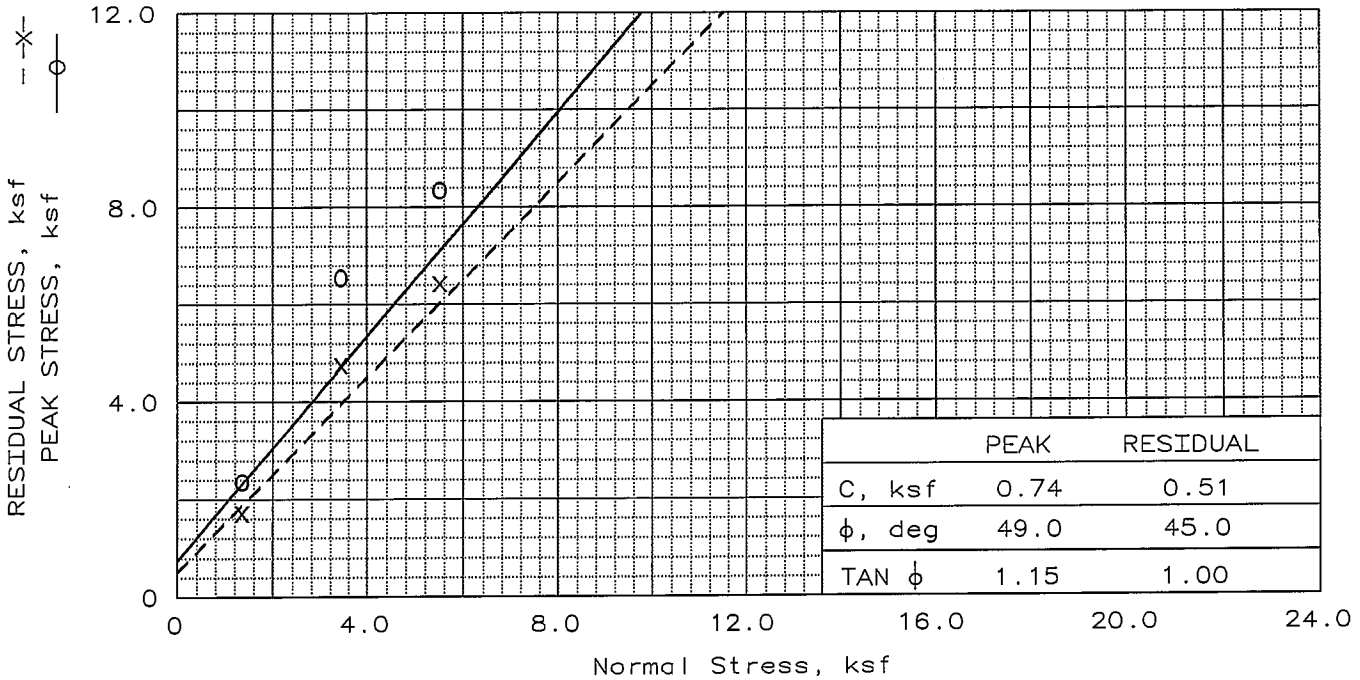
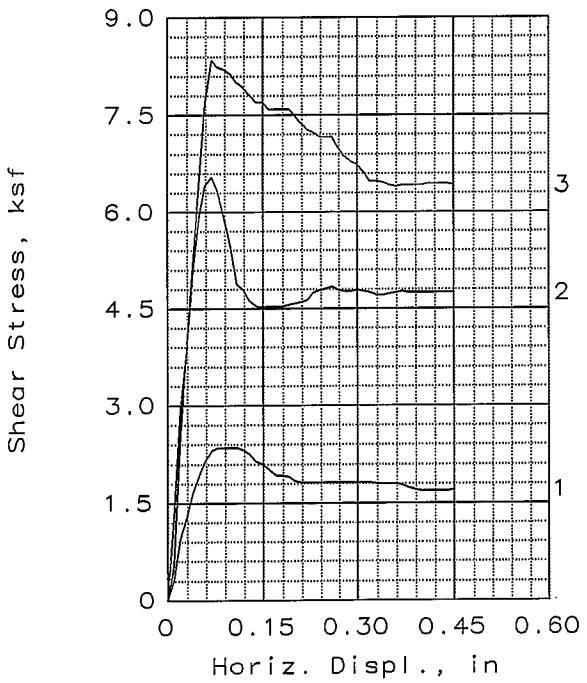
ENGINEERING GEOLOGY, INC.



	PEAK	RESIDUAL
C, ksf	0.74	0.51
ϕ, deg	49.0	45.0
TAN ϕ	1.15	1.00



	SAMPLE NO.:	1	2	3
INITIAL	WATER CONTENT, %	6.3	6.7	7.0
	DRY DENSITY, pcf	120.7	125.6	123.9
	SATURATION, %	42.7	52.6	52.5
	VOID RATIO	0.396	0.342	0.361
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	13.7	11.0	11.7
	DRY DENSITY, pcf	122.9	129.5	127.9
	SATURATION, %	99.6	98.4	99.2
	VOID RATIO	0.372	0.301	0.317
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.98	0.97	0.97
	NORMAL STRESS, ksf	1.42	3.50	5.58
	PEAK STRESS, ksf	2.35	6.55	8.34
	DISPLACEMENT, in	0.08	0.07	0.07
	RESIDUAL STRESS, ksf	1.71	4.75	6.42
	DISPLACEMENT, in	0.45	0.45	0.45
	Strain rate, in/min	0.0197	0.0197	0.0197

SAMPLE TYPE: Undisturbed
DESCRIPTION: Well graded sand with gravel

SPECIFIC GRAVITY= 2.7
REMARKS: Cross bedding (TQs) (Sandstone)

CLIENT: Hasley Canyon Land Comapny, L.L.C.

PROJECT: T.T. 52584

SAMPLE LOCATION: BA-6 @ 20 ft.

PROJ. NO.: 99-1617-4 DATE: 10/22/99

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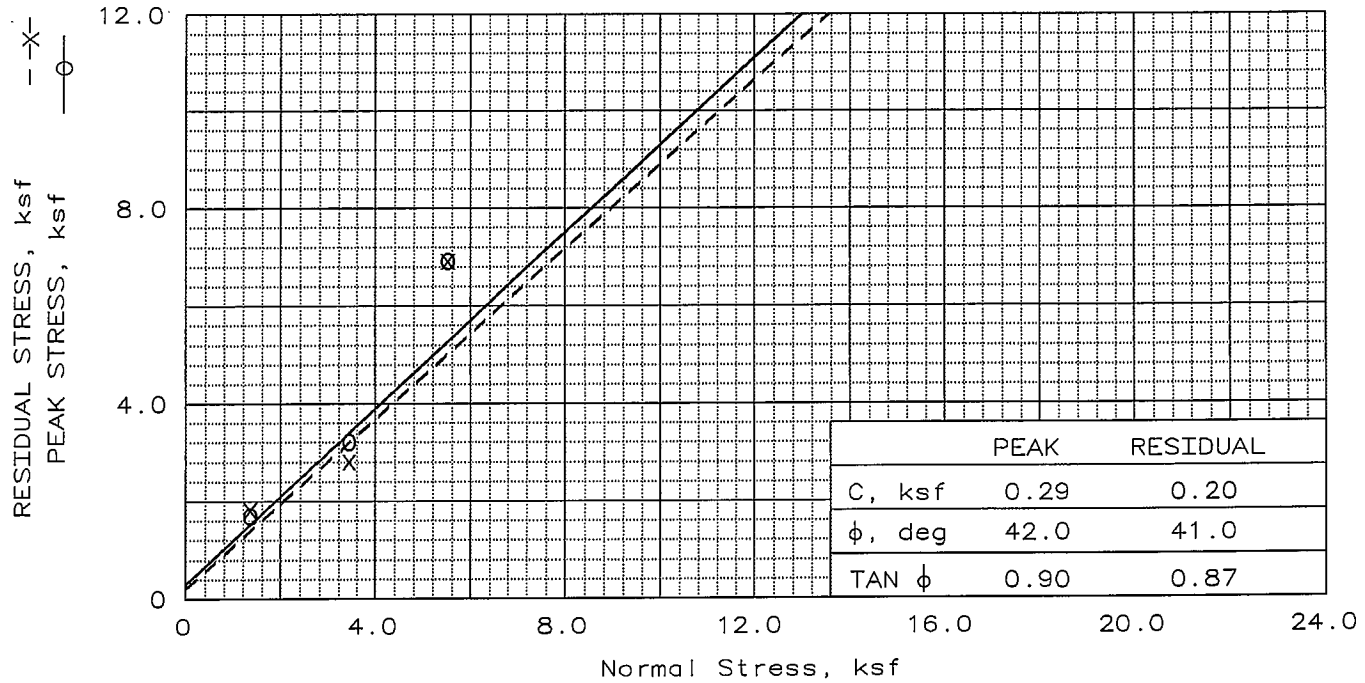
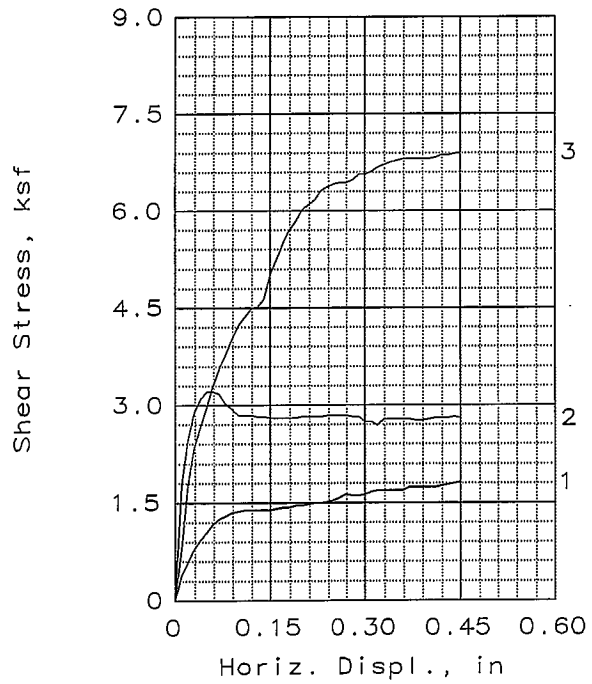
Fig. No.: C3.11



	PEAK	RESIDUAL
C, ksf	0.29	0.20
ϕ, deg	42.0	41.0
TAN ϕ	0.90	0.87



SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	2.4	5.3	5.7
	DRY DENSITY, pcf	118.5	110.9	114.7
	SATURATION, %	15.5	27.4	32.8
	VOID RATIO	0.422	0.519	0.469
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	14.7	17.9	15.4
	DRY DENSITY, pcf	120.2	113.4	118.9
	SATURATION, %	99.1	99.5	99.2
	VOID RATIO	0.402	0.486	0.418
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.98	0.97
NORMAL STRESS, ksf		1.42	3.50	5.58
PEAK STRESS, ksf		1.69	3.21	6.91
DISPLACEMENT, in		0.34	0.05	0.45
RESIDUAL STRESS, ksf		1.82	2.80	6.91
DISPLACEMENT, in		0.45	0.45	0.45
Strain rate, in/min		0.0197	0.0197	0.0197

SAMPLE TYPE: Undisturbed
DESCRIPTION: Well-graded sand w/gravel

SPECIFIC GRAVITY= 2.7
REMARKS: Terrace Deposits (Qt)

CLIENT: Hasley Canyon Land Company, L.L.C.

PROJECT: T.T. 52584

SAMPLE LOCATION: HS-2 @ 20 ft.

PROJ. NO.: 99-1617-4 DATE: 10/22/99

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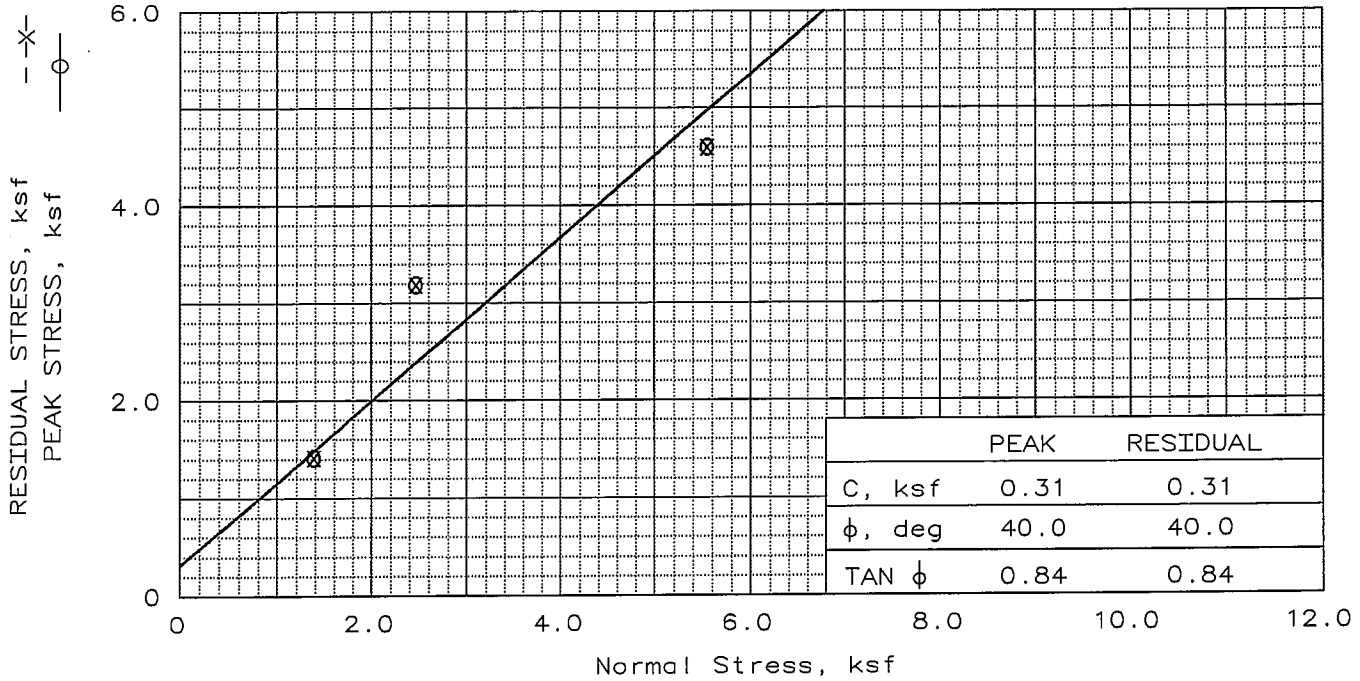
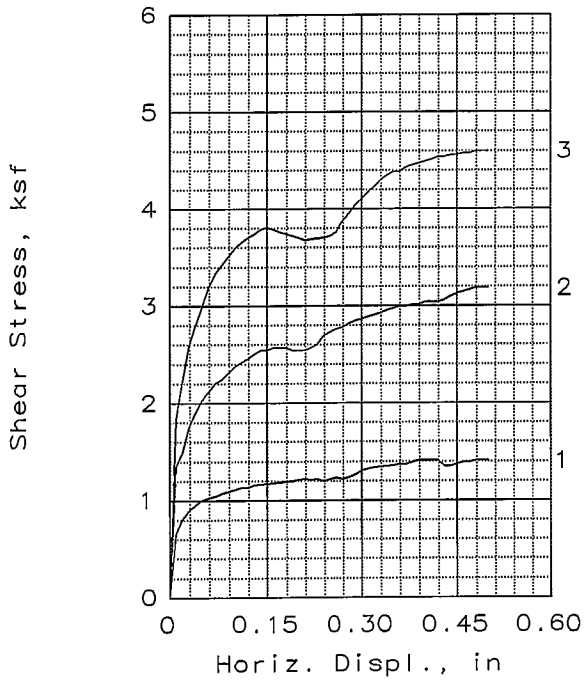
Fig. No.: C3.12



	PEAK	RESIDUAL
C, ksf	0.31	0.31
ϕ, deg	40.0	40.0
TAN ϕ	0.84	0.84



SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	7.3	7.3	7.4
	DRY DENSITY, pcf	109.8	109.8	109.8
	SATURATION, %	36.8	36.8	37.3
	VOID RATIO	0.535	0.534	0.535
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	18.7	18.7	18.0
	DRY DENSITY, pcf	110.7	111.5	112.2
	SATURATION, %	96.8	98.5	96.7
	VOID RATIO	0.522	0.512	0.502
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.99	0.98
NORMAL STRESS, ksf		1.42	2.50	5.58
PEAK STRESS, ksf		1.41	3.19	4.60
DISPLACEMENT, in		0.50	0.48	0.50
RESIDUAL STRESS, ksf		1.41	3.19	4.60
DISPLACEMENT, in		0.50	0.50	0.50
Strain rate, in/min		0.0197	0.0197	0.0197

SAMPLE TYPE: Remolded
DESCRIPTION: Well graded sand w/silt & gravel (SW-SM)

SPECIFIC GRAVITY= 2.7
REMARKS: Remolded to 90% R/C Compacted Fill (Cef)

Fig. No.: C3.13

CLIENT: Hasley Canyon Land Company, L.L.C.

PROJECT: T.T. 52584

SAMPLE LOCATION: BA-4 @ 24 ft.

PROJ. NO.: 99-1617-4 DATE: 1/15/99

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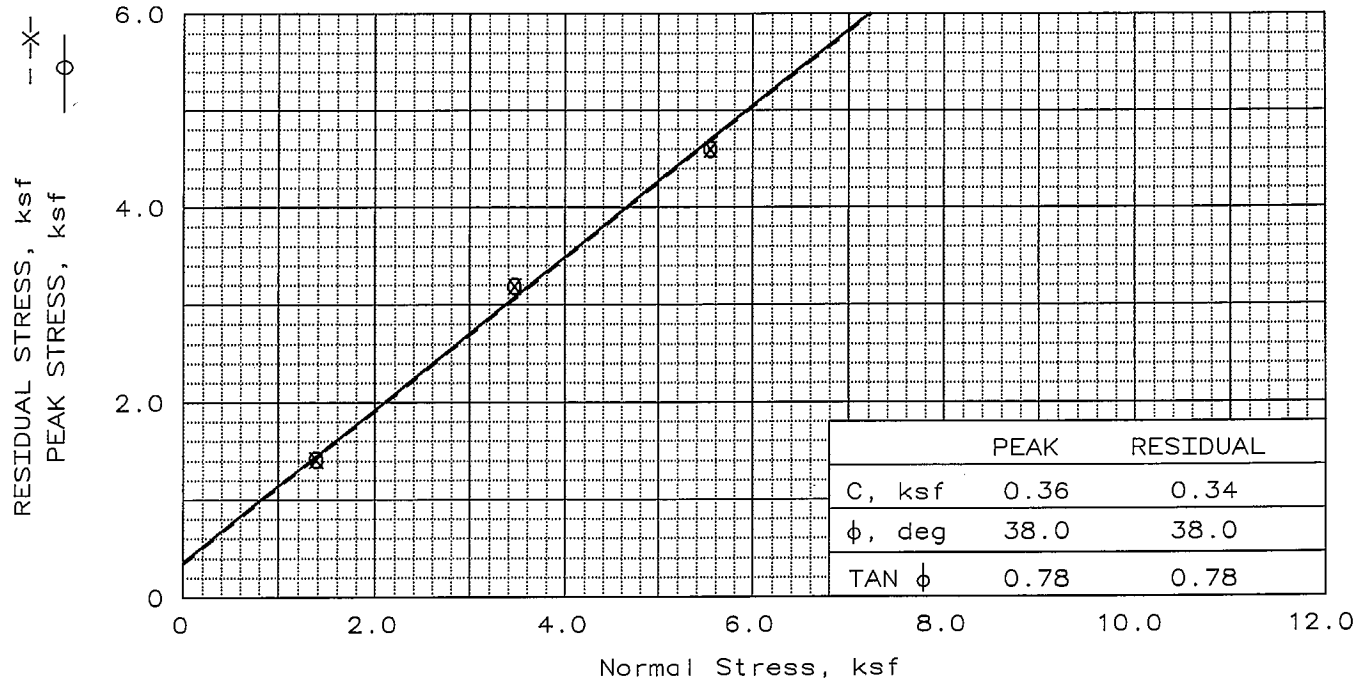
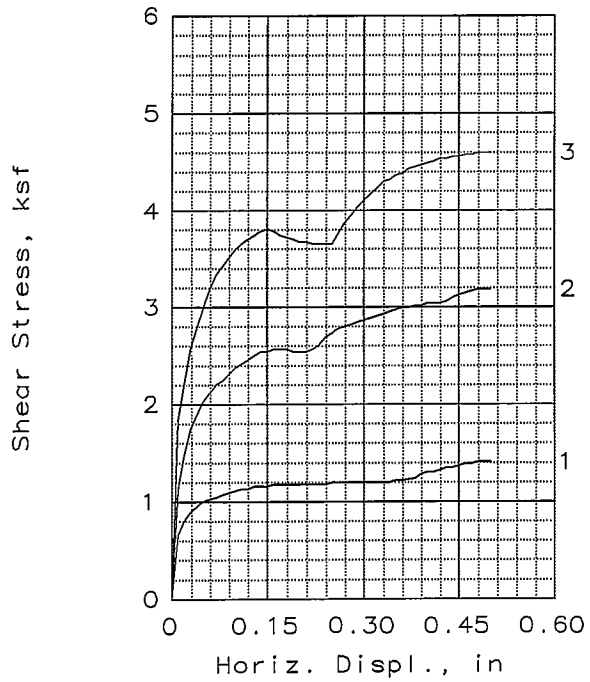
ENGINEERING GEOLOGY, INC.



	PEAK	RESIDUAL
C, ksf	0.36	0.34
ϕ, deg	38.0	38.0
TAN ϕ	0.78	0.78



	SAMPLE NO.:	1	2	3
INITIAL	WATER CONTENT, %	7.3	7.3	7.4
	DRY DENSITY, pcf	109.8	109.8	109.8
	SATURATION, %	36.8	36.8	37.3
	VOID RATIO	0.535	0.534	0.535
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	19.1	18.7	18.0
	DRY DENSITY, pcf	110.7	111.5	112.2
	SATURATION, %	98.7	98.5	96.7
	VOID RATIO	0.522	0.512	0.502
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.99	0.98
	NORMAL STRESS, ksf	1.42	3.50	5.58
	PEAK STRESS, ksf	1.41	3.19	4.60
	DISPLACEMENT, in	0.48	0.48	0.48
	RESIDUAL STRESS, ksf	1.41	3.19	4.60
	DISPLACEMENT, in	0.50	0.50	0.50
	Strain rate, in/min	0.0197	0.0197	0.0197

SAMPLE TYPE: Remolded
DESCRIPTION: Well-graded sand with silt and gravel

SPECIFIC GRAVITY= 2.7
REMARKS: Remolded to 90% R/C Compacted Fill (Cef)

Fig. No.: C3.14

CLIENT: Hasley Canyon Land Company, L.L.C

PROJECT: T.T. 52584

SAMPLE LOCATION: BA-4 @ 37 ft.

PROJ. NO.: 99-1617-4 DATE: 10/22/99

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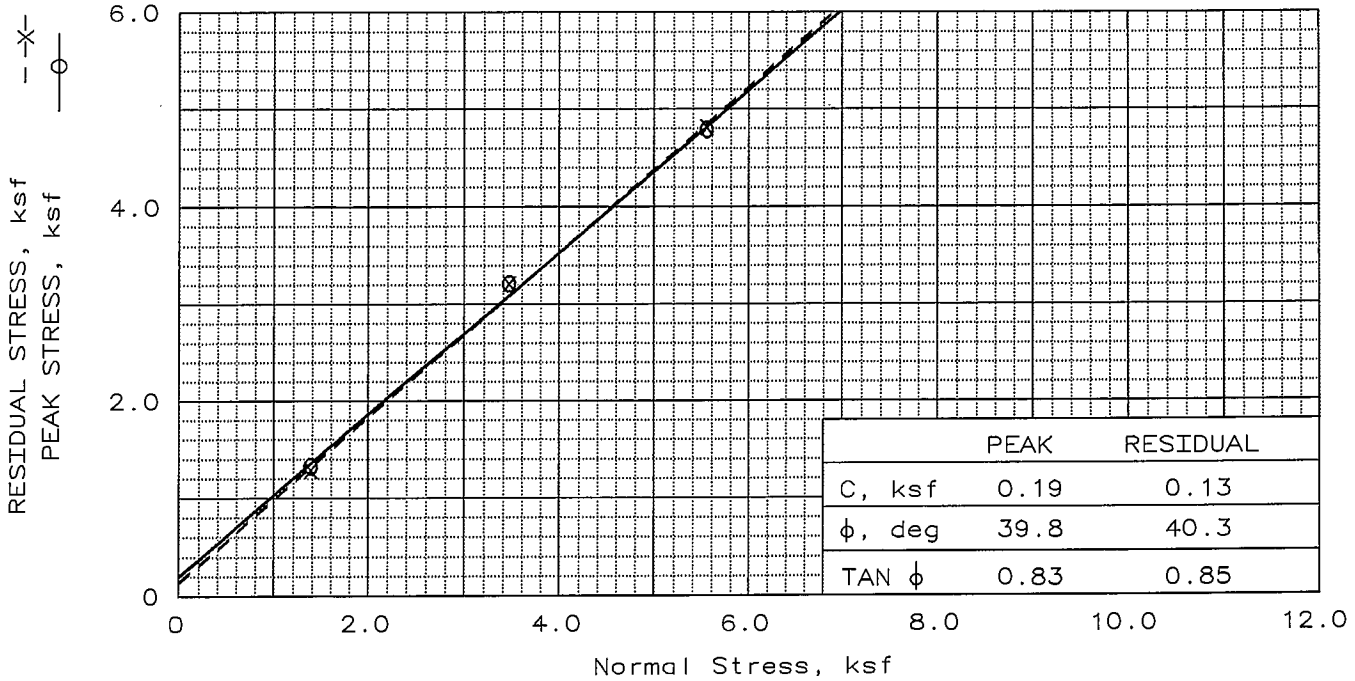
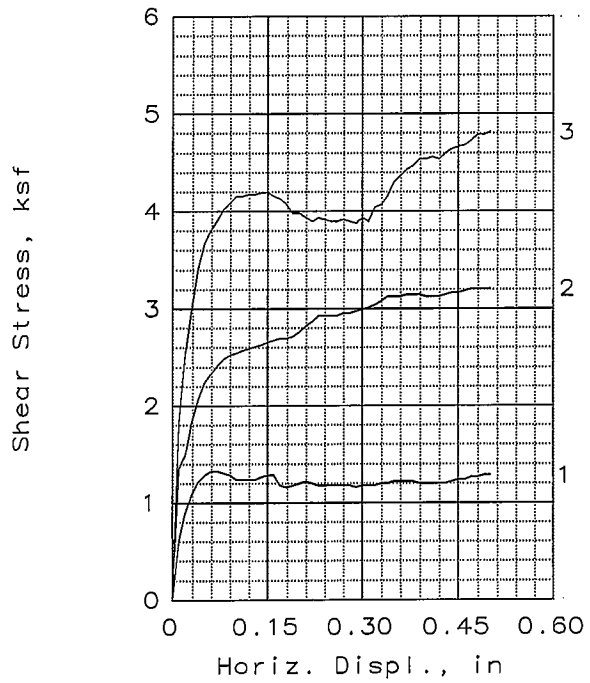


	PEAK	RESIDUAL
C, ksf	0.19	0.13
ϕ, deg	39.8	40.3
TAN ϕ	0.83	0.85



SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	6.2	6.2	6.4
	DRY DENSITY, pcf	114.2	114.2	119.2
	SATURATION, %	35.3	35.0	41.7
	VOID RATIO	0.476	0.476	0.414
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	16.9	16.7	14.6
	DRY DENSITY, pcf	115.4	116.0	120.9
	SATURATION, %	99.3	99.4	99.8
	VOID RATIO	0.461	0.452	0.394
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.98	0.99
NORMAL STRESS, ksf		1.42	3.50	5.58
PEAK STRESS, ksf		1.33	3.21	4.79
DISPLACEMENT, in		0.06	0.50	0.49
RESIDUAL STRESS, ksf		1.28	3.21	4.81
DISPLACEMENT, in		0.50	0.50	0.50
Strain rate, in/min		0.0197	0.0197	0.0197

SAMPLE TYPE: Remolded
DESCRIPTION: Well graded sand with silt and gravel

SPECIFIC GRAVITY= 2.7
REMARKS: Remolded to 90% R/C Compacted Fill (Cef)

Fig. No.: C3.15

CLIENT: Hasley Canyon Land Company, L.L.C.

PROJECT: T.T. 52584

SAMPLE LOCATION: BA-5 @ 12 ft.

PROJ. NO.: 99-1617-4 DATE: 1/15/99

DIRECT SHEAR TEST REPORT
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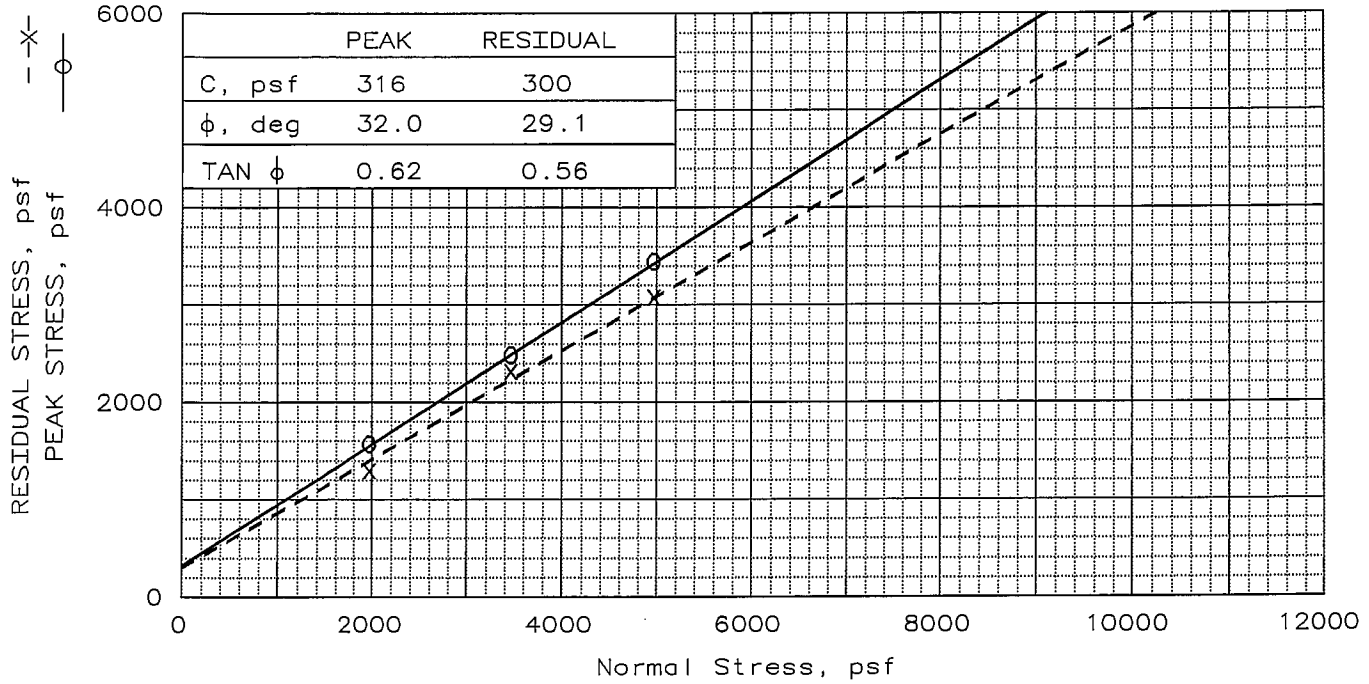

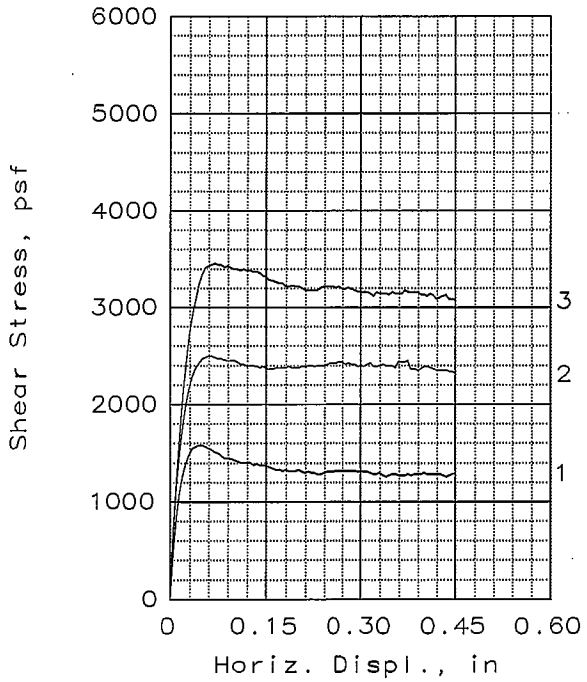

SAMPLE No:		1	2	3
INITIAL	WATER CONTENT, %	7.5	8.0	7.9
	DRY DENSITY, pcf	115.8	115.4	115.4
	SATURATION, %	46.2	48.8	48.6
	VOID RATIO	0.428	0.434	0.433
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	15.1	15.1	15.1
	DRY DENSITY, pcf	117.6	117.3	118.1
	SATURATION, %	98.1	97.4	99.4
	VOID RATIO	0.407	0.410	0.401
	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		1572	2484	3444
DISPLACEMENT, in		0.06	0.07	0.08
RESIDUAL STRESS, psf		1296	2316	3072
DISPLACEMENT, in		0.45	0.45	0.45
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Remolded
DESCRIPTION: Silty sand

SPECIFIC GRAVITY= 2.65
REMARKS: Remolded to 90% R/C
Compacted Fill (Cef)

Fig. No.: C3.16

CLIENT: Hasley Canyon Land Company, L.L.C.

PROJECT: T.T. 52584

SAMPLE LOCATION: BA-7,BA-8,BA-9 & BA-10
@ 0-15 ft.

PROJ. NO.: 99-1617-4 DATE: 10/22/99

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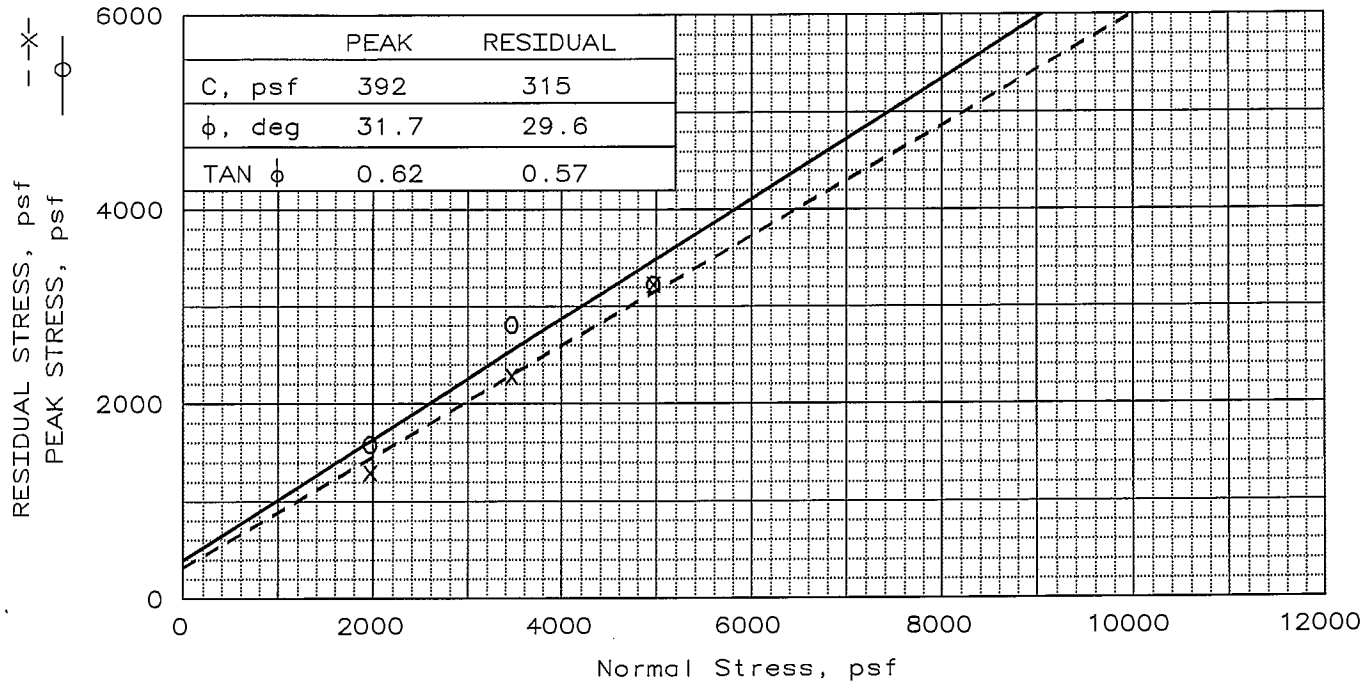

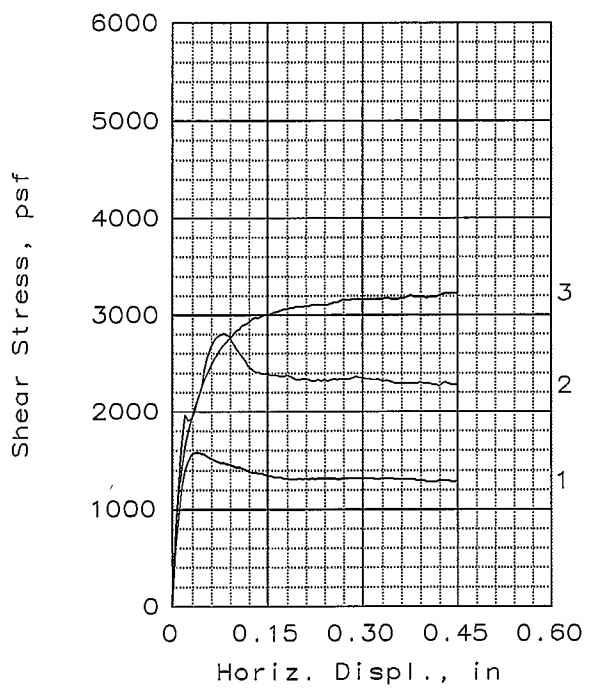

SAMPLE No:		1	2	3
INITIAL	WATER CONTENT, %	7.2	7.6	7.6
	DRY DENSITY, pcf	120.9	120.4	120.6
	SATURATION, %	51.5	53.7	54.0
	VOID RATIO	0.369	0.374	0.372
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	13.1	13.2	13.0
	DRY DENSITY, pcf	122.8	122.5	122.6
	SATURATION, %	99.9	99.6	98.6
	VOID RATIO	0.348	0.350	0.349
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.98	0.98	0.98
NORMAL STRESS, psf		2000	3500	5000
PEAK STRESS, psf		1584	2808	3228
DISPLACEMENT, in		0.04	0.08	0.43
RESIDUAL STRESS, psf		1296	2280	3228
DISPLACEMENT, in		0.45	0.45	0.45
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Remalded
DESCRIPTION: Silty Sand (SM)

SPECIFIC GRAVITY= 2.65
REMARKS: Remolded to 90% R/C
Compacted Fill (cef)
#200 = 30.2%

Fig. No.: C3.17

CLIENT: Hasley Canyon Land Company, L.L.C.

PROJECT: T.T. 52584

SAMPLE LOCATION: T-209 @ 9 ft.

PROJ. NO.: 99-1617-4 DATE: 10/22/99

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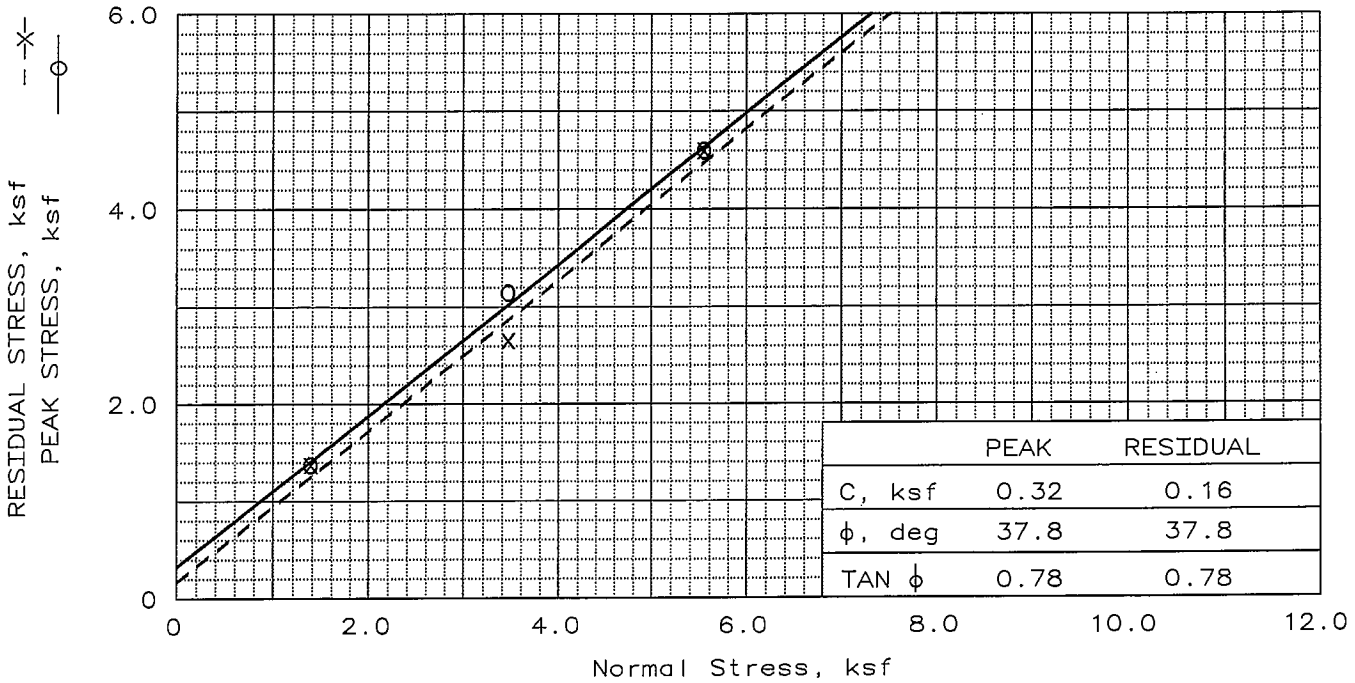
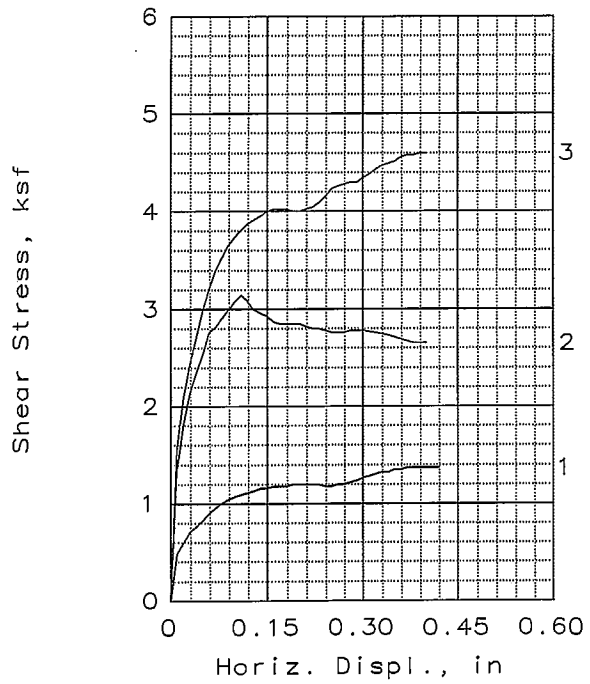


	PEAK	RESIDUAL
C, ksf	0.32	0.16
ϕ, deg	37.8	37.8
TAN ϕ	0.78	0.78



SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	6.7	9.4	6.4
	DRY DENSITY, pcf	115.6	115.1	117.4
	SATURATION, %	39.6	54.9	39.6
	VOID RATIO	0.458	0.465	0.436
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	16.2	16.2	14.1
	DRY DENSITY, pcf	117.0	117.2	121.7
	SATURATION, %	99.2	99.8	98.6
	VOID RATIO	0.441	0.439	0.385
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.98	0.96
NORMAL STRESS, ksf		1.42	3.50	5.58
PEAK STRESS, ksf		1.37	3.14	4.60
DISPLACEMENT, in		0.37	0.11	0.40
RESIDUAL STRESS, ksf		1.37	2.65	4.60
DISPLACEMENT, in		0.42	0.40	0.40
Strain rate, in/min		0.0079	0.0079	0.0079

SAMPLE TYPE: Undisturbed
DESCRIPTION: Silty Sand

SPECIFIC GRAVITY= 2.7
REMARKS: alluvium (Qal)

CLIENT: Hasley Canyon Land Company, L.L.C.

PROJECT: T.T. 52584

SAMPLE LOCATION: HS-4 @ 10 ft.

PROJ. NO.: 98-1617-4 DATE: 1/15/99

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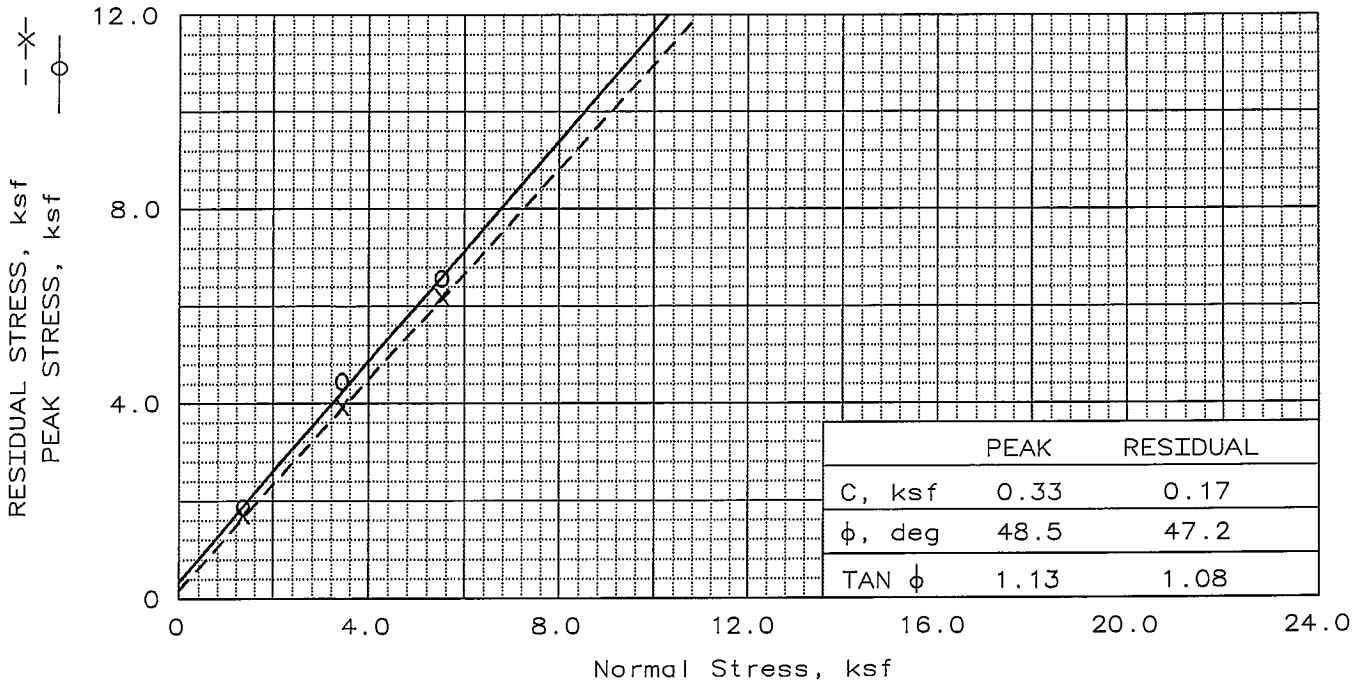
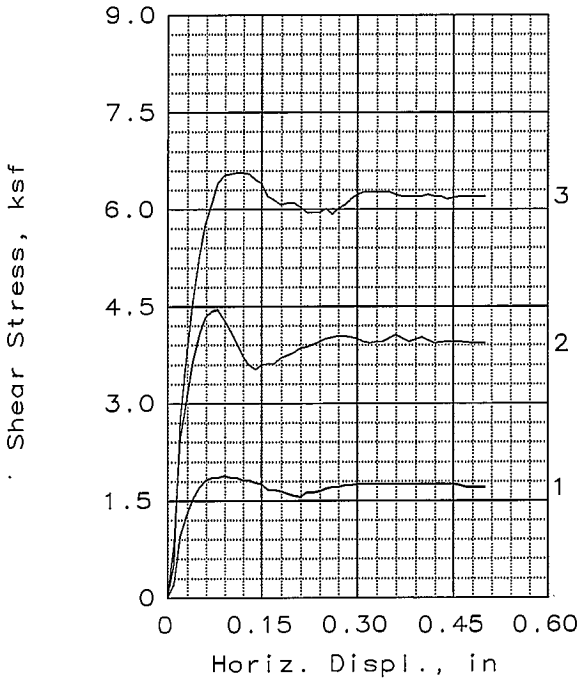
Fig. No.: C3.18



	PEAK	RESIDUAL
C, ksf	0.33	0.17
ϕ, deg	48.5	47.2
TAN ϕ	1.13	1.08



SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	12.2	13.2	12.2
	DRY DENSITY, pcf	113.7	114.2	115.7
	SATURATION, %	67.9	74.7	71.8
	VOID RATIO	0.483	0.476	0.457
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	16.5	16.5	14.8
	DRY DENSITY, pcf	114.5	115.5	118.3
	SATURATION, %	94.2	97.1	94.1
	VOID RATIO	0.472	0.459	0.425
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.99	0.98
NORMAL STRESS, ksf		1.42	3.50	5.58
PEAK STRESS, ksf		1.86	4.45	6.57
DISPLACEMENT, in		0.07	0.08	0.11
RESIDUAL STRESS, ksf		1.71	3.94	6.20
DISPLACEMENT, in		0.50	0.50	0.50
Strain rate, in/min		0.0079	0.0079	0.0079

SAMPLE TYPE: Undisturbed
DESCRIPTION: Well graded sand with gravel

SPECIFIC GRAVITY= 2.7
REMARKS: Alluvium (Qal)

CLIENT: Hasley Canyon Land Company, L.L.C.

PROJECT: T.T. 52584

SAMPLE LOCATION: RW-1 @ 6 ft.

PROJ. NO.: 99-1617-4 DATE: 1/15/99

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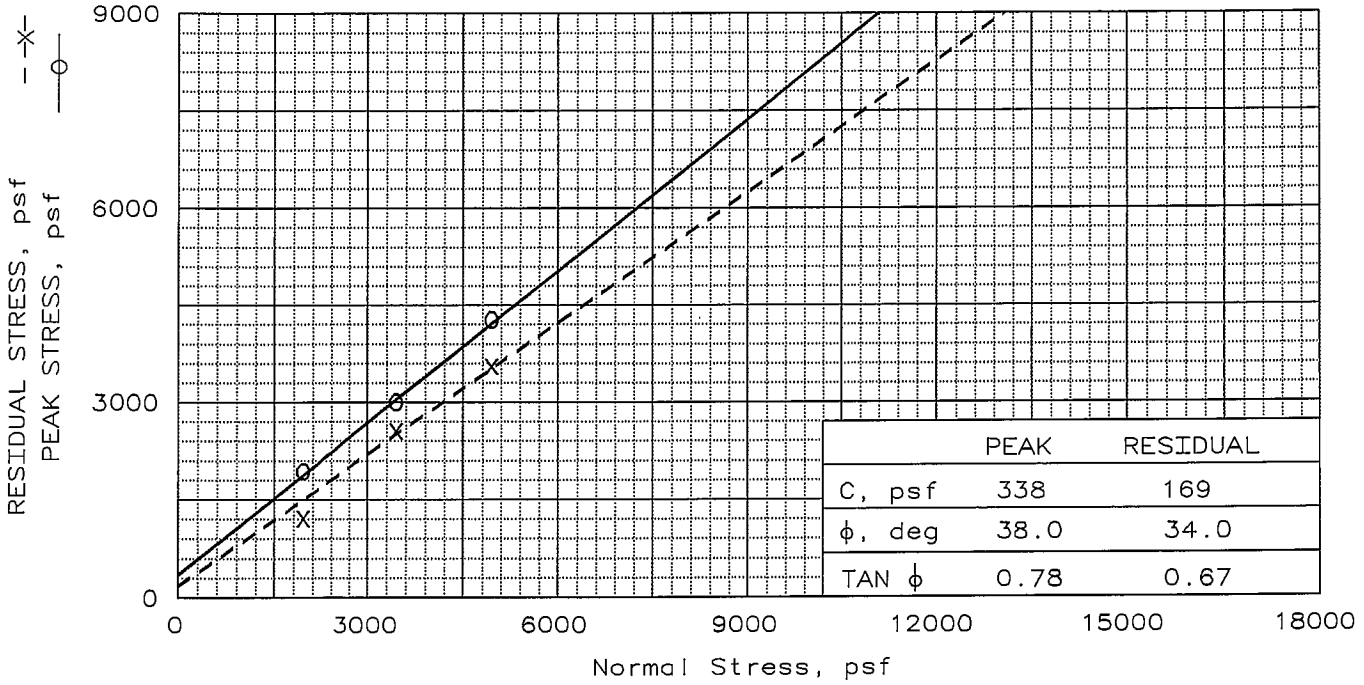
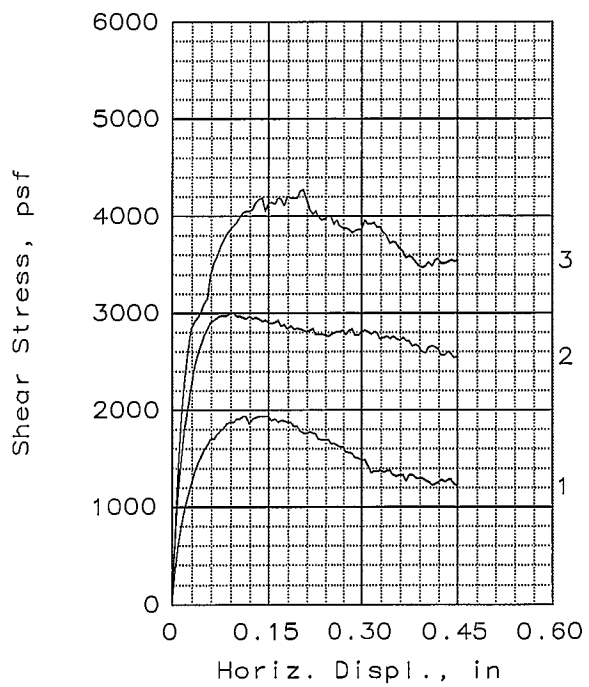
Fig. No.: C3.19



	PEAK	RESIDUAL
C, psf	338	169
ϕ, deg	38.0	34.0
TAN ϕ	0.78	0.67



SAMPLE No:		1	2	3
INITIAL	WATER CONTENT, %	5.9	8.2	5.3
	DRY DENSITY, pcf	112.4	110.4	113.3
	SATURATION, %	32.9	43.3	30.4
	VOID RATIO	0.472	0.499	0.460
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	16.2	17.2	15.8
	DRY DENSITY, pcf	114.6	112.9	115.9
	SATURATION, %	96.7	97.7	97.9
	VOID RATIO	0.444	0.465	0.428
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.98	0.98	0.98
NORMAL STRESS, psf		2000	3500	5000
PEAK STRESS, psf		1932	3000	4272
DISPLACEMENT, in		0.11	0.09	0.21
RESIDUAL STRESS, psf		1212	2556	3552
DISPLACEMENT, in		0.45	0.45	0.45
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Undisturbed
DESCRIPTION: Sand w/Silt (SP-SM)

SPECIFIC GRAVITY= 2.65
REMARKS: Alluvium (Qal)

CLIENT: Hasley Canyon Land Company, L.L.C.

PROJECT: T.T. 52584

SAMPLE LOCATION: RW-1 @ 9 ft.

PROJ. NO.: 99-1617-4 DATE: 10/22/99

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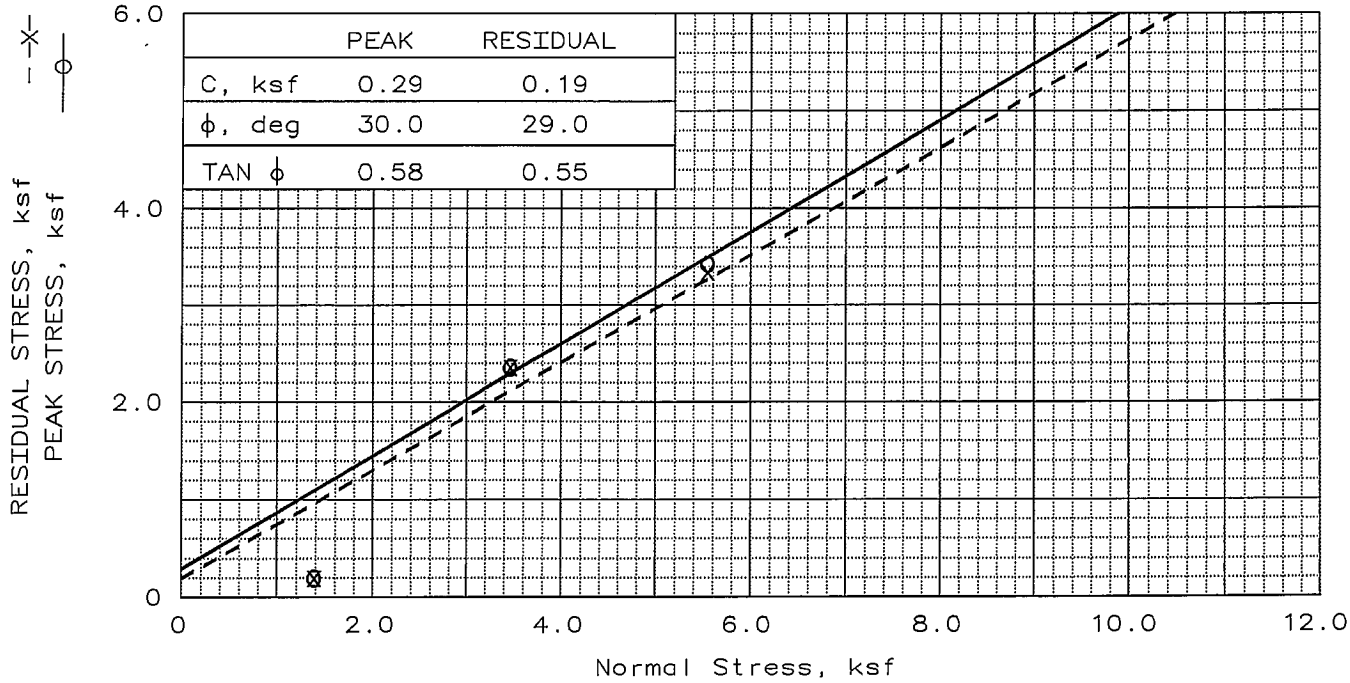
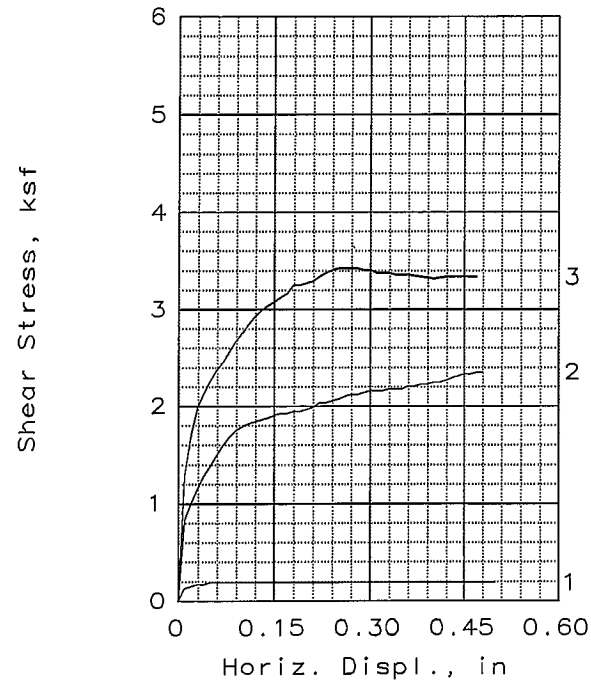
Fig. No.: C3.20





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	11.7	20.7	12.0
	DRY DENSITY, pcf	90.0	83.3	98.7
	SATURATION, %	36.2	54.6	45.8
	VOID RATIO	0.873	1.024	0.707
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	29.6	31.2	19.5
	DRY DENSITY, pcf	93.6	91.5	110.4
	SATURATION, %	99.8	99.8	99.9
	VOID RATIO	0.801	0.843	0.527
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.96	0.91	0.89
NORMAL STRESS, ksf		1.42	3.50	5.58
PEAK STRESS, ksf		0.19	2.35	3.42
DISPLACEMENT, in		0.10	0.47	0.25
RESIDUAL STRESS, ksf		0.19	2.35	3.34
DISPLACEMENT, in		0.50	0.48	0.47
Strain rate, in/min		0.0197	0.0197	0.0197

SAMPLE TYPE: undisturbed
DESCRIPTION: silty sand

SPECIFIC GRAVITY= 2.7
REMARKS: slopewash (sw)

Fig. No.: C3.21

CLIENT: Hasley Canyon Land Comapny, L.L.C.

PROJECT: T.T. 52584

SAMPLE LOCATION: T-156 @ 3.5 ft.

PROJ. NO.: 98-1617-4 DATE: 10/22/99

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ENGINEERING GEOLOGY, INC.

Appendix D

SUMMARY OF LANDSLIDES (REVISED 3/31/00)

LANDSLIDE NO.	PLATE NO.	MITIGATION
1	I	Due to Los Angeles County requirements, we have recommended that **this landslide be completely removed** via the proposed grading shown on the Tentative Map. Cross Section 17-17′ illustrates the three-dimensional geometry of this slide relative to proposed grading. In areas to receive fill, the landslide removal bottom should be surveyed in order to document the removal for future reference.
2	I	Relatively small landslide complex located directly east of Landslide Qls-1 west of Lots 27 through 29. Most of this landslide complex is located within the golf course area (hole no. 3). The proposed Tentative Map indicates this **landslide** will be **entirely removed beneath the pad areas** and will pose no hazard to the existing residential lots. The remaining landslide material within the golf course area will also be removed and recompacted due to Los Angeles County requirements. In areas to receive fill, the landslide removal bottom should be surveyed in order to document the removal for future reference.
3	II	Landslide located within a fill canyon beneath proposed Lots 66 through 70. It is recommended that this landslide be **completely removed** from beneath the proposed lots under the continuous observation of the Project Engineering Geologist. In areas to receive fill, the landslide removal bottom should be surveyed in order to document the removal for future reference.
4	I	Small landslide located beneath proposed Lot 18 and within the proposed golf course area (hole no. 7). The proposed grading concept will remove approximately 75% of this landslide. It is recommended that the **remaining portion** of this **small landslide also be completely removed** under the observation of the Project Engineering Geologist. In areas to receive fill, the landslide removal bottom should be surveyed in order to document the removal for future reference.
5	II	Landslide located beneath proposed Lots 218, 219 and 220. Cross Section 19-19′ illustrates the three-dimensional geometry of this landslide. It is recommended that this **landslide** be **completely removed** under the observation of the Project Engineering Geologist. In areas to receive fill, the landslide removal bottom should be surveyed in order to document the removal for future reference.

LANDSLIDE NO.	PLATE NO.	MITIGATION
6	II	Landslide located southwest of Lot 1. Based on geotechnical engineering analysis of Cross Section 7-7' Landslide Qls-6 calculates **stable** with a factor of safety greater than 1.5. See discussion in the Cut-Slope Summary (Table 2) for data on Proposed Cut-Slope CS-18. The portion of Qls-6 located offsite is a part of VTT 20685.
7	II	Landslide located beneath proposed Lots 51 thru 54. The proposed grading concept will remove approximately 85% of this landslide. It is recommended that the remaining portion of **this landslide be completely removed** under the observation of the Project Engineering Geologist. In areas to receive fill, the landslide removal bottom should be surveyed in order to document the removal for future reference.
8	II	Small probable landslide located east of Lots 75 and 76 and entirely within the proposed golf course area (hole no. 6). This probable landslide poses no hazard to the future residential lots and the golf course and is safe for the use intended. However, due to Los Angeles County requirements, it is recommended that **this landslide be completely removed** and recompacted. In areas to receive fill, the landslide removal bottom should be surveyed in order to document the removal for future reference.

SUMMARY OF CUT-SLOPES (Revised 3/31/00)

PROPOSED CUT-SLOPE CS-1

Location:	Plate II - West of golf hole #13
Direction Slope Faces:	Southeast
Slope Parameters:	90± ft. High; 3:1 gradient
Geologic Cross Sections:	47-47'
Anticipated Geologic Conditions:	Axis of syncline anticipated to be exposed within the proposed cut-slope face. TQs bedrock north of the axial trace is anticipated to be dipping 0 to 26° out-of-slope. South of the axial trace TQs bedrock is anticipated to be dipping into the proposed cut-slope face.
Mitigation Measures:	None - Our slope stability analyses performed on this cut-slope yields a minimum factor of safety greater than the Los Angeles County minimum requirement of 1.50.

PROPOSED CUT-SLOPE CS-2

Location:	Plate II - East of golf hole #14 and west of Lot 131
Direction Slope Faces:	West
Slope Parameters:	55± ft. high; 3:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock anticipated to be oriented neutral to the proposed cut-slope face; **grossly stable**
Mitigation Measures:	None

PROPOSED CUT-SLOPE CS-3

Location:	Plate II - East of golf hole #14 and west of Lots 122-126
Direction Slope Faces:	West
Slope Parameters:	65± ft. high; 2:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock anticipated to be oriented neutral to the proposed cut-slope face; **grossly stable**
Mitigation Measures:	None

PROPOSED CUT-SLOPE CS-4

Location:	Plate II - East of Lots 124-126 and west of Lots 113-115
Direction Slope Faces:	West
Slope Parameters:	29± ft. high; 2:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock anticipated to be oriented essentially neutral to proposed cut-slope face; **grossly stable**
Mitigation Measures:	None

PROPOSED CUT-SLOPE CS-5

Location:	Plate II - North of "D" Street in the vicinity of golf hole #17
Direction Slope Faces:	South to Southwest
Slope Parameters:	105± ft. high; 2.7:1 to 3:1 gradient
Geologic Cross Sections:	1-1' and 35-35'
Anticipated Geologic Conditions:	TQs bedrock dipping 18° on the southwest facing portion and 30° to the south on the south-facing portion.
Mitigation Measures:	None - Our slope stability analyses performed on this cut-slope yields a minimum factor of safety greater than the Los Angeles County minimum requirement of 1.50.

PROPOSED CUT-SLOPE CS-6

Location:	Plate II - North of "D" Street in the vicinity of Lots 149 thru 151 and 178
Direction Slope Faces:	Southwest
Slope Parameters:	145± ft. high; 3:1 gradient
Geologic Cross Sections:	46-46' (replaces 33-33')
Anticipated Geologic Conditions:	TQs bedrock dipping 23° which is steeper than the proposed 3:1 cut-slope
Mitigation Measures:	None - Our slope stability analyses performed on this cut-slope yields a minimum factor of safety greater than the Los Angeles County minimum requirement of 1.50.

PROPOSED CUT-SLOPE CS-7

Location:	Plate II - Northwest of "E" Street in the vicinity of Lots 103 thru 105; merges with CS-6 to the west
Direction Slope Faces:	Southeast
Slope Parameters:	±165 ft. high; 2:1 gradient
Geologic Cross Sections:	32-32'
Anticipated Geologic Conditions:	TQs bedrock dipping an average of 30° towards the south which is steeper than the proposed cut-slope face
Mitigation Measures:	None - Our slope stability analyses performed on this cut-slope yields a minimum factor of safety greater than the Los Angeles County minimum requirement of 1.50.

PROPOSED CUT-SLOPE CS-8

Location:	Plate II - North of Lot 107 and golf hole #2
Direction Slope Faces:	South to Southwest
Slope Parameters:	±155 ft. high; 3:1 gradient
Geologic Cross Sections:	3-3' and 36-36'
Anticipated Geologic Conditions:	TQs bedrock dipping an average of average 32° south which is steeper than the proposed cut-slope face
Mitigation Measures:	None - Our slope stability analyses performed on this cut-slope yields a minimum factor of safety greater than the Los Angeles County minimum requirement of 1.50.

PROPOSED CUT-SLOPE CS-9

Location:	Plate II - Southeast of Lots 178-182
Direction Slope Faces:	Southeast
Slope Parameters:	30± ft. high; 2:1 gradient
Geologic Cross Sections:	49-49'
Anticipated Geologic Conditions:	TQs bedrock dipping steeper than the proposed cut-slope slope face. The artificial fill mapped in this vicinity will be removed by the proposed grading.
Mitigation Measures:	None - Our slope stability analyses performed on this cut-slope yields a minimum factor of safety greater than the Los Angeles County minimum requirement of 1.50.

PROPOSED CUT-SLOPE CS-10

Location:	Plate II - Northwest of Lots 183-186, east of golf hole #1
Direction Slope Faces:	Northwest
Slope Parameters:	25± ft. high; 3:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock dipping neutral to into the proposed cut-slope face; **grossly stable**
Mitigation Measures:	None required

PROPOSED CUT-SLOPE CS-11

Location:	Plate II - North of "D" Street in vicinity of Lots 86-89
Direction Slope Faces:	Southwest
Slope Parameters:	180± ft. high; 3:1 gradient
Geologic Cross Sections:	30-30'
Anticipated Geologic Conditions:	TQs bedrock component anticipated to be dipping 20° to the south which is steeper than the proposed cut-slope face.
Mitigation Measures:	None - Our slope stability analyses performed on this cut-slope yields a minimum factor of safety greater than the Los Angeles County minimum requirement of 1.50.

PROPOSED CUT-SLOPE CS-12

Location:	Plate II - Southeast of Lots 168 and 169 adjacent to golf hole #1
Direction Slope Faces:	Southeast
Slope Parameters:	±65 ft. high; 3:1 gradient
Geologic Cross Sections:	41-41'
Anticipated Geologic Conditions:	TQs bedrock anticipated to be dipping 28° towards the south, which is steeper than the proposed cut-slope face
Mitigation Measures:	None - Our slope stability analyses performed on this cut-slope yields a minimum factor of safety greater than the Los Angeles County minimum requirement of 1.50.

PROPOSED CUT-SLOPE CS-13

Location:	Plate II - South of Lots 163-165 and north of golf hole #9
Direction Slope Faces:	South and Southeast
Slope Parameters:	90± ft. high; 3:1 gradient
Geologic Cross Sections:	40-40’
Anticipated Geologic Conditions:	Axial trace of syncline traverses the southern portion of the proposed cut-slope.
Mitigation Measures:	None - Our slope stability analyses performed on this cut-slope yields a minimum factor of safety greater than the Los Angeles County minimum requirement of 1.50.

PROPOSED CUT-SLOPE CS-14

Location:	Plate II - adjacent to golf hole #10
Direction Slope Faces:	South
Slope Parameters:	35± ft. high; 3:1 gradient
Geologic Cross Sections:	48-48’
Anticipated Geologic Conditions:	TQs bedrock anticipated to be dipping steeper than the proposed cut-slope face.
Mitigation Measures:	None - Our slope stability analyses performed on this cut-slope yields a minimum factor of safety greater than the Los Angeles County minimum requirement of 1.50.

PROPOSED CUT-SLOPE CS-15

Location:	Plate II - between club house parking and golf hole #9
Direction Slope Faces:	East and Southeast
Slope Parameters:	35± ft. high; 3:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock dipping neutral to slope face but partially within zone of tectonic deformation; **grossly stable**
Mitigation Measures:	Recommend 20-ft. wide **Stability fill** on southern portion of slope within zone of tectonic deformation to prevent potential surficial instability.

PROPOSED CUT-SLOPE CS-16

Location:	Plate II - East of golf hole #9 and west of Lots 195-201
Direction Slope Faces:	West to Southwest
Slope Parameters:	50± ft. high; 3:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock dipping neutral to slopeface but partially within zone of tectonic deformation; **grossly stable**. Fill over bedrock situation anticipated westerly of Lots 196, 197, 200 and 201 and a portion is within the zone of tectonic deformation.
Mitigation Measures:	We recommend that CS-16 be removed and replaced with a 20-ft. wide **Stability Fill** due to the fill over cut configuration west of Lots 195-197 and Lots 199-201.

PROPOSED CUT-SLOPE CS-17

Location:	Plate II - Southwest of Lots 216-220
Direction Slope Faces:	Southwest
Slope Parameters:	40± ft. high; 2:1 gradient
Geologic Cross Sections:	19-19'
Anticipated Geologic Conditions:	The western portion of the proposed cut-slope is anticipated to expose TQs bedrock dipping into the proposed cut-slope face as well as a small sliver fill located south of Lot 217. The eastern portion of the slope is anticipated to expose landslide debris (Qls-5).
Mitigation Measures:	Due to the recommended complete removal of Qls-5 and the small sliver fill configuration, most of CS-17 will be replaced as a fill slope while the remaining westernmost portion will be replaced with a 20 ft. wide **Stability Fill**.

PROPOSED CUT-SLOPE CS-18

Location:	Plate II - adjacent to Hasley Canyon Road and golf hole #8
Direction Slope Faces:	Southwest
Slope Parameters:	70± ft. high overall; 3:1 gradient
Geologic Cross Sections:	7-7'
Anticipated Geologic Conditions:	TQs bedrock dipping 0 to 10° (near anticline axis) out-of-slope on the upper portion and landslide debris on the lower portion.
Mitigation Measures:	CS-18 was designed to stabilize Landslide Qls-6 utilizing a bench cut (as shown on the map). The portion of CS-18 above the bench cut was analyzed at a 2:1 gradient and found to be stable (safety factor >1.5) with a 30-ft. wide buttress. Subsequently, the **upper portion** has been laid back to a 3:1 gradient to maintain uniformity of the 3:1 slope which further enhances the stability but requires that a **50-ft. wide buttress** be constructed in order to remove Qls-6 landslide debris from the backcut (See Cross Section 7-7'). The portion of CS-18 **below** the **bench** requires a **20-ft. wide Stability Fill** to prevent surficial erosion of the landslide material.

PROPOSED CUT-SLOPE CS-19

Location:	Plate II - West of golf hole #8
Direction Slope Faces:	Northwest
Slope Parameters:	40± ft. high; 3:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock neutral to slope face but within zone of tectonic deformation and along the northern limb of anticline; **grossly stable**.
Mitigation Measures:	Recommend a 20-ft. wide **Stability Fill** to prevent potential surficial instability due to tectonic deformation and presence of anticline .

PROPOSED CUT-SLOPE CS-20

Location:	Plate II - Between Hasley Cyn. Road and golf hole #8
Direction Slope Faces:	Southwest
Slope Parameters:	75± ft. high; 3:1 gradient
Geologic Cross Sections:	50-50’
Anticipated Geologic Conditions:	TQs bedrock generally dipping steeper than the slope face to locally out-of-slope (locally deformed due to the presence of an anticline). Analyzed assuming shallow bedding planes dipping out-of-slope.
Mitigation Measures:	Our slope stability analyses performed on this cut-slope yields a minimum factor of safety greater than the Los Angeles County minimum requirement of 1.50. Recommend a 20-ft. wide **Stability Fill** to prevent potential surficial instability due to presence of anticline.

PROPOSED CUT-SLOPE CS-21

Location:	Plate II - Between golf hole #8 and Lots 1-3
Direction Slope Faces:	Southwest
Slope Parameters:	33± ft. high; 3:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock generally dipping into slope but locally deformed with zone of tectonic deformation; **grossly stable**.
Mitigation Measures:	Recommend a 20-ft. wide **Stability Fill** to prevent potential surficial instability due to tectonically deformed bedrock.

PROPOSED CUT-SLOPE CS-22

Location:	Plate II and III - West of golf hole #7 and south of Lots 8-9
Direction Slope Faces:	Southwest
Slope Parameters:	50± ft. high; 3:1 gradient or less
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock generally dipping into slope but locally deformed within zone of tectonic deformation; **grossly stable**.
Mitigation Measures:	Recommend a 20-ft. wide **Stability Fill** to prevent potential surficial instability due to tectonically deformed bedrock.

PROPOSED CUT-SLOPE CS-23

Location:	Plate II - West of golf hole #6
Direction Slope Faces:	West
Slope Parameters:	40± ft. high; 3:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock dipping 24-37° towards the northwest; **grossly stable**
Mitigation Measures:	None

PROPOSED CUT-SLOPE CS-24

Location:	Plate II - North of golf hole #6 and south of Lots 56-59
Direction Slope Faces:	South
Slope Parameters:	85± ft. high; 3:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock dipping 32-37° into the proposed cut-slope face; **grossly stable**.
Mitigation Measures:	None

PROPOSED CUT-SLOPE CS-25

Location:	Plate I - North of golf hole #2
Direction Slope Faces:	Southwest
Slope Parameters:	160± ft. high; 2:1 gradient
Geologic Cross Sections:	51-51' (oriented to include the upper steeper and higher natural slope in the analyses).
Anticipated Geologic Conditions:	TQs bedrock component anticipated to be dipping 23° out of the proposed slope face. BA-2 drilled on this proposed cut-slope consists entirely of sandstone and conglomerate except for plastic clay bed (1/2-1" thick) at 62 ft.
Mitigation Measures:	None - Our slope stability analyses performed on this cut-slope yields a minimum factor of safety greater than the Los Angeles County minimum requirement of 1.50.

PROPOSED CUT-SLOPE CS-26

Location:	Plate I - West of Lots 25-27
Direction Slope Faces:	Southeast
Slope Parameters:	165± ft. high; 3:1
Geologic Cross Sections:	44-44'
Anticipated Geologic Conditions:	TQs bedrock component anticipated to be dipping 22° which is steeper than the proposed cut-slope face
Mitigation Measures:	None - Our slope stability analyses performed on this cut-slope yields a minimum factor of safety greater than the Los Angeles County minimum requirement of 1.50.

PROPOSED CUT-SLOPE CS-27

Location:	Plate I - North of Lots 25-28
Direction Slope Faces:	South
Slope Parameters:	100± ft. high; 3:1 gradient
Geologic Cross Sections:	52-52' (Replaced 38-38')
Anticipated Geologic Conditions:	TQs bedrock dipping 28° to the south, which is steeper than the proposed south-facing slope.
Mitigation Measures:	None - Our slope stability analyses performed on this cut-slope yields a minimum factor of safety greater than the Los Angeles County minimum requirement of 1.50.

PROPOSED CUT-SLOPE CS-28

Location:	Plate I - Northeast corner of Tract
Direction Slope Faces:	South
Slope Parameters:	135± ft. high; 3:1 gradient
Geologic Cross Sections:	53-53' (Replaced 9-9')
Anticipated Geologic Conditions:	TQs bedrock dipping 26° to the south, which is steeper than the proposed south-facing slope.
Mitigation Measures:	None - Our slope stability analyses performed on this cut-slope yields a minimum factor of safety greater than the Los Angeles County minimum requirement of 1.50.

PROPOSED CUT-SLOPE CS-29

Location:	Plate I - West of golf hole #3
Direction Slope Faces:	East
Slope Parameters:	60± ft. high; 3:1 gradient
Geologic Cross Sections:	56-56'
Anticipated Geologic Conditions:	Proposed Cut-Slope CS-29 is anticipated to expose horizontally bedded Quaternary Terrace deposits.
Mitigation Measures:	None - Our slope stability analyses performed on this cut-slope yields a minimum factor of safety greater than the Los Angeles County minimum requirement of 1.50.

PROPOSED CUT-SLOPE CS-30

Location:	Plate - West of golf hole #3 and east of Lot 97
Direction Slope Faces:	Southeast
Slope Parameters:	95± ft. high; 3:1 gradient
Geologic Cross Sections:	31-31'
Anticipated Geologic Conditions:	Synclinal axial trace traverses the northern portion of the proposed cut-slope. North of the axial trace bedding is anticipated to be dipping 25 to 27° towards the south. South of the axial trace bedding is anticipated to be dipping 0 to 34° towards the north.
Mitigation Measures:	None - Our slope stability analyses performed on this cut-slope yields a minimum factor of safety greater than the Los Angeles County minimum requirement of 1.50.

PROPOSED CUT-SLOPE CS-31

Location:	Plate I - East of golf hole #3 and west of Lots 34-42
Direction Slope Faces:	West
Slope Parameters:	45± ft. high; 2:1 to 3:1 gradient
Geologic Cross Sections:	42-42' and 43-43'
Anticipated Geologic Conditions:	TQs bedrock anticipated to be dipping out-of-slope at angles ranging from 16 to 21° (apparent). It is anticipated that a fill over bedrock configuration will be exposed along portions of the proposed cut slope.
Mitigation Measures:	Our slope stability analyses performed on this cut-slope yields a minimum factor of safety greater than the Los Angeles County minimum requirement of 1.50. Recommended 20 ft. wide **Stability Fill** for areas exposing fill over bedrock.

PROPOSED CUT-SLOPE CS-32

Location:	Plate I - East of Lots 34-36
Direction Slope Faces:	West
Slope Parameters:	30± ft. high; 3:1 gradient
Geologic Cross Sections:	54-54'
Anticipated Geologic Conditions:	TQs bedrock anticipated to be dipping steeper than the proposed cut-slope face; **grossly stable**.
Mitigation Measures:	None - our slope stability analyses performed on this cut-slope yields a minimum factor of safety greater than the Los Angeles County minimum requirement of 1.50.

PROPOSED CUT-SLOPE CS-33

Location:	Plate I - South of Lots 19-24
Direction Slope Faces:	South
Slope Parameters:	35± ft. high; 3:1gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock anticipated to be dipping into the proposed cut-slope face; **grossly stable**
Mitigation Measures:	None

PROPOSED CUT-SLOPE CS-34

Location:	Plate I - East of golf hole #7
Direction Slope Faces:	West
Slope Parameters:	40± ft. high; 3:1gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock anticipated to be dipping 14 to 28° towards the north, neutral to the slope face; **grossly stable**
Mitigation Measures:	None.

PROPOSED CUT-SLOPE CS-35

Location:	Plate I - South of Lots 62 and 63, west of Lots 16-18
Direction Slope Faces:	West and Southwesterly
Slope Parameters:	64± ft. high; 3:1 gradient
Geologic Cross Sections:	None
Anticipated Geologic Conditions:	TQs bedrock oriented neutral to dipping into the proposed cut-slope face; **grossly stable**.
Mitigation Measures:	None

PROPOSED CUT-SLOPE CS-36

Location:	Plate J - North of Lots 96 and 97
Direction Slope Faces:	Southeast
Slope Parameters:	90 ft. high; 3:1 gradient
Geologic Cross Sections:	17-17', 27-27' and 31-31'
Anticipated Geologic Conditions:	TQs bedrock anticipated to be dipping steeper than the proposed cut-slope face on cross sections 27-27' and 31-31' and a component of 11° out-of-slope on cross section 17-17'
Mitigation Measures:	None - This cut-slope was designed to improve the stability of the natural slope above Lots 96 and 97 and later revised per this report to remove Qls-1. Our slope stability analyses performed on this cut-slope yields a minimum factor of safety greater than the Los Angeles County minimum requirement of 1.50.

Appendix E

SLOPE STABILITY ANALYSES

Introduction

Table E1 summarizes the results of state-of-the-art computerized static and pseudostatic (i.e. with a statically-simulated seismic load) stability analyses performed on several cross sections of the currently proposed development of the vesting Tentative Tract 52584. Table E2 includes the results of surficial (Infinite Slope) analyses. Based upon the results from the analyses, the need for tentative stabilization measures or slope modification were explored and dimensional design of these measures was performed, as needed, by a step-by-step fashion utilizing slope stability analyses.

Stabilization Fills have been recommended to prevent erosion of cuts exposing landslide debris, tectonically deformed bedrock, daylighted bedding and fill over cut conditions.

Analysis Approach

The stability of the proposed cut, fill slopes and natural slopes was evaluated. Cross sections representing the critical three-dimensional geometry of the subsurface conditions were selected for stability analyses, based upon critical conditions for stability (i.e. potential adverse bedding and slope height and slope inclination). Surficial stability for fill, natural and cut (in TQs) slopes, and terrace deposits were analyzed using the "Infinite Slope" method using lower-bound cohesion values of these materials, as applicable.

Geometry and Ground Water

The analyzed geometries of cut slopes included removal of existing landslides and slopewash material and replacement with certified compacted fill to currently proposed grades, as needed. Analyses also included natural slopes and cuts in bedrock with cross bedding and potential adverse bedding. Geometries were modified as analyses progressed since some of the proposed grades did not comply with County standards for minimum factors of safety.

Review of ground water data in the vicinity of the site and exploratory trench and boring log data indicate that ground water is not present in the elevated portion of the site. Furthermore, backdrains are proposed for all **Stability Fill And Buttress Fill** slopes. However, due to future introduction of water to the site via landscape irrigation, we have modeled anticipated

future ground water conditions where appropriate as discussed under our Response to Remark No. 1 of the geotechnical engineering review sheet.

Shear Strength Parameters

A significant number of shear strength tests were performed for this project as documented in previous reports, and a new test was performed for this report. The shear strength values obtained are summarized in **Table C1**, which includes revisions to two tests. These revisions are explained in the Background section of this report, and in **Appendix C**.

In our analyses, residual shear strengths were used for static analysis while peak strengths were used for pseudostatic analysis.

Sections Analyzed

We have performed analysis on numerous cross sections considered the most critical and on other cross sections as requested by L.A. County Geotechnical Review Sheet dated December 28, 1999. The cross sections and the subject of each analysis are presented in **Table E1**. Surficial stability analyses are presented in **Table E2**.

Methods of Analysis

The computer program PCSTABL5M, originally written by Purdue University 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 and Spencer'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, PCSTABLSM 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 Ordinary Method of Slices (OMS) was used on some critical failure planes with lower-bound safety factors determined by the Janbu Method. Even though the OMS is not considered an appropriate method, it is required by the County of Los Angeles (see Response to County Remark No. **8**). Bishop's Modified Method was used for circular slip surfaces.

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.

As indicated previously, the "Infinite Slope" method was used for surficial stability of natural and cut-slopes in TQs, fill slopes, landslide materials, and terrace deposits.

Results of Stability Analyses

Analyzed cut-slopes and grades, natural slopes, compacted fill slopes and surficial stability comply with Los Angeles County requirements for stability under static and pseudostatic loading conditions, as applicable, with some mitigating modifications. The results of the stability analyses are summarized in **Table E1 and Table E2**.

A complete package of computer output cross sections and output files corresponding to the stability analyses performed are included in **this Appendix**. The critical failure surfaces and their corresponding factors of safety are plotted on the respective cross sections.

The following attachments complete this Appendix.

Slope Stability Analysis Results (Revised)	Table E1
Analysis of Infinite Slope with Parallel Seepage	Table E2
Computer Output Sheets	

TT 52584 - Hasley Canyon
Slope Stability Analyses Results[1] (Revised)

Slope Designation	File Name	Cross Section (Revised)	Analyzed Plane	Method	Factor of Safety		Comments	Run No.
					Static	Pseudostatic[2] (Coeff=0.15)		
CS-18	HASL7BG	7-7'	Slide plane	Janbu	2.00	~	Cut in landslide debris with upper 50 ft. wide buttress and lower 20-ft. wide stability fill in CS-18. Re-analyzed per this report.	1
CS-18	--	7-7'	Slide plane	OMS	1.67	2.05	Cut in landslide debris with upper 50 ft. wide buttress and lower 20-ft. wide stability fill in CS-18. Re-analyzed per this report.	2
CS-36	HC17S2	17-17'	Bedding Plane Search	Janbu	2.29		Bedding plane search below revised cut-slope CS-36 (Revised to remove Qls-1 per L.A. County).	3
Natural Slope	HAS27BR2.IN	27-27'	Contact #3 from top	Janbu	2.34	1.95	Analyzed prior to the modification of the adjacent CS-36. Modified CS-36 cuts the top of section 27-27' which increases its stability thus, further analyses are unnecessary (FS > 2.34)	4
Natural Slope	HAS27AR2.IN	27-27'	Contact #1 from top	Janbu	2.68	--	Analyzed prior to the modification of the adjacent CS-36. Modified CS-36 cuts the top of section 27-27' which increases its stability thus, further analyses are unnecessary (FS > 2.68)	5
Natural Slope	HC27S4	27-27'	Search (Circular)	Bishop	2.40	--	Circular search within TQs bedrock sandstone and conglomerate units analyzed prior to the modification of adjacent CS-36 which cuts the top of section 27-27' and increases its stability; thus, further analyses are unnecessary (FS > 2.4).	6
CS-11	SEC30-30	30-30'	Silty claystone located 40 ft. below the toe of 2:1 CS-11	Janbu	1.68	--	OMS analysis based on this run resulted in factor of safety of 1.46, so CS-11 was laid back to a 3:1 slope (2.5:1 did not pass either) See Run Nos, 11 and 12	7
CS-11	SEC30(B)	30-30'	Search in TQs below upper toe and above silty claystone bed	Janbu	2.35	--	2:1 slope. Sandstone and conglomerate contacts analyzed per L.A. County Review Sheet	8
CS-11	SEC30(C)	30-30'	Search above upper toe in TQs (lower area)	Janbu	2.46	--	2:1 slope . Sandstone and conglomerate contacts analyzed per L.A. County Review Sheet	9

[1] The above results for static conditions are based upon residual, site-specific shear strength test results presented in the Table of "Summary of Shear Strength Test Data".
[2] Based on peak shear strength values for short-term simulated earthquake loading. For peak values, see Table of "Summary of Shear Strength Test Data".

CS-11	SEC30(D)	30-30′	Search above upper toe in TQs (Upper area)	Janbu	2.78	--	**2:1** slope sandstone and conglomerate contacts analyzed per L.A. County Review Sheet	10
CS-11	S30-30R2	30-30′	6 to 7 ft. thick silty claystone bed 40 ft. below toe of CS-11	Janbu	1.86	--	Slope laid back to **3:1** because at 2:1 gradient OMS did not pass (FS=1.46) along the silty claystone bed. Analyzed per L.A. County Review Sheet	11
CS-11	--	30-30′	6 to 7 ft. thick silty claystone bed 40 ft. below toe of CS-11	OMS	1.66	1.58	Slope laid back to **3:1** because at 2:1 gradient OMS did not pass (FS=1.46) along the silty claystone bed. Analyzed per L.A. County Review Sheet	12
*Natural Slope/CS-30 & CS-36	SC31(2)R	31-31′	Plane 2 (worse case per 10/22/99 report)	Janbu	2.40	--	*Plane 2 in natural slope below CS-36 and above CS-30	13
*Natural Slope/CS-30 & CS-36	SC31(2)AR	31-31′	Plane 2A	Janbu	2.70	--	*Plane 2A in natural slope below CS-36 and above CS-30	14
CS-7	HC32S18	32-32′	Bedding Plane Search	Janbu	2.10	--	Bedding plane search for 2:1 CS-7. Analyzed per L.A. County Review Sheet	15
CS-7	--	32-32′	Bedding Plane per Run No. 15	OMS	1.75	1.91	Analyzed per L.A. County Review Sheet	16
CS-5	HC35S5	35-35′	Lower clay bed	Janbu	2.22	--	Clay bed @ 63 ft. in BA-11 analyzed	17
CS-5	--	35-35′	Lower clay bed	OMS	1.96	1.66	Clay bed @ 63 ft. in BA-11 analyzed	18
CS-5	HC35S6	35-35′	Upper silty claystone	Janbu	2.38	--	Silty claystone @ 30 ft. in BA-11 analyzed	19
CS-8	HC36S4	36-36′	Bedding plane search	Janbu	2.45	--	Analyzed per L.A. County Review Sheet	20
Natural Slope	HC37SC3	37-37′	Search circular	Bishop	2.73	-	Analyzed horizontally bedded Qt deposits per L.A. County Review Sheet	21
CS-13	HC40S1	40-40′	Bedding Plane Search	Janbu	1.93	--	Cut-slope at syncline axis analyzed per L.A. County Review Sheet	22
CS-13	--	40-40′	Bedding Plane per Run No. 22	OMS	1.69	1.51	Cut-slope at syncline axis analyzed per L.A. County Review Sheet	23
CS-12	HC41S3	41-41′	Bedding Plane Search	Janbu	1.95	--	Analyzed per L.A. County Review Sheet	24
CS-12	--	41-41′	Bedding Plane per Run No. 24	OMS	1.64	1.73	Analyzed per L.A. County Review Sheet	25
CS-31	T42S1C	42-42′	Bedding Plane Search	Janhu	2.10	--	Analyzed per L.A. County Review Sheet	26
CS-31	--	42-42′	Bedding Plane per Run No. 26	OMS	1.67	1.96	Analyzed per L.A. County Review Sheet	27

CS-31	T43S1C	43-43'	Bedding Plane Search	Janbu	2.58	--	Analyzed per L.A. County Review Sheet	28
CS-26	HC44S4	44-44'	Bedding Plane Search	Janbu	2.21	--	Analyzed per L.A. County Review Sheet	29
Natural Slope (Steepest)	HC45S1	45-45'	Circular Search	Bishop	1.91	--	Analyzed steepest natural slope (from 10/22/99 report).	30
CS-6	HC46S2	46-46'	Bedding Plane Search	Janbu	2.01	--	Analyzed per L.A. County Review Sheet	31
CS-6	--	46-46'	Bedding Plane Per Run No. 31	OMS	1.79	1.95	Analyzed per L.A. County Review Sheet	32
CS-1	HC47S2	47-47'	Bedding Plane Search	Janbu	2.65	--	Analyzed per L.A. County Review Sheet	33
CS-14	HC48S2	48-48'	Bedding Plane Search	Janbu	4.62	--	Analyzed per L.A. County Review Sheet	34
CS-9	HC49S5	49-49'	Bedding Plane Search	Janbu	2.01	--	Analyzed per L.A. County Review Sheet	35
CS-9	--	49-49'	Bedding Plane per Run No. 35	OMS	1.74	2.61	Analyzed per L.A. County Review Sheet	36
CS-20	HC50S2	50-50'	Bedding Plane Search	Janbu	2.30	--	Analyzed per L.A. County Review Sheet	37
CS-25	T51(B)1	51-51'	Clay bed	Janbu	2.34	--	Analyzed per L.A. County Review Sheet (Clay bed @ 62 ft. in BA-2) (upper natural slope)	38a
CS-25	T51(A)1	51-51'	Clay bed	Janbu	2.36	--	Analyzed per L.A. County Review Sheet (Clay bed @ 62 ft. in BA-2) (combined cut and natural slope)	38b
CS-27	HC52S2	52-52'	Bedding Plane Search	Janbu	3.28	--	Analyzed per L.A. County Review Sheet	39
CS-28	HC53R	53-53'	Bedding Plane Search	Janbu	2.31	--	Analyzed per L.A. County Review Sheet	40
CS-32	HC54S1	54-54'	Bedding Plane Search	Janbu	4.61	--	Analyzed per L.A. County Review Sheet	41
Fill Slope	HC55S1	55-55'	Search (Circular)	Bishop	1.69	1.33	Analyzed critical fill slope (steepest and highest) per L.A. County Review Sheet	42
CS-29	T56S3A	56-56'	Search (Circular)	Bishop	2.64	--	Analyzed horizontal Qt deposits per L.A. County Review Sheet	43
Natural Slope	HC57S3	57-57'	Lower clay bed	Janbu	2.24	---	Analyzed natural slope adjacent to CS-5 with new subsurface info from BA-11 (clay bed @ 63 ft.)	44

Natural Slope	HC57S6	57-57'	Upper silty claystone	Janbu	2.15	--	Analyzed natural slope adjacent to CS-5 with new subsurface info from BA-11 (silty claystone @ 30 ft.)	45
Desilting Basin	HC58S1	58-58'	Search (Circular)	Bishop	2.60	2.03	Analyzed critical desilting basin utilizing rapid drawdown analysis per L.A. County Review Sheet	46

TABLE E2

ANALYSIS OF INFINITE SLOPE WITH PARALLEL SEEPAGE

By: EC Date: 10/22/1999(revised)

Project TT 52584 - Hasley Canyon

Project No : 99-1617-4

Required vertical depth of saturation (LA County) = h = 4 feet

$$FS = [c' + (Gamma_t - Gamma_{H2O})*h*Cos^2Alpha*TanPhi']/(Gamma_t*h*CosAlpha*SinAlpha)$$

c' (psf)	Phi' (deg)	$Gamma_t$ (pcf)	$Gamma_{H2O}$ (pcf)	h (ft)	Alpha (deg)	Safety Factor	Comments
130	40	123	62.4	4	26.6	1.5	Lowest cohesion value for fill(1)
300	29	125	62.4	4	26.6	2.1	per additional strength data for fill
410	40.5	119	62.4	4	30.5	2.7	Lower-bound cohesion for TQs steepest exposed slope
400	36	120	62.4	4	26.6	2.8	Landslide mat'l (lower cohesion)
200	41	120	62.4	4	26.6	1.9	Terrace deposits

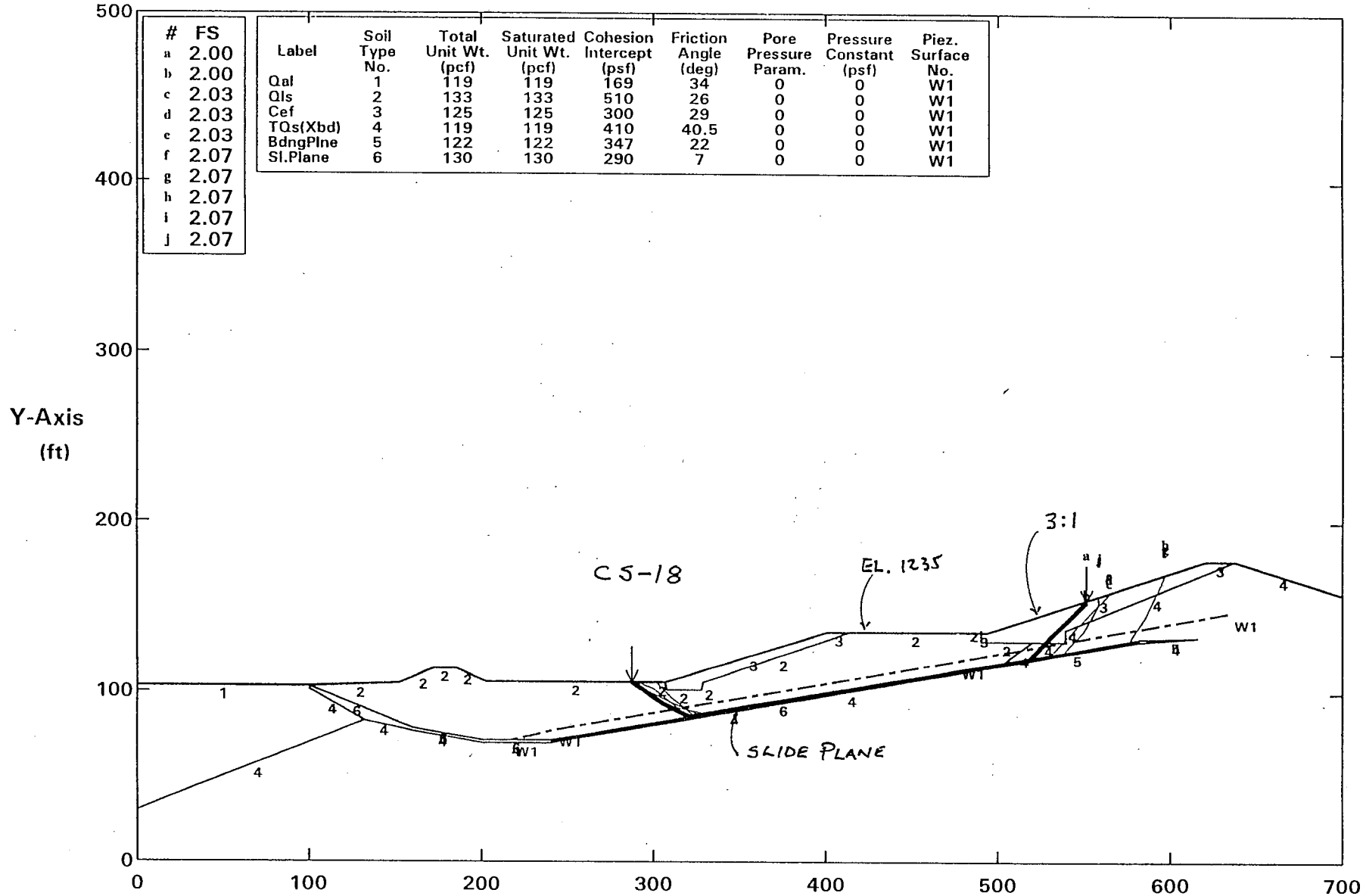
(1): Strength parameters correspond to lower-bound residual values from site specific tests on specimens remolded to 90% Relative Compaction.

TT52584-Hasley Cyn-Sec.7-7'-w/bench(El. 1235) & 3:1 Stab.Fill(El 1235)-Static

Ten Most Critical. C:HASL7BG.PLT By: EC 2/11/2000 3:15pm

#	FS
a	2.00
b	2.00
c	2.03
d	2.03
e	2.03
f	2.07
g	2.07
h	2.07
i	2.07
j	2.07

Label	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.
Qal	1	119	119	169	34	0	0	W1
Qls	2	133	133	510	26	0	0	W1
Cef	3	125	125	300	29	0	0	W1
TQs(Xbd)	4	119	119	410	40.5	0	0	W1
BdngPlne	5	122	122	347	22	0	0	W1
Sl.Plane	6	130	130	290	7	0	0	W1



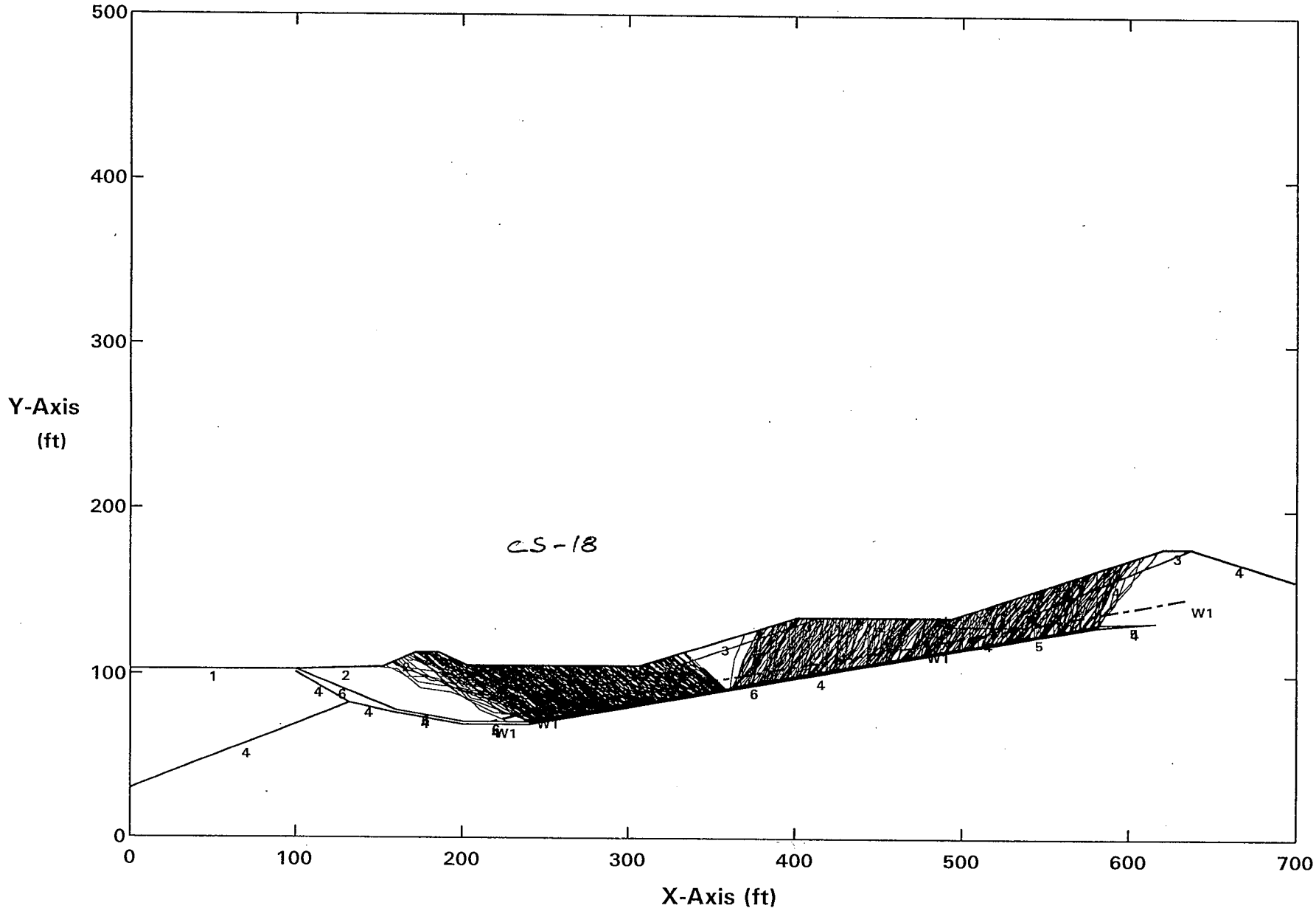
PCSTABL5M FSmin = 2.00 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run #1

TT52584-Hasley Cyn-Sec.7-7'-w/bench(El. 1235) & 3:1 Stab.Fill(El 1235)-Static

All surfaces evaluated. C:HASL7BG.PLT By: EC 2/11/2000 3:15pm



Factors Of Safety Calculated By The Modified Janbu Method

Run #1

** PCSTABL5M **

by
Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date: 2/11/2000
Time of Run: 3:15pm
Run By: EC
Input Data Filename: C:HASL7BG.IN
Output Filename: C:HASL7BG.OUT
Plotted Output Filename: C:HASL7BG.PLT

PROBLEM DESCRIPTION TT52584-Hasley Cyn-Sec.7-7'-w/bench(El. 1235) & 3:1 Stab.Fill(El 1235)-Static

BOUNDARY COORDINATES

13 Top Boundaries
36 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	103.00	100.00	103.00	1
2	100.00	103.00	152.00	105.00	2
3	152.00	105.00	172.00	114.00	2
4	172.00	114.00	185.00	114.00	2
5	185.00	114.00	203.00	106.00	2
6	203.00	106.00	307.00	106.00	2
7	307.00	106.00	401.00	135.00	3
8	401.00	135.00	414.00	135.00	3
9	414.00	135.00	490.00	135.00	2
10	490.00	135.00	494.00	135.00	3
11	494.00	135.00	620.00	177.00	3
12	620.00	177.00	637.00	177.00	3
13	637.00	177.00	699.00	158.00	4
14	490.00	137.00	490.50	130.00	2
15	490.50	130.00	520.00	130.00	2
16	520.00	130.00	539.00	130.00	4
17	539.00	130.00	539.50	137.00	4
18	539.50	137.00	637.00	177.00	4
19	502.00	117.00	520.00	130.00	4
20	502.00	117.00	582.00	132.00	5
21	582.00	132.00	616.00	133.00	5
22	307.00	106.00	307.50	101.00	2

Run#1

23	307.50	101.00	328.00	101.00	2
24	328.00	101.00	328.50	106.00	2
25	328.50	106.00	414.00	135.00	2
26	100.00	103.00	160.00	79.00	6
27	160.00	79.00	200.00	72.00	6
28	200.00	72.00	240.00	72.00	6
29	240.00	72.00	502.00	117.00	6
30	100.00	101.00	132.00	83.00	4
31	132.00	83.00	160.00	77.00	4
32	160.00	77.00	200.00	70.00	4
33	200.00	70.00	240.00	70.00	4
34	240.00	70.00	582.00	130.00	4
35	582.00	130.00	616.00	133.00	4
36	.00	30.00	132.00	83.00	4

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	119.0	119.0	169.0	34.0	.00	.0	1
2	133.0	133.0	510.0	26.0	.00	.0	1
3	125.0	125.0	300.0	29.0	.00	.0	1
4	119.0	119.0	410.0	40.5	.00	.0	1
5	122.0	122.0	347.0	22.0	.00	.0	1
6	130.0	130.0	290.0	7.0	.00	.0	1

---

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 4 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	218.00	72.00
2	243.00	78.00
3	477.00	119.00
4	635.00	148.00

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 18.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	240.00	71.00	360.00	92.10	.00
2	361.00	92.20	582.00	131.00	.00

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined By The Following 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	228.12	106.00
2	238.84	100.20
3	255.46	93.28
4	268.23	80.60
5	286.16	79.12
6	387.64	96.88
7	387.86	114.88
8	390.91	131.89

Factor Of Safety For The Preceding Specified Surface = 8.872

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined By The Following 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	322.49	110.78
2	332.43	101.39
3	346.08	89.65
4	418.99	102.38
5	419.22	120.38
6	423.33	135.00

Factor Of Safety For The Preceding Specified Surface = 7.234

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	280.79	106.00
2	293.30	95.34
3	306.03	82.61
4	375.01	94.66
5	375.45	112.66
6	385.11	127.85
7	387.67	130.89

Factor Of Safety For The Preceding Specified Surface = 6.472

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

1	228.12	106.00
2	238.84	100.20
3	255.46	93.28
4	268.23	80.60
5	286.16	79.12
6	387.64	96.88
7	387.86	114.88
8	390.91	131.89

Factor Of Safety For The Preceding Specified Surface = 8.872

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By The Following 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	322.49	110.78
2	332.43	101.39
3	346.08	89.65
4	418.99	102.38
5	419.22	120.38
6	423.33	135.00

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1	322.49	110.78
2	332.43	101.39
3	346.08	89.65
4	418.99	102.38
5	419.22	120.38
6	423.33	135.00

Factor Of Safety For The Preceding Specified Surface = 7.234

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	287.79	106.00
2	290.43	104.21
3	304.99	93.62
4	320.91	85.23
5	518.10	119.78
6	530.76	132.58
7	543.18	145.61
8	551.61	154.20

*** 2.003 ***

Individual data on the 25 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	2.6	314.5	.0	.0	.0	.0	.0	.0	.0
2	14.6	13718.0	.0	.0	.0	.0	.0	.0	.0
3	2.0	3460.4	.0	.0	.0	.0	.0	.0	.0
4	.5	897.7	.0	.0	.0	.0	.0	.0	.0
5	4.3	8663.4	.0	.0	.0	.0	.0	.0	.0
6	8.2	22201.1	.0	1636.6	.0	.0	.0	.0	.0
7	1.0	3075.5	.0	405.7	.0	.0	.0	.0	.0
8	7.1	23475.7	.0	2842.2	.0	.0	.0	.0	.0
9	.5	1694.7	.0	200.5	.0	.0	.0	.0	.0
10	72.5	294710.7	.0	29062.3	.0	.0	.0	.0	.0
11	13.0	59579.2	.0	5210.4	.0	.0	.0	.0	.0
12	63.0	234070.8	.0	25247.2	.0	.0	.0	.0	.0
13	13.0	36792.2	.0	5245.5	.0	.0	.0	.0	.0
14	.5	1330.5	.0	203.5	.0	.0	.0	.0	.0
15	3.5	9052.1	.0	1428.1	.0	.0	.0	.0	.0

16	8.0	20952.3	.0	3288.1	.0	.0	.0	.0	.0
17	12.2	33731.9	.0	5091.2	.0	.0	.0	.0	.0
18	3.9	11015.1	.0	1628.1	.0	.0	.0	.0	.0
19	.3	821.6	.0	167.1	.0	.0	.0	.0	.0
20	1.6	4450.6	.0	822.6	.0	.0	.0	.0	.0
21	6.3	15354.1	.0	1421.0	.0	.0	.0	.0	.0
22	1.9	4112.9	.0	.0	.0	.0	.0	.0	.0
23	2.6	4959.3	.0	.0	.0	.0	.0	.0	.0
24	12.4	15890.8	.0	.0	.0	.0	.0	.0	.0
25	8.4	3050.2	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	287.79	106.00
2	290.43	104.21
3	304.99	93.62
4	320.91	85.23
5	518.10	119.78
6	530.76	132.58
7	543.18	145.61
8	551.61	154.20

*** 2.003 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	286.59	106.00
2	294.90	101.01
3	311.08	93.10
4	327.80	86.44
5	530.35	121.93
6	542.18	135.50
7	554.91	148.23
8	564.69	158.56

*** 2.033 ***

Failure Surface Specified By 8 Coordinate Points

Point	X-Surf	Y-Surf

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
MATERIALS ENGINEERING DIVISION
GEOTECHNICAL ENGINEERING
DEVELOPMENT SERVICES SECTION
ORDINARY METHOD OF SLICES USED FOR ANALYSIS
(CONSIDERING PORE-WATER PRESSURES)

PROJECT: Hasley Cyn VTT 52584
CONSULTANT: AES
REPORT DATE:
SECTION: 7-7' CIRCLE: Landslide plane & Bedding plane per Janbu HASL7BG DATE: 2/15/00 BY: SKM

SLICE NO.	ABOVE HT(1)	WATER HT(2)	BELOW HT(3)	WATER HT(4)	SLICE WIDTH	WET AREA	TOTAL AREA	SLICE WEIGHT	UNIT WEIGHT	SLICE Ru
1.	0.00	13.00	0.00	0.00	19.50	0.00	126.75	16.86	133.0	0.000
2.	13.00	18.00	0.00	0.00	5.50	0.00	85.25	11.34	133.0	0.000
3.	18.00	19.00	0.00	7.00	8.50	29.75	187.00	24.87	133.0	0.075
4.	19.00	30.00	7.00	7.00	80.50	563.50	2535.75	329.65	130.0	0.107
5.	30.00	13.50	7.00	7.00	91.00	637.00	2616.25	340.11	130.0	0.117
6.	13.50	15.00	7.00	7.00	9.50	66.50	201.88	26.24	130.0	0.158
7.	15.00	18.00	7.00	7.00	15.50	108.50	364.25	46.99	129.0	0.144
8.	18.00	19.00	7.00	0.00	10.50	36.75	231.00	27.49	119.0	0.083
9.	19.00	0.00	0.00	0.00	23.50	0.00	223.25	27.91	125.0	0.000

SLOPE STABILITY DATA

SEISMIC COEFFICIENT = 0.15 g

SLICE NO.	1 SLICE WEIGHT W (kips)	1.1 Ru (PORE PRESSURE RATIO)	2 FAILURE PLANE ANGLE i(deg)	3 ANGLE OF INT. FRICTION phi(deg)	4 COHE-SION C (ksf)	5 LENGTH OF ARC L (ft)	6 W (1-Ru) COS i / TAN phi	7 C L	8 g W (1-Ru) SINi / TAN phi	9 W SIN i	10 g W COS i
1.	16.86	0.000	-32.50	26.00	0.510	23.12	6.93	11.79	-0.66	-9.06	2.13
2.	11.34	0.000	-32.50	26.00	0.510	6.52	4.66	3.33	-0.45	-6.09	1.43
3.	24.87	0.075	-32.50	26.00	0.510	10.08	9.47	5.14	-0.90	-13.36	3.15
4.	329.65	0.107	10.00	7.00	0.290	81.74	35.61	23.71	0.94	57.24	48.70
5.	340.11	0.117	10.00	7.00	0.290	92.40	36.32	26.80	0.96	59.06	50.24
6.	26.24	0.158	10.00	7.00	0.290	9.65	2.67	2.80	0.07	4.56	3.88
7.	46.99	0.144	10.00	22.00	0.347	15.74	16.00	5.46	0.42	8.16	6.94
8.	27.49	0.083	45.00	40.50	0.410	14.85	15.22	6.09	2.28	19.44	2.92
9.	27.91	0.000	45.00	29.00	0.300	33.23	10.94	9.97	1.64	19.73	2.96
SUMMATION:							137.82	95.08	4.31	139.68	122.34

STATIC SAFETY FACTOR = 1.67
~~SEISMIC SAFETY FACTOR = 0.87~~

Run #2a

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
MATERIALS ENGINEERING DIVISION
GEOTECHNICAL ENGINEERING
DEVELOPMENT SERVICES SECTION
ORDINARY METHOD OF SLICES USED FOR ANALYSIS
(CONSIDERING PORE-WATER PRESSURES)

PROJECT: Hasley Cyn VTT 52584
CONSULTANT: AES
REPORT DATE:
SECTION: 7-7' CIRCLE: Landslide plane & Bedding plane per Janbu HASL7BG DATE: 2/15/00 BY: SKM

SLICE NO.	ABOVE HT(1)	WATER HT(2)	BELOW HT(3)	WATER HT(4)	SLICE WIDTH	WET AREA	TOTAL AREA	SLICE WEIGHT	UNIT WEIGHT	SLICE Ru
1.	0.00	13.00	0.00	0.00	19.50	0.00	126.75	16.86	133.0	0.000
2.	13.00	18.00	0.00	0.00	5.50	0.00	85.25	11.34	133.0	0.000
3.	18.00	19.00	0.00	7.00	8.50	29.75	187.00	24.87	133.0	0.075
4.	19.00	30.00	7.00	7.00	80.50	563.50	2535.75	329.65	130.0	0.107
5.	30.00	13.50	7.00	7.00	91.00	637.00	2616.25	340.11	130.0	0.117
6.	13.50	15.00	7.00	7.00	9.50	66.50	201.88	26.24	130.0	0.158
7.	15.00	18.00	7.00	7.00	15.50	108.50	364.25	46.99	129.0	0.144
8.	18.00	19.00	7.00	0.00	10.50	36.75	231.00	27.49	119.0	0.083
9.	19.00	0.00	0.00	0.00	23.50	0.00	223.25	27.91	125.0	0.000

SLOPE STABILITY DATA

SEISMIC COEFFICIENT = 0.15 g

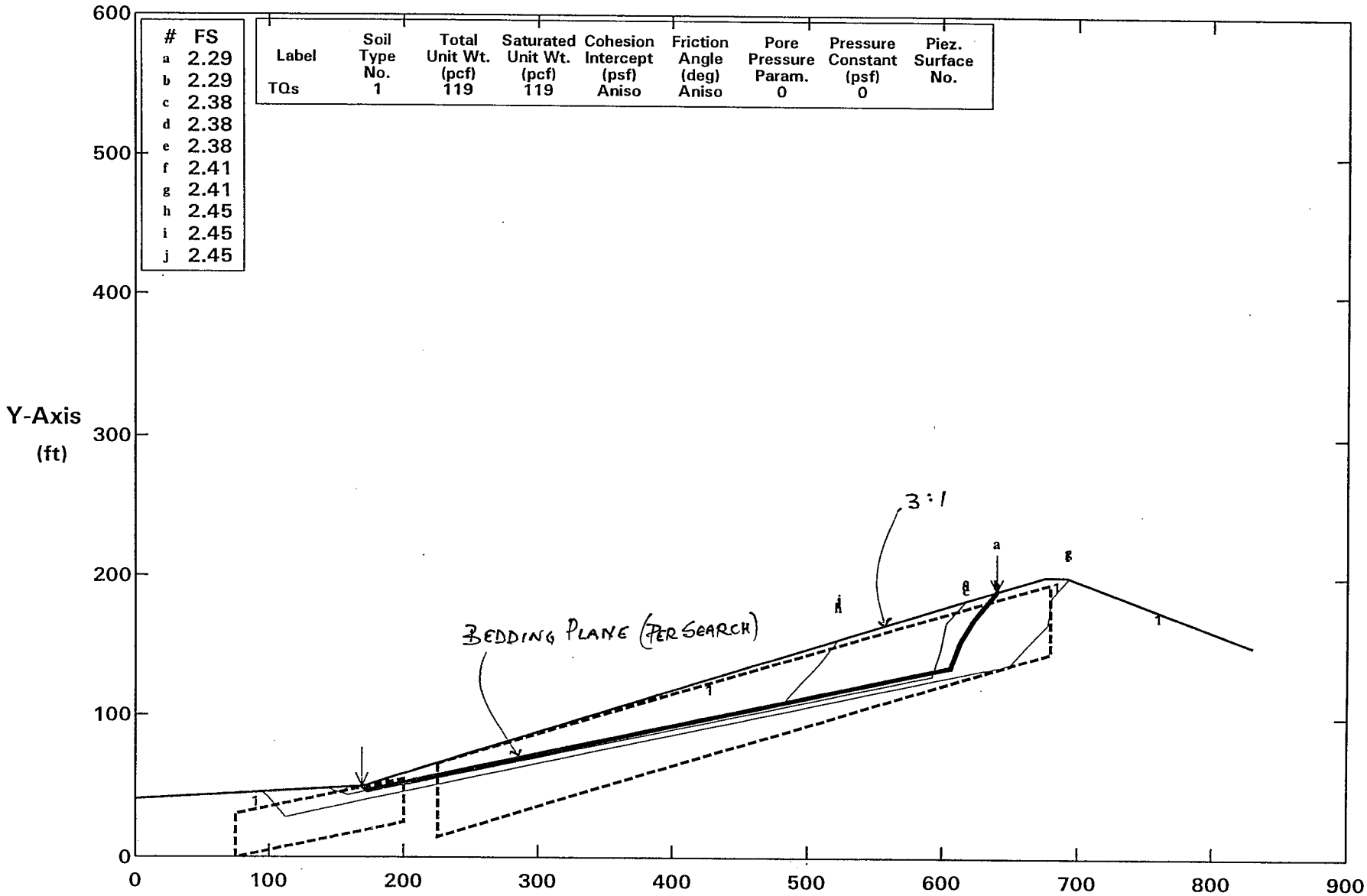
SLICE NO.	1 SLICE WEIGHT W (kips)	1.1 Ru (PORE PRESSURE RATIO)	2 FAILURE PLANE ANGLE i(deg)	3 ANGLE OF INT. FRICTION phi(deg)	4 COHE-SION C (ksf)	5 LENGTH OF ARC L (ft)	6 W (1-Ru) COS i TAN phi	7 C L	8 g W (1-Ru) SINi TAN phi	9 W SIN i	10 g W COS i
1.	16.86	0.000	-32.50	29.00	1.800	23.12	7.88	41.62	-0.75	-9.06	2.13
2.	11.34	0.000	-32.50	29.00	1.800	6.52	5.30	11.74	-0.51	-6.09	1.43
3.	24.87	0.075	-32.50	29.00	1.800	10.08	10.76	18.14	-1.03	-13.36	3.15
4.	329.65	0.107	10.00	28.00	0.210	81.74	154.20	17.17	4.08	57.24	48.70
5.	340.11	0.117	10.00	28.00	0.210	92.40	157.28	19.40	4.16	59.06	50.24
6.	26.24	0.158	10.00	28.00	0.210	9.65	11.57	2.03	0.31	4.56	3.88
7.	46.99	0.144	10.00	27.00	1.168	15.74	20.18	18.38	0.53	8.16	6.94
8.	27.49	0.083	45.00	42.00	0.880	14.85	16.04	13.07	2.41	19.44	2.92
9.	27.91	0.000	45.00	32.00	0.316	33.23	12.33	10.50	1.85	19.73	2.96
SUMMATION:							395.54	152.05	11.05	139.68	122.34

~~STATIC SAFETY FACTOR = 3.92~~
SEISMIC SAFETY FACTOR = 2.05

Run#26

Hasley Canyon Cross Section 17-17' Cut Slope 36 3:1 Static

Ten Most Critical. C:HC17S2.PLT By: DCS 3/15/2000 10:56am



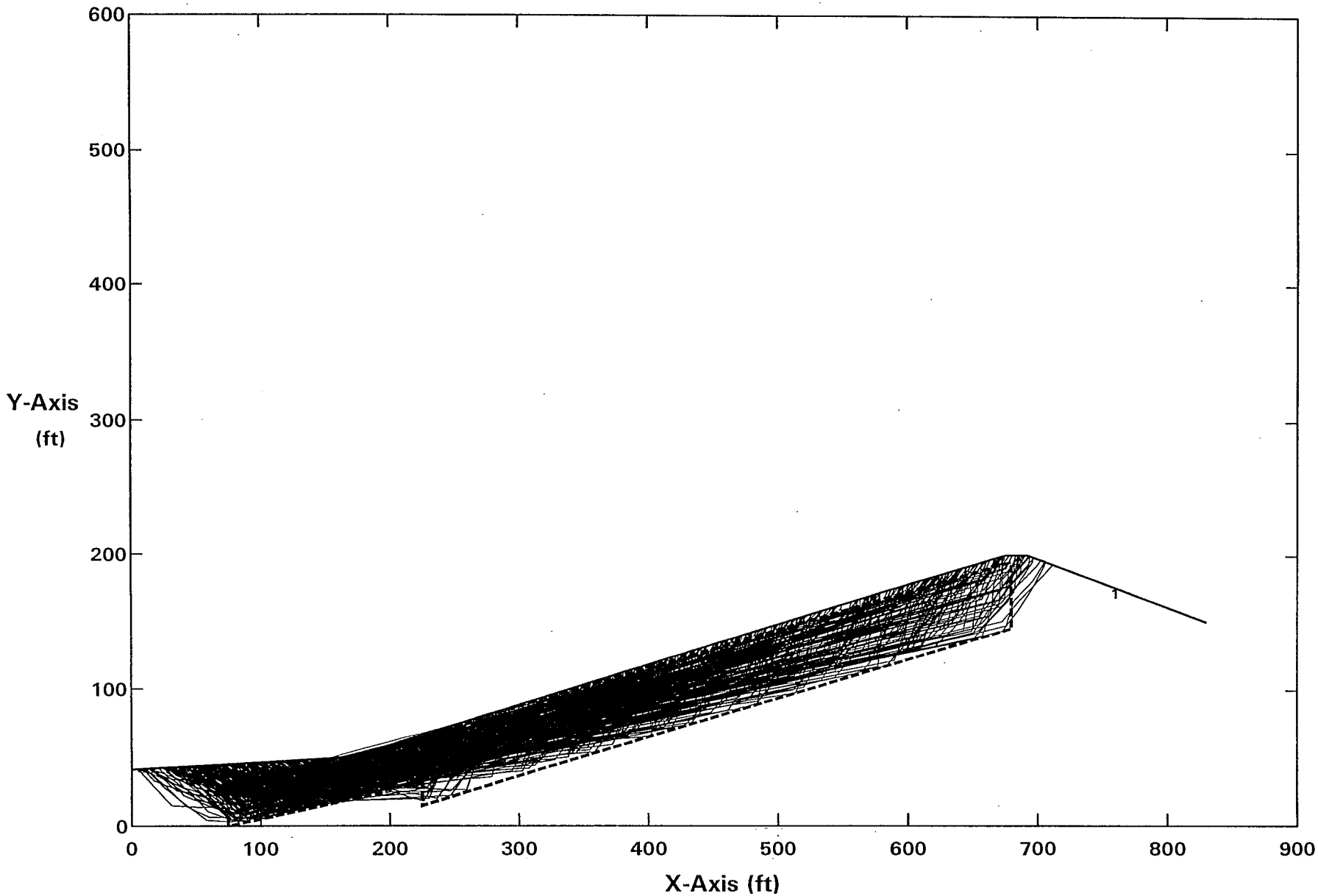
PCSTABL5M/SI FSmin = 2.29 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

RUN #3

Hasley Canyon Cross Section 17-17' Cut Slope 36 3:1 Static

All surfaces evaluated. C:HC17S2.PLT By: DCS 3/15/2000 10:56am



Factors Of Safety Calculated By The Modified Janbu Method

Run #3

** PCSTABL5M **

by
Purdue University

1

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	3/15/2000
Time of Run:	10:56am
Run By:	DCS
Input Data Filename:	C:HC17S2.IN
Output Filename:	C:HC17S2.OUT
Unit:	ENGLISH
Plotted Output Filename:	C:HC17S2.PLT

PROBLEM DESCRIPTION Hasley Canyon Cross Section 17-17'
Cut Slope 36 3:1 Static

BOUNDARY COORDINATES

4 Top Boundaries
4 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	40.00	170.00	50.00	1
2	170.00	50.00	675.00	200.00	1
3	675.00	200.00	692.00	200.00	1
4	692.00	200.00	830.00	150.00	1

1

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	119.0	119.0	410.0	40.5	.00	.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	410.0	40.5
2	11.5	347.0	22.0
3	90.0	410.0	40.5

Janbus Empirical Coef is being used for the case of c & phi both > 0

1

Run #3

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	75.00	15.00	200.00	40.00	30.00
2	225.00	40.00	680.00	170.00	50.00

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	162.08	49.53
2	173.17	38.75
3	239.08	47.24
4	239.46	67.24
5	241.95	71.37

Factor Of Safety For The Preceding Specified Surface = 15.869

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	131.63	47.74
2	142.50	37.00
3	247.41	25.20
4	261.44	39.45
5	261.65	59.45
6	274.60	74.68
7	275.95	81.47

Factor Of Safety For The Preceding Specified Surface = 11.902

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	162.08	49.53
2	173.17	38.75
3	239.08	47.24
4	239.46	67.24
5	241.95	71.37

Factor Of Safety For The Preceding Specified Surface = 15.869

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	131.63	47.74
2	142.50	37.00
3	247.41	25.20
4	261.44	39.45
5	261.65	59.45
6	274.60	74.68
7	275.95	81.47

Factor Of Safety For The Preceding Specified Surface = 11.902

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	162.08	49.53
2	173.17	38.75
3	239.08	47.24
4	239.46	67.24
5	241.95	71.37

Factor Of Safety For The Preceding Specified Surface = 15.869

1

Following Are Displayed The Ten Most Critical Of The Trial

Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	168.91	49.94
2	172.86	46.64
3	605.88	134.64
4	612.73	153.43
5	623.68	170.16
6	636.54	185.48
7	640.07	189.63

*** 2.293 ***

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	1.1	63.6	.0	.0	.0	.0	.0	.0	.0
2	2.9	883.0	.0	.0	.0	.0	.0	.0	.0
3	433.0	********	.0	.0	.0	.0	.0	.0	.0
4	6.8	29703.3	.0	.0	.0	.0	.0	.0	.0
5	11.0	27811.4	.0	.0	.0	.0	.0	.0	.0
6	12.9	13544.8	.0	.0	.0	.0	.0	.0	.0
7	3.5	651.8	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	168.91	49.94
2	172.86	46.64
3	605.88	134.64
4	612.73	153.43
5	623.68	170.16
6	636.54	185.48
7	640.07	189.63

*** 2.293 ***

1

Failure Surface Specified By 7 Coordinate Points

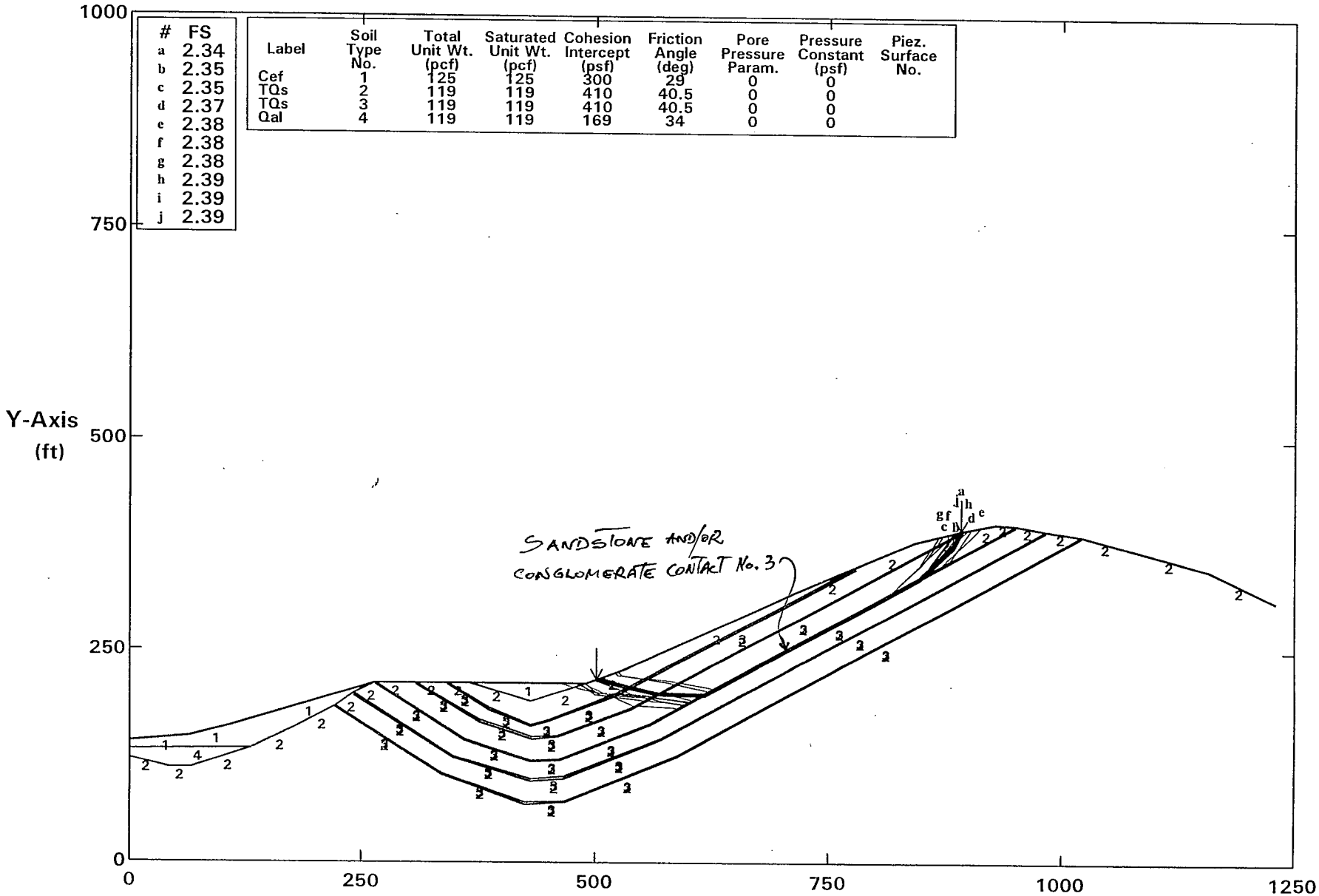
Point No.	X-Surf (ft)	Y-Surf (ft)
1	186.50	54.90
2	198.16	49.31
3	592.22	128.79
4	598.66	147.72
5	602.29	167.39
6	616.40	181.56
7	617.16	182.82

Hasley Cyn. X-Section 27-27' Contact #3, Static

Ten Most Critical. A:HAS27BR2.PLT By: AC 3/22/2000 1:03pm

#	FS
a	2.34
b	2.35
c	2.35
d	2.37
e	2.38
f	2.38
g	2.38
h	2.39
i	2.39
j	2.39

Label	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.
Cef	1	125	125	300	29	0	0	
TQs	2	119	119	410	40.5	0	0	
TQs	3	119	119	410	40.5	0	0	
Qal	4	119	119	169	34	0	0	



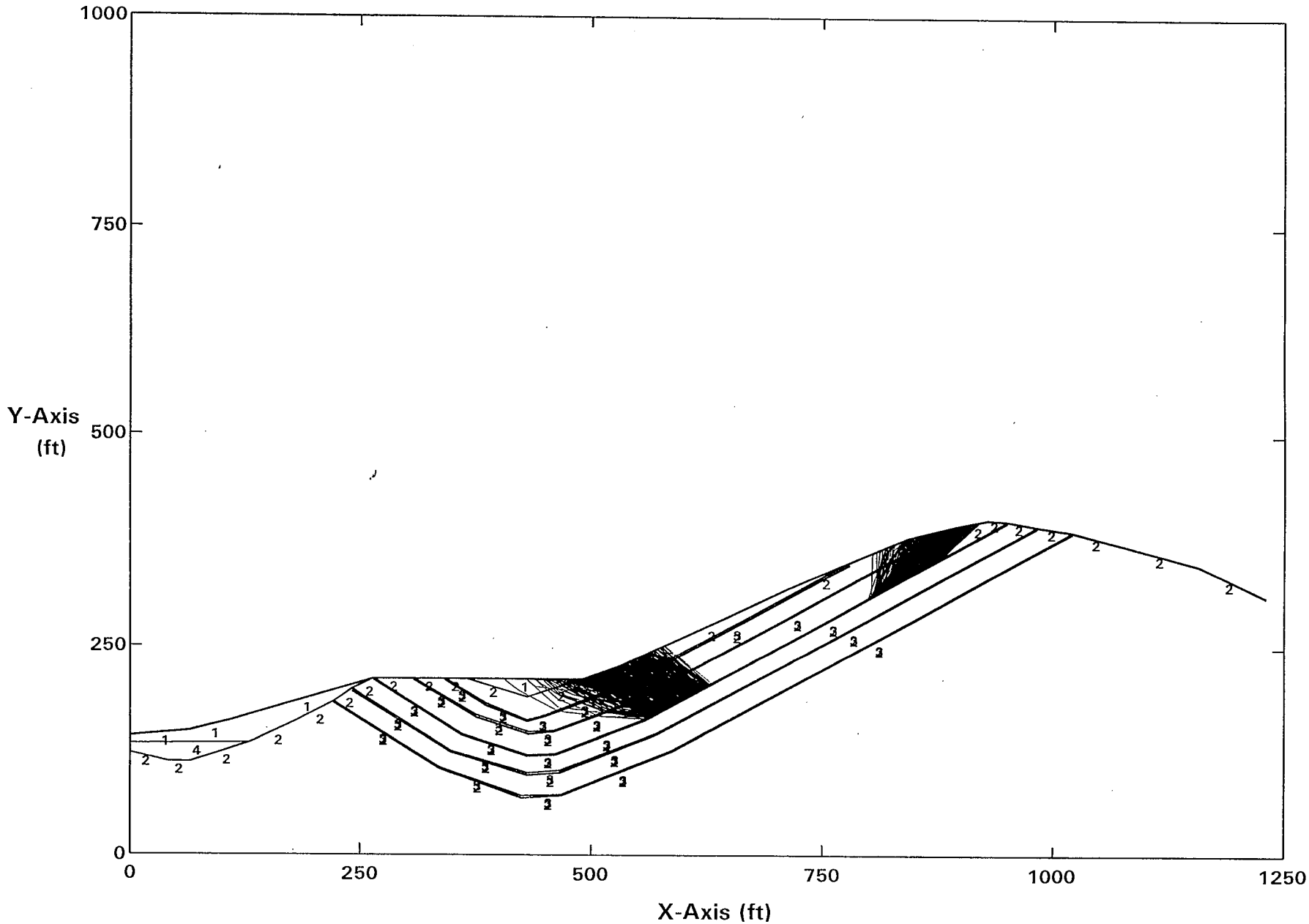
PCSTABL5M FSmin = 2.34 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run #4

Hasley Cyn. X-Section 27-27' Contact #3, Static

All surfaces evaluated. A:HAS27BR2.PLT By: AC 3/22/2000 1:03pm



Factors Of Safety Calculated By The Modified Janbu Method

Run #4

** PCSTABL5M **

by
Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date: 3/22/2000
Time of Run: 1:03pm
Run By: AC
Input Data Filename: A:HAS27BR2.IN
Output Filename: A:HAS27BR2.OUT
Plotted Output Filename: A:HAS27BR2.PLT

PROBLEM DESCRIPTION Hasley Cyn. X-Section 27-27'
Contact #3, Static

BOUNDARY COORDINATES

19 Top Boundaries
79 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	142.00	65.00	147.00	1
2	65.00	147.00	109.00	160.00	1
3	109.00	160.00	264.00	211.00	1
4	264.00	211.00	308.00	211.00	2
5	308.00	211.00	341.00	211.00	2
6	341.00	211.00	364.00	211.00	2
7	364.00	211.00	490.00	211.00	1
8	490.00	211.00	532.00	228.00	2
9	532.00	228.00	714.00	320.00	2
10	714.00	320.00	780.00	350.00	2
11	780.00	350.00	842.00	380.00	2
12	842.00	380.00	893.00	394.00	2
13	893.00	394.00	928.00	401.00	2
14	928.00	401.00	950.00	400.00	2
15	950.00	400.00	982.00	394.00	2
16	982.00	394.00	1021.00	388.00	2
17	1021.00	388.00	1079.00	370.00	2
18	1079.00	370.00	1158.00	348.00	2
19	1158.00	348.00	1230.00	311.00	2
20	364.00	211.00	430.00	189.00	2
21	430.00	189.00	490.00	211.00	2
22	341.00	211.00	386.00	181.00	3

Run#4

23	386.00	181.00	431.00	162.00	3
24	431.00	162.00	451.00	168.00	3
25	451.00	168.00	521.00	198.00	3
26	521.00	198.00	780.00	350.00	3
27	341.00	209.00	386.00	179.00	2
28	386.00	179.00	431.00	160.00	2
29	431.00	160.00	451.00	166.00	2
30	451.00	166.00	521.00	196.00	2
31	521.00	196.00	780.00	348.00	2
32	308.00	211.00	375.00	167.00	3
33	375.00	167.00	432.00	147.00	3
34	432.00	147.00	460.00	149.00	3
35	460.00	149.00	538.00	182.00	3
36	538.00	182.00	893.00	394.00	3
37	308.00	209.00	375.00	165.00	2
38	375.00	165.00	432.00	145.00	2
39	432.00	145.00	460.00	147.00	2
40	460.00	147.00	538.00	180.00	2
41	538.00	180.00	893.00	392.00	2
42	264.00	211.00	360.00	145.00	3
43	360.00	145.00	430.00	120.00	3
44	430.00	120.00	462.00	122.00	3
45	462.00	122.00	558.00	163.00	3
46	558.00	163.00	950.00	400.00	3
47	264.00	209.00	360.00	143.00	2
48	360.00	143.00	430.00	118.00	2
49	430.00	118.00	462.00	120.00	2
50	462.00	120.00	558.00	161.00	2
51	558.00	161.00	950.00	398.00	2
52	241.00	198.00	264.00	211.00	2
53	241.00	198.00	348.00	125.00	3
54	348.00	125.00	430.00	98.00	3
55	430.00	98.00	466.00	101.00	3
56	466.00	101.00	570.00	146.00	3
57	570.00	146.00	982.00	394.00	3
58	241.00	196.00	348.00	123.00	2
59	348.00	123.00	430.00	96.00	2
60	430.00	96.00	466.00	99.00	2
61	466.00	99.00	570.00	144.00	2
62	570.00	144.00	982.00	392.00	2
63	221.00	183.00	241.00	198.00	2
64	221.00	183.00	335.00	105.00	3
65	335.00	105.00	425.00	70.00	3
66	425.00	70.00	468.00	72.00	3
67	468.00	72.00	587.00	126.00	3
68	587.00	126.00	1021.00	388.00	3
69	221.00	181.00	335.00	103.00	2
70	335.00	103.00	425.00	68.00	2
71	425.00	68.00	468.00	70.00	2
72	468.00	70.00	587.00	124.00	2
73	587.00	124.00	1021.00	386.00	2
74	.00	132.00	130.00	133.00	4
75	130.00	133.00	178.00	159.00	2
76	178.00	159.00	221.00	183.00	2
77	.00	121.00	41.00	110.00	2
78	41.00	110.00	66.00	110.00	2
79	66.00	110.00	130.00	133.00	2

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	125.0	300.0	29.0	.00	.0	0
2	119.0	119.0	410.0	40.5	.00	.0	0
3	119.0	119.0	410.0	40.5	.00	.0	0
4	119.0	119.0	169.0	34.0	.00	.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.

400 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	560.00	163.20	630.00	205.60	.00
2	800.00	308.40	880.00	356.80	.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

1	500.97	215.44
2	517.53	210.78
3	565.93	198.21
4	615.91	197.07
5	847.77	337.30
6	882.24	373.52
7	891.92	393.70

*** 2.335 ***

Individual data on the 18 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	16.6	11197.5	.0	.0	.0	.0	.0	.0	.0
2	14.5	27831.5	.0	.0	.0	.0	.0	.0	.0
3	3.0	8000.5	.0	.0	.0	.0	.0	.0	.0
4	2.4	6803.3	.0	.0	.0	.0	.0	.0	.0
5	28.0	119274.8	.0	.0	.0	.0	.0	.0	.0
6	.5	3004.4	.0	.0	.0	.0	.0	.0	.0
7	2.5	14036.4	.0	.0	.0	.0	.0	.0	.0
8	46.0	330626.4	.0	.0	.0	.0	.0	.0	.0
9	1.5	13092.9	.0	.0	.0	.0	.0	.0	.0
10	98.1	799300.3	.0	.0	.0	.0	.0	.0	.0
11	66.0	460618.6	.0	.0	.0	.0	.0	.0	.0
12	62.0	368447.5	.0	.0	.0	.0	.0	.0	.0
13	5.8	31052.8	.0	.0	.0	.0	.0	.0	.0
14	2.0	10349.5	.0	.0	.0	.0	.0	.0	.0
15	32.5	116424.4	.0	.0	.0	.0	.0	.0	.0
16	8.1	9828.1	.0	.0	.0	.0	.0	.0	.0
17	1.3	262.5	.0	.0	.0	.0	.0	.0	.0
18	.2	5.9	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	489.23	211.00
2	504.16	196.09
3	554.07	192.97
4	603.97	189.83
5	811.77	315.52
6	846.48	351.52
7	881.62	387.08
8	884.95	391.79

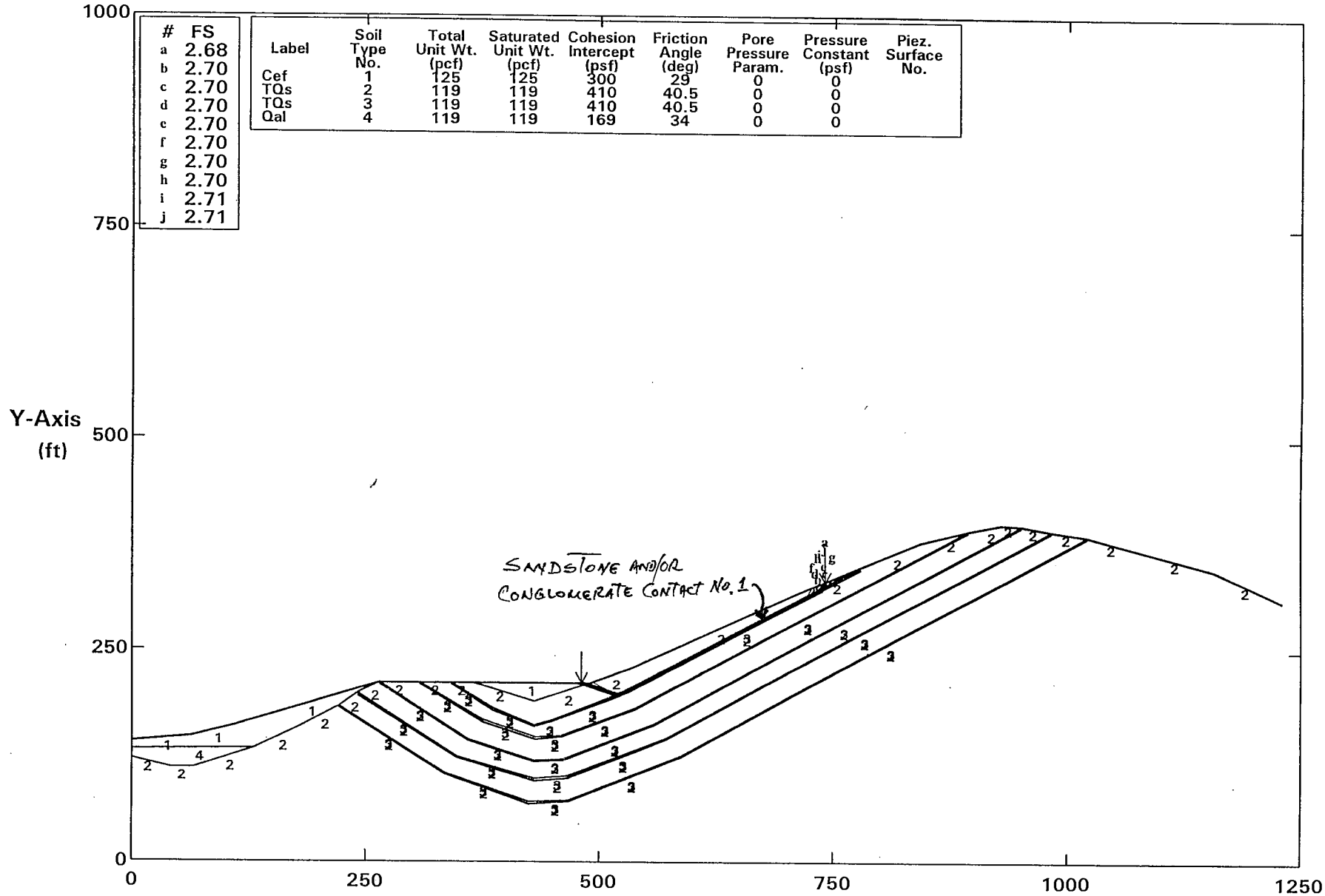
*** 2.345 ***

Hasley Cyn. X-Section 27-27' Contact #1, Static

Ten Most Critical. A:HAS27AR2.PLT By: AC 3/22/2000 1:01pm

#	FS
a	2.68
b	2.70
c	2.70
d	2.70
e	2.70
f	2.70
g	2.70
h	2.70
i	2.71
j	2.71

Label	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.
Cef	1	125	125	300	29	0	0	
TQs	2	119	119	410	40.5	0	0	
TQs	3	119	119	410	40.5	0	0	
Qal	4	119	119	169	34	0	0	



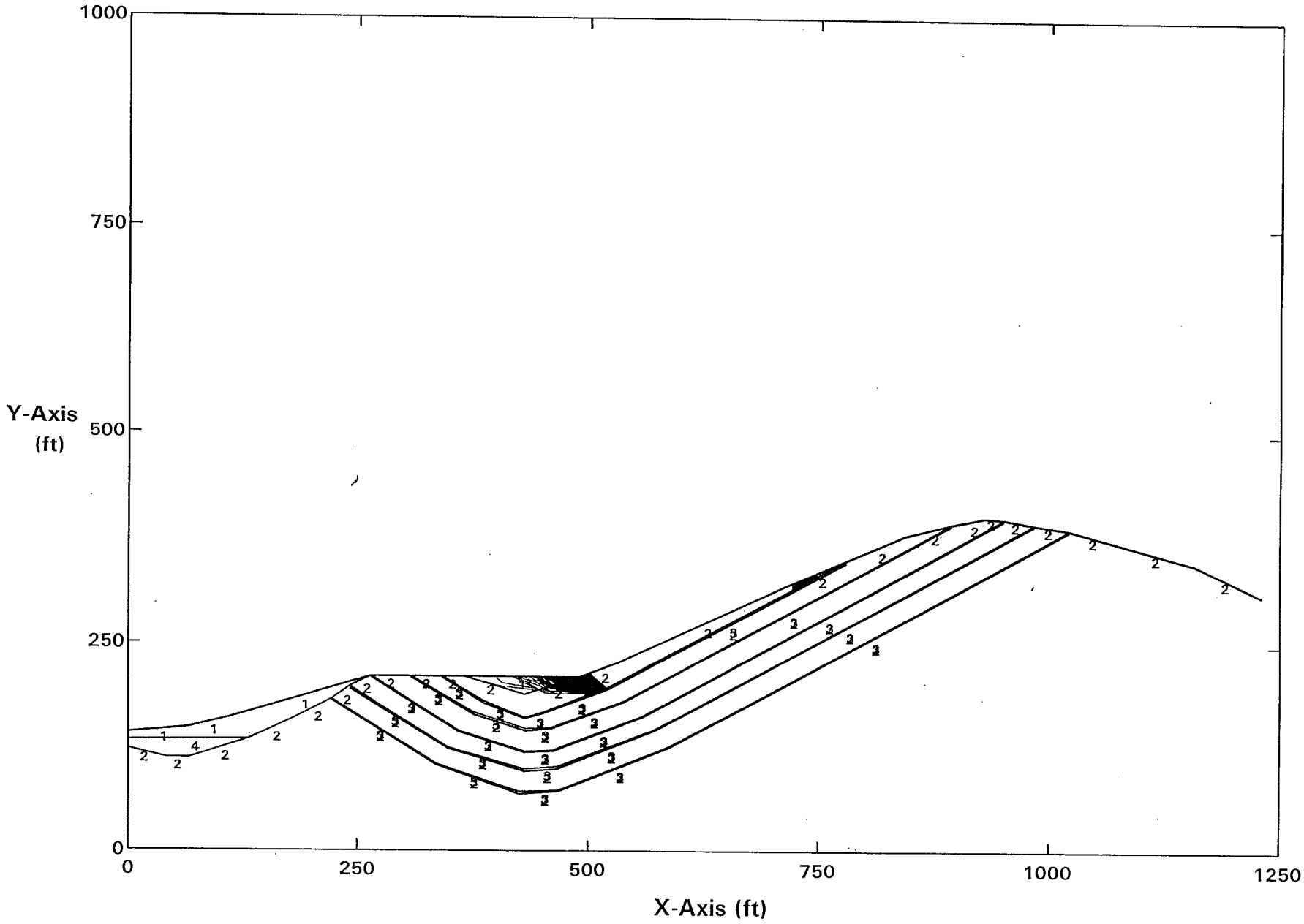
PCSTABL5M FSmin = 2.68 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run #5

Hasley Cyn. X-Section 27-27' Contact #1, Static

All surfaces evaluated. A:HAS27AR2.PLT By: AC 3/22/2000 1:01pm



Factors Of Safety Calculated By The Modified Janbu Method

Attach 5

** PCSTABL5M **

by
Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date: 3/22/2000
Time of Run: 1:01pm
Run By: AC
Input Data Filename: A:HAS27AR2.IN
Output Filename: A:HAS27AR2.OUT
Plotted Output Filename: A:HAS27AR2.PLT

PROBLEM DESCRIPTION Hasley Cyn. X-Section 27-27'
Contact #1, Static

BOUNDARY COORDINATES

19 Top Boundaries
79 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	142.00	65.00	147.00	1
2	65.00	147.00	109.00	160.00	1
3	109.00	160.00	264.00	211.00	1
4	264.00	211.00	308.00	211.00	2
5	308.00	211.00	341.00	211.00	2
6	341.00	211.00	364.00	211.00	2
7	364.00	211.00	490.00	211.00	1
8	490.00	211.00	532.00	228.00	2
9	532.00	228.00	714.00	320.00	2
10	714.00	320.00	780.00	350.00	2
11	780.00	350.00	842.00	380.00	2
12	842.00	380.00	893.00	394.00	2
13	893.00	394.00	928.00	401.00	2
14	928.00	401.00	950.00	400.00	2
15	950.00	400.00	982.00	394.00	2
16	982.00	394.00	1021.00	388.00	2
17	1021.00	388.00	1079.00	370.00	2
18	1079.00	370.00	1158.00	348.00	2
19	1158.00	348.00	1230.00	311.00	2
20	364.00	211.00	430.00	189.00	2
21	430.00	189.00	490.00	211.00	2
22	341.00	211.00	386.00	181.00	3

Run #5

23	386.00	181.00	431.00	162.00	3
24	431.00	162.00	451.00	168.00	3
25	451.00	168.00	521.00	198.00	3
26	521.00	198.00	780.00	350.00	3
27	341.00	209.00	386.00	179.00	2
28	386.00	179.00	431.00	160.00	2
29	431.00	160.00	451.00	166.00	2
30	451.00	166.00	521.00	196.00	2
31	521.00	196.00	780.00	348.00	2
32	308.00	211.00	375.00	167.00	3
33	375.00	167.00	432.00	147.00	3
34	432.00	147.00	460.00	149.00	3
35	460.00	149.00	538.00	182.00	3
36	538.00	182.00	893.00	394.00	3
37	308.00	209.00	375.00	165.00	2
38	375.00	165.00	432.00	145.00	2
39	432.00	145.00	460.00	147.00	2
40	460.00	147.00	538.00	180.00	2
41	538.00	180.00	893.00	392.00	2
42	264.00	211.00	360.00	145.00	3
43	360.00	145.00	430.00	120.00	3
44	430.00	120.00	462.00	122.00	3
45	462.00	122.00	558.00	163.00	3
46	558.00	163.00	950.00	400.00	3
47	264.00	209.00	360.00	143.00	2
48	360.00	143.00	430.00	118.00	2
49	430.00	118.00	462.00	120.00	2
50	462.00	120.00	558.00	161.00	2
51	558.00	161.00	950.00	398.00	2
52	241.00	198.00	264.00	211.00	2
53	241.00	198.00	348.00	125.00	3
54	348.00	125.00	430.00	98.00	3
55	430.00	98.00	466.00	101.00	3
56	466.00	101.00	570.00	146.00	3
57	570.00	146.00	982.00	394.00	3
58	241.00	196.00	348.00	123.00	2
59	348.00	123.00	430.00	96.00	2
60	430.00	96.00	466.00	99.00	2
61	466.00	99.00	570.00	144.00	2
62	570.00	144.00	982.00	392.00	2
63	221.00	183.00	241.00	198.00	2
64	221.00	183.00	335.00	105.00	3
65	335.00	105.00	425.00	70.00	3
66	425.00	70.00	468.00	72.00	3
67	468.00	72.00	587.00	126.00	3
68	587.00	126.00	1021.00	388.00	3
69	221.00	181.00	335.00	103.00	2
70	335.00	103.00	425.00	68.00	2
71	425.00	68.00	468.00	70.00	2
72	468.00	70.00	587.00	124.00	2
73	587.00	124.00	1021.00	386.00	2
74	.00	132.00	130.00	133.00	4
75	130.00	133.00	178.00	159.00	2
76	178.00	159.00	221.00	183.00	2
77	.00	121.00	41.00	110.00	2
78	41.00	110.00	66.00	110.00	2
79	66.00	110.00	130.00	133.00	2

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	125.0	300.0	29.0	.00	.0	0
2	119.0	119.0	410.0	40.5	.00	.0	0
3	119.0	119.0	410.0	40.5	.00	.0	0
4	119.0	119.0	169.0	34.0	.00	.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.

200 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 50.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	500.00	188.00	521.00	197.00	.00
2	521.10	197.10	530.00	202.30	.00
3	720.00	313.80	740.00	325.60	.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

1	481.41	211.00
2	519.62	196.41
3	529.78	202.17
4	735.86	323.16
5	741.68	332.58

*** 2.683 ***

Individual data on the 11 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	4.2	422.4	.0	.0	.0	.0	.0	.0	.0
2	4.4	1294.6	.0	.0	.0	.0	.0	.0	.0
3	28.4	48800.2	.0	.0	.0	.0	.0	.0	.0
4	1.2	3832.0	.0	.0	.0	.0	.0	.0	.0
5	1.4	4331.9	.0	.0	.0	.0	.0	.0	.0
6	8.8	26786.3	.0	.0	.0	.0	.0	.0	.0
7	2.2	6539.0	.0	.0	.0	.0	.0	.0	.0
8	182.0	370367.1	.0	.0	.0	.0	.0	.0	.0
9	21.9	21401.3	.0	.0	.0	.0	.0	.0	.0
10	.9	675.9	.0	.0	.0	.0	.0	.0	.0
11	4.9	1672.2	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	488.54	211.00
2	518.85	196.08
3	529.54	202.03
4	730.82	320.19
5	734.01	329.10

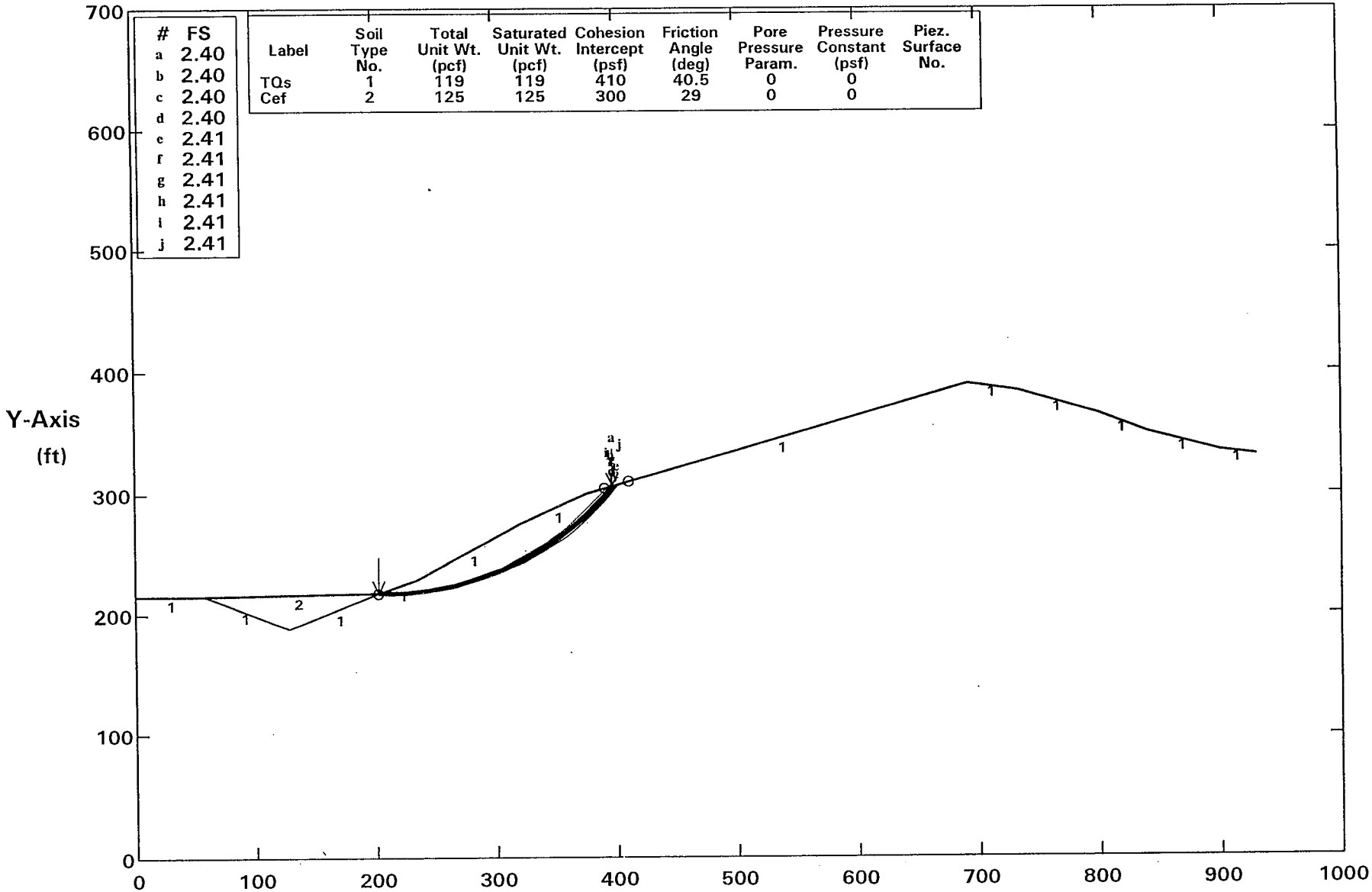
*** 2.699 ***

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	486.95	211.00

TR.52584-Hasley Cyn-Sec.27-27'-Circular analysis-Static

Ten Most Critical. C:HC27S4.PLT By: EC 2/22/2000 11:55am



#	FS
a	2.40
b	2.40
c	2.40
d	2.40
e	2.41
f	2.41
g	2.41
h	2.41
i	2.41
j	2.41

Label	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.
TQs	1	119	119	410	40.5	0	0	
Cef	2	125	125	300	29	0	0	

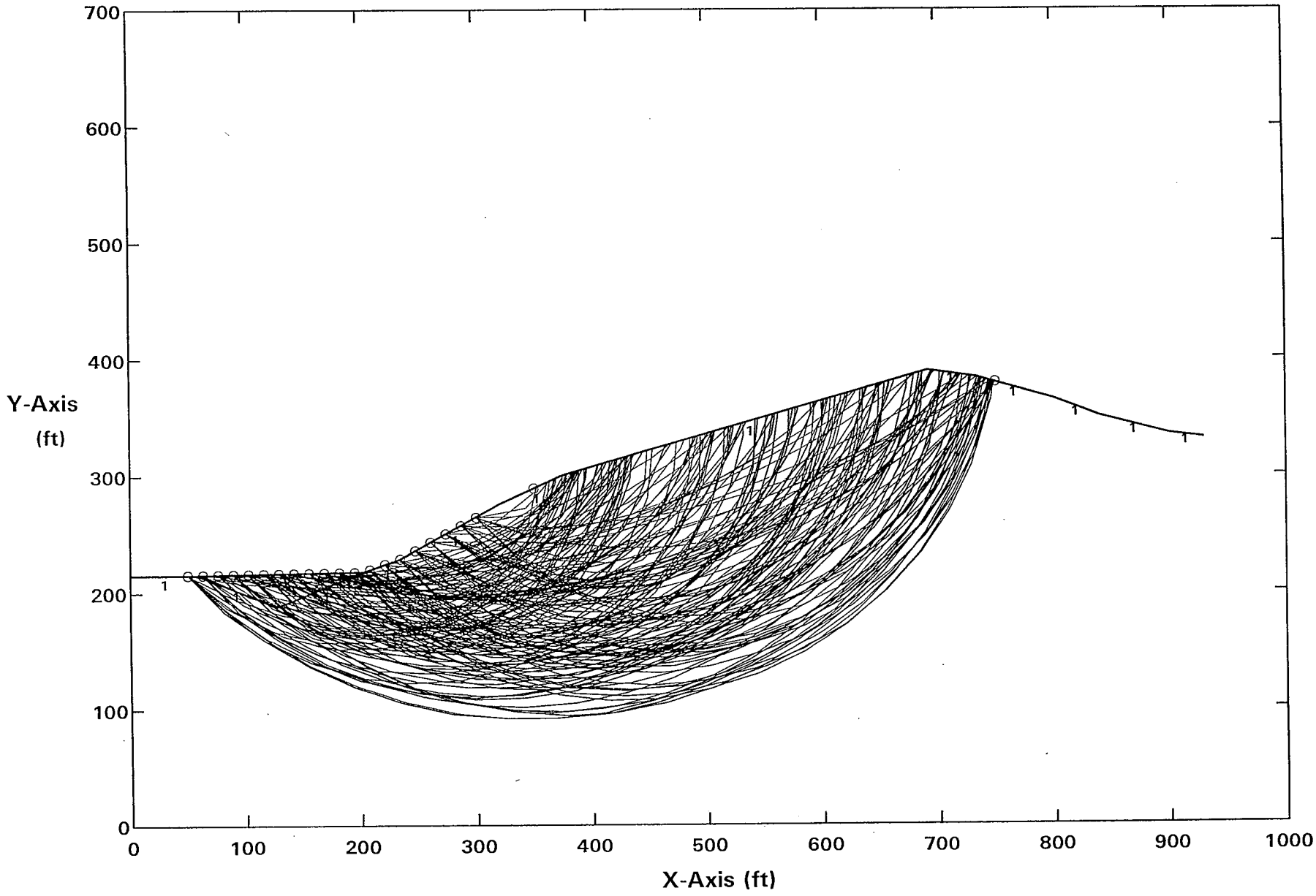
PCSTABL5M FSmin = 2.40 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

Run #6

TR.52584-Hasley Cyn-Sec.27-27'-Circular analysis-Static

All surfaces evaluated. C:HC27S4.PLT By: EC 2/22/2000 11:24am



Factors Of Safety Calculated By The Modified Bishop Method

Run #6

** PCSTABL5M **

by
Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date:	2/22/2000
Time of Run:	11:55am
Run By:	EC
Input Data Filename:	C:HC27S4.IN
Output Filename:	C:HC27S4.OUT
Plotted Output Filename:	C:HC27S4.PLT

PROBLEM DESCRIPTION TR.52584-Hasley Cyn-Sec.27-27'-Circular analysis-Static

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	.00	215.00	58.00	215.00	1
2	58.00	215.00	202.00	217.00	2
3	202.00	217.00	234.00	228.00	1
4	234.00	228.00	320.00	275.00	1
5	320.00	275.00	374.00	300.00	1
6	374.00	300.00	692.00	390.00	1
7	692.00	390.00	733.00	384.00	1
8	733.00	384.00	800.00	365.00	1
9	800.00	365.00	840.00	350.00	1
10	840.00	350.00	900.00	335.00	1
11	900.00	335.00	930.00	331.00	1
12	58.00	215.00	128.00	188.00	1
13	128.00	188.00	202.00	217.00	1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

Run #6

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	119.0	119.0	410.0	40.5	.00	.0	0
2	125.0	125.0	300.0	29.0	.00	.0	0

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

200 Trial Surfaces Have Been Generated.

10 Surfaces Initiate From Each Of 20 Points Equally Spaced Along The Ground Surface Between X = 202.00 ft.
and X = 202.10 ft.

Each Surface Terminates Between X = 390.00 ft.
and X = 410.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = .00 ft.

21.00 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 13.0 deg.

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	202.02	217.01
2	223.02	217.29
3	243.91	219.39
4	264.55	223.29

5	284.76	228.98
6	304.41	236.40
7	323.34	245.49
8	341.41	256.20
9	358.47	268.43
10	374.42	282.10
11	389.11	297.10
12	396.81	306.45

Circle Center At X = 209.5 ; Y = 457.5 and Radius, 240.6

*** 2.403 ***

Individual data on the 14 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	21.0	8669.8	.0	.0	.0	.0	.0	.0	.0
2	11.0	10811.9	.0	.0	.0	.0	.0	.0	.0
3	9.9	13945.8	.0	.0	.0	.0	.0	.0	.0
4	20.6	43498.5	.0	.0	.0	.0	.0	.0	.0
5	20.2	57936.0	.0	.0	.0	.0	.0	.0	.0
6	19.6	66454.0	.0	.0	.0	.0	.0	.0	.0
7	15.6	56766.0	.0	.0	.0	.0	.0	.0	.0
8	3.3	12348.3	.0	.0	.0	.0	.0	.0	.0
9	18.1	64250.2	.0	.0	.0	.0	.0	.0	.0
10	17.1	53927.8	.0	.0	.0	.0	.0	.0	.0
11	15.5	39393.7	.0	.0	.0	.0	.0	.0	.0
12	.4	901.1	.0	.0	.0	.0	.0	.0	.0
13	14.7	22035.5	.0	.0	.0	.0	.0	.0	.0
14	7.7	3286.8	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 12 Coordinate Points

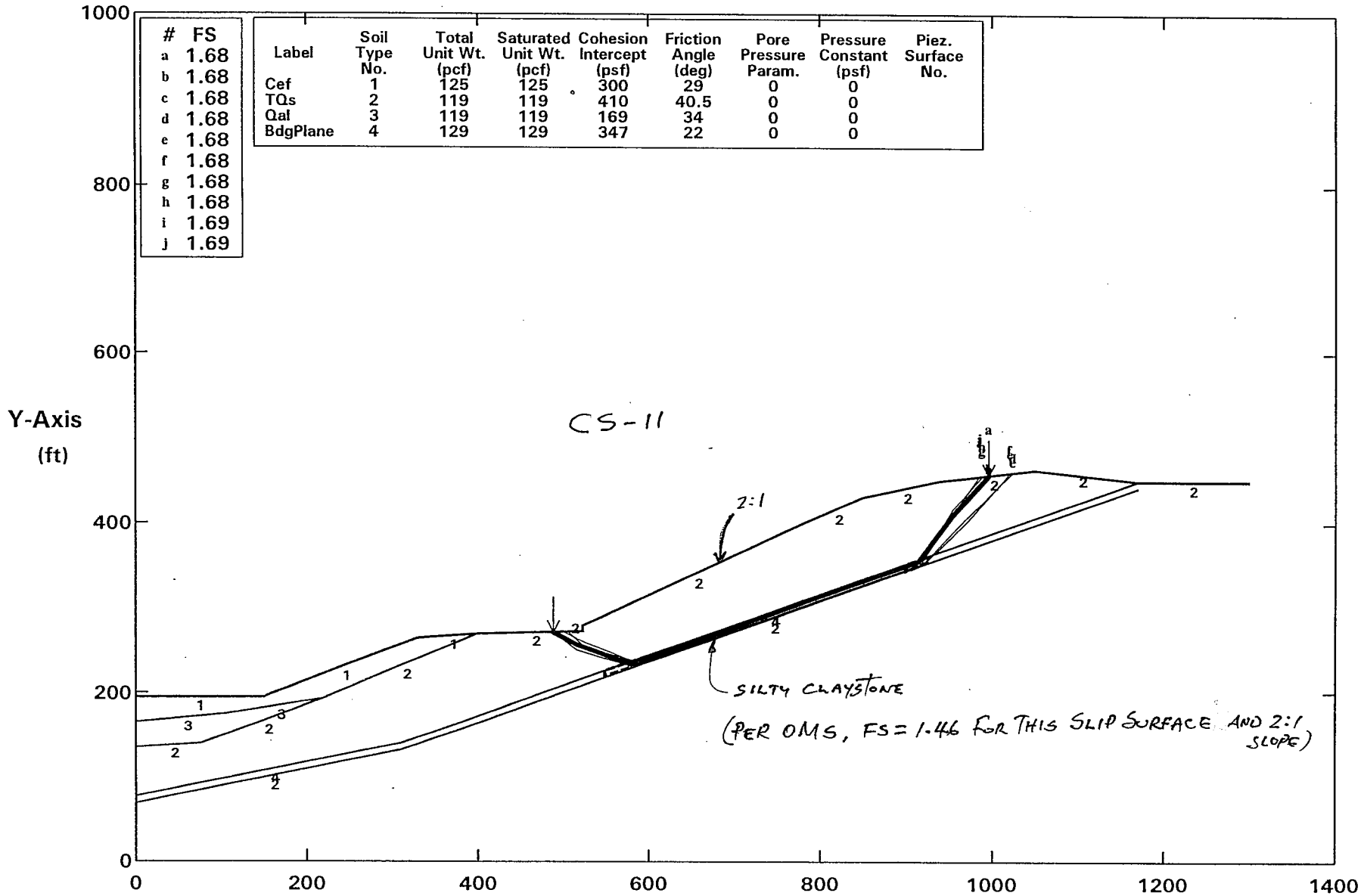
Point No.	X-Surf (ft)	Y-Surf (ft)
1	202.02	217.01
2	223.01	217.56
3	243.88	219.87
4	264.49	223.92
5	284.68	229.68
6	304.32	237.12
7	323.27	246.17
8	341.40	256.77
9	358.57	268.86
10	374.67	282.34
11	389.58	297.13
12	397.76	306.73

TT52584-Hasley Cyn-Sec30-30'(2:1 slope)- Lower bedding plane-Search-Static

Ten Most Critical. C:SEC30-30.PLT By: EC 3/21/2000 3:35pm

#	FS
a	1.68
b	1.68
c	1.68
d	1.68
e	1.68
f	1.68
g	1.68
h	1.68
i	1.69
j	1.69

Label	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.
Cef	1	125	125	300	29	0	0	
TQs	2	119	119	410	40.5	0	0	
Qal	3	119	119	169	34	0	0	
BdgPlane	4	129	129	347	22	0	0	



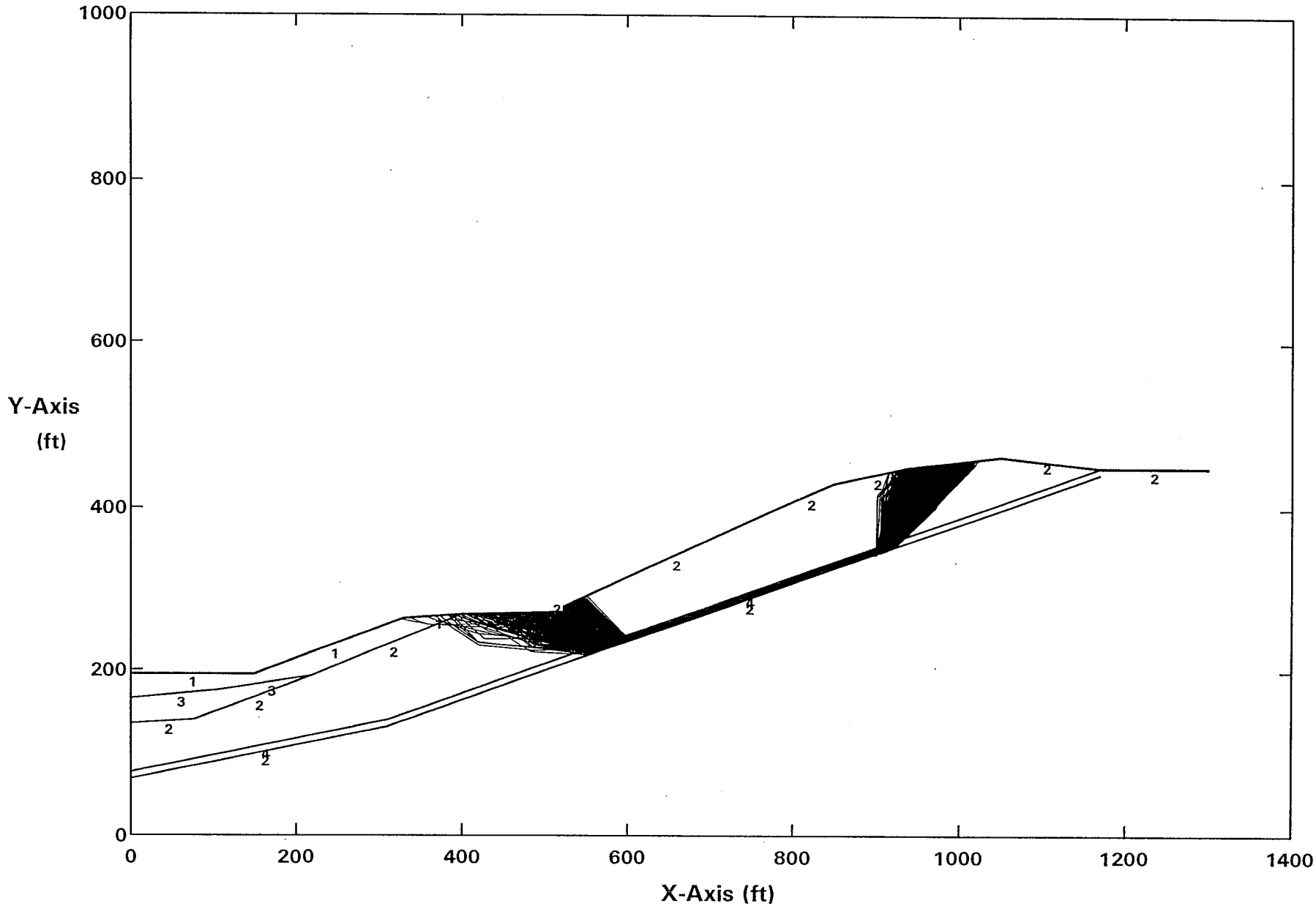
PCSTABL5M FSmin = 1.68 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run #7

TT52584-Hasley Cyn-Sec30-30'(2:1 slope)- Lower bedding plane-Search-Static

All surfaces evaluated. C:SEC30-30.PLT By: EC 3/21/2000 3:35pm



Factors Of Safety Calculated By The Modified Janbu Method

Run #7

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	3/21/2000
Time of Run:	3:35pm
Run By:	EC
Input Data Filename:	C:SEC30-30.IN
Output Filename:	C:SEC30-30.OUT
Plotted Output Filename:	C:SEC30-30.PLT

PROBLEM DESCRIPTION TT52584-Hasley Cyn-Sec30-30'(2:1 slope)-
Lower bedding plane-Search-Static

BOUNDARY COORDINATES

11 Top Boundaries
20 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	195.00	150.00	195.00	1
2	150.00	195.00	330.00	265.00	1
3	330.00	265.00	400.00	270.00	1
4	400.00	270.00	523.00	273.00	2
5	523.00	273.00	524.00	280.00	2
6	524.00	280.00	780.00	400.00	2
7	780.00	400.00	850.00	430.00	2
8	850.00	430.00	940.00	450.00	2
9	940.00	450.00	1050.00	463.00	2
10	1050.00	463.00	1170.00	450.00	2
11	1170.00	450.00	1300.00	450.00	2
12	.00	165.00	105.00	176.00	3
13	105.00	176.00	220.00	193.00	3
14	220.00	193.00	400.00	270.00	2
15	.00	135.00	76.00	140.00	2
16	76.00	140.00	220.00	193.00	2
17	.00	76.00	311.00	140.00	4
18	311.00	140.00	1170.00	450.00	4
19	.00	68.00	311.00	132.00	2
20	311.00	132.00	1170.00	442.00	2

Run #7

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	125.0	300.0	29.0	.00	.0	0
2	119.0	119.0	410.0	40.5	.00	.0	0
3	119.0	119.0	169.0	34.0	.00	.0	0
4	129.0	129.0	347.0	22.0	.00	.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 67.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	550.00	222.30	600.00	240.30	7.00
2	900.00	348.60	925.00	357.60	7.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	489.55	272.18

2	516.35	256.98
3	579.31	234.06
4	915.32	355.91
5	954.53	410.24
6	996.45	456.67

*** 1.679 ***

Individual data on the 12 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	26.8	25287.9	.0	.0	.0	.0	.0	.0	.0
2	6.7	13578.6	.0	.0	.0	.0	.0	.0	.0
3	1.0	2633.2	.0	.0	.0	.0	.0	.0	.0
4	51.5	289460.8	.0	.0	.0	.0	.0	.0	.0
5	3.8	32022.9	.0	.0	.0	.0	.0	.0	.0
6	200.7	********	.0	.0	.0	.0	.0	.0	.0
7	70.0	796945.7	.0	.0	.0	.0	.0	.0	.0
8	65.3	725927.0	.0	.0	.0	.0	.0	.0	.0
9	2.1	22177.1	.0	.0	.0	.0	.0	.0	.0
10	22.5	195879.8	.0	.0	.0	.0	.0	.0	.0
11	14.5	87631.5	.0	.0	.0	.0	.0	.0	.0
12	41.9	103457.7	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	489.55	272.18
2	516.35	256.98
3	579.31	234.06
4	915.32	355.91
5	954.53	410.24
6	996.45	456.67

*** 1.679 ***

Failure Surface Specified By 7 Coordinate Points

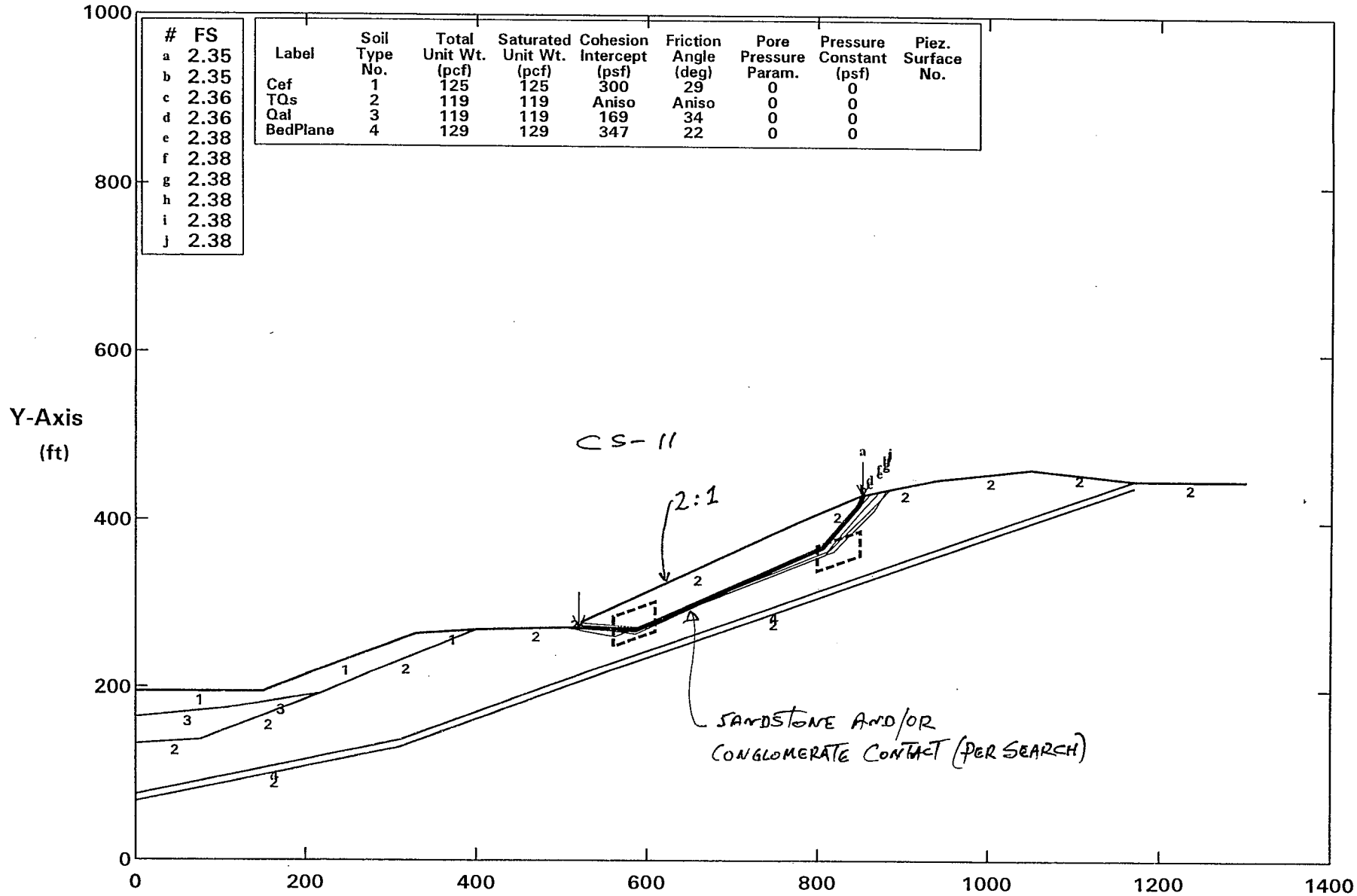
Point No.	X-Surf (ft)	Y-Surf (ft)

TT52584-Hasley Cyn-Sec30(B)- Search Below Upper Toe- Static

Ten Most Critical. C:SEC30(B).PLT By: EC 2/14/2000 12:41pm

#	FS
a	2.35
b	2.35
c	2.36
d	2.36
e	2.38
f	2.38
g	2.38
h	2.38
i	2.38
j	2.38

Label	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.
Cef	1	125	125	300	29	0	0	
TQs	2	119	119	Aniso	Aniso	0	0	
Qal	3	119	119	169	34	0	0	
BedPlane	4	129	129	347	22	0	0	



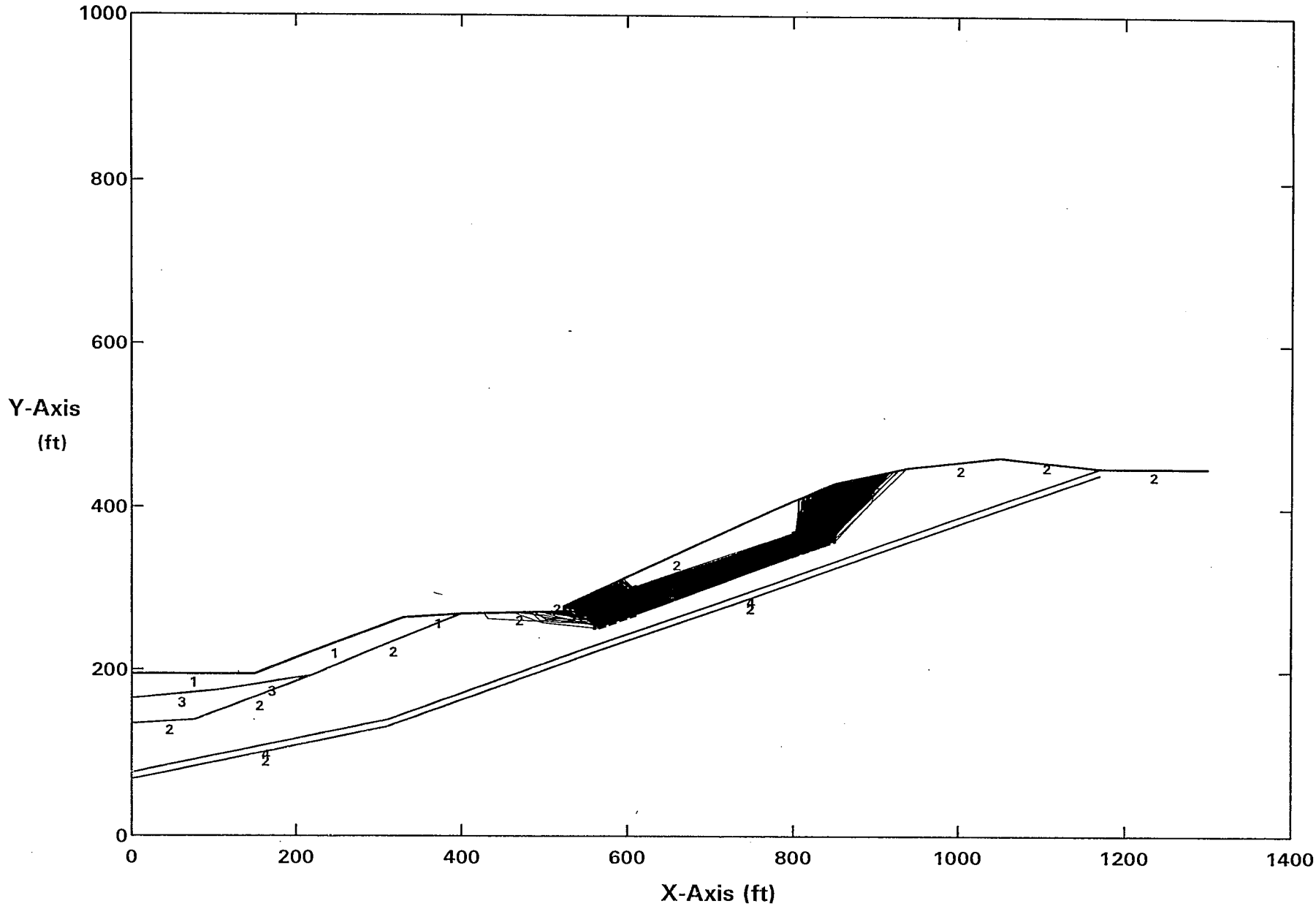
PCSTABL5M FSmin = 2.35 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run #8

TT52584-Hasley Cyn-Sec30(B)- Search Below Upper Toe- Static

All surfaces evaluated. C:SEC30(B).PLT By: EC 2/14/2000 12:41pm



Factors Of Safety Calculated By The Modified Janbu Method

Run #8

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	2/14/2000
Time of Run:	12:41pm
Run By:	EC
Input Data Filename:	C:SEC30(B)
Output Filename:	C:SEC30(B).OUT
Plotted Output Filename:	C:SEC30(B).PLT

PROBLEM DESCRIPTION TT52584-Hasley Cyn-Sec30(B)- Search Below Upper Toe- Static

BOUNDARY COORDINATES

11 Top Boundaries
20 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	195.00	150.00	195.00	1
2	150.00	195.00	330.00	265.00	1
3	330.00	265.00	400.00	270.00	1
4	400.00	270.00	523.00	273.00	2
5	523.00	273.00	524.00	280.00	2
6	524.00	280.00	780.00	400.00	2
7	780.00	400.00	850.00	430.00	2
8	850.00	430.00	940.00	450.00	2
9	940.00	450.00	1050.00	463.00	2
10	1050.00	463.00	1170.00	450.00	2
11	1170.00	450.00	1300.00	450.00	2
12	.00	165.00	105.00	176.00	3
13	105.00	176.00	220.00	193.00	3
14	220.00	193.00	400.00	270.00	2
15	.00	135.00	76.00	140.00	2
16	76.00	140.00	220.00	193.00	2
17	.00	76.00	311.00	140.00	4
18	311.00	140.00	1170.00	450.00	4
19	.00	68.00	311.00	132.00	2
20	311.00	132.00	1170.00	442.00	2

Run #8

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	125.0	300.0	29.0	.00	.0	0
2	119.0	119.0	410.0	40.5	.00	.0	0
3	119.0	119.0	169.0	34.0	.00	.0	0
4	129.0	129.0	347.0	22.0	.00	.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	19.5	410.0	40.5
2	20.5	410.0	40.5
3	90.0	410.0	40.5

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 67.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	560.00	268.20	610.00	286.40	35.00

2	800.00	355.60	850.00	373.80	30.00

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	589.00	310.47
2	603.30	297.53
3	821.40	349.98
4	821.81	416.98
5	823.44	418.62

Factor Of Safety For The Preceding Specified Surface = 5.086

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Examined. They Are Ordered - Most Critical
First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	520.48	272.94
2	587.41	270.55
3	805.42	368.36
4	848.73	419.47
5	852.75	430.61

*** 2.354 ***

Individual data on the 8 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	2.5	22.8	.0	.0	.0	.0	.0	.0	.0
2	1.0	436.7	.0	.0	.0	.0	.0	.0	.0
3	63.4	174947.8	.0	.0	.0	.0	.0	.0	.0
4	192.6	942203.3	.0	.0	.0	.0	.0	.0	.0
5	25.4	129422.8	.0	.0	.0	.0	.0	.0	.0
6	43.3	135354.0	.0	.0	.0	.0	.0	.0	.0
7	1.3	1281.4	.0	.0	.0	.0	.0	.0	.0
8	2.7	1146.1	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	520.48	272.94
2	587.41	270.55
3	805.42	368.36
4	848.73	419.47
5	852.75	430.61

*** 2.354 ***

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	522.94	273.00
2	587.22	264.32
3	809.91	371.28
4	852.91	422.66
5	861.74	432.61

*** 2.359 ***

Failure Surface Specified By 5 Coordinate Points

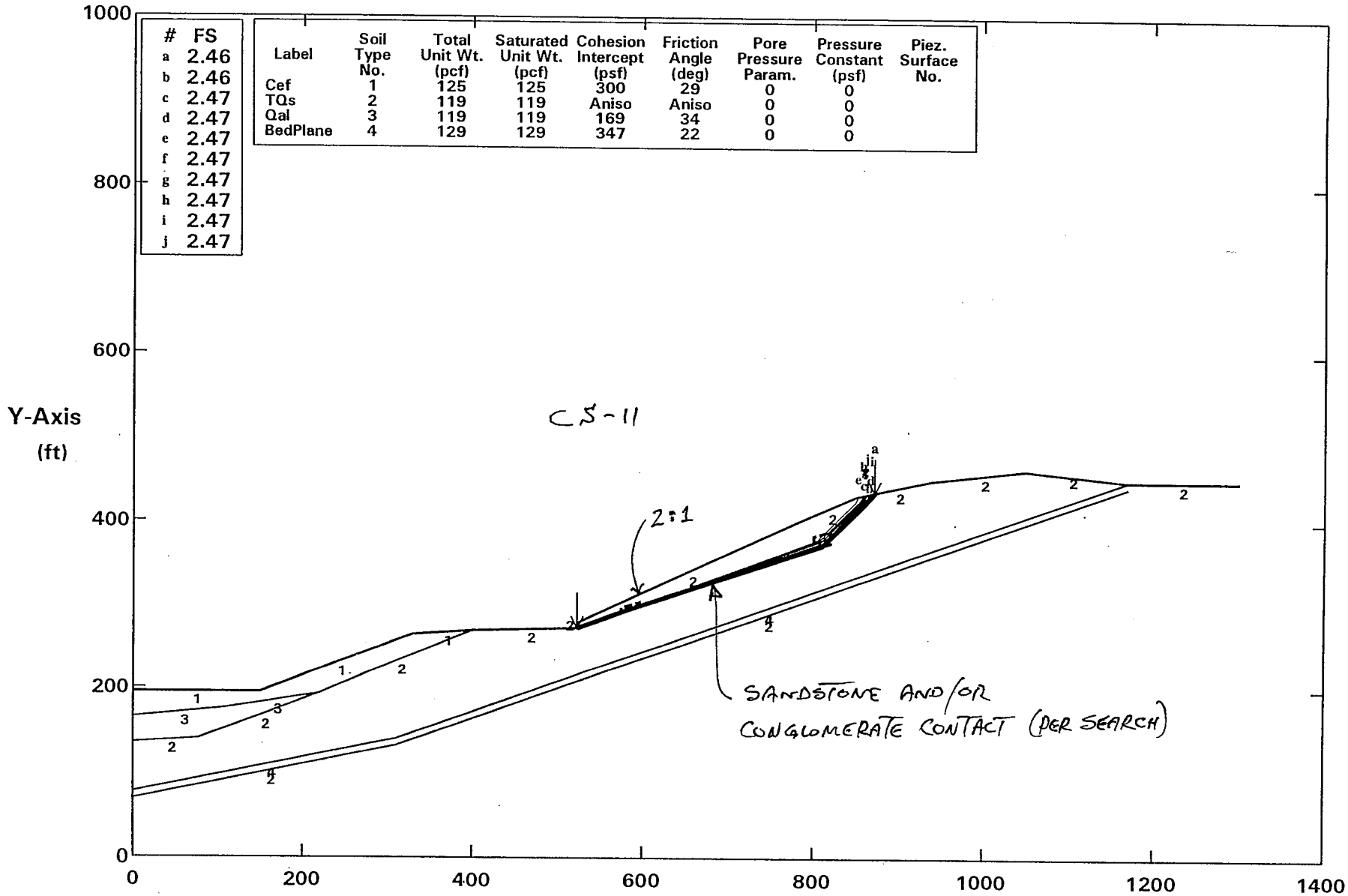
Point No.	X-Surf (ft)	Y-Surf (ft)
1	522.94	273.00
2	587.22	264.32

TT52584-Hasley Cyn-Sec30(C)- Search Above Upper Toe(lower area)- Static

Ten Most Critical. C:SEC30(C).PLT By: EC 2/14/2000 12:28pm

#	FS
a	2.46
b	2.46
c	2.47
d	2.47
e	2.47
f	2.47
g	2.47
h	2.47
i	2.47
j	2.47

Label	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.
Cef	1	125	125	300	29	0	0	
TQs	2	119	119	Aniso	Aniso	0	0	
Qal	3	119	119	169	34	0	0	
BedPlane	4	129	129	347	22	0	0	



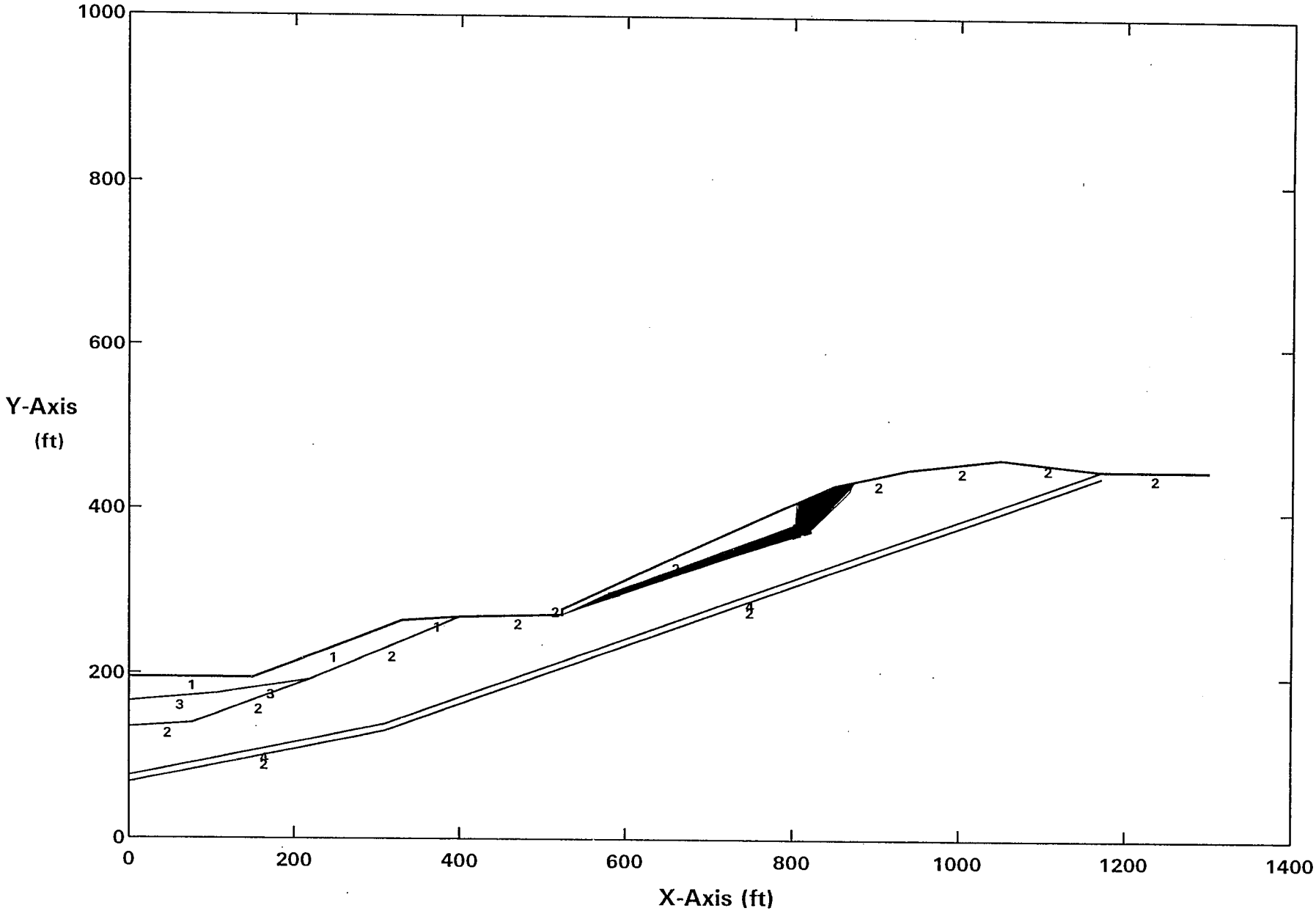
PCSTABL5M FSmin = 2.46 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

RUN #9

TT52584-Hasley Cyn-Sec30(C)- Search Above Upper Toe(lower area)- Static

All surfaces evaluated. C:SEC30(C).PLT By: EC 2/14/2000 12:28pm



Factors Of Safety Calculated By The Modified Janbu Method

Run #9

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--

Simplified Janbu, Simplified Bishop

or Spencer's Method of Slices

Run Date:	2/14/2000
Time of Run:	12:28pm
Run By:	EC
Input Data Filename:	C:SEC30(C)
Output Filename:	C:SEC30(C).OUT
Plotted Output Filename:	C:SEC30(C).PLT

PROBLEM DESCRIPTION TT52584-Hasley Cyn-Sec30(C)- Search
Above Upper Toe(lower area)- Static

BOUNDARY COORDINATES

11 Top Boundaries
20 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	195.00	150.00	195.00	1
2	150.00	195.00	330.00	265.00	1
3	330.00	265.00	400.00	270.00	1
4	400.00	270.00	523.00	273.00	2
5	523.00	273.00	524.00	280.00	2
6	524.00	280.00	780.00	400.00	2
7	780.00	400.00	850.00	430.00	2
8	850.00	430.00	940.00	450.00	2
9	940.00	450.00	1050.00	463.00	2
10	1050.00	463.00	1170.00	450.00	2
11	1170.00	450.00	1300.00	450.00	2
12	.00	165.00	105.00	176.00	3
13	105.00	176.00	220.00	193.00	3
14	220.00	193.00	400.00	270.00	2
15	.00	135.00	76.00	140.00	2
16	76.00	140.00	220.00	193.00	2
17	.00	76.00	311.00	140.00	4
18	311.00	140.00	1170.00	450.00	4
19	.00	68.00	311.00	132.00	2
20	311.00	132.00	1170.00	442.00	2

Run #9

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	125.0	300.0	29.0	.00	.0	0
2	119.0	119.0	410.0	40.5	.00	.0	0
3	119.0	119.0	169.0	34.0	.00	.0	0
4	129.0	129.0	347.0	22.0	.00	.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	19.5	410.0	40.5
2	20.5	410.0	40.5
3	90.0	410.0	40.5

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.

400 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 67.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	523.00	273.00	523.00	273.00	.00

2	575.80	294.60	595.80	301.80	5.50
3	800.80	375.70	820.80	383.00	15.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	523.00	273.00
2	580.24	293.62
3	810.62	371.97
4	857.89	419.45
5	872.73	435.05

*** 2.459 ***

Individual data on the 7 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	1.0	395.1	.0	.0	.0	.0	.0	.0	.0
2	56.2	64863.5	.0	.0	.0	.0	.0	.0	.0
3	199.8	608385.4	.0	.0	.0	.0	.0	.0	.0
4	30.6	144994.4	.0	.0	.0	.0	.0	.0	.0
5	39.4	139703.5	.0	.0	.0	.0	.0	.0	.0
6	7.9	14445.7	.0	.0	.0	.0	.0	.0	.0
7	14.8	10859.5	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 5 Coordinate Points

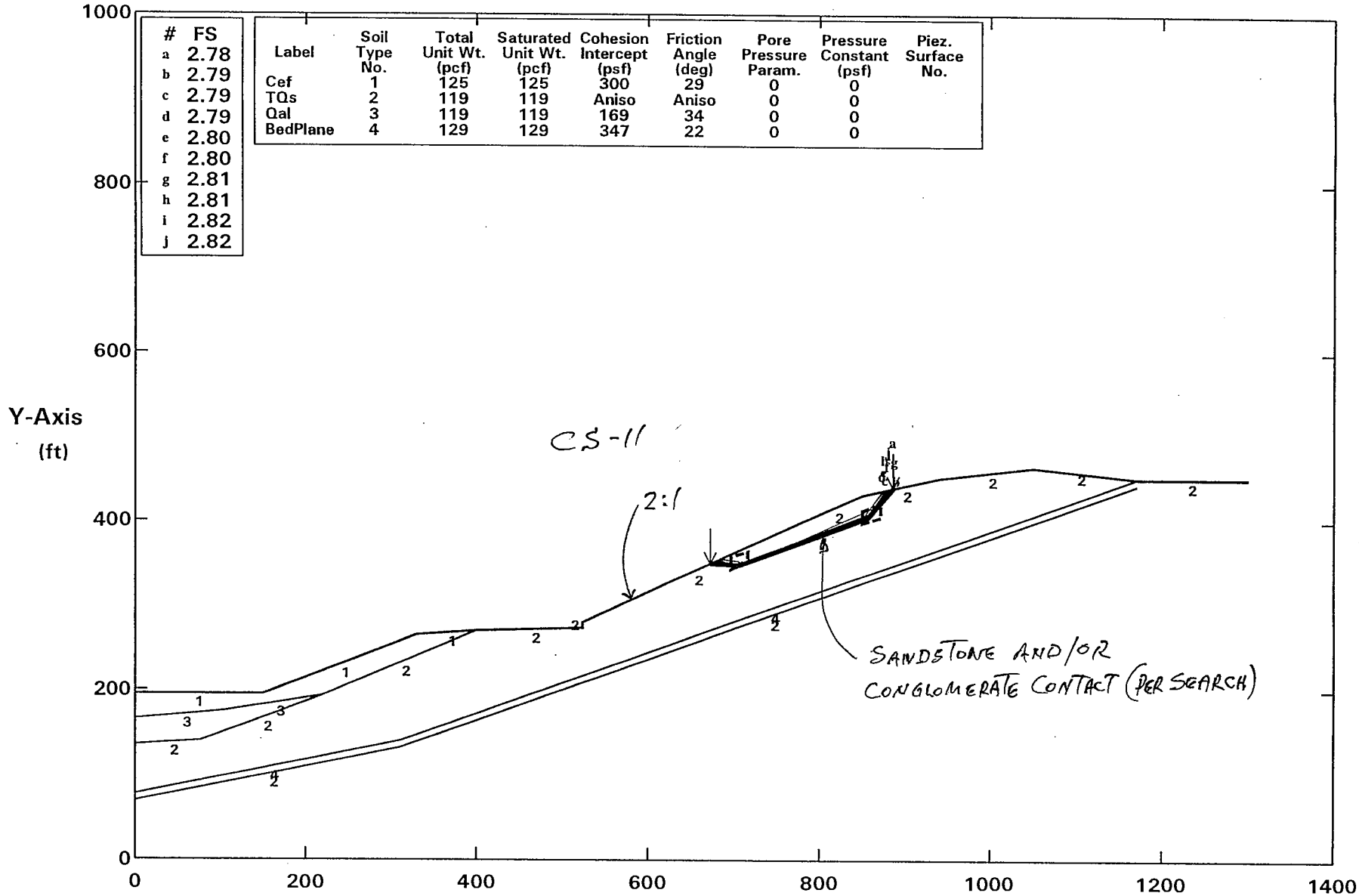
Point No.	X-Surf (ft)	Y-Surf (ft)
1	523.00	273.00
2	591.53	297.54
3	813.36	376.36
4	860.70	423.77
5	865.97	433.55

TT52584-Hasley Cyn-Sec30(D)- Search Above Upper Toe(upper area)- Static

Ten Most Critical. C:SEC30(D).PLT By: EC 2/14/2000 12:33pm

#	FS
a	2.78
b	2.79
c	2.79
d	2.79
e	2.80
f	2.80
g	2.81
h	2.81
i	2.82
j	2.82

Label	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.
Cef	1	125	125	300	29	0	0	
TQs	2	119	119	Aniso	Aniso	0	0	
Qal	3	119	119	169	34	0	0	
BedPlane	4	129	129	347	22	0	0	



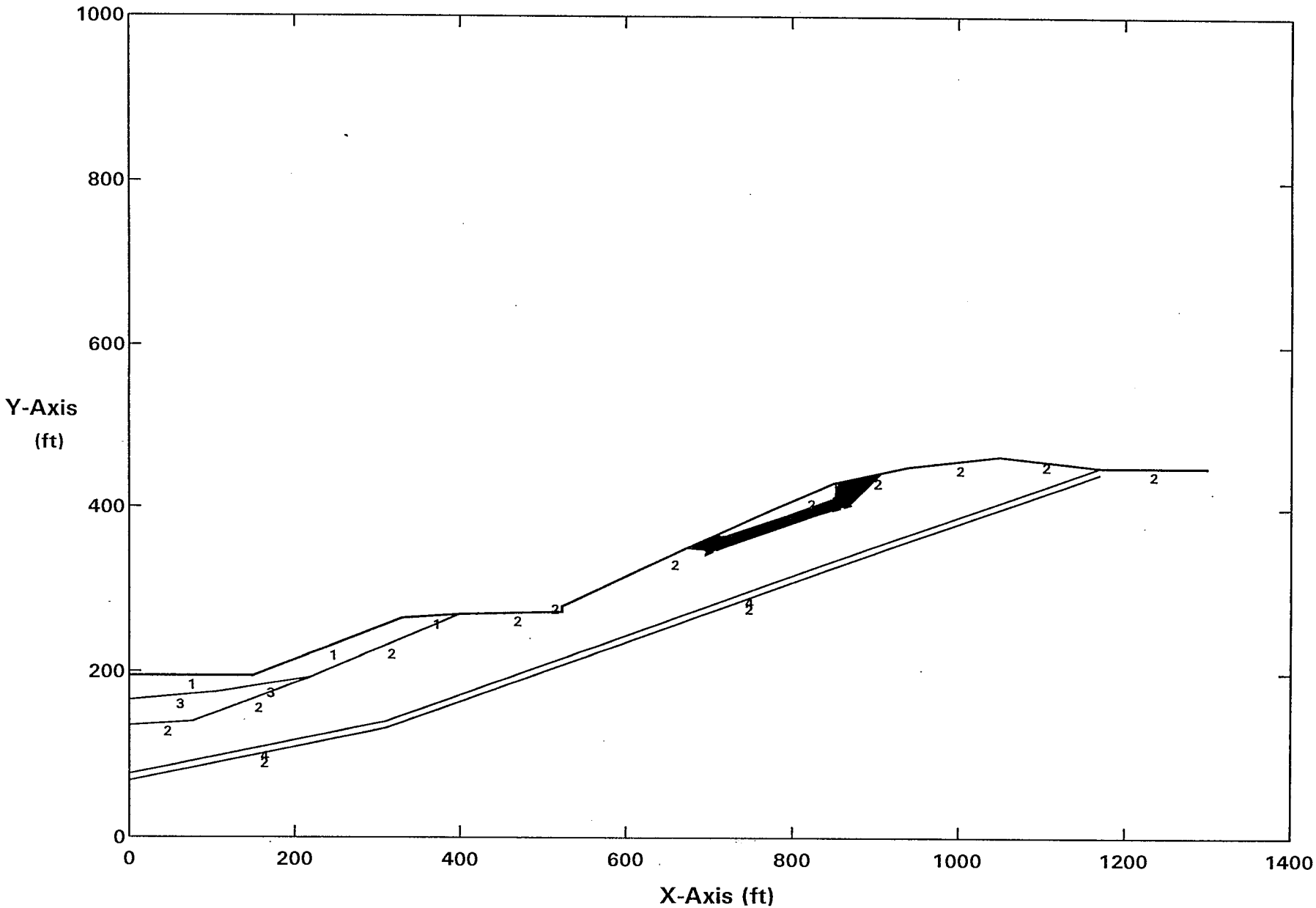
PCSTABL5M FSmin = 2.78 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

RUN #10

TT52584-Hasley Cyn-Sec30(D)- Search Above Upper Toe(upper area)- Static

All surfaces evaluated. C:SEC30(D).PLT By: EC 2/14/2000 12:33pm



Factors Of Safety Calculated By The Modified Janbu Method

Run #10

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	2/14/2000
Time of Run:	12:33pm
Run By:	EC
Input Data Filename:	C:SEC30(D)
Output Filename:	C:SEC30(D).OUT
Plotted Output Filename:	C:SEC30(D).PLT

PROBLEM DESCRIPTION TT52584-Hasley Cyn-Sec30(D)- Search
Above Upper Toe(upper area)- Static

BOUNDARY COORDINATES

11 Top Boundaries
20 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	195.00	150.00	195.00	1
2	150.00	195.00	330.00	265.00	1
3	330.00	265.00	400.00	270.00	1
4	400.00	270.00	523.00	273.00	2
5	523.00	273.00	524.00	280.00	2
6	524.00	280.00	780.00	400.00	2
7	780.00	400.00	850.00	430.00	2
8	850.00	430.00	940.00	450.00	2
9	940.00	450.00	1050.00	463.00	2
10	1050.00	463.00	1170.00	450.00	2
11	1170.00	450.00	1300.00	450.00	2
12	.00	165.00	105.00	176.00	3
13	105.00	176.00	220.00	193.00	3
14	220.00	193.00	400.00	270.00	2
15	.00	135.00	76.00	140.00	2
16	76.00	140.00	220.00	193.00	2
17	.00	76.00	311.00	140.00	4
18	311.00	140.00	1170.00	450.00	4
19	.00	68.00	311.00	132.00	2
20	311.00	132.00	1170.00	442.00	2

Run#10

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	125.0	300.0	29.0	.00	.0	0
2	119.0	119.0	410.0	40.5	.00	.0	0
3	119.0	119.0	169.0	34.0	.00	.0	0
4	129.0	129.0	347.0	22.0	.00	.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	19.5	410.0	40.5
2	20.5	410.0	40.5
3	90.0	410.0	40.5

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.

400 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 67.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	697.40	350.40	717.40	357.70	14.00

2	850.40	405.60	870.40	412.90	15.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	672.46	349.59
2	706.16	348.55
3	855.72	403.91
4	885.83	437.96

*** 2.776 ***

Individual data on the 5 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	33.7	33758.0	.0	.0	.0	.0	.0	.0	.0
2	73.8	179907.6	.0	.0	.0	.0	.0	.0	.0
3	70.0	217898.1	.0	.0	.0	.0	.0	.0	.0
4	5.7	18896.1	.0	.0	.0	.0	.0	.0	.0
5	30.1	49016.7	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	674.34	350.47
2	703.18	347.83
3	854.45	401.85
4	888.22	438.49

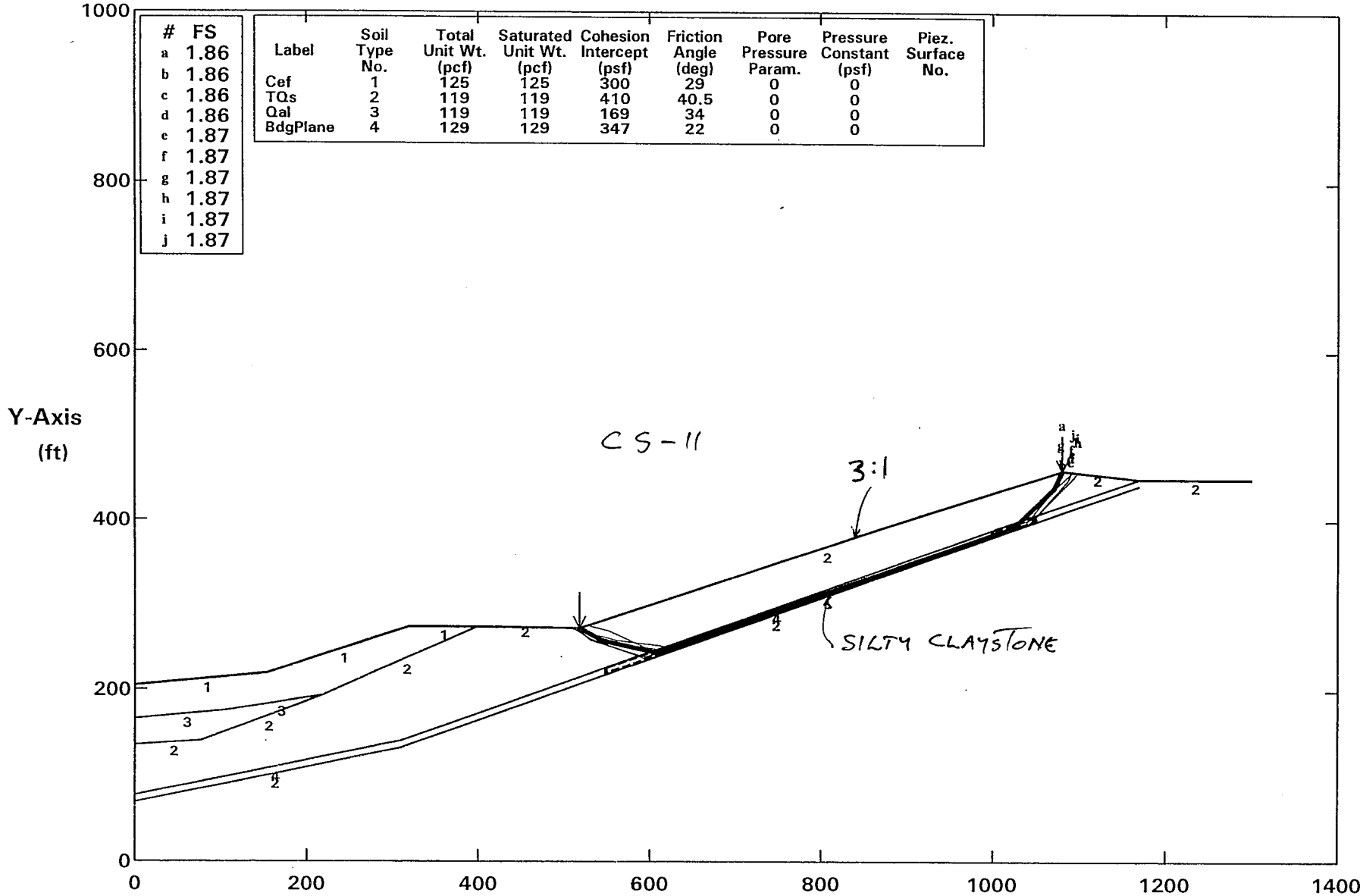
*** 2.785 ***

TT52584-Hasley Cyn-Sec30-30'- 3:1 Slope- Bedding Plane-Search-Static

Ten Most Critical. C:S30-30R2.PLT By: EC 2/16/2000 3:53pm

#	FS
a	1.86
b	1.86
c	1.86
d	1.86
e	1.87
f	1.87
g	1.87
h	1.87
i	1.87
j	1.87

Label	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.
Cef	1	125	125	300	29	0	0	
TQs	2	119	119	410	40.5	0	0	
Qal	3	119	119	169	34	0	0	
BdgPlane	4	129	129	347	22	0	0	



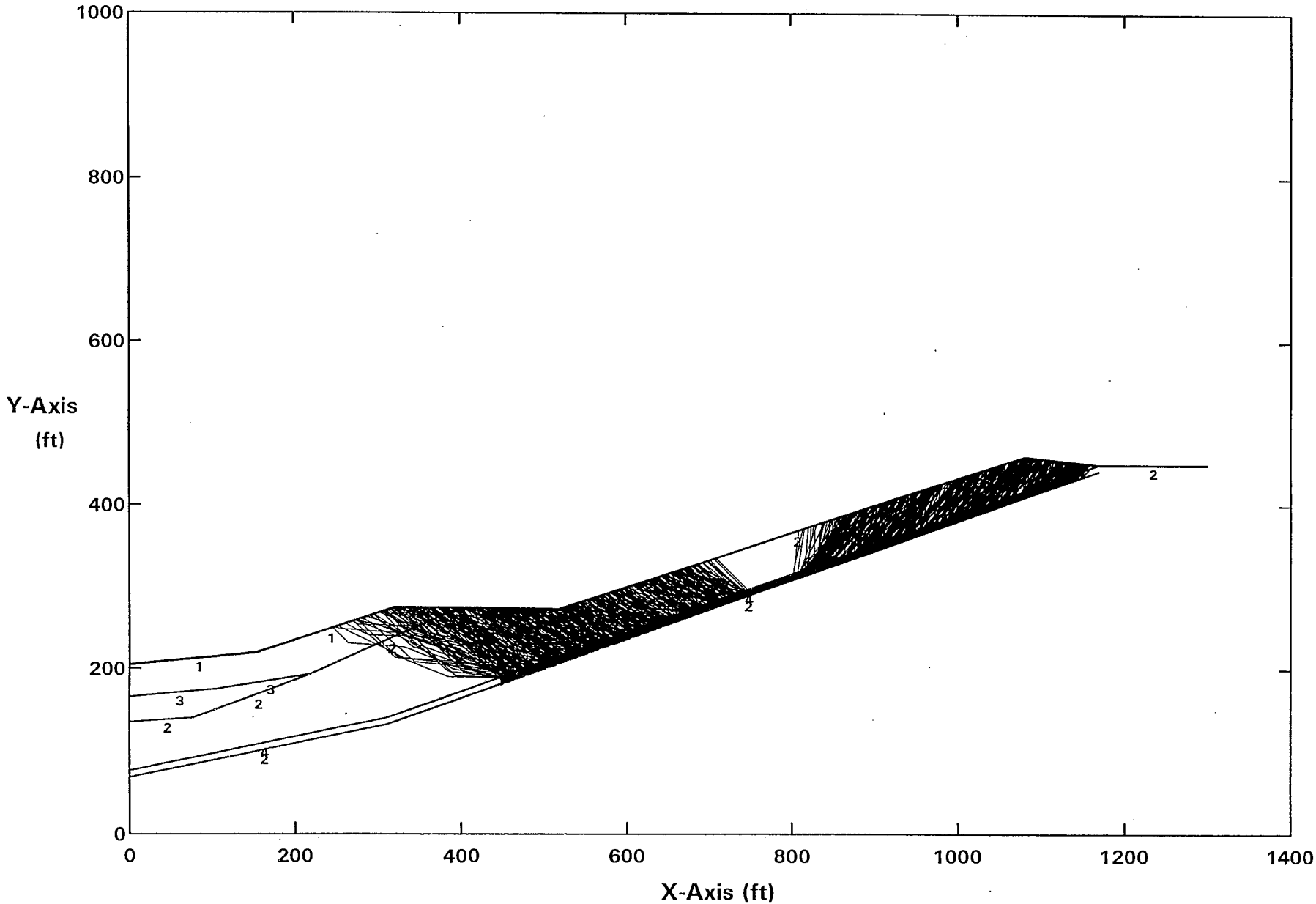
PCSTABL5M FSmin = 1.86 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run #11

TT52584-Hasley Cyn-Sec30-30'- Bdng plane -Search-Static

All surfaces evaluated. C:S30-30R2.PLT By: EC 2/16/2000 3:32pm



Factors Of Safety Calculated By The Modified Janbu Method

Run #11

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	2/16/2000
Time of Run:	3:53pm
Run By:	EC
Input Data Filename:	C:S30-30R2.IN
Output Filename:	C:S30-30R2.OUT
Plotted Output Filename:	C:S30-30R2.PLT

PROBLEM DESCRIPTION TT52584-Hasley Cyn-Sec30-30'- 3:1 Slope-
Bedding Plane-Search-Static

BOUNDARY COORDINATES

7 Top Boundaries
16 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	205.00	155.00	220.00	1
2	155.00	220.00	320.00	275.00	1
3	320.00	275.00	400.00	274.00	1
4	400.00	274.00	519.00	273.00	2
5	519.00	273.00	1080.00	460.00	2
6	1080.00	460.00	1170.00	450.00	2
7	1170.00	450.00	1300.00	450.00	2
8	.00	165.00	105.00	176.00	3
9	105.00	176.00	220.00	193.00	3
10	220.00	193.00	400.00	274.00	2
11	.00	135.00	76.00	140.00	2
12	76.00	140.00	220.00	193.00	2
13	.00	76.00	311.00	140.00	4
14	311.00	140.00	1170.00	450.00	4
15	.00	68.00	311.00	132.00	2
16	311.00	132.00	1170.00	442.00	2

ISOTROPIC SOIL PARAMETERS

Run #11

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	125.0	300.0	29.0	.00	.0	0
2	119.0	119.0	410.0	40.5	.00	.0	0
3	119.0	119.0	169.0	34.0	.00	.0	0
4	129.0	129.0	347.0	22.0	.00	.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 67.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	550.00	222.30	650.00	258.30	7.00
2	1000.00	384.60	1050.00	402.70	7.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	518.56	273.00
2	543.88	258.09
3	609.20	243.16
4	1023.91	391.10
5	1070.31	439.42

i 2 = 18.22°
i 219.6°
i 246.2°

6 1080.10 459.99) i = 64.5

*** 1.862 ***

Individual data on the 9 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	.4	6.7	.0	.0	.0	.0	.0	.0	.0
2	24.9	34726.7	.0	.0	.0	.0	.0	.0	.0
3	57.8	271032.4	.0	.0	.0	.0	.0	.0	.0
4	7.6	52099.4	.0	.0	.0	.0	.0	.0	.0
5	414.7	********	.0	.0	.0	.0	.0	.0	.0
6	9.1	51086.7	.0	.0	.0	.0	.0	.0	.0
7	37.3	135719.7	.0	.0	.0	.0	.0	.0	.0
8	9.7	10127.0	.0	.0	.0	.0	.0	.0	.0
9	.1	1.4	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	518.56	273.00
2	543.88	258.09
3	609.20	243.16
4	1023.91	391.10
5	1070.31	439.42
6	1080.10	459.99

*** 1.862 ***

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	527.29	275.76
2	552.27	269.11
3	613.37	241.63
4	1044.65	397.58
5	1087.61	448.99
6	1090.60	458.82

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
MATERIALS ENGINEERING DIVISION
GEOTECHNICAL ENGINEERING
DEVELOPMENT SERVICES SECTION

ORDINARY METHOD OF SLICES USED FOR ANALYSIS

PROJECT: TT52584-Hasley Canyon
CONSULTANT: AES
REPORT DATE:
SECTION: 30-30' CIRCLE: Beddin pLane in TQs-Janbu's S30-30R2(FS=1.86) DATE: 2/16/00 BY: AC

3:1 SLOPE

SLICE	HEIGHT(1)	HEIGHT(2)	WIDTH	AREA	WEIGHT	UNIT WT
1.	0.00	60.00	89.50	2685.00	319.52	119.0
2.	60.00	50.00	419.50	23072.50	2976.35	129.0
3.	50.00	19.00	48.00	1656.00	197.06	119.0
4.	19.00	0.00	10.00	95.00	11.31	119.0

SLOPE STABILITY DATA

SEISMIC COEFFICIENT = 0.00 g

SLICE NO.	1 SLICE WEIGHT W (kips)	2 FAILURE PLANE ANGLE i(deg)	3 ANGLE OF INT. FRICTION phi(deg)	4 COHE-SION C (ksf)	5 LENGTH OF ARC L (ft)	6 W (1-Ru) COS i TAN phi	7 C L	8 g W (1-Ru) SINi TAN phi	9 W SIN i	10 g W COS i
1.	319.52	-18.20	40.50	0.410	94.21	259.24	38.63	0.00	-99.80	0.00
2.	2976.35	19.60	22.00	0.347	445.30	1132.85	154.52	0.00	998.42	0.00
3.	197.06	46.20	40.50	0.410	69.35	116.49	28.43	0.00	142.23	0.00
4.	11.31	64.50	40.50	0.410	23.23	4.16	9.52	0.00	10.20	0.00
SUMMATION:						1512.74	231.10	0.00	1051.06	0.00

STATIC SAFETY FACTOR = 1.66
~~SEISMIC SAFETY FACTOR = 1.66~~

Run #12a

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
MATERIALS ENGINEERING DIVISION
GEOTECHNICAL ENGINEERING
DEVELOPMENT SERVICES SECTION
ORDINARY METHOD OF SLICES USED FOR ANALYSIS

PROJECT: TT52584-Hasley Canyon
CONSULTANT: AES
REPORT DATE:
SECTION: 30-30' CIRCLE: Bedding Plane in TQs-Janbu's S30-30R2 DATE: 2/16/00 BY: AC.

3:1 SLOPE

SLICE	HEIGHT(1)	HEIGHT(2)	WIDTH	AREA	WEIGHT	UNIT WT
1.	0.00	60.00	89.50	2685.00	319.52	119.0
2.	60.00	50.00	419.50	23072.50	2976.35	129.0
3.	50.00	19.00	48.00	1656.00	197.06	119.0
4.	19.00	0.00	10.00	95.00	11.31	119.0

SLOPE STABILITY DATA

SEISMIC COEFFICIENT = 0.15 g

SLICE NO.	1 SLICE WEIGHT W (kips)	2 FAILURE PLANE ANGLE i(deg)	3 ANGLE OF INT. FRICTION phi(deg)	4 COHE-SION C (ksf)	5 LENGTH OF ARC L (ft)	6 W (1-Ru) COS i / TAN phi	7 C L	8 g W (1-Ru) SINi / TAN phi	9 W SIN i	10 g W COS i
1.	319.52	-18.20	42.00	0.880	94.21	273.30	82.91	-13.48	-99.80	45.53
2.	2976.35	19.60	27.00	1.168	445.30	1428.66	520.11	76.31	998.42	420.58
3.	197.06	46.20	42.00	0.880	69.35	122.81	61.03	19.21	142.23	20.46
4.	11.31	64.50	42.00	0.880	23.23	4.38	20.44	1.38	10.20	0.73
SUMMATION:						1829.15	684.49	83.42	1051.06	487.30

~~STATIC SAFETY FACTOR = 2.38~~
SEISMIC SAFETY FACTOR = 1.58

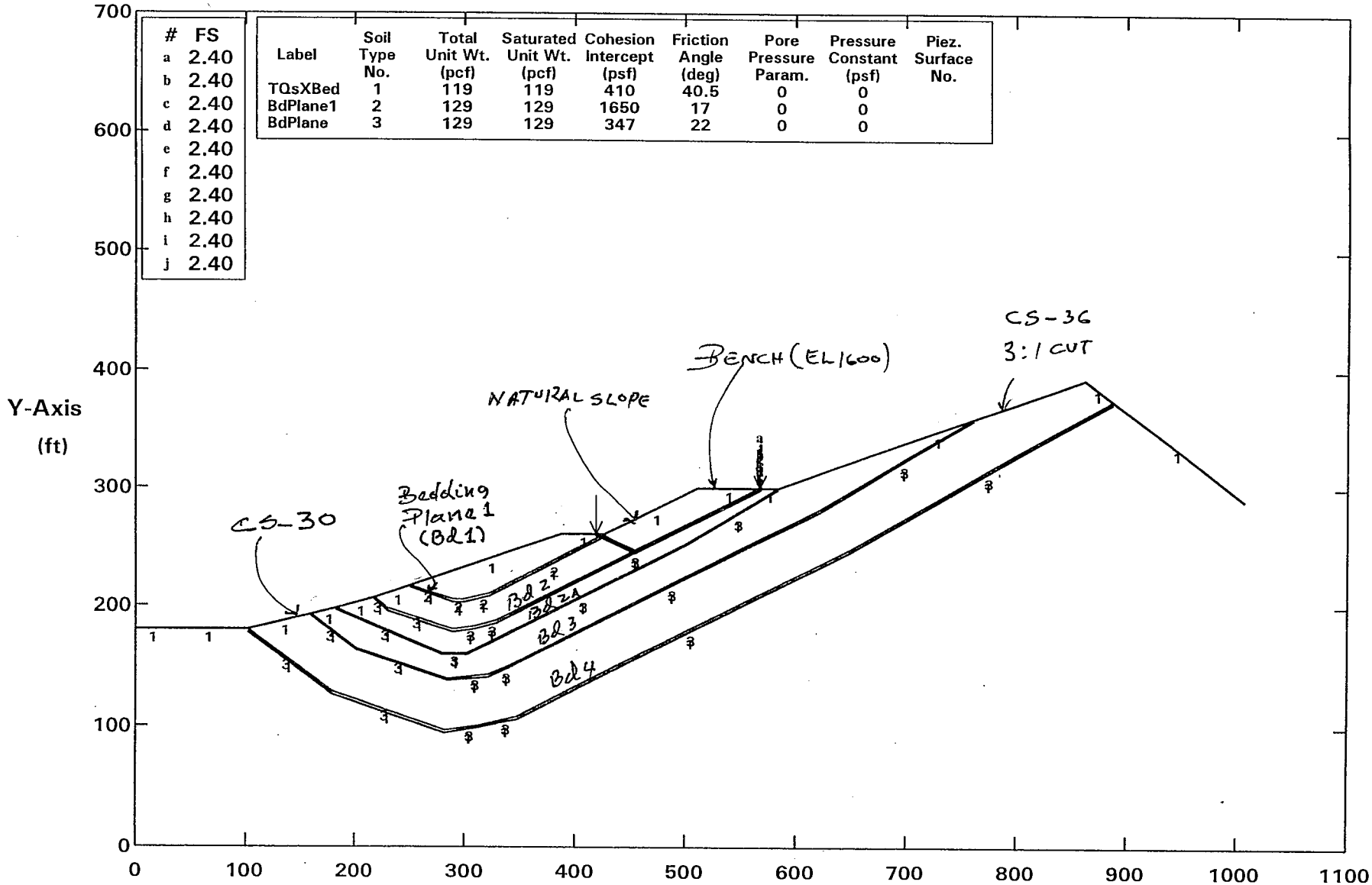
Run #126

TT52584-Sec.31-31'w/BENCH @El.1600 & 3:1 cut above it-Plane 2-Search-Static

Ten Most Critical. C:SC31(2)R.PLT By: EC 2/22/2000 4:49pm

#	FS
a	2.40
b	2.40
c	2.40
d	2.40
e	2.40
f	2.40
g	2.40
h	2.40
i	2.40
j	2.40

Label	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.
TQsXBed	1	119	119	410	40.5	0	0	
BdPlane1	2	129	129	1650	17	0	0	
BdPlane	3	129	129	347	22	0	0	



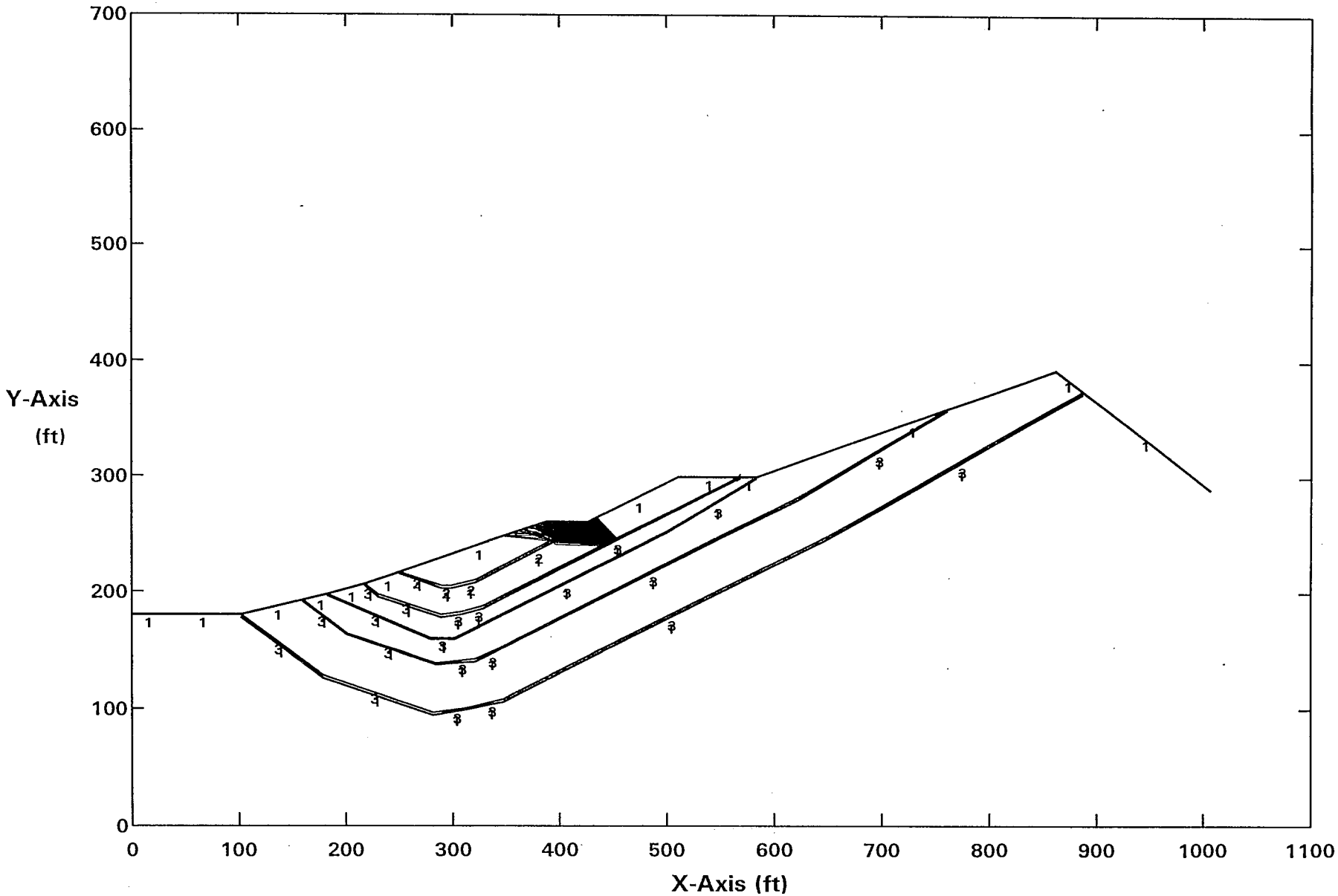
PCSTABL5M FSmin = 2.40 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Lun #3

TT52584-Sec.31-31'w/BENCH @El.1600 & 3:1 cut above it-Plane 2-Search-Static

All surfaces evaluated. C:SC31(2)R.PLT By: EC 2/22/2000 4:49pm



Factors Of Safety Calculated By The Modified Janbu Method

Run #13

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	2/22/2000
Time of Run:	4:49pm
Run By:	EC
Input Data Filename:	C:SC31(2)R.IN
Output Filename:	C:SC31(2)R.OUT
Plotted Output Filename:	C:SC31(2)R.PLT

PROBLEM DESCRIPTION TT52584-Sec.31-31'w/BENCH @El.1600 & 3:1
cut above it-Plane 2-Search-Static

BOUNDARY COORDINATES

14 Top Boundaries
64 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	180.00	30.00	180.00	1
2	30.00	180.00	102.00	180.00	1
3	102.00	180.00	160.00	193.00	1
4	160.00	193.00	182.00	198.00	1
5	182.00	198.00	218.00	207.00	1
6	218.00	207.00	251.00	217.00	1
7	251.00	217.00	388.00	260.00	1
8	388.00	260.00	427.00	260.00	1
9	427.00	260.00	511.00	300.00	1
10	511.00	300.00	568.00	300.00	1
11	568.00	300.00	584.00	300.00	1
12	584.00	300.00	862.00	392.67	1
13	862.00	392.67	888.00	375.00	1
14	888.00	375.00	1007.00	290.00	1
15	251.00	217.00	290.00	205.00	2
16	290.00	205.00	300.00	205.00	2
17	300.00	205.00	322.00	210.00	2
18	322.00	210.00	427.00	260.00	2
19	251.00	215.00	290.00	203.00	1
20	290.00	203.00	300.00	203.00	1
21	300.00	203.00	322.00	208.00	1
22	322.00	208.00	427.00	258.00	1

Run#13

23	218.00	207.00	230.00	197.00	3
24	230.00	197.00	289.00	180.00	3
25	289.00	180.00	309.00	182.00	3
26	309.00	182.00	328.00	187.00	3
27	328.00	187.00	568.00	300.00	3
28	218.00	205.00	230.00	195.00	1
29	230.00	195.00	289.00	178.00	1
30	289.00	178.00	309.00	180.00	1
31	309.00	180.00	328.00	185.00	1
32	328.00	185.00	568.00	298.00	1
33	182.00	198.00	280.00	160.00	3
34	280.00	160.00	302.00	160.00	3
35	302.00	160.00	500.00	252.00	3
36	500.00	252.00	584.00	300.00	3
37	182.00	196.00	280.00	158.00	1
38	280.00	158.00	302.00	158.00	1
39	302.00	158.00	500.00	250.00	1
40	500.00	250.00	584.00	298.00	1
41	160.00	193.00	202.00	164.00	3
42	202.00	164.00	285.00	139.00	3
43	285.00	139.00	321.00	142.00	3
44	321.00	142.00	341.00	150.00	3
45	341.00	150.00	622.00	282.00	3
46	622.00	282.00	762.00	359.33	3
47	160.00	191.00	202.00	162.00	1
48	202.00	162.00	285.00	137.00	1
49	285.00	137.00	321.00	140.00	1
50	321.00	140.00	341.00	148.00	1
51	341.00	148.00	622.00	280.00	1
52	622.00	280.00	762.00	357.33	1
53	102.00	180.00	179.00	128.00	3
54	179.00	128.00	282.00	97.00	3
55	282.00	97.00	314.00	101.00	3
56	314.00	101.00	348.00	108.00	3
57	348.00	108.00	650.00	248.00	3
58	650.00	248.00	888.00	375.00	3
59	102.00	178.00	179.00	126.00	1
60	179.00	126.00	282.00	95.00	1
61	282.00	95.00	314.00	99.00	1
62	314.00	99.00	348.00	106.00	1
63	348.00	106.00	650.00	246.00	1
64	650.00	246.00	888.00	373.00	1

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	119.0	119.0	410.0	40.5	.00	.0	0
2	129.0	129.0	1650.0	17.0	.00	.0	0
3	129.0	129.0	347.0	22.0	.00	.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.

800 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	440.00	238.70	455.00	245.80	.10
2	565.00	297.60	568.00	299.00	.10

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	419.23	260.00
2	453.82	245.26
3	566.94	298.48
4	568.23	300.00

*** 2.398 ***

Individual data on the 9 slices

Water Force	Water Force	Tie Force	Tie Force	Earthquake Force	Surcharge

Slice No.	Width Ft (m)	Weight Lbs (kg)	Top Lbs (kg)	Bot Lbs (kg)	Norm Lbs (kg)	Tan Lbs (kg)	Hor Lbs (kg)	Ver Lbs (kg)	Load Lbs (kg)
1	4.1	426.7	.0	.0	.0	.0	.0	.0	.0
2	2.2	607.9	.0	.0	.0	.0	.0	.0	.0
3	1.5	548.9	.0	.0	.0	.0	.0	.0	.0
4	25.7	45672.6	.0	.0	.0	.0	.0	.0	.0
5	1.1	3534.8	.0	.0	.0	.0	.0	.0	.0
6	57.2	188900.0	.0	.0	.0	.0	.0	.0	.0
7	55.9	98321.2	.0	.0	.0	.0	.0	.0	.0
8	1.1	119.7	.0	.0	.0	.0	.0	.0	.0
9	.2	3.7	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	418.80	260.00
2	452.70	244.68
3	565.35	297.73
4	567.32	300.00

*** 2.399 ***

Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	415.26	260.00
2	453.85	245.23
3	566.81	298.46
4	568.11	300.00

*** 2.400 ***

Failure Surface Specified By 4 Coordinate Points

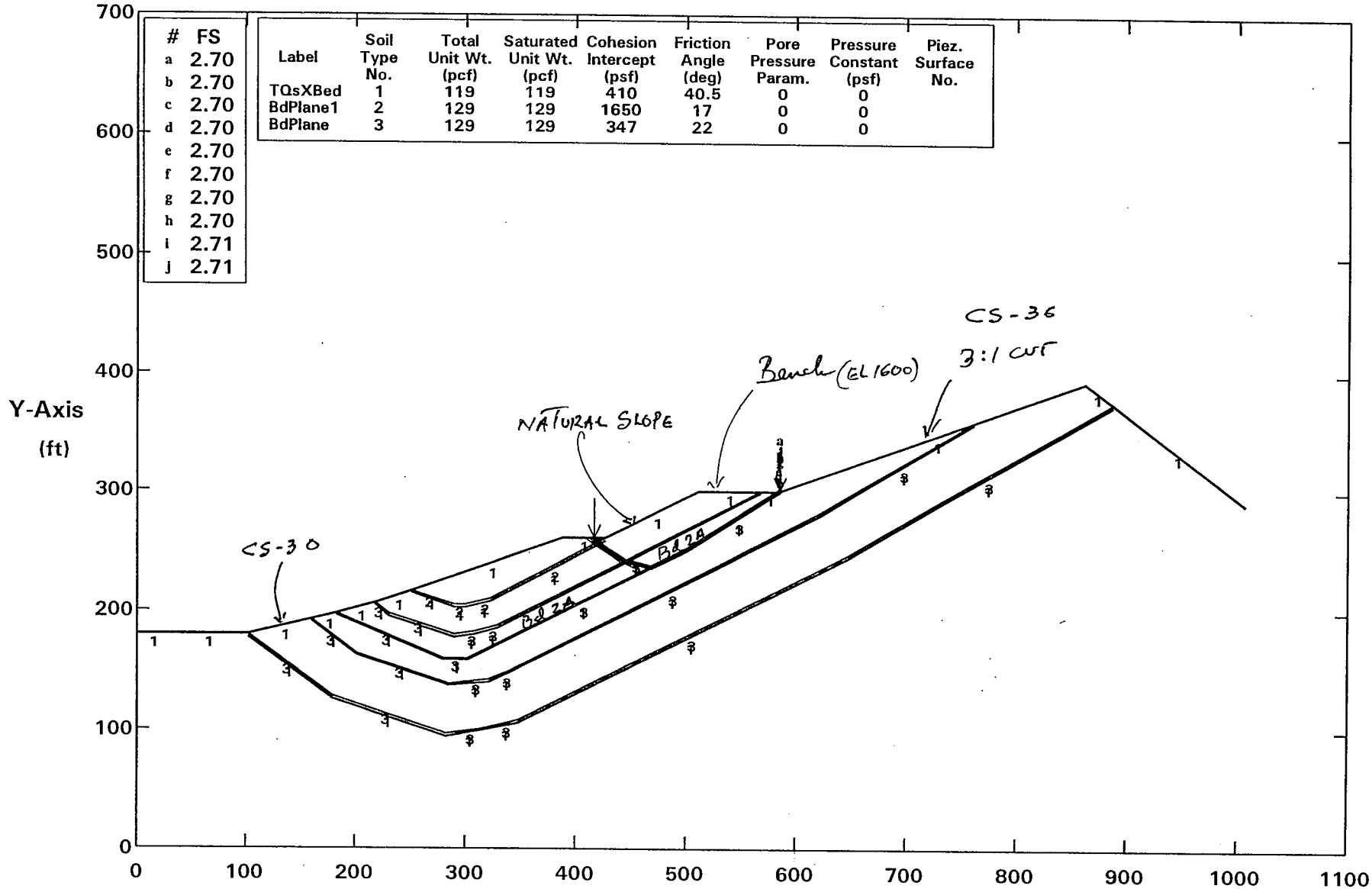
Point No.	X-Surf (ft)	Y-Surf (ft)
1	415.26	260.00
2	453.85	245.23
3	566.81	298.46
4	568.11	300.00

TT52584-Sec.31-31'w/BENCH @El.1600 & 3:1 cut above it-Plane 2A-Search-Static

Ten Most Critical. C:SC31(2AR.PLT By: EC 2/22/2000 5:30pm

#	FS
a	2.70
b	2.70
c	2.70
d	2.70
e	2.70
f	2.70
g	2.70
h	2.70
i	2.71
j	2.71

Label	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.
TQsXBed	1	119	119	410	40.5	0	0	
BdPlane1	2	129	129	1650	17	0	0	
BdPlane	3	129	129	347	22	0	0	



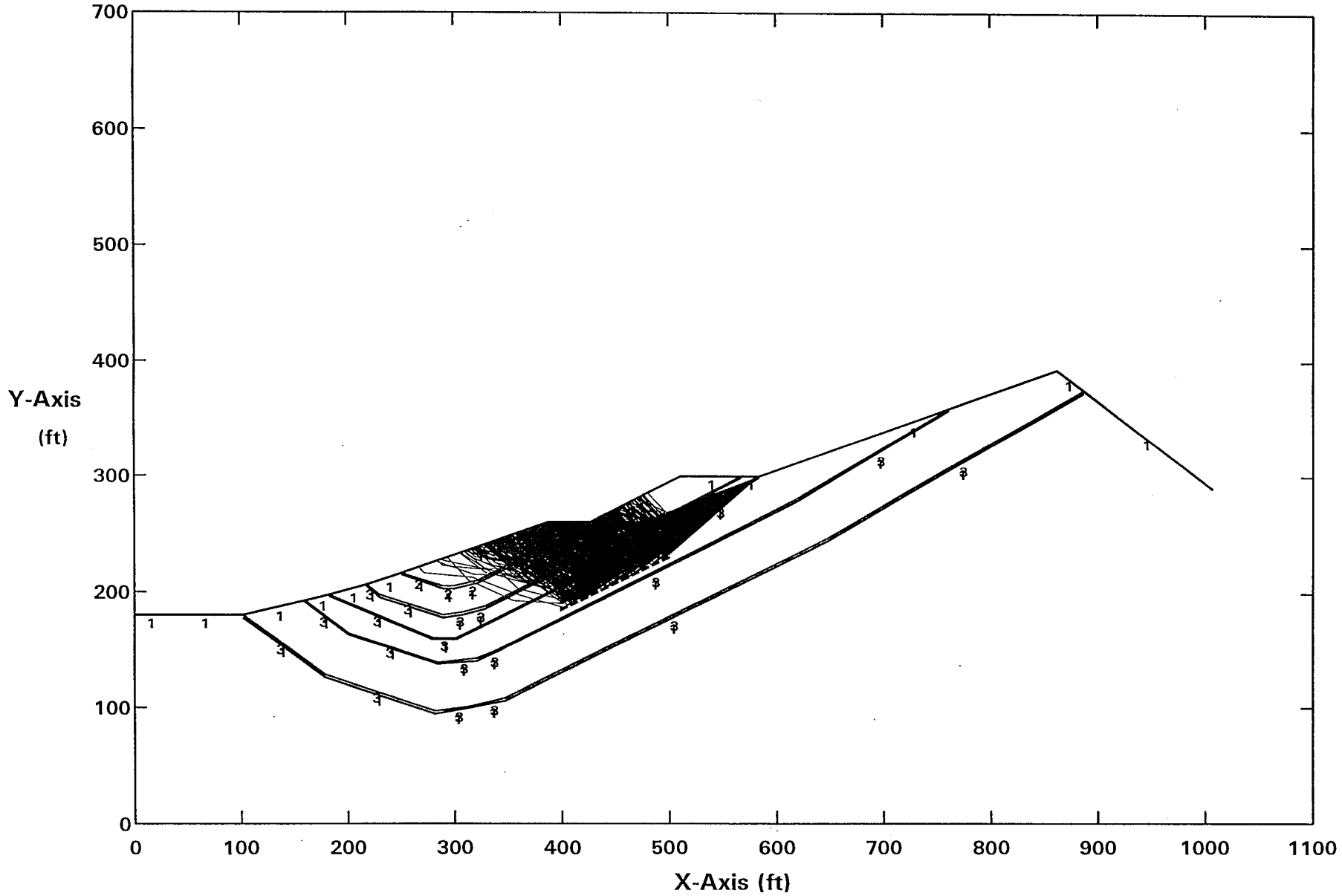
PCSTABL5M FSmin = 2.70 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Bunch

TT52584-Sec.31-31'w/BENCH @El.1600 & 3:1 cut above it-Plane 2A-Search-Static

All surfaces evaluated. C:SC31(2AR.PLT By: EC 2/22/2000 5:05pm



Factors Of Safety Calculated By The Modified Janbu Method

Janbu

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	2/22/2000
Time of Run:	5:30pm
Run By:	EC
Input Data Filename:	C:SC31(2AR.IN
Output Filename:	C:SC31(2AR.OUT
Plotted Output Filename:	C:SC31(2AR.PLT

PROBLEM DESCRIPTION TT52584-Sec.31-31'w/BENCH @El.1600 & 3:1
cut above it-Plane 2A-Search-Static

BOUNDARY COORDINATES

14 Top Boundaries
64 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	180.00	30.00	180.00	1
2	30.00	180.00	102.00	180.00	1
3	102.00	180.00	160.00	193.00	1
4	160.00	193.00	182.00	198.00	1
5	182.00	198.00	218.00	207.00	1
6	218.00	207.00	251.00	217.00	1
7	251.00	217.00	388.00	260.00	1
8	388.00	260.00	427.00	260.00	1
9	427.00	260.00	511.00	300.00	1
10	511.00	300.00	568.00	300.00	1
11	568.00	300.00	584.00	300.00	1
12	584.00	300.00	862.00	392.67	1
13	862.00	392.67	888.00	375.00	1
14	888.00	375.00	1007.00	290.00	1
15	251.00	217.00	290.00	205.00	2
16	290.00	205.00	300.00	205.00	2
17	300.00	205.00	322.00	210.00	2
18	322.00	210.00	427.00	260.00	2
19	251.00	215.00	290.00	203.00	1
20	290.00	203.00	300.00	203.00	1
21	300.00	203.00	322.00	208.00	1
22	322.00	208.00	427.00	258.00	1

Run #14

23	218.00	207.00	230.00	197.00	3
24	230.00	197.00	289.00	180.00	3
25	289.00	180.00	309.00	182.00	3
26	309.00	182.00	328.00	187.00	3
27	328.00	187.00	568.00	300.00	3
28	218.00	205.00	230.00	195.00	1
29	230.00	195.00	289.00	178.00	1
30	289.00	178.00	309.00	180.00	1
31	309.00	180.00	328.00	185.00	1
32	328.00	185.00	568.00	298.00	1
33	182.00	198.00	280.00	160.00	3
34	280.00	160.00	302.00	160.00	3
35	302.00	160.00	500.00	252.00	3
36	500.00	252.00	584.00	300.00	3
37	182.00	196.00	280.00	158.00	1
38	280.00	158.00	302.00	158.00	1
39	302.00	158.00	500.00	250.00	1
40	500.00	250.00	584.00	298.00	1
41	160.00	193.00	202.00	164.00	3
42	202.00	164.00	285.00	139.00	3
43	285.00	139.00	321.00	142.00	3
44	321.00	142.00	341.00	150.00	3
45	341.00	150.00	622.00	282.00	3
46	622.00	282.00	762.00	359.33	3
47	160.00	191.00	202.00	162.00	1
48	202.00	162.00	285.00	137.00	1
49	285.00	137.00	321.00	140.00	1
50	321.00	140.00	341.00	148.00	1
51	341.00	148.00	622.00	280.00	1
52	622.00	280.00	762.00	357.33	1
53	102.00	180.00	179.00	128.00	3
54	179.00	128.00	282.00	97.00	3
55	282.00	97.00	314.00	101.00	3
56	314.00	101.00	348.00	108.00	3
57	348.00	108.00	650.00	248.00	3
58	650.00	248.00	888.00	375.00	3
59	102.00	178.00	179.00	126.00	1
60	179.00	126.00	282.00	95.00	1
61	282.00	95.00	314.00	99.00	1
62	314.00	99.00	348.00	106.00	1
63	348.00	106.00	650.00	246.00	1
64	650.00	246.00	888.00	373.00	1

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	119.0	119.0	410.0	40.5	.00	.0	0
2	129.0	129.0	1650.0	17.0	.00	.0	0
3	129.0	129.0	347.0	22.0	.00	.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.

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	455.00	230.10	480.00	241.70	.10
2	500.00	251.00	500.00	251.00	.00
3	584.00	299.00	584.00	299.00	.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	416.37	260.00
2	422.86	254.26
3	444.37	241.52
4	468.86	236.49
5	500.00	251.00
6	584.00	299.00
7	585.33	300.44

*** 2.698 ***

Individual data on the 14 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	3.7	727.7	.0	.0	.0	.0	.0	.0	.0
2	1.5	703.7	.0	.0	.0	.0	.0	.0	.0
3	1.3	824.1	.0	.0	.0	.0	.0	.0	.0
4	4.1	3513.2	.0	.0	.0	.0	.0	.0	.0
5	17.1	35306.5	.0	.0	.0	.0	.0	.0	.0
6	.3	807.3	.0	.0	.0	.0	.0	.0	.0
7	2.6	8435.3	.0	.0	.0	.0	.0	.0	.0
8	20.4	86366.8	.0	.0	.0	.0	.0	.0	.0
9	1.5	7951.1	.0	.0	.0	.0	.0	.0	.0
10	31.1	162513.4	.0	.0	.0	.0	.0	.0	.0
11	11.0	56928.7	.0	.0	.0	.0	.0	.0	.0
12	57.0	180974.9	.0	.0	.0	.0	.0	.0	.0
13	16.0	10768.0	.0	.0	.0	.0	.0	.0	.0
14	1.3	79.3	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	416.37	260.00
2	422.86	254.26
3	444.37	241.52
4	468.86	236.49
5	500.00	251.00
6	584.00	299.00
7	585.33	300.44

*** 2.698 ***

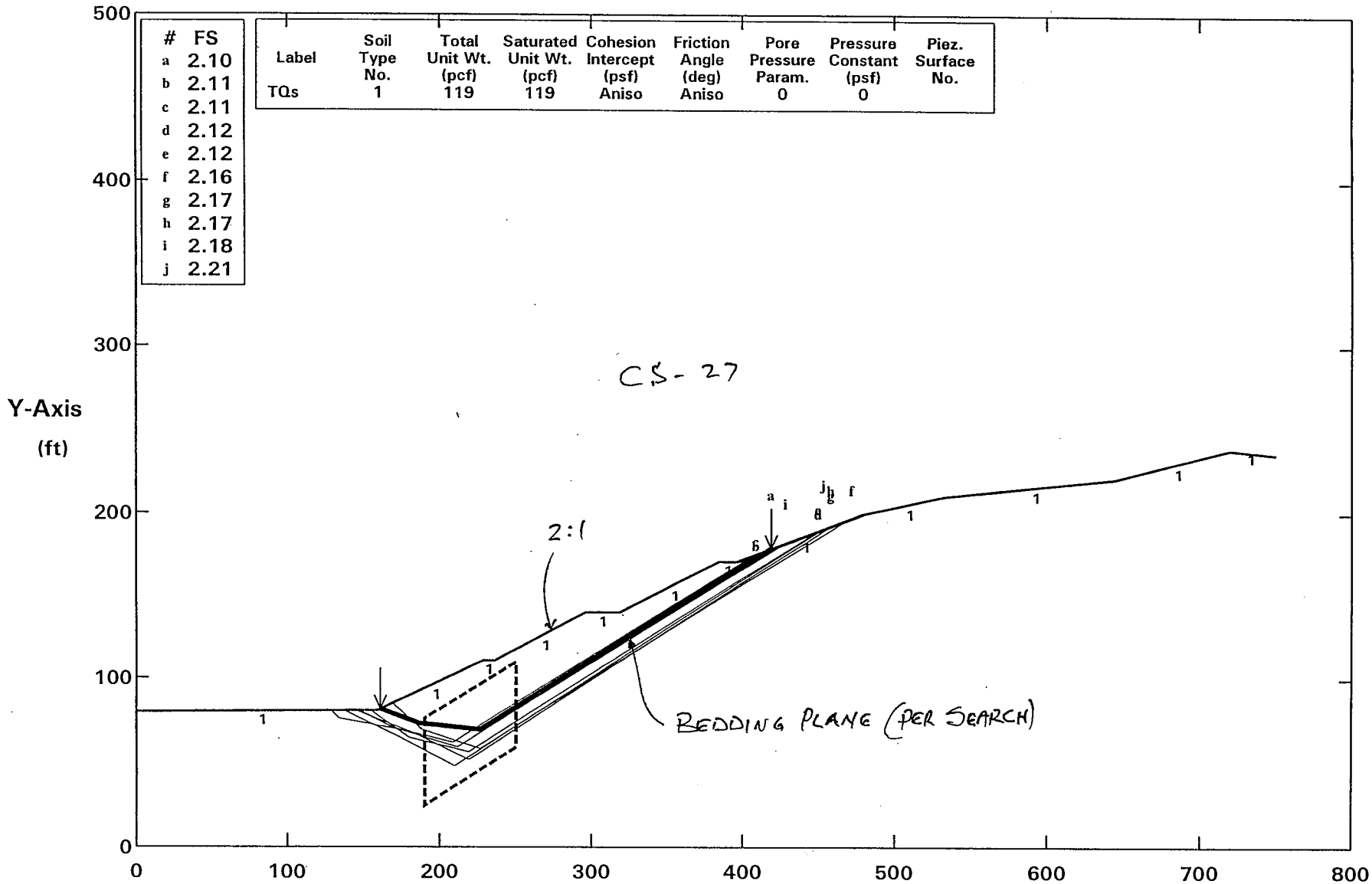
Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	407.62	260.00
2	421.42	252.58
3	444.32	242.56
4	468.54	236.36
5	500.00	251.00
6	584.00	299.00
7	584.20	300.07

*** 2.702 ***

Hasley Canyon Cross Section 32-32' Cut Slope 7, 2:1, Static

Ten Most Critical. C:HC32S18.PLT By: EC 2/11/2000 1:58pm



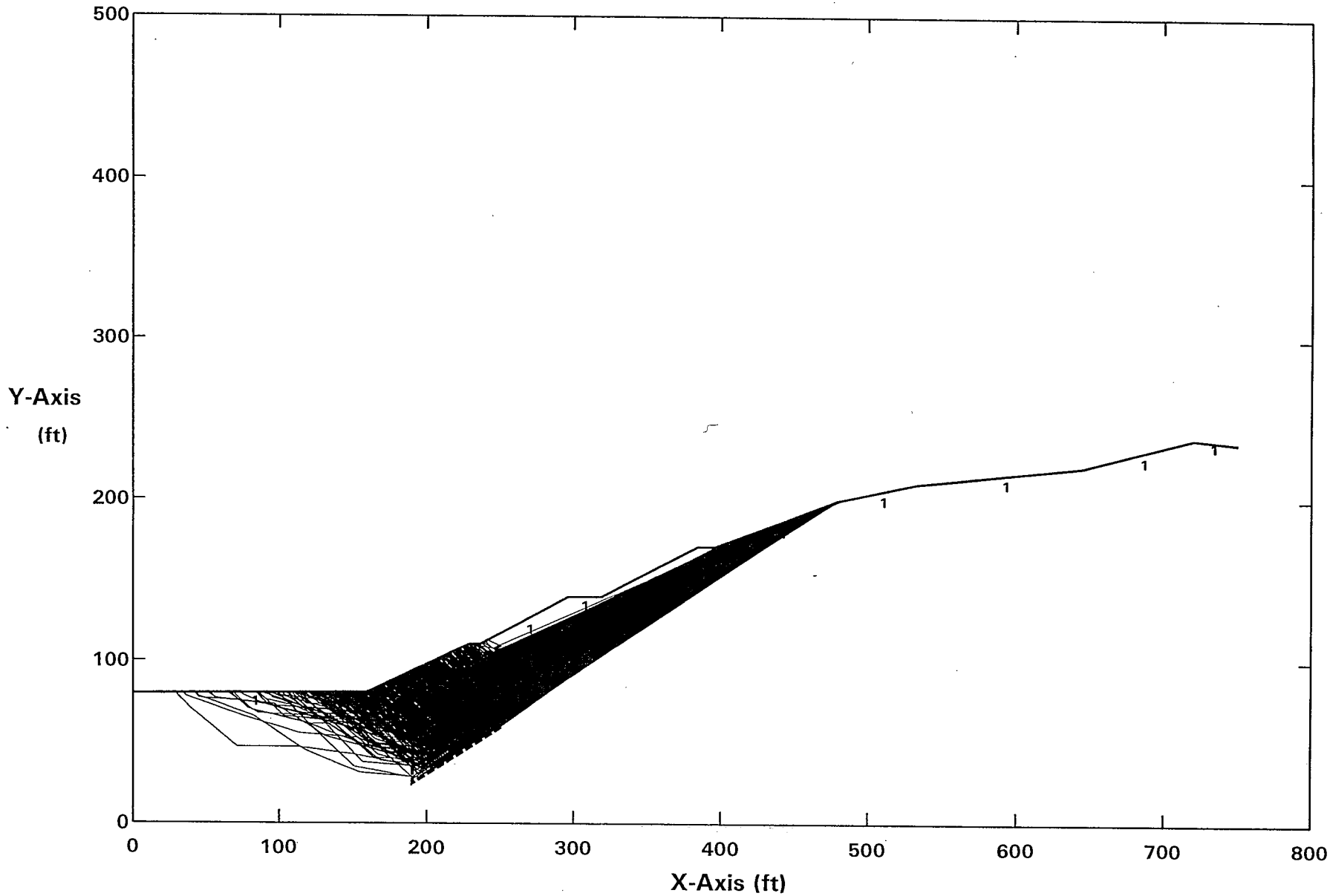
PCSTABL5M FSmin = 2.10 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

RUN#15

Hasley Canyon Cross Section 32-32' Cut Slope 7, 2:1, Static

All surfaces evaluated. C:HC32S18.PLT By: EC 2/11/2000 1:53pm



Factors Of Safety Calculated By The Modified Janbu Method

Run #15

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	2/11/2000
Time of Run:	1:58pm
Run By:	EC
Input Data Filename:	C:HC32S18
Output Filename:	C:HC32S18.OUT
Plotted Output Filename:	C:HC32S18.PLT

PROBLEM DESCRIPTION Hasley Canyon Cross Section 32-32'
Cut Slope 7, 2:1, Static

BOUNDARY COORDINATES

12 Top Boundaries
12 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	80.00	159.00	81.00	1
2	159.00	81.00	229.00	111.00	1
3	229.00	111.00	236.00	111.00	1
4	236.00	111.00	296.00	140.00	1
5	296.00	140.00	319.00	140.00	1
6	319.00	140.00	384.00	171.00	1
7	384.00	171.00	397.00	171.00	1
8	397.00	171.00	480.00	200.00	1
9	480.00	200.00	533.00	210.00	1
10	533.00	210.00	645.00	220.00	1
11	645.00	220.00	720.00	238.00	1
12	720.00	238.00	750.00	235.00	1

ISOTROPIC SOIL PARAMETERS

1 Type(s) of Soil

Soil Total Saturated Cohesion Friction Pore Pressure Piez.

RUN #15

Type No.	Unit Wt. (pcf)	Unit Wt. (pcf)	Intercept (psf)	Angle (deg)	Pressure Param.	Constant (psf)	Surface No.
1	119.0	119.0	410.0	40.5	.00	.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	29.5	410.0	40.5
2	30.5	347.0	22.0
3	90.0	410.0	40.5

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 40.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	190.00	50.00	250.00	84.60	51.00
2	397.00	171.00	480.00	200.00	.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	161.40	82.03
2	186.91	73.16
3	226.72	69.23
4	419.22	178.77

*** 2.101 ***

Individual data on the 9 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	25.5	30065.2	.0	.0	.0	.0	.0	.0	.0
2	39.8	143519.7	.0	.0	.0	.0	.0	.0	.0
3	2.3	11024.7	.0	.0	.0	.0	.0	.0	.0
4	7.0	32055.1	.0	.0	.0	.0	.0	.0	.0
5	60.0	242187.9	.0	.0	.0	.0	.0	.0	.0
6	23.0	67894.8	.0	.0	.0	.0	.0	.0	.0
7	65.0	118114.7	.0	.0	.0	.0	.0	.0	.0
8	13.0	13271.8	.0	.0	.0	.0	.0	.0	.0
9	22.2	6453.7	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	146.93	80.92
2	169.68	69.96
3	208.79	61.58
4	408.69	175.08

*** 2.110 ***

Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
MATERIALS ENGINEERING DIVISION
GEOTECHNICAL ENGINEERING
DEVELOPMENT SERVICES SECTION
ORDINARY METHOD OF SLICES USED FOR ANALYSIS

PROJECT: Hasley Cyn VTT 52584
CONSULTANT: AES
REPORT DATE:
SECTION: 32-32' CIRCLE: Bedding Plane in TQs per Janbu HC32S18 (FS=2.10) DATE: 2/22/00 BY: SKM

CS-27
2:1 SLOPE

SLICE	HEIGHT(1)	HEIGHT(2)	WIDTH	AREA	WEIGHT	UNIT WT
1.	0.00	19.00	30.00	285.00	33.92	119.0
2.	19.00	53.00	36.00	1296.00	154.22	119.0
3.	53.00	49.00	7.00	357.00	46.05	129.0
4.	49.00	40.00	49.00	2180.50	281.28	129.0
5.	40.00	24.00	25.00	800.00	103.20	129.0
6.	24.00	14.00	64.00	1216.00	156.86	129.0
7.	14.00	7.00	8.00	84.00	10.84	129.0
8.	7.00	0.00	26.00	91.00	11.74	129.0

SLOPE STABILITY DATA

SEISMIC COEFFICIENT = 0.15 g

SLICE NO.	1 SLICE WEIGHT W (kips)	2 FAILURE PLANE ANGLE i(deg)	3 ANGLE OF INT. FRICTION phi(deg)	4 COHE-SION C (ksf)	5 LENGTH OF ARC L (ft)	6 W (1-Ru) COS i TAN phi	7 C L	8 g W (1-Ru) SINi TAN phi	9 W SIN i	10 g W COS i
1.	33.92	-11.00	40.50	0.410	30.56	28.43	12.53	-0.83	-6.47	4.99
2.	154.22	-11.00	40.50	0.410	36.67	129.30	15.04	-3.77	-29.43	22.71
3.	46.05	30.00	22.00	0.347	8.08	16.11	2.80	1.40	23.03	5.98
4.	281.28	30.00	22.00	0.347	56.58	98.42	19.63	8.52	140.64	36.54
5.	103.20	30.00	22.00	0.347	28.87	36.11	10.02	3.13	51.60	13.41
6.	156.86	30.00	22.00	0.347	73.90	54.89	25.64	4.75	78.43	20.38
7.	10.84	30.00	22.00	0.347	9.24	3.79	3.21	0.33	5.42	1.41
8.	11.74	30.00	22.00	0.347	30.02	4.11	10.42	0.36	5.87	1.52
SUMMATION:						371.16	99.29	13.88	269.09	106.94

STATIC SAFETY FACTOR = 1.75
~~SEISMIC SAFETY FACTOR = 1.21~~

Run #1 (a)

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
MATERIALS ENGINEERING DIVISION
GEOTECHNICAL ENGINEERING
DEVELOPMENT SERVICES SECTION
ORDINARY METHOD OF SLICES USED FOR ANALYSIS

PROJECT: Hasley Cyn VTT 52584
CONSULTANT: AES
REPORT DATE:
SECTION: 32-32' CIRCLE: Bedding Plane in TQs per Janbu HC32S18 (FS=2.10) DATE: 2/22/00 BY: SKM

SLICE	HEIGHT(1)	HEIGHT(2)	WIDTH	AREA	WEIGHT	UNIT WT
1.	0.00	19.00	30.00	285.00	33.92	119.0
2.	19.00	53.00	36.00	1296.00	154.22	119.0
3.	53.00	49.00	7.00	357.00	46.05	129.0
4.	49.00	40.00	49.00	2180.50	281.28	129.0
5.	40.00	24.00	25.00	800.00	103.20	129.0
6.	24.00	14.00	64.00	1216.00	156.86	129.0
7.	14.00	7.00	8.00	84.00	10.84	129.0
8.	7.00	0.00	26.00	91.00	11.74	129.0

SLOPE STABILITY DATA

SEISMIC COEFFICIENT = 0.15 g

SLICE NO.	1 SLICE WEIGHT W (kips)	2 FAILURE PLANE ANGLE i(deg)	3 ANGLE OF INT. FRICTION phi(deg)	4 COHE-SION C (ksf)	5 LENGTH OF ARC L (ft)	6 W (1-Ru) COS i TAN phi	7 C L	8 g W (1-Ru) SINi TAN phi	9 W SIN i	10 g W COS i
1.	33.92	-11.00	42.00	0.880	30.56	29.98	26.89	-0.87	-6.47	4.99
2.	154.22	-11.00	42.00	0.880	36.67	136.31	32.27	-3.97	-29.43	22.71
3.	46.05	30.00	27.00	1.168	8.08	20.32	9.44	1.76	23.03	5.98
4.	281.28	30.00	27.00	1.168	56.58	124.12	66.09	10.75	140.64	36.54
5.	103.20	30.00	27.00	1.168	28.87	45.54	33.72	3.94	51.60	13.41
6.	156.86	30.00	27.00	1.168	73.90	69.22	86.32	5.99	78.43	20.38
7.	10.84	30.00	27.00	1.168	9.24	4.78	10.79	0.41	5.42	1.41
8.	11.74	30.00	27.00	1.168	30.02	5.18	35.07	0.45	5.87	1.52
SUMMATION:						435.45	300.58	18.46	269.09	106.94

~~STATIC SAFETY FACTOR = 2.74~~
SEISMIC SAFETY FACTOR = 1.91

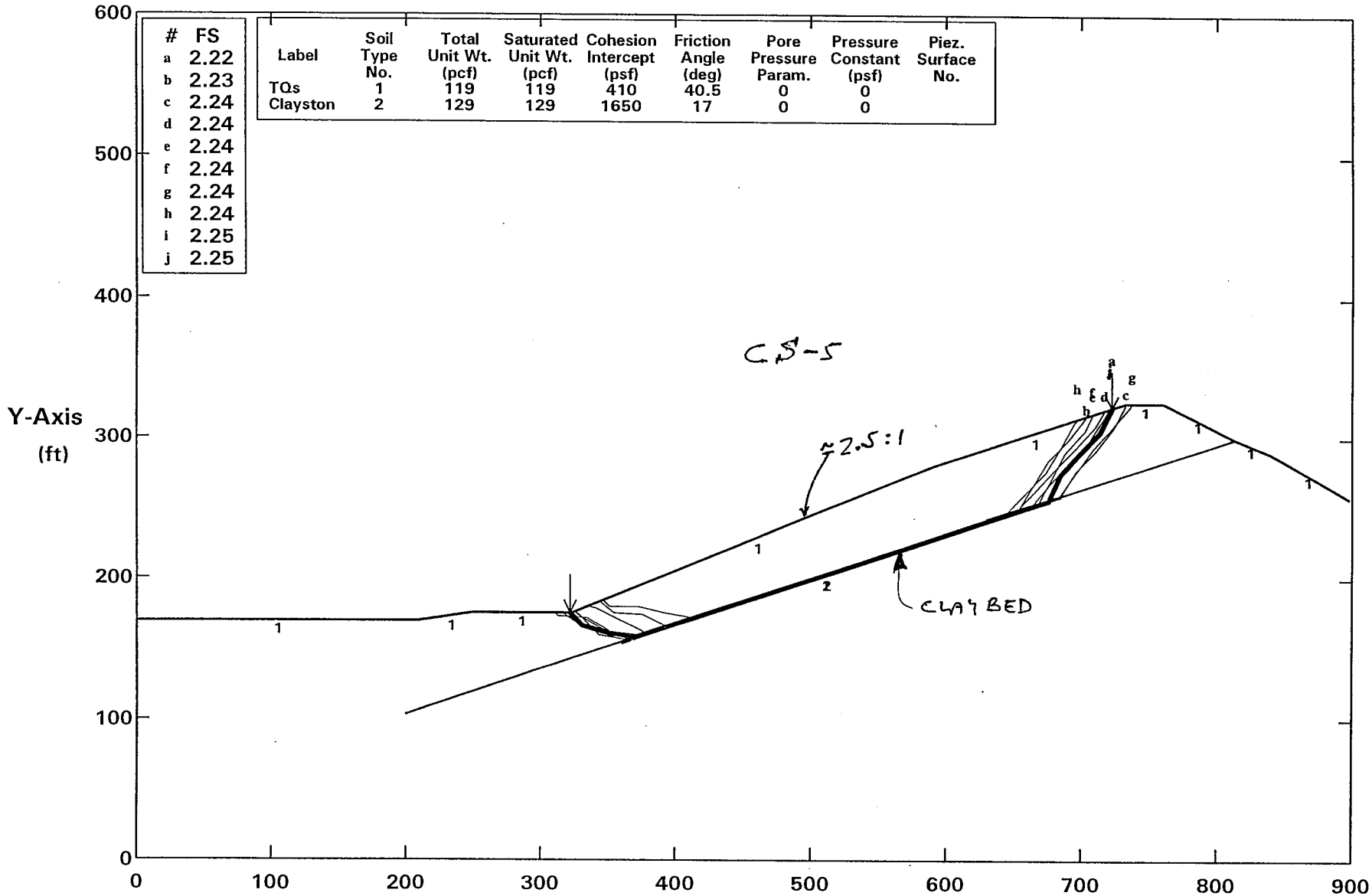
Run#166

Hasley Canyon Cross Section 35 - 35' Cut Slope 5 (22Deg)-Lower bed - Static

Ten Most Critical. C:HC35S5.PLT By: EC 3/21/2000 3:58pm

#	FS
a	2.22
b	2.23
c	2.24
d	2.24
e	2.24
f	2.24
g	2.24
h	2.24
i	2.25
j	2.25

Label	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.
TQs	1	119	119	410	40.5	0	0	
Clayston	2	129	129	1650	17	0	0	



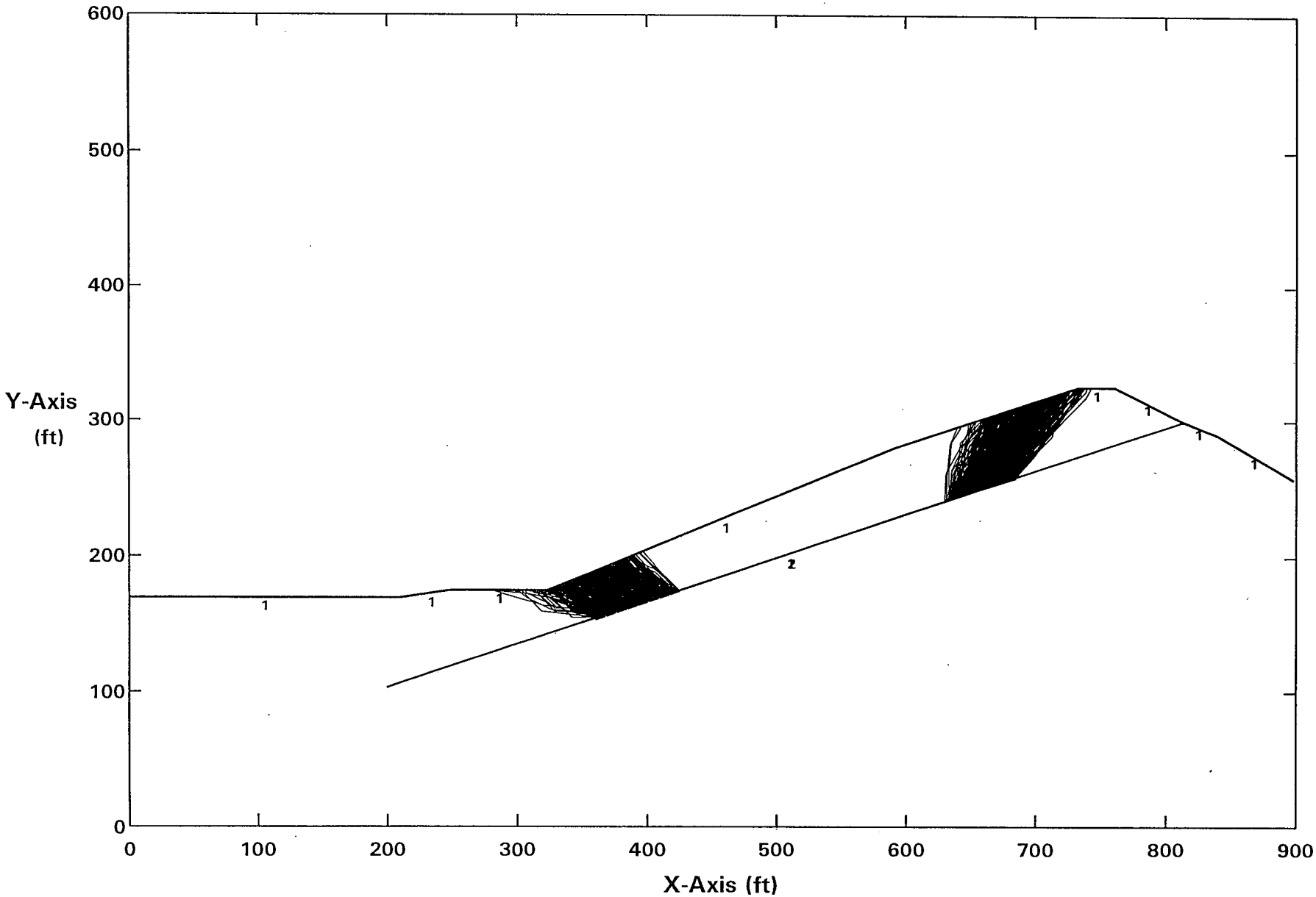
PCSTABL5M FSmin = 2.22 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run #17

Hasley Canyon Cross Section 35 - 35' Cut Slope 5 (22Deg)-Lower bed - Static

All surfaces evaluated. C:HC35S5.PLT By: EC 3/21/2000 3:58pm



Factors Of Safety Calculated By The Modified Janbu Method

Lunatg7

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--

Simplified Janbu, Simplified Bishop

or Spencer's Method of Slices

Run Date:	3/21/2000
Time of Run:	3:58pm
Run By:	EC
Input Data Filename:	C:HC35S5
Output Filename:	C:HC35S5.OUT
Plotted Output Filename:	C:HC35S5.PLT

PROBLEM DESCRIPTION Hasley Canyon Cross Section 35 - 35'
Cut Slope 5 (22Deg)-Lower bed - Static

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	.00	170.00	210.00	170.00	1
2	210.00	170.00	249.00	175.00	1
3	249.00	175.00	323.00	175.00	1
4	323.00	175.00	590.00	280.00	1
5	590.00	280.00	733.00	325.00	1
6	733.00	325.00	761.00	325.00	1
7	761.00	325.00	814.00	300.00	1
8	814.00	300.00	840.00	290.00	1
9	840.00	290.00	898.00	257.00	1
10	200.00	103.00	814.00	300.00	2
11	200.00	102.80	814.00	299.80	1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

Soil Type	Total Unit Wt.	Saturated Unit Wt.	Cohesion Intercept	Friction Angle	Pore Pressure	Pressure Constant	Piez. Surface

Run#17

No.	(pcf)	(pcf)	(psf)	(deg)	Param.	(psf)	No.
1	119.0	119.0	410.0	40.5	.00	.0	0
2	129.0	129.0	1650.0	17.0	.00	.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.

2 Boxes Specified For Generation Of Central Block Base

Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 21.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	360.00	154.20	425.00	175.10	.00
2	630.00	240.90	685.00	258.50	.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	322.33	175.00
2	331.10	166.24
3	351.16	160.04
4	372.07	158.08
5	675.21	255.37
6	684.83	274.03
7	699.00	289.53
8	713.84	304.39
9	723.29	321.95

*** 2.221 ***

Individual data on the 12 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	.7	26.4	.0	.0	.0	.0	.0	.0	.0
2	8.1	6078.6	.0	.0	.0	.0	.0	.0	.0
3	20.1	45348.8	.0	.0	.0	.0	.0	.0	.0
4	20.6	76125.3	.0	.0	.0	.0	.0	.0	.0
5	.3	1319.5	.0	.0	.0	.0	.0	.0	.0
6	217.9	********	.0	.0	.0	.0	.0	.0	.0
7	85.2	524447.7	.0	.0	.0	.0	.0	.0	.0
8	.1	386.8	.0	.0	.0	.0	.0	.0	.0
9	9.6	49549.3	.0	.0	.0	.0	.0	.0	.0
10	14.2	51076.8	.0	.0	.0	.0	.0	.0	.0
11	14.8	34744.7	.0	.0	.0	.0	.0	.0	.0
12	9.5	8202.7	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	316.20	175.00
2	326.53	168.17
3	346.53	161.77
4	366.84	156.40
5	653.37	248.38
6	664.01	266.48
7	676.27	283.54
8	690.90	298.61
9	703.93	315.07
10	704.15	315.92

*** 2.225 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	346.77	184.35
2	351.70	179.49
3	372.70	179.26
4	393.22	174.80

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
MATERIALS ENGINEERING DIVISION
GEOTECHNICAL ENGINEERING
DEVELOPMENT SERVICES SECTION
ORDINARY METHOD OF SLICES USED FOR ANALYSIS

PROJECT: Hasley Cyn VTT 52584
CONSULTANT: AES
REPORT DATE:
SECTION: 35-35' CIRCLE: Bedding Plane in TQs (clay bed) per Janbu HC35S5 (FS=2.22) DATE: 2/22/00 BY: SKM

CS-5
CLAY BED

SLICE	HEIGHT(1)	HEIGHT(2)	WIDTH	AREA	WEIGHT	UNIT WT
1.	0.00	5.00	4.00	10.00	1.19	119.0
2.	5.00	14.00	5.00	47.50	5.65	119.0
3.	14.00	28.00	20.00	420.00	49.98	119.0
4.	28.00	38.00	21.00	693.00	82.47	119.0
5.	38.00	55.00	218.00	10137.00	1307.67	129.0
6.	55.00	52.00	85.00	4547.50	586.63	129.0
7.	52.00	36.00	10.00	440.00	52.36	119.0
8.	36.00	24.00	14.00	420.00	49.98	119.0
9.	24.00	14.00	15.00	285.00	33.92	119.0
10.	14.00	0.00	9.00	63.00	7.50	119.0

SLOPE STABILITY DATA

SEISMIC COEFFICIENT = 0.15 g

SLICE NO.	1 SLICE WEIGHT W (kips)	2 FAILURE PLANE ANGLE i(deg)	3 ANGLE OF INT. FRICTION phi(deg)	4 COHE-SION C (ksf)	5 LENGTH OF ARC L (ft)	6 W (1-Ru) COS i TAN phi	7 C L	8 g W (1-Ru) SINi TAN phi	9 W SIN i	10 g W COS i
1.	1.19	-45.00	40.50	0.410	5.66	0.72	2.32	-0.11	-0.84	0.13
2.	5.65	-45.00	40.50	0.410	7.07	3.41	2.90	-0.51	-4.00	0.60
3.	49.98	-17.00	40.50	0.410	20.91	40.82	8.57	-1.87	-14.61	7.17
4.	82.47	-5.00	40.50	0.410	21.08	70.17	8.64	-0.92	-7.19	12.32
5.	1307.67	18.00	17.00	1.650	229.22	380.23	378.21	18.53	404.09	186.55
6.	586.63	18.00	17.00	1.650	89.37	170.57	147.47	8.31	181.28	83.69
7.	52.36	62.00	40.50	0.410	21.30	20.99	8.73	5.92	46.23	3.69
8.	49.98	49.00	40.50	0.410	21.34	28.01	8.75	4.83	37.72	4.92
9.	33.92	43.00	40.50	0.410	20.51	21.18	8.41	2.96	23.13	3.72
10.	7.50	63.00	40.50	0.410	19.82	2.91	8.13	0.86	6.68	0.51
SUMMATION:						739.01	582.13	38.01	672.49	303.29

STATIC SAFETY FACTOR = 1.96
~~SEISMIC SAFETY FACTOR = 1.31~~

Run #1Ba

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
MATERIALS ENGINEERING DIVISION
GEOTECHNICAL ENGINEERING
DEVELOPMENT SERVICES SECTION

ORDINARY METHOD OF SLICES USED FOR ANALYSIS

PROJECT: Hasley Cyn VTT 52584
CONSULTANT: AES
REPORT DATE:
SECTION: 35-35' CIRCLE: Bedding Plane in TQs (clay bed) per Janbu HC35S5 (FS=2.22) DATE: 2/22/00 BY: SKM

SLICE	HEIGHT(1)	HEIGHT(2)	WIDTH	AREA	WEIGHT	UNIT WT
1.	0.00	5.00	4.00	10.00	1.19	119.0
2.	5.00	14.00	5.00	47.50	5.65	119.0
3.	14.00	28.00	20.00	420.00	49.98	119.0
4.	28.00	38.00	21.00	693.00	82.47	119.0
5.	38.00	55.00	218.00	10137.00	1307.67	129.0
6.	55.00	52.00	85.00	4547.50	586.63	129.0
7.	52.00	36.00	10.00	440.00	52.36	119.0
8.	36.00	24.00	14.00	420.00	49.98	119.0
9.	24.00	14.00	15.00	285.00	33.92	119.0
10.	14.00	0.00	9.00	63.00	7.50	119.0

SLOPE STABILITY DATA

SEISMIC COEFFICIENT = 0.15 g

SLICE NO.	1 SLICE WEIGHT W (kips)	2 FAILURE PLANE ANGLE i(deg)	3 ANGLE OF INT. FRICTION phi(deg)	4 COHE-SION C (ksf)	5 LENGTH OF ARC L (ft)	6 W (1-Ru) COS i TAN phi	7 C L	8 g W (1-Ru) SINi TAN phi	9 W SIN i	10 g W COS i
1.	1.19	-45.00	42.00	0.880	5.66	0.76	4.98	-0.11	-0.84	0.13
2.	5.65	-45.00	42.00	0.880	7.07	3.60	6.22	-0.54	-4.00	0.60
3.	49.98	-17.00	42.00	0.880	20.91	43.04	18.40	-1.97	-14.61	7.17
4.	82.47	-5.00	42.00	0.880	21.08	73.97	18.55	-0.97	-7.19	12.32
5.	1307.67	18.00	28.00	1.270	229.22	661.27	291.11	32.23	404.09	186.55
6.	586.63	18.00	28.00	1.270	89.37	296.65	113.51	14.46	181.28	83.69
7.	52.36	62.00	42.00	0.880	21.30	22.13	18.74	6.24	46.23	3.69
8.	49.98	49.00	42.00	0.880	21.34	29.52	18.78	5.09	37.72	4.92
9.	33.92	43.00	42.00	0.880	20.51	22.33	18.05	3.12	23.13	3.72
10.	7.50	63.00	42.00	0.880	19.82	3.06	17.45	0.90	6.68	0.51
SUMMATION:						1156.34	525.79	58.45	672.49	303.29

~~STATIC SAFETY FACTOR = 3.50~~
SEISMIC SAFETY FACTOR = 1.66

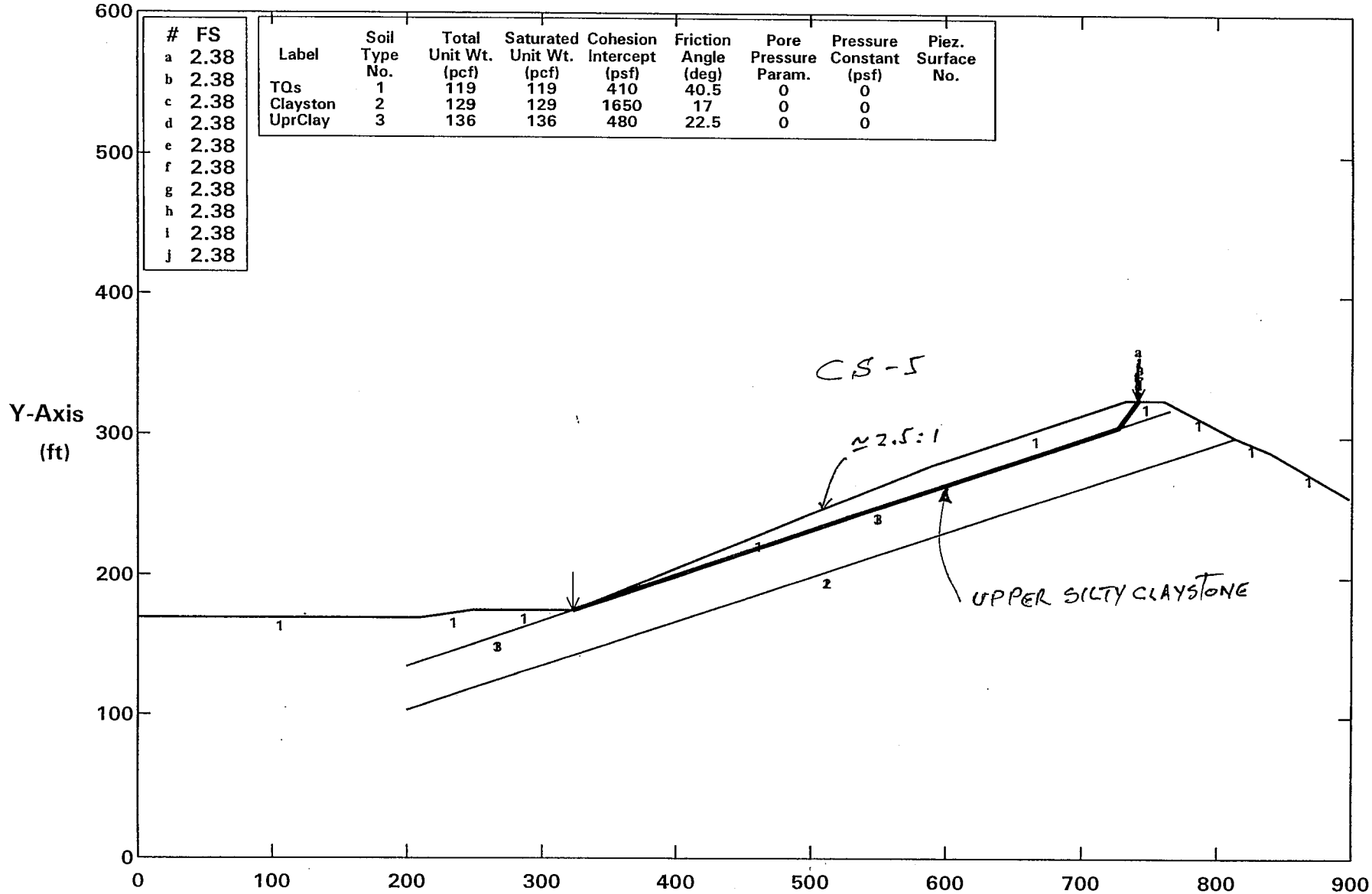
RUN#18b

Hasley Canyon Cross Section 35 - 35'- Cut Slope 5 (22Deg)-Upper bed - Static

Ten Most Critical. C:HC35S6.PLT By: EC 3/21/2000 3:22pm

#	FS
a	2.38
b	2.38
c	2.38
d	2.38
e	2.38
f	2.38
g	2.38
h	2.38
i	2.38
j	2.38

Label	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.
TQs	1	119	119	410	40.5	0	0	
Clayston	2	129	129	1650	17	0	0	
UprClay	3	136	136	480	22.5	0	0	



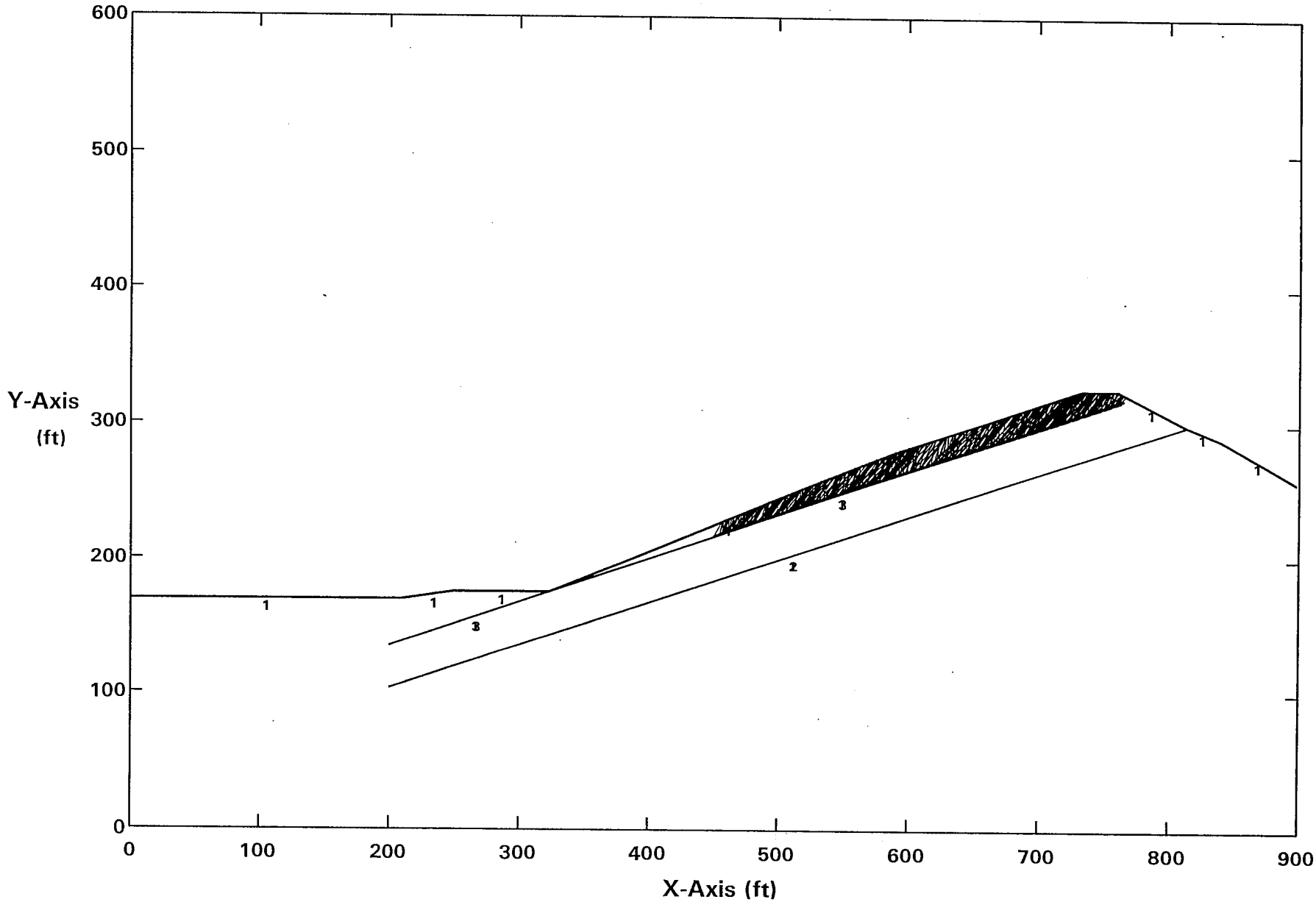
PCSTABL5M FSmin = 2.38 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Plan #19

Hasley Canyon Cross Section 35 - 35'- Cut Slope 5 (22Deg)-Upper bed - Static

All surfaces evaluated. C:HC35S6.PLT By: EC 3/21/2000 3:25pm



Factors Of Safety Calculated By The Modified Janbu Method

Run #19

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	3/21/2000
Time of Run:	3:22pm
Run By:	EC
Input Data Filename:	C:HC35S6
Output Filename:	C:HC35S6.OUT
Plotted Output Filename:	C:HC35S6.PLT

PROBLEM DESCRIPTION Hasley Canyon Cross Section 35 - 35'-
Cut Slope 5 (22Deg)-Upper bed - Static

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	.00	170.00	210.00	170.00	1
2	210.00	170.00	249.00	175.00	1
3	249.00	175.00	323.00	175.00	1
4	323.00	175.00	590.00	280.00	1
5	590.00	280.00	733.00	325.00	1
6	733.00	325.00	761.00	325.00	1
7	761.00	325.00	814.00	300.00	1
8	814.00	300.00	840.00	290.00	1
9	840.00	290.00	898.00	257.00	1
10	200.00	135.04	323.00	175.00	3
11	323.00	175.00	765.00	318.61	3
12	200.00	134.84	323.00	174.80	1
13	323.00	174.80	765.00	318.41	1
14	200.00	103.00	814.00	300.00	2
15	200.00	102.80	814.00	299.80	1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Run #19

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	119.0	119.0	410.0	40.5	.00	.0	0
2	129.0	129.0	1650.0	17.0	.00	.0	0
3	136.0	136.0	480.0	22.5	.00	.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.

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	323.00	175.00	323.00	175.00	.00
2	720.00	304.00	730.00	307.20	.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 3 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	323.00	175.00
2	726.84	306.19
3	742.04	325.00

*** 2.382 ***

Individual data on the 5 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	267.0	290187.1	.0	.0	.0	.0	.0	.0	.0
2	136.8	286123.1	.0	.0	.0	.0	.0	.0	.0
3	.0	49.8	.0	.0	.0	.0	.0	.0	.0
4	6.1	10238.2	.0	.0	.0	.0	.0	.0	.0
5	9.0	6017.4	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 3 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	323.00	175.00
2	726.35	306.03
3	741.61	325.00

*** 2.382 ***

Failure Surface Specified By 3 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	323.00	175.00
2	726.94	306.22
3	741.86	325.00

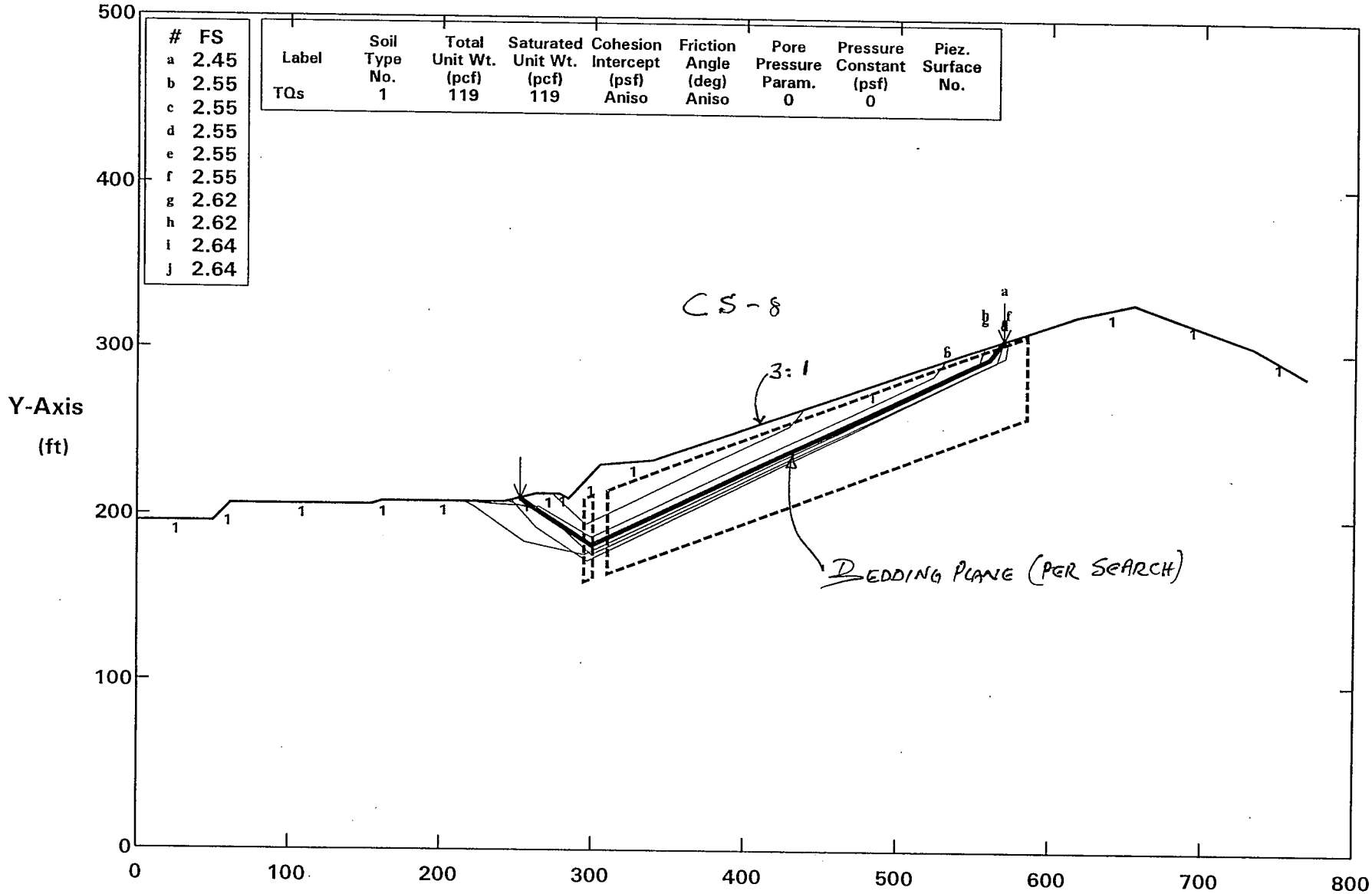
*** 2.382 ***

Failure Surface Specified By 3 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	323.00	175.00
2	727.27	306.33
3	742.15	325.00

Hasley Canyon Cross Section 36-36' Cut Slope 8, 3:1, Static

Ten Most Critical. C:HC36S4.PLT By: AC 2/09/2000 3:37pm



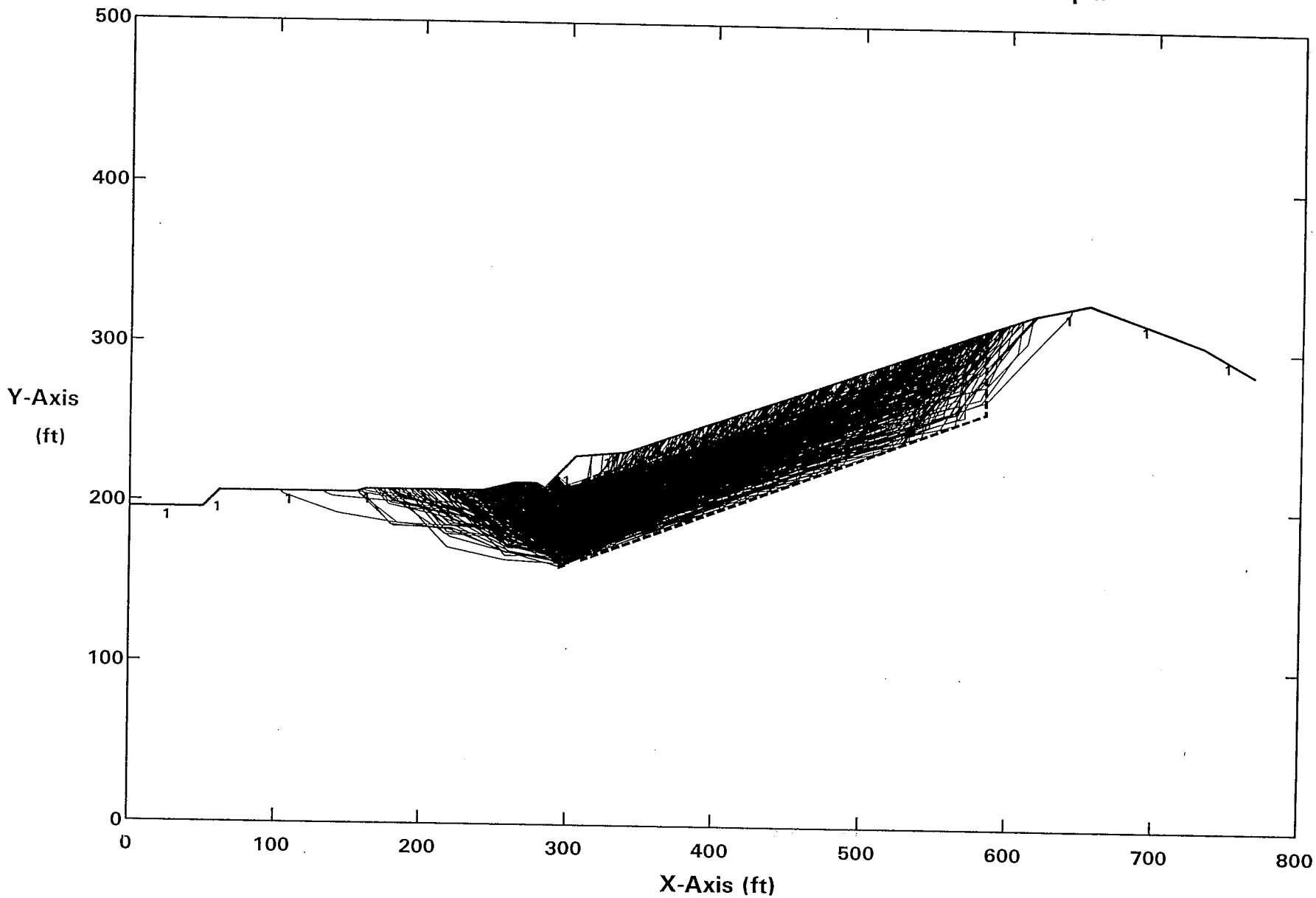
PCSTABL5M FSmin = 2.45 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run #20

Hasley Canyon Cross Section 36-36' Cut Slope 8, 3:1, Static

All surfaces evaluated. C:HC36S4.PLT By: AC 2/09/2000 3:35pm



Factors Of Safety Calculated By The Modified Janbu Method

Run #20

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--

Simplified Janbu, Simplified Bishop

or Spencer's Method of Slices

Run Date:	2/09/2000
Time of Run:	3:37pm
Run By:	AC
Input Data Filename:	C:HC36S4
Output Filename:	C:HC36S4.OUT
Plotted Output Filename:	C:HC36S4.PLT

PROBLEM DESCRIPTION Hasley Canyon Cross Section 36-36'

Cut Slope 8, 3:1, Static

BOUNDARY COORDINATES

14 Top Boundaries

14 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	196.00	50.00	196.00	1
2	50.00	196.00	61.00	206.00	1
3	61.00	206.00	155.00	206.00	1
4	155.00	206.00	161.00	208.00	1
5	161.00	208.00	242.00	208.00	1
6	242.00	208.00	263.00	213.00	1
7	263.00	213.00	278.00	213.00	1
8	278.00	213.00	284.00	210.00	1
9	284.00	210.00	305.00	230.00	1
10	305.00	230.00	340.00	233.00	1
11	340.00	233.00	617.00	323.00	1
12	617.00	323.00	655.00	330.00	1
13	655.00	330.00	732.00	304.00	1
14	732.00	304.00	768.00	286.00	1

ISOTROPIC SOIL PARAMETERS

1 Type(s) of Soil

Run #20

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	119.0	119.0	410.0	40.5	.00	.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	23.5	410.0	40.5
2	24.5	347.0	22.0
3	90.0	410.0	40.5

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 40.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	295.00	185.00	300.00	187.00	50.00
2	310.00	190.00	585.00	285.00	50.00

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	209.25	208.00
2	229.57	201.18
3	268.99	194.42
4	297.64	166.51
5	332.00	189.36
6	333.33	229.34
7	334.08	232.49

Factor Of Safety For The Preceding Specified Surface = 14.939

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	287.25	213.09
2	297.89	208.82
3	363.83	191.98
4	364.61	231.97
5	372.58	243.59

Factor Of Safety For The Preceding Specified Surface = 58.872

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

1	262.07	212.78
2	264.06	212.46
3	298.88	192.76
4	347.45	189.79
5	349.23	229.75
6	353.87	237.51

Factor Of Safety For The Preceding Specified Surface = 22.021

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	260.34	212.37
2	267.56	206.77
3	296.78	179.45
4	319.11	179.44
5	320.99	219.39
6	333.77	232.47

Factor Of Safety For The Preceding Specified Surface = 23.108

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	209.25	208.00
2	229.57	201.18
3	268.99	194.42
4	297.64	166.51
5	332.00	189.36

6	333.33	229.34
7	334.08	232.49

Factor Of Safety For The Preceding Specified Surface = 14.939

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	287.25	213.09
2	297.89	208.82
3	363.83	191.98
4	364.61	231.97
5	372.58	243.59

Factor Of Safety For The Preceding Specified Surface = 58.872

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	262.07	212.78
2	264.06	212.46
3	298.88	192.76
4	347.45	189.79
5	349.23	229.75
6	353.87	237.51

Factor Of Safety For The Preceding Specified Surface = 22.021

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	252.76	210.56
2	264.78	202.74
3	299.09	182.18
4	560.01	296.10
5	569.27	307.49

*** 2.446 ***

Individual data on the 9 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	10.2	5545.1	.0	.0	.0	.0	.0	.0	.0
2	1.8	2050.2	.0	.0	.0	.0	.0	.0	.0
3	13.2	22372.3	.0	.0	.0	.0	.0	.0	.0
4	6.0	13195.4	.0	.0	.0	.0	.0	.0	.0
5	15.1	54741.1	.0	.0	.0	.0	.0	.0	.0
6	5.9	30751.2	.0	.0	.0	.0	.0	.0	.0
7	35.0	162855.9	.0	.0	.0	.0	.0	.0	.0
8	220.0	541167.8	.0	.0	.0	.0	.0	.0	.0
9	9.3	4620.7	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	223.82	208.00
2	224.71	207.12
3	264.69	205.64
4	299.99	186.83
5	523.48	284.66
6	531.88	295.34

*** 2.550 ***

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	223.82	208.00
2	224.71	207.12
3	264.69	205.64
4	299.99	186.83
5	523.48	284.66
6	531.88	295.34

*** 2.550 ***

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	246.27	209.02
2	262.71	193.14
3	296.99	172.54
4	564.51	293.84
5	569.11	307.44

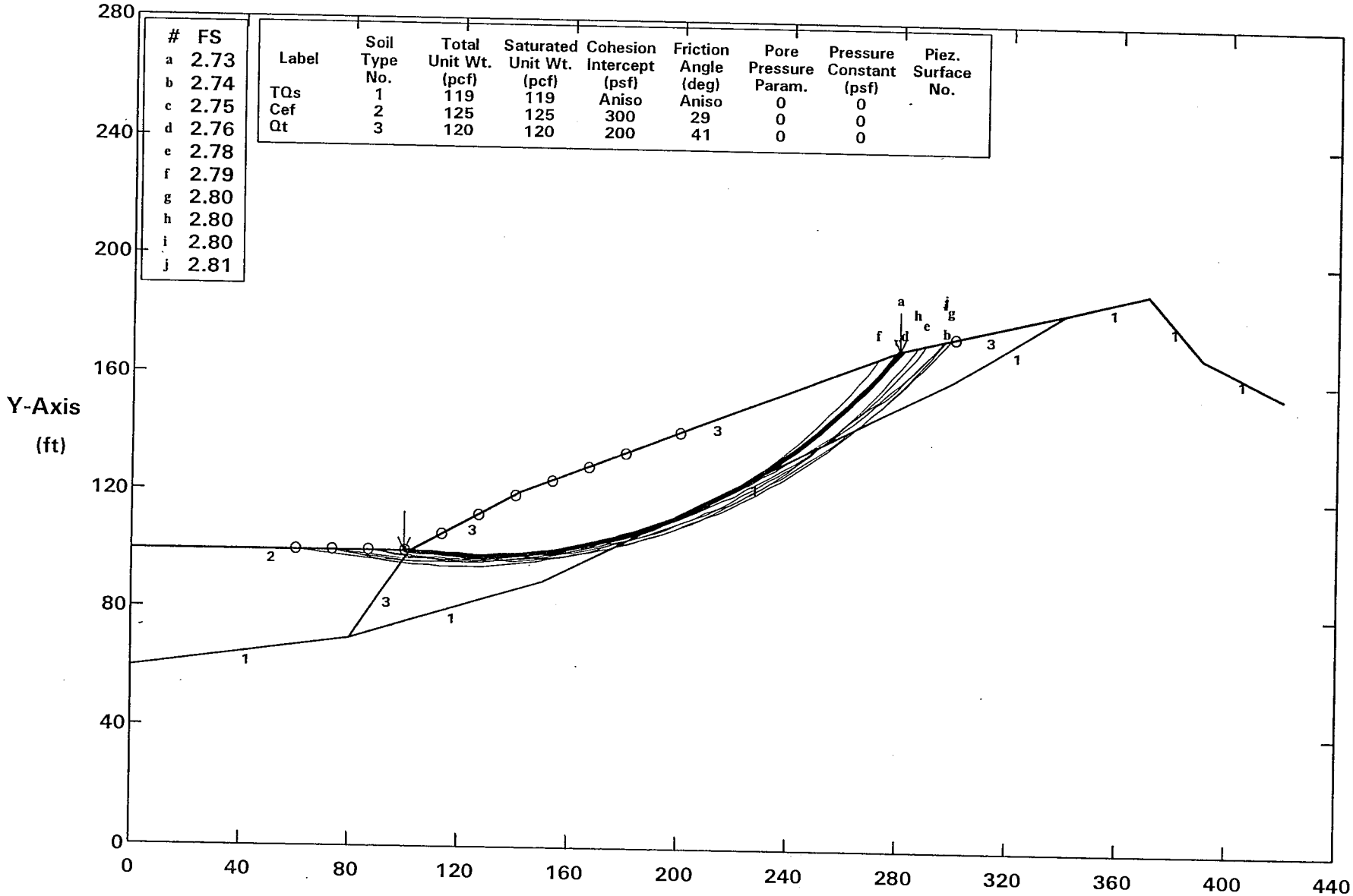
*** 2.551 ***

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	246.27	209.02
2	262.71	193.14
3	296.99	172.54
4	564.51	293.84
5	569.11	307.44

Hasley Canyon Cross Section 37-37' Natural Slope with Qt, Static

Ten Most Critical. C:HC37SC3.PLT By: DCS 2/07/2000 10:39am



#	FS
a	2.73
b	2.74
c	2.75
d	2.76
e	2.78
f	2.79
g	2.80
h	2.80
i	2.80
j	2.81

Label	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.
TQs	1	119	119	Aniso	Aniso	0	0	-
Cef	2	125	125	300	29	0	0	
Qt	3	120	120	200	41	0	0	

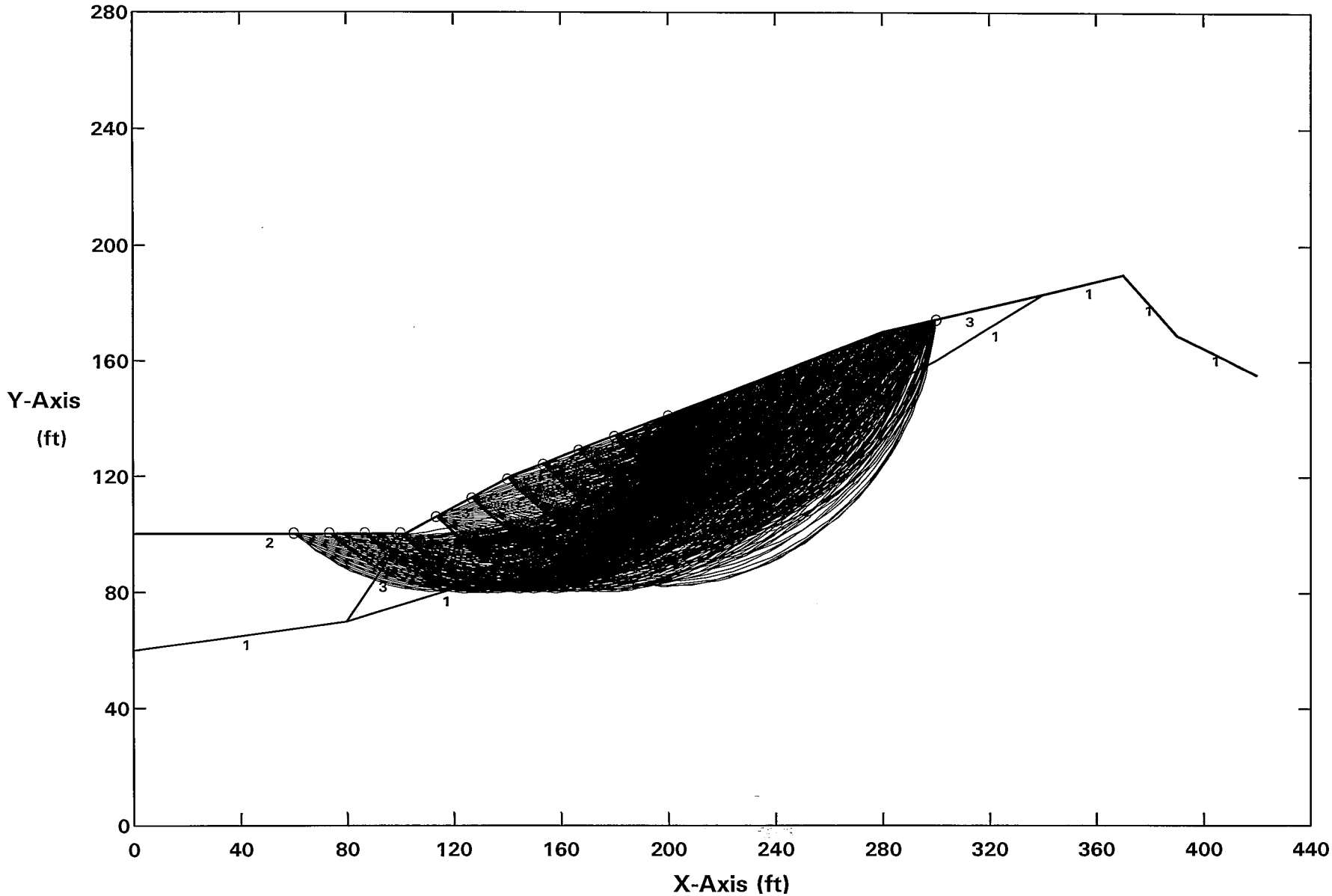
PCSTABL5M/SI FSmin = 2.73 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

Run #21

Hasley Canyon Cross Section 37-37' Natural Slope with Qt, Static

All surfaces evaluated. C:HC37SC3.PLT By: DCS 2/07/2000 10:39am



Factors Of Safety Calculated By The Modified Bishop Method

Lunh21

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	2/07/2000
Time of Run:	10:39am
Run By:	DCS
Input Data Filename:	C:HC37SC3.IN
Output Filename:	C:HC37SC3.OUT
Unit:	ENGLISH
Plotted Output Filename:	C:HC37SC3.PLT

PROBLEM DESCRIPTION Hasley Canyon Cross Section 37-37'
Natural Slope with Qt, Static

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	.00	100.00	102.00	100.00	2
2	102.00	100.00	142.00	120.00	3
3	142.00	120.00	280.00	170.00	3
4	280.00	170.00	340.00	183.00	3
5	340.00	183.00	370.00	190.00	1
6	370.00	190.00	390.00	169.00	1
7	390.00	169.00	420.00	155.50	1
8	.00	60.00	80.00	70.00	1
9	80.00	70.00	102.00	100.00	3
10	80.00	70.00	150.00	90.00	1
11	150.00	90.00	300.00	160.00	1
12	300.00	160.00	340.00	183.00	1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Run #21

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	119.0	119.0	410.0	40.5	.00	.0	0
2	125.0	125.0	300.0	29.0	.00	.0	0
3	120.0	120.0	200.0	41.0	.00	.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	410.0	40.5
2	31.0	200.0	17.4
3	90.0	410.0	40.5

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

1000 Trial Surfaces Have Been Generated.

100 Surfaces Initiate From Each Of 10 Points Equally Spaced Along The Ground Surface Between X = 60.00 ft.
and X = 180.00 ft.

Each Surface Terminates Between X = 200.00 ft.
and X = 300.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = 80.00 ft.

5.00 ft. Line Segments Define Each Trial Failure Surface.

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 42 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	100.00	100.00
2	104.97	99.43
3	109.95	98.98
4	114.94	98.66
5	119.93	98.46
6	124.93	98.38
7	129.93	98.43
8	134.93	98.60
9	139.92	98.90
10	144.90	99.32
11	149.87	99.86
12	154.83	100.52
13	159.77	101.31
14	164.68	102.22
15	169.58	103.25
16	174.44	104.40
17	179.28	105.68
18	184.08	107.07
19	188.85	108.58
20	193.57	110.21
21	198.26	111.95
22	202.90	113.81
23	207.49	115.78
24	212.04	117.87
25	216.53	120.07
26	220.96	122.38
27	225.34	124.80
28	229.65	127.33
29	233.90	129.96
30	238.09	132.70
31	242.20	135.54
32	246.24	138.48
33	250.21	141.52
34	254.11	144.66
35	257.92	147.89
36	261.65	151.22
37	265.30	154.64
38	268.86	158.15
39	272.34	161.74
40	275.72	165.42
41	279.02	169.18
42	279.56	169.84

Circle Center At X = 125.5 ; Y = 300.2 and Radius, 201.8

*** 2.734 ***

Individual data on the 46 slices

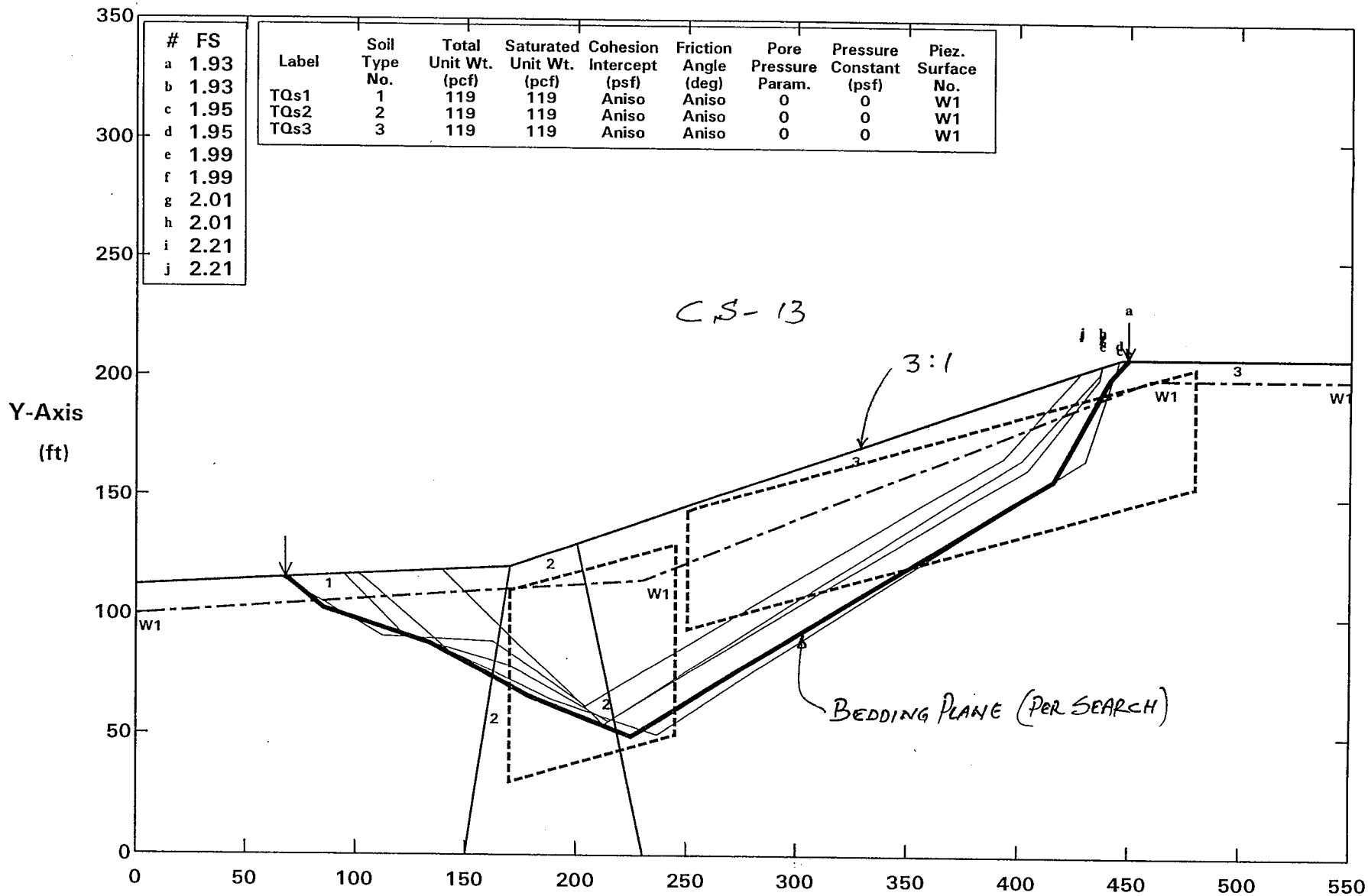
Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	1.8	24.4	.0	.0	.0	.0	.0	.0	.0
2	.2	4.2	.0	.0	.0	.0	.0	.0	.0
3	3.0	406.7	.0	.0	.0	.0	.0	.0	.0
4	5.0	2105.4	.0	.0	.0	.0	.0	.0	.0
5	5.0	3832.5	.0	.0	.0	.0	.0	.0	.0
6	5.0	5491.2	.0	.0	.0	.0	.0	.0	.0
7	5.0	7077.0	.0	.0	.0	.0	.0	.0	.0
8	5.0	8585.9	.0	.0	.0	.0	.0	.0	.0
9	5.0	10014.1	.0	.0	.0	.0	.0	.0	.0
10	5.0	11358.4	.0	.0	.0	.0	.0	.0	.0
11	2.1	5113.9	.0	.0	.0	.0	.0	.0	.0
12	2.9	7432.1	.0	.0	.0	.0	.0	.0	.0
13	5.0	13340.5	.0	.0	.0	.0	.0	.0	.0
14	5.0	14010.8	.0	.0	.0	.0	.0	.0	.0
15	4.9	14591.5	.0	.0	.0	.0	.0	.0	.0
16	4.9	15081.8	.0	.0	.0	.0	.0	.0	.0
17	4.9	15481.6	.0	.0	.0	.0	.0	.0	.0
18	4.9	15790.7	.0	.0	.0	.0	.0	.0	.0
19	4.8	16009.6	.0	.0	.0	.0	.0	.0	.0
20	4.8	16138.9	.0	.0	.0	.0	.0	.0	.0
21	4.8	16179.6	.0	.0	.0	.0	.0	.0	.0
22	3.7	12533.8	.0	.0	.0	.0	.0	.0	.0
23	1.1	3599.4	.0	.0	.0	.0	.0	.0	.0
24	4.7	15999.7	.0	.0	.0	.0	.0	.0	.0
25	4.6	15782.8	.0	.0	.0	.0	.0	.0	.0
26	4.6	15485.6	.0	.0	.0	.0	.0	.0	.0
27	4.5	15110.5	.0	.0	.0	.0	.0	.0	.0
28	4.5	14660.8	.0	.0	.0	.0	.0	.0	.0
29	4.4	14139.6	.0	.0	.0	.0	.0	.0	.0
30	4.4	13550.5	.0	.0	.0	.0	.0	.0	.0
31	3.0	9004.9	.0	.0	.0	.0	.0	.0	.0
32	1.3	3892.3	.0	.0	.0	.0	.0	.0	.0
33	4.3	12182.1	.0	.0	.0	.0	.0	.0	.0
34	4.2	11410.3	.0	.0	.0	.0	.0	.0	.0
35	4.1	10587.1	.0	.0	.0	.0	.0	.0	.0
36	4.0	9717.2	.0	.0	.0	.0	.0	.0	.0
37	4.0	8805.8	.0	.0	.0	.0	.0	.0	.0
38	3.9	7858.2	.0	.0	.0	.0	.0	.0	.0
39	3.8	6879.8	.0	.0	.0	.0	.0	.0	.0
40	3.7	5876.2	.0	.0	.0	.0	.0	.0	.0
41	3.6	4853.3	.0	.0	.0	.0	.0	.0	.0
42	3.6	3817.1	.0	.0	.0	.0	.0	.0	.0
43	3.5	2773.5	.0	.0	.0	.0	.0	.0	.0
44	3.4	1728.9	.0	.0	.0	.0	.0	.0	.0
45	3.3	689.3	.0	.0	.0	.0	.0	.0	.0
46	.5	15.1	.0	.0	.0	.0	.0	.0	.0

Hasley Canyon Cross Section 40-40' Cut Slope 13, 3:1, Static

Ten Most Critical. C:HC40S1.PLT 2/11/2000 9:57am

#	FS
a	1.93
b	1.93
c	1.95
d	1.95
e	1.99
f	1.99
g	2.01
h	2.01
i	2.21
j	2.21

Label	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.
TQs1	1	119	119	Aniso	Aniso	0	0	W1
TQs2	2	119	119	Aniso	Aniso	0	0	W1
TQs3	3	119	119	Aniso	Aniso	0	0	W1



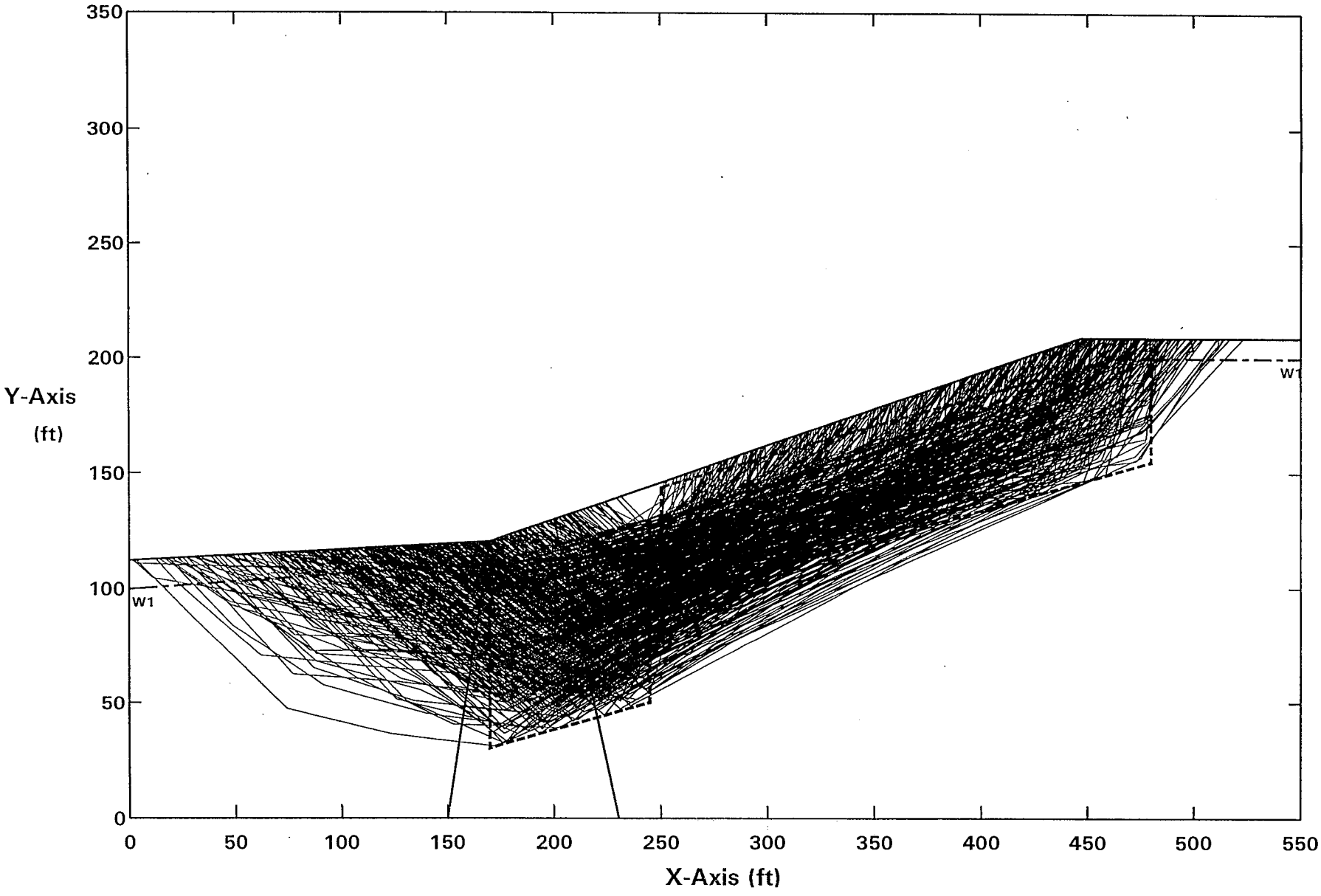
PCSTABL5M FSmin = 1.93 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run #2

Hasley Canyon Cross Section 40-40' Cut Slope 13, 3:1, Static

All surfaces evaluated. C:HC40S1.PLT 2/11/2000 9:57am



Factors Of Safety Calculated By The Modified Janbu Method

Lumped

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date: 2/11/2000
Time of Run: 9:57am
Run By:
Input Data Filename: C:HC40S1.
Output Filename: C:HC40S1.OUT
Plotted Output Filename: C:HC40S1.PLT

PROBLEM DESCRIPTION Hasley Canyon Cross Section 40-40'
Cut Slope 13, 3:1, Static

BOUNDARY COORDINATES

4 Top Boundaries
6 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	112.00	170.00	120.00	1
2	170.00	120.00	200.00	130.00	2
3	200.00	130.00	447.00	209.00	3
4	447.00	209.00	550.00	209.00	3
5	150.00	.00	170.00	120.00	2
6	200.00	130.00	230.00	.00	2

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	119.0	119.0	410.0	40.5	.00	.0	1
2	119.0	119.0	410.0	40.5	.00	.0	1
3	119.0	119.0	410.0	40.5	.00	.0	1

Run#22

ANISOTROPIC STRENGTH PARAMETERS

3 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	-41.0	410.0	40.5
2	-39.0	347.0	22.0
3	90.0	410.0	40.5

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	-41.0	410.0	40.5
2	29.0	347.0	22.0
3	90.0	410.0	40.5

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	29.0	410.0	40.5
2	31.0	347.0	22.0
3	90.0	410.0	40.5

---

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 4 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	100.00
2	230.00	115.00
3	460.00	200.00
4	550.00	200.00

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 50.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	170.00	70.00	245.00	90.00	80.00
2	250.00	119.00	480.00	180.00	50.00

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined By The Following 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	190.67	126.89
2	213.28	117.81
3	295.02	114.32
4	295.93	160.68

Factor Of Safety For The Preceding Specified Surface = 21.039

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	190.67	126.89
2	213.28	117.81
3	295.02	114.32
4	295.93	160.68

Factor Of Safety For The Preceding Specified Surface = 21.039

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Examined. They Are Ordered - Most Critical
First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	68.19	115.21
2	85.19	102.54
3	133.11	88.27
4	177.90	66.04
5	225.02	49.32
6	415.92	157.19
7	441.30	200.27
8	449.92	209.00

*** 1.930 ***

Individual data on the 17 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	13.3	8312.3	.0	.0	.0	.0	.0	.0	.0
2	3.7	5309.2	.0	435.4	.0	.0	.0	.0	.0
3	47.9	123923.1	.0	36469.3	.0	.0	.0	.0	.0
4	29.2	131717.1	.0	58038.6	.0	.0	.0	.0	.0
5	6.2	35078.5	.0	16613.3	.0	.0	.0	.0	.0
6	1.5	8869.9	.0	4249.5	.0	.0	.0	.0	.0
7	7.9	50116.2	.0	23800.0	.0	.0	.0	.0	.0
8	22.1	168841.3	.0	73313.6	.0	.0	.0	.0	.0
9	3.9	33536.7	.0	14177.0	.0	.0	.0	.0	.0
10	14.2	133762.3	.0	55753.5	.0	.0	.0	.0	.0
11	7.0	71608.9	.0	29426.4	.0	.0	.0	.0	.0
12	5.0	52210.0	.0	22842.8	.0	.0	.0	.0	.0
13	185.9	********	.0	*******	.0	.0	.0	.0	.0
14	20.0	66810.6	.0	30595.8	.0	.0	.0	.0	.0
15	5.4	6843.2	.0	.0	.0	.0	.0	.0	.0
16	5.7	3347.4	.0	.0	.0	.0	.0	.0	.0
17	2.9	514.2	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	68.19	115.21
2	85.19	102.54
3	133.11	88.27
4	177.90	66.04
5	225.02	49.32
6	415.92	157.19
7	441.30	200.27
8	449.92	209.00

*** 1.930 ***

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	100.49	116.73
2	103.41	115.65
3	142.42	84.37
4	188.35	64.61
5	236.22	50.19
6	430.52	166.38
7	445.72	208.59

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
MATERIALS ENGINEERING DIVISION
GEOTECHNICAL ENGINEERING
DEVELOPMENT SERVICES SECTION

ORDINARY METHOD OF SLICES USED FOR ANALYSIS
(CONSIDERING PORE-WATER PRESSURES)

PROJECT: TT52584 - Hasley Canyon -PN. 00-1617-4
CONSULTANT: AES
REPORT DATE:
SECTION: 40-40' CIRCLE: Bdng.Plane in TQs- Janbu HC40S1 (FS=1.93) DATE: 2/11/00 BY: EC

CS-13

SLICE NO.	ABOVE HT(1)	WATER HT(2)	BELOW HT(3)	WATER HT(4)	SLICE WIDTH	WET AREA	TOTAL AREA	SLICE WEIGHT	UNIT WEIGHT	SLICE Ru
1.	0.00	13.00	0.00	0.00	17.00	0.00	110.50	13.15	119.0	0.000
2.	13.00	10.00	0.00	22.00	48.00	528.00	1080.00	128.52	119.0	0.256
3.	10.00	10.00	22.00	36.00	28.00	812.00	1092.00	129.95	119.0	0.390
4.	10.00	10.00	36.00	40.00	8.00	304.00	384.00	49.54	129.0	0.383
5.	10.00	13.00	40.00	45.00	10.00	425.00	540.00	69.66	129.0	0.381
6.	13.00	26.00	45.00	64.00	47.00	2561.50	3478.00	413.88	119.0	0.386
7.	26.00	27.00	64.00	61.00	5.00	312.50	445.00	57.40	129.0	0.340
8.	27.00	18.00	61.00	28.00	185.00	8232.50	12395.00	1598.95	129.0	0.321
9.	18.00	14.00	28.00	0.00	21.00	294.00	630.00	74.97	119.0	0.245
10.	14.00	0.00	0.00	0.00	12.00	0.00	84.00	10.00	119.0	0.000

SLOPE STABILITY DATA

SEISMIC COEFFICIENT = 0.00 g

SLICE NO.	1 SLICE WEIGHT W (kips)	1.1 Ru (PORE PRESSURE RATIO)	2 FAILURE PLANE ANGLE i(deg)	3 ANGLE OF INT. FRICTION phi(deg)	4 COHE-SION C (ksf)	5 LENGTH OF ARC L (ft)	6 W (1-Ru) COS i TAN phi	7 C L	8 g W (1-Ru) SINi TAN phi	9 W SIN i	10 g W COS i
1.	13.15	0.000	-31.00	40.50	0.410	19.83	9.63	8.13	0.00	-6.77	0.00
2.	128.52	0.256	-17.00	40.50	0.410	50.19	78.06	20.58	0.00	-37.58	0.00
3.	129.95	0.390	-27.00	40.50	0.410	31.43	60.33	12.88	0.00	-59.00	0.00
4.	49.54	0.383	-27.00	22.00	0.347	8.98	11.00	3.12	0.00	-22.49	0.00
5.	69.66	0.381	-27.00	22.00	0.347	11.22	15.53	3.89	0.00	-31.62	0.00
6.	413.88	0.386	-20.00	40.50	0.410	50.02	203.89	20.51	0.00	-141.56	0.00
7.	57.40	0.340	29.00	22.00	0.347	5.72	13.39	1.98	0.00	27.83	0.00
8.	1598.95	0.321	29.00	22.00	0.347	211.52	383.49	73.40	0.00	775.19	0.00
9.	74.97	0.245	58.00	40.50	0.410	39.63	25.63	16.25	0.00	63.58	0.00
10.	10.00	0.000	58.00	40.50	0.410	22.64	4.52	9.28	0.00	8.48	0.00
SUMMATION:							805.48	170.03	0.00	576.06	0.00

STATIC SAFETY FACTOR = 1.69

~~SEISMIC SAFETY FACTOR = 1.59~~

Run #23a

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
MATERIALS ENGINEERING DIVISION
GEOTECHNICAL ENGINEERING
DEVELOPMENT SERVICES SECTION

ORDINARY METHOD OF SLICES USED FOR ANALYSIS
(CONSIDERING PORE-WATER PRESSURES)

PROJECT: TT52584 - Hasley Canyon -PN. 00-1617-4
CONSULTANT: AES
REPORT DATE:
SECTION: 40-40' CIRCLE: Bdng.Plane in TQs- Janbu HC40S1 (FS=1.93) DATE: 2/11/00 BY: -

SLICE NO.	ABOVE HT(1)	WATER HT(2)	BELOW HT(3)	WATER HT(4)	SLICE WIDTH	WET AREA	TOTAL AREA	SLICE WEIGHT	UNIT WEIGHT	SLICE Ru
1.	0.00	13.00	0.00	0.00	17.00	0.00	110.50	13.15	119.0	0.000
2.	13.00	10.00	0.00	22.00	48.00	528.00	1080.00	128.52	119.0	0.256
3.	10.00	10.00	22.00	36.00	28.00	812.00	1092.00	129.95	119.0	0.390
4.	10.00	10.00	36.00	40.00	8.00	304.00	384.00	49.54	129.0	0.383
5.	10.00	13.00	40.00	45.00	10.00	425.00	540.00	69.66	129.0	0.381
6.	13.00	26.00	45.00	64.00	47.00	2561.50	3478.00	413.88	119.0	0.386
7.	26.00	27.00	64.00	61.00	5.00	312.50	445.00	57.40	129.0	0.340
8.	27.00	18.00	61.00	28.00	185.00	8232.50	12395.00	1598.95	129.0	0.321
9.	18.00	14.00	28.00	0.00	21.00	294.00	630.00	74.97	119.0	0.245
10.	14.00	0.00	0.00	0.00	12.00	0.00	84.00	10.00	119.0	0.000

SLOPE STABILITY DATA

SEISMIC COEFFICIENT = 0.15 g

SLICE NO.	1 SLICE WEIGHT W (kips)	1.1 Ru (PORE PRESSURE RATIO)	2 FAILURE PLANE ANGLE i(deg)	3 ANGLE OF INT. FRICTION phi(deg)	4 COHE-SION C (ksf)	5 LENGTH OF ARC L (ft)	6 W (1-Ru) COS i TAN phi	7 C L	8 g W (1-Ru) SINi TAN phi	9 W SIN i	10 g W COS i
1.	13.15	0.000	-31.00	42.00	0.880	19.83	10.15	17.45	-0.91	-6.77	1.69
2.	128.52	0.256	-17.00	42.00	0.880	50.19	82.29	44.17	-3.77	-37.58	18.44
3.	129.95	0.390	-27.00	42.00	0.880	31.43	63.60	27.65	-4.86	-59.00	17.37
4.	49.54	0.383	-27.00	27.00	1.168	8.98	13.88	10.49	-1.06	-22.49	6.62
5.	69.66	0.381	-27.00	27.00	1.168	11.22	19.59	13.11	-1.50	-31.62	9.31
6.	413.88	0.386	-20.00	42.00	0.880	50.02	214.95	44.01	-11.74	-141.56	58.34
7.	57.40	0.340	29.00	27.00	1.168	5.72	16.89	6.68	1.40	27.83	7.53
8.	1598.95	0.321	29.00	27.00	1.168	211.52	483.63	247.06	40.21	775.19	209.77
9.	74.97	0.245	58.00	42.00	0.880	39.63	27.02	34.87	6.49	63.58	5.96
10.	10.00	0.000	58.00	42.00	0.880	22.64	4.77	19.93	1.14	8.48	0.79
SUMMATION:							936.77	465.42	25.40	576.06	335.82

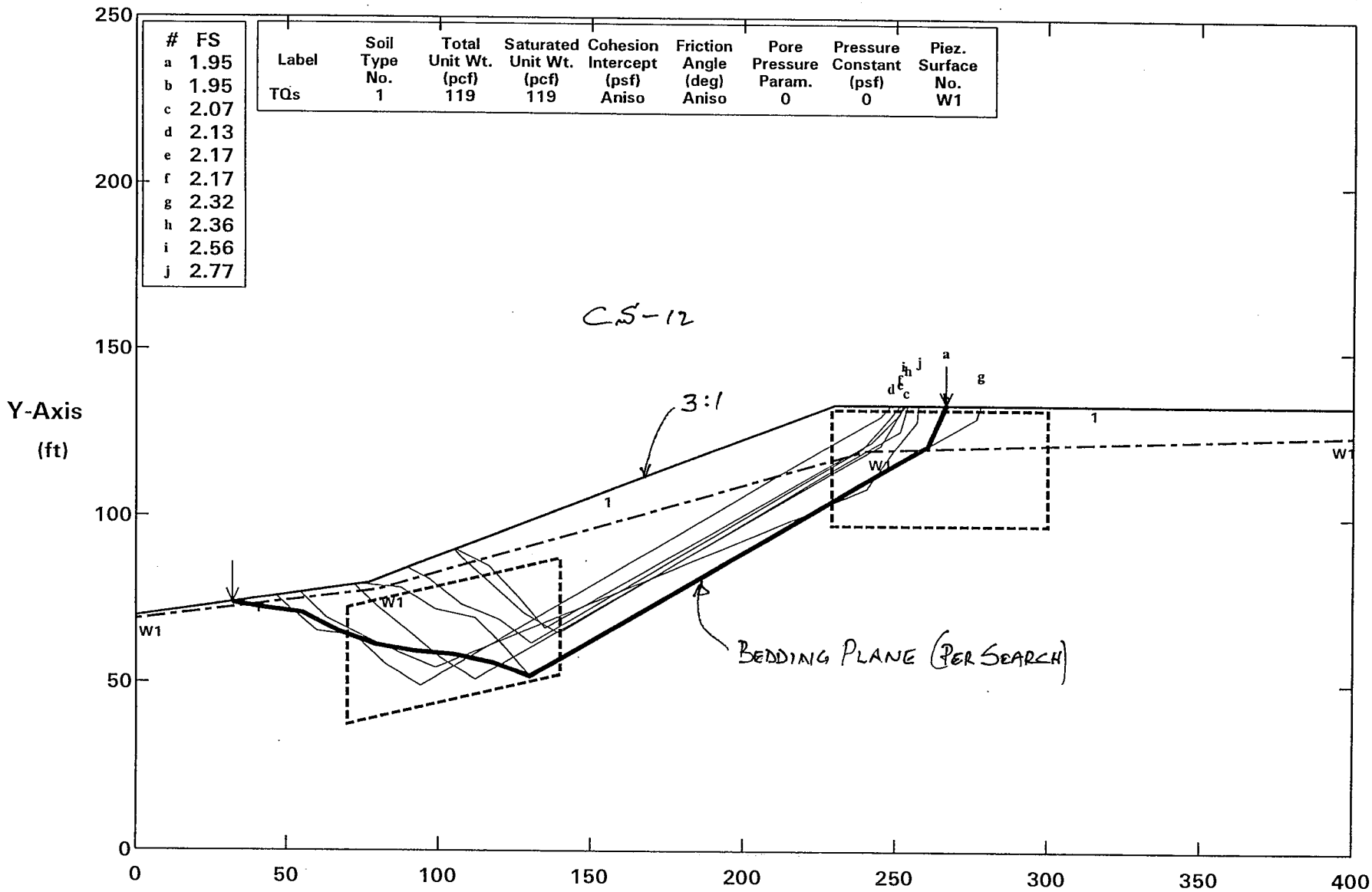
[redacted]

SEISMIC SAFETY FACTOR = 1.51

Run#23b

Hasley Canyon Cross Section 41-41' Cut Slope 12, 3:1, Static

Ten Most Critical. C:HC41S3.PLT By: AC 2/10/2000 3:39pm



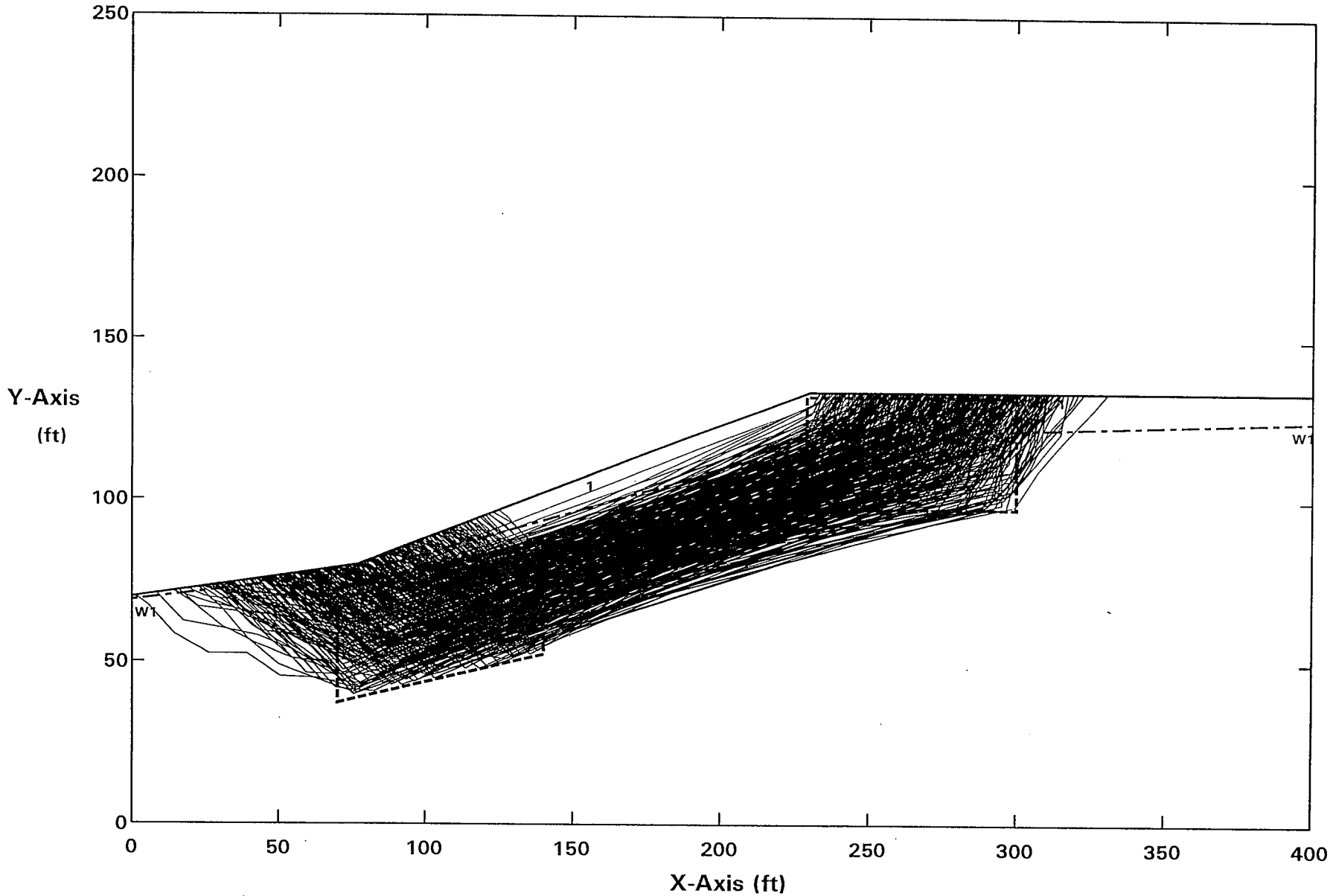
PCSTABL5M FSmin = 1.95 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Jun #2

Hasley Canyon Cross Section 41-41' Cut Slope 12, 3:1, Static

All surfaces evaluated. C:HC41S3.PLT By: AC 2/10/2000 3:18pm



Factors Of Safety Calculated By The Modified Janbu Method

Run#24

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	2/10/2000
Time of Run:	3:39pm
Run By:	AC
Input Data Filename:	C:HC41S3.IN
Output Filename:	C:HC41S3.OUT
Plotted Output Filename:	C:HC41S3.PLT

PROBLEM DESCRIPTION Hasley Canyon Cross Section 41-41'
Cut Slope 12, 3:1, Static

BOUNDARY COORDINATES

3 Top Boundaries
3 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	70.00	77.00	80.00	1
2	77.00	80.00	230.00	134.00	1
3	230.00	134.00	400.00	134.00	1

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	119.0	119.0	410.0	40.5	.00	.0	1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Run#24

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	27.5	410.0	40.5
2	28.5	347.0	22.0
3	90.0	410.0	40.5

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1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 4 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	69.00
2	80.00	78.00
3	240.00	120.00
4	400.00	125.00

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 13.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	70.00	55.00	140.00	70.00	35.00

2	229.00	115.00	300.00	115.00	35.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	31.84	74.13
2	42.17	72.46
3	55.08	71.00
4	66.77	65.31
5	79.23	61.61
6	92.06	59.47
7	105.01	58.33
8	117.83	56.21
9	130.19	52.16
10	260.47	121.40
11	265.84	133.24
12	266.59	134.00

*** 1.945 ***

Individual data on the 17 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	5.7	555.5	.0	.0	.0	.0	.0	.0	.0
2	4.7	1297.7	.0	188.4	.0	.0	.0	.0	.0
3	12.9	7046.1	.0	2208.0	.0	.0	.0	.0	.0
4	11.7	13569.3	.0	6206.6	.0	.0	.0	.0	.0
5	10.2	18926.6	.0	8799.9	.0	.0	.0	.0	.0
6	2.2	4902.3	.0	2288.5	.0	.0	.0	.0	.0
7	.8	1770.5	.0	792.1	.0	.0	.0	.0	.0
8	12.1	32580.1	.0	14100.7	.0	.0	.0	.0	.0
9	12.9	44221.4	.0	18811.1	.0	.0	.0	.0	.0
10	12.8	53231.3	.0	22749.4	.0	.0	.0	.0	.0
11	12.4	62349.2	.0	27765.1	.0	.0	.0	.0	.0
12	99.8	447816.7	.0	*******	.0	.0	.0	.0	.0
13	10.0	31105.2	.0	7403.6	.0	.0	.0	.0	.0
14	19.0	41611.8	.0	6348.1	.0	.0	.0	.0	.0

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
MATERIALS ENGINEERING DIVISION
GEOTECHNICAL ENGINEERING
DEVELOPMENT SERVICES SECTION
ORDINARY METHOD OF SLICES USED FOR ANALYSIS
(CONSIDERING PORE-WATER PRESSURES)

PROJECT: Hasley Cyn VTT 52584
CONSULTANT: AES
REPORT DATE:
SECTION: 41-41' CIRCLE: Bedding Plane in TQs per Janbu HC41S3 (FS=1.95) DATE: 2/15/00 BY: SKM

CS-12

SLICE NO.	ABOVE WATER HT(1)	WATER HT(2)	BELOW WATER HT(3)	WATER HT(4)	SLICE WIDTH	WET AREA	TOTAL AREA	SLICE WEIGHT	UNIT WEIGHT	SLICE Ru
1.	0.00	3.00	0.00	0.00	8.00	0.00	12.00	1.43	119.0	0.000
2.	3.00	4.00	0.00	12.00	34.50	207.00	327.75	39.00	119.0	0.331
3.	4.00	7.50	11.50	39.00	55.50	1401.38	1720.50	204.74	119.0	0.427
4.	7.50	17.50	39.00	14.00	96.00	2544.00	3744.00	482.98	129.0	0.329
5.	17.50	14.00	14.00	10.00	14.00	168.00	388.50	50.12	129.0	0.209
6.	14.00	13.00	10.00	0.00	21.00	105.00	388.50	50.12	129.0	0.131
7.	13.00	0.00	0.00	0.00	12.00	0.00	78.00	9.28	119.0	0.000

SLOPE STABILITY DATA

SEISMIC COEFFICIENT = 0.15 g

SLICE NO.	1 SLICE WEIGHT W (kips)	1.1 Ru (PORE PRESSURE RATIO)	2 FAILURE PLANE ANGLE i(deg)	3 ANGLE OF INT. FRICTION phi(deg)	4 COHE-SION C (ksf)	5 LENGTH OF ARC L (ft)	6 W (1-Ru) COS i TAN phi	7 C L	8 g W (1-Ru) SINi TAN phi	9 W SIN i	10 g W COS i
1.	1.43	0.000	-13.00	40.50	0.410	8.21	1.19	3.37	-0.04	-0.32	0.21
2.	39.00	0.331	-13.00	40.50	0.410	35.41	21.71	14.52	-0.75	-8.77	5.70
3.	204.74	0.427	-13.00	40.50	0.410	56.96	97.61	23.35	-3.38	-46.06	29.92
4.	482.98	0.329	28.00	22.00	0.347	108.73	115.66	37.73	9.22	226.74	63.97
5.	50.12	0.209	28.00	22.00	0.347	15.86	14.14	5.50	1.13	23.53	6.64
6.	50.12	0.131	28.00	22.00	0.347	23.78	15.54	8.25	1.24	23.53	6.64
7.	9.28	0.000	63.00	40.50	0.410	26.43	3.60	10.84	1.06	8.27	0.63
SUMMATION:							269.45	103.56	8.48	226.92	113.71

STATIC SAFETY FACTOR = 1.64
~~SEISMIC SAFETY FACTOR = 1.07~~

Run #25a

COUNTY OF LOS ANGELES
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(CONSIDERING PORE-WATER PRESSURES)

PROJECT: Hasley Cyn VTT 52584
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REPORT DATE:
SECTION: 41-41' CIRCLE: Bedding Plane in TQs per Janbu HC41S3 (FS=1.95) DATE: 2/15/00 BY: SKM

SLICE NO.	ABOVE HT(1)	WATER HT(2)	BELOW HT(3)	WATER HT(4)	SLICE WIDTH	WET AREA	TOTAL AREA	SLICE WEIGHT	UNIT WEIGHT	SLICE Ru
1.	0.00	3.00	0.00	0.00	8.00	0.00	12.00	1.43	119.0	0.000
2.	3.00	4.00	0.00	12.00	34.50	207.00	327.75	39.00	119.0	0.331
3.	4.00	7.50	11.50	39.00	55.50	1401.38	1720.50	204.74	119.0	0.427
4.	7.50	17.50	39.00	14.00	96.00	2544.00	3744.00	482.98	129.0	0.329
5.	17.50	14.00	14.00	10.00	14.00	168.00	388.50	50.12	129.0	0.209
6.	14.00	13.00	10.00	0.00	21.00	105.00	388.50	50.12	129.0	0.131
7.	13.00	0.00	0.00	0.00	12.00	0.00	78.00	9.28	119.0	0.000

SLOPE STABILITY DATA

SEISMIC COEFFICIENT = 0.15 g

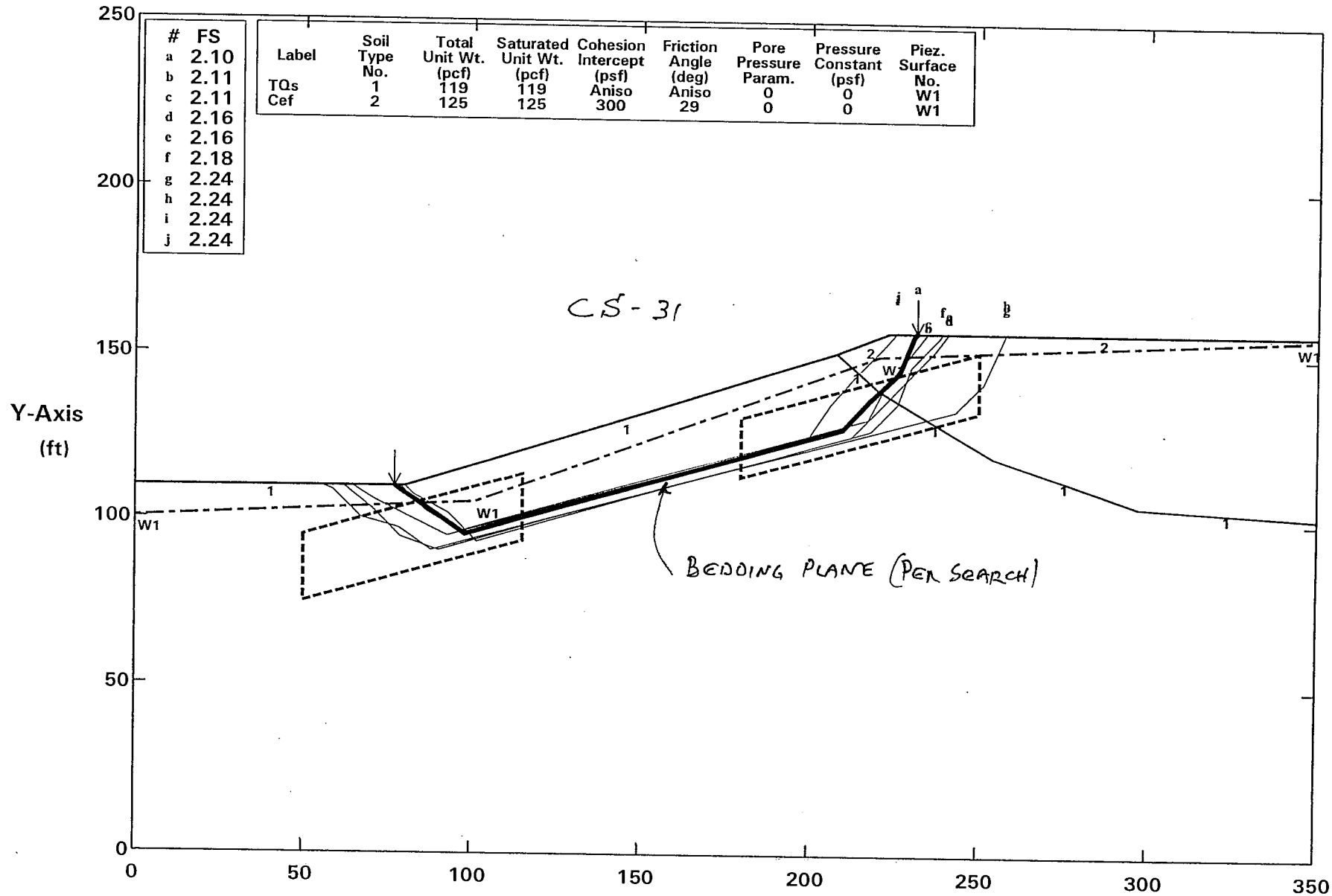
SLICE NO.	1 SLICE WEIGHT W (kips)	1.1 Ru (PORE PRESSURE RATIO)	2 FAILURE PLANE ANGLE i(deg)	3 ANGLE OF INT. FRICTION phi(deg)	4 COHE-SION C (ksf)	5 LENGTH OF ARC L (ft)	6 W (1-Ru) COS i / TAN phi	7 C L	8 g W (1-Ru) SINi / TAN phi	9 W SIN i	10 g W COS i
1.	1.43	0.000	-13.00	42.00	0.880	8.21	1.25	7.23	-0.04	-0.32	0.21
2.	39.00	0.331	-13.00	42.00	0.880	35.41	22.89	31.16	-0.79	-8.77	5.70
3.	204.74	0.427	-13.00	42.00	0.880	56.96	102.90	50.12	-3.56	-46.06	29.92
4.	482.98	0.329	28.00	27.00	1.168	108.73	145.87	126.99	11.63	226.74	63.97
5.	50.12	0.209	28.00	27.00	1.168	15.86	17.83	18.52	1.42	23.53	6.64
6.	50.12	0.131	28.00	27.00	1.168	23.78	19.60	27.78	1.56	23.53	6.64
7.	9.28	0.000	63.00	42.00	0.880	26.43	3.79	23.26	1.12	8.27	0.63
SUMMATION:							314.13	285.06	11.34	226.92	113.71

~~STATIC SAFETY FACTOR = 3.64~~
SEISMIC SAFETY FACTOR = 1.73

RUN #256

TT52584-Hasley Cyn-Sec42-42'- Static

Ten Most Critical. C:T42S1C.PLT By: AC 2/09/2000 8:02pm



#	FS
a	2.10
b	2.11
c	2.11
d	2.16
e	2.16
f	2.18
g	2.24
h	2.24
i	2.24
j	2.24

Label	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.
TQs	1	119	119	Aniso	Aniso	0	0	W1
Cef	2	125	125	300	29	0	0	W1

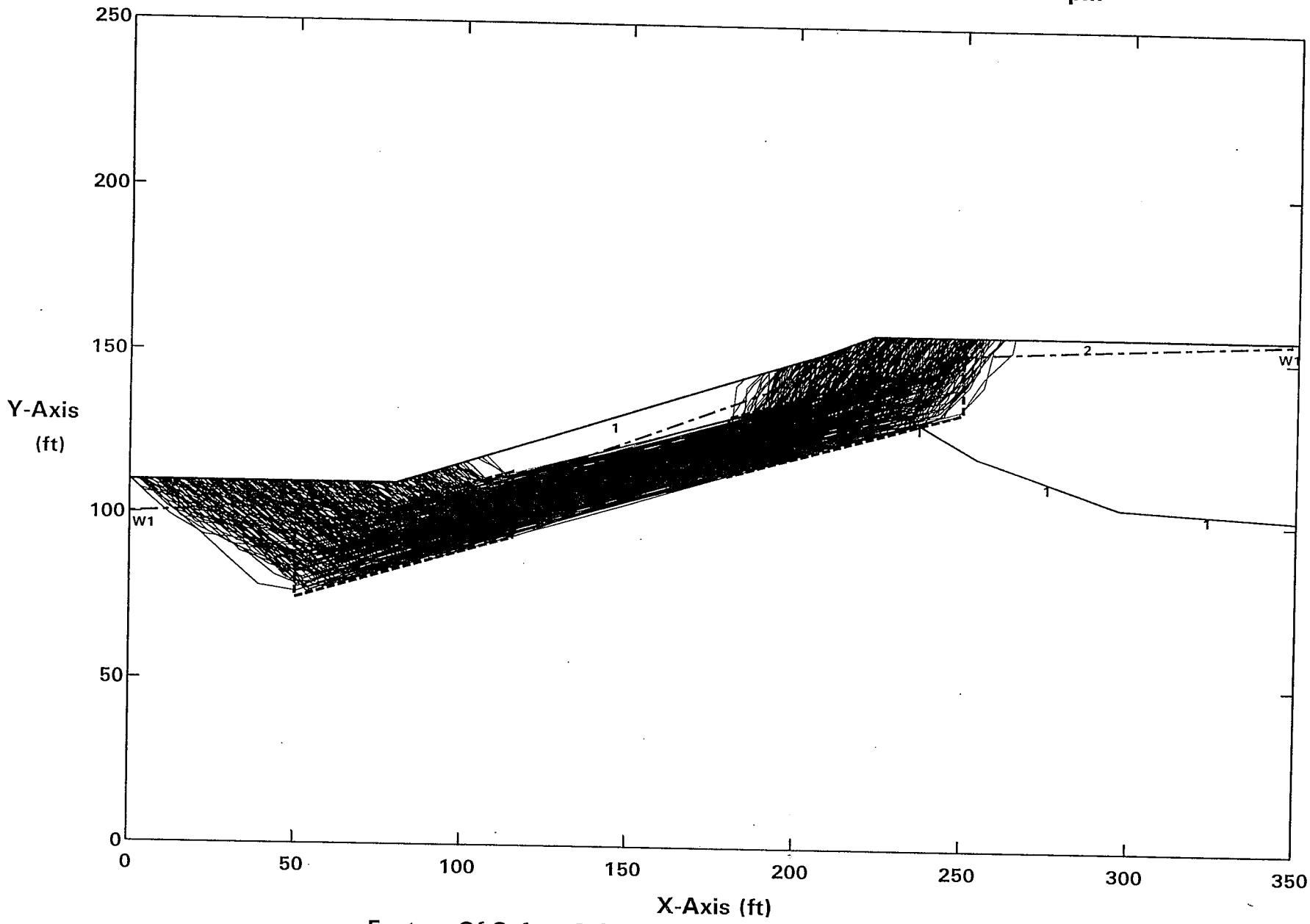
PCSTABL5M FSmin = 2.10 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run #26

TT52584-Hasley Cyn-Sec42-42'- Static

All surfaces evaluated. C:T42S1C.PLT By: AC 2/09/2000 8:02pm



Factors Of Safety Calculated By The Modified Janbu Method

Janbu

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	2/09/2000
Time of Run:	8:10pm
Run By:	AC
Input Data Filename:	C:T42S1C
Output Filename:	C:T42S1C.OUT
Plotted Output Filename:	C:T42S1C.PLT

PROBLEM DESCRIPTION TT52584-Hasley Cyn-Sec42-42'- Static

BOUNDARY COORDINATES

4 Top Boundaries
8 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	110.00	80.00	110.00	1
2	80.00	110.00	208.00	151.00	1
3	208.00	151.00	223.00	157.00	2
4	223.00	157.00	350.00	157.00	2
5	208.00	151.00	220.00	140.00	1
6	220.00	140.00	254.00	120.00	1
7	254.00	120.00	297.00	105.00	1
8	297.00	105.00	350.00	102.00	1

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	119.0	119.0	410.0	40.5	.00	.0	1

Run #26

2	125.0	125.0	300.0	29.0	.00	.0	1

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	410.0	40.5
2	16.5	347.0	22.0
3	90.0	410.0	40.5

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1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 4 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	100.00
2	100.50	105.00
3	220.00	150.00
4	350.00	156.00

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.

600 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 11.8

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	50.00	85.00	115.00	103.60	20.00
2	180.00	122.30	250.00	142.40	18.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	76.89	110.00
2	78.55	108.61
3	88.33	102.02
4	98.17	95.51
5	209.56	128.32
6	217.63	136.93
7	225.98	145.27
8	230.56	156.15
9	231.26	157.00

*** 2.103 ***

Individual data on the 17 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	1.7	137.3	.0	.0	.0	.0	.0	.0	.0
2	1.5	325.1	.0	.0	.0	.0	.0	.0	.0
3	5.0	2929.9	.0	.0	.0	.0	.0	.0	.0
4	3.3	3525.8	.0	293.3	.0	.0	.0	.0	.0
5	9.8	18131.5	.0	4321.5	.0	.0	.0	.0	.0
6	2.3	5629.2	.0	1373.5	.0	.0	.0	.0	.0
7	107.5	278311.5	.0	86662.7	.0	.0	.0	.0	.0
8	1.6	4323.4	.0	1684.3	.0	.0	.0	.0	.0
9	2.7	7276.6	.0	3892.7	.0	.0	.0	.0	.0
10	5.4	12883.0	.0	6441.3	.0	.0	.0	.0	.0
11	2.4	5049.6	.0	2241.1	.0	.0	.0	.0	.0

12	.4	907.9	.0	410.8	.0	.0	.0	.0	.0
13	2.6	4943.1	.0	2042.0	.0	.0	.0	.0	.0
14	3.0	4919.0	.0	1686.1	.0	.0	.0	.0	.0
15	2.2	2468.2	.0	863.6	.0	.0	.0	.0	.0
16	2.4	1137.4	.0	.0	.0	.0	.0	.0	.0
17	.7	37.3	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	78.65	110.00
2	86.35	102.37
3	96.46	96.29
4	217.01	131.18
5	222.24	141.76
6	229.57	151.01
7	234.31	157.00

*** 2.108 ***

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	78.65	110.00
2	86.35	102.37
3	96.46	96.29
4	217.01	131.18
5	222.24	141.76
6	229.57	151.01
7	234.31	157.00

*** 2.108 ***

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	61.79	110.00
2	70.60	102.98
3	78.94	94.64
4	89.94	90.36

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
MATERIALS ENGINEERING DIVISION
GEOTECHNICAL ENGINEERING
DEVELOPMENT SERVICES SECTION

ORDINARY METHOD OF SLICES USED FOR ANALYSIS
(CONSIDERING PORE-WATER PRESSURES)

PROJECT: VTT52584 - Hasley Canyon
CONSULTANT: AES
REPORT DATE:
SECTION: 42-42' CIRCLE: Bedding Plane in TQs per Janbu T42S1C (FS=2.10) DATE: 2/16/00 BY: EC

CS-31

SLICE NO.	ABOVE HT(1)	WATER HT(2)	BELOW HT(3)	WATER HT(4)	SLICE WIDTH	WET AREA	TOTAL AREA	SLICE WEIGHT	UNIT WEIGHT	SLICE Ru
1.	0.00	7.00	0.00	0.00	8.00	0.00	28.00	3.33	119.0	0.000
2.	7.00	7.00	0.00	3.00	3.00	4.50	25.50	3.03	119.0	0.093
3.	7.00	8.00	3.00	5.00	4.00	16.00	46.00	5.47	119.0	0.182
4.	8.00	7.00	5.00	9.00	5.50	38.50	79.75	9.49	119.0	0.253
5.	7.00	11.00	9.00	8.00	3.50	29.75	61.25	7.90	129.0	0.235
6.	11.00	7.00	8.00	18.00	109.00	1417.00	2398.00	309.34	129.0	0.286
7.	7.00	7.00	18.00	11.00	10.00	145.00	215.00	25.58	119.0	0.354
8.	7.00	7.00	11.00	7.00	4.00	36.00	64.00	8.00	125.0	0.281
9.	7.00	7.00	7.00	5.00	2.00	12.00	26.00	3.25	125.0	0.230
10.	7.00	7.00	5.00	0.00	3.00	7.50	28.50	3.56	125.0	0.131
11.	7.00	0.00	0.00	0.00	2.50	0.00	8.75	1.09	125.0	0.000

SLOPE STABILITY DATA

SEISMIC COEFFICIENT = 0.00 g

SLICE NO.	1 SLICE WEIGHT W (kips)	1.1 Ru (PORE PRESSURE RATIO)	2 FAILURE PLANE ANGLE i(deg)	3 ANGLE OF INT. FRICTION phi(deg)	4 COHE-SION C (ksf)	5 LENGTH OF ARC L (ft)	6 W (1-Ru) COS i TAN phi	7 C L	8 g W (1-Ru) SINi TAN phi	9 W SIN i	10 g W COS i
1.	3.33	0.000	-33.70	40.50	0.410	9.62	2.37	3.94	0.00	-1.85	0.00
2.	3.03	0.093	-33.70	40.50	0.410	3.61	1.96	1.48	0.00	-1.68	0.00
3.	5.47	0.182	-33.70	40.50	0.410	4.81	3.18	1.97	0.00	-3.04	0.00
4.	9.49	0.253	-33.70	40.50	0.410	6.61	5.04	2.71	0.00	-5.27	0.00
5.	7.90	0.235	16.00	22.00	0.347	3.64	2.35	1.26	0.00	2.18	0.00
6.	309.34	0.286	16.00	22.00	0.347	113.39	85.80	39.35	0.00	85.27	0.00
7.	25.58	0.354	46.70	40.50	0.410	14.58	9.69	5.98	0.00	18.62	0.00
8.	8.00	0.281	46.70	29.00	0.300	5.83	2.19	1.75	0.00	5.82	0.00
9.	3.25	0.230	46.70	29.00	0.300	2.92	0.95	0.87	0.00	2.37	0.00
10.	3.56	0.131	67.00	29.00	0.300	7.68	0.67	2.30	0.00	3.28	0.00
11.	1.09	0.000	67.00	29.00	0.300	6.40	0.24	1.92	0.00	1.01	0.00
SUMMATION:							114.42	63.54	0.00	106.70	0.00

STATIC SAFETY FACTOR = 1.67

~~SEISMIC SAFETY FACTOR = 1.67~~

Run #27a

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DEVELOPMENT SERVICES SECTION

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REPORT DATE:
SECTION: 42-42' CIRCLE: Bedding Plane in TQs per Janbu T42S1C (FS=2.10) DATE: 2/16/00 BY: EC

SLICE NO.	ABOVE HT(1)	WATER HT(2)	BELOW HT(3)	WATER HT(4)	SLICE WIDTH	WET AREA	TOTAL AREA	SLICE WEIGHT	UNIT WEIGHT	SLICE Ru
1.	0.00	7.00	0.00	0.00	8.00	0.00	28.00	3.33	119.0	0.000
2.	7.00	7.00	0.00	3.00	3.00	4.50	25.50	3.03	119.0	0.093
3.	7.00	8.00	3.00	5.00	4.00	16.00	46.00	5.47	119.0	0.182
4.	8.00	7.00	5.00	9.00	5.50	38.50	79.75	9.49	119.0	0.253
5.	7.00	11.00	9.00	8.00	3.50	29.75	61.25	7.90	129.0	0.235
6.	11.00	7.00	8.00	18.00	109.00	1417.00	2398.00	309.34	129.0	0.286
7.	7.00	7.00	18.00	11.00	10.00	145.00	215.00	25.58	119.0	0.354
8.	7.00	7.00	11.00	7.00	4.00	36.00	64.00	8.00	125.0	0.281
9.	7.00	7.00	7.00	5.00	2.00	12.00	26.00	3.25	125.0	0.230
10.	7.00	7.00	5.00	0.00	3.00	7.50	28.50	3.56	125.0	0.131
11.	7.00	0.00	0.00	0.00	2.50	0.00	8.75	1.09	125.0	0.000

SLOPE STABILITY DATA

SEISMIC COEFFICIENT = 0.15 g

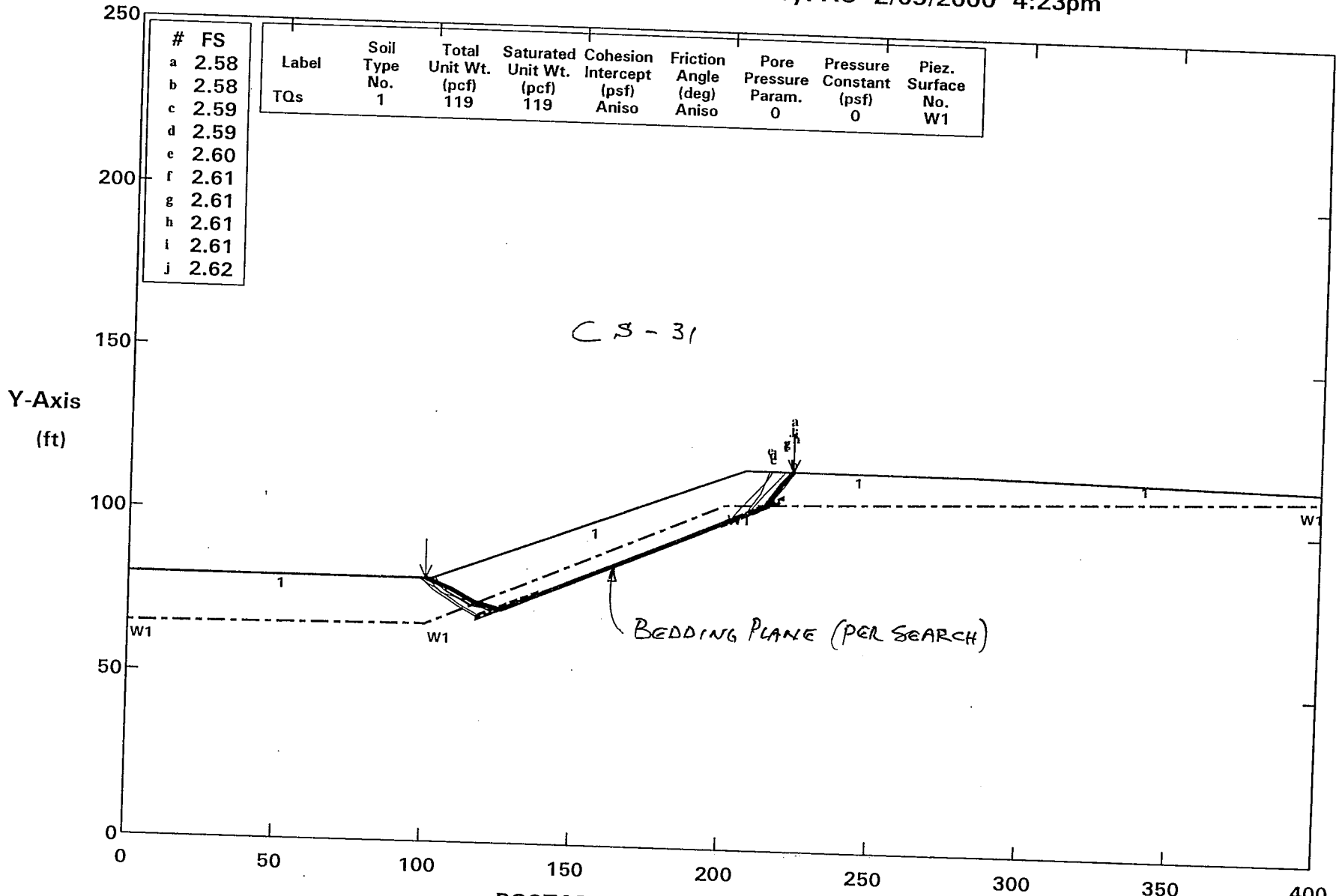
SLICE NO.	1 SLICE WEIGHT W (kips)	1.1 Ru (PORE PRESSURE RATIO)	2 FAILURE PLANE ANGLE i(deg)	3 ANGLE OF INT. FRICTION phi(deg)	4 COHE-SION C (ksf)	5 LENGTH OF ARC L (ft)	6 W (1-Ru) COS i / TAN phi	7 C L	8 g W (1-Ru) SINi / TAN phi	9 W SIN i	10 g W COS i
1.	3.33	0.000	-33.70	42.00	0.880	9.62	2.50	8.46	-0.25	-1.85	0.42
2.	3.03	0.093	-33.70	42.00	0.880	3.61	2.06	3.17	-0.21	-1.68	0.38
3.	5.47	0.182	-33.70	42.00	0.880	4.81	3.35	4.23	-0.34	-3.04	0.68
4.	9.49	0.253	-33.70	42.00	0.880	6.61	5.31	5.82	-0.53	-5.27	1.18
5.	7.90	0.235	16.00	27.00	1.168	3.64	2.96	4.25	0.13	2.18	1.14
6.	309.34	0.286	16.00	27.00	1.168	113.39	108.20	132.44	4.65	85.27	44.60
7.	25.58	0.354	46.70	42.00	0.880	14.58	10.21	12.83	1.63	18.62	2.63
8.	8.00	0.281	46.70	32.00	0.316	5.83	2.47	1.84	0.39	5.82	0.82
9.	3.25	0.230	46.70	32.00	0.316	2.92	1.07	0.92	0.17	2.37	0.33
10.	3.56	0.131	67.00	32.00	0.316	7.68	0.76	2.43	0.27	3.28	0.21
11.	1.09	0.000	67.00	32.00	0.316	6.40	0.27	2.02	0.09	1.01	0.06
SUMMATION:							139.16	178.42	6.01	106.70	52.47

~~STATIC SAFETY FACTOR = 2.98~~
SEISMIC SAFETY FACTOR = 1.96

RUN #276

TT52584-Hasley Canyon- Sec 43-43' Static

Ten Most Critical. C:T43S1C.PLT By: AC 2/09/2000 4:23pm



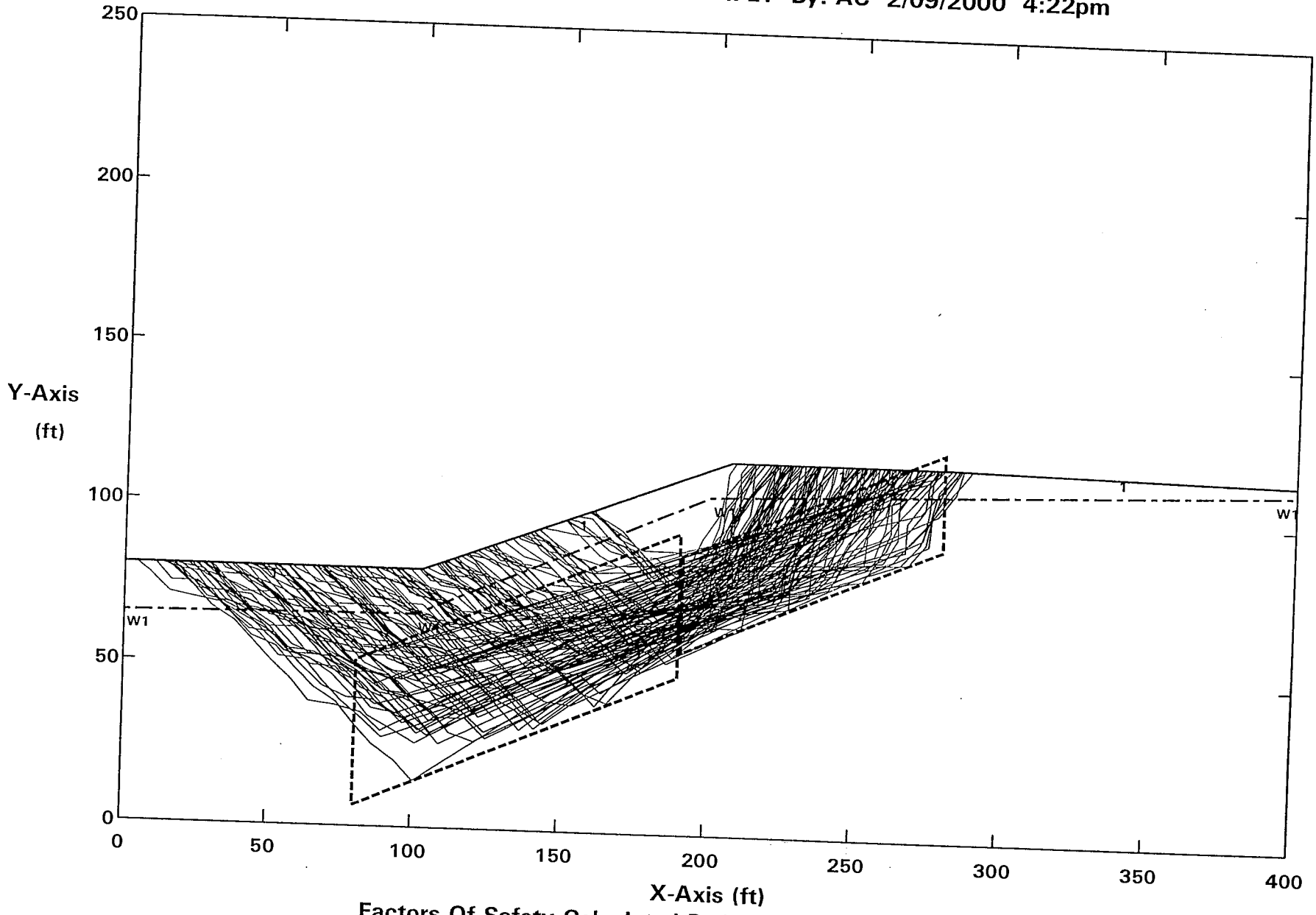
PCSTABL5M FSmin = 2.58 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run #28

TT52584-Hasley Canyon- Sec 43-43' Static

All surfaces evaluated. C:T43S1C.PLT By: AC 2/09/2000 4:22pm



Factors Of Safety Calculated By The Modified Janbu Method

Run #28

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	2/09/2000
Time of Run:	4:23pm
Run By:	AC
Input Data Filename:	C:T43S1C
Output Filename:	C:T43S1C.OUT
Plotted Output Filename:	C:T43S1C.PLT

PROBLEM DESCRIPTION TT52584-Hasley Canyon- Sec 43-43'
Static

BOUNDARY COORDINATES

4 Top Boundaries
4 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	80.00	102.00	80.00	1
2	102.00	80.00	207.00	116.00	1
3	207.00	116.00	282.00	116.00	1
4	282.00	116.00	400.00	114.00	1

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	119.0	119.0	410.0	40.5	.00	.0	1

ANISOTROPIC STRENGTH PARAMETERS

Run#28

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	20.5	410.0	40.5
2	21.5	347.0	22.0
3	90.0	410.0	40.5

---

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 4 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	65.00
2	100.00	66.00
3	200.00	105.00
4	400.00	111.00

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 9.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)

1	117.60	68.30	137.60	76.00	1.00
2	199.30	99.60	219.30	107.30	1.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	100.20	80.00
2	108.32	76.86
3	116.55	73.22
4	125.32	71.19
5	213.65	104.83
6	218.97	112.09
7	222.82	116.00

*** 2.583 ***

Individual data on the 11 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	1.8	74.7	.0	.0	.0	.0	.0	.0	.0
2	6.3	2257.3	.0	.0	.0	.0	.0	.0	.0
3	8.2	8362.7	.0	.0	.0	.0	.0	.0	.0
4	1.2	1781.7	.0	.0	.0	.0	.0	.0	.0
5	7.5	13121.9	.0	1056.5	.0	.0	.0	.0	.0
6	74.7	136757.8	.0	23418.4	.0	.0	.0	.0	.0
7	7.0	11523.5	.0	1933.6	.0	.0	.0	.0	.0
8	6.6	9838.7	.0	773.9	.0	.0	.0	.0	.0
9	.4	559.4	.0	13.2	.0	.0	.0	.0	.0
10	4.9	4212.5	.0	.0	.0	.0	.0	.0	.0
11	3.9	896.0	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

1	100.20	80.00
2	108.32	76.86
3	116.55	73.22
4	125.32	71.19
5	213.65	104.83
6	218.97	112.09
7	222.82	116.00

*** 2.583 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	101.41	80.00
2	106.94	75.77
3	115.03	71.81
4	123.90	70.33
5	201.22	99.95
6	207.57	106.33
7	213.84	112.78
8	216.24	116.00

*** 2.589 ***

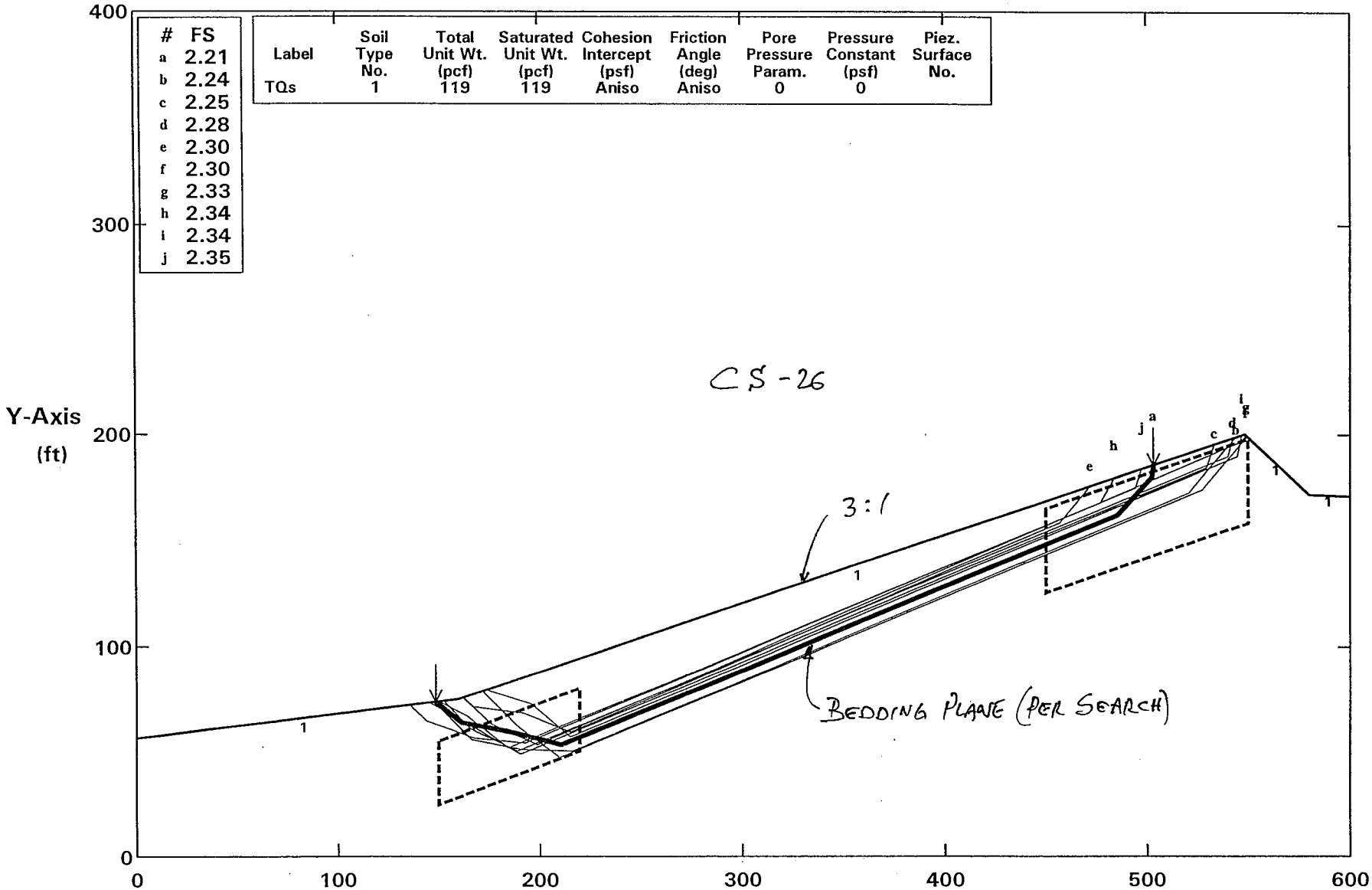
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	101.41	80.00
2	106.94	75.77
3	115.03	71.81
4	123.90	70.33
5	201.22	99.95
6	207.57	106.33
7	213.84	112.78
8	216.24	116.00

*** 2.589 ***

Hasley Canyon Cross Section 44-44' Cut Slope 26, 3:1, Static

Ten Most Critical. C:HC44S4.PLT By: AC 2/10/2000 3:01pm



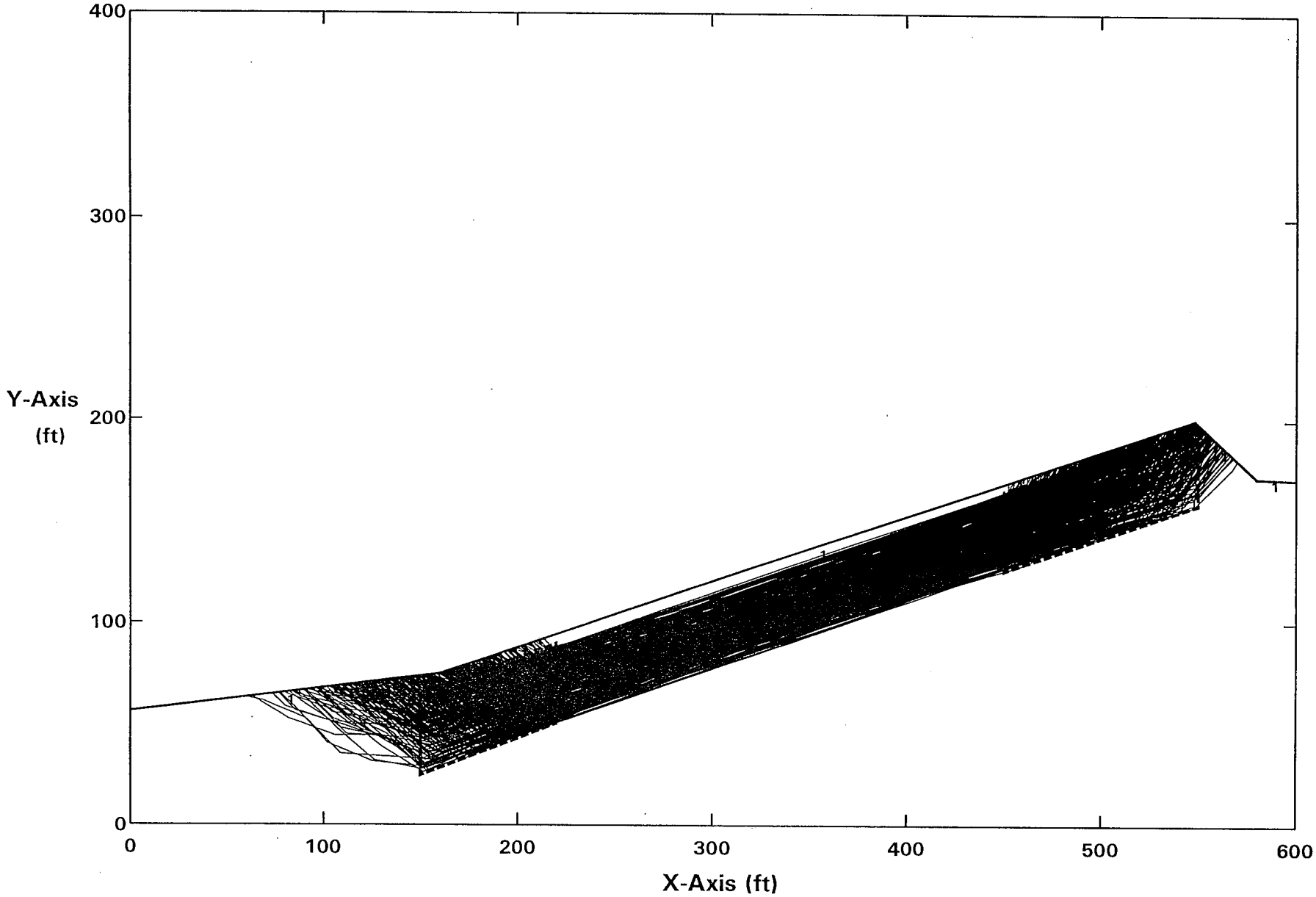
PCSTABL5M FSmin = 2.21 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Punting

Hasley Canyon Cross Section 44-44' Cut Slope 26, 3:1, Static

All surfaces evaluated. C:HC44S4.PLT By: AC 2/10/2000 2:57pm



Factors Of Safety Calculated By The Modified Janbu Method

Duplicate

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	2/10/2000
Time of Run:	3:01pm
Run By:	AC
Input Data Filename:	C:HC44S4.IN
Output Filename:	C:HC44S4.OUT
Plotted Output Filename:	C:HC44S4.PLT

PROBLEM DESCRIPTION Hasley Canyon Cross Section 44-44'
Cut Slope 26, 3:1, Static

BOUNDARY COORDINATES

4 Top Boundaries
4 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	56.00	160.00	75.00	1
2	160.00	75.00	548.00	200.00	1
3	548.00	200.00	580.00	172.00	1
4	580.00	172.00	600.00	171.00	1

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	119.0	119.0	410.0	40.5	.00	.0	0

ANISOTROPIC STRENGTH PARAMETERS

Run#29

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	410.0	40.5
2	22.5	347.0	22.0
3	90.0	410.0	40.5

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	150.00	40.00	220.00	65.00	30.00
2	450.00	145.00	550.00	178.00	40.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	148.38	73.62

2	161.54	63.62
3	186.13	59.13
4	210.46	53.38
5	485.35	162.26
6	502.67	180.28
7	503.28	185.59

*** 2.213 ***

Individual data on the 7 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	11.6	7058.1	.0	.0	.0	.0	.0	.0	.0
2	1.5	2019.0	.0	.0	.0	.0	.0	.0	.0
3	24.6	52916.8	.0	.0	.0	.0	.0	.0	.0
4	24.3	89985.3	.0	.0	.0	.0	.0	.0	.0
5	274.9	906654.8	.0	.0	.0	.0	.0	.0	.0
6	17.3	23375.1	.0	.0	.0	.0	.0	.0	.0
7	.6	186.0	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	147.60	73.53
2	148.64	72.67
3	166.63	55.31
4	191.24	50.90
5	216.24	50.59
6	520.55	172.57
7	537.17	191.24
8	543.97	198.70

*** 2.240 ***

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	145.57	73.29
2	146.42	72.72

3	168.43	60.86
4	190.48	49.08
5	529.27	184.83
6	533.50	195.33

*** 2.248 ***

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	152.14	74.07
2	166.00	60.95
3	188.64	50.33
4	539.91	189.94
5	542.10	198.10

*** 2.279 ***

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	161.82	75.59
2	166.99	70.93
3	191.84	68.17
4	215.14	59.11
5	456.49	158.30
6	471.69	175.42

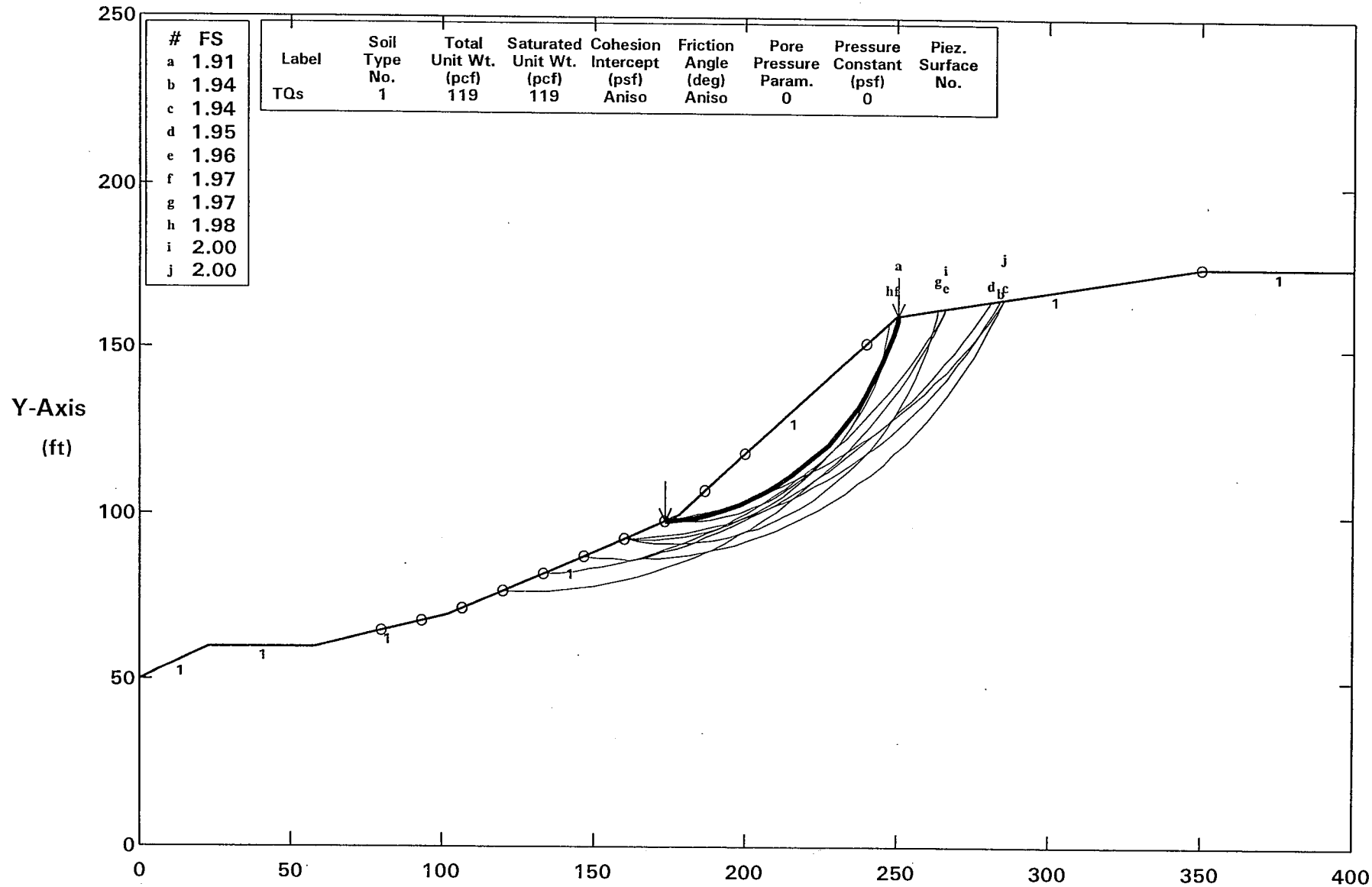
*** 2.300 ***

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	171.66	78.76
2	189.54	61.50
3	209.95	47.06

Hasley Canyon Cross Section 45-45' Natural Slope, Static

Ten Most Critical. C:HC45S1.PLT By: DCS 10/11/99 11:42am



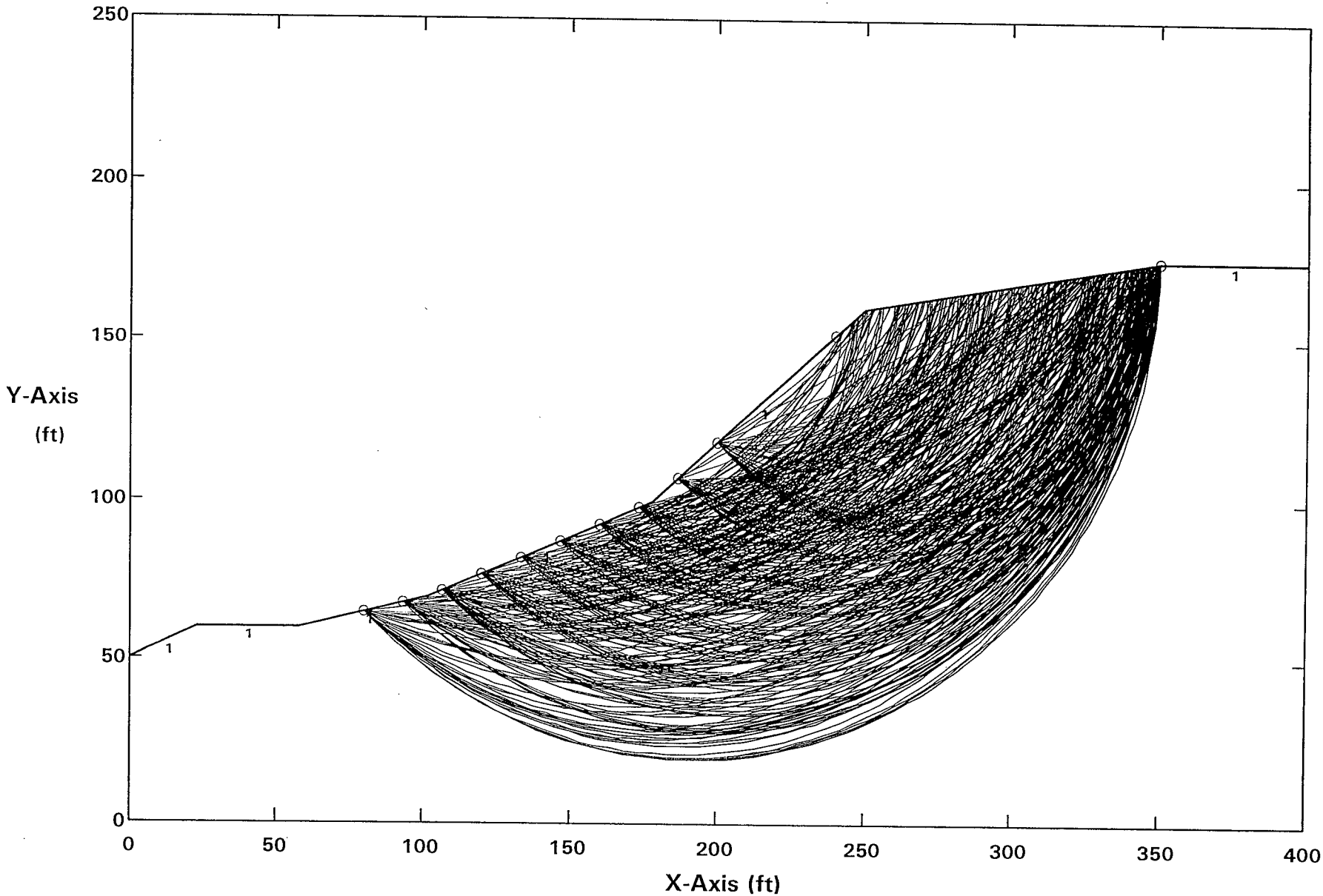
PCSTABL5M/SI FSmin = 1.91 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

Run #30

Hasley Canyon Cross Section 45-45' Natural Slope, Static

All surfaces evaluated. C:HC45S1.PLT By: DCS 10/11/99 11:42am



Factors Of Safety Calculated By The Modified Bishop Method

Run #30

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	10/11/99
Time of Run:	11:42am
Run By:	DCS
Input Data Filename:	C:HC45S1.IN
Output Filename:	C:HC45S1.OUT
Unit:	ENGLISH
Plotted Output Filename:	C:HC45S1.PLT

PROBLEM DESCRIPTION Hasley Canyon Cross Section 45-45'
Natural Slope, Static

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	.00	50.00	23.00	60.00	1
2	23.00	60.00	58.00	60.00	1
3	58.00	60.00	102.00	70.00	1
4	102.00	70.00	178.00	100.00	1
5	178.00	100.00	250.00	160.00	1
6	250.00	160.00	350.00	175.00	1
7	350.00	175.00	400.00	175.00	1

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	119.0	119.0	410.0	40.5	.00	.0	0

Run#30

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	-32.0	410.0	40.5
2	-28.0	200.0	17.5
3	90.0	410.0	40.5

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

400 Trial Surfaces Have Been Generated.

40 Surfaces Initiate From Each Of 10 Points Equally Spaced Along The Ground Surface Between X = 80.00 ft.
and X = 200.00 ft.

Each Surface Terminates Between X = 240.00 ft.
and X = 350.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = .00 ft.

5.00 ft. Line Segments Define Each Trial Failure Surface.

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	173.33	98.16
2	178.32	98.55
3	183.27	99.24
4	188.17	100.21
5	193.01	101.48
6	197.77	103.03
7	202.42	104.85
8	206.96	106.95
9	211.37	109.31
10	215.63	111.93
11	219.72	114.80
12	223.64	117.90
13	227.37	121.23
14	230.90	124.77
15	234.21	128.52
16	237.30	132.45
17	240.15	136.56
18	242.75	140.83
19	245.09	145.25
20	247.17	149.80
21	248.97	154.46
22	250.50	159.22
23	250.73	160.11

Circle Center At X = 169.2 ; Y = 182.7 and Radius, 84.6

*** 1.907 ***

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	4.7	409.5	.0	.0	.0	.0	.0	.0	.0
2	.3	60.4	.0	.0	.0	.0	.0	.0	.0
3	5.0	2025.1	.0	.0	.0	.0	.0	.0	.0
4	4.9	3916.2	.0	.0	.0	.0	.0	.0	.0
5	4.8	5554.3	.0	.0	.0	.0	.0	.0	.0
6	4.8	6924.0	.0	.0	.0	.0	.0	.0	.0
7	4.7	8015.3	.0	.0	.0	.0	.0	.0	.0
8	4.5	8824.4	.0	.0	.0	.0	.0	.0	.0
9	4.4	9352.8	.0	.0	.0	.0	.0	.0	.0
10	4.3	9608.1	.0	.0	.0	.0	.0	.0	.0
11	4.1	9603.0	.0	.0	.0	.0	.0	.0	.0
12	3.9	9356.0	.0	.0	.0	.0	.0	.0	.0
13	3.7	8890.1	.0	.0	.0	.0	.0	.0	.0
14	3.5	8233.2	.0	.0	.0	.0	.0	.0	.0
15	3.3	7417.2	.0	.0	.0	.0	.0	.0	.0

16	3.1	6477.7	.0	.0	.0	.0	.0	.0	.0
17	2.8	5453.1	.0	.0	.0	.0	.0	.0	.0
18	2.6	4384.5	.0	.0	.0	.0	.0	.0	.0
19	2.3	3314.4	.0	.0	.0	.0	.0	.0	.0
20	2.1	2286.7	.0	.0	.0	.0	.0	.0	.0
21	1.8	1345.3	.0	.0	.0	.0	.0	.0	.0
22	1.0	428.9	.0	.0	.0	.0	.0	.0	.0
23	.5	94.8	.0	.0	.0	.0	.0	.0	.0
24	.2	11.5	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 31 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	160.00	92.89
2	165.00	93.08
3	169.98	93.44
4	174.96	93.97
5	179.91	94.66
6	184.83	95.52
7	189.73	96.55
8	194.58	97.74
9	199.40	99.10
10	204.16	100.61
11	208.87	102.29
12	213.52	104.13
13	218.11	106.12
14	222.62	108.26
15	227.07	110.56
16	231.43	113.01
17	235.70	115.60
18	239.89	118.33
19	243.98	121.21
20	247.97	124.22
21	251.86	127.36
22	255.64	130.63
23	259.30	134.03
24	262.85	137.56
25	266.28	141.20
26	269.59	144.95
27	272.76	148.81
28	275.80	152.78
29	278.71	156.85
30	281.48	161.01
31	284.00	165.10

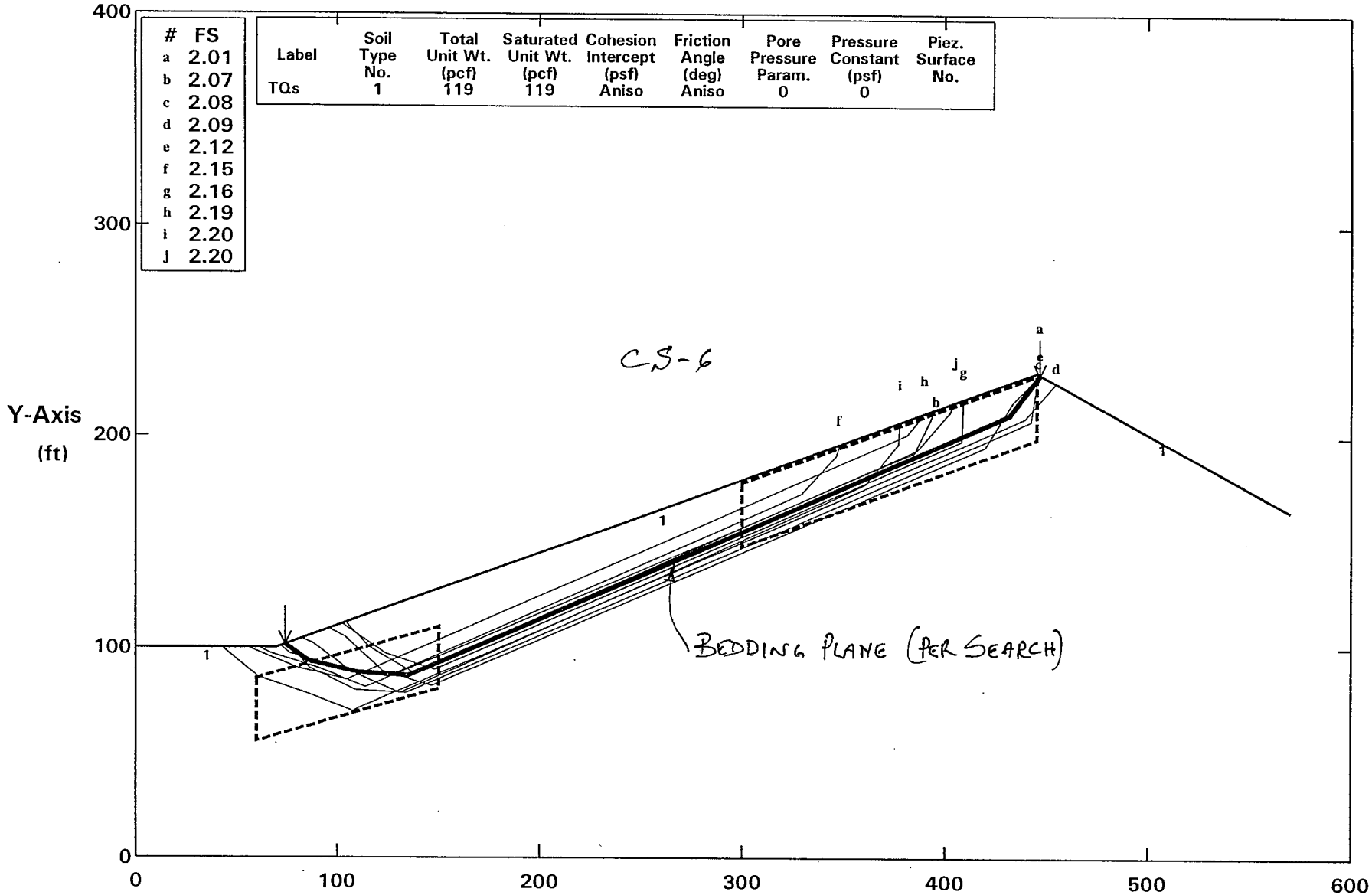
Circle Center At X = 156.9 ; Y = 240.8 and Radius, 147.9

*** 1.935 ***

Failure Surface Specified By 28 Coordinate Points

TT52584-Hasley Canyon-Sec.46-Cut slope 6 -Static

Ten Most Critical. C:HC46S2.PLT By: AC 2/09/2000 11:39am



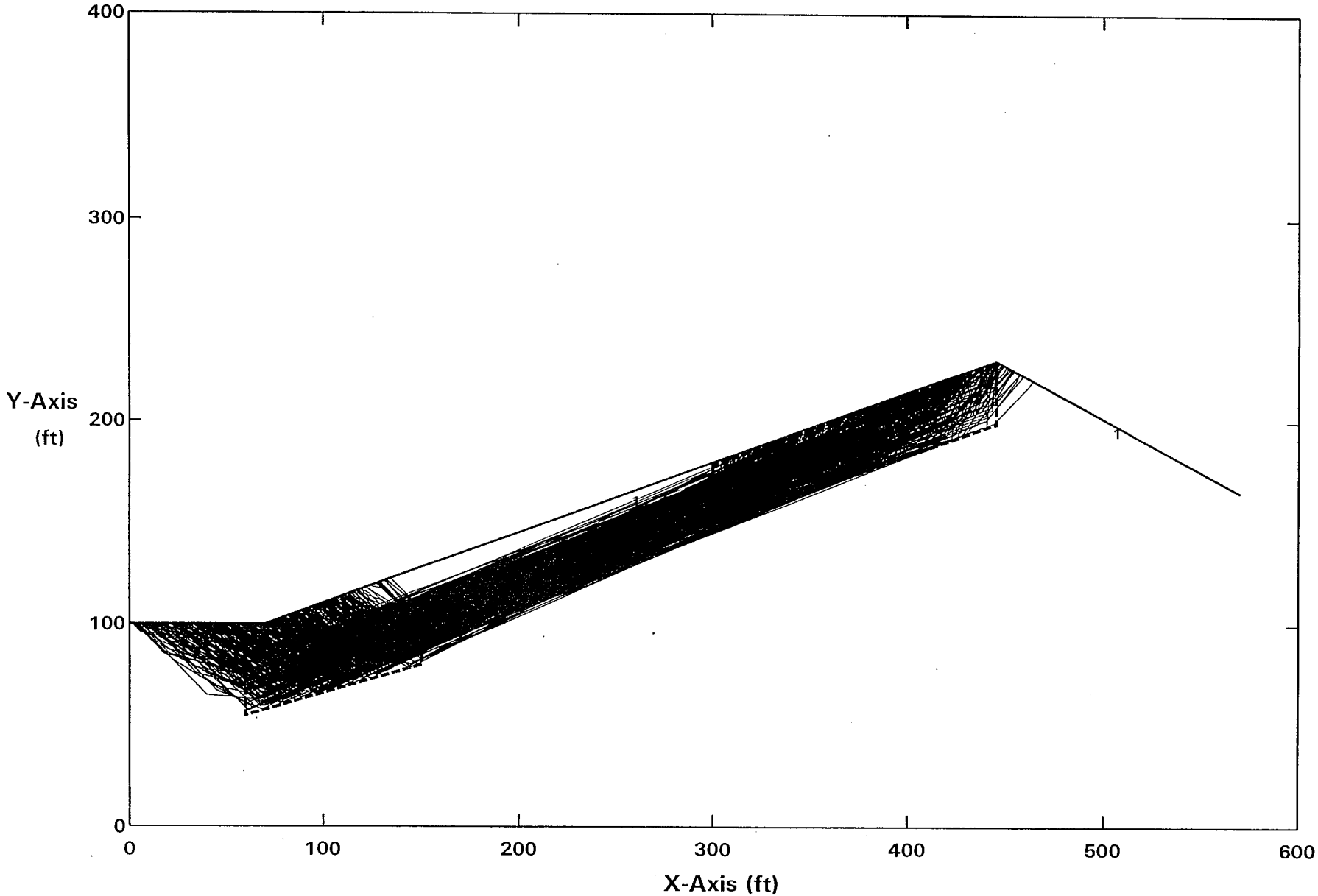
PCSTABL5M FSmin = 2.01 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run #31

TT52584-Hasley Canyon-Sec.46-Cut slope 6 -Static

All surfaces evaluated. C:HC46S2.PLT By: AC 2/10/2000 4:08pm



Factors Of Safety Calculated By The Modified Janbu Method

Run#31

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	2/08/2000
Time of Run:	10:39am
Run By:	AC
Input Data Filename:	C:HC46S2.IN
Output Filename:	C:HC46S2.OUT
Plotted Output Filename:	C:HC46S2.PLT

PROBLEM DESCRIPTION TT52584-Hasley Canyon-Sec.46-Cut slope 6
-Static

BOUNDARY COORDINATES

3 Top Boundaries
3 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	100.00	70.00	100.00	1
2	70.00	100.00	445.00	230.00	1
3	445.00	230.00	570.00	165.00	1

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	119.0	119.0	410.0	40.5	.00	.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Run#31

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	22.5	410.0	40.5
2	23.5	200.0	17.5
3	90.0	410.0	40.5

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	60.00	70.00	150.00	95.00	30.00
2	300.00	163.00	445.00	214.00	30.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	73.97	101.38
2	85.77	93.04

* i (73.97 → 135.08) = -14.22°

i (toe 110,100 → 135.08) = -12.233

3	110.12	87.35	*
4	135.08	85.89	
bd. Plane 5	431.65	210.12	} i = 22.7°
6	446.87	229.03	} i = 51.17°

*** 1.651 ***

Individual data on the 6 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	11.8	8731.9	.0	.0	.0	.0	.0	.0	.0
2	24.3	56482.8	.0	.0	.0	.0	.0	.0	.0
3	25.0	93900.7	.0	.0	.0	.0	.0	.0	.0
4	296.6	916209.4	.0	.0	.0	.0	.0	.0	.0
5	13.4	14732.1	.0	.0	.0	.0	.0	.0	.0
6	1.9	365.7	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	60.25	100.00
2	66.80	97.05
3	90.80	90.03
4	113.85	80.36
5	384.42	192.59
6	395.66	212.89

*** 1.696 ***

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	55.71	100.00
2	56.97	98.79
3	80.32	89.84
4	104.64	84.08
5	381.20	200.84
6	390.08	210.96

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
MATERIALS ENGINEERING DIVISION
GEOTECHNICAL ENGINEERING
DEVELOPMENT SERVICES SECTION
ORDINARY METHOD OF SLICES USED FOR ANALYSIS

PROJECT: Hasley Cyn VTT 52584
CONSULTANT: AES
REPORT DATE:
SECTION: 46-46' CIRCLE: Bedding Plane in TQs per JanbuHC46S2 (FS=2.01) DATE: 2/22/00 BY: SKM

CS-6

SLICE	HEIGHT(1)	HEIGHT(2)	WIDTH	AREA	WEIGHT	UNIT WT
1.	0.00	14.00	14.00	98.00	11.66	119.0
2.	14.00	28.00	24.00	504.00	59.98	119.0
3.	28.00	38.00	25.00	825.00	98.18	119.0
4.	38.00	15.00	297.00	7870.50	1015.29	129.0
5.	15.00	0.00	15.00	112.50	13.39	119.0

SLOPE STABILITY DATA

SEISMIC COEFFICIENT = 0.15 g

SLICE NO.	1 SLICE WEIGHT W (kips)	2 FAILURE PLANE ANGLE i(deg)	3 ANGLE OF INT. FRICTION phi(deg)	4 COHE-SION C (ksf)	5 LENGTH OF ARC L (ft)	6 W (1-Ru) COS i / TAN phi	7 C L	8 g W (1-Ru) SINi / TAN phi	9 W SIN i	10 g W COS i
1.	11.66	-33.70	40.50	0.410	16.83	8.29	6.90	-0.83	-6.47	1.46
2.	59.98	-14.00	40.50	0.410	24.73	49.70	10.14	-1.86	-14.51	8.73
3.	98.18	-2.30	40.50	0.410	25.02	83.78	10.26	-0.50	-3.94	14.71
4.	1015.29	22.70	22.00	0.347	321.94	378.43	111.71	23.75	391.81	140.50
5.	13.39	51.70	40.50	0.410	24.20	7.09	9.92	1.35	10.51	1.24
SUMMATION:						527.29	148.93	21.90	377.39	166.64

STATIC SAFETY FACTOR = 1.79
~~SEISMIC SAFETY FACTOR = 1.20~~

Run#32a

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
MATERIALS ENGINEERING DIVISION
GEOTECHNICAL ENGINEERING
DEVELOPMENT SERVICES SECTION
ORDINARY METHOD OF SLICES USED FOR ANALYSIS

PROJECT: Hasley Cyn VTT 52584
CONSULTANT: AES
REPORT DATE:
SECTION: 46-46' CIRCLE: Bedding Plane in TQs per JanbuHC46S2 (FS=2.01) DATE: 2/22/00 BY: SKM

SLICE	HEIGHT(1)	HEIGHT(2)	WIDTH	AREA	WEIGHT	UNIT WT
1.	0.00	14.00	14.00	98.00	11.66	119.0
2.	14.00	28.00	24.00	504.00	59.98	119.0
3.	28.00	38.00	25.00	825.00	98.18	119.0
4.	38.00	15.00	297.00	7870.50	1015.29	129.0
5.	15.00	0.00	15.00	112.50	13.39	119.0

SLOPE STABILITY DATA

SEISMIC COEFFICIENT = 0.15 g

SLICE NO.	1 SLICE WEIGHT W (kips)	2 FAILURE PLANE ANGLE i(deg)	3 ANGLE OF INT. FRICTION phi(deg)	4 COHE-SION C (ksf)	5 LENGTH OF ARC L (ft)	6 W (1-Ru) COS i TAN phi	7 C L	8 g W (1-Ru) SINi TAN phi	9 W SIN i	10 g W COS i
1.	11.66	-33.70	42.00	0.880	16.83	8.74	14.81	-0.87	-6.47	1.46
2.	59.98	-14.00	42.00	0.880	24.73	52.40	21.77	-1.96	-14.51	8.73
3.	98.18	-2.30	42.00	0.880	25.02	88.33	22.02	-0.53	-3.94	14.71
4.	1015.29	22.70	27.00	1.168	321.94	477.25	376.02	29.95	391.81	140.50
5.	13.39	51.70	42.00	0.880	24.20	7.47	21.30	1.42	10.51	1.24
SUMMATION:						634.18	455.91	28.00	377.39	166.64

~~STATIC SAFETY FACTOR = 2.09~~
SEISMIC SAFETY FACTOR = 1.95

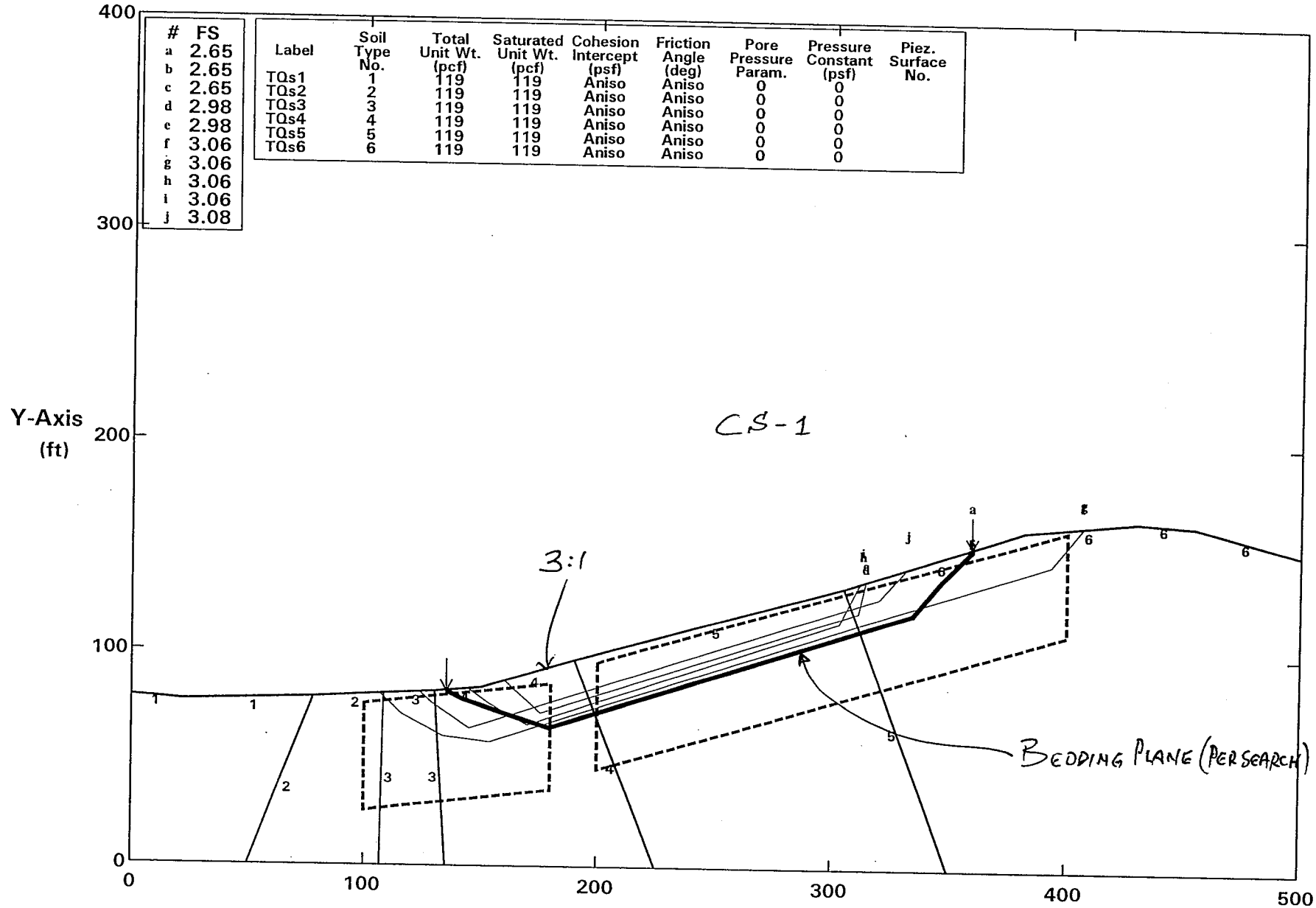
Run#32b

Hasley Canyon Cross Section 47-47' Cut Slope 1, 3:1, static

Ten Most Critical. C:HC47S2.PLT By: DCS 2/10/2000 6:03pm

#	FS
a	2.65
b	2.65
c	2.65
d	2.98
e	2.98
f	3.06
g	3.06
h	3.06
i	3.06
j	3.08

Label	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.
TQs1	1	119	119	Aniso	Aniso	0	0	
TQs2	2	119	119	Aniso	Aniso	0	0	
TQs3	3	119	119	Aniso	Aniso	0	0	
TQs4	4	119	119	Aniso	Aniso	0	0	
TQs5	5	119	119	Aniso	Aniso	0	0	
TQs6	6	119	119	Aniso	Aniso	0	0	



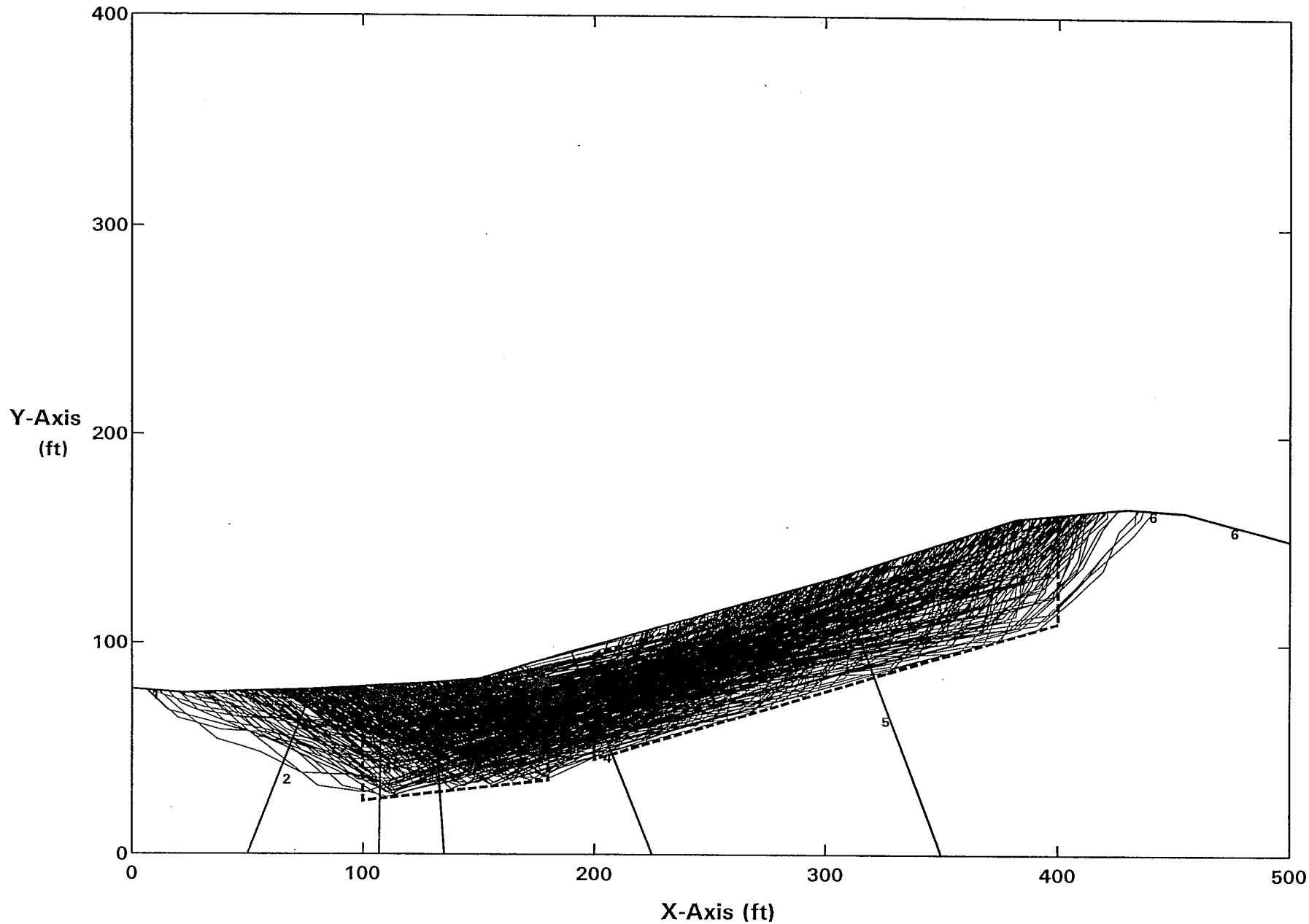
PCSTABL5M FSmin = 2.65 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

RUN #33

Hasley Canyon Cross Section 47-47' Cut Slope 1, 3:1, static

All surfaces evaluated. C:HC47S2.PLT By: DCS 2/10/2000 6:03pm



Factors Of Safety Calculated By The Modified Janbu Method

Run #33

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--

Simplified Janbu, Simplified Bishop

or Spencer's Method of Slices

Run Date:	2/10/2000
Time of Run:	6:03pm
Run By:	DCS
Input Data Filename:	C:HC47S2.IN
Output Filename:	C:HC47S2.OUT
Plotted Output Filename:	C:HC47S2.PLT

PROBLEM DESCRIPTION Hasley Canyon Cross Section 47-47'

Cut Slope 1, 3:1, static

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	.00	78.00	22.00	76.00	1
2	22.00	76.00	78.00	78.00	1
3	78.00	78.00	108.00	80.00	2
4	108.00	80.00	130.00	81.00	3
5	130.00	81.00	150.00	83.00	4
6	150.00	83.00	190.00	96.00	4
7	190.00	96.00	305.00	132.00	5
8	305.00	132.00	382.00	160.00	6
9	382.00	160.00	430.00	165.00	6
10	430.00	165.00	455.00	163.00	6
11	455.00	163.00	500.00	150.00	6
12	50.00	.00	78.00	78.00	2
13	107.00	.00	108.00	80.00	3
14	130.00	81.00	135.00	.00	3
15	190.00	96.00	225.00	.00	4
16	305.00	132.00	350.00	.00	5

ISOTROPIC SOIL PARAMETERS

Run#33

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	119.0	119.0	.0	.0	.00	.0	0
2	119.0	119.0	.0	.0	.00	.0	0
3	119.0	119.0	.0	.0	.00	.0	0
4	119.0	119.0	.0	.0	.00	.0	0
5	119.0	119.0	.0	.0	.00	.0	0
6	119.0	119.0	.0	.0	.00	.0	0

ANISOTROPIC STRENGTH PARAMETERS

6 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	-25.5	410.0	40.5
2	-24.5	347.0	22.0
3	90.0	410.0	40.5

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	-20.0	410.0	40.5
2	-10.0	347.0	22.0
3	90.0	410.0	40.5

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	-10.0	410.0	40.5

2	10.0	347.0	22.0
3	90.0	410.0	40.5

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	10.0	410.0	40.5
2	20.0	347.0	22.0
3	90.0	410.0	40.5

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	410.0	40.5
2	20.5	347.0	22.0
3	90.0	410.0	40.5

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	27.5	410.0	40.5
2	28.5	347.0	22.0
3	90.0	410.0	40.5

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	50.00	180.00	60.00	50.00
2	200.00	70.00	400.00	135.00	50.00

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	134.81	81.48
2	149.16	73.14
3	163.86	59.58
4	271.67	73.77
5	271.73	93.77
6	280.61	111.69
7	294.75	125.84
8	295.75	129.10

Factor Of Safety For The Preceding Specified Surface = 9.255

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	73.00	77.82
2	88.56	70.37
3	104.55	58.35
4	124.55	58.27

5	207.36	63.80
6	207.88	83.79
7	221.40	98.53
8	223.11	106.37

Factor Of Safety For The Preceding Specified Surface = 14.832

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	96.34	79.22
2	99.82	75.76
3	117.42	66.25
4	292.27	81.03
5	292.29	101.03
6	306.35	115.25
7	313.50	133.93
8	314.76	135.55

Factor Of Safety For The Preceding Specified Surface = 8.844

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	99.09	79.41
2	109.23	75.69
3	287.83	95.22
4	287.91	115.22
5	297.63	129.69

Factor Of Safety For The Preceding Specified Surface = 10.887

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	134.81	81.48
2	149.16	73.14
3	163.86	59.58
4	271.67	73.77
5	271.73	93.77
6	280.61	111.69
7	294.75	125.84
8	295.75	129.10

Factor Of Safety For The Preceding Specified Surface = 9.255

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	73.00	77.82
2	88.56	70.37
3	104.55	58.35
4	124.55	58.27
5	207.36	63.80
6	207.88	83.79
7	221.40	98.53
8	223.11	106.37

Factor Of Safety For The Preceding Specified Surface = 14.832

Factor Of Safety Calculation Has Gone Through Ten Iterations

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5	292.29	101.03
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7	313.50	133.93
8	314.76	135.55

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Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
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2	109.23	75.69
3	287.83	95.22
4	287.91	115.22
5	297.63	129.69

Factor Of Safety For The Preceding Specified Surface = 10.887

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	134.81	81.48
2	149.16	73.14
3	163.86	59.58
4	271.67	73.77
5	271.73	93.77
6	280.61	111.69
7	294.75	125.84
8	295.75	129.10

Factor Of Safety For The Preceding Specified Surface = 9.255

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Examined. They Are Ordered - Most Critical
First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	134.89	81.49
2	141.62	77.67
3	160.42	70.83
4	179.29	64.22
5	334.46	119.35
6	346.16	135.57
7	359.57	150.41
8	359.68	151.88

*** 2.646 ***

Individual data on the 12 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	6.7	1800.4	.0	.0	.0	.0	.0	.0	.0
2	8.4	6419.1	.0	.0	.0	.0	.0	.0	.0
3	10.4	14836.7	.0	.0	.0	.0	.0	.0	.0
4	18.9	49263.3	.0	.0	.0	.0	.0	.0	.0
5	10.7	35857.7	.0	.0	.0	.0	.0	.0	.0
6	9.0	29861.0	.0	.0	.0	.0	.0	.0	.0
7	106.0	319768.4	.0	.0	.0	.0	.0	.0	.0
8	7.0	19364.6	.0	.0	.0	.0	.0	.0	.0
9	22.4	62115.6	.0	.0	.0	.0	.0	.0	.0
10	11.7	24207.9	.0	.0	.0	.0	.0	.0	.0
11	13.4	10232.9	.0	.0	.0	.0	.0	.0	.0
12	.1	9.3	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	134.89	81.49
2	141.62	77.67
3	160.42	70.83
4	179.29	64.22
5	334.46	119.35
6	346.16	135.57
7	359.57	150.41
8	359.68	151.88

*** 2.646 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	134.89	81.49
2	141.62	77.67
3	160.42	70.83
4	179.29	64.22
5	334.46	119.35
6	346.16	135.57
7	359.57	150.41
8	359.68	151.88

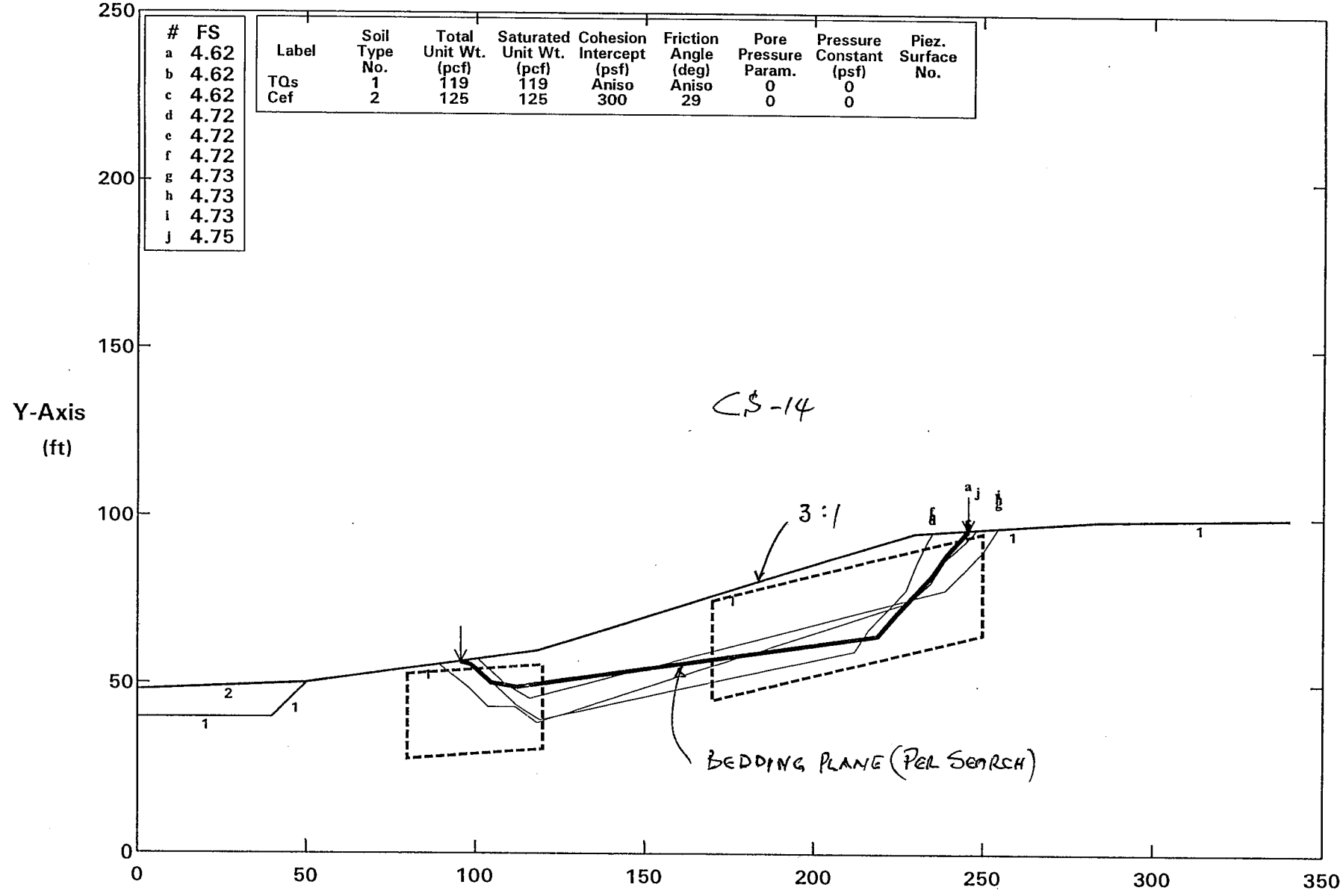
*** 2.646 ***

Hasley Canyon Cross Section 48-48' Cut Slope 14, 3:1, Static

Ten Most Critical. C:HC48S2.PLT By: EC 2/10/2000 12:29pm

#	FS
a	4.62
b	4.62
c	4.62
d	4.72
e	4.72
f	4.72
g	4.73
h	4.73
i	4.73
j	4.75

Label	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.
TQs	1	119	119	Aniso	Aniso	0	0	
Cef	2	125	125	300	29	0	0	



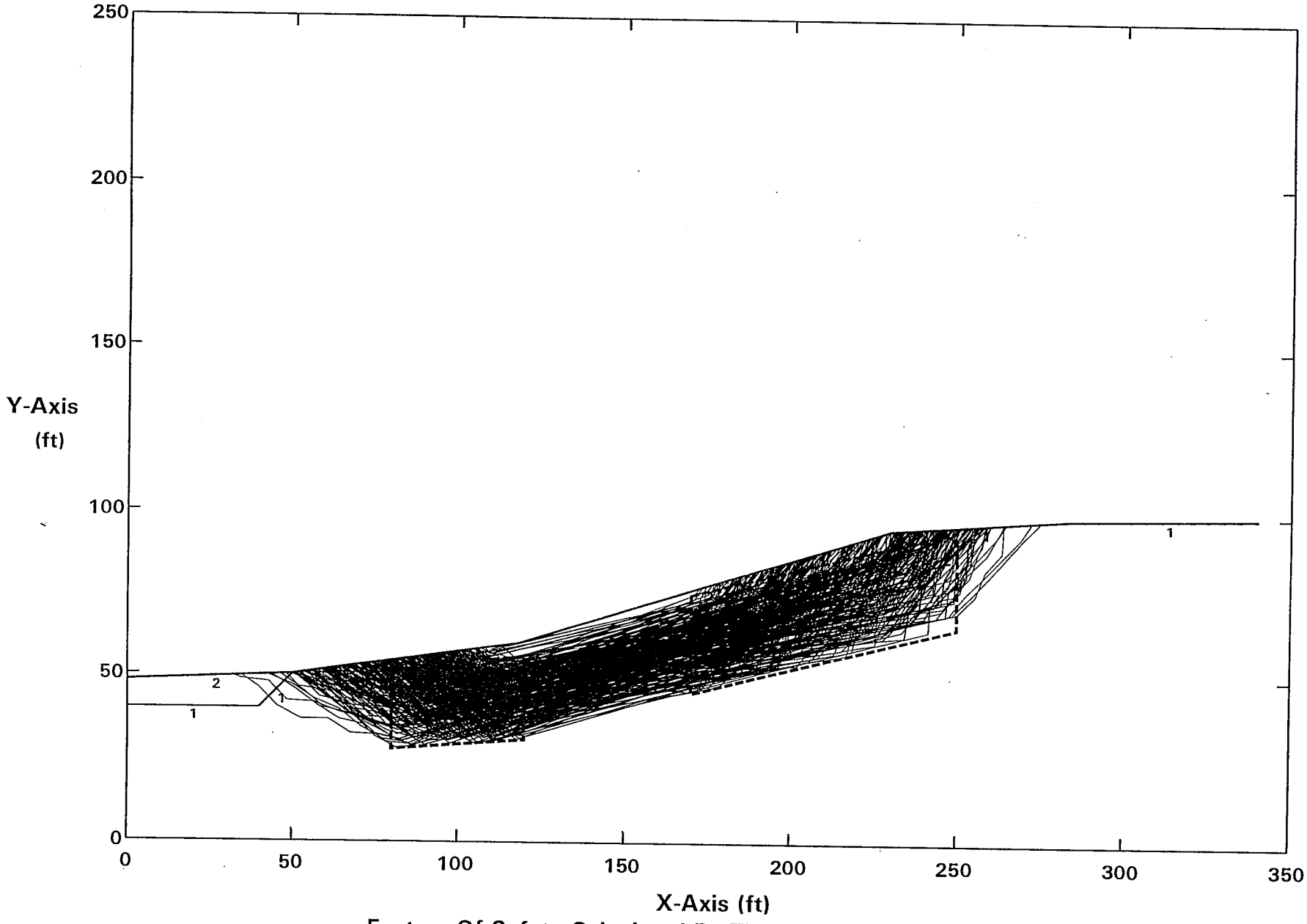
PCSTABL5M/SI FSmin=4.62 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run #34

Hasley Canyon Cross Section 48-48' Cut Slope 14, 3:1, Static

All surfaces evaluated. C:HC48S2.PLT By: EC 2/10/2000 12:29pm



Factors Of Safety Calculated By The Modified Janbu Method

Plan #34

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	2/10/2000
Time of Run:	12:29pm
Run By:	EC
Input Data Filename:	C:HC48S2.IN
Output Filename:	C:HC48S2.OUT
Unit:	ENGLISH
Plotted Output Filename:	C:HC48S2.PLT

PROBLEM DESCRIPTION Hasley Canyon Cross Section 48-48'
Cut Slope 14, 3:1, Static

BOUNDARY COORDINATES

5 Top Boundaries
7 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	48.00	50.00	50.00	2
2	50.00	50.00	118.00	60.00	1
3	118.00	60.00	230.00	95.00	1
4	230.00	95.00	284.00	99.00	1
5	284.00	99.00	340.00	100.00	1
6	.00	40.00	40.00	40.00	1
7	40.00	40.00	50.00	50.00	1

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	119.0	119.0	410.0	40.5	.00	.0	0

Run #34

2	125.0	125.0	300.0	29.0	.00	.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	29.5	410.0	40.5
2	30.5	347.0	22.0
3	90.0	410.0	40.5

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 8.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	80.00	40.00	120.00	43.00	25.00
2	170.00	60.00	250.00	80.00	30.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	95.63	56.71
2	98.77	55.79
3	104.43	50.14
4	112.36	49.06
5	218.90	64.47
6	223.86	70.74
7	229.46	76.46
8	234.85	82.37
9	239.45	88.91
10	244.62	95.02
11	245.70	96.16

*** 4.621 ***

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	3.1	257.8	.0	.0	.0	.0	.0	.0	.0
2	5.7	3116.1	.0	.0	.0	.0	.0	.0	.0
3	7.9	8477.3	.0	.0	.0	.0	.0	.0	.0
4	5.6	6789.5	.0	.0	.0	.0	.0	.0	.0
5	100.9	223268.8	.0	.0	.0	.0	.0	.0	.0
6	5.0	14585.1	.0	.0	.0	.0	.0	.0	.0
7	5.6	13546.6	.0	.0	.0	.0	.0	.0	.0
8	.5	1175.1	.0	.0	.0	.0	.0	.0	.0
9	4.9	8928.8	.0	.0	.0	.0	.0	.0	.0
10	4.6	5415.0	.0	.0	.0	.0	.0	.0	.0
11	5.2	2413.4	.0	.0	.0	.0	.0	.0	.0
12	1.1	68.3	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	95.63	56.71
2	98.77	55.79
3	104.43	50.14
4	112.36	49.06
5	218.90	64.47
6	223.86	70.74
7	229.46	76.46
8	234.85	82.37
9	239.45	88.91
10	244.62	95.02

11	245.70	96.16

*** 4.621 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	95.63	56.71
2	98.77	55.79
3	104.43	50.14
4	112.36	49.06
5	218.90	64.47
6	223.86	70.74
7	229.46	76.46
8	234.85	82.37
9	239.45	88.91
10	244.62	95.02
11	245.70	96.16

*** 4.621 ***

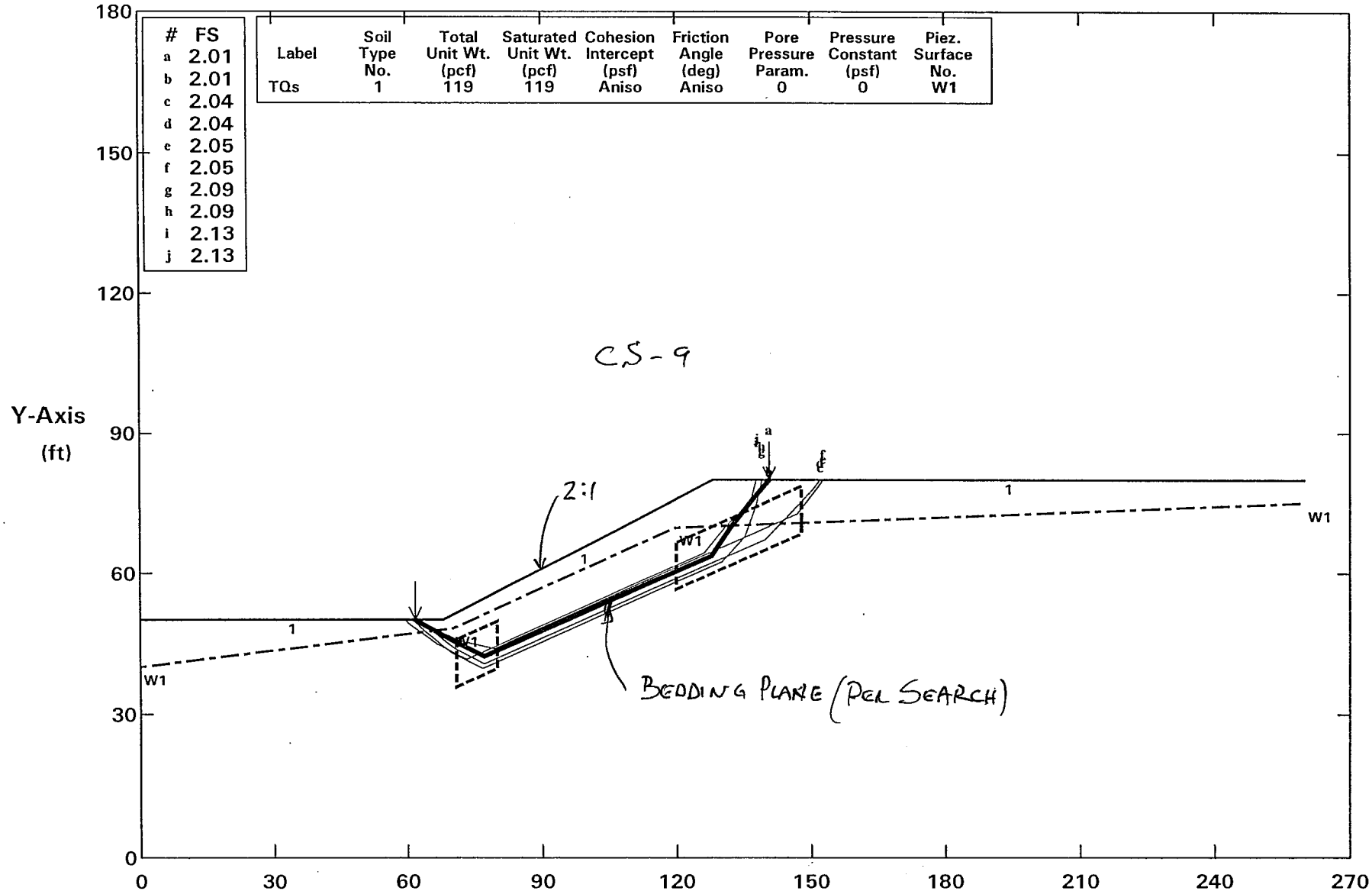
Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	97.32	56.96
2	100.43	54.18
3	106.26	48.71
4	112.07	43.20
5	118.82	38.91
6	211.97	60.10
7	216.37	66.78
8	222.03	72.44
9	227.55	78.23
10	230.29	85.74
11	233.73	92.97
12	235.14	95.38

*** 4.721 ***

Hasley Canyon Cross Section 49-49' Cut Slope 9, 2:1, Static

Ten Most Critical. C:HC49S5.PLT By: AC 2/10/2000 11:45am



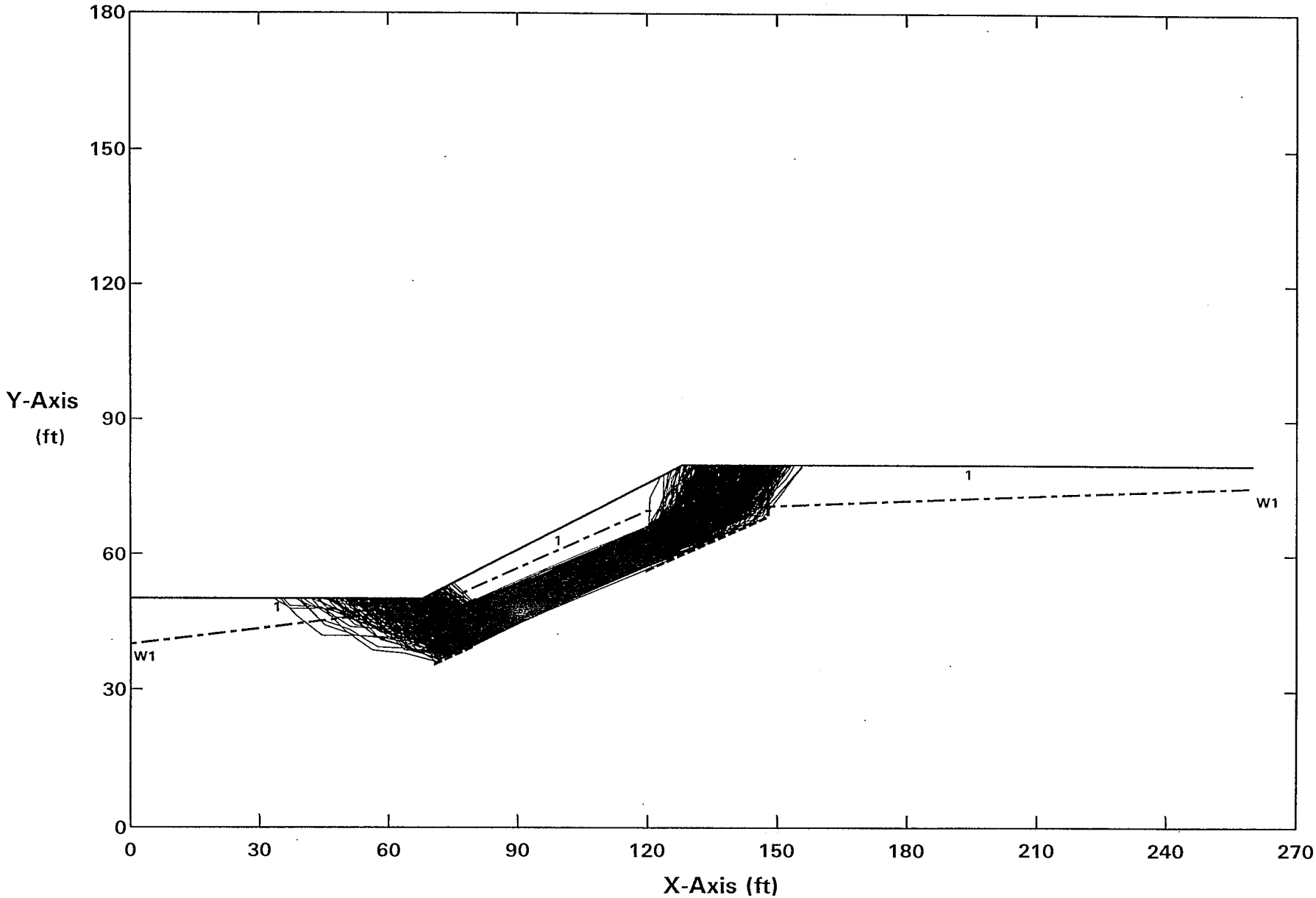
PCSTABL5M FSmin = 2.01 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

RUN #35

Hasley Canyon Cross Section 49-49' Cut Slope 9, 2:1, Static

All surfaces evaluated. C:HC49S5.PLT By: AC 2/10/2000 11:45am



Factors Of Safety Calculated By The Modified Janbu Method

Run #35

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--

Simplified Janbu, Simplified Bishop

or Spencer's Method of Slices

Run Date:	2/10/2000
Time of Run:	11:45am
Run By:	AC
Input Data Filename:	C:HC49S5
Output Filename:	C:HC49S5.OUT
Plotted Output Filename:	C:HC49S5.PLT

PROBLEM DESCRIPTION Hasley Canyon Cross Section 49-49'

Cut Slope 9, 2:1, Static

BOUNDARY COORDINATES

3 Top Boundaries

3 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	50.00	68.00	50.00	1
2	68.00	50.00	128.00	80.00	1
3	128.00	80.00	260.00	80.00	1

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	119.0	119.0	410.0	40.5	.00	.0	1

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Run #35

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	22.5	410.0	40.5
2	23.5	347.0	22.0
3	90.0	410.0	40.5

---

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 4 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	40.00
2	70.00	48.00
3	120.00	70.00
4	260.00	75.00

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 7.5

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	71.00	40.90	80.00	44.70	10.00

2	120.00	61.70	148.00	73.60	10.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	61.76	50.00
2	63.43	48.95
3	70.10	45.52
4	76.89	42.34
5	127.83	63.76
6	131.97	70.01
7	136.74	75.80
8	140.88	80.00

*** 2.009 ***

Individual data on the 13 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	1.7	104.3	.0	.0	.0	.0	.0	.0	.0
2	2.7	562.1	.0	.0	.0	.0	.0	.0	.0
3	1.9	648.3	.0	76.2	.0	.0	.0	.0	.0
4	2.0	1050.6	.0	251.0	.0	.0	.0	.0	.0
5	.1	65.6	.0	16.1	.0	.0	.0	.0	.0
6	6.8	7128.8	.0	2411.4	.0	.0	.0	.0	.0
7	43.1	70875.2	.0	24427.1	.0	.0	.0	.0	.0
8	7.8	14751.7	.0	4248.1	.0	.0	.0	.0	.0
9	.2	333.7	.0	126.0	.0	.0	.0	.0	.0
10	4.0	6126.4	.0	1495.1	.0	.0	.0	.0	.0
11	.4	408.9	.0	7.1	.0	.0	.0	.0	.0
12	4.4	3621.8	.0	.0	.0	.0	.0	.0	.0
13	4.1	1035.4	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 8 Coordinate Points

Point	X-Surf	Y-Surf

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
MATERIALS ENGINEERING DIVISION
GEOTECHNICAL ENGINEERING
DEVELOPMENT SERVICES SECTION
ORDINARY METHOD OF SLICES USED FOR ANALYSIS
(CONSIDERING PORE-WATER PRESSURES)

PROJECT: TT52584 - Hasley Canyon
CONSULTANT: AES
REPORT DATE:
SECTION: 49-49' CIRCLE: Bdng Plane in TQs - Janbu's HC49S5 DATE: 2/14/00 BY: EC

CS-9
2:1

SLICE NO.	ABOVE HT(1)	WATER HT(2)	BELOW HT(3)	WATER HT(4)	SLICE WIDTH	WET AREA	TOTAL AREA	SLICE WEIGHT	UNIT WEIGHT	SLICE Ru
1.	0.00	5.00	0.00	0.00	4.50	0.00	11.25	1.34	119.0	0.000
2.	5.00	4.00	0.00	5.00	6.00	15.00	42.00	5.00	119.0	0.187
3.	4.00	6.00	5.00	8.00	41.00	266.50	471.50	60.82	129.0	0.273
4.	6.00	9.00	8.00	5.00	9.00	58.50	126.00	16.25	129.0	0.225
5.	9.00	10.00	5.00	2.00	3.00	10.50	39.00	4.64	119.0	0.141
6.	10.00	10.00	2.00	0.00	2.00	2.00	22.00	2.62	119.0	0.048
7.	10.00	3.00	0.00	0.00	3.00	0.00	19.50	2.32	119.0	0.000
8.	3.00	0.00	0.00	0.00	4.00	0.00	6.00	0.71	119.0	0.000

SLOPE STABILITY DATA

SEISMIC COEFFICIENT = 0.00 g

SLICE NO.	1 SLICE WEIGHT W (kips)	1.1 Ru (PORE PRESSURE RATIO)	2 FAILURE PLANE ANGLE i(deg)	3 ANGLE OF INT. FRICTION phi(deg)	4 COHE-SION C (ksf)	5 LENGTH OF ARC L (ft)	6 W (1-Ru) COS i / TAN phi	7 C L	8 g W (1-Ru) SINi / TAN phi	9 W SIN i	10 g W COS i
1.	1.34	0.000	-26.90	40.50	0.410	5.05	1.02	2.07	0.00	-0.61	0.00
2.	5.00	0.187	-26.90	40.50	0.410	6.73	3.09	2.76	0.00	-2.26	0.00
3.	60.82	0.273	22.80	22.00	0.347	44.48	16.46	15.43	0.00	23.57	0.00
4.	16.25	0.225	22.80	22.00	0.347	9.76	4.69	3.39	0.00	6.30	0.00
5.	4.64	0.141	56.50	40.50	0.410	5.44	1.88	2.23	0.00	3.87	0.00
6.	2.62	0.048	56.50	40.50	0.410	3.62	1.18	1.49	0.00	2.18	0.00
7.	2.32	0.000	50.50	40.50	0.410	4.72	1.26	1.93	0.00	1.79	0.00
8.	0.71	0.000	45.40	40.50	0.410	5.70	0.43	2.34	0.00	0.51	0.00
SUMMATION:							30.01	31.63	0.00	35.35	0.00

STATIC SAFETY FACTOR = 1.74
~~SEISMIC SAFETY FACTOR = 1.74~~

Run #36a

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
MATERIALS ENGINEERING DIVISION
GEOTECHNICAL ENGINEERING
DEVELOPMENT SERVICES SECTION

ORDINARY METHOD OF SLICES USED FOR ANALYSIS
(CONSIDERING PORE-WATER PRESSURES)

PROJECT: TT52584 - Hasley Canyon
CONSULTANT: AES
REPORT DATE:
SECTION: 49-49' CIRCLE: Bdng Plane in TQs - Janbu's HC49S5 DATE: 2/14/00 BY: EC

SLICE NO.	ABOVE HT(1)	WATER HT(2)	BELOW HT(3)	WATER HT(4)	SLICE WIDTH	WET AREA	TOTAL AREA	SLICE WEIGHT	UNIT WEIGHT	SLICE Ru
1.	0.00	5.00	0.00	0.00	4.50	0.00	11.25	1.34	119.0	0.000
2.	5.00	4.00	0.00	5.00	6.00	15.00	42.00	5.00	119.0	0.187
3.	4.00	6.00	5.00	8.00	41.00	266.50	471.50	60.82	129.0	0.273
4.	6.00	9.00	8.00	5.00	9.00	58.50	126.00	16.25	129.0	0.225
5.	9.00	10.00	5.00	2.00	3.00	10.50	39.00	4.64	119.0	0.141
6.	10.00	10.00	2.00	0.00	2.00	2.00	22.00	2.62	119.0	0.048
7.	10.00	3.00	0.00	0.00	3.00	0.00	19.50	2.32	119.0	0.000
8.	3.00	0.00	0.00	0.00	4.00	0.00	6.00	0.71	119.0	0.000

SLOPE STABILITY DATA

SEISMIC COEFFICIENT = 0.15 g

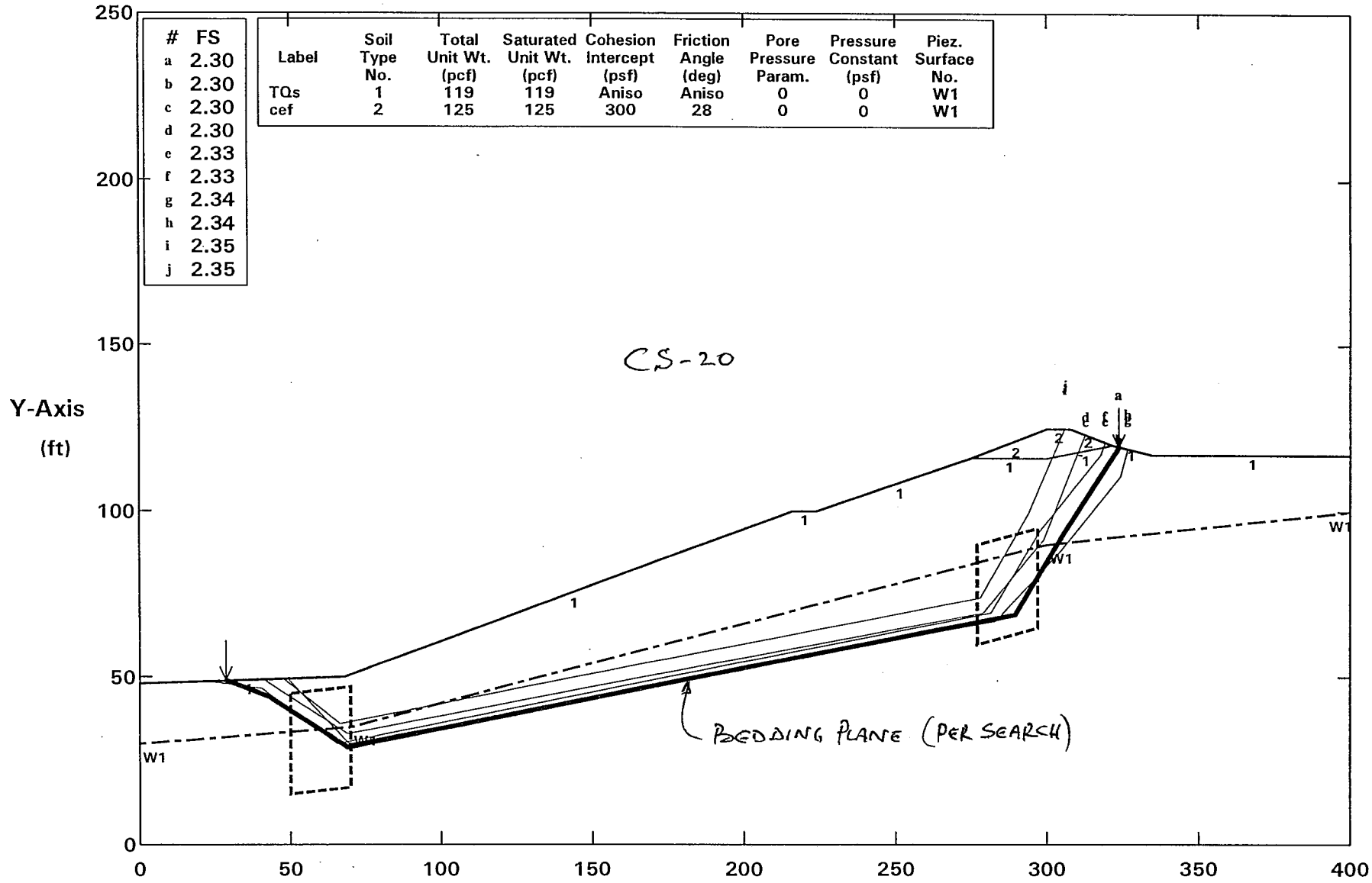
SLICE NO.	1 SLICE WEIGHT W (kips)	1.1 Ru (PORE PRESSURE RATIO)	2 FAILURE PLANE ANGLE i(deg)	3 ANGLE OF INT. FRICTION phi(deg)	4 COHE-SION C (ksf)	5 LENGTH OF ARC L (ft)	6 W (1-Ru) COS i TAN phi	7 C L	8 g W (1-Ru) SINi TAN phi	9 W SIN i	10 g W COS i
1.	1.34	0.000	-26.90	42.00	0.880	5.05	1.07	4.44	-0.08	-0.61	0.18
2.	5.00	0.187	-26.90	42.00	0.880	6.73	3.26	5.92	-0.25	-2.26	0.67
3.	60.82	0.273	22.80	27.00	1.168	44.48	20.76	51.95	1.31	23.57	8.41
4.	16.25	0.225	22.80	27.00	1.168	9.76	5.92	11.40	0.37	6.30	2.25
5.	4.64	0.141	56.50	42.00	0.880	5.44	1.98	4.78	0.45	3.87	0.38
6.	2.62	0.048	56.50	42.00	0.880	3.62	1.24	3.19	0.28	2.18	0.22
7.	2.32	0.000	50.50	42.00	0.880	4.72	1.33	4.15	0.24	1.79	0.22
8.	0.71	0.000	45.40	42.00	0.880	5.70	0.45	5.01	0.07	0.51	0.08
SUMMATION:							36.02	90.85	2.39	35.35	12.40

~~STATIC SAFETY FACTOR = 3.59~~
SEISMIC SAFETY FACTOR = 2.61

Run #3b

Hasley Canyon Cross Section 50-50' Cut Slope 20, Static

Ten Most Critical. C:HC50S2.PLT By: DCS 2/09/2000 6:12pm



#	FS
a	2.30
b	2.30
c	2.30
d	2.30
e	2.33
f	2.33
g	2.34
h	2.34
i	2.35
j	2.35

Label	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.
TQs	1	119	119	Aniso	Aniso	0	0	W1
cef	2	125	125	300	28	0	0	W1

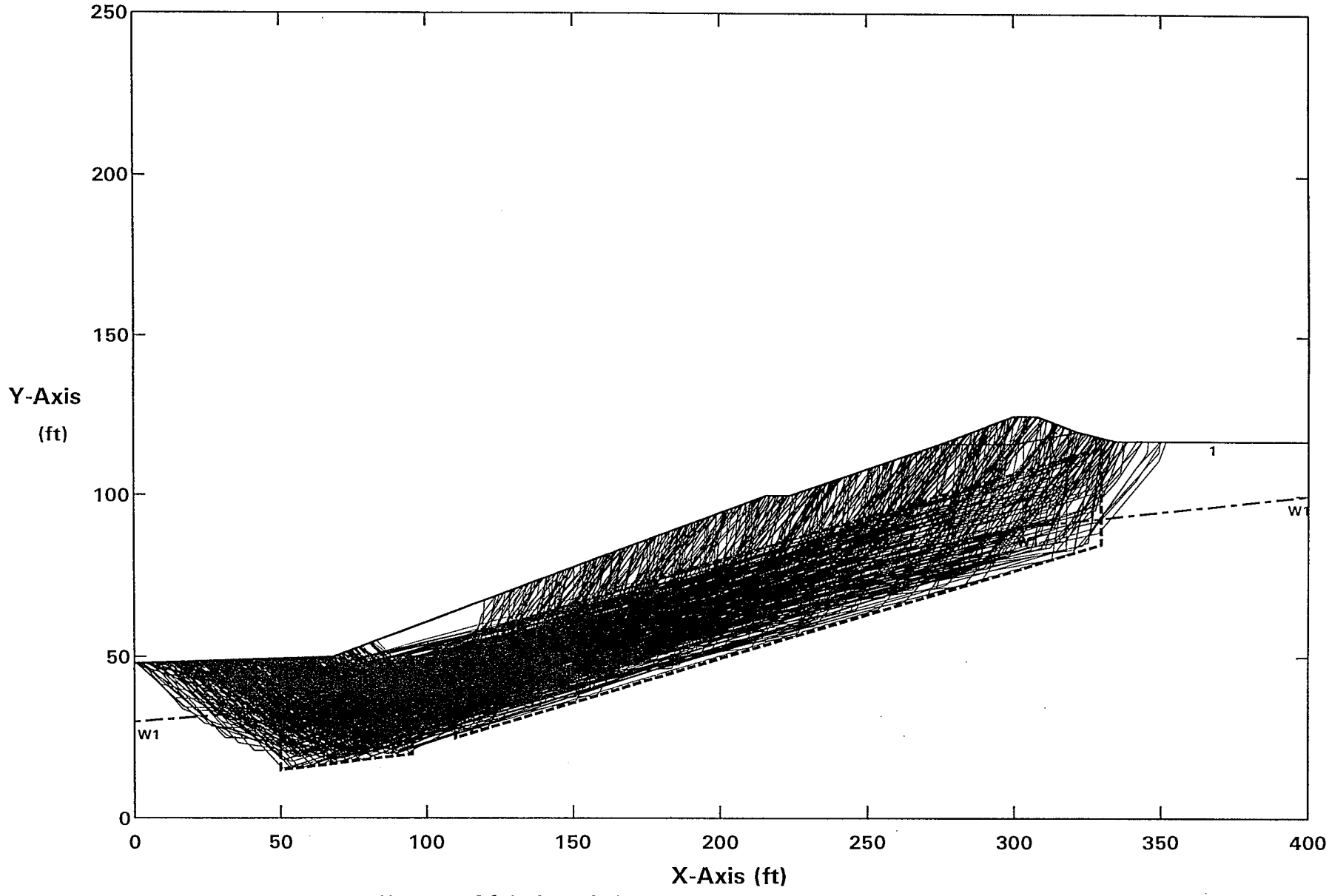
PCSTABL5M/SI FSmin = 2.30 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run #37

Hasley Canyon Cross Section 50-50' Cut Slope 20, Static

All surfaces evaluated. C:HC50S2.PLT By: DCS 2/09/2000 5:58pm



Factors Of Safety Calculated By The Modified Janbu Method

Run #37

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	2/09/2000
Time of Run:	6:12pm
Run By:	DCS
Input Data Filename:	C:HC50S2
Output Filename:	C:HC50S2.OUT
Unit:	ENGLISH
Plotted Output Filename:	C:HC50S2.PLT

PROBLEM DESCRIPTION Hasley Canyon Cross Section 50-50'
Cut Slope 20, Static

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	.00	48.00	68.00	50.00	1
2	68.00	50.00	216.00	100.00	1
3	216.00	100.00	224.00	100.00	1
4	224.00	100.00	275.00	116.00	1
5	275.00	116.00	300.00	125.00	2
6	300.00	125.00	308.00	125.00	2
7	308.00	125.00	322.00	120.00	2
8	322.00	120.00	335.00	117.00	1
9	335.00	117.00	400.00	117.00	1
10	275.00	116.00	300.00	116.00	1
11	300.00	116.00	322.00	120.00	1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

Soil Total Saturated Cohesion Friction Pore Pressure Piez.

Run#37

Type No.	Unit Wt. (pcf)	Unit Wt. (pcf)	Intercept (psf)	Angle (deg)	Pressure Param.	Constant (psf)	Surface No.
1	119.0	119.0	.0	.0	.00	.0	1
2	125.0	125.0	300.0	28.0	.00	.0	1

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	410.0	40.5
2	10.5	347.0	22.0
3	90.0	410.0	40.5

---

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 4 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	30.00
2	70.00	35.00
3	300.00	90.00
4	400.00	100.00

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	50.10	30.00	70.10	32.00	30.00
2	276.90	75.00	296.90	80.00	30.00

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	51.91	49.53
2	59.91	44.16
3	295.57	71.97
4	295.72	101.97
5	314.19	122.79

Factor Of Safety For The Preceding Specified Surface = 6.771

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	51.91	49.53
2	59.91	44.16
3	295.57	71.97
4	295.72	101.97
5	314.19	122.79

Factor Of Safety For The Preceding Specified Surface = 6.771

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	28.61	48.84
2	42.97	43.93
3	68.98	28.99
4	289.52	68.97
5	306.01	94.03
6	323.59	118.34
7	323.79	119.59

*** 2.295 ***

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	14.4	4556.6	.0	.0	.0	.0	.0	.0	.0
2	16.8	20832.8	.0	.0	.0	.0	.0	.0	.0
3	8.2	17574.7	.0	1565.7	.0	.0	.0	.0	.0
4	1.0	2438.7	.0	395.9	.0	.0	.0	.0	.0
5	1.0	2599.0	.0	379.5	.0	.0	.0	.0	.0
6	146.0	572171.2	.0	90547.1	.0	.0	.0	.0	.0
7	8.0	41540.5	.0	7159.7	.0	.0	.0	.0	.0
8	51.0	280914.6	.0	51011.9	.0	.0	.0	.0	.0
9	14.5	88287.7	.0	16221.8	.0	.0	.0	.0	.0
10	10.5	58036.3	.0	13675.5	.0	.0	.0	.0	.0
11	3.6	16173.6	.0	1036.3	.0	.0	.0	.0	.0
12	2.4	9547.5	.0	.0	.0	.0	.0	.0	.0
13	2.0	7099.5	.0	.0	.0	.0	.0	.0	.0
14	14.0	27028.0	.0	.0	.0	.0	.0	.0	.0
15	1.6	484.9	.0	.0	.0	.0	.0	.0	.0
16	.2	16.1	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	28.61	48.84
2	42.97	43.93
3	68.98	28.99
4	289.52	68.97
5	306.01	94.03
6	323.59	118.34
7	323.79	119.59

*** 2.295 ***

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	41.64	49.22
2	43.17	47.99
3	69.12	32.93
4	278.76	69.57
5	298.99	91.72
6	311.01	119.21
7	312.82	123.28

*** 2.298 ***

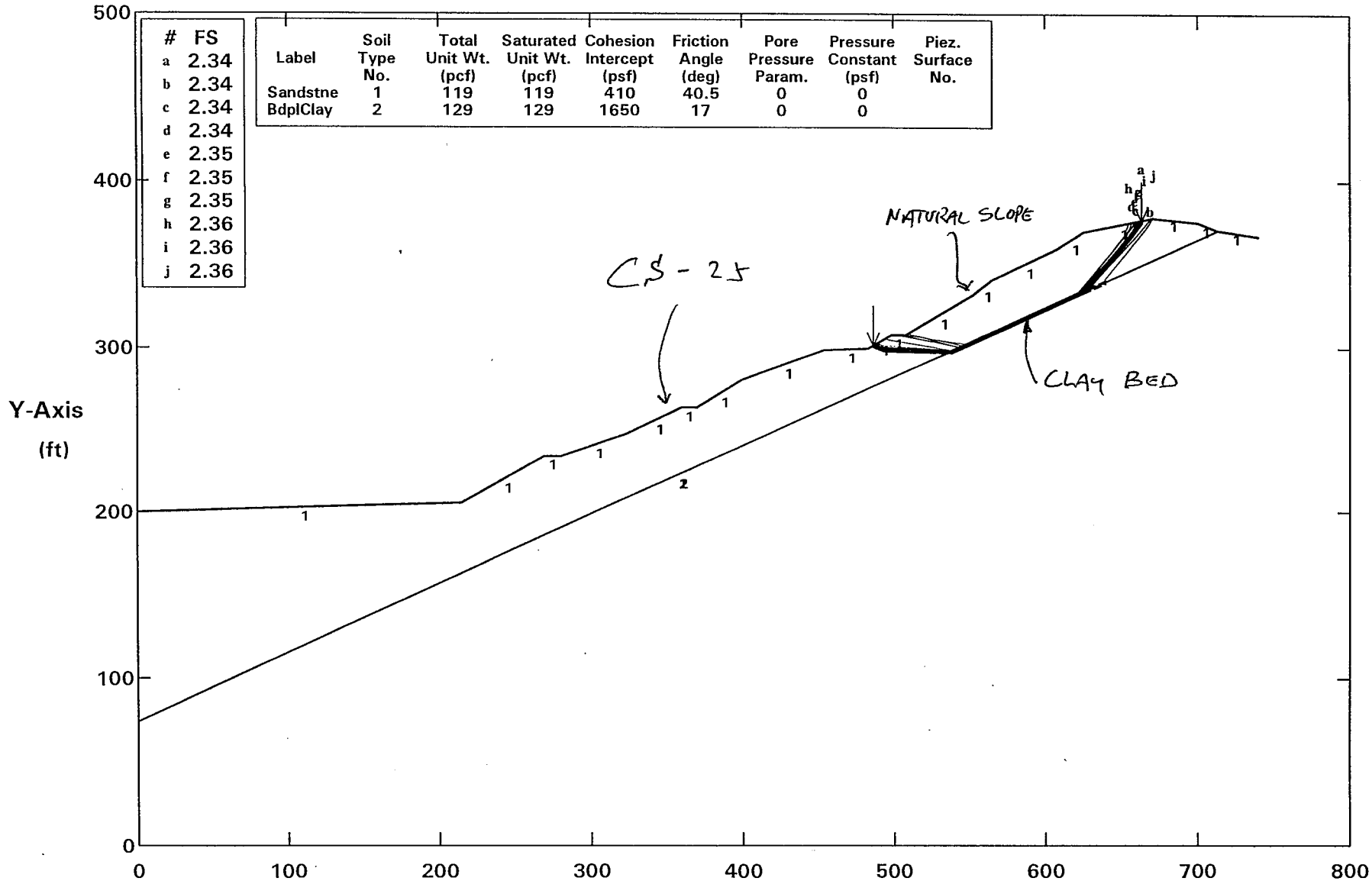
Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	41.64	49.22
2	43.17	47.99
3	69.12	32.93
4	278.76	69.57
5	298.99	91.72
6	311.01	119.21
7	312.82	123.28

*** 2.298 ***

TT52584- Hasley Cyn- Sec.51(B)- Planar analysis- Upper area- Search- Static

Ten Most Critical. C:T51(B)1.PLT By: AC 2/09/2000 5:16pm



#	FS
a	2.34
b	2.34
c	2.34
d	2.34
e	2.35
f	2.35
g	2.35
h	2.36
i	2.36
j	2.36

Label	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.
Sandstne	1	119	119	410	40.5	0	0	
BdplClay	2	129	129	1650	17	0	0	

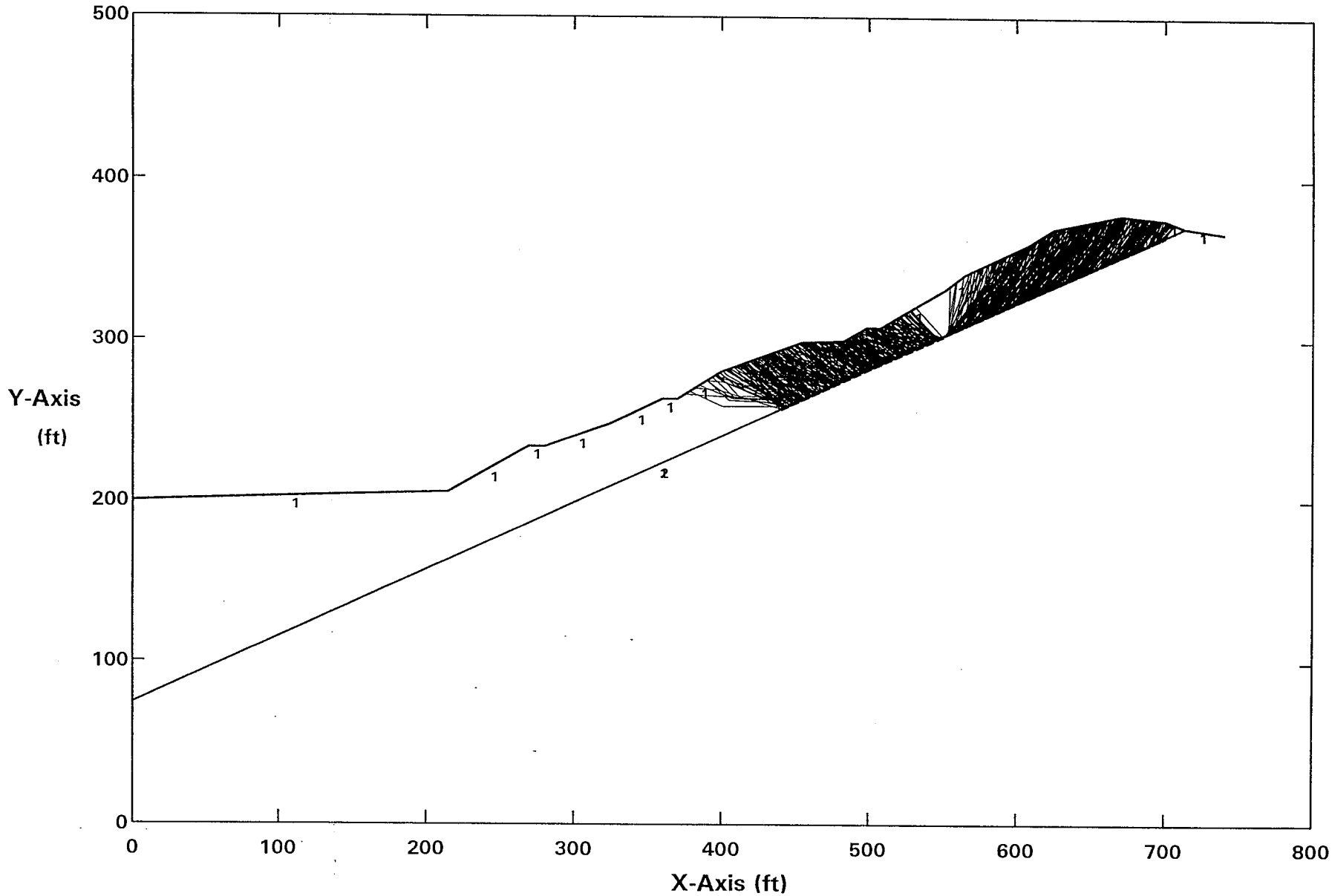
PCSTABL5M FSmin = 2.34 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run #38 a

TT52584- Hasley Cyn- Sec.51(B)- Planar analysis- Upper area- Search- Static

All surfaces evaluated. C:T51(B)1.PLT By: AC 2/09/2000 5:18pm



Factors Of Safety Calculated By The Modified Janbu Method

Run #38a

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date: 2/09/2000
Time of Run: 5:21pm
Run By: AC
Input Data Filename: C:T51(B)1
Output Filename: C:T51(B)1.OUT
Plotted Output Filename: C:T51(B)1.PLT

PROBLEM DESCRIPTION TT52584- Hasley Cyn- Sec.51(B)- Planar analysis- Upper area- Search- Static

BOUNDARY COORDINATES

19 Top Boundaries
21 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	200.00	215.00	205.00	1
2	215.00	205.00	269.00	234.00	1
3	269.00	234.00	280.00	234.00	1
4	280.00	234.00	324.00	248.00	1
5	324.00	248.00	360.00	264.00	1
6	360.00	264.00	370.00	264.00	1
7	370.00	264.00	400.00	280.00	1
8	400.00	280.00	454.00	299.00	1
9	454.00	299.00	483.00	300.00	1
10	483.00	300.00	499.00	308.00	1
11	499.00	308.00	508.00	308.00	1
12	508.00	308.00	552.00	332.00	1
13	552.00	332.00	565.00	341.00	1
14	565.00	341.00	608.00	360.00	1
15	608.00	360.00	625.00	370.00	1
16	625.00	370.00	671.00	378.00	1
17	671.00	378.00	700.00	376.00	1
18	700.00	376.00	713.00	371.00	1
19	713.00	371.00	740.00	367.00	1
20	.00	74.00	713.00	371.00	2
21	.00	73.60	713.00	370.60	1

Run #38a

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	119.0	119.0	410.0	40.5	.00	.0	0
2	129.0	129.0	1650.0	17.0	.00	.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.

400 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 44.5

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	538.50	298.10	558.50	306.50	.40
2	619.00	331.60	639.00	340.00	.40

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	487.01	302.00
2	494.10	299.04

3	538.60	298.22
4	626.16	334.79
5	656.17	367.64
6	663.19	376.64

*** 2.339 ***

Individual data on the 13 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	7.1	2749.3	.0	.0	.0	.0	.0	.0	.0
2	4.9	4533.7	.0	.0	.0	.0	.0	.0	.0
3	9.0	9781.8	.0	.0	.0	.0	.0	.0	.0
4	30.3	64015.0	.0	.0	.0	.0	.0	.0	.0
5	.3	947.4	.0	.0	.0	.0	.0	.0	.0
6	13.4	43599.7	.0	.0	.0	.0	.0	.0	.0
7	13.0	46371.9	.0	.0	.0	.0	.0	.0	.0
8	43.0	165168.9	.0	.0	.0	.0	.0	.0	.0
9	17.0	69279.8	.0	.0	.0	.0	.0	.0	.0
10	1.2	4895.1	.0	.0	.0	.0	.0	.0	.0
11	.1	214.9	.0	.0	.0	.0	.0	.0	.0
12	30.0	76912.3	.0	.0	.0	.0	.0	.0	.0
13	7.0	3249.6	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	489.17	303.09
2	494.16	301.04
3	538.56	297.97
4	627.06	334.98
5	658.52	366.44
6	668.52	377.57

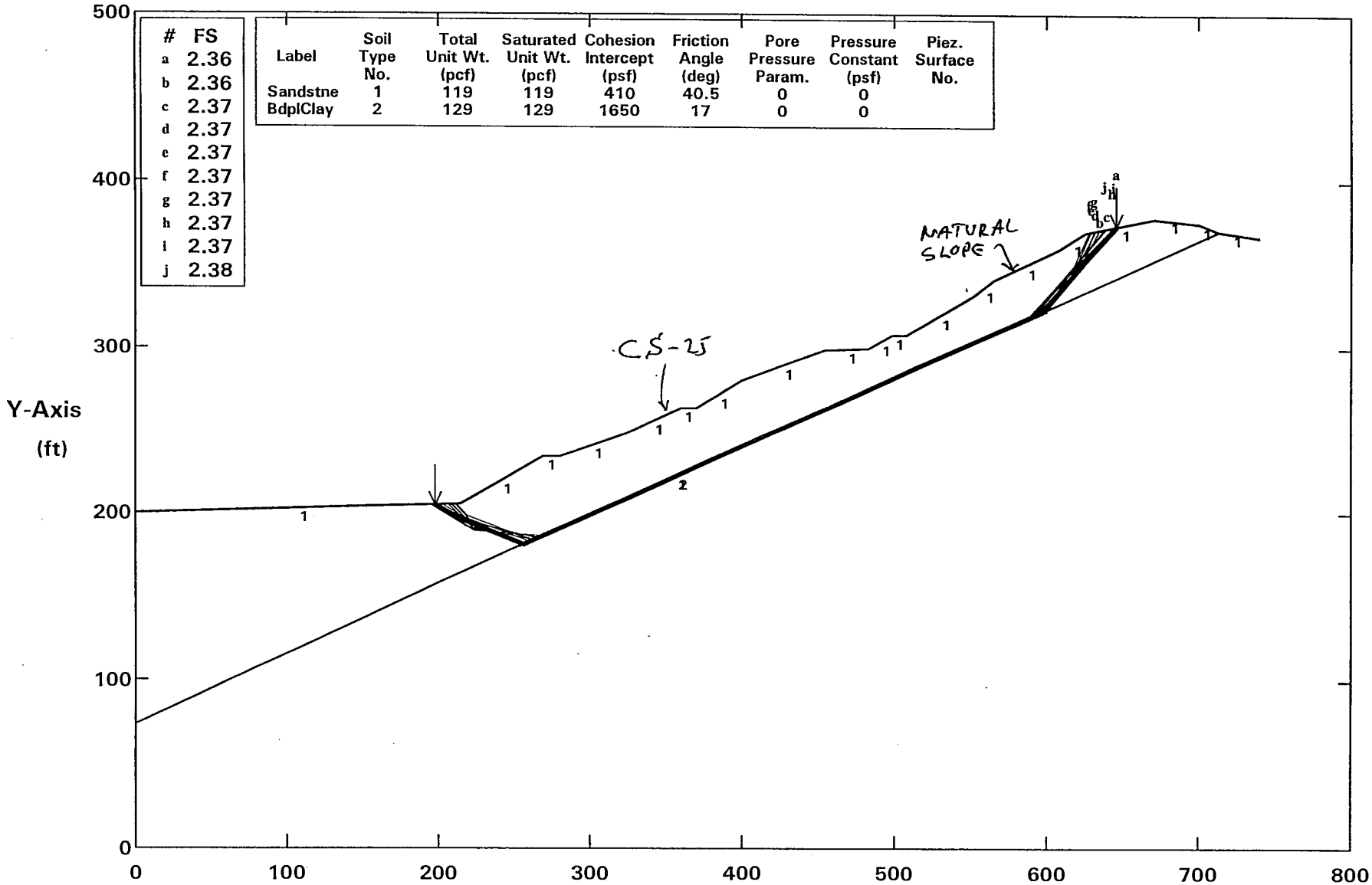
*** 2.340 ***

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

TT52584- Hasley Cyn- Sec.51(A)- Planar analysis- Search- Static

Ten Most Critical. C:T51(A)1.PLT By: AC 2/09/2000 3:59pm



#	FS
a	2.36
b	2.36
c	2.37
d	2.37
e	2.37
f	2.37
g	2.37
h	2.37
i	2.37
j	2.38

Label	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.
Sandstne	1	119	119	410	40.5	0	0	
BdplClay	2	129	129	1650	17	0	0	

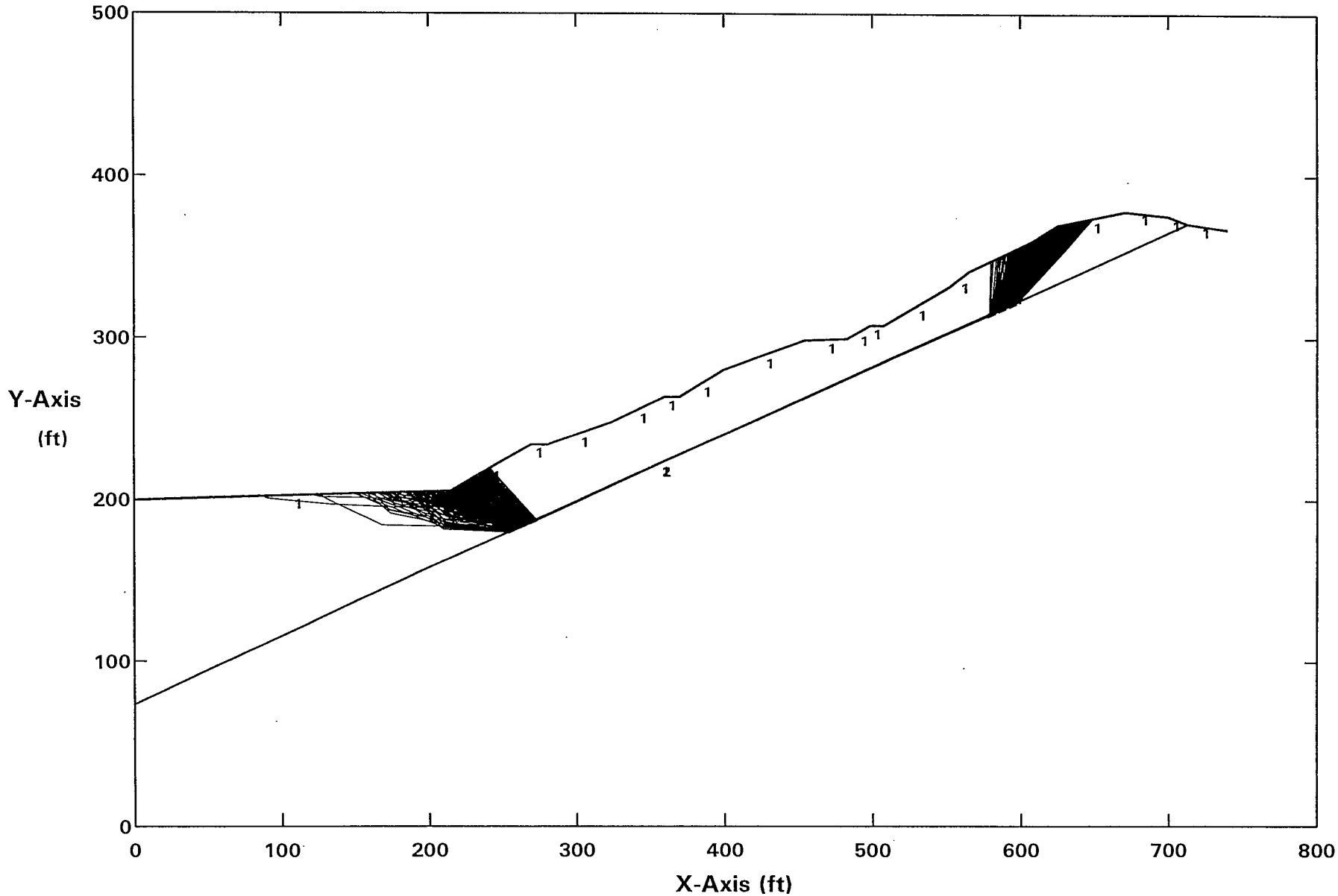
PCSTABL5M FSmin = 2.36 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run 386

TT52584- Hasley Cyn- Sec.51(A)- Planar analysis- Search- Static

All surfaces evaluated. C:T51(A)1.PLT By: AC 2/09/2000 3:50pm



Factors Of Safety Calculated By The Modified Janbu Method

Run 38(6)

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	2/09/2000
Time of Run:	3:59pm
Run By:	AC
Input Data Filename:	C:T51(A)1
Output Filename:	C:T51(A)1.OUT
Plotted Output Filename:	C:T51(A)1.PLT

PROBLEM DESCRIPTION TT52584- Hasley Cyn- Sec.51(A)- Planar analysis- Search- Static

BOUNDARY COORDINATES

19 Top Boundaries
21 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	200.00	215.00	205.00	1
2	215.00	205.00	269.00	234.00	1
3	269.00	234.00	280.00	234.00	1
4	280.00	234.00	324.00	248.00	1
5	324.00	248.00	360.00	264.00	1
6	360.00	264.00	370.00	264.00	1
7	370.00	264.00	400.00	280.00	1
8	400.00	280.00	454.00	299.00	1
9	454.00	299.00	483.00	300.00	1
10	483.00	300.00	499.00	308.00	1
11	499.00	308.00	508.00	308.00	1
12	508.00	308.00	552.00	332.00	1
13	552.00	332.00	565.00	341.00	1
14	565.00	341.00	608.00	360.00	1
15	608.00	360.00	625.00	370.00	1
16	625.00	370.00	671.00	378.00	1
17	671.00	378.00	700.00	376.00	1
18	700.00	376.00	713.00	371.00	1
19	713.00	371.00	740.00	367.00	1
20	.00	74.00	713.00	371.00	2
21	.00	73.60	713.00	370.60	1

RUN 386

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	119.0	119.0	410.0	40.5	.00	.0	0
2	129.0	129.0	1650.0	17.0	.00	.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.

400 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 44.5

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	253.40	179.40	273.40	187.70	.40
2	579.20	315.10	599.20	323.40	.40

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	198.10	204.61
2	214.15	195.81

3	255.85	180.27
4	597.23	322.60
5	627.38	355.33
6	645.63	373.59

*** 2.360 ***

Individual data on the 22 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	16.0	8757.9	.0	.0	.0	.0	.0	.0	.0
2	.8	941.5	.0	.0	.0	.0	.0	.0	.0
3	40.5	134383.4	.0	.0	.0	.0	.0	.0	.0
4	.4	2165.2	.0	.0	.0	.0	.0	.0	.0
5	13.2	74311.8	.0	.0	.0	.0	.0	.0	.0
6	11.0	60193.1	.0	.0	.0	.0	.0	.0	.0
7	44.0	217384.7	.0	.0	.0	.0	.0	.0	.0
8	36.0	170668.1	.0	.0	.0	.0	.0	.0	.0
9	10.0	45515.3	.0	.0	.0	.0	.0	.0	.0
10	30.0	135334.3	.0	.0	.0	.0	.0	.0	.0
11	54.0	243519.8	.0	.0	.0	.0	.0	.0	.0
12	29.0	105572.1	.0	.0	.0	.0	.0	.0	.0
13	16.0	48951.7	.0	.0	.0	.0	.0	.0	.0
14	9.0	26237.1	.0	.0	.0	.0	.0	.0	.0
15	44.0	133245.9	.0	.0	.0	.0	.0	.0	.0
16	13.0	46509.6	.0	.0	.0	.0	.0	.0	.0
17	32.2	123695.6	.0	.0	.0	.0	.0	.0	.0
18	.3	1021.5	.0	.0	.0	.0	.0	.0	.0
19	10.5	36382.3	.0	.0	.0	.0	.0	.0	.0
20	17.0	43452.8	.0	.0	.0	.0	.0	.0	.0
21	2.4	4572.6	.0	.0	.0	.0	.0	.0	.0
22	18.3	16385.3	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	210.13	204.89
2	219.66	195.57
3	262.39	183.17
4	596.74	322.26
5	625.69	356.05
6	634.49	371.65

*** 2.364 ***

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	210.51	204.90
2	220.85	194.89
3	263.89	183.58
4	587.37	318.39
5	618.58	350.12
6	638.90	372.42

*** 2.367 ***

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	196.09	204.56
2	222.55	189.43
3	266.81	184.81
4	597.60	322.62
5	624.35	358.18
6	631.76	371.17

*** 2.368 ***

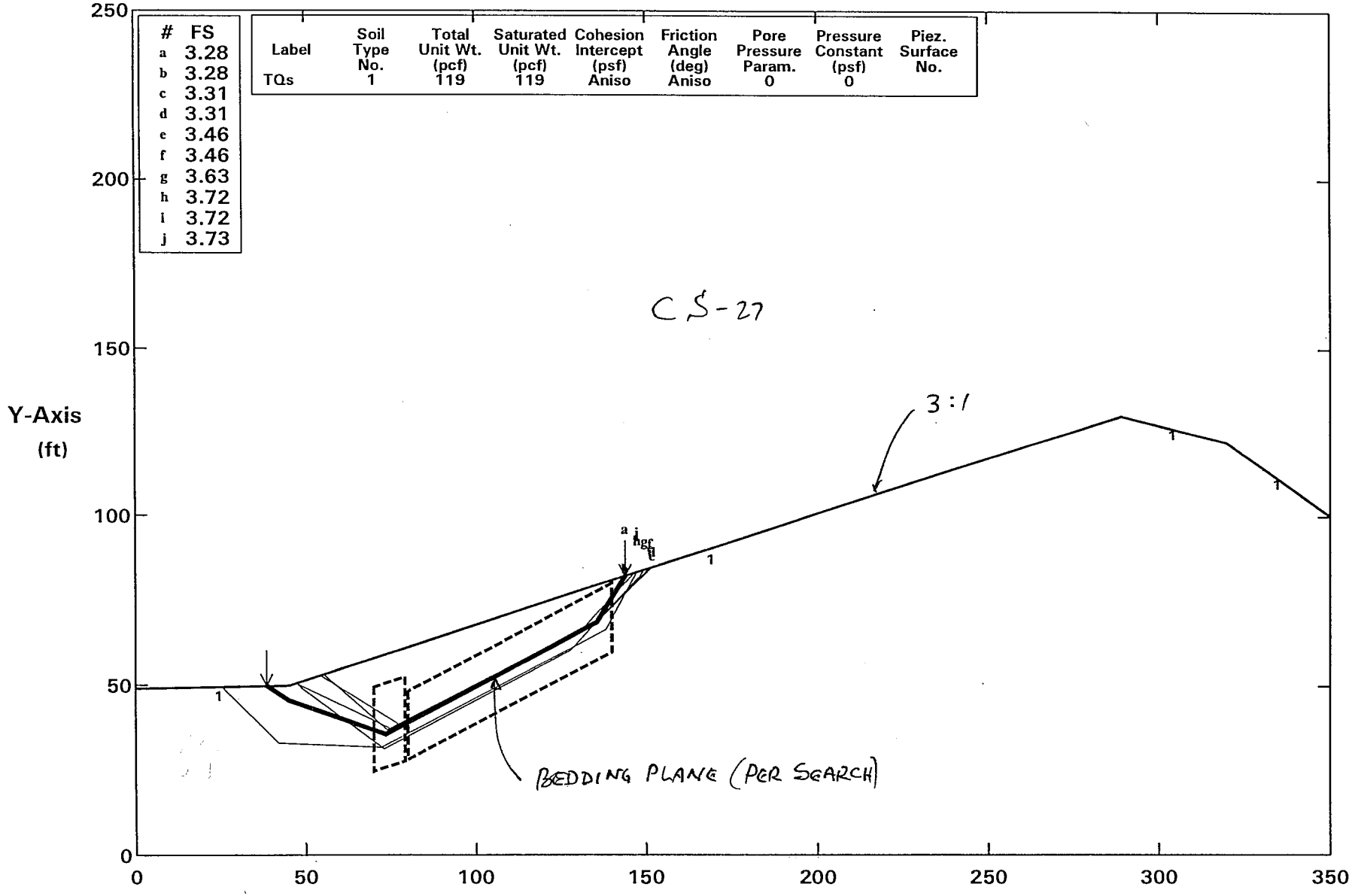
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	203.96	204.74
2	221.86	194.20
3	265.24	184.29
4	588.76	318.95
5	619.58	351.04
6	628.93	370.68

*** 2.368 ***

Hasley Canyon Cross Section 52-52' Cut Slope 27, 3:1, Static

Ten Most Critical. C:HC52S2.PLT By: DCS 2/09/2000 5:54pm



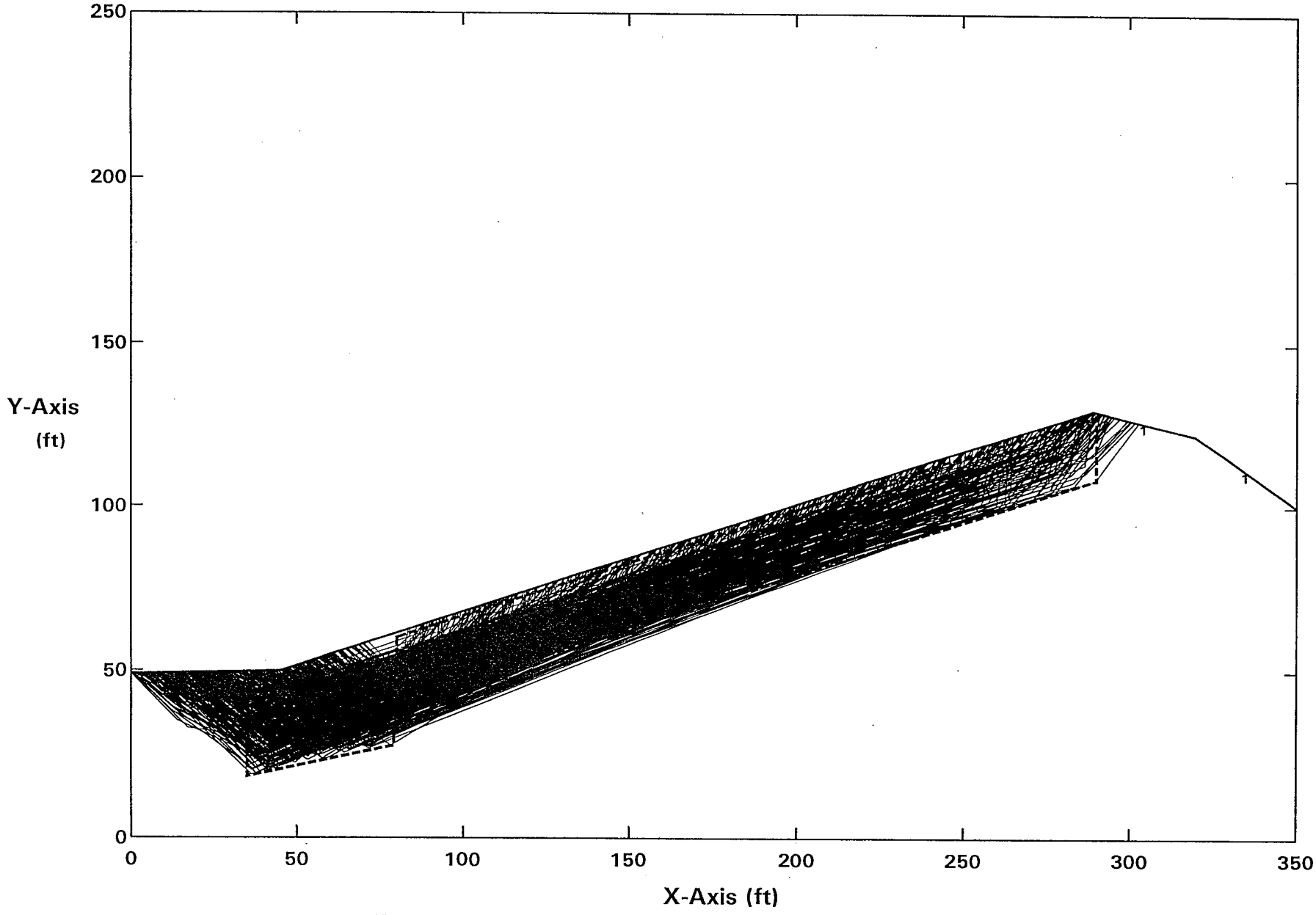
PCSTABL5M/SI FSmin = 3.28 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Run #39

Hasley Canyon Cross Section 52-52' Cut Slope 27, 3:1, Static

All surfaces evaluated. C:HC52S2.PLT By: DCS 2/09/2000 5:48pm



Factors Of Safety Calculated By The Modified Janbu Method

Run #29

** PCSTABL5M **

by
Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	2/09/2000
Time of Run:	5:54pm
Run By:	DCS
Input Data Filename:	C:HC52S2
Output Filename:	C:HC52S2.OUT
Unit:	ENGLISH
Plotted Output Filename:	C:HC52S2.PLT

PROBLEM DESCRIPTION Hasley Canyon Cross Section 52-52'
Cut Slope 27, 3:1, Static

BOUNDARY COORDINATES

4 Top Boundaries
4 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	49.00	45.00	50.00	1
2	45.00	50.00	289.00	130.00	1
3	289.00	130.00	320.00	122.00	1
4	320.00	122.00	350.00	100.00	1

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	119.0	119.0	.0	.0	.00	.0	0

Run#39

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	27.5	410.0	40.5
2	28.5	347.0	22.0
3	90.0	410.0	40.5

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	70.00	37.00	79.00	40.00	25.00
2	80.00	38.00	140.00	70.00	20.00

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined By The Following 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	62.83	55.85
2	73.34	47.05

3	98.94	43.09
4	99.66	67.92

Factor Of Safety For The Preceding Specified Surface = 45.747

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	51.82	52.24
2	72.54	31.73
3	85.90	48.08
4	85.98	63.44

Factor Of Safety For The Preceding Specified Surface = 33.483

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	59.87	54.87
2	72.91	42.33
3	96.46	53.38
4	96.51	66.89

Factor Of Safety For The Preceding Specified Surface = 30.821

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	62.32	55.68
2	73.73	47.35
3	106.80	56.53
4	107.31	70.43

Factor Of Safety For The Preceding Specified Surface = 11.965

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	62.83	55.85
2	73.34	47.05
3	98.94	43.09
4	99.66	67.92

Factor Of Safety For The Preceding Specified Surface = 45.747

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 4 Coordinate Points

Point	X-Surf	Y-Surf

No.	(ft)	(ft)
1	51.82	52.24
2	72.54	31.73
3	85.90	48.08
4	85.98	63.44

Factor Of Safety For The Preceding Specified Surface = 33.483

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	59.87	54.87
2	72.91	42.33
3	96.46	53.38
4	96.51	66.89

Factor Of Safety For The Preceding Specified Surface = 30.821

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Examined. They Are Ordered - Most Critical
First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	38.32	49.85
2	45.03	45.34
3	73.29	35.29
4	135.68	68.76
5	143.92	82.43

*** 3.278 ***

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	6.7	1844.5	.0	.0	.0	.0	.0	.0	.0
2	.0	15.1	.0	.0	.0	.0	.0	.0	.0
3	28.3	48195.0	.0	.0	.0	.0	.0	.0	.0
4	62.4	129764.8	.0	.0	.0	.0	.0	.0	.0
5	8.2	5386.2	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	38.32	49.85
2	45.03	45.34
3	73.29	35.29
4	135.68	68.76
5	143.92	82.43

*** 3.278 ***

Failure Surface Specified By 5 Coordinate Points

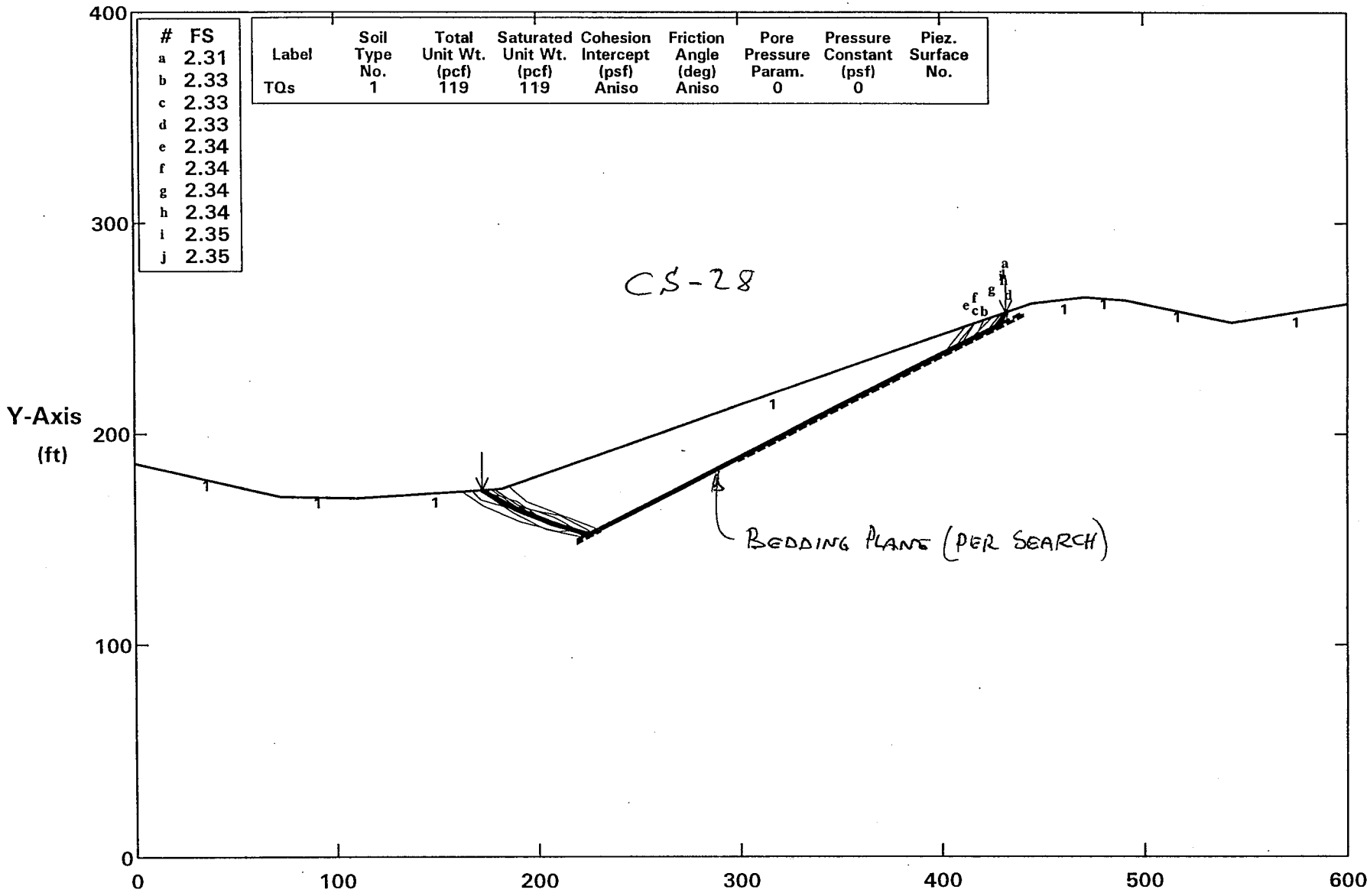
Point No.	X-Surf (ft)	Y-Surf (ft)
1	46.65	50.54
2	48.77	49.99
3	75.69	36.75
4	136.28	69.34
5	151.66	84.97

*** 3.305 ***

Failure Surface Specified By 5 Coordinate Points

Hasley Canyon- Sec 53-53'- Cut Slope-` CS28- Static

Ten Most Critical. C:HC53R.PLT By: AC 3/29/2000 10:51am



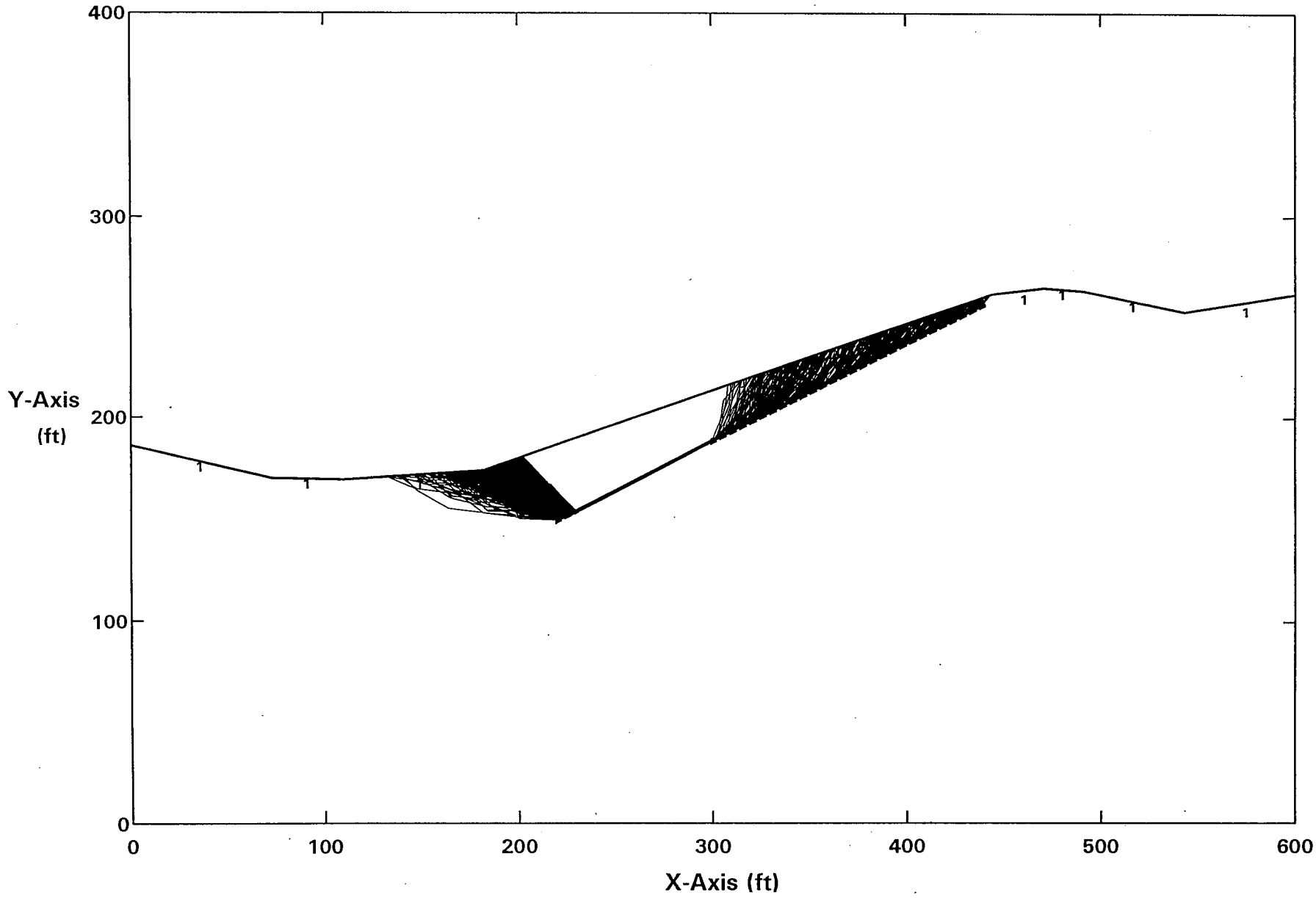
PCSTABL5M FSmin = 2.31 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

RUN No. 40

Hasley Canyon- Sec 53-53'- Cut Slope-` CS28- Static

All surfaces evaluated. C:HC53R.PLT By: AC 3/29/2000 10:51am



Factors Of Safety Calculated By The Modified Janbu Method

Run No. 40

** PCSTABL5M **

by
Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	3/29/2000
Time of Run:	10:51am
Run By:	AC
Input Data Filename:	C:HC53R
Output Filename:	C:HC53R.OUT
Plotted Output Filename:	C:HC53R.PLT

PROBLEM DESCRIPTION Hasley Canyon- Sec 53-53'- Cut Slope-'
CS28- Static

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	.00	186.00	73.00	170.00	1
2	73.00	170.00	110.00	169.50	1
3	110.00	169.50	182.00	174.00	1
4	182.00	174.00	445.00	262.00	1
5	445.00	262.00	471.00	265.00	1
6	471.00	265.00	491.00	263.00	1
7	491.00	263.00	543.00	253.00	1
8	543.00	253.00	600.00	262.00	1

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	119.0	119.0	410.0	40.5	.00	.0	0

Run No. 40

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	25.5	410.0	40.5
2	26.5	347.0	22.0
3	90.0	410.0	40.5

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 19.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	220.00	149.30	230.00	154.10	1.00
2	300.00	188.30	440.00	256.60	1.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

1	172.29	173.39
2	172.60	173.13
3	189.24	163.95
4	207.17	157.66
5	225.29	151.96
6	428.20	251.22
7	431.84	257.60

*** 2.313 ***

Individual data on the 7 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	.3	5.3	.0	.0	.0	.0	.0	.0	.0
2	9.4	3540.9	.0	.0	.0	.0	.0	.0	.0
3	7.2	7979.9	.0	.0	.0	.0	.0	.0	.0
4	17.9	39715.4	.0	.0	.0	.0	.0	.0	.0
5	18.1	66087.7	.0	.0	.0	.0	.0	.0	.0
6	202.9	503172.9	.0	.0	.0	.0	.0	.0	.0
7	3.6	1117.9	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	171.15	173.32
2	171.19	173.31
3	187.13	162.96
4	204.08	154.38
5	222.78	150.99
6	416.20	244.58
7	421.62	254.18

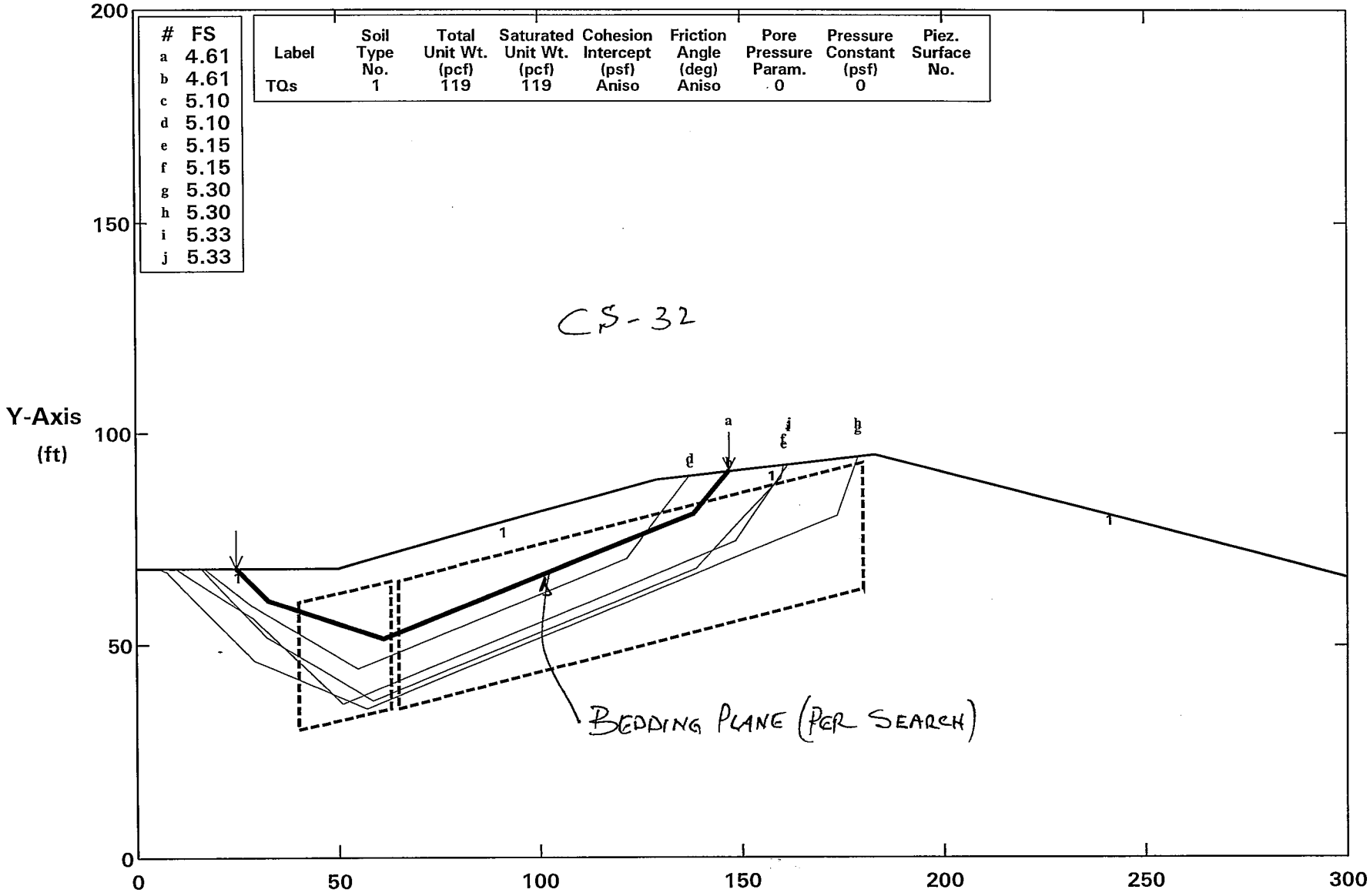
*** 2.325 ***

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	174.25	173.52

Hasley Canyon Cross Section 54-54' Cut Slope 32, Static

Ten Most Critical. C:HC54S1.PLT By: DCS 3/24/2000 3:06pm



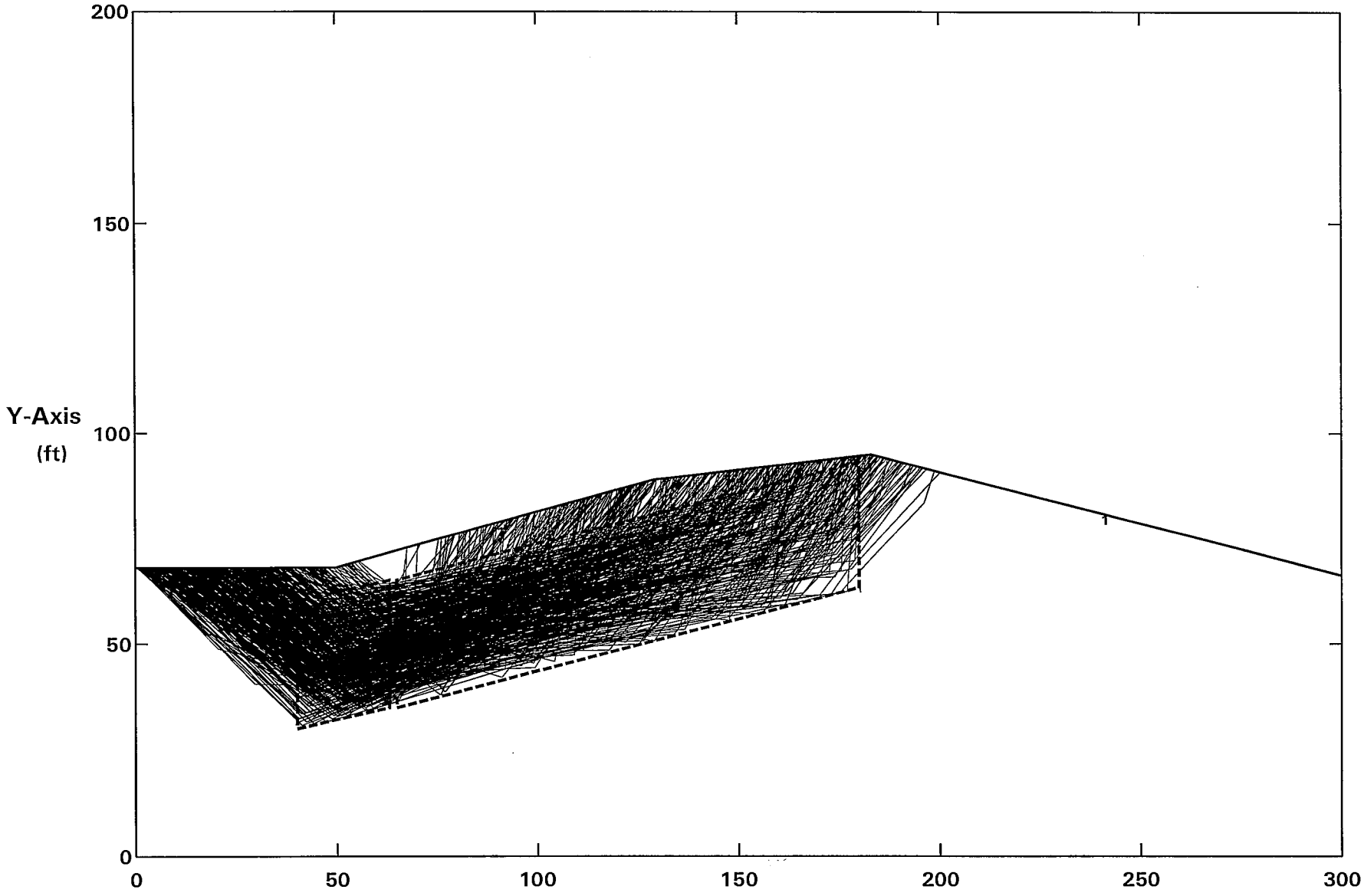
PCSTABL5M/SI FSmin = 4.61 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

PAGE 16 of 41

Hasley Canyon Cross Section 54-54' Cut Slope 32, Static

All surfaces evaluated. C:HC54S1.PLT By: DCS 3/24/2000 3:06pm



Factors Of Safety Calculated By The Modified Janbu Method

Run No. 44

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	3/24/2000
Time of Run:	3:06pm
Run By:	DCS
Input Data Filename:	C:HC54S1.IN
Output Filename:	C:HC54S1.OUT
Unit:	ENGLISH
Plotted Output Filename:	C:HC54S1.PLT

PROBLEM DESCRIPTION Hasley Canyon Cross Section 54-54'
Cut Slope 32, Static

BOUNDARY COORDINATES

4 Top Boundaries
4 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	68.00	50.00	68.00	1
2	50.00	68.00	129.00	89.00	1
3	129.00	89.00	183.00	95.00	1
4	183.00	95.00	300.00	66.00	1

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	119.0	119.0	.0	.0	.00	.0	0

Run No. 41

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	20.5	410.0	40.5
2	21.5	347.0	22.0
3	90.0	410.0	40.5

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	40.00	45.00	63.00	50.00	30.00
2	65.00	50.00	180.00	78.00	30.00

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined By The Following 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	3.86	68.00
2	20.74	65.53

3	47.21	51.42
4	108.65	60.71
5	109.22	83.74

Factor Of Safety For The Preceding Specified Surface = 22.240

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	37.32	68.00
2	38.47	67.12
3	60.57	46.83
4	96.80	57.49
5	97.43	80.61

Factor Of Safety For The Preceding Specified Surface = 24.092

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	30.65	68.00
2	47.44	51.85
3	96.55	67.59
4	96.60	80.39

Factor Of Safety For The Preceding Specified Surface = 24.263

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	42.91	68.00
2	60.05	53.90
3	98.71	57.87
4	99.49	81.16

Factor Of Safety For The Preceding Specified Surface = 25.245

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	30.34	68.00
2	54.27	61.91
3	102.59	63.05
4	103.10	82.11

Factor Of Safety For The Preceding Specified Surface = 27.822

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	3.86	68.00
2	20.74	65.53
3	47.21	51.42
4	108.65	60.71
5	109.22	83.74

Factor Of Safety For The Preceding Specified Surface = 22.240

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	37.32	68.00
2	38.47	67.12
3	60.57	46.83
4	96.80	57.49
5	97.43	80.61

Factor Of Safety For The Preceding Specified Surface = 24.092

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	30.65	68.00
2	47.44	51.85
3	96.55	67.59
4	96.60	80.39

Factor Of Safety For The Preceding Specified Surface = 24.263

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	42.91	68.00
2	60.05	53.90
3	98.71	57.87
4	99.49	81.16

Factor Of Safety For The Preceding Specified Surface = 25.245

Factor Of Safety Calculation Has Gone Through Ten Iterations

The Trial Failure Surface In Question Is Defined
By The Following 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	30.34	68.00
2	54.27	61.91
3	102.59	63.05
4	103.10	82.11

Factor Of Safety For The Preceding Specified Surface = 27.822

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Examined. They Are Ordered - Most Critical
First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	24.84	68.00
2	32.44	60.54
3	60.96	51.24
4	137.85	80.60
5	146.86	90.98

*** 4.613 ***

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	7.6	3371.2	.0	.0	.0	.0	.0	.0	.0
2	17.6	21567.0	.0	.0	.0	.0	.0	.0	.0
3	11.0	21428.7	.0	.0	.0	.0	.0	.0	.0
4	68.0	127347.1	.0	.0	.0	.0	.0	.0	.0
5	8.9	11147.7	.0	.0	.0	.0	.0	.0	.0
6	9.0	5031.8	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 5 Coordinate Points

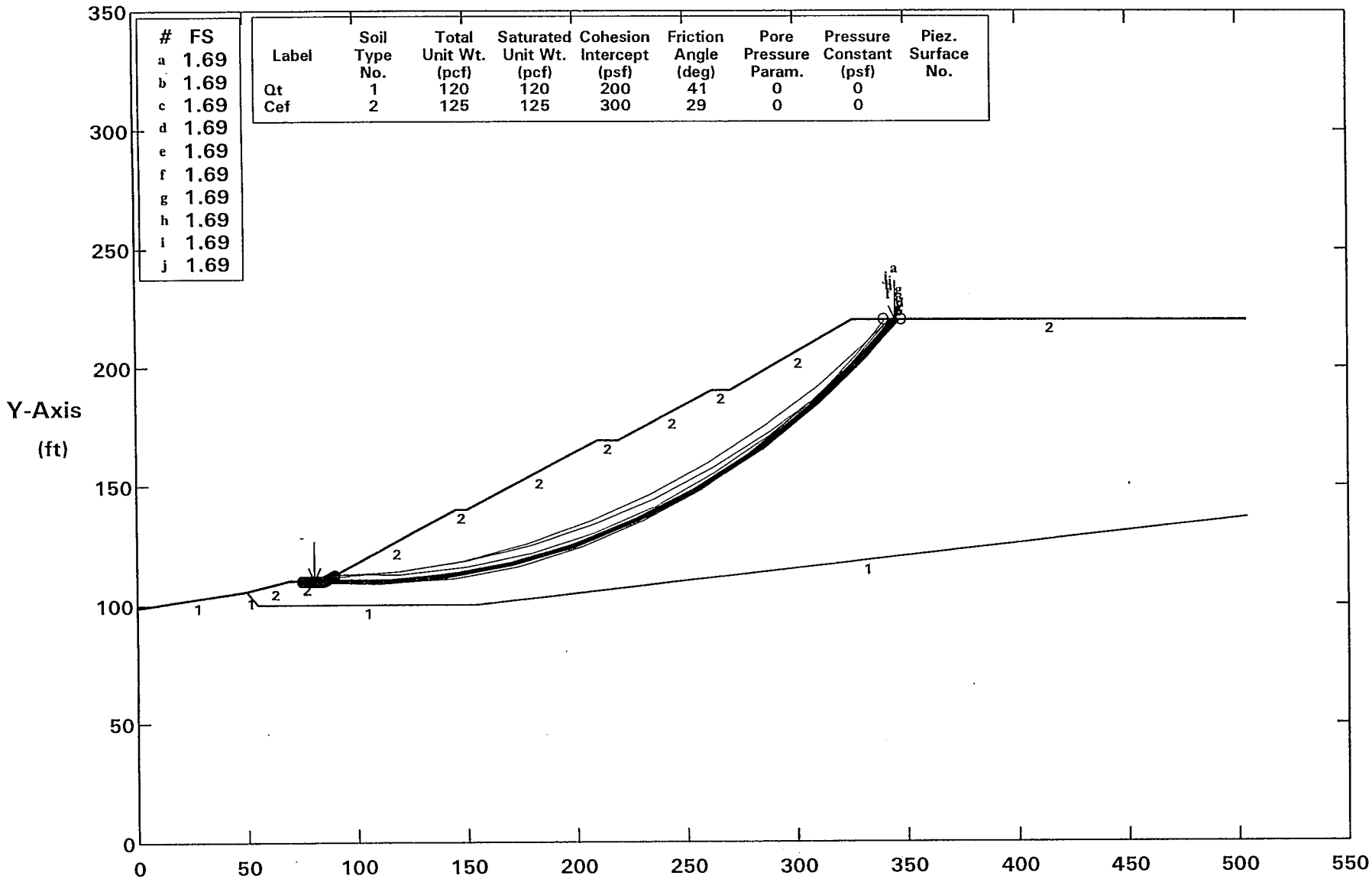
Point No.	X-Surf (ft)	Y-Surf (ft)
1	24.84	68.00
2	32.44	60.54
3	60.96	51.24
4	137.85	80.60
5	146.86	90.98

*** 4.613 ***

Failure Surface Specified By 5 Coordinate Points

T52584-HASLEY CANYON-Sec. 55 - Critical Fill Slope-Static

Ten Most Critical. C:HC55S1.PLT By: EC 1/25/2000 12:55pm



#	FS
a	1.69
b	1.69
c	1.69
d	1.69
e	1.69
f	1.69
g	1.69
h	1.69
i	1.69
j	1.69

Label	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.
Qt	1	120	120	200	41	0	0	
Cef	2	125	125	300	29	0	0	

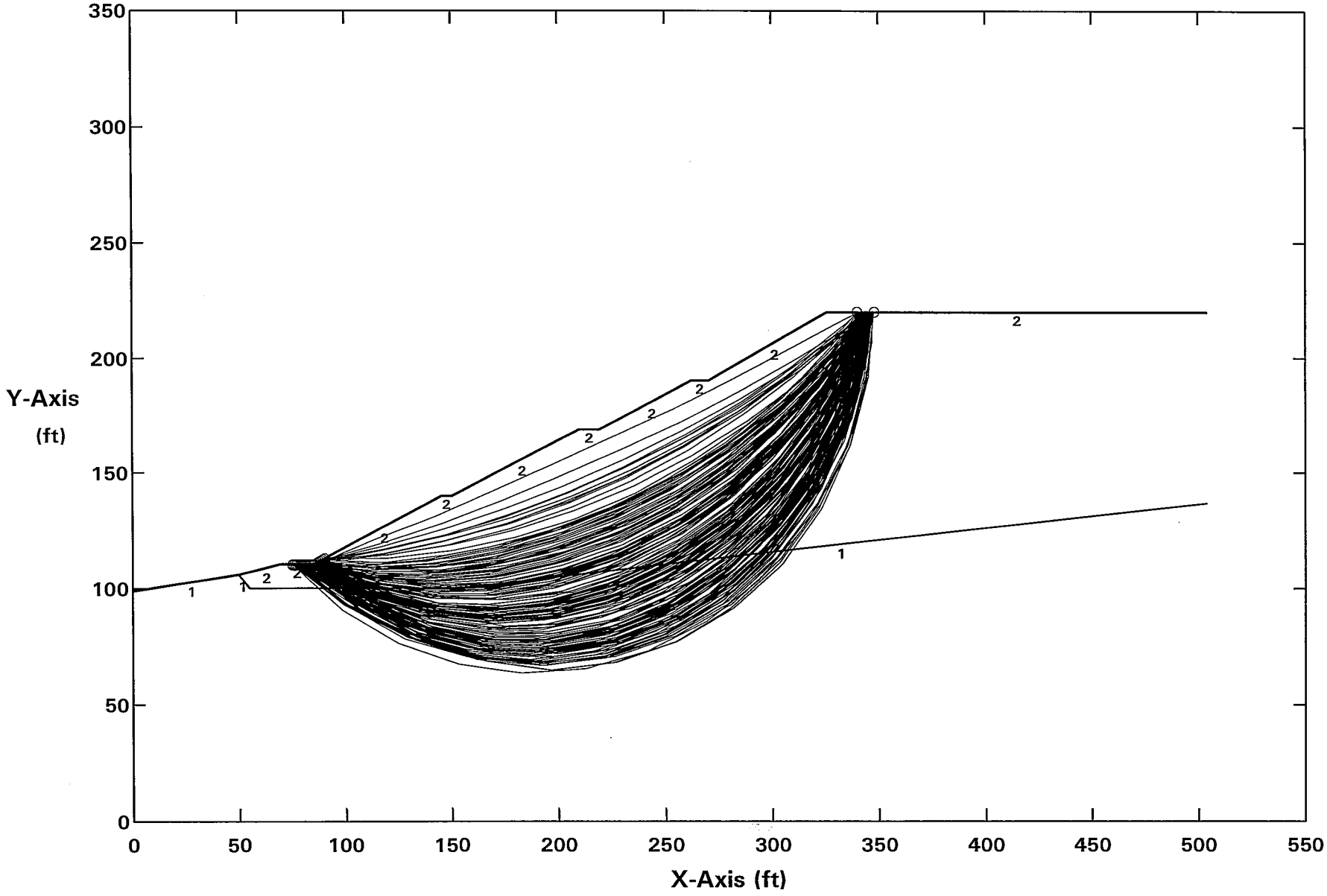
PCSTABL5M FSmin = 1.69 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

Run #42a

T52584-HASLEY CANYON-Sec. 55 - Critical Fill Slope-Static

All surfaces evaluated. C:HC55S1.PLT By: EC 1/25/2000 12:55pm



Factors Of Safety Calculated By The Modified Bishop Method

Run #42

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	1/25/2000
Time of Run:	12:55pm
Run By:	EC
Input Data Filename:	C:HC55S1.IN
Output Filename:	C:HC55S1.OUT
Plotted Output Filename:	C:HC55S1.PLT

PROBLEM DESCRIPTION T52584-HASLEY CANYON-Sec. 55 - Critical Fill Slope-Static

BOUNDARY COORDINATES

11 Top Boundaries
14 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	99.00	50.00	106.00	1
2	50.00	106.00	69.00	110.00	2
3	69.00	110.00	85.00	110.00	2
4	85.00	110.00	145.00	140.00	2
5	145.00	140.00	150.00	140.00	2
6	150.00	140.00	210.00	169.00	2
7	210.00	169.00	219.00	169.00	2
8	219.00	169.00	262.00	190.00	2
9	262.00	190.00	270.00	190.00	2
10	270.00	190.00	326.00	220.00	2
11	326.00	220.00	504.00	220.00	2
12	50.00	106.00	55.00	100.00	1
13	55.00	100.00	155.00	100.00	1
14	155.00	100.00	504.00	137.00	1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

Run #42a

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	120.0	200.0	41.0	.00	.0	0
2	125.0	125.0	300.0	29.0	.00	.0	0

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

200 Trial Surfaces Have Been Generated.

10 Surfaces Initiate From Each Of 20 Points Equally Spaced Along The Ground Surface Between X = 75.00 ft.
and X = 90.00 ft.

Each Surface Terminates Between X = 340.00 ft.
and X = 348.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = .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 20.0 deg.

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	80.53	110.00
2	110.53	109.67
3	140.43	112.07

4	169.99	117.17
5	198.97	124.93
6	227.12	135.30
7	254.22	148.17
8	280.04	163.45
9	304.36	181.02
10	326.99	200.71
11	345.45	220.00

Circle Center At X = 99.1 ; Y = 439.6 and Radius, 330.1

*** 1.688 ***

Individual data on the 18 slices

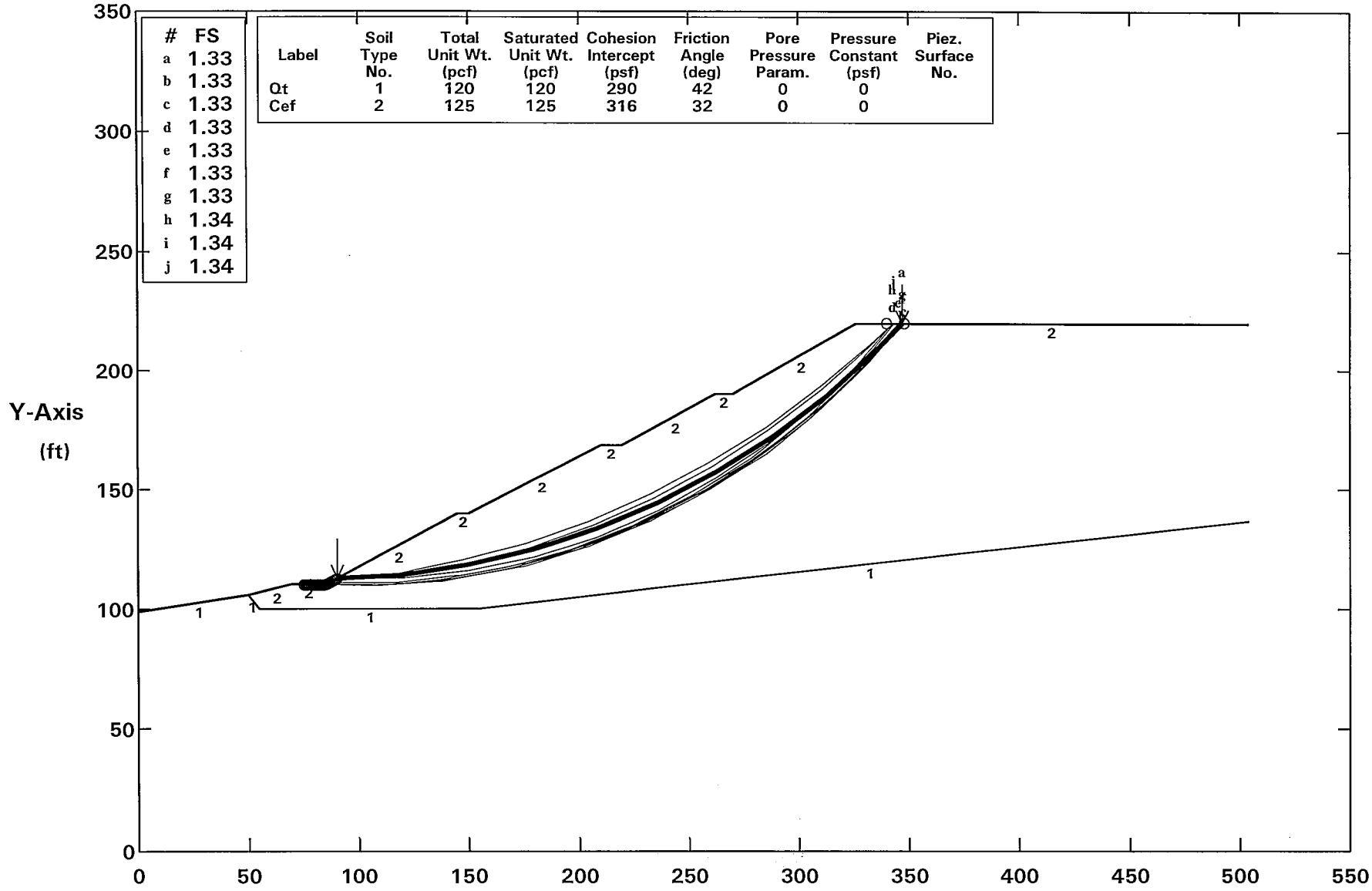
Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	4.5	13.7	.0	.0	.0	.0	.0	.0	.0
2	25.5	20961.3	.0	.0	.0	.0	.0	.0	.0
3	29.9	72398.3	.0	.0	.0	.0	.0	.0	.0
4	4.6	15080.5	.0	.0	.0	.0	.0	.0	.0
5	5.0	16694.4	.0	.0	.0	.0	.0	.0	.0
6	20.0	73437.2	.0	.0	.0	.0	.0	.0	.0
7	29.0	129002.0	.0	.0	.0	.0	.0	.0	.0
8	11.0	54281.2	.0	.0	.0	.0	.0	.0	.0
9	9.0	43143.7	.0	.0	.0	.0	.0	.0	.0
10	8.1	37757.3	.0	.0	.0	.0	.0	.0	.0
11	27.1	128200.6	.0	.0	.0	.0	.0	.0	.0
12	7.8	36589.7	.0	.0	.0	.0	.0	.0	.0
13	8.0	34855.2	.0	.0	.0	.0	.0	.0	.0
14	10.0	40402.5	.0	.0	.0	.0	.0	.0	.0
15	24.3	90164.0	.0	.0	.0	.0	.0	.0	.0
16	21.6	64295.7	.0	.0	.0	.0	.0	.0	.0
17	1.0	2429.5	.0	.0	.0	.0	.0	.0	.0
18	18.5	22256.0	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	86.84	110.92
2	116.84	111.01
3	146.71	113.80
4	176.21	119.27
5	205.09	127.38
6	233.13	138.06
7	260.08	151.22
8	285.74	166.76
9	309.90	184.56

T52584-HASLEY CANYON-Sec. 55 - Critical Fill Slope-Pseudostatic

Ten Most Critical. C:HC55P1.PLT By: EC 1/25/2000 12:58pm



#	FS
a	1.33
b	1.33
c	1.33
d	1.33
e	1.33
f	1.33
g	1.33
h	1.34
i	1.34
j	1.34

Label	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.
Qt	1	120	120	290	42	0	0	
Cef	2	125	125	316	32	0	0	

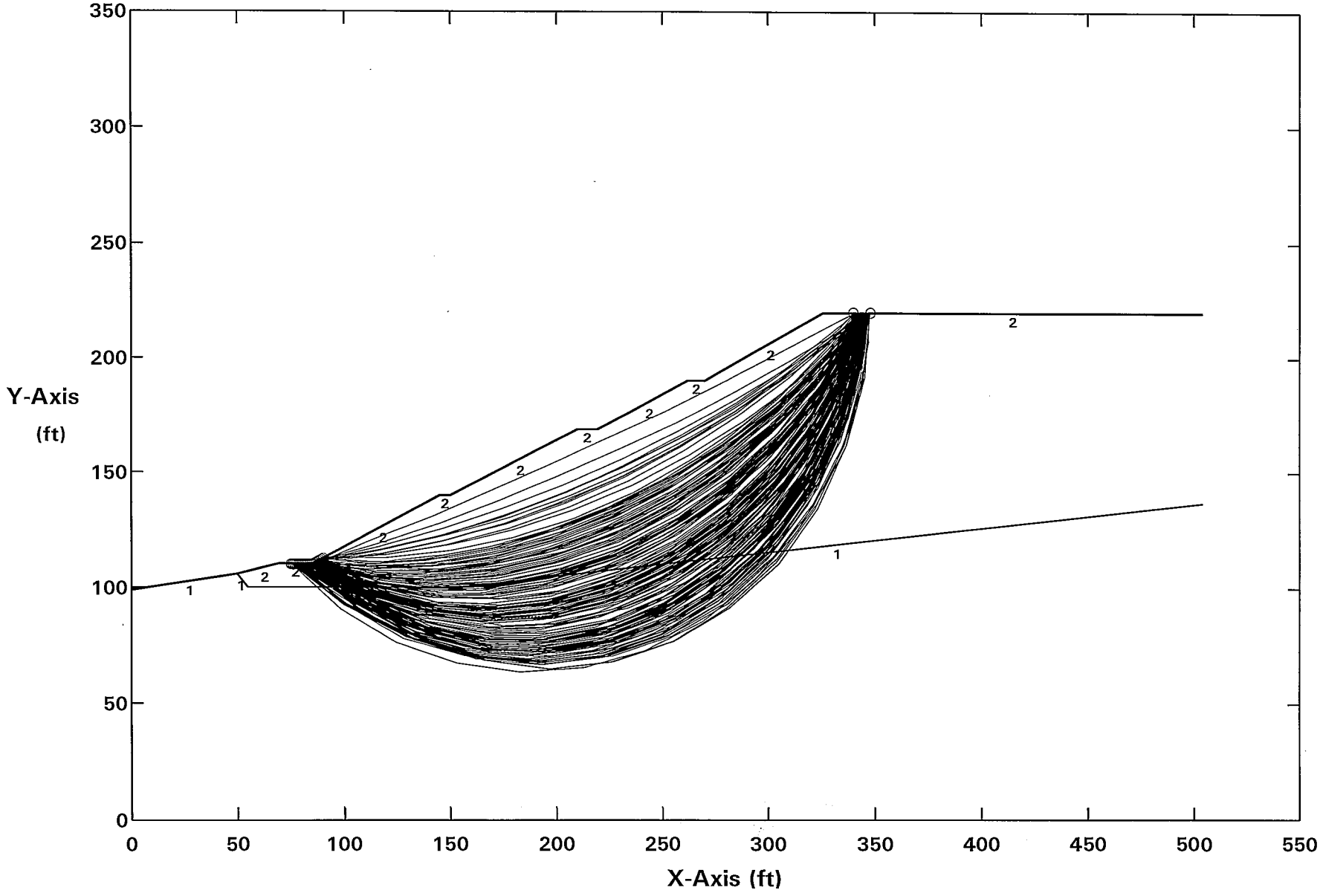
PCSTABL5M FSmin = 1.33 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

Run 426

T52584-HASLEY CANYON-Sec. 55 - Critical Fill Slope-Pseudostatic

All surfaces evaluated. C:HC55P1.PLT By: EC 1/25/2000 12:58pm



Factors Of Safety Calculated By The Modified Bishop Method

Run 426

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	1/25/2000
Time of Run:	12:58pm
Run By:	EC
Input Data Filename:	C:HC55P1.IN
Output Filename:	C:HC55P1.OUT
Plotted Output Filename:	C:HC55P1.PLT

PROBLEM DESCRIPTION T52584-HASLEY CANYON-Sec. 55 - Critical Fill Slope-Pseudostatic

BOUNDARY COORDINATES

11 Top Boundaries
14 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	99.00	50.00	106.00	1
2	50.00	106.00	69.00	110.00	2
3	69.00	110.00	85.00	110.00	2
4	85.00	110.00	145.00	140.00	2
5	145.00	140.00	150.00	140.00	2
6	150.00	140.00	210.00	169.00	2
7	210.00	169.00	219.00	169.00	2
8	219.00	169.00	262.00	190.00	2
9	262.00	190.00	270.00	190.00	2
10	270.00	190.00	326.00	220.00	2
11	326.00	220.00	504.00	220.00	2
12	50.00	106.00	55.00	100.00	1
13	55.00	100.00	155.00	100.00	1
14	155.00	100.00	504.00	137.00	1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

Run 42b

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	120.0	290.0	42.0	.00	.0	0
2	125.0	125.0	316.0	32.0	.00	.0	0

A Horizontal Earthquake Loading Coefficient
Of .150 Has Been Assigned

A Vertical Earthquake Loading Coefficient
Of .000 Has Been Assigned

Cavitation Pressure = .0 psf

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.

200 Trial Surfaces Have Been Generated.

10 Surfaces Initiate From Each Of 20 Points Equally Spaced
Along The Ground Surface Between X = 75.00 ft.
and X = 90.00 ft.

Each Surface Terminates Between X = 340.00 ft.
and X = 348.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = .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 20.0 deg.

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Examined. They Are Ordered - Most Critical
First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	90.00	112.50
2	119.96	114.15
3	149.68	118.18
4	179.00	124.57
5	207.70	133.27
6	235.63	144.24
7	262.59	157.39
8	288.42	172.65
9	312.95	189.93
10	336.02	209.10
11	347.19	220.00

Circle Center At X = 84.3 ; Y = 488.5 and Radius, 376.1

*** 1.332 ***

Individual data on the 17 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	30.0	24953.2	.0	.0	.0	.0	3743.0	.0	.0
2	25.0	56011.8	.0	.0	.0	.0	8401.8	.0	.0
3	4.7	12959.0	.0	.0	.0	.0	1943.8	.0	.0
4	.3	862.9	.0	.0	.0	.0	129.4	.0	.0
5	29.0	92779.6	.0	.0	.0	.0	13916.9	.0	.0
6	28.7	114956.1	.0	.0	.0	.0	17243.4	.0	.0
7	2.3	9961.9	.0	.0	.0	.0	1494.3	.0	.0
8	9.0	37192.8	.0	.0	.0	.0	5578.9	.0	.0
9	16.6	66703.4	.0	.0	.0	.0	10005.5	.0	.0
10	26.4	108420.2	.0	.0	.0	.0	16263.0	.0	.0
11	.6	2420.6	.0	.0	.0	.0	363.1	.0	.0
12	7.4	28171.5	.0	.0	.0	.0	4225.7	.0	.0
13	18.4	63825.9	.0	.0	.0	.0	9573.9	.0	.0
14	24.5	77105.1	.0	.0	.0	.0	11565.8	.0	.0
15	13.1	34515.6	.0	.0	.0	.0	5177.3	.0	.0
16	10.0	18872.1	.0	.0	.0	.0	2830.8	.0	.0
17	11.2	7612.6	.0	.0	.0	.0	1141.9	.0	.0

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

1	86.84	110.92
2	116.84	111.01
3	146.71	113.80
4	176.21	119.27
5	205.09	127.38
6	233.13	138.06
7	260.08	151.22
8	285.74	166.76
9	309.90	184.56
10	332.35	204.45
11	346.99	220.00

Circle Center At X = 100.9 ; Y = 443.0 and Radius, 332.4

*** 1.333 ***

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	77.37	110.00
2	107.37	109.81
3	137.27	112.23
4	166.85	117.23
5	195.89	124.77
6	224.16	134.81
7	251.45	147.27
8	277.56	162.04
9	302.29	179.03
10	325.45	198.10
11	346.87	219.10
12	347.63	220.00

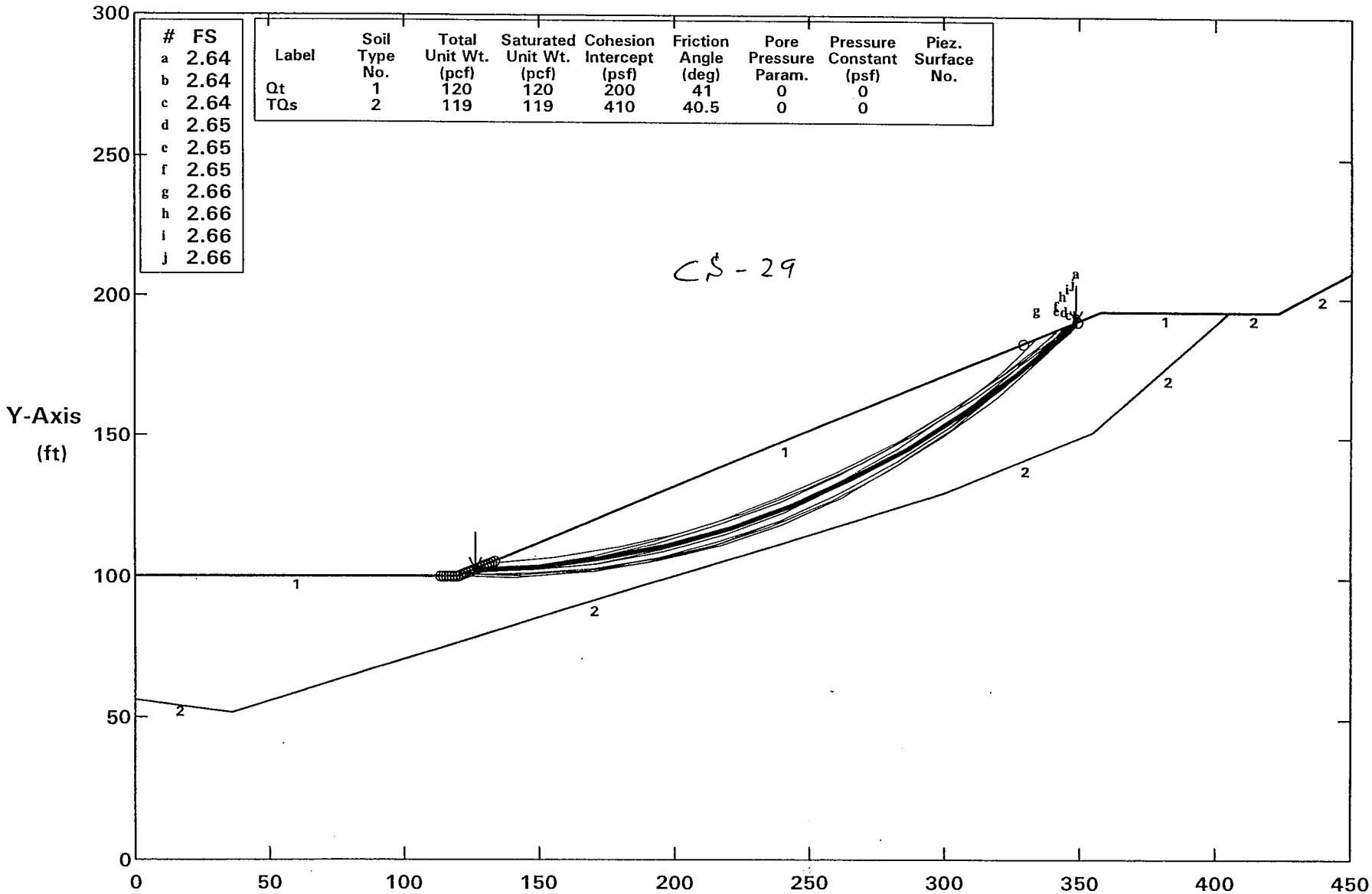
Circle Center At X = 94.6 ; Y = 454.7 and Radius, 345.1

*** 1.333 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	88.42	111.71
2	118.33	114.04
3	147.97	118.67
4	177.17	125.56

TT52584- Hasley Canyon- Sec 56-56'- Cut - Slope- CS-29-Circular analysis- Static
Ten Most Critical. C:T56S3A.PLT By: ac 1/26/2000 2:30pm



#	FS
a	2.64
b	2.64
c	2.64
d	2.65
e	2.65
f	2.65
g	2.66
h	2.66
i	2.66
j	2.66

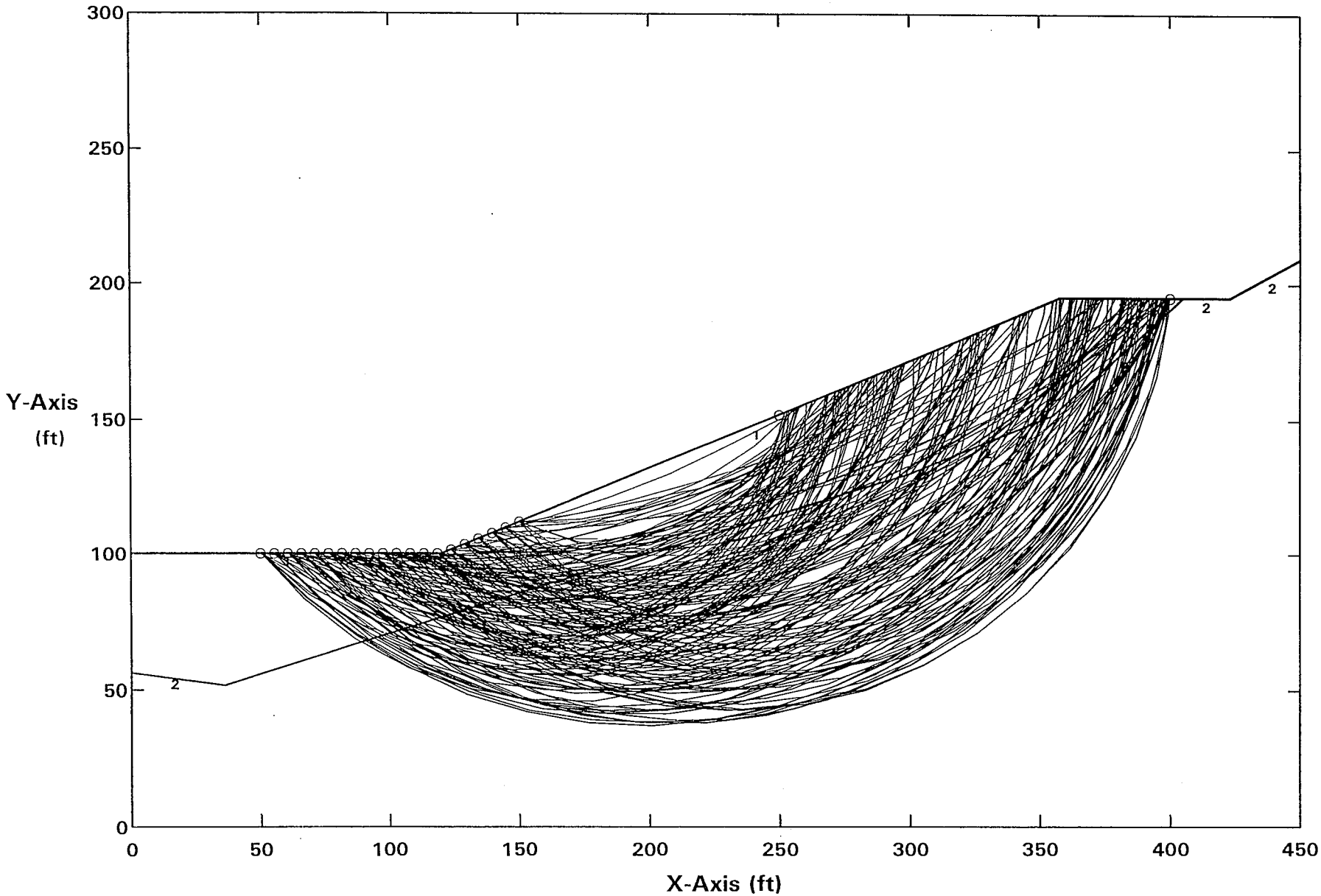
Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Qt	1	120	120	200	41	0	0	
TQs	2	119	119	410	40.5	0	0	

PCSTABL5M FSmin=2.64 X-Axis (ft)
Factors Of Safety Calculated By The Modified Bishop Method

EXHIBIT 3

TT52584- Hasley Canyon- Sec 56-56'- Cut - Slope- CS-29-Circular analysis- Static

All surfaces evaluated. C:T56S3.PLT By: ac 1/26/2000 2:29pm



Factors Of Safety Calculated By The Modified Bishop Method

RUN#43

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	1/26/2000
Time of Run:	2:30pm
Run By:	ac
Input Data Filename:	C:T56S3A
Output Filename:	C:T56S3A.OUT
Plotted Output Filename:	C:T56S3A.PLT

PROBLEM DESCRIPTION TT52584- Hasley Canyon- Sec 56-56'- Cut
- Slope- CS-29-Circular analysis- Static

BOUNDARY COORDINATES

5 Top Boundaries
9 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	100.00	120.00	100.00	1
2	120.00	100.00	358.00	195.00	1
3	358.00	195.00	405.00	195.00	1
4	405.00	195.00	423.00	195.00	2
5	423.00	195.00	450.00	209.00	2
6	.00	56.00	36.00	52.00	2
7	36.00	52.00	300.00	130.00	2
8	300.00	130.00	355.00	152.00	2
9	355.00	152.00	405.00	195.00	2

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.

Run #43

1	120.0	120.0	200.0	41.0	.00	.0	0
2	119.0	119.0	410.0	40.5	.00	.0	0

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

200 Trial Surfaces Have Been Generated.

10 Surfaces Initiate From Each Of 20 Points Equally Spaced Along The Ground Surface Between X = 113.68 ft.
and X = 133.68 ft.

Each Surface Terminates Between X = 329.31 ft.
and X = 349.31 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = .00 ft.

24.00 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 Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	126.31	102.52
2	150.28	103.71
3	174.11	106.61
4	197.66	111.21
5	220.83	117.48
6	243.49	125.39
7	265.52	134.90
8	286.82	145.97

9	307.28	158.52
10	326.78	172.51
11	345.23	187.85
12	348.89	191.37

Circle Center At X = 121.8 ; Y = 436.9 and Radius, 334.5

*** 2.640 ***

Individual data on the 11 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	24.0	12046.1	.0	.0	.0	.0	.0	.0	.0
2	23.8	33388.8	.0	.0	.0	.0	.0	.0	.0
3	23.6	49139.4	.0	.0	.0	.0	.0	.0	.0
4	23.2	59142.6	.0	.0	.0	.0	.0	.0	.0
5	22.7	63435.1	.0	.0	.0	.0	.0	.0	.0
6	22.0	62244.0	.0	.0	.0	.0	.0	.0	.0
7	21.3	55980.5	.0	.0	.0	.0	.0	.0	.0
8	20.5	45229.4	.0	.0	.0	.0	.0	.0	.0
9	19.5	30734.7	.0	.0	.0	.0	.0	.0	.0
10	18.5	13382.0	.0	.0	.0	.0	.0	.0	.0
11	3.7	451.1	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 12 Coordinate Points

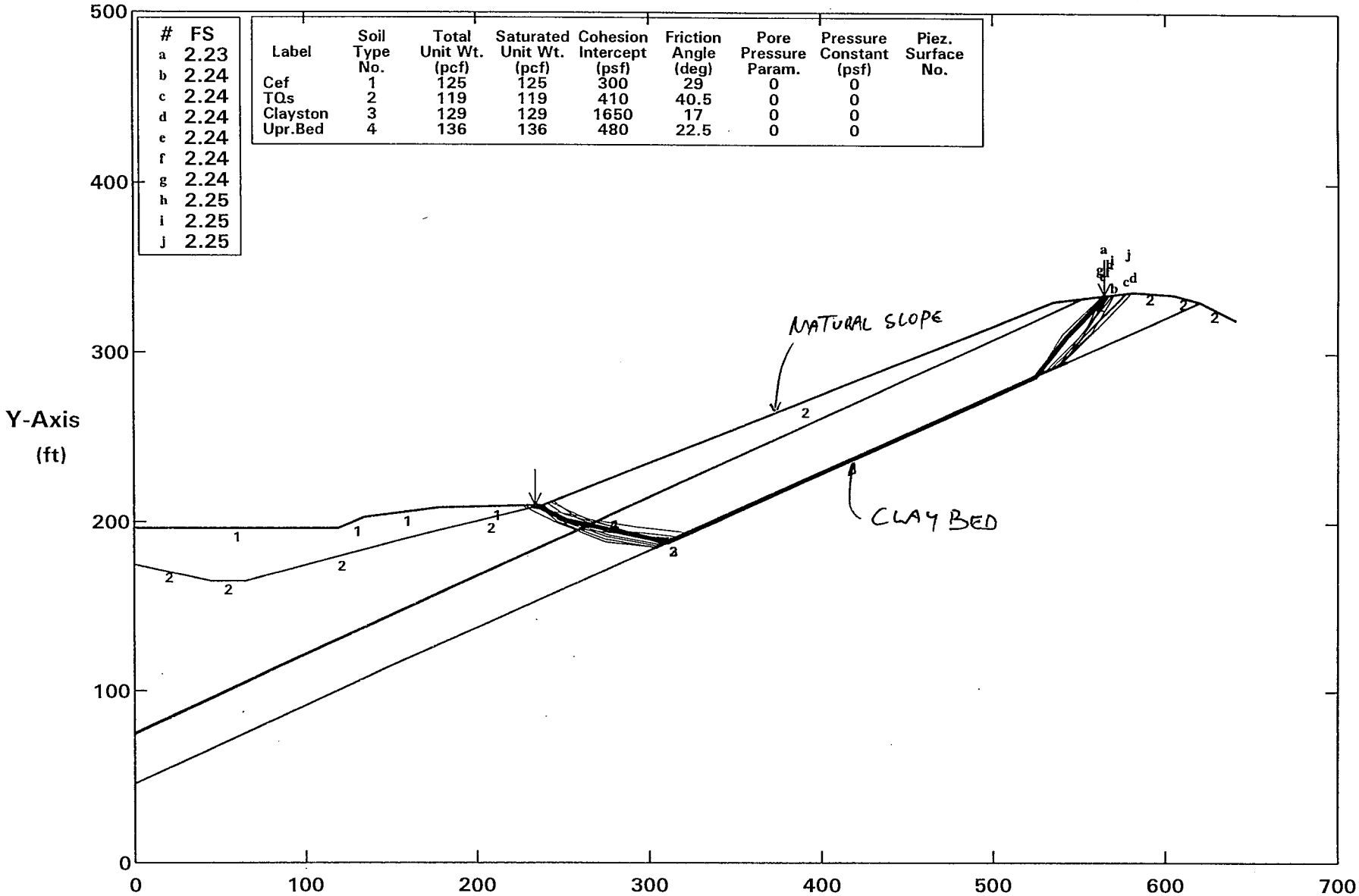
Point No.	X-Surf (ft)	Y-Surf (ft)
1	117.89	100.00
2	141.89	99.81
3	165.83	101.53
4	189.56	105.14
5	212.92	110.63
6	235.78	117.95
7	257.98	127.06
8	279.39	137.90
9	299.87	150.41
10	319.30	164.51
11	337.54	180.10
12	348.70	191.29

Circle Center At X = 132.4 ; Y = 400.7 and Radius, 301.1

*** 2.643 ***

Hasley Canyon Cross Section 57-57'-Nat. Slope - Lower bed - Static

Ten Most Critical. C:HC57S3.PLT By: EC 3/21/2000 4:54pm



#	FS
a	2.23
b	2.24
c	2.24
d	2.24
e	2.24
f	2.24
g	2.24
h	2.25
i	2.25
j	2.25

Label	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.
Cef	1	125	125	300	29	0	0	
TQs	2	119	119	410	40.5	0	0	
Clayston	3	129	129	1650	17	0	0	
Upr.Bed	4	136	136	480	22.5	0	0	

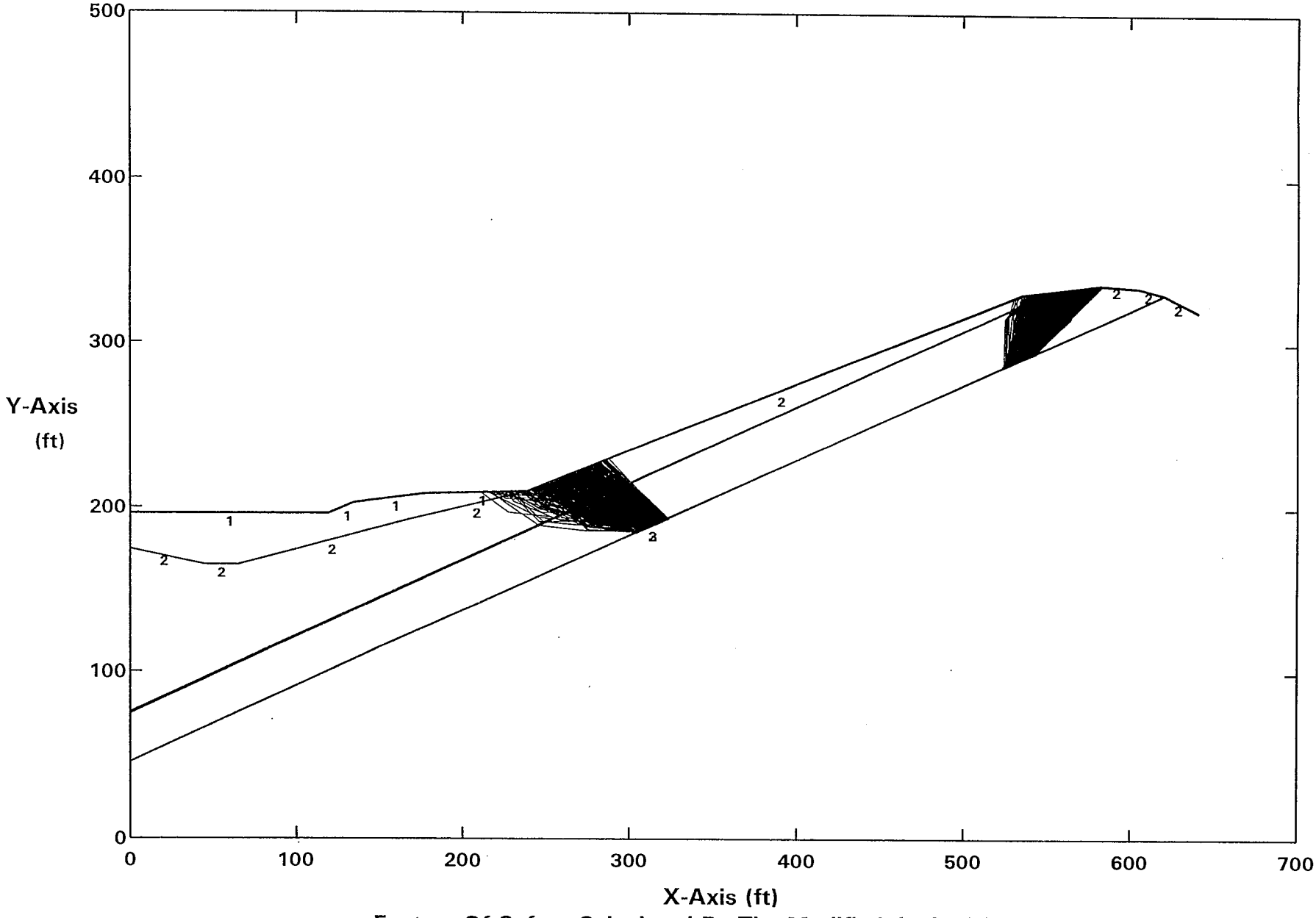
PCSTABL5M FSmin = 2.23 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

Runtitle

Hasley Canyon Cross Section 57-57'-Nat. Slope - Lower bed - Static

All surfaces evaluated. C:HC57S3.PLT By: EC 3/21/2000 4:54pm



Factors Of Safety Calculated By The Modified Janbu Method

Run #44

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	3/21/2000
Time of Run:	4:54pm
Run By:	EC
Input Data Filename:	C:HC57S3
Output Filename:	C:HC57S3.OUT
Plotted Output Filename:	C:HC57S3.PLT

PROBLEM DESCRIPTION Hasley Canyon Cross Section 57-57'-Nat.
Slope - Lower bed - Static

BOUNDARY COORDINATES

9 Top Boundaries
17 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	196.00	119.00	196.00	1
2	119.00	196.00	135.00	203.00	1
3	135.00	203.00	178.00	208.00	1
4	178.00	208.00	239.00	210.00	1
5	239.00	210.00	535.00	330.00	2
6	535.00	330.00	582.00	336.00	2
7	582.00	336.00	605.00	334.00	2
8	605.00	334.00	620.00	330.00	2
9	620.00	330.00	641.00	320.00	2
10	.00	175.00	45.00	165.00	2
11	45.00	165.00	65.00	165.00	2
12	65.00	165.00	170.00	193.00	2
13	170.00	193.00	239.00	210.00	2
14	.00	75.06	551.00	332.00	4
15	.00	74.86	551.00	331.80	2
16	.00	46.00	620.00	330.00	3
17	.00	45.80	620.00	329.80	2

ISOTROPIC SOIL PARAMETERS

RUN #44

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	125.0	300.0	29.0	.00	.0	0
2	119.0	119.0	410.0	40.5	.00	.0	0
3	129.0	129.0	1650.0	17.0	.00	.0	0
4	136.0	136.0	480.0	22.5	.00	.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.

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	304.00	185.10	324.00	194.30	.00
2	523.40	285.70	543.40	294.80	.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	233.88	209.83
2	251.90	200.78
3	281.29	194.76
4	310.55	188.11

5	524.70	286.29
6	543.11	309.98
7	563.89	331.62
8	564.49	333.77

*** 2.228 ***

Individual data on the 15 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	1.5	71.4	.0	.0	.0	.0	.0	.0	.0
2	3.7	775.3	.0	.0	.0	.0	.0	.0	.0
3	12.9	13196.4	.0	.0	.0	.0	.0	.0	.0
4	12.3	26639.0	.0	.0	.0	.0	.0	.0	.0
5	.3	782.2	.0	.0	.0	.0	.0	.0	.0
6	16.8	54536.7	.0	.0	.0	.0	.0	.0	.0
7	29.1	143833.6	.0	.0	.0	.0	.0	.0	.0
8	.2	1227.3	.0	.0	.0	.0	.0	.0	.0
9	214.2	********	.0	.0	.0	.0	.0	.0	.0
10	.1	312.1	.0	.0	.0	.0	.0	.0	.0
11	10.2	42607.4	.0	.0	.0	.0	.0	.0	.0
12	8.1	24898.6	.0	.0	.0	.0	.0	.0	.0
13	7.9	16405.7	.0	.0	.0	.0	.0	.0	.0
14	12.9	12205.8	.0	.0	.0	.0	.0	.0	.0
15	.6	74.4	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	232.08	209.77
2	248.85	201.33
3	277.50	192.43
4	306.89	186.43
5	536.32	291.58
6	557.52	312.81
7	570.39	334.52

*** 2.235 ***

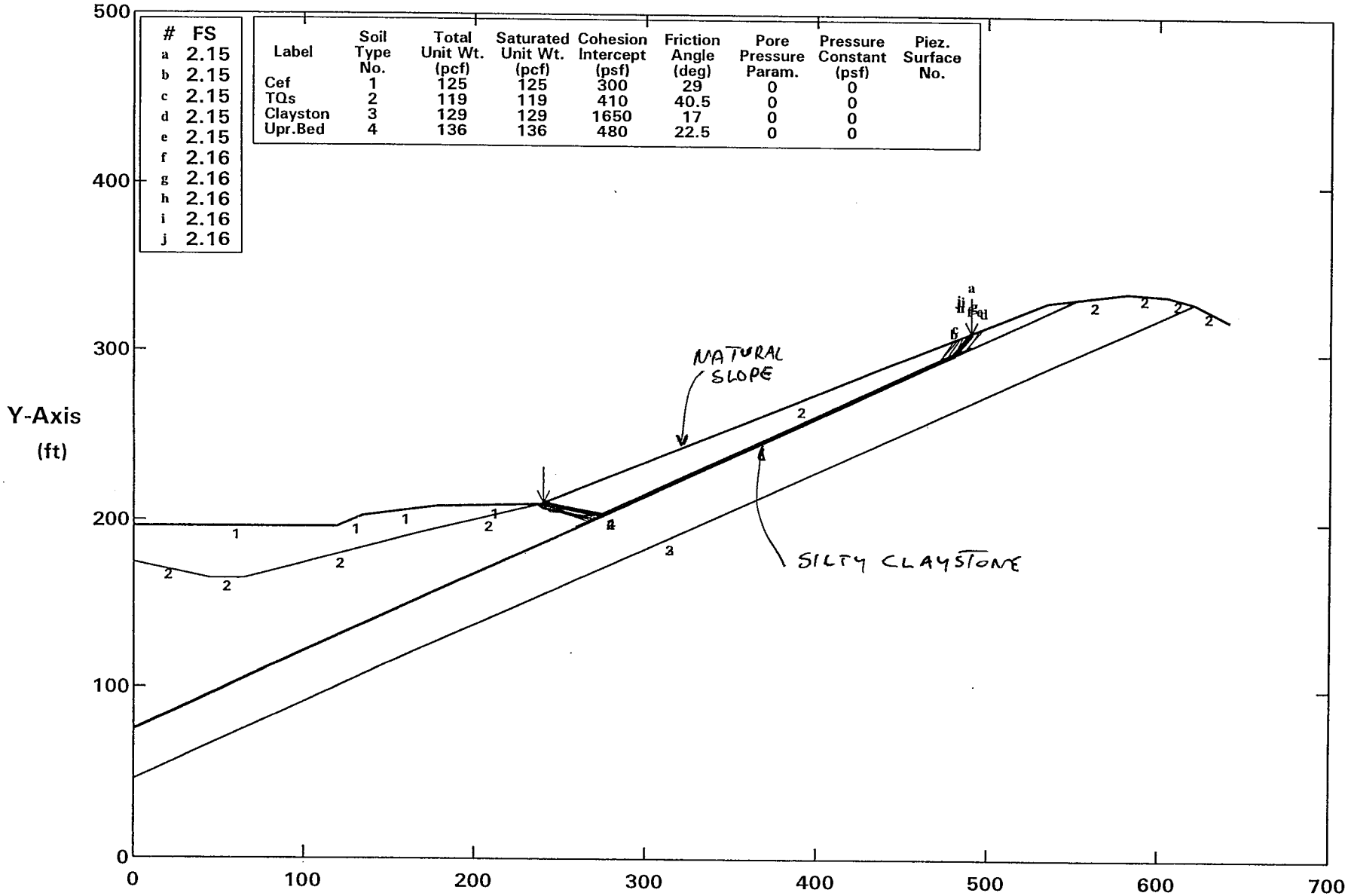
Failure Surface Specified By 7 Coordinate Points

Hasley Canyon Cross Section 57-57'-Nat. Slope - Upper bed - Static

Ten Most Critical. C:HC57S6.PLT By: EC 3/21/2000 5:23pm

#	FS
a	2.15
b	2.15
c	2.15
d	2.15
e	2.15
f	2.16
g	2.16
h	2.16
i	2.16
j	2.16

Label	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.
Cef	1	125	125	300	29	0	0	
TQs	2	119	119	410	40.5	0	0	
Clayston	3	129	129	1650	17	0	0	
Upr.Bed	4	136	136	480	22.5	0	0	



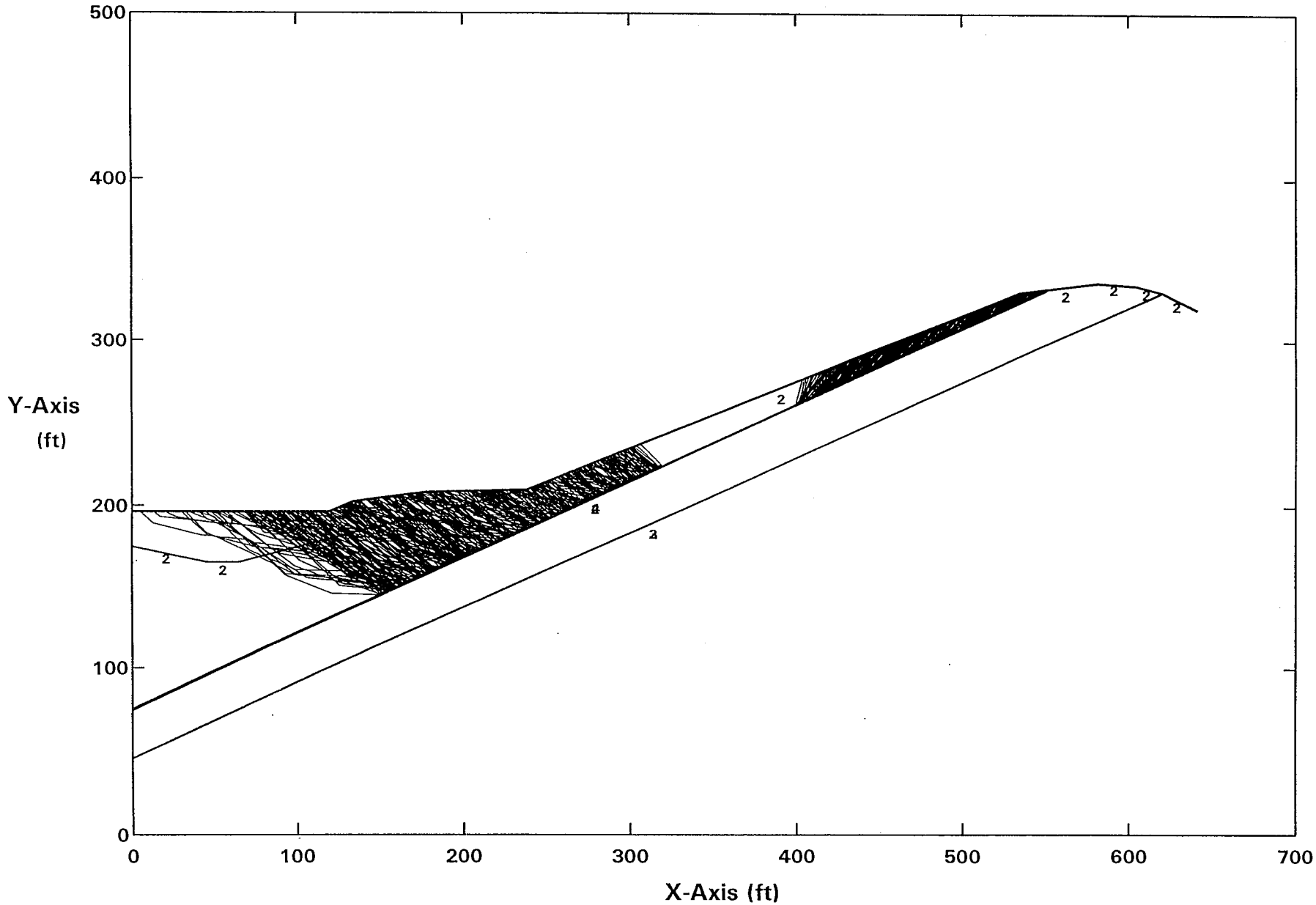
PCSTABL5M FSmin = 2.15 X-Axis (ft)

Factors Of Safety Calculated By The Modified Janbu Method

SHEAR

Hasley Canyon Cross Section 57-57'-Nat. Slope - Upper bed - Static

All surfaces evaluated. C:HC57S6.PLT By: EC 3/21/2000 5:16pm



Factors Of Safety Calculated By The Modified Janbu Method

Kunitus

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	3/21/2000
Time of Run:	5:23pm
Run By:	EC
Input Data Filename:	C:HC57S6
Output Filename:	C:HC57S6.OUT
Plotted Output Filename:	C:HC57S6.PLT

PROBLEM DESCRIPTION Hasley Canyon Cross Section 57-57'-Nat.
Slope - Upper bed - Static

BOUNDARY COORDINATES

9 Top Boundaries
17 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	196.00	119.00	196.00	1
2	119.00	196.00	135.00	203.00	1
3	135.00	203.00	178.00	208.00	1
4	178.00	208.00	239.00	210.00	1
5	239.00	210.00	535.00	330.00	2
6	535.00	330.00	582.00	336.00	2
7	582.00	336.00	605.00	334.00	2
8	605.00	334.00	620.00	330.00	2
9	620.00	330.00	641.00	320.00	2
10	.00	175.00	45.00	165.00	2
11	45.00	165.00	65.00	165.00	2
12	65.00	165.00	170.00	193.00	2
13	170.00	193.00	239.00	210.00	2
14	.00	75.06	551.00	332.00	4
15	.00	74.86	551.00	331.80	2
16	.00	46.00	620.00	330.00	3
17	.00	45.80	620.00	329.80	2

ISOTROPIC SOIL PARAMETERS

Run#45

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	125.0	300.0	29.0	.00	.0	0
2	119.0	119.0	410.0	40.5	.00	.0	0
3	129.0	129.0	1650.0	17.0	.00	.0	0
4	136.0	136.0	480.0	22.5	.00	.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.

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	260.00	196.20	290.00	210.20	.10
2	470.00	294.10	490.00	303.50	.10

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	240.61	210.65
2	245.47	208.75
3	274.94	203.14
4	480.30	298.92

5	490.14	311.81

*** 2.150 ***

Individual data on the 6 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	4.9	1121.3	.0	.0	.0	.0	.0	.0	.0
2	29.3	43864.5	.0	.0	.0	.0	.0	.0	.0
3	.2	513.4	.0	.0	.0	.0	.0	.0	.0
4	205.4	371131.6	.0	.0	.0	.0	.0	.0	.0
5	.1	139.3	.0	.0	.0	.0	.0	.0	.0
6	9.7	5071.9	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	239.88	210.36
2	247.43	207.60
3	277.24	204.22
4	470.04	294.15
5	480.02	307.71

*** 2.152 ***

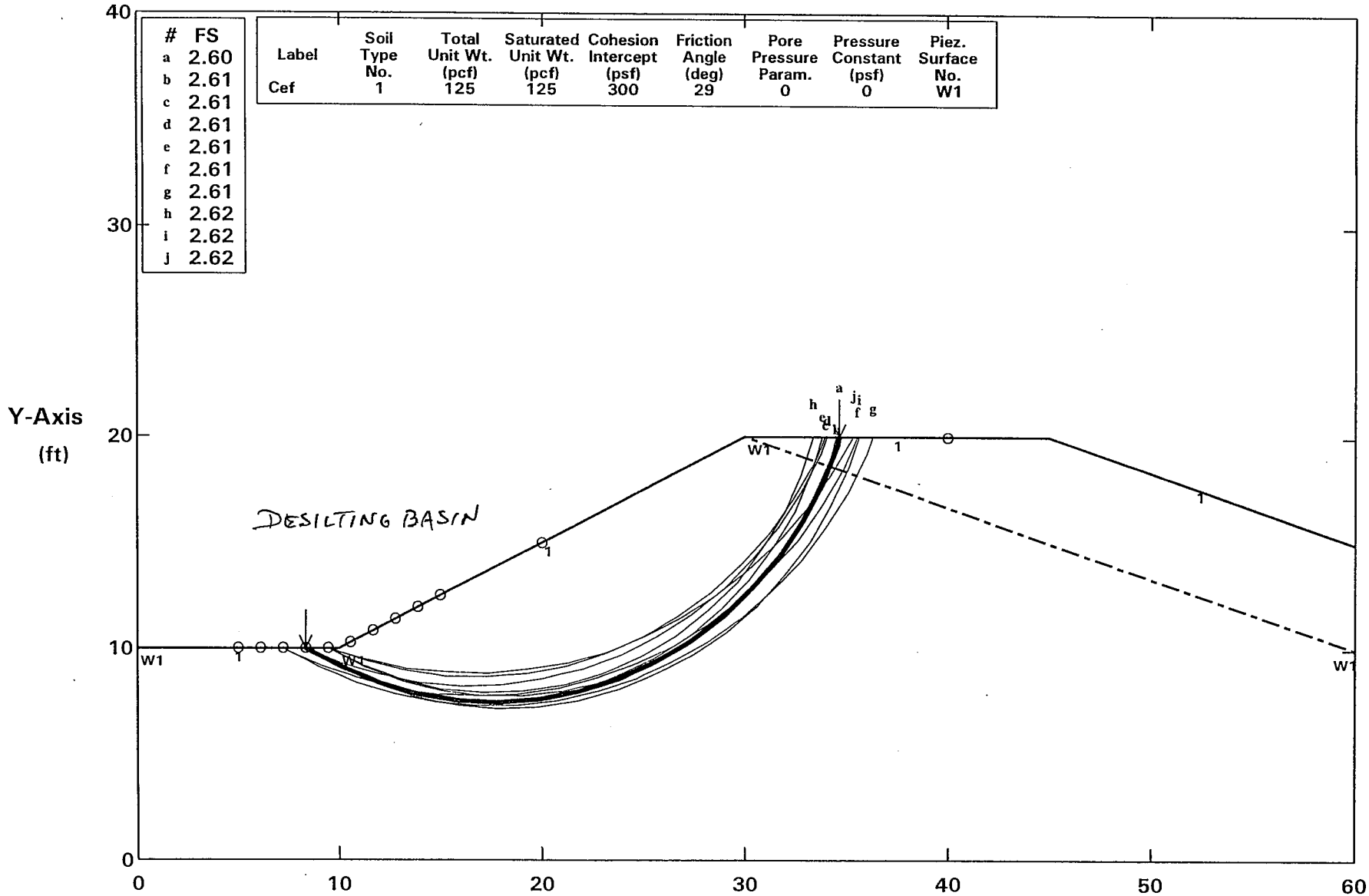
Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	237.92	209.96
2	242.70	206.69
3	272.33	202.00
4	470.28	294.23
5	481.15	308.17

*** 2.153 ***

Hasley Canyon Cross Section 58-58' Desilting Basin, Rapid Drawdown, Static

Ten Most Critical. C:HC58S1.PLT By: DCS 3/17/2000 11:41am



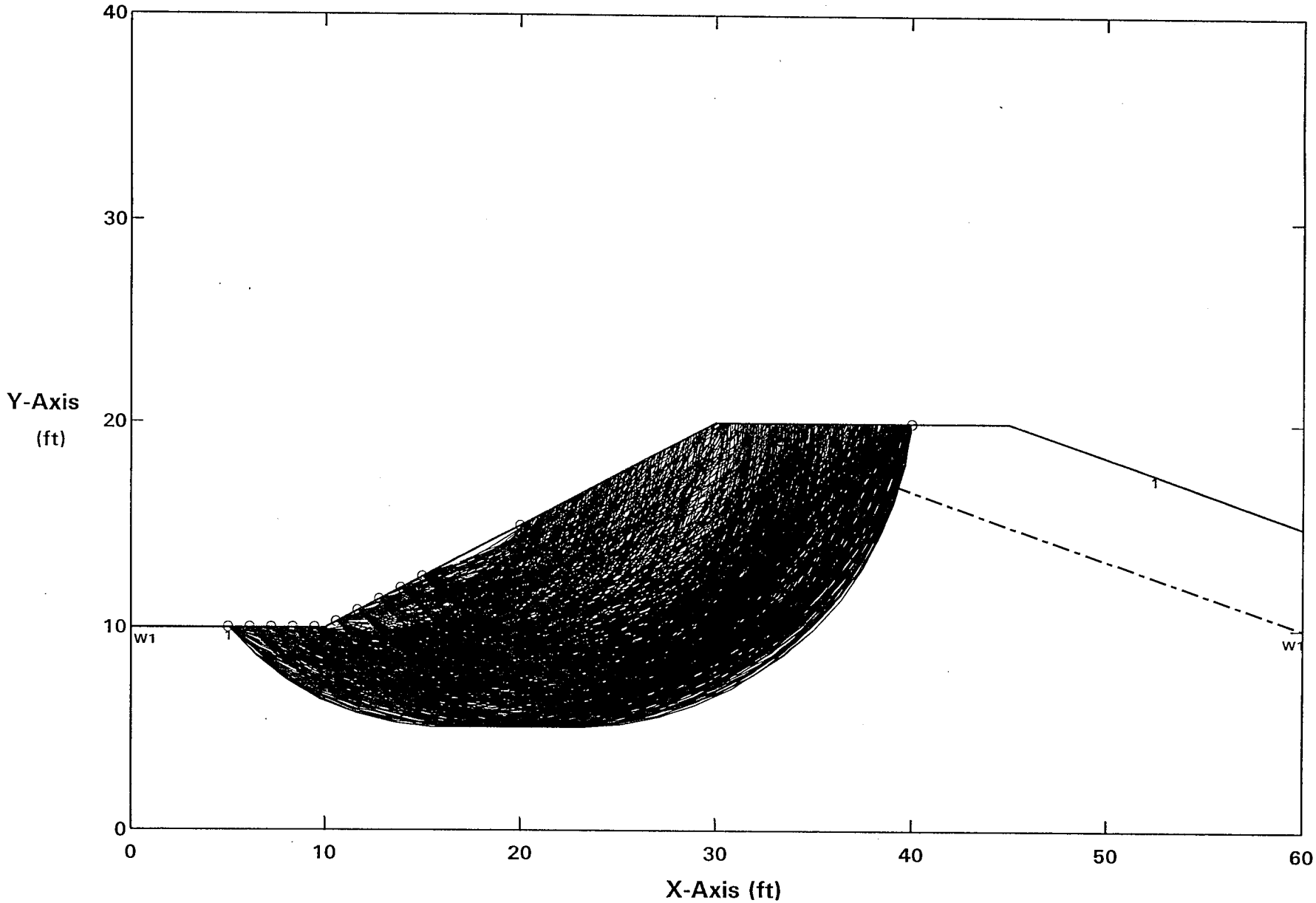
PCSTABL5M/SI FSmin = 2.60 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

Runnum 9

Hasley Canyon Cross Section 58-58' Desilting Basin, Rapid Drawdown, Static

All surfaces evaluated. C:HC58S1.PLT By: DCS 3/17/2000 11:41am



Factors Of Safety Calculated By The Modified Bishop Method

Run #4 Hydro

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	3/17/2000
Time of Run:	11:41am
Run By:	DCS
Input Data Filename:	C:HC58S1.IN
Output Filename:	C:HC58S1.OUT
Unit:	ENGLISH
Plotted Output Filename:	C:HC58S1.PLT

PROBLEM DESCRIPTION Hasley Canyon Cross Section 58-58'
Desilting Basin, Rapid Drawdown, Static

BOUNDARY COORDINATES

4 Top Boundaries
4 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	10.00	10.00	10.00	1
2	10.00	10.00	30.00	20.00	1
3	30.00	20.00	45.00	20.00	1
4	45.00	20.00	60.00	15.00	1

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	300.0	29.0	.00	.0	1

Run #46a

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 4 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	10.00
2	10.00	10.00
3	30.00	20.00
4	60.00	10.00

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

1000 Trial Surfaces Have Been Generated.

100 Surfaces Initiate From Each Of 10 Points Equally Spaced Along The Ground Surface Between X = 5.00 ft.
and X = 15.00 ft.

Each Surface Terminates Between X = 20.00 ft.
and X = 40.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = 5.00 ft.

2.00 ft. Line Segments Define Each Trial Failure Surface.

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 18 Coordinate Points

Point	X-Surf	Y-Surf

No.	(ft)	(ft)
1	8.33	10.00
2	10.11	9.07
3	11.97	8.34
4	13.90	7.83
5	15.88	7.53
6	17.88	7.46
7	19.87	7.61
8	21.84	7.98
9	23.75	8.56
10	25.59	9.36
11	27.32	10.35
12	28.94	11.53
13	30.41	12.88
14	31.72	14.39
15	32.86	16.03
16	33.81	17.80
17	34.56	19.65
18	34.65	20.00

Circle Center At X = 17.5 ; Y = 25.4 and Radius, 17.9

*** 2.602 ***

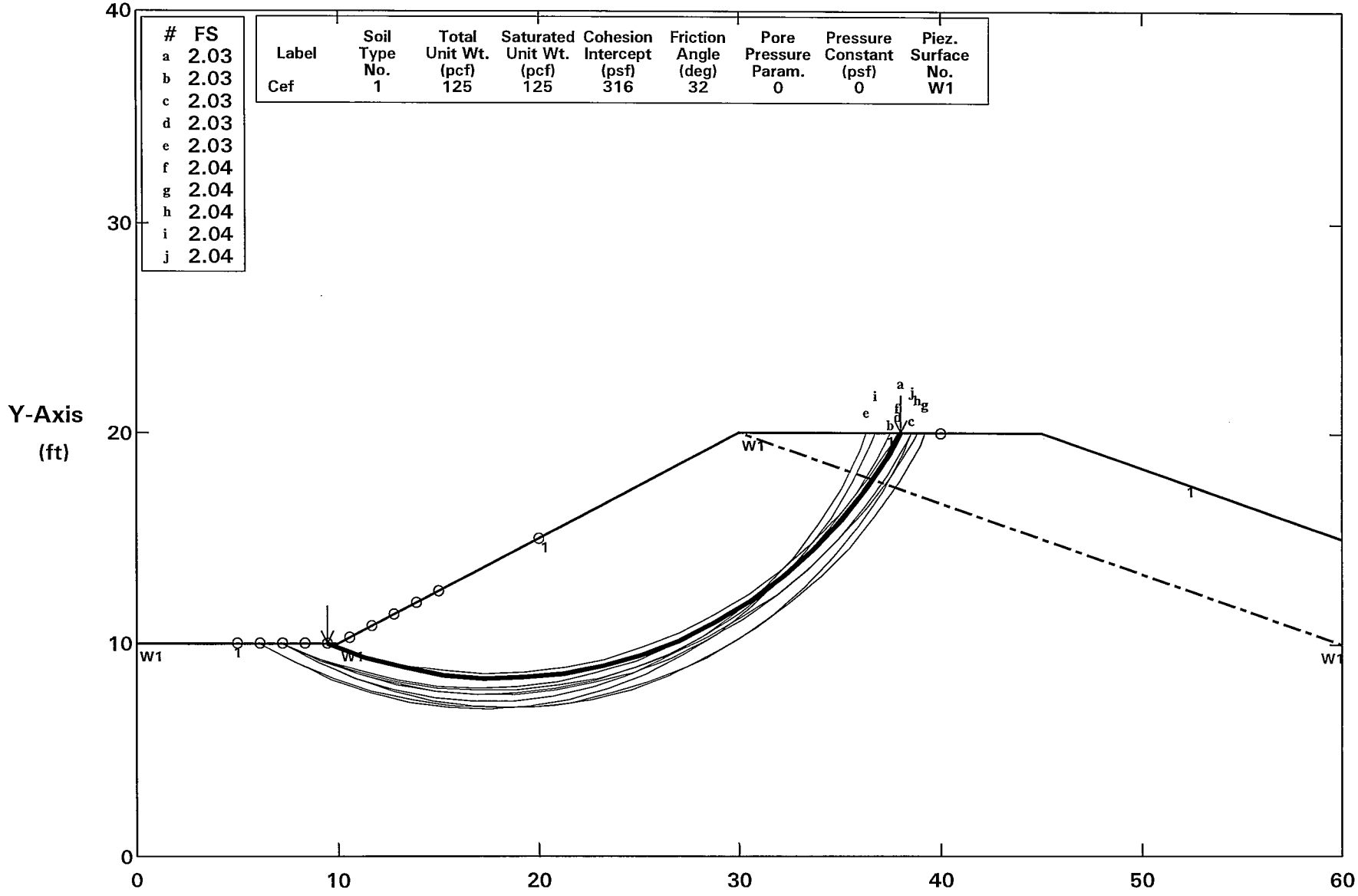
Individual data on the 20 slices

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	1.7	91.0	.0	51.3	.0	.0	.0	.0	.0
2	.1	12.2	.0	6.2	.0	.0	.0	.0	.0
3	1.9	421.7	.0	203.3	.0	.0	.0	.0	.0
4	1.9	816.5	.0	379.6	.0	.0	.0	.0	.0
5	2.0	1177.6	.0	535.0	.0	.0	.0	.0	.0
6	2.0	1484.6	.0	667.5	.0	.0	.0	.0	.0
7	2.0	1721.3	.0	775.5	.0	.0	.0	.0	.0
8	2.0	1876.1	.0	857.6	.0	.0	.0	.0	.0
9	1.9	1943.0	.0	912.9	.0	.0	.0	.0	.0
10	1.8	1921.6	.0	940.7	.0	.0	.0	.0	.0
11	1.7	1817.0	.0	940.6	.0	.0	.0	.0	.0
12	1.6	1639.8	.0	912.6	.0	.0	.0	.0	.0
13	1.1	1025.9	.0	625.6	.0	.0	.0	.0	.0
14	.4	374.2	.0	238.6	.0	.0	.0	.0	.0
15	1.3	1045.1	.0	712.3	.0	.0	.0	.0	.0
16	1.1	681.0	.0	477.0	.0	.0	.0	.0	.0
17	.9	365.6	.0	233.9	.0	.0	.0	.0	.0
18	.3	74.2	.0	24.6	.0	.0	.0	.0	.0
19	.4	44.8	.0	.0	.0	.0	.0	.0	.0
20	.1	2.1	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 17 Coordinate Points

Hasley Canyon Cross Section 58-58' Desilting Basin, Rapid Drawdown, Static

Ten Most Critical. C:HC58P1.PLT By: EC 3/27/2000 6:05pm



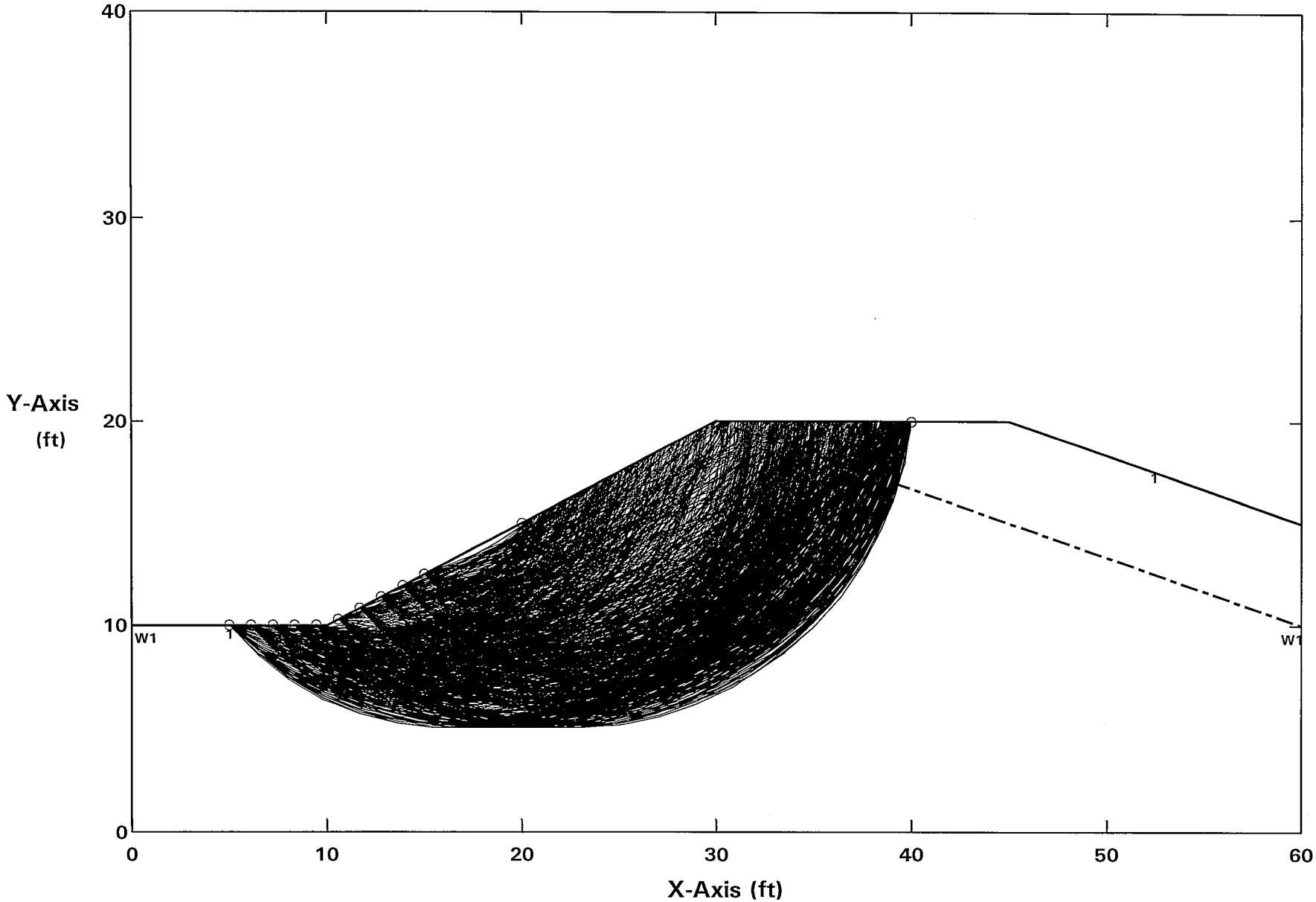
PCSTABL5M/SI FSmin = 2.03 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

Run 46b

Hasley Canyon Cross Section 58-58' Desilting Basin, Rapid Drawdown, Static

All surfaces evaluated. C:HC58P1.PLT By: EC 3/27/2000 6:05pm



Factors Of Safety Calculated By The Modified Bishop Method

Run 46b

** PCSTABL5M **

by

Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	3/27/2000
Time of Run:	6:05pm
Run By:	EC
Input Data Filename:	C:HC58P1.IN
Output Filename:	C:HC58P1.OUT
Unit:	ENGLISH
Plotted Output Filename:	C:HC58P1.PLT

PROBLEM DESCRIPTION Hasley Canyon Cross Section 58-58'
Desilting Basin, Rapid Drawdown, Static

BOUNDARY COORDINATES

4 Top Boundaries
4 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	10.00	10.00	10.00	1
2	10.00	10.00	30.00	20.00	1
3	30.00	20.00	45.00	20.00	1
4	45.00	20.00	60.00	15.00	1

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	316.0	32.0	.00	.0	1

RUN 46b

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 4 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	10.00
2	10.00	10.00
3	30.00	20.00
4	60.00	10.00

A Horizontal Earthquake Loading Coefficient
Of .150 Has Been Assigned

A Vertical Earthquake Loading Coefficient
Of .000 Has Been Assigned

Cavitation Pressure = .0 (psf)

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.

1000 Trial Surfaces Have Been Generated.

100 Surfaces Initiate From Each Of 10 Points Equally Spaced
Along The Ground Surface Between X = 5.00 ft.
and X = 15.00 ft.

Each Surface Terminates Between X = 20.00 ft.
and X = 40.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 5.00 ft.

2.00 ft. Line Segments Define Each Trial Failure Surface.

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Examined. They Are Ordered - Most Critical
First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	9.44	10.00
2	11.33	9.34
3	13.27	8.84
4	15.24	8.51
5	17.24	8.36
6	19.24	8.38
7	21.23	8.57
8	23.19	8.93
9	25.12	9.46
10	27.00	10.16
11	28.80	11.02
12	30.53	12.03
13	32.16	13.19
14	33.68	14.48
15	35.09	15.91
16	36.37	17.44
17	37.51	19.09
18	38.03	20.00

Circle Center At X = 18.0 ; Y = 31.3 and Radius, 23.0

*** 2.027 ***

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	.6	6.8	.0	3.6	.0	.0	1.0	.0	.0
2	1.3	126.9	.0	60.4	.0	.0	19.0	.0	.0
3	1.9	499.3	.0	231.6	.0	.0	74.9	.0	.0
4	2.0	851.3	.0	387.7	.0	.0	127.7	.0	.0
5	2.0	1167.7	.0	526.2	.0	.0	175.2	.0	.0
6	2.0	1437.8	.0	646.0	.0	.0	215.7	.0	.0
7	2.0	1653.3	.0	746.3	.0	.0	248.0	.0	.0
8	2.0	1808.2	.0	826.2	.0	.0	271.2	.0	.0
9	1.9	1899.0	.0	885.2	.0	.0	284.8	.0	.0
10	1.9	1924.7	.0	922.8	.0	.0	288.7	.0	.0
11	1.8	1887.4	.0	938.8	.0	.0	283.1	.0	.0
12	1.2	1247.5	.0	649.7	.0	.0	187.1	.0	.0

13	.5	535.3	.0	291.1	.0	.0	80.3	.0	.0
14	1.6	1506.7	.0	823.0	.0	.0	226.0	.0	.0
15	1.5	1174.7	.0	615.3	.0	.0	176.2	.0	.0
16	1.4	845.0	.0	396.4	.0	.0	126.8	.0	.0
17	1.3	531.3	.0	167.9	.0	.0	79.7	.0	.0
18	.2	72.7	.0	5.5	.0	.0	10.9	.0	.0
19	.9	174.5	.0	.0	.0	.0	26.2	.0	.0
20	.5	29.8	.0	.0	.0	.0	4.5	.0	.0

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	7.22	10.00
2	9.05	9.18
3	10.94	8.52
4	12.88	8.04
5	14.85	7.73
6	16.85	7.59
7	18.85	7.64
8	20.84	7.86
9	22.80	8.25
10	24.71	8.82
11	26.57	9.55
12	28.36	10.45
13	30.06	11.50
14	31.66	12.70
15	33.15	14.04
16	34.52	15.50
17	35.74	17.08
18	36.83	18.76
19	37.48	20.00

Circle Center At X = 17.4 ; Y = 30.1 and Radius, 22.5

*** 2.028 ***

Failure Surface Specified By 20 Coordinate Points

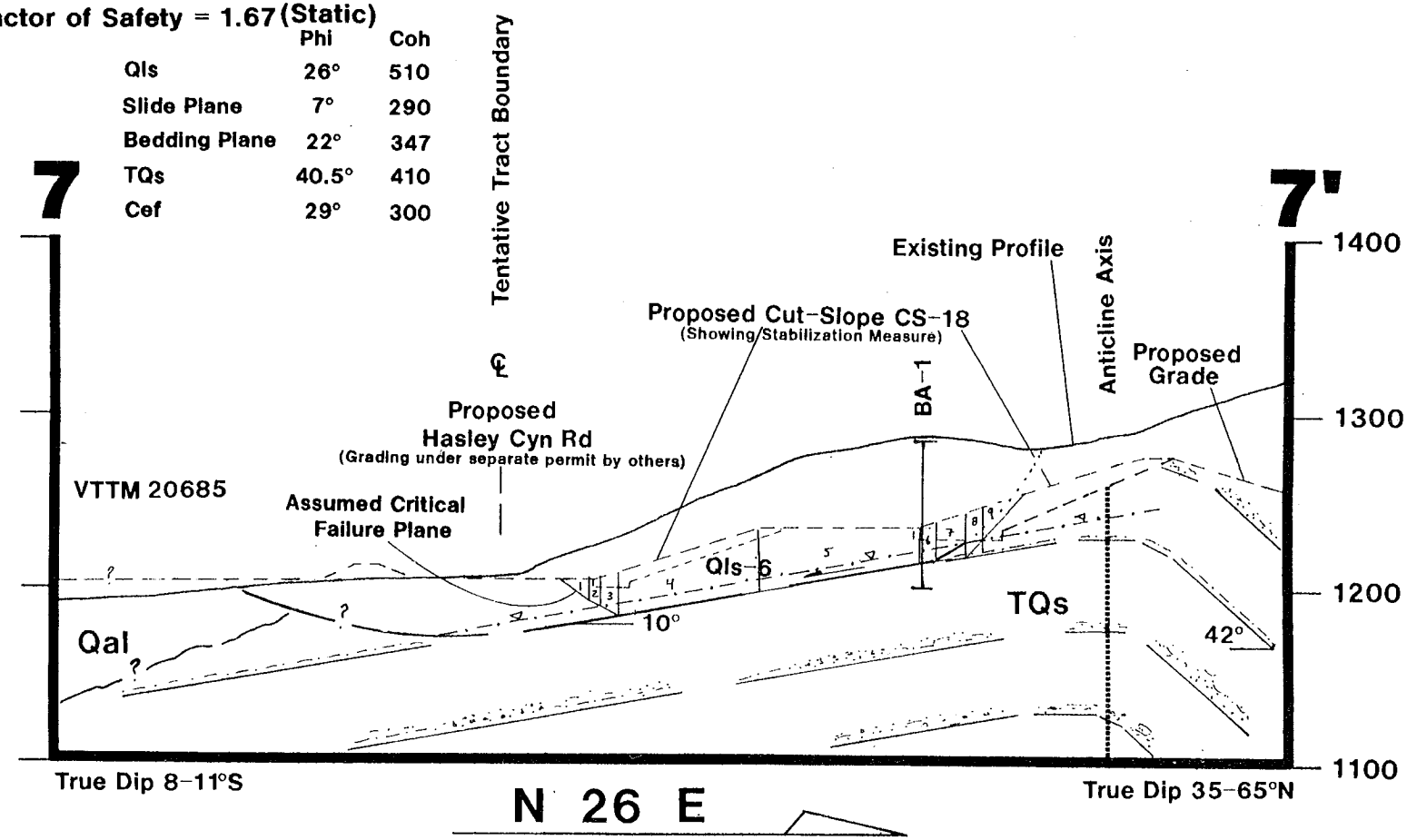
Point No.	X-Surf (ft)	Y-Surf (ft)
1	7.22	10.00
2	9.05	9.20
3	10.95	8.55
4	12.89	8.07
5	14.86	7.75
6	16.86	7.60
7	18.86	7.61
8	20.85	7.80

Appendix F

REVISED CROSS SECTION

OMS Factor of Safety = 1.67 (Static)

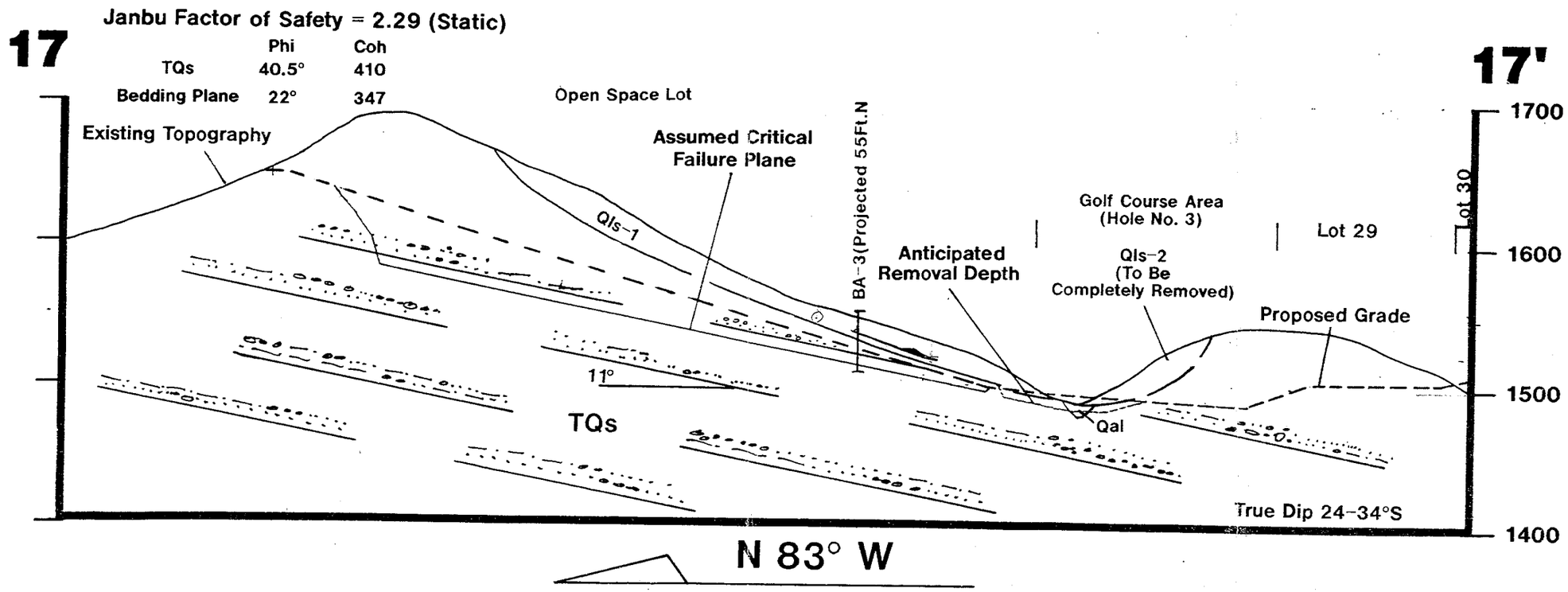
	Phi	Coh
Qls	26°	510
Slide Plane	7°	290
Bedding Plane	22°	347
TQs	40.5°	410
Cef	29°	300



ALLAN E. SEWARD
ENGINEERING GEOLOGY

JOB NUMBER: 99-1617-4	DATE: 1/15/99	
SCALE: 1"=100'		DRAWN BY: staff
		REVISED: 10/22/99 3/31/00

REVISED CROSS SECTION



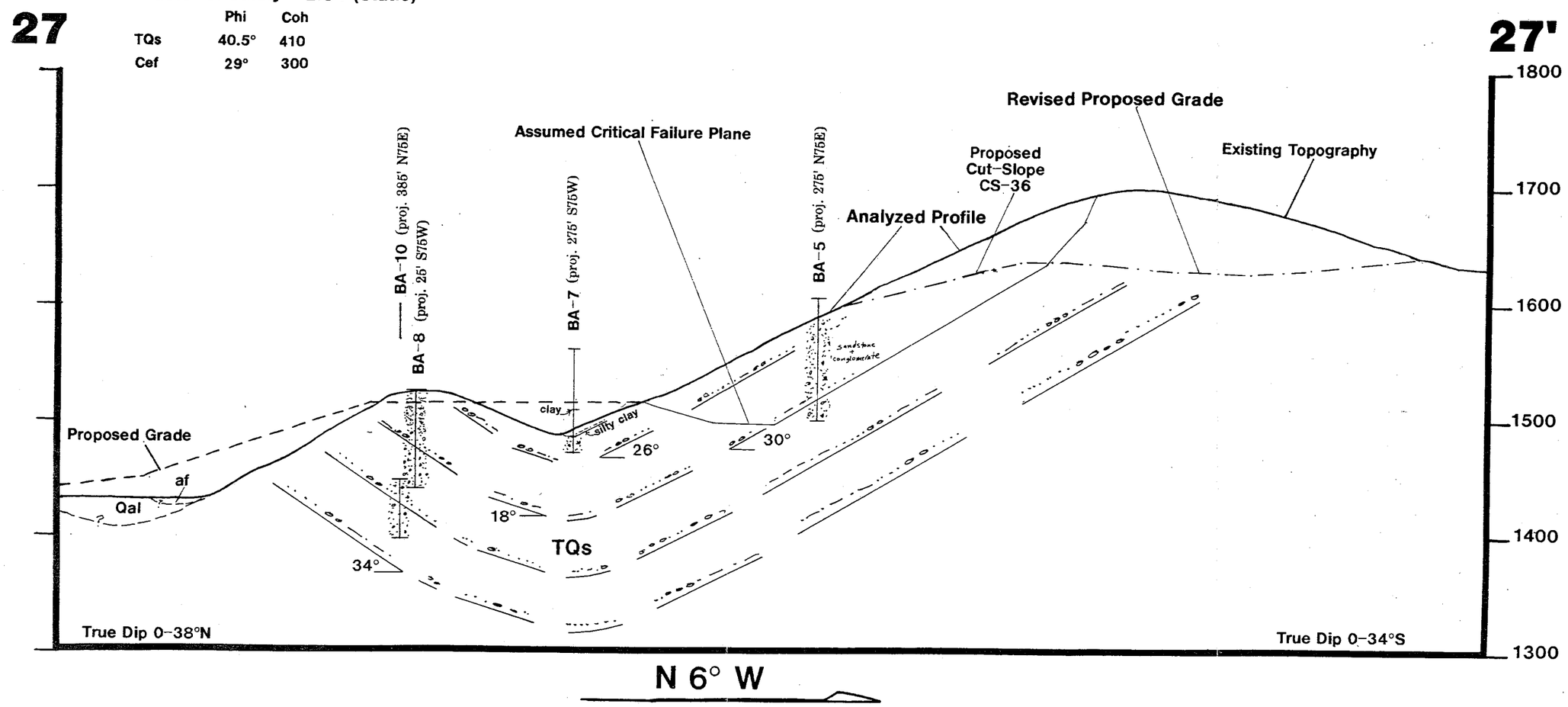
ALLAN E. SEWARD
ENGINEERING GEOLOGY

JOB NUMBER:	99-1617-4	DATE:	1/15/99
SCALE:	1"=100'	DRAWN BY:	Staff
		REVISED:	10/22/99 3/31/00

REVISED CROSS SECTION

Janbu Factor of Safety = 2.34 (Static)

	Phi	Coh
TQs	40.5°	410
Cef	29°	300

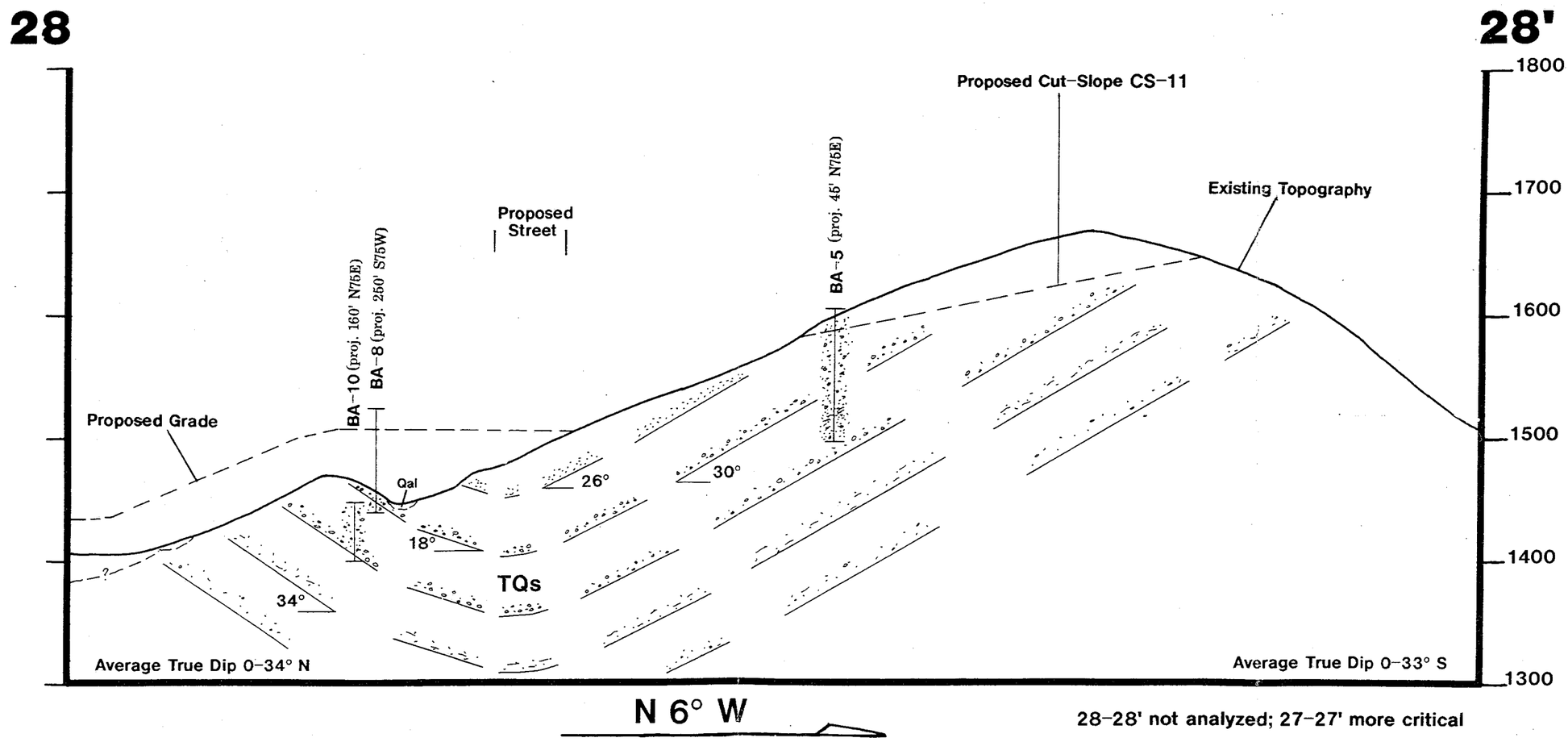


1"=100'

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1958

Date: 10/22/99 3/31/00 | Job No.: 99-1617-4

REVISED CROSS SECTION



28-28' not analyzed; 27-27' more critical

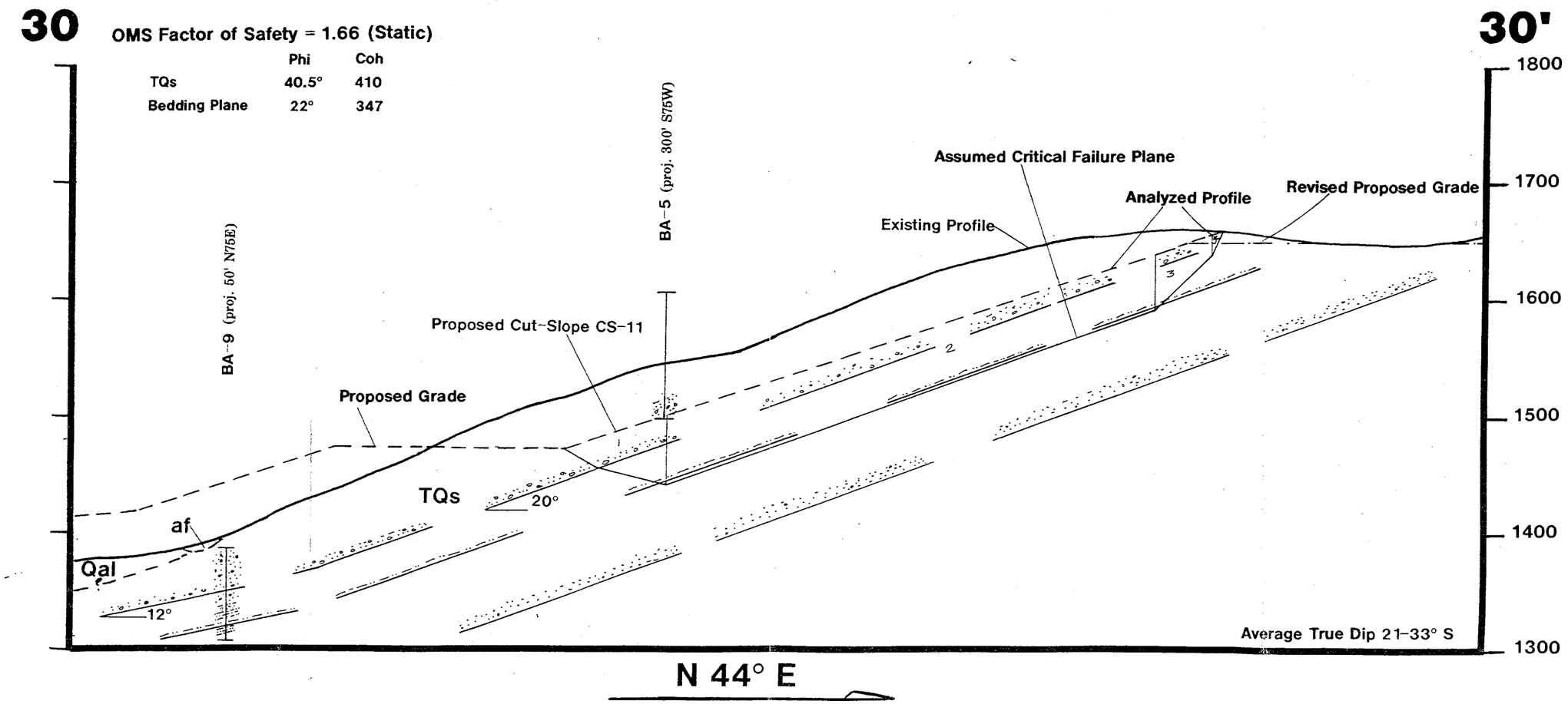
1"=100'

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1958

Date: 10/22/99 3/31/00

Job No.: 99-1617-4

REVISED CROSS SECTION



1"=100'

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1958

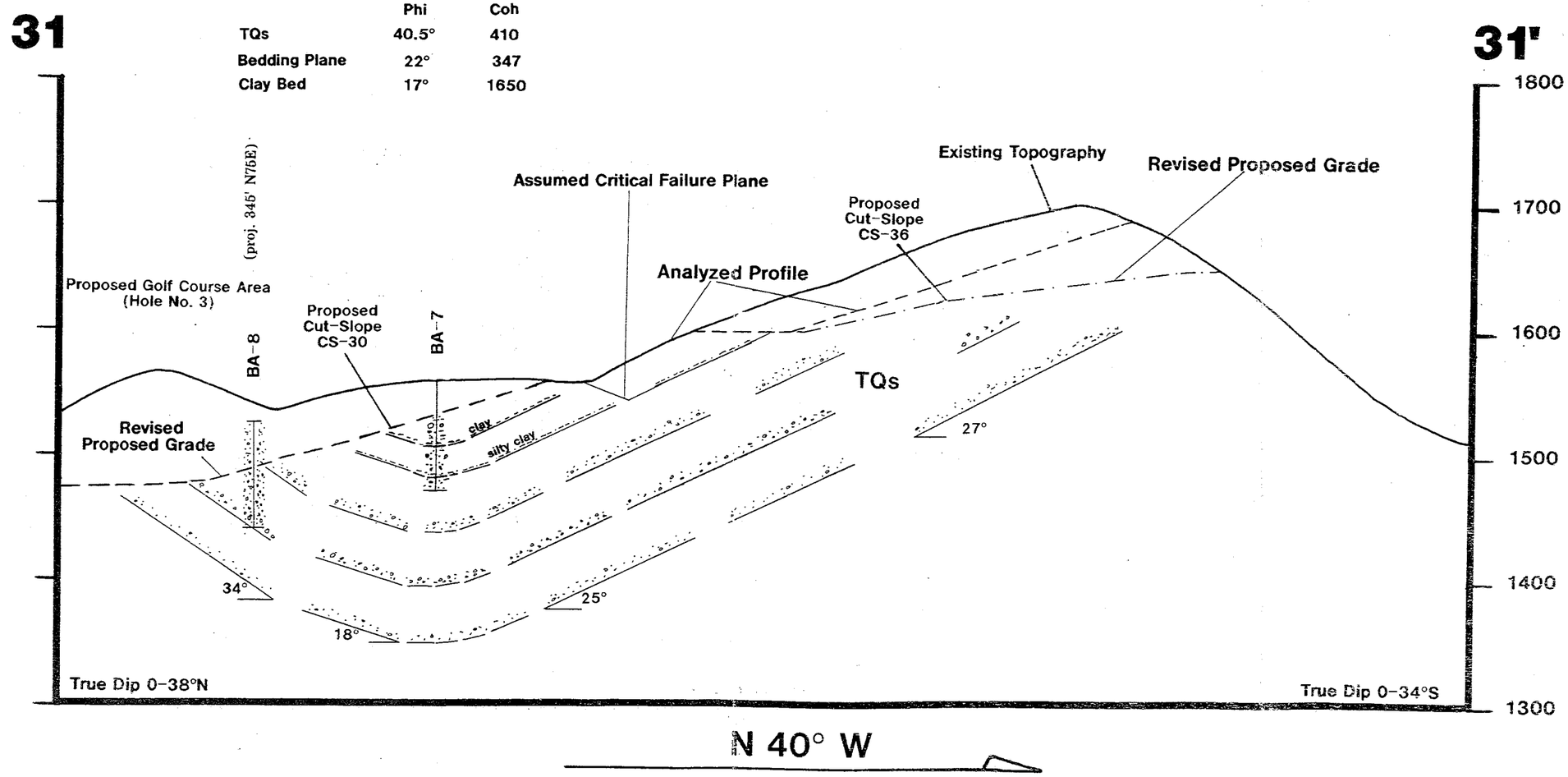
Date: 10/22/99 3/31/00

Job No.: 99-1617-4

REVISED CROSS SECTION

Janbu Factor of Safety = 2.40 (Static)

	Phi	Coh
TQs	40.5°	410
Bedding Plane	22°	347
Clay Bed	17°	1650



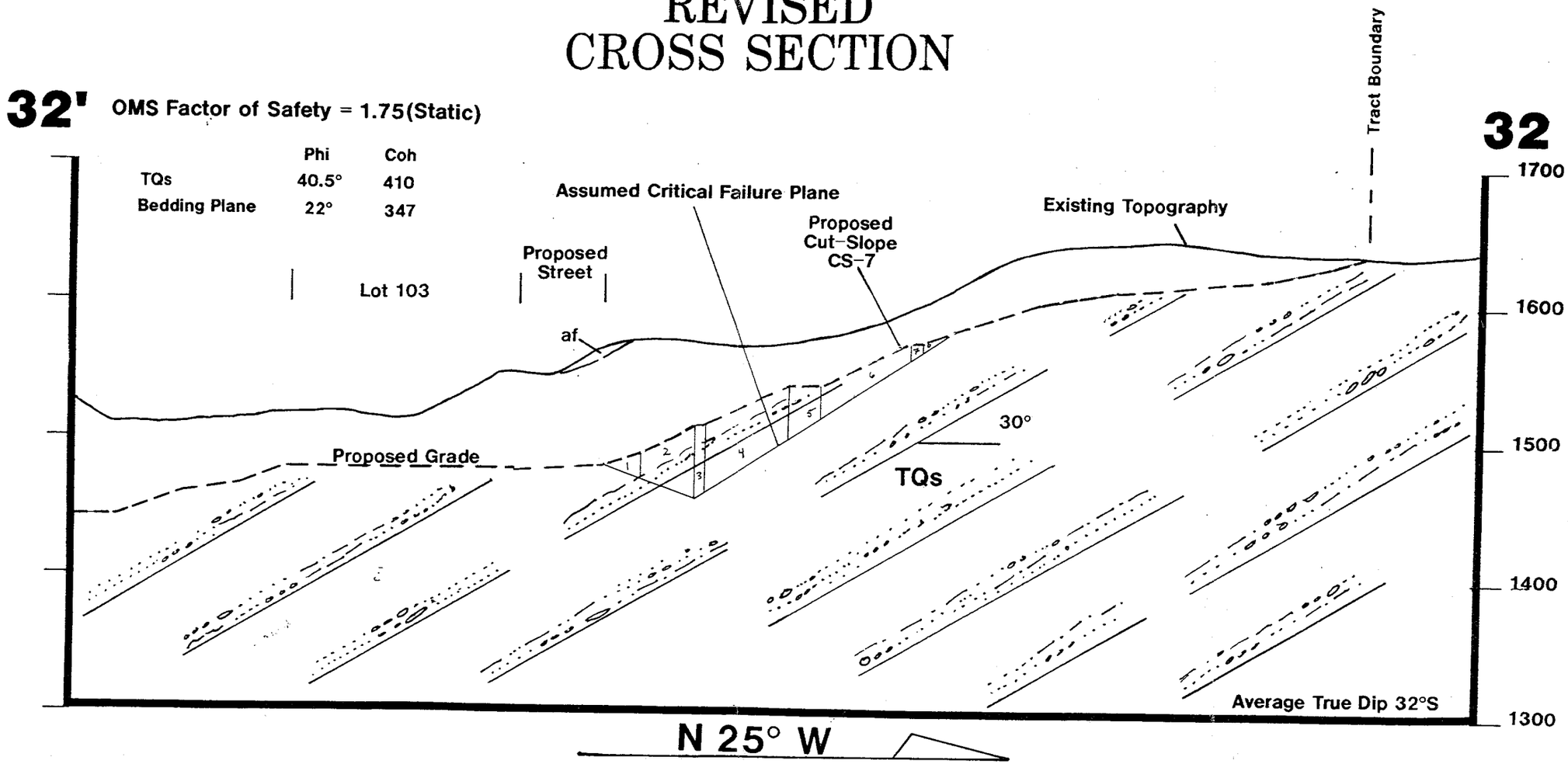
1"=100'

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1958

Date: 10/22/99 3/31/00

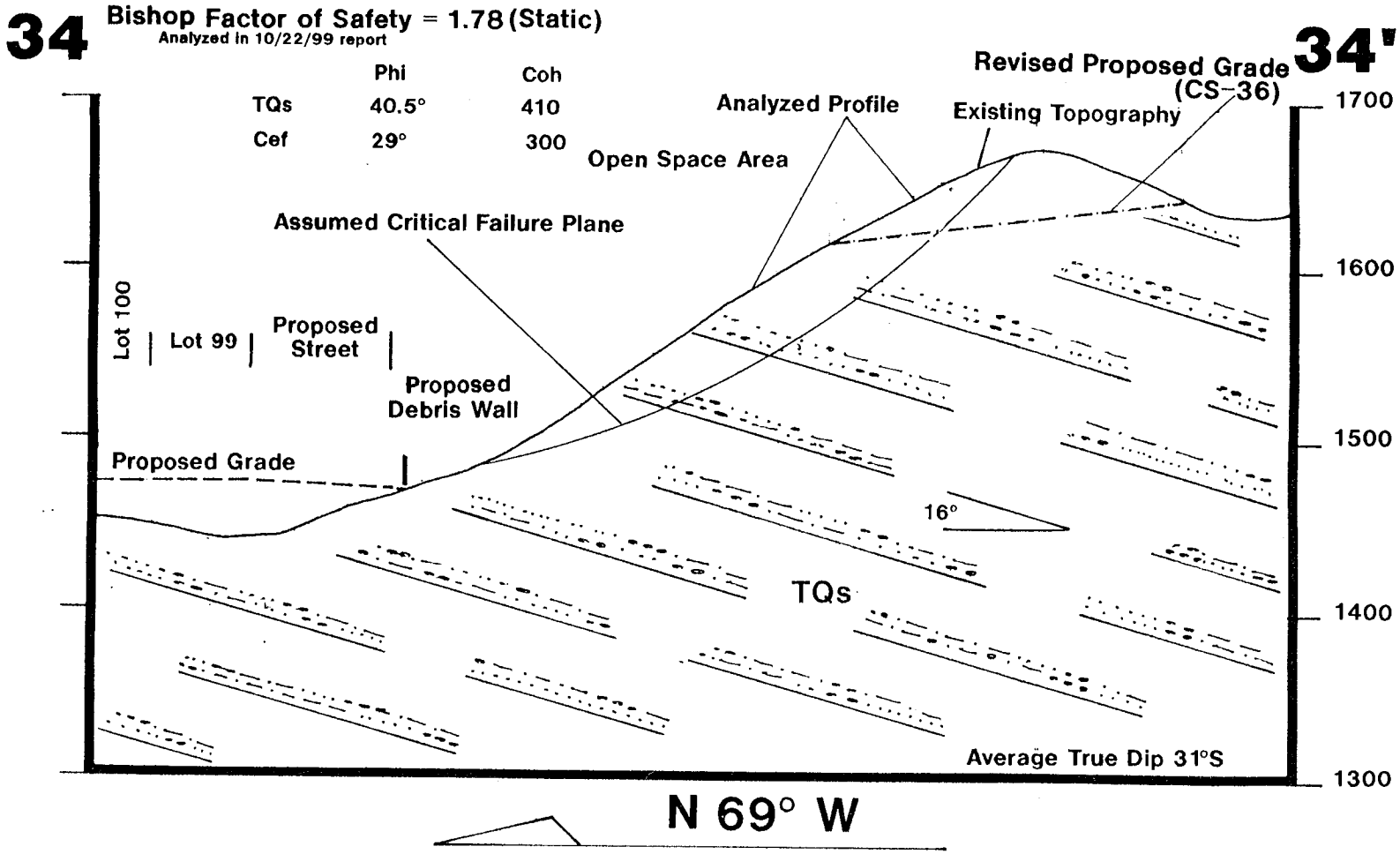
Job No.: 99-1617-4

REVISED CROSS SECTION



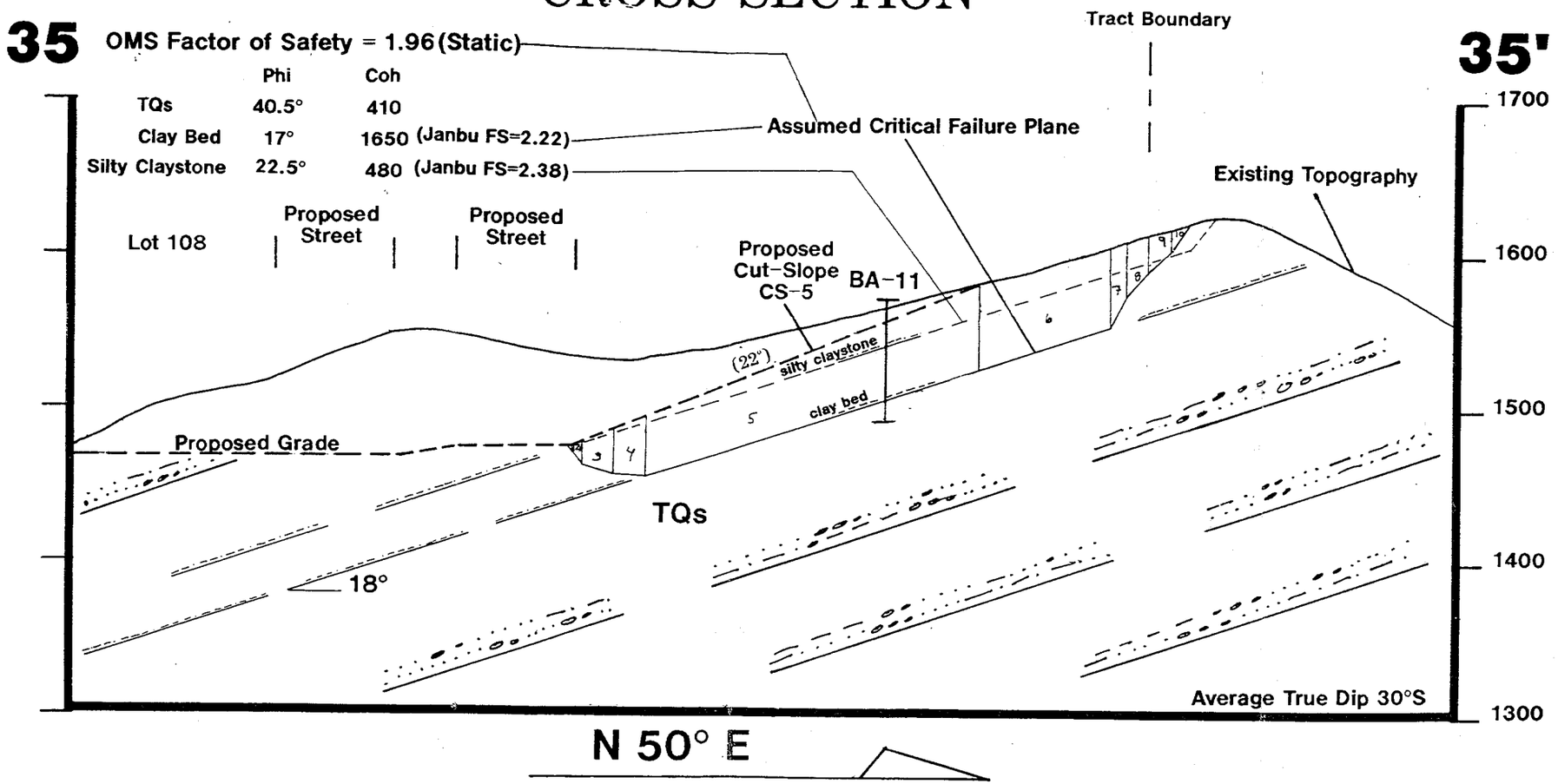
ALLAN E. SEWARD ENGINEERING GEOLOGY		
JOB NUMBER: 99-1617-4	DATE: 10/22/99	
SCALE: 1"=100'		DRAWN BY: Staff REVISED: 3/31/00

REVISED CROSS SECTION



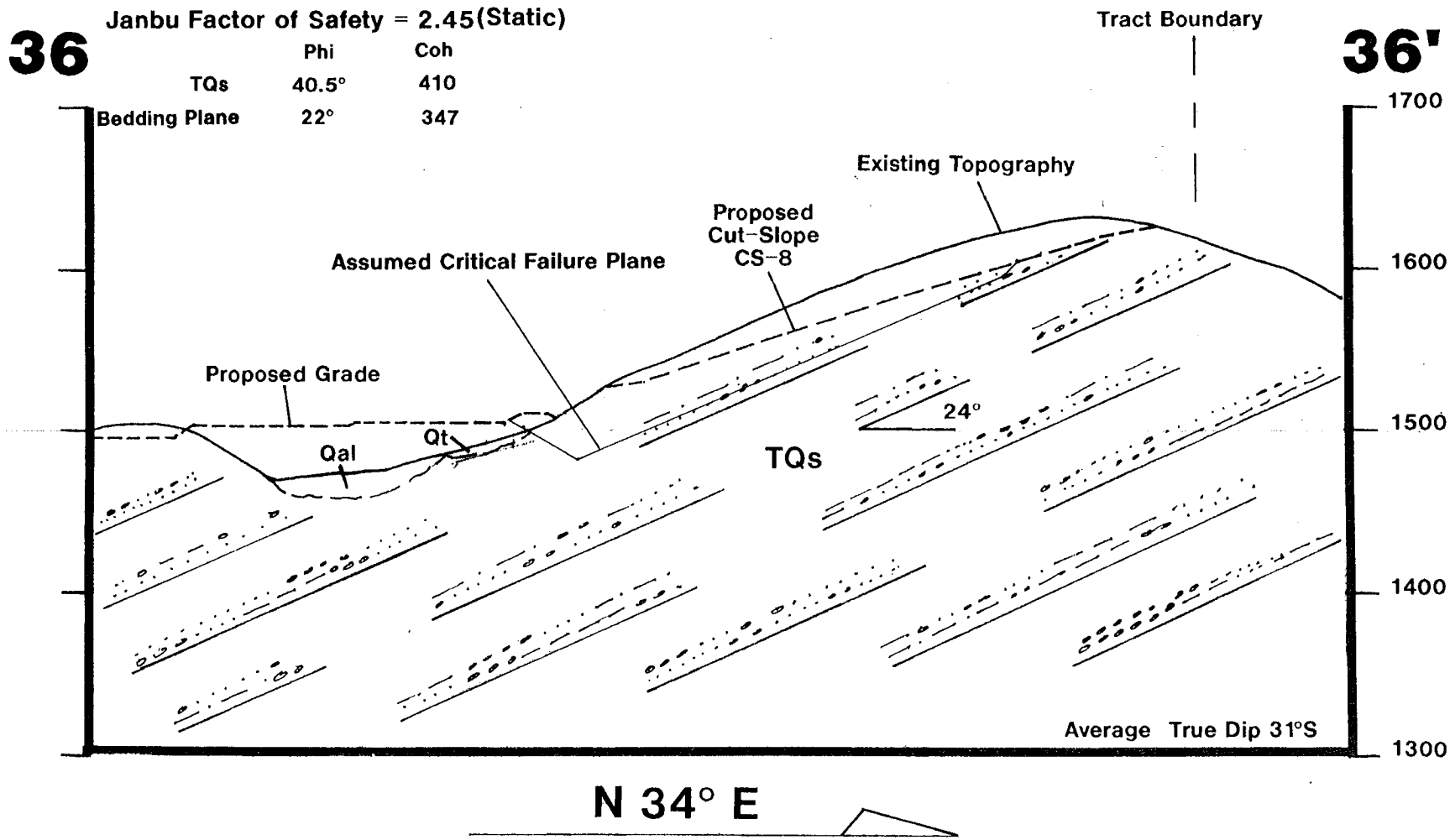
ALLAN E. SEWARD ENGINEERING GEOLOGY		
JOB NUMBER: 99-1617-4	DATE: 10/22/99	
SCALE: 1"=100'		DRAWN BY: Staff REVISED: 3/31/00

REVISED CROSS SECTION



ALLAN E. SEWARD ENGINEERING GEOLOGY		
JOB NUMBER: 99-1617-4	DATE: 10/22/99	
SCALE: 1"=100'		DRAWN BY: Staff REVISED: 3/31/00

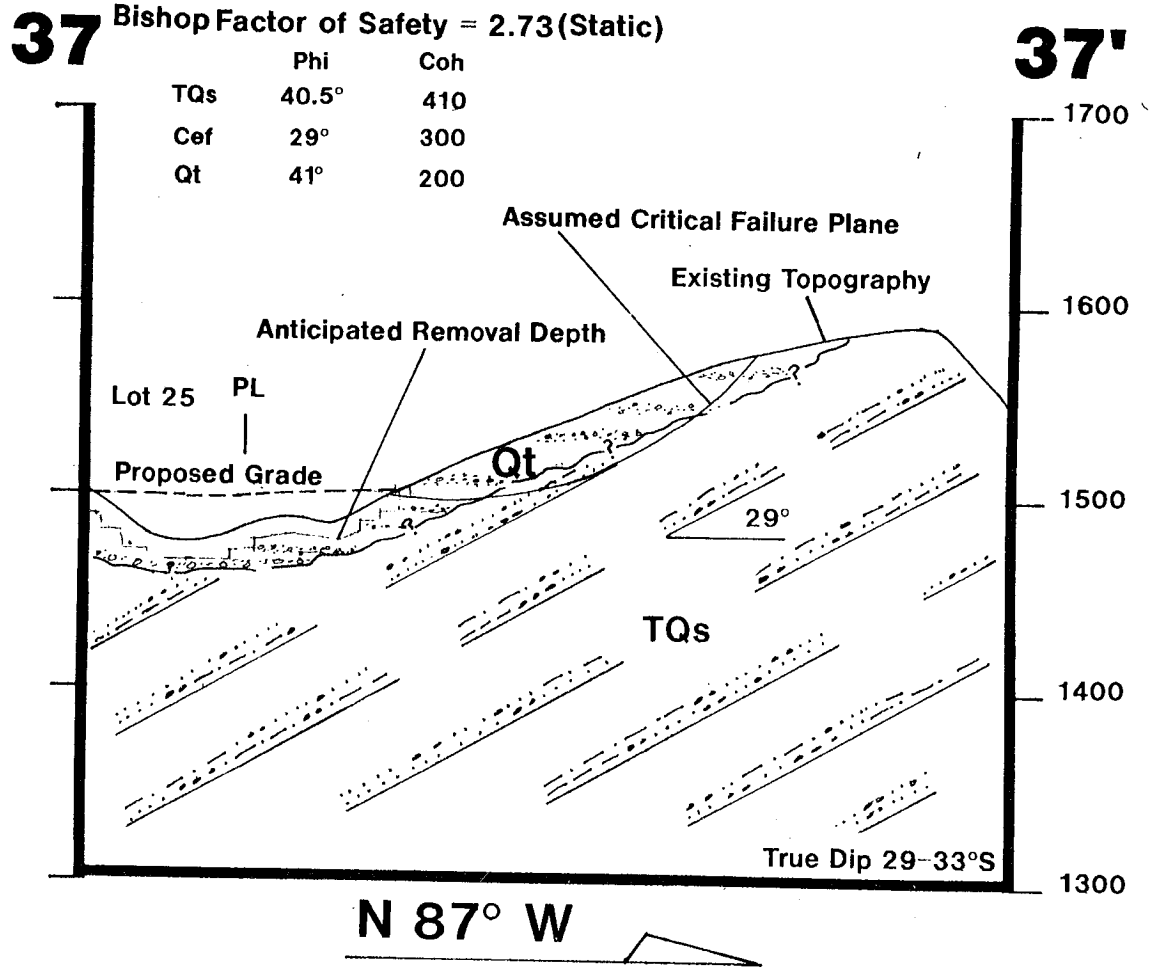
REVISED CROSS SECTION



ALLAN E. SEWARD
ENGINEERING GEOLOGY

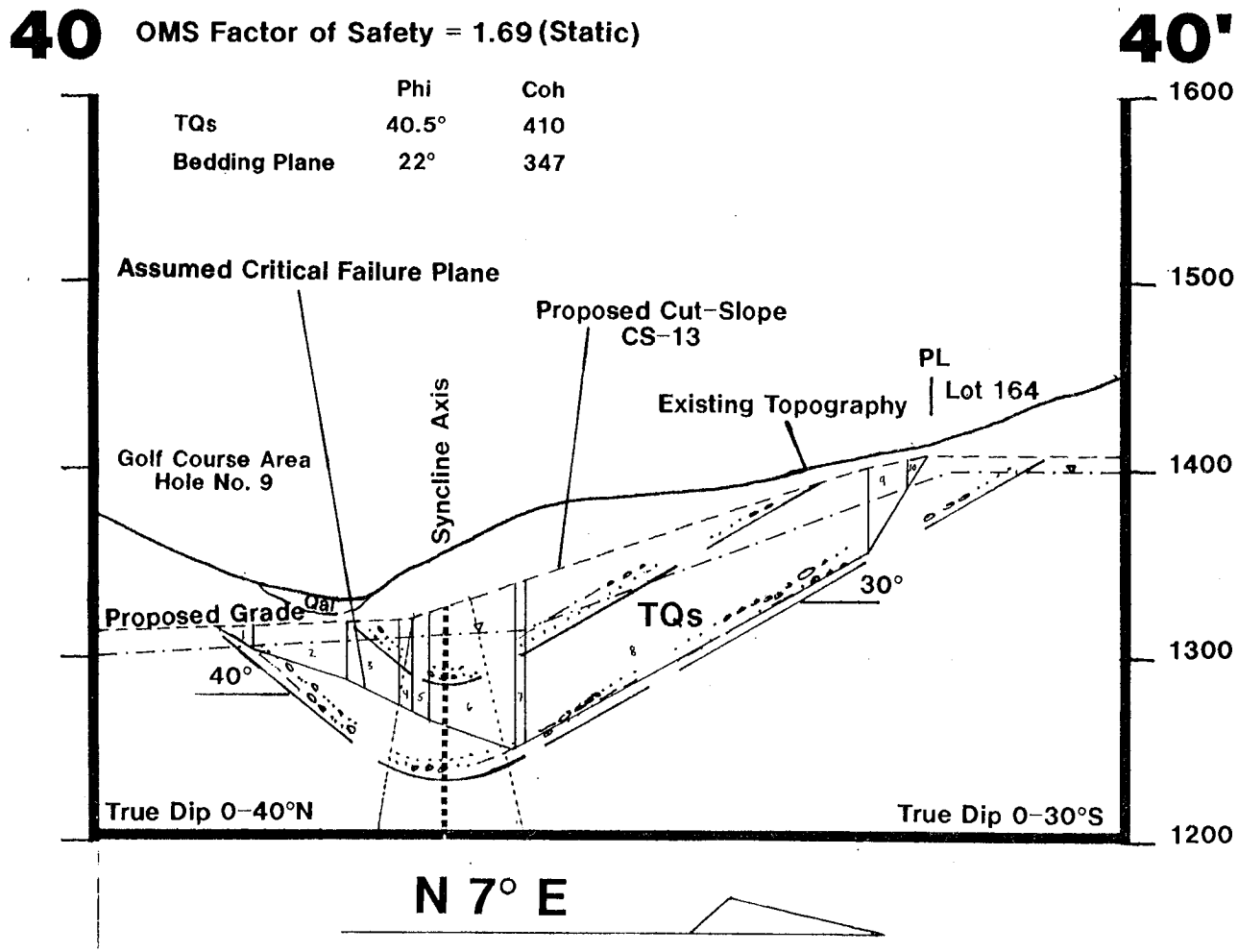
JOB NUMBER: 99-1617-4		DATE: 10/22/99	
SCALE: 1"=100'		DRAWN BY: Staff	
		REVISED: 3/31/00	

REVISED CROSS SECTION



ALLAN E. SEWARD ENGINEERING GEOLOGY		
JOB NUMBER: 99-1617-4	DATE: 10/22/99	
SCALE: 1"=100'		DRAWN BY: Staff REVISED: 3/31/00

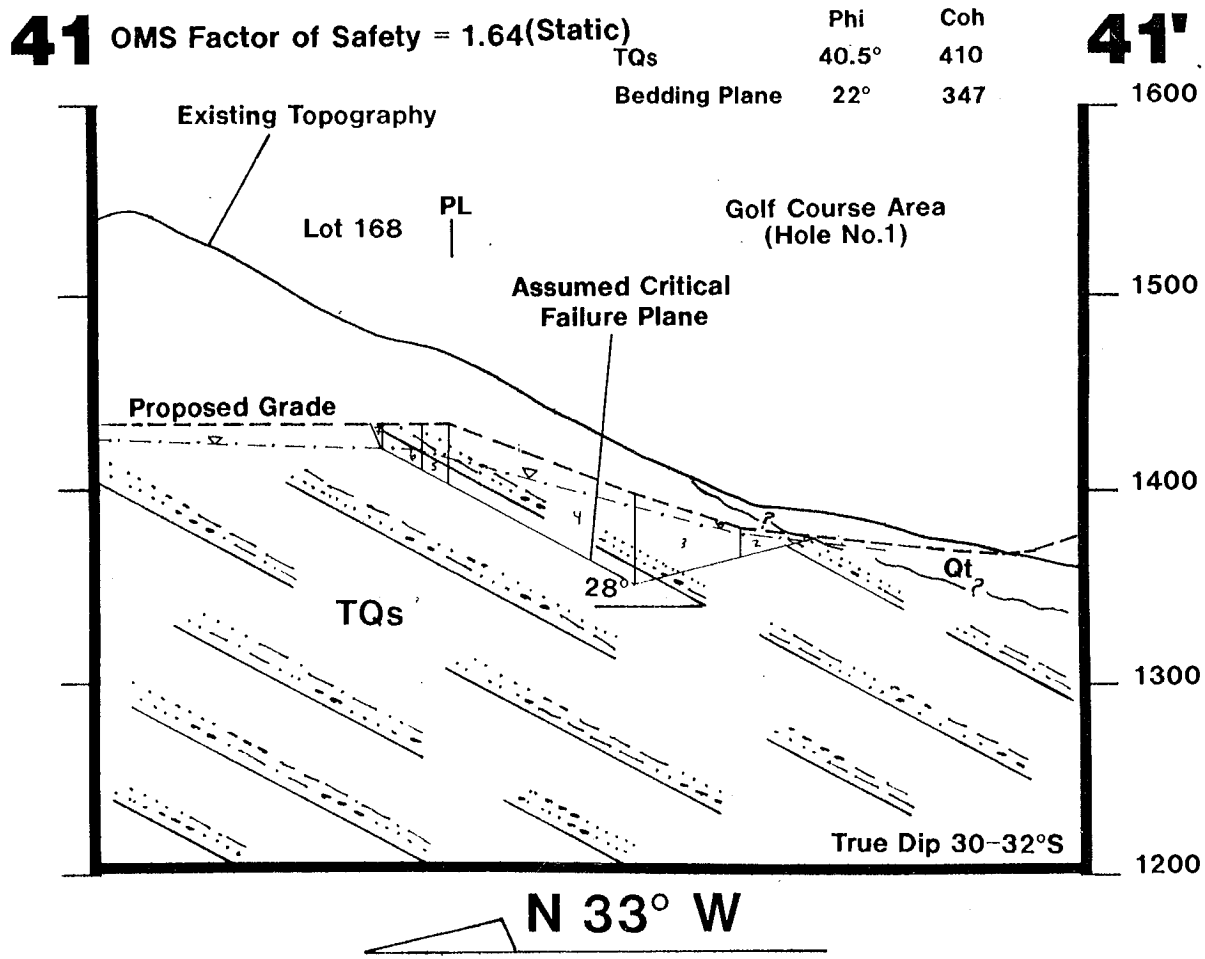
REVISED CROSS SECTION



ALLAN E. SEWARD
ENGINEERING GEOLOGY

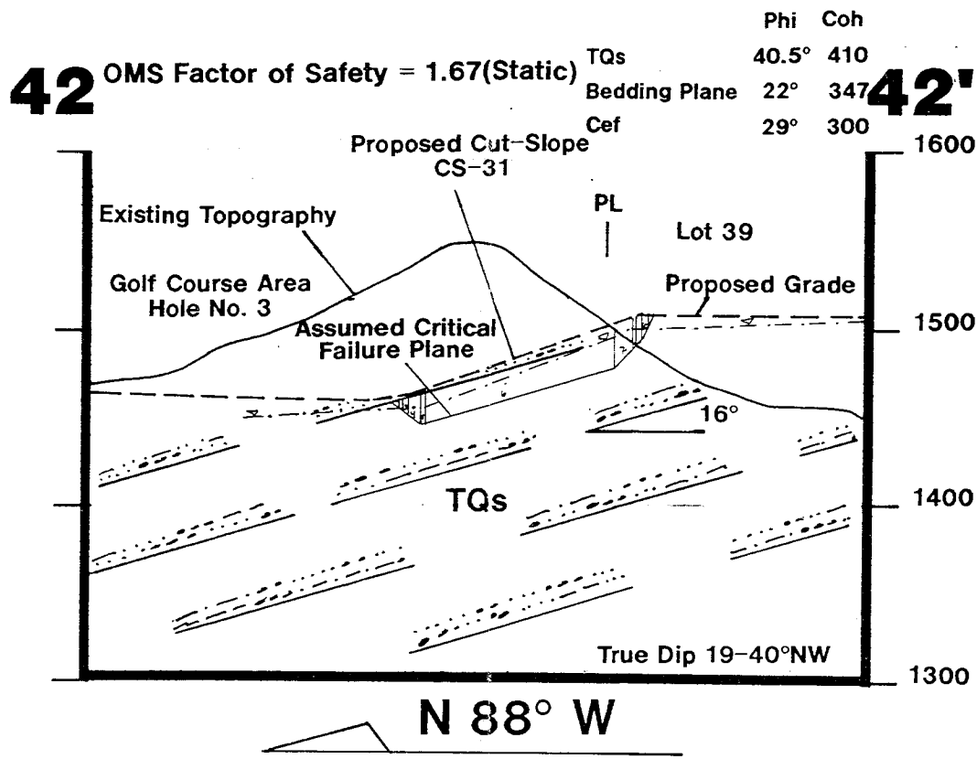
JOB NUMBER: 99-1617-4		DATE: 10/22/99	
SCALE: 1"=100'		DRAWN BY: Staff	
		REVISED: 3/31/00	

REVISED CROSS SECTION



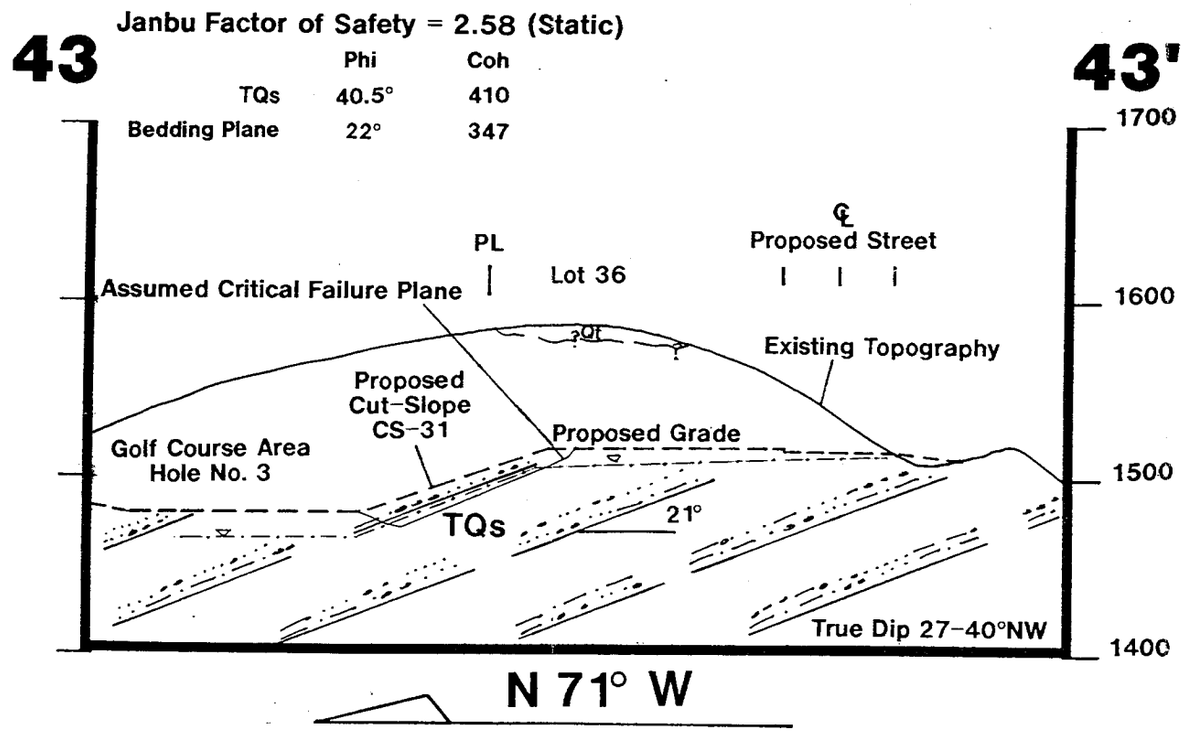
ALLAN E. SEWARD ENGINEERING GEOLOGY		
JOB NUMBER: 99-1617-4	DATE: 10/22/99	
SCALE: 1"=100'		DRAWN BY: Staff REVISED: 3/31/00

REVISED CROSS SECTION



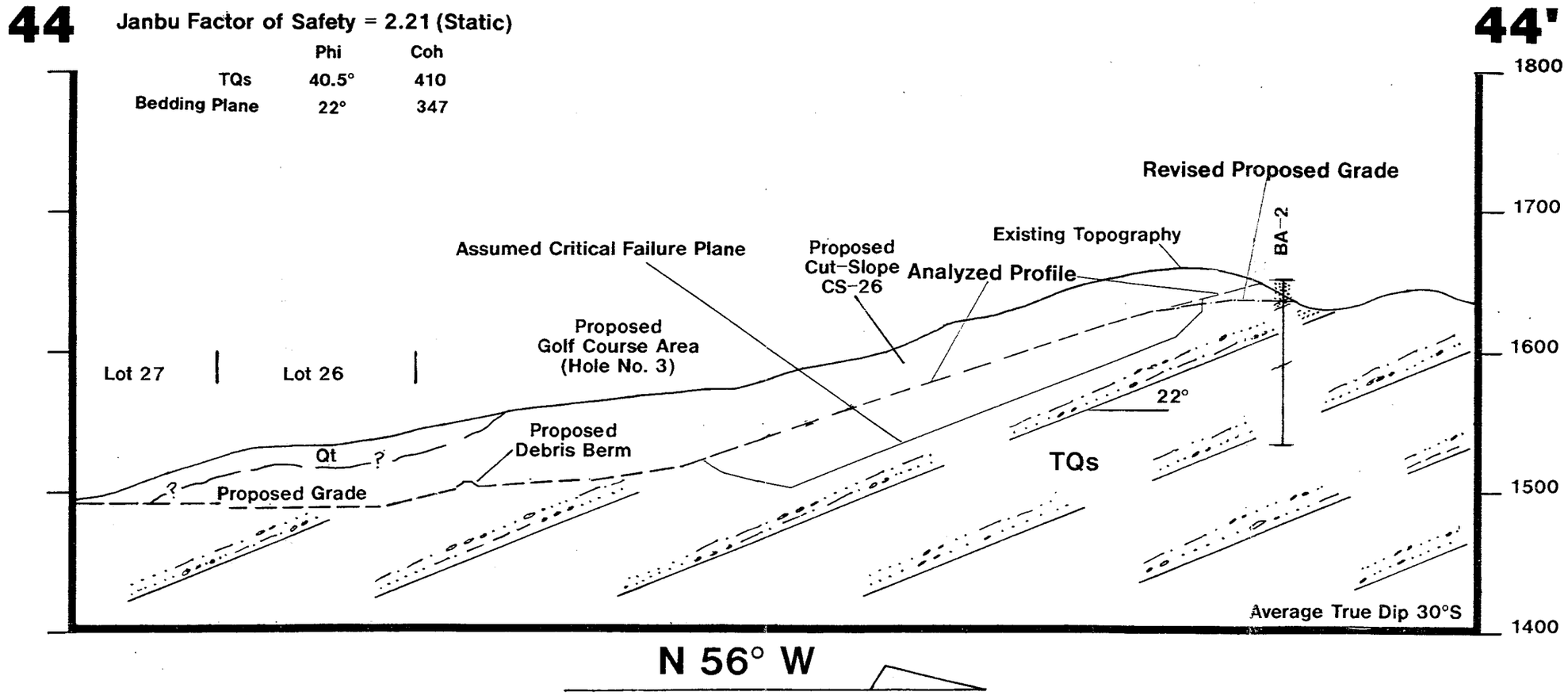
ALLAN E. SEWARD ENGINEERING GEOLOGY		
JOB NUMBER: 99-1617-4	DATE: 10/22/99	
SCALE: 1"=100'		DRAWN BY: Staff REVISED: 3/31/00

REVISED CROSS SECTION



ALLAN E. SEWARD ENGINEERING GEOLOGY		
JOB NUMBER: 99-1617-4	DATE: 10/22/99	
SCALE: 1"=100'		DRAWN BY: Staff REVISED: 3/31/00

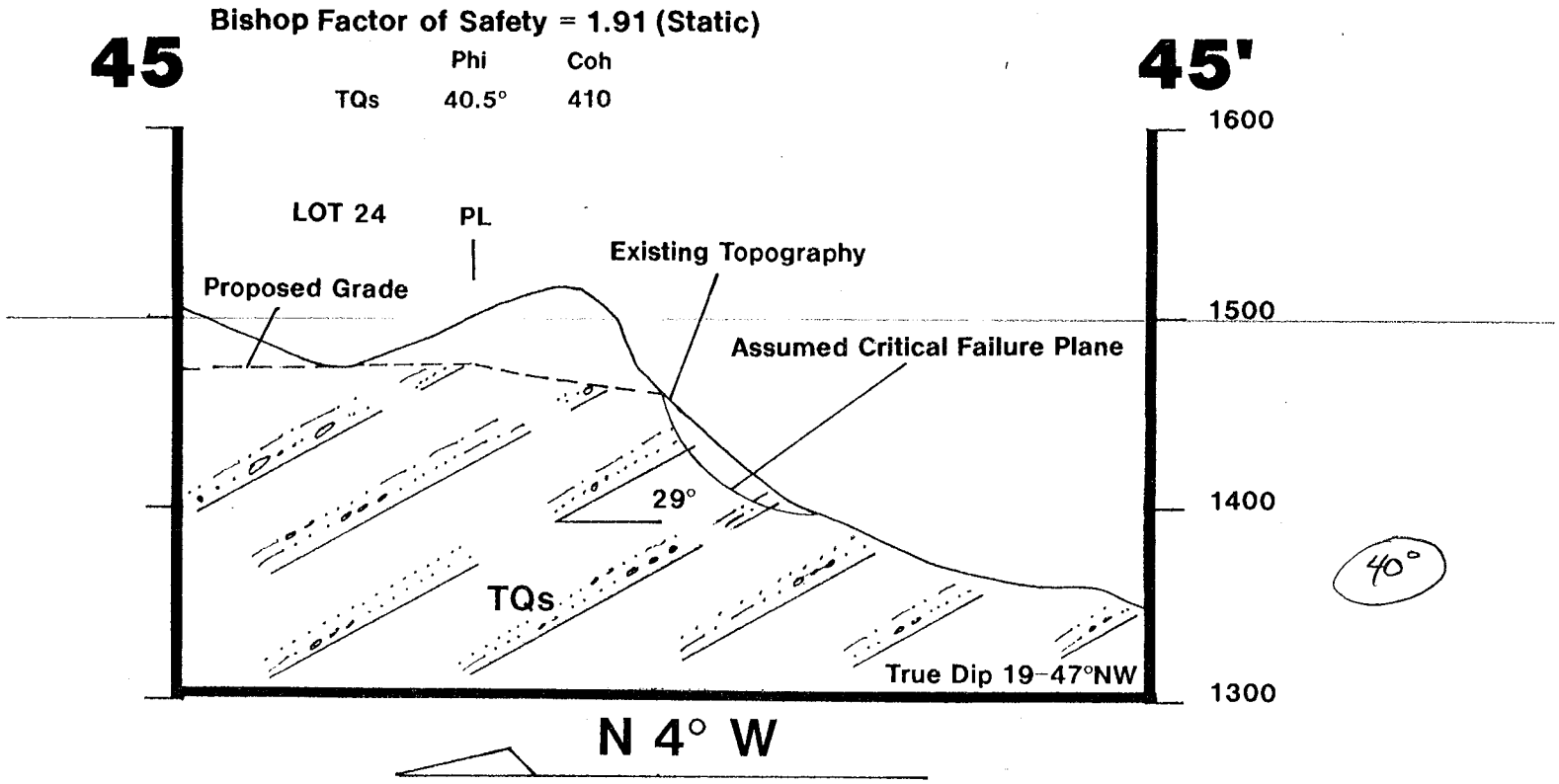
REVISED CROSS SECTION



ALLAN E. SEWARD
ENGINEERING GEOLOGY

JOB NUMBER:	99-1617-4	DATE:	10/22/99
SCALE:	1"=100'	DRAWN BY:	Staff
		REVISED:	3/31/00

REVISED CROSS SECTION



ALLAN E. SEWARD
ENGINEERING GEOLOGY

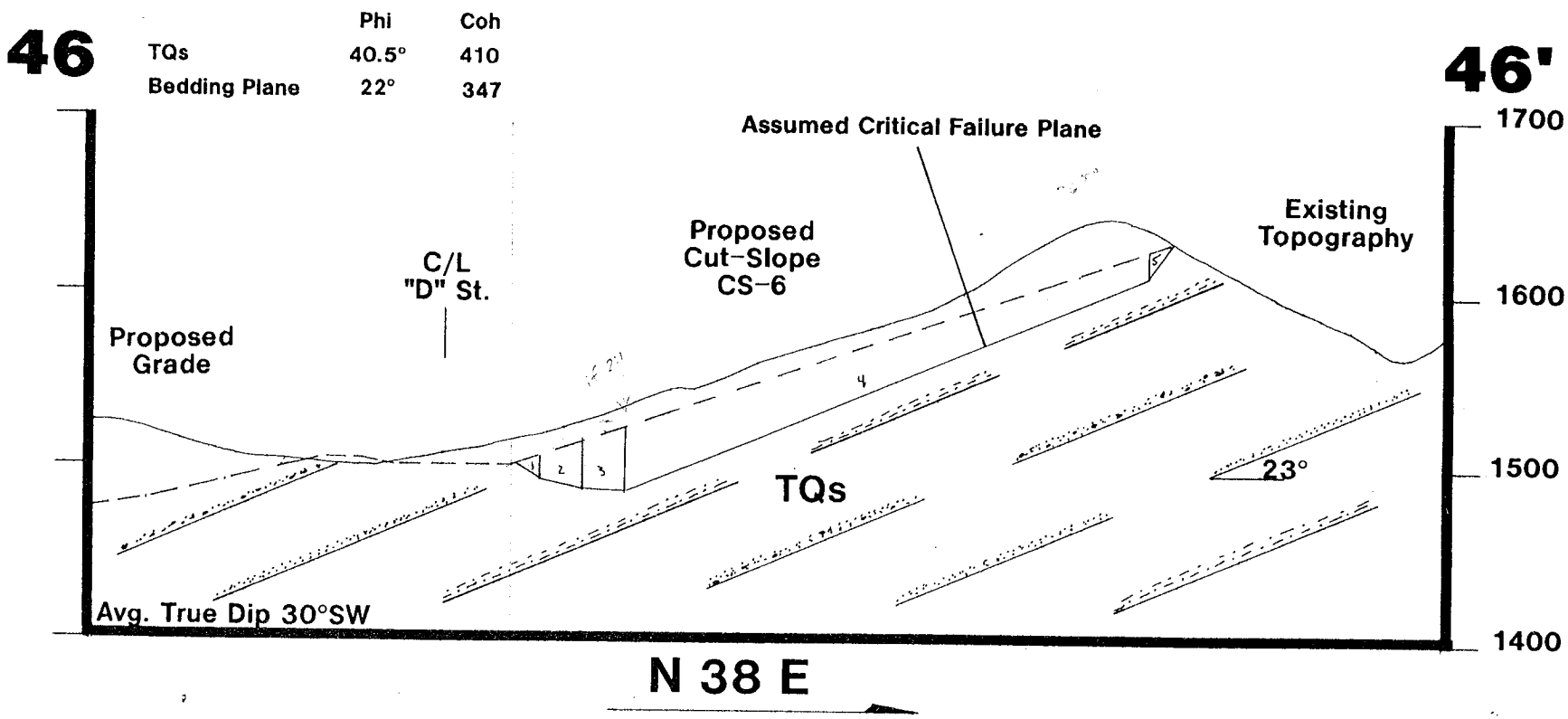
JOB NUMBER:	99-1617-4	DATE:	10/22/99
SCALE: 1"=100'		DRAWN BY:	Staff
		REVISED:	3/31/00

Appendix G

CROSS SECTION

OMS Factor of Safety = 1.79 (Static)

	Phi	Coh
TQs	40.5°	410
Bedding Plane	22°	347



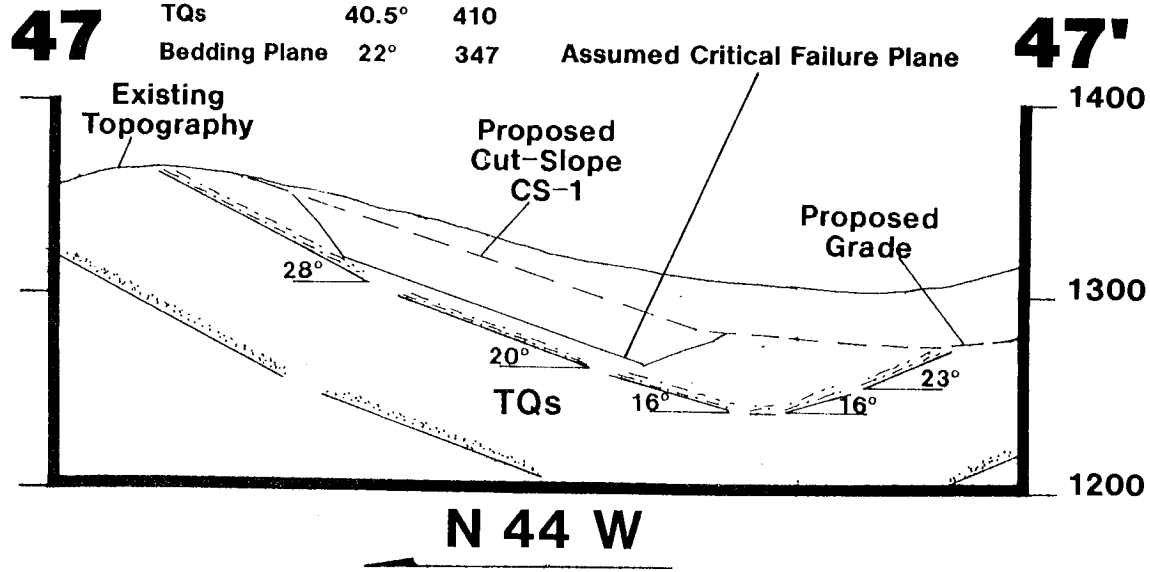
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1968

Date: 3/31/00		Job No.: 00-1617-4
Scale: 1"=100'	Geology by: Staff	Revised.
	Drawn by: Staff	

CROSS SECTION

Janbu Factor of Safety = 2.65 (Static)

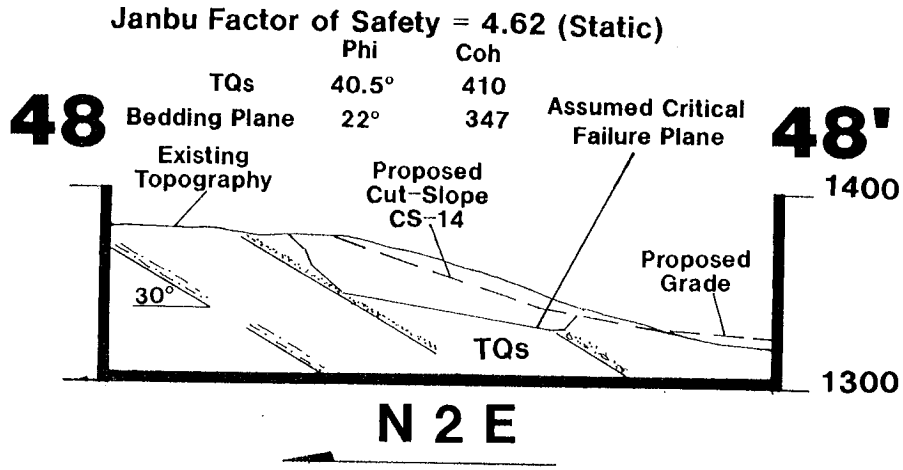
	Phi	Coh
TQs	40.5°	410
Bedding Plane	22°	347



ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1958

Date: 3/31/00		Job No.: 00-1617-4
Scale: 1"=100'	Geology by: Staff Drawn by: Staff	Revised:

CROSS SECTION



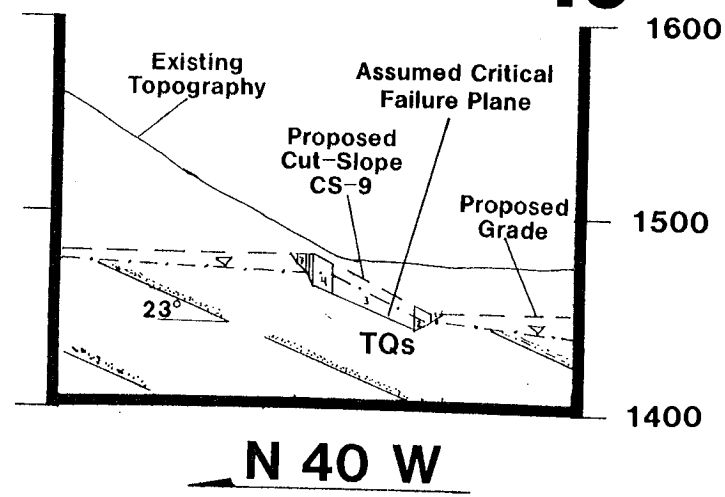
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1958

Date: 3/31/00		Job No.: 00-1617-4
Scale: 1"=100'	Geology by: Staff Drawn by: Staff	Revised:

CROSS SECTION

OMS Factor of Safety = 1.74 (Static)

	Phi	Coh
TQs	40.5°	410
Bedding Plane	22°	347



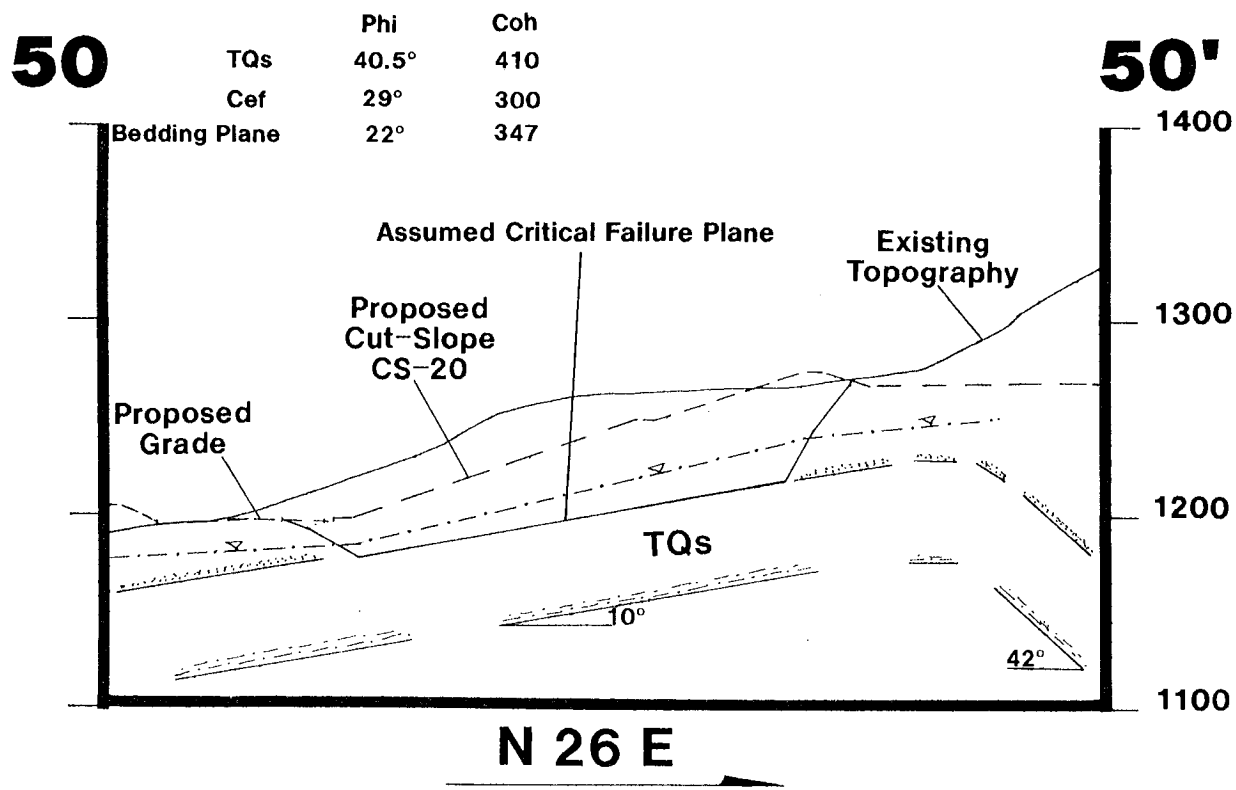
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1958

Date: 3/31/00		Job No.: 00-1617-4
Scale: 1"=100'	Geology by: Staff	Revised:
	Drawn by: Staff	

CROSS SECTION

Janbu Factor of Safety = 2.30 (Static)

	Phi	Coh
TQs	40.5°	410
Cef	29°	300
Bedding Plane	22°	347



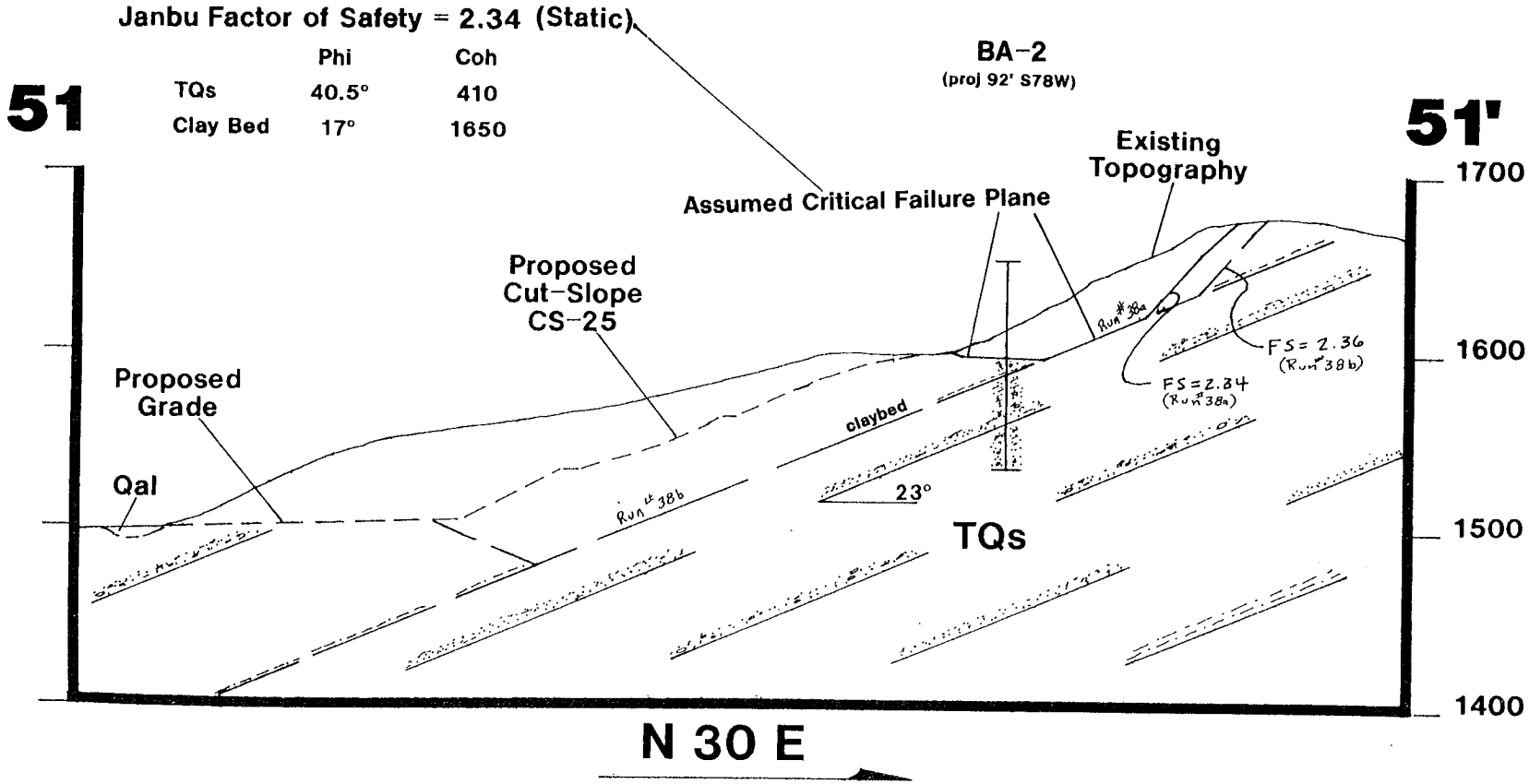
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1958

Date: 3/31/00		Job No.: 00-1617-4
Scale: 1"=100'	Geology by: Staff	Revised:
	Drawn by: Staff	

CROSS SECTION

Janbu Factor of Safety = 2.34 (Static)

	Phi	Coh
TQs	40.5°	410
Clay Bed	17°	1650

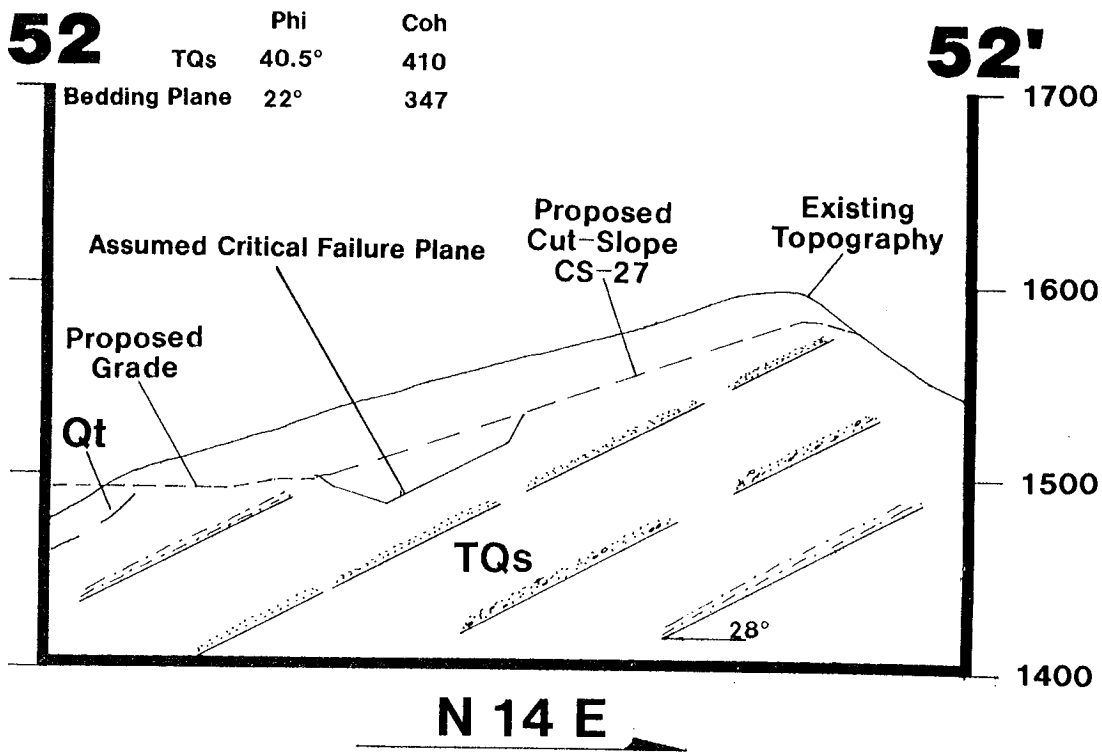


ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1968

Date: 3/31/00		Job No.: 00-1617-4
Scale: 1"=100'	Geology by: Staff	Revised:
	Drawn by: Staff	

CROSS SECTION

Janbu Factor of Safety = 3.28 (Static)



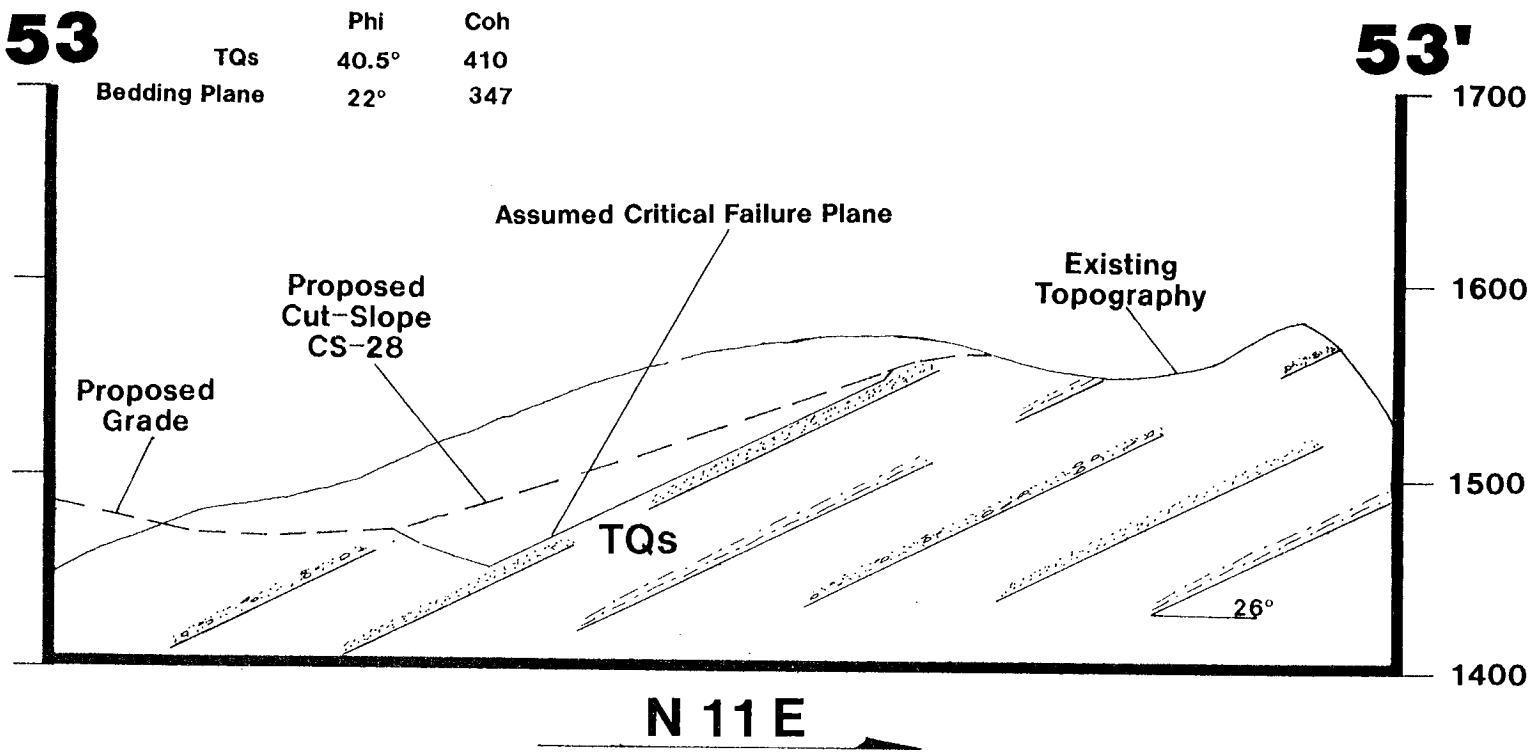
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1968

Date: 3/31/00		Job No.: 00-1617-4
Scale: 1"=100'	Geology by: Staff Drawn by: Staff	Revised:

CROSS SECTION

Janbu Factor of Safety = 2.51 (Static)

	Phi	Coh
TQs	40.5°	410
Bedding Plane	22°	347



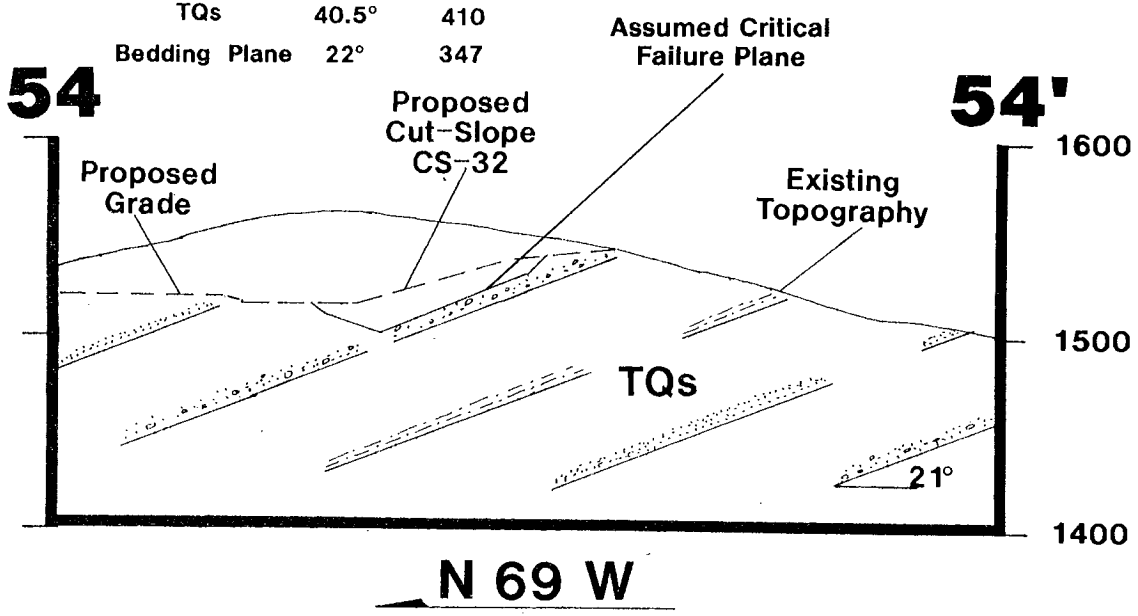
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1968

Date: 3/31/00		Job No.: 00-1617-4
Scale: 1"=100'	Geology by: Staff	Revised:
	Drawn by: Staff	

CROSS SECTION

Janbu Factor of Safety = 4.61 (Static)

	Phi	Coh
TQs	40.5°	410
Bedding Plane	22°	347



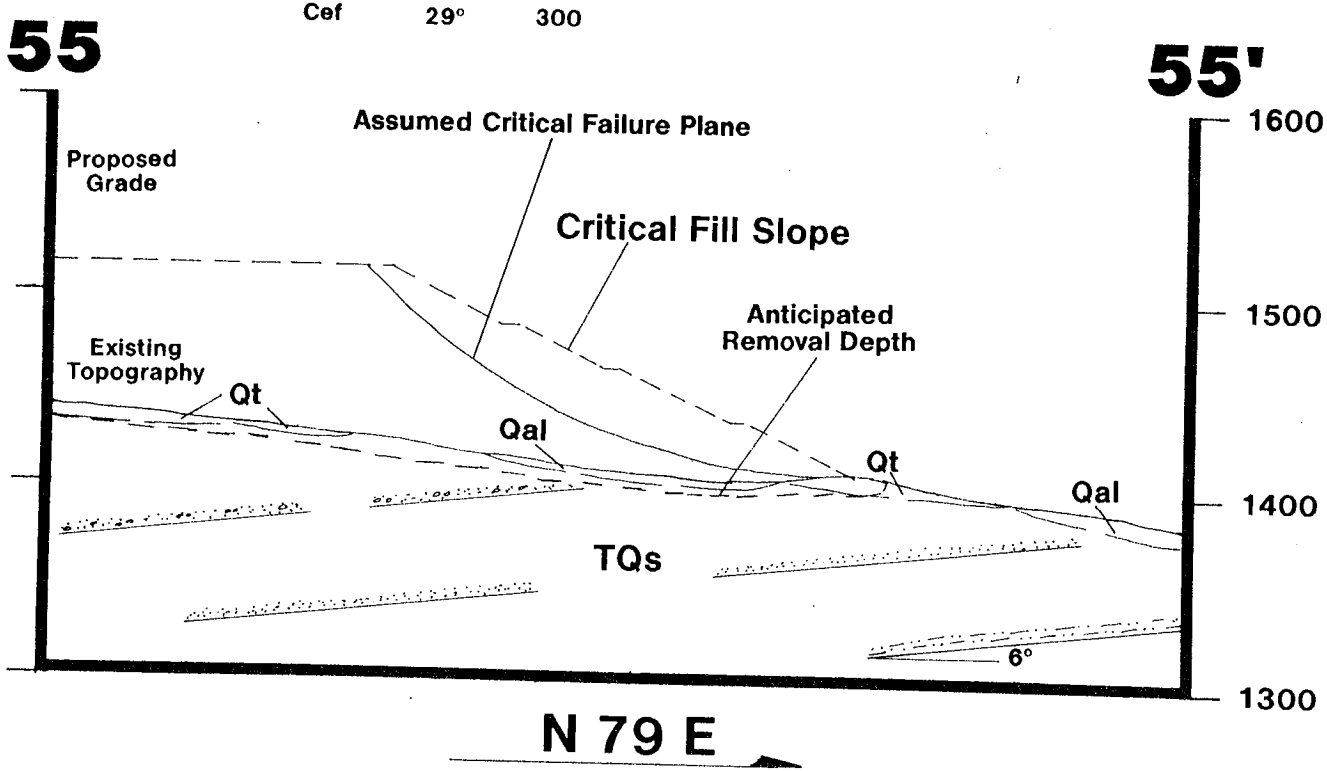
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1958

Date: 3/31/00		Job No.: 00-1617-4
Scale: 1"=100'	Geology by: Staff Drawn by: Staff	Revised:

CROSS SECTION

Bishop Factor of Safety = 1.69 (Static)

	Phi	Coh
Cef	29°	300



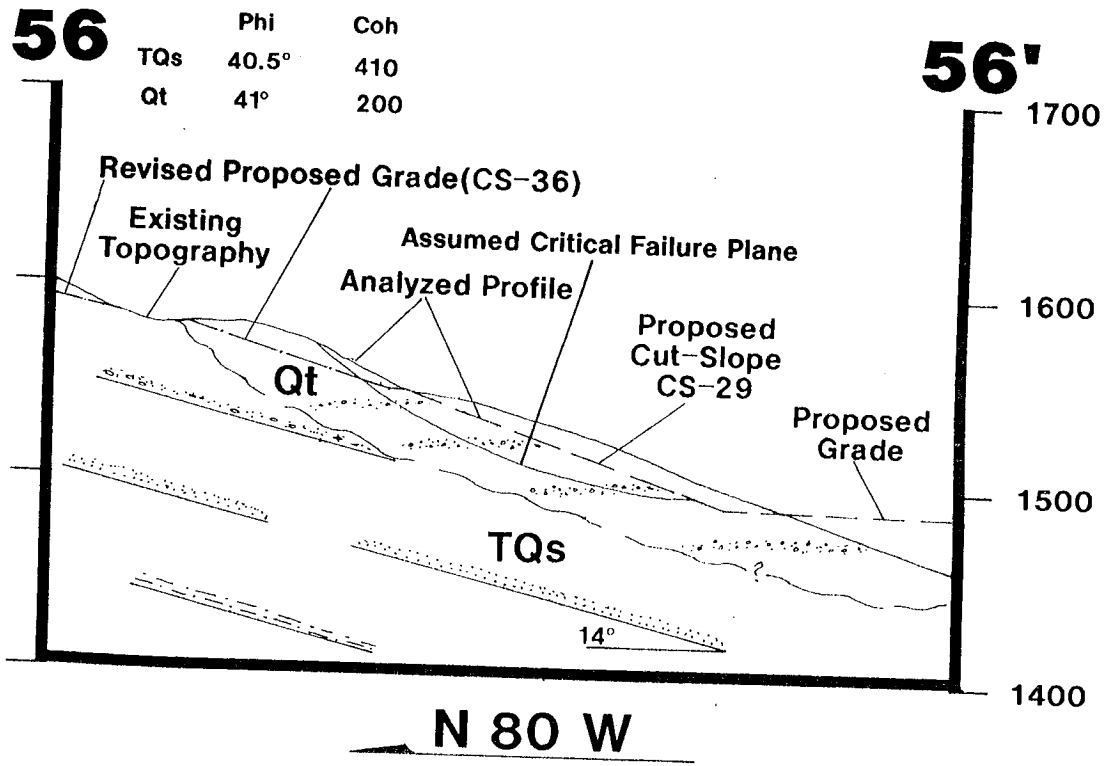
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1968

Date: 3/31/00		Job No.: 00-1617-4
Scale: 1"=100'	Geology by: Staff	Revised:
	Drawn by: Staff	

CROSS SECTION

Bishop Factor of Safety = 2.64 (Static)

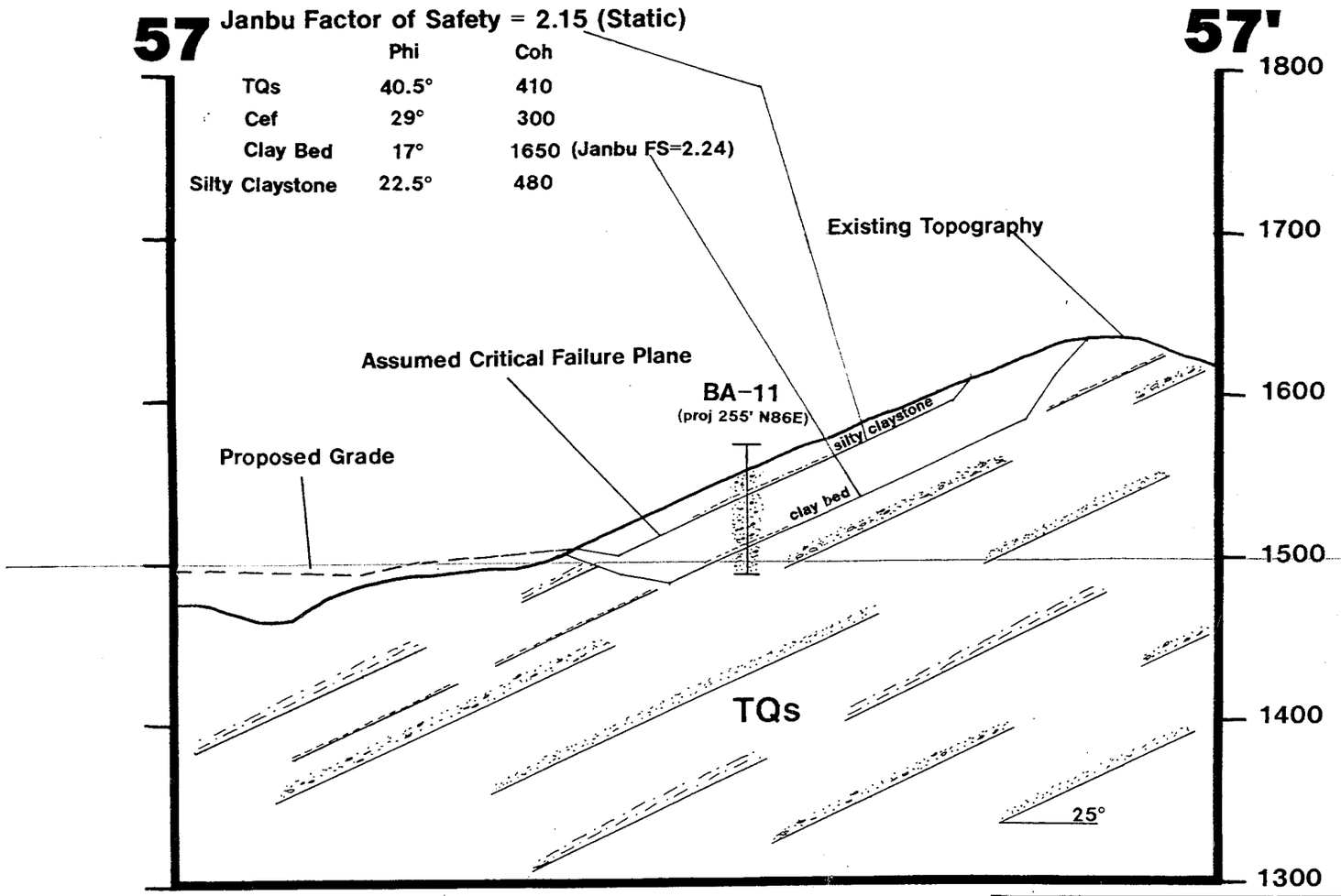
	Phi	Coh
TQs	40.5°	410
Qt	41°	200



ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1968

Date: 3/31/00		Job No.: 00-1617-4
Scale: 1"=100'	Geology by: Staff	Revised:
	Drawn by: Staff	

CROSS SECTION



N 41° W

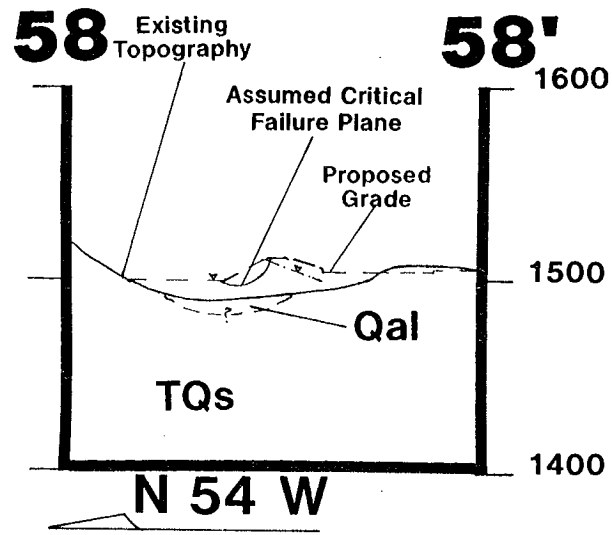
ALLAN E. SEWARD
ENGINEERING GEOLOGY

JOB NUMBER: 00-1617-4	DATE: 3/31/00
SCALE: 1"=100'	DRAWN BY: Staff
	REVISED:

CROSS SECTION

Bishop Factor of Safety = 2.60 (Static)

	Phi	Coh
Cef	29°	300



Critical Desilting Basin

(For Rapid Drawdown Analysis)

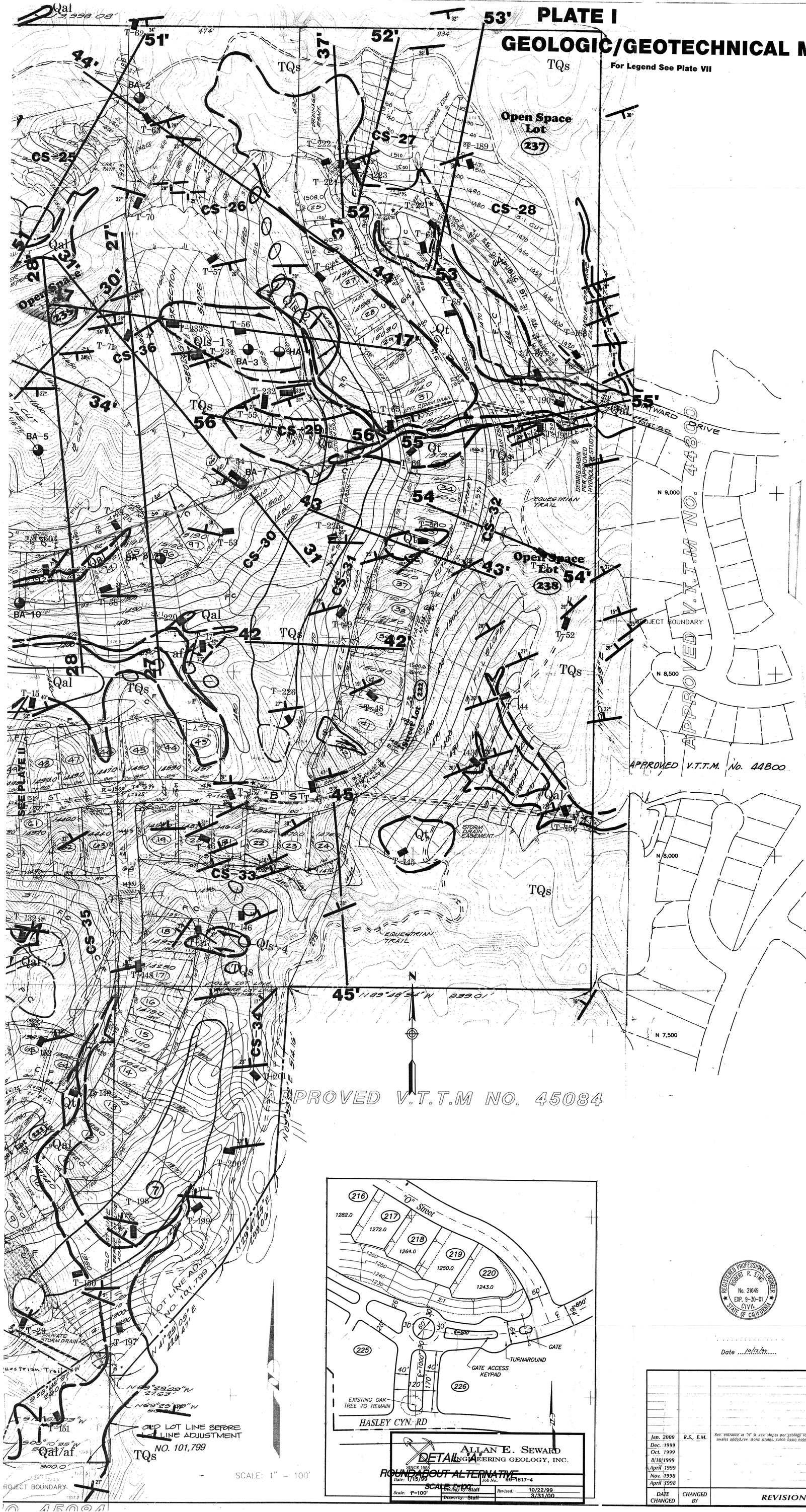
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1958

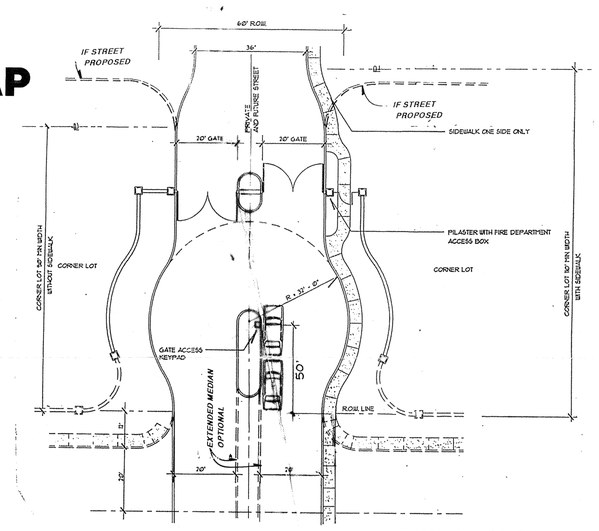
Date: 3/31/00		Job No.: 00-1617-4
Scale: 1"=100'	Geology by: Staff Drawn by: Staff	Revised:

PLATE I

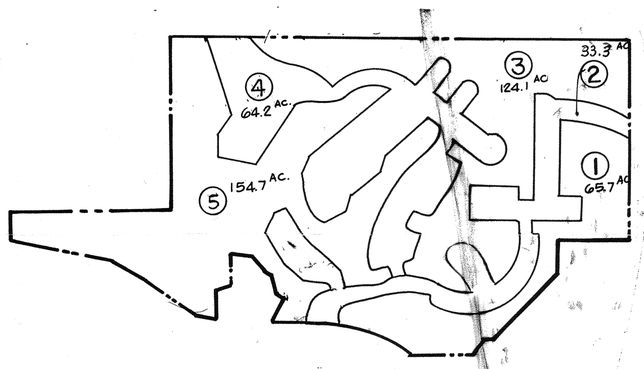
GEOLOGIC/GEOTECHNICAL MAP

For Legend See Plate VII





TYPICAL GATED ENTRY



PRELIMINARY PARCEL MAP
INSET EXHIBIT
(PER NOTE 30 HEREON)
NOT TO SCALE

142.0 Ac.

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1958

Date: 1/15/99	Job No.: 99-1617-4
Scale: 1"=100'	Geology by: Staff
	Drawn by: Staff
	Revised: 10/22/99, 3/31/00

RECEIVED
MAR 28 2000
ALLAN E. SEWARD
Engineering Geology, Inc.

SCALE IN FEET: 0 100 200 400

REGISTERED PROFESSIONAL ENGINEER ROBERT R. SIMS No. 21649 EXP. 9-30-01 CIVIL STATE OF CALIFORNIA

Date 10/2/99

DATE CHANGED	CHANGED BY	REVISION
Jan. 2000	R.S., E.M.	Rev. entrance at "A" St., rev. slopes per geology recommendations, vegetative swales added, rev. storm drains, catch basin notes added
Dec. 1999		
Oct. 1999		
8/10/1999		
April 1999		
Nov. 1998		
April 1998		

Developer:
PALMER INVESTMENTS
1999 AVENUE OF THE STARS, 15TH FLOOR
LOS ANGELES, CALIFORNIA 90067
Ph.: (310) 772-7799
Fax: (310) 772-7790

Owner:
HASLEY CANYON LAND COMPANY, L.L.C.
1999 AVENUE OF THE STARS, 15TH FLOOR
LOS ANGELES, CALIFORNIA 90067

Legal Description:
PORTION OF THE NORTHWEST QUARTER OF SECTION 2 & THE NORTHEAST QUARTER OF SECTION 3, T4N, R17W, SBM IN THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA.

VESTING TENTATIVE TRACT MAP NO.

52584

IN THE UNINCORPORATED TERRITORY OF LOS ANGELES COUNTY
COUNTY CASE NO. 98-034(5)

Prepared by:
LAND DESIGN CONSULTANTS, INC.
Land Planning Civil Engineering, Surveying & Environmental Services
225 South Lake Ave., Suite 600, Pasadena, California 91101
Ph. (626) 578-7000 Fax: (626) 578-7373
http://www.ldcla.com

R.C.E. No. 21649 Robert R. Sims — 3/27/00 DATE

LDC

Proj. No.: 97017-005
Sht. 1 of 1

PLATE II
GEOLOGIC/GEOTECHNICAL MAP

For Legend See Plate VII

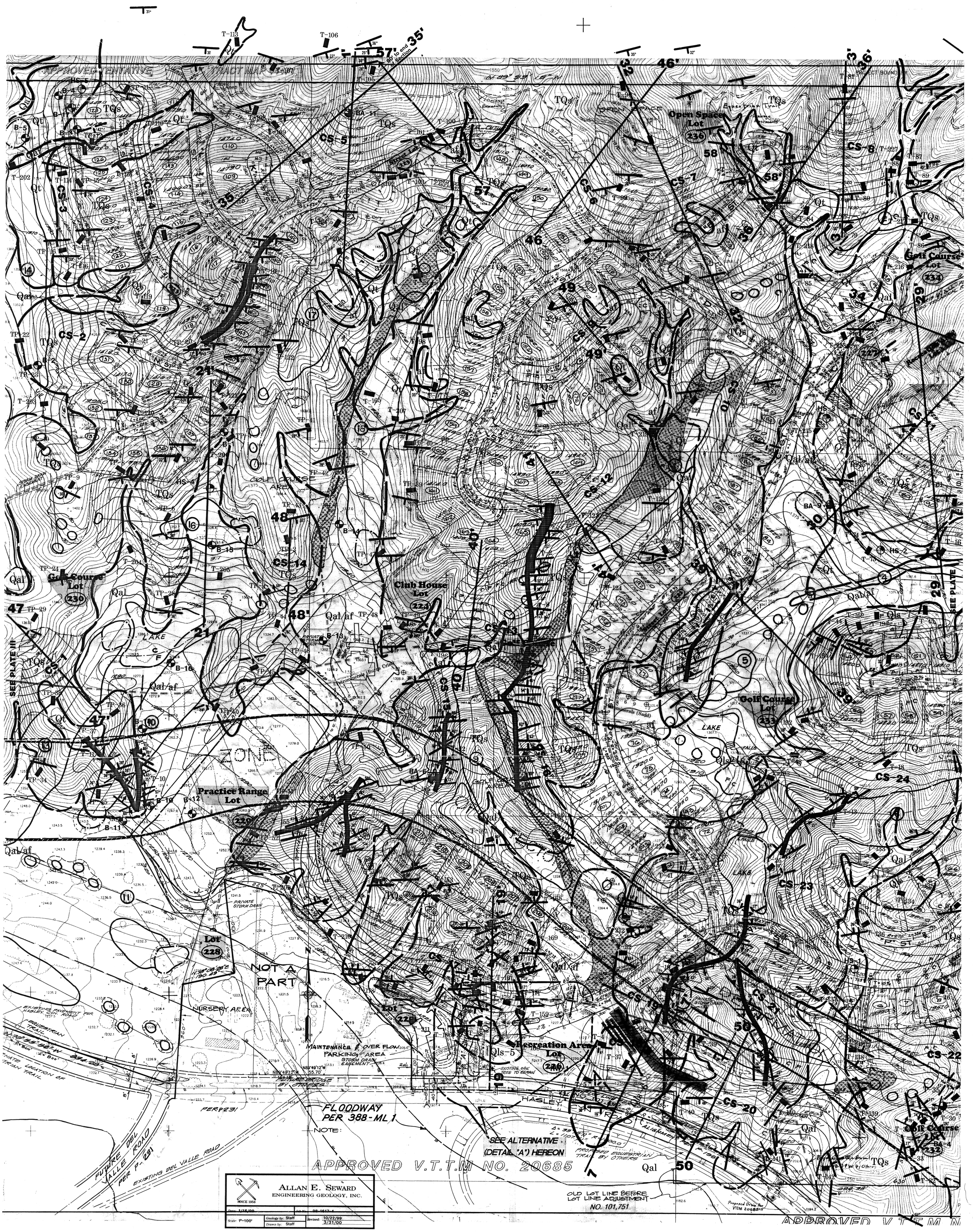
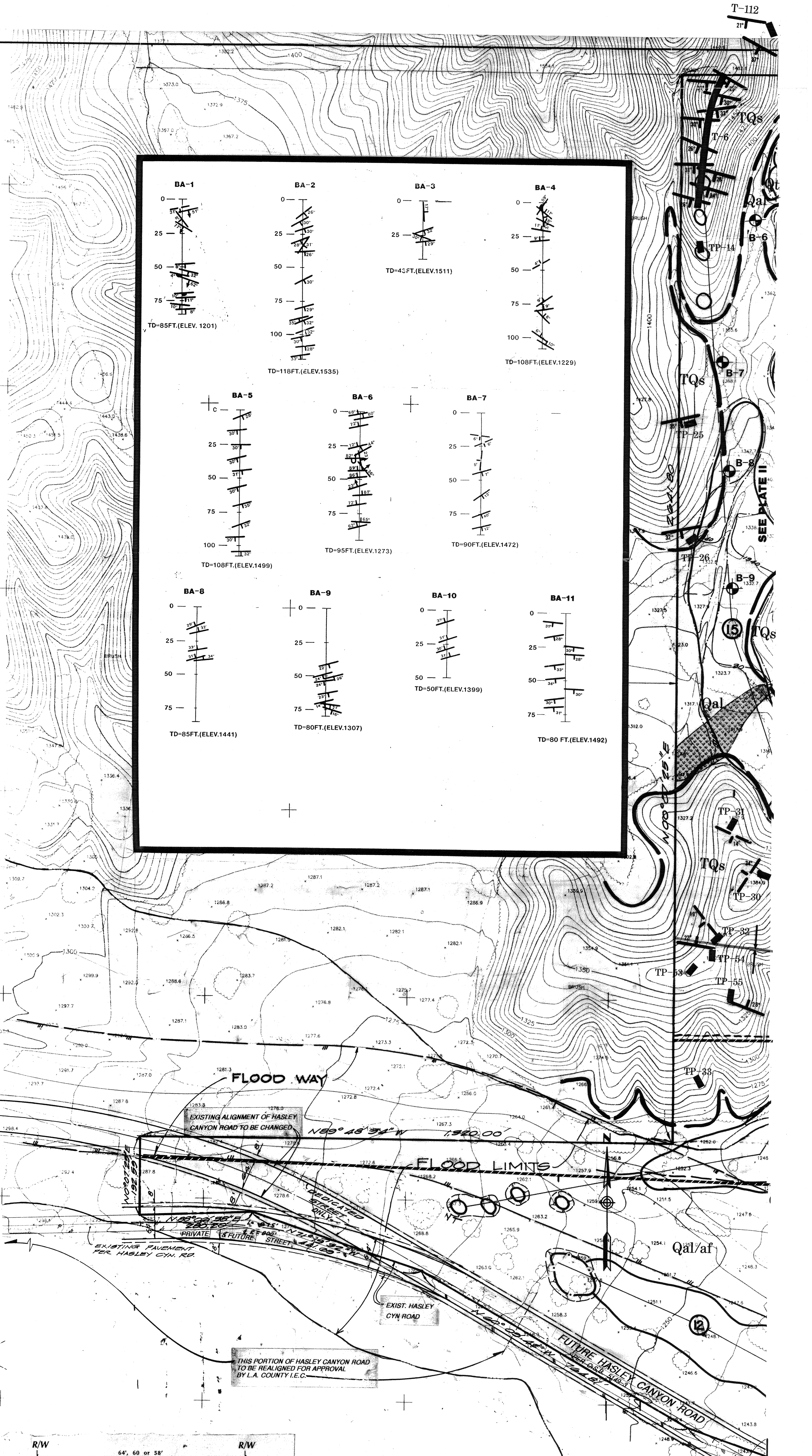


PLATE III
GEOLOGIC/GEOTECHNICAL MAP

For Legend See Plate VII



RESIDENTIAL LOTS

LOT NO.	LOT AREA (S.F.)	PAD AREA (S.F.)	LOT NO.	LOT AREA (S.F.)	PAD AREA (S.F.)	LOT NO.	LOT AREA (S.F.)	PAD AREA (S.F.)	NO.	LOT AREA (S.F.)	PAD AREA (S.F.)
1	16,500	11,500	26	18,000	11,700	51	15,000	11,000	76	15,000	10,000
2	16,600	11,500	27	15,000	11,700	52	15,000	11,000	77	15,000	11,100
3	15,000	11,300	28	15,000	11,500	53	15,000	11,500	78	15,000	11,150
4	15,000	11,300	29	15,000	10,400	54	15,000	11,500	79	15,000	11,250
5	15,000	11,350	30	15,000	11,900	55	15,000	11,500	80	15,000	11,200
6	15,000	11,400	31	15,000	11,800	56	15,000	12,000	81	15,000	11,250
7	15,000	11,250	32	15,000	11,700	57	15,000	11,900	82	15,000	11,250
8	15,000	11,350	33	15,000	11,400	58	15,000	11,900	83	15,000	12,320
9	15,000	12,000	34	15,000	11,400	59	15,000	11,200	84	15,000	11,250
10	15,000	11,500	35	15,000	11,400	60	15,000	11,200	85	15,000	12,000
11	15,000	11,200	36	15,000	11,400	61	15,000	11,200	86	15,000	12,400
12	15,000	11,000	37	15,000	11,400	62	15,000	11,300	87	15,680	12,400
13	15,000	11,000	38	15,000	11,400	63	15,000	12,000	88	15,500	10,400
14	15,000	10,300	39	15,000	11,500	64	15,000	11,050	89	15,500	10,400
15	15,000	10,300	40	15,500	11,600	65	15,000	11,100	90	16,000	11,200
16	15,000	10,400	41	16,700	12,000	66	15,000	11,100	91	16,200	11,600
17	15,000	10,400	42	20,400	13,650	67	15,000	12,300	92	16,200	11,200
18	15,000	10,500	43	15,000	12,600	68	15,000	12,000	93	15,000	10,800
19	19,000	10,800	44	15,000	11,250	69	16,000	12,500	94	15,000	10,800
20	15,800	11,900	45	15,000	11,350	70	15,000	10,500	95	15,000	13,500
21	15,000	11,900	46	15,000	11,200	71	15,000	9,200	96	17,000	14,400
22	15,000	11,800	47	15,000	11,200	72	15,000	9,800	97	17,000	13,500
23	15,000	11,700	48	15,000	11,200	73	15,000	10,400	98	15,300	13,500
24	15,500	11,700	49	15,000	11,200	74	15,000	10,400	99	15,300	13,500
25	15,000	10,400	50	15,000	11,000	75	15,000	10,000	100	15,300	13,500

LOT NO.	LOT AREA (S.F.)	PAD AREA (S.F.)	LOT NO.	LOT AREA (S.F.)	PAD AREA (S.F.)	LOT NO.	LOT AREA (S.F.)	PAD AREA (S.F.)	LOT NO.	LOT AREA (S.F.)	PAD AREA (S.F.)
101	18,500	13,800	126	15,000	10,800	151	17,800	12,000	176	17,000	12,400
102	18,500	13,800	127	15,000	10,800	152	15,000	11,200	177	22,000	12,600
103	16,000	13,200	128	16,000	10,800	153	15,000	12,600	178	21,500	12,400
104	16,000	14,400	129	21,600	10,600	154	15,200	12,600	179	17,100	10,200
105	16,000	14,400	130	18,700	12,300	155	15,000	12,600	180	17,100	10,200
106	18,000	15,000	131	16,000	11,700	156	15,500	11,000	181	19,900	12,700
107	18,000	15,000	132	21,600	10,600	157	16,000	11,000	182	26,000	12,700
108	18,000	13,000	133	21,000	10,700	158	18,700	11,000	183	22,100	15,000
109	15,400	13,000	134	20,700	12,600	159	18,000	10,900	184	15,000	12,000
110	25,000	15,300	135	16,500	12,600	160	17,500	12,600	185	15,200	12,000
111	26,000	12,300	136	16,800	12,800	161	17,200	12,600	186	15,400	12,000
112	18,000	12,300	137	16,800	12,600	162	16,800	12,600	187	15,400	11,600
113	17,100	12,100	138	16,500	12,600	163	17,800	12,800	188	15,000	11,500
114	17,100	12,100	139	16,000	12,600	164	16,900	13,800	189	15,200	11,500
115	17,100	12,200	140	16,100	12,500	165	25,100	13,200	190	17,850	11,500
116	17,200	12,200	141	18,200	13,600	166	20,700	12,600	191	15,400	11,500
117	21,600	12,200	142	18,700	11,600	167	18,000	12,800	192	15,300	11,100
118	19,800	12,100	143	19,300	11,600	168	17,800	13,000	193	15,000	11,000
119	15,300	10,800	144	16,000	12,000	169	19,800	14,900	194	15,100	10,800
120	17,500	14,250	145	16,000	12,300	170	20,500	12,800	195	15,300	10,800
121	15,300	13,000	146	17,000	12,300	171	17,000	12,600	196	15,000	10,660
122	15,200	13,100	147	17,000	13,700	172	17,800	12,800	197	15,000	10,660
123	15,300	10,800	148	16,500	12,300	173	17,100	12,600	198	15,200	10,700
124	15,300	10,800	149	15,500	12,600	174	17,100	12,400	199	15,300	10,700
125	15,300	10,700	150	17,000	12,700	175	17,100	12,400	200	15,300	10,700

SUMMARY

	[S.F.]	[Ac.]
Single Family Lots (1-220)	3,585,000	82.30
Private Street Lots (221-223)	1,276,250	29.30
Club House Lot (224)	592,800	13.61
Maintain/Overflow Parking Lot (225)	76,950	1.77
Private Park & Recreation Lots (226, 227)	205,450	4.72
Nursery Lot (228)	63,700	1.46
Practice Range Lot (229)	384,300	8.82
Golf Course Lots (230-234)	9,616,600	220.77
Open Space Lots (235-238)	2,816,000	64.65
Streets	232,900	5.35
Total	18,849,950	432.74

LOT NO.	LOT AREA (S.F.)	PAD AREA (S.F.)
201	15,000	10,500
202	15,000	10,700
203	15,000	10,500
204	19,600	13,500
205	17,000	11,900
206	16,000	11,000
207	16,500	11,000
208	16,500	11,000
209	16,500	11,000
210	16,500	12,300
211	16,000	12,000
212	15,500	12,000
213	15,500	12,000
214	16,500	12,000
215	16,500	11,000
216	16,200	10,600
217	16,200	10,200
218	15,680	10,300
219	15,500	10,300
220	15,600	10,500
TOTAL =	82.30 AC.	

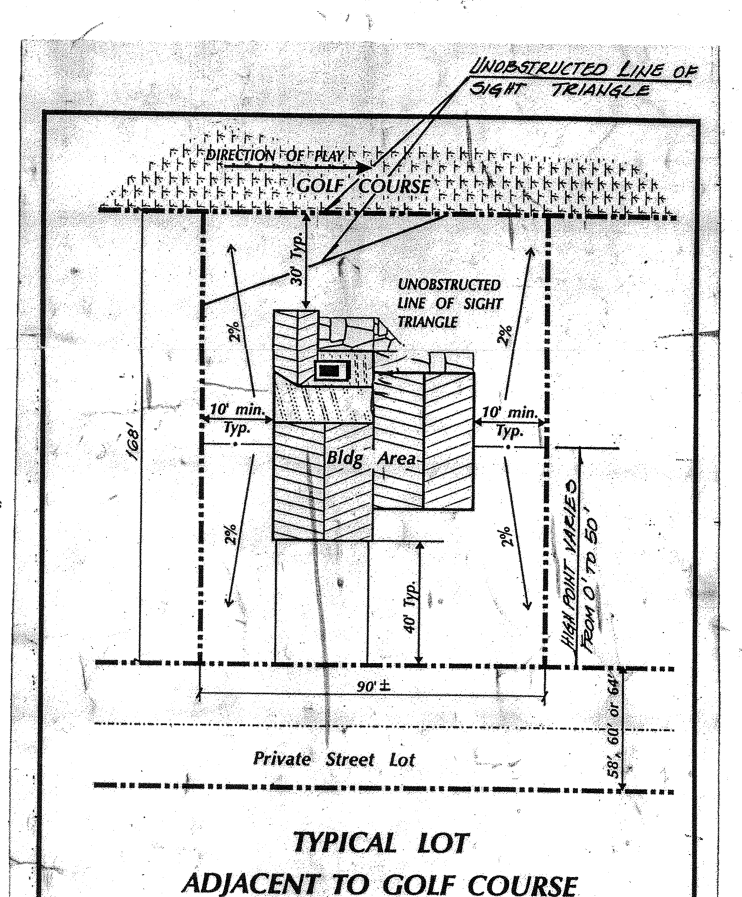
LOT NO.	LOT AREA [S.F.]	LOT AREA [AC.]
221	576,300	13.23
222	220,500	5.06
223	464,300	10.66
224	592,800	13.61
225	76,950	1.77
226	169,550	3.89
227	35,900	0.82
228	63,700	1.46
229	384,300	8.82
230	4,251,800	97.61
231	1,044,800	23.99
232	1,258,100	28.88
233	2,513,450	57.70
234	434,300	9.97
235	481,100	11.04
236	901,600	20.70
237	471,800	10.83
238	928,100	21.31
Street "J"	43,000	0.99
Barcelona Dr.	25,700	0.59
Hasley Cyn.	161,400	3.71

GENERAL NOTES:

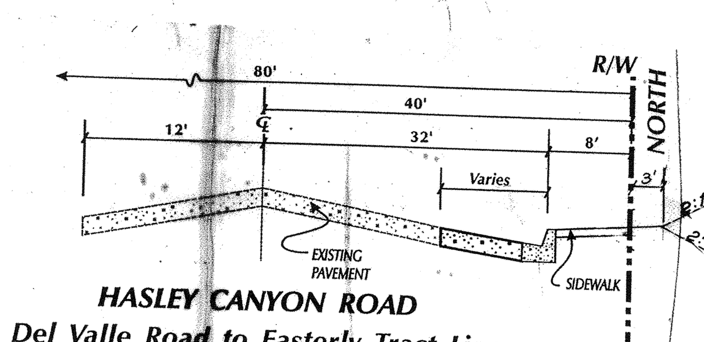
1. AREA .... 432.7± AC. GROSS
2. EXISTING ZONING A-2-2
3. PROPOSED ZONING A-2-1
4. EXISTING SITE USE .... VACANT, ABANDONED GOLF COURSE, SINGLE FAMILY HOUSE & OIL FACILITIES
5. DEVELOPMENT TYPE .... GOLF COURSE & RESIDENTIAL
6. TOTAL NUMBER OF SINGLE FAMILY LOTS 220
7. MINIMUM RESIDENTIAL LOT SIZE .... 15,000 SQ. FT.
8. DEVELOPMENT IS LOCATED IN FIRE ZONE 4
9. STREET, PRIVATE AND FUTURE STREET, PRIVATE DRIVEWAY AND FIRE LANE GRADES MIN. 0.5%, MAX. ~~12% ON A & C STREETS &~~ 15% ON J STREET
10. TOPOGRAPHY IS BASED ON CONTROLLED TOPO W/ CONTOUR INTERVALS 2 FEET.
11. ALL PUBLIC STREETS ARE OFFERED FOR DEDICATION.
12. RESIDENTIAL STREET TO BE DESIGNATED AS "PRIVATE & FUTURE STREETS" EASEMENTS SUBDIVIDER RESERVES THE RIGHT TO CONSTRUCT GATES & MEDIANS.
13. THE RIGHT IS RESERVED TO ADJUST STREET AND BUILDING PAD ELEVATIONS ON THE FINAL GRADING PLAN.
14. ALL SLOPES OVER 5 FEET IN HEIGHT ARE TO BE LANDSCAPED AND IRRIGATED WITH COUNTY APPROVED PLANTS AND GROUND COVER.
15. THE RIGHT IS RESERVED TO ADJUST LOT LINES AND MERGE LOTS ON THE FINAL MAP.
16. RECIPROCAL PARKING EASEMENTS TO BE RESERVED FOR ALL RESIDENTIAL AND GOLF COURSE LOTS.
17. EXISTING & PROPOSED COUNTY-WIDE GENERAL PLAN .... R
18. EXISTING SANTA CLARITA VALLEY AREAWIDE LOCAL PLAN .... N2, HM
19. GROSS DENSITY .... 0.5 DU/AC
20. OAK TREES EXISTING WITHIN PROJECT BOUNDARY ARE SUBJECT TO A LOS ANGELES COUNTY OAK TREE PERMIT
21. BOUNDARY LINE DIMENSIONS ARE TAKEN FROM RECORD DATA. LOT AREAS SHOWN IN TABLE HEREON ARE GROSS ACREAGE.
22. SUBDIVIDER REQUESTS ALTERNATE STREET SECTIONS PER SECTION 21.24.090 OF LOS ANGELES COUNTY SUBDIVISION CODE TITLE 21
23. SUBDIVIDER RESERVES THE RIGHT TO FILE MULTIPLE FINAL MAPS PER SECTION 66456.1 OF THE STATE MAP ACT.
24. NUMBER AND TYPE OF LOTS PROPOSED: ... WITH THE FOLLOWING USES: NURSERY, OVERFLOW PARKING & PRIVATE & REC. AREAS GOLF COURSE AREAS OPEN SPACE AREAS PRIVATE STREET AREAS 220 SINGLE FAMILY LOTS 238 TOTAL
25. TOTAL PARKING SPACES PROVIDED - GOLF COURSE 150
26. TOP AND TOE OF SLOPES ARE SUBJECT TO CHANGE IN FINAL ENGINEERING.
27. A LANDSCAPE MAINTENANCE DISTRICT OR H.O.A. WILL BE ESTABLISHED FOR MAINTENANCE OF PRIVATE & FUTURE STREETS, OPEN SPACE SLOPES AND COMMON SLOPES OVER 5 FEET IN HEIGHT.
28. PERMISSION IS REQUESTED TO ABANDON ALL OF THE COUNTY EASEMENTS FOR DRAINAGE PURPOSES BY THE FINAL MAP PERSUANT TO SECTION 66499.20 ½ OF THE STATE GOVERNMENT CODE (IF ANY).
29. TOTAL CUT: 6,800,000 C.Y., TOTAL FILL: 6,800,000 C.Y.
30. SUBDIVIDER RESERVES THE RIGHT TO FILE A PARCEL MAP PRIOR TO FILING FINAL TRACT MAPS CONTAINING ALL LOTS 20 ACREAMINIMUM.

UTILITIES AND SERVICES

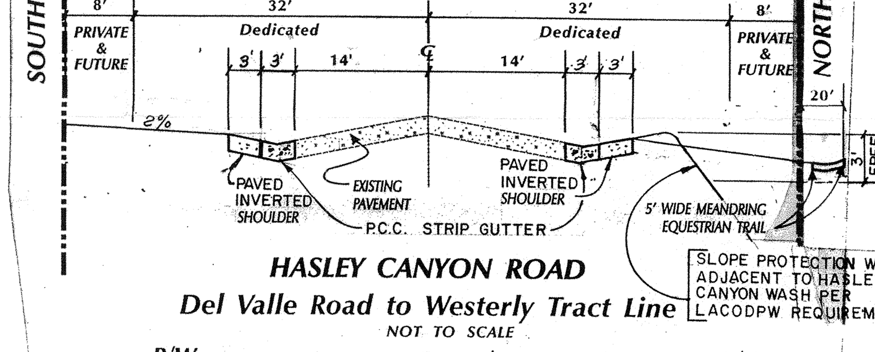
1. WATER .... VALENCIA WATER COMPANY
2. SEWER .... LOS ANGELES SANITATION DISTRICT 32
3. GAS .... SOUTHERN CALIFORNIA GAS COMPANY
4. ELECTRIC .... SOUTHERN CALIFORNIA EDISON COMPANY
5. TELEPHONE .... GENERAL TELEPHONE
6. CABLE TV .... TBD
7. SCHOOL .... CASTAIC SCHOOL DISTRICT .... & WILLIAM S. HART UNIFIED HIGH SCHOOL DISTRICT



TYPICAL LOT ADJACENT TO GOLF COURSE DETAIL

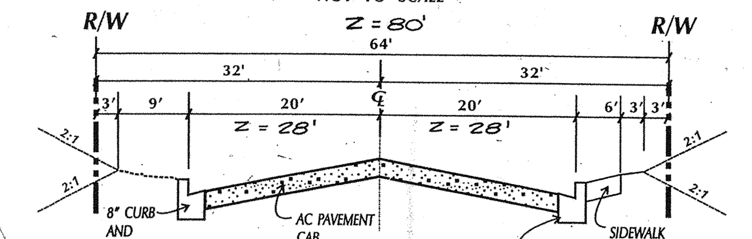


HASLEY CANYON ROAD
Del Valle Road to Easterly Tract Line
NOT TO SCALE

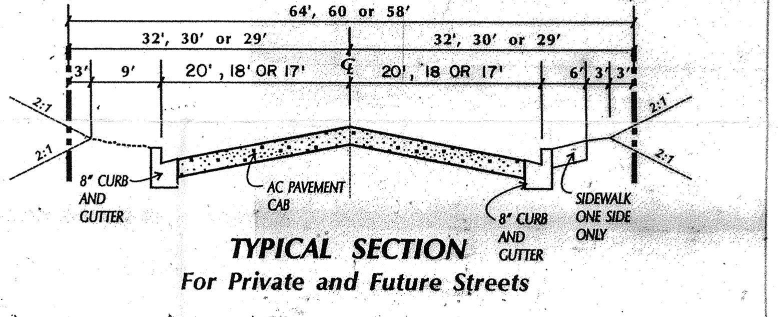


HASLEY CANYON ROAD
Del Valle Road to Westerly Tract Line
NOT TO SCALE

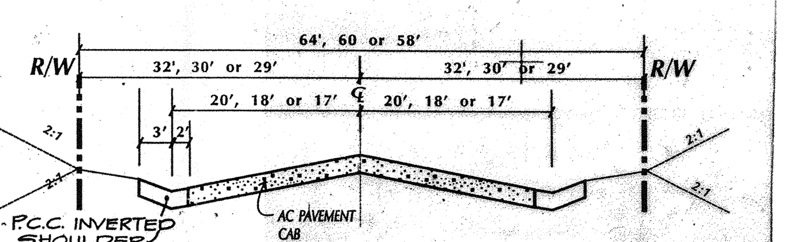
SLOPE PROTECTION WHEN ADJACENT TO HASLEY CANYON WASH PER LACODPW REQUIREMENTS



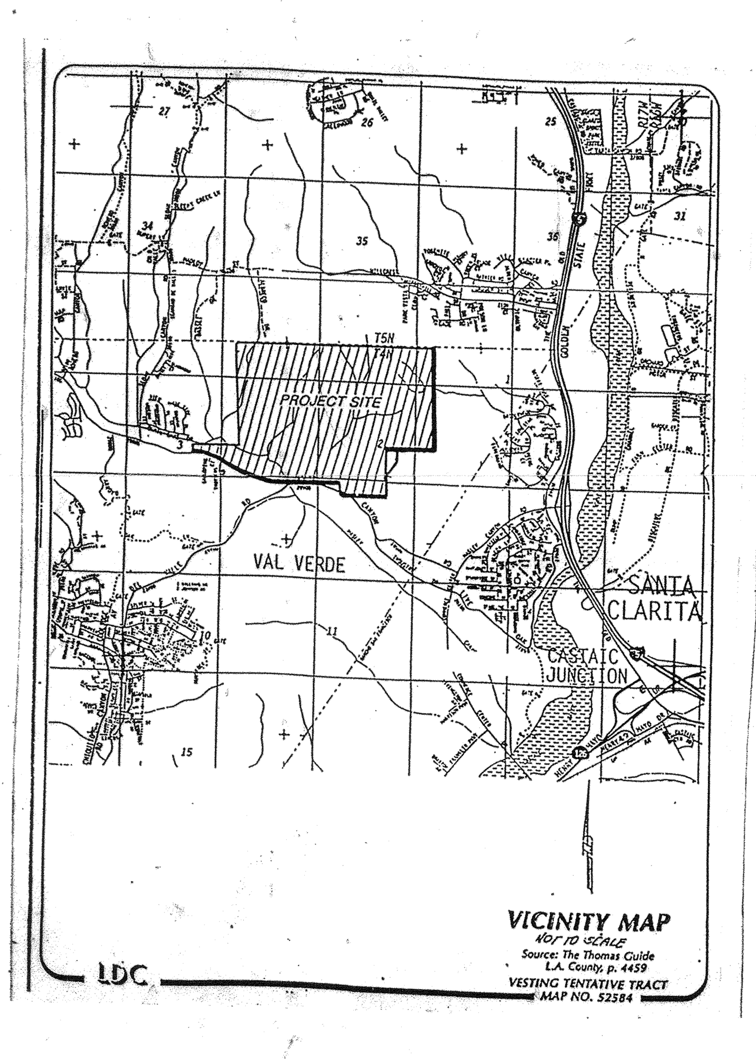
TYPICAL SECTION
Public Streets
To be dedicated
NOT TO SCALE



TYPICAL SECTION
For Private and Future Streets
NOT TO SCALE



ALTERNATE STREET SECTION
Private And Future Streets
NOT TO SCALE



VICINITY MAP
NOT TO SCALE
Source: The Thomas Guide L.A. County, p. 4459
VESTING TENTATIVE TRACT MAP NO. 52584

LEGEND: BMPs

VEGETATIVE SWALES

H.O.A. OR MAINTENANCE DISTRICT MAINTAINED CURB OPENING CATCH BASIN WITH CATCH BASIN INSERT AS APPROVED BY D.P.W. ALL CBs.

ALL CATCH BASINS AND INLETS SHALL BE STENCILED WITH "WARNING! DRAINS TO OCEAN". NOTES AND SYMBOLS PER NPDES BMP STANDARDS OR AS APPROVED BY D.W.P.

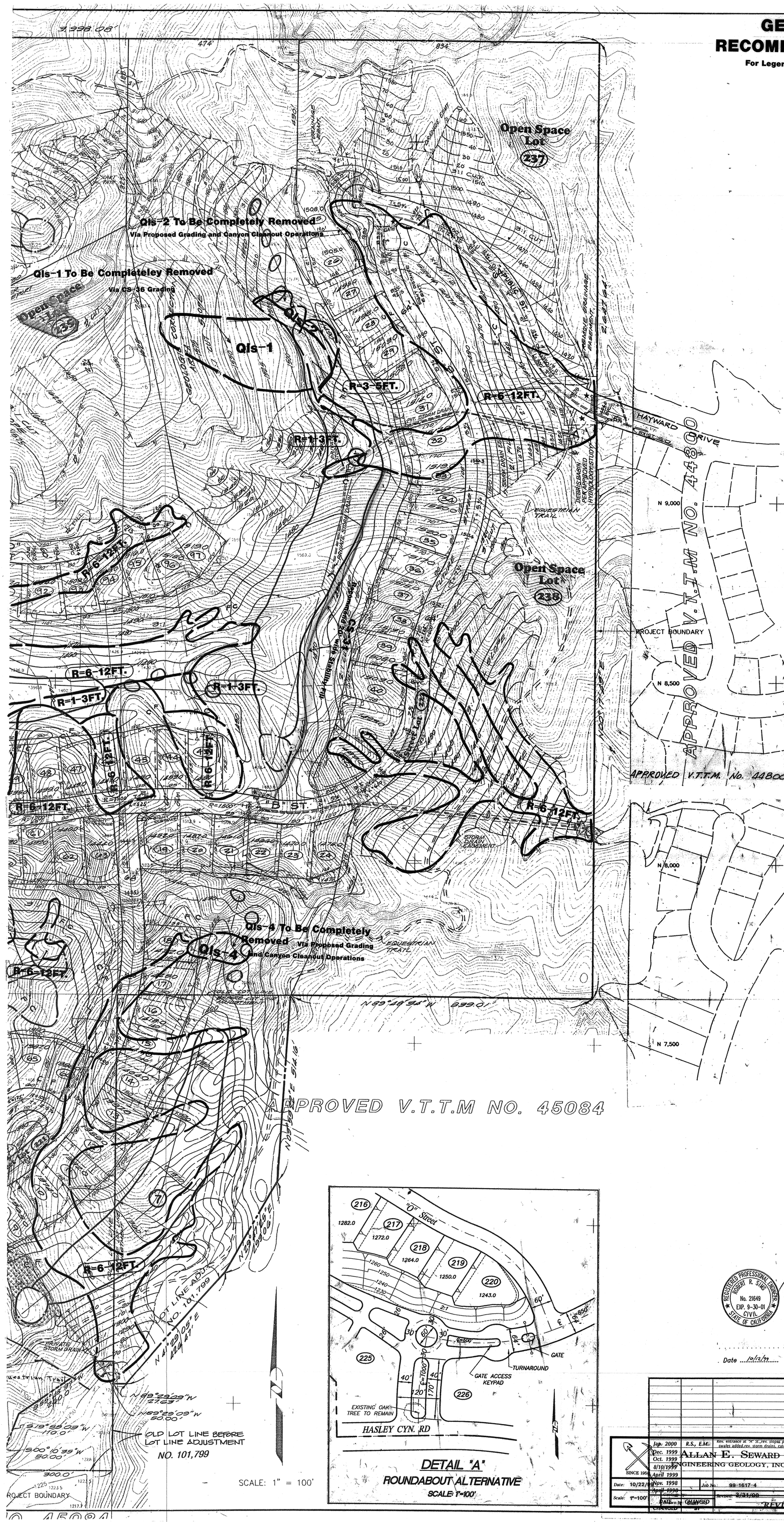
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1958

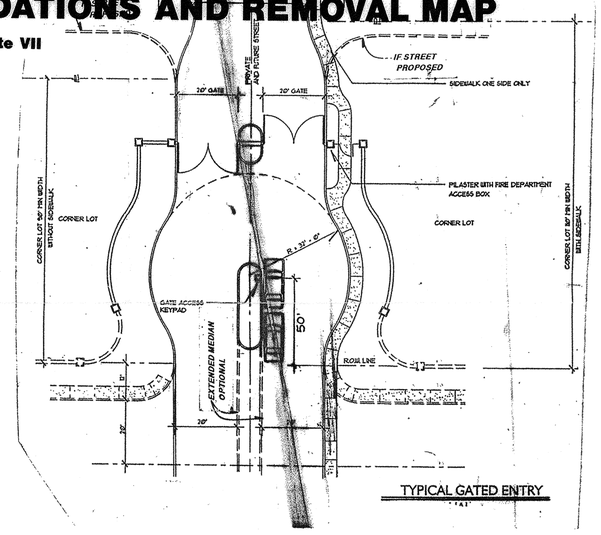
Date: 1/15/99		Job No.: 98-1617-4	
Scale: 1"=100'	Geology by: Staff	Revised:	10/22/99 3/31/00
	Drawn by: Staff		

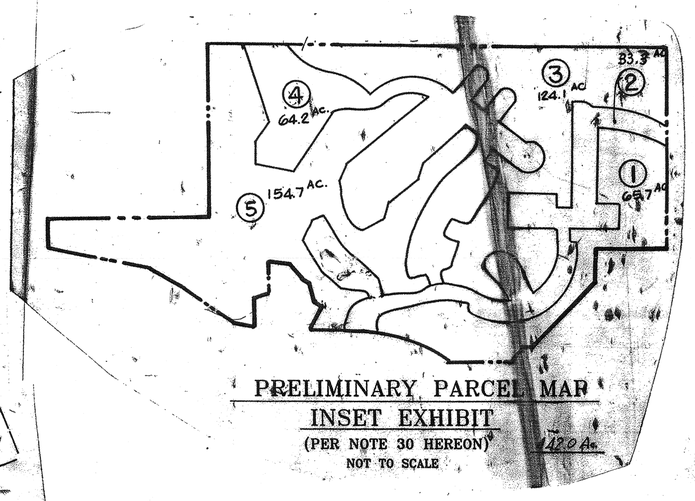
GEOLOGIC/GEOTECHNICAL RECOMMENDATIONS AND REMOVAL MAP

PLATE IV

For Legend See Plate VII







PRELIMINARY PARCEL MAP
INSET EXHIBIT
(PER NOTE 30 HEREON)
NOT TO SCALE

DETAIL "A"
ROUNDABOUT ALTERNATIVE
SCALE: 1"=100'

SCALE: 1" = 100'

OLD LOT LINE BEFORE LOT LINE ADJUSTMENT NO. 101,799

REGISTERED PROFESSIONAL ENGINEER ROBERT R. SIMS No. 21649 EXP. 9-30-01 CIVIL STATE OF CALIFORNIA

Date 10/2/99

Jan. 2000	R.S., E.M.	Rev. entrance at "A" St.,rev. slopes per geologic recommendations, vegetative swales added,rev. storm drains, catch basin notes added
Dec. 1999		
Oct. 1999		
8/10/1999		
April 1999		
Nov. 1998		
April 1998		
DATE	CHANGED BY	REVISION

SINCE 1958 ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Date: 10/22/98 Job No.: 99-1617-4
Scale: 1"=100' Revised: 3/31/00
Drawn by: Checked by:

RECEIVED MAR 28 2000 ALLAN E. SEWARD Engineering Geology, Inc.

SCALE IN FEET: 0 100 200 400

Developer:
PALMER INVESTMENTS
1999 AVENUE OF THE STARS, 15TH FLOOR
LOS ANGELES, CALIFORNIA 90067
Ph.: (310) 772-7799
Fax: (310) 772-7790

Owner:
HASLEY CANYON LAND COMPANY, L.L.C.
1999 AVENUE OF THE STARS, 15TH FLOOR
LOS ANGELES, CALIFORNIA 90067

Legal Description:
PORTION OF THE NORTHWEST QUARTER OF SECTION 2 & THE NORTHEAST QUARTER OF SECTION 3, T4N, R17W, SBM IN THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA.

VESTING TENTATIVE TRACT MAP NO. 52584

IN THE UNINCORPORATED TERRITORY OF LOS ANGELES COUNTY
COUNTY CASE NO. 98-034(5)

Prepared by:
LAND DESIGN CONSULTANTS, INC.
Land Planning Civil Engineering, Surveying & Environmental Services
225 South Lake Ave., Suite 600, Pasadena, California 91101
Ph. (626) 578-7000 Fax: (626) 578-7373
http://www.ldcla.com

R.C.E. No. 21649 Robert R. Sims — 3/23/00 DATE

LDC

Proj. No. 97017-005

Sht 1 of 1

APPROVED TENTATIVE TRACT MAP 44471

GEOLOGIC/GEOTECHNICAL RECOMMENDATIONS AND REMOVAL MAP

PLATE V

For Legend See Plate VII

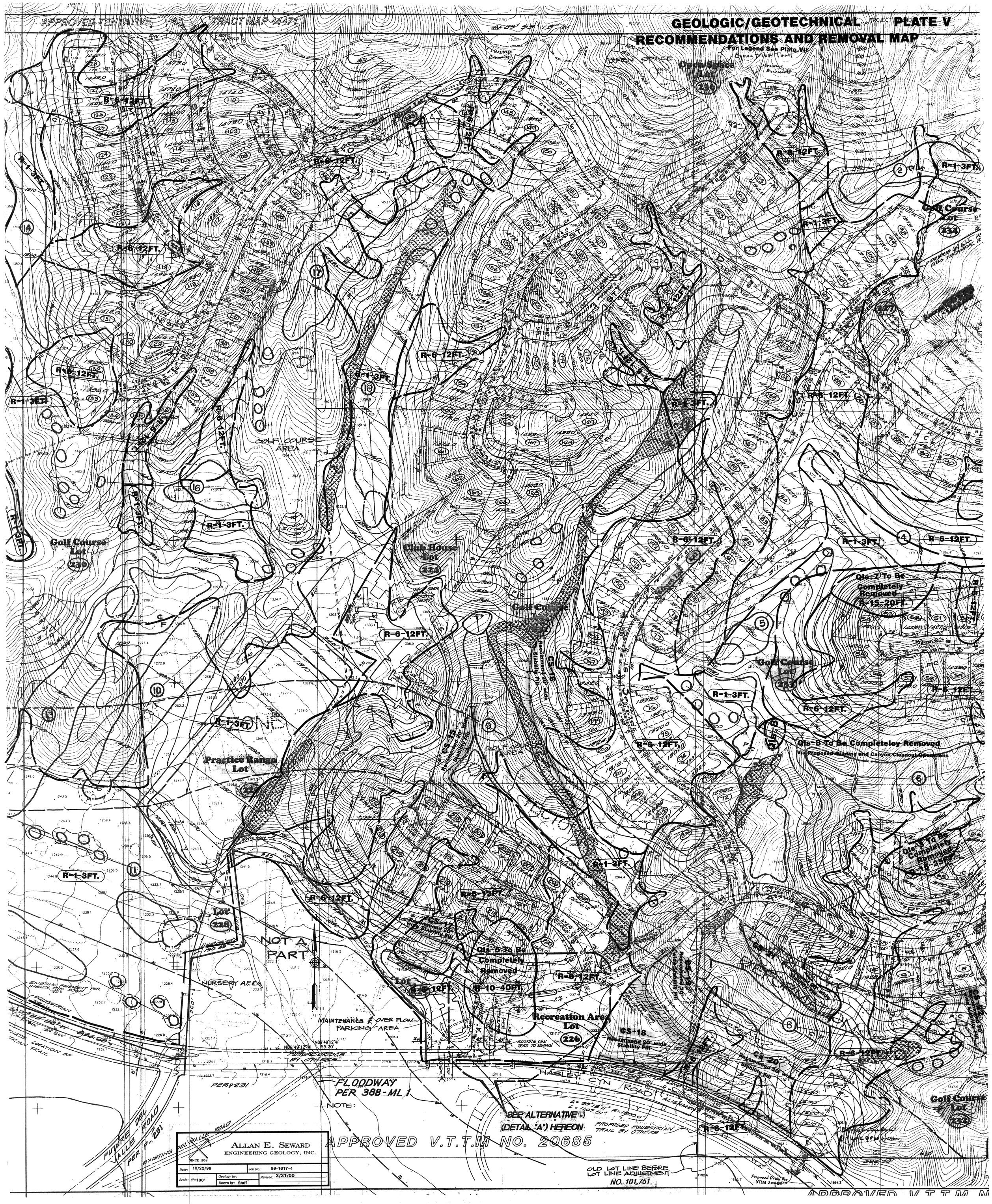


PLATE VI

GEOLOGIC/GEOTECHNICAL RECOMMENDATIONS AND REMOVAL MAP

For Legend See Plate VII

RESIDENTIAL LOTS

LOT NO.	LOT AREA (S.F.)	PAD AREA (S.F.)	LOT NO.	LOT AREA (S.F.)	PAD AREA (S.F.)	LOT NO.	LOT AREA (S.F.)	PAD AREA (S.F.)	LOT NO.	LOT AREA (S.F.)	PAD AREA (S.F.)
1	16,500	11,500	26	18,000	11,700	51	15,000	11,000	76	15,000	10,000
2	16,600	11,500	27	15,000	11,700	52	15,000	11,000	77	15,000	11,100
3	15,000	11,300	28	15,000	11,500	53	15,000	11,500	78	15,000	11,150
4	15,000	11,300	29	15,000	10,400	54	15,000	11,500	79	15,000	11,250
5	15,000	11,350	30	15,000	11,900	55	15,000	11,500	80	15,000	11,200
6	15,000	11,400	31	15,000	11,800	56	15,000	12,000	81	15,000	11,250
7	15,000	11,250	32	15,000	11,700	57	15,000	11,900	82	15,000	11,250
8	15,000	11,350	33	15,000	11,400	58	15,000	11,900	83	15,000	12,320
9	15,000	12,000	34	15,000	11,400	59	15,000	11,200	84	15,000	11,250
10	15,000	11,500	35	15,000	11,400	60	15,000	11,200	85	15,000	12,000
11	15,000	11,200	36	15,000	11,400	61	15,000	11,200	86	15,000	12,400
12	15,000	11,000	37	15,000	11,400	62	15,000	11,300	87	15,680	12,400
13	15,000	11,000	38	15,000	11,400	63	15,000	12,000	88	15,500	10,400
14	15,000	10,300	39	15,000	11,500	64	15,000	11,050	89	15,500	10,400
15	15,000	10,300	40	15,500	11,600	65	15,000	11,100	90	16,000	11,200
16	15,000	10,400	41	16,700	12,000	66	15,000	11,100	91	16,200	11,600
17	15,000	10,400	42	20,400	13,650	67	15,000	12,300	92	16,200	11,200
18	15,000	10,500	43	15,000	12,600	68	15,000	12,000	93	15,000	10,800
19	19,000	10,800	44	15,000	11,250	69	16,000	12,500	94	15,000	10,800
20	15,800	11,900	45	15,000	11,350	70	15,000	10,500	95	15,000	13,500
21	15,000	11,900	46	15,000	11,200	71	15,000	10,200	96	17,000	14,400
22	15,000	11,800	47	15,000	11,200	72	15,000	9,800	97	17,000	13,500
23	15,000	11,700	48	15,000	11,200	73	15,000	10,400	98	15,300	13,500
24	15,500	11,700	49	15,000	11,200	74	15,000	10,400	99	15,300	13,500
25	15,000	10,400	50	15,000	11,000	75	15,000	10,000	100	15,300	13,500

LOT NO.	LOT AREA (S.F.)	PAD AREA (S.F.)	LOT NO.	LOT AREA (S.F.)	PAD AREA (S.F.)	LOT NO.	LOT AREA (S.F.)	PAD AREA (S.F.)	LOT NO.	LOT AREA (S.F.)	PAD AREA (S.F.)
101	18,500	13,800	126	15,000	10,800	151	17,800	12,000	176	17,000	12,400
102	18,500	13,800	127	15,000	10,800	152	15,000	11,200	177	22,000	12,600
103	16,000	13,200	128	16,000	10,800	153	15,000	12,600	178	21,500	12,400
104	16,000	13,400	129	21,600	10,600	154	15,200	12,600	179	17,100	10,200
105	16,000	14,400	130	18,700	12,300	155	15,000	12,600	180	17,100	10,200
106	18,000	15,000	131	16,000	11,700	156	15,500	11,000	181	19,900	12,700
107	18,000	15,000	132	21,600	10,600	157	16,000	11,000	182	26,000	12,700
108	18,000	13,000	133	21,000	10,700	158	18,700	11,000	183	22,100	15,000
109	15,400	13,000	134	20,700	12,600	159	18,000	10,900	184	15,000	12,000
110	25,000	15,300	135	16,500	12,600	160	17,500	12,600	185	15,200	12,000
111	26,000	12,300	136	16,800	12,800	161	17,200	12,600	186	15,400	12,000
112	18,000	12,300	137	16,800	12,600	162	16,800	12,600	187	15,400	11,600
113	17,100	12,100	138	16,500	12,600	163	17,800	12,800	188	15,000	11,500
114	17,100	12,100	139	16,000	12,600	164	16,900	13,800	189	15,200	11,500
115	17,100	12,200	140	16,100	12,500	165	25,100	13,200	190	17,850	11,500
116	17,200	12,200	141	18,200	13,600	166	20,700	12,600	191	15,400	11,500
117	21,600	12,200	142	18,700	11,600	167	18,000	12,800	192	15,300	11,100
118	19,800	12,100	143	19,300	11,600	168	17,800	13,000	193	15,000	11,000
119	15,300	10,800	144	16,000	12,000	169	19,800	14,000	194	15,100	10,800
120	17,500	14,250	145	16,000	12,300	170	20,500	12,800	195	15,300	10,800
121	15,300	13,000	146	17,000	12,300	171	17,000	12,600	196	15,000	10,660
122	15,200	13,100	147	17,000	13,700	172	17,800	12,600	197	15,000	10,660
123	15,300	10,800	148	16,500	12,300	173	17,100	12,600	198	15,200	10,700
124	15,300	10,800	149	15,500	12,600	174	17,100	12,400	199	15,300	10,700
125	15,300	10,700	150	17,000	12,700	175	17,100	12,400	200	15,300	10,700

SUMMARY

	[S.F.]	[Ac.]
Single Family Lots (1-220)	3,585,000	82.30
Private Street Lots (221-223)	1,276,250	29.30
Club House Lot (224)	592,800	13.61
Maintain/Overflow Parking Lot (225)	76,950	1.77
Private Park & Recreation Lots (226, 227)	205,450	4.72
Nursery Lot (228)	63,700	1.46
Practice Range Lot (229)	384,300	8.82
Golf Course Lots (230-234)	9,616,600	220.77
Open Space Lots (235-238)	2,816,000	64.65
Streets	232,900	5.35
Total	18,849,950	432.74

LOT NO.	LOT AREA (S.F.)	PAD AREA (S.F.)
201	15,000	10,500
202	15,000	10,700
203	15,000	10,500
204	19,600	13,500
205	17,000	11,900
206	16,000	11,000
207	16,500	11,000
208	16,500	11,000
209	16,500	11,000
210	16,500	12,300
211	16,000	12,000
212	15,500	12,000
213	15,500	12,000
214	16,500	12,000
215	16,500	11,000
216	16,200	10,600
217	16,200	10,200
218	15,680	10,300
219	15,500	10,300
220	15,600	10,500
TOTAL =	82.30 AC.	

LOT NO.	LOT AREA [S.F.]	LOT AREA [AC.]
221	576,300	13.23
222	220,500	5.06
223	464,300	10.66
224	592,800	13.61
225	76,950	1.77
226	169,550	3.89
227	35,900	0.82
228	63,700	1.46
229	384,300	8.82
230	4,251,800	97.61
231	1,044,800	23.99
232	1,258,100	28.88
233	2,513,450	57.70
234	434,300	9.97
235	481,100	11.04
236	901,600	20.70
237	471,600	10.83
238	928,100	21.31
Street "J"	43,000	0.99
Barcelona Dr.	25,700	0.59
Hasley Cyn.	161,400	3.71

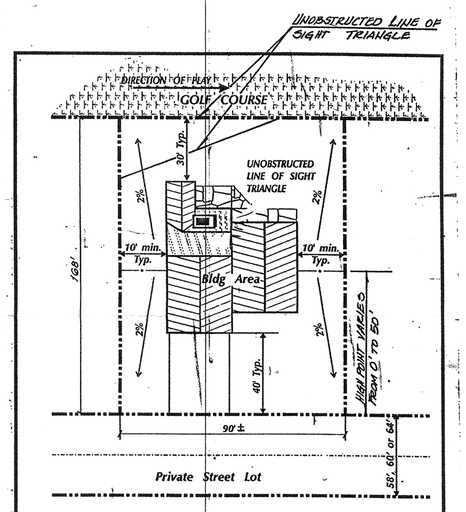
GENERAL NOTES:

1. AREA ..... 432.74 AC. GROSS
2. EXISTING ZONING A-2-2
3. PROPOSED ZONING A-2-1
4. EXISTING SITE USE: ..... VACANT, ABANDONED GOLF COURSE, SINGLE FAMILY HOUSE & OIL FACILITIES
5. DEVELOPMENT TYPE ..... GOLF COURSE & RESIDENTIAL
6. TOTAL NUMBER OF SINGLE FAMILY LOTS 220
7. MINIMUM RESIDENTIAL LOT SIZE ..... 15,000 SQ. FT.
8. DEVELOPMENT IS LOCATED IN FIRE ZONE 4
9. STREET, PRIVATE AND FUTURE STREET, PRIVATE DRIVEWAY AND FIRE LANE GRADES MIN. 0.5%, MAX. 15%. ON A & B STREETS IS 15 % ON J STREET
10. TOPOGRAPHY IS BASED ON CONTROLLED TOPO W/ CONTOUR INTERVALS 2 FEET.
11. ALL PUBLIC STREETS ARE OFFERED FOR DEDICATION.
12. RESIDENTIAL STREET TO BE DESIGNATED AS "PRIVATE & FUTURE STREETS" EASEMENTS SUBDIVIDER RESERVES THE RIGHT TO CONSTRUCT GATES & MEDIANS.
13. THE RIGHT IS RESERVED TO ADJUST STREET AND BUILDING PAD ELEVATIONS ON THE FINAL GRADING PLAN.
14. ALL SLOPES OVER 5 FEET IN HEIGHT ARE TO BE LANDSCAPED AND IRRIGATED WITH COUNTY APPROVED PLANTS AND GROUND COVER.
15. THE RIGHT IS RESERVED TO ADJUST LOT LINES AND MERGE LOTS ON THE FINAL MAP.
16. RECIPROCAL PARKING EASEMENTS TO BE RESERVED FOR ALL RESIDENTIAL AND GOLF COURSE LOTS.
17. EXISTING & PROPOSED COUNTY-WIDE GENERAL PLAN ..... R
18. EXISTING SANTA CLARITA VALLEY AREAWIDE LOCAL PLAN ..... N2, HM
19. GROSS DENSITY ..... 0.5 DU/AC
20. OAK TREES EXISTING WITHIN PROJECT BOUNDARY ARE SUBJECT TO A LOS ANGELES COUNTY OAK TREE PERMIT
21. BOUNDARY LINE DIMENSIONS ARE TAKEN FROM RECORD DATA. LOT AREAS SHOWN IN TABLE HEREON ARE GROSS ACREAGE.
22. SUBDIVIDER REQUESTS ALTERNATE STREET SECTIONS PER SECTION 21.24.090 OF LOS ANGELES COUNTY SUBDIVISION CODE TITLE 21
23. SUBDIVIDER RESERVES THE RIGHT TO FILE MULTIPLE FINAL MAPS PER SECTION 66456.1 OF THE STATE MAP ACT.
24. NUMBER AND TYPE OF LOTS PROPOSED:

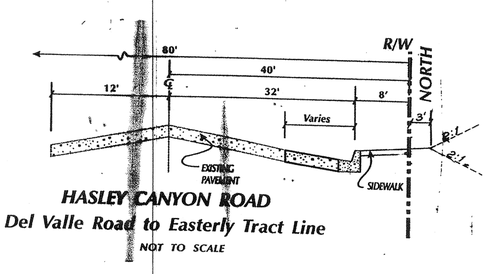
    " WITH THE FOLLOWING USES: NURSERY, OVERFLOW PARKING & PRIVATE & REC. AREAS
    GOLF COURSE AREAS
    OPEN SPACE AREAS
    PRIVATE STREET AREAS
    220 SINGLE FAMILY LOTS
    238 TOTAL
25. TOTAL PARKING SPACES PROVIDED - GOLF COURSE 150
26. TOP AND TOE OF SLOPES ARE SUBJECT TO CHANGE IN FINAL ENGINEERING.
27. A LANDSCAPE MAINTENANCE DISTRICT OR H.O.A. WILL BE ESTABLISHED FOR MAINTENANCE OF PRIVATE & FUTURE STREETS, OPEN SPACE SLOPES AND COMMON SLOPES OVER 5 FEET IN HEIGHT.
28. PERMISSION IS REQUESTED TO ABANDON ALL OF THE COUNTY EASEMENTS FOR DRAINAGE PURPOSES BY THE FINAL MAP PERSUANT TO SECTION 66499.20 ½ OF THE STATE GOVERNMENT CODE (IF ANY).
29. TOTAL CUT: 6,800,000 C.Y., TOTAL FILL: 6,800,000 C.Y.
30. SUBDIVIDER RESERVES THE RIGHT TO FILE A PARCEL MAP PRIOR TO FILING FINAL TRACT MAPS CONTAINING ALL LOTS 20 ACRE MINIMUM.

UTILITIES AND SERVICES

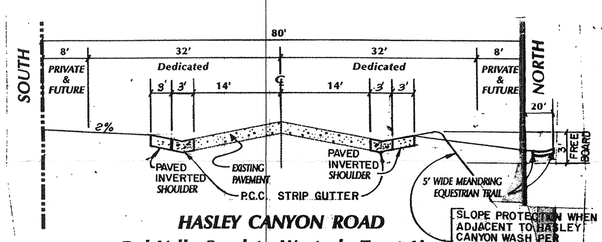
1. WATER ..... VALENCIA WATER COMPANY
2. SEWER ..... LOS ANGELES SANITATION DISTRICT 32
3. GAS ..... SOUTHERN CALIFORNIA GAS COMPANY
4. ELECTRIC ..... SOUTHERN CALIFORNIA EDISON COMPANY
5. TELEPHONE ..... GENERAL TELEPHONE
6. CABLE TV ..... TBD
7. SCHOOL ..... CASTAIC SCHOOL DISTRICT
   ..... & WILLIAM S. HART UNIFIED HIGH SCHOOL DISTRICT



TYPICAL LOT ADJACENT TO GOLF COURSE DETAIL

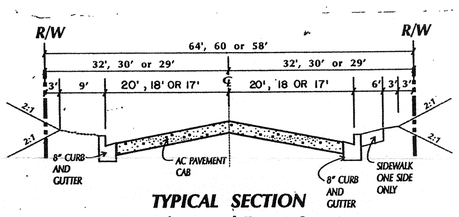


HASLEY CANYON ROAD
Del Valle Road to Easterly Tract Line
NOT TO SCALE

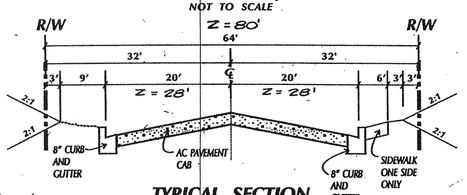


SLOPE PROTECTION WHEN ADJACENT TO HASLEY CANYON WASH PER LACODPW REQUIREMENTS

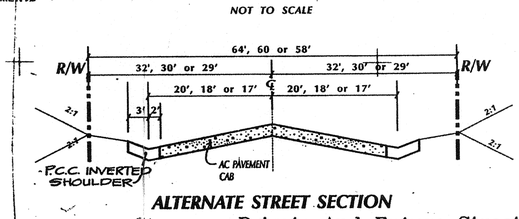
HASLEY CANYON ROAD
Del Valle Road to Westerly Tract Line
NOT TO SCALE



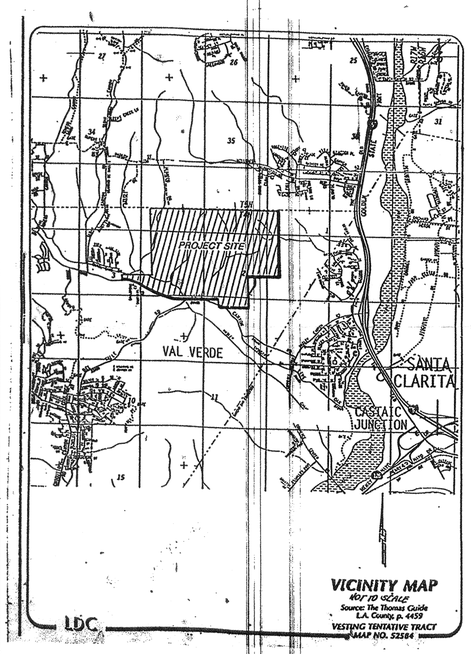
TYPICAL SECTION
For Private and Future Streets
NOT TO SCALE



TYPICAL SECTION
Public Streets
To be dedicated
NOT TO SCALE

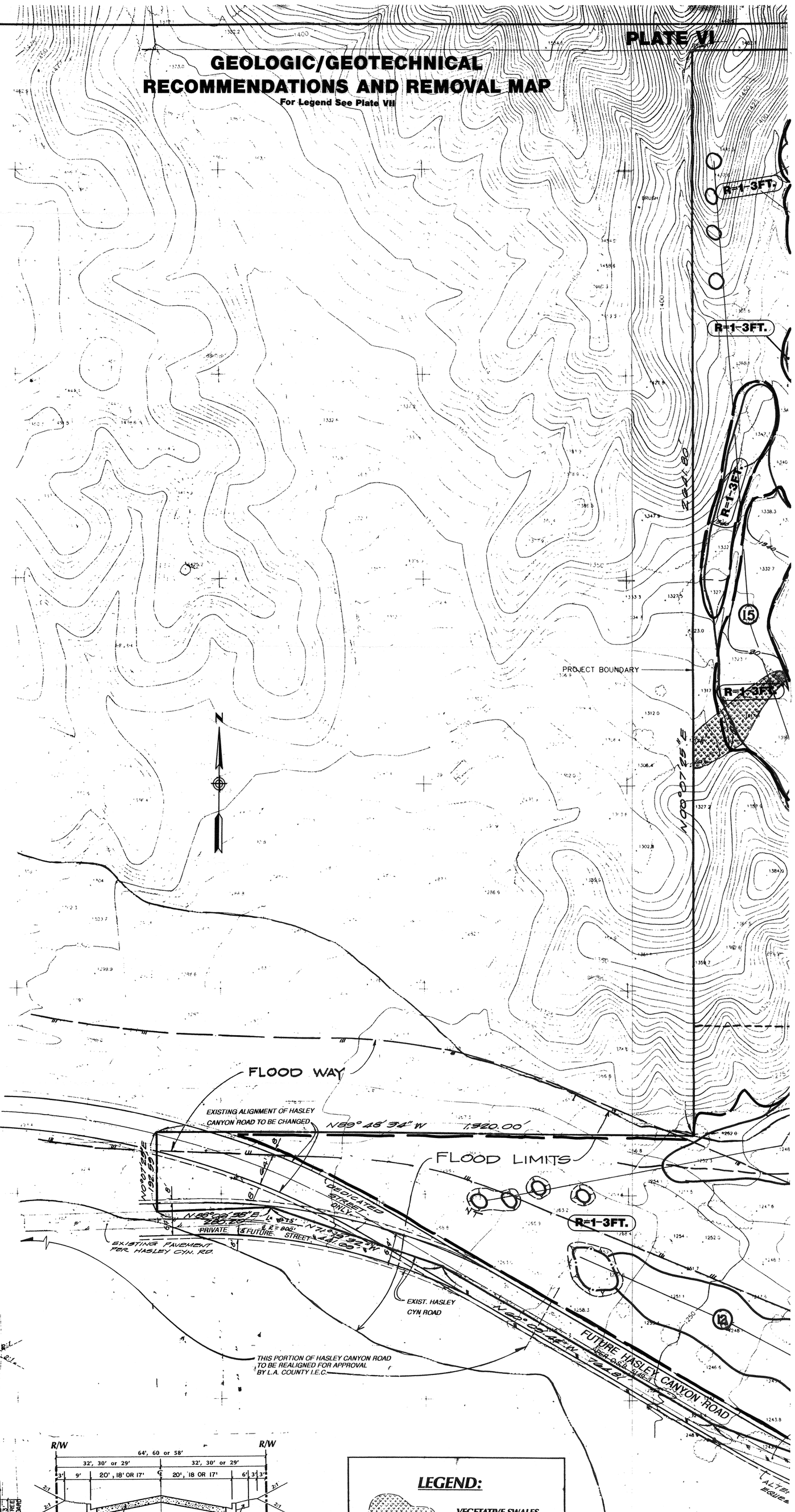


ALTERNATE STREET SECTION
Private And Future Streets
NOT TO SCALE



VICINITY MAP
NOT TO SCALE
Source: The Thomas Guide L.A. County, p. 4459
VESTING TENTATIVE TRACT MAP NO. 52564

LDC



LEGEND:

VEGETATIVE SWALES (BMP)

★ - H.O.A. OR MAINTENANCE DISTRICT MAINTAINED CURB OPENING CATCH BASIN WITH FOSSIL FILTER "DUAL STAGE" CATCH BASIN INSERT OR AS APPROVED BY D.P.W.

ALL CATCH BASINS AND INLETS SHALL BE STENCILED WITH "WARNING! DRAINS TO OCEAN". NOTES AND SYMBOLS PER NPDES BMP STANDARDS OR AS APPROVED BY D.W.P.

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
SINCE 1958

Date: 10/22/99		Job No.: 99-1617-4	
Scale: 1"=100'	Geology by:	Revised: 3/31/00	
	Drawn by: Staff		

PLATE VII

GEOLOGIC/GEOTECHNICAL LEGEND

af	Artificial Fill	55° 55° 10°	Orientation of Fault; Shear; Slip Surface
Cef	Certified Engineered Fill		Approximate Location of Surface Trace of Axis of Syncline; Anticline; Dotted Where Inferred
Qal	Quaternary Alluvium	T-234	Approximate Location of Exploratory Trench
sf	Surficial Failure	TP-55	Approximate Location of Test Pit from AES Report dated 10/30/87
Qls-8	Quaternary Landslide	RW-1	Approximate Location of Rotary Wash Boring
Qt	Quaternary Terrace	BA-11	Approximate Location of Exploratory Bucket Auger Boring
TQs	Saugus Formation	HS-5	Approximate Location of Hollow Stem Auger Boring
35° 66° 85°	Orientation of Bedding; Approximate Bedding; Overturned Bedding	HA-1	Approximate Location of Hand Auger Boring
		B-18	Approximate Location of Exploratory Bucket Auger Boring from AES Report dated 10/30/87

		12	Approximate Location of Existing Oil/Gas Well
		CS-36	Proposed Cut-Slope with Designation
		26 26'	Cross Section
			Geologic Contact; Dotted Where Concealed
			Recommended Building Setback
		R=6-12Ft.	Recommended Removal Depth per Designated Area (Alluvial or Landslide Material)
		CS-31	Proposed Stability Fill Showing Approximate Limits
		CS-18	Proposed Buttress Color Coded Red

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Date: 1/15/99		Job No.: 98-1617-4	
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