Appendix A
Notice of Preparation/Initial Study

Notice of Preparation

Los Angeles County
Department of Regional Planning

Planning for the Challenges Ahead

Richard J. Bruckner
Director

NOTICE OF PREPARATION

DATE: November 21, 2011

PROJECT TITLE: CHIQUITA CANYON LANDFILL MASTER PLAN REVSION
PROJECT NO. R2004-00559-(5)
CONDITIONAL USE PERMIT NO. 200400042
ENVIRONMENTAL CASE NO. 200400039

PROJECT APPLICANT: Chiquita Canyon Landfill LLC.
29201 Henry Mayo Drive
Castaic, CA 91384
(661) 257-3655

The County of Los Angeles is the lead agency and will prepare an Environmental Impact Report (EIR) for the project identified below. In compliance with Section 15082 of the State of California Environmental Quality Act (CEQA) Guidelines, the County of Los Angeles is distributing the Notice of Preparation (NOP) to the Office of Planning and Research, each responsible agency, interested parties, and federal agencies, involved in approving the project and to trustee agencies responsible for natural resources affected by the project. Within 30 days after receiving the NOP, each agency shall provide the County of Los Angeles with specific written details about the scope and content of the environmental information related to the agency's area of statutory responsibility.

The purpose of this NOP is to solicit the views of your agency as to scope and content of the environmental information germane to your agency's statutory authority with respect to the proposed project. Your agency may need to use the EIR prepared by our agency when considering approval of applicable permits and other approvals for the project.

PROJECT LOCATION AND ENVIRONMENTAL SETTING: The Chiquita Canyon Landfill (CCL), located in the northwestern portion of unincorporated Los Angeles County, is approximately three miles west of the Interstate 5 and State Route 126 (SR-126) intersection (Figure 1). The site is located in Section 15, Township 4 North, Range 17 West, San Bernardino Baseline and Meridian. The site latitude and longitude are 34°25'N and 118°39'W, respectively.

Much of the area surrounding CCL consists of undeveloped open space as a result of steep topography. Surrounding land uses include mostly open lands to the north; rural residential development is located to the west and northwest along Chiquito Canyon Road and in the Val Verde area, respectively. Relatively new suburban residential areas are located to the northeast. The closest of these residential dwellings is located approximately 500 feet from the northwest site boundary corner and 1,200 feet from the current landfill footprint;

intervening topography prevents residential views of the operating landfill from these locations. Industrial/commercial uses are located to the northeast, east, and southeast. The United States Postal Service has a general mail facility adjacent to the eastern edge of the landfill property boundary. The property immediately west and south of the landfill is owned by the Newhall Land and Farming Company (NLF) and is currently either vacant or is used for agricultural activities. Oil extraction fields and associated storage areas are located less than one mile from the landfill to the west and south. Valencia Travel Village, a short- and long-term campground, is located approximately one mile east of the landfill on the south side of SR-126.

PROJECT SUMMARY: The CCL Master Plan Revision (Proposed Project) would allow the existing landfill to continue operations with a new grant term, as well as extend the waste footprint at CCL within the existing site boundary, better utilize the landfill's remaining and potential disposal capacity, and allow for the disposal of all non-hazardous wastes acceptable at a Class III solid waste disposal landfill. The Proposed Project would also include the continued diversion of such materials as green waste, asphalt/concrete and metal through ongoing landfill waste diversion programs on which numerous jurisdictions depend to comply with state-mandated waste diversion goals.

ENTITLEMENT REQUIREMENTS AND DISCRETIONARY APPROVALS: The applicant, Chiquita Canyon LLC, is requesting a Conditional Use Permit (CUP) to authorize the continued operation, maintenance and expansion of an existing waste disposal facility located in the A-2 (Heavy Agricultural) zone. A CUP is required for the operation of a waste disposal facility in the A-2 zone pursuant to Section 22.24.150 of the Los County Code (Zoning Ordinance).

POTENTIAL PROJECT IMPACTS:
Based on the Initial Study, an EIR is necessary for the proposed Project. Based on a preliminary assessment of potential environmental impacts that may occur as a result of the proposed Project (Attachment 2, Draft Initial Study), the environmental issues to be addressed in the Chiquita Canyon Landfill Master Plan Revision would include at least the following:

Potential Hazards
Geology/Soils
Hazards/Hazardous Materials
Noise

Potential Impacts to Resources
Hydrology/Water Quality
Air Quality
Biological Resources
Cultural Resources
Greenhouse Gas Emissions

Potential Impact to Services
Transportation/Traffic

Utilities/Services

NOTICE OF PREPARATION REVIEW AND COMMENTS: The review period for the Notice of Preparation will be from November 28, 2011 to January 12, 2012. As a result of the time limits mandated by state law, your response must be sent at the earliest possible date, but not later than January 4, 2012. Please direct all written comments to the following address. In your response, please include the name of a contact person in your agency.

Rob Glaser
Zoning Permits North Section
Los Angeles County Department of Regional Planning
320 W. Temple Street, Room 1348
Los Angeles, CA 90012
Tel: (213) 974-6443
Fax: (213) 626-0434
E-mail: rglaser@planning.lacounty.gov

SCOPING MEETING: To assist in local participation, a Scoping Meeting will be held to present the proposed Project and to solicit suggestions from the public and responsible agencies on the content of the Draft EIR. The Scoping Meeting will be held at the Val Verde Community Regional Park Facility, located at 30300 West Arlington Street, Val Verde, on **Tuesday December 6, 2011 from 7:00 p.m. – 8:30 p.m.**

Attachment:
Draft Initial Study

Initial Study

Environmental Checklist Form (Initial Study)
County of Los Angeles, Department of Regional Planning

Project title: Chiquita Canyon Landfill / Project No. R2004-00559-(5) / Case No(s) Conditional Use Permit No. 200400042, Environmental Case No. 200400039.

Project location: 29201 Henry Mayo Drive, Castaic, CA 91384 (Located between Chiquito Canyon Road and Wolcott Way)
APN: 3721-002-011, 013, 019 and 034 *Thomas Guide*: 4549 D-1, D-2, E-1, E-2 *USGS Quad*: Val Verde

Gross Acreage: 643 acres

Description of project: The Chiquita Canyon Landfill (CCL) Master Plan Revision (Proposed Project) would continue the existing landfill use with a new grant term, as well as extend the waste footprint at CCL within the existing site boundary, better utilize the landfill's remaining and potential disposal capacity, and allow for the disposal of all non-hazardous wastes acceptable at a Class III solid waste disposal landfill. The Proposed Project would also include the continued diversion of such materials as green waste, asphalt/concrete and metal through ongoing landfill waste diversion programs on which numerous jurisdictions depend to comply with state-mandated waste diversion goals.

General plan designation: R (Non Urban)

Community/Area wide Plan designation: HM (Hillside Management), I (Industrial), P (Public Facilities) (Santa Clarita Valley Areawide General Plan_

Zoning: A-2-2 (Heavy Agricultural - two acre minimum required lot area), A-2-5 (Heavy Agricultural – Five Acre Minimum Lot Area), M-1 1/2-DP (Restricted Heavy Manufacturing – Development Program).

Surrounding land uses and setting: Much of the area surrounding CCL consists of undeveloped vacant hillsides as a result of steep topography. Surrounding land uses include mostly open lands to the north; rural residential development is located to the west and northwest along Chiquito Canyon Road and in the Val Verde area, respectively. Relatively new suburban residential areas are located to the northeast. The closest of these residential dwellings is located approximately 500 feet from the northwest site boundary corner and 1,200 feet from the current landfill footprint; intervening topography prevents residential views of the operating landfill from these locations. Industrial/commercial uses are located to the northeast, east, and southeast. The United States Postal Service has a general mail facility adjacent to the eastern edge of the landfill property boundary. The property immediately west and south of the landfill is owned by the Newhall Land and Farming Company (NLF) and is currently either vacant or is used for agricultural activities. Oil extraction fields and associated storage areas are located less than 1 mile from the landfill to the west and south. Valencia Travel Village, a short- and long-term campground, is located approximately 1 mile east of the landfill on the south side of SR-126.

Major projects in the area:

Project/Case No.	*Description and Status*
00-196/TR53108	The "River Village" project (part of Newhall Ranch SP, pending)
04-181/TR061105	The "Mission Village" project (part of Newhall Ranch SP, pending)

00-210/TR53295	The "Entrada" project (pending)
PM20685	21 industrial lots on 110 AC (approved)
TR069708	100 single family residential lots (pending)
TR52475	58 single family residential lots (pending)
PM066190	825 single family lots (pending)
TR060257	353 single and multi-family residential lots (pending)
PM060030	37 industrial lots and 5 public lots (pending)
TR060665	109 residential condo lots (pending)
TR52584	209 single family residential lots, one golf course lot, 2 open space lots and two street lots on 432 acres (approved)
TR45084	294 single family residential lots (recorded)
PM18108	1,740 commercial, industrial and public lots (pending)
TR061996	The "Legacy" project; 3,455 single and multi-family residential lots (pending)
TR060678	The "Homestead Newhall Ranch" project; 5,778 single and multi-family residential lots (pending)

Reviewing Agencies:

Responsible Agencies

- ☐ None
- Regional Water Quality Control Board:
  - ☒ Los Angeles Region
  - ☐ Lahontan Region
- ☐ Coastal Commission
- ☒ Army Corps of Engineers
- ☒ Caltrans
- ☒ CA DHS

Special Reviewing Agencies

- ☐ None
- ☐ Santa Monica Mountains Conservancy
- ☒ National Parks
- ☒ National Forest
- ☐ Edwards Air Force Base
- ☐ Resource Conservation District of Santa Monica Mountains Area
- ☒ DOCDOG, AQMD, CIWMB
- ☒ CA Food & Agriculture, Kern County, SCOPE, Save Open Space
- ☒ U.S. Postal Services, MTA
- ☒ City of Santa Clarita, SC Oak Conservancy, Sierra Club
- ☒ CA Dept of Water Resources, City of Los Angeles, Friends of the SC River, Communities for a Better Environment
- ☒ Castaic Water, Valencia Water
- ☒ Ventura County, Santa Clarita Civic Association, SCAG

Regional Significance

- ☐ None
- ☐ SCAG Criteria
- ☒ Air Quality
- ☒ Water Resources
- ☐ Santa Monica Mtns. Area
- ☐

Trustee Agencies

- ☐ None
- ☒ State Dept. of Fish and Game
- ☒ State Dept. of Parks and Recreation
- ☒ State Lands Commission
- ☐ University of California (Natural Land and Water Reserves System)

County Departments

- ☒ DPW:
  - Land Development Division (Grading & Drainage)
  - Geotechnical & Materials Engineering Division
  - Traffic and Lighting Division
  - Environmental Programs Division
  - Waterworks Division
- ☒ Fire Department
  - Forestry, Environmental Division
  - Planning Division
- ☒ Sanitation District
- ☒ Public Health: Environmental Hygiene (Noise)
- ☐ Sheriff Department
- ☒ Parks and Recreation
- ☐ Subdivision Committee
- ☐

Public agency approvals which may be required:

Public Agency	*Approval Required*
_____	(E.g., permits, financing approval, or participation agreement.)

Lead agency name and address:
County of Los Angeles
Attn: Department of Regional Planning
320 West Temple Street
Los Angeles, CA 90012

Project sponsor's name and address:
Chiquita Canyon Landfill, LLC
29201 Henry Mayo Drive
Castaic, CA 91384

Contact person and phone number: Rob Glaser, Principal Planner (213) 974-6443

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

IMPACT ANALYSIS SUMMARY MATRIX		**No Impact**				
			Less than Significant Impact			
				Less than Significant Impact w/ Project Mitigation		
					Potentially Significant Impact	
Environmental Factor	Pg.					*Potential Concern*
1. Aesthetics		☐	☐	☐	☒	*Recreational trail; landform alteration*
2. Agriculture/Forest		☒	☐	☐	☐	
3. Air Quality		☐	☐	☐	☒	*Diesel, methane, odors*
4. Biological Resources		☐	☐	☐	☒	*Undisturbed areas, blue line streams, coastal sage scrub*
5. Cultural Resources		☐	☐	☐	☒	
6. Energy		☒	☐	☐	☐	
7. Geology/Soils		☐	☐	☐	☒	*Landslides, substantial grading*
8. Greenhouse Gas Emissions		☐	☐	☐	☒	
9. Hazards/Hazardous Materials		☐	☐	☐	☒	
10. Hydrology/Water Quality		☐	☐	☐	☒	*Storm water runoff*
11. Land Use/Planning		☒	☐	☐	☐	
12. Mineral Resources		☒	☐	☐	☐	
13. Noise		☐	☐	☒	☐	*Equipment noise, entrance relocation*
14. Population/Housing		☒	☐	☐	☐	
15. Public Services		☐	☒	☐	☐	
16. Recreation		☐	☒	☐	☐	
17. Transportation/Traffic		☐	☐	☒	☐	*Entrance relocation, update traffic analysis*
18. Utilities/Services		☐	☐	☒	☐	
19. Mandatory Findings of Significance		☐	☐	☐	☒	

DETERMINATION: (To be completed by the Lead Department.)
On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☒ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature — Date: 11/22/11

Signature — Date: 11/22/11

EVALUATION OF ENVIRONMENTAL IMPACTS:

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources the Lead Department cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the Lead Department has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level. (Mitigation measures from Section XVII, "Earlier Analyses," may be cross-referenced.)

5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA processes, an effect has been adequately analyzed in an earlier EIR or negative declaration. (State CEQA Guidelines § 15063(c)(3)(D).) In this case, a brief discussion should identify the following:

   a) Earlier Analysis Used. Identify and state where they are available for review.

   b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of, and adequately analyzed in, an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

   c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

7) The explanation of each issue should identify: the significance threshold, if any, used to evaluate each question, and; mitigation measures identified, if any, to reduce the impact to less than significance. Sources of thresholds include the County General Plan, other County planning documents, and County ordinances. Some thresholds are unique to geographical locations.

8) Climate Change Impacts: When determining whether a project's impacts are significant, the analysis should consider, when relevant, the effects of future climate change on : 1) worsening hazardous conditions that pose risks to the project's inhabitants and structures (e.g., floods and wildfires), and 2) worsening the project's impacts on the environment (e.g., impacts on special status species and public health).

1. AESTHETICS

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Have a substantial adverse effect on a scenic vista, including County-designated scenic resources areas (scenic highways as shown on the Scenic Highway Element, scenic corridors, scenic hillsides, and scenic ridgelines)?	☐	☐	☒	☐
Henry Mayo Drive is a first priority scenic highway.				
b) Be visible from or obstruct views from a regional riding or hiking trail?	☐	☐	☒	☐
Santa Clara River Trail will be located south of the site.				
c) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, historic buildings, or undeveloped or undisturbed areas?	☐	☐	☒	☐
Currently undisturbed areas will be developed for solid waste disposal.				
d) Substantially degrade the existing visual character or quality of the site and its surroundings because of height, bulk, pattern, scale, character, or other features?	☒	☐	☐	☐
Visual analysis/simulations will be included in the EIR.				
e) Create a new source of substantial shadows, light, or glare which would adversely affect day or nighttime views in the area?	☐	☒	☐	☐
Nighttime lighting will be addressed in the EIR.				

2. AGRICULTURE / FOREST

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
No agricultural activities would be converted to non-agricultural use.				
b) Conflict with existing zoning for agricultural use, with a designated Agricultural Opportunity Area, or with a Williamson Act contract?	☐	☐	☐	☒
Continued operation of CCL would be consistent with existing land uses at CCL since its inception, and is not within a designated Agricultural Opportunity Area or with a Williamson Act contract.				
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code § 12220 (g)) or timberland zoned Timberland Production (as defined in Public Resources Code § 4526)?	☐	☐	☐	☒
CCL does not contain forest land or timberland.				
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
CCL does not contain forest land.				
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒
CCL does not contain Farmland or forest land.				

3. AIR QUALITY

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Conflict with or obstruct implementation of applicable air quality plans of the South Coast AQMD (SCAQMD) or the Antelope Valley AQMD?	☒	☐	☐	☐
Potential air quality impacts will be evaluated in the EIR.				
b) Violate any applicable federal or state air quality standard or contribute substantially to an existing or projected air quality violation (i.e. exceed the State's criteria for regional significance which is generally (a) 500 dwelling units for residential uses or (b) 40 gross acres, 650,000 square feet of floor area or 1,000 employees for nonresidential uses)?	☒	☐	☐	☐
Proposed Project is a 124-acre expansion of an existing landfill; potential air quality impacts will be evaluated in the EIR.				
c) Exceed a South Coast AQMD or Antelope Valley AQMD CEQA significance threshold?	☒	☐	☐	☐
Potential air quality impacts will be evaluated in the EIR.				
d) Otherwise result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	☒	☐	☐	☐
Cumulatively considerable impacts will be evaluated in the EIR.				
e) Expose sensitive receptors (e.g., schools, hospitals, parks) to substantial pollutant concentrations due to location near a freeway or heavy industrial use?	☐	☐	☒	☐
CCL has an existing use landfill footprint which is currently permitted on approximately 257 acres and with proposed expansion the footprint will increase to approximately 400 acres; no sensitive receptors are within one mile and therefore, would not be impacted.				
f) Create objectionable odors affecting a substantial number of people?	☒	☐	☐	☐
Odors possible from delivered trash, landfill gas, wastewater residues, and green waste used for alternative daily cover.				

4. BIOLOGICAL RESOURCES

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game (DFG) or U.S. Fish and Wildlife Service (USFWS)?	☒	☐	☐	☐

The Proposed Project would disturb drainage courses tributary to Castaic Creek and the Santa Clara River which are habitat to sensitive species.

b) Have a substantial adverse effect on sensitive natural communities (e.g., riparian habitat, coastal sage scrub, oak woodlands, non-jurisdictional wetlands) identified in local or regional plans, policies, and regulations DFG or USFWS? These communities include Significant Ecological Areas (SEAs) identified in the General Plan, SEA Buffer Areas, and Sensitive Environmental Resource Areas (SERAs) identified in the Coastal Zone Plan.	☒	☐	☐	☐

Coastal sage scrub is found onsite.

c) Have a substantial adverse effect on federally protected wetlands (including marshes, vernal pools, and coastal wetlands) or waters of the United States, as defined by § 404 of the Clean Water Act through direct removal, filling, hydrological interruption, or other means?	☒	☐	☐	☐

Blue line streams traverse the expansion areas.

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☒	☐	☐	☐

The Proposed Project would result in a loss of undisturbed area prior to closure of the landfill, and will be further analyzed in the EIR.

e) Convert oak woodlands (as defined by the state, oak woodlands are oak stands with greater than 10%	☐	☐	☒	☐

canopy cover with oaks at least 5" inch in diameter measured at 4.5 feet above mean natural grade) or otherwise contain oak or other unique native trees (junipers, Joshuas, etc.)?

The Proposed Project would not impact oak woodlands.

f) Conflict with any local policies or ordinances protecting biological resources, including Wildflower Reserve Areas (L.A. County Code, Title 12, Ch. 12.36) and the Los Angeles County Oak Tree Ordinance (L.A. County Code, Title 22, Ch. 22.56, Part 16)?	☐	☐	☒	☐

The Proposed Project would be consistent with Los Angeles County Oak Tree Ordinance and an Oak Tree Permit will be determined once the Oak Tree Report is provided.

g) Conflict with the provisions of an adopted state, regional, or local habitat conservation plan?	☒	☐	☐	☐

The consistency of the Proposed Project with habitat conservation plans will be evaluated in the EIR.

5. CULTURAL RESOURCES

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines § 15064.5?	☐	☐	☒	☐

Prehistoric site CA-LAN-36 is within the property boundary line, but outside of any grading activity. The closest listed historical resource to the site is the Rancho San Francisco Estancia Adobe, which is located 2.5 miles to the northeast of the project site.

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines § 15064.5?	☐	☐	☒	☐

No impacts to known archaeological resources would occur.

c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature, or contain rock formations indicating potential paleontological resources?	☐	☐	☒	☐

No impacts to known paleontological resources would occur.

d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☒	☐

No impacts to known interred human remains would occur.

6. ENERGY

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Comply with Los Angeles County Green Building Standards? (L.A. County Code Title 22, Ch. 22.52, Part 20 and Title 21, § 21.24.440.)	☐	☐	☒	☐

CCL expansion would comply with Los Angeles County Green Building Code Standards.

b) Involve the inefficient use of energy resources (see Appendix F of the CEQA Guidelines)?	☐	☐	☒	☐

CCL currently generates green energy via a landfill-gas-to-energy plant.

7. GEOLOGY AND SOILS

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Be located in an active or potentially active fault zone, Seismic Hazards Zone, or Alquist-Priolo Earthquake Fault Zone, and expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault.	☒	☐	☐	☐
Holser (0.5 miles north), Oak Ridge (4.5 miles west), and Santa Susana (4.5 *miles south) faults are located in the immediate vicinity.*				
ii) Strong seismic ground shaking?	☒	☐	☐	☐
Potential seismic impacts will be addressed in the EIR.				
iii) Seismic-related ground failure, including liquefaction?	☒	☐	☐	☐
Areas of shallow groundwater per Safety Element Plate 3.				
iv) Landslides?	☒	☐	☐	☐
Several 5-100 acre landslides located on the site per Safety Element Plate 5; Holocene landslide deposits occur in several locations scattered throughout the project site; an off-site landslide mobilized by 1994 Northridge earthquake is located just north of the landfill lease boundary.				
b) Result in substantial soil erosion or the loss of topsoil?	☒	☐	☐	☐
The potential for soil erosion will be addressed in the EIR.				
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☒	☐	☐	☐
The potential for unstable soils will be addressed in the EIR.				
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☒	☐	☐	☐

Top soils on the project site are predominantly loamy in character and contain variable quality of clay. Some areas of moderate expansion potential occur onsite due to the water-holding capacity of clay minerals.

e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☒	☐	☐	☐

Soils at CCL will be addressed in the EIR.

f) Conflict with the Hillside Management Area Ordinance (L.A. County Code, Title 22, § 22.56.215) or hillside design standards in the County General Plan Conservation and Open Space Element?	☐	☐	☒	☐

The Proposed Project would be consistent with the Hillside Management Area Ordinance and hillside design standards.

8. GREENHOUSE GAS EMISSIONS

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Generate greenhouse gas (GhGs) emissions, either directly or indirectly, that may have a significant impact on the environment (i.e., on global climate change)? Normally, the significance of the impacts of a project's GhG emissions should be evaluated as a cumulative impact rather than a project-specific impact.	☒	☐	☐	☐

The Proposed Project would generate construction-related and operation-related GhG emissions from energy use, onsite equipment exhaust, landfill gas generation and flaring, and disposal vehicle/transportation. The EIR will include a cumulative impact analysis of GhGs.

b) Conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases including regulations implementing AB 32 of 2006, General Plan policies and implementing actions for GhG emission reduction, and the Los Angeles Regional Climate Action Plan?	☐	☐	☒	☐

The Proposed Project would result in the generation of construction-related and operation-related GhG emissions; however, these emissions are not expected to hinder or delay California's ability to meet the reduction targets contained in AB 32.

9. HAZARDS AND HAZARDOUS MATERIALS

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Create a significant hazard to the public or the environment through the routine transport, storage, production, use, or disposal of hazardous materials or use of pressurized tanks on-site?	☐	☒	☐	☐

As a Class III Landfill, CCL does not accept hazardous wastes. The energy conversion facility located on the subject property may generate hazardous waste.

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials or waste into the environment?	☐	☐	☒	☐

As a Class III Landfill, CCL does not accept hazardous wastes.

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 500 feet of sensitive land uses (e.g., homes, schools, hospitals)?	☐	☐	☒	☐

CCL does not accept hazardous wastes; waste areas are not located within 500 feet of a sensitive land use.

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code § 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒

CCL is not located on a hazardous materials site compiled pursuant to Government Code § 65962.5.

e) For a project located within an airport land use plan, or where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒

CCL is not located within an airport land use plan or within two miles of an airport.

f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒

CCL is not within the vicinity of a private airstrip.

g) Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐

Continued operation of CCL would not interfere with an adopted emergency response plan or emergency evacuation plan.

h) Expose people or structures to a significant risk of loss, injury or death involving fires, because the project is located:

i) in a Very High Fire Hazard Severity Zones (Zone 4)?	☒	☐	☐	☐

Per Los Angeles County General Plan Safety Element Plate 7

ii) in a high fire hazard area with inadequate access?	☐	☐	☒	☐

Access to the subject property is on paved road of adequate width. The new internal road network will be analyzed.

iii) in an area with inadequate water and pressure to meet fire flow hazards?	☐	☐	☒	☐

Water trucks and bulldozers onsite 24-hours a day. Two 50,000-gallon and one 12,000-gallon water tanks onsite.

iv) in proximity to land uses that have the potential for dangerous fire hazard (such as refineries, flammables, and explosives manufacturing)?	☒	☐	☐	☐

Oil wells are located in the vicinity of CCL.

10. HYDROLOGY AND WATER QUALITY

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Violate any water quality standards or waste discharge requirements?	☒	☐	☐	☐
Storm water runoff may increase due to compaction of soils in the proposed expansion area.				
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☒	☐	☐	☐
A Water Supply Assessment addressing groundwater supplies has been prepared for the Proposed Project.				
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☒	☐	☐	☐
Landfill operations will alter natural drainage patterns and watershed, and potential impacts as well as proposed mitigation will be analyzed in the EIR.				
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☒	☐	☐	☐
Onsite drainages may be modified to allow for safe and efficient landfilling operations.				
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems?	☐	☒	☐	☐
Storm water runoff may increase due to compaction of soils in the proposed expansion area but would be managed onsite by project design, including basins, grading design, etc.				
f) Generate construction or post-construction runoff that would violate applicable stormwater NPDES permits or otherwise significantly affect surface water or groundwater quality?	☒	☐	☐	☐

Storm water runoff may increase due to compaction of soils in the proposed expansion area.

g) Conflict with the Los Angeles County Low Impact Development Ordinance (L.A. County Code, Title 12, Ch. 12.84 and Title 22, Ch. 22.52)?	☐	☐	☒	☐

The Proposed Project would not conflict with the Los Angeles County Low Impact Development Ordinance.

h) Result in point or nonpoint source pollutant discharges into State Water Resources Control Board-designated Areas of Special Biological Significance?	☐	☐	☒	☐

The Proposed Project is not anticipated to result in point or nonpoint source pollutant discharges into SWRCB-designated Areas of Special Biological Significance.

i) Use septic tanks or other private sewage disposal system in areas with known septic tank limitations or in close proximity to a drainage course?	☐	☐	☒	☐

The Proposed Project does not have a sewer connection to a public sewage collection or disposal system. Sanitary facilities at the landfill are connected to a septic system. Portable toilets are used for other areas of the landfill.

j) Otherwise substantially degrade water quality?	☒	☐	☐	☐

Water quality will be addressed in the EIR.

k) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map, or within a floodway or floodplain?	☐	☐	☐	☒

The Proposed Project does not include housing.

l) Place structures, which would impede or redirect flood flows, within a 100-year flood hazard area, floodway, or floodplain?	☐	☐	☐	☒

The Proposed Project would not place structures within a 100-year flood hazard area.

m) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☒	☐

The Proposed Project would not expose people or structures to flooding hazards.

n) Place structures in areas subject to inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

CCL is not subject to inundation by seiche, tsunami, or mudflow.

11. LAND USE AND PLANNING

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Physically divide an established community?	☐	☐	☒	☐

CCL is an existing use with a currently permitted waste footprint of approximately 257 acres and is proposed to be expanded to approximately 400 acres. .

b) Be inconsistent with the plan designations of the subject property? Applicable plans include: the County General Plan, County specific plans, County local coastal plans, County area plans, County community/neighborhood plans, or Community Standards Districts.	☐	☐	☒	☐

The Proposed Project is consistent with current underlying plan designations.

c) Be inconsistent with the zoning designation of the subject property?	☐	☐	☒	☐

The Proposed Project is consistent with current underlying zoning designations, and has filed a Conditional Use Permit to allow the landfill use as a solid fill project, to continue and expand within the underlying zones.

d) Conflict with Hillside Management Criteria, SEA Conformance Criteria, or other applicable land use criteria?	☐	☐	☒	☐

The Proposed Project would not conflict with applicable land use criteria.

12. MINERAL RESOURCES

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☒	☐

This factor was deemed insignificant and therefore not discussed in the 1996 certified EIR. Need to confirm with the State of California Department of Conservation, Division of Mines and Geology mineral resource zone maps.

b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

The subject property in not located within a mineral resource area as depicted on the November 25, 1980 Special Management Areas Map from the Countywide General Plan.

13. NOISE

Would the project result in:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Exposure of persons to, or generation of, noise levels in excess of standards established in the County noise ordinance (Los Angeles County Code, Title 12, Chapter 12.08) or the General Plan Noise Element?	☐	☐	☒	☐

Construction and operation noise levels from the Proposed Project from all noise sensitive areas would remain below the statutory requirements of the County of Los Angeles.

b) Exposure of sensitive receptors (e.g., schools, hospitals, senior citizen facilities) to excessive noise levels?	☐	☐	☒	☐

The closest sensitive receptors to the Proposed Project are residential dwellings located approximately 500 feet from the northwest site boundary corner and 1,200 feet from the landfill footprint. Construction and operation noise levels would be similar to the existing noise level.

c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project, including noise from parking areas?	☐	☐	☒	☐

Construction and operation noise levels from the Proposed Project would remain essentially unchanged from the existing noise level.

d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project, including noise from amplified sound systems?	☐	☐	☒	☐

Construction and operation noise levels from the Proposed Project would remain essentially unchanged, below the statutory requirements of the County of Los Angeles.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

CCL is not located within the vicinity of a public airport or public use airport.

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

CCL is not located within the vicinity of a private airstrip.

14. POPULATION AND HOUSING

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☒	☐
The Proposed Project may accommodate future population growth indirectly.				
b) Cumulatively exceed official regional or local population projections?	☐	☐	☐	☒
The Proposed Project would not result in population growth.				
c) Displace existing housing, especially affordable housing?	☐	☐	☐	☒
The Proposed Project would not displace existing housing.				
d) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
The Proposed Project would be located entirely within the existing CCL property boundary and would not displace housing.				

15. PUBLIC SERVICES

	Potentially Significant Impact	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Would the project create capacity or service level problems, or result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?	☐	☐	☒	☐
The Proposed Project may not require additional fire protection.				
Sheriff protection?	☐	☐	☒	☐
The Proposed Project may not require additional sheriff protection.				
Schools?	☐	☐	☒	☐
The Proposed Project may be growth inducing and may affect schools.				
Parks?	☐	☐	☒	☐
The Proposed Project may be growth inducing and may affect parks.				
Libraries?	☐	☐	☒	☐
The Proposed Project may be growth inducing and may affect libraries.				
Other public facilities?	☐	☐	☒	☐

The Proposed Project would not require additional facilities or staffing of existing community facilities. Proposed Project implementation would not diminish the level of service for existing community facilities..

16. RECREATION

	Potentially Significant Impact	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☒	☐

The Proposed Project may be growth inducing indirectly and would affect parks or other recreational facilities.

b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☒	☐

The Proposed Project may be growth inducing indirectly and would affect recreational facilities. One the landfill has reached capacity and the end use may be a park.

c) Is the project consistent with the Department of Parks and Recreation Strategic Asset Management Plan for 2020 (SAMP) and the County General Plan standards for the provision of parkland?	☐	☐	☒	☐

The Proposed Project may not be growth inducing and should not affect parkland.

d) Would the project interfere with regional open space connectivity?	☐	☐	☒	☐

The Proposed Project located within the existing CCL property boundary and should not affect regional open space.

17. TRANSPORTATION/TRAFFIC

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Conflict with an applicable plan, ordinance, or policy establishing a measure of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and non-motorized travel, and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit? Measures of performance effectiveness include those found in the most up-to-date Southern California Association of Governments (SCAG) Regional Transportation Plan, County Congestion Management Plan, and County General Plan Mobility Element.	☒	☐	☐	☐
Transportation and traffic impacts will be addressed in the EIR.				
b) Exceed the County Congestion Management Plan (CMP) Transportation Impact Analysis thresholds?	☒	☐	☐	☐
Transportation and traffic impacts will be addressed in the EIR.				
c) Conflict with an applicable congestion management program, including, but not limited to, level of service standards and travel demand measures, or other standards established by the CMP, for designated roads or highways (50 peak hour vehicles added by project traffic to a CMP highway system intersection or 150 peak hour trips added by project traffic to a mainline freeway link)?	☒	☐	☐	☐
Transportation and traffic impacts will be addressed in the EIR.				
d) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
The Proposed Project will not affect air traffic patterns.				
e) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☒	☐

The Proposed Project would not increase hazards as a result of design features or incompatible uses.

f) Result in inadequate emergency access?	☐	☐	☒	☐

The Proposed Project is not anticipated to impede emergency access.

g) Conflict with the Bikeway Plan, Pedestrian Plan, Transit Oriented District development standards in the County General Plan Mobility Element, or other adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☐	☒	☐

The Proposed Project should not affect alternative transportation plans.

h) Decrease the performance or safety of alternative transportation facilities?	☐	☐	☒	☐

The Proposed Project should not affect alternative transportation facilities.

18. UTILITIES AND SERVICE SYSTEMS

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Exceed wastewater treatment requirements of the Los Angeles or Lahontan Regional Water Quality Control Boards?	☐	☐	☒	☐
The Proposed Project should not produce wastewater requiring treatment.				
b) Create water or wastewater system capacity problems, or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐
The Proposed Project should not produce wastewater requiring treatment.				
c) Create drainage system capacity problems, or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐
Project design will address storm water drainage through designs approved by Los Angeles County Department of Public Works.				
d) Have sufficient reliable water supplies available to serve the project demands from existing entitlements and resources, considering existing and projected water demands from other land uses?	☐	☐	☒	☐
A Water Supply Assessment has been prepared for the Proposed Project and concludes….				
e) Conflict with the Los Angeles County Low Impact Development Ordinance (L.A. County Code, Title 12, Ch. 12.84 and Title 22, Ch. 22.52) or Drought Tolerant Landscaping Ordinance (L.A. County Code, Title 21, § 21.24.430 and Title 22, Ch. 21, Part 21)?	☐	☐	☒	☐
The Proposed Project will not conflict with Los Angeles County Ordinances.				
f) Create energy utility (electricity, natural gas, propane) system capacity problems, or result in the construction of new energy facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐

The Proposed Project may not create energy utility systems capacity problems, or require construction of new energy facilities or expansion of existing facilities.

g) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐

The Proposed Project is continued operation of a Class III solid waste disposal landfill along with expansion.

h) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☒	☐

The Proposed Project will comply with federal, state, and local statues and regulations related to solid waste.

19. MANDATORY FINDINGS OF SIGNIFICANCE

	Potentially Significant Impact	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☒	☐	☐	☐
Biota				
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☒	☐	☐	☐
Air quality, visual (landform alteration)				
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☒	☐	☐	☐
Water quality, air quality				

Notice of Preparation –
Notice of Comment Period Extension
(December 27, 2011)

Los Angeles County
Department of Regional Planning

Planning for the Challenges Ahead

Richard J. Bruckner
Director

December 27, 2011

NOTICE OF A TIME EXTENSION FOR PUBLIC COMMENT ON THE NOTICE OF PREPARATION FOR THE CHIQUITA CANYON LANDFILL MASTER PLAN REVISION CONDITIONAL USE PERMIT REQUEST

PROJECT TITLE: CHIQUITA CANYON LANDFILL MASTER PLAN REVISON
PROJECT NO. R2004-00559-(5)
CONDITIONAL USE PERMIT NO. 200400042
ENVIRONMENTAL CASE NO. 200400039
SCH NO. 2005081071

PROJECT APPLICANT: Chiquita Canyon Landfill LLC.
29201 Henry Mayo Drive
Castaic, CA 91384

The applicant, Chiquita Canyon Landfill LLC., is requesting a Conditional Use Permit (CUP) to authorize the continued operation and maintenance of an existing Class III waste disposal facility with a new grant term. In addition the applicant is also requesting an expansion of the waste footprint within the existing site boundary, an increase to allowable daily tonnage of acceptable waste, an increase to the disposal capacity, and to allow for the disposal of all non-hazardous wastes acceptable at a Class III solid waste facility. The proposed project would also include the continued diversion of such materials as green waste, asphalt/concrete and metal through ongoing landfill waste diversion programs on which numerous jurisdictions depend to comply with state-mandated waste diversion goals.

The Notice of Preparation (NOP) for this project request was prepared on November 21, 2011. The purpose of this NOP is to solicit your views as to the scope and content of the environmental information that will be considered to be analyzed the project's Environmental Impact Report (EIR). The previous comment period was from November 28, 2011 to January 12, 2012. **The comment period will now extend to February 13, 2012.** The scoping meeting for this project was held on December 6, 2011 at the Val Verde Community Regional Park Facility. There will not be another scoping meeting held regarding the NOP. The next steps are outlined below to facilitate the California Environmental Quality Act process:

- Receive all Public comments and Reviewing Agency comments on what will be analyzed in the EIR;
- Prepare the Draft EIR

- Internal Review of Draft EIR with County Agencies;
- Public Notice on Draft EIR availability for Public and Agency Review
- Circulate Draft EIR for a 45 day public review period;
- Hold a Hearing Examiner (**Public Hearing**) in the Val Verde Community to gather comments from the public and responsible agencies about the Draft EIR;
- Receive written and verbal comments;
- Prepare written Responses to Comments;
- Prepare Final EIR with Response to Comments;
- Make California Environmental Quality Act (CEQA) Findings;
- Set Regional Planning Commission Public Hearing.

The next opportunity for public participation in this process will be when the Draft EIR is available for circulation for a 45 day public review period. After this review period has ended, the Department of Regional Planning will conduct a Hearing Examiner Public Hearing in the Val Verde Community to gather testimony on the Draft EIR. Please direct all written comments to the following address. In your response, please include your name and address.

Rob Glaser, Principal Planner
Zoning Permits North Section
Los Angeles County Department of Regional Planning
320 W. Temple Street, Room 1348
Los Angeles, CA 90012
Tel: (213) 974-6443
Fax: (213) 626-0434
Email: rglaser@planning.lacounty.gov

Si necesita más información o si desea este anuncio en español, llame al Departamento de Planificación al (213) 974-1522.

Attachment:
Notice of Preparation

Notice of Preparation Comments

County Comments
Preparation of Chiquita Canyon Landfill Draft EIR

Department of Public Health

1. Detailed description of the permitted area.
2. Peak Daily Tonnage
3. Peak Vehicle Count
4. Days and hours of operation, including receipt of material/waste, site operation, public and commercial access, and maintenance of facility, vehicles, etc.
5. Design Capacity
6. Acceptable Wastes:
    a. Types of material/waste to be accepted
    b. Types of material/waste to be excluded
    c. Discussion on load checking and screening procedures
    d. Description of procedures for handling incoming incident al hazardous waste
    e. Description of procedures for handling universal and e-waste
7. Tonnage: Description and analysis of maximum design tonnage of the facility
8. Buildings and on-site improvements
    a. Description of the design characteristics of significant improvements to be made to the site.
    b. Description of where commercial municipal solid waste, green waste, construction and demolition material will be handled.
    c. Description of design features to attenuate for odors, dust, noise and vectors. Will the facility be fully enclosed? Will it be under negative pressure? Will it have a filtration system? Will it have a mister system to control odors and dust?
    d. Description locations where salvaged/recyclable materials that are removed from the waste stream will be stored and indicate storage time.
9. Odor Management Plan (OMP): All new facilities shall comply with current requirements of the South Coast Air Quality Management District.
10. Revision of the Solid Waste Facility Permit (SWFP) by the Solid Waste Management Program and concurrence from Ca Recycle.
11. Potentially Significant Environmental Impacts

    In the NOP, the Lead Agency has identified several resource topics that may be potentially significant. If there are significant impacts after design features or mitigation measures are implemented, it will be necessary to prepare and adopt a Statement of Overriding Consideration. If it is necessary to prepare a Statement of Overriding Consideration, a copy needs to be forwarded to the

Solid Waste Management Program and CalRecycle prior to review and adoption. In order for CalRecycle to concur on a SWFP with significant impacts after mitigation, it is necessary for CalRecycle to adopt your Statement of Overriding Consideration as their own to prepare a separate statement.

12. Land Use Compatibility: The DEIR should identify the proposed land use surrounding the facility and identify the distance to the nearest sensitive receptors (residential, commercial, etc.)
13. Traffic and vehicular impacts: Analyze peak volume and onsite traffic circulation impacts and describe mitigation measure, if necessary.
14. Air Quality Impacts: Air quality impacts should be analyzed in detail from vehicles, trucks, and equipment emissions from the operation of the facility.
15. Noise Impacts: Noise impacts should be analyzed in detail of the proposed facility operations, including noise from vehicles and equipment.
16. Risk of upset/human risk: An emergency response preparedness plan should be prepared and made available.
17. Mitigation Reporting and monitoring Program
18. Hazards and hazardous Materials: Although the existing facility does not accept hazardous material, there is a possibility that during the receipt of solid waste, hazardous material might be incidentally included in a load. Therefore, the facility needs to address employee training on handling of hazardous materials and the required temporary storage of hazardous materials.

In conclusion, the SWMP request that the DEIR be review by CalRecycle. The DEIR can be sent to CalRecycle's Waste Compliance and Mitigation Program, Permitting and LEA Support Division/Environmental Review, located at 1001 I Street, Sacramento, CA 95814. The SWMP also request advanced notification of any public hearing regarding the proposed project.

For questions regarding the above comments, please contact Gerry Villalobos at (626) 430-5543.

County Fire Department

General Comments:

1. Submit a minimum of four copies of the site plan indicating the new landfill entrance road, new entrance to the facilities area, and the new site entrance. Additional access requirements may need to be addressed. Indicate all existing fire hydrants.
2. The proposed expansion shall comply with the Fire Department's Regulation 10, Combustible Waste Site. The requirements are listed below.
3. Any future development on this property may require additional access and water system requirements.

4. The property is located within the area described by the Fire Department as “Very High Fire Hazard Severity Zone” (formerly Fire Zone 4). A “Fuel Modification Plan” shall be submitted and approved prior to final map clearance. (Contact Fuel Modification Unit, Fire Station #32, 605 North Angeleno Avenue, Azusa, CA 91702-2904, Phone (626) 969-5205, for details).

Water System Requirements:

1. A water supply shall be provided which meets the Fire Department standards as determined by the Land Development Unit of the Fire Prevention Division.
2. Adequate on-site fire hydrants shall be required per Fire Department standards. The future expansion of the facility should be considered when determining the size and placement of water mains and hydrants.
3. A Class II Standpipe System shall provide and located within 200 feet of dumping operations and shall have sufficient 1 1/2 –inch hose with a variable-fog nozzle to reach all portions of such operations.
4. In lieu of Class II standpipe system, the use of water tender trucks may be permitted, provided each truck is equipped with 2 ½ - inch outlets for fire department use.

Access:

1. Approved access roads shall be provided and maintained at all times around the dumping area, and all existing and proposed buildings to access for firefighting equipment as addressed in the Fiore Code Section 503.
2. Fire apparatus access roads shall have a unobstructed width not less than 20 feet and an unobstructed vertical clearance clear to sky.
3. Fire apparatus access road widths may be increased, in the opinion of the chief, when the widths are not adequate enough to provide fire apparatus access. The increase in the fire apparatus access road width may be applied for future buildings.
4. Entrance to roads, trails or other access ways that have been closed with gates and barrier shall not be obstructed by parked vehicles.
5. Weeds, grass and combustible vegetation shall be removed for a distance of 10 feet on both sides of all access roads by rubbish trucks or the public.

Additional Requirements:

1. A firebreak or clearance of all dry weeds and grass shall be provided around the dumping areas. Secondary firebreaks, as required by the Fire Department, shall be provided and maintained in order to prevent the spread of the fire beyond the dump facility. The secondary firebreaks shall be not less than 60 feet in width.
2. The property shall be adequately fenced to prevent entry of unauthorized persons, and gates shall be locked at all times when the facility is not supervised. An attendant shall be on duty when the site is open to the public.

3. "**NO SMOKING**" signs shall be posted on the facility and at all entrances to the facility . Smoking regulations, as required by the Fire Department, will be strictly enforced.
4. Dumping operations shall be carried on in such manner as to minimize the possibility of fires occurring in the waste material. The waste material which is dumped on the premises shall be immediately mixed with earth, and under no circumstances shall any exposed surface or face of combustible material be left uncovered at the close of daily operations.
5. Any fire which occurs on the premises shall be reported immediately to the Fire Department and it shall be the responsibility of the operator to immediately extinguish any such fire. A telephone shall be installed for purposes of notifying the Fire Department in case of fire.
6. Provisions shall be made to control or prevent the blowing of papers or other combustibles water materials into brush or outside the established dumping areas. The premises shall be kept free of any accumulations of waste combustible material, which might constitute a fire menace.
7. All Fire Protection Facilities, including access and water, must be provided prior to and during construction.

Please contact Fire Prevention Engineering Assistant, Wally Collins, at (323) 890-4243 if there are any questions regarding these requirements.

Forestry Division – Other Environmental Concerns:

1. The statutory responsibilities of County of Los Angeles Fire Department, Forestry Division include erosion control, watershed management, rare and endangered species, vegetation, fuel modification for Very High Fire Hazard Severity Zones or Fire Zone 4, archeological and cultural resources, and the County Oak Tree Ordinance. Potential impacts in these areas should be addressed in the DEIR.

Department of Parks and Recreation

The requested project will not affect any Departmental Facilities.

Department of Public Works

1. Environmental Programs
   The EIR must include the following:

   a. Site plan showing locations of all proposed landfilling and ancillary facilities onsite;
   b. Discussion of all proposed ancillary activities and/or facilities, including environmental impacts associated with these activities/facilities and appropriate mitigation measures. This includes, but is not limited to, facilities such as sediment basins, landfill gas-to-energy facility, green

waste chipping and grinding, composting, materials recovery facility/operation, household hazardous/electronic waste facility/collection activities, residential recycling, bin rental and/or storage, etc., if any;

c. If proposed, discussion of a timeline of when the materials recovery facility/operation and household hazardous/electronic waste facility/collection activities may become operational;
d. Discussion of the source, proposed daily intake rates, potential environmental impacts, and mitigation measures associated with the management of all materials received at the landfill, including:
    - Municipal solid waste;
    - Green waste;
    - Construction and demolition debris;
    - Beneficial use materials, identifying each type and their use;
    - Soil and if contaminated, provide details of known source and constituents;
    - Composting operation;
    - Recyclables, including those recovered through the materials recovery operation; and
    - Household hazardous/electronic waste;
e. Proposed project schedule indicating the sequence of fill, estimated capacity, and landfill life;
f. Map showing the proposed final fill elevation, disposal footprint, grading limits, and property boundary;
g. Analysis of the visual impacts of the project on the surrounding communities. Three-dimensional visualization of proposed final design of the landfill and discussion on proposed mitigation measures such as tree planting and maintenance for screening the site from the Val Verde community.
h. Proposed operating hours of disposal activities, ancillary facilities, and maintenance of the site as well as their associated potential impacts on the Val Verde and other surrounding communities;
i. Discussion of alternatives to the Project, including a No Project Alternative, and other alternatives that could reduce the scope of the project, including but not limited to:
    - A materials recovery facility;
    - A waste conversion technology facility (a facility utilizing non-combustion thermal, chemical or biological technology to convert residual solid waste into products and energy); or
    - An integrated “eco park” that maximizes recovery of materials, using a materials recovery facility, conversion technology, composting operation, reuse and/or drop off facility, and household hazardous/electronic waste collection facility, with residual waste disposed of at the landfill.

2. Geotechnical and Materials Engineering
   An EIR is required for the Proposed Project. All or portions of the site have been found to be located within a potentially liquefiable area according to the State of California Seismic Hazard Zone Map – Val Verde Quadrangle. All geotechnical issues discussed in the Notice of Preparation and Initial Study must be addressed in the EIR. Geotechnical reports must be included in the EIR.

3. Traffic and Lighting
   A Traffic Impact Analysis (TIA) is required for this Department's review and approval. The analysis will, at a minimum, address the following items:
   a. Level of service along all proposed haul roads;
   b. Traffic Index calculations along the haul roads; and
   c. Queuing analysis at the entrance and at all freeways rams in the vicinity of the project.

4. Project Management
   The Proposed Project entails relocation of the existing driveway into the site. Please be advised that grade-separated interchange improvements along State Route 126 in the vicinity of the landfill are currently scheduled to start in July 2012 and projected to take approximately 2 years. The EIR should consider the cumulative construction impacts from both projects if executed simultaneously. Coordination with Construction Division of this Department on construction activities may be required to minimize impacts to the surrounding communities.

5. Land Development
   Hydrology and Water Quality Comments:

   The applicant must prepare an EIR and indicate in the hydrology and water quality section that the Proposed Project will comply with the County Low Impact Development Ordinance. Accordingly, the EIR must discuss appropriate mitigation measures.

   Road Comments:

   Prior to our recommendation of approval, the applicant must address the following:
   a. As previously requested of the applicant, as part of the TIA, provide an updated analysis of the pavement section on Wolcott Way and Franklin Parkway along the project frontage and within any section of these roadways identified as part of the truck route to ensure that it is adequate to handle increased traffic loads.

b. Provide conceptual striping plan for Wolcott Way, Franklin Parkway and any other offsite roadway based on the mitigations in the TIA as approved by this Department.

Preliminary Road Conditions:

Should the subject Conditional Use Permit be approved, the following road related conditions shall apply:

a. Construct full street improvement on Wolcott Way and Franklin Parkway within the project frontage compatible with the ultimate improvements per TR 53108 to the satisfaction of this Department.

b. The design and construction on Wolcott Way shall be compatible with vertical approaches to the future grade separations at California State Route 126 (SR-126) to the satisfaction of this Department and Caltrans.

c. Dedicate right of way to the satisfaction of this Department and Caltrans a minimum of 70 feet from the latest approved centerline on SR-126. The typical section and the ultimate right of way are contingent on the TIA demonstrating that the project volumes do not exceed the road capacity. If so, provide additional right of way for additional lanes, exclusive right turn lanes and transition improvements to the satisfaction of this Department and Caltrans.

d. Provide slope easement at the future SR-126/Wolcott Road Interchange to the satisfaction of this Department and Caltrans.

e. Comply with mitigation measures, including offsite improvements, identified in the approved TIA to the satisfaction of this Department.

f. Provide signing and striping plan for Wolcott Way, Franklin Parkway and any other offsite roadway based on the mitigations in the approved TIA.

g. Pay the fees established by the Board of Supervisors for the Westside Bridge and Major Thoroughfare Construction Fee District. The fee is to be based upon the fee rate in effect at the time of the project effective date. The applicable fee will be determined by the Department of Public Works (as a Special Case) after the review and approval of the TIA.

h. If any improvements constructed by the developer are included as District improvements in the Westside Bridge and Major Thoroughfare Construction Fee District, then the cost of such improvements may be credited against the project's District fee obligation if approved by this Department. If the amount to be credited exceeds the developer's fee

obligation, the developer may use the excess credits to satisfy the fee obligation of another project within the District, transfer the credit to another developer within the District, or be reimbursed by the District at the discretion of this Department if funds are available. If District improvements are constructed after the project effective date, the developer will receive credit equal to the cost of such improvements, which may be used to satisfy the fee obligation for another project within the District, transferred to another developer within the District, or reimbursed at the discretion of this Department.

If you have any questions in regard to the above requirements, please contact Martin Aiyetiwa at (626) 458-3553.

STATE OF CALIFORNIA

Governor's Office of Planning and Research

State Clearinghouse and Planning Unit

Edmund G. Brown Jr.
Governor

Ken Alex
Director

Notice of Preparation

November 28, 2011

To: Reviewing Agencies

Re: Chiquita Canyon Landfill Master Plan Revision
SCH# 2005081071

Attached for your review and comment is the Notice of Preparation (NOP) for the Chiquita Canyon Landfill Master Plan Revision draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Rob Glaser
Los Angeles County Department of Regional Planning
320 W. Temple Street
Los Angeles, CA 90012

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Scott Morgan
Director, State Clearinghouse

DEC - 1 2011

Attachments
cc: Lead Agency

1400 TENTH STREET P.O. BOX 3044 SACRAMENTO, CALIFORNIA 95812-3044
TEL (916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

Document Details Report
State Clearinghouse Data Base

SCH# 2005081071
Project Title Chiquita Canyon Landfill Master Plan Revision
Lead Agency Los Angeles County

Type NOP Notice of Preparation

Description The Chiquita Canyon Landfill (CCL) Master Plan Revision (Proposed Project) would continue the existing landfill use with a new grant term, as well as extend the waste footprint at CCL within the existing site boundary, better utilize the landfill's remaining and potential disposal capacity, and allow for the disposal of all non-hazardous wastes acceptable at a Class III solid waste disposal landfill. The Proposed Project would also include the continued diversion of such materials as green waste, asphalt/concrete and metal through ongoing landfill waste diversion programs on which numerous jurisdictions depend to comply with state-mandated waste diversion goals.

Lead Agency Contact

Name Rob Glaser
Agency Los Angeles County Department of Regional Planning
Phone 213 974 6443 **Fax**
email
Address 320 W. Temple Street
City Los Angeles **State** CA **Zip** 90012

Project Location

County Los Angeles
City
Region
Cross Streets Located between Chiquito Canyon Road and Wolcott Way
Lat / Long 34° 25' N / 118° 39' W
Parcel No. 3271-002-013, 011, 034, 019
Township 4N **Range** 17W **Section** 15 **Base** SBB&M

Proximity to:

Highways SR-126
Airports
Railways
Waterways Santa Clara River, Castaic Creek
Schools
Land Use A-2-2 (Heavy Agricultural - two acre minimum required lot area), A-2-5 (Heavy Agricultural - Five Acre Minimum Lot Area), M-1

Project Issues Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Biological Resources; Geologic/Seismic; Minerals; Noise; Population/Housing Balance; Public Services; Recreation/Parks; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Water Supply; Wetland/Riparian; Landuse; Cumulative Effects; Other Issues

---

Reviewing Agencies Resources Agency; Department of Conservation; Cal Fire; Department of Parks and Recreation; Resources, Recycling and Recovery; Department of Water Resources; Department of Fish and Game, Region 5; CA Department of Public Health; Native American Heritage Commission; State Lands Commission; Caltrans, District 7; Air Resources Board, Major Industrial Projects; Department of Toxic Substances Control; Regional Water Quality Control Board, Region 4

Date Received 11/28/2011 **Start of Review** 11/28/2011 **End of Review** 12/27/2011

Note: Blanks in data fields result from insufficient information provided by lead agency.

Print Form

Appendix C

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH # 2005081071

Project Title: CHIQUITA CANYON LANDFILL MASTER PLAN REVISION

Lead Agency: Los Angeles County Department of Regional Planning
Contact Person: Rob Glaser, Principal Planner
Mailing Address: 320 West Temple Street
Phone: (213) 974-6443
City: Los Angeles, CA
Zip: 90012
County: Los Angeles

Project Location: County: Los Angeles
City/Nearest Community: Castaic
Cross Streets: Located between Chiquito Canyon Road and Wolcott Way
Zip Code: 91384
Longitude/Latitude (degrees, minutes and seconds): 34 ° 25 ′ ___ ″ N / 118 ° 39 ′ ___ ″ W
Total Acres: 643
Assessor's Parcel No.: 3721-002-011, 013, 019 and 034
Section: 15
Twp.: 4 North
Range: 17 West
Base: SB
Within 2 Miles: State Hwy #: SR-126
Waterways: Castaic Creek, Santa Clara River
Airports: ___
Railways: ___
Schools: ___

Document Type:

CEQA:
- [x] NOP
- [ ] Early Cons
- [ ] Neg Dec
- [ ] Mit Neg Dec
- [ ] Draft EIR
- [ ] Supplement/Subsequent EIR (Prior SCH No.) ___
- Other: ___

NEPA:
- [ ] NOI
- [ ] EA
- [ ] Draft EIS
- [ ] FONSI

Other:
- [ ] Joint Document
- [ ] Final Document
- [ ] Other: ___

RECEIVED
NOV 28 2011
STATE CLEARING HOUSE

Local Action Type:

- [ ] General Plan Update
- [ ] General Plan Amendment
- [ ] General Plan Element
- [ ] Community Plan
- [ ] Specific Plan
- [ ] Master Plan
- [ ] Planned Unit Development
- [ ] Site Plan
- [ ] Rezone
- [ ] Prezone
- [x] Use Permit
- [ ] Land Division (Subdivision, etc.)
- [ ] Annexation
- [ ] Redevelopment
- [ ] Coastal Permit
- [ ] Other: ___

Development Type:

- [ ] Residential: Units ___ Acres ___
- [ ] Office: Sq.ft. ___ Acres ___ Employees ___
- [ ] Commercial: Sq.ft. ___ Acres ___ Employees ___
- [ ] Industrial: Sq.ft. ___ Acres ___ Employees ___
- [ ] Educational: ___
- [ ] Recreational: ___
- [ ] Water Facilities: Type ___ MGD ___
- [ ] Transportation: Type ___
- [ ] Mining: Mineral ___
- [ ] Power: Type ___ MW ___
- [ ] Waste Treatment: Type ___ MGD ___
- [ ] Hazardous Waste: Type ___
- [x] Other: Class III solid waste disposal landfill

Project Issues Discussed in Document:

- [x] Aesthetic/Visual
- [x] Agricultural Land
- [x] Air Quality
- [x] Archeological/Historical
- [x] Biological Resources
- [ ] Coastal Zone
- [ ] Drainage/Absorption
- [ ] Economic/Jobs
- [ ] Fiscal
- [ ] Flood Plain/Flooding
- [ ] Forest Land/Fire Hazard
- [x] Geologic/Seismic
- [x] Minerals
- [x] Noise
- [x] Population/Housing Balance
- [x] Public Services/Facilities
- [x] Recreation/Parks
- [ ] Schools/Universities
- [ ] Septic Systems
- [ ] Sewer Capacity
- [x] Soil Erosion/Compaction/Grading
- [x] Solid Waste
- [x] Toxic/Hazardous
- [x] Traffic/Circulation
- [x] Vegetation
- [x] Water Quality
- [x] Water Supply/Groundwater
- [x] Wetland/Riparian
- [ ] Growth Inducement
- [x] Land Use
- [x] Cumulative Effects
- [x] Other: GHG & Energy

Present Land Use/Zoning/General Plan Designation:

A-2-2 (Heavy Agricultural - two acre minimum required lot area), A-2-5 (Heavy Agricultural – Five Acre Minimum Lot Area), M-1

Project Description: *(please use a separate page if necessary)*

The Chiquita Canyon Landfill (CCL) Master Plan Revision (Proposed Project) would continue the existing landfill use with a new grant term, as well as extend the waste footprint at CCL within the existing site boundary, better utilize the landfill's remaining and potential disposal capacity, and allow for the disposal of all non-hazardous wastes acceptable at a Class III solid waste disposal landfill. The Proposed Project would also include the continued diversion of such materials as green waste, asphalt/ concrete and metal through ongoing landfill waste diversion programs on which numerous jurisdictions depend to comply with state-mandated waste diversion goals.

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

NOP Distribution List

County: Los Angeles

SCH# 2005081071

Resources Agency

- [x] **Resources Agency**
  Nadell Gayou
- [ ] **Dept. of Boating & Waterways**
  Nicole Wong
- [ ] **California Coastal Commission**
  Elizabeth A. Fuchs
- [ ] **Colorado River Board**
  Gerald R. Zimmerman
- [ ] **Dept. of Conservation**
  Elizabeth Carpenter
- [ ] **California Energy Commission**
  Eric Knight
- [ ] **Cal Fire**
  Allen Robertson
- [ ] **Central Valley Flood Protection Board**
  James Herota
- [ ] **Office of Historic Preservation**
  Ron Parsons
- [x] **Dept of Parks & Recreation**
  Environmental Stewardship Section
- [ ] **California Department of Resources, Recycling & . Recovery**
  Sue O'Leary
- [ ] **S.F. Bay Conservation & Dev't. Comm.**
  Steve McAdam
- [ ] **Dept. of Water Resources** Resources Agency
  Nadell Gayou

Fish and Game

- [ ] **Depart. of Fish & Game**
  Scott Flint
  Environmental Services Division
- [ ] **Fish & Game Region 1**
  Donald Koch
- [ ] **Fish & Game Region 1E**
  Laurie Harnsberger
- [ ] **Fish & Game Region 2**
  Jeff Drongesen
- [ ] **Fish & Game Region 3**
  Charles Armor
- [ ] **Fish & Game Region 4**
  Julie Vance
- [ ] **Fish & Game Region 5**
  Leslie Newton-Reed
  Habitat Conservation Program
- [ ] **Fish & Game Region 6**
  Gabrina Gatchel
  Habitat Conservation Program
- [ ] **Fish & Game Region 6 I/M**
  Brad Henderson
  Inyo/Mono, Habitat Conservation Program
- [ ] **Dept. of Fish & Game M**
  George Isaac
  Marine Region

Other Departments

- [ ] **Food & Agriculture**
  Sandra Schubert
  Dept. of Food and Agriculture
- [ ] **Depart. of General Services**
  Public School Construction
- [ ] **Dept. of General Services**
  Anna Garbeff
  Environmental Services Section
- [ ] **Dept. of Public Health**
  Bridgette Binning
  Dept. of Health/Drinking Water
- [ ] **Delta Stewardship Council**
  Terry Macaulay

Independent Commissions,Boards

- [ ] **Delta Protection Commission**
  Linda Flack
- [ ] **Cal EMA (Emergency Management Agency)**
  Dennis Castrillo
- [x] **Native American Heritage Comm.**
  Debbie Treadway
- [ ] **Public Utilities Commission**
  Leo Wong
- [ ] **Santa Monica Bay Restoration**
  Guangyu Wang
- [x] **State Lands Commission**
  Jennifer Deleong
- [ ] **Tahoe Regional Planning Agency (TRPA)**
  Cherry Jacques

Business, Trans & Housing

- [ ] **Caltrans - Division of Aeronautics**
  Philip Crimmins
- [ ] **Caltrans - Planning**
  Terri Pencovic
- [ ] **California Highway Patrol**
  Suzann Ikeuchi
  Office of Special Projects
- [ ] **Housing & Community Development**
  CEQA Coordinator
  Housing Policy Division

Dept. of Transportation

- [ ] **Caltrans, District 1**
  Rex Jackman
- [ ] **Caltrans, District 2**
  Marcelino Gonzalez
- [ ] **Caltrans, District 3**
  Bruce de Terra
- [ ] **Caltrans, District 4**
  Lisa Carboni
- [ ] **Caltrans, District 5**
  David Murray
- [ ] **Caltrans, District 6**
  Michael Navarro
- [x] **Caltrans, District 7**
  Elmer Alvarez
- [ ] **Caltrans, District 8**
  Dan Kopulsky
- [ ] **Caltrans, District 9**
  Gayle Rosander
- [ ] **Caltrans, District 10**
  Tom Dumas
- [ ] **Caltrans, District 11**
  Jacob Armstrong
- [ ] **Caltrans, District 12**
  Marlon Regisford

Cal EPA

Air Resources Board

- [ ] Airport/Energy Projects
  Jim Lerner
- [ ] Transportation Projects
  Douglas Ito
- [x] Industrial Projects
  Mike Tollstrup
- [ ] **State Water Resources Control Board**
  Regional Programs Unit
  Division of Financial Assistance
- [ ] **State Water Resources Control Board**
  Student Intern, 401 Water Quality Certification Unit
  Division of Water Quality
- [ ] **State Water Resouces Control Board**
  Phil Crader
  Division of Water Rights
- [x] **Dept. of Toxic Substances Control**
  CEQA Tracking Center
- [ ] **Department of Pesticide Regulation**
  CEQA Coordinator

Regional Water Quality Control Board (RWQCB)

- [ ] **RWQCB 1**
  Cathleen Hudson
  North Coast Region (1)
- [ ] **RWQCB 2**
  Environmental Document Coordinator
  San Francisco Bay Region (2)
- [ ] **RWQCB 3**
  Central Coast Region (3)
- [x] **RWQCB 4**
  Teresa Rodgers
  Los Angeles Region (4)
- [ ] **RWQCB 5S**
  Central Valley Region (5)
- [ ] **RWQCB 5F**
  Central Valley Region (5)
  Fresno Branch Office
- [ ] **RWQCB 5R**
  Central Valley Region (5)
  Redding Branch Office
- [ ] **RWQCB 6**
  Lahontan Region (6)
- [ ] **RWQCB 6V**
  Lahontan Region (6)
  Victorville Branch Office
- [ ] **RWQCB 7**
  Colorado River Basin Region (7)
- [ ] **RWQCB 8**
  Santa Ana Region (8)
- [ ] **RWQCB 9**
  San Diego Region (9)

- [ ] **Other** _____
  _____
  _____

- [ ] _____
  Conservancy

Last Updated 9/29/11

Glaser, Rob

From: Thomas Leeb [thomas@thomasleeb.com]
Sent: Thursday, January 05, 2012 9:11 AM
To: Glaser, Rob
Subject: R2004-00559-(5) / CUP 200400042

(re-send with address)

Thomas Leeb
31413 San Martinez Road
Val Verde, CA 91384

Mr. Glaser,

What's wonderful about the landfill in its current form is that it is basically invisible from Chiquito Canyon Road. Being a Val Verde resident of 12 years, I never appreciated how well this was done until I drove up to the Del Valle Fire station a few years ago and got a good view of the landfill from their higher elevation.

I would not like to be able to see the expanded landfill when driving in and out of town, otherwise I'm all for it! Maybe berms / trees could be used as a compromise for a few difficult angles?

All the Best,

Thomas Leeb

Glaser, Rob

From: Laura Hocking [Laura.Hocking@ventura.org]
Sent: Thursday, January 12, 2012 12:54 PM
To: Glaser, Rob
Subject: Comments on the NOP of the EIR for the Chiquita Canyon Landfill Master Plan Revision
Attachments: 11-036 County of LA Response Cover Letter.pdf; 11-036 (APCD).pdf; 11-036 (Trans-BE).pdf; 11-036 (WPD-TW).pdf

Mr. Glaser:

Please find attached a cover letter and comments from County of Ventura staff regarding the subject document.

Thank you for allowing us to be part of the review process for this project. If you have any questions, please contact me at (805) 654-2443.

*Please note for future reference: In the past our office has requested multiple copies of documents for our distribution. For projects distributed via CD-ROM and for "simple" documents (those without spiral binding/large, fold-out maps, etc.), a single copy of the document/CD is now usually sufficient. Please contact me with any questions regarding this request. Thank you.

Sincerely,

Laura Hocking, RMA Tech. III
Ventura County Planning Division
800 S. Victoria Avenue, Ventura, CA 93009
laura.hocking@ventura.org
(805) 654-2443

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
ds_nahc@pacbell.net

DEC - 6 2011

November 29, 2011

Mr. Rob Glaser, Project Planner
Los Angeles County Department of Regional Planning
320 West Temple Street
Los Angeles, CA 90012

Re: SCH#2005081071 CEQA Notice of Preparation (NOP); draft Environmental Impact Report (DEIR) for the " **Chiquita Canyon Landfill Master Plan Revision Project"** located in the Castaic Area; Los Angeles County, California

Dear Mr. Glaser:

The Native American Heritage Commission (NAHC), the State of California 'Trustee Agency' for the protection and preservation of Native American cultural resources pursuant to California Public Resources Code §21070 and affirmed by the Third Appellate Court in the case of EPIC v. Johnson (1985: 170 Cal App. 3rd 604). The court held that the NAHC has jurisdiction and special expertise, as a state agency, over affected Native American resources, impacted by proposed projects including archaeological, places of religious significance to Native Americans and burial sites. The NAHC wishes to comment on the proposed project.

This letter includes state and federal statutes relating to Native American historic properties of religious and cultural significance to American Indian tribes and interested Native American individuals as 'consulting parties' under both state and federal law. State law also addresses the freedom of Native American Religious Expression in Public Resources Code §5097.9.

The California Environmental Quality Act (CEQA – CA Public Resources Code 21000-21177, amendments effective 3/18/2010) requires that any project that causes a substantial adverse change in the significance of an historical resource, that includes archaeological resources, is a 'significant effect' requiring the preparation of an Environmental Impact Report (EIR) per the CEQA Guidelines defines a significant impact on the environment as 'a substantial, or potentially substantial, adverse change in any of physical conditions within an area affected by the proposed project, including ...objects of historic or aesthetic significance." In order to comply with this provision, the lead agency is required to assess whether the project will have an adverse impact on these resources within the 'area of potential effect (APE), and if so, to mitigate that effect.

The NAHC Sacred Lands File (SLF) search resulted as follows: **Native American cultural resources were not identified** within the project area identified (e.g. 'area of potential effect' or APE). Also, the absence of archaeological resources does not preclude their existence. . California Public Resources Code §§5097.94 (a) and 5097.96 authorize the NAHC to establish a Sacred Land Inventory to record Native American sacred sites and burial sites. These records are exempt from the provisions of the California Public Records Act pursuant to. California Government Code §6254 (r). The purpose of this code is to protect such sites from vandalism, theft and destruction. The NAHC "Sacred Sites,' as defined by the Native American Heritage Commission and the California Legislature in California Public Resources Code

§§5097.94(a) and 5097.96. Items in the NAHC Sacred Lands Inventory are confidential and exempt from the Public Records Act pursuant to California Government Code §6254 (r).

Early consultation with Native American tribes in your area is the best way to avoid unanticipated discoveries of cultural resources or burial sites once a project is underway. Culturally affiliated tribes and individuals may have knowledge of the religious and cultural significance of the historic properties in the project area (e.g. APE). We strongly urge that you make contact with the list of Native American Contacts on the list of Native American contacts, to see if your proposed project might impact Native American cultural resources and to obtain their recommendations concerning the proposed project. Special reference is made to the *Tribal Consultation* requirements of the California 2006 Senate Bill 1059: enabling legislation to the federal Energy Policy Act of 2005 (P.L. 109-58), mandates consultation with Native American tribes (both federally recognized and non federally recognized) where electrically transmission lines are proposed. This is codified in the California Public Resources Code, Chapter 4.3 and §25330 to Division 15.

Furthermore, pursuant to CA Public Resources Code § 5097.95, the NAHC requests that the Native American consulting parties be provided pertinent project information. Consultation with Native American communities is also a matter of environmental justice as defined by California Government Code §65040.12(e). Pursuant to CA Public Resources Code §5097.95, the NAHC requests that pertinent project information be provided consulting tribal parties. The NAHC recommends *avoidance* as defined by CEQA Guidelines §15370(a) to pursuing a project that would damage or destroy Native American cultural resources and Section 2183.2 that requires documentation, data recovery of cultural resources.

Consultation with tribes and interested Native American consulting parties, on the NAHC list, should be conducted in compliance with the requirements of federal NEPA and Section 106 and 4(f) of federal NHPA (16 U.S.C. 470 *et seq*), 36 CFR Part 800.3 (f) (2) & .5, the President's Council on Environmental Quality (CSQ, 42 U.S.C 4371 *et seq.* and NAGPRA (25 U.S.C. 3001-3013) as appropriate. The 1992 *Secretary of the Interiors Standards for the Treatment of Historic Properties* were revised so that they could be applied to all historic resource types included in the National Register of Historic Places and including cultural landscapes. Also, federal Executive Orders Nos. 11593 (preservation of cultural environment), 13175 (coordination & consultation) and 13007 (Sacred Sites) are helpful, supportive guides for Section 106 consultation. The aforementioned Secretary of the Interior's *Standards* include recommendations for all 'lead agencies' to consider the historic context of proposed projects and to "research" the cultural landscape that might include the 'area of potential effect.'

Confidentiality of "historic properties of religious and cultural significance" should also be considered as protected by California Government Code §6254(r) and may also be protected under Section 304 of he NHPA or at the Secretary of the Interior discretion if not eligible for listing on the National Register of Historic Places. The Secretary may also be advised by the federal Indian Religious Freedom Act (cf. 42 U.S.C., 1996) in issuing a decision on whether or not to disclose items of religious and/or cultural significance identified in or near the APEs and possibility threatened by proposed project activity.

Furthermore, Public Resources Code Section 5097.98, California Government Code §27491 and Health & Safety Code Section 7050.5 provide for provisions for accidentally discovered archeological resources during construction and mandate the processes to be followed in the event of an accidental discovery of any human remains in a project location other than a 'dedicated cemetery'.

To be effective, consultation on specific projects must be the result of an ongoing relationship between Native American tribes and lead agencies, project proponents and their contractors, in the opinion of the NAHC. Regarding tribal consultation, a relationship built around regular meetings and informal involvement with local tribes will lead to more qualitative consultation tribal input on specific projects.

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

Sincerely,

Dave Singleton
Program Analyst

Cc: State Clearinghouse

Attachment: Native American Contact List

California Native American Contacts
Los Angeles County
November 29, 2011

Charles Cooke
32835 Santiago Road
Acton , CA 93510
suscol@intox.net

(661) 733-1812 - cell
suscol@intox.net

Chumash
Fernandeno
Tataviam
Kitanemuk

Tongva Ancestral Territorial Tribal Nation
John Tommy Rosas, Tribal Admin.
Private Address
,
tattnlaw@gmail.com
310-570-6567

Gabrielino Tongva

Beverly Salazar Folkes
1931 Shadybrook Drive
Thousand Oaks, CA 91362
folkes@msn.com
805 492-7255
(805) 558-1154 - cell
folkes9@msn.com

Chumash
Tataviam
Ferrnandeño

Kitanemuk & Yowlumne Tejon Indians
Delia Dominguez, Chairperson
981 N. Virginia
Covina , CA 91722
deedominguez@juno.com
(626) 339-6785

Yowlumne
Kitanemuk

Fernandeno Tataviam Band of Mission Indians
Ronnie Salas, Cultural Preservation Department
601 South Brand Boulevard, Suite 102
San Fernando CA 91340
rsalas@tataviam-nsn.gov
(818) 837-0794 Office

(818) 837-0796 Fax

Fernandeno
Tataviam

San Fernando Band of Mission Indians
John Valenzuela, Chairperson
P.O. Box 221838
Newhall , CA 91322
tsen2u@hotmail.com
(661) 753-9833 Office
(760) 885-0955 Cell
(760) 949-1604 Fax

Fernandeño
Tataviam
Serrano
Vanyume
Kitanemuk

LA City/County Native American Indian Comm
Ron Andrade, Director
3175 West 6th St, Rm. 403
Los Angeles , CA 90020
randrade@css.lacounty.gov
(213) 351-5324
(213) 386-3995 FAX

Randy Guzman - Folkes
6471 Cornell Circle
Moorpark , CA 93021
ndnRandy@yahoo.com
(805) 905-1675 - cell

Chumash
Fernandeño
Tataviam
Shoshone Paiute
Yaqui

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH#2005081071; CEQA Notice of Preparation (NOP); draft Environmental Impact Report (DEIR) for the Chiquita Canyon Landfill Master Plan Revision; located in the Castaic Area; Los Angeles County, California.

California Native American Contacts
Los Angeles County
November 29, 2011

San Manuel Band of Mission Indians
Ann Brierty, Policy/Cultural Resources Departmen
26569 Community Center. Drive Serrano
Highland , CA 92346
(909) 864-8933, Ext 3250
abrierty@sanmanuel-nsn.gov
(909) 862-5152 Fax

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH#2005081071; CEQA Notice of Preparation (NOP); draft Environmental Impact Report (DEIR) for the Chiquita Canyon Landfill Master Plan Revision; located in the Castaic Area; Los Angeles County, California.

RESOURCE MANAGEMENT AGENCY

county of ventura

Planning Division
Kimberly L. Prillhart
Director

January 12, 2012

County of Los Angeles
Dept. of Regional Planning
Attn.: Rob Glaser
320 W. Temple St., Rm 1348
Los Angeles, CA 90012

E-mail: rglaser@planning.lacounty.gov

Subject: Comments on the NOP of the EIR for the Chiquita Canyon Landfill Master Plan Revision

Dear Mr. Glaser:

Thank you for the opportunity to review and comment on the subject document. Attached are the comments that we have received resulting from intra-county review of the subject document. Additional comments may have been sent directly to you by other County agencies.

Your proposed responses to these comments should be sent directly to the commenter, with a copy to Laura Hocking, Ventura County Planning Division, L#1740, 800 S. Victoria Avenue, Ventura, CA 93009.

If you have any questions regarding any of the comments, please contact the appropriate respondent. Overall questions may be directed to Laura Hocking at (805) 654-2443.

Sincerely,

Tricia Maier, Manager
Planning Programs Section

Attachment

County RMA Reference Number 11-036

VENTURA COUNTY WATERSHED PROTECTION DISTRICT
PLANNING AND REGULATORY DIVISION
800 South Victoria Avenue, Ventura, California 93009
Tom Wolfington, Permit Manager – (805) 654-2061

MEMORANDUM

DATE: January 9, 2012

TO: Laura Hocking, RMA/Planning Technician

FROM: Tom Wolfington, P.E., Permit Manager TW

SUBJECT: RMA 11-036, Chiquita Canyon Landfill Master Plan Revision
Notice of Preparation of EIR & Initial Study
Los Angeles County

Pursuant to your request, this office has reviewed the Notice of Preparation of an Environmental Impact Report and Initial Study.

PROJECT LOCATION

The Chiquita Canyon Landfill (CCL), located in the northwestern portion of unincorporated Los Angeles County, is approximately three miles west of the Interstate 5 and State Route 126 (SR-126) intersection. The site is located in Section 15, Township 4 North, Range 17 West, San Bernardino Baseline and Meridian. The latitude and longitude are 34°25'N and 118°39'W, respectively.

PROJECT DESCRIPTION

The CCL Master Plan Revision (Proposed Project) would allow the existing landfill to continue operations with a new grant term, as well as extend the waste footprint at CCL within the existing site boundary, better utilize the landfill's remaining and potential disposal capacity, and allow for the disposal of all non-hazardous wastes acceptable at a Class III solid waste disposal landfill. The Proposed Project would also include the continued diversion of such materials as green waste, asphalt/concrete and metal through ongoing landfill waste diversion programs on which numerous jurisdictions depend to comply with state-mandated waste diversion goals.

WATERSHED PROTECTION DISTRICT PROJECT COMMENTS:

The proposed landfill site is close to Santa Clara River, and is about 4 miles upstream of the County line between Los Angeles and Ventura Counties. The initial study checklist indicates that the project may have "Potentially Significant Impact" on water quality (surface water and ground water), hydrology, and soil erosion. These impacts will need to be quantified and on-site mitigation measures be analyzed in the EIR.

END OF TEXT

PUBLIC WORKS AGENCY
TRANSPORTATION DEPARTMENT
Traffic, Advance Planning & Permits Division

MEMORANDUM

DATE: December 16, 2011

TO: Resource Management Agency, Planning Division
Attention: Laura Hocking

FROM: Ben Emami, Engineering Manager II Ben

SUBJECT: **REVIEW OF DOCUMENT 11-036** (formerly 05-054) Notice of Preparation (NOP) of Environmental Impact Report / Initial Study (EIR/IS)
CHIQUITA CANYON LANDFILL MASTER PLAN REVISION
Continued operation of regional landfill in Los Angeles County (LAC).
Lead Agency: **County of Los Angeles Dept. of Regional Planning**

Pursuant to your request, the Public Works Agency -- Transportation Department has reviewed the Notice of Preparation (NOP) of an Environmental Impact Report / Initial Study (EIR/IS) for the Chiquita Canyon Landfill (CCL) Master Plan Revision (MPR).

The CCL MPR would allow the existing landfill to continue operations with a new grant term, extend the waste footprint within the existing site boundary, better utilize the landfill's remaining and potential disposal capacity, and allow for the disposal of all non-hazardous wastes acceptable at a Class III solid waste disposal landfill. The project also includes the diversion of such materials as green waste, asphalt/concrete, and metal through ongoing landfill waste diversion programs on which numerous jurisdictions depend to comply with state-mandated waste diversion goals. The applicant, Chiquita Canyon LLC, is requesting a Conditional Use Permit (CUP) to authorize the continued operation, maintenance, and expansion of the existing waste disposal facility located in the A-2 (Heavy Agricultural) zone. An EIR is necessary for the proposed Project. The landfill is located north of State Route 126 approximately three miles west of Interstate 5 in LAC.

We offer the following comment:

Although the project is located outside of the County of Ventura jurisdiction, the traffic from this project may have an impact on County of Ventura Regional Road Network and local roads. The Environmental Impact Report should analyze and mitigate the traffic impacts, if any, that this project may have on roads in Ventura County. Please send us the draft EIR when it becomes available for our review and comment.

Our review is limited to the impacts this project may have on Ventura County's Regional Road Network.

Please call me at 654-2087 if you have questions.

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VENTURA COUNTY
AIR POLLUTION CONTROL DISTRICT
Memorandum

TO: Laura Hocking/Dawnyelle Addison, Planning DATE: January 10, 2012

FROM: Alicia Stratton

SUBJECT: Request for Review of Notice of Preparation for an Environmental Impact Report for the Chiquita Canyon Landfill Master Plan Revision, County of Los Angeles (Reference No. 11-036)

Air Pollution Control District staff has reviewed the subject notice of preparation (NOP), for an environmental impact report (EIR), which is a proposal to continue the existing landfill use with a new grant term, as well as extend the waste footprint at the landfill within the existing site boundary, better utilize the landfill's remaining and potential disposal capacity, and allow for disposal of all non-hazardous wastes acceptable at a Class III solid waste disposal landfill. The project would also include the continued diversion of such materials as green waste, asphalt/concrete and metal through ongoing land fill waste diversion programs on which numerous jurisdictions depend to comply with state-mandated waste diversion goals. The project location is 29201 Henry Mayo Drive in the unincorporated Castaic area of Los Angeles County.

District staff recommends the EIR evaluate all potential air quality impacts resulting from the project that may affect Ventura County, which is directly west of the project area. Specifically, the air quality assessment should consider reactive organic compound and nitrogen oxide emissions from all project-related motor vehicles and construction equipment. Further, analysis of project consistency with the Ventura County Air Quality Management Plan should be evaluated.

If the project is determined to have a significant impact on regional and/or local air quality affecting Ventura County, the EIR should include all feasible mitigation measures applicable to Ventura County impacts. The Draft EIR should clearly state that all feasible air quality mitigation measures included in the document would be fully implemented if the project were approved.

Greenhouse gas emissions should be evaluated as well.

If you have any questions, please call me at (805) 645-1426.

Glaser, Rob

From: Stuart Abramson [hbprod@sbcglobal.net]
Sent: Monday, January 09, 2012 10:16 AM
To: Glaser, Rob
Subject: Landfill Expansion

The recent article in The Signal on Jan. 5, 2012, talks about the Chiquita landfill expansion. We, as homeowners in Val Verde, along with a number of our neighbors, are completely against such an expansion.

Val Verde is a great little community to live in, but it does have some faults. It could use some sprucing up, and some of the roads could use re-doing. The large amount of money that we hear Chiquita provides to Val Verde, should be divided to include these projects and to make it a safer place by turning it into a gated community.

The expansion will make it undesirable to buy or sell homes, because it will create more noise (you can hear them start up at 3 am) and they don't control the smell already (hang out on Lincoln St.) We would like to see these issues addressed.

Thank you,

Stuart Abramson

Glaser, Rob

From: Tae, Susan
Sent: Tuesday, January 03, 2012 7:56 AM
To: Glaser, Rob
Subject: Phone message/Chiquita Landfill comment

Stewart Abramson called, and some of his property addresses are 29147 Sheridan Road, and 28706 Lincoln Avenue, Val Verde. He doesn't want anything done. He doesn't want Chiquita to go forward without a proper meeting with every resident in Val Verde aware of the proposal. He smells methane, and the landfill should do more for the community, including clean-up and making Val Verde a beautiful community.

He also indicated that he'll be forwarding additional material, including petition with signatures, etc.

Thanks

Susan Tae, AICP
Zoning Permits North Section
213-974-6443

Metro

Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

213.922.2000 Tel
metro.net

RECEIVED
DEC 21 2011

December 16, 2011

Mr. Rob Glaser
Zoning Permits North Section
Los Angeles County Department of Regional Planning
320 W. Temple Street, Room 1348
Los Angeles, CA 90012

Dear Mr. Glaser:

Thank you for the opportunity to comment on the Notice of Preparation (NOP) for the Chiquita Canyon Landfill Master Plan Revision project. This letter conveys recommendations from the Los Angeles County Metropolitan Transportation Authority (LACMTA) concerning issues that are germane to our agency's statutory responsibilities in relation to the proposed project.

A Traffic Impact Analysis (TIA), with roadway and transit components, is required under the State of California Congestion Management Program (CMP) statute. The CMP TIA Guidelines are published in the "2010 Congestion Management Program for Los Angeles County", Appendix D (attached). The geographic area examined in the TIA must include the following, at a minimum:

1. All CMP arterial monitoring intersections, including monitored freeway on/off-ramp intersections, where the proposed project will add 50 or more trips during either the a.m. or p.m. weekday peak hour (of adjacent street traffic);
2. If CMP arterial segments are being analyzed rather than intersections, the study area must include all segments where the proposed project will add 50 or more peak hour trips (total of both directions). Within the study area, the TIA must analyze at least one segment between monitored CMP intersections;
3. Mainline freeway-monitoring locations where the project will add 150 or more trips, in either direction, during either the a.m. or p.m. weekday peak hour; and
4. Caltrans must also be consulted through the NOP process to identify other specific locations to be analyzed on the state highway system.

The CMP TIA requirement also contains two separate impact studies covering roadways and transit, as outlined in Sections D.8.1 – D.9.4. If the TIA identifies no facilities for study based on the criteria above, no further traffic analysis is required. However, projects must still consider transit impacts. For all CMP TIA requirements please see the attached guidelines.

MTA looks forward to reviewing the Draft EIR. If you have any questions regarding this response, please call Scott Hartwell at 213-922-2836 or by email at hartwells@metro.net. Please send the Draft EIR to the following address:

MTA CEQA Review Coordination
One Gateway Plaza MS 99-23-2
Los Angeles, CA 90012-2952
Attn: Scott Hartwell

Sincerely,

Scott Hartwell
CEQA Review Coordinator, Long Range Planning

Attachment

APPENDIX

D

GUIDELINES FOR CMP TRANSPORTATION IMPACT ANALYSIS

Important Notice to User: This section provides detailed travel statistics for the Los Angeles area which will be updated on an ongoing basis. Updates will be distributed to all local jurisdictions when available. In order to ensure that impact analyses reflect the best available information, lead agencies may also contact MTA at the time of study initiation. Please contact MTA staff to request the most recent release of "Baseline Travel Data for CMP TIAs."

D.1 OBJECTIVE OF GUIDELINES

The following guidelines are intended to assist local agencies in evaluating impacts of land use decisions on the Congestion Management Program (CMP) system, through preparation of a regional transportation impact analysis (TIA). The following are the basic objectives of these guidelines:

- Promote consistency in the studies conducted by different jurisdictions, while maintaining flexibility for the variety of project types which could be affected by these guidelines.
- Establish procedures which can be implemented within existing project review processes and without ongoing review by MTA.
- Provide guidelines which can be implemented immediately, with the full intention of subsequent review and possible revision.

These guidelines are based on specific requirements of the Congestion Management Program, and travel data sources available specifically for Los Angeles County. References are listed in Section D.10 which provide additional information on possible methodologies and available resources for conducting TIAs.

D.2 GENERAL PROVISIONS

Exhibit D-7 provides the model resolution that local jurisdictions adopted containing CMP TIA procedures in 1993. TIA requirements should be fulfilled within the existing environmental review process, extending local traffic impact studies to include impacts to the regional system. In order to monitor activities affected by these requirements, Notices of Preparation (NOPs) must be submitted to MTA as a responsible agency. Formal MTA approval of individual TIAs is not required.

The following sections describe CMP TIA requirements in detail. In general, the competing objectives of consistency & flexibility have been addressed by specifying standard, or minimum, requirements and requiring documentation when a TIA varies from these standards.

D.3 PROJECTS SUBJECT TO ANALYSIS

In general a CMP TIA is required for all projects required to prepare an Environmental Impact Report (EIR) based on local determination. A TIA is not required if the lead agency for the EIR finds that traffic is not a significant issue, and does not require local or regional traffic impact analysis in the EIR. Please refer to Chapter 5 for more detailed information.

CMP TIA guidelines, particularly intersection analyses, are largely geared toward analysis of projects where land use types and design details are known. Where likely land uses are not defined (such as where project descriptions are limited to zoning designation and parcel size with no information on access location), the level of detail in the TIA may be adjusted accordingly. This may apply, for example, to some redevelopment areas and citywide general plans, or community level specific plans. In such cases, where project definition is insufficient for meaningful intersection level of service analysis, CMP arterial segment analysis may substitute for intersection analysis.

D.4 STUDY AREA

The geographic area examined in the TIA must include the following, at a minimum:

- ❑ All CMP arterial monitoring intersections, including monitored freeway on- or off-ramp intersections, where the proposed project will add 50 or more trips during either the AM or PM weekday peak hours (of adjacent street traffic).
- ❑ If CMP arterial segments are being analyzed rather than intersections (see Section D.3), the study area must include all segments where the proposed project will add 50 or more peak hour trips (total of both directions). Within the study area, the TIA must analyze at least one segment between monitored CMP intersections.
- ❑ Mainline freeway monitoring locations where the project will add 150 or more trips, in either direction, during either the AM or PM weekday peak hours.
- ❑ Caltrans must also be consulted through the Notice of Preparation (NOP) process to identify other specific locations to be analyzed on the state highway system.

If the TIA identifies no facilities for study based on these criteria, no further traffic analysis is required. However, projects must still consider transit impacts (Section D.8.4).

D.5 BACKGROUND TRAFFIC CONDITIONS

The following sections describe the procedures for documenting and estimating background, or non-project related traffic conditions. Note that for the purpose of a TIA, these background estimates must include traffic from all sources without regard to the exemptions specified in CMP statute (e.g., traffic generated by the provision of low and very low income housing, or trips originating outside Los Angeles County. Refer to Chapter 5, Section 5.2.3 for a complete list of exempted projects).

D.5.1 Existing Traffic Conditions. Existing traffic volumes and levels of service (LOS) on the CMP highway system within the study area must be documented. Traffic counts must

be less than one year old at the time the study is initiated, and collected in accordance with CMP highway monitoring requirements (see Appendix A). Section D.8.1 describes TIA LOS calculation requirements in greater detail. Freeway traffic volume and LOS data provided by Caltrans is also provided in Appendix A.

D.5.2 Selection of Horizon Year and Background Traffic Growth. Horizon year(s) selection is left to the lead agency, based on individual characteristics of the project being analyzed. In general, the horizon year should reflect a realistic estimate of the project completion date. For large developments phased over several years, review of intermediate milestones prior to buildout should also be considered.

At a minimum, horizon year background traffic growth estimates must use the generalized growth factors shown in Exhibit D-1. These growth factors are based on regional modeling efforts, and estimate the general effect of cumulative development and other socioeconomic changes on traffic throughout the region. Beyond this minimum, selection among the various methodologies available to estimate horizon year background traffic in greater detail is left to the lead agency. Suggested approaches include consultation with the jurisdiction in which the intersection under study is located, in order to obtain more detailed traffic estimates based on ongoing development in the vicinity.

D.6 PROPOSED PROJECT TRAFFIC GENERATION

Traffic generation estimates must conform to the procedures of the current edition of Trip Generation, by the Institute of Transportation Engineers (ITE). If an alternative methodology is used, the basis for this methodology must be fully documented.

Increases in site traffic generation may be reduced for existing land uses to be removed, if the existing use was operating during the year the traffic counts were collected. Current traffic generation should be substantiated by actual driveway counts; however, if infeasible, traffic may be estimated based on a methodology consistent with that used for the proposed use.

Regional transportation impact analysis also requires consideration of trip lengths. Total site traffic generation must therefore be divided into work and non-work-related trip purposes in order to reflect observed trip length differences. Exhibit D-2 provides factors which indicate trip purpose breakdowns for various land use types.

For lead agencies who also participate in CMP highway monitoring, it is recommended that any traffic counts on CMP facilities needed to prepare the TIA should be done in the manner outlined in Chapter 2 and Appendix A. If the TIA traffic counts are taken within one year of the deadline for submittal of CMP highway monitoring data, the local jurisdiction would save the cost of having to conduct the traffic counts twice.

D.7 TRIP DISTRIBUTION

For trip distribution by direct/manual assignment, generalized trip distribution factors are provided in Exhibit D-3, based on regional modeling efforts. These factors indicate Regional Statistical Area (RSA)-level tripmaking for work and non-work trip purposes.

(These RSAs are illustrated in Exhibit D-4.) For locations where it is difficult to determine the project site RSA, census tract/RSA correspondence tables are available from MTA.

Exhibit D-5 describes a general approach to applying the preceding factors. Project trip distribution must be consistent with these trip distribution and purpose factors; the basis for variation must be documented.

Local agency travel demand models disaggregated from the SCAG regional model are presumed to conform to this requirement, as long as the trip distribution functions are consistent with the regional distribution patterns. For retail commercial developments, alternative trip distribution factors may be appropriate based on the market area for the specific planned use. Such market area analysis must clearly identify the basis for the trip distribution pattern expected.

D.8 IMPACT ANALYSIS

CMP Transportation Impact Analyses contain two separate impact studies covering roadways and transit. Section Nos. D.8.1-D.8.3 cover required roadway analysis while Section No. D.8.4 covers the required transit impact analysis. Section Nos. D.9.1-D.9.4 define the requirement for discussion and evaluation of alternative mitigation measures.

D.8.1 Intersection Level of Service Analysis. The LA County CMP recognizes that individual jurisdictions have wide ranging experience with LOS analysis, reflecting the variety of community characteristics, traffic controls and street standards throughout the county. As a result, the CMP acknowledges the possibility that no single set of assumptions should be mandated for all TIAs within the county.

However, in order to promote consistency in the TIAs prepared by different jurisdictions, CMP TIAs must conduct intersection LOS calculations using either of the following methods:

- ❑ The Intersection Capacity Utilization (ICU) method as specified for CMP highway monitoring (see Appendix A); or
- ❑ The Critical Movement Analysis (CMA) / Circular 212 method.

Variation from the standard assumptions under either of these methods for circumstances at particular intersections must be fully documented.

TIAs using the 1985 or 1994 Highway Capacity Manual (HCM) operational analysis must provide converted volume-to-capacity based LOS values, as specified for CMP highway monitoring in Appendix A.

D.8.2 Arterial Segment Analysis. For TIAs involving arterial segment analysis, volume-to-capacity ratios must be calculated for each segment and LOS values assigned using the V/C-LOS equivalency specified for arterial intersections. A capacity of 800 vehicles per hour per through traffic lane must be used, unless localized conditions necessitate alternative values to approximate current intersection congestion levels.

D.8.3 Freeway Segment (Mainline) Analysis. For the purpose of CMP TIAs, a simplified analysis of freeway impacts is required. This analysis consists of a demand-to-capacity calculation for the affected segments, and is indicated in Exhibit D-6.

D.8.4 Transit Impact Review. CMP transit analysis requirements are met by completing and incorporating into an EIR the following transit impact analysis:

- ❑ Evidence that affected transit operators received the Notice of Preparation.
- ❑ A summary of existing transit services in the project area. Include local fixed-route services within a ¼ mile radius of the project; express bus routes within a 2 mile radius of the project, and; rail service within a 2 mile radius of the project.
- ❑ Information on trip generation and mode assignment for both AM and PM peak hour periods as well as for daily periods. Trips assigned to transit will also need to be calculated for the same peak hour and daily periods. Peak hours are defined as 7:30-8:30 AM and 4:30-5:30 PM. Both "peak hour" and "daily" refer to average weekdays, unless special seasonal variations are expected. If expected, seasonal variations should be described.
- ❑ Documentation of the assumption and analyses that were used to determine the number and percent of trips assigned to transit. Trips assigned to transit may be calculated along the following guidelines:
  - ➢ Multiply the total trips generated by 1.4 to convert vehicle trips to person trips;
  - ➢ For each time period, multiply the result by one of the following factors:

    3.5% of Total Person Trips Generated for most cases, except:

    10% primarily Residential within 1/4 mile of a CMP transit center
    15% primarily Commercial within 1/4 mile of a CMP transit center
    7% primarily Residential within 1/4 mile of a CMP multi-modal transportation center
    9% primarily Commercial within 1/4 mile of a CMP multi-modal transportation center
    5% primarily Residential within 1/4 mile of a CMP transit corridor
    7% primarily Commercial within 1/4 mile of a CMP transit corridor
    0% if no fixed route transit services operate within one mile of the project

  To determine whether a project is primarily residential or commercial in nature, please refer to the CMP land use categories listed and defined in Appendix E, *Guidelines for New Development Activity Tracking and Self Certification*. For projects that are only partially within the above one-quarter mile radius, the base rate (3.5% of total trips generated) should be applied to all of the project buildings that touch the radius perimeter.

- ❑ Information on facilities and/or programs that will be incorporated in the development plan that will encourage public transit use. Include not only the jurisdiction's TDM Ordinance measures, but other project specific measures.

- Analysis of expected project impacts on current and future transit services and proposed project mitigation measures, and;
- Selection of final mitigation measures remains at the discretion of the local jurisdiction/lead agency. Once a mitigation program is selected, the jurisdiction self-monitors implementation through the existing mitigation monitoring requirements of CEQA.

D.9 IDENTIFICATION AND EVALUATION OF MITIGATION

D.9.1 Criteria for Determining a Significant Impact. For purposes of the CMP, a significant impact occurs when the proposed project increases traffic demand on a CMP facility by 2% of capacity ($V/C \geq 0.02$), causing LOS F ($V/C > 1.00$); if the facility is already at LOS F, a significant impact occurs when the proposed project increases traffic demand on a CMP facility by 2% of capacity ($V/C \geq 0.02$). The lead agency may apply a more stringent criteria if desired.

D.9.2 Identification of Mitigation. Once the project has been determined to cause a significant impact, the lead agency must investigate measures which will mitigate the impact of the project. Mitigation measures proposed must clearly indicate the following:

- Cost estimates, indicating the fair share costs to mitigate the impact of the proposed project. If the improvement from a proposed mitigation measure will exceed the impact of the project, the TIA must indicate the proportion of total mitigation costs which is attributable to the project. This fulfills the statutory requirement to exclude the costs of mitigating inter-regional trips.
- Implementation responsibilities. Where the agency responsible for implementing mitigation is not the lead agency, the TIA must document consultation with the implementing agency regarding project impacts, mitigation feasibility and responsibility.

Final selection of mitigation measures remains at the discretion of the lead agency. The TIA must, however, provide a summary of impacts and mitigation measures. Once a mitigation program is selected, the jurisdiction self-monitors implementation through the mitigation monitoring requirements contained in CEQA.

D.9.3 Project Contribution to Planned Regional Improvements. If the TIA concludes that project impacts will be mitigated by anticipated regional transportation improvements, such as rail transit or high occupancy vehicle facilities, the TIA must document:

- Any project contribution to the improvement, and
- The means by which trips generated at the site will access the regional facility.

D.9.4 Transportation Demand Management (TDM). If the TIA concludes or assumes that project impacts will be reduced through the implementation of TDM measures, the TIA must document specific actions to be implemented by the project which substantiate these conclusions.

D.10 REFERENCES

1. *Traffic Access and Impact Studies for Site Development: A Recommended Practice*, Institute of Transportation Engineers, 1991.
2. *Trip Generation*, 5th Edition, Institute of Transportation Engineers, 1991.
3. *Travel Forecast Summary: 1987 Base Model - Los Angeles Regional Transportation Study (LARTS)*, California State Department of Transportation (Caltrans), February 1990.
4. *Traffic Study Guidelines*, City of Los Angeles Department of Transportation (LADOT), July 1991.
5. *Traffic/Access Guidelines*, County of Los Angeles Department of Public Works.
6. *Building Better Communities*, Sourcebook, Coordinating Land Use and Transit Planning, American Public Transit Association.
7. *Design Guidelines for Bus Facilities*, Orange County Transit District, 2nd Edition, November 1987.
8. *Coordination of Transit and Project Development*, Orange County Transit District, 1988.
9. *Encouraging Public Transportation Through Effective Land Use Actions*, Municipality of Metropolitan Seattle, May 1987.

CalRecycle

DEPARTMENT OF RESOURCES RECYCLING AND RECOVERY

1001 I STREET, P.O. BOX 4025 SACRAMENTO, CALIFORNIA 95812 • (916) 341-4027 • WWW.CALRECYCLE.CA.GOV

December 27, 2011

Mr. Rob Glaser, Principal Planner
County of Los Angeles
Department of Regional Planning
320 West Temple Street
Los Angeles, CA 90012

Subject: **SCH No. 2005081071** – Notice of Preparation of a Draft Master Plan Revision/Environmental Impact Report for the Chiquita Canyon Landfill, Solid Waste Information System No.19-AA-0052, Los Angeles County

Dear Mr. Glaser,

Thank you for allowing the Department of Resources Recycling and Recovery (CalRecycle) staff to provide comments for this proposed project and for your agency's consideration of these comments as part of the California Environmental Quality Act (CEQA) process.

CalRecycle staff has reviewed the environmental document cited above and offers the following project description, analysis and our recommendations for the proposed project based on our understanding of the project. If CalRecycle's project description varies substantially from the project as understood by the Lead Agency, CalRecycle staff requests incorporation of any significant differences in the Final Environmental Impact Report. Significant differences in the project description could qualify as "significant new information" about the project that would require recirculation of the document before certification pursuant to CEQA, Section 15088.5.

PROPOSED PROJECT DESCRIPTION

Chiquita Canyon Landfill, located at 29201 Henry Mayo Drive, in the City of Castaic, would continue the existing landfill use with a new grant term, as well as extend the waste footprint within the existing site boundary, better utilize the landfill's remaining and potential disposal capacity, and allow for the disposal of all non-hazardous wastes acceptable at a Class III solid waste disposal landfill. The proposed project would also include the continued diversion of such materials as green waste, asphalt, concrete and metal.

Entitlements for a Solid Waste Facilities Permit

	Current	**Proposed**
Permitted Area	592 acres	Not identified

Disposal Footprint	257 acres	400 acres
Peak Daily Tonnage	6,000 tons per day	Not Identified
Peak Weekly Tonnage	30,000 tons per week	Not Identified
Peak Daily Vehicle Count	Not Specified	Not Identified
Days of Operation	Sunday through Monday	Not Identified
Hours of Operation	24 hours per day, except 5:00 P.M. Saturday through 4:00 A.M. Monday	Not Identified
Design Capacity	29,291,000 cubic yards	Not Identified
Maximum Elevation	1,430 feet Mean Sea Level	Not Identified
Maximum Depth	Not Specified/Applicable	Not Identified
Estimated Closure Date	November 24, 2019	Not Identified

Based on the preliminary assessment of the environmental effects potentially stemming from the proposed project, the Lead Agency has determined that an Environmental Impact Report (EIR) will need to be prepared. The following components have been identified as having a potentially significant effect on the environment:

- Aesthetics
- Air Quality
- Biological Resources
- Cultural Resources
- Geology and Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Mandatory Findings of Significance

CALRECYCLE STAFF COMMENTS

As required by Title 14, California Code of Regulations (14 CCR), Sections 15126.2, 15126.4, and 15126.6, CalRecycle staff requests that the Draft EIR contain detailed considerations and discussions of the significant effects, mitigation measures, and alternatives for the proposed project including the alternative of "no project."

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The local government, in whose jurisdiction the facilities will be located, must make a finding that the facility is consistent with the General Plan and is identified in the most recent Countywide Integrated Waste Management Plan [Public Resources Code (PRC), Sections 50000 and 50001].

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CONCLUSION

CalRecycle staff requests copies of any subsequent environmental documents including, the Final Environmental Impact Report, Statement of Overriding Considerations, copies of public notices and any Notices of Determination for this project.

Please refer to 14 CCR, § 15094(d) that states: "<u>If the project requires discretionary approval from any state agency, the local lead agency shall also, within five working days of this approval, file a copy of the notice of determination with the Office of Planning and Research</u> [State Clearinghouse]."

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If you have any questions regarding these comments, please contact me at 951.782.4194 or e-mail me at Martin.Perez@calrecycle.ca.gov.

Sincerely,

Martin Perez
Permitting and Assistance Branch - South Unit
Permits and Certification Division
CalRecycle

cc: Virginia Rosales, Supervisor
Permitting and Assistance Branch - South Unit

Gerardo Villalobos, REHS IV
Department of Public Health
County of Los Angeles
5050 Commerce Drive,
Baldwin Park, CA 91706

State of California - The Resources Agency
EDMUND G. BROWN JR., Governor
DEPARTMENT OF FISH AND GAME
Charlton H. Bonham, Director
http://www.dfg.ca.gov

3883 Ruffin Road
San Diego, CA 92123
Telephone: (858) 467-4201
Fax: (858) 495-3614

FAX TRANSMITTAL SHEET

Date: 12-27-2011

No. of Pages 7 including Cover Sheet

To: **Mr. Bob Glaser**
Los Angeles County Department of Regional Planning
Fax: **(213) 217-5108**

From: **Leslie MacNair --Environmental Program Manager**
South Coast Region-San Diego
Tel: 949-458-1754
Fax: **858- 495-3614**

Subject: **Notice of Preparation of a Draft Environmental Impact Report for Chiquita Canyon Landfill Master Plan Revision Project SCH# 2005081071, Los Angeles County**

_____Urgent _____Please Reply _____For Review _X_Orig Mailed

f you do not receive all of the pages indicated, please call the sender as soon as possible. Thank you.

Conserving California's Wildlife Since 1870

State of California -The Natural Resources Agency
DEPARTMENT OF FISH AND GAME
South Coast Region
3883 Ruffin Road
San Diego, CA 92123
(858) 467-4201
http://www.dfg.ca.gov

EDMUND G. BROWN JR., Governor
CHARLTON H. BONHAM, Director

December 27, 2011

Mr. Bob Glaser
Los Angeles County Department of Regional Planning
320 West Temple Street
Los Angeles, CA 90012

Subject: Notice of Preparation for Draft Environmental Impact Report for Chiquita Canyon Landfill Master Plan Revision Project SCH # 2005081071, Los Angeles County

Dear Mr. Glaser:

The Department of Fish and Game (Department) has reviewed the Notice of Preparation (NOP) for the proposed Chiquita Canyon Landfill Master Plan Revision (Project). The Project would continue the existing landfill use with a new grant term as well as extending the waste footprint of the land fill within the existing site boundary. The Project is located between Chiquita Canyon Road and Wolcott Way within the Santa Clara River and Castaic Creek Watershed in unincorporated Los Angeles County. The Project will result in impacts to undisturbed areas prior to closure of the landfill including coastal sage scrub and streambeds that may be within Department jurisdiction.

The California Wildlife Action Plan, a recent Department guidance document, identified the following stressors affecting wildlife and habitats within the Project area: 1) growth and development; 2) water management conflicts and degradation of aquatic ecosystems; 3) invasive species; 4) altered fire regimes; and 5) recreational pressures. With these stressors in mind, the Department has previously worked with the City in recommending conservation and protective measures for biological and botanical resources and looks forward to continuing this effort. Please let Department staff know if you would like a copy of the California Wildlife Action Plan to review.

The Department is California's Trustee Agency for fish and wildlife resources, holding these resources in trust for the People of the State pursuant to various provisions of the California Fish and Game Code. (Fish & G. Code, §§ 711.7, subd. (a), 1802.) The Department submits these comments in that capacity under the California Environmental Quality Act (CEQA). (See generally Pub. Resources Code, §§ 21070; 21080.4.) Given its related permitting authority under the California Endangered Species Act (CESA) and Fish and Game Code section 1600 *et seq.*, the Department also submits these comments likely as a Responsible Agency for the Project under CEQA. (*Id.*, § 21069.)

To enable Department staff to adequately review and comment on the proposed Project we recommend the following information, where applicable, be included in the DEIR:

1. A complete, recent assessment of flora and fauna within and adjacent to the Project area, with particular emphasis upon identifying endangered, threatened, and locally unique species and sensitive habitats including:

a. A thorough recent assessment of rare plants and rare natural communities, following the Department's Guidelines for Assessing Impacts to Rare Plants and Rare Natural Communities. (See Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities at: http://www.dfg.ca.gov/habcon/plant/).

b. A complete, recent assessment of sensitive fish, wildlife, reptile, and amphibian species. Seasonal variations in use within the Project area should also be addressed. Recent, focused, species-specific surveys, conducted at the appropriate time of year and time of day when the sensitive species are active or otherwise identifiable, are required.

c. Endangered, rare, and threatened species to address should include all those species which meet the related definition under the CEQA Guidelines. (See Cal. Code Regs., tit. 14, § 15380.)

d. The Department's Biogeographic Data Branch in Sacramento should be contacted at (916) 322-2493 (www.dfg.ca.gov/biogeodata) to obtain current information on any previously reported sensitive species and habitats, including Significant Natural Areas identified under Chapter 12 of the Fish and Game Code. Also, any Significant Ecological Areas or Environmentally Sensitive Habitats or any areas that are considered sensitive by the local jurisdiction that are located in or adjacent to the Project area must be addressed.

2. A thorough discussion of direct, indirect, and cumulative impacts expected to adversely affect biological resources, with specific measures to offset such impacts. This discussion should focus on maximizing avoidance, and minimizing impacts.

a. CEQA Guidelines, Section 15125(a), direct that knowledge of the regional setting is critical to an assessment of environmental impacts and that special emphasis should be placed on resources that are rare or unique to the region.

b. Project impacts including deposition of debris should also be analyzed relative to their effects on off-site habitats and populations. Specifically, this should include nearby public lands, open space, natural habitats, and riparian ecosystems. Impacts to and maintenance of wildlife corridor/movement areas, including access to undisturbed habitat in adjacent areas are of concern to the Department and should be fully evaluated and provided. The analysis should also include a discussion of the potential for impacts resulting from such effects as increased vehicle traffic, outdoor artificial lighting, noise and vibration and pest management.

c. A cumulative effects analysis should be developed as described under CEQA Guidelines, Section 15130. General and specific plans, as well as past, present, and anticipated future projects, should be analyzed relative to their impacts on similar plant communities and wildlife habitats.

d. Impacts to migratory wildlife affected by the Project should be fully evaluated including proposals to remove/disturb native and ornamental landscaping and other nesting habitat for native birds. Impact evaluation may also include such elements as migratory butterfly roost sites and neo-tropical bird and waterfowl stop-over and staging sites. All migratory nongame native bird species are protected by international treaty under the Federal Migratory Bird Treaty Act (MBTA) of 1918 (50 C.F.R. Section 10.13). Sections

3503, 3503.5 and 3513 of the California Fish and Game Code prohibit take of birds and their active nests, including raptors and other migratory nongame birds as listed under the MBTA.

e. Impacts from Project activities (including but not limited to, staging and disturbances to native and non native vegetation, structures, and substrates) should occur outside of the avian breeding season which generally runs from March 1-August 31 (as early as January 1 for some raptors) to avoid take of birds or their eggs. If Project activities cannot avoid the avian breeding season, nest surveys should be conducted and active nests should be avoided and provided with a minimum buffer as determined by a biological monitor (the Department generally recommends a minimum 300 foot nest avoidance buffer (or 500 feet for all active raptor nests).

f. Proposed impacts to all habitats from City or County required Fuel Modification Zones (FMZ). Areas slated as mitigation for loss of habitat shall not occur within the FMZ.

3. A range of alternatives should be analyzed to ensure that alternatives to the proposed Project are fully considered and evaluated. A range of alternatives which avoid or otherwise minimize impacts to sensitive biological resources including wetlands/riparian habitats, alluvial scrub, coastal sage scrub, should be included. Specific alternative locations should also be evaluated in areas with lower resource sensitivity where appropriate.

   a. Mitigation measures for project impacts to sensitive plants, animals, and habitats should emphasize evaluation and selection of alternatives which avoid or otherwise minimize Project impacts. Compensation for unavoidable impacts through acquisition and protection of high quality habitat elsewhere should be addressed with off-site mitigation locations clearly identified.

   b. The Department considers Rare Natural Communities as threatened habitats having both regional and local significance. Thus, these communities should be fully avoided and otherwise protected from Project-related impacts (Attachment).

   c. The Department generally does not support the use of relocation, salvage, and/or transplantation as mitigation for impacts to rare, threatened, or endangered species. Department studies have shown that these efforts are experimental in nature and largely unsuccessful.

4. An Incidental Take Permit from the Department may be required if the Project, Project construction, or any Project-related activity during the life of the Project will result in "take" as defined by the Fish and Game Code of any species protected by CESA. (Fish & G. Code, §§86, 2080, 2081, subd. (b), (c).) Early consultation with Department regarding potential permitting obligations under CESA with respect to the Project is encouraged. (Cal. Code Regs., tit. 14, § 783.2, subd. (b).) It is imperative with these potential permitting obligations that the draft environmental document prepared by the Lead Agency includes a thorough and robust analysis of the potentially significant impacts to endangered, rare, and threatened species, and their habitat, that may occur as a result of the proposed Project. For any such potentially significant impacts the Lead Agency should also analyze and describe specific, potentially feasible mitigation measures to avoid or substantially lessen any such impacts as required by CEQA and, if an ITP is necessary, as required by the relevant permitting criteria prescribed by Fish and Game Code section 2081, subdivisions (b) and (c). The failure to include this analysis in an environmental document could

preclude the Department from relying on the Lead Agency's analysis to issue an ITP without the Department first conducting its own, separate Lead Agency subsequent or supplemental analysis for the Project. (See, e.g., Cal. Code Regs., tit. 14, § 15096, subd. (f).) For these reasons, the following information is requested:

a. Biological mitigation monitoring and reporting proposals should be of sufficient detail and resolution to satisfy the requirements for a CESA Permit.

b. A Department-approved Mitigation Agreement and Mitigation Plan are required for plants listed as rare under the Native Plant Protection Act.

5. The Department opposes the elimination of watercourses (including concrete channels, blue line streams and other watercourses not designated as blue line streams on USGS maps) and/or the channelization of natural and manmade drainages or conversion to subsurface drains. All wetlands and watercourses, whether intermittent, ephemeral, or perennial, must be retained and provided with substantial setbacks which preserve the riparian and aquatic habitat values and maintain their value to on-site and off-site wildlife populations. The Department recommends a minimum natural buffer of 100 feet from the outside edge of the riparian zone on each side of drainage.

   a. The Department also has regulatory authority with regard to activities occurring in streams and/or lakes that could adversely affect any fish or wildlife resource. For any activity that will divert or obstruct the natural flow, or change the bed, channel, or bank (which may include associated riparian resources) or a river or stream or use material from a streambed, the Project applicant (or "entity") must provide written notification to the Department pursuant to Section 1602 of the Fish and Game Code. Based on this notification and other information, the Department then determines whether a Lake and Streambed Alteration (LSA) Agreement is required. The Department's issuance of an LSA is a project subject to CEQA. To facilitate issuance of an Agreement, if necessary, the environmental document should fully identify the potential impacts to the lake, stream or riparian resources and provide adequate avoidance, mitigation, monitoring and reporting commitments for issuance of the Agreement. Early consultation is recommended, since modification of the proposed Project may be required to avoid or reduce impacts to fish and wildlife resources. Again, the failure to include this analysis in the Project environmental impact report could preclude the Department from relying on the Lead Agency's analysis to issue an Agreement without the Department first conducting its own, separate Lead Agency subsequent or supplemental analysis for the Project.

Thank you for this opportunity to provide comments. Please contact Mr. Scott Harris, Environmental Scientist, at (626) 797-3170 if you should have any questions and for further coordination on the proposed Project.

Sincerely,

Leslie MacNair

Leslie S. MacNair
Environmental Program Manager
South Coast Region

Attachment

cc: Ms. Leslie MacNair, Laguna Hills
Ms. Terri Dickerson, Laguna Niguel
Ms. Kelly Schmoker, Pasadena
Mr. Scott Harris, Pasadena
Mr. Dan Blankenship, Newhall

HabCon-Chron
Department of Fish and Game

State Clearinghouse
Sacramento

S1.2	Southern Foredunes Mono Pumice Flat Southern Interior Basalt Flow Vernal Pool
S2.1	Venturan Coastal Sage Scrub Diegan Coastal Sage Scrub Riversidean Upland Coastal Sage Scrub Riversidean Desert Sage Scrub Sagebrush Steppe Desert Sink Scrub Mafic Southern Mixed Chaparral San Diego Mesa Hardpan Vernal Pool San Diego Mesa Claypan Vernal Pool Alkali Meadow Southern Coastal Salt Marsh Coastal Brackish Marsh Transmontane Alkali Marsh Coastal and Valley Freshwater Marsh Southern Arroyo Willow Riparian Forest Southern Willow Scrub Modoc-Great Basin Cottonwood Willow Riparian Modoc-Great Basin Riparian Scrub Mojave Desert Wash Scrub Engelmann Oak Woodland Open Engelmann Oak Woodland Closed Engelmann Oak Woodland Island Oak Woodland California Walnut Woodland Island Ironwood Forest Island Cherry Forest Southern Interior Cypress Forest Bigcone Spruce-Canyon Oak Forest
S2.2	Active Coastal Dunes Active Desert Dunes Stabilized and Partially Stabilized Desert Dunes Stabilized and Partially Stabilized Desert Sandfield Mojave Mixed Steppe Transmontane Freshwater Marsh Coulter Pine Forest Southern California Fellfield White Mountains Fellfield
S2.3	Bristlecone Pine Forest Limber Pine Forest
S3.2	Joshua tree woodland Mojave mixed woody scrub

2

Sensitivity of Top Priority Rare Natural Communities in Southern California

Sensitivity rankings are determined by the Department of Fish and Game, California Natural Diversity Data Base and based on either number of known occurrences (locations) and/or amount of habitat remaining (acreage). The three rankings used for these top priority rare natural communities are as follows:

S1.# Fewer than 6 known locations and/or on fewer than 2,000 acres of habitat remaining.

S2.# Occurs in 6-20 known locations and/or 2,000-10,000 acres of habitat remaining.

S3.# Occurs in 21-100-known locations and/or 10,000-50,000 acres of habitat remaining.

The number to the right of the decimal point after the ranking refers to the degree of threat posed to that natural community regardless of the ranking. For example:

S1.1 = very threatened
S2.2 = threatened
S3.3 = no current threats known

Sensitivity Rankings (February 1992)

Rank	Community Name
S1.1	Mojave Riparian Forest
	Sonoran Cottonwood Willow Riparian
	Mesquite Bosque
	Elephant Tree Woodland
	Crucifixion Thorn Woodland
	Allthorn Woodland
	Arizonan Woodland
	Southern California Walnut Forest
	Mainland Cherry Forest
	Southern Bishop Pine Forest
	Torrey Pine Forest
	Desert Mountain White Fir Forest
	Southern Dune Scrub
	Southern Coastal Bluff Scrub
	Maritime Succulent Scrub
	Riversidean Alluvial Fan Sage Scrub
	Southern Maritime Chaparral
	Valley Needlegrass Grassland
	Great Basin Grassland
	Mojave Desert Grassland
	Pebble Plains
	Southern Sedge Bog
	Cismontane Alkali Marsh

CalRecycle

DEPARTMENT OF RESOURCES RECYCLING AND RECOVERY

1001 I STREET, P.O. BOX 4025 SACRAMENTO, CALIFORNIA 95812 • (916) 341-4027 • WWW.CALRECYCLE.CA.GOV

December 27, 2011

Mr. Rob Glaser, Principal Planner
County of Los Angeles
Department of Regional Planning
320 West Temple Street
Los Angeles, CA 90012

Subject: **SCH No. 2005081071** – Notice of Preparation of a Draft Master Plan Revision/Environmental Impact Report for the Chiquita Canyon Landfill, Solid Waste Information System No.19-AA-0052, Los Angeles County

Dear Mr. Glaser,

Thank you for allowing the Department of Resources Recycling and Recovery (CalRecycle) staff to provide comments for this proposed project and for your agency's consideration of these comments as part of the California Environmental Quality Act (CEQA) process.

CalRecycle staff has reviewed the environmental document cited above and offers the following project description, analysis and our recommendations for the proposed project based on our understanding of the project. If CalRecycle's project description varies substantially from the project as understood by the Lead Agency, CalRecycle staff requests incorporation of any significant differences in the Final Environmental Impact Report. Significant differences in the project description could qualify as "significant new information" about the project that would require recirculation of the document before certification pursuant to CEQA, Section 15088.5.

PROPOSED PROJECT DESCRIPTION

Chiquita Canyon Landfill, located at 29201 Henry Mayo Drive, in the City of Castaic, would continue the existing landfill use with a new grant term, as well as extend the waste footprint within the existing site boundary, better utilize the landfill's remaining and potential disposal capacity, and allow for the disposal of all non-hazardous wastes acceptable at a Class III solid waste disposal landfill. The proposed project would also include the continued diversion of such materials as green waste, asphalt, concrete and metal.

Entitlements for a Solid Waste Facilities Permit

	Current	Proposed
Permitted Area	592 acres	Not identified

Disposal Footprint	257 acres	400 acres
Peak Daily Tonnage	6,000 tons per day	Not Identified
Peak Weekly Tonnage	30,000 tons per week	Not Identified
Peak Daily Vehicle Count	Not Specified	Not Identified
Days of Operation	Sunday through Monday	Not Identified
Hours of Operation	24 hours per day, except 5:00 P.M. Saturday through 4:00 A.M. Monday	Not Identified
Design Capacity	29,291,000 cubic yards	Not Identified
Maximum Elevation	1,430 feet Mean Sea Level	Not Identified
Maximum Depth	Not Specified/Applicable	Not Identified
Estimated Closure Date	November 24, 2019	Not Identified

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If you have any questions regarding these comments, please contact me at 951.782.4194 or e-mail me at Martin.Perez@calrecycle.ca.gov.

Sincerely,

Martin Perez
Permitting and Assistance Branch - South Unit
Permits and Certification Division
CalRecycle

cc: Virginia Rosales, Supervisor
Permitting and Assistance Branch - South Unit

Gerardo Villalobos, REHS IV
Department of Public Health
County of Los Angeles
5050 Commerce Drive,
Baldwin Park, CA 91706

To: Rob Glaser, Principal Planner
Zoning Permits North Section
Los Angeles Co Dept. of Regional Planning
320 W Temple St, room 1348
Los Angeles CA 90012

CC: Michael Antonovich
LA County Supervisor 5th District
500 West Temple Street, Room 869
Los Angeles, CA 90012

Scott Wardle (President)
Castaic Area Town Council
Castaic, CA 91384

RE: Chiquita Canyon Landfill/ project No. R2004-00559-(5) Conditional Use Permit No. 200400042, Environmental Case 200400039

Location 29201 Henry Mayo Drive (Highway126) Castaic CA 91384 Located between Regions 1 and 2 of the Castaic Area Town Council.

As a past member of the Castaic Town Council I am aware that the council has abrogated it duties to comment and guide the EIR process for the proposed landfill expansion. The Council by-laws prevent swift action without warning, due to the fact that actions must be presented to the public as an agenda item prior to official actions by the Council can be taken. This process takes two months minimum to process, so longer notice is required by the Council. During my term on the council, many times we were required to comment at the earliest steps for such a large project with such serious ramifications to the community. First notifications were received, and extensions for comment periods were requested to conform to council bylaws.

Due to the councils unavoidable delayed response past the comment extension date, I would hope that Supervisor Antonovich's Staff and the LA County Regional Planning will receive these comments for action and expand the notification process to the other affected areas outlined below to prevent future problems.

1. Val Verde, and North river "Project" (Region 2 of the Castaic Town Council)
2. Hasley Canyon Area (Region 3 of the Castaic Town Council)
3. Live Oak Community, River Village "Project", and the Castaic Valencia Industrial Park (Region 1 of the Castaic Town Council)

*Notification of Expansion was sent only to the Val Verde area residents all other communities directly affected were **NOT** included and must be added for all future notices.*

Areas to be included should include the above listed and any other areas that fall within a 50% increased sphere of impact notification. Using the 1997 documented sphere of impact of 1.2 miles, and projecting a 50% increase the new proposed impacted areas would fall within a 1.8 mile radius of the landfill boundaries'.

- While all of the Castaic community should have input into the Chiquita Landfill Expansion the residents of the three (3) regions of the Castaic Area Town Council should be notified of all meetings and deadlines for comments by post. Public meetings for these regions should be held at the Live Oak School Site auditorium of Castaic Middle School to allow best attendance.

The request for the permit extension should allow all rules and laws to be applied and implemented immediately. The implementation of AB939 recycling requirements should go into effect 2012 and all municipalities utilizing this facility be required to follow these requirements.

After reviewing the Initial Study Checklist, there were some items of question and items not on the list that must be added or will be questioned during the EIR.

1. Aesthetics: *states less than significant impact*

a. The 126 Hwy is a first Priority Scenic Highway and the proposed landfill height and visibility would make this road way forfeit the scenic designation having a "**Potentially Significant Impact**".
b. The Castaic Community Standards District (CSD) is not listed as a requirement.
c. The SCV SEA (vistas section is not listed as a requirement.
d. Property Value impacts

Vistas and CSD considerations:
The Castaic Community Standards District (CSD) is not listed as a regulation to be followed along with the SCV SEA vista regulations. The Castaic CSDs ridgeline protection sections clearly outline how scenic vistas must be protected and maintained. The proposed 140/ft increase in the approved height would be making the landfill the tallest figure in the hillside range violating the approved CSD. All height projections must be shown utilizing photos from all visually affected roadways, community ingress and egress pathways and the neighborhoods of Live Oak, the Valencia Industrial Park, Mission Village, North River and Val Verde.

Other Scenic jurisdictions along the 126 corridor must be considered. County comment on scenic routes and roadways must be reviewed along with CSD considerations. As the picture below shows the present Landfill is becoming a significant visual impact already, adding 140ft would make it the largest hill within the hillside range. Impact Significant.

Picture from 126 ½ mile west from I5

Ascetic impacts shall contain affects to areas of ingress and egress such as entrance roads to Hasley Canyon, Val Verde, Live Oak, and Castaic Industrial Park Also to include impact on Landmark Village, Mission Village and Homestead Village.

(3) Air Quality

a. Exposure to Sensitive Receptors do not list impacts to:
   i. Schools
   ii. Planned schools
   iii. AQMD-CARB

After reviewing the Initial Study Checklist, there were some items of question and items not on the list that must be added or will be questioned during the EIR. There are a significant many established and plan/approved residential, business and school areas not listed.

Areas not list that are within the affected boundaries are as follows:

- Val Verde, and North river "Project" (Region 2 of the Castaic Town Council)
- Hasley Canyon Area (Region 3 of the Castaic Town Council)
- Live Oak Community, Mission Village "Project", and the Castaic Valencia Industrial Park (Region 1 of the Castaic Town Council)

The Initial study List does not recognized areas that are approved by the Castaic Town Council and are in process and with approved maps submitted to Regional Planning. Areas to be included should include the above listed and any other areas that fall within a 50% increased sphere of impact notification. Using the 1997 documented sphere of impact of 1.2 miles, and projecting a 50% increase the new proposed impacted areas would fall within a 1.8 mile radius of the landfill boundaries'.

Projects in Process:
Landmark Village eventually will be home to about 4,500 residents along the Santa Clara River between the 126 just south, of the 2012 landfill entrance. The 300-acre neighborhood will also have an elementary school, community park and business development within the 1.2 mile affected zone.

Mission Village, located West of Magic Mountain and South of Hwy 126 was approved by the Los Angeles County Regional Planning Commission in May 2011. Mission Village is a 1261-acre neighborhood of 621 lots that include single family homes, condominiums, community park, and business development within the 1 mile affected zone.

Homestead Village is in process of approval and includes both a middle school and High school. The middle school will be within one (1) mile of boundary the High school 1.2-1.8.

Air Quality:
While other areas of Sothern California have reduced the number of first stage smog alerts, the Santa Clarita Valley has seen an increase in the number of first stage days. An emissions reduction plan must be presented to AQMD and CARB outlining emission reduction for garbage trucks entering the facility, on site vehicles such as tractors, haulers and landfill gases.

With the new stated CARB regulations all landfill operations should follow the set guide lines put forth by CARB. CARB must be added to the approving of the air quality plan showing the use of CNG, battery electric, hydrogen fuel cell and plug-in hybrid vehicles, by 2018.

A study of all hauling and grading aspects must include particulate, CO2 emissions, carbon monoxide, Vinyl Chloride, Methane, and all other regulated emissions associated with landfill, and grading type of operations.

Sensitive Receptors:
Air Quality Impact to schools within one mile of the landfill are of significant Impact. There are two approved projects that have school components within the 1 mile stated boundary. These schools will be operated by the Castaic School District. The district must be added to the list of notifications and approving bodies.

Landmark Village eventually will be home to an elementary school, community park within the 1.2 mile affected zone.

Homestead Village is in process of approval and includes both a middle school and High school. The middle school will be within one (1) mile of boundary the High school 1.2-1.8.

These sites would be considered Air Quality Sensitive Receptors. Comments from both Castaic School district and the Hart School district will be required.

2. <u>(4) Biological Resources</u>

a. Wildlife impacts are not listed as a requirement.
b. Applicable ordnances not listed
   iv. Castaic CSD
   v. SCV SEA

Wildlife Impacts:
We need to assess that all sensitive species are adequately surveyed during the preparation of EIR outlined below but not limited to this list that specifically applies to the taxa that would be scavenge or hunt along the landfill cover, cap and boundaries where contaminated rodents would be hunted, become carrion or wander off site. Birds most affected by contaminated or poisoned food sources would be the raptors and nocturnal species that hunt wild game. The actual status of each, including nesting sites as applicable, impact analysis, must be addressed in an amended EIR.

Specifically, these species include:
1. California Condor (overlooked)
2. Golden Eagle (nesting raptor)
3. Cooper's Hawk (nesting raptor)
4. White-tailed Kite (nesting raptor)
5. Prairie Falcon (nesting raptor)
6. Horned Owl (nocturnal)
7. Long-eared Owl (nocturnal)
8. California Spotted Owl (Nocturnal)

3. <u>(5) Cultural Resources</u>

a. Bowers Cave.
b. Archaeological findings

Archaeological and Historical Impacts and Protection
Expected impacts and protection plans must be outlined for the **Bowers Cave**, Tataviam Indian sites and petroglyphs located on or near the landfill site area. Also plans for escorting guests to view and study the sites must be proposed. Due to the fact that the last Tataviam of this tribe died in early 1900s the closest tribe with legal jurisdiction would be the Fernandeño Tataviam Band of Mission Indian's and the Chumash Tribe. The Chumash Tribal Council and Fernandeño Tataviam Band of Mission Indian's must be notified and approve any and all protection and impact proposals that would affect these sites located on or near the Landfill site.

About 50,000 years ago this area was an inlet with much of the landfill area under water. Many artifacts have been found in this area during grading. The EIR must show how any and all archaeological artifacts will be preserved and submitted to Los Angeles County for storage until a Castaic/SCV Museum is built to house them.

4. <u>(8) Greenhouse Emissions</u>

a. Emissions
b. Cap and Trade requirements

A study of all hauling and grading aspects must include particulate, CO2 emissions, carbon monoxide, Vinyl Chloride, Methane, and all other regulated emissions associated with landfill, and grading type of operations. This study must also include Vehicle operations including Haulers and site equipment, cogeneration units and water treatment operations.

The emission impacts will have some cap and trade impacts for emissions of haulers and landfill operations. We would like to see the numbers as projected b current CARB regulations.

5. <u>(10) Hydrology and Water Quality</u>

a. Ground water
b. Water treatment
c. Monitoring

Presently the landfill operates without any leachate treatment facilities, runoff water treatment or ground water monitoring. Water contamination considerations must include continual monitoring of run off, area ground water monitoring wells, and river bed aquifer monitoring. The landfill location sits on the western region of the Saugus Aquifer that supplies water to all of the Santa Clarita Valley and is required for continued development of the Newhall Ranch development. The lower water table known as the Pico Aquifer is considered non-potable and will not be required in this assessment.

A new third party ground water survey and evaluation must be included and submitted to District 36 Water (LA County), Newhall Water District along with the Castaic Water Agency for comment. District 36 has a well within 1.2 miles that supplies water to Val Verde and Hasley Canyon. Both Hasley Canyon and Val Verde have private wells that will require some type of ground and surface water runoff monitoring.

*Implementation plans must be presented for leachate and surface water runoff monitoring of compounds listed by Federal and Calif. State landfill regulations, with the addition of **heavy metals** found in automotive manufacturing, **Lithium**, and **Mercury** from batteries, CFLs & electronic waste.*

Recognizing that the new CFL law will increase the number of mercury containing light bulbs being incorrectly disposed along with illegal disposal of cell phones, and other electronic devices, mercury must be added to the heavy metal list. One household product that is causing a problem these days is throwaway batteries. Each year, Americans throw away 84,000 tons of alkaline batteries. These AA, C and D cells that power electronic toys and games, portable audio equipment and a wide range of other gadgets comprise 20% of the household hazardous materials present around the country in America's landfills. With the new Lithium cells we must add the monitoring of these potential contaminants also.

A landfill cover or cap is an umbrella over the landfill to keep water out (to help prevent leachate formation). It will generally consists of several sloped layers: clay or membrane liner (to prevent rain from intruding), overlain by a very permeable layer of sandy or gravelly soil (to promote rain runoff), overlain by topsoil in which vegetation can root (to stabilize the underlying layers of the cover). If the cover (cap) is not maintained, rain will enter the landfill resulting in buildup of leachate to the point where the bathtub overflows its sides and wastes enter the environment.

The present use of Auto Shredder waste and compost outlined in the landfill proposal as daily cover is very permeable to rainwater, contain contamination elements of their own and will be factors in the discussion of the required water treatment facilities.

6. <u>(14) Population and Housing</u>

d. Areas of impact incomplete.
e. Projects in approval process not listed
   vi. Mission Village
   vii.
   viii. SCV SEA

After reviewing the Initial Study Checklist, there were some items of question and items not on the list that must be added or will be questioned during the EIR. There are a significant many established and plan/approved residential, business and school areas not listed or considered.

Areas not list that are within the affected boundaries are as follows:

- Val Verde, and North river "Project" (Region 2 of the Castaic Town Council)
- Hasley Canyon Area (Region 3 of the Castaic Town Council)
- Live Oak Community, Mission Village "Project", and the Castaic Valencia Industrial Park (Region 1 of the Castaic Town Council)

The Initial study list does not recognized areas that are approved by the Castaic Town Council and are in process with approved maps submitted to Regional Planning. Areas to be included should include the above listed and any other areas that fall within a 50% increased sphere of impact notification. Using the 1997 documented sphere of impact of 1.2 miles, and projecting a 50% increase the new proposed impacted areas would fall within a 1.8 mile radius of the landfill boundaries'.

Property Values

Proximity to landfills and hazardous waste sites can severely affect property values. Any property close to an active landfill will probably be devalued as a matter of course. Depending on how close the property lies to the site, whether the site is still active, and (if not active) if the waste has been properly encapsulated or removed, the value of a tract of land or home could be affected in many different ways. For example, if an active landfill is declared "closed" and proper measures are taken to ensure that there is no risk of contamination from the waste therein, the value of a nearby property may rise from the low value it had from being located near an active waste site.

I recommend that the L.A County assessor report on the property value effects on all properties within 1 mile-1.5 miles and 1.8 miles from the outer boundaries of the landfill site. The report should contain projected values if the extension is approved, along with the values if closed as presently contracted.

Short term profits from the landfill operations must be weighed against the loss of continued property tax incomes from high end businesses and residential locations in the landfill area.

Projects in Process such as Landmark Village will be home to about 4,500 residents along the Santa Clara River between the 126 just south, of the 2012 landfill entrance and within the 1.2 mile affected zone.

Mission Village, located West of Magic Mountain and South of Hwy 126 was approved by the Los Angeles County Regional Planning Commission in May 2011 within the 1 mile affected zone.

Homestead Village is in process of approval and includes both a middle school and High school. The middle school will be within one (1) mile of boundary the High school 1.2-1.8.

7. <u>(17) Transportation and Traffic</u>

a. Truck traffic on 126
b. Trash along road sides
c. Hauler emissions.

Hauler traffic will be a significant traffic impact and will be very dependent on the amount of intake allowed per day. Presently at 6:00Am one complete lane is blocked by trucks waiting to get on site for about 1 mile.

8. <u>(19) Mandatory Findings of Significance</u>

1) Environmental Racism

Environmental discrimination has historically occurred with respect to several different kinds of sites, including waste disposal. The justification that has been used is to pay off the affected community as was done under the original 1997 contract. The money received by Val Verde never will resolve the health effects that those in the community have suffered. "Environmental justice advocates make the argument that minority populations often undertake environmentally hazardous activities because they have few economic alternatives and/or are not fully aware of the risks involved." The EIR should be reviewed by both Calif. EPA and the State Attorney General before the approval process moves forward in the county as an Environmental Justice issue. No community should be asked to trade health for money.

<u>Reviewing agencies and groups:</u>

The following agencies must be added to the review list:

1. Water District 36- LA Co. Water district 36
2. Newhall Water District
3. Castaic School District
4. Hart School District
5. Chumash Tribal Council
6. Fernandeño Tataviam Tribal Council
7. Calif. State Attorney General (environmental Justus considerations)
8. Los Angeles County Assessor's Office
9. Castaic Chamber of Commerce
10. CARB
11. SAQMD

SCOPE
Santa Clarita Organization for Planning and the Environment
TO PROMOTE, PROTECT AND PRESERVE THE ENVIRONMENT, ECOLOGY
AND QUALITY OF LIFE IN THE SANTA CLARITA VALLEY
POST OFFICE BOX 1182, SANTA CLARITA, CA 91386

2-10-12

Rob Glaser
LA County Dept. of Regional Planning
320 W. Temple St.
Los Angeles, CA 90012

Via email to rglaser@planning.lacounty.gov

Re: Notice of Preparation for Chiquita Canyon Landfill Expansion RCEP2004-00559

Dear Mr. Glaser:

First we note that, on your list of parties to be notified, the Friends of the Santa Clara River (660 Randy Dr., Newbury Park, 91320) is not listed. We urge you to ensure that they are notified of this project, since they were in involved in the previous EIR process for the 1997 expansion CUP.

Background
A CUP for this landfill was granted in 1997 and is not due to expire until 2019 or until 23 million tons of trash has been deposited in the landfill. It is our understanding that the permit banned sewage sludge from the landfill, allowed green waste composting and eliminated the proposed Materials Recovery Facility.

At that time, the County of Los Angeles claimed insufficient capacity for solid waste throughout the County and that garbage would be overflowing into the streets if permits for expansion of several landfills were not granted. They proposed a mega-dump in Elsmere Canyon, and huge expansions for Sunshine Landfill and Puente Hills Landfill in the San Fernando San Gabriel Valleys and rail haul to distant sites. Sunshine, Puente Hills and Chiquita were all granted expansion permits and one rail haul site has since begun operations.

In 1998, AB939 was passed by the legislature, requiring a reduction in waste generation by cities and counties of 50%. Most entities now have well functioning waste reduction programs. In addition, waste generation in the County of Los Angeles has been experiencing a downward trend, either from the economy or growing public awareness of waste issues.

We therefore request that the EIR carefully analyze the real need for an expansion of this landfill at this time due to the fact that the current permit still grants seven years of operation and the declining trend of waste generation from entities dumping in this landfill.

Setting
The NOP describes the location of the landfill as surrounded by vacant land with some nearby residents in Val Verde. It completely fails to mention the proposed Newhall Ranch project whose first two phases totally some 6000 units are likely to be approved by the County in the next few months.

These phases include several County facilities and local agencies such as school that will be deemed "sensitive receptors" for air quality purposes. It is therefore essential that the EIR accurately describe these future uses in the environmental document.

Air Quality

While the NOP accurately notes that air quality will be significantly impacted and require analysis due to the release of various landfill gases, the EIR should additionally analysis these impacts as stated above for their detrimental health effects on "sensitive receptors", especially children attending the various schools proposed for the Newhall Ranch development. The EIR should include a map of the landfill that includes the Newhall Ranch project and all public facilities within the project.

Mitigation for Air Quality Impacts

If the County proceeds with this approval with over-riding conditions, they must require all feasible mitigation to reduce air quality impacts. We therefore believe they should, in addition to other air quality reduction measures, require:

- that entities disposing to this facility must meet AB939 standards,
- avail themselves of all means of waste reduction such as plastic bag bans
- require natural gas trash trucks be used by all haulers
- Provide a Materials Recovery Facility at the site

The Santa Clarita Valley is in a non-attainment zone for ozone and particulate matter. Special attention must be paid to these areas in order to identify methods to reduce their negative affects.

The County should require implementation on an anaerobic trash digester as used in the Simi Landfill. Such an alternative would reduce the amount of acreage that would be destroyed with garbage as well as reducing air pollution in addition to extending the life of the landfill.

Water Quality

During the previous CUP process, several water quality violations came to light. To address that problem, a water quality monitoring system was implemented that required place of several wells and routine testing. Testing results should be provided in the EIR and any tests that did not met required standards should be disclosed. The monitoring system should be reviewed for efficiency and enhanced as needed to address the new proposal.

We do not support the destruction of additional blue line streams in this area. Loss of ground water recharge is a major impact which must be analyzed in the EIR. Again, the EIR should consider an anaerobic trash digester as an alternative that might reduce this impact.

Other Areas of Concern Listed in the NOP

We believe the NOP accurately reflects the other areas of concern including visual impacts, biological, impacts, increased greenhouse gases, traffic, etc. We especially request that surveys for threatened and endangered species present in the area be conducted along the blue line streams. Again, avoidance of any impacts to blue line streams is the preferable alternative.

Existing Agreements and Requirements

The EIR should fully disclose all existing mitigation requirements and whether they have been followed. For example, the height limitation was violated several years ago. How was this violation corrected? What safeguard will the new permit employ o avoid such future violations?

All settlement agreements with the community should be disclosed. Will these agreements be continued under the new CUP?

Thanks you for considering our comments.

Sincerely,

Lynne Plambeck
President

UNIVERSITY OF CALIFORNIA, IRVINE

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Planning, Policy and Design

School of Social Ecology
202 Social Ecology 1
Irvine, CA 92697-7075
(949) 824-0563
Fax (949) 824-8566

May 14, 2012

Mr. Rob Glaser
Principal Regional Planner
Los Angeles County Department of Regional Planning

Dear Mr. Glaser:

I just recently became aware of the proposal to expand the Chiquita Landfill (Val Verde, California) and the Notice of Preparation of CEQA documentation. I would like to request that I be added to the mailing list as an interested party for all CEQA documentation and notices for these. I do this as an interested party by virtue of: first, my previous experience studying environmental impacts of the landfill on local environmental quality, which is part of my academic research; but secondly and more directly, as a member of the community group, URPAVV (Union de los Residentes Para Proteccion Ambiental de Val Verde). My contact information is:

Prof. Raul Lejano
Department of Planning, Policy, and Design
Social Ecology I Building, Room 218G
University of California
Irvine, CA 92697-7075
Email: rplejano@yahoo.com, Phone: (949) 8128150, Fax: (949) 8248566

I would also point out to you, and other persons preparing the environmental documentation, that our previous analysis of air quality and other environmental impacts of the landfill suggest significant impacts to air quality. In particular, we examined emissions of air toxics not just from the landfill itself but also from trucks coming to and from it. Other serious environmental effects include odor compounds, dust and litter, and noise from the landfill and its operation. There is also a possibility of leachate from the landfill percolating into the ground. Lastly, there is the significant potential for cumulative impacts to regional air and water quality. I hope that all of these, and other, environmental impacts be evaluated as part of the CEQA process and taken into careful consideration. If the process leads to preparation of a Draft EIR, then I and colleagues would be keen to submit our analysis of some of these impacts.

Sincerely,

Raul Lejano, Ph.D.
Associate Professor
Co-Director, Social Ecology Research Center

Rob Glaser,

I have been a resident of Val Verde for almost 30 years. I raised all of my children here, both sets of my parents have lived and passed away here in Val Verde and now my sons have bought homes and I have grandchildren that live here. I plan to live my life out here and watch my family grow in Val Verde. I also own and operate a small business as well as own several properties in Val Verde. I have a vested interest in what happens to our community. We have a statement and understanding between Newhall Land and Farm, Laidlaw Waste Systems aka: Chiquito Canyon Landfill and Val Verde Civic Assoc. dated February 21st, 1997 to close and cover the landfill in 2017 or a maximum of 23 million tons. Any other conditions will not be acceptable in order to insure the health and welfare of residents in Val Verde.

There are many dangers associated in living near a land fill such as high risk of cancer, low infant body weight (as noted in a study dated 09-23-98) quoting "A study of people living near the BKK landfill in LA County in 1997 reported significantly reduced birth weight among children born during the period of heaviest dumping at the site." "Increase of bladder cancer and leukemia" "EPA study notes cancers of cancer of lung, stomach and rectum." I won't take the time to site additional information but as you know there are many studies linking poor health or health risks to living near landfills.

Some of the problems that I have encountered to date are as follows:

- excessive trash smells, early am with still air or a northernly breeze
- unsightly debris blowing on hillsides and tree's near the landfill
- bright lights observed from the west side of the landfill reducing night sky visibility
- the work site can be seen and observed from Chiquito Canyon Road
- tippers can be seen daily
- fixed fence within full view
- turbine wind mills an eyesore

They are not good neighbors now and are not conforming as agreed; see Attachment C in the Chiquita Canyon Landfill Expansions and Related Facilities; Project CUP #89-081
page 3, condition 9 modified as follows; 9b

They are talking about going up 130 feet more. That is 13 stories and we don't even have a 13 story building in all of Santa Clarita. This is not even reasonable.

In conclusion; they need to close the landfill as originally agreed in 2017 or when the agreed upon maximum of 23 million tons is reached. Cover the landfill for a minimum of 10 years and conduct environmental impact studies so that an informed decision can be made with regard to any expansion. As well as monitor the health of the individuals that reside in the community. Thank you for your time and attention to this matter.

Sincerely,

Marc Salzarulo

Marc Salzarulo
28838 Lincoln Avenue
Val Verde, CA 91384

RECEIVED
FEB 1 0 2012

Nancy Carder
30530 Remington Road
Castaic, CA 91384
carderfam@sbcglobal.net

February 10, 2012

Mr. Rob Glaser
Principal Planner
Zoning Permits North Section
Los Angeles County Department of Regional Planning
320 West Temple Street, Room 1348
Los Angeles, CA 90012

NOTICE OF PREPARATION REVIEW AND COMMENT

Chiquita Canyon Landfill Master Plan Revision
Project No. R2004-00559-(5)
Conditional Use Permit No. 200400042
Environmental Case No. 200400039

Dear Mr. Glaser,

I am a member of the community and have the following comments on the Initial Study Checklist:

1. AESTHETICS

a) Highway 126 has “eligible” status for scenic highway designation. The purpose of the scenic highway designation is to ensure the protection of highway corridors that reflect the state’s natural scenic beauty. In accordance with the Caltrans Scenic Highway Program, should the proposed additional expansion of the landfill be approved, Los Angeles County could lose their county scenic highway designation for highway 126. The landfill expansion would create more than a “less significant impact”.

b) If the expansion is approved, there will be substantial alteration of the view of the prominent ridgelines surrounding the landfill. Nothing can be done to mitigate this.

If additional undisturbed areas are developed, is there a local area where habitat/scenic area can be restored in exchange?

d) The landfill is already visible from Newhall Ranch Road/SR 126 and I-5 as it appears behind the U.S. Postal Facility. If the landfill height grows 143 feet from the maximum capacity under current permit, there will be significant visual blight in the appearance of the landfill that will have a degrading effect on property values and the community. What

actions will be taken to mitigate the detrimental effect that the landfill expansion will have on property values in the Val Verde, Live Oak, and Hasley Canyon neighborhoods?

If the expansion is approved, what will be the final elevation of the landfill at closure?

2. AGRICULTURAL / FOREST

e) Surface water run-off from the landfill carrying pollutants such as elevated heavy metals and polychlorinated biphenyls (PCBs) from Auto Shredder Residue (ASR) used as daily cover, as well as salts and other contaminants will impact the quality of agricultural soils downstream.

3. AIR QUALITY

a-d) An increase in the daily capacity at the landfill will increase the daily number of dump trucks delivering waste to the landfill. This will have a negative impact on air quality. Air quality impacts such as particulate, methane, carbon monoxide, hydrogen sulfide, and vinyl chloride should be assessed and included in a continuous monitoring program. Can there be a requirement for vehicles on the landfill to be powered by compressed natural gas?

e) With the approved build-out of the Newhall Ranch Project, more sensitive receptors will be located within one mile of the landfill expansion. Children and elderly from Val Verde and Newhall Ranch will have increased asthma and be at risk for lung disease. How will the detrimental effects on the health of these receptors be prevented? Giving these communities money, in exchange for the landfill expansion and their health, is bad policy and a flagrant environmental justice issue. This happened with the approval of the previous expansion at this landfill. For the landfill operator to give Los Angeles County money to increase the community programs in Val Verde and potentially other communities in exchange for the county approving the landfill is a conflict of interest, and not in the best interest of the citizens. The landfill operator is buying the county's approval by paying the county for programs that the county would otherwise provide for the community anyway.

ASR should not be used as daily cover at this landfill, because residents living nearby can be exposed to particulate lead in dust from activities on the landfill during high wind events.

f) Odors from the Sunshine Canyon landfill are noticeable every day while driving Interstate 5 through the Newhall Pass. The Val Verde and Castaic Communities are close enough to suffer the impacts of odors and poor air quality every day, if the landfill is expanded. What is proposed to mitigate this? Maybe approving a smaller expansion,

or not increasing the maximum daily tonnage, from what it is now, would help mitigate odor/air quality impacts.

4. BIOLOGICAL RESOURCES

a) The Santa Clara Riverbed, adjacent to the landfill, is habitat to threatened and endangered species. The impact of these species must be evaluated. The Chiquita Canyon Landfill is also in the habitat for the endangered California Condor, a scavenger, who has access to and can ingest ASR, with its elevated levels of lead and other metals, from the daily cover of the landfill. ASR accepted by the landfill can contain up to 50 mg/L of lead (see March 27, 2008 report attachment 13). Ingestion of lead is the leading cause of mortality in the California Condor.

b) Storm water run-off carrying elevated levels of lead, copper, zinc and other metals, as well as PCBs, from the ASR is toxic to riparian ecosystems. This must be evaluated in an ecological risk assessment.

e) If an oak woodland is destroyed during expansion, is there another area where an oak woodland can be created or restored?

5. CULTURAL RESOURCES

a) The integrity of, and access to Bowers Cave must be maintained for future generations.

7. GEOLOGY AND SOILS

b) The Chiquita Landfill uses ASR as alternative daily cover. The ASR contains elevated levels of leachable heavy metals, some potentially above California hazardous waste levels, as well as PCBs. During rain events, erosion can transport and dispose of PCBs and elevated and hazardous waste levels of metals into the Santa Clara riverbed.

9. HAZARDS AND HAZARDOUS MATERIALS

a) What is the rated efficiency of the burner at the cogeneration facility? Is it efficient enough to prevent the formation of dioxins and furans?

Elevated heavy metals and PCBs from the ASR are subject to uncontrolled release by high winds, surface water run-off, and everyday landfill activities.

b) Indoor air monitoring for methane, hydrogen sulfide, and vinyl chloride should be conducted at the US Postal Service facility adjacent to the landfill.

h) Oil wells are within close proximity to the landfill. With the proposed new expansion, will additional gas wells be installed and maintained to prevent the build-up of landfill gas, and to prevent the possibility of underground fires that could spread to the oilfield?

10. HYDROLOGY AND WATER QUALITY

a) Surface water run-off must be sampled and analyzed to make sure the discharge complies with all standards set forth by the Los Angeles Regional Quality Control Board (LARWQCB), and the State Water Resources Control Board (SWRCB). Auto shredder residue contains California hazardous waste levels of zinc, and elevated levels of other heavy metals and PCBs. Surface water run-off and silt can potentially contain elevated levels of these contaminants.

The landfill accepts approximately 1,000 - 20 ton loads of auto shredders residue per month that it uses as alternative daily cover. ASR is classified as a “Special Waste” under Title 22, California Code of Regulations section 66261.126. The landfill expansion must comply with this section of the regulations that specify that the ASR may be disposed of at a landfill with no hazardous waste facility permit or Interim Status provided that: The facility is operating in compliance with WDRs set forth by the LARWQCB (see March 27, 2008 report, attachment 3); and the owner has been granted a variance (non-hazardous waste classification letter) (see March 27, 2008 report, attachment 13).

Sample analyses taken at the landfill, by the Department of Toxic Substances Control (DTSC), on both March 27, 2008 and April 9, 2008 show that the ASR contained California hazardous waste levels of soluble zinc, and therefore was not in compliance with the non-hazardous waste classification letter (see attached sampling reports).

The December 19, 1988 non-hazardous classification letter from the Department of Health Services gives ASR nonhazardous classification with a set of conditions that if not met, must be managed as hazardous waste. The letter specifies that, with the exception of inorganic lead, the soluble concentrations for metals must be below hazardous waste levels. The limit for soluble lead for ASR is 50 mg/L. Greater than 5 mg/L soluble lead is considered a hazardous waste in California. The above mentioned waste was disposed of at the Chiquita Canyon Landfill which is not a hazardous waste landfill. Furthermore it was used as daily cover.

There is a land disposal restriction (LDR) in California for waste containing levels of zinc exceeding 250 mg/L of zinc (see March 27, 2008 report, attachment 4). This requires waste with greater than 250 mg/L of soluble zinc to be pretreated before allowing it to be disposed of in a hazardous waste landfill, yet was disposed of as daily cover at Chiquita

Canyon Landfill which a municipal landfill, is unlined, and in close proximity to the Santa Clara Riverbed and the agricultural soils downstream.

f) Grading during the during the construction phase of the landfill expansion will release silt and contaminants into the riverbed.

h) With the landfill expansion and increased daily tonnage, including the use of ASR as daily cover, heavy metal pollutants and PCBs will be carried off-site during rain events into designated Areas of Special Biological Significance.

Surface water as well as wastewater should be captured and treated before release.

j) The current landfill is unlined, and its threat to ground water is very significant. Will the new area proposed by the expansion have a liner to help prevent leachate containing heavy metals and other pollutants from further impacting groundwater? Is there a leachate collection system in place or proposed?

Monitoring wells must be put in place to measure water quality in the Santa Clara Riverbed, Val Verde, and Hasley Canyon to protect public and private wells.

l) If the landfill is expanded into the entrance area, a catastrophic 100 year flood in the Santa Clara Riverbed could wash a portion of the landfill away. This would cause uncontrolled disposal to the riverbed, loss of soil, and major instability to the structure of the landfill. This scenario happened in 2005 in a severe rain event at the old Piru Burn Dump, in Piru. It took years and government funding before that landfill was repaired.

11. LAND USE AND PLANNING

b & d) The proposed expansion would alter and change the appearance of the natural ridgeline, which does not comply with the community standards district.

New development, approved and proposed, will put sensitive receptors within one mile of the landfill.

13. NOISE

a) Shielding should be put in place to reduce noise from the cogeneration facility.

c) An increase in daily capacity will increase the number dump trucks on the highway, and the number of vehicles operating on the landfill that will create more noise. As the landfill gets taller, there will no longer be ridgelines to block the noise coming from activities on the landfill.

17. TRANSPORTATION/TRAFFIC

There will be a significant increase in the number of dump trucks on the highway with the increased daily tonnage capacity. This will result in more traffic and accidents on Interstate 5 and highway 126, and it will create more blowing trash coming from the dump trucks onto highway 126. Add the additional traffic from the Newhall Ranch Project and there will be significant problems. What is going to be done to mitigate this?

18. UTILITIES AND SERVICE SYSTEMS

f) The burner for the cogeneration facility must be efficient enough to prevent the formation of dioxins and furans.

h) The landfill has already violated the December 19, 1988, non-hazardous waste classification letter, from the Department of Health Services, that allows the ASR to be disposed of at a non-hazardous waste landfill by accepting ASR containing California hazardous waste levels of soluble zinc.

Attachments:

November 24, 2008 investigation report, SA Recycling, LLC, conducted at Chiquita Canyon Landfill on March 27, 2008 (March 27, 2008 sampling report).

November 24, 2008 investigation report, SA Recycling, LLC, conducted at Chiquita Canyon Landfill on April 10-11, 2008 (April 10, 2008 sampling report).

Attachments to this NOP comment letter are on file with LADRP.

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
5. Air Quality and Greenhouse Gas				
Impact 5.1: Construction and operations of AD facilities within California would result in emissions of criteria air pollutants at levels that could substantially contribute to a potential violation of applicable air quality standards or to nonattainment conditions.	**Measure 5.1a:** Applicants shall prepare and submit an Air Quality Technical Report as part of the environmental assessments for the development of future AD facilities on a specific project-by-project basis. The technical report shall include an analysis of potential air quality impacts for all steps of the project (including a screening level analysis to determine if construction and operation [for all on-site processes, including any end-use and disposal methods] related criteria air pollutant emissions would exceed applicable air district thresholds, as well as greenhouse gas (GHG) emissions and any health risk associated with toxic air contaminants (TACs) from all AD facility sources) and reduction measures. Preparation of the technical report should be coordinated with the appropriate air district and shall identify compliance with all applicable New Source Review and Best Available Control Technology (BACT) requirements. The technical report shall identify all project emissions from permitted (stationary) and non-permitted (mobile and area) sources and mitigation measures (as appropriate) designed to reduce significant emissions to below the applicable air district thresholds of significance, and if these thresholds cannot be met with mitigation, then the individual AD facility project could require additional CEQA review or additional mitigation measures.	Project Applicant Local Lead Agency	Submit Air Quality Technical Report. Review and acceptance of Air Quality Technical Report.	Local CEQA Review Local CEQA Review
	Measure 5.1b: Applicants shall require construction contractors and system operators to implement the following Best Management Practices (BMPs) as applicable during construction and operations: • Facilities shall be required to comply with the rules and regulations from the applicable Air Quality Management District (AQMD) or Air Pollution Control District (APCD). • Facilities shall require substrate unloading and pre-processing activities to occur indoors within enclosed, negative pressure buildings. Collected foul air (including volatile organic compounds (VOCs) off-gassed from undigested substrates) should be treated via biofilter or air scrubbing system. • Use equipment meeting, at a minimum, Tier II emission standards. • Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes (as required by the state airborne toxics control measure [Title 13, §2485 of the California Code of Regulations]). Provide clear signage that posts this requirement for workers at the entrances to the site. • Maintain all equipment in proper working condition according to manufacturer's specifications. • Use electric equipment when possible.	Project Applicant/ Operator Construction Contractor Local Air District	Implement BMPs during construction and operations. Enforce construction and operation air quality rules and regulations and compliance.	Construction and Operations Construction and Operations

LEA – Local Enforcement Agency

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
	For projects that are unable to use internal combustion engines due to air district regulations (i.e., NOx emission limits), other options for generating renewable energy from biogas should be considered. Other options that should be evaluated for using biogas or biomethane as an energy source include: use as a transportation fuel (compressed biomethane), use in fuel cells to generate clean electricity, use for on-site heating, or injection of biomethane into the utility gas pipeline system. If there are other lower NOx alternative technologies available at the time of AD facility development, these should be considered as well during the facility design process.			
Impact 5.2: Operation of AD facilities in California could create objectionable odors affecting a substantial number of people.	**Measure 5.2a:** Applicants for the development of AD facilities shall comply with appropriate local land use plans, policies, and regulations, including applicable setbacks and buffer areas from sensitive land uses for potentially odoriferous processes.	Project Applicant	Comply with local land use plans, policies and regulations related to odor and sensitive receptors.	Local CEQA Review
	Measure 5.2b: If an AD facility handles compostable material and is classified as a compostable material handling facility, the facility must develop an Odor Impact Minimization Plan (OIMP) pursuant to 14 CCR 17863.4. Otherwise, applicants shall develop and implement an Odor Management Plan (OMP) that incorporates equivalent odor reduction controls for digester operations and is consistent with local air district odor management requirements. These plans shall identify and describe potential odor sources, as well as identify the potential, intensity, and frequency of odor from these likely sources. In addition, the plans will specify odor control technologies and management practices that if implemented, would mitigate odors associated with the majority of facilities to less than significant. However, less or more control measures may be required for individual projects. Odor control strategies and management practices that can be incorporated into these plans include, but are not limited to, the following: - Require substrate haulage to the AD facility within covered, liquid leak-proof containers. - Establish time limit for on-site retention of undigested substrates (i.e., feedstocks should be processed and placed into the portion of the system where liquid discharge and air emissions can be controlled within 24 or 48 hours of receipt). - Provide enclosed, negative pressure buildings for indoor receiving and pre-processing. Treat collected foul air in a biofilter or air scrubbing system. - Establish contingency plans for operating downtime (e.g., equipment malfunction, power outage).	Project Applicant/ Operator LEA (composting permit) and/or Local Air District (other facilities)	Develop and implement an OIMP or Odor Management Plan. Enforce OIMP or Odor Management Plan.	Operations Operations

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Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
	- Manage delivery schedule to facilitate prompt handling of odorous substrates. - Handle fresh unstable digestate within enclosed building, or mix with green waste and incorporate into a composting operation within the same business day, and/or directly pump to covered, liquid leak-proof containers for transportation. - Protocol for monitoring and recording odor events. - Protocol for reporting and responding to odor events.			
Impact 5.3: Construction and operation of AD facilities in California could lead to increases in chronic exposure of sensitive receptors in the vicinity to certain toxic air contaminants from stationary and mobile sources.	**Measure 5.3a:** Implement Mitigation Measures 5.1a and 5.1b.	See Mitigation Measures 5.1a and 5.1b		
	Measure 5.3b: Based on the Air Quality Technical Report (specified in Measure 5.1a), if the health risk is determined to be significant on a project-by-project basis with diesel particulate matter (DPM) as a major contributor, then the applicants shall implement control measures such that the AD facility health risk would be below the applicable air district threshold, which may include implementation of one or more of the following requirements, where feasible and appropriate: • Use either new diesel engines that are designed to minimize DPM emissions (usually through the use of catalyzed particulate filters in the exhaust) or retrofit older engines with catalyzed particulate filters (which will reduce DPM emissions by 85%); • Use electric equipment to be powered from the grid, which would eliminate local combustion emissions; Use alternative fuels, such as compressed natural gas (CNG) or liquefied natural gas (LNG).	Project Applicant/ Operator	Implement measures to reduce DPM.	Local CEQA Review/during Operations
	Measure 5.3c: Hydrogen sulfide (H2S) contained in the biogas shall be scrubbed (i.e., via iron sponge or other technology) before emission to air can occur.	Operator	Scrub H_2S as required.	Operations
Impact 5.4: Development of AD facilities in California could increase GHG emissions.	**Measure 5.4:** Implement Mitigation Measure 5.1a.	See Mitigation Measure 5.1a		
Impact 5.5: Development of AD facilities in California, together with anticipated cumulative development in the area, would contribute to regional criteria pollutants.	**Measure 5.5:** Implement Mitigation Measures 5.1a and 5.1b.	See Mitigation Measures 5.1a and 5.1b		

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Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
6. Hydrology and Water Quality				
Impact 6.2: The operation of AD facilities could adversely affect surface and groundwater quality.	**Measure 6.2a:** During pre-processing, all water that contacts digester feedstock, including stormwater from feedstock handling and storage facilities and water from equipment washdown and feedstock wetting, shall be contained until appropriately disposed or utilized. Best Management Practices (BMPs) may be used to reduce loading of sediment, nutrients, trash, organic matter, and other pollutants. These BMPs may include, but are not limited to, trash grates and filters, oil-water separators, mechanical filters such as sand filters, vegetated swales, engineered wastewater treatment wetlands, settling ponds, and other facilities to reduce the potential loading of pollutants into surface waters or groundwater. All discharges of stormwater are prohibited unless covered under the General Industrial Stormwater Permit, other National Pollutant Discharge Elimination System (NPDES) permit, or are exempted from NPDES permitting requirements. The NPDES permits will generally require implementation of management measures to achieve a performance standard of best available technology economically achievable (BAT) and best conventional pollutant control technology (BCT), as appropriate. The General Industrial Stormwater Permit also requires the development of a storm water pollution prevention plan (SWPPP) and a monitoring plan, in compliance with permit requirements.[1] Other liquid and solid wastes may only be discharged pursuant to an NPDES permit or waste discharge requirement (WDR) order.	Operator Regional Water Quality Control Board	Contain water during pre-processing activities. Enforce water quality regulations.	Operations Operations
	Measure 6.2b: In order to minimize the amount of fugitive trash or feedstock released to surface waters, the following measures shall be implemented. When feasible, the project proponent shall preferentially select feedstocks that contain minimal amounts of trash that could become entrained in surface water, either via direct contact with stormwater flows or via other accidental release, such as due to wind. Processing of such feedstocks may, however, be unavoidable, such as in support of an AD facility that processes MSW. Therefore, the project applicant shall ensure that (1) drainage from all feedstock loading, unloading, and storage areas is contained onsite or treated to remove trash and stray feedstock, and sediment prior to release as permitted; (2) in all feedstock loading and unloading areas, and all areas where feedstock is moved by front loaders or other uncovered or uncontained transport machinery, the applicant shall ensure that mechanical sweeping and/or equivalent trash control operational procedures are performed at least daily, during operations; and (3) the facility operator shall train all employees involved in feedstock handling so as to discourage, avoid, and minimize the release of feedstock or trash during operations.	Project Applicant/ Operator Regional Water Quality Control Board	Implement measures to minimize fugitive trash/feedstock release to surface waters. Enforce water quality regulations.	Operations Operations

1 For more information, please refer to: http://www.swrcb.ca.gov/water_issues/programs/stormwater/industrial.shtml

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Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
	Measure 6.2c: In order to minimize water quality degradation associated with accidental spills at AD facilities, the applicant for individual projects that would be implemented under the Program EIR shall require project proponents to complete and adhere to the requirements of a Spill Prevention, Control, and Countermeasure (SPCC) Plan, which is based on the federal SPCC rule. Notification of the SPCC Plan shall be provided to the local Certified Unified Program Agency (CUPA). The SPCC Plan shall contain measures to prevent, contain, and otherwise minimize potential spills of pollutants during facility operation, in accordance with U.S. EPA requirements. For individual projects that would utilize wet digestion systems, in which processing and holding tanks would contain the (aqueous) digestion reaction and liquid digestate containing fats and oils, the SPCC Plan shall provide for installation and monitoring of secondary containment and/or leak detection systems to ensure that AD liquids are not accidentally discharged to navigable waters or adjoining shorelines. Monitoring of these systems shall be in accordance with SPCC Plan requirements.	Project Applicant/ Operator Local Lead Agency CUPA	Complete and adhere to SPCC Plan. Review and accept SPCC Plan. Review implementation of SPCC Plan.	Operations Local CEQA Review Prior to/during Operations
	Measure 6.2d: Any proposed discharge to a pond for an individual project would require the project applicant to acquire WDRs from the appropriate regional board. The project applicant shall ensure that all ponds and discharges to such ponds adhere to all requirements under applicable WDRs. The need for pond liners in order to protect groundwater quality would be assessed during the regional board's review of the project, and requirements for pond liners would be included in the WDRs, as warranted. If appropriate, the WDRs would impose requirements for Class II surface impoundments as presented in Title 27 of the California Code of Regulations. Requirements include, but are not limited to, groundwater monitoring, double liner systems with leachate collection, water balance, a preliminary closure plan for clean closure, seismic analysis, and financial assurances. Compliance with WDRs may require the installation of facilities such as tanks and containers to store and process the digestate, the use of filter presses, and implementation of other water quality protection practices.	Project Applicant/ Operator Regional Water Quality Control Board	Adhere to applicable WDRs for ponds or discharges to ponds. Enforce WDRs for ponds or discharges to ponds.	Prior to/during Operations Prior to/during Operations
	Measure 6.2e: This measure would reduce potential for the movement of nutrients and other pollutants to groundwater and surface water for individual projects that would employ land application for liquid digestate or residual solids. The operators of individual projects implemented under this Program EIR shall ensure that land application of liquid digestate and/or residual solids adheres to all requirements of applicable WDRs. WDR requirements include but are not limited to, groundwater monitoring, completion of an anti-degradation analysis, and in some cases best practicable treatment and control to achieve salinity reduction in materials prior to discharge to land. WDRs would be issued by the appropriate regional board, and would consider site-specific conditions and waste characteristics, in order to determine applicable control measures and procedures that	Project Applicant/ Operator Regional Water Quality Control Board	Adhere to requirements of WDRs for land application of liquid digestate and/or residual solids. Issue and enforce WDRs for land application of liquid digestate and/or residual solids.	Operations Prior to/during Operations

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Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
	protect water quality.			
	Measure 6.2f: This measure would reduce the potential for water quality degradation from projects that include discharge of liquid digestate to surface waters. The applicant for individual projects implemented under this Program EIR shall ensure that the discharge of liquid digestate to surface waters adheres to all NPDES permitting recommendations and requirements, as established by the appropriate regional board. Specific measures may include, but are not limited to, limitations on discharge volumes, seasonal discharge restrictions, limitations on loading rates and/or concentrations of specific constituents, and other facility-specific water quality control measures designed to protect receiving water quality and preserve beneficial uses identified in Basin Plans.	Project Applicant/ Operator Regional Water Quality Control Board	Adhere to NPDES permitting recommendations and requirements for discharge of liquid digestate to surface waters. Approve and enforce NPDES permits	Operations Prior to/during Operations
Impact 6.3: AD facilities could be exposed to flooding hazards.	**Measure 6.3:** Individual applicants seeking coverage under this Program EIR shall ensure that, for their proposed AD facilities including pre-processing areas, feedstock storage areas, and digestate handling facilities, are protected from FEMA-defined 100-year flood events. Design measures may include, but are not limited to: facility siting, access placement, grading, elevated foundations, and site protection such as installation of levees or other protective features.	Project applicant	Ensure facilities are protected from FEMA-defined 100-year flood events.	Local CEQA Review
Impact 6.4: Construction of AD facilities could change drainage and flooding patterns	**Measure 6.4:** In order to ensure that the AD facilities would not result in detrimental increases in stormwater flow or flooding on site or downstream, the Applicant for each AD facility project shall prepare a comprehensive drainage plan (prior to construction) and implement the plan during construction. The comprehensive drainage plan shall include engineered stormwater retention facility designs, such as retention basins, flood control channels, storm drainage facilities, and other features as needed to ensure that, at a minimum, no net increase in stormwater discharge would occur during a 10-year, 24-hour storm event, as a result of project implementation. Project related increases in stormwater flows shall be assessed based on proposed changes in impervious surface coverage on site, as well as proposed grading and related changes in site topography.	Project Applicant Local Lead Agency	Prepare and implement a comprehensive drainage plan. Review and acceptance of comprehensive drainage plan.	Local CEQA Review/during Construction Local CEQA Review
Impact 6.6: AD facilities could become inundated as a result of seiche, tsunami, or mudflow.	**Measure 6.6:** To ensure that proposed AD facilities would not incur impacts associated with seiche, tsunami, or mudflow, the applicant for each individual project shall ensure that all facilities are located outside of potential risk areas for seiche, tsunami, and mudflow. In the event that a proposed facility would be sited within a potential risk area for one of these hazards, the facility shall be raised above projected maximum base inundation elevations, or shall be protected from inundation by the installation of berms, levees, or other protective facilities.	Project Applicant Local Lead Agency	Ensure facilities are located outside of potential risk areas for seiche, tsunami and mudflow. Approve siting of facilities with respect to risk areas for seiche, tsunami and mudflow.	Local CEQA Review Local CEQA Review
Impact 6.7: AD facilities could contribute to	**Measure 6.7:** Implement Mitigation Measures 6.2 (a-f) and 6.3.	See Mitigation Measures 6.2 (a-f) and 6.3		

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Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
cumulative impacts to water quality.				
7. Noise				
Impact 7.1: Construction of AD facilities could temporarily increase noise levels at nearby sensitive receptor locations or result in noise levels in excess of standards in local general plans, noise ordinances, or other applicable standards.	**Measure 7.1a:** Construction activities shall be limited to the hours between 7 a.m. and 7 p.m., Monday through Saturday, or an alternative schedule established by the local jurisdiction, or other limits to construction hours normally enforced by the local jurisdiction (see Measure 7.1d below).	Construction Contractor Local Lead Agency	Limit construction hours as indicated by local jurisdiction. Enforce construction hour limits.	Construction Construction
	Measure 7.1b: Construction equipment noise shall be minimized by muffling and shielding intakes and exhaust on construction equipment to a level no less effective than the manufacture's specifications, and by shrouding or shielding impact tools.	Construction Contractor / Local Lead Agency	Minimize construction equipment noise.	Construction
	Measure 7.1c: Construction contractors within 750 feet of sensitive receptors shall locate fixed construction equipment, such as compressors and generators, and construction staging areas as far as possible from nearby sensitive receptors.	Construction Contractor / Local Lead Agency	Locate applicable construction equipment away from sensitive receptors.	Construction
	Measure 7.1d: Construction contractors shall comply with all local noise ordinances and regulations and other measures deemed necessary by the Lead Agency.	Construction Contractor Local Lead Agency	Comply with local noise ordinances and regulations. Enforce local noise ordinances and regulations.	Construction Construction
Impact 7.2: Noise from operation of AD facilities could substantially increase ambient noise levels at nearby land uses or result in noise levels in excess of standards in local general plans, local noise ordinances, or other applicable standards.	**Measure 7.2:** AD facilities located within 2,000 feet of a sensitive receptor shall conduct a site specific noise study. If operational sound levels would exceed local regulations, or 45 dBA at a sensitive receptor (if no regulations are available), additional sound-proofing such as enclosures, muffling, shielding, or other attenuation measures shall be installed to meet the required sound level.	Project Applicant/ Operator	Conduct site specific noise study and implement recommendations.	Prior to /during Operation
Impact 7.4: Development of AD facilities could result in a cumulative increase in noise levels.	**Measure 7.4:** Implement Mitigation Measures 7.1a through 7.1d and Measure 7.2.	See Mitigation Measures 7.1a through 7.1d and Measure 7.2.		
8. Public Services and Utilities				
Impact 8.1: The project could substantially increase demands on fire protection services	**Mitigation Measure 8.1:** Implement Mitigation Measures 10.1b, 10.3c, and 11.4a.	See Mitigation Measures 10.1b, 10.3c, and 11.4a.		
Impact 8.2: The project could potentially exceed wastewater treatment requirements of the Regional Water Quality Control Board (RWQCB).	**Measure 8.2a:** Implement Mitigation Measure 8.3b if the operator does not have an existing agreement, such as for co-located facilities.	See Mitigation Measure 8.3b		
	Measure 8.2b: In addition to an agreement for service, coordination with the wastewater treatment provider would be needed to determine if pre-treatment would be required to meet the RWQCB requirements for the	Project Applicant/ Operator	Coordinate with wastewater treatment provider.	Prior to Operation

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Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
	existing wastewater treatment facility.			
Impact 8.3: The project could result in significant environmental effects from the construction and operation of new water and wastewater treatment facilities or expansion of existing facilities.	**Measure 8.3a:** If the project proposes to obtain water from a water supplier (municipal system or other public water entity), the developer would enter into an agreement for service with the supplier.	Project Applicant/ Operator	Enter into service agreement with water supplier.	Prior to Operation
	Measure 8.3b: If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), the developer would enter into an agreement for service with the provider.	Project Applicant/ Operator	Enter into service agreement with wastewater supplier.	Prior to Operation
	Measure 8.3c: Alternate water sources, such as non-potable and recycled water, shall be used during the pre-processing and AD process phases where needed and as available.	Project Applicant/ Operator	Development and use of non-potable and recycled water sources during AD pre-processing and process phases.	Prior to/during Operation
Impact 8.6: The project could result in exceeding the capacity of a wastewater treatment provider.	**Measure 8.6:** If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), implement Mitigation Measure 8.3b.	See Mitigation Measure 8.3b		
Impact 8.7: The project could result in the construction of new energy supplies and could require additional energy infrastructure.	**Measure 8.7:** Projects requiring off-site energy infrastructure must complete CEQA review for the proposed energy improvements as a separate project. Infrastructure improvements may qualify as a categorical exemption pursuant to CEQA.	Project Applicant/Lead Agency	Complete CEQA for off-site energy improvements if applicable.	Local CEQA Review
9. Transportation				
Impact 9.1: Construction of AD facilities would intermittently and temporarily increase traffic congestion due to vehicle trips generated by construction workers and construction vehicles on area roadways.	**Measure 9.1:** The contractor(s) will obtain any necessary road encroachment permits prior to installation of pipelines within the existing roadway right-of-way. As part of the road encroachment permit process, the contractor(s) will submit a traffic safety / traffic management plan (for work in the public right-of-way) to the agencies having jurisdiction over the affected roads. Elements of the plan will likely include, but are not necessarily limited to, the following: • Develop circulation and detour plans to minimize impacts to local street circulation. Use haul routes minimizing truck traffic on local roadways to the extent possible. Use flaggers and/or signage to guide vehicles through and/or around the construction zone. • To the extent feasible, and as needed to avoid adverse impacts on traffic flow, schedule truck trips outside of peak morning and evening commute hours. • Limit lane closures during peak traffic hours to the extent possible. Restore roads and streets to normal operation by covering trenches with steel plates outside of allowed working hours or when work is not in progress. • Limit, where possible, the pipeline construction work zone to a width that, at a minimum, maintains alternate one-way traffic	Construction Contractor Local Lead Agency(s)	Submit application for roadway encroachment permits. Prepare and submit traffic safety/traffic management plan. Review and approval of roadway encroachment permits and traffic safety/traffic management plan.	Prior to construction Prior to construction

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Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
	flow past the construction zone. • Install traffic control devices as specified in Caltrans' Manual of Traffic Controls for Construction and Maintenance Work Zones where needed to maintain safe driving conditions. Use flaggers and/or signage to safely direct traffic through construction work zones. • Coordinate with facility owners or administrators of sensitive land uses such as police and fire stations, hospitals, and schools. Provide advance notification to the facility owner or operator of the timing, location, and duration of construction activities. • Coordinate with the local public transit providers so that bus routes or bus stops in work zones can be temporarily relocated as the service provider deems necessary.			
Impact 9.2: AD facility operations would not substantially increase on-going (operational) traffic volumes on roadways serving the facilities.	**Measure 9.2:** Measures will be imposed by applicable local agencies, as needed, to address site-specific significant traffic impacts identified during subsequent facility-specific analyses, implementation of which would reduce those impacts to a less-than-significant level.	Project Applicant Local Lead Agency	Implement traffic mitigation measures. Enforce traffic mitigation measures.	Ongoing Ongoing
Impact 9.3: AD facilities could potentially cause traffic safety hazards for vehicles, bicyclists, and pedestrians on public roadways, and could increase traffic hazards due to possible road wear or to accidental spills of digestate (liquids and solids).	**Measure 9.3a:** Implement Measure 9.1, which stipulates actions required of the contractor(s) to reduce potential traffic safety impacts to a less-than-significant level.	See Mitigation Measure 9.1		
	Measure 9.3b: Prior to construction, the contractor(s), in cooperation with the agencies having jurisdiction over the affected roadways, will survey and describe the pre-construction roadway conditions on rural roadways and residential streets. Within 30 days after construction is completed, the affected agencies will survey these same roadways and residential streets in order to identify any damage that has occurred. Roads damaged by construction will be repaired to a structural condition equal to the condition that existed prior to construction activity.	Construction Contractor Construction Contractor Local Lead Agency	Survey and document pre-construction roadway condition. Identify any damage to roadway from construction. Review and approve pre-construction and post-construction roadway damage analysis.	Prior to Construction Following Construction Prior to and during Construction
	Measure 9.3c: Prior to initiation of project operations, the project sponsor(s) will submit a Spill Prevention Plan to the appropriate local agency. The Spill Prevention Plan will include, among other provisions, a requirement that each truck driver know how to carry out the emergency measures described in the Spill Prevention Plan (therefore reducing roadway hazards if an accidental spill were to occur).	Project Applicant/ Operator Local Lead Agency	Prepare and submit a Spill Prevention Plan. Review and approve Spill Prevention Plan.	Prior to Operations Prior to Operations
Impact 9.4: AD facilities could intermittently and temporarily impede access to local streets or adjacent uses (including access for emergency vehicles),	**Measure 9.4:** Implement Measure 9.1, which stipulates actions required of the contractor(s) to reduce potential access impacts to a less-than-significant level.	See Mitigation Measure 9.1		

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Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
as well as disruption to bicycle/pedestrian access and circulation.				
Impact 9.5: The project could contribute to cumulative impacts to traffic and transportation (traffic congestion, traffic safety, and emergency vehicle access).	**Measure 9.5a:** Prior to construction, the project sponsor will coordinate with the appropriate local government departments, Caltrans, and utility districts and agencies regarding the timing of construction projects that would occur near AD project sites. Specific measures to mitigate potential significant impacts will be determined as part of the interagency coordination, and could include measures such as employing flaggers during key construction periods, designating alternate haul routes, and providing more outreach and community noticing.	Project Applicant/ Construction Contractor	Coordinate with local agencies, State agencies and utility districts regarding construction.	Prior to construction
	Measure 9.5b: Implement Mitigation Measure 9.2.	See Mitigation Measure 9.2		
	Measure 9.5c: Implement Mitigation Measures 9.1, 9.3b and 9.3c.	See Mitigation Measure 9.1, 9.3b and 9.3c		
10. Aesthetics				
Impact 10.1: AD facilities could have adverse effects on a scenic vista and/or scenic resources.	**Measure 10.1a:** Avoid siting AD facilities near scenic vistas and corridors designated within an applicable land use plan and the State Scenic Highway Program.	Project Applicant	Avoid siting project near scenic vistas or corridors.	Local CEQA Review
	Measure 10.1b: Landscaping and/or vegetated berms should be used to minimize views of facilities from sensitive views.	Project Applicant/ Operator	Plan, develop and maintain landscaping/vegetated berms for sensitive views.	Ongoing
Impact 10.2: AD facilities could degrade the existing visual character/quality of the site and its surroundings.	**Measure 10.2a:** Implement Mitigation Measures 10.1a and 10.1b.	See Mitigation Measures 10.1a and 10.1b		
	Measure 10.2b: Facilities using truck tippers or other un-enclosed unloading should consider using litter fences to manage blowing litter. Facilities should educate haulers delivering materials to the AD facility through literature, web links, or provide training on the acceptance of waste at the facilities to minimize litter. Facility operators should develop a protocol to identify feedstocks that are severely contaminated with potential litter and reject unacceptable loads.	Operator LEA	Implement measures to reduce litter. Enforce litter reduction measures.	Operations Operations
	Measure 10.2c: Clean-up crews can be used as necessary to control litter.	Operator LEA	Implement measures to reduce litter. Enforce litter reduction measures.	Operations Operations
	Measure 10.2d: Feedstocks and digestate byproducts should be stored in enclosed facilities or processed in a timely manner to prevent visibly deteriorated site conditions.	Operator LEA	Store of feedstocks and digestate byproducts in enclosed facilities or process in a timely manner. Enforce storage measures.	Operations Operations
	Measure 10.2e: Project operators should consider enclosure of pre-processing operations if it provides an aesthetic and/or noise attenuating benefit.	Operator	Consider additional pre-processing measures.	Ongoing

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Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
Impact 10.3: AD facilities could create a new source of light or glare with adverse affects to daytime and/or nighttime views.	**Measure 10.3a:** Implement 10.1b.	See Mitigation Measure 10.1b		
	Measure 10.3b: Any lighting (portable or permanent) should be hooded and directed onto the project site. This would reduce effects to nighttime skies from uplighting, reduce glare, and prevent light from spilling onto adjoining properties and roads.	Operator	Use hooded and directed lighting on site.	Operations
	Measure 10.3c: Flares may be enclosed to reduce the visibility of flames during operation.	Operator	Consider use of enclosed flares.	Operations
Impact 10.4: The project could result in cumulative impacts to visual resources.	**Measure 10.4:** Implement Mitigation Measures 10.1a, 10.1b, 10.2a, 10.2b, 10.2c, 10.2d, 10.2e, 10.3a, 10.3b, and 10.3c.	See Mitigation Measures 10.1a, 10.1b, 10.2a, 10.2b, 10.2c, 10.2d, 10.2e, 10.3a, 10.3b, and 10.3c.		
11. Hazards and Hazardous Materials				
Impact 11.1: Construction of AD facilities could result in the potential exposure of construction workers, the public and the environment to preexisting soil and/or groundwater contamination.	**Mitigation Measure 11.1:** Prior to final project design and any earth disturbing activities, the applicant or agency(ies) responsible shall conduct a Phase I Environmental Site Assessment (ESA). The Phase I ESA shall be prepared by a Registered Environmental Assessor (REA) or other qualified professional to assess the potential for contaminated soil or groundwater conditions at the project site; specifically in the area proposed for construction of AD facilities. The Phase I ESA shall include a review of appropriate federal, State and local hazardous materials databases to identify hazardous waste sites at on-site and off-site locations within a one quarter mile radius of the project location. This Phase I ESA shall also include a review of existing and past land uses through aerial photographs, historical records, interviews of owners and/or operators of the property, observations during a reconnaissance site visit, and review of other relevant existing information that could identify the potential existence of contaminated soil or groundwater. If no contaminated soil or groundwater is identified or if the Phase I ESA does not recommend any further investigation then the project applicant or agency(ies) responsible shall proceed with final project design and construction. OR If existing soil or groundwater contamination is identified, and if the Phase I ESA recommends further review, the applicant or agency(ies) responsible shall retain a REA to conduct follow-up sampling to characterize the contamination and to identify any required remediation that shall be conducted consistent with applicable regulations prior to any earth disturbing activities. The environmental professional shall prepare a report that includes, but is not limited to, activities performed for the assessment, summary of anticipated contaminants and contaminant concentrations at the proposed construction site, and recommendations	Project Applicant Project Applicant Local Lead Agency	Conduct Phase I ESA. If applicable, conduct sampling and prepare report with summary and recommendations for contaminants. Integrate recommendations into project mitigation. Review Phase I and follow-up report (if applicable).	Local CEQA review Local CEQA review Local CEQA review

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Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
	for appropriate handling of any contaminated materials during construction.			
Impact 11.3: Transportation, use, disposal or accidental spill of hazardous materials during the operation and maintenance of AD facilities would not result in potential harmful exposures of the public or the environment to hazardous materials.	**Mitigation Measure 11.3:** Implement Mitigation Measures 5.1a and 6.2a-f.			
Impact 11.4: Operation of AD facilities could increase the risk of fire hazards due to the potential release of biogas.	**Mitigation Measure 11.4a:** Prior to project approval, AD facility operators shall prepare and implement a Fire Safety Plan that outlines fire hazards, describes facility operations procedures to prevent ignition of fires, requires regular inspection of fire suppression systems, and provides for worker training in safety procedures as well as protocols for responding to fire incidents. The Fire Safety Plan shall be reviewed and approved by the local fire enforcement agency.	Project Applicant	Prepare a Fire Safety Plan.	Local CEQA Review
		Local Fire Agency/LEA	Review and approve Fire Safety Plan.	Local CEQA Review
		Operator	Implement Fire Safety Plan.	Operations
	Mitigation Measure 11.4b: Implement Mitigation Measure 11.5.	See Mitigation Measure 11.5		
Impact 11.5: AD facilities could be located within one quarter mile of a school resulting in potential hazards associated with accidental release of hazardous materials, including biogas.	**Mitigation Measure 11.5:** AD facilities shall be sited at least one quarter mile from existing or proposed schools, daycare facilities, hospitals and other sensitive land uses.	Project applicant	Site facilities at least one quarter mile from existing or proposed schools, daycare facilities, hospitals and other sensitive land uses.	Local CEQA Review
Impact 11.7: AD facilities could be located within five miles of a public airport or private airstrip and create an aviation hazard.	**Mitigation Measure 11.7:** For any AD facility proposed within 5 statute miles of an airport's air operations area, the operator will notify the Federal Aviation Administration (FAA) Regional Airports Division office and the airport operator of the proposed facility as early in the process as possible. AD facilities with any open air (outdoor) activities must receive an FAA Determination of No Hazard prior to project approval.	Project applicant/ Operator	Notify FAA if applicable.	Local CEQA Review
		FAA	Review project and issue an FAA Determination of No Hazard.	Prior to Project Approval
Impact 11.8: Development of AD facilities could contribute to cumulative impacts related to hazardous materials.	**Mitigation Measure 11.8:** Implement Mitigation Measures 11.1, 11.4, 11.5, and 11.7.	See Mitigation Measures 11.1, 11.4, 11.5, and 11.7		

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HYDROGEOLOGIC REPORT

CHIQUITA CANYON LANDFILL

CASTAIC, CALIFORNIA

FOR

CHIQUITA CANYON LANDFILL

JANUARY 20, 2012

JOB NO. 2002-036-005(R)

RTF&A

GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

RTF&A

GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

January 20, 2012

Chiquita Canyon Landfill
29201 Henry Mayo Drive
Castaic, California 91384

Job No. 2002-036-005

Attention: Mr. Michael Dean, District Manager

Dear Mr. Dean:

We are pleased to submit the Hydrogeologic Report, Chiquita Canyon Landfill. This report summarizes the site hydrogeologic conditions and provides recommendations for groundwater monitoring and perimeter landfill gas monitoring systems for the proposed Master Plan Revision. This report references the November 2011 Excavation Plan from Golder Associates and supersedes our Hydrogeologic Reports dated January 12, 2011, and August 11, 2011. If you should have any questions regarding this report please feel free to contact us.

Respectfully,

R. T. FRANKIAN & ASSOCIATES

PROFESSIONAL GEOLOGIST NO. 4407
THEODORE M. CLARK
#89
CERTIFIED
HYDROGEOLOGIST
EXPIRES: 4-30-12
STATE OF CALIFORNIA

by: Theodore M. Clark, C.H.G.
Principal Geologist

TMC/eaw

Distribution: (2) Chiquita Canyon Landfill
Attn: Mr. Michael Dean (plus CD containing PDF file)
(1) Law Offices of Scott Gordon
Attn: Mr. Scott Gordon (plus CD containing PDF file)
(2) CH2M Hill
Attn: Mr. Jim Hunter (plus CD containing PDF file)
(1) Golder Associates
Attn: Mr. Rich Haughey (plus CD containing PDF file)

R. T. FRANKIAN & ASSOCIATES
1329 SCOTT ROAD BURBANK CALIFORNIA 91504
TEL. (818) 531-1501 FAX (818) 531-1511 WWW.RTFRANKIAN.COM

Chiquita Canyon Landfill
January 20, 2012
2002-036-005

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RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

HYDROGEOLOGIC REPORT

CHIQUITA CANYON LANDFILL

CASTAIC, CALIFORNIA

FOR

CHIQUITA CANYON LANDFILL

JANUARY 20, 2012

JOB NO. 2002-036-005

INTRODUCTION

On behalf of Chiquita Canyon Landfill, R. T. Frankian and Associates (RTF&A) prepared this report of our site hydrogeologic investigation of the Chiquita Canyon Landfill (CCL) property in Castaic, California. The purpose of this report is to describe the site hydrogeologic conditions and provide recommendations for groundwater monitoring and perimeter landfill gas monitoring systems for the proposed Master Plan Revision (MPR), which includes changes to the currently approved landfill footprint. The proposed landfill footprint for the MPR is shown on the November 2011 Excavation Plan provided to us by Golder Associates (Appendix A). With respect to the monitoring programs, the most significant modification to the landfill footprint is the addition of the North Canyon and East Canyon area, which will be contiguous with the northeast side of the existing, active Main Canyon landfill and the north side of the closed Canyon B landfill. The MPR also moves the southern perimeter of the Main Canyon landfill into the South Main Canyon area near the current entrance area.

The North Canyon and East Canyon area has been the subject of several phases of geologic and hydrogeologic characterization, including a geologic fault study (RTF&A, 2006b), geotechnical investigations (RTF&A, 2006a, 2010b, 2011a, and 2012b), groundwater monitoring well installations and aquifer testing (RTF&A, 2004, 2005, and 2006c), and installation of perimeter landfill gas wells (RTF&A, 2009a). The South

Main Canyon area has also been the subject of multiple phases of geologic and hydrogeologic characterization, including geotechnical investigations (RTF&A, 2009b, 2012a and 2012b) and installation of groundwater wells and perimeter landfill gas wells (RTF&A, 2003 and 2009a).

The following findings, conclusions, and recommendations are based on our characterization work for the North Canyon and East Canyon area, the South Main Canyon, as well as our review of site data, field explorations, and geologic/hydrogeologic analyses. This report provides an overview of site geologic conditions for understanding the hydrogeology, but the geology is detailed separately in the geologic fault study and geotechnical investigation reports (RTF&A, 2006b and 2012b, respectively).

SCOPE OF WORK

The scope of work for the site hydrogeologic investigation consisted of the following:

- planning an exploratory drilling program to characterize hydrogeologic conditions in the Pico Formation and lowermost Saugus Formation in the vicinity of the North Canyon;
- preparing a work plan for exploratory well installations (RTF&A, 2010a) and submittal to the California Regional Water Quality Control Board–Los Angeles Region (RWQCB);
- drilling exploratory borings and installing wells DW-27 and DW-28, piezometer PZ-8, temporary piezometers HS-1 and HS-2, and gas probe GP-26;
- preparing a gas probe installation report (RTF&A, 2010c) for CCL;
- preparing a groundwater well installation report (RTF&A, 2010d) and submittal to RWQCB;
- identifying and correlating geologic contacts and stratigraphic marker beds across the site using available surface geologic maps,

test pit logs, dozer cut logs, and exploratory boring logs, and updating the site geologic map;

- preparing a comprehensive, detailed set of geologic sections through the groundwater monitoring wells and piezometers to illustrate geologic and hydrogeologic conditions at the existing and proposed waste management units;

- evaluating groundwater elevation data and preparing groundwater elevation and flow maps;

- analyzing the MPR excavation plan with respect to siting and design requirements for maintaining greater than five feet of separation between refuse and the highest anticipated groundwater underlying the proposed waste management units;

- evaluating the MPR with respect to groundwater monitoring system requirements, and designing a monitoring system based on the geologic and hydrogeologic conditions beneath the landfill and along the point of compliance (POC); and

- evaluating perimeter landfill gas system monitoring requirements for the MPR, and designing a proposed monitoring system based on the site geologic and hydrogeologic conditions.

SITE SETTING

TOPOGRAPHY

The regional topography is influenced by the steep, rugged terrain of the Piru and Santa Susana mountains, which exhibit prominent and variably oriented ridges and canyons. The Santa Clara River provides regional drainage, flowing west-southwest along State Route 126 to the south of CCL. The Santa Clara River Valley bisects the local terrain with a level and relatively extensive floodplain winding through otherwise rugged topography.

The landfill site is primarily located in the hills along the north edge of the Santa Clara River Valley, and the southeast property corner is within the floodplain (Figure 1). Within the site, steep-sided canyons with slopes approaching 1:1 (horizontal: vertical) are generally north-south trending. The natural ridgelines rise 300 to 600 feet above the canyon floors. The landfill development operations have reduced the lengths of some slopes and provided more gentle terrain in some areas. These landfill activities have largely retained the perimeter ridgelines and produced an amphitheater-like topography that opens to the south. On-site elevations range from approximately 1,600 feet above mean sea level (ft-msl) in the northwestern corner to approximately 950 ft-msl along the south property line.

Topography to the north, west, and east of the site is characterized by east-west-oriented, steep-sided canyons with slopes that approach 1:1 and in some cases are nearly vertical. The relatively flat terrain immediately south and southeast of the site defines the limits of the Santa Clara River floodplain.

GEOLOGY

CCL is located at the eastern end of the Ventura Basin within the Transverse Ranges geomorphic province. Sedimentary rock units at and near the site are the Pliocene age Pico Formation and the Plio-Pleistocene age Saugus Formation. The marine sediments of the Pico Formation outcrop in the Hasley Canyon-Val Verde area and in the northwest portion of the site. The Saugus Formation overlies the Pico Formation at CCL, and Saugus Formation units extend south and east to the Castaic-Newhall area. The Saugus Formation is composed of interbedded shallow-water marine, brackish water, and nonmarine units (Kew, 1924; Winterer and Durham, 1962). Other geologic materials exposed nearby include terrace deposits of Pleistocene age and Holocene alluvium mantling the valley floor.

The Pico Formation generally consists of siltstone and fine-grained silty sandstone, with lesser amounts of mudstone and conglomerate, approximately 5,000 feet thick in the vicinity of the site. Locally, the Pico Formation represents near shore- to offshore-marine depositional settings. Near the contact with the overlying Saugus Formation, some Pico Formation beds also represent nonmarine fluvial environments of deposition. The Pico Formation rests conformably above the late Miocene to early Pliocene age Towsley Formation.

The Saugus Formation consists of lenticular, loosely consolidated conglomerate; conglomeratic sandstone; and sandstone interbedded with siltstone, mudstone, and claystone approximately 7,000 feet thick in the vicinity of the site. These rock types characterize principally fluvial sequences of deposition. The Saugus Formation rests conformably above and is locally gradational with the Pico Formation.

Strata of the Saugus and Pico formations form east-west to southeast-trending open to close folds, which plunge gently to the east. These folds are related to the north-south compressional forces associated with the Holser Fault system, approximately 1,000 feet north of the site. Major faults trending approximately east-west to northwest in the vicinity of the project site also include the San Gabriel fault, approximately three miles northeast of the site; the Del Valle fault, approximately 1.4 miles west; and the Oak Ridge fault, approximately four miles west.

Geologic Units: The site geology was characterized by data gathered from this and previous site investigations that included geologic mapping of natural exposures and cell excavations; geologic mapping and logging of dozer cut and trench exposures; soil and rock samples taken from on-site test pits; and geologic borings drilled for various geologic/geotechnical explorations, gas probes, piezometers and groundwater monitoring wells. These various geologic data have been previously reported in the Solid Waste Assessment Test (SWAT) Report (Harding Lawson and Associates, 1987), Geologic/Hydrogeologic Report (EMCON, 1990a), CCL Joint Technical Document

(Shaw EMCON/OWT, Inc., 2003; Appendices E, F, and I), slope stability report (RTF&A, 2006a) and geologic fault study (RTF&A, 2006b) for East Canyon, fault and subgrade geologic mapping reports for the Main Canyon (EMCON; 1990b, 1997a, and 1997b), well/probe installation reports (RTF&A; 2003, 2004, 2005, 2009a, 2010c, and 2010d), and geotechnical investigations for the South Main Canyon (RTF&A, 2009b), Main Canyon (GeoLogic Associates; 2005a, 2005b, and 2005c), and North Canyon (RTF&A, 2010b, and 2011a). The known exploratory excavations (borings, test pits, and trenches) are shown on a location map (Figure C-1, Appendix C) that also indicates (by color) the consulting firm that reported on the exploration. The exploratory boring logs, as-built well construction details, and trench and test pit logs are provided in digital (PDF) format (compact disc (CD), Appendix C). The CD files are grouped by consultant, further subdivided (bookmarked in Adobe^{tm}) by type of excavation (groundwater wells, piezometers, gas probes, borings, or test pits and trenches), then listed in ascending alphabetical and numeric order.

The soil and bedrock materials encountered within the site consist of man-made deposits, alluvium, landslide debris, terrace deposits, and bedrock units of the Saugus and Pico formations. The 1" = 200 feet Geologic Map (Figure 2) and Geologic Sections (Figure 3) depict the surface and subsurface distribution of these units. A description of each unit is presented as follows:

Man-made Deposits (af, afr, afs and cef): Man-made deposits consist of uncompacted artificial fill (map unit "af") and compacted (or certified) engineered fill (map unit "cef") associated with past grading activities on-site, and artificial fill materials related to landfill refuse disposal activities, including stockpile fill (map unit "afs") and refuse fill (map unit "afr"). The fill materials are composed primarily of reworked Pico and Saugus Formation units and, in the case of the refuse fill, compacted municipal solid waste and associated cover materials primarily derived from reworked Pico and Saugus Formation materials.

Alluvium (Qal): Holocene age alluvium ("Qal") is present in the canyons and major drainage courses within the site and as Santa Clara River floodplain deposits adjacent to State Highway 126. As observed, the alluvium generally consists of sand and silty sand with scattered gravel and cobbles, derived from local bedrock exposures. The alluvium is generally loose to moderately dense and uncemented.

Older Alluvium (Qoa): Pleistocene age (older) alluvium ("Qoa") is limited to the southerly-draining tributary in the East Canyon area, immediately west of landslide Qols A. The older alluvium is composed of unconsolidated to poorly consolidated mixtures of sand, gravel, silt, and clay.

Terrace Deposits (Qt): Pleistocene age terrace deposits occur on-site along State Highway 126 southeast of the existing landfill entrance and as isolated and limited remnant stream channel deposits. The terrace deposits are typically composed of poorly consolidated deposits of coarse sand, gravel and silt with cobbles and, to a lesser extent, boulders.

Landslide Debris (Qd, Qls, Qols): Three types of deposits attributable to slope failure have been identified at the site, and these consist of debris flow deposits (Qd), Holocene landslides (Qls), and a Pleistocene landslide (Qols). The debris flow deposits are derived from weathered bedrock and slope wash materials and consist of unconsolidated sand, silt, and clay. These deposits typically occur within ravines and on slopes steeper than approximately 2:1.

Materials designated as Holocene landslide debris range from poorly consolidated, highly weathered rock materials to relatively coherent, moderately hard to hard sandstone, siltstone, and claystone units derived from the underlying Saugus or Pico formations. Depending on the amount of movement, the entire landslide or the upper portions of the landslide debris are disturbed.

The central portion of the East Canyon is mantled by an older landslide deposit (Qols) that appears to be comprised of older alluvium as well as Pico and Saugus

Formation materials.

Saugus Formation (QTs): Plio-Pleistocene age non-marine sedimentary rock units of the Saugus Formation ("map unit "QTs") outcrop in the eastern and southern portions of the site. Saugus Formation units typically consist of poorly to moderately well-bedded, light yellowish brown to pinkish gray, fine- to coarse-grained, pebble- to cobble-bearing sandstone and silty sandstone with moderate brown siltstone to clayey siltstone. This formation is poorly to moderately well-bedded and ranges from friable to moderately hard. The fine-grained clayey beds, typical of the lower Saugus Formation, represent some of the weakest material within the formation.

Pico Formation (Tp): Marine sedimentary rock units of the Pliocene age Pico Formation (map unit "Tp") are exposed in the northern and western portions of the site. These units are comprised of grayish orange to light gray sandstone, yellowish gray to yellowish brown siltstone, and limited brownish gray fossiliferous siltstone and sandstone. These units range from soft near the surface to moderately hard at depth. The fossiliferous beds tend to be more resistant than surrounding units, as indicated by the prominent, ridge-forming fossiliferous siltstone ("Ridge-Forming Coquina") near the mouth of North Canyon.

The Pico formational contact with the overlying Saugus Formation is interfingering, gradational, and not always readily discernible, particularly in exploratory borings. Within the site and for the purposes of this study, RTF&A has defined the top of the Pico Formation as the first appearance of fossiliferous beds. Where fossiliferous beds are missing from the stratigraphic section, we have defined the contact using color as an indicator. In particular, the presence of Munsell hues "5Y" is more common within the Pico Formation and may indicate the approximate contact with the Saugus Formation.

HYDROGEOLOGY

Groundwater is found beneath the site in the sedimentary bedrock of the Saugus and Pico formations and not in the relatively thin alluvial deposits that are restricted to canyon floors. In the Santa Clara River Valley along the southeast property corner, groundwater is also encountered in the higher-permeability, unconsolidated valley alluvium, which overlies the bedrock materials. In this river valley, the bedrock and alluvial groundwater systems are interconnected where the base of the saturated valley alluvium rests on the underlying sedimentary bedrock. The two groundwater systems are also connected along the edge of the Santa Clara River Valley where valley alluvium is in lateral contact with the saturated bedrock of the hills that border the valley.

ALLUVIAL AQUIFER – SANTA CLARA RIVER VALLEY

The alluvial aquifer system is present in the lower portion of the Santa Clara River channel alluvium. This lower Santa Clara River channel alluvium aquifer is the main source of agricultural and domestic groundwater for the Santa Clara River Valley. The regional alluvial aquifer consists of relatively high-permeability alluvium about 100 to 200 feet thick (Harding Lawson and Associates, 1987). The upper 20 percent of the alluvial aquifer contains higher-permeability material than the lower portions (Robson, 1972). The hydraulic conductivities for the lower Santa Clara River alluvial aquifer were estimated from pump efficiency tests and drillers' logs for regional wells, and range from 1.4×10^{-2} to 1.3×10^{-1} centimeters per second (cm/sec) (Table 1).

Because the alluvial aquifer is only present beneath the southeast corner of the site, no wells monitor this aquifer. A single exploratory boring (B-5-11) encountered groundwater in the alluvial aquifer at a depth of 49 feet.

UNSATURATED ALLUVIAL DEPOSITS

The uppermost portion of the Santa Clara River channel alluvium is unsaturated, and this alluvium extends from the river valley onto the site along the floor of three canyons: the Main Canyon that extends from the site entrance to its terminus in the North Canyon, a small canyon north of Wolcott Way, and the East Canyon, which flows into Castaic Creek before reaching the Santa Clara River. The limited extent of these alluvial deposits (Qal) is shown on the site Geologic Map (Figure 2). The site alluvial deposits are relatively thin and are typically less than about 41 feet in thickness, as illustrated by the Geologic Sections (Figure 3). Laboratory permeameter tests of these alluvial deposits show hydraulic conductivities from 1.9×10^{-3} to 2.0×10^{-5} cm/sec (Table 1).

Along the Main Canyon, the depth of alluvium encountered in 10 exploratory borings ranges from 17 to 41 feet below ground surface (Table 2). Groundwater was not observed in the alluvium during the drilling of these borings. Two of these borings were converted to vadose wells: SW-1 near Primary Canyon monitors alluvium and the uppermost Saugus Formation, and RD-1 near Canyon C monitored alluvium prior to destruction of RD-1 in October 2002. The vadose wells were monitored quarterly starting January 1986 (SW-1) and September 1989 (RD-1), and groundwater was not observed in either well during the period ending October 2011 for SW-1 and July 2002 for RD-1 (Appendix B).

In the East Canyon, exploratory boring E-7 (drilled 3/10/89) encountered 37 feet of unsaturated alluvium above the Saugus Formation, with groundwater found in the Saugus Formation at a depth of 52.5 feet (EMCON, 1990a). Nearby geotechnical borings HS-3-10 (31 feet of alluvium) and HS-4-10 (34 feet of alluvium) also encountered unsaturated alluvium over the Saugus Formation when drilled in summer 2010 (RTF&A, 2012b). Borings for well DW-3 (18 feet of alluvium) and gas probe GP-9 (25 feet of alluvium) encountered unsaturated alluvium. Groundwater is present in well

DW-3 at a depth of approximately 90 feet in the underlying Saugus Formation, and was absent during the September 1995 drilling of boring GP-9 to a total depth of 85.5 feet.

In the small canyon near Wolcott Way, exploratory boring E-9 (drilled 3/13/89) encountered 54.5 feet of unsaturated alluvium overlying the Saugus Formation (EMCON, 1990a). Groundwater was encountered beneath the alluvium at a depth of 77 feet in the Saugus Formation.

Near the south property line at the edge of the Santa Clara River Valley, well DW-7 (drilled 3/14/1988) penetrated 28 feet of unsaturated alluvium and was completed as a Saugus Formation monitoring well. Groundwater depths at well DW-7 are greater than 32 feet (Appendix B). To the south and east in the Santa Clara River Valley, exploratory borings B-2-11 through B-5-11 (drilled November 2011) encountered unsaturated alluvium at depths of 24.5 to 49 feet. Groundwater was encountered in the underlying alluvial aquifer at a depth of 49 feet in B-5-11.

The site groundwater monitoring wells and piezometers monitor the Saugus and Pico formations, with well screens installed across the uppermost water-bearing zone as best determined during drilling operations at each location. Ten of these monitoring points penetrated unsaturated alluvium and were completed with screen intervals in the underlying Saugus Formation. The highest recorded static groundwater elevations at all of these points have remained below the base of the alluvial deposits for the monitoring period ending October 2011 (Table 2). At the eight groundwater monitoring points in the Main Canyon, the minimum separation between the base of the unsaturated alluvial deposits and static groundwater elevations in the Saugus Formation has been greater than approximately 14 feet. In the East Canyon at well DW-3, the minimum separation between base alluvium and groundwater has been greater than about 61 feet. South of the property along the edge of the Santa Clara River Valley, the minimum alluvium-groundwater separation has been more than approximately four feet at well DW-7. Given the observed elevation separation between groundwater and the base alluvium,

base flow from groundwater in the Saugus Formation to the overlying alluvial deposits does not appear likely within the Main Canyon or the East Canyon. South of the site at well DW-7, the small separation between groundwater and base alluvium elevations indicates that base flow is likely in this vicinity where saturated Saugus Formation is buried beneath the widespread alluvial deposits along the north flank of the Santa Clara River Valley.

SAUGUS AND PICO FORMATIONS

Groundwater occurs in both the Saugus and Pico formations in the Chiquita Canyon area. In these sedimentary rocks, groundwater is present primarily in the intergranular porosity, with the more permeable, coarser-grained sandstone and conglomeratic units yielding more water than the siltstone and finer-grained sedimentary rocks. Regionally, the Saugus Formation contains many thin zones of low permeability material that could act as confining layers (Robson, 1972). Near CCL, few production wells produce primarily from the Saugus Formation because the regional alluvial aquifer is the major source for groundwater (EMCON, 1990a). The Pico Formation lies stratigraphically beneath the Saugus Formation, where Pico Formation groundwater is under confined conditions due to the low permeability of the mudstone and siltstone sequences (Robson, 1972). Well surveys show no production wells in the vicinity of the site are completed in the Pico Formation (EMCON, 1990a).

Bedrock hydrogeology may be influenced by the presence of interbedded aquitards, which are the less permeable lithologies in the sedimentary sequence. In the Saugus and Pico formations at CCL, these less permeable beds include siltstone, mudstone, and claystone. The Pico Formation also contains less permeable interbeds of well-cemented, fossiliferous sandstone and siltstone.

The geologic structure may also influence groundwater flow in layered sedimentary rocks, particularly in areas of steeply-dipping beds, folds, or faults. At CCL,

the bedrock is folded by two major anticline/syncline pairs that generally trend east and plunge to the east, and locally produce steeply-dipping beds (Figures 2 and 3). Geologic Sections A-A' and B-B' are transverse to the site geologic structure and illustrate the overall shape and location of these anticline/syncline pairs, as well as areas of more steeply dipping beds. Geologic Sections C-C' and D-D' each parallel the axis of a syncline and show the gentle east plunge of these structures.

The Geologic Map and detailed Geologic Sections were prepared to illustrate geologic and hydrogeologic conditions across the site (Figures 2 and 3). Geologic contacts, stratigraphic marker beds, mappable lithologic units, and geologic structure were identified by evaluating surface geologic maps, test pit logs, dozer cut logs, and exploratory boring logs, and by conducting additional field mapping where needed. The lithologic units identified as mappable were generally greater than approximately ten feet thick (drilled thickness), with coarse-grained silty sandstone, sandstone, and conglomeratic sandstone grouped together, and the fine-grained siltstone, mudstone, claystone, and cemented, fossiliferous sandstone grouped separately as potential confining layers, or aquitards. The geologic contacts, marker beds, and lithologic units were correlated across the site using both subsurface and surface lithologic and structural data.

A thick section of predominately fine-grained Saugus Formation units was identified in the central portion of the site, as illustrated (in green) on Geologic Sections B-B' and D-D' (Figure 3). The overall stratigraphic thickness of this interval is approximately 300 feet and includes the "DW-6 Siltstone," with a drilled (vertical) thickness of more than 164 feet and an estimated stratigraphic thickness of greater than 129 feet at well DW-6. This fine-grained unit underlies much of Canyon B, the southeast corner of the Main Canyon, and the northeast portion of Primary Canyon.

Within the Pico Formation, a thick section of siltstone more than 194 feet in vertical thickness (with a calculated stratigraphic thickness of greater than 173 feet at

well DW-27) was identified as an aquitard beneath the northwest portion of the site and is illustrated (in purple) on Geologic Sections A-A' and C-C' (Figure 3). The deepest stratigraphic penetration of this siltstone is at well DW-27, which was drilled through 452 feet of Pico Formation. The boring encountered primarily siltstone below a depth of 197.5 feet, including the "DW-19 Siltstone" unit (the top of which was initially penetrated during drilling of well DW-19 in 1999). The siltstone beds appear to have very low hydraulic conductivity, based on the slight amounts of groundwater yielded from overnight water checks during the well DW-27 drilling program, the slow well recharge during well development (RTF&A, 2010d), and the continued rise in monthly groundwater elevations eight months after well development was completed in early August 2010 (Appendix B). Groundwater in the "DW-19 Siltstone" unit is considered to be under confined conditions, with this low permeability unit acting as an aquitard for potentially deeper water-bearing zones. Within the western portion of the North Canyon, including the vicinity of well DW-27, the uppermost groundwater is found within this aquitard.

Depth to Groundwater: Beneath most of the site, the uppermost water-bearing unit is the Saugus Formation, except in the northwest area. The majority of the groundwater monitoring wells and piezometers are completed in the Saugus Formation, where the depth to groundwater ranges from approximately 33 feet at well DW-7 to 345 feet at well DW-23 (Appendix B). Groundwater elevations in Saugus Formation wells vary from near 920 ft-msl near the south property line (wells DW-7 and DW-12) to 1,080 ft-msl in East Canyon (wells DW-26 and PZ-7) (Figure 4). Seasonal groundwater elevation variations are less than a few feet at most hillside locations, with greater fluctuations (nearly 20 feet) in wells along canyon bottoms (Appendix B). In spring 2005, groundwater levels in the canyon wells rose almost ten feet at well DW-1 following the 2004-2005 winter rains. At the CCL rain gauge, annual precipitation of 48.15 inches for 2004-2005 was more than triple the local average annual precipitation for the

period from 1970 to 2011 (Table 3). The groundwater elevations at most Saugus wells reached historical highs in spring 2005 or spring 2006.

Several exploratory bucket auger borings drilled as part of RTF&A's slope stability/geotechnical investigations (RTF&A, 2006a, 2009b, and 2012b) and downhole-logged by a geologist encountered perched groundwater conditions. These perched zones typically consisted of several feet of saturated materials at the base of sandstone beds, underlain by fine-grained impermeable claystone and siltstone beds or fault gouge. The more permeable sandstones directly below these perched zones were moist, but not saturated.

Groundwater is also present in the Pico Formation, which crops out in the northwestern part of the site. In this area, the uppermost groundwater occurs in the Pico Formation. Eight monitoring points (DW-8, DW-19, DW-25, DW-27, DW-28, PZ-5, PZ-6, and PZ-8) have been completed in the Pico Formation (Figure 4). Groundwater depths range from approximately 72 feet at PZ-6 in the East Canyon to 335 feet at well DW-28 on the slope of the northwest ridgeline (Appendix B). Pico Formation groundwater elevations vary from about 1,105 ft-msl in the East Canyon (PZ-6) to 1,219 ft-msl in the North Canyon (PZ-8) (Figure 4). The seasonal groundwater elevation variations are less than a few feet at wells DW-8, DW-19, DW-25, and PZ-5. Piezometer PZ-6, located in the bottom of the East Canyon along the east-plunging axis of the anticline, showed a greater seasonal groundwater elevation fluctuation of over 10 feet.

Hydraulic Properties: The hydraulic properties of the bedrock formations were obtained from in situ pumping tests, rising and falling head (slug) tests, and laboratory testing from various sources (Table 1). Hydraulic conductivity, gradient, porosity, and groundwater flow velocity in the Saugus Formation were obtained from various site data.

Both regional and site hydraulic conductivity data are available for the Saugus Formation (Table 1). The regional permeability of the Saugus Formation, determined

from soils, electric log correlations, and pumping tests, ranges between $2.4x10^{-4}$ and $4.7x10^{-7}$ cm/sec (Robson, 1972). The hydraulic conductivity of the Saugus Formation at CCL was determined from laboratory permeameter testing of samples from shallow depths in borings B-1, B-2, and C-1, and from slug tests at wells DW-3, DW-9, DW-14, DW-24, DW-26, PZ-3, and PZ-4 (Table 1). The best estimate for in situ hydraulic conductivity values within the saturated zone ranges from $1.1x10^{-3}$ to $1.1x10^{-5}$ cm/sec and is based on the slug test results of on-site wells.

The hydraulic conductivity of the Pico Formation at CCL was determined from slug tests at wells DW-8, DW-19, PZ-5, and PZ-6 (Table 1). Values for hydraulic conductivity range from $6.4x10^{-5}$ to $2.4x10^{-6}$ cm/sec at these points and are generally less than the Saugus Formation values. Based on the very slow recharge at well DW-27, it appears to have lower permeability than well DW-19 (2.4×10^{-6} to 2.5×10^{-6} cm/sec), which was completed in the upper portion of the "DW-19 Siltstone."

Groundwater Flow Directions and Point of Compliance: The October 2011 static groundwater elevations and associated groundwater contours across the site are presented on Figure 5, with approximate groundwater flow directions indicated by arrows. The proposed landfill limits for the MPR are also shown. The MPR footprint encompasses South Main Canyon, Main Canyon Landfill, and North Canyon with surface drainage to the south, and East Canyon with drainage southeast to Castaic Creek. The closed landfill footprints (Primary Canyon and Canyon B) remain the same. The groundwater flow directions and POC are described below for each of the existing and proposed (MPR) landfill areas. The POC for each landfill area is a vertical surface located in the hydraulically downgradient limit of the waste management unit that extends through the uppermost water-bearing zone underlying the unit, as defined by the California Code of Regulations (Title 27, s 20164).

Most Saugus Formation water level measurements are in wells or piezometers with relatively short screens (40 feet or less) and standing water columns of about

40 feet. These groundwater elevations probably represent hydraulic head at the water table where the monitoring point is completed in the uppermost water-bearing zone. However, many of the Pico Formation water level measurement points (wells DW-8, DW-19, DW-27, and PZ-5) have standing water columns near or greater than 100 feet and may be indicative of the hydraulic head measured at depths greater than the water table. Therefore, the groundwater elevation contours in the northern area are more approximate relative to water table flow conditions. The groundwater elevation at well DW-27 is considered to represent confined conditions at depth and is not part of the contoured data. No groundwater elevations are shown in the west portion of the North Canyon where the uppermost water-bearing unit is the "DW-19 Siltstone" aquitard penetrated by well DW-27.

In the west half of the site beneath South Main Canyon, Main Canyon, and Primary Canyon, the general groundwater flow direction is south toward the Santa Clara River Valley. Along Main Canyon from near the site entrance (well DW-1), north about 2,500 feet, the natural topography appears to direct groundwater flow from the ridges (wells DW-8 and DW-9 on the west, and wells DW-15, DW-16, and DW-17 to the east) to the canyon bottom, where groundwater elevation contours "V" or point up Main Canyon. Based on these groundwater contours, the interpreted point of POC for South Main Canyon and Main Canyon extends from approximately 850 feet southeast of well DW-9 to 700 feet north of well DW-1, following the south edge of the proposed landfill perimeter (Figure 5). The POC for Primary Canyon remains unchanged from previous monitoring reports, and follows the south and west landfill perimeter (RTF&A, 2011b). POC monitoring in both areas is within the Saugus Formation.

Beneath the closed Canyon B landfill, groundwater within the Saugus Formation appears to flow east down the canyon towards monitoring points DW-3 and PZ-4, with well DW-14 in a hydraulically upgradient position. The local topography and stratigraphy appear to influence the groundwater flow at Canyon B, with a high ridge

(about 1,450 ft-msl) south of the canyon, and a thick, fine-grained "DW-6 Siltstone" unit along the south side of Canyon B, as shown on Geologic Section B-B' (Figure 3). The POC for Canyon B is at the northeast perimeter of the unit and is unchanged from previous monitoring reports (RTF&A, 2011b).

In East Canyon, south of the anticlinal fold axis, the apparent groundwater flow direction is south (Figures 2 and 5). Along the fold axis, the groundwater flows down-plunge to the east through successively higher (younger) lithologic units, starting with Pico Formation siltstone at well DW-19 and ending with Saugus Formation sandstone at well DW-26. In North Canyon and the northern portion of East Canyon, the groundwater appears to flow east and northeast, generally down and away from the axis of a broad synclinal fold. Based on these groundwater contours, the POC for North Canyon and East Canyon extends east from near well DW-27 to the northeast corner of Canyon B, following the proposed landfill perimeter (Figure 5).

Groundwater Flow Velocity: Estimates of the rate of groundwater flow in the Saugus Formation can be calculated from Darcy's Law, expressed as:

$$V = Ki/n$$

where V = linear groundwater velocity
K = hydraulic conductivity
i = hydraulic gradient
n = effective porosity

As discussed above, the range for in situ hydraulic conductivity values in the Saugus Formation is 1.1×10^{-3} to 1.1×10^{-5} cm/sec. The hydraulic gradient measures the change of hydraulic head (feet) per unit length (feet), measured parallel to flow. Based on the groundwater elevations in October 2011, the gradient beneath the Main Canyon

and Primary Canyon areas was approximately 0.03 to 0.04, and the estimated hydraulic gradient in the East Canyon near boring E-7 was 0.11 (Figure 5).

Effective porosity refers to the amount of interconnected pore space available for fluid transmission and is different than the porosity of a material, which is the volume of voids expressed as a percentage of the total volume of material. The available porosity values from laboratory tests in the Saugus Formation are 0.25 to 0.38, and assuming that only 75 percent of the pore spaces are connected, the estimated effective porosity is 0.19 to 0.28 (EMCON, 1990a).

Because the Saugus Formation underlies most of the landfill areas, including all of the POC areas, and the Pico Formation is less permeable than the Saugus Formation, the rate of groundwater flow through the Saugus Formation should be considered a maximum. For the Main Canyon and Primary Canyon areas, the calculated Saugus Formation flow velocity is approximately one to 210 feet per year using the stated range of porosity, permeability, and hydraulic gradient values. At the proposed toe of the East Canyon landfill area, the calculated Saugus Formation flow velocity is approximately four to 659 feet per year using the range of porosity, permeability, and hydraulic gradient values noted above.

SEPARATION BETWEEN GROUNDWATER AND WASTE

The MPR changes the currently permitted landfill footprint in two areas: 1) the North Canyon and East Canyon excavation area northeast of, and contiguous with, the Main Canyon landfill; and 2) the South Main Canyon excavation area, which is south of and adjoining the Main Canyon landfill. The cell excavation plan illustrates the proposed grading (with red elevation contour lines) in these areas (Figure 4).

The waste management unit siting and design criteria (CCR, Title 27, s 20240 (c)) state, “All new landfills waste piles, and surface impoundments shall be sited, designed, constructed, and operated to ensure that wastes will be a minimum of five feet

(5 ft.) above the highest anticipated elevation of underlying ground water. Existing landfills, waste piles, and surface impoundments shall be operated to ensure that wastes will be a minimum of five feet (5 ft.) above the highest anticipated elevation of underlying ground water." A maximum groundwater elevation map was prepared for comparison to the proposed project excavation plan, so that a minimum of five feet separation would be maintained between groundwater and refuse. The maximum groundwater elevations (blue contour lines) and excavation elevations (red contour lines) are shown on Figure 4. The excavation plan appears to meet the above Title 27 requirement based on the following analysis.

Since January 1986, the groundwater elevations in the canyon bottoms have been monitored at wells DW-1 (Main Canyon) and DW-3 (East Canyon) and provide 25 years of historical data at points near the downgradient edge of each of the proposed landfills (Appendix B). Local annual precipitation data show the greatest rainfall (48.15 inches at the site) during the winter 2004-2005, with an average of about 14.66 inches (Table 3). The most recent 2010-2011 season had an above average rainfall total of 19.75 inches. For the purpose of establishing the highest anticipated groundwater elevations beneath the proposed North/East Canyons and South Main Canyon landfill areas, we assume that the record rainfall of 2004-2005 will result in the maximum (highest) groundwater elevations. At a particular groundwater monitoring point, if the record of groundwater elevations at a monitoring point extends through the 2004-2005 rainfall season, the highest recorded elevation was used on the maximum groundwater elevation map (Figure 4). If the record does not extend through the 2004-2005 rainfall season, but a nearby monitoring point does have the extended record, the highest elevation is adjusted based on the groundwater level difference in the nearby monitoring point. These adjusted groundwater elevations are noted on Figure 4, and the groundwater elevation adjustments and site historical groundwater elevation measurements for all monitoring points are summarized in Appendix B.

The majority of the current monitoring wells, including all of the Saugus Formation wells located in or near the canyon bottoms, recorded the highest historical groundwater elevations during either the spring of 2005 or 2006. In wells near the bottom of the Main Canyon, the highest groundwater elevations were in spring 2005. Compared to the Main Canyon, the East Canyon wells responded more slowly to the rainfall in 2004-2005, with some wells (DW-3 and DW-17) showing the highest groundwater elevations in spring 2008. In piezometer PZ-4 at the eastern edge of the drainage, the most recent October 2011 measurement was the highest groundwater level recorded. In the central portion of the North/East Canyons at piezometers PZ-5 and PZ-6, the highest groundwater elevations were reached August 2011 and March 2006, respectively. In the North Canyon, only 2010 and 2011 groundwater levels were available, with the exception of well DW-19, which showed the highest groundwater level in August 2011.

Maximum groundwater elevations determined either from historical measurements or from adjustments are provided on Figure 4. These maximum groundwater elevations, along with water levels determined from soil borings, where appropriate, were used to produce the maximum groundwater elevation (blue) contours. Because the water levels determined from soil borings are from a single measurement, no adjustments were possible with these data, and less emphasis was placed on these for contouring.

The excavation plan (red elevation contours) is also presented on Figure 4 to illustrate the waste-groundwater separation in both the North/East Canyons and South Main Canyon landfill areas, where the elevation difference between the red and blue contour lines represents the approximate minimum waste-groundwater separation. Because the bottom of refuse will be slightly higher than the excavation elevations depending on the approved liner system design, the waste-groundwater separation calculated from these contour lines represents a minimum.

In the North/East Canyons, the waste-groundwater separation is smallest near the northwest corner of the excavation floor along a zone of higher groundwater associated with the anticlinal fold axis. The minimum separation of five feet occurs above the toe of the sideslope, between piezometers PZ-5 and PZ-8, where proposed grades range from 1,165 ft-msl to 1,205 ft-msl and associated groundwater elevations range from 1,160 ft-msl to 1,200 ft-msl. The waste-groundwater separation increases to 25 feet southeasterly along the fold trend, where the "1100" groundwater contour intercepts the excavation contour "1125" between wells PZ-6 and DW-26 at the east side of the landfill floor. The waste-groundwater separation within the excavation floor increases to 50 to 60 feet along the north side and to 110 feet in the southwest corner.

In South Main Canyon, the waste-groundwater separation is least at the west side of the excavation floor near the toe of the east-facing cut slope. Here, the approximate waste-groundwater separation is 14 feet near the center (proposed grade estimated at 1,014 ft-msl, "1000" groundwater elevation contour) and increases to about 25 to 30 feet at the north and south ends of the cut slope. Across the excavation floor, the waste-groundwater separation ranges from 25 to 50 feet. Therefore, the proposed cell excavation plans for the North/East Canyons and South Main Canyon areas appear to meet the California Code of Regulations (Title 27, s 20240 (c)) requirement for siting and design to ensure that wastes will be a minimum of five feet above the highest anticipated elevation of underlying groundwater.

PROPOSED GROUNDWATER MONITORING SYSTEM

The proposed groundwater monitoring system for the MPR is shown on Figure 6 and listed in Table 4. The POC for each landfill area is a vertical surface located in the hydraulically downgradient limit of the waste management unit that extends through the uppermost water-bearing zone underlying the unit. The proposed downgradient monitoring points are located as close as possible to the POC, given the operational and

physical constraints of positioning monitoring wells where they will remain accessible. These proposed Saugus and Pico Formation wells will be completed in the uppermost water-bearing zone as determined during exploratory drilling operations.

The proposed monitoring system consists of 19 groundwater points (DW-1, DW-7, DW-8, DW-14 to DW-18, DW-23, DW-26, DW-28 to DW-35, and PZ-4), three vadose zone points (SW-1, VP-2[GP-29], and VP-3[DW-30]), and an additional three groundwater points to be monitored for groundwater levels only (DW-9, DW-21, and DW-27) (Table 4). Thirteen existing monitoring points will be destroyed (LP-1, GP-9, VP-1[GP-10], DW-3, DW-6, DW-12, DW-20, DW-24, DW-25, PZ-3, PZ-5, PZ-6, and PZ-7), either because they are within the proposed landfill development area or because they no longer provide useful monitoring data (vadose zone lysimeter LP-1).

The proposed extension of the Main Canyon footprint into South Main Canyon requires one new downgradient groundwater monitoring well, DW-29. Well DW-29 is centrally located in the Main Canyon drainage to monitor downgradient from the lowest elevations in the landfill floor, and is also downgradient from the POC on the west slope. Additional groundwater monitoring near the Main Canyon POC is provided by wells DW-15 and DW-16, and monitoring downgradient from the POC is provided at wells DW-1 and DW-18. Upgradient groundwater monitoring will be conducted at Pico Formation wells DW-8 and DW-28 and at Saugus Formation well DW-17. On the west ridge, Saugus Formation well DW-9 is not in the proposed monitoring system, but should be retained for groundwater level measurements only. Proposed vadose points consist of downgradient well SW-1 and upgradient well VP-2 (GP-29).

The POC for the proposed North Canyon and East Canyon footprint will require downgradient monitoring in the Pico Formation along the north (well DW-34), and in the Saugus Formation along the northeast (wells DW-23 and DW-33), east (wells DW-26 and DW-32), and southeast (wells DW-30 and DW-31). Upgradient monitoring will be provided by Pico Formation well DW-28. Monitoring point DW-27 should be

used for groundwater level measurements only and is not part of the proposed groundwater monitoring program. Wells DW-24 and DW-25 and piezometers PZ-3, PZ-5, PZ-6, and PZ-7 will be destroyed as landfill development proceeds, but water levels should be monitored until their destruction. Vadose points consist of downgradient well VP-3 (DW-30) and upgradient point VP-2 (GP-29).

The Primary Canyon POC is unchanged, and the proposed points include existing monitoring points DW-1, DW-7, and DW-16 through DW-18. Because well DW-12 will be destroyed by the entrance road development, a replacement well DW-35 will be installed. Well DW-21 will be retained for groundwater level measurements only, but could be used for future monitoring in the event that a new landfill release impacts nearby wells. Well DW-21 is a deep pair to well DW-18, and their historical water quality results have been similar since installation of DW-21 in 1999. The vadose zone point will be well SW-1.

The Canyon B POC is also unchanged, and the proposed groundwater monitoring system includes existing groundwater monitoring points DW-14 and PZ-4. Because well DW-3 and vadose zone point GP-9 will be destroyed by the landfill development, replacement downgradient points DW-30/VP-3 and DW-31 will be installed. The shallow vadose point VP-3 in the boring for well DW-30 replaces vadose zone point GP-9. Inactive well DW-6 will be within the landfill development area and should be destroyed.

The well depth and design for each of the additional monitoring points will meet CCR Title 27 regulatory requirements and be determined based on geologic and groundwater conditions encountered during drilling. In general, the groundwater wells will target the uppermost water-bearing zone and be completed with a relatively short screen intended to sample approximately 20 feet of saturated rock. As required by CCR Title 27, a detailed Well Installation Work Plan will be submitted for RWQCB review and approval prior to installation of the proposed monitoring points.

PROPOSED PERIMETER LANDFILL GAS MONITORING SYSTEM

To meet the perimeter landfill gas monitoring requirements of the South Coast Air Quality Management District (SCAQMD) Rule 1150.1 and the CCR Title 27, the proposed perimeter landfill gas monitoring program will consist of a total of 27 multi-level gas monitoring probes (Figure 7 and Table 5). The proposed probes are spaced less than 1,000 feet apart around the proposed landfill limits. The expanded landfill footprint will require installation of nine additional landfill gas monitoring probes (GP-27 through GP-35) on the north and east side of the property. Nine existing monitoring probes (GP-A, GP-B, GP-9, GP-10, GP-11, GP-12, GP-24, GP-25, and W-2) will be destroyed as the expansion progresses.

The number and depth of gas probes at each of the additional monitoring points will meet SCAQMD Rule 1150.1 and CCR Title 27 regulatory requirements and be determined based on geologic conditions encountered during drilling, maximum depth of refuse, and local groundwater elevations. As required by CCR Title 27, a Landfill Gas Monitoring Plan that provides justification for the monitoring point locations, depths, and construction methods will be submitted for agency review and approval prior to installation of these points.

LIMITATIONS

Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable engineering geologists or geotechnical consultants practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional advice included in this report. This report has been prepared for Chiquita Canyon Landfill and their design consultants, to be used solely for planning and design. The report has not been prepared for use by other parties and may not contain sufficient information for purposes of other parties or other uses.

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PROFESSIONAL GEOLOGIST NO. 4407
THEODORE M. CLARK
#89
CERTIFIED
HYDROGEOLOGIST
EXPIRES: 4-30-12
STATE OF CALIFORNIA

Respectfully submitted,
R. T. FRANKIAN & ASSOCIATES

by: Theodore M. Clark, C.H.G.
Principal Geologist

TMC/eaw

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

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Table 1
Hydraulic Conductivity
Chiquita Canyon Landfill, Castaic, California

Well	Lithology	Hydraulic Conductivity (cm/sec)	Source	Method
Alluvial Deposits				
Regional Wells (about 200)	alluvium	1.42E-02 to 0.13	Robson, 1972	Pumping test & drillers logs
A-1 (6 feet)	silty sand (SM)	2.0E-04	HLA, 1987	Lab permeameter
A-2 (16 feet)	silty sand (SM)	2.0E-05	HLA, 1987	Lab permeameter
B-2 (6 feet)	silty sand (SM)	5.4E-05	HLA, 1987	Lab permeameter
C-2 (16 feet)	silt (ML)	1.9E-03	HLA, 1987	Lab permeameter
D-1 (6 feet)	silty sand (SM)	1.0E-04	HLA, 1987	Lab permeameter
D-2 (16 feet)	silty sand (SM)	3.5E-05	HLA, 1987	Lab permeameter
Saugus Formation				
Regional Wells (about 100)	sandstone (ss)	2.4E-04 to 4.7E-07	Robson, 1972	Pumping test & E-log approximation
B-1 (16 feet)	ss	3.2E-03	HLA, 1987	Lab permeameter
B-2 (16 feet)	silty ss	3.4E-05	HLA, 1987	Lab permeameter
C-1 (36 feet)	silty ss	8.5E-05	HLA, 1987	Lab permeameter
DW-3	silty ss w/gravel	3.0E-04	RTF&A, 2005b	Falling Head
		2.9E-04	RTF&A, 2005b	Rising Head
DW-9	silty ss	9.2E-04	EMCON, 1990	Falling Head
		1.1E-03	EMCON, 1990	Rising Head
DW-14	ss	1.1E-05	RTF&A, 2005b	Falling Head
		1.1E-05	RTF&A, 2005b	Rising Head
DW-24	ss, gravelly ss, w/silty ss	6.5E-05	RTF&A, 2005b	Falling Head
		8.1E-05	RTF&A, 2005b	Rising Head
DW-26	intbd silty ss/sandy siltstone (sltst)	3.2E-05	RTF&A, 2005b	Falling Head
		3.6E-05	RTF&A, 2005b	Rising Head
PZ-3	ss & pebbly ss	3.2E-05	RTF&A, 2005b	Rising Head
PZ-4	ss	2.1E-05	RTF&A, 2005b	Rising Head
Pico Formation				
DW-8	mudstone w/3' to 6' ss intbds	6.4E-05	EMCON, 1990	Falling Head
DW-19	sandy sltst to sandy claystone	2.4E-06	RTF&A, 2005b	Falling Head
		2.5E-06	RTF&A, 2005b	Rising Head
PZ-5	silty ss w/7' clayey ss intbd	5.4E-06	RTF&A, 2005b	Falling Head
		5.0E-06	RTF&A, 2005b	Rising Head
PZ-6	silty ss w/6' sandy sltst	2.5E-06	RTF&A, 2005b	Falling Head
		2.8E-06	RTF&A, 2005b	Rising Head

Notes: cm/sec = centimeters per second
Permeameter = Laboratory permeameter testing
Rising and falling head = "slug" testing
Electric logs were correlated with known hydraulic values from pumping test and then electric log values from oil wells were used to estimate hydraulic conductivities

Table 2
Base Alluvium vs. Highest Groundwater Depths
Chiquita Canyon Landfill, Castaic, California

Location	Well ID	Base Alluvium Depth (ft)	Highest Groundwater Depth (ft)	Approximate Base Alluvium - Groundwater Separation (ft)	Date of Highest Groundwater
Main Canyon	DW-1	21	48.91	27.9	4/1/2005
	DW-2	22	50.91	28.9	4/16/2001 [1]
	DW-13	20	38.13	18.1	7/22/1998 [1]
	DW-18	17	57.11	40.1	4/16/2001
	DW-20	41	54.75	13.8	6/10/2005
	DW-21	22	62.85	40.9	4/15/2005
	PZ-1	18.5	34.30	15.8	1/19/1993 [1]
	PZ-2	17	56.05	39.1	4/22/1998 [1]
	SW-1	26	dry	--	--
	RD-1	30	dry	--	-- [1]
East Canyon	DW-3	17	78.12	61.1	4/24/2006
Santa Clara River Valley	DW-7	28	32.64	4.6	3/4/2005

Notes:
Base alluvium depths in feet below ground surface
Highest groundwater depth in feet below top of well casing; based on highest groundwater elevations (relative to surveys), not shallowest measured depth to water
Highest groundwater dates for period ending October 2010
SW-1 and RD-1 = Vadose zone monitoring points
[1] = Monitoring points destroyed prior to 2005

DW-2	(destroyed 12/04)
DW-13	(destroyed 10/02)
PZ-1	(destroyed 10/02)
PZ-2	(destroyed 11/99)

Table 3
Local Annual Precipitation (1970 to 2011)
Chiquita Canyon Landfill, Castaic, California

Date From	Date To	Rainfall Season Total (inches)	Location
Oct-70	Sep-71	12.5	Castaic Junction, Station No. 1021
Oct-71	Sep-72	8.04	Castaic Junction, Station No. 1021
Oct-72	Sep-73	14.77	Castaic Junction, Station No. 1021
Oct-73	Sep-74	12.23	Castaic Junction, Station No. 1021
Oct-74	Sep-75	11.18	Castaic Junction, Station No. 1021
Oct-75	Sep-76	9.08	Castaic Junction, Station No. 1021
Oct-76	Sep-77	11.74	Castaic Junction, Station No. 1021
Oct-77	Sep-78	31.98	Castaic Junction, Station No. 1021
Oct-78	Sep-79	18.16	Castaic Junction, Station No. 1021
Oct-79	Sep-80	23.6	Castaic Junction, Station No. 1021
Oct-80	Sep-81	9.91	Castaic Junction, Station No. 1021
Oct-81	Sep-82	13.68	Castaic Junction, Station No. 1021
Oct-82	Sep-83	29.51	Castaic Junction, Station No. 1021
Oct-83	Sep-84	8.61	Castaic Junction, Station No. 1021
Oct-84	Sep-85	9.51	Castaic Junction, Station No. 1021
Oct-85	Sep-86	18.24	Castaic Junction, Station No. 1021
Oct-86	Sep-87	5.98	Magic Mtn. Parkway, Station No. 200
Oct-87	Sep-88	17.95	Magic Mtn. Parkway, Station No. 200
Oct-88	Sep-89	10.37	Castaic Junction, Station No. 1021
Oct-89	Sep-90	4.71	Castaic Junction, Station No. 1021
Oct-90	Sep-91	12.94	Castaic Junction, Station No. 1021
Oct-91	Sep-92	22.72	Castaic Junction, Station No. 1021
Oct-92	Sep-93	26.76	Castaic Junction, Station No. 1021
Oct-93	Sep-94	8.2	Castaic Junction, Station No. 1021
Oct-94	Sep-95	23	Castaic Junction, Station No. 1021
Oct-95	Sep-96	10.24	Castaic Junction, Station No. 1021
Oct-96	Jan-98	-	data gap
Feb-98	Jun-98	12.25	Chiquita Canyon Landfill Office Rain Gauge
Sep-98	Jun-99	6.80	Chiquita Canyon Landfill Office Rain Gauge
Nov-99	May-00	10.60	Chiquita Canyon Landfill Office Rain Gauge
Oct-00	Apr-01	16.65	Chiquita Canyon Landfill Office Rain Gauge, with March/April from Newhall Station
Nov-01	May-02	5.27	Chiquita Canyon Landfill Office Rain Gauge
Nov-02	May-03	17.55	Chiquita Canyon Landfill Office Rain Gauge
Oct-03	Mar-04	8.35	Chiquita Canyon Landfill Office Rain Gauge
Oct-04	May-05	48.15	Chiquita Canyon Landfill Office Rain Gauge
Sep-05	May-06	16.15	Chiquita Canyon Landfill Office Rain Gauge
Dec-06	Apr-07	2.81	Chiquita Canyon Landfill Office Rain Gauge
Sep-07	Feb-08	14.10	Chiquita Canyon Landfill Office Rain Gauge
Oct-08	Mar-09	10.57	Chiquita Canyon Landfill Office Rain Gauge
Oct-09	May-10	11.75	Chiquita Canyon Landfill Office Rain Gauge
Oct-10	May-11	19.75	Chiquita Canyon Landfill Office Rain Gauge
	Average	**14.66**	

Note: Castaic Junction and Magic Mountain Parkway records from Los Angeles County Department of Public Works, Hydrologic Records Division

Table 4
MPR Groundwater Monitoring System
Chiquita Canyon Landfill, Castaic, California

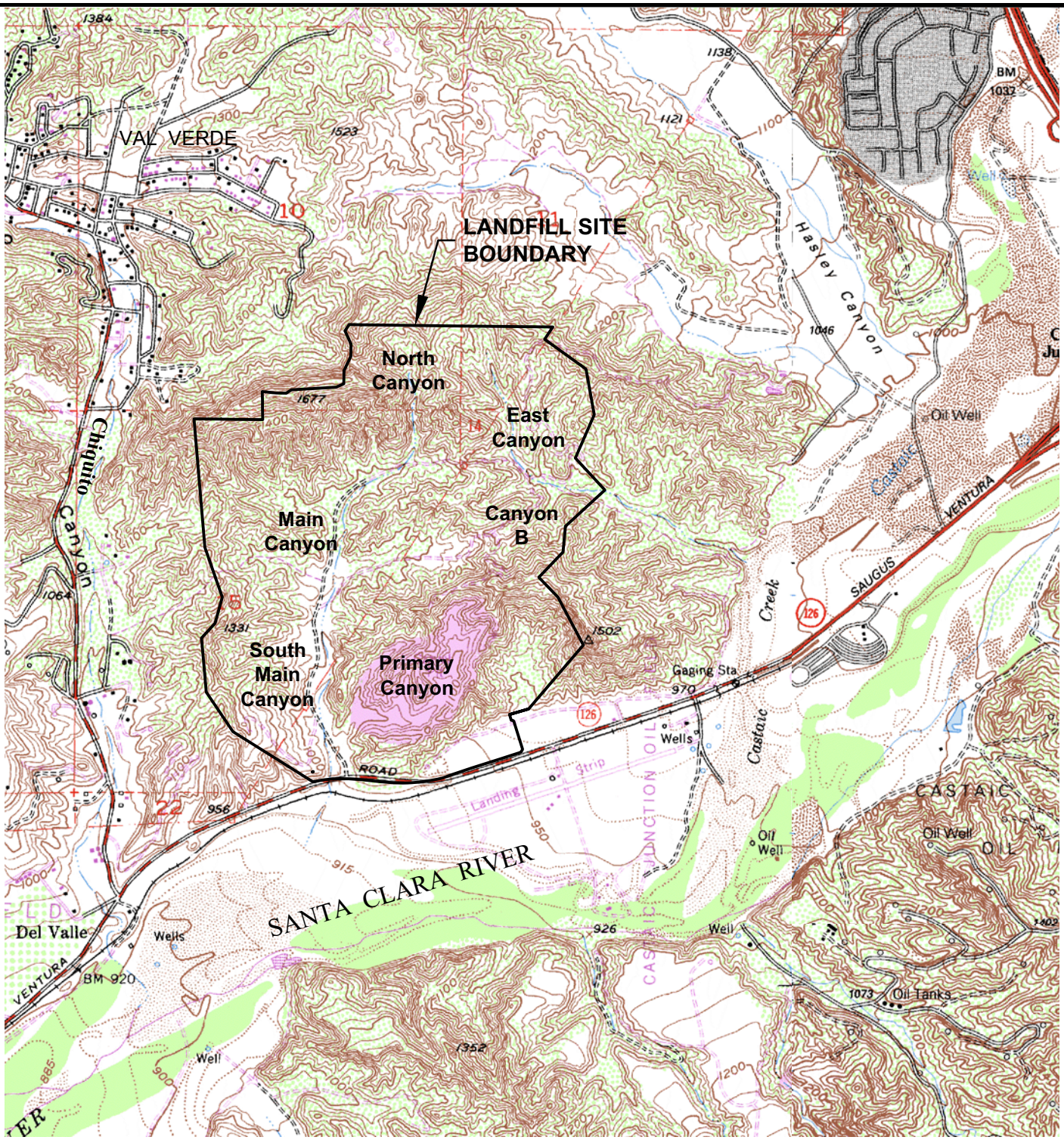
Monitored Medium	Downgradient Monitoring Points	Upgradient Monitoring Points
Main Canyon		
Vadose Zone		
	SW-1	VP-2 (GP-29)
Groundwater		
	DW-1	DW-8
	DW-15	DW-9[GWE]
	DW-16	DW-17
	DW-18	DW-28
	DW-21[GWE]	
	DW-29	
North & East Canyons		
Vadose Zone		
	VP-3 (DW-30)	VP-2 (GP-29)
Groundwater		
	DW-23	DW-27[GWE]
	DW-26	DW-28
	DW-30	
	DW-31	
	DW-32	
	DW-33	
	DW-34	
Primary Canyon		
Vadose Zone		
	SW-1	
Groundwater		
	DW-1	DW-16
	DW-7	DW-17
	DW-18	
	DW-21[GWE]	
	DW-35	
Canyon B		
Vadose Zone		
	VP-3 (DW-30)	
Groundwater		
	DW-30	DW-14
	DW-31	
	PZ-4	

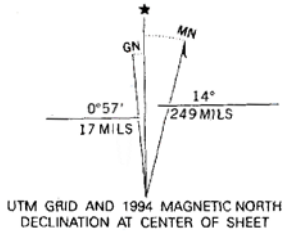
[GWE] = measured for groundwater elevations only

Table 5
MPR Landfill Gas Monitoring System
Chiquita Canyon Landfill, Castaic, California

	Monitoring Programs			Monitoring Programs	
Existing Wells	**Title 27**	**Rule 1150.1**	**Future Wells**	**Title 27**	**Rule 1150.1**
GP-1R	no	yes	GP-27	yes	yes
GP-2	yes	yes	GP-28	yes	yes
GP-5	no	yes	GP-29	yes	yes
GP-6	no	yes	GP-30	yes	yes
GP-7	no	yes	GP-31	yes	yes
GP-8	yes	yes	GP-32	yes	yes
GP-13	yes	yes	GP-33	yes	yes
GP-14	yes	yes	GP-34	yes	yes
GP-15	yes	no	GP-35	yes	yes
GP-16	yes	no			
GP-17	yes	no			
GP-18	yes	no			
GP-19	yes	no			
GP-20	yes	no			
GP-21	yes	no			
GP-22	yes	no			
GP-23	yes	no			
GP-26	yes	yes			

Note: The following existing wells will be destroyed: GP-A, GP-B, GP-9, GP-10, GP-11, GP-12, GP-24, GP-25, & W-2





LOCATION MAP

PREPARED FOR

Chiquita Canyon Landfill

VALENCIA, CALIFORNIA

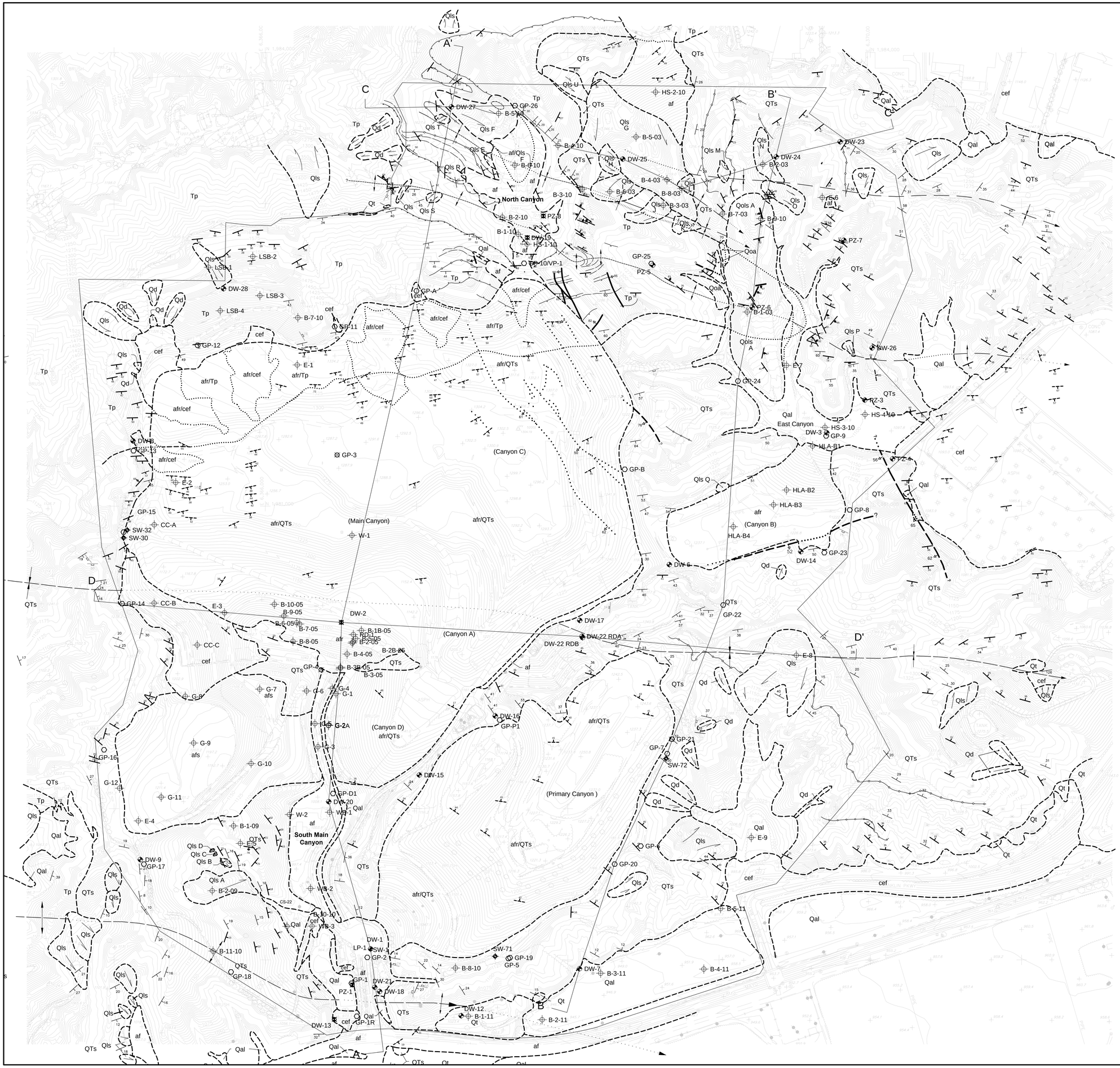
U.S.G.S 7.5 MINUTE
VAL VERDE, CA
34118-D6-TF-024
1991

NEWHALL, CA
1995
NIMA 2252 I NE - SERIES V895

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

R.T. FRANKIAN & ASSOCIATES
FIGURE 1

JOB NO. 2002-036-005(R)
1/20/2012



EXPLANATION

- GEOLOGIC CONTACT; QUERIED WHERE UNCERTAIN OR INFERRED, DOTTED WHERE CONCEALED
- GRADATIONAL GEOLOGIC CONTACT
- ANTICLINAL FOLD; APPROXIMATELY LOCATED, QUERIED WHERE UNCERTAIN, DOTTED WHERE CONCEALED
- SYNCLINAL FOLD; APPROXIMATELY LOCATED QUERIED WHERE UNCERTAIN, DOTTED WHERE CONCEALED
- STRIKE AND DIP OF BEDDING
- STRIKE AND DIP OF CONCEALED BEDDING
- STRIKE AND DIP OF SLIDE PLANE
- STRIKE AND DIP OF JOINT
- SILTSTONE BED
- SANDSTONE BED
- FOSSIL BED
- RIDGE-FORMING COQUINA
- SURFICIAL FAILURE
- af — ARTIFICIAL FILL
- afr — ARTIFICIAL FILL, REFUSE - FILLED AND COMPACTED SOLID WASTE
- afs — ARTIFICIAL FILL STOCKPILE
- cef — CERTIFIED ENGINEERED FILL
- Qal — ALLUVIUM
- Qd — DEBRIS FLOW
- Qls — LANDSLIDE DEBRIS
- Qols — OLDER LANDSLIDE DEBRIS
- Qoa — OLDER ALLUVIUM
- Qt — TERRACE DEPOSITS
- QTs — SAUGUS FORMATION
- Tp — PICO FORMATION
- B-2-10 — EXPLORATORY BORING
- DW-24/PZ-3 — GROUNDWATER MONITORING WELL
- DW-19/PZ-8 — GROUNDWATER MONITORING WELL DESTROYED
- SW-1 — VADOSE ZONE MONITORING WELL
- GP-14 — VADOSE GAS PROBE
- LP-2 — VACUUM PRESSURE LYSIMETER
- A A' — GEOLOGIC SECTION LINE

SCALE 1"= 200'

200' 0 200' 400' 600'

CONTOUR INTERVAL 5'

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Geologic Map

PREPARED FOR

Chiquita Canyon Landfill

Project Location

Master Plan Revision
Castaic, California

SCALE	DRAWN BY	CHECKED BY
AS SHOWN	JH	TMC
DATE		JOB NO.
1-20-2012	Figure 2	2002-036-005(R)

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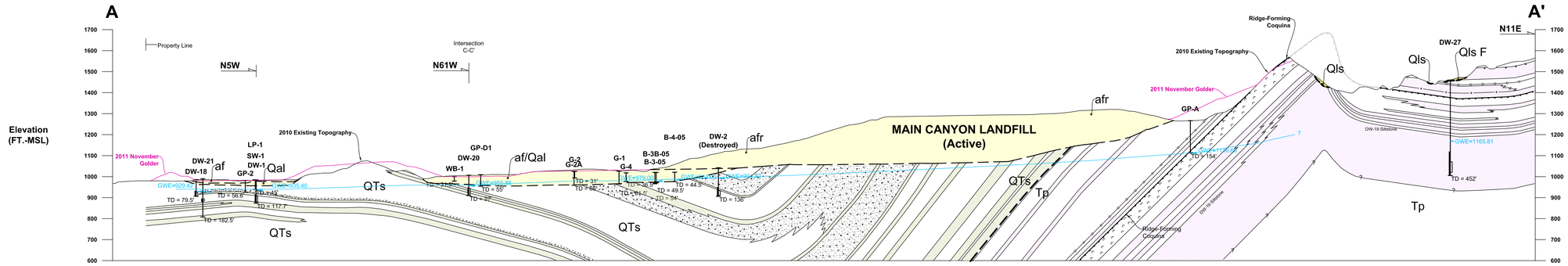
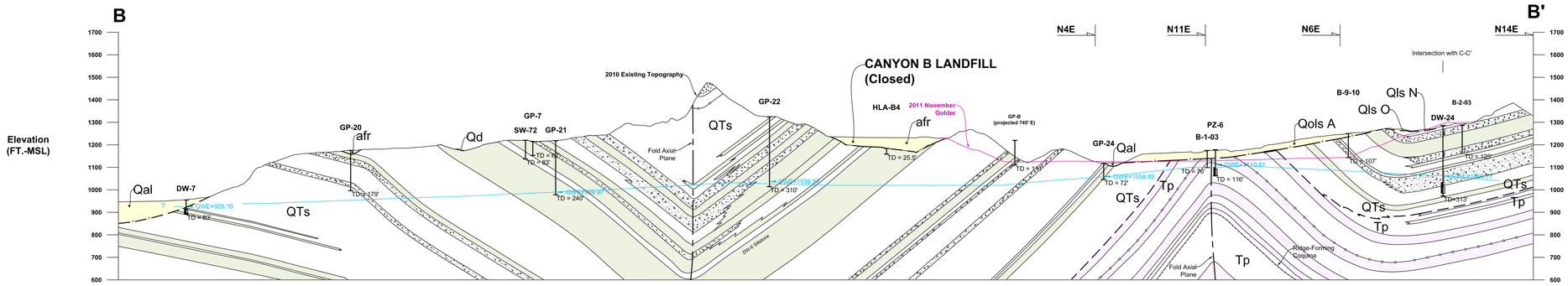
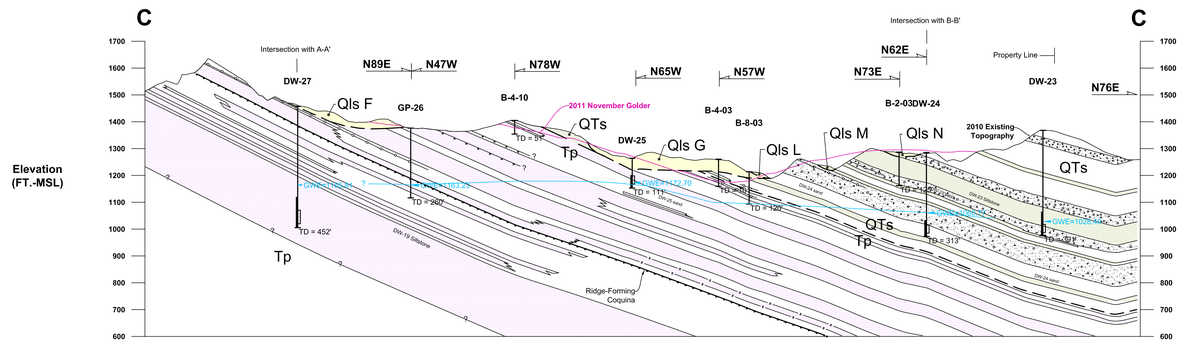
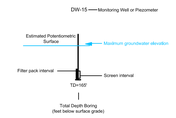


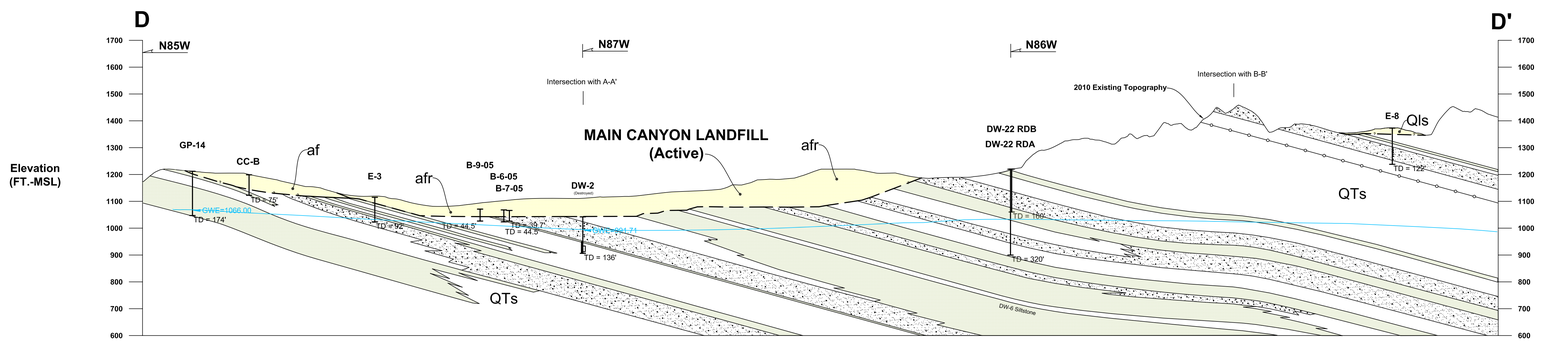




EXPLANATION

- af — Artificial Fill
- afr — Artificial Fill Refuse
- Qal — Quaternary Alluvium
- Qsa — Saugus Formation Coarse-grained: sandstone with gravel
- QTs — Saugus Formation Coarse-grained: primarily sandstone
- QTs — Saugus Formation Fine-grained: primarily siltstone, mudstone or claystone
- Tp — Pico Formation Coarse-grained: primarily sandstone
- Tp — Pico Formation Fine-grained: primarily siltstone, mudstone or claystone
- Tp — Fossil rich; Primarily Sandstone
- Siltstone Bed
- Sandstone Bed
- Fossil Bed





Geologic Sections

PREPARED FOR: Chiquita Canyon Landfill

Project Location: Chiquita Canyon Landfill, Castaic, California

SCALE	DRAWN BY	CHECKED BY
1"=200'	JH	TMC
DATE: 1-20-2012	Figure 3	JOB NO.: 2002-036-005(R)

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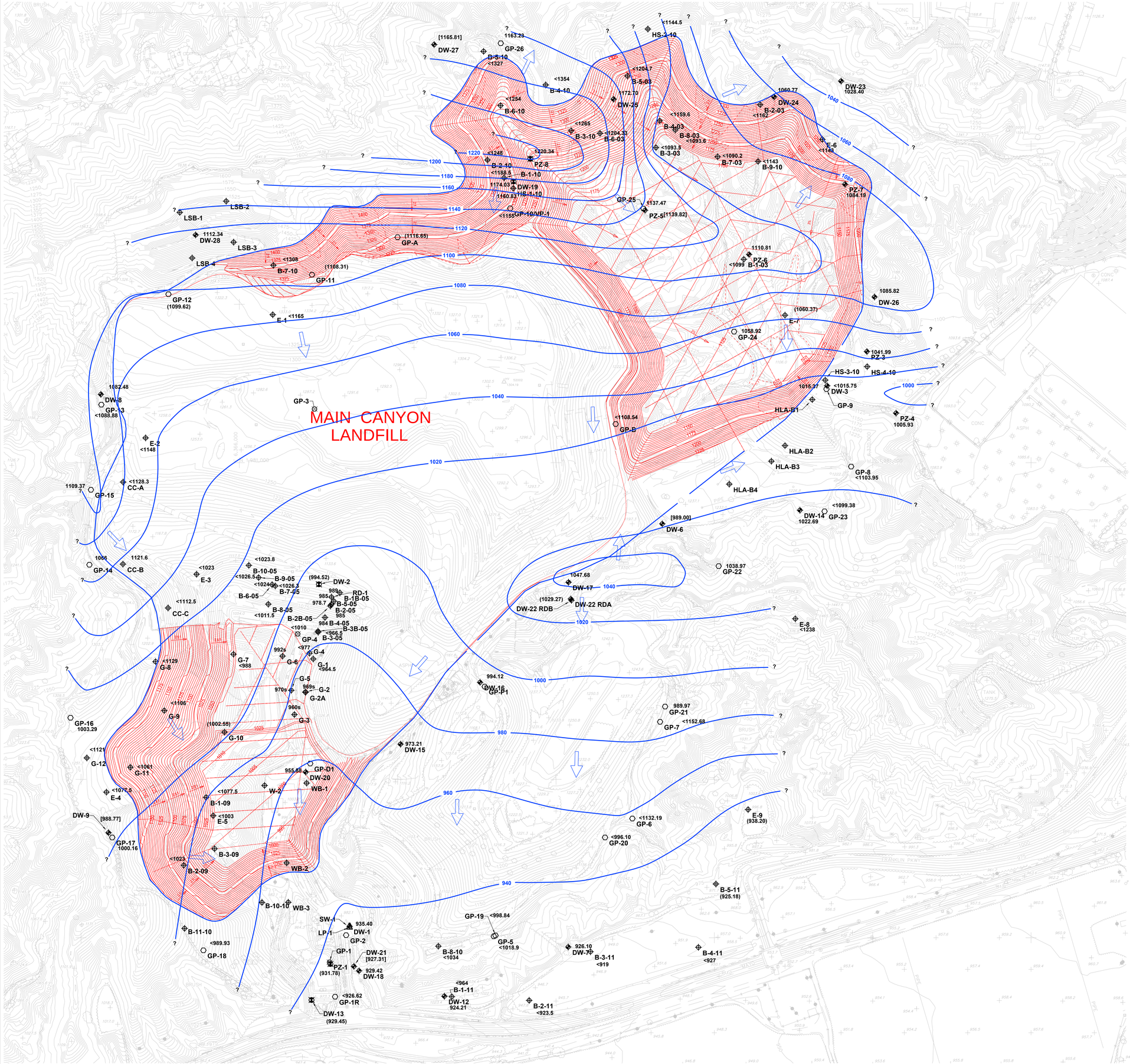

EXPLANATION

1040	Maximum Groundwater Elevation contour (Ft.-MSL)
	Groundwater Monitoring Points (continuous groundwater measurements)
	Groundwater Monitoring Points Destroyed
	Exploratory Borings (limited groundwater measurements)
	Gas Probe Monitoring Points (continuous groundwater measurements)
	Vadose Zone Monitoring Points (continuous groundwater measurements)
1084.19	Groundwater Elevation (Ft.-MSL); Historical Maximum
(1084.19)	Adjusted Historical Maximum Groundwater Elevation (Ft.- MSL)
<1084	Groundwater Elevation (Ft.-MSL) based on dry exploratory borings (unadjusted)
[1084.19]	Groundwater Elevation (Ft.-MSL) omitted from contouring
1084s	Groundwater Elevation (Ft.-MSL); based on seepage in exploratory borings
	Groundwater Flow Direction (from October 2010)

Proposed Project Excavation Within Landfill Footprint
From Golder, November, 2011, Excavation Plan

SCALE 1"= 200'

200' 0 200' 400' 600'

CONTOUR INTERVAL 5'

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Maximum Groundwater Elevations and Cell Excavation Plan

PREPARED FOR: Chiquita Canyon Landfill

Project Location: Chiquita Canyon Landfill, Castaic, California

SCALE	DRAWN BY	CHECKED BY
AS SHOWN	JH	TMC
DATE: 1-20-2012	Figure 4	JOB NO.: 2002-036-005(R)

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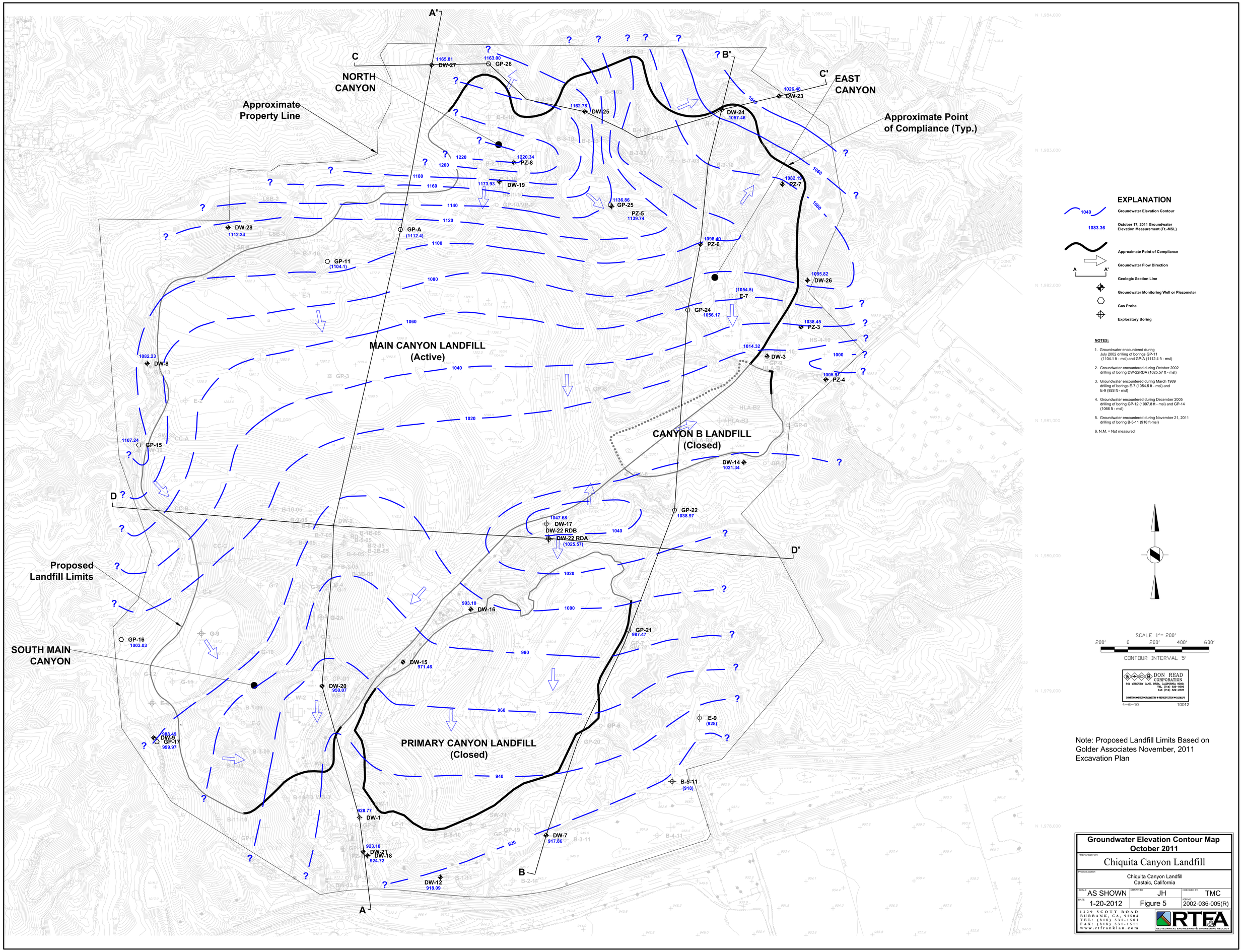
A'
C
NORTH CANYON
Approximate Property Line
1165.81
DW-27
1163.00
GP-26
B'
C'
EAST CANYON
1026.48
DW-23
1162.78
DW-25
DW-24
1057.46
Approximate Point of Compliance (Typ.)
1220.34
PZ-8
1173.93
DW-19
1136.86
GP-25
PZ-5
1139.74
1082.19
PZ-7
DW-28
1112.34
GP-A
(1112.4)
1098.40
PZ-6
GP-11
(1104.1)
1065.82
DW-26
(1054.5)
E-7
GP-24
1056.17
1038.45
PZ-3
MAIN CANYON LANDFILL
(Active)
1082.23
DW-8
1014.32
DW-3
1005.91
PZ-4
1107.24
GP-15
CANYON B LANDFILL
(Closed)
DW-14
1021.34
D
GP-22
1038.97
1047.68
DW-17
DW-22 RDB
DW-22 RDA
(1025.57)
D'
Proposed Landfill Limits
993.10
DW-16
GP-21
987.47
SOUTH MAIN CANYON
GP-16
1003.03
DW-15
971.46
DW-20
950.07
E-9
(928)
988.49
DW-9
GP-17
999.97
PRIMARY CANYON LANDFILL
(Closed)
B-5-11
(918)
928.77
DW-1
DW-7
917.86
923.18
DW-21
DW-18
924.72
B
DW-12
918.09
A
1040
1083.36
EXPLANATION
Groundwater Elevation Contour
October 17, 2011 Groundwater Elevation Measurement (Ft.-MSL)
Approximate Point of Compliance
Groundwater Flow Direction
Geologic Section Line
Groundwater Monitoring Well or Piezometer
Gas Probe
Exploratory Boring
NOTES:
1. Groundwater encountered during July 2002 drilling of borings GP-11 (1104.1 ft - msl) and GP-A (1112.4 ft - msl)
2. Groundwater encountered during October 2002 drilling of boring DW-22RDA (1025.57 ft - msl)
3. Groundwater encountered during March 1989 drilling of borings E-7 (1054.5 ft - msl) and E-9 (928 ft - msl)
4. Groundwater encountered during December 2005 drilling of boring GP-12 (1097.8 ft - msl) and GP-14 (1066 ft - msl)
5. Groundwater encountered during November 21, 2011 drilling of boring B-5-11 (918 ft-msl)
6. N.M. = Not measured
SCALE 1"= 200'
200' 0 200' 400' 600'
CONTOUR INTERVAL 5'
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10012
Note: Proposed Landfill Limits Based on Golder Associates November, 2011 Excavation Plan
Groundwater Elevation Contour Map
October 2011
PREPARED FOR
Chiquita Canyon Landfill
Project Location
Chiquita Canyon Landfill
Castaic, California
SCALE AS SHOWN
DRAWN BY JH
CHECKED BY TMC
DATE 1-20-2012
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JOB NO. 2002-036-005(R)
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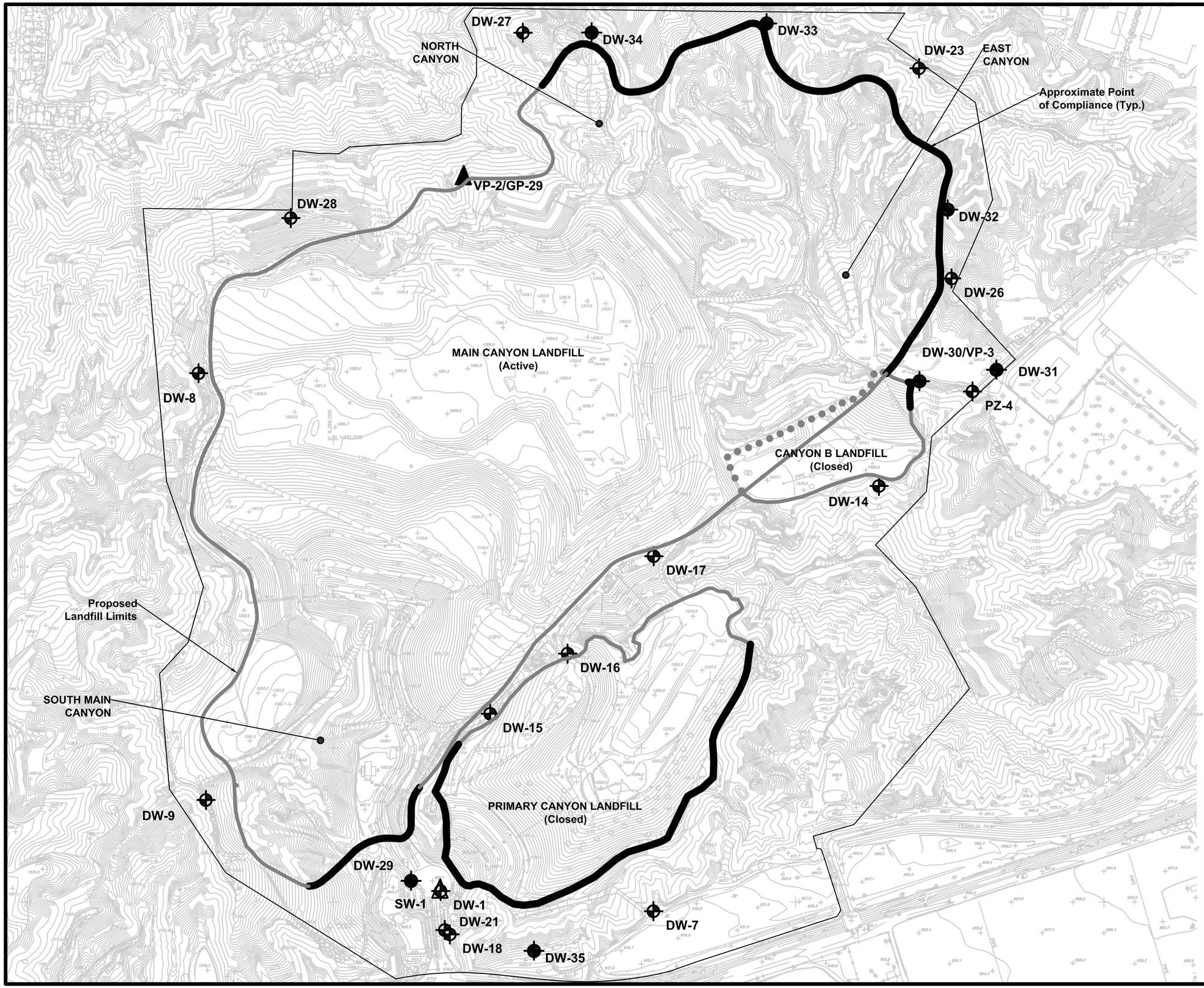

EXPLANATION

- Vadose Zone Monitoring Point (existing)
- Vadose Zone Monitoring Point (future)
- Groundwater Monitoring Point (existing)
- Groundwater Monitoring Point (future)

Note:

Proposed Landfill Limits from Golder Associates November, 2011 Excavation Plan

SCALE 1' = 600'

200' 0 200' 400' 600'

CONTOUR INTERVAL 5'

DON READ CORPORATION

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Groundwater Monitoring System

PREPARED FOR

Chiquita Canyon Landfill

Project Location

Chiquita Canyon Landfill
Castaic, California

SCALE	DRAWN BY	CHECKED BY
1" = 600'	JH	TMC
DATE		JOB NO.
1-20-2012	Figure 6	2002-036-005(R)

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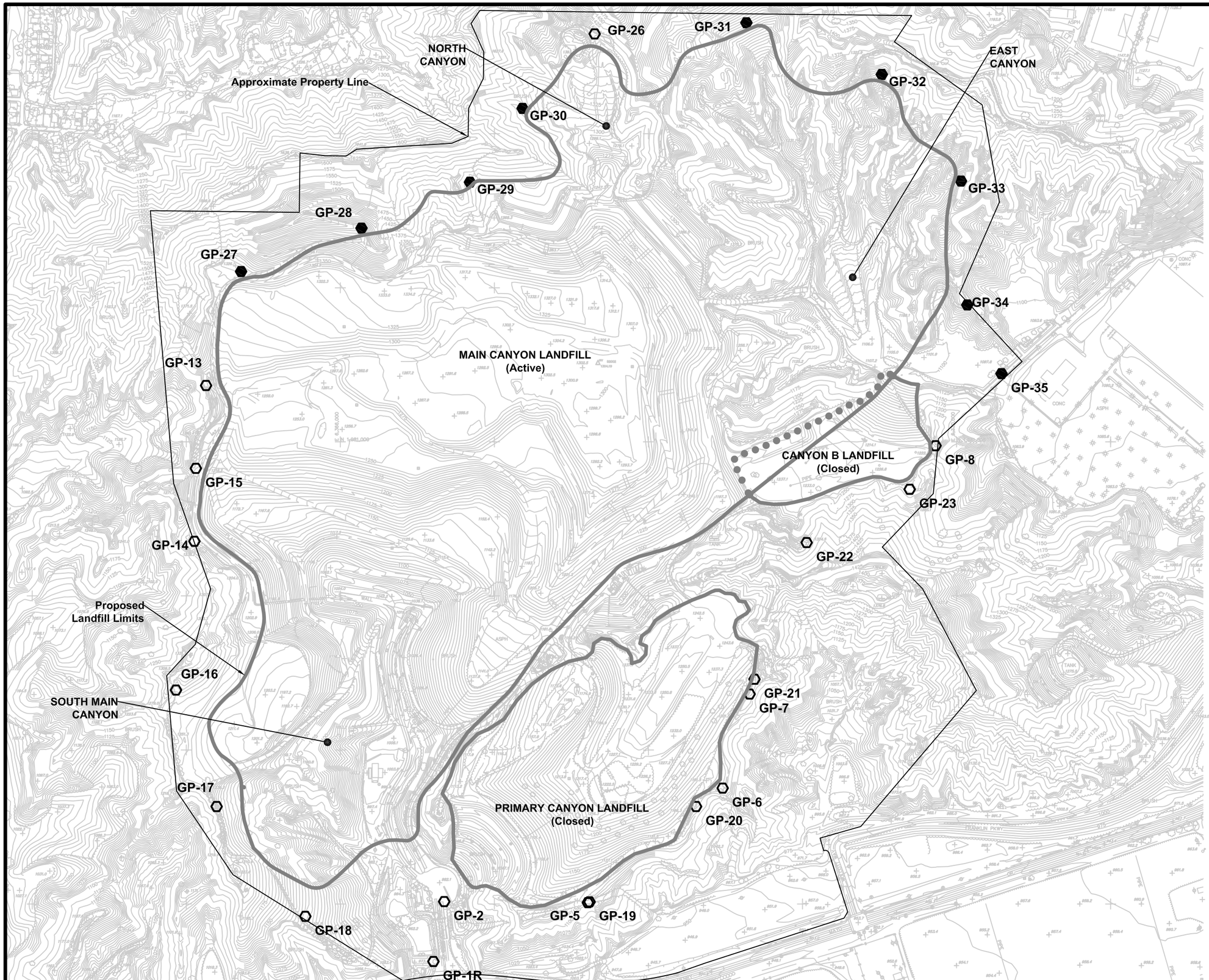


EXPLANATION

- Landfill Gas Monitoring Probe (existing)
- Landfill Gas Monitoring Probe (future)

Note:

Proposed Landfill Limits from
Golder Associates
November 2011
Excavation Plan

SCALE 1" = 600'

200' 0 200' 400' 600'

CONTOUR INTERVAL 5'

DON READ CORPORATION

4-6-10 10012

Perimeter Landfill Gas Monitoring System

PREPARED FOR

Chiquita Canyon Landfill

Project Location

Chiquita Canyon Landfill
Castaic, California

SCALE	DRAWN BY	CHECKED BY
1" = 600'	JH	TMC
DATE		JOB NO.
1-20-2012	Figure 7	2002-036-005(R)

1329 SCOTT ROAD
BURBANK, CA, 91504
TEL: (818) 531-1501
FAX: (818) 531-1511
www.rtfrankian.com

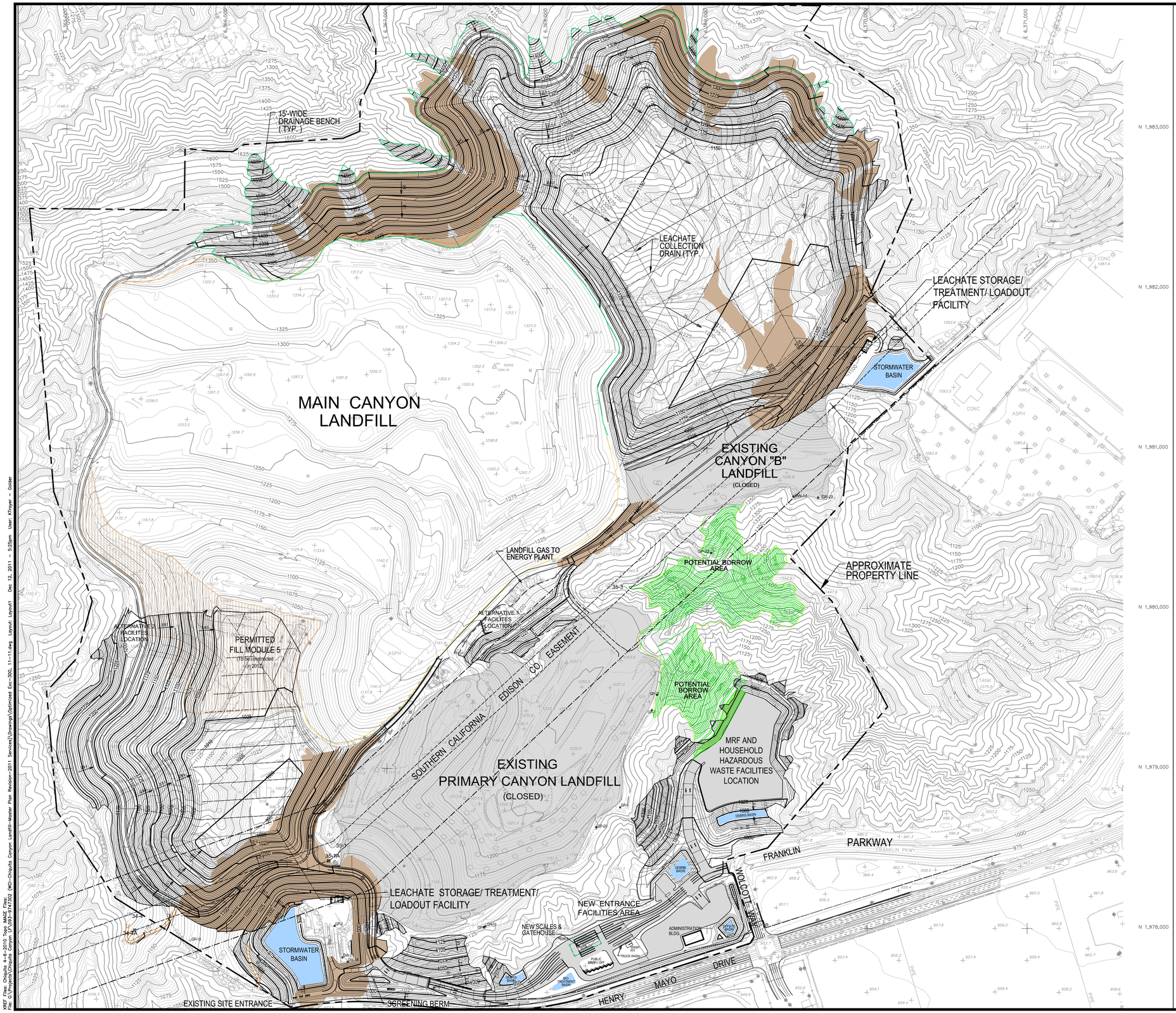
RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

Chiquita Canyon Landfill
January 20, 2012
2002-036-005

APPENDIX A

EXCAVATION PLAN
(GOLDER ASSOCIATES, NOVEMBER 2011)

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY



NOTE: Areas contoured with green contours represent borrow areas and are not mandatory for the construction of the landfill, but are designed to help the project soil balance. The space that is gained around the MRF due to the borrow areas is the area shaded green and equals 0.6 additional acreage.

Base compiled by photogrammetric methods
by Don Read Corporation, Brea, CA
Date of photography: April 6, 2010

PROJECT
WASTE CONNECTIONS, INC.
CHIQUITA CANYON LANDFILL
LOS ANGELES COUNTY, CALIFORNIA

TITLE
EXCAVATION PLAN

Golder Associates
Sunnyvale, California

PROJECT No. 093-9747302			FILE No.	
DESIGN	SER	NOV 2011	SCALE AS NOTED	REV. 0
CADD	KLT	DEC 2011	2	
CHECK				
REVIEW				

FOR USE WITH RTF&A JOB NO. 2002-036-005(R) REPORT DATED 1-20-2012

XREF Files: Chiquita 4-4-2010 Topo IMAGE Files:
File: G:\Projects\Chiquita Canyon LF\093-9747302 (WC-Chiquita Canyon Landfill-Master Plan Revision-2011 Services)\Drawings\Optimized Exc-300, 11-11.dwg Layout: Layout1 Dec 12, 2011 - 5:25pm User: KTroyer - Golder

Chiquita Canyon Landfill
January 20, 2012
2002-036-005

APPENDIX B

GROUNDWATER ELEVATIONS

GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

APPENDIX B
GROUNDWATER ELEVATIONS
Chiquita Canyon Landfill

All elevations are in feet, relative to mean sea level.

Sample Date	DW-1	DW-2	DW-3	DW-6	DW-7	DW-8	DW-9	DW-12	DW-13	DW-14	DW-15	DW-16	DW-17	DW-18	DW-19	DW-20	DW-21	DW-23	DW-24
1/28/1986	920.10	987.40	1007.90	977.40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/2/1986	921.20	987.50	1008.70	977.70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/16/1986	921.40	988.00	1008.80	977.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/10/1986	921.70	985.80	1008.50	978.20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/17/1986	922.10	987.60	1008.60	978.30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/24/1987	919.60	987.30	1008.70	978.70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/16/1987	919.30	987.00	1008.60	978.80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/17/1987	919.70	986.70	1008.60	979.30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/4/1987	918.40	986.60	1008.40	979.80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/18/1988	918.11	986.24	1008.30	979.74	926.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/17/1988	917.83	986.24	1008.47	979.97	926.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/15/1988	917.28	--	1008.09	--	924.94	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/4/1988	917.35	--	1008.40	--	925.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/5/1988	--	986.03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/6/1988	917.80	--	1008.11	--	925.54	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/7/1988	--	--	--	978.45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/14/1989	918.70	987.10	1009.50	981.30	922.40	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/8/1989	918.48	986.97	1009.38	--	--	--	976.94	--	--	--	--	--	--	--	--	--	--	--	--
6/9/1989	--	--	--	981.10	921.48	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/1/1989	--	--	--	--	--	1078.49	977.00	--	--	--	--	--	--	--	--	--	--	--	--
8/2/1989	--	986.99	--	--	920.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/3/1989	--	--	1009.29	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/4/1989	918.36	--	--	981.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/28/1989	--	--	--	980.95	--	1078.42	977.50	--	--	--	--	--	--	--	--	--	--	--	--
10/3/1989	--	--	--	--	921.08	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/4/1989	--	986.25	1009.37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/6/1989	918.10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

APPENDIX B
GROUNDWATER ELEVATIONS
Chiquita Canyon Landfill

All elevations are in feet, relative to mean sea level.

Sample Date	DW-1	DW-2	DW-3	DW-6	DW-7	DW-8	DW-9	DW-12	DW-13	DW-14	DW-15	DW-16	DW-17	DW-18	DW-19	DW-20	DW-21	DW-23	DW-24
1/29/1990	--	--	--	--	921.90	1078.64	977.40	--	--	--	--	--	--	--	--	--	--	--	--
1/30/1990	--	986.82	1008.97	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/31/1990	917.92	--	--	980.87	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/27/1990	919.09	986.96	1009.14	980.99	922.32	1078.91	977.53	--	--	--	--	--	--	--	--	--	--	--	--
3/14/1990	918.00	986.91	1009.12	980.91	922.39	1078.84	977.54	--	--	--	--	--	--	--	--	--	--	--	--
4/11/1990	--	--	--	--	--	1078.68	977.33	--	--	--	--	--	--	--	--	--	--	--	--
4/12/1990	--	--	1008.85	980.71	921.92	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/13/1990	--	986.69	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/16/1990	919.12	984.84	1009.04	981.00	921.59	1078.96	977.68	--	--	--	--	--	--	--	--	--	--	--	--
6/19/1990	918.98	986.83	1009.07	981.10	921.36	1078.98	977.77	--	--	--	--	--	--	--	--	--	--	--	--
7/11/1990	918.56	986.54	1009.20	980.61	920.78	1078.64	977.41	--	--	--	--	--	--	--	--	--	--	--	--
8/17/1990	919.18	984.64	1008.88	981.06	--	1078.91	977.61	--	--	--	--	--	--	--	--	--	--	--	--
9/17/1990	--	--	--	--	920.76	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/16/1990	--	986.38	1008.64	--	--	1078.68	977.48	--	--	--	--	--	--	--	--	--	--	--	--
10/17/1990	--	--	--	980.95	920.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/18/1990	918.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/15/1990	917.30	986.45	1008.70	981.58	--	1078.87	977.66	--	--	--	--	--	--	--	--	--	--	--	--
1/21/1991	--	--	--	--	--	1078.64	977.39	--	--	--	--	--	--	--	--	--	--	--	--
1/22/1991	--	--	--	981.43	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/23/1991	917.00	986.22	1008.38	--	921.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/6/1991	--	--	--	--	--	--	--	919.18	--	--	--	--	--	--	--	--	--	--	--
2/19/1991	918.21	986.13	1008.45	981.42	921.24	1078.76	977.50	--	--	--	--	--	--	--	--	--	--	--	--
4/8/1991	918.33	986.07	--	981.99	922.60	1078.89	977.71	919.03	922.36	--	--	--	--	--	--	--	--	--	--
4/23/1991	918.87	986.06	1011.65	981.76	922.71	1078.65	977.33	918.98	922.32	--	--	--	--	--	--	--	--	--	--
5/18/1991	919.12	986.08	1009.25	982.04	922.27	1078.87	977.57	918.96	922.41	--	--	--	--	--	--	--	--	--	--
6/20/1991	918.89	986.04	1009.05	982.23	921.95	1078.82	977.52	919.00	922.44	--	--	--	--	--	--	--	--	--	--
7/22/1991	918.79	984.02	1008.89	982.42	921.69	1078.78	977.55	916.99	922.42	--	--	--	--	--	--	--	--	--	--

APPENDIX B
GROUNDWATER ELEVATIONS
Chiquita Canyon Landfill

All elevations are in feet, relative to mean sea level.

Sample Date	DW-1	DW-2	DW-3	DW-6	DW-7	DW-8	DW-9	DW-12	DW-13	DW-14	DW-15	DW-16	DW-17	DW-18	DW-19	DW-20	DW-21	DW-23	DW-24
8/1/1991	918.55	--	--	--	921.50	1078.53	977.23	918.74	922.32	--	--	--	--	--	--	--	--	--	--
8/2/1991	--	985.85	1008.71	981.95	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/17/1991	918.56	985.95	1008.59	982.85	921.38	1078.89	977.73	918.95	922.30	--	--	--	--	--	--	--	--	--	--
10/21/1991	--	985.80	1008.40	982.89	921.17	1078.73	977.46	918.68	922.21	--	--	--	--	--	--	--	--	--	--
10/22/1991	918.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/28/1992	918.11	985.69	1009.07	983.69	921.95	1078.47	977.38	918.72	922.18	--	--	--	--	--	--	--	--	--	--
3/3/1992	--	--	--	984.63	923.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/16/1992	920.48	985.01	--	--	--	1078.84	977.20	919.16	922.51	--	--	--	--	--	--	--	--	--	--
4/20/1992	921.50	985.71	--	984.70	922.96	1078.64	977.50	918.90	922.41	--	--	--	--	--	--	--	--	--	--
6/16/1992	920.23	985.91	1013.56	985.82	921.64	1078.82	977.80	918.99	922.68	--	--	--	--	--	--	--	--	--	--
7/20/1992	921.33	985.67	1012.53	985.78	921.85	1078.63	977.78	918.93	922.55	--	--	--	--	--	--	--	--	--	--
8/14/1992	920.01	985.77	--	985.68	922.17	1078.76	977.82	919.19	922.47	--	--	--	--	--	--	--	--	--	--
9/23/1992	921.79	983.97	1007.93	986.53	921.69	1078.82	978.00	918.92	922.61	--	--	--	--	--	--	--	--	--	--
10/19/1992	921.18	985.93	1007.88	986.57	921.46	1078.51	977.64	918.80	922.55	--	--	--	--	--	--	--	--	--	--
11/16/1992	921.33	986.04	1007.98	986.75	921.69	1078.84	977.82	918.89	921.56	--	--	--	--	--	--	--	--	--	--
12/16/1992	921.38	986.02	1007.93	986.73	921.99	1078.74	977.80	918.79	921.61	--	--	--	--	--	--	--	--	--	--
1/19/1993	921.63	985.92	1007.61	986.45	922.67	1078.60	977.63	918.61	922.79	--	--	--	--	--	--	--	--	--	--
3/16/1993	922.03	986.62	1007.91	987.04	922.69	1078.94	977.95	919.12	922.11	--	--	--	--	--	--	--	--	--	--
3/24/1993	--	--	--	986.99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/19/1993	927.18	989.32	1007.95	986.90	924.05	1078.52	977.85	919.39	923.31	--	--	--	--	--	--	--	--	--	--
5/18/1993	922.36	986.90	1007.88	987.18	922.99	1078.74	978.00	918.99	922.33	--	--	--	--	--	--	--	--	--	--
6/15/1993	922.28	987.22	1008.13	986.83	923.24	1078.84	978.10	918.74	922.66	--	--	--	--	--	--	--	--	--	--
7/19/1993	927.01	990.12	1008.33	987.28	922.61	1078.49	977.77	919.24	924.09	--	--	--	--	--	--	--	--	--	--
8/17/1993	922.78	987.30	1008.10	986.78	923.24	1078.84	978.00	918.79	922.73	--	--	--	--	--	--	--	--	--	--
9/16/1993	922.83	987.32	1008.08	986.83	923.24	1078.79	978.00	918.74	922.71	--	--	--	--	--	--	--	--	--	--
10/18/1993	926.56	990.00	1008.43	987.73	922.64	1078.64	977.93	919.21	924.00	--	--	--	--	--	--	--	--	--	--
11/16/1993	923.00	987.67	1008.43	986.28	922.69	1078.84	978.20	918.56	922.86	--	--	--	--	--	--	--	--	--	--

APPENDIX B
GROUNDWATER ELEVATIONS
Chiquita Canyon Landfill

All elevations are in feet, relative to mean sea level.

Sample Date	DW-1	DW-2	DW-3	DW-6	DW-7	DW-8	DW-9	DW-12	DW-13	DW-14	DW-15	DW-16	DW-17	DW-18	DW-19	DW-20	DW-21	DW-23	DW-24
12/16/1993	923.03	987.62	1008.48	986.53	922.59	1078.84	978.15	918.54	923.01	--	--	--	--	--	--	--	--	--	--
1/31/1994	925.43	989.51	1007.43	987.08	922.54	1075.13	974.82	918.69	921.64	--	--	--	--	--	--	--	--	--	--
2/16/1994	923.18	987.37	1008.63	986.28	922.69	1078.64	978.00	918.69	923.01	--	--	--	--	--	--	--	--	--	--
3/16/1994	925.33	990.32	1007.72	987.93	923.26	1077.22	975.62	919.42	922.00	--	--	--	--	--	--	--	--	--	--
4/18/1994	925.05	989.82	1007.74	988.04	--	1077.30	976.65	919.35	921.99	--	--	--	--	--	--	--	--	--	--
4/19/1994	--	--	--	--	923.27	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/18/1994	925.33	990.32	1007.70	987.83	923.24	1077.24	975.67	919.41	922.06	--	--	--	--	--	--	--	--	--	--
7/18/1994	924.33	989.60	1007.62	988.06	922.13	1077.28	976.91	919.21	922.14	--	--	--	--	--	--	--	--	--	--
10/10/1994	923.60	989.50	1007.70	988.34	922.14	1077.40	977.33	919.20	922.19	--	--	--	--	--	--	--	--	--	--
12/7/1994	--	--	--	988.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/5/1995	922.98	989.37	1007.58	988.03	922.04	--	977.45	919.14	922.41	--	--	--	--	--	--	--	--	--	--
2/3/1995	924.69	989.18	1007.63	988.11	923.48	1077.37	--	919.25	922.44	--	--	--	--	--	--	--	--	--	--
2/10/1995	--	--	1007.64	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/17/1995	925.99	989.46	1007.59	988.37	923.88	1077.57	977.80	919.48	922.72	--	--	--	--	--	--	--	--	--	--
7/12/1995	925.82	989.57	1007.55	987.95	923.46	1077.47	978.00	919.72	922.82	--	--	--	--	--	--	--	--	--	--
10/11/1995	--	--	--	987.71	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/12/1995	925.41	989.71	1007.73	--	922.09	1077.55	978.12	919.89	923.11	--	--	--	--	--	--	--	--	--	--
1/9/1996	924.44	989.52	1007.66	987.16	923.07	1077.45	978.20	919.66	923.06	--	--	--	--	--	--	--	--	--	--
2/13/1996	923.65	989.43	1007.29	986.82	922.40	--	977.88	919.26	923.21	--	--	--	--	--	--	--	--	--	--
2/14/1996	--	--	--	--	--	1077.39	--	--	--	--	--	--	--	--	--	--	--	--	--
4/8/1996	924.51	989.45	1007.66	986.75	923.00	1077.54	978.26	919.56	923.31	--	--	--	--	--	--	--	--	--	--
5/24/1996	--	--	--	--	--	--	--	--	--	1020.39	--	--	--	--	--	--	--	--	--
7/8/1996	924.03	989.44	1007.37	986.76	921.75	1077.63	978.23	919.46	923.25	1020.79	--	--	--	--	--	--	--	--	--
10/9/1996	923.24	989.29	1007.24	985.90	921.55	1077.52	978.37	919.21	923.07	1021.05	--	--	--	--	--	--	--	--	--
1/29/1997	924.07	989.21	1007.26	985.46	922.65	1077.50	978.47	919.23	923.22	1020.87	--	--	--	--	--	--	--	--	--
4/8/1997	925.37	989.34	1007.22	985.32	922.34	1077.59	978.72	919.26	923.37	1021.01	--	--	--	--	--	--	--	--	--
4/11/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

APPENDIX B
GROUNDWATER ELEVATIONS
Chiquita Canyon Landfill

All elevations are in feet, relative to mean sea level.

Sample Date	DW-1	DW-2	DW-3	DW-6	DW-7	DW-8	DW-9	DW-12	DW-13	DW-14	DW-15	DW-16	DW-17	DW-18	DW-19	DW-20	DW-21	DW-23	DW-24
7/7/1997	924.66	989.27	1007.25	985.47	920.22	1077.67	978.91	918.80	--	1021.07	--	--	--	--	--	--	--	--	--
10/7/1997	923.79	989.37	1007.12	985.37	920.08	1077.49	978.86	918.58	923.14	1020.97	--	--	--	--	--	--	--	--	--
1/19/1998	923.90	989.16	1007.23	989.00	921.70	1073.51	975.04	918.69	923.32	--	--	--	--	--	--	--	--	--	--
4/22/1998	931.00	990.32	1006.98	986.32	922.25	1077.48	979.04	918.81	924.64	1020.79	--	--	--	--	--	--	--	--	--
7/22/1998	931.41	990.86	1007.62	986.60	921.25	1077.84	979.61	918.86	925.46	1020.88	--	--	--	--	--	--	--	--	--
10/19/1998	930.34	990.71	1007.94	986.15	921.25	1077.87	979.18	918.86	925.00	1020.72	--	--	--	--	--	--	--	--	--
1/22/1999	929.54	990.17	1008.17	986.02	921.03	1077.96	978.51	918.66	924.74	1020.82	--	--	--	--	--	--	--	--	--
4/16/1999	928.79	990.07	1008.17	985.52	921.75	1077.84	979.46	918.91	924.64	1020.67	--	--	--	--	--	--	--	--	--
7/26/1999	927.84	989.52	1008.62	--	919.69	1078.19	978.81	918.41	924.47	1020.92	--	--	--	--	--	--	--	--	--
7/29/1999	--	989.50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/19/1999	927.91	989.12	1008.97	984.82	921.45	1077.94	978.81	918.06	924.44	1020.52	--	--	--	--	--	--	--	--	--
1/24/2000	925.62	989.08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/25/2000	--	--	--	985.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/2/2000	--	--	1008.67	--	920.48	--	--	--	--	--	--	--	--	922.28	1170.56	--	919.53	--	--
2/3/2000	--	--	--	--	--	1077.74	978.61	918.11	923.99	1020.72	--	--	--	--	--	--	--	--	--
5/1/2000	926.10	989.16	1009.07	984.85	920.60	1078.22	980.44	918.31	923.98	1020.93	--	--	--	927.22	1170.09	--	920.83	--	--
7/21/2000	926.01	989.10	1010.13	984.78	919.58	1078.06	979.78	918.05	923.80	1020.73	--	--	--	924.84	1169.91	--	920.25	--	--
10/19/2000	924.86	988.87	1009.08	982.07	919.14	1077.98	980.27	917.83	923.68	1020.58	--	--	--	922.80	1169.95	--	919.46	--	--
1/22/2001	923.92	988.71	1009.05	983.71	919.76	1078.06	980.35	917.82	923.66	1020.50	--	--	--	921.59	1169.85	--	918.81	--	--
4/16/2001	930.88	991.71	1008.64	983.46	921.27	1078.12	980.46	918.14	924.04	1020.45	--	--	--	929.42	1169.99	--	921.97	--	--
7/13/2001	926.92	991.71	1009.04	983.31	919.80	1078.16	980.62	918.51	924.05	1020.44	--	--	--	925.68	1169.98	--	921.19	--	--
10/5/2001	926.17	989.91	1008.97	983.04	919.32	1078.19	980.68	918.52	924.05	1020.36	--	--	--	923.88	1170.01	--	920.72	--	--
1/18/2002	925.18	988.88	1009.02	983.10	919.55	1078.47	981.01	918.61	924.02	1020.52	--	--	--	923.18	1170.15	--	919.91	--	--
4/5/2002	924.40	984.62	1009.01	982.94	919.15	1078.57	981.17	918.51	923.95	1020.49	--	--	--	922.51	1170.21	--	919.41	--	--
7/8/2002	923.07	989.46	1011.45	985.87	924.19	--	983.84	921.10	923.68	1022.39	--	--	--	924.37	1170.28	--	921.55	--	--
10/7/2002	923.11	988.94	1011.57	985.39	921.30	1080.88	984.28	920.95	--	1022.69	--	--	--	923.83	1170.30	--	921.51	--	--
1/13/2003	--	988.66	1011.62	984.76	922.62	1080.88	984.04	920.86	--	1022.10	973.21	993.70	1043.76	924.15	1170.22	949.89	921.44	--	--

APPENDIX B
GROUNDWATER ELEVATIONS
Chiquita Canyon Landfill

All elevations are in feet, relative to mean sea level.

Sample Date	DW-1	DW-2	DW-3	DW-6	DW-7	DW-8	DW-9	DW-12	DW-13	DW-14	DW-15	DW-16	DW-17	DW-18	DW-19	DW-20	DW-21	DW-23	DW-24
4/7/2003	929.32	988.24	1011.17	--	923.03	1080.75	983.16	920.80	--	1022.50	972.80	993.45	1043.95	924.97	1170.13	952.53	924.14	--	--
7/15/2003	929.34	988.15	1011.19	--	923.27	--	985.94	920.99	--	1022.63	972.96	993.80	1044.63	925.46	1170.26	951.38	923.83	1025.43	1060.77
7/23/2003	--	--	--	--	--	1079.42	--	--	--	--	--	--	--	--	--	--	--	--	--
9/11/2003	--	--	--	--	--	--	--	--	--	1022.39	--	--	--	--	--	--	--	--	--
10/13/2003	928.35	987.85	1011.06	--	922.05	1079.80	985.47	920.66	--	1022.40	972.68	993.67	1044.67	924.75	--	950.38	922.83	1025.22	1060.38
1/12/2004	929.11	987.51	1010.97	--	922.24	1079.92	985.10	920.57	--	1022.23	972.52	993.57	1044.75	924.86	1173.57	948.96	924.75	--	1060.11
1/15/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1025.32	--
4/19/2004	928.81	987.28	1010.99	--	922.31	1079.90	984.92	920.56	--	1022.06	972.29	993.44	1044.70	925.15	1172.92	949.28	923.70	1025.02	1059.07
7/9/2004	927.42	987.23	1010.93	--	921.95	1080.26	985.32	920.58	--	1022.21	972.44	993.71	1044.95	924.28	1172.83	948.74	922.48	1025.11	1059.10
10/6/2004	925.97	987.02	1010.84	--	922.16	1080.21	985.23	920.49	--	1022.21	972.32	993.77	1044.99	923.44	1172.72	948.02	921.44	1025.05	1059.11
11/10/2004	926.37	986.98	1010.77	--	923.14	1080.14	985.14	920.63	--	1022.01	972.24	993.68	1044.92	923.45	1172.67	948.03	921.99	1025.03	1058.88
12/3/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/7/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/9/2004	926.18	986.87	1010.62	--	922.97	1080.17	985.19	920.53	--	1021.89	972.13	993.55	1044.76	923.33	1172.70	948.23	921.67	1024.87	1058.76
12/15/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/16/2004	926.06	--	--	--	922.97	--	--	920.42	--	--	972.02	993.47	--	923.18	--	--	921.60	--	--
12/23/2004	926.16	--	--	--	923.00	--	--	920.48	--	--	972.10	993.56	--	923.27	--	--	921.85	--	--
12/30/2004	926.35	--	--	--	923.27	--	--	920.51	--	--	972.11	993.55	--	923.30	--	--	922.05	--	--
1/6/2005	927.25	--	--	--	923.99	--	--	920.79	--	--	972.27	993.73	--	923.59	--	--	922.45	--	--
1/14/2005	929.59	--	1010.70	--	925.04	1080.18	985.29	920.89	--	1022.01	972.16	993.61	1044.88	923.79	1173.18	949.21	923.26	1024.99	1058.81
1/21/2005	933.15	--	--	--	925.37	--	--	921.01	--	--	972.31	993.75	--	924.20	--	952.53	924.17	--	--
1/28/2005	931.89	--	--	--	925.23	--	--	920.98	--	--	972.22	993.63	--	924.59	--	951.38	924.78	--	--
2/4/2005	933.88	--	--	--	924.96	--	--	921.05	--	--	972.26	993.67	--	924.98	--	952.15	925.14	--	--
2/10/2005	932.64	--	1010.76	--	924.81	1080.33	985.49	921.24	--	1022.23	972.44	993.82	1045.14	925.39	1172.97	952.91	925.41	1024.99	1058.82
2/18/2005	932.99	--	--	--	924.78	--	--	921.39	--	--	972.51	993.85	--	925.66	--	--	925.62	--	--
2/25/2005	933.62	--	--	--	925.52	--	--	921.49	--	--	972.35	993.71	--	925.91	--	--	925.76	--	--
3/4/2005	934.46	--	--	--	926.10	--	--	921.81	--	--	972.45	993.77	--	926.11	--	--	926.11	--	--

APPENDIX B
GROUNDWATER ELEVATIONS
Chiquita Canyon Landfill

All elevations are in feet, relative to mean sea level.

Sample Date	DW-1	DW-2	DW-3	DW-6	DW-7	DW-8	DW-9	DW-12	DW-13	DW-14	DW-15	DW-16	DW-17	DW-18	DW-19	DW-20	DW-21	DW-23	DW-24
3/11/2005	934.90	--	1010.81	--	926.07	1080.46	985.54	922.01	--	1022.14	972.50	993.81	1045.15	926.38	1173.00	954.98	926.46	1025.00	1058.85
3/18/2005	935.12	--	--	--	925.82	--	--	922.29	--	--	972.52	993.83	--	926.70	--	--	926.80	--	--
3/25/2005	935.22	--	--	--	925.45	--	--	922.41	--	--	972.39	993.70	--	926.87	--	--	926.97	--	--
4/1/2005	935.40	--	--	--	925.27	--	--	922.71	--	--	972.50	993.82	--	927.20	--	--	927.13	--	--
4/8/2005	935.39	--	--	--	924.99	--	--	922.66	--	--	972.56	993.86	--	927.36	--	--	927.27	--	--
4/15/2005	935.35	--	--	--	924.86	--	--	922.81	--	--	972.56	993.87	--	927.58	--	--	927.31	--	--
4/20/2005	935.23	--	1011.89	--	924.66	1080.46	985.45	923.05	--	1022.02	972.48	993.78	1045.14	927.63	1172.87	955.67	927.26	1025.20	1058.72
4/28/2005	935.06	--	--	--	924.46	--	--	923.30	--	--	972.59	993.86	--	927.83	--	--	927.25	--	--
5/6/2005	935.10	--	--	--	924.40	--	--	923.42	--	--	972.60	993.86	--	927.90	--	--	927.23	--	--
5/17/2005	934.96	--	1012.42	--	924.42	1080.55	985.66	923.66	--	1022.19	972.67	993.93	1045.39	928.05	1172.96	955.82	927.21	1025.64	1058.84
5/20/2005	934.90	--	--	--	924.38	--	--	923.70	--	--	972.69	993.92	--	928.06	--	--	927.15	--	--
5/27/2005	934.76	--	--	--	924.27	--	--	923.76	--	--	972.69	993.96	--	928.10	--	--	927.12	--	--
6/3/2005	934.61	--	--	--	924.19	--	--	923.79	--	--	972.70	993.93	--	928.12	--	--	927.04	--	--
6/10/2005	934.45	--	1012.72	--	924.03	1080.55	985.60	923.90	--	1022.13	972.76	993.99	1045.56	928.14	1172.97	955.88	926.98	1025.85	1058.80
7/8/2005	933.85	--	1012.94	--	923.42	1080.30	985.51	924.02	--	1022.02	972.73	993.93	1045.69	928.00	1172.84	955.81	926.66	1026.04	1058.77
7/15/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/9/2005	933.36	--	1013.11	--	922.80	1080.84	985.54	924.14	--	1022.02	972.80	993.94	1045.93	927.80	1172.78	955.69	926.41	1026.47	1058.75
9/9/2005	932.81	--	1013.29	--	922.40	1080.71	985.56	924.19	--	1022.03	972.80	993.87	1046.15	927.56	1172.76	955.52	926.07	--	1058.73
10/14/2005	932.30	--	1013.55	--	922.34	1080.54	985.59	924.12	--	1022.02	972.90	993.94	1046.35	927.36	1172.73	955.30	925.81	1027.02	1058.64
11/21/2005	932.10	--	1013.64	--	922.46	1080.48	985.41	924.12	--	1021.87	972.79	993.72	1046.39	927.29	1172.65	954.95	926.01	1027.38	1058.75
12/9/2005	931.85	--	1013.77	--	922.60	1080.45	985.51	924.09	--	1021.92	972.74	993.85	1046.49	927.16	1172.66	954.83	925.85	1027.28	1058.66
1/13/2006	931.83	--	1014.00	--	922.57	1080.69	985.77	924.04	--	1022.11	972.95	993.96	1046.75	927.25	1172.79	954.86	926.03	1027.36	1058.69
2/10/2006	931.44	--	1013.91	--	922.76	1080.67	985.64	923.89	--	1021.99	972.80	993.75	1046.63	926.97	1172.78	954.59	925.60	1027.19	1058.59
3/9/2006	931.61	--	1014.27	--	923.59	1080.83	985.91	924.21	--	1022.29	973.11	994.12	1047.04	927.14	1172.94	954.68	925.85	1027.56	1058.88
4/24/2006	932.11	--	1014.31	--	923.81	1080.87	985.76	923.85	--	1022.02	972.71	993.73	1046.78	927.17	1172.93	954.79	926.02	1027.30	1058.57
5/10/2006	932.21	--	1014.37	--	923.68	1080.95	985.94	923.89	--	1022.15	972.90	993.85	1046.97	927.37	1172.98	955.09	926.12	1027.30	1058.57
6/13/2006	931.87	--	1014.41	--	923.62	1080.82	985.92	923.74	--	1022.01	972.71	993.72	1046.89	927.05	1172.97	954.73	925.72	1027.21	1058.51

APPENDIX B
GROUNDWATER ELEVATIONS
Chiquita Canyon Landfill

All elevations are in feet, relative to mean sea level.

Sample Date	DW-1	DW-2	DW-3	DW-6	DW-7	DW-8	DW-9	DW-12	DW-13	DW-14	DW-15	DW-16	DW-17	DW-18	DW-19	DW-20	DW-21	DW-23	DW-24
7/6/2006	931.57	--	1014.56	--	922.76	1080.86	985.90	923.72	--	1022.07	972.76	993.81	1047.02	926.95	1172.98	954.52	925.49	1027.30	1058.60
8/9/2006	931.13	--	1014.65	--	--	1080.91	986.00	--	--	1022.10	972.83	993.87	1047.14	926.78	1173.01	954.23	925.10	1027.35	1058.56
9/8/2006	--	--	--	--	--	--	--	--	--	1022.12	--	993.87	1047.14	--	--	--	--	1027.28	1058.56
10/9/2006	930.23	--	1014.76	--	921.32	1080.81	985.87	923.30	--	1022.02	972.77	993.74	1047.20	926.23	1173.19	953.49	923.38	1027.31	1058.45
11/14/2006	929.69	--	1014.88	--	921.57	1080.97	986.04	923.05	--	1022.10	972.76	993.91	1047.22	925.90	1173.03	953.11	923.93	1027.30	1058.51
12/7/2006	929.26	--	1014.86	--	921.66	1080.93	985.88	922.99	--	1021.92	972.71	993.90	1047.21	925.54	1172.92	952.63	923.61	1027.30	1058.50
1/15/2007	928.80	--	1014.80	--	921.64	1080.91	985.82	922.49	--	1021.77	972.41	993.63	1046.93	925.14	1172.92	951.88	923.41	1027.10	1058.22
2/21/2007	928.83	--	1014.96	--	921.83	1081.12	986.09	922.66	--	1022.02	972.48	993.70	1047.13	925.32	1173.06	951.51	923.89	1027.33	1058.41
3/14/2007	929.16	--	1014.98	--	921.37	1081.13	986.14	922.68	--	1022.06	972.49	993.71	1047.16	925.47	1173.06	951.25	924.44	1027.35	1058.42
4/17/2007	928.61	--	1014.98	--	920.90	1081.02	986.12	922.22	--	1021.94	972.33	993.58	1047.08	925.18	1173.04	950.72	923.63	1027.24	1058.25
5/11/2007	928.32	--	1015.12	--	920.90	1081.14	986.33	922.19	--	1022.07	972.51	993.75	1047.26	925.05	1173.08	950.59	923.37	1027.37	1058.37
6/8/2007	927.97	--	1015.19	--	920.88	1081.24	986.48	922.13	--	1022.20	972.53	993.79	1047.33	924.84	1173.14	950.38	922.97	1027.48	1058.47
7/7/2007	927.56	--	1015.18	--	920.61	1081.34	986.49	922.00	--	1022.14	972.49	993.77	1047.35	924.57	1173.11	950.02	922.73	1027.52	1058.39
8/10/2007	927.17	--	1015.20	--	920.17	1081.22	986.49	921.78	--	1022.09	972.46	993.70	1047.27	924.34	1173.11	949.68	922.51	1027.58	1058.35
9/10/2007	926.84	--	1015.17	--	920.62	1081.40	986.47	921.66	--	1022.03	972.29	993.61	1047.20	924.07	1173.13	949.28	922.27	1027.55	1058.27
10/12/2007	926.50	--	1015.27	--	920.89	1081.58	986.63	921.72	--	1022.17	972.43	993.76	1047.37	923.91	1173.15	949.17	921.90	1027.75	1058.42
11/8/2007	926.20	--	1015.21	--	920.98	1081.42	986.53	921.47	--	1022.06	972.32	993.68	1047.24	923.63	1173.08	948.93	921.60	1026.66	1058.27
12/14/2007	925.73	--	1015.26	--	921.48	1081.32	986.37	921.48	--	1022.05	972.13	993.53	1047.32	923.22	1173.06	948.55	921.42	1026.98	1058.22
1/15/2008	927.12	--	1015.31	--	922.08	1081.63	986.75	921.58	--	1021.98	972.42	993.84	1047.39	924.05	1173.17	948.70	923.05	1027.96	1058.31
2/26/2008	928.60	--	1015.20	--	921.92	1081.54	986.66	921.28	--	1021.85	972.11	993.58	1047.23	924.65	1173.20	949.58	923.79	1027.90	1058.17
3/18/2008	928.69	--	1015.25	--	921.89	1081.70	986.65	921.19	--	1021.89	971.98	993.46	1047.13	924.69	1173.20	949.97	923.77	1027.90	1058.13
4/8/2008	928.44	--	1015.37	--	921.50	1081.82	986.91	921.32	--	1022.12	972.25	993.73	1047.46	924.77	1173.38	950.49	923.29	1028.15	1058.32
5/9/2008	927.76	--	1015.37	--	920.33	1081.48	986.96	921.10	--	1022.14	972.19	993.63	1047.40	924.32	1173.30	950.48	922.56	1026.66	1058.29
6/17/2008	926.98	--	1015.27	--	920.26	1081.68	986.94	920.86	--	1022.03	972.07	993.55	1047.29	923.78	1173.31	950.25	921.78	1028.18	1058.15
7/9/2008	926.62	--	1015.32	--	920.44	1081.93	987.17	920.80	--	1022.17	972.16	993.63	1047.43	923.57	1173.33	950.26	921.46	1028.40	1058.26
8/13/2008	925.94	--	1015.33	--	920.02	1081.87	987.14	920.71	--	1022.12	972.11	993.63	1047.44	923.19	1173.37	949.89	921.02	1028.40	1058.26
9/10/2008	925.58	--	1015.30	--	919.75	1081.91	987.15	920.56	--	1022.06	972.02	993.52	1047.37	922.91	1173.45	949.53	920.68	1028.28	1058.14

APPENDIX B
GROUNDWATER ELEVATIONS
Chiquita Canyon Landfill

All elevations are in feet, relative to mean sea level.

Sample Date	DW-1	DW-2	DW-3	DW-6	DW-7	DW-8	DW-9	DW-12	DW-13	DW-14	DW-15	DW-16	DW-17	DW-18	DW-19	DW-20	DW-21	DW-23	DW-24
10/13/2008	925.20	--	1015.09	--	919.93	1081.56	986.76	920.25	--	1021.67	971.67	993.26	1047.06	922.55	1173.27	948.93	920.48	1028.08	1058.00
11/14/2008	924.98	--	1015.23	--	920.35	1081.81	987.08	920.45	--	1021.93	971.97	993.49	1047.32	922.47	1173.35	948.86	920.30	1028.32	1058.11
12/19/2008	924.70	--	1015.13	--	920.36	1081.64	987.10	920.19	--	1021.71	971.73	993.21	1047.07	922.15	1173.40	948.37	920.19	1028.09	1057.86
1/9/2009	924.88	--	1015.14	--	920.52	1081.75	987.12	920.19	--	1021.76	971.79	993.33	1047.18	922.20	1173.38	948.19	920.48	1028.12	1057.98
2/12/2009	924.79	--	1015.17	--	920.34	1081.58	987.19	920.16	--	1021.72	971.83	993.44	1047.26	922.15	1173.49	948.07	920.40	1027.98	1057.84
3/10/2009	926.15	--	1015.21	--	921.30	1081.86	987.34	920.16	--	1021.93	971.91	993.55	1047.42	922.73	1173.49	948.17	921.55	1028.03	1058.02
4/13/2009	926.07	--	1015.24	--	920.74	1081.85	987.45	920.25	--	1021.90	971.89	993.54	1047.39	922.81	1173.48	948.52	921.16	1027.98	1058.01
5/12/2009	925.62	--	1015.23	--	919.89	1081.98	987.63	920.05	--	1022.03	971.86	993.54	1047.43	922.57	1173.55	948.57	920.68	1027.91	1058.03
6/15/2009	925.03	--	1015.18	--	919.16	1081.97	987.55	919.85	--	1021.90	971.77	993.46	1047.38	922.15	1173.50	948.30	920.13	1027.75	1057.96
7/10/2009	924.70	--	1015.13	--	918.89	1081.95	987.47	919.71	--	1021.80	971.67	993.27	1047.37	922.00	1173.54	948.15	919.90	1027.68	1057.91
8/14/2009	924.43	--	1015.10	--	918.12	1081.93	987.56	919.53	--	1021.83	971.69	993.38	1047.31	921.77	1173.50	947.89	919.58	1027.51	1057.88
9/16/2009	924.24	--	1015.19	--	918.06	1081.89	987.76	919.54	--	1021.89	971.79	993.50	1047.37	921.71	1173.55	947.82	919.53	1027.43	1057.94
10/19/2009	925.06	--	1015.07	--	918.66	1081.96	987.69	919.33	--	1021.78	971.60	993.35	1047.24	921.70	1173.60	947.52	922.13	1027.27	1057.88
11/13/2009	926.52	--	1015.08	--	919.17	1082.09	987.90	919.34	--	1021.94	971.73	993.46	1047.38	922.87	1173.60	947.56	922.07	1027.29	1057.97
12/15/2009	927.29	--	1014.84	--	919.34	1081.79	987.52	919.13	--	1021.54	971.43	993.19	1047.04	922.96	1173.58	947.12	923.40	1026.89	1057.60
1/9/2010	928.93	--	1014.98	--	--	1081.90	987.70	--	--	1021.65	971.55	993.33	1047.16	924.47	1173.51	947.20	924.97	1027.07	1057.80
1/11/2010	--	--	--	--	919.65	--	--	919.06	--	--	--	--	--	--	--	--	--	--	--
2/17/2010	929.62	--	1014.96	--	920.97	1081.96	987.89	919.30	--	1021.72	971.63	993.41	1047.23	925.15	1173.62	947.89	924.69	1026.97	1057.81
3/16/2010	929.49	--	1014.80	--	921.15	1081.78	987.63	919.19	--	1021.46	971.35	993.15	1046.96	925.00	1173.51	948.33	924.35	1026.72	1057.59
4/13/2010	929.42	--	1014.88	--	921.55	1082.04	987.98	919.33	--	1021.76	971.51	993.32	1047.22	925.17	1173.68	948.86	924.32	1026.76	1057.76
5/13/2010	929.33	--	1014.96	--	920.88	1082.11	987.93	919.44	--	1021.75	971.62	993.42	1047.35	925.27	1173.64	949.12	924.16	1026.85	1057.86
6/9/2010	928.69	--	1014.81	--	919.18	1082.03	988.01	919.14	--	1021.65	971.42	993.26	1047.20	924.84	1173.66	948.96	923.45	1026.65	1057.68
7/6/2010	928.68	--	1014.87	--	919.36	1082.17	987.96	919.09	--	1021.60	971.59	993.44	1047.37	924.87	1173.70	948.96	923.49	1026.68	1057.63
8/12/2010	927.70	--	1014.82	--	917.84	1082.21	988.37	918.91	--	1021.81	971.54	993.44	1047.42	924.27	1173.72	948.76	922.41	1026.94	1057.85
9/16/2010	926.89	--	1014.75	--	917.46	1082.27	988.36	918.80	--	1021.76	971.52	993.44	1047.41	923.66	1173.69	948.46	921.57	1026.84	1057.76
10/15/2010	926.19	--	1014.60	--	917.58	1082.18	988.01	919.51	--	1021.52	971.29	993.20	1047.16	923.14	1173.55	948.04	921.06	1026.69	1057.52
11/12/2010	926.48	--	1014.44	--	918.25	1081.97	987.83	918.39	--	1021.22	971.09	992.99	1046.98	923.07	1173.58	947.67	922.12	1026.48	1057.28

APPENDIX B
GROUNDWATER ELEVATIONS
Chiquita Canyon Landfill

All elevations are in feet, relative to mean sea level.

Sample Date	DW-1	DW-2	DW-3	DW-6	DW-7	DW-8	DW-9	DW-12	DW-13	DW-14	DW-15	DW-16	DW-17	DW-18	DW-19	DW-20	DW-21	DW-23	DW-24
12/8/2010	926.46	--	1014.56	--	918.20	1082.09	988.06	918.49	--	1021.43	971.37	992.26	1047.25	923.27	1173.64	948.60	921.85	1026.71	1057.49
1/11/2011	928.67	--	1014.44	--	919.75	1082.09	988.06	918.44	--	1021.34	971.15	993.05	1047.10	924.17	1173.73	947.29	924.11	1026.59	1057.53
2/15/2011	928.84	--	1014.55	--	919.37	1082.31	988.36	918.53	--	1021.59	971.39	993.31	1047.35	924.70	1173.70	947.84	923.82	1026.67	1057.63
3/15/2011	930.00	--	1014.53	--	920.56	1082.32	988.47	918.57	--	1021.62	971.39	993.31	1047.41	925.32	1173.78	948.02	925.47	1026.67	1057.67
4/15/2011	932.42	--	1014.46	--	922.13	1082.24	988.55	918.85	--	1021.51	971.44	993.36	1047.47	926.77	1173.86	950.09	927.12	1026.62	1057.58
5/12/2011	931.85	--	1014.40	--	921.06	1082.32	988.54	919.23	--	1021.58	971.25	993.14	1047.35	926.67	1173.93	950.96	926.11	1026.55	1057.63
6/16/2011	931.09	--	1014.29	--	919.93	1082.48	988.77	918.69	--	1021.75	971.38	993.30	1047.57	926.40	1174.01	951.17	925.13	1026.63	1057.76
7/11/2011	930.43	--	1014.26	--	919.36	1082.40	988.71	918.53	--	1021.40	971.39	993.20	1047.50	925.97	1174.01	950.99	924.45	1026.47	1057.62
8/17/2011	929.50	--	1014.28	--	918.08	1082.43	988.70	918.34	--	1021.53	971.28	993.22	1047.66	925.41	1174.03	950.72	921.59	1026.47	1057.64
9/16/2011	928.68	--	1014.31	--	917.15	1082.27	988.52	918.12	--	1021.82	971.22	993.13	1047.64	924.87	1173.95	950.41	922.86	1026.55	1057.53
10/17/2011	928.77	--	1014.32	--	917.86	1082.23	988.49	918.09	--	1021.34	971.46	993.10	1047.68	924.72	1173.93	950.07	923.18	1026.48	1057.46

Most Recent Elevation Calculation:

10/17/2011

TOCE	984.31	1104.17	958.97	1265.13	1224.34	1027.57	1237.49	1106.91	1176.08	1197.59	989.38	1253.82	1010.63	990.16	1372.5	1289.92
DTW	55.54	89.85	41.11	182.9	235.85	109.48	216.15	135.45	182.98	149.91	64.66	79.89	60.56	66.98	346.02	232.46
GWE	928.77	1014.32	917.86	1082.23	988.49	918.09	1021.34	971.46	993.10	1047.68	924.72	1173.93	950.07	923.18	1026.48	1057.46

Notes:

-- = Not Measured
TOCE = Top of Casing Elevation
DTW = Depth to Water
GWE = Groundwater Elevation

APPENDIX B
GROUNDWATER ELEVATIONS
Chiquita Canyon Landfill

All elevations are in feet, relative to mean sea level.

Sample Date	DW-25	DW-26	DW-27	DW-28	PZ-1	PZ-2	PZ-3	PZ-4	PZ-5	PZ-6	PZ-7	PZ-8	GP-15	GP-16	GP-17	GP-21	GP-22	GP-24	GP-25	GP-26
1/28/1986	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/2/1986	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/16/1986	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/10/1986	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/17/1986	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/24/1987	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/16/1987	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/17/1987	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/4/1987	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/18/1988	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/17/1988	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/15/1988	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/4/1988	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/5/1988	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/6/1988	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/7/1988	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/14/1989	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/8/1989	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/9/1989	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/1/1989	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/2/1989	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/3/1989	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/4/1989	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/28/1989	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/3/1989	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/4/1989	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/6/1989	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

APPENDIX B
GROUNDWATER ELEVATIONS
Chiquita Canyon Landfill

All elevations are in feet, relative to mean sea level.

Sample Date	DW-25	DW-26	DW-27	DW-28	PZ-1	PZ-2	PZ-3	PZ-4	PZ-5	PZ-6	PZ-7	PZ-8	GP-15	GP-16	GP-17	GP-21	GP-22	GP-24	GP-25	GP-26
1/29/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/30/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/31/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/27/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/14/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/11/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/12/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/13/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/16/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/19/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/11/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/17/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/17/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/16/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/17/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/18/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/15/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/21/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/22/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/23/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/6/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/19/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/8/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/23/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/18/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/20/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/22/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

APPENDIX B
GROUNDWATER ELEVATIONS
Chiquita Canyon Landfill

All elevations are in feet, relative to mean sea level.

Sample Date	DW-25	DW-26	DW-27	DW-28	PZ-1	PZ-2	PZ-3	PZ-4	PZ-5	PZ-6	PZ-7	PZ-8	GP-15	GP-16	GP-17	GP-21	GP-22	GP-24	GP-25	GP-26
8/1/1991	--	--	--	--	922.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/2/1991	--	--	--	--	--	916.37	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/17/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/21/1991	--	--	--	--	920.50	916.32	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/22/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/28/1992	--	--	--	--	921.42	916.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/3/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/16/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/20/1992	--	--	--	--	928.13	917.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/16/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/20/1992	--	--	--	--	924.73	917.95	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/14/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/23/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/19/1992	--	--	--	--	922.62	917.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/16/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/16/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/19/1993	--	--	--	--	934.28	917.90	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/16/1993	--	--	--	--	932.08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/24/1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/19/1993	--	--	--	--	930.20	921.03	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/18/1993	--	--	--	--	930.53	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/15/1993	--	--	--	--	928.58	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/19/1993	--	--	--	--	927.04	921.72	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/17/1993	--	--	--	--	928.63	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/16/1993	--	--	--	--	928.58	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/18/1993	--	--	--	--	925.47	921.61	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/16/1993	--	--	--	--	928.80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

APPENDIX B
GROUNDWATER ELEVATIONS
Chiquita Canyon Landfill

All elevations are in feet, relative to mean sea level.

Sample Date	DW-25	DW-26	DW-27	DW-28	PZ-1	PZ-2	PZ-3	PZ-4	PZ-5	PZ-6	PZ-7	PZ-8	GP-15	GP-16	GP-17	GP-21	GP-22	GP-24	GP-25	GP-26
12/16/1993	--	--	--	--	928.58	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/31/1994	--	--	--	--	920.88	920.87	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/16/1994	--	--	--	--	928.53	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/16/1994	--	--	--	--	924.03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/18/1994	--	--	--	--	925.36	920.59	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/19/1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/18/1994	--	--	--	--	924.03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/18/1994	--	--	--	--	924.06	920.20	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/10/1994	--	--	--	--	922.86	919.95	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/7/1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/5/1995	--	--	--	--	921.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/3/1995	--	--	--	--	932.89	919.76	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/10/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/17/1995	--	--	--	--	929.70	920.83	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/12/1995	--	--	--	--	926.62	921.31	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/11/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/12/1995	--	--	--	--	924.91	921.10	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/9/1996	--	--	--	--	923.48	920.54	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/13/1996	--	--	--	--	922.87	920.34	1036.77	1000.31	--	--	--	--	--	--	--	--	--	--	--	--
2/14/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/8/1996	--	--	--	--	928.32	924.59	1036.72	1000.31	--	--	--	--	--	--	--	--	--	--	--	--
5/24/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/8/1996	--	--	--	--	925.02	922.14	1036.60	1000.21	--	--	--	--	--	--	--	--	--	--	--	--
10/9/1996	--	--	--	--	923.47	920.95	1036.31	1000.06	--	--	--	--	--	--	--	--	--	--	--	--
1/29/1997	--	--	--	--	933.98	925.71	1036.15	1000.07	--	--	--	--	--	--	--	--	--	--	--	--
4/8/1997	--	--	--	--	926.97	925.62	1036.05	999.96	--	--	--	--	--	--	--	--	--	--	--	--
4/11/1997	--	--	--	--	--	925.61	--	999.97	--	--	--	--	--	--	--	--	--	--	--	--

APPENDIX B
GROUNDWATER ELEVATIONS
Chiquita Canyon Landfill

All elevations are in feet, relative to mean sea level.

Sample Date	DW-25	DW-26	DW-27	DW-28	PZ-1	PZ-2	PZ-3	PZ-4	PZ-5	PZ-6	PZ-7	PZ-8	GP-15	GP-16	GP-17	GP-21	GP-22	GP-24	GP-25	GP-26
7/7/1997	--	--	--	--	925.05	922.77	1035.97	999.91	--	--	--	--	--	--	--	--	--	--	--	--
10/7/1997	--	--	--	--	923.60	921.64	1035.62	999.83	--	--	--	--	--	--	--	--	--	--	--	--
1/19/1998	--	--	--	--	929.08	927.13	1035.45	999.76	--	--	--	--	--	--	--	--	--	--	--	--
4/22/1998	--	--	--	--	932.00	932.04	1035.81	999.43	--	--	--	--	--	--	--	--	--	--	--	--
7/22/1998	--	--	--	--	929.45	928.83	1036.57	999.58	--	--	--	--	--	--	--	--	--	--	--	--
10/19/1998	--	--	--	--	928.10	926.65	1041.28	999.58	--	--	--	--	--	--	--	--	--	--	--	--
1/22/1999	--	--	--	--	927.10	925.36	1041.09	999.10	--	--	--	--	--	--	--	--	--	--	--	--
4/16/1999	--	--	--	--	927.20	925.84	1037.72	999.61	--	--	--	--	--	--	--	--	--	--	--	--
7/26/1999	--	--	--	--	926.40	924.69	1036.77	999.51	--	--	--	--	--	--	--	--	--	--	--	--
7/29/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/19/1999	--	--	--	--	926.95	925.74	1037.62	998.91	--	--	--	--	--	--	--	--	--	--	--	--
1/24/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/25/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/2/2000	--	--	--	--	--	--	1037.62	--	--	--	--	--	--	--	--	--	--	--	--	--
2/3/2000	--	--	--	--	926.73	--	--	999.31	--	--	--	--	--	--	--	--	--	--	--	--
5/1/2000	--	--	--	--	929.62	--	1037.82	999.60	--	--	--	--	--	--	--	--	--	--	--	--
7/21/2000	--	--	--	--	926.08	--	1037.61	999.45	--	--	--	--	--	--	--	--	--	--	--	--
10/19/2000	--	--	--	--	924.36	--	1037.44	999.44	--	--	--	--	--	--	--	--	--	--	--	--
1/22/2001	--	--	--	--	924.85	--	1037.27	999.44	--	--	--	--	--	--	--	--	--	--	--	--
4/16/2001	--	--	--	--	929.02	--	1037.12	999.64	--	--	--	--	--	--	--	--	--	--	--	--
7/13/2001	--	--	--	--	926.79	--	1036.90	999.58	--	--	--	--	--	--	--	--	--	--	--	--
10/5/2001	--	--	--	--	925.50	--	1036.65	996.63	--	--	--	--	--	--	--	--	--	--	--	--
1/18/2002	--	--	--	--	924.50	--	1036.49	999.82	--	--	--	--	--	--	--	--	--	--	--	--
4/5/2002	--	--	--	--	924.49	--	1036.30	999.87	--	--	--	--	--	--	--	--	--	--	--	--
7/8/2002	--	--	--	--	923.18	--	1039.72	1002.48	--	--	--	--	--	--	--	--	--	--	--	--
10/7/2002	--	--	--	--	--	--	1038.44	1002.54	--	--	--	--	--	--	--	--	--	--	--	--
1/13/2003	--	--	--	--	--	--	1038.25	1002.51	--	--	--	--	--	--	--	--	--	--	--	--

APPENDIX B
GROUNDWATER ELEVATIONS
Chiquita Canyon Landfill

All elevations are in feet, relative to mean sea level.

Sample Date	DW-25	DW-26	DW-27	DW-28	PZ-1	PZ-2	PZ-3	PZ-4	PZ-5	PZ-6	PZ-7	PZ-8	GP-15	GP-16	GP-17	GP-21	GP-22	GP-24	GP-25	GP-26
4/7/2003	--	--	--	--	--	--	1037.88	1002.38	--	--	--	--	--	--	--	--	--	--	--	--
7/15/2003	--	--	--	--	--	--	1037.73	1002.47	--	--	--	--	--	--	--	--	--	--	--	--
7/23/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/11/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/13/2003	--	--	--	--	--	--	1037.52	1002.50	--	--	--	--	--	--	--	--	--	--	--	--
1/12/2004	--	--	--	--	--	--	1037.34	1002.44	--	--	--	--	--	--	--	--	--	--	--	--
1/15/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/19/2004	--	--	--	--	--	--	1037.13	1002.47	--	--	--	--	--	--	--	--	--	--	--	--
7/9/2004	--	--	--	--	--	--	1037.04	1002.57	--	--	--	--	--	--	--	--	--	--	--	--
10/6/2004	--	--	--	--	--	--	1036.86	1002.57	--	--	--	--	--	--	--	--	--	--	--	--
11/10/2004	--	--	--	--	--	--	1036.75	1002.59	--	--	--	--	--	--	--	--	--	--	--	--
12/3/2004	--	--	--	--	--	--	--	--	1137.00	1099.60	--	--	--	--	--	--	--	--	--	--
12/7/2004	1172.70	--	--	--	--	--	--	--	1135.67	1094.85	--	--	--	--	--	--	--	--	--	--
12/9/2004	1167.47	--	--	--	--	--	1036.62	1002.52	1134.30	1096.65	--	--	--	--	--	--	--	--	--	--
12/15/2004	--	1078.71	--	--	--	--	--	--	--	--	1072.29	--	--	--	--	--	--	--	--	--
12/16/2004	1166.84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/23/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/30/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/6/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/14/2005	1167.32	1079.68	--	--	--	--	1036.72	1002.71	1139.01	1097.90	1071.87	--	--	--	--	--	--	--	--	--
1/21/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/28/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/4/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/10/2005	1167.19	1079.93	--	--	--	--	1037.04	1002.74	1138.72	1098.02	1075.22	--	--	--	--	--	--	--	--	--
2/18/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/25/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/4/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

APPENDIX B
GROUNDWATER ELEVATIONS
Chiquita Canyon Landfill

All elevations are in feet, relative to mean sea level.

Sample Date	DW-25	DW-26	DW-27	DW-28	PZ-1	PZ-2	PZ-3	PZ-4	PZ-5	PZ-6	PZ-7	PZ-8	GP-15	GP-16	GP-17	GP-21	GP-22	GP-24	GP-25	GP-26
3/11/2005	1167.36	1080.26	--	--	--	--	1037.43	1002.69	1138.92	1098.40	1076.84	--	--	--	--	--	--	--	--	--
3/18/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/25/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/1/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/8/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/15/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/20/2005	1166.30	1080.66	--	--	--	--	1041.98	1002.67	1138.77	1100.01	1077.57	--	--	--	--	--	--	--	--	--
4/28/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/6/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/17/2005	1165.97	1080.92	--	--	--	--	1038.37	1002.74	1138.48	1102.14	1078.13	--	--	--	--	--	--	--	--	--
5/20/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/27/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/3/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/10/2005	1166.53	1081.30	--	--	--	--	1038.68	1002.82	1138.76	1104.04	1078.59	--	--	--	--	--	--	--	--	--
7/8/2005	--	1081.43	--	--	--	--	1039.01	1002.82	1138.67	1105.99	1079.07	--	--	--	--	--	--	--	--	--
7/15/2005	1165.95	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/9/2005	1165.90	1081.67	--	--	--	--	1039.37	1002.87	1138.62	1107.84	1079.57	--	--	--	--	--	--	--	--	--
9/9/2005	1166.03	1081.91	--	--	--	--	1039.70	1002.91	1138.62	1109.00	1079.99	--	--	--	--	--	--	--	--	--
10/14/2005	1166.00	1082.18	--	--	--	--	1040.10	1003.06	1138.62	1109.72	1080.39	--	--	--	--	--	--	--	--	--
11/21/2005	1166.25	1082.35	--	--	--	--	1040.37	1003.04	1138.52	1110.20	1080.66	--	--	--	--	--	--	--	--	--
12/9/2005	1166.31	1082.45	--	--	--	--	1040.54	1003.09	1138.57	1110.27	1080.80	--	--	--	--	--	--	--	--	--
1/13/2006	1166.64	1082.86	--	--	--	--	1040.86	1003.23	1138.71	1110.50	1081.17	--	--	--	--	--	--	--	--	--
2/10/2006	1166.51	1082.87	--	--	--	--	1040.93	1003.09	1138.67	1110.41	1081.32	--	--	--	--	--	--	--	--	--
3/9/2006	1167.21	1083.35	--	--	--	--	1041.26	1003.36	1138.69	1110.81	1081.65	--	--	--	--	--	--	--	--	--
4/24/2006	--	1083.39	--	--	--	--	1041.44	1003.32	1138.90	1110.40	1082.02	--	--	--	--	--	--	--	--	--
5/10/2006	1165.96	1083.53	--	--	--	--	1041.52	1003.34	1138.79	1110.27	1082.04	--	--	--	--	--	--	--	--	--
6/13/2006	1166.44	1083.58	--	--	--	--	1041.63	1003.36	1138.80	1109.93	1082.14	--	--	--	--	--	--	--	--	--

APPENDIX B
GROUNDWATER ELEVATIONS
Chiquita Canyon Landfill

All elevations are in feet, relative to mean sea level.

Sample Date	DW-25	DW-26	DW-27	DW-28	PZ-1	PZ-2	PZ-3	PZ-4	PZ-5	PZ-6	PZ-7	PZ-8	GP-15	GP-16	GP-17	GP-21	GP-22	GP-24	GP-25	GP-26
7/6/2006	1166.55	1083.73	--	--	--	--	1041.76	1003.48	1138.74	1109.74	1082.13	--	--	--	--	--	--	--	--	--
8/9/2006	1166.90	1083.78	--	--	--	--	1041.84	1003.51	1138.70	1109.45	1082.26	--	--	--	--	--	--	--	--	--
9/8/2006	--	--	--	--	--	--	--	1003.48	1138.81	1109.19	1082.38	--	--	--	--	--	--	--	--	--
10/9/2006	1166.79	1083.91	--	--	--	--	1041.95	1003.52	1138.73	1108.84	1082.55	--	--	--	--	--	--	--	--	--
11/14/2006	1166.58	1084.03	--	--	--	--	1041.98	1003.65	1138.77	1108.49	1082.68	--	--	--	--	--	--	--	--	--
12/7/2006	1166.34	1084.05	--	--	--	--	1041.97	1003.66	1138.72	1108.27	1082.72	--	--	--	--	--	--	--	--	--
1/15/2007	1165.79	1084.01	--	--	--	--	1041.88	1003.64	1138.73	1107.89	1082.87	--	--	--	--	--	--	--	--	--
2/21/2007	1166.36	1084.35	--	--	--	--	1041.60	1003.79	1138.88	1107.83	1083.07	--	--	--	--	--	--	--	--	--
3/14/2007	1166.32	1084.44	--	--	--	--	1041.99	1003.78	1138.86	1107.69	1083.13	--	--	--	--	--	--	--	--	--
4/17/2007	1165.85	1084.38	--	--	--	--	1041.91	1003.78	1138.93	1107.38	1083.25	--	--	--	--	--	--	--	--	--
5/11/2007	1165.96	1084.56	--	--	--	--	1041.96	1003.91	1138.95	1107.25	1083.34	--	--	--	--	--	--	--	--	--
6/8/2007	1166.29	1084.86	--	--	--	--	1041.99	1003.96	1139.01	1107.14	1083.41	--	--	--	--	--	--	--	--	--
7/7/2007	1166.08	1084.71	--	--	--	--	1041.91	1003.98	1139.02	1106.88	1083.44	--	--	--	--	--	--	--	--	--
8/10/2007	1165.89	1084.72	--	--	--	--	1041.85	1004.00	1138.99	1106.55	1083.46	--	--	--	--	--	--	--	--	--
9/10/2007	1165.70	1084.72	--	--	--	--	1041.76	1004.01	1139.05	1106.29	1083.62	--	--	--	--	--	--	--	--	--
10/12/2007	1165.55	1084.91	--	--	--	--	1041.76	1004.11	1139.03	1106.13	1083.66	--	--	--	--	--	--	--	--	--
11/8/2007	1165.59	1084.84	--	--	--	--	1041.65	1004.08	1138.95	1105.77	1083.69	--	--	--	--	--	--	--	--	--
12/14/2007	1165.38	1085.01	--	--	--	--	1041.52	1004.15	1139.06	1105.64	1083.82	--	--	--	--	--	--	--	--	--
1/15/2008	1161.46	1085.10	--	--	--	--	1040.62	1004.29	1139.19	1105.49	1083.99	--	--	--	--	--	--	--	--	--
2/26/2008	1165.12	1085.15	--	--	--	--	1041.48	1004.21	1139.27	1105.30	1084.19	--	--	--	--	--	--	--	--	--
3/18/2008	1165.29	1085.18	--	--	--	--	1041.47	1004.23	1139.17	1105.10	1084.10	--	--	--	--	--	--	--	--	--
4/8/2008	1165.85	1085.41	--	--	--	--	1041.53	1004.35	1139.16	1105.03	1084.02	--	--	--	--	--	--	--	--	--
5/9/2008	1165.59	1085.41	--	--	--	--	1041.43	1004.35	1139.16	1104.73	1084.00	--	--	--	--	--	--	--	--	--
6/17/2008	1165.10	1085.38	--	--	--	--	1041.33	1004.36	1139.21	1104.42	1084.04	--	--	--	--	--	--	--	--	--
7/9/2008	1165.08	1085.50	--	--	--	--	1041.32	1004.37	1139.25	1104.35	1084.03	--	--	--	--	--	--	--	--	--
8/13/2008	1165.44	1085.53	--	--	--	--	1041.28	1004.47	1139.22	1104.09	1084.10	--	--	--	--	--	--	--	--	--
9/10/2008	1165.11	1085.49	--	--	--	--	1041.17	1004.48	1139.26	1103.87	1084.18	--	--	--	--	--	--	--	--	--

APPENDIX B
GROUNDWATER ELEVATIONS
Chiquita Canyon Landfill

All elevations are in feet, relative to mean sea level.

Sample Date	DW-25	DW-26	DW-27	DW-28	PZ-1	PZ-2	PZ-3	PZ-4	PZ-5	PZ-6	PZ-7	PZ-8	GP-15	GP-16	GP-17	GP-21	GP-22	GP-24	GP-25	GP-26
10/13/2008	1164.08	1085.21	--	--	--	--	1040.97	1004.41	1139.17	1103.41	1084.11	--	--	--	--	--	--	--	--	--
11/14/2008	1164.68	1085.48	--	--	--	--	1041.02	1004.60	1139.17	1103.32	1084.02	--	--	--	--	--	--	--	--	--
12/19/2008	1164.55	1085.33	--	--	--	--	1040.86	1004.57	1139.26	1103.09	1084.15	--	--	--	--	--	--	--	--	--
1/9/2009	1164.47	1085.45	--	--	--	--	1040.87	1004.60	1139.24	1103.02	1083.91	--	--	--	--	--	--	--	--	--
2/12/2009	1164.39	1085.50	--	--	--	--	1040.81	1004.69	1139.36	1102.90	1084.10	--	--	--	--	--	--	--	--	--
3/10/2009	1164.70	1085.65	--	--	--	--	1040.78	1004.75	1139.36	1102.85	1084.17	--	--	--	--	--	--	--	--	--
4/13/2009	1164.31	1085.66	--	--	--	--	1040.75	1004.85	1139.37	1102.65	1084.14	--	--	--	--	--	--	--	--	--
5/12/2009	1164.53	1085.70	--	--	--	--	1040.66	1004.85	1139.36	1102.48	1083.92	--	--	--	--	--	--	--	--	--
6/15/2009	1164.26	1085.59	--	--	--	--	1040.54	1004.86	1139.37	1102.20	1083.89	--	--	--	--	--	--	--	--	--
7/10/2009	1164.24	1085.60	--	--	--	--	1040.47	1004.88	1139.44	1102.06	1083.87	--	--	--	--	--	--	--	--	--
8/14/2009	1164.29	1085.56	--	--	--	--	1040.38	1004.90	1139.35	1101.81	1083.73	--	--	--	--	--	--	--	--	--
9/16/2009	1164.01	1085.62	--	--	--	--	1040.36	1005.04	1139.41	1101.69	1083.77	--	1105.97	1002.74	999.90	989.97	1037.56	1058.92	1136.23	--
10/19/2009	1164.12	1085.59	--	--	--	--	1040.22	1005.04	1139.51	1101.54	1083.68	--	1105.80	1002.90	999.91	989.78	1036.39	1058.69	1136.45	--
11/13/2009	1164.45	1085.67	--	--	--	--	1040.19	1005.06	1139.41	1101.45	1083.53	--	1105.82	1003.00	999.96	989.78	1036.30	1058.68	1136.64	--
12/15/2009	1163.79	1085.40	--	--	--	--	1039.96	1005.05	1139.53	1101.14	1083.62	--	1105.37	1002.88	999.88	989.27	1036.50	1058.26	1136.42	--
1/9/2010	1163.77	1085.57	--	--	--	--	1040.02	1005.20	1139.42	1101.11	1083.49	--	1105.32	1002.94	999.91	989.35	1036.50	1058.26	1136.55	--
1/11/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/17/2010	1163.67	1085.71	--	--	--	--	1039.92	1005.27	1139.66	1101.13	1083.60	--	1105.29	1002.97	999.95	989.21	1036.77	1058.15	1136.74	--
3/16/2010	1163.57	1085.54	--	--	--	--	1039.75	1005.24	1139.54	1100.88	1083.51	--	1105.14	1002.93	999.91	988.97	1036.87	1057.99	1136.59	--
4/13/2010	1163.70	1085.69	--	--	--	--	1039.77	1005.31	1139.55	1100.86	1084.02	--	1105.85	1002.99	999.97	989.05	1037.00	1058.10	1136.91	--
5/13/2010	1163.54	1085.76	--	--	--	--	1039.76	1005.45	1139.52	1100.72	1083.95	--	1107.47	1003.04	1000.02	988.97	1037.10	1058.04	1137.00	--
6/9/2010	1163.64	1085.56	--	--	--	--	1039.60	1005.41	1139.54	1100.46	1083.83	--	1108.58	1003.00	999.96	988.77	1037.24	1057.87	1136.96	--
7/6/2010	1163.74	1085.63	--	--	--	--	1039.59	1005.55	1139.61	1100.38	1083.88	--	1109.07	1002.90	999.94	988.61	1037.28	1057.81	1137.09	--
8/12/2010	1163.53	1085.53	1085.77	1111.29	--	--	1039.49	1005.58	1139.60	1100.17	1083.76	1219.82	1109.37	1003.23	1000.16	988.71	1037.70	1057.68	1135.09	1163.06
9/16/2010	1163.64	1085.43	1131.77	1111.50	--	--	1039.38	1005.63	1139.55	1099.92	1083.59	1219.82	1109.23	1003.24	1000.16	988.57	1037.78	1057.52	1137.09	1162.97
10/15/2010	1163.38	1085.26	1143.66	1111.57	--	--	1039.21	1005.53	1139.47	1099.68	1083.36	1219.68	1108.80	1002.97	999.95	988.28	1037.59	1057.31	1136.97	1162.85
11/12/2010	1162.73	1085.05	1150.03	1111.52	--	--	1039.05	1005.45	1139.40	1100.33	1083.33	1219.55	1108.43	1002.95	999.89	988.07	1037.85	1057.05	1136.84	1162.64

APPENDIX B
GROUNDWATER ELEVATIONS
Chiquita Canyon Landfill

All elevations are in feet, relative to mean sea level.

Sample Date	DW-25	DW-26	DW-27	DW-28	PZ-1	PZ-2	PZ-3	PZ-4	PZ-5	PZ-6	PZ-7	PZ-8	GP-15	GP-16	GP-17	GP-21	GP-22	GP-24	GP-25	GP-26
12/8/2010	1163.77	1085.24	1153.80	1111.74	--	--	1039.06	1005.61	1139.47	1099.40	1083.20	1219.72	1108.35	1003.03	999.95	988.10	1037.63	1057.08	1136.95	1162.83
1/11/2011	1163.64	1085.34	1157.66	1111.74	--	--	1038.99	1005.57	1139.73	1099.48	1083.43	1219.62	1108.11	1002.98	999.91	988.01	1037.84	1056.88	1137.00	1162.85
2/15/2011	1163.57	1085.42	1159.94	1111.93	--	--	1038.99	1005.78	1139.62	1099.37	1083.18	1219.72	1108.04	1003.24	1000.11	988.08	1037.82	1056.85	1137.14	1162.93
3/15/2011	1163.72	1085.52	1161.39	1112.04	--	--	1038.92	1005.83	1139.70	1099.34	1083.13	1219.79	1107.91	1003.25	1000.14	988.05	1038.20	1056.73	1137.22	1163.03
4/15/2011	1163.41	1085.59	1162.80	1112.04	--	--	1038.89	1005.87	1139.80	1099.29	1083.13	1219.82	1107.71	1003.25	1000.14	987.95	1038.35	1056.63	1137.20	1163.09
5/12/2011	1163.52	1085.63	1163.42	1112.17	--	--	1038.80	1005.83	1139.74	1099.16	1082.93	1219.84	1108.51	1003.27	1000.10	987.93	1038.47	1056.61	1137.33	1163.17
6/16/2011	1163.96	1085.79	1164.04	1112.19	--	--	1038.76	1005.93	1139.80	1099.09	1082.72	1220.11	1107.47	1003.29	1000.14	987.91	1038.60	1056.63	1137.47	1163.23
7/11/2011	1163.26	1085.66	1164.53	1112.26	--	--	1038.66	1005.76	1139.81	1098.89	1082.68	1220.10	1107.27	1003.25	1000.14	987.81	1038.75	1056.48	1137.44	1163.20
8/17/2011	1163.16	1085.64	1165.34	1112.25	--	--	1038.61	1005.91	1139.82	1098.70	1082.49	1220.25	1107.21	1003.27	1000.15	987.77	1038.82	1056.36	1137.41	1162.92
9/16/2011	1163.21	1085.58	1165.80	1112.26	--	--	1038.53	1005.85	1139.73	1098.53	1082.23	1220.33	1107.39	1003.17	1000.07	987.53	1038.91	1056.34	1137.44	1163.07
10/17/2011	1162.78	1085.82	1165.81	1112.34	--	--	1038.45	1005.91	1139.74	1098.40	1082.19	1220.34	1107.24	1003.03	999.97	987.47	1038.97	1056.17	1136.86	1163.00

Most Recent Elevation Calculation:

10/17/2011

	DW-25	DW-26	DW-27	DW-28	PZ-1	PZ-2	PZ-3	PZ-4	PZ-5	PZ-6	PZ-7	PZ-8	GP-15	GP-16	GP-17	GP-21	GP-22	GP-24	GP-25	GP-26
TOCE	1265.5	1177.31	1459.48	1447.15			1106.23	1107.29	1214.58	1182.6	1195.64	1283.86	1218.51	1257.11	1216.32	1220.39	1326.41	1120.83	1213.36	1378.51
DTW	102.72	91.49	293.67	334.81			67.78	101.38	74.84	84.2	113.45	63.52	111.27	254.08	216.35	232.92	287.44	64.66	76.5	215.51
GWE	1162.78	1085.82	1165.81	1112.34			1038.45	1005.91	1139.74	1098.40	1082.19	1220.34	1107.24	1003.03	999.97	987.47	1038.97	1056.17	1136.86	1163.00

Notes:

-- = Not Measured
TOCE = Top of Casing Elevation
DTW = Depth to Water
GWE = Groundwater Elevation

APPENDIX B

GROUNDWATER ELEVATIONS - VADOSE
Chiquita Canyon Landfill

Well Number	Date Measured	Reference Point Elevation (feet)(1)	Depth to Water (feet)(2)	Groundwater Elevation (feet)
Vadose Monitoring Wells				
RD-1	9/28/1989		DRY	NA
	to 7/8/02		**----- Well Abandoned 10/02 -----**	
SW-1	1/24/1986	976.20	DRY	NA
	to 9/10/86			
	12/17/1986	980.90	DRY	NA
	to 9/15/88			
	10/4/1988	976.20	DRY	NA
	to 4/23/91			
	8/1/1991		51.56 (4)	NA
	10/21/1991		51.60 (4)	NA
	1/28/1992		51.53 (4)	NA
	4/20/1992		51.55 (4)	NA
	7/20/1992		51.36 (4)	NA
	10/19/1992		51.13 (4)	NA
	1/19/1993		51.23 (4)	NA
	4/19/1993		51.18 (4)	NA
	7/19/1993		51.20 (4)	NA
	10/18/1993		50.30 (4)	NA
	1/31/1994		DRY	NA
	to 2/3/95			
	4/17/1995		51.21 (4)	NA
	7/12/1995		51.21 (4)	NA
	10/12/1995		DRY	NA
	to 10/7/02	984.15		
	1/13/2003		Well inaccessible - buried.	
	4/7/2003		DRY	NA
SW-1	to 10/17/11			
GP-9	1/22/1999	1105.11	DRY	NA
	to 10/17/11			
LDS	1/22/1999		DRY	NA
	to 2/3/00			
	4/7/2003		DRY	NA
	to 7/15/03		Inaccessible due to cell construction; replaced with aboveground tank.	
VP-1	2/7/2000	1238.85	DRY	NA
	to 10/7/02		DRY	NA
	1/13/2003		Not measurable	
	4/7/2003		DRY	NA
	to 7/15/03			
	10/13/2003	1250.66	Inaccessible due to soil stockpiling.	
	1/12/2004		DRY	NA
	to 10/17/11			
Lysimeters				
DL-1	10/18/1990		NA	NA
	to 10/19/98		**----- Well Abandoned 10/02 -----**	
DL-2	10/18/1990		NA	NA

APPENDIX B

GROUNDWATER ELEVATIONS - VADOSE
Chiquita Canyon Landfill

Well Number	Date Measured	Reference Point Elevation (feet)(1)	Depth to Water (feet)(2)	Groundwater Elevation (feet)
	to 10/19/98		**----- Well Abandoned 10/02 -----**	
DL-3	1/29/1990		NA	NA
	to 10/19/98		**----- Well Abandoned 10/02 -----**	
LP-1	1/22/1991		NA	NA
	to 10/17/11			

Definitions:
NA = Not Applicable
Measurements prior to 10/4/88 performed by Harding Lawson Associates (HLA);
Measurements following 10/4/88 performed by EMCON.
Measurements following 1/13/03 performed by EnviroSolve and R. T. Frankian & Associates.

Footnotes:
(1) Mean Sea Level Datum, measured at top of PVC well casing.
(2) Depth to water measured from top of PVC well casing.
(3) Well inaccessible for measurement.
(4) Detected water is condensation in well, and not groundwater.

APPENDIX B
Maximum Groundwater Elevation Adjustments for Figure 4

Well ID	Maximum Groundwater Elevation (Adjusted)	Maximum Groundwater Elevation (Date Measured)	Amount of Adjustment	Basis for Adjustment
DW-2	994.52	986.87 (12/9/04)	7.65	DW-20: Max = 955.88 Measured 12/9/04 = 948.23 Difference = 7.65
DW-13	929.45	925.46 (7/22/98)	3.99	DW-1: Max = 935.40 Measured 7/22/98 = 931.41 Difference = 3.99
DW-22 RDA	1029.27	1025.57 (10/7/02)	3.70	DW-17: Max = 1047.46 Measured 1/13/03 = 1043.76 Difference = 3.70
B-5-11	925.18	918 (11/__/11)	7.18	DW-7: Max = 926.10 Measured 10/17/11 = 917.86 Difference = 8.24 DW-12: Max = 924.21 Measured 10/17/11 = 918.09 Difference = 6.12 Average difference = 7.18
E-7	1060.37	1054.5 (3/10/89)	5.87	DW-3: Max = 1015.37 Measured 3/14/89 = 1009.50 Difference = 5.87
E-9	938.20	929 (3/13/89)	10.2	DW-1: Max = 935.40 Measured 3/14/89 =918.70 Difference = 16.70 DW-7: Max = 926.10 Measured 3/14/89 =922.40 Difference = 3.70 Average difference = 10.2
G-10	1002.55	1000 (1/25/07)	2.55	DW-9: Max = 988.37 Measured 1/15/07 = 985.82 Difference = 2.55
GP-11	1108.31	1104.1 (7/27/2000)	4.21	DW-8: Max = 1082.27 Measured 7/21/2000 = 1078.06 Difference = 4.21
GP-12	1099.62	1097.8 (12/5/2005)	1.82	DW-8: Max = 1082.27 Measured 12/9/05 = 1080.45 Difference = 1.82
GP-21	n/a	989.97 (9/16/09)	n/a	DW-16: Max = 994.12 Measured 9/16/09 = 993.50 Difference = 0.62 <1' difference; no adjustment

Maximum Groundwater Elevation Adjustments for Figure 4

Well ID	Maximum Groundwater Elevation (Adjusted)	Maximum Groundwater Elevation (Date Measured)	Amount of Adjustment	Basis for Adjustment
GP-22	n/a	1037.78 (9/16/10)	n/a	DW-14: Max = 1022.69 Measured 9/16/10 = 1021.76 Difference = 0.93 <1' difference; no adjustment
GP-A	1116.65	1112.44 (7/29/2000)	4.21	DW-8: Max = 1082.27 Measured 7/21/2000 = 1078.06 Difference = 4.21
PZ-1	931.78	915.5 (5/16/91)	16.28	DW-1: Max = 935.40 Measured 5/18/91 = 919.12 Difference = 16.28

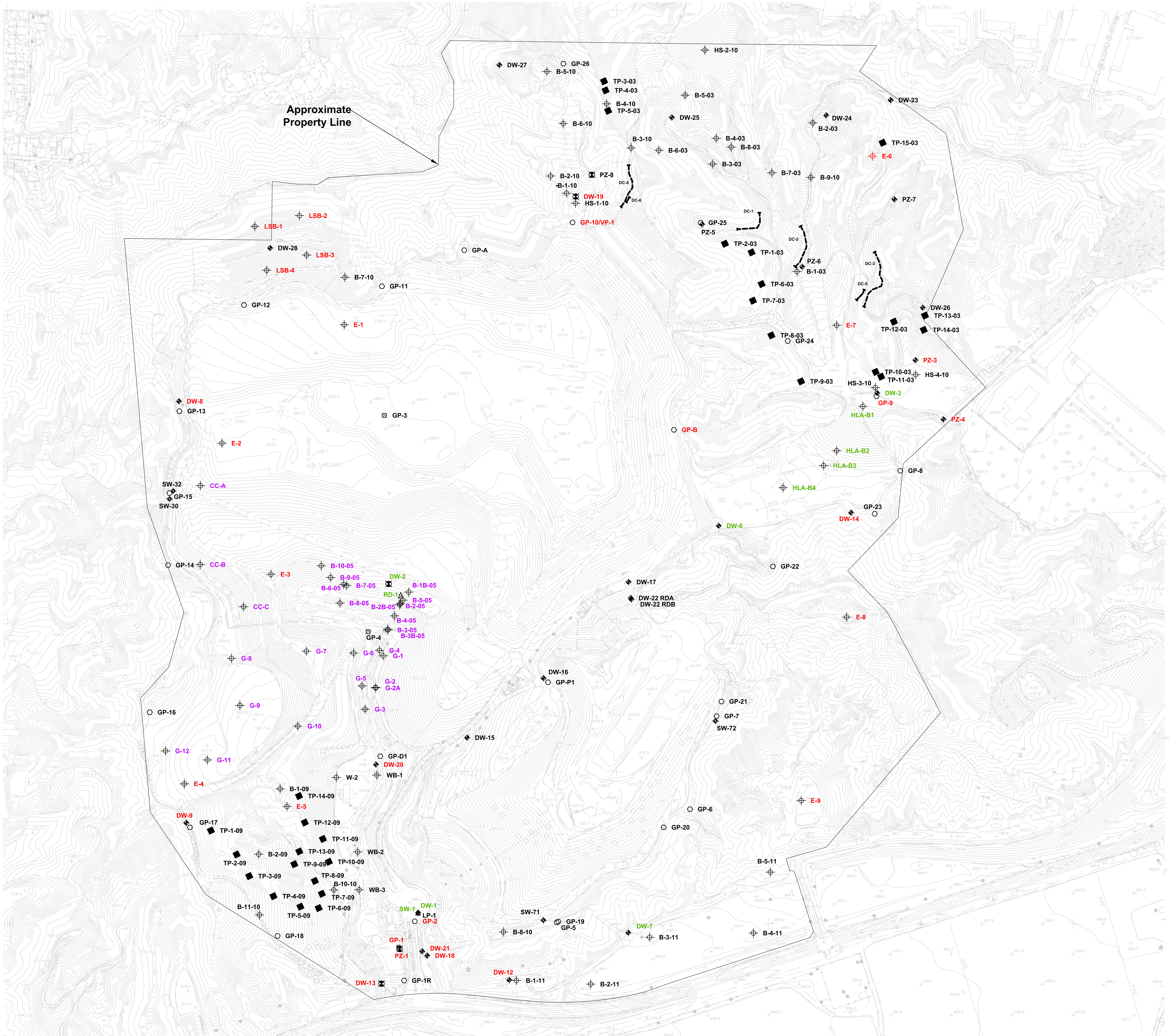
All elevations measured in feet relative to Mean Sea Level.
n/a = not applicable

Chiquita Canyon Landfill
January 20, 2012
2002-036-005

APPENDIX C

EXPLORATORY EXCAVATIONS MAP AND LOGS (CD ONLY)

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY



EXPLANATION

- Groundwater Monitoring Well or Piezometer
- Gas Probe
- Exploratory Boring
- Test Pit
- Trench
- LFG Extraction Wells

DW=26 Black Denotes R. T. Frankian & Associates Exploratory Excavations

PZ-3 Red Denotes EMCON Exploratory Excavations

G-7 Purple Denotes Geologic Associates Exploratory Excavations

DW-3 Green Denotes Harding Lawson Associates Exploratory Excavations

SCALE 1"= 200'

200' 0 200' 400' 600'

CONTOUR INTERVAL 5'

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FAX (714) 529-2537
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4-6-10 10012

Exploratory Excavations

PREPARED FOR
Chiquita Canyon Landfill

Project Location
Chiquita Canyon Landfill
Castaic, California

SCALE	DRAWN BY	CHECKED BY
AS SHOWN	JH	TMC
DATE 1-20-2012	Figure C-1	JOB NO. 2002-036-005(R)

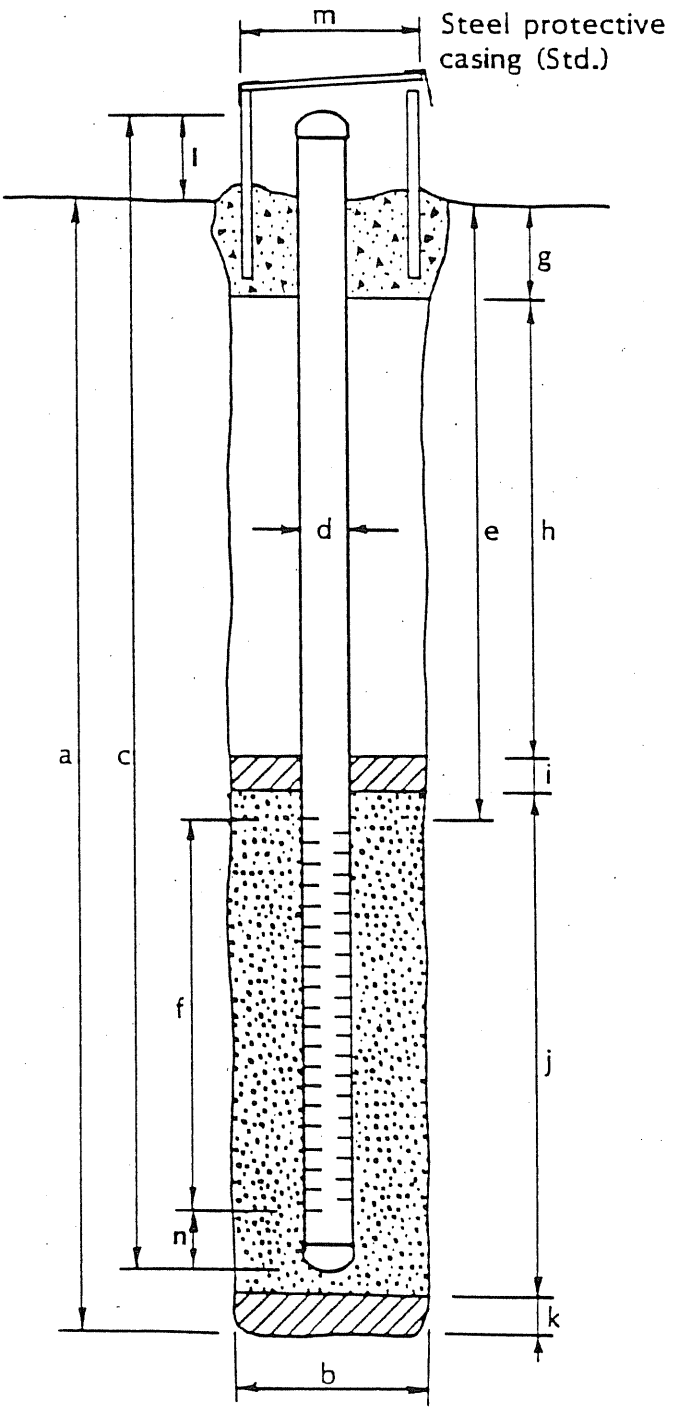
1329 SCOTT ROAD
BURBANK, CA, 91504
TEL: (818) 531-1501
FAX: (818) 531-1511
www.rtfrankian.com

RTFA
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

WELL DETAILS

PROJECT NUMBER 976-01.02
PROJECT NAME Chiquita Canyon Landfill
COUNTY Los Angeles
WELL PERMIT NO.

BORING / WELL NO. DW-8
TOP OF CASING ELEV. T.B.D.
GROUND SURFACE ELEV. ~1263 ft.
DATUM Mean Sea Level



EXPLORATORY BORING

a. Total depth 290 ft.
b. Diameter 10 in.
Drilling method Reverse Air Rotary

WELL CONSTRUCTION

c. Casing length 290 ft.
Material Schedule 80 PVC
d. Diameter 5 in.
e. Depth to top perforations 259 ft.
f. Perforated length 28.7 ft.
Perforated interval from 259 to 287.7 ft.
Perforation type Machine Slotted
Perforation size 0.02 inch
g. Surface seal 2.5 ft.
Seal material Cement/Bentonite
h. Backfill 246 ft.
Backfill material Cement/Bentonite
i. Seal 5 ft.
Seal material Bentonite
j. Gravel pack 35 ft.
Pack material #3 Monterey Sand
k. Bottom seal 1.5 ft.
Seal material Natural Materials
l. Casing height 1.5 ft.
m. Protective casing diameter 10 in.
N. Blank casting and end cap 0.8 ft.

LOG OF EXPLORATORY BORING

PROJECT NUMBER 76-23.04 BORING NO. DW-3

PROJECT NAME Chiquita Canyon Landfill PAGE 1 OF 3

BY E.A.M. DATE March 28, 1989 SURFACE ELEV. 1261.3' MSL

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						SLT.	SILTSTONE, yellowish gray (5Y 7/2); 5 to 10% fine sand.
				5			
				10			
							@ 12': grayish yellow green (5GY 7/2).
				15		MST.	MUDSTONE, grayish yellow green (5GY 7/2); trace fine sand; micaceous.
				20			@ 20 to 20.5': 15 to 20% fine sand.
				25			
							@ 29': dark greenish yellow (10Y 6/6).
				30			
				35		SLT.	SILTSTONE, greenish gray (5GY 6/1); 10 to 15% fine sand; micaceous.
						MST.	MUDSTONE, dusky yellow (5Y 6/4); trace to 5% fine sand; micaceous.
				40			

REMARKS

Drilled a 5 1/4"-diameter borehole with dual-tube reverse-air-rotary drilling equipment to 290 feet; borehole was subsequently reamed to 10" diameter. Borehole was converted to a ground-water monitoring well as shown on Well Details.

Bag samples were collected which were generally representative of each major lithologic unit.

EMCON ASSOCIATES

PLATE

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04
PROJECT NAME Chiquita Canyon Landfill
BY E.A.M. DATE March 28, 1989

BORING NO. DW-8
PAGE 2 OF 8
SURFACE ELEV. 1261.3' MSL

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				40			
					MST.		MUDSTONE (continued).
				45			
				50			@50': light olive gray (5Y 5/2).
							@52': dark greenish gray (5GY 4/1); 15 to 20% fine gravel; calcite veinlets;
				55			
				60			@60 to 64': black (N 1/0) mudstone interbeds.
				65			
					SLT.		SILTSTONE, dusky yellow (5Y 6/4); 5 to 10% fine sand; micaceous.
				70			
							@74': greenish black (5GY 2/1); bivalve fragments common.
				75			
				80			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 476-03.04
PROJECT NAME Chiquita Canyon Landfill
BY E.A.M. DATE March 28, 1989

BORING NO. OW-3
PAGE 3 OF 8
SURFACE ELEV. 1261.3' MSL

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				80		SLT.	SILTSTONE (continued). @ 81': medium gray (N 5/0). @ 83': light olive gray (5Y 5/2).
				85		MST.	MUDSTONE, grayish olive (10Y 4/2) to medium gray (N 5/0); trace to 5% fine sand; micaceous. @ 90': yellowish gray (5Y 7/2).
				90			
				95			@ 95': 10 to 15% fine to medium sand.
				100			
				105		SLT.	SILTSTONE, greenish gray (5GY 6/1); 10 to 15% fine sand; 5 to 10% fine gravel (up to 1/2" maximum diameter).
				110			@ 110': grayish yellow green (5GY 7/2).
				115		MST.	MUDSTONE, medium gray (N 5/0); trace fine sand; fresh calcite fragments; damp.
				120			

REMARKS

EMCON ASSOCIATES

PLATE

LOG OF EXPLORATORY BORING

PROJECT NUMBER 176-03.04 BORING NO. DW-B

PROJECT NAME Chiquita Canyon Landfill PAGE 4 OF 8

BY E.A.M. DATE March 23, 1984 SURFACE ELEV. 261.3' MSL

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				120		CLST.	MUDSTONE (continued).
							from 123' to 150': dark greenish gray (5G 4/1).
				125			
				130			
				135			
				140			
				145			
				150			@ 150': trace bivalve fragments.
							@ 152': greenish black (5G 2/1); massive.
				155		SLT.	SILTSTONE, dusky yellow (5Y 6/4); 5 to 10% fine sand; trace bivalve fragments; trace fine gravel; damp.
				160			

REMARKS

EMCON ASSOCIATES

PLATE

LOG OF EXPLORATORY BORING

PROJECT NUMBER 476-03.04
PROJECT NAME Chiquita Canyon Landfill
BY E.A.M. DATE March 28, 1989

BORING NO. DW-8
PAGE 5 OF 8
SURFACE ELEV. 1261.3' MSL

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				160		SLT.	SILTSTONE (continued). @ 161' to 200': 25 to 30% fine sand.
				165			
				170			
				175			
				180			@ 180': 10 to 15% fine gravel; local calcite cementation.
			4/4/89	185			
				190			
				195			
				200			

REMARKS

EMCON ASSOCIATES

PLATE

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. OW-8

PROJECT NAME Chiquita Canyon Landfill PAGE 6 OF 8

BY E.A.M. DATE March 28, 1989 SURFACE ELEV. 1261.3' MSL

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				200		SS.	SILTY SANDSTONE, yellowish gray (5Y 8/1); 30 to 40% fines; fine to coarse grained; 5 to 10% fine gravel (up to 3/8" maximum diameter); damp to dry.
				205			
						SLT.	SILTSTONE, yellowish gray (5Y 8/1); 15 to 20% fine sand; micaceous; damp.
				210			
				215		SS.	SILTY SANDSTONE, light greenish gray (5GY 8/1); 40 to 45% fines; fine grained; damp to dry.
				220			
						SLT.	SILTSTONE, pale olive (10Y 6/2); 5 to 10% fine sand; damp to dry.
				225			
							@ 229': yellowish gray (5Y 8/1); 25 to 30% fine sand.
				230			
				235			@ 235': 5 to 10% fine sand.
							@ 237': 20 to 25% fine to coarse sand.
						MST.	MUDSTONE, light gray (N 7/0); trace fine sand; damp.
				240			

REMARKS

EMCON ASSOCIATES

PLATE

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. DW-8

PROJECT NAME Chiquita Canyon Landfill PAGE 7 OF 8

BY E.A.M. DATE March 28, 1989 SURFACE ELEV. 1261.3' MSL

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				240		MST.	MUDSTONE (Continued).
				245			@ 246': pale olive (10Y 6/2); 5 to 10% fine to coarse sand; damp.
				250			
				255			@ 255 to 277': olive gray (5Y 3/2); massive; damp.
				260			@ 260': 50% drilling pressure increase (inferred hard zone).
				265			
				270			
				275			@ 277': 10 to 15% fine sand; moist to very moist.
			▽	280			

REMARKS

EMCON ASSOCIATES

PLATE

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976 - 03. 04 | BORING NO. DW-8

PROJECT NAME Chiquita Canyon Landfill | PAGE 8 OF 8

BY E.A.M. DATE March 28, 1989 | SURFACE ELEV. 1261.3' MSL

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				280		MST.	MUDSTONE (continued). @280': thin lenses of fine- to medium-grained sandstone (3 to 6" thick).
				285			@285': medium gray (N 5/0); 10 to 15% fine sand; damp to slightly damp.
				290			BOTTOM OF BORING: 290 FEET. Terminated Hole.
				295			

REMARKS

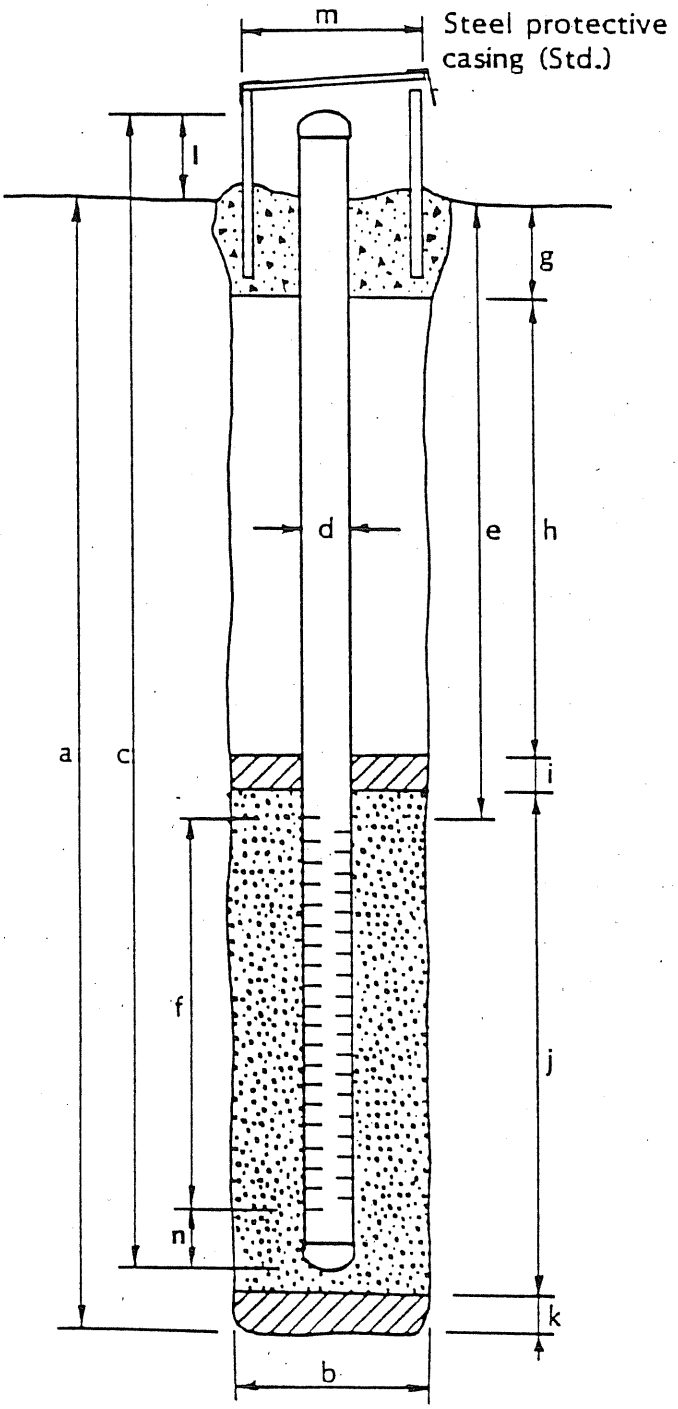
EMCON ASSOCIATES

PLATE

WELL DETAILS

PROJECT NUMBER 976-01.02
PROJECT NAME Chiquita Canyon Landfill
COUNTY Los Angeles
WELL PERMIT NO. _____

BORING / WELL NO. DW-9
TOP OF CASING ELEV. T.B.D.
GROUND SURFACE ELEV. ~1223 ft.
DATUM Mean Sea Level



EXPLORATORY BORING

a. Total depth 280 ft.
b. Diameter 10 in.
Drilling method Reverse Air Rotary

WELL CONSTRUCTION

c. Casing length 280.5 ft.
Material Schedule 80 PVC
d. Diameter 5 in.
e. Depth to top perforations 239.8 ft.
f. Perforated length 28.7 ft.
Perforated interval from 239.8 to 268.5 ft.
Perforation type Machine Slotted
Perforation size 0.02 inch
g. Surface seal 2 ft.
Seal material Cement/Bentonite
h. Backfill 220 ft.
Backfill material Cement/Bentonite
i. Seal 5 ft.
Seal material Bentonite
j. Gravel pack 52 ft.
Pack material #3 Monterey Sand
k. Bottom seal 1 ft.
Seal material Natural Materials
l. Casing height 1.5 ft.
m. Protective casing diameter 10 in.
N. Blank casting and end cap 10.5 ft.

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. DW-9
PROJECT NAME Chiquita Canyon Landfill PAGE 1 OF 7
BY E.A.M. DATE March 30, 1989 SURFACE ELEV. 1220.90' MSL

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
					SS.		SILTY SANDSTONE, light olive gray (5Y 6/1); 15 to 20% fines; fine to medium grained; 5 to 10% gravel (up to 1" maximum diameter); damp.
				5			
				10			
				15	MST.		MUDSTONE, olive gray (5Y 4/1); massive.
					SLT.		SILTSTONE, pale olive (10Y 6/2); trace to 5% fine sand; damp.
				20	SLT./ MST.		SILTSTONE and MUDSTONE - Interbedded. SILTSTONE: light olive gray (5Y 6/1); 5 to 10% fine sand; damp. MUDSTONE: olive gray (5Y 4/1); indistinct fine laminations.
				35			
				30			
					SS.		SILTY SANDSTONE, pale olive (10Y 6/2); 20 to 25% fines; fine to medium grained; 10 to 15% gravel (up to 2" maximum diameter); damp.
				35			@ 36': 5 to 10% fines; 30 to 35% gravel.
				40			

REMARKS

Drilled a 5 1/2"-diameter borehole with dual-tube reverse-air-rotary drilling equipment to 280 feet; borehole was subsequently reamed to 10" diameter. Bag samples were collected which were generally representative of each major lithologic unit. Borehole was converted to a ground-water monitoring well as shown on Well Details.

EMCON ASSOCIATES

PLATE

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. DW-9

PROJECT NAME Chiquita Canyon Landfill PAGE 2 OF 7

BY E.A.M. DATE March 30, 1989 SURFACE ELEV. 1220.90' MSL

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				40		SS.	SILTY SANDSTONE (continued). SILTSTONE and MUDSTONE - Interbedded. SILTSTONE: light olive brown (5Y 5/6); trace to 5% fine sand. MUDSTONE: light olive brown (5Y 5/6); massive; hard.
				45			
				50		SLT.	SILTSTONE, pale olive (10Y 6/2); 5 to 10% fine sand; damp.
							@ 54' to 54 1/2': conglomerate.
				55			
				60			
				65			
				70		MST.	MUDSTONE, grayish olive (10Y 4/2); fine laminations; locally hard and brittle; damp.
				75			
				80			

REMARKS

EMCON ASSOCIATES

PLATE

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. DW-9

PROJECT NAME Chiquita Canyon Landfill PAGE 3 OF 7

BY E.A.M. DATE March 30, 1989 SURFACE ELEV. 1220.90' MSL

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				80		MST.	MUDSTONE (continued).
						SS./SLT.	SANDSTONE and SILTSTONE - Interbedded. SANDSTONE: grayish yellow green (5GY 7/2); 15 to 25% fines; fine to medium grained; 10 to 15% fine gravel; damp. SILTSTONE: light olive brown (5Y 5/6); 5 to 10% fine sand; damp.
				85			
				90			
				95			
				100			
						SLT./MST.	SILTSTONE and MUDSTONE - Interbedded. SILTSTONE: dusky yellow (5Y 6/4); trace fine sand; damp. MUDSTONE: grayish olive (10Y 4/2); indistinct fine laminations; damp to moist.
				105			
				110			@ 112': medium dark gray (N 4/0).
				115			
				120			

REMARKS

EMCON ASSOCIATES

PLATE

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. DW-9

PROJECT NAME Chiquita Canyon Landfill PAGE 4 OF 7

BY E.A.M. DATE March 30, 1989 SURFACE ELEV. 1220.90'MSL

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				120	SLT./MST.		SILTSTONE and MUDSTONE - Interbedded (continued).
				125			
				130			
				135			@ 135 to 138': dark yellowish orange (10YR 6/6).
				140			
					SS.		SILTY SANDSTONE, grayish yellow green (5GY 7/2); 30 to 35% fines; fine to coarse grained; 5 to 10% fine gravel; damp to moist.
				145	SLT.		SILTSTONE, light olive brown (5Y 5/6); trace fine sand; damp to moist.
				150			
				155			
				160			

REMARKS

EMCON ASSOCIATES

PLATE

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. DW-9

PROJECT NAME Chiquita Canyon Landfill PAGE 5 OF 7

BY E.A.M. DATE March 30, 1989 SURFACE ELEV. 1220.90' MSL

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				160	SLT./MST.		SILTSTONE and MUDSTONE - Interbedded. SILTSTONE: dusk yellow (5Y 6/4); trace fine sand; damp. MUDSTONE: grayish olive (10Y 4/2); indistinct fine laminations; damp to moist.
				165			
				170	SS.		CONGLOMERATIC SANDSTONE, light greenish gray (5GY 8/1); 15 to 20% fines; fine to coarse grained; 30 to 35% gravel (up to 1" maximum diameter); damp.
					SLT.		SILTSTONE, pale olive (10Y 6/2); trace fine sand; trace fine gravel; damp to moist.
				175			
				180	SLT./MST.		SILTSTONE and MUDSTONE - Interbedded. SILTSTONE: light olive gray (5Y 5/2); trace fine sand; damp to moist. MUDSTONE: olive gray (5Y 3/2); massive; damp to moist.
				185			
				190			
				195	SS./SLT.		SANDSTONE and SILTSTONE - Interbedded. SANDSTONE: light greenish gray (5GY 8/1); 15 to 20% fines; fine to coarse grained; 10 to 15% fine gravel; damp. SILTSTONE: greenish gray (5GY 6/1); 10 to 15% fine sand; moist.
				200			

REMARKS

EMCON ASSOCIATES

PLATE

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. DW-9

PROJECT NAME Chiquita Canyon Landfill PAGE 6 OF 7

BY E.A.M. DATE March 30, 1989 SURFACE ELEV. 1220.90' MSL

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				200	SS./SLT.		SANDSTONE and SILTSTONE - Interbedded (continued).
				205			
				210			
				215			
				220	MST.		MUDSTONE, greenish gray (5GY 6/1) to olive black (5Y 2/1); trace fine sand; massive; moderate hardness; damp. @ 223': very hard; brittle.
				225			
				230			
				235			
				240			

REMARKS

EMCON ASSOCIATES

PLATE

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. DW-9

PROJECT NAME Chiquita Canyon Landfill PAGE 7 OF 7

BY E. A. M. DATE March 30, 1989 SURFACE ELEV. 1220.90' MSL

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				240		MST.	MUDSTONE (continued).
				245			
				250			
				255			@255': light olive gray (5Y 6/1); trace to 5% fine sand; trace fine gravel (up to 3/8" maximum diameter).
			▽	260		SS.	SILTY SANDSTONE, light olive gray (5Y 6/1); 10 to 20% fines; fine grained; trace to 5% fine gravel; moist.
				265			
				270			@270': 5 to 10% fines; fine to medium grained; 5 to 10% fine gravel.
				275			@275': 20 to 25% fines; fine grained.
				280			BOTTOM OF BORING: 280 FEET. Terminated Hole.

REMARKS

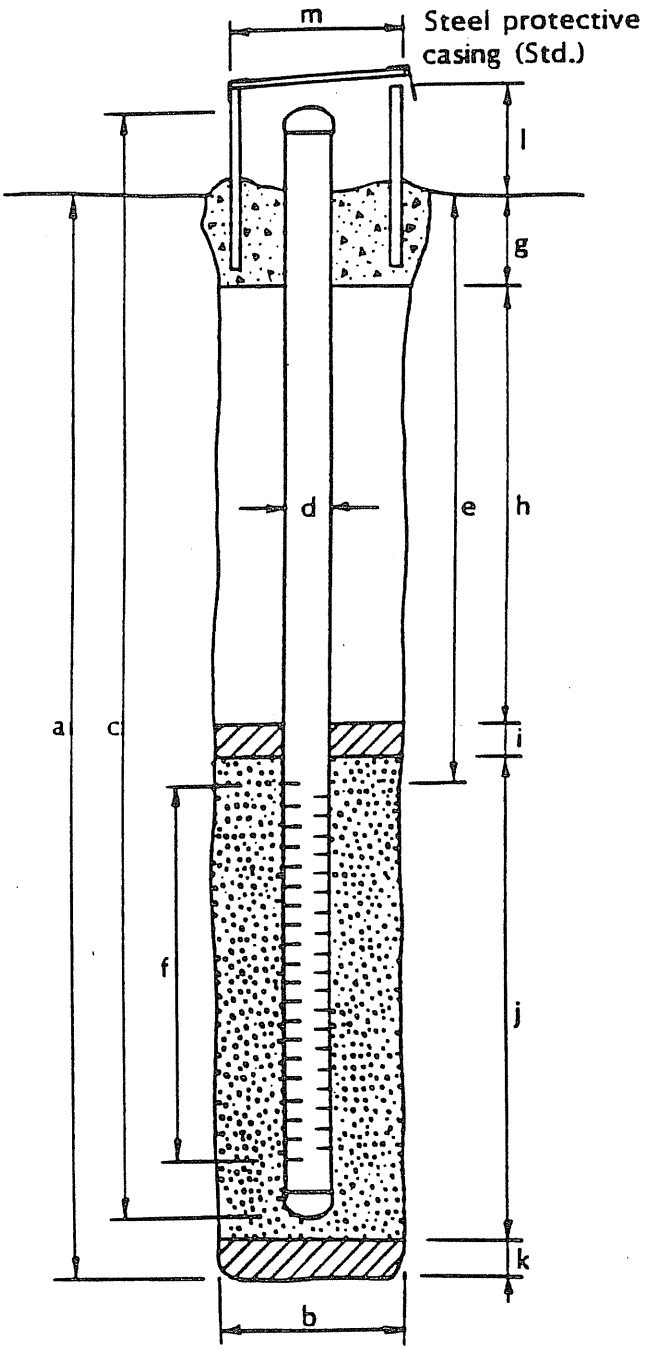
EMCON ASSOCIATES

PLATE

WELL DETAILS

PROJECT NUMBER 976-04.02
PROJECT NAME Chiquita Canyon
COUNTY Los Angeles
WELL PERMIT NO. 185858

BORING / WELL NO. DW-12
TOP OF CASING ELEV. 1025
GROUND SURFACE ELEV. 1022
DATUM Mean Sea Level



EXPLORATORY BORING

a. Total depth 135.4 ft.
b. Diameter 7 in.
Drilling method Air Rotary

WELL CONSTRUCTION

c. Casing length 136 ft.
Material Schedule 40 PVC
d. Diameter 4 in.
e. Depth to top perforations 95 ft.
f. Perforated length 30 ft.
Perforated interval from 95 to 125 ft.
Perforation type machine-slot
Perforation size 0.020 inch
g. Surface seal 2 ft.
Seal material concrete
h. Backfill 78 ft.
Backfill material cement/bentonite grout
i. Seal 8.5 ft.
Seal material bentonite
j. Gravel pack 46.5 ft.
Pack material #3 Lonestar sand
k. Bottom seal 0.4 ft.
Seal material Native material
l. Casing height 3 ft.
m. Protective casing diameter 12 in.

LOG OF EXPLORATORY BORING

PROJECT NUMBER	976-04.02	BORING NO.	DW-12
PROJECT NAME	Chiquita Canyon Landfill	PAGE	1 OF 7
BY Scott Sankey	DATE 2/6/91	SURFACE ELEV.	~1023 ft.

PID (ppm)			GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WEI DET
1.6				5			SILTY SAND (SM), dark grayish brown (10YR,4/2); 30% non-plastic fines; 30% fine sand, 20% medium sand, 10% coarse sand; 10% fine gravel; no odor.	
1.1				10			@ 10 feet: brown (10YR,5/3); 35% non-plastic fines; 30% fine sand, 20% medium sand, 5% coarse sand; 10% fine gravel.	
1.3				15			@ 15 feet: same as above.	
				20				

REMARKS

Borehole drilled to 135.4 feet using air-rotary drilling equipment. A 135-foot ground-water monitoring well, perforated from 95.03 to 124.64 feet, was subsequently installed. PID calibrated daily to 100 ppm isobutylene.

QA/QC: BB Hogan

EMCON

For use with report dated 07/26/2006; RTF job number 2002-036-01

LOG OF EXPLORATORY BORING

PROJECT NUMBER	976-04.02	BORING NO.	DW-12
PROJECT NAME	Chiquita Canyon Landfill	PAGE	2 OF 7
BY Scott Sankey	DATE 2/6/91	SURFACE ELEV.	~1023 ft.

PID (ppm)			GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WEL DETA
1.2							@ 20 feet: 40% non-plastic fines; 40% fine sand, 10% medium sand, 5% coarse sand; 5% fine gravel.	
1.5				25			@ 25 feet: 35% non-plastic fines; 30% fine sand, 15% medium sand, 5% coarse sand; 15% fine gravel.	
1.1				30			@ 30 feet: 45% non-plastic fines; 40% fine sand, 10% medium sand, 5% coarse sand.	
1.0				35			SANDY SILT (ML), brown (10YR 5/3); 55% non-plastic fines; 25% fine sand, 5% medium sand, 5% coarse sand; 10% fine gravel, no odor.	
				40				

REMARKS

Borehole drilled to 135.4 feet using air-rotary drilling equipment. A 135-foot ground-water monitoring well, perforated from 95.03 to 124.64 feet, was subsequently installed. PID calibrated daily to 100 ppm isobutylene.

QA/QC: BB Siegner

EMCON

LOG OF EXPLORATORY BORING

PROJECT NUMBER	976-04.02	BORING NO.	DW-12
PROJECT NAME	Chiquita Canyon Landfill	PAGE	3 OF 7
BY Scott Sankey	DATE 2/6/91	SURFACE ELEV.	~1023 ft.

PID (ppm)			GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WE DET.
1.2							@ 40 feet: 55% non-plastic fines; 25% fine sand, 10% medium sand, 5% coarse sand; 5% fine gravel.	
							@ 40 to 45 feet: driller notes decrease in drilling rate.	
1.5				45			SANDSTONE (SSF), dark yellowish brown (10YR,4/2); 40% non-plastic fines; 45% fine sand, 10% medium sand, 5% coarse sand; no odor.	
1.6				50			@ 50 feet: trace fine gravel.	
1.3				55			MUDSTONE (MDST), light olive gray (5Y, 5/2); 60% non-plastic fines; 25% fine sand, 10% medium sand, 5% coarse sand; no odor.	
				60				

REMARKS

Borehole drilled to 135.4 feet using air-rotary drilling equipment. A 135-foot ground-water monitoring well, perforated from 95.03 to 124.64 feet, was subsequently installed. PID calibrated daily to 100 ppm isobutylene.

QA/QC: [illegible]

EMCON

LOG OF EXPLORATORY BORING

PROJECT NUMBER	976-04.02	BORING NO.	DW-12
PROJECT NAME	Chiquita Canyon Landfill	PAGE	4 OF 7
BY Scott Sankey	DATE 2/6/91	SURFACE ELEV.	~1023 ft.

PID (ppm)			GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WE DET.
1.6							SANDSTONE (SSF), light olive gray (5Y, 5/2); 40% non-plastic fines; 45% fine sand, 10% medium sand, 5% coarse sand; no odor. @ 61 feet: driller notes gravel-sized cuttings begin to appear.	
1.4				65			@ 65 feet: 30% non-plastic fines; 25% fine sand, 15% medium sand, 20% coarse sand; 10% fine gravel; subangular to subrounded; no odor. @ 66 to 68 feet: rig chatter.	
1.2				70			@ 70 feet: 30% non-plastic fines; 25% fine sand, 20% medium sand; 20% coarse sand; 5% fine gravel.	
2.0				75			@ 75 feet: 20% non-plastic fines, 10% grayish brown (2.5Y,5/2), medium-plasticity fines; 30% fine sand, 20% medium sand, 20% coarse sand	
				80				

REMARKS

Borehole drilled to 135.4 feet using air-rotary drilling equipment. A 135-foot ground-water monitoring well, perforated from 95.03 to 124.64 feet, was subsequently installed. PID calibrated daily to 100 ppm isobutylene.

QA/QC: GB Siegner

EMCON

LOG OF EXPLORATORY BORING

PROJECT NUMBER	976-04.02	BORING NO.	DW-12
PROJECT NAME	Chiquita Canyon Landfill	PAGE	5 OF 7
BY Scott Sankey	DATE 2/6/91	SURFACE ELEV.	~1023 ft.

PID (ppm)			GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WEL DETA
2.0							@ 80 feet: 40% non-plastic fines: 30% fine sand, 20% medium sand, 10% coarse sand.	
2.9				85			MUDSTONE (MDST), light olive gray (5Y, 5/2); 60% non-plastic fines; 25% fine sand, 10% medium sand, 5% coarse sand, no odor.	
0.9				90			@ 90 feet: same as above.	
1.8				95			@ 95 feet: same as above.	
							@ 98 to 105 feet: driller stops adding water to hole.	
				100				

REMARKS

Borehole drilled to 135.4 feet using air-rotary drilling equipment. A 135-foot ground-water monitoring well, perforated from 95.03 to 124.64 feet, was subsequently installed. PID calibrated daily to 100 ppm isobutylene.

QA/QC: [illegible]

EMCON

For use with report dated 07/26/2006; RTF job number 2002-036-01

LOG OF EXPLORATORY BORING

PROJECT NUMBER	976-04.02	BORING NO.	DW-12
PROJECT NAME	Chiquita Canyon Landfill	PAGE	6 OF 7
BY Scott Sankey	DATE 2/6/91	SURFACE ELEV.	~1023 ft.

PID (ppm)			GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WE: DET:
2.9							@ 102 feet: 65% non-plastic fines; 25% fine sand, 10% medium sand.	
			▼				@ 103.9 feet: static ground-water level, measured on 2/4/91.	
1.2				105			@ 105 feet: 60% non-plastic fines; 30% fine sand, 10% medium sand; cannot lift cuttings with air, driller adds water.	
1.1				110			SANDSTONE (SSF), light olive gray (5Y, 5/2); 35% non-plastic fines; 55% fine sand, 10% medium sand, no odor.	
4.8				115			MUDSTONE (MDST), light olive gray (5Y, 5/2); 65% non-plastic fines; 30% fine sand, 5% medium sand, no odor.	
				120				

REMARKS

Borehole drilled to 135.4 feet using air-rotary drilling equipment. A 135-foot ground-water monitoring well, perforated from 95.03 to 124.64 feet, was subsequently installed. PID calibrated daily to 100 ppm isobutylene.

QA/QC: [illegible]

EMCON

LOG OF EXPLORATORY BORING

PROJECT NUMBER	976-04.02	BORING NO.	DW-12
PROJECT NAME	Chiquita Canyon Landfill	PAGE	7 OF 7
BY Scott Sankey	DATE 2/6/91	SURFACE ELEV.	~1023 ft.

PID (ppm)			GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WEL DETA
3.5							@ 120 feet: 55% non-plastic fines; 20% fine sand, 10% medium sand, 5% coarse sand; 10% fine gravel, driller says air stream is cooler; first encountered water during drilling.	
3.6				125			@ 125 feet: 60% non-plastic fines; 25% fine sand, 10% medium sand, 5% coarse sand.	
4.8				130			@ 130 feet: same as above.	
1.3				135			@ 135 feet: 60% non-plastic fines; 25% fine sand, 10% medium sand, trace coarse sand, 5% fine gravel.	
							BOTTOM OF BORING: 135.5 FEET. BOREHOLE TERMINATED.	
				140				

REMARKS

Borehole drilled to 135.4 feet using air-rotary drilling equipment. A 135-foot ground-water monitoring well, perforated from 95.03 to 124.69 feet, was subsequently installed. PID calibrated daily to 100 ppm isobutylene.

QA/QC: [illegible]

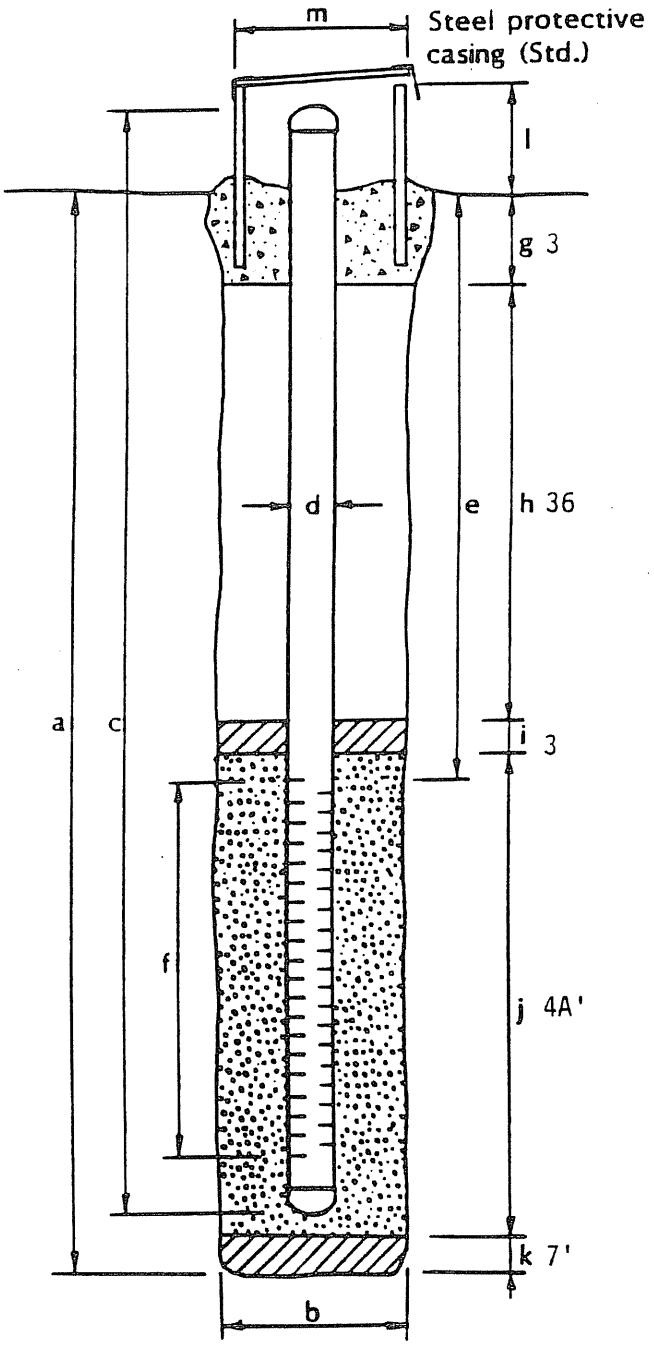
EMCON ASSOCIATES

For use with report dated 07/26/2006; RTF job number 2002-036-01

WELL DETAILS

PROJECT NUMBER 376-04.02
PROJECT NAME Laidlaw
COUNTY Chiquita Canyon
WELL PERMIT NO. N/A

BORING / WELL NO. DW-13
TOP OF CASING ELEV. 963.51
GROUND SURFACE ELEV. 960.31
DATUM mean sea level
INSTALLATION DATE: 11-29-91



EXPLORATORY BORING

a. Total depth 93 ft.
b. Diameter 10 in.
Drilling method Direct Air Rotary

WELL CONSTRUCTION

c. Casing length 91 ft.
Material Sch 40 PVC
d. Diameter 4 in.
e. Depth to top perforations 54 ft.
f. Perforated length 30 ft.
Perforated interval from 54 to 84 ft.
Perforation type Machine Slot
Perforation size 0.020 in.
g. Surface seal 3 ft.
Seal material Concrete
h. Backfill 36 ft.
Backfill material Enviro Plug
i. Seal 3 ft.
Seal material Bentonite Pellets
j. Gravel pack 44 ft.
Pack material #3 Monterey Sand
k. Bottom seal 7 ft.
Seal material Native
l. Casing height 3.2 ft.
m. Protective casing diameter 12 in.

For use with report dated 07/26/2006; RTF job number 2002-036-01

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976.04.02 BORING NO. DW-13

PROJECT NAME LAIDLAW WASTE SYSTEMS PAGE 1 OF 5

BY JOHN PAVLIK DATE 11/29/90 SURFACE ELEV. ~963.00 ft.

GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
				SAND (SW), light yellow brown (10YR 6/4); 20% fine sand, 60% medium sand, 10-15% coarse sand (subangular to subrounded grains); 5% gravel (rounded quartz and rock fragments); 40% quartz; 50% light minerals; 10% dark minerals; dry.	
	5			@ 5 feet: 10% fine sand, 75% medium sand, 10% coarse sand; < 5% gravel.	
	10			@ 10 feet: trace of silt; 60% fine sand, 15% medium sand, 15% coarse sand; 10% gravel.	
				(RIG CHATTERS BETWEEN 10 FEET AND 12 FEET).	
	15				
	20				

REMARKS

Well DW-13 drilled by Datum Exploration of Long Beach,CA. using a direct air rotary method and an AMCA Speedstar 30K rig. Well materials were supplied by Sinclair Well Products, Ventura,CA. Well casing: 4"-outside diameter, 40 PVC pipe, 0.02"-slotted was used.

EMCON

For use with report dated 07/26/2006; RTF job number 2002-036-01

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976.04.02 BORING NO. DW-13

PROJECT NAME LAIDLAW WASTE SYSTEMS PAGE 2 OF 5

BY JOHN PAVLIK DATE 11/29/90 SURFACE ELEV. ~963.00 ft.

GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
				SANDSTONE (SS): yellowish gray (5Y 7/2); cuttings are fine-grained with trace amounts of silt-sized grains. well cemented, dry. (AT 20 FEET: DRILLING SLOWER. ROCK IS APPARENTLY WELL CEMENTED.)	
	25			(BETWEEN 20 FEET AND 45 FEET, MISTING IS USED TO COUNTERACT SLOUGHING).	
	30			@ 30 feet: dark yellowish brown (10YR 4/2); 20% fine sand, 70% medium sand: 10% gravel (rounded quartz).	
	35			(BETWEEN 30 FEET AND 40 FEET, DRILLING MUCH EASIER THAN INTERVAL 20 FEET TO 22 FEET).	
	40				

REMARKS

Well DW-13 drilled by Datum Exploration of Long Beach,CA. using a direct air rotary method and an AMCA Speedstar 30K rig. Well materials were supplied by Sinclair Well Products, Ventura,CA. Well casing: 4"-outside diameter, 40 PVC pipe, 0.02"-slotted was used.

EMCON

For use with report dated 07/26/2006; RTF job number 2002-036-01

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976.04.02 BORING NO. DW-13

PROJECT NAME LAIDLAW WASTE SYSTEMS PAGE 3 OF 5

BY JOHN PAVLIK DATE 11/29/90 SURFACE ELEV. ~963.00 ft.

GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
				@ 40 feet; 90% medium-grained; 10% matics and biotite.	
	45			MUDSTONE (MDST), dark yellowish brown (10YR 4/2); cuttings are sandy with 50% fines (clay/silt).	
11/30/90				(AT 45 FEET TO 50 FEET: STOPPED MISTING; USING ONLY DIRECT AIR).	
	50			SANDSTONE (SS), dark yellowish brown (10YR 4/2); very fine-grained; poorly cemented.	
	55				
	60				

REMARKS

Well DW-13 drilled by Datum Exploration of Long Beach,CA. using a direct air rotary method and an AMCA Speedstar 30K rig. Well materials were supplied by Sinclair Well Products, Ventura,CA. Well casing: 4"-outside diameter, 40 PVC pipe, 0.02"-slotted was used.

EMCON

For use with report dated 07/26/2006; RTF job number 2002-036-01

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976.04.02 BORING NO. DW-13

PROJECT NAME LAIDLAW WASTE SYSTEMS PAGE 4 OF 5

BY JOHN PAVLIK DATE 11/29/90 SURFACE ELEV. ~963.00 ft.

			GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							MUDSTONE (MDST), dusky yellowish brown (10YR 2/2); cuttings are coarse-grained to gravel-sized, plastic.	
				65				
				70				
			11/29/90 ▽				@ 72 feet: moist.	
				75				
				80				

REMARKS

Well DW-13 drilled by Datum Exploration of Long Beach,CA. using a direct air rotary method and an AMCA Speedstar 30K rig. Well materials were supplied by Sinclair Well Products, Ventura,CA. Well casing: 4"-outside diameter, 40 PVC pipe, 0.02"-slotted was used.

For use with report dated 07/26/2006; RTF job number 2002-036-01

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976.04.02 BORING NO. DW-13

PROJECT NAME LAIDLAW WASTE SYSTEMS PAGE 5 OF 5

BY JOHN PAVLIK DATE 11/29/90 SURFACE ELEV. ~963.00 ft.

GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
				@ 80 feet: Interbedded SANDSTONE/MUDSTONE, dusky yellowish brown (10YR 2/2). Deeply weathered-iron staining on surfaces of rock fragments.	
	85			@ 85 feet: dark yellowish brown (10YR 4/2).	
	90			MUDSTONE (MDST), dark yellowish brown (10YR 4/2); cuttings mainly clay/silt material.	
				BOTTOM OF BORING: 93 FEET. BOREHOLE TERMINATED.	
	95				
	100				

REMARKS

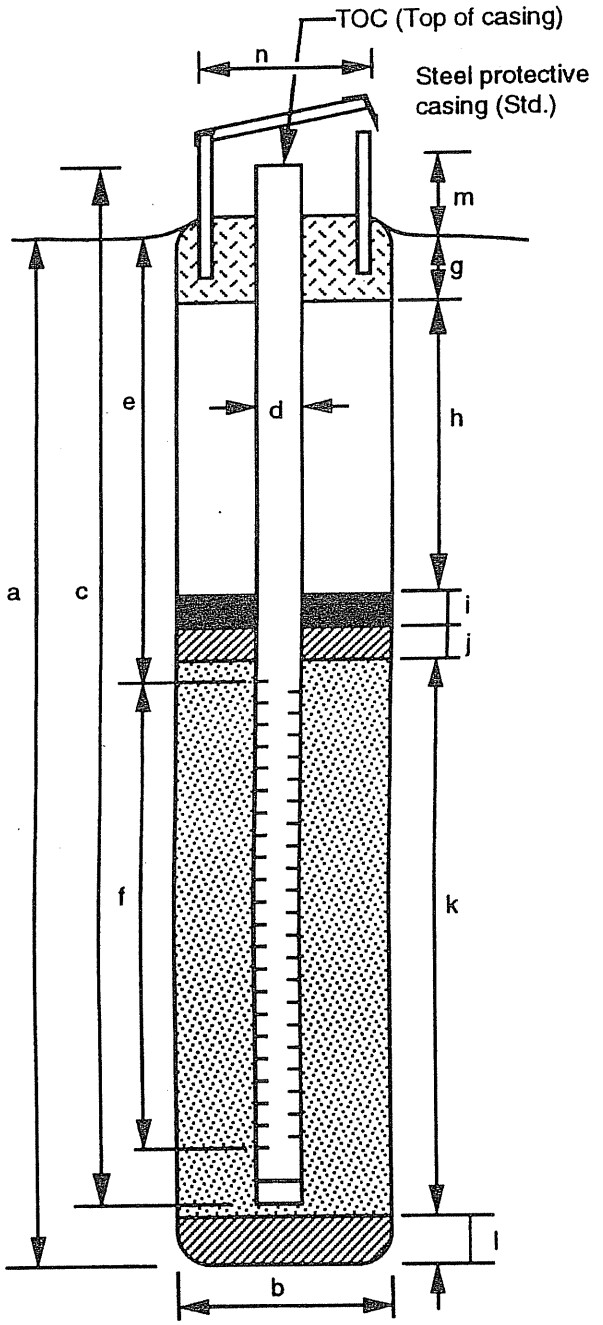
Well DW-13 drilled by Datum Exploration of Long Beach,CA. using a direct air rotary method and an AMCA Speedstar 30K rig. Well materials were supplied by Sinclair Well Products, Ventura,CA. Well casing: 4"-outside diameter, 40 PVC pipe, 0.02"-slotted was used.

WELL CONSTRUCTION DETAIL

EMCON

PROJECT NUMBER 20976-001.041
PROJECT NAME: Chiquita Canyon Landfill
LOCATION: Los Angeles County, CA
WELL PERMIT NO. pending
DRILLER: Water Development Corp.

BORING / WELL NO. DW-14
TOP OF CASING ELEV. ~1233
GROUND SURFACE ELEV. ~1230
DATUM: Mean Sea Level
INSTALLATION DATE N/A



EXPLORATORY BORING

a. Total depth 302 ft.
b. Diameter 10 in.
Drilling method Air rotary

WELL CONSTRUCTION

c. Total casing length 281.5 ft.
Material Schedule 80 PVC
d. Diameter ID 3.8 in. OD 4.5 in.
e. Depth to top perforations 235 ft.
f. Perforated length 40 ft.
Perforated interval from 235 to 275 ft.
Perforation type machine-slotted
Perforation size 0.02 inch
g. Surface seal 1.5 ft.
Seal interval from 0 to 1.5 ft.
Material Concrete
h. Backfill/Annular Seal 198.5 ft.
Backfill interval from 1.5 to 200 ft.
Material Bentonite grout
i. Seal 8 ft.
Seal interval from 200 to 208 ft.
Material Bentonite chips
j. Transition backfill 25 ft.
Backfill interval from 208 to 233 ft.
Material Native slough
k. Filter pack 54 ft.
Filter pack interval from 233 to 287 ft.
Material Lonestar #2/12 sand
!. Bottom seal/fill 15 ft.
Seal/fill interval from 287 to 302 ft.
Material Bentonite chips/native slough
m. Casing stickup 1.5 ft.
n. Protective casing diameter 8 in.

QA/QC:
Well Installed by: D. Koning/M. Kuncir
Checked By: _____ Date: _____

\MISC-WELL DETAILS\CCL-DW-14.pdc Rev. 5/10/96

For use with report dated 07/26/2006; RTF job number 2002-036-01

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **20976-001.041**

WELL NO.: **DW-14**

PROJECT NAME: **Chiquita Canyon Landfill**

PAGE: **1 of 8**

BY: **Don Koning**

DATE: **4/23/98**

SURFACE ELEVATION: **1233± MSL**

PID READING (ppm)	PENETRATION (blows/6")	RECOVERY (ft/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							ARTIFICIAL FILL (Af): 0 TO 3 FEET SILTY SAND TO SAND (SM-SP): pale yellow (2.5Y 7/4); 10% low plasticity fines; 30% fine sand; 25% medium sand; 25% coarse sand; 10% fine gravel; subangular; moderately weathered; dry.	
							SAUGUS FORMATION (Qs): 3 TO 302 FEET MUDSTONE: light olive brown (5Y 5/6); 60% medium plasticity fines; 40% fine sand; 20 to 25% of cuttings return as gravel-sized mudstone clasts.	
				10			SANDSTONE	
							SILTSTONE: light olive (10Y 5/4); 85 to 90% non- to low- plasticity fines; 10 to 15% fine sand; damp to moist.	
0.0				20			@ 20 ft.: 90% non-plastic fines; 10% fine sand.	
							@ 25 ft.: SILTSTONE: moderate olive brown (5Y 4/4); 20% indurated fragments.	
							MUDSTONE: pale olive (10Y 6/2); 100% medium-plasticity fines; trace fine sand; moderately indurated; dry.	
0.5				30			CLAYEY SANDSTONE: dusky yellow (5Y 6/4); 15% non-plastic fines; 35% clay balls; 45% fine sand; 5% medium sand.	
							MUDSTONE.	
0.0				40				

REMARKS

Boring drilled using air rotary methods with a Dresser T70W drilling rig. Boring diameter 10.75 inches to 38.7 feet bgs and 10.5 inches from 38 feet bgs to 302 feet bgs. Drill cuttings were collected at approximately 10-foot depth intervals except where shown otherwise. A Munsell soil color chart was used to describe soil colors and a GSA rock color chart was utilized for bedrock color descriptions. The boring was converted to a 4.0-inch diameter, Schedule 80 PVC monitoring well. Refer to Well Details for construction information.

EMCON

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **20976-001.041**

PROJECT NAME: **Chiquita Canyon Landfill**

BY: **Don Koning** DATE: **4/23/98**

WELL NO.: **DW-14**

PAGE: **2 of 8**

SURFACE ELEVATION: **1233± MSL**

PID READING (ppm)	PENETRATION (blows/6")	RECOVERY (ft/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							MUDSTONE: dusky yellow (5Y 6/4); 15% fine sand; indurated; damp.	
							SILTSTONE: moderate olive brown (5Y 4/4); 100% non-plastic fines	
				50				
							CLAYSTONE: light olive gray (5Y 5/2); 100% medium plasticity fines; indurated.	
							SANDY MUDSTONE: dusky yellow (5Y 6/4); 75 to 80% medium- plasticity fines; 20 to 25% fine sand; weakly indurated; dry.	
							CLAYEY SANDSTONE: dusky yellow (5Y 6/4) 20% clay which returns as hard "mud balls"; 5% silt; 25% fine sand; 50% medium sand; dry.	
				60				
							SANDY SILTSTONE: dusky yellow (5Y 6/4); 75% non-plastic fines; 25% fine sand; damp.	
							MUDSTONE: moderate yellowish brown (10Y 5/4); 85 to 90% medium-plasticity fines; 10 to 15% fine sand.	
							SANDY CLAYSTONE: moderate yellowish brown (10YR 5/4); 75 to 80% medium- to high-plasticity fines; 20 to 25% fine sand; indurated; damp.	
				70				
							SILTSTONE: medium gray (N5).	
							SANDSTONE: yellowish gray (5Y 7/2); 10% non-plastic fines; 90% fine sand; subangular; damp.	
				80				

REMARKS

Boring drilled using air rotary methods with a Dresser T70W drilling rig. Boring diameter 10.75 inches to 38.7 feet bgs and 10.5 inches from 38 feet bgs to 302 feet bgs. Drill cuttings were collected at approximately 10-foot depth intervals except where shown otherwise. A Munsell soil color chart was used to describe soil colors and a GSA rock color chart was utilized for bedrock color descriptions. The boring was converted to a 4.0-inch diameter, Schedule 80 PVC monitoring well. Refer to Well Details for construction information.

EMCON

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **20976-001.041**

WELL NO.: **DW-14**

PROJECT NAME: **Chiquita Canyon Landfill**

PAGE: **3 of 8**

BY: **Don Koning**

DATE: **4/23/98**

SURFACE ELEVATION: **1233± MSL**

PID READING (ppm)	PENETRATION (blows/6")	RECOVERY (ft/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							SANDSTONE	
							SILTSTONE: dusky yellow (5Y 6/4); 90% low- to medium-plasticity fines; 10% fine sand; damp.	
							CLAYSTONE: moderate yellowish brown (10YR 5/4); 100% medium- to high-plasticity fines; trace fine sand; damp.	
				90				
							CLAYSTONE TO SILTSTONE: dusky yellow (5Y 6/4); 95% low- to medium-plasticity fines; fines; 5% fine sand; indurated; hard mudstone balls to 0.5 inches diameter common. common.	
				100			SANDSTONE: yellowish gray (5Y 7/2); 5% non-plastic fines; 45% fine sand; 45% medium sand; 5% coarse sand; trace gravel; sand is subangular to subrounded; arkosic; moderately weathered.	
							GRAVELLY SANDSTONE: yellowish gray (5Y 7/2); 5% non-plastic fines; 20% fine sand; 25% medium sand; 50% coarse sand; 15% fine gravel to 0.5 inches diameter; dry to damp.	
							SANDSTONE: 90% fine to medium sand; 5% coarse sand; 5% fine gravel; damp.	
				110				
							GRAVELLY SANDSTONE: 75% fine to medium sand; 10% coarse sand; 15% gravel to 1 inch diameter; dry.	
				120				

REMARKS

Boring drilled using air rotary methods with a Dresser T70W drilling rig. Boring diameter 10.75 inches to 38.7 feet bgs and 10.5 inches from 38 feet bgs to 302 feet bgs. Drill cuttings were collected at approximately 10-foot depth intervals except where shown otherwise. A Munsell soil color chart was used to describe soil colors and a GSA rock color chart was utilized for bedrock color descriptions. The boring was converted to a 4.0-inch diameter, Schedule 80 PVC monitoring well. Refer to Well Details for construction information.

EMCON

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **20976-001.041**

WELL NO.: **DW-14**

PROJECT NAME: **Chiquita Canyon Landfill**

PAGE: **4 of 8**

BY: **Don Koning**

DATE: **4/23/96**

SURFACE ELEVATION: **1233± MSL**

PID READING (ppm)	PENETRATION (blows/6")	RECOVERY (ft/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							@ 122 ft.: Decreasing gravel.	
							@ 125 ft.: light olive gray (5Y 5/2); 35% fine sand; [illegible] 35% medium sand; 15% coarse sand; 15% fine gravel to 0.5 inches diameter; broken; damp.	
				130			SANDSTONE: yellowish gray (5Y 7/2); trace non-plastic fines; 95% fine sand; 5% medium sand; dry.	
							SILTY SANDSTONE: moderate olive brown (5Y 4/4); 40% non-plastic fines; 40 to 45% fine sand; [illegible] medium sand; damp.	
				140			MUDSTONE: light olive gray (5Y 5/2); 85 to 90% medium-plasticity fines; 10 to 15% fine sand; damp.	
							SILTY SANDSTONE: 15 to 20% non-plastic fines; 80 to 85% fine sand	
				150			SANDY CLAYSTONE: olive yellow (5Y 6/4); 80% medium- to high- plasticity fines; 20% fine to medium sand; damp.	
							SILTY SANDSTONE: 15% non-plastic fines; 80% fine sand; 5% medium sand; damp.	
							SANDSTONE: yellowish gray (5Y 7/2); 5% non-plastic fines; 25% fine sand; 25% medium sand; 20% coarse sand; 25% nodules of sandstone and sandy mudstone; hard; indurated; damp.	
				160				

REMARKS

Boring drilled using air rotary methods with a Dresser T70W drilling rig. Boring diameter 10.75 inches to 38.7 feet bgs and 10.5 inches from 38 feet bgs to 302 feet bgs. Drill cuttings were collected at approximately 10-foot depth intervals except where shown otherwise. A Munsell soil color chart was used to describe soil colors and a GSA rock color chart was utilized for bedrock color descriptions. The boring was converted to a 4.0-inch diameter, Schedule 80 PVC monitoring well. Refer to Well Details for construction information.

EMCON

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **20976-001.041**

WELL NO.: **DW-14**

PROJECT NAME: **Chiquita Canyon Landfill**

PAGE: **5** of **8**

BY: **Don Koning**

DATE: **4/23/98**

SURFACE ELEVATION: **1233± MSL**

PID READING (ppm)	PENETRATION (blows/6")	RECOVERY (ft/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							SANDSTONE	
							SILTY SANDSTONE	
							SANDY MUDSTONE: light olive brown (5Y 5/6); 70% medium- plasticity fines; 30% fine sand; damp.	
				170			SILTY SANDSTONE: dusky yellow (5Y 6/4); 35% low-plasticity fines; 65% fine sand; damp.	
1.2				180			SANDSTONE: 5% non-plastic fines; 45% fine sand; 20% medium sand; 15% coarse sand; 10 to 15% fine gravel; damp. @ 183 to 184 ft.: cemented; indurated sandstone.	
							SILTY SANDSTONE: 25% non-plastic fines; 50% fine sand; 25% medium sand; damp.	
				190			SANDY SILTSTONE: dusky yellow (5Y 6/4); 65 to 70% non- to low- plasticity fines; 30 to 35% fine sand; damp to moist.	
							SILTSTONE: moderate olive brown (5Y 4/4); 80 to 85% low- to medium-plasticity fines; 15 to 20% fine to medium sand; moist.	
				200				

REMARKS

Boring drilled using air rotary methods with a Dresser T70W drilling rig. Boring diameter 10.75 inches to 38.7 feet bgs and 10.5 inches from 38 feet bgs to 302 feet bgs. Drill cuttings were collected at approximately 10-foot depth intervals except where shown otherwise. A Munsell soil color chart was used to describe soil colors and a GSA rock color chart was utilized for bedrock color descriptions. The boring was converted to a 4.0-inch diameter, Schedule 80 PVC monitoring well. Refer to Well Details for construction information.

EMCON

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **20976-001.041**

WELL NO.: **DW-14**

PROJECT NAME: **Chiquita Canyon Landfill**

PAGE: **8 of 8**

BY: **Don Koning**

DATE: **4/23/98**

SURFACE ELEVATION: **1233± MSL**

PID READING (ppm)	PENETRATION (blows/6")	RECOVERY (ft/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							SILTSTONE:	
							SILTSTONE: [illegible] moist.	
				210			CLAYSTONE: [illegible] 100% medium- plasticity fines; damp.	
			4/24/98				SILTSTONE: [illegible] low-plasticity fines; damp.	
				220			SILTY SANDSTONE: 20% non-plastic fines; 80% fine sand; damp.	
				230			@ 228 ft.: 40 to 45% non-plasticity fines; 60 to 65% fine sand; damp.	
							SANDY MUDSTONE: light olive brown (5Y 5/6); 75% medium- plasticity fines; 25% fine sand; damp.	
							MUDSTONE: 100% low- to medium-plasticity fines; damp.	
							SILTY SANDSTONE: dusky yellow (5Y 6/4); 20% non-plasticity fines; 70% fine sand; 5 to 10% medium sand; damp to moist.	
				240				

REMARKS

Boring drilled using air rotary methods with a Dresser T70W drilling rig. Boring diameter 10.75 inches to 38.7 feet bgs and 10.5 inches from 38 feet bgs to 302 feet bgs. Drill cuttings were collected at approximately 10-foot depth intervals except where shown otherwise. A Munsell soil color chart was used to describe soil colors and a GSA rock color chart was utilized for bedrock color descriptions. The boring was converted to a 4.0-inch diameter, Schedule 80 PVC monitoring well. Refer to Well Details for construction information.

EMCON

For use with report dated 07/26/2006; RTF job number 2002-036-01

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **20976-001.041**

WELL NO.: **DW-14**

PROJECT NAME: **Chiquita Canyon Landfill**

PAGE: **7** of **8**

BY: **Don Koning**

DATE: **4/23/98**

SURFACE ELEVATION: **1233± MSL**

PID READING (ppm)	PENETRATION (blows/6")	RECOVERY (ft/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
0.5					☒		SILTY SANDSTONE:	
							SANDSTONE: [illegible] non-plastic fines; 55% fine sand; 15% medium sand; 5% coarse sand; moist.	
					☒			
				250	☒		@ 250 ft.: 25% fine sand; 30% medium sand; 30% coarse sand; 5% fine gravel; 10% hard gravel-size mudballs; moist.	
			▽ 4/23/98					
					☒		@ 255 ft.: moderate olive brown (5Y 4/4); 50% fine sand; 45% medium sand; 5% coarse sand; moist.	
				260	☒		SILTY SANDSTONE: moderate olive brown (5Y 4/4); 15% non-plastic fines; 60% fine sand; 25% medium sand; moist.	
							SANDSTONE: 100% fine to medium sand; moist.	
					☒		@ 265 ft.: moderate olive brown (5Y 4/4); 5 to 10% non-plastic fines; 70 to 75% fine sand; 20% medium sand; moist.	
				270	☒			
					☒		@ 274 ft.: trace to 5% non-plastic fines; 40% fine sand; 45% medium sand; 10% coarse sand; subangular to subrounded; moist.	
							@ 275 ft.: light olive gray (5Y 5/2); 35% fine sand; 45% medium sand; 20% coarse sand; moist.	
				280	☒			

REMARKS

Boring drilled using air rotary methods with a Dresser T70W drilling rig. Boring diameter 10.75 inches to 38.7 feet bgs and 10.5 inches from 38 feet bgs to 302 feet bgs. Drill cuttings were collected at approximately 10-foot depth intervals except where shown otherwise. A Munsell soil color chart was used to describe soil colors and a GSA rock color chart was utilized for bedrock color descriptions. The boring was converted to a 4.0-inch diameter, Schedule 80 PVC monitoring well. Refer to Well Details for construction information.

EMCON

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **20976-001.041**

WELL NO.: **DW-14**

PROJECT NAME: **Chiquita Canyon Landfill**

PAGE: **8** of **8**

BY: **Don Koning**

DATE: **4/23/98**

SURFACE ELEVATION: **1233± MSL**

PID READING (ppm)	PENETRATION (blows/6")	RECOVERY (ft/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							[illegible] SANDSTONE: 5 to 10% non-plastic fines; 45% fine sand; 45% medium sand; moist.	
				290				
							SILTY SANDSTONE: 15 to 20% low-plasticity fines; 80 to 85% fine to coarse sand; wet.	
				300				
							BOTTOM OF BORING: 302 FEET TARGET DEPTH REACHED	
				310				
				320				

REMARKS

Boring drilled using air rotary methods with a Dresser T70W drilling rig. Boring diameter 10.75 inches to 38.7 feet bgs and 10.5 inches from 38 feet bgs to 302 feet bgs. Drill cuttings were collected at approximately 10-foot depth intervals except where shown otherwise. A Munsell soil color chart was used to describe soil colors and a GSA rock color chart was utilized for bedrock color descriptions. The boring was converted to a 4.0-inch diameter, Schedule 80 PVC monitoring well. Refer to Well Details for construction information.

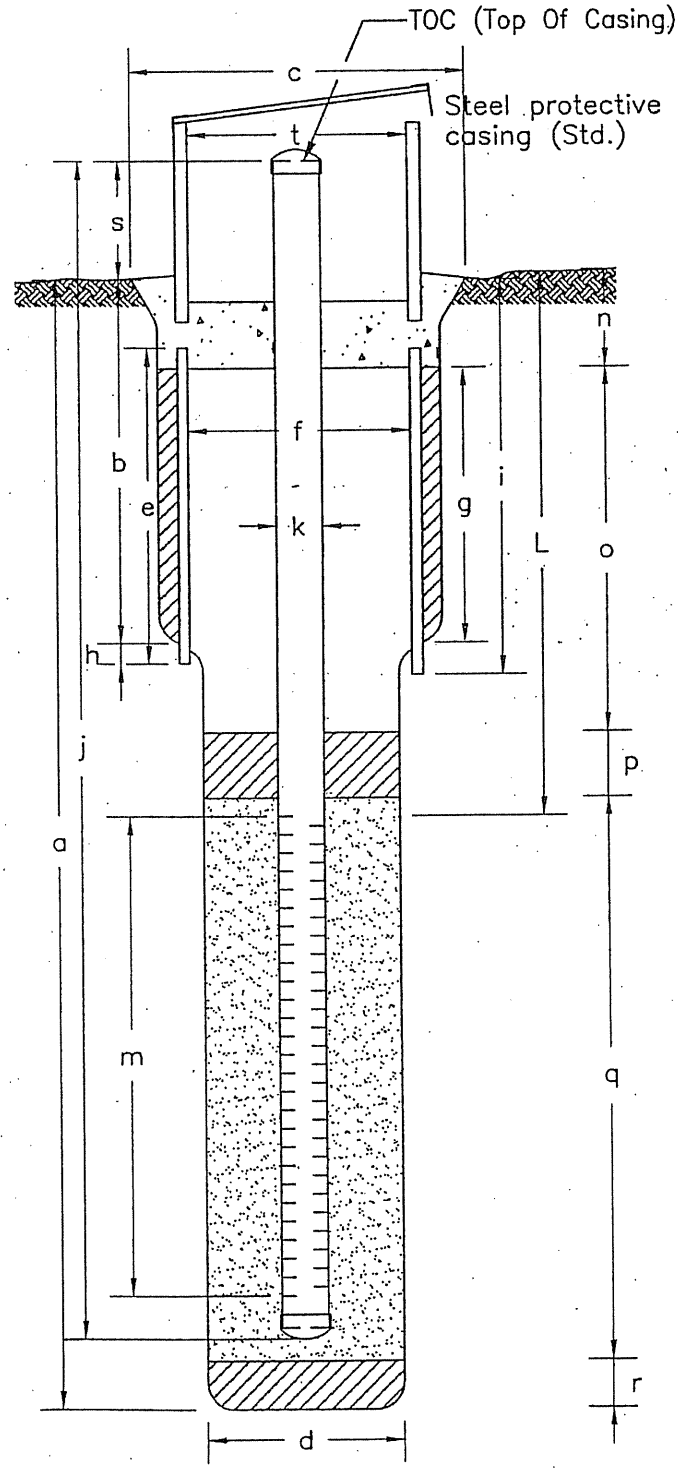
EMCON

WELL DETAILS

EMCON

JOB NUMBER 792038
PROJECT NAME CHIQUITA CANYON LANDFILL
LOCATION LOS ANGELES COUNTY
WELL PERMIT NO. _____

BORING/WELL NO. DW-18
TOP OF CASING ELEV. 986.53
GROUND SURFACE ELEV. 985.43
DATUM MEAN SEA LEVEL
INSTALLATION DATE 11/02/99



EXPLORATORY BORING

a. Total depth 79.5 ft.
b. Upper boring depth – ft.
c. Upper boring diameter – in.
d. Lower boring diameter 11.25 in.
Drilling method AIR ROTARY

CONDUCTOR CASING

e. Total casing length 79.5 ft.
Material STEEL
f. Diameter (O.D.) 11.25 in.
g. Upper (outer) seal – ft.
Material –
h. Penetration – in.
i. Depth 79.5 ft.

WELL CONSTRUCTION

j. Casing length 80.5 ft.
Material SCH 40 PVC
k. Diameter 4.0 in.
L. Depth to top of perforations 57.89 ft.
m. Perforated length 19.6 ft.
Perforated interval from 57.89 to 77.49
Perforation type MACHINE SLOTTED
Perforation size 0.020"
n. Surface seal 6.5 ft.
Seal material CONCRETE
o. Backfill 40.8 ft.
Backfill material BENTONITE CHIPS
p. Transition Seal 5 ft.
Seal material BENTONITE CHIPS
q. Sand Filter Pack 27.2 ft.
Pack material #2/12 SAND
r. Bottom seal – ft.
Material –
s. Casing height 2.5 ft.
t. Protective casing diameter 12 in.

DETAILAF

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EMCON/OWT Solid Waste Services

EXPLORATORY BORING LOG

SITE NAME AND LOCATION Chiquita Canyon Landfill Valencia, California	DRILLING METHOD: ARCH	DRILLING CONTRACTOR: Water Development Corp.	BORING NO. DW-18
	RIG: Dresser T70W	OPERATOR:	SHEET 1 OF 1
▼ = Static Water Levels ▽ = First Encountered Water	SAMPLING METHOD:		
PROJECT NO. 792038			DRILLING
SURFACE CONDITIONS:	BOREHOLE DIAMETER: 11 1/4"		START TIME / FINISH TIME
	BOREHOLE DEPTH:	DRILLED DEPTH: 79.5'	
LOCATION:	WATER LEVEL	61.4 / 61.24	DATE 11/02/99 / DATE 11/02/99
EAST 6366755.9871 NORTH 1977790.2706	DATE	10:00 / 10:08	
DATUM MSL ELEVATION (FT. MSL) 985.43	TIME	11/2/99 / 11/22/99	

TIME	Type of Sampler	RECOVERY FT. / FT.	SAMPLE NO.	SAMPLE INTERVAL	DEPTH (FT.)	WATER LEVEL	GRAPHIC LOG	DESCRIPTION
					0-40			PZ-2 well material; fine sand with cement fragments (no PVC @25')
					42			
					44			@45'; well material absent; returns mostly fine to medium sands with gravel and rock fragments.
					46			
					48			
					50			
					52			
					54			
					56			
					58			@58'; **GRAVELLY SANDSTONE (SW)**, moderate greenish yellow (10YR 7/4); mostly fine to medium sand; minor silt; gravel size clasts; moist.
					60	▽		
					62			
					64			
					66			
					68			
					70			@70'; begin injecting water to bring up cuttings; returns are moist.
					72			@73'; 40% fine to coarse gravel.
					74			
					76			
					78			
					80			Bottom of Boring; 79.5'

COMMENTS:

QA/QC
LOGGED BY Paul Chang
CHECKED BY _____ DATE _____

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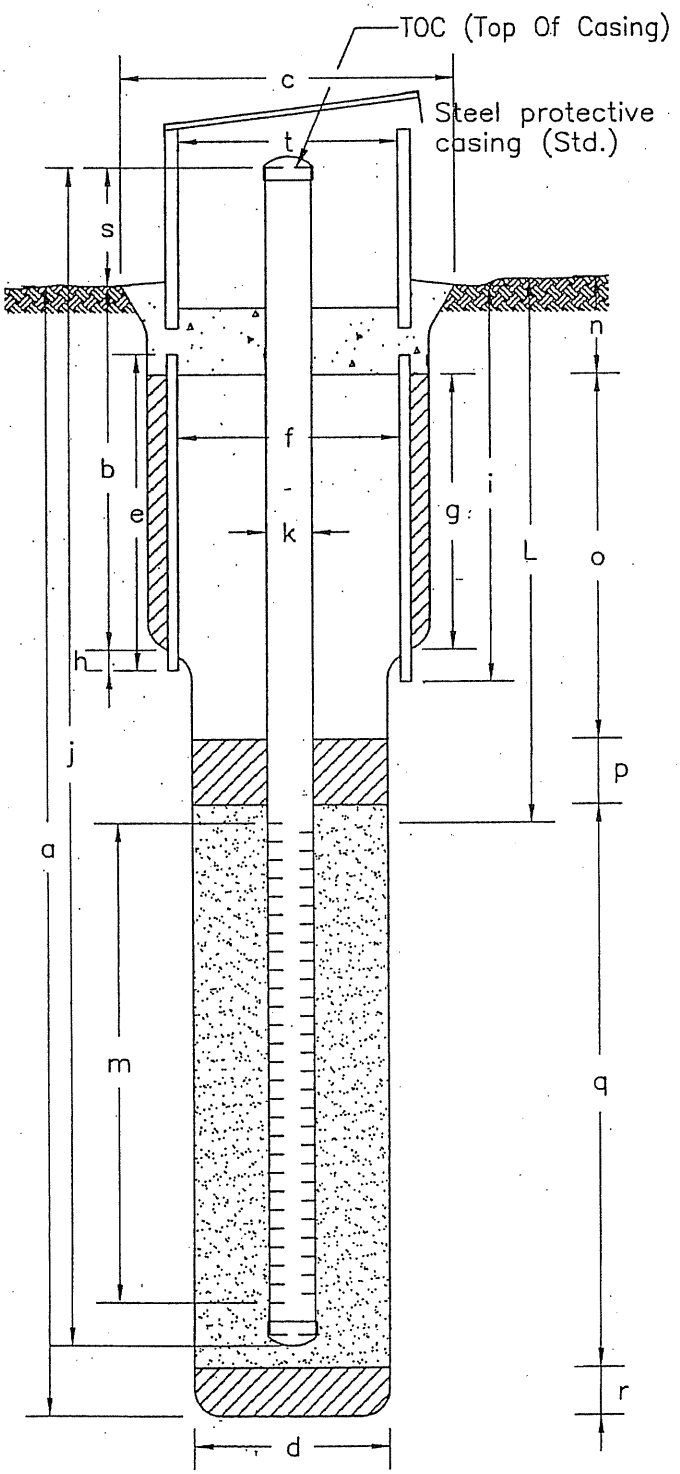
For use with report dated 07/26/2006; RTF job number 2002-036-01

WELL DETAILS

EMCON

JOB NUMBER 792038 BORING/WELL NO. DW-19
PROJECT NAME CHIQUITA CANYON LANDFILL TOP OF CASING ELEV. 1241.66
LOCATION LOS ANGELES COUNTY GROUND SURFACE ELEV. 1239.35
WELL PERMIT NO. _____ DATUM MEAN SEA LEVEL
INSTALLATION DATE 11/10/99



EXPLORATORY BORING

a. Total depth 282 ft.
b. Upper boring depth 137 ft.
c. Upper boring diameter 11.25 in.
d. Lower boring diameter 10.75 in.
Drilling method AIR ROTARY

CONDUCTOR CASING

e. Total casing length 140 ft.
Material STEEL
f. Diameter (O.D.) 11.25 in.
g. Upper (outer) seal – ft.
Material –
h. Penetration – in.
i. Depth 137 ft.

WELL CONSTRUCTION

j. Casing length 202.7 ft.
Material SCH 40 PVC
k. Diameter 4 in.
L. Depth to top of perforations 160.3 ft.
m. Perforated length 39.4 ft.
Perforated interval from 160.3 to 199.7
Perforation type MACHINE SLOTTED
Perforation size 0.020"
n. Surface seal 4 ft.
Seal material CONCRETE
o. Backfill 136 ft.
Backfill material BENTONITE GROUT
p. Transition Seal 4 ft.
Seal material BENTONITE CHIPS & GROUT
q. Sand Filter Pack 76 ft.
Pack material #2/12 SAND
r. Bottom seal 60 ft.
Material BENTONITE GROUT
s. Casing height 2.5 ft.
t. Protective casing diameter 12 in.

DETAILAF

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For use with report dated 07/26/2006; RTF job number 2002-036-01

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EMCON/OWT Solid Waste Services

EXPLORATORY BORING LOG

SITE NAME AND LOCATION: Chiquita Canyon Landfill, Valencia, California	DRILLING METHOD: ARCH	DRILLING CONTRACTOR: Water Development Corp.	BORING NO. DW-19
	RIG: Dresser T70W	OPERATOR:	SHEET 1 OF 8
▼ = Static Water Levels ▽ = First Encountered Water	SAMPLING METHOD: Grab		
PROJECT NO. 792038			DRILLING
SURFACE CONDITIONS:	BOREHOLE DIAMETER: 11 1/4" / 10 3/4"		START TIME 14:05 / FINISH TIME 14:54
	BOREHOLE DEPTH:	DRILLED DEPTH: 282'	
LOCATION:	WATER LEVEL: 121 / 65.14		DATE 11/08/99 / DATE 11/10/99
EAST 6367731.746 NORTH 1982776.2224	DATE: 11/9/99 / 11/23/99		
DATUM MSL ELEVATION (FT. MSL) 1239.35	TIME: 9:07 / 7:58		

TIME	TYPE OF SAMPLER	RECOVERY FT. / FT.	SAMPLE NO.	SAMPLE INTERVAL	DEPTH (FT.)	WATER LEVEL	GRAPHIC LOG	DESCRIPTION
14:05					2, 4, 6, 8			Artificial Fill: **SILTY SAND (SM),** light olive brown (5Y 5/6); some fines; mostly fine to medium sand; minor coarse sand and gravels; dry to moist; moderately dense
14:40	Grab			■	10, 12, 14, 16, 18			
14:55	Grab			■	20, 22, 24, 26, 28			@20'; light olive (10Y 5/4); more gravels.
15:09	Grab			■	30, 32, 34, 36, 38			@36'; dusky yellow (5Y 6/4)
15.22	Grab			■	40			

COMMENTS:

QA/QC
LOGGED BY Paul Chang
CHECKED BY _____ DATE _____

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For use with report dated 07/26/2006; RTF job number 2002-036-01

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EMCON/OWT Solid Waste Services

EXPLORATORY BORING LOG

SITE NAME AND LOCATION Chiquita Canyon Landfill Valencia, California	DRILLING METHOD: ARCH	DRILLING CONTRACTOR: Water Development Corp.	BORING NO. DW-19
	RIG: Dresser T70W	OPERATOR:	SHEET 2 OF 8
▼ = Static Water Levels ▽ = First Encountered Water	SAMPLING METHOD: Grab		
PROJECT NO. 792038			DRILLING
SURFACE CONDITIONS:	BOREHOLE DIAMETER: 11 1/4" / 10 3/4"		START TIME 14:05 / FINISH TIME 14:54
	BOREHOLE DEPTH:	DRILLED DEPTH: 282'	
LOCATION:	WATER LEVEL 121	65.14	DATE 11/08/99 / DATE 11/10/99
EAST 6367731.746 NORTH 1982776.2224	DATE 11/9/99	11/23/99	
DATUM MSL ELEVATION (FT. MSL) 1239.35	TIME 9:07	7:58	

TIME	TYPE OF SAMPLER	RECOVERY FT. / FT.	SAMPLE NO.	SAMPLE INTERVAL	DEPTH (FT.)	WATER LEVEL	GRAPHIC LOG	DESCRIPTION
					40			
					42			
					44			@43'; dark yellowish orange (10YR 6/6); less silty; more fines to medium sands.
					46			
					48			
15:48	Grab				50			
					52			
					54			
15:54	Grab				56			
					58			
16:15	Grab				60			@60'; slightly more gravels.
					62			
					64	▼		
16:21	Grab				66			
					68			@68'; dusky yellow (5Y 6/4); mostly fine to medium sand with some gravels.
16:56	Grab				70			
					72			
					74			
17:05	Grab				76			
					78			
17:13	Grab				80			

COMMENTS:

QA/QC
LOGGED BY Paul Chang
CHECKED BY _____ DATE _____

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EMCON/OWT Solid Waste Services

EXPLORATORY BORING LOG

SITE NAME AND LOCATION Chiquita Canyon Landfill Valencia, California	DRILLING METHOD: ARCH	DRILLING CONTRACTOR: Water Development Corp.	BORING NO. DW-19
	RIG: Dresser T70W	OPERATOR:	SHEET 3 OF 8
▼ = Static Water Levels ▽ = First Encountered Water	SAMPLING METHOD: Grab		
PROJECT NO. 792038			DRILLING
SURFACE CONDITIONS:	BOREHOLE DIAMETER: 11 1/4" / 10 3/4"		START TIME 14:05 / FINISH TIME 14:54
	BOREHOLE DEPTH:	DRILLED DEPTH: 282'	
LOCATION:	WATER LEVEL	121 / 65.14	DATE 11/08/99 / DATE 11/10/99
EAST 6367731.746 NORTH 1982776.2224	DATE	11/9/99 / 11/23/99	
DATUM MSL ELEVATION (FT. MSL) 1239.35	TIME	9:07 / 7:58	

TIME	TYPE OF SAMPLER	RECOVERY FT. / FT.	SAMPLE NO.	SAMPLE INTERVAL	DEPTH (FT.)	WATER LEVEL	GRAPHIC LOG	DESCRIPTION
	Grab				80			@80'; mostly gravels.
					82			Pico Formation:
					84			**SANDSTONE (SW)**; grayish yellow green (5GY 7/2); minor fines; mostly fine to medium sands; hard; moist; (injecting water).
7:30	Grab				86			
					88			
7:37	Grab				90			
					92			
					94			@94'; muddy sandstone; some fines; mostly fine sand; moist (injecting water); hard.
7:40	Grab				96			
					98			
7:43	Grab				100			@100'; Slightly less fines.
					102			**SANDY SILTSTONE (ML)**, pale yellowish green (10GY 7/2); 60% fines; 40% fine sand; occasional medium to course sand; some silty nodules; moist to wet (injecting water); moderately hard.
					104			
8:34	Grab				106			
					108			**SILTY SANDSTONE (SM)**, grayish yellow green (5GY 7/2); some fines; mostly fine sand; minor medium to coarse sand; moderately hard.
8:39	Grab				110			
					112			
					114			
	Grab				116			
					118			
8:52	Grab				120			

COMMENTS:

QA/QC
LOGGED BY Paul Chang
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EMCON/OWT Solid Waste Services

EXPLORATORY BORING LOG

SITE NAME AND LOCATION Chiquita Canyon Landfill Valencia, California	DRILLING METHOD: ARCH	DRILLING CONTRACTOR: Water Development Corp.	BORING NO. DW-19
	RIG: Dresser T70W	OPERATOR:	SHEET 4 OF 8
▼ = Static Water Levels ▽ = First Encountered Water	SAMPLING METHOD: Grab		
PROJECT NO. 792038			DRILLING
SURFACE CONDITIONS:	11 1/4" / 10 3/4"		START TIME 14:05 / FINISH TIME 14:54
	BOREHOLE DEPTH:	DRILLED DEPTH: 282'	
LOCATION:	WATER LEVEL 121	65.14	DATE 11/08/99 / DATE 11/10/99
EAST 6367731.746 NORTH 1982776.2224	DATE 11/9/99	11/23/99	
DATUM MSL ELEVATION (FT. MSL) 1239.35	TIME 9:07	7:58	

TIME	TYPE OF SAMPLER	RECOVERY FT. / FT.	SAMPLE NO.	SAMPLE INTERVAL	DEPTH (FT.)	WATER LEVEL	GRAPHIC LOG	DESCRIPTION
	Grab				120	▽		SANDY SILTSTONE (ML); Grayish yellow green (5GY 7/2); mostly fine silt; some fine sand; hard. @121'; driller notes possible water production.
					122			
					124			
9:10	Grab				126			@125'; more coarse sand and minor gravels
					128			
9:18	Grab				130			
					132			
					134			
9:21	Grab				136			@135'; mostly fines & fine sand; minor medium to coarse sand.
					138			
9:25	Grab				140			
					142			
					144			
10:37	Grab				146			@145'; grayish green (10GY 5/2); hard.
					148			
10:43	Grab				150			@150'; more fines.
					152			
					154			
11:16	Grab				156			
					158			
11:27	Grab				160			

COMMENTS:

QA/QC
LOGGED BY Paul Chang
CHECKED BY _____ DATE _____

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For use with report dated 07/26/2006; RTF job number 2002-036-01

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EMCON/OWT Solid Waste Services

EXPLORATORY BORING LOG

SITE NAME AND LOCATION: Chiquita Canyon Landfill, Valencia, California	DRILLING METHOD: ARCH	DRILLING CONTRACTOR: Water Development Corp.	BORING NO. DW-19
	RIG: Dresser T70W	OPERATOR:	SHEET 5 OF 8
▼ = Static Water Levels ▽ = First Encountered Water	SAMPLING METHOD: Grab		
PROJECT NO. 792038			DRILLING
SURFACE CONDITIONS:	BOREHOLE DIAMETER: 11 1/4" / 10 3/4"		START TIME 14:05 / FINISH TIME 14:54
	BOREHOLE DEPTH:	DRILLED DEPTH: 282'	
LOCATION:	WATER LEVEL: 121 / 65.14		DATE 11/08/99 / DATE 11/10/99
EAST 6367731.746 NORTH 1982776.2224	DATE: 11/9/99 / 11/23/99		
DATUM MSL ELEVATION (FT. MSL) 1239.35	TIME: 9:07 / 7:58		

TIME	TYPE OF SAMPLER	RECOVERY FT. / FT.	SAMPLE NO.	SAMPLE INTERVAL	DEPTH (FT.)	WATER LEVEL	GRAPHIC LOG	DESCRIPTION
	Grab				160			
					162			
					164			
13:16	Grab				166			@165; more fines.
					168			
13:23	Grab				170			
					172			
					174			
13:30	Grab				176			**SANDY SILTSTONE TO SANDY CLAYSTONE (ML)**, pale olive (10Y 6/2); moderate plasticity fines; 35% fine sand; minor medium to coarse sand; moist to wet (injecting water); hard.
					178			
13:37	Grab				180			
					182			
					184			
13:50	Grab				186			
					188			
13:54	Grab				190			
					192			
					194			
14:00	Grab				196			
					198			
14:05	Grab				200			

COMMENTS:

QA/QC
LOGGED BY Paul Chang
CHECKED BY _____ DATE _____

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For use with report dated 07/26/2006; RTF job number 2002-036-01

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EMCON/OWT Solid Waste Services

EXPLORATORY BORING LOG

SITE NAME AND LOCATION Chiquita Canyon Landfill Valencia, California	DRILLING METHOD: ARCH	DRILLING CONTRACTOR: Water Development Corp.	BORING NO. DW-19
	RIG: Dresser T70W	OPERATOR:	SHEET 6 OF 8
▼ = Static Water Levels ▽ = First Encountered Water	SAMPLING METHOD: Grab		
PROJECT NO. 792038			DRILLING
SURFACE CONDITIONS:	BOREHOLE DIAMETER: 11 1/4" / 10 3/4"		START TIME 14:05 / FINISH TIME 14:54
	BOREHOLE DEPTH:	DRILLED DEPTH: 282'	
LOCATION:	WATER LEVEL	121 / 65.14	DATE 11/08/99 / DATE 11/10/99
EAST 6367731.746 NORTH 1982776.2224	DATE	11/9/99 / 11/23/99	
DATUM MSL ELEVATION (FT. MSL) 1239.35	TIME	9:07 / 7:58	

TIME	TYPE OF SAMPLER	RECOVERY FT. / FT.	SAMPLE NO.	SAMPLE INTERVAL	DEPTH (FT.)	WATER LEVEL	GRAPHIC LOG	DESCRIPTION
					200			
					202			
					204			
14:20	Grab				206			
					208			
14:32	Grab				210			@210'; slightly less clayey.
					212			
					214			
14:37	Grab				216			@215'; minor medium to coarse sands.
					218			
14:49	Grab				220			
					222			
					224			
8:37					226			@225'; drilling and injecting water, but no returns.
8:43	Grab				228			
8:49	Grab				230			
					232			
					234			
9:02	Grab				236			
					238			
9:11	Grab				240			

COMMENTS:

QA/QC
LOGGED BY Paul Chang
CHECKED BY _____ DATE _____

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For use with report dated 07/26/2006; RTF job number 2002-036-01

the igroup
EMCON/OWT Solid Waste Services

EXPLORATORY BORING LOG

SITE NAME AND LOCATION Chiquita Canyon Landfill Valencia, California	DRILLING METHOD: ARCH	DRILLING CONTRACTOR: Water Development Corp.	BORING NO. DW-19
	RIG: Dresser T70W	OPERATOR:	SHEET 7 OF 8
▼ = Static Water Levels ▽ = First Encountered Water	SAMPLING METHOD: Grab		
PROJECT NO. 792038			DRILLING
SURFACE CONDITIONS:	BOREHOLE DIAMETER: 11 1/4" / 10 3/4"		START TIME 14:05 / FINISH TIME 14:54
	BOREHOLE DEPTH:	DRILLED DEPTH: 282'	
LOCATION:	WATER LEVEL 121 / 65.14		DATE 11/08/99 / DATE 11/10/99
EAST 6367731.746 NORTH 1982776.2224	DATE 11/9/99 / 11/23/99		
DATUM MSL ELEVATION (FT. MSL) 1239.35	TIME 9:07 / 7:58		

TIME	TYPE OF SAMPLER	RECOVERY FT. / FT.	SAMPLE NO.	SAMPLE INTERVAL	DEPTH (FT.)	WATER LEVEL	GRAPHIC LOG	DESCRIPTION
					240			(as above)
					242			
					244			
9:40	Grab				246			
					248			
9:47	Grab				250			
					252			
					254			
9:52	Grab				256			
					258			
10:17	Grab				260			
					262			
					264			
10:21	Grab				266			
					268			
10:25	Grab				270			
					272			
					274			
11:40	Grab				276			@275'; minor fine gravel
					278			@280'; fine to coarse gravel ~5%; coarse gravel is angular-rounded, granitoid and sandy siltstone.
14:54	Grab				280			

COMMENTS:

QA/QC
LOGGED BY Paul Chang
CHECKED BY _____ DATE _____

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For use with report dated 07/26/2006; RTF job number 2002-036-01

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EMCON/OWT Solid Waste Services

EXPLORATORY BORING LOG

SITE NAME AND LOCATION Chiquita Canyon Landfill Valencia, California	DRILLING METHOD: ARCH	DRILLING CONTRACTOR: Water Development Corp.	BORING NO. DW-19
	RIG: Dresser T70W	OPERATOR:	SHEET 8 OF 8
▼ = Static Water Levels ▽ = First Encountered Water	SAMPLING METHOD: Grab		DRILLING
PROJECT NO. 792038			START TIME 14:05 / FINISH TIME 14:54
SURFACE CONDITIONS:	BOREHOLE DIAMETER: 11 1/4" / 10 3/4"		
	BOREHOLE DEPTH:	DRILLED DEPTH: 282'	
LOCATION:	WATER LEVEL 121	65.14	DATE 11/08/99 / DATE 11/10/99
EAST 6367731.746 NORTH 1982776.2224	DATE 11/9/99	11/23/99	
DATUM MSL ELEVATION (FT. MSL) 1239.35	TIME 9:07	7:58	

TIME	TYPE OF SAMPLER	RECOVERY FT. / FT.	SAMPLE NO.	SAMPLE INTERVAL	DEPTH (FT.)	WATER LEVEL	GRAPHIC LOG	DESCRIPTION
					280			
					282			**TOTAL DEPTH OF BORING: 282'** **TERMINATED HOLE**
					284			
					286			
					288			
					290			
					292			
					294			
					296			
					298			
					300			
					302			
					304			
					306			
					308			
					310			
					312			
					314			
					316			
					318			
					320			

COMMENTS:

QA/QC
LOGGED BY Paul Chang
CHECKED BY _____ DATE _____

BUR: N:\PUBLIC\C...ON\CHIQUITA\DW-19.ai

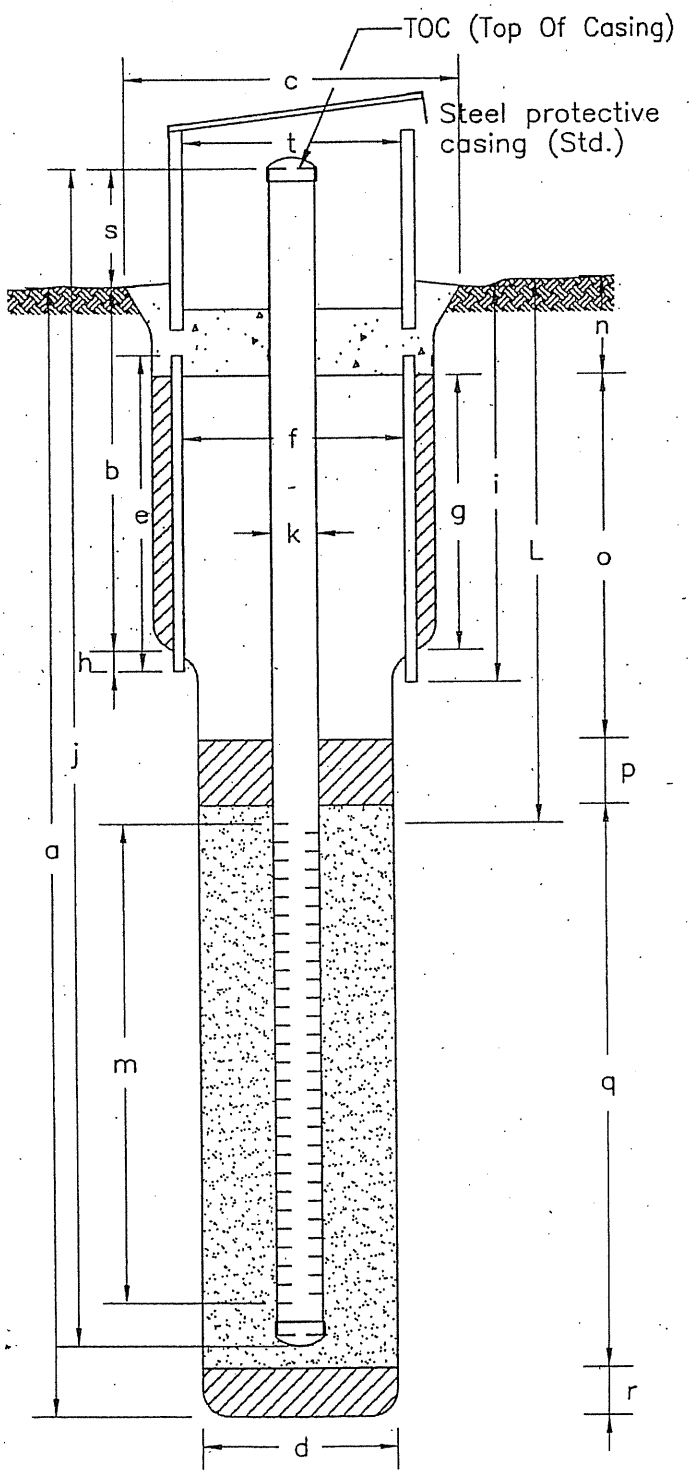
For use with report dated 07/26/2006; RTF job number 2002-036-01

WELL DETAILS

EMCON

JOB NUMBER 792038
PROJECT NAME CHIQUITA CANYON LANDFILL
LOCATION LOS ANGELES COUNTY
WELL PERMIT NO.

BORING/WELL NO. DW-21
TOP OF CASING ELEV. 987.23
GROUND SURFACE ELEV. 985.70
DATUM MEAN SEA LEVEL
INSTALLATION DATE 11/05/99



EXPLORATORY BORING

a. Total depth 182.5 ft.
b. Upper boring depth 96 ft.
c. Upper boring diameter 11.25 in.
d. Lower boring diameter 10.75 in.
Drilling method AIR ROTARY

CONDUCTOR CASING

e. Total casing length 100 ft.
Material STEEL
f. Diameter (O.D.) 11.25 in.
g. Upper (outer) seal – ft.
Material
h. Penetration – in.
i. Depth 96 ft.

WELL CONSTRUCTION

j. Casing length 110.5 ft.
Material SCH 40 PVC
k. Diameter 4 in.
L. Depth to top of perforations 97.74 ft.
m. Perforated length 9.56 ft.
Perforated interval from 97.74 to 107.30
Perforation type MACHINE SLOTTED
Perforation size 0.020"
n. Surface seal 7 ft.
Seal material CONCRETE
o. Backfill 46.6 ft.
Backfill material BENTONITE CHIPS & GROUT
p. Transition Seal 42.25 ft.
Seal material BENTONITE CHIPS
q. Sand Filter Pack 14.25 ft.
Pack material #2/12 SAND
r. Bottom seal 72.4 ft.
Material #2/12 SAND, BENTONITE CHIPS
s. Casing height 2.5 ft.
t. Protective casing diameter 12 in.

DETAILAF

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EMCON/OWT Solid Waste Services

EXPLORATORY BORING LOG

SITE NAME AND LOCATION Chiquita Canyon Landfill Valencia, California	DRILLING METHOD: ARCH/Direct Air	DRILLING CONTRACTOR: Water Development Corp.	BORING NO. DW-21
	RIG: Dresser T70W	OPERATOR:	SHEET 1 OF 5
▼ = Static Water Levels ▽ = First Encountered Water	SAMPLING METHOD: Grab/94mm Core		
PROJECT NO. 792038			DRILLING
SURFACE CONDITIONS:	BOREHOLE DIAMETER: 11 2/4" / 10 3/4		START TIME 07:30 / FINISH TIME 13:45
	BOREHOLE DEPTH:	DRILLED DEPTH: 182.5'	
LOCATION:	WATER LEVEL 66.4		DATE 11/03/99 / DATE 11/05/99
EAST 6366722.9128 NORTH 1977818.9277	DATE 13:00		
DATUM MSL ELEVATION (FT. MSL) 985.70	TIME 11/4/99		

TIME	TYPE OF SAMPLER	RECOVERY FT. / FT.	SAMPLE NO.	SAMPLE INTERVAL	DEPTH (FT.)	WATER LEVEL	GRAPHIC LOG	DESCRIPTION
07:30					2, 4			**SILTY SAND (SM),** yellowish gray (5Y 7/2); some silt; mostly fine sand; dry (artificial fill).
	Grab				6			@5': dusky yellow (5Y 6/4)
					8			
	Grab				10			
					12			@11': more gravelly
					14			
	Grab				16			**ALLUVIUM (Qal):** moderate yellowish brown (10YR 5/4); minor fines; mostly fine to medium sand; occasional gravel, subangular to rounded; minor caliche fragments; moist.
					18			
8:20	Grab				20			
					22			@22': harder drilling
					24			**SANDSTONE (SW)** (Saugus Fm): moderate olive brown (5Y 4/4); mostly fine to medium sand; trace fines; minor caliche fragments in returns.
	Grab				26			
					28			
	Grab				30			@30'; mostly fine sand: occasional medium sand to fine gravel; no caliche fragments.
					32			
					34			
	Grab				36			@36': Harder driving
					38			
9:15	Grab				40			

COMMENTS:

QA/QC
LOGGED BY Paul Chang
CHECKED BY _____ DATE _____

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For use with report dated 07/26/2006; RTF job number 2002-036-01

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EMCON/OWT Solid Waste Services

EXPLORATORY BORING LOG

SITE NAME AND LOCATION Chiquita Canyon Landfill Valencia, California	DRILLING METHOD: ARCH/Direct Air	DRILLING CONTRACTOR: Water Development Corp.	BORING NO. DW-21
	RIG: Dresser T70W	OPERATOR:	SHEET 2 OF 5
▼ = Static Water Levels ▽ = First Encountered Water	SAMPLING METHOD: Grab/94mm Core		
PROJECT NO. 792038			DRILLING: START TIME 07:30; FINISH TIME 13:45
SURFACE CONDITIONS:	BOREHOLE DIAMETER: 11 2/4" / 10 3/4		
	BOREHOLE DEPTH:	DRILLED DEPTH: 182.5'	
LOCATION:	WATER LEVEL 66.4		DATE 11/03/99; DATE 11/05/99
EAST 6366722.9128 NORTH 1977818.9277	DATE 13:00		
DATUM MSL ELEVATION (FT. MSL) 985.70	TIM 11/4/99		

TIME	TYPE OF SAMPLER	RECOVERY FT. / FT.	SAMPLE NO.	SAMPLE INTERVAL	DEPTH (FT.)	WATER LEVEL	GRAPHIC LOG	DESCRIPTION
					40			
					42			@42'; **GRAVELLY SANDSTONE (SW)**: light olive gray (5Y 5/2); minor fines; mostly fine to medium sand; some subrounded gravels; medium dense; moist.
			Grab		44			
					46			
					48			@47.5'; slightly more gravels in cuttings; minor caliche.
			Grab		50			
					52			
					54			@53-56'; abundant gravels (subangular to subrounded.)
			Grab		56			
					58			
10:30			Grab		60			@59'; abundant gravels @61'; less gravels; more silty
					62			**SANDY MUDSTONE (ML)**; yellowish gray (5Y 7/2); 65% fines; 30% fine sand; 5% medium sand; dry; dense. (hard driving)
					64	▼		
			Grab		66	▽		@63'; dry to moist @66'; more sands; less fines.
11:40					68			@66.4'; First encounted water; sandstone with some gravel; moist to wet.
			Grab		70			
13:10					72			**SILTY SANDSTONE (SM)**; dusky yellow (5Y 6/9); 30% fines; 70% fine to medium sand; moist; moderately dense.
					74			
			Grab		76			@71-74.5; no returns; (injecting water)
					78			@78'; **GRAVELLY SANDSTONE (SW)**
			Grab					

COMMENTS:

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EMCON/OWT Solid Waste Services

EXPLORATORY BORING LOG

SITE NAME AND LOCATION Chiquita Canyon Landfill Valencia, California	DRILLING METHOD: ARCH/Direct Air	DRILLING CONTRACTOR: Water Development Corp.	BORING NO. DW-21
	RIG: Dresser T70W	OPERATOR:	SHEET 3 OF 5
▼ = Static Water Levels ▽ = First Encountered Water	SAMPLING METHOD: Grab/94mm Core		DRILLING
PROJECT NO. 792038			START TIME 07:30 / FINISH TIME 13:45
SURFACE CONDITIONS:	BOREHOLE DIAMETER: 11 2/4" / 10 3/4		
	BOREHOLE DEPTH:	DRILLED DEPTH: 182.5'	
LOCATION:	WATER LEVEL 66.4		DATE 11/03/99 / DATE 11/05/99
EAST 6366722.9128 NORTH 1977818.9277	DATE 13:00		
DATUM MSL ELEVATION (FT. MSL) 985.70	TIME 11/4/99		

TIME	TYPE OF SAMPLER	RECOVERY FT. / FT.	SAMPLE NO.	SAMPLE INTERVAL	DEPTH (FT.)	WATER LEVEL	GRAPHIC LOG	DESCRIPTION
14:35					80			
					82			**SANDY MUDSTONE (ML),** 70% fines; fine to coarse sand; wet (injecting water).
					84			**GRAVELLY SANDSTONE (SW),** light olive brown (5Y 5/6); 20% fines; mostly fine to medium sand; occasional gravel.
	Grab				86			
					88			**SANDY, GRAVELLY MUDSTONE (SW),** pale olive (10Y 7/4); some sand & gravel; mostly fines; wet (injecting water).
	Grab				90			**GRAVELLY SANDSTONE (SW),** as above.
					92			
					94			**SANDY MUDSTONE (ML),** pale olive (10Y 7/4); 60% fines; 40% fine sand; wet (injecting water).
	Grab				96			
					98			**SILTY SANDSTONE (SM),** light olive gray (5Y 5/2); 25% fines; mostly fine sand; minor medium to course sand.
	Grab				100			
					102			@102'; abundant gravels.
					104			@105'; silty, clayey sandstone; some fines with clay nodules; mostly fine to medium sand.
	Grab				106			@106'; occasional gravels
					108			@109'; sandy claystone (or clayey sandstone)
15:30	Grab				110			@110'; switch to 94 mm core. **SANDY CLAYSTONE (CL),** light olive brown (5Y 4/4); mostly fines; ~30% fine sand; minor medium to ourse sand; friable; finely laminated 112'-112.5' and 113.5'-114.5'; moist to wet.
	94mm	18"/18"	(1)		112			
	94mm	15"/18"	(2)		114			
7:05	94mm	5'/5'	(3)		116			**SANDY SILTSTONE (ML),** grayish olive (10Y 4/2); 60% fines; 40% fine sand; dense; moist to wet.
					118			**SILTY SANDSTONE (SM),** pale olive (10Y 4/2); 25% fines.
7:30					120			

COMMENTS:

QA/QC
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For use with report dated 07/26/2006; RTF job number 2002-036-01

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EMCON/OWT Solid Waste Services

EXPLORATORY BORING LOG

SITE NAME AND LOCATION: Chiquita Canyon Landfill, Valencia, California	DRILLING METHOD: ARCH/Direct Air	DRILLING CONTRACTOR: Water Development Corp.	BORING NO. DW-21
	RIG: Dresser T70W	OPERATOR:	SHEET 4 OF 5
▼ = Static Water Levels ▽ = First Encountered Water	SAMPLING METHOD: Grab/94mm Core		
PROJECT NO. 792038			DRILLING: START TIME 07:30; FINISH TIME 13:45
SURFACE CONDITIONS:	BOREHOLE DIAMETER: 11 2/4" / 10 3/4		
	BOREHOLE DEPTH:	DRILLED DEPTH: 182.5'	
LOCATION:	WATER LEVEL: 66.4		DATE: 11/03/99; DATE: 11/05/99
EAST 6366722.9128 NORTH 1977818.9277	DATE: 13:00		
DATUM MSL ELEVATION (FT. MSL) 985.70	TIME: 11/4/99		

TIME	Type of Sampler	RECOVERY FT. / FT.	SAMPLE NO.	SAMPLE INTERVAL	DEPTH (FT.)	WATER LEVEL	GRAPHIC LOG	DESCRIPTION
7:45	94mm	4.3'/5'	(4)		120, 122, 124			80% fine sand; friable; wet. @117 - 118.8'; slightly coarser with some medium sand. @120.6'; **SANDSTONE (SW)**, pale olive (10Y 6/2); minor fines; mostly fine sand; some medium sand; moist to wet.
8:00 8:12	94mm	4'/4'	(5)		126, 128			**SILTSTONE (ML)**, grayish olive (10Y 4/2); mostly silt; minor fine sands; hard; finely laminated; moist to wet.
8:37 8:50	94mm	4.4'/5'	(6)		130, 132			**SILTY SANDSTONE (SM)**, dusky yellowish green (5GY 5/2); 35% fines; 65% fine sand; dense to friable; moist to wet.
9:15 9:25	94mm	5'/5'	(7)		134, 136, 138			**SILTSTONE (ML)**, grayish olive (10Y 4/2); mostly silt; trace fine sands; hard; laminated; moist. @131-133.2', more fine sands; pale greenish yellow (10Y 8/2); with light olive brown (5Y 5/6) streaks. **SILTY SANDSTONE (SM)**, pale olive (10Y 6/2); minor fines; mostly fine sand; hard to friable; moist to wet. @134'; grayish green (5G 5/2); friable; wet.
9:54 10:02	94mm	3'/5'	(8)		140, 142, 144			**SILTSTONE (ML)**, grayish green (10GY 5/2); mostly silt; minor fine sand; very hard; moist; not laminated @137-137.4; slightly more fine sands. **SILTY SANDSTONE (SM)**, grayish green (10GY 5/2); minor silt; mostly fine sand; friable; moist to wet. @142'; minor gravels.
10:22 10:30	94mm	5'/5'	(9)		146, 148			
10:39 10:55	94mm	2.3'/5'	(10)		150, 152, 154			@147.8'; **SANDSTONE (SW)**; trace fines; mostly fine sand; some medium to coarse sand; wet; friable. @151.5'; possible gravels and cobbles; no recovery in core barrel. @152'; gravels in return
	Grab				156			**SANDY SILTSTONE (ML)**; with minor gravels.
	Grab				158, 160			**SANDSTONE (SW)**; grayish green; as above; trace gravels.

COMMENTS:

QA/QC
LOGGED BY: Paul Chang
CHECKED BY _____ DATE _____

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EMCON/OWT Solid Waste Services

EXPLORATORY BORING LOG

SITE NAME AND LOCATION Chiquita Canyon Landfill Valencia, California	DRILLING METHOD: ARCH/Direct Air	DRILLING CONTRACTOR: Water Development Corp.	BORING NO. DW-21
	RIG: Dresser T70W	OPERATOR:	SHEET 5 OF 5
▼ = Static Water Levels ▽ = First Encountered Water	SAMPLING METHOD: Grab/94mm Core		
PROJECT NO. 792038			DRILLING
SURFACE CONDITIONS:	BOREHOLE DIAMETER: 11 2/4" / 10 3/4		START TIME 07:30 / FINISH TIME 13:45
	BOREHOLE DEPTH:	DRILLED DEPTH: 182.5'	
LOCATION:	WATER LEVEL 66.4		DATE 11/03/99 / DATE 11/05/99
EAST 6366722.9128 NORTH 1977818.9277	DATE 13:00		
DATUM MSL ELEVATION (FT. MSL) 985.70	TIME 11/4/99		

TIME	Type of Sampler	RECOVERY FT. / FT.	SAMPLE NO.	SAMPLE INTERVAL	DEPTH (FT.)	WATER LEVEL	GRAPHIC LOG	DESCRIPTION
13:45					160			sandstone continues; with minor gravels.
	Grab				162			
					164			
					166			
	Grab				168			
					170			**SANDY SILTSTONE (ML)**, grayish olive green (5GY 3/2); mostly clays; minor fine to medium sand; hard; slow drilling.
					172			
					174			
					176			
					178			
					180			@179'; more sandy; 35% fine to medium sand.
					182			
					184			**TOTAL DEPTH OF BORING: 182.5'** **TARGET DEPTH REACHED**

COMMENTS:

QA/QC
LOGGED BY Paul Chang
CHECKED BY _____ DATE _____

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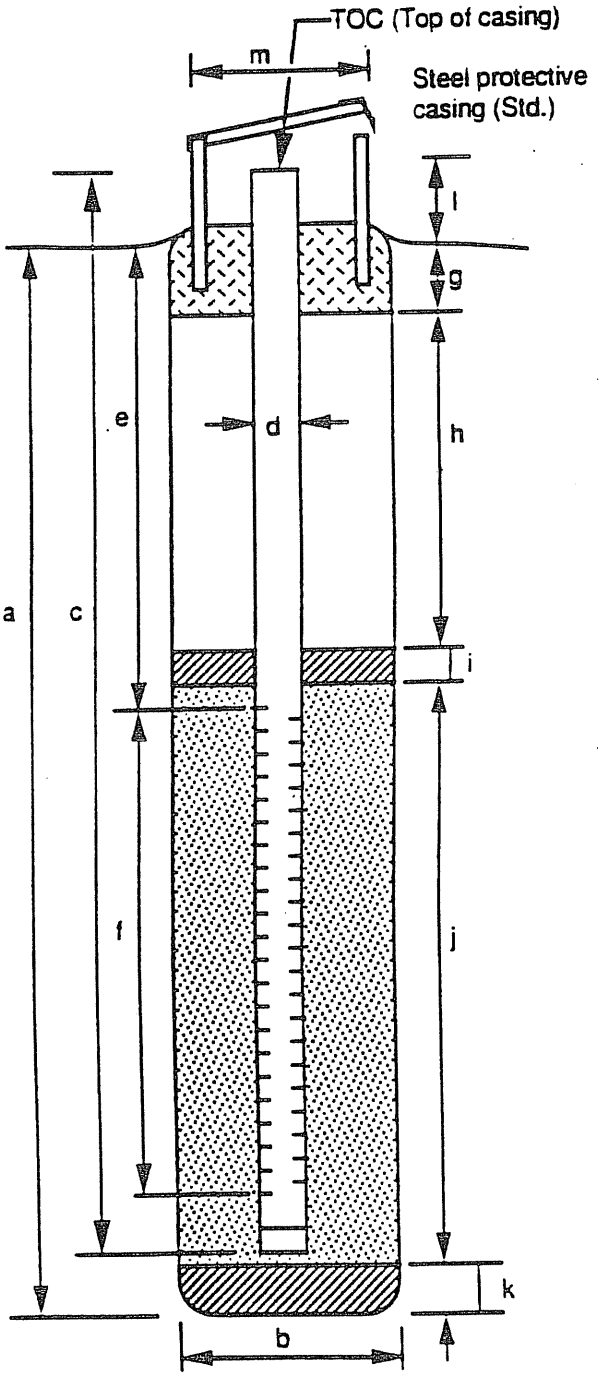
For use with report dated 07/26/2006; RTF job number 2002-036-01

PIEZOMETER DETAILS

EMCON ASSOCIATES

PROJECT NUMBER 976-04.02
PROJECT NAME Chiquita Canyon Landfill - VMP
LOCATION Los Angeles County
WELL PERMIT NO. LA County DHS. 5/22/91
INSTALLED BY L. Rainey

PIEZOMETER NO. PZ-1
TOP OF CASING ELEV. 968.58 ft.
GROUND SURFACE ELEV. 966 ft.
DATUM MSL
INSTALLATION DATE 5/16/91



EXPLORATORY BORING

a. Total depth 57.2 ft.
b. Diameter 10 in.
Drilling method Hollow Stem Auger

WELL CONSTRUCTION

c. Total casing length 59.6 ft.
Material Schedule 40 PVC
d. Diameter 2 in.
e. Depth to top perforations 36.9 ft.
f. Perforated length 19.8 ft.
Perforated interval from 36.9 to 56.7 ft.
Perforation type Machine Slotted
Perforation size 0.020 inch
g. Surface seal 3.0 ft.
Material Concrete
h. Backfill 29.5 ft.
Material Cement/Bentonite
i. Seal 2.4 ft.
Material Bentonite Chips
j. Gravel pack 22.3 ft.
Gravel pack interval from 34.9 to 57.2 ft.
Material Lonestar #3 Sand
k. Bottom seal/fill N/A ft.
Material
l. Casing stickup 2.4 ft.
m. Protective casing diameter 12 in.

Drilling Contractor: West Hazmat Drilling Corp.
Driller: Mark
Date:
Checked By:
Installed by:

Ventura Mac 2 LR:jaa Rev. 8/9/91

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For use with report dated 07/26/2006; RTF job number 2002-036-01

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-04.02 | BORING NO. PZ-1

PROJECT NAME Chiquita Canyon Landfill | PAGE 1 OF 7

BY K Johnson/L Rainey DATE 5/16/91 | SURFACE ELEV. ~966 ft.

Core Box # at top	Core Recovery (ft/ft)	Core Run # at top	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
		1					FILL: sand (SP-SM), dark grayish brown (10YR 4/2); 10% nonplastic fines; 75% fine sand; 15% medium sand; trace gravel; rootlets common; dry.	
	2.6/2.6	2		5			@ 4.5': same.	
							@ 5.5': light yellowish brown (10YR 6/4); 10 to 15% nonplastic fines; 85 to 90% fine sand; trace medium sand; trace fine gravel; subrounded; styrofoam debris.	
	1.5/2.3	3					@ 7': light gray (2.5Y 7/2); 100% fine sand; trace mica; very well sorted; damp.	
							@ 8': light yellowish brown (10YR 6/4); 90% fine sand; 10% medium sand; trace coarse sand; loose; dry.	
	0.7/2.0	4					@ 8.5'. pale yellow (5Y 7/4).	
							@ 9': sand (SW), pale yellow (5Y 7/4); 20% fine sand; 50% medium sand; 20% coarse sand; 10% gravel; damp.	
				10				

REMARKS

Boring drilled using hollow-stem auger equipment to the total depth explored. Continuous coring performed to total depth using a 2.5" (I.D.) 5-foot long split spoon sampler advanced ahead of the augers as drilling progressed. Subsequently, a 2" (O.D.) piezometer was installed. Soil and rock colors based on the Munsell Soil Color Chart.

QA/QC: [signature]

EMCON ASSOCIATES

For use with report dated 07/26/2006; RTF job number 2002-036-01

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-04.02 | BORING NO. PZ-1

PROJECT NAME Chiquita Canyon Landfill | PAGE 2 OF 7

BY K Johnson/L Rainey DATE 5/16/91 | SURFACE ELEV. ~966 ft.

Core Box # at top	Core Recovery (ft/ft)	Core Run # at top	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							SAND (SP), light yellowish brown (2.5Y 6/4); 85% fine sand; 15% medium sand; trace mica; medium grains are quartzose.	
	2.0/2.5	5					@ 12': 100% fine sand; very well sorted.	
							@ 12.5': trace nonplastic fines; 85% fine sand; 15% medium sand.	
							SILTY SAND (SM), light olive brown (2.5Y 5/4); 20% nonplastic fines; 80% fine sand; damp.	
	1.7/2.5	6					SAND (SP), light olive brown (2.5Y 5/4); 60% fine sand; 40% medium sand; damp.	
				15			SAND (SW), light yellowish brown (2.5Y 6/4); 5% nonplastic fines; 50% fine sand; 25% medium sand; 20% coarse sand; angular to subrounded; damp.	
	2.0/2.5	7					@ 17': gravelly lens containing 60% gravel; gravel is subrounded whitish quartzite, grayish brown granite, and black schist.	
							@ 17.7': light olive brown (2.5Y 5/4); 30% fine sand; 40% medium sand; 30% coarse sand; loose.	
							@ 17.8': biotite granite gravel encountered.	
							SANDSTONE (SAUGUS FORMATION), light brownish gray (2.5Y 6/2); 90% fine sand; 10% medium sand; micaceous; low to moderate hardness.	
	1.7/3.0	8					@ 18.5': light olive brown (2.5Y 5/4); 15% fine	
				20				

REMARKS

Boring drilled using hollow-stem auger equipment to the total depth explored. Continuous coring performed to total depth using a 2.5" (I.D.) 5-foot long split spoon sampler advanced ahead of the augers as drilling progressed. Subsequently, a 2" (O.D.) piezometer was installed. Soil and rock colors based on the Munsell Soil Color Chart.

QA/QC: [illegible]

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LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-04.02 | BORING NO. PZ-1

PROJECT NAME Chiquita Canyon Landfill | PAGE 3 OF 7

BY K Johnson/L Rainey DATE 5/16/91 | SURFACE ELEV. ~966 ft.

Core Box # at top	Core Recovery (ft/ft)	Core Run # at top	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							sand; 70% medium sand; 15% coarse sand; loose.	
							@ 18.75': gravelly lens encountered.	
							@ 20.5': 55% fine sand; 20% medium sand; 10% coarse sand; 15% gravel; gravel and coarse sand is subangular to subrounded granite and metamorphic rock; low hardness; damp.	
							@ 21.5': 45% fine sand; 25% medium sand; 25% coarse sand; 5% gravel.	
	1.5/2.5	9						
							@ 23': light yellowish brown (2.5Y 6/4); 90% fine sand; 10% medium sand.	
							@ 23.5': light olive brown (2.5Y 5/4); 10% nonplastic fines; 90% fine sand; micaceous; rounded grains; low hardness; dry.	
							@ 24': light yellowish brown (2.5Y 6/4); 10% nonplastic fines; 85% fine sand; 5% medium sand; well cemented.	
	2.0/3.0	10						
				25				
							@ 25.5': SILTY SANDSTONE, light olive brown (2.5Y 5/4); 30 to 35% nonplastic to low-plasticity fines; 65 to 70% fine sand; trace medium sand; medium grains are rounded quartz; damp.	
							@ 26': SANDSTONE, light brownish gray (2.5Y 6/2); 30% fine sand; 35% medium sand; 15% coarse sand; 20% fine gravel; gravel is subangular to subrounded; sand consists of quartz, feldspar, and mafic grains; friable.	
	1.6/2.0	11						
							@ 26.5': SILTY SANDSTONE, light olive brown (2.5Y 6/4); 25% low-plasticity fines; 65% fine sand; 10% medium sand; trace coarse sand and gravel; mineralogy as above.	
							@ 27.9': SANDSTONE, light olive brown (2.5Y 5/4); 20% fine sand; 70% medium sand; 10% coarse sand; angular to subrounded siliceous and felsic clasts; loose; dry.	
	1.8/2.5	12						
				30				

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REMARKS

Boring drilled using hollow-stem auger equipment to the total depth explored. Continuous coring performed to total depth using a 2.5" (I.D.) 5-foot long split spoon sampler advanced ahead of the augers as drilling progressed. Subsequently, a 2" (O.D.) piezometer was installed. Soil and rock colors based on the Munsell Soil Color Chart.

QA/QC: [illegible]

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For use with report dated 07/26/2006; RTF job number 2002-036-01

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-04.02 | BORING NO. PZ-1

PROJECT NAME Chiquita Canyon Landfill | PAGE 4 OF 7

BY K Johnson/L Rainey DATE 5/16/91 | SURFACE ELEV. ~966 ft.

Core Box # at top	Core Recovery (ft/ft)	Core Run # at top	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							@ 30.2': SILTY SANDSTONE, brownish gray (2.5Y 5/2); 25% low-plasticity fines; 75% fine sand; slight iron oxide stain; massive; damp.	
							@ 30.5': trace fine gravel.	
	2.0/2.5	13					@ 31.5': 30 to 35% low-plasticity fines; 65 to 70% fine sand; trace coarse sand and fine gravel; 0.75"-wide iron oxide stain bands; low hardness.	
							@ 32': white (2.5Y 8/2); 15 to 20% nonplastic to low-plasticity fines; 80 to 85% fine sand; black specks in sand.	
							@ 32.5': SANDSTONE, light yellowish brown (2.5Y 6/4); 10% nonplastic fines; 90% fine sand; micaceous; loose; damp.	
	2.2/2.6	14					@ 33.6': SILTY SANDSTONE, grayish brown (2.5Y 5/2); 20% low-plasticity fines; 80% fine sand; moderate hardness; dry.	
				35			SILTSTONE (SAUGUS FORMATION), light yellowish brown (2.5Y 6/4); 80% nonplastic to low-plasticity fines; 20% fine sand; moderate hardness; dry.	
							SANDSTONE (SAUGUS FORMATION), grayish brown (2.5Y 5/2); 100% fine sand; micaceous; massive; friable; damp.	
	2.0/2.5	15					@ 37.5': SILTY SANDSTONE, light brownish gray (2.5Y 6/2); 25% nonplastic fines; 75% fine sand; loose to friable; damp.	
							@ 38': SANDSTONE, light brownish gray (2.5Y 6/2); 100% fine sand; friable; damp.	
							@ 38.5': gravelly lens encountered.	
	2.3/2.5	16					@ 38.7': SILTY SANDSTONE, olive brown (2.5Y 4/4); 20% low-plasticity fines; 80% fine sand; trace medium sand; finely laminated with layers of dark mineral grains.	
				40				

REMARKS

Boring drilled using hollow-stem auger equipment to the total depth explored. Continuous coring performed to total depth using a 2.5" (I.D.) 5-foot long split spoon sampler advanced ahead of the augers as drilling progressed. Subsequently, a 2" (O.D.) piezometer was installed. Soil and rock colors based on the Munsell Soil Color Chart.

QA/QC: [illegible]

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For use with Procedure 07/26/2006, R14 Job Number 2002-036-01

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-04.02 | BORING NO. PZ-1

PROJECT NAME Chiquita Canyon Landfill | PAGE 5 OF 7

BY K Johnson/L Rainey DATE 5/16/91 | SURFACE ELEV. ~966 ft.

Core Box ∅ at top	Core Recovery (ft/ft)	Core Run ∅ at top	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							@ 39.8': quartzite gravel clast encountered. @ 40': massive; low hardness.	
	2.2/2.5	17					CLAYSTONE (SAUGUS FORMATION), brown (10YR 5/3); 100% medium plasticity fines; trace mica; finely laminated just below upper contact; damp. @ 41.5': low hardness.	
	2.5/2.5	18		45			CLAYEY SANDSTONE (SAUGUS FORMATION), dark grayish brown (2.5Y 4/2); 20% low-plasticity fines; 80% fine sand; micaceous; moderate hardness; trace limonitic staining; damp. @ 42.75': trace medium sand. CLAYSTONE (SAUGUS FORMATION), brown (10YR 5/3); 100% low-plasticity fines; friable; dry.	
	3.0/2.5	19					CLAYEY SANDSTONE (SAUGUS FORMATION), dark grayish brown (2.5Y 4/2); 30% low-plasticity fines; 70% fine sand; moderate hardness; damp. @ 44': SILTY SANDSTONE, yellowish brown (10YR 5/4); 20% nonplastic fines; 80% fine sand; trace mica; minor iron oxide staining; friable to low hardness; damp. SANDY SILTSTONE (SAUGUS FORMATION), yellowish brown (10YR 5/4) to pale brown (10YR 6/3); 65 to 70% nonplastic to low-plasticity fines; 30 to 35% fine sand; massive; low hardness; damp.	
	2.5/2.5	20		50			SANDSTONE (SAUGUS FORMATION), light olive brown (2.5Y 5/4); trace fines; 100% fine sand; massive; minor iron oxide staining; friable to low hardness; damp.	

REMARKS

Boring drilled using hollow-stem auger equipment to the total depth explored. Continuous coring performed to total depth using a 2.5" (I.D.) 5-foot long split spoon sampler advanced ahead of the augers as drilling progressed. Subsequently, a 2" (O.D.) piezometer was installed. Soil and rock colors based on the Munsell Soil Color Chart.

QA/QC: [illegible]

EMCON

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For use with report dated 07/26/2006; RTF job number 2002-036-01

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-04.02 | BORING NO. PZ-1

PROJECT NAME Chiquita Canyon Landfill | PAGE 6 OF 7

BY K Johnson/L Rainey DATE 5/16/91 | SURFACE ELEV. ~966 ft.

Core Box # at top	Core Recovery (ft/ft)	Core Run # at top	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
						clayey SS	SILTSTONE and SANDSTONE, INTERBEDDED (SAUGUS FORMATION), thinly interbedded; micaceous; low hardness; damp to moist: SILTSTONE: olive (5Y 5/3); 100% nonplastic fines. SANDSTONE: olive gray (5Y 5/2); 5% nonplastic fines; 95% fine sand.	
	3.0/2.0	21					CLAYEY SANDSTONE (SAUGUS FORMATION), olive (5Y 5/3); 40% low-plasticity fines; 60% fine sand; micaceous; caliche; low hardness; moist.	
							@ 49.5': SANDSTONE, gray to light gray (5Y 6/1); 100% fine sand; very well sorted; trace mica; damp.	
							@ 50.5': static ground-water level measured 5/15/91.	
	3.6/2.5	22					@ 51': trace iron oxide staining.	
							@ 52': olive (5Y 5/4); 10% nonplastic fines; 90% fine sand; micaceous.	
				55			@ 52.5': olive gray (5Y 5/2); 100% fine sand; bedding inclined 30 degrees from horizontal. down plunge?	
							@ 53': ground-water level first measured on 5/15/91.	
							@ 53.3': SILTY SANDSTONE, olive (5Y 5/3); 20% non-plastic fines; 80% fine sand.	
							@ 54.5': SANDSTONE, light olive gray (5Y 6/2); 5% nonplastic fines; 95% fine sand; trace iron oxide staining; friable; damp.	
							@ 55.2': strong iron oxide staining.	
							@ 55.8': SILTY SANDSTONE, light gray (5Y 7/1); 25 to 30% nonplastic to low-plasticity fines; 70 to 75% fine sand; low hardness; dark gray streaks on core; damp.	
							CLAYSTONE (SAUGUS FORMATION), olive brown (2.5Y 4/4); 100% low- to medium-plasticity fines; trace fine sand; friable; dry.	
				60			@ 56.5': SANDY CLAYSTONE, 70 to 75% low- to	

REMARKS

Boring drilled using hollow-stem auger equipment to the total depth explored. Continuous coring performed to total depth using a 2.5" (I.D.) 5-foot long split spoon sampler advanced ahead of the augers as drilling progressed. Subsequently, a 2" (O.D.) piezometer was installed. Soil and rock colors based on the Munsell Soil Color Chart.

QA/QC: [illegible]

Printed on Recycled Paper

For use with report dated 07/26/2006, RTI job number 2002-036-01

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-04.02 BORING NO. PZ-1

PROJECT NAME Chiquita Canyon Landfill PAGE 7 OF 7

BY K Johnson/L Rainey DATE 5/16/91 SURFACE ELEV. ~966 ft.

Core Box # at top	Core Recovery (ft/ft)	Core Run # at top	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							medium-plasticity fines; 25 to 30% fine sand; micaceous; low hardness; damp.	
							BOTTOM OF BORING: 57.2 FEET. TARGET DEPTH ATTAINED.	
				65				
				70				

REMARKS

Boring drilled using hollow-stem auger equipment to the total depth explored. Continuous coring performed to total depth using a 2.5" (I.D.) 5-foot long split spoon sampler advanced ahead of the augers as drilling progressed. Subsequently, a 2" (O.D.) piezometer was installed. Soil and rock colors based on the Munsell Soil Color Chart.

QA/QC: [illegible]

EMCON

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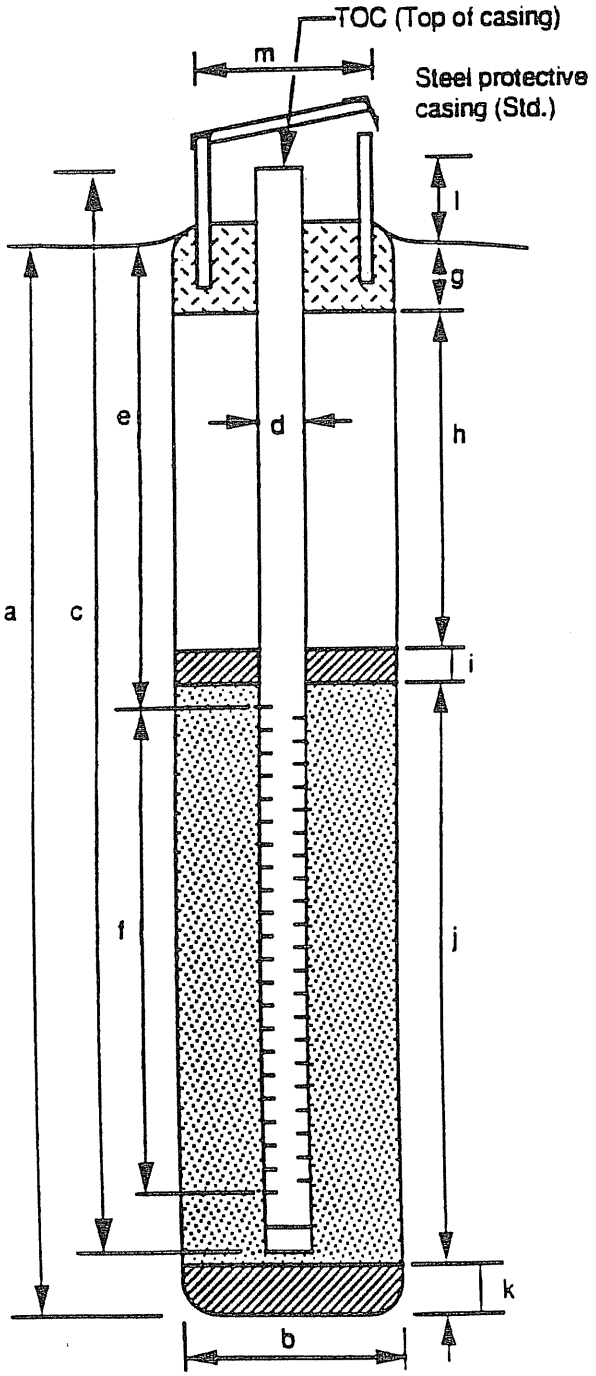
For use with report dated 07/26/2006, RTF job number 2002-036-01

PIEZOMETER DETAILS

EMCON ASSOCIATES

PROJECT NUMBER 976-04.02
PROJECT NAME Chiquita Canyon Landfill - VMP
LOCATION Los Angeles County
WELL PERMIT NO. LA County DHS. 5/22/91
INSTALLED BY L. Rainey

PIEZOMETER NO. PZ-2
TOP OF CASING ELEV. 976.02 ft.
GROUND SURFACE ELEV. 973 ft.
DATUM MSL
INSTALLATION DATE 5/16/91



EXPLORATORY BORING

a. Total depth 67.9 ft.
b. Diameter 10 in.
Drilling method Hollow Stem Auger

WELL CONSTRUCTION

c. Total casing length 67.5 ft.
Material Schedule 40 PVC
d. Diameter 2 in.
e. Depth to top perforations 47.2 ft.
f. Perforated length 19.4 ft.
Perforated interval from 47.2 to 66.7 ft.
Perforation type Machine Slotted
Perforation size 0.020 inch
g. Surface seal 4.8 ft.
Material Concrete
h. Backfill 31.7 ft.
Material Cement/Bentonite
i. Seal 9.1 ft.
Material Bentonite Chips
j. Gravel pack 22.3 ft.
Gravel pack interval from 45.6 to 67.9 ft.
Material Lonestar #3 Sand
k. Bottom seal/fill N/A ft.
Material
l. Casing stickup 2.6 ft.
m. Protective casing diameter 12 in.

Drilling Contractor: West Hazmat Drilling Corp.
Driller: Mark
Date:
Checked By:
Installed by:

Ventura Mac 2 LRjaa Rev. 8/9/91

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For use with report dated 07/26/2006; RTF job number 2002-036-01

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-04.02 | BORING NO. PZ-2

PROJECT NAME Chiquita Canyon Landfill | PAGE 1 OF 7

BY K Johnson/L Rainey DATE 5/16/91 | SURFACE ELEV. ~973 ft.

Core Box # at top	Core Recovery (ft/ft)	Core Run # at top	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
		1					FILL sand (SP), olive (5Y 5/3); 75% fine sand; 20% medium sand; 5% coarse sand; trace fine gravel; abundant rootlets; loose; dry.	
							@ 3': damp.	
	1.5/2.0	2		5			SILTY SAND (SM), light yellowish brown (2.5Y 6/4); 20 to 25% low-plasticity fines; 75 to 80% fine sand; trace medium sand; rare fine gravel; gravel is subangular to rounded; mica flakes; damp.	
	1.7/2.5	3					@ 7.5': pale olive (5Y 6/4); 20% nonplastic fines; 80% fine sand.	
	1.6/2.5	4		10				

REMARKS

Boring drilled using hollow-stem auger equipment to the total depth explored. Continuous coring performed to total depth using a 2.5" (I.D.) 5-foot long split-spoon sampler advanced ahead of the augers as drilling progressed. Subsequently, a 2" (O.D.) piezometer was installed. Soil and rock colors based on the Munsell Soil Color Chart.

QA/QC: [illegible]

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-04.02 BORING NO. PZ-2

PROJECT NAME Chiquita Canyon Landfill PAGE 2 OF 7

BY K Johnson/L Rainey DATE 5/16/91 SURFACE ELEV. ~973 ft.

Core Box # at top	Core Recovery (ft/ft)	Core Run # at top	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
	1.5/2.5	5					@ 11': light olive brown (2.5Y 5/4); 15 to 20% low-plasticity fines; 80 to 85% fine sand; trace medium sand to fine gravel; rare white calcareous nodules (0.2"-diameter); coarse sand and gravel are subangular and granitic; mica flakes; damp.	
	2.0/2.5	6		15			@ 15.25': 15% nonplastic fines; 75% fine sand; 10% medium sand.	
	2.0/2.5	7					@ 16.75': dark brown clayey chips observed.	
	2.4/2.5	8		20			SILTY SANDSTONE (SAUGUS FORMATION), light olive brown (2.5Y 5/4); 15% nonplastic fines; 85% fine sand; abundant caliche; low to moderate hardness; damp. @ 17.75': SANDSTONE, light gray (5Y 7/2); 100% fine sand; loose; damp. @ 19': light brownish gray (2.5Y 6/2); 90% fine sand; 5% medium sand; 5% coarse sand.	

REMARKS

Boring drilled using hollow-stem auger equipment to the total depth explored. Continuous coring performed to total depth using a 2.5" (I.D.) 5-foot long split-spoon sampler advanced ahead of the augers as drilling progressed. Subsequently, a 2" (O.D.) piezometer was installed. Soil and rock colors based on the Munsell Soil Color Chart.

QA/QC: [signature]

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-04.02 | BORING NO. PZ-2

PROJECT NAME Chiquita Canyon Landfill | PAGE 3 OF 7

BY K Johnson/L Raines DATE 5/16/91 | SURFACE ELEV. ~973 ft.

Core Box ϕ at top	Core Recovery (ft/ft)	Core Run ϕ at top	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							@ 21': thin (0.1"-thick) black horizontal laminae observed.	
	2.3/2.5	9					CLAYSTONE (SAUGUS FORMATION), brown (10YR 5/3); 100% medium-plasticity fines; trace fine sand; trace mica; mottled with dark grayish brown blotches; friable. @ 22.2': SANDY CLAYSTONE, dark yellowish brown (10YR 4/4); 80% low-plasticity fines; 20% fine sand; low hardness; damp. @ 23.5': CLAYSTONE, dark brown (7.5Y 4/4); 100% low- to medium-plasticity fines; caliche present on undulating bedding surfaces; damp.	
		10		25			@ 24.5': SANDY CLAYSTONE, dark yellowish brown (10YR 4/4); 70% low- to medium-plasticity fines; 30% fine sand; trace medium sand; minor iron oxide staining; mica flakes; friable; damp.	
	1.9/2.5	11					SANDSTONE (SAUGUS FORMATION), olive gray (5Y 5/2); 100% fine sand; low hardness; damp. @ 28.2': SILTY SANDSTONE, yellowish brown (10YR 5/4); 15% nonplastic fines; 85% fine sand. @ 28.9': pale olive (5Y 6/3) sandstone lens; 100% fine sand.	
	2.2/2.5	12		30			@ 29.5': pale olive (5Y 6/3); 10% nonplastic fines; 85% fine sand; 5% medium sand; friable.	

REMARKS

Boring drilled using hollow-stem auger equipment to the total depth explored. Continuous coring performed to total depth using a 2.5" (I.D.) 5-foot long split-spoon sampler advanced ahead of the augers as drilling progressed. Subsequently, a 2" (O.D.) piezometer was installed. Soil and rock colors based on the Munsell Soil Color Chart.

QA/QC: [signature]

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-04.02 | BORING NO. PZ-2

PROJECT NAME Chiquita Canyon Landfill | PAGE 4 OF 7

BY K Johnson/L Rainey DATE 5/16/91 | SURFACE ELEV. ~973 ft.

Core Box # at top	Core Recovery (ft/ft)	Core Run # at top	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							@ 29.7': 0.25"-thick weakly cemented tablets observed.	
							@ 31.5': 100% fine sand lens.	
	1.5/2.5	13					@ 32': moderately weathered granite cobble lodged in sampler.	
							CLAYSTONE (SAUGUS FORMATION), dark brown (7.5Y 3/2); 90% medium-plasticity fines; 10% fine sand; trace fine gravel; mottled; low to moderate hardness; damp.	
							@ 33.8': bedding observed inclined at 20 degrees from horizontal.	
	2.4/2.5	14		35			SANDSTONE (SAUGUS FORMATION), light gray (2.5Y N7); 100% fine sand; moderate hardness; damp.	
							@ 34.1': CLAYEY SANDSTONE, olive gray (5Y 5/2); 30% low-plasticity fines; 70% fine sand; damp.	
							@ 34.2': SANDSTONE, olive (5Y 5/4); 100% fine sand; low hardness; damp.	
	1.9/2.5	15					@ 34.5': SILTY SANDSTONE, light olive brown (2.5Y 5/4); 20 to 25% low-plasticity fines; 75 to 80% fine sand; trace mica; friable to low hardness, with low hardness portions more micaceous; iron oxide staining; damp.	
							@ 34.9': pale olive 1"-thick beds observed.	
							@ 36': moderate yellowish staining; friable.	
							@ 36.3': SANDSTONE, olive gray (5Y 5/2); 5% low-plasticity fines; 95% fine sand; damp.	
	2.9/2.5	16					@ 36.5': SILTY SANDSTONE, light olive brown (2.5Y 5/4); 30% low-plasticity fines; 70% fine sand; trace fine gravel; massive; damp.	
				40			@ 37.5': SANDSTONE, gray (5Y 5/1); trace fines;	

EMCON ASSOCIATES

REMARKS

Boring drilled using hollow-stem auger equipment to the total depth explored. Continuous coring performed to total depth using a 2.5" (I.D.) 5-foot long split-spoon sampler advanced ahead of the augers as drilling progressed. Subsequently, a 2" (O.D.) piezometer was installed. Soil and rock colors based on the Munsell Soil Color Chart.

QA/QC: [illegible]

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-04.02 BORING NO. PZ-2

PROJECT NAME Chiquita Canyon Landfill PAGE 5 OF 7

BY K Johnson/L Rainey DATE 5/16/91 SURFACE ELEV. ~973 ft.

Core Box ϕ at top	Core Recovery (ft/ft)	Core Run ϕ at top	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							100% fine sand; friable; iron oxide staining; damp. @ 38' : 5% fines. @ 38.5': light olive brown (2.5Y 5/6); 10% low-plasticity fines; micaceous; strong iron oxide staining.	
	2.6/2.5	17					SANDY CLAYSTONE (SAUGUS FORMATION), light olive brown (2.5Y 5/4); 85 to 90% medium-plasticity fines; 10 to 15% fine sand; mica flakes; friable; damp. @ 39.8': CLAYSTONE, grayish brown (2.5Y 5/2); 95% medium-plasticity fines; 5% fine sand; massive; low hardness; damp.	
	2.4/2.5	18		45			SANDSTONE (SAUGUS FORMATION), olive (5Y 5/3); 10% low-plasticity fines; 90% fine sand; trace medium sand; low hardness. @ 42': SILTY SANDSTONE, light brownish gray (2.5Y 6/2); 35% nonplastic to low-plasticity fines; 65% fine sand; micaceous; low to moderate hardness; damp.	
							SILTSTONE (SAUGUS FORMATION), light olive brown (2.5Y 5/4); 100% nonplastic fines; low to moderate hardness; damp. @ 43.1': olive gray (5Y 4/2).	
	2.8/2.5	19					SANDSTONE (SAUGUS FORMATION), olive gray (5Y 5/2); 100% fine sand; low to moderate hardness; damp. @ 44.4': SILTY SANDSTONE, olive brown (2.5Y 4/4); 20% nonplastic fines; 80% fine sand; micaceous; caliche veins; low hardness; damp. @ 44.5': SANDSTONE, light yellowish brown (2.5Y 6/4); 100% fine sand; low hardness; caliche; damp. from 46.1' to 46.5': non-indurated zone. @ 46.5': whitish color; calcareous.	
	2.5/2.5	20		50			@ 47': CLAYEY SANDSTONE, olive gray (5Y	

REMARKS

Boring drilled using hollow-stem auger equipment to the total depth explored. Continuous coring performed to total depth using a 2.5" (I.D.) 5-foot long split-spoon sampler advanced ahead of the augers as drilling progressed. Subsequently, a 2" (O.D.) piezometer was installed. Soil and rock colors based on the Munsell Soil Color Chart.

QA/QC: [illegible]

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-04.02 BORING NO. PZ-2

PROJECT NAME Chiquita Canyon Landfill PAGE 6 OF 7

BY K Johnson/L Rainey DATE 5/16/91 SURFACE ELEV. ~973 ft.

Core Box # at top	Core Recovery (ft/ft)	Core Run # at top	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							4/2); 20% medium-plasticity fines; 80% fine sand; moderate hardness; damp; mottled. @ 47.6': SANDSTONE, brown (10YR 5/3); 100% fine sand; mottled with limonitic staining; moderate hardness; moist. @ 48.9': SILTY SANDSTONE, brown (10YR 5/3); 25% nonplastic to low-plasticity fines; 75% fine sand; trace medium sand; low to moderate hardness; damp.	
	2.6/2.5	21					SANDY MUDSTONE (SAUGUS FORMATION), olive brown (2.5Y 4/4); 75 to 80% low- to medium-plasticity fines; 20 to 25% fine sand; trace mica; slight iron oxide staining; friable; damp.	
	2.3/2.5	22		55			SANDSTONE (SAUGUS FORMATION), light olive brown (2.5Y 5/6) and gray (10YR 5/1) mottled; 100% fine sand; trace rounded quartzose medium to coarse sand; trace mica; iron oxide staining; damp. @ 51.5': intense iron oxide staining. @ 52': low hardness; moist. @ 52.9': yellowish brown (10YR 5/8). @ 53.3': 90% fine sand; 10% medium sand. @ 53.9': SILTY SANDSTONE, light olive brown (2.5Y 5/4); 30% nonplastic fines; 70% fine sand; micaceous; minor caliche; low to moderate hardness; damp.	
	1.8/2.5	23					@ 54.5': SANDSTONE, olive gray (5Y 5/2); 80% fine sand; 20% medium sand; trace coarse sand; low to moderate hardness; wet due to water added to borehole by drillers.	
	1.8/2.5	24	▼	60			@ 59.6': ground-water level measured on 5/15/91.	

EMCON ASSOCIATES

REMARKS

Boring drilled using hollow-stem auger equipment to the total depth explored. Continuous coring performed to total depth using a 2.5" (I.D.) 5-foot long split-spoon sampler advanced ahead of the augers as drilling progressed. Subsequently, a 2" (O.D.) piezometer was installed. Soil and rock colors based on the Munsell Soil Color Chart.

QA/QC: [signature]

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-04.02 BORING NO. PZ-2

PROJECT NAME Chiquita Canyon Landfill PAGE 7 OF 7

BY K Johnson/L Rainey DATE 5/16/91 SURFACE ELEV. ~973 ft.

Core Box # at top	Core Recovery (ft/ft)	Core Run # at top	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
	1.7/2.5	25	▽				@ 61': 75% fine sand; 20% medium sand; 5% coarse sand; subrounded felsic clasts; moist. @ 62': first encountered ground water during drilling; 60% fine sand; 30% medium sand; 10% coarse sand. @ 63': grayish brown (2.5Y 5/2) to olive (5Y 5/3); 45% fine sand; 45% medium sand; 10% coarse sand; trace fine gravel; rare small cobbles; subangular to subrounded quartz, felsic, and mafic grains; friable; wet; @ 64.2': coarse gravelly lens encountered; no recovery to total depth of boring.	
				65				
				70			BOTTOM OF BORING: 67.9 FEET. TARGET DEPTH ATTAINED.	

EMCON ASSOCIATES

REMARKS

Boring drilled using hollow-stem auger equipment to the total depth explored. Continuous coring performed to total depth using a 2.5" (I.D.) 5-foot long split-spoon sampler advanced ahead of the augers as drilling progressed. Subsequently, a 2" (O.D.) piezometer was installed. Soil and rock colors based on the Munsell Soil Color Chart.

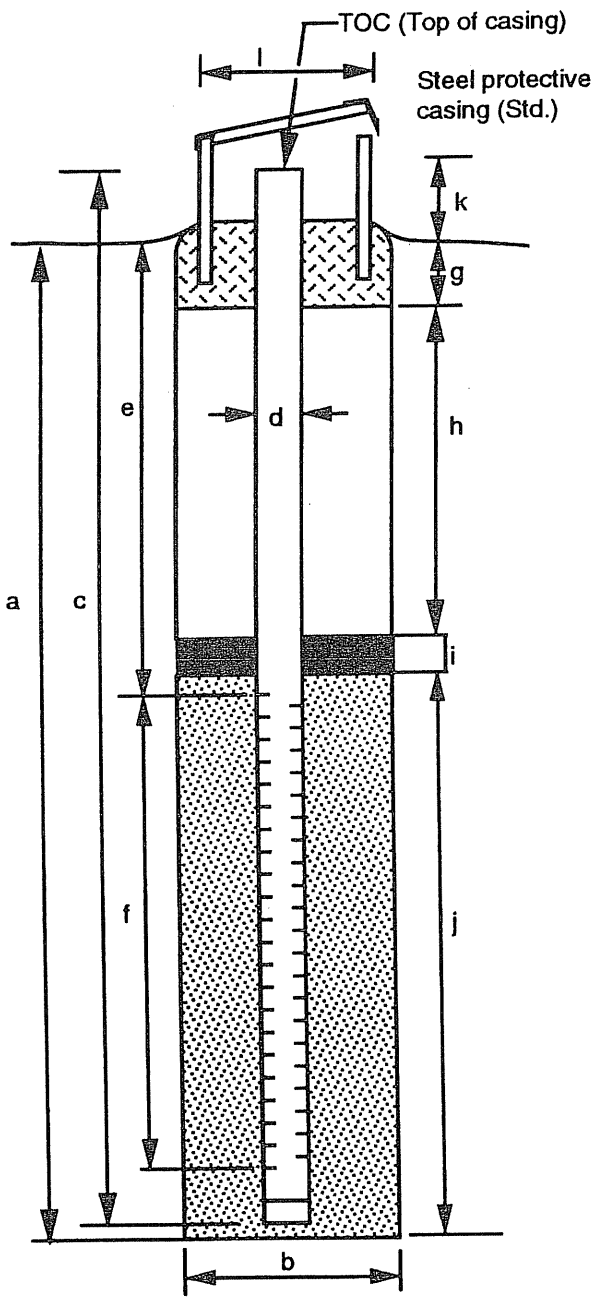
QA/QC: [signature]

PIEZOMETER CONSTRUCTION DETAIL

EMCON

PROJECT NUMBER 20976-001.041
PROJECT NAME: Chiquita Canyon Landfill
LOCATION: Los Angeles County, CA
WELL PERMIT NO. Approved 2-9-96
DRILLER: Valley Well Drilling

BORING / WELL NO. PZ - 3
TOP OF CASING ELEV. 1103.62
GROUND SURFACE ELEV. 1100.63
DATUM: Mean Sea Level
INSTALLATION DATE 1-31-96



EXPLORATORY BORING

a. Total depth 100.0 ft.
b. Diameter 8 in.
Drilling method Air Rotary

WELL CONSTRUCTION

c. Total casing length 103.3 ft.
Material Schedule 40 PVC
d. Diameter ID 2.07 in. OD 2.38 in.
e. Depth to top perforations 59.6 ft.
f. Perforated length 40.4 ft.
Perforated interval from 59.6 to 100.0 ft.
Perforation type Machine-slotted
Perforation size 0.02-inch
g. Surface seal ~1.5 ft.
Seal interval from 0 to ~1.5 ft.
Material Concrete
h. Backfill/Annular Seal 38.5 ft.
Backfill interval from ~1.5 to 40.0 ft.
Material Bentonite Grout
i. Seal 17 ft.
Seal interval from 40 to 57 ft.
Material Medium Bentonite Chips
j. Filter pack 43 ft.
Filter pack interval from 57 to 100 ft.
Material Lonestar #3 Sand
k. Casing stickup 3.3 ft.
l. Protective casing diameter 8 in.

QA/QC:
Well Installed by: M. Kuncir
Checked By: _____ Date: _____

^MISC-WELL DETAILS\CCL-DW-14.pdc Rev. 5/10/96

For use with report dated 07/26/2006; RTF job number 2002-036-01

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **20976-001.041**

WELL NO.: **PZ-3**

PROJECT NAME: **Chiquita Canyon Landfill**

PAGE: **1 of 3**

BY: **Mark T. Kuncir**

DATE: **01/30/98**

SURFACE ELEVATION: **1100.83 MSL**

PID READING (ppm)	PENETRATION (blows/6")	RECOVERY (ft/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							SAUGUS FORMATION (Qs): 0 TO 100 FEET SANDSTONE: pale olive (5Y 6/3); 95% fine sand; 5% medium sand; trace coarse sand; trace fine gravel up to 0.5 inch in diameter; sand is subangular; gravel is subangular to subrounded; damp.	
<1				10			@ 12 ft.: gravel and cobble-size clasts.	
<1				20			@ 20 ft.: sand is subangular to subrounded.	
6.1				30			@ 30 ft.: 85% fine sand; 10% medium sand; 5% coarse sand; trace fine gravel up to 0.25 inch in diameter; sand and gravel are angular to subrounded; damp.	
							@ 36 ft.: gravel and cobble-size clasts.	
				40				

REMARKS

Drilled by Valley Well Drilling using a Failing 1500 rig and air rotary drilling method. Hole diameter is 8 inches. Grab samples were collected for logging purposes at 10-foot intervals. The boring was completed as a 2-inch diameter, PVC piezometer set at a total depth of 100 feet.

EMCON

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **20978-001.041**

WELL NO.: **PZ-3**

PROJECT NAME: **Chiquita Canyon Landfill**

PAGE: **2 of 3**

BY: **Mark T. Kuncir**

DATE: **01/30/98**

SURFACE ELEVATION: **1100.63 MSL**

PID READING (ppm)	PENETRATION (blows/6")	RECOVERY (ft/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
<1					☒		SANDSTONE: pale olive (5Y 6/3); 10% fine sand; 10% medium sand; 80% coarse sand; trace fine gravel up to 0.25 inch in diameter; sand is subangular to subrounded; gravel is angular to subrounded; damp.	
<1				50	☒		@ 50 ft.: 100% fine sand; damp.	
<1				60	☒		@ 60 ft.: 90% fine sand; 10% medium sand and coarse sand; trace fine gravel up to 0.5 inch in diameter; subangular; damp.	
			02/02/98				@ 64 ft.: Increase in soil moisture.	
			01/30/98				@ 69 ft.: first groundwater encountered.	
<1				70	☒		@ 70 ft.: 10% non to low-plasticity fines; 10% fine sand; trace medium and coarse sand; subangular.	
							PEBBLY SANDSTONE: olive (5Y 5/4); trace fines; 20% fine sand; 40% medium sand; 20% coarse sand; 20% fine gravel up to 0.5 inch in diameter; sand is angular to subangular; gravel is angular to subrounded; wet.	
				80				

REMARKS

Drilled by Valley Well Drilling using a Failing 1500 rig and air rotary drilling method. Hole diameter is 8 inches. Grab samples were collected for logging purposes at 10-foot intervals. The boring was completed as a 2-inch diameter, PVC piezometer set at a total depth of 100 feet.

EMCON

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **20976-001.041**

WELL NO.: **PZ-3**

PROJECT NAME: **Chiquita Canyon Landfill**

PAGE: **3** of **3**

BY: **Mark T. Kuncir**

DATE: **01/30/96**

SURFACE ELEVATION: **1100.63 MSL**

PID READING (ppm)	PENETRATION (blows/6")	RECOVERY (ft/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
					☒		PEBBLY SANDSTONE.	
				90	☒			
							SANDSTONE: olive (5Y 5/4); trace fines; 90% fine sand; 10% medium sand to coarse sand; angular to subrounded; wet.	
				100	☒		BOTTOM OF BORING: 100 FEET TARGET DEPTH REACHED	
				110				
				120				

REMARKS

Drilled by Valley Well Drilling using a Failing 1500 rig and air rotary drilling method. Hole diameter is 8 inches. Grab samples were collected for logging purposes at 10-foot intervals. The boring was completed as a 2-inch diameter, PVC piezometer set at a total depth of 100 feet.

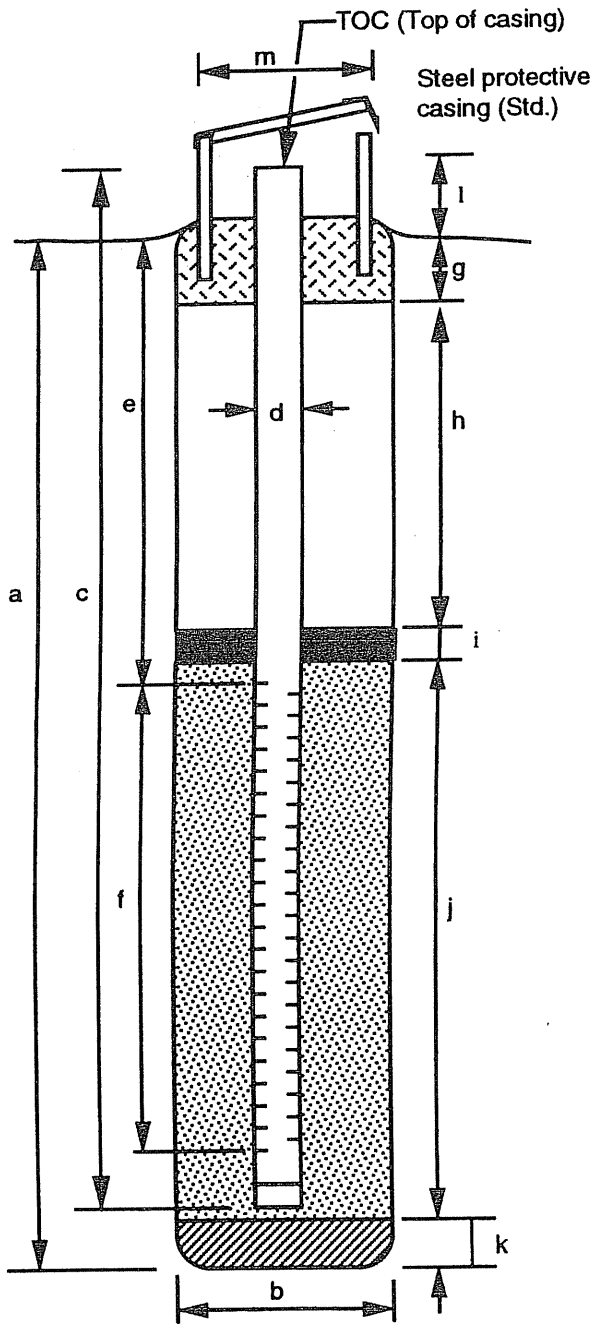
EMCON

PIEZOMETER CONSTRUCTION DETAIL

EMCON

PROJECT NUMBER 20976-001.041
PROJECT NAME: Chiquita Canyon Landfill
LOCATION: Los Angeles County, CA
WELL PERMIT NO. Approved 2-9-96
DRILLER: Valley Well Drilling

BORING / WELL NO. PZ-4
TOP OF CASING ELEV. 1104.71
GROUND SURFACE ELEV. 1101.71
DATUM: Mean Sea Level
INSTALLATION DATE 1-29-96



EXPLORATORY BORING

a. Total depth 160.0 ft.
b. Diameter 8 in.
Drilling method Air Rotary

WELL CONSTRUCTION

c. Total casing length 137.22 ft.
Material Schedule 40 PVC
d. Diameter ID 2.07 in. OD 2.38 in.
e. Depth to top perforations 93.8 ft.
f. Perforated length 40.4 ft.
Perforated interval from 96.8 to 137.2 ft.
Perforation type Machine-slotted
Perforation size 0.02-inch
g. Surface seal ~1.5 ft.
Seal interval from 0 to ~1.5 ft.
Material Concrete
h. Backfill/Annular Seal 78 ft.
Backfill interval from ~1.5 to 79.5 ft.
Material Bentonite Grout
i. Seal 10.5 ft.
Seal interval from 79.5 to 90 ft.
Material Medium Bentonite Chips
j. Filter pack 50 ft.
Filter pack interval from 90 to 140 ft.
Material Lonestar #3 Sand
k. Bottom seal/fill 20 ft.
Seal/fill interval from 140/145 to 145/160 ft.
Material Medium Bentonite Chips/ Lonestar #3 Sand
l. Casing stickup 3.0 ft.
m. Protective casing diameter 8 in.

QA/QC:
Well Installed by: M. Kuncir
Checked By: _____ Date: _____

^MISC-WELL DETAILS\CCL-DW-14.pdc Rev. 5/10/96

For use with report dated 07/26/2006; RTF job number 2002-036-01

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **20976-001.041**

WELL NO.: **PZ-4**

PROJECT NAME: **Chiquita Canyon Landfill**

PAGE: **1 of 5**

BY: **Mark T. Kuncir**

DATE: **01/29/98**

SURFACE ELEVATION: **1101.71 MSL**

PID READING (ppm)	PENETRATION (blows/6")	RECOVERY (ft/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							SAUGUS FORMATION (Qs): 0 TO 160 FEET	
							SILTY SANDSTONE: very pale brown (10YR 8/4); 20% non-plastic fines; 70% fine sand; 10% medium to coarse sand; subangular; damp.	
							SANDSTONE: pale yellow (5Y 8/3); 5% non to low-plasticity fines; 95% fine sand; trace medium sand; damp.	
<1				10	☒			
3.1				20	☒		@ 20 ft.: light olive gray (5Y 6/2); trace fines; 100% fine sand; trace medium and coarse sand; trace fine gravel up to 0.25 inch in diameter; sand is angular to subrounded; gravel is subangular; damp.	
							@ 30 ft.: light gray (5Y 7/2).	
2.9				30	☒		SANDY CLAYSTONE: olive gray (5Y 5/2); 85% low to medium-plasticity fines; 15% fine sand; damp.	
<1					☒		CLAYEY SANDSTONE: pale olive (5Y 6/3); 15% low plasticity fines; 70% fine sand; 10% medium sand; 5% coarse sand; trace fine gravel up to 0.5 inch in diameter; subangular; damp.	
				40				

REMARKS

Drilled by Valley Well Drilling using a Failing 1500 rig and air rotary drilling method. Hole diameter is 8 inches. Grab samples were collected for logging purposes at 10-foot intervals. The boring was completed as a 2-inch diameter, PVC piezometer set at a total depth of 133 feet.

EMCON

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **20976-001.041**

WELL NO.: **PZ-4**

PROJECT NAME: **Chiquita Canyon Landfill**

PAGE: **2 of 5**

BY: **Mark T. Kuncir**

DATE: **01/29/98**

SURFACE ELEVATION: **1101.71 MSL**

PID READING (ppm)	PENETRATION (blows/6")	RECOVERY (ft/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
					X		CLAYEY SANDSTONE.	
							SILTY SANDSTONE: pale olive (5Y 6/3); 30% low to medium-plasticity fines; 50% fine sand; 10% medium sand; 5% coarse sand; 5% fine gravel up to 0.25 inch in diameter; subangular; damp.	
<1				50	X			
							SANDSTONE: light olive gray (5Y 6/3); trace fines; 95% fine sand; trace medium and coarse sand; trace fine gravel up to 0.25 inch in diameter; sand is subangular to subrounded; gravel is subangular; damp.	
<1				60	X			
<1				70	X		[illegible] ft.: light olive gray (5Y 6/2); 10% low-plasticity fines; 90% fine sand; damp.	
				80				

REMARKS

Drilled by Valley Well Drilling using a Failing 1500 rig and air rotary drilling method. Hole diameter is 8 inches. Grab samples were collected for logging purposes at 10-foot intervals. The boring was completed as a 2-inch diameter, PVC piezometer set at a total depth of 133 feet.

EMCON

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **20976-001.041**

WELL NO.: **PZ-4**

PROJECT NAME: **Chiquita Canyon Landfill**

PAGE: **3** of **5**

BY: **Mark T. Kuncir**

DATE: **01/29/98**

SURFACE ELEVATION: **1101.71 MSL**

PID READING (ppm)	PENETRATION (blows/6")	RECOVERY (ft/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
<1					☒		SANDSTONE.	
							SILTY SANDSTONE: light olive brown (2.5Y 5/3); 20% non to low-plasticity fines; 80% fine sand; trace medium and coarse sand; subangular to subrounded; damp.	
<1				90	☒			
							SANDSTONE: light olive gray (5Y 6/2); 10% non to low-plasticity fines; 90% fine sand; trace medium and coarse sand; subangular to subrounded; moist.	
							99.97 ft.: Increase in soil moisture.	
<1			01/30/98	100	☒			
<1				110	☒		110 ft.: olive gray (5Y 5/2); 100% fine sand; trace medium sand; moist.	
				120				

REMARKS

Drilled by Valley Well Drilling using a Failing 1500 rig and air rotary drilling method. Hole diameter is 8 inches. Grab samples were collected for logging purposes at 10-foot intervals. The boring was completed as a 2-inch diameter, PVC piezometer set at a total depth of 133 feet.

EMCON

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **20976-001.041**

WELL NO.: **PZ-4**

PROJECT NAME: **Chiquita Canyon Landfill**

PAGE: **4 of 5**

BY: **Mark T. Kuncir**

DATE: **01/29/98**

SURFACE ELEVATION: **1101.71 MSL**

PID READING (ppm)	PENETRATION (blows/6")	RECOVERY (ft/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
<1					☒		SANDSTONE: light olive gray (5Y 6/2); 5% non to low-plasticity fines; 95% fine sand; trace medium and coarse sand; trace fine gravel; subangular; moist.	
<1				130	☒		@ 130 ft.: olive gray (5Y 5/2); 100% fine sand; trace medium and coarse sand; trace fine gravel up to 0.25 inch in diameter; sand is subangular to subrounded; gravel is subrounded; moist.	
			▽ 01/29/98					
<1				140	☒		@ 140 ft.: trace fines; 50% fine sand; 40% medium sand; 10% coarse sand; angular to subrounded; wet.	
<1				150	☒		@ 150 ft.: 60% fine sand; 30% medium sand; 10% coarse sand; subangular; wet.	
				160				

REMARKS

Drilled by Valley Well Drilling using a Failing 1500 rig and air rotary drilling method. Hole diameter is 8 inches. Grab samples were collected for logging purposes at 10-foot intervals. The boring was completed as a 2-inch diameter, PVC piezometer set at a total depth of 133 feet.

EMCON

LOG OF EXPLORATORY BORING

PROJECT NUMBER: **20978-001.041**

WELL NO.: **PZ-4**

PROJECT NAME: **Chiquita Canyon Landfill**

PAGE: **5** of **5**

BY: **Mark T. Kuncir**

DATE: **01/29/98**

SURFACE ELEVATION: **1101.71 MSL**

PID READING (ppm)	PENETRATION (blows/6")	RECOVERY (ft/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							BOTTOM OF BORING: 160 FEET	
							TARGET DEPTH REACHED	
				170				
				180				
				190				
				200				

REMARKS

Drilled by Valley Well Drilling using a Failing 1500 rig and air rotary drilling method. Hole diameter is 8 inches. Grab samples were collected for logging purposes at 10-foot intervals. The boring was completed as a 2-inch diameter, PVC piezometer set at a total depth of 133 feet.

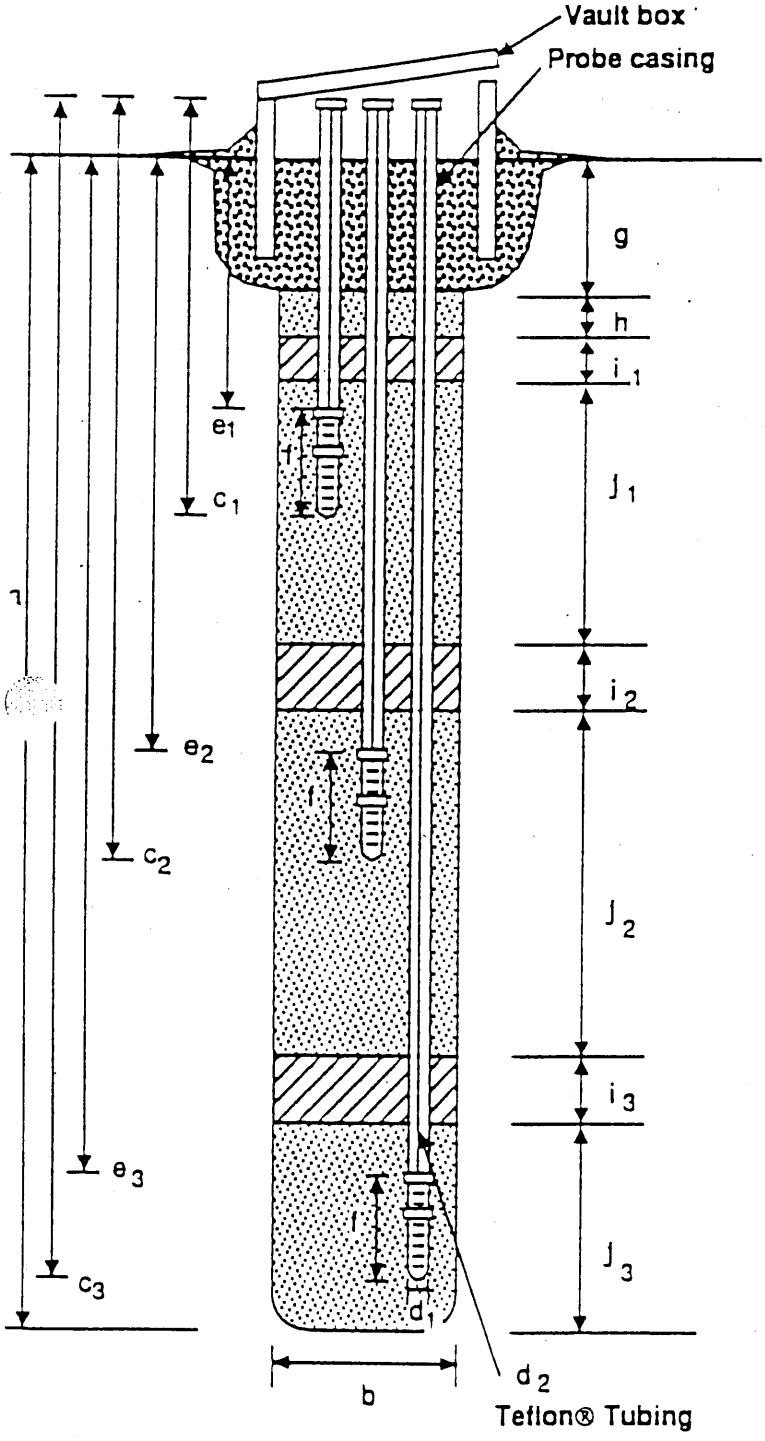
EMCON

GAS PROBE DETAILS

EMCON SOUTHWEST

PROJECT NUMBER 976-04.02
PROJECT NAME Chiquita Canyon Landfill-VMP
LOCATION Los Angeles County
DRILLING CONTRACTOR West Hazmat Drilling, Inc.
INSTALLED BY Laura Rainey

GAS PROBE NO. GP-1
TOP OF VAULT ELEV. 970.78 ft.
GROUND SURFACE ELEV. 966 ft.
DATUM MSL
INSTALLATION DATE 5/21/91



EXPLORATORY BORING

a. Total depth 40.0 ft.
b. Diameter 10 in.
Drilling method: Hollow Stem Auger

GAS PROBE CONSTRUCTION

c. Total Casing Length:
c_1 20.0 ft.
c_2 32.0 ft.
c_3 41.5 ft.
Material: Schedule 40 PVC

d. Probe Casing and Tubing Diameter:
d_1 Probe Casing 1/2 in.
Material: Schedule 40 PVC
d_2 Teflon® Tube Diameter 1/8 in. (ID)
1/4 in. (OD)

e. Depth From Ground Surface to Probe Tip:
e_1 15.5 ft.
e_2 27.5 ft.
e_3 37.0 ft.

f. Probe Tip Length: 1.5 ft.
g. Surface Seal: 5.1 ft.
Material: Concrete
h. Soil Backfill: 3.3 ft.
i. Seal:
i_1 2.0 ft. total, from 8.4 ft. to 10.4 ft.
i_2 2.0 ft. total, from 18.3 ft. to 20.3 ft.
i_3 2.0 ft. total, from 32.8 ft. to 34.8 ft.
Material: Bentonite

j. Gravel Pack:
j_1 7.5 ft. total, from 10.4 ft. to 18.3 ft.
j_2 12.0 ft. total, from 20.3 ft. to 32.8 ft.
j_3 14.4 ft. total, from 34.8 ft. to 39.4 ft.
Material: Pea Gravel

QA/QC
Logged by: FDR
Checked by/date: KAH 11/14/91

Note: Drawing not to scale

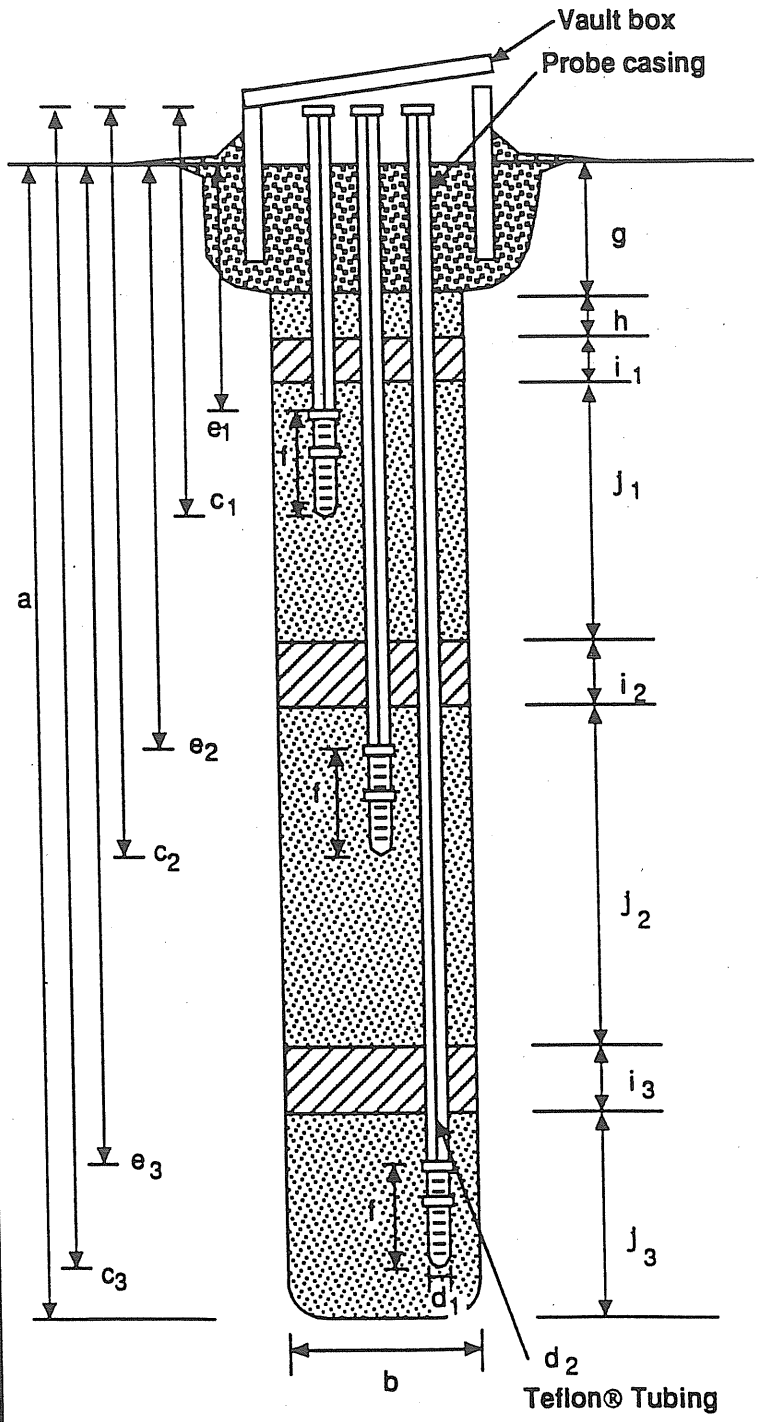
Printed on Recycled Paper

GAS PROBE DETAILS

EMCON SOUTHWEST

PROJECT NUMBER 976-04.02
PROJECT NAME Chiquita Canyon Landfill-VMP
LOCATION Los Angeles County
DRILLING CONTRACTOR West Hazmat Drilling, Inc.
INSTALLED BY Laura Rainey

GAS PROBE NO. GP-2
TOP OF VAULT ELEV. 985.18 ft.
GROUND SURFACE ELEV. 982 ft.
DATUM MSL
INSTALLATION DATE 5/22/91



EXPLORATORY BORING

a. Total depth 56.6 ft.
b. Diameter 10 in.
Drilling method: Hollow Stem Auger

GAS PROBE CONSTRUCTION

c. Total Casing Length:
c_1 19.5 ft.
c_2 48.5 ft.
c_3 57.0 ft.
Material: Schedule 40 PVC

d. Probe Casing and Tubing Diameter:
d_1 Probe Casing 1/2 in.
Material: Schedule 40 PVC
d_2 Teflon® Tube Diameter 1/8 in. (ID)
1/4 in. (OD)

e. Depth From Ground Surface to Probe Tip:
e_1 15.5 ft.
e_2 44.5 ft.
e_3 53.0 ft.

f. Probe Tip Length: 1.5 ft.

g. Surface Seal: 5.0 ft.
Material: Concrete

h. Soil Backfill: 4.5 ft.

i. Seal:
i_1 2.0 ft. total, from 9.5 ft. to 11.5 ft.
i_2 2.0 ft. total, from 19.0 ft. to 21.0 ft.
i_3 2.0 ft. total, from 48.0 ft. to 50.0 ft.
Material: Bentonite

j. Gravel Pack:
j_1 7.5 ft. total, from 11.5 ft. to 19.0 ft.
j_2 27.0 ft. total, from 21.0 ft. to 48.0 ft.
j_3 6.6 ft. total, from 50.0 ft. to 56.6 ft.
Material: Pea Gravel

QA/QC
Logged by: LDR
Checked by/date: CL 11-12-91

Note: Drawing not to scale

MAC 2 LR:jaa Rev. 8/5/91

Printed on Recycled Paper

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-04.02 BORING NO. GP-2

PROJECT NAME CHIQUITA CANYON LANDFILL PAGE 1 OF 6

BY Laura Rainey DATE 5/22/91 SURFACE ELEV. ~981 ft.

Core Run # at top	Core Recovery (ft/ft)	Penetr-ation blows/6"	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
1	1.7/2.5						FILL, sand, olive (5Y 5/3); 45% fine sand; 30% medium sand; 10% coarse sand; 15% fine gravel; loose; dry.	
							@2.5': 90% fine sand; 10% medium sand.	
							SILTY SAND (SM), olive (5Y 5/3); 20% nonplastic fines; 80% fine sand; trace fine gravel; angular to subrounded clasts; loose; damp.	
2	1.7/2.5			5			@4': 20% nonplastic fines; 70% fine sand; 10% medium sand; trace fine gravel; loose; damp; micaceous.	
							SAND (SP), gray (5Y 6/1); 100% fine sand; damp. @ 6.8': olive (5Y 4/3). @ 7': dark gray (5Y 4/1); contains lenses of black clayey organic material.	
3	1.5/2.5						SILTY SAND (SM), olive (5Y 5/3); 85% fine sand; 15% medium sand; trace fine gravel; plastic refuse.	
							SAND (SP), olive (5Y 5/3); 75% fine sand; 15% medium sand: 10% coarse sand; damp	
4	1.2/2.5			10				

EMCON ASSOCIATES

REMARKS

Boring drilled using hollow-stem auger equipment to the total depth explored. Core samples were collected in approximately 2.5-foot long steps continuously to the total depth explored. Subsequently, a cluster of three soil-vapor probes was installed. Soil and rock colors based on the Munsell Soil Color Chart.

QA/QC: KOM 11/14/91

Printed on Recycled Paper

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-04.02 BORING NO. GP-2

PROJECT NAME CHIQUITA CANYON LANDFILL PAGE 2 OF 6

BY Laura Rainey DATE 5/22/91 SURFACE ELEV. ~981 ft.

Core Run # at top	Core Recovery (ft/ft)	Penetr-ation blows/6"	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
							SILTY SAND (SM), olive (5Y 5/4); 20% nonplastic fines; 80% fine sand; micaceous; damp.	
							SAND (SP), olive (5Y 5/3); 85% fine sand; 15% medium sand @ 11.9': olive (5Y 5/4); 80% fine sand; 20% medium sand.	
5	1.0/1.5						@ 12.5': trace fine gravel.	
							SAND (SW), brown (10YR 5/3); 35% fine sand; 50% medium sand; 15% coarse sand; trace fine to coarse gravel up to 1.5" diameter; damp.	
6	2.1/2.5			15				
							SAND (SP), olive (5Y 5/3); 85% fine sand; 15% medium sand: trace fine gravel; damp. @ 15.8': thin caliche-filled veins; moderately cemented; trace fine gravel, rounded, up to 1" diameter; damp. @ 16.5': 95% fine sand; 5% medium sand.	
7	1.4/2.5						@ 17.5': 85% fine sand; 15% medium sand; trace coarse sand; damp.	
				20			SANDSTONE (SAUGUS FORMATION), light olive brown (2.5Y 5/4); 20% fine sand; 65% medium sand: 15% coarse sand; damp; soft.	

EMCON ASSOCIATES

REMARKS

Boring drilled using hollow-stem auger equipment to the total depth explored. Core samples were collected in approximately 2.5-foot long steps continuously to the total depth explored. Subsequently, a cluster of three soil-vapor probes was installed. Soil and rock colors based on the Munsell Soil Color Chart.

QA/QC: Kay 11/14/91

Printed on Recycled Paper

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-04.02 BORING NO. GP-2

PROJECT NAME CHIQUITA CANYON LANDFILL PAGE 3 OF 6

BY Laura Rainey DATE 5/22/91 SURFACE ELEV. ~981 ft.

Core Run # at top	Core Recovery (ft/ft)	Penetr-ation blows/6"	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
8	1.6/2.5						@ 19.5': SILTY SANDSTONE, light olive brown (2.5Y 5/4); 15% nonplastic fines; 15% fine sand; 40% medium sand; 30% coarse sand; moderate hardness.	
							@ 20.7': SANDSTONE, light brownish gray (2.5Y 6/2); 50% fine sand; 35% medium sand; 10% coarse sand; 5% medium gravel; soft; damp.	
							@ 20.9': light gray (5Y 7/1); 85% fine sand; 15% medium sand; moderate hardness.	
							@ 21.5': olive (5Y 5/4); 95% fine sand; 5% medium sand; low hardness; damp.	
9	1.3/2.5						@ 22.5': 75% fine sand; 25% medium sand; low hardness.	
							@ 23.7': olive (5Y 5/4); 100% fine sand; trace medium sand; moderate hardness; damp.	
							@ 24': 15% fine sand; 40% medium sand; 25% coarse sand; 20% fine gravel; rounded to subrounded clasts up to 1.5" diameter; low hardness.	
				25				
10	1.5/2.5							
							@ 26': 100% fine sand; micaceous; low hardness.	
							@ 26.6': moderate hardness.	
							@ 26.8': 85% fine sand; 15% medium sand; damp; hard.	
11	1.0/2.5							
							@ 27.5': 75% fine sand; 25% medium sand.	
							@ 29': SILTY SANDSTONE, olive (5Y 5/3); 20% nonplastic fines; 65% fine sand; 15% medium sand; damp; moderate hardness.	
							@ 29.1': SANDSTONE, light olive brown (2.5Y	
				30				

EMCON ASSOCIATES

REMARKS

Boring drilled using hollow-stem auger equipment to the total depth explored. Core samples were collected in approximately 2.5-foot long steps continuously to the total depth explored. Subsequently, a cluster of three soil-vapor probes was installed. Soil and rock colors based on the Munsell Soil Color Chart.

QA/QC: RAO 11/14/91

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LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-04.02 BORING NO. GP-2

PROJECT NAME CHIQUITA CANYON LANDFILL PAGE 4 OF 6

BY Laura Rainey DATE 5/22/91 SURFACE ELEV. ~981 ft.

Core Run # at top	Core Recovery (ft/ft)	Penetr-ation blows/6"	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
12	2.1/2.5						5/4);10% nonplastic fines; 50% fine sand; 20% medium sand; 10% coarse sand; 10% fine gravel, angular to subrounded; low hardness; damp. @ 30.4': 15% fine sand; 65% medium sand; 15% coarse sand; 5% fine gravel; low hardness. @ 31.2': white (10YR 8/1); 100% fine-grained (crushed cobble). @ 31.3': (light olive brown (2.5Y 5/4); 15% fine sand; 65% medium sand; 15% coarse sand; 5% fine gravel; low hardness.	
13	1.4/2.5						@ 33.6': light olive brown (2.5Y 5/4); 40% fine sand; 25% medium sand; 25% coarse sand; 10% fine gravel; angular to subrounded. @ 34.3': cobbles up to 1.5" diameter. @ 34.7': 60% fine sand; 40% medium sand; trace fine gravel.	
				35				
14	1.4/2.5						@ 36.1': 50% fine sand; 25% medium sand; 25% coarse sand. @ 36.7': olive (5Y 5/4); 100% fine sand; trace medium sand; micaceous; moderate hardness. @ 36.8': SILTY SANDSTONE, dark grayish brown (2.5Y 4/2); 30% nonplastic fines; 70% fine sand; modertate hardness; damp.	
15	1.3/2.5						@ 37': olive (5Y 5/3);20% nonplastic fines; 60% fine sand; 20% medium sand. @ 38.7': SANDSTONE, olive (5Y 5/3); 100% fine sand; micaceous; soft; moist. @ 38.9': SILTY SANDSTONE, brown (10YR 5/3); 20% nonplastic fines; 15% fine sand; 45% medium sand; 20% coarse sand; moderate hardness; damp.	
				40				

EMCON ASSOCIATES

REMARKS

Boring drilled using hollow-stem auger equipment to the total depth explored. Core samples were collected in approximately 2.5-foot long steps continuously to the total depth explored. Subsequently, a cluster of three soil-vapor probes was installed. Soil and rock colors based on the Munsell Soil Color Chart.

QA/QC: KAJ 11/14/91

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LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-04.02 BORING NO. GP-2

PROJECT NAME CHIQUITA CANYON LANDFILL PAGE 5 OF 6

BY Laura Rainey DATE 5/22/91 SURFACE ELEV. ~981 ft.

Core Run # at top	Core Recovery (ft/ft)	Penetr-ation blows/6"	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
16	1.3/2.5						@ 39.9 ': SANDSTONE, olive (5Y 5/3); 90% fine sand; 10% medium sand; micaceous; moderate hardness; damp. @ 41.2': olive (5Y 5/3); 30% fine sand; 40% medium sand; 25% coarse sand; 5% fine gravel; soft. @ 41.7': SILTY SANDSTONE, olive (5Y 5/3); 20% nonplastic fines; 80% fine sand; micaceous; moderate hardness; damp. @ 42': SANDSTONE, olive (5Y 5/3); 85% fine sand; 15% medium sand; soft; damp.	
17	1.0/2.5						from 42.5 to 44': no recovery. @ 44': SILTY SANDSTONE, olive (5Y 5/3); 15% nonplastic fines; 30% fine sand; 40% medium sand; 10% coarse sand; 5% fine gravel; trace medium gravel; low hardness; damp.	
				45				
18	1.3/2.5						@ 44.5': SANDSTONE, olive (5Y 5/3); 5% nonplastic fines; 45% fine sand; 35% medium sand; 10% coarse sand; 5% fine gravel; trace medium gravel; soft; damp. @ 46.2': olive (5Y 5/3); 5% nonplastic fines; 50% fine sand; 30% medium sand; 10% coarse sand; 5% fine gravel; trace coarse gravel; moderate hardness. @ 46.5': 40% fine sand; 20% medium sand; 15% coarse sand; 25% fine gravel; clasts up to 1.5" diameter.	
19	1.2/2.5						@ 46.8': light gray (5Y 7/1); 100% fine sand. @ 46.9': olive (5Y 5/3); 40% fine sand; 20% medium sand; 15% coarse sand; 25% fine gravel. @ 47': SILTY SANDSTONE, olive (5Y 5/3); 20% nonplastic fines; 60% fine sand; 15% medium sand; 5% fine gravel; moderate hardness; damp. @ 48.8': 15% nonplastic fines; 45% fine sand; 20% medium sand; 15% coarse sand; 5% medium gravel.	
				50				

EMCON ASSOCIATES

REMARKS

Boring drilled using hollow-stem auger equipment to the total depth explored. Core samples were collected in approximately 2.5-foot long steps continuously to the total depth explored. Subsequently, a cluster of three soil-vapor probes was installed. Soil and rock colors based on the Munsell Soil Color Chart.

QA/QC: RAG 11/14/91

Printed on Recycled Paper

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-04.02 BORING NO. GP-2

PROJECT NAME CHIQUITA CANYON LANDFILL PAGE 6 OF 6

BY Laura Rainey DATE 5/22/91 SURFACE ELEV. ~981 ft.

Core Run # at top	Core Recovery (ft/ft)	Penetr-ation blows/6"	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
20	1.1/2.5						@ 49.3': 25% nonplastic fines; 25% fine sand; 20% medium sand; 15% coarse sand; 15% fine gravel. from 50 to 51.4': no recovery. @ 51.4': SANDSTONE, olive (5Y 5/3); 10% nonplastic fines; 70% fine sand; 15% medium sand; 5% coarse sand; low hardness; moist. @ 51.8': SILTY SANDSTONE, light olive brown (2.5Y 5/4); 25% nonplastic fines; 75% fine sand; micaceous; moderate hardness; moist.	
21	1.7/2.5						@ 52': olive (5Y 5/3); 15% nonplastic fines; 50% fine sand; 20% medium sand; 15% fine gravel. @ 53.3': SANDSTONE, olive (5Y 5/3); 30% fine sand; 50% medium sand; 15% coarse sand; 5% fine gravel; moderate hardness; moist. from 55 to 56.6': no recovery.	
				55				
							BOTTOM OF BORING: 56.6 FEET TARGET DEPTH ATTAINED.	
				60				

EMCON ASSOCIATES

REMARKS

Boring drilled using hollow-stem auger equipment to the total depth explored. Core samples were collected in approximately 2.5-foot long steps continuously to the total depth explored. Subsequently, a cluster of three soil-vapor probes was installed. Soil and rock colors based on the Munsell Soil Color Chart.

QA/QC: RCW 11/14/91

Printed on Recycled Paper

LOG OF EXPLORATORY BORING

PROJECT NUMBER: 0978-001038 | WELL NO.: GP-9

PROJECT NAME: Chiquita Canyon Landfill | PAGE: 1 of 5

BY: Dan Koning | DATE: September 14, 1995 | SURFACE ELEVATION: 1090± MSL

PID Reading (ppm)	PENETRATION (blows/6")	SAMPLES SELECTED FOR ANALYSES	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
0	28						ALLUVIUM: 0 TO 25 FEET	
	37						SILTY SAND WITH GRAVEL (SM): Very pale brown (10YR 8/4); 20% low plasticity fines; 50% fine sand; 20% medium to coarse sand; 10% gravel up to 1 inch in diameter; sand is subangular and arkosic; dense; dry.	
	20							
	29							
	24							
	34						CLAYEY SAND (SC): Dark yellowish brown (10YR 4/6); 20-40% medium plasticity fines; 50-70% fine sand; 10% medium sand; dense; moist; this may represent an argillic horizon of a soil.	
	26							
	40							
	38						SILTY SAND (SM): Olive (5Y 5/4); 20% low plasticity fines; 70% fine sand; 10% medium sand; subangular to subrounded; very dense; moist.	
	22			5				
	16						@ 4.25 ft.: 15% low plasticity fines; minor coarse sand and gravel; clay-rich stringers about 0.5 inch thick; moist.	
	19							
	11							
	7						SAND WITH SILT (SP-SM): Olive (5Y 5/4); 10% low plasticity fines; 80% fine sand; 5% medium sand; 5% coarse sand; subangular to subrounded; medium dense; moist.	
	8							
	14							
	11							
1.9	9						@ 7 ft.: 10% low plasticity fines; 80% fine sand; 10% medium to coarse sand; subangular to subrounded; slightly moist.	
	11							
	9						SILTY SAND (SM): 35% low plasticity fines; 65% fine sand.	
	12			10				
	3						SILT WITH SAND (ML): Olive (5Y 4/4); approx. 25% fine sand; very moist.	
	6							
	10	Moisture: 11.5-12'					SAND (SW): Olive (5Y 4/4); 50% fine sand; 50% medium sand; subangular; medium dense; moist.	
	13							
	30						@ 11.5 ft.: Some silty sand beds present which are 3-4 inches thick; the silty sand beds are moist; the intervening sand is dry.	
	32	VOCs: 13-13.5'						
							SAND (SP): Olive (5Y 4/4); 30% fine sand; 50% medium sand; 20% coarse sand; subangular; slightly moist.	
		Moisture: 14.5-15'		15			SILTY SAND (SM): Dense; moist.	
	3						@ 15 ft.: Moist.	
	19							
	25							
	14							
	14						@ 17 ft.: Olive (5Y4/4); 25% low plasticity fines; 40% fine sand; 35% medium sand; subangular; moist.	
	15							
	16						SAND WITH SILT (SP-SM): 10% low plasticity fines; 45% fine sand; 30% medium sand; 15% coarse sand.	
	19							
	20						@ 19 ft.: Olive (5Y 5/4); 10-15% low plasticity fines; 50% fine sand; 25-30% medium sand; 10% coarse sand; subangular; dense; moist.	
	8			20				

EMCON

REMARKS

Drilled using 11-inch-diameter continuous-flight hollow-stem augers to 29 feet, and 6-inch-diameter air-rotary to 85.5 feet. Soil samples collected with a modified California split-spoon sampler equiped with brass liners and driven into undisturbed soil beyond the augers with a down-hole hammer. Grab samples were collected for logging purposes. The boring was converted into a triple-completion gas probe using three 3/4-inch-diameter scheduale 80 PVC pipes. The PID was calibrated to 100 ppm isobutylene.

LOG OF EXPLORATORY BORING

PROJECT NUMBER: 0978-001038 | WELL NO.: GP-9

PROJECT NAME: Chiquita Canyon Landfill | PAGE: 2 of 5

BY: Dan Koning | DATE: September 14, 1995 | SURFACE ELEVATION: 1090± MSL

PID Reading (ppm)	PENETRATION (blows/6")	SAMPLES SELECTED FOR ANALYSES	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
	15						SAND (SP): 5% low plasticity fines; 90% fine sand; 5% medium sand; medium dense; moist.	
	23							
	14						SAND WITH SILT (SP-SM): Olive (5Y 4/4); 10% low plasticity fines; 40% fine sand; 35% medium sand; 15% coarse sand and gravel up to 0.5 inch in diameter; dense; moist.	
	19							
	20							
	15							
	25	Moisture:					@ 22.5 ft.: 10% low plasticity fines; 50% fine sand; 30% medium sand; 10% coarse sand with minor gravel; subangular; moist.	
	30	23-23.5'						
	20						@ 24 ft.: Light olive brown (2.5Y 5/4); 5% low plasticity fines; 40% fine sand; 35% medium sand; 10% coarse sand; 10% gravel up to 0.75 inch in diameter; subangular; arkosic; dense; moist.	
	30	VOCs: 24.5-25'		25				
	35	Moisture:						
	40	25-25.5'					SAUGUS FORMATION: 25 TO 85.5 FEET	
	38						SAND WITH GRAVEL (SP): Gravels are up to 1 inch in diameter; very dense; moist.	
	39							
	27						@ 27 ft.: Sandstone cobble, up to 2.5-3 inches diameter, is wedged in sampler.	
	30							
	30						GRAVELLY SAND (SP): 50% fine sand; 30% medium to coarse sand; 20% gravel up to 0.5 inch in diameter; dense.	
	30							
	37	Moisture:					@ 28.5 ft.: Olive (5Y 5/6); 50% fine sand; 25% medium to coarse sand; 25% gravel up to 0.75 inch in diameter; moist.	
	40	29-29.5'		30				
	43							
	50/5.5"	VOCs: 30.5-31'					@ 29 ft.: Pale yellow (5Y 7/4); 40% fine sand; 30% medium sand; 25% coarse sand; 5% gravel up to 1 inch in diameter; sand is subangular; gravel is subrounded; very dense; dry.	
				35				
							Note: Above contact is approximate.	
				40				

EMCON

REMARKS

Drilled using 11-inch-diameter continuous-flight hollow-stem augers to 29 feet, and 6-inch-diameter air-rotary to 85.5 feet. Soil samples collected with a modified California split-spoon sampler equiped with brass liners and driven into undisturbed soil beyond the augers with a down-hole hammer. Grab samples were collected for logging purposes. The boring was converted into a triple-completion gas probe using three 3/4-inch-diameter scheduale 80 PVC pipes. The PID was calibrated to 100 ppm isobutylene.

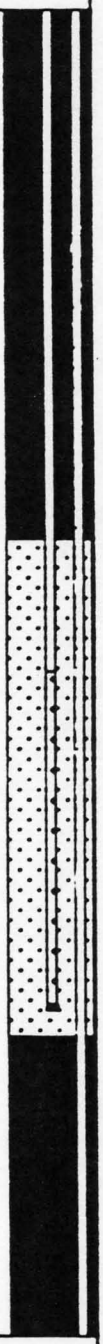
LOG OF EXPLORATORY BORING

PROJECT NUMBER: 0976-001038 | WELL NO.: GP-9

PROJECT NAME: Chiquita Canyon Landfill | PAGE: 3 of 5

BY: Dan Koning | DATE: September 14, 1995 | SURFACE ELEVATION: 1080± MSL

PID Reading (ppm)	PENETRATION (blows/6")	SAMPLES SELECTED FOR ANALYSES	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
				45				
				50	☒		@ 50 ft.: SILTY SAND (SM): Pale olive (5Y 6/3.5); 15% non to low plasticity fines; 25% fine sand; 25% medium sand; 10-15% coarse sand; 20-25% rounded gravel up to 0.5 inch in diameter; sand is subangular; arkosic; dry.	
							Note: Above contact is approximate.	
				55				
				60				



EMCON

REMARKS

Drilled using 11-inch-diameter continuous-flight hollow-stem augers to 29 feet, and 6-inch-diameter air-rotary to 85.5 feet. Soil samples collected with a modified California split-spoon sampler equiped with brass liners and driven into undisturbed soil beyond the augers with a down-hole hammer. Grab samples were collected for logging purposes. The boring was converted into a triple-completion gas probe using three 3/4-inch-diameter scheduale 80 PVC pipes. The PID was calibrated to 100 ppm isobutylene.

LOG OF EXPLORATORY BORING

PROJECT NUMBER: 0976-001038 WELL NO.: GP-9

PROJECT NAME: Chiquita Canyon Landfill PAGE: 4 of 5

BY: Dan Koning DATE: September 14, 1995 SURFACE ELEVATION: 1090± MSL

PID Reading (ppm)	PENETRATION (blows/6")	SAMPLES SELECTED FOR ANALYSES	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
				65	☒		@ 65 ft.: SAND WITH SOME GRAVEL (SP): Light yellowish brown (2.5Y 6/4); 5% non to low plasticity fines; 35% fine sand; 40% medium sand; 10% coarse sand; 10% gravel up to 0.75 inch in diameter; subangular; arkosic; dry.	
				70				
				75			Note: Above contact is approximate.	
				80				

EMCON

REMARKS

Drilled using 11-inch-diameter continuous-flight hollow-stem augers to 29 feet, and 6-inch-diameter air-rotary to 85.5 feet. Soil samples collected with a modified California split-spoon sampler equiped with brass liners and driven into undisturbed soil beyond the augers with a down-hole hammer. Grab samples were collected for logging purposes. The boring was converted into a triple-completion gas probe using three 3/4-inch-diameter scheduale 80 PVC pipes. The PID was calibrated to 100 ppm isobutylene.

LOG OF EXPLORATORY BORING

PROJECT NUMBER: 0978-001038 | WELL NO.: GP-9

PROJECT NAME: Chiquita Canyon Landfill | PAGE: 5 of 5

BY: Dan Koning | DATE: September 14, 1995 | SURFACE ELEVATION: 1090± MSL

PID Reading (ppm)	PENETRATION (blows/6")	SAMPLES SELECTED FOR ANALYSES	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
					☒		@ 80 ft.: GRAVELLY SAND (SP): Pale yellow (5Y 6/5); 5-10% non to low plasticity fines; 40% fine sand; 20-25% medium sand; 10-15% coarse sand; 15% gravel up to 0.5 inch in diameter; subangular; arkosic; dry. There are nodules of sand held weakly by fines; the nodules are about 0.5 inch in diameter.	
				85				
							BOTTOM OF BORING: 85.5 FEET Target Depth Reached Groundwater Not Encountered	
				90				
				95				
				100				

EMCON

REMARKS

Drilled using 11-inch-diameter continuous-flight hollow-stem augers to 29 feet, and 6-inch-diameter air-rotary to 85.5 feet. Soil samples collected with a modified California split-spoon sampler equiped with brass liners and driven into undisturbed soil beyond the augers with a down-hole hammer. Grab samples were collected for logging purposes. The boring was converted into a triple-completion gas probe using three 3/4-inch-diameter scheduale 80 PVC pipes. The PID was calibrated to 100 ppm isobutylene.

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EXPLORATORY BORING LOG

SITE NAME AND LOCATION Chiquita Canyon Landfill Valencia, California	DRILLING METHOD: Air Rotary	DRILLING CONTRACTOR: Water Development Corp.	BORING NO. GP-10
	RIG: Dresser T70W	OPERATOR:	SHEET 1 OF 3
PROJECT NO. 792038	SAMPLING METHOD:		DRILLING
SURFACE CONDITIONS:	BOREHOLE DIAMETER: 10 5/8"		START TIME / FINISH TIME
	BOREHOLE DEPTH:	DRILLED DEPTH: 81.12'	
LOCATION:	WATER LEVEL		
EAST 6367711.9631 NORTH 1982606.4719	DATE		DATE 11/16/99 / DATE 11/16/99
DATUM MSL ELEVATION (FT. MSL) 1236.08	TIME		

TIME	PENETRATION BLOWS / 6"	RECOVERY FT. / FT.	SAMPLE NO.	SAMPLE INTERVAL	DEPTH (FT.)	WATER LEVEL	GRAPHIC LOG	DESCRIPTION
					2, 4, 6, 8			SAND W/SILT (SP), brown (10YR 4/3); 95% fine sand; 5% non-plastic fines; trace medium sand, medium density, moist. @5.5': abundant fine to medium gravel (<5%)
10:10				■	10			
					12, 14, 16, 18			@12': gravel less abundant
10:25				■	20			
					22, 24, 26, 28			
10:50				■	30			@29':trace medium plasticity fines
					32, 34, 36, 38			

COMMENTS:

QA/QC
LOGGED BY Brian Eytcheson
CHECKED BY _____ DATE _____

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EXPLORATORY BORING LOG

SITE NAME AND LOCATION Chiquita Canyon Landfill Valencia, California	DRILLING METHOD: Air Rotary	DRILLING CONTRACTOR: Water Development Corp.	BORING NO. GP-10
	RIG: B-61	OPERATOR:	SHEET 2 OF 3
PROJECT NO. 792038	SAMPLING METHOD:		DRILLING
SURFACE CONDITIONS:	BOREHOLE DIAMETER: 10 5/8•		START TIME / FINISH TIME
	BOREHOLE DEPTH:	DRILLED DEPTH: 81.12•	
LOCATION:	WATER LEVEL		
EAST 6367711.9631 SOUTH 1982606.4719	DATE		DATE 11/16/99 / DATE 11/16/99
DATU MSL ELEVATION (FT. MSL) 1236.08	TIME		

TIME	PENETRATION BLOWS / 6"	RECOVERY FT. / FT.	SAMPLE NO.	SAMPLE INTERVAL	DEPTH (FT.)	WATER LEVEL	GRAPHIC LOG	DESCRIPTION
11:14					40			
					42			@41•: trace shell fragments
					44			
					46			@46•: abundant shell fragments, angular to subangular sandstone, granitoid, and mafic schist fragments. Nearly intact brachiopod (?) found in cuttings.
					48			
11:25					50			
					52			SANDY SILT (ML), pale red (2.5YR 6/2); 80% non-plastic fines; 20% fine to coarse sand, trace fine gravel, shell fragments; dense; damp.
					54			
					56			
					58			
11:35					60			@60•: trace medium gravel, medium sand; poorly graded; subrounded to subangular.
					62			
					64			@64•: pale yellow (2.5YR 8/2); trace subrounded to sub-angular coarse sand
					66			
					68			
11:45					70			
					72			
					74			@74•: darker cuttings, light brownish grey (10YR 6/2); moist.
11:57					76			
					78			

COMMENTS:

QA/QC
LOGGED BY Brian Eytcheson
CHECKED BY _____ DATE _____

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EXPLORATORY BORING LOG

SITE NAME AND LOCATION: Chiquita Canyon Landfill, Valencia, California	DRILLING METHOD: Air Rotary	DRILLING CONTRACTOR: Water Development Corp.	BORING NO.: GP-10
	RIG: B-61	OPERATOR:	SHEET 3 OF 3
PROJECT NO. 792038	SAMPLING METHOD:		DRILLING
SURFACE CONDITIONS:	BOREHOLE DIAMETER: 10 5/8"		START TIME / FINISH TIME
	BOREHOLE DEPTH:	DRILLED DEPTH: 81.12"	
LOCATION:	WATER LEVEL		
EAST 6367711.9631 SOUTH 1982606.4719	DATE		DATE 11/16/99 / DATE 11/16/99
DATU MSL ELEVATION (FT. MSL) 1236.08	TIME		

TIME	PENETRATION BLOWS / 6"	RECOVERY FT. / FT.	SAMPLE NO.	SAMPLE INTERVAL	DEPTH (FT.)	WATER LEVEL	GRAPHIC LOG	DESCRIPTION
					80			
					82			**Boring Terminated at 81.12 ft. Target Depth attained.**
					84			
					86			
					88			
					90			
					92			
					94			
					96			
					98			
					100			
					102			
					104			
					106			
					108			
					110			
					112			

COMMENTS:

QA/QC
LOGGED BY Brian Eytcheson
CHECKED BY _____ DATE _____

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EXPLORATORY BORING LOG

SITE NAME AND LOCATION Chiquita Canyon Landfill Valencia, California	DRILLING METHOD: Air Rotary	DRILLING CONTRACTOR: Water Development Corp.	BORING NO. GP-B
	RIG: Dresser T70W	OPERATOR:	SHEET 1 OF 3
PROJECT NO. 792038	SAMPLING METHOD:		DRILLING
SURFACE CONDITIONS:	BOREHOLE DIAMETER: 10 5/8"		START TIME / FINISH TIME
	BOREHOLE DEPTH:	DRILLED DEPTH: 111.0'	
LOCATION:	WATER LEVEL		DATE 11/17/99 / DATE 11/17/99
EAST 6368378.1809 NORTH 1981245.3582	DATE		
DATUM MSL ELEVATION (FT. MSL) 1219.23	TIME		

TIME	PENETRATION BLOWS / 6"	RECOVERY FT. / FT.	SAMPLE NO.	SAMPLE INTERVAL	DEPTH (FT.)	WATER LEVEL	GRAPHIC LOG	DESCRIPTION
					2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38			SILTY SANDSTONE (SM), yellowish brown (10YR 5/4); 80% fine sand; trace fine gravel; 5% medium course sand; moist; dense. @5'-5% fine to coarse gravel. SILTY SANDSTONE W/CLAY (SM), yellowish brown (10YR 5/4); 70% fine sand, trace medium sand; trace medium gravel; 20% non-plastic fines; 10% medium GRAVELLY SANDSTONE W/SILT (SW), yellowish red (10YR 5/4); 65% fine sand; 15% fine to coarse gravel; 15% non-plastic fines; 5% medium to coarse sand; moist; very dense. SANDY CLAYSTONE (CL), yellowish red (5YR 5/6); 25% fine sand; 75% medium plasticity fines; trace medium GRAVELLY SANDSTONE; (as above). SANDY SILTSTONE (SM), pinkish grey (5YR 7/2); 35% fine sand; 65% non-plastic fines; damp; very dense.

COMMENTS:

QA/QC
LOGGED BY Brian Eytcheson
CHECKED BY _____ DATE _____

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EXPLORATORY BORING LOG

SITE NAME AND LOCATION Chiquita Canyon Landfill Valencia, California	DRILLING METHOD: Air Rotary	DRILLING CONTRACTOR: Water Development Corp.	BORING NO. GP-B
	RIG: B-61	OPERATOR:	SHEET 2 OF 3
PROJECT NO. 792038	SAMPLING METHOD:		DRILLING
SURFACE CONDITIONS:	BOREHOLE DIAMETER: 10 5/8•		START TIME / FINISH TIME
	BOREHOLE DEPTH:	DRILLED DEPTH: 111.0'	
LOCATION:	WATER LEVEL		
EAST 6368378.1809 SOUTH 1981245.3582	DATE		DATE 11/17/99 / DATE 11/17/99
DATUM MSL ELEVATION (FT. MSL) 1219.23	TIME		

TIME	PENETRATION BLOWS / 6"	RECOVERY FT. / FT.	SAMPLE NO.	SAMPLE INTERVAL	DEPTH (FT.)	WATER LEVEL	GRAPHIC LOG	DESCRIPTION
					40, 42, 44			@44•: (10YR 6/2);trace medium to course sand
					46, 48			SANDY SILTSTONE W/CLAY (ML), light brownish grey (10YR 6/2); 30% fine sand, 60% non-plastic fines; 10% low to medium plastic fines; very dense; moist.
					50			@48•-50•: more sand & gravel; less fines.
					52, 54, 56, 58, 60			CLAYEY SILTSTONE W/SAND (ML): grayish orange (10YR 7/4); 25% low-medium plastic fines; 70% non-plastic fines; 5% fine sand; moist; very dense.
					62			@62• ~35% medium plastic
					64			SANDY SILTSTONE (ML), pale yellowish brown (10YR 6/2); 35% non-plastic fines; moist; very dense.
10:35		Grab			66, 68, 70, 72			@73•: more fines, ~10%; medium plastic
					74			CLAYEY SILTSTONE (ML), light olive grey (5YR 5/2); 60% non-plastic fines; 30% medium plastic fines; 10% fine sand; damp; very dense.
11:00		Grab			76, 78			SILTY SANDSTONE (SM), medium yellowish brown (10YR 5/4); 60% fine sand; 35% non-plastic fines; 5% medium-coarse sand; moist; very dense.

COMMENTS:

QA/QC
LOGGED BY Brian Eytcheson

CHECKED BY _____ DATE _____

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EXPLORATORY BORING LOG

SITE NAME AND LOCATION: Chiquita Canyon Landfill, Valencia, California	DRILLING METHOD: Air Rotary	DRILLING CONTRACTOR: Water Development Corp.	BORING NO. GP-B
	RIG: B-61	OPERATOR:	SHEET 3 OF 3
PROJECT NO. 792038	SAMPLING METHOD:		DRILLING
SURFACE CONDITIONS:	BOREHOLE DIAMETER: 10 5/8"		START TIME / FINISH TIME
LOCATION:	BOREHOLE DEPTH:	DRILLED DEPTH: 111.0'	
EAST 6368378.1809 NORTH 1981245.3582	WATER LEVEL		DATE / DATE
DATUM MSL ELEVATION (FT. MSL) 1219.23	DATE / TIME		11/17/99 / 11/17/99

TIME	PENETRATION BLOWS / 6"	RECOVERY FT. / FT.	SAMPLE NO.	SAMPLE INTERVAL	DEPTH (FT.)	WATER LEVEL	GRAPHIC LOG	DESCRIPTION
					80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104, 106, 108, 110, 112			
								@88': (SM), yellowish brown (10YR 5/4); less medium plastic fines. @89-93': 40% fines.
								@93': (SM), dark greyish brown (10YR 4/2); moist, ~5% fine gravel.
11:30								@95': (SM), pale yellow brown (10YR 6/2); less fines.
								GRAVELLY SAND W/SILT (SW-SM), pale yellowish brown (10YR 6/2); 60% fine sand; 30% fine gravel; 10% non-plastic fines; trace medium-course sand; damp; very dense.
11:42								**SANDY SILTSTONE (ML)**, yellowish grey (5YR 7/2); 70% fines; 30% fine to medium sand, dry to moist, hard.
								Boring Terminated at 111 ft. Target Depth attained.

COMMENTS:

QA/QC
LOGGED BY Brian Eytcheson
CHECKED BY _____ DATE _____

PROJECT NO: 827026
LOGGED BY: MC
DRILLER: WEST HAZMAT
DRILLING METHOD: HSA
SAMPLING METHOD: -
CASING TYPE: -
SLOT SIZE: -
GRAVEL PACK: -

CLIENT:
DATE DRILLED: 4/1-2/02
LOCATION: CHIQUITA CANYON LANDFILL
HOLE DIAMETER: 8"
HOLE DEPTH:
WELL DIAMETER: -
WELL DEPTH: -
CASING STICKUP: -

LOCATION MAP

WELL COMPLETION	PRODUCT ODOR	SAMPLE NO.	RECOVERY	PENETRATION (BLOWS/ 6")	DEPTH (FEET)	RECOVERY	SAMPLE INTERVAL	GRAPHIC	SOIL TYPE	LITHOLOGY/REMARKS
										CLAYSTONE little FINE SAND (Landslide debris): light brown; dry; very weak; open fractures to 1/2" (Soil/Rock Debris)
					2					SANDSTONE: fine; some silt; dusky yellow; very dense; dry; friable; closely spaced silt partings
					4					
		1-5	45%	33 33 33						
					6					
					8					
		1-10	85%	50/6"	10					
					12					SILTSTONE: some fine sand; light olive gray; very dense; dry
					14					
		1-15	100%	36 50/6"						
					16					
					18					
		1-20	100%	60/3"	20					Intermittent sandstone and siltstone; iron oxide staining on fractures
					22					

PROJECT NO: 827026
LOGGED BY: MC
DRILLER: WEST HAZMAT
DRILLING METHOD: HSA
SAMPLING METHOD: -
CASING TYPE: -
SLOT SIZE: -
GRAVEL PACK: -

CLIENT:
DATE DRILLED: 4/1-2/02
LOCATION: CHIQUITA CANYON LANDFILL
HOLE DIAMETER: -
HOLE DEPTH: -
WELL DIAMETER: -
WELL DEPTH: -
CASING STICKUP: -

LOCATION MAP

WELL COMPLETION	PRODUCT ODOR	SAMPLE NO.	RECOVERY	PENETRATION (BLOWS/ 6")	DEPTH (FEET)	RECOVERY	SAMPLE INTERVAL	GRAPHIC	SOIL TYPE	LITHOLOGY/REMARKS
										SILTSTONE (Soil/Rock Debris): cont.
					24					
		1-25	100%	60/5"						Friable; closely spaced fractures in random orientation
					26					
					28					
					30					
		1-30	75%	50/6"						Interbeds of SANDSTONE: fine; some silt; light olive gray; very dense; dry
					32					Some fine sand; low plasticity; olive gray and white; very dense; dry; very closely spaced chaotic fractures with secondary carbonate cementation along rough fractures
					34					
		1-35	100%	60/3"						
					36					
					38					
		1-40	0%	50/2"	40					Abundant subangular shell fragments; highly sheared; extremely close fractures with iron oxide staining
		1-42	100%	50/3"	42					
					44					

PROJECT NO: 827026
LOGGED BY: MC
DRILLER: WEST HAZMAT
DRILLING METHOD: HSA
SAMPLING METHOD: -
CASING TYPE: -
SLOT SIZE: -
GRAVEL PACK: -

CLIENT:
DATE DRILLED: 4/1-2/02
LOCATION: CHIQUITA CANYON LANDFILL
HOLE DIAMETER: -
HOLE DEPTH: -
WELL DIAMETER: -
WELL DEPTH: -
CASING STICKUP: -

LOCATION MAP

WELL COMPLETION	PRODUCT ODOR	SAMPLE NO.	RECOVERY	PENETRATION (BLOWS/ 6")	DEPTH (FEET)	RECOVERY / SAMPLE INTERVAL	GRAPHIC	SOIL TYPE	LITHOLOGY/REMARKS
									SILTSTONE (Soil/Rock Debris): cont.
		1-45	100%	50/2"	46				Primarily carbonate rich clasts; chaotic assemblage; no preferential orientation
		1-47	100%	50/3"	48				SANDSTONE: fine; some silt; olive-gray; very dense; dry; possibly sheared; highly weathered
		1-50	100%	50/3"	50				SANDSTONE (Pico Formation): fine; some silt; very pale orange; banded with light olive, gray and yellow-brown; very dense; dry; friable; highly weathered; silt in filling; intact laminated bedding
		1-52	100%	60/4"	52				
					54				
		1-55	100%	60/3"	56				Interbedded; fine sandstone; fine; some silt and siltstone; very difficult drilling
		1-57	100%	50/5"	58				Gradational contact to:
		1-60	20%	60/4"	60				SILTSTONE: some fine sand; low plasticity; olive-gray; very dense; dry; laminated; subangular shell fragments faintly oriented with bedding; iron oxide staining
					62				Bottom of boring at approximately 60.5 feet No groundwater observed

Log of Exploration Boring

Boring Location	Project No. 827026.40	Date 4-18-2-02	Boring No. LSB-1
	Project Name Chiquita Canyon Landfill		
	Client		
	Drilling Co. West Hazmat		
	Driller Oscar	Drill Rig LARCHE 75	Sheet 1
	Drilling Method HSA	Hole Dia. 8-inch	
	Surface Conditions		of 2

Sample No.	Blow Counts	Recovery	Depth	Description (El. 1520' (from section) Logged By MC)	Moisture Density	Other Tests
				Claystone little fine sand, light brown, dry, very weak, open fractures to 1/2 inch. (LANDSLIDE DEBRIS)		
1-5	33 33 33	94%	5	Sandstone fine, some silt, dusky yellow, very dense dry, friable, closely spaced silt partings.		
1-10	50/6"	83%	10	@ 10' Cobble		
				Siltstone some fine sand, light olive gray, very dense, dry		
1-15	36 50/6"	100%	15			
1-20	60/3"	100%	20	intermixed sandstone and siltstone, ironoxide staining ~~at partings~~ on fractures		
1-25	60/5"	100%	25	friable, closely spaced fractures in random orientation		
1-30	50/6"	75%	30	interbeds of sandstone, fine, some silt, light olive gray, very dense, dry		

Start Time | End Time | Groundwater

Log of Exploration Boring

Boring Location	Project No. 827026.40	Date 4-1&2-02	Boring No. LSB-1
	Project Name		
	Client		
	Drilling Co.		
	Driller	Drill Rig	Sheet ~~1~~ 2
	Drilling Method	Hole Dia.	
	Surface Conditions		of 2

Sample No.	Blow Counts	Recovery	Depth	Description (El. / Logged By MC)	Moisture Density	Other Tests
			30	SILTSTONE cont'd (LANDSLIDE DEBRIS) some fine sand, low plasticity, olive gray and white, very dense, dry, ~~locally cemented~~ very closely spaced chaotic fractures with secondary carbonate cementation along rough fractures		
1-35	60/3"	100%	35			
1-40	50/2"	0%	40	@40' abundant subangular shell fragments; highly sheared, extremely close fractures with ironoxide staining		
1-42	50/3"	100%				
1-45	50/2"	100%	45	@45' primarily carbonate rich clasts siltstone, chaotic assemblage, no preferential orientation		
1-47	50/4"	100%		47.2' SANDSTONE fine, some silt, olive gray, dry dense, dry, possibly sheared, highly weathered		
1-50	50/3"	100%	50	49.5 where's claystone referenced 2.2.3.01 SANDSTONE (PICO FORMATION) fine, some silt, very pale orange, banded with light tolined, very dense, dry, friable, highly weathered, silt infilling, intact laminated bedding, very difficult drilling		
1-52	60/4"	100%				
1-55	60/3"	100%	55	@55' interbedded fine sandstone, some silt and siltstone, gradational contact to SILTSTONE some fine sand, low plasticity, olive gray, very dense, dry, scattered subangular shell fragments faintly oriented with bedding, ironoxide staining		
1-57	50/5"	100%				
1-60	60/4"	19%	60			

"ruptured claystone" in this interval

gray and pale yellow brown

Bottom of Boring at 60.4 feet
No Groundwater Observed
Completed April 2, 2002.

Start Time | End Time | Groundwater

PROJECT NO: 827026
LOGGED BY: MS
DRILLER: WEST HAZMAT
DRILLING METHOD: HSA
SAMPLING METHOD: -
CASING TYPE: -
SLOT SIZE: -
GRAVEL PACK: -

CLIENT:
DATE DRILLED: 4/1/02
LOCATION: CHIQUITA CANYON LANDFILL
HOLE DIAMETER: 8"
HOLE DEPTH: -
WELL DIAMETER: -
WELL DEPTH: -
CASING STICKUP: -

LOCATION MAP

WELL COMPLETION	PRODUCT ODOR	SAMPLE NO.	RECOVERY	PENETRATION (BLOWS/ 6")	DEPTH (FEET)	RECOVERY	SAMPLE INTERVAL	GRAPHIC	SOIL TYPE	LITHOLOGY/REMARKS
										SANDSTONE (Soil/Rock Debris): little silt; dusky yellow; fine; dry; weak and friable; chaotic closely spaced sand partings and fractures
					2					
					4					
		2-5	55%	24 15 15	6					Dense
					8					Light olive-brown
		2-10	85%	15 50/6"	10					Very dense
					12					
					14					
		2-15	25%	32 50	16					Scattered cobbles; subrounded sandstone clasts
					18					
		2-20	100%	38 50/5"	20					Fine to medium sand; dusky yellow-orange
					22					

PROJECT NO: 827026
LOGGED BY: MC
DRILLER: WEST HAZMAT
DRILLING METHOD: HSA
SAMPLING METHOD: -
CASING TYPE: -
SLOT SIZE: -
GRAVEL PACK: -

CLIENT:
DATE DRILLED: 4/1/02
LOCATION: CHIQUITA CANYON LANDFILL
HOLE DIAMETER: -
HOLE DEPTH: -
WELL DIAMETER: -
WELL DEPTH: -
CASING STICKUP: -

LOCATION MAP

WELL COMPLETION	PRODUCT ODOR	SAMPLE NO.	RECOVERY	PENETRATION (BLOWS/ 6")	DEPTH (FEET)	RECOVERY / SAMPLE INTERVAL	GRAPHIC	SOIL TYPE	LITHOLOGY/REMARKS
									SANDSTONE (Soil/Rock Debris): cont.
					24				
		2-25	100%	50					Fine to medium sand; dusky yellow-orange
					26				
					28				
					30				
		2-30	-	29 50					Localized intervals of chaotically oriented coarse sand with gravel and silt; fine sand; faint bedding laminations
					32				SILTSTONE: some fine sand; low plasticity; mottled light and moderate olive-brown with dusky yellow; very dense; moist; friable; iron oxide stained clasts; closely spaced fractures
					34				
		2-35	100%	40 50/3"	36				CLAYSTONE: some silt and fine sand; moderate brown with olive-gray inclusions; very hard; moist; chaotic very closely spaced fractures
					38				CLAYSTONE: some silt and fine sand; moderate brown with olice-brown inclusions; very hard; moist; chaotic very closely spaced fractures
		2-40	100%	41 50/5"	40				
					42				
					44				

PROJECT NO: 827026
LOGGED BY: MC
DRILLER: WEST HAZMAT
DRILLING METHOD: HSA
SAMPLING METHOD: -
CASING TYPE: -
SLOT SIZE: -
GRAVEL PACK: -

CLIENT:
DATE DRILLED: 4/1/02
LOCATION: CHIQUITA CANYON LANDFILL
HOLE DIAMETER: -
HOLE DEPTH: -
WELL DIAMETER: -
WELL DEPTH: -
CASING STICKUP: -

LOCATION MAP

WELL COMPLETION	PRODUCT ODOR	SAMPLE NO.	RECOVERY	PENETRATION (BLOWS/ 6")	DEPTH (FEET)	RECOVERY / SAMPLE INTERVAL	GRAPHIC	SOIL TYPE	LITHOLOGY/REMARKS
									CLAYSTONE (Soil/Rock Debris): cont.
		2-45	100%	26 50/4"	46				
									SILT STONE: some fine sand; low plasticity; light olive-gray to light brown-gray; very dense; moist
					48				
		2-50	100%	50/5"	50				
					52				
					54				
		2-55	100%	50/6"					Moderate plasticity; grayish olive
					56				
					58				
		2-60	-	50/6"	60				
					62				
					64				SILTSTONE (Pico Formation): some fine sand; scattered shell fragments; low plasticity; light brown gray; very dense; moist; faint bedding laminations; localized caliche
		2-65	100%	50/5"	66				

PROJECT NO: 827026
LOGGED BY: MC
DRILLER: WEST HAZMAT
DRILLING METHOD: HSA
SAMPLING METHOD: -
CASING TYPE: -
SLOT SIZE: -
GRAVEL PACK: -

CLIENT:
DATE DRILLED: 4/1/02
LOCATION: CHIQUITA CANYON LANDFILL
HOLE DIAMETER: -
HOLE DEPTH: -
WELL DIAMETER: -
WELL DEPTH: -
CASING STICKUP: -

LOCATION MAP

WELL COMPLETION	PRODUCT ODOR	SAMPLE NO.	RECOVERY	PENETRATION (BLOWS/ 6")	DEPTH (FEET)	RECOVERY	SAMPLE INTERVAL	GRAPHIC	SOIL TYPE	LITHOLOGY/REMARKS
		2-68	-	50/3"	68					At 68': shell and gypsum fragments
										Bottom of boring at approximately 68.5 feet Near refusal No groundwater observed
					70					

Log of Exploration Boring

2-20
2-40
60
2-65

Boring Location	Project No. 827026.40	Date 4-1-01	Boring No. LSB-2
	Project Name Chiquita Canyon Landfill		
	Client		
	Drilling Co. West Hazmat		
	Driller	Drill Rig LAR CME75	Sheet 1
	Drilling Method HSA	Hole Dia. 8"	
	Surface Conditions		of 3

Sample No.	Blow Counts	Recovery	Depth	Description (El. 1535' (from xsection) Logged By MC)	Moisture Density	Other Tests
				SANDSTONE fine, little silt, dusky yellow, dry (LANDSLIDE DEBRIS) weak and friable, chaotic closely spaced sand partings and fractures		
2-5	24 15 15	56%	5	dense		
				light olive brown		
2-10	15 50/6"	83%	10	very dense		
2-15	32 50	25%	15	scattered cobbles, sub rounded sandstone clasts		
2-20	38 50/5"	100%	20			
2-25	50	100%	25	fine to medium sand dusky yellow orange		
2-30	29 50	—	30	localized intervals of chaotically oriented coarse sand with gravel and silt with fine sand, faint bedding laminations		

33'

Start Time End Time Groundwater

Log of Exploration Boring

Boring Location	Project No. 827026.40	Date 4-1-02	Boring No. LSB-2
	Project Name Chiquita Canyon Landfill		
	Client		
	Drilling Co.		
	Driller	Drill Rig	Sheet ~~1~~ 2
	Drilling Method	Hole Dia.	
	Surface Conditions		of 3

El. 1535' (from section) Logged By MC

Sample No.	Blow Counts	Recovery	Depth	Description	Moisture Density	Other Tests
			30	SANDSTONE CONT'D (LANDSLIDE DEBRIS)		
2-35	40 50/3"	100%	35	SILTSTONE some fine sand, low plasticity, mottled light and moderate olive brown with dusky yellow, friably, iron oxide stained clasts, very dense, moist, closely spaced fractures		
2-40	41 50/5"	100%	40	Claystone some silt and fine sand, moderate brown with olive gray inclusions, very hard, moist, chaotic very closely spaced fractures		
2-45	26 50/4"	100%	45			
2-50	50/5"	100%	50	SILTSTONE some fine sand, low plasticity, light olive gray to light brown gray, very dense, moist, chaotic		
2-55	50/6"	100%	55			
2-60	50/6"	—	60	moderate plasticity, grayish olive		

Start Time | End Time | Groundwater

Log of Exploration Boring

Boring Location	Project No. 827026.40	Date 4-1-02	Boring No. LSB-2
	Project Name Chiquita Canyon Landfill		
	Client		
	Drilling Co.		
	Driller	Drill Rig	Sheet 3 of 3
	Drilling Method	Hole Dia.	
	Surface Conditions		

Sample No.	Blow Counts	Recovery	Depth	Description (El. / Logged By MC)	Moisture Density	Other Tests
			60	SILTSTONE Cont'd (LANDSLIDE DEBRIS)		
2-65	50/5"	100%	65	SILTSTONE (PILO FORMATION) some fine sand, scattered shell fragments, low plasticity light brown gray, very dense, moist, faint bedding laminations, localized caliche		
2-68	50/3"	—		@68' shell fragments and gypsum.		
			70			
			75	Bottom of Boring at 68.4 feet Near Refusal No Groundwater Observed Completed April 1, 2002		
			80			
			85			
			90			

Start Time | End Time | Groundwater

PROJECT NO: 827026
LOGGED BY: DE/MC/JB
DRILLER: WEST HAZMAT
DRILLING METHOD: HSA
SAMPLING METHOD: -
CASING TYPE: -
SLOT SIZE: -
GRAVEL PACK: -

CLIENT:
DATE DRILLED: 4/2-3/02
LOCATION: CHIQUITA CANYON LANDFILL
HOLE DIAMETER: 8"
HOLE DEPTH:
WELL DIAMETER: -
WELL DEPTH: -
CASING STICKUP: -

LOCATION MAP

WELL COMPLETION	PRODUCT ODOR	SAMPLE NO.	RECOVERY	PENETRATION (BLOWS/ 6")	DEPTH (FEET)	RECOVERY	SAMPLE INTERVAL	GRAPHIC	SOIL TYPE	LITHOLOGY/REMARKS
										SANDSTONE (Slide block): fine to medium; little silt; yellowish gray and white; medium dense; dry occasional pebbles to 1/8"; friable
					2					
					4					
		3-5	50%	11 11 15	6					
					8					
					10					Yellowish gray
		3-11	50%	11 16						
					12					
					14					
					16					
		3-16	25%	23 23 30						Fine; little silt; yellowish gray; very dense; dry
					18					
					20					
		3-21	25%	27 27 43	22					Moist

PROJECT NO: 827026
LOGGED BY: DE/MC/JB
DRILLER: WEST HAZMAT
DRILLING METHOD: HSA
SAMPLING METHOD: -
CASING TYPE: -
SLOT SIZE: -
GRAVEL PACK: -

CLIENT:
DATE DRILLED: 4/2-3/02
LOCATION: CHIQUITA CANYON LANDFILL
HOLE DIAMETER: -
HOLE DEPTH: -
WELL DIAMETER: -
WELL DEPTH: -
CASING STICKUP: -

LOCATION MAP

WELL COMPLETION	PRODUCT ODOR	SAMPLE NO.	RECOVERY	PENETRATION (BLOWS/ 6")	DEPTH (FEET)	RECOVERY / SAMPLE INTERVAL	GRAPHIC	SOIL TYPE	LITHOLOGY/REMARKS
									Sandstone (Slide Block): cont.
					24				
		3-25	100%	27 50/3"					Dusky yellow
					26				
					28				
		3-30	50%	37 50/6"	30				
					32				
					34				
		3-35	100%	38 50/5"	36				
					38				
		3-40	100%	50/6"	40				Approximately 1/2" thick layer of coarse grained sandstone
					42				
					44				

PROJECT NO: 827026
LOGGED BY: DE/MC/JB
DRILLER: WEST HAZMAT
DRILLING METHOD: HSA
SAMPLING METHOD: -
CASING TYPE: -
SLOT SIZE: -
GRAVEL PACK: -

CLIENT:
DATE DRILLED: 4/2-3/02
LOCATION: CHIQUITA CANYON LANDFILL
HOLE DIAMETER: -
HOLE DEPTH: -
WELL DIAMETER: -
WELL DEPTH: -
CASING STICKUP: -

LOCATION MAP

WELL COMPLETION	PRODUCT ODOR	SAMPLE NO.	RECOVERY	PENETRATION (BLOWS/ 6")	DEPTH (FEET)	RECOVERY / SAMPLE INTERVAL	GRAPHIC	SOIL TYPE	LITHOLOGY/REMARKS
									SANDSTONE (Slide Block): cont.
		3-45	100%	50/3"					Slight iron oxide staining
					46				
									GRAVEL AND COBBLES: indicated by drill action
					48				
					50				
		3-50	0%	50/4"					
					52				
		3-52	100%	20 23 30					SANDSTONE: fine; little silt; mottled coloring and staining of dusky yellow and greenish gray; very dense; moist; carbonate filled fractures up to 1/16" thick
					54				
		3-55	100%	50/5"					
					56				
					58				
					60				
		3-60	100%	60/4"					Claystone clast; greenish gray; approximately 1" diameter Laminated bedding; highly weathered; closely spaced silt partings
					62				
					64				
		3-65	100%	50/3"					Iron oxide staining; chaotic layering
					66				

PROJECT NO: 827026
LOGGED BY: MC
DRILLER: WEST HAZMAT
DRILLING METHOD: HSA
SAMPLING METHOD: -
CASING TYPE: -
SLOT SIZE: -
GRAVEL PACK: -

CLIENT:
DATE DRILLED: 4/2-3/02
LOCATION: CHIQUITA CANYON LANDFILL
HOLE DIAMETER: -
HOLE DEPTH: -
WELL DIAMETER: -
WELL DEPTH: -
CASING STICKUP: -

LOCATION MAP

WELL COMPLETION	PRODUCT ODOR	SAMPLE NO.	RECOVERY	PENETRATION (BLOWS/ 6")	DEPTH (FEET)	RECOVERY	SAMPLE INTERVAL	GRAPHIC	SOIL TYPE	LITHOLOGY/REMARKS
										SANDSTONE (Soil/Rock Debris): cont.
					68					
					70					
		3-70	100%	60/5"						
					72					CLAYSTONE (Pico Formation): little fine sand; low plasticity; moderate reddish brown to moderate brown; very hard; moist; massive; highly weathered
					74					
		3-75	100%	60/5"						
					76					
										Blocky, medium gray, silt inclusions
					78					SILTSTONE and SANDSTONE: Interbedded; fine grained sandstone; banded light olive-brown and dusky yellow; very dense; moist; laminated bedding; closely spaced silt partings; fractures to 1/16" thick
					80					
		3-80	83%	60/6"						
					82					
					84					
		3-85	100%	31 50/3"						Chaotic distribution of siltstone and sandstone clasts
					86					
										COBBLES: indicated by drill action; sample driven on cobble, recovered broken fragments
					88					

PROJECT NO: 827026
LOGGED BY: DE/MC/JB
DRILLER: WEST HAZMAT
DRILLING METHOD: HSA
SAMPLING METHOD: -
CASING TYPE: -
SLOT SIZE: -
GRAVEL PACK: -

CLIENT:
DATE DRILLED: 4/2-3/02
LOCATION: CHIQUITA CANYON LANDFILL
HOLE DIAMETER: -
HOLE DEPTH: -
WELL DIAMETER: -
WELL DEPTH: -
CASING STICKUP: -

LOCATION MAP

WELL COMPLETION	PRODUCT ODOR	SAMPLE NO.	RECOVERY	PENETRATION (BLOWS/ 6")	DEPTH (FEET)	RECOVERY / SAMPLE INTERVAL	GRAPHIC	SOIL TYPE	LITHOLOGY/REMARKS
									COBBLES (Pico Formation): cont.
		3-89	35%	50/6"					
					90				
					92				
					94				
		3-94	100%	50/5"					SANDSTONE: fine; little silt; light brown; very dense; dry; poor cementation
					96				
		3-96.5	100%	60/5"					Some silt; gray brown
					98				
		3-99	100%	60/6"					SILTSTONE: mottled gray, red-brown, brown; very dense; dry; laminated to stratified bedding; moderately weathered
					100				
		3-101.5	80%	50/5"	102				Bottom of boring at approximatelty 102 feet Near refusal, broke bearing at top of Kelley bar No groundwater observed
					104				

Log of Exploration Boring

Boring Location	Project No. 827026.40	Date 4-2 & 4-3-02	Boring No. LSB-3
	Project Name Chiquita Canyon Land Fill		
	Client		
	Drilling Co.		
	Driller	Drill Rig	Sheet 1
	Drilling Method	Hole Dia.	
	Surface Conditions		of 4

3-5 1, 25% m
-21 80% m
30 20% m
40 15% m
75 -75% m
80 70% m

Sample No.	Blow Counts	Recovery	Depth	Description	Moisture Density	Other Tests
				El. 1475' (from xsection) Logged By DE/MC/JB		
				Sandstone (LANDSLIDE BLOCK) fine to medium little silt, yellowish gray and white, medium dense, dry occasional pebbles to 1/8", friable.		
3-5	11 11 15	50%	5			
3-11	11 16	50%	10	yellowish gray		
3-16	23 23 30	25%	15	fine, little silt, yellowish gray, very dense, dry,		
3-21	27 27 43	25%	20	moist		
3-25	27, 50/3"	100%	25	dusky yellow		
3-30	37 50/6"	50%	30			

Start Time | End Time | Groundwater

Log of Exploration Boring

Boring Location	Project No. 827026.40	Date 4-2 & 4-3-02	Boring No. CSB-3
	Project Name Chiquita Canyon Landfill		
	Client		
	Drilling Co.		
	Driller	Drill Rig	Sheet 2 of 4
	Drilling Method	Hole Dia.	
	Surface Conditions		

Sample No.	Blow Counts	Recovery	Depth	Description (El. / Logged By DE/mc/JRB)	Moisture Density	Other Tests
			30	Sandstone (LANDSLIDE BLOCK) Cont'd		
3-35	38 50/5"	100%	35			
3-40	50/18"	100%	40	approximately 1/2" thick layer of coarse grained sandstone		
3-45	50/3"	100%	45	slight iron oxide staining		
3-50	50/4"	0%	50	GRAVEL & Cobbles indicated by drill action		
3-52	20 23 30	100%		SANDSTONE fine little silt, mottled coloring/staining of dusky yellow and greenish gray, very dense, moist carbonate filled fractures up to 1/16" thick		
3-55	50/5"	100%	55			
3-60	60/4"	100%	60	Claystone clast, greenish gray, approximately 1" diameter		

Pico ← from report → Landslide block

Start Time | End Time | Groundwater

Log of Exploration Boring

Boring Location	Project No. 827026.401	Date 4-2&4-3-02	Boring No. LSB-3
	Project Name Chiquita Canyon Landfill		
	Client		
	Drilling Co.		
	Driller	Drill Rig	Sheet ~~1~~ 3
	Drilling Method	Hole Dia.	
	Surface Conditions		of 4

From rpt. → Landslide Block

Pico

Sample No.	Blow Counts	Recovery	Depth	Description (El. / Logged By DE/mc/JTB)	Moisture Density	Other Tests
			60	SANDSTONE CONT'D ~~(LANDSLIDE BLOCK)~~ laminated bedding, highly weathered, closely spaced silt partings		
3-65	50/3"	100%	65	iron oxide staining, chaotic layering, sheared		
3-70	60/5"	100%	70			
3-75	60/5"	100%	75	CLAYSTONE (PICO FORMATION) little fine sand, low plasticity, moderate reddish brown to moderate brown, very hard, moist, massive, highly weathered. blocky, medium gray, silt, inclusions		
3-80	60/6"	83%	80	SILTSTONE AND SANDSTONE Interbedded, fine grained sandstone, banded light olive brown and dusky yellow, very dense, moist, laminated bedding, closely spaced silt partings/fractures to 1/16" thick		
3-85	31 50/3"	100%	85	chaotic distribution of siltstone and sandstone clasts) used above in defining landslide block.		
3-89	50/6"	33%	90	Cobbles indicated by drill action, sample driven on cobble, recovered broken fragments		

Start Time | End Time | Groundwater

Log of Exploration Boring

Boring Location	Project No. 827026.40	Date 4-2 & 4-3-02	Boring No. LSB-3
	Project Name Chiquita Canyon Landfill		
	Client		
	Drilling Co.		
	Driller	Drill Rig	Sheet 4 of 4
	Drilling Method	Hole Dia.	
	Surface Conditions		

Sample No.	Blow Counts	Recovery	Depth	Description (El. / Logged By)	Moisture Density	Other Tests
		90		Cobbles CONT'D (PICO FORMATION)		
3-94	50/5"	100%		SANDSTONE FINE, little silt, light brown, very dense, dry, poor cementation		
			95			
3-96.5	60/5"	100%		some silt, gray-brown		
3-99	60/6"	100%				
			100	SILTSTONE mottled gray, red-brown, brown, very dense, dry laminated to stratified bedding, moderately weathered		
3-101.5	50/5"	80%				
			105			
			110	Bottom of boring at 102 feet. Near refusal, broke bearing at top of Kelley bar. No groundwater observed. Completed April 3, 2002		
			115			
			120			

Start Time | End Time | Groundwater

PROJECT NO: 827026
LOGGED BY: JB
DRILLER: WEST HAZMAT
DRILLING METHOD: HSA
SAMPLING METHOD: -
CASING TYPE: -
SLOT SIZE: -
GRAVEL PACK: -

CLIENT:
DATE DRILLED: 4/4/02
LOCATION: CHIQUITA CANYON LANDFILL
HOLE DIAMETER: 8"
HOLE DEPTH:
WELL DIAMETER: -
WELL DEPTH: -
CASING STICKUP: -

LOCATION MAP

WELL COMPLETION	PRODUCT ODOR	SAMPLE NO.	RECOVERY	PENETRATION (BLOWS/ 6")	DEPTH (FEET)	RECOVERY	SAMPLE INTERVAL	GRAPHIC	SOIL TYPE	LITHOLOGY/REMARKS
										SAND (Fill): fine; some silt; light brown to white; loose; dry
					2					SANDSTONE (Soil/Rock debris): fine; little silt; light gray-brown; medium dense; dry; poorly cemented
					4					
		4-5	100%	11 16 18	6					
					8					
		4-10	100%	8 12 15	10					
					12					
					14					
		4-15	100%	17 17 11	16					Some silt; few gravel clasts of well cemented sandstone
					18					
		4-20	100%	21 50/4"	20					Grades to: fine to medium; few gravel clasts of siltstone and sandstone; light gray-brown; very dense; dry
					22					

PROJECT NO: 827026
LOGGED BY: JB
DRILLER: WEST HAZMAT
DRILLING METHOD: HSA
SAMPLING METHOD: -
CASING TYPE: -
SLOT SIZE: -
GRAVEL PACK: -

CLIENT:
DATE DRILLED: 4/4/02
LOCATION: CHIQUITA CANYON LANDFILL
HOLE DIAMETER: -
HOLE DEPTH: -
WELL DIAMETER: -
WELL DEPTH: -
CASING STICKUP: -

LOCATION MAP

WELL COMPLETION	PRODUCT ODOR	SAMPLE NO.	RECOVERY	PENETRATION (BLOWS/ 6")	DEPTH (FEET)	RECOVERY	SAMPLE INTERVAL	GRAPHIC	SOIL TYPE	LITHOLOGY/REMARKS
										SANDSTONE (Soil/Rock Debris): cont.
					24					GRAVEL: indicated by drill action
		4-25	100%	50/6"						
					26					
					28					
										SANDSTONE: fine to medium; little silt; yellowish brown; very dense; dry
		4-30	100%	22 34 40	30					
					32					
					34					
		4-35	100%	9 18 17	36					Some silt; dense
					38					Fine; trace medium sand; some silt; reddish brown; very dense; dry
		4-40	100%	13 13 21	40					
					42					
					44					

PROJECT NO: 827026
LOGGED BY: JB
DRILLER: WEST HAZMAT
DRILLING METHOD: HSA
SAMPLING METHOD: -
CASING TYPE: -
SLOT SIZE: -
GRAVEL PACK: -

CLIENT:
DATE DRILLED: 4/4/02
LOCATION: CHIQUITA CANYON LANDFILL
HOLE DIAMETER: -
HOLE DEPTH: -
WELL DIAMETER: -
WELL DEPTH: -
CASING STICKUP: -

LOCATION MAP

WELL COMPLETION	PRODUCT ODOR	SAMPLE NO.	RECOVERY	PENETRATION (BLOWS/ 6")	DEPTH (FEET)	RECOVERY / SAMPLE INTERVAL	GRAPHIC	SOIL TYPE	LITHOLOGY/REMARKS
									SANDSTONE: cont.
		4-45	100%	25 34 50/5"	46				SILTSTONE: trace fine sand; low plasticity; reddish brown; very dense; moist; highly fractured; sheared
					48				
		4-50	100%	23 50/6"	50				SANDSTONE (Pico Formation): fine; brown; very dense; moist; laminated to stratified bedding; interbedded with siltstone; low plasticity; mottled brown and reddish brown
					52				
					54				
		4-55	100%	50/6"	56				Grades to CLAYSTONE: some fine sand; medium plasticity; reddish brown; very hard; moist; laminated with sandstone; fine; some silt; gray and siltstone; few fine sand; gray; highly fractured
					58				
		4-60	75%	32 50/5"	60				
					62				Moderately fractured
		4-62.5	100%	27 28 32	64				SANDSTONE: fine to medium; some silt; occasional fine gravel; clasts of sandstone and siltstone; light gray; very dense; moist
		4-65	100%	25 50/6"	66				

PROJECT NO: 827026
LOGGED BY: JB
DRILLER: WEST HAZMAT
DRILLING METHOD: HSA
SAMPLING METHOD: -
CASING TYPE: -
SLOT SIZE: -
GRAVEL PACK: -

CLIENT:
DATE DRILLED: 4/4/02
LOCATION: CHIQUITA CANYON LANDFILL
HOLE DIAMETER: -
HOLE DEPTH: -
WELL DIAMETER: -
WELL DEPTH: -
CASING STICKUP: -

LOCATION MAP

WELL COMPLETION	PRODUCT ODOR	SAMPLE NO.	RECOVERY	PENETRATION (BLOWS/ 6")	DEPTH (FEET)	RECOVERY	SAMPLE INTERVAL	GRAPHIC	SOIL TYPE	LITHOLOGY/REMARKS
										SANDSTONE (Pico Formation): cont.
					68					
		4-70	100%	50/6"	70					little silt; trace fine gravel clasts
					72					
					74					
		4-75	100%	50/5"	76					
					78					Fine; some silt; gray-brown; very dense; moist; faint bedding
		4-80	0%	50/6"	80					
					82					Fine to medium sand; little silt; brown; very dense; moist; gypsum fragments to 1/8"
					84					
		4-85	50%	18 35 50/5"	86					
					88					Fine; few medium sand; little silt; gray; very dense; moist

PROJECT NO: 827026
LOGGED BY: JB
DRILLER: WEST HAZMAT
DRILLING METHOD: -
SAMPLING METHOD: -
CASING TYPE: -
SLOT SIZE: -
GRAVEL PACK: -

CLIENT:
DATE DRILLED: 4/4/02
LOCATION: CHIQUITA CANYON LANDFILL
HOLE DIAMETER: -
HOLE DEPTH: -
WELL DIAMETER: -
WELL DEPTH: -
CASING STICKUP: -

LOCATION MAP

WELL COMPLETION	PRODUCT ODOR	SAMPLE NO.	RECOVERY	PENETRATION (BLOWS/ 6")	DEPTH (FEET)	RECOVERY	SAMPLE INTERVAL	GRAPHIC	SOIL TYPE	LITHOLOGY/REMARKS
										SANDSTONE (Pico Formation): cont.
		4-90	50%	27 50/6"	90					
		4-92.5	100%	30 50/3"	92					
					94					
		4-95	100%	39 50/3"	96					Fine; some silt; light gray; iron oxide staining on partings; laminated with siltstone; stratified bedding
					98					
		4-99	100%	60/6"	100					
					102					
		4-102.5	100%	27 50/6"	104					Bottom of boring at approximayely 103 feet Near refusal No groundwater observed

Log of Exploration Boring

Boring Location	Project No. 827026.40	Date 4-4-02	Boring No. LSB-4
	Project Name Chiquita Canyon Landfill		
	Client		
	Drilling Co. West Hazmat		
	Driller Oscar	Drill Rig LARCHETS	Sheet 1
	Drilling Method HSA	Hole Dia. 8"	
	Surface Conditions		of 4

S PL
0 F-C Lithm
45 76m PIS
50 40m UP
55 60m 18
60 90m 20
70 F-C lithm

Sample No.	Blow Counts	Recovery	Depth	Description (El. 1440' (from x-section) Logged By JCB)	Moisture Density	Other Tests
				SAND (FILL) fine, some silt, light brown/white, loose, dry		
				SANDSTONE (LANDSLIDE DEBRIS) FINE, LITTLE SILT, light gray-brown medium dense, dry, poorly cemented		
4-5	11 16 18	100%	5			
4-10	8 12 15	100%	10			
4-15	17 17 11	100%	15	some silt, few gravel clasts of well cemented sandstone		
4-20	21 50/4"	100%	20	grades to: fine to medium, few gravel clasts of siltstone and sandstone, light gray brown, very dense, dry		
4-25	50/6"	100% 0% ?	25	GRAVEL indicated by drill action description ?		
4-30	22 34 40	100%	30	SANDSTONE fine to medium, little silt, yellowish brown, very dense, dry		

Start Time | End Time | Groundwater

Log of Exploration Boring

Boring Location	Project No. 827026.40	Date 4-4-02	Boring No. LSB-4
	Project Name Chiquita Canyon Landfill		
	Client		
	Drilling Co.		
	Driller	Drill Rig	Sheet ~~1~~ 2
	Drilling Method	Hole Dia.	
	Surface Conditions		of 4

Sample No.	Blow Counts	Recovery	Depth	Description (El. / Logged By JCB)	Moisture Density	Other Tests
			30	SANDSTONE (CONT'D.) (LANDSLIDE DEBRIS)		
4-35	9 18 17	100%	35	some silt dense		
4-40	13 13 21	100%	40	fine, trace medium sand, some silt, reddish brown, very dense, dry		
4-45	25 34 50/5"	100%	45	No core recovery in this interval, description from drill returns only. SILTSTONE trace fine sand, low plasticity, reddish brown, very dense, moist, highly fractured, sheared		
4-50	23 50/6"	100%	50	SANDSTONE (PICO FORMATION) fine, brown, very dense moist, laminated to stratified bedding, interbedded w/ SILTSTONE, low plasticity, mottled brown and reddish brown, moist		
4-55	50/6"	100%	55	grades to CLAYSTONE some fine sand, medium plasticity, reddish brown, very hard, moist, laminated with sandstone, fine, some silt, gray and siltstone, few fine sand, gray highly fractured		
4-60	32 50/5"	75%	60			

"shear zone"

Start Time End Time Groundwater

Log of Exploration Boring

Boring Location	Project No. 827026.40	Date 4-4-02	Boring No. LSB-4
	Project Name Chiquita Canyon Landfill		
	Client		
	Drilling Co.		
	Driller	Drill Rig	Sheet 3 of 4
	Drilling Method	Hole Dia.	
	Surface Conditions		

Sample No.	Blow Counts	Recovery	Depth	Description (El. / Logged By JCB)	Moisture Density	Other Tests
			60	CLAYSTONE Cont'd (PICO FORMATION)		
4-62.5	27 28 32	100%		moderately fractured		
4-65	25 50/6"	100%	65	SANDSTONE fine to medium, some silt, occasional fine gravel clasts of SILTSTONE and SANDSTONE, light gray, very dense, moist		
4-70	50/6"	100%	70	little silt, trace fine gravel clasts		
4-75	50/5"	100%	75			
4-80	50/6"	0%	80	fine, some silt, gray-brown, very dense, moist, faint bedding		
4-85	18 35 50/5"	50%	85	fine to medium sand, little silt, brown, very dense, moist, gypsum fragments to 1/8".		
4-90	27 50/6"	50%	90	fine, few medium, little silt sand, gray, very dense, moist		

Start Time End Time Groundwater

Log of Exploration Boring

Boring Location	Project No. 827026.40	Date 4-4-02	Boring No. LSB-4
	Project Name		
	Client		
	Drilling Co.		
	Driller	Drill Rig	Sheet ~~1~~ 4
	Drilling Method	Hole Dia.	
	Surface Conditions		of 4

Sample No.	Blow Counts	Recovery	Depth	Description (El. / Logged By JCB)	Moisture Density	Other Tests
			90			
4-92.5	30 50/3"	0%		SANDSTONE cont'd (PICO FORMATION)		
4-95	39 50/3"	100%	95	fine, light gray, some silt ironoxide staining on partings, laminated with siltstone		
4-99	60/6"	100%	100	stratified beddings		
4-102.5	27 50/6"	100%				
			105	Bottom of boring at 103 feet Near Refusal No groundwater observed Completed on April 4, 2002		
			110			
			115			
			120			

Start Time End Time Groundwater

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-1

PROJECT NAME Chiquita Canyon Landfill PAGE 1 OF 9

BY E. A. Morelan DATE 3/21/89 SURFACE ELEV. ~ 1330 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
					SS		PICO FORMATION: SANDSTONE, grayish yellow (5Y 8/4): 10 to 15% fines: fine to medium grained: 10 to 15% fine gravel (up to 1/2" maximum diameter): local calcite cementation; moderate fracturing; friable, with local very hard zones; moderate weathering.
				5			
				10			@9-12': 15 to 20% fines; fine grained.
				15			@12-15': locally grayish yellow green (5GY 7/2); 15 to 20% fines; fine grained: trace to 5% coarse sand: micaceous: massive: bivalve fragments common; local partings along bedding planes.
				20			

EMCON ASSOCIATES

REMARKS

Drilled with direct-air rotary drilling equipment to 165 feet. Samples collected in 3-inch-diameter Shelby tubes using a Pitcher-barrel sampler. Ground water not encountered. Boring backfilled with cement/bentonite grout.

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-1

PROJECT NAME Chiquita Canyon Landfill PAGE 2 OF 9

BY E. A. Morelan DATE 3/21/89 SURFACE ELEV. ~1330 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						SS	@19-22': 20 to 25% fines; fine grained; trace coarse sand.
				25			@22-28': 5 to 10% fines; fine grained; trace to 5% gravel (up to 1/2" maximum diameter).
							@28': 10 to 15% gravel (up to 1/2" maximum diameter).
				30			@29-32': fine grained; trace to 5% fine gravel (up to 2" maximum diameter).
				35		SL	SANDY SILTSTONE, dusky yellow (5Y 6/4) to light greenish gray (5GY 8/1); 40 to 45% fine sand; trace coarse sand; trace to 5% fine gravel; micaceous; trace indistinct laminations; friable; moderate weathering.
				40			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-1

PROJECT NAME Chiquita Canyon Landfill PAGE 3 OF 9

BY E. A. Morelan DATE 3/21/89 SURFACE ELEV. ~1330 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						MST	MUDSTONE, grayish olive green (5GY 3/2) to moderate yellowish brown (10YR 5/4); trace fine sand, grading upward in upper 1' to 15 to 20% sand; massive; slight to moderate fracturing; low to moderate hardness; moderate to deep weathering.
				45		SL/ MST	SILTSTONE and MUDSTONE - Interbedded. SILTSTONE: pale olive (10Y 6/2); trace to 10% fine sand; trace to 10% gravel (up tp 1" maximum diameter); massive; moderate fracturing; moderate hardness; slight to moderate weathering. MUDSTONE: dark greenish gray (5G 4/1); trace fine sand; massive.
				50			@52': indistinct fine laminations.
				55			@55': MUDSTONE, moderate yellowish brown (10YR 5/4); slickensides. @57': MUDSTONE, grayish olive (10Y 4/2).
				60			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-1

PROJECT NAME Chiquita Canyon Landfill PAGE 4 OF 9

BY E. A. Morelan DATE 3/21/89 SURFACE ELEV. ~1330 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						SL/ MST	
				65			@63-66': both lithologies: massive, with local fine laminations; moderate to intense fracturing; low to moderate hardness. SILTSTONE: grayish yellow green (5GY 7/2). MUDSTONE: grayish olive green (5GY 3/2) to moderate olive brown (5Y 4/4); slickensides common.
				70			@69-72': both lithologies: massive, with local fine laminations; friable to low hardness; moderate to intense fracturing; weak to moderate weathering. SILTSTONE: grayish yellow green (5GY 7/2); 20 to 25% fine sand.
						SL	SANDY SILTSTONE, greenish gray (5GY 6/1); 25 to 30% fine sand; trace to 5% medium to coarse sand; trace to 5% fine gravel; micaceous; indistinct fine laminations; bivalve fragments common; moderate fracturing, locally with thin (<1/16") calcite coating; friable to low hardness; slight weathering.
				75			
				80			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-1

PROJECT NAME Chiquita Canyon Landfill PAGE 5 OF 9

BY E. A. Morelan DATE 3/21/89 SURFACE ELEV. ~1330 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				85		SL	
				90		SL/ MST	SANDY SILTSTONE & MUDSTONE - Interbedded. Both lithologies: low hardness; moderate weathering. SANDY SILTSTONE: light olive brown (5Y 5/6); 5 to 10% fine sand; trace medium to coarse sand; micaceous; sparse wood fragments; moderate to intense fracturing. MUDSTONE: dusky yellow green (5GY 5/2); 10 to 15% fine to coarse sand; moderate fracturing.
				95		SS	SANDSTONE, yellowish gray (5Y 8/1); 10 to 20% fines; fine to medium grained; 5 to 10% coarse sand and fine gravel; trace bivalve fragments; local zones of very hard calcite cement; friable to loose; moderate weathering.
				100			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-1

PROJECT NAME Chiquita Canyon Landfill PAGE 6 OF 9

BY E. A. Morelan DATE 3/21/89 SURFACE ELEV. ~1330 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
					SS		
				105			@107': 20 to 25% fines.
				110			@109-112': pale greenish yellow (10Y 8/2).
							@111-113': calcite-cemented; very hard.
				115			
				120			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-1

PROJECT NAME Chiquita Canyon Landfill PAGE 7 OF 9

BY E. A. Morelan DATE 3/21/89 SURFACE ELEV. ~1330 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						SS	@114-124': 20 to 25% fines; trace fine gravel.
							@119-122': grayish yellow (5Y 8/4).
				125			
							@127': 5 to 10% fine gravel.
				130			
							@131-134': pale greenish yellow (10Y 8/2); 20 to 25% fines; trace fine gravel; very hard @133 1/2 to 134'.
				135		SL	SANDY SILTSTONE, pale olive (10Y 6/2); 30 to 35% fine sand; trace to 5% fine gravel; bivalve fragments common; friable to loose; moderate weathering.
				140			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-1

PROJECT NAME Chiquita Canyon Landfill PAGE 8 OF 9

BY E. A. Morelan DATE 3/21/89 SURFACE ELEV. ~1330 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						SL	@139-142': light olive brown (5Y 5/6); 15 to 20% fine sand.
				145			@145': light olive brown (5Y 5/6).
				150			@149-152': light olive brown (5Y 5/6); 20 to 25% fine sand.
				155			@154-159': greenish black (5GY 2/1); 5 to 10% fine sand.
				160		SS	SILTY SANDSTONE, grayish orange (10YR 7/4); 25 to 30% fines; fine grained; contains dark gray

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-1

PROJECT NAME Chiquita Canyon Landfill PAGE 9 OF 9

BY E. A. Morelan DATE 3/21/89 SURFACE ELEV. ~1330'

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
					SS		lense of clayey sandstone (approximately 1" thick); friable to low hardness; deep weathering.
					SL		SANDY SILTSTONE, dark yellowish brown (10YR 4/2) with dark yellowish orange (10YR 6/6) mottling; 25 to 30% fine sand; trace fine gravel; fine laminations (approximately 1/32" thick); friable to loose. @165': light greenish gray (5G 8/1). BOTTOM OF BORING: 165 FEET. Terminated Hole.
				165			
				170			
				175			
				180			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-2

PROJECT NAME Chiquita Canyon Landfill PAGE 1 OF 7

BY E. A. Morelan DATE 3/8/89 SURFACE ELEV. ~1269 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						SS/ SL	SAUGUS FORMATION: SANDSTONE and SILTSTONE-Interbedded. Both lithologies: dusky yellow (5Y 6/4). SANDSTONE: 10 to 20% fines; fine grained. SILTSTONE: trace fine sand.
				5			
						SS	SANDSTONE, light olive brown (5Y 5/6); trace to 5% fines; fine to medium grained; 10 to 15% coarse sand and fine gravel; friable to loose. @9': 2" thick gravel layer.
				10			
				15			
				20			@18-20.5': dusky yellow (5Y 6/4); 15 to 20% fines; 5 to 10% coarse sand and fine gravel.

EMCON ASSOCIATES

REMARKS

Drilled with direct-air rotary drilling equipment to 121 feet. Samples collected in 3-inch Shelby tubes using a Pitcher-barrel sampler. Ground water not encountered. Boring backfilled with cement/bentonite grout.

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-2

PROJECT NAME Chiquita Canyon Landfill PAGE 2 OF 7

BY E. A. Morelan DATE 3/8/89 SURFACE ELEV. ~1269 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						SS	
				25		SL/ MST	SILTSTONE and MUDSTONE-Interbedded. SILTSTONE: grayish yellow green (5GY 7/2); 10 to 20% fine sand. MUDSTONE: olive gray (5Y 4/1); trace fine sand; indistinct fine laminations.
						MST	MUDSTONE, olive gray (5Y 4/1); trace fine sand; indistinct fine laminations.
				30		SL	SILTSTONE, light olive gray (5Y 5/2); 10 to 15% fine sand; trace fine gravel.
						SL/ MST	SILTSTONE and MUDSTONE-Interbedded. Both lithologies: yellowish gray (5Y 7/2). SILTSTONE: 10 to 15% fine sand; trace fine gravel. MUDSTONE: trace fine sand; fine laminations.
				35		SL	SANDY SILTSTONE, light olive gray (5Y 5/2); 30 to 40% fine sand; trace to 10% fine gravel.
				40			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-2

PROJECT NAME Chiquita Canyon Landfill PAGE 3 OF 7

BY E. A. Morelan DATE 3/8/89 SURFACE ELEV. ~1269 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
					SL		
				45			
							@48-49.5': light olive brown (5Y 5/6); 30 to 40% fine sand; trace fine gravel; loose.
				50		MST	MUDSTONE, olive gray (5Y 3/2) to light olive gray (5Y 5/2); fine laminations; small veinlets (1/16") of calcite; moderate fracturing; moderate hardness; moderate weathering.
					SL		SILTSTONE, pale olive (10Y 6/2); 10 to 15% fine sand.
				55			
					MST		MUDSTONE, light gray (N 7/0); 10 to 15% fine sand; trace fine gravel; massive; hard.
				60			@58-61': grayish olive (10Y 4/2) to very pale orange

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-2

PROJECT NAME Chiquita Canyon Landfill PAGE 4 OF 7

BY E. A. Morelan DATE 3/8/89 SURFACE ELEV. ~1269 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						MST	(10YR 8/2); strong mottling; 1/4" thick calcite veinlet; moderate hardness; moderate to deep weathering.
						SL	SILTSTONE, dusky yellow (5Y 6/4); 5 to 10% fine sand.
				65			
						MST	MUDSTONE, grayish olive (10Y 4/2) to dark yellowish orange (10YR 6/6); indistinct laminations; veinlets of calcite (1/4"); slight fracturing; low hardness; weak to moderate weathering.
				70			
							@74': greenish black (5GY 2/1).
				75			
						SL/ MST	SANDY SILTSTONE & MUDSTONE-Interbedded. SANDY SILTSTONE: 35 to 40% fine sand. MUDSTONE: olive gray (5Y 3/2); calcite veinlets; low hardness; weak weathering.
				80			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-2

PROJECT NAME Chiquita Canyon Landfill PAGE 5 (7

BY E. A. Morelan DATE 3/8/89 SURFACE ELEV. ~1269

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						SL/ MST	
				85			@86': SILTSTONE: grayish yellow green (5GY 7/2); trace to 10% fine sand. MUDSTONE: dark gray (N 3/0); fine laminations; hard.
						SS	SILTY SANDSTONE, pale olive (10Y 6/2); 15 to 20% fines; fine grained; faint laminations; friable.
				90		SL	SILTSTONE, light olive gray (5Y 5/2); thin laminations; slight fracturing; low hardness; moderate weathering. @90-91': grayish olive (10Y 4/2); mudstone interbed; local slickensides.
				95			
							@98': 10% fine sand; loose.
						SS	SILTY SANDSTONE, moderate yellowish brown (10YR 5/4); 20 to 25% fines; fine to medium
				100			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-2

PROJECT NAME Chiquita Canyon Landfill PAGE 6 OF 7

BY E. A. Morelan DATE 3/8/89 SURFACE ELEV. ~1269 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						SS	grained; trace to 10% coarse sand; friable. @101': pale olive (5Y 6/2).
							@103': light brown (5YR 5/6): minor mudstone interbeds.
				105			
				110			@108-111': 35 to 40% fines.
				115			
						MST	MUDSTONE, dark yellowish brown (10YR 4/2): trace fine sand; massive; minor slickensides.
						SL	SILTSTONE, dark yellowish orange (10YR 6/6); 5 to 10% fine sand; trace fine gravel.
				120			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-2

PROJECT NAME Chiquita Canyon Landfill PAGE 7 OF 7

BY E. A. Morelan DATE 3/8/89 SURFACE ELEV. ~1269 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
					SL		@121': grayish orange (10YR 7/4). BOTTOM OF BORING: 121 FEET. Terminated Hole.
				125			
				130			
				135			
				140			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-3

PROJECT NAME Chiquita Canyon Landfill PAGE 1 OF 5

BY E. A. Morelan DATE 3/9/89 SURFACE ELEV. ~1115 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						SW	GRAVELLY SAND - FILL, light yellowish brown (2.5Y 6/4); 5 to 10% fines; fine to coarse grained; 25 to 35% fine to coarse gravel; medium dense.
		32		5		ML	SANDY SILT - FILL, dark greenish brown (2.5Y 4/2); low plasticity; 30 to 35% fine sand; 10 to 15% fine to coarse gravel; very stiff.
		28		10		SM	SILTY SAND - FILL, olive (5Y 5/3); 20 to 25% low-plasticity fines; fine to medium grained; 20 to 25% fine gravel; medium dense.
		28		15			@14': natural materials; pale olive (5Y 6/3); 10 to 15% low-plasticity fines; fine grained.
		17		20		ML	SANDY SILT, olive brown (2.5Y 4/4); low plasticity; 30 to 35% fine sand; trace to 5% fine gravel; very stiff.

EMCON ASSOCIATES

REMARKS

Drilled with mud-rotary equipment to 29 feet and sampled with a Standard Penetration sampler to 30.5 feet. Drilled with air-rotary equipment from 29 to 92 ft.; samples collected using pitcher-barrel sampler. Boring backfilled with cement/bentonite grout.

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-3

PROJECT NAME Chiquita Canyon Landfill PAGE 2 OF 5

BY E. A. Morelan DATE 3/9/89 SURFACE ELEV. ~ 1115 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
		50-5"		25		ML	@24': pale olive (5Y 6/3); 20 to 25% fine sand; very hard; slightly damp.
		50-5"		30		SL	SAUGUS FORMATION: SILTSTONE, pale olive (10Y 6/2); 5 to 10% fine sand; trace fine gravel; massive; friable; moderate weathering.
				35		SS	SILTY SANDSTONE, light olive brown (5Y 5/6); 30 to 35% fines; fine grained; friable; damp.
				40			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-3

PROJECT NAME Chiquita Canyon Landfill PAGE 3 OF 5

BY E. A. Morelan DATE 3/9/89 SURFACE ELEV. ~1115 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
					SS		@40': dusky yellow (5Y 6/4); 20 to 25% fines; loose.
				45			
				50			@50.5': moderate olive brown (5Y 4/4); 35 to 40% fines; trace fine gravel.
					MST		MUDSTONE, moderate olive brown (5Y 4/4) to dark yellowish orange (10YR 6/6); trace to 10% fine to medium sand; fine laminations; low hardness; moderate to deep weathering.
				55			
					SL		SANDY SILTSTONE, light olive gray (5Y 5/2); 30 to 35% fine sand; trace fine gravel.
					SS		SANDSTONE, yellowish gray (5Y 7/2); 5 to 10% fines; fine to coarse grained; trace to 10% fine
				60			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-3

PROJECT NAME Chiquita Canyon Landfill PAGE 4 OF 5

BY E. A. Morelan DATE 3/9/89 SURFACE ELEV. ~1115 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
					SS		to coarse gravel; loose.
				65			
					SL/ MST		SILTSTONE and MUDSTONE - Interbedded. SILTSTONE: medium light gray (N 6/0); trace fine sand; micaceous; indistinct laminations; beds are 2 to 6" thick; friable. MUDSTONE: dark greenish gray (5G 4/1) to light olive gray (5Y 5/2), weathering to moderate brown (5YR 4/4); trace fine sand; massive; moderate hardness; moderate weathering.
				70			
				75			
					SS		SILTY SANDSTONE, light olive brown (5Y 5/6) to very pale orange (10YR 8/2); 35 to 40% fines;
				80			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-3

PROJECT NAME Chiquita Canyon Landfill PAGE 5 OF 5

BY E. A. Morelan DATE 3/9/89 SURFACE ELEV. ~1115 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
					SS		fine to coarse grained; 15 to 20% fine to coarse gravel.
				85			@85-89': trace to 10% fine gravel.
				90			@89-92': yellowish gray (5Y 7/2); 10 to 15% fines; 5 to 10% fine grained; medium to coarse grained; trace fine gravel; thin laminations; thin interbed of mudstone present at approximately 89.5'; friable.
							BOTTOM OF BORING: 92 FEET. Terminated Hole.
				95			
				100			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-4

PROJECT NAME Chiquita Canyon Landfill PAGE 1 OF 5

BY E. A. Morelan DATE 3/7/89 SURFACE ELEV. ~1160 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						SS	SAUGUS FORMATION: SILTY SANDSTONE, greenish gray (5GY 6/1); 30 to 40% fines; fine to medium grained; 10 to 15% coarse grained; trace fine gravel to cobbles.
				5			
				10		MST	MUDSTONE, dusky yellow (5Y 6/4); massive; intense fracturing; low hardness; moderate weathering.
						SS	SANDSTONE, light greenish gray (5GY 8/1); 20 to 25% fines; fine grained; moderate fracturing; friable; moderate weathering.
						MST	MUDSTONE, pale brown (5YR 5/2); massive.
				15		SL	SANDY SILTSTONE, dusky yellow (5Y 6/4); 40 to 50% fine sand.
						SL/ MST	SILTSTONE and MUDSTONE - Interbedded. SILTSTONE: grayish yellow green (5GY 7/2); micaceous; massive; low hardness; slight weathering.
				20			

EMCON ASSOCIATES

REMARKS

Drilled with direct-air drilling equipment to 82.5 feet. Samples collected in 3"-diameter Shelby tubes using a Pitcher-barrel sampler. Ground-water not encountered. Boring backfilled with cement/bentonite grout upon completion.

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-4

PROJECT NAME Chiquita Canyon Landfill PAGE 2 OF 5

BY E. A. Morelan DATE 3/7/89 SURFACE ELEV. ~1160 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
					SL/ MST		MUDSTONE: dusky yellow green (5GY 5/2); fine laminations and crossbedding; moderate to intense fracturing.
					SS		SILTY SANDSTONE, (5GY 6/1); 40 to 50% fines; fine grained; micaceous; massive; slight fracturing; friable.
				25	MST		MUDSTONE, medium gray (N 4/0) to moderate olive brown (5Y 4/4); indistinct laminations.
					SS		SILTY SANDSTONE, greenish gray (5GY 6/1); 40 to 50% fines; fine grained.
					MST		MUDSTONE, medium gray (N 4/0) to moderate olive brown (5Y 4/4); indistinct laminations.
				30	SS		SANDSTONE, grayish yellow (5Y 8/4); 10 to 15% fines; fine to medium grained; 5 to 10% coarse grained and fine gravel; trace coarse gravel; moderate fracturing friable; moderate weathering.
					SS/ SL		SANDSTONE and SILTSTONE - Interbedded. Both lithologies are dusky yellow (5Y 6/4). SANDSTONE: fine to medium grained; 10 to 20% coarse grained. SILTSTONE: 40 to 50% fine sand.
				35			
					SS		SILTY SANDSTONE, grayish yellow green (5GY 7/2); 30 to 35% fines; interbedded fine to medium sand, with thin intervals of gravel and cobbles;
				40			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-4

PROJECT NAME Chiquita Canyon Landfill PAGE 3 OF 5

BY E. A. Morelan DATE 3/7/89 SURFACE ELEV. ~1160 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
					SS		micaceous; moderate fracturing; friable; moderate weathering.
				45			
				50	CONG		SANDY CONGLOMERATE, pale olive (10Y 6/2); trace to 5% fines; 40 to 45% fine to medium sand; granitic gravel and cobbles; loose; moderate to deep weathering.
					SS		SANDSTONE, grayish yellow (5Y 8/4); 10 to 15% fines; fine to medium grained; 5 to 10% fine gravel; loose to friable; deep weathering.
				55			
				60			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-4

PROJECT NAME Chiquita Canyon Landfill PAGE 4 OF 5

BY E. A. Morelan DATE 3/7/89 SURFACE ELEV. ~1160 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
					SS		@59.5-62.5': fine grained; moderate weathering.
				65			@62.5 to 65.5': pale olive (10Y 6/2), with dark yellowish orange (10YR 6/6) mottling; trace to 5% fine gravel. Contains thin bed (2 to 3") of claystone which is: grayish olive (10Y 4/2) with light olive brown (5Y 5/6) mottling; intense fracturing.
				70	SS/ MST		SILTY SANDSTONE & MUDSTONE - Interbedded. SILTY SANDSTONE: dusky yellow (5Y 6/4); 30 to 35% fines; fine grained; trace to 5% coarse sand to fine gravel; contains thin interbeds (3-4") of gravel; moderate fracturing; friable; moderate to weak weathering; MUDSTONE: olive black (5Y 2/1); trace fine sand; wood fragments sparse to common; indistinct fine laminations to bioturbated; local thin interbeds of siltstone; moderate fracturing; moderate hardness; slight weathering to fresh.
				75			
				80			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-4

PROJECT NAME Chiquita Canyon Landfill PAGE 5 OF 5

BY E. A. Morelan DATE 3/7/89 SURFACE ELEV. ~ 1160 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						SS/ MST	BOTTOM OF BORING: 82.5 FEET. Terminated Hole.
				85			
				90			
				95			
				100			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-5

PROJECT NAME Chiquita Canyon Landfill PAGE 1 OF 7

BY E. A. Morelan DATE 3/8/89 SURFACE ELEV. ~ 1125 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				5		SS	SAUGUS FORMATION: SILTY SANDSTONE, light olive gray (5Y 5/2); 20 to 30% fines; fine to medium grained; 10 to 20% gravel.
				10		MST	MUDSTONE, moderate yellowish brown (10YR 5/4); 10% sand to fine gravel; soft; moderate weathering.
				15		SS/ SL	SANDSTONE and SILTSTONE-Interbedded. SANDSTONE: light olive gray (5Y 6/1); 5 to 10% fines; fine grained; friable. SILTSTONE: light olive gray (5Y 5/2), weathering to light olive brown (5Y 5/6); 15 to 20% fine sand; indistinct laminations. Both lithologies: trace fine gravel; moderate fracturing; moderate weathering.
				20			

EMCON ASSOCIATES

REMARKS

Drilled with direct-air rotary drilling equipment to 121 feet. Samples collected in 3-inch Shelby tubes using a Pitcher-barrel sampler. Ground water not encountered. Boring backfilled with cement/bentonite grout.

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-5

PROJECT NAME Chiquita Canyon Landfill PAGE 2 OF 7

BY E. A. Morelan DATE 3/8/89 SURFACE ELEV. ~1125 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						SS/ SL	
						SL	SILTSTONE, grayish yellow green (5GY 7/2); 10 to 15% fine sand.
				25			
						SS	SILTY SANDSTONE, grayish yellow green (5GY 7/2) to dusky yellow (5Y 6/4); 20 to 30% fines; fine grained; friable.
				30			@30-33': pale olive (10Y 6/2); 5 to 10% fines; fine to medium grained, with thin intervals of coarse grained; trace fine gravel.
				35			
						MST	MUDSTONE, moderate brown (5YR 3/4); trace to 5% fine sand; massive; low hardness; moderate weathering.
				40			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-5

PROJECT NAME Chiquita Canyon Landfill PAGE 3 OF 7

BY E. A. Morelan DATE 3/8/89 SURFACE ELEV. ~1125 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						MST	
						SS	SANDSTONE, light olive gray (5Y 5/2): 10 to 15% fines; fine to medium grained; 10 to 15% gravel (granitic clasts); friable; moderate weathering.
				45			@43-46': fine to coarse grained; 20 to 30% gravel.
				50			
				55			
				60			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-5

PROJECT NAME Chiquita Canyon Landfill PAGE 4 OF 7

BY E. A. Morelan DATE 3/8/89 SURFACE ELEV. ~1125'

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
					SS		@57-69': fine to coarse grained; 20 to 40% gravel and cobbles.
				65			
					MST		MUDSTONE, dark yellowish brown (10YR 4/2); massive; moderate weathering.
				70	SS		SANDSTONE, light olive gray (5Y 5/2); 5 to 10% fines; fine to medium grained; very loose. @70': gravel and cobbles (inferred).
				75			
							@78.5-80': siltstone and mudstone interbeds.
				80			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-5

PROJECT NAME Chiquita Canyon Landfill PAGE 5 OF 7

BY E. A. Morelan DATE 3/8/89 SURFACE ELEV. ~ 1125 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
					SS		
					SL		SILTSTONE, light olive gray (5Y 5/2); trace to 10% fine sand; 20 to 30% gravel (calcite concretions and metamorphic clasts); low hardness.
					SS		SILTY SANDSTONE, light olive gray (5Y 5/2); 20 to 25% fines; fine to medium grained; friable.
				85			
				90			
					SL		SANDY SILTSTONE, light olive gray (5Y 6/1); 40 to 50% fine sand; friable; slight weathering.
				95			
					MST		MUDSTONE, dark greenish gray (5GY 4/1) to moderate olive brown (5Y 4/4); massive; slight to moderate weathering.
				100	SS		SANDSTONE, yellowish gray (5Y 3/2) to dusky

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-5

PROJECT NAME Chiquita Canyon Landfill PAGE 6 OF 7

BY E. A. Morelan DATE 3/8/89 SURFACE ELEV. ~1125 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
					SS		yellow (5Y 6/4); trace to 5% fines; fine grained; trace to 5% gravel; low hardness.
				105			@102-110': yellowish gray (5Y 3/2); fine to medium grained; friable.
				110			
				115			@110-122': 20 to 40% gravel (percentage increases with depth); loose.
				120			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-5

PROJECT NAME Chiquita Canyon Landfill PAGE 7 OF 7

BY E. A. Morelan DATE 3/8/89 SURFACE ELEV. ~1125 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
					SS		BOTTOM OF BORING: 122 FEET. Terminated Hole.
				125			
				130			
				135			
				140			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-6

PROJECT NAME Chiquita Canyon Landfill PAGE 1 OF 7

BY E. A. Morelan DATE 3/15/89 SURFACE ELEV. ~1265 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
					SS		SAUGUS FORMATION: SILTY SANDSTONE, grayish orange (10YR 7/4); 30 to 40% fines; fine grained; 5 to 10% fine gravel.
				5			
				10			
					SL		SILTSTONE, very light gray (N 8/0); 20 to 25% fine sand; trace to 5% fine gravel; micaceous. @13-15': white (N 8/0); calcite cemented; very hard.
				15			@17': moderate olive brown (5Y 4/4).
				20			

REMARKS

Drilled with direct-air rotary drilling equipment to 122 feet. Samples collected with 3-inch Shelby tubes using a Pitcher-barrel sampler. Ground water not encountered. Borehole backfilled with cement/bentonite grout.

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-6

PROJECT NAME Chiquita Canyon Landfill PAGE 2 OF 7

BY E. A. Morelan DATE 3/15/89 SURFACE ELEV. ~1265 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
					SL		
							@23': very light gray (N 8/0); calcite cemented; locally very hard.
				25			
							@27': light olive brown (5Y 5/6); contains thin interbeds of sandy mudstone.
				30			
							@32': dusky yellow (5Y 6/4).
				35			
					SS		SANDSTONE, grayish yellow green (5GY 7/2); 10 to 15% fines; fine grained.
					SL		SILTSTONE, light olive brown (5Y 5/6); 10 to 15% fine sand; trace fine gravel.
				40			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-6

PROJECT NAME Chiquita Canyon Landfill PAGE 3 OF 7

BY E. A. Morelan DATE 3/15/89 SURFACE ELEV. ~1265 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						SL	
				45		SS	SILTY SANDSTONE, pale olive (10Y 6/2); 20 to 30% fines; fine grained; trace fine gravel.
						SL	SILTSTONE, pale olive (10Y 6/2); 10 to 15% fine sand; trace to 5% fine gravel.
				50		MST	MUDSTONE, pale olive (10Y 6/2); silt fraction greater than clay; trace to 5% fine sand; indistinct fine laminations.
						SL/ MST	SILTSTONE and MUDSTONE-Interbedded. Both lithologies: pale olive (10Y 6/2). SILTSTONE: 5 to 10% fine sand; trace fine gravel. MUDSTONE: trace fine sand; massive, with local very fine laminations.
				55			
				60			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-6

PROJECT NAME Chiquita Canyon Landfill PAGE 4 OF 7

BY E. A. Morelan DATE 3/15/89 SURFACE ELEV. ~ 1265 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						SL/ MST	
				65			
				70			
				75			@75': olive gray (5Y 4/1) mudstone interbeds.
							@78': moderate brown (5YR 4/4) siltstone interbeds; 25 to 30% fine sand.
				80			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-6

PROJECT NAME Chiquita Canyon Landfill PAGE 5 OF 7

BY E. A. Morelan DATE 3/15/89 SURFACE ELEV. ~1265'

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						SL/ MST	
						SS	SILTY SANDSTONE, moderate brown (5YR 4/4); 35 to 45% fines; fine to medium grained; trace to 5% fine gravel.
				85			@84-89': light olive brown (5Y 5/6); 15 to 20% fines.
						MST	MUDSTONE, moderate brown (5YR 4/4); 10 to 15% fine sand; micaceous; locally very hard.
				90			@92': 20 to 25% fine gravel.
						SL	SILTSTONE, yellowish gray (5Y 8/1); 5 to 10% fine sand; calcite cemented; very hard.
				95			@95-102': no calcite cementation.
							@98': 20 to 25% fine gravel.
				100			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-6

PROJECT NAME Chiquita Canyon Landfill PAGE 6 OF 7

BY E. A. Morelan DATE 3/15/89 SURFACE ELEV. ~1265 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						SL	
						SL/ MST	SILTSTONE and MUDSTONE-Interbedded. SILTSTONE: light olive brown (5Y 5/6); trace to 5% fine sand. MUDSTONE: moderate brown (5YR 3/4); trace fine sand; massive.
				105			@106': siltstone contains 10 to 15% fine gravel.
				110		SL	SILTSTONE, light olive brown (5Y 5/6); 5 to 10% fine sand; trace to 5% fine gravel.
				115			114-117': trace to 5% fine sand.
				120			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER **976-03.04** BORING NO. **E-6**

PROJECT NAME **Chiquita Canyon Landfill** PAGE **7 OF 7**

BY **E. A. Morelan** DATE **3/15/89** SURFACE ELEV. **~1265 '**

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
					SL		@122': moderate brown (5YR 4/4); 5 to 10% fine sand; calcite cemented. BOTTOM OF BORING: 122 FEET. Terminated Hole.
				125			
				130			
				135			
				140			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-7

PROJECT NAME Chiquita Canyon Landfill PAGE 1 OF 5

BY E. A. Morelan DATE 3/10/89 SURFACE ELEV. ~ 1107 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						SM	SILTY SAND, light yellowish brown (2.5Y 6/4); 30 to 40% low- plasticity fines; fine to medium grained; 15 to 20% fine gravel; medium dense; slightly damp.
		19		5			
		25		10			@11': 10 to 15% fines; trace to 5% fine gravel; local white veinlets of caliche.
						GM	SILTY GRAVEL, light olive brown (2.5Y 5/4); 10 to 15% low-plasticity fines; 30 to 35% fine to coarse sand; fine to coarse clast size; crystalline, volcanic, and mudstone clast lithologies; very dense.
		50-5"		15			
				20			

EMCON ASSOCIATES

REMARKS

Drilled with mud-rotary equipment to 22 feet and sampled with Standard Penetration sampler to 23.5 feet. Drilled with air-rotary equipment from 22 to 91.5 feet; samples collected using Pitcher-barrel sampler. Boring backfilled with cement/bentonite grout.

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-7

PROJECT NAME Chiquita Canyon Landfill PAGE 2 OF 5

BY E. A. Morelan DATE 3/10/89 SURFACE ELEV. ~1107 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
		50-5.5"			SS		SAUGUS FORMATION: SILTY SANDSTONE, moderate olive brown (5Y 4/4); 35 to 40% fines; fine to coarse grained; 5 to 10% fine gravel; loose.
				25			
							@28': dusky yellow (5Y 6/4); 15 to 20% fines.
				30			@28.5-30.5': light olive brown (5Y 5/6); 20 to 25% fines; 20 to 25% fine gravel.
				35			
					SL/ MST		SILTSTONE and MUDSTONE-Interbedded. Both lithologies: light brown (5YR 5/6). SILTSTONE: trace fine sand. MUDSTONE: massive, with local indistinct laminations.
				40			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-7

PROJECT NAME Chiquita Canyon Landfill PAGE 3 OF 5

BY E. A. Morelan DATE 3/10/89 SURFACE ELEV. ~1107 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
					SS		SILTY SANDSTONE, moderate brown (5YR 3/4); 30 to 35% fines; fine to medium grained; trace to 10% coarse sand; friable.
				45	SL		SILTSTONE, dark yellowish orange (10YR 6/6); trace fine sand.
					SS		CLAYEY SANDSTONE, moderate yellowish brown (10YR 5/4); 35 to 40% fines; fine grained; trace medium to coarse grained; low hardness.
				50	SL		SILTSTONE, dark yellowish orange (10YR 6/6); trace fine sand.
				55	SS		SILTY SANDSTONE, dark yellowish brown (10YR 4/2); 10 to 15% fines; fine grained; thin laminations; friable.
				60			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-7

PROJECT NAME Chiquita Canyon Landfill PAGE 4 OF 5

BY E. A. Morelan DATE 3/10/89 SURFACE ELEV. ~1107 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						SS	
						MST	MUDSTONE, moderate brown (5YR 4/4); trace fine sand; trace mica.
				65			
						CONG	SILTY CONGLOMERATE, dusky yellow (5Y 6/4) to yellowish gray (5Y 7/2); 40 to 50% siltstone; clast size to 2"; sparse calcite coatings on clasts; low hardness; slight weathering. @70.5': interbed of moderate yellowish brown (10YR 5/4) claystone; 10 to 15% fine sand; soft. @71.5-73.5': grayish orange (10YR 7/4); 40 to 60% fines; low hardness.
				70			
						SL/ MST	SILTSTONE and MUDSTONE-Interbedded. SILTSTONE: greenish gray (5GY 6/1); local calcite cement; locally hard. MUDSTONE: dark yellowish brown (10YR 4/2); massive; moderate fracturing; low hardness; trace slickensides.
				75			
				80			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-7

PROJECT NAME Chiquita Canyon Landfill PAGE 5 OF 5

BY E. A. Morelan DATE 3/10/89 SURFACE ELEV. ~ 1107 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
					SL/ MST		@81.5': light gray (N 7/0), with grayish orange (10YR 7/4) mottling.
							@84': light olive (10YR 5/4).
				85			
					SS		CLAYEY SANDSTONE, light olive gray (5Y 5/2); 40 to 45% fines; fine grained; friable; moist.
				90			@89.5': 10 to 15% fines; fine to medium grained.
							BOTTOM OF BORING: 91.5 FEET. Terminated Hole.
				95			
				100			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-8

PROJECT NAME Chiquita Canyon Landfill PAGE 1 OF 7

BY E. A. Morelan DATE 3/16/89 SURFACE ELEV. ~ 1360 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						ML	CLAYEY SILT, yellowish brown (10YR 5/6); low plasticity; 10 to 15% fine sand; trace fine gravel; micaceous; stiff; damp.
				5			
						SS	SAUGUS FORMATION: SANDSTONE, yellowish gray (5Y 7/2); 15 to 20% fines; fine to coarse grained; trace to 5% fine gravel (angular quartzose clasts); locally calcite cemented; loose.
				10			
				15			
				20			

REMARKS

Drilled with direct-air rotary equipment to 122 feet. Samples collected in 3-inch Shelby tubes using a pitcher-barrel sampler. Ground water not encountered. Boring backfilled with cement/bentonite grout.

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-8

PROJECT NAME Chiquita Canyon Landfill PAGE 2 OF 7

BY E. A. Morelan DATE 3/16/89 SURFACE ELEV. ~ 1360 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						SS	
						SLT	SILTSTONE, dusky yellow (5Y 6/4); 15 to 20% fine sand; indistinctly bedded.
				25			
						SS	SANDSTONE, yellowish gray (5Y 7/2); trace to 5% fines; fine to coarse grained; trace to 5% fine gravel.
				30			
						MST	MUDSTONE, light olive brown (5Y 5/6); locally silty; indistinct fine laminations.
						SS	SANDSTONE, dusky yellow (5Y 6/4); 15 to 20% fines; fine grained; trace to 5% fine gravel. @34': thin interbedded mudstone.
				35		SLT	SILTSTONE, light olive brown (5Y 5/6); trace fine sand; micaceous.
				40			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-8

PROJECT NAME Chiquita Canyon Landfill PAGE 3 OF 7

BY E. A. Morelan DATE 3/16/89 SURFACE ELEV. ~1360 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
					SS		SILTY SANDSTONE, grayish orange (10YR 7/4); 20 to 25% fines; fine to medium grained; local interbeds of light olive brown (5Y 5/6), massive mudstone; friable; moderate weathering. @42': light olive brown (5Y 5/6); 30 to 35% fines; fine grained. @45-48': locally dusky yellow (5Y 6/4); 20 to 30% fines; fine grained; friable to low hardness; moderate weathering @46-47': 15 to 20% coarse sand.
				45			
				50			
					SLT/ MST		SILTSTONE and MUDSTONE-Interbedded. SILTSTONE: pale olive (10Y 6/2); 10 to 15% fine sand. MUDSTONE: olive gray (5Y 3/2); trace fine sand; massive.
				55			
				60			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-8

PROJECT NAME Chiquita Canyon Landfill PAGE 4 OF 7

BY E. A. Morelan DATE 3/16/89 SURFACE ELEV. ~1360 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
					SLT/ MST		SANDSTONE, grayish orange (10YR 7/4); 10 to 15% fines; fine to medium grained; 5 to 10% fine gravel; micaceous; gypsum-filled voids.
					SS		
							@64': 10 to 15% fine gravel.
				65			
					SS/ MST		SANDSTONE and MUDSTONE-Interbedded. SANDSTONE: moderate yellowish brown (10YR 5/4); 15 to 20% fines; fine to medium grained; 10 to 15% fine gravel. MUDSTONE: dark yellowish brown (10YR 4/2); massive.
				70			
					SS		SANDSTONE, light olive brown (5Y 5/6); 5 to 10% fines; fine to coarse grained; 10 to 15% gravel.
				75	SS/ MST		SANDSTONE and MUDSTONE-Interbedded. SANDSTONE: moderate yellowish brown (10YR 5/4); 15 to 20% fines; fine to medium grained; 10 to 15% fine gravel. MUDSTONE: dark yellowish brown (10YR 4/2); massive.
					SS		SANDSTONE, yellowish gray (5Y 7/2); trace to 5% fines; fine to coarse grained; 10 to 15% gravel; moist.
				80			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-8

PROJECT NAME Chiquita Canyon Landfill PAGE 5 OF 7

BY E. A. Morelan DATE 3/16/89 SURFACE ELEV. ~ 1360 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
					SS		
							@83-89': 5 to 10% fine gravel.
				85			
				90			
							@92-97': 30 to 35% gravel.
				95			
							@99': thin interbeds of mudstone.
				100			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-8

PROJECT NAME Chiquita Canyon Landfill PAGE 6 OF 7

BY E. A. Morelan DATE 3/16/89 SURFACE ELEV. ~1360 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						SS	
						SLT/ MST	SILTSTONE and MUDSTONE-Interbedded. SILTSTONE: light olive brown (5Y 5/6); 15 to 20% fine sand; 5 to 10% fine gravel. MUDSTONE: dark yellowish brown (10YR 4/2); indistinct fine laminations.
				105			
						SS	SANDSTONE, light olive brown (5Y 5/6); 10 to 15% fines; fine to medium grained; 5 to 10% fine gravel.
						SLT/ MST	SILTSTONE and MUDSTONE-Interbedded. SILTSTONE: light olive brown (5Y 5/6); 15 to 20% fine sand; 5 to 10% fine gravel. MUDSTONE: dark yellowish brown (10YR 4/2); indistinct fine laminations.
						SS	
				110			
							SANDSTONE, yellowish gray (5Y 7/2); 5 to 10% fines; fine to coarse grained; 15 to 20% gravel; thorough calcite cementation; very hard.
				115		MST	MUDSTONE, light olive gray (5Y 6/1), weathering to light olive brown (5Y 5/6); micaceous; massive.
						SLT	SILTSTONE, light olive brown (5Y 5/6); trace to 5% fine sand; trace fine gravel.
				120			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-8

PROJECT NAME Chiquita Canyon Landfill PAGE 7 OF 7

BY E. A. Morelan DATE 3/16/89 SURFACE ELEV. ~1360 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
					SS		PEBBLY SANDSTONE, greenish gray (5GY 6/1); 10 to 15% fines; fine to coarse grained; 25 to 30% gravel; calcite-cemented; hard. BOTTOM OF BORING: 122 FEET. Terminated Hole.
				125			
				130			
				135			
				140			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-9

PROJECT NAME Chiquita Canyon Landfill PAGE 1 OF 5

BY E. A. Morelan DATE 3/13/89 SURFACE ELEV. ~1005 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						ML	SANDY SILT, very pale brown (10YR 7/3); non plastic; 25 to 30% fine sand; micaceous; firm; slightly damp.
				5			
		7					
						SC	CLAYEY SAND, very dark grayish brown (2.5Y 3/2); 25 to 30% moderate-plasticity fines; fine to medium grained; medium dense.
		12		10			
		29		15			@15-20': olive brown (2.5Y 4/4); 10 to 15% moderate-plasticity fines; trace to 5% fine gravel; medium dense.
				20			@20': dense.

EMCON ASSOCIATES

REMARKS

Drilled with mud-rotary equipment to 58.5 feet & sampled with Standard Penetration sampler to 55.5 feet. Drilled with air-rotary equipment from 58.5 to 91 feet. Samples collected using pitcher-barrel sampler. Ground water at 77 feet.

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-9

PROJECT NAME Chiquita Canyon Landfill PAGE 2 OF 5

BY E. A. Morelan DATE 3/13/89 SURFACE ELEV. ~1005 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
		34				SC	
		22		25			@25': olive brown (2.5Y 4/4); 20 to 25% moderate -plasticity fines.
		41		30			@30': light olive brown (2.5Y 5/4); 10 to 15% fine gravel; micaceous; dense.
		40		35			@35': grayish brown (2.5Y 5/2); 15 to 20% moderate-plasticity fines; 20 to 25% gravel, consisting mostly of strong brown (7.5YR 4/6) deeply weathered sandstone clasts.
						GW	SANDY GRAVEL, light gray (5Y 7/2); trace to 10% fines; 20 to 30% medium to coarse sand; clast size ranges from fine gravel to cobbles.
				40			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-9

PROJECT NAME Chiquita Canyon Landfill PAGE 3 OF 5

BY E. A. Morelan DATE 3/13/89 SURFACE ELEV. ~ 1005 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						GW	
				45			
				50			
				55		MST	SAUGUS FORMATION: MUDSTONE, olive gray (5Y 4/1); trace fine sand; fine laminations (<1 mm); scarce slickensides; moderate hardness; slight to moderate weathering.
						SL	
						SS	SANDY SILTSTONE, greenish gray (5GY 6/1), with light olive brown (5Y 5/6) mottling; 25 to 30% fine to medium sand; trace to 10% coarse sand to fine gravel; massive; friable to low hardness; moderate weathering.
				60			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-9

PROJECT NAME Chiquita Canyon Landfill PAGE 4 OF 5

BY E. A. Morelan DATE 3/13/89 SURFACE ELEV. ~1005 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
					SS		SILTY SANDSTONE, dusky yellow green (5GY 5/2); 30 to 35% fines; fine to medium grained; trace to 10% fine gravel.
				65			@65': moderate olive brown (5Y 4/4); 10 to 15% fines.
							@68': yellowish gray (5Y 7/2); 5 to 10% fines; friable.
				70			@71': 25 to 30% gravel.
					CONG		SANDY CONGLOMERATE, light olive gray (5Y 5/2); trace to 5% fines; 30 to 35% medium to coarse sand; fine gravel (to 3/4" diameter).
					SS		SANDSTONE, light olive gray (5Y 5/2); trace to 5% fines; fine to coarse grained; 10 to 15% fine gravel; micaceous.
				75			
							@78': dusky yellow (5Y 6/4); 5 to 10% fines; indistinctly laminated; friable.
					SLT		SILTSTONE, pale olive (10Y 6/2); 15 to 20% fine
				80			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 976-03.04 BORING NO. E-9

PROJECT NAME Chiquita Canyon Landfill PAGE 5 OF 5

BY E. A. Morelan DATE 3/13/89 SURFACE ELEV. ~ 1005 '

		PENETRATION Blow Ct.	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						SLT	sand.
						SS	SANDSTONE, light olive gray (5Y 5/2); trace to 5% fines; fine to coarse grained; 10 to 15% fine gravel; micaceous.
				85			
				90			@88-91': yellowish gray (5Y 7/2); 10 to 15% fines; fine to medium grained; friable; weak to moderate weathering; moist.
							BOTTOM OF BORING: 91 FEET. Terminated Hole.
				95			
				100			

REMARKS

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/15/2007
Date Completed: 1/15/2007

Boring No: **G-1**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem Auger
Approx. Ground Elevation: 1026 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear Peak ϕ°	Direct Shear Peak C psf	Direct Shear Ultimate ϕ°	Direct Shear Ultimate C psf	Other Tests
	SM			**FILL:** Light gray, fine to medium SILTY SAND with some GRAVEL, damp to moist										
5		X		**ALLUVIUM:** Light gray, fine to medium SILTY SAND with some GRAVEL, damp, very dense	1	77	11.5	107						
10		X		. . . (10 feet) some coarse layers	2	56	7.2	100						
15	SM	X		. . . (15 feet) brown, light brown coarse SILTY SAND with some GRAVEL, moist, dense	3	49	5.9	110						CON
20				. . . (20 feet) brown to olive, medium to coarse SILTY SAND/SANDY SILT with some fine GRAVEL, damp, dense	4	38	4.7							
25		X		. . . (25 feet) light brown, coarse SILTY SAND with fine GRAVEL, dry to damp, dense to very dense	5	75	2.6	112						
30				. . . (30 feet) same as above	6	50	2.9							
35		X		. . . (35 feet) light gray to light brown, very dense	7	50/6"	2.0	119						

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/15/2007
Date Completed: 1/15/2007

Boring No: **G-1**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem Auger
Approx. Ground Elevation: 1026 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear Peak/Ultimate φ°	Direct Shear Peak/Ultimate C psf	Other Tests
				ALLUVIUM: Light gray, coarse to medium SILTY SAND/SANDY SILT with fine GRAVEL, dry to damp, dense to very dense	8	50	3.0					
45	SM				9	50/5"	3.3	112				
50				. . . (50 feet) olive-gray, SANDY SILT, interbedded medium SILTY SAND with fine GRAVEL, damp, very dense	10	50/6"	6.0					
55				**BEDROCK:** Gray-olive, fine SANDY SILTSTONE, moist	11	81	9.1	116				
60				. . . (60 feet) olive CLAYEY SILTSTONE, moist	12	50/5"	15.3					
65				**NOTES:** 1. Total depth of boring 61-1/2 feet. 2. No groundwater encountered. 3. Boring backfilled with cuttings on 1/15/07.								
70												
75												

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/15/2007
Date Completed: 1/15/2007

Boring No: **G-2**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem Auger
Approx. Ground Elevation: 1025 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear Peak/Ultimate φ°	Direct Shear Peak/Ultimate C psf	Other Tests
	SM			**FILL:** Gray, medium to coarse SILTY SAND with fine GRAVEL, damp to moist, dense								
5		X		. . . (5 feet) olive-gray SANDY SILT, medium to coarse SAND sizes with some fine GRAVEL, damp to moist, dense	1	82	8.3	122				
10				. . . (10 feet) same as above	2	47	7.9					
15		X			3	81	5.0	108				
	SM			**ALLUVIUM:** Light gray, medium to coarse SANDY SILT/SILTY SAND, dry to damp, dense to very dense								
20				. . . (20 feet) brown, medium to coarse SILTY SAND with fine GRAVEL, dry, very dense	4	50/6"	1.9					
25		X		. . . (25 feet) coarse to medium	5	49	5.5	112				
30				. . . (30 feet) same as above . . . (31 feet) refusal	6	—	2.6					
35				**NOTES:** 1. Total depth of boring 31 feet. 2. No groundwater encountered. 3. Auger refusal. 4. Boring was backfilled with cuttings on 1/15/07.								

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/15/2007
Date Completed: 1/15/2007

Boring No: **G-2A**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem Auger
Approx. Ground Elevation: 1025 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear Peak/Ultimate φ°	Direct Shear Peak/Ultimate C psf	Other Tests
	SM			**FILL:** Light gray, medium to coarse SILTY SAND with fine GRAVEL . . . (1.5 feet) dark gray, damp to moist, dense								
5												
10				. . . (10 feet) SANDY SILT/SILTY SAND, medium to coarse, damp to moist, dense	1	38	10.0					
15	SM			**ALLUVIUM:** Light brown, medium to coarse SILTY SAND with fine GRAVEL, dry, dense								
20					2	52	1.9	109				
25												
30				. . . (30 feet) very dense	3	50/2"	2.4					
35					4	76	2.9	111				

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/15/2007
Date Completed: 1/15/2007

Boring No: **G-2A**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem Auger
Approx. Ground Elevation: 1025 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear φ° (Peak / Ultimate)	Direct Shear C psf (Peak / Ultimate)	Other Tests
	SM			**ALLUVIUM:** Light gray, coarse to medium SILTY SAND with fine GRAVEL layers, dry to damp, very dense	5	50/6"	3.0					
45				. . . (45 feet) fine with some medium	6	69	4.7	111				CON
50				. . . (50 feet) dense	7	44	7.9					GS
55	Seepage			. . . (55 feet) brown-olive, coarse to medium SILTY SAND with some fine GRAVEL and CLAYEY seams, moist to damp, very dense (sampler tip shows moisture)	8	50/6"	8.3	127	4.5			
60				**BEDROCK:** Olive-gray, CLAYEY SILTSTONE with fine SAND sizes, moist to wet	9	50/6"	25.8					
65				. . . (65.5 feet) olive-gray, fine SILTY SANDSTONE, damp	10	50/6"	16.7	104				
70				**NOTES:** 1. Total depth of boring 66 feet. 2. Seepage encountered at 56 feet. 3. Boring was backfilled with cuttings on 1/15/07.								
75												

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/16/2007
Date Completed: 1/16/2007

Boring No: **G-3**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem Auger
Approx. Ground Elevation: 1018 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear φ° (Peak / Ultimate)	Direct Shear C psf (Peak / Ultimate)	Other Tests
				ASPHALTIC CONCRETE: 5 inches								
	SM			**FILL:** Olive-brown, fine to medium SILTY SAND with fine GRAVEL, damp, medium dense								
5		X			1	24	5.3	110				
10				. . . (10 feet) olive, light brown, fine SANDY SILT/ SILTY SAND with some fine GRAVEL, damp, medium dense	2	21	8.1					
15					3	42	4.0	116				
	SM	X		**ALLUVIUM:** Brown, coarse to medium SILTY SAND with fine GRAVEL, dry to damp, dense								
20					4	41	6.2					
25		X			5	49	4.9	112				
30				. . . (30 feet) olive-brown, medium to coarse, dry to damp, dense to very dense	6	50/6"	3.4					
35		X		. . . (35 feet) brown to light brown, coarse to medium SILTY SAND with some GRAVEL, dry to damp, very dense	7	77	3.0	119				

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/16/2007
Date Completed: 1/16/2007

Boring No: **G-3**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem Auger
Approx. Ground Elevation: 1018 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear Peak Ultimate: φ°	Direct Shear Peak Ultimate: C psf	Other Tests
	SM			. . . (40 feet) very dense	8	50/6"	NSR					
45					9	50/6"	8.9	113				
50					10	50/6"	5.4					
55				. . . (55 feet) medium to coarse SILTY SAND with trace of CLAY (some visible moisture on sampler)	11	50/6"	5.0	119				
60	SM/ SC			Brown, mottled, coarse SAND with SILT and CLAY, some GRAVEL, very moist, very dense	12	71	12.1					GS
65				. . . (65 feet) brown, medium to coarse CLAYEY SAND with SILT, some GRAVEL, very moist, very dense	13	50/4"	12.2	121				CON
70				. . . (70 feet) no recovery	14	50/3"	NSR					
75				. . . (75 feet) layered fine SANDY SILT with CLAY, very dense . . . (78 feet) layered brown to gray, fine SILTY SAND/SANDY SILT, damp	15	50/3"	16.3	112				

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/16/2007
Date Completed: 1/16/2007

Boring No: **G-3**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem Auger
Approx. Ground Elevation: 1018 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear φ° (Peak / Ultimate)	Direct Shear C psf (Peak / Ultimate)	Other Tests
				BEDROCK: Blue-gray, CLAYEY SILTSTONE with fine SAND sizes, moist	16	50/6"	18.5					
85												
90												
95												
100												
105												
110												
115												

NOTES:

1. Total depth of boring 81 feet.
2. Seepage encountered at 58 feet.
3. Boring was backfilled with cuttings on 1/15/07.

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/15/2007
Date Completed: 1/15/2007

Boring No: **G-4**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem Auger
Approx. Ground Elevation: 1018 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear Peak/Ultimate φ°	Direct Shear Peak/Ultimate C psf	Other Tests
	SM			**FILL:** Light gray, medium to coarse SILTY SAND with fine GRAVEL, dry, medium dense								
5				. . . (5 feet) brown to light brown, dry to damp, medium dense, with some construction debris, brick, concrete, etc.	1	29	3.0	116				
10	SM			**ALLUVIUM:** Coarse to medium SILTY SAND, with fine GRAVEL, damp to dry, dense	2	40	9.1					
15				. . . (15 feet) same as above	3	38	4.1					
20				. . . (20 feet) same as above	4	44	8.7	117				
25				. . . (25 feet) very dense	5	50/6"	4.0					
30				. . . (30 feet) very dense	6	50/6"	4.5	113				CON
35				. . . (36 feet) layered gray to dark gray, fine to coarse SANDY SILT with red and white layered zones	7	50/6"	19.6					
				BEDROCK: Gray to dark gray, CLAYEY								

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/15/2007
Date Completed: 1/15/2007

Boring No: **G-4**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem Auger
Approx. Ground Elevation: 1018 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear: ϕ° (Peak / Ultimate)	Direct Shear: C psf (Peak / Ultimate)	Other Tests
		X		SILTSTONE with red stringers and some fine SILTY SANDSTONE layers	8	50/6"	20.3	104				
45												
50												
55												
60												
65												
70												
75												

NOTES:

1. Total depth of boring 41 feet.
2. No groundwater encountered.
3. Boring was backfilled with cuttings on 1/15/07.

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/15/2007
Date Completed: 1/15/2007

Boring No: **G-5**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem Auger
Approx. Ground Elevation: 1022 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear Peak/Ultimate φ°	Direct Shear Peak/Ultimate C psf	Other Tests
				ASPHALTIC CONCRETE over BASE at surface								
	SM			**FILL:** Light brown, fine to medium SILTY SAND with some scattered fine GRAVEL, dry to damp, dense								
5					1	41	5.8					
	SM			**ALLUVIUM:** Gray, medium to coarse SILTY SAND with fine GRAVEL, damp, medium dense to dense								
10					2	38	5.9	107				
15				. . . (15 feet) medium to coarse with fine GRAVEL . . . (15.5 feet) fine to medium . . . (16.5 feet) medium to coarse	3	36	4.9					
20				. . . (20 feet) medium to coarse	4	32	6.6	113				
25				. . . (25 feet) medium to coarse, dense . . . (25.5 feet) fine to medium . . . (26 feet) medium to coarse . . . (26.5 feet) fine to medium	5	39	6.7					
30				. . . (30 feet) coarse to medium SILTY SAND with fine GRAVEL, damp to moist, very dense	6	74	8.7	110				
35				. . . (35 feet) 3- to 4-inch layers of fine to medium and coarse to medium SILTY SAND, damp, very dense	7	91	6.6					

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/15/2007
Date Completed: 1/15/2007

Boring No: **G-5**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem Auger
Approx. Ground Elevation: 1022 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear φ° (Peak / Ultimate)	Direct Shear C psf (Peak / Ultimate)	Other Tests
	SM	X		. . . (40 feet) olive-brown, fine to medium SILTY SAND/SANDY SILT with fine GRAVEL, moist	8	73	10.4	102				
45				. . . (45 feet) coarse to medium SILTY SAND with fine GRAVEL, damp to moist, very dense	9	63	6.5					
50		X		. . . (50 feet) moist to damp, very dense (sample at tip damp)	10	50/6"	4.3	111				CON
	Seepage			. . . (52 feet) seepage								
55				**BEDROCK:** Coarse SILTY SANDSTONE, moist	11	50/6"	8.0					
60		X		. . . (60 feet) interbedded fine CLAYEY SILTSTONE, very moist	12	50/3"	17.6	121				
65				**NOTES:**								
				1. Total depth of boring 60-1/2 feet.								
				2. Seepage encountered at 52 feet.								
				3. Boring was backfilled with cuttings on 1/15/07.								
70												
75												

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/15/2007
Date Completed: 1/15/2007

Boring No: **G-6**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem Auger
Approx. Ground Elevation: 1052 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear φ° (Peak / Ultimate)	Direct Shear C psf (Peak / Ultimate)	Other Tests
	SM			**FILL:** (0 to 41 feet) brown, fine to medium SILTY SAND/SANDY SILT, damp to moist (not logged in detail)								
40		X		. . . (40 feet) brown-olive, fine to medium SILTY SAND/SANDY SILT with some scattered fine GRAVEL, damp, very dense	1	50/6"	4.1	101				
	SM			**ALLUVIUM:** Light brown-tan, coarse to medium SILTY SAND with some GRAVEL, dry to damp, very dense								
45				. . . (45 feet) brown	2	50/6"	2.9					
50		X		. . . (50 feet) medium to coarse, moist	3	50/6"	9.6	118				
55				. . . (55 feet) CLAYEY fine to medium SAND, damp, very dense	4	59	9.4					
				BEDROCK: Gray, fine CLAYEY SILTSTONE with fine SAND, finely bedded, damp	6	Bulk	11.9					
60	Seepage	X		. . . (56.5 feet) orange-brown, fine SILTY SANDSTONE with CLAY, damp to moist	5	50/5"	14.7	108				
				. . . (60 feet) brown-orange, mottled, CLAYEY SILTSTONE, moist								
65				**NOTES:**								
				1. Total depth of boring 60-1/2 feet.								
				2. Hard drilling at 51 feet.								
				3. Seepage encountered at 60 feet.								
				4. Boring was backfilled with cuttings on 1/16/07.								
70												

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/16/2007
Date Completed: 1/16/2007

Boring No: **G-7**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem Auger
Approx. Ground Elevation: 1109 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear: ϕ° (Peak / Ultimate)	Direct Shear: C psf (Peak / Ultimate)	Other Tests
				FILL: Brown, medium SILTY SAND/SANDY SILT with CLAY and fine GRAVEL, some SILTSTONE and SANDSTONE fragments, dense (Depth of fill uncertain - not logged above 100 feet)								
100		X		**ALLUVIUM:** Brown, SILTY SAND with some CLAY, damp to moist, very dense	1	50/6"	7.1	120				
105					2	80	14.2					
	SM											
110		X		. . . (110 feet) light brown to brown, fine to medium SILTY SAND, damp, dense to very dense	3	54	11.1	123				CON
115				. . . (115 feet) tan, light gray, coarse to medium SILTY SAND, damp, very dense	4	50/4"	6.0					GS
120		X		**BEDROCK:** Gray, CLAYEY SILTSTONE, moist	5	50/6"	12.5	118				
125												
130												

NOTES:

1. Total depth of boring 121 feet.
2. No groundwater encountered.
3. Boring was backfilled with cuttings on 1/16/07.

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/18/2007
Date Completed: 1/18/2007

Boring No: **G-8**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem Auger
Approx. Ground Elevation: 1205 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear φ° (Peak / Ultimate)	Direct Shear C psf (Peak / Ultimate)	Other Tests
	SM/ ML			**FILL:** Olive-brown, firm to medium SILTY SAND/ SANDY SILT with some fine GRAVEL (not logged in detail from 0 - 30 feet)								
30				. . . (30 feet) light brown-olive, coarse to medium SILTY SAND with fine GRAVEL, dry, very dense	1	50/3"	3.8					
35				. . . (35 feet) inclusion of light gray-tan, CLAYEY SILTSTONE with fine SAND, damp, very dense	2	50/6"	8.7	117				
40					3	50/6"	3.0					
45				. . . (45 feet) medium SILTY SAND with some fine GRAVEL, damp, dense to very dense	4	69	7.4	121				CON
50				. . . (50 feet) olive, CLAYEY SILT with fine SAND, moist, very dense	5	50/6"	12.0					
55	SM			**ALLUVIUM:** Light gray, olive-brown, layered, fine SILTY SAND with some red-orange layers, dry to damp, very dense	6	70	8.0	105				
60				. . . (60 feet) light gray, olive-brown, layered, fine SILTY SAND with some red-orange layers, damp, very dense	7	50/6"	7.8					

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/18/2007
Date Completed: 1/18/2007

Boring No: **G-8**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem Auger
Approx. Ground Elevation: 1205 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear Peak/Ultimate φ°	Direct Shear Peak/Ultimate C psf	Other Tests
	SM	X		. . . (65 feet) light gray, layered, white, fine SILTY SAND, dense	8	81	20.0	102				
					8A	Bulk	22.5					
				BEDROCK: Olive-brown, SILTY CLAYSTONE with red-orange layers, weathered, small shears, gypsum crystals, moist								
70					9	87	23.3					
				. . . (70 feet) olive-brown, CLAYEY SILTSTONE with red-orange layers, moist								
75		X		. . . (75 feet) olive-brown, CLAYEY SILTSTONE with trace of fine SAND, damp	10	50/5"	11.4	97				

NOTES:

1. Total depth of boring 76 feet.
2. No groundwater encountered.
3. Boring was backfilled with cuttings on 1/18/07.

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/18/2007
Date Completed: 1/19/2007

Boring No: **G-9**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem Auger
Approx. Ground Elevation: 1262 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear φ° (Peak/Ultimate)	Direct Shear C psf (Peak/Ultimate)	Other Tests
	SM/ ML			Not logged above 120 feet **FILL:** Brown-gray, medium SILTY SAND/ SANDY SILT with fine GRAVEL, some SILTSTONE and SANDSTONE fragments								
120				. . . (120 feet) light gray, SANDY SILT with CLAY, damp to moist, very dense	1	50/6"	8.9					GS
125				. . . (125 feet) gray, SILTY CLAY, damp, hard	2	50/3"	11.4	102	4.5			CON
130				. . . (130 feet) gray-olive, fine SILTY SAND with SANDY SILTSTONE inclusions, damp, very dense . . . (131 feet) light gray, mottled, medium to coarse SILTY SAND, dry	3	50/6"	9.4					
135	SM			**ALLUVIUM:** Fine to medium SAND with trace of SILT, dry to damp, very dense	4	50/3"	5.0	102				
140				. . . (140 feet) light gray, gray, fine SILTY SAND/ SANDY SILT, dry to damp, very dense	5	50/4"	8.4					
145				. . . (145 feet) no recovery - 30 feet of augers pulled to clean flights	6	50/4"	NSR					
150					7	50/4"	NSR					

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/18/2007
Date Completed: 1/19/2007

Boring No: **G-9**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem Auger
Approx. Ground Elevation: 1262 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear Peak/Ultimate: φ, °	Direct Shear Peak/Ultimate: C psf	Other Tests
		X		**BEDROCK:** Olive-gray, SILTSTONE, moist, hard drilling	8	50/5"	11.9	79				
		X		. . . (156 feet) light gray fine SANDY SILTSTONE fragment	8A	Bulk	9.4					
160				**NOTES:**								
				1. Total depth of boring 156 feet.								
				2. No groundwater encountered.								
				3. Boring was backfilled with cuttings on 1/19/07.								
165				4. Hard drilling from below 65 feet.								
				5. Water added by drillers during boring (outside) of auger only.								
170												
175												
180												
185												
180												

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/25/2007
Date Completed: 1/29/2007

Boring No: **G-10**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem
Approx. Ground Elevation: 1143 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear φ° (Peak / Ultimate)	Direct Shear C psf (Peak / Ultimate)	Other Tests
				(0 to 80 feet not logged)								
80	SM			**FILL:** Grayish-brown (2.5 Y 5/2), subrounded to subangular, fine to medium SILTY SAND with minor CLAY, damp, very dense	1	Bulk	22.2					MAX
85				. . . (85 feet) lens of light yellowish-brown to light olive-brown (2.5 Y 6/3 to 3/3), weathered, SILTSTONE inclusions, damp, very dense	2	50/6"	5.7					
90				. . . (90 feet) more SILTSTONE inclusions, moist, very dense	3	77	11.5					
95				. . . (95 feet) light gray (2.5 Y 7/1 to 7/2), fine micaceous SAND with abundant quartz clasts over grayish-brown to dark grayish-brown (2.5 Y 5/2 to 4/2), fine SILTSTONE inclusions with scattered rounded pebbles, damp, very dense	4	50/6"	4.9					
100				. . . (100 feet) light olive-gray (5 Y 6/2), micaceous, fine SILTY SAND to SANDY SILT with abundant very fine quartz grains, damp	5	50/6"	3.8	121				CON
105				. . . (105 feet) light yellowish-brown (2.5 Y 6/3), fine to coarse SILTY SAND with scattered gray SILTSTONE fragments, damp to moist, very dense	6	50/6"	10.0					GS
110				. . . (110 feet) dry to damp	7	50/6"	3.6	118				
	SW			**ALLUVIUM:** Light gray to light brownish-gray (2.5 Y 7/2 to 6/2), subangular to subrounded,	8	Bulk	19.1					

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/25/2007
Date Completed: 1/29/2007

Boring No: **G-10**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem
Approx. Ground Elevation: 1143 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear φ ° (Peak / Ultimate)	Direct Shear C psf (Peak / Ultimate)	Other Tests
	SW			arkosic fine to medium SAND with minor coarse grains and little to no fines, dry to damp, very dense	9	50+	3.1					
120				. . . (120 feet) more medium and coarse SAND than above	10	50/6"	7.5	131				
125				. . . (125 feet) same as above	11	50+/6"	4.0					
130				. . . (130 feet) finer grained than above, little to no coarse SAND, minor amounts of SILT, damp, very dense	12	50+/6"	3.5	113				
135	SM			Brown to dark yellowish-brown (10 YR 4/3 to 4/4), fine SILTY SAND, with scattered coarse sandy lenses and SILTSTONE fragments, damp, very dense	13	50+/6"	8.3					
140				. . . (140 feet) same as above	14	50+/6"	7.6	114				CON
	SW			Very pale brown (10 YR 8/2), fine to coarse SAND with little to no fines and subrounded to rounded clasts, moist, very dense								
145					15	50+/6"	8.6					
150				. . . (150 feet) same as above	16	50+/6"	10.3	112				
	SM			Light yellowish-brown (2.5 Y 6/3), micaceous fine								

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/25/2007
Date Completed: 1/29/2007

Boring No: **G-10**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem
Approx. Ground Elevation: 1143 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear φ° (Peak / Ultimate)	Direct Shear C psf (Peak / Ultimate)	Other Tests
	SM			to medium SILTY SAND with abundant rounded to subrounded quartz grains, moist, very dense	17	50+/6"	14.0					
160	SW/ SM			Light yellowish-brown (2.5 Y 6/3), subrounded to rounded, arkosic fine to coarse SAND with scattered coarser lenses with rounded fine GRAVEL, moist, very dense	18	50+/6"	9.8	124				CON
165				. . . (165 feet) fine to coarse SILTY SAND, moist, very dense	19	50+/6"	11.9					GS
170					20	50+/6"	12.2					
175					21	50+/6"	13.9					
180					NSR	50+/6"						
185	SM			Yellowish-brown to dark yellowish-brown (10 YR 5/6 to 4/6), fine to medium SILTY SAND, moist, very dense	22	50+/6"	10.6					
190				. . . (190 feet) color now light brownish-gray to light yellowish-brown (2.3 Y 6/2 to 6/3) with more coarse SAND and rounded fine GRAVEL than above, damp, very dense	23	50+/6"	6.0					

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/25/2007
Date Completed: 1/29/2007

Boring No: **G-10**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem
Approx. Ground Elevation: 1143 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear Peak/Ultimate φ°	Direct Shear Peak/Ultimate C psf	Other Tests
				BEDROCK: (At 193 feet) - Mottled pale olive (5 Y 7/3) to light gray (2.5 Y 7/2), massive, CLAYEY SILTSTONE with argillaceous laminations and iron-oxide staining	24	50+/6"	13.5					
					25	50+/6"	18.5					
200				**NOTES:**								
				1. Total depth of boring 200 feet.								
205				2. Seepage encountered at 159 feet on 1/26/07 and groundwater measured at 143 feet on 1/29/07.								
				3. Boring backfilled with cuttings on 1/29/07.								
210												
215												
220												
225												
230												

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/19/2007
Date Completed: 1/24/2007

Boring No: **G-11**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem Auger
Approx. Ground Elevation: 1259 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear Peak Ultimate: φ°	Direct Shear Peak Ultimate: C psf	Other Tests
	SM			(0 - 100 feet not logged)								
100				**FILL:** Brown, olive-gray, fine to medium SILTY SAND/SANDY SILT with CLAY, and fine GRAVEL, scattered large GRAVEL and scattered SILTSTONE and SANDSTONE fragments, moist								
105												
110				. . . (110 feet) gray-olive, fine SANDY SILT with CLAY, very dense	1	50/6"	9.2					
				. . . (110.5 feet) layered orange-brown CLAYEY fine SAND								
115				. . . (110.8 feet) light gray mottled, medium to coarse SILTY SAND (SANDSTONE)	NSR	75/6"						
				. . . (116 feet) mottled, light brownish-gray to grayish-brown (2.5 Y 6/2 and 5/2), fine to medium SILTY SAND with minor coarse SAND, scattered clayey iron-oxide stained veins, very dense								
120				. . . (121 feet) thin lens, fine to very fine subrounded quartz SAND with fine rounded GRAVEL, moist, very dense	2	50/6"	11.1	119				CON
125				. . . (126 to 126.5 feet) clean fine to medium SAND lens with minor rounded GRAVEL	NSR	50/6"						
130					3	91	12.1	121				

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/19/2007
Date Completed: 1/24/2007

Boring No: **G-11**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem Auger
Approx. Ground Elevation: 1259 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear Peak Ultimate: ϕ°	Direct Shear Peak Ultimate: C psf	Other Tests
	SM			**FILL:** Continued . . . (136 feet) lens of light brownish-gray (2.5 Y 6/2), fine SILTY SAND, very dense	NSR	83						
140					4	85	12.5	118				
				. . . (142 feet) fine SAND with some SILT, moist, dense to very dense								
145					NSR	78						
				. . . (145.5 feet) large weathered, friable clast, . . . (146.5 feet) dark bluish-gray (5 PB 3/1 to 4/1), weathered, fine SANDY to CLAYEY SILTSTONE fragment, moist, dense to very dense								
150					5	71	11.7	116				CON
					6	Bulk	13.4					
155				. . . (155.5 feet) 6-inch clean light brownish-gray sandy lens	NSR	68						
	SM			**ALLUVIUM:** Grayish-brown to olive-gray (2.5 Y to 5 Y 5/2), subangular to subrounded, fine to medium SILTY SAND with abundant quartz clasts and scattered fine GRAVEL, moist, very dense								
160					7	88	8.7	117				
165					NSR	84						
170				. . . (170 feet) finer grained than above	8	50/4"	13.4					
	SP/ SW			Light gray to light brownish-gray (2.5 Y 7/2 to								

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/19/2007
Date Completed: 1/24/2007

Boring No: **G-11**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem Auger
Approx. Ground Elevation: 1259 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear Peak Ultimate φ°	Direct Shear Peak Ultimate C psf	Other Tests
	SP/ SW	X		6/2), subrounded arkosic fine SAND, that grades with depth to fine to coarse grained, moist, very dense	9	150/8"	12.2	121				
180				. . . (180 feet) light yellowish-brown to light brownish-gray (2.5 Y 6/3), damp, very dense	10	140/4"	7.6					
185		X		. . . (185 feet) thin gravelly lens . . . (186 feet) more medium SAND than above, damp, very dense	11	150/6"	4.8	127				CON
190				. . . (190 feet) SAND more fine to coarse grained, moist, very dense	12	140/6"	15.6					
195				. . . (194 feet) little to no fine and medium SAND, more fines than above	13	NSR	—					
				BEDROCK: Grayish-brown to light olive-brown (2.5 Y 5/2 to 5/3), weathered, iron-oxide mottled, fine to very fine SILTY SANDSTONE to SANDY SILTSTONE	14	—	10.3					
200												
205												
210												

NOTES:

1. Total depth of boring 198 feet.
2. No groundwater encountered.
3. Boring backfilled with cuttings on 1/24/07.

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/24/2007
Date Completed: 1/25/2007

Boring No: **G-12**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem
Approx. Ground Elevation: 1256 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear φ° (Peak / Ultimate)	Direct Shear C psf (Peak / Ultimate)	Other Tests
				(0 to 50 feet not logged)								
50	SM/ ML	X		**FILL:** Light brown-gray to light olive-brown (2.5 Y 6/2 to 5/3), micaceous, fine SILTY SAND to SANDY SILT with scattered rounded fine GRAVEL and SILTSTONE fragments and iron oxide-stained lenses, moist, dense to very dense	1	50	10.7	123				
			/		2	Bulk	19.6					MAX
55		I		. . . (54 feet) lens of light yellowish-brown (2.5 Y 6/4), well graded, fine to coarse SAND	3	50/6"	7.8					
60	SP	X		Pale yellow to light yellowish-brown (2.5 Y 7/4 to 6/4), subrounded, arkosic fine SAND with minor fines and coarser grains, damp to moist, very dense	4	50/6"	9.4	117				
65		I		. . . (64 feet) finer grained	5	75/7"	11.1					
70	SM	X		Light yellowish-brown (2.5 Y 6/3 to 6/4), well sorted, fine SILTY SAND with SILTSTONE fragments, dark gray clayey lenses, and thin iron oxide-stained stringers, damp to moist, very dense	6	50+/6"	6.5	115				CON
75		I		. . . (74 feet) scattered coarse sandy lenses	7	50+/6"	11.0					
			/		8	Bulk	20.6					MAX
80		X		. . . (80 feet) little to no coarse SAND, dried-out organic matter	9	50+/6"	20.5	109				
	SP/ SM	I		**ALLUVIUM:** Light gray to light yellowish-brown (2.5 Y 7/2 to 6/3), fine SAND with SILTY horizons	10	50+/6"	10.4					

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/24/2007
Date Completed: 1/25/2007

Boring No: **G-12**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem
Approx. Ground Elevation: 1256 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear Peak Ultimate: ϕ °	Direct Shear Peak Ultimate: C psf	Other Tests
	SP/ SM			and scattered rounded fine GRAVEL and iron oxide-staining, damp, very dense								
90		X		. . . (90 feet) more silt than above	11	50+/6"	10.7	111				
95				. . . (94 feet) same as above	12	50+/6"	10.9					
	SP			Brown to yellowish-brown (10 YR 5/3 to 5/4), subangular to subrounded, arkosic, fine to medium SAND with minor SILT, coarse SAND and fine GRAVEL, damp, very dense	13	97	6.7	114				CON
100		X										
105				. . . (105 feet) SILTY SAND lens, finer grained than above	14	99	5.8					
110		X		. . . (109 feet) fewer fines than above, color change to light gray (2.5 Y to 5 Y 7/2)	15	50+/6"	6.2	119				
115				. . . (115 feet) coarse grained than above, abundant medium and coarse SAND	16	50+/6"	3.8					
120		X		. . . (120 feet) thin SILTSTONE lens	17	50+/6	6.4	125				CON

LOG OF EXPLORATORY BORING

Job Number: 2007-006
Project: Chiquita Canyon Landfill
Cell 5/6
Date Started: 1/24/2007
Date Completed: 1/25/2007

Boring No: **G-12**
Drilling Contractor: ABC Liovin Drilling
Drill Type: 8-1/2-inch Dia. Hollow-Stem
Approx. Ground Elevation: 1256 Feet

Sample Type: Thin Wall Tube Sample; 2.5" Ring Sample; Seepage; Bulk Sample; Standard Split Spoon Sample (SPT); Static Water Table

Depth in Feet	Soil Type	Sample Type: As Shown	Sample Type: Bulk	SOIL DESCRIPTION	Sample Number	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Pocket Pen. (tsf)	Direct Shear Peak/Ultimate φ°	Direct Shear Peak/Ultimate C psf	Other Tests
	SP			. . . (125 feet) fine to coarse SAND, minor SILT, damp to moist, very dense	18	50+/6"	10.2					
130				**BEDROCK:** Weathered, dark yellowish-brown (10 YR 4/4), massive SILTSTONE with strong brown (7.5 YR 5/8) mottling and thin, very fine micaceous sandy laminations	19	50+/6"	13/0	114				
135					20	50+/6"	NSR					
140				**NOTES:** 1. Total depth of boring 135 feet. 2. No groundwater encountered. 3. Boring backfilled with cuttings on 1/25/07.								
145												
150												
155												
160												

GeoLogic Associates
Boring Log

BORING NO.: CC-A

JOB NO.: 2004-207
SITE LOCATION: CHIQUITA LANDFILL – PALEOCANYON A
DRILLING METHOD: 24"ø BUCKET AUGER
CONTRACTOR: TRI-VALLEY DRILLING
LOGGED BY: J. CZAJKOWSKI

DATE STARTED: 12/02/04
DATE FINISHED: 12/03/04
ELEVATION: ±1199.8
NORTHING: ±1980877
EASTING: ±6365266

GW DEPTH: NA
TOTAL DEPTH: 71.5 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
12:40						0			SM	ARITIFICIAL FILL: Brown (10YR 5/3), poorly sorted, very fine to very coarse SILTY SAND with abundant GRAVEL and minor CLAY.	Use digging bucket. Slightly moist.
				Bulk	1	5					
										...(7') – color change to brown (10YR 4/3).	
			23	2.5 SPT	2-10 1-10	10					
						15					
			33	2.5 SPT	4-20 3-20	20				...(21'-23') – oxidized CLAYEY SILT.	
						25					
			25	2.5 SPT	6-30 5-30	30				...(30.5'-31') – oxidized CLAYEY SILT.	

CONTINUED ON NEXT PAGE

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates
Boring Log

BORING NO.: CC-A

JOB NO.: 2004-207
SITE LOCATION: CHIQUITA LANDFILL – PALEOCANYON A
DRILLING METHOD: 24"ø BUCKET AUGER
CONTRACTOR: TRI-VALLEY DRILLING
LOGGED BY: J. CZAJKOWSKI

DATE STARTED: 12/02/04
DATE FINISHED: 12/03/04
ELEVATION: ±1199.8
NORTHING: ±1980877
EASTING: ±6365266

GW DEPTH: NA
TOTAL DEPTH: 71.5 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
			25	2.5 SPT	6-30 5-30	30			SM	...same as above. ...(30.5'-31') – oxidized CLAYEY SILT.	
				Bulk	2	35					
			48	2.5 SPT	8-40 7-40	40				...(40') – color change to brown (7.5YR 4/3). ...(42.5'-44') – reddish brown (5YR 5/3) to brown (7.5YR 5/2), moderately well-sorted, very fine to medium SILTY SAND to CLAYEY SILT.	
17:00 12/03 7:00						45					
			13	2.5 SPT	10-50 9-50	50			ML-SW	ALLUVIUM: Very dark gray (7.5YR 3/1), poorly sorted, very fine to very coarse SANDY SILT with minor CLAY coarsening downward to fine to coarse GRAVELLY SAND with fine to very coarse GRAVEL.	
				Bulk	3	55				BEDROCK (SAUGUS FORMATION): Light yellowish brown (10YR 6/4), poorly cemented, well-indurated, poorly sorted, fine to very coarse SANDSTONE with abundant SILT and fine GRAVEL. ...(54.5') – irregular contact with 6" thick CLAY lens. Bedding is oriented 104/42. ...(55') – decrease in grain size to very fine to medium SANDSTONE with abundant SILT and trace amounts of GRAVEL. Contains abundant CLAY-lined shears.	
			158	2.5 SPT	12-60 11-60	60				...(60.5'-62') – SILTSONE with abundant very fine to fine SAND interbedded with oxidized, thinly laminated SILTY SANDSTONE. Bedding is oriented 075/42.	

CONTINUED ON NEXT PAGE

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates
Boring Log

BORING NO.: CC-A

JOB NO.: 2004-207
SITE LOCATION: CHIQUITA LANDFILL – PALEOCANYON A
DRILLING METHOD: 24"ø BUCKET AUGER
CONTRACTOR: TRI-VALLEY DRILLING
LOGGED BY: J. CZAJKOWSKI

DATE STARTED: 12/02/04
DATE FINISHED: 12/03/04
ELEVATION: ±1199.8
NORTHING: ±1980877
EASTING: ±6365266

GW DEPTH: NA
TOTAL DEPTH: 71.5 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
			50+	2.5 SPT	12-60 11-60	60				...(60.5'-62') – SILTSONE with abundant very fine to fine SAND interbedded with oxidized, thinly laminated SILTY SANDSTONE. Bedding is oriented 075/42.	
						65				Grayish brown (2.5Y 5/2) CLAYEY SANDSTONE. Bedding is oriented 115/40.	
12:15			50+/8"	2.5 SPT	14-70 13-70	70					
						75				Notes: 1. Total depth of boring 71.5 feet. 2. Groundwater not encountered. 3. Boring downhole-logged on 12/06/04. 4. Borehole backfilled with cuttings and tamped into place.	
						80					
						85					
						90					

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates
Boring Log

BORING NO.: CC-B

JOB NO.: 2004-207
SITE LOCATION: CHIQUITA LANDFILL - PALEOCANYON B
DRILLING METHOD: 24"ø BUCKET AUGER
CONTRACTOR: TRI-VALLEY DRILLING
LOGGED BY: J. CZAJKOWSKI

DATE STARTED: 12/01/04
DATE FINISHED: 12/02/04
ELEVATION: ±1196.6
NORTHING: ±1980359
EASTING: ±6365265

GW DEPTH: NA
TOTAL DEPTH: 75 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
8:24						0			SM	ARTIFICIAL FILL: Dark yellowish brown (10YR 4/4), well sorted, very fine to medium SILTY SAND with trace amounts of fine to coarse GRAVEL.	Use digging bucket. Slightly moist.
			63	Bulk SPT	1	5			SW-SM	Light brownish gray (10YR 6/2), fine to coarse SAND with SILT and minor to trace GRAVEL composed of indurated SANDSTONE.	
			80	2.5 SPT	3-10 2-10	10				...(12') - approximately 8" thick, dark gray (N3) SILTY CLAY lens. ...(14') - contains minor amounts of SILTY CLAY to CLAYEY SILT.	
			28	SPT		15			CL-ML	Dark gray (10YR 4/1) SILTY CLAY to CLAYEY SILT with minor amounts of fine to coarse SAND and trace amounts of fine GRAVEL.	
									SW-SM	Brown (10YR 5/3), fine to coarse SAND with SILT.	
			29	2.5 SPT	5-20 4-20	20					
				Bulk	2						
			32	SPT		25				...(27') - contains minor amounts of SILT and CLAY.	
			48	2.5 SPT	7-30 6-30	30					

CONTINUED ON NEXT PAGE

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates
Boring Log

BORING NO.: CC-B

JOB NO.: 2004-207
SITE LOCATION: CHIQUITA LANDFILL – PALEOCANYON B
DRILLING METHOD: 24"ø BUCKET AUGER
CONTRACTOR: TRI-VALLEY DRILLING
LOGGED BY: J. CZAJKOWSKI

DATE STARTED: 12/01/04
DATE FINISHED: 12/02/04
ELEVATION: ±1196.6
NORTHING: ±1980359
EASTING: ±6365265

GW DEPTH: NA
TOTAL DEPTH: 75 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
			48	2.5 SPT	7-30 6-30	30			SW-SM	...some as above.	
			45	SPT		35			SM	Brown (10YR 5/3), very fine to medium SILTY SAND with trace amounts of CLAY and GRAVEL.	
			24	2.5 SPT	9-10 8-10	40				...(40') – slight increase in grain size to fine to very coarse SAND with minor SILT and no CLAY.	
				Bulk	3				ML	Brown (7.5YR 5/4), fine SANDY SILT with minor CLAY and fine GRAVEL.	
			48	SPT		45			SM	Brown (10YR 5/3), very fine to medium SILTY SAND with trace amounts of CLAY and GRAVEL.	
			39	2.5 SPT	11-20 10-20	50			SM	ALLUVIUM: Brown (7.5YR 4/3), poorly sorted, moderately well-consolidated, very fine to very coarse SILTY SAND with minor CLAY and GRAVEL.	
			18	SPT		55				BEDROCK (SAUGUS FORMATION): Gray (10YR 6/1), poorly sorted, poorly cemented, well-consolidated, very fine to very coarse SANDSTONE with abundant coarse GRAVEL and minor SILT.	
16:00 12/02 7:00			64	2.5 SPT	13-30 12-30	60					

CONTINUED ON NEXT PAGE

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates
Boring Log

BORING NO.: CC-B

JOB NO.: 2004-207
SITE LOCATION: CHIQUITA LANDFILL – PALEOCANYON B
DRILLING METHOD: 24"ø BUCKET AUGER
CONTRACTOR: TRI-VALLEY DRILLING
LOGGED BY: J. CZAJKOWSKI

DATE STARTED: 12/01/04
DATE FINISHED: 12/02/04
ELEVATION: ±1196.6
NORTHING: ±1980359
EASTING: ±6365265

GW DEPTH: NA
TOTAL DEPTH: 75 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
12/02 7:00			64	2.5 SPT	13-30 12-30	60				...(62'-63') – lens of very fine to medium SANDY SILT with minor CLAY. ...(63') – fault oriented 256/49.	
						65				Dark gray (N3), oxidized CLAYEY SILT to SILTY CLAY with zones of SILT. Bedding is oriented 305/48.	
			80	2.5 SPT.	15-10 14-10	70					
9:15						75				Notes: 1. Total depth of boring 75 feet. 2. No groundwater encountered. 3. Boring downhole-logged on 12/02/04. 4. Borehole backfilled with cuttings and tamped into place.	
						80					
						85					
						90					

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GeoLogic Associates
Boring Log

BORING NO.: CC-C

JOB NO.: 2004-207
SITE LOCATION: CHIQUITA LANDFILL – PALEOCANYON C
DRILLING METHOD: 24"ø BUCKET AUGER
CONTRACTOR: TRI-VALLEY DRILLING
LOGGED BY: J. CZAJKOWSKI

DATE STARTED: 12/06/04
DATE FINISHED: 12/07/04
ELEVATION: ±1174.0
NORTHING: ±1980082
EASTING: ±6365550

GW DEPTH: NA
TOTAL DEPTH: 61.5 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
10:55						0			SW-SM	ARTIFICIAL FILL: Brown (10YR 5/3), poorly sorted, very fine to very coarse SAND with abundant SILT and minor fine to coarse GRAVEL.	Use digging bucket. Slightly moist.
				Bulk	1	5				...(6') – color change to yellowish brown (10YR 5/4).	
			18	2.5 SPT	2-10 1-10	10			CL	Plastic SILTY CLAY.	
						15			SW-SM	Yellowish brown (10YR 5/4), poorly sorted, very fine to very coarse SAND with abundant SILT and minor fine to coarse GRAVEL. ...(16') – color change to brown (10YR 4/3 to 5/3).	...(14'-15.5') – use core bucket.
			7	2.5 SPT	4-20 3-20	20					
						25			SM	Light brownish gray (10YR 6/2), very fine to medium SILTY SAND.	
									GW	ALLUVIUM: Brown (7.5YR 4/3), medium to very coarse SANDY GRAVEL.	
			50+/9"	2.5 SPT	6-30 5-30	30					

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GeoLogic Associates
Boring Log

BORING NO.: CC-C

JOB NO.: 2004-207
SITE LOCATION: CHIQUITA LANDFILL – PALEOCANYON C
DRILLING METHOD: 24"ø BUCKET AUGER
CONTRACTOR: TRI-VALLEY DRILLING
LOGGED BY: J. CZAJKOWSKI

DATE STARTED: 12/06/04
DATE FINISHED: 12/07/04
ELEVATION: ±1174.0
NORTHING: ±1980082
EASTING: ±6365550

GW DEPTH: NA
TOTAL DEPTH: 61.5 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						30			GW	...same as above.	
			50+/9"	2.5 SPT	6-30 5-30					BEDROCK (SAUGUS FORMATION): Gray (7.5YR 5/1), poorly cemented, poorly sorted, well-indurated, fine to very coarse GRAVELLY SANDSTONE interbedded with minor amounts of CLAYSTONE and SILTSTONE. GRAVEL clasts are fine to very coarse.	
						35				...(32') – SILTY CLAYSTONE to CLAYEY SILTSTONE. Upper contact is oriented 295/39.	
				Bulk	2					...(34'-38.5') – medium to very coarse SANDSTONE grading to very fine to medium SANDY SILTSTONE.	
										...(38.5') – SILTY CLAYSTONE.	
			50+/10"	2.5 SPT	8-40 7-40	40					
15:40 12/07 7:10										...(41.5') – CLAY shears oriented 300/26 and 104/66. Contains more SILT with depth.	
						45				...(46'-47.5') – fine to coarse SANDSTONE grading to medium to coarse SANDY GRAVEL.	
										...(47.5') – fault oriented 200/45.	
			50+/8"	2.5 SPT	10-50 9-50	50				...(51.5') – very fine to medium, laminated SILTY SANDSTONE. Upper contact is oriented 318/25.	
				Bulk	3					...(52.5') – laminations oriented 325/31.	
										...(52.6') – plastic CLAYSTONE.	
										Massive CLAYEY SITLSTONE.	
						55					
			50+/9"	2.5 SPT	12-60 11-60	60					

CONTINUED ON NEXT PAGE

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GeoLogic Associates
Boring Log

BORING NO.: CC-C

JOB NO.: 2004-207
SITE LOCATION: CHIQUITA LANDFILL – PALEOCANYON C
DRILLING METHOD: 24"ø BUCKET AUGER
CONTRACTOR: TRI-VALLEY DRILLING
LOGGED BY: J. CZAJKOWSKI

DATE STARTED: 12/06/04
DATE FINISHED: 12/07/04
ELEVATION: ±1174.0
NORTHING: ±1980082
EASTING: ±6365550

GW DEPTH: NA
TOTAL DEPTH: 61.5 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
				2.5	12-60	60				...same as above.	
9:20			50+/9"	SPT	11-60						
						65				Notes: 1. Total depth of boring 61.5 feet. 2. No groundwater encountered. 3. Boring downhole-logged on 12/07/04. 4. Borehole backfilled with cuttings and tamped into place.	
						70					
						75					
						80					
						85					
						90					

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates
Boring Log

BORING NO.: B-1

JOB NO.: 2005-071
SITE LOCATION: CHIQUITA CANYON
DRILLING METHOD: 24" BUCKET AUGER
CONTRACTOR: SD DRILLING
LOGGED BY: J. SAPP, CHG

DATE STARTED: 6/25/05
DATE FINISHED: 6/25/05
ELEVATION: 1025.1
NORTHING: 1980186
EASTING: 6366631

GW DEPTH: 37 feet
TOTAL DEPTH: 40 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						0			SP/SM	FILL: Light olive brown (2.5Y 5/3), massive, well-sorted, fine SAND to SILTY SAND with scattered coarser-grained horizons.	
						5					
						10				...(10') – coarser SANDY lens.	
						15					
						20				...(22') – coarser GRAVELLY lens.	...(22') – hard lens.
						25				...(28') – COBBLES and GRAVEL with cemented SANDSTONE clasts.	...(28') – harder than above.
						30			SW	ALLUVIUM: Light brownish gray (2.5Y 6/2), poorly sorted, fine to coarse SAND with rounded GRAVEL and minor COBBLES.	...(32') – very damp cuttings.
						35				...(32') – better sorting than above, little to no coarse SAND or GRAVEL.	...(37') – saturated cuttings.
						40				BEDROCK: Dark greenish gray (5GY 4/1), massive, weathered SILTSTONE.	...(39') – no free water in bedrock.
						45				Notes: 1. Total depth of boring 40 feet. 2. Groundwater encountered at 37 feet. 3. Borehole backfilled with tamped cuttings.	
						50					
						55					
						60					

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates
Boring Log

BORING NO.: B-1B

JOB NO.: 2005-071
SITE LOCATION: CHIQUITA CANYON
DRILLING METHOD: HOLLOW STEM AUGER
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: M. VINCENT, CEG

DATE STARTED: 7/06/05
DATE FINISHED: 7/06/05
ELEVATION: ~1025
NORTHING: ~1980178
EASTING: ~6366635

GW DEPTH: 36-37(?) feet
TOTAL DEPTH: 45 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						0			SM	FILL: Yellowish brown (10YR 5/4), poorly sorted, fine to medium SILTY SAND with fine to medium GRAVEL and fragments of reworked bedrock.	All drive samples were collected using a 140-lb drop hammer.
			16	SPT	1	5					
			40	2.5	2	10				...(10') - same as above.	
			52	SPT	3	15					
			65	2.5	4	20			SW	ALLUVIUM: Pale olive to olive (5Y 5.5/3), poorly sorted, fine to very coarse SAND with GRAVEL interbedded with fine, micaceous SAND with SILT.	
			50/6"	SPT	5	25					
			60/6"	2.5	6	30				...(30') - same as above.	
			55/6"	SPT	7	35				BEDROCK (SAUGUS FORMATION): Dark gray (5Y 4/1) to olive gray (5Y 4/2), well-indurated, micaceous, fine SILTY SANDSTONE.	...(36'-37') - possible groundwater level.
			50/6"	2.5	8	40					
			50/6"	SPT	9	45				Notes: 1. Total depth of boring 45 feet. 2. Possible groundwater level at approximately 36-37 feet bgs. 3. Alluvium/Bedrock contact encountered at 33 feet bgs. 4. Borehole backfilled with neat cement grout. 5. Proposed grade to be at 14 feet above ground surface.	
						50					
						55					
						60					

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GeoLogic Associates
Boring Log

BORING NO.: B-2

JOB NO.: 2005-071
SITE LOCATION: CHIQUITA CANYON
DRILLING METHOD: 24" BUCKET AUGER
CONTRACTOR: SD DRILLING
LOGGED BY: J. SAPP, CHG

DATE STARTED: 6/25/05
DATE FINISHED: 6/25/05
ELEVATION: 1023.7
NORTHING: 1980103
EASTING: 6366580

GW DEPTH: 45 feet
TOTAL DEPTH: 52 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						0			SP/SM	FILL: Light olive brown (2.5Y 5/3), massive, well-sorted, fine SAND to SILTY SAND with scattered GRAVELLY lenses.	
						5				...(6') – coarser SANDY lens.	
										...(8'-10') – GRAVELLY lens with cemented SANDSTONE GRAVEL.	
						10				...(10') – more SILT than above.	
						15					
						20					
						25				...(24'-28') – fine SILTY SAND.	
						30					
						35				...(33') – COBBLES and GRAVEL with SAND.	
										...(38') – mottled SILTY SAND and SANDY SILT, rounded pebble GRAVEL.	...(38') – wet cuttings.
						40			SW	ALLUVIUM: Light brownish gray (2.5Y 6/2), poorly sorted, fine to coarse SAND and scattered GRAVEL.	...(40') – very wet cuttings.
						45				...(43') – little to no GRAVEL or coarse SAND.	...(45') – saturated cuttings.
										...(48') – SAND showing depositional structure including oxidation layers and SAND/SILT interbeds.	
						50				BEDROCK: Dark greenish gray (5GY 4/1), massive, mottled, weathered SILTSTONE.	
						55				Notes: 1. Total depth of boring 52 feet. 2. Groundwater encountered at 45 feet. 3. Borehole unstable below 45 feet. 4. Borehole backfilled with tamped cuttings.	
						60					

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GeoLogic Associates
Boring Log

BORING NO.: B-2B

JOB NO.: 2005-071
SITE LOCATION: CHIQUITA CANYON
DRILLING METHOD: HOLLOW STEM AUGER
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: M. VINCENT, CEG

DATE STARTED: 7/06/05
DATE FINISHED: 7/06/05
ELEVATION: ~1022
NORTHING: ~1980095
EASTING: ~6366575

GW DEPTH: 37 feet
TOTAL DEPTH: 49.5 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						0			SM	FILL: Pale yellow (2.5Y 7/4), poorly sorted, fine to coarse SILTY SAND.	All drive samples were collected using a 140-lb drop hammer.
			24	SPT	1	5			SM-SW	ALLUVIUM: Light yellowish brown (2.5Y 6/3), poorly sorted, fine to very coarse, angular to subangular SILTY SAND with minor subangular to subrounded GRAVEL. Contains lenses of fine, micaceous SAND and coarse to very coarse GRAVELLY SAND.	
			70	2.5	2	10					
			45	SPT	3	15					
			90	2.5	4	20				...(20') - same as above.	
			65	SPT	5	25					
			52	2.5	6	30				...(30') - same as above.	
			50/5"	SPT	7	35					...(37') - groundwater encountered.
			70/6"	2.5	8	40				...(40') - same as above.	
			60/6"	SPT	9	45				BEDROCK (SAUGUS FORMATION): Moderately weathered, pale olive (5Y 6/3) to light gray (5Y 7/2), well-indurated, fine to medium SANDY SILTSTONE to SILTY SANDSTONE.	
			50/6"	2.5	10	50				Notes: 1. Total depth of boring 49.5 feet. 2. Groundwater encountered at approximately 37 feet bgs. 3. Alluvium/Bedrock contact encountered at 42 feet bgs. 4. Borehole backfilled with neat cements grout. 5. Proposed grade will be at 15 feet above ground surface.	
						55					
						60					

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates
Boring Log

BORING NO.: B-3

JOB NO.: 2005-071
SITE LOCATION: CHIQUITA CANYON
DRILLING METHOD: 24" BUCKET AUGER
CONTRACTOR: SD DRILLING
LOGGED BY: J. SAPP, CHG

DATE STARTED: 6/25/05
DATE FINISHED: 6/25/05
ELEVATION: 1020.6
NORTHING: 1979929
EASTING: 6366498

GW DEPTH: NA
TOTAL DEPTH: 54 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
13:45						0			SP/SM	FILL: Light olive brown (2.5Y 5/3), well sorted, fine SAND to SILTY SAND.	
						5					
						10					
						15					
						20				...(19') – more medium and coarse SAND than above.	
						25				...(24') – scattered rounded GRAVEL and minor COBBLES.	
						30					
						35				...(32') – better sorting than above, little to no coarse SAND, GRAVEL; more SILT than above.	
						40					
						45				...(44') – mottled, weathered SILTSTONE fragments.	
									SM	Yellowish brown (10YR 5/4), well sorted, fine SILTY SAND.	...(49') – cuttings more damp than above.
						50				BEDROCK: Olive gray (5Y 4/1) to light olive gray (5Y 5/2), massive, poorly indurated, well-sorted, fine GRAYWACKE with abundant angular QUARTZ fragments; minor amounts of MICA and SILT.	...(51') – more moisture in cuttings than above.
15:15						55					
						60					

Notes:

1. Total depth of boring 54 feet.
2. No groundwater encountered.
3. Borehole backfilled with tamped cuttings.

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GeoLogic Associates
Boring Log

BORING NO.: B-3B

JOB NO.: 2005-071
SITE LOCATION: CHIQUITA CANYON
DRILLING METHOD: HOLLOW STEM AUGER
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: M. VINCENT, CEG

DATE STARTED: 7/06/05
DATE FINISHED: 7/06/05
ELEVATION: ~1020
NORTHING: ~1979935
EASTING: ~6366497

GW DEPTH: 41 feet
TOTAL DEPTH: 49.5 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						0			SM	FILL: Light olive brown (2.5Y 5/4), poorly sorted, fine to very coarse SILTY SAND with GRAVEL.	All drive samples were collected using a 140-lb drop hammer.
			50/6"	SPT	1	5			SW	ALLUVIUM: Light olive brown (2.5Y 5/3), poorly sorted, fine to very coarse SAND with GRAVEL and minor interbeds of SILTY SAND to SANDY SILT.	
			55	2.5	2	10				...(10') - same as above.	
			50/6"	SPT	3	15					
			50/5"	2.5	4	20				...(20') - same as above.	
				BAG	5						
			50/6"	SPT	6	25					
			50/2"	2.5	7	30				...(30') - same as above.	
			50/6"	SPT	8	35					
			50/5"	2.5	9	40				...(39'-44.5') - contains abundant GRAVEL.	...(41') - groundwater encountered.
			50/2"	SPT	10	45				BEDROCK (SAUGUS FORMATION): Mottled yellowish brown (10YR 5/4) with light olive brown (2.5Y 5/4), well-indurated, poorly sorted, fine, micaceous SILTY SANDSTONE.	
			68/6"	2.5	11	50				Notes: 1. Total depth of boring 49.5 feet. 2. Groundwater encountered at approximately 41 feet bgs. 3. Alluvium/Bedrock contact encountered at 44.5 feet bgs. 4. Borehole backfilled with neat cement grout. 5. Proposed grade will be at 15 feet above ground surface.	
						55					
						60					

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates
Boring Log

BORING NO.: B-4

JOB NO.: 2005-071
SITE LOCATION: CHIQUITA CANYON
DRILLING METHOD: HOLLOW STEM AUGER
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: M. VINCENT, CEG

DATE STARTED: 7/06/05
DATE FINISHED: 7/06/05
ELEVATION: ~1021
NORTHING: ~1980022
EASTING: ~6366541

GW DEPTH: 37 feet
TOTAL DEPTH: 44.5 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						0			SM	FILL: Light yellowish brown (2.5Y 6/3), poorly sorted, fine to coarse SILTY SAND with GRAVEL.	All drive samples collected using a 140-lb slide hammer.
			21	SPT	1	5			SW	ALLUVIUM: Light yellowish brown (2.5Y 6/3), poorly sorted, fine to very coarse SAND with lenses of GRAVEL and fine, micaceous SAND with SILT.	
			50/4"	2.5	2	10				...(10') - same as above.	
				BAG	3						
			45	SPT	4	15					
			50/5"	2.5	5	20				...(19'-20.5') - abundant GRAVEL.	
			41	SPT	6	25					
			50/5"	2.5	7	30				...(30') - same as above.	
			50	SPT	8	35				...(33'-39') - predominantly medium to very coarse SAND with fine GRAVEL.	...(37') - groundwater encountered.
			50/3"	2.5	9	40				BEDROCK (SAUGUS FORMATION): Dark grayish brown (2.5Y 4/2) mottled with light brownish gray (10YR 6/2), very fine, micaceous SANDY SILTSTONE.	
			61/6"	SPT	10	45				Notes: 1. Total depth of boring 44.5 feet. 2. Groundwater encountered at approximately 37 feet bgs. 3. Alluvium/Bedrock contact encountered at 39 feet bgs. 4. Borehole backfilled with neat cement grout. 5. Proposed grade will be at 17 feet above ground surface.	
						50					
						55					
						60					

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates
Boring Log

BORING NO.: B-5

JOB NO.: 2005-071
SITE LOCATION: CHIQUITA CANYON
DRILLING METHOD: HOLLOW STEM AUGER
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: M. VINCENT, CEG

DATE STARTED: 7/07/05
DATE FINISHED: 7/07/05
ELEVATION: ~1023
NORTHING: ~1980125
EASTING: ~6366597

GW DEPTH: 38 feet
TOTAL DEPTH: 69.5 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						0			SW	FILL: Light olive brown (2.5Y 5/4) to yellowish brown (10YR 5/4), poorly sorted, fine to medium SAND with SILT and minor amounts of GRAVEL.	All drive samples were collected using a 140-lb slide hammer.
			16	SPT	1	5					
			54	2.5	2	10				...(10') - same as above.	
			50/3"	SPT	3	15			SW	ALLUVIUM: Light olive brown (2.5Y 5/4) mottled with yellowish brown (10YR 5/7), poorly sorted, fine to coarse SAND with lenses of very coarse SAND and fine to medium GRAVEL and lenses of fine SAND with SILT.	
			50/5"	2.5	4	20				...(20') - same as above.	
				BAG	5						
			50/5"	SPT	6	25					
			60/3"	2.5	7	30				...(30') - same as above.	
			75/6"	SPT	8	35					
			62/3"	2.5	9	40				...(38'-54') - predominantly coarse to very coarse SAND with minor amounts of fine GRAVEL.	...(38') - groundwater encountered.
			53/6"	SPT	10	45					
			50/2"	2.5	NSR	50				...(48'-50') - contains abundant COBBLES.	...(49'-50') - no 2.5" ring sample was retained due to cobbles.
			50/4"	2.5	11	55					
			63/6"	SPT	12	60				...(60') - same as above.	

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GeoLogic Associates
Boring Log

BORING NO.: B-5

JOB NO.: 2005-071
SITE LOCATION: CHIQUITA CANYON
DRILLING METHOD: HOLLOW STEM AUGER
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: M. VINCENT, CEG

DATE STARTED: 7/07/05
DATE FINISHED: 7/07/05
ELEVATION: ~1023
NORTHING: ~1980125
EASTING: ~6366597

GW DEPTH: 38 feet
TOTAL DEPTH: 69.5 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						60			SW	...(60') – same as above.	
			50/3"	2.5	13	65					
			62/6"	SPT	14	70				BEDROCK (SAUGUS FORMATION): Moderately to slightly weathered, greenish gray (5BG 5/1), fine, micaceous SILTY SANDSTONE to SANDY SILTSTONE.	
						75					
						80					
						85					
						90					
						95					
						100					
						105					
						110					
						115					
						120					

Notes:

1. Total depth of boring 69.5 feet.
2. Groundwater encountered at approximately 38 feet bgs.
3. Alluvium/Bedrock contact encountered at 67 feet bgs.
4. Borehole backfilled with neat cement.
5. Proposed grade will be at 15 feet above ground surface.

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates
Boring Log

BORING NO.: B-6

JOB NO.: 2005-071
SITE LOCATION: CHIQUITA CANYON
DRILLING METHOD: HOLLOW STEM AUGER
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: M. VINCENT, CEG

DATE STARTED: 7/07/05
DATE FINISHED: 7/07/05
ELEVATION: ~1068.5
NORTHING: 1980229
EASTING: 6366207

GW DEPTH: NA
TOTAL DEPTH: 44.5 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						0			SM	FILL: Brown (10YR 5/3), light olive gray (5Y 6/2), and light olive brown (2.5Y 5/4), poorly sorted, fine to medium SILTY SAND with minor coarse to very coarse SAND and fine GRAVEL.	All drive samples were collected using a 140-lb slide hammer.
			42	SPT	1	5					
			50/4"	2.5	2	10				...(10') – same as above.	
			37	SPT	3	15					
			52	2.5	4	20				...(20') – same as above.	
			50/5"	SPT	5	25			SM/SW	ALLUVIUM: Olive gray to light olive gray (5Y 5/2 to 6/2), poorly sorted, fine to medium, micaceous SILTY SAND interbedded with fine to very coarse SAND with fine GRAVEL.	
			61/6"	2.5	6	30					
			68/6"	SPT	7	35					
			53/6"	2.5	8	40				BEDROCK (SAUGUS FORMATION): Greenish gray (10Y 5/1), well-indurated, slightly to moderately weathered, micaceous, fine SILTY SANDSTONE to SANDY SILTSTONE.	
			51/6"	SPT	9	45				Notes: 1. Total depth of boring 44.5 feet. 2. No groundwater encountered. 3. Alluvium/Bedrock contact encountered at 39 feet bgs. 4. Borehole backfilled with neat cement grout. 5. Proposed grade will be at 28 feet below ground surface.	
						50					
						55					
						60					

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates
Boring Log

BORING NO.: B-7

JOB NO.: 2005-071
SITE LOCATION: CHIQUITA CANYON
DRILLING METHOD: HOLLOW STEM AUGER
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: M. VINCENT, CEG

DATE STARTED: 7/07/05
DATE FINISHED: 7/07/05
ELEVATION: ~1066
NORTHING: ~1980221
EASTING: ~6366227

GW DEPTH: NA
TOTAL DEPTH: 39.7 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						0			SM	FILL: Brown (10YR 5/3), light olive gray (5Y 6/2), and light olive brown (2.5Y 5/4), poorly sorted, fine to medium SILTY SAND with minor amounts of coarse SAND and fine GRAVEL.	All drive samples collected using a 140-lb slide hammer.
			24	SPT	1	5					
			50/4"	2.5	2	10				...(10') - same as above.	
			50/3"	SPT	3	15					
			72	2.5	4	20				...(20') - same as above.	
			30	SPT	5	25			SW	ALLUVIUM: Olive gray (5Y 5/2) to light olive gray (5Y 6/2), poorly sorted, fine to medium SAND interbedded with lenses of medium to very coarse SAND with fine GRAVEL.	
			47	2.5	6	30					
			42	SPT	7	35				BEDROCK (SAUGUS FORMATION): Light olive brown (2.5Y 5/4), well-indurated, fine to medium, micaceous SILTY SANDSTONE.	
			50/2"	2.5	8	40				Notes: 1. Total depth of boring 39.7 feet. 2. No groundwater encountered. 3. Alluvium/Bedrock contact encountered at 35 feet bgs. 4. Borehole backfilled with neat cement grout. 5. Proposed grade will be at 25 feet below ground surface.	
						45					
						50					
						55					
						60					

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates
Boring Log

BORING NO.: B-8

JOB NO.: 2005-071
SITE LOCATION: CHIQUITA CANYON
DRILLING METHOD: HOLLOW STEM AUGER
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: M. VINCENT, CEG

DATE STARTED: 7/07/05
DATE FINISHED: 7/07/05
ELEVATION: ~1071
NORTHING: ~1980106
EASTING: ~6366183

GW DEPTH: NA
TOTAL DEPTH: 59.5 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						0			SM	FILL: Pale olive (5Y 6/3), light olive brown (2.5Y 5/3), and yellowish brown (10YR 5/5), poorly sorted, fine to coarse SILTY SAND with minor GRAVEL.	All drive samples collected using a 140-lb slide hammer.
			33	SPT	1	5					
			57/6"	2.5	2	10				...(10') - same as above.	
			59	SPT	3	15					
			50/5"	2.5	4	20				...(20') - same as above.	
			55	SPT	5	25			SM	ALLUVIUM: Pale olive (5Y 6/3), light olive brown (2.5Y 5/3), and yellowish brown (10YR 5/5), poorly sorted, fine to coarse SILTY SAND with minor GRAVEL.	
			50/4"	2.5	6	30				...(30') - same as above.	
			52	SPT	7	35					
			55	2.5	8	40				...(40') - same as above.	
				BAG	9						
			60	SPT	10	45					
			70/5"	2.5	11	50				...(50') - same as above.	
			50/5"	SPT	12	55				BEDROCK (SAUGUS FORMATION): Light yellowish brown (2.5Y 6/3), well-indurated, poorly sorted, fine, micaceous SILTY SANDSTONE to SANDY SILTSTONE.	
			50/6"	2.5	13	60					

Notes:
1. Total depth of boring 59.5 feet.
2. No groundwater encountered.
3. Fill/Bedrock contact encountered at 54.5 feet bgs.
4. Borehole backfilled with neat cement grout.
5. Proposed grade will be at 32 feet below ground surface.

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates
Boring Log

BORING NO.: B-9

JOB NO.: 2005-071
SITE LOCATION: CHIQUITA CANYON
DRILLING METHOD: HOLLOW STEM AUGER
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: M. VINCENT, CEG

DATE STARTED: 7/08/05
DATE FINISHED: 7/08/05
ELEVATION: ~1071
NORTHING: 1980274
EASTING: 6366122

GW DEPTH: NA
TOTAL DEPTH: 44.5 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						0			SM	FILL: Olive gray (5Y 5/2) to light olive brown (2.5Y 5/3), poorly sorted, fine to medium SILTY SAND with minor amounts of coarse to very coarse SAND and GRAVEL.	All drive samples collected using a 140-lb slide hammer.
			45	SPT	1	5					
			80/11"	2.5	2	10				...(10') – same as above.	
			61/6"	SPT	3	15					
			72	2.5	4	20			SW	ALLUVIUM: Light olive gray (5Y 6/2), fine to medium SAND with lenses of coarse SAND with GRAVEL.	
			48	SPT	5	25					
			50/4"	2.5	6	30				...(30') – same as above.	
			50/5"	SPT	7	35					
			70/5"	2.5	8	40				BEDROCK (SAUGUS FORMATION): Brown to strong brown (7.5YR 4.5/5), well-indurated, poorly sorted, fine to coarse SILTY SANDSTONE.	
			50/6"	2.5	9	45				Notes: 1. Total depth of boring 44.5 feet. 2. No groundwater encountered. 3. Alluvium/Bedrock contact encountered at 37 feet bgs. 4. Borehole backfilled with neat cement grout. 5. Proposed grade will be at 30 feet below ground surface.	
						50					
						55					
						60					

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates
Boring Log

BORING NO.: B-10

JOB NO.: 2005-071
SITE LOCATION: CHIQUITA CANYON
DRILLING METHOD: HOLLOW STEM AUGER
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: M. VINCENT, CEG

DATE STARTED: 7/08/05
DATE FINISHED: 7/08/05
ELEVATION: ~1068
NORTHING: 1980351
EASTING: 6366060

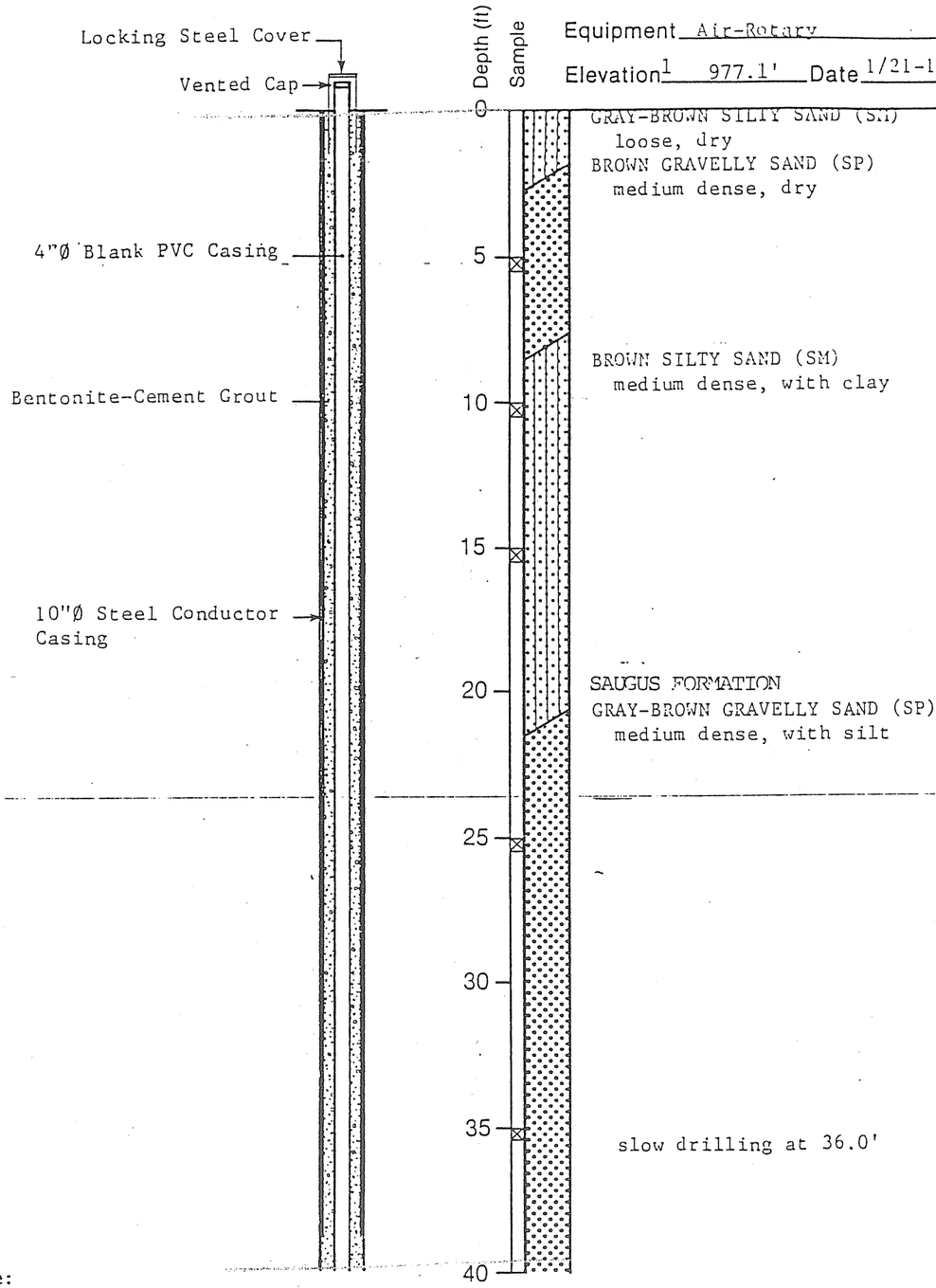
GW DEPTH: NA
TOTAL DEPTH: 44.2 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						0			SM	FILL: Olive gray (5Y 5/2) and light olive brown (2.5Y 5/3), poorly sorted, fine to coarse SILTY SAND with minor GRAVEL.	All drive samples collected using a 140-lb slide hammer.
			23	SPT	1	5					
			50/4"	2.5	2	10				...(10') - same as above.	
			50	SPT	3	15					
			65	2.5	4	20				...(20') - same as above.	
			32	SPT	5	25					
			43	SPT	6	30			SW	ALLUVIUM: Olive to olive gray (5Y 5/2.5), very fine to fine, micaceous SAND.	
			50/5"	2.5	7	35					
			50/5"	SPT	8	40				BEDROCK (SAUGUS FORMATION): Reddish brown (5YR 5/3) mottled with Olive (5Y 5/3), well-indurated, fine, micaceous SANDY SILTSTONE.	
			50/4"	2.5	9	45				Notes: 1. Total depth of boring 44.2 feet. 2. No groundwater encountered. 3. Alluvium/Bedrock contact encountered at 37 feet bgs. 4. Borehole backfilled with neat cement grout. 5. Proposed grade will be at 25 feet below ground surface.	
						50					
						55					
						60					

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

Equipment Air-Rotary

Elevation[1] 977.1' Date 1/21-1/24/86



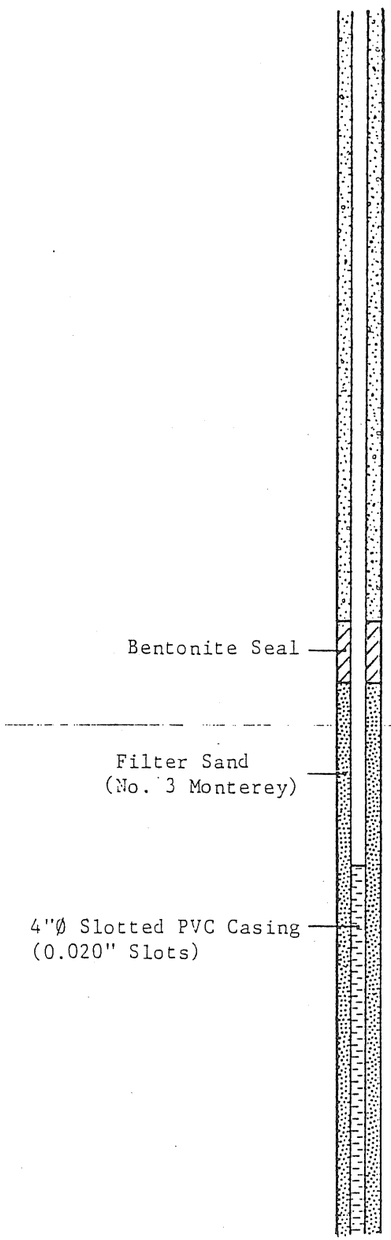
GRAY-BROWN SILTY SAND (SM)
loose, dry

BROWN GRAVELLY SAND (SP)
medium dense, dry

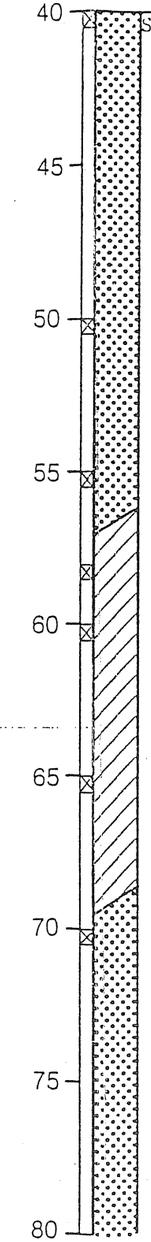
BROWN SILTY SAND (SM)
medium dense, with clay

SAUGUS FORMATION
GRAY-BROWN GRAVELLY SAND (SP)
medium dense, with silt

slow drilling at 36.0'



(Continuation of Log)



SAUGUS FORMATION

gravelly from 45.0' to 48.0'

rig chatter, gravelly at 56.0'

RED-BROWN SANDY CLAY (CL)
stiff, moist, with silt

color change to brown 64.0' to 65.0'

sandy at 66.0'

BROWN-GRAY SAND (SP)
medium dense, with silt
gravelly at 72.0'

color change to gray at 78.0'

Note:

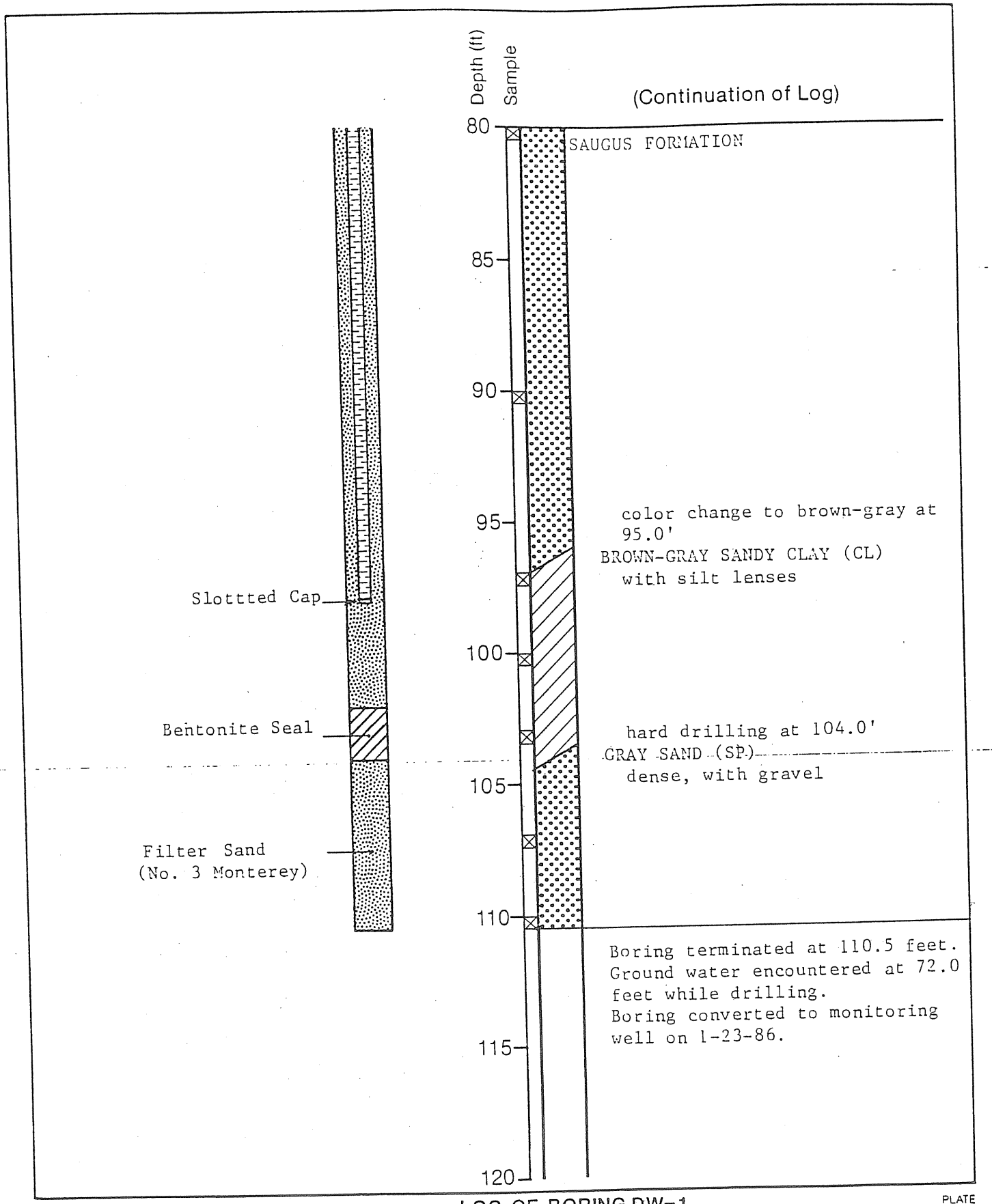
1. Top of casing elevation, Mean Sea Level datum

Harding Lawson Associates
Engineers, Geologists & Geophysicists

LOG OF BORING DW-1
GSX-Chiquita Canyon Landfill
Monitoring Plan Implementation
Saugus, California

PLATE C3a

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
tl	17012,006.11	/ac	4-15-86		



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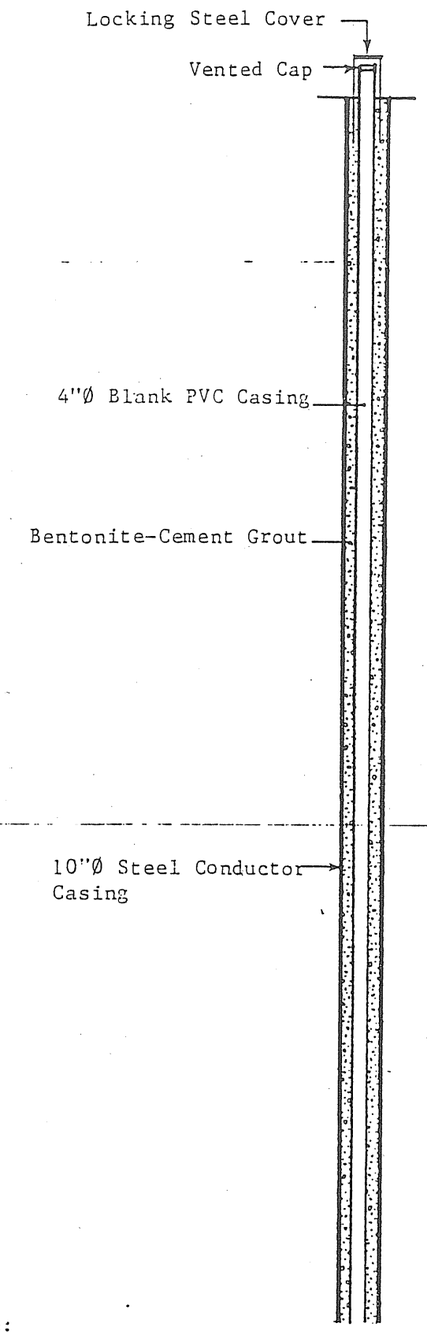
LOG OF BORING DW-1
GSX-Chiquita Canyon Landfill
Monitoring Plan Implementation
Saugus, California

PLATE
C3b

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
tl	17012,006.11	JMB /ac	4-15-86		



Equipment Air-Rotary

Elevation[1] 1041.7' Date 11/14-11/21/85

Depth (ft) | Sample

0 — BROWN SILTY SAND (SM)
dense, dry

5

10 — GRAY-BROWN SAND (SP)
very dense, moist, with silt and gravel

15 — GRAY-BROWN GRAVELLY SAND (SP)
very dense

20 — SAUGUS FORMATION
BROWN GRAVELLY SILTY SAND (SM)
dense, with gravel

25

30 — rig chatter at 32.0'

35

40

(Continuation of Log)

40 — SAUGUS FORMATION
rig chatter from 41.0' to 45.0'

45

50

55

60

65

70

75

80

Note:
1. Top of casing elevation, Mean Sea Level datum

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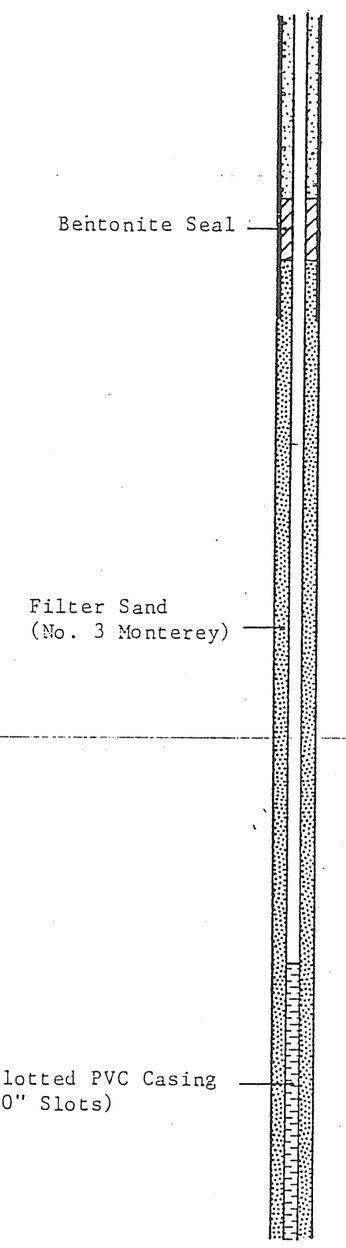
LOG OF BORING DW-2
GSX-Chiquita Canyon Landfill
Monitoring Plan Implementation
Saugus, California

PLATE C4a

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
tl	17012,006.11	/ac	4-15-86		

Equipment Air-Rotary

Elevation[1] 1041.7' Date 11/14-11/21/85

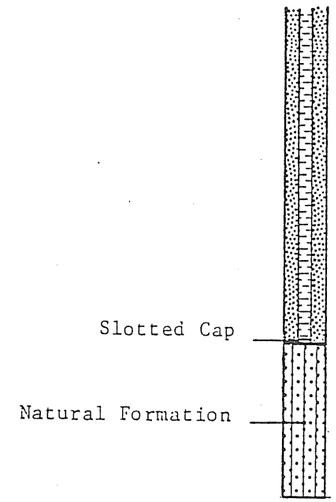


Depth (ft)	Sample	
80		SAUGUS FORMATION
85		rig chatter at 85.0' gravelly from 85.0' to 90.0'
90		
95		GRAY CLAYEY SILT (ML) stiff, with sand
100		GRAY SILTY SAND (SM) dense, with gravel
105		
110		
115		rig chatter 118.0 to 125.0'
120		

Note:

1. Top of casing elevation, Mean Sea Level datum

(Continuation of Log)



Depth (ft)	Sample	
120		SAUGUS FORMATION
125		rig chatter at 124.0' rig chatter and bouncing at 127.0'
130		
135		Boring terminated at 136.0 feet. Ground water encountered at 100.0 feet while drilling. Boring converted to monitoring well on 11-21-85.
140		
145		
150		
155		
160		

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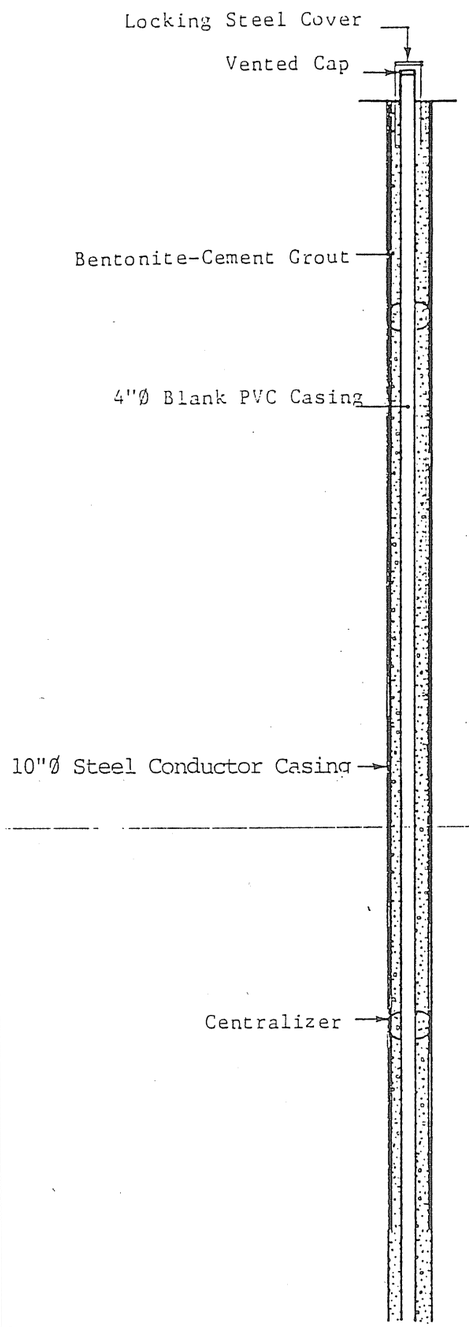
LOG OF BORING DW-2
GSX-Chiquita Canyon Landfill
Monitoring Plan Implementation
Saugus, California

PLATE C4b

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
tl	17012,006.11	lac	4-15-86		



Equipment Air-Rotary

Elevation[1] 1090.4' Date 11/7-11/13/85

Depth (ft)	Sample	
0		BROWN SILTY SAND (SM) loose, moist, with gravel
5		
10		BROWN SAND (SP) medium dense, moist, with gravel
		BROWN SILTY SAND (SM) moist, with gravel
15		
		SAUGUS FORMATION BROWN GRAVELLY SAND (SP) very dense, with silt
20		
25		
30		
35		BROWN SILTY SAND (SM) - very dense, medium- to coarse-grained
40		

(Continuation of Log)

Depth (ft)	Sample	
40		SAUGUS FORMATION
45		rig chatter at 48.0' GRAY-BROWN GRAVELLY SAND (SP) very dense, coarse-grained
50		
55		BROWN SAND (SP) dense, with gravel
60		
65		rig chatter at 67.0'
70		BROWN SILTY SAND (SM) dense, with gravel
75		BROWN SANDY SILT (ML) very stiff, with gravel
80		

Note:

1. Top of casing elevation, Mean Sean Level datum

Harding Lawson Associates
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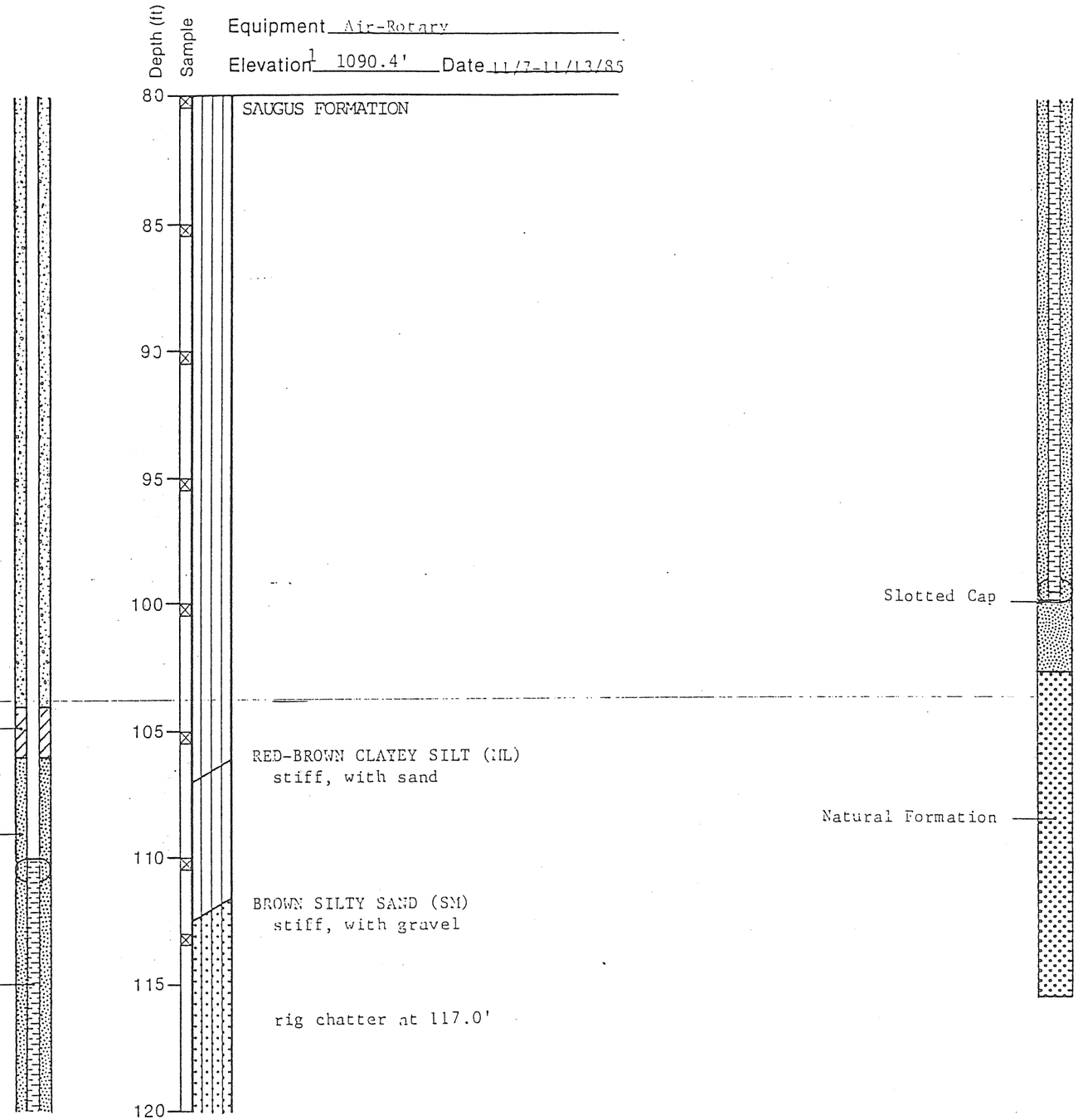
LOG OF BORING DW-3
GSX-Chiquita Canyon Landfill
Monitoring Plan Implementation
Saugus, California

PLATE C5a

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
tl	17012,006.11	/ac	4-15-86		

Equipment Air-Rotary

Elevation[1] 1090.4' Date 11/7-11/13/85



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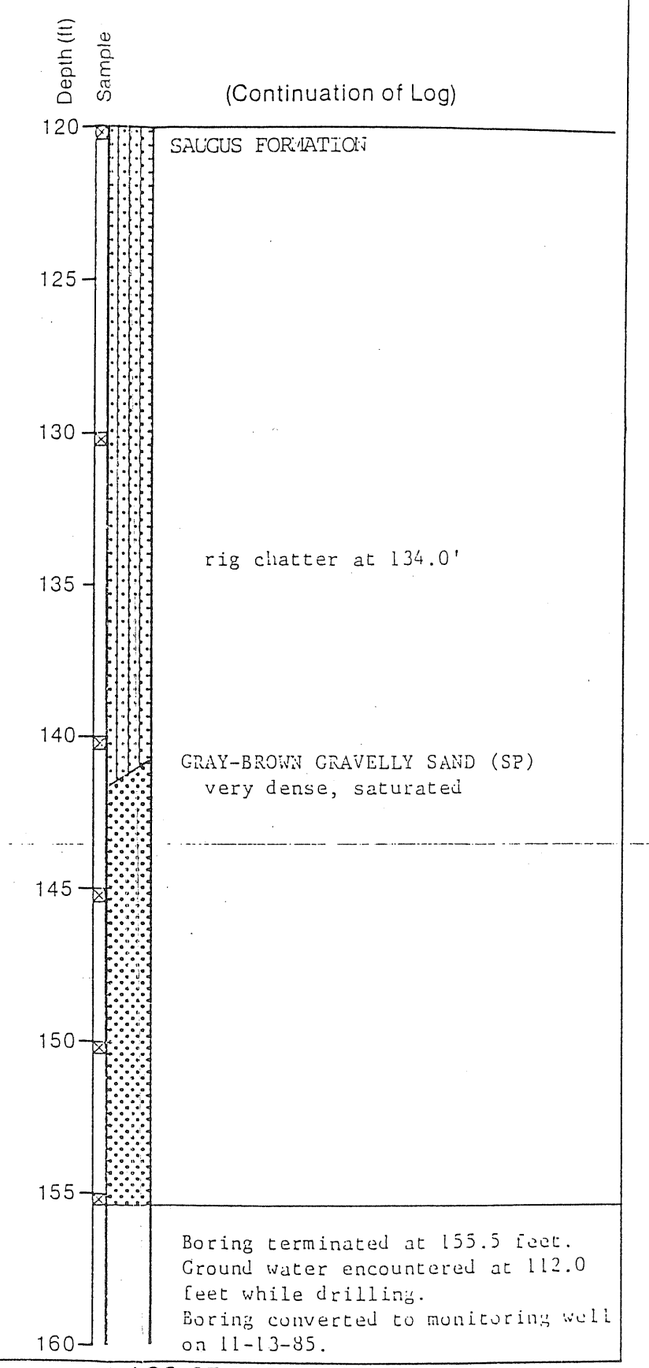

Boring terminated at 155.5 feet.
Ground water encountered at 112.0 feet while drilling.
Boring converted to monitoring well on 11-13-85.

Note:

1. Top of casing elevation, Mean Sea Level datum

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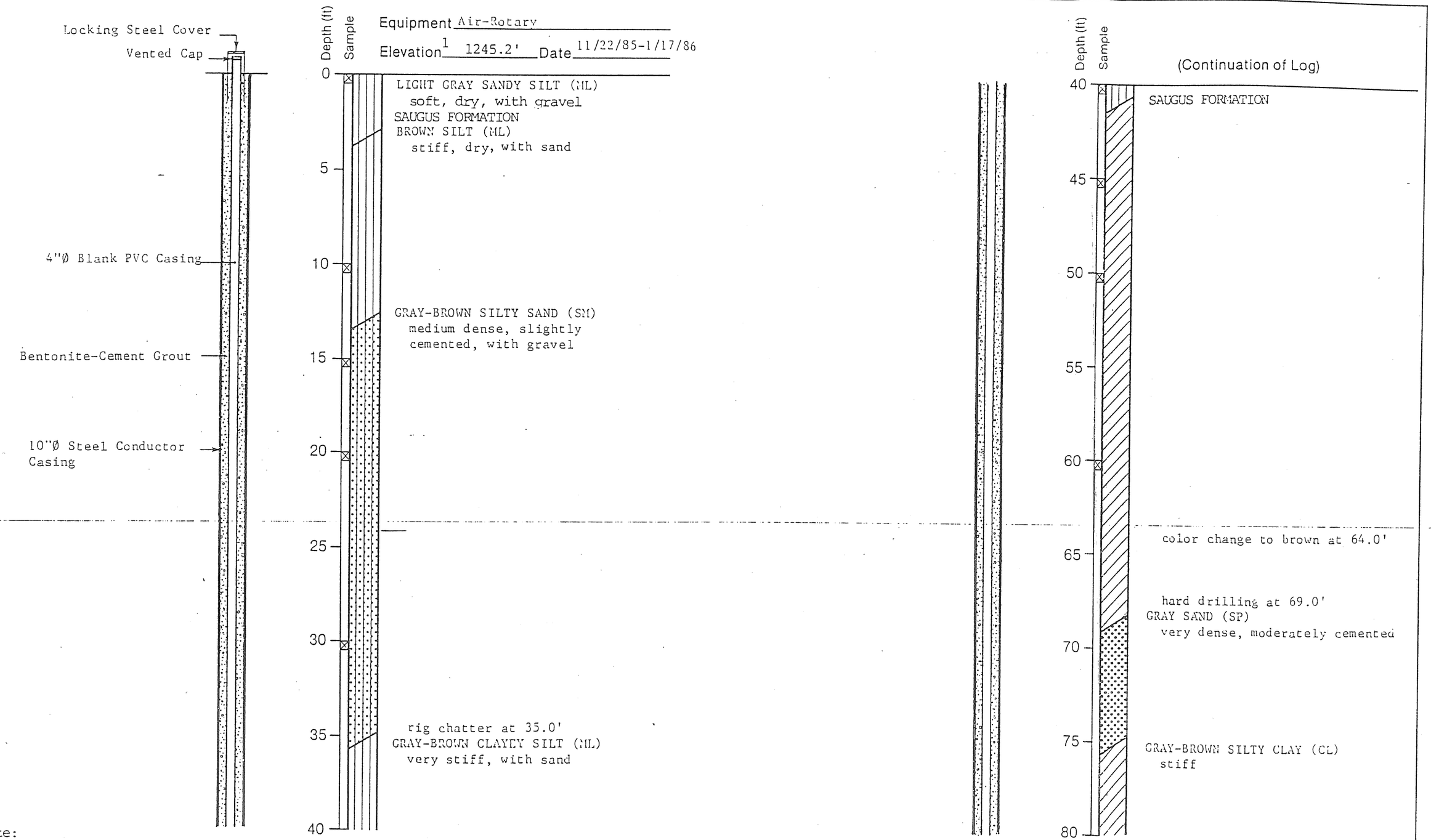
LOG OF BORING DW-3
GSX-Chiquita Canyon Landfill
Monitoring Plan Implementation
Saugus, California

PLATE C5b

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
tl	17012,006.11	/ac	4-15-86		

Equipment Air-Rotary

Elevation[1] 1245.2' Date 11/22/85-1/17/86



Note:

1. Top of casing elevation, Mean Sea level

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LOG OF BORING DW-6
GSX-Chiquita Canyon Landfill
Monitoring Plan Implementation
Saugus, California

PLATE C6a

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
tl	17012,007.11	/ac	4-15-86		

Equipment Air-Rotary

Elevation[1] 1245.2' Date 11/22/85-1/17/86

Depth (ft)	Sample	
80		SAUGUS FORMATION BROWN CLAYEY SILT (ML) stiff
85		GRAY-BROWN SILTY SAND (SM) dense
90		
95		GRAY-BROWN SAND (SP) dense, with silt and gravel, medium- to coarse-grained
100		
105		
110		
115		
120		

(Continuation of Log)

Depth (ft)	Sample	
120		SAUGUS FORMATION
125		
130		
135		
140		gravelly at 142.0'
145		BROWN SILTY SAND (SM) very dense, with clay and gravel
150		GRAY-BROWN SAND (SM) dense, with gravel
155		
160		BROWN SILTY SAND (SM) medium dense, with clay

Note:

1. Top of casing elevation, Mean Sea Level datum

Harding Lawson Associates
Engineers, Geologists & Geophysicists

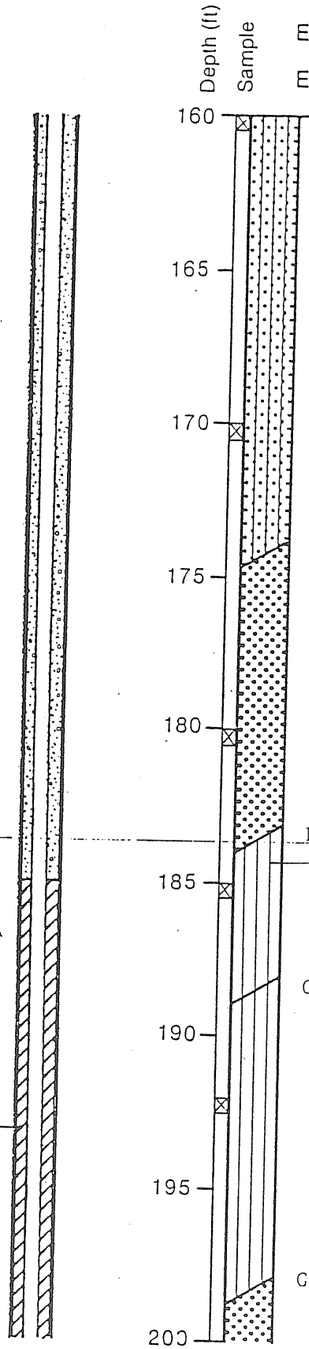
LOG OF BORING DW-6
GSX-Chiquita Canyon Landfill
Monitoring Plan Implementation
Saugus, California

PLATE C6b

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
tl	17012,007.11	/ac	4-15-86		

Equipment Air-Rotary

Elevation[1] 1245.2' Date 11/22/85-1/17/86



SAUGUS FORMATION

gravelly at 164.0'

gravelly at 172.0'

GRAY-BROWN GRAVELLY SAND (SP)
dense to very dense

BROWN CLAYEY SILT (ML)
very stiff, slightly cemented

slow drilling at 186.0'

easier drilling at 188.0'

GRAY-BROWN SANDY SILT (ML)
medium stiff, slightly cemented, with clay

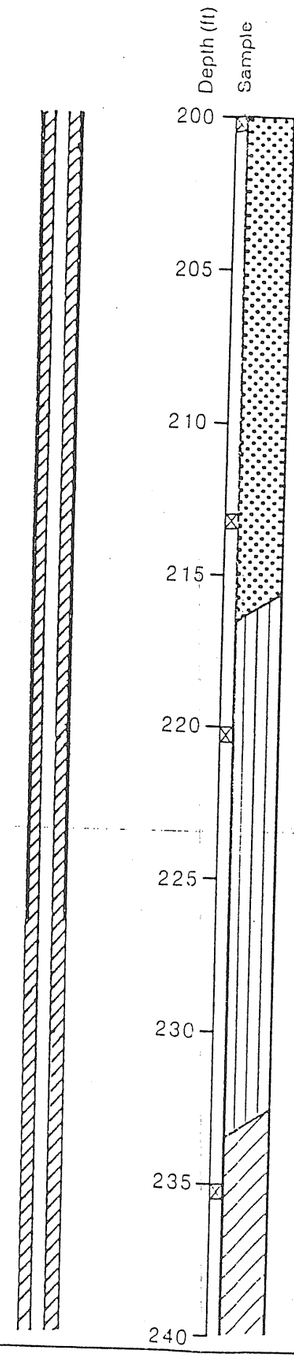
rig chatter at 198.0'

GRAY-BROWN SAND (SP)
medium dense to dense, slightly cemented

Note:

1. Top of casing elevation, Mean Sea Level datum

(Continuation of Log)



SAUGUS FORMATION

rig chatter at 208.0'

GRAY-BROWN CLAYEY SILT (ML)
very stiff, with sand and gravel

drive shoe on 10" casing bent at 226.0'

GRAY SILTY CLAY (CL)
very stiff, with sand

slow drilling at 238.0'

Harding Lawson Associates
Engineers, Geologists & Geophysicists

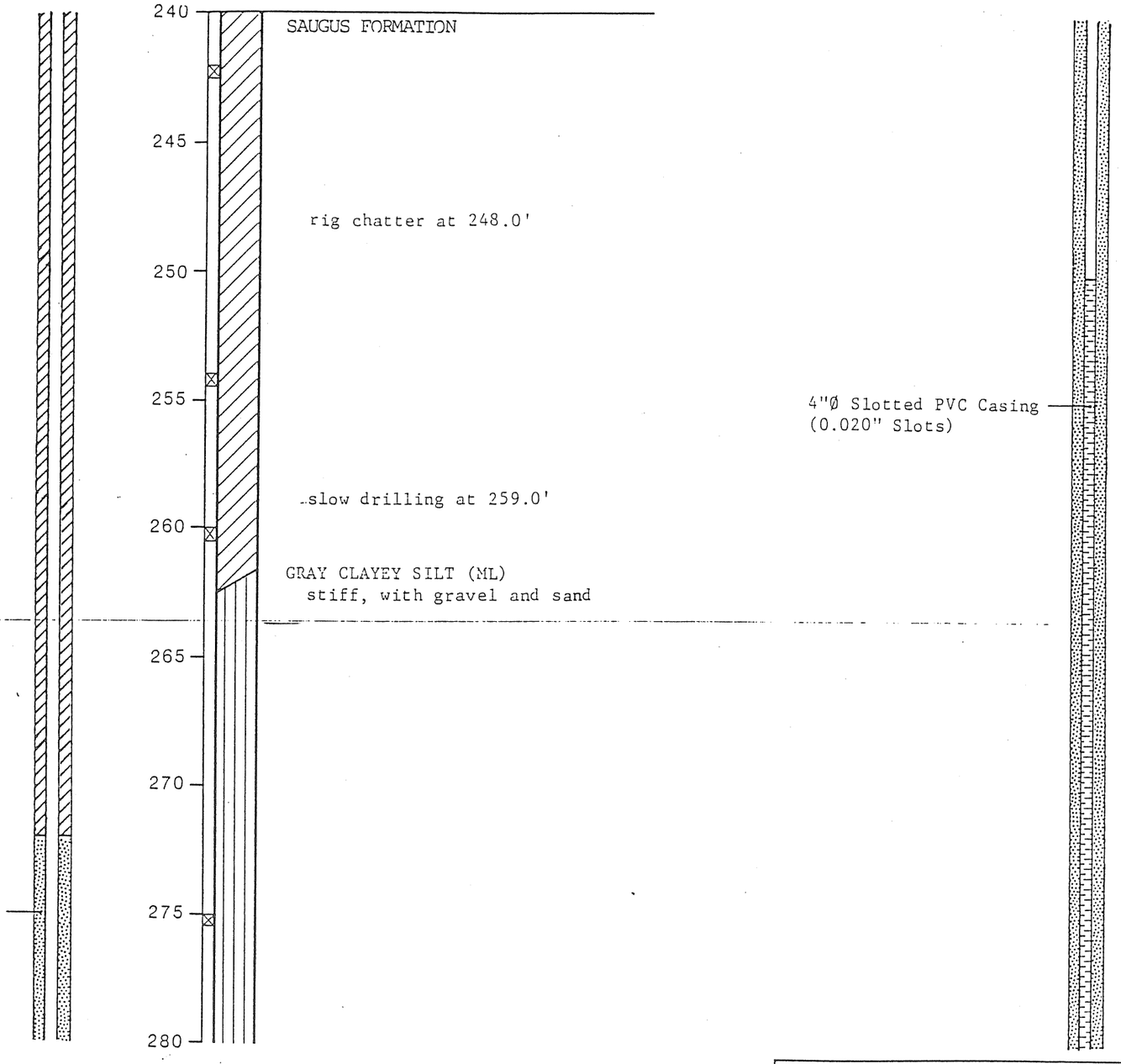
LOG OF BORING DW-6
GSX-Chiquita Canyon Landfill
Monitoring Plan Implementation
Saugus, California

PLATE C6c

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
tl	17012,007.11	/ac	4-15-86		

Equipment Air-Rotary

Elevation[1] 1245.2' Date 11/22/85-1/17/86



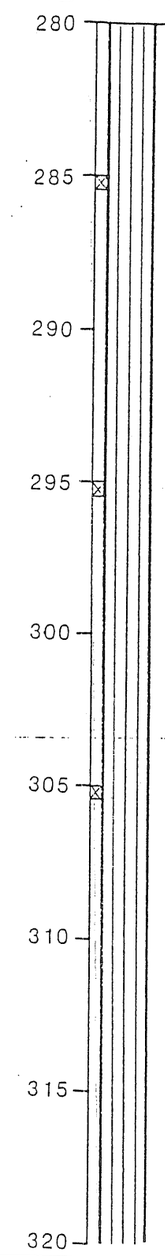
SAUGUS FORMATION

rig chatter at 248.0'

slow drilling at 259.0'

GRAY CLAYEY SILT (ML)
stiff, with gravel and sand

(Continuation of Log)



SAUGUS FORMATION

rig chatter and slow drilling 284.0-286.0'

rig chatter and slow drilling at 288.0'

rig chatter at 300.0'

rig chatter at 303.0'

Note:
1. Top of casing elevation, Mean Sea Level datum

Harding Lawson Associates
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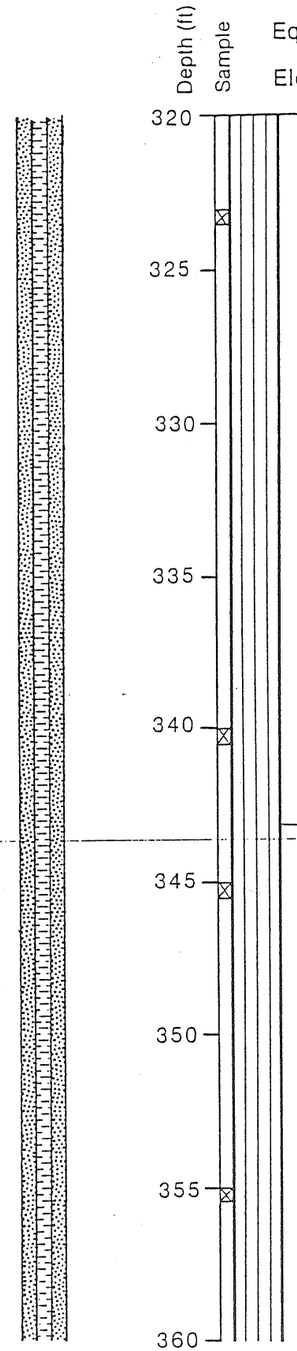
LOG OF BORING DW-6
GSX-Chiquita Canyon Landfill
Monitoring Plan Implementation
Saugus, California

PLATE C6d

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
tl	17012,007.11	/ac	4-15-86		

Equipment Air-Rotary

Elevation[1] 1245.2' Date 11/22/85-1/17/86



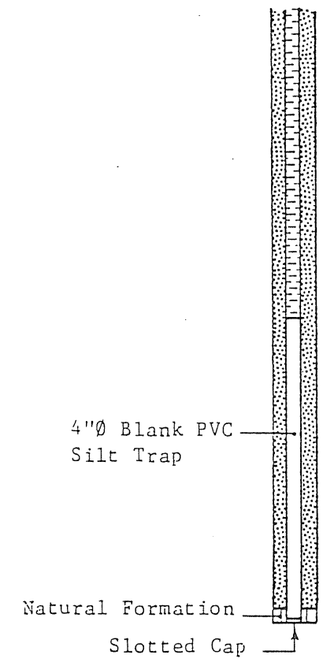
SAUGUS FORMATION

rig chatter at 325.0'

clayey at 340.0'

hard drilling at 348.0'

sandy at 350.0'



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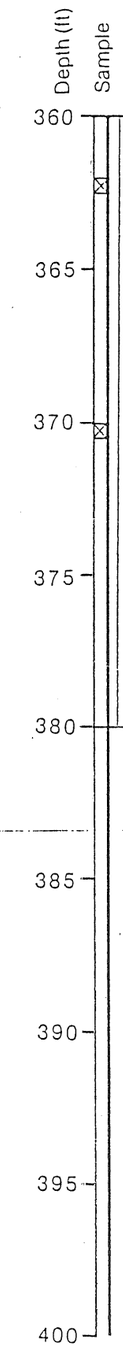


SAUGUS FORMATION

hard drilling at 374.0'

Boring terminated at 380.0 feet.
Ground water encountered at 320.0-330.0 feet while drilling.
Boring converted to monitoring well on 1-17-86.

Note:

1. Top of casing elevation, Mean Sea Level datum

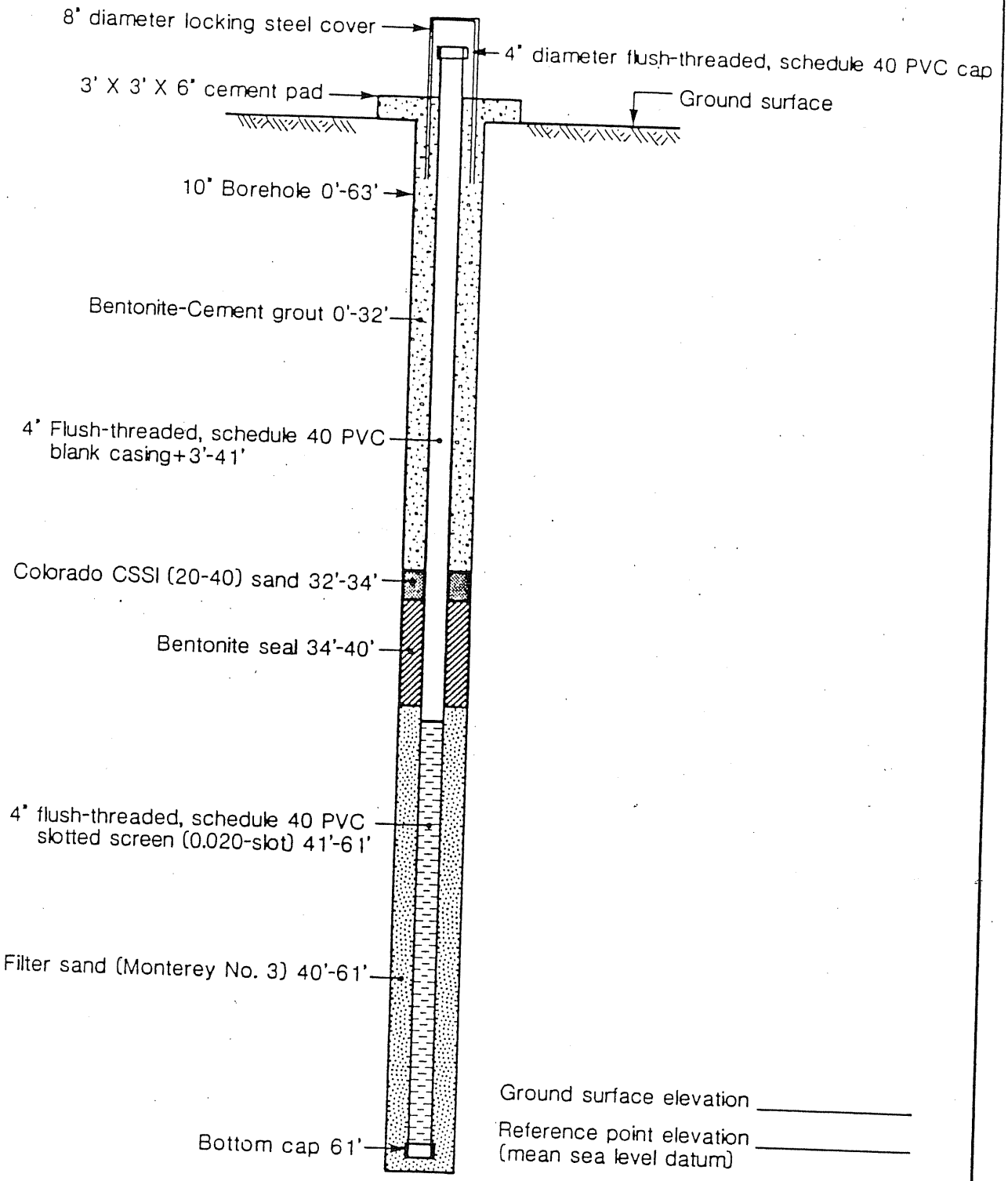
Harding Lawson Associates
Engineers, Geologists & Geophysicists

LOG OF BORING DW-6
GSX-Chiquita Canyon Landfill
Monitoring Plan Implementation
Saugus, California

PLATE C6e

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
tl	17012,007.11	/ac	4-15-86		

MONITORING WELL DW-7



Not to Scale

Harding Lawson Associates
Engineers, Geologists
& Geophysicists

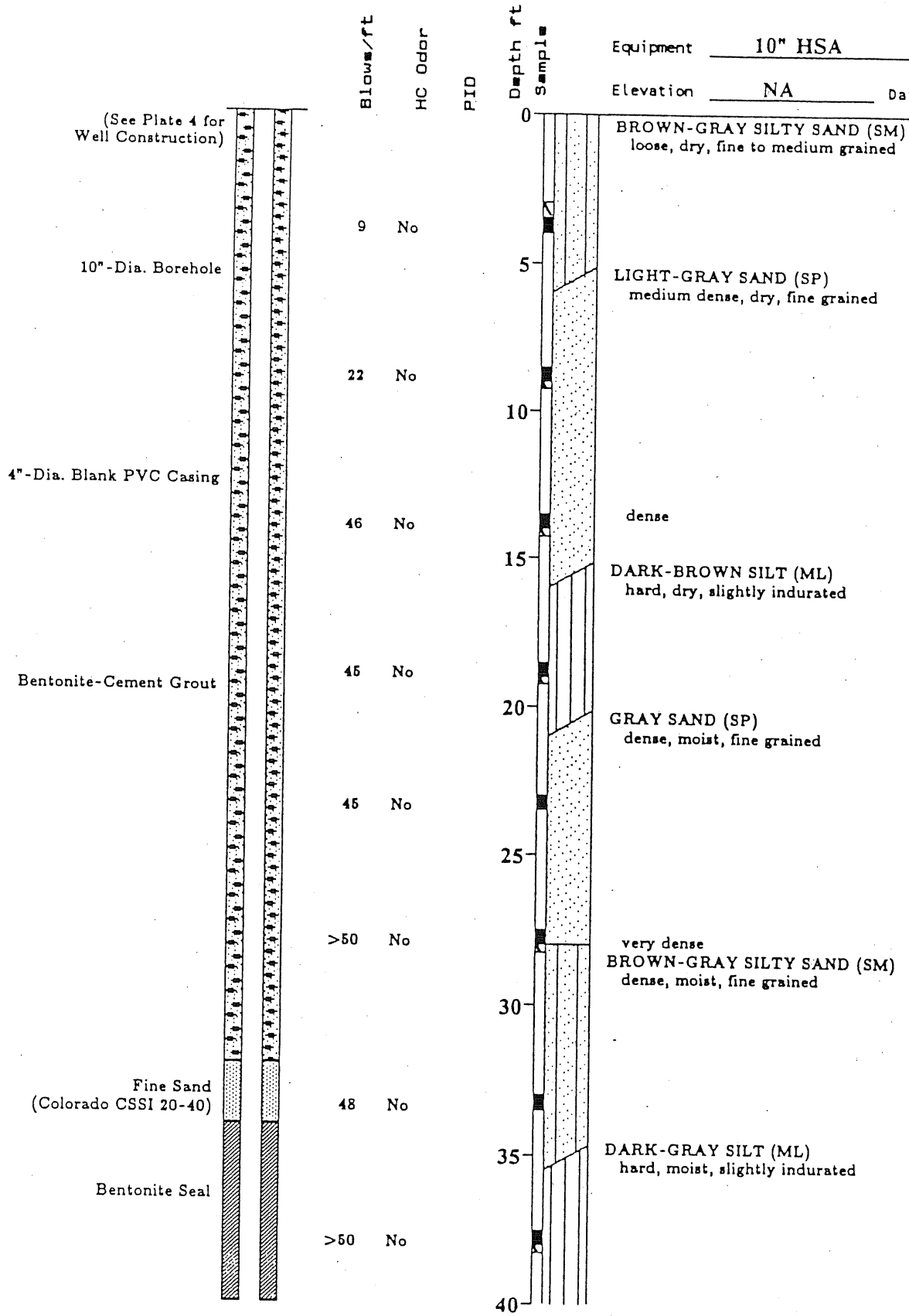
MONITORING WELL COMPLETION
Chiquita Canyon
Laidlaw Waste Systems, Inc.
Valencia, California

PLATE
4

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
jb	18132,007.11	CAF			

Equipment 10" HSA

Elevation NA Date 3/14/88



Harding Lawson Associates
Engineers and Geoscientists

Log of Boring DW- 7 (sheet 1 of 2)

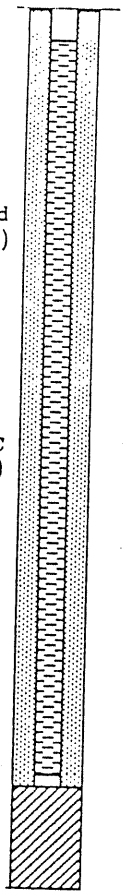
Laidlaw Chiquita Canyon
Valencia, California

PLATE **3a**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SS	18132,007.11		4/88		

Equipment 10" HSA

Elevation NA Date 3/14/88



Blows/ft	HC Odor	PID	Depth ft	Sample	Description
>50	No		40		GRAY SILTY SAND (SM) very dense, moist, fine grained, slightly indurated
			45		GRAY SAND (SP) very dense, saturated, medium grained
>50	No				
			50		
>50	No				some gravels
			55		BROWN-GRAY SILT (ML) hard, moist, with very fine-grained sand
>50	No				
			60		
>50	No				
			65		Boring terminated at 63.0 feet. Ground water encountered at 31.0 feet while drilling. Boring converted to monitoring well on 3/14/88.
			70		
			75		
			80		

Harding Lawson Associates
Engineers and Geoscientists

Log of Boring DW- 7 (sheet 2 of 2)

Laidlaw Chiquita Canyon
Valencia, California

PLATE **3b**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SS	18132,007.11		4/88		

Equipment 8" Hollow Stem Auger

Elevation 1060 Date 8/22/83

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Description
				0	BROWN SILTY SAND (SM) medium dense, dry, with wood fragments
SA (-200=44%) Hydrometer Perm 2.0×10^{-4} cm/sec G_s=2.89	12*	8.1	108	5	color change to gray-brown, moist below 6', with caliche
	20			10	dense below 10'
	30*	11	123	15	gravelly
	50+			20	oxidation stains, very dense below 20'
	50+*			25	SAUGUS FORMATION GRAY GRAVELLY SILTY SAND (SM) very dense, dry
	50+			30	
	50+*			35	GRAY SILTY SAND (SM) very dense, moist
				40	

* S & H sample, blow count converted to approximate SPT N-value.

(Continuation of Log)

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Description
	50+			40	SAUGUS FORMATION
	50+* No recovery			45	
	50+			50	
	50+* No recovery			55	
	50+			60	Boring terminated at 60.5 feet Converted to monitoring well on 8/22/83
				65	
				70	
				75	
				80	

Well Installation Explanation

1. blank PVC, 2"Ø
2. slotted PVC, 2"Ø
3. cement grout
4. bentonite
5. #16 sand
6. drilling spoil

Harding Lawson Associates
Engineers, Geologists & Geophysicists

LOG OF BORING A-1
Chiquita Canyon Landfill Expansion
Saugus, California

PLATE A2

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
jb	17012,001.11	BCP /sls	9/28/83		

Equipment 8" Hollow Stem Auger

Elevation 1090 Date 8/22/83

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Description
				0	BROWN SANDY SILT (ML) soft, moist
	9*			5	
SA(-200=66%) Hydrometer G_s=2.67	15	8.0		10	medium stiff below 10', occasional gravel
					GRAY-BROWN GRAVELLY SILTY SAND (SM) medium dense, moist, with caliche
SA(-200=41%) Hydrometer Perm 2.0×10^{-5} cm/sec G_s=2.78	19*	10.8	113	15	
	18			20	
	50+*			25	SAUGUS FORMATION BROWN-GRAY SAND (SP) very dense, moist, with oxidation staining
	50+			30	
	50+*			35	GRAY-BROWN SANDY SILT (ML) hard, slightly moist
				40	

(Continuation of Log)

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Description
	50+			40	SAUGUS FORMATION color change to gray
	50+*			45	color change to gray-brown GRAY SILTY FINE SAND (SM) very dense, slightly moist
	50+			50	
	50+*			55	occasional gravel
	50+			60	
	50+			65	GRAY SILTY CLAY (CL) hard, slightly moist, trace of sand
	50+			70	color change to brown-gray
	50+			75	Boring terminated at 75.5' Groundwater not encountered
				80	

Harding Lawson Associates
Engineers, Geologists & Geophysicists

LOG OF BORING A-2
Chiquita Canyon Landfill Expansion
Saugus, California

PLATE A3

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
jb	17012,001.11	bc	9/28/83		

Equipment 8" Hollow Stem Auger

Elevation 1094 Date 8/23/83

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Sample	Description
				0		BROWN GRAVELLY SILTY SAND (SM) loose, moist
	9*	4.5	100	5	4	
					1	
	13			10		BROWN SAND (SP) medium dense, moist, trace of silt
SA (-200=13%) Hydrometer Perm 3.2×10^{-3} cm/sec G_s=2.75	27*	9.8	116	15		SAUGUS FORMATION BROWN SILTY GRAVELLY SAND (SM) medium dense, moist
	50+			20	2	very dense below 20'
	50+*			25		
	50+			30	5	BROWN SILTY SAND (SM) very dense, slightly moist
	50+*			35		RED-BROWN SILTY CLAYEY SAND (SC) very dense, slightly moist
	50+			40		RED-BROWN SILT (ML) hard, slightly moist, traces of sand Boring terminated at 40.5' Converted to monitoring well on 8/24/83

Well Installation Explanation

1 blank PVC, 2"Ø
2 slotted PVC, 2"Ø
3 cement grout
4 bentonite
5 #16 sand

Harding Lawson Associates
Engineers, Geologists & Geophysicists

LOG OF BORING B-1
Chiquita Canyon Landfill Expansion
Saugus, California

PLATE A4

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
jb	17012,001.11	EJP/sls	9/28/83		

Equipment 8" Hollow Stem Auger

Elevation 1118 Date 8/23/83

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Description
				0	GRAY-BROWN GRAVELLY SILTY SAND (SM) loose, slightly moist
SA(-200=42%) Hydrometer Perm 5.4×10^{-5} cm/sec G_s=2.80	38*	5.6	116	5	dense, with caliche
	15			10	color change to brown, medium dense, less gravels
					SAUGUS FORMATION GRAY SAND (SW) medium dense, slightly moist, weakly cemented
SA(-200=42%) Hydrometer Perm 3.4×10^{-5} cm/sec G_s=2.84	16*	12.0	107	15	BROWN SILTY SAND (SM) medium dense, moist, with caliche
	50+			20	BROWN SANDY SILT (ML) hard, slightly moist, with caliche and organics
	50+			25	GRAY-BROWN SAND (SP) very dense, slightly moist, with oxidation stains
	50+*			30	color change to gray, weakly cemented
					Boring terminated at 30.5 feet Groundwater not encountered
				35	
				40	

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Engineers, Geologists & Geophysicists

LOG OF BORING B-2
Chiquita Canyon Landfill Expansion
Saugus, California

PLATE **A5**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
jb	17012,001.11	/bc	9/28/83		

Equipment 8" Hollow Stem Auger

Elevation 1134 Date 8/23/83

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Sample	
				0		GRAY-BROWN GRAVELLY SILTY FINE SAND (SM) loose, moist, with organics
	8*	8.5	93	5		
	14			10		GRAY-BROWN SANDY CLAY (CL) stiff, moist, occasional gravel
						SAUGUS FORMATION BROWN GRAVELLY SILTY SAND (SM) dense, moist
	27*			15		
	50+			20		
						GRAY-BROWN SANDY SILT (ML) hard, dry
SA(-200=83%) Hydrometer G_s=2.76	50+*	14.6	113	25		
						GRAY SILTY FINE SAND (SM) very dense, slightly moist
	50+			30		GRAY-BROWN SANDY CLAYEY SILT (ML) hard, slightly moist
						Boring terminated at 31.5 feet Ground water not encountered
				35		
				40		

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LOG OF BORING B-3
Chiquita Canyon Landfill Expansion
Saugus, California

PLATE **A6**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
jb	17011.001.11	BLP/bc	9/26/83		

Equipment 8" Hollow Stem Auger

Elevation 1184 Date 8/24/83

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Sample	
				0		BROWN GRAVELLY SILTY SAND (SM) loose, moist (fill)
SA (-200=33.5%) Hydrometer G_s=2.68						
				5		
	8*	11.9	101			color change to gray-brown
						GRAY FINE SILTY SAND (SM) very dense, slightly moist, with organics (fill)
				10		
	77					
				15		with oxidation stains
	50+*					
				20		
	50+					
				25		Boring terminated at 25.5 feet Groundwater not encountered
SA (-200=25%) Hydrometer G_s=2.71	50+*	8.0				
				30		
				35		
				40		

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LOG OF BORING B-4
Chiquita Canyon Landfill Expansion
Saugus, California

PLATE A7

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
jb	17012,001.11	BWP/sls	9/26/83		

Equipment 8" Hollow Stem Auger

Elevation 1093 Date 8/17/83

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Sample	Description
SA (-200=23%) Non-plastic				0		BROWN SILTY SAND (SM) loose, moist
	43*	2.4	115	5		LIGHT BROWN TO GRAY SILTY SAND (SM) dense, dry, with gravel
						LIGHT GRAY TO BROWN GRAVELLY SAND (SP) DENSE, DRY
	12			10		
						LIGHT BROWN SAND (SP) medium dense, moist, slightly silty
	17*	5.7	95	15		
	25			20		
	39	No recovery		25		LIGHT BROWN GRAVELLY SAND (SP) very dense, moist
	50+*					
	40			30		
				35		SAUGUS FORMATION BROWN GRAVELLY SILTY SAND (SM) very dense, moist
SA (-200=27%) Perm 8.5×10^{-5} cm/sec Non-plastic G_s=2.77	50+*	8.4	124			
				40		DARK BROWN SANDY SILT (ML) hard, slightly moist

(Continuation of Log)

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Sample	Description
	50+			40		SAUGUS FORMATION
	50+*			45		BROWN SAND (SP) very dense, moist, slightly silty
	50+			50		BROWN SANDY SILT (ML) hard, slightly moist
	50+			55		
				60		
				65		
				70		
				75		
				80		

Boring terminated at 55 feet
Converted to monitoring well on 8/17/83

Well Installation Explanation

1. blank PVC, 2"Ø
2. slotted PVC, 2"Ø
3. cement grout
4. bentonite
5. #16 sand
6. drilling spoil

Harding Lawson Associates
Engineers, Geologists & Geophysicists

LOG OF BORING C-1
Chiquita Canyon Landfill Expansion
Saugus, California

PLATE A8

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
jb	17012,001.11	RWP/sls	9/18/83		

Equipment 8" Hollow Stem Auger

Elevation 1124 Date 8/23/83

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Sample	
				0		BROWN GRAVELLY SILTY SAND (SM) loose, moist, with organics
	18*	12.8	111	5		GRAY-BROWN SANDY SILT (ML) very stiff, moist, with caliche
	17			10		LIGHT BROWN SILTY SAND (SM) & SANDY SILT (ML) medium dense and medium stiff, moist
SA (-200=54%) Hydrometer Perm 1.9×10^{-3} cm/sec G_s=2.82	18*	12.7	91	15		
	26			20		SAUGUS FORMATION BROWN-GRAY SILTY SAND (SM) medium dense, moist, with gravel
SA (-200=10%) Hydrometer G_s=2.65	41*	4.0	110	25		dense below 25'
	50+			30		very dense below 30', gravelly weakly cemented, with oxidation stains
	50+ *			35		GRAY SAND (SP) very dense, trace of silt
				40		GRAY-BROWN SILTY FINE SAND (SM) very dense, silghtly moist

(Continuation of Log)

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Sample	
	50+			40		SAUGUS FORMATION
				45		Boring terminated at 41.0 feet Groundwater not encountered
				50		
				55		
				60		
				65		
				70		
				75		
				80		

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LOG OF BORING C-2
Chiquita Canyon Lanfill Expansion
Saugus, California

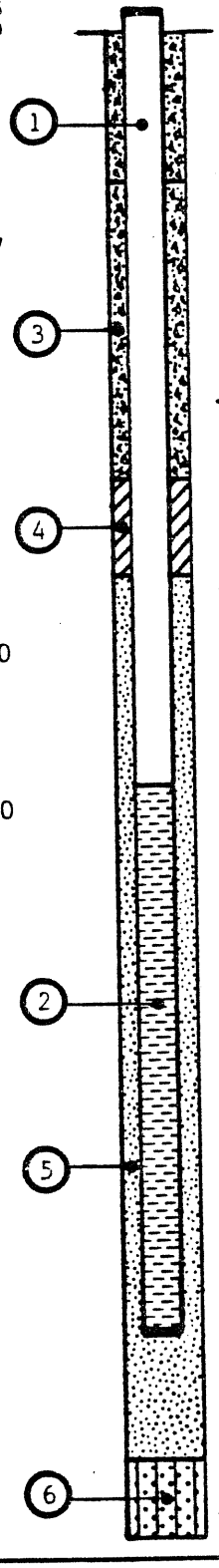
PLATE A9

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
jb	17012,001.11	EBP/sls	9/28/83		

Equipment 8" Hollow Stem Auger

Elevation 1036 Date 8/18/83

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)
SA (-200=25%) Perm 1.0×10^{-4} cm/sec G_s=2.78 Non-plastic	27*	3.8	107
	57		
	12 *		
	19	6.3	110
	11*	14.9	100
	50+		
	50+*		
	50+		
	50+*		



Depth (ft)	Sample	Description
0		BROWN SILTY SAND (SM) medium dense, moist
5		GRAY-BROWN SILTY SAND (SM) dense, moist, with rock fragments
10		very dense at 10', with gravel
15		GRAY-BROWN GRAVELLY SAND (SP) medium dense, moist
		BROWN SILTY SAND (SM) medium dense, moist
		GRAY-BROWN SILTY SAND (SM) medium dense, moist
20		BROWN SILTY SAND (SM) medium dense, moist
		SAUGUS FORMATION
25		GRAY AND RED SILTY SAND (SM) very dense, dry
		BROWN-GRAY AND RED SANDY SILT (ML) hard, moist
30		
35		MOTTLED GRAY AND RED SILTY SAND (SM) very dense, moist
40		Boring terminated at 40.5 feet Converted to monitoring well on 8/18/83

Well Installation Explanation

1 blank PVC, 2"Ø
2 slotted PVC, 2"Ø
3 cement grout
4 bentonite
5 #16 sand
6 drilling spoil

Harding Lawson Associates
Engineers, Geologists & Geophysicists

LOG OF BORING D-1
Chiquita Canyon Landfill Expansion
Saugus, California

PLATE **A10**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
jb	17012,001.11	BWP/sls	9/26/83		

Equipment 8" Hollow Stem Auger

Elevation 1028 Date 8/18/83

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)
	12*	4.8	94
	22		
SA(-200=42% Perm 3.1×10^{-5} cm/sec G_s=2.78 Non-plastic	22*	6.7	120
	39		
	50+*		
	50+		

Depth (ft) Sample

0

BROWN SILTY SAND (SM)
medium dense, moist

5

with organics

10

15

20

SAUGUS FORMATION
GRAY SILTY SAND (SM)
dense, moist, with caliche

25

very dense at 25'

30

35

Boring terminated at 33.0 feet
Groundwater not encountered

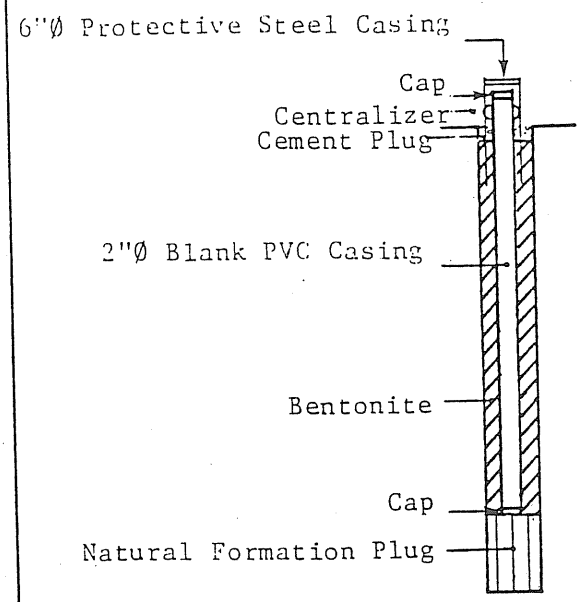
40

Harding Lawson Associates
Engineers, Geologists & Geophysicists

LOG OF BORING D-2
Chiquita Canyon Landfill Expansion
Saugus, California

PLATE A11

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
jb	17012,001.11	BWP/bc	9/28/83		

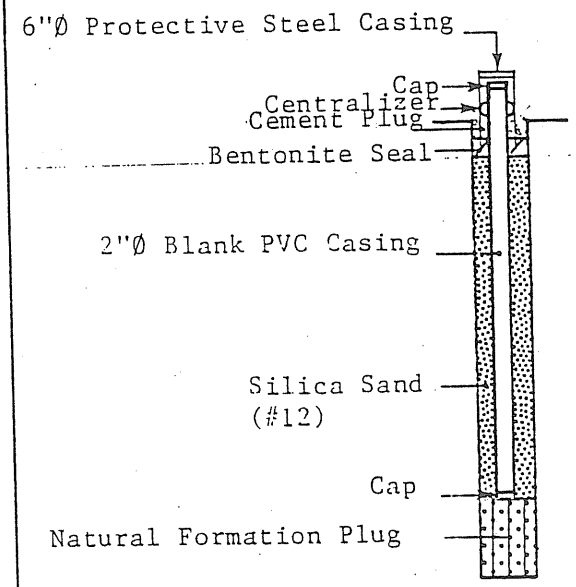


LOG OF BORING N-1

Equipment 8" Hollow-stem Auger

Elevation[1] 1135' Date 10-22-85

Depth (ft)	Sample	
0		GRAY GRAVELLY SILT (ML) dry, with sand
5		
		moist at 9.0'
10		
15		Boring terminated at 12.0 feet. Ground water not encountered. Boring converted into neutron access hole on 10-22-85.



LOG OF BORING N-2

Equipment 8" Hollow-stem Auger

Elevation[1] 1104' Date 10-22-85

Depth (ft)	Sample	
0		BROWN SILTY SAND (SM) dry, with gravel
5		
10		
15		Boring terminated at 12.0 feet. Ground water not encountered. Boring converted into neutron access hole on 10-22-85.

Note:

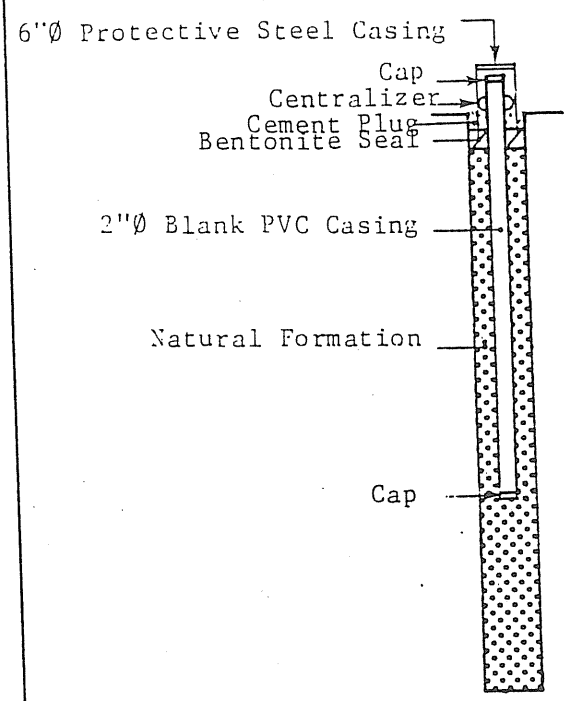
1. Ground surface elevation, Mean Sea Level datum

Harding Lawson Associates
Engineers, Geologists & Geophysicists

LOG OF BORING N-1 & N-2
GSX-Chiquita Canyon Landfill
Monitoring Plan Implementation
Saugus, California

PLATE B2

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
tl	17012,006.11	/ac	4-15-86		



LOG OF BORING N-3

Equipment 8" Hollow-stem Auger

Elevation[1] 1093' Date 10-22-85

Depth (ft)	Sample	
0		BROWN GRAVELLY SAND (SP) moist, with silt
5		
10		
15		Boring terminated at 15.0 feet. Ground water not encountered. Boring converted into neutron access hole on 10-22-85.

Note:

1. Ground surface elevation, Mean Sea Level datum

Harding Lawson Associates
Engineers, Geologists & Geophysicists

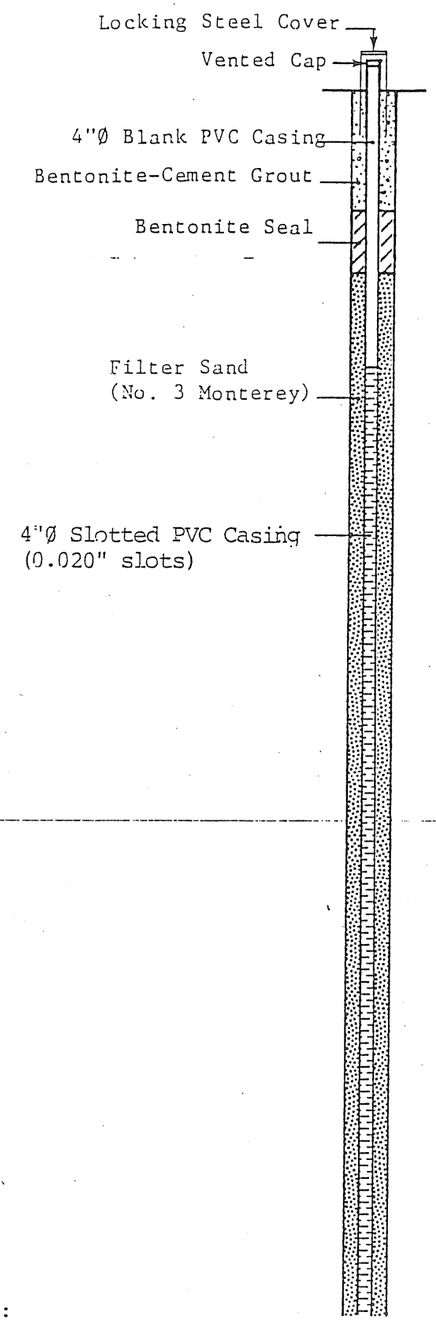
LOG OF BORING N-3
GSX- Chiquita Canyon Landfill
Monitoring Plan Implementation
Saugus, California

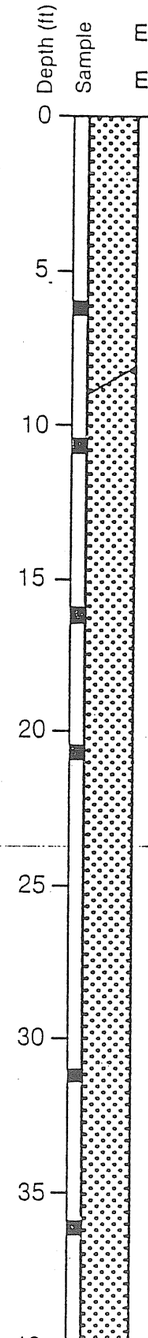
PLATE B3

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
tl	17012,006.11	JMS/ac	4-15-86		

Equipment 10" Hollow-stem Auger

Elevation[1] 976.2' Date 10-23-86





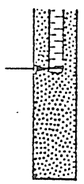
GRAY SAND (SP)
medium dense, moist,
trace silt, medium-grained

GRAY SAND (SP)
very dense, moist, medium- to coarse-grained, with cobbles 1" to 4" in diameter

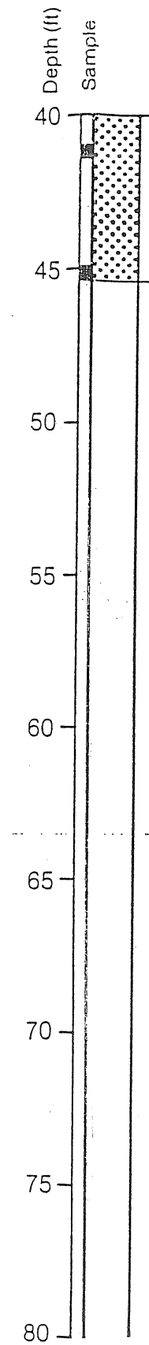
medium dense at 16.0'

medium dense, at 21.0'

SAUGUS FORMATION
very dense below at 26.0'



(Continuation of Log)



Boring terminated at 45.0 feet.
Ground water not encoutered.
Boring converted to monitoring well on 10-23-86.

Note:
1. Top of casing elevation, Mean Sea Level datum

Harding Lawson Associates
Engineers, Geologists & Geophysicists

LOG OF BORING SW-1
GSX-Chiquita Canyon Landfill
Monitoring Plan Implementation
Saugus, California

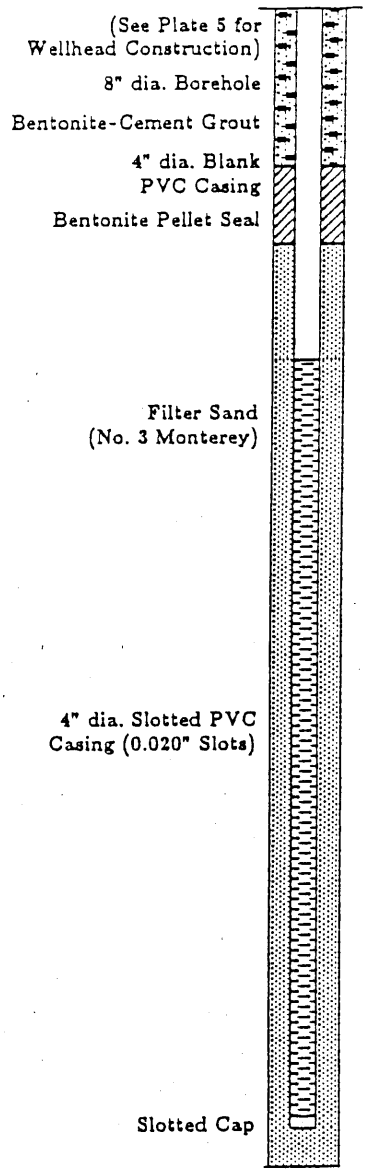
PLATE C2

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
tl	17012,006.11	/ac	4-15-86		

Top of Casing 1019 ft (est)

Equipment Mobil B-50

Elevation 1018 ft (est) Date 4/12/89



Depth ft	Sample	
0		Note: Boring RD-1, and subsequent monitoring well installation, was drilled and completed to replace Alluvial Monitoring Well D-1, which was grouted and abandoned during construction of the Canyon D liner and leachate collection and removal system. BROWN SAND (SP) moist, fine grained, with minor silt
5		color change to light brown, fine to coarse grained, with angular rock fragments (mostly quartzite)
10		with interbedded sand and gravel
15		with interbedded sand and gravel
20		
25		with interbedded sand and gravel
30		Boring terminated at 30.0 feet. Ground water not encountered during drilling. Boring converted to monitoring well on 4/12/89.
35		
40		

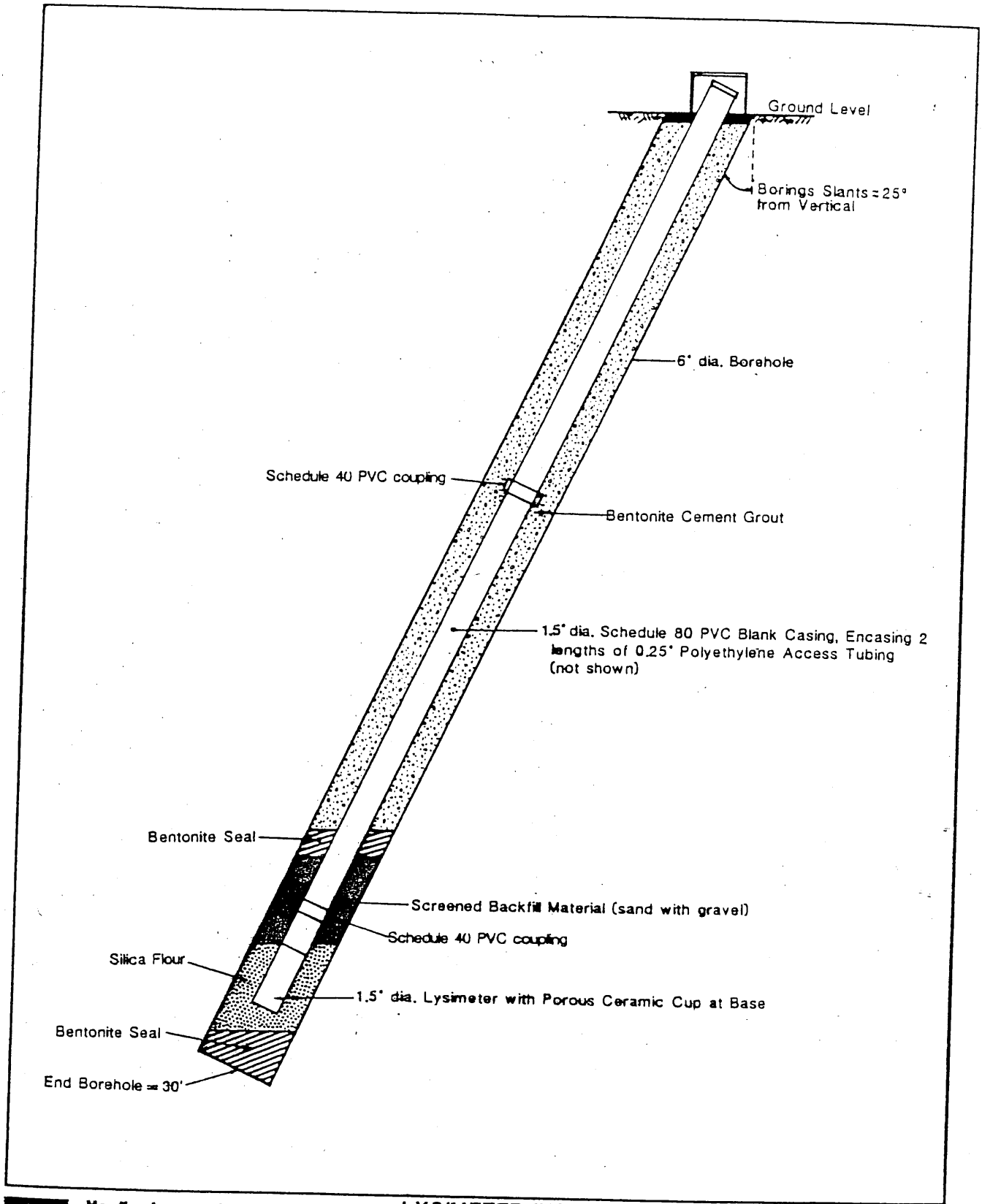
Harding Lawson Associates
Engineers and Geoscientists

Log of Boring/Well RD- 1 (sheet 1 of 1)

Chiquita Canyon D Monitoring Well Installation
Valencia, California

PLATE 4

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
HK	18132,020.11		8/89		



Harding Lawson Associates
Engineers, Geologists & Geophysicists

LYSIMETER INSTALLATIONS L-1, L-2 and L-3
Chiquita Canyon D
Laidlaw Waste Systems, Inc.
Valencia, California

PLATE **9**

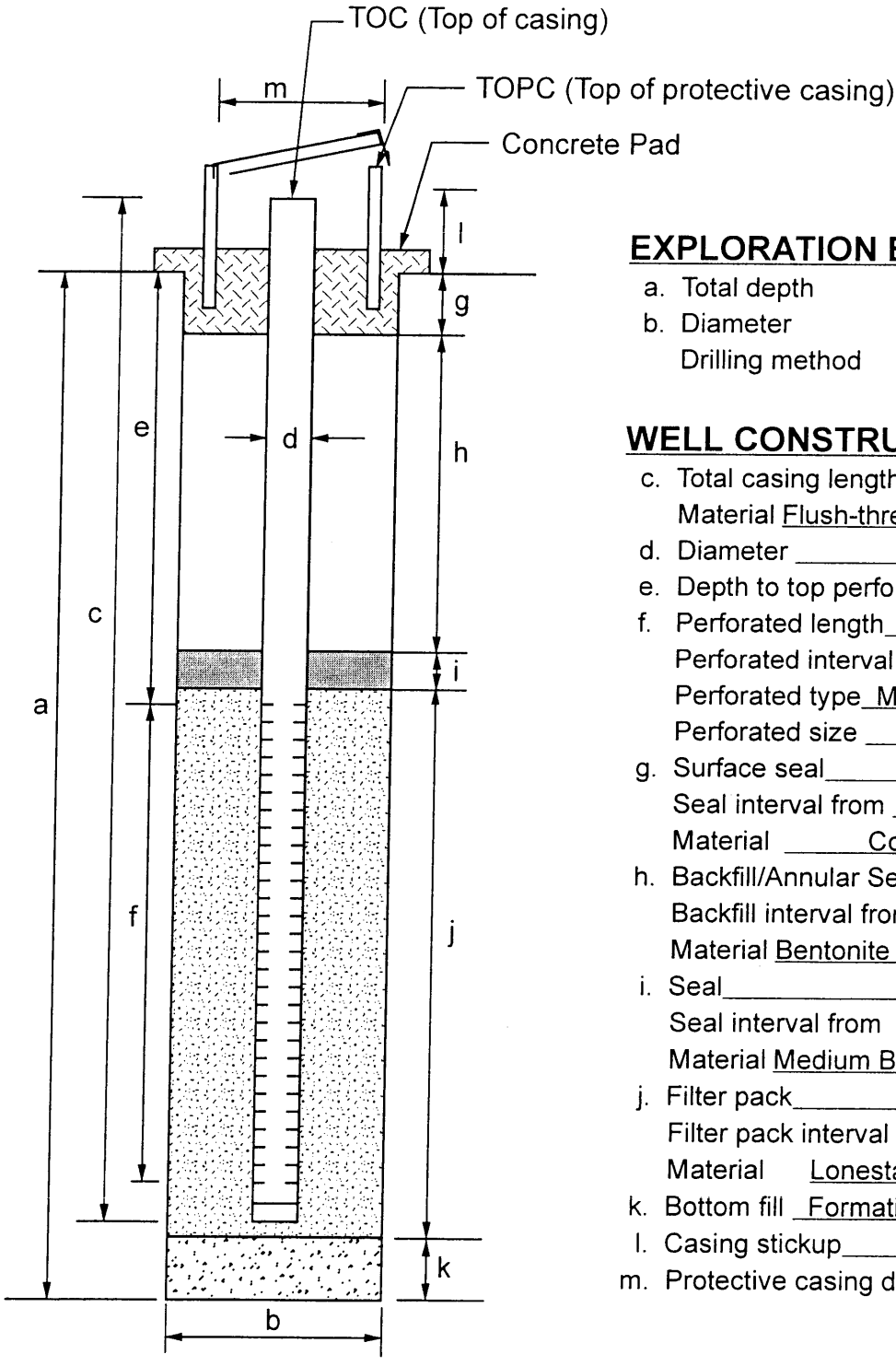
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
jb	18132,020.11		8/89		

DW-15 AS BUILT WELL CONSTRUCTION

PROJECT NUMBER: 2002-036-90
PROJECT NAME: Chiquita Canyon Landfill
LOCATION: Los Angeles County
DRILLER: WDC/THF Drilling, Inc.
INSTALLATION DATE 9-17-02

TOP OF PROTECTIVE CASING ELEV.: 1105.35
TOP OF CASING ELEV.: 1104.56
CONCRETE PAD SURFACE ELEV.: 1102.45
DATUM: Mean Sea Level

NORTHING: 1979222.96 EASTING: 6367017.86



EXPLORATION BORING

a. Total depth 165 ft.
b. Diameter 10 in.
Drilling method Air Rotary.

WELL CONSTRUCTION

c. Total casing length 165.08 ft.
Material Flush-threaded Schedule 40 PVC.
d. Diameter 4 in.
e. Depth to top perforations 132.1 ft.
f. Perforated length 29.59 ft.
Perforated interval from 132.38 to 161.97 ft.
Perforated type Machine-slotted
Perforated size 0.020-inch.
g. Surface seal 2 ft.
Seal interval from 0 to 2 ft.
Material Concrete.
h. Backfill/Annular Seal 119 ft.
Backfill interval from 2 to 121 ft.
Material Bentonite Cement Grout.
i. Seal 5.8 ft.
Seal interval from 121 to 126.8 ft.
Material Medium Bentonite Chips
j. Filter pack 36.7 ft.
Filter pack interval from 126.8 to 163.5 ft.
Material Lonestar #2/12
k. Bottom fill Formation.
l. Casing stickup 2.58 ft.
m. Protective casing diameter 10 3/4 in.

BORING DW-15

JOB NUMBER: 2002-036-90
DATE DRILLED: 9/16/02 - 9/17/02
EQUIPMENT USED: Dresser TH75W
ELEVATION: 1102 feet - MSL
SURFACE CONDITIONS: Graded road
NORTHING: 1979222.96
EASTING: 6367017.86

BY: P. Chang

DATE & TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE	
9/16/02 12:05			ML	**0-5.5 feet: ARTIFICIAL FILL (af)** @ 0 feet: SANDY SILT - mostly silt, dry to moist, grayish yellow (5Y 8/4)
			SM	@ 3 feet: SILTY SAND - mostly fine sand, some silt, little gravel, light olive gray (10Y 5/4)
	0-5	5		
12:31 12:38				**5.5-165 feet: SAUGUS FORMATION (QTs)** @ 5.5 feet: SANDY SILTSTONE - mostly silt, some fine sand, damp, light olive brown (5Y 5/6) Drilling 10 inch hole with 9-5/8 inch tricone bit, and driving temporary steel casing (nominal 9-5/8 inch) using air rotary casing hammer method.
	5-10	10		@ 10 feet: more clayey
				@ 14 feet: drive casing advances very slowly
	10-15	15		@ 14.5 feet: SILTY SANDSTONE: mostly fine to medium sand, some silt, little coarse sand and gravel, damp, dense, dusky yellow (5Y 6/4)
13:05 13:15				Set temporary drive casing shoe at 15.85 feet, then drill 10 inch open hole using 9-5/8 inch tricone bit and direct air rotary drilling method.
	15-20	20		@ 20 feet: moderate olive brown (5Y 4/4), slightly more silty @ 21 feet: moderate yellowish brown (10YR 5/4), more fine to medium sand, less silt
	20-25	25		
13:20 13:23				
	25-30	30		
				@ 31.5 feet: SILTSTONE - mostly silt, little clay and fine to medium sand, finely laminated, damp, moderately hard, dusky yellow (5Y 6/4)
	30-35	35		
13:35 13:39				@ 36 feet: moderate yellowish brown (10YR 5/4), slightly more clayey, hard @ 36.5 feet: SILTY SANDSTONE - mostly fine sand, some medium to coarse sand, some silt, little gravel, damp, moderately hard, yellowish gray (5Y 7/2)
	35-40	40		

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-15 (Continued)

BY: P. Chang

JOB NUMBER: 2002-036-90
DATE DRILLED: 9/16/02 - 9/17/02

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE	
	40-45	45		@ 45 feet: SANDSTONE - more coarse sand and gravel, subangular, little silt
13:48 13:52				
	45-50	50		
				@ 52 feet: some fine to coarse gravel, subrounded to subangular
	50-55	55		@ 55 feet: mostly fine sand, little gravel
14:00 14:03				
	55-60	60		@ 60 feet: mostly fine to medium sand
	60-65	65		@ 65 feet: little gravel
14:11 14:14				
				@ 67 feet: rig chatter, slightly more gravel
	65-70	70		@ 70 feet: mostly fine to medium sand
	70-75	75		@ 75 feet: more fines, mostly fine sand, damp, moderately hard
14:23 14:25				
				@ 77.5 feet: SANDY SILTSTONE - mostly silt, some fine sand, moist, moderately hard, olive gray (5Y 3/2)
	75-80	80		

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-15 (Continued)

BY: P. Chang

JOB NUMBER: 2002-036-90
DATE DRILLED: 9/16/02 - 9/17/02

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE	
				@ 80 feet: SILTY SANDSTONE - mostly fine sand, some silt, damp to moist, moderately hard, moderate olive brown (5Y 4/4)
14:35 14:37	80-85	85		
				@ 86.5 feet: SANDY SILTSTONE - mostly silt, some fine to medium sand, damp, moderately hard, olive gray (5Y 3/2)
				@ 88 feet: light olive gray (5Y 5/2)
	85-90	90		@ 90 feet: dark yellowish brown (10YR 4/2), more fine sand, damp
				@ 92.5 feet: Gradational contact
				@ 93.5 feet: SILTY SANDSTONE - mostly fine sand, some medium to coarse sand, some silt, light olive brown (5Y 5/6)
14:52 14:55	90-95	95		
	95-100	100		@ 100 feet: less silt and more fine to medium sand
15:03 15:40	100-105	105		@ 105 feet: SANDSTONE - mostly fine to medium sand, little gravel, some silt
	105-110	110		@ 110 feet: SILTY SANDSTONE - mostly fine sand, more silt, damp
15:48 15:50	110-115	115		@ 115 feet: mostly fine sand, little silt
	115-120	120		

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-15 (Continued)

BY: P. Chang

JOB NUMBER: 2002-036-90
DATE DRILLED: 9/16/02 - 9/17/02

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE
15:57 16:00	120-125	125	@ 125 feet: light olive brown (5Y 5/6), more silt @ 125.5 feet: SANDY SILTSTONE - sand as above with abundant olive gray (5Y 3/2) siltstone and claystone, damp, hard, slower drilling @ 127 feet: SILTY SANDSTONE - mostly fine sand, some medium to coarse sand, some silt, damp to moist, moderately hard, light olive brown (5Y 5/6)
	125-130	130	Water level sounded at 129.8' at 07:40 on 9/17/02, with total depth of boring at 136' prior to starting rig air compressor. @ 131 feet: SANDSTONE -moist
16:12 9/17/02 7:45	130-135	135	
	135-140	140	@ 140 feet: moist drilling returns, but no water being blown out of hole
7:59 8:02	140-145	145	@ 145 feet: more coarse sand and gravel, poor drilling returns @ 146 feet: water being returned after joint connection
		150	@ 150 feet: poor returns, no sample collected
8:25	150-155	155	@ 155 feet: wet sandstone with silt and clay (possibly washed out from above)
		160	@ 160 feet: no sample recovery

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-15 (Continued)

BY: P. Chang

JOB NUMBER: 2002-036-90
DATE DRILLED: 9/16/02 - 9/17/02

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE	
				@ 160 feet: wet sandstone as above , very poor drilling returns
9:20		165		Terminate boring at target depth 165'
		170		
		175		
		180		
		185		
		190		
		195		
		200		

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

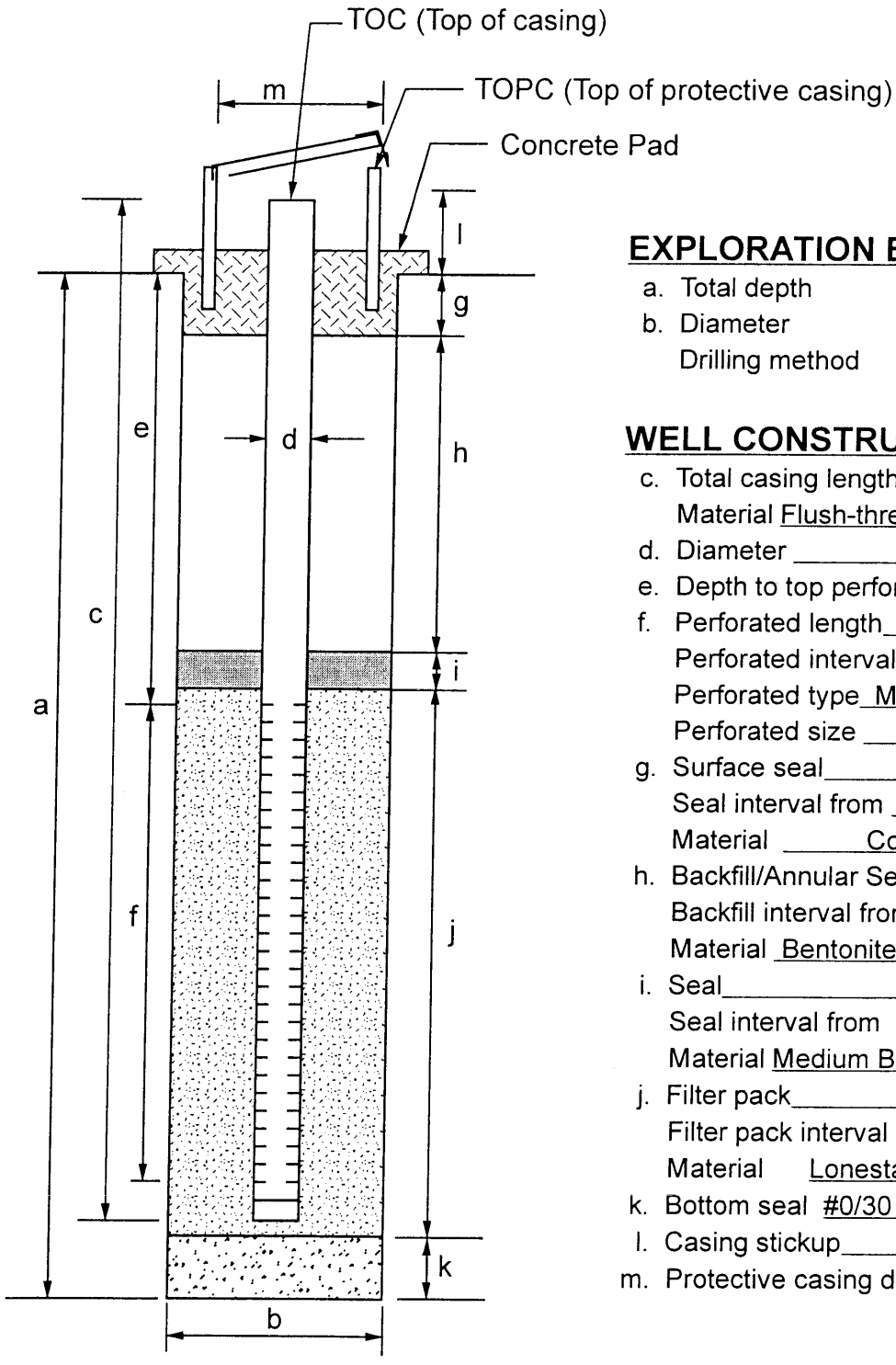
LOG OF BORING

DW-16 AS BUILT WELL CONSTRUCTION

PROJECT NUMBER: 2002-036-90
PROJECT NAME: Chiquita Canyon Landfill
LOCATION: Los Angeles County
DRILLER: WDC/THF Drilling, Inc.
INSTALLATION DATE 9-20-02

TOP OF PROTECTIVE CASING ELEV.: 1174.52
TOP OF CASING ELEV.: 1173.70
CONCRETE PAD SURFACE ELEV.: 1171.64
DATUM: Mean Sea Level

NORTHING: 1979612.66 EASTING: 6367520.63



EXPLORATION BORING

a. Total depth 227 ft.
b. Diameter 10 in.
Drilling method Air Rotary.

WELL CONSTRUCTION

c. Total casing length 218.01 ft.
Material Flush-threaded Schedule 40 PVC.
d. Diameter 4 in.
e. Depth to top perforations 184.97 ft.
f. Perforated length 29.44 ft.
Perforated interval from 185.39 to 214.83 ft.
Perforated type Machine-slotted
Perforated size 0.020-inch.
g. Surface seal 2 ft.
Seal interval from 0 to 2 ft.
Material Concrete.
h. Backfill/Annular Seal 170 ft.
Backfill interval from 2 to 172 ft.
Material Bentonite Cement Grout .
i. Seal 5.8 ft.
Seal interval from 172 to 177.8 ft.
Material Medium Bentonite Chips
j. Filter pack 42.2 ft.
Filter pack interval from 177.8 to 220 ft.
Material Lonestar #2/12
k. Bottom seal #0/30 Sand and formation
l. Casing stickup 2.63 ft.
m. Protective casing diameter 10 3/4 in.

BORING DW-16

JOB NUMBER: 2002-036-90
DATE DRILLED: 9/20/02
EQUIPMENT USED: Dresser TH75W
ELEVATION: 1171 feet - MSL
SURFACE CONDITIONS: Graded road
NORTHING: 1979612.66
EASTING: 6367520.63

BY: D.Francuch

DATE & TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE	
9/20/02			SM	**0-3 feet: ARTIFICIAL FILL (af)** @ 0 feet: SILTY SAND- mostly silt and fine sand, some medium to coarse sand and gravel, dry, yellowish gray (5Y 7/2)
8:05	0-5	5		**3-227 feet: SAUGUS FORMATION (QTs)** @ 3 feet: SILTY SANDSTONE- mostly fine sand, some silt, dry, soft, light olive gray (5Y 5/2) Drilling 10 inch hole with 9-5/8 inch tricone bit, and driving temporary steel casing (nominal 9-5/8 inch) using air rotary casing hammer method.
8:37	5-10	10		@ 10 feet: SANDSTONE - fine sand, dry, moderately hard, yellowish gray (5Y 7/2)
8:40	10-15	15		@ 15 feet: CLAYEY SILTSTONE - mostly silt, some clay, moist, soft to moderately hard, light olive gray (5Y 5/2) Set temporary drive casing shoe at 20 feet, then drill 10 inch open hole using 9-5/8 inch tricone bit and direct air rotary drilling method.
8:54	15-20	20		@ 20 feet: SILTSTONE - loose, moist, light olive gray (5Y 5/2)
8:58	20-25	25		@ 25 feet: SILTSTONE - moist, moderately hard to soft, light olive gray (5Y 5/2)
				@ 29 feet: drilling rate slows
9:15	25-30	30		@ 30 feet: SILTY CLAYSTONE - mostly clay, some silt, dry to damp, hard, light olive gray (5Y 5/2) @ 32 feet: water injected
9:26	30-35	35		
9:31	35-40	40		@ 40 feet: SANDY SILTSTONE - mostly silt, trace fine to medium sand, moist, moderately hard to soft, dark yellowish brown (10YR 4/2)

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

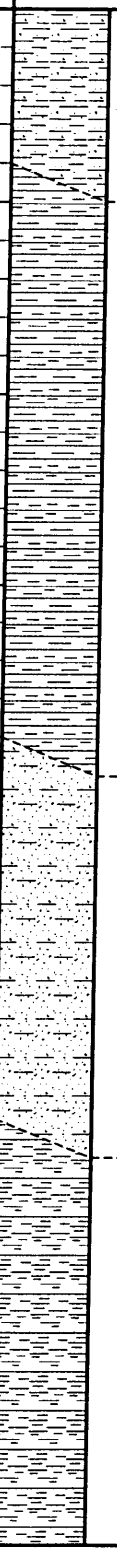
LOG OF BORING

BORING DW-16 (Continued)

BY: D.Francuch

JOB NUMBER: 2002-036-90
DATE DRILLED: 9/20/02

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE
9:38	40-45	45	
9:46	45-50	50	
9:55	50-55	55	
10:03	55-60	60	
10:07	60-65	65	
10:35	65-70	70	
10:40	70-76	75	
10:47	76-80	80	



@ 45 feet: SILTY CLAYSTONE - moist, moderately hard to hard, light olive gray (5Y 5/2)

@ 50 feet: SILTY CLAYSTONE - moist, moderately hard to hard, olive gray (5Y 3/2)

@ 55 feet: SILTY CLAYSTONE - moist, moderately hard, grayish olive green (5GY 3/2)

@ 60 feet: water injected
@ 60 feet: SILTY SANDSTONE - mostly fine to coarse sand, some silt, moderately hard to hard, light olive gray (5Y 5/2) (water injected)

@ 65 feet: same as above

@ 70 feet: CLAYEY SILTSTONE - mostly silt, some clay, moist, hard to moderately hard, olive gray (5Y 4/2)

@ 76 feet: same as above

@ 80 feet: SILTSTONE - moist, moderately hard to soft, moderate olive brown (5Y 4/4)

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

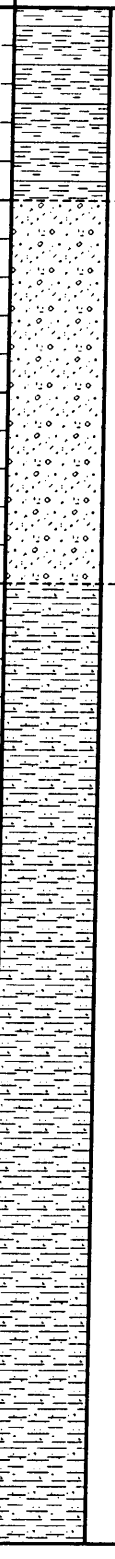
LOG OF BORING

BORING DW-16 (Continued)

BY: D.Francuch

JOB NUMBER: 2002-036-90
DATE DRILLED: 9/20/02

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE
10:53	80-85	85	
10:58	85-90	90	
11:01	90-95	95	
11:09	95-100	100	
11:14	100-105	105	
NR	NR	110	
NR	NR	115	
NR	NR	120	



@ 85 feet: PEBBLY SANDSTONE - fine to coarse, moist, moderately hard to hard, light olive gray (5Y 5/2)

@ 87 feet: rig chatter

@ 90 feet: hard, light olive brown (5Y 5/4)

@ 95 feet: SILTSTONE - with fine sand, moist, moderately hard, yellowish gray (5Y 6/2)

@ 100 feet: CLAYEY SILTSTONE - trace fine sand, moist, moderately hard, moderate yellowish brown (10YR 5/4)

@ 105 feet: SILTSTONE - with fine sand, moist, moderately hard, dusky yellow (5Y 6/3)

@ 107 feet: mud in hole, clean hole 11:20 - 12:30

@ 108 feet: water injected

@ 110 feet: no cuttings from cyclone

@ 115 feet: CLAYEY SILTSTONE - hard, yellow olive brown (5Y 5/4), (water injected)

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

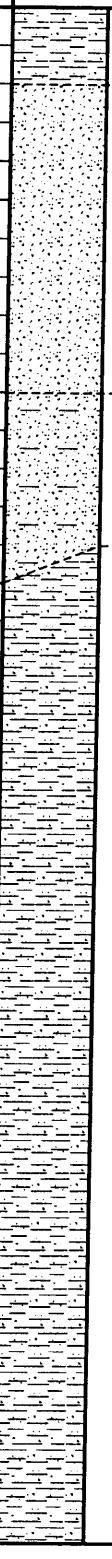
LOG OF BORING

BORING DW-16 (Continued)

BY: D.Francuch

JOB NUMBER: 2002-036-90
DATE DRILLED: 9/20/02

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE
12:55	122		
12:57	122-125	125	
13:02	125-130	130	
13:05	130-135	135	
13:15	135-140	140	
13:22	140-145	145	
13:30	145-150	150	
13:35	150-155	155	
		160	



@ 122 feet: SANDSTONE - fine to medium, moist, moderately hard, light olive gray (5Y 5/2)

@ 125 feet: same as above

@ 130 feet: SILTY SANDSTONE - fine to medium, moist, moderately hard, yellowish gray (5Y 6/2)

@ 135 feet: SILTSTONE - with fine grained sand, moist, moderately hard, yellowish gray (5Y 6/2)

@140 feet: SILTSTONE - moist, moderately hard to soft, dusky yellow (5Y 6/4)

@ 145 feet: same as above

@ 150 feet: SILTSTONE - with fine sand, moist, moderately hard, moderate yellowish brown (10YR 5/4)

@ 155 feet: SILTSTONE - moist, moderately hard, yellow olive brown (5Y 5/4)

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-16 (Continued)

BY: D.Francuch

JOB NUMBER: 2002-036-90
DATE DRILLED: 9/20/02

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE
13:48	155-161		@ 161 feet: SILTSTONE - with fine to coarse sand, moist, moderately hard, moderate yellowish brown (10YR 5/4)
13:53	161-165	165	@ 165 feet: moderately hard to soft, moderate olive brown (5Y 4/4)
14:02	165-170	170	@ 170 feet: same as above
14:04	170-175	175	@ 175 feet: SILTSTONE - moist, soft, moderate olive brown (5Y 4/4)
		180	Water level @ 179.4 feet at 8:40 on 9/23/02 after rig idle over weekend (9/21 and 9/22)
			@ 181 feet: moisture increase
14:15	175-182		@ 182 feet: SILTSTONE - moist, moderate hard to soft, light olive gray (5Y 5/2)
		185	@ 185 feet: same as above
14:30	182-190	190	@190 feet: SILTSTONE - moist, moderately hard to soft, moderate olive brown 5Y 4/4)
		195	
14:37	190-196		@ 196 feet: SILTY SANDSTONE - fine to coarse, moist, moderately hard, light olive gray (5Y 5/2)
	196-200	200	

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-16 (Continued)

BY: D.Francuch

JOB NUMBER: 2002-036-90
DATE DRILLED: 9/20/02

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE	
		205		@ 206 feet: medium to coarse sand with clay, light olive gray (5Y 5/2)
14:51	200-206			@ 207 feet: rig down for 20 minute water check, free standing water
				Water blown out of cyclone @ 206 feet bore hole depth after sitting for 20+/- minute (~20-30 gallons)
		210		@ 210-215 feet: SILTSTONE - with fine to coarse sand, wet, moderately hard, light olive gray (5Y 5/2)
	210-215	215		
15:34	215-220	220		@ 220 feet: SANDSTONE - mostly fine to coarse sand, with silt, wet, moderately hard light olive gray (5Y 5/2)
15:39	220-225	225		@ 225 feet: CLAYEY SILTSTONE - with fine to medium sand, wet, moderately hard, grayish olive (10Y 4/2)
		230		Terminate boring at target depth 227' Remove 50 feet of drill rod, then check water level. Water level tagged at 180 feet at 16:10 on 9/20/02. Rig idle over weekend (9/21 and 9/22), Water level at 179.4 feet at 08:40 on 9/23/02
		235		
		240		

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

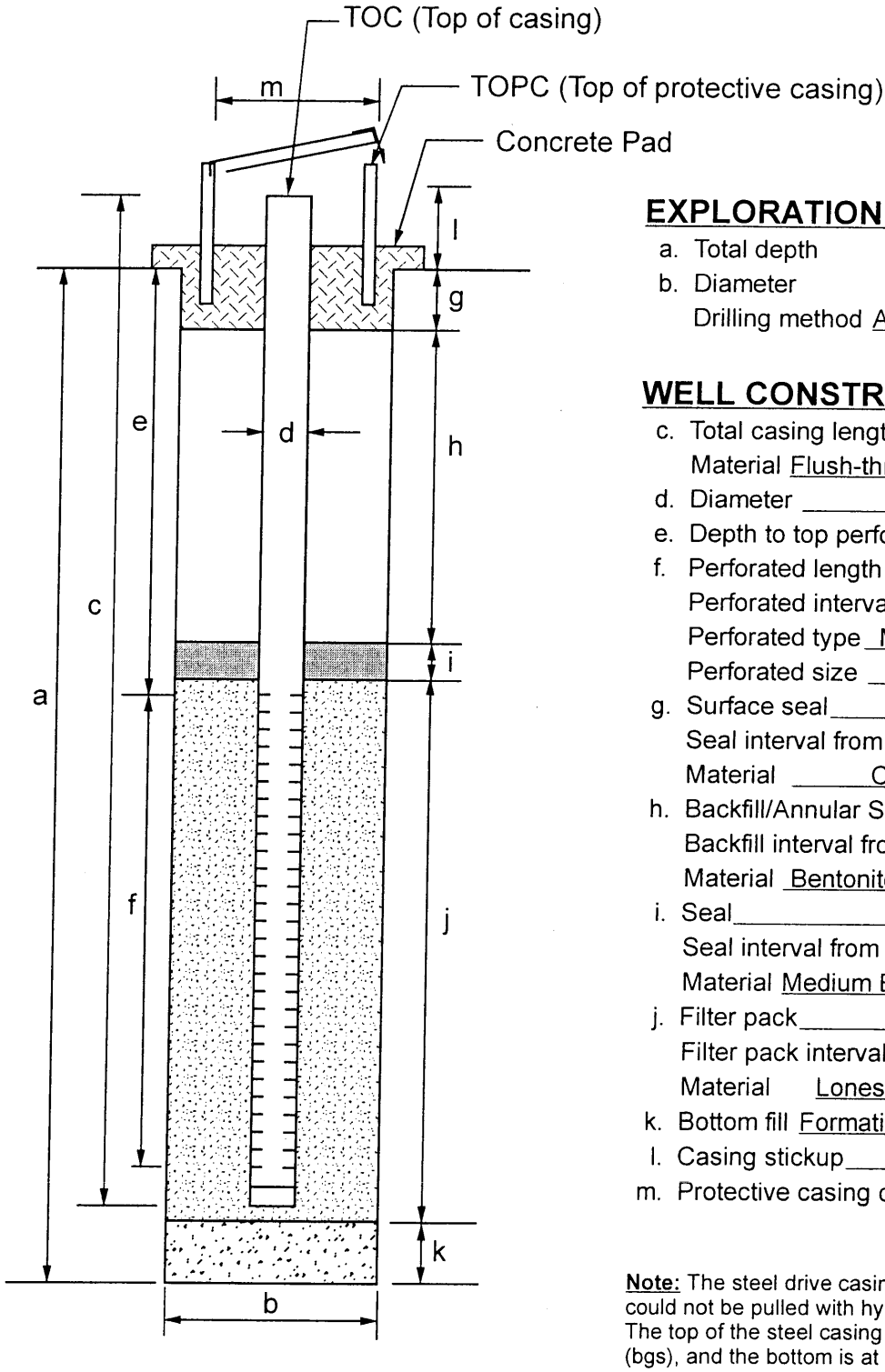
LOG OF BORING

DW-17 AS BUILT WELL CONSTRUCTION

PROJECT NUMBER: 2002-036-90
PROJECT NAME: Chiquita Canyon Landfill
LOCATION: Los Angeles County
DRILLER: WDC/THF Drilling, Inc.
INSTALLATION DATE 10-1-02

TOP OF PROTECTIVE CASING ELEV.: 1196.40
TOP OF CASING ELEV.: 1195.28
CONCRETE PAD SURFACE ELEV.: 1193.15
DATUM: Mean Sea Level

NORTHING: 1980244.21 EASTING: 6368079.60



EXPLORATION BORING

a. Total depth 210 ft.
b. Diameter 10 in.
Drilling method Air Rotary Casing Hammer.

WELL CONSTRUCTION

c. Total casing length 206.80 ft.
Material Flush-threaded Schedule 40 PVC.
d. Diameter 4 in.
e. Depth to top perforations 173.8 ft.
f. Perforated length 29.6 ft.
Perforated interval from 173.8 to 203.4 ft.
Perforated type Machine-slotted
Perforated size 0.020-inch.
g. Surface seal 2 ft.
Seal interval from 0 to 2 ft.
Material Concrete.
h. Backfill/Annular Seal 158.5 ft.
Backfill interval from 2 to 160.5 ft.
Material Bentonite Grout.
i. Seal 6.5 ft.
Seal interval from 160.5 to 167 ft.
Material Medium Bentonite Chips
j. Filter pack 40 ft.
Filter pack interval from 167 to 207 ft.
Material Lonestar #2/12
k. Bottom fill Formation
l. Casing stickup 2.30 ft.
m. Protective casing diameter 10 3/4 in.

Note: The steel drive casing (nominal 9-5/8-inch diameter) could not be pulled with hydraulic jacks, so it was left in place. The top of the steel casing is 5' below ground surface (bgs), and the bottom is at 135' bgs.

BORING DW-17

JOB NUMBER: 2002-036-90
DATE DRILLED: 9/24/02 - 9/25/02
EQUIPMENT USED: Dresser TH75W
ELEVATION: 1193 feet - MSL
SURFACE CONDITIONS: Graded drill pad
NORTHING: 1980244.21
EASTING: 6368079.60

BY: P. Chang 0-96'
D.Francuch 96-210'

DATE & TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE	
9/24/02 14:30			SM	**0-4 feet: ARTIFICIAL FILL (af)** @ 0 feet: SILTY SAND- mostly sand, some silt, dry, soft, yellowish gray (5Y 7/2)
14:40 14:45	0-5	5	SP	**4-13 feet: SAUGUS FORMATION (QTs)** @ 4 feet: possibly weathered SANDSTONE or COLLUVIUM - mostly fine to medium sand, some coarse sand and gravel, dry to damp, soft to medium dense, dark yellowish brown (10YR 4/2) Drilling 10 inch hole with 9-5/8 inch tricone bit, and driving temporary steel casing (nominal 9-5/8 inch) using air rotary casing hammer method.
	5-10	10		@ 10 feet: more coarse sand and gravel
14:53 14:56	10-15	15		**13-210 feet: SAUGUS FORMATION (QTs)** 13 feet: SANDSTONE - mostly fine sand, little silt, some medium sand to gravel, damp, moderately hard, weathered, olive gray (5Y 3/2) @ 15 feet: light olive gray (5Y 5/2), moist, moderately hard, moderately weathered Set temporary drive casing shoe at 20 feet, then drill 10 inch open hole using 9-5/8 inch tricone bit and direct air rotary drilling method.
	15-20	20		@ 20 feet: more gravel, weathered, soft to moderately hard
15:05 15:07	20-25	25		@ 25 feet: mostly fine to medium sand, some coarse, little gravel, moderately hard, moderately weathered, dry to damp, yellowish gray (5Y 7/2)
	25-30	30		@ 30 feet: more fine to coarse gravel, subangular to subrounded
15:12 15:15	30-35	35		@ 35 feet: some fine to coarse gravel @ 36 feet: rig chatter; little cobbles
	35-40	40		

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-17 (Continued)

BY: P. Chang 0-96'
D.Francuch 96-210'

JOB NUMBER: 2002-036-90
DATE DRILLED: 9/24/02 - 9/25/02

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE
			@ 40 feet: some gravel and cobbles, angular to subrounded
15:22 15:25	40-45	45	@ 45 feet: mostly fine sand, little silt and clay, some medium to coarse sand, moderately hard, dusky yellow (5Y 6/4)
			@ 48 feet: SANDY SILTSTONE - mostly silt, few fine sand, damp, moderately hard, yellowish gray (5Y 7/2)
	45-50	50	@ 50 feet: 9-5/8" casing 8:00 (9/27/02)
			@ 51 feet: GRAVELLY SANDSTONE - mostly fine sand, some medium to coarse gravel and cobbles, moderately hard, dry to damp, light olive gary (5Y 5/2)
15:34 15:37	50-55	55	
	55-60	60	@ 60 feet: 9-5/8" casing 8:07 (9/27/02)
15:48 15:51	60-65	65	@ 65 feet: mostly medium to coarse sand and gravel, some fine sand, hard, damp, lots of rig chatter ,
			@ 66 feet: hard, slow drilling, rig chatter
15:59	65-70	70	@ 70 feet: 9-5/8" casing 8:16 (9/27/02)
			@ 71 feet: more fine to medium sand, drilling gets easier
16:03 16:05	70-76	75	@ 75 feet: SILTY SANDSTONE - mostly fine to medium sand, some silt and clay, minor grave, moderately hard, damp, dusky yellow (5Y 6/4)
	76-80	80	@ 80 feet: 9-5/8" casing 8:34 (9/27/02)

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-17 (Continued)

BY: P. Chang 0-96'
D.Francuch 96-210'

JOB NUMBER: 2002-036-90
DATE DRILLED: 9/24/02 - 9/25/02

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE
16:17 16:20	80-85	85	@ 83 feet: SANDY SILTSTONE and CLAYSTONE - mostly low to medium plasticity siltstone and claystone, some fine sand, moderately hard, damp to dry, (10Y 4/2)
16:24	85-90	90	@ 88.5 feet: SILTY SANDSTONE - mostly fine sand, some silt, moderately hard, damp, light olive gray (5Y 5/2) @ 83 feet: SANDY SILTSTONE and CLAYSTONE - mostly low to medium plasticity siltstone and claystone, some fine sand, moderately hard, damp to dry, (10Y 4/2)
16:32 9/25/02 7:30	90-95	95	@ 94 feet: SILTY SANDSTONE - mostly fine sand, some silt, moderately hard, damp, light olive brown (5Y 5/6) @ 96 feet: terminate drilling on 9/24/02. No ground water encountered. Restart drilling at 7:30 9/25/02 DGF logging.
7:41	95-100	100	@ 100 feet: SILTSTONE - moderately hard, damp to moist, light olive gray (5Y 5/2) @ 100 feet: 9-5/8" casing 10:00 (9/27/02)
7:49	100-105	105	@ 104 feet: CLAYEY SILTSTONE - moderately hard to hard, damp, moderate yellowish brown (10YR 5/4), replacing pipe from 7:55 to 8:50
8:58	105-110	110	@ 110 feet: same as above, moisture decrease dry to damp
9:05	110-115	115	@ 114 feet: 9-5/8" casing 14:30 (9/27/02) @ 115 feet: SILTSTONE - moderately hard to hard, dry to damp, moderate yellowish brown (10YR 5/4) @ 115 feet: 9-5/8" casing 7:55 (9/30/02)
9:13	115-120	120	@ 120 feet: same as above

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-17 (Continued)

BY: P. Chang 0-96'
D.Francuch 96-210'

JOB NUMBER: 2002-036-90
DATE DRILLED: 9/24/02 - 9/25/02

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE
		125	
9:22	127		@ 127 feet: SILTY SANDSTONE - mostly fine sand, some silt, moderately hard, dry, yellowish gray (5Y 7/2)
9:27	127-130	130	@ 130 feet: SANDY SILTSTONE - mostly silt, some fine sand, moderately hard, dry to damp, yellowish gray (5Y 7/2)
		135	
9:33	137		@ 137 feet: SILTY SANDSTONE - mostly fine to coarse sand, some silt, moderately hard, dry, pale yellowish brown (10 YR 6/2)
9:35	137-140	140	@ 140 feet: 9-5/8" drive casing refusal 11:40 (9/30/02)
9:38	140-145	145	@ 145 feet: SILTSTONE - moderately hard, damp, light olive brown (5Y 5/4)
9:46	145-150	150	@ 150 feet: SANDSTONE - fine to medium, moderately hard, damp, pale yellowish brown (10YR 6/2)
9:49	150-155	155	@ 155 feet: SILTSTONE - moderately hard, damp, light olive brown (5Y5/4)
9:58	155-160	160	

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-17 (Continued)

BY: P. Chang 0-96'
D.Francuch 96-210'

JOB NUMBER: 2002-036-90
DATE DRILLED: 9/24/02 - 9/25/02

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE
			@ 160 feet: SANDSTONE - fine, moderately hard, damp, light olive brown (5Y 5/4)
		165	
10:05	160-167		@ 167 feet: SANDSTONE - medium, moderately hard, damp, pale yellowish brown (10Y 6/2)
		170	Water level at 170 feet at 12:15 on 9/25/02 with boring TD at 206 feet tagged with driller's weighted tape because electronic sounder would not drop to bottom.
10:10	167-172		@ 172 feet: SANDSTONE - fine to coarse, moderately hard, damp to moist, pale yellowish brown (10YR 6/2)
10:22	175-177	175	@ 175 feet: groundwater, cuttings return wet (10:24)
			@ 175-177 feet: composite sample, fine to medium silty sand, moderately hard to hard, wet, light olive gray
		180	@ 180 feet: composite sample same as above
10:34	180-185	185	
10:46	185-190	190	@ 190 feet: fine to coarse sand, hard, wet, light olive gray (5Y 5/2)
		195	
10:53	190-196		@ 196 feet: SILTY SANDSTONE - mostly fine to coarse sand, some silt, hard, wet, light olive gray (5Y 5/2)
11:03	196-200	200	@ 200 feet: same as above

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-17 (Continued)

BY: P. Chang 0-96'
D.Francuch 96-210'

JOB NUMBER: 2002-036-90
DATE DRILLED: 9/24/02 - 9/25/02

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE	
11:08 9/25/02	200-205	205		@ 206 feet: Terminate 10 inch boring at target depth. Water level tagged at 170 feet at 12:15 on 9/25/02. Could not build well due to caving formation. On 9/27 and 9/30, advanced 9-5/8 inch steel drive casing to 140' refusal depth. Run 7-5/8 inch steel casing to 206 feet, then drill ahead on 10/1/02.
10/1/02 13:15		210		Terminate boring at target depth 210'
		215		
		220		
		225		
		230		
		235		
		240		

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

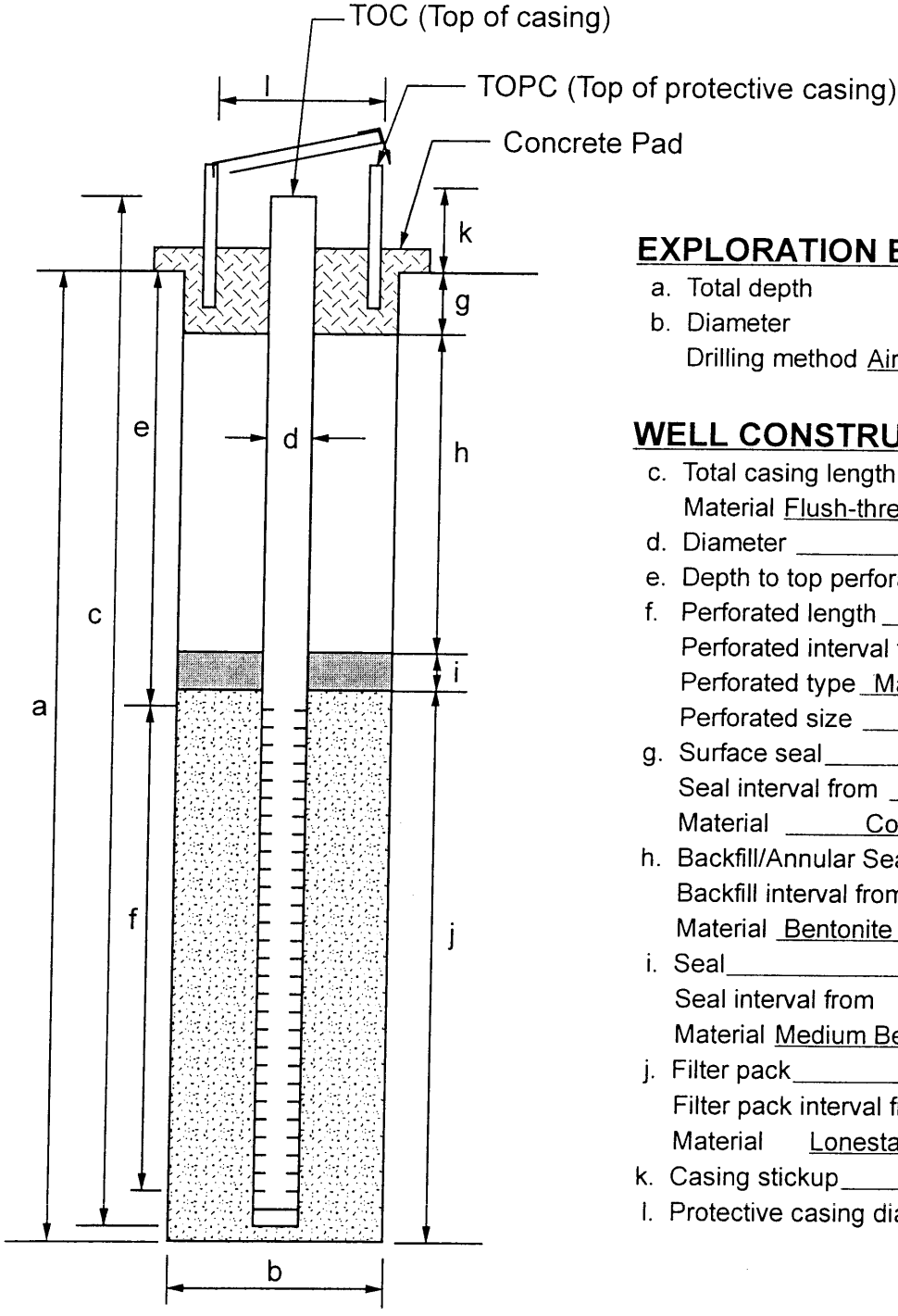
LOG OF BORING

DW-20 AS BUILT WELL CONSTRUCTION

PROJECT NUMBER: 2002-036-90
PROJECT NAME: Chiquita Canyon Landfill
LOCATION: Los Angeles County
DRILLER: WDC/THF Drilling, Inc.
INSTALLATION DATE: 9-19-02

TOP OF PROTECTIVE CASING ELEV.: 1009.36
TOP OF CASING ELEV.: 1008.31
CONCRETE PAD SURFACE ELEV.: 1006.44
DATUM: Mean Sea Level

NORTHING: 1979045.58 EASTING: 6366418.91



EXPLORATION BORING

a. Total depth 97 ft.
b. Diameter 10 in.
Drilling method Air Rotary Casing Hammer.

WELL CONSTRUCTION

c. Total casing length 97.75 ft.
Material Flush-threaded Schedule 40 PVC.
d. Diameter 4 in.
e. Depth to top perforations 64.99 ft.
f. Perforated length 29.81 ft.
Perforated interval from 65.31 to 95.12 ft.
Perforated type Machine-slotted
Perforated size 0.020-inch.
g. Surface seal 2 ft.
Seal interval from 0 to 2 ft.
Material Concrete.
h. Backfill/Annular Seal 54 ft.
Backfill interval from 2 to 56 ft.
Material Bentonite Cement Grout.
i. Seal 5.5 ft.
Seal interval from 56 to 61.5 ft.
Material Medium Bentonite Chips
j. Filter pack 35.5 ft.
Filter pack interval from 61.5 to 97 ft.
Material Lonestar #2/12
k. Casing stickup 2.34 ft.
l. Protective casing diameter 10 3/4 in.

BORING DW-20

BY: D.Francuch

JOB NUMBER: 2002-036-90
DATE DRILLED: 9/18/02
EQUIPMENT USED: Dresser TH75W
ELEVATION: 1006 feet - MSL
SURFACE CONDITIONS: Graded road
NORTHING: 1979045.58
EASTING: 6366418.91

DATE & TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE	
9/18/02			SM	**0-18 feet: ARTIFICIAL FILL (af)** @ 0 feet: SANDY SILT - mostly silt, some fine sand, dry, loose, micaceous, grayish brown (2.5Y 5/2)
11:01	0-5	5		Drilling 10 inch hole with 9-5/8 inch tricone bit, and driving temporary steel casing (nominal 9-5/8 inch) using air rotary casing hammer method to 65 feet.
11:20	5-10	10		@ 10 feet: color change to light brownish gray (2.5Y 6/2)
11:35	10-15	15		
11:40	15-20	20	SP	**18-41 feet: ALLUVIUM (Qal)** @ 20 feet: PEBBLY SAND - mostly fine to coarse pebbly sand, some silt, moist, loose, light brownish gray (2.5Y 6/2)
		25		caving below 25 feet in open hole, so continue driving 9-5/8 casing
11:45	20-27			@ 27 feet: fine to coarse pebbly sand, loose, moist, light olive brown (2.5Y 5/3)
		30		
		35		@ 37 feet: fine to coarse sand with pebbles, moist, loose, light brownish gray (10YR 6/2)
12:10	27-40	40		@ 40 feet: same as above

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-20 (Continued)

BY: D.Francuch

JOB NUMBER: 2002-036-90
DATE DRILLED: 9/18/02 - 9/19/02

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE	
			SP	@ 41 feet: driving casing slower
				41-97 feet: SAUGUS FORMATION (QTs) @ 41 feet: SANDSTONE - fine to coarse, moist, loose, light yellowish brown (2.5Y 6/3)
12:30	40-45	45		
12:40	45-50	50		@ 50 feet: fine to coarse, pebbly, loose, moist, light brownish gray (10YR 6/2) note moisture increasing at 50 feet
12:45	50-55	55		@ 55 feet: SILTY SANDSTONE - mostly fine to coarse sand, some silt, loose, moist, light brownish gray (2.5Y 6/2)
	55-60	60		Water level tagged at 59.10 feet at 7:20 on 9/19/02 with boring TD at 97 feet. @ 60 feet: SILTSTONE - with fine to medium sand, loose, moist, light brownish gray (2.5Y 6/2)
13:45	55-65	65		tagged mud in hole at 64 feet @ 13:45 on 9/18/02 with casing @ 65' Set temporary drive casing shoe at 65 feet, then drill 10 inch open hole using 9-5/8 inch tricone bit and direct air rotary drilling method. @ 65 feet: SILTSTONE - loose, moist, grayish brown (2.5Y 5/2)
14:48	65-70	70		@ 70 feet: SANDSTONE - fine to coarse, trace silt, loose, moist, grayish brown (2.5Y 5/2)
14:52	70-75	75		@ 75 feet: SANDSTONE - medium to coarse, loose, wet, grayish brown (2.5Y 5/2)
15:02	75-80	80		@ 80 feet: SANDY SILTSTONE - mostly silt, some fine to coarse sand, loose, wet dark grayish brown (2.5Y 4/2)

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-20 (Continued)

BY: D.Francuch

JOB NUMBER: 2002-036-90
DATE DRILLED: 9/18/02 - 9/19/02

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE	
15:10	80-85	85		@ 85 feet: silt with fine sand, loose, wet, dark grayish brown (2.5Y 4/2)
15:25	85-91	90		@ 91 feet: silt with fine to coarse sand, loose, wet, dark gray (5Y 4/1)
15:30	91-95	95		@ 95 feet: silt, trace fine to medium sand, trace clay, loose, wet, dark gray (5Y 4/1)
16:10				Terminate boring at target depth 97 feet. Water level tagged at 59.10 feet at 7:20 on 9/19/02.
		100		
		105		
		110		
		115		
		120		

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

LOG OF BORING

BORING DW-22 RDA

JOB NUMBER: 2002-036-90
DATE DRILLED: 10/7/02 - 10/9/02
EQUIPMENT USED: Failing and Speedstar Star 30K
ELEVATION: 1219.77 feet - MSL
SURFACE CONDITIONS: Graded drill pad on road
NORTHING: 1980139.48
EASTING: 6368093.80

BY: P. Chang

DATE & TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE	
10/7/02 14:07			SM	**0 -2 feet: ARTIFICIAL FILL (af)** @ 0 feet: SILTY SAND- mostly silt and fine sand, some medium to coarse sand and gravel, dry, yellowish gray (5Y 7/2)
				2-320 feet: SAUGUS FORMATION (QTs) @ 2 feet: SILTY SANDSTONE- mostly fine sand, some silt, some medium and coarse sand, damp, soft to moderately hard, light olive (10Y 5/4)
	0-5	5		
				@ 7 feet: SANDY SILTSTONE- mostly silt, some fine to medium sand, damp, moderately hard, medium olive brown (5Y4/4)
14:12	5-10	10		Drilling 10 inch hole with 8 ½ inch tricone bit, and driving temporary steel casing (nominal 9-5/8 inch) using air rotary casing hammer method.
	10-15	15		@ 15 feet: more fine sand; olive gray (5Y 3/2)
14:19 14:30				
	15-20	20		
	20-25	25		@ 25 feet: as above; light olive gray (5Y 5/2)
				@ 28.5 feet: SILTY SANDSTONE- mostly fine to medium sand, some silt, damp, moderately hard, dark yellowish brown (10YR 4/2)
14:38	25-30	30		
	30-35	35		Set temporary drive casing shoe at 37 feet, then drill 10 inch open hole using 8 ½ inch tricone bit and direct air rotary drilling method.
14:47 14:51				
	35-40	40		

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-22 RDA (Continued)

BY: P. Chang

JOB NUMBER: 2002-036-90
DATE DRILLED: 10/7/02 - 10/9/02

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE	
				@ 40 feet: moderate brown (5YR 4/4)
	40-45	45		@ 44 feet: GRAVELLY SANDSTONE: mostly fine to coarse sand, some fine to coarse gravels; subangular to subrounded, dry, moderately hard, yellowish gray (5Y 7/2)
	45-50	50		@ 50 feet: little gravels, light olive brown (5Y 5/6)
	50-55	55		@ 55 feet: little gravels, damp
14:57 15:07				
	55-60	60		@ 60 feet: little gravels, yellowish gray (5Y 7/2)
	60-65	65		
15:08	65-70	70		@ 70 feet: trace gravels, mostly fine to medium sand, dry
	70-75	75		
15:13 15:18				
	75-80	80		

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-22 RDA (Continued)

BY: P. Chang

JOB NUMBER: 2002-036-90
DATE DRILLED: 10/7/02 - 10/9/02

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE	
	80-85	85		@ 85 feet: minor subrounded gravel
15:18	85-90	90		@ 90 feet: little gravels, subangular to subrounded, dry, moderately hard
				@ 92-95 feet: drill chatter
	90-95	95		
15:22 15:28				
	95-100	100		
	100-105	105		
15:28	105-110	110		@ 110 feet: SILTY GRAVELY SANDSTONE: mostly fine to coarse sand, little silt and gravels, damp, moderately hard, light olive brown (5Y 5/6)
	110-115	115		
15:34 15:42				
	115-120	120		

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-22 RDA (Continued)

BY: P. Chang

JOB NUMBER: 2002-036-90
DATE DRILLED: 10/7/02 - 10/9/02

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE	
				@ 120 feet: mostly fine sand to coarse gravels, pale olive (10Y 6/2)
	120-125	125		@ 125 feet: less gravels
15:48	125-130	130		@ 130 feet: more silt and gravels, slower drilling, light olive gray (5Y 5/2)
	130-135	135		
15:55 16:02				
	135-140	140		
	140-145	145		@ 144 feet: SANDY SILTSTONE-mostly silt and siltstone fragments, some fine to medium sand, moist, moderately hard, light olive gray (5Y 5/2)
16:05	145-150	150		
	150-155	155		@ 155 feet: slightly more fine to medium sand
16:12 16:16				
	155-160	160		

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-22 RDA (Continued)

BY: P. Chang

JOB NUMBER: 2002-036-90
DATE DRILLED: 10/7/02 - 10/9/02

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE	
	160-165	165		@ 165 feet: slightly more sand and gravels
16:22	165-170	170		@ 170 feet: little claystone, moist, moderate yellowish brown (10YR 5/4)
	170-175	175		@ 175 feet: mostly silt, some sand and gravels, moist, moderately hard, light olive brown (5Y 5/6)
16:32				
7:41 10/8/02	175-180	180		
	180-185	185		@ 185 feet: moist, hard, no dust in drilling returns
7:50	185-190	190		@ 190 feet: wet, more sand; start injecting water to lift cuttings
	190-195	195		@ 193 feet: SANDSTONE: mostly fine to medium sand, little silt, hard moderate olive brown (5Y 4/4) with boring bottom at 219 feet, water level at 194.2 feet at 9:27 on 10/8/02 after shutting down rig at 9:05
8:05 8:09	195-200	200		

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-22 RDA (Continued)

BY: P. Chang

JOB NUMBER: 2002-036-90
DATE DRILLED: 10/7/02 - 10/9/02

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE	
				@ 200 feet: mostly medium to coarse sand
	200-205	205		
				@ 208 feet: no returns, more silt
	NR	210		@ 210 feet: begin injecting water to lift cuttings
	210-215	215		@ 214 feet: SILTY SANDSTONE- mostly fine to medium sand, some silt, wet, moderately hard, light olive brown (5Y 5/6)
9:05 9:50	215-230	220		@ 220 feet: SANDSTONE - little silt, mostly fine to coarse sand, little gravel, wet, moderately hard, pale yellowish brown (10YR 5/2), water being injected
		225		
		230		
	230-235	235		@ 235 feet: mostly fine to medium sand, few coarse sand and gravel, little silt, light olive brown (5Y 5/6)
10:05 10:58	NR	240		10/8: Lost circulation at 240 feet; jets in drill bit clogged with silty sand. Attempt lowering 7-5/8 inch steel casing to bottom, but can't push past 110 feet. 10/9: Pull 7-5/8 casing; drive 9-5/8 casing to 46.5 feet. Add 750 cfm auxiliary air compressor to provide more lift of cuttings. Ream hole from 200 to 240 feet.

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-22 RDA (Continued)

BY: P. Chang

JOB NUMBER: 2002-036-90
DATE DRILLED: 10/7/02 - 10/9/02

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE	
10/9/02 13:57				@ 240 feet: SILTY SANDSTONE-mostly fine to medium sand, some silt, wet, moderately hard, light olive brown (5Y 5/6) Drilling without injecting water
	240-245	245		
	245-250	250		@ 250 feet: few fine to coarse gravel
	250-255	255		@ 255 feet: slightly more gravel
15:15 14:19	255-260	260		@ 260 feet: mostly fine to coarse sand, some silt, few gravel
	260-265	265		
14:21	265-270	270		@ 270 feet: less gravel, more fine to medium sand
	270-275	275		
14:24 14:28	275-280	280		

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-22 RDA (Continued)

BY: P. Chang

JOB NUMBER: 2002-036-90
DATE DRILLED: 10/7/02 - 10/9/02

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE	
				@ 280 feet: some silt, mostly fine to medium sand
	280-285	285		
	285-290	290		@ 290 feet: slightly more medium to coarse sand, little gravel
	290-295	295		@ 295 feet: trace gravel
14:41 14:45	295-300	300		
	300-305	305		@ 305 feet: more medium to coarse sand, little gravel
	305-310	310		
	310-315	315		@ 315 feet: trace gravel, mostly fine to coarse sand, some silt
				10/10/02: Hole caved to 190'. 7-5/8 inch drive casing met refusal at 140'. Abandoned borehole; plugged with bentonite grout up to 152.5 feet; then bentonite cement grout to surface.
14:58	315-320	320		Terminate boring at target depth 320'

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

LOG OF BORING

BORING DW-22 RDB

JOB NUMBER: 2002-036-90
DATE DRILLED: 10/11/02 - 10/14/02
EQUIPMENT USED: Failing & Speedstar Star 30K
ELEVATION: 1220.33 feet - MSL
SURFACE CONDITIONS: Graded drill pad on road
NORTHING: 1980130.64
EASTING: 6368097.52

BY: T.M.Clark 0-54'
P. Chang 54'-160'

DATE & TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE	
10/11/02 13:00			SM	**0-1.5 feet: ARTIFICIAL FILL (af)** @ 0 feet: SANDY SILT - mostly fine sand, some silt, dry, yellowish gray (5Y 7/2)
				1.5-160 feet: SAUGUS FORMATION (QTs) @ 2 feet: SILTY SANDSTONE - mostly fine sand, moist, yellowish gray (5Y 7/2), with siltstone interbeds, light olive gray (5Y 5/2)
	0-5	5		Drilling 10 inch hole with 9-5/8 inch tricone bit, and driving temporary steel casing (nominal 9-5/8 inch) using air rotary casing hammer method.
				@ 7.5 feet: SANDY SILTSTONE - mostly silt, some fine sand, moist, moderate olive brown (5Y 4/4) to light olive gray (5Y 5/2)
	5-10	10		
	10-15	15		@ 14 feet: SANDY SILTSTONE - interbedded with sandstone; very fine to fine , moist, light olive gray (5Y 5/2)
13:30	15-20	20		@ 20 feet: SANDY SILTSTONE - as above, with some olive gray (5Y 3/2) siltstone interbeds, and some very fine to fine sand, moist
	20-25	25		
				@ 28 feet: SILTY SANDSTONE - mostly very fine to fine sand, some silt, moist, dark yellowish brown (10YR 4/2)
	25-30	30		
	30-35	35		
				@ 38 feet: SILTY SANDSTONE - as above, moderate brown (5YR 3/4)
	35-40	40		

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-22 RDB (Continued)

BY: T.M.Clark 0-54'
P. Chang 54'-160'

JOB NUMBER: 2002-036-90
DATE DRILLED: 10/11/02 - 10/14/02

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE
10/11/02 14:00			
	40-45	45	
	45-50	50	
14:15			
10/14/02 8:00	50-55	55	
8:10 8:45	55-60	60	
	60-65	65	
	65-70	70	
	70-75	75	
9:13 9:24	75-80	80	

@ 43.5 feet: SANDSTONE - mostly fine sand, few very fine to medium, moist, pale yellowish brown (10YR 6/2)

@ 47.5 feet: GRAVELLY SANDSTONE - mostly fine sand, few medium, few gravel, granitic fragments, moist, yellowish gray (5Y 7/2)

Set 9-5/8 temporary drive casing shoe at 48.5' with 8.5 inch open hole drilled to 54'

@ 52 feet: SANDSTONE - mostly very fine to fine sand, few silt, moist, yellowish gray (5Y 7/2)

Switch over to 7-5/8" temporary steel drive casing at 54 feet. Reduce hole size to 6-1/2" bit, and proceed using air rotary casing hammer method

@ 56 feet: minor siltstone

@ 59 feet: mostly sand

@ 60 feet: mostly fine sand, little silt, some medium to coarse sand, moderately hard, moist, dark yellow (5Y 6/4)

@ 65 feet: some gravel, yellowish gray (5Y 7/2)

GRAVELLY SANDSTONE: mostly fine to coarse sand, some fine to coarse gravel, subangular to subrounded

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-22 RDB (Continued)

BY: T.M.Clark 0-54'
P. Chang 54'-160'

JOB NUMBER: 2002-036-90
DATE DRILLED: 10/11/02 - 10/14/02

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE	
	80-85	85		@ 85 feet: slightly less gravel
	85-90	90		@ 90 feet: more gravels (30%)
	90-95	95		
9:58 10:08	95-100	100		
	100-105	105		
	105-110	110		@ 108 feet: SILTY GRAVELLY SANDSTONE - mostly fine sand, some fine to coarse gravel, some siltstone, moderately hard to hard, moist, moderate olive brown (5Y 4/4) @ 110 feet: slow casing driving
	110-115	115		@ 114 feet: GRAVELLY SANDSTONE - mostly fine to medium sand, some coarse sand to gravel, moderately hard, moist, yellowish gray (5Y 7/2)
10:47 11:12	115-120	120		

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-22 RDB (Continued)

BY: T.M.Clark 0-54'
P. Chang 54'-160'

JOB NUMBER: 2002-036-90
DATE DRILLED: 10/11/02 - 10/14/02

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE	
				@ 120 feet: occasional cobbles, hard
11:35	120-125	125		@ 125 feet: more silt and siltstone interbeds in gravelly sandstone, hard, light olive gray (5Y 5/2))
				@ 127-129 feet: SILTY SANDSTONE - mostly sand, some silt
11:46	125-130	130		@ 130 feet: GRAVELLY SANDSTONE - with siltstone interbeds
				@ 132 feet: SILTY SANDSTONE - mostly fine sand, some silt and siltstone, moderately hard, light olive brown, moist
12:08	130-135	135		
12:19 13:36	135-140	140		
				@ 143 feet: SANDY SILTSTONE - mostly silt, some fine sand, moderately hard to hard, moist, light olive gray (5Y 5/2)
13:59	140-145	145		
				@ 148 to 150 feet: slightly more fine sand
14:15	145-150	150		
14:56	150-155	155		@ 155 feet: SANDY SILTSTONE - as above very slow casing driving
15:25	155-160	160		Terminate boring at depth 160'. Drive casing refusal. No groundwater encountered. Abandon borehole.

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

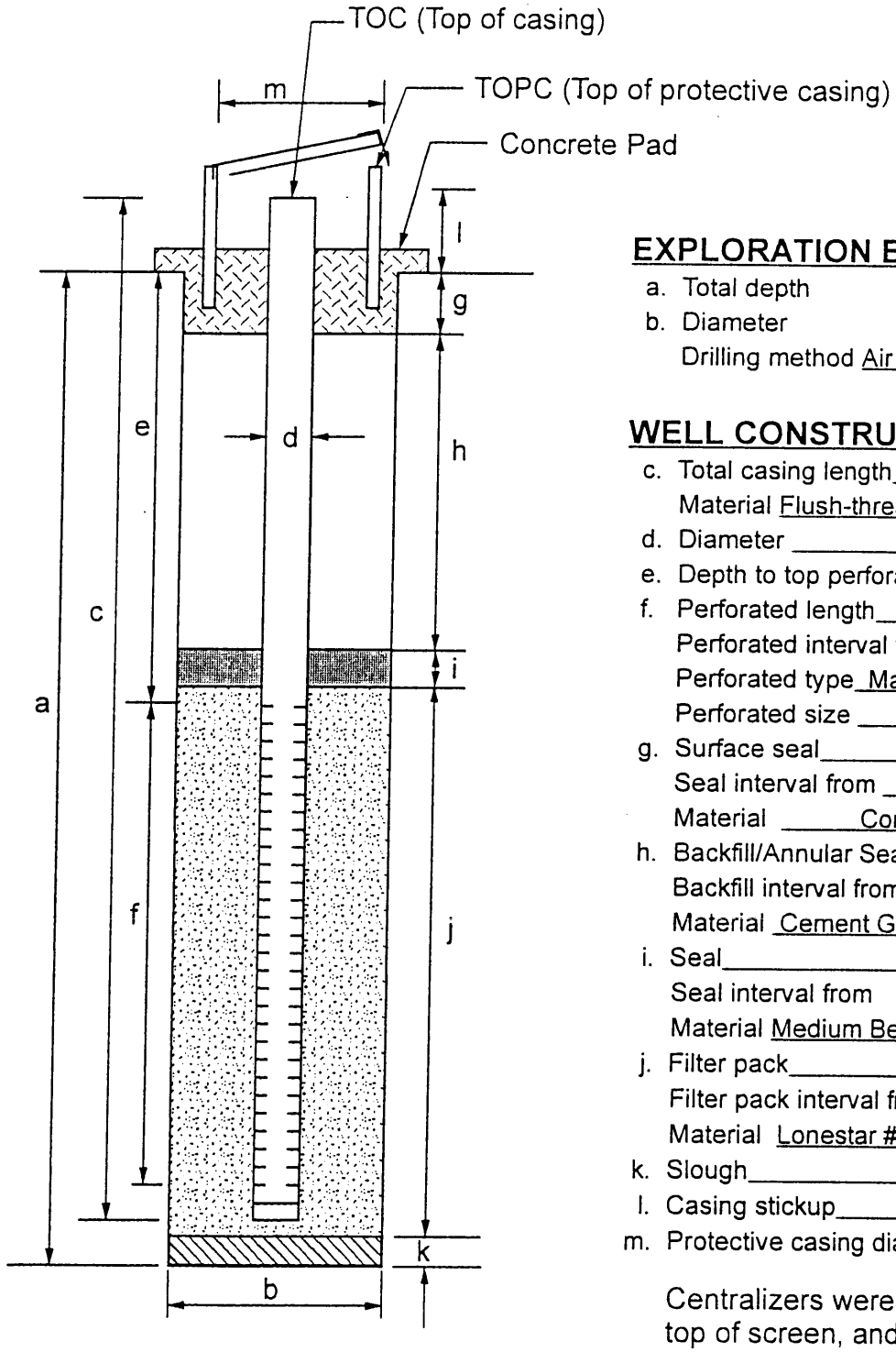
LOG OF BORING

DW-23 AS BUILT WELL CONSTRUCTION

PROJECT NUMBER: 2002-036-01
PROJECT NAME: Chiquita Canyon Landfill
LOCATION: Los Angeles County
DRILLER: WDC
INSTALLATION DATE: 5/1/03 - 5/2/03

TOP OF PROTECTIVE CASING ELEV.: 1370.68
TOP OF CASING ELEV.: 1370.24
CONCRETE PAD SURFACE ELEV.: 1368.06
DATUM: Mean Sea Level

NORTHING: 1983409.6870 EASTING: 6369800.4960



EXPLORATION BORING

a. Total depth 391 ft.
b. Diameter 9 in.
Drilling method Air Rotary Casing Hammer.

WELL CONSTRUCTION

c. Total casing length 382.16 ft.
Material Flush-threaded Schedule 80 PVC.
d. Diameter 4 in.
e. Depth to top perforations 350.24 ft.
f. Perforated length 28.89 ft.
Perforated interval from 350.24 to 379.13 ft.
Perforated type Machine-slotted
Perforated size 0.020-inch.
g. Surface seal 2 ft.
Seal interval from 0 to 2 ft.
Material Concrete.
h. Backfill/Annular Seal 295 ft.
Backfill interval from 2 to 297 ft.
Material Cement Grout with 5% bentonite.
i. Seal 7 ft.
Seal interval from 297 to 304 ft.
Material Medium Bentonite Chips
j. Filter pack 76 ft.
Filter pack interval from 304 to 380 ft.
Material Lonestar #2/12 and native slough
k. Slough 380 to 391 ft.
l. Casing stickup 2.46 ft.
m. Protective casing diameter 10.75 in.

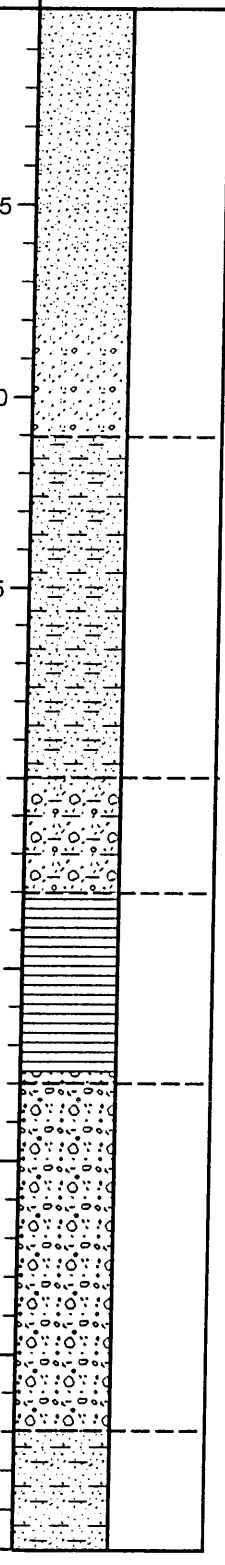
Centralizers were placed at bottom and top of screen, and every 40 feet above.

BORING DW-23

JOB NUMBER: 2002-036-01
DATE DRILLED: 4/28/03 - 4/30/03
EQUIPMENT USED: Dresser T70W Air Rotary
ELEVATION: 1368
SURFACE CONDITIONS: dirt road at saddle
NORTHING: 1983409.6870
EASTING: 6369800.4960

BY: P. Chang

DATE & TIME	SAMPLE DEPTH	DEPTH (FEET)	SOIL TYPE
4/28/03			
14:42		5	
		10	
		15	
15:12 15:20		20	
		25	
		30	
		35	
		40	



0-391 feet; SAUGUS FORMATION (QTs)

SANDSTONE: mostly fine to medium grained sand, few coarse sand to gravel, minor silt, moderately hard, grayish orange (10YR7/4)

Drilling 9-inch hole with 8 ½ inch bit, and driving temporary steel casing (nominal 9-5/8 inch) using air rotary casing hammer method

@ 5 feet: light olive brown (5Y 5/6), moist

@ 8 feet: some gravel

@ 11 feet: SILTY SANDSTONE: mostly fine grained sand, some silt and siltstone clasts, trace gravel

Set temporary drive casing at 17 feet, then drill open hole using 8 ½ inch bit and direct air rotary drilling method.

@ 20 feet: more gravel and cobbles

CLAYSTONE: mostly clay and claystone fragments, few fine sand, moderately hard, moist, moderate brown (5Y 4/4)

GRAVELLY SANDSTONE: mostly medium to coarse sand, some subangular gravel and cobbles, moderately hard to hard, dry to moist, pale yellowish brown

@ 35 feet: slightly more sand and less gravel

SILTY SANDSTONE: mostly silt and fine sand, medium to coarse sand, moderately hard, moist, light olive brown (5Y 5/6)

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-23 (Continued)

BY: P. Chang

JOB NUMBER: 2002-036-01
DATE DRILLED: 4/28/03 - 4-30/03

TIME	SAMPLE DEPTH	DEPTH (FEET)	SOIL TYPE	
15:43 16:02				@ 41.5 feet: more silt and siltstone clasts
		45		@ 45 feet: moderate brown (5Y 4/4)
				GRAVELLY SANDSTONE: mostly fine to coarse sand, little silt, some angular to subrounded gravel, moderately hard, moist, moderate yellowish brown (10YR 5/4)
		50		
		55		@ 55 feet: slightly less gravel
				CLAYSTONE to SILTSTONE: mostly fines and claystone clasts, little fine sand, moderately hard, moist, moderate brown (5Y 4/4)
16:14		60		@ 60 feet: more silt, dusky yellow (5Y 6/4)
4/29/03 7:30				SILTY SANDSTONE: mostly fine to medium sand, some silt, moderately hard, moist, moderate yellowish brown (10YR 5/4)
		65		@ 65 feet: more silt and siltstone clasts, light brown (5Y 5/6)
		70		@ 70 feet: moderate yellowish brown (10 YR 5/4)
				SANDSTONE: mostly fine sand, some medium sand, little silt, dusky yellow (5Y 6/4)
		75		@ 75 feet: few gravel
		80		

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-23 (Continued)

BY: P. Chang

JOB NUMBER: 2002-036-01
DATE DRILLED: 4/28/03 - 4-30/03

TIME	SAMPLE DEPTH	DEPTH (FEET)	SOIL TYPE	
7:49 7:52				SILTY SANDSTONE: mostly fine sand, some silt and siltstone clasts, little medium sand, moderately hard, moderate yellowish brown (10YR 5/4)
		85		
		90		@ 90 feet: some silt but no clasts
		95		@ 96.5-98 feet: with siltstone clasts
8:09 8:16		100		
		105		@ 105 feet: dusky yellow
		110		@ 110 feet: some siltstone clasts, little gravel
		115		@ 115 feet: more medium to coarse sand, moderate yellowish brown
		120		SANDY SILTSTONE: mostly fine silt and siltstone clasts, little fine sand, moderately hard, moist, dusky yellow (5Y 6/4) to light olive gray (5Y 5/2)

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-23 (Continued)

BY: P. Chang

JOB NUMBER: 2002-036-01
DATE DRILLED: 4/28/03 - 4-30/03

TIME	SAMPLE DEPTH	DEPTH (FEET)	SOIL TYPE	
8:28 8:34				SILTY SANDSTONE: mostly fine sand, some silt, little gravel, moderately hard, moist, dusky yellow (5Y 6/4)
		125		
		130		@ 130 feet: more siltstone clasts, light olive brown
				@ 132 feet: more medium sand, light brown (5YR 5/6)
		135		@ 136 feet: moderate yellowish brown (10YR 5/4)
8:50 8:56		140		
				SANDY SILTSTONE: mostly silt and siltstone clasts, little fine to medium sand, moderately hard, moist, moderate yellowish brown (10YR 5/4)
		145		
				SILTY SANDSTONE: mostly fine sand, little medium sand, some silt and siltstone clasts, few gravel, moderately hard, moist, moderate yellowish brown (10YR 5/4)
		150		
		155		@ 155 feet: more silt and siltstone clasts, light olive brown (5Y 5/6)
		160		SANDY SILTSTONE: mostly siltstone clasts with little silt, few fine to medium sands, moderately hard to hard, moist, moderate yellowish brown (10YR 5/4)

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-23 (Continued)

BY: P. Chang

JOB NUMBER: 2002-036-01
DATE DRILLED: 4/28/03 - 4-30/03

TIME	SAMPLE DEPTH	DEPTH (FEET)	SOIL TYPE	
9:14				
		165		@ 165 feet: siltstone and claystone clasts, light brown (5Y 5/6)
		170		@ 170 feet: more fine to medium sand
				SILTY SANDSTONE: mostly fine sand, some medium sand, some silt and siltstone clasts, moderately hard, moist, light olive brown (5Y 5/6)
		175		
9:27 9:32		180		@ 180 feet: less silt, few gravel
				SANDSTONE: mostly fine sand, little medium to coarse sand, moderately hard, moist, yellowish gray (5Y 7/2)
		185		
		190		@ 190 feet: dusky yellow (5Y 6/4)
		195		@ 195 feet: more silt
				SILTY SANDSTONE: mostly fine sand, little medium to coarse sand, some silt, moderately hard, moist, moderate yellowish brown (10YR 5/4)
		200		

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-23 (Continued)

BY: P. Chang

JOB NUMBER: 2002-036-01
DATE DRILLED: 4/28/03 - 4-30/03

TIME	SAMPLE DEPTH	DEPTH (FEET)	SOIL TYPE	
9:44 9:50				
		205		@ 205 feet: more silt
				@ 207 feet: some silt and siltstone clasts, mostly fine to medium sand, light olive brown (5Y 5/6)
		210		
		215		@ 215 feet: more silt and siltstone clasts
10:04 10:15		220		
		225		
		230		@ 230 feet: slightly more silt, mostly fine sand
		235		@ 235 feet: more coarse sand and fine gravel
		240		

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-23 (Continued)

BY: P. Chang

JOB NUMBER: 2002-036-01
DATE DRILLED: 4/28/03 - 4-30/03

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

TIME	SAMPLE DEPTH	DEPTH (FEET)	SOIL TYPE	
10:26 10:32				
		245		@ 245 feet: moderate yellowish brown (10YR 5/4)
				GRAVELLY SANDSTONE: mostly fine to coarse sand, few gravel, trace fines, moderately hard, moist, pale yellowish brown (10YR 6/2)
		250		
		255		@ 255 feet: slightly more gravel
10:47 14:11		260		
		265		
		270		@ 270 feet: slightly less gravel
				@ 274 feet: circulation drops, poor drilling returns, driller reports possible water
14:20		275		@ 275 feet: no noticeable change in moisture @ 276-278 feet: few siltstone clasts
		280		@ 280 feet: continue to experience loss of circulation and poor returns

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-23 (Continued)

BY: P. Chang

JOB NUMBER: 2002-036-01
DATE DRILLED: 4/28/03 - 4-30/03

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

TIME	SAMPLE DEPTH	DEPTH (FEET)	SOIL TYPE
15:06 15:15			
		285	@ 285 feet: some fines, mostly fine to medium sand, some gravel, moist, pale yellowish brown (10YR 6/2)
			SANDY CLAYSTONE: mostly clay and claystone fragments, little fine to medium sand, moderately hard to hard, moist, olive gray (5Y 3/2)
15:25		290	
		295	SILTY SANDSTONE: mostly fine sand, some fine silt with few siltstone fragments, moderately hard, moist, light olive gray (5Y 5/2)
			SANDY SILTSTONE: mostly silt and siltstone clasts, little fine sand, moderately hard, moist, light olive brown (5Y 5/6)
15:47 15:55		300	
4/30/03 10:19			@301 feet: 7:40 am sounded boring, no water. Add 2nd air compressor to better lift cuttings.
		305	@ 305 feet: light olive gray (5Y 5/2)
		310	@ 310 feet: more sand, moderate yellowish brown (10YR 3/2)
			SILTY SANDSTONE: mostly fine sand, little silt, trace gravel, moderately hard, moist, moderate olive brown (5Y 4/4)
		315	
			SANDY SILTSTONE: mostly fines and siltstone fragments, some fine sand, few medium sand to gravel, moderately hard, moist, light olive brown (5Y 5/6)
		320	

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-23 (Continued)

BY: P. Chang

JOB NUMBER: 2002-036-01
DATE DRILLED: 4/28/03 - 4-30/03

TIME	SAMPLE DEPTH	DEPTH (FEET)	SOIL TYPE	
10:32 10:37				
		325		@ 325 feet: hard, moderate yellowish brown (10YR 5/4)
		330		@ 330 feet: mostly siltstone fragments with some silt, little fine to medium sand, hard
		335		@ 335 feet: less silt and siltstone, more fine sand, moderately hard
10:57 11:02		340		@ 340 feet: more fines and siltstone clasts
				At 14:45 on 4/30/03 water level measured at 343.0 feet inside drill pipe, with the borehole depth of 361 feet and the drill bit at 360 feet.
		345		
		350		@ 350 feet: more fine to medium sand
				@ 353 feet: more fine sand, pale yellowish brown (10 YR 6/2)
		355		
11:15				SILTY SANDSTONE: mostly fine to medium sand, little coarse sand and fine gravel, little silt, moderately hard, moist, (slight massive), dark yellowish brown (10YR 5/4)
		360		

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-23 (Continued)

BY: P. Chang

JOB NUMBER: 2002-036-01
DATE DRILLED: 4/28/03 - 4-30/03

TIME	SAMPLE DEPTH	DEPTH (FEET)	SOIL TYPE	
11:20 14:50				@ 361 feet: water blew out of the hole when drilling resumed. @ 361-381 feet: wet sand and gravel, poor recovery GRAVELLY, SILTY SANDSTONE: mostly fine to coarse sand, some gravel, some silt, moderately hard, wet
		365		
		370		@ 370 feet: mostly gravel in returns (poor recovery)
		375		
15:12		380		
		385		@ 385-390 feet: continued poor recovery, returns are mostly medium to coarse sand and gravel
15:29		390		
				BOTTOM OF BORING AT 391.0 FEET. Target depth reached.
		395		
		400		

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

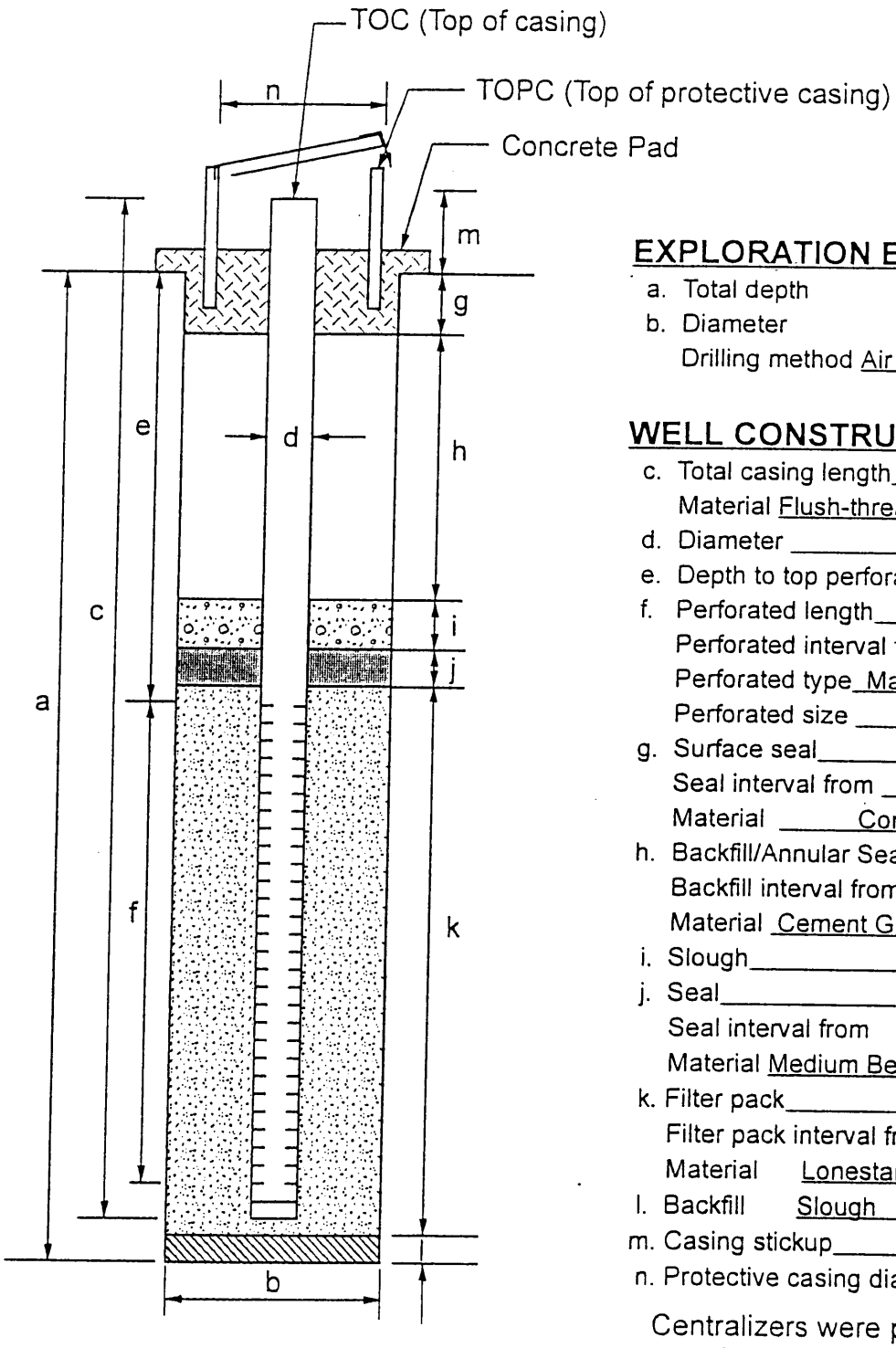
LOG OF BORING

DW-24 AS BUILT WELL CONSTRUCTION

PROJECT NUMBER: 2002-036-01
PROJECT NAME: Chiquita Canyon Landfill
LOCATION: Los Angeles County
DRILLER: WDC
INSTALLATION DATE: 5/6/03 - 5/7/03

TOP OF PROTECTIVE CASING ELEV.: 1288.47
TOP OF CASING ELEV.: 1287.74
CONCRETE PAD SURFACE ELEV.: 1285.61
DATUM: Mean Sea Level

NORTHING: 1983309.6170 EASTING: 6369377.5790



EXPLORATION BORING

a. Total depth 313 ft.
b. Diameter 9 in.
Drilling method Air Rotary Casing Hammer.

WELL CONSTRUCTION

c. Total casing length 303.22 ft.
Material Flush-threaded Schedule 80 PVC.
d. Diameter 4 in.
e. Depth to top perforations 271.37 ft.
f. Perforated length 28.95 ft.
Perforated interval from 271.37 to 300.32 ft.
Perforated type Machine-slotted
Perforated size 0.020-inch.
g. Surface seal 5 ft.
Seal interval from 0 to 5 ft.
Material Concrete.
h. Backfill/Annular Seal 197 ft.
Backfill interval from 5 to 202 ft.
Material Cement Grout with 5% Bentonite.
i. Slough 202 to 241 ft.
j. Seal 12.6 ft.
Seal interval from 241 to 253.6 ft.
Material Medium Bentonite Chips
k. Filter pack 45.4 ft.
Filter pack interval from 253.6 to 299 ft.
Material Lonestar #2/12
l. Backfill Slough 299 to 313 ft.
m. Casing stickup 2.43 ft.
n. Protective casing diameter 10.75 in.

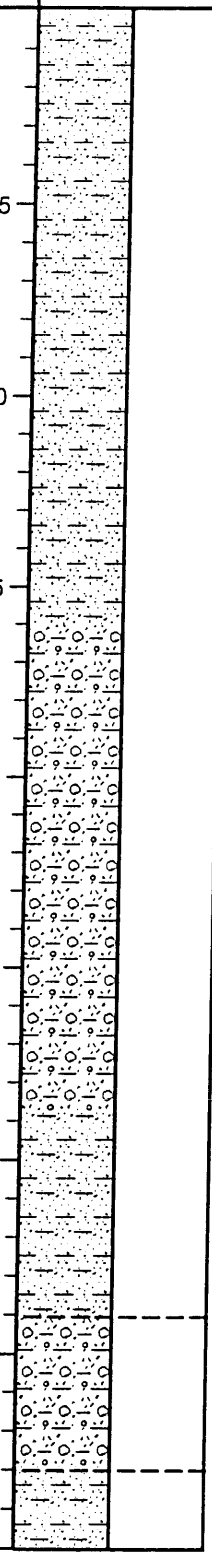
Centralizers were placed at bottom and top of screen, and every 40 feet above.

BORING DW-24

JOB NUMBER: 2002-036-01
DATE DRILLED: 5/5/03 - 5/6/03
EQUIPMENT USED: Dresser T70W Air Rotary
ELEVATION: 1285
SURFACE CONDITIONS: Dirt drilling pad on hillside
NORTHING: 1983309.6170
EASTING: 6369377.5790

BY: P. Chang

DATE & TIME	SAMPLE DEPTH	DEPTH (FEET)	SOIL TYPE
5/5/03 9:45			
		5	
		10	
		15	
		20	
10:00 10:07			
		25	
		30	
		35	
		40	



0-313 feet; SAUGUS FORMATION (TQs)

SILTY SANDSTONE: mostly fine to medium sand, some fine silt, little coarse sand and gravel, loose to moderately hard, moist, dusky yellow (5Y 6/4)

Drilling 9-inch hole with 8 ½ inch bit, and driving temporary steel casing (nominal 9-5/8 inch) using air rotary casing hammer method.

@ 5 feet: moderately hard

@ 10 feet: more silt and siltstone fragments

@ 16 feet: becomes gravelly

Set temporary drive casing at 17.68 feet, then drill open hole using 8 ½ inch bit and direct air rotary drilling method.

@ 25 feet: light olive brown (5Y 5/6)

@ 28 feet: more silt and siltstone fragments, little coarse sand and gravel

GRAVELLY SANDSTONE: mostly fine sand, some medium to coarse sand, some gravel to 2", trace fines, moist, moderately hard, light olive gray (5Y 5/2)

SILTY SANDSTONE: mostly fine to medium sand, few gravel, some fines and siltstone fragments, moderately hard, moist, light olive brown (5Y 5/6)

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-24 (Continued)

BY: P. Chang

JOB NUMBER: 2002-036-01
DATE DRILLED: 5/5/03 - 5/6/03

TIME	SAMPLE DEPTH	DEPTH (FEET)	SOIL TYPE	
10:20 10:26				
		45		SANDY SILTSTONE: mostly silt and siltstone fragments, little fine sand, moderately hard, moist, light olive brown (5Y 5/6)
		50		CLAYSTONE: mostly fine clay and claystone fragments, few fine sand, moderately hard, moist, olive gray (5Y 3/2) @ 51 feet: more fine sand
				SANDY SILTSTONE: mostly silt and siltstone fragments, some fine to medium sand, few gravel, hard, moist, light olive gray (5Y 5/2)
		55		
				GRAVELLY SANDSTONE: mostly fine to coarse sand, some fine to coarse gravel, subangular, few silt, moderately hard, moist, dusky yellow (5Y 6/4)
		60		
10:47 10:52				SANDY SILTSTONE: mostly silt and siltstone fragments, little sand, moderately hard, moist, moderate yellowish brown (10YR 5/4)
		65		
		70		@ 70 feet: more fine to medium sand
				@ 73 feet: less sand, more silt and siltstone fragments
		75		
				@ 78 feet: few fine to medium sand, light olive brown (5Y5/6)
		80		

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-24 (Continued)

BY: P. Chang

JOB NUMBER: 2002-036-01
DATE DRILLED: 5/5/03 - 5/6/03

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

TIME	SAMPLE DEPTH	DEPTH (FEET)	SOIL TYPE	
11:09 11:26				
		85		@ 85 feet: hard, light olive gray (5Y 5/2)
		90		@ 90 feet: light olive brown (5Y 5/6)
		95		@ 95 feet: few sand, mostly siltstone fragments, hard
		100		@ 100 feet: slightly more fine to medium sand
11:46 13:11				
		105		@ 105 feet: mostly fine silt and siltstone fragments, little fine to medium sand, moderately hard to hard, moist, light brown (5Y 5/6)
		110		
				SILTY SANDSTONE: mostly fine sand, some silt, little medium to coarse sand, moderately hard, moist, moderate yellowish brown (10YR 5/4)
		115		@ 115 feet: gradually becomes coarser
				GRAVELLY SANDSTONE: mostly fine to medium sand, some coarse sand and gravel, subangular to subrounded, few silt, moderately hard, moist, dusky yellow (5Y 6/4)
		120		

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-24 (Continued)

BY: P. Chang

JOB NUMBER: 2002-036-01
DATE DRILLED: 5/5/03 - 5/6/03

TIME	SAMPLE DEPTH	DEPTH (FEET)	SOIL TYPE	
13:26				
13:30				
		125		
		130		@ 132 feet: few to no gravel
				@ 134 feet: slightly moisture increase
		135		@ 136 feet: little gravel, moist
13:39		140		@ 141 feet: moderate yellowish brown (10YR 5/4)
				@ 142 feet: @ 13:55 shut down air compressors for 15 minutes, water check no water
14:01				SANDY SILTSTONE: mostly silt and siltstone fragments, little fine to medium sand, moderately hard to hard, moist, moderate yellowish brown (10YR 5/4)
		145		
		150		@ 150 feet: few fine sand
		155		@ 155 feet: slightly more fine to coarse sand
				SILTY SANDSTONE: mostly fine to medium sand, little coarse sand and fine gravel, little silt, moderately hard, moist, moderate olive brown (5Y 4/4)
		160		

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-24 (Continued)

BY: P. Chang

JOB NUMBER: 2002-036-01
DATE DRILLED: 5/5/03 - 5/6/03

TIME	SAMPLE DEPTH	DEPTH (FEET)	SOIL TYPE	
14:18				
14:23				
		165		@ 165 feet: few gravel
				@ 168 feet: slightly moisture increase
		170		
		175		
14:32		180		
				SANDY SILTSTONE: mostly silt and siltstone fragments, little fine to medium sand, hard, moist, light olive gray (5Y 5/2)
14:37				
		185		
				@ 189 feet: more fine sand, light brown (5Y 5/6)
		190		
				SANDSTONE: mostly fine sand, little medium sand to gravel, few fines, moderately hard, moist, dusky yellow (5Y 6/4)
		195		
		200		

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-24 (Continued)

BY: P. Chang

JOB NUMBER: 2002-036-01
DATE DRILLED: 5/5/03 - 5/6/03

TIME	SAMPLE DEPTH	DEPTH (FEET)	SOIL TYPE	
14:48				
14:52				@ 202 feet: becomes gravelly
		205		
				@ 207 feet: less gravel
		210		
				@ 212 to 216 feet: gravelly
		215		
				@ 218 feet: slight moisture increase
15:02		220		
15:05				
		225		@ 225 feet: more medium and coarse sand, few gravel, light olive gray (5Y 5/2) At 8:15 am on 5/6/03, water level sounded at 226.1' feet with total depth of boring at 302' prior to starting rig air compressor.
		230		@ 232 - 235 feet: little silt
		235		
		240		

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-24 (Continued)

BY: P. Chang

JOB NUMBER: 2002-036-01
DATE DRILLED: 5/5/03 - 5/6/03

TIME	SAMPLE DEPTH	DEPTH (FEET)	SOIL TYPE	
15:12				
15:38				@ 242 feet: 15 minute water check, no water
				@ 243 - 248 feet: some silt and siltstone fragments, mostly fine to coarse sand, little gravel, hard, moist
		245		@ 245 feet: moderate yellowish brown (10YR 5/4)
				@ 248 feet: few silt
		250		
		255		
15:50		260		@ 260 feet: moderate brown (5YR 4/4)
15:55				
		265		@ 265 feet: moderate yellowish brown (10YR 5/4)
				SILTY SANDSTONE: more silt, less gravel
		270		@ 270 feet: moderately hard to hard, light brown (5YR 5/6)
		275		@ 275 feet: some silt and siltstone fragments, mostly fine to medium sand
				SANDSTONE: mostly fine to coarse sand, less silt, dark yellowish brown (10YR 4/2), less dust in return
16:09		280		

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-24 (Continued)

BY: P. Chang

JOB NUMBER: 2002-036-01
DATE DRILLED: 5/5/03 - 5/6/03

TIME	SAMPLE DEPTH	DEPTH (FEET)	SOIL TYPE	
16:11				@ 280 feet: few siltstone fragments, fragments are wet
16:16				@ 282 feet: poor recovery after joint connection
		285		
		290		
				@ 293 feet: rig chatter , possible gravels
		295		@ 295 feet: small amount of gravel in returns, poor recovery
		300		@ 300 feet composite sample: medium to coarse sand and siltstone fragments
16:40				@ 302 feet: starting to blow small amount of water out during hole cleaning
5/6/03 9:55				
		305		
				@ 304 - 313 feet composite sample: mostly siltstone fragments, little sand, wet
		310		
10:05				BOTTOM OF BORING AT 313 FEET. Target depth reached.
		315		
		320		

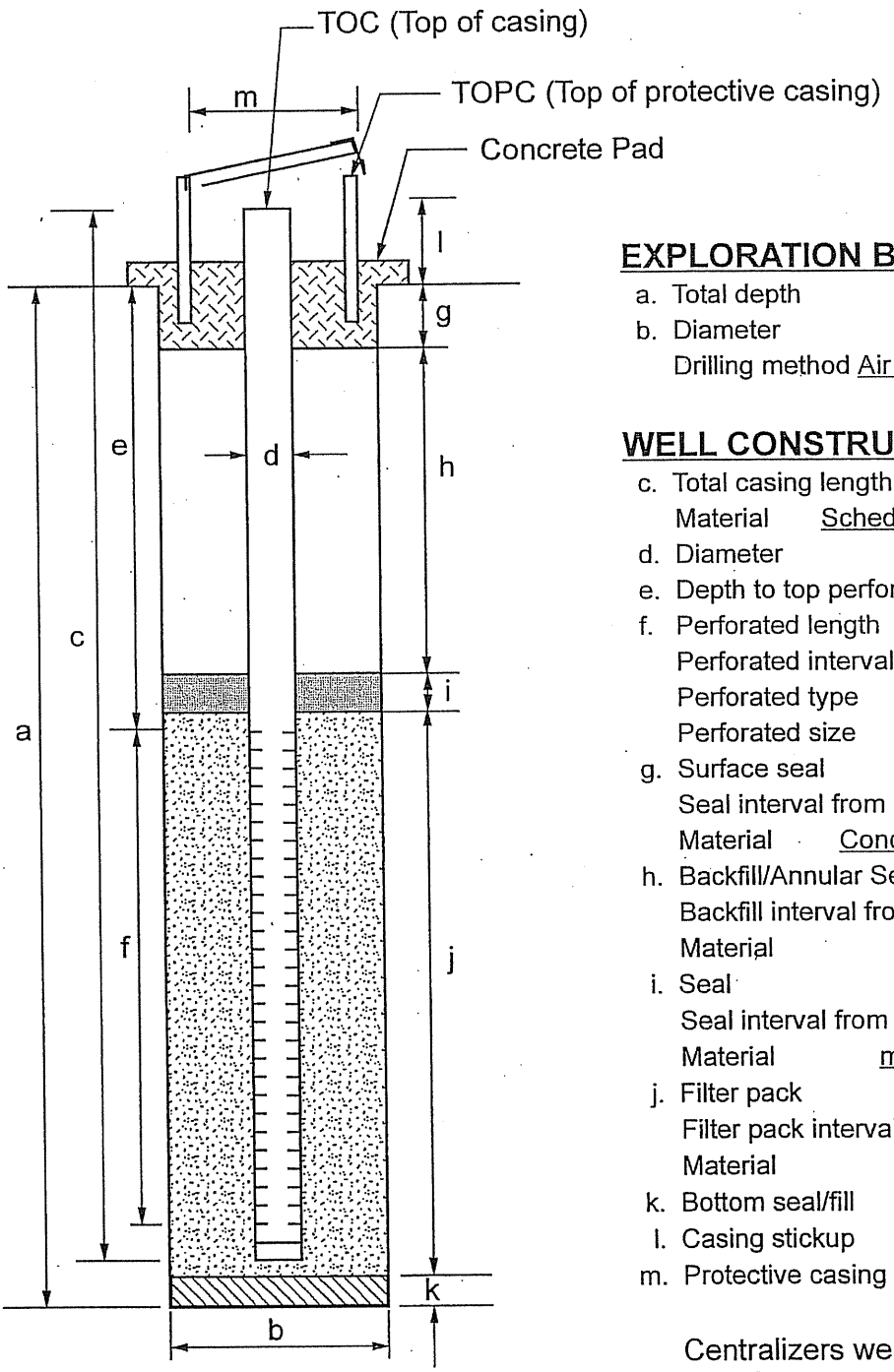
Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

LOG OF BORING

AS BUILT WELL DETAIL: DW-25

PROJECT NUMBER: 2002-036-91
PROJECT NAME: Chiquita Canyon Landfill
LOCATION: Los Angeles County
DRILLER: WDC

SURFACE ELEVATION: 1263.00
TOC ELEVATION: 1265.50
DATUM: Mean Sea Level
INSTALLATION DATE: 12-2-04



EXPLORATION BORING

a. Total depth 106 ft.
b. Diameter 8.5 in.
Drilling method Air Rotary Casing Hammer.

WELL CONSTRUCTION

c. Total casing length 107.50 ft.
Material Schedule 80 PVC
d. Diameter 4.0 in.
e. Depth to top perforations 65.16 ft.
f. Perforated length 38.97 ft.
Perforated interval from 65.16 to 104.13 ft.
Perforated type machine slotted
Perforated size 0.020 in.
g. Surface seal 2 ft.
Seal interval from 0 to 2 ft.
Material Concrete / Bentonite Chips
h. Backfill/Annular Seal 52.0 ft.
Backfill interval from 2.0 to 54.0 ft.
Material neat cement
i. Seal 4.5 ft.
Seal interval from 54.0 to 58.5 ft.
Material medium bentonite chips
j. Filter pack 47.5 ft.
Filter pack interval from 58.5 to 106 ft.
Material #2/12 graded sand
k. Bottom seal/fill none
l. Casing stickup 2.5 ft.
m. Protective casing diameter 10 3/4 in.

Centralizers were placed at bottom and top of screen, and every 40 feet above.

BORING DW-25

JOB NUMBER: 2002-036-91
DATE DRILLED: 12/1/04
EQUIPMENT USED: Air Rotary Casing Hammer
ELEVATION: 1263'
LOGGED BY: Paul Chang
BORING DEPTH: 0-111'
SURFACE CONDITIONS: Dirt drilling pad

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								0-41' LANDSLIDE (Qls)
								SILTY SANDSTONE: mostly fine to medium sand, some fine silt, few coarse sand and gravel, moderately hard, dry to moist, moderate brown (5YR 4/4)
								SANDY SILTSTONE: some fine to medium sand, mostly silt, moderately hard, moist, pale yellowish brown (10YR 6/2)
				5				@ 5 ft. more clayey fines
								@ 8 ft. slightly more moist
				10				@ 10 ft. light olive gray (5Y 5/2): moist
								SILTY SANDSTONE: mostly fine sand, some silt with clay, little medium sand, moderately hard, moist, dark yellowish brown (10 YR 4/2)
				15				(10:04) (10:12)
				20				
				25				@ 25 ft. more fine sands
								SANDY SILTSTONE: some fine to medium sand, mostly silt and clay with siltstone fragments, moderately hard to hard, moist, moderate yellowish brown (10YR 5/4)
				30				
								SILTY SANDSTONE: mostly fine sand, some silt, few medium sand, moderately hard, moist, moderate yellowish brown (10YR 5/4)
				35				(10:21) (10:28)
				40				

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BOREHOLE LOG 2002-036-91.GPJ FRANKIAN.GDT 8/25/05

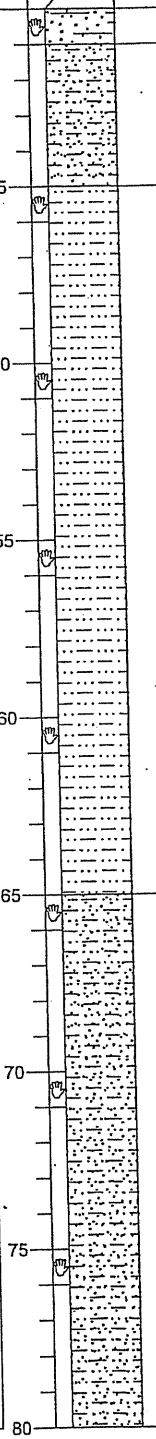
LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING DW-25 (CONTINUED)

JOB NUMBER: 2002-036-91
DATE DRILLED: 12/1/04
EQUIPMENT USED: Air Rotary Casing Hammer
ELEVATION: 1263'
LOGGED BY: Paul Chang
BORING DEPTH: 0-111'
SURFACE CONDITIONS: Dirt drilling pad

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION / GRAPHIC LOG	SOIL TYPE



@ 40 ft. slightly more medium to coarse sands

41-111' PICO FORMATION (Tp)

SANDY SILTSTONE: some fine sand, mostly silt, hard, moist, light olive brown (5Y 5/6)
@ 43 ft. some light olive gray (5Y 5/2): siltstone fragments

SILTSTONE: mostly silt and siltstone fragments, few fine sands, light olive brown (5Y 5/6)

@ 47 ft. more fine sands
@ 47.12 ft. bottom of drive casing (removed 12/2/2004): drill 8.5-inch open hole to 100 feet using air rotary method
@ 48 ft. more siltstone fragments: making fine dust

@ 54 ft. light olive gray (5Y 5/2): mostly silt and siltstone fragments, few fine sand: very hard
(10:40)
(10:52)

@ 60 ft. grayish olive (10 Y 4/2): more siltstone fragments

SANDY SILTSTONE: mostly silt, some fine sand, hard, moist, light olive gray (5Y 5/2)
@ 66 ft. grayish orange (10YR 7/4): mostly siltstone fragments: dry to moist: making fine dust

@ 70 ft. moderate yellowish brown (10YR 5/4): mostly silt: some fine sand: hard: moist

▽ groundwater at 74.3 feet
with borehole total depth at 95 feet (1:00 PM) 12/1/04

▽ groundwater at 75.81 feet
in well (3:55 PM) 12/2/04
@ 75 ft. Sandy Siltstone/Claystone: moderate brown (5YR 4/4): mostly silt and clay: little fine sand: moist to very moist: hard.
(11:02)
(11:11)

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BOREHOLE LOG 2002-036-91.GPJ FRANKIAN.GDT 8/25/05

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING DW-25 (CONTINUED)

JOB NUMBER: 2002-036-91
DATE DRILLED: 12/1/04
EQUIPMENT USED: Air Rotary Casing Hammer
ELEVATION: 1263'
LOGGED BY: Paul Chang
BORING DEPTH: 0-111'
SURFACE CONDITIONS: Dirt drilling pad

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								@ 80 ft. light olive gray (5Y 5/2): more fine to medium sand
								SILTY SANDSTONE: mostly fine sand, some silt with clay, hard, moist, light olive gray (5Y 5/2)
				85				
				90				@ 90 ft. grayish olive (10Y 4/2): slightly more sands
				95				@ 95 ft. more clay: few medium to coarse sands. (11:28) Convert to Christensen 94 mm continuous coring system. 92 minute water check: groundwater at 74.3 feet, 1:00 P.M. 12/1/04 (13:00) @ 96 to 99 ft. no recovery on continuous core
				100				@ 100.5 ft. Silty Sandstone
				105				
								SANDY SILTSTONE: some fine sand, mostly silt, finely laminated, hard, wet, light olive gray (5Y 5/2)
				110				
								Bottom of Boring at 111 feet. At 4:00 pm 12/1/04. Target depth reached
				115				
				120				

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-91.GPJ FRANKIAN.GDT 8/25/05

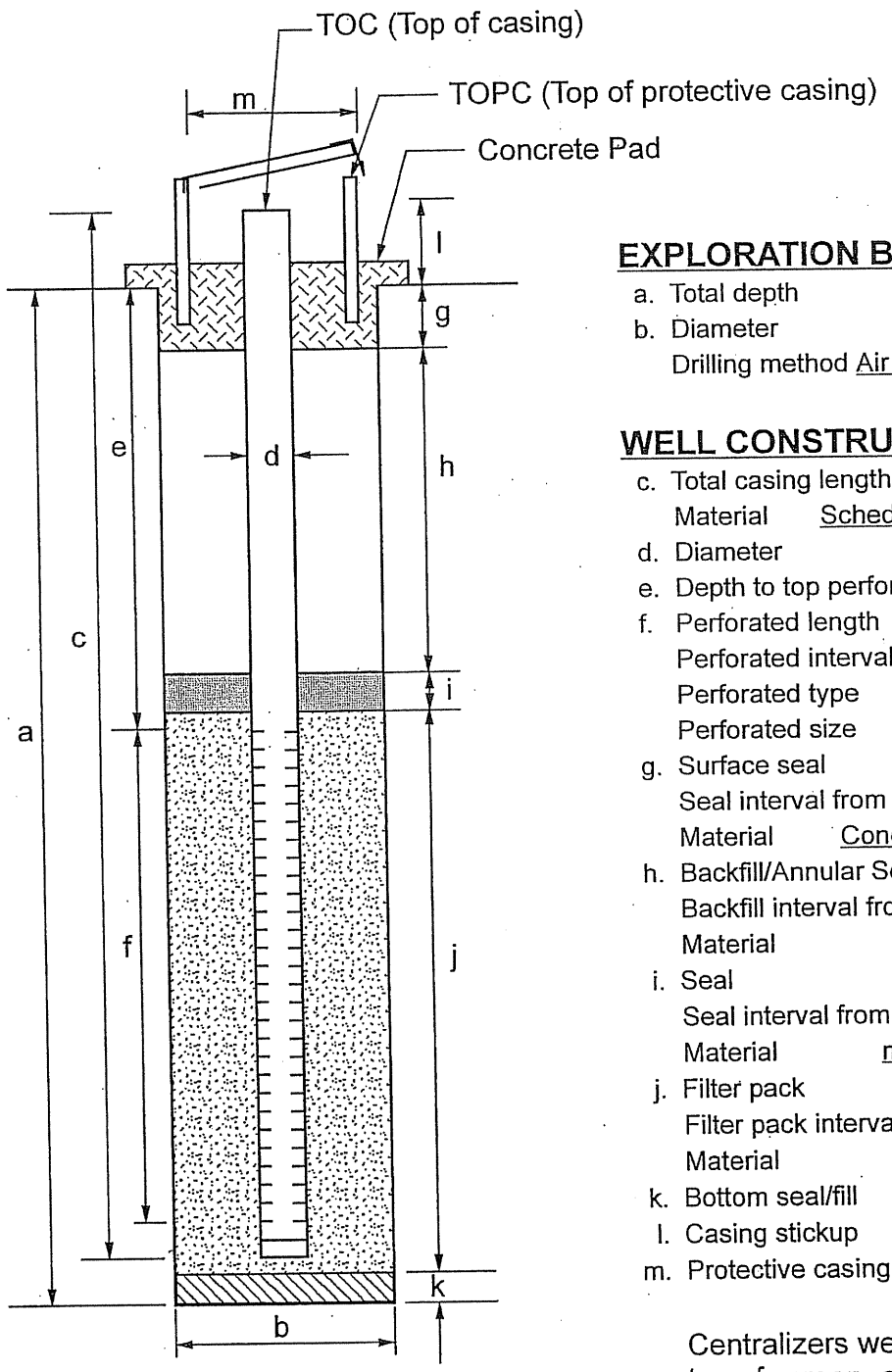
LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

AS BUILT WELL DETAIL: DW-26

PROJECT NUMBER: 2002-036-91
PROJECT NAME: Chiquita Canyon Landfill
LOCATION: Los Angeles County
DRILLER: WDC

SURFACE ELEVATION: 1174.81
TOC ELEVATION: 1177.31
DATUM: Mean Sea Level
INSTALLATION DATE: 12-14-04



EXPLORATION BORING

a. Total depth 146.5 ft.
b. Diameter 8.5 in.
Drilling method Air Rotary Casing Hammer.

WELL CONSTRUCTION

c. Total casing length 148.11 ft.
Material Schedule 80 PVC
d. Diameter 4.0 in.
e. Depth to top perforations 115.52 ft.
f. Perforated length 29.62 ft.
Perforated interval from 115.52 to 145.14 ft.
Perforated type machine slotted
Perforated size 0.020 in.
g. Surface seal 2 ft.
Seal interval from 0 to 2 ft.
Material Concrete / Bentonite Chips
h. Backfill/Annular Seal 94.5 ft.
Backfill interval from 2.0 to 96.5 ft.
Material neat cement
i. Seal 13 ft.
Seal interval from 96.5 to 109.5 ft.
Material medium bentonite chips
j. Filter pack 37 ft.
Filter pack interval from 109.5 to 146.5 ft.
Material #2/12 graded sand
k. Bottom seal/fill none
l. Casing stickup 2.5 ft.
m. Protective casing diameter 10 3/4 in.

Centralizers were placed at bottom and top of screen, and every 40 feet above.

BORING DW-26

JOB NUMBER: 2002-036-91
DATE DRILLED: 12/10/04
EQUIPMENT USED: Air Rotary Casing Hammer
ELEVATION: 1174.81'
LOGGED BY: Paul Chang
BORING DEPTH: 0-146.5'
SURFACE CONDITIONS: Dirt access road for power tower, on ridge line.

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
				5				**0-146.5' SAUGUS FORMATION (QTs)** SILTY SANDSTONE: mostly fine to coarse sand, some silt, few gravels, moderately hard, dry to moist, light olive brown (5Y 5/6)
				10				@ 8 ft. more silt
				15				@ 15 ft. more clayey: few gravels: moderate yellowish brown (10YR 4/5) (16:05) (10:08 12/13/2004)
				20				@ 19 ft. more silty
				25				@ 22 ft. some gravels
				30				@ 25 ft. silty, gravelly, sandstone: light olive brown (5Y 5/6): some silt: mostly fine sand: little medium sand to gravels: moderately hard to hard: moist
				35				@ 30 ft. less gravels
				40				SANDY SILTSTONE: some fine sand, mostly silt and siltstone fragments, moderately hard, moist, light olive gray (5 Y 5/6) (10:29) (10:39) SILTY SANDSTONE: mostly fine to medium sand, some silt, hard, moist, light olive brown (5Y 5/6)

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BOREHOLE LOG 2002-036-91.GPJ FRANKIAN.GDT 8/25/05

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING DW-26 (CONTINUED)

JOB NUMBER: 2002-036-91
DATE DRILLED: 12/10/04
EQUIPMENT USED: Air Rotary Casing Hammer
ELEVATION: 1174.81'
LOGGED BY: Paul Chang
BORING DEPTH: 0-146.5'
SURFACE CONDITIONS: Dirt access road for power tower, on ridge line.

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								@ 42 ft. more medium sand to gravels
				45				SANDY SILTSTONE: some fine to medium sand, mostly silt and siltstone fragments, hard, moist, light olive gray (5Y 5/2)
				50				@ 50 ft. less siltstone fragments: more fine sand
								SILTY SANDSTONE: mostly fine to medium sand, some silt, little coarse sand and gravels, moderately hard to hard, moist, light olive brown (5 Y 5/6)
				55				(10:48) (10:52)
								SILTSTONE: few fine sand, mostly silt and siltstone fragments, hard to very hard, moist, grayish olive (10Y 4/2) to olive gray (5Y 3/2)
				60				
								SILTY SANDSTONE: mostly fine sand, some silt, few medium sands to gravels, hard, moist, moderate olive brown (5Y 4/4)
				65				
								SANDY SILTSTONE: little fine sand, mostly silt and siltstone fragments, hard to very hard, moist, moderate olive brown (5Y 4/4)
				70				@ 71 ft. yellowish gray (5Y 7/2): more silt: making fine dust: dry, very hard
				75				@ 75 ft. dusky yellow (5Y 6/4): slightly more fine to medium sand: hard to very hard
				80				(11:12)

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BORING DW-26 (CONTINUED)

JOB NUMBER: 2002-036-91
DATE DRILLED: 12/10/04
EQUIPMENT USED: Air Rotary Casing Hammer
ELEVATION: 1174.81'
LOGGED BY: Paul Chang
BORING DEPTH: 0-146.5'
SURFACE CONDITIONS: Dirt access road for power tower, on ridge line.

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								(11:23) @ 80 ft. moderate yellowish brown (10YR 5/4): more sands
				85				@85 ft. more silt and siltstone fragments: hard: moist
				90				@ 90 ft. more sandy SILTY SANDSTONE: mostly fine sand, some silt, few medium sands to gravels, hard, moist, light olive brown (5Y 5/6)
				95				@ 95 ft. more fine to medium sands: little gravels
				100				(11:35) (11:42) @ 101 ft. slight increase in moisture
								SANDY SILTSTONE: some fine to medium sand, mostly silt and siltstone fragments, hard, moist, moderate yellowish brown (10YR 5/4)
				105				SILTY SANDSTONE: mostly fine to medium sands, some silt, hard, moist (slightly more moisture), light olive brown (5Y 5/6)
								SANDY SILTSTONE: some fine sand, mostly silt and siltstone fragments, hard, moist (less moisture), moderate yellowish brown (10YR 5/4)
				110				
				115				@ 115 ft. moderate brown (5YR 4/4): hard to very hard: some fine to medium sands
				120				SILTY SANDSTONE: mostly fine to medium sand, little silt, little coarse sand and gravels, hard, moist to wet, moderate yellowish brown

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BOREHOLE LOG 2002-036-91.GPJ FRANKIAN.GDT 8/25/05

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING DW-26 (CONTINUED)

JOB NUMBER: 2002-036-91
DATE DRILLED: 12/10/04
EQUIPMENT USED: Air Rotary Casing Hammer
ELEVATION: 1174.81'
LOGGED BY: Paul Chang
BORING DEPTH: 0-146.5'
SURFACE CONDITIONS: Dirt access road for power tower, on ridge line.

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								(10YR 5/4) @119 ft. 15 minute water check (to 109'): no water. (11:54) Groundwater estimated at 120 feet (12:15 pm) 12/13/2004 (12:12) @ 122 ft. more coarse sands and gravels
				125				SANDY SILTSTONE: some fine to medium sand, mostly silt and siltstone fragments, hard, moist to very moist, moderate yellowish brown (10YR 5/4) to pale brown (5YR 5/2) @ 128 ft. slightly less moisture
				130				@ 130 ft. moderate yellowish brown (10YR 5/4): more silt and fine sand: moist SILTY SANDSTONE: mostly fine to medium sand, little silt, some coarse sand and gravels, hard, wet, light olive brown (5Y 5/6) SANDY SILTSTONE: some fine sand, mostly silt with few siltstone fragments, hard, moist to very moist, moderate yellowish brown (10YR 5/4)
				135				SILTY SANDSTONE: mostly fine to medium sand, little silt, some coarse sand and gravels, hard, wet, light olive brown (5Y 5/6) @ 138 ft. 1 hour water check: no water (to 124') blowing water out of hole when rig compressor starts. (12:29) (13:31) @ 140 ft. more silt: moist to wet
				140				
				145				SANDY SILTSTONE: some fine sand, mostly siltstone and siltstone fragments, hard, very moist, light olive brown (5Y 5/6)
				150				Bottom of Boring at 146.5 feet. At 1:43 pm 12/13/04. Target depth reached
				155				
				160				

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-91.GPJ FRANKIAN.GDT 8/25/05

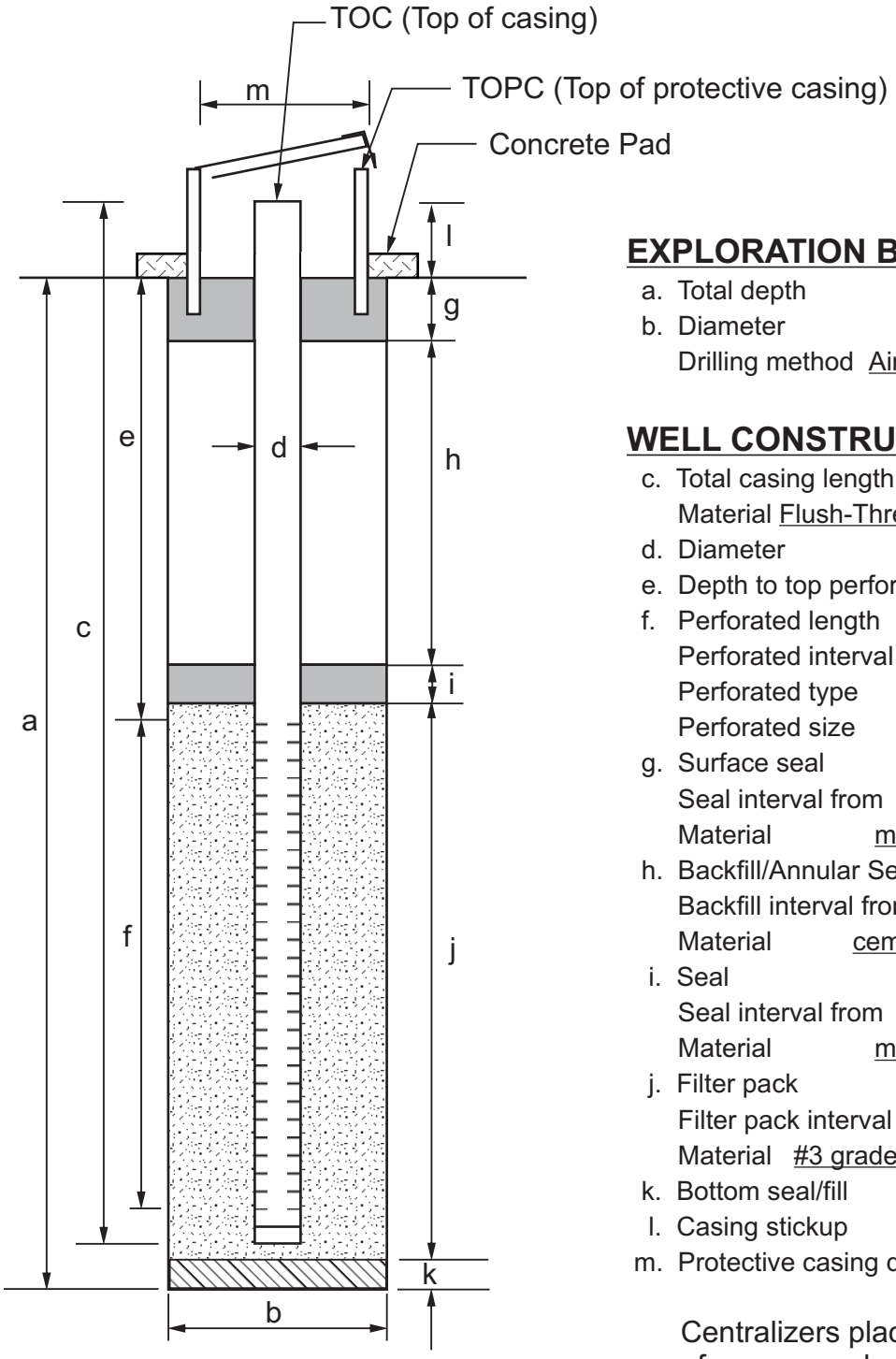
LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

As-Built Well DW-27

PROJECT NUMBER: 2002-036-005
PROJECT NAME: Chiquita Canyon Landfill
LOCATION: Los Angeles County
DRILLER: WDC

TOP CONCRETE PAD ELEVATION: 1457.505
TOC ELEVATION: 1459.48
DATUM: Mean Sea Level
INSTALLATION DATE: 7/12/2010
BY: P. Chang



EXPLORATION BORING

a. Total depth 452 ft.
b. Diameter 8.5 in.
Drilling method Air Rotary Casing Hammer

WELL CONSTRUCTION

c. Total casing length 441.69 ft.
Material Flush-Threaded Schedule 80 PVC
d. Diameter 4.0 in.
e. Depth to top perforations 388.6 ft.
f. Perforated length 50 ft.
Perforated interval from 388.6 to 438.59 ft.
Perforated type machine slotted
Perforated size 0.020 in.
g. Surface seal 4.5 ft.
Seal interval from 0 to 4.5 ft.
Material medium bentonite chips
h. Backfill/Annular Seal 304 ft.
Backfill interval from 4.5 to 308.5 ft.
Material cement with 5% bentonite
i. Seal 29 ft.
Seal interval from 308.5 to 337.5 ft.
Material medium bentonite chips
j. Filter pack 114.5 ft.
Filter pack interval from 337.5 to 452 ft.
Material #3 graded sand and native slough
k. Bottom seal/fill none
l. Casing stickup 2.5 ft.
m. Protective casing diameter 10 3/4 in.

Centralizers placed at bottom and top of screen, and every 40 feet above.

BORING DW-27

JOB NUMBER: 2002-036-005
DATE DRILLED: 7/7/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-452'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
8:38			-					**PICO FORMATION (Tp)** SANDSTONE: fine, little silt, friable to medium dense, dry to moist, pale orange (10YR 8/2), no odor
			-	5				
								more silt, medium dense, grayish orange (10YR 7/4)
			-	10				
			-	15				some medium to coarse sand, less silt
								bottom of temporary drive casing; removed 7/14/10
								SANDY SILTSTONE: some fine sand, medium dense, moist, dusky yellow (5Y 6/4)
8:54			-	20				
9:00			-					
			-					
			-	25				more fine to medium sand
			-	30				moderate yellowish brown (10YR 5/4)
								more sand, dark yellowish orange (10YR 6/6)
								dusky yellow (5Y 6/4)
			-	35				more silt, light olive gray (5Y 5/2)
								more sand and few gravel, moderate yellowish brown (10YR 5/4)
				40				SILTY SANDSTONE: fine, some medium sand to gravel, medium

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-27 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 7/7/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-452'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
9:11			-					dense, moist, dark yellowish orange (10YR 6/6)
9:15			-					
			-					SANDY SILTSTONE: some fine sand, medium dense, moist, dark yellowish orange (10YR 6/6)
			-	45				
								moderate yellowish brown (10YR 5/4)
			-	50				more fine to medium sand, dark yellowish orange (10YR 6/6)
			-	55				more fine sand, light olive brown (5Y 5/6)
								CLAYSTONE: moderately hard, moist, moderate yellowish brown (10YR 5/4)
			-	60				
9:25			-					mudstone interbeds
9:29			-					MUDSTONE: moderate brown (5YR 3/4)
								moderate yellowish brown (10YR 5/4)
								light olive gray (5Y 5/2)
								moderate yellowish brown (10YR 5/4)
			-	65				
								light brown (5YR 5/6)
								pale yellowish brown (10YR 6/2)
			-	70				
								FOSSILIFEROUS SANDY SILTSTONE: some fine sand, little medium sand to gravel, few shell fragments, medium dense to dense, dusky yellow (5Y 6/4)
			-	75				
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-27 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 7/7/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-452'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
9:44			-					more sand and gravel
9:47			-					
			-					
								SANDSTONE: fine to medium with some coarse and gravel, dense to very dense, moist, grayish orange (10YR 7/4), rig chatter and making lots of dust
			-	85				
								slightly more silt
								SILTSTONE: medium dense to dense, moist, dark yellowish brown (10YR 6/2)
			-	90				
								little fine sand, moderate yellowish brown (10YR 5/4)
								SILTY SANDSTONE: fine to medium, little coarse sand and gravel, dense, moist, dusky yellow (5Y 6/4)
			-	95				
								FOSSILIFEROUS SANDSTONE: fine to coarse, little gravel, some shell fragments, dense to very dense, dry to moist, very pale orange (10YR 8/4), making lots of dust
10:00			-	100				
10:08			-					
			-					
								more silt, less shell fragments
			-	105				
			-	110				less silt
			-	115				SANDY SILTSTONE: some fine sand, dense, moist, dusky yellow (5Y 6/4)
								pale olive (10Y 6/2)
								SILTSTONE: dense, moist, dusky yellow green (5GY 5/2)
				120				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-27 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 7/7/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-452'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
10:20								
10:25								
				125				little sand and gravel
				130				dense to very dense, some rig chatter
				135				FOSSILIFEROUS SILTSTONE: few shell fragments, medium dense to dense
10:38				140				dense to very dense
10:43								SILTY SANDSTONE: fine to medium, medium dense to dense, moist, grayish yellow green (5GY 7/2)
				145				
				150				gradational contact
								SANDSTONE: fine to coarse, medium dense to dense, moist, pale olive (10Y 6/2)
				155				
								SANDY SILTSTONE: fine sand, medium dense, moist, grayish yellow green (5GY 7/2)
				160				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-27 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 7/7/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-452'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
10:54			-					
10:58			-					
			-					
			-	165				more fine to medium sand
								gradational contact
								SILTY SANDSTONE: fine to medium, little coarse sand, medium dense to dense, moist, dusky yellow green (5GY 5/2)
			-	170				
								SANDY CLAYSTONE: fine sand, moderately hard to hard, moist, moderate yellowish brown (10YR 5/4)
			-	175				
			-	180				
11:12			-					CLAYSTONE: less sand, pale yellowish brown (10YR 6/2)
11:17			-					MUDSTONE: little fine sand, grayish green (10 GY 5/2)
								SILTY SANDSTONE: fine to medium, little coarse sand and gravel, medium dense to dense, moist, dusky yellow green (5GY 5/2)
			-	185				
			-	190				more medium to coarse
			-	195				more silt, less medium to coarse sands
								gradational contact
								SANDY SILTSTONE: fine sand, medium dense to dense, moist, dusky yellow green (5GY 5/2)
				200				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-27 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 7/7/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-452'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
11:25 13:17								
				205				more plasticity, dark yellowish brown (10YR 4/2) dusky yellow green (5GY 5/2)
				210				
				215				SILTY SANDSTONE: fine, some medium sand to gravel, medium dense to dense, moist, grayish green (10GY 5/2)
13:31 13:37				220				
				225				FOSSILIFEROUS SILTY SANDSTONE: little shell fragments, dense to very dense, pale olive (10Y 6/2), making lots of dust (driller slowed the drilling rate) gradational contact SANDY SILTSTONE: fine to medium sand, dense to very dense, moist, light olive gray (5Y 5/2)
				230				more silt
				235				SILTSTONE: grayish green (10GY 5/2)
				240				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-27 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 7/7/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-452'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
14:06			-					more fine sand
14:12			-					
			-					
			-	245				SANDY SILTSTONE: more fine and medium sand
								PEBBLY SANDSTONE: fine to coarse, some gravel, some silt, dense, moist, dusky yellow green (5GY 5/2)
			-	250				
								making lots of dust
								SANDSTONE: fine to coarse, little gravel, dense to very dense, moist, pale olive (10Y 6/2)
			-	255				
								SANDY SILTSTONE: fine to medium sand, dense, moist, grayish green (10GY 5/2)
14:48			-	260				
14:57			-					
			-					
			-	265				more sand
			-	270				more silt, more moisture
			-	275				
				280				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-27 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 7/7/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-452'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
15:15			-					still blowing lots of dust
16:10			-					45 minute water check: no water detected
			-					
			-	285				more fine sand, light olive gray (5Y 5/2)
			-	290				less sand
			-	295				grayish olive (10Y 4/2)
16:26			-	300				
8:09			-					overnight water check: no water detected (7:00 am 7/8/10)
			-	305				groundwater at 304.8 feet (8:45 am) 7/12/10 fine sand, dense, moist, grayish olive green (5GY 3/2)
								more fine sand
			-	310				SILTSTONE: some finely laminated, dense, moist, grayish olive green (5GY 3/2)
			-	315				little fine sand
				320				SANDY SILTSTONE: fine sand, dense, moist, pale olive (10Y 6/2)

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BORING DW-27 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 7/7/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-452'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
8:28			-					
8:34			-					
			-					
			-	325				more sand, light olive gray (5Y 5/2)
								dense to very dense, pale olive (10Y 6/2), rig chatter, making dust
			-	330				more silt, dense
			-	335				
			-	340				
8:48			-					some fine to medium sand, light olive gray (5Y 5/2)
8:52			-					
			-	345				more silt, dense to very dense, dusky yellowish green (5GY 5/2)
			-	350				more sand, dense, pale olive (10Y 6/2)
			-	355				
				360				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BORING DW-27 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 7/7/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-452'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
9:06			-					light olive gray (5Y 5/2)
10:22			-					1 hour water check: no water detected
			-					
			-	365				mostly silt, medium dense to dense, grayish olive (10Y 4/2)
								▽ groundwater at 369 feet (7:44 am) 7/9/10
			-	370				little fine to medium sand, driller notes easier drilling
			-	375				pale olive (10Y 6/2)
			-	380				
10:35			-					
12:50			-					2 hour water check: no water detected
			-	385				
								little fine to coarse sand
			-	390				
			-	395				some fine to coarse sand, light olive gray (5Y 5/2)
				400				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-27 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 7/7/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-452'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
13:10			-					
13:15			-					
			-					hard gravel size fragments
			-	405				greenish yellow green (5GY 7/2)
			-	410				few gravel
			-	415				more fine to medium sand and gravel
			-	420				
13:27			-					
13:38			-					
			-	425				little gravel, dusky yellow green (5GY 5/2)
			-	430				
			-	435				more silt and less sand and gravel
								SILTSTONE: little fine sand, dense to very dense, light olive gray (5Y 5/2), making dust
				440				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BORING DW-27 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 7/7/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-452'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
13:52			-					
10:04			-					
			-	445				SANDY SILTSTONE: poor recovery, some fine to medium sand
			-	450				poor recovery
10:18			-					driller injects water to clean out hole
								Bottom of Boring at 452 feet. On 7/12/10. Target depth reached. Groundwater monitoring well installed.
				455				
				460				
				465				
				470				
				475				
				480				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

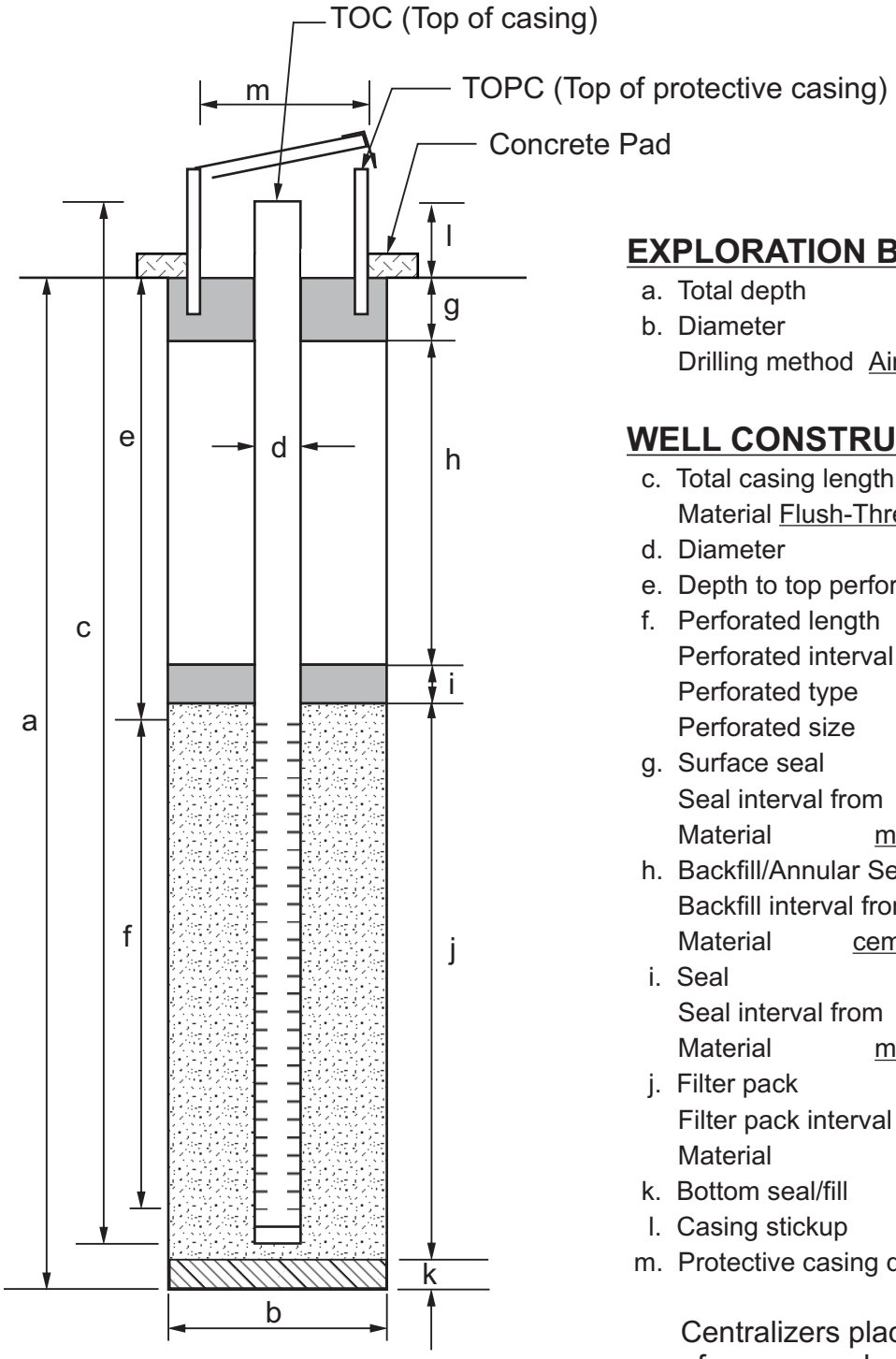
BOREHOLE LOG 2002-036-005.GPJ FRANKIAN.GDT 10/25/10

LOG OF BORING

As-Built Well DW-28

PROJECT NUMBER: 2002-036-005
PROJECT NAME: Chiquita Canyon Landfill
LOCATION: Los Angeles County
DRILLER: WDC

TOP CONCRETE PAD ELEVATION: 1444.867
TOC ELEVATION: 1447.15
DATUM: Mean Sea Level
INSTALLATION DATE: 7/2/2010
BY: P. Chang



EXPLORATION BORING

a. Total depth 402 ft.
b. Diameter 8.5 in.
Drilling method Air Rotary Casing Hammer

WELL CONSTRUCTION

c. Total casing length 383 ft.
Material Flush-Threaded Schedule 80 PVC
d. Diameter 4.0 in.
e. Depth to top perforations 330.34 ft.
f. Perforated length 49.23 ft.
Perforated interval from 330.34 to 379.57 ft.
Perforated type machine slotted
Perforated size 0.020 in.
g. Surface seal 8.2 ft.
Seal interval from 0 to 8.2 ft.
Material medium bentonite chips
h. Backfill/Annular Seal 304.4 ft.
Backfill interval from 8.2 to 312.6 ft.
Material cement with 5% bentonite
i. Seal 10.9 ft.
Seal interval from 312.6 to 323.5 ft.
Material medium bentonite chips
j. Filter pack 74 ft.
Filter pack interval from 323.5 to 397.5 ft.
Material #3 graded sand
k. Bottom seal/fill native slough
l. Casing stickup 2.5 ft.
m. Protective casing diameter 10 3/4 in.

Centralizers placed at bottom and top of screen, and every 40 feet above.

BORING DW-28

JOB NUMBER: 2002-036-005
DATE DRILLED: 6/29/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-402'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
9:02			-		SM	**ARTIFICIAL FILL (af)** SILTY SAND: fine to medium, some coarse sand and gravel, loose to medium dense, dry to moist, grayish orange (10YR 7/4), no odor
						PICO FORMATION (Tp) SILTY SANDSTONE: fine, little medium sand, medium dense, moist, very pale orange (10YR 8/2)
			-	5		
			-	10		little medium sand, dusky yellow (5Y 6/4)
9:07			-			
9:18			-			
			-	15		little coarse sand and gravel
						bottom of temporary drive casing; removed 7/16/10
						SANDSTONE: fine to medium, little silt, medium dense, moist, yellowish gray (5Y 7/2)
			-	20		fine, less silt, grayish yellow (5Y 8/4)
9:25			-			
			-	25		FOSSILIFEROUS SANDSTONE: fine to medium, little shell fragments
			-	30		more medium sand and gravel, less silt
9:50			-			
9:53			-			
			-	35		
				40		

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING DW-28 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 6/29/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-402'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION / GRAPHIC LOG	SOIL TYPE
			-			more silt, more shell fragments
						more sand, medium dense to dense
				45		
						more silt, dark yellowish orange (10YR 6/6)
						CLAYEY SANDSTONE: fine to medium, little coarse sand and angular gravel, low plasticity, medium dense, moist, moderate brown (5YR 4/4)
			-	50		
						SANDY MUDSTONE: fine to medium sand, medium dense to dense, moderate yellowish brown (10YR 5/4)
			-	55		
			-	60		
10:13			-			
10:16			-			
						CLAYSTONE: hard to very hard, moist, light brown (5YR 5/6), slow drilling
			-	65		
			-	70		moderate brown (5YR 4/4)
				75		
						FOSSILIFEROUS CLAYSTONE: few shell fragments
				80		

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-28 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 6/29/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-402'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								moderate yellowish brown (10YR 5/4), few shell fragments
11:04			-					
11:08			-					caving problems
								SILTSTONE: very hard, moist, pale olive (10Y 6/2), rig chatter making lots of dust
			-	85				
								little fine sand, dusky yellow (5Y 6/4)
			-	90				
								begin using auxillary compressor, some gravel returned initially
			-	95				
								easier drilling
			-	100				
								mostly silt, making lots of dust
11:35			-					
12:30			-					FOSSILIFEROUS SILTY SANDSTONE: fine to coarse, dense to very dense, moist, light olive gray (5Y 5/2), little shell fragments, making lots of dust
			-	105				
								driller begins injecting water to keep dust down
			-	110				
			-	115				
								fine, more silt, dusky yellow (5Y 6/4)
				120				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-28 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 6/29/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-402'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
12:55			-					
13:00			-					
			-	125				FOSSILEFEROUS SANDY SILTSTONE: fine, dense, moist, olive gray (5Y 3/2), some shell fragments
			-	130				
			-	135				light olive gray (5Y 5/2), less shell fragments
			-	140				more silt, more shell fragments
13:21			-					
13:24			-					
			-	145				SILTY SANDSTONE: fine to medium, little coarse sand, dense to very dense, moist, yellowish gray (5Y 7/2)
			-	150				FOSSILIFEROUS SILTY SANDSTONE: sample collection difficult; mostly blown dust, some sand and shell fragments
			-	155				some shell fragments
				160				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BORING DW-28 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 6/29/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-402'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
			-					more fine sand
13:50			-					
13:54			-					
			-	165				some medium to coarse sand, slow drilling
			-	170				more silt
			-	175				more fine to medium sand
			-	180				fine, more silt
14:13			-					NOTE* - not able to grab samples from cyclone due to dust and sand being blown away
14:17			-					
								SANDSTONE: fine to coarse, dense to very dense, moist, grayish yellow (5Y 8/4)
			-	185				very dense, poor sample - fines and fine sand being blown away. slow drilling
			-	190				driller continuing to inject water to keep dust down
			-	195				
				200				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BORING DW-28 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 6/29/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-402'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
			-					more silt, moist
14:48			-					NOTE* - continued poor sampling from cyclone
14:55			-					SILTY SANDSTONE: fine, little medium sand, dense, moist, yellowish gray (5Y 7/2), slightly easier drilling
			-	205				
			-	210				more silt
			-	215				
								SANDSTONE: fine to medium, dense to very dense, moist, yellowish gray (5Y 7/2)
			-	220				
15:16			-					NOTE* - continued poor sampling from cyclone
15:18			-					SILTY SANDSTONE: fine, little medium sand, dense to very dense, moist, yellowish gray (5Y 7/2)
			-	225				
			-	230				more silt, dusky yellow (5Y 6/4)
			-	235				
				240				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-28 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 6/29/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-402'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								less silt, more fine sand
15:44								
15:03								
				245				
								SANDY SILTSTONE: fine to medium sand, dense, moist, dusky yellow (5Y 6/4), cored but no recovery, resumed drilling with air rotary
				250				
				255				dense to very dense, grayish yellow (5Y 8/4), making lots of dust
				260				less silt, dusky yellow (5Y 6/4)
15:13								
15:16								
				265				
				270				SILTY SANDSTONE: fine to medium, little coarse sand, dense to very dense, moist, dusky yellow (5Y 6/4)
								some gravel
								MUDSTONE: very dense, moist, grayish yellow green (5GY 7/2), difficult to sample, slow drilling and making lots of dust
				275				
				280				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BORING DW-28 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 6/29/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-402'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								little fine sand, light olive gray (5Y 5/2)
15:33			-					
15:36			-					
			-	285				SILTSTONE: very dense, moist, dusky yellow green (5GY 5/2), making lots of dust, slow drilling
			-	290				little fine sand
								MUDSTONE: little fine sand, very dense, moist, pale yellowish brown (10YR 6/2) to light olive gray (5Y 5/2)
			-	295				
			-	300				SILTSTONE: pale olive (10Y 6/2)
15:56			-					
8:15			-					
			-	305				more fine sand
			-	310				SANDY SILTSTONE: fine sand, very dense, dusky yellow green (5GY 5/2)
			-	315				
				320				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-28 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 6/29/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-402'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
			-					fine to medium sand
8:27			-					gradational contact
8:32			-					SILTY SANDSTONE: fine to medium, little gravel, dense to very dense, moist, grayish yellowish green (5GY 7/2)
			-	325				
			-	330				more sand and subrounded gravel
			-	335				
								▽ groundwater at 338 feet (8:40 am) 7/1/10
								PEBBLY SANDSTONE: fine to coarse, some subrounded to subangular gravel, dense to very dense, moist, pale olive (10Y 6/2), slightly less dust and more moisture
			-	340				
8:51			-					
8:54			-					
			-	345				
			-	350				FOSSILIFEROUS SANDSTONE: more silt and less gravels, little shell fragments
								SANDY SILTSTONE: very dense, moist, light olive brown (5Y 5/6), making lots of dust
			-	355				less sand, pale olive (10Y 6/2)
								making lots of dust, light olive brown (5Y 5/6)
				360				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-28 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 6/29/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-402'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								grayish olive (10Y 4/2)
9:23 10:38								30 minute water check: no water detected, but probe tip was wet; waited another 30 minutes: no water. Not making water when air turned on, but less dust being produced
				365				▽ groundwater at 365.2 feet (7:25 am) 7/2/10
								SILTSTONE: little sand
				370				very dense, grayish olive green (5GY 3/2), slow drilling, producing more dust
				375				MUDSTONE: very dense, moist, grayish olive (10Y 4/2)
				380				no sample, very little returned to surface other than fine dust
11:05 11:10								FOSSILIFEROUS MUDSTONE: little shell fragments
				385				poor sample, lots of dust and slow drilling
				390				SANDY SILTSTONE: fine to medium sand, few gravel
				395				
				400				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING DW-28 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 6/29/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-402'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
11:35								2 hour water check: water level at 365.2' (7:25 am 7/2/10)
								Bottom of Boring at 402 feet. On 7/1/10. Target depth reached. Groundwater monitoring well installed.
				405				
				410				
				415				
				420				
				425				
				430				
				435				
				440				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-005.GPJ FRANKIAN.GDT 10/25/10

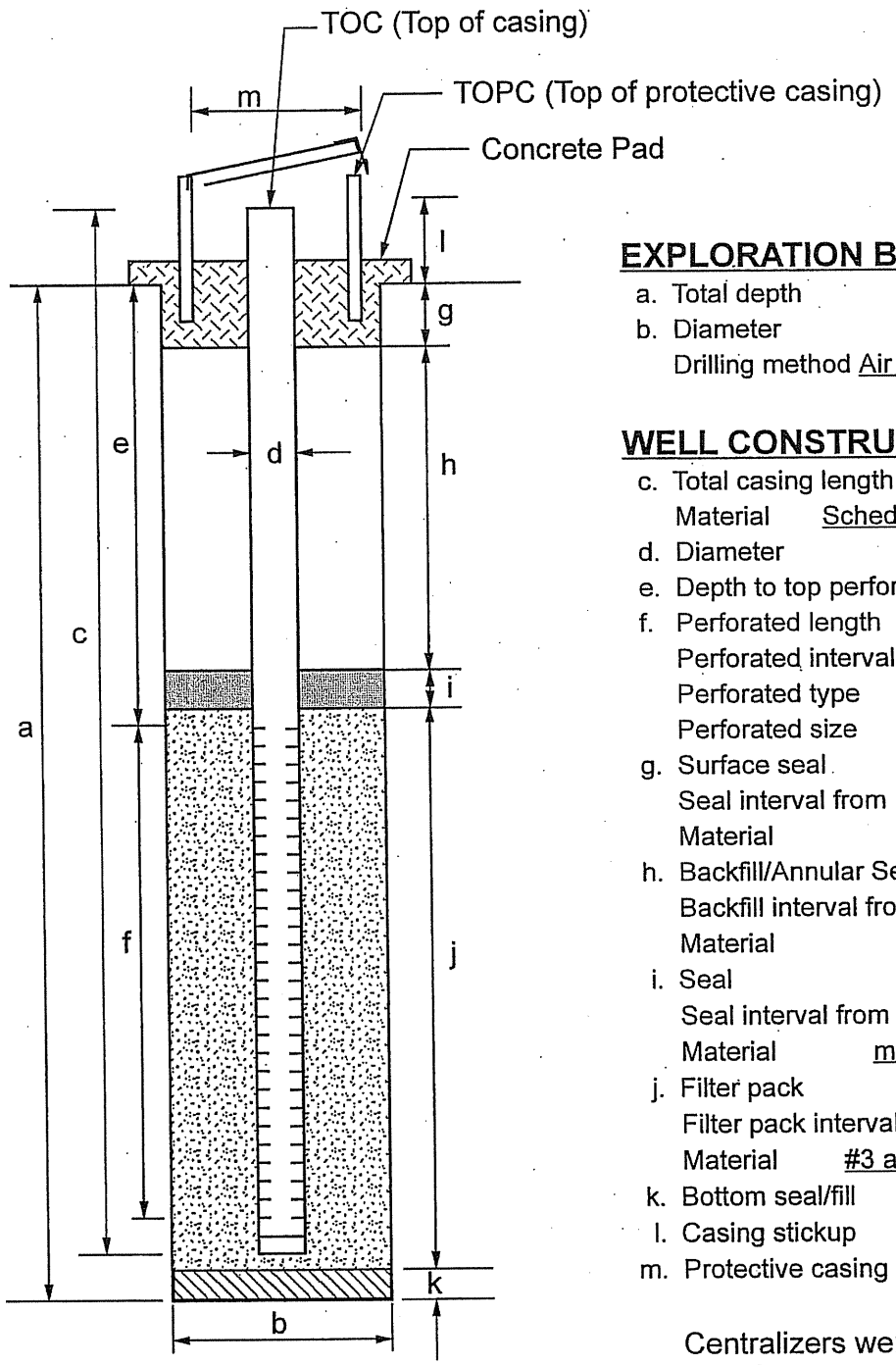
LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

AS BUILT WELL DETAIL: PZ-5

PROJECT NUMBER: 2002-036-91
PROJECT NAME: Chiquita Canyon Landfill
LOCATION: Los Angeles County
DRILLER: WDC

SURFACE ELEVATION: 1212.08
TOC ELEVATION: 1214.58
DATUM: Mean Sea Level
INSTALLATION DATE: 11-23-04



EXPLORATION BORING

a. Total depth 190 ft.
b. Diameter 8.5 in.
Drilling method Air Rotary Casing Hammer.

WELL CONSTRUCTION

c. Total casing length 192.03 ft.
Material Schedule 80 PVC
d. Diameter 2.0 in.
e. Depth to top perforations 159.50 ft.
f. Perforated length 29.61 ft.
Perforated interval from 159.50 to 189.11 ft.
Perforated type machine slotted
Perforated size 0.020 in.
g. Surface seal 1.5 ft.
Seal interval from 0 to 1.5 ft.
Material Concrete / Cement
h. Backfill/Annular Seal 143.6 ft.
Backfill interval from 1.5 to 145.1 ft.
Material neat cement
i. Seal 7.7 ft.
Seal interval from 145.1 to 152.8 ft.
Material medium bentonite chips
j. Filter pack 37.2 ft.
Filter pack interval from 152.8 to 190.0 ft.
Material #3 and #2/12 graded sand
k. Bottom seal/fill none
l. Casing stickup 2.5 ft.
m. Protective casing diameter 10 3/4 in.

Centralizers were placed at bottom and top of screen, and every 40 feet above.

BORING PZ-5

JOB NUMBER: 2002-036-91
DATE DRILLED: 11/22/04
EQUIPMENT USED: Air Rotary Casing Hammer
ELEVATION: 1212.08'
LOGGED BY: Paul Chang
BORING DEPTH: 0-190'
SURFACE CONDITIONS: Dirt drilling pad

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
							ML	**0-3' FILL (af)** SANDY SILT: some fine sand, few medium sand to fine gravel, loose to moderately hard, dry to damp, grayish orange (10YR 7/4), no odor. (10:27)
				5				**3-190' PICO FORMATION (Tp)** SANDY SILTSTONE: mostly silt, some fine to medium sand, few fine gravels, moderately hard to hard, dry to damp, pale yellowish brown (10YR 6/2), no odor (10:35) @ 7ft. driller switches to downhole hammer. Drilling 9-inch hole with 8.5-inch bit; driving temporary steel casing (nominal 9 5/8-inch) to 46.52 feet using air rotary casing hammer method. (10:40) (10:58)
				10				@ 10 ft. dark yellowish orange: more silts
				15				@ 15 ft. dusky yellow (5YR 6/4): more fine sand
								CLAYSTONE: little fine sands: mostly clay and silt, moderately hard, damp, light olive gray (5Y 5/2), no odor
				20				SANDY SILTSTONE: mostly silt: few claystone fragments, some fine sand, moderately hard, damp, dusky yellow (5YR 6/4), no odor
				25				@ 25 ft. mostly silt: some fine to medium sand
								SILTY SANDSTONE: some silt, mostly fine sand, few medium to coarse sand, moderately hard, moist, dusky yellow (5Y 6/4), no odor (11:15) (11:20)
				30				
								SANDY SILTSTONE: mostly fine silt: some fine to medium sand, little coarse sand and fine gravels, moderately hard, moist, olive brown (5Y 5/6), no odor
				35				
				40				

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING PZ-5 (CONTINUED)

JOB NUMBER: 2002-036-91
DATE DRILLED: 11/22/04
EQUIPMENT USED: Air Rotary Casing Hammer
ELEVATION: 1212.08'
LOGGED BY: Paul Chang
BORING DEPTH: 0-190'
SURFACE CONDITIONS: Dirt drilling pad

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
			-					@ 40 ft. more medium to coarse sand
			-	45				@ 45 ft. little medium sand to gravels: mostly silt: some fine sand: occasional claystone fragments @ 46.52 bottom of drive casing (removed 11/23/04); drill to 190 ft. open hole using direct air rotary method.
			-	50				(11:42) (11:47) @ 50 ft. few medium to coarse sand
								SILTY SANDSTONE: some silt: mostly fine to medium sand, some coarse sand and gravel, moderatly hard, moist, dusky yellow (5Y 6/4), no odor
			-	55				
			-	60				@ 60 ft. light olive brown (5Y 5/6): more silt and fine sand
			-	65				@ 65 ft. some silt: mostly fine sand: little medium sand
			-	70				(11:54) (11:57) @ 70 ft. more silts
			-	75				∇ groundwater at 75.53 feet (8:40 am) 12/1/04 in piezometer (8:40 AM) 12/01/04
				80				

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BOREHOLE LOG 2002-036-91.GPJ FRANKIAN.GDT 8/25/05

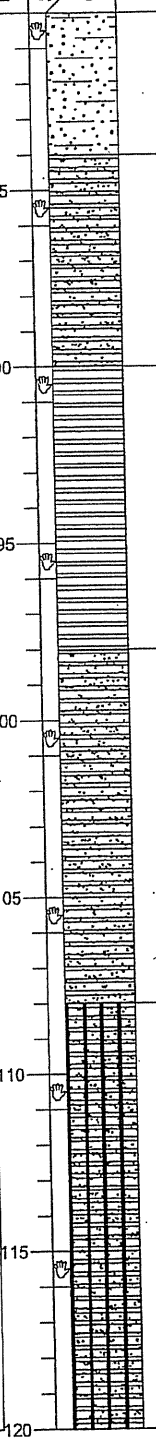
LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING PZ-5 (CONTINUED)

JOB NUMBER: 2002-036-91
DATE DRILLED: 11/22/04
EQUIPMENT USED: Air Rotary Casing Hammer
ELEVATION: 1212.08'
LOGGED BY: Paul Chang
BORING DEPTH: 0-190'
SURFACE CONDITIONS: Dirt drilling pad

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
				85			
				90			
				95			
				100			
				105			
				110			
				115			
				120			



SANDY CLAYSTONE: mostly fines: some fine sand, little claystone clasts, hard, moist, grayish olive (10Y 4/2), no odor
@ 85 ft. 1 hour water check: no water

(12:08)
(13:10)
CLAYSTONE: mostly fine clay and claystone fragments, little fine sand, hard, moist, no odor

@ 95 ft. moderate olive brown (5Y 4/4)

SANDY CLAYSTONE: mostly clay and claystone fragments, some fine sand, hard, moist, no odor

@ 100 ft. light olive gray (5Y 5/2): more fine sand

@ 104 ft. slight increase in moisture
@ 105 ft. 15 minute water check: no water

CLAYEY/SILTY SANDSTONE: some clay/silt and claystone fragments, mostly fine sand, hard, moist, light olive (5Y 5/2), no odor
(13:28)
(13:45)

@ 115 ft. more fine to medium sands

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BOREHOLE LOG 2002-036-91.GPJ FRANKIAN.GDT 8/25/05

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING PZ-5 (CONTINUED)

JOB NUMBER: 2002-036-91
DATE DRILLED: 11/22/04
EQUIPMENT USED: Air Rotary Casing Hammer
ELEVATION: 1212.08'
LOGGED BY: Paul Chang
BORING DEPTH: 0-190'
SURFACE CONDITIONS: Dirt drilling pad

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								@ 122 ft. more clay and claystone fragments
				125				@ 125 ft. more fine to coarse sand: little gravels: harder drilling. 10 minute water check: no water
								@ 128 ft. making lots of whitish dust (dry returns)
								SILTY SANDSTONE: little silt; mostly fine sand and rock fragments, some medium to coarse sand; few white fragments, hard, dry to moist, yellowish gray (5Y 7/2), no odor (13:58) (14:10)
				130				
				135				@ 135 ft. light olive gray (5Y 5/2): more silt and fine sands: moist
				140				@ 140 ft. pale olive (10Y 6/2): few white (shell?) fragments
				145				@ 145 ft. more fine sand: very hard: moist. Water check for 15 minutes: no water
				150				(14:21) (14:39) ▽ groundwater at 150.62 feet (7:15 am) 11/23/04 (7:15 am) 10/23/2004 after overnight water check with boring total depth 189 feet.
				155				
				160				@ 158.5 moderate olive brown (5Y 4/4): slightly coarser sand and few rock fragments

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BOREHOLE LOG 2002-036-91.GPJ FRANKIAN.GDT 8/25/05

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING PZ-5 (CONTINUED)

JOB NUMBER: 2002-036-91
DATE DRILLED: 11/22/04
EQUIPMENT USED: Air Rotary Casing Hammer
ELEVATION: 1212.08'
LOGGED BY: Paul Chang
BORING DEPTH: 0-190'
SURFACE CONDITIONS: Dirt drilling pad

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								@ 161 ft. pale olive (10YR 6/2): mostly fine to medium sand: few rock fragments: some silt: moist: hard: no odor
				165				@ 165 ft. 15 minute water check: no water
								∇ probable first encountered (3:08 pm) 11/22/04) groundwater at 169 feet (3:08 pm) 12/30/99
				170				CLAYEY SANDSTONE: some clay with silt: some fine sand, little medium to coarse sand, hard, moist (possible water) to very moist, moderate brown (5YR 4/4), no odor. (14:59) (15:08)
				175				@ 175 ft. slightly more medium to coarse sand
								SILTY SANDSTONE: some silt: mostly fine sand, hard, moist to very moist, pale olive (10 Y 6/2), no odor
				180				
				185				@ 185 ft. light olive brown (5Y 5/6): some silt: mostly fine sand: some medium to coarse sand: hard: moist to very moist: no odor. 15 minute water check: No water
								@ 190 ft. (15:24) Overnight water check: water = 150.62' at 7:00 11/23/04. Tag bottom of hole at 162.1 ft., drill out to 190 ft.
				190				Bottom of Boring at 190 feet. At 3:24 pm 11/22/04. Target depth reached
				195				
				200				

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-91.GPJ FRANKIAN.GDT 8/25/05

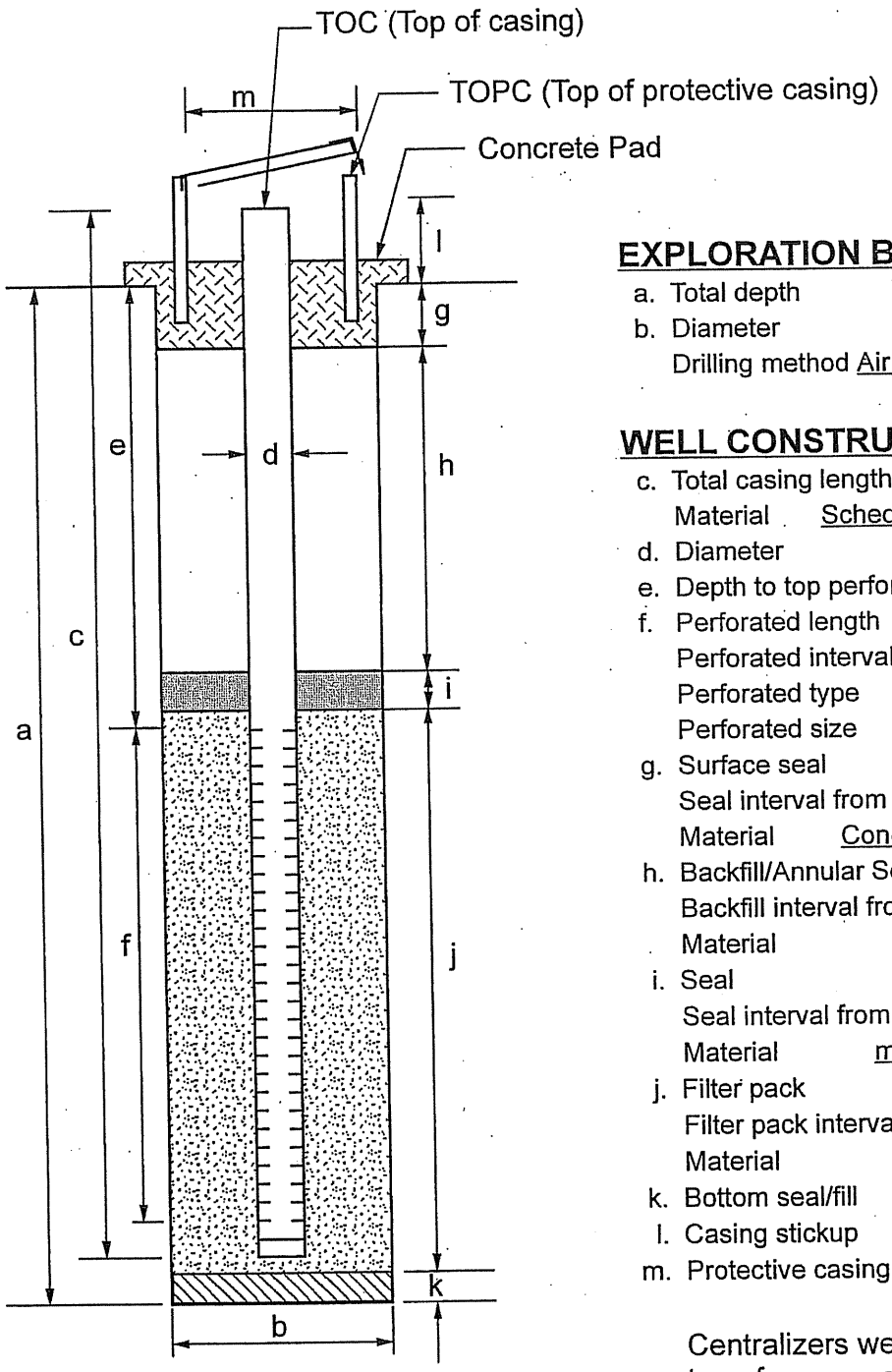
LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

AS BUILT WELL DETAIL: PZ-6

PROJECT NUMBER: 2002-036-91
PROJECT NAME: Chiquita Canyon Landfill
LOCATION: Los Angeles County
DRILLER: WDC

SURFACE ELEVATION: 1180.10
TOC ELEVATION: 1182.60
DATUM: Mean Sea Level
INSTALLATION DATE: 11-30-04



EXPLORATION BORING

a. Total depth 116 ft.
b. Diameter 8.5 in.
Drilling method Air Rotary Casing Hammer.

WELL CONSTRUCTION

c. Total casing length 118.56 ft.
Material Schedule 80 PVC
d. Diameter 2.0 in.
e. Depth to top perforations 86.01 ft.
f. Perforated length 29.61 ft.
Perforated interval from 86.01 to 115.62 ft.
Perforated type machine slotted
Perforated size 0.020 in.
g. Surface seal 2 ft.
Seal interval from 0 to 2 ft.
Material Concrete / Bentonite Chips
h. Backfill/Annular Seal 70.8 ft.
Backfill interval from 2 to 72.8 ft.
Material neat cement
i. Seal 7.4 ft.
Seal interval from 72.8 to 80.2 ft.
Material medium bentonite chips
j. Filter pack 35.8 ft.
Filter pack interval from 80.2 to 116 ft.
Material #2/12 graded sand
k. Bottom seal/fill none
l. Casing stickup 2.5 ft.
m. Protective casing diameter 10 3/4 in.

Centralizers were placed at bottom and top of screen, and every 40 feet above.

BORING PZ-6

JOB NUMBER: 2002-036-91
DATE DRILLED: 11/29/04
EQUIPMENT USED: Air Rotary Casing Hammer
ELEVATION: 1180.10'
LOGGED BY: Paul Chang
BORING DEPTH: 0-116'
SURFACE CONDITIONS: Dirt Road

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								0-42' LANDSLIDE (Qls) SILTSTONE: mostly silt: some clay, minor fine to medium sand, moderately hard, dry to moist, light olive gray (5Y 5/2), no odor. (14:35) Drilling 9-inch hole with 8.5-inch bit; driving temporary steel casing (nominal 9 5/8-inch) to 47.22 feet using air rotary casing hammer method.
				5				SANDY SILTSTONE: mostly silt: some fine sand, few medium sand, moderately hard, moist, moderate yellowish brown (10 YR 5/4), no odor
				10				(14:45) (14:58) @ 10 ft. moderate brown (5 YR 4/4): slightly more clayey
				15				
				20				SILTY SANDSTONE: some silt: mostly fine sand, little medium sand, moderately hard, moist, moderate yellowish brown (10 YR 5/4), no odor
				25				@ 25 ft. more sand: some medium to coarse sand
				30				@ 30 ft. more silt and fine sands. (15:10) (15:22)
								@ 32 ft. grayish yellow (5Y 8/4): some silt: mostly fine sand: making fine dust: hard: dry to moist: no odor
				35				@ 34 ft. light olive brown (5Y 5/6) some silt: mostly fine sand: some medium to coarse sand: moderately hard to hard: moist: no odor
				40				@ 38 ft. pale olive (10 YR 6/2): some silt: mostly fine sand

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BOREHOLE LOG 2002-036-91.GPJ FRANKIAN.GDT 8/25/05

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING PZ-6 (CONTINUED)

JOB NUMBER: 2002-036-91
DATE DRILLED: 11/29/04
EQUIPMENT USED: Air Rotary Casing Hammer
ELEVATION: 1180.10'
LOGGED BY: Paul Chang
BORING DEPTH: 0-116'
SURFACE CONDITIONS: Dirt Road

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								@ 42 ft. probable base of landslide
								42-116' PICO FORMATION (Tp)
								SANDY SILTSTONE: mostly silt and siltstone fragments, some fine sand: few medium sand, hard, moist, light olive brown (5Y 5/6), no odor
				45				
								@ 47.22 ft. bottom of drive casing (removed 11/30/04); drill to 116 ft. open hole using direct air rotary method.
								SILTSTONE: mostly silt and silstone fragments, few fine to medium sand, hard, moist, grayish olive (10Y 4/2), no odor
				50				(15:47)
				55				
								@ 57-60 ft. slightly more sandy
				60				@ 60 ft. mostly silt: some fine sand
								SILTY SANDSTONE: dusky yellow (5YR 6/2)
								SILTSTONE: mostly siltstone, some fine sand
				65				SILTY SANDSTONE: some silt: mostly fine to medium sand, few coarse sand, hard, moist, light olive brown (5 Y 5/6), no odor
				70				
								@ 73 ft. more silt and fine sand. (16:05) (16:09)
				75				SILTSTONE: mostly silt and siltstone fragments, few fine sand, hard, moist, light olive gray (5YR 5/2), no odor
								SILTY SANDSTONE: some silt: mostly fine sand, hard, moist, light olive gray (5Y 5/2), no odor
								∇ groundwater at 79.25 feet (8:30 am) 12/1/04
				80				

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BOREHOLE LOG 2002-036-91.GPJ FRANKIAN.GDT 8/25/05

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING PZ-6 (CONTINUED)

JOB NUMBER: 2002-036-91
DATE DRILLED: 11/29/04
EQUIPMENT USED: Air Rotary Casing Hammer
ELEVATION: 1180.10'
LOGGED BY: Paul Chang
BORING DEPTH: 0-116'
SURFACE CONDITIONS: Dirt Road

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								in piezometer (8:30 am) 12/1/04
				85				SANDY SILTSTONE: mostly silt, some fine sand, hard, moist, light olive gray (5Y 5/2), no odor
				90				@ 90 ft. grayish olive (10Y 4/2): some siltstone fragments
								SILTY SANDSTONE: some silt: mostly fine sand, few medium sand, hard, moist to very moist, light olive gray (5Y 3/2), no odor
				95				@ 95 ft. (16:26) overnight water check: water = 93.16 ft. (7:00 AM) 11/30/04 @ 95-100 ft. poor recovery
				100				
				105				@ 106 ft. pale olive gray (10Y 6/2): some fines (less than above): mostly fine sand: hard to very hard: very moist: no odor
				110				
				115				@ 115 ft. yellowish gray (5Y 7/2): slightly less silt
				120				Bottom of Boring at 116 feet. At 8:10 am 11/30/04. Target depth reached

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-91.GPJ FRANKIAN.GDT 8/25/05

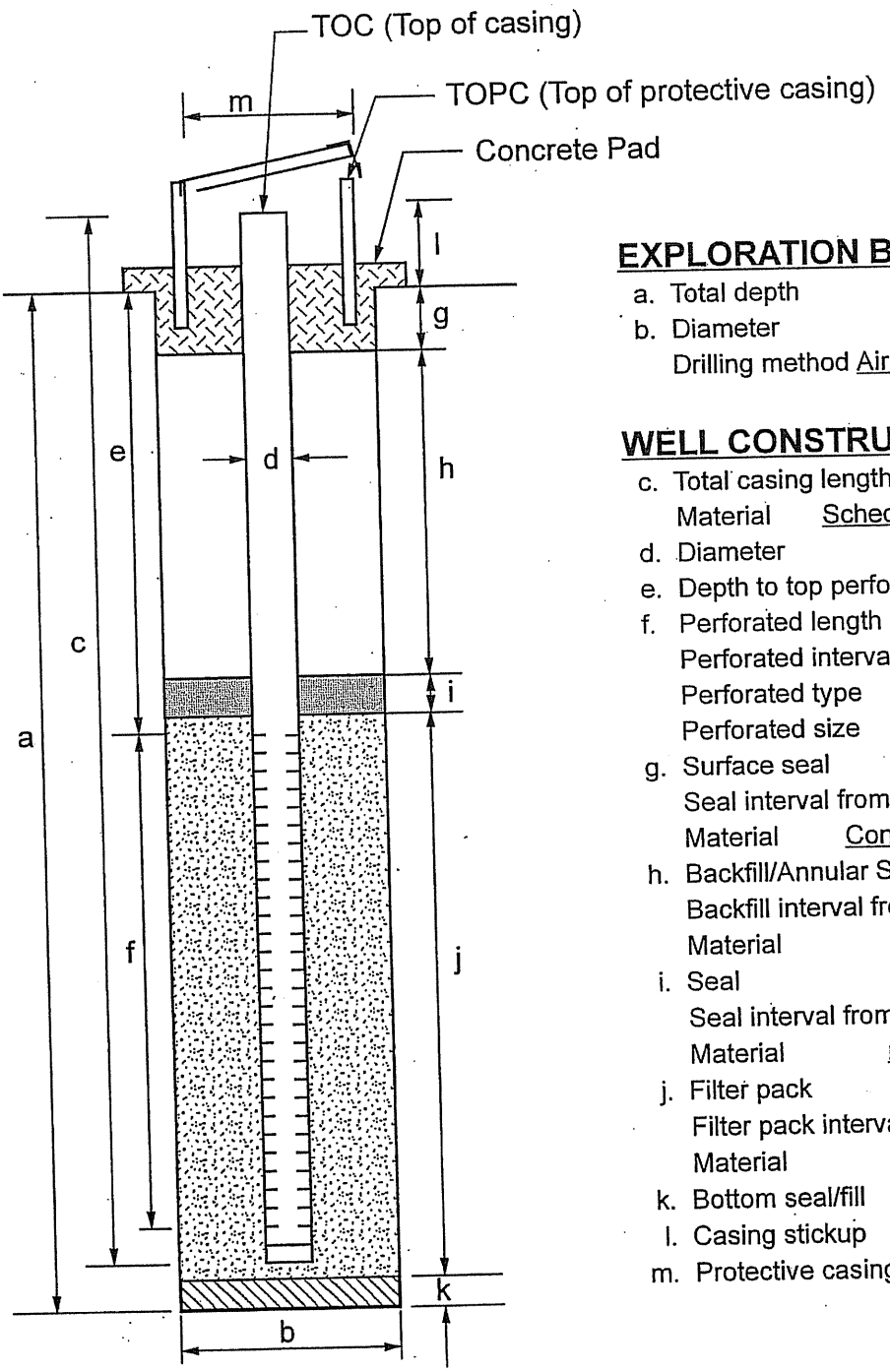
LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

AS BUILT WELL DETAIL: PZ-7

PROJECT NUMBER: 2002-036-91
PROJECT NAME: Chiquita Canyon Landfill
LOCATION: Los Angeles County
DRILLER: WDC

SURFACE ELEVATION: 1193.14
TOC ELEVATION: 1195.64
DATUM: Mean Sea Level
INSTALLATION DATE: 12-9-04



EXPLORATION BORING

a. Total depth 295 ft.
b. Diameter 8.5 in.
Drilling method Air Rotary Casing Hammer.

WELL CONSTRUCTION

c. Total casing length 241.63 ft.
Material Schedule 80 PVC
d. Diameter 4.0 in.
e. Depth to top perforations 219.76 ft.
f. Perforated length 18.97 ft.
Perforated interval from 219.76 to 238.73 ft.
Perforated type machine slotted
Perforated size 0.020 in.
g. Surface seal 2 ft.
Seal interval from 0 to 2 ft.
Material Concrete / Bentonite Chips
h. Backfill/Annular Seal 120 ft.
Backfill interval from 2 to 120 ft.
Material neat cement
i. Seal 8 ft.
Seal interval from 120 to 128 ft.
Material medium bentonite chips
j. Filter pack 167 ft.
Filter pack interval from 128 to 295 ft.
Material native sandy slough
k. Bottom seal/fill none
l. Casing stickup 2.5 ft.
m. Protective casing diameter 10 3/4 in.

R.T. FRANKIAN & ASSOCIATES
FIGURE 6

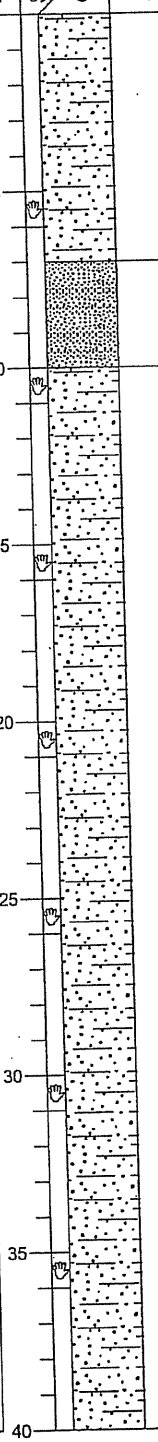
2002-036-91 REPORT DATED 8-26-05

For use with report dated 07/26/2006; RTF job number 2002-036-01

BORING PZ-7

JOB NUMBER: 2002-036-91
DATE DRILLED: 12/3/04
EQUIPMENT USED: Air Rotary Casing Hammer
ELEVATION: 1193.14'
LOGGED BY: Paul Chang
BORING DEPTH: 0-295'
SURFACE CONDITIONS: Dirt drill pad in canyon bottom

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE



0-295' SAUGUS FORMATION (QTs)

SILTY SANDSTONE: mostly fine sand, some silt, little medium to coarse sand and gravels, moderately hard, dry to moist, moderate yellowish brown (10YR 5/4), (9:44) Drilling 9-inch hole with 8.5-inch bit; driving temporary steel casing (nominal 9 5/8-inch) to 46.3 feet using air rotary casing hammer method.

(9:46)
(10:06)

SANDSTONE: little silt: mostly fine to coarse sands, some gravels, hard, dry to moist, pale olive (10Y 6/2)

SILTY SANDSTONE: some silt: mostly fine sand, some medium sand to fine gravels, moderately hard, moist, light olive brown (5Y 5/6)

@ 15 ft. more fine gravels

@ 20 ft. little coarse sand to gravels: mostly fine sand: some silt

@ 25 ft. pale olive (10Y 6/2): more silts and fine sand: few medium sand

(10:18)
(10:20)
@ 30 ft. dusky yellow (5YR 6/4): more fine sand

@ 35 ft. light olive brown (5Y 5/6)

(CONTINUED ON THE FOLLOWING FIGURE)

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-91.GPJ FRANKIAN.GDT 8/25/05

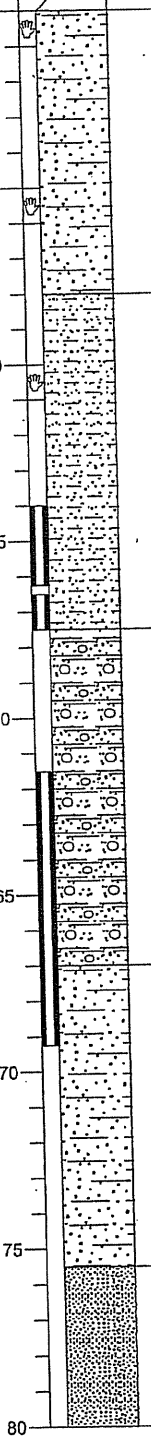
LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING PZ-7 (CONTINUED)

JOB NUMBER: 2002-036-91
DATE DRILLED: 12/3/04
EQUIPMENT USED: Air Rotary Casing Hammer
ELEVATION: 1193.14'
LOGGED BY: Paul Chang
BORING DEPTH: 0-295'
SURFACE CONDITIONS: Dirt drill pad in canyon bottom

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE



@ 40 ft. more medium to coarse sands: few gravels

@ 46.3 ft. bottom of drive casing (removed 12/10/04); drill to 54 ft. open hole using direct air rotary method.

SANDY SILTSTONE: some fine sand, mostly silt and siltstone fragments, moderately hard, moist, dusky yellow (5Y 6/4)

@ 54 ft. begin continuous coring (10:46)
(11:40)
@ 55 ft. light olive gray (5Y 5/2): mostly silt: some fine sands: moist: hard
@ 55.5 high angle fracture (60 degrees) with slickenside.
(11:46)
(13:05)
@ 57 ft. very hard: massive: some gravels at bottom

SILTY, GRAVELLY SANDSTONE: mostly fine to medium sand, little silt, some coarse sand and fine gravels, massive, hard, moist, light olive brown (5Y 5/6), @ 57.5 ft - 61.5 ft. No recovery (13:12)

(13:20)

(13:26)
(13:37)

@ 65.5 ft. less gravels: more fine sand

(13:41)
(13:55)

SILTY SANDSTONE: some silt, mostly fine sand, moist, (increasing in moisture)
(14:03)
(14:12)
@ 68.8 ft. more medium to coarse sands: few fine gravels: moderately hard: friable: less moist
(14:24)
(14:35)

SANDSTONE: mostly fine sand, little silt, moderately hard, moist, dusky yellow (5Y 6/4), (14:40)
(14:44)

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BOREHOLE LOG 2002-036-91.GPJ FRANKIAN.GDT 8/25/05

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING PZ-7 (CONTINUED)

JOB NUMBER: 2002-036-91
DATE DRILLED: 12/3/04
EQUIPMENT USED: Air Rotary Casing Hammer
ELEVATION: 1193.14'
LOGGED BY: Paul Chang
BORING DEPTH: 0-295'
SURFACE CONDITIONS: Dirt drill pad in canyon bottom

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
				85				GRAVELLY SANDSTONE: some fine sand: little medium to coarse sand, some gravels, hard, moist, pale olive (10Y 6/2), massive (14:56) (15:02)
				90				@ 90 ft. Gravelly Sandstone: moist: light olive (10Y 5/4): mostly fine to medium sand: some coarse sand and gravels: little silt (15:10) (15:13)
				95				SILTSTONE TO CLAYSTONE: little fine sand, mostly fines (silt & clays), hard, moist, dusky yellow (5Y 6/4) to moderate brown (5YR 4/4), finely laminated in places (15:19) (15:35) @ 97.8 ft. high angle fracture (55 degrees) with slickenside: otherwise massive
				100				@ 100 ft. more fine sands CLAYSTONE: mostly clay with silt, little fine sand, hard to very hard, moist, moderate brown (5YR 4/4), (15:44) (15:55) SILTSTONE: mostly silt with clay, moist @ 103 ft. some fine sand: less moisture
				105				SILTY SANDSTONE: mostly fine sand, some silt, little medium sand, moderately hard to hard, moist, light olive brown (5Y 5/6) @ 107.5 ft. (16:00) overnight water check: no water. (9:31 12/06/2004) @ 108 ft. dusky yellow (5Y 6/4): moist @ 108.8 ft. slight increase in moisture
				110				@ 110 ft. light olive gray (5Y 5/2): moist (9:40) (9:49) @ 113 ft. more silt
				115				@ 115.5 ft. little silt: mostly fine sand. (9:57) (10:07)
				120				∇ groundwater at 118.9 feet (8:20 am) 12/13/04 (8:20 AM) 12/13/04 in piezometer

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BOREHOLE LOG 2002-036-91.GPJ FRANKIAN.GDT 8/25/05

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING PZ-7 (CONTINUED)

JOB NUMBER: 2002-036-91
DATE DRILLED: 12/3/04
EQUIPMENT USED: Air Rotary Casing Hammer
ELEVATION: 1193.14'
LOGGED BY: Paul Chang
BORING DEPTH: 0-295'
SURFACE CONDITIONS: Dirt drill pad in canyon bottom

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								SANDY SILTSTONE: some fine sand, mostly silt, hard, moist, light olive brown (5Y 5/6)
								(10:12)
								(10:18)
								@ 120.5 ft. more fine sands
								SILTSTONE: mostly fines, few fine sand, very hard, moist, light olive gray (5Y 5/2)
				125				@ 121.5 ft. olive gray (5Y 3/2): less fine sand
								(10:24)
								(10:35)
								@ 124.5 ft - 125.5 ft. few black (organic?) streaks
								@ 125.7 ft. light olive gray (5Y 5/2)
								(10:43)
								(10:58)
				130				@ 128.5 ft. Sandy Siltstone: more fine sands: moist
								@ 129.2 ft. Siltstone: few fine sands: mostly silt
								(11:07)
								(11:18)
								@ 133.5 ft. some organics
								@ 134.2 ft. high angle (60 degrees) bedding/lamination
				135				@ 134.8 ft. more fine sands
								(11:21)
								(11:37)
								@ 136.5 ft. easier drilling
				140				(11:45)
								(11:55)
								@ 140 ft. little fine sand: shiny fractured surfaces: moist
								@ 140.8 ft. yellowish gray (5Y 7/2)
								(12:01)
								(12:15)
				145				@ 144.5 ft - 145.2 ft Sandy Siltstone: light olive (10Y 5/4): mostly silt: some fine sands: moist: hard: bedding ~50 - 60 degrees
								SILTSTONE: mostly silt, few fine sands, hard, moist, light olive brown (5Y 5/6)
								@ 147.5 ft. 1 hour water check: no water. (12:21)
								(13:45)
								SANDY SILTSTONE: mostly silt, some fine sand, hard, moist, light olive brown (5YR 4/4)
				150				
								(13:55)
								(14:05)
								SILTSTONE: mostly silt: few sands, some oxide staining, hard to very hard, moist, grayish olive (10Y 4/2)
				155				(14:20)
								(14:26)
								@ 157.5 ft: very hard: highly fractured. (14:31)
								(14:45)
				160				

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BOREHOLE LOG 2002-036-91.GPJ FRANKIAN.GDT 8/25/05

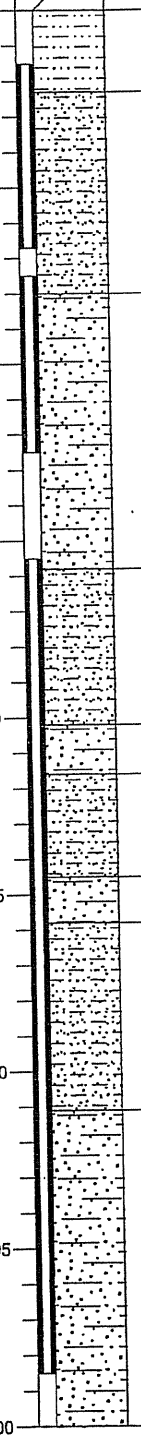
LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING PZ-7 (CONTINUED)

JOB NUMBER: 2002-036-91
DATE DRILLED: 12/3/04
EQUIPMENT USED: Air Rotary Casing Hammer
ELEVATION: 1193.14'
LOGGED BY: Paul Chang
BORING DEPTH: 0-295'
SURFACE CONDITIONS: Dirt drill pad in canyon bottom

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE



(14:54)
(15:07)
SANDY SILTSTONE: mostly silt: some fine sand, some iron-oxide staining, very hard, moist, light olive gray (5Y 5/2), massive

165

(15:12)
(15:25)
@ 166.5 ft. slightly more fine sand
@ 167.5 ft. Siltstone: pale olive (10Y 6/2): mostly silt: little fine to medium sand: very hard: moist. (15:28)
SILTY SANDSTONE: mostly fine sand, some silt, moderate hard to hard, moist, moderate olive brown (5Y 4/4), (11:00 12/07/2004)
@ 169.5 ft. - 170 ft. some medium sand to fine gravels

170

(11:03)
(11:26)
@ 172 ft. silty sand: slight increase in moisture

175

(11:29)
(11:38)
SANDY SILTSTONE: some fine sand, mostly silt, hard, moist (less moisture), moderate olive brown (5Y 4/4)
@ 178 ft. less fine sand: high angle bedding (~60 degrees)

180

(11:45)
(11:55)
SILTY SANDSTONE: mostly fine sand, some silt, hard, very moist, moderate olive brown (5Y 4/4)
SANDY SILTSTONE: little fine sand, mostly silt, hard, moist, light olive brown (5Y 5/6)
(12:00)
(12:10)
SILTY SANDSTONE: mostly fine sand, some silt, little medium to coarse sand, hard, moist to wet, pale olive (10Y 6/2)
@ 185.2 ft. dusky yellow (5Y 6/4): mostly fine sand
SANDY SILTSTONE: little fine sand, mostly silt with clay, very hard, moist to wet, moderate brown (5YR 4/4)
@ 187.5 ft. 1 hour water check: no water. (12:21)
(13:50)
@ 189.8 ft. Siltstone: mostly silt: few to little sand: moist

185

190

SILTY SANDSTONE: mostly fine sand, some fines, moderately hard, moist, light olive brown (5Y 5/6)
(13:53)
(14:07)
@ 194 ft. high angle bedding (55 degrees)
@ 194.5 ft. Sandy Siltstone: greenish olive (10Y 4/2): mostly silt: little fine sand: very hard: moist
(14:11)
▽ (14:21)
@ 196 ft. Silty Sandstone: light brown (5YR 5/6): some silt: mostly fine sand: hard: moist
groundwater at 197.45 feet (7:10 am) 12/8/04

195

200

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BOREHOLE LOG 2002-036-91.GPJ FRANKIAN.GDT 8/25/05

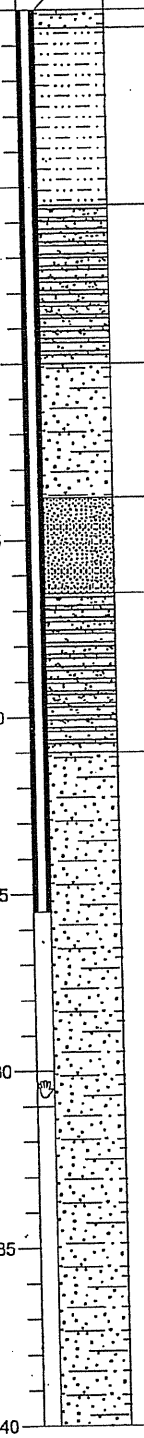
LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING PZ-7 (CONTINUED)

JOB NUMBER: 2002-036-91
DATE DRILLED: 12/3/04
EQUIPMENT USED: Air Rotary Casing Hammer
ELEVATION: 1193.14'
LOGGED BY: Paul Chang
BORING DEPTH: 0-295'
SURFACE CONDITIONS: Dirt drill pad in canyon bottom

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE



(7:10 am) 12/8/04 after overnight water check with boring total depth at 211.5 feet.
@ 198 ft. more fine sand: friable
(14:28)
(14:59)
@ 200 feet: moist to wet

SILTSTONE: little fine sand, mostly silt, very hard, moist, moderate yellowish brown (10YR 5/4), shiny fracture surfaces
(15:04)
(15:15)

CLAYEY SANDSTONE: mostly fine to medium sand, some clay with silt, little coarse sand and gravels, very hard (cemented), moist, moderate brown (5YR 4/4)
(15:21)
(15:36)

SILTY SANDSTONE: mostly silt with clay, some fine sand: little medium to coarse sand, hard, moist, moderate yellowish brown (10YR 5/4)
@ 211.5 ft. less medium to coarse sands (15:45)
(8:12 12/08/2004)

SANDSTONE: little silt: mostly fine to medium sand, little coarse sand and gravels, hard, moist, dusky yellow (5Y 6/4)
@ 215 ft. less coarse sands to gravels: moist to wet
(8:18)
(8:31)

CLAYEY SANDSTONE: some to mostly clay with silt, mostly fine sand: few medium to coarse sand, very hard (well cemented), moist, moderate yellowish brown (10YR 5/4)
@ 218 ft. slightly coarser sands
@ 219.5 ft. less medium to coarse sands: moist to wet
(8:35)
(8:50)

SILTY SANDSTONE: some silt: mostly fine sands, few medium sands, hard, moist to wet, light olive gray (5Y 5/2)
@ 221.5 ft. friable
@223.5 ft. hard to very hard: well cemented
@ 225 ft. friable. (8:56)

@ 230 ft. reamed with 8.5" bit. (11:50)
@ 230 ft. - 250 ft. No recovery. Clean out composite sample is Silty Sandstone: mostly silt: some fine to medium sands: few coarse sands and gravels: hard. (13:37)

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BOREHOLE LOG 2002-036-91.GPJ FRANKIAN.GDT 8/25/05

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING PZ-7 (CONTINUED)

JOB NUMBER: 2002-036-91
DATE DRILLED: 12/3/04
EQUIPMENT USED: Air Rotary Casing Hammer
ELEVATION: 1193.14'
LOGGED BY: Paul Chang
BORING DEPTH: 0-295'
SURFACE CONDITIONS: Dirt drill pad in canyon bottom

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
				245				
				250				@ 250 ft. - 270 ft. poor recovery. Composite sample shows some silt, some fine to medium sands: little coarse sand: few gravels. (14:02) (14:06)
				255				
				260				@ 260 ft. driller notes possible water
				265				
				270				@ 270 ft. 30 minute water check: no water measurement to 262' inside drill pipe (14:20) @ 270 ft. after making next connection, small quantity of water being blown from hole (14:58) @ 270 ft. - 290 ft. poor recovery. Driller notes that hole is making water but not very much. Composite sample is silty, gravelly sandstone
				275				
				280				

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BOREHOLE LOG 2002-036-91.GPJ FRANKIAN.GDT 8/25/05

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING PZ-7 (CONTINUED)

JOB NUMBER: 2002-036-91
DATE DRILLED: 12/3/04
EQUIPMENT USED: Air Rotary Casing Hammer
ELEVATION: 1193.14'
LOGGED BY: Paul Chang
BORING DEPTH: 0-295'
SURFACE CONDITIONS: Dirt drill pad in canyon bottom

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
				285				@ 282 ft. - 290 ft. no recovery: no water being blown out: some rig chatter
				290				@ 290 ft. Driller adds water to clean out hole (15:20)
				295				Bottom of Boring at 295 feet. At 4:00 pm 12/8/04. Target depth reached
				300				
				305				
				310				
				315				
				320				

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-91.GPJ FRANKIAN.GDT 8/25/05

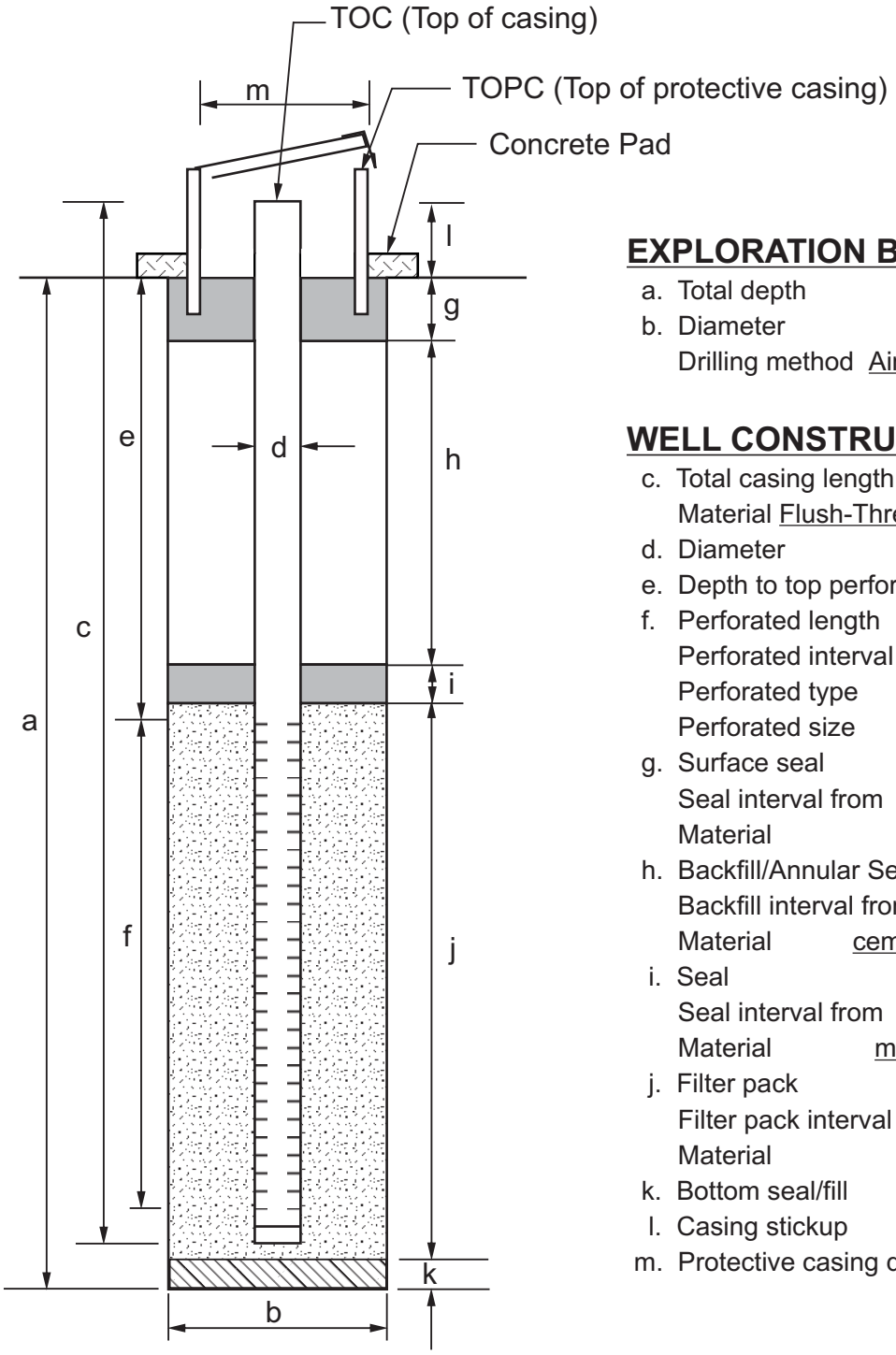
LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

As-Built Well PZ-8

PROJECT NUMBER: 2002-036-005
PROJECT NAME: Chiquita Canyon Landfill
LOCATION: Los Angeles County
DRILLER: WDC

TOP CONCRETE PAD ELEVATION: 1281.533
TOC ELEVATION: 1283.86
DATUM: Mean Sea Level
INSTALLATION DATE: 6/22/2010
BY: P. Chang



EXPLORATION BORING

a. Total depth 96 ft.
b. Diameter 8.5 in.
Drilling method Air Rotary Casing Hammer

WELL CONSTRUCTION

c. Total casing length 92.85 ft.
Material Flush-Threaded Schedule 80 PVC
d. Diameter 2.0 in.
e. Depth to top perforations 60 ft.
f. Perforated length 30 ft.
Perforated interval from 60 to 90 ft.
Perforated type machine slotted
Perforated size 0.020 in.
g. Surface seal 6 ft.
Seal interval from 0 to 6 ft.
Material Bentonite Chips
h. Backfill/Annular Seal 43.5 ft.
Backfill interval from 6.0 to 49.5 ft.
Material cement with 5% bentonite
i. Seal 8.5 ft.
Seal interval from 49.5 to 58 ft.
Material medium bentonite chips
j. Filter pack 34.5 ft.
Filter pack interval from 58 to 92.5 ft.
Material #3 graded sand
k. Bottom seal/fill native sandy slough
l. Casing stickup 2.5 ft.
m. Protective casing diameter 10 3/4 in.

BORING PZ-8

JOB NUMBER: 2002-036-005
DATE DRILLED: 6/22/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-96'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
10:45			-		SM	**ARTIFICIAL FILL (af)** SILTY SAND: fine to coarse, few gravel, loose to medium dense, dry to moist, dusky yellow (5Y 6/4), no odor
			-	5		**PICO FORMATION (Tp)** SANDY SILTSTONE: fine, moderately hard, moist, light olive brown (5Y 5/6)
10:53 11:19			- - -	10		fine to medium, yellowish gray (5Y 7/2)
			-	15		PEBBLY SANDSTONE: fine to medium, some silt, some coarse sand and gravel, moderately hard, damp, dusky yellow (5Y 6/4)
						CLAYSTONE: moderately hard, moist, moderate brown (5YR 4/4) bottom of temporary drive casing; removed 6/22/10
11:27 11:40			- - -	20		
			-	25		little sand
						SILTSTONE: trace fine sand, moderately hard, moist, light olive brown (5Y 5/6)
			-	30		grading to
						SILTY SANDSTONE: fine, little medium to coarse sand, moderately hard, moist, dusky yellow (5Y 6/4)
			-	35		
						CLAYSTONE: moderately hard to hard, moist, light brown (5YR 5/6)
				40		

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

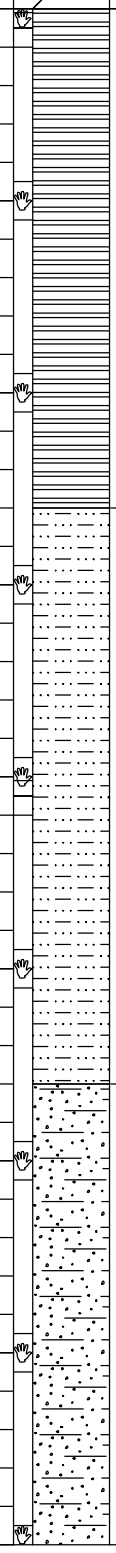
LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING PZ-8 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 6/22/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-96'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
11:58			-				
13:06			-				
			-				
			-	45			
			-	50			
			-	55			
			-	60			
13:28			-				
14:00			-				
			-	65			
			-	70			
			-	75			
				80			



interbedded with Siltstone to 46' with light olive gray (5Y 5/2), moist, dense

SILTSTONE: little sand to gravel, moderately hard, moist, dusky yellow (5Y 6/4)

no sand and gravel, dense

more fine to medium sand

SILTY SANDSTONE: moderately dense, moist, duskey yellow (5Y 6/4)

no dust being blown, more moisture

mostly fine sands

▽ groundwater at 76.5 feet (3:00 pm) 6/22/10

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING PZ-8 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 6/22/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-96'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
14:23								fine to medium, more silt
14:26								
				85				
								some medium sand, more silt
				90				
14:35								
15:00								some medium to coarse sand
15:30								SANDSTONE: mostly medium and coarse
				95				
								Bottom of Boring at 96 feet. Target depth reached. Piezometer installed.
				100				
				105				
				110				
				115				
				120				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-005.GPJ FRANKIAN.GDT 10/25/10

LOG OF BORING

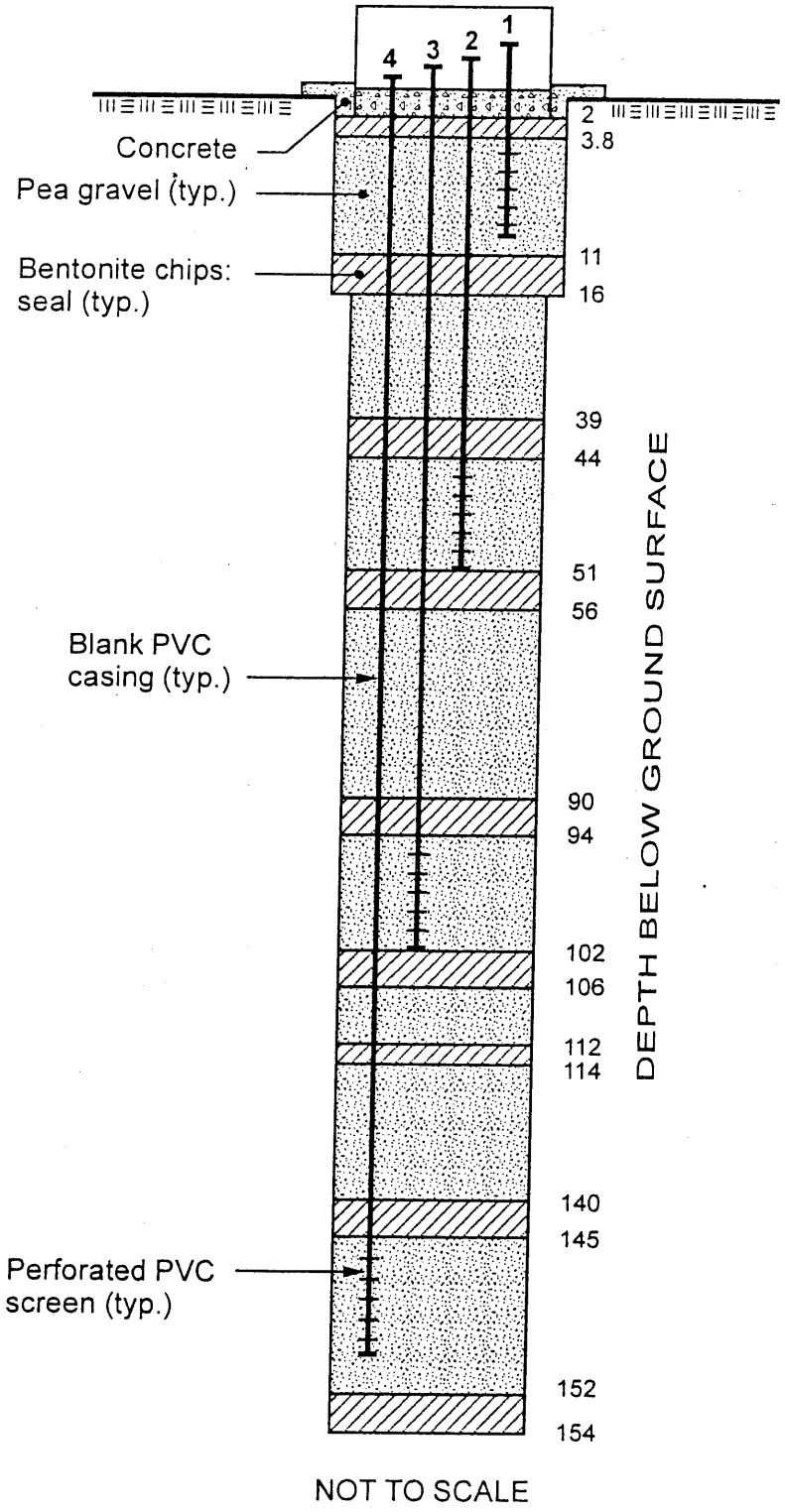
R.T. FRANKIAN & ASSOCIATES

SOIL-GAS PROBE GP-A

Chiquita Canyon Landfill
Los Angeles County, CA

Project No.: 2000-025-90
Drilling Contractor: Water Development Corp.
Installed 7/29/00 by T. Clark

Top of vault elev. 1268.95
Ground Surface elev. 1266.0
Datum MSL



Exploratory Boring
Total depth 154 feet
Diameter 9 5/8" from 0 to 16 ft.
8 1/2" from 16 to 154 ft.

Probe Construction
Material: 3/4-inch. schedule 80 PVC, flush-threaded
Perforations: 1/8-inch holes, 20 per foot

Probe 1
Total length: 12.^{09} ft.
Perforation depth: 4.^{77} to 9.^{65} ft.

Probe 2
Total length: 53.^{21} ft.
Perforation depth: 46.^{00} to 50.^{90} ft.

Probe 3
Total length: 104.^{22} ft.
Perforation depth: 97.^{17} to 102.^{04} ft.

Probe 4
Total length: 153.^{57} ft.
Perforation depth: 146.^{63} to 151.^{51} ft.

Protective vault
Steel pipe, 8 3/4" diameter, 5 ft. overall length

Appendix I-2

BORING GP-A

JOB NUMBER: 2000-025-90
DATE DRILLED: 7-29-00
EQUIPMENT USED: Air rotary / Air rotary casing hammer
ELEVATION: 1266.0
SURFACE CONDITIONS: Engineered fill west of cut slope, north of perimeter access road, southeast of natural slopes. estimated ground surface elevation; 1266 MSL

BY: Ted Clark

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE	
7:30am			SM	**ARTIFICIAL FILL (af) 0-16'** SILTY SAND: mostly fine sand, some medium sand, little fines, strength none, moist, light olive brown (5Y 5/6)
	0-5	5		
	5-10	10		SILTY SAND: mostly fine sand, few medium to coarse sand, little fines, strength none, moist, light olive brown (5Y 5/6)
	10-15	15		SILTY SAND: mostly fine sand, few medium to coarse sand, little fines, strength none, moist, light olive brown (5Y 5/6)
				PICO FORMATION (Tp) 16-154' SANDSTONE: very fine to fine grained, 10-15% silt, calcite cement, moist, light olive brown (5Y 5/6)
7:50am	15-20	20		
	20-25	25		SANDSTONE: very fine to fine grained, 5% calcareous shell fragments, calcite cement, moist, light olive brown (5Y 5/6)
	25-30	30		SANDSTONE: very fine to fine grained, 5% calcareous shell fragments, moist, light olive brown (5Y 5/6) FOSSILIFEROUS SANDSTONE: very fine to medium grained, 5-10% calcareous shell fragments, dry, yellowish gray (5Y 7/2)
	30-35	35		
8:03am	35-40	40		FOSSILIFEROUS SANDSTONE: very fine to fine grained, few medium grained, 10% calcareous shell fragments, dry, yellowish gray (5Y 7/2)

(CONTINUED ON THE FOLLOWING FIGURE)

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

LOG OF BORING

BORING GP-A (Continued)

BY: Ted Clark

JOB NUMBER: 2000-025-90
DATE DRILLED: 7-29-00

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE
	40-45	45	SANDSTONE: very fine to medium grained, few coarse to very coarse grained, 5% calcareous shell fragments, light dusky yellow (5Y 7/4)
	45-50	50	SANDSTONE: very fine to fine grained, 1% calcareous shell fragments, moist, light dusky yellow (5Y 7/4)
	50-55	55	SANDSTONE: very fine to fine grained, moist, light dusky yellow (5Y 7/4)
8:20am	55-60	60	SANDSTONE: very fine to fine grained, 1% calcareous shell fragments, moist, light dusky yellow (5Y 7/4)
	60-65	65	SANDSTONE: very fine to fine grained, moist, dusky yellow (5Y 6/4)
	65-70	70	FOSSILIFEROUS SANDSTONE: very fine to medium grained, <5% calcareous shell fragments, moist, grayish yellow (5Y 8/4)
	70-75	75	
8:30am	75-80	80	SANDSTONE: very fine to fine grained, 2% calcareous shell fragments, moist, dark yellowish orange (10YR 6/6)

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING GP-A (Continued)

BY: Ted Clark

JOB NUMBER: 2000-025-90
DATE DRILLED: 7-29-00

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE
	80-85	85	INTERBEDDED SANDSTONE AND MUDSTONE: very fine to fine grained sandstone, mudstone with 5% fine to medium sand, moist, moderate brown (5YR 4/4)
	85-90	90	SANDSTONE: very fine to fine grained, moist, grayish olive, (10Y 4/2)
			INTERBEDDED SILTSTONE AND SANDSTONE
			90-95' poor sample recovery
	90-95	95	SILTSTONE: with 10% fine sand, moist, interbedded moderate brown (5YR 4/4) and olive gray (5Y 3/2) siltstones
			SANDSTONE: very fine grained, moist, moderate brown (5YR 4/4)
8:50am start 9:25am	95-100	100	SANDSTONE: very fine grained, moist, olive gray (5Y 3/2)
			SANDSTONE: very fine to fine, moist, moderate brown, (5YR 4/4)
			SILTSTONE: with 10-15% fine sand, moist, moderate brown (5YR 3/4)
	100-105	105	
	105-110	110	SANDSTONE: very fine to fine grained, moist, light olive (10Y 5/2)
			INTERBEDDED LIMESTONE AND MUDSTONE: MUDSTONE: <5% very fine to fine sand, laminations several millimeters thick with dusky yellow (5Y 6/4) and grayish olive (10Y 4/2), and rare moderate brown (5YR 3/4) laminations
	110-115	115	LIMESTONE: microcrystalline, dry, very light gray (N8)
			SANDSTONE: very fine to fine grained, few silt, moist, grayish olive green (5GY 4/2)
115-120	115-120	120	

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING GP-A (Continued)

BY: Ted Clark

JOB NUMBER: 2000-025-90
DATE DRILLED: 7-29-00

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE
	120-125	125	SANDSTONE: very fine to fine grained, few silt, moist, grayish olive green (5GY 4/2)
	125-130	130	SANDSTONE: very fine to fine grained, moist, grayish olive green (5GY 4/2)
	130-135	135	SANDSTONE: very fine to fine grained, moist, grayish olive green (5GY 4/2)
10:am	135-140	140	SANDSTONE: very fine to fine grained, trace silt, trace calcareous shell fragments, grayish green (5GY 4/2)
	140-145	145	FOSSILIFEROUS SANDSTONE: very fine to fine grained, 50% calcareous shell fragments ranging from medium sand to pebble size, calcite cement, dry, light gray (N7)
	145-150	150	SANDSTONE: very fine to fine grained, moist, grayish olive green (5GY 4/2)
10:10 am	150-154		SANDSTONE: very fine to medium grained, moist, grayish olive green (5GY 4/2)
		155	Terminated boring depth at 154' based on increased moisture in drilling returns. Pulled drill rod and tagged boring TD at 154'. Bottom of measuring tape tagged wet sand.
		160	

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

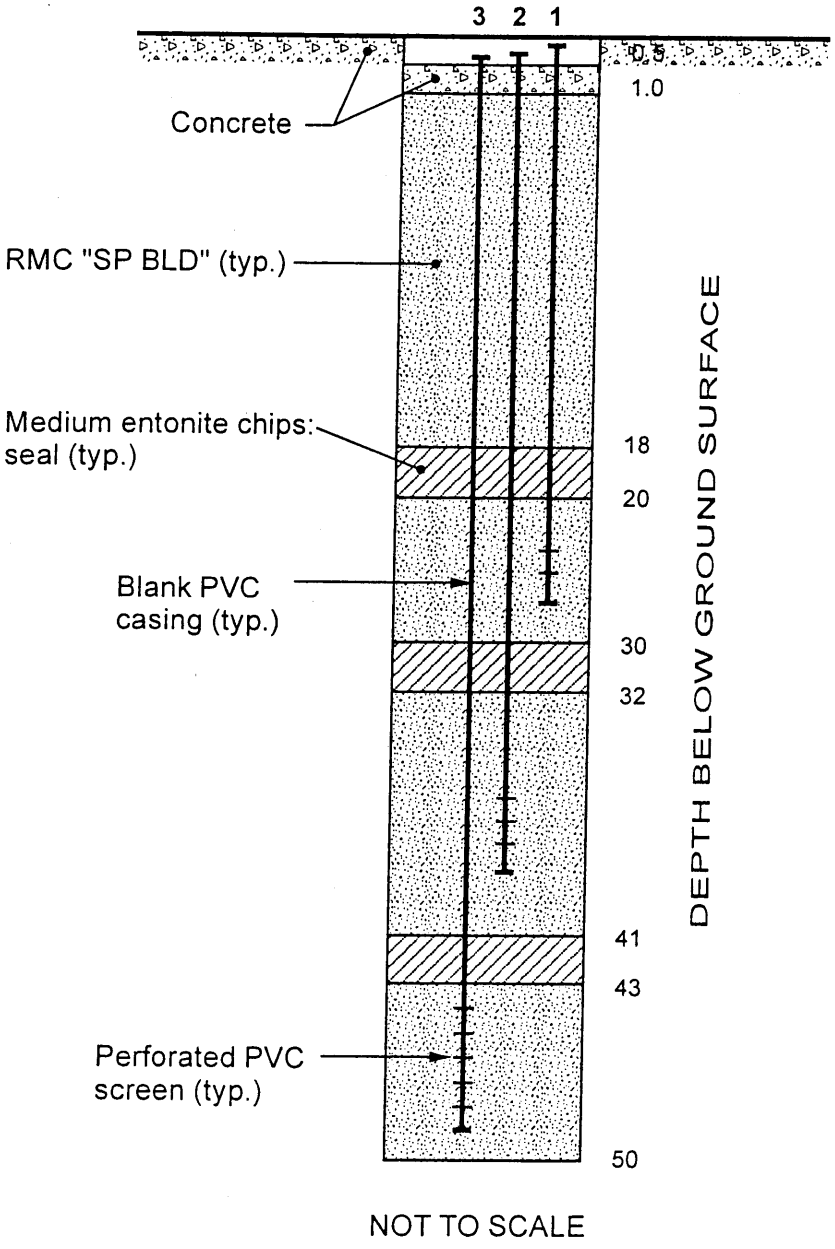
LOG OF BORING

GP-1R SOIL-GAS PROBE DETAIL

Chiquita Canyon Landfill
Los Angeles County, CA

Project No.: 2002-036-91
Drilling Contractor: Water Development Corp.
Installed 2/12/03 by D.G.Francuch

Top of vault elev. 976.37
Ground Surface elev. 976.3
Northing: 1977628.10
Easting: 6366605.12
(Top of Probe 3)



Exploratory Boring
Total depth 50 feet
Diameter 10" from 0 to 50 ft.

Probe Construction
Material: 3/4-inch. schedule 80 PVC, flush-threaded
Perforations: 1/8-inch holes, 20 per foot

Probe 1
Total length:
Perforation depth: 24.0 to 26.0 ft.
Top of casing elev.: 976.01

Probe 2
Total length:
Perforation depth: 36.0 to 38.0 ft.
Top of casing elev.: 975.93

Probe 3
Total length:
Perforation depth: 45.0 to 47.0 ft.
Top of casing elev.: 975.87

Protective vault
EMCO Wheaton Flush
12" diameter.

BORING GP-1R

JOB NUMBER: 2002-036-91 BY: DGF
DATE DRILLED: 2/12/03
EQUIPMENT USED: 10" Hollow Stem
ELEVATION: 976.3
SURFACE CONDITIONS: Concrete apron on sedimentation basin dam, Heavy to moderate rain

DEPTH (FEET)	SOIL TYPE	
		0-0.5 feet: concrete
	SM	**0.5-18 feet: CERTIFIED ENGINEERED FILL (cef)** @ 0.5 feet: SAND: fine to coarse grained sand, moist, light brown to yellowish orange
5		
10		
15		@ 17 feet: drill auger chatter
	SP	**18-50 feet: ALLUVIUM (Qal)** @ 18 feet: SAND: fine to coarse grained sand with pebbles, moist, light brown
20		
25	SM	@ 25 feet: SAND: fine to medium grained sand, moist, yellowish orange
30		
	SP	@ 32 feet: SAND: fine to coarse grained sand with pebbles, moist, light brown
35		
40		

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING GP-1R (Continued)

BY: DGF

JOB NUMBER: 2002-036-91
DATE DRILLED: 02-12-03

		DEPTH (FEET)	SOIL TYPE	
		45		SP
		50		
		55		
		60		
		65		
		70		
		75		
		80		

@ 42 feet: GRAVELLY SAND: fine to coarse grained sand with pebbles, moist, light brown

TOTAL DEPTH 50 FEET.
No groundwater.
No caving.

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

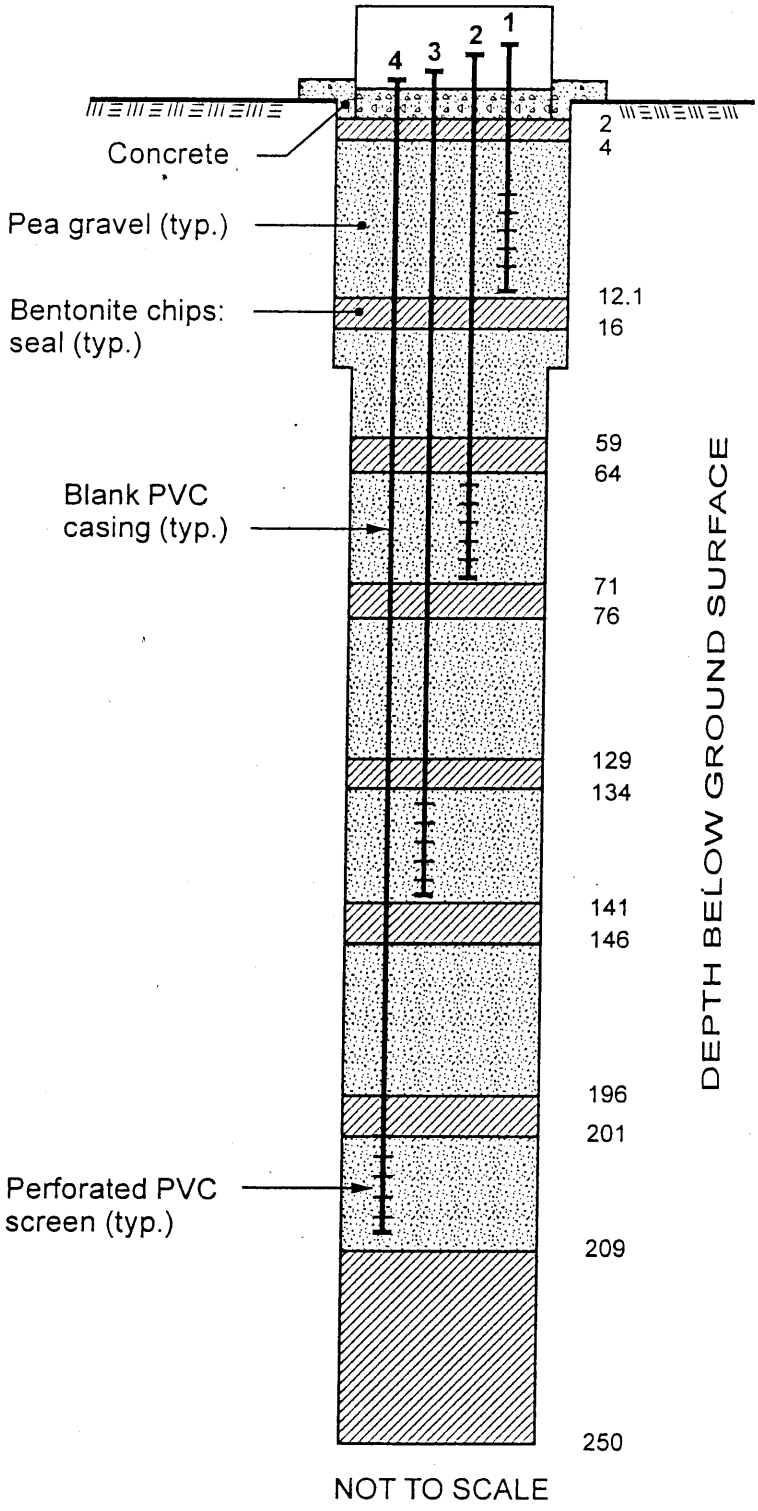
LOG OF BORING

SOIL-GAS PROBE GP-11

Chiquita Canyon Landfill
Los Angeles County, CA

Project No.: 2000-025-90
Drilling Contractor: Water Development Corp.
Installed 7/28/00 by T. Clark

Top of vault elev.	1318.28
Ground Surface elev.	1315.3
Datum	MSL



Exploratory Boring
Total depth 250 feet
Diameter 9 5/8" from 0 to 26.8 ft.
8 1/2" from 26.8 to 250 ft.

Probe Construction
Material: 3/4-inch. schedule 80 PVC, flush-threaded
Perforations: 1/8-inch holes, 20 per foot

Probe 1
Total length: 12.^{83} ft.
Perforation depth: 5 to 10 ft.

Probe 2
Total length: 72.^{67} ft.
Perforation depth: 65.^{08} to 69.^{97} ft.

Probe 3
Total length: 143.^{37} ft.
Perforation depth: 136.^{06} to 140.^{99} ft.

Probe 4
Total length: 210.^{05} ft.
Perforation depth: 202.^{92} to 207.^{82} ft.

Protective vault
Steel pipe, 8 3/4" diameter, 5 ft. overall length

BORING GP-11

JOB NUMBER: 2000-025-90 BY: Ted Clark
DATE DRILLED: 7-27-00 / 7-28-00
EQUIPMENT USED: Air rotary / Air rotary casing hammer
ELEVATION: 1315.3
SURFACE CONDITIONS: Engineered fill in canyon, north of concrete drainage ditch along perimeter access road.

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE	
3:45pm			SM	**ARTIFICIAL FILL (af) 0-26'** SILTY SAND: mostly very fine to fine grained sand, few medium grained sand, little fines, strength none, moist, light olive brown (5Y 5/6)
	0-5	5		
	5-10	10	SM	SILTY SAND: mostly very fine to fine grained sand, few medium grained sand, little fines, strength none, moist, light olive brown (5Y 5/6)
	10-15	15		
	15-20	20		increased resistance to drive casing at 20'
			SM	SILTY SAND: mostly very fine to fine grained sand, few medium grained sand, trace calcareous fossil fragments, little fines, strength none, moist, light olive brown (5Y 5/6)
	20-25	25		**PICO FORMATION (Tp) 26-250'** SANDSTONE: fine to very fine grained sand, moist grayish orange (10YR 7/4)
		30		SANDSTONE: fine to very fine grained sand, moist, grayish orange (10YR 7/4)
		35		SANDSTONE: fine to very fine grained sand, moist, grayish orange (10YR 7/4)
		40		SANDSTONE: fine to very fine grained sand, trace coarse grained sand, grayish orange (10YR 7/4)

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING GP-11 (Continued)

BY: Ted Clark

JOB NUMBER: 2000-025-90
DATE DRILLED: 7-27-00 / 7-28-00

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE
		45	SANDSTONE: very fine to fine grained sand, moist, moderate yellowish brown (10YR 5/4)
		50	SANDSTONE: fine to very fine grained sand, moist, moderate yellowish brown (10YR 5/4)
		55	SANDSTONE: medium to fine grained sand, few very fine grained, moist, grayish orange (10YR 7/4)
		60	SANDSTONE: medium to fine grained sand, few coarse grained, moist, moderate yellowish brown (10YR 5/4)
	60-65	65	SANDSTONE: very fine to fine grained sand, some calcite cement, light olive gray (5Y 5/2)
	65-70	70	SANDSTONE: fine grained, few medium grained sand, moist, grayish orange (10YR 7/4)
	70-75	75	SANDSTONE: fine grained, few medium grained sand, moist, grayish orange (10YR 7/4)
	75-80	80	SANDSTONE: fine to very fine grained; trace medium to coarse grained, moist, very pale orange (10YR 8/2)

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING GP-11 (Continued)

BY: Ted Clark

JOB NUMBER: 2000-025-90
DATE DRILLED: 7-27-00 / 7-28-00

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE
	80-85	85	SANDSTONE: very fine to fine grained, moist, moderate yellowish brown (10YR 5/4)
	85-90	90	SANDSTONE: very fine to fine grained; trace coarse to very coarse grained, moist, dark yellowish orange (10YR 6/6)
	90-95	95	SANDSTONE: very fine to fine grained, moist, moderate yellowish brown (10YR 5/4)
	95-100	100	SANDSTONE: very fine to fine grained; trace coarse to very coarse grained, moist, grayish orange (10YR 7/4)
	100-105	105	SANDSTONE: very fine to medium grained; trace coarse to very coarse grained, moist, grayish orange (10YR 7/4)
stop @ 5:15 pm start @ 7:15 am	105-110	110	SANDSTONE: very fine to medium grained; trace coarse to very coarse grained, moist, grayish orange (10YR 7/4)
			SILTSTONE and MUDSTONE interbeds: moist, olive gray (5Y 3/2)
	110-115	115	SANDSTONE: very fine to fine grained, moist, yellowish gray (5Y 7/2)
	115-120	120	SANDSTONE: very fine to fine grained, moist, yellowish gray (5Y 7/2)

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING GP-11 (Continued)

BY: Ted Clark

JOB NUMBER: 2000-025-90
DATE DRILLED: 7-27-00 / 7-28-00

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE
	120-125	125	SANDSTONE: very fine to fine grained, moist, dark yellowish orange (10YR 6/6)
			FOSSILIFEROUS SANDSTONE: very fine to fine grained sand, moist, grayish orange (10YR 7/4), 2% calcareous shell fragments
	125-130	130	
	130-135	135	FOSSILIFEROUS SANDSTONE: very fine to fine grained sand, trace medium grained, moist, moderate yellowish brown (10YR 5/4), 2% calcareous shell fragments
	135-140	140	SANDSTONE: very fine to fine grained sand, moist, grayish orange (10YR 7/4)
	140-145	145	FOSSILIFEROUS SANDSTONE: very fine to fine grained sand, trace medium to coarse grained, 2% calcareous shell fragments, calcite cement, moist, yellowish gray (5Y 7/2)
7:45 am	145-150	150	FOSSILIFEROUS SANDSTONE: very fine to fine grained sand, trace medium to coarse grained, 2% calcareous shell fragments, moist, yellowish gray (5Y 7/2),
			INTERBEDDED SANDSTONE, SILTSTONE and MUDSTONE: fine to very fine grained sand, moist, olive gray (5Y 3/2)
	150-155	155	
	155-160	160	SANDSTONE: very fine to fine grained, moist, dusky yellow (5Y 6/4)

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING GP-11 (Continued)

BY: Ted Clark

JOB NUMBER: 2000-025-90
DATE DRILLED: 7-27-00 / 7-28-00

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE
	160-165	165	SANDSTONE: very fine to fine grained, moist, yellowish gray (5Y 7/2)
	165-170	170	SANDSTONE: very fine to fine grained, calcite cement, calcareous fossil fragments, moist, yellowish gray (5Y 7/2)
	170-175	175	SILTY SANDSTONE: interbeds, very fine to fine grained, few silt, moist, moderate brown (5YR 4/4)
			SILTY SANDSTONE: interbeds, very fine to fine grained, trace medium grained, few silt, dusky yellowish brown (10YR 2/2), 5% calcareous shell fragments
	175-180	180	SANDSTONE with SILTSTONE INTERBEDS: very fine to fine grained, trace medium grained, dark yellowish brown (10YR 4/2) sandstone, with moderate brown (5YR 3/4) siltstone
	180-185	185	SANDSTONE: very fine to fine grained, calcite cement, <2% calcareous shell fragments, moist, yellowish gray (5Y 7/2)
8:18 am	185-190	190	SANDSTONE: very fine to medium grained, calcite cement, <2% calcareous shell fragments, moist, yellowish gray (5Y 7/2)
	190-195	195	SANDSTONE: very fine to fine grained, calcite cement, moist, yellowish gray (5Y 7/2)
	195-200	200	SANDSTONE: very fine to fine grained, moist, dusky yellow (5Y 6/4)

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING GP-11 (Continued)

BY: Ted Clark

JOB NUMBER: 2000-025-90
DATE DRILLED: 7-27-00 / 7-28-00

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE
	200-205	205	SANDSTONE: very fine to fine grained, moist, dusky yellow (5Y 6/4)
8:40 am	205-210	210	SANDSTONE: very fine to fine grained, trace silt, moist, dusky yellow (5Y 6/4)
			Water level measured at a depth of 211.8 on 7-28-00 at 10:35am
	210-215	215	FOSSILIFEROUS SANDSTONE: very fine to medium grained sand, 20% calcareous shell fragments of coarse sand size, dry, yellowish gray, (5Y 7/2)
	215-220	220	SANDSTONE: very fine to fine grained, moist, yellowish gray, (5Y 7/2)
	220-225	225	SANDSTONE: very fine to fine grained, few medium grained, moist, dark yellowish orange (10YR 6/6)
			poor drilling returns 225-235
9:05 am	225-230	230	SANDSTONE: very fine to fine, moist, dark yellowish orange (10YR 6/6)
	230-235	235	SANDSTONE: very fine to fine grain, trace medium grained, <5% calcareous shell fragments, dusky yellow (5Y 6/4)
			No drilling returns 235-243 (NR)
		240	NR

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING GP-11 (Continued)

BY: Ted Clark

JOB NUMBER: 2000-025-90
DATE DRILLED: 7-27-00 / 7-28-00

TIME	SAMPLE TAKEN	DEPTH (FEET)	SOIL TYPE	
			NR	No drilling returns 235-243 (NR)
	243-245	245		SANDSTONE: very fine to fine grained, few medium grained, wet, grayish olive (10Y 4/2)
9:30 am	245-250	250		SANDSTONE: very fine to fine grained, wet grayish olive (10Y 4/2)
				Terminate boring at target depth 250'
		255		
		260		
		265		
		270		
		275		
		280		

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

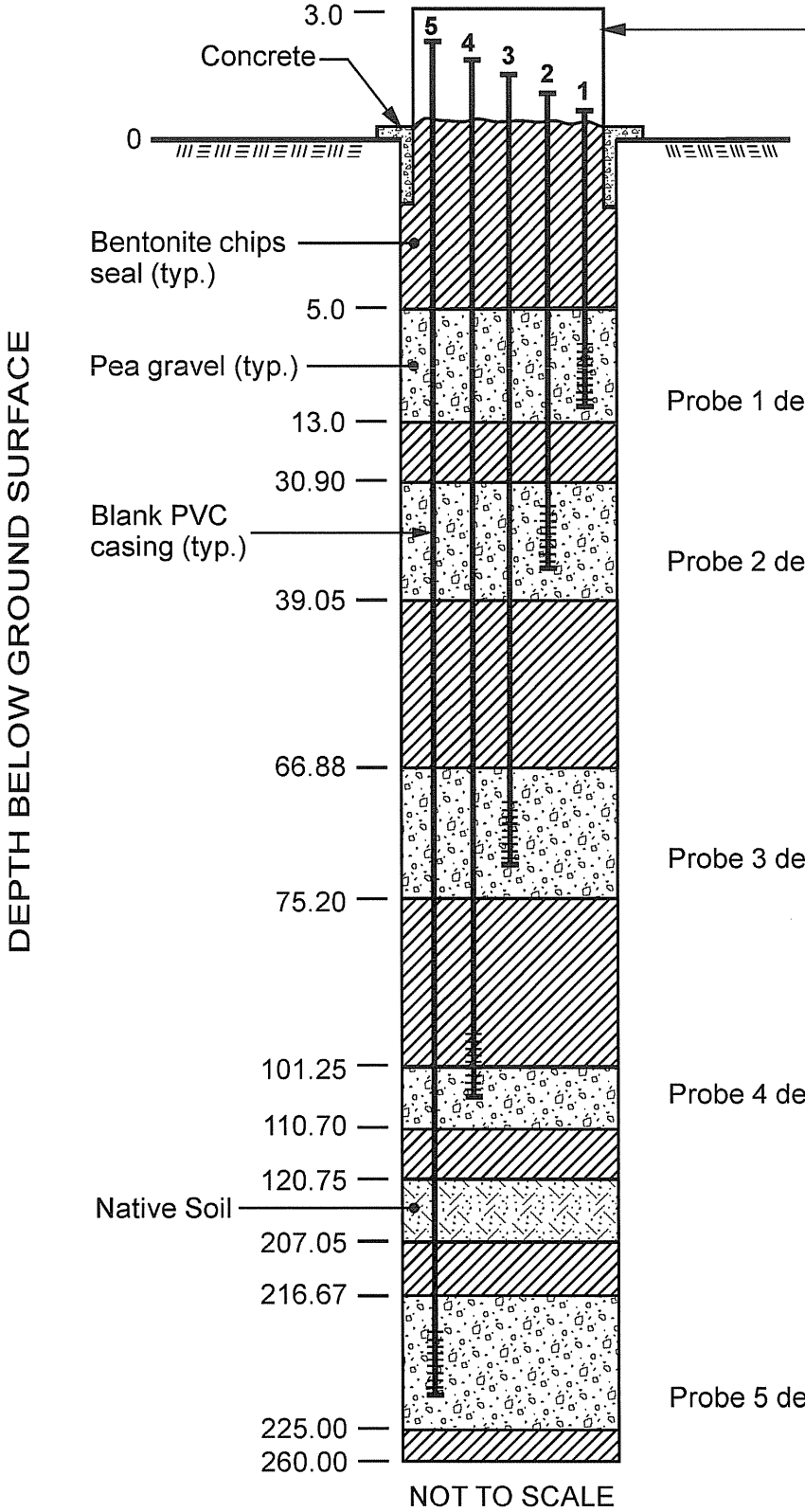
LOG OF BORING

AS-BUILT SOIL-GAS PROBE GP-12

Chiquita Canyon Landfill
Los Angeles County, CA

Project No.: 2004-001-92
Drilling Contractor: WDC Exploration and Wells
Installed 12/6/05 by P. Chang

Ground Surface elev. 1335[78]
Datum MSL



Protective Casing
8-inch steel with locking lid

Exploratory Boring
Total depth 260 feet
Diameter 10"

Probes
3/4 - inch schedule 40 PVC,
Flush threaded; machine-slotted
screens at bottom 5 feet

Probe 1 depth: 7' to 12'

Probe 2 depth: 33' to 38'

Probe 3 depth: 69' to 74'

Probe 4 depth: 105' to 110'

Probe 5 depth: 219' to 224'

R.T. FRANKIAN AND ASSOCIATES

2004-001-92 REPORT DATED 5-25-07

For use with report dated 05/08/2008; RTF Job No. 2004-001-92

BORING GP-12

JOB NUMBER: 2004-001-92
DATE DRILLED: 12/5/05
EQUIPMENT USED: Air Rotary
LOGGED BY: PDC
BORING DEPTH: 0-260'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
15:45			-					**ARTIFICIAL FILL (af)**
			-	5				
								PICO FORMATION (Tp) SILTY SANDSTONE: mostly fine sand, little silt, little medium sand, medium hard, moist, yellowish gray (5Y 7/2)
			-	10				
			-	15				more fine to coarse sands, dusky yellow (5Y 6/4)
15:57			-					
16:02			-					
			-	20				
			-	25				more silt, less medium to coarse sands
			-	30				
			-	35				
16:06			-					
7:20			-	40				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING GP-12 (CONTINUED)

JOB NUMBER: 2004-001-92
DATE DRILLED: 12/5/05
EQUIPMENT USED: Air Rotary
LOGGED BY: PDC
BORING DEPTH: 0-260'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION / GRAPHIC LOG	SOIL TYPE	
			-				medium hard to hard, light olive brown (5Y 5/6)
			-	45			more silt, less medium to coarse sands
			-	50			yellowish gray (5Y 7/2)
			-	55			more fine to coarse sand, few fine gravels, dusky yellow (5Y 6/4)
7:35			-				
7:39			-				
			-	60			more fine to medium sands, grayish orange (10YR 7/4)
			-	65			
			-	70			less medium to coarse sands, dusky yellow (5Y 6/4)
			-	75			
7:49			-				
7:52			-	80			

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING GP-12 (CONTINUED)

JOB NUMBER: 2004-001-92
DATE DRILLED: 12/5/05
EQUIPMENT USED: Air Rotary
LOGGED BY: PDC
BORING DEPTH: 0-260'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION / GRAPHIC LOG	SOIL TYPE	
			-				moderate yellow (5Y 7/6)
				85			
				90			more silt, hard, dusky yellow (5Y 6/4)
				95			
8:00			-				
8:03			-				
			-	100			
			-	105			hard to medium hard, slow drilling
			-	110			more sand, some siltstone fragments, hard, light olive gray (5Y 5/2)
			-	115			mostly fine to coarse sand, some silt, moist, dusky yellow (5Y 6/4)
8:13			-				
8:17			-	120			

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING GP-12 (CONTINUED)

JOB NUMBER: 2004-001-92
DATE DRILLED: 12/5/05
EQUIPMENT USED: Air Rotary
LOGGED BY: PDC
BORING DEPTH: 0-260'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION / GRAPHIC LOG	SOIL TYPE	
			-				
			-	125			more silt
							SANDY SILTSTONE: mostly silt, some fine to medium sands, hard, moist, light olive gray (5Y 8/2)
			-	130			
			-	135			more silt, some siltstone fragments, slightly more moisture, grayish olive (10Y 4/2)
8:26			-				
8:29			-				
			-	140			
			-	145			
			-	150			more fine to coarse sands, light olive brown (5Y 5/6)
			-	155			more fine to coarse sands, hard to very hard, less moisture, yellowish gray (5Y 7/2), making lots of fine dust
8:42			-				
8:46			-	160			

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING GP-12 (CONTINUED)

JOB NUMBER: 2004-001-92
DATE DRILLED: 12/5/05
EQUIPMENT USED: Air Rotary
LOGGED BY: PDC
BORING DEPTH: 0-260'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
				165				more sands
				170				still making lots of fine dust, some rig chatter
				175				
9:02								
9:06				180				
				185				
				190				SILTY SANDSTONE: mostly fine to coarse sand, some silt, hard, moist, yellowish gray (5Y 7/2), easier driling
				195				
9:12								
9:16				200				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING GP-12 (CONTINUED)

JOB NUMBER: 2004-001-92
DATE DRILLED: 12/5/05
EQUIPMENT USED: Air Rotary
LOGGED BY: PDC
BORING DEPTH: 0-260'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION / GRAPHIC LOG	SOIL TYPE	
				205			less sand
				210			SANDY SILTSTONE: mostly silt, some fine to medium sand, hard, moist, yellowish gray (5Y 7/2), making less dust
				215			more silt, slight increase in moisture
9:28							
9:53							15 minute water check, no water
				220			more fine to medium sand
							SILTY SANDSTONE: mostly fine to medium sand, some silt, little coarse sand, hard, moist, dusky yellow (5Y 6/4)
				225			
				230			more fine to coarse sands, grayish orange (10YR 7/4)
							increasing moisture
				235			
							▽ very moist, dark yellowish orange (10YR 6/6) groundwater at 238 feet 12/6/05
10:05							
10:24							15 minute water check, no water
				240			

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING GP-12 (CONTINUED)

JOB NUMBER: 2004-001-92
DATE DRILLED: 12/5/05
EQUIPMENT USED: Air Rotary
LOGGED BY: PDC
BORING DEPTH: 0-260'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								slightly more silt, less moisture, grayish orange (10YR 7/4)
				245				
								SANDY CLAYSTONE: mostly clay and silt with claystone fragments, little fine to medium sand, medium hard to hard, moist, moderate yellowish orange (10YR 5/4)
				250				
				255				more fine to medium sand
								SANDY SILTSTONE: mostly silt with siltstone fragments, little fine to medium sand, medium hard, moist, pale olive (10Y 6/2)
10:40				260				Bottom of Boring at 260 feet. On 12/6/05.
				265				
				270				
				275				
				280				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2004-001-92.GPJ FRANKIAN.GDT 5/22/07

LOG OF BORING

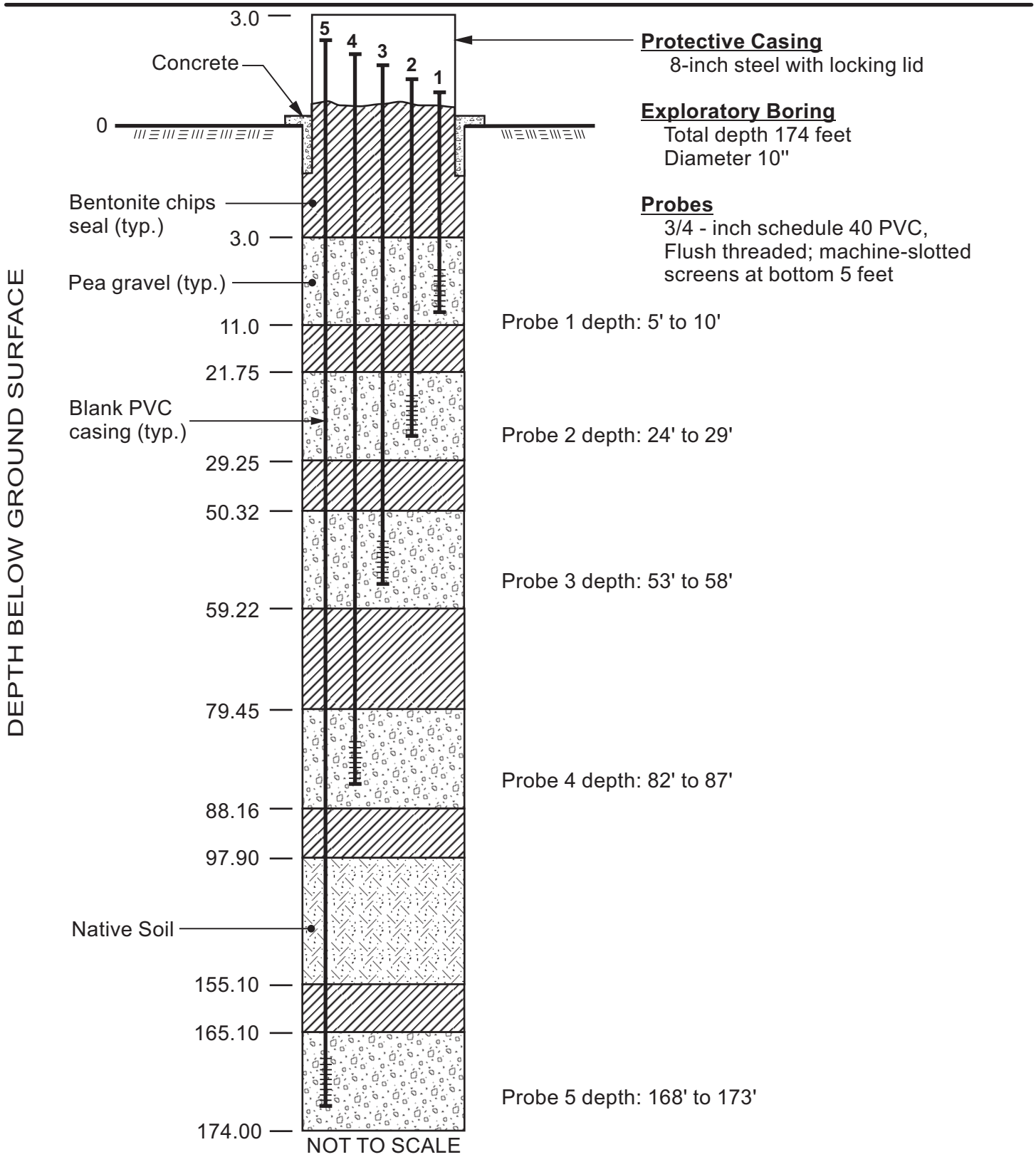
R.T. FRANKIAN & ASSOCIATES

AS-BUILT SOIL-GAS PROBE GP-13

Chiquita Canyon Landfill
Los Angeles County, CA

Project No.: 2004-001-92
Drilling Contractor: WDC Exploration and Wells
Installed 12/5/05 by P. Chang

Ground Surface elev. 1262[88]
Datum MSL



R.T. FRANKIAN AND ASSOCIATES

2004-001-92 REPORT DATED 5-25-07

For use with report dated 05/08/2008; RTF Job No. 2004-001-92

BORING GP-13

JOB NUMBER: 2004-001-92
DATE DRILLED: 12/5/05
EQUIPMENT USED: Air Rotary
LOGGED BY: PDC
BORING DEPTH: 0-174'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
							SM	**ARTIFICIAL FILL (af)** SILTY SAND: mostly fine to coarse sand, some silt, little gravel, loose to medium dense, dry to moist, olive yellow (25Y 6/6)
			-	5				**PICO FORMATION (Tp)** SILTSTONE: mostly silt, little sand, medium hard, moist, pale olive (10Y 6/2), making fine dust
			-	10				
			-	15				little more fine sand, medium hard to hard, light olive brown (5Y 5/6)
7:25 7:38			- - -	20				
			-	25				some white siltstone fragments, pale olive (10Y 6/2), making fine dust
								SANDY SILTSTONE: mostly silt and siltstone fragments, some fine to medium sand, medium hard, moist, light olive brown (5Y 5/6)
			-	30				
			-	35				slightly coarser sand
7:45 7:49			- -	40				SILTSTONE: mostly silt and siltstone fragments, little fine sand, medium hard to hard, moist, moderate yellowish brown (10YR 5/4)

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING GP-13 (CONTINUED)

JOB NUMBER: 2004-001-92
DATE DRILLED: 12/5/05
EQUIPMENT USED: Air Rotary
LOGGED BY: PDC
BORING DEPTH: 0-174'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION / GRAPHIC LOG	SOIL TYPE	
			-				
							SILTY SANDSTONE: mostly fine to coarse sand, some silt, medium hard, moist, grayish orange (10YR 7/4)
			-	45			
							SILTSTONE: mostly silt and siltstone fragments, little fine to medium sand, medium hard, moist, light olive brown (5Y 5/6)
			-	50			
			-	55			more silt, few sands
7:58			-				making lots of fine light gray dust
8:01			-				
			-	60			some very hard siltstone fragments, dusky yellow (5Y 6/4)
			-	65			medium hard to hard, light olive brown (5Y 5/6), less fine dust
							hard, dusky yellow (5Y 6/4), making lots of dust
			-	70			
			-	75			very hard, slow drilling
8:13			-				
8:17			-	80			CLAYSTONE: mostly clay and silt with claystone fragments, hard to very

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BOREHOLE LOG 2004-001-92.GPJ FRANKIAN.GDT 5/22/07

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING GP-13 (CONTINUED)

JOB NUMBER: 2004-001-92
DATE DRILLED: 12/5/05
EQUIPMENT USED: Air Rotary
LOGGED BY: PDC
BORING DEPTH: 0-174'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
			-					hard, moist, grayish olive (10Y 4/2)
			-	85				SILTSTONE: mostly silt and siltstone fragments, few coarse sand, medium hard to hard, moist, olive gray (5Y 5/2)
								CLAYSTONE: mostly clay and silt, medium hard to hard, moist, grayish olive (10Y 4/2)
			-	90				
			-	95				some very hard claystone fragments
8:25			-					
8:28			-					
			-	100				
			-	105				hard, very hard
			-	110				
			-	115				still making lots of fine dust
8:36			-					
8:40			-	120				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING GP-13 (CONTINUED)

JOB NUMBER: 2004-001-92
DATE DRILLED: 12/5/05
EQUIPMENT USED: Air Rotary
LOGGED BY: PDC
BORING DEPTH: 0-174'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
			-					SILTSTONE/CLAYSTONE: mostly silt and clay with few sand
			-	125				mostly siltstone fragments, light olive brown (5Y 5/6)
			-	130				mostly silt and clay, grayish olive (10Y 4/2)
			-	135				mostly silt and siltstone fragments, very hard, moist, light olive gray (5Y 5/2)
8:51			-					
8:56			-					
			-	140				
			-	145				
			-	150				mostly silt, few fine sand, medium hard to hard, moist, dusky yellow (5Y 6/4)
			-	155				hard, light olive gray (5Y 5/2)
9:05			-					
9:09			-					
				160				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BORING GP-13 (CONTINUED)

JOB NUMBER: 2004-001-92
DATE DRILLED: 12/5/05
EQUIPMENT USED: Air Rotary
LOGGED BY: PDC
BORING DEPTH: 0-174'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								hard to very hard, dusky yellow (5Y 6/4), making lots of dust
								CLAYSTONE/SILTSTONE: mostly clay and silt, hard to very hard, moist, grayish yellow green (5GY 7/2), making fine powder
				165				some claystone fragments, grayish olive (10Y 4/2)
				170				
9:20								Bottom of Boring at 174 feet.
				175				
				180				
				185				
				190				
				195				
				200				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2004-001-92.GPJ FRANKIAN.GDT 5/22/07

LOG OF BORING

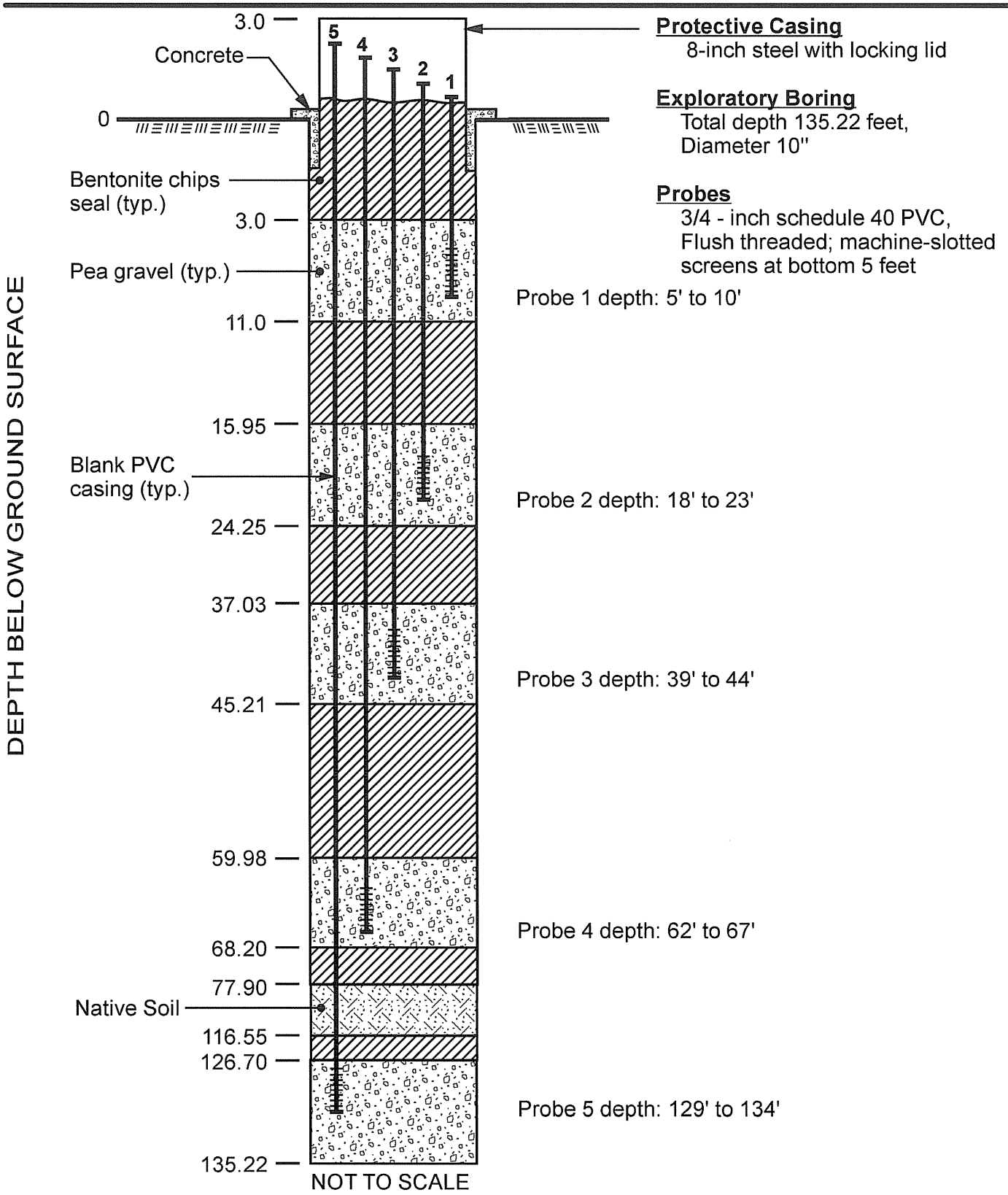
R.T. FRANKIAN & ASSOCIATES

AS-BUILT SOIL-GAS PROBE GP-14

Chiquita Canyon Landfill
Los Angeles County, CA

Project No.: 2004-001-92
Drilling Contractor: WDC Exploration and Wells
Installed 12/2/05 by P. Chang

Ground Surface elev. 1212.00
Datum MSL



R.T. FRANKIAN AND ASSOCIATES

2004-001-92 REPORT DATED 5-25-07

For use with report dated 05/08/2008; RTF Job No. 2004-001-92

BORING GP-14

JOB NUMBER: 2004-001-92
DATE DRILLED: 12/1/05
EQUIPMENT USED: Air Rotary
LOGGED BY: PDC
BORING DEPTH: 0-165'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
8:36			-					**SAUGUS FORMATION (QTs)** SILTY SANDSTONE: mostly fine to medium sand, some silt, some coarse sand and gravel, slightly weathered, loose, moist, light olive brown (5Y 5/6)
								more gravels, less weathering
			-	5				
			-	10				less gravels, more silt, loose to medium hard
			-	15				some gravels and cobbles
8:42			-					
8:46			-					
			-	20				more sands, less gravels, yellowish gray (5Y 7/2)
								SANDY SILTSTONE: mostly silt and siltstone fragments, some fine to medium sand, medium hard, moist, dusky yellow (5Y 6/4)
			-	25				bottom of drive casing
8:53			-					
8:57			-					
			-	30				SILTSTONE: less sand, hard, light olive gray (5Y 5/2)
			-	35				
				40				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING GP-14 (CONTINUED)

JOB NUMBER: 2004-001-92
DATE DRILLED: 12/1/05
EQUIPMENT USED: Air Rotary
LOGGED BY: PDC
BORING DEPTH: 0-165'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION / GRAPHIC LOG	SOIL TYPE	
			-				SILTSTONE/CLAYSTONE: mostly silt and claystone fragments, medium hard to hard, moist
			-	45			
9:05			-				
9:10			-				
			-	50			SANDY SILTSTONE: mostly silt with siltstone fragments, some fine sand, medium hard, moist, light olive brown (5Y 5/6)
			-	55			slightly more sand
			-	60			less sand, more silt & clay
							CLAYSTONE: mostly clay and silt with claystone fragments, few sands, medium hard to hard, moist, pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/4)
			-	65			
9:18			-				SILTY SANDSTONE: mostly fine to medium sand, some silt, little coarse sand, medium hard, moist, light olive brown (5Y 5/6)
9:23			-				
			-	70			
			-	75			some gravel to 2"
				80			

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING GP-14 (CONTINUED)

JOB NUMBER: 2004-001-92
DATE DRILLED: 12/1/05
EQUIPMENT USED: Air Rotary
LOGGED BY: PDC
BORING DEPTH: 0-165'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
			-					less gravel, mostly fine to coarse sand, little silt
			-	85				
9:31 9:35			- - -	90				more silt, less medium to coarse sand
			-	95				more silt
								SANDY SILTSTONE: mostly silt and siltstone fragments, some fine sand, medium hard to hard, moist, light olive gray (5Y 5/2)
			-	100				
			-	105				little sand, moderate olive brown (5Y 4/4)
9:43 9:47			- - -	110				light olive brown (5Y 4/4)
								CLAYSTONE: mostly clay with dark claystone fragments, hard, moist, moderate olive brown (5Y 4/4)
			-	115				
								SANDY SILTSTONE: mostly silt, some fine to medium sand, hard, moist, pale olive (10Y 6/2), making lots of fine white dust
				120				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BORING GP-14 (CONTINUED)

JOB NUMBER: 2004-001-92
DATE DRILLED: 12/1/05
EQUIPMENT USED: Air Rotary
LOGGED BY: PDC
BORING DEPTH: 0-165'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								SILTSTONE: mostly silt and siltstone fragments, medium hard, moist, light olive gray (5Y 5/2)
				125				
9:57								
10:02								
				130				more siltstone & claystone fragments, hard
				135				
								making fine dust to 142'
				140				dusky yellow (5Y 6/4)
								slightly more sand, medium hard, moist, light olive brown (5Y 5/6)
				145				▽ groundwater at 146 feet 12/2/05
10:15								
10:20				150				
				155				slightly more sandy
				160				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING GP-14 (CONTINUED)

JOB NUMBER: 2004-001-92
DATE DRILLED: 12/1/05
EQUIPMENT USED: Air Rotary
LOGGED BY: PDC
BORING DEPTH: 0-165'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								SANDY SILTSTONE: some fine sand
10:37				165				▽ groundwater at 165 feet 12/1/05
								Bottom of Boring at 165 feet. Groundwater first encountered at 165', then rose to 146' following overnight water check.
				170				
				175				
				180				
				185				
				190				
				195				
				200				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2004-001-92.GPJ FRANKIAN.GDT 5/22/07

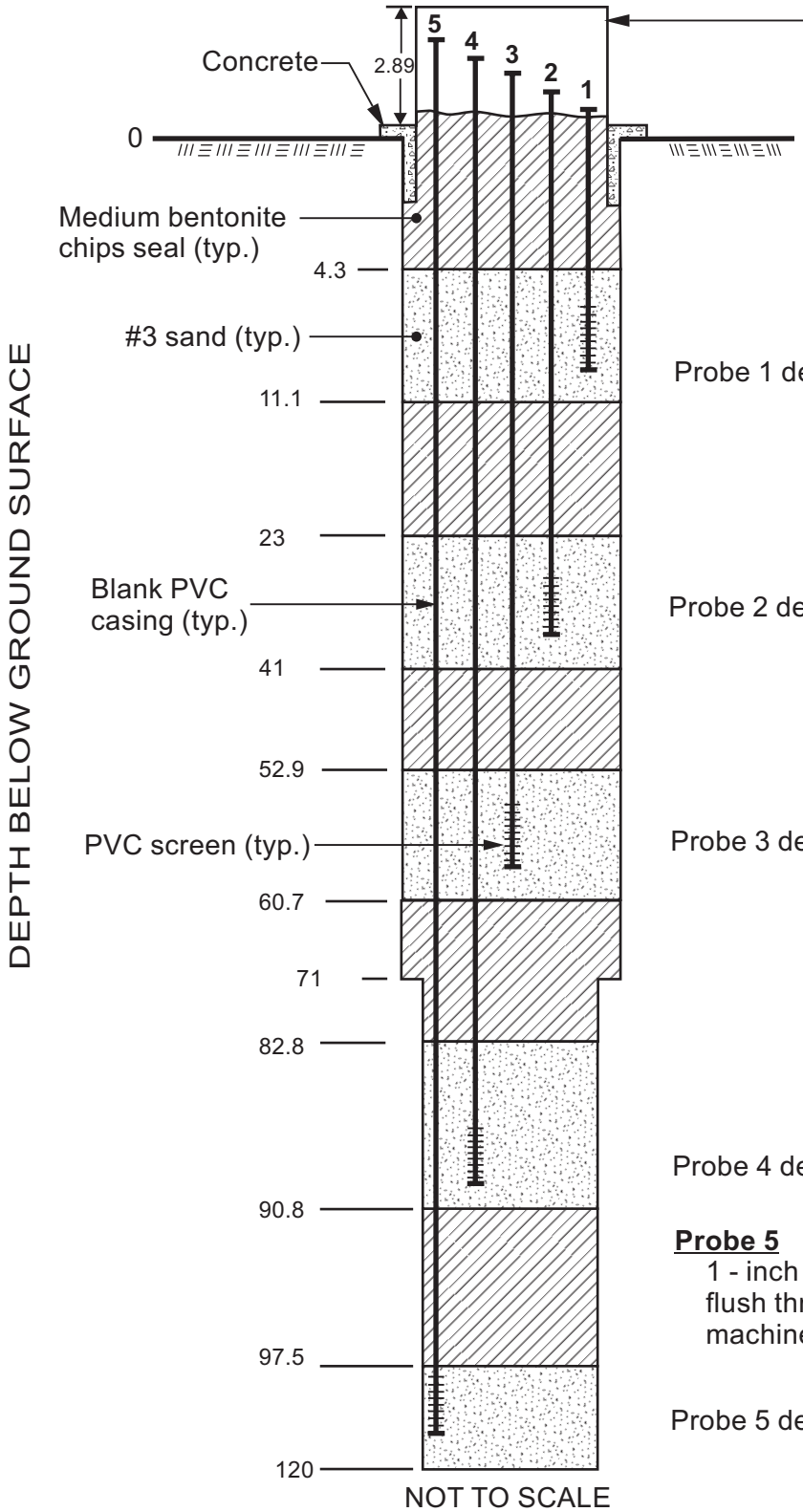
LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

As-Built Gas Probe GP-15

Project No.: 2004-001-92
Drilling Contractor: Cascade Drilling, Inc.
Installed: 8/25/09 By: P. Chang

Top Concrete Pad Elev. 1215.86 feet
Ground Surface Elev. 1215.5 feet
Datum MSL



Protective Casing
10.5-inch steel with locking lid

Exploratory Boring
Total depth 120 feet
Diameter 11 inch to 71 feet,
8.5 inch from 71 to 120 feet.

Probes 1 to 4
3/4 - inch schedule 40 PVC,
flush threaded with "O" rings;
0.020 - inch machine-slotted screens

Probe 1 depth: 5 to 10.17 feet

Probe 2 depth: 25 to 40.17 feet

Probe 3 depth: 55 to 60.17 feet

Probe 4 depth: 85 to 90.17 feet

Probe 5
1 - inch schedule 80 PVC,
flush threaded; 0.020 - inch
machine-slotted screens

Probe 5 depth: 100 to 115.25 feet

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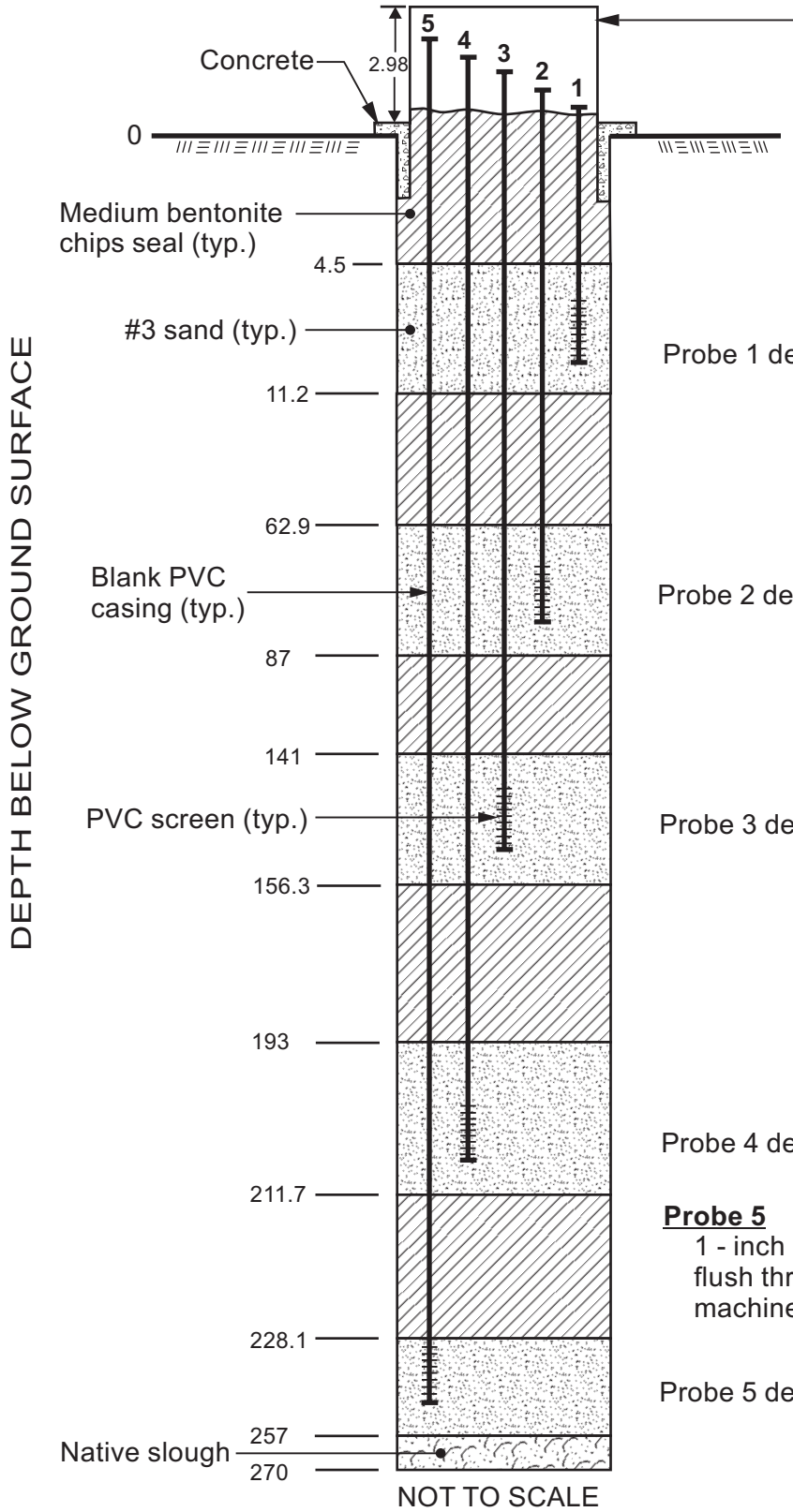
As-Built Gas Probe GP-16

Project No.: 2004-001-92
Drilling Contractor: Cascade Drilling, Inc.
Installed: 9/01/09 By: P. Chang

Top Concrete Pad Elev. 1254.48 feet
Ground Surface Elev. 1254.2 feet
Datum MSL



Protective Casing
10.5-inch steel with locking lid

Exploratory Boring
Total depth 270 feet
Diameter 8.5 inch

Probes 1 to 4
3/4 - inch schedule 40 PVC,
flush threaded with "O" rings;
0.020 - inch machine-slotted screens

Probe 1 depth: 5 to 10.17 feet

Probe 2 depth: 65 to 85.17 feet

Probe 3 depth: 144 to 154.17 feet

Probe 4 depth: 195 to 210.17 feet

Probe 5
1 - inch schedule 80 PVC,
flush threaded with "O" rings; 0.020 - inch
machine-slotted screens

Probe 5 depth: 230 to 255.25 feet

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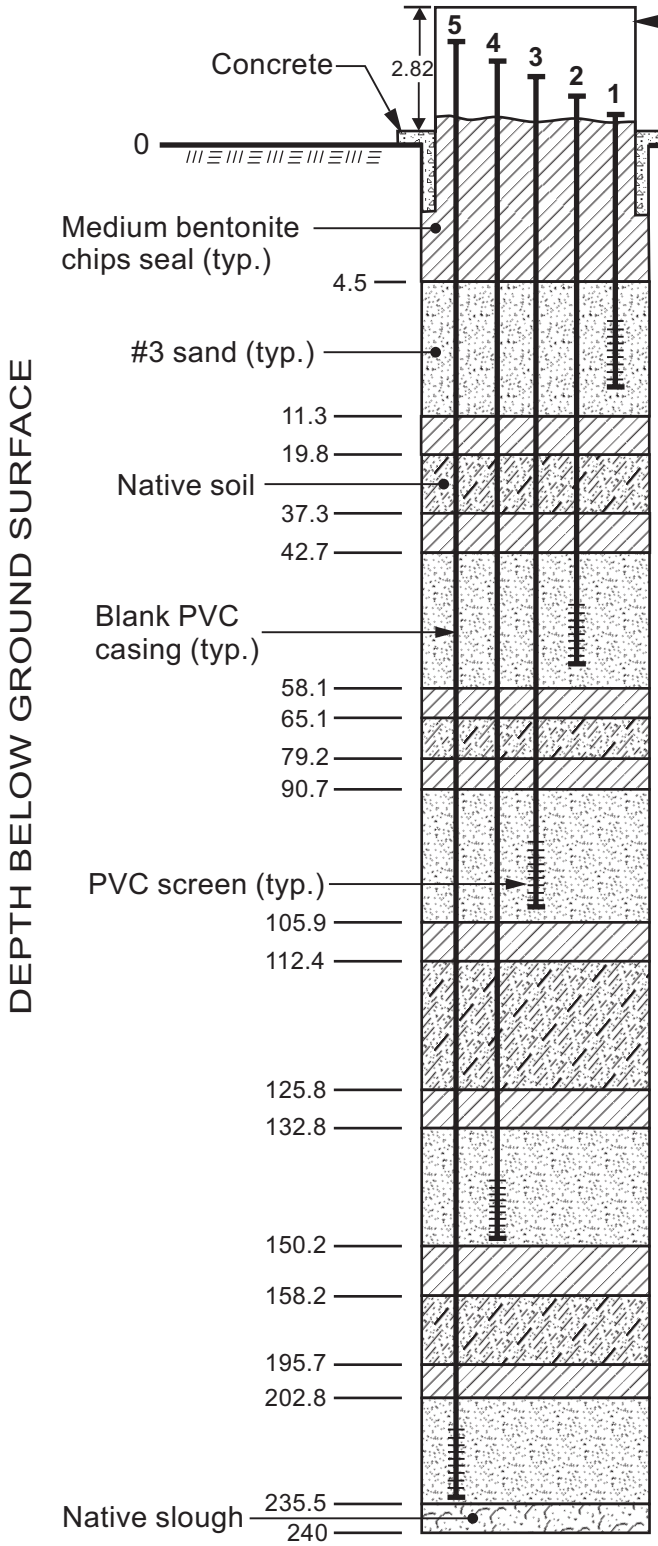
As-Built Gas Probe GP-17

Project No.: 2004-001-92
Drilling Contractor: Cascade Drilling, Inc.
Installed: 8/28/09 By: P. Chang

Top Concrete Pad Elev. 1213.84 feet
Ground Surface Elev. 1213.6 feet
Datum MSL



NOT TO SCALE

Protective Casing
10.5-inch steel with locking lid

Exploratory Boring
Total depth 240 feet
Diameter 8.5 inch

Probes 1 to 4
3/4 - inch schedule 40 PVC,
flush threaded with "O" rings;
0.020 - inch machine-slotted screens

Probe 1 depth: 5 to 10.17 feet

Probe 2 depth: 45.1 to 55.27 feet

Probe 3 depth: 95.1 to 105.27 feet

Probe 4 depth: 139.2 to 149.37 feet

Probe 5
1 - inch schedule 80 PVC,
flush threaded with "O" rings;
0.020 - inch machine-slotted screens

Probe 5 depth: 205 to 235.25 feet

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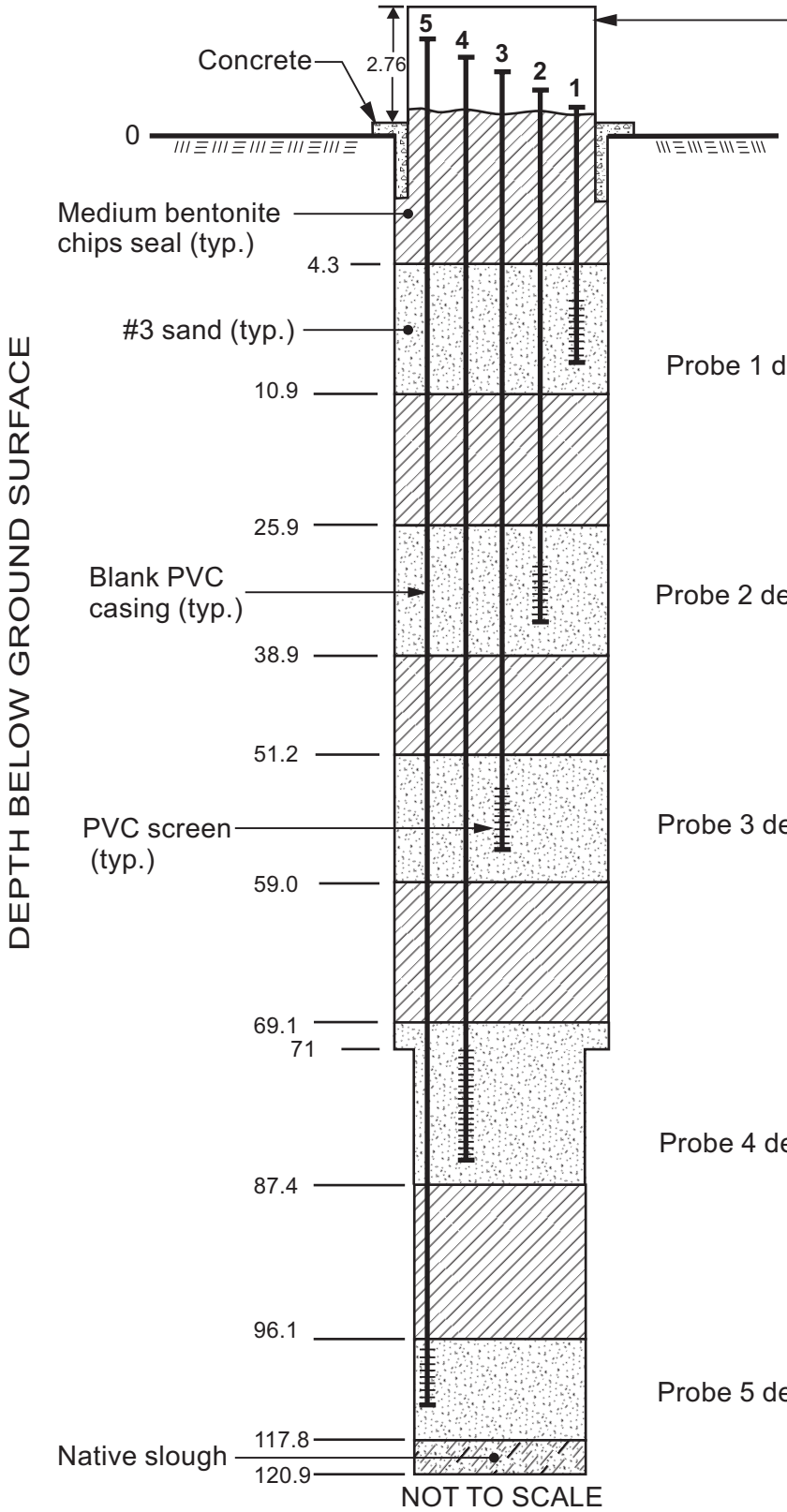
As-Built Gas Probe GP-18

Project No.: 2004-001-92
Drilling Contractor: Cascade Drilling, Inc.
Installed: 8/26/09 By: P. Chang

Top Concrete Pad Elev. 1110.93 feet
Ground Surface Elev. 1110.7 feet
Datum MSL



Protective Casing
10.5-inch steel with locking lid

Exploratory Boring
Total depth 120.9
Diameter 11 inch to 71 feet,
8.5 inch from 71 to 120.9 feet

Probes
3/4 - inch schedule 40 PVC,
flush threaded with "O" rings;
0.020 - inch machine-slotted screens

Probe 1 depth: 5 to 10.17 feet

Probe 2 depth: 28 to 38.17 feet

Probe 3 depth: 53 to 58.17 feet

Probe 4 depth: 71 to 86.17 feet

Probe 5 depth: 100 to 115.17 feet

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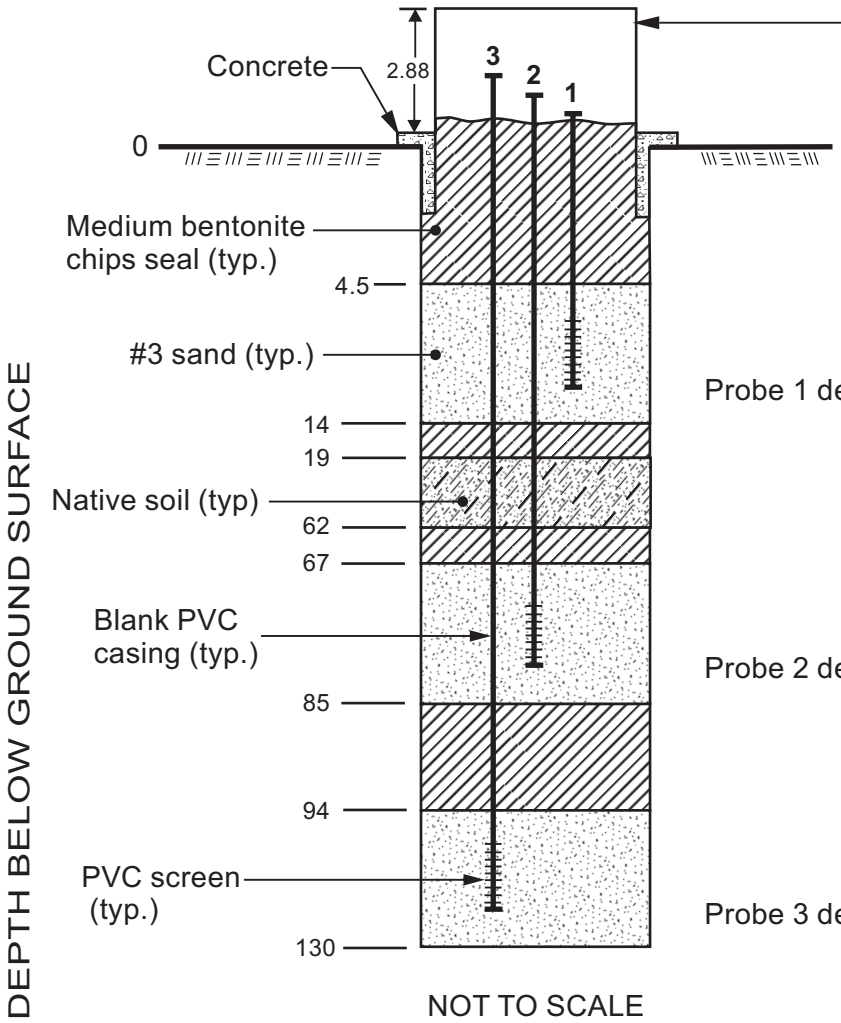
As-Built Gas Probe GP-19

Project No.: 2004-001-92
Drilling Contractor: Cascade Drilling, Inc.
Installed: 9/4/09 By: K. Pitcher

Top Concrete Pad Elev. 1128.84 feet
Ground Surface Elev. 1128.6 feet
Datum MSL



Protective Casing
10.5-inch steel with locking lid

Exploratory Boring
Total depth 130 feet
Diameter 8 inch

Probes
3/4 - inch schedule 40 PVC,
flush threaded with "O" rings;
0.020 - inch machine-slotted screens

Probe 1 depth: 5 to 10.17 feet

Probe 2 depth: 69 to 84.17 feet

Probe 3 depth: 96 to 116.17 feet

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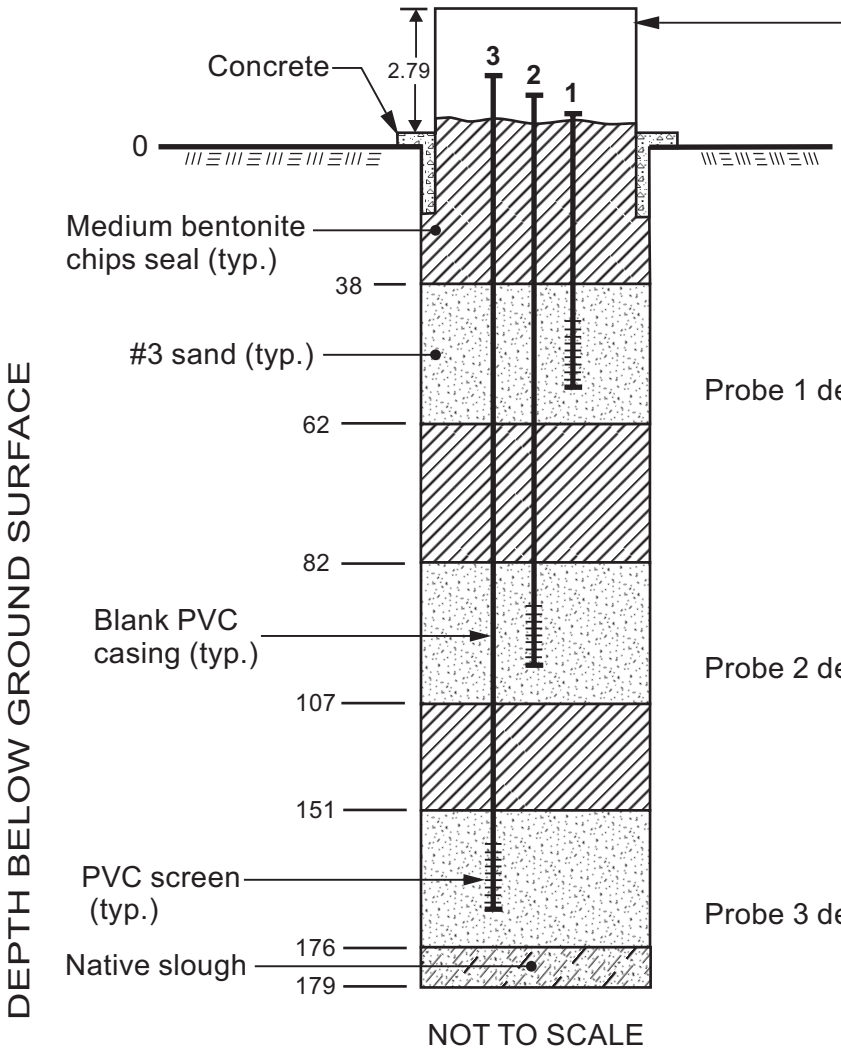
As-Built Gas Probe GP-20

Project No.: 2004-001-92
Drilling Contractor: Cascade Drilling, Inc.
Installed: 9/4/09 By: K. Farrell

Top Concrete Pad Elev. 1175.10 feet
Ground Surface Elev. 1174.9 feet
Datum MSL



Protective Casing
10.5-inch steel with locking lid

Exploratory Boring
Total depth 179 feet
Diameter 8.5 inch

Probes
3/4 - inch schedule 40 PVC,
flush threaded with "O" rings;
0.020 - inch machine-slotted screens

Probe 1 depth: 40 to 60.17 feet

Probe 2 depth: 85 to 105.17 feet

Probe 3 depth: 153 to 173.17 feet

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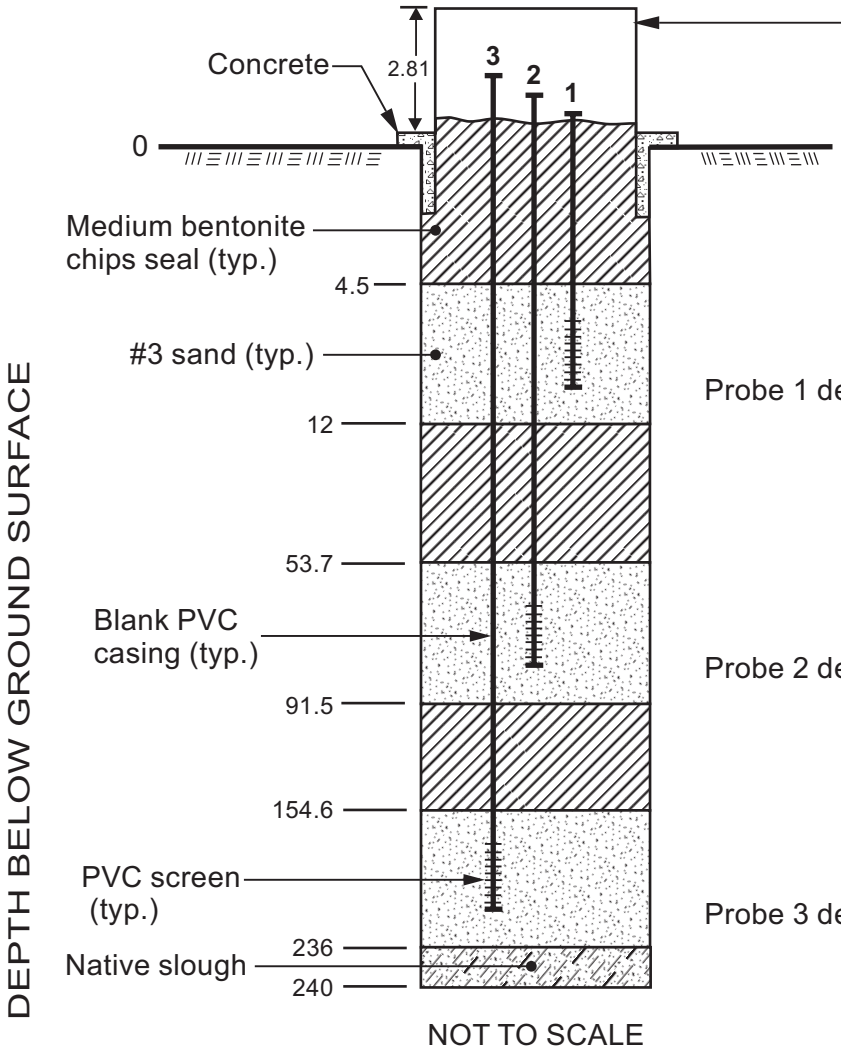
Figure 7

As-Built Gas Probe GP-21

Project No.: 2004-001-92
Drilling Contractor: Cascade Drilling, Inc.
Installed: 9/2/09 By: P. Chang

Top Concrete Pad Elev. 1218.14 feet
Ground Surface Elev. 1217.9 feet
Datum MSL



Protective Casing
10.5-inch steel with locking lid

Exploratory Boring
Total depth 240 feet
Diameter 8.5 inch

Probes 1 and 2
3/4 - inch schedule 40 PVC, flush threaded with "O" rings; 0.020 - inch machine-slotted screens

Probe 1 depth: 5 to 10.17 feet

Probe 2 depth: 60 to 90.17 feet

Probe 3
1 - inch schedule 80 PVC, flush threaded with "O" rings; 0.020 - inch machine-slotted screens, centralizers at 192 and 232 feet

Probe 3 depth: 167 to 232.25 feet

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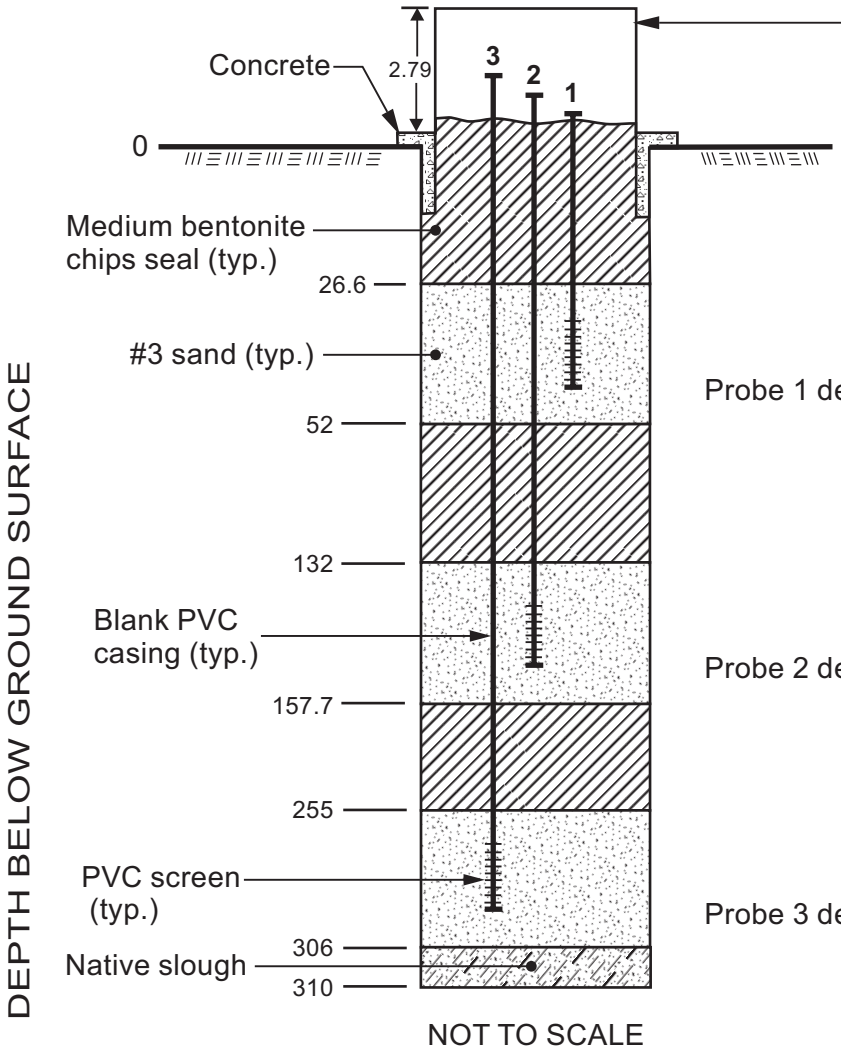
Figure 8

As-Built Gas Probe GP-22

Project No.: 2004-001-92
Drilling Contractor: Cascade Drilling, Inc.
Installed: 9/8/09 By: P. Chang

Top Concrete Pad Elev. 1324.20 feet
Ground Surface Elev. 1324.0 feet
Datum MSL



Protective Casing
10.5-inch steel with locking lid

Exploratory Boring
Total depth 310 feet
Diameter 8.5 inch

Probes 1 and 2
3/4 - inch schedule 40 PVC, flush threaded with "O" rings; 0.020 - inch machine-slotted screenss

Probe 1 depth: 30 to 50.17 feet

Probe 2 depth: 135 to 155.17 feet

Probe 3
1 - inch schedule 80 PVC, flush threaded with "O" rings; 0.020 - inch machine-slotted screens

Probe 3 depth: 260 to 305.25 feet

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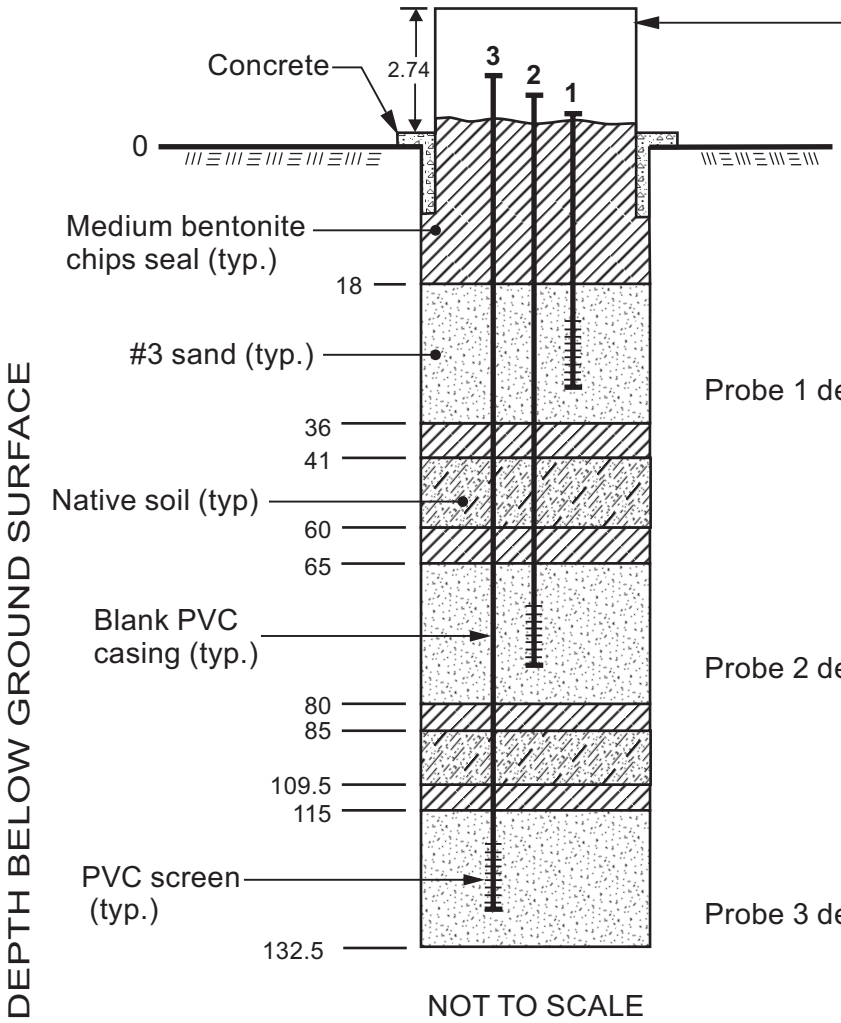
As-Built Gas Probe GP-23

Project No.: 2004-001-92
Drilling Contractor: Cascade Drilling, Inc.
Installed: 9/3/09 By: K. Pitcher

Top Concrete Pad Elev. 1231.88 feet
Ground Surface Elev. 1231.6 feet
Datum MSL



Protective Casing
10.5-inch steel with locking lid

Exploratory Boring
Total depth 132.5 feet
Diameter 8 inch

Probes
3/4 - inch schedule 40 PVC,
flush threaded with "O" rings;
0.020 - inch machine-slotted screens

Probe 1 depth: 20 to 35.17 feet

Probe 2 depth: 67 to 77.17 feet

Probe 3 depth: 117 to 132.17 feet

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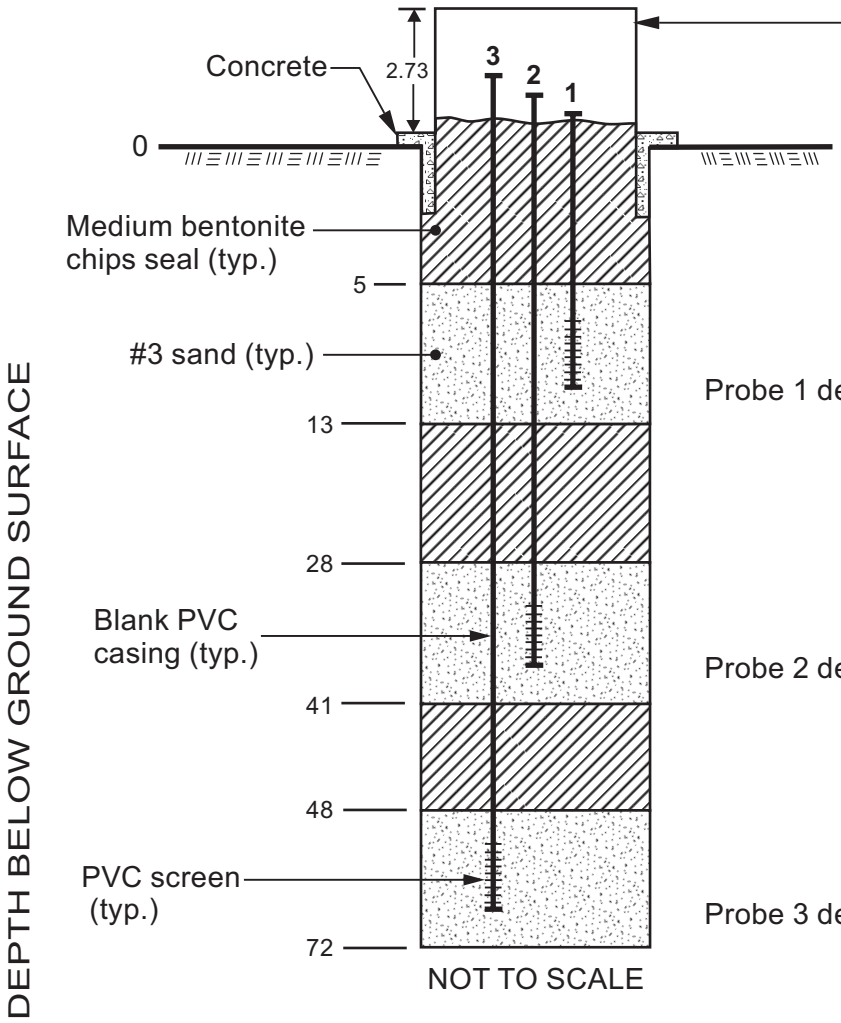
As-Built Gas Probe GP-24

Project No.: 2004-001-92
Drilling Contractor: Cascade Drilling, Inc.
Installed: 9/2/09 By: K. Pitcher

Top Concrete Pad Elev. 1118.38 feet
Ground Surface Elev. 1118.1 feet
Datum MSL



Protective Casing
10.5-inch steel with locking lid

Exploratory Boring
Total depth 72 feet
Diameter 8 inch

Probes
3/4 - inch schedule 40 PVC,
flush threaded with "O" rings;
0.020 - inch machine-slotted screens

Probe 1 depth: 7 to 12.17 feet

Probe 2 depth: 30 to 40.17 feet

Probe 3 depth: 50 to 70.17 feet

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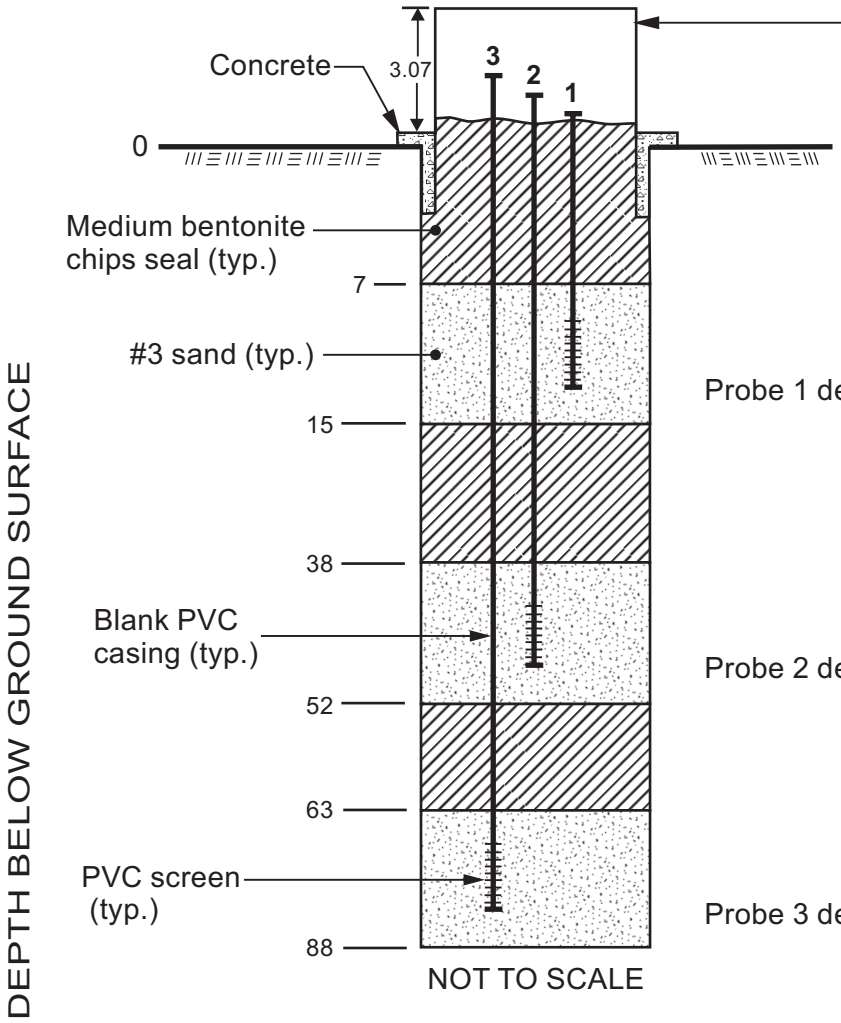
Figure 11

As-Built Gas Probe GP-25

Project No.: 2004-001-92
Drilling Contractor: Cascade Drilling, Inc.
Installed: 9/2/09 By: K. Farrell

Top Concrete Pad Elev. 1211.11 feet
Ground Surface Elev. 1210.9 feet
Datum MSL



Protective Casing
10.5-inch steel with locking lid

Exploratory Boring
Total depth 88 feet
Diameter 8 inch

Probes
3/4 - inch schedule 40 PVC,
flush threaded with "O" rings;
0.020 - inch machine-slotted screens

Probe 1 depth: 9 to 14.17 feet

Probe 2 depth: 40 to 50.17 feet

Probe 3 depth: 65 to 80.17 feet

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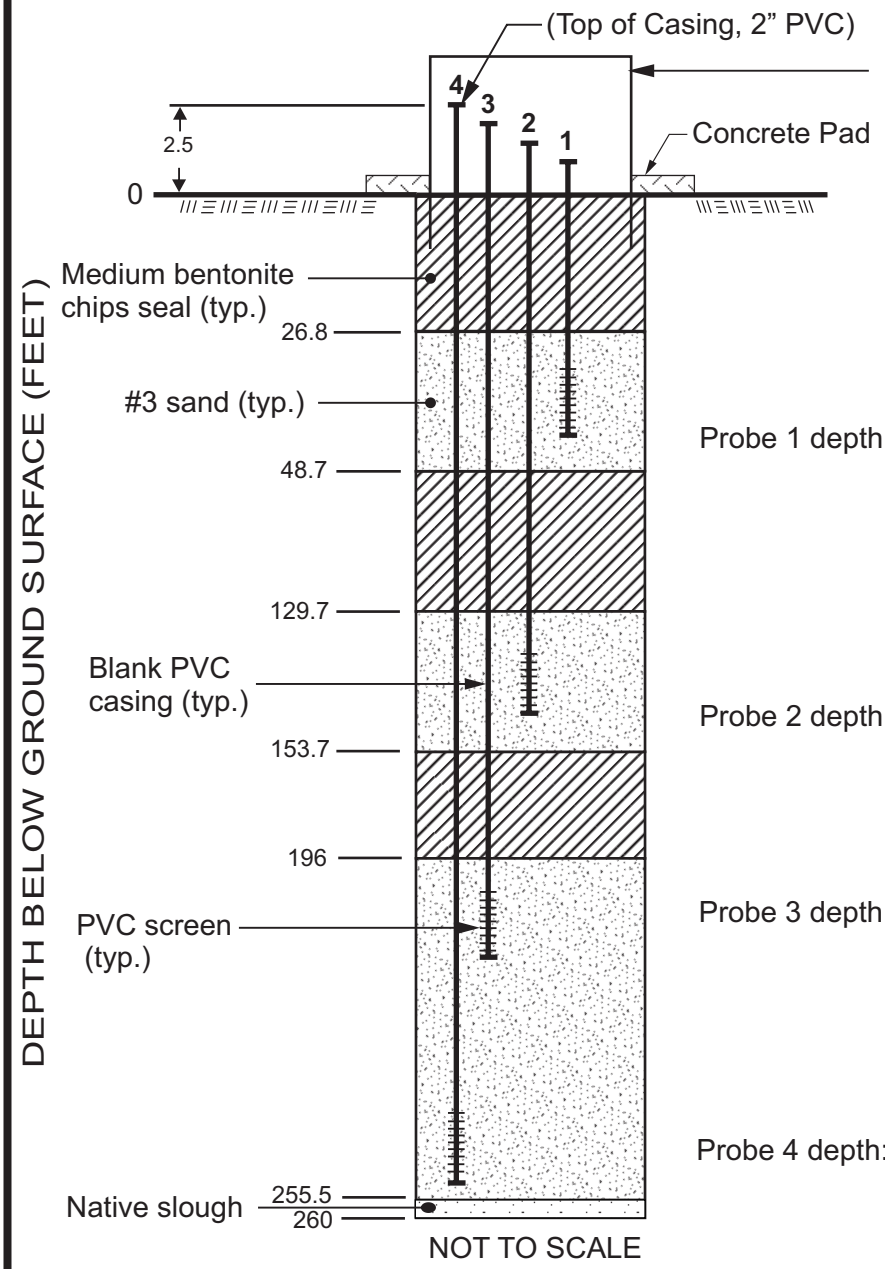
Figure 12

As-Built Gas Probe GP-26

Project No.: 2002-036-005
Drilling Contractor: WDC
Installed: 6/28/10 By: P. Chang

Top Concrete Pad Elev. 1376.342 feet
2" PVC TOC Elevation 1378.51 feet
Datum MSL



Protective Casing
10 3/4-inch steel with locking lid

Exploratory Boring
Total depth 260 feet
Diameter 8.5 inch

Probes 1 to 3
3/4 - inch schedule 80 PVC,
flush threaded with "O" rings;
0.020 - inch machine-slotted screens

Probe 1 depth: 29 to 44 feet

Probe 2 depth: 135 to 150 feet

Probe 3 depth: 200 to 215 feet

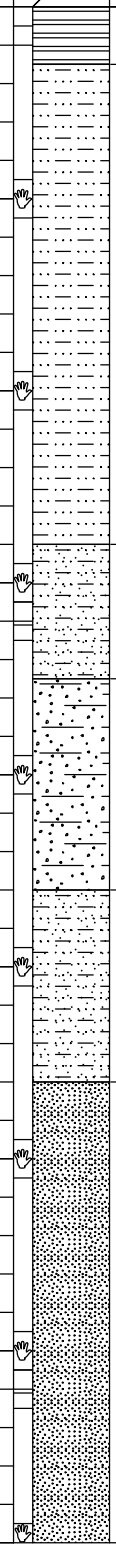
Probe 4
2-inch schedule 80 PVC,
flush threaded with "O" rings;
0.020 - inch machine-slotted screens
Total casing length: 256.45 feet

Probe 4 depth: 223.6 to 253.6 feet

BORING GP-26

JOB NUMBER: 2002-036-005
DATE DRILLED: 6/23/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-260'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE
15:28			-		**PICO FORMATION (Tp)** CLAYSTONE: moderately hard, moist, light brown (5YR 5/6)
					SILTSTONE: little fine sand, medium dense, moist, light olive gray (5Y 5/2), no odor
			-	5	
					dusky yellow (5Y 6/4)
			-	10	
					interbedded dusky yellow (5Y 6/4) and light olive gray (5Y 5/2)
			-	15	SANDY SILTSTONE: fine sand, medium dense, moist, dusky yellow (5Y 6/4)
15:52			-		bottom of temporary drive casing; removed 6/28/10
15:59			-		
					gradational contact
					SILTY SANDSTONE: fine, little medium, medium dense, moist, dusky yellow (5Y 6/4)
			-	20	
					SANDY SILTSTONE: fine sand, medium dense, moist, light olive (10Y 5/6)
			-	25	
					SANDSTONE: fine to medium with little coarse sand, medium dense, moist, light olive brown (5Y 5/6)
			-	30	
					grayish orange (10YR 7/4)
			-	35	
16:22			-		fine, less medium and coarse sand
7:20			-		
				40	



Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING GP-26 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 6/23/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-260'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								more medium to coarse sand
								CLAYEY SANDSTONE: fine to medium, medium dense, moist, moderate yellowish brown (10YR 5/4)
				45				SILTSTONE: medium dense, moist, dusky yellow (5Y 6/4)
								CLAYSTONE: medium dense, moist, dark yellowish orange (10YR 6/6)
								SILTSTONE: medium dense, moist, yellowish gray (5Y 7/2)
				50				
7:47 7:51				55				
				60				moderate yellow (5Y 7/6)
				65				light olive brown (5Y 5/6) little fine sand, more silstone fragments, medium dense to dense medium dense
				70				SANDY SILTSTONE: fine sand, medium dense, moist, dusky yellow (5Y 6/4) more fine to medium sand
8:20 8:24				75				SILTSTONE: medium dense, moist, dusky yellow (5Y 6/4)
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING GP-26 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 6/23/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-260'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								grayish yellow green (5GY 7/2)
								very dense, making a lot of dust
				85				driller injecting water to keep dust down
				90				
								little fine sand
8:52				95				
8:56								
				100				
								SANDY SILTSTONE: fine sand, dense, moist, dusky yellow green (5GY 5/2)
								FOSSILIFEROUS SANDY SILTSTONE: shell fragments
				105				more fine to medium sand
								CLAYSTONE: moderately hard to hard, moist, dark yellowish brown (10YR 4/2)
				110				
				115				
9:32								
9:36								SILTSTONE: medium dense, moist, light olive gray (5Y 5/2)
								SILTY SANDSTONE: fine to medium, little coarse sand, medium dense, moist, grayish yellow green (5GY 7/2)
				120				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING GP-26 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 6/23/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-260'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								less medium and coarse
				125				more silt
				130				more fine sand and less silt
10:05 10:22				135				some medium
				140				
				145				few coarse sand and gravel
				150				few claystone fragments (possibly interbeds)
10:45 10:49				155				SANDY SILTSTONE: fine to medium sand, medium dense to dense, moist, light olive gray (5Y 5/2)
				160				SILTY SANDSTONE: fine, medium dense, moist, light olive (10Y 5/4)

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING GP-26 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 6/23/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-260'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								few gravel
				165				
								CLAYSTONE: moderately hard, moist, moderate brown (5YR 4/4), minor thin siltstone lamination
				170				
								interbedded with light olive siltstone
								making lots of dust, driller injecting water to keep dust down
11:18 12:00				175				
				180				
								interbedded mudstone, pale yellowish brown (10YR 6/2)
				185				
								SILTSTONE: dense, moist, yellowish gray (5Y 7/2), making lots of dust
				190				FOSSILIFEROUS SILTY SANDSTONE: fine, little medium sand, dense, moist, light olive gray (5Y 5/2), some shell fragments
12:37 12:50				195				
				200				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BORING GP-26 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 6/23/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-260'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								more silt and less shell fragments
								SILTSTONE: dense, moist, dusky yellow green (5GY 5/2)
				205				olive gray (5Y 3/2)
								FOSSILIFEROUS SILTY SANDSTONE: fine, little medium sand, little shell fragments, dense, moist, light olive gray (5Y 5/2)
								more shell fragments, making lots of dust
				210				
								▽ groundwater at 213.14 feet (9:30 am) 6/28/10
								more siltstone fragments, possibly interbeds
13:22 12:22				215				
				220				
								fine to medium, little silt, dense to very dense, few shell fragments, making lots of dust
								PEBBLY SANDSTONE: fine to coarse, gravel, subangular fragments in drill returns, very dense, dry to moist, grayish yellow (5Y 8/4)
								SILTSTONE: dense, moist, grayish olive green (5GY 3/2), easier drilling
				225				
								more fine sands
				230				
								less sands, light olive gray (5Y 5/2)
								▽ groundwater at 234.25 feet (2:10 pm) 6/25/10
12:53 12:58				235				little fine sands, light olive gray (5Y 3/2)
				240				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING GP-26 (CONTINUED)

JOB NUMBER: 2002-036-005
DATE DRILLED: 6/23/10
EQUIPMENT USED: Air-Rotary rig (STAR 50K-CH)
LOGGED BY: P. Chang
BORING DEPTH: 0-260'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								FOSSILIFEROUS SILTY SANDSTONE: fine to medium, very dense, moist, grayish yellow green (5GY 7/2), few shell fragments
				245				
				250				SANDSTONE: fine to medium, dense, moist, yellowish gray (5Y 7/2), producing less dust
13:22 13:28				255				some medium to coarse sand, started producing water from hole at connection
				260				Bottom of Boring at 260 feet. On 6/25/10. Target depth reached. Multi-level gas probe installed.
				265				
				270				
				275				
				280				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-005.GPJ FRANKIAN.GDT 10/26/10

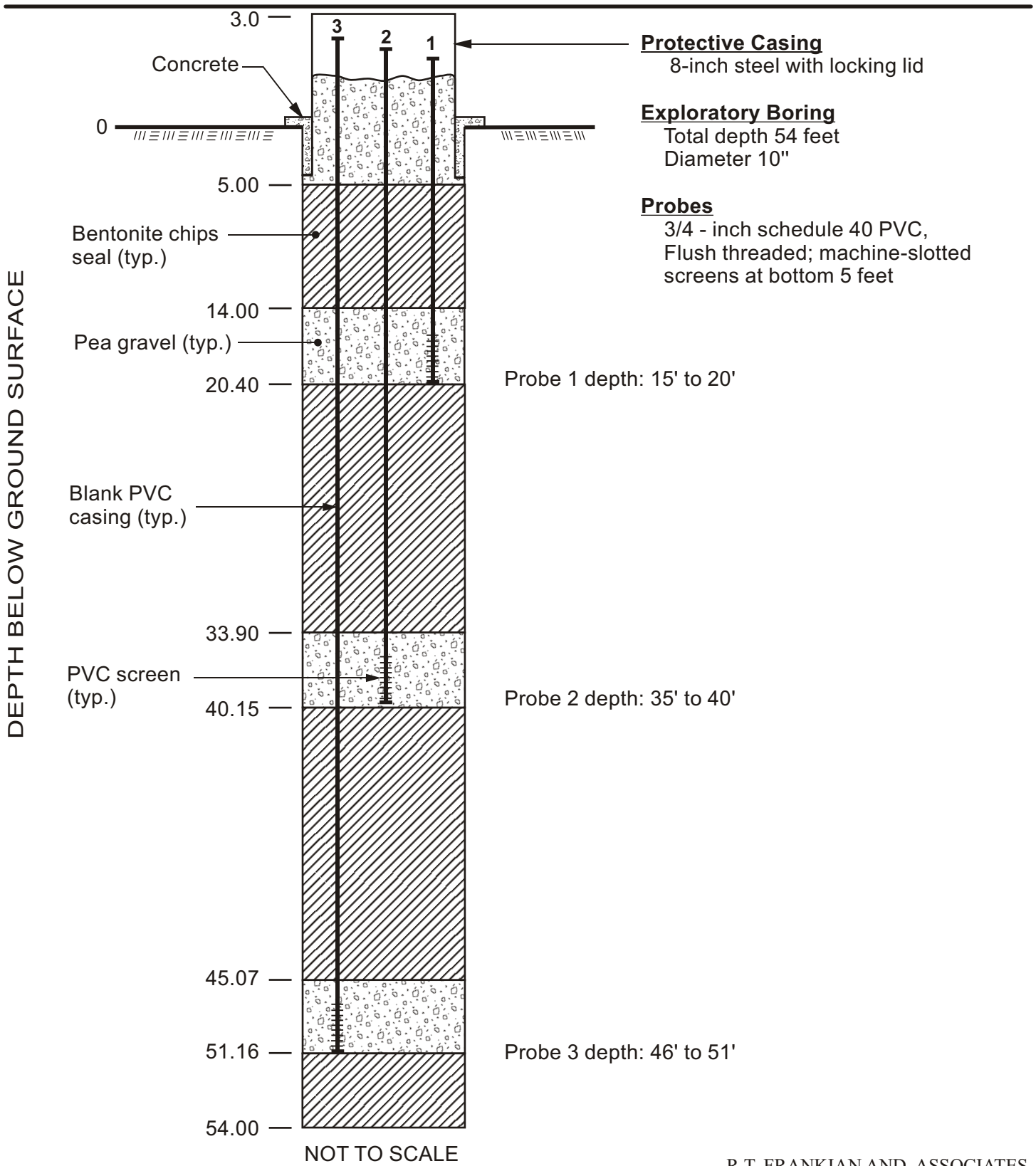
LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

As-Built Soil-Gas Probe GP-D1

Project No.: 2004-001-91
Drilling Contractor: WDC Exploration and Wells
Installed 11/30/05 by P. Chang

Ground Surface elev. 1009[35]
Datum MSL



BORING GP-D1

JOB NUMBER: 2004-001-91
DATE DRILLED: 11/30/05
EQUIPMENT USED: Air rotary casing hammer
LOGGED BY: PDC
BORING DEPTH: 0-55'

DATE/TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
12:05			-				SP	**ARTIFICIAL FILL (af)** SAND: mostly fine to coarse sand, some silt, little gravel & cobbles, loose to medium dense, dry to moist, olive brown (10YR 4/3)
			-	5				
			-	10				less gravel & cobbles
							SM	**ALLUVIUM (Qal)** SILTY SAND: mostly fine to medium sand, some silt, little coarse sand, medium dense, moist, light yellowish brown
			-	15				
12:11			-					
12:20			-	20				some gravels, loose to medium dense
				25				slightly less gravels
12:25			-					
12:30			-	30				more gravels and cobbles
				35				
12:34			-					
12:39			-	40				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING GP-D1 (CONTINUED)

JOB NUMBER: 2004-001-91
DATE DRILLED: 11/30/05
EQUIPMENT USED: Air rotary casing hammer
LOGGED BY: PDC
BORING DEPTH: 0-55'

DATE/TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION / GRAPHIC LOG	SOIL TYPE	
						SM	less gravels
				45			
12:38			-				
12:45			-				**SAUGUS FORMATION (QTs)** SILTY SANDSTONE: mostly fine to coarse sand, some silt, little gravels, medium hard, moist, light olive brown (5Y 5/6), slightly harder drilling
				50			
							∇ groundwater at 54 feet 11/30/05
12:48			-	55			coarser sands
							Bottom of Boring at 55 feet.
				60			
				65			
				70			
				75			
				80			

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2004-001-91.GPJ FRANKIAN.GDT 3/26/10

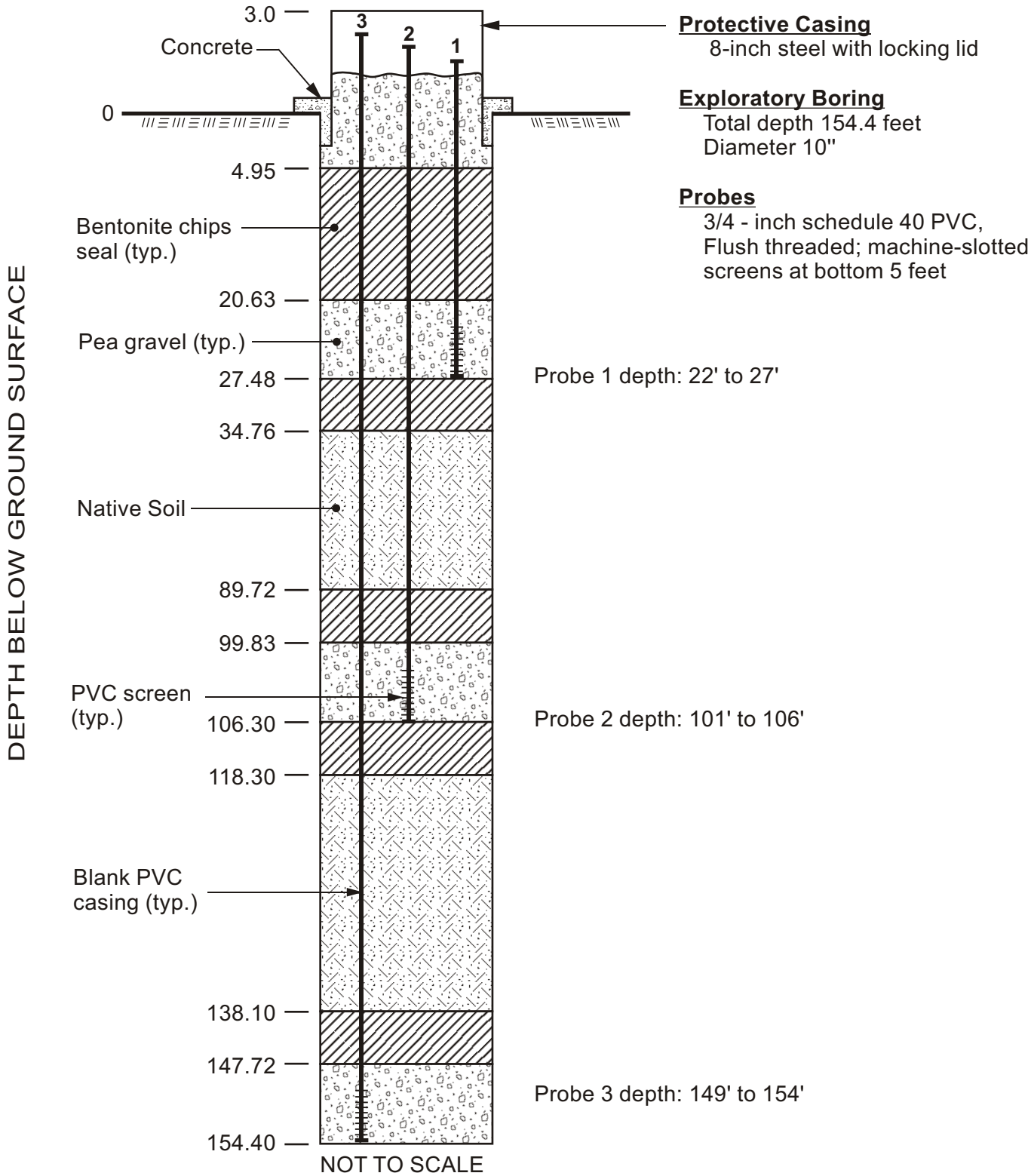
LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

As-Built Soil-Gas Probe GP-P1

Project No.: 2004-001-91
Drilling Contractor: WDC Exploration and Wells
Installed 11/30/05 by P. Chang

Ground Surface elev. 1173[46]
Datum MSL



BORING GP-P1

JOB NUMBER: 2004-001-91
DATE DRILLED: 11/29/05
EQUIPMENT USED: Air rotary casing hammer
LOGGED BY: PDC
BORING DEPTH: 0-154'

DATE/TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
14:05			-				SP	**ARTIFICIAL FILL (af)** SAND: mostly fines and fine sand, some medium to coarse sand and gravels, loose to medium dense, dry to moist, light brownish gray
								SAUGUS FORMATION (QTs) SILTY SANDSTONE: mostly fine to fine sand, some medium sand to gravels, cobble fragments, medium hard, moist, dusky yellow (5Y 6/4)
			-	5				
			-	10				more fine to medium sand, light olive brown (5Y 5/6)
			-	15				more sands
								SANDY SILTSTONE: mostly fines, some fine to medium coarse sand, little coarse sand and gravels, medium hard, moist, light olive gray (5Y 5/2)
14:14			-					
14:20			-					
			-	20				more clayey fines, dusky yellow (5Y 6/4)
			-	25				more sand and siltstone fragments bottom of drive casing: removed 11/30/2005
14:27			-					
14:31			-					
			-	30				more silt and fine sand
			-	35				CLAYSTONE: mostly clay and claystone fragments, some silt, little fine to medium sand, medium hard, moist, light olive gray (5Y 5/2)
				40				SANDY SILTSTONE: mostly silt, some clay, some fine sand, medium hard, moist, light olive gray (5Y 5/2)

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING GP-P1 (CONTINUED)

JOB NUMBER: 2004-001-91
DATE DRILLED: 11/29/05
EQUIPMENT USED: Air rotary casing hammer
LOGGED BY: PDC
BORING DEPTH: 0-154'

DATE/TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
			-					mostly silt and siltstone fragments, little fine sand
			-	45				more fine sand, dusky yellow (5Y 6/4)
14:37			-					
14:42			-					
			-	50				light olive gray (5Y 5/2)
			-	55				more fine sand, dusky yellow (5Y 6/4)
			-	60				
			-	65				trace gravels
14:50			-					
14:58			-					
			-	70				moderate olive brown (5Y 4/4)
			-	75				more siltstone and claystone fragments, light olive gray (5Y 5/2)
								CLAYSTONE: mostly clay and claystone fragments, little fine sand, medium hard, moist, grayish olive (10Y 4/2)
								SILTY SANDSTONE: mostly fine to medium sand, some silt, some medium to coarse sand, medium hard, moist, moderate olive
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING GP-P1 (CONTINUED)

JOB NUMBER: 2004-001-91
DATE DRILLED: 11/29/05
EQUIPMENT USED: Air rotary casing hammer
LOGGED BY: PDC
BORING DEPTH: 0-154'

DATE/TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION / GRAPHIC LOG	SOIL TYPE	
							brown (5Y 4/4)
				85			more medium to coarse sands, pale yellowish brown (10YR 6/3)
15:10							
15:14							
				90			more fine to coarse sands
				95			more fines, little medium to coarse sand, light olive brown (5Y 5/6)
				100			dusky yellow (5Y 6/4)
							harder drilling conditions
							GRAVELLY SANDSTONE: mostly fine to coarse sand, little gravels, hard, moist
				105			some gravels, yellowish gray (5Y 7/2)
							more fine to coarse sand, less gravels, easier drilling
15:21							SILTY SANDSTONE: mostly fine to medium sand, some silt, medium hard, moist, dusky yellow (5Y 6/4)
15:25				110			
							SANDY SILTSTONE: mostly silt, some fine sand, medium hard, moist, light olive brown (5Y 5/6)
				115			
				120			

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING GP-P1 (CONTINUED)

JOB NUMBER: 2004-001-91
DATE DRILLED: 11/29/05
EQUIPMENT USED: Air rotary casing hammer
LOGGED BY: PDC
BORING DEPTH: 0-154'

DATE/TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								more sand, light olive gray (5Y 5/2)
								SILTY SANDSTONE: mostly fine to medium sand, some silt, some coarse sand and fine gravels, medium hard to hard, moist, dusky yellow (5Y 6/4)
				125				
15:37								
15:42								
				130				more fines, less medium to coarse sands
				135				more fines
								SANDY SILTSTONE: mostly silt, some fine sand, medium hard, moist, light olive brown (5Y 5/6)
				140				
				145				more siltstone fragments
15:49								
15:53								
				150				more fine sand
16:10								more fine to medium sand
				155				Bottom of Boring at 154 feet. Target Depth Reached
				160				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2004-001-91.GPJ FRANKIAN.GDT 3/26/10

LOG OF BORING

BORING B-1-03

JOB NUMBER: 2002-036-01 By: D.G. Francuch
DATE DRILLED: 10-13-03
EQUIPMENT USED: 24"-Diameter Bucket Auger
ELEVATION: 1175+/-
SURFACE CONDITIONS:
SAMPLING METHOD: 2 5/8-inch drive

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG (SW NE)	SOIL TYPE
				5, 10, 15, 20, 25, 30, 35, 40			

0-40 feet: OLDER LANDSLIDE (Qols)

@ 0 feet: CLAYEY SILTSTONE, plastic to moderate stiff, moist, caliche pods, brownish gray (5Y 4/1)

@ 5 feet: blebs of dark brown siltstone within light reddish brown silty sand

@ 11 feet: CLAYSTONE, plastic, moist, dark reddish brown (10R 3/4)

Slide Plane: N60W, 85W, 1"-2" thick

@ 11.3 feet: CLAYEY SILTSTONE, olive gray (5Y 4/1)

@ 14 feet: SANDSTONE, fine to coarse grained, moderately hard, moist, moderate yellowish brown (10YR 5/4)

@ 19 feet: CLAYEY SILTSTONE, stiff, moist, micaceous, pale yellowish brown (10YR 6/2)

@ 21 feet: Sheared Claystone, Irregular dips to NW, 1"-2" thick

@ 25 feet: CLAYEY SANDSTONE, fine grained, clayey to silty sand, moderately hard, moist, moderate yellowish brown (10YR 5/4)

@ 26 feet: Shear, N30E, 45NW, 1/4" reddish brown clay gouge

@ 26.5 feet: Bedding, approx. N70W, 20NE, sandstone

@ 27 feet: SILTSTONE (ML), some fine grained sand and clay, moderately hard, moist, light brown (5YR 5/6)

@ 27.5 feet: Shear, irregular, bedding discontinuos N10E, 52SE

@ 30 feet: color changes to light olive gray (5Y 5/2)

@ 35 feet: SANDSTONE, fine to medium grained with small cobbles, moderately hard, moist, light olive gray (5Y 5/2)

@ 38 feet: SILTSTONE, minor to trace clay, moderately hard, moist, light olive gray (5Y 5/2)

@ 39.5 feet: Shear, N35W, 65SW well defined clay shear polished, below 39.5 feet gradual color change to olive gray, no distinct shears or slide planes

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING B-1-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 10-13-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
						SW NE	
26				45, 50, 55, 60, 65, 70, 75, 80		no log	

40-76 feet: PICO FORMATION (Tp)

@ 40 feet: SILTY CLAYSTONE, dark reddish brown (10R 3/4) to olive gray (5Y 4/1), Bedding parallel to shear

@ 43 feet: SILTY CLAYSTONE, hard, moist, olive gray (5Y 4/1), conchoidal fracture possible contact with bedrock, note hardness and color change

@ 45.5 feet: Bedding N85W, 47SW , sandstone bed in siltstone

@ 47 feet: fossiliferous, small clam fragments and caliche bed, Bedding: N90W, 54S, 1 foot thick

@ 56 feet: zone of sandstone blocks in clay matrix, discontinuous high angle shear, polished claystone above with hackly fracture

@ 57 feet: CLAYEY SANDSTONE: fine grained sand with silt and clay, hard, moist, greenish gray (5GY 6/1)

@ 59 feet: Shear, N75E, 50SE, poorly developed zone of discontinuous sandstone blocks within siltstone

@ 60 feet: SILTY CLAYSTONE, approximately 6" thick

@ 61 feet: SANDSTONE, fine grained sand, hard, moist, light olive gray (5Y 6/1)

@ 68 feet: Bedding, N80W, 52SW, dark brown clayey siltstone bed in sandstone 4" thick ,Fault offsets siltstone bed

@ 69 feet: CLAYSTONE, moderately hard, moist, semi-plastic, dark yellowish brown (10YR 4/2)

70 feet: increase in moisture

@ 72 feet: CLAYEY SANDSTONE, fine to medium grained sand with clay, hard, moist, light olive gray (5Y 6/1)

TOTAL DEPTH 76 FEET.
No Groundwater. No caving.
Downhole logged to 71 feet.

SAMPLE DEPTH	KELLY WEIGHT
0-28'	5952 lbs.
28-55'	3921 lbs.
55-84'	2531 lbs.
84-114'	1407 lbs
+1000 lbs/30 ft. stem	

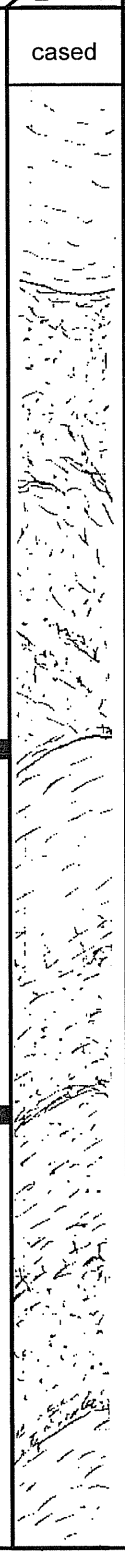
Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

LOG OF BORING

BORING B-2-03

JOB NUMBER: 2002-036-01 By: D.G. Francuch
DATE DRILLED: 10-13-03 - 10-14-03
EQUIPMENT USED: 24"-Diameter Bucket Auger
ELEVATION: 1287+/-
SURFACE CONDITIONS:
SAMPLING METHOD: 2 5/8-inch drive

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
					E W		
					cased		
				5			
				10			
				15			
Bag				20			
				25			
Bag				30			
				35			
				40			



0-4 feet: ARTIFICIAL FILL (af)
@ 0 feet: SANDY SILT (SM), silt with fine sand, loose, dry, pale yellowish brown (10YR 6/2)

4-19 feet: LANDSLIDE (Qls)
@ 4 feet: SILTSTONE, soft, moist, light olive gray (5Y 5/2)

@ 7 feet: Slide Plane: N75W, 11SW, olive gray siltstone over brown sandy siltstone 8" thick soil zone with sandstone blocks
@ 8 feet: stopped drilling on 10/13/03 @ 15:30
Resume drilling on 10/14/03 @ 7:00

@ 11 feet: SANDY SILTSTONE: fine sand, moderately hard, moist, moderate yellowish brown (10YR 5/4)
@ 12 feet: chaotic assemblage of sandy silt and clayey siltstone

@ 19 feet: Slide Plane: N25E, 22SE 2-3"zone of dark brown polished clay, moderately plastic

19-125 feet: SAUGUS FORMATION (QTs)
@ 19 feet: SILTSTONE, moderately hard to hard, moist, light olive gray (5Y 5/2)

@ 24 feet: Bedding; N40E, 34SE; limey siltstone bed, 8" thick

@ 28 feet: Bedding; N30E, 28SE, dark olive green clayey siltstone

@ 31 feet: CLAYEY SILTSTONE, trace fine sand, hard, moist, dark yellowish brown (10YR 4/2)
@ 32 feet: Bedding; N50E, 31SE, limey siltstone
@ 32 feet: wood fragments in siltstone
@ 33 feet: SANDSTONE, fine grained, hard, moist, yellowish gray (5Y 7/2)

@ 36 feet: Increased drilling effort
@ 37 feet: Bedding N60E, 38SE; pebble bed in sandstone
@ 37 feet: CLAYEY SILTSTONE, hard, moist, moderate yellowish brown (10 YR 5/4)

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

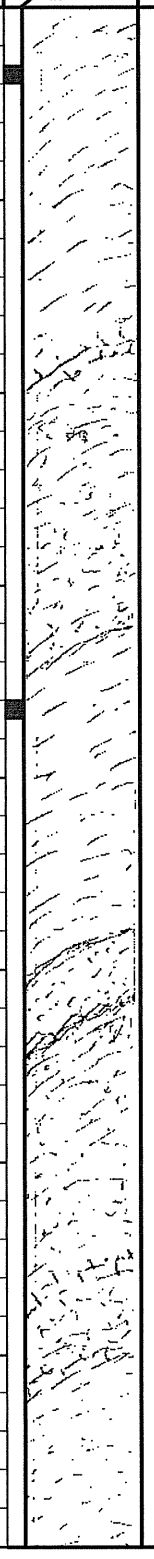
LOG OF BORING

BORING B-2-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 10-13-03 - 10-15-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
Bag				45			
				50			
				55			
Bag				60			
				65			
				70			
				75			
				80			



@ 49.5 feet: Bedding; N40E, 22SE, limey siltstone
@ 50 feet: SANDY SILTSTONE, some fine sand, moderately hard, dry to moist, yellowish gray (5Y 7/2)

@ 56 feet: CLAYEY SILTSTONE, moderately hard to hard, moist, light olive gray (5Y 5/2), Bedding; N40E, 25SE, clay bed 1" thick

@ 63.9 feet: Bedding; N40E, 24SE, clay bed 1" thick
@ 64 feet: SANDSTONE, fine grained sand, moderately hard, moist, pale olive (10Y 6/2)
@ 65.5 feet: Bedding; N25E, 28SE, clay bed 8" thick
@ 66 feet: CLAYEY SILTSTONE, hard moist, moderate yellowish brown (10YR 5/4)

@ 73 feet: limey siltstone

@ 79 feet: SILTSTONE, trace fine sand, hard, moist, dark yellowish brown (10YR 4/2)
@ 79.3 feet: bedding; N40E, 29SE, limey siltstone bed, 12" thick

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING B-2-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 10-13-03 - 10-15-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE

@ 89 feet: Bedding; N45E, 28SE

@ 89 feet: SILTSTONE, trace fine to medium grained sand, moderately hard to hard, moist, dusky yellow (6Y 6/4)

@ 90 feet: SANDSTONE, fine to medium grained sand, trace silt, moderately hard, moist, moderate yellowish brown (10YR 5/4)

@ 95 feet: SANDSTONE, fine to coarse grained with large pebbles, moderately hard, moist, yellowish gray (5Y 7/2)

@ 98 feet: Bedding; N55E, 28SE, pebbly sandstone bed 6" thick

@ 104 feet: Bedding; N30E, 31SE, heavy mineral, fine sand bed

@ 110 feet: SANDSTONE, fine to coarse grained sand with medium pebbles, moderately hard, moist, yellowish gray (5Y 7/2)

@ 115 feet: Bedding; N40E, 22SE, gray sandstone over reddish brown sandstone

@ 115 feet: SILTY SANDSTONE, fine to coarse grained sand, some silt, trace small pebbles, moderately hard to hard, moist, grayish orange (10YR 7/4)

@ 118 feet: Stopped drilling at 15:30 on 10-14-03
resume drilling @ 7:00 on 10-15-03

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

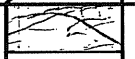
LOG OF BORING

BORING B-2-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 10-13-03 - 10-15-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
					E W		



no log

@ 120.5 feet: Bedding; N45E, 24SE at contact
@ 121 feet: SILTSTONE, trace clay, moderately hard, moist, light brown (5YR 5/6)

@ 124 feet: small cobbles

125
130
135
140
145
150
155
160

TOTAL DEPTH 125 FEET.
No Groundwater. No caving.
Downhole logged to 121 feet.

SAMPLE DEPTH	KELLY WEIGHT
0-28'	5952 lbs.
28-55'	3921 lbs.
55-84'	2531 lbs.
84-114'	1407 lbs
+1000 lbs/30 ft. stem	

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

LOG OF BORING

BORING B-3-03

JOB NUMBER: 2002-036-01 By: D.G. Francuch
DATE DRILLED: 10-16-03
EQUIPMENT USED: 24"-Diameter Bucket Auger
ELEVATION: 1203.5
SURFACE CONDITIONS:
SAMPLING METHOD: 2 5/8-inch drive

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
					S N		

0-6 feet: LANDSLIDE (Qls)

@ 0 feet: SILT (ML), soft, dry, some caliche staining, light olive gray (5Y 6/1)

@ 4 feet: SILTY SANDSTONE, fine grained sand with silt, moderately hard, dry, moderate yellowish brown (10YR 5/4)

@ 6 feet: Slide Plane; N60W, 14SW, dark brown clay, 2" thick, gypsum

6-16 feet: ALLUVIUM (Qal)

@ SILT (ML), trace clay, moderately hard to moderately soft, dry, yellowish gray, (5Y 7/2)

@ 8 feet: PEBBLY SAND (SP), fine to coarse grained sand with small to large pebbles, hard, dry, intermixed with silt, yellowish gray, (5Y 7/2)

@ 11-14 feet: well bedded sand deposits, shallow dip to north

@ 13 feet: medium cobbles up to 6" diameter

@ 14-16 feet: base of alluvium, irregular erosional contact

16-110 feet: PICO FORMATION (Tp)

@ 16 feet: SILTY SANDSTONE, fine sand with some silt, hard, moist, dusky yellow (5Y 6/4)

@ 16 feet: Bedding approximate; N40W, 52NE, limey siltstone

@ 22 feet: Fracture; N35W, 52NE, 54 SE,1/16" clay gouge

@ 25 feet: increased drilling effort

@ 28 feet: Minor fault; N10E, 54SE, 1/8" clay gouge

@ 29 feet: Minor fault; N20W, 34NE, ½" - 2" wide zone, clay shears 1/16" thick

@ 29 feet : Bedding; N55W, 47NE siltstone bed cut by fault

@ 33 feet: Minor Fault; N/S, 43E, ½"- 1" wide shear zone of 1/16" clay gouge

@ 34 feet: SANDSTONE, fine to medium grained, trace silt, hard, moist, yellowish gray (5Y 7/2)

@ 36 feet: Bedding approximate; N30W, 57NE, fine grain sandstone/ siltstone

@ 36 feet: SANDY SILTSTONE, some fine grained sand, moderately hard, moist, light olive gray (5Y 5/2)

@ 39 feet: Minor Fault; N80W, 72NE, 1/8" -1/4" thick red clay gouge

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING B-3-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 10-16-03

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
						S N		@39 feet: CLAYEY TO SANDY SILTSTONE, some clay, some fine sand, hard, moist, moderate yellowish brown (10YR 5/4) @ 40 feet: Shear; subparallel to minor fault at 39 feet @ 42 feet: SANDSTONE, fine to coarse grained sand, trace silt, hard, moist, pale yellowish brown (10YR 6/2)
				45				
								@ 49 feet: Bedding; N50W, 63NE, coarse sandstone
				50				
								@ 53 feet: PEBBLY SANDSTONE, fine to coarse sand with small to medium pebbles, moderately hard to hard, moist, pale yellowish brown (10YR 6/2) @ 55.5 feet: Minor Fault; N75W, 24NE, 1/4" to 1" thick shear zone of 1/8" - 1/4" clay gouge
				55				
								@ 57 feet: Bedding; N55W, 57NE, coarse sandstone / siltstone @ 57 feet: SILTSTONE, trace fine grained sand, trace clay, hard, moist, moderate yellowish brown (10YR 5/4)
				60				
				65				@ 65 feet: moisture increase @ 66 feet: Minor Fault; N15E, 30SE, 1/8" - 1/4" thick clay gouge
				70				@ 72 feet: increase in clay content
				75				@ 75 feet: SILTSTONE, trace clay, hard, moist, moderate yellowish brown (10YR 5/4) @ 75 feet: Bedding; N50W, 62NE
				80				

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING B-3-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 10-16-03

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
30				85, 90, 95, 100, 105, 110, 115, 120	S N	no log	

@ 80 feet: CLAYEY SILTSTONE, hard, moist, moderate yellowish brown (10YR 5/4)

@ 87 feet: Minor Fault, N20E, 25SE, 1/8" clay gouge, separates silty sandstone from siltstone

@ 87 feet: SILTSTONE, trace fine sand, hard, moist, moderate yellowish brown (10YR 5/4)

@ 90 feet: SANDSTONE, fine to coarse grained sand, trace small pebbles, hard, moist, pale yellowish brown (10YR 6/2)

@ 94 feet: SILTSTONE, moderately hard, moist, moderate yellowish brown, (10YR 5/4), Erosion surface; N/S 33E

@ 96 feet: Bedding approximate; N35E, 24SE

@ 100 feet: SANDY SILTSTONE: some fine grained sand, moderately hard, moist, pale yellowish brown (10YR 6/2)

@ 103 feet: SILTY SANDSTONE, fine to coarse grained sand, some silt, hard, moist, moderate brown (5YR 4/4), Bedding approx. N20E, 23SE

@ 105 feet: SANDSTONE, fine to coarse grained, hard, moist, pale yellowish brown (10YR 6/2)

TOTAL DEPTH 110FEET.
No Groundwater.
Minor caving at 8-15 feet.
Downhole logged to 106 feet.

SAMPLE DEPTH	KELLY WEIGHT
0-28'	5952 lbs.
28-55'	3921 lbs.
55-84'	2531 lbs.
84-114'	1407 lbs
+1000 lbs/30 ft. stem	

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

LOG OF BORING

BORING B-4-03

JOB NUMBER: 2002-036-01 By: D.G. Francuch
DATE DRILLED: 10-21-03 - 10-28-03
EQUIPMENT USED: 24"-Diameter Bucket Auger
ELEVATION: 1260.6
SURFACE CONDITIONS:
SAMPLING METHOD: 2 5/8-inch drive

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE

0-53 feet: LANDSLIDE (Qls)

@ 0 feet: GRAVELLEY SANDSTONE, fine to coarse grained sand with pebbles and gravel up to 6" diameter, soft, dry, pale yellowish brown (10YR 6/2)

@ 10 feet: Bedding approximate; N50E, 16SE

@ 10.5 feet: SILTSTONE, moderately soft, dry, moderate yellowish brown (10YR 5/4),

@13 feet: density increase

@ 15.5 feet: Slide Plane, N40E, 28SE, reddish brown silty clay, 3"-5" thick

@ 19 feet: SANDSTONE, fine to coarse grained sand with trace small pebbles, moderately hard, dry to moist, pale yellowish brown (10YR 6/2),

@ 22 feet: cobbles up to 6" diameter

@ 27 feet: SANDY SILTSTONE, fine sand, hard, moist, moderate yellowish brown (10YR 5/4),

@ 32 feet: CLAYEY SILTSTONE, moderately hard to hard, moist, moderate yellowish brown (10YR 5/4),

@ 33.2 feet: Slide Plane: N70E, 6SE 4"-5" thick reddish brown waxy clay

@ 36 feet: SANDY SILTSTONE, fine grained sand and silt, moderately hard, moist, moderate yellowish brown (10YR 5/4),

@ 40 feet: pods of sand in siltstone matrix

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING B-4-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 10-21-03 - 10-28-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
					S N		
				45			
Bag							
Bag				50			
				55			
				60			
				65			
Bag							
				70			
				75			
				80			

@ 40 feet: slight increase in grain size
@ 41.5 feet: Slide Plane N80E, 29SE, 4"-5" thick reddish brown waxy clay
@ 42 feet: CLAYEY SILTSTONE: some clay, hard, moist, moderate yellowish brown (10 YR 5/4),
@ 43 feet: SILTSTONE to SANDY SILTSTONE, cobbles up to 8" diameter
@ 45.5 feet: waxy to plastic brown clay
@ 47 feet: SILTY CLAYSTONE, some silt, moderately hard, moist, moderately plastic, moderate yellowish brown (10YR 5/4),
@ 48 feet: SANDY SILTSTONE, fine grained sand, hard, moist, trace large pebbles of cemented sandstone, moderate yellowish brown (10YR 5/4),
@ 48.5 to 50.5 feet: numerous low angle fractures
@ 50.5 feet: CLAYEY SILTSTONE, moderate yellowish brown (10YR 5/4)
@ 51 feet: CLAYSTONE, plastic, moist, possible, slide plane, dark yellowish brown (10YR 4/2),
@ 51.9 feet: Slide Plane, N5W, 7SW, 1"-2" thick reddish brown clay, plastic
@ 52 feet: SANDSTONE, fine to medium grained sand, trace silt, pale yellowish brown (10YR 6/2),
@ 53 feet: Slide Plane, N60W, 6SW, ½" thick red clay gouge

53 - 81 feet: SAUGUS FORMATION (QTs)

@ 53 feet: SANDSTONE, fine to medium grained sand, trace silt, hard, moist, pale yellowish brown (10YR 6/2)
@ 56 feet: Minor fault; N25W, 25NE ½" thick red clay gouge
@ 56.5 feet: Bedding; N/S, 40E, sandstone/siltstone
@ 62 feet: Bedding; N30E, 28SE, fine grained sandstone/siltstone
@ 62 feet: SILTSTONE, hard, moist, dark yellowish brown (10YR 4/2)
@ 65 feet: SILTY CLAYSTONE, some silt, hard to very hard, moist, dark yellowish brown (10YR 4/2)
@ 70 feet: Drilling rate slows
@ 71 feet: Bedding approximate; N40E, 29SE, clayey silt/silty sandstone
@ 71 feet: SILTY SANDSTONE; fine to coarse grained sand with silt, hard, moist, dark yellowish brown (10YR 4/2)
@ 77 feet: Gradational contact

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

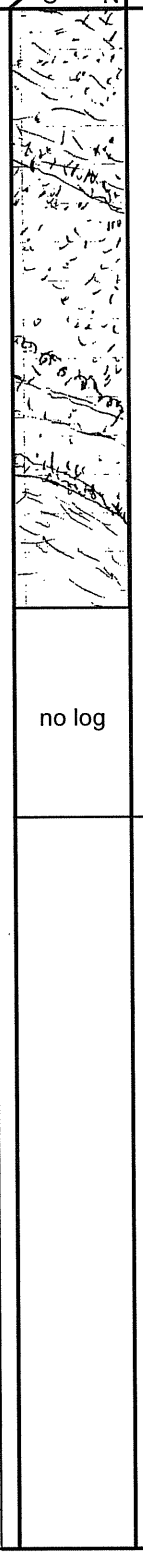
LOG OF BORING

BORING B-4-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 10-21-03 - 10-28-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE



81 -101 feet: PICO FORMATION (Tp)

@ 81 feet: Bedding, N40E, 24SE, limey siltstone bed 5" thick

@ 82 feet:
Rig down 13:50 on 10-21-03
Resume drilling 7:30 on 10-28-03

@ 84.7 feet: Bedrock, N40E, 33SE

@ 85 feet: PEBBLY SANDSTONE, yellowish gray (5Y 7/2), fine to coarse grained sand, trace medium to large pebbles, hard, moist

@ 90 feet: Bedding, N10E, 20SE, pebbly sandstone / silty sandstone

@ 91 feet: Bedding, N40E, 31SE, 1" thick clayey siltstone

93.5 feet: Bedding, N40E, 35SE, coarse grained sandstone / siltstone

93.5 feet: SANDY SILTSTONE, moderate yellowish brown (10YR 5/4), some fine to medium grained sand, hard, moist

@ 98 feet: moisture increase

TOTAL DEPTH 101FEET.
No Caving.
No Groundwater.
Downhole logged to 95 feet.

SAMPLE DEPTH	KELLY WEIGHT
0-30'	5962 lbs.
30-57'	3921 lbs.
57-86'	2531 lbs.
86-116'	1407 lbs
+600 lbs/30 ft. stem	

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

LOG OF BORING

BORING B-5-03

JOB NUMBER: 2002-036-01 By: D.G. Francuch
DATE DRILLED: 10-29-03
EQUIPMENT USED: 24"-Diameter Bucket Auger
ELEVATION: 1306.8
SURFACE CONDITIONS:
SAMPLING METHOD: 2 5/8-inch drive

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG (E / W)	SOIL TYPE
						cased	
				5			
				10			
				15			
Bag				20			
				25			
Bag				30			
				35			
				40			

0-28 feet: LANDSLIDE (Qls)

@ 0 feet: SANDSTONE, fine to medium grained sand, soft, dry, pale yellowish brown, (10YR 6/2)

Hole cased from 0-3 feet

@ 6 feet: SANDY SILTSTONE, silt with fine grained sand, moderately hard, dry to moist, moderate yellowish brown (10YR 5/4)

@ 9 feet: color change to grayish orange (10YR 7/4)

@ 11 feet: SANDSTONE, fine to coarse grained sand, trace silt, trace small to medium pebbles, soft, dry, yellowish gray (5Y 7/2),

@ 11-14 feet: Minor caving of sands

@ 14 feet: SILTSTONE, moderately hard, moist, moderate yellowish brown (10YR 5/4),

@ 14 to 17.8 feet: chaotic mix of sand and siltstone

@ 17.8 feet: Slide Plane, N/S, 40E, 2"-3" thick reddish brown clay, waxy, no distinct slide surface

@ 19 feet: CLAYEY SILTSTONE, silt with clay, moderately soft, moist, moderate yellowish brown (10YR 5/4)

@ 20 feet: SILTSTONE, hard, moist, moderate yellowish brown (10YR 5/4)

@ 25 feet: Bedding approximate, N10W, 43NE

@ 25 feet: CLAYSTONE, plastic, moist, moderate yellowish brown (10YR 5/4) to olive gray (5Y 4/1)

@ 28 feet: Slide Plane, N40E, 24SE, 1"-3' thick red to dark gray clay gouge, striations 12,° S 15° E

@ 28 feet: CLAYEY SILTSTONE, moderately hard to hard, moist, dark yellowish brown (10YR 4/2),

28.1-95.5 feet: SAUGUS FORMATION (QTs)

@ 34 feet: SILTSTONE, trace fine sand, hard, moist, moderate yellowish brown (10YR 5/4)

@ 37 feet: SILTY SANDSTONE, fine to medium grained sand with silt, hard, moist, moderate yellowish brown (10YR 5/4)

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

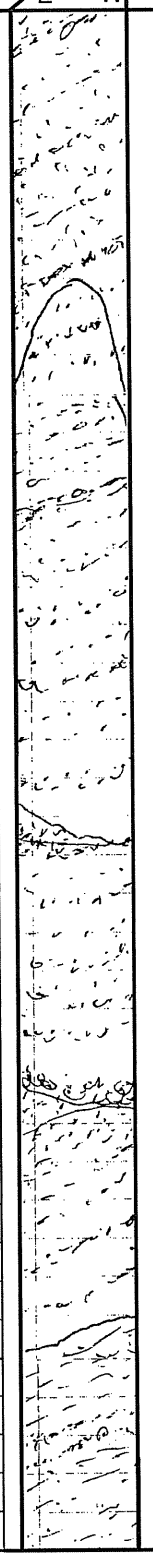
LOG OF BORING

BORING B-5-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 10-21-03 - 10-28-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE



@ 40.3 feet: Bedding approximate, N10E, 28SE, coarse sandstone

@ 40 feet: PEBBLY SANDSTONE, pale yellowish brown (10YR 6/2), fine to coarse grained sand with small to large pebbles, hard, moist

@ 46 feet: Bedding, N30E, 33SE, coarse sandstone

@ 51.7 feet: Fracture, N30E, 63NW, 1/4" thick silt gouge, approximate ½"-1" normal offset

@ 52.3 feet: Bedding, N/S, 26E, coarse sandstone

@ 62 feet: Bedding, N15E, 22SE, medium to coarse grained sandstone

@ 69 feet: Bedding, N/S, 18E, fine to coarse grained sandstone

@ 70 feet: PEBBLY SANDSTONE, fine to coarse grained sand with small to large pebbles, hard, moist, yellowish gray (5Y 7/2)

@ 74 feet: Bedding, N10E, 22SE, coarse sandstone / siltstone

@ 74 feet: SILTY SANDSTONE, fine to coarse grained sand with silt, hard, moist, moderate yellowish brown (10YR 5/4)

@ 77 feet: Bedding, N15E, 30SE, fine to coarse grained sandstone in silty sandstone

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING B-5-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 10-21-03 - 10-28-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
Bag					E W		
				85			
				90		no log	
				∇			
				95			
Bag							
				100		no log	
				105			
				110			
				115			
				120			

@ 79 feet: SILTSTONE, trace fine to coarse sand, hard, moist, moderate yellowish brown (10YR 5/4)

@ 80 feet: CLAYEY SILTSTONE, some clay, hard, moist, moderate yellowish brown (10YR 5/4)

@ 82 feet: Bedding, N30E, 22SE, siltstone/fine to coarse sandstone

@ 82 feet: SANDSTONE, fine to coarse grained sand with some small to medium pebbles, hard, moist, moderate yellowish brown (10YR 5/4)

@ 84 feet: SILTSTONE, hard, moist, moderate yellowish brown (10YR 5/4)

@ 86-95 feet: No log due to low oxygen

@ 93-97 feet: perched groundwater, boring wall wet but no free water

@ 95 feet: CLAYEY SILTSTONE, silt with some clay, hard, moist, moderate yellowish brown (10YR 5/4)

@ 95.5 feet: Bedding, N/S, 24E

@ 95.5-102 feet: PICO FORMATION (Tp)

@ 95.5 feet: CLAYSTONE, trace silt, hard to very hard, moist, medium dark gray (N4),
No seepage below 97 feet.

@ 100 feet: SILTY SANDSTONE, fine grained sand with silt, hard, moist, dark greenish gray (5GY 4/1)

TOTAL DEPTH 102 FEET.
Minor Caving 11-14 feet.
Minor seepage 93-97 feet.
Downhole logged to 97 feet.

SAMPLE DEPTH	KELLY WEIGHT
0-30'	5962 lbs.
30-57'	3921 lbs.
57-86'	2531 lbs.
84-116'	1407 lbs
+600 lbs/30 ft. stem	

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated.
It is not warranted to be representative of subsurface conditions at other locations or times.

LOG OF BORING

BORING B-6-03

JOB NUMBER: 2002-036-01 By: D.G. Francuch
DATE DRILLED: 10-30-03 - 10-31-03
EQUIPMENT USED: 24"-Diameter Bucket Auger
ELEVATION: 1305.3
SURFACE CONDITIONS:
SAMPLING METHOD: 2 5/8-inch drive

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
23				5, 10, 15, 20, 25, 30, 35, 40	S N	cased	

0-31.1 feet LANDSLIDE (Qls)

@ 0 feet: SILTY SANDSTONE, fine to grained sand with silt, hard, moist, pale yellowish brown (10YR 6/2)

@ 4 feet: Fracture

@ 5 feet: pebbles up to 2" in diameter

@ 8 feet: color change to moderate yellowish brown (10YR 5/4), Bedding approximate; N65E, 55SE

@ 8.5 feet: rootlets

@ 9 feet: SANDY SILTSTONE, silt with fine grained sand, moderately hard, moist, moderate yellowish brown (10YR 5/4)

@ 10 feet: Fracture; N55W, 45NE, 1/8" -1/4" clay gouge separates silty sandstone from pebbly sandstone

@ 13 feet: SANDSTONE, fine to medium grained sand, hard, dry to moist, yellowish gray (5Y 7/2)

@ 13-15 feet: rootlets

@ 17 feet: SILTY SANDSTONE, fine to coarse grained sand with silt, moderately hard, moist, grayish orange (10YR 7/4)

@ 17 feet: Fracture; N65W, 82NE

@ 20 feet: rootlets

@ 20.5 feet: Bedding; N10E, 26SE, irregular contact

@ 21.5 feet: PEBBLY SANDSTONE, fine to coarse grained sand, trace silt, pebbles up to 2" diameter, hard, moist, pale yellowish brown (10YR 6/2)

@ 25 feet: Fracture splits into two strands, separates fine grained sand from coarse grained sand

@ 28 feet: Bedding? N10E, 46SE, irregular contact

@ 28 feet: SILTSTONE, moderately hard, moist, moderate yellowish brown (10YR 5/4)

@ 31.1 feet: Slide Plane; N5W, 22NE, 3" wide zone of waxy clay sandwiched between two shears each 1/16"-1/8" thick gouge

31.5-96 feet: SAUGUS FORMATION (QTs)

@ 31.5 feet: CLAYEY SILTSTONE, trace fine to medium grained sand, hard, moist, moderate yellowish brown (10YR 5/4)

@ 34 feet: Minor Fault; N50W, 42NE, 1/16" wide clay gouge, 4"reverse offset (apparent)

@ 35 feet: SANDSTONE, fine to medium grained sand, moderately hard, moist, moderate yellowish brown (10YR 5/4)

@ 38 feet: Fracture N45W, 46NE, 1/16"-1/8" wide silt gouge

@ 39 feet: SANDSTONE, fine to coarse grained sand, trace pebbles up to 2" diameter, moderately hard, moist, pale yellowish brown (10YR 6/2),

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING B-6-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 10-30-03 - 10-31-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE

@ 40 feet: Bedding, N/S, 23E, contact, worm burrows
@ 40 feet: SANDY SILTSTONE, silt with fine sand, trace clay, hard, moist, moderate brown (5YR 4/4),

@ 46 feet: SILTY SANDSTONE, fine grained sand with silt, hard, moist, gradational contact, moderate brown (5YR 4/4),

@ 47 feet: PEBBLY SANDSTONE, fine to coarse grained sand with pebbles and small cobbles, up to 4" diameter, hard, moist, moderate yellowish brown (10YR 5/4)

@ 50 feet: Fracture; N40E, 30SE, 1/8" wide clay gouge

@ 50 feet: SANDY SILTSTONE, silt with fine to medium sand, moderately hard, moist, moderate yellowish brown (10YR 5/4)

@ 52 feet: SILTY SANDSTONE, fine grained sand with silt, moderately hard, moist, pale yellowish brown (10YR 6/2)

@ 54 feet: Bedding, N10E, 26SE

@ 54 feet: SANDSTONE, fine to coarse grained sand, trace small pebbles, moderately hard, moist, yellowish gray (5Y 7/2)

@ 60.5 feet: Bedding; N5W, 24NE, fine grained sandstone,

@ 63 feet: PEBBLY SANDSTONE, fine to coarse grained sand with medium pebbles, trace cobbles up to 8" diameter, hard, moist, yellowish gray (5Y 7/2)

Stopped @ 69 feet, @ 15:30 on 10/30/03
Resume @ 7:00 on 10/31/03

@ 70.7 feet: Bedding; N5E, 22SE, coarse grained sandstone / fine grained sandstone

@ 71.6 feet: Bedding; N/S, 26E ½"-3" thick clayey siltstone

@ 72 feet PEBBLY SANDSTONE, fine to coarse grained sand with small pebbles, moderately hard, moist, yellowish gray (5Y 7/2)

@ 77.8 feet: Bedding; N5W, 23NE contact

@ 77.8 feet: SANDY SILTSTONE, silt with fine to coarse grained sand, trace clay, hard, moist, moderate yellowish brown (10 YR 5/4)

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING B-6-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 10-30-03 - 10-31-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
				85			
				90			
Bag				95			
Bag				100		no log	
				105			
				110			
				115			
				120			

@ 81 feet: SANDSTONE, fine to coarse grained sand, trace small pebbles up to 1" diameter, moderately hard, moist, pale yellowish brown (10YR 6/2),

@ 85.5 feet: Bedding N15W, 27NE, contact

@ 85.5 feet: SILTY SANDSTONE, fine grained sand with silt, hard, moist, moderate yellowish brown (10YR 5/4)

@ 90.7 feet: Bedding; N/S, 23E, contact

@ 90.7 feet: CLAYEY SILTSTONE, silt with clay, hard, moist, moderate yellowish brown (10YR 5/4),

@ 95 feet: Bedding N/S, 27E, parting in siltstone

96-101 feet: PICO FORMATION (Tp)

@ 96 feet: limey siltstone

@ 97 feet: CLAYEY SILTSTONE, hard, moist, light olive gray (5Y 5/2)

@ 98 feet: SILTY CLAYSTONE, clay with silt, moderately hard to hard, moist, medium dark gray (N4)

TOTAL DEPTH 101 FEET.
No Caving.
No groundwater.
Downhole logged to 97 feet.

SAMPLE DEPTH	KELLY WEIGHT
0-30'	5962 lbs.
30-57'	3921 lbs.
57-86'	2531 lbs.
86-116'	1407 lbs
+600 lbs/30 ft. stem	

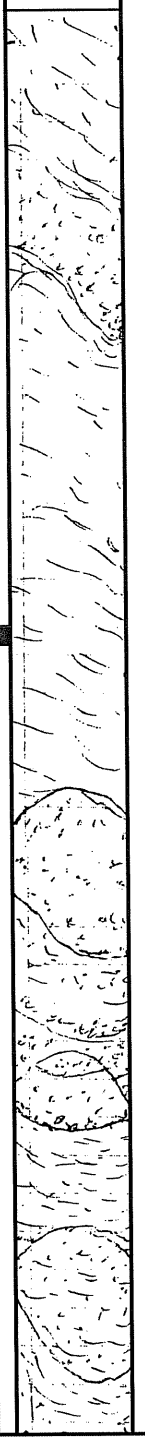
Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-7-03

JOB NUMBER: 2002-036-01 By: D.G. Francuch
DATE DRILLED: 11-3-03 - 11-4-03
EQUIPMENT USED: 24"-Diameter Bucket Auger
ELEVATION: 1201+/-
SURFACE CONDITIONS:
SAMPLING METHOD: 2 5/8-inch drive

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG (SW NE)	SOIL TYPE
Bag				5, 10, 15, 20, 25, 30, 35, 40	cased		

0-74 feet: SAUGUS FORMATION (QTs)

@ 0 feet: SILTY SANDSTONE, fine to medium grained sand with silt, moderately hard, moist, light brown (5YR 6/4)

@ 6 feet: SANDY SILTSTONE, silt with fine grained sand, trace coarse grained sand, moderately hard, moist to dry, grayish orange (10YR 7/4)

@ 10 feet: Bedding; N40W, 50NE
@ 10 feet: SILTY CLAYSTONE, clay with silt, hard, moist, moderate yellowish brown (10YR 5/4)

@ 18 feet: plastic clay, gray

@ 24.4 feet: Minor Fault; N75E, 35SE, 1/4" wide brown silt gouge

@ 26 feet: Bedding; N60W, 44NE
@ 26 feet: SILTY SANDSTONE, fine grained sand with silt, moderately hard, moist, pale yellowish brown (10YR 6/2)

@ 31 feet: Minor Fault; N90W, 44S, 1/8" wide silt gouge, 2" normal apparent offset
@ 32 feet: Bedding N30W, 46NE

@ 34 feet: CLAYEY SILTSTONE, silt with clay, trace fine to medium grained sand, hard, moist, moderate yellowish brown (10YR 5/4)

@ 35.5 feet: Minor Fault; N90W, 37S, 1/16" -1/8" wide clay gouge

@ 36 feet: CLAYSTONE, clay with trace silt, moderately hard, moist, dark yellowish brown (10YR 4/2)

@ 36.5 feet: Bedding N40W, 53NE, silt/silty clay

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING B-7-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 11-3-03 - 11-4-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG (SW NE)	SOIL TYPE
				45			
Bag							
				50			
7							
				55			
				60			
				65			
				70			
				75			
				80			

@ 42 feet: SILTY CLAYSTONE, clay with silt, moderately hard, moist, light olive gray (5Y 6/1)

@ 44 feet: Minor Fault N55W, 90, joins clay bed at 44'

@ 44 feet: SILTY SANDSTONE, fine grained sand with silt, moderately hard, moist, yellowish gray (5Y 7/2)

@ 45 feet: Bedding: N35W, 33NE, 1"thick gray clay

@ 46 feet: CLAYSTONE, moderately soft, moist, plastic, light olive gray (5Y 5/2)

@ 48 feet: CLAYEY SILTSTONE, silt with clay, hard, moist, olive gray (5Y 4/1)

@ 53 feet: CLAYSTONE, moderately soft, moist, plastic, medium dark gray (N4)

@ 54 feet: Bedding N30W,49 NE, 4-5" thick plastic gray clay

@ 58 feet: SILTSTONE, hard, moist, medium dark gray (N4)

@ 63 feet: Minor Fault: N10W, 47SW, ½"-1" wide zone of silt and clay gouge

@ 65 feet: Shear: N10E, 55SE, along base of sheared claystone

@ 67 feet: Bedding: N35W, 35NE

@ 70 feet: CLAYSTONE, moderately soft, moist, plastic, medium dark gray (N4)

@ 72 feet: Bedding: N20W, 35NE

@ 72 feet: SANDY SILTSTONE, silt with fine grained sand, moderately hard, moist, pale olive (10Y 6/2)

@ 74-111 feet: PICO FORMATION (Tp)

@ 74 feet: SILTY CLAYSTONE, clay with silt, hard, moist, fossiliferrous, dark gray (N3),

@ 77 feet: Bedding: N50E, 43SE, truncated by sheared clay

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

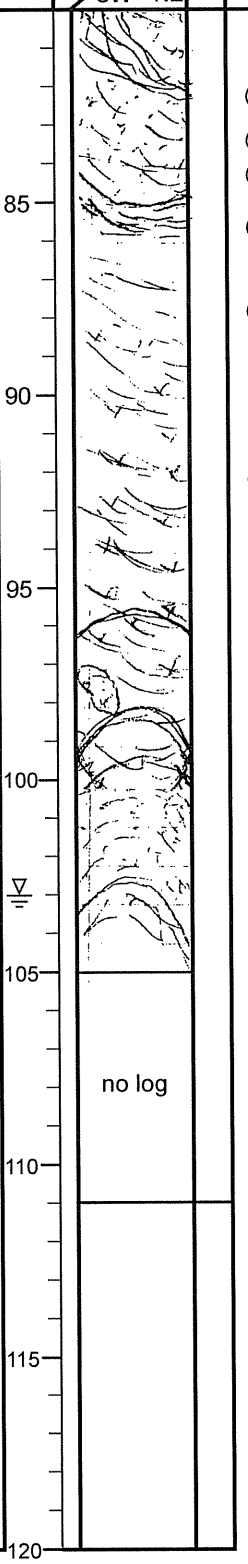
LOG OF BORING

BORING B-7-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 11-3-03 - 11-4-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG (SW NE)	SOIL TYPE



@ 82 feet: CLAYSTONE, moderately soft, moist, plastic, dark gray (N3)

@ 84 feet: Bedding: N10W, 26NE, siltstone/claystone

@ 84 feet: SILTSTONE, hard, moist, fossiliferrous, dark greenish gray (5GY 4/1)

@ 85 feet: Rig down @ 13:00 on 11/3/03
resume drilling @ 7:55 on 11/4/03
No water from bottom of boring @ 85 feet

@ 87 feet: limey siltstone, very hard

@ 92 feet: CLAYSTONE, hard, moist, moderate plasticity, dark greenish gray (5GY 4/1)

@ 95 feet: SILTSTONE, hard, moist, dark greenish gray (5GY 4/1)

@ 96 feet: Shear: N60W, 35SW, brown clay 1" thick

@ 97 feet: sandstone block 12" diameter in claystone matrix, sheared

@ 99 feet: Shear N40E, 50SE, 1" clay gouge

@ 100 feet: Bedding N40E, 46SE

@ 100 feet: increase in moisture, perched groundwater above clay at 103 feet

@ 104 feet: CLAYEY SILTSTONE, silt with clay, hard to very hard, moist, dark greenish gray (5GY 4/1)

@ 104 feet: Bedding N50E, 39SE, siltstone / claystone

TOTAL DEPTH 111 FEET.
No Caving.
Minor perched water at 100-103 feet.
Downhole logged to 105 feet.

SAMPLE DEPTH	KELLY WEIGHT
0-30'	5952 lbs.
30-57'	3921 lbs.
57-86'	2531 lbs.
86-116'	1407 lbs
+600 lbs/30 ft. stem	

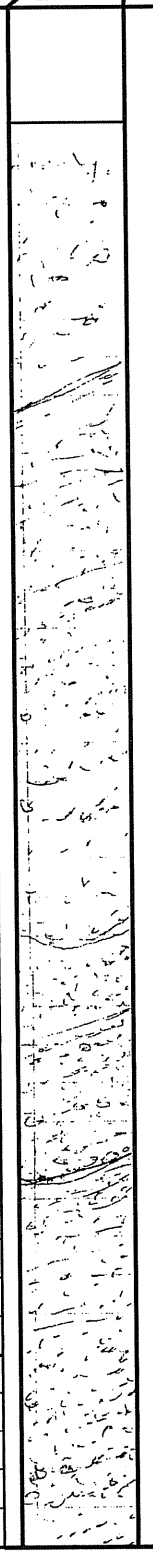
Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

LOG OF BORING

BORING B-8-03

JOB NUMBER: 2002-036-01 By: D.G. Francuch
DATE DRILLED: 11-4-03 - 11-5-03
EQUIPMENT USED: 24"-Diameter Bucket Auger
ELEVATION: 1213.6
SURFACE CONDITIONS:

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
					E W		



0-30.5 feet: LANDSLIDE (Qls)

@ 0 feet: SANDY SILTSTONE, silt with fine grained sand, moderately soft, dry to moist, moderate yellowish brown (10YR 5/4)

@ 7 feet: PEBBLY SANDSTONE, fine to coarse grained sand with pebbles up to 3" in diameter, moderately soft, moist, yellowish gray (5Y 7/2),

@ 10 feet: Slide plane; N/S, 31E, 1" thick plastic clay gouge, reddish brown

@ 10 feet: SANDY TO CLAYEY SILTSTONE, moderately soft, moist, semi plastic, moderate yellowish brown (10YR 5/4)

@ 15 feet: Bedding; N10E, 28SE

@ 15 feet: SANDSTONE, fine to coarse grained sand with small pebbles, moderately hard, moist, yellowish gray (5Y 7/2)

@ 18 feet: PEBBLY SANDSTONE, fine to coarse grained sand with pebbles up to 3" diameter, pale yellowish brown (10YR 6/2)

@ 24 feet: Bedding; N70E, 24SE, cross-bedding coarse sandstone

@ 27 feet: Bedding; N55E, 20SE

@ 27 feet: COBBLY SANDSTONE, fine to coarse grained sand with pebbles and cobbles up to 5", hard, moist, yellowish gray (5Y 7/2)

@ 30.5 feet: Slide plane: N25E, 31SE, polished surface

30.5 -76 feet: SAUGUS FORMATION (QTs)

@ 30.6 feet: CLAYSTONE, moderately soft, moist, plastic (possible slide plane), moderate brown (5YR 4/4)

@ 32.5 feet: SILTSTONE, trace fine sand, trace clay, moderately hard, moist, moderate brown (5YR 4/4)

@ 35 feet: PEBBLY SANDSTONE, fine to coarse grained sand with pebbles up to 2" diameter, moderately hard, moist, pale yellowish brown (10YR 6/2)

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

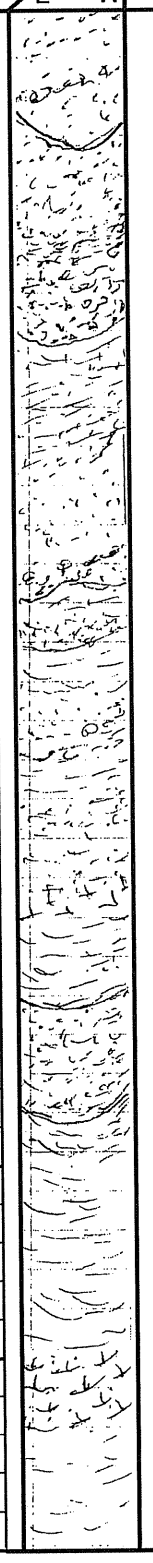
LOG OF BORING

BORING B-8-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 11-4-03 - 11-5-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE



@ 42.7 feet: Fault; N65E, 49SE, reddish brown, clayey silt gouge ½"-1" wide
@ 43 feet: interbedded silt and clay within sandstone

@ 45.5 feet: Bedding; N20E, 22SE, medium to coarse grained sandstone

@ 48 feet: Bedding; N20E, 22SE, striations 20° due south
@ 48 feet: SILTSTONE, trace clay, moderately hard to hard, moist, moderate brown (5YR 4/4)
@ 50 feet: Stopped drilling @ 17:05 on 11/4/03
Resume drilling @ 6:40 on 11/5/03

@ 52 feet: SANDSTONE, fine to coarse grained sand, some pebbles up to 2" diameter, moderately hard to hard, moist, yellowish gray (5Y 7/2)

@ 56 feet: SANDY SILTSTONE, silt with fine grained sand, moderately hard, moist, gradational contact, moderate yellowish brown (10YR 5/4)
@ 57 feet: Bedding, N5E, 22SE, fine grained sandstone in siltstone

@ 60 feet: PEBBLY SANDSTONE, fine to coarse grained sand with pebbles up to 1" diameter, moderately hard to hard, moist, pale yellowish brown (10YR 6/2),

@ 65 feet: SANDY SILTSTONE, silt with fine grained sand, hard, moist, moderate yellowish brown (10YR 5/4)

@ 69 feet: Bedding; N65E, 40SE
@ 69 feet: SILTY SANDSTONE, fine grained sand with silt, hard, moist, pale yellowish brown (10YR 6/2)

@ 72 feet: SILTSTONE, hard, moist, laminated, moderate yellowish brown (10YR 5/4),

@ 74 feet: CLAYEY SILTSTONE, silt with clay, hard, moist, moderate yellowish brown (10YR 5/4),

76-120 feet: PICO FORMATION (Tp)
@ 76 feet: limey siltstone

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

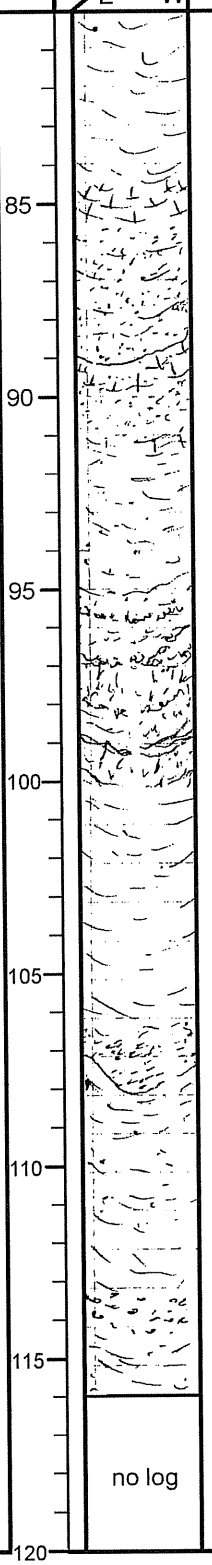
R.T. FRANKIAN & ASSOCIATES

BORING B-8-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 11-4-03 - 11-5-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE



@ 82 feet: SILTY SANDSTONE, fine to medium grained sandstone with silt, hard, moist, dark yellowish brown (10YR 4/2)

@ 85 feet: Bedding approximate; N50E, 38SE, limey siltstone
@ 85 feet: SANDY SILTSTONE, silt with fine grained sand, hard, moist, limey, moderate yellowish brown (10YR 5/4),

@ 89 feet: Bedding; N45E, 27SE
@ 89 feet: SILTY SANDSTONE, fine to medium grained sand with silt, moderately hard, moist, limey, yellowish gray (5Y 7/2),
@ 91 feet: CLAYEY SILTSTONE, silt with clay, trace fine grained sand, hard, moist, moderate yellowish brown (10YR 5/4)
@ 92 feet: SILTSTONE, hard, moist, moderate yellowish brown (10YR 5/4)

@ 95.5 feet: Bedding; N30E, 23SE
@ 96 feet, PEBBLY SANDSTONE, fine to coarse grained sand with pebbles up to 2" diameter, hard moist, yellowish gray (5Y 7/2)

Stopped logging @ 96 feet on 11/5/03 at 16:50
Resume logging on 11/6/03 @ 7:15
@ 98 to 100 feet: interbedded siltstone and sandstone
@ 100 feet: SILTSTONE, hard to very hard, moist, limey, moderate yellowish brown (10YR 5/4)

@ 107 feet: Bedding approximate: N30E, 28SE, fine grained sandstone

@ 107 feet: CLAYEY SILTSTONE, silt with clay, moderately hard to hard, moist, dark yellowish orange (10YR 6/6)

@ 108 feet: increase in moisture

@ 112 feet: Begin stemming @ 12:10
@ 113 feet: Bedding, approximate, N35E, 27SE, pebble bed
@ 114 feet: SILTY SANDSTONE, fine grained sand with silt, hard, moist, moderate yellowish brown (10YR 5/4)

TOTAL DEPTH 120 FEET.
No Caving.
No Groundwater
Downhole logged to 116 feet.

SAMPLE DEPTH	KELLY WEIGHT
0-30'	5952 lbs.
30-57'	3921 lbs.
57-86'	2531 lbs.
86-116'	1407 lbs
+600 lbs/30 ft. stem	

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES
FIGURE A-2.8c

BORING B-1-09

JOB NUMBER: 2002-036-03
DATE DRILLED: 7/13/09
EQUIPMENT USED: 24" Rotary Bucket rig with Sleeve sampler. Driving weights - 5952 lbs. (0-30'), 3921 lbs. (30-57'), and 2531 lbs. (57-86')
ELEVATION: 1150'
DRILLING CO.: Tri-Valley
LOGGED BY: TL
BORING DEPTH: 0-84.5'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
							ML	**ARTIFICIAL FILL (af)** SANDY SILT: soft, dry, light gray
								SAUGUS FORMATION (QTs) INTERBEDDED SANDSTONE, SILTY SANDSTONE, and SANDY SILTSTONE, very fine to medium, low hardness, dry, light gray (N7) to greenish gray (5GY 6/1), average bed thickness is 1-2', weakly cemented, poorly-defined bedding @ 3 feet: 6" thick reddish brown lenticular siltstone @ 3.5 feet: Contact N26W, 43NE
				5				
4	2.6	121	-	10				BEDDING: N5E, 22SE
				15				pale yellowish brown (10YR 6/2) to yellowish gray (5Y 7/2)
8	3.1	120	-	20				
			-	25				
10	4.5	118	-	30				BEDDING: N10E, 14SE SANDSTONE: very fine to coarse, with gravel, weakly cemented, low hardness, slightly moist
				35				BEDDING: N20W, 9NE: undulatory contact SILTSTONE: massive, trace fine to coarse sand, low hardness, slightly moist, pale yellowish brown (10YR 6/2)
				40				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BOREHOLE LOG 2002-036-03.GPJ FRANKIAN.GDT 11/20/09

BORING B-1-09 (CONTINUED)

JOB NUMBER: 2002-036-03
DATE DRILLED: 7/13/09
EQUIPMENT USED: 24" Rotary Bucket rig with Sleeve sampler. Driving weights - 5952 lbs. (0-30'), 3921 lbs. (30-57'), and 2531 lbs. (57-86')
ELEVATION: 1150'
DRILLING CO.: Tri-Valley
LOGGED BY: TL
BORING DEPTH: 0-84.5'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
14	6.6	127	-					SANDSTONE: fine to coarse, weakly cemented, low hardness, slightly moist, light gray (N7) to light brownish gray (5YR 6/1), poorly defined bedding
				45				CROSS-BEDDING: N2E, 27NW
20	4.8	124	-	50				fine to medium, light gray (N7)
								BEDDING: N18W, 26NE
								SILTSTONE: slightly clayey, massive, soft, slightly moist, pale reddish brown (10R 5/4)
11	9.2	122	-	55				
								SILTY SANDSTONE/SANDY SILTSTONE: very fine, micaceous, weakly cemented, low hardness, slightly moist, light gray (N7)
				60				
								BEDDING: N30W, 22NE
15	7.2	123	-	65				
								SILTSTONE: micaceous, some very fine sand, massive, low hardness, moist, pale reddish brown (10R 5/4) to light brownish gray (5YR 6/1)
				70				
								light seepage
				75				
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING B-1-09 (CONTINUED)

JOB NUMBER: 2002-036-03
DATE DRILLED: 7/13/09
EQUIPMENT USED: 24" Rotary Bucket rig with Sleeve sampler. Driving weights - 5952 lbs. (0-30'), 3921 lbs. (30-57'), and 2531 lbs. (57-86')
ELEVATION: 1150'
DRILLING CO.: Tri-Valley
LOGGED BY: TL
BORING DEPTH: 0-84.5'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
40/6"	7.2	117	-					
				85				Bottom of Boring at 84.5 feet. No caving. Light seepage at 72.5'.
				90				
				95				
				100				
				105				
				110				
				115				
				120				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-03.GPJ FRANKIAN.GDT 11/20/09

LOG OF BORING

BORING B-2-09

JOB NUMBER: 2002-036-03
DATE DRILLED: 7/14/09
EQUIPMENT USED: 24" Rotary Bucket rig with Sleeve sampler. Driving weights - 3160 lbs. (0-24'), 2040 lbs. (24-46'), and 1120 lbs. (46-72')
ELEVATION: 1095'
DRILLING CO.: Tri-Valley
LOGGED BY: TL
BORING DEPTH: 0-71.5'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
					ML	**LANDSLIDE DEBRIS (Qls)** SANDY SILT: very fine, soft, dry, light brownish gray (10R 5/4)
10	6.3	124	-	10		SILTSTONE: fine to medium sand, soft, dry, light brown (5YR 6/4), no discernible structure 3/4" to 2" thick plastic clay, slightly undulatory, moderate reddish brown (10R 4/6), N70E, 27SE
			-	15		SLIDE PLANE: N15E, 22SE: 1" thick plastic clay, moderate reddish brown (10R 4/6) **SAUGUS FORMATION (QTs)** SANDSTONE: very fine to medium, weathered, low hardness, moist, light gray (N7) to light brownish gray (10R 5/4)
12	10.4	121	-	20		SILTSTONE: micaceous, low hardness, moist, light grayish brown (10R 5/4)
				25		SILTY SANDSTONE: very fine to medium, micaceous, laminated, low hardness, slightly moist, yellowish gray (5Y 7/2), weakly cemented BEDDING: N10W, 14NE PEBBLY SANDSTONE: fine to very coarse, well-cemented, moderately hard, slightly moist, light gray (N7) to yellowish gray (5Y 7/2)
52/9"	1.9	134	-	30		BEDDING: N40W, 14NE INTERBEDDED SANDSTONE and PEBBLY SANDSTONE, weakly cemented to moderately cemented, low hardness, slightly moist, light gray (N7) to yellowish gray (5Y 7/2)
				35		BEDDING: N18W, 11NE: defined by fine laminations in
				40		

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING B-2-09 (CONTINUED)

JOB NUMBER: 2002-036-03
DATE DRILLED: 7/14/09
EQUIPMENT USED: 24" Rotary Bucket rig with Sleeve sampler. Driving weights - 3160 lbs. (0-24'), 2040 lbs. (24-46'), and 1120 lbs. (46-72')
ELEVATION: 1095'
DRILLING CO.: Tri-Valley
LOGGED BY: TL
BORING DEPTH: 0-71.5'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
57/9"	4.7	124	-					sandstone
								BEDDING: N-S, 16E
				45				BEDDING: N18E, 25SE
								SILTSTONE: slightly clayey, micaceous, low hardness, slightly moist, greenish gray (5GY 6/1)
58	10.6	131	-					
				50				
				55				
			-					
62/9"	15.3	117	-					4-6" thick plastic clay bed, dark gray (N3)
62/8"	11.8	123	-					
				60				unoxidized, medium light gray (N5)
				65				pale yellowish brown (10YR 6/2)
				70				
62	15.9	114	-					
								Bottom of Boring at 71.5 feet. No groundwater. No caving.
				75				
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-03.GPJ FRANKIAN.GDT 11/20/09

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-3-2009

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/13/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1026'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-72'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
					SM/ML	**LANDSLIDE DEBRIS (Qls)** SILTY SAND/ SANDY SILT: fine, light olive brown (2.5Y 5/3), silty appears as mixture of fine grained sandstone & siltstone
5			-	5		
7/9"			-	10		laminated fine sands, near horizontal slightly clayey
12/10"			-	15		concretionary layer, near horizontal sandy, hard, cemented layer, fractured, olive gray (5Y 5/2)
					ML	CLAYEY SILT: base of Qls near horizontal
14			-	20		**SAUGUS FORMATION (QTs)** SANDSTONE: fine to medium, moderately well sorted, moderately hard, slightly moist BEDDING: N25W, 8NE
27/7"			-	25		BEDDING: N21W, 14NE: coarse sand layer N5W, 16NE
						CONGLOMERATE: coarse sand, pebbly, moderately hard, slightly moist
36/7"			-	30		
24/7"			-	35		BEDDING: N10, 15E: silty layer in pebble conglomerate
				40		

(CONTINUED ON THE FOLLOWING FIGURE)

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 11/16/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-3-2009 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/13/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1026'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-72'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
39/7"			-					SANDSTONE: fine to medium, well sorted, slightly laminated, very moist to wet, yellowish brown
								CONTACT/BEDDING: N10W, 14E: light seepage
42/9"			-	45				SILTSTONE: with clay, massive, moderately hard, moist, bluish gray to dark gray (5Y, 4/1), seepage along fractures from 45'-48'
42			-	50				
46			-	55				
45/10"			-	60				becomes very clayey, slickensides within clay layer
68			-	65				
								SANDSTONE: fine to medium, poorly sorted, dense, moist, dark olive gray
58/9"			-	70				
				75				Bottom of Boring at 72 feet. Light seepage at 45'. No caving. Minor sloughing in saturated sand @ 43' to 45'. Slickenslide clay layer at 62'-64'. Downhole logged to 50'.
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 11/16/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-1-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/14/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1260.5'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-72'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
12	7.4	126	-	5			
12/9"	4.2	126	-	10			
15	4.6	119	-	15			
9	12.1	119	-	20			
21/9"	3.3	115	-	25			
21/9"	2.9	118	-	30			
12/9"	4	123	-	35			
				40			

PICO FORMATION (Tp)

SANDSTONE: medium to coarse, with granules (10%) and occasional pebbles (2-5%), slightly moist, light olive brown (2.5Y 5/4)

fine to medium

BEDDING: N50E, 35SE

drilling slower, rock appears to be more cemented

becomes primarily medium, slightly silty

BEDDING: N70E, 35S

CLAYSTONE/SILTSTONE: massive, dense, olive brown to dark olive brown (2.5Y 4/3)

BEDDING: N40E, 30SE

PEBBLY SANDSTONE: fine to coarse, with gravel (5-10%), poorly sorted, damp, yellowish brown to tan (2.5Y, 6/6)

BEDDING: N80E, 38S (pebble lineation)

BEDDING: N79E, 41S

BEDDING: N70E, 35S
coarse, with granules and pebbles

SHEAR: N50E, 80S
BEDDING: N75E, 33S
with rounded to sub-rounded gravel, occasional cobles to 5"

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING B-1-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/14/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1260.5'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-72'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
19/6"	3.9	116	-					minor cobbles (5%) to 4"
								CLAYSHEAR: N60W, 61S BEDDING: N68E, 36S
23	3.9	119	-	45				
35/6"	3.7	113	-	50				BEDDING: N60E, 38S (SANDSTONE OVER CLAYSTONE)
								CLAYSTONE: fine to medium, massive to thickly bedded, dense, slightly moist, olive greenish gray (5Y 5/4) to yellowish gray
38/6"	8.1	113	-	55				CLAYEY LAYER: N30E, 38S
								fine, laminated, clayey
47/11"	11.3	118	-	60				BEDDING: N60E, 38S: clay
								CLAYEY SILTSTONE: interlayered, laminated, soft, slightly moist, brown to bluish gray
25	9.2	119	-	65				BEDDING: N70E, 42S BEDDING: N72E, 41S silt and clayey silt and fine sand with bluish gray to reddish brown layers of clayey silt with yellowish brown sandy layers
								becomes olive gray
40/6"	8.9	113	-	70				SANDSTONE: fine to medium, slightly silty, dense, moist, bluish gray (unoxidized)
								Bottom of Boring at 72 feet. No groundwater. No caving.
				75				
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 8/19/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-2-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/15/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1300'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-52'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
					SM	**ARTIFICIAL FILL (af)** SILTY SAND: fine to medium, massive, medium dense, damp, light olive brown (2.5Y, 5/3)
				5		
5	4.6	113	-	10		
				15		base of fill in clean contact with bedrock and horizontal
						PICO FORMATION (Tp) SILTSTONE: massive, damp, olive gray (5Y, 4/2) to light olive gray (5Y 6/2)
7	11	114	-	20		CONTACT: N80E, 38S BEDDING: N78E, 36S CLAYSTONE
						red with slick dark reddish brown (2.5YR 3/3)
5	16.4	108	-	25		silty, firm, moist, locally slickensided where more clayey
			-	30		SANDSTONE: fine, massive, dense, damp, light olive gray (5Y 6/2)
8	15.8	108	-			
				35		contact approximately 70 degrees between sandstone and claystone. Minor shearing along and throughout, but no gouge or fault gouge, appears to be axis of fold SHEAR: EW, 75N SHEAR: N86E, 78N
				40		

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING B-2-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/15/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1300'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-52'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
11	9.8	117	-					BEDDING/CONTACT: N50W, 65NE; N48W, 68NE CLAYSTONE: fine, massive, dense, damp, red, with slicks
				45				very plastic, stiff, no bedding discernable downhole, occasional sandy interlayers, but not laterally extensive, massive
28	4.6	133	-	50				SILTSTONE: fine, dense, damp, light olive gray (5Y 6/2), laminated with claystone interlayers, appears in sample as near vertical, approximately 80 degree dip
				55				Bottom of Boring at 52 feet. No groundwater. No caving.
				60				
				65				
				70				
				75				
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 8/19/10

LOG OF BORING

BORING B-3-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/14/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1376'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-111'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								PICO FORMATION (Tp)
								SANDSTONE/ MUDSTONE: fine to coarse, with minor pebbles, poorly sorted, plastic, moist to slightly moist, yellowish red to reddish brown (5YR, 4/4)
				5				becoming coarser with depth and better sorted
								SANDSTONE: medium to coarse, slightly silty with minor granules, very hard, very dense, damp to slightly moist, yellowish brown to gray (5YR, 6/1)
12/8"	4.9	128	-	10	■			
								BEDDING: N85W, 43N
								BEDDING: N89W, 42N
				15				fine to medium, moist, yellowish brown (10YR, 5/4)
								BEDDING: N85W, 44N
19	6.1	134	-	20	■			
								coarse, with approximately 5% gravel, very hard, well cemented
								BEDDING: E-W, 38N
				25				cobble layer (pink quartzite) cobble to 6"
								fine
								PEBBLE CONGOMERATE: medium to coarse, with minor gravel and cobbles, well cemented, moderately well sorted, light gray
22	3.4	123	-	30	■			BEDDING: N60W, 47N
				35				increase in moisture and increase in fines, poorly sorted with approximately 5-15% rounded gravel
				40				

(CONTINUED ON THE FOLLOWING FIGURE)

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 8/19/10

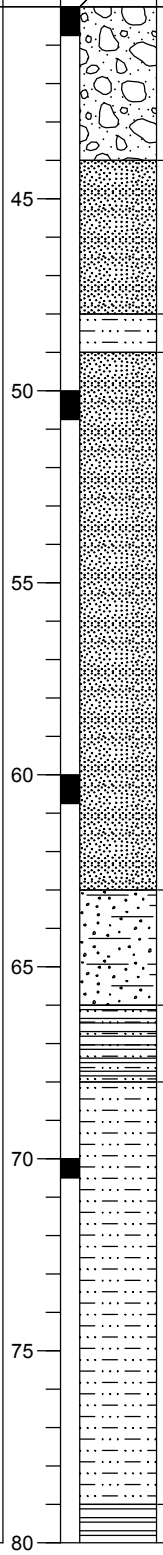
LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-3-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/14/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1376'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-111'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
30/9"	5.1	126	-				
31/9"	7.9	121	-	50			
34/9"	7.2	111	-	60			
41/6"	6.5	103	-	70			



CROSS-BEDDING: N80E, 34N

SANDSTONE: fine to medium, poorly sorted, slightly plastic, medium dense, moist, yellowish brown (10YR, 5/4)

BEDDING: 50W, 36NE

SILTSTONE: slightly plastic, dark brown

SANDSTONE: coarse, with gravel, hard, dense, yellowish brown (10YR, 5/4)

BEDDING: N60W, 37NE

BEDDING: N59W, 39NE

SILTY SANDSTONE: light olive brown (2.5Y, 5/4)

BEDDING: N61W, 37N

MUDSTONE: slightly plastic, moist, dark gray (5Y, 4/1)

SILTSTONE: grayish brown (2.5Y, 5/2)

very hard, well cemented, massive, damp, fractured, concretionary from 69-71'

massive, well sorted, micaceous, dense, moist, olive (5Y, 4/3)

CONTACT: N58W, 37N

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BORING B-3-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/14/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1376'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-111'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
29	21.5	109	-			CLAYSTONE: with slickensides, plastic, soft, moist, black
						with bi-valve shells approximately 1%, small white thin clamshells to 1/2" (freshwater), and reed casts to 82'. Grading to clayey siltstone
						MUDSTONE: clayey, slightly plastic, moist, olive gray (10YR, 4/3)
				85		
38/9"	9.7	116	-	90		SANDSTONE: fine, locally well cemented, dense, slightly moist, brown (10YR, 4/3)
						CLAYSHEAR CONTACT: N40E, 30SE, N35E, 29SE
				95		SILTSTONE: massive, slightly plastic, dense, moist, greenish gray to olive gray (5Y, 4/2), and with minor fine sand (10%)
						BEDDING: N38, 32SE
37/9"	11.9	124	-	100		
				105		SANDSTONE: fine to medium, poorly sorted, with 20-30% silt and 5% clay, damp to slightly moist, yellowish brown (10YR, 5/4)
						becoming better sorted with depth
				110		clean
						Bottom of Boring at 111 feet. No groundwater. No caving.
				115		
				120		

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 8/19/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-4-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/14/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1405'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-51'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
15/9"	7.7	129	-	10	■		
15	14.4	120	-	20	■		
23/11"	15.9	117	-	30	■		

PICO FORMATION (Tp)

CLAYSTONE/MUDSTONE: massive, slightly plastic, moist, dark yellowish brown (10YR, 4/4)

CLAYEY SANDSTONE: fine, silty (10-20%) with occasional coarse (2%), poorly sorted, dense, damp, yellowish brown (10YR, 5/4)

@12' BEDDING: N40E, 25SE

PEBBLY SANDSTONE: fine to medium, with minor gravel (2-5%), moderately sorted, light brownish gray (10YR, 6/2)

BEDDING: N26E, 24SE

BEDDING: N31E, 22SE
BEDDING: N28E, 26SE
slight change in color to brown (7.5YR, 5/4)
BEDDING: N15E, 26SE

SILTSTONE/MUDSTONE: dark brown (7.5YR, 3/3)

SILTY SANDSTONE: fine to medium, dense, damp, light brownish gray (2.5Y, 6/2)
@ 25'-26': concretionary layer of nodules in sandy clay layer

BEDDING: N21E, 21SE

BEDDING: N18E, 22SE

BEDDING: N39E, 25SE

SILTSTONE: micaceous, slightly laminated, dense, slightly moist, dark olive gray (5Y, 3/2)
BEDDING: N36E, 26SE

BEDDING: N36E, 25SE

BEDDING: N32E, 24SE

SANDSTONE: fine to medium, moderately well sorted, damp, light

(CONTINUED ON THE FOLLOWING FIGURE)

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 8/19/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-4-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/14/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1405'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-51'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
35	4.6	113	-					brownish gray (2.5Y, 6/2)
								BEDDING: N27E, 24SE
				45				BEDDING: N26E, 25SE
								BEDDING: N28E, 24SE grading to predominately medium grained
42	6.3	109	-	50				
								Bottom of Boring at 51 feet. No groundwater. No caving.
				55				
				60				
				65				
				70				
				75				
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BORING B-5-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/19/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1398'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-71'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
							SM	**LANDSLIDE DEBRIS (Qls)** SILTY SAND: fine to meduim, loose, moist, light olive brown (2.5Y, 5/3)
				5				
								fine, loose to medium dense, damp to slightly moist, light yellowish brown (2.5Y, 6.4)
5	3	102	-	10	■			
				15				
								fine to medium
4	3.1	104	-	20	■			
				25				with pebbles and cobbles, increase in moisture
							ML	CLAYEY SILT: soft to firm, moist, brown @30' SHEAR: N10W, 24W
6	13.4	115	-	30	■		CL	SILTY CLAY: soft to firm, moist, brown @31' SHEAR: N10W, 12W @31'-32': CLAY/SAND CONTACT: N60E, 20SE @32': BEDDING: N50W, 30SW
							SP	@ 32' SAND: fine, moderately well sorted, micaceous, loose to medium dense, light yellowish brown (2.5Y, 5/3) rock exhibits shearing
				35				
								SHEAR: N5W, 15E
				40				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-5-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/19/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1398'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-71'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
18	5.6	111	-					@41': SLIDE PLAN CONTACT: N21E, 31SE: Base of landslide/top of bedrock
								PICO FORMATION (Tp)
								SANDSTONE: medium to coarse, with pebbles, dense, slightly moist, yellowish brown (2.5Y, 5/3)
				45				
42/9"			-	50				(Sample fell out)
								BEDDING: N30E, 34SE
								BEDDING: N15E, 29SE
				55				BEDDING: N32E, 31SE
								BEDDING: N28E, 29SE
42/9"	7.1	120	-	60				
				65				
								SILTY SANDSTONE: fine, moist, olive (5Y, 5/4)
								light yellowish brown (10YR, 6/4)
35/9"	5.5	111	-	70				
								Bottom of Boring at 71 feet. No groundwater. No caving.
				75				
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 8/19/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-6-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/20/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1330'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-76'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
							SM	**ARTIFICIAL FILL (af)** SILTY SAND: fine to medium, loose, moist, light yellowish brown (2.5Y, 6/3)
				5				Note: fill appears relatively "clean" with no organic debris and minimized clay
3	7.4	118	-	10	■			
				15				
4	6	117	-	20	■			
				25				
5	7.6	117	-	30	■			
				35				**LANDSLIDE DEBRIS (Qls)** SILTY SANDSTONE: dense, light yellowish brown (2.5Y, 6/3), (clean contact with fill)
								fine, very clean, massive
				40				slightly clayey, very hard drilling in concretionary layer

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING B-6-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/20/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1330'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-76'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
27	2.6	126	-					PEBBLY CONGLOMERATE: medium to coarse, with granules and pebbles, poorly sorted, dense, damp, light yellowish brown (2.5Y, 6/3), with coarse sand size shell fragments
				45				N59E, 35S: pebble layer @46'-48': orange layer, olive yellow (2.5Y, 6/8) BEDDING: N30E, 34SE BEDDING: N60E, 40S softer
20	6.8	109	-	50				
				55				SANDSTONE: medium to coarse, moderately sorted, dense, damp to slightly moist, light yellowish brown (2.5Y, 6/3) BEDDING: N10E, 35E BEDDING: N12E, 33E
21	6.9	104	-	60				BEDDING: N16E, 34SE
				65				SILTSTONE: with clam fossils, micaceous, moist, bluish gray @68': CLAY SEAM: N50E, 20SE: (landslide plane) CLAYSTONE: plastic, moist, reddish brown @69' BEDDING: N52, 18SE
12	17.6	102	-	70				**PICO FORMATION (Tp)** MUDSTONE/CLAYEY SILTSTONE: massive, with sand and granules, mottled brown and olive gray
				75				(no discernable bedding)
				80				Bottom of Boring at 76 feet. No groundwater. Minor caving in sandy fill.

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 8/19/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-7-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/21/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1408'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-100'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								PICO FORMATION (Tp)
								SANDSTONE: fine to medium, moderately well sorted, dense, damp, light yellowish brown
				5				
								BEDDING: N75E, 41S
16/9"	7.2	112	-	10	■			BEDDING: N75E, 42S
								BEDDING: N78E, 42S
				15				CONGLOMERATE: with pebbles
								SANDSTONE: fine, moderately well sorted, dense, damp, pale yellow (2.5Y, 8/2), with minor pebbles, minimal to no fines
18/9"	4.3	116	-	20	■			medium to coarse
								pebble conglomerate layer: N78E, 44S
				25				
								BEDDING: N76E, 48S
								fine to medium, slightly silty, light gray (2.5Y, 7/1)
34/9"	6.1	107	-	30	■			
				35				
								medium to coarse, with granules and pebbles, yellow
				40				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-7-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/21/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1408'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-100'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
33/9"			-					
				45				PEBBLY SANDSTONE: medium to coarse, with granules and pebbles (5%), moderately well sorted (no fines), dense, damp, pale yellow (2.5Y, 7/3)
								well cemented, (slow drilling)
								BEDDING: N88W, 39S: (pebble layer)
30/4"			-	50				
				55				BEDDING: N80E, 47S
								BEDDING: N80E, 42S
50	6.7	114	-	60				
								FOSSILIFEROUS SILTSTONE: with numerous shells, dense, slightly moist, olive (5Y, 5/3), concretionary, cemented
								SILTY SANDSTONE: fine to medium, poorly sorted, olive (5Y, 5/3)
				65				
30/9"	10.2	121	-	70				
								hard cemented zone
								BEDDING: N82E, 43S
				75				
								SANDSTONE: fine, well sorted, dense, moist, pale yellow to olive (5Y, 7/3)
								BEDDING: N78E, 40S
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING B-7-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/21/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1408'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-100'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
34/9"	10.1	113	-		■			N83E, 42S
				85				BEDDING: N86W, 39S: (shell layer), slightly silty and concretionary
								SANDY SILTSTONE: laminated, locally concretionary, dense, moist, mottled bluish gray and brown
52/9"	6.8	122	-	90	■			no clay in matrix
								BEDDING: N88E, 41S
								SILTY SANDSTONE: fine to medium, poorly sorted, dense, slightly moist, olive brown
				95				SANDSTONE: fine, slightly silty, moderately well sorted, light gray (5Y, 7/1)
				100				Bottom of Boring at 100 feet. No groundwater. No caving.
				105				
				110				
				115				
				120				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 11/16/10

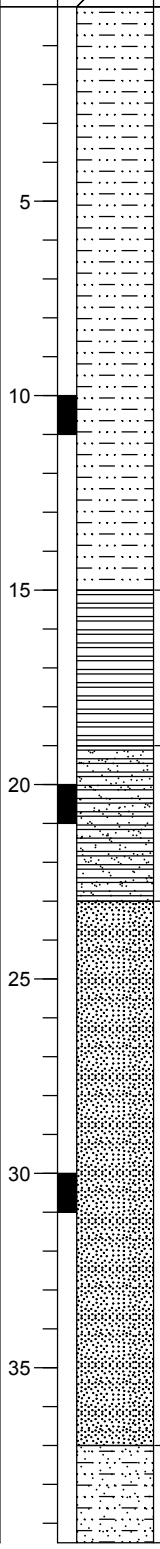
LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-8-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/23/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1135'
DRILLING CO.: Tri-Valley
LOGGED BY: TL
BORING DEPTH: 0-101'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
3	2.9	109	-	10	■		
2	7.9	123	-	20	■		
7	3.6	118	-	30	■		



SAUGUS FORMATION (QTs)

SILTSTONE: micaceous, soft, dry, light grayish brown (10YR 5/2)

BEDDING: N72W, 16N

BEDDING: N80W, 12N

CLAYSTONE: moderately soft, dark grayish brown (10YR 4/2)

massive

CLAYEY SANDSTONE: with sand and silt, moderately soft, light reddish brown (5YR 4/3)

BEDDING: N72W, 8N): (top of sandstone)

SANDSTONE: fine, moderately well sorted, micaceous, medium dense, damp, light olive brown (2.5Y, 5/3)

BEDDING: N32W, 12NE: pebble layer cross bed

grading coarser with pebbles

BEDDING: N51W, 19NE

BEDDING: N53W, 12NE

FAULT: N60E, 58S

BEDDING: N85E, 24N

SANDY SILTSTONE: fine sand and trace gravel to 1/2", with fraction of clay, poorly sorted, dense, slightly moist, dark grayish brown (2.5Y 4/2)

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-8-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/23/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1135'
DRILLING CO.: Tri-Valley
LOGGED BY: TL
BORING DEPTH: 0-101'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
12	7.1	118	-	40				grading to mudstone
								CONGLOMERATE: medium to coarse sand, with pebble to 1" and few cobbles to 6", dark grayish brown (2.5Y, 4/2)
								BEDDING: N81W, 9N
				45				OFFSET LITHOLOGY BUT NO SHEARING OBSERVEABLE FAULT: N80E, 68S: (hard drilling)
								medium, light bluish gray (2.5Y, 6/2)
33	2.8	123	-	50				
				55				silty and well cemented BEDDING: N86E, 26N SANDSTONE: fine to medium, laminated, light gray
								BEDDING: N55W, 16NE: clean sand layer
39	4.5	115	-	60				SANDY SILTSTONE: damp, olive gray (5Y, 5/2)
				65				SILTSTONE: micaceous, soft, moist, olive gray (5Y, 5/2)
								BEDDING: N48W, 24NE: thin clay bed
								increasing clay with depth
								CLAYSTONE: plastic, firm, moist, dark olive gray
28	13.8	113	-	70				
								SILTSTONE: with clay, slightly plastic, locally micaceous and laminated, slightly firm to soft, moist, olive gray (5Y, 5/2) @74': BEDDING: 50W, 22NE
				75				
								CLAYSTONE: with silt, massive, firm, slightly moist, olive gray (5Y,

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BORING B-8-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/23/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1135'
DRILLING CO.: Tri-Valley
LOGGED BY: TL
BORING DEPTH: 0-101'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
18	16.4	115	-	80				5/2) @79' BEDDING: N60W, 14N: clay seam
								SILTSTONE: laminated, soft
				85				
								SANDSTONE: medium, moderately sorted with small pebble inclusions, hard, light olive gray (5Y 6/2), (cuttings fell out of basket)
42	3.9	124	-	90				CROSS-BEDDING: N20W, 15E
								CONGLOMERATE: fine to medium sand, with granules and pebbles, well cemented and poorly sorted, slightly moist, light olive gray (5Y 6/2) BEDDING: N32W, 13NE: fine sand layer
				95				BEDDING: N36W, 14NE
								fine sand, no pebbles, massive, well sorted, light gray
38/10"	5.3	112	-	100				
								Bottom of Boring at 101 feet. No groundwater. No caving.
				105				
				110				
				115				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 11/16/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-9-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/27/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1250'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-107'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								OLDER LANDSLIDE DEBRIS (Qols)
								SILTY SANDSTONE: fine, soft, damp, light olive brown (2.5Y, 5/3), appears jumbled
				5				SANDY SILTSTONE: clean, slightly laminated, soft, olive brown (2.5Y, 4/3)
								SILTY SANDSTONE: medium to coarse, with pebbles, poorly sorted, slightly moist, light olive brown (2.5Y, 5/3)
								hard zone
7	13	120	-	10	■			CLAYSTONE: with silt, massive, slightly plastic, moist, dark brown (10YR, 3/3), (jumbled)
								MUDSTONE: with coarse sand & granules in silty matrix, massive, poorly sorted, slightly plastic, slightly moist, dark brown (10YR, 3/3)
				15				
								CONTACT: N20W, 17SW
								SAUGUS FORMATION (QTs)
								SANDSTONE: fine to medium, moderately well sorted, cemented, hard, light gray (2.5Y, 7/2)
9/7"	4.2	131	-	20	■			BEDDING: N40W, 60NE: (pebble layer)
								CONGLOMERATE: coarse sand, with pebbles and cobbles, hard, light gray (2.5Y, 7/2)
				25				
								BEDDING: N25W, 37NE
20/9"	4	131	-	30	■			medium to coarse sand, no fines
				35				
								BEDDING: N25W, 31NW: fine sand layer
				40				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING B-9-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/27/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1250'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-107'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
24/9"	3.9	128	-					
				45				CONTACT/BEDDING: N61W, 53NE SILTSTONE: with clay, poorly sorted, massive, dense, brown (10YR, 4/3)
								SANDSTONE: medium, with granules, hard, olive gray (5Y, 5/2)
38/9"	5.5	108	-	50				
								BEDDING: N50W, 41NE
				55				PEBBLY SANDSTONE: fine to medium, poorly sorted with granules, grayish brown (2/5Y, 4/2) BEDDING: N38W, 42NE
57/9"	4.7	110	-	60				
								SHEAR: N15W, 67NE BEDDING: N38W, 71NE SHEAR: N18W, 44NE: (with slicks) CONTACT: N61W, 43NE: (top of siltstone)
				65				SILTSTONE: with clay, firm, massive, slightly plastic, slightly moist, reddish brown (5YR, 4/4)
								SHEAR: N31W, 55NE: (clay slicks) grades to brown silty sandstone to 72'
53	9.6	132	-	70				
								very plastic
				75				SILTY SANDSTONE: fine, poorly sorted, massive, dense, yellowish brown (10YR, 5/4)
								BEDDING: N51W, 52N
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING B-9-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/27/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1250'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-107'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
51/9"	10.9	116	-					
				85				BEDDING: N61W, 58W: (sandy layer)
53/11"	7.1	133	-	90				
				95				fine to medium, olive brown (2.5Y, 4/4)
								CONGLOMERATE: with pebbles, medium to coarse sand, slightly silty, massive, light brownish gray (2.5Y, 6/2)
				100				BEDDING: N38W, 43NE
40/10"	3.7	121	-					SANDSTONE: fine to medium, clean, well sorted, dense, light gray (2.5Y, 7/2), well indurated
				105				
								Bottom of Boring at 107 feet. No groundwater. No caving.
				110				
				115				
				120				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 11/16/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-10-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 10/7/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-70'(1120 lbs.).
ELEVATION: 1002.5'
DRILLING CO.: Tri-Valley
LOGGED BY: TPL
BORING DEPTH: 0-70'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
							ML	**ALLUVIUM (Qal)** SANDY SILT: very fine sand, soft, slightly moist, grayish brown (10YR 5/2)
				5				
				10				minor caliche veins trace cobbles, medium stiff angular sandstone cobble; 8" long, 3" wide
				15				
				20				siltstone rip up clasts
								SAUGUS FORMATION (QTs) SANDY SILTSTONE: very fine sand, micaceous, some caliche pods, soft, slightly moist, yellowish gray (5Y 7/2) slight orangish brown mottling
				25				BEDDING: N10E, 20SE: defined by 1/4" thick caliche at contact SILTY SANDSTONE: very fine, trace pebbles, some siltstone interbeds up to 6" thick, friable, slightly moist, yellowish gray (5Y 7/2) very fine to medium with cross bedding BEDDING: N27E, 17SE
				30				SANDY SILTSTONE: very fine to fine sand, low hardness, slightly moist, yellowish gray (5Y 7/2) SANDSTONE: fine to coarse, minor amount of pebbles, moderately hard, slightly moist, yellowish gray (5Y 7/2)
				35				CROSS-BEDDING: N57E, 15SE: moderately well cemented
				40				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING B-10-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 10/7/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-70'(1120 lbs.).
ELEVATION: 1002.5'
DRILLING CO.: Tri-Valley
LOGGED BY: TPL
BORING DEPTH: 0-70'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								BEDDING: N5E, 17SE
				45				PEBBLY SANDSTONE: fine to very coarse, moderately cemented, moderately hard, moist, yellowish gray (5Y 7/2), light seepage
								moderate seepage
				50				CONTACT: N10W, 15NE
								SANDY SILTSTONE: very fine to fine sand, weakly cemented, micaceous, low hardness, moist, light olive gray (5Y 5/2) thin very fine sandstone interbed @ 52'
								1" thick siltstone; 4" thick very fine sandstone
				55				SILTSTONE: moderately indurated, moderately hard, slightly moist, medium dark gray (N4)
				60				
				65				light olive gray (5Y 5/2)
								dark yellowish brown (10YR 4/2)
				70				Bottom of Boring at 70 feet. Light seepage at 44', moderate seepage at 47 '. No caving.
				75				
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 11/16/10

LOG OF BORING

BORING B-11-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 10/7/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-70'(1120 lbs.).
ELEVATION: 1145.5'
DRILLING CO.: Tri-Valley
LOGGED BY: TPL
BORING DEPTH: 0-70'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION / GRAPHIC LOG	SOIL TYPE	
						ML	**RESIDUAL SOIL** SANDY SILT: very fine to fine sand, minor caliche, soft, slightly moist, dark yellowish brown (10YR 4/2)
				5			yellowish brown (10YR 5/4)
							SAUGUS FORMATION (QTs) SANDY SILTSTONE: very fine sand, micaceous, soft, dry, yellowish gray (5Y 7/2) BEDDING: N20E, 10SE BEDDING: N40E, 10SE: some siltstone interbeds, 1" to 2" thick
				10			
							SILTSTONE: moderately indurated, low hardness, slightly moist, light olive gray (5Y 5/2)
				15			
				20			SILTY SANDSTONE: very fine to fine, micaceous, soft, slightly moist, yellowish gray (5Y 7/2)
							SILTSTONE: moderately indurated, low hardness, slightly moist, light olive gray (5Y 5/2)
				25			SANDSTONE: very fine to fine, low hardness, slightly moist, light olive gray (5Y 6/1), laminated bedding defined by aligned mafic minerals
							SANDY SILTSTONE: very fine sand, micaceous, soft, slightly moist, yellowish gray (5Y 7/2)
				30			SANDSTONE: very fine to medium, weakly cemented, slightly micaceous, soft, dry, yellowish gray (5Y 7/2), laminated
							trace pebbles BEDDING: N-S, 12E some cross bedding
				35			
							BEDDING: N10E, 8SE
				40			

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING B-11-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 10/7/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-70'(1120 lbs.).
ELEVATION: 1145.5'
DRILLING CO.: Tri-Valley
LOGGED BY: TPL
BORING DEPTH: 0-70'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
				45				BEDDING: N15E, 10SE
				50				PEBBLY SANDSTONE: fine to coarse, trace cobbles, weakly cemented, low hardness, dry, yellowish gray (5Y 7/2)
								SILTY SANDSTONE: very fine to fine, micaceous, soft, slightly moist, light olive gray (5Y 5/2)
								SANDY SILTSTONE: very fine sand, micaceous, soft, slightly moist, light olive gray (5Y 5/2)
				55				BEDDING: N11E, 15SE: 2" thick siltstone interbed
								SILTSTONE: micaceous, moderately hard, slightly moist, moderate olive brown (5Y 4/4), some very fine to fine sandstone interbeds
								dark yellowish brown (10YR 4/2)
				60				massive
								olive gray (5Y 4/1)
				65				minor very fine sand, caliche coating on fracture surfaces
								medium bluish gray (5B 5/1)
								SILTY SANDSTONE: fine to coarse, trace pebbles, moderately hard, slightly moist, light olive gray (5Y 5/2)
				70				Bottom of Boring at 70 feet. No groundwater. No caving.
				75				
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 11/16/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING HS-1-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 5/10/10
EQUIPMENT USED: Hollow Stem Auger CME 95 with heavy duty sampler and SPT sampler
ELEVATION: 1248'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-112'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
							SM	**ARTIFICIAL FILL (af)** SILTY SAND: medium to coarse, loose, moist, light brown (2.5Y, 5/4)
22	9.9	111	-	5				
								fine to medium, olive brown (2.5Y, 5/4)
-			18	10				
32	13.6	117	-	15				has red clayey inclusions, shows compaction layering
-			27	20				fine to medium, poorly sorted, small shell fragments, slightly plastic, olive brown (2.5Y, 4/3)
59	10.4	118	-	25				
-			38	30				
								increase in moisture, slightly clayey (5-10%) in matrix
67	10.5	125	-	35				
								medium to coarse, trace pebbles
				40				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING HS-1-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 5/10/10
EQUIPMENT USED: Hollow Stem Auger CME 95 with heavy duty sampler and SPT sampler
ELEVATION: 1248'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-112'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
-			32		SM	slightly clayey
						fine to medium, with gravel, moderately to poorly sorted, olive brown (2.5Y, 4/3)
41	6.1	120	-	45		with abundant fossil shell fragments
-			50/3"	50		**PICO FORMATION (Tp)** SANDSTONE: medium to coarse, moderately well sorted, well cemented, hard, dark yellowish brown (10YR, 4/4)
50/4"	8.3	107	-	55		(hard drilling)
						PEBBLY SANDSTONE: medium, well cemented, light yellowish brown (10YR, 6/4), poorly sorted with granules (10%) and pebbles (5-10%)
-			65/3"	60		(sampler bouncing)
70/4"			-	65		(sampler bouncing)
						medium to coarse, moderately well sorted, well cemented, damp
-			65/5"	70		(bouncing after 5")
						(very hard drilling, adding water to cool bit)
						hard, with localized olive brown fine clayey mottling
75/5"	8.1	123	-	75		
				80		becomes coarser with pebbles

(CONTINUED ON THE FOLLOWING FIGURE)

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

LOG OF BORING

BORING HS-1-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 5/10/10
EQUIPMENT USED: Hollow Stem Auger CME 95 with heavy duty sampler and SPT sampler
ELEVATION: 1248'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-112'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
-			30/1"					coarse, (bouncing after 6")
80/4"			-	85				(bouncing after 4")
								∇ groundwater at 87.08 feet 7/1/10
-				90				(bouncing after 5")
								medium to coarse
68/5"			-	95				
								∇ groundwater at 97.5 feet 5/14/10
								MUDSTONE: dark gray, mixture of sand (25%), silt (50%), and clay (25%)
-			50/6"	100				
				105				
				110				
				115				Bottom of Boring at 112 feet. Very slight groundwater seep noted at about 100'
				120				Installed temporary piezometer of 2" schedule 80 PVC with bottom at 108'; 0.020" machine-slotted screen from 108-88'; blank PVC to surface. Backfilled with #3 sand up to 85', and sealed with medium bentonite chips to 81'. Destroyed piezometer on July 14, 2010 by removing PVC casing and backfilling to surface with cement grout and 5% bentonite.

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 11/16/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING HS-2-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 5/11/10
EQUIPMENT USED: Hollow Stem Auger CME 95 with heavy duty sampler and SPT sampler
ELEVATION: 1333'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-199'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
					SM	**ARTIFICIAL FILL (af)** SILTY SAND: fine to medium, slightly moist, light brown to pale yellow (2.5Y, 7/3)
44	5.4	110	-	5		
						fine, poorly graded, light olive brown(2.5Y, 5/3) to light gray
-			12	10		
23	13.3	112	-	15	ML	CLAYEY SILT: well graded with some sand in localized layers, moist, dark reddish brown (7.5YR, 5/3), interlayered soils
-			16	20		
28	11	109	-	25	SM	SILTY SAND: fine, moist, light olive brown, locally with clayey silt matrix
					ML	CLAYEY SILT: sandy, slightly plastic, stiff, moist, brown to reddish brown
-			24	30		
30	11.1	124	-	35	CL	SILTY CLAY: plastic, moist, reddish brown to brown, locally mottled with greenish gray silt and sand
						very stiff
-			39	40		locally sandy but mostly in reddish brown clay matrix
						(difficult drilling)
				45	ML	SANDY SILT: well graded, clayey, stiff, slightly plastic, reddish brown

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING HS-2-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 5/11/10
EQUIPMENT USED: Hollow Stem Auger CME 95 with heavy duty sampler and SPT sampler
ELEVATION: 1333'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-199'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
132/11"	12.1	117	-		■		ML	to brown (adding water during drilling)
-			97/9"	50	⊠			
							SM	SILTY SAND: fine to medium, dense, slightly moist, brown to light reddish brown
129/9"	9.5	117	-	55	■			
-			78/6"	60	⊠			
								SAUGUS FORMATION (QTs) SANDSTONE: fine to medium, dense, grayish brown
100/6"			-	65	■			Note: fine grained clean sandy residue left in sampler tip medium to coarse
-			50/3"	70	⊠			fine to coarse, clean with granules and pebbles
								CLAYSTONE: plastic, very stiff, moist, natural brown to reddish brown
100/11"	14.1	112	-	75	■			
								SILTY SANDSTONE: fine, moderately well sorted, grayish brown
*			-	80	□			(* Sampler bouncing after first 5")
				85				
								SANDSTONE: medium to coarse with granules and few gravel, moderately sorted, massive, dense, damp, brown
				90				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING HS-2-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 5/11/10
EQUIPMENT USED: Hollow Stem Auger CME 95 with heavy duty sampler and SPT sampler
ELEVATION: 1333'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-199'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
*			-				
				95			
-			50/4"	100			
				105			
-			20/1"	110			
				115			
-			50/2"	120			
				125			
-			46/6"	130			
				135			

(* Sampler bouncing after first 3")

SILTY SANDSTONE: fine, poorly sorted, dark olive gray

becomes clayey siltstone @99-100'

SANDSTONE: fine, moderately sorted, dense, damp, light brownish gray

SILTSTONE: massive (without lamination), dense, moist, brown

MUDSTONE: plastic, massive, moist, dark yellowish brown, clayey silt with few sand (5-10%)

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING HS-2-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 5/11/10
EQUIPMENT USED: Hollow Stem Auger CME 95 with heavy duty sampler and SPT sampler
ELEVATION: 1333'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-199'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								SILTSTONE: well cemented, gray
								MUDSTONE
-			*	140				* sub-parallel partings in core tube appear to have ~10-15 degree dip
								SILTSTONE: fine sand, damp, dark grayish brown, locally very hard and well cemented
				145				
								fine sand
				150				
				155				becoming slightly clayey
-			50/5"	160				
								very plastic (30% clay), moist, dark gray to dark olive
				165				
				170				Squeezing Hole
								very dark/black, very sticky
				175				
				180				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING HS-2-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 5/11/10
EQUIPMENT USED: Hollow Stem Auger CME 95 with heavy duty sampler and SPT sampler
ELEVATION: 1333'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-199'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								dark olive
								MUDSTONE: fine to medium sand, trace clayey silt, olive gray
				185				
				190				
								slight increase in sand content, but still clayey silt matrix
				195				
				200				Bottom of Boring at 199 feet. No groundwater in boring or in temporary piezometer monitored 5/17/10 to 6/25/10. Installed temporary piezometer of 2" schedule 80 PVC with bottom at 190'; 0.020" machine-slotted screen from 190-180'; blank PVC to surface. Backfilled with #3 sand up to 178', and sealed with medium bentonite chips to 176'. Destroyed piezometer on July 14, 2010 by removing PVC casing and backfilling to surface with cement grout and 5% bentonite.
				205				
				210				
				215				
				220				
				225				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 11/16/10

LOG OF BORING

BORING HS-3-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 5/13/10
EQUIPMENT USED: Hollow Stem Auger CME 95 with heavy duty sampler and SPT sampler
ELEVATION: 1102'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-41'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
					SM	**ALLUVIUM (Qal)** SILTY SAND: soft, moist, light brown to olive brown (2.5Y, 4/3)
12	13.8	115	-	5	ML	CLAYEY SILT: soft, moist, dark brown (10YR, 3/3)
-			12			some fine to coarse sand (10-15%), well graded, light brown to yellowish brown
62			-	10	SM	SILTY SAND: fine to medium, well graded, clayey (plastic), slightly moist, dark brown (10YR, 3/3)
-			13			
					SP/SM	SILTY SAND: poorly graded, loose, damp, yellowish brown (10YR, 5/4)
18	8.1	117	-	15		
-			8			
					SM	SILTY SAND: medium to coarse, with gravel, loose, damp, yellowish brown (10YR, 5/4)
18	8.5	109	-	20		
-			8			
25	4.2	118	-	25		
-			14			
-			44	30		**SAUGUS FORMATION (QTs)** SANDSTONE: fine to medium, locally laminated, well cemented, dense, damp, light olive brown (2.5Y, 4/3)
90/10"	8.7	130	-	35		
				40		CLAYSTONE: massive, dense, moist, reddish brown

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING HS-3-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 5/13/10
EQUIPMENT USED: Hollow Stem Auger CME 95 with heavy duty sampler and SPT sampler
ELEVATION: 1102'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-41'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
75/6"	6.8	120	-				

Bottom of Boring at 41 feet.
No groundwater. No caving.

45
50
55
60
65
70
75
80

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 11/16/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING HS-4-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 5/14/10
EQUIPMENT USED: Hollow Stem Auger CME 95 with heavy duty sampler and SPT sampler
ELEVATION: 1099'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-41.5'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
					SM	**ALLUVIUM (Qal)** SILTY SAND: fine to medium with few coarse, localized gravel, dry to damp, light olive brown (2.5Y, 5/3)
-			19			
53/10"	10.8	119	-	5	ML	SANDY SILT: fine to medium sand, well graded, slightly plastic, damp, brown to dark brown (10YR, 3/3)
-			45			
					SM	SILTY SAND: fine to medium, moderately well graded, slightly moist, light olive brown (2/5Y, 5/3)
-			27	10		
55	8.7	125	-			increase in fines
-			30	15		
						becomes dark brown
						brown (10YR, 4/3)
-			8	20		
20	5.8	112	-			with gravel (5%)
-			16	25		
					SP/SM	SILTY SAND: fine, poorly graded, damp, light yellowish brown (10YR, 6/4)
-			30	30		
						SAUGUS FORMATION (QTs) SILTSTONE: massive, poorly indurated (soft), damp, light olive gray (5Y, 6/2)
47	11.4	108	-	35		
				40		

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING HS-4-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 5/14/10
EQUIPMENT USED: Hollow Stem Auger CME 95 with heavy duty sampler and SPT sampler
ELEVATION: 1099'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-41.5'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
-			55					
								Bottom of Boring at 41.5 feet. No groundwater. No caving.
				45				
				50				
				55				
				60				
				65				
				70				
				75				
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 11/16/10

LOG OF BORING

BORING WB-1

JOB NUMBER: 2002-036-03
DATE DRILLED: 7/13/09
EQUIPMENT USED: Rotary wash rig with Sleeve and SPT samplers.
ELEVATION: 1000'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-21.5'
HAMMER WEIGHT: 140lbs; DROP: 30"

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
					SM	**ARTIFICIAL FILL (af)** SILTY SAND: fine to medium, well graded, dense, slightly moist, dark brown
61	9.2	116	-			minor inert debris (glass & concrete)
-			23	5		
28	14.6	109	-			minor concrete, moist
-			12	10	SP	**ALLUVIUM (Qal)** SAND: medium, poorly graded, loose, slightly moist, light brown to grayish brown
102	11	119	-			**SAUGUS FORMATION (QTs)** SANDSTONE: coarse, with gravel, dense, damp to slightly moist, tan to gray
-			63	15		medium to coarse, silty, slightly moist, light brown to tan
119	13.01 11.6	120.02 119	94 -			medium, light brown to reddish brown
-			44	20		
						Bottom of Boring at 21.5 feet.

25
30
35
40

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-03.GPJ FRANKIAN.GDT 11/20/09

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING WB-2

JOB NUMBER: 2002-036-03
DATE DRILLED: 7/14/09
EQUIPMENT USED: Rotary wash rig with Sleeve and SPT samplers.
ELEVATION: 996'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-51'
HAMMER WEIGHT: 140lbs; DROP: 30"

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
					SM	**ARTIFICIAL FILL (af)** SILTY SAND: fine to medium, well graded, medium dense, slightly moist, brown to dark brown
					SM	**ALLUVIUM (Qal)** SILTY SAND: fine to medium, loose to medium dense, moist, dark brown to brown
42	3.2	120	-			
-			20	5		
	2.97176	86.849			SW	SAND: medium to coarse, massive to poorly layered, loose to medium dense, slightly moist, light brown to tan
38	6.7	108	-			
-			21	10		poorly graded, yellowish brown
	3.57726	87.2438				
35	3.8	112	-			
-			36	15		
						SAUGUS FORMATION (QTs) SANDSTONE: medium to coarse, with minor gravel, massive, dense, gray
109	4.7	127	-			
-			85	20		coarse, appears slightly cemented, very tight
135	4.9	124	-			tan to light brown
-			83	25		
						small gravel 2-5%
-			57			
				30		fine to medium, massive, medium dense, slightly moist, light brown
52	8.1	118	-			
-			19			SILTY SANDSTONE: fine to medium, slightly laminated, loose, moist, light brown
				35		
-			24			light brown to dark olive brown
				40		

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING WB-2 (CONTINUED)

JOB NUMBER: 2002-036-03
DATE DRILLED: 7/14/09
EQUIPMENT USED: Rotary wash rig with Sleeve and SPT samplers.
ELEVATION: 996'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-51'
HAMMER WEIGHT: 140lbs; DROP: 30"

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
-			20					
-			100/12"	45				SANDSTONE: coarse, with gravel (5%), massive, low hardness, slightly moist, grayish orange (10YR 7/4) to light gray (N7)
-			100/12"					poorly bedded, light brown to tan, bedding observed (distorted) in sampler at about 25 to 35 degree dip
175/8"	10	124	-	50				
								Bottom of Boring at 51 feet.
				55				
				60				
				65				
				70				
				75				
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-03.GPJ FRANKIAN.GDT 11/20/09

LOG OF BORING

BORING WB-3

JOB NUMBER: 2002-036-03
DATE DRILLED: 7/15/09
EQUIPMENT USED: Rotary wash rig with Sleeve and SPT samplers.
ELEVATION: 976'
DRILLING CO.: WDC
LOGGED BY: BKP
BORING DEPTH: 0-50.2'
HAMMER WEIGHT: 140lbs; DROP: 30"
SURFACE CONDITIONS: dry grass adjacent to asphalt road

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
					SM	**CERTIFIED ENGINEERED FILL (cef)** SILTY SAND: fine to coarse, compact, moist, mottled light grayish brown and medium dark brown
99/8"	6.2	129	-			
-			30	5		occasional layer of dark to medium gray silty sand
118/8"	12.8	123	-			fine to medium, occasional small gravel, very compact, more moist, dark grayish brown
-			40	10		
	7.69230770.5975				SM	**ALLUVIUM (Qal)** SILTY SAND: fine to coarse, occasional gravel, medium dense, damp, light grayish brown
21	8.3	115	-			fine to medium, with occasional coarse sand, medium dense to dense, damp to moist
-			11	15		fine, occasional thin lens of sandy silt, loose to medium dense
	11.52816	63.9889				
23	11.7	121	-			fine to medium, with occasional coarse sand, more silty
-			19	20		
145	2.4	124	-			**SAUGUS FORMATION (QTs)** SANDSTONE: fine to coarse, with some silt, occasional small gravel, low hardness, damp, light brownish gray (5YR 6/1)
-			19	25		
-			27			moist, occasional thin lens of pale reddish brown (10R 5/4) fine sandy siltstone
132	4.7	138	-	30		fine to very coarse, pebbly, low hardness, slightly moist, light brownish gray (5YR 6/1)
-			96/9"			occasional thin lens of light gray (N7) sandstone, damp, low hardness, occasional small gravel
-			65	35		
				40		

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING WB-3 (CONTINUED)

JOB NUMBER: 2002-036-03
DATE DRILLED: 7/15/09
EQUIPMENT USED: Rotary wash rig with Sleeve and SPT samplers.
ELEVATION: 976'
DRILLING CO.: WDC
LOGGED BY: BKP
BORING DEPTH: 0-50.2'
HAMMER WEIGHT: 140lbs; DROP: 30"
SURFACE CONDITIONS: dry grass adjacent to asphalt road

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
-			84					fine to coarse, slightly silty, damp to moist, light gray (N7) to medium brownish gray (5YR 6/1)
-			22	45				SANDY SILTSTONE: fine, soft to low hardness, moist, pale reddish brown (10R 5/4)
-			96					SILTSTONE: low hardness, moist, light gray (N7) to medium light gray (N5)
100/2"			-	50				Bottom of Boring at 50.2 feet.
				55				
				60				
				65				
				70				
				75				
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-03.GPJ FRANKIAN.GDT 11/20/09

LOG OF BORING

BORING SW-30

JOB NUMBER: 2004-001-092
DATE DRILLED: 3/18/10
EQUIPMENT USED: 24" Solid Stem Auger
ELEVATION: 1212'
DRILLING CO.: SCS Engineers
LOGGED BY: PC/TC
BORING DEPTH: 0-98'

DATE/TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION / GRAPHIC LOG	SOIL TYPE	
						ML	SANDY SILTY: some fine sands, low plasticity, moist, olive brown (5Y 5/6)
				5			
				10			
				15			
				20		SM	SILTY SAND: fine, some fine silt, medium dense, moist, yellowish gray (5Y 7/2)
				25			
				30		SP	SAND: very fine to fine, little medium sand, moist, yellowish gray (5Y 7/2)
							little medium to coarse, few gravels and cobbles
				35			
				40			

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING SW-30 (CONTINUED)

JOB NUMBER: 2004-001-092
DATE DRILLED: 3/18/10
EQUIPMENT USED: 24" Solid Stem Auger
ELEVATION: 1212'
DRILLING CO.: SCS Engineers
LOGGED BY: PC/TC
BORING DEPTH: 0-98'

DATE/TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION / GRAPHIC LOG	SOIL TYPE	
						SP	
				45			GRAVELLY SANDSTONE: very fine to coarse, moist, yellowish gray (5Y 7/2)
				50			SANDSTONE: fine to medium, some coarse sand, few gravels and cobbles, yellowish gray (5Y 7/2)
							SILTY SANDSTONE: very fine to fine, little medium sand, little silt, moist, light olive gray (5Y 5/2)
				55			finer, little silt
				60			SANDY SILTSTONE: little fine sand, moist, light olive gray (5Y 5/2)
				65			with mudstone interbeds, light olive brown (5Y 5/6)
				70			SILTY SANDSTONE: fine, little silt, moist, light olive gray (5Y 5/2)
							SANDY SILTSTONE: little fine sand, light olive gray (5Y 5/2)
				75			MUDSTONE: little silt, micaceous, massive, moist, Olive gray (5Y 3/2), (no laminations)
				80			

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BORING SW-30 (CONTINUED)

JOB NUMBER: 2004-001-092
DATE DRILLED: 3/18/10
EQUIPMENT USED: 24" Solid Stem Auger
ELEVATION: 1212'
DRILLING CO.: SCS Engineers
LOGGED BY: PC/TC
BORING DEPTH: 0-98'

DATE/TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
				85				SANDY SILTSTONE: fine to medium, moist, dusky yellow (5Y 6/4)
								SANDSTONE: fine to medium, few gravels and cobbles, moist, yellowish gray (5Y 7/2)
				90				
				95				
								Bottom of Boring at 98 feet. Target depth reached. No groundwater.
				100				
				105				
				110				
				115				
				120				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2004-001-092.GPJ FRANKIAN.GDT 3/30/10

LOG OF BORING

BORING SW-32

JOB NUMBER: 2004-001-092
DATE DRILLED: 3/17/10
EQUIPMENT USED: 24" Solid Stem Auger
ELEVATION: 1215'
DRILLING CO.: SCS Engineers
LOGGED BY: PC/TC
BORING DEPTH: 0-104'

DATE/TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
							ML	SANDY SILT
				5				
				10				
				15				
				20				
				25				
								SANDY SILTSTONE: light olive brown (5Y 5/6)
				30				
				35				
								more fine sands, yellowish gray
								SILTY SANDSTONE: fine with little medium grained sand, some silt
				40				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING SW-32 (CONTINUED)

JOB NUMBER: 2004-001-092
DATE DRILLED: 3/17/10
EQUIPMENT USED: 24" Solid Stem Auger
ELEVATION: 1215'
DRILLING CO.: SCS Engineers
LOGGED BY: PC/TC
BORING DEPTH: 0-104'

DATE/TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								and siltstone fragments, moist
								more fine sands, some silt
				45				
				50				SANDY SILTSTONE: some fine sand, moist, light olive gray (5Y 5/2)
								SILTY SANDSTONE: dusky yellow (5Y 6/4)
				55				
				60				
				65				
				70				fine to medium, little silt, minor oxidation, light olive brown (5Y 5/6)
				75				
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING SW-32 (CONTINUED)

JOB NUMBER: 2004-001-092
DATE DRILLED: 3/17/10
EQUIPMENT USED: 24" Solid Stem Auger
ELEVATION: 1215'
DRILLING CO.: SCS Engineers
LOGGED BY: PC/TC
BORING DEPTH: 0-104'

DATE/TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION / GRAPHIC LOG	SOIL TYPE	
							more medium to coarse sands, few gravels
				85			
				90			large gravels and cobbles
				95			
				100			SANDY SILTSTONE: fine to medium, moist, light olive brown (5Y 5/6)
				105			more fine sands Bottom of Boring at 104 feet. Target depth reached. No groundwater.
				110			
				115			
				120			

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2004-001-092.GPJ FRANKIAN.GDT 3/30/10

LOG OF BORING

BORING SW-71

JOB NUMBER: 2004-001-092
DATE DRILLED:
EQUIPMENT USED: 24" Solid Stem Auger
ELEVATION: 1129.46'
DRILLING CO.: SCS Engineers
LOGGED BY: PC
BORING DEPTH: 0-86'

DATE/TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
							SM	SILTY SAND: fine to medium, moist, light olive brown (5Y 5/6)
				5				
				10				more medium sand
				15				SANDY SILTSTONE: fine, dense, moist, dark yellowish brown (10YR 4/2)
				20				SANDSTONE: fine, little silt, friable, moist, light olive brown (5Y 5/6)
				25				SANDY SILTSTONE: fine, medium dense to dense, moist, light olive brown (5Y 5/6)
				30				
				35				more fine to medium sands, moderate yellowish brown (10YR 5/4) dense, siltstone/mudstone
				40				SANDSTONE: fine, little medium to coarse sands and gravels, moist, dusky yellow (5Y 6/4)

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING SW-71 (CONTINUED)

JOB NUMBER: 2004-001-092
DATE DRILLED:
EQUIPMENT USED: 24" Solid Stem Auger
ELEVATION: 1129.46'
DRILLING CO.: SCS Engineers
LOGGED BY: PC
BORING DEPTH: 0-86'

DATE/TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
				45				some gravels
								less gravels, mostly fine sands
				50				
								few gravels and cobbles
				55				
								slightly more fines, massive
								more silt, light olive brown (5Y 5/6)
				60				
								mostly fine to coarse sand and gravels
				65				few mudstone fragments, (claystone?)
				70				
								well cemented, slow drilling?
				75				
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BORING SW-71 (CONTINUED)

JOB NUMBER: 2004-001-092
DATE DRILLED:
EQUIPMENT USED: 24" Solid Stem Auger
ELEVATION: 1129.46'
DRILLING CO.: SCS Engineers
LOGGED BY: PC
BORING DEPTH: 0-86'

DATE/TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION / GRAPHIC LOG	SOIL TYPE	
							driller says the hole is caving in CLAYSTONE: with fine to medium sands, hard, moist, moderate olive brown (5Y 4/4), (mixed in with caving sands from above?)
				85			
							Bottom of Boring at 86 feet. Target depth reached. Gas well installed per SCS
				90			
				95			
				100			
				105			
				110			
				115			
				120			

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2004-001-092.GPJ FRANKIAN.GDT 3/30/10

LOG OF BORING

BORING SW-72

JOB NUMBER: 2004-001-092
DATE DRILLED: 3/24/10
EQUIPMENT USED: 24" Solid Stem Auger
ELEVATION: 1220.24'
DRILLING CO.: SCS Engineers
LOGGED BY: PC
BORING DEPTH: 0-83'

DATE/TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION / GRAPHIC LOG	SOIL TYPE	
							FILL: water line damaged
						SP	SAND: fine, some medium sands, loose to medium dense, moist
				5			
							SILTSTONE: little sand, dense, moist, light olive gray (5Y 5/2)
				10			
				15			
							SANDSTONE: fine to medium, some coarse sand with gravels, little silt, medium dense, moist, pale olive (10Y 6/2)
				20			
							SANDY SILTSTONE: some fine sands, medium dense, moist, light olive brown (5Y 5/6)
				25			
				30			
				35			mixed with moderate olive brown (5Y 4/4) hard siltstone fragments
							SILTSTONE: little fine sand, dense to very dense, moist, moderate olive brown (5Y 4/4)
				40			

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING SW-72 (CONTINUED)

JOB NUMBER: 2004-001-092
DATE DRILLED: 3/24/10
EQUIPMENT USED: 24" Solid Stem Auger
ELEVATION: 1220.24'
DRILLING CO.: SCS Engineers
LOGGED BY: PC
BORING DEPTH: 0-83'

DATE/TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION / GRAPHIC LOG	SOIL TYPE	
							more fine sands
							little fine sands, dark yellowish brown (10YR 4/2)
				45			
							SANDY SILTSTONE: some fine sands, medium dense to dense, moist, light olive brown (5Y 5/6)
				50			
							more fine to medium sands, little coarse sand, moderate yellowish brown (10YR 5/4)
				55			
							SILTY SANDSTONE: fine to medium, some coarse sand and little gravels, medium dense, moist, light olive gray (5Y 5/2)
				60			SANDSTONE: fine to medium, some coarse sands and little gravels, little silt, medium dense, moist, yellowish gray (5Y 7/2)
							less gravels
				65			
							SILTY SANDSTONE: fine with some medium sands, few gravels and some silt, medium dense, moist, moderate yellowish brown (10YR 5/4)
				70			
							GRAVELLY SANDSTONE: fine to medium, some gravels and cobble, medium dense, moist, dusky yellow (5Y 6/4)
							less silt and more gravels
				75			
							fine to coarse, some gravels with and cobbles, yellowish gray (5Y 7/2)
							less gravels and cobbles
				80			

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BORING SW-72 (CONTINUED)

JOB NUMBER: 2004-001-092
DATE DRILLED: 3/24/10
EQUIPMENT USED: 24" Solid Stem Auger
ELEVATION: 1220.24'
DRILLING CO.: SCS Engineers
LOGGED BY: PC
BORING DEPTH: 0-83'

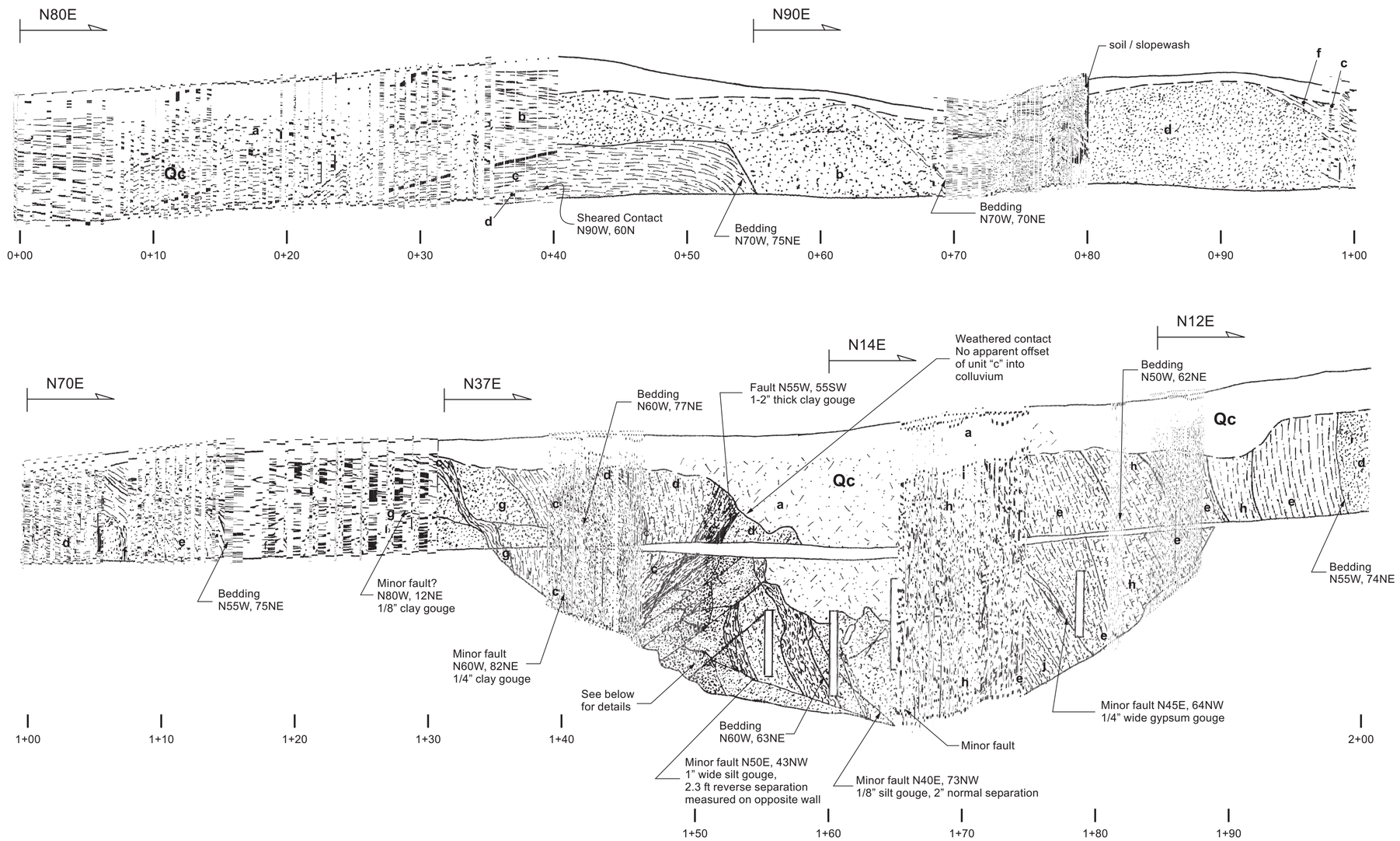
DATE/TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								more silt
								SANDY SILTSTONE SILTY SANDSTONE/: fine to medium sands, some silt, medium dense, moist, light olive gray (5Y 5/2)
				85				Bottom of Boring at 83 feet. Target depth reached. Gas well installed per SCS
				90				
				95				
				100				
				105				
				110				
				115				
				120				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2004-001-092.GPJ FRANKIAN.GDT 3/30/10

LOG OF BORING

DOZER CUT DC-1



EXPLANATION

Colluvium/Slopewash (Qc)

a) Silty sand: pale yellowish brown (10YR 7/2), fine to medium sand with silt, dry, massive, sandstone clasts up to 8" diameter

Pico Formation (Tp)

b) Sandstone: grayish orange (10YR 7/4), medium to coarse grained, dry, medium hard to loose

c) Clayey siltstone: moderate brown (5YR 5/4), moderately hard (stiff), moist, hackly fracture

d) Silty sandstone: pale greenish yellow (10Y 8/2), fine grained sand with silt, moderately hard, moderately cemented, dry, massive

e) Siltstone: yellowish gray (5Y 7/2), moderately hard, fractured, dry, jarosite staining

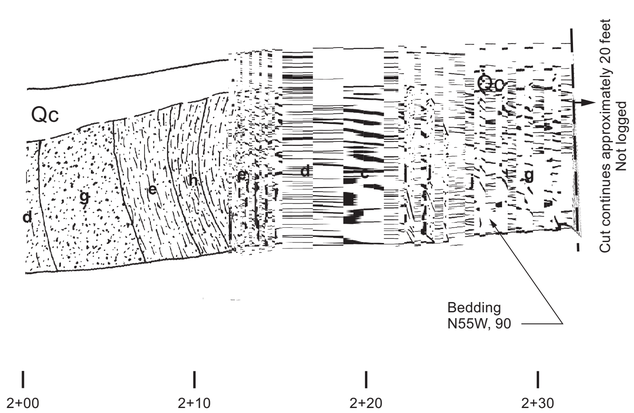
f) Silty claystone: dark yellowish brown (10YR 4/2), moderately hard (stiff), moist, moderately well bedded

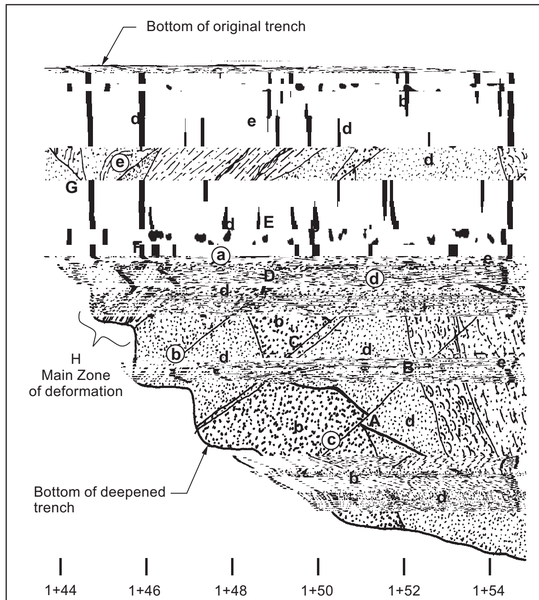
g) Sandstone: very light gray (N8), fine to coarse grained sand, moderately hard, dry, massive to poorly bedded

h) Siltstone: greenish gray (5GY 6/1), moderately hard, dry to moist, hackly fracture, limey

i) Siltstone: light brownish gray (5YR 6/1), moderately hard to soft, dry, fossiliferous hash

j) Sandstone: medium light gray (N6), fine grained sand, dry, moderately hard





DC-1 "Detail"

Scale: 1" = 2'

ⓐ Minor fault N30W, 41SW

ⓑ Minor fault N30W, 34SW

ⓒ Minor fault N35W, 38SW

ⓓ Minor fault N45W, 44SW

ⓔ Minor fault N55W, 34SW

EXPLANATION

A) 0.3' Reverse separation

B) 0.2' Reverse separation, Fault dies? in siltstone

C) 1.8' Reverse separation, along minor fault zone 2-3" wide within sandstone

D) 0.5' Reverse separation (total) along zone of subparallel shears

E) 2.0' Reverse separation

F) 0.5' Reverse separation, offsets sheared claystone along main shear

G) Minor fault N45W, 45NE; 1/8" thick clay gouge. Extension of low angle fault from southwestern portion of dozer cut

H) Fault, Deformation along two zones of sheared claystone, width approximately 6"-8". Less deformed claystone between shears. Individual sheared gouge width approximately 2". Offset of upper shear at F

I) Minor fault, 1/8" gouge

R.T. FRANKIAN & ASSOCIATES

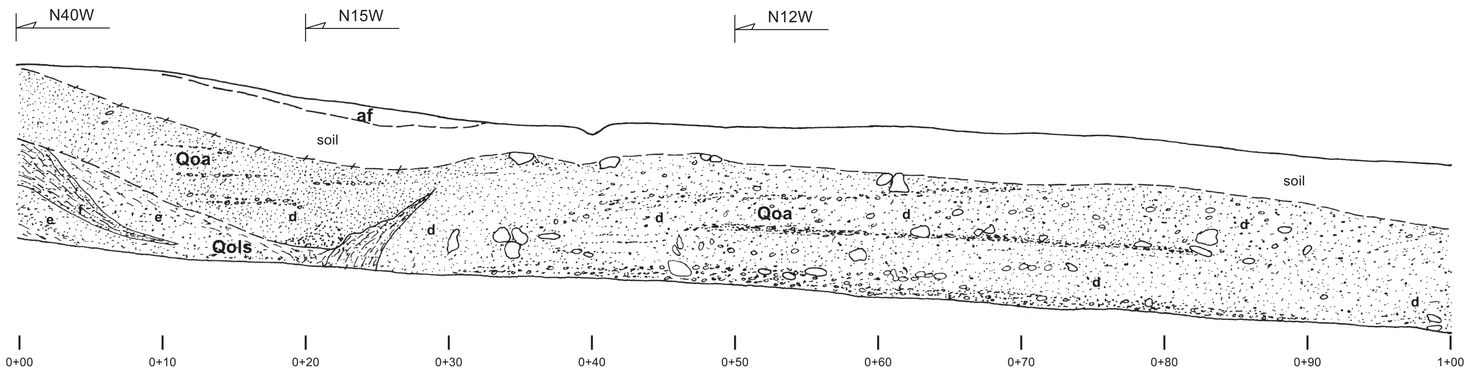
DOZER CUT DC-1

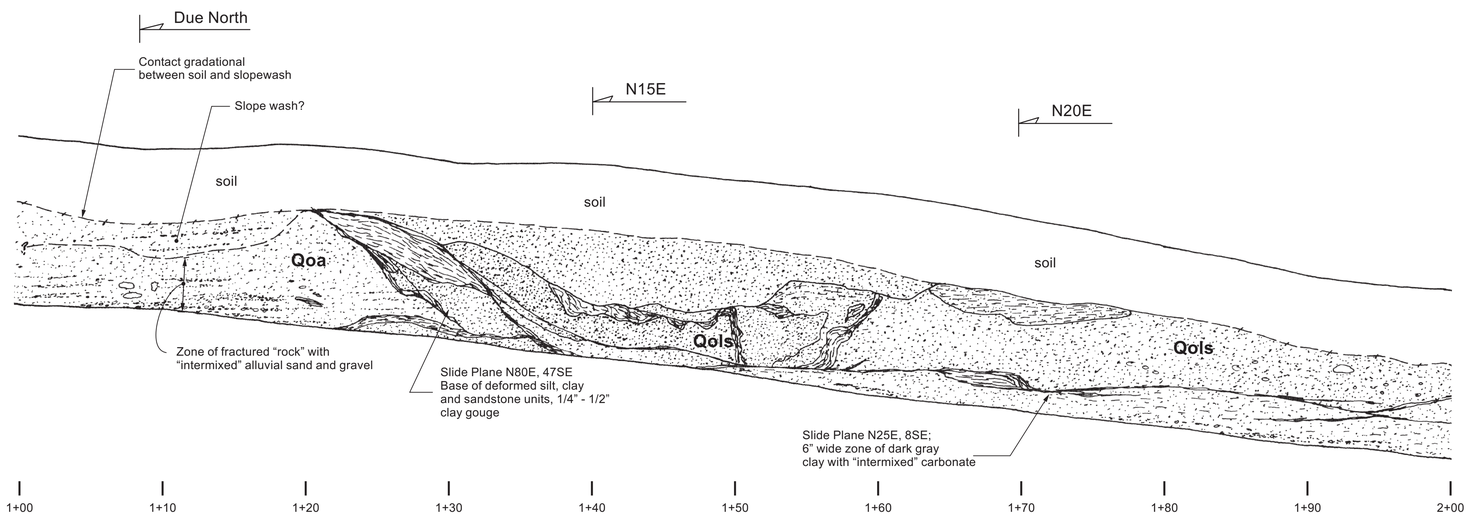
PREPARED FOR
Chiquita Canyon Landfill

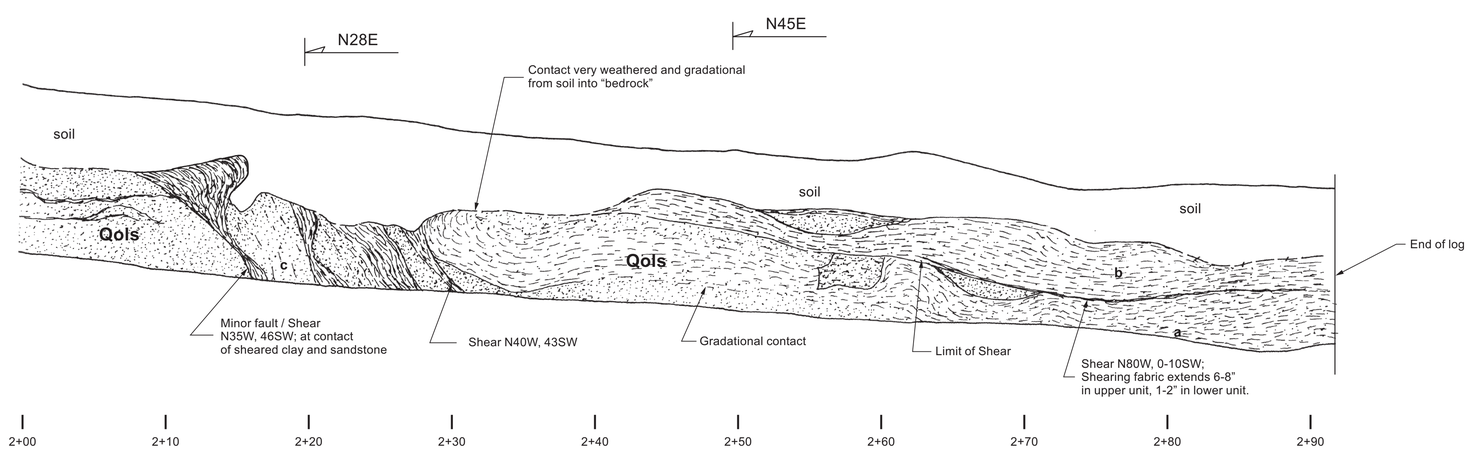
Chiquita Canyon Landfill
Valencia, California

SCALE	DRAWN BY	CHECKED BY
1" = 5'	MN	DGF/TMC
DATE 4-11-06	FIGURE 4.1	Job No. 2002-036-01

DOZER CUT DC-2







EXPLANATION

Older Landslide (Qols)

a) Silty Claystone: moderate yellowish brown (10YR 5/4) stiff, weathered to hackly fracture with polished surfaces, minor amount of carbonate pods near top of unit

b) Silty Claystone: olive gray (5Y 4/1), stiff, weathered to hackly fracture with polished surfaces, carbonate pods in upper half of unit (minor)

c) Silty Sandstone: yellowish brown (5Y 8/1), fine grained sand with silt, hard, micaceous, massive bedding

e) Sandstone: yellowish gray (5Y 8/1), fine to coarse grained sand, loose, poorly cemented

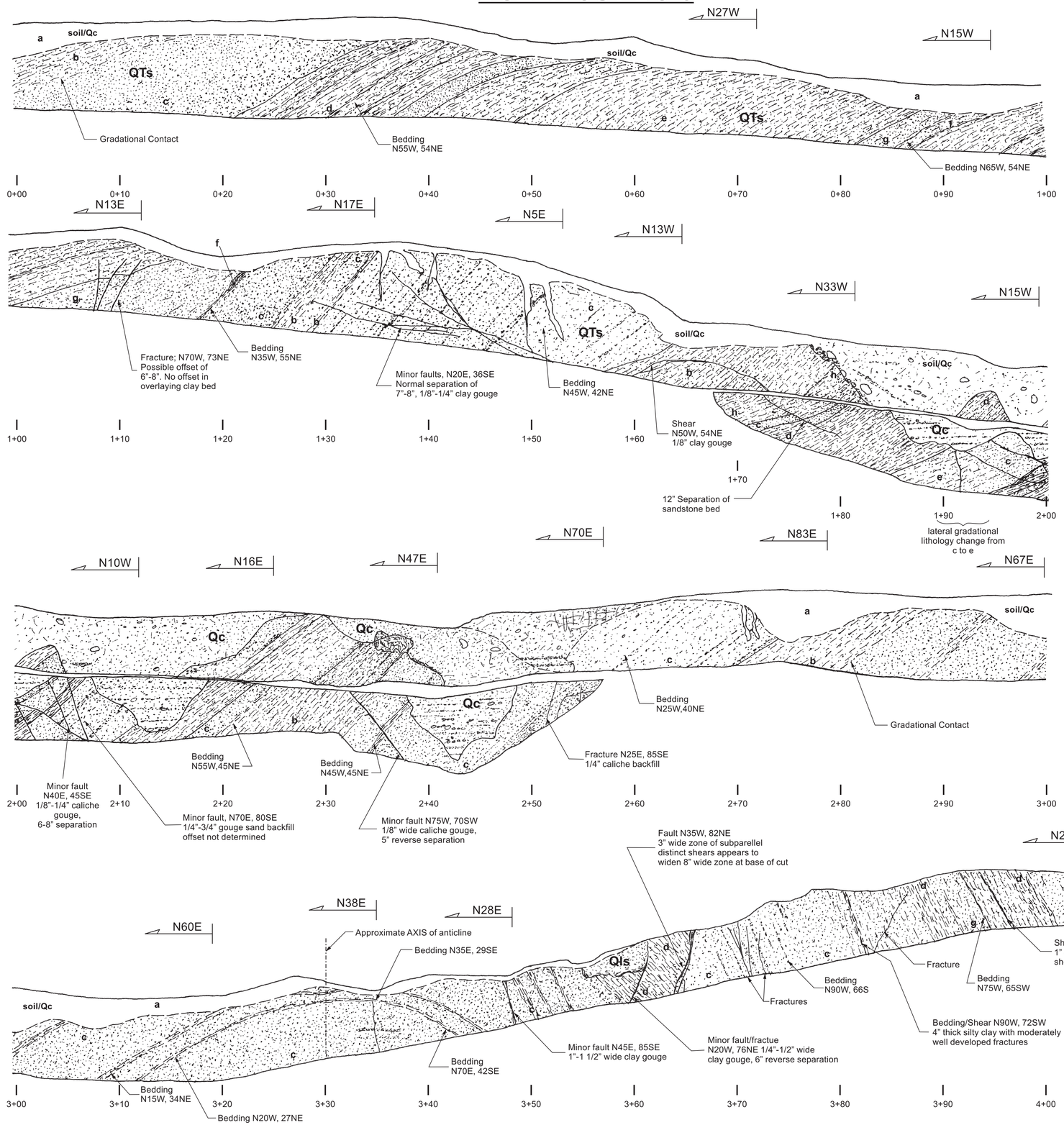
f) Siltstone: light brown (5Y 6/4), moderately hard, massively bedded, landslide material "e" and "f" derived from Saugus Formation

Older Alluvium (Qoa)

d) Silty to Pebbly Sand: grayish orangish pink (5YR 7/2), fine to coarse grained sand with silt and pebble interbeds, poorly cemented, poorly bedded, chaotic mix of sandstone and siltstone blocks derived from Saugus Formation

R.T. FRANKIAN & ASSOCIATES		
DOZER CUT DC-2		
PREPARED FOR Chiquita Canyon Landfill		
Chiquita Canyon Landfill Valencia, California		
SCALE 1" = 5'	DRAWN BY MN	CHECKED BY DGF/TMC
DATE 4-11-06	FIGURE 4.2	Job No. 2002-036-01

DOZER CUT DC-3



EXPLANATION

Colluvium/Slopewash (Qc)

a) Sandy silt: moderate yellowish brown (10YR 5/4), fine grained sand with silt, moist, loose

Saugus Formation (QTs)

b) Sandy siltstone: moderate yellowish brown (10YR 5/4), moderately hard, dry, caliche on fracture surfaces

c) Sandstone: yellowish gray (5Y 8/1), fine to coarse grained sand with pebbles, moderately hard to soft, dry, poorly bedded

d) Clayey siltstone: light brown (5YR 6/4) to light brown (5YR 5/6)

e) Siltstone: yellowish gray (5Y 7/2), siltstone, moderately hard, dry, hackly fracture, weathers to dusky yellow (5Y 6/4)

f) Claystone: olive black (5Y 2/1), moderately hard (stiff), moist

g) Silty sandstone: Yellowish gray (5Y 7/2), fine grained, sand with silt soft to moderately hard, dry, poorly bedded to massive

h) Sandy siltstone: very pale orange (10YR 8/2), silt with fine grained sand, hard to very hard, dry, caliche staining

R.T. FRANKIAN & ASSOCIATES

DOZER CUT DC-3

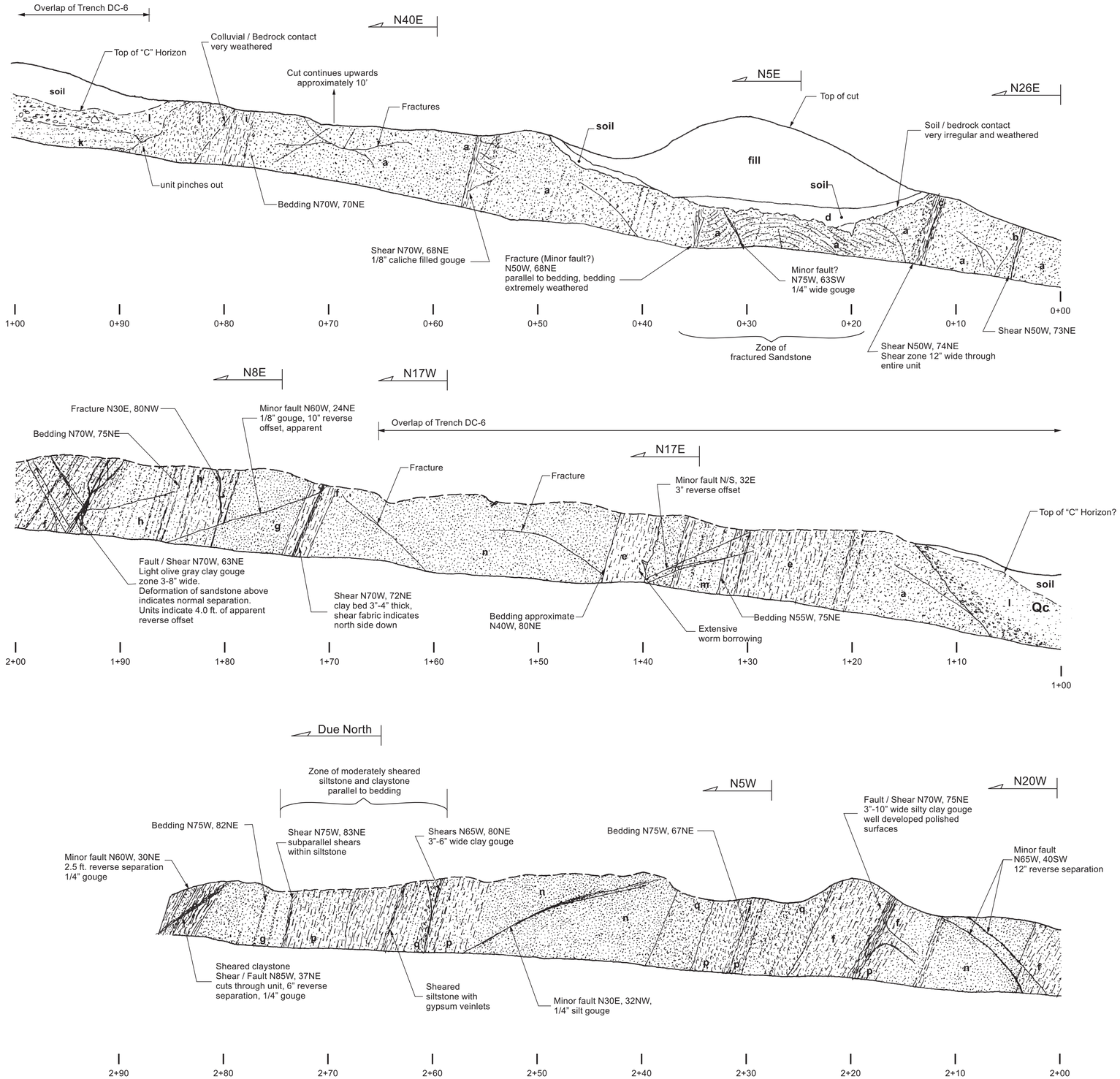
PREPARED FOR

Chiquita Canyon Landfill

Chiquita Canyon Landfill
Valencia, California

SCALE	DRAWN BY	CHECKED BY
1" = 5'	MN	DGF/TMC
DATE 4-11-06	FIGURE 4.3	Job No. 2002-036-01

DOZER CUT DC-4



EXPLANATION

Soil/Colluvium

d) Sandy silt (soil): pale yellowish brown (10YR 6/2), silt with fine to coarse sand, loose, dry, massive

j) Sandy silt: grayish orange pink (5YR 7/2), silt with fine sand and fossil fragments, abundant CaCo3 coating, massive (colluvium)

l) Sandy silt: pale yellowish brown (10YR 6/2), silt with fine to coarse sand and pebbles to small cobbles, dry, massive abundant root holes, cobbles composed of unit a material also material derived from unit e

Pico Formation (Tp)

a) Sandstone: yellowish gray (5Y 8/1), fine to coarse grained, poorly bedded, moderately well cemented, hard

b) Siltstone: pale yellowish brown (10YR 6/2) silt with fine grained sand, trace clay, hard, carbonate flecks

c) Claystone: grayish red (10R 4/2), clay with trace silt, carbonate staining

e) Siltstone: moderate yellowish orange (10YR 6/4), silt with trace clay, hard, very minor shearing

f) Siltstone: light olive gray (5Y 5/2), silt with fine sand and interbedded clay, abundant gypsum along bedding

g) Sandstone: yellowish gray (5Y 7/2), fine grained, poorly bedded, moderately well cemented, iron staining

h) Sandstone: light gray (N7), fine to coarse grained sand with silt, well bedded, moderately well cemented

i) Silty sandstone: yellowish gray (5Y 8/1), fine grained sand with silt, moderately well bedded, well cemented, fossiliferous

k) Sand: yellowish gray (5Y 7/2), fine sand with scattered coarse sand to small pebbles, dry, loose

m) Sandstone: yellowish gray (5Y8/1), fine grained, massive, moderately well cemented

n) Sandstone: yellowish gray (5Y8/1), fine grained, massive, moderately well cemented

p) Siltstone: yellowish gray (5Y 7/2), trace clay, hard, fractured

q) Fossiliferous sandstone: yellowish gray (5Y 7/2), fine grained sand with silt, hard, bivalve hash

R.T. FRANKIAN & ASSOCIATES

DOZER CUT DC-4

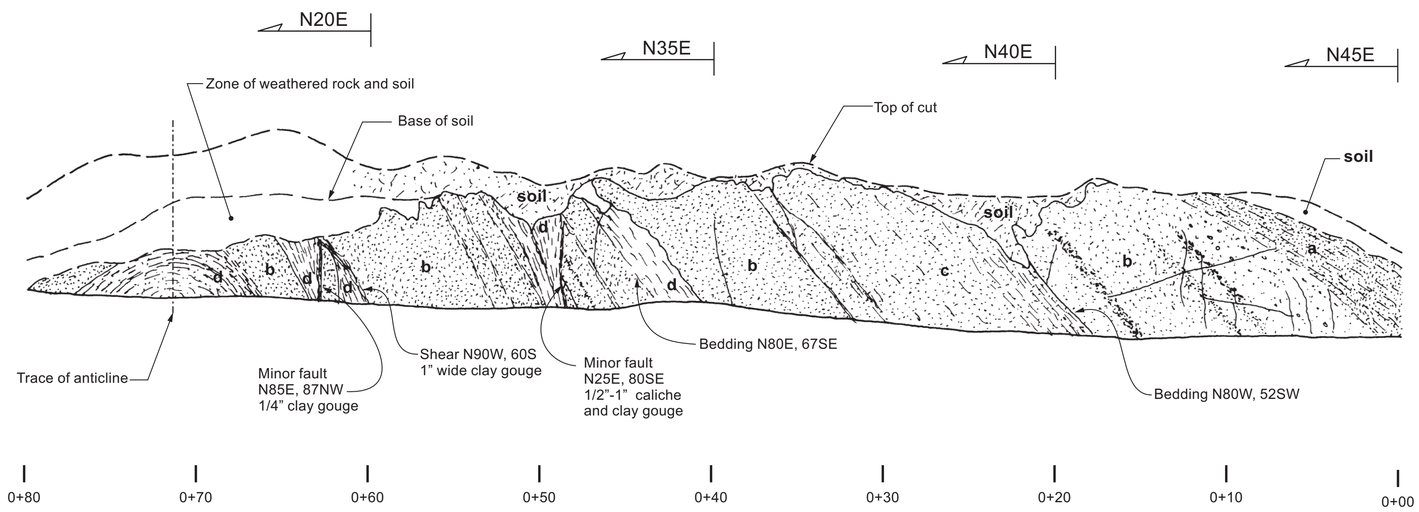
PREPARED FOR

Chiquita Canyon Landfill

Chiquita Canyon Landfill
Valencia, California

SCALE	DRAWN BY	CHECKED BY
1" = 5'	MN	DGF/TMC
DATE 4-11-06	FIGURE 4.4	Job No. 2002-036-01

DOZER CUT DC-5



EXPLANATION DC-5

Saugus Formation (QTs)

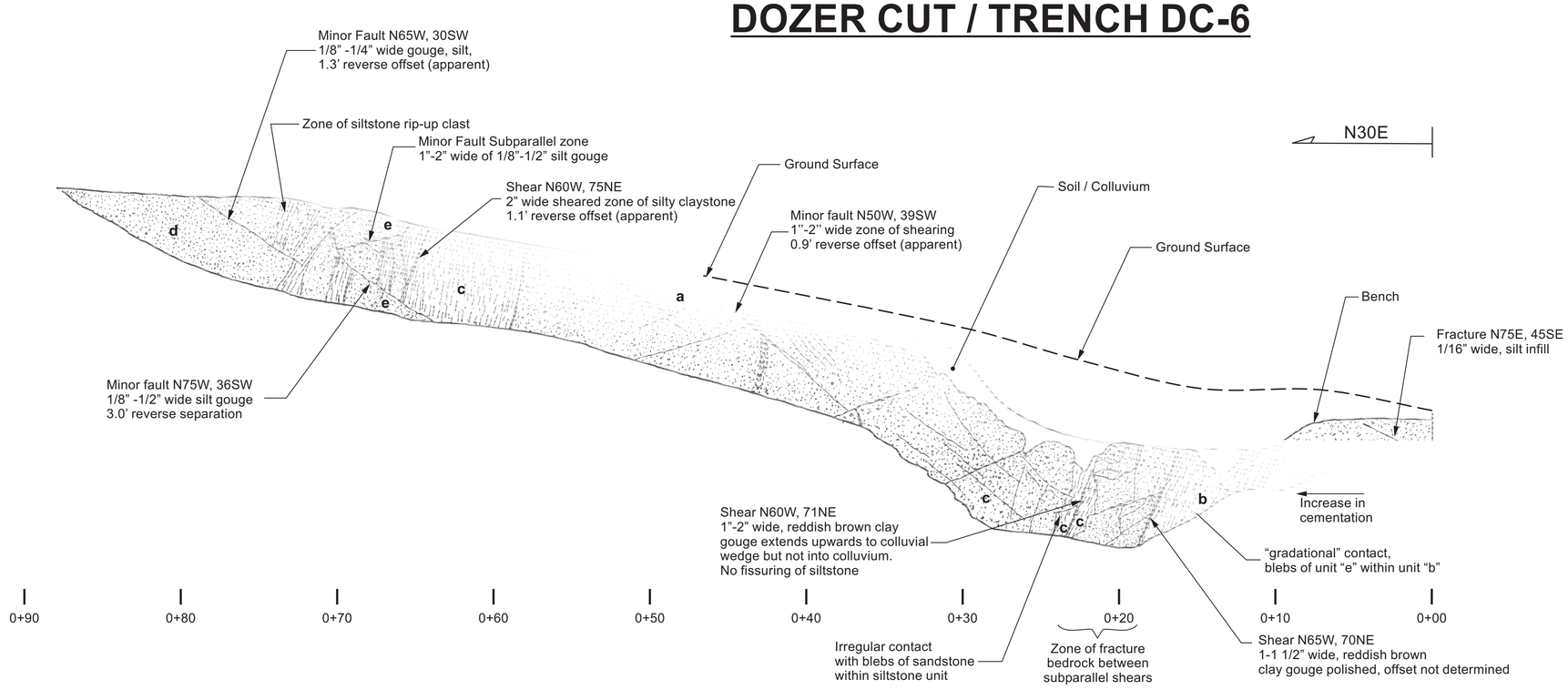
a) Clayey sandstone: pale reddish brown (10R 5/4), fine to coarse grained sand with clay, moderately hard, massive

b) Sandstone: pinkish gray (5YR 8/1), fine to coarse grained sand, well cemented, poorly bedded

c) Silty sandstone: pale yellowish brown (10YR 6/2), fine to medium grained sand with silt, moderately hard, poorly bedded

d) Clayey siltstone: dark yellowish brown (10YR 4/2), silt with clay, stiff, hackly fracture

DOZER CUT / TRENCH DC-6



EXPLANATION DC-6

Pico Formation (Tp)

a) Sandstone: grayish yellow (5Y 8/4), fine to medium grained sand, moderately hard, poorly bedded to massive, F_eO staining carbonate cement in places

b) Silty sandstone: yellowish gray (5Y 7/2), fine grained sand with silt, massive, hard

c) Clayey siltstone: moderate reddish brown (10 R 4/6), silt with clay, clay content increases upward in unit, hard to stiff, caliche filled fractures

d) Sandstone: yellowish gray (5Y 8/1), fine grained sand, moderately hard, poorly bedded to massive

e) Sandstone: grayish orange (10YR 7/4), fine to coarse grained sand, moderately hard, well-bedded, trace pebbles

R.T. FRANKIAN & ASSOCIATES

DOZER CUT DC-5 & DC-6

PREPARED FOR
Chiquita Canyon Landfill

Chiquita Canyon Landfill
Valencia, California

SCALE	DRAWN BY	CHECKED BY
1" = 5'	MN	DGF/TMC
DATE 4-11-06	FIGURE 4.5	Job No. 2002-036-01

LOG OF TEST PIT TP-1

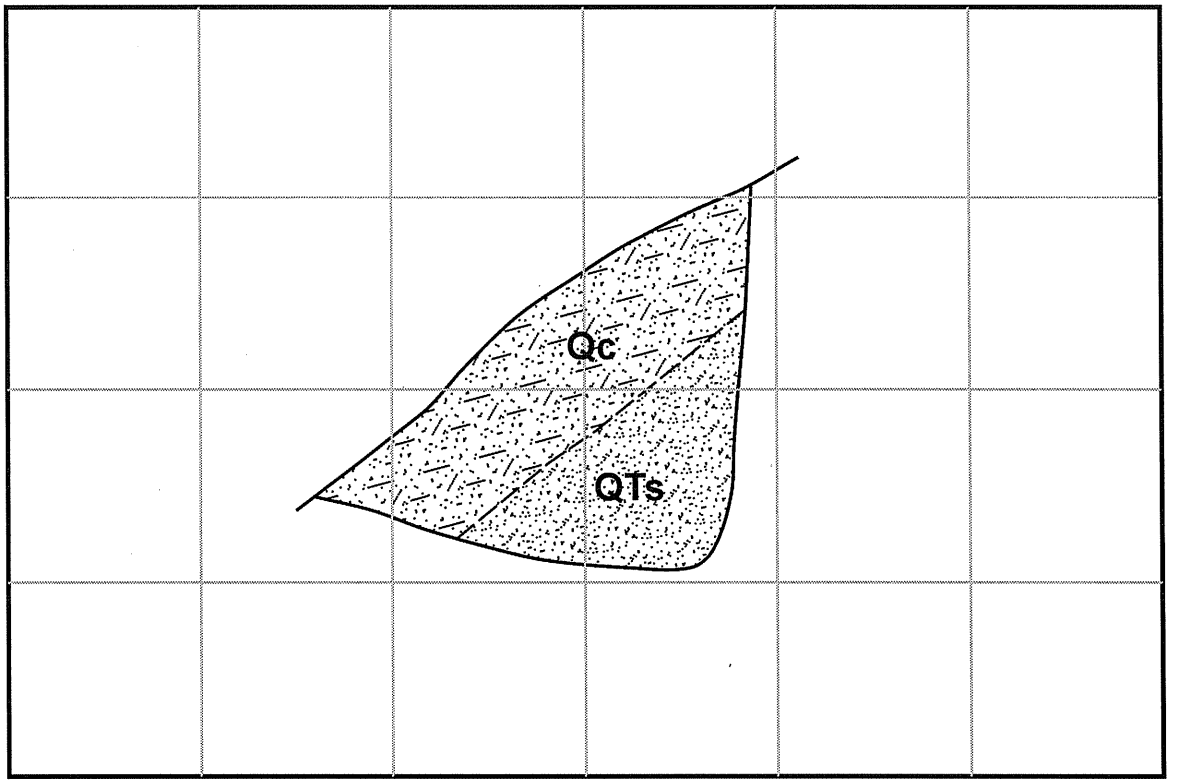
JOB NUMBER 2002-036-01 **CLIENT** Chiquita **LOGGED BY** DGF

LOCATION Chiquita Canyon Landfill **ELEVATION** 1200 **DATE LOGGED** 4-2-03

0-4 ft. Colluvium (Qc):
fine to medium-grained silty sand, moderate yellowish brown (10 YR 5/4), loose, moist, massive roots to 3 feet.

4-10 ft. Bedrock? (QTs):
fine-grained sandstone with caliche nodules, grayish orange (10YR 7/4), soft, moist, massive, possible landslide

BEARING: ← N50E



SCALE: 1"=5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF TEST PIT TP-2

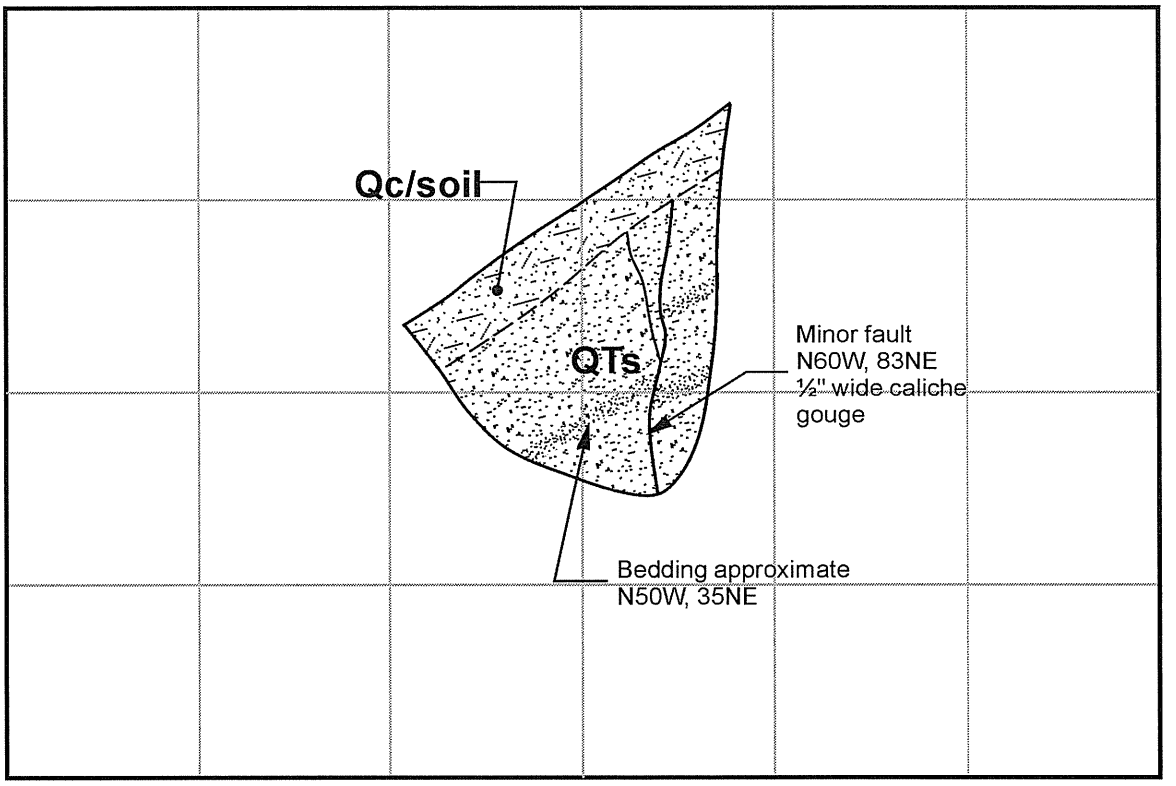
JOB NUMBER 2002-036-01 **CLIENT** Chiquita **LOGGED BY** DGF

LOCATION Chiquita Canyon Landfill **ELEVATION** 1220 **DATE LOGGED** 4-2-03

0-1.5 ft. Colluvium/Soil :
fine to medium-grained silty sand, moderate yellowish brown (10 YR 5/4), loose, moist, roots to 1.5 feet.

1.5-10 ft. Bedrock (QTs):
fine to coarse-grained sandstone, yellowish gray (5Y 7/2), hard, moist, poorly bedded.

BEARING: N45E



SCALE: 1"=5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF TEST PIT TP-3

JOB NUMBER 2002-036-01 **CLIENT** Chiquita **LOGGED BY** DGF

LOCATION Chiquita Canyon Landfill **ELEVATION** 1430 **DATE LOGGED** 9-29-03

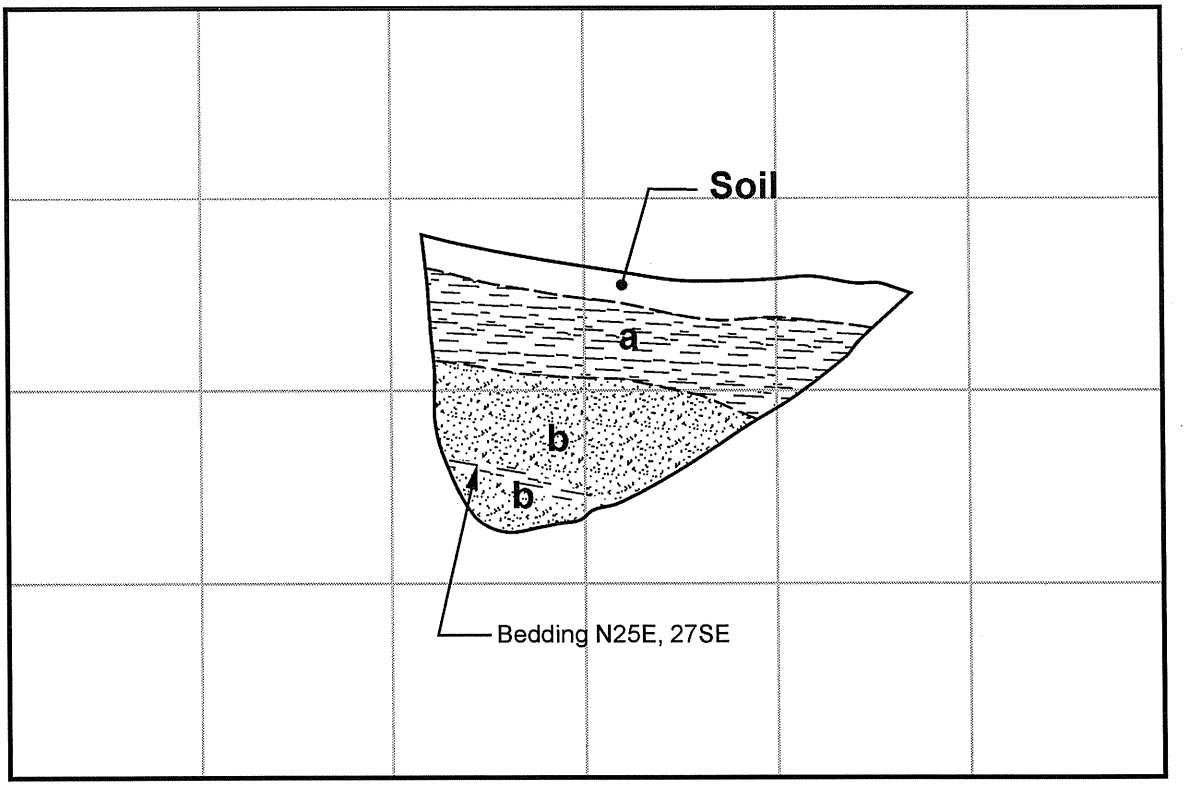
0-0.8 ft. Soil

0.8'-7.5' ft. Bedrock (QTs):

a) silty claystone, light brown (5YR 6/4),stiff to very stiff, dry, caliche pods

b) fine grained sandstone, grayish orange (10YR 7/4), moderately hard, moist

BEARING: N18W



SCALE: 1"=5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF TEST PIT TP-4

JOB NUMBER 2002-036-01 **CLIENT** Chiquita **LOGGED BY** DGF

LOCATION Chiquita Canyon Landfill **ELEVATION** 1420 **DATE LOGGED** 9-29-03

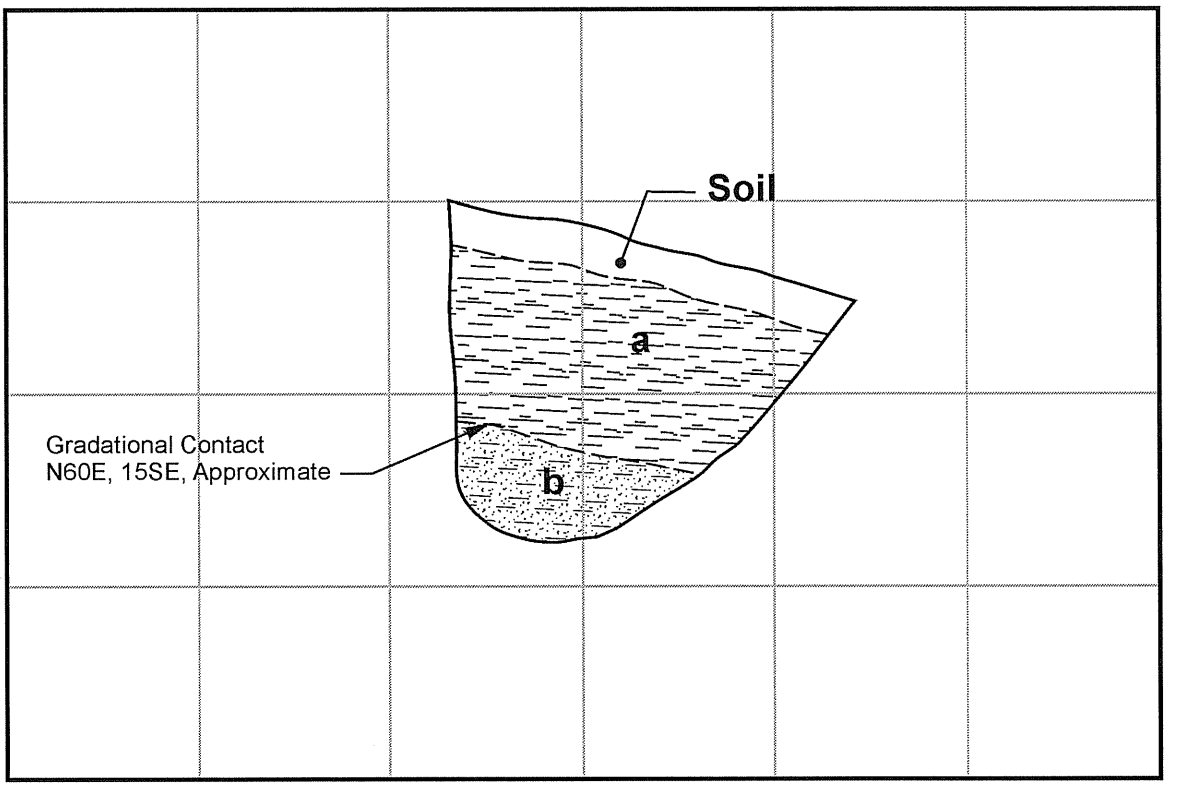
0-1 ft. Soil

1-9 ft. Bedrock (QTs):

a) silty claystone, dark brown (10YR 4/2), stiff, dry, moderately weathered

b) fine grained silty sandstone, moderate yellowish brown(10YR 5/4), hard, moist, abundant caliche stringers and pods

BEARING: N6W



SCALE: 1"=5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF TEST PIT TP-5

JOB NUMBER 2002-036-01 **CLIENT** Chiquita **LOGGED BY** DGF

LOCATION Chiquita Canyon Landfill **ELEVATION** 1410 **DATE LOGGED** 9-29-03

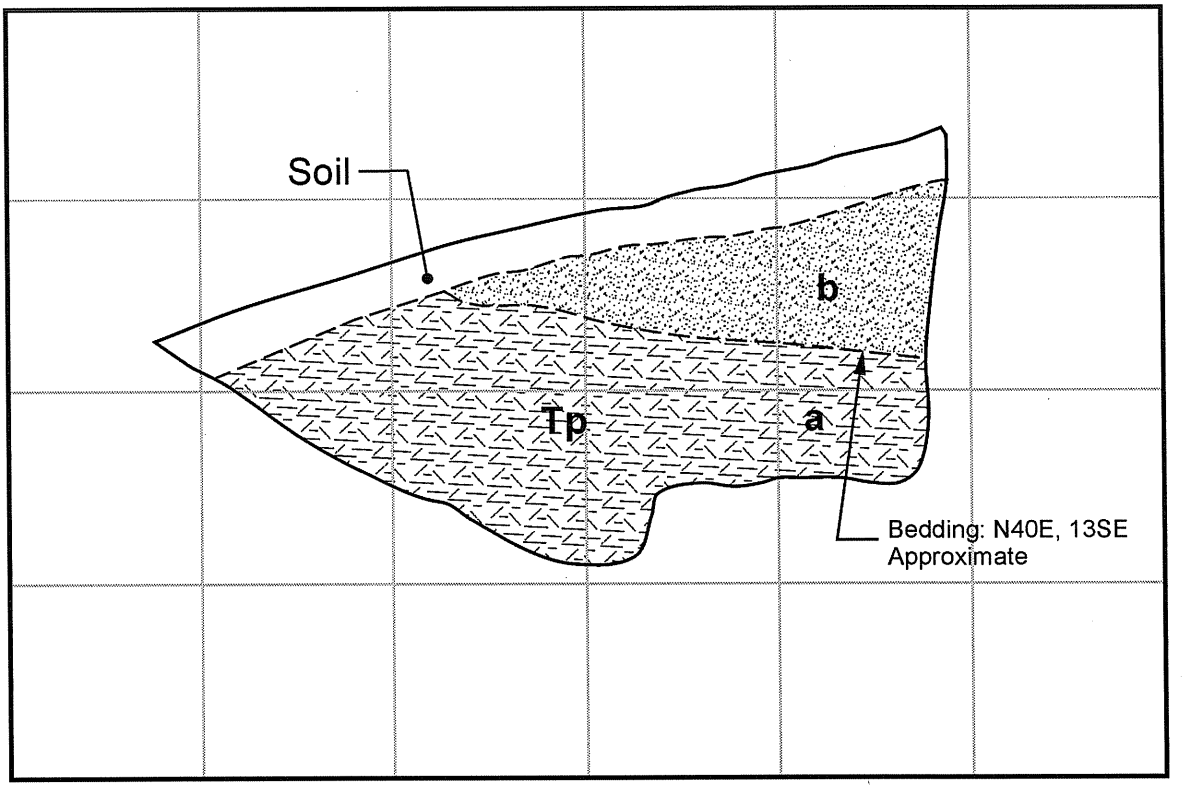
0-1 ft. Soil

1-9.5 ft. Bedrock (Tp):

a) sandy siltstone to claystone, dark gray (N3), moderately hard to stiff, moist, bedding massive

b) fine grained sandstone, moderate yellowish brown (10YR 5/4), soft, dry

BEARING: N20W



SCALE: 1"=5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF TEST PIT TP-6

JOB NUMBER 2002-036-01 **CLIENT** Chiquita **LOGGED BY** DGF

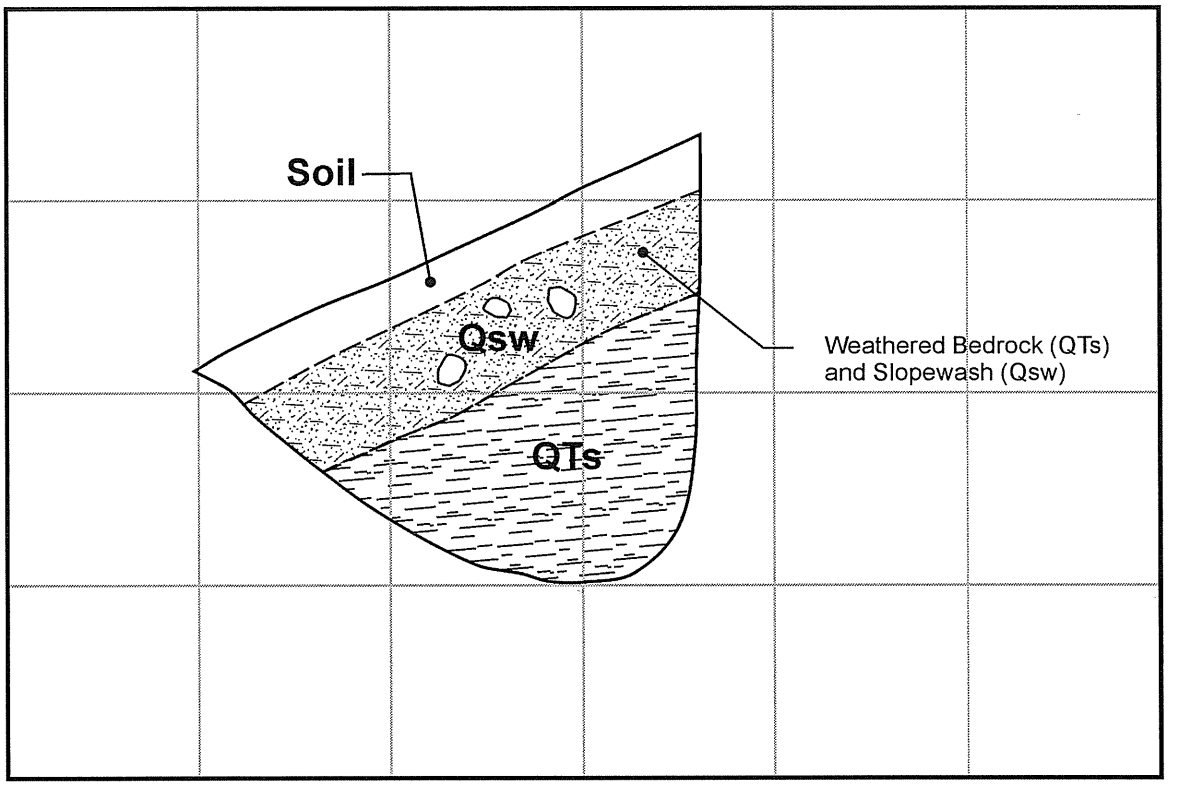
LOCATION Chiquita Canyon Landfill **ELEVATION** 1175 **DATE LOGGED** 9-29-03

0-1 ft. Soil

1-4 ft. Slopewash (Qsw):
sandy silt with blocks of light gray sandstone, light gray (N7), soft, dry

4-12 ft. Bedrock (QTs):
silty claystone, dark reddish brown (10YR 3/4), hard, moist, massive bedding, hackly fracture to 8 feet

BEARING: N70W



SCALE: 1"=5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF TEST PIT TP-7

JOB NUMBER 2002-036-01 **CLIENT** Chiquita **LOGGED BY** DGF

LOCATION Chiquita Canyon Landfill **ELEVATION** 1180 **DATE LOGGED** 9-29-03

0-1 ft. Soil

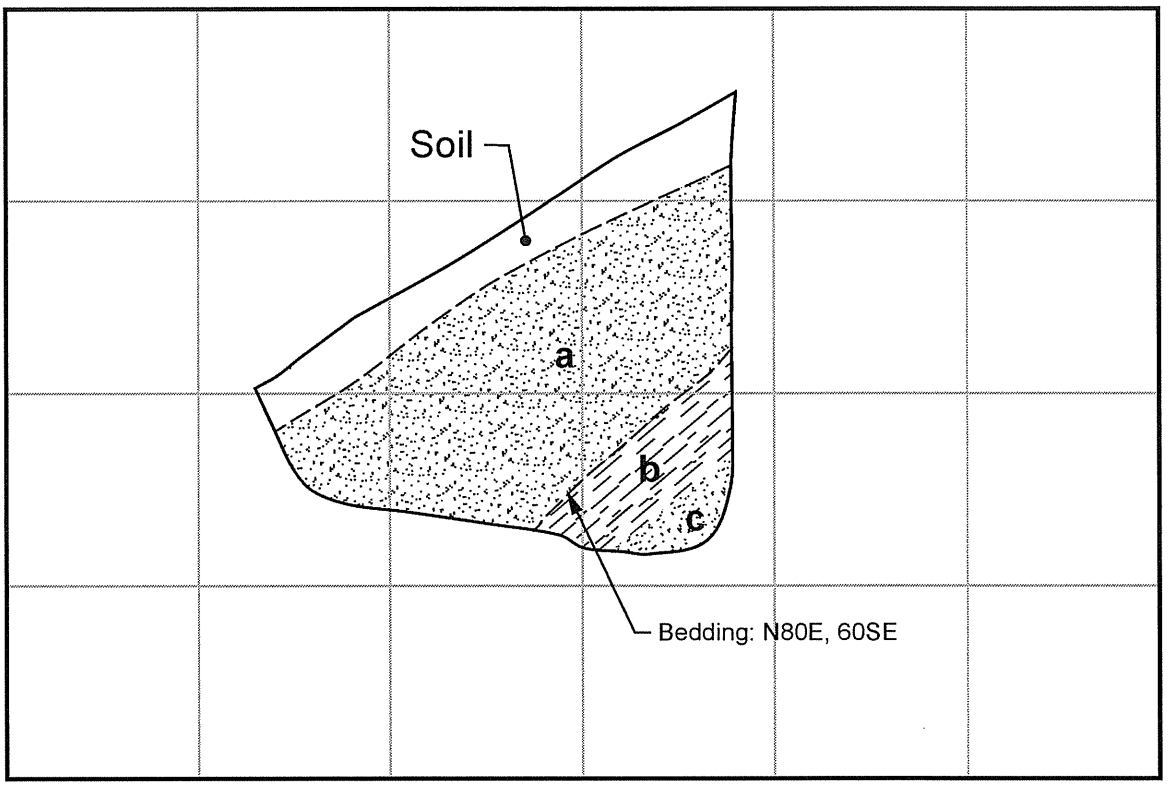
1-11.5 ft. Bedrock (QTs):

a) fine grained sandstone, lght brownish gray (5YR 6/1), moderately hard, dry

b) silty claystone, dark yellowish brown (10YR 4/2), stiff to hard, moist, hackly fractured

c) silty sandstone, dark gray (N3), stiff to hard, moist, fractured

BEARING: N45W



SCALE: 1"=5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF TEST PIT TP-8

JOB NUMBER 2002-036-01 **CLIENT** Chiquita **LOGGED BY** DGF

LOCATION Chiquita Canyon Landfill **ELEVATION** 1145 **DATE LOGGED** 9-29-03

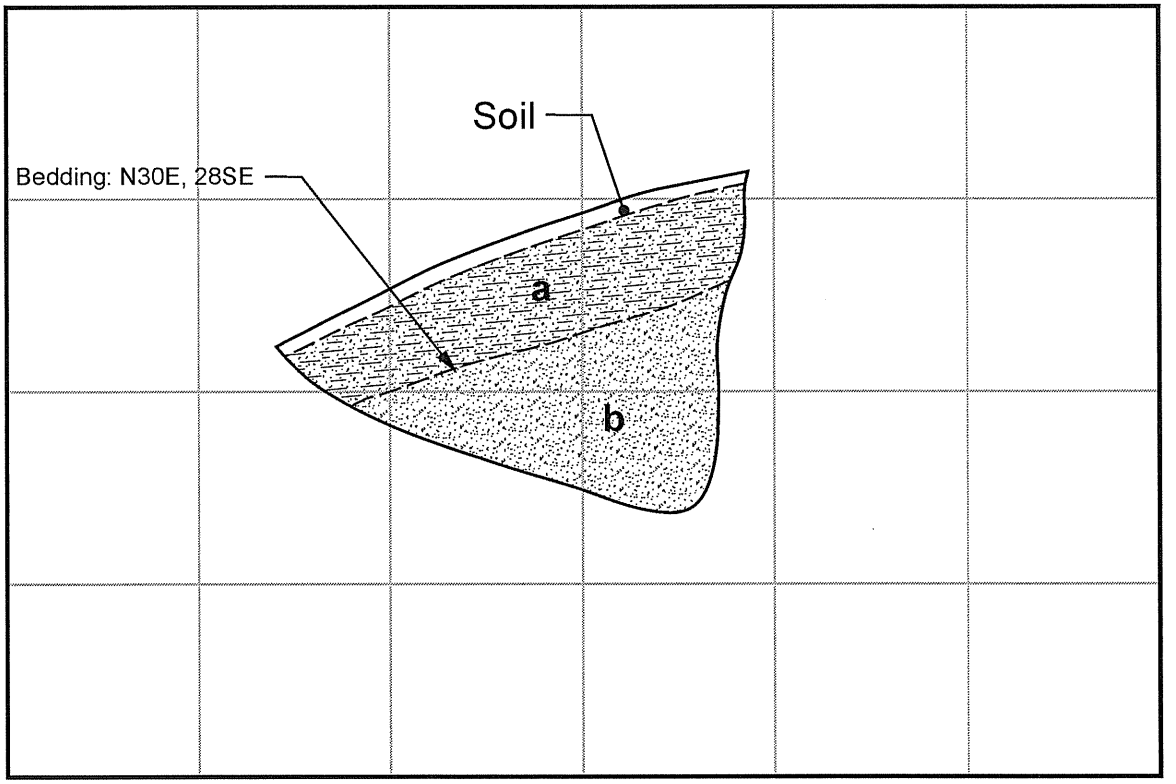
0-0.5 ft. Soil

0.5-8.5 ft. Bedrock (QTs):

a) fine to coarse grained clayey sandstone, pale yellowish brown (10YR 6/2), hard, moist

b) fine to medium grained sandstone, pale yellowish brown (10YR 6/2), moderately hard to soft, dry

BEARING: N73E



SCALE: 1"=5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF TEST PIT TP-9

JOB NUMBER 2002-036-01 **CLIENT** Chiquita **LOGGED BY** DGF

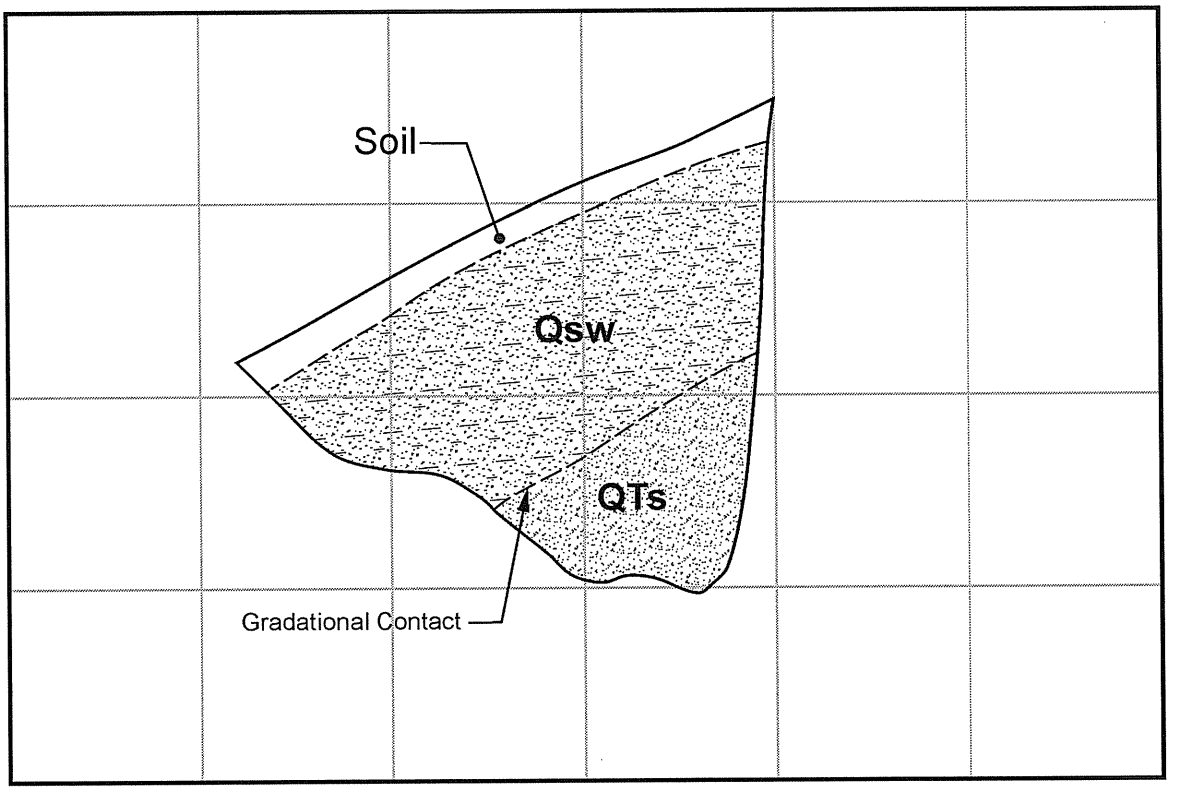
LOCATION Chiquita Canyon Landfill **ELEVATION** 1135 **DATE LOGGED** 9-29-03

0-1 ft. Soil

1-7 ft. Slopewash (Qsw):
fine grained silty sand, pale yellowish brown (10YR 6/2), loose, dry, angular sandstone clasts

7-11.5 ft. Bedrock (QTs):
fine grained sandstone, pale yellowish brown (10YR 6/2), soft, dry, weathered

BEARING: N78E



SCALE: 1"=5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF TEST PIT TP-10

JOB NUMBER 2002-036-01 **CLIENT** Chiquita **LOGGED BY** DGF

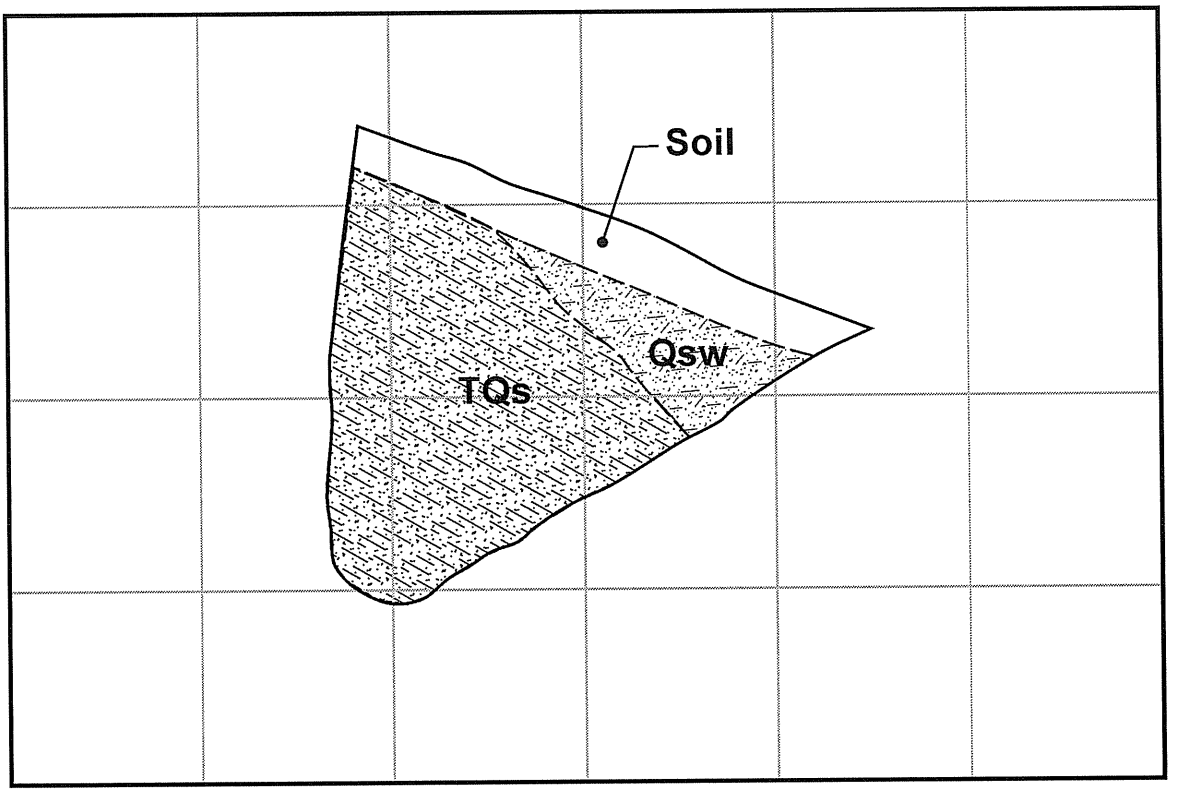
LOCATION Chiquita Canyon Landfill **ELEVATION** 1120 **DATE LOGGED** 9-29-03

0-1.5 ft. Soil

1.5-3.0 ft. Slopewash (Qsw):
silt, light gray (N7),dry, loose

3.0-11.5 ft. Bedrock (QTs):
siltstone, greenish gray (5GY 6/1), hard, moist to dry, fractured, massive bedding

BEARING: N60E



SCALE: 1"=5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF TEST PIT TP-11

JOB NUMBER 2002-036-01 **CLIENT** Chiquita **LOGGED BY** DGF

LOCATION Chiquita Canyon Landfill **ELEVATION** 1110 **DATE LOGGED** 9-30-03

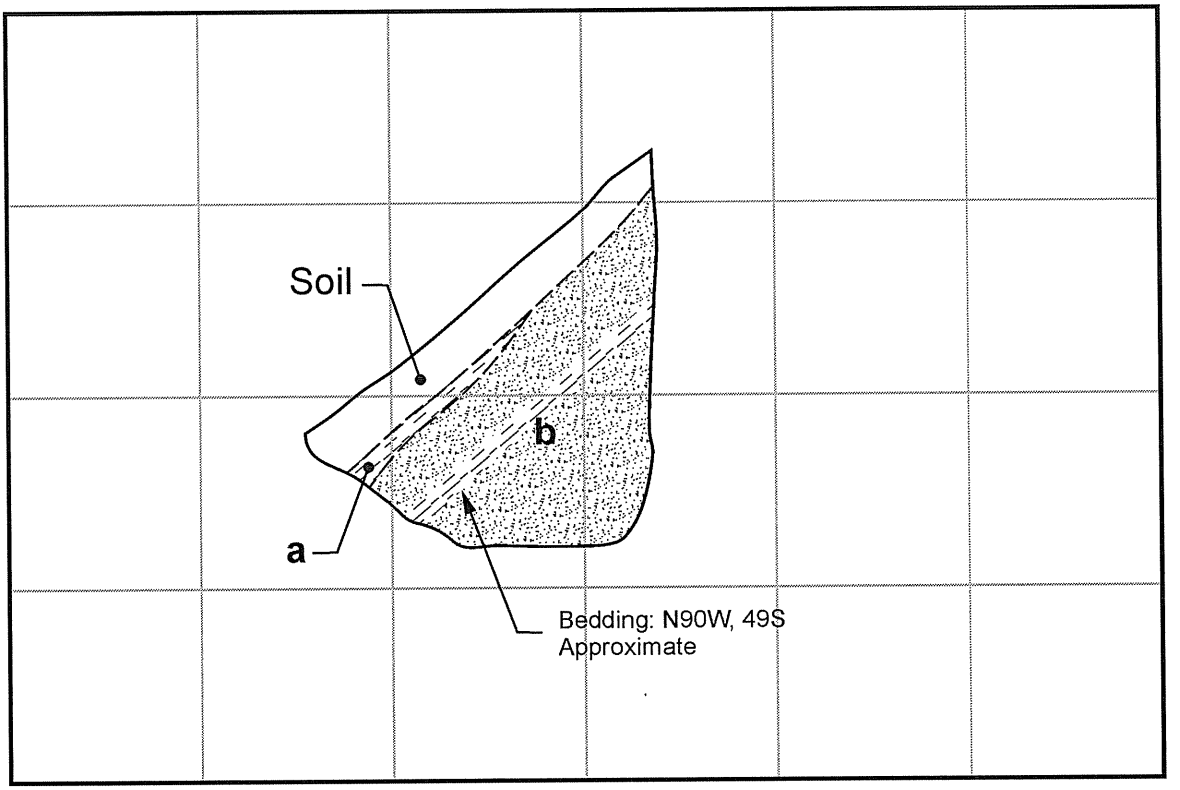
0-1 ft. Soil

1-10.5 ft. Bedrock (QTs):

a) siltstone, pale yellowish brown (10YR 6/2), hard, moist

b) fine grained sandstone, pale yellowish brown (10YR 6/1), hard, moist

BEARING: N3E



SCALE: 1"=5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF TEST PIT TP-12

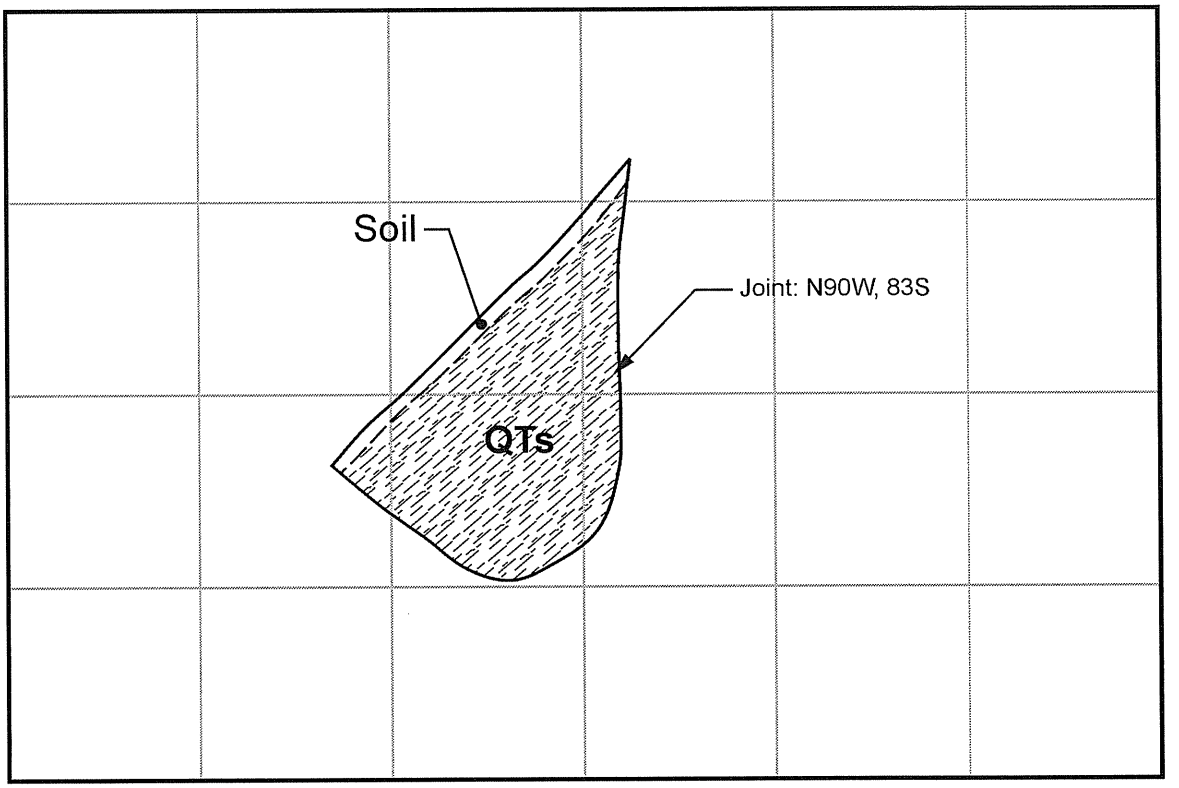
JOB NUMBER 2002-036-01 **CLIENT** Chiquita **LOGGED BY** DGF

LOCATION Chiquita Canyon Landfill **ELEVATION** 1135 **DATE LOGGED** 9-30-03

0-0.5 ft. Soil

0.5-12 ft. Bedrock (QTs):
clayey siltstone, olive gray (5Y 3/2), hard, moist, massive bedding

BEARING: N53W



SCALE: 1"=5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF TEST PIT TP-13

JOB NUMBER 2002-036-01 **CLIENT** Chiquita **LOGGED BY** DGF

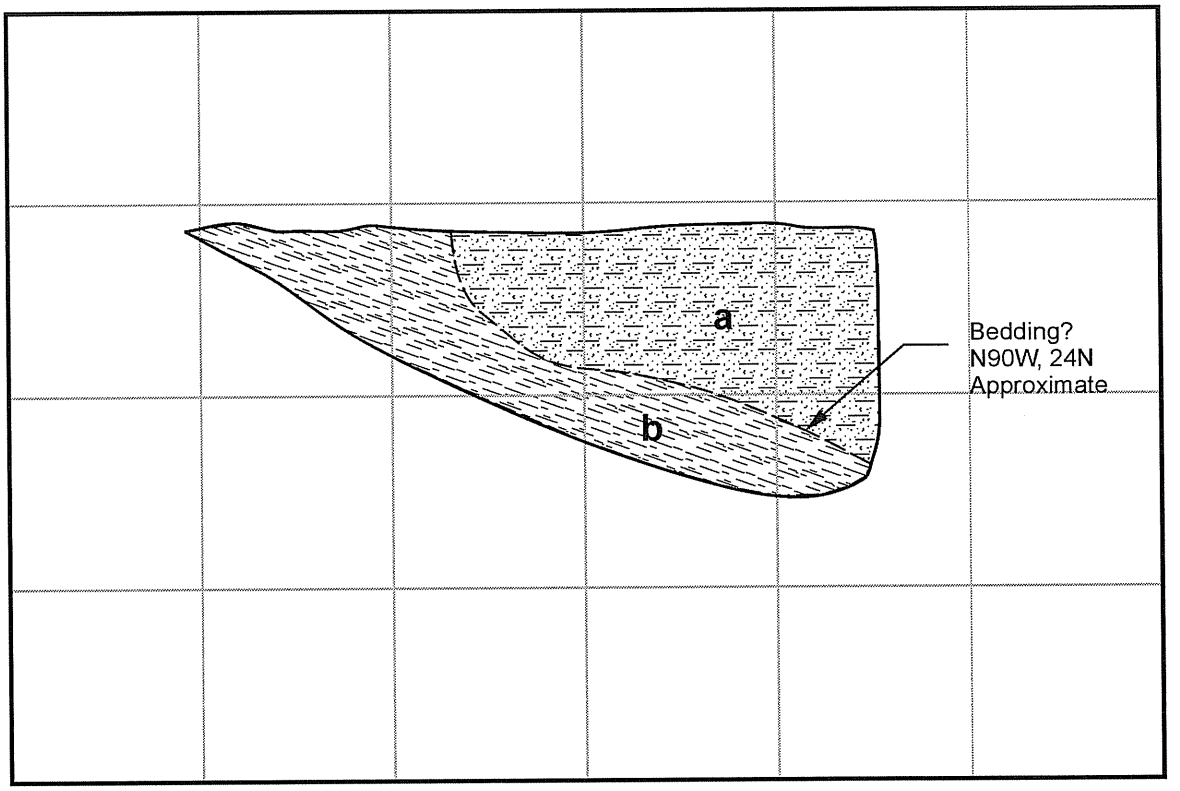
LOCATION Chiquita Canyon Landfill **ELEVATION** 1168 **DATE LOGGED** 9-30-03

0-7 ft. Bedrock (QTs):

a) sandy siltstone, pale yellowish brown to light gray (N7), moderately hard, moist, mottled

b) silty claystone, grayish red (5R, 4/2), soft, moist, plastic

BEARING: N35W



SCALE: 1"=5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF TEST PIT TP-14

JOB NUMBER 2002-036-01 **CLIENT** Chiquita **LOGGED BY** DGF

LOCATION Chiquita Canyon Landfill **ELEVATION** 1160 **DATE LOGGED** 9-30-03

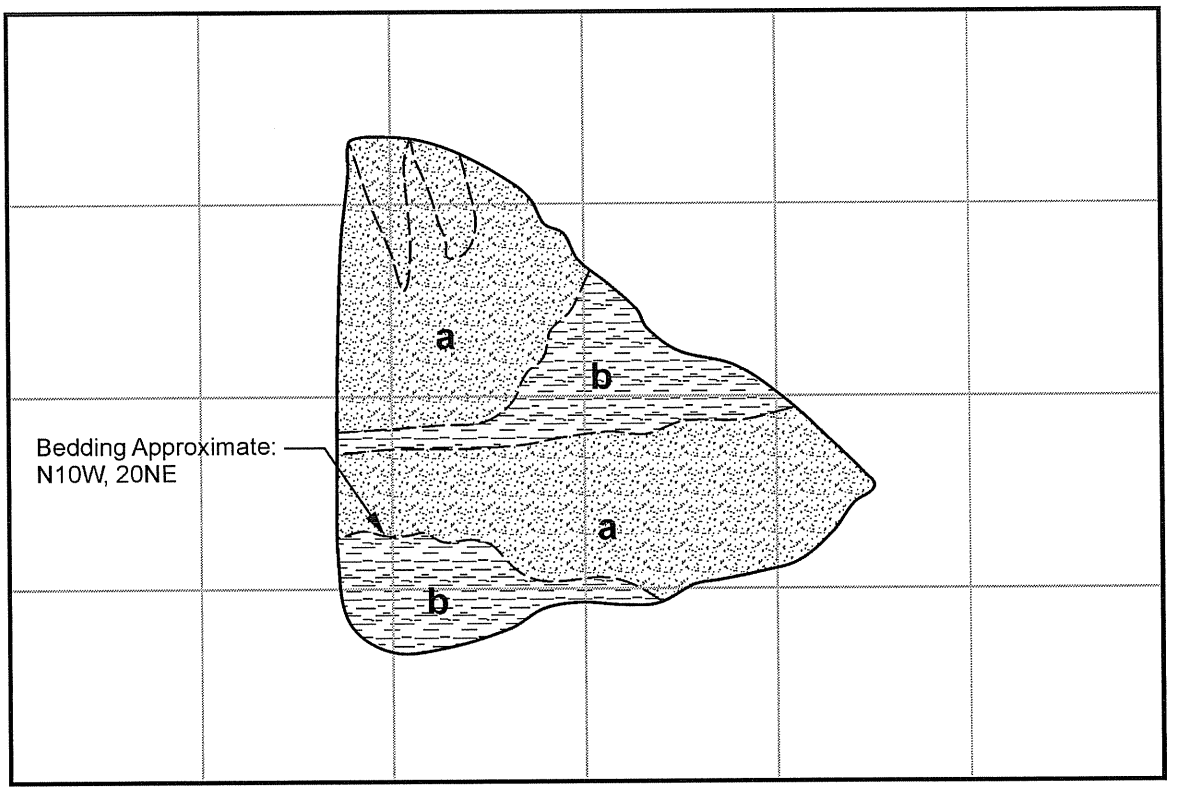
0-13.5 ft. Bedrock? (QTs):

a) fine to coarse grained pebbly sandstone, light gray (N7), soft to moderately hard, dry

b) clayey siltstone, grayish red (5R 4/2), moderately hard, moist

Note:
Rock in trench appears weathered and disturbed. Possible landslide. or deformation related to folding.

BEARING: N24E



SCALE: 1"=5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF TEST PIT TP-15

JOB NUMBER 2002-036-01 **CLIENT** Chiquita **LOGGED BY** DGF

LOCATION Chiquita Canyon Landfill **ELEVATION** 1290 **DATE LOGGED** 9-30-03

0-0.5 ft. Soil

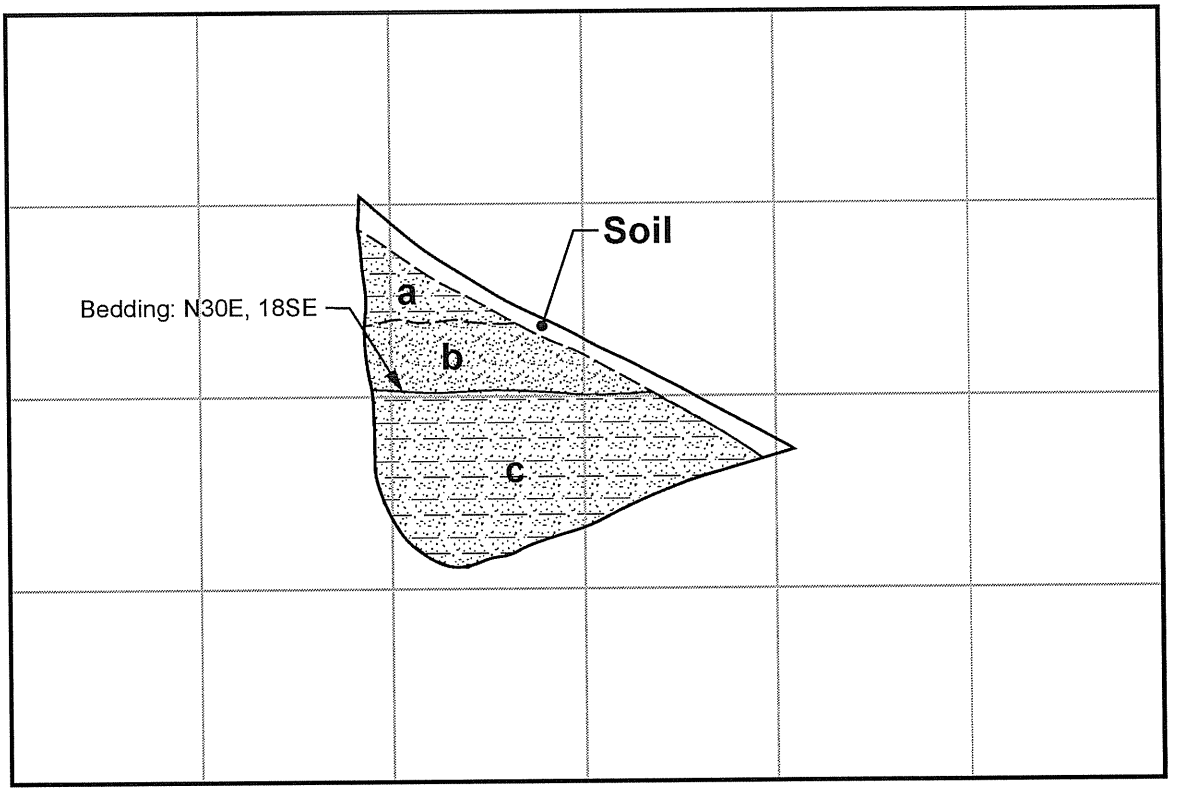
0.5-8 ft. Bedrock (QTs):

a) siltstone, light gray (N7), moderately hard, dry

b) fine grained sandstone, light gray (N7), moderately hard, dry

c) clayey siltstone, grayish red (5R 4/2), hard, dry

BEARING: N23E



SCALE: 1"=5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF TEST PIT TP-1

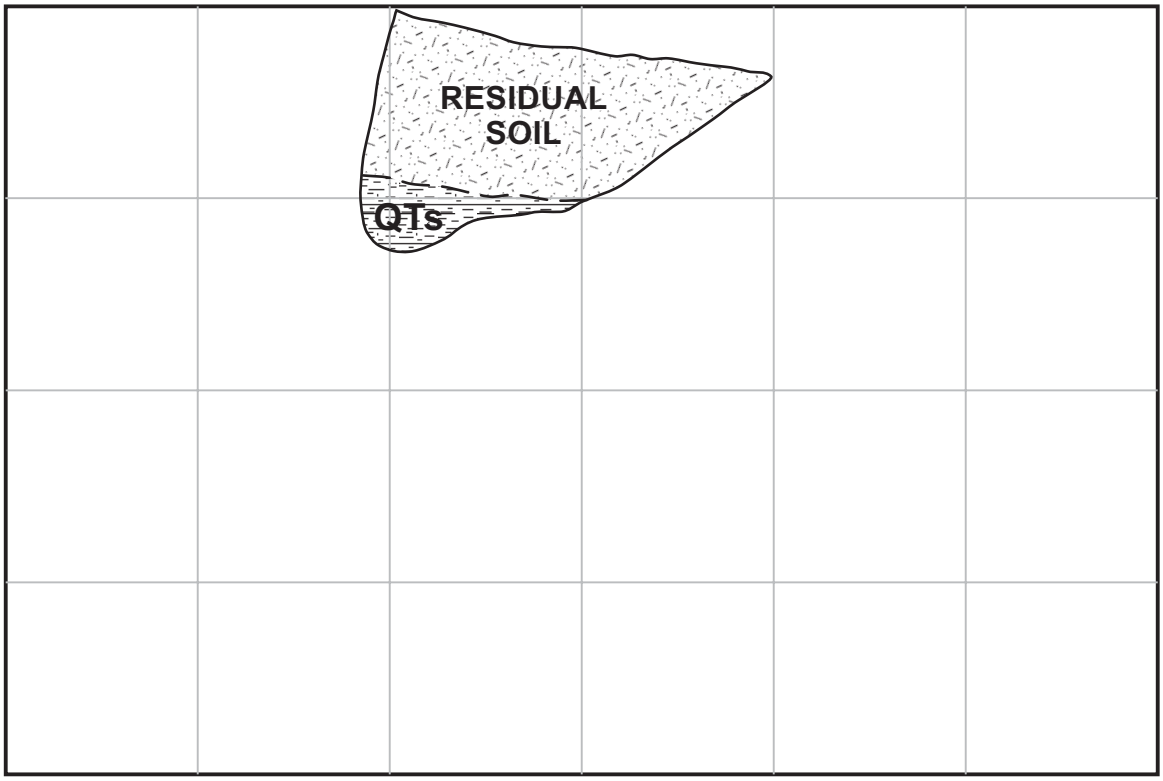
JOB NUMBER 2002-036-03 **CLIENT** Chiquita Canyon Landfill **LOGGED BY** TL

LOCATION Chiquita Canyon Landfill **ELEVATION** 1185 feet **DATE LOGGED** 6-30-09

0-4.5 feet: RESIDUAL SOIL - Sandy Silt (ML), very fine sand, brownish gray dry, soft

4.5-6.5 feet: SAUGUS FORMATION (QTs) - Sandy Siltstone, very fine grained sand, light gray, dry, low hardness, no discernible bedding, weathered

BEARING: N23E



SCALE: 1"=5'

NOTE:
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LOG OF TEST PIT TP-2

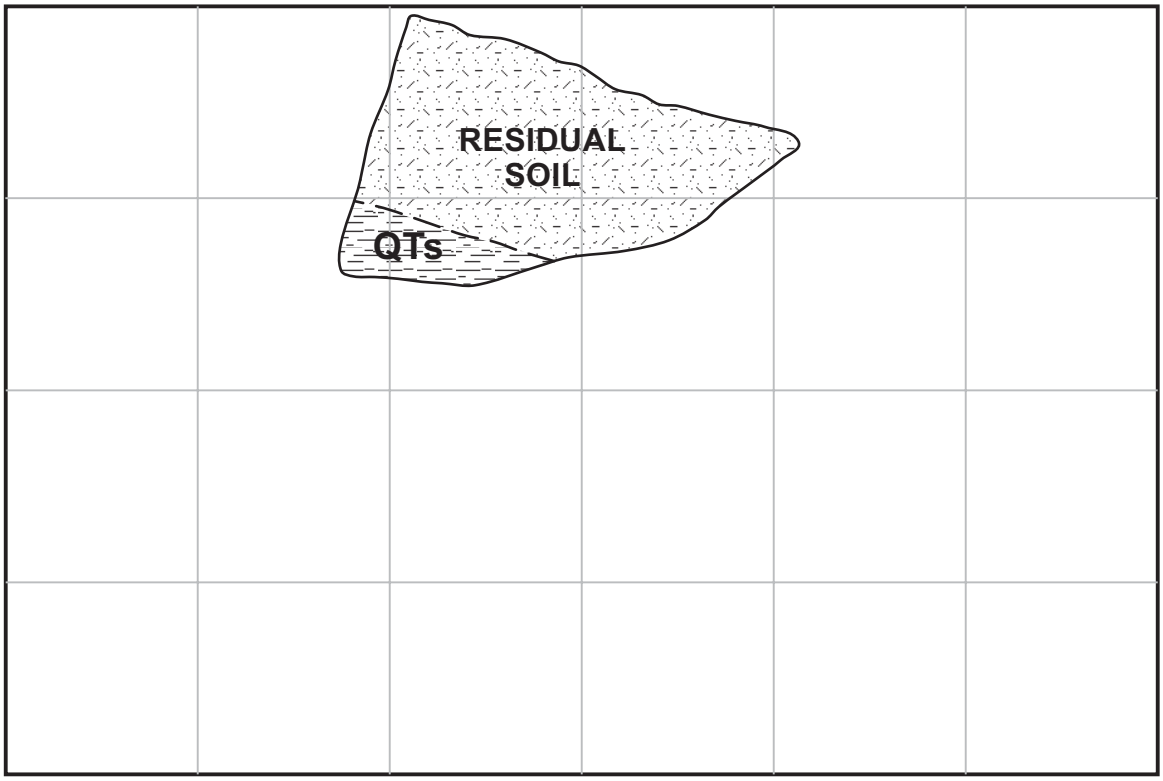
JOB NUMBER 2002-036-03 **CLIENT** Chiquita Canyon Landfill **LOGGED BY** TL

LOCATION Chiquita Canyon Landfill **ELEVATION** 1125 feet **DATE LOGGED** 6-30-09

0-5.0 feet: RESIDUAL SOIL - Sandy Silt (ML), very fine sand, brownish gray to light gray, dry, soft

5.0-7.0 feet: SAUGUS FORMATION (QTs) - Siltstone, gray, dry, low hardness; massive, weathered

BEARING: N66E



SCALE: 1"=5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

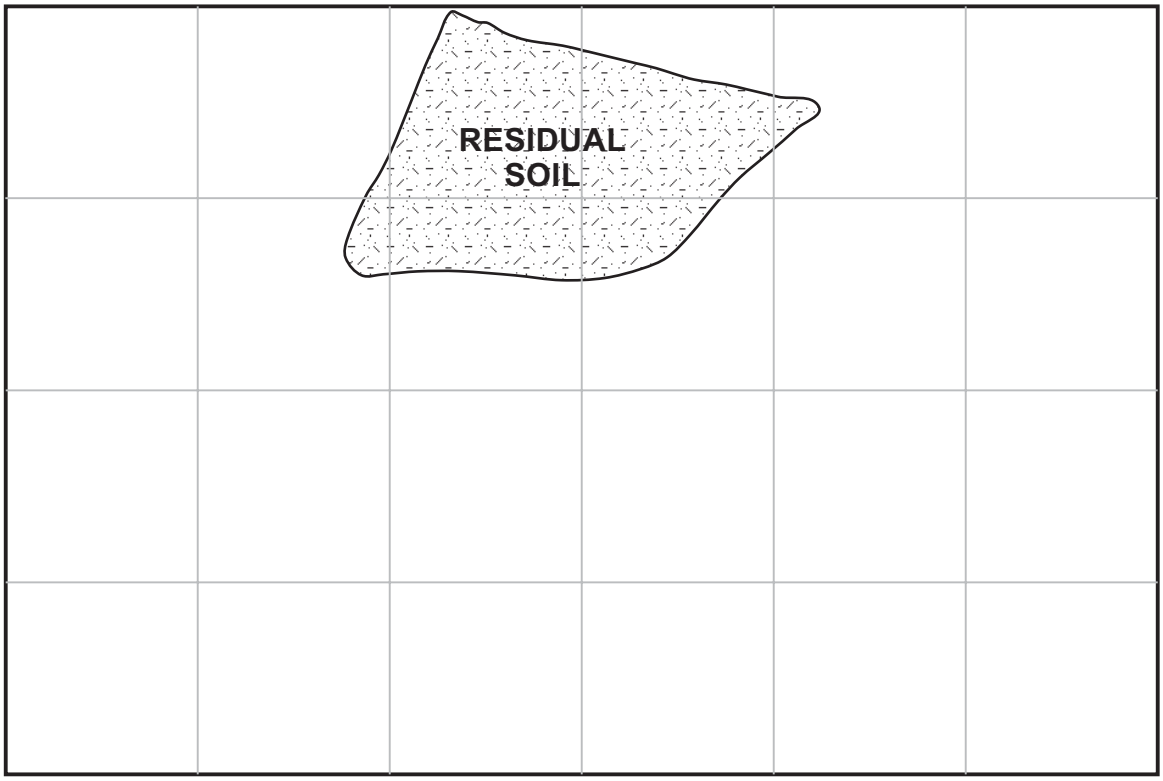
LOG OF TEST PIT TP-3

JOB NUMBER 2002-036-03 **CLIENT** Chiquita Canyon Landfill **LOGGED BY** TL

LOCATION Chiquita Canyon Landfill **ELEVATION** 1125 feet **DATE LOGGED** 6-30-09

0-7.0 feet: RESIDUAL SOIL - Sandy Silt (ML), very fine to fine sand, light brownish gray, dry, soft

BEARING: N65E



SCALE: 1"=5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF TEST PIT TP-4

JOB NUMBER 2002-036-03 **CLIENT** Chiquita Canyon Landfill **LOGGED BY** TL

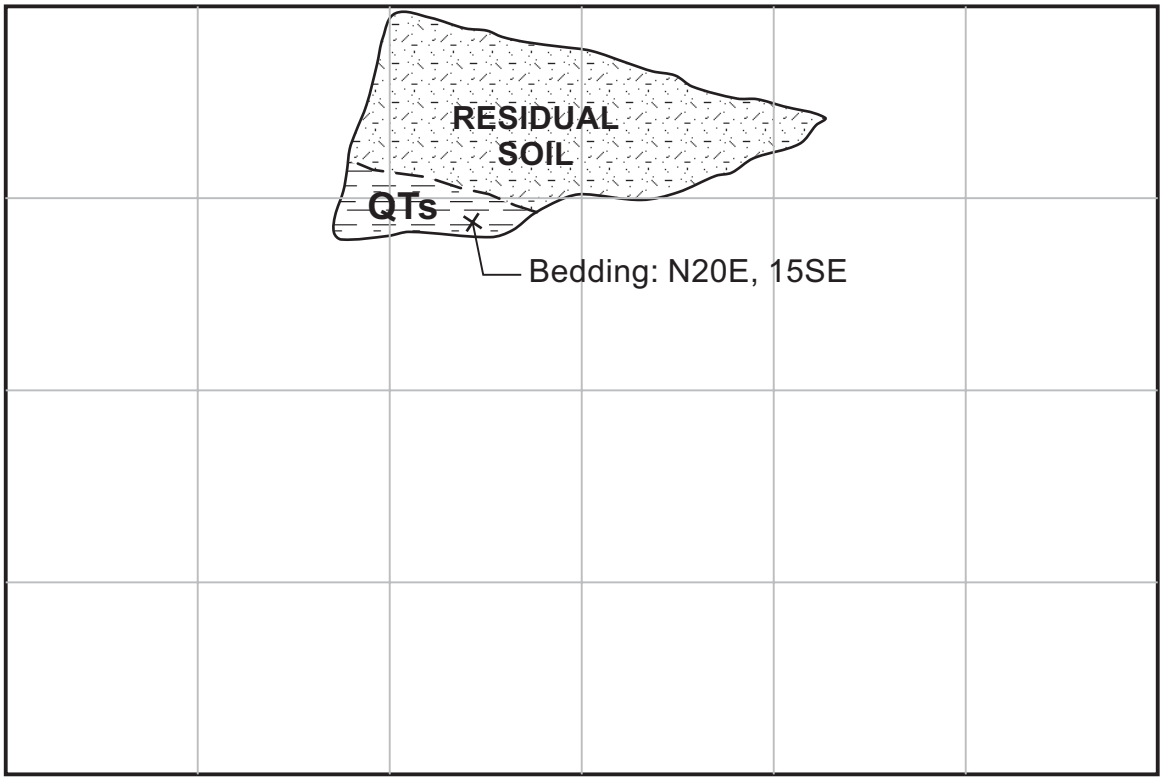
LOCATION Chiquita Canyon Landfill **ELEVATION** 1115 feet **DATE LOGGED** 6-30-09

0-4.0 feet: RESIDUAL SOIL - Silt (ML), light gray to light brownish gray, soft, dry

4.0-6.0 feet: SAUGUS FORMATION (QTs) - Siltstone, brown, low hardness, dry to slightly moist

Bedding @ 5.0 feet: N20E, 15SE

BEARING: N31E



SCALE: 1"=5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF TEST PIT TP-5

JOB NUMBER 2002-036-03 **CLIENT** Chiquita Canyon Landfill **LOGGED BY** TL

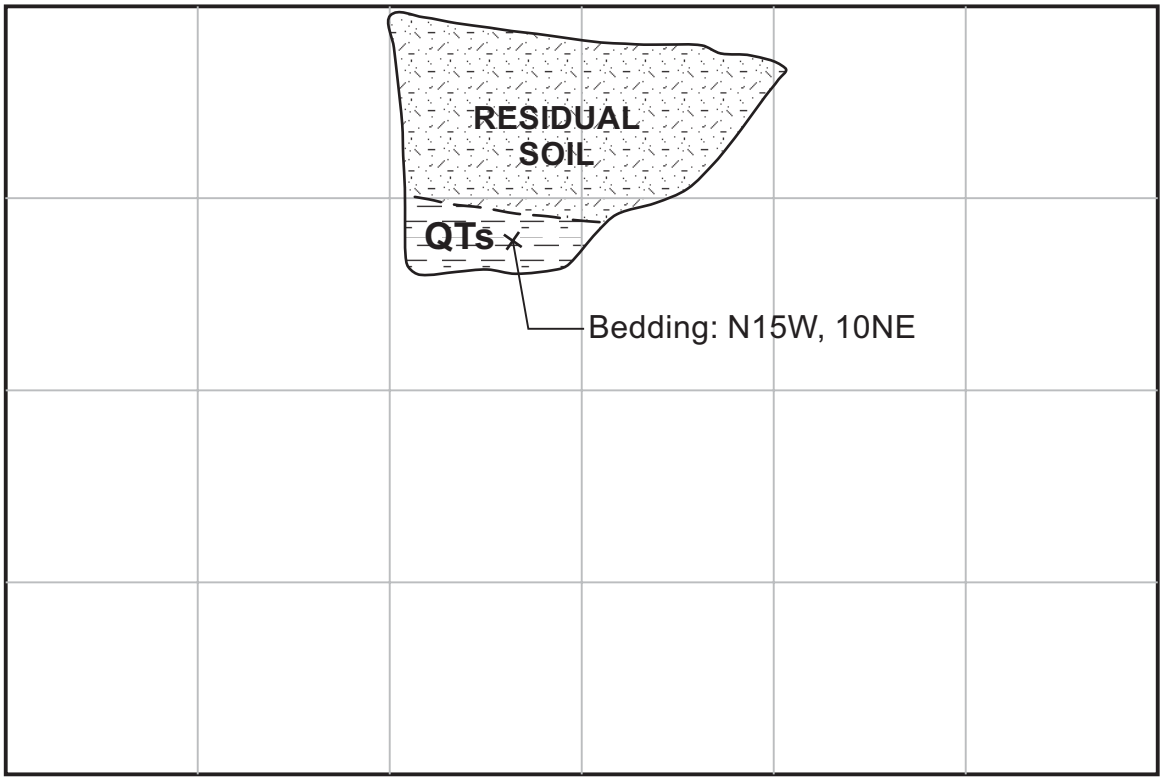
LOCATION Chiquita Canyon Landfill **ELEVATION** 1070 feet **DATE LOGGED** 6-30-09

0-5.0 feet: RESIDUAL SOIL - Silt (ML), light gray, soft, dry

5.0-7.0 feet: SAUGUS FORMATION (QTs) - Siltstone, brown, low hardness, slightly moist

Bedding @ 6.0 feet: N15W, 10NE

BEARING: N72E



SCALE: 1"=5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF TEST PIT TP-6

JOB NUMBER 2002-036-03 **CLIENT** Chiquita Canyon Landfill **LOGGED BY** TL

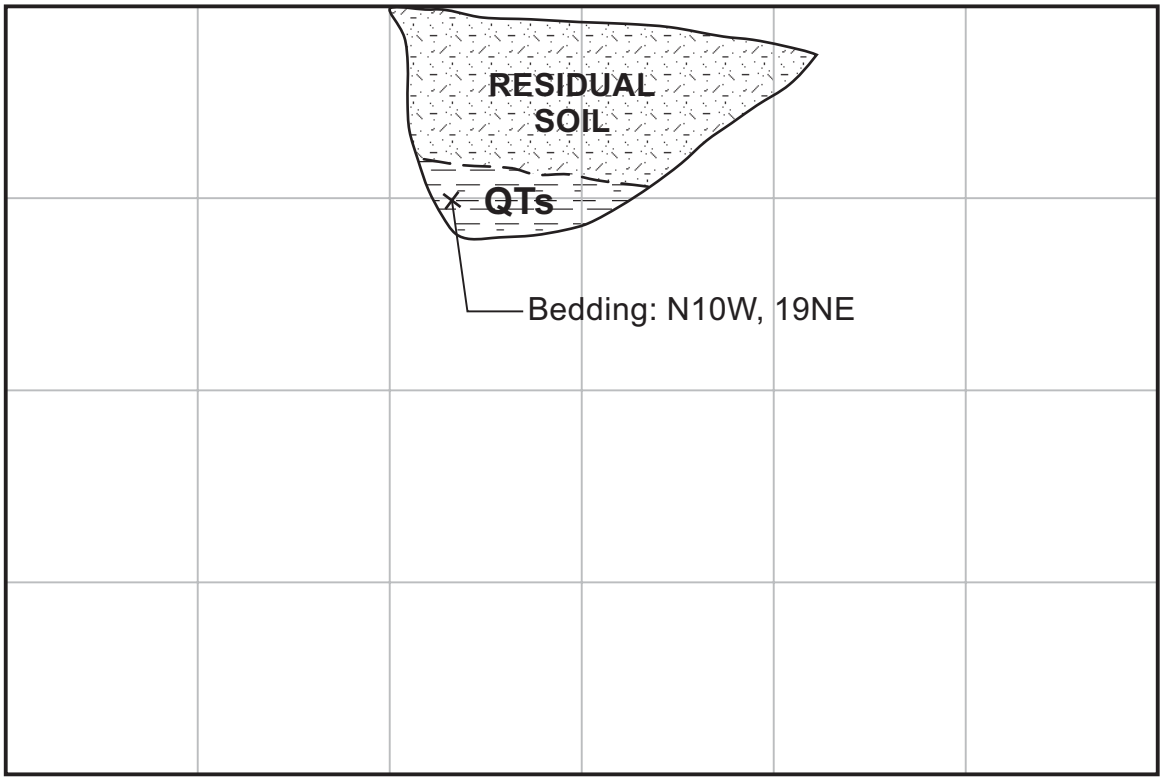
LOCATION Chiquita Canyon Landfill **ELEVATION** 1035 feet **DATE LOGGED** 6-30-09

0-4.0 feet: RESIDUAL SOIL - Sandy Silt (ML), very fine to fine sand, light grayish brown, soft, dry

4.0-6.0 feet: SAUGUS FORMATION (QTs) - Interbedded Siltstone and Sandstone, very fine grained sand, gray to light grayish brown, moderately well-developed bedding

Bedding @ 5.0 feet: N10W, 19NE

BEARING: N45E



SCALE: 1"=5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF TEST PIT TP-7

JOB NUMBER 2002-036-03 **CLIENT** Chiquita Canyon Landfill **LOGGED BY** TL

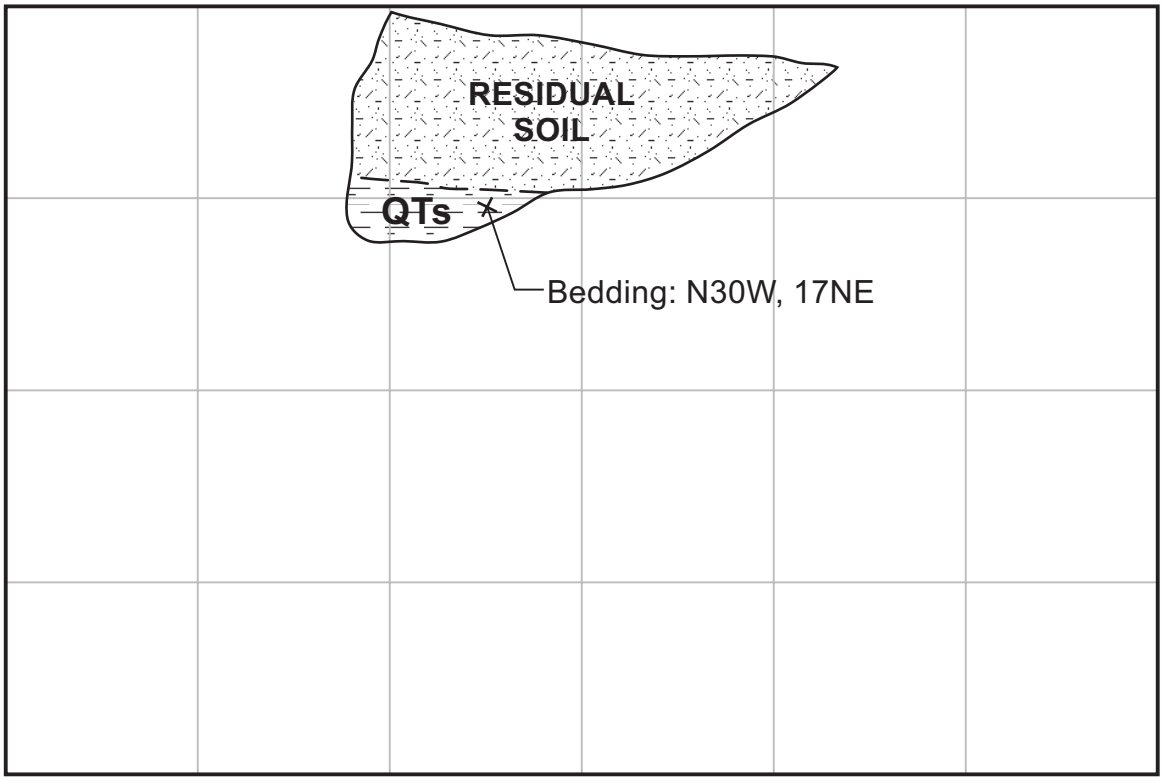
LOCATION Chiquita Canyon Landfill **ELEVATION** 1010 feet **DATE LOGGED** 6-30-09

0-4.5 feet: RESIDUAL SOIL - Silt (ML), gray, soft, dry

4.5-6.0 feet: SAUGUS FORMATION (QTs) - Siltstone, gray to grayish brown, low hardness to moderately hard

Bedding @ 5.0 feet: N30W, 17NE

BEARING: N5E



SCALE: 1"=5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF TEST PIT TP-8

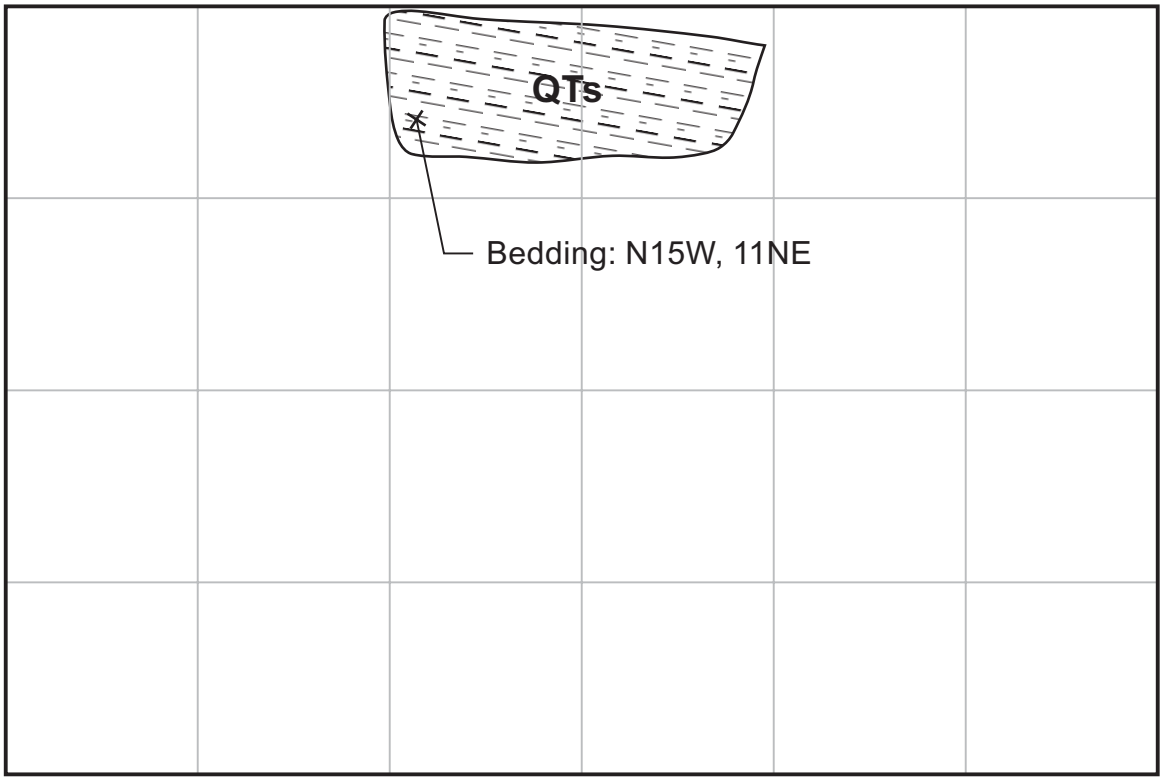
JOB NUMBER 2002-036-03 **CLIENT** Chiquita Canyon Landfill **LOGGED BY** TL

LOCATION Chiquita Canyon Landfill **ELEVATION** 1025 feet **DATE LOGGED** 6-30-09

0-4.0 feet: SAUGUS FORMATION (QTs) - Siltstone, grayish brown, to brown, low hardness, dry to slightly moist

Bedding @ 3.0 feet: N15W, 11NE

BEARING: N80E



SCALE: 1"=5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF TEST PIT TP-9

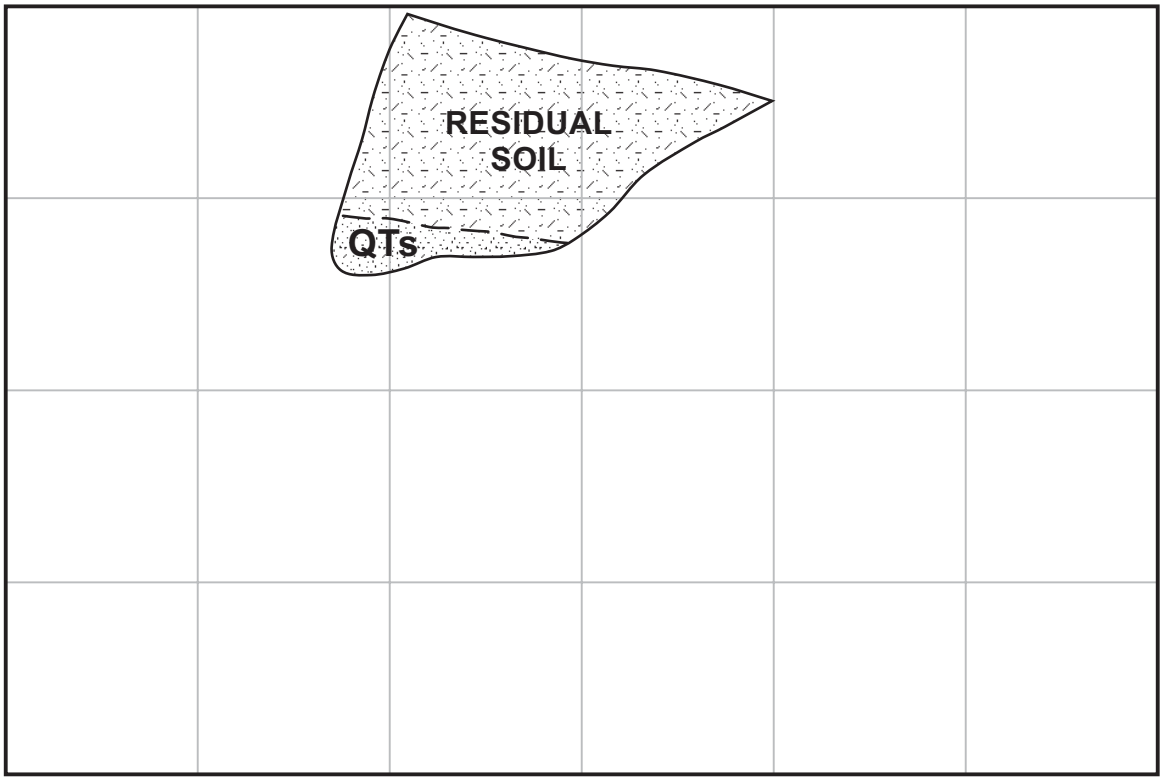
JOB NUMBER 2002-036-03 **CLIENT** Chiquita Canyon Landfill **LOGGED BY** TL

LOCATION Chiquita Canyon Landfill **ELEVATION** 1040 feet **DATE LOGGED** 6-30-09

0-5.5 feet: RESIDUAL SOIL - Silty Sand (SM), grayish brown, loose, dry

5.5-7.0 feet: SAUGUS FORMATION (QTs) - Sandstone, fine to coarse, light gray to grayish brown, low hardness, massive

BEARING: N84W



SCALE: 1"=5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF TEST PIT TP-10

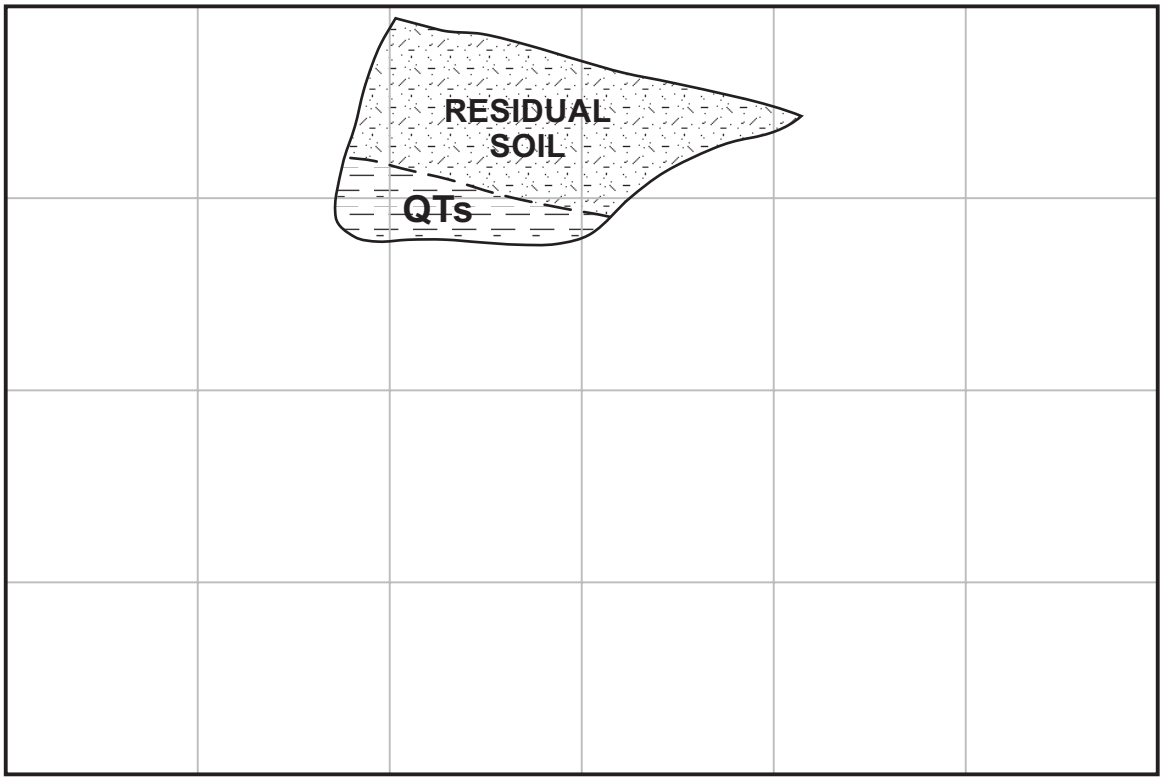
JOB NUMBER 2002-036-03 **CLIENT** Chiquita Canyon Landfill **LOGGED BY** TL

LOCATION Chiquita Canyon Landfill **ELEVATION** 1007 feet **DATE LOGGED** 6-30-09

0-4.0 feet: RESIDUAL SOIL - Sandy Silt (ML), gray, soft, dry

4.0-6.0 feet: SAUGUS FORMATION (QTs) - Sandy Siltstone, very fine grained, light gray, low hardness, dry, massive

BEARING: N38E



SCALE: 1"=5'

NOTE:
THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC TEST PIT LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOG OF TEST PIT TP-11

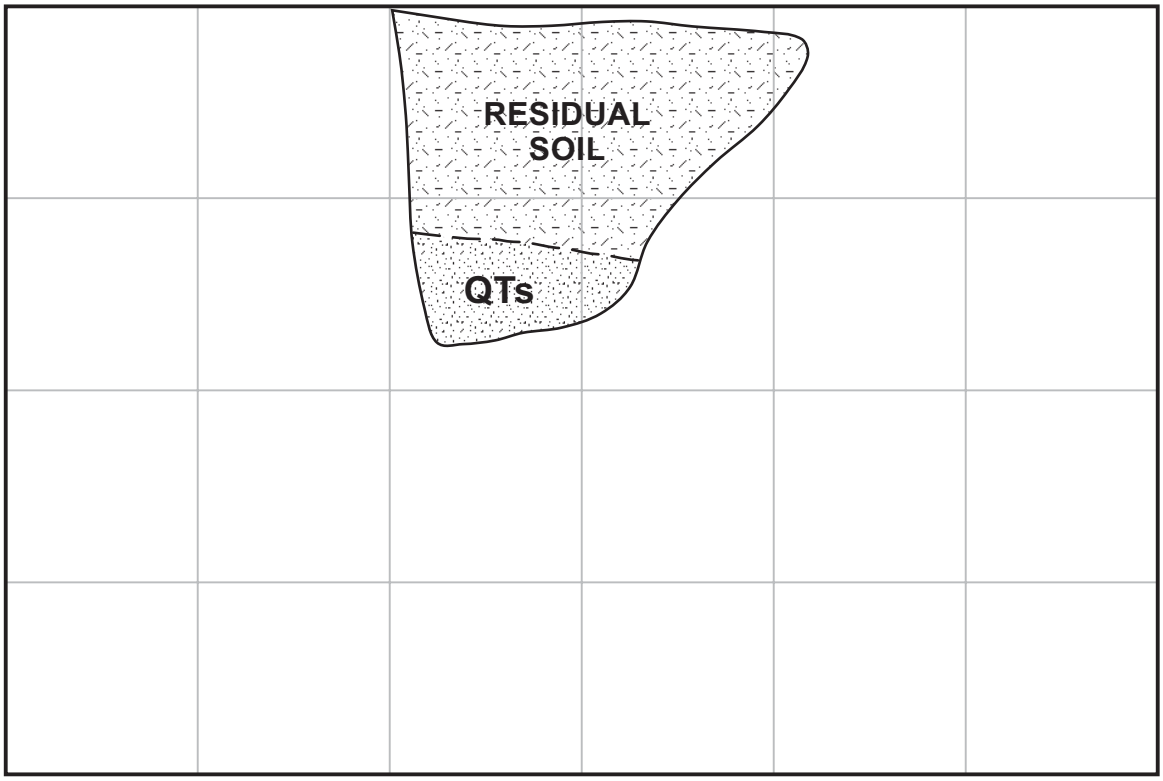
JOB NUMBER 2002-036-03 **CLIENT** Chiquita Canyon Landfill **LOGGED BY** TL

LOCATION Chiquita Canyon Landfill **ELEVATION** 1023 feet **DATE LOGGED** 6-30-09

0-6.0 feet: RESIDUAL SOIL - Silty Sand (SM), brownish gray, loose, dry

6.0-8.0 feet: SAUGUS FORMATION (QTs) - Sandstone, very fine to fine grained, light gray, weakly cemented, friable, no discernible bedding

BEARING: N21E



SCALE: 1"=5'

NOTE:
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LOG OF TEST PIT TP-12

JOB NUMBER 2002-036-03 **CLIENT** Chiquita Canyon Landfill **LOGGED BY** TL

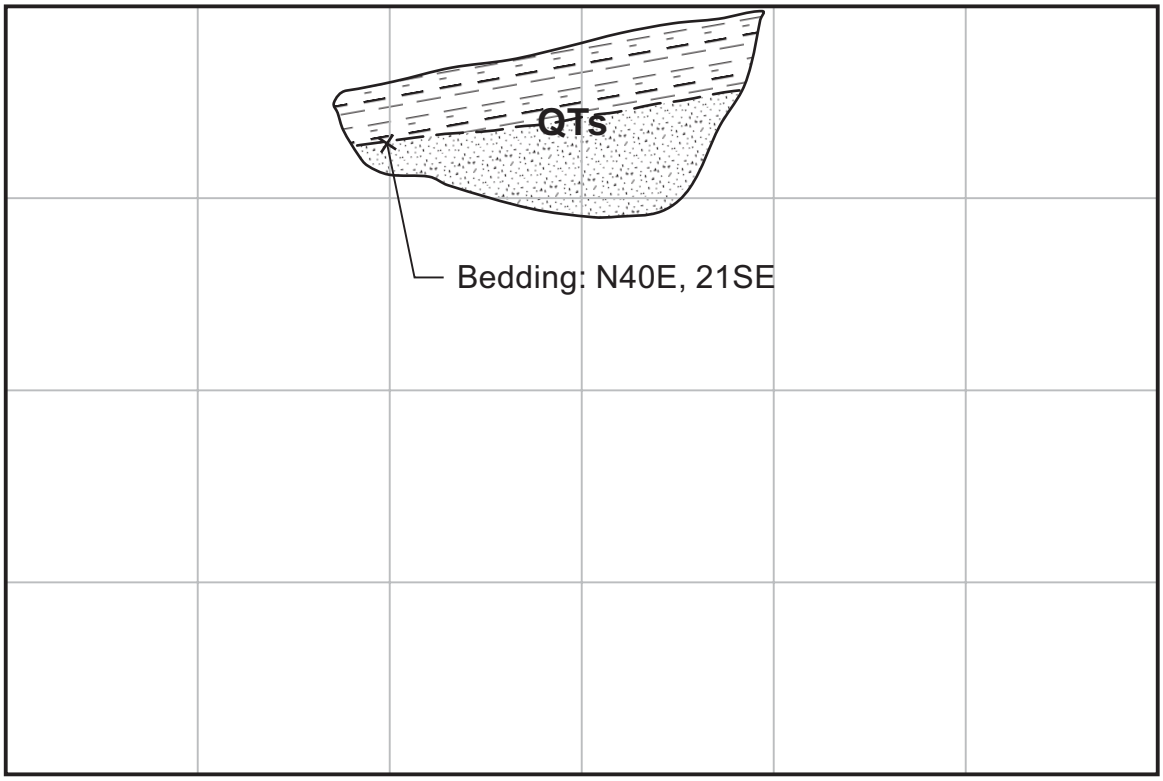
LOCATION Chiquita Canyon Landfill **ELEVATION** 1085 feet **DATE LOGGED** 6-30-09

0-3.5 feet: SAUGUS FORMATION (QTs) - Siltstone, brown, low hardness, highly fractured, weathered in upper 2 feet

3.5-5.5 feet: SAUGUS FORMATION (QTs) - Sandstone, fine to coarse, orangish brown to grayish brown, moderately hard

Bedding @ 3.5 feet: N40E, 21SE

BEARING: N23W



SCALE: 1"=5'

NOTE:
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LOG OF TEST PIT TP-13

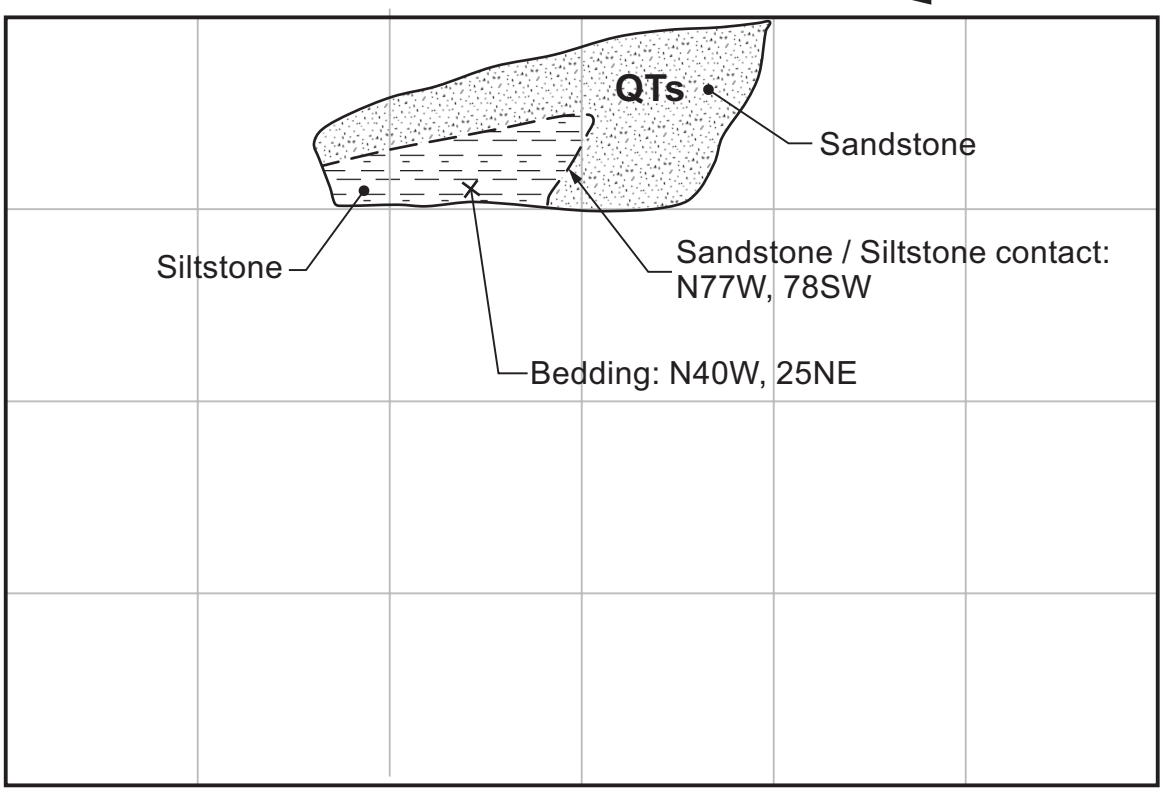
JOB NUMBER 2002-036-03 **CLIENT** Chiquita Canyon Landfill **LOGGED BY** TL

LOCATION Chiquita Canyon Landfill **ELEVATION** 1105 feet **DATE LOGGED** 6-30-09

0-5.0 feet: SAUGUS FORMATION (QTs) - Sandstone, fine to medium, light gray, friable, weakly cemented, with lenticular Siltstone below 2 feet dark brown to brownish gray, low hardness

Contact @ 4.0 feet: N77W, 78SW
Bedding @ 4.5 feet (in siltstone): N40W, 25NE

BEARING: N25W



SCALE: 1"=5'

NOTE:
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LOG OF TEST PIT TP-14

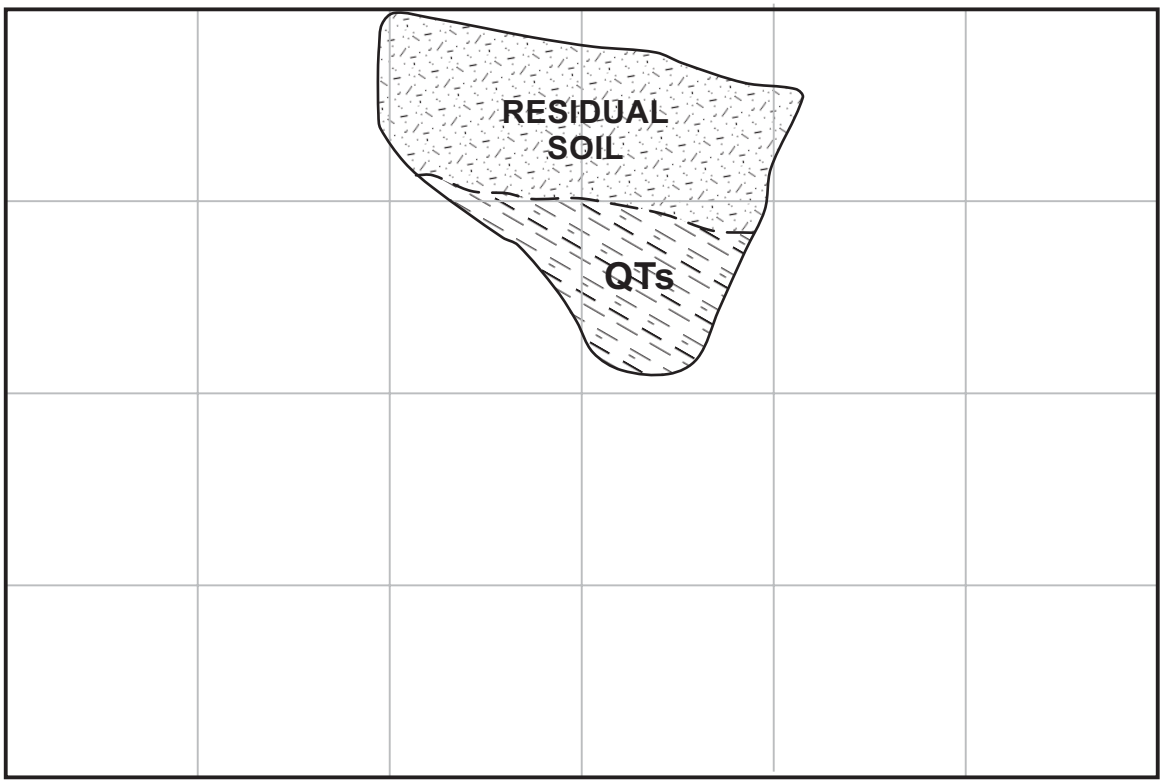
JOB NUMBER 2002-036-03 **CLIENT** Chiquita Canyon Landfill **LOGGED BY** TL

LOCATION Chiquita Canyon Landfill **ELEVATION** 1112 feet **DATE LOGGED** 6-30-09

0-4.5 feet: RESIDUAL SOIL - Sandy Silt (ML), gray, soft, dry

4.5-7.5 feet: SAUGUS FORMATION (QTs) - Siltstone, brown to reddish brown, soft, highly weathered and fractured, no discernible bedding

BEARING: N70E



SCALE: 1"=5'

NOTE:
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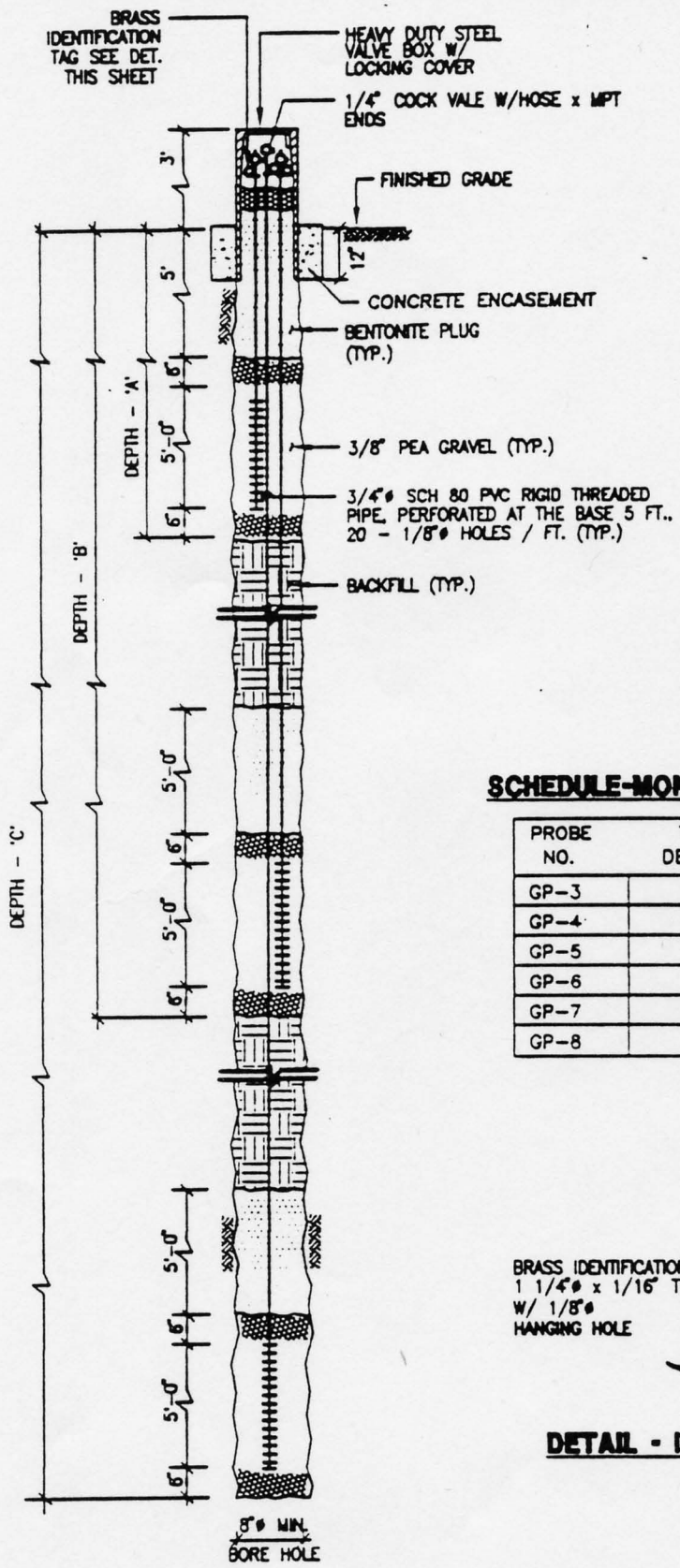
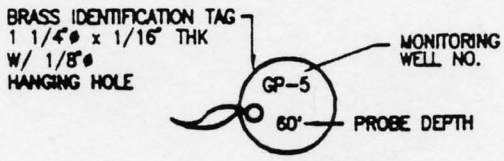


SCHEDULE-MONITORING PROBES AS-BUILT

PROBE NO.	TOTAL DEPTH(FT.)	PROBE DEPTH(FT.)		
		A	B	C
GP-3	25	10	25	NA
GP-4	20	10	20	NA
GP-5	93	10	45	93
GP-6	60	10	30	60
GP-7	60	10	30	60
GP-8	120	10	60	120



DETAIL - IDENTIFICATION TAG

DETAIL - GAS MONITORING PROBE (TYP.)

NOT TO SCALE

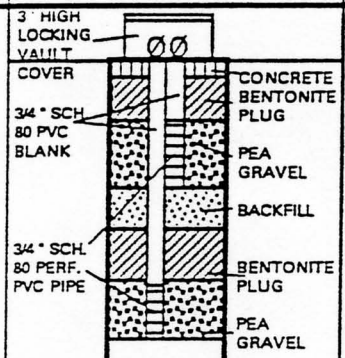
SCS ENGINEERS

Figure 1. Cross-Sectional View of a Typical Gas Monitoring Probe.

BORING LOG

SCS ENGINEERS
Environmental Consultants
3711 Long Beach Blvd.
Ninth Floor
Long Beach, CA
90807-3315
(310) 426-9544
FAX (310) 427-0805

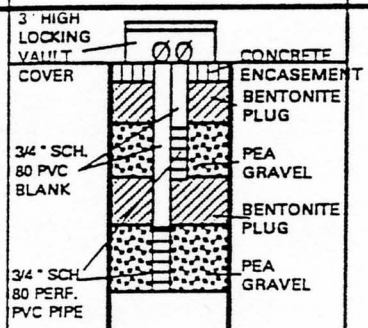
PROJECT: PERIMETER PROBES
HOLE / WELL # : GP3
LOCATION : CHIQUITA CANYON LANDFILL
DIAMETER : 8"
JOB NUMBER : 0194204.00
TOTAL DEPTH : 25 '
GEOLOGIST / ENGINEER : B. BENSON
DATE STARTED : APRIL 8, 1995
DRILLER : DISCOVERY DRILLING
DATE COMPLETED : APRIL 8, 1995
DRILL RIG :
SAMPLING DEVICE :
DRILLING METHOD : AIR ROTARY
PAGE : 1 OF 1

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / 6 INCHES	USCS SYMBOL	DESCRIPTION
0						
					C H	LIGHT GRAY SILT AND CLAY, GRAVELLY - 1/4" - 1/2 " Ø ANGULAR MATERIAL, HIGH PLASTICITY
10						
					S M	17 ' - LATE BROWNISH GRAY SANDSTONE, FINE SAND
20						
						TD = 25 '
30						
40						
50						
60						
70						
80						
90						
100						
110						

BORING LOG

SCS ENGINEERS
Environmental Consultants
3711 Long Beach Blvd.
Ninth Floor
Long Beach, CA
90807-3315
(310) 426-9544
FAX (310) 427-0805

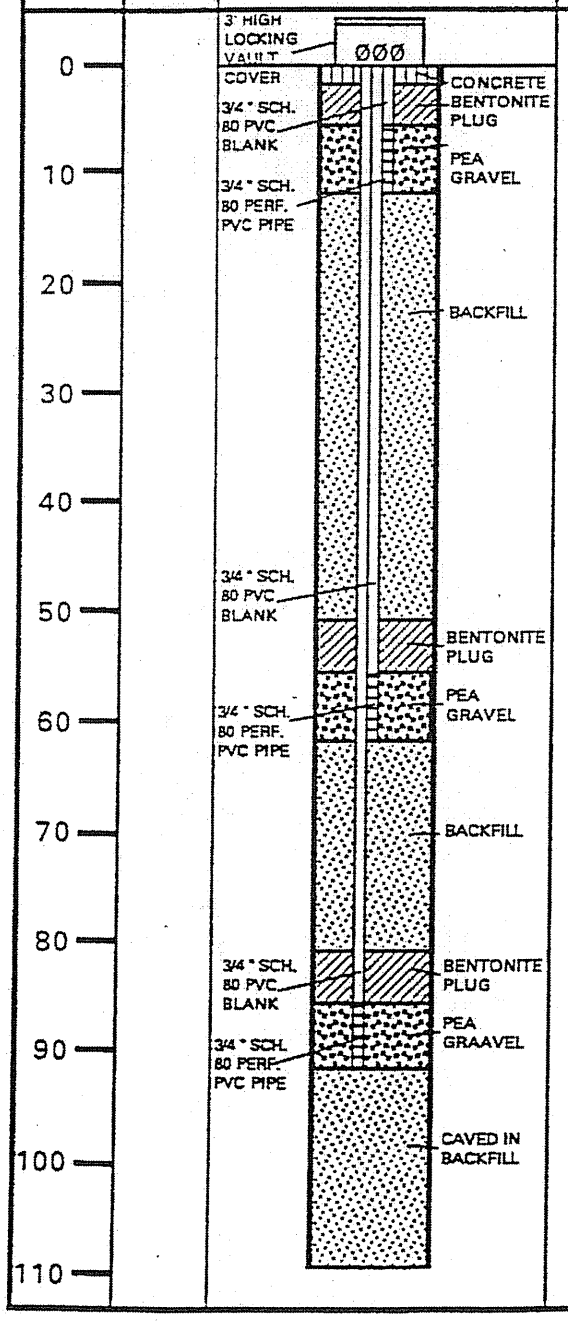
PROJECT: PERIMETER PROBES
HOLE / WELL # : GP4
LOCATION : CHIQUITA CANYON LANDFILL
DIAMETER : 8 "
JOB NUMBER : 0194204.00
TOTAL DEPTH : 20 '
GEOLOGIST / ENGINEER : B. BENSON
DATE STARTED : APRIL 8, 1995
DRILLER : DISCOVERY DRILLING
DATE COMPLETED : APRIL 8, 1995
DRILL RIG :
SAMPLING DEVICE :
DRILLING METHOD : AIR ROTARY
PAGE : 1 OF 1

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / 6 INCHES	USCS SYMBOL	DESCRIPTION
0						
					O L	LIGHT BROWN FILL DIRT MATERIAL, MOIST
10					C H	GRAVELLY SILT AND CLAY 1/4 " TO 1/2 " Ø, ANGULAR MATERIAL
20					S M	LIGHT BROWNISH GRAY SANDSTONE, FINE SAND,
30						TD = 20 '
40						
50						
60						
70						
80						
90						
100						
110						

BORING LOG

SCS ENGINEERS
Environmental Consultants
3711 Long Beach Blvd.
Ninth Floor
Long Beach, CA
90807-3315
(310) 426-9544
FAX (310) 427-0805

PROJECT: PERIMETER PROBES
HOLE / WELL # : GP5
LOCATION : CHIQUITA CANYON LANDFILL
DIAMETER : 8"
JOB NUMBER : 0194204.00
TOTAL DEPTH : 93 '
GEOLOGIST / ENGINEER : B. BENSON
DATE STARTED : APRIL 4, 1995
DRILLER : DISCOVERY DRILLING
DATE COMPLETED : APRIL 6, 1995
DRILL RIG :
SAMPLING DEVICE :
DRILLING METHOD : AIR ROTARY
PAGE : 1 OF 1



DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / 6 INCHES	USCS SYMBOL	DESCRIPTION
0					S M	LIGHT GRAY SAND AND FINES
10					M L	GREENISH GRAY SILTY SAND SANDSTONE
20					S M	PREDOMINANTLY LIGHT GRAY FINE SAND, SAND STONE
30						LIGHT GRAY FINE SAND, MOIST FOR NEXT 5 ', SOFTER DRILLING, LIGHT GAS ODOR
40						
50					S M	LIGHT BROWNISH GRAY SANDSTONE, PREDOMINANTLY FINE SANDS, SOME MEDIUM SANDS, DRY
60						
70					S M	72 ' - LIGHT GRAY SILTY SANDSTONE, HARD DRILLING
80						
90					S M	93 ' - FINAL DEPTH AFTER DRILLING TO 110 ', HOLE CAVED IN, BACKFILLING TO 93 '
100						110 ' - SANDSTONE, FINE SAND; BOREHOLE CAVING IN; DRILLING STOPPED; FINAL DRILLING DEPTH
110					S M	120' NOT ATTAINED

BORING LOG

SCS ENGINEERS
Environmental Consultants
3711 Long Beach Blvd.
Ninth Floor
Long Beach, CA
90807-3315
(310) 426-9544
FAX (310) 427-0805

PROJECT: PERIMETER PROBES

LOCATION : CHIQUITA CANYON LANDFILL

JOB NUMBER : 0194204.00

GEOLOGIST / ENGINEER : B. BENSON

DRILLER : DISCOVERY DRILLING

DRILL RIG :

DRILLING METHOD : AIR ROTARY

HOLE / WELL # : GP6

DIAMETER : 8 "

TOTAL DEPTH : 60 '

DATE STARTED : APRIL 8, 1995

DATE COMPLETED : APRIL 8, 1995

SAMPLING DEVICE :

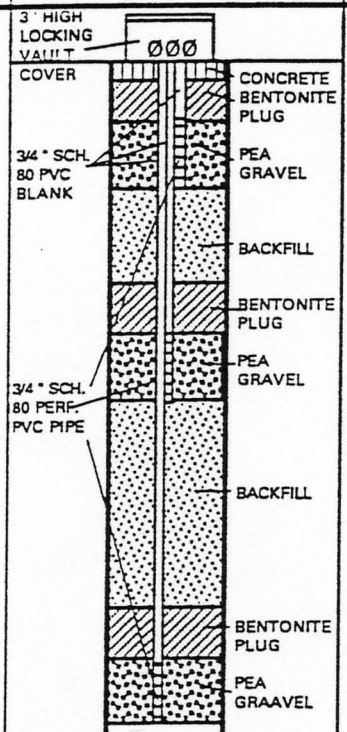
PAGE : 1 OF 1

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / 6 INCHES	USCS SYMBOL	DESCRIPTION
0		3' HIGH LOCKING VAULT; COVER; CONCRETE; BENTONITE PLUG			S M	LIGHT GRAY SILTS AND CLAY, MAJORITY FINE MATERIAL WITH SOME GRAVELLY PATCHES
10		3/4 " SCH. 80 PVC BLANK; PEA GRAVEL			S M	LIGHT BROWNISH GRAY SANDSTONE, FINE SANDS
20		BACKFILL; BENTONITE PLUG				
30		3/4 " SCH. 80 PERF. PVC PIPE; PEA GRAVEL			S M	LIGHT BROWNISH GRAY SANDSTONE, FINE SAND WITH MEDIUM SAND
40		BACKFILL				
50		BENTONITE PLUG				
60		PEA GRAAVEL			S M	60 ' - SANDSTONE, FINE SAND WITH SOME MEDIUM AND COARSE SAND TD = 60 '
70						
80						
90						
100						
110						

BORING LOG

SCS ENGINEERS
Environmental Consultants
3711 Long Beach Blvd.
Ninth Floor
Long Beach, CA
90807-3315
(310) 426-9544
FAX (310) 427-0805

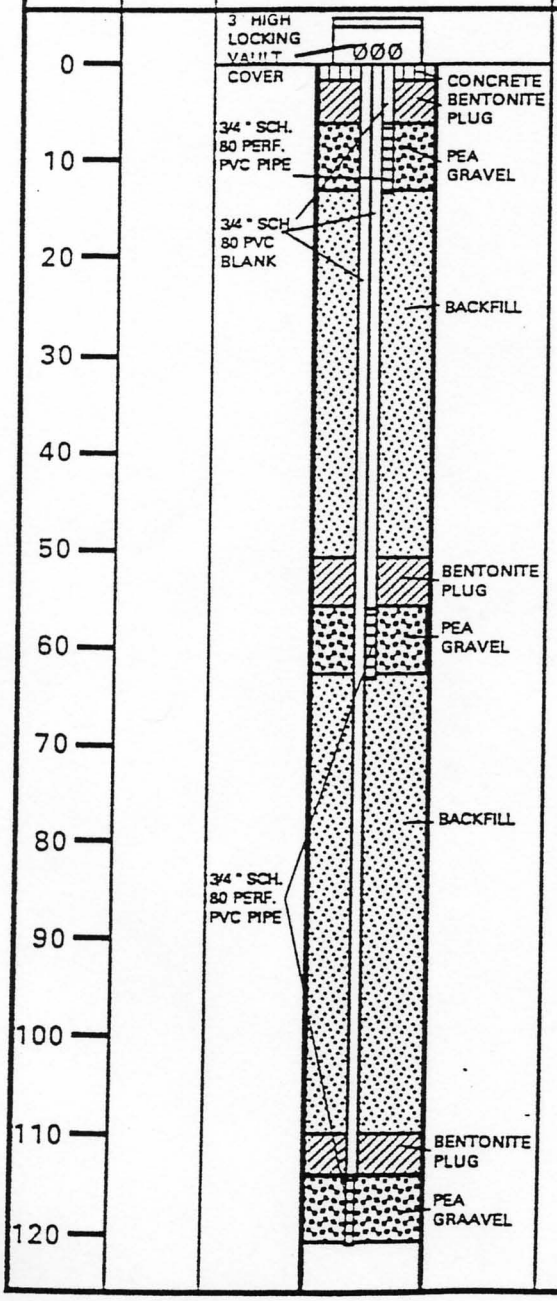
PROJECT: PERIMETER PROBES
HOLE / WELL # : GP7
LOCATION : CHIQUITA CANYON LANDFILL
DIAMETER : 8 "
JOB NUMBER : 0194204.00
TOTAL DEPTH : 60 '
GEOLOGIST / ENGINEER : B. BENSON
DATE STARTED : APRIL 7, 1995
DRILLER : DISCOVERY DRILLING
DATE COMPLETED : APRIL 7, 1995
DRILL RIG :
SAMPLING DEVICE :
DRILLING METHOD : AIR ROTARY
PAGE : 1 OF 1

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / 6 INCHES	USCS SYMBOL	DESCRIPTION
0						
					C L	LIGHT BROWN SILTY CLAY, GRAVELLY < 1/4 " Ø
10					M L	LIGHT GRAY SILTY SANDSTONE, FINE SANDS, SOME MEDIUM SANDS
20						
30						
40						
50						
60						60 ' - SANDSTONE, FINE SAND, TRACE MEDIUM AND COARSE SAND; BORING OVERDRILLED TO 62 '
70						
80						
90						
100						
110						

BORING LOG

SCS ENGINEERS
Environmental Consultants
3711 Long Beach Blvd.
Ninth Floor
Long Beach, CA
90807-3315
(310) 426-9544
FAX (310) 427-0805

PROJECT: PERIMETER PROBES
HOLE / WELL # : GP8
LOCATION : CHIQUITA CANYON LANDFILL
DIAMETER : 8 "
JOB NUMBER : 0194204.00
TOTAL DEPTH : 120 '
GEOLOGIST / ENGINEER : B. BENSON
DATE STARTED : APRIL 8, 1995
DRILLER : DISCOVERY DRILLING
DATE COMPLETED : APRIL 8, 1995
DRILL RIG :
SAMPLING DEVICE :
DRILLING METHOD : AIR RO TARY
PAGE : 1 OF 1



DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / 6 INCHES	USCS SYMBOL	DESCRIPTION
					C L	LIGHT BROWN SILTS AND CLAYS, SOFT DRILLING
					S M	LIGHT GRAY SILTY SANDSTONE
					S M	SAND STONE, FINE SANDS
					S M	LIGHT GRAY SANDSTONE, FINE SAND WITH SOME MEDIUM SAND
					G C	LIGHT GRAY SANDSTONE, FINE SAND WITH SOME MEDIUM AND COARSE SAND, HARD DRILLING
					G P	LIGHT GRAY SANDSTONE, FINE SAND WITH SOME MEDIUM AND COARSE SAND, 1/4 " - 1/2 " Ø ANGULAR MATERIAL
					G C	SANDSTONE WITH SOME GRAVELS
						TD = 120 '

GEOTECHNICAL INVESTIGATION

MASTER PLAN REVISION

CHIQUITA CANYON LANDFILL

CASTAIC, CALIFORNIA

FOR

CHIQUITA CANYON LANDFILL

JANUARY 27, 2012

JOB NO. 2002-036-004

VOLUME 1 OF 2

RTF&A

GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

January 27, 2012

Chiquita Canyon Landfill
29201 Henry Mayo Drive
Castaic, California 91384

Job No. 2002-036-004

Attention: Mr. Michael Dean
District Manager

Gentlemen:

We are pleased to submit our report of "Geotechnical Investigation, Master Plan Revision (MPR), Chiquita Canyon Landfill, Castaic, California" for the site. This report summarizes our opinions on the stability of slopes planned for the proposed landfill development, and for slopes associated with the entrance road area.

Based on the current field conditions and our knowledge of the site geologic conditions, the proposed Master Plan Revision development will be safe from hazard of landslide, settlement, or slippage, and will not adversely affect the geotechnical conditions of off-site properties, provided our recommendations and the requirements of the Los Angeles County Building Code are followed.

Our report incorporates the latest Golder Associates (Golder) Excavation Plan, dated November 2011. This geotechnical report supersedes our August 12, 2011 report, which was based on Golder's April 2011 plan.

-oOo-

R. T. FRANKIAN & ASSOCIATES
1329 SCOTT ROAD BURBANK CALIFORNIA 91504
TEL. (818) 531-1501 FAX (818) 531-1511 WWW.RTFRANKIAN.COM

If you should have any questions regarding this report please feel free to contact us.

Respectfully submitted,

R. T. FRANKIAN & ASSOCIATES

PROFESSIONAL GEOLOGIST NO. 3749
TIMOTHY P. LATIOLAIT
#1140
CERTIFIED
ENGINEERING
GEOLOGIST
Expires: 12-31-13
STATE OF CALIFORNIA

by: Timothy P. Latiolait
Principal Engineering Geologist

PROFESSIONAL GEOLOGIST NO. 4407
THEODORE M. CLARK
#1736
CERTIFIED
ENGINEERING
GEOLOGIST
EXPIRES: 4-30-12
STATE OF CALIFORNIA

and: Theodore M. Clark
Principal Geologist

REGISTERED PROFESSIONAL ENGINEER
ALAN W. RASPLICKA
No. GE 2558
Exp. 6/30/13
GEOTECHNICAL
STATE OF CALIFORNIA

and: Alan W. Rasplicka
Principal Geotechnical Engineer

TPL/TMC/AWR/eaw

Distribution: (2) Chiquita Canyon Landfill (plus CD containing PDF file)
Attn: Mr. Michael Dean
(1) Law Offices of Scott Gordon (plus CD containing PDF file)
Attn: Mr. Scott Gordon
(2) CH2M Hill (plus CD containing PDF file)
Attn: Mr. Jim Hunter
(1) Golder Associates (plus CD containing PDF file)
Attn: Mr. Rich Haughey
(1) SCS Engineers (plus CD containing PDF file)
Attn: Mr. Robert Johnson

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

Chiquita Canyon Landfill
January 27, 2012
2002-036-004

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GEOTECHNICAL INVESTIGATION

MASTER PLAN REVISION

CHIQUITA CANYON LANDFILL

CASTAIC, CALIFORNIA

FOR

CHIQUITA CANYON LANDFILL

JANUARY 27, 2012

JOB NO. 2002-036-004

INTRODUCTION

This report presents the results of R. T. Frankian & Associates (RTF&A) geotechnical investigation for the Master Plan Revision (MPR) for the Chiquita Canyon Landfill (CCL). The investigation was performed at the request of Mr. Michael Dean of CCL and is based on the November 2011 *Excavation Plan* for the MPR, prepared by Golder Associates (Golder) and presented in Appendix A. The MPR includes extending the currently approved landfill footprint into the areas northeast and south of the active Main Canyon landfill, the relocation of the entrance road, and changes to the existing south and east sedimentation basins. The report summarizes our opinions on the stability of slopes planned in the following areas:

- northeast of the Main Canyon landfill, where the MPR grading limits include the lined landfill area, permanent cut slopes above the landfill perimeter, and grading for the east stormwater basin; and

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- south of the Main Canyon landfill, where the MPR grading limits include the lined landfill area, permanent cut slopes above the landfill, grading for the south stormwater basin, and the future entrance road south of Primary Canyon.

This geotechnical report does not, however, address future grading within the MPR areas designated as "Potential Borrow Area" and "MRF and Household Hazardous Waste Facilities Location."

This report presents the results of RTF&A's evaluation of the geologic and geotechnical conditions at the subject site. The purpose of the evaluation is to identify existing or potential geologic hazards and substantiate that the site is suitable for the proposed development from a geotechnical and geologic perspective. This data is provided for incorporation into an Environmental Impact Report (EIR). Our findings and recommendations are based on the results of our site geologic mapping and subsurface investigation, review of published data, and appropriate engineering and geologic analyses. The assessment of general site environmental conditions for the presence of contaminants in the soils and groundwater at the site was beyond the scope of this investigation.

Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers and geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional advice included in this report. This report has been prepared for CCL and their design consultants, to be used solely for planning and design of the MPR and associated grading.

PROJECT DESCRIPTION

NORTH AND EAST CANYON EXCAVATION AREA

The North and East Canyon Excavation Area will encompass northern portions of the property known as North Canyon and East Canyon. In this area, the MPR extends the lined landfill footprint north and northeast of the active Main Canyon landfill and includes a proposed east stormwater basin in the vicinity of the existing east sedimentation basin. The MPR grading plan includes permanent cut slopes above the perimeter of the proposed landfill, lined cut slopes and fill slopes within the landfill area, and permanent cut slopes above the proposed east basin. The proposed landfill liner limit is approximately coincident with the downslope side of the perimeter road.

North Canyon is located in the north portion of the site, just north of the active Main Canyon landfill (Figure 1). The topography of the North Canyon site is dominated by a southerly-draining canyon with moderately-steep bedrock slopes forming the west, north, and east canyon walls. These slopes descend to the canyon bottom at an overall gradient of approximately 1½:1 (horizontal:vertical). The floor of the canyon has been modified by at least two episodes of filling, including fill placed in the mid-1990s during construction of Canyon C Cell 2, and in 2003-2004 when fill material was generated during removal of the Northridge earthquake landslide. As much as 70± feet of fill has been placed in North Canyon since the 1990s, changing the canyon configuration from a steeply-incised canyon to one that is somewhat broad and flat-bottomed.

The East Canyon topography is characterized by a series of southerly- to easterly-descending ridges that border two southerly-draining tributaries of Castaic Creek. The natural slopes descend toward the two canyons at gradients ranging generally from 1½:1 to 3:1. The northern portion of the East Canyon includes an existing 3:1 southeasterly-facing 180± feet high fill slope constructed for two off-site water tanks. Approximately two-thirds of the fill slope is located within the CCL property.

Existing site elevations range from approximately 1,660 feet above mean sea level (msl) at the upper reaches of North Canyon to 1,100 feet msl at the confluence of the two tributary canyons of Castaic Creek.

The North and East Canyon Excavation Area extends from the northwest corner of CCL (above the perimeter road of Main Canyon landfill) to the eastern property line, immediately north of Canyon "B" landfill and northwest of the post office. The proposed floor of the excavation will range from approximate elevations 1,175 feet msl to 1,125 feet msl. Numerous cut slopes will be graded as part of the North and East Canyon development. Proposed slope gradients will range from 2:1 to 4:1. The maximum proposed cut slope height will be approximately 300 feet.

The location of North and East Canyon areas are shown on the Geotechnical Map, North and East Canyon Excavation Area (Figure 2.1).

SOUTH MAIN CANYON AND ENTRANCE ROAD

The South Main Canyon and Entrance Road areas lie within the southwest portion of the property. The geologic/geotechnical conditions within South Main Canyon were previously addressed by RTF&A in our November 20, 2009 report (RTF&A, 2009b); the geologic/geotechnical conditions along the Entrance Road were presented in RTF&A's January 13, 2012 report (RTF&A, 2012b). In the South Main Canyon area, the MPR grading plan includes extending the lined landfill footprint south of the active Main Canyon landfill. The proposed MPR entrance road is east of the existing landfill entrance, along the south side of the closed Primary Canyon landfill.

The South Main Canyon includes the main southerly-draining canyon, an easterly-draining tributary canyon, and ascending canyon slopes, located northwest of an existing sedimentation basin. Natural slope gradients range from 1½:1, for the slopes at the head of the canyon, to 4:1. Elevations range from approximately 1,330 feet msl to 980 feet msl.

A new stormwater basin is proposed for the South Main Canyon area, coinciding with the footprint of the existing sedimentation basin, with the basin bottom established at approximate elevation 965 feet msl. Side slopes for this basin will be graded at an inclination of 2:1 and attain a maximum height of approximately 125 feet.

A new landfill Entrance Road is proposed in the southwest corner of the site, with the road alignment beginning at the current intersection of Franklin Parkway and Wolcott Way, extending west-southwesterly toward the current landfill entrance. The topography along the proposed Entrance Road is characterized by a relatively flat alluviated area along the north side of State Highway 126, bordering moderately to steeply-ascending bedrock slopes. Cut-and-fill grading will be utilized for the Entrance Road, including south- and west-facing cut slopes up to 160 feet high. Proposed slope grades will range from 1½:1 to 2:1.

The South Main Canyon area and the future Entrance Road are depicted on the Geotechnical Map, South Main Canyon and Entrance Road (Figure 2.2).

SUBSURFACE EXPLORATION

Field exploration was conducted within the project site to develop and refine our understanding of the geologic surface and subsurface conditions. In particular, attention was focused on the underlying geologic structure and stratigraphy that will affect the slope stability of the proposed excavation plan. The explorations were conducted within North Canyon (for this current MPR investigation), East Canyon (RTF&A, 2006a and 2006b), South Main Canyon (RTF&A, 2009a), and the area of the future Entrance Road (RTF&A, 2012b).

The North Canyon investigation included exploring the subsurface conditions beneath the site by excavating 10 bucket auger borings (designated Borings B-1-10 through B-7-10, B-9-10, and B-11-10) and four hollow-stem auger borings (designated HS-1-10 through HS-4-10). The East Canyon investigation included the excavation of

eight bucket auger borings, designated B-1-03 through B-8-03. The South Main Canyon investigation included the excavation of three bucket-auger borings (B-1-09 through B-3-09) and three rotary-wash borings (WB-1-09 through WB-3-09). Investigation of the Entrance Road consisted of exploring the subsurface conditions by excavating six bucket auger borings (designated Borings B-8-10 and B-1-11 through B-5-11).

We obtained undisturbed samples from the borings for laboratory examination and testing. Standard Penetration Test (SPT) samples were also obtained from the hollow-stem auger borings.

The locations of the various borings are depicted on the Geologic Map, presented as Figure 1, and the Geotechnical Map, Figures 2.1 and 2.2. The logs of the borings are presented in Appendix B.

The surface geologic conditions within the landfill were previously mapped by EMCON (1990a), Harding Lawson and Associates (1987), and GeoLogic Associates (2005c), and mapped at a regional scale by professionals of the Dibblee Foundation (1993), the United States Geological Survey (USGS) (Winter and Durham, 1962), and California Division of Mines and Geology (CDMG) (Barrows, 1986).

LABORATORY ANALYSES

We performed laboratory tests on selected samples obtained from the borings to aid in the classification of the soils, for use in slope stability analyses, and to determine the pertinent engineering properties of the subsurface earth materials. The following tests were performed:

- moisture content and dry density determinations;
- direct shear tests;
- consolidation tests;
- plasticity index; and
- grain size analyses.

The results of the tests are presented in Appendix C.

GEOLOGY

REGIONAL GEOLOGY

CCL is located at the eastern end of the Ventura basin within the Transverse Ranges geomorphic province of California. The Ventura basin consists of a narrow, elongate sedimentary trough extending from the Santa Barbara Channel on the west to the San Gabriel fault on the east. The axis of the trough trends east-west, reflecting the overall east-west trend of the Transverse Ranges, and generally coincides with the Santa Clara River Valley and Santa Barbara Channel. The Ventura basin has been an area of subsidence and sediment accumulation since the beginning of the Tertiary period, with the present trough-like form developing near the beginning of the Miocene epoch (Winterer and Durham, 1962).

The structure of the basin is defined as a highly folded "synclinorium" formed by north-south compressional forces (Kew, 1924) and containing a maximum 50,000± feet of marine and nonmarine Tertiary through Quaternary age sediments (Bailey and Jahns, 1954). Two main periods of general deformation of the Ventura basin are indicated by the regional geologic structure: one in middle to late Miocene (represented by deposition of the Modelo Formation) and the other during the Pleistocene epoch, after deposition of the Plio-Pleistocene Saugus Formation (Kew, 1924; Winterer and Durham, 1962; Yeats et al., 1994). The flanks of the Ventura basin synclinorium are broken by a series of large reverse/thrust faults including the Santa Susana and Oak Ridge faults on the southern flank, and the Red Mountain and San Cayetano faults on the northern flank (Bailey and Jahns, 1954; Yeats et al., 1994). The San Gabriel fault, the dominant geologic feature in the Santa Clarita Valley, forms the eastern Ventura basin boundary and separates the Ventura basin from the structurally similar Soledad basin.

Sedimentary rock units comprising the eastern Ventura basin include approximately 2,000 feet of undifferentiated middle to late Eocene age rocks; 1,000± feet of the middle Miocene age Topanga Formation; 5,000± feet of the late Miocene age Modelo Formation; 4,000± feet of the late Miocene to early Pliocene age Towsley Formation; 5,000± feet of the Pliocene age Pico Formation; and 7,000± feet of the Plio-Pleistocene Saugus Formation (Winterer and Durham, 1962). The undifferentiated Eocene units and the Topanga, Modelo, Towsley, and Pico formations are composed of marine sediments; the Saugus Formation is composed of interfingering shallow-water marine, brackish water, and nonmarine units (Kew, 1924; Winterer and Durham, 1962). These Tertiary period rocks rest unconformably on pre-Cretaceous age metamorphic and igneous basement rocks of the San Gabriel Mountains.

Within the Santa Clarita Valley, the primary sedimentary rock formations are the Pico and Saugus formations. The Pico Formation outcrops along the northern flanks of the Santa Susana Mountains and in the Chiquita Canyon-Val Verde area. The Saugus Formation overlies the Pico Formation and comprises most of the hills of the valley between Newhall and Castaic. These two formations have been deformed into a series of closely spaced anticlines and synclines whose moderately to steeply-dipping flanks are broken by the Holser fault and cut off diagonally by the San Gabriel fault (Bailey and Jahns, 1954). Other geologic materials exposed within the valley include Pleistocene fanglomerate deposits of the Pacoima Formation (exposed in the southern portion of the valley) (Oakeshott, 1958), sporadic remnant terrace deposits of Pleistocene age, and Holocene alluvium mantling the valley floor.

The site is located within a region of high seismic activity primarily related to the active San Cayetano, Oak Ridge, Santa Susana, and San Gabriel faults, all of which are located within six miles of the site. Secondary, potentially active faults near the site include the nearby Holser fault.

LOCAL GEOLOGY

The site is situated on the northerly limb of the Ventura basin "synclinorium," approximately 1,000 feet south of the Holser fault. The Holser fault is a regional structure and may branch from the active San Gabriel fault (Winterer and Durham, 1962). Data compiled from oil company well logs indicate that the Holser fault is a south-dipping reverse fault with approximately 2,200 feet of dip-slip separation within the area of the Castaic Junction Oil field (Stitt, 1986). Studies completed by Allen E. Seward Engineering Geology (Seward, 1986 and 1993) examined the Holser fault for Holocene activity in the Hasley Industrial Park north of the site. Seward (1986) concluded that while deformation of the fault has clearly affected Quaternary sediments of the Saugus Formation, no offset has occurred in the overlying Holocene sediments.

The geologic structure beneath the site is dominated by four subparallel northwest-southeast trending, through-going folds. The folds are related to the north-south compressional forces within the hanging wall of the Holser fault system, which lies north of the study site. The axial traces of the folds are shown on the Geologic Map, Figure 1. Two of the through-going folds, consisting of an anticline on the south and a syncline to the north, transect the North and East Canyon Excavation Area. The geologic structure beneath the site is shown on the Site Geologic Sections, presented as Figure 3.

Geologic mapping of the site was previously performed by RTF&A in 2003 and 2004 as part of our Slope Stability Study and Geologic Fault Study for East Canyon (RTF&A, 2006a and 2006b). Additional geologic mapping was performed during our 2010 site exploration. The geologic units identified within the site during the geologic mapping are discussed below.

GEOLOGIC UNITS

The soil and bedrock materials encountered within the site consist of man-made deposits, alluvium, landslide debris, terrace deposits, and bedrock units of the Saugus and Pico formations. The various geologic units exposed within the landfill are depicted on the 1" = 200 feet Geologic Map, Figure 1. Units specific to the North and East Canyon Excavation Area and the South Main Canyon Entrance Road are presented on the 1" = 100 feet Geotechnical Maps, included as Figures 2.1 and 2.2, respectively. A description of each unit is presented as follows:

Man-made Deposits (af, afr, afs and cef): Man-made deposits consist of uncompacted artificial fill (map unit "af") and compacted (or certified) engineered fill (map unit "cef") associated with past grading activities on-site, and artificial fill materials related to landfill refuse disposal activities including stockpile fill (map unit "afs") and refuse fill (map unit "afr"). The fill materials are composed primarily of reworked Pico and Saugus Formation units and, in the case of the refuse fill, compacted municipal solid waste and associated cover materials primarily derived from reworked Pico and Saugus Formation materials.

Alluvium (Qal): Holocene age alluvium ("Qal") is present in the canyons and major drainage courses within the site and as Santa Clara River flood plain deposits adjacent to State Highway 126. As observed, the alluvium generally consists of sand and silty sand with scattered gravel and cobbles, derived from local bedrock exposures. The alluvium is generally loose to moderately dense and uncemented.

Older Alluvium (Qoa): Pleistocene age (older) alluvium ("Qoa") is limited to the southerly-draining tributary in the East Canyon area, immediately west of landslide Qols A. The older alluvium is composed of unconsolidated to poorly consolidated mixtures of sand, gravel, silt, and clay.

Terrace Deposits (Qt): Pleistocene age terrace deposits occur on-site along State Highway 126 southeast of the existing landfill entrance and as isolated and limited

remnant stream channel deposits. The terrace deposits are typically composed of poorly consolidated deposits of coarse sand, gravel and silt with cobbles, and, to a lesser extent, boulders.

Landslide Debris (Qd, Qls, Qols): Three types of deposits attributable to slope failure have been identified at the site, and these consist of debris flow deposits (Qd), Holocene landslides (Qls), and a Pleistocene landslide (Qols). The debris flow deposits are derived from weathered bedrock and slope wash materials and consist of unconsolidated sand, silt, and clay. These deposits typically occur within ravines and on slopes steeper than approximately 2:1.

Materials designated as Holocene landslide debris range from poorly consolidated, highly weathered rock materials to relatively coherent, moderately hard to hard sandstone, siltstone, and claystone units derived from the underlying Saugus or Pico formations. Depending on the amount of movement, the entire landslide or the upper portions of the landslide debris are disturbed.

The central portion of the East Canyon is mantled by an older landslide deposit (Qols) that appears to be comprised of older alluvium as well as Pico and Saugus Formation materials.

Saugus Formation (QTs): Plio-Pleistocene age non-marine sedimentary rock units of the Saugus Formation ("map unit "QTs") outcrop in the eastern and southern portions of the site. Saugus Formation units typically consist of poorly to moderately well-bedded, light yellowish brown to pinkish gray, fine- to coarse-grained, pebble- to cobble-bearing sandstone and silty sandstone with moderate brown siltstone to clayey siltstone. This formation is poorly to moderately well-bedded and ranges from friable to moderately hard. The fine-grained clayey beds, typical of the lower Saugus Formation, represent some of the weakest material within the formation.

Pico Formation (Tp): Marine sedimentary rock units of the Pliocene age Pico Formation (map unit "Tp") are exposed in the northern and western portions of the site.

These units are comprised of grayish orange to light gray sandstone, yellowish gray to yellowish brown siltstone, and limited brownish gray fossiliferous siltstone and sandstone. These units range from soft near the surface to moderately hard at depth. The fossiliferous beds tend to be more resistant than surrounding units, as indicated by the prominent, ridge-forming fossiliferous siltstone ("Ridge-Forming Coquina") near the mouth of North Canyon.

The Pico formational contact with the overlying Saugus Formation is interfingering, gradational, and not always readily discernible, particularly in exploratory borings. Within the site and for the purposes of this study, RTF&A has defined the top of the Pico Formation as the first appearance of fossiliferous beds. Where fossiliferous beds are missing from the stratigraphic section, we have defined the contact using color as an indicator. In particular, the presence of Munsell hues "5Y" is more common within the Pico Formation and may indicate the approximate contact with the Saugus Formation.

GROUNDWATER

Groundwater occurs in both the Saugus and Pico formations in the Chiquita Canyon area. In these sedimentary rocks, groundwater is present primarily in the intergranular porosity, with the more permeable, coarser-grained sandstone and conglomeratic units yielding more water than the siltstone and finer-grained sedimentary rocks.

Beneath most of the site, the uppermost water-bearing unit is the Saugus Formation, except in the northwest area approximately coincident with the Pico Formation outcrop area (Figure 1). The majority of the groundwater monitoring wells and piezometers are completed in the Saugus Formation, where the depth to groundwater ranges from approximately 33 feet at well DW-7 to 345 feet at well DW-23. Groundwater elevations in Saugus wells vary from near 920 feet msl along the south

property line (DW-7 and DW-12) to 1,080 feet msl in the East Canyon (DW-26 and PZ-7). Seasonal groundwater elevation variations are less than a few feet at most hillside locations, with greater fluctuations in wells along canyon bottoms.

Groundwater is also present in the Pico Formation. Eight monitoring points (DW-8, DW-19, DW-25, DW-27, DW-28, PZ-5, PZ-6, and PZ-8) have been completed in the Pico Formation (Figure 1). Groundwater depths range from approximately 72 feet at PZ-6 in the East Canyon to 335 feet at DW-28 on the slope of the northwest ridgeline. Pico Formation groundwater elevations vary from about 1,105 feet msl in the East Canyon (PZ-6) to 1,221 feet msl in the North Canyon (PZ-8). The seasonal groundwater elevation variations are less than a few feet at wells DW-8, DW-19, DW-25, and PZ-5. Piezometer PZ-6, located in the bottom of the East Canyon, showed a greater seasonal groundwater elevation fluctuation of over 10 feet.

SLOPE STABILITY

GENERAL

Twenty cut slopes are planned for development of the North and East Canyon Excavation Area; six cut slopes are proposed for the South Main Canyon and Entrance Road. In both areas, the proposed landfill liner limit is approximately coincident with the downslope side of the perimeter road, shown on Figures 2.1 and 2.2. The cut slopes are designated Cut Slope CS-1 through Cut Slope CS-25, with locations shown on Figures 2.1 and 2.2. Proposed cut slope gradients will range from 2:1 to 4:1. The maximum cut slope height is approximately 300 feet (Cut Slope CS-1). The lower 200 feet of this cut slope will be lined and eventually buried by refuse. Cut Slope CS-24 is the highest proposed permanent cut slope, with a permanent height of approximately 225 feet. Data specific to all of the cut slopes, including slope height, gradient, and underlying geologic conditions are summarized in Table 1, Summary of Cut Slopes.

Natural slopes within the site are underlain by bedrock of the Pliocene age Pico

Formation and the younger Plio-Pleistocene age Saugus Formation. Collectively, these formations are composed of bedded sedimentary rock units. Claystone units are common within both formations. These claystone units are most likely responsible for the landslides within the site, including the landslide complex located in East Canyon (landslides Qls G through Qls L, Figure 2.1).

Bedding planes within the Pico Formation are well developed and are poorly to moderately well developed within the Saugus Formation. The bedding can constitute planes of weakness. Where bedding is adversely oriented, or "daylighted," with respect to natural or cut slopes, potential for "block-glide" failure exists. Block-glide slides are common within both the Saugus and Pico formations.

STABILITY ANALYSES

Slope stability analyses were performed using the program Slope/W by GEO-SLOPE International Ltd., which utilized Spencer's or Bishop's Method. Within Los Angeles County, a static factor of safety of 1.5 and a seismic factor of safety of 1.1 is required for permanent slopes. The MPR excavation slopes outside of the lined landfill footprint are considered permanent slopes. Within the landfill liner limit, the temporary excavation slopes will be lined and eventually covered with refuse. We understand that for a particular lined cut slope, the local placement of refuse may continue for several years before the final landfill grade is attained. However, there will not be any structures or access by the public below these temporary slopes. Within Los Angeles County, temporary slopes are required to meet a static factor of safety of 1.25, which was utilized in this report for the evaluation of the excavation plan for slopes that are proposed to be lined.

The slope stability evaluation presented in this report addresses the proposed slopes indicated on the MPR Excavation Plan (Appendix A) associated with construction of the landfill liner, the east and south stormwater basins, and the entrance road. We

understand that the static and seismic stability of the MPR landfill liner and the refuse fill will be evaluated by Golder Associates.

SHEAR STRENGTH PARAMETERS

The recommended shear strength parameters are based on the results of the direct shear test results, presented in Appendix C, performed on representative samples of the earth materials encountered within our exploratory borings. In addition, we also reviewed shear strength parameters presented in the referenced reports for the subject site and nearby vicinity. The plots of peak, single shear residual (SSR), and multi-shear residual (MSR), as appropriate, are presented on the attached direct shear test summaries. Presented below are the selected bedding plane shear strengths, as well as the cross-bedding and compacted fill shear strengths recommended for slope stability evaluation at the site.

MATERIAL	COHESION (psf)	ANGLE OF SHEARING RESISTANCE (degrees)
Landslide Failure Plane (MSR)	100	10
QTs & Tp Bedding Plane (MSR)	200	18
QTs Cross Bedding (SSR)	600	36
Tp Cross Bedding (SSR)	500	30
Compacted Fill (SSR)	350	30

GEOLOGIC SECTIONS AND ASSUMED CRITICAL FAILURE SURFACE

The analyses were based on subsurface conditions, as depicted on the Geologic Sections, Figures 4.1 and 4.2. The existing topography, proposed grading scheme, and subsurface geologic structure are shown on the attached Geologic Sections. Where Geologic Sections traverse the proposed landfill perimeter, the lined slopes (temporary slopes within the landfill footprint) and permanent slopes (above the landfill perimeter) are also designated. For analyses where the location of weak bedding planes is unknown

or uncertain, one is assumed to be located at the critical location, typically near the toe of the slope. Although the highest measured groundwater level is indicated on the Geologic Sections, the analyses generally assumed a phreatic surface above the critical failure surface for bedding plane failures. The critical failure surfaces and factors of safety are added to the Geologic Sections for presentation as Geotechnical Sections in this report. The Geotechnical Sections and Slope Stability Analyses results are presented as Figure 5. The slope stability calculations are presented in Appendix D.

RESULTS OF STABILITY ANALYSES

Cut Slope CS-1: Cut Slope CS-1 (Figure 2.1) will be graded as a south- to southeast-facing, 2:1 slope. The total slope height is approximately 300 feet. The upper 200 feet of the slope (above the proposed perimeter road) is planned as a permanent cut slope; the lower 100 feet of the slope (below the perimeter road) will be lined in the future and covered by waste. The cut slope will expose Pico Formation units in which the underlying bedding strikes generally east-west to east-northeast and dips 36 to 50 degrees to the south. As depicted on Geologic Section S11-S11' (Figure 4.1), the bedding is favorably oriented with respect to Cut Slope CS-1, and the cut slope is considered grossly stable from a geologic standpoint.

Cut Slope CS-2: Cut Slope CS-2 (Figure 2.1) is proposed as a south-southeast-facing, 2:1 slope. The total slope height is approximately 150 feet, with the upper (permanent) portion of the cut slope approximately 80 feet high and the lower (lined) portion of the slope 70 feet high. The cut slope will expose Pico Formation units in which the underlying bedding strikes generally east-northeast and dips 40 to 47 degrees to the southeast. As depicted on Geologic Section S12-S12' (Figure 4.1), this bedding orientation is favorable with respect to Cut Slope CS-2, and the cut slope is considered grossly stable from a geologic standpoint.

Cut Slope CS-3a: Cut Slope CS-3a (Figure 2.1) is proposed as a south- to east-southeast-facing, 2:1 slope. The total slope height is approximately 220 feet, with the upper (permanent) portion of the cut slope approximately 175 feet high and the lower (lined) portion of the slope 45 feet high. Bedding within the underlying Pico Formation strikes east-northeast and dips 39 to 52 degrees toward the southeast. As depicted on Geologic Section S26-S26" (Figure 4.2), a 19-degree bedding component is defined by a distinctive marker bed, identified as a "Ridge-Forming Coquina." The 19-degree bedding is essentially parallel to the apparent slope gradient, as reflected on the Geologic Section, and Cut Slope CS-3a is considered grossly stable from a geologic standpoint.

Cut Slope CS-3b: Cut Slope CS-3b (Figure 2.1) will be graded as an east-southeast-facing, 2:1 slope to a height of approximately 75 feet. The entire slope represents a temporary slope that will be lined and eventually buried by waste. As depicted on Geologic Section S26-S26' (Figure 4.2), bedding within the underlying Pico Formation strikes generally east-west and dips approximately 58 degrees toward the south, resulting in an apparent dip of 33 degrees south, relative to the proposed cut slope. As the apparent bedding dips steeper than the proposed cut slope gradient, Cut Slope CS-3b is considered grossly stable from a geologic standpoint.

Cut Slope CS-4: Cut Slope CS-4 (Figure 2.1) will be graded as a 2:1 to 4:1, southeast-facing cut slope. The overall slope height is approximately 210 feet, with the proposed permanent and lined portions of the slope approximately 120 feet and 90 feet high, respectively. The cut slope will expose Pico Formation units, landslides Qls E and Qls F, and artificial fill. The bedding in the underlying Pico Formation strikes generally northwest to north-south and dips 25 to 40 degrees to the south and east. As depicted on Geologic Section S16-S16' (Figure 4.1), the bedding is essentially parallel to the slope gradient, as reflected on the Geologic Section, and Cut Slope CS-4 is considered grossly stable from a geologic standpoint.

The proposed cut slope will remove Qls E and the artificial fill. Qls F, which underlies the artificial fill in the area of the cut slope, will also require removal during grading. Any removals exceeding proposed grade will require restoration of grade by placement of certified engineered fill.

Cut Slope CS-5: Cut Slope CS-5 (Figure 2.1) is proposed as a southeast- to south-facing, 2:1 to 3:1 slope. The total slope height is approximately 120 feet, with the upper (permanent) portion of the cut slope approximately 30 feet high and the lower (lined) portion of the slope 90 feet high. The cut slope will encounter Pico Formation units, landslide Qls F, and artificial fill. Bedding within the underlying Pico Formation strikes northeast and dips 27 to 33 degrees toward the southeast. As depicted on Geologic Section S15-S15' (Figure 4.1), a 24-degree bedding component is adversely oriented, or "daylighted," with respect to Cut Slope CS-5. Stability analyses performed for potential failure along the adversely oriented bedding indicate that the proposed cut slope exceeds the temporary factor of safety requirements of 1.25. The slope stability results are indicated on the Geotechnical Sections (Figure 5), and the slope stability calculations are presented in Appendix D.

Landslide Qls F and artificial fill, depicted on Geologic Section S24-S24' (Figure 4.2), should be removed to elevation 1,400 feet msl. Proposed slope grades should then be re-established with compacted fill as a stability fill. The need for backdrains above the proposed landfill liner should be evaluated during grading operations. The stability fill and backdrains should be constructed in accordance with the recommendations presented in this report and as shown on Figure 6 – Stability Fill Details for Grossly Stable Slopes.

Cut Slope CS-6: Cut Slope CS-6 (Figure 2.1) will be graded as a south-southeast-facing, 2½:1 to 3:1 slope. The overall slope height is approximately 290 feet, with the proposed permanent and lined portions of the slope approximately 95 feet and 195 feet high, respectively. The cut slope will encounter Pico and Saugus Formation

units and landslide Qls H through Qls J. Strike of the bedding in the underlying formations ranges from northwest to northeast, with easterly dips between 16 and 44 degrees. As indicated on Geologic Sections S17-S17' (Figure 4.1) and S20-S20' (Figure 4.2), a bedding component ranging from 19 to 25 degrees will likely be exposed in the cut slope. Stability analyses performed for potential failure along the adversely oriented bedding indicate that the proposed cut slope exceeds the temporary factor of safety requirements of 1.25. The slope stability results are indicated on the Geotechnical Sections (Figure 5), and the slope stability calculations are presented in Appendix D.

It is anticipated that grading of Cut Slope CS-6 will remove Qls H through Qls J. If any landslide debris remains after completion of the cut slope, the debris should be removed and compacted fill placed to restore grade.

Cut Slope CS-7: Cut Slope CS-7 (Figure 2.1) will be graded as a southeast- to southwest-facing, 2:1 to 3:1 slope. The total slope height is approximately 205 feet high, with the upper (permanent) portion of the cut slope approximately 35 feet high and the lower (lined) portion of the slope 170 feet high. The cut slope will encounter Saugus Formation units and landslides Qls G through Qls I, and Qls L. Bedding in the underlying Saugus Formation strikes from north-south to northeast with easterly dips between 20 and 40 degrees. As indicated on Geologic Section S5-S5' (Figure 4.1), a daylighted bedding component of 17 degrees will be exposed in the cut slope. Stability analyses performed for potential failure along the adversely oriented bedding indicate that proposed cut slope exceeds the temporary factor of safety requirements of 1.25. The slope stability results are indicated on the Geotechnical Sections (Figure 5), and the slope stability calculations are presented in Appendix D.

It is anticipated that grading of Cut Slope CS-7 will remove landslides Qls G through Qls I, and Qls L. If any landslide debris remains after completion of the cut slope, the debris should be removed and certified engineered fill placed to restore grade.

Cut Slope CS-8: Cut Slope CS-8 (Figure 2.1) is proposed as a southwest-facing, 2:1 slope. The total slope height is approximately 225 feet, with the upper (permanent) portion of the cut slope approximately 75 feet high and the lower (lined) portion of the slope 150 feet high. The cut slope will encounter Saugus Formation units in which the underlying bedding strikes northwest to northeast and dips 20 to 53 degrees toward the east. This bedding orientation is favorable with respect to Cut Slope CS-8, and the cut slope is considered grossly stable from a geologic standpoint.

Cut Slope CS-9: Cut Slope CS-9 (Figure 2.1) will be graded as a 150-feet-high, 2:1, south-facing slope. The entire slope represents a temporary slope that will be lined and eventually buried by waste. The cut slope will encounter Saugus Formation units, landslides Qls N and Qls O, and Pleistocene (older) landslide Qols A. The axis of an easterly-plunging syncline will cross the footprint of Cut Slope CS-9. Bedding on the north flank of the syncline, relative to the cut slope, strikes north-south to northeast and dips 23 to 31 degrees to the east; bedding along the south flank of the syncline strikes northwest and dips 30 to 50 degrees to the northeast. As depicted on Geologic Sections S19-S19' and S25-S25' (Figure 4.2), this bedding orientation is unfavorable relative to stability of Cut Slope CS-9. Stability analyses performed for potential failure along the adversely oriented bedding indicate that the proposed cut slope exceeds the temporary factor of safety requirements of 1.25. The slope stability results are indicated on the Geotechnical Sections (Figure 5), and the slope stability calculations are presented in Appendix D.

It is anticipated that grading of Cut Slope CS-9 will remove Qols A and Qls O. If any debris remains from these two landslides after completion of the cut slope, the debris should be removed and compacted fill placed to restore grade. The upper portion of Qls N lies outside of the grading footprint. This slide is estimated to be between 15 and 20 feet thick at this location (see Geologic Section S25-S25', Figure 4.2). It is recommended that the entire landslide be removed during grading and the existing

grades above the grading footprint be re-established by placing compacted fill. The need for backdrains above the proposed liner should be evaluated during grading operations.

Cut Slope CS-10: Cut Slope CS-10 (Figure 2.1) will be graded as a southwest-facing, 2:1 slope. The overall slope height is approximately 185 feet, with the proposed permanent and lined portions of the slope approximately 75 feet and 110 feet high, respectively. The cut slope will expose Saugus Formation units in which the underlying bedding strikes northwest and dips 45 to 60 degrees toward the northeast (see Geologic Section S2-S2', Figure 4.1). Based on the northeasterly bedding dip, the southwesterly-facing cut slope is considered grossly stable from a geologic standpoint.

Cut Slope CS-11: Cut Slope CS-11 (Figure 2.1) is proposed as a west-southwest-facing, 2:1 slope. The total slope height is approximately 150 feet, with the permanent portion of the cut slope approximately 65 feet high and the lined portion of the slope 85 feet high. As depicted on Geologic Section S1-S1' (Figure 4.1), the cut slope will expose Saugus Formation units in which the underlying bedding strikes northwest and dips 40 to 60 degrees to the northeast. This bedding orientation is favorable with respect to the southwest-facing cut slope, and Cut Slope CS-11 is considered grossly stable from a geologic standpoint.

Cut Slope CS-12: Cut Slope CS-12 (Figure 2.1) is planned as a 100-feet-high, 2:1 slope that will face northwest and southeast. The cut slope will be graded to develop the east stormwater basin and will be a permanent slope, unassociated with grading of future landfill cells. The cut slope will encounter Saugus Formation units and landslide Qls P. The axis of a northwest-southeast-trending anticline will cross the footprint of Cut Slope CS-12. Bedding on the north flank of the anticline, where the proposed cut slope will face to the northwest, strikes northwest and dips 27 to 40 degrees to the northeast. The bedding is favorably oriented with respect to the northwest-facing segment of Cut Slope CS-12 and is considered grossly stable from a geologic standpoint.

On the south flank of the anticline, where the proposed cut slope will face southeast, the bedding strikes generally east-west and dips 49 to 79 degrees to the south (see Geologic Section S21-S21', Figure 4.2). This bedding orientation is favorable relative to the southeast-facing segment of Cut Slope CS-12, and the cut slope is considered grossly stable from a geologic standpoint.

It is anticipated that the proposed grading will remove all of Qls P. If any landslide debris from Qls P remains after completion of the cut slope, the debris should be removed and certified engineered fill placed to restore grade.

Cut Slopes CS-13, CS-14 and CS-15: Cut Slopes CS-13, CS-14, and CS-15 (Figure 2.1) will consist of permanent, southwest-facing, 2:1 cut slopes graded along the northeast side of the future east stormwater basin. Cut Slopes CS-13, CS-14, and CS-15 will be graded to maximum heights of approximately 50 feet, 20 feet, and 50 feet, respectively. The three cut slopes will expose Saugus Formation units in which the underlying bedding strikes generally east-west and dips 35 degrees to near-vertical. This bedding orientation is favorable relative to the three southwest-facing cut slopes, and Cut Slope CS-13, CS-14, and CS-15 are considered grossly stable from a geologic standpoint.

Cut Slope CS-16: Cut Slope CS-16 (Figure 2.1) is planned as a 110-feet-high, 2:1 slope that will face northwest. This cut slope will be graded as a temporary slope that will be lined and eventually buried by waste. Cut Slope CS-16 will encounter Saugus Formation units in which the underlying bedding strikes generally east-west and dips 50 degrees to the south. This bedding orientation is favorable with respect to Cut Slope CS-16, and the cut slope is considered grossly stable from a geologic standpoint.

Cut Slope CS-17: Cut Slope CS-17 is planned as a 2:1 slope that will face south and attain a maximum height of approximately 155 feet. The cut slope will encounter Saugus Formation units and Pleistocene terrace deposits. As depicted on Geologic Sections S22-S22' and S27-S27' (Figure 4.2), the axis of an anticline is located in the

area of the proposed toe of the cut slope. Bedding north of the anticlinal axis and beneath the proposed cut slope strikes northwest and dips 9 to 24 degrees towards the northeast. This bedding orientation is considered favorable with respect to stability of Cut Slope CS-17. South of the anticlinal axis the bedding strikes northeast and dips 10 to 20 degrees to the southeast, with an apparent out-of-slope bedding dip of 5 degrees. Due to the relatively flat bedding angle, the portion of the cut slope south of the anticline is considered grossly stable by inspection.

Terrace deposits will likely be exposed in the lower portion of Cut Slope CS-17. Bedding within the terrace deposits is essentially flat-lying and is grossly stable.

Both the Saugus Formation and the terrace deposits are subject to erosion and surficial failures due to the weakly cemented nature of the materials. Furthermore, grading of the slope as currently designed will result in some adverse fill-over-cut conditions where the slope crosses minor drainage gullies. Consequently, it is recommended that a stability fill slope with backdrains be constructed against the face of Cut Slope CS-17, both above and below the proposed Entrance Road. Above the Entrance Road, the stability fill should have a keyway measuring 35 feet wide and three feet deep, with the stability fill extending upslope from the Entrance Road to the upper drainage terrace.

Below the road the stability fill slope should be 15 feet wide and three feet deep. The stability fill should extend from the Entrance Road down to State Highway 126 (Henry Mayo Drive) from proposed road elevation 1000 feet to 975 feet. Upgradient of the proposed road elevation 1000 feet, the stability fill slope should extend from the terrace drain down to Henry Mayo Drive.

Cut Slope CS-18 Cut Slope CS-18 (Figure 2.2) is planned as a 200-feet-high, east-facing, permanent, 2:1 slope on the west side of the proposed South Main Canyon stormwater basin. The cut slope is underlain by Saugus Formation units in which the underlying bedding strikes northwest to northeast and dips nine to 32 degrees to the

east. As depicted on Geologic Section S23-S23', easterly-dipping bedding ranging from 10 to 17 degrees will be exposed in the planned 2:1 cut slope. Stability analyses performed for potential failure along the adversely-dipping bedding indicate that proposed Cut Slope CS-18 meets the temporary factor of safety of 1.25.

A portion of landslide Qls A will encroach into CS-18. The landslide should be removed and compacted fill placed, if necessary, to restore slope grades.

Cut Slope CS-19: Cut Slope CS-19 (Figure 2.1) is proposed as a west-southwest-facing, 2:1 slope. The slope is located above the future perimeter road in the East Canyon area and is planned as a permanent, 50±-feet-high cut slope. Cut Slope CS-19 will expose Saugus Formation units in which the underlying bedding strikes northeast and dips 18 to 23 degrees to the southeast. This bedding orientation is favorable with respect to west-southwest-facing cut slope, and Cut Slope CS-19 is considered grossly stable from a geologic standpoint.

Cut Slope CS-20: Cut Slope CS-20 will be graded as a southeast-facing, 2:1 slope, to a height of approximately 100 feet. The cut slope will be graded for a debris basin along the north side of the project. As depicted on Geologic Section S28-S28', the upper portion of the cut slope (above the proposed terrace drain) will expose Saugus Formation units; Pleistocene terrace deposits will likely be encountered below the terrace drain. Bedding in the Saugus Formation strikes northwest and dips 15 degrees to the northeast, with an apparent bedding of 6 degrees dipping into the proposed cut slope. The Saugus Formation bedding orientation is favorable with respect to the southeast-facing cut slope. Bedding within the terrace deposits is essentially flat-lying and is grossly stable. Accordingly, Cut Slope CS-20 is considered grossly stable from a geologic standpoint.

Cut Slope CS-21: Cut Slope CS-21 (Figure 2.2) is proposed as a west-facing, permanent, 2:1 slope that will be graded along the east side of the future Entrance Road. The cut slope, attaining a maximum height of approximately 85 feet, will encounter

Saugus Formation units in which the underlying bedding strikes northwest and dips 14 to 22 degrees to the northeast. This bedding orientation is favorable with respect to Cut Slope CS-21, and the cut slope is considered grossly stable from a geologic standpoint.

Cut Slope CS-22: Cut Slope CS-22 (Figure 2.2) will consist of a limited exposure of bedrock surrounded by compacted fill along the northern slope of the proposed South Main Canyon stormwater basin. The cut slope will be graded at 2:1, face south-southeast, and attain a maximum height of approximately 100 feet. Cut Slope CS-22 is underlain by Saugus Formation units in which the bedding strikes north-northwest and dips 11 to 18 degrees to the east. This bedding orientation is favorable with respect to Cut Slope CS-22, and the cut slope is considered grossly stable from a geologic standpoint.

Cut Slope CS-23: Cut Slope CS-23 (Figure 2.1) will constitute the western limit of the floor of the North and East Canyon Excavation Area. The slope will be graded at 2:1, face east-northeast to east, and attain a maximum height of 85 feet. Cut Slope CS-23 will be a temporary cut slope that will be lined and eventually buried by waste. The cut slope will expose sedimentary rock units of the Pico and Saugus formations in which the underlying bedding strikes generally east-west and dips 47 to 64 degrees toward the south. This bedding orientation is favorable with respect to Cut Slope CS-23, and the cut slope is considered grossly stable from a geologic standpoint.

Cut Slope CS-24: Cut Slope CS-24 (Figure 2.2) will be graded as an east- to north-facing, 2½:1 slope. The overall slope height is approximately 235 feet, with the proposed permanent and lined portions of the slope approximately 70 feet and 165 feet high, respectively. The cut slope will be graded in South Main Canyon, south of the existing Main Canyon landfill. This area is currently covered by stockpile fill soil. The cut slope will, for the most part, expose the fill soils and, to a lesser extent, Saugus Formation units. Bedding within the underlying Saugus Formation strikes north-northwest to northwest and dips 20 to 44 degrees toward the east. In general, this

bedding is oriented parallel to, or dipping steeper than, the proposed 2½:1 (approximately 22-degree) cut slope gradient. Development of Cut Slope CS-24 will require removal of the stockpile fill soil. Once the stockpile is removed, the slope will need to be reconstructed as an engineered fill slope to reestablish the proposed landfill slope grades. This engineered fill would essentially buttress any potential daylighted bedding that may be encountered in the cut slope. Accordingly, the cut slope is considered grossly stable from a geologic standpoint.

Cut Slope CS-25: Cut Slope CS-25 (Figure 2.1) is proposed as a permanent, southeast-facing, 2:1 slope to a height of approximately 35 feet. The cut slope will expose Pico Formation units in which the underlying bedding strikes north-south and dips 30 to 40 degrees to the east. This bedding orientation dips steeper than the 2:1 (26-degree) slope gradient, and Cut Slope CS-25 is considered grossly stable from a geologic standpoint.

Proposed Fill Slopes: A proposed fill slope of about 125 feet in height is proposed for South Main Canyon above the proposed basin. Stability analysis for a 130-feet-high, 2:1, compacted fill slope is presented in Appendix D and meets the static and seismic factor of safety requirements for grossly stable permanent fill slopes of 1.5 and 1.1, respectively.

Permanent Cut Slopes: Several permanent cut slopes will remain after landfill closure of the proposed MPR. The highest cut slope (Cut Slope CS-1) will be about 200 feet high, as illustrated on Geologic Section S11-S11'. Slope stability calculations for a cross bedding failure for Geologic Section S11-S11' are presented in Appendix D and meet the permanent and seismic factor of safety requirements for grossly stable permanent slopes of 1.5 and 1.1, respectively.

GEOLOGIC HAZARDS

GENERAL

Potential geologic hazards include, but are not limited to, primary earthquake hazards (ground shaking and ground rupture), secondary earthquake hazards from earthquake ground shaking (such as liquefaction, tsunamis, and seiches), and landslides/slope instability. Earthquakes have the potential to inflict the greatest loss of life and property damage. Consequently, the proximity of a site to active or potentially active faults is a key element in assessing the potential for earthquake damage.

The major cause of damage from earthquakes is generally the result of strong ground shaking from movement along a fault or fault zone. Ground shaking could occur not only immediately adjacent to the earthquake epicenter, but also within areas for many miles in all directions. Damage due to actual fault displacement or ground rupture beneath a structure may also occur; however, fault ground rupture is much less common and is typically confined to areas along, or immediately adjacent to, the fault surface trace.

Landslides are common hazards in southern California, particularly in hillside areas underlain by sedimentary rock units. Landslides can occur in terrain ranging from vertical cliffs to slopes as gentle as one or two degrees. Materials on slopes that are subject to landsliding include rock, soil, artificial fill, or combinations of these materials.

FAULTS

General: Earthquakes result from movement along faults or volcanic activity. In California, earthquakes are more commonly associated with faults or fault zones, and the southern California region is historically seismically active. The numerous faults in California include both active and potentially active faults. In accordance with criteria established for the Alquist-Priolo Earthquake Fault Zoning program (Hart and Bryant, 1999) by the California Geological Survey (CGS), formerly known as CDMG, a fault can

be considered active if it has demonstrated movement within the Holocene epoch, or approximately the last 11,000 years. Faults that have demonstrated Quaternary movement (last 1.6 million years), but lack strong evidence of Holocene movement, are classified as potentially active. Faults that have not moved since the beginning of the Quaternary period are deemed inactive.

Site Faults: As part of CCL's MPR for landfill development, a fault study (including an extensive subsurface investigation) was performed by RTF&A (2006b) within the footprint of the future North and East Canyon Excavation Area. The purpose of this fault study was to investigate previously mapped faults in the North and East Canyon area to determine if the site meets the State Class III landfill siting criteria for ground rupture that states, "landfills shall not be located on a known Holocene fault" (27 California Code of Regulations, Section 20260[d] and the Federal location restriction for fault areas [40 Code of Federal Regulations, Part 258.13]).

Based on the geologic fault investigation, RTF&A concluded that no mappable, through-going, continuous active or potentially active faults underlie the site, and the site is not within an Alquist-Priolo Earthquake Fault Zone, as established by CGS. The closest active (and zoned) fault to the site is the San Gabriel fault, located approximately 3.3 miles to the east-northeast. In our opinion, there is little probability of surface rupture due to faulting occurring on-site during the design life of the project.

A discussion of nearby active and potentially active faults is presented in the following sections.

Active Faults: The site is located within an area potentially susceptible to severe ground shaking, due to the close proximity of several active faults, including the San Gabriel, Oak Ridge, Santa Susana, and San Cayetano faults.

San Gabriel Fault: The nearest active fault is the San Gabriel fault, located approximately 3.3 miles east-northeast of the site. The San Gabriel fault extends approximately 90 miles through the Transverse Ranges of southern California. The San

Gabriel fault consists of a zone of imbricate, steeply north-dipping faults. Throughout most of its extent, the fault has strong geomorphic expression, with the faults comprising the zone characterized by displaced geologic units, deflected drainages, strike valleys, notched ridges, subparallel faulting, fracturing, and folding (Oakeshott, 1958; Wentworth and Yerkes, 1971).

Within the Santa Clarita Valley, from Castaic Creek to the San Gabriel Mountains, the fault crosses the Castaic lowlands and the Santa Clara River, where its course is marked by a belt of braided small faults and steep dips in Pliocene and Pleistocene beds. Since most of the displacement within the fault zone took place before deposition of these geologically young beds, the fault's trend through this area is not nearly as conspicuous as within the rocks along the southwestern margin of the Ridge basin or in the basement rocks of the San Gabriel Mountains (Crowell, 1982). The location of the fault, however, is somewhat defined by the steeply-dipping and folded beds of the Plio-Pleistocene Saugus Formation, and the fault is exposed in cut slopes, roadcuts, and trenches.

Prior to 1979, most geologists studying the San Gabriel fault acknowledged that late Pleistocene (approximately the past 100,000 years) activity along the fault zone was probable, but evidence for possible Holocene activity was judged to be very questionable (Kahle, 1986). However, after completing a geologic and geomorphic investigation of the San Gabriel fault, Weber (1979) concluded that some evidence strongly suggested Holocene activity. Subsequently, Cotton and Seward (1984) conducted exploratory trenching along segments of the fault zone in the Santa Clarita Valley. Although no surface evidence of faulting was recognized, at least two trenches revealed displacement of Holocene age alluvial deposits. Radiocarbon analyses of detrital charcoal from faulted alluvial materials in a trench excavated in Rye Canyon yielded an age of 3,500±250 years before present. Alluvium dated as 1,550±190 years before present was

shown to be unfaulted in the same trench, establishing limits of latest movement on the Castaic-Bouquet Junction segment of the San Gabriel fault.

Based on the findings of Weber (1979), Cotton and Seward (1984), and the recommendations of Kahle (1986) for a CDMG Fault Evaluation Report for the fault, the State Geologist established an Alquist-Priolo Earthquake Fault Zone for the San Gabriel fault in 1987 within the Newhall Quadrangle.

Santa Susana Fault: The Santa Susana fault, located approximately six miles southwest of the site, consists of a complex zone of primarily north-dipping thrust faults. The fault zone extends northeastward from the Santa Susana Mountains across San Fernando Pass, and into the San Gabriel Mountains. A short segment of the Santa Susana fault ruptured during the 1971 San Fernando earthquake (Southern California Earthquake Data Center [SCEDC], 2010); however, the remainder of the fault zone has not demonstrated displacement since late Pleistocene time (Slosson and Barnhart, 1967).

Oak Ridge Fault: The Oak Ridge fault is a south-dipping reverse fault that forms a ridge to the south of its trace. The fault extends for a distance of approximately 56 miles from Piru, on the east, to offshore, at a point about 20 miles south of Santa Barbara. The onshore segment of the Oak Ridge fault is roughly parallel to both the Santa Clara River and State Highway 126. The offshore segment is associated with a definite zone of active seismicity (Southern California Earthquake Data Center [SCEDC], 2010). The only known Holocene surface rupture is found onshore, between the towns of Bardsdale and Fillmore (Yeats et al., 1986b; Powell, 1991).

At its eastern end, the Oak Ridge fault appears to be overthrust by the Santa Susana fault, becoming a “blind thrust fault” (SCEDC, 2010). The fault associated with the 1994 Northridge earthquake is probably associated with the Oak Ridge fault system. At its closest point, the Oak Ridge fault is situated approximately seven miles west-southwest of the site.

San Cayetano Fault: The San Cayetano fault is an east-west trending, north-dipping thrust fault that extends approximately 28 miles from the foothills north of Piru to the southeastern edge of Ojai Valley. Weber et al. (1973) and Kahle (1985) suggest that Holocene fault activity is indicated by well-defined fault scarps and offset Holocene sediments. The San Cayetano fault is located approximately 9.5 miles west of the site.

Other Active Faults: Other, more distant but significantly active faults include the San Fernando fault zone, located approximately 12 miles southeast of the site, and the San Andreas fault zone, located approximately 20 miles to the northeast.

Potentially Active Faults: The potentially active Holser fault is situated approximately 1,000 feet north of the site. The Holser fault consists of a south-dipping, sharply folded reverse fault (Winterer and Durham, 1962) that trends east-southeast from near Piru Creek to at least Castaic Junction. The Holser fault post-dates deposition of the Pico Formation and is believed to be a "backthrust" of a subsurface thrust fault that represents the intersection of the San Cayetano and Santa Susana faults at depth (Yeats et al., 1994). Weber (1979) states that there is no clear evidence of Holocene activity along the Holser fault but "plentiful evidence" that activity has occurred in the past 100,000 years. Geolabs (2007) recently conducted a surface fault rupture hazard assessment for the Holser fault within Parcel Map 18108, located east of CCL. Geolabs concluded that the last known movement on the Holser fault was approximately 40,000 to 100,000 years ago. Consequently, the fault is considered potentially active.

Inactive Faults: The inactive Del Valle fault is located approximately 1.2 miles southwest of the site. This fault trends eastward from the Los Angeles-Ventura County Line for nearly two miles, turning southward before crossing San Martinez Grande Canyon near its confluence with the Santa Clara River. According to Winterer and Durham (1962), the eastward-trending segment of the Del Valle fault consists of a

south-dipping reverse fault; the southward-trending segment is considered a tear (strike-slip) fault.

Blind-Thrust Faults: A growing body of geologic and seismologic data, supplemented by regional structural interpretations, suggests Pliocene to modern deformation in the Los Angeles basin is partly accommodated by developing basement-involved fold and thrust belts (Davis et al., 1989; Hauksson, 1990; Shaw and Suppe, 1996). The fold and thrust belts are expressed at the ground surface by elongate, low-lying anticlinal ridges. At the core of these anticlinal ridges are low-angle, blind-thrust faults rising off a basal detachment surface. Recognized blind-thrust faults in the Los Angeles and Ventura basins include the Elysian Park, Compton-Los Alamitos, Oak Ridge, and Northridge blind-thrust faults.

The closest known blind-thrust to the site is the Northridge blind-thrust fault. The site, however, is not underlain by any known blind-thrust fault.

LANDSLIDES

The site is mantled by several landslides. Most of the major landslides were previously identified by EMCON (1990a) and other workers within the subject site boundaries. The landslides are, in part, due to the orientation of the geologic structure, as well as the weak materials exposed within the upper Pico Formation and lower Saugus Formation.

Several Holocene landslides (designated "Qls A" through "R") and one Pleistocene (older) landslide (designated "Qols A") have been identified within the proposed MPR grading limits. The landslides typically consist of translational slides that failed along a weak, unsupported bedding plane. Landslides located within the footprint of the North and East Canyon Excavation Area include Qls E through Qls R, and Qols A. Landslides located within the proposed grading limits of the South Main Canyon landfill and Entrance Road consist of Qls A through Qls D.

Landslide Qls G constitutes a major landslide complex within the northern portion of the site that was reactivated during the 2004-2005 winter storms when a record rainfall of 48.15 inches occurred at the site. In addition to the Qls G complex, numerous smaller slides have been identified adjacent to Qls G, including Qls H through Qls L.

An older, previously unidentified landslide was discovered by RTF&A during exploration for the 2006 fault study (RTF&A, 2006b). The older landslide appears to be derived primarily from bedrock of the Pico Formation, although lithologies of Saugus Formation and older alluvium are intermixed within the landslide mass. The geomorphology of the landslide suggests that no recent movement has occurred within the mass, as there are no signs of open fractures, scarps, grabens, or hummocky terrain. The base of the older landslide was identified in borings B-1-03 and B-9-10 at depths of 40 feet and 17 feet, respectively. Geologic sections were constructed through the slide (Geologic Sections S1-S1' and S19-S19') and indicate the landslide will likely be removed as part of development of the North and East Canyon Excavation Area. Any Qols A material remaining at the completion of the excavation to proposed grade should be removed and replaced with certified compacted fill.

DEBRIS FLOW HAZARD

Debris flows, consisting of a moving mass of heterogeneous debris lubricated by water, are generated by shallow soil slips in response to heavy rainfall. Whereas landslides depend on deep percolation of groundwater and may not respond to the effects of heavy rainfall until long after a storm, debris flows "occur during, and only during, heavy rainfall" (Campbell, 1975). According to Campbell (1975), damage from debris flows is due chiefly to inundation by, or high-velocity impact of, the debris mass. Campbell identifies three conditions for debris flow potential:

- a mantle of colluvial soil or a wedge of colluvial ravine soil;

- a slope angle ranging from 27 to 56 degrees (slopes steeper than 56 degrees generally do not have a continuous mantle of colluvium and are most commonly bare bedrock); and

- soil moisture equal to or greater than the colluvial soil's liquid limit.

No existing debris flow deposits have been identified within the proposed MPR grading footprint. Within the MPR footprint, the proposed grading will eliminate most of the debris flow hazard by the removal of debris flow–susceptible material (i.e., weathered bedrock, slope wash, and residual soil) and with the construction of drainage/stormwater basins. The potential for debris flows still exists along the perimeter of the proposed MPR development area. The proposed landfill design should allow for the clean-up or control of any debris flows that may encroach into the landfill area and perimeter maintenance road.

The potential for debris flows also exists within the natural drainages and slopes along the north side of the future entrance road, specifically where the entrance road will cross in front of three significant drainage gullies. As presently designed, there is no protection from debris flows emanating from the three gullies, and any such flows would greatly impact use of the entrance road and operation of the scales. The project design should consider elevating the roadway higher than the mouths of the gullies so that runoff and debris flows could be diverted around and/or beneath the roadway. Other alternatives for debris protection could include debris walls and/or debris basins at the mouths of the three gullies. Additional debris flow evaluation and mitigation should be performed as part of future development of rough grading plans for the entrance road.

EXPANSIVE SOILS

The site is underlain by bedrock of the Pico and Saugus formations, both of which contain potentially expansive clay-rich strata, as discussed above. Additional testing of

expansive properties of the soils may be required if improvements, buildings, or other structures sensitive to expansive soils are planned for the site. Additional testing should be completed during the grading plan review, if deemed necessary by the project geotechnical and civil engineers.

FLOODING

Review of Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps indicate that the site is not within a known flood zone. The nearest mapped flood zone boundary related to Castaic Creek is approximately 1,500 feet southeast of the site.

LIQUEFACTION

The State of California Seismic Hazard Map for the Val Verde Quadrangle (California Geological Survey, 2002) indicates that portions of the alluvial soils at site are located within a potential liquefaction area.

Liquefaction may occur when saturated, loose to medium dense, cohesionless soils are densified by ground vibrations. The densification results in increased pore water pressures if the soils are not sufficiently permeable to dissipate these pressures during, and immediately following, an earthquake. When the pore water pressure is equal to, or exceeds, the overburden pressure, liquefaction of the affected soil layers occurs. For liquefaction to occur, three conditions are required:

- ground shaking of sufficient magnitude and duration;
- soils that are susceptible to liquefaction; and
- a groundwater level at or above the level of the susceptible soils during the ground shaking.

For a site to be considered susceptible to liquefaction using the criteria and methodology initially developed by Seed and Idriss (1982), liquefaction of underlying soil layers must result in an observed surface effect such as sand boils, mud-spouts, surface water seepage, ground cracking, or quicksand-like conditions.

Lateral spreading can result in ground cracking and may occur when a site is sloped or is near a free-face and there is a sufficiently continuous liquefiable layer on which the overlying soils can move laterally.

Ground settlement may occur during seismic shaking of an area. The settlement can be caused by liquefaction of loose, granular soils and by compaction of loose, but not necessarily liquefiable, soils.

As a result of the existing and proposed grading, loose alluvial soils within the proposed development area will be removed and replaced with compacted fill soils. The alluvium within the proposed development area will be mantled by certified engineered fill. The alluvial soils are underlain by bedrock materials. Accordingly, the site will be underlain by a combination of bedrock materials, dense alluvial deposits, and certified engineered fill.

Due to the historic, high groundwater levels at the site, which are lower than the base of alluvial deposits (RTF&A, 2012b), the site is considered to have a very low potential for liquefaction. The site is also not considered as being subject to lateral spreading.

CONCLUSIONS AND RECOMMENDATIONS

GEOLOGIC CONSIDERATIONS

General: Based on the geologic data developed during the MPR geotechnical investigation, it is our opinion that the site may be developed as planned, provided our recommendations are incorporated in the design of the project.

Faulting: No mapped active or potentially active faults underlie the site, and the site is not within an Alquist-Priolo Earthquake Fault Zone, as established by CGS

(Hart and Bryant, 1999). The closest active fault to the site is the San Gabriel fault, located approximately 3.3 miles to the east-northeast.

Landslides: Several landslides are located within the site boundaries, as depicted on the Geologic Map, Figure 1. Landslides lying within the proposed grading limits of the North and East Canyon Excavation Area are designated as Qols A, and Qls E through Qls R (see Figure 2.1.); landslides located within the South Main Canyon landfill area include Qls A through D (see Figure 2.2).

North and East Canyon Excavation Area: Landslides Qols A, Qls E, and Qls G through Qls R lie within the proposed grading limits of the North and East Canyon Excavation Area and will require complete removal. Most of these landslides occur above planned excavation grades and will be removed as part of the excavation. Any of these landslides not eliminated by the proposed excavation will need to be removed below proposed excavation grade, and the grades restored by placement of certified engineered fill.

Landslide Qls F will be removed below elevation 1,400 feet msl, with the remaining portion of the slide mass above elevation 1,400 feet remaining in place.

Other landslides lie upslope and outside of the expansion grading limits. These landslides, in their present configuration, are stable. Any renewed movement or partial movement of these slides will result in debris accumulating on the future perimeter road, which may require some maintenance but will not adversely impact the landfill or future landfill operations.

South Main Canyon and Entrance Road: Landslides Qls A through Qls D are located along the west side of the South Main Canyon landfill area. As indicated on the grading plan, the majority of landslide Qls A lies within a future fill area associated with the toe berm for the proposed landfill. This entire landslide mass, estimated to be approximately 15 to 20 feet deep, should be removed prior to placement of certified

engineered fill. The cut area impacted by removal of the landslide should have proposed grade restored by placement of certified engineered fill.

Landslides Qls B through Qls D lie within a future fill area and should be removed prior to fill placement.

Debris Flow: The natural drainages and slopes within the site will be susceptible to debris flows generated during repeated heavy rains. The proposed design should allow for the clean-up or control of any debris flows that may encroach into the landfill area and perimeter maintenance road.

The natural drainages and slopes along the north side of the entrance road will be susceptible to debris flows generated during repeated heavy rains. The project design for the entrance road should consider elevating the roadway higher than the mouths of the existing gullies north of the road so that runoff and debris flows could be diverted around and/or beneath the roadway. Other alternatives for debris protection could include debris walls and/or debris basins at the mouths of the three gullies. Additional debris flow evaluation and mitigation should be performed as part of future development of rough grading plans.

Groundwater: The measured groundwater elevations beneath the site lie below the proposed excavation grades for the North and East Canyon Excavation Area, and the South Main Canyon and Entrance Road development. Accordingly, groundwater is not likely to be encountered during site grading.

Rippability: Grading operations can be performed using conventional grading equipment. Heavy ripping may be needed when excavating well-cemented sandstone or conglomerate beds.

GRADING

Site Preparation: Prior to performing earthwork, the existing vegetation and any deleterious debris should be removed from the area of proposed grading. Existing

utility lines should be relocated or properly protected in-place. All unsuitable soils, landslide material, and uncertified fills in the areas of grading receiving new fill should be removed to competent earth materials and replaced with engineered fill.

Material for Fill: The on-site soils, less any debris or organic matter, may be used in required fills. Rocks or hard fragments larger than eight inches may not be placed in the fill without special treatment. Rocks or hard fragments larger than four inches shall not compose more than 25 percent of the fill or a lift. Soils containing more than 25 percent rock or hard fragments larger than four inches must be compacted with successive passes (e.g., with a sheepsfoot roller) until rock or hard fragments larger than four inches constitute less than 25 percent of the fill or lift.

Compaction: After the site is cleared and excavated as recommended, the exposed soils should be carefully observed for the removal of all unsuitable deposits. Next, the exposed soils should be scarified to a depth of six inches, brought to about two percent above optimum moisture content, and rolled with heavy compaction equipment. The upper six inches of exposed soils should be compacted to at least 90 percent of the maximum dry density obtainable by the ASTM D 1557-02 Method of Compaction.

After compacting the exposed soils, all required fills should be placed in loose lifts not more than eight inches in thickness, and compacted to at least 90 percent. The moisture content of the fill soils at the time of compaction should be about two to four percent above optimum moisture content. Compacted fill should not be allowed to dry out before subsequent lifts are placed.

Grades should be sloped so as not to direct water flow over slope faces; surface water should be directed to proposed drainage devices (i.e., terrace benches and downdrains).

GENERAL GRADING REQUIREMENTS

1. All fills, unless otherwise specifically designed, shall be compacted to at least 90 percent of the maximum dry unit weight as determined by ASTM D 1557-02 Method of Soil Compaction.

2. No fill shall be placed until the area to receive the fill has been adequately prepared, and subsequently approved by the Geotechnical Consultant of Record or his representative.

3. Fill soils should be kept free of debris and organic material.

4. Rocks or hard fragments larger than eight inches may not be placed in the fill without approval of the Geotechnical Consultant of Record or his representative, and in a manner specified for each occurrence.

   Bedrock fragments larger than eight inches or fill soils containing greater than 25 percent of bedrock fragments larger than four inches in diameter must be compacted using successive passes of a sheepsfoot compactor, or until rock fragments constitute less than 25 percent of the fill material.

5. The fill material shall be placed in layers which, when compacted, shall not exceed eight inches per layer. Each layer shall be spread evenly and shall be mixed thoroughly during the spreading to ensure uniformity of material and moisture.

6. When moisture content of the fill material is too low to obtain adequate compaction, water shall be added and thoroughly dispersed until the soil is approximately two to four percent above optimum moisture content.

7. When the moisture content of the fill material is too high to obtain adequate compaction, the fill material shall be aerated by blading, or other satisfactory methods, until the soil is approximately two to four percent above optimum moisture content.

8. Fill and cut slopes should not be constructed at gradients steeper than 2:1.

GRADING OBSERVATION

Construction observation should be made by a Geotechnical Consultant of Record during any grading activities within the site, to verify the findings within this report. Additional recommendations may be required for landfill design based on conditions uncovered during grading.

SEISMICITY

The following parameters were determined based on the USGS website, 2007 California Building Code (CBC), and ASCE Standard 7-05. Additional analyses of the seismic criteria of the site, including spectral response, may be necessary for the design of the proposed cell slopes. The need for this additional evaluation to support the evaluation of the cell slopes is referred to Golder.

CALIFORNIA BUILDING CODE SEISMIC DESIGN

Under Section 1613 Earthquake Loads of the CBC, the following coefficients and factors apply to seismic force design at the subject site. The ground motion parameters were determined using the Ground Motion Parameter Calculator at the USGS website.

Latitude	34.427722
Longitude	-118.648116
Site Class	C
Ss	2.247
S1	0.687
SMs	2.247
SM1	0.893
SDs	1.498
SD1	0.595

SEISMIC HAZARD ZONE REPORT

The seismic hazard zone report for the Val Verde Quadrangle was reviewed to determine the site Peak Ground Acceleration (PGA) (California Geological Survey, 2002).

Based on review of Figure 3.5 of the seismic hazard zone report, the Magnitude Weighted Pseudo-Peak Acceleration with a 10 percent exceedance in 50 years is about 0.59g.

SEISMIC SPECTRUM

The USGS website was utilized to determine the response spectrum for the subject site. The Site Modified Spectrum, MCE Spectrum, and the Design Response Spectrum from the USGS website is presented in Figure 7.

DEAGGREGATED SEISMIC SOURCE PARAMETERS

The USGS website was used to determine the Probability Seismic Hazard Deaggregation for a 2,475-year return period for a site with Vs = 760 m/s. The graph from the USGS website is presented in Figure 8.

FRISK SITE-SPECIFIC GROUND MOTION ANALYSIS

The probabilistic MCE was determined in accordance with Section 21.2.1 of ASCE Standard 7-05 for five percent damped acceleration response spectrum having approximately two percent probability of exceedance within a 50-year period (return interval 2,500 years) using the program FRISK for the Bozorgnia, Campbell, Niazi (1999) Holocene, Soil-pseudo, Rel Vel, with five percent damping attenuation relationship. The results are presented in Figure 9, and the factors are summarized below.

Factors	Value
Sds	1.95
Sd1	1.25
Sms	2.92
Sm1	1.87

PGA = Sds/2.50 = 0.78

SECTION 111 STATEMENT

Based on our review of the MPR grading plan and the referenced reports, it is our professional opinion that the proposed MPR development will be safe from hazard of landslide, settlement, or slippage and will not adversely affect the geotechnical conditions of off-site properties, provided our recommendations and the requirements of the Los Angeles County Building Code are followed.

LIMITATIONS

Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers and engineering geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional advice included in this report. This report has been prepared for Chiquita Canyon Landfill and their design consultants, to be used solely for planning and design. The report has not been prepared for use by other parties and may not contain sufficient information for purposes of other parties or other uses.

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Please contact us if you have any questions regarding the recommendations presented in this report.

PROFESSIONAL GEOLOGIST NO. 3749
TIMOTHY P. LATIOLAIT
#1140
CERTIFIED
ENGINEERING
GEOLOGIST
Expires: 12-31-13
STATE OF CALIFORNIA

PROFESSIONAL GEOLOGIST NO. 4407
THEODORE M. CLARK
#1736
CERTIFIED
ENGINEERING
GEOLOGIST
EXPIRES: 4-30-12
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
ALAN W. RASPLICKA
No. GE 2558
Exp. 6/30/13
GEOTECHNICAL
STATE OF CALIFORNIA

Respectfully submitted,

R. T. FRANKIAN & ASSOCIATES

by: Timothy P. Latiolait
Principal Engineering Geologist

and: Theodore M. Clark
Principal Geologist

and: Alan W. Rasplicka
Principal Geotechnical Engineer

TPL/TMC/AWR/eaw

Distribution: (2) Chiquita Canyon Landfill (plus CD containing PDF file)
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GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

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Table 1

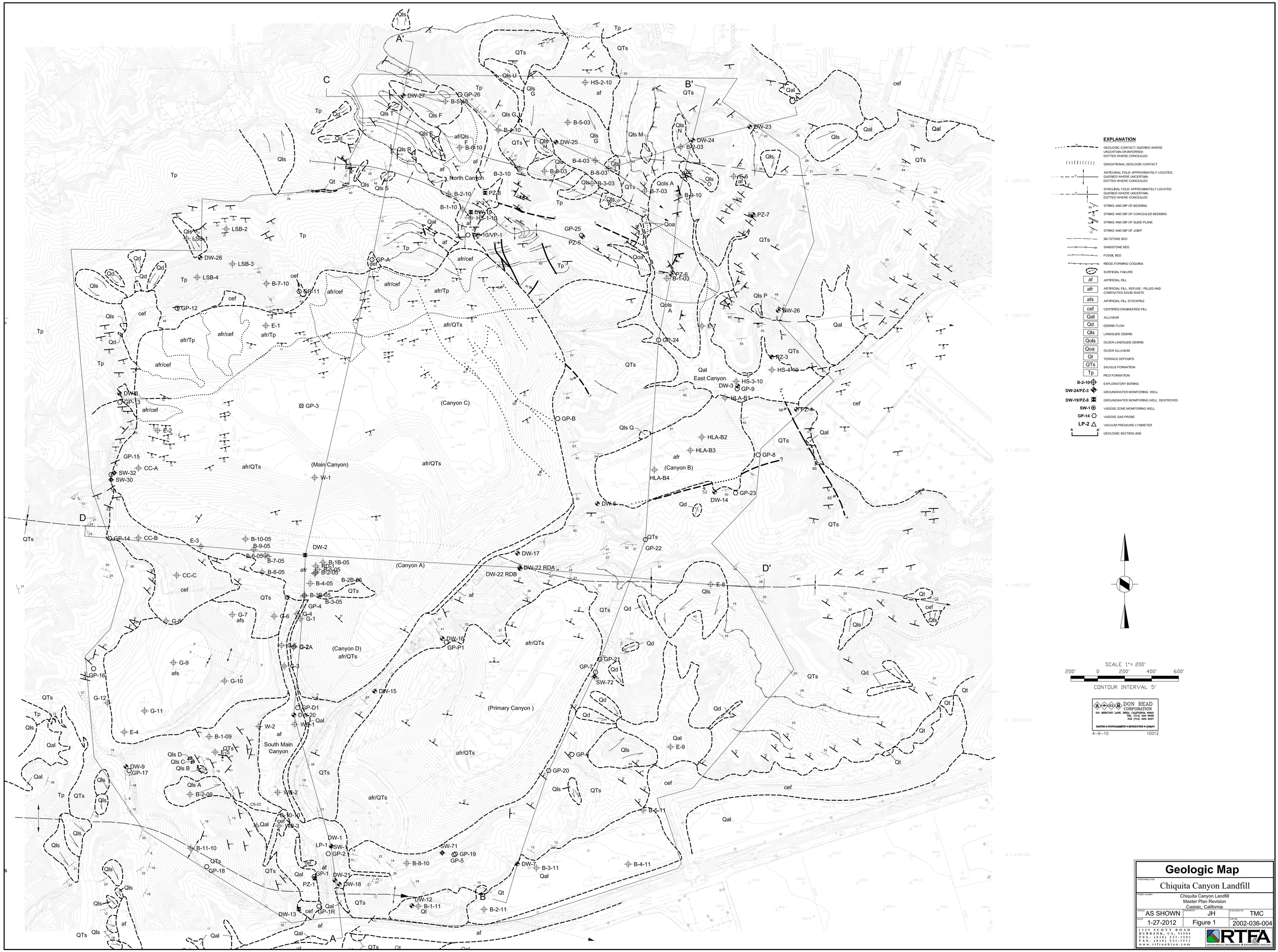
Summary of Cut Slopes
Chiquita Canyon Landfill
Master Plan Revision

CUT SLOPE	FIGURE NO.	SLOPE GRADIENT	SLOPE HEIGHT (total/permanent)	SLOPE FACE DIRECTION	GEOLOGIC MATERIALS	GEOLOGIC SECTION	GEOLOGIC STABILITY	MITIGATION
CS-1	2.1	2:1	300'/200'	S to SE	Tp	S11-S11'	Bedding dipping steeper than slope gradient; grossly stable	None
CS-2	2.1	2:1	150'/80'	SSE	Tp	S12-S12'	Bedding dipping steeper than slope gradient; grossly stable	None
CS-3a	2.1	2:1	220'/175'	ESE	Tp	S13-S13', S26-S26'	Bedding dipping parallel to or steeper than slope gradient; grossly stable	None
CS-3b	2.1	2:1	75'/0	ESE	Tp	S26-S26'	Bedding dipping steeper than slope gradient; grossly stable	None
CS-4	2.1	2:1 to 4:1	210'/120'	SE	Tp, Qls E, Qls F, af	S16-S16'	Bedding dipping parallel to or steeper than slope gradient; grossly stable	Qls E & Qls F and af to be removed during grading
CS-5	2.1	2:1 to 3:1	120'/30'	SE to S	Tp, Qls F, af	S15-S15', S24-S24'	Daylighted bedding; stable by analyses	Remove Qls F and af below elevation 1400 feet; reconstruct as stability fill to restore grade
CS-6	2.1	2½:1 to 3:1	290'/95'	SSE	Tp, QTs, Qls H-J	S17-S17', S20-S20'	Daylighted bedding; stable by analyses	Remove Qls H through Qls J during grading
CS-7	2.1	2:1 to 3:1	205'/35'	SE to SW	QTs, Qls G - I, & Qls L, af	S5-S5'	Daylighted bedding; stable by analyses	Qls G - I, Qls L to be removed during grading.
CS-8	2.1	2:1	225'/75'	SW	QTs	---	Favorable bedding; grossly stable	None
CS-9	2.1	2:1	150'/0	S	QTs, Qols A, Qls N, Qls O	S19-S19', S25-S25'	Daylighted bedding; stable by analyses	Qols A, Qls N & Qls O to be removed during grading. Restore existing grades above MPR grading footprint with compacted fill
CS-10	2.1	2:1	185'/75'	SW	QTs	S2-S2'	Favorable bedding; grossly stable	None
CS-11	2.1	2:1	150'/65'	WSW	QTs	S1-S1'	Favorable bedding; grossly stable	None
CS-12	2.1	2:1	100'/100'	NW and SE	QTs, Qls P	S21-S21'	Favorable bedding; grossly stable	None
CS-13	2.1	2:1	50'/50'	SW	QTs	---	Favorable bedding; grossly stable	None
CS-14	2.1	2:1	20'/20'	SW	QTs	---	Favorable bedding; grossly stable	None
CS-15	2.1	2:1	50'/50'	SW	QTs	---	Favorable bedding; grossly stable	None
CS-16	2.1	2:1	110'/0	NW	QTs	---	Favorable bedding; grossly stable	None

Table 1

Summary of Cut Slopes
Chiquita Canyon Landfill
Master Plan Revision

CUT SLOPE	FIGURE NO.	SLOPE GRADIENT	SLOPE HEIGHT (total/permanent)	SLOPE FACE DIRECTION	GEOLOGIC MATERIALS	GEOLOGIC SECTION	GEOLOGIC STABILITY	MITIGATION
CS-17	2.2	2:1	160'/160'	S	QTs, Qt	S22-S22', S27-S27'	Favorable bedding; grossly stable	Construct stability fills above and below entrance to control erosion
CS-18	2.2	2:1	200'/200'	E	QTs, Qls A	S23-S23'	Daylighted bedding; stable by analyses	Remove Qls A during grading; if needed, place compacted fill to restore slope grades
CS-19	2.1	2:1	50'/50'	WSW	QTs	---	Favorable bedding; grossly stable	None
CS-20	2.2	2:1	100'100'	SE	QTs, Qt	S28-S28'	Favorable bedding; grossly stable	None
CS-21	2.2	2:1	85'/85'	W	QTs	---	Favorable bedding; grossly stable	None
CS-22	2.2	2:1	100'/100'	SSE	QTs	---	Favorable bedding; grossly stable	None
CS-23	2.1	2:1	85'/0	ENE to E	Tp, QTs	---	Favorable bedding; grossly stable	None
CS-24	2.2	2-1/2:1	235'/60'	E to N	QTs, afs	---	Bedding dipping steeper than slope gradient; grossly stable	Remove "afs" and reconstruct as engineered fill slope
CS-25	2.1	2:1	35'/35'	SE	Tp	---	Bedding dipping steeper than slope gradient; grossly stable	None


EXPLANATION
GEOLOGIC CONTACT; QUERIED WHERE UNCERTAIN OR INFERRED; DOTTED WHERE CONCEALED
GRADATIONAL GEOLOGIC CONTACT
ANTICLINAL FOLD; APPROXIMATELY LOCATED, QUERIED WHERE UNCERTAIN, DOTTED WHERE CONCEALED
SYNCLINAL FOLD; APPROXIMATELY LOCATED QUERIED WHERE UNCERTAIN, DOTTED WHERE CONCEALED
STRIKE AND DIP OF BEDDING
STRIKE AND DIP OF CONCEALED BEDDING
STRIKE AND DIP OF SLIDE PLANE
STRIKE AND DIP OF JOINT
SILTSTONE BED
SANDSTONE BED
FOSSIL BED
RIDGE-FORMING COQUINA
SURFICIAL FAILURE
af ARTIFICIAL FILL
afr ARTIFICIAL FILL, REFUSE - FILLED AND COMPACTED SOLID WASTE
afs ARTIFICIAL FILL STOCKPILE
cef CERTIFIED ENGINEERED FILL
Qal ALLUVIUM
Qd DEBRIS FLOW
Qls LANDSLIDE DEBRIS
Qols OLDER LANDSLIDE DEBRIS
Qoa OLDER ALLUVIUM
Qt TERRACE DEPOSITS
QTs SAUGUS FORMATION
Tp PICO FORMATION
B-2-10 EXPLORATORY BORING
DW-24/PZ-3 GROUNDWATER MONITORING WELL
DW-19/PZ-8 GROUNDWATER MONITORING WELL DESTROYED
SW-1 VADOSE ZONE MONITORING WELL
GP-14 VADOSE GAS PROBE
LP-2 VACUUM PRESSURE LYSIMETER
A A' GEOLOGIC SECTION LINE
SCALE 1"= 200'
200' 0 200' 400' 600'
CONTOUR INTERVAL 5'
DON READ CORPORATION
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Geologic Map
PREPARED FOR
Chiquita Canyon Landfill
Project Location
Chiquita Canyon Landfill
Master Plan Revision
Castaic, California
SCALE AS SHOWN
DRAWN BY JH
CHECKED BY TMC
DATE 1-27-2012
Figure 1
JOB NO. 2002-036-004
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North Canyon
(Canyon C)
(Main Canyon)
(Canyon B)
(Canyon A)
(Canyon D)
(Primary Canyon)
South Main Canyon
East Canyon
DW-27
GP-26
B-5-10
HS-2-10
B-5-03
DW-23
DW-24
B-2-03
DW-25
B-6-10
B-4-03
B-8-03
B-6-03
B-3-10
B-3-03
B-2-10
PZ-5
B-1-10
DW-19
HS-1-10
GP-10/VP-1
GP-25
PZ-5
B-7-03
B-9-10
E-6
PZ-7
LSB-1
LSB-2
DW-28
LSB-3
LSB-4
B-7-10
GP-A
GP-11
GP-12
E-1
PZ-6
B-1-03
E-7
SW-26
GP-24
PZ-3
HS-4-10
HS-3-10
DW-3
GP-9
HLA-B1
PZ-4
DW-18
GP-13
GP-3
GP-B
E-2
GP-15
CC-A
SW-32
SW-30
W-1
HLA-B2
HLA-B3
HLA-B4
GP-8
GP-23
DW-14
DW-6
GP-14
CC-B
E-3
B-10-05
B-9-05
B-6-05
B-7-05
B-8-05
B-1B-05
B-2-05
B-4-05
B-2B-05
B-3-05
DW-2
DW-17
DW-22 RDA
DW-22 RDB
GP-22
E-8
CC-C
G-8
G-7
G-6
G-4
G-1
G-2A
G-3
G-9
G-10
GP-16
G-12
G-11
E-4
B-1-09
E-5
DW-9
GP-17
B-2-09
B-10-10
B-11-10
GP-18
DW-16
GP-P1
GP-21
GP-7
SW-72
DW-15
GP-D1
DW-20
WB-1
W-2
WB-2
WB-3
GP-6
GP-20
E-9
B-5-11
DW-1
LP-1
SW-1
GP-2
SW-71
GP-19
GP-5
B-8-10
DW-7
B-3-11
B-4-11
GP-1
DW-21
DW-18
PZ-1
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DW-13
GP-1R
A
B
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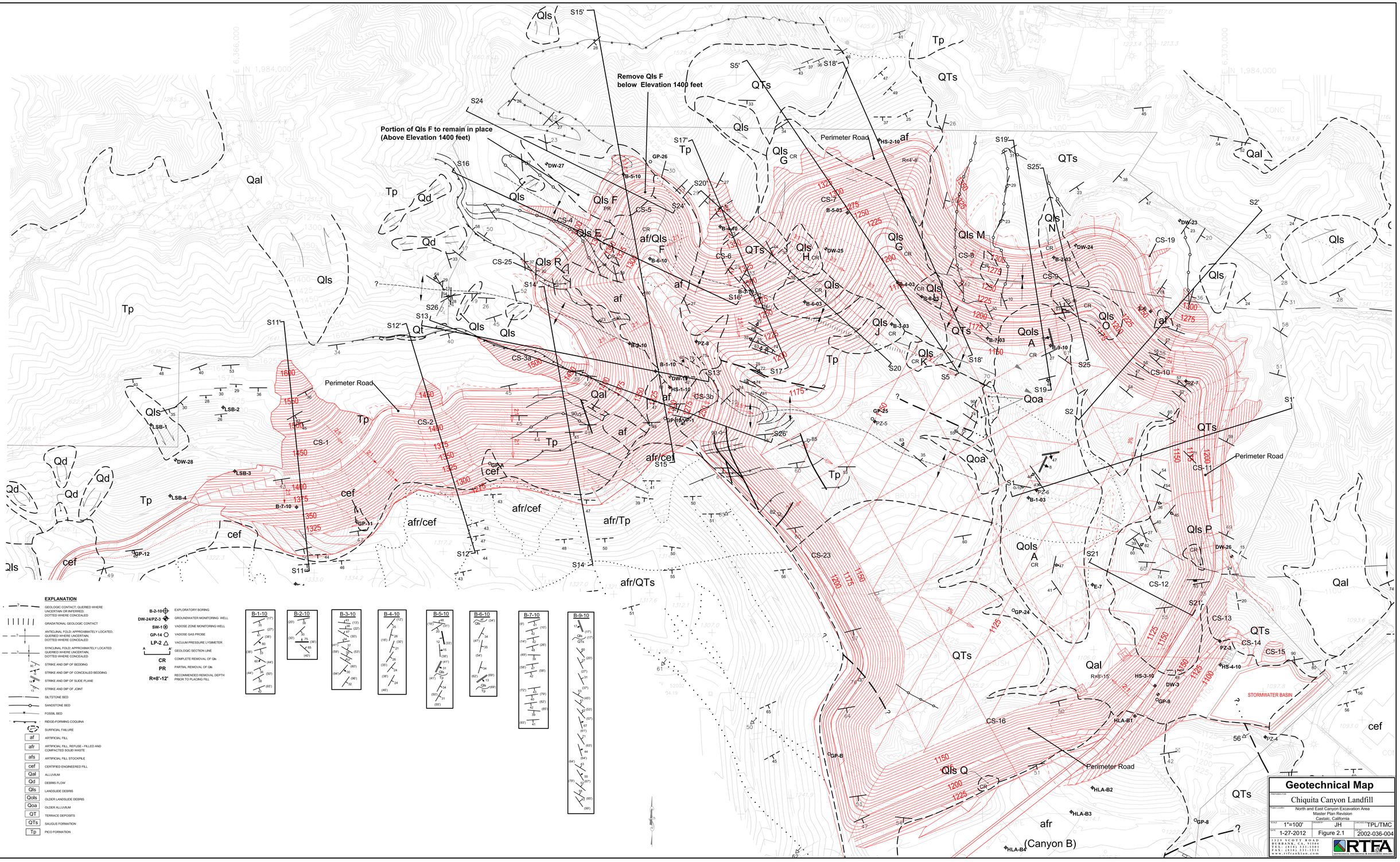
Remove Qls F
below Elevation 1400 feet
Portion of Qls F to remain in place
(Above Elevation 1400 feet)
Perimeter Road
STORMWATER BASIN
(Canyon B)
Qal
Qd
Qls
Tp
QTs
Qt
Qoa
Qols
afr
afr/cef
afr/Tp
afr/QTs
cef
af
EXPLANATION
GEOLOGIC CONTACT: QUERIED WHERE UNCERTAIN OR INFERRED; DOTTED WHERE CONCEALED
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SILTSTONE BED
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RIDGE-FORMING COQUINA
SURFICIAL FAILURE
af ARTIFICIAL FILL
afr ARTIFICIAL FILL, REFUSE - FILLED AND COMPACTED SOLID WASTE
afs ARTIFICIAL FILL STOCKPILE
cef CERTIFIED ENGINEERED FILL
Qal ALLUVIUM
Qd DEBRIS FLOW
Qls LANDSLIDE DEBRIS
Qols OLDER LANDSLIDE DEBRIS
Qoa OLDER ALLUVIUM
QT TERRACE DEPOSITS
QTs SAUGUS FORMATION
Tp PICO FORMATION
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LP-2 VACUUM PRESSURE LYSIMETER
A A' GEOLOGIC SECTION LINE
CR COMPLETE REMOVAL OF Qls
PR PARTIAL REMOVAL OF Qls
R=8'-12' RECOMMENDED REMOVAL DEPTH PRIOR TO PLACING FILL
B-1-10
B-2-10
B-3-10
B-4-10
B-5-10
B-6-10
B-7-10
B-9-10
Geotechnical Map
PREPARED FOR
Chiquita Canyon Landfill
Project Location
North and East Canyon Excavation Area
Master Plan Revision
Castaic, California
SCALE 1"=100'
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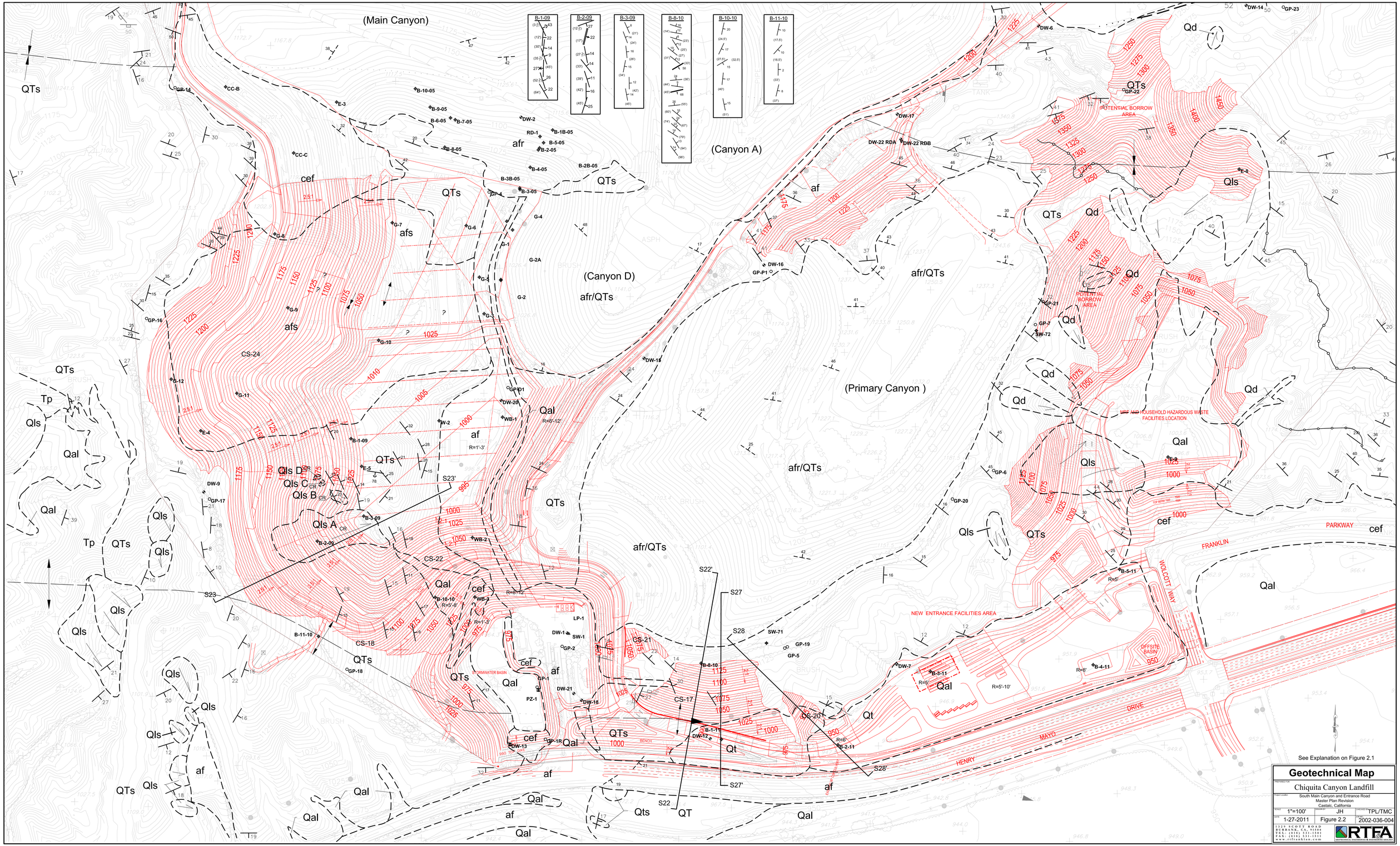

See Explanation on Figure 2.1

Geotechnical Map

PREPARED FOR: Chiquita Canyon Landfill

PROJECT LOCATION: South Main Canyon and Entrance Road Master Plan Revision Castaic, California

SCALE	DRAWN BY	CHECKED BY
1"=100'	JH	TPL/TMC
DATE	FIGURE	JOB NO.
1-27-2011	Figure 2.2	2002-036-004

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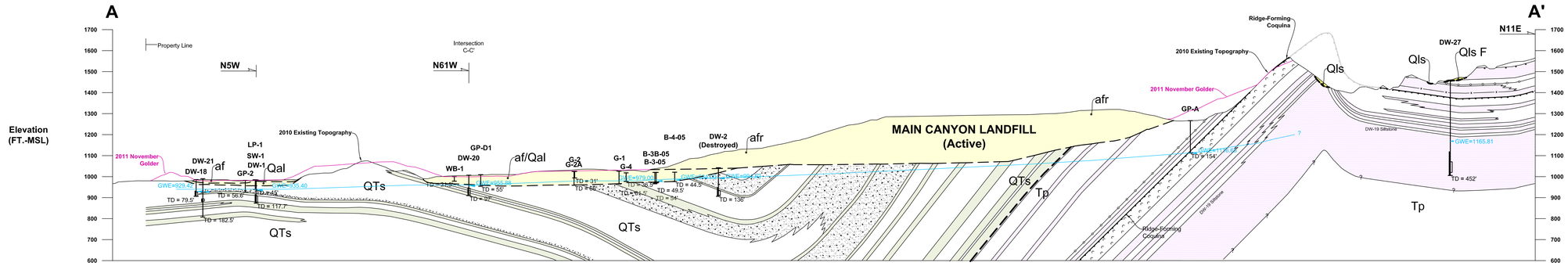
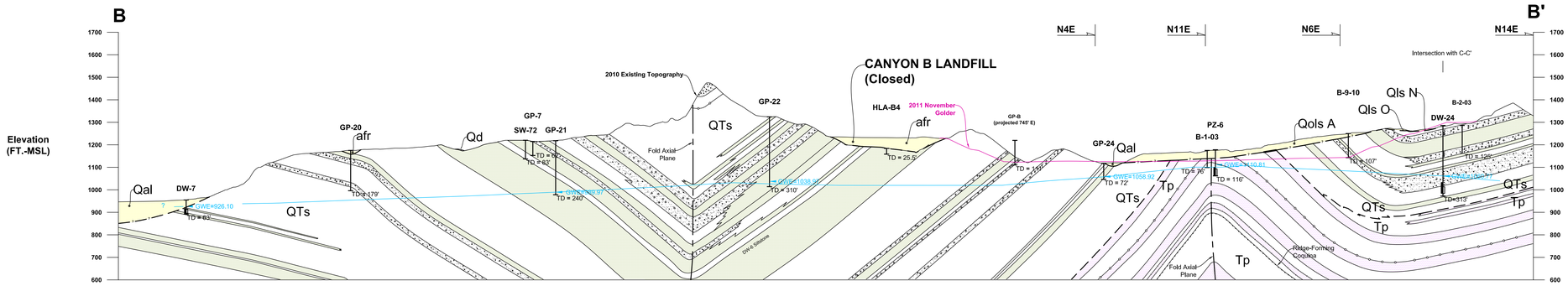
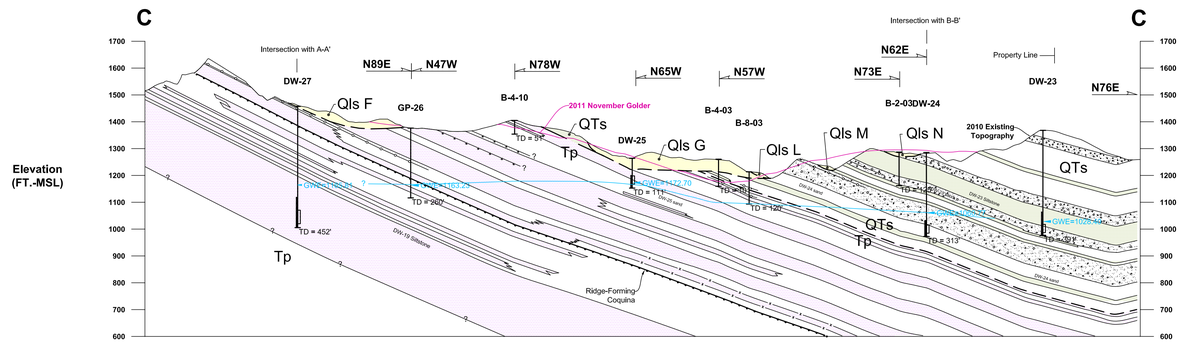
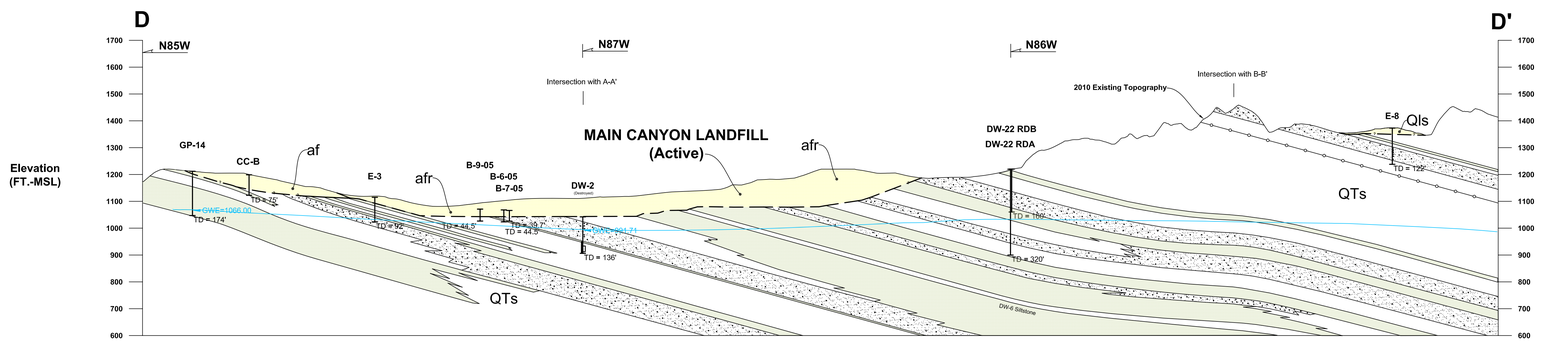




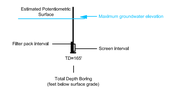




EXPLANATION

- af — Artificial Fill
- afr — Artificial Fill Refuse
- Qal — Quaternary Alluvium
- Qsa — Saugus Formation Coarse-grained; sandstone with gravel
- QTs — Saugus Formation Coarse-grained; primarily sandstone
- QTs — Saugus Formation Fine-grained; primarily siltstone, mudstone or claystone
- Tp — Pico Formation Coarse-grained; primarily sandstone
- Tp — Pico Formation Fine-grained; primarily siltstone, mudstone or claystone
- Tp — Fossil rich; Primarily Sandstone
- Siltstone Bed
- Sandstone Bed
- Fossil Bed

DW-15 — Monitoring Well or Piezometer



Geologic Sections

PREPARED FOR: Chiquita Canyon Landfill

Project Location: Chiquita Canyon Landfill, Castaic, California

SCALE	DRAWN BY	CHECKED BY
1"=200'	JH	TMC
DATE: 1-27-2012	Figure 3	JOB NO.: 2002-036-004

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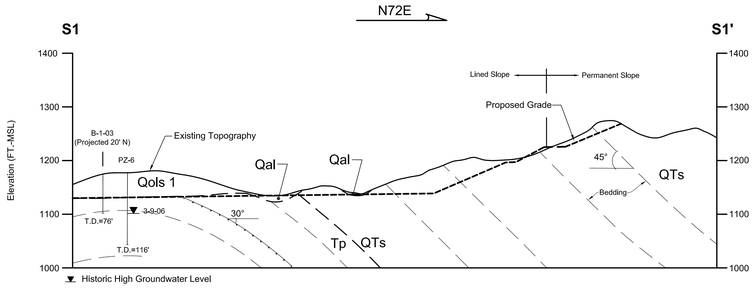

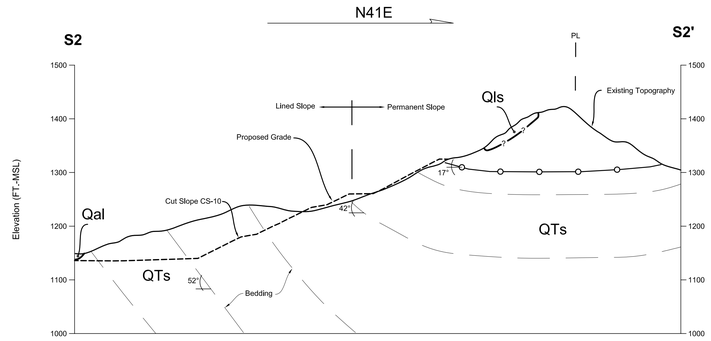

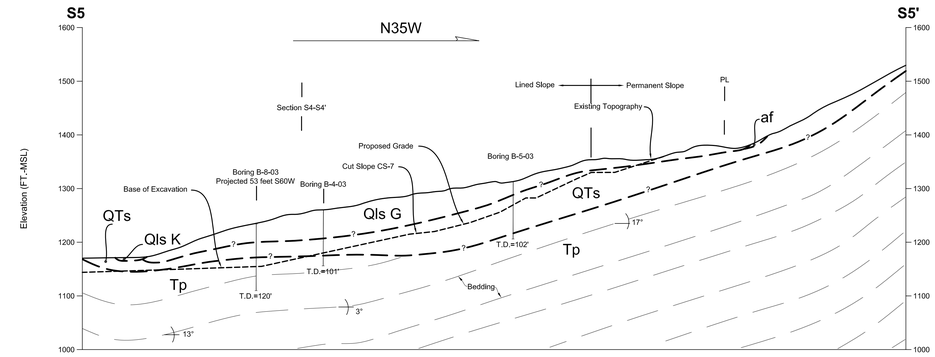

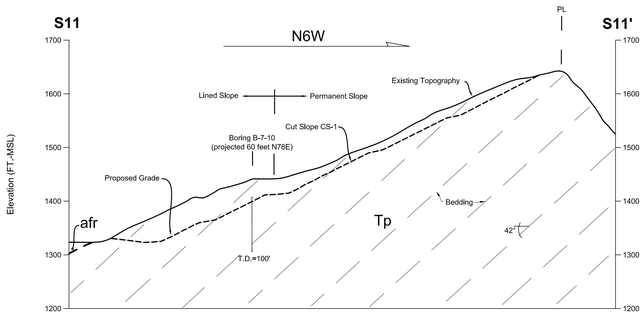

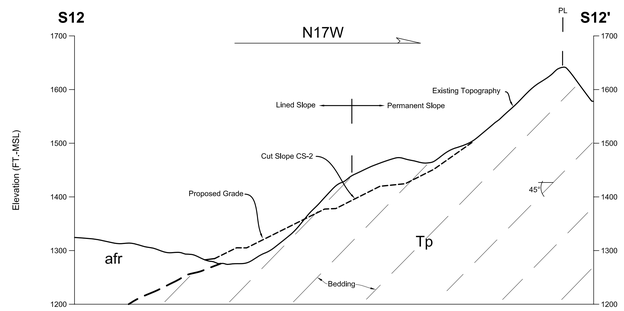

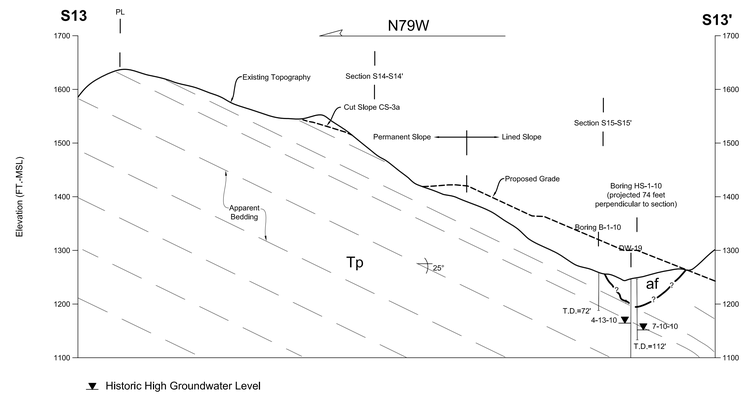

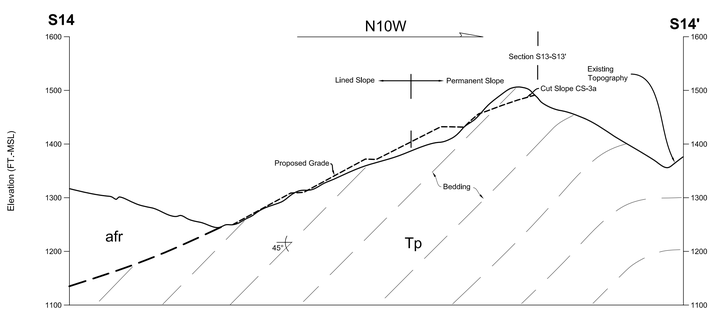

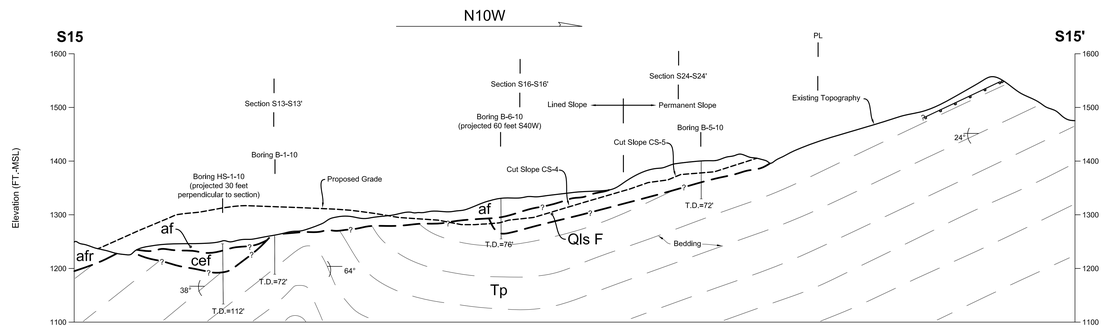

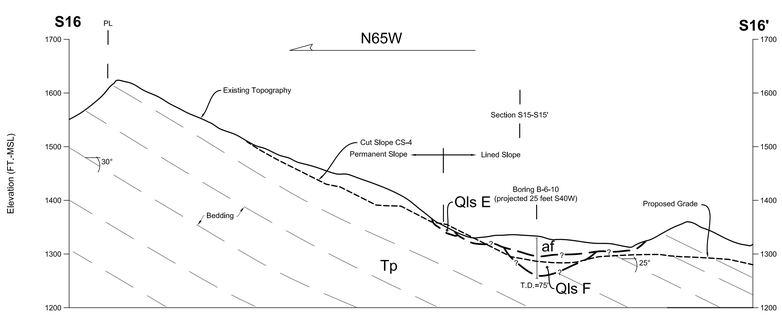

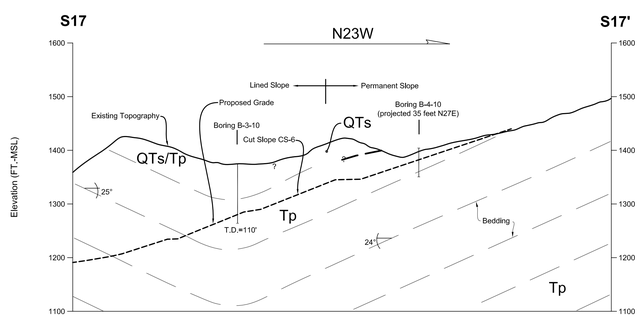

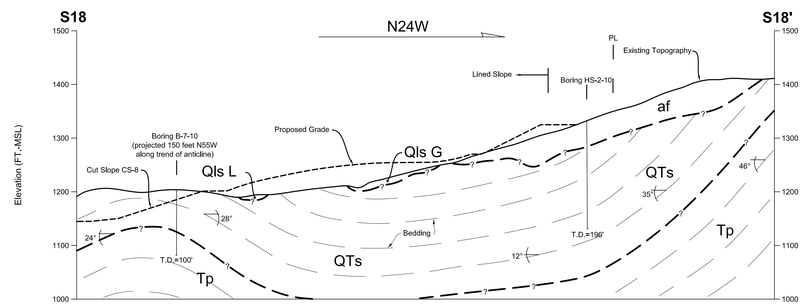

Geologic Sections

PREPARED FOR

Chiquita Canyon Landfill

Project Location

Master Plan Revision
Castaic, California

SCALE	DRAWN BY	CHECKED BY
AS SHOWN	JH	TPL
DATE		JOB NO.
1-27-2012	Figure 4.1	2002-036-004

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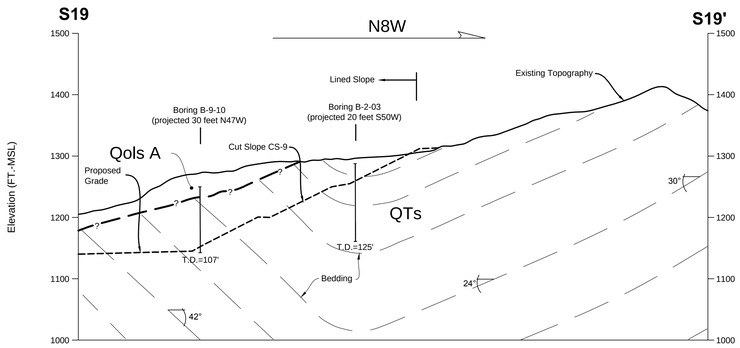
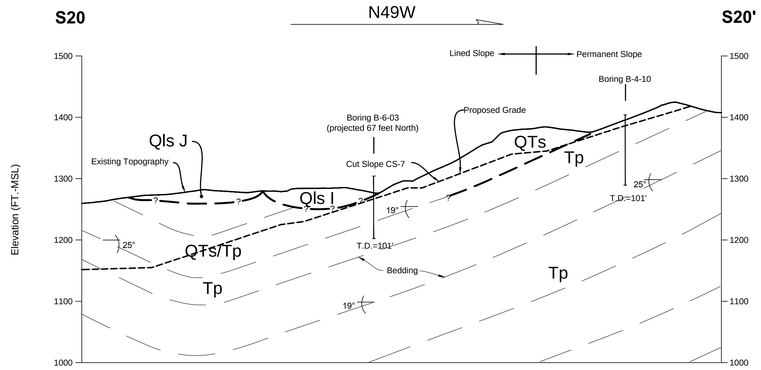
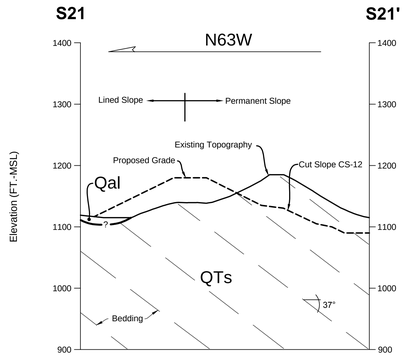
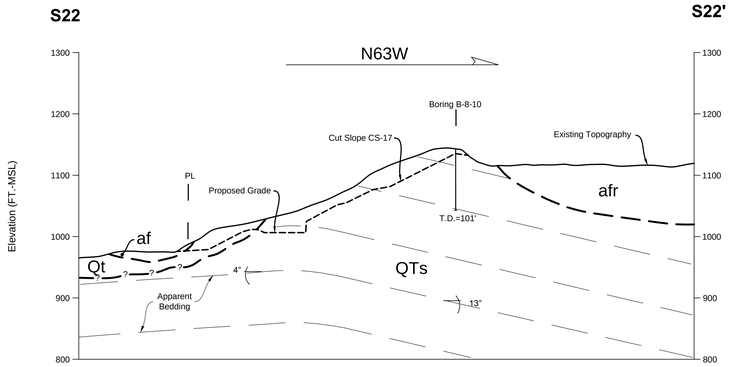
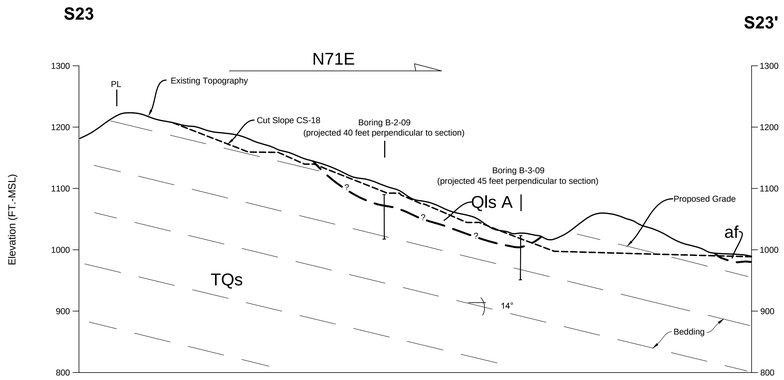
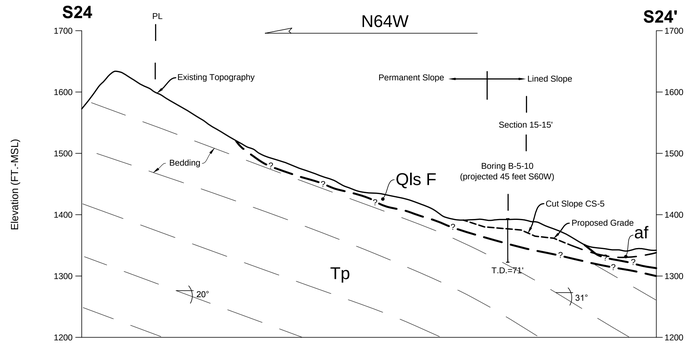


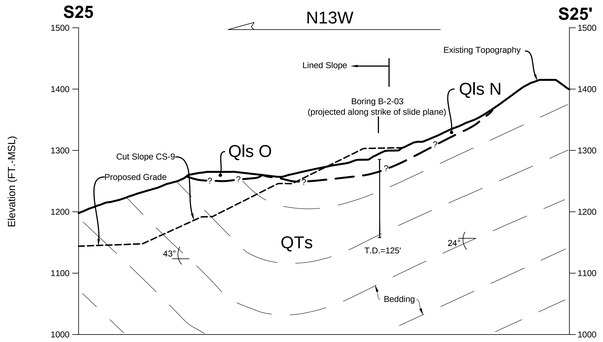


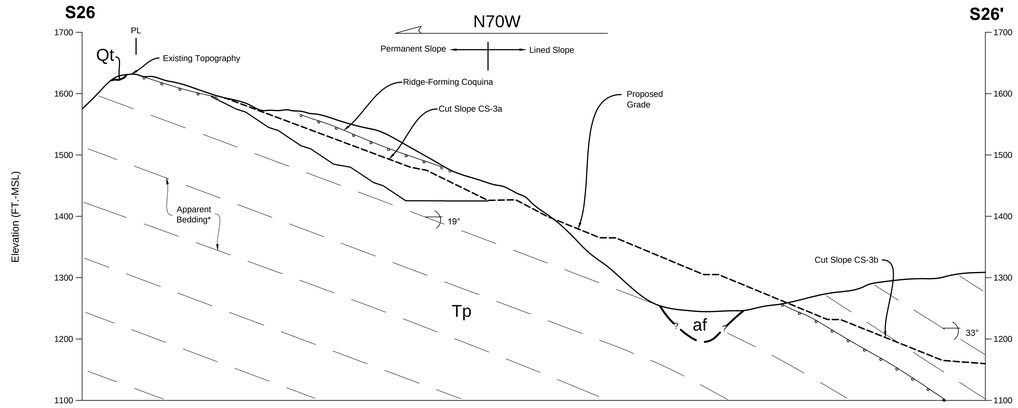




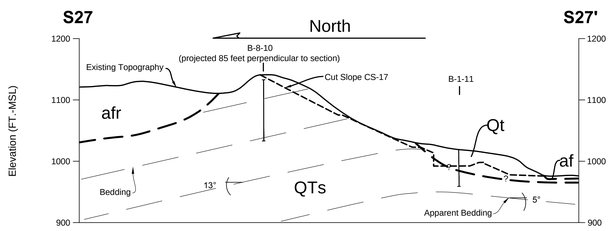


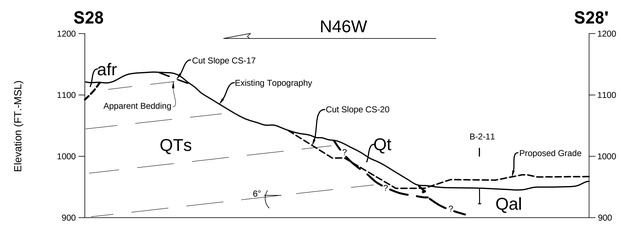






* Bedding Structure Defined by Ridge-Forming Coquina





Geologic Sections

PREPARED FOR

Chiquita Canyon Landfill

Project Location

Master Plan Revision
Castaic, California

SCALE	DRAWN BY	CHECKED BY
AS SHOWN	JH	TPL
DATE 1-27-2012	Figure 4.2	JOB NO. 2002-036-004

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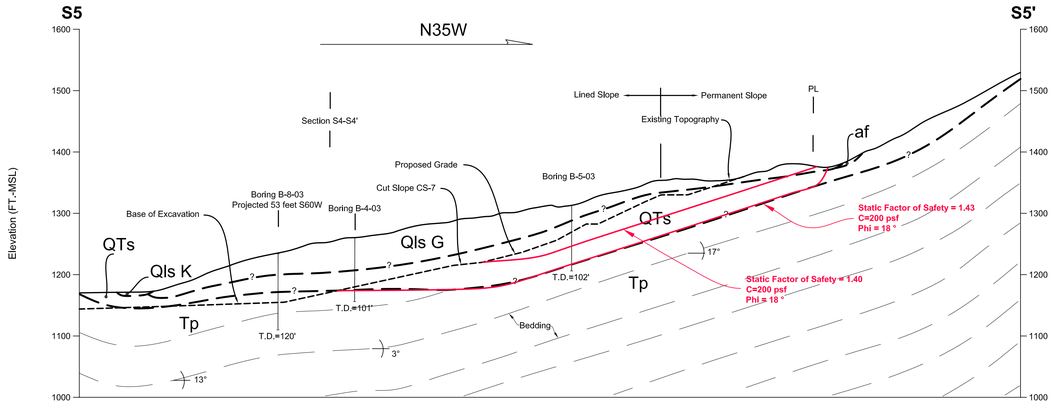

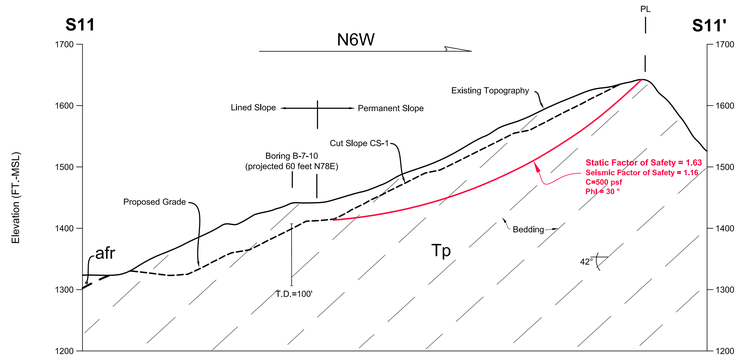

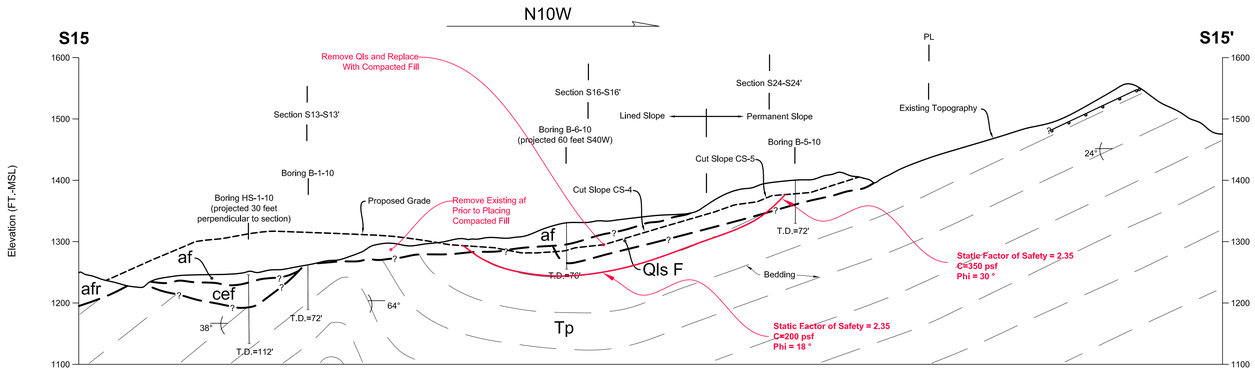

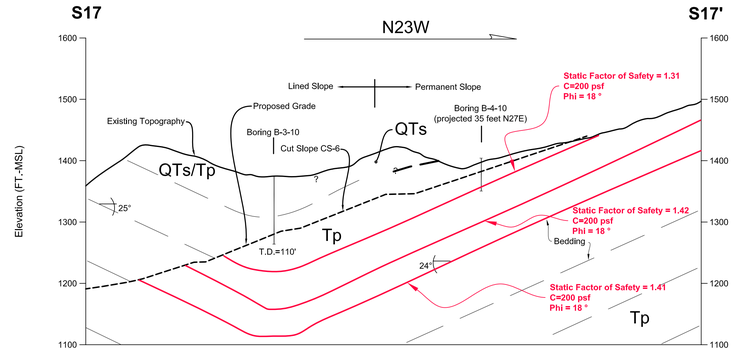

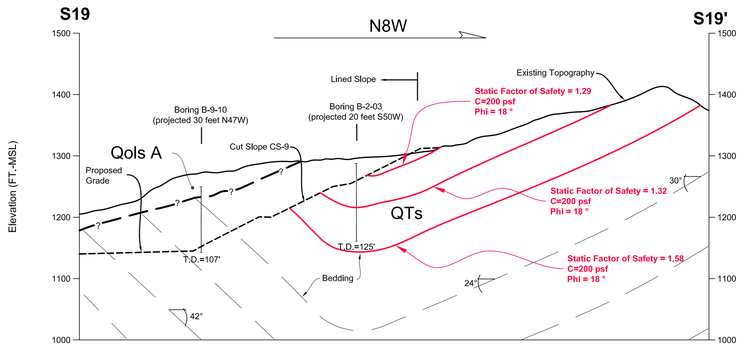

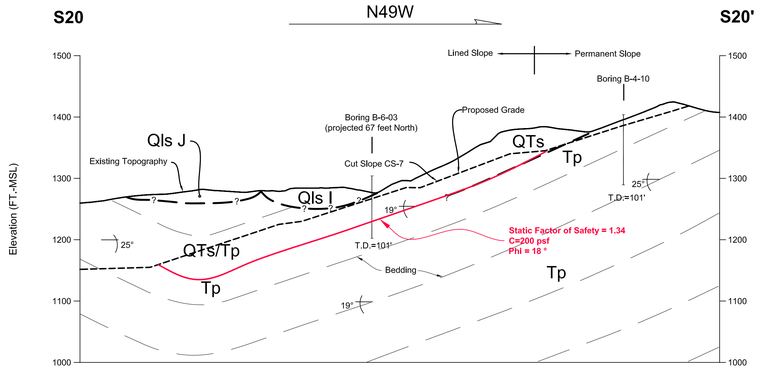

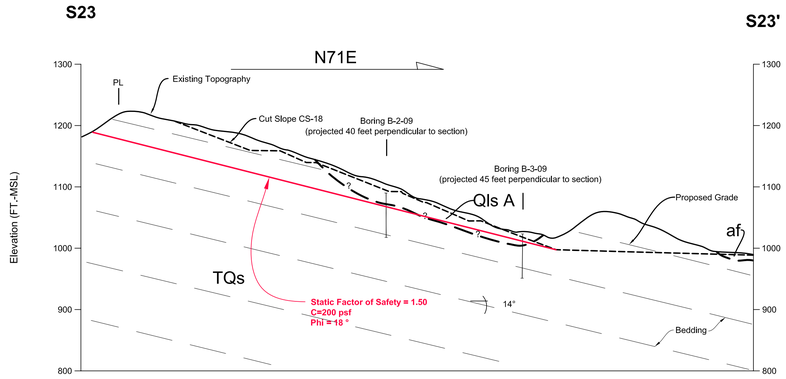

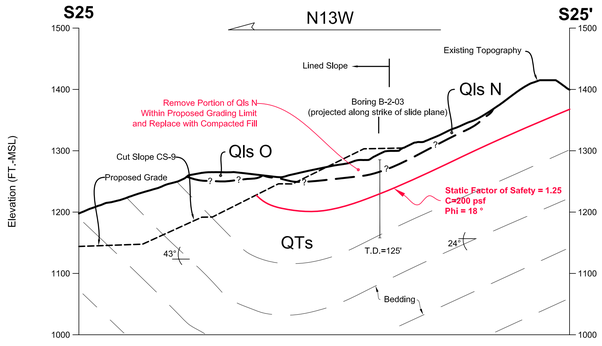

Geotechnical Sections

PREPARED FOR

Chiquita Canyon Landfill

Project Location

Master Plan Revision
Castaic, California

SCALE	DRAWN BY	CHECKED BY
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DATE 1-27-2012	Figure 5	JOB NO. 2002-036-004

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GEOTECHNICAL INVESTIGATION

MASTER PLAN REVISION

CHIQUITA CANYON LANDFILL

CASTAIC, CALIFORNIA

FOR

CHIQUITA CANYON LANDFILL

JANUARY 27, 2012

JOB NO. 2002-036-004

VOLUME 2 OF 2

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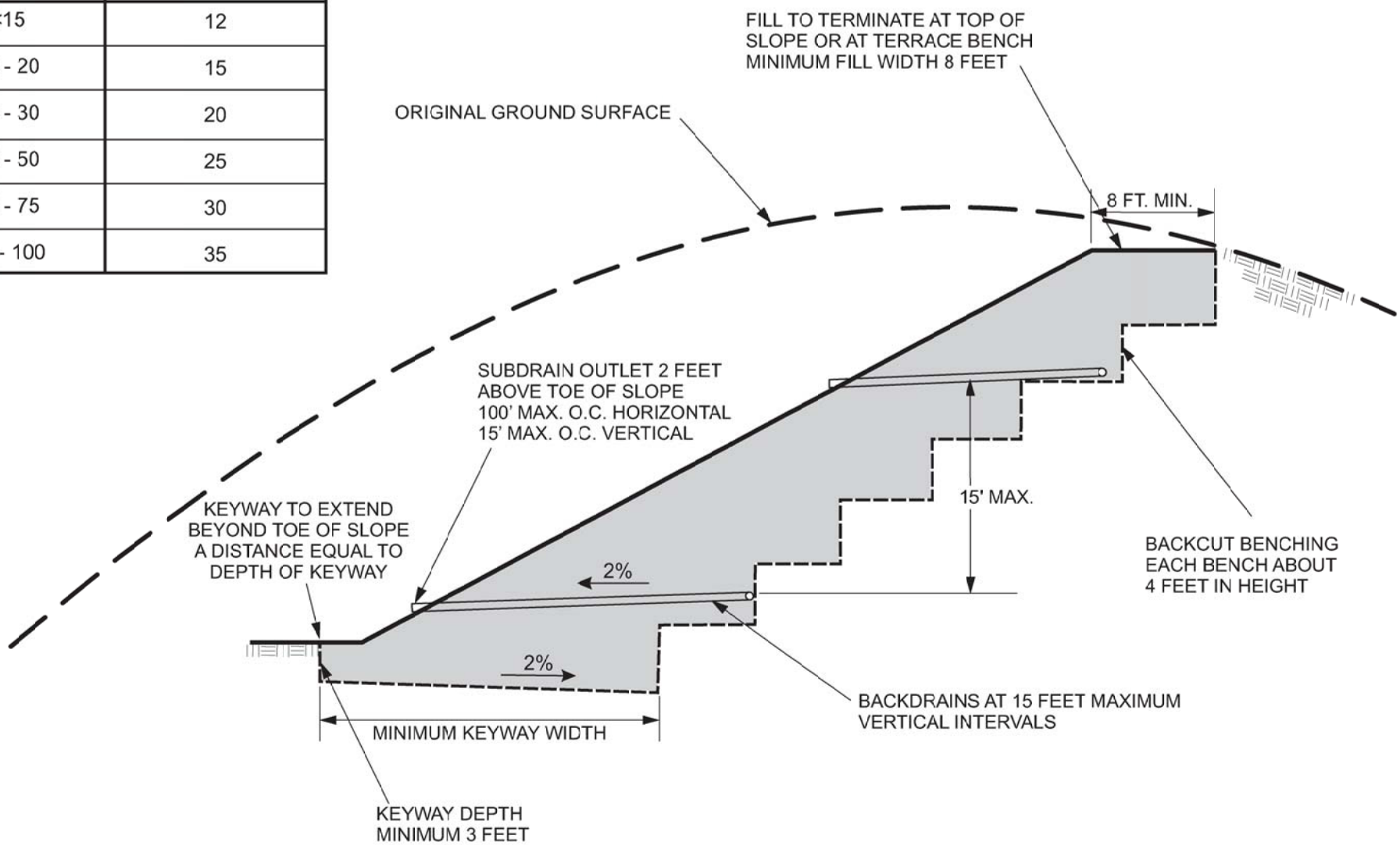
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

STABILITY FILL HEIGHT (FEET)	MINIMUM WIDTH OF KEYWAY (FEET)
<15	12
15 - 20	15
20 - 30	20
30 - 50	25
50 - 75	30
75 - 100	35

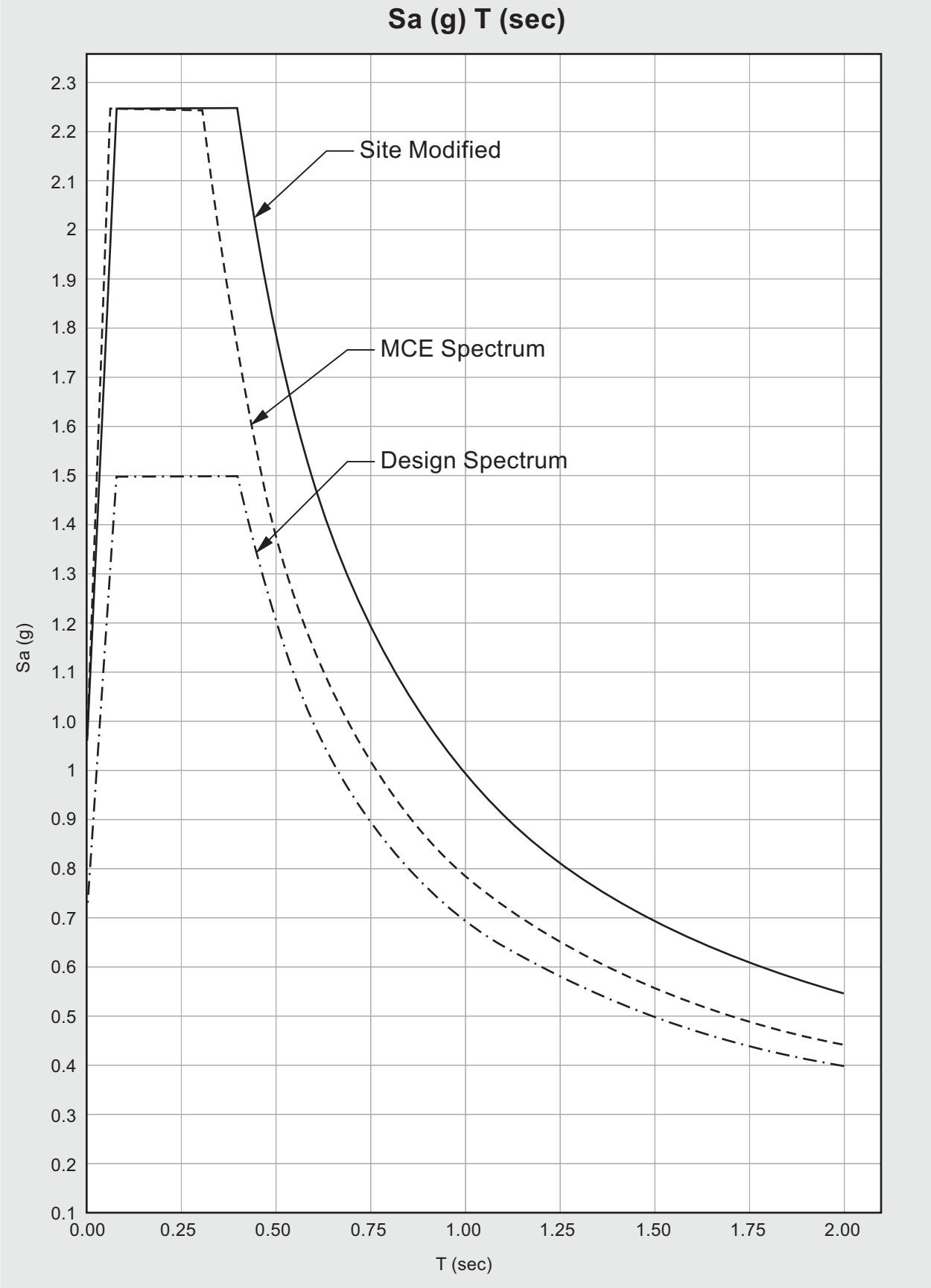


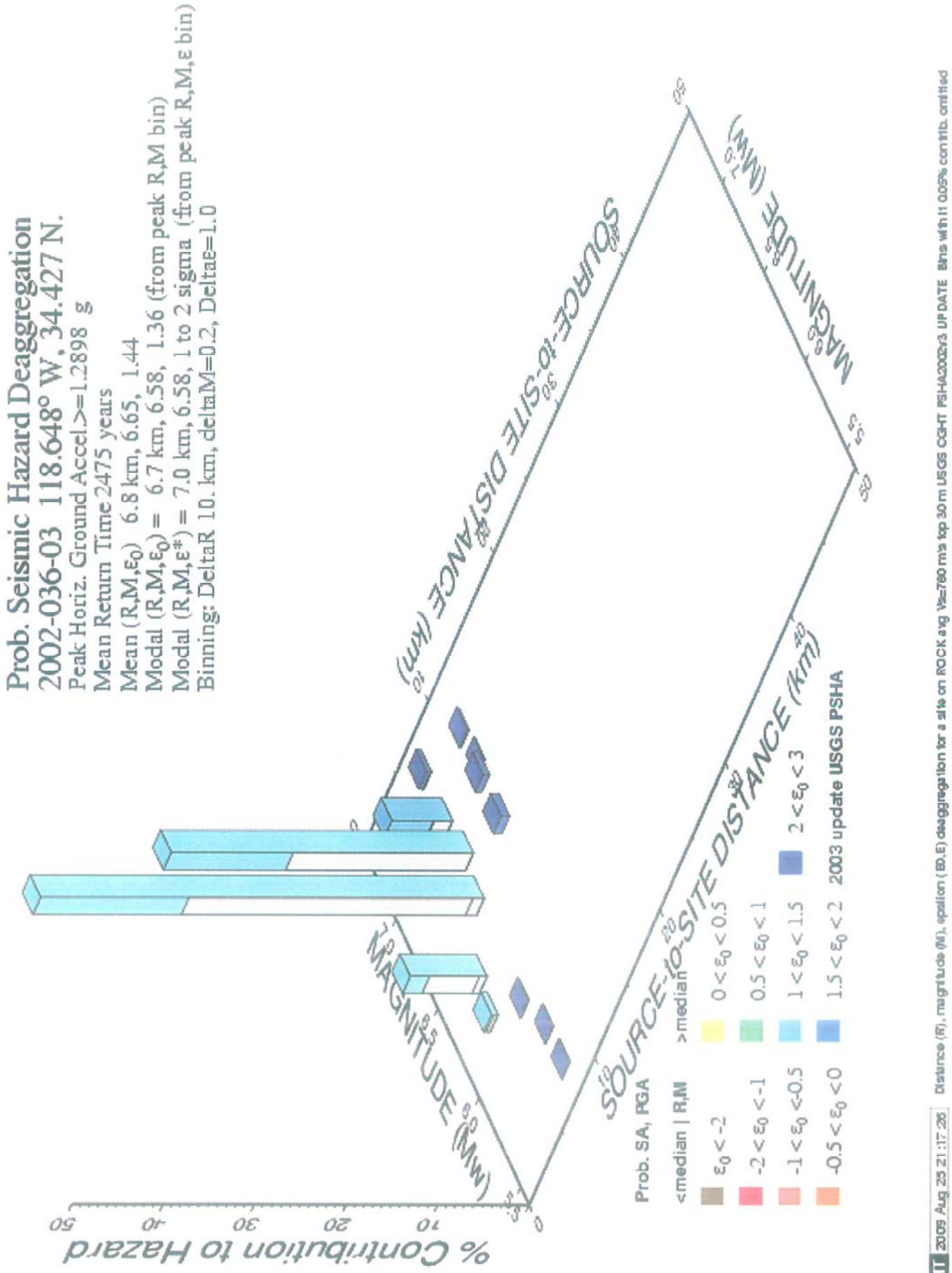
STABILITY FILL DETAILS FOR GROSSLY STABLE SLOPES

NOT TO SCALE

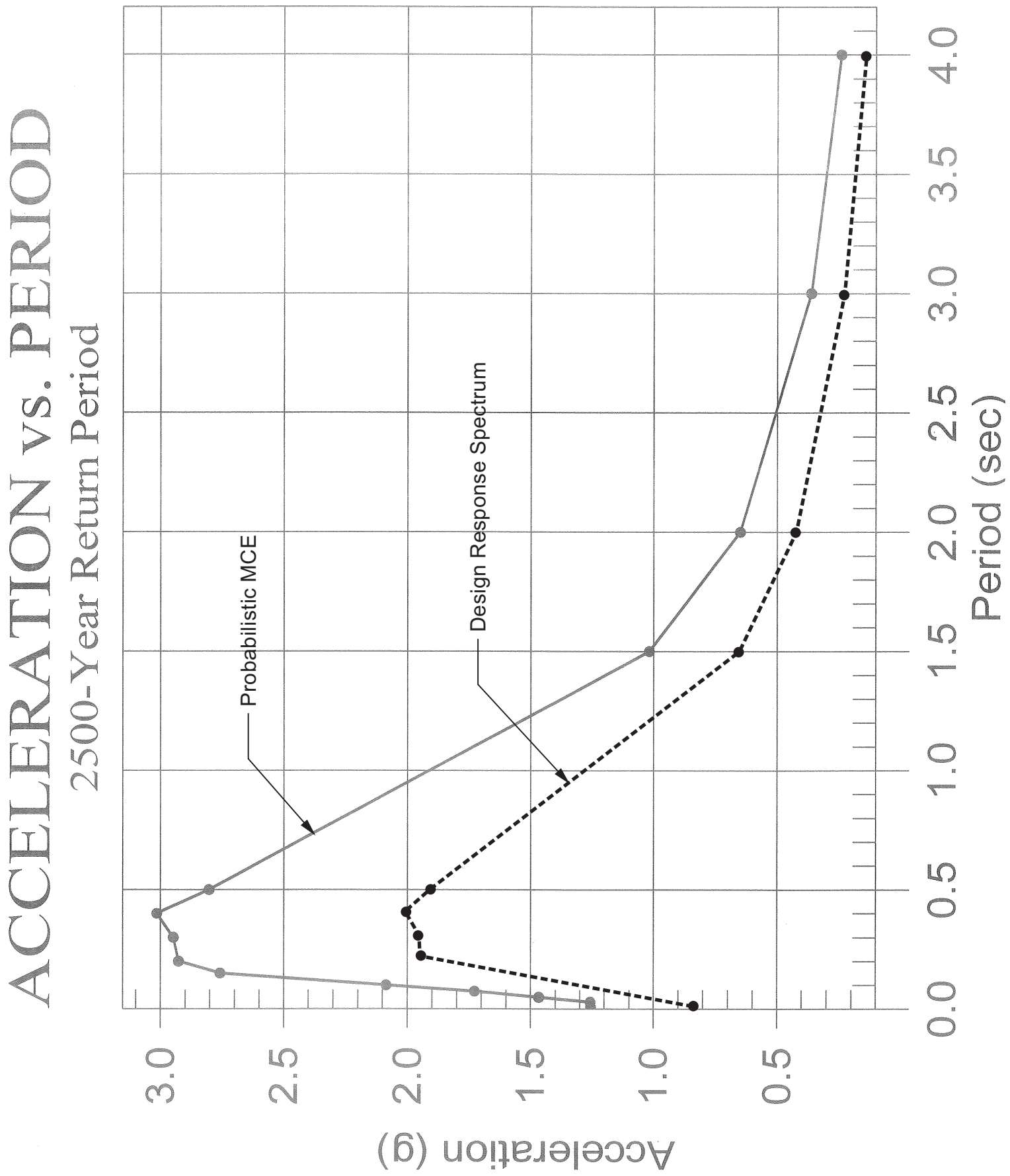
NOTE:
SUBDRAIN PIPES ALONG BACKCUT SHOULD CONSIST OF AT LEAST 4'' DIAMETER SLOTTED PIPE WITH AT LEAST 6" OF F-1 FILTER MATERIAL ON ALL SIDES OF THE PIPE.

SEISMIC SPECTRUM




Prob. Seismic Hazard Deaggregation
2002-036-03 118.648° W, 34.427 N.
Peak Horiz. Ground Accel.>=1.2898 g
Mean Return Time 2475 years
Mean (R,M,ε0) 6.8 km, 6.65, 1.44
Modal (R,M,ε0) = 6.7 km, 6.58, 1.36 (from peak R,M bin)
Modal (R,M,ε*) = 7.0 km, 6.58, 1 to 2 sigma (from peak R,M,ε bin)
Binning: DeltaR 10. km, deltaM=0.2, DeltaE=1.0
% Contribution to Hazard
SOURCE-to-SITE DISTANCE (km)
MAGNITUDE (MW)
Prob. SA, PGA
<median | R,M
>median
ε0 < -2
-2 < ε0 < -1
-1 < ε0 < -0.5
-0.5 < ε0 < 0
0 < ε0 < 0.5
0.5 < ε0 < 1
1 < ε0 < 1.5
1.5 < ε0 < 2
2 < ε0 < 3
2003 update USGS PSHA
GMT 2009 Aug 23 21:17:26
Distance (R), magnitude (M), epsilon (ε0,ε) deaggregation for a site on ROCK avg Vs=760 m/s top 30 m USGS CGHT PSHA2002v3 UPDATE Bins with lt 0.05% contrib. omitted

PROBABILISTIC MCE



Chiquita Canyon Landfill
January 27, 2012
2002-036-004

APPENDIX A

EXCAVATION PLAN (GOLDER ASSOCIATES, NOVEMBER 2011)

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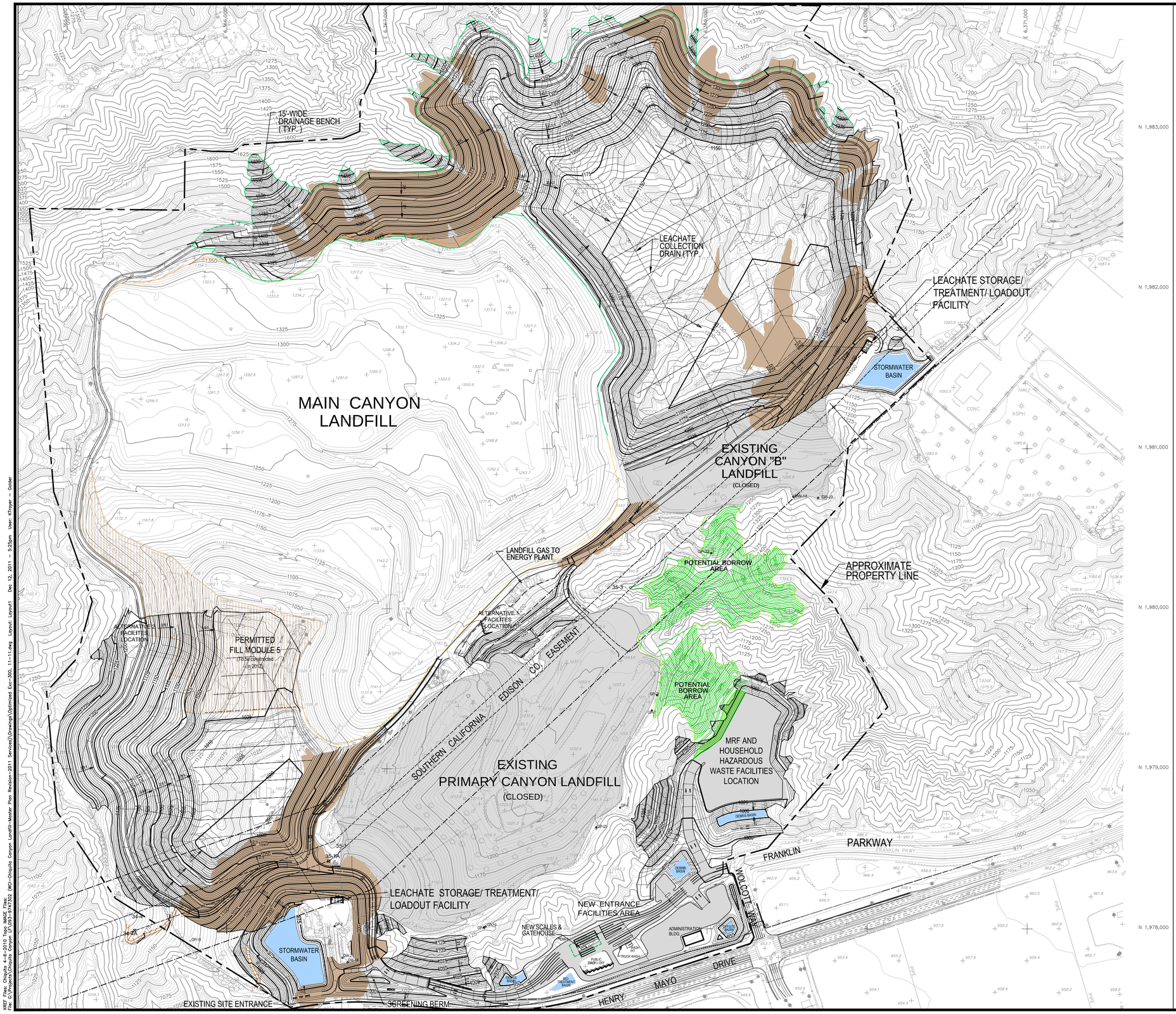
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY



NOTE: Areas contoured with green contours represent borrow areas and are not mandatory for the construction of the landfill, but are designed to help the project soil balance. The space that is gained around the MRF due to the borrow areas is the area shaded green and equals 0.6 additional acreage.

Base compiled by photogrammetric methods
by Don Read Corporation, Brea, CA
Date of photography: April 6, 2010

PROJECT

WASTE CONNECTIONS, INC.
CHIQUITA CANYON LANDFILL
LOS ANGELES COUNTY, CALIFORNIA

TITLE

EXCAVATION PLAN

Golder Associates
Sunnyvale, California

PROJECT No. 093-9747302			FILE No.	
DESIGN	SER	NOV 2011	SCALE AS NOTED	REV. 0
CADD	KLT	DEC 2011	2	
CHECK				
REVIEW				

XREF Files: ChiquitaLandfill-Master Plan Revision-2011 Services\Drawings\Optimized Exc-300_11-11.dwg Layout: Layout1 Dec 12, 2011 - 5:25pm User: KTroyer - Golder
File: G:\Projects\Chiquita Canyon LF\093-9747302 (WC-Chiquita Canyon Landfill-Master Plan Revision-2011 Services)\Drawings\Chiquita Canyon Landfill-Master Plan Revision-2011 Services.dwg Layout: Layout1 Dec 12, 2011 - 5:25pm User: KTroyer - Golder

Chiquita Canyon Landfill
January 27, 2012
2002-036-004

APPENDIX B

FIELD EXPLORATIONS

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

APPENDIX B

FIELD EXPLORATIONS

RECONNAISSANCE GEOLOGIC MAPPING

During geologic mapping, local surficial deposits (both natural and man-made) and bedrock units were mapped on a 1 inch = 100 feet topographic base map compiled by Don Read Corporation, based on April 4, 2010 photography. Geologic structural features, including bedding, were observed, measured, and plotted on the base map. Previous geologic mapping of the North and East Canyon was conducted in 2003.

EXCAVATION AND LOGGING OF EXPLORATORY BORINGS

The project site exploration has been conducted over a nine year period beginning in 2003 and concluding in 2011 as detailed below:

- eight bucket auger borings, designated B-1-03 through B-8-03, that were excavated for East Canyon in 2003;

- five bucket auger borings (B-1-09 through B-3-09, B-10-10 and B-11-10) and three rotary wash borings (WB-1-09 through WB-3-09) excavated within South Main Canyon in 2009 and 2010;

- nine bucket auger borings (B-1-10 through B-9-10) and four hollow-stem auger borings (HS-1-10 through HS-4-10) excavated within North & East Canyon, and above the future Entrance Road, in 2009; and

- five bucket auger borings (B-1-11 through B-5-11) excavated for the future Entrance Road in 2011.

Several of the bucket auger borings were down-hole logged by a Certified Engineering Geologist to directly observe the subsurface geologic units and structure. The locations of the various exploratory borings are shown on the attached Geotechnical Maps, Figure 2.1 and 2.2. The soils/rock units encountered were classified in accordance with the Unified Soil Classification System. Rock types were identified using standard rock nomenclature. The boring logs are presented in this appendix.

Boring HS-1-10, drilled to a depth of 112 feet below existing ground surface, was completed as a temporary piezometer, with well screen placed from 88 feet to 108 feet. Boring HS-2-10 was drilled to a depth of 199 feet and completed as a temporary

piezometer with well screen placed from 180 to 190 feet. Both temporary piezometers were monitored for water levels prior to destruction on July 14, 2010.

Undisturbed and bulk samples of the subsurface materials were collected for laboratory inspection and testing. The lined-barrel sampler used to take undisturbed samples has an external diameter of 3.25 inches and an internal diameter of 2.625 inches. The depths at which the undisturbed samples were obtained are indicated on the logs. The number of blows required to drive the sampler 12 inches with the hammer is also shown on the boring logs.

In addition to obtaining undisturbed samples, Standard Penetration Tests (SPT) were performed within some of the hollow-stem auger borings. The results of the tests are indicated on the boring logs. The Standard Penetration Tests were performed in accordance with the ASTM D1586 Test Method.

BORING B-1-03

JOB NUMBER: 2002-036-01 By: D.G. Francuch
DATE DRILLED: 10-13-03
EQUIPMENT USED: 24"-Diameter Bucket Auger
ELEVATION: 1175+/-
SURFACE CONDITIONS:
SAMPLING METHOD: 2 5/8-inch drive

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG (SW NE)	SOIL TYPE
				5, 10, 15, 20, 25, 30, 35, 40			

0-40 feet: OLDER LANDSLIDE (Qols)

@ 0 feet: CLAYEY SILTSTONE, plastic to moderate stiff, moist, caliche pods, brownish gray (5Y 4/1)

@ 5 feet: blebs of dark brown siltstone within light reddish brown silty sand

@ 11 feet: CLAYSTONE, plastic, moist, dark reddish brown (10R 3/4)

Slide Plane: N60W, 85W, 1"-2" thick

@ 11.3 feet: CLAYEY SILTSTONE, olive gray (5Y 4/1)

@ 14 feet: SANDSTONE, fine to coarse grained, moderately hard, moist, moderate yellowish brown (10YR 5/4)

@ 19 feet: CLAYEY SILTSTONE, stiff, moist, micaceous, pale yellowish brown (10YR 6/2)

@ 21 feet: Sheared Claystone, Irregular dips to NW, 1"-2" thick

@ 25 feet: CLAYEY SANDSTONE, fine grained, clayey to silty sand, moderately hard, moist, moderate yellowish brown (10YR 5/4)

@ 26 feet: Shear, N30E, 45NW, 1/4" reddish brown clay gouge

@ 26.5 feet: Bedding, approx. N70W, 20NE, sandstone

@ 27 feet: SILTSTONE (ML), some fine grained sand and clay, moderately hard, moist, light brown (5YR 5/6)

@ 27.5 feet: Shear, irregular, bedding discontinuos N10E, 52SE

@ 30 feet: color changes to light olive gray (5Y 5/2)

@ 35 feet: SANDSTONE, fine to medium grained with small cobbles, moderately hard, moist, light olive gray (5Y 5/2)

@ 38 feet: SILTSTONE, minor to trace clay, moderately hard, moist, light olive gray (5Y 5/2)

@ 39.5 feet: Shear, N35W, 65SW well defined clay shear polished, below 39.5 feet gradual color change to olive gray, no distinct shears or slide planes

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING B-1-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 10-13-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
						SW NE	
26				45, 50, 55, 60, 65, 70, 75, 80		no log	

40-76 feet: PICO FORMATION (Tp)

@ 40 feet: SILTY CLAYSTONE, dark reddish brown (10R 3/4) to olive gray (5Y 4/1), Bedding parallel to shear

@ 43 feet: SILTY CLAYSTONE, hard, moist, olive gray (5Y 4/1), conchoidal fracture possible contact with bedrock, note hardness and color change

@ 45.5 feet: Bedding N85W, 47SW , sandstone bed in siltstone

@ 47 feet: fossiliferous, small clam fragments and caliche bed, Bedding: N90W, 54S, 1 foot thick

@ 56 feet: zone of sandstone blocks in clay matrix, discontinuous high angle shear, polished claystone above with hackly fracture

@ 57 feet: CLAYEY SANDSTONE: fine grained sand with silt and clay, hard, moist, greenish gray (5GY 6/1)

@ 59 feet: Shear, N75E, 50SE, poorly developed zone of discontinuous sandstone blocks within siltstone

@ 60 feet: SILTY CLAYSTONE, approximately 6" thick

@ 61 feet: SANDSTONE, fine grained sand, hard, moist, light olive gray (5Y 6/1)

@ 68 feet: Bedding, N80W, 52SW, dark brown clayey siltstone bed in sandstone 4" thick ,Fault offsets siltstone bed

@ 69 feet: CLAYSTONE, moderately hard, moist, semi-plastic, dark yellowish brown (10YR 4/2)

70 feet: increase in moisture

@ 72 feet: CLAYEY SANDSTONE, fine to medium grained sand with clay, hard, moist, light olive gray (5Y 6/1)

TOTAL DEPTH 76 FEET.
No Groundwater. No caving.
Downhole logged to 71 feet.

SAMPLE DEPTH	KELLY WEIGHT
0-28'	5952 lbs.
28-55'	3921 lbs.
55-84'	2531 lbs.
84-114'	1407 lbs
+1000 lbs/30 ft. stem	

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

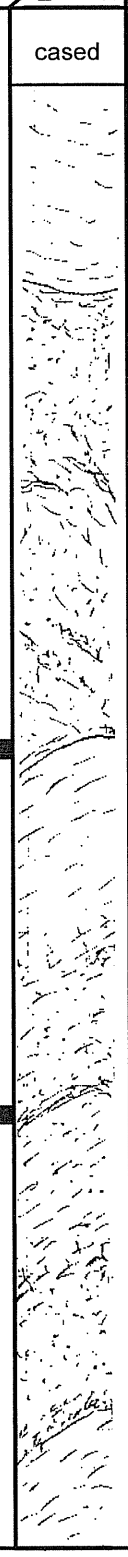
LOG OF BORING

R.T. FRANKIAN & ASSOCIATES
FIGURE A-2.1b

BORING B-2-03

JOB NUMBER: 2002-036-01 By: D.G. Francuch
DATE DRILLED: 10-13-03 - 10-14-03
EQUIPMENT USED: 24"-Diameter Bucket Auger
ELEVATION: 1287+/-
SURFACE CONDITIONS:
SAMPLING METHOD: 2 5/8-inch drive

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
					E W		
					cased		
				5			
				10			
				15			
Bag				20			
				25			
Bag				30			
				35			
				40			



0-4 feet: ARTIFICIAL FILL (af)
@ 0 feet: SANDY SILT (SM), silt with fine sand, loose, dry, pale yellowish brown (10YR 6/2)

4-19 feet: LANDSLIDE (Qls)
@ 4 feet: SILTSTONE, soft, moist, light olive gray (5Y 5/2)

@ 7 feet: Slide Plane: N75W, 11SW, olive gray siltstone over brown sandy siltstone 8" thick soil zone with sandstone blocks
@ 8 feet: stopped drilling on 10/13/03 @ 15:30
Resume drilling on 10/14/03 @ 7:00

@ 11 feet: SANDY SILTSTONE: fine sand, moderately hard, moist, moderate yellowish brown (10YR 5/4)
@ 12 feet: chaotic assemblage of sandy silt and clayey siltstone

@ 19 feet: Slide Plane: N25E, 22SE 2-3"zone of dark brown polished clay, moderately plastic

19-125 feet: SAUGUS FORMATION (QTs)
@ 19 feet: SILTSTONE, moderately hard to hard, moist, light olive gray (5Y 5/2)

@ 24 feet: Bedding; N40E, 34SE; limey siltstone bed, 8" thick

@ 28 feet: Bedding; N30E, 28SE, dark olive green clayey siltstone

@ 31 feet: CLAYEY SILTSTONE, trace fine sand, hard, moist, dark yellowish brown (10YR 4/2)
@ 32 feet: Bedding; N50E, 31SE, limey siltstone
@ 32 feet: wood fragments in siltstone
@ 33 feet: SANDSTONE, fine grained, hard, moist, yellowish gray (5Y 7/2)

@ 36 feet: Increased drilling effort
@ 37 feet: Bedding N60E, 38SE; pebble bed in sandstone
@ 37 feet: CLAYEY SILTSTONE, hard, moist, moderate yellowish brown (10 YR 5/4)

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

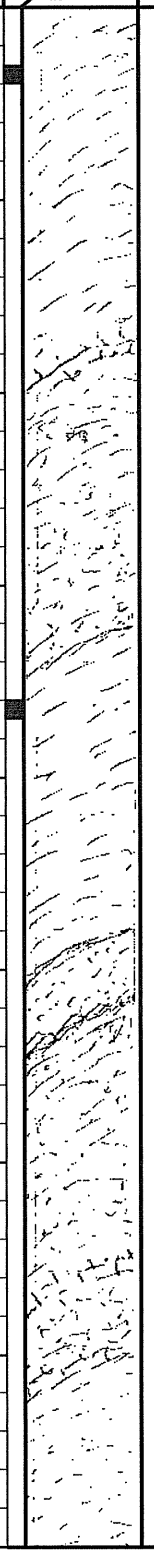
LOG OF BORING

BORING B-2-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 10-13-03 - 10-15-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
Bag				45			
				50			
				55			
Bag				60			
				65			
				70			
				75			
				80			



@ 49.5 feet: Bedding; N40E, 22SE, limey siltstone
@ 50 feet: SANDY SILTSTONE, some fine sand, moderately hard, dry to moist, yellowish gray (5Y 7/2)

@ 56 feet: CLAYEY SILTSTONE, moderately hard to hard, moist, light olive gray (5Y 5/2), Bedding; N40E, 25SE, clay bed 1" thick

@ 63.9 feet: Bedding; N40E, 24SE, clay bed 1" thick
@ 64 feet: SANDSTONE, fine grained sand, moderately hard, moist, pale olive (10Y 6/2)
@ 65.5 feet: Bedding; N25E, 28SE, clay bed 8" thick
@ 66 feet: CLAYEY SILTSTONE, hard moist, moderate yellowish brown (10YR 5/4)

@ 73 feet: limey siltstone

@ 79 feet: SILTSTONE, trace fine sand, hard, moist, dark yellowish brown (10YR 4/2)
@ 79.3 feet: bedding; N40E, 29SE, limey siltstone bed, 12" thick

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING B-2-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 10-13-03 - 10-15-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE

@ 89 feet: Bedding; N45E, 28SE
@ 89 feet: SILTSTONE, trace fine to medium grained sand, moderately hard to hard, moist, dusky yellow (6Y 6/4)

@ 90 feet: SANDSTONE, fine to medium grained sand, trace silt, moderately hard, moist, moderate yellowish brown (10YR 5/4)

@ 95 feet: SANDSTONE, fine to coarse grained with large pebbles, moderately hard, moist, yellowish gray (5Y 7/2)

@ 98 feet: Bedding; N55E, 28SE, pebbly sandstone bed 6" thick

@ 104 feet: Bedding; N30E, 31SE, heavy mineral, fine sand bed

@ 110 feet: SANDSTONE, fine to coarse grained sand with medium pebbles, moderately hard, moist, yellowish gray (5Y 7/2)

@ 115 feet: Bedding; N40E, 22SE, gray sandstone over reddish brown sandstone
@ 115 feet: SILTY SANDSTONE, fine to coarse grained sand, some silt, trace small pebbles, moderately hard to hard, moist, grayish orange (10YR 7/4)
@ 118 feet: Stopped drilling at 15:30 on 10-14-03
resume drilling @ 7:00 on 10-15-03

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated.
It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

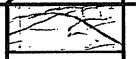
LOG OF BORING

BORING B-2-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 10-13-03 - 10-15-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
					E W		



no log

@ 120.5 feet: Bedding; N45E, 24SE at contact
@ 121 feet: SILTSTONE, trace clay, moderately hard, moist, light brown (5YR 5/6)

@ 124 feet: small cobbles

125
130
135
140
145
150
155
160

TOTAL DEPTH 125 FEET.
No Groundwater. No caving.
Downhole logged to 121 feet.

SAMPLE DEPTH	KELLY WEIGHT
0-28'	5952 lbs.
28-55'	3921 lbs.
55-84'	2531 lbs.
84-114'	1407 lbs
+1000 lbs/30 ft. stem	

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES
FIGURE A-2.2d

BORING B-3-03

JOB NUMBER: 2002-036-01 By: D.G. Francuch
DATE DRILLED: 10-16-03
EQUIPMENT USED: 24"-Diameter Bucket Auger
ELEVATION: 1203.5
SURFACE CONDITIONS:
SAMPLING METHOD: 2 5/8-inch drive

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
					S N		

0-6 feet: LANDSLIDE (Qls)

@ 0 feet: SILT (ML), soft, dry, some caliche staining, light olive gray (5Y 6/1)

@ 4 feet: SILTY SANDSTONE, fine grained sand with silt, moderately hard, dry, moderate yellowish brown (10YR 5/4)

@ 6 feet: Slide Plane; N60W, 14SW, dark brown clay, 2" thick, gypsum

6-16 feet: ALLUVIUM (Qal)

@ SILT (ML), trace clay, moderately hard to moderately soft, dry, yellowish gray, (5Y 7/2)

@ 8 feet: PEBBLY SAND (SP), fine to coarse grained sand with small to large pebbles, hard, dry, intermixed with silt, yellowish gray, (5Y 7/2)

@ 11-14 feet: well bedded sand deposits, shallow dip to north

@ 13 feet: medium cobbles up to 6" diameter

@ 14-16 feet: base of alluvium, irregular erosional contact

16-110 feet: PICO FORMATION (Tp)

@ 16 feet: SILTY SANDSTONE, fine sand with some silt, hard, moist, dusky yellow (5Y 6/4)

@ 16 feet: Bedding approximate; N40W, 52NE, limey siltstone

@ 22 feet: Fracture; N35W, 52NE, 54 SE,1/16" clay gouge

@ 25 feet: increased drilling effort

@ 28 feet: Minor fault; N10E, 54SE, 1/8" clay gouge

@ 29 feet: Minor fault; N20W, 34NE, ½" - 2" wide zone, clay shears 1/16" thick

@ 29 feet : Bedding; N55W, 47NE siltstone bed cut by fault

@ 33 feet: Minor Fault; N/S, 43E, ½"- 1" wide shear zone of 1/16" clay gouge

@ 34 feet: SANDSTONE, fine to medium grained, trace silt, hard, moist, yellowish gray (5Y 7/2)

@ 36 feet: Bedding approximate; N30W, 57NE, fine grain sandstone/ siltstone

@ 36 feet: SANDY SILTSTONE, some fine grained sand, moderately hard, moist, light olive gray (5Y 5/2)

@ 39 feet: Minor Fault; N80W, 72NE, 1/8" -1/4" thick red clay gouge

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING B-3-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 10-16-03

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
						S N		@39 feet: CLAYEY TO SANDY SILTSTONE, some clay, some fine sand, hard, moist, moderate yellowish brown (10YR 5/4) @ 40 feet: Shear; subparallel to minor fault at 39 feet @ 42 feet: SANDSTONE, fine to coarse grained sand, trace silt, hard, moist, pale yellowish brown (10YR 6/2)
				45				
								@ 49 feet: Bedding; N50W, 63NE, coarse sandstone
				50				
								@ 53 feet: PEBBLY SANDSTONE, fine to coarse sand with small to medium pebbles, moderately hard to hard, moist, pale yellowish brown (10YR 6/2) @ 55.5 feet: Minor Fault; N75W, 24NE, 1/4" to 1" thick shear zone of 1/8" - 1/4" clay gouge
				55				
								@ 57 feet: Bedding; N55W, 57NE, coarse sandstone / siltstone @ 57 feet: SILTSTONE, trace fine grained sand, trace clay, hard, moist, moderate yellowish brown (10YR 5/4)
				60				
				65				@ 65 feet: moisture increase @ 66 feet: Minor Fault; N15E, 30SE, 1/8" - 1/4" thick clay gouge
				70				@ 72 feet: increase in clay content
				75				@ 75 feet: SILTSTONE, trace clay, hard, moist, moderate yellowish brown (10YR 5/4) @ 75 feet: Bedding; N50W, 62NE
				80				

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING B-3-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 10-16-03

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
30							

@ 80 feet: CLAYEY SILTSTONE, hard, moist, moderate yellowish brown (10YR 5/4)

@ 87 feet: Minor Fault, N20E, 25SE, 1/8" clay gouge, separates silty sandstone from siltstone

@ 87 feet: SILTSTONE, trace fine sand, hard, moist, moderate yellowish brown (10YR 5/4)

@ 90 feet: SANDSTONE, fine to coarse grained sand, trace small pebbles, hard, moist, pale yellowish brown (10YR 6/2)

@ 94 feet: SILTSTONE, moderately hard, moist, moderate yellowish brown, (10YR 5/4), Erosion surface; N/S 33E

@ 96 feet: Bedding approximate; N35E, 24SE

@ 100 feet: SANDY SILTSTONE: some fine grained sand, moderately hard, moist, pale yellowish brown (10YR 6/2)

@ 103 feet: SILTY SANDSTONE, fine to coarse grained sand, some silt, hard, moist, moderate brown (5YR 4/4), Bedding approx. N20E, 23SE

@ 105 feet: SANDSTONE, fine to coarse grained, hard, moist, pale yellowish brown (10YR 6/2)

TOTAL DEPTH 110FEET.
No Groundwater.
Minor caving at 8-15 feet.
Downhole logged to 106 feet.

SAMPLE DEPTH	KELLY WEIGHT
0-28'	5952 lbs.
28-55'	3921 lbs.
55-84'	2531 lbs.
84-114'	1407 lbs
+1000 lbs/30 ft. stem	

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

LOG OF BORING

BORING B-4-03

JOB NUMBER: 2002-036-01 By: D.G. Francuch
DATE DRILLED: 10-21-03 - 10-28-03
EQUIPMENT USED: 24"-Diameter Bucket Auger
ELEVATION: 1260.6
SURFACE CONDITIONS:
SAMPLING METHOD: 2 5/8-inch drive

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
					S N		

0-53 feet: LANDSLIDE (Qls)

@ 0 feet: GRAVELLEY SANDSTONE, fine to coarse grained sand with pebbles and gravel up to 6" diameter, soft, dry, pale yellowish brown (10YR 6/2)

@ 10 feet: Bedding approximate; N50E, 16SE

@ 10.5 feet: SILTSTONE, moderately soft, dry, moderate yellowish brown (10YR 5/4),

@13 feet: density increase

@ 15.5 feet: Slide Plane, N40E, 28SE, reddish brown silty clay, 3"-5" thick

@ 19 feet: SANDSTONE, fine to coarse grained sand with trace small pebbles, moderately hard, dry to moist, pale yellowish brown (10YR 6/2),

@ 22 feet: cobbles up to 6" diameter

@ 27 feet: SANDY SILTSTONE, fine sand, hard, moist, moderate yellowish brown (10YR 5/4),

@ 32 feet: CLAYEY SILTSTONE, moderately hard to hard, moist, moderate yellowish brown (10YR 5/4),

@ 33.2 feet: Slide Plane: N70E, 6SE 4"-5" thick reddish brown waxy clay

@ 36 feet: SANDY SILTSTONE, fine grained sand and silt, moderately hard, moist, moderate yellowish brown (10YR 5/4),

@ 40 feet: pods of sand in siltstone matrix

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING B-4-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 10-21-03 - 10-28-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG (S / N)	SOIL TYPE
				45			
Bag							
Bag				50			
				55			
				60			
				65			
Bag							
				70			
				75			
				80			

@ 40 feet: slight increase in grain size
@ 41.5 feet: Slide Plane N80E, 29SE, 4"-5" thick reddish brown waxy clay
@ 42 feet: CLAYEY SILTSTONE: some clay, hard, moist, moderate yellowish brown (10 YR 5/4),
@ 43 feet: SILTSTONE to SANDY SILTSTONE, cobbles up to 8" diameter
@ 45.5 feet: waxy to plastic brown clay
@ 47 feet: SILTY CLAYSTONE, some silt, moderately hard, moist, moderately plastic, moderate yellowish brown (10YR 5/4),
@ 48 feet: SANDY SILTSTONE, fine grained sand, hard, moist, trace large pebbles of cemented sandstone, moderate yellowish brown (10YR 5/4),
@ 48.5 to 50.5 feet: numerous low angle fractures
@ 50.5 feet: CLAYEY SILTSTONE, moderate yellowish brown (10YR 5/4)
@ 51 feet: CLAYSTONE, plastic, moist, possible, slide plane, dark yellowish brown (10YR 4/2),
@ 51.9 feet: Slide Plane, N5W, 7SW, 1"-2" thick reddish brown clay, plastic
@ 52 feet: SANDSTONE, fine to medium grained sand, trace silt, pale yellowish brown (10YR 6/2),
@ 53 feet: Slide Plane, N60W, 6SW, ½" thick red clay gouge

53 - 81 feet: SAUGUS FORMATION (QTs)

@ 53 feet: SANDSTONE, fine to medium grained sand, trace silt, hard, moist, pale yellowish brown (10YR 6/2)
@ 56 feet: Minor fault; N25W, 25NE ½" thick red clay gouge
@ 56.5 feet: Bedding; N/S, 40E, sandstone/siltstone
@ 62 feet: Bedding; N30E, 28SE, fine grained sandstone/siltstone
@ 62 feet: SILTSTONE, hard, moist, dark yellowish brown (10YR 4/2)
@ 65 feet: SILTY CLAYSTONE, some silt, hard to very hard, moist, dark yellowish brown (10YR 4/2)
@ 70 feet: Drilling rate slows
@ 71 feet: Bedding approximate; N40E, 29SE, clayey silt/silty sandstone
@ 71 feet: SILTY SANDSTONE; fine to coarse grained sand with silt, hard, moist, dark yellowish brown (10YR 4/2)
@ 77 feet: Gradational contact

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

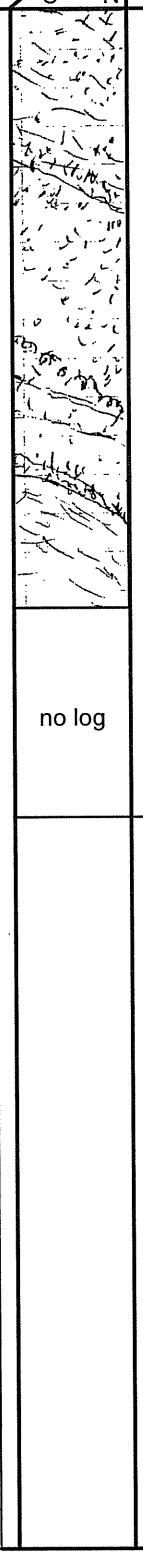
LOG OF BORING

BORING B-4-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 10-21-03 - 10-28-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE



81 -101 feet: PICO FORMATION (Tp)

@ 81 feet: Bedding, N40E, 24SE, limey siltstone bed 5" thick

@ 82 feet:
Rig down 13:50 on 10-21-03
Resume drilling 7:30 on 10-28-03

@ 84.7 feet: Bedrock, N40E, 33SE

@ 85 feet: PEBBLY SANDSTONE, yellowish gray (5Y 7/2), fine to coarse grained sand, trace medium to large pebbles, hard, moist

@ 90 feet: Bedding, N10E, 20SE, pebbly sandstone / silty sandstone

@ 91 feet: Bedding, N40E, 31SE, 1" thick clayey siltstone

93.5 feet: Bedding, N40E, 35SE, coarse grained sandstone / siltstone

93.5 feet: SANDY SILTSTONE, moderate yellowish brown (10YR 5/4), some fine to medium grained sand, hard, moist

@ 98 feet: moisture increase

TOTAL DEPTH 101FEET.
No Caving.
No Groundwater.
Downhole logged to 95 feet.

SAMPLE DEPTH	KELLY WEIGHT
0-30'	5962 lbs.
30-57'	3921 lbs.
57-86'	2531 lbs.
86-116'	1407 lbs
+600 lbs/30 ft. stem	

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES
FIGURE A-2.4c

BORING B-5-03

JOB NUMBER: 2002-036-01 By: D.G. Francuch
DATE DRILLED: 10-29-03
EQUIPMENT USED: 24"-Diameter Bucket Auger
ELEVATION: 1306.8
SURFACE CONDITIONS:
SAMPLING METHOD: 2 5/8-inch drive

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
					E W		
				5		cased	
				10			
				15			
Bag				20			
				25			
Bag				30			
				35			
				40			

0-28 feet: LANDSLIDE (Qls)

@ 0 feet: SANDSTONE, fine to medium grained sand, soft, dry, pale yellowish brown, (10YR 6/2)

Hole cased from 0-3 feet

@ 6 feet: SANDY SILTSTONE, silt with fine grained sand, moderately hard, dry to moist, moderate yellowish brown (10YR 5/4)

@ 9 feet: color change to grayish orange (10YR 7/4)

@ 11 feet: SANDSTONE, fine to coarse grained sand, trace silt, trace small to medium pebbles, soft, dry, yellowish gray (5Y 7/2),

@ 11-14 feet: Minor caving of sands

@ 14 feet: SILTSTONE, moderately hard, moist, moderate yellowish brown (10YR 5/4),

@ 14 to 17.8 feet: chaotic mix of sand and siltstone

@ 17.8 feet: Slide Plane, N/S, 40E, 2"-3" thick reddish brown clay, waxy, no distinct slide surface

@ 19 feet: CLAYEY SILTSTONE, silt with clay, moderately soft, moist, moderate yellowish brown (10YR 5/4)

@ 20 feet: SILTSTONE, hard, moist, moderate yellowish brown (10YR 5/4)

@ 25 feet: Bedding approximate, N10W, 43NE

@ 25 feet: CLAYSTONE, plastic, moist, moderate yellowish brown (10YR 5/4) to olive gray (5Y 4/1)

@ 28 feet: Slide Plane, N40E, 24SE, 1"-3' thick red to dark gray clay gouge, striations 12,° S 15° E

@ 28 feet: CLAYEY SILTSTONE, moderately hard to hard, moist, dark yellowish brown (10YR 4/2),

28.1-95.5 feet: SAUGUS FORMATION (QTs)

@ 34 feet: SILTSTONE, trace fine sand, hard, moist, moderate yellowish brown (10YR 5/4)

@ 37 feet: SILTY SANDSTONE, fine to medium grained sand with silt, hard, moist, moderate yellowish brown (10YR 5/4)

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

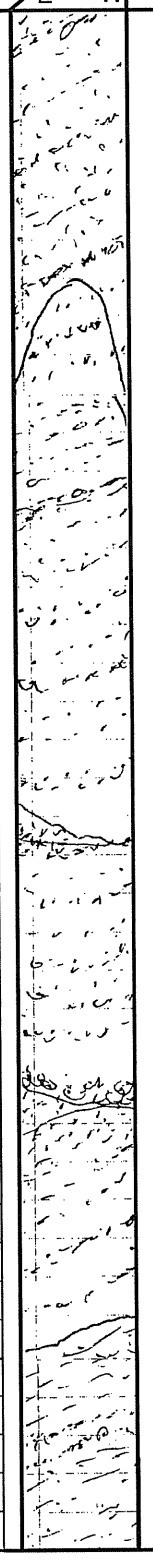
LOG OF BORING

BORING B-5-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 10-21-03 - 10-28-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE



@ 40.3 feet: Bedding approximate, N10E, 28SE, coarse sandstone

@ 40 feet: PEBBLY SANDSTONE, pale yellowish brown (10YR 6/2), fine to coarse grained sand with small to large pebbles, hard, moist

@ 46 feet: Bedding, N30E, 33SE, coarse sandstone

@ 51.7 feet: Fracture, N30E, 63NW, 1/4" thick silt gouge, approximate ½"-1" normal offset

@ 52.3 feet: Bedding, N/S, 26E, coarse sandstone

@ 62 feet: Bedding, N15E, 22SE, medium to coarse grained sandstone

@ 69 feet: Bedding, N/S, 18E, fine to coarse grained sandstone

@ 70 feet: PEBBLY SANDSTONE, fine to coarse grained sand with small to large pebbles, hard, moist, yellowish gray (5Y 7/2)

@ 74 feet: Bedding, N10E, 22SE, coarse sandstone / siltstone

@ 74 feet: SILTY SANDSTONE, fine to coarse grained sand with silt, hard, moist, moderate yellowish brown (10YR 5/4)

@ 77 feet: Bedding, N15E, 30SE, fine to coarse grained sandstone in silty sandstone

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES
FIGURE A-2.5b

BORING B-5-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 10-21-03 - 10-28-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
Bag					E W		
				85			
				90		no log	
				∇			
				95			
Bag							
				100		no log	
				105			
				110			
				115			
				120			

@ 79 feet: SILTSTONE, trace fine to coarse sand, hard, moist, moderate yellowish brown (10YR 5/4)

@ 80 feet: CLAYEY SILTSTONE, some clay, hard, moist, moderate yellowish brown (10YR 5/4)

@ 82 feet: Bedding, N30E, 22SE, siltstone/fine to coarse sandstone

@ 82 feet: SANDSTONE, fine to coarse grained sand with some small to medium pebbles, hard, moist, moderate yellowish brown (10YR 5/4)

@ 84 feet: SILTSTONE, hard, moist, moderate yellowish brown (10YR 5/4)

@ 86-95 feet: No log due to low oxygen

@ 93-97 feet: perched groundwater, boring wall wet but no free water

@ 95 feet: CLAYEY SILTSTONE, silt with some clay, hard, moist, moderate yellowish brown (10YR 5/4)

@ 95.5 feet: Bedding, N/S, 24E

@ 95.5-102 feet: PICO FORMATION (Tp)

@ 95.5 feet: CLAYSTONE, trace silt, hard to very hard, moist, medium dark gray (N4),
No seepage below 97 feet.

@ 100 feet: SILTY SANDSTONE, fine grained sand with silt, hard, moist, dark greenish gray (5GY 4/1)

TOTAL DEPTH 102 FEET.
Minor Caving 11-14 feet.
Minor seepage 93-97 feet.
Downhole logged to 97 feet.

SAMPLE DEPTH	KELLY WEIGHT
0-30'	5962 lbs.
30-57'	3921 lbs.
57-86'	2531 lbs.
84-116'	1407 lbs
+600 lbs/30 ft. stem	

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated.
It is not warranted to be representative of subsurface conditions at other locations or times.

LOG OF BORING

BORING B-6-03

JOB NUMBER: 2002-036-01 By: D.G. Francuch
DATE DRILLED: 10-30-03 - 10-31-03
EQUIPMENT USED: 24"-Diameter Bucket Auger
ELEVATION: 1305.3
SURFACE CONDITIONS:
SAMPLING METHOD: 2 5/8-inch drive

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
23				5, 10, 15, 20, 25, 30, 35, 40	S N	cased	

0-31.1 feet LANDSLIDE (Qls)

@ 0 feet: SILTY SANDSTONE, fine to grained sand with silt, hard, moist, pale yellowish brown (10YR 6/2)

@ 4 feet: Fracture

@ 5 feet: pebbles up to 2" in diameter

@ 8 feet: color change to moderate yellowish brown (10YR 5/4), Bedding approximate; N65E, 55SE

@ 8.5 feet: rootlets

@ 9 feet: SANDY SILTSTONE, silt with fine grained sand, moderately hard, moist, moderate yellowish brown (10YR 5/4)

@ 10 feet: Fracture; N55W, 45NE, 1/8" -1/4" clay gouge separates silty sandstone from pebbly sandstone

@ 13 feet: SANDSTONE, fine to medium grained sand, hard, dry to moist, yellowish gray (5Y 7/2)

@ 13-15 feet: rootlets

@ 17 feet: SILTY SANDSTONE, fine to coarse grained sand with silt, moderately hard, moist, grayish orange (10YR 7/4)

@ 17 feet: Fracture; N65W, 82NE

@ 20 feet: rootlets

@ 20.5 feet: Bedding; N10E, 26SE, irregular contact

@ 21.5 feet: PEBBLY SANDSTONE, fine to coarse grained sand, trace silt, pebbles up to 2" diameter, hard, moist, pale yellowish brown (10YR 6/2)

@ 25 feet: Fracture splits into two strands, separates fine grained sand from coarse grained sand

@ 28 feet: Bedding? N10E, 46SE, irregular contact

@ 28 feet: SILTSTONE, moderately hard, moist, moderate yellowish brown (10YR 5/4)

@ 31.1 feet: Slide Plane; N5W, 22NE, 3" wide zone of waxy clay sandwiched between two shears each 1/16"-1/8" thick gouge

31.5-96 feet: SAUGUS FORMATION (QTs)

@ 31.5 feet: CLAYEY SILTSTONE, trace fine to medium grained sand, hard, moist, moderate yellowish brown (10YR 5/4)

@ 34 feet: Minor Fault; N50W, 42NE, 1/16" wide clay gouge, 4"reverse offset (apparent)

@ 35 feet: SANDSTONE, fine to medium grained sand, moderately hard, moist, moderate yellowish brown (10YR 5/4)

@ 38 feet: Fracture N45W, 46NE, 1/16"-1/8" wide silt gouge

@ 39 feet: SANDSTONE, fine to coarse grained sand, trace pebbles up to 2" diameter, moderately hard, moist, pale yellowish brown (10YR 6/2),

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

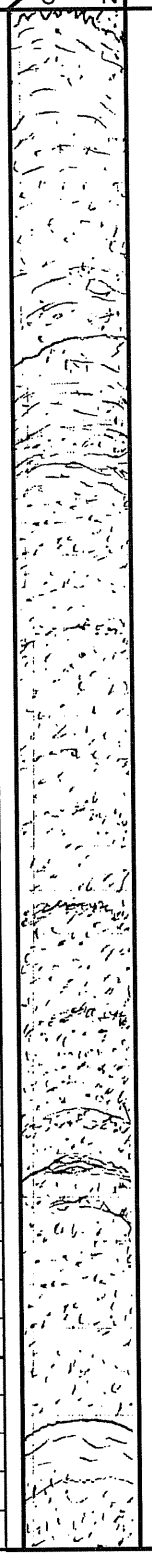
LOG OF BORING

BORING B-6-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 10-30-03 - 10-31-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
					S N		



45 50 55 60 65 70 75 80

@ 40 feet: Bedding, N/S, 23E, contact, worm burrows
@ 40 feet: SANDY SILTSTONE, silt with fine sand, trace clay, hard, moist, moderate brown (5YR 4/4),

@ 46 feet: SILTY SANDSTONE, fine grained sand with silt, hard, moist, gradational contact, moderate brown (5YR 4/4),

@ 47 feet: PEBBLY SANDSTONE, fine to coarse grained sand with pebbles and small cobbles, up to 4" diameter, hard, moist, moderate yellowish brown (10YR 5/4)

@ 50 feet: Fracture; N40E, 30SE, 1/8" wide clay gouge

@ 50 feet: SANDY SILTSTONE, silt with fine to medium sand, moderately hard, moist, moderate yellowish brown (10YR 5/4)

@ 52 feet: SILTY SANDSTONE, fine grained sand with silt, moderately hard, moist, pale yellowish brown (10YR 6/2)

@ 54 feet: Bedding, N10E, 26SE

@ 54 feet: SANDSTONE, fine to coarse grained sand, trace small pebbles, moderately hard, moist, yellowish gray (5Y 7/2)

@ 60.5 feet: Bedding; N5W, 24NE, fine grained sandstone,

@ 63 feet: PEBBLY SANDSTONE, fine to coarse grained sand with medium pebbles, trace cobbles up to 8" diameter, hard, moist, yellowish gray (5Y 7/2)

Stopped @ 69 feet, @ 15:30 on 10/30/03
Resume @ 7:00 on 10/31/03

@ 70.7 feet: Bedding; N5E, 22SE, coarse grained sandstone / fine grained sandstone

@ 71.6 feet: Bedding; N/S, 26E ½"-3" thick clayey siltstone

@ 72 feet PEBBLY SANDSTONE, fine to coarse grained sand with small pebbles, moderately hard, moist, yellowish gray (5Y 7/2)

@ 77.8 feet: Bedding; N5W, 23NE contact
@ 77.8 feet: SANDY SILTSTONE, silt with fine to coarse grained sand, trace clay, hard, moist, moderate yellowish brown (10 YR 5/4)

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES
FIGURE A-2.6b

BORING B-6-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 10-30-03 - 10-31-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
					S N		
				85			
				90			
Bag				95			
Bag						no log	
				100			
				105			
				110			
				115			
				120			

@ 81 feet: SANDSTONE, fine to coarse grained sand, trace small pebbles up to 1" diameter, moderately hard, moist, pale yellowish brown (10YR 6/2),

@ 85.5 feet: Bedding N15W, 27NE, contact

@ 85.5 feet: SILTY SANDSTONE, fine grained sand with silt, hard, moist, moderate yellowish brown (10YR 5/4)

@ 90.7 feet: Bedding; N/S, 23E, contact

@ 90.7 feet: CLAYEY SILTSTONE, silt with clay, hard, moist, moderate yellowish brown (10YR 5/4),

@ 95 feet: Bedding N/S, 27E, parting in siltstone

96-101 feet: PICO FORMATION (Tp)

@ 96 feet: limey siltstone

@ 97 feet: CLAYEY SILTSTONE, hard, moist, light olive gray (5Y 5/2)

@ 98 feet: SILTY CLAYSTONE, clay with silt, moderately hard to hard, moist, medium dark gray (N4)

TOTAL DEPTH 101 FEET.
No Caving.
No groundwater.
Downhole logged to 97 feet.

SAMPLE DEPTH	KELLY WEIGHT
0-30'	5962 lbs.
30-57'	3921 lbs.
57-86'	2531 lbs.
86-116'	1407 lbs
+600 lbs/30 ft. stem	

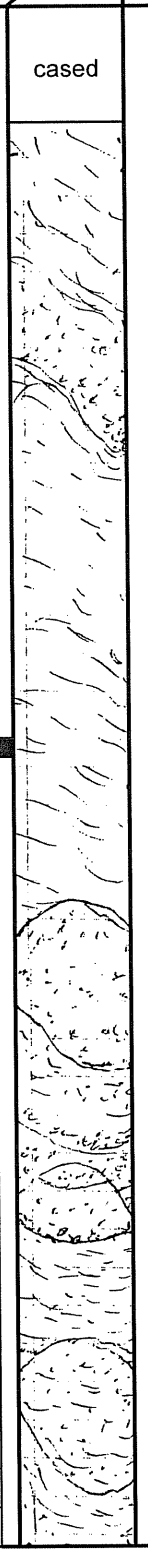
Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES
FIGURE A-2.6c

BORING B-7-03

JOB NUMBER: 2002-036-01 By: D.G. Francuch
DATE DRILLED: 11-3-03 - 11-4-03
EQUIPMENT USED: 24"-Diameter Bucket Auger
ELEVATION: 1201+/-
SURFACE CONDITIONS:
SAMPLING METHOD: 2 5/8-inch drive

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG (SW NE)	SOIL TYPE
Bag				5, 10, 15, 20, 25, 30, 35, 40	cased		

0-74 feet: SAUGUS FORMATION (QTs)

@ 0 feet: SILTY SANDSTONE, fine to medium grained sand with silt, moderately hard, moist, light brown (5YR 6/4)

@ 6 feet: SANDY SILTSTONE, silt with fine grained sand, trace coarse grained sand, moderately hard, moist to dry, grayish orange (10YR 7/4)

@ 10 feet: Bedding; N40W, 50NE
@ 10 feet: SILTY CLAYSTONE, clay with silt, hard, moist, moderate yellowish brown (10YR 5/4)

@ 18 feet: plastic clay, gray

@ 24.4 feet: Minor Fault; N75E, 35SE, 1/4" wide brown silt gouge

@ 26 feet: Bedding; N60W, 44NE
@ 26 feet: SILTY SANDSTONE, fine grained sand with silt, moderately hard, moist, pale yellowish brown (10YR 6/2)

@ 31 feet: Minor Fault; N90W, 44S, 1/8" wide silt gouge, 2" normal apparent offset
@ 32 feet: Bedding N30W, 46NE

@ 34 feet: CLAYEY SILTSTONE, silt with clay, trace fine to medium grained sand, hard, moist, moderate yellowish brown (10YR 5/4)

@ 35.5 feet: Minor Fault; N90W, 37S, 1/16" -1/8" wide clay gouge

@ 36 feet: CLAYSTONE, clay with trace silt, moderately hard, moist, dark yellowish brown (10YR 4/2)

@ 36.5 feet: Bedding N40W, 53NE, silt/silty clay

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

BORING B-7-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 11-3-03 - 11-4-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG (SW NE)	SOIL TYPE
				45			
Bag							
				50			
7							
				55			
				60			
				65			
				70			
				75			
				80			

@ 42 feet: SILTY CLAYSTONE, clay with silt, moderately hard, moist, light olive gray (5Y 6/1)

@ 44 feet: Minor Fault N55W, 90, joins clay bed at 44'

@ 44 feet: SILTY SANDSTONE, fine grained sand with silt, moderately hard, moist, yellowish gray (5Y 7/2)

@ 45 feet: Bedding: N35W, 33NE, 1"thick gray clay

@ 46 feet: CLAYSTONE, moderately soft, moist, plastic, light olive gray (5Y 5/2)

@ 48 feet: CLAYEY SILTSTONE, silt with clay, hard, moist, olive gray (5Y 4/1)

@ 53 feet: CLAYSTONE, moderately soft, moist, plastic, medium dark gray (N4)

@ 54 feet: Bedding N30W,49 NE, 4-5" thick plastic gray clay

@ 58 feet: SILTSTONE, hard, moist, medium dark gray (N4)

@ 63 feet: Minor Fault: N10W, 47SW, ½"-1" wide zone of silt and clay gouge

@ 65 feet: Shear: N10E, 55SE, along base of sheared claystone

@ 67 feet: Bedding: N35W, 35NE

@ 70 feet: CLAYSTONE, moderately soft, moist, plastic, medium dark gray (N4)

@ 72 feet: Bedding: N20W, 35NE

@ 72 feet: SANDY SILTSTONE, silt with fine grained sand, moderately hard, moist, pale olive (10Y 6/2)

@ 74-111 feet: PICO FORMATION (Tp)

@ 74 feet: SILTY CLAYSTONE, clay with silt, hard, moist, fossiliferrous, dark gray (N3),

@ 77 feet: Bedding: N50E, 43SE, truncated by sheared clay

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

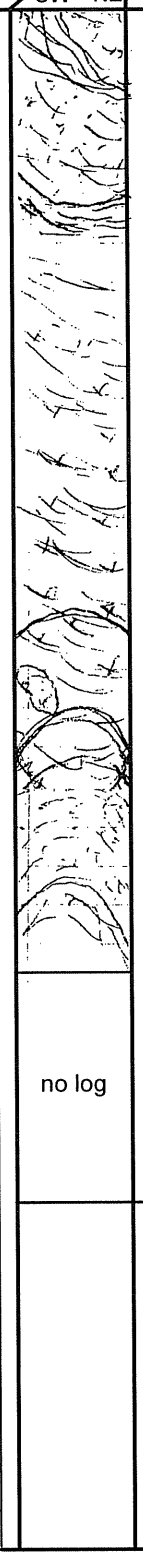
R.T. FRANKIAN & ASSOCIATES
FIGURE A-2.7b

BORING B-7-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 11-3-03 - 11-4-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG (SW NE)	SOIL TYPE



@ 82 feet: CLAYSTONE, moderately soft, moist, plastic, dark gray (N3)

@ 84 feet: Bedding: N10W, 26NE, siltstone/claystone

@ 84 feet: SILTSTONE, hard, moist, fossiliferrous, dark greenish gray (5GY 4/1)

@ 85 feet: Rig down @ 13:00 on 11/3/03
resume drilling @ 7:55 on 11/4/03
No water from bottom of boring @ 85 feet

@ 87 feet: limey siltstone, very hard

@ 92 feet: CLAYSTONE, hard, moist, moderate plasticity, dark greenish gray (5GY 4/1)

@ 95 feet: SILTSTONE, hard, moist, dark greenish gray (5GY 4/1)

@ 96 feet: Shear: N60W, 35SW, brown clay 1" thick

@ 97 feet: sandstone block 12" diameter in claystone matrix, sheared

@ 99 feet: Shear N40E, 50SE, 1" clay gouge

@ 100 feet: Bedding N40E, 46SE

@ 100 feet: increase in moisture, perched groundwater above clay at 103 feet

@ 104 feet: CLAYEY SILTSTONE, silt with clay, hard to very hard, moist, dark greenish gray (5GY 4/1)

@ 104 feet: Bedding N50E, 39SE, siltstone / claystone

TOTAL DEPTH 111 FEET.
No Caving.
Minor perched water at 100-103 feet.
Downhole logged to 105 feet.

SAMPLE DEPTH	KELLY WEIGHT
0-30'	5952 lbs.
30-57'	3921 lbs.
57-86'	2531 lbs.
86-116'	1407 lbs
+600 lbs/30 ft. stem	

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

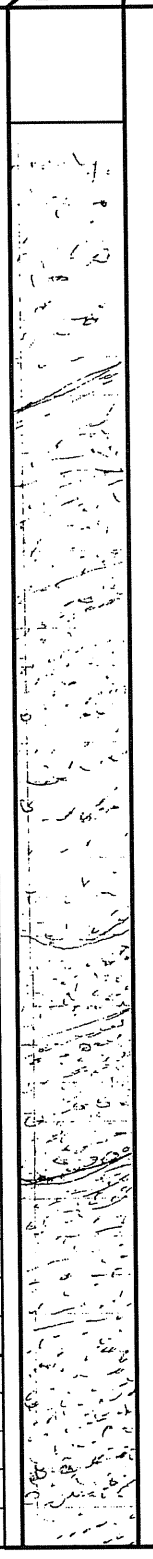
LOG OF BORING

R.T. FRANKIAN & ASSOCIATES
FIGURE A-2.7c

BORING B-8-03

JOB NUMBER: 2002-036-01 By: D.G. Francuch
DATE DRILLED: 11-4-03 - 11-5-03
EQUIPMENT USED: 24"-Diameter Bucket Auger
ELEVATION: 1213.6
SURFACE CONDITIONS:

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
					E W		



0-30.5 feet: LANDSLIDE (Qls)

@ 0 feet: SANDY SILTSTONE, silt with fine grained sand, moderately soft, dry to moist, moderate yellowish brown (10YR 5/4)

@ 7 feet: PEBBLY SANDSTONE, fine to coarse grained sand with pebbles up to 3" in diameter, moderately soft, moist, yellowish gray (5Y 7/2),

@ 10 feet: Slide plane; N/S, 31E, 1" thick plastic clay gouge, reddish brown

@ 10 feet: SANDY TO CLAYEY SILTSTONE, moderately soft, moist, semi plastic, moderate yellowish brown (10YR 5/4)

@ 15 feet: Bedding; N10E, 28SE

@ 15 feet: SANDSTONE, fine to coarse grained sand with small pebbles, moderately hard, moist, yellowish gray (5Y 7/2)

@ 18 feet: PEBBLY SANDSTONE, fine to coarse grained sand with pebbles up to 3" diameter, pale yellowish brown (10YR 6/2)

@ 24 feet: Bedding; N70E, 24SE, cross-bedding coarse sandstone

@ 27 feet: Bedding; N55E, 20SE

@ 27 feet: COBBLY SANDSTONE, fine to coarse grained sand with pebbles and cobbles up to 5", hard, moist, yellowish gray (5Y 7/2)

@ 30.5 feet: Slide plane: N25E, 31SE, polished surface

30.5 -76 feet: SAUGUS FORMATION (QTs)

@ 30.6 feet: CLAYSTONE, moderately soft, moist, plastic (possible slide plane), moderate brown (5YR 4/4)

@ 32.5 feet: SILTSTONE, trace fine sand, trace clay, moderately hard, moist, moderate brown (5YR 4/4)

@ 35 feet: PEBBLY SANDSTONE, fine to coarse grained sand with pebbles up to 2" diameter, moderately hard, moist, pale yellowish brown (10YR 6/2)

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

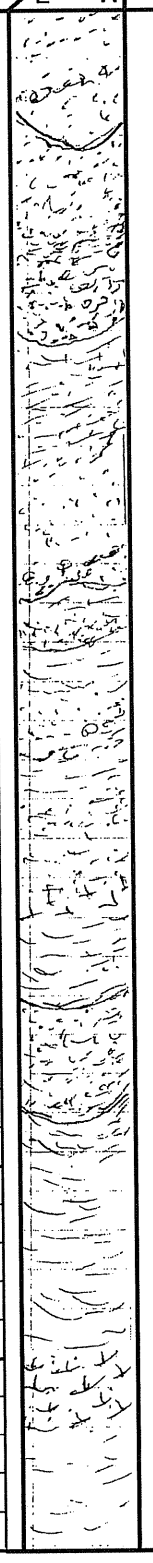
LOG OF BORING

BORING B-8-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 11-4-03 - 11-5-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE



@ 42.7 feet: Fault; N65E, 49SE, reddish brown, clayey silt gouge ½"-1" wide

@ 43 feet: interbedded silt and clay within sandstone

@ 45.5 feet: Bedding; N20E, 22SE, medium to coarse grained sandstone

@ 48 feet: Bedding; N20E, 22SE, striations 20° due south

@ 48 feet: SILTSTONE, trace clay, moderately hard to hard, moist, moderate brown (5YR 4/4)

@ 50 feet: Stopped drilling @ 17:05 on 11/4/03
Resume drilling @ 6:40 on 11/5/03

@ 52 feet: SANDSTONE, fine to coarse grained sand, some pebbles up to 2" diameter, moderately hard to hard, moist, yellowish gray (5Y 7/2)

@ 56 feet: SANDY SILTSTONE, silt with fine grained sand, moderately hard, moist, gradational contact, moderate yellowish brown (10YR 5/4)

@ 57 feet: Bedding, N5E, 22SE, fine grained sandstone in siltstone

@ 60 feet: PEBBLY SANDSTONE, fine to coarse grained sand with pebbles up to 1" diameter, moderately hard to hard, moist, pale yellowish brown (10YR 6/2),

@ 65 feet: SANDY SILTSTONE, silt with fine grained sand, hard, moist, moderate yellowish brown (10YR 5/4)

@ 69 feet: Bedding; N65E, 40SE

@ 69 feet: SILTY SANDSTONE, fine grained sand with silt, hard, moist, pale yellowish brown (10YR 6/2)

@ 72 feet: SILTSTONE, hard, moist, laminated, moderate yellowish brown (10YR 5/4),

@ 74 feet: CLAYEY SILTSTONE, silt with clay, hard, moist, moderate yellowish brown (10YR 5/4),

76-120 feet: PICO FORMATION (Tp)

@ 76 feet: limey siltstone

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

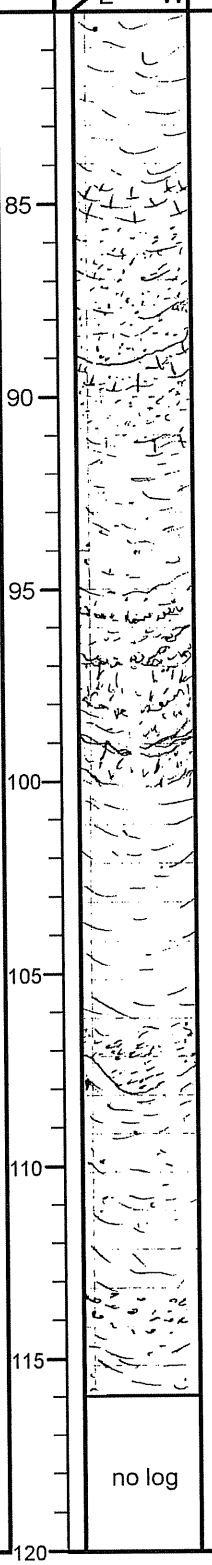
R.T. FRANKIAN & ASSOCIATES
FIGURE A-2.8b

BORING B-8-03 (CONTINUED)

JOB NUMBER: 2002-036-01
DATE DRILLED: 11-4-03 - 11-5-03

By: D.G. Francuch

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE



@ 82 feet: SILTY SANDSTONE, fine to medium grained sandstone with silt, hard, moist, dark yellowish brown (10YR 4/2)

@ 85 feet: Bedding approximate; N50E, 38SE, limey siltstone
@ 85 feet: SANDY SILTSTONE, silt with fine grained sand, hard, moist, limey, moderate yellowish brown (10YR 5/4),

@ 89 feet: Bedding; N45E, 27SE
@ 89 feet: SILTY SANDSTONE, fine to medium grained sand with silt, moderately hard, moist, limey, yellowish gray (5Y 7/2),
@ 91 feet: CLAYEY SILTSTONE, silt with clay, trace fine grained sand, hard, moist, moderate yellowish brown (10YR 5/4)
@ 92 feet: SILTSTONE, hard, moist, moderate yellowish brown (10YR 5/4)

@ 95.5 feet: Bedding; N30E, 23SE
@ 96 feet, PEBBLY SANDSTONE, fine to coarse grained sand with pebbles up to 2" diameter, hard moist, yellowish gray (5Y 7/2)

Stopped logging @ 96 feet on 11/5/03 at 16:50
Resume logging on 11/6/03 @ 7:15
@ 98 to 100 feet: interbedded siltstone and sandstone
@ 100 feet: SILTSTONE, hard to very hard, moist, limey, moderate yellowish brown (10YR 5/4)

@ 107 feet: Bedding approximate: N30E, 28SE, fine grained sandstone

@ 107 feet: CLAYEY SILTSTONE, silt with clay, moderately hard to hard, moist, dark yellowish orange (10YR 6/6)

@ 108 feet: increase in moisture

@ 112 feet: Begin stemming @ 12:10
@ 113 feet: Bedding, approximate, N35E, 27SE, pebble bed
@ 114 feet: SILTY SANDSTONE, fine grained sand with silt, hard, moist, moderate yellowish brown (10YR 5/4)

TOTAL DEPTH 120 FEET.
No Caving.
No Groundwater
Downhole logged to 116 feet.

SAMPLE DEPTH	KELLY WEIGHT
0-30'	5952 lbs.
30-57'	3921 lbs.
57-86'	2531 lbs.
86-116'	1407 lbs
+600 lbs/30 ft. stem	

Note: The log of subsurface conditions shown hereon applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES
FIGURE A-2.8c

BORING B-1-09

JOB NUMBER: 2002-036-03
DATE DRILLED: 7/13/09
EQUIPMENT USED: 24" Rotary Bucket rig with Sleeve sampler. Driving weights - 5952 lbs. (0-30'), 3921 lbs. (30-57'), and 2531 lbs. (57-86')
ELEVATION: 1150'
DRILLING CO.: Tri-Valley
LOGGED BY: TL
BORING DEPTH: 0-84.5'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION / GRAPHIC LOG	SOIL TYPE	
						ML	**ARTIFICIAL FILL (af)** SANDY SILT: soft, dry, light gray
							SAUGUS FORMATION (QTs) INTERBEDDED SANDSTONE, SILTY SANDSTONE, and SANDY SILTSTONE, very fine to medium, low hardness, dry, light gray (N7) to greenish gray (5GY 6/1), average bed thickness is 1-2', weakly cemented, poorly-defined bedding @ 3 feet: 6" thick reddish brown lenticular siltstone @ 3.5 feet: Contact N26W, 43NE
				5			
4	2.6	121	-	10			BEDDING: N5E, 22SE
				15			pale yellowish brown (10YR 6/2) to yellowish gray (5Y 7/2)
8	3.1	120	-	20			
			-	25			
10	4.5	118	-	30			BEDDING: N10E, 14SE SANDSTONE: very fine to coarse, with gravel, weakly cemented, low hardness, slightly moist
				35			BEDDING: N20W, 9NE: undulatory contact SILTSTONE: massive, trace fine to coarse sand, low hardness, slightly moist, pale yellowish brown (10YR 6/2)
				40			

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-1-09 (CONTINUED)

JOB NUMBER: 2002-036-03
DATE DRILLED: 7/13/09
EQUIPMENT USED: 24" Rotary Bucket rig with Sleeve sampler. Driving weights - 5952 lbs. (0-30'), 3921 lbs. (30-57'), and 2531 lbs. (57-86')
ELEVATION: 1150'
DRILLING CO.: Tri-Valley
LOGGED BY: TL
BORING DEPTH: 0-84.5'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
14	6.6	127	-					SANDSTONE: fine to coarse, weakly cemented, low hardness, slightly moist, light gray (N7) to light brownish gray (5YR 6/1), poorly defined bedding
				45				CROSS-BEDDING: N2E, 27NW
20	4.8	124	-	50				fine to medium, light gray (N7)
								BEDDING: N18W, 26NE
								SILTSTONE: slightly clayey, massive, soft, slightly moist, pale reddish brown (10R 5/4)
11	9.2	122	-	55				
								SILTY SANDSTONE/SANDY SILTSTONE: very fine, micaceous, weakly cemented, low hardness, slightly moist, light gray (N7)
				60				
								BEDDING: N30W, 22NE
15	7.2	123	-	65				
								SILTSTONE: micaceous, some very fine sand, massive, low hardness, moist, pale reddish brown (10R 5/4) to light brownish gray (5YR 6/1)
				70				
								light seepage
				75				
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-1-09 (CONTINUED)

JOB NUMBER: 2002-036-03
DATE DRILLED: 7/13/09
EQUIPMENT USED: 24" Rotary Bucket rig with Sleeve sampler. Driving weights - 5952 lbs. (0-30'), 3921 lbs. (30-57'), and 2531 lbs. (57-86')
ELEVATION: 1150'
DRILLING CO.: Tri-Valley
LOGGED BY: TL
BORING DEPTH: 0-84.5'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
40/6"	7.2	117	-					
				85				Bottom of Boring at 84.5 feet. No caving. Light seepage at 72.5'.
				90				
				95				
				100				
				105				
				110				
				115				
				120				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-03.GPJ FRANKIAN.GDT 11/20/09

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-2-09

JOB NUMBER: 2002-036-03
DATE DRILLED: 7/14/09
EQUIPMENT USED: 24" Rotary Bucket rig with Sleeve sampler. Driving weights - 3160 lbs. (0-24'), 2040 lbs. (24-46'), and 1120 lbs. (46-72')
ELEVATION: 1095'
DRILLING CO.: Tri-Valley
LOGGED BY: TL
BORING DEPTH: 0-71.5'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
					ML	**LANDSLIDE DEBRIS (Qls)** SANDY SILT: very fine, soft, dry, light brownish gray (10R 5/4)
10	6.3	124	-	10		SILTSTONE: fine to medium sand, soft, dry, light brown (5YR 6/4), no discernible structure 3/4" to 2" thick plastic clay, slightly undulatory, moderate reddish brown (10R 4/6), N70E, 27SE
			-	15		SLIDE PLANE: N15E, 22SE: 1" thick plastic clay, moderate reddish brown (10R 4/6) **SAUGUS FORMATION (QTs)** SANDSTONE: very fine to medium, weathered, low hardness, moist, light gray (N7) to light brownish gray (10R 5/4)
12	10.4	121	-	20		SILTSTONE: micaceous, low hardness, moist, light grayish brown (10R 5/4)
				25		SILTY SANDSTONE: very fine to medium, micaceous, laminated, low hardness, slightly moist, yellowish gray (5Y 7/2), weakly cemented BEDDING: N10W, 14NE PEBBLY SANDSTONE: fine to very coarse, well-cemented, moderately hard, slightly moist, light gray (N7) to yellowish gray (5Y 7/2)
52/9"	1.9	134	-	30		BEDDING: N40W, 14NE INTERBEDDED SANDSTONE and PEBBLY SANDSTONE, weakly cemented to moderately cemented, low hardness, slightly moist, light gray (N7) to yellowish gray (5Y 7/2)
				35		BEDDING: N18W, 11NE: defined by fine laminations in
				40		

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-2-09 (CONTINUED)

JOB NUMBER: 2002-036-03
DATE DRILLED: 7/14/09
EQUIPMENT USED: 24" Rotary Bucket rig with Sleeve sampler. Driving weights - 3160 lbs. (0-24'), 2040 lbs. (24-46'), and 1120 lbs. (46-72')
ELEVATION: 1095'
DRILLING CO.: Tri-Valley
LOGGED BY: TL
BORING DEPTH: 0-71.5'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
57/9"	4.7	124	-					sandstone
								BEDDING: N-S, 16E
				45				BEDDING: N18E, 25SE
								SILTSTONE: slightly clayey, micaceous, low hardness, slightly moist, greenish gray (5GY 6/1)
58	10.6	131	-					
				50				
				55				
			-					
62/9"	15.3	117	-					4-6" thick plastic clay bed, dark gray (N3)
62/8"	11.8	123	-					
				60				unoxidized, medium light gray (N5)
				65				pale yellowish brown (10YR 6/2)
				70				
62	15.9	114	-					
								Bottom of Boring at 71.5 feet. No groundwater. No caving.
				75				
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-03.GPJ FRANKIAN.GDT 11/20/09

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-3-2009

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/13/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1026'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-72'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
							SM/ML	**LANDSLIDE DEBRIS (Qls)** SILTY SAND/ SANDY SILT: fine, light olive brown (2.5Y 5/3), silty appears as mixture of fine grained sandstone & siltstone
5			-	5				
7/9"			-	10				laminated fine sands, near horizontal slightly clayey
12/10"			-	15				concretionary layer, near horizontal sandy, hard, cemented layer, fractured, olive gray (5Y 5/2)
							ML	CLAYEY SILT: base of Qls near horizontal
14			-	20				**SAUGUS FORMATION (QTs)** SANDSTONE: fine to medium, moderately well sorted, moderately hard, slightly moist BEDDING: N25W, 8NE
27/7"			-	25				BEDDING: N21W, 14NE: coarse sand layer N5W, 16NE
								CONGLOMERATE: coarse sand, pebbly, moderately hard, slightly moist
36/7"			-	30				
24/7"			-	35				BEDDING: N10, 15E: silty layer in pebble conglomerate
				40				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-3-2009 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/13/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1026'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-72'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
39/7"			-					SANDSTONE: fine to medium, well sorted, slightly laminated, very moist to wet, yellowish brown
								CONTACT/BEDDING: N10W, 14E: light seepage
42/9"			-	45				SILTSTONE: with clay, massive, moderately hard, moist, bluish gray to dark gray (5Y, 4/1), seepage along fractures from 45'-48'
42			-	50				
46			-	55				
45/10"			-	60				becomes very clayey, slickensides within clay layer
68			-	65				
								SANDSTONE: fine to medium, poorly sorted, dense, moist, dark olive gray
58/9"			-	70				
				75				Bottom of Boring at 72 feet. Light seepage at 45'. No caving. Minor sloughing in saturated sand @ 43' to 45'. Slickenslide clay layer at 62'-64'. Downhole logged to 50'.
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 11/16/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-1-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/14/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1260.5'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-72'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								PICO FORMATION (Tp)
								SANDSTONE: medium to coarse, with granules (10%) and occasional pebbles (2-5%), slightly moist, light olive brown (2.5Y 5/4)
								fine to medium
12	7.4	126	-	5				
12/9"	4.2	126	-	10				BEDDING: N50E, 35SE
								drilling slower, rock appears to be more cemented
								becomes primarily medium, slightly silty
15	4.6	119	-	15				
								BEDDING: N70E, 35S
								CLAYSTONE/SILTSTONE: massive, dense, olive brown to dark olive brown (2.5Y 4/3)
9	12.1	119	-	20				
								BEDDING: N40E, 30SE
21/9"	3.3	115	-	25				PEBBLY SANDSTONE: fine to coarse, with gravel (5-10%), poorly sorted, damp, yellowish brown to tan (2.5Y, 6/6)
								BEDDING: N80E, 38S (pebble lineation)
								BEDDING: N79E, 41S
21/9"	2.9	118	-	30				
								BEDDING: N70E, 35S
								coarse, with granules and pebbles
12/9"	4	123	-	35				
								SHEAR: N50E, 80S
								BEDDING: N75E, 33S
								with rounded to sub-rounded gravel, occasional cobles to 5"
				40				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-1-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/14/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1260.5'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-72'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
19/6"	3.9	116	-					minor cobbles (5%) to 4"
								CLAYSHEAR: N60W, 61S BEDDING: N68E, 36S
23	3.9	119	-	45				
35/6"	3.7	113	-	50				BEDDING: N60E, 38S (SANDSTONE OVER CLAYSTONE)
								CLAYSTONE: fine to medium, massive to thickly bedded, dense, slightly moist, olive greenish gray (5Y 5/4) to yellowish gray
38/6"	8.1	113	-	55				CLAYEY LAYER: N30E, 38S
								fine, laminated, clayey
47/11"	11.3	118	-	60				BEDDING: N60E, 38S: clay
								CLAYEY SILTSTONE: interlayered, laminated, soft, slightly moist, brown to bluish gray
25	9.2	119	-	65				BEDDING: N70E, 42S BEDDING: N72E, 41S silt and clayey silt and fine sand with bluish gray to reddish brown layers of clayey silt with yellowish brown sandy layers
								becomes olive gray
40/6"	8.9	113	-	70				SANDSTONE: fine to medium, slightly silty, dense, moist, bluish gray (unoxidized)
								Bottom of Boring at 72 feet. No groundwater. No caving.
				75				
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 8/19/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-2-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/15/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1300'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-52'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
							SM	**ARTIFICIAL FILL (af)** SILTY SAND: fine to medium, massive, medium dense, damp, light olive brown (2.5Y, 5/3)
				5				
5	4.6	113	-	10				
				15				base of fill in clean contact with bedrock and horizontal
								PICO FORMATION (Tp) SILTSTONE: massive, damp, olive gray (5Y, 4/2) to light olive gray (5Y 6/2)
7	11	114	-	20				CONTACT: N80E, 38S BEDDING: N78E, 36S CLAYSTONE
								red with slick dark reddish brown (2.5YR 3/3)
5	16.4	108	-	25				silty, firm, moist, locally slickensided where more clayey
			-	30				SANDSTONE: fine, massive, dense, damp, light olive gray (5Y 6/2)
8	15.8	108	-					
				35				contact approximately 70 degrees between sandstone and claystone. Minor shearing along and throughout, but no gouge or fault gouge, appears to be axis of fold SHEAR: EW, 75N SHEAR: N86E, 78N
				40				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-2-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/15/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1300'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-52'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
11	9.8	117	-					BEDDING/CONTACT: N50W, 65NE; N48W, 68NE CLAYSTONE: fine, massive, dense, damp, red, with slicks
				45				very plastic, stiff, no bedding discernable downhole, occasional sandy interlayers, but not laterally extensive, massive
28	4.6	133	-	50				SILTSTONE: fine, dense, damp, light olive gray (5Y 6/2), laminated with claystone interlayers, appears in sample as near vertical, approximately 80 degree dip
				55				Bottom of Boring at 52 feet. No groundwater. No caving.
				60				
				65				
				70				
				75				
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 8/19/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-3-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/14/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1376'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-111'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								PICO FORMATION (Tp)
								SANDSTONE/ MUDSTONE: fine to coarse, with minor pebbles, poorly sorted, plastic, moist to slightly moist, yellowish red to reddish brown (5YR, 4/4)
				5				becoming coarser with depth and better sorted
								SANDSTONE: medium to coarse, slightly silty with minor granules, very hard, very dense, damp to slightly moist, yellowish brown to gray (5YR, 6/1)
12/8"	4.9	128	-	10	■			
								BEDDING: N85W, 43N
								BEDDING: N89W, 42N
				15				fine to medium, moist, yellowish brown (10YR, 5/4)
								BEDDING: N85W, 44N
19	6.1	134	-	20	■			
								coarse, with approximately 5% gravel, very hard, well cemented
								BEDDING: E-W, 38N
				25				cobble layer (pink quartzite) cobble to 6"
								fine
								PEBBLE CONGOMERATE: medium to coarse, with minor gravel and cobbles, well cemented, moderately well sorted, light gray
22	3.4	123	-	30	■			BEDDING: N60W, 47N
				35				increase in moisture and increase in fines, poorly sorted with approximately 5-15% rounded gravel
				40				

(CONTINUED ON THE FOLLOWING FIGURE)

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 8/19/10

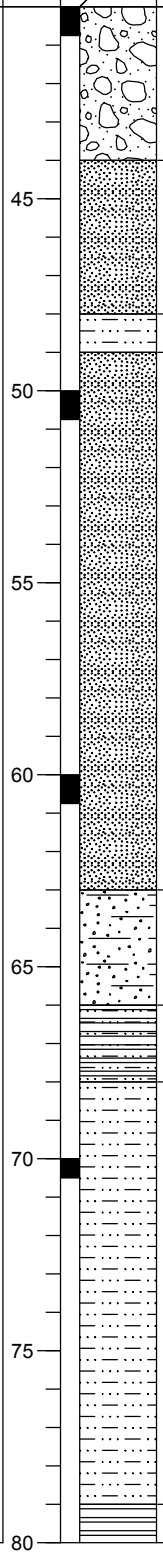
LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-3-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/14/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1376'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-111'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
30/9"	5.1	126	-				
31/9"	7.9	121	-	50			
34/9"	7.2	111	-	60			
41/6"	6.5	103	-	70			



CROSS-BEDDING: N80E, 34N

SANDSTONE: fine to medium, poorly sorted, slightly plastic, medium dense, moist, yellowish brown (10YR, 5/4)

BEDDING: 50W, 36NE

SILTSTONE: slightly plastic, dark brown

SANDSTONE: coarse, with gravel, hard, dense, yellowish brown (10YR, 5/4)

BEDDING: N60W, 37NE

BEDDING: N59W, 39NE

SILTY SANDSTONE: light olive brown (2.5Y, 5/4)

BEDDING: N61W, 37N

MUDSTONE: slightly plastic, moist, dark gray (5Y, 4/1)

SILTSTONE: grayish brown (2.5Y, 5/2)

very hard, well cemented, massive, damp, fractured, concretionary from 69-71'

massive, well sorted, micaceous, dense, moist, olive (5Y, 4/3)

CONTACT: N58W, 37N

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BORING B-3-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/14/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1376'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-111'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
29	21.5	109	-			CLAYSTONE: with slickensides, plastic, soft, moist, black
						with bi-valve shells approximately 1%, small white thin clamshells to 1/2" (freshwater), and reed casts to 82'. Grading to clayey siltstone
						MUDSTONE: clayey, slightly plastic, moist, olive gray (10YR, 4/3)
				85		
38/9"	9.7	116	-	90		SANDSTONE: fine, locally well cemented, dense, slightly moist, brown (10YR, 4/3)
						CLAYSHEAR CONTACT: N40E, 30SE, N35E, 29SE
				95		SILTSTONE: massive, slightly plastic, dense, moist, greenish gray to olive gray (5Y, 4/2), and with minor fine sand (10%)
						BEDDING: N38, 32SE
37/9"	11.9	124	-	100		
				105		SANDSTONE: fine to medium, poorly sorted, with 20-30% silt and 5% clay, damp to slightly moist, yellowish brown (10YR, 5/4)
						becoming better sorted with depth
				110		clean
						Bottom of Boring at 111 feet. No groundwater. No caving.
				115		
				120		

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 8/19/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-4-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/14/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1405'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-51'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
15/9"	7.7	129	-	10	■		
15	14.4	120	-	20	■		
23/11"	15.9	117	-	30	■		

PICO FORMATION (Tp)

CLAYSTONE/MUDSTONE: massive, slightly plastic, moist, dark yellowish brown (10YR, 4/4)

CLAYEY SANDSTONE: fine, silty (10-20%) with occasional coarse (2%), poorly sorted, dense, damp, yellowish brown (10YR, 5/4)

@12' BEDDING: N40E, 25SE

PEBBLY SANDSTONE: fine to medium, with minor gravel (2-5%), moderately sorted, light brownish gray (10YR, 6/2)

BEDDING: N26E, 24SE

BEDDING: N31E, 22SE
BEDDING: N28E, 26SE
slight change in color to brown (7.5YR, 5/4)
BEDDING: N15E, 26SE

SILTSTONE/MUDSTONE: dark brown (7.5YR, 3/3)

SILTY SANDSTONE: fine to medium, dense, damp, light brownish gray (2.5Y, 6/2)
@ 25'-26': concretionary layer of nodules in sandy clay layer

BEDDING: N21E, 21SE

BEDDING: N18E, 22SE

BEDDING: N39E, 25SE

SILTSTONE: micaceous, slightly laminated, dense, slightly moist, dark olive gray (5Y, 3/2)
BEDDING: N36E, 26SE

BEDDING: N36E, 25SE

BEDDING: N32E, 24SE

SANDSTONE: fine to medium, moderately well sorted, damp, light

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-4-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/14/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1405'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-51'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
35	4.6	113	-					brownish gray (2.5Y, 6/2)
								BEDDING: N27E, 24SE
				45				BEDDING: N26E, 25SE
								BEDDING: N28E, 24SE grading to predominately medium grained
42	6.3	109	-	50				
								Bottom of Boring at 51 feet. No groundwater. No caving.
				55				
				60				
				65				
				70				
				75				
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 8/19/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-5-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/19/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1398'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-71'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
							SM	**LANDSLIDE DEBRIS (Qls)** SILTY SAND: fine to meduim, loose, moist, light olive brown (2.5Y, 5/3)
				5				
								fine, loose to medium dense, damp to slightly moist, light yellowish brown (2.5Y, 6.4)
5	3	102	-	10	■			
				15				
								fine to medium
4	3.1	104	-	20	■			
				25				with pebbles and cobbles, increase in moisture
							ML	CLAYEY SILT: soft to firm, moist, brown @30' SHEAR: N10W, 24W
6	13.4	115	-	30	■		CL	SILTY CLAY: soft to firm, moist, brown @31' SHEAR: N10W, 12W @31'-32': CLAY/SAND CONTACT: N60E, 20SE @32': BEDDING: N50W, 30SW
							SP	@ 32' SAND: fine, moderately well sorted, micaceous, loose to medium dense, light yellowish brown (2.5Y, 5/3) rock exhibits shearing
				35				
								SHEAR: N5W, 15E
				40				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-5-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/19/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1398'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-71'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
18	5.6	111	-					@41': SLIDE PLAN CONTACT: N21E, 31SE: Base of landslide/top of bedrock
								PICO FORMATION (Tp)
								SANDSTONE: medium to coarse, with pebbles, dense, slightly moist, yellowish brown (2.5Y, 5/3)
				45				
42/9"			-	50				(Sample fell out)
								BEDDING: N30E, 34SE
								BEDDING: N15E, 29SE
				55				BEDDING: N32E, 31SE
								BEDDING: N28E, 29SE
42/9"	7.1	120	-	60				
				65				
								SILTY SANDSTONE: fine, moist, olive (5Y, 5/4)
								light yellowish brown (10YR, 6/4)
35/9"	5.5	111	-	70				
								Bottom of Boring at 71 feet. No groundwater. No caving.
				75				
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 8/19/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-6-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/20/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1330'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-76'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
							SM	**ARTIFICIAL FILL (af)** SILTY SAND: fine to medium, loose, moist, light yellowish brown (2.5Y, 6/3)
				5				Note: fill appears relatively "clean" with no organic debris and minimized clay
3	7.4	118	-	10	■			
				15				
4	6	117	-	20	■			
				25				
5	7.6	117	-	30	■			
				35				**LANDSLIDE DEBRIS (Qls)** SILTY SANDSTONE: dense, light yellowish brown (2.5Y, 6/3), (clean contact with fill)
								fine, very clean, massive
				40				slightly clayey, very hard drilling in concretionary layer

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-6-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/20/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1330'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-76'

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
27	2.6	126	-					PEBBLY CONGLOMERATE: medium to coarse, with granules and pebbles, poorly sorted, dense, damp, light yellowish brown (2.5Y, 6/3), with coarse sand size shell fragments
				45				N59E, 35S: pebble layer @46'-48': orange layer, olive yellow (2.5Y, 6/8) BEDDING: N30E, 34SE BEDDING: N60E, 40S softer
20	6.8	109	-	50				
				55				SANDSTONE: medium to coarse, moderately sorted, dense, damp to slightly moist, light yellowish brown (2.5Y, 6/3) BEDDING: N10E, 35E BEDDING: N12E, 33E
21	6.9	104	-	60				BEDDING: N16E, 34SE
				65				SILTSTONE: with clam fossils, micaceous, moist, bluish gray @68': CLAY SEAM: N50E, 20SE: (landslide plane) CLAYSTONE: plastic, moist, reddish brown @69' BEDDING: N52, 18SE
12	17.6	102	-	70				**PICO FORMATION (Tp)** MUDSTONE/CLAYEY SILTSTONE: massive, with sand and granules, mottled brown and olive gray
				75				(no discernable bedding)
				80				Bottom of Boring at 76 feet. No groundwater. Minor caving in sandy fill.

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 8/19/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-7-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/21/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1408'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-100'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								PICO FORMATION (Tp)
								SANDSTONE: fine to medium, moderately well sorted, dense, damp, light yellowish brown
				5				
								BEDDING: N75E, 41S
16/9"	7.2	112	-	10	■			BEDDING: N75E, 42S
								BEDDING: N78E, 42S
				15				CONGLOMERATE: with pebbles
								SANDSTONE: fine, moderately well sorted, dense, damp, pale yellow (2.5Y, 8/2), with minor pebbles, minimal to no fines
18/9"	4.3	116	-	20	■			medium to coarse
								pebble conglomerate layer: N78E, 44S
				25				
								BEDDING: N76E, 48S
								fine to medium, slightly silty, light gray (2.5Y, 7/1)
34/9"	6.1	107	-	30	■			
				35				
								medium to coarse, with granules and pebbles, yellow
				40				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-7-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/21/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1408'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-100'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
33/9"			-					
				45				PEBBLY SANDSTONE: medium to coarse, with granules and pebbles (5%), moderately well sorted (no fines), dense, damp, pale yellow (2.5Y, 7/3)
								well cemented, (slow drilling)
								BEDDING: N88W, 39S: (pebble layer)
30/4"			-	50				
				55				BEDDING: N80E, 47S
								BEDDING: N80E, 42S
50	6.7	114	-	60				
								FOSSILIFEROUS SILTSTONE: with numerous shells, dense, slightly moist, olive (5Y, 5/3), concretionary, cemented
								SILTY SANDSTONE: fine to medium, poorly sorted, olive (5Y, 5/3)
				65				
30/9"	10.2	121	-	70				
								hard cemented zone
								BEDDING: N82E, 43S
				75				
								SANDSTONE: fine, well sorted, dense, moist, pale yellow to olive (5Y, 7/3)
								BEDDING: N78E, 40S
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-7-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/21/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1408'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-100'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
34/9"	10.1	113	-		■			N83E, 42S
				85				BEDDING: N86W, 39S: (shell layer), slightly silty and concretionary
								SANDY SILTSTONE: laminated, locally concretionary, dense, moist, mottled bluish gray and brown
52/9"	6.8	122	-	90	■			no clay in matrix
								BEDDING: N88E, 41S
								SILTY SANDSTONE: fine to medium, poorly sorted, dense, slightly moist, olive brown
				95				SANDSTONE: fine, slightly silty, moderately well sorted, light gray (5Y, 7/1)
				100				Bottom of Boring at 100 feet. No groundwater. No caving.
				105				
				110				
				115				
				120				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 11/16/10

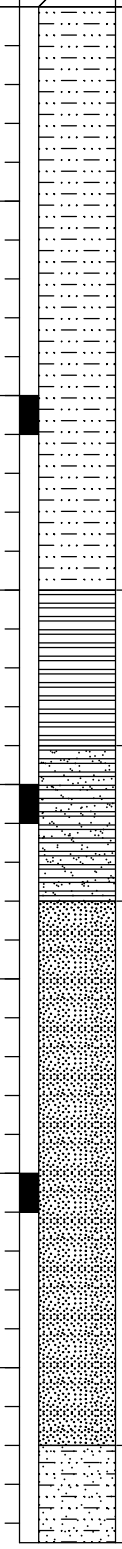
LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-8-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/23/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1135'
DRILLING CO.: Tri-Valley
LOGGED BY: TL
BORING DEPTH: 0-101'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
3	2.9	109	-	10	■		
2	7.9	123	-	20	■		
7	3.6	118	-	30	■		



SAUGUS FORMATION (QTs)

SILTSTONE: micaceous, soft, dry, light grayish brown (10YR 5/2)

BEDDING: N72W, 16N

BEDDING: N80W, 12N

CLAYSTONE: moderately soft, dark grayish brown (10YR 4/2)

massive

CLAYEY SANDSTONE: with sand and silt, moderately soft, light reddish brown (5YR 4/3)

BEDDING: N72W, 8N): (top of sandstone)

SANDSTONE: fine, moderately well sorted, micaceous, medium dense, damp, light olive brown (2.5Y, 5/3)

BEDDING: N32W, 12NE: pebble layer cross bed

grading coarser with pebbles

BEDDING: N51W, 19NE

BEDDING: N53W, 12NE

FAULT: N60E, 58S

BEDDING: N85E, 24N

SANDY SILTSTONE: fine sand and trace gravel to 1/2", with fraction of clay, poorly sorted, dense, slightly moist, dark grayish brown (2.5Y 4/2)

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BORING B-8-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/23/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1135'
DRILLING CO.: Tri-Valley
LOGGED BY: TL
BORING DEPTH: 0-101'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
12	7.1	118	-	40				grading to mudstone
								CONGLOMERATE: medium to coarse sand, with pebble to 1" and few cobbles to 6", dark grayish brown (2.5Y, 4/2)
								BEDDING: N81W, 9N
				45				OFFSET LITHOLOGY BUT NO SHEARING OBSERVEABLE FAULT: N80E, 68S: (hard drilling)
								medium, light bluish gray (2.5Y, 6/2)
33	2.8	123	-	50				
				55				silty and well cemented BEDDING: N86E, 26N SANDSTONE: fine to medium, laminated, light gray
								BEDDING: N55W, 16NE: clean sand layer
39	4.5	115	-	60				SANDY SILTSTONE: damp, olive gray (5Y, 5/2)
				65				SILTSTONE: micaceous, soft, moist, olive gray (5Y, 5/2)
								BEDDING: N48W, 24NE: thin clay bed
								increasing clay with depth
								CLAYSTONE: plastic, firm, moist, dark olive gray
28	13.8	113	-	70				
								SILTSTONE: with clay, slightly plastic, locally micaceous and laminated, slightly firm to soft, moist, olive gray (5Y, 5/2) @74': BEDDING: 50W, 22NE
				75				
								CLAYSTONE: with silt, massive, firm, slightly moist, olive gray (5Y,

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BORING B-8-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/23/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1135'
DRILLING CO.: Tri-Valley
LOGGED BY: TL
BORING DEPTH: 0-101'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
18	16.4	115	-	80				5/2) @79' BEDDING: N60W, 14N: clay seam
								SILTSTONE: laminated, soft
				85				
								SANDSTONE: medium, moderately sorted with small pebble inclusions, hard, light olive gray (5Y 6/2), (cuttings fell out of basket)
42	3.9	124	-	90				CROSS-BEDDING: N20W, 15E
								CONGLOMERATE: fine to medium sand, with granules and pebbles, well cemented and poorly sorted, slightly moist, light olive gray (5Y 6/2) BEDDING: N32W, 13NE: fine sand layer
				95				BEDDING: N36W, 14NE
								fine sand, no pebbles, massive, well sorted, light gray
38/10"	5.3	112	-	100				
								Bottom of Boring at 101 feet. No groundwater. No caving.
				105				
				110				
				115				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 11/16/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-9-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/27/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1250'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-107'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								OLDER LANDSLIDE DEBRIS (Qols)
								SILTY SANDSTONE: fine, soft, damp, light olive brown (2.5Y, 5/3), appears jumbled
				5				SANDY SILTSTONE: clean, slightly laminated, soft, olive brown (2.5Y, 4/3)
								SILTY SANDSTONE: medium to coarse, with pebbles, poorly sorted, slightly moist, light olive brown (2.5Y, 5/3)
								hard zone
7	13	120	-	10	■			CLAYSTONE: with silt, massive, slightly plastic, moist, dark brown (10YR, 3/3), (jumbled)
				15				MUDSTONE: with coarse sand & granules in silty matrix, massive, poorly sorted, slightly plastic, slightly moist, dark brown (10YR, 3/3)
								CONTACT: N20W, 17SW
								SAUGUS FORMATION (QTs)
								SANDSTONE: fine to medium, moderately well sorted, cemented, hard, light gray (2.5Y, 7/2)
9/7"	4.2	131	-	20	■			BEDDING: N40W, 60NE: (pebble layer)
				25				CONGLOMERATE: coarse sand, with pebbles and cobbles, hard, light gray (2.5Y, 7/2)
								BEDDING: N25W, 37NE
20/9"	4	131	-	30	■			medium to coarse sand, no fines
				35				BEDDING: N25W, 31NW: fine sand layer
				40				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-9-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/27/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1250'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-107'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
24/9"	3.9	128	-					
				45				CONTACT/BEDDING: N61W, 53NE SILTSTONE: with clay, poorly sorted, massive, dense, brown (10YR, 4/3)
								SANDSTONE: medium, with granules, hard, olive gray (5Y, 5/2)
38/9"	5.5	108	-	50				
								BEDDING: N50W, 41NE
				55				PEBBLY SANDSTONE: fine to medium, poorly sorted with granules, grayish brown (2/5Y, 4/2) BEDDING: N38W, 42NE
57/9"	4.7	110	-	60				
								SHEAR: N15W, 67NE BEDDING: N38W, 71NE SHEAR: N18W, 44NE: (with slicks) CONTACT: N61W, 43NE: (top of siltstone)
				65				SILTSTONE: with clay, firm, massive, slightly plastic, slightly moist, reddish brown (5YR, 4/4)
								SHEAR: N31W, 55NE: (clay slicks) grades to brown silty sandstone to 72'
53	9.6	132	-	70				
								very plastic
				75				SILTY SANDSTONE: fine, poorly sorted, massive, dense, yellowish brown (10YR, 5/4)
								BEDDING: N51W, 52N
				80				

(CONTINUED ON THE FOLLOWING FIGURE)

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 11/16/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-9-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 4/27/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-72'(1120 lbs.). 400 lb stem added each 20' after 72'.
ELEVATION: 1250'
DRILLING CO.: Tri-Valley
LOGGED BY: KGF
BORING DEPTH: 0-107'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
51/9"	10.9	116	-					
				85				BEDDING: N61W, 58W: (sandy layer)
53/11"	7.1	133	-	90				
				95				fine to medium, olive brown (2.5Y, 4/4)
								CONGLOMERATE: with pebbles, medium to coarse sand, slightly silty, massive, light brownish gray (2.5Y, 6/2)
				100				BEDDING: N38W, 43NE
40/10"	3.7	121	-					SANDSTONE: fine to medium, clean, well sorted, dense, light gray (2.5Y, 7/2), well indurated
				105				
								Bottom of Boring at 107 feet. No groundwater. No caving.
				110				
				115				
				120				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 11/16/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-10-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 10/7/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-70'(1120 lbs.).
ELEVATION: 1002.5'
DRILLING CO.: Tri-Valley
LOGGED BY: TPL
BORING DEPTH: 0-70'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION / GRAPHIC LOG	SOIL TYPE	
						ML	**ALLUVIUM (Qal)** SANDY SILT: very fine sand, soft, slightly moist, grayish brown (10YR 5/2)
				5			
				10			minor caliche veins trace cobbles, medium stiff angular sandstone cobble; 8" long, 3" wide
				15			
				20			siltstone rip up clasts
							SAUGUS FORMATION (QTs) SANDY SILTSTONE: very fine sand, micaceous, some caliche pods, soft, slightly moist, yellowish gray (5Y 7/2) slight orangish brown mottling
				25			BEDDING: N10E, 20SE: defined by 1/4" thick caliche at contact SILTY SANDSTONE: very fine, trace pebbles, some siltstone interbeds up to 6" thick, friable, slightly moist, yellowish gray (5Y 7/2) very fine to medium with cross bedding BEDDING: N27E, 17SE
				30			SANDY SILTSTONE: very fine to fine sand, low hardness, slightly moist, yellowish gray (5Y 7/2)
							SANDSTONE: fine to coarse, minor amount of pebbles, moderately hard, slightly moist, yellowish gray (5Y 7/2)
				35			CROSS-BEDDING: N57E, 15SE: moderately well cemented
				40			

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-10-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 10/7/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-70'(1120 lbs.).
ELEVATION: 1002.5'
DRILLING CO.: Tri-Valley
LOGGED BY: TPL
BORING DEPTH: 0-70'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								BEDDING: N5E, 17SE
				45				PEBBLY SANDSTONE: fine to very coarse, moderately cemented, moderately hard, moist, yellowish gray (5Y 7/2), light seepage
								moderate seepage
				50				CONTACT: N10W, 15NE
								SANDY SILTSTONE: very fine to fine sand, weakly cemented, micaceous, low hardness, moist, light olive gray (5Y 5/2) thin very fine sandstone interbed @ 52'
								1" thick siltstone; 4" thick very fine sandstone
				55				SILTSTONE: moderately indurated, moderately hard, slightly moist, medium dark gray (N4)
				60				
				65				light olive gray (5Y 5/2)
								dark yellowish brown (10YR 4/2)
				70				Bottom of Boring at 70 feet. Light seepage at 44', moderate seepage at 47 '. No caving.
				75				
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 11/16/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-11-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 10/7/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-70'(1120 lbs.).
ELEVATION: 1145.5'
DRILLING CO.: Tri-Valley
LOGGED BY: TPL
BORING DEPTH: 0-70'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
							ML	**RESIDUAL SOIL** SANDY SILT: very fine to fine sand, minor caliche, soft, slightly moist, dark yellowish brown (10YR 4/2)
				5				yellowish brown (10YR 5/4)
								SAUGUS FORMATION (QTs) SANDY SILTSTONE: very fine sand, micaceous, soft, dry, yellowish gray (5Y 7/2) BEDDING: N20E, 10SE BEDDING: N40E, 10SE: some siltstone interbeds, 1" to 2" thick
				10				
								SILTSTONE: moderately indurated, low hardness, slightly moist, light olive gray (5Y 5/2)
				15				
				20				SILTY SANDSTONE: very fine to fine, micaceous, soft, slightly moist, yellowish gray (5Y 7/2)
								SILTSTONE: moderately indurated, low hardness, slightly moist, light olive gray (5Y 5/2)
				25				SANDSTONE: very fine to fine, low hardness, slightly moist, light olive gray (5Y 6/1), laminated bedding defined by aligned mafic minerals
								SANDY SILTSTONE: very fine sand, micaceous, soft, slightly moist, yellowish gray (5Y 7/2)
				30				SANDSTONE: very fine to medium, weakly cemented, slightly micaceous, soft, dry, yellowish gray (5Y 7/2), laminated
								trace pebbles BEDDING: N-S, 12E some cross bedding
				35				
								BEDDING: N10E, 8SE
				40				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-11-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 10/7/10
EQUIPMENT USED: 24" Bucket auger with heavy duty sampler. 0-24' (3160 lbs.), 24-46'(2040 lbs.), 46-70'(1120 lbs.).
ELEVATION: 1145.5'
DRILLING CO.: Tri-Valley
LOGGED BY: TPL
BORING DEPTH: 0-70'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
				45				BEDDING: N15E, 10SE
				50				PEBBLY SANDSTONE: fine to coarse, trace cobbles, weakly cemented, low hardness, dry, yellowish gray (5Y 7/2)
								SILTY SANDSTONE: very fine to fine, micaceous, soft, slightly moist, light olive gray (5Y 5/2)
								SANDY SILTSTONE: very fine sand, micaceous, soft, slightly moist, light olive gray (5Y 5/2)
				55				BEDDING: N11E, 15SE: 2" thick siltstone interbed
								SILTSTONE: micaceous, moderately hard, slightly moist, moderate olive brown (5Y 4/4), some very fine to fine sandstone interbeds
								dark yellowish brown (10YR 4/2)
				60				massive
								olive gray (5Y 4/1)
				65				minor very fine sand, caliche coating on fracture surfaces
								medium bluish gray (5B 5/1)
								SILTY SANDSTONE: fine to coarse, trace pebbles, moderately hard, slightly moist, light olive gray (5Y 5/2)
				70				Bottom of Boring at 70 feet. No groundwater. No caving.
				75				
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 11/16/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-1-11

JOB NUMBER: 2002-036-006
DATE DRILLED: 11/22/11
EQUIPMENT USED: 24" diameter bucket rig #7 with triple scope weights of 3160 lbs. (0-24'), 2040 lbs. (24-46'), 1120 lbs. (46-72')
ELEVATION: 1025'
DRILLING CO.: Tri-Valley
LOGGED BY: BKP
BORING DEPTH: 0-61'
SURFACE CONDITIONS: Dirt Access Road

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	SOIL TYPE	
				ML	**TERRACE DEPOSITS (Qt)** SANDY SILT: fine, moderately firm, moist, medium brown
P	5.8	95	-		grades occasional small gravel, less moist, grayish brown
P	6.5	101	-		grades more sandy, occasional gravel and cobbles
P	7.9	104	-		grades more firm, slightly porous
P	7.6	106	-	ML/SM	SILTY SAND: fine, grades more sandy
1	8.2	106	-	SM	SILTY SAND: fine, gravel, dense, moist, medium brown to grayish brown
1	8.1	107	-		grades less silty grades light brown
2	5.7	111	-		less silty, fine to medium, occasional coarse sand, dense, damp to moist, light grayish brown
					grades less silty, light gray
5	16.3	105	-		silty, dense to very dense, moist, mottled light gray and olive gray
					occasional rounded cobbles
6	7	109	-		**SAUGUS FORMATION (QTs)** SILTY SANDSTONE: very fine, friable, damp moist, olive gray

DEPTH (FEET): 5, 10, 15, 20, 25, 30, 35, 40

SAMPLE LOCATION / GRAPHIC LOG

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-1-11 (CONTINUED)

JOB NUMBER: 2002-036-006
DATE DRILLED: 11/22/11
EQUIPMENT USED: 24" diameter bucket rig #7 with triple scope weights of 3160 lbs. (0-24'), 2040 lbs. (24-46'), 1120 lbs. (46-72')
ELEVATION: 1025'
DRILLING CO.: Tri-Valley
LOGGED BY: BKP
BORING DEPTH: 0-61'
SURFACE CONDITIONS: Dirt Access Road

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
5	8.2	108	-					grades more moist
								large cobble (10"+/-)
6	7.9	111	-	45				BEDDING: N30E, 10SE
								some gravel and small cobbles
10	4.5	107	-	50				SANDSTONE: fine to coarse, slightly silty, friable, damp to moist, light gray
								fine, silty, occasional gravel, light olive gray
10	5.3	111	-	55				
								SANDY SILTSTONE: fine, soft, moist, olive gray
13	9.5	113	-	60				
								Bottom of Boring at 61 feet. No water. No caving.
				65				
				70				
				75				
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-006.GPJ FRANKIAN.GDT 1/11/12

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-2-11

JOB NUMBER: 2002-036-006
DATE DRILLED: 11/21/11
EQUIPMENT USED: 24" diameter bucket rig #7 with triple scope weights of 3160 lbs. (0-24'), 2040 lbs. (24-46'), 1120 lbs. (46-72')
ELEVATION: 948'
DRILLING CO.: Tri-Valley
LOGGED BY: BKP
BORING DEPTH: 0-24.5'
SURFACE CONDITIONS: Grass Field

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	SOIL TYPE	
				ML	**ALLUVIUM (Qal)** CLAYEY SILT: moderately firm, moist, medium brown
P	6.2	95	-	ML	SANDY SILT: fine, less moist, lighter medium brown
P&T	4.8	96	-	SM	SILTY SAND: fine to coarse, damp, tan
P&T	9.8	90	-		fine, medium dense to dense, grayish brown
1	8	91	-		lens of sandy silt grades less silty
2	11.9	95	-		alternating layers of moist to very moist clayey silt and damp, clean, fine to coarse sand, dense
2	1.8	103	-	SP	SAND: fine to coarse, dense, dry to damp, buff to white
				ML	CLAYEY SILT: very moist to wet, dark brown
3	3	115	-	SP-GP	GRAVELLY SAND: medium to coarse with occasional fine, abundant gravel with occasional small cobble, dense, damp, grayish brown difficult drilling; clean damp sand with abundant gravel & cobbles, moderate caving
					Bottom of Boring at 24.5 feet. No water. Moderate caving below 22'

DEPTH (FEET): 5, 10, 15, 20, 25, 30, 35, 40

SAMPLE LOCATION / GRAPHIC LOG

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-006.GPJ FRANKIAN.GDT 1/11/12

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-3-11

JOB NUMBER: 2002-036-006
DATE DRILLED: 11/21/11
EQUIPMENT USED: 24" diameter bucket rig #7 with triple scope weights of 3160 lbs. (0-24'), 2040 lbs. (24-46'), 1120 lbs. (46-72')
ELEVATION: 948'
DRILLING CO.: Tri-Valley
LOGGED BY: BKP
BORING DEPTH: 0-29'
SURFACE CONDITIONS: Open Field

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	SOIL TYPE	
				SM/SP	**ALLUVIUM (Qal)** SILTY SAND: fine to medium, with occasional coarse sand, occasional gravel, medium dense to dense, damp to moist, tan to light brown
1	2.5	107	-		lens of clean and damp sand
					grades more clayey
2	15.4	107	-	CL	SILTY CLAY: approaching clayey silt, moderately firm, moist to very moist, medium brown
				SM	SILTY SAND: fine, medium dense to dense, moist, light to medium brown
2	14.7	101	-		
10*	14	100	-	ML	SANDY SILT: firm, very moist, olive gray
5	5.2	109	-	SP	CLEAN SAND: fine to medium, with occasional coarse sand, occasional gravel, damp, light reddish brown
1	5.9	93	-		dry to damp
				ML	SANDY SILT: moderately firm, moist, mottled rust brown and olive gray
				SP	CLEAN SAND: fine to coarse, dry to damp, buff
2	2.9	93	-		difficult drilling - soil not staying in bucket (too sandy, too dry) grades to clean fine sand
				CL	SILTY CLAY: very moist to wet, dark grayish brown
6	20.6	100	-		lens of silt and sand (sample sleeve wet)
				SM/GP	SILTY SAND: fine to coarse, with abundant gravel, cobbles, damp to moist, tan to light brown
					Bottom of Boring at 29 feet. No water. No caving.

DEPTH (FEET): 5, 10, 15, 20, 25, 30, 35, 40

SAMPLE LOCATION / GRAPHIC LOG

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-006.GPJ FRANKIAN.GDT 1/11/12

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-4-11

JOB NUMBER: 2002-036-006
DATE DRILLED: 11/22/11
EQUIPMENT USED: 24" diameter bucket rig #7 with triple scope weights of 3160 lbs. (0-24'), 2040 lbs. (24-46'), 1120 lbs. (46-72')
ELEVATION: 952'
DRILLING CO.: Tri-Valley
LOGGED BY: BKP
BORING DEPTH: 0-25'
SURFACE CONDITIONS: Grass Field

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	SOIL TYPE	
1+T	5.2	110	-	ML	**ALLUVIUM (Qal)** SANDY SILT: fine, occasional coarse sand, occasional small gravel, firm, damp to moist, grayish brown
P	2.4	103	-	SP-SM	SILTY SAND: fine to coarse, medium dense, damp, grayish tan
P	15.1 9.2424124	92 0.3813	-	ML	SANDY SILT: firm, moist, grayish brown
1	2.4	103	-	SM-SP	SILTY SAND: fine to coarse, occasional gravel and cobble, damp, tan, some slight caving
				ML	SANDY SILT: fine, moist, medium brown
2	1.8	104	-	SP	SAND: fine to coarse, medium dense to dense, damp to moist, mottled light gray and rust brown alternating layers of silt and sand
1	2.3	106	-	SM	SILTY SAND: occasional gravel, damp, tannish yellow
				SP	SAND: fine to coarse, dense, damp, light gray
				ML	CLAYEY SILT: very moist, medium to dark brown
1	13	98	-	SP/SM	SILTY SAND: fine to medium, dense, damp to moist, mottled light gray and rust brown

Bottom of Boring at 25 feet.
No water. Some slight caving at 11'.

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-006.GPJ FRANKIAN.GDT 1/11/12

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-5-11

JOB NUMBER: 2002-036-006
DATE DRILLED: 11/21/11
EQUIPMENT USED: 24" diameter bucket rig #7 with triple scope weights of 3160 lbs. (0-24'), 2040 lbs. (24-46'), 1120 lbs. (46-72')
ELEVATION: 967'
DRILLING CO.: Tri-Valley
LOGGED BY: BKP
BORING DEPTH: 0-49'
SURFACE CONDITIONS: Grass Field

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
					SM-SP	**ALLUVIUM (Qal)** SILTY SAND: fine to medium, with occasional coarse sand, slightly silty, medium dense, moist, light to medium brown
1	2.5	106	- -			grades fine to coarse, occasional small gravel, medium dense to dense, damp to moist, light grayish brown
3	3.9	110	-	5		lens of fine silty sand
						abundant cobbles
1	7.9	107	-	10	SM	SILTY SAND: fine to medium, with occasional coarse sand, occasional cobbles, dense, moist, light grayish brown
5	11.3	111	-			no coarse sand, very silty, moist to very moist, medium grayish brown
3	22	105	-	15		grades less silty, fine, moist
						fine to coarse, abundant gravel, dense to very dense, grayish brown
						abundant cobbles
2	24.5	97	-	20	SM-SP	SILTY SAND: fine to medium with occasional coarse sand, occasional gravel, slightly silty, moist, light brown
4	24.4	97	-	25	SM	SILTY SAND: fine to medium, dense, moist, grayish brown
3	13.3	107	-	30		more fines, more moist
5	24.4	97	-	35	SM-SP	SILTY SAND: fine, with occasional coarse sand, slightly silty, dense, moist, mottled light gray and rust brown
					ML	CLAYEY SILT: moist to very moist, dark gray
				40	SP-GP	SAND: fine to coarse, with abundant gravel, almost clean, very dense, damp to moist, light brown

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING B-5-11 (CONTINUED)

JOB NUMBER: 2002-036-006
DATE DRILLED: 11/21/11
EQUIPMENT USED: 24" diameter bucket rig #7 with triple scope weights of 3160 lbs. (0-24'), 2040 lbs. (24-46'), 1120 lbs. (46-72')
ELEVATION: 967'
DRILLING CO.: Tri-Valley
LOGGED BY: BKP
BORING DEPTH: 0-49'
SURFACE CONDITIONS: Grass Field

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
12	13.3	107	-				SP-GP	abundant cobbles
15			-	45				(sample disturbed)
							ML	SANDY SILT: fine, moist to very moist, greenish gray
								grades wet
				50				Bottom of Boring at 49 feet. Water at 49'. Moderate ravelling below 36'
				55				
				60				
				65				
				70				
				75				
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-006.GPJ FRANKIAN.GDT 1/11/12

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING HS-1-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 5/10/10
EQUIPMENT USED: Hollow Stem Auger CME 95 with heavy duty sampler and SPT sampler
ELEVATION: 1248'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-112'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
							SM	**ARTIFICIAL FILL (af)** SILTY SAND: medium to coarse, loose, moist, light brown (2.5Y, 5/4)
22	9.9	111	-	5				
								fine to medium, olive brown (2.5Y, 5/4)
-			18	10				
32	13.6	117	-	15				has red clayey inclusions, shows compaction layering
-			27	20				fine to medium, poorly sorted, small shell fragments, slightly plastic, olive brown (2.5Y, 4/3)
59	10.4	118	-	25				
-			38	30				
								increase in moisture, slightly clayey (5-10%) in matrix
67	10.5	125	-	35				
								medium to coarse, trace pebbles
				40				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING HS-1-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 5/10/10
EQUIPMENT USED: Hollow Stem Auger CME 95 with heavy duty sampler and SPT sampler
ELEVATION: 1248'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-112'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
-			32				SM	
								slightly clayey
								fine to medium, with gravel, moderately to poorly sorted, olive brown (2.5Y, 4/3)
41	6.1	120	-	45				
								with abundant fossil shell fragments
-			50/3"	50				
								PICO FORMATION (Tp) SANDSTONE: medium to coarse, moderately well sorted, well cemented, hard, dark yellowish brown (10YR, 4/4)
50/4"	8.3	107	-	55				(hard drilling)
								PEBBLY SANDSTONE: medium, well cemented, light yellowish brown (10YR, 6/4), poorly sorted with granules (10%) and pebbles (5-10%)
-			65/3"	60				(sampler bouncing)
70/4"			-	65				(sampler bouncing)
								medium to coarse, moderately well sorted, well cemented, damp
-			65/5"	70				(bouncing after 5")
								(very hard drilling, adding water to cool bit)
								hard, with localized olive brown fine clayey mottling
75/5"	8.1	123	-	75				
								becomes coarser with pebbles
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING HS-1-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 5/10/10
EQUIPMENT USED: Hollow Stem Auger CME 95 with heavy duty sampler and SPT sampler
ELEVATION: 1248'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-112'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
-			30/1"					coarse, (bouncing after 6")
80/4"			-	85				(bouncing after 4")
								▽ groundwater at 87.08 feet 7/1/10
-				90				(bouncing after 5") medium to coarse
68/5"			-	95				
								▽ groundwater at 97.5 feet 5/14/10
								MUDSTONE: dark gray, mixture of sand (25%), silt (50%), and clay (25%)
-			50/6"	100				
				105				
				110				
								Bottom of Boring at 112 feet. Very slight groundwater seep noted at about 100'
				115				Installed temporary piezometer of 2" schedule 80 PVC with bottom at 108'; 0.020" machine-slotted screen from 108-88'; blank PVC to surface. Backfilled with #3 sand up to 85', and sealed with medium bentonite chips to 81'. Destroyed piezometer on July 14, 2010 by removing PVC casing and backfilling to surface with cement grout and 5% bentonite.
				120				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 11/16/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING HS-2-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 5/11/10
EQUIPMENT USED: Hollow Stem Auger CME 95 with heavy duty sampler and SPT sampler
ELEVATION: 1333'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-199'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
					SM	**ARTIFICIAL FILL (af)** SILTY SAND: fine to medium, slightly moist, light brown to pale yellow (2.5Y, 7/3)
44	5.4	110	-	5		
						fine, poorly graded, light olive brown(2.5Y, 5/3) to light gray
-			12	10		
23	13.3	112	-	15	ML	CLAYEY SILT: well graded with some sand in localized layers, moist, dark reddish brown (7.5YR, 5/3), interlayered soils
-			16	20		
28	11	109	-	25	SM	SILTY SAND: fine, moist, light olive brown, locally with clayey silt matrix
					ML	CLAYEY SILT: sandy, slightly plastic, stiff, moist, brown to reddish brown
-			24	30		
30	11.1	124	-	35	CL	SILTY CLAY: plastic, moist, reddish brown to brown, locally mottled with greenish gray silt and sand
						very stiff
-			39	40		
						locally sandy but mostly in reddish brown clay matrix
						(difficult drilling)
				45	ML	SANDY SILT: well graded, clayey, stiff, slightly plastic, reddish brown

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING HS-2-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 5/11/10
EQUIPMENT USED: Hollow Stem Auger CME 95 with heavy duty sampler and SPT sampler
ELEVATION: 1333'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-199'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
132/11"	12.1	117	-		■		ML	to brown (adding water during drilling)
-			97/9"	50	⊠			
							SM	SILTY SAND: fine to medium, dense, slightly moist, brown to light reddish brown
129/9"	9.5	117	-	55	■			
-			78/6"	60	⊠			
								SAUGUS FORMATION (QTs) SANDSTONE: fine to medium, dense, grayish brown
100/6"			-	65	■			Note: fine grained clean sandy residue left in sampler tip medium to coarse
-			50/3"	70	⊠			fine to coarse, clean with granules and pebbles
								CLAYSTONE: plastic, very stiff, moist, natural brown to reddish brown
100/11"	14.1	112	-	75	■			
								SILTY SANDSTONE: fine, moderately well sorted, grayish brown
*			-	80	□			(* Sampler bouncing after first 5")
				85				
								SANDSTONE: medium to coarse with granules and few gravel, moderately sorted, massive, dense, damp, brown
				90				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING HS-2-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 5/11/10
EQUIPMENT USED: Hollow Stem Auger CME 95 with heavy duty sampler and SPT sampler
ELEVATION: 1333'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-199'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
*			-				
				95			
-			50/4"	100			
				105			
-			20/1"	110			
				115			
-			50/2"	120			
				125			
-			46/6"	130			
				135			

(* Sampler bouncing after first 3")

SILTY SANDSTONE: fine, poorly sorted, dark olive gray

becomes clayey siltstone @99-100'

SANDSTONE: fine, moderately sorted, dense, damp, light brownish gray

SILTSTONE: massive (without lamination), dense, moist, brown

MUDSTONE: plastic, massive, moist, dark yellowish brown, clayey silt with few sand (5-10%)

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BORING HS-2-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 5/11/10
EQUIPMENT USED: Hollow Stem Auger CME 95 with heavy duty sampler and SPT sampler
ELEVATION: 1333'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-199'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								SILTSTONE: well cemented, gray
								MUDSTONE
-			*	140				* sub-parallel partings in core tube appear to have ~10-15 degree dip
								SILTSTONE: fine sand, damp, dark grayish brown, locally very hard and well cemented
				145				
								fine sand
				150				
				155				becoming slightly clayey
-			50/5"	160				
								very plastic (30% clay), moist, dark gray to dark olive
				165				
				170				Squeezing Hole
								very dark/black, very sticky
				175				
				180				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

BORING HS-2-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 5/11/10
EQUIPMENT USED: Hollow Stem Auger CME 95 with heavy duty sampler and SPT sampler
ELEVATION: 1333'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-199'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
								dark olive
								MUDSTONE: fine to medium sand, trace clayey silt, olive gray
				185				
				190				
								slight increase in sand content, but still clayey silt matrix
				195				
				200				Bottom of Boring at 199 feet. No groundwater in boring or in temporary piezometer monitored 5/17/10 to 6/25/10. Installed temporary piezometer of 2" schedule 80 PVC with bottom at 190'; 0.020" machine-slotted screen from 190-180'; blank PVC to surface. Backfilled with #3 sand up to 178', and sealed with medium bentonite chips to 176'. Destroyed piezometer on July 14, 2010 by removing PVC casing and backfilling to surface with cement grout and 5% bentonite.
				205				
				210				
				215				
				220				
				225				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 11/16/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING HS-3-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 5/13/10
EQUIPMENT USED: Hollow Stem Auger CME 95 with heavy duty sampler and SPT sampler
ELEVATION: 1102'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-41'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
					SM	**ALLUVIUM (Qal)** SILTY SAND: soft, moist, light brown to olive brown (2.5Y, 4/3)
12	13.8	115	-	5	ML	CLAYEY SILT: soft, moist, dark brown (10YR, 3/3)
-			12			some fine to coarse sand (10-15%), well graded, light brown to yellowish brown
62			-	10	SM	SILTY SAND: fine to medium, well graded, clayey (plastic), slightly moist, dark brown (10YR, 3/3)
-			13			
					SP/SM	SILTY SAND: poorly graded, loose, damp, yellowish brown (10YR, 5/4)
18	8.1	117	-	15		
-			8			
					SM	SILTY SAND: medium to coarse, with gravel, loose, damp, yellowish brown (10YR, 5/4)
18	8.5	109	-	20		
-			8			
25	4.2	118	-	25		
-			14			
-			44	30		**SAUGUS FORMATION (QTs)** SANDSTONE: fine to medium, locally laminated, well cemented, dense, damp, light olive brown (2.5Y, 4/3)
90/10"	8.7	130	-	35		
				40		CLAYSTONE: massive, dense, moist, reddish brown

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING HS-3-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 5/13/10
EQUIPMENT USED: Hollow Stem Auger CME 95 with heavy duty sampler and SPT sampler
ELEVATION: 1102'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-41'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE
75/6"	6.8	120	-				

Bottom of Boring at 41 feet.
No groundwater. No caving.

45
50
55
60
65
70
75
80

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 11/16/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING HS-4-10

JOB NUMBER: 2002-036-004
DATE DRILLED: 5/14/10
EQUIPMENT USED: Hollow Stem Auger CME 95 with heavy duty sampler and SPT sampler
ELEVATION: 1099'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-41.5'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
					SM	**ALLUVIUM (Qal)** SILTY SAND: fine to medium with few coarse, localized gravel, dry to damp, light olive brown (2.5Y, 5/3)
-			19			
53/10"	10.8	119	-	5	ML	SANDY SILT: fine to medium sand, well graded, slightly plastic, damp, brown to dark brown (10YR, 3/3)
-			45			
					SM	SILTY SAND: fine to medium, moderately well graded, slightly moist, light olive brown (2/5Y, 5/3)
-			27	10		
55	8.7	125	-			increase in fines
-			30	15		
						becomes dark brown
						brown (10YR, 4/3)
-			8	20		
20	5.8	112	-			with gravel (5%)
-			16	25		
					SP/SM	SILTY SAND: fine, poorly graded, damp, light yellowish brown (10YR, 6/4)
-			30	30		
						SAUGUS FORMATION (QTs) SILTSTONE: massive, poorly indurated (soft), damp, light olive gray (5Y, 6/2)
47	11.4	108	-	35		
				40		

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING HS-4-10 (CONTINUED)

JOB NUMBER: 2002-036-004
DATE DRILLED: 5/14/10
EQUIPMENT USED: Hollow Stem Auger CME 95 with heavy duty sampler and SPT sampler
ELEVATION: 1099'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-41.5'

TIME	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
-			55					
								Bottom of Boring at 41.5 feet. No groundwater. No caving.
				45				
				50				
				55				
				60				
				65				
				70				
				75				
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-004.GPJ FRANKIAN.GDT 11/16/10

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING WB-1

JOB NUMBER: 2002-036-03
DATE DRILLED: 7/13/09
EQUIPMENT USED: Rotary wash rig with Sleeve and SPT samplers.
ELEVATION: 1000'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-21.5'
HAMMER WEIGHT: 140lbs; DROP: 30"

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
					SM	**ARTIFICIAL FILL (af)** SILTY SAND: fine to medium, well graded, dense, slightly moist, dark brown
61	9.2	116	-			minor inert debris (glass & concrete)
-			23	5		
28	14.6	109	-			minor concrete, moist
-			12	10	SP	**ALLUVIUM (Qal)** SAND: medium, poorly graded, loose, slightly moist, light brown to grayish brown
102	11	119	-			**SAUGUS FORMATION (QTs)** SANDSTONE: coarse, with gravel, dense, damp to slightly moist, tan to gray
-			63	15		medium to coarse, silty, slightly moist, light brown to tan
119	13.01 11.6	120.02 119	94 -			medium, light brown to reddish brown
-			44	20		
						Bottom of Boring at 21.5 feet.

25
30
35
40

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-03.GPJ FRANKIAN.GDT 11/20/09

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING WB-2

JOB NUMBER: 2002-036-03
DATE DRILLED: 7/14/09
EQUIPMENT USED: Rotary wash rig with Sleeve and SPT samplers.
ELEVATION: 996'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-51'
HAMMER WEIGHT: 140lbs; DROP: 30"

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
					SM	**ARTIFICIAL FILL (af)** SILTY SAND: fine to medium, well graded, medium dense, slightly moist, brown to dark brown
					SM	**ALLUVIUM (Qal)** SILTY SAND: fine to medium, loose to medium dense, moist, dark brown to brown
42	3.2	120	-			
-			20	5		
	2.97176	86.849			SW	SAND: medium to coarse, massive to poorly layered, loose to medium dense, slightly moist, light brown to tan
38	6.7	108	-			
-			21	10		poorly graded, yellowish brown
	3.57726	87.2438				
35	3.8	112	-			
-			36	15		
						SAUGUS FORMATION (QTs) SANDSTONE: medium to coarse, with minor gravel, massive, dense, gray
109	4.7	127	-			
-			85	20		coarse, appears slightly cemented, very tight
135	4.9	124	-			tan to light brown
-			83	25		
						small gravel 2-5%
-			57			
				30		fine to medium, massive, medium dense, slightly moist, light brown
52	8.1	118	-			
-			19			SILTY SANDSTONE: fine to medium, slightly laminated, loose, moist, light brown
				35		
-			24			light brown to dark olive brown
				40		

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING WB-2 (CONTINUED)

JOB NUMBER: 2002-036-03
DATE DRILLED: 7/14/09
EQUIPMENT USED: Rotary wash rig with Sleeve and SPT samplers.
ELEVATION: 996'
DRILLING CO.: WDC
LOGGED BY: KGF
BORING DEPTH: 0-51'
HAMMER WEIGHT: 140lbs; DROP: 30"

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
-			20					
-			100/12"	45				SANDSTONE: coarse, with gravel (5%), massive, low hardness, slightly moist, grayish orange (10YR 7/4) to light gray (N7)
-			100/12"					poorly bedded, light brown to tan, bedding observed (distorted) in sampler at about 25 to 35 degree dip
175/8"	10	124	-	50				
								Bottom of Boring at 51 feet.
				55				
				60				
				65				
				70				
				75				
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-03.GPJ FRANKIAN.GDT 11/20/09

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING WB-3

JOB NUMBER: 2002-036-03
DATE DRILLED: 7/15/09
EQUIPMENT USED: Rotary wash rig with Sleeve and SPT samplers.
ELEVATION: 976'
DRILLING CO.: WDC
LOGGED BY: BKP
BORING DEPTH: 0-50.2'
HAMMER WEIGHT: 140lbs; DROP: 30"
SURFACE CONDITIONS: dry grass adjacent to asphalt road

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SOIL TYPE	
					SM	**CERTIFIED ENGINEERED FILL (cef)** SILTY SAND: fine to coarse, compact, moist, mottled light grayish brown and medium dark brown
99/8"	6.2	129	-			
-			30	5		occasional layer of dark to medium gray silty sand
118/8"	12.8	123	-			fine to medium, occasional small gravel, very compact, more moist, dark grayish brown
-			40	10		
	7.69230770.5975				SM	**ALLUVIUM (Qal)** SILTY SAND: fine to coarse, occasional gravel, medium dense, damp, light grayish brown
21	8.3	115	-			fine to medium, with occasional coarse sand, medium dense to dense, damp to moist
-			11	15		fine, occasional thin lens of sandy silt, loose to medium dense
	11.52816	63.9889				
23	11.7	121	-			fine to medium, with occasional coarse sand, more silty
-			19	20		
145	2.4	124	-			**SAUGUS FORMATION (QTs)** SANDSTONE: fine to coarse, with some silt, occasional small gravel, low hardness, damp, light brownish gray (5YR 6/1)
-			19	25		
-			27			moist, occasional thin lens of pale reddish brown (10R 5/4) fine sandy siltstone
132	4.7	138	-	30		fine to very coarse, pebbly, low hardness, slightly moist, light brownish gray (5YR 6/1)
-			96/9"			occasional thin lens of light gray (N7) sandstone, damp, low hardness, occasional small gravel
-			65	35		
				40		

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

(CONTINUED ON THE FOLLOWING FIGURE)

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

BORING WB-3 (CONTINUED)

JOB NUMBER: 2002-036-03
DATE DRILLED: 7/15/09
EQUIPMENT USED: Rotary wash rig with Sleeve and SPT samplers.
ELEVATION: 976'
DRILLING CO.: WDC
LOGGED BY: BKP
BORING DEPTH: 0-50.2'
HAMMER WEIGHT: 140lbs; DROP: 30"
SURFACE CONDITIONS: dry grass adjacent to asphalt road

BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (LBS. PER CU. FT.)	N-VALUE	DEPTH (FEET)	SAMPLE LOCATION	GRAPHIC LOG	SOIL TYPE	
-			84					fine to coarse, slightly silty, damp to moist, light gray (N7) to medium brownish gray (5YR 6/1)
-			22	45				SANDY SILTSTONE: fine, soft to low hardness, moist, pale reddish brown (10R 5/4)
-			96					SILTSTONE: low hardness, moist, light gray (N7) to medium light gray (N5)
100/2"			-	50				Bottom of Boring at 50.2 feet.
				55				
				60				
				65				
				70				
				75				
				80				

Note: The log of subsurface conditions shown hereon is approximate and applies only at the specific location and date indicated. It is not warranted to be representative of subsurface conditions at other locations or times.

BOREHOLE LOG 2002-036-03.GPJ FRANKIAN.GDT 11/20/09

LOG OF BORING

R.T. FRANKIAN & ASSOCIATES

Chiquita Canyon Landfill
January 27, 2012
2002-036-004

APPENDIX C

LABORATORY TESTING

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

APPENDIX C

LABORATORY TESTING

Laboratory tests were performed on selected samples obtained from the borings to aid in the classification of the soils and to determine their engineering properties.

The field moisture content and dry density of the soils encountered were determined by performing tests on the undisturbed samples. The results of the tests are shown to the left of the boring logs in Appendix B.

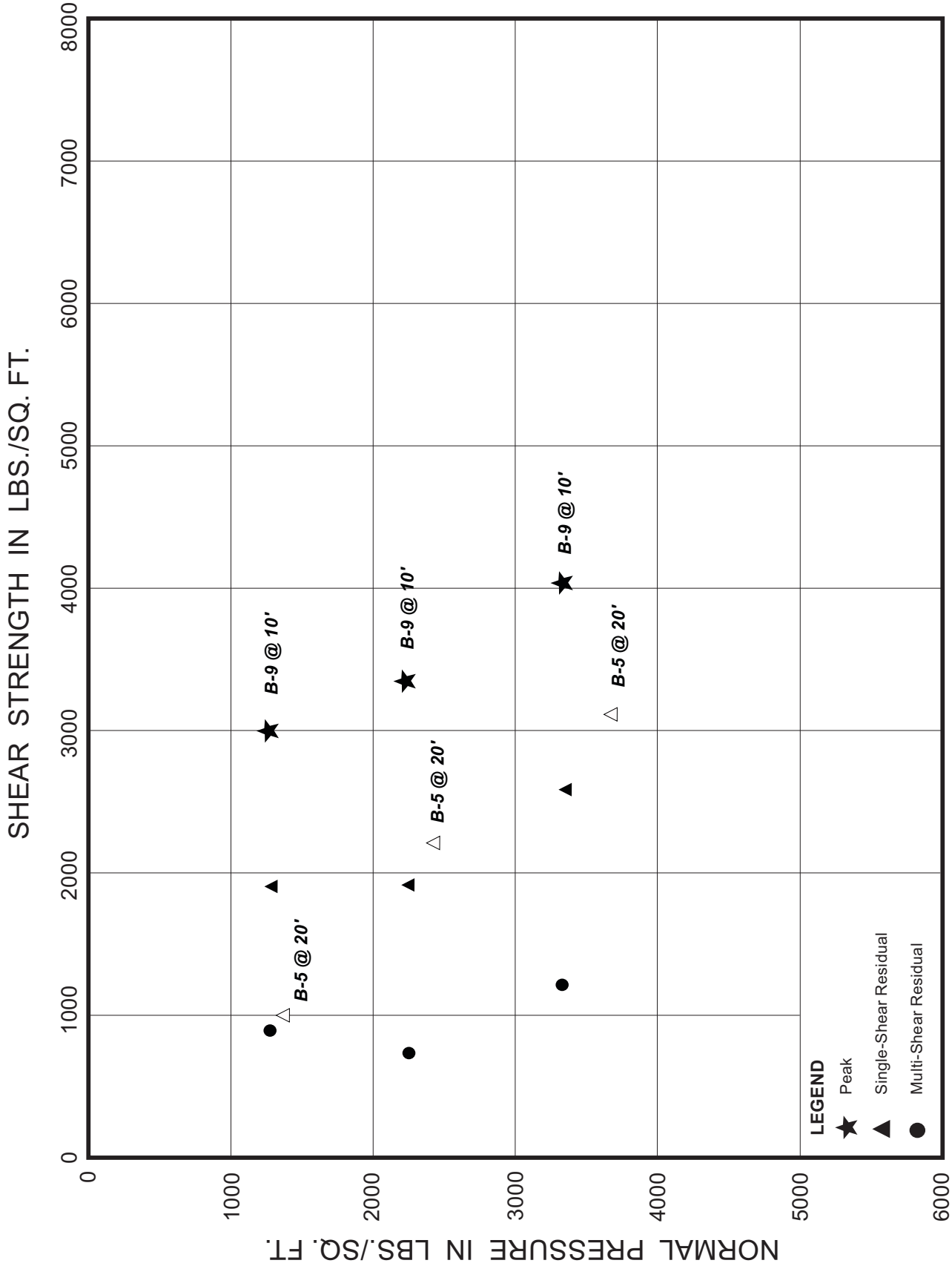
Direct shear tests were performed on selected undisturbed samples to determine the strength of the soils. The tests were performed after soaking the samples to near-saturated moisture content and at various surcharge pressures. The ultimate strength values determined from the direct shear tests are presented on the Shear Test Data page.

Confined consolidation tests were performed on four undisturbed samples. Water was added during the tests to each of the samples to illustrate the effect of moisture on the compressibility. The results of the tests are presented on the Consolidation Test Data pages.

Atterberg limits (liquid and plastic limit) tests were conducted on selected samples to aid in classifying the soils and determining index properties. Test results are presented on the attached graphic, "Atterberg Limit's Test Data."

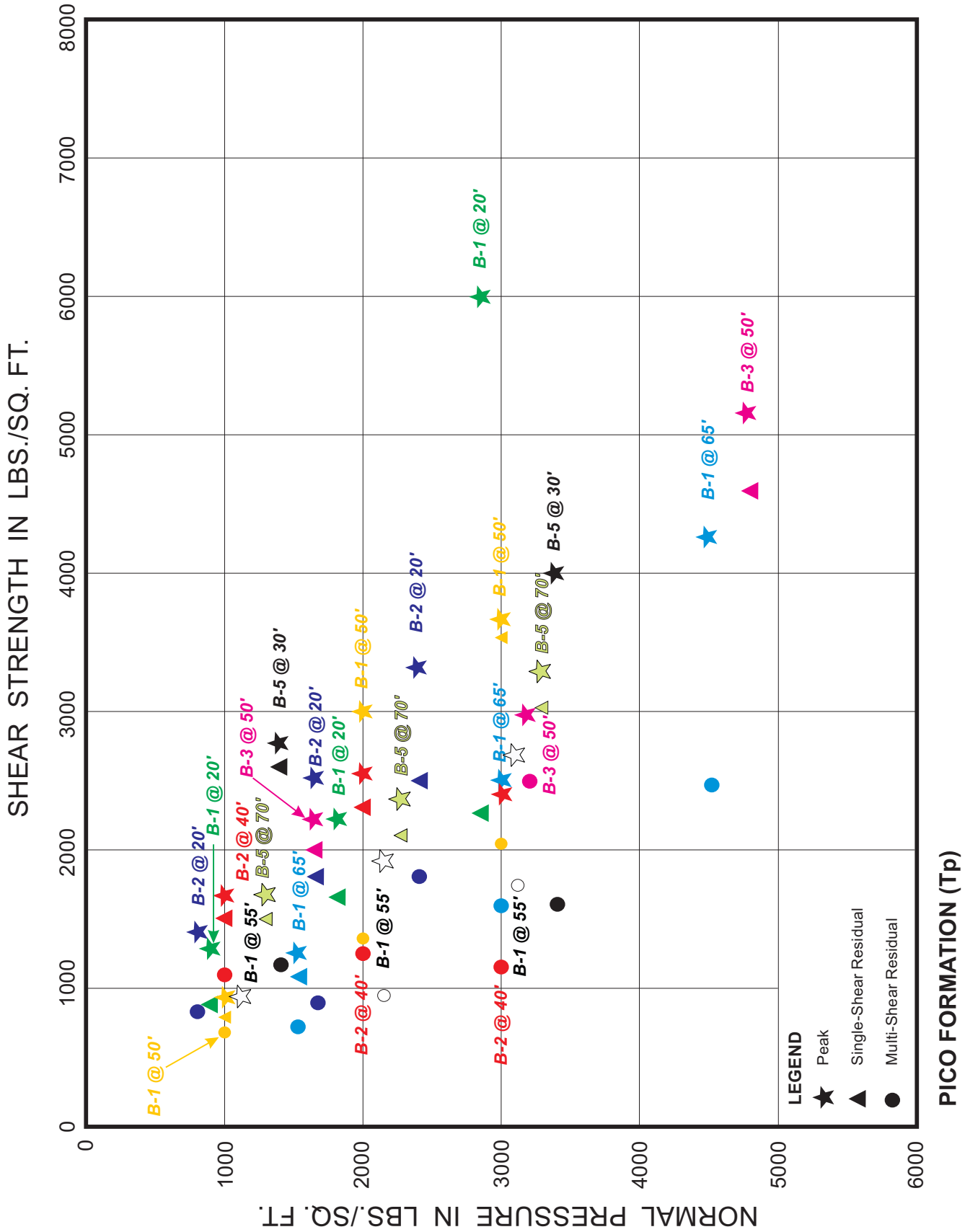
The gradation of selected samples was determined by performing sieve analyses. Hydrometer tests were performed on some of the sieve analyses samples. The results of the tests are presented on Gradation Test Data pages.

SUMMARY OF SHEAR TEST DATA



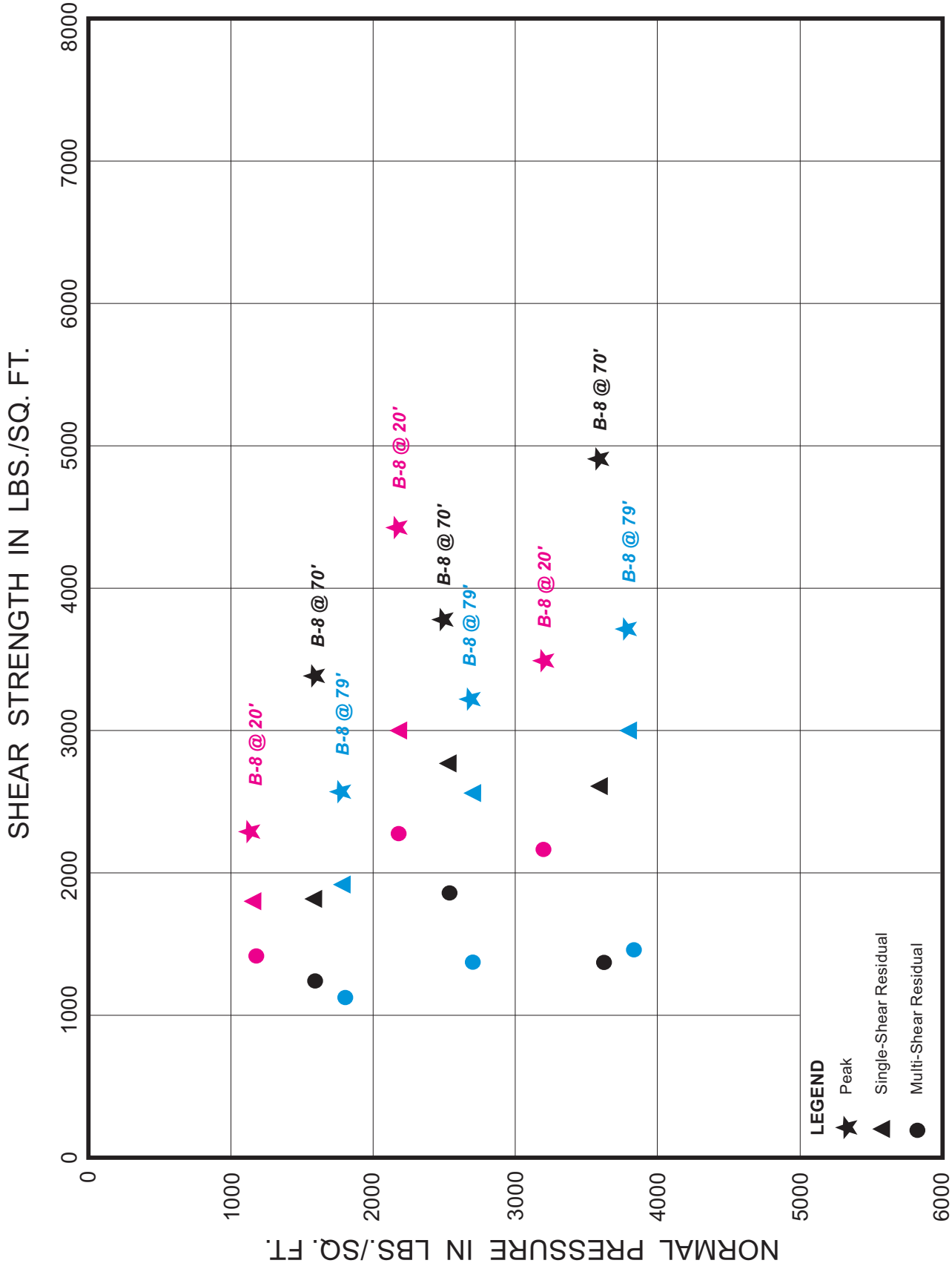
LANDSLIDE MATERIAL

SUMMARY OF SHEAR TEST DATA



PICO FORMATION (Tp)

SUMMARY OF SHEAR TEST DATA

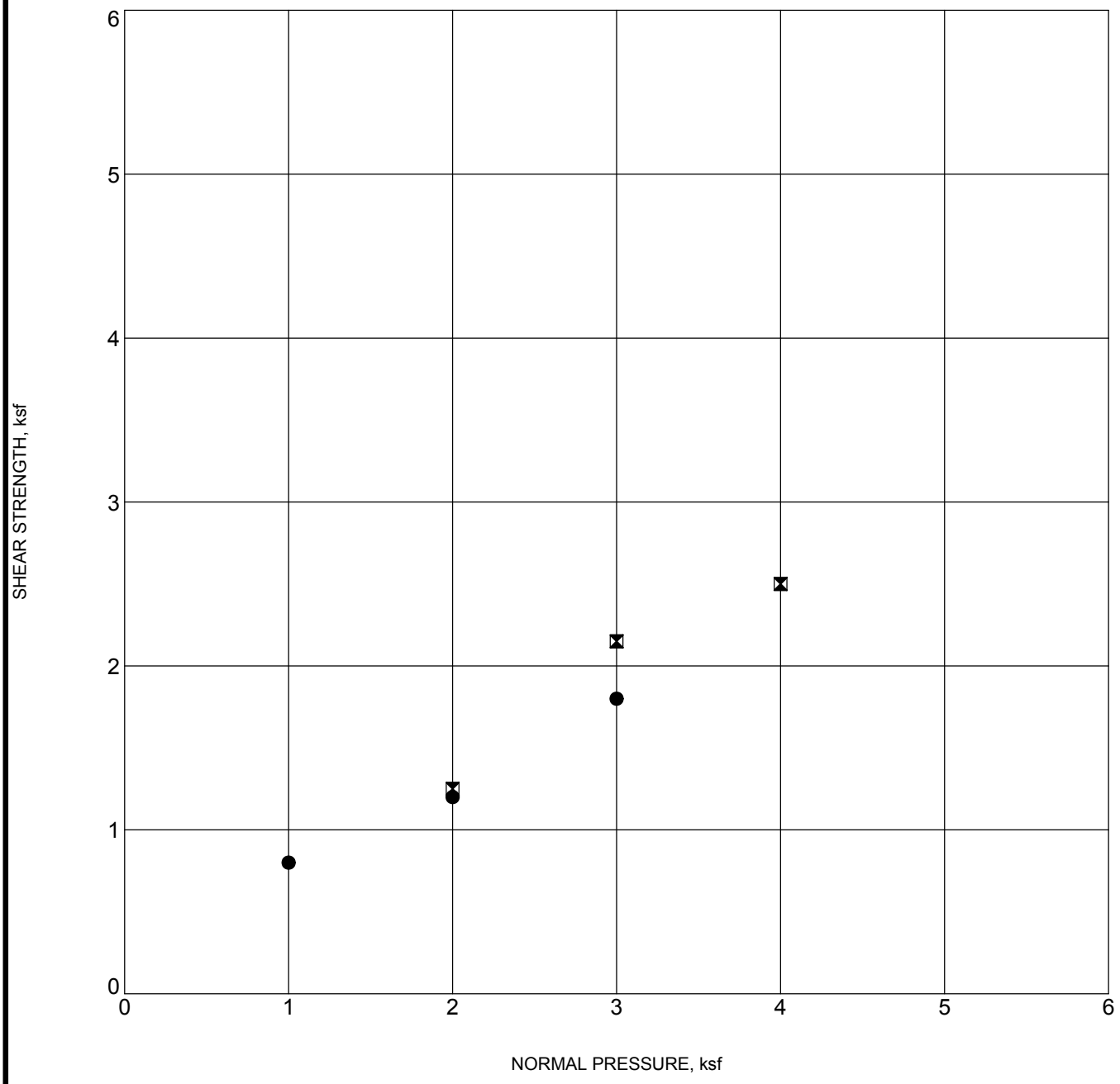


SAUGUS FORMATION (QTs)

R.T. FRANKIAN & ASSOCIATES

2002-036-004 REPORT DATED 8-12-2011

FOR USE WITH RTF&A 2002-036-004 REPORT DATED 1-27-2012



Specimen Identification		Classification				
●	**B-1-11 11.0'**					
⊠	**B-1-11 45.0'**					

R. T. Frankian & Associates
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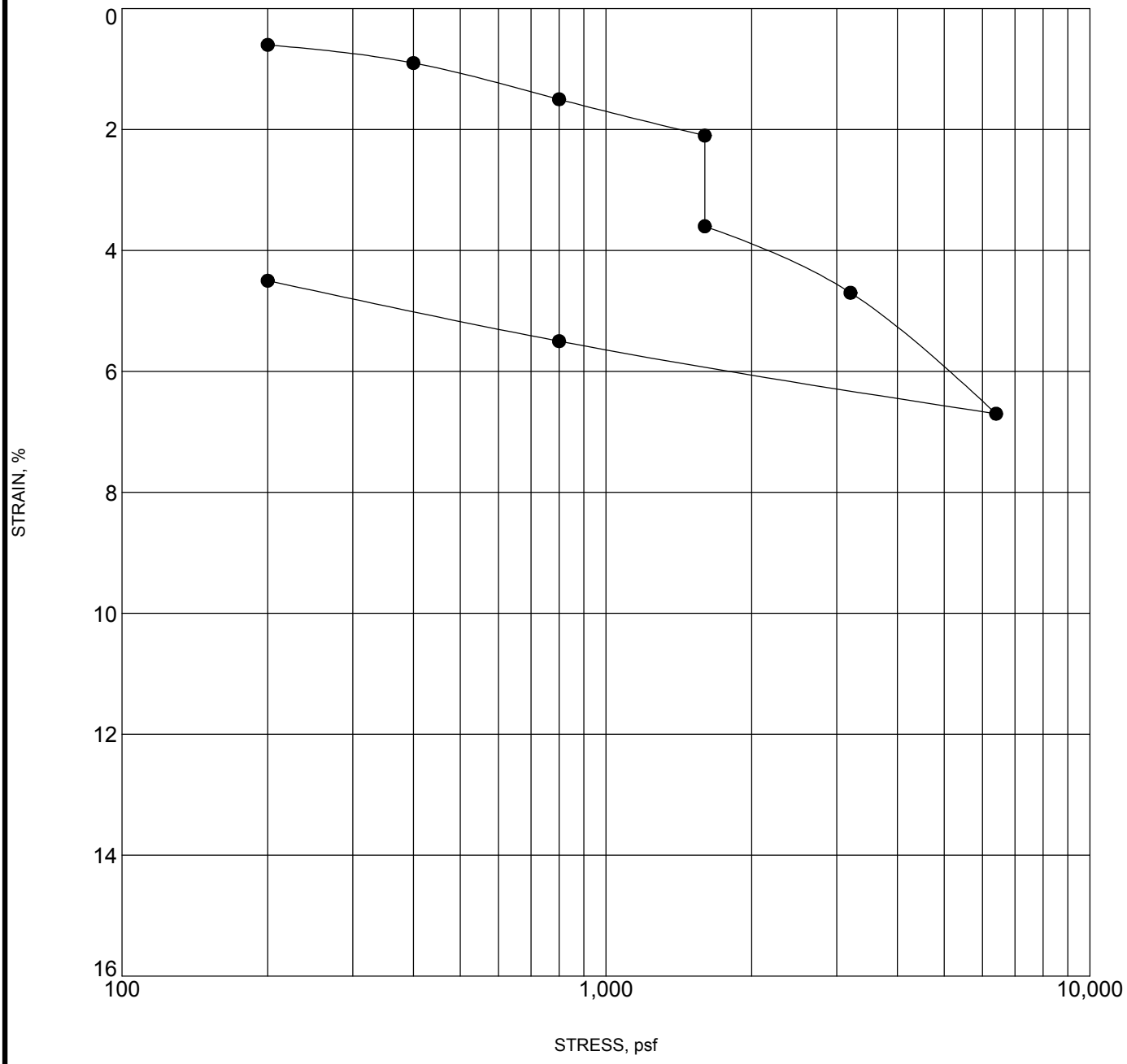
Burbank, Ca 91504
Telephone: (818) 531-1501
Fax: (818) 531-1511

DIRECT SHEAR TEST

JOB NUMBER: 2002-036-006

REPORT DATED: 01-13-2012

FOR USE WITH RTF&A 2002-036-004 REPORT DATED 1-27-2012



Water added at 1600 psf

Specimen Identification		Classification		
●	**B-2-10 10.0'**			

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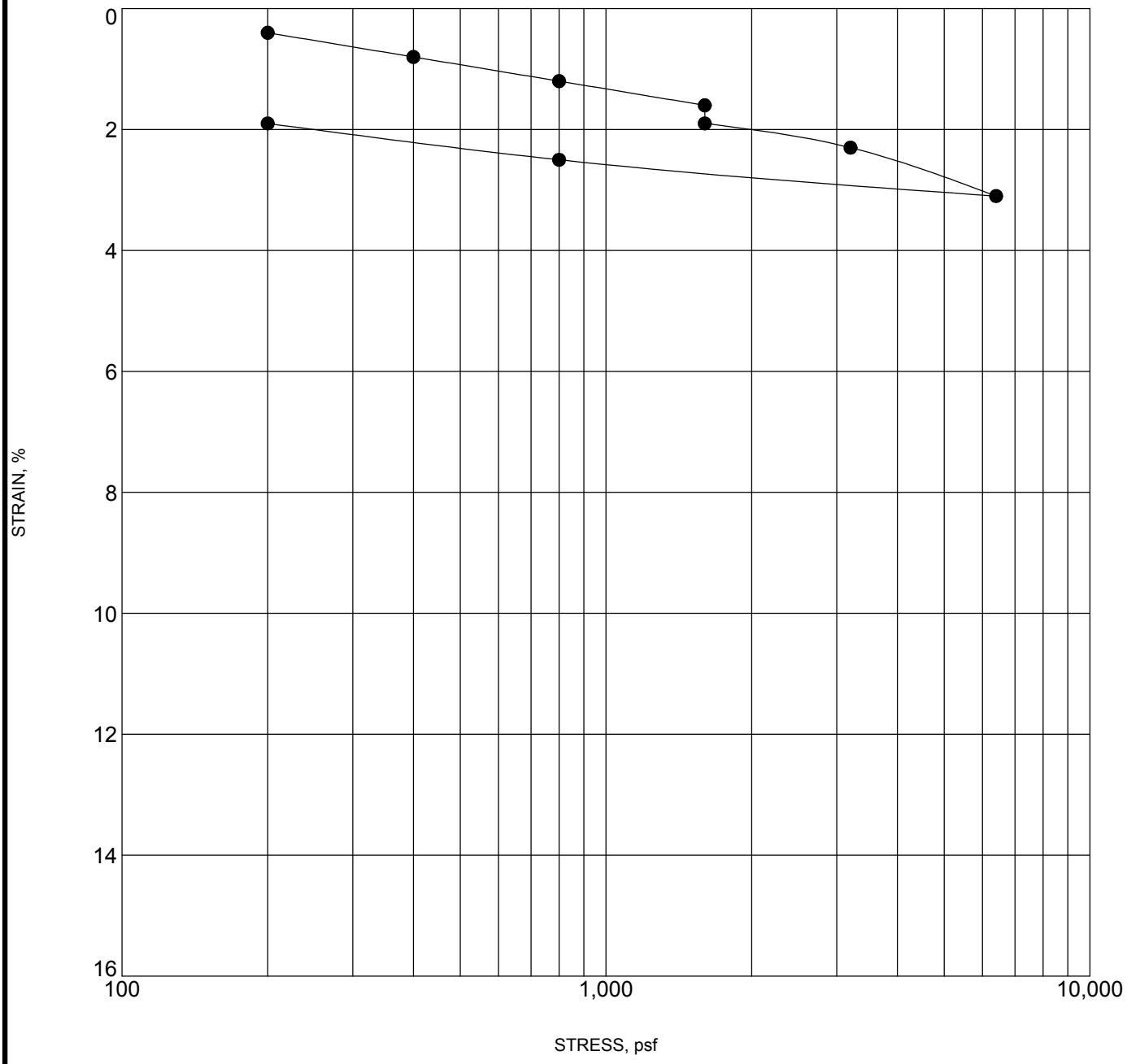
Burbank, Ca 91504
Telephone: (818) 531-1501
Fax: (818) 531-1511

CONSOLIDATION TEST

JOB NUMBER: 2002-036-004

REPORT DATED: 01-19-2011



Water added at 1600 psf

Specimen Identification		Classification		
●	**B-6-10 10.0'**			

R. T. Frankian & Associates
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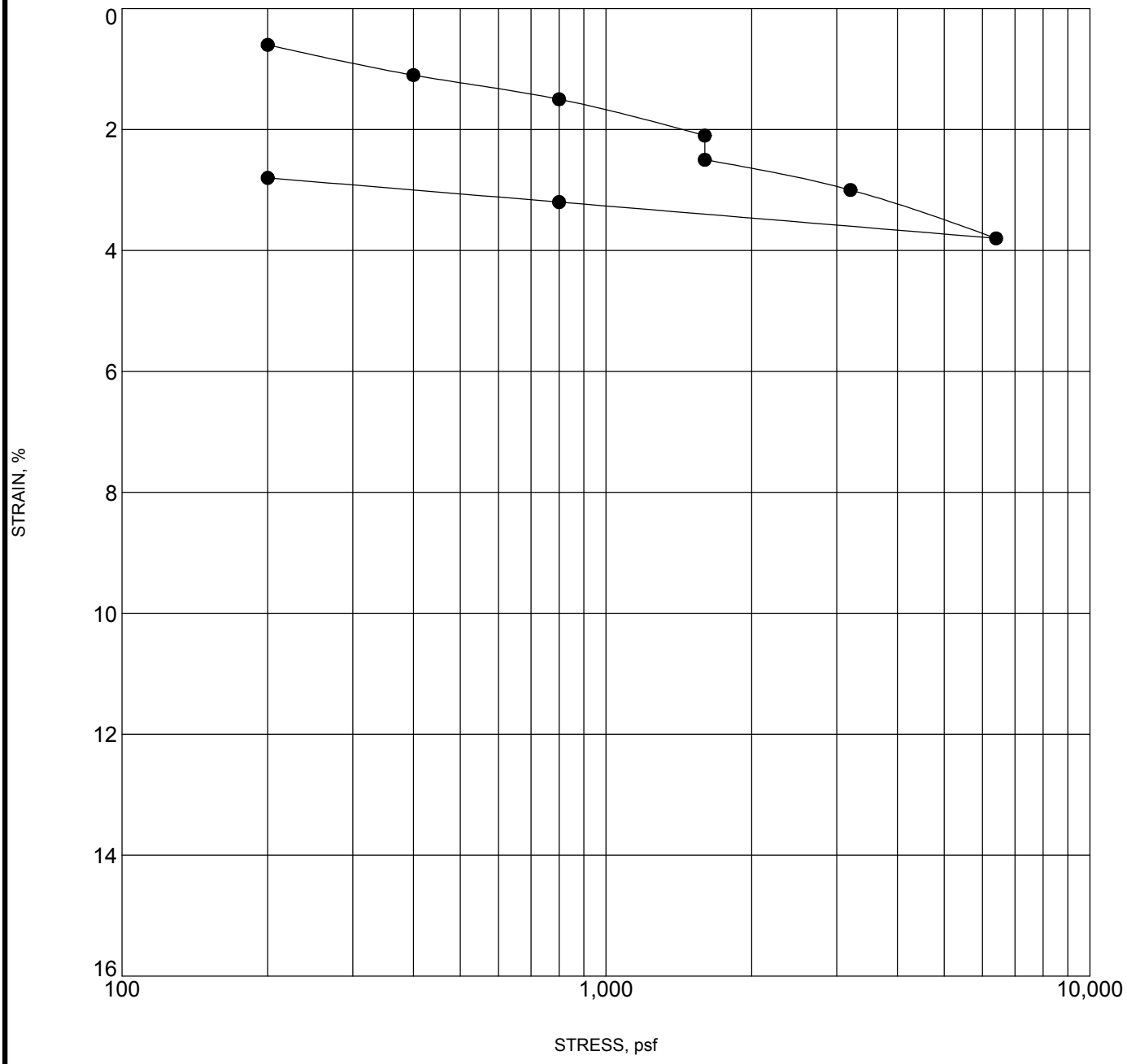
Telephone: (818) 531-1501
Fax: (818) 531-1511

CONSOLIDATION TEST

JOB NUMBER: 2002-036-004

REPORT DATED: 01-19-2011



Water added at 1600 psf

Specimen Identification		Classification		
●	**B-6-10 20.0'**			

R. T. Frankian & Associates
1329 Scott Road
Burbank, Ca 91504
Telephone: (818) 531-1501
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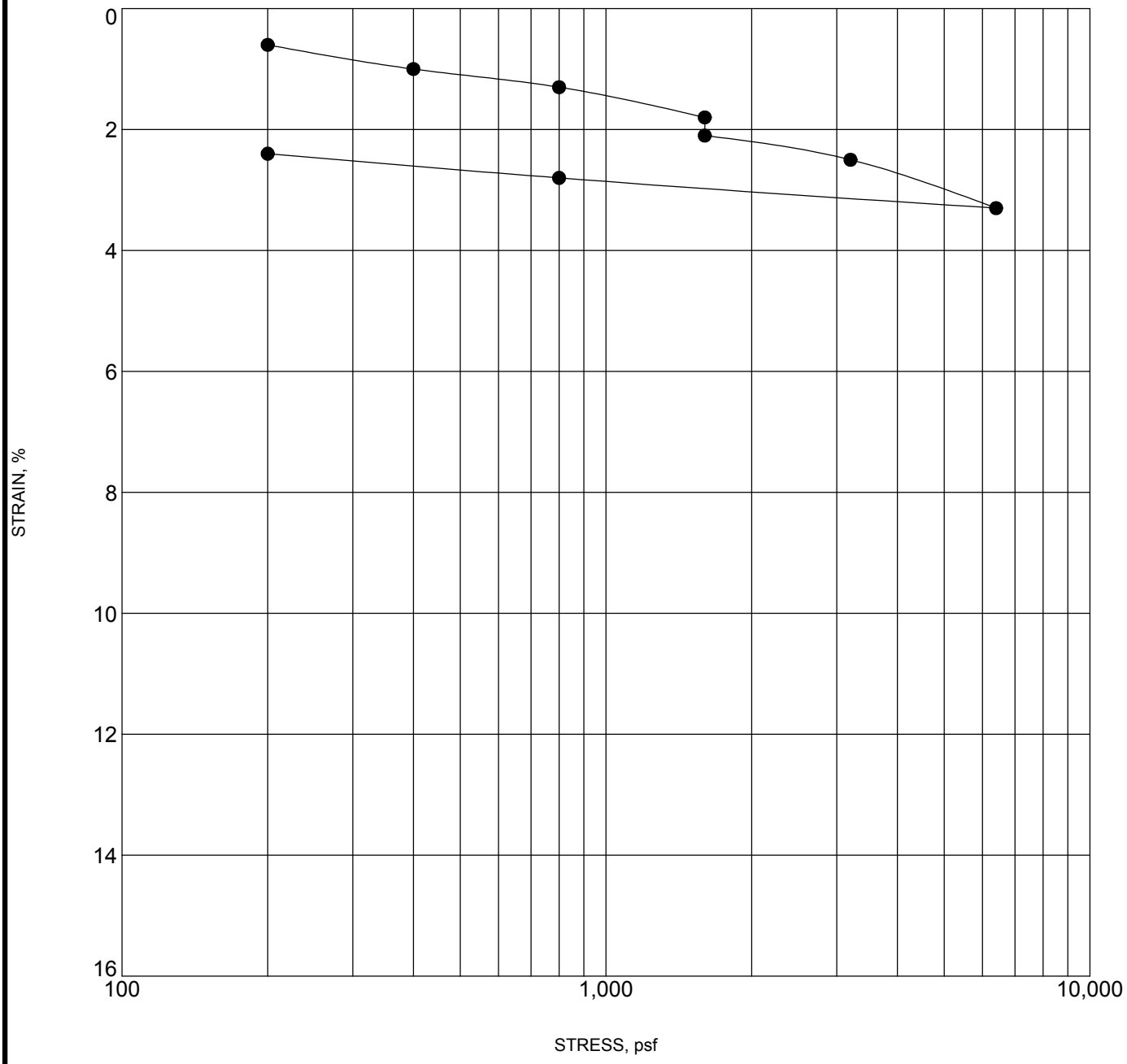
CONSOLIDATION TEST

JOB NUMBER: 2002-036-004

REPORT DATED: 01-19-2011



Water added at 1600 psf

Specimen Identification		Classification		
●	**B-6-10 30.0'**			

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Telephone: (818) 531-1501
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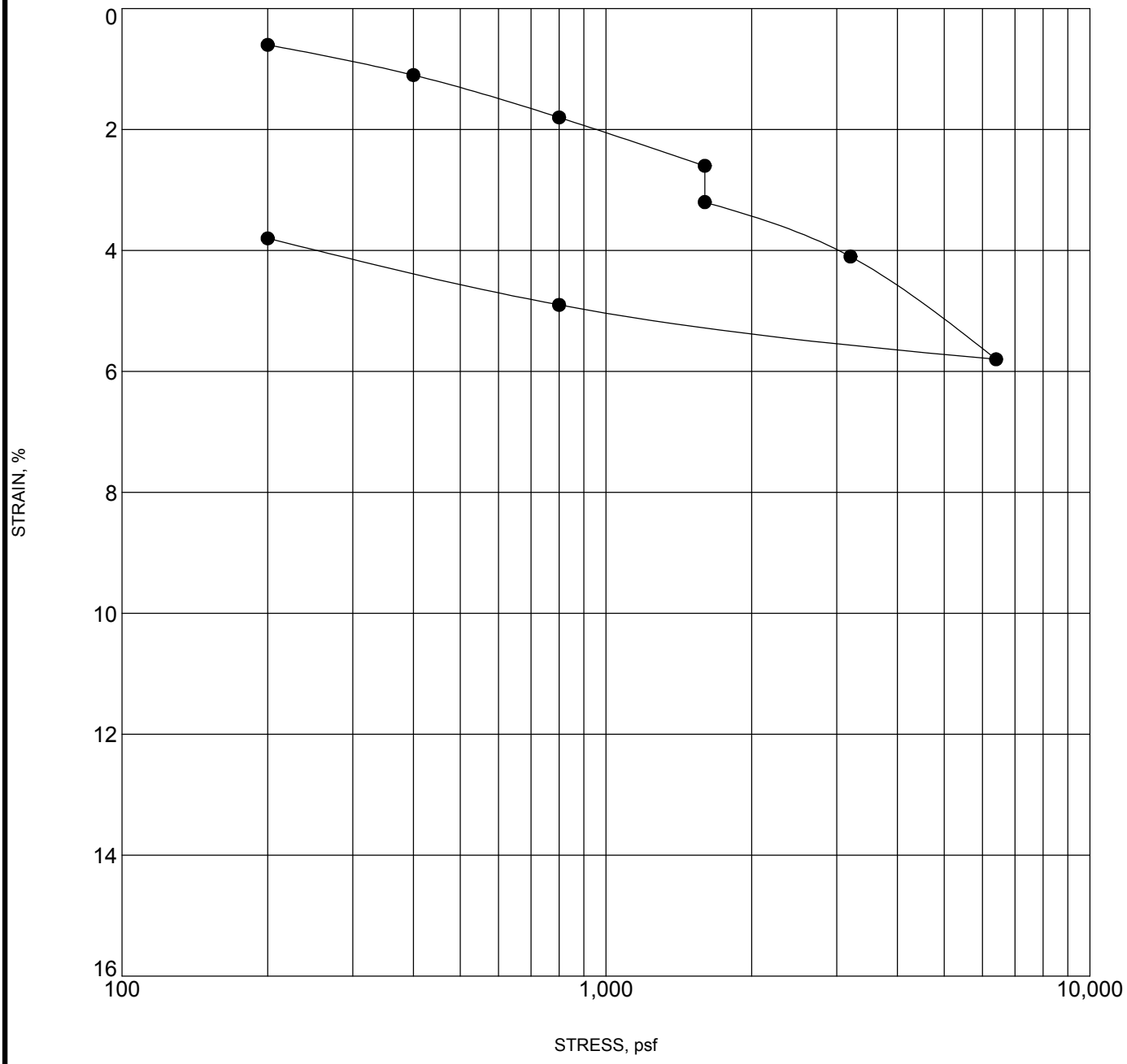
CONSOLIDATION TEST

JOB NUMBER: 2002-036-004

REPORT DATED: 01-19-2011



Water added at 1600 psf

Specimen Identification		Classification		
●	**HS-1-10 5.0'**			

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1329 Scott Road
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Telephone: (818) 531-1501
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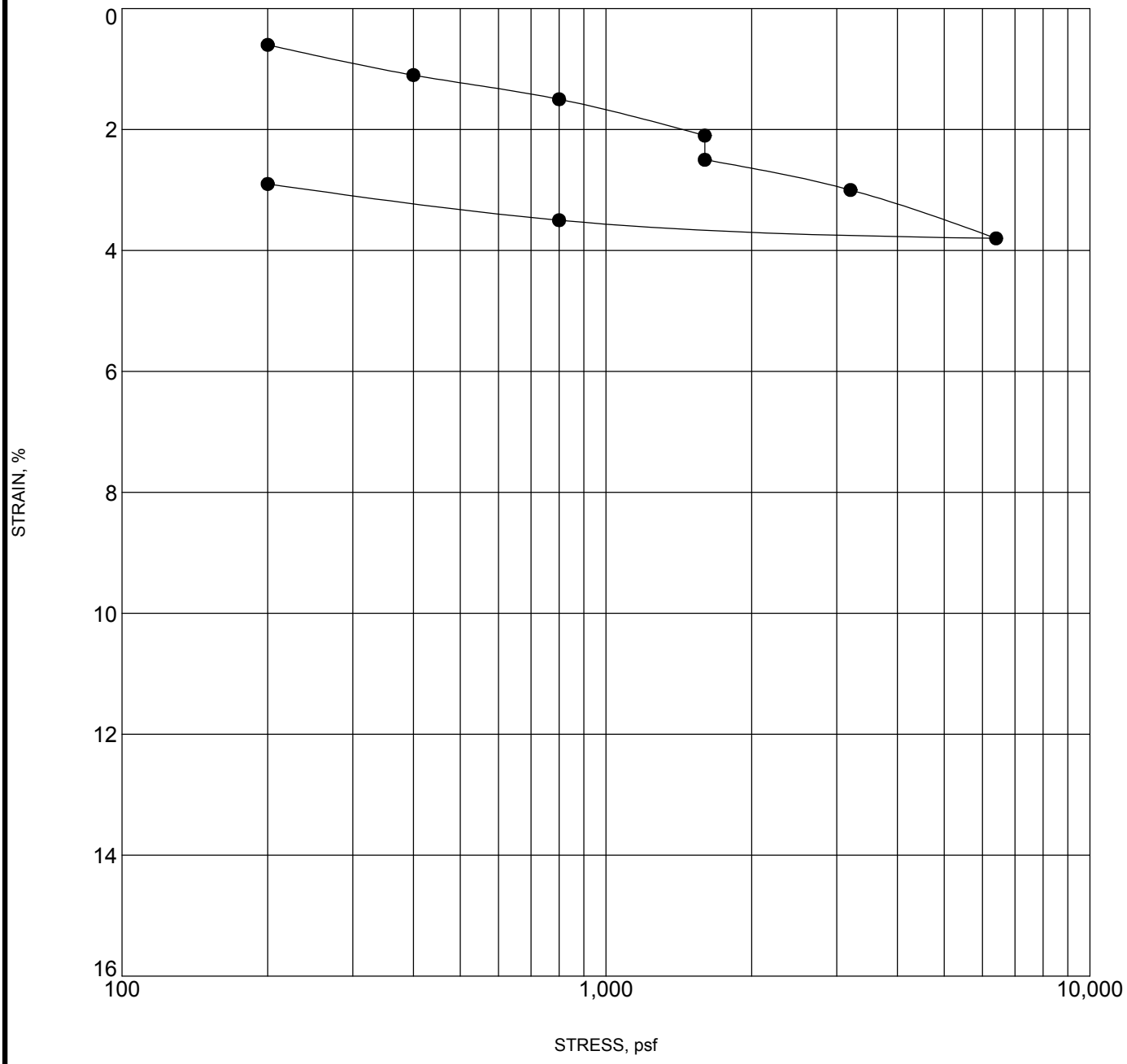
CONSOLIDATION TEST

JOB NUMBER: 2002-036-004

REPORT DATED: 01-19-2011



Water added at 1600 psf

Specimen Identification		Classification		
●	**HS-1-10 15.0'**			

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1329 Scott Road
Burbank, Ca 91504
Telephone: (818) 531-1501
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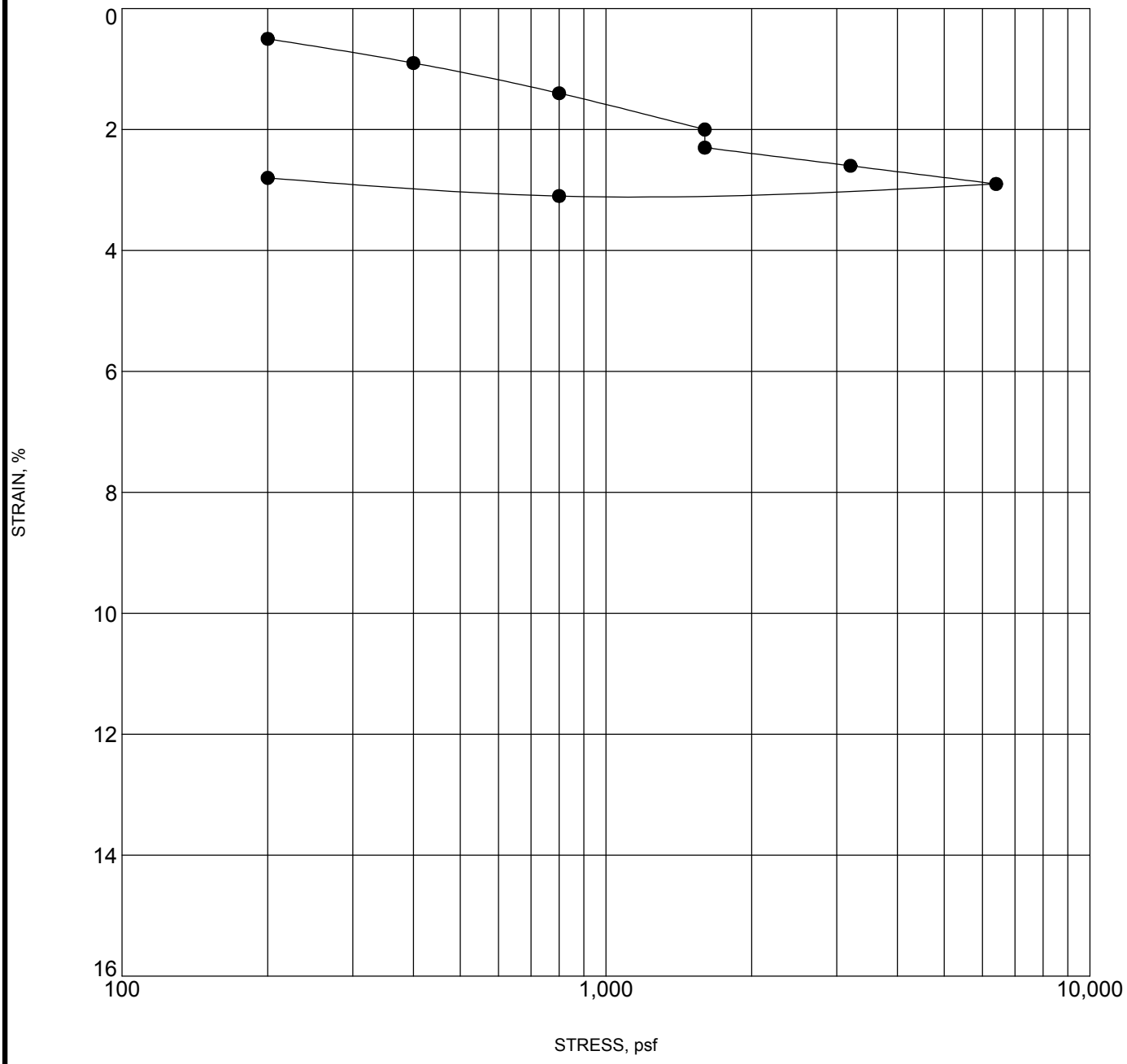
CONSOLIDATION TEST

JOB NUMBER: 2002-036-004

REPORT DATED: 01-19-2011



Water added at 1600 psf

Specimen Identification		Classification		
●	**HS-1-10 25.0'**			

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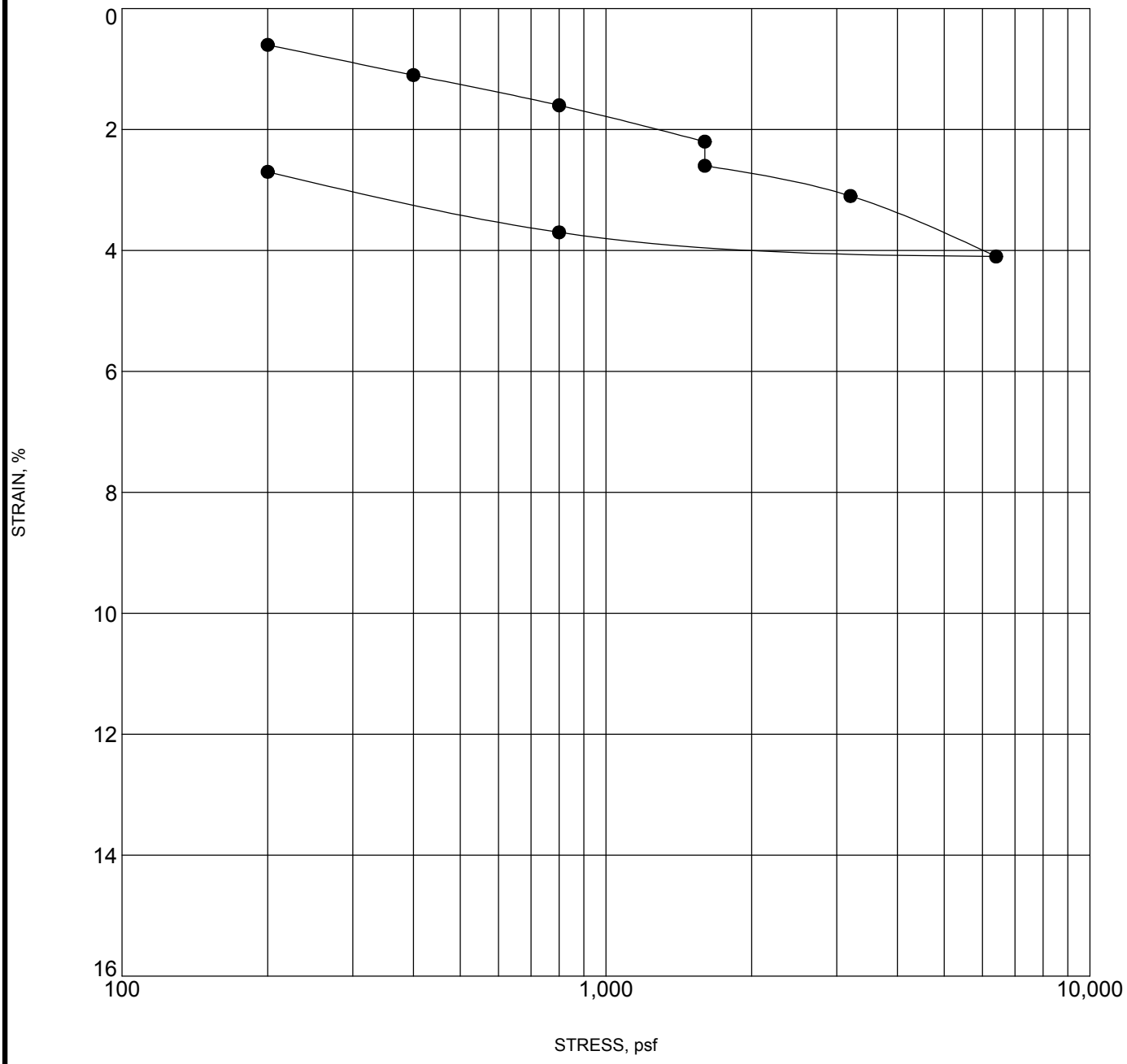
1329 Scott Road
Burbank, Ca 91504
Telephone: (818) 531-1501
Fax: (818) 531-1511

CONSOLIDATION TEST

JOB NUMBER: 2002-036-004

REPORT DATED: 01-19-2011



Water added at 1600 psf

Specimen Identification		Classification		
●	**HS-1-10 35.0'**			

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Telephone: (818) 531-1501
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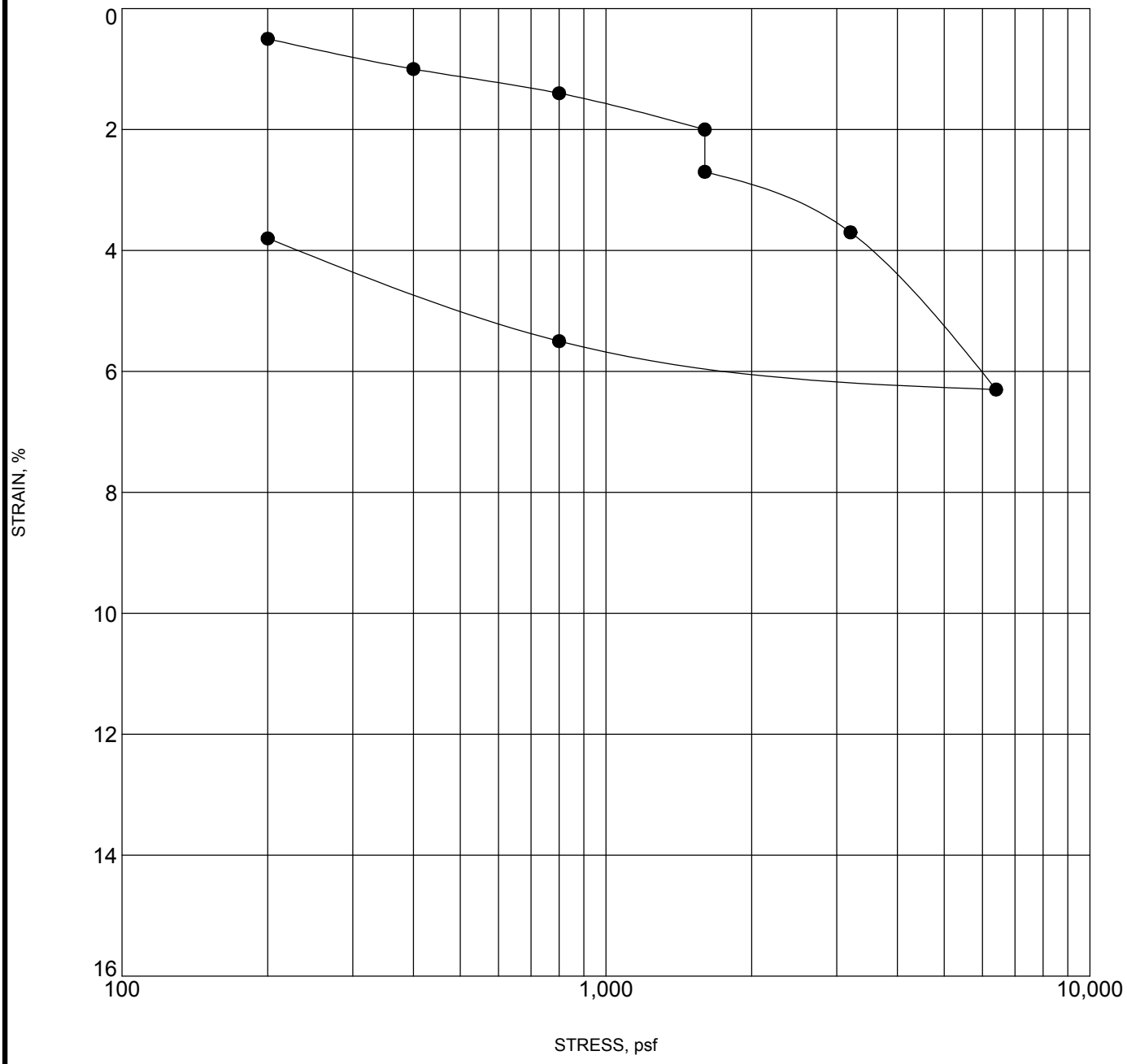
CONSOLIDATION TEST

JOB NUMBER: 2002-036-004

REPORT DATED: 01-19-2011



Water added at 1600 psf

Specimen Identification		Classification		
●	**HS-2-10 5.0'**			

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1329 Scott Road
Burbank, Ca 91504
Telephone: (818) 531-1501
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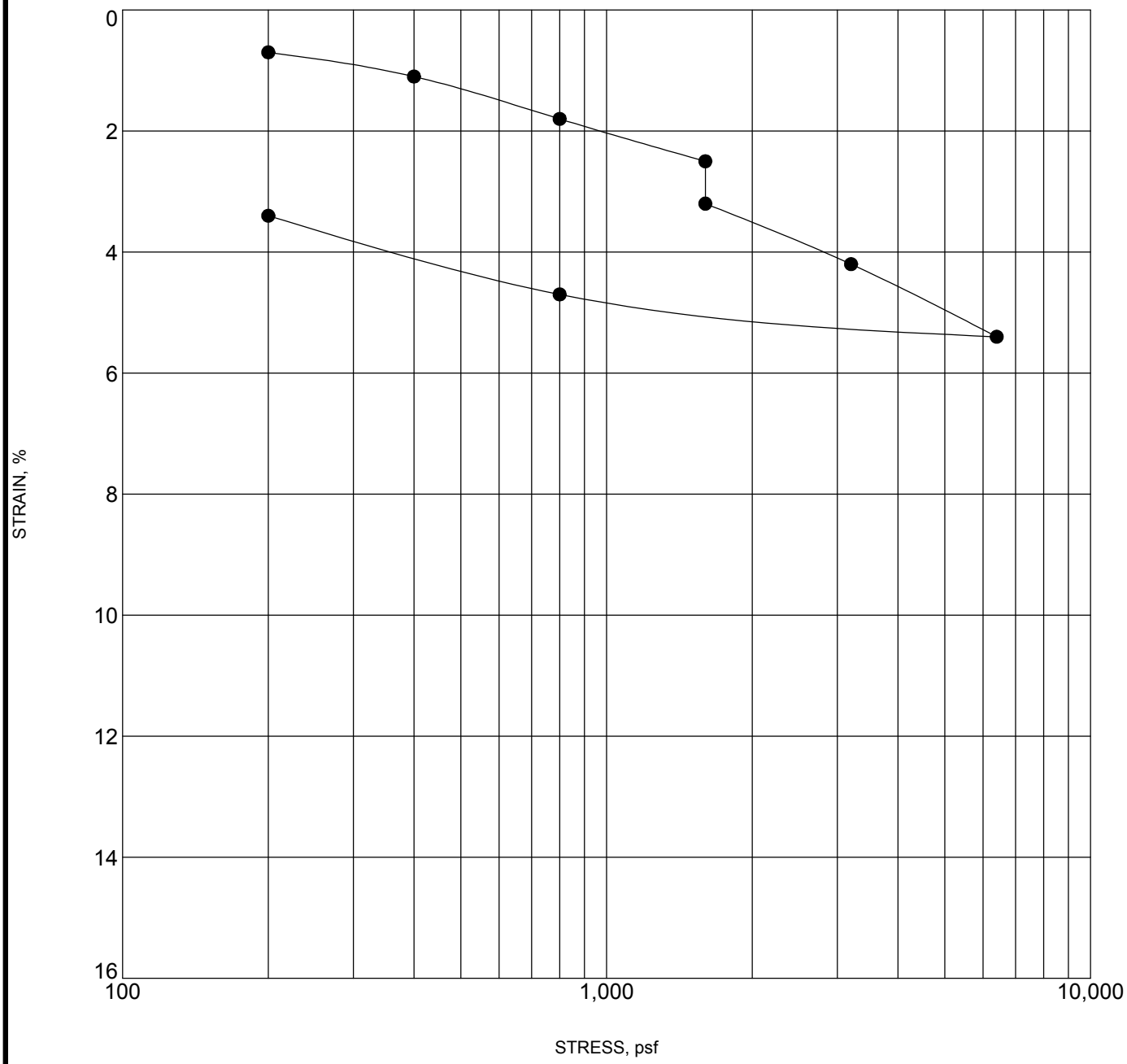
CONSOLIDATION TEST

JOB NUMBER: 2002-036-004

REPORT DATED: 01-19-2011



Water added at 1600 psf

Specimen Identification		Classification		
●	**B-2-11 5.0'**			

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1329 Scott Road
Burbank, Ca 91504
Telephone: (818) 531-1501
Fax: (818) 531-1511

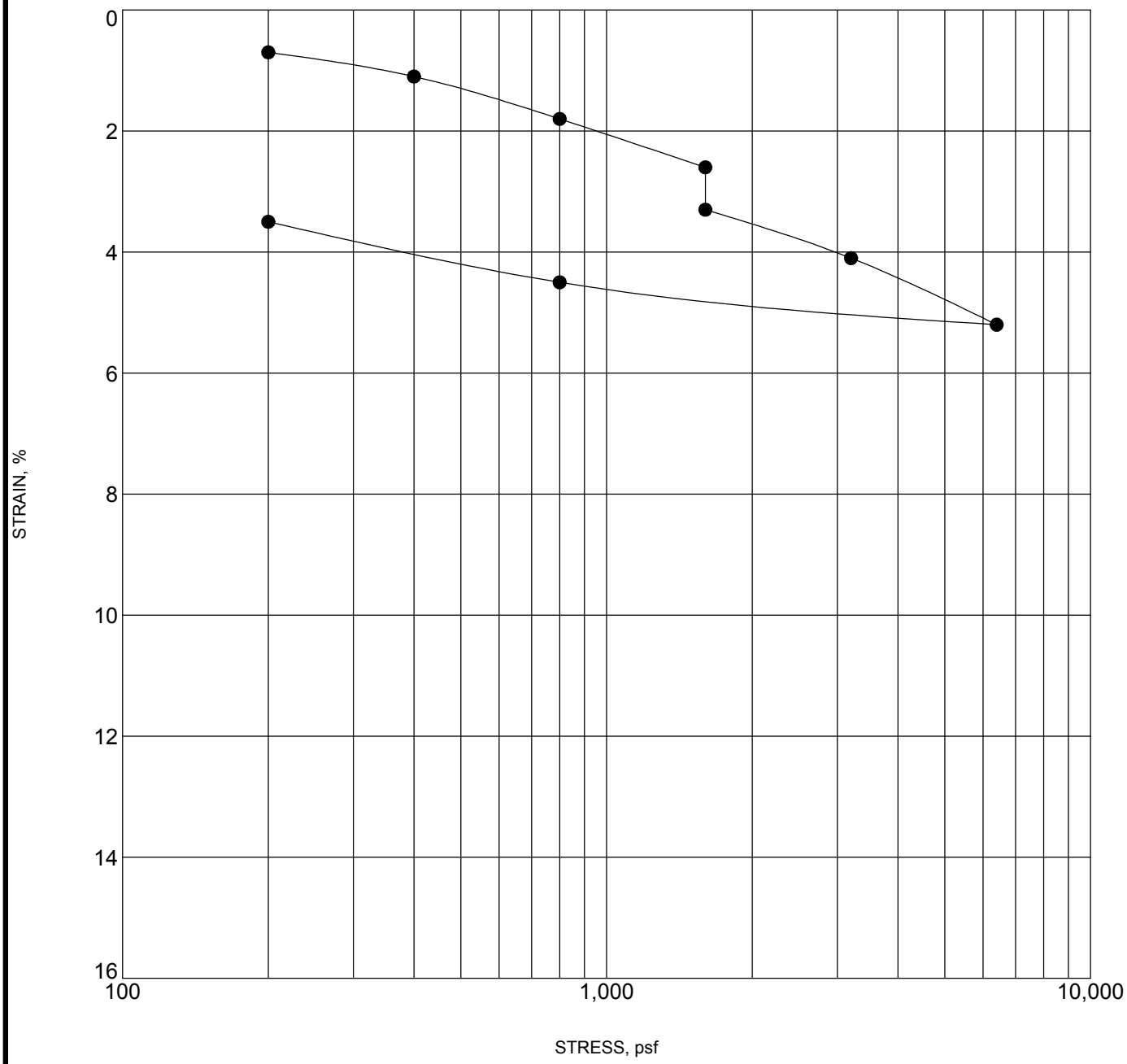
CONSOLIDATION TEST

JOB NUMBER: 2002-036-006

REPORT DATED: 01-13-2012

US CONSOL STRAIN 2002-036-006.GPJ FRANKIAN.GDT 1/11/12

FOR USE WITH RTF&A 2002-036-004 REPORT DATED 1-27-2012



Water added at 1600 psf

Specimen Identification		Classification		
●	**B-2-11 10.5'**			

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Burbank, Ca 91504
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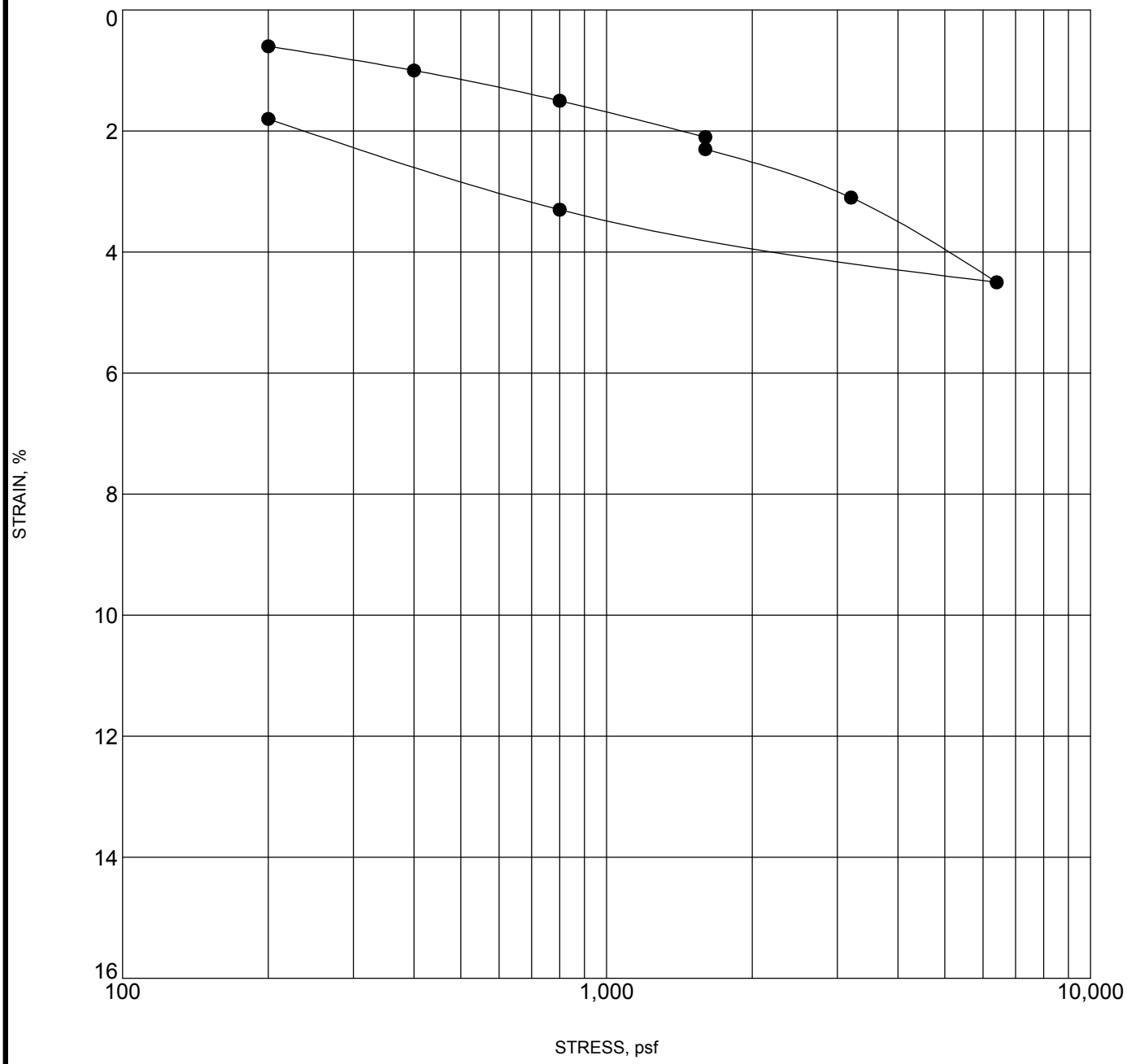
CONSOLIDATION TEST

JOB NUMBER: 2002-036-006

REPORT DATED: 01-13-2012

US CONSOL STRAIN 2002-036-006.GPJ FRANKIAN.GDT 1/11/12

FOR USE WITH RTF&A 2002-036-004 REPORT DATED 1-27-2012



Water added at 1600 psf

Specimen Identification		Classification		
●	**B-3-11 5.0'**			

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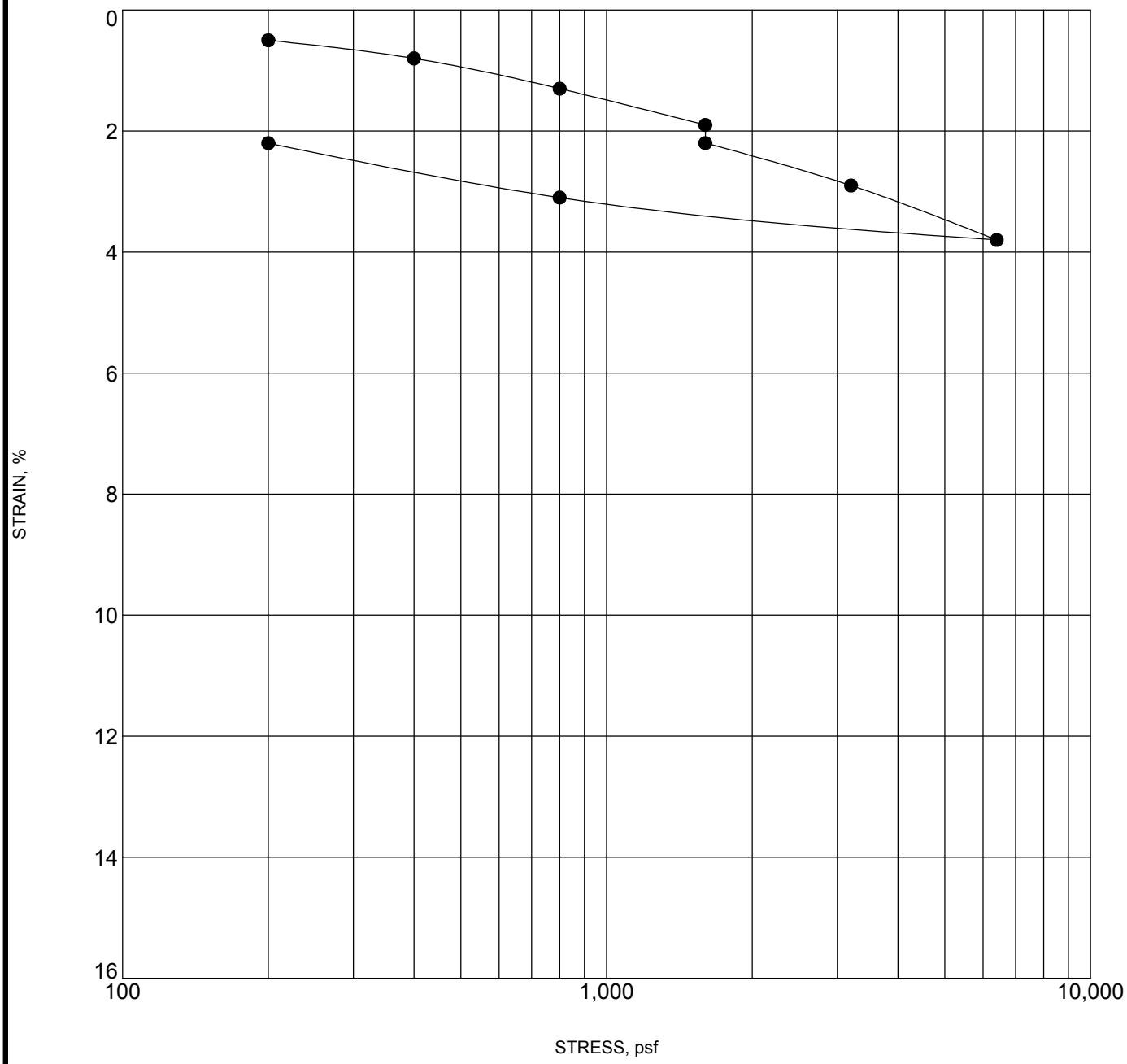
CONSOLIDATION TEST

JOB NUMBER: 2002-036-006

REPORT DATED: 01-13-2012



Water added at 1600 psf

Specimen Identification		Classification		
●	**B-3-11 8.0'**			

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Telephone: (818) 531-1501
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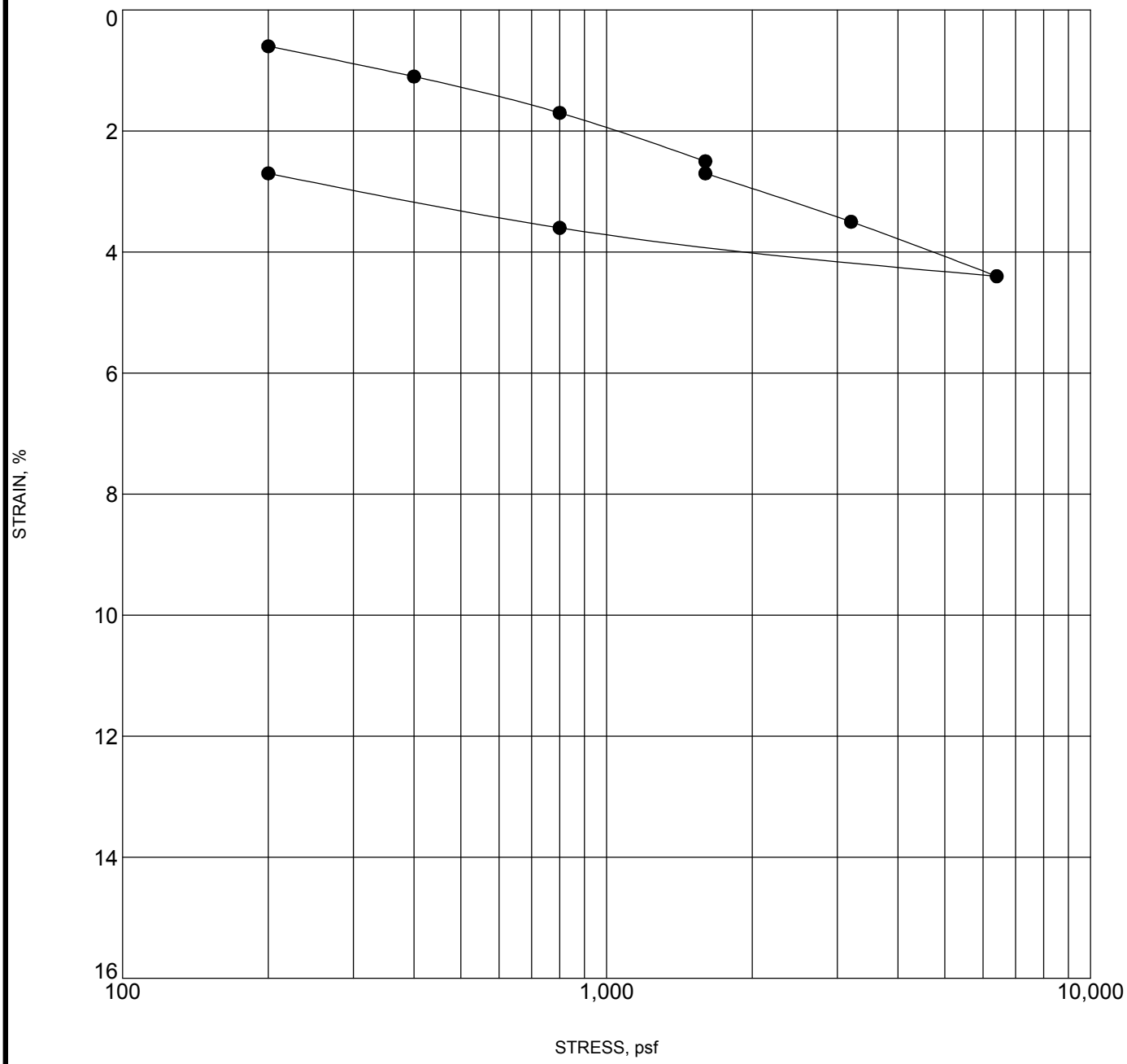
CONSOLIDATION TEST

JOB NUMBER: 2002-036-006

REPORT DATED: 01-13-2012



Water added at 1600 psf

Specimen Identification		Classification		
●	**B-3-11 10.0'**			

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1329 Scott Road
Burbank, Ca 91504
Telephone: (818) 531-1501
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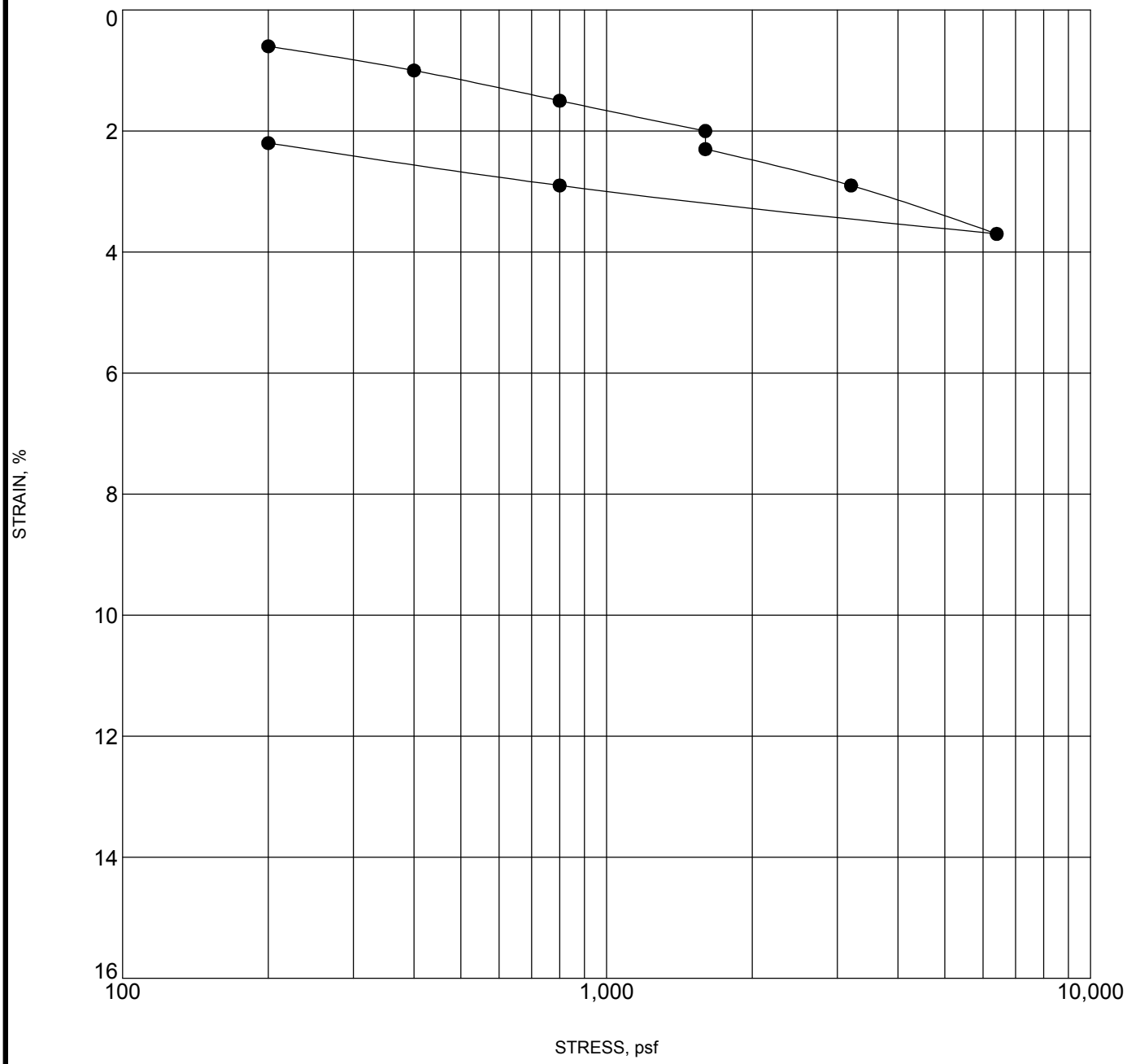
CONSOLIDATION TEST

JOB NUMBER: 2002-036-006

REPORT DATED: 01-13-2012



Water added at 1600 psf

Specimen Identification		Classification		
●	**B-3-11 15.0'**			

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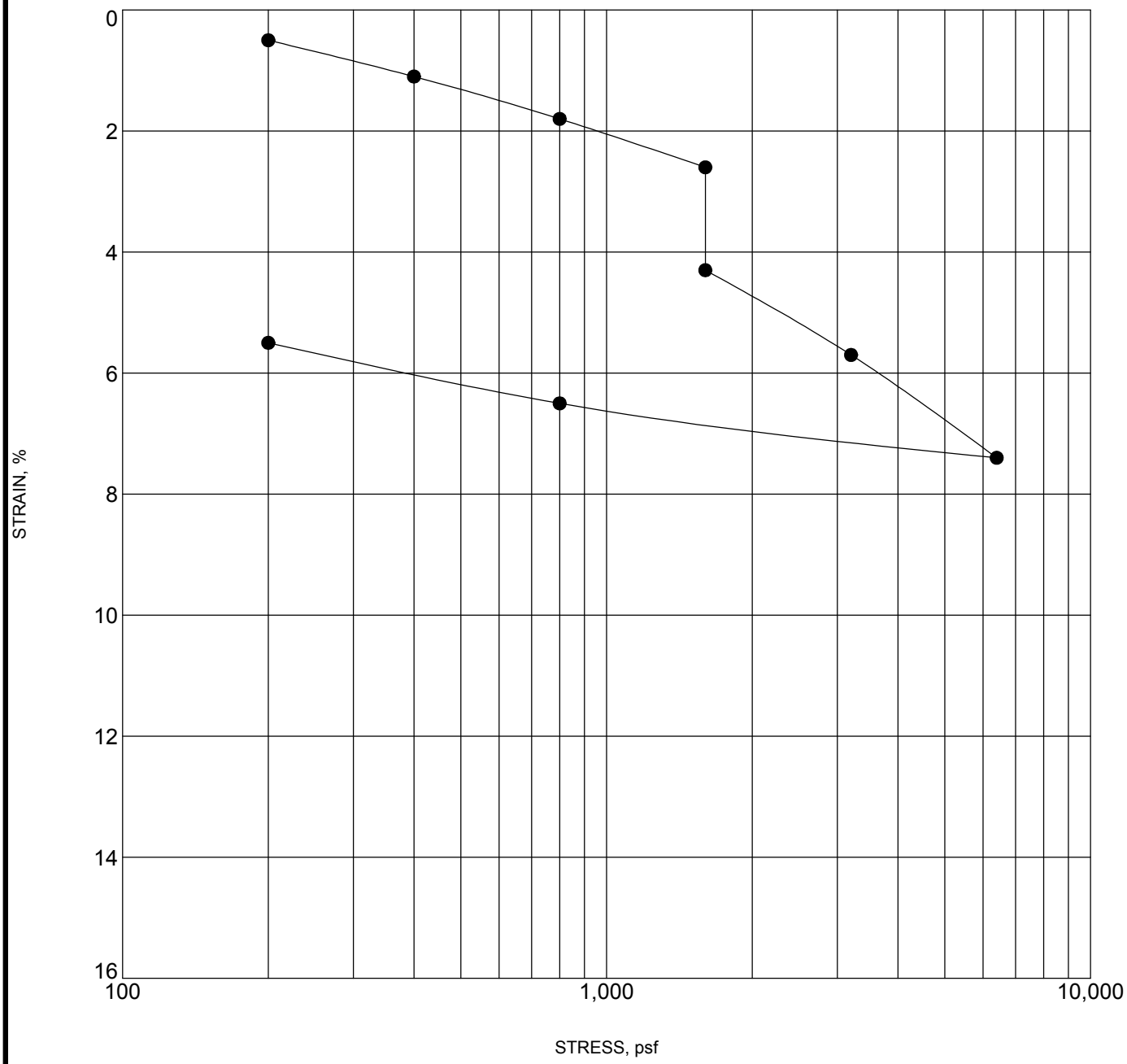
CONSOLIDATION TEST

JOB NUMBER: 2002-036-006

REPORT DATED: 01-13-2012

US CONSOL STRAIN 2002-036-006.GPJ FRANKIAN.GDT 1/11/12

FOR USE WITH RTF&A 2002-036-004 REPORT DATED 1-27-2012



Water added at 1600 psf

Specimen Identification		Classification		
●	**B-4-11 5.0'**			

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1329 Scott Road
Burbank, Ca 91504
Telephone: (818) 531-1501
Fax: (818) 531-1511

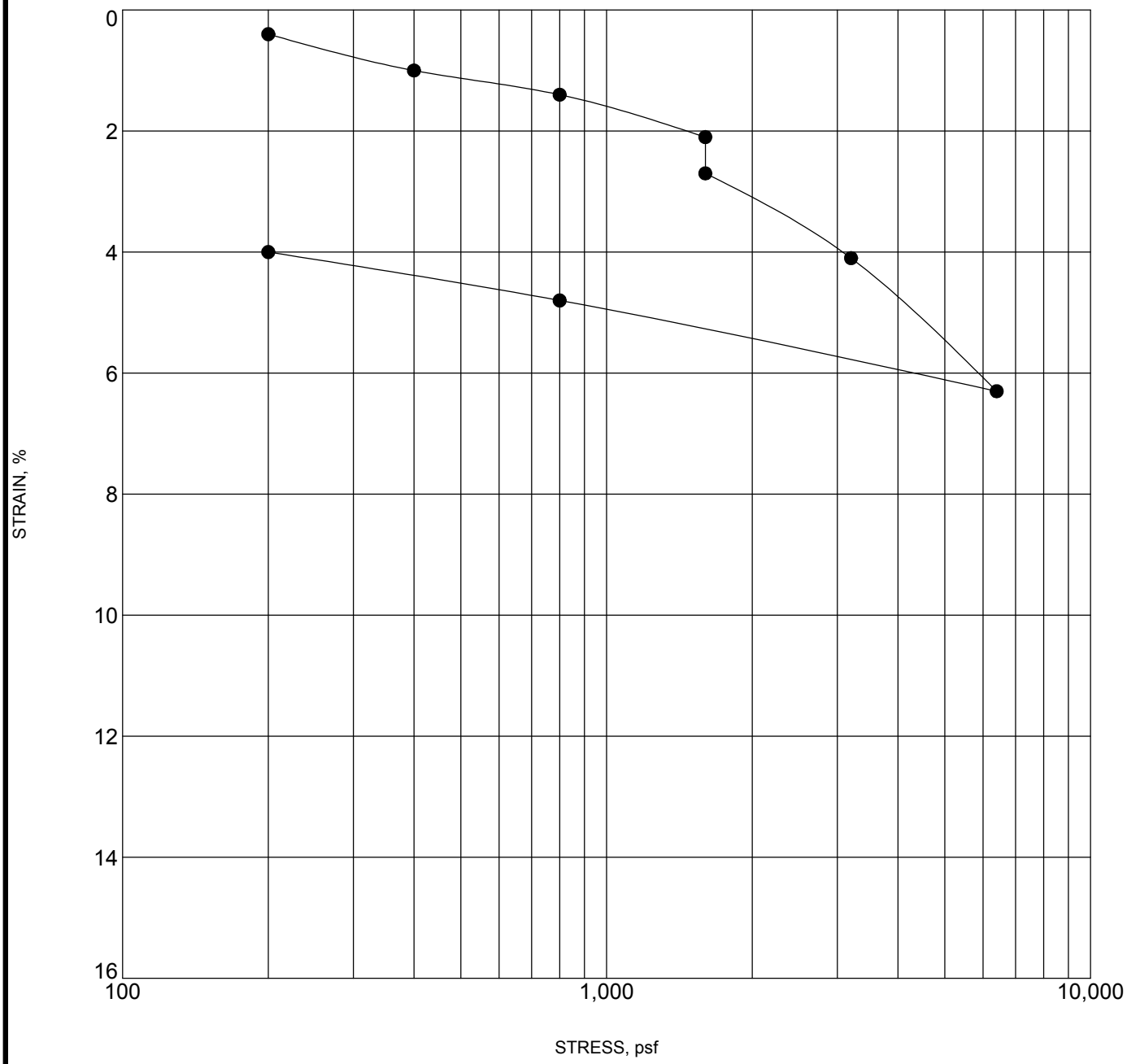
CONSOLIDATION TEST

JOB NUMBER: 2002-036-006

REPORT DATED: 01-13-2012

US CONSOL STRAIN 2002-036-006.GPJ FRANKIAN.GDT 1/11/12

FOR USE WITH RTF&A 2002-036-004 REPORT DATED 1-27-2012



Water added at 1600 psf

Specimen Identification		Classification		
●	**B-4-11 9.0'**			

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Burbank, Ca 91504
Telephone: (818) 531-1501
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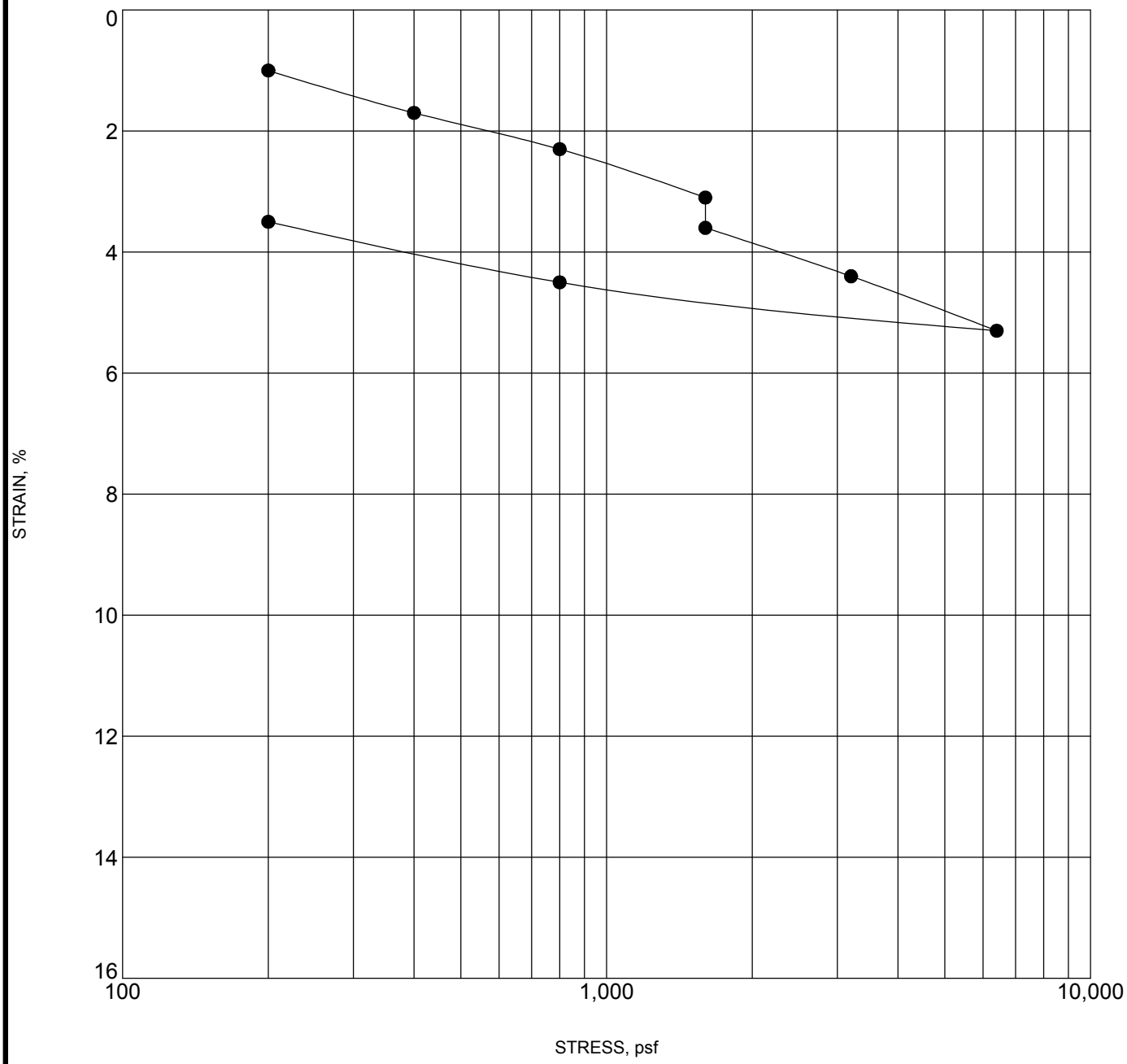
CONSOLIDATION TEST

JOB NUMBER: 2002-036-006

REPORT DATED: 01-13-2012

US CONSOL STRAIN 2002-036-006.GPJ FRANKIAN.GDT 1/11/12

FOR USE WITH RTF&A 2002-036-004 REPORT DATED 1-27-2012



Water added at 1600 psf

Specimen Identification		Classification		
●	**B-4-11 12.5'**			

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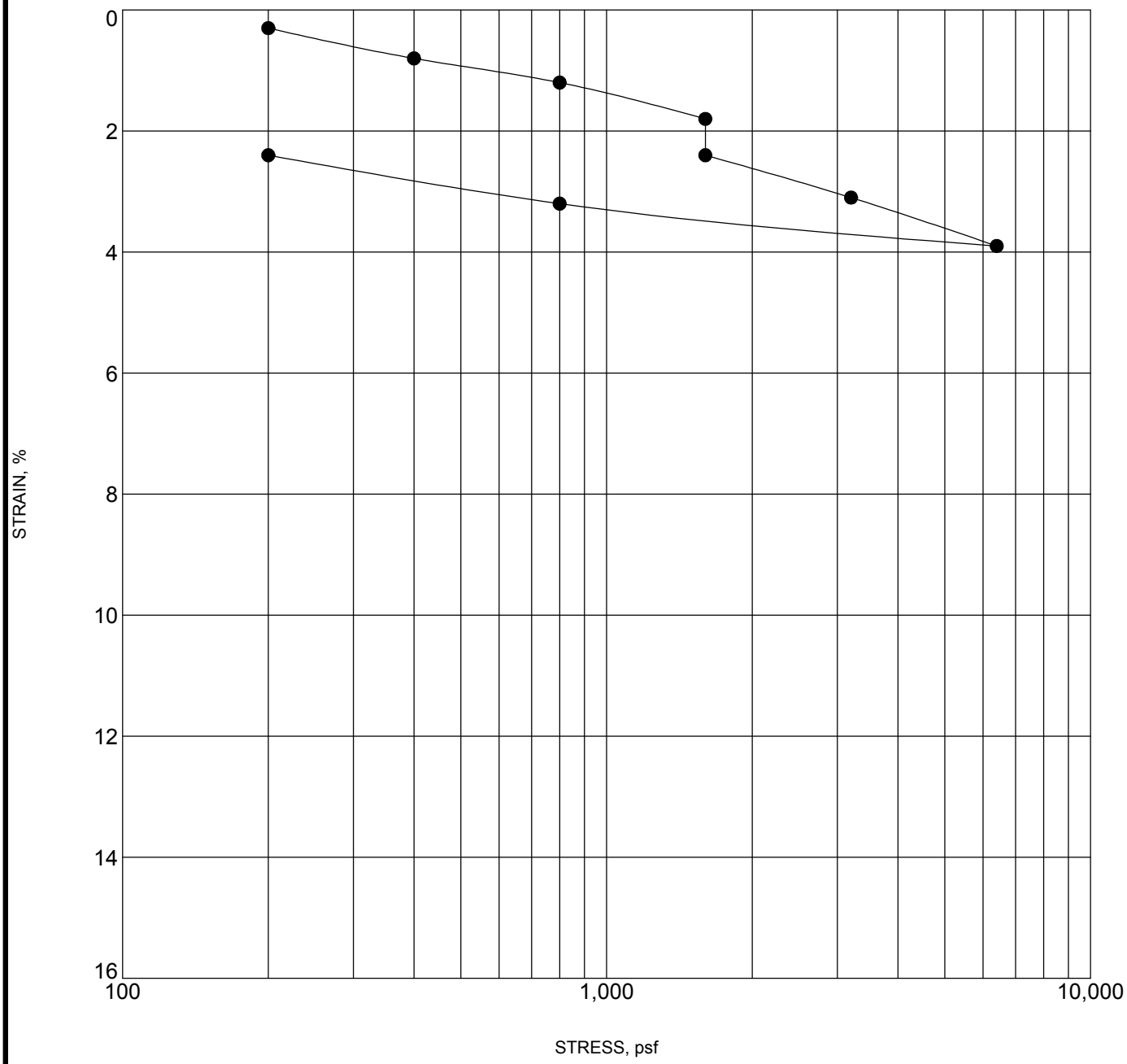
Fax: (818) 531-1511

CONSOLIDATION TEST

JOB NUMBER: 2002-036-006

REPORT DATED: 01-13-2012

US CONSOL STRAIN 2002-036-006.GPJ FRANKIAN.GDT 1/11/12



Water added at 1600 psf

Specimen Identification		Classification		
●	**B-5-11 5.0'**			

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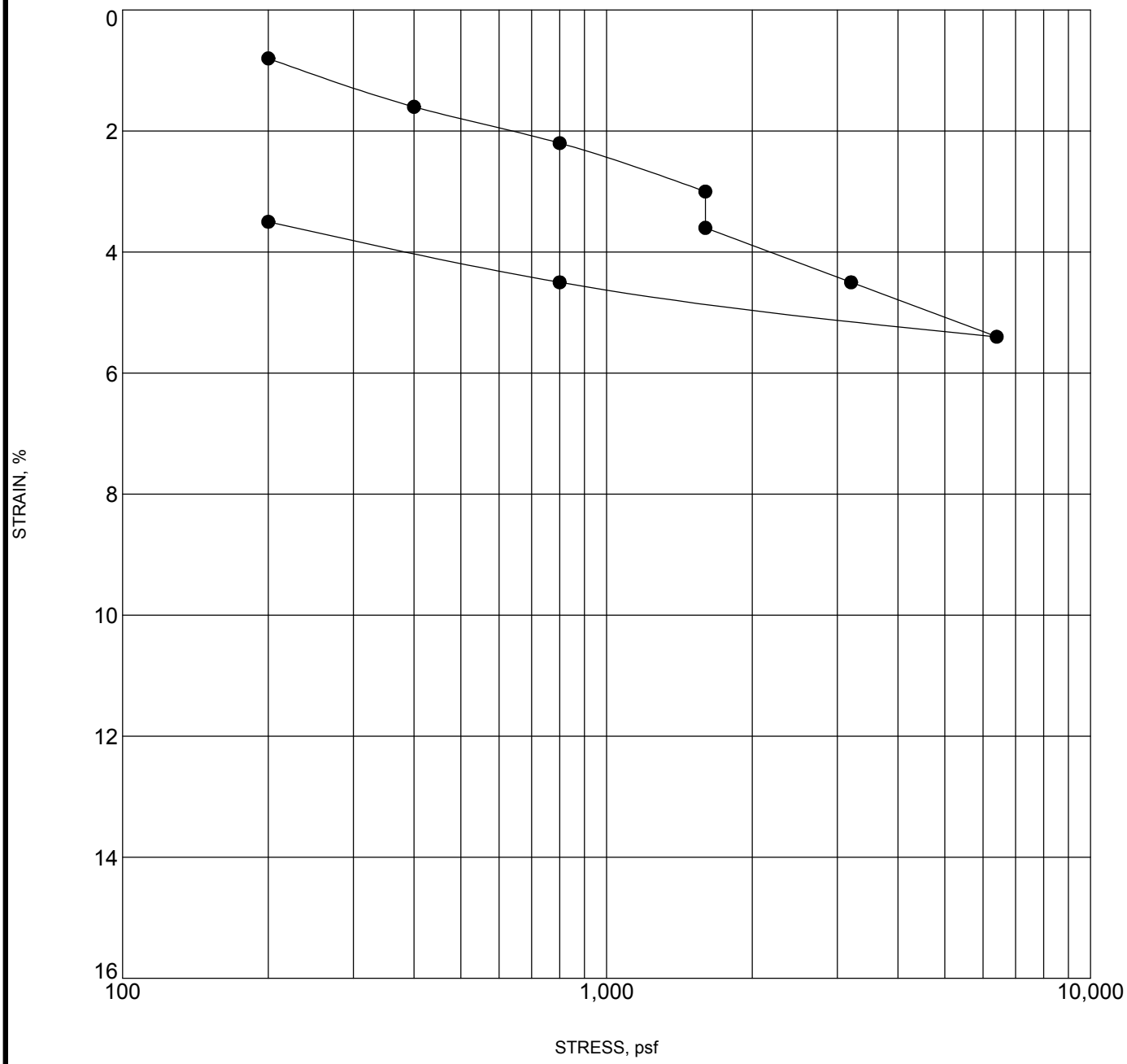
Telephone: (818) 531-1501
Fax: (818) 531-1511

CONSOLIDATION TEST

JOB NUMBER: 2002-036-006

REPORT DATED: 01-13-2012

US CONSOL STRAIN 2002-036-006.GPJ FRANKIAN.GDT 1/11/12



Water added at 1600 psf

Specimen Identification		Classification		
●	**B-5-11 9.0'**			

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Burbank, Ca 91504
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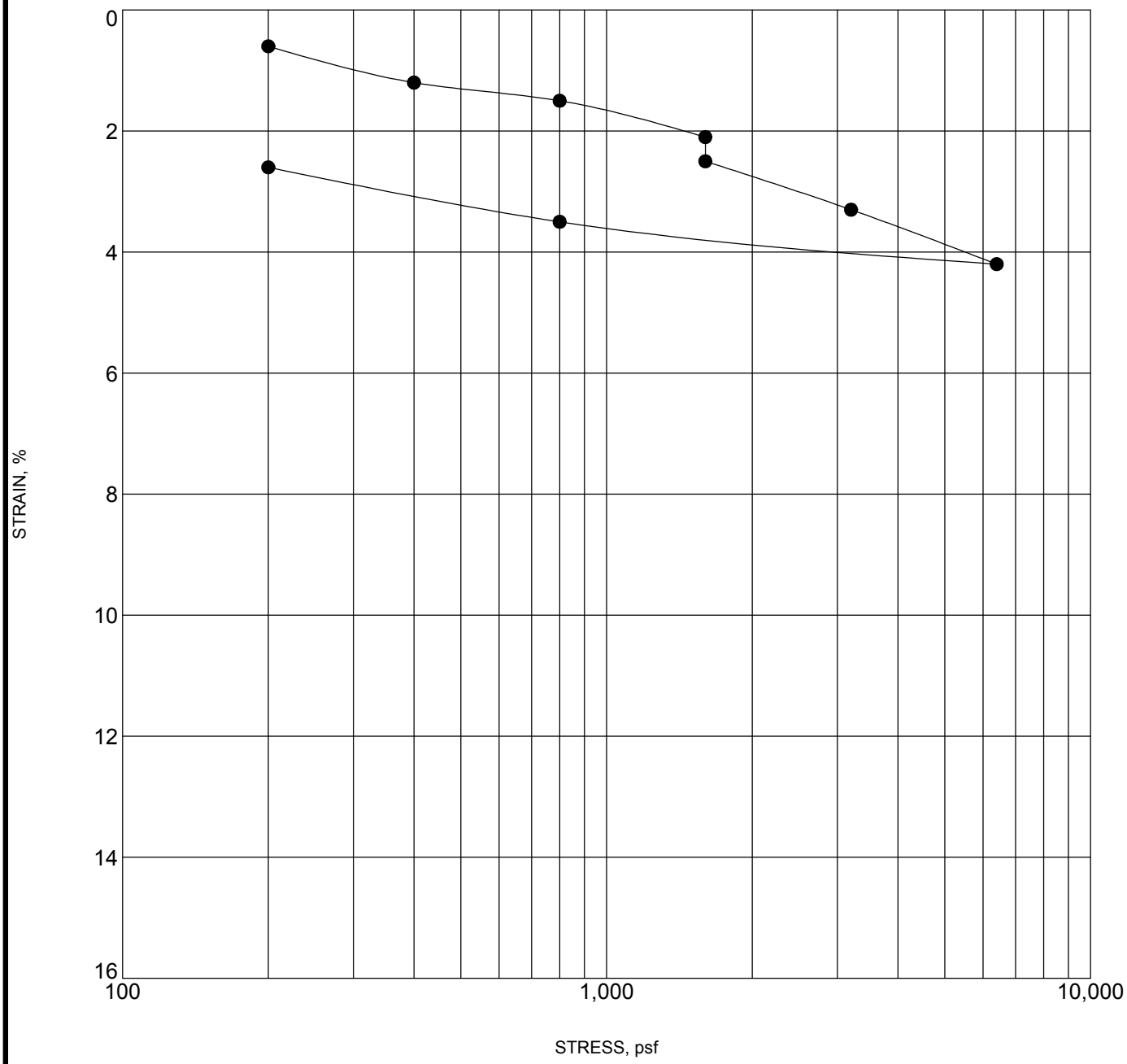
CONSOLIDATION TEST

JOB NUMBER: 2002-036-006

REPORT DATED: 01-13-2012

US CONSOL STRAIN 2002-036-006.GPJ FRANKIAN.GDT 1/11/12

FOR USE WITH RTF&A 2002-036-004 REPORT DATED 1-27-2012



Water added at 1600 psf

Specimen Identification		Classification		
●	**B-5-11 12.0'**			

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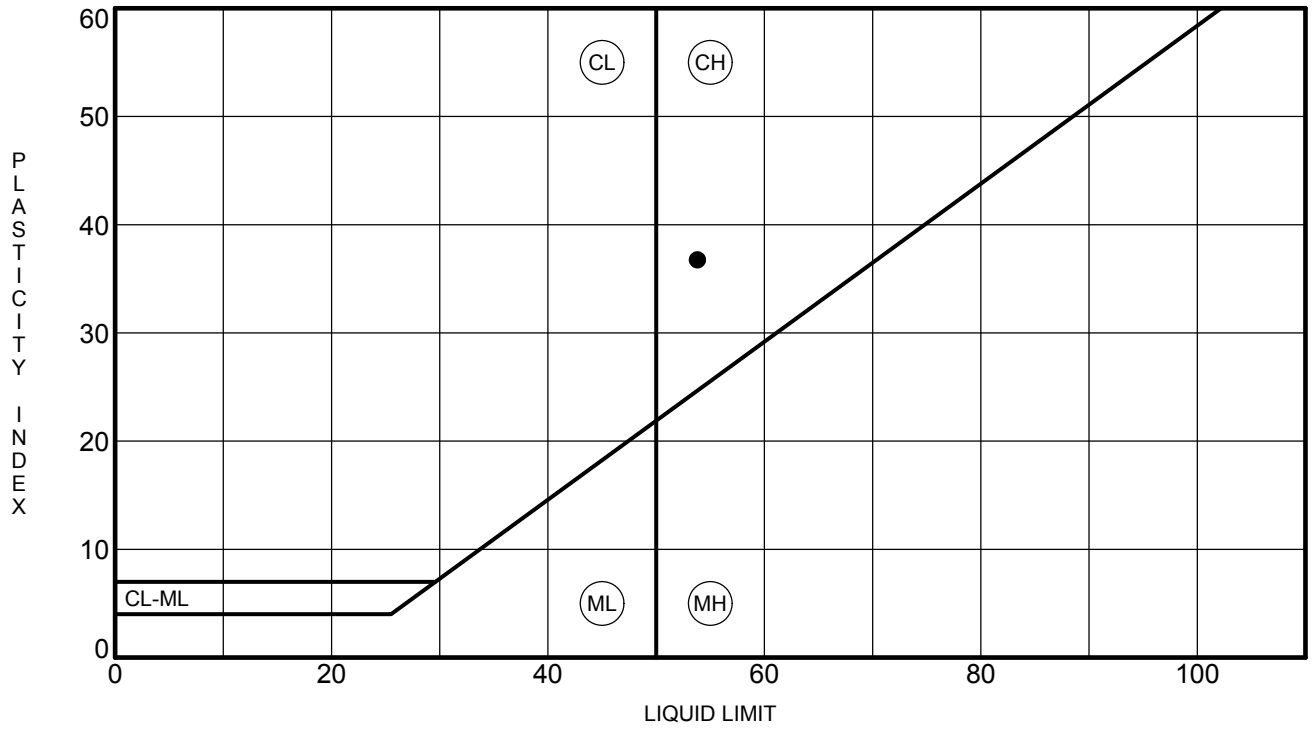
CONSOLIDATION TEST

JOB NUMBER: 2002-036-006

REPORT DATED: 01-13-2012



	Specimen Identification		LL	PL	PI	Fines	Classification
●	**B-1-10**	**65.0**	**54**	**17**	**37**	**82**	**FAT CLAY with SAND(CH)**

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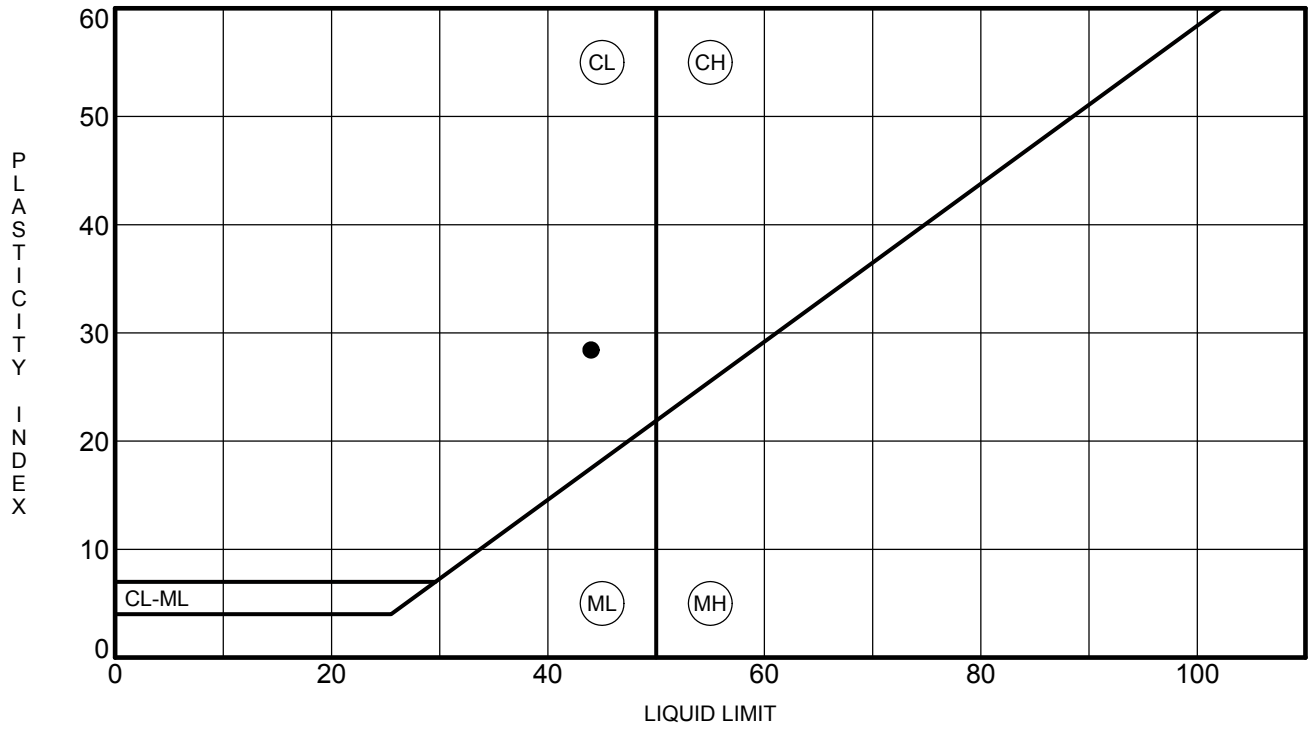
Telephone: (818) 531-1501
Fax: (818) 531-1511

ATTERBERG LIMITS' RESULTS

JOB NUMBER: 2002-036-004

REPORT DATED: 01-19-2011



	Specimen Identification		LL	PL	PI	Fines	Classification
●	**HS-2-10**	**20.0**	**44**	**16**	**28**	**72**	**LEAN CLAY with SAND(CL)**

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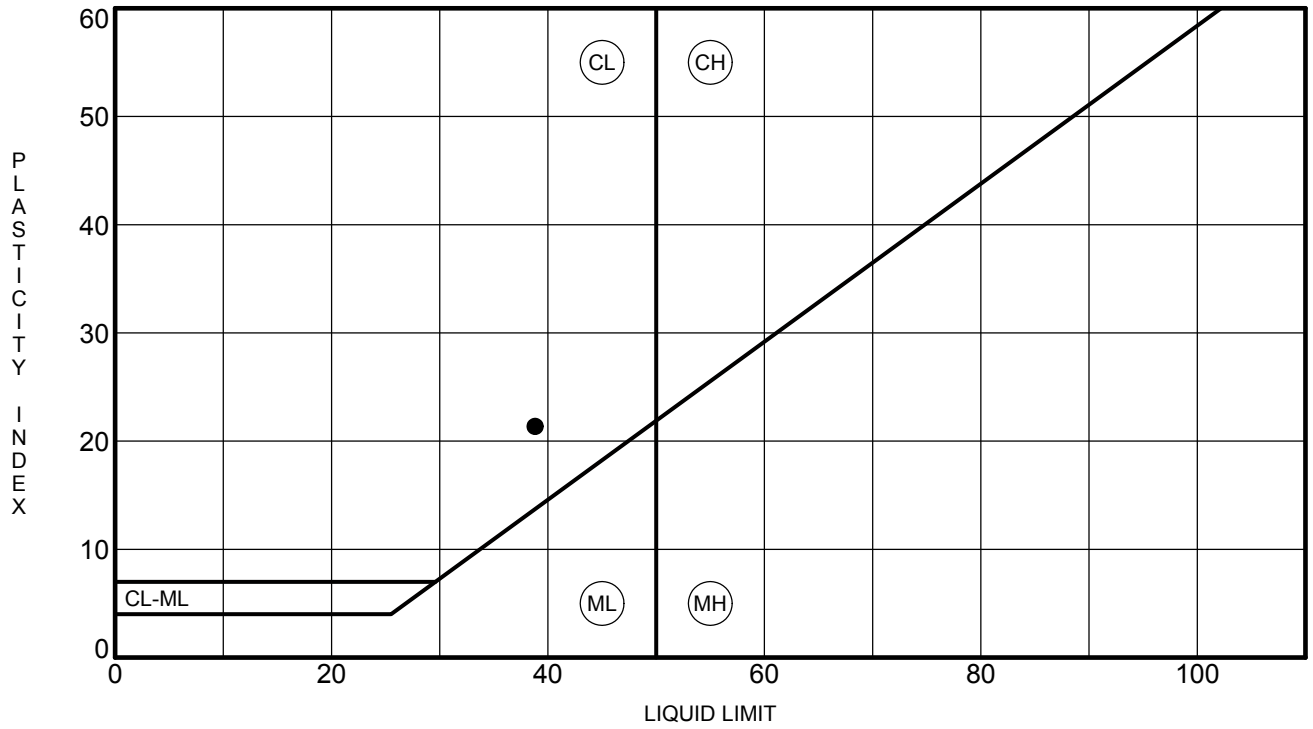
Burbank, Ca 91504
Telephone: (818) 531-1501
Fax: (818) 531-1511

ATTERBERG LIMITS' RESULTS

JOB NUMBER: 2002-036-004

REPORT DATED: 01-19-2011



	Specimen Identification		LL	PL	PI	Fines	Classification
●	**HS-2-10**	**30.0**	**39**	**17**	**22**	**63**	**SANDY LEAN CLAY(CL)**

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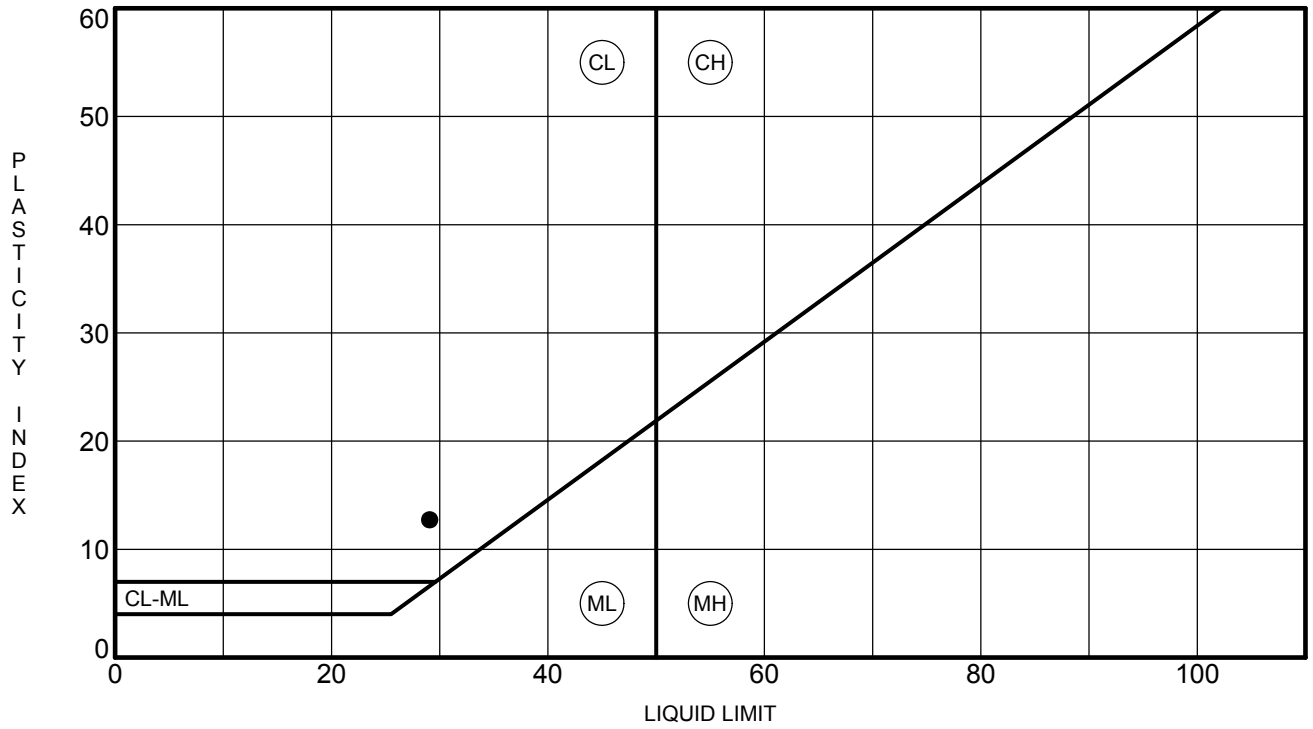
Burbank, Ca 91504
Telephone: (818) 531-1501
Fax: (818) 531-1511

ATTERBERG LIMITS' RESULTS

JOB NUMBER: 2002-036-004

REPORT DATED: 01-19-2011



	Specimen Identification		LL	PL	PI	Fines	Classification
●	**HS-4-10**	**25.0**	**29**	**16**	**13**	**50**	**CLAYEY SAND(SC)**

R. T. Frankian & Associates
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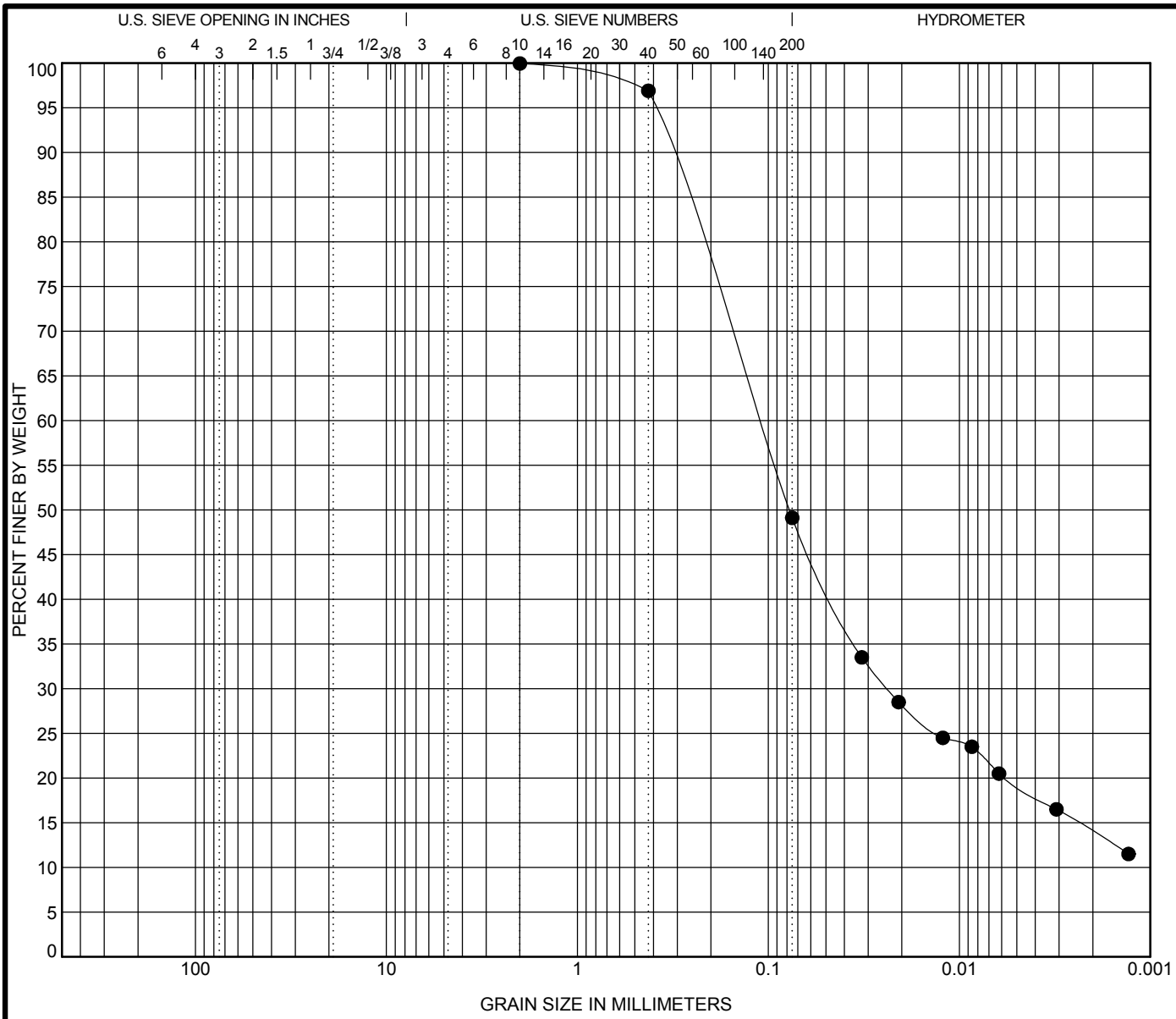
Burbank, Ca 91504
Telephone: (818) 531-1501
Fax: (818) 531-1511

ATTERBERG LIMITS' RESULTS

JOB NUMBER: 2002-036-004

REPORT DATED: 01-19-2011



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	**B-1-10**						

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay

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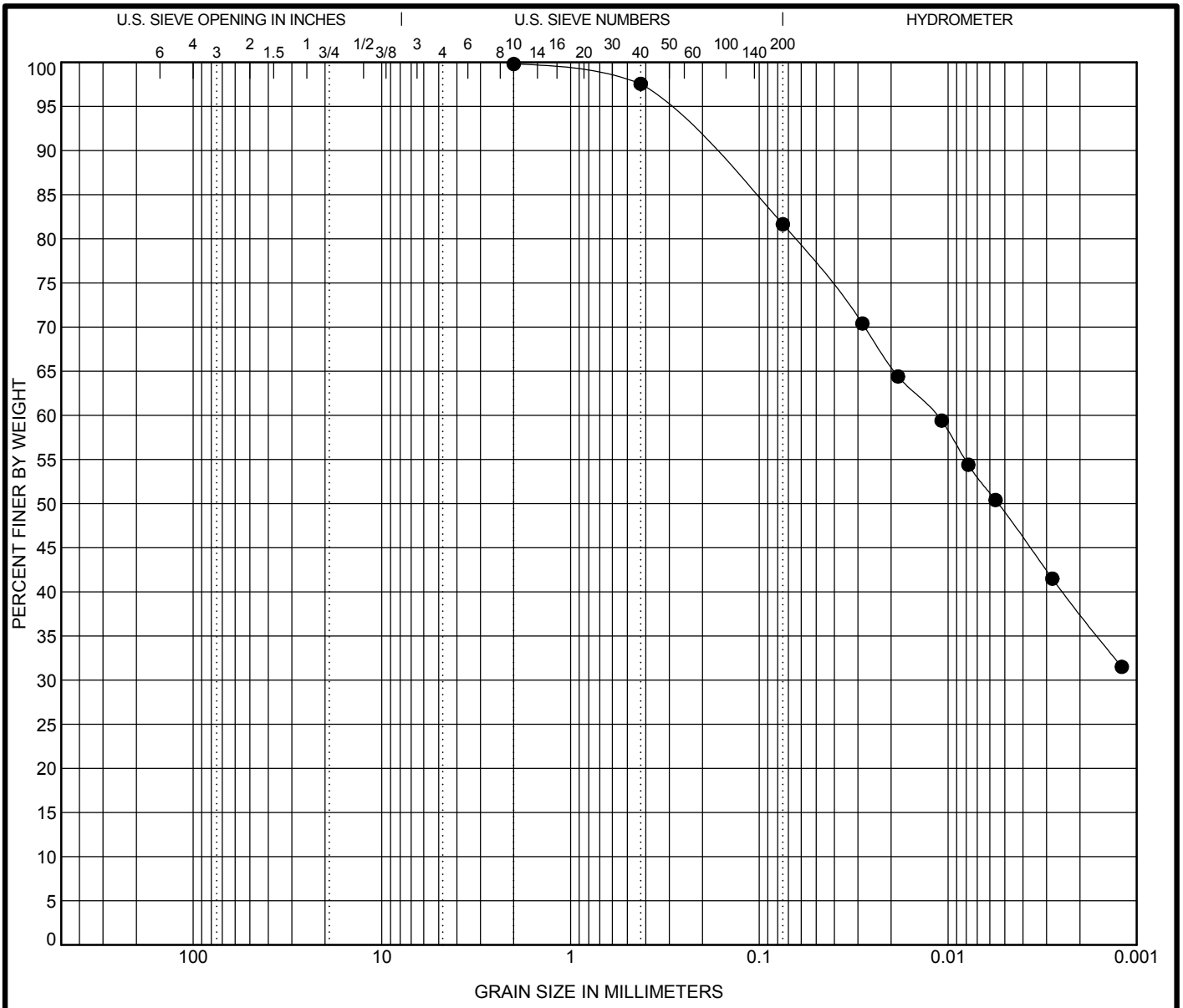
Telephone: (818) 531-1501
Fax: (818) 531-1511

GRAIN SIZE DISTRIBUTION

JOB NUMBER: 2002-036-004

REPORT DATED: 01-19-2011



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	**B-1-10**	**FAT CLAY with SAND(CH)**					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay

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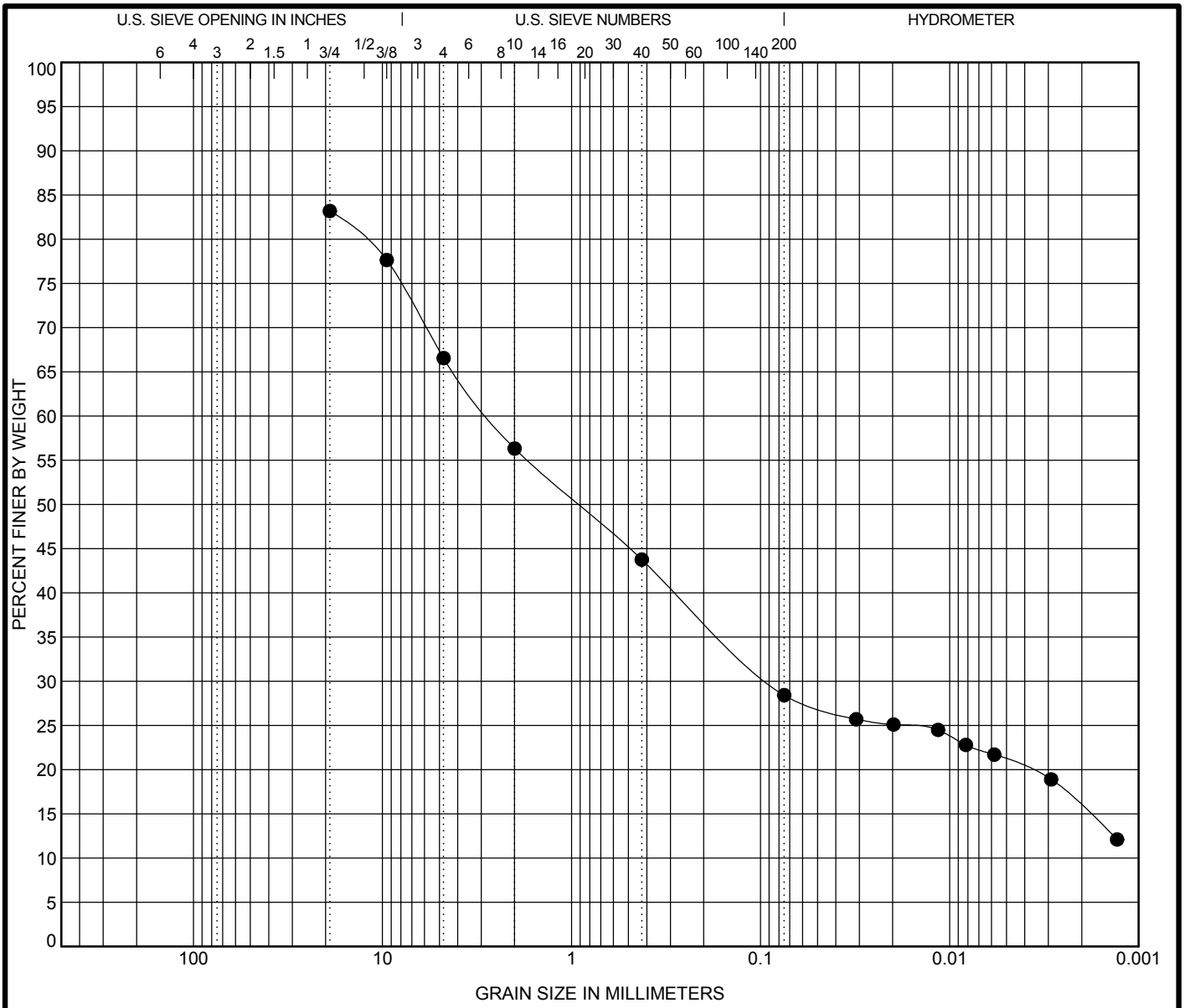
GRAIN SIZE DISTRIBUTION

JOB NUMBER: 2002-036-004

REPORT DATED: 01-19-2011



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	**B-2-10**						

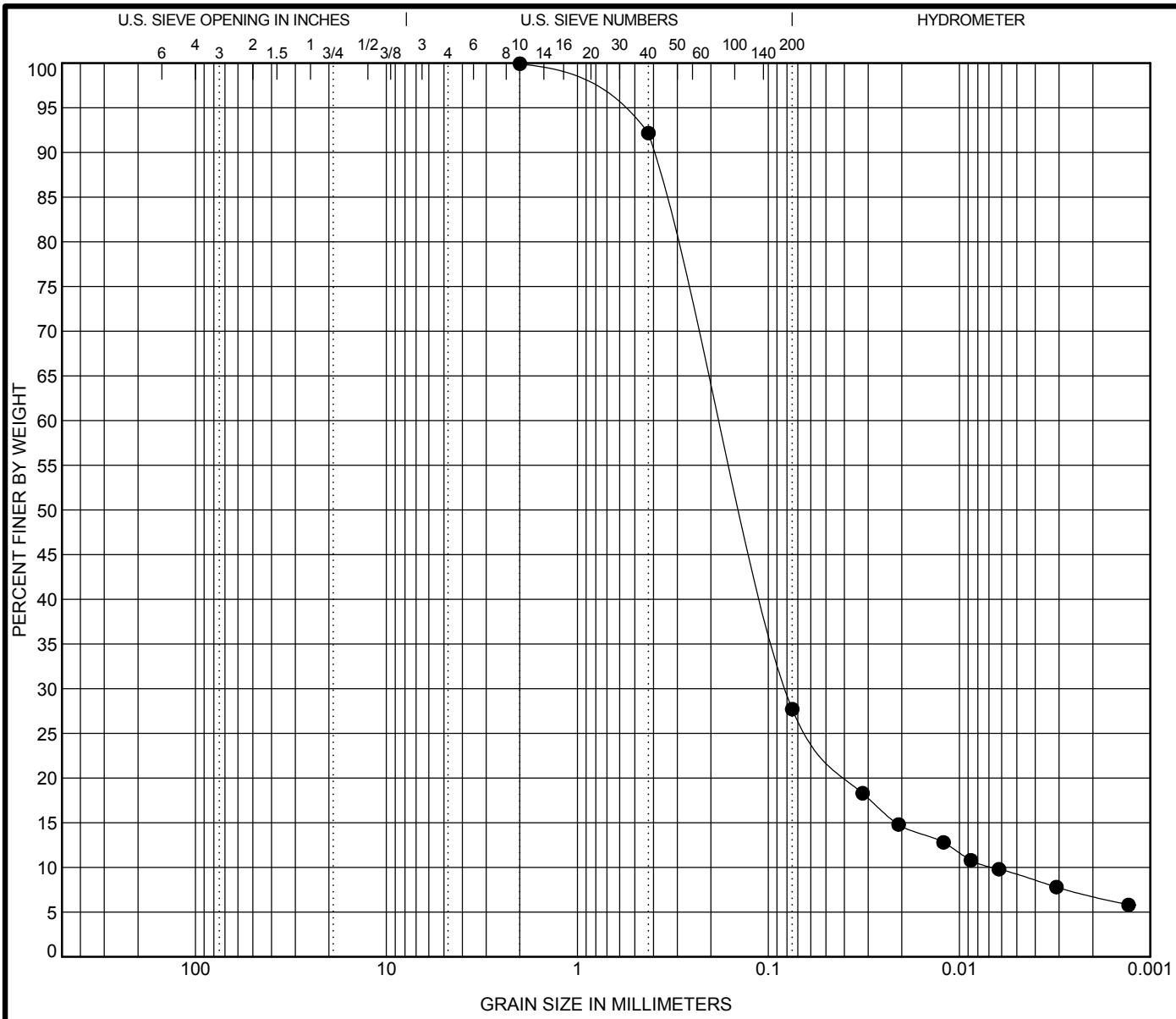
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay

R. T. Frankian & Associates
1329 Scott Road
Burbank, Ca 91504
Telephone: (818) 531-1501
Fax: (818) 531-1511

GRAIN SIZE DISTRIBUTION

JOB NUMBER: 2002-036-004

REPORT DATED: 01-19-2011



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	**B-3-10**						

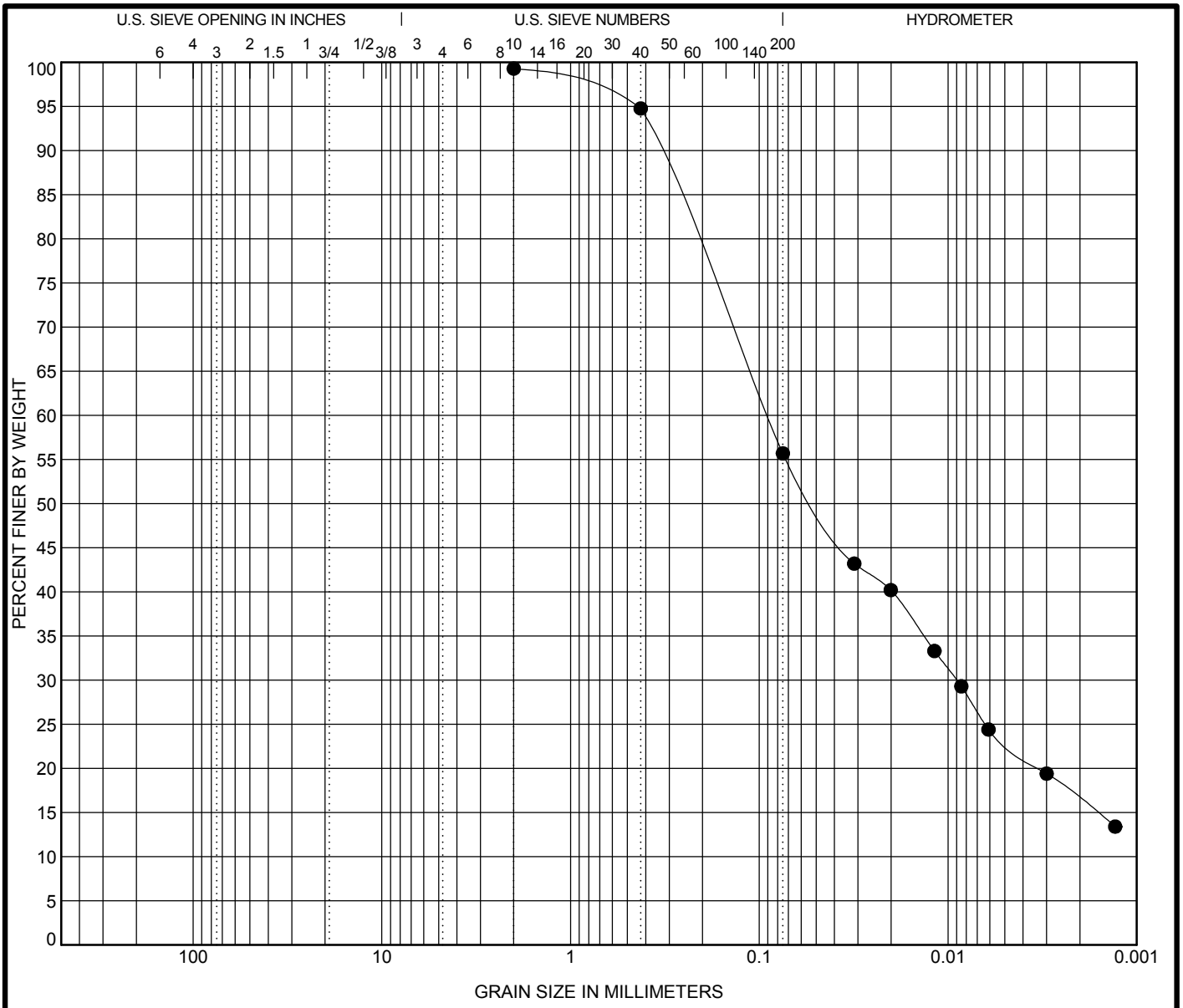
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay

R. T. Frankian & Associates
1329 Scott Road
Burbank, Ca 91504
Telephone: (818) 531-1501
Fax: (818) 531-1511

GRAIN SIZE DISTRIBUTION

JOB NUMBER: 2002-036-004

REPORT DATED: 01-19-2011



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	**B-8-10**						

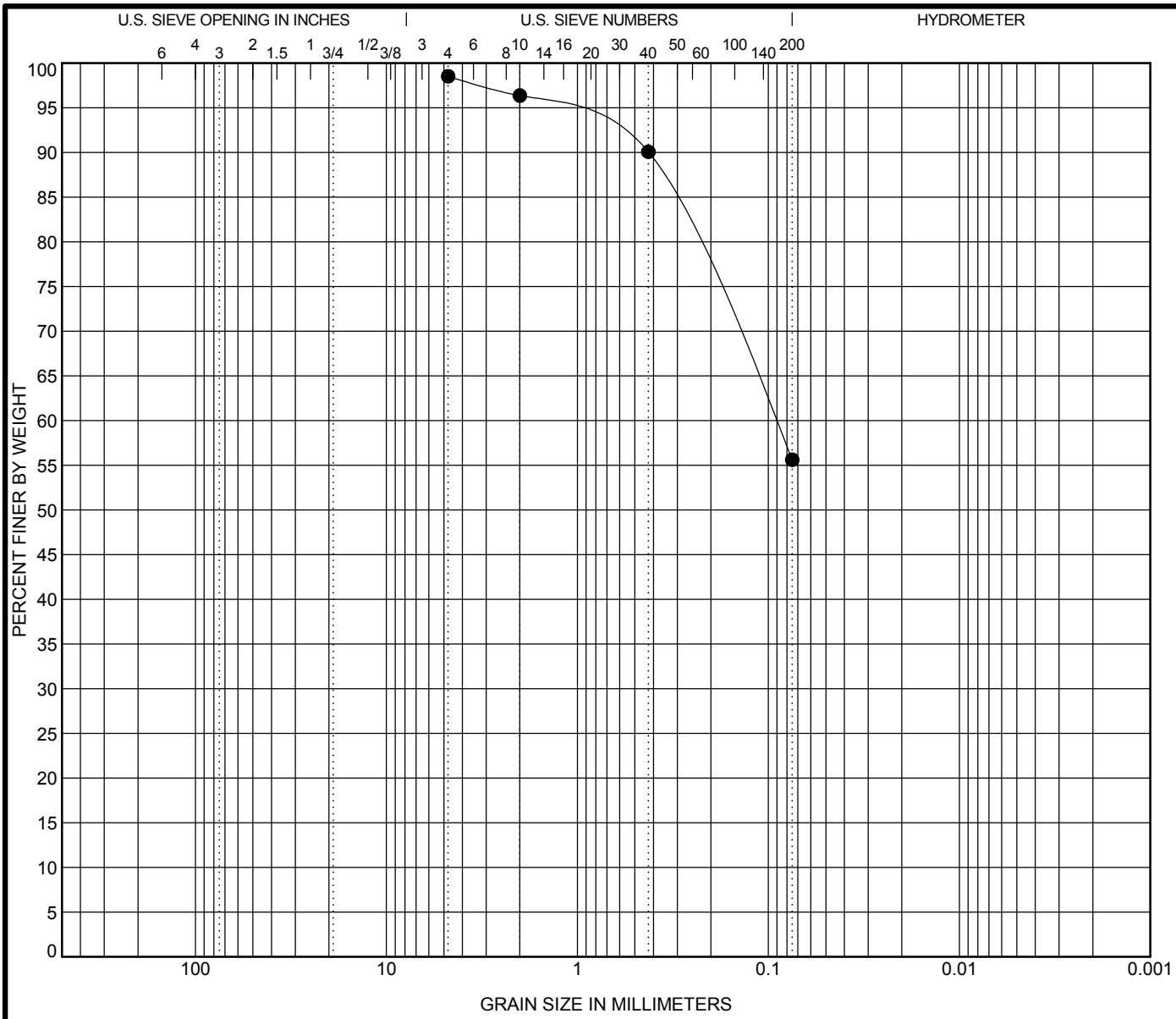
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay

R. T. Frankian & Associates
1329 Scott Road
Burbank, Ca 91504
Telephone: (818) 531-1501
Fax: (818) 531-1511

GRAIN SIZE DISTRIBUTION

JOB NUMBER: 2002-036-004

REPORT DATED: 01-19-2011



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	**HS-1-10**						

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay

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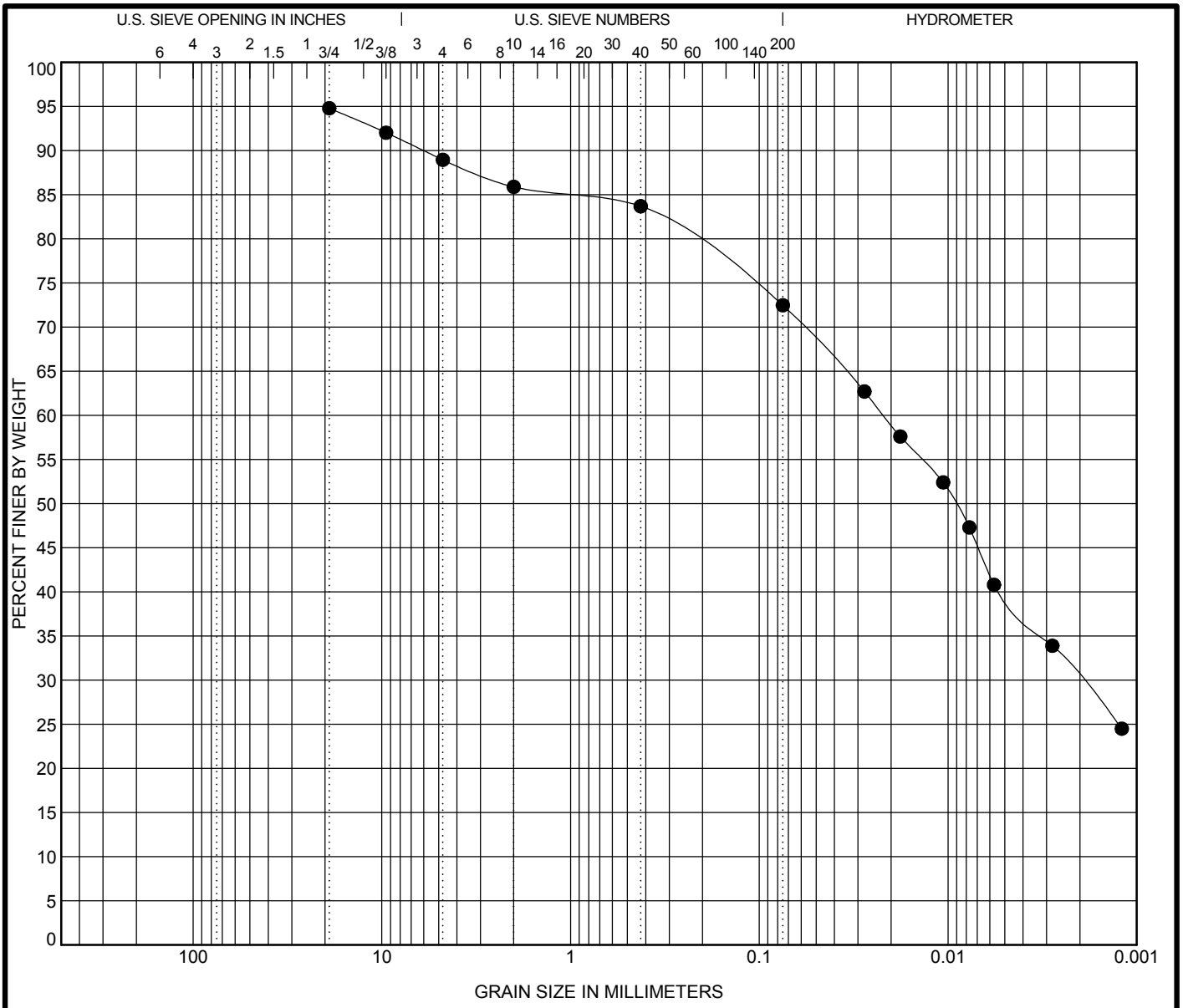
Burbank, Ca 91504
Telephone: (818) 531-1501
Fax: (818) 531-1511

GRAIN SIZE DISTRIBUTION

JOB NUMBER: 2002-036-004

REPORT DATED: 01-19-2011



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	**HS-2-10**	**LEAN CLAY with SAND(CL)**					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay

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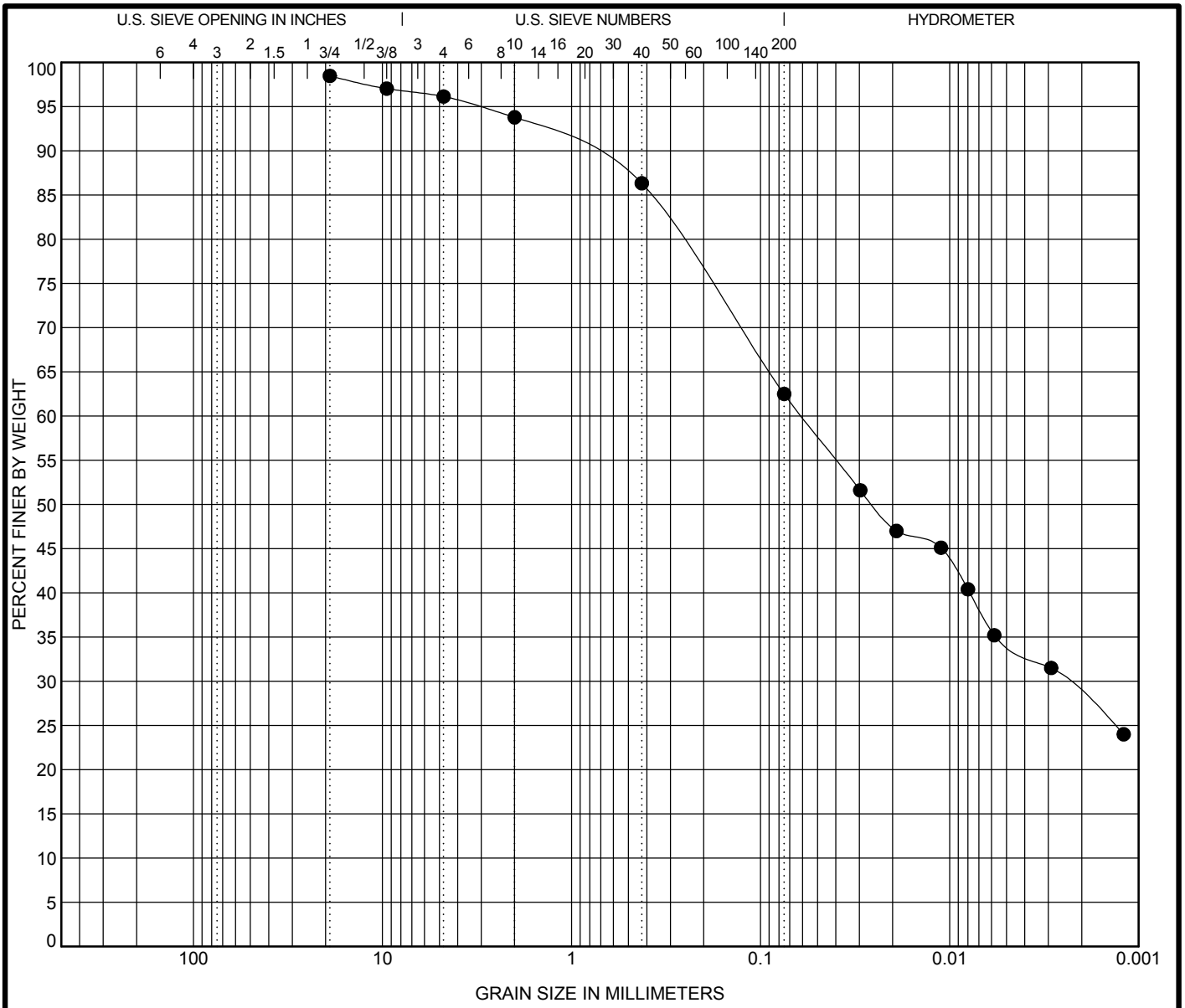
1329 Scott Road
Burbank, Ca 91504
Telephone: (818) 531-1501
Fax: (818) 531-1511

GRAIN SIZE DISTRIBUTION

JOB NUMBER: 2002-036-004

REPORT DATED: 01-19-2011



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	**HS-2-10**	**SANDY LEAN CLAY(CL)**					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay

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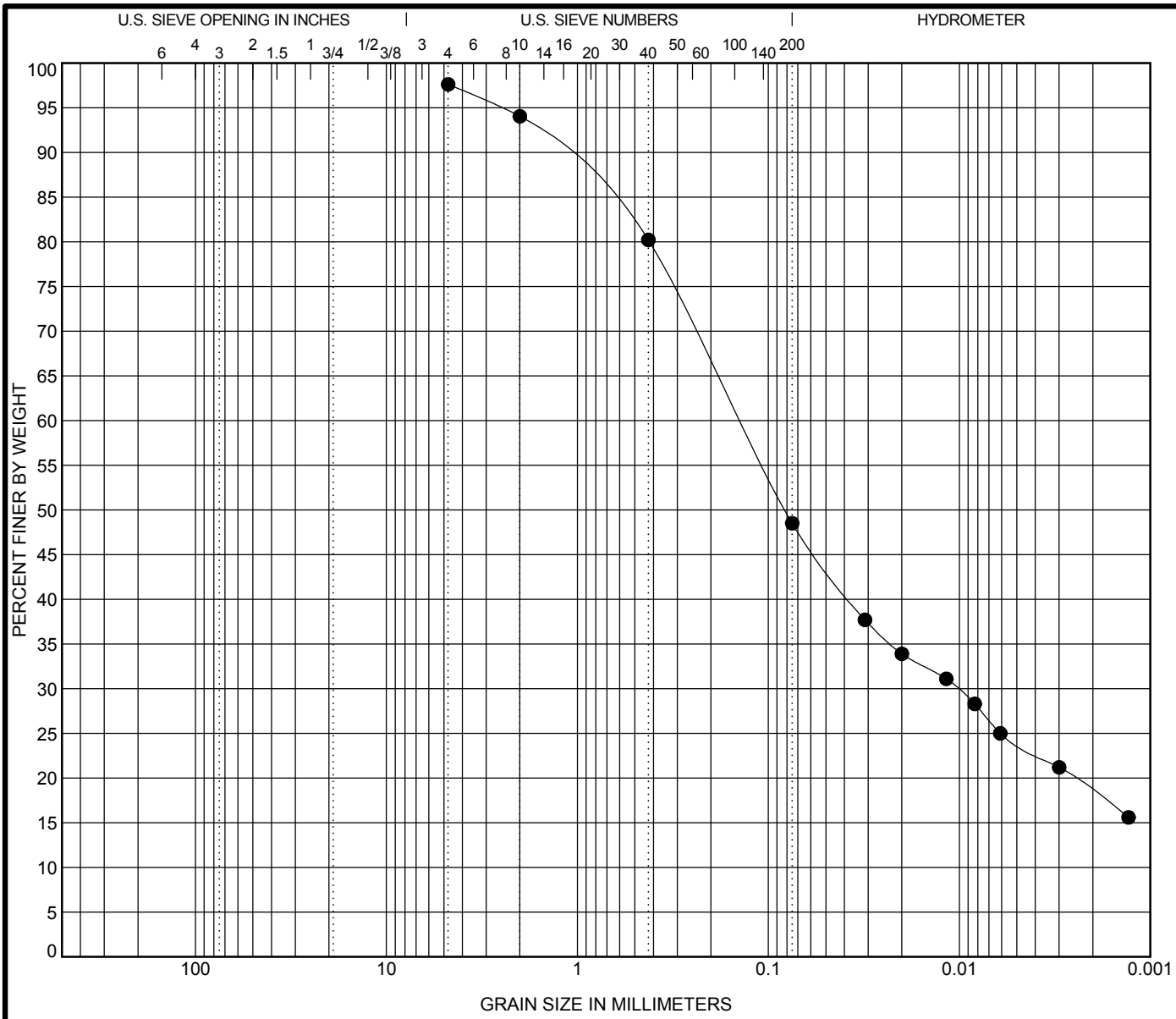
Burbank, Ca 91504
Telephone: (818) 531-1501
Fax: (818) 531-1511

GRAIN SIZE DISTRIBUTION

JOB NUMBER: 2002-036-004

REPORT DATED: 01-19-2011



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	**HS-3-10**						

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay

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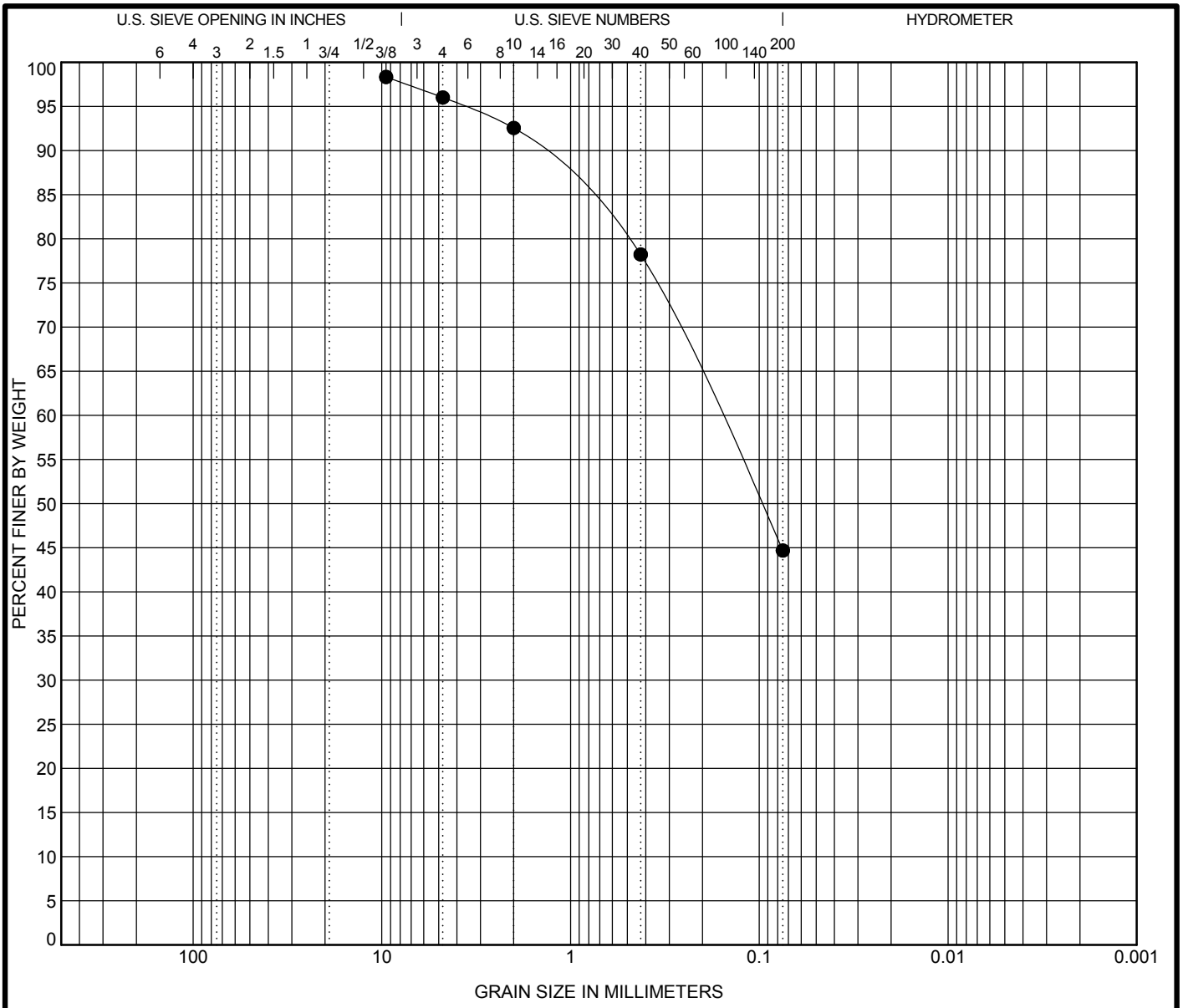
Burbank, Ca 91504
Telephone: (818) 531-1501
Fax: (818) 531-1511

GRAIN SIZE DISTRIBUTION

JOB NUMBER: 2002-036-004

REPORT DATED: 01-19-2011



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	**HS-3-10**						

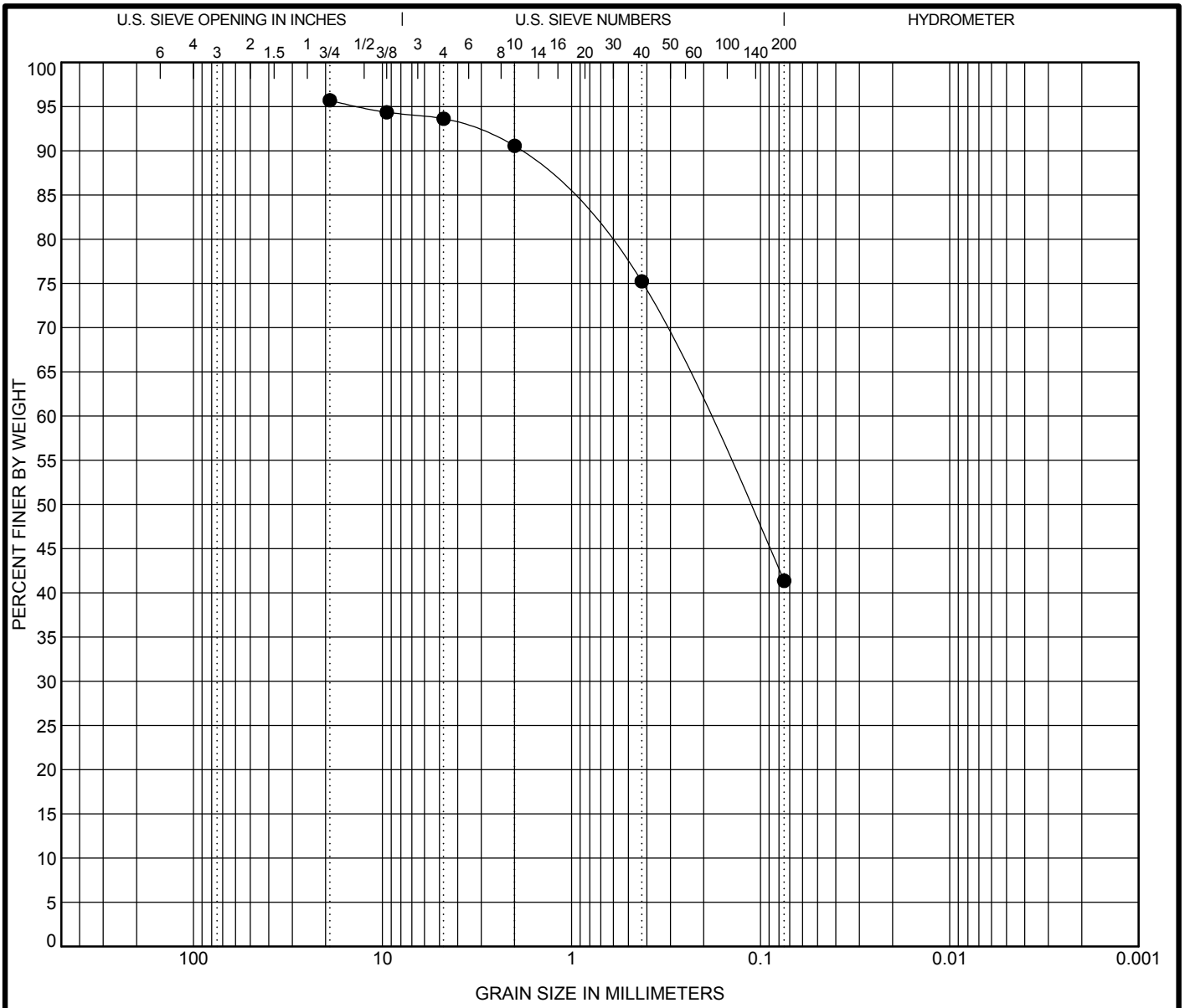
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay

R. T. Frankian & Associates
1329 Scott Road
Burbank, Ca 91504
Telephone: (818) 531-1501
Fax: (818) 531-1511

GRAIN SIZE DISTRIBUTION

JOB NUMBER: 2002-036-004

REPORT DATED: 01-19-2011



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	**HS-3-10**						

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay

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1329 Scott Road
Burbank, Ca 91504
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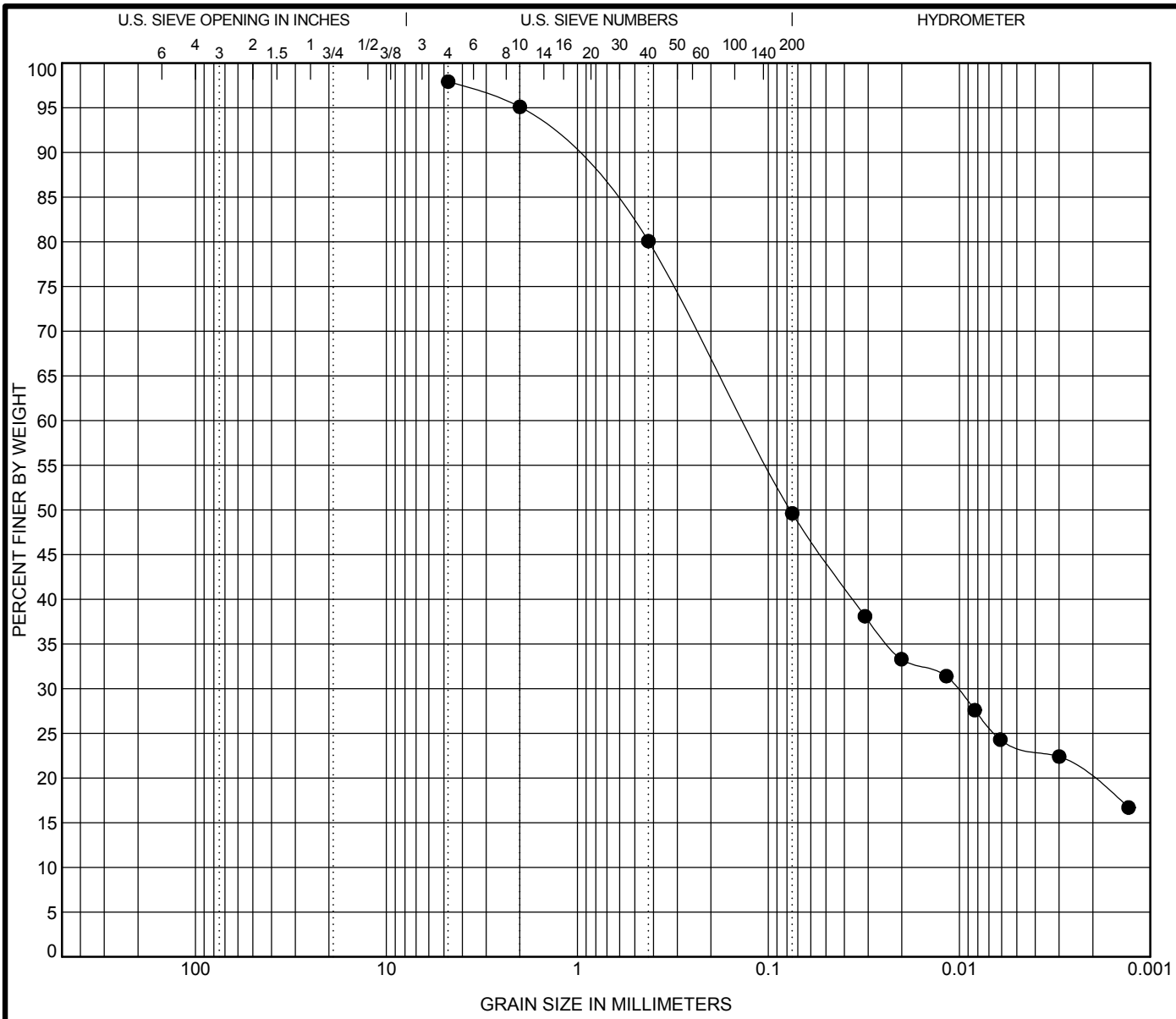
Fax: (818) 531-1511

GRAIN SIZE DISTRIBUTION

JOB NUMBER: 2002-036-004

REPORT DATED: 01-19-2011



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	**HS-4-10**	**CLAYEY SAND(SC)**					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay

R. T. Frankian & Associates
1329 Scott Road
Burbank, Ca 91504
Telephone: (818) 531-1501
Fax: (818) 531-1511

GRAIN SIZE DISTRIBUTION

JOB NUMBER: 2002-036-004

REPORT DATED: 01-19-2011

Chiquita Canyon Landfill
January 27, 2012
2002-036-004

APPENDIX D

SLOPE STABILITY CALCULATIONS

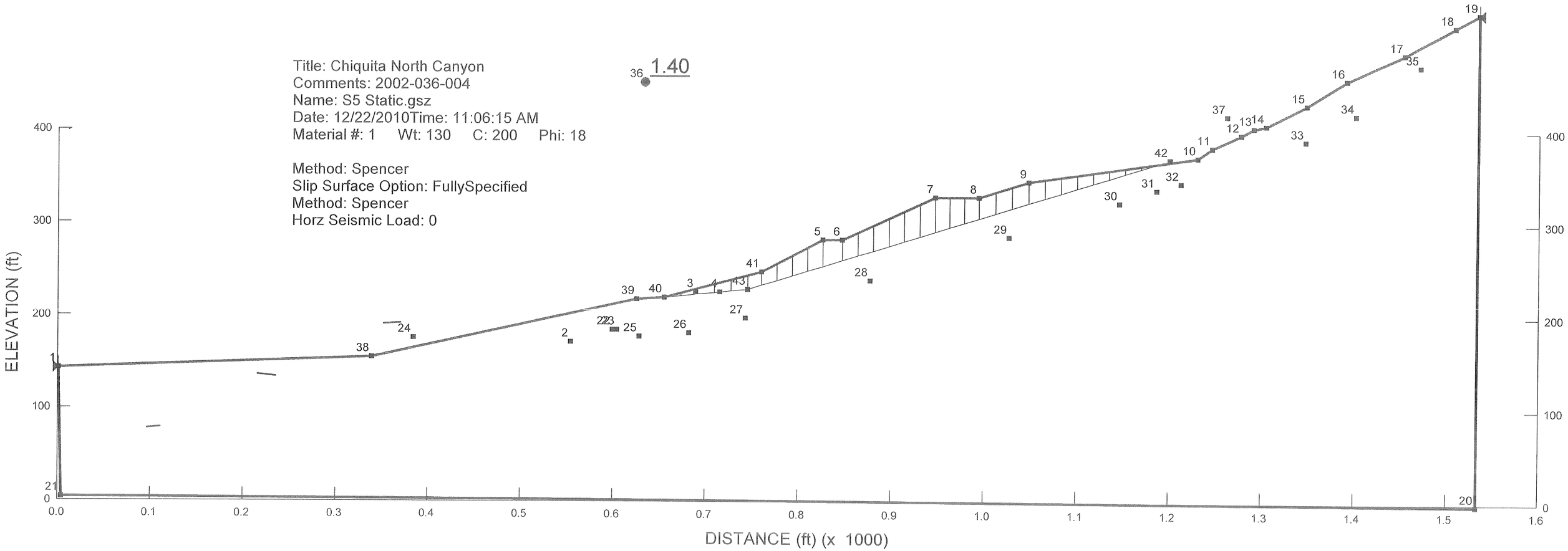
RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

Summary of Slope Stability Calculations

Section	Case	File	Factor of Safety	Condition
S5	Static	S5 Static.gsz	1.4	Bedding through 1st bench
S5	Static	S5 Static.gsz	1.43	Bedding between toe & 1st bench
S11	Static	S11 Static.gsz	1.63	Tp Cross Bedding Failure
S11	Seismic	S11 Seismic.gsz	1.16	Tp Cross Bedding Failure
S15	Static	S15 Static.gsz	2.35	Failure along bedding
S17	Static	S17 Static.gsz	1.31	Bedding above first bench
S17	Static	S17 Static.gsz	1.41	Bedding near toe
S17	Static	S17 Static.gsz	1.42	Bedding below 1st bench
S19	Static	Section S19 Static.gsz	1.58	Bedding above first bench
S19	Static	Section S19 Static.gsz	1.32	Bedding between 1st and 2nd bench
S19	Static	Section S19 Static.gsz	1.29	Bedding above 2nd Bench
S20	Static	S20 Static.gsz	1.34	Bedding near toe
S23	Static	S23 Static.gsz	1.5	Bedding near toe
S25	Static	S25 Static.gsz	1.25	Bedding below 2nd bench
N/A	Static	130' Fill Slope Static.gsz	1.56	130' High 2:1 Slope
N/A	Seismic	130' Fill Slope Static.gsz	1.14	130' High 2:1 Slope

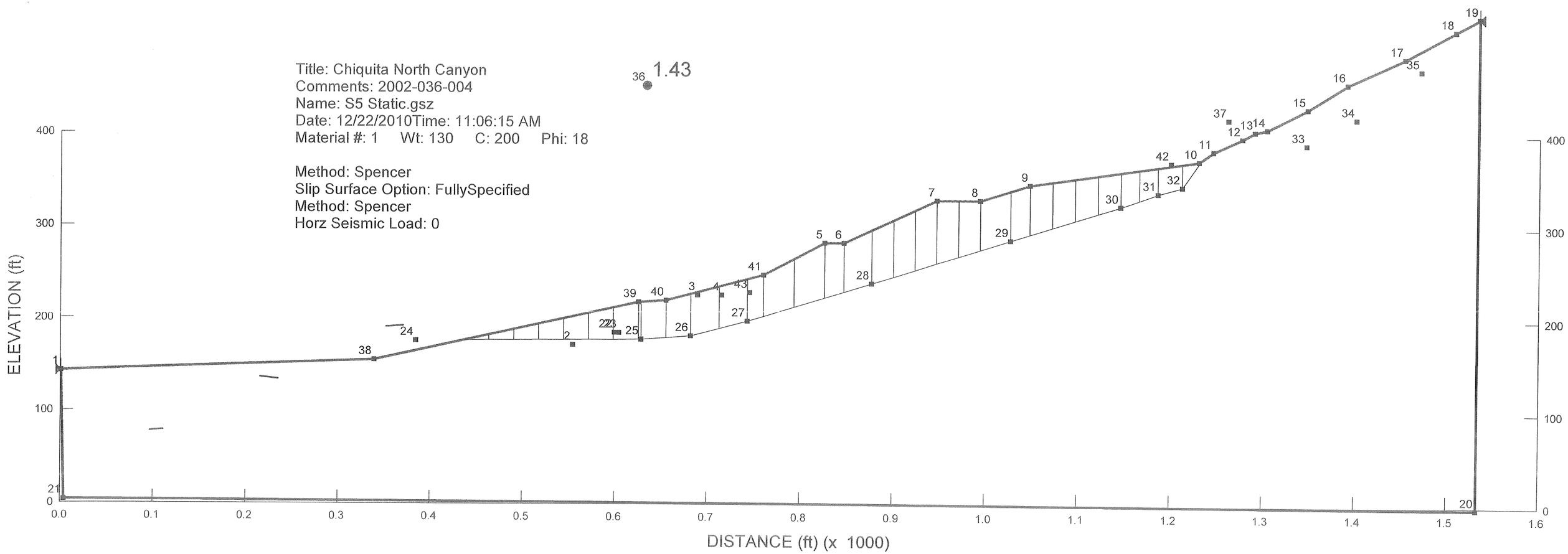
Title: Chiquita North Canyon
Comments: 2002-036-004
Name: S5 Static.gsz
Date: 12/22/2010Time: 11:06:15 AM
Material #: 1 Wt: 130 C: 200 Phi: 18

Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0

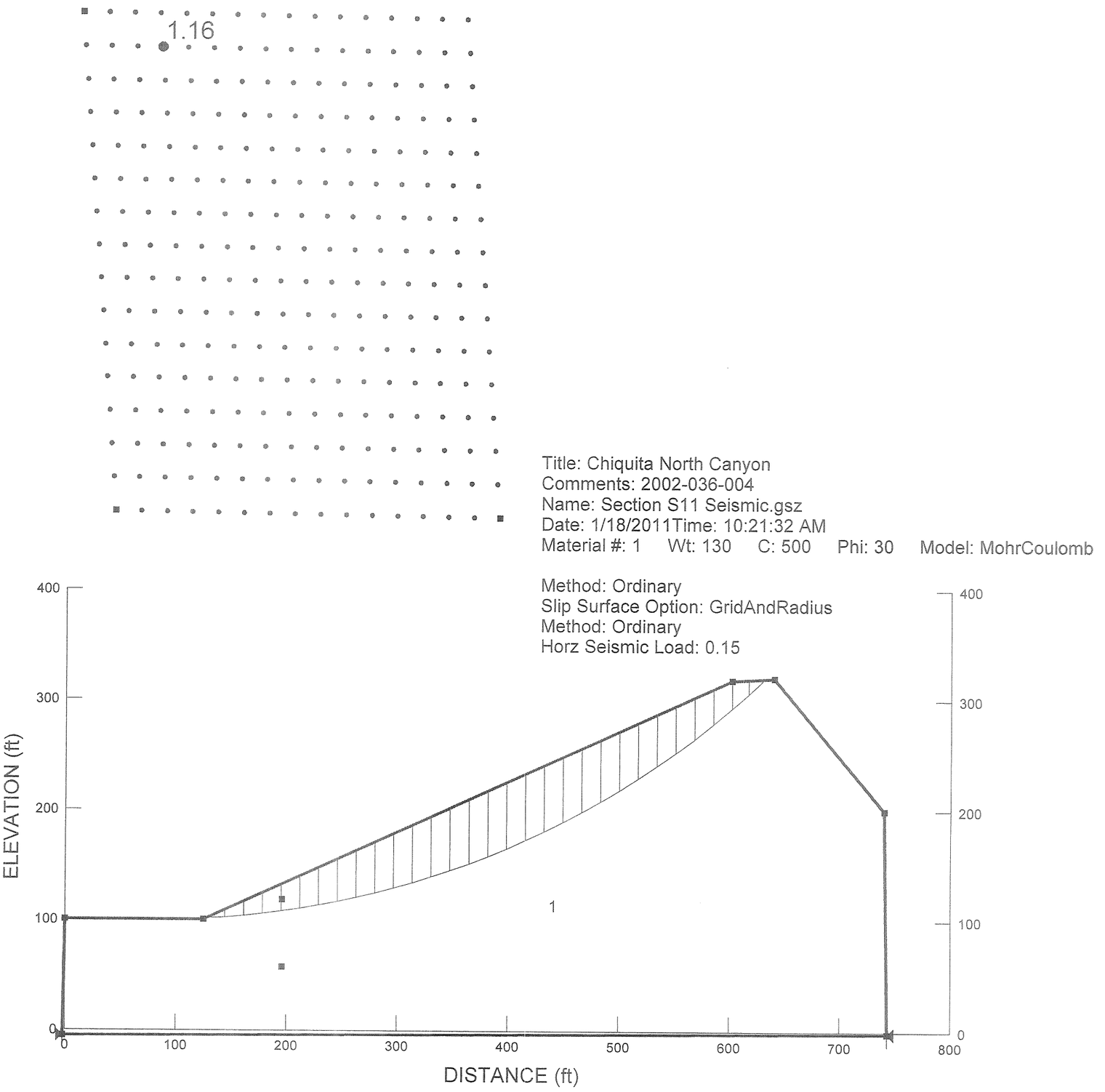


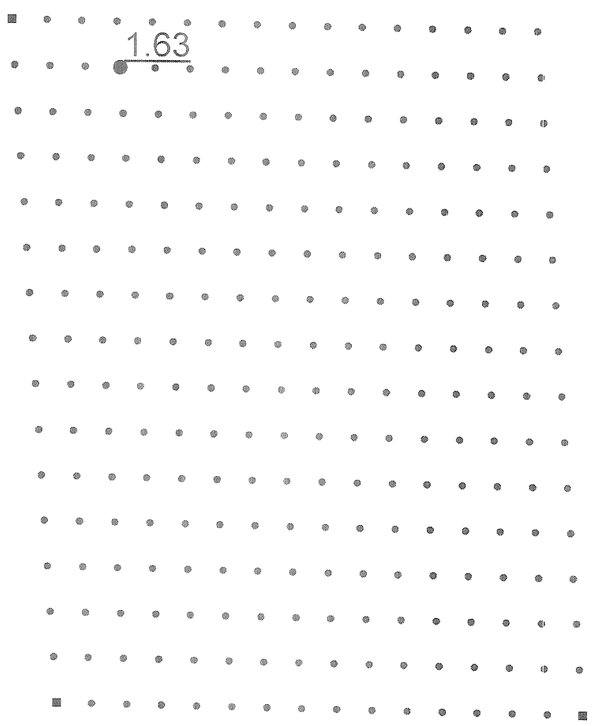
Title: Chiquita North Canyon
Comments: 2002-036-004
Name: S5 Static.gsz
Date: 12/22/2010Time: 11:06:15 AM
Material #: 1 Wt: 130 C: 200 Phi: 18

Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0



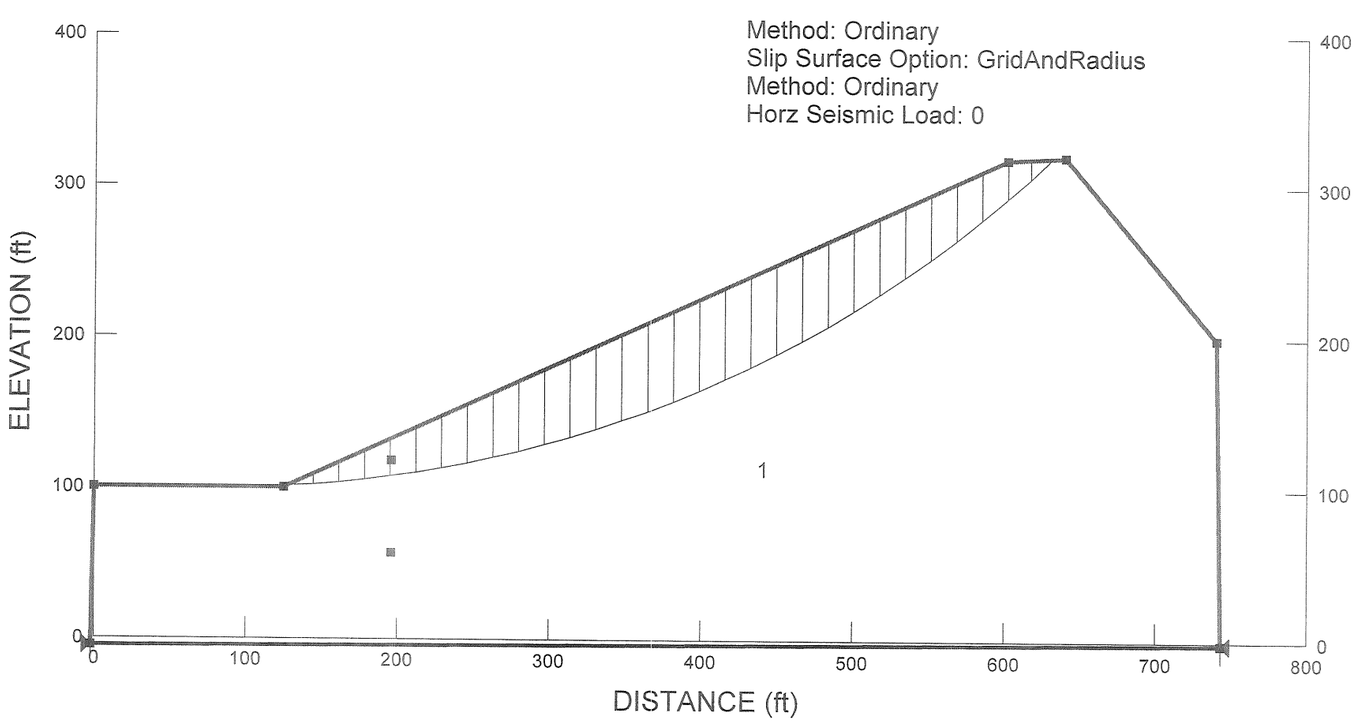
RTF&A JOB NO. 2002-036-004 REPORT DATED 1-27-2012





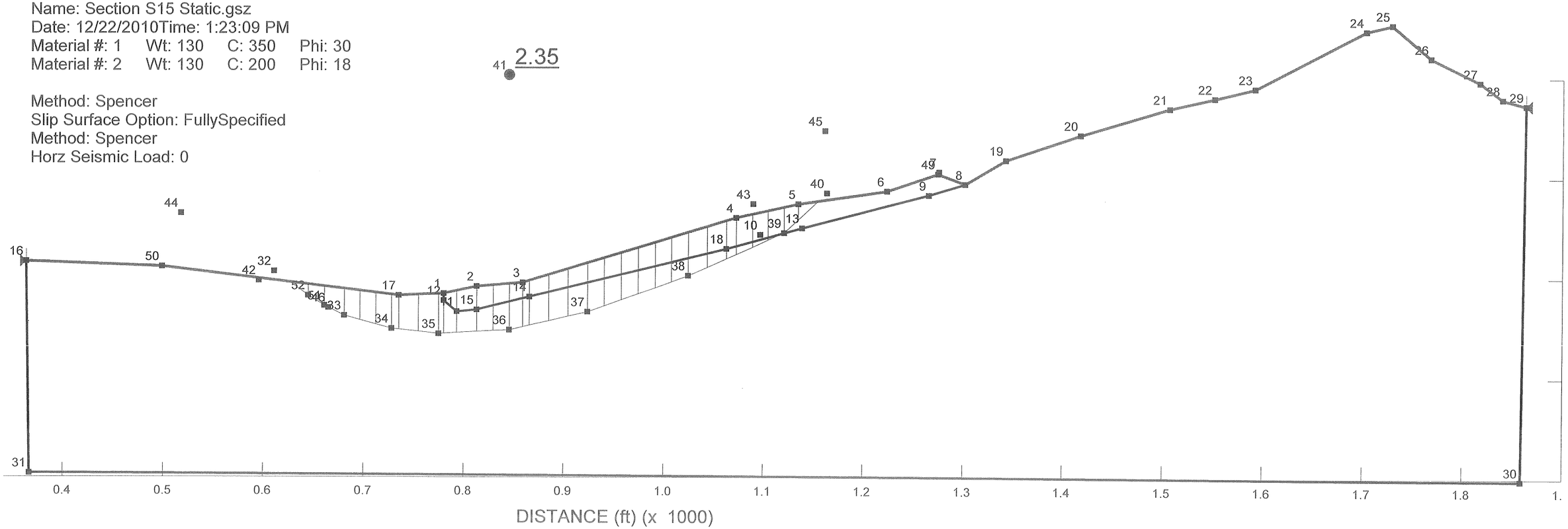
Title: Chiquita North Canyon
Comments: 2002-036-004
Name: Section S11 Static.gsz
Date: 1/18/2011Time: 9:37:43 AM
Material #: 1 Wt: 130 C: 500 Phi: 30 Model: MohrCoulomb

Method: Ordinary
Slip Surface Option: GridAndRadius
Method: Ordinary
Horz Seismic Load: 0



Title: Chiquita North Canyon
Comments: 2002-036-004
Name: Section S15 Static.gsz
Date: 12/22/2010Time: 1:23:09 PM
Material #: 1 Wt: 130 C: 350 Phi: 30
Material #: 2 Wt: 130 C: 200 Phi: 18

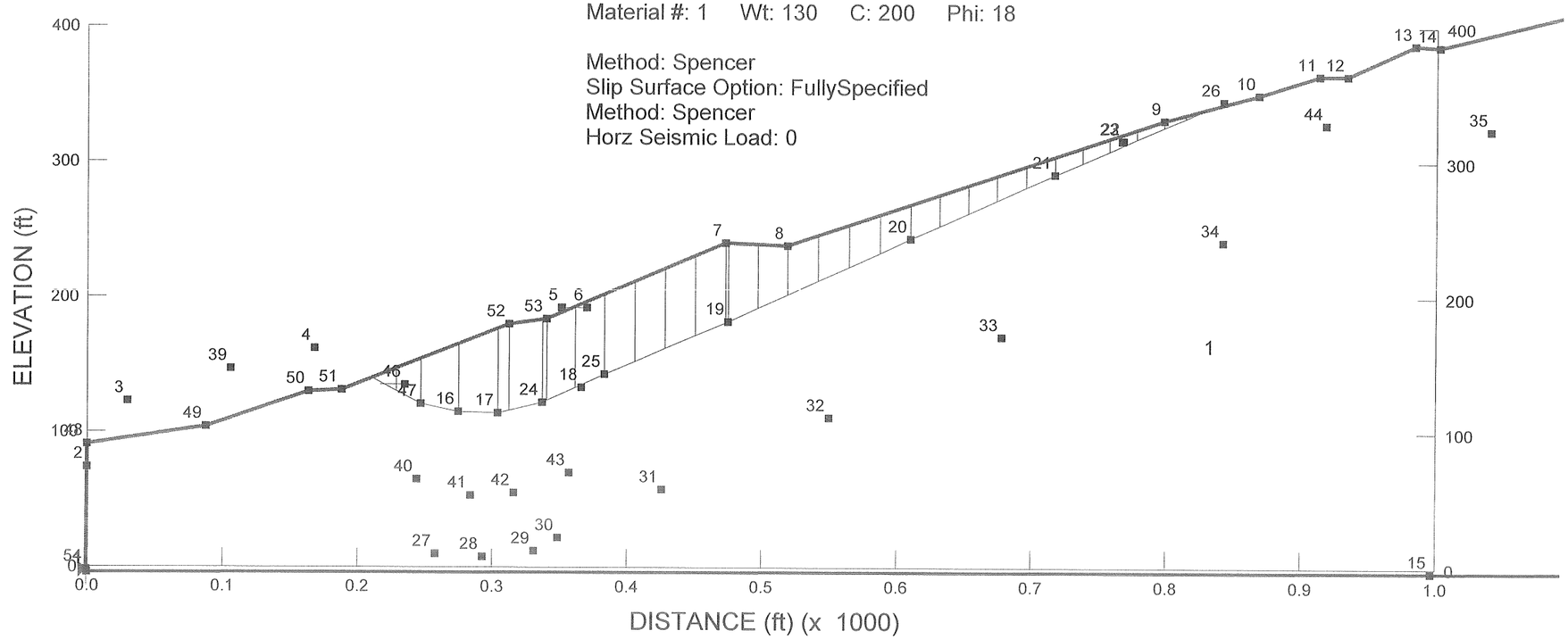
Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0



1.31

Title: Chiquita North Canyon
Comments: SECTION S17 Bedding
Name: S17 Static.gsz
Date: 12/22/2010Time: 1:47:19 PM
Material #: 1 Wt: 130 C: 200 Phi: 18

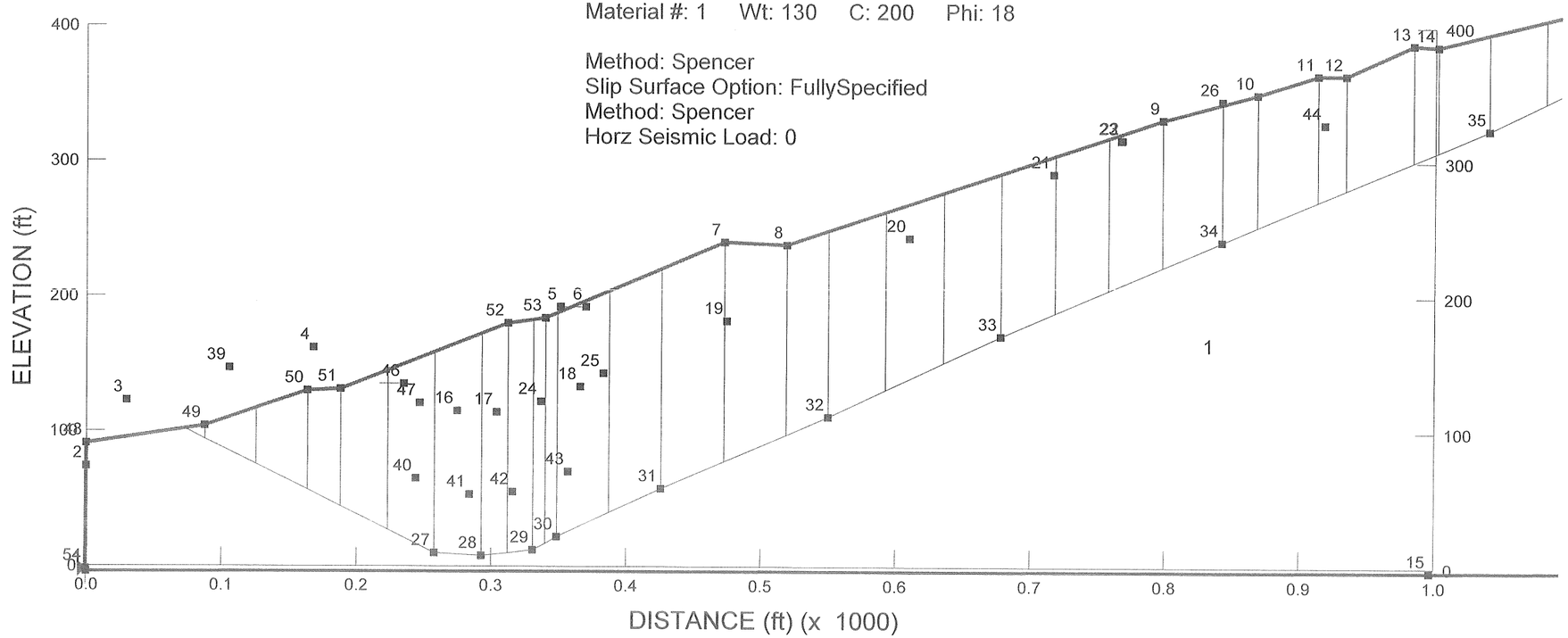
Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0



1.41

Title: Chiquita North Canyon
Comments: SECTION S17 Bedding
Name: S17 Static.gsz
Date: 12/22/2010Time: 1:47:19 PM
Material #: 1 Wt: 130 C: 200 Phi: 18

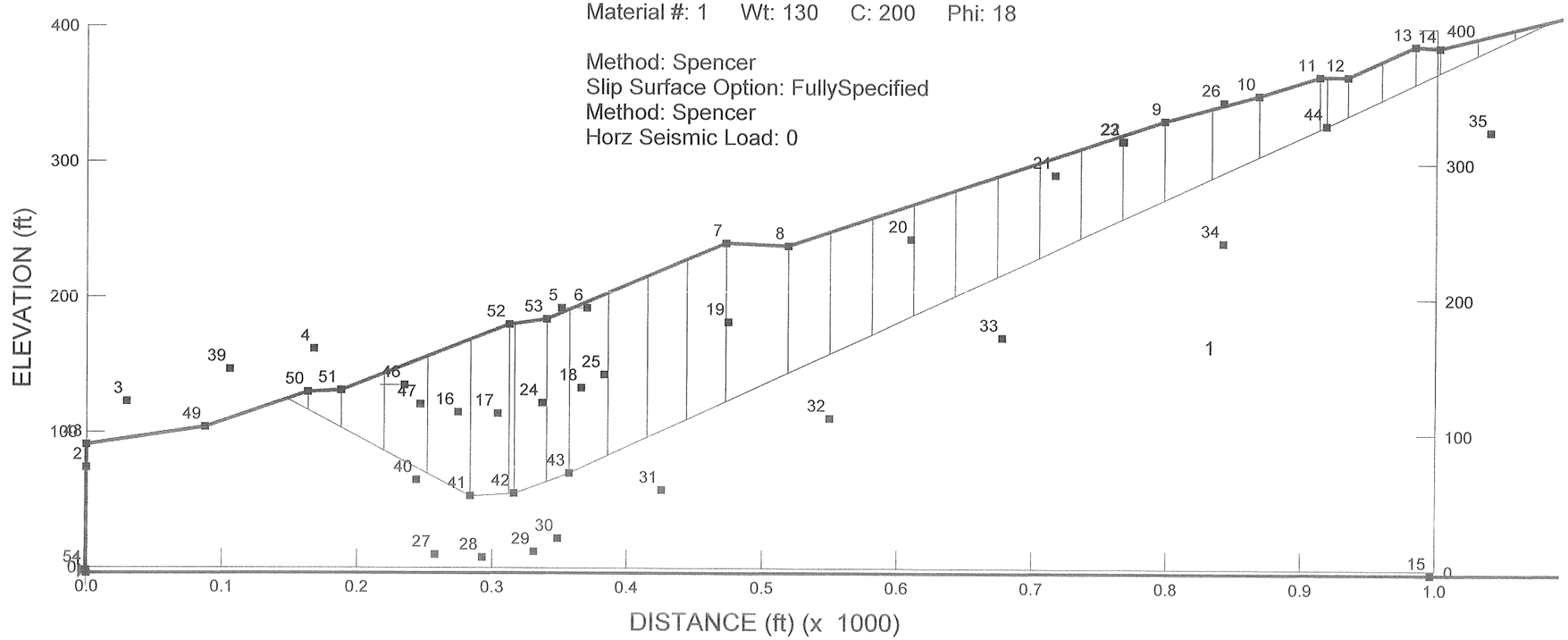
Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0



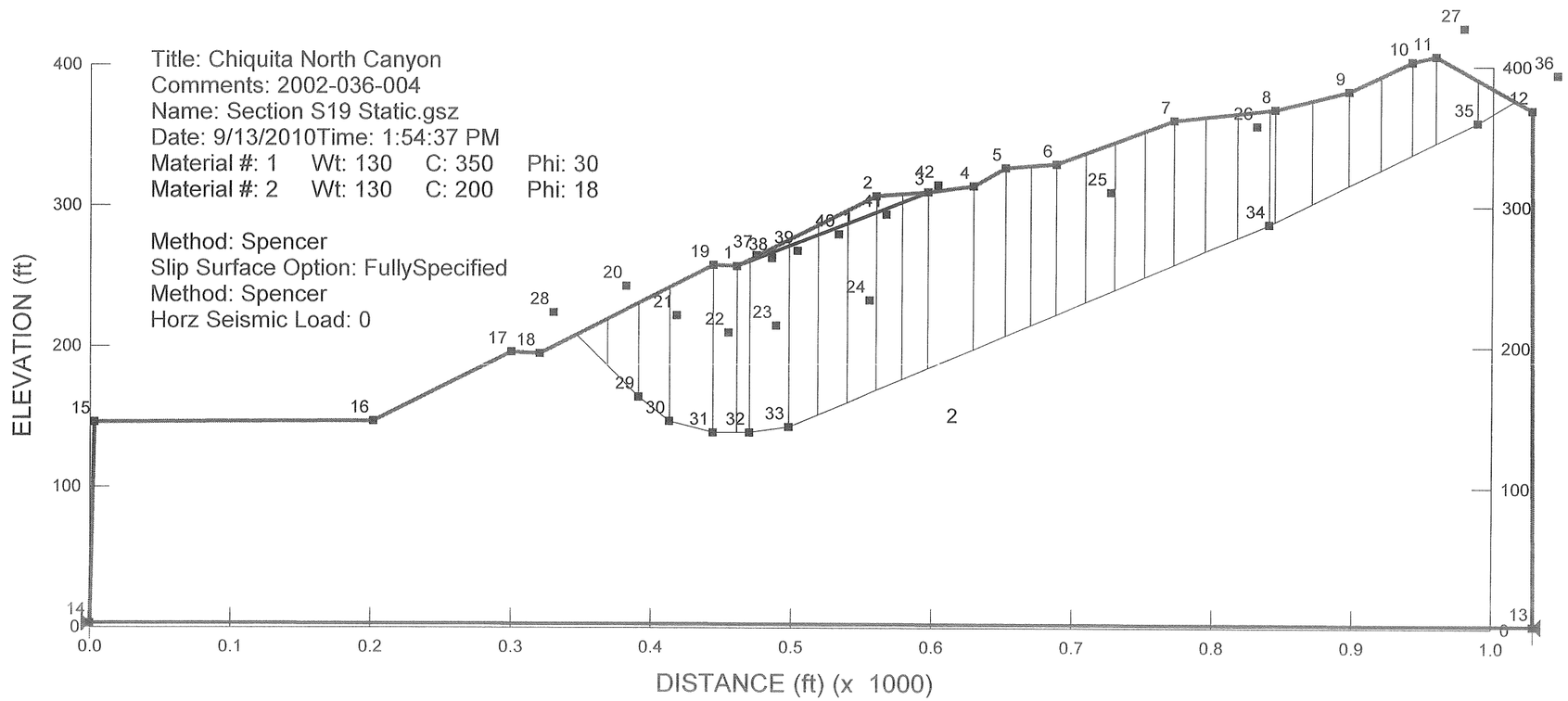
1.42

Title: Chiquita North Canyon
Comments: SECTION S17 Bedding
Name: S17 Static.gsz
Date: 12/22/2010Time: 1:47:19 PM
Material #: 1 Wt: 130 C: 200 Phi: 18

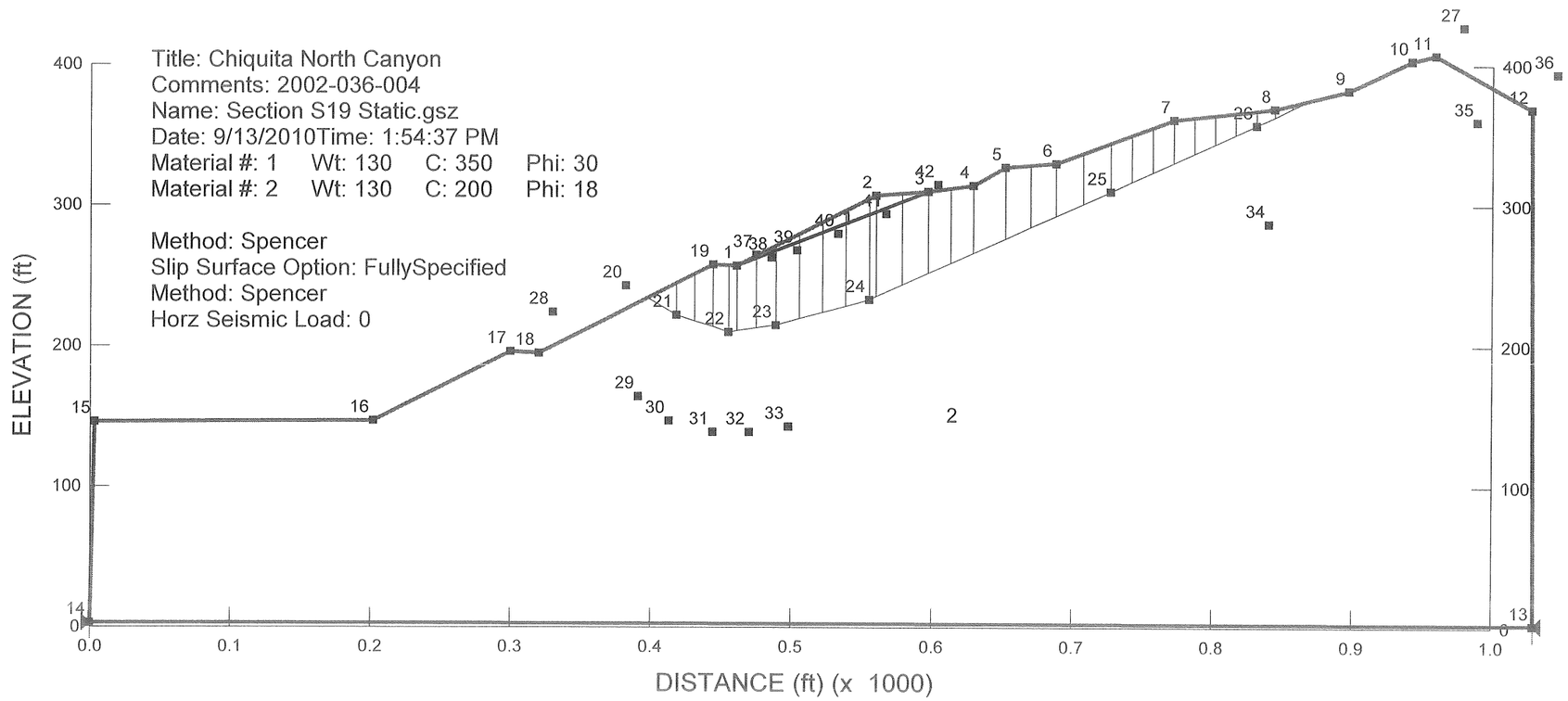
Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0



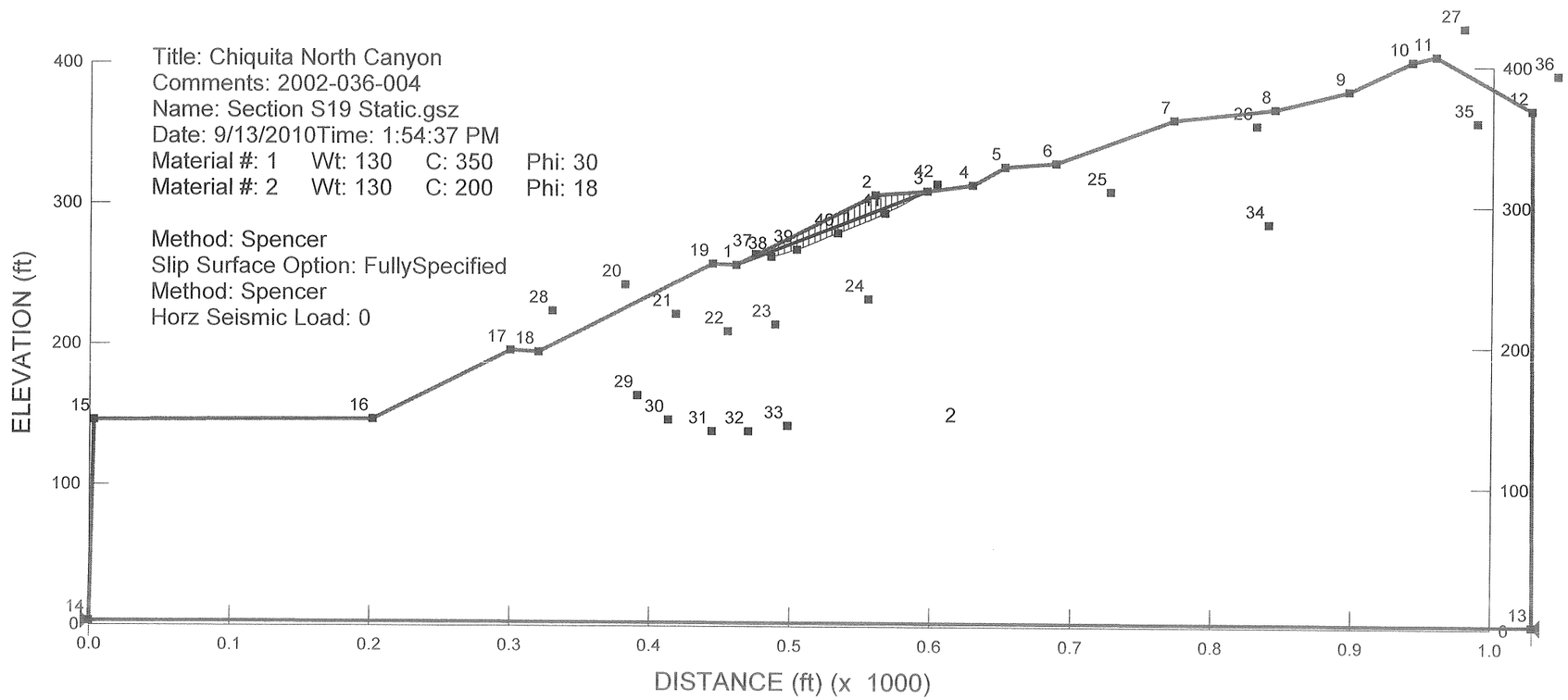
1.58


Title: Chiquita North Canyon
Comments: 2002-036-004
Name: Section S19 Static.gsz
Date: 9/13/2010Time: 1:54:37 PM
Material #: 1 Wt: 130 C: 350 Phi: 30
Material #: 2 Wt: 130 C: 200 Phi: 18
Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0
ELEVATION (ft)
DISTANCE (ft) (x 1000)
400
300
200
100
0
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
2

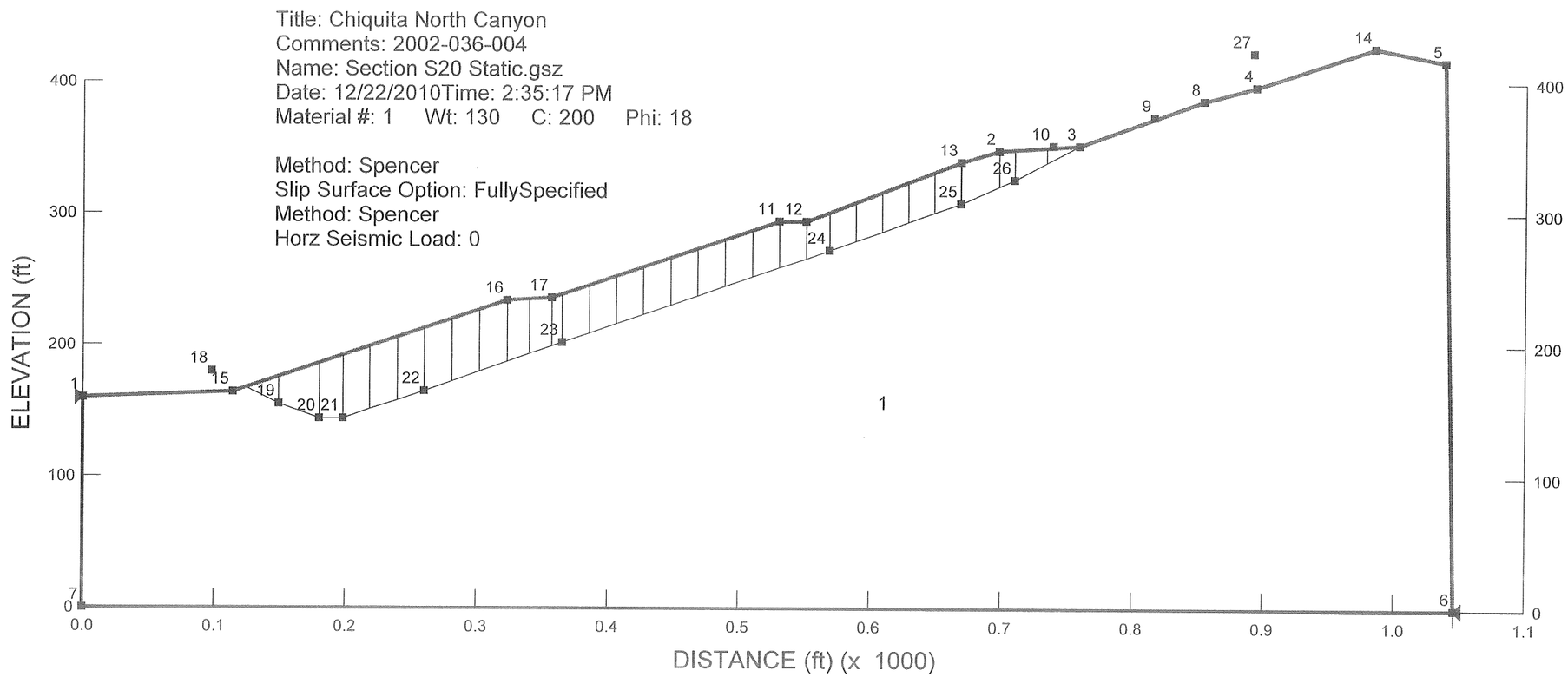
1.32


Title: Chiquita North Canyon
Comments: 2002-036-004
Name: Section S19 Static.gsz
Date: 9/13/2010Time: 1:54:37 PM
Material #: 1 Wt: 130 C: 350 Phi: 30
Material #: 2 Wt: 130 C: 200 Phi: 18
Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0
ELEVATION (ft)
DISTANCE (ft) (x 1000)
2

1.29

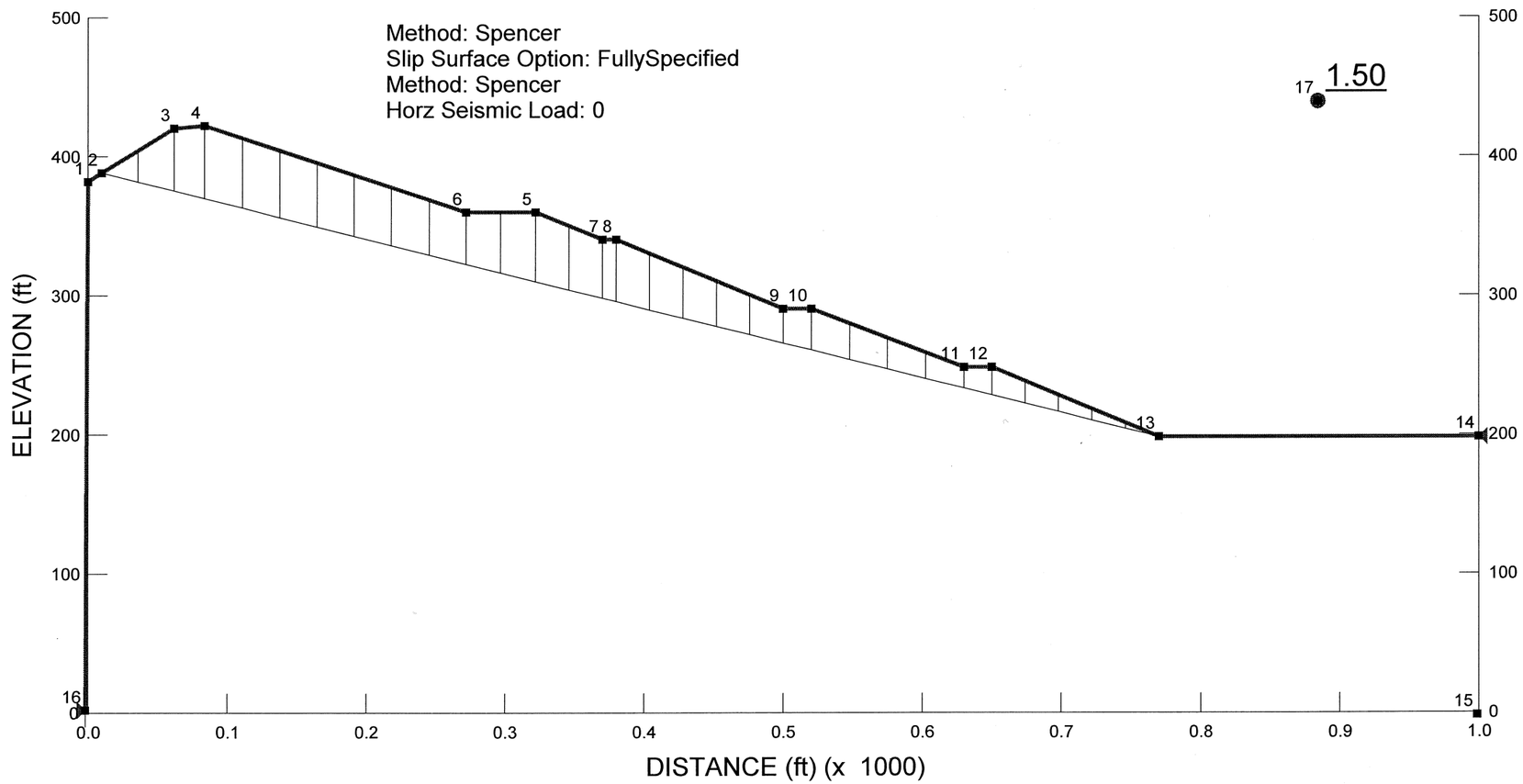

Title: Chiquita North Canyon
Comments: 2002-036-004
Name: Section S19 Static.gsz
Date: 9/13/2010Time: 1:54:37 PM
Material #: 1 Wt: 130 C: 350 Phi: 30
Material #: 2 Wt: 130 C: 200 Phi: 18
Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0
ELEVATION (ft)
DISTANCE (ft) (x 1000)
400
300
200
100
0
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0

1.34


Title: Chiquita North Canyon
Comments: 2002-036-004
Name: Section S20 Static.gsz
Date: 12/22/2010Time: 2:35:17 PM
Material #: 1 Wt: 130 C: 200 Phi: 18
Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0
ELEVATION (ft)
DISTANCE (ft) (x 1000)
0
100
200
300
400
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27

Title: Chiquita
Comments: 2002-036-004
Name: S23 Static.gsz
Date: 11/23/2011Time: 12:21:28 PM
Material #: 1 Wt: 130 C: 200 Phi: 18

Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0



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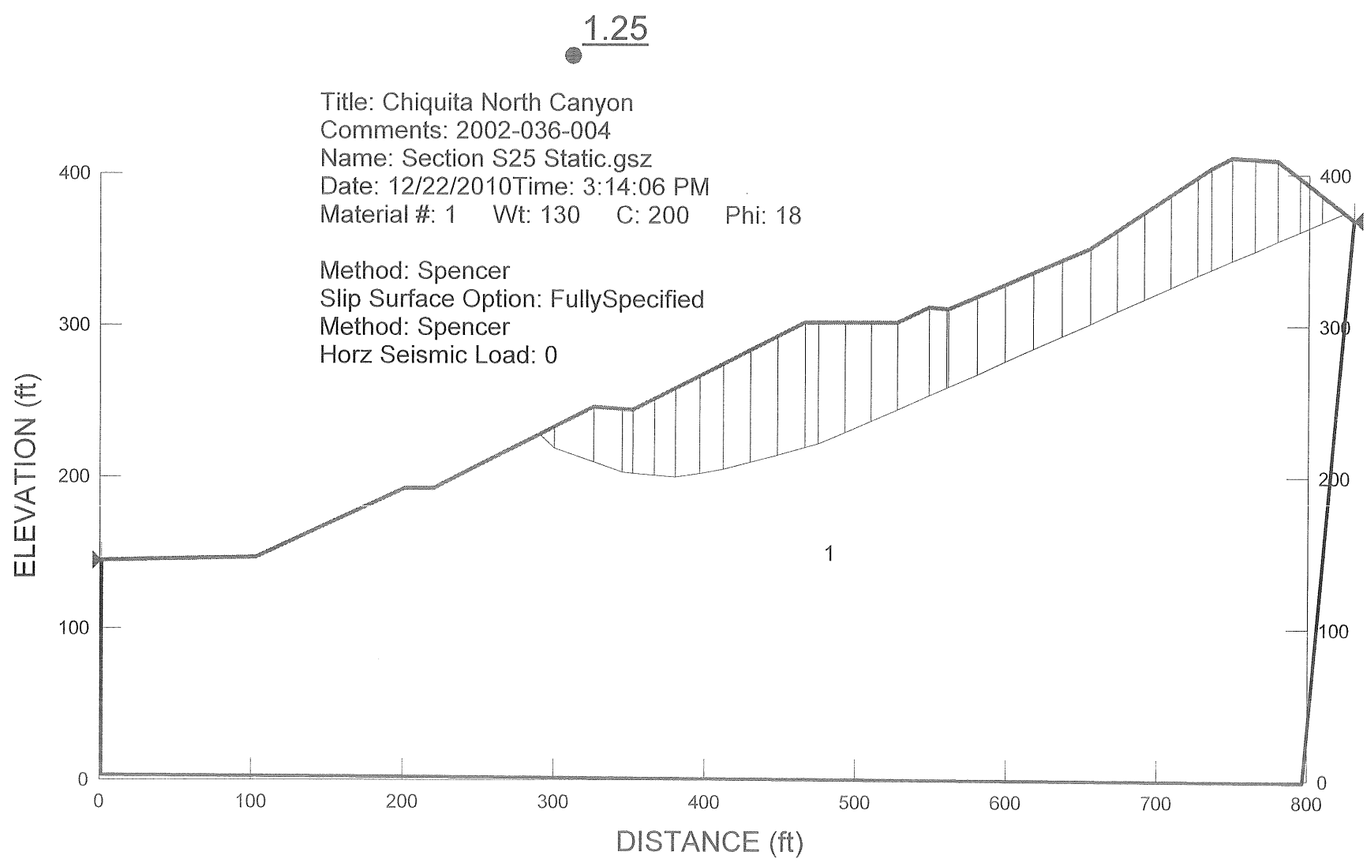
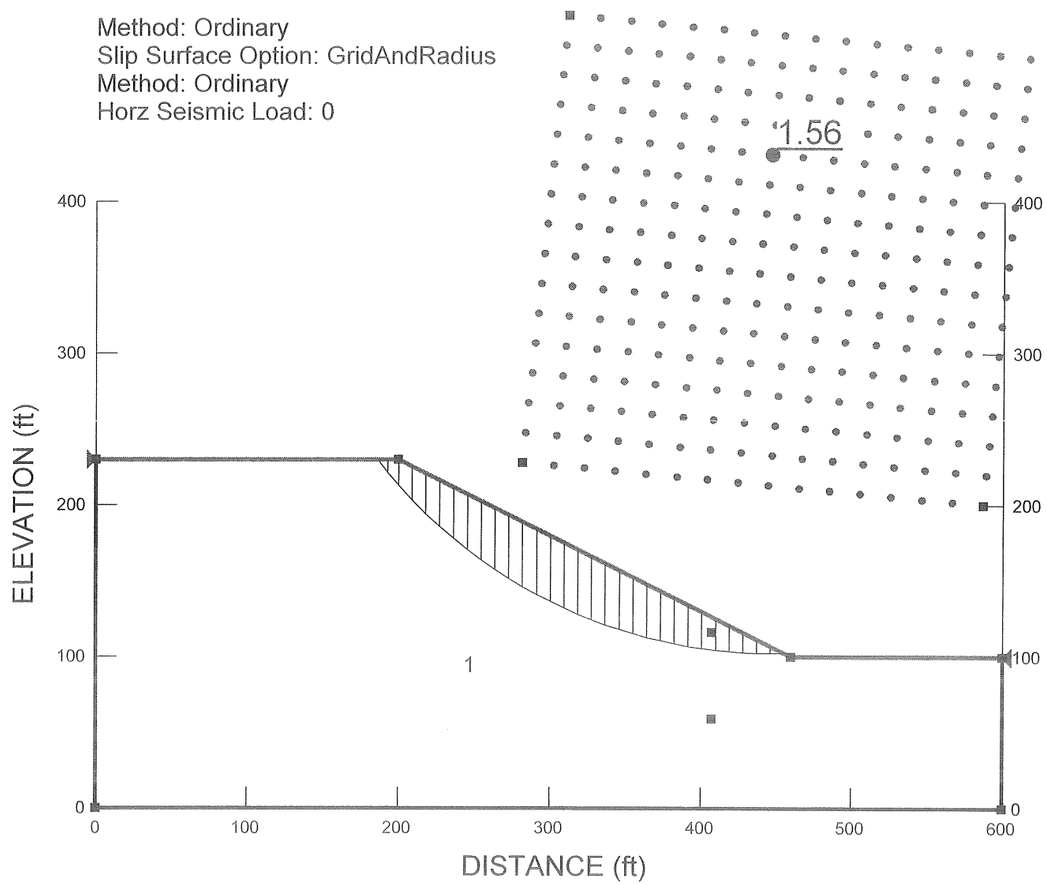

1.25
Title: Chiquita North Canyon
Comments: 2002-036-004
Name: Section S25 Static.gsz
Date: 12/22/2010Time: 3:14:06 PM
Material #: 1 Wt: 130 C: 200 Phi: 18
Method: Spencer
Slip Surface Option: FullySpecified
Method: Spencer
Horz Seismic Load: 0
1
ELEVATION (ft)
DISTANCE (ft)
0
100
200
300
400
500
600
700
800

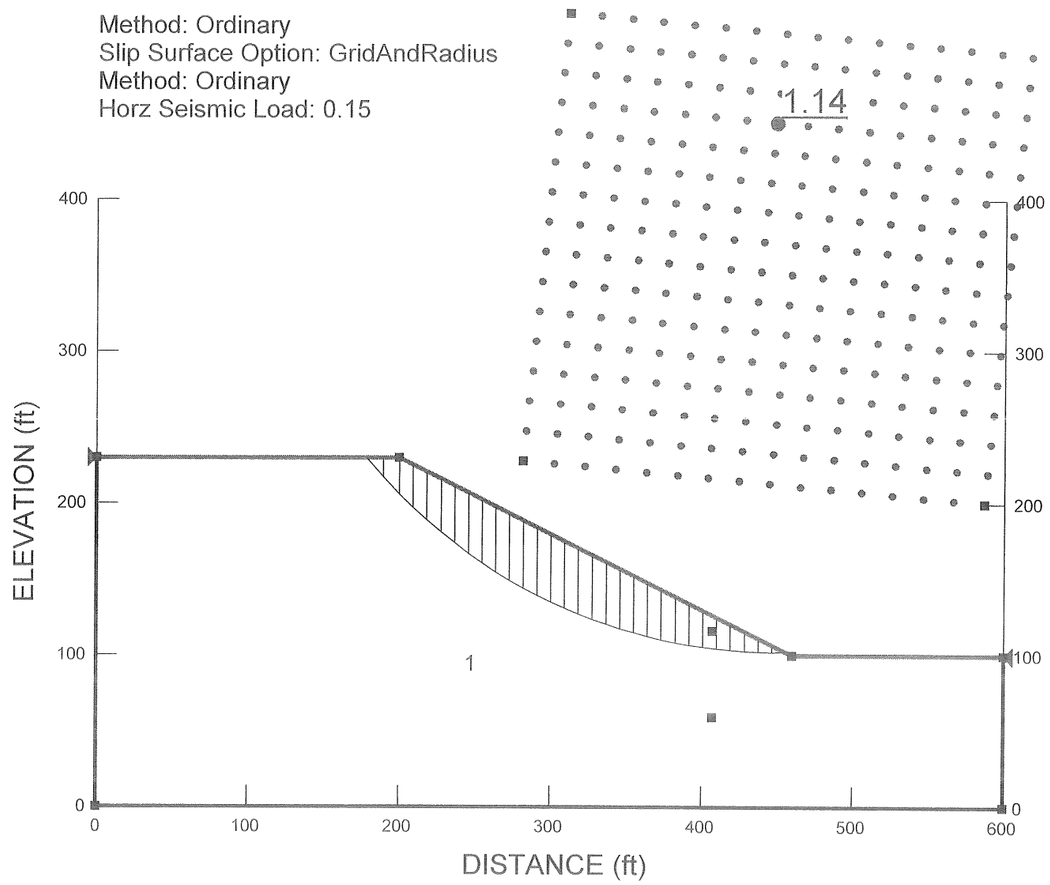
Title: Chiquita North Canyon
Comments: 130' High, 2:1 Compacted Fill Slope
Name: 130' Fill Slope Static.gsz
Date: 1/18/2011Time: 10:15:23 AM
Material #: 1 Wt: 130 C: 350 Phi: 30 Model: MohrCoulomb

Method: Ordinary
Slip Surface Option: GridAndRadius
Method: Ordinary
Horz Seismic Load: 0



Title: Chiquita North Canyon
Comments: 130' High, 2:1 Compacted Fill Slope
Name: 130' Fill Slope Seismic.gsz
Date: 1/18/2011Time: 10:14:07 AM
Material #: 1 Wt: 130 C: 350 Phi: 30 Model: MohrCoulomb

Method: Ordinary
Slip Surface Option: GridAndRadius
Method: Ordinary
Horz Seismic Load: 0.15



GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

May 23, 2014

Chiquita Canyon Landfill
29201 Henry Mayo Drive
Castaic, California 91384

Job No. 2002-036-004

Attention: Mr. Michael Dean
Division Vice President

Subject: Geotechnical Evaluation of Updated Excavation Plan
Master Plan Revision
Chiquita Canyon Landfill
29201 Henry Mayo Drive
Castaic, California

Gentlemen:

This letter summarizes the findings from R. T. Frankian & Associates' (RTF&A) geotechnical evaluation of the updated Chiquita Canyon Landfill (CCL) *Proposed Project Excavation Plan* (herein referred to as the 2014 Excavation Plan) for the Master Plan Revision (MPR). The 2014 Excavation Plan, prepared by Golder Associates (Golder) and dated April 30, 2014, supersedes the December 2011 Golder *Excavation Plan* presented in our January 27, 2012 MPR geotechnical investigation report (RTF&A, 2012c).

Since the completion of our 2012 MPR report, RTF&A has provided additional geotechnical services for CCL. These have included construction observation services during development of Cell 5 (RTF&A, 2012d and 2012e) and a geotechnical investigation for future Cell 6 (RTF&A, 2014). Geologic and geotechnical data developed for this additional work have been incorporated into this geotechnical evaluation.

R. T. FRANKIAN & ASSOCIATES
1329 SCOTT ROAD BURBANK CALIFORNIA 91504
TEL. (818) 531-1501 FAX (818) 531-1511 WWW.RTFRANKIAN.COM

SUMMARY OF 2014 EXCAVATION PLAN REVISIONS

The 2014 Excavation Plan revisions are primarily associated with the future landfill entrance facility and the Future Potential Conversion Technology Set-Aside Area (herein referred to as the "Set-Aside Area"). The landfill entrance facility will be located in the southwest corner of the CCL site, northwest of the intersection of California State Highway 126 (also known as Henry Mayo Drive in the vicinity of CCL) and Wolcott Way. It will include a new entrance road, scales, gatehouse, and administration building. The new entrance road alignment will extend westerly from the current intersection of Franklin Parkway and Wolcott Way, extending west-southwesterly toward the current landfill entrance. The 2011 Excavation Plan indicated the grading of two cut slopes at the west end of the entrance facility. Revisions to the entrance facility, as depicted on the 2014 Excavation Plan, indicate two additional cut slopes, and modification of one of the previously proposed cut slopes.

The Set-Aside Area will be located within a southerly-draining steep-walled canyon (herein referred to as "Wolcott Canyon") located immediately north of the intersection of Wolcott Way and Franklin Parkway. Potential grading for the Set-Aside Area will include construction of a near-level pad at approximate elevation 1025 feet above mean sea level (msl), with associated cut and fill slopes surrounding the pad. The Set-Aside Area pad will be accessible by way of road extending from the north end of Wolcott Way to the southwest corner of the graded pad.

The 2011 Excavation Plan indicated Potential Borrow Area cut slopes along the northern and northwestern walls of Wolcott Canyon. The 2014 Excavation Plan includes an additional Potential Borrow Area cut slope and pad southwest of the Set-Aside Area pad.

The grading associated with the 2014 Excavation Plan is indicated on our Geotechnical Map, presented as Figures 1.1 and 1.2. The 2014 Excavation Plan is included as Figure 2.

GEOTECHNICAL EVALUATION

The geotechnical evaluation was performed to provide additional temporary slope stability calculations for Cut Slope CS-7 and to assess the impact of the site geologic and geotechnical conditions relative to the revised MPR development at CCL, as depicted on the 2014 Excavation Plan. This included RTF&A evaluating the stability of proposed new cut slopes. The geologic conditions within the site are shown on the Geotechnical Map (Figures 1.1 and 1.2). The geologic data presented in our 2012 MPR report (RTF&A, 2012c) have been slightly modified to reflect new findings from studies post-dating our 2012 report, changed geologic interpretations, and/or corrections. Specifically, we have revised the depiction of the inactive faulting identified in East Canyon, based on our 2006 fault study (RTF&A, 2006b) and adjusted geologic contacts in the areas of Cell 5 and future Cell 6, based on additional geotechnical work (RTF&A, 2012d, 2012e, and 2014). The adjusted geologic contacts were mapped using the March 12, 2013 aerial survey prepared by Cooper Aerial Survey Co.

From a geotechnical standpoint, the most significant plan revisions relate to the grading proposed along the north side of the landfill entrance facility in which two new cut slopes (designated as Cut Slopes CS-26 and CS-27) are proposed, and a previously planned cut slope (Cut Slope CS-20) will be relocated and reduced in height. The three cut slopes are indicated on the Geotechnical Map (Figure 1.2). Data specific to the three cut slopes, including slope height, gradient, and underlying geologic conditions, are summarized in Table 1, Summary of Cut Slopes. The stability of the three cut slopes is addressed below. Additionally, we are providing a preliminary evaluation of the potential grading of the Set-Aside Area and Potential Borrow Area slopes.

We also received feedback from Los Angeles County Department of Public Works Geotechnical Materials and Engineering Division (GMED) relative to factor of safety requirements for the proposed temporary excavation slopes that have the potential to exist for an extended period of time. GMED indicated that a temporary factor of safety of 1.25 is acceptable for the proposed excavation slopes within the Chiquita Canyon Landfill property boundary.

However, any potential failure planes that daylight off property that have the potential to exist in an unmodified condition for an extended period of time will need to meet the GMED static factor of safety requirements of 1.5 for permanent slopes.

We have reviewed the numerous proposed cut slopes for the 2012 MPR Report and have determined that only proposed Cut Slope CS-7, depicted on Geotechnical Section S5-S5' (Figure 3 of this report), has the potential to exist unmodified for an extended period of time and has a failure plane that extends off-site that will have a factor of safety of less than 1.5. In addition to the revised geotechnical evaluation for plan revisions presented in this report, we also performed additional slope stability calculations for Cut Slope CS-7 as presented below. Table 1 from our MPR Report has been updated based on the slope stability evaluations and is re-presented in this report.

CUT SLOPE CS-7

Cut Slope CS-7 (Figure 1.1) will be graded as a southeast- to southwest-facing, 2:1 to 3:1 slope. The total slope height is approximately 205 feet high, with the upper (permanent) portion of the cut slope approximately 35 feet high and the lower (lined) portion of the slope 170 feet high. The cut slope will encounter Saugus Formation units and landslides Qls G through Qls I, and Qls L. Bedding in the underlying Saugus Formation strikes from north-south to northeast, with easterly dips between 20 and 40 degrees. As indicated on Geotechnical Section S5-S5' (Figure 3), a daylighted bedding component of 17 degrees will be exposed in the cut slope (RTF&A, 2012c). It is anticipated that grading of Cut Slope CS-7 will remove landslides Qls G through Qls I, and Qls L. If any landslide debris remains after completion of the cut slope, the debris should be removed and certified engineered fill placed to restore grade.

Cut Slope CS-7 has the potential to exist for an extended period of time and has a potential bedding plane that extends beyond the Chiquita Canyon Landfill property limit. Accordingly, a static factor of safety of 1.5 will be required. As presented in the MRP report (RTF&A, 2012c), the static factor of safety is greater than 1.25, but is less than 1.5. Slope

stability calculations were performed for a buttress shear key design that meets the GMED slope stability static factor of safety requirements of 1.5. The slope stability calculations were performed using the below listed shear strength parameters and the computer program Slope/W. The slope stability calculations are presented in the Appendix of this report. The proposed buttress shear key and the slope stability results that exceed a static factor of safety of 1.5 are shown on Geotechnical Section S5-S5'.

The recommended shear strength parameters are based on the results of the direct shear test results (RTF&A, 2012c). In addition, we also reviewed shear strength parameters presented in the referenced report for the subject site and nearby vicinity. Presented in the following table are the selected bedding plane shear strengths, as well as the cross-bedding and compacted fill shear strengths recommended for slope stability evaluation at the site.

MATERIAL	COHESION (psf)	ANGLE OF SHEARING RESISTANCE (degrees)
Landslide Failure Plane (MSR)	100	10
QTs & Tp Bedding Plane (MSR)	200	18
Seismic Bedding Plane (SSR)	300	26
QTs Cross Bedding (SSR)	600	36
Tp Cross Bedding (SSR)	500	30
Compacted Fill (SSR)	350	30

Mitigation to obtain a permanent factor of safety of 1.5 for Cut Slope CS-7 will consist of excavating a 40-foot-wide buttress shear key at approximate elevation of 1,300 feet, downgradient from the proposed perimeter road, as depicted on Figure 1.1 and attached Geotechnical Section S5-S5'. Construction of the recommended buttress shear key provides the required factor of safety of 1.5 for static slope stability conditions, as presented in Figure 3 and the Appendix.

CUT SLOPE CS-20

Cut Slope CS-20 will be graded as a southeast-facing, 2:1 (horizontal:vertical) slope, to a height of approximately 30 feet. The cut slope will be graded for a debris basin along the north

side of the project. The upper portion of the cut slope will expose Saugus Formation units; Pleistocene terrace deposits could be encountered in the lower portion of CS-20. Bedding in the Saugus Formation strikes northwest and dips 15 degrees to the northeast, with an apparent bedding of 6 degrees dipping into the proposed cut slope. The Saugus Formation bedding orientation is favorable with respect to the southeast-facing cut slope. Bedding within the terrace deposits is essentially flat-lying and is grossly stable. Accordingly, Cut Slope CS-20 is considered grossly stable from a geologic standpoint.

CUT SLOPE CS-26

Cut Slope CS-26 is proposed as an 85-foot-high, southwest-facing, 2:1 slope. The cut slope will expose Saugus Formation units in which the underlying bedding strikes northwest and dips 12 degrees towards the northeast. This bedding orientation is favorable with respect to southwest-facing cut slope, and Cut Slope CS-26 is considered grossly stable from a geologic standpoint.

CUT SLOPE CS-27

Cut Slope CS-27 will consist of a 75-foot-high, south- to southwest-facing, 2:1 slope. The cut slope is underlain by Saugus Formation units in which the bedding strikes northwest, dipping 15 to 25 degrees towards the northeast. This bedding orientation is favorable with respect to Cut Slope CS-27, and the cut slope is considered grossly stable from a geologic standpoint.

POTENTIAL SET-ASIDE AREA AND BORROW AREA SLOPES

The 2014 Excavation Plan includes grading for potential improvements in the Set-Aside Area and three Potential Borrow Areas, as depicted with green elevation contours on Figure 1.2. As shown on Figure 1.2, perimeter cut slopes would be created for any grading associated with the Set-Aside Area pad, including slopes on the north and east sides of the pad, as well as a

borrow area slope along the northwest side. These slopes would range from 100 feet on the north and east to approximately 125 feet for the northwest borrow area slope. The proposed pad elevation of the Set-Aside Area would be established at an elevation of approximately 1025 feet msl. Additionally, borrow area slopes would be graded along the western and northern walls of Wolcott Canyon. The maximum proposed heights for these slopes range from 100 feet to 225 feet.

The cut slopes will encounter sedimentary bedrock units of the Saugus Formation, with the underlying bedding striking northwest and dipping approximately 20 to 40 degrees towards the northeast. Based on the orientation of bedding relative to cut slopes, there is a potential for adversely dipping, or "daylighted," bedding for the easterly-facing cut slopes along the western side of Wolcott Canyon. Potential daylighted bedding may require some type of stabilization, such as buttresses, retaining walls, or flattening of the cut slope gradient.

Landslides would likely be encountered in the 160-foot-high borrow area cut slope in the southwest corner of the Set-Aside Area, and in the borrow area cut slope along the north wall of Wolcott Canyon. Both landslides would require complete removal to establish a stable slope configuration if the potential grading depicted on the 2014 Excavation Plan is implemented. If the cut slopes do not effectively remove the landslides, additional excavation deeper than the proposed cut grades would be necessary to remove the slide debris, and the slope grades restored with engineered fill.

The floor of the Set-Aside Area is mantled by Holocene alluvial deposits. These materials may be susceptible to liquefaction and/or hydroconsolidation. If grading of the Set-Aside Area is performed, alluvial deposits determined to be susceptible to liquefaction or hydroconsolidation would need to be removed and replaced with engineered fill materials.

Once site-specific grading plans are developed for the Set-Aside Area and the Potential Borrow Area slopes, geotechnical investigations will need to be performed to refine the geotechnical mitigation measures and recommendations addressed above.

SECTION 111 STATEMENT

Based on our review of the 2014 Excavation Plan and the referenced reports, it is our professional opinion that the proposed MPR development will be safe from hazard of landslide, settlement, or slippage and will not adversely affect the geotechnical conditions of off-site properties, provided our recommendations and the requirements of the Los Angeles County Building Code are followed.

Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers and geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional advice included in this report. This report has been prepared for CCL and their design consultants, to be used solely for planning and design of the MPR and associated grading.

The following are attached and complete this report.

- Table 1 – Summary of Cut Slopes
- Geotechnical Map – Figures 1.1 and 1.2
- 2014 Excavation Plan, titled "Proposed Project Excavation Plan" – Figure 2
- Geotechnical Section S5-S5' – Figure 3
- Appendix – Stability Analyses

PROFESSIONAL GEOLOGIST NO. 3749
TIMOTHY P. LATIOLAIT
#1140
CERTIFIED
ENGINEERING
GEOLOGIST
Expires: 12-31-15
STATE OF CALIFORNIA

Respectfully submitted,

R. T. FRANKIAN & ASSOCIATES

by: Timothy P. Latiolait
Principal Engineering Geologist

PROFESSIONAL GEOLOGIST NO. 4407
THEODORE M. CLARK
#1736
CERTIFIED
ENGINEERING
GEOLOGIST
EXPIRES: 4-30-14
STATE OF CALIFORNIA

and: Theodore M. Clark
Principal Geologist

REGISTERED PROFESSIONAL ENGINEER
ALAN W. RASPLICKA
No. GE 2558
GEOTECHNICAL
STATE OF CALIFORNIA

and: Alan W. Rasplicka
Principal Geotechnical Engineer

TPL/TMC/AWR/eaw

Distribution: (2) Chiquita Canyon Landfill (plus PDF via email)
1 - Attn: Mr. Michael Dean
1 - Attn: Mr. Steve Cassulo
(1) CH2M Hill (plus PDF via email and CD)
Attn: Ms. Colleen Bredensteiner
Law Offices of Scott Gordon (PDF via email only)
Attn: Mr. Scott Gordon
Golder Associates (PDF via email only)
Attn: Mr. Rich Haughey

RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

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TABLE 1

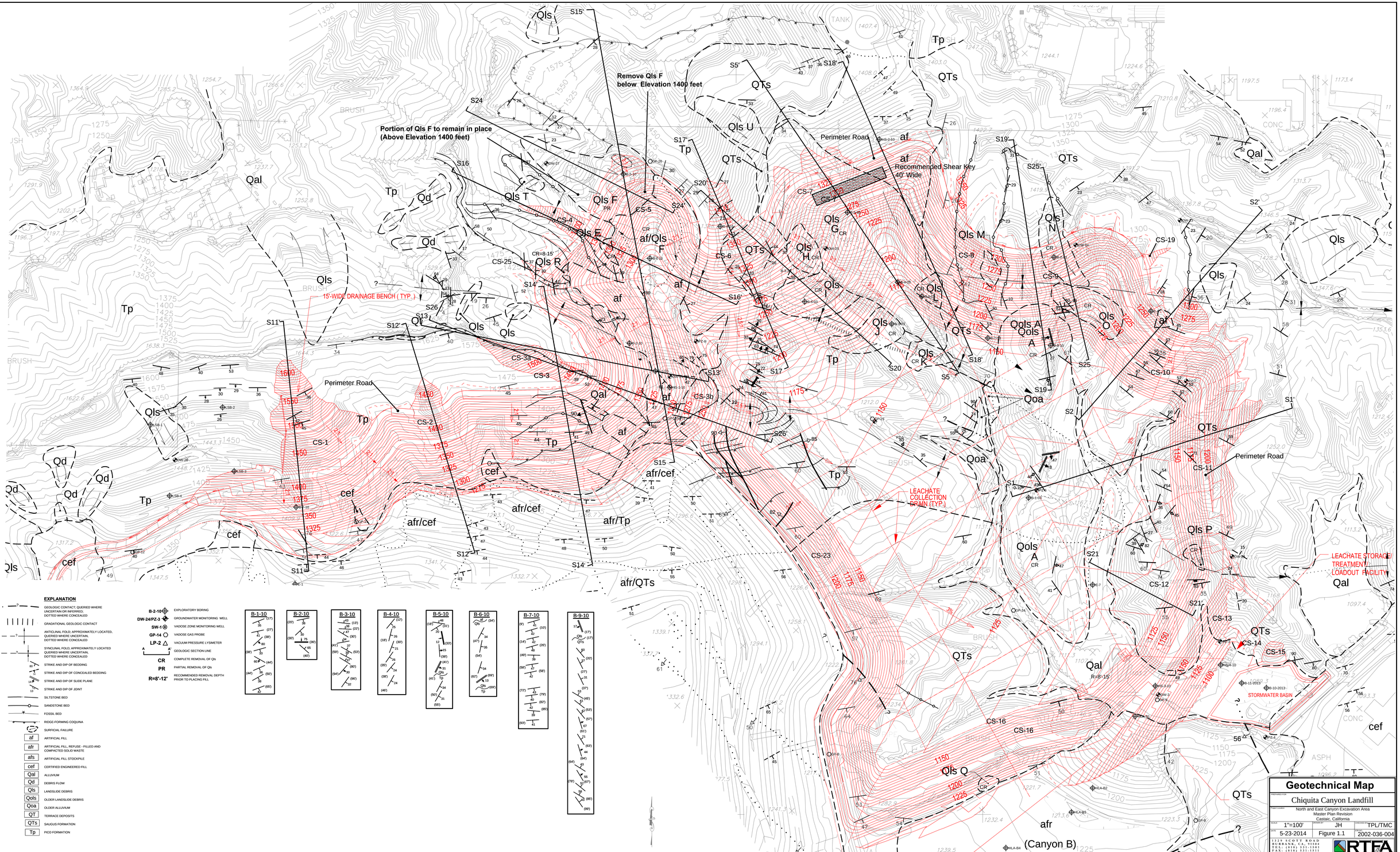
SUMMARY OF CUT SLOPES
North Canyon Expansion

CUT SLOPE	FIGURE NO.	SLOPE GRADIENT	SLOPE HEIGHT (total/permanent)	SLOPE FACE DIRECTION	GEOLOGIC MATERIALS	GEOLOGIC SECTION	GEOLOGIC STABILITY	ADDITIONAL RECOMMENDED GRADING
CS-1	1.1	2:1	300'/200'	S to SE	Tp	S11-S11'	Bedding dipping steeper than slope gradient; grossly stable	None
CS-2	1.1	2:1	150'/80'	SSE	Tp	S12-S12'	Bedding dipping steeper than slope gradient; grossly stable	None
CS-3a	1.1	2:1	220'/175'	ESE	Tp	S13-S13', S26-S26'	Bedding dipping parallel to or steeper than slope gradient; grossly stable	None
CS-3b	1.1	2:1	75'/0	ESE	Tp	S26-S26'	Bedding dipping steeper than slope gradient; grossly stable	None
CS-4	1.1	2:1 to 4:1	210'/120'	SE	Tp, Qls E, Qls F, af	S16-S16'	Bedding dipping parallel to or steeper than slope gradient; grossly stable	Qls E & Qls F and af to be removed during grading
CS-5	1.1	2:1 to 3:1	120'/30'	SE to S	Tp, Qls F, af	S15-S15', S24-S24'	Daylighted bedding; stable by analyses	Remove Qls F and af below elevation 1400 feet; reconstruct as stability fill to restore grade
CS-6	1.1	2½:1 to 3:1	290'/95'	SSE	Tp, QTs, Qls H-J	S17-S17', S20-S20'	Daylighted bedding; stable by analyses	Remove Qls H through Qls J during grading
CS-7	1.1	2:1 to 3:1	205'/35'	SE to SW	QTs, Qls G - I, & L, af	S5-S5'	Daylighted bedding; stable by analyses	Construct 40 feet wide shear key at approximate elevation 1300 feet. Shear key should extend through QTs units and 5 feet into Tp units.
CS-8	1.1	2:1	225'/75'	SW	QTs	---	Favorable bedding; grossly stable	None
CS-9	1.1	2:1	150'/0	S	QTs, Qols A, Qls N, Qls O	S19-S19', S25-S25'	Daylighted bedding; slope stable by analyses	Qols A, Qls N & Qls O to be removed during grading. Restore existing grades above MPR grading footprint with engineered fill.
CS-10	1.1	2:1	185'/75'	SW	QTs	S2-S2'	Favorable bedding; grossly stable	None
CS-11	1.1	2:1	150'/65'	WSW	QTs	S1-S1'	Favorable bedding; grossly stable	None
CS-12	1.1	2:1	100'/100'	NW and SE	QTs, Qls P	S21-S21'	Favorable bedding; grossly stable	None
CS-13	1.1	2:1	50'/50'	SW	QTs	---	Favorable bedding; grossly stable	None
CS-14	1.1	2:1	20'/20'	SW	QTs	---	Favorable bedding; grossly stable	None
CS-15	1.1	2:1	50'/50'	SW	QTs	---	Favorable bedding; grossly stable	None

TABLE 1

SUMMARY OF CUT SLOPES
North Canyon Expansion

CUT SLOPE	FIGURE NO.	SLOPE GRADIENT	SLOPE HEIGHT (total/permanent)	SLOPE FACE DIRECTION	GEOLOGIC MATERIALS	GEOLOGIC SECTION	GEOLOGIC STABILITY	ADDITIONAL RECOMMENDED GRADING
CS-16	1.1	2:1	110'/0	NW	QTs	---	Favorable bedding; grossly stable	None
CS-17	1.2	2:1	160'/160'	S	QTs, Qt	S22-S22', S27-S27'	Favorable bedding; grossly stable	Construct stability fill slopes above and below entrance to control erosion
CS-18	1.2	2:1	200'/200'	E	QTs, Qls A	S23-S23'	Daylighted bedding; stable by analyses	Qls A to be removed during grading; if needed place engineered fill to restore slope grades
CS-19	1.1	2:1	50'/50'	WSW	QTs	---	Favorable bedding; grossly stable	None
CS-20	1.2	2:1	30'/30'	SE	QTs, Qt	---	Favorable bedding; grossly stable	None
CS-21	1.2	2:1	85'/85'	W	QTs	---	Favorable bedding; grossly stable	None
CS-22	1.2	2:1	100'/100'	SSE	QTs	---	Favorable bedding; grossly stable	None
CS-23	1.1	2:1	85'/0	ENE to E	Tp, QTs	---	Favorable bedding; grossly stable	None
CS-24	1.2	2-1/2:1	235'/60'	E to N	QTs, afs	---	Bedding dipping steeper than slope gradient; grossly stable	Remove "afs" and reconstruct as engineered fill slope
CS-25	1.1	2:1	35'/35'	SE	Tp	---	Bedding dipping steeper than slope gradient; grossly stable	None
CS-26	1.2	2:1	85'/85'	SW	QTs	---	Favorable bedding; grossly stable	None
CS-27	1.2	2:1	75'/75'	SW	QTs	---	Favorable bedding; grossly stable	None


Remove Qls F below Elevation 1400 feet
Portion of Qls F to remain in place (Above Elevation 1400 feet)
Perimeter Road
Recommended Shear Key 40' Wide
15'-WIDE DRAINAGE BENCH (TYP.)
LEACHATE COLLECTION DRAIN (TYP.)
LEACHATE STORAGE TREATMENT/ LOADOUT FACILITY
STORMWATER BASIN
(Canyon B)
EXPLANATION
GEOLOGIC CONTACT; QUERIED WHERE UNCERTAIN OR INFERRED; DOTTED WHERE CONCEALED
GRADATIONAL GEOLOGIC CONTACT
ANTICLINAL FOLD; APPROXIMATELY LOCATED; QUERIED WHERE UNCERTAIN; DOTTED WHERE CONCEALED
SYNCLINAL FOLD; APPROXIMATELY LOCATED QUERIED WHERE UNCERTAIN; DOTTED WHERE CONCEALED
STRIKE AND DIP OF BEDDING
STRIKE AND DIP OF CONCEALED BEDDING
STRIKE AND DIP OF SLIDE PLANE
STRIKE AND DIP OF JOINT
SILTSTONE BED
SANDSTONE BED
FOSSIL BED
RIDGE-FORMING COQUINA
SURFICIAL FAILURE
af ARTIFICIAL FILL
afr ARTIFICIAL FILL, REFUSE - FILLED AND COMPACTED SOLID WASTE
afs ARTIFICIAL FILL STOCKPILE
cef CERTIFIED ENGINEERED FILL
Qal ALLUVIUM
Qd DEBRIS FLOW
Qls LANDSLIDE DEBRIS
Qols OLDER LANDSLIDE DEBRIS
Qoa OLDER ALLUVIUM
QT TERRACE DEPOSITS
QTs SAUGUS FORMATION
Tp PICO FORMATION
B-2-10 EXPLORATORY BORING
DW-24/PZ-3 GROUNDWATER MONITORING WELL
SW-1 VADOSE ZONE MONITORING WELL
GP-14 VADOSE GAS PROBE
LP-2 VACUUM PRESSURE LYSIMETER
A A' GEOLOGIC SECTION LINE
CR COMPLETE REMOVAL OF Qls
PR PARTIAL REMOVAL OF Qls
R=8'-12' RECOMMENDED REMOVAL DEPTH PRIOR TO PLACING FILL
B-1-10
B-2-10
B-3-10
B-4-10
B-5-10
B-6-10
B-7-10
B-9-10
Geotechnical Map
PREPARED FOR
Chiquita Canyon Landfill
PROJECT LOCATION
North and East Canyon Excavation Area
Master Plan Revision
Castaic, California
SCALE 1"=100'
DRAWN BY JH
CHECKED BY TPL/TMC
DATE 5-23-2014
Figure 1.1
2002-036-004
1129 SCOTT ROAD
BURBANK, CA. 91504
TEL: (818) 331-1501
FAX: (818) 331-1511
www.rtfrankian.com
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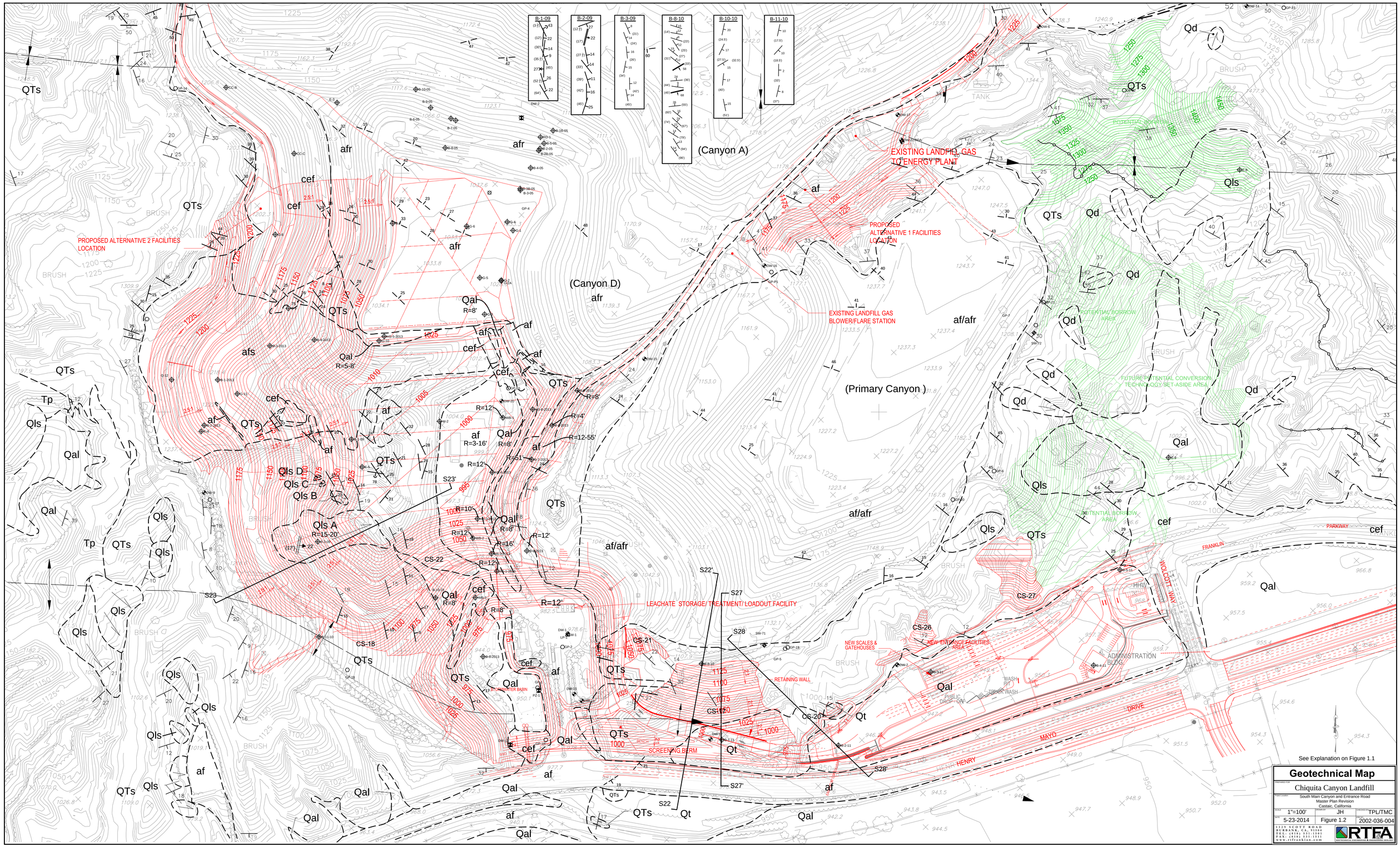
GEOTECHNICAL ENGINEERING & ENVIRONMENTAL DESIGN



Geotechnical Map

PREPARED FOR: Chiquita Canyon Landfill

PROJECT LOCATION: South Main Canyon and Entrance Road Master Plan Revision, Castaic, California

SCALE	DRAWN BY	DESIGNED BY
1"=100'	JH	TPL/TMC
DATE: 5-23-2014	Figure 1.2	JOB NO.: 2002-036-004

3339 ACOSTA ROAD
BURBANK, CA. 91504
TEL: (818) 531-1501
FAX: (818) 531-1531
www.rtfrankfurt.com
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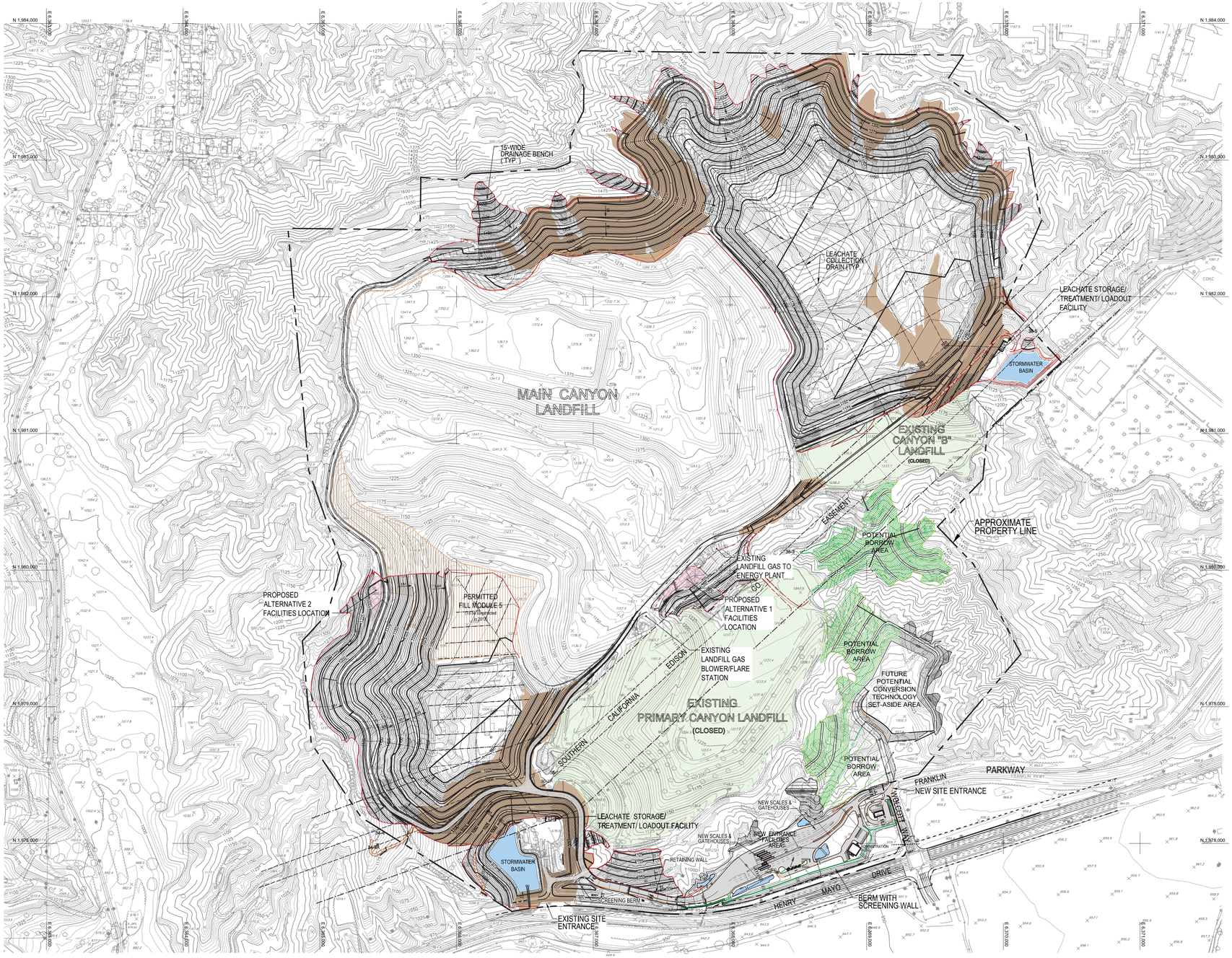
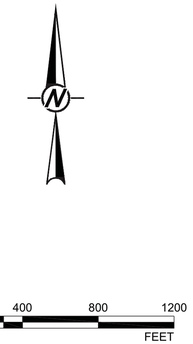
GEOTECHNICAL ENGINEERING & ENVIRONMENTAL SCIENCES





LEGEND

- EXISTING LIMIT OF LANDFILL
- CLOSED PERMITTED LANDFILL AREA
- POTENTIAL BORROW AREA
- EARTHFILL
- ALTERNATIVE EQUIPMENT/MAINTENANCE AREA

NOTES

1. BASE COMPILED BY PHOTOGRAMMETRIC METHODS BY DON READ CORPORATION, BREA, CA. DATE OF PHOTOGRAPHY: OCTOBER 17, 2012

CLIENT
WASTE CONNECTIONS INC.

PROJECT
CHIQUITA CANYON LANDFILL
LOS ANGELES COUNTY, CALIFORNIA

TITLE
PROPOSED PROJECT EXCAVATION PLAN

CONSULTANT

Golder Associates

YYYY-MM-DD	2014-04-30
PREPARED	KLT
DESIGN	SER
REVIEW	RDH
APPROVED	RDH

PROJECT No. 0939747303 | Rev. | FIGURE 2-3

RTF&A JOB NO. 2002-036-004 REPORT DATED 5-23-2014

Path: G:\CAD\VAULT_CAD\Chiquita Canyon LF\99_PROJECTS\0939747303_ChiquitaCanyon\0101_MasterPlanRev\02_PRODUCTION\DWG\2014_04_29_EntranceUpdate | File Name: Optimized EXC-300_APR_2014.dwg

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D
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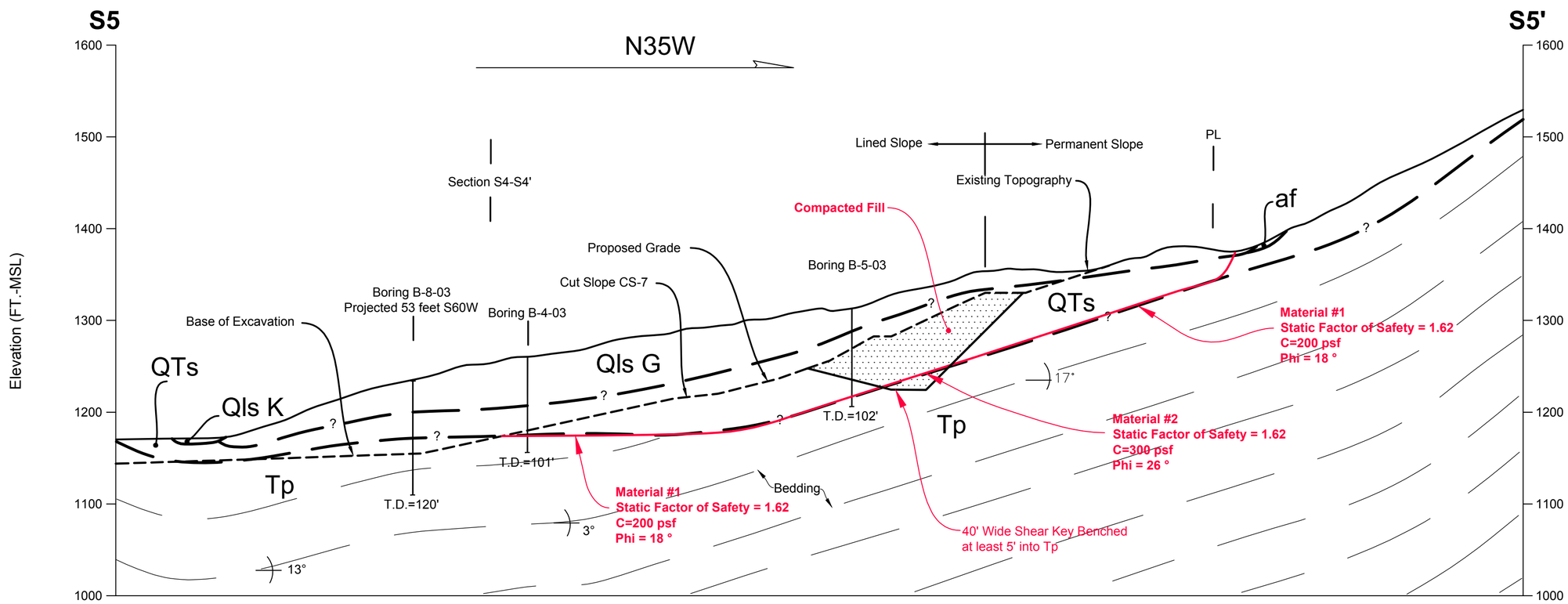

Geotechnical Section

PREPARED FOR

Chiquita Canyon Landfill

Project Location

Tract No. 53901-01
Valencia, California

SCALE	DRAWN BY	CHECKED BY
1" = 100'	JH	TPL/AWR
DATE 5-23-2014	Figure 3	JOB NO. 2002-036-004

1329 SCOTT ROAD
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RTF&A
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

Chiquita Canyon Landfill
May 23, 2014
2002-036-004

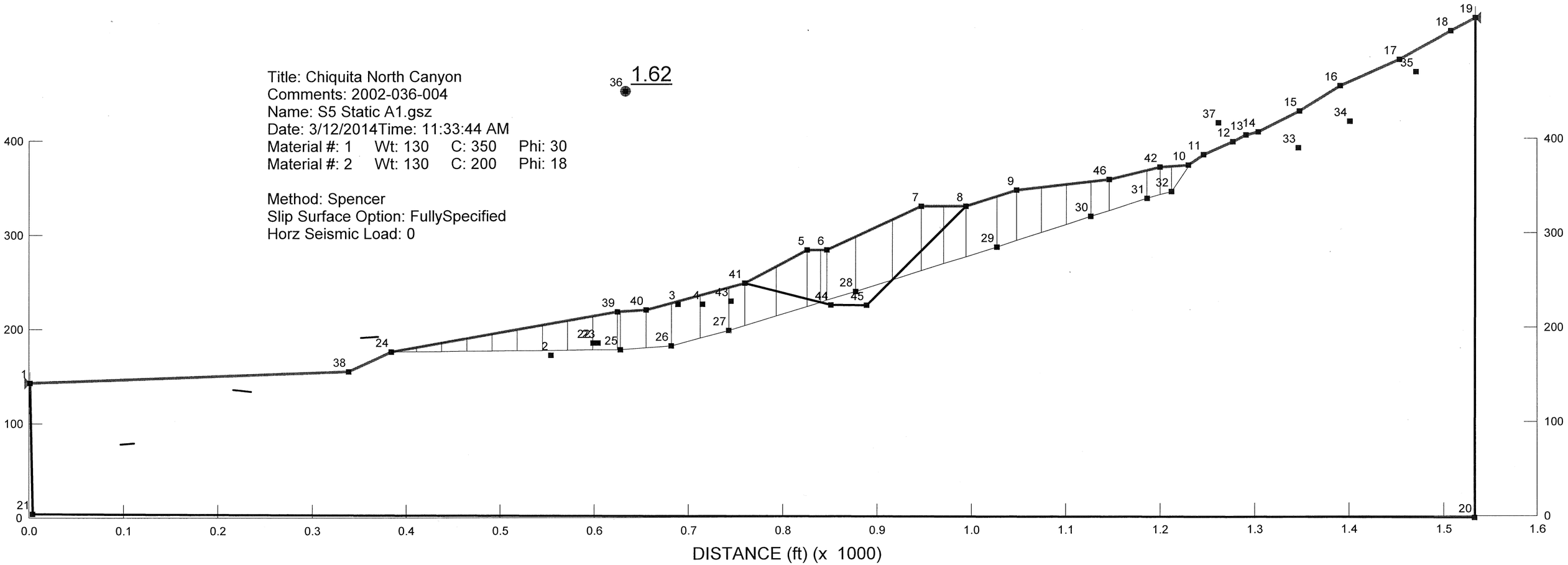
APPENDIX

STABILITY ANALYSES

GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

Title: Chiquita North Canyon
Comments: 2002-036-004
Name: S5 Static A1.gsz
Date: 3/12/2014Time: 11:33:44 AM
Material #: 1 Wt: 130 C: 350 Phi: 30
Material #: 2 Wt: 130 C: 200 Phi: 18

Method: Spencer
Slip Surface Option: FullySpecified
Horz Seismic Load: 0



JOB NO. 2002-036-004
REPORT DATED 5-23-2014

APPENDIX

Summary of Biological Surveys Conducted at Chiquita Canyon Landfill

PREPARED FOR: Waste Connections, Inc.

PREPARED BY: CH2M HILL

DATE: March 2014

This technical memorandum outlines the biological surveys and associated results that have been conducted at Chiquita Canyon Landfill (CCL) Master Plan Revision (Proposed Project), which is located on the north side of State Route 126 (SR-126), west of Interstate 5 (I-5) in the Santa Clarita Valley area of Los Angeles County.

Biological Surveys

A comprehensive list of biological sampling that was conducted at the Project site is provided in Table 1-1.

TABLE 1-1
Comprehensive List of Sampling Performed at the Project Site

Biologist Affiliation	Sampling Purpose	Sampling Dates
CH2M HILL	Avian Surveys	April 3, 2002
CH2M HILL	Amphibian Surveys	April 3, May 14, and 24, 2002
CH2M HILL	Reptile Surveys	April 3 and May 26, 2002
CH2M HILL	California gnatcatcher Surveys	May 16, 31, June 6, 13, 20, and 27, 2002
CH2M HILL	Bat Surveys	May 14 and 24, 2002
CH2M HILL	Special-Status Plant Survey	May 24, 31, and June 28, 2002
CH2M HILL	Vegetation Mapping	June 28, 2002
CH2M HILL	Vegetation Monitoring	December 21-22, 2004
CH2M HILL	Vegetation Mapping	September 28, 2005
CH2M HILL	Vegetation Monitoring	July 27, 2007
CH2M HILL	Surface Waters Delineation	December 3-5, 2007
CH2M HILL	Vegetation Monitoring	December 3-4, 2007
CH2M HILL	Vegetation Monitoring	October 13-14, 2008
CH2M HILL	Vegetation Monitoring	September 1-2, 2009
CH2M HILL	Vegetation Mapping	June 9, 2010
CH2M HILL	Vegetation Monitoring	November 15-16, 2010
CH2M HILL	Vegetation Monitoring	September 26-28, 2011
CH2M HILL	Vegetation Assessment	August 4-5 and October 14, 2011
CH2M HILL	Vegetation Monitoring	September 25-26, 2012
CH2M HILL	Sediment Basin Survey	September 30, 2013

Observed Species within the Project Boundary

A comprehensive list of observed wildlife species is provided in Table 1-2 and plant species document within the Project area are shown in Table 1-3.

TABLE 1-2
List of Wildlife Species Observed at the Project Site

Common Name	Scientific Name
Birds	
Anna's hummingbird	*Calypte anna*
Ash-throated flycatcher	*Myiarchus cinerascens*
Bewick's wren	*Thryomanes bewickii*
Bullock's oriole	*Icterus bullockii*
Bushtit	*Psaltriparus minimus*
California quail	*Callipepla californica*
California thrasher	*Toxostoma redivivum*
California towhee	*Pipilo crissalis*
Cliff swallow	*Petrochelidon pyrrhonata*
Common raven	*Corvus corax*
Costa's hummingbird	*Calypte costae*
Gull	*Larus* sp.
Horned lark	*Eremophila alpestris*
House finch	*Carpodacus mexicanus*
Lesser goldfinch	*Carduelis psaltria*
Mourning dove	*Zenaida macroura*
Northern mockingbird	*Mimus polyglottos*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Nuttall's woodpecker	*Picoides nuttallii*
Phainopepla	*Phainopepla nitens*
Prairie falcon	*Falco mexicanus*
Red-tailed hawk	*Buteo jamaicensis*
Rock wren	*Salpinctes obsoletus*
Rufous-crowned sparrow	*Aimophila ruficeps*
Spotted towhee	*Pipilo maculatus*
Turkey vulture	*Cathartes aura*
Western kingbird	*Tyrannus verticalis*
Western scrub-jay	*Aphelocoma californica*
White-throated swift	*Aeronautes saxatalis*
Wrentit	*Chamaea fasciata*

TABLE 1-2
List of Wildlife Species Observed at the Project Site

Common Name	Scientific Name
Mammals	
Bobcat	*Lynx rufus*
Coyote	*Canis latrans*
Deer mouse	*Peromyscus maniculatus*
Desert cottontail	*Sylvilagus audubonii*
Dusky-footed woodrat	*Neotoma fuscipes*
Gray fox	*Urocyon cinereoargenteus*
Mule deer	*Odocoileus hemionus*
Reptiles	
Coachwhip	*Masticophus flagellum*
San Diego gopher snake	*Pituophis melanoleucus annectens*
Side-blotched lizard	*Uta stansburiana*
Western fence lizard	*Sceloporus occidentalis*
Western diamondback rattlesnake	*Crotalus atrox*
Western rattlesnake	*Crotalus viridis*

TABLE 1-3
List of Plant Species Observed at the Project Site

Scientific Name	Common Name
Adenostoma fasciculatum	Chamise
Ambrosia acanthicarpa	Annual bursage
Ambrosia psilostachya	Western ragweed
Artemisia californica	California sagebrush
Artemisia douglasiana	Mugwort
Aster spp.	Aster
Atriplex canescens	Fourwing saltbush
Atriplex lentiformis	Quail bush
Atriplex semibaccata	Australian saltbush
Avena barbata	Slender wild oat
Avena spp.	Wild oat
Baccharis pilularis	Coyote bush
Baccharis salicifolia	Mule fat
Brassica nigra	Black mustard
Bromus diandrus	Rip-gut brome
Bromus hordeaceus	Soft chess
Bromus madritensis ssp. *rubens*	Red brome

TABLE 1-3
List of Plant Species Observed at the Project Site

Scientific Name	Common Name
Bromus tectorum	Cheat grass
Carduus pycnocephalus	Italian thistle
Centaurea melitensis	Tocalote
Cercocarpus betuloides	Mountain mahogany
Chamaesyce albomarginata	Rattlesnake weed
Chenopodium spp.	Chenopodium
Cortaderia selloana	Pampas grass
Datura wrightii	Jimsonweed
Daucus pusillus	Rattlesnake weed
Encelia californica	Bush sunflower
Encelia farinosa	Brittlebush
Eremocarpus setigerus	Doveweed
Eriogonum fasciculatum	Buckwheat
Erodium cicutarium	Red-stemmed filaree
Eucalyptus sp.	Eucalyptus
Hazardia squarrosus	Sawtooth goldenbush
Heliotropium curassavicum	Common heliotrops
Heteromeles arbutifolia	Toyon
Heterotheca grandiflora	Telegraph weed
Hirschfeldia incana	Summer mustard
Hordeum leporinum	Hare barley
Hordeum murinum	Hare barley
Isocoma sp.	Goldenbush
Lactuca serriola	Prickly lettuce
Lessingia filaginifolia	Cudweed aster
Leymus condensatus	Giant wild rye
Lolium sp.	Rye grass
Lotus scoparius	Deerweed
Lupinus spp.	Lupine
Malacothamnus fasciculatus	Bushmallow
Malosma laurina	Laurel sumac
Marrubium vulgare	Horehound
Medicago polymorpha	Bur clover
Melilotus alba	White sweet-clover
Melilotus indica	Yellow sweet-clover
Mimulus sp.	Monkey flower

TABLE 1-3
List of Plant Species Observed at the Project Site

Scientific Name	Common Name
Nicotiana glauca	Indian tree tobacco
Opuntia littoralis	Western prickly pear
Pinus spp.	Pine
Plantago erecta	Dwarf plantain
Platanus racemosa	Western sycamore
Populus fremontii	Fremont cottonwood
Quercus agrifolia	Coast live oak
Quercus berberidifolia	Scrub oak
Quercus lobata	Valley oak
Raphanus sativa	Wild radish
Rhus integrifolia	Lemonade berry
Rhus ovata	Sugarbush
Rhus trilobata	Squawbush
Ricinus communis	Castor bean
Salix exigua	Sandbar willow
Salix gooddingii	Goodding's black willow
Salsola tragus	Russian thistle
Salvia apiana	White sage
Salvia leucophylla	Purple sage
Salvia mellifera	Black sage
Sambucus mexicana	Mexican elderberry
Sambucus nigra ssp. Caerulea	Blue elderberry
Schinus molle	Peruvian pepper tree
Schismus barbatus	Mediterranean grass
Stephanomeria virgata	Wand chicory
Tamarix ramosissima	Salt cedar
Toxicodendron diversilobum	Poison oak
Tribulus terrestris	Puncture vine
Trichostema lanceolatum	Vinegar weed
Trifolium spp.	Clover
Yucca whipplei	Our Lord's candle

sb horticulture
801 glenneyre street suite d
laguna beach ca 92651
sbhorticulture@cox.net
949.233.8076 cell
888.5521795 fax

June 6, 2014

Steve Cassulo
Chiquita Canyon Landfill
Waste Connections Inc.
29201 Henry Mayo Drive
Castaic, CA 91384

RE: **Chiquita Canyon Landfill Master Plan Revision**

Dear Mr. Cassulo:

Pursuant to the request of Chiquita Canyon Landfill, an oak tree field study evaluation has been conducted by this office to ascertain base line data in regard to native oak tree resources located at 29201 Henry Mayo Drive, City of Castaic. This project study is mandated by the Los Angeles County Oak Tree Ordinance.

The field study was conducted by sb horticulture (sbh) in early April 2012 and early June 2014. Specifications and photographs are included in this report related to individual tree species, size and overall condition.
The four oak trees evaluated are proposed for removal at client request due to future grading considerations.

Respectfully submitted by,

Sean Brown

sb horticulture

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Survey Results 4

Oak Tree Data 4

Tree Notes/Recommendations 5

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Oak Tree Mitigation 6

Oak Tree Photographs 7-10

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Oak Tree Mitigation Proposed Location

Appendix B 13
Aerial Photo of Existing Oak Trees Locations

Appendix C 14
Report Glossary

Appendix D 15
Oak Tree Location Plan

Survey Methodology:

- Reference material used:
  - Oak tree location map supplied by Pinnacle Land Surveying, Inc.

- Tree diameters were field measured approximately 4.5 feet above grade with a LUFKIN diameter tape measure. This is referred to as DBH (Diameter at Breast Height). Where low branching or other factors interfered with measuring the tree diameter at 4.5 feet the measurement was moved and noted in the report.

- Tree height was field estimated.

- Driplines were measured in a minimum of four (4) compass directions.

- Trees were tagged with metal discs for identification and location purposes.

- The surveyed trees were photographed with a digital camera to facilitate reader ease in identification. These pictures are for reference only and should not be used to ascertain actual condition and size of the surveyed tree specimens.

  It is important to note that the information included in this report was collected during an above ground visual observation consistent with professional standards. No extensive internal tree or subsurface investigation was made. Trees are living entities and subject to stress and disease that may not be apparent during cursory inspection. Therefore, no guarantee is given or implied that any of the trees will survive planned construction activity and/or relocation.

Rating Review:

Individual species have been field rated in regard to form and health based on an A, B, C, D, F scale. The letter E is not utilized as a rating classification. Trees were also given a vigor rating as a percentage separate from the overall grade of the tree.

A That tree is rated as an excellent specimen and needs no special attention at this time as long as construction and development impacts do not negatively effect its environment.

B That condition of tree is average to slightly above average with regard to health and structure. Tree may have indicated possible need for minor pruning (deadwood removal). Implementing reasonable preservation procedures and practices, tree has excellent potential to survive planned development if construction guidelines and post-construction maintenance are followed.

C That condition of tree indicates a possible need for moderate corrective maintenance. Tree may be in good physiological condition while displaying one or more structural defects. Tree may display symptoms/signs of stress or decline due to adverse abiotic and/or biotic conditions.

D That tree has serious problems in regard to health, disease, or structure that it may not be possible to be remedied through reasonable preservation procedures and practices.

Overall Tree Conditions

Four (4) Los Angeles County ordinance sized oak trees were documented within the proposed project area. Two (2) are native trees- and both are growing adjacent to an abandoned field previously used for agricultural purposes. The other two trees are non native landscape trees growing within landscaped areas of the existing landfill facility.

It should be noted that one (1) heritage sized dead oak tree was observed adjacent to tree # 1. Arborist Sean Brown met onsite with representatives Bill Romo and Joseph Brunet from the Los Angeles County Forestry Division's Environmental Review Unit to confirm this oak tree was dead in late 2011. Because the tree is no longer living, it is not included in this August 2012 report. It is, however, still onsite and still tagged with the #87.

Survey Results:

- **4** Los Angeles County ordinance sized oak trees were documented within the proposed project area.
  - 3 Quercus agrifolia (Coast Live Oak)
  - 1 Quercus lobata (Valley Oak)

Impact summary

	Tree tag #'s
Proposed Removal	**1,2,3,89**
Encroachment	
No proposed impact	
Total trees in report	**four**

Oak Tree Data

Tag #	Species	Impact Status	DBH in inches	Grade	Vigor	Structure	Height
1	Valley Oak *Quercus lobata*	Remove	(10,5)	B	Good	Fair to Good	20'-30'
2	Coast Live Oak *Quercus agrifolia*	Remove	(10,5)	B-	Good	Fair	15'-20'
3	Coast Live Oak *Quercus agrifolia*	Remove	(11.5,6.5)	B-	Good	Fair	15'-20'
89	Coast Live Oak *Quercus agrifolia*	Remove	(18.5,17,14)	D+	Poor	Poor	25'-30'

Tree Notes

Tag #	Tree comments
1	Tree is a native specimen to the site. Tree is a multi-trunk. Trunk base slightly buried by natural fill from adjacent slope. Growing adjacent to large dead oak tree to west.
2	This tree is non native to the site and was planted as part of the installed landscape. Low branching. Some included bark. Tree is multi trunked. Low branching with canopy in contact with ground. Excessive branch production at point of codominance on larger trunk- may be result of precious damage to trunk.
3	This tree is non native to the site and was planted as part of the installed landscape. Low branching with canopy in contact with ground. Trunk base slightly buried by fill. Multi-trunked. Tree is growing within a partially landscaped area directly adjacent to a paved parking/storage facility.
89	Tree is a native specimen to the site. Multi-trunked. Tree is growing in natural area. Trunk base is heavily buried by adjacent natural slope failure. One dead trunk on ground. Exfoliating bark. Middle trunk lying on west trunk. Multiple broken large limbs. Heavy trunk damage and decay. Poor condition of tree is most likely a result of heavy fire damage and excess soil fill on trunk.

Canopy Measurements

Canopy Dripline From Trunk in Feet

Tag Number	N	E	S	W
1	14	10	14	18
2	9	9	11	11
3	9	10	9	14
89	12	12	18	23

Oak Tree Mitigation

- Required oak tree mitigation per Los Angeles County Oak Tree Ordinance:
  - 6 (two) 15 gallon *Quercus agrifolia*
  - 2 (two) 15 gallon *Quercus lobata*

  8 total mitigation trees. (Replacement to removal ratio--- 2:1)

- Recommended oak tree mitigation:
  - 11 (eleven) 15 gallon *Quercus agrifolia*
  - 5 (five) 15 gallon *Quercus lobata*

  16 total mitigation trees.

  This is only a recommendation. The final mitigation requirements will be determined by the Los Angeles County Forestry Department.

  Proposed mitigation tree planting site- These mitigation trees are proposed to be within the existing property in a natural area as detailed below (see Appendix B). Other alternative natural areas also exist within the project boundary. These are proposals only. The final mitigation requirements will be determined and approved by the Los Angeles County Forestry Division's Environmental Review Unit.

Tree Photographs

Tree #1

Tree Photographs continued

Tree #2

Tree Photographs continued

Tree #3

Tree Photographs continued

Tree #89

Tree Photographs continued

Tree #89

Appendix A

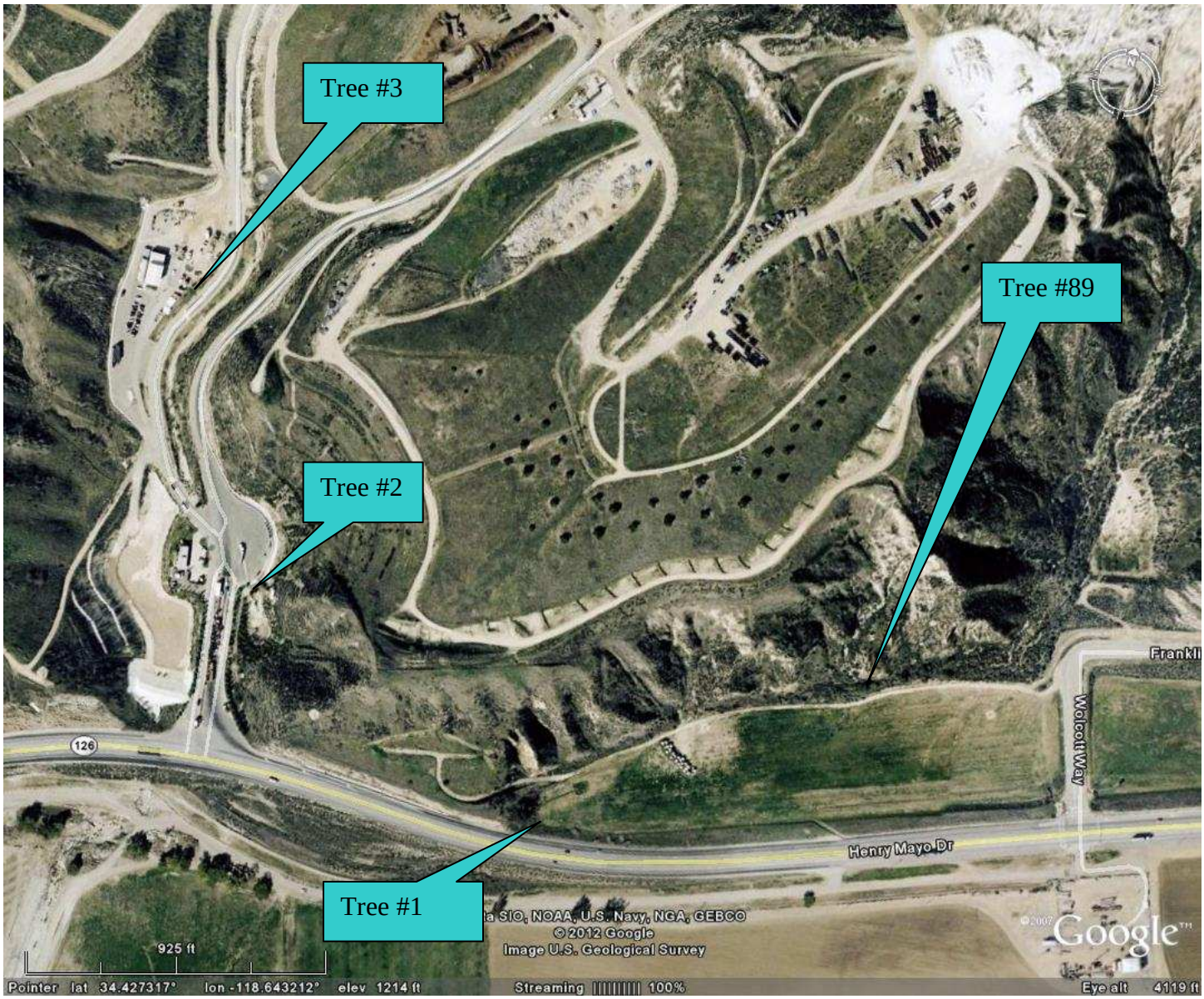
Oak Tree Mitigation Proposed Location

Appendix A

Oak Tree Mitigation Proposed Location

Appendix B

Aerial Photo of Existing Oak Trees Locations



Appendix C

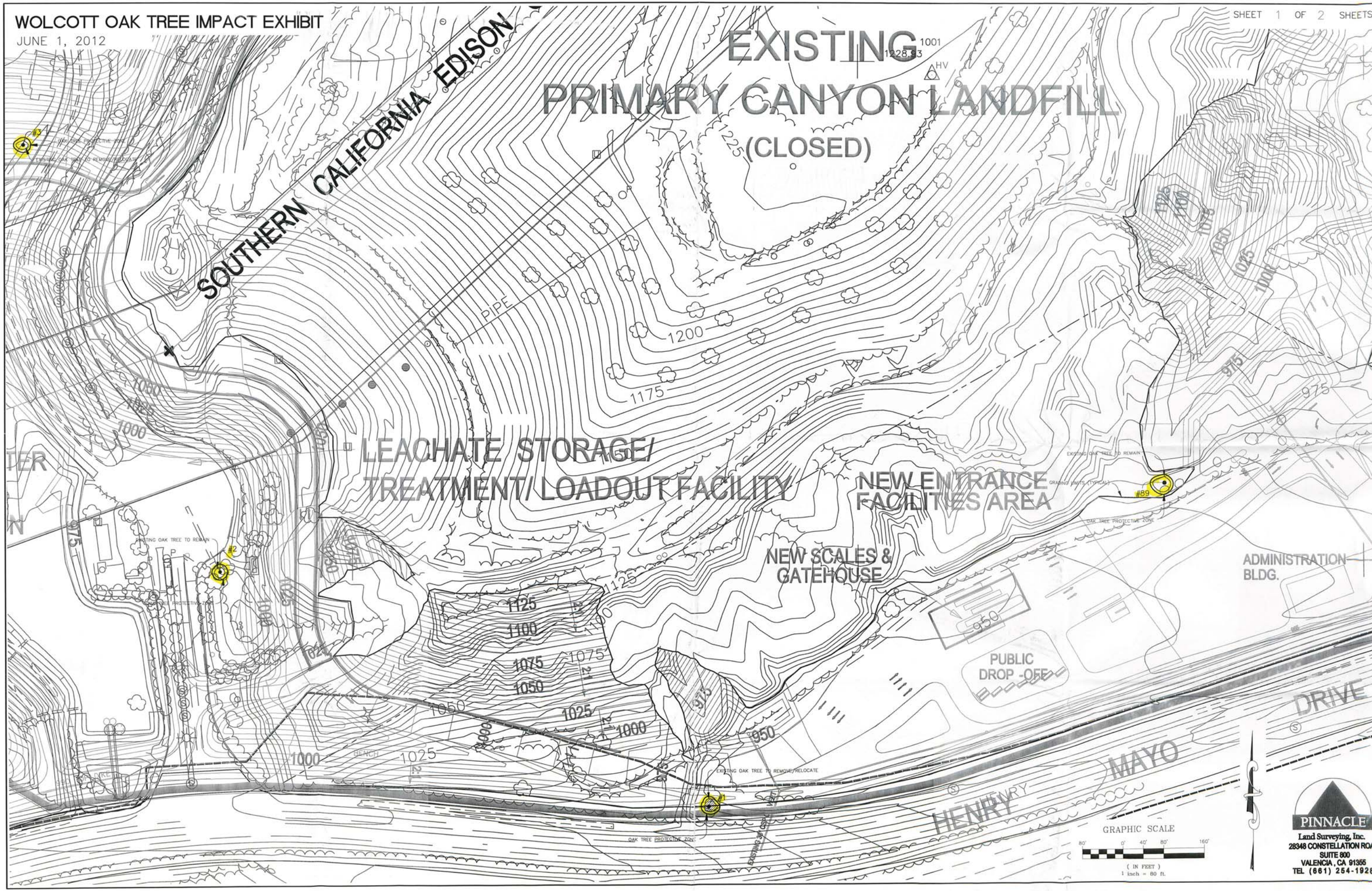
Report Glossary

- **Arboriculture:** The science and art of caring for trees, shrubs and other woody plants.
- **Arborist:** A person possessing the technical competence through experience and related training to provide for or supervise the management of trees or other woody plants.
- **Cavity:** An open and exposed area of wood, where the bark is missing and internal wood has been decayed and dissolved.
- **Codominant:** Equal in size and relative importance, usually associated with either trunks/stems or limbs branches in the crown.
- **Crotch:** The point or angle at which two branches (or a branch and a leader) meet.
- **DBH –Diameter Breast Height**: The diameter of the trunk of a tree measured at 4.5 feet above natural grade.
- **Decay:** Progressive deterioration of organic tissues, usually caused by fungal or bacterial organisms, resulting in loss of cell structure, strength, and function. In wood, the loss of structural strength.
- **Defoliation:** Loss of leaves.
- **Dripline:** The width of the crown, as measured by the lateral extent of the foliage.
- **"Encroachment" as it pertains to the LA County Oak Tree Ordinance:** Proposed construction, excavation, grading and/or landfill within the Protective Zone.
- **Epicormic growth:** Growth that arises from latent buds that occur on stems, branches, and at the base of trees. This type of growth is more vigorous and weaker than normal growth
- **Foliage:** The live leaves or needles of the tree; the plant part primarily responsible for photosynthesis.
- **Heritage Oak Tree:** any oak tree measuring 36" or more in diameter, measured 4½ feet above natural grade.
- **Mulch:** Any material such as wood chips, straw, sawdust, leaves, and stone that is spread on the surface of the soil to protect the soil and plant roots from the effects of raindrops, soil crusting, freezing, and evaporation.
- **"Protective Zone" as it pertains to the LA County Oak Tree Ordinance:** "The Protected Zone shall mean that area within the dripline of an oak tree and extending there from to a point at least 5 feet outside the dripline or 15 feet from the trunk, whichever distance is greater."
- **Pruning:** Selective removal of woody plant parts of any size, using saws, pruners, clippers, or other pruning tools.
- **Root ball:** Area containing the main root structure.
- **Root crown:** Area at the base of a tree where the roots and stem merge.
- **Root System:** The portion of the tree containing the root organs, including buttress roots, transport roots, and fine absorbing roots; all underground parts of the tree.
- **Root Zone:** The area and volume of soil around the tree in which roots are normally found. May extend to three or more times the branch spread of the tree, or several times the height of the tree.
- **Shaded out:** Slower or stunted growth due to lack of sufficient light.
- **Species:** The main category of taxonomic classification into which living organisms are subdivided, comprising a group of similar individuals having a number of correlated characteristics.
- **Stress:** Unfavorable deviation from normal. The action on a body of any system of balanced forces whereby strain or deformation results. In arboriculture, the adverse alteration of tree health by abiotic or biotic factors.
- **Sucker:** Vigorous upright epicormic (Adventitious) shoot rising from the base of the trunk or just below the soil surface.
- **Re-growth/trunk sprout:** Growth rising from the base of damaged or cut trees/shrubs. Epicormic type growth.
- **Vigor:** Overall health; the capacity to grow and resist physiological stress.
- **Visual Tree Assessment:** Method of evaluating structural defects and stability in trees.

Appendix D Oak Tree Location Plan

WOLCOTT OAK TREE IMPACT EXHIBIT

JUNE 1, 2012



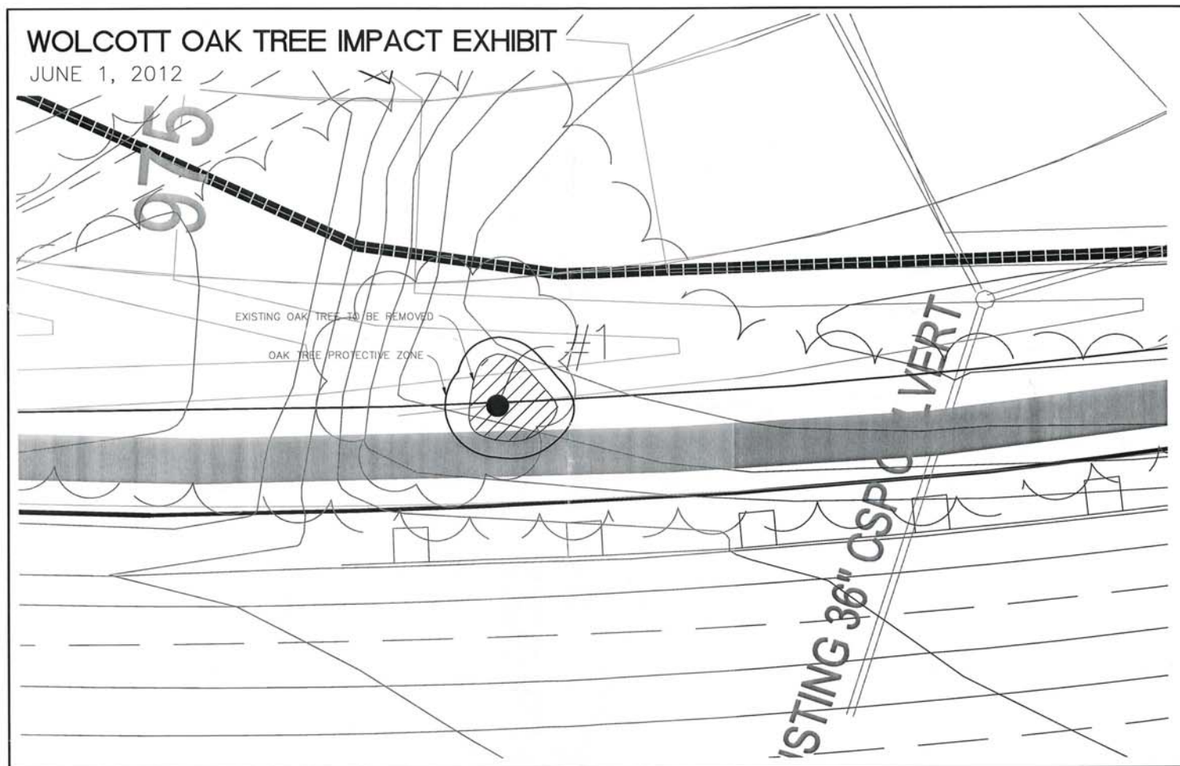
WOLCOTT OAK TREE IMPACT EXHIBIT

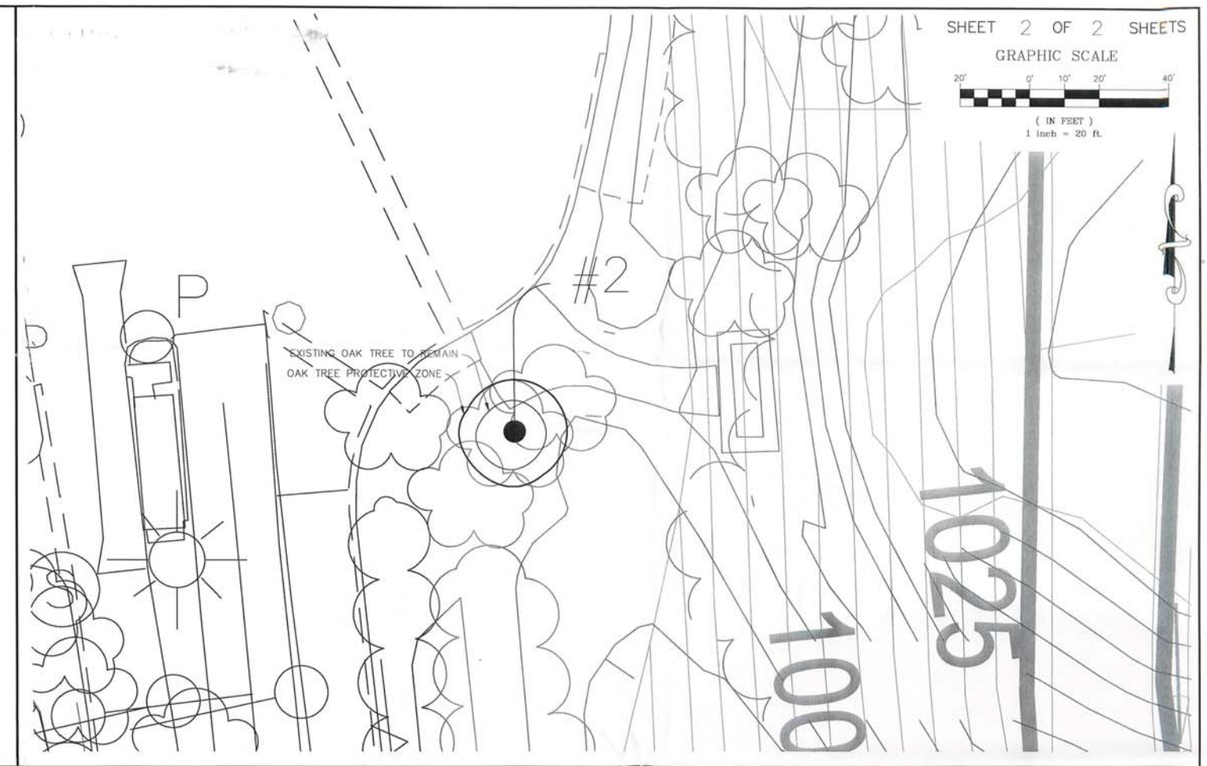
JUNE 1, 2012

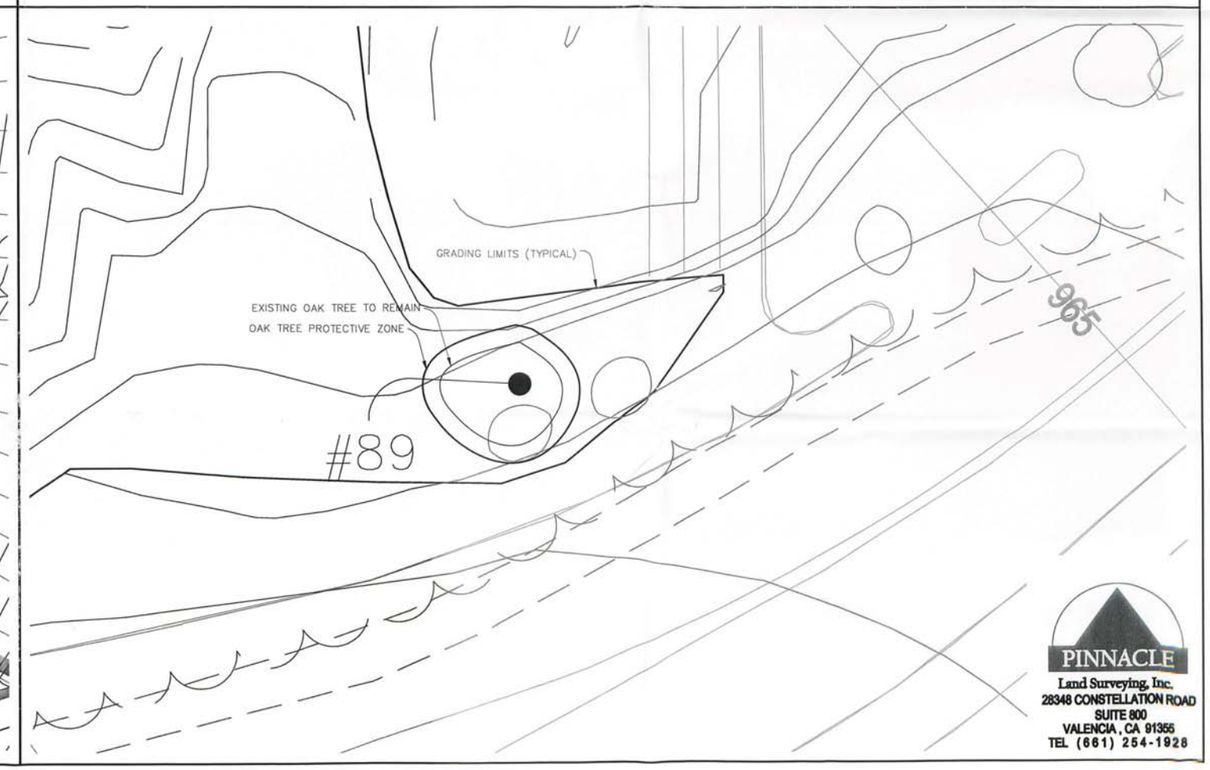
GRAPHIC SCALE

20' 0' 10' 20' 40'

(IN FEET)
1 inch = 20 ft.







PINNACLE
Land Surveying, Inc.
28348 CONSTELLATION ROAD
SUITE 800
VALENCIA, CA 91355
TEL (661) 254-1928

Appendix F
Cultural Resources

Summary of Technical Support Documents for Cultural Resources

Appendix F comprises three documents, a letter to the Native American Heritage Commission from the Fernandeño Tataviam Band of Mission Indians (Tataviam) dated April 12, 2014, the *Cultural Resources Inventory Report for the Chiquita Canyon Landfill Master Plan Revision*, dated December 2011, and the *Investigation of Archaeological Site CA-LAN-36 (Bowers Cave) for the Chiquita Canyon Landfill Master Plan Revision, Los Angeles County, California*, dated May 2013.

The letter from Tataviam explains the negotiations between Tataviam and CCL and their agreement to provide construction and cultural resource oversight and monitoring to CCL. The remaining two documents are technical analyses and are described briefly below.

***Cultural Resources Inventory Report for the Chiquita Canyon Landfill Master Plan Revision* (Inventory Report)**

The Inventory Report describes the results of a pedestrian survey of the 143-acre expansion area, conducted in January 2010. The Inventory Report details the natural setting of the site; methods, including literature search and pedestrian survey; results, including Native American consultation and pedestrian survey; and determination of eligibility and assessment of potential effects. The Inventory Report also includes project photos.

The Inventory Report is included as part of Appendix F.

Investigation of Archaeological Site CA-LAN-36 (Bowers Cave) for the Chiquita Canyon Landfill Master Plan Revision, Los Angeles County, California

Subsequent to the Inventory Report, additional investigation was undertaken specifically to assess impacts the Chiquita Canyon Landfill Master Plan Revision may have on identified cultural resources. Specifically, the *Investigation of Archaeological Site CA-LAN-36 (Bowers Cave) for the Chiquita Canyon Landfill Master Plan Revision, Los Angeles County, California* addresses the following topics:

- Previous work
- Resource access
- Additional Native American and historical society consultation
- Research design
- Evaluation methodology
- Results
- Determination of eligibility and assessment of potential effects
- California Register status
- Management considerations

The technical report of this additional investigation is a confidential document and is therefore not included in Appendix F. The technical report and its appendixes will be filed with the South Central Coastal Information Center of the California Historical Resources Information System located at California State University, Fullerton.

Cultural Appendix F1
Fernandeño Tataviam
Band of Mission Indians Letter

Larry J. Ortega Sr.
Tribal President

Tribal Historic & Cultural Preservation Committee
Steve Ortega
Chairman
Berta Pleitez

Fernandeño Tataviam Band of Mission Indians
Tribal Historic & Cultural Preservation

April 12, 2014

David Singleton
Program Analyst
Native American Heritage Commission
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691

Subject: Chiquita Landfill Project, Los Angeles County, CA

Dear Mr. Singleton,

The Fernandeño Tataviam Band of Mission Indians (Tataviam) thank you for the effort you have invested and would like to inform you that Tataviam have entered into an agreement with Chiquita Canyon, LLC (CCL) on the matter of the Chiquita Canyon Landfill Project (CCLP). Tataviam are providing CCL with construction monitoring and cultural resource oversight services for the CCLP.

We identified the potential for cultural resources within the CCLP proposed grading and excavation. Tataviam entered into negotiation with CCL for the proposed grading and excavation to be adjusted to exclude the Bower's Cave site. Tataviam were successful in having the grading and excavation plans moved in avoidance of Bower's cave, for the sake of the site's cultural relevance and preservation. We are doing our best to ensure that artifacts and features are avoided, but here is still a possibility that they will be encountered. Artifacts and features can go undetected and can also shift due to erosion and tectonic activity. Therefore, Tataviam are providing construction and cultural resource oversight and monitoring to CCL for the CCLP.

Furthermore, all artifacts that may be found will be returned to Tataviam or reinterred into the earth. CCL understands that Bower's Cave cultural, historical, and archaeological site is to remain untouched and avoided by both personnel and impacts of the project. If any other artifacts or features of cultural, historical, or archaeological nature are found, the tribe is to be notified immediately.

Sincerely,

Caitlin B. Gulley
Tribal Historic and Cultural Preservation
cgulley@tataviam-nsn.us

Cultural Appendix F2
Cultural Resources Inventory Report

Final

Cultural Resources Inventory Report

For the

Chiquita Canyon Landfill Master Plan Revision

Los Angeles County, California

Submitted to:

Waste Connections, Inc.

December 2011

Prepared by:

CH2MHILL.

6 Hutton Centre Drive, Suite 700
Santa Ana, CA 92707

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Cultural Resources Inventory Report for the Chiquita Canyon Landfill Master Plan Revision, Los Angeles County, California

FINAL

Report Prepared For:

Waste Connections, Inc.

For the Chiquita Canyon Landfill

Prepared by:
Natalie Lawson, M.A., RPA

and Clint Helton, M.A., RPA

CH2M HILL
6 Hutton Centre Drive, Suite 700
Santa Ana, CA 92707

December 2011

National Archaeological Database (NADB)
Type of Study: Literature Search and Survey
Sites Recorded/Updated: CA-LAN-36 (Bower's Cave)
USGS Quadrangle: Val Verde, CA; Newhall, CA
Acreage: 143 acres
Level of Investigation: CEQA
Key Words: Chiquita Canyon, CEQA, Positive Survey, Bower's Cave, Prehistoric Site, Landfill Expansion

Management Summary

CH2M HILL completed a cultural resources inventory of an approximately 140-acre area in support of the proposed expansion of the Chiquita Canyon Landfill (CCL) site within the Transverse Mountain Ranges in the northwestern portion of unincorporated Los Angeles County, California. The CCL Master Plan Revision (Proposed Project) is being proposed by Waste Connections, Inc. The Proposed Project increases the permitted landfill footprint by approximately 143 acres by extending it slightly south toward the existing landfill entrance and to the north. The landfill footprint increases from the currently permitted acreage, approximately 257 acres, to approximately 400 acres. The Proposed Project also increases the maximum elevation to 1,573 feet.

The cultural resources inventory was conducted in compliance with Section 5024.1 of the *California Public Resources Code* (PRC) to identify archaeological or historical resources in the area of potential effect. "Historical Resource" is a California Environmental Quality Act (CEQA) term referring to a resource eligible for or listed on the California Register of Historical Resources (CRHR) and generally older than 50 years of age by definition. Cultural resources include prehistoric and historic archaeological sites; districts and objects; standing historic structures, buildings, districts and objects; and locations of important historic events, or sites of traditional/ cultural importance to various groups. This assessment includes a review of previous studies, the results of a systematic pedestrian surface survey, and preliminary site evaluations of recorded resources. The archival research was completed in 2005 and updated in January 2010. Native American consultation was completed in 2005. Field work was completed in January 2010.

A literature search was requested by CH2M HILL of the South Central Coastal Information Center (SCCIC), located at California State University, Fullerton, California (CSUF). The majority of CCL was previously surveyed in 1993 for the Phase I Cultural Resource Evaluation of the Chiquita Canyon Sanitary Landfill Expansion project. Additional studies also included portions of the landfill.

A systematic pedestrian cultural resource survey of the 143-acre area was conducted on January 28, 2010, by CH2M HILL. One previously recorded archaeological site was documented within the survey area. This resource has been determined as an eligible or potentially eligible resource (Bowers Cave [CA-LAN-36]). Although the cave is located approximately 200 feet above the proposed grading footprint, the cave may be impacted by the Proposed Project. Additional work was proposed at the cave to determine its eligibility for the CRHR.

If human remains are encountered, State Health and Safety Code Section 7050.5 states that no further disturbance will occur until the County Coroner has made a determination of origin and disposition pursuant to PRC Section 5097.98. The County Coroner must be notified of the find immediately. If the remains are determined to be Native American, the County Coroner will notify the Native American Heritage Commission (NAHC), which will determine and notify a Most Likely Descendant (MLD). With the permission of the landowner or his/her authorized representative, the MLD may inspect the site of the discovery. The MLD will complete the inspection within 48 hours of notification by the NAHC. The MLD may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.

A copy of this report will be filed with the SCCIC of the California Historical Resources Information System located at CSUF.

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1 Project Vicinity, Location, and Archaeological Survey Area

Attachments

A Project Photos
B Department of Parks and Recreation Forms (Confidential)

Acronyms and Abbreviations

CCL	Chiquita Canyon Landfill
CCR	*California Code of Regulations*
CEQA	California Environmental Quality Act
CHRIS	California Historical Resources Information System
CRHR	California Register of Historical Resources
CSUF	California State University, Fullerton
DPR	Department of Parks and Recreation
GPS	Global Positioning System
MLD	Most Likely Descendant
NADB	National Archaeological Database
NAHC	Native American Heritage Commission
NRHP	National Register of Historic Places
OHP	Office of Historic Preservation
PRC	*California Public Resources Code*
Proposed Project	Chiquita Canyon Landfill Master Plan Revision
SCCIC	South Central Coastal Information Center
SR-126	State Route 126
USGS	United States Geological Survey
WPA	Work Progress Administration

SECTION 1.0

Introduction

CH2M HILL was contracted by Waste Connections Inc. to complete a cultural resource assessment in support of California Environmental Quality Act (CEQA) documentation for the Chiquita Canyon Landfill (CCL) Master Plan Revision (Proposed Project), a proposed landfill expansion in Los Angeles County, California. The cultural resources assessment was conducted in compliance with Section 5024.1 of the *California Public Resources Code* (PRC) to identify archaeological or historic resources in the area of potential effect.

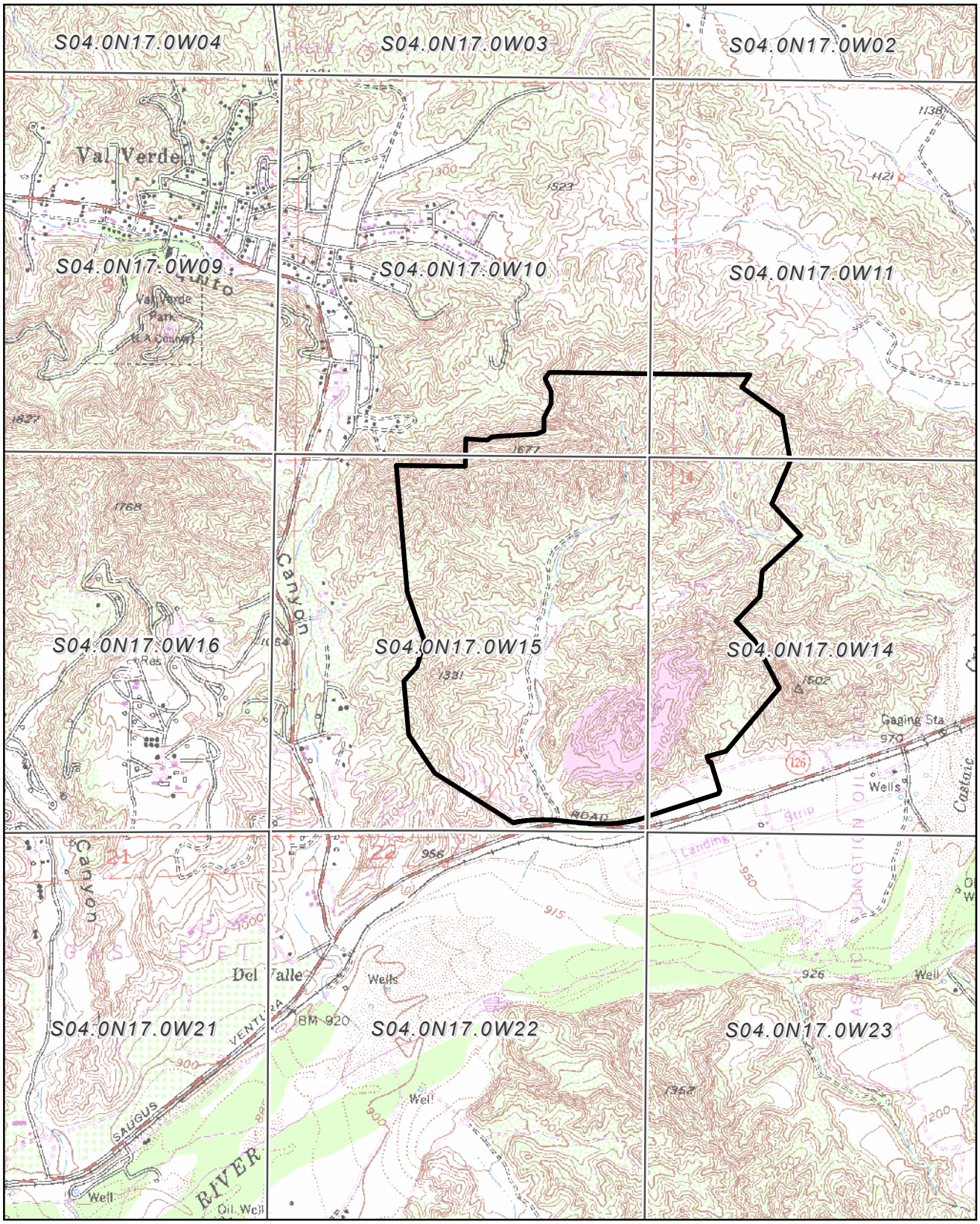
The Proposed Project would extend the waste footprint at CCL, better utilize the landfill's remaining and potential disposal capacity, and allow for the disposal of all non-hazardous wastes acceptable at a Class III solid waste disposal landfill. The Proposed Project would also include the continued diversion of such materials as green waste, asphalt/concrete, and metal through ongoing landfill waste diversion programs on which numerous jurisdictions depend to comply with state-mandated waste diversion goals.

CCL is located on private land south of the census-designated population of Val Verde in northwestern Los Angeles County, California, and within the planning area of the City of Santa Clarita, California. CCL is located approximately 3 miles west of the Interstate 5 and the State Route 126 (SR-126) intersection. Specifically, the landfill is located in Section 15, Township 4 North, Range 17 West, San Bernardino Baseline and Meridian on the *Val Verde, California* and *Newhall, California* 7.5-minute United States Geological Survey (USGS) quadrangle topographic maps. The site latitude and longitude are 34°25'N and 118°39'W, respectively (Figure 1). This cultural resources assessment focuses on areas of proposed disturbance, referred to here as the cultural resources survey area (survey area), which consists of approximately 140 acres.

This report contains two appendices. Attachment A contains representative project photos. Confidential Attachment B contains all Department of Parks and Recreation (DPR) forms.

The cultural resource assessment for the CCL survey area was completed pursuant to CEQA PRC Chapter 2.6, Section 21083.2 and 21084.1, and the *California Code of Regulations* (CCR) Title 14, Chapter 3, Article 5, Section 15064.5.

Project personnel included Natalie Lawson, M.A., RPA. Clint Helton, M.A., RPA, reviewed this final technical report.



LEGEND

Project Boundary

N

0 1,000 2,000

Feet

FIGURE 1
Project Vicinity, Location, and Archaeological Survey Area
Chiquita Canyon Landfill
Master Plan Revision

Basemap Source: 7.5 Minute USGS Quad (Val Verde)

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CH2MHILL

SECTION 2.0

Environmental Setting

2.1 Natural Setting

CCL lies near the eastern end of the late Cenozoic Ventura Basin, which is situated in the western Transverse Ranges Province. The eastern end of the basin in CCL vicinity is composed of stratigraphic or sedimentary rock units consisting of late Cenozoic marine and stratigraphically overlying nonmarine strata reflecting the final filling of the basin and its emergence above sea level. Surficial geologic mapping of CCL and vicinity prepared by Jennings and Strand (1969), Dibblee (1993), and Winterer and Durham (1962) indicates the landfill is underlain by three late Cenozoic rock units including the Pliocene marine upper Pico Formation and the Pliocene and Pleistocene nonmarine Saugus Formation, which forms the hills at the project site, and younger alluvium, which floors the gullies.

Precipitation varies little in the vicinity of CCL, averaging about 4 to 5 inches annually. Rain typically falls in winter during the wet season. Snow occurs at the higher elevations. Temperatures typically average between 60 and 80 degrees Fahrenheit throughout the year. In the summer, however, temperatures can reach into the 90s. At higher elevations, temperatures can drop below freezing.

2.1.1 Biology

The project area was historically located within the Coastal Scrub and Chaparral Communities as defined by Jaeger and Smith (1966).

The Coastal Scrub Biotic Community occurs on the slopes of cismontane areas between the sea and the higher elevation chaparral covered mountainous slopes. Plants in this community include California wormwood or sagebrush (*Artemisia californica*), white sage (*Salvia apiana*), black sage (*Salvia mellifera*), encelia (*Encelia farinosa*), yerba santa (*Eriodictyon crassifolium*), buckwheat (*Eriogonum fasciculatum*), prickly pears (*Opuntia* spp.), and Our Lord's candle (*Yucca whipplei*). Birds include Costa's hummingbird (*Calypte costae*), cactus wren (*Campylorhynchus brunneicapillum*), lazuli bunting (*Passerina amoena*), wrentit (*Chamaea fasciata*), brown towhee (*Pipilo fuscus*), sage sparrow (*Amphispiza belli*), and rufous-crowned sparrow (*Aimophila ruficeps*). Mammals in this community include the California ground squirrel (*Spermophilus beecheyi*), nimble kangaroo rat (*Dipodomys agilis*), desert woodrat (*Neotoma lepida*), California mouse (*Peromyscus californicus*), and short-eared pocket mouse (*Perognathus fallax*). Reptiles in this community include the western fence lizard (*Sceloporus occidentalis*), striped racer (*Masticophis lateralis*), and the western rattlesnake (*Crotalus viridis*).

The Chaparral Biotic Community is located along the foothills of the mountains between 1,000 to 4,000 feet in elevation. Plants in this community include chamise (*Adenostoma fasciculatum*), scrub oak (*Quercus dumosa*), foothill ash (*Fraxinus dipetala*), hard tack (*Cercocarpus betuloides*), wild lilac (*Ceanothus cordulatus*, *C. greggii*, *C. leucodermis*, *C. megacarpus*, *C. crassifolius*), holly-leaf cherry (*Prunus ilicifolia*), bear brush (*Garrya fremontii*), quinine bush (*Garrya flavescens*), manzanita (*Arctostaphylos pungens*, *A. pringlei*, *A. glauca*, *A. glandulosa*), toyon (*Heteromeles arbutifolia*), and sugarbush (*Rhus ovata*). Mammals include the mule deer (*Odocoileus hemionus*), coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), bobcat (*Lynx rufus*), brush rabbit (*Sylvilagus bachmanni*), dusky-footed woodrat (*Neotoma fuscipes*), nimble kangaroo rat (*Dipodomys agilis*), California pocket mouse (*Perognathus californicus*), and the California mouse (*Peromyscus californicus*). Birds of this community include the mountain quail (*Oreortyx pictus*), scrub jay (*Aphelocoma coerulescens*), wrentit (*Chamaea fasciata*), poor-will (*Phalaenoptilis nuttallii*), Bewick's wren (*Thryomanes bewickii*), California thrasher (*Toxostoma redivivum*), rufous-sided towhee (*Pipilo erythrophthalmus*), and orange-crowned warbler (*Vermivora celata*). The reptiles include the western fence lizard (*Sceloporus occidentalis*), southern alligator lizard (*Gerrhontus multicarinatus*), coast horned lizard (*Phrynosoma coronatum*), striped racer (*Masticophis lateralis*), and the western rattlesnake (*Crotalus viridis*).

2.1.2 Current Land Use

Much of the area surrounding CCL consists of undeveloped open space as a result of steep topography. Surrounding land uses include mostly open lands to the north; rural residential development is located to the west and northwest along Chiquito Canyon Road and in the Val Verde area, respectively. Relatively new suburban residential areas are located to the northeast. The closest of these residential dwellings is located approximately 500 feet from the northwest site boundary corner and 1,200 feet from the landfill footprint, and intervening topography prevents residential views of the operating landfill from these locations. Industrial/commercial uses are located to the northeast, east, and southeast. The United States Postal Service has a General Mail Facility adjacent to the eastern edge of the landfill property boundary. The property immediately west and south of the landfill is owned by the Newhall Land and Farming Company and is currently either vacant or is used for agricultural activities. Oil extraction fields and associated storage areas are located less than 1 mile from the landfill to the west and south. Valencia Travel Village, a short- and long-term recreational vehicle resort, is located approximately 1 mile east of the landfill on the south side of SR-126.

2.1.3 Cultural Context

Aboriginal settlement of North America probably began over 25,000 years ago when people crossed the Bering Straits land bridge (exposed continental shelf). Some of the oldest sites occur in southern California. In January 1936, Work Progress Administration (WPA) workers digging a storm drain along the Los Angeles River (north of Baldwin Hills) recovered human bones from an ancient stream bed (Moratto, 1984:52-53). In March 1936, imperial mammoth teeth were exposed at the same depth as the human remains (Moratto, 1984:53). The next oldest site in southern California where both human skeletal remains and artifacts occur is the La Brea Tar Pits (CA-LAN-159).

Evidence for Paleo-Indian occupation in California exists but remains scanty, particularly along the coast of southern California (Byrd and Raab, 2007). The following chronology is based on Byrd and Raab's updated synthesis of the southern bight cultures (2007).

2.1.3.1 Early Holocene (9,600 cal B.C. – 5,600 cal B.C.)

The first groups to inhabit California (for which there is significant evidence) are described as hunters and gatherers with specialized bifacial projectile points, well-made scrapers, knives and many other tools designed for subsistence related tasks (food processing). They adapted to a number of environments and developed a variety of secondary subsistence strategies that enabled them to live in a changing environment (Pleistocene to Holocene). As the (Wisconsin) Ice Age ended, previously stable water sources began to dry up in inland California, prompting migrations to the coast. California's islands were occupied as early as 9600 to 9000 cal B.C., as indicated by the oldest levels at Daisy Cave on San Miguel Island. Southern California dwellers exploited a wider range of plants and animals, and the archaeological record shows that a greater emphasis was placed on gathering wild grasses and seeds, rather than on hunting large mammals. Coastal groups, including those living on the islands off of California's coast, utilized marine resources such as shellfish, fish, sea lions, and dolphins. Shell midden sites of the early Holocene are characterized by cobble tools, basin metates, manos, discoids, and flexed burials (Byrd and Raab, 2007).

2.1.3.2 Middle Holocene (6,000 cal B.C. – cal A.D. 500)

At the start of the Middle Holocene, millingstone cultures appeared throughout central and southern California. The Millingstone Horizon represents an adaptive subsistence shift indicated by the first occurrence of millingstones (mano and metate), which were used to process hard seeds like Salvia sp. (sages) and buckwheat. Sites from this period are characterized by the majority of artifacts being manos and metates suggesting the importance of vegetal resources. Most of these sites are located in grassland and sagebrush communities where these hard seeds could support small populations on a yearly basis. Late fall and winter were difficult seasons when vegetal foods were scarce and their diet had to be supplemented with deer and small mammal hunting and shellfish collecting (Tartaglia, 1976).

Middle Holocene cultures are quite diverse. Large Middle Holocene sites have been well documented along the coast as well as inland. Archaeological evidence of extensive trade networks between southern California and the Southwest has been found. Rare artifact types, including the marine purple olive shell, indicate trade networks that extend from Catalina Island through the Mojave Desert and into Oregon (Byrd and Raab, 2007).

Temporary settlements for a few nuclear families (10 to 25 individuals) have been recorded. These sites were seasonal campsites for exploiting yucca and acorns from April throughout September. The seasonal pattern has been documented as regional variations in the Millingstone Horizon sites in southern California (King, 1967). These sites are characterized by plant processing tools (scraper planes, millingstones, and earth ovens--necessary to prepare yucca) and an absence of hunting implements. The inhabitants of the region intensively exploited their environment with reliance on no particular food resource. Characteristic features of this period include crude chopping tools, large projectile points, manos and metates, Olivella shell beads, quartz crystals and cog stones, few ornaments, earth roasting pits, extended posture burials, reburials (secondary interment), and rock cairns (Wallace, 1955:219-221). The first evidence of cemeteries are recorded during this period and based on the relative absence of non-utilitarian artifacts, an egalitarian social system was likely to have been in operation (Tartaglia, 1976).

2.1.3.3 Late Holocene (cal A.D. 500 – Historic Contact)

The Late Holocene is characterized by a larger number of more specialized and diversified sites. Population increased substantially and is reflected in a greater number of sites recorded during this time period. This period is characterized by large village sites, tightly flexed burials, bow and arrow, arrowshaft straighteners, ollas (jars) and comals (cooking flats), personal ornaments, pottery vessels, circular shell fishhooks, an extensive trade network, a wide variety of ritual objects, and large stone bowls (Wallace, 1955:223-226). Elaborate mortuary artifacts are recovered from sites of this period.

Villages occur in the same general locations as they did in earlier time periods, but they increased in size and decreased in their frequency; base camps were often associated with villages. There was also an increase in the number of specialized and/or diversified sites. Trade was extensive during this period and long distance trading is reflected in artifacts recovered from the American Southwest (pottery) in California sites, while, steatite objects and Pacific Coast seashells occur in American Southwest sites. During the Late Period, many more classes of artifacts are found in the archaeological record and reveal a higher order of workmanship. Larger and more extensive settlement systems are evident, likely a byproduct of a more intensive subsistence base exploiting all available food resources. The bow and arrow was introduced along with other aspects of an expanded culture (population growth, more complex social system, and trade network).

New studies indicate that culture change in southern California may have been rapid, rather than gradual. Overexploitation of resources may have caused shifts to new resources that occurred in greater amounts (Byrd and Raab, 2007). On the coast, intensified fishing and small sea mammal hunting replaced hunting of large sea mammals and shellfish collection. Inland groups focused on grasses rather than acorns and direct evidence for acorn use is minimal at Late Holocene sites.

In the upper Santa Clara River drainage, it was reported that no drastic interruptions in the cultural sequence can be detected in the artifactual assemblages. But a gradual shift from one subsistence/settlement pattern to another with associated changes in technology and socio-political organization seems to have taken place in the project vicinity. This is similar to the shift in the coastal Chumash area, but began about 500 years later than in the areas to the west (Tartaglia, 1976).

2.1.4 Ethnographic Overview

At the time of Spanish contact, the lower Santa Clara River Valley was occupied by the Hokan speaking Ventureño Chumash while the upper Santa Clara River drainage was inhabited by the Uto-Aztecan speaking Tataviam (Kroeber 1925:621). Piru Creek was the territorial boundary between these two linguistic groups. The linguistic affinities and boundaries of this region have not been resolved, but many of the native inhabitants were bilingual and intermarriage with neighboring groups was fairly common (Forbes, 1966:138).

2.1.4.1 Tataviam

Tataviam is identified as a Takic branch of Uto-Aztecan stock, closely related to the Serrano (Johnson and Earle, 1990; Solis, 2008). The "People Who Face the Sun" likely migrated into the Santa Clara River area approximately 1,500 years ago and were possibly an offshoot of the Serrano, although there is some debate on this point (Solis, 2008). The extent of Tataviam territory is under debate. Their core area was identified in the early 1900s as stretching from Piru to Soledad Canyon, over much of the upper Santa Clara Valley (Bright, 1975). Johnson and Earle (1990) tentatively identify Tataviam speakers as far north as modern day Quail Lake, near the intersection of Interstate 5 and Highway 138, on the western end of the Antelope Valley. Generally, Tataviam territory included areas from the Santa Clara River to Piru Creek, from the Liebre Mountains to the Santa Susanna Mountains and into the westernmost parts of the Antelope Valley (Higgins, 1996; Johnson and Earle, 1990).

The Tataviam were hunter-gatherers who alternately occupied permanent villages in winter and temporary campsites used for resource gathering of plant foods such as acorns, seeds, berries, yucca, piñon nuts, and hunting deer and rabbit during the spring, summer, and fall months (Solis, 2008). Permanent villages consisted of familial dwellings, a *ki'j*, which was dome shaped and consisted of small saplings or branches affixed to a willow frame and covered with bulrush or cattails. Villages also had a sweat lodge, a *Sehé,* which consisted of a dug out area with a frame similar to the *ki'j*. Sweat lodges were also used as meeting places and dances (Solis, 2008). Johnson and Earle (1990) identified and confirmed several Tataviam villages through genealogical research and review of Harrington and Kroeber's early interviews with local Native Americans including *Cuecchao, Piru, Tochonanga, Siutasegena*, and *Tochaborunga*.

Of the three groups who occupied the project area in pre-contact times, the Tataviam are the least known of all Native California groups (Johnson, 2006; Solis, 2008). What written information survives, references the Tataviam in generalizations and comparisons to their neighbors. Population estimates are at less than 3,000 at time of contact, but there is no feasible manner to accurately verify that information. When it comes to population estimates at the time of contact by Europeans, these numbers are approximations and no reliable data exist (Johnson, 2006). Little was recorded about the Tataviam culture during Spanish exploration and later missionization in the 1770s; the Tataviam appeared to have intermarried with other groups and moved to new locations when Europeans settled near the Santa Clara River. Mission records and other historic documents often failed to distinguish the Tataviam as an individual group when multiple tribes and languages where encountered; often ethnic affiliation was not distinguished or commented upon. Many of the Tataviam were relocated to the San Fernando Mission during historic times and were assimilated with other groups into an indistinct neophyte culture. Despite missionization and European introduced diseases, the Tataviam survived into the 20th century. The remnants of the native Tataviam language, however, were documented by John Peabody Harrington in the early 1900s, as the last native speaker died in 1916 (Native-Languages, 2009; Survey of California Other Native Languages, 2010).

2.1.4.2 Chumash

The Chumash language belongs to the Hokan linguistic stock and they occupied the territory between Point Conception and Malibu, including three of the Channel Islands. This span of territory afforded the Chumash large trade networks that webbed into central California (King, 1971). The Chumash economic activities produced great wealth and possibly allowed for population increase; the largest villages of the pre-contact Chumash reportedly contained a thousand members (Moratto, 1984:119).

The Chumash had a strict socio-economic hierarchy made up of elites and non-elites; only the chief could have multiple wives (Fages, 1937; McCawley, 1996). It is theorized that there was an inter-dependent relationship between those who specialized in craft production and the elites, who managed the distribution of goods (Arnold, 2004). Chester King (1971) reported that the Chumash economy was a market economy in which shell beads were the exchange medium. Reciprocal ceremonial exchange was also employed, during feasts and celebrations. Open intervillage exchange was also likely (Gamble, 2008). In 1769, Pedro Fages accompanied the Gaspar de Portola expedition which crossed through California. Fages made some of the first written observations of the Chumash, and although colored by the prejudices of the Spanish at the time, did note the

artistry and richness of Chumash wares. Fages (1937) noted the Chumash manufactured wares of great artistry, including stone mortars with inlaid mother-of-pearl, baskets of white, black, and red, and cloaks with shells and small stones. Headgear was often embroidered. Women's skirts were decorated with small shells and stones, as well. Shell bracelets, necklaces, and hair ornaments were also noted by the Spaniards (Fages, 1937).

Coastal Chumash marine resource procurement was heavily dependent on the seaworthiness of fishing vessels; the Chumash were master plank canoe, or *tomol* builders (Gamble, 2002). Plank canoe building is credited with establishing the sociopolitical power the Chumash held amongst their neighbors, with the exception of the Gabrieleño, a neighboring, largely maritime, culture who seems to have been the sociopolitical equals to the Chumash (Gamble, 2002; McCawley, 1996). The Chumash also constructed a tule reed balsa, a lighter weight watercraft which was used along the coastline or in calm waters. Explorers and settlers in the area noted the Chumash also used a dugout canoe in the late 1800s, but there is no clear evidence that they employed the dugout before the arrival of the Europeans (Gamble, 2008). Along with marine resource procurement, control of waterways provided the Chumash with a command of transportation and goods distribution to the interior, resulting in the Chumash controlling various trade networks (Gamble, 2002). Plank canoe ownership appears to have been limited to the wealthy Chumash elite. Building a plank canoe was an expensive endeavor, both in time and in materials. The owners of the canoes, in part, controlled trade between the mainland and the islands, likely acting as middlemen between goods manufacturers and tribal chiefs, or *wots* (Gamble, 2008).

Like most hunter-gatherers, the Chumash moved seasonally, primarily in the summer, to optimize their resources. It is reported that they kept permanent winter villages, confining the seasonal camps to temporary occupancy during resource procurement, harvesting, and hunting (Arnold, 2004; King, 1971). These villages consisted of family houses, shaped like half globes with doors on the east and west sides and an opening in the ceiling at the middle of the structure. Four or five related families resided in each house (Fages, 1937). Villages were well populated. Fages estimated at least one village contained about 600 men considered able to bear arms. The village chief appeared to function primarily as a military commander (Fages, 1937) to the Spanish.

At the time of Missionization, baptismal records indicate an average population of 90 members per village and reports by Fages and Anza estimate a total of 3,000 Chumash at the time of contact. However, a Chumash village survey by Kroeber documented 41 villages on the coast and 25 villages in the interior; the survey results yielded population estimates at more than 10,000 members (Cooke, 1976).

2.1.5 Historic Era (1769 AD – present)

Although Alta California, as it was then known, was discovered by Juan Rodrigues Cabrillo in 1542, it was not until 1769 that Spain first began to explore and colonize Alta California. Successful colonization and religious conversion of native peoples in Lower California led the Jesuits to attempt the same in Alta California in a joint effort between the Church and the Spanish Government. The Spanish Government provided soldiers to protect the missionaries from rebellious Indians and to subjugate them while the Church converted the natives to Christianity. The Indians were the labor force of the mission system (Guinn, 1909:82).

The Alta California expedition was prepared by Jose de Galvez, Visitador General of New Spain and Junipero Serra, head of the Franciscans in Lower California. On July 1, 1769, the expedition arrived at San Diego, the northern frontier settlement of Lower California. The Spanish Government organized an expedition to explore the country and establish a second mission at Monterey; led by Gaspar de Portola, Governor of the Californias and Comandante of the Military.

The historic period in the immediate project vicinity began with Portola passing through the Santa Clara River Valley on his way to Monterey. He camped northwest of the San Fernando Mission before entering the Newhall-Saugus area via the Fremont Pass following Indian trails. Portola's expedition probably camped near the rancheria of *Chaguayavit*, near the Newhall ranch. It is assumed that Portola witnessed the Mourning Ceremony based on his description of the village population. The next contact occurred in 1776 when Father Garces followed the same overall route. Garces asked the chief of the *Cuabajay* (apparently the *Castaic*

Chumash) with whom he was staying, “to cease waging war against the people living on the upper Santa Clara River” (King and Blackburn, 1978:536).

Missions San Gabriel (1771), San Buenaventura (1782), and San Fernando (1797) recruited neophytes from villages in the Saugus-Newhall area who were incorporated into the developing mission system. In 1810, nearly all the Tatavium were baptized at the San Fernando Mission and by 1820, nearly all the Indian villages in the Santa Clara Valley had been abandoned or severely reduced in size (Tartaglia, 1976). The Indians were acculturated, their lifestyle destroyed, and their numbers decimated by disease epidemics. Many died within a short time of being brought into the mission system.

After the founding of San Fernando Mission, the headwaters of the Santa Clara River came under its control as part of Rancho San Francisco. On the exact spot that Friar Crespi recommended for a mission site, an Assistencia was built in 1804, which served as the headquarters for all the mission activities on the rancho. The Mission San Fernando padres established the Assistencia near the former village of *Chaguaya-vit;* Indians were baptized there and were taught to tend the herds and carry out various manufacturing activities.

While still under Mexican rule, interest in the Santa Clara River Valley as a passage route was fostered by a number of American explorers and fur trappers such as Jededdiah Strong Smith in 1826 and John C. Fremont in the 1840’s. Meanwhile, the Spanish Government began to institute the practice of Land Grants in the form of leases and ranchos to retired soldiers for services rendered. This practice continued throughout the Mexican Period (1822 to 1846) when the ranchos were sold for money to help defray the costs of the government. During the Mission Period (1789 to 1834), the Indians were under the jurisdiction and protection of the Church, but as the Church declined in power, the mission system collapsed and many of the neophytes (missionized Indians) became laborers on the ranchos.

Since the early Mexican Republic, the rancho became an important part of southern California history because the social and economic systems that revolved around the ranchos served to stratify the Spanish, Mexican, and Indian cultures. The Spanish owners or “Gente de Razon” were the elite of the area controlling vast amounts of land which enabled them to exert great political and economic influence. After 12 years of armed conflict, Mexico finally won its independence from Spain in 1822. Conflicts immediately arose between the already existing mission system and the new government. In 1833 the missions were secularized, and in 1834 Don Antonio del Valle had been appointed to oversee the desecularization of the Mission San Fernando. He used part of the Rancho San Francisco for his personal use as early as 1824 and on January 22, 1839, he petitioned Governor Alvarado for the Rancho. He relocated at the Mission Assistencia and used the Rancho for livestock grazing.

In March of 1842, gold was first discovered in southern California in Placerita Canyon by Don Francisco Lopez from this Mission Assistencia (Tartaglia, 1976). Several hundred miners immediately poured into the canyon and started placer mining, which continued until about 1935. In the 1860s and 1870s, other canyons were placer mined for gold (San Francisquito, Dry, Castaic, and Haskell Canyons). After the war with Mexico and the northern California gold strike at Sutter’s Mill in 1848, settlements began to increase. Many Mother Lode bound gold seekers passed through the Santa Clara River Valley to purchase provisions and food, causing an economic shift to beef, grain, and crop production for the valley ranches.

Both the Gold Rush and California’s statehood in 1850 provided the first great impetus towards the development of roads, the growth of freighting and express companies, and the emergence of a stagecoach system. Miners, unwilling to leave profitable claims, were willing to pay for someone to carry their mail, bring supplies, and transport gold. Traders hauling freight in large wagons, brought in by the emigrants to the ever-changing mining locations, were the first to open many of the roads (Beck and Haase, 1974). In 1853, the Pacific Railroad Survey, led by Lieutenant Williamson, passed through San Francisquito Canyon, which he reported as the only feasible route through the La Liebre and Techachapi Mountains. Gold was discovered in 1854 on the Kern River and on August 10, 1854, Fort Tejon was established on the Grapevine Pass. For the first time on December 5, 1854, a stage line from Fort Tejon followed an old Mexican pack trail through the Grapevine and San Francisquito Canyon.

With California's Statehood in 1850, regular stagecoach routes followed with emphasis still oriented through the Grapevine to the north. Stage lines were dependent on livestock and wagons; therefore, stations were located at rather short intervals. Lyons Stations was probably the first Anglo settlement in the project area and was opened in the early 1850s by Henry Wiley and Jose Ygnacio del Valle. The Butterfield Overland mail stage, a transcontinental link from St. Louis to San Francisco, began service in 1854. The initial local leg of the route extended from San Bernardino to San Francisco, via Cajon and Tejon Passes, through the San Andreas rift zone valleys, bypassing the Santa Clarita Valley. Later, one route ran through the Newhall Pass area and Bouquet Canyon to Lake Elizabeth. Another route passed along the traditional Santa Clara River corridor from Ventura to San Bernardino. The Butterfield followed the Williamson-Banning route through San Francisquito Canyon from October 21, 1858, until the outbreak of the Civil War in 1861. United States Secretary of War, Jefferson Davis, imported camels to supply isolated army posts from New Mexico to Fort Tejon, California. The camel caravans passed through San Francisquito Canyon to Los Angeles until June of 1861.

In 1866, oil seepage in Wiley Canyon was being "skimmed" and the "oil salvaged" was shipped to the Metropolitan Gas Works in San Francisco (Perkins, 1957:21). In 1876, the Star Oil Company's Well No. 4 became California's first successful commercial oil well. A refinery was established just outside of Newhall and oil wells started producing. In the 1880s, San Francisquito Canyon was mined for gold. There was a gold camp (Hollandsville) beyond the present day Powerhouse No. 1 of the Los Angeles Aqueduct (built from 1907 to 1913). Oil wells continued to be drilled into the 1890s; oil wells and placer claims sprung up all over the area (part of the Soledad Mining District).

As noted elsewhere, on May 2, 1884, McCoy Pyle traveled over an old Indian trail toward the San Martins and found a cave. Upon entering it, he observed many Indian baskets, containing feather robes and headdresses woven with flicker and condor feathers. There were also four stone ax heads, quartz crystals, and an assortment of ceremonial obsidian knife blades (Van Valkenburgh, 1952:5-7). Coincidentally, Stephen Bowers was in the region seeking Indian relics. When he heard of the Pyle discovery, he immediately went to Mud Springs Canyon were he purchased the Pyle collection for $1,500. Bowers sold part of the collection (including the ceremonial wands) to Professor F.W. Putnum of Harvard's Peabody Museum.

By 1890, the town of Newhall was established as a community and the early 1900s marked the beginning of urban growth in the general area. However in 1883, the Newhall Land and Farming Company was incorporated by the Newhall family to supervise the various activities of its land holdings. This included Rancho San Francisco, whose main functions centered around livestock raising and mineral exploitation. By 1916, the last speaker of the Tataviam language died (King and Blackburn, 1978:536).

SECTION 3.0

Methods

3.1 Literature Search

A literature search of the Proposed Project area was conducted by staff of the South Central Coastal Information Center (SCCIC) of the California Historical Resources Information System (CHRIS) at California State University, Fullerton (CSUF) in 2005. An updated literature search was requested by CH2M HILL on January 19, 2010. A 1-mile buffer zone around the project area was included in this search. The CHRIS literature and records review included a review of all recorded archaeological sites as well as all known cultural resource survey and excavation reports. The National Register of Historic Places (NHRP), the California Register, California Historical Landmarks, and California Points of Historical Interest were all examined. State and local listings were consulted for the presence of historic buildings, structures, landmarks, points of historical interest, and other cultural resources.

The majority of the project area was previously surveyed in 1993 by Theodore Cooley, George Toren, and Loren Santoro for the Phase 1 Cultural Resource Evaluation of the Chiquita Canyon Sanitary Landfill Expansion project (Cooley et al., 1993). This report was thoroughly reviewed as a part of the literature search.

3.2 Pedestrian Survey

Survey methodology for prehistoric and historic archaeological resources was performed using pedestrian transects spaced at 10- to 15-meter intervals throughout the entire surveyed area. The topography of the project area is varied and ranges from relatively flat lowlands to narrow ridgelines bounded by brush-covered slopes. The only areas that were not surveyed were slopes greater than 25 percent. See Attachment A for photographs of the project area. Many of the steeper slopes were surveyed during the process of accessing the higher ridgelines. Although slopes greater than 25 percent were only opportunistically surveyed, all were examined for the presence of bedrock outcrops, historic features, or anomalous characteristics. If any such features were noted, these were examined during the opportunistic survey. Subsurface exposures, including rodent burrows and cut banks, were examined. The survey crew navigated via a Trimble Geo XT global positioning system (GPS). Additionally, transects were recorded using GPS during the survey to record that the survey was accomplished using the 10- to 15-meter intervals.

CH2M HILL identified the single previously recorded resource located within the survey area and updated the site record for this site on appropriate DPR forms. This site was also mapped using a Trimble Geo XT GPS and photographed. Information on the appearance and physical characteristics of the resources as well as the location of the resources was gathered. The survey was noncollection and no artifacts were collected by CH2M HILL.

SECTION 4.0

Results

4.1 Literature Search

The literature search requested by CH2M HILL revealed that several previous studies had been conducted within Proposed Project area. All previous surveys were thoroughly reviewed.

The majority of the project area was previously surveyed in 1993 by Theodore Cooley, George Toren, and Loren Santoro for the Phase 1 Cultural Resource Evaluation of the Chiquita Canyon Sanitary Landfill Expansion project (Cooley et al., 1993). Twenty-four studies (LA285, LA294, LA990, LA1318, LA1660, LA1753, LA1775, LA1785, LA1832, LA2255, LA2362, LA2437, LA2950, LA2980, LA3309, LA3360, LA3397, LA3499, LA4546, LA4547, LA6250, LA6251, LA6585, and LA6595) have been conducted within the project area or immediately adjacent to the project area. There are 18 additional investigations located on the Val Verde and Newhall 7.5-minute USGS Quadrangles that are potentially within the project area vicinity, but were not mapped by CHRIS due to insufficient locational information (Letter to CH2M HILL from Thomas David Shackford, Assistant Coordinator, SCCIC, January 21, 2010).

One previously recorded site, Bower's Cave, LAN-36, is noted within the overall project area, but outside of the grading footprint. Isolated find CA-LAN-IF-27 (Cooley and Toren, 1989), a United States Forest Reserve boundary monument dated 1905 is no longer present within the project area and was destroyed by previous landfill grading (Cooley et al., 1993:13-14). Three prehistoric archaeological sites are located outside the project area on the south side of SR-126 (Henry Mayo Drive) or west of Chiquita Canyon Road. A single, dark grey Franciscan chert projectile point was found outside the project area, to the north of Bowers Cave.

The California Points of Historical Interest (2004) of the Office of Historic Preservation (OHP), DPR lists no properties within the project area. The California Historical Landmarks (2004) of the OHP DPR also lists no properties within the project area. The California Register of Historical Places (2004) and the NRHP (2004) list no properties within the project area. The City of Los Angeles Historic Resources Inventory (2004) lists no properties that have been evaluated for historical significance within the Proposed Project area.

4.1.1 CA-LAN-36, Bowers Cave

During the 1880s, Everett Pyle and his brother, McCoy, lived with their mother, Mandy Pyle, in Mud Springs Canyon, just 3 miles northwest of present Castaic Junction. The family raised bees and livestock. The boys hunted in the nearby canyons and ridges.

On May 2, 1884, McCoy traveled westward over an old Indian trail toward the San Martins to look for deer. Fifty feet below the summit, McCoy reached the lip of a cave. Upon entering it, he observed many Indian baskets. Inside some of the baskets, he saw feather robes and headdresses woven with flicker and condor features. There were also four stone axe heads, quartz crystals, and an assortment of ceremonial obsidian knife blades. Four ceremonial "wands or sceptors" were also recovered, probably representing "sun sticks" used in solstice ceremonies.

McCoy returned to the ranch and told his brother Everett what he had found. The boys returned to the cave and removed the "treasures" to be stored in the milk house at the ranch (Van Valkenburgh, 1952:5-7).

At the same time, Stephen Bowers was in the region obtaining Indian relics. When he heard of the Pyle discovery, he immediately went to Mud Springs Canyon. There, he purchased the Pyle collection for $1,500. Bowers sold part of the collection, including the ceremonial wands, to Professor F.W. Putnam of the Peabody Museum at Harvard University. What happened to the remaining artifacts is unknown; perhaps, there were sold to other museums. In 1884, McCoy carved an inscription in the sandstone of the cave, "MAC – 1884" (Van Valkenburgh 1952:7-8).

In the early 1950s, Richard Van Valkenburgh revisited the cave now referred to as “Bowers Cave” (CA-LAN-36). Using nonscientific excavation methods, Van Valkenburgh removed additional materials from the cave. Small blue and rose colored glass beads were found that date to approximately A.D. 1800. The absence of hearths suggests that the cave was not a permanent, but a temporary site. Three American Southwest ceramic fragments (Verde black-on-grey) date from the thirteenth century were also found (Van Valkenburgh 1952:8).

No subsequent recorded excavations from this cave have been reported; however, local looting of this site probably occurred. The artifacts purchased by Putnam and stored at the Peabody Museum were analyzed and published in The Archaeology of Bowers Cave, Los Angeles County, California by Albert Elsasser and Robert Heizer (Elsasser and Heizer, 1963). On February 26, 1981, Louis Tartaglia and R. Wlodarski (Tartaglia and Wlodarski, 1981) revisited Bowers Cave and prepared an updated archaeological site survey record form.

Based on the results of a 1993 field survey conducted by Theodore Cooley, George Toren, and Loren Santoro for the Phase 1 Cultural Resource Evaluation of the Chiquita Canyon Sanitary Landfill Expansion project (Cooley et al., 1993), prehistoric site CA-LAN-36 was determined to be immediately adjacent to the western boundary line of the northernmost portion of the Proposed Project area. Cooley, Toren, and Santoro made the following recommendation (Cooley et al., 1993:17):

> No newly discovered prehistoric cultural resources were found during the current field survey, but one previously recorded prehistoric site, CA-LAN-36, situated on the slope of a very steep ridge, immediately adjacent, or contiguous to, the project property. A more accurate determination of the location of the site, relative to the project property boundary, would be required if project grading near this slope were to occur in the future. Portions of the northern and western property boundaries adjacent to the archaeological site location should be staked by surveyors, and then the boundary lines should be evaluated, by a qualified archaeological, in the field, in relation to the site location.
>
> If the archaeologist determines that the project boundary is close enough that, under CEQA, further mitigation measures are required, particularly if grading is to occur within a 300 linear foot radius of the site, a qualified archaeologist should be retained to flag-off the site area to ensure avoidance of the site. Grading plans should clearly depict the sensitive area and state that grading must not occur beyond a buffer established by the archaeologist.

4.1.2 Isolated Find CA-LAN-IF-27

Isolated find CA-LAN-IF-27 (Cooley and Toren, 1989), a United States Forest Reserve boundary monument dated 1905 is no longer present within the project area and was destroyed by previous landfill grading (Cooley et al., 1993).

4.1.3 Sites CA-LAN-2234, -2235, and -2236

Three prehistoric archaeological sites are located outside the project area on the south side of SR-126 (Henry Mayo Drive) or west of Chiquita Canyon Road. Site CA-LAN-2234 is a small lithic scatter or campsite, perhaps slightly buried by colluvial processes (Whitley and Simon, 1994). Two manos and quartzite and chert primary flakes are present. Site CA-LAN-2235 is a small habitation/village site, probably Late Prehistoric in age (Whitley and Simon, 1994). Chert, quartzite and fused shale debitage, core/cobble complex tools, and a possible schist metate fragment are present. Midden soil, burnt animal bone, and fire-cracked rock are also present. Site CA-LAN-2336 is a small, low density lithic scatter; eight quartzite flakes are present (Whitley and Simon, 1994).

4.1.4 Isolated Find 19-100511

A single, dark grey Franciscan chert projectile point was found outside the project area, to the north of Bowers Cave. It resembles a Malaga Cover Leaf Cluster type projectile point believed to date to the Canaliño period (A.D. 300 to 1300) (McKenna, 2004).

4.2 Native American Consultation

The Native American Heritage Commission (NAHC) conducted a record search of the sacred lands file; their record search on September 16, 2005, failed to indicate the presence of Native American cultural resources in the immediate project area. As recommended by the NAHC, letters were sent to the following individuals/ groups: on September 19, 2005: Charles Cooke (*Chumash, Fernandeño, Tataviam, Kitanemuk*), Beverly Salazar Folkes (*Chumash, Tataviam, Fernandeño*), Randy Guzman-Folkes (*Chumash, Fernandeño, Tataviam, Shoshone Paiute, Yaqui*), John Valenzuela (San Fernando Band of Mission Indians – *Fernandeño, Tataviam, Serrano, Vanyume, Kitanemuk*), and Ron Andrade (LA City/County Native American Indian Commission) soliciting information on potential Native American cultural resources. No responses were received. No additional Native American consultation was conducted in 2010.

The NAHC record search of the Sacred Lands file did not indicate the presence of Native American cultural resources in the CCL survey area. The record search conducted at the SCCIC also did not indicate the presence of Native American traditional cultural properties.

4.3 Pedestrian Survey

CH2M HILL conducted an archaeological survey of the 143-acre expansion in January 2010.

The majority of the Proposed Project area was surveyed at 10- to 15-meter intervals. The only areas not surveyed were slopes which were greater than 25 percent. All slopes were searched, however, for rock outcrops or possible caves. All observed rock outcrops were examined. Aside from CA-LAN-36, no other caves were observed in the Proposed Project area. Visibility throughout the majority of the Proposed Project area was excellent at approximately 70 percent. Visibility of a small section of the southern portion of the Proposed Project area was considered fair at approximately 50 percent as much of this area consisted of thick grasses. No new cultural resources were identified during this survey.

The Proposed Project area includes CA-LAN-36, which was revisited by CH2M HILL during the archaeological survey. Locational data of Bowers Cave was recorded with a submeter accurate Trimble Geo XT GPS. No artifacts were found either inside the cave or immediately outside of the cave. Much of the sandstone ceiling has collapsed onto the floor of the cave and large chunks of sandstone obscures much of the floor. Modern plastic and a large wood rat nest were observed on the western end of the cave. Modern graffiti, including several stick figures, was observed on the walls of the cave but the inscription “MAC-1884” described by Valkenburgh above was not relocated. The majority of the signatures are new; one inscription reads “1911.”

SECTION 5.0

Determination of Eligibility and Assessment of Potential Effects

5.1 Standards of Significance

CEQA guidelines define three ways that a property may qualify as a historical resource for the purposes of CEQA review:

- If the resource is listed in or determined eligible for listing in the California Register of Historical Resources (CRHR),
- If the resource is included in a local register of historical resources, as defined in Section 5020.1(k) of the PRC, or identified as significant in an historical resource survey meeting the requirements of PRC Section 5024.1(g) unless the preponderance of evidence demonstrates that it is not historically or culturally significant, or
- The lead agency determines the resource to be significant as supported by substantial evidence in light of the whole record (CCR Title 14, Division 6, Chapter 3, Section 15064.5[a]).

Each of these ways of qualifying a property as an historical resource for the purpose of CEQA is related to the eligibility criteria for inclusion in the CRHR (PRC 5020.1(k), 5024.1, 5024.1(g)). A historical resource may be eligible for inclusion in the CRHR if it:

- Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- Is associated with the lives of persons important in our past;
- Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
- Has yielded, or may be likely to yield, information important in prehistory or history.

Properties that are listed in or eligible for listing in the NRHP are considered eligible for listing in the CRHR, and thus are significant historical resources for the purpose of CEQA (PRC Section 5024.1(d)(1)).

5.1.1 Integrity

Integrity is the authenticity of an historical resource's physical identity evidence by the survival of characteristics that existed during the resource's period of significance. Historical resources eligible for listing in the California Register must meet one of the criteria of significance described above and retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance. Historical resources that have been rehabilitated or restored may be evaluated for listing.

Integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling, and association. It must also be judged with reference to the particular criteria under which a resource is proposed for eligibility. Alterations over time to a resource or historic changes in its use may themselves have historical, cultural, or architectural significance.

It is possible that historical resources may not retain sufficient integrity to meet the criteria for listing in the National Register, but they may still be eligible for listing in the California Register. A resource that has lost its historical character or appearance may still have sufficient integrity for the California Register if it maintains the potential to yield significant scientific or historical information or specific data.

An adverse effect on a cultural resource is defined as:

- Substantial adverse change in the significance of a historical resource by physical demolition, destruction, relocation, or alteration of the resource of its immediate surroundings
- Demolishes or materially alters those physical characteristics of a historical resource that convey its significance and that justify its inclusion in, or eligibility for inclusion in, the CRHR, or inclusion in a local register

Section 7052 of the Health and Safety Code establishes a felony penalty for mutilating, disinterring, or otherwise disturbing human remains, except by relatives. Penal Code Section 622.5 provides misdemeanor penalties for injuring or destroying objects of historical or archaeological interest location on public or private lands, but specifically excludes the landowner. PRC Section 5097.5 defines as a misdemeanor the unauthorized disturbance or removal of archaeological, historical, or paleontological resources located on public lands.

5.1.2 California Register of Historical Resources

As provided in California PRC Section 5020.4, the California Legislature established the CRHR in 1992. The CRHR is used as a guide by state and local agencies, private groups, and citizens to identify the state historical resources and to include which properties are to be protected, to the extent prudent and feasible, from substantial adverse change. The CRHR, as instituted by the California PRC, automatically includes all California properties already listed in the NRHP. It also includes those formally determined to be eligible for listing in the NRHP (Categories 1 and 2 in the State Inventory of Historical Resources), as well as specific listings of the State Historical Landmarks and in the State Inventory of Historical Resources), as well as specific listings of State Historical Landmarks and State Points of Historical Interest. The CRHR may also include various other types of historical resources that meet the criteria for eligibility, including the following:

- Individual historical resources
- Resources that contribute to a historic district
- Resources identified as significant in historic resource surveys
- Resources with a significance rating of Category 3 through Category 5 in the State Inventory (Categories 3 and 4 refer to potential eligibility for the NRHP; Category 5 indicates a property with local significance)

The CRHR follows the lead of the NRHP in utilizing the 50-year threshold. A resource is usually considered for its historical significance after it reaches the age of 50 years. This threshold is not absolute, but was selected as a reasonable span of time after which a professional evaluation of historical value/importance can be made.

5.2 California Register/National Register Status

The archaeological survey conducted in 2010 confirms the presence of CA-LAN-36 within the Proposed Project area. Although most of the artifacts were removed from this cave by looting and early investigations, it is possible that there could be some intact subsurface deposition. Intact subsurface deposits could have the potential for additional information important to the prehistory of the area and thus, this site could be eligible for inclusion on the CRHR under Criterion 4.

A Phase II evaluation of the cave is proposed to determine whether the cave is eligible for listing on the CRHR.

5.3 Potential for Buried Archaeological Resources

In portions of the CCL survey area the potential exists for archaeological resources to have been buried through alluviation, colluviation, or Aeolian processes, and would not be found during a surface reconnaissance. The potential that project implementation could uncover and destroy buried resources must be assessed. Generally, the potential of an area to contain buried resources can be assessed by reference to topography, soil types, and proximity to water. This potential can be ranked by relative sensitivity (i.e., none, low, medium, high

potential for buried resources), and rankings can be used to avoid sites, or plan appropriate mitigation in the event that sites are discovered. Further, the geomorphological environment for the project area is one of alluvial deposition. Important archaeological deposits with no surface expression may be buried beneath deep alluvial sediments. Mitigation to address the possibility of impact to buried resources is discussed in Chapter 9.0 of the CCL Master Plan Revision Draft Environmental Impact Report.

5.4 Management Considerations

The Proposed Project could directly affect an historical resource as defined by CEQA. The areas delineated for vertical and horizontal landfill expansion grading footprint have already been archaeologically surveyed with negative results, no historical resources are present. In addition, the vertical and lateral expansion areas have already been graded and used for landfilling as a result of earlier permitting (Cooley et al., 1993). The archaeological survey conducted in 2010 confirms the presence of CA-LAN-36 within the Proposed Project area. This resource is recommended as potentially eligible for listing on the CRHR. A Phase II evaluation should be completed, and the eligibility of this resource should be determined. Most impact potential would exist during the construction phase of the project, although disturbance could occur during operation and maintenance of the facilities. Ground-disturbing activities, including the operation of heavy equipment, could result in significant impacts to cultural resources. In addition, development outside of recorded site boundaries could result in unanticipated discoveries.

As with any ground-disturbing project, there remains a potential for the accidental discovery of buried cultural resources not detected through a surface inventory, or even through shovel testing. If cultural resources or materials are discovered during ground-disturbing activities, the work in the vicinity of the discovery should cease and the area be protected until the find can be evaluated by a qualified archaeologist. Depending on the nature of the find, additional consultation with the SHPO or Tribal leaders may be necessary before work can resume in the area of the find.

If human remains are encountered, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to PRC Section 5097.98. The County Coroner must be notified of the find immediately. If the remains are determined to be Native American, the County Coroner will notify the NAHC, which will determine and notify a Most Likely Descendant (MLD). The MLD may inspect the site of the discovery with the permission of the landowner, or his or her authorized representative. The MLD shall complete its inspection within 48 hours of its notification by the NAHC. The MLD may recommend scientific removal and analysis of human remains and items associated with Native American burials.

SECTION 6.0

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Attachment A
Project Photos

Photo 1, View west of survey area near SR-126.

Photo 2, View northeast of survey area near SR-126.

Photo 3, View north of survey area on the north end of CCL.

Photo 4, View north of CA-LAN-36, from the edge of the proposed grading footprint.

Confidential Attachment B
Department of Parks and Recreation Forms
(Confidential)

Final Report

Chiquita Canyon Landfill Master Plan Revision Traffic Analysis

Prepared for

Los Angeles County Department of Public Works, Traffic and Lighting Division

July 2014

Prepared by

CH2MHILL

6 Hutton Centre Drive, Suite 700
Santa Ana, CA 92707

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Appendix

Appendix A – Los Angeles County Traffic Study Memorandum of Understanding
Appendix B – Existing Turning Movement Data Collection Sheets
Appendix C - Traffic Analysis Work Sheets
Appendix D – Traffic Signal Warrant Worksheets
Appendix E – Other Project Trip Distributions
Appendix F – Traffic Index Calculation Worksheets

1. Introduction

This report documents the potential traffic-related impacts of the proposed Chiquita Canyon Landfill (CCL) Master Plan Revision.

The scope of the analysis in this report is in accordance with direction provided by Los Angeles County Department of Public Works, Traffic and Lighting Division staff. The signed Memorandum of Understanding (MOU), which outlines the agreed upon scope of this traffic study, is provided in Appendix A. This report satisfies the Traffic Impact requirements of the Congestion Management Program (CMP) for Los Angeles County. The analysis focuses on on-site circulation and access, off-site traffic impacts, and addresses the project impact at area intersections.

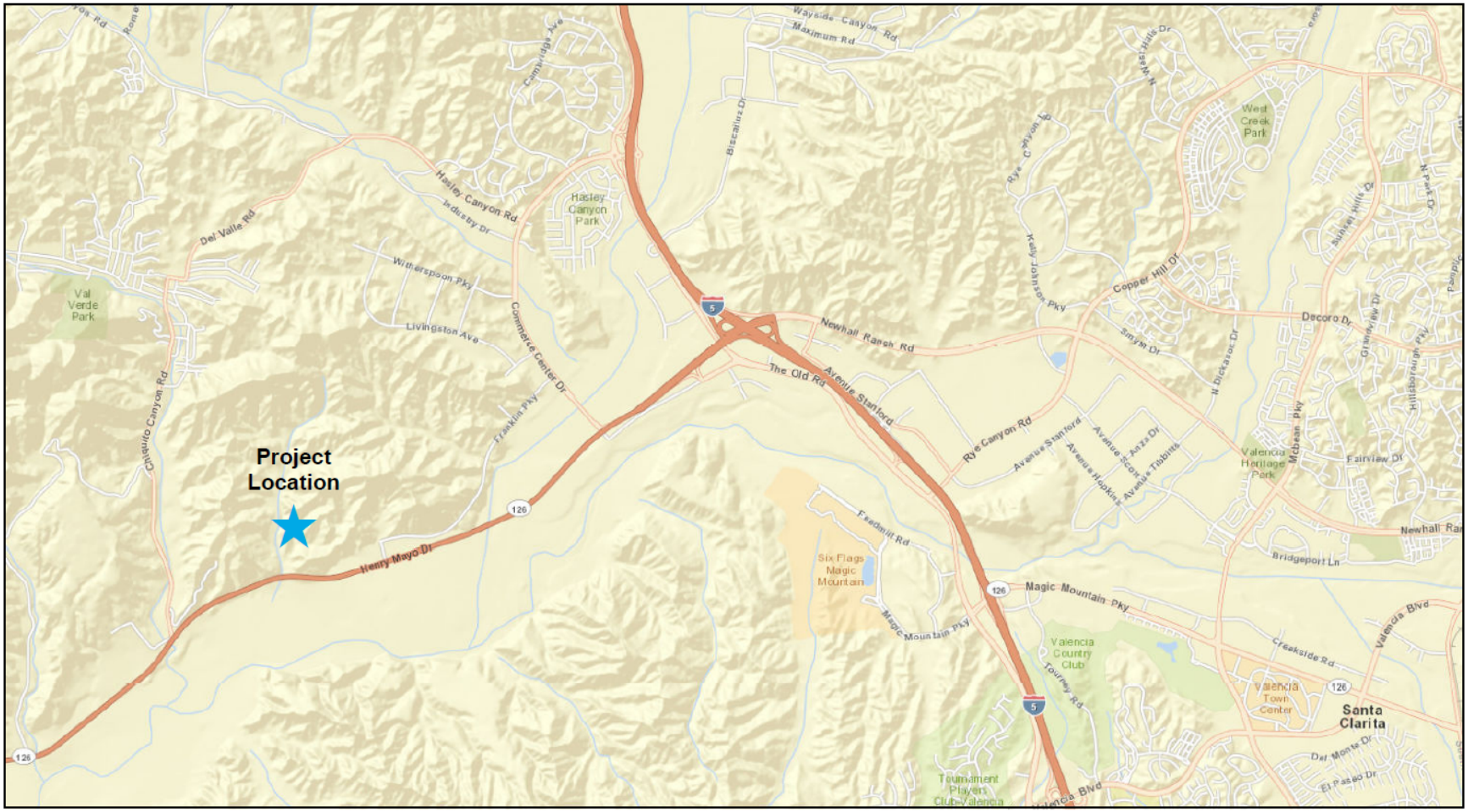
1.1 Project Description and Location

CCL is located in the northwestern portion of unincorporated Los Angeles County, approximately three miles west of the intersection of Interstate 5 (I-5) and State Route 126 (SR-126). A regional vicinity map is provided on **Figure 1-1.** Access to the project site is from SR-126 (Henry Mayo Drive), a four-lane paved highway running east-west along the southern boundary of CCL. Access to the existing CCL at SR-126 includes left-turn and right-turn deceleration lanes for traffic entering the site.

CCL is located within the planning area of the City of Santa Clarita, but outside its city limits and sphere of influence. The landfill site is also located within the Santa Clarita Valley Area Plan of the Los Angeles County General Plan and in the Castaic Area Community Standards District.

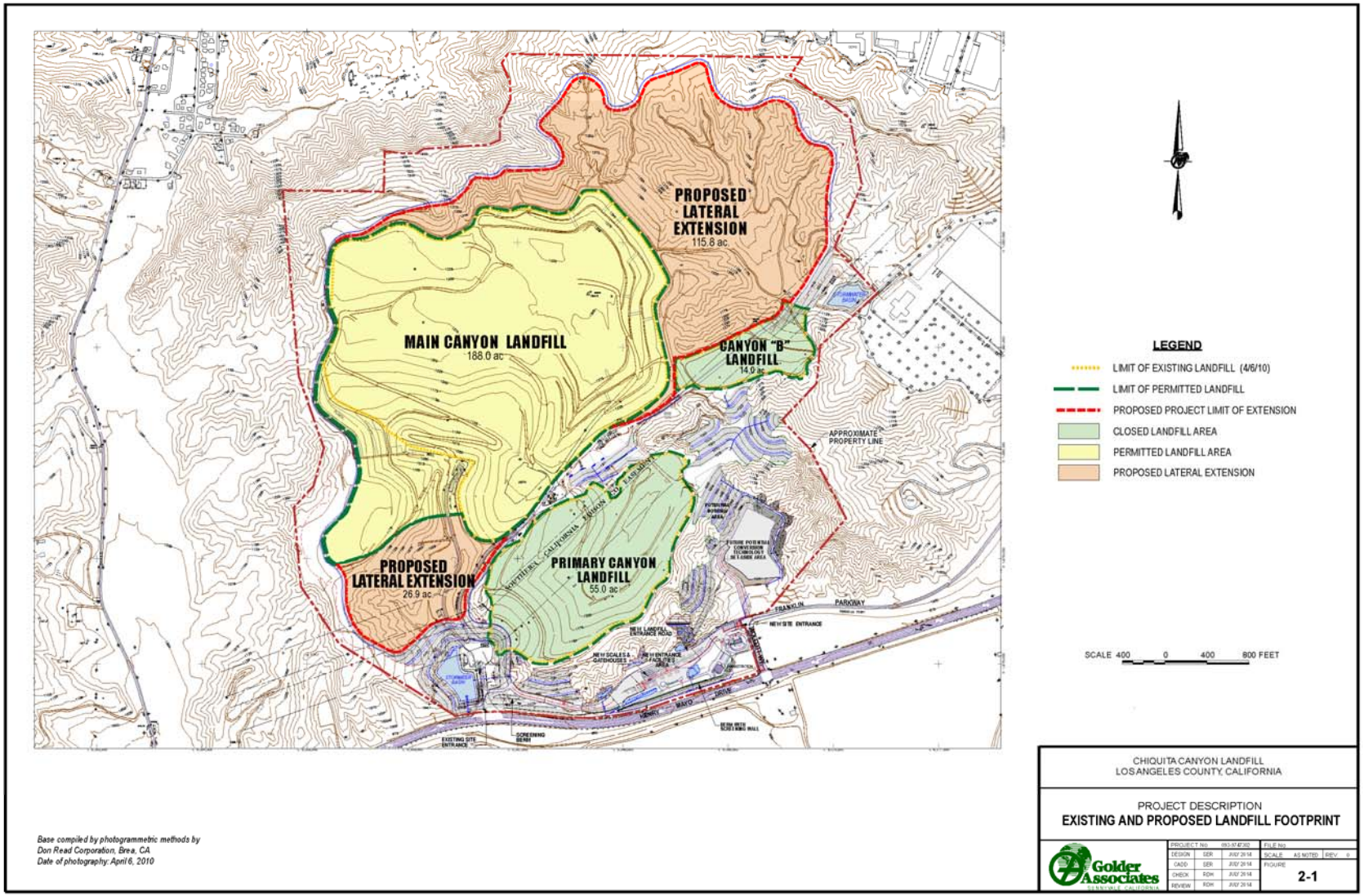
The proposed project would continue the landfill operation by extending the waste footprint at CCL by approximately 143 acres within the confines of the existing property boundary, relocating the site entrance, better utilizing the landfill's remaining and potential disposal capacity, and allowing for the disposal of all nonhazardous wastes acceptable at a Class III solid waste disposal landfill. The proposed project would also include the continued diversion of such materials as green waste, asphalt/concrete, and metal through ongoing as well as permitted, but not yet developed, landfill waste diversion programs on which numerous jurisdictions depend to comply with state-mandated waste diversion goals, and continued landfill gas control and recovery for beneficial use. Figure 1-2 illustrates the existing and proposed CCL project footprint.

FIGURE 1-1
Vicinity Map



Basemap Source: ESRI

FIGURE 1-2
Existing and Proposed Landfill Footprint



1.2 Study Area

This traffic study includes documentation of existing conditions, analysis of project build-out traffic conditions and identification of project-related impacts at the following study intersections:

- Chiquito Canyon Road @ SR-126
- Chiquita Canyon Landfill Entrance (existing) @ SR-126
- Wolcott Way @ SR-126
- Commerce Center Drive @ SR-126
- I-5 Southbound Ramps @ SR-126
- I-5 Northbound Ramps @ SR-126
- Franklin Parkway @ Commerce Center Drive
- Wolcott Way @ Franklin Parkway (proposed CCL entrance)

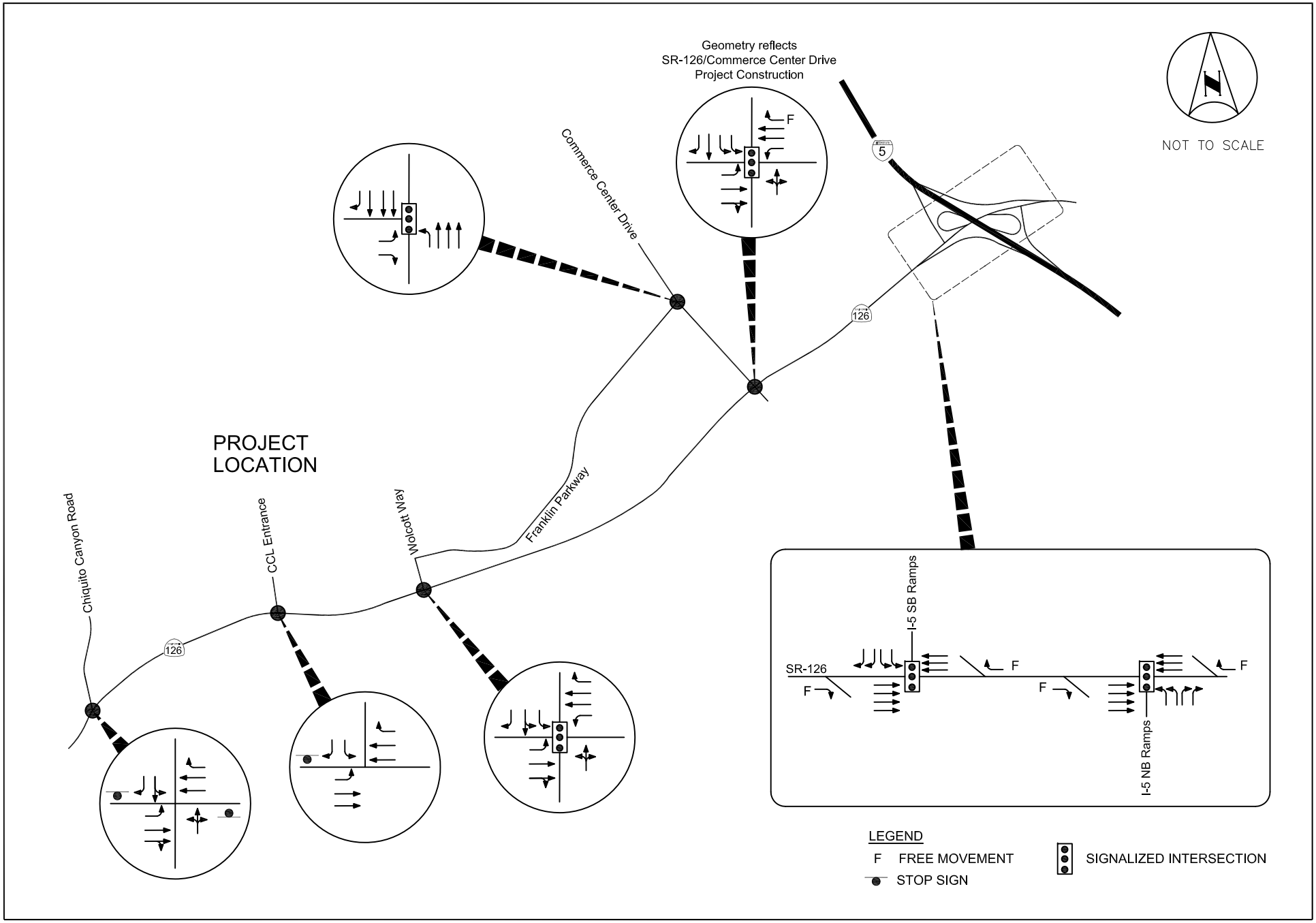
The existing lane configurations of the study intersections are illustrated in Figure 1-3. For each of the study intersections, five analysis scenarios were analyzed for the morning and evening peak hours:

- Existing Conditions
- Existing plus Growth (2015) Conditions without Project
- Existing plus Growth (2015) plus Other Development Conditions without Project
- Existing plus Growth (2015) Conditions with Project
- Existing plus Growth (2015) plus Other Development Conditions with Project

1.3 Analysis Methodology

Traffic analysis for the intersections was conducted using two different methods to accommodate the requirements of the both Caltrans and the County. The Highway Capacity Manual (HCM) and Intersection Capacity Utilization (ICU) methodologies were used to analyze intersection operations.

Caltrans uses the HCM methodology for intersection analysis. The HCM methodology assesses Level of Service (LOS) based on average delay per vehicle. The delay is calculated using peak hourly traffic volumes, peak hour factors, number of lanes, type of operation (signalized or unsignalized), and other factors. For this study, the HCM methodology was implemented using the Synchro software (Version 8). The HCM delay forecast translates to a LOS assessment, ranging from LOS A to LOS F using the delay ranges shown in Table 1-1.



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EXISTING LANE CONFIGURATIONS

FIGURE 1-3

TABLE 1-1
HCM-Based Level of Service and Delay Ranges

Average Delay (seconds / vehicle)		LOS
Signalized Intersections	**Unsignalized intersections**	
< 10.0	< 10.0	A
> 10.0 to < 20.0	> 10.0 to < 15.0	B
> 20.0 to < 35.0	> 15.0 to < 25.0	C
> 35.0 to < 55.0	> 25.0 to < 35.0	D
> 55.0 to < 80.0	> 35.0 to < 50.0	E
> 80.0	> 50.0	F

Source: Highway Capacity Manual, 2010

The ICU methodology provides a comparison of the number of vehicles actually passing through an intersection during a given hour to the theoretical hourly vehicular capacity of that intersection. A saturation flow rate of 1,600 vehicles/hour/lane for all through/turn lanes and 2,880 vehicles/hour/lane for all dual turn lanes was used in the ICU calculation, consistent with the guidance provided in the Los Angeles County CMP. The ICU calculation returns a volume-to-capacity (V/C) ratio that translates into a corresponding LOS. A summary description of each LOS and the corresponding V/C ratio is provided in Table 1-2.

TABLE 1-2
ICU Level of Service Criteria

LOS	V/C Ratio	Definition
A	0.00 - 0.60	At LOS A, there are no cycles that are fully loaded, and few are even close to loaded. No approach phase is fully utilized by traffic and no vehicle waits longer than one red indication. Typically, the approach appears quite open, turning movements are easily made, and nearly all drivers find freedom of operation.
B	>0.60 - 0.70	LOS B represents stable operation. An occasional approach phase is fully utilized and a substantial number are approaching full use. Many drivers begin to feel somewhat restricted with platoons of vehicles.
C	>0.70 - 0.80	In LOS C stable operation continues. Full signal cycle loading is still intermittent, but more frequent. Occasionally drivers may have to wait through more than one red signal indication and back-ups may develop behind turning vehicles.
D	>0.80 – 0.90	LOS D encompasses a zone of increasing restriction, approaching instability. Delays to approaching vehicles may be substantial during short peaks within the peak period, but enough cycles with lower demand occur to permit periodic clearance of developing queues, thus preventing excessive back-ups.
E	>0.90 – 1.00	LOS E represents the most vehicles that any particular intersection approach can accommodate. At capacity (V/C = 1.00) there may be long queues of vehicles waiting upstream of the intersection and delays may be great (up to several signal cycles).
F	> 1.00	LOS F represents jammed conditions. Back-ups from location downstream or on the cross street may restrict or prevent movement of vehicles out of the approach under consideration; hence, volumes carried are not predictable. V/C values are highly variable, because full utilization of the approach may be prevented by outside conditions.

Source: 2010 Congestion Management Program for Los Angeles County, Los Angeles County Metropolitan Transportation Authority.

For comparison purposes, both the HCM and ICU analysis values are reported in the summary tables.

1.4 Congestion Management Program Compliance

The Los Angeles County CMP was established in 1992. The 1992 CMP forged new ground in linking transportation, land use and air quality decisions for the most populous and one of the most complex urban areas in the country. The 2010 CMP is the eighth CMP adopted for Los Angeles County since the requirement became effective with the passage of Proposition 111 in 1990. The hallmark of the CMP program is that it is intended to address the impact of local growth on the regional transportation system. Compliance with the CMP requirements ensures a local jurisdiction's eligibility to compete for State gas tax funds for local transportation projects. SR-126 (Henry Mayo Drive) is a CMP Highway and Roadway System arterial in the project study area.

The Los Angeles County CMP states that "a CMP Transportation Impact Analysis (TIA) is required for all projects required to prepare and Environmental Impact Report (EIR) based on local determination." The proposed CCL Master Plan Revision is required to prepare an EIR. Therefore, a CMP-level analysis is required for this project. The traffic analysis documented in this report is consistent with the Guidelines for CMP Transportation Impact Analysis in Appendix D of the Los Angeles County CMP.

1.5 Traffic Impact Criteria

The purpose of a traffic impact study is to identify the impacts of a proposed development, and to determine whether or not those impacts are significant. If determined to be significant, the project would be required to mitigate the project's traffic-related impacts.

Based on the County of Los Angeles Department of Public Works Traffic Impact Analysis Guidelines, a significant impact occurs if the project related increase in the V/C ratio equals or exceeds the threshold shown in Table 1-3.

TABLE 1-3
Significant Impact Thresholds

INTERSECTIONS		
Pre-Project		Project V/C Increase
LOS	V/C	
C	0.71 to 0.80	0.04 or more
D	0.81 to 0.90	0.02 or more
E/F	0.91 or more	0.01 or more

V/C calculations are done using the ICU methodology only. All impacts are assessed using the ICU methodology only. The HCM analysis is provided for Caltrans review purposes since SR-126 is a Caltrans facility.

2. Existing Conditions

2.1 Existing Traffic Volumes

Morning and evening peak hour turning movement traffic counts were conducted at the study intersections in March 2013, and are depicted on Figure 2-1. Copies of the traffic count data sheets are provided in Appendix B.

2.2 Level of Service Analysis

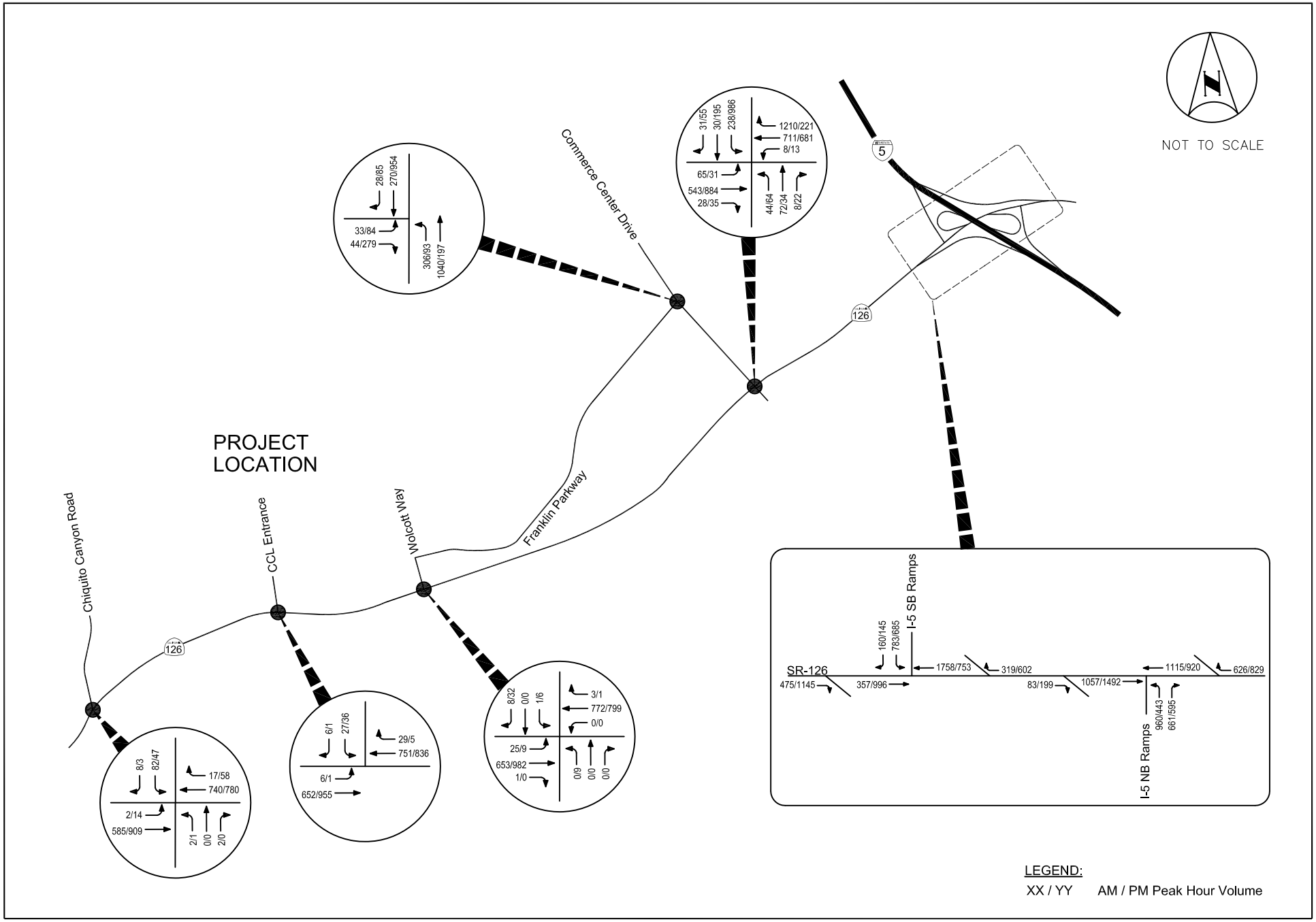
Existing morning and evening peak hour operating conditions were evaluated using the HCM and ICU methodologies. The results of the existing conditions analysis are summarized on Table 2-1. Copies of intersection analysis worksheets are provided in Appendix C.

TABLE 2-1
Summary of Intersection Analysis – Existing Conditions

			Existing Conditions							
			AM Peak				PM Peak			
Intersection		Control	Delay (sec/veh)	LOS	ICU	LOS	Delay (sec/veh)	LOS	ICU	LOS
1	Chiquito Canyon Road @ SR-126	Unsignalized*	40.1	E	0.386	A	53.0	F	0.414	A
2	Chiquita Canyon Landfill Entrance @ SR-126	Unsignalized*	23.5	C	0.355	A	38.9	E	0.421	A
3	Wolcott Way @ SR-126	Signalized	13.5	B	0.357	A	26.6	C	0.415	A
4	Commerce Center Drive @ SR-126	Signalized	26.4	C	0.490	A	66.7	E	0.759	C
5	I-5 Southbound Ramps @ SR-126	Signalized	18.6	B	0.738	C	11.2	B	0.495	A
6	I-5 Northbound Ramps @ SR-126	Signalized	24.3	C	0.532	A	25.0	C	0.425	A
7	Franklin Parkway @ Commerce Center Drive	Signalized	8.8	A	0.368	A	18.2	B	0.409	A
8	Wolcott Way @ Franklin Parkway	Unsignalized**	Intersection does not exist currently							

* HCM results (delay) reported for worst stop controlled approach

** HCM results (delay) reported for overall stop controlled intersection



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EXISTING PEAK HOUR VOLUMES

FIGURE 2-1

Table 2-1 shows that all study intersections are currently operating at LOS C or better using the ICU methodology.

Using the HCM methodology, the following intersections currently operate at LOS E or worse:

- Chiquito Canyon Road @ SR-126 (two-way stop controlled, LOS E in the AM, LOS F in the PM)
- Chiquita Canyon Landfill Entrance @ SR-126 (two-way stop controlled, LOS E in the PM)
- Commerce Center Drive @ SR-126 (signalized, LOS E in the PM)

Peak hour volume traffic signal warrants indicate that signals are not warranted at Chiquito Canyon Road/SR-126 and Chiquita Canyon Landfill Entrance/SR-126 under existing conditions. Copies of the peak hour volume warrant worksheets are provided in Appendix D.

3. Cumulative Conditions

3.1 Ambient Growth

Future peak hour traffic projections for the study intersections have been developed for the proposed project buildout year of 2015. An annual ambient growth rate of 2.75% per year has been applied to the existing (2013) traffic volumes. The annual growth rate is based upon direction received from Los Angeles County Department of Public Works, Traffic and Lighting Division staff (see the signed MOU in Appendix A). The 2015 buildout year without project volumes (Existing plus Growth traffic) at each of the study intersections is shown on Figure 3-1.

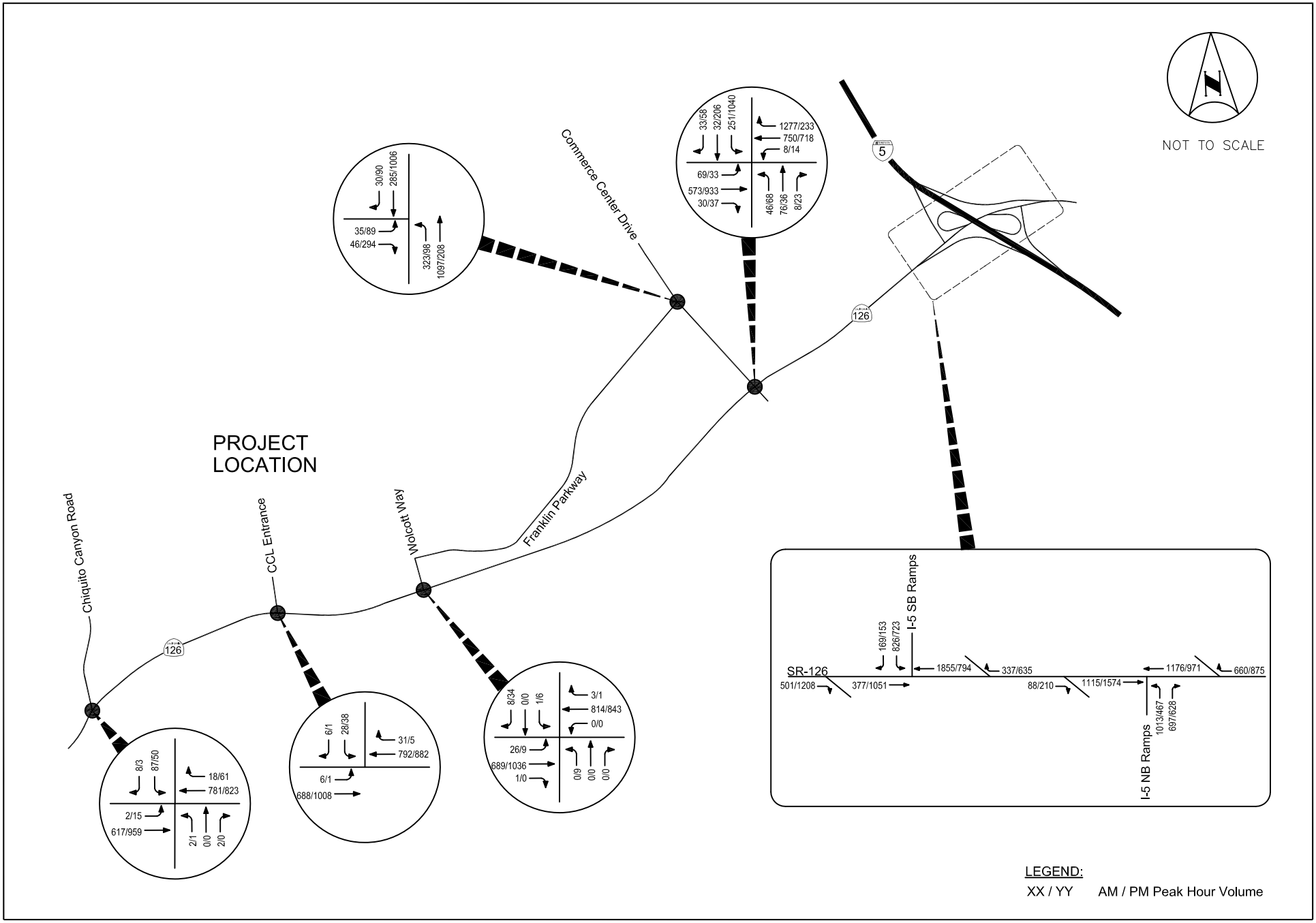
3.2 Other Development

In addition to the ambient growth rate, anticipated traffic from other development in the vicinity of the project was added to existing traffic volumes. Other development includes any project that has already been approved but is not yet constructed, or any project that is in the application process, and is a reasonably foreseeable development. The projects currently planned or proposed in the cumulative impact area of the Proposed Project were provided by the Los Angeles County Department of Regional Planning (LADRP). The cumulative project information is based on the best information available at the time this Draft Environmental Impact Report (DEIR) was prepared. A summary of other development is provided in Table 3-1. The location of each of these projects and their associated trip distribution information is attached in Appendix E. Cumulatively, all other development has the potential to generate a total of 919 trips in the morning peak hour, and 1,249 trips in the evening peak hour by 2015 in the vicinity of the project.

Traffic from the other development projects was assigned to the study intersections by referencing the traffic studies for each project. The assumed trip distribution of each of these projects through the study area is also included in Appendix E. The total combined traffic generated in the Cumulative condition (Existing plus Growth plus Other Development traffic) at each of the study intersections is shown on Figure 3-2.

TABLE 3-1
Summary of Other Development Land Use and Trip Generation

PROJECT					PEAK HOUR					
					AM			PM		
County ID	**Name**	**LAND USE**	**QUANTITY**	**UNITS**	**IN**	**OUT**	**TOTAL**	**IN**	**OUT**	**TOTAL**
PM060030	Sterling Gateway	Insustrial Park	1,221.36	TSF	672	122	794	159	635	794
PM060734	Valencia Gateway	Shopping Center	135.01	TSF	76	49	125	218	237	455
TOTAL FORECASTED TRIPS BY THE YEAR 2015					***748***	***171***	***919***	***377***	***872***	***1,249***



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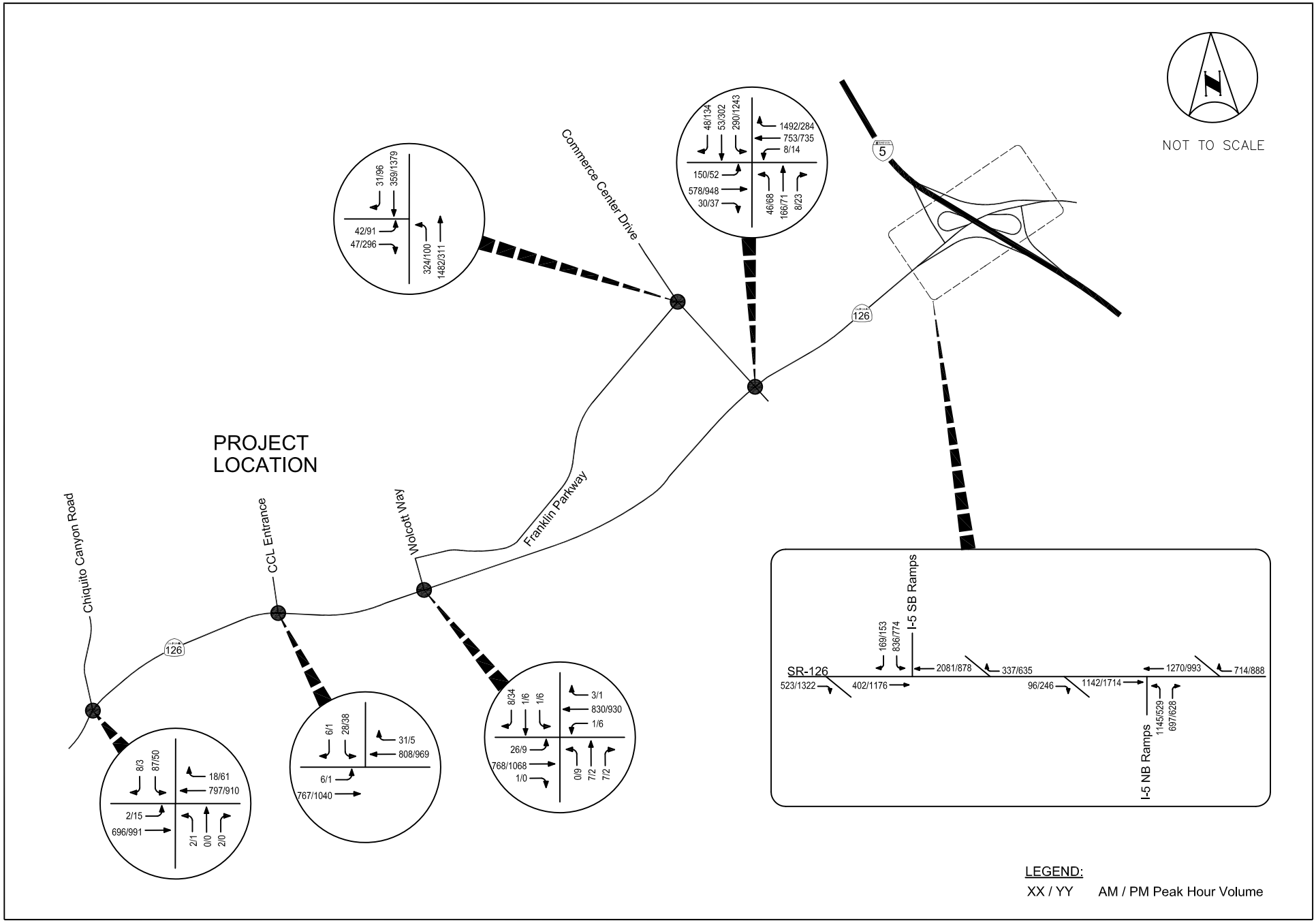
EXISTING PLUS GROWTH WITHOUT PROJECT PEAK HOUR VOLUMES

FIGURE 3-1



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CHIQUITA CANYON LANDFILL MASTER PLAN REVISION

EXISTING PLUS GROWTH PLUS OTHER DEVELOPMENT WITHOUT PROJECT PEAK HOUR VOLUMES

FIGURE 3-2

3.3 Level of Service Analysis

3.3.1 Existing plus Growth Conditions

The results of the Existing plus Growth analysis are summarized on Table 3-2. Morning and evening peak hour operating conditions were evaluated using HCM and ICU methodologies. Copies of intersection analysis worksheets are provided in Appendix C.

TABLE 3-2
Summary of Intersection Analysis – Existing plus Growth Conditions

			Existing plus Growth Conditions							
			AM Peak				PM Peak			
Intersection		Control	Delay (sec/veh)	LOS	ICU	LOS	Delay (sec/veh)	LOS	ICU	LOS
1	Chiquito Canyon Road @ SR-126	Unsignalized*	49.7	E	0.402	A	65.9	F	0.432	A
2	Chiquita Canyon Landfill Entrance @ SR-126	Unsignalized*	25.7	D	0.369	A	45.5	E	0.439	A
3	Wolcott Way @ SR-126	Signalized	14.2	B	0.371	A	29.2	C	0.432	A
4	Commerce Center Drive @ SR-126	Signalized	27.0	C	0.546	A	71.0	E	0.852	D
5	I-5 Southbound Ramps @ SR-126	Signalized	20.6	C	0.773	C	11.8	B	0.516	A
6	I-5 Northbound Ramps @ SR-126	Signalized	26.3	C	0.556	A	26.7	C	0.443	A
7	Franklin Parkway @ Commerce Center Drive	Signalized	9.1	A	0.383	A	19.2	B	0.426	A
8	Wolcott Way @ Franklin Parkway	Unsignalized**	Intersection does not exist without project							

* HCM results (delay) reported for worst stop controlled approach

** HCM results (delay) reported for overall stop controlled intersection

Table 3-2 shows that all study intersections will operate at LOS D or better using the ICU methodology in the Existing plus Growth (2015 buildout year) without project conditions.

Using the HCM methodology, the following intersections will operate at LOS E or worse (same as existing conditions):

- Chiquito Canyon Road @ SR-126 (two-way stop controlled, LOS E in the AM, LOS F in the PM)
- Chiquita Canyon Landfill Entrance @ SR-126 (two-way stop controlled, LOS E in the PM)
- Commerce Center Drive @ SR-126 (signalized, LOS E in the PM)

Peak hour volume traffic signal warrants indicate that signals are not warranted at Chiquito Canyon Road/SR-126 and Chiquita Canyon Landfill Entrance/SR-126 under Existing plus Growth (2015 buildout year) without project conditions. Copies of the peak hour volume warrant worksheets are provided in Appendix D.

3.3.2 Existing plus Growth plus Other Development Conditions

The results of the Existing plus Growth plus Other Development analysis are summarized on Table 3-3. Morning and evening peak hour operating conditions were evaluated using HCM and ICU methodologies. Copies of intersection analysis worksheets are provided in Appendix C.

TABLE 3-3
Summary of Intersection Analysis – Existing plus Growth plus Other Development Conditions

			Existing plus Growth plus Other Development Conditions							
			AM Peak				PM Peak			
Intersection		Control	Delay (sec/veh)	LOS	ICU	LOS	Delay (sec/veh)	LOS	ICU	LOS
1	Chiquito Canyon Road @ SR-126	Unsignalized*	58.7	F	0.407	A	88.9	F	0.442	A
2	Chiquita Canyon Landfill Entrance @ SR-126	Unsignalized*	27.9	D	0.374	A	55.7	F	0.449	A
3	Wolcott Way @ SR-126	Signalized	35.0	D	0.385	A	42.6	D	0.448	A
4	Commerce Center Drive @ SR-126	Signalized	36.0	D	0.667	B	97.8	F	0.949	E
5	I-5 Southbound Ramps @ SR-126	Signalized	24.0	C	0.824	D	12.6	B	0.553	A
6	I-5 Northbound Ramps @ SR-126	Signalized	27.4	C	0.603	A	26.7	C	0.478	A
7	Franklin Parkway @ Commerce Center Drive	Signalized	8.3	A	0.435	A	19.5	B	0.507	A
8	Wolcott Way @ Franklin Parkway	Unsignalized**	Intersection does not exist without project							

* HCM results (delay) reported for worst stop controlled approach

** HCM results (delay) reported for overall stop controlled intersection

Table 3-3 shows that all but one study intersection will operate at LOS D or better using the ICU methodology in the Existing plus Growth plus Other Development without project conditions. The intersection of Commerce Center Drive and SR-126 is projected to operate at LOS E in the PM peak hour using the ICU methodology. It is important to note that the intersection of Commerce Center Drive and SR-126 will still be under construction in 2015 as part of the Commerce Center Drive/SR-126 improvement project. The Commerce Center Drive/SR-126 improvement project is schedule to be complete in 2016. Upon completion, the planned improvements at this intersection (interchange) will return operations to LOS D or better in both the morning and evening peak hours.

Using the HCM methodology, the following intersections will operate at LOS E or worse:

- Chiquito Canyon Road @ SR-126 (two-way stop controlled, LOS F in the AM and PM)
- Chiquita Canyon Landfill Entrance @ SR-126 (two-way stop controlled, LOS F in the PM)
- Commerce Center Drive @ SR-126 (signalized, LOS F in the PM)

Peak hour volume traffic signal warrants indicate that signals are not warranted at Chiquito Canyon Road/SR-126 and Chiquita Canyon Landfill Entrance/SR-126 under Existing plus Growth plus Other Development without project conditions. Copies of the peak hour volume warrant worksheets are provided in Appendix D.

4.0 Project Traffic

4.1 Project Trip Generation

In addition to traffic at CCL that results from incoming waste, there are several other sources of inbound and outbound traffic at CCL. A wide variety of material that is diverted from the waste stream is accepted at CCL for other uses, including alternative daily cover, road base, compost, and erosion control material. Material from CCL, including clean soil, compost products, and recycled materials, may also be trucked from the site to other locations. Additionally, periodic cell construction occurs at CCL, during which time additional traffic related to construction occurs. Table 4-1 details the potential maximum daily traffic volume at CCL under baseline project conditions. Table 4-2 details the potential maximum daily traffic volume at CCL under proposed project conditions. Table 4-3 details the potential maximum daily net new trips of the proposed project (i.e., proposed project minus baseline project).

Tables 4-1 through 4-3 are based on historical records for different vehicle and material types, so the data represent a typical day of CCL operations. Also, Tables 4-1 through 4-3 summarize the project trips in passenger car equivalents (PCEs). A PCE factor of 2.0 was used to convert truck trips to PCEs. This factor was agreed upon by Los Angeles County staff during the scoping process for the traffic report.

From Table 4-3, there will be 2,332 net new trips with the proposed. These values were determined on a daily basis, so it was necessary to convert to peak hours for the traffic analysis. AM and PM peak hour project trips (net new trips) were developed to reflect the peak of the surrounding network system (one hour between 7 and 9 AM and one hour between 4 and 6 PM). Peak hour project trips were developed with historical time of day gate receipt data collected by CCL. Table 4-4 summarizes time of day vehicle count information for a typical weekday in April 2013 at CCL. Based on the historical data presented in Table 4-4, approximately 6.4% of the net new trips for the proposed project will occur in the AM peak hour (8 to 9 AM) and 6.5% will occur in the PM peak hour (4 to 5 PM). The majority of the net new trips will occur outside the peak hours of the surrounding roadway system.

4.2 Project Trip Distribution and Assignment

Project trip distribution assumptions for the proposed project were based on historical gate receipt information from CCL. Final trip distribution assumptions are shown on Figure 4-1. Based on these trip distribution patterns, the net new trips to be added to the street system by the proposed project were calculated, and are shown on Figure 4-2 (volumes are shown as PCEs).

TABLE 4-1
Summary of Baseline Peak Potential Daily Inbound and Outbound Traffic

Traffic Source	Number of Vehicles Peak Potential Daily[a,b]	Number of Vehicles Peak Potential Daily - PCE	Number of Trip Ends Peak Potential Daily - PCE
Inbound			
Trash (Disposal)[c]			
Transfer	273	546	1092
Route	300	600	1200
Roll-offs	460	920	1840
Self Haul	500	500	1000
Other Materials (Beneficial Reuse)			
Shredded Curbside Green Waste	40	80	160
Clean Soil	200	400	800
Contaminated Soil[d]			
Large Trucks	300	600	1200
10-Wheelers	60	120	240
Protective Cover			
TASW	200	400	800
MRF Fines	40	80	160
Tire Shred	15	30	60
C&D Fines	25	50	100
Road Base			
Concrete	50	100	200
Asphalt	50	100	200
Processed C&D Material	30	60	120
Composting[e]	55	110	220
Outbound			
Clean Soil	100	200	400
Compost Products	8	16	32
Other	25	50	100
Special Projects[f]			
Cell Construction			
Mobilize/Demobilize Traffic	20	20	40
Contractor Employees	80	80	160
Employees			
Landfill – Permanent	34	34	68
Landfill – Temporary	25	25	50
LFGTE Plant	2	2	4
Transfer Drivers	4	4	8
Total	**2,896**	**5,127**	**10,254**

Notes:
[a] These numbers are one-way trips and based on 5 days per week.
[b] The maximum number of trash vehicles in each category does not happen simultaneously. The daily maximum tonnage is still 6,000 tons per day.
[c] Regardless of actual vehicle mix, incoming waste tonnage would not exceed 6,000 tons per day per existing CUP condition 9e.
[d] Contaminated soils may also be disposed and not put to beneficial reuse.
[e] The existing CUP allows for operation of up to a 560-tons-per-day composting facility for windrow or in-vessel technology composting operation.
[f] These projects occur periodically. Typically once every 2-3 years.
TASW = treated auto shredder waste

TABLE 4-2
Summary of Proposed Peak Potential Daily Inbound and Outbound Traffic

Traffic Source	Number of Vehicles Peak Potential Daily[a,b]	Number of Vehicles Peak Potential Daily - PCE	Number of Trip Ends Peak Potential Daily - PCE
Inbound			
Trash (Disposal)[c]			
Transfer	545	1090	2180
Route	600	1200	2400
Roll-offs	460	920	1840
Self Haul	500	500	1000
Other Materials (Beneficial Reuse)			
Shredded Curbside Green Waste	40	80	160
Clean Soil	200	400	800
Contaminated Soil[d]			
Large Trucks	300	600	1200
10-Wheelers	60	120	240
Protective Cover			
TASW	200	400	800
MRF Fines	40	80	160
Tire Shred	15	30	60
C&D Fines	25	50	100
Road Base			
Concrete	50	100	200
Asphalt	50	100	200
Processed C&D Material	30	60	120
Composting[e]	55	110	220
Outbound			
Clean Soil	100	200	400
Compost Products	8	16	32
Other	25	50	100
Special Projects[f]			
Cell Construction			
Mobilize/Demobilize Traffic	20	20	40
Contractor Employees	80	80	160
Employees			
Landfill – Permanent	55	55	110
Landfill – Temporary	25	25	50
LFGTE Plant	3	3	6
Transfer Drivers	4	4	8
Total	**3,490**	**6,293**	**12,586**

Notes:
[a] These numbers are one-way trips and based on 5 days per week.
[b] The maximum number of trash vehicles in each category does not happen simultaneously. The daily maximum tonnage is still 12,000 tons per day.
[c] Regardless of actual vehicle mix, incoming waste tonnage would not exceed 12,000 tons per day.
[d] Contaminated soils may also be disposed and not put to beneficial reuse.
[e] The existing CUP allows for operation of up to a 560-tons-per-day composting facility for windrow or in-vessel technology composting operation.
[f] These projects occur periodically. Typically once every 2 to 3 years.

TABLE 4-3
Summary of Proposed Net New Peak Potential Daily Inbound and Outbound Traffic

Traffic Source	Number of Vehicles Peak Potential Daily[a,b]	Number of Vehicles Peak Potential Daily - PCE	Number of Trip Ends Peak Potential Daily - PCE
Inbound			
Trash (Disposal)[c]			
Transfer	272	544	1088
Route	300	600	1200
Roll-offs	0	0	0
Self Haul	0	0	0
Other Materials (Beneficial Reuse)			
Shredded Curbside Green Waste	0	0	0
Clean Soil	0	0	0
Contaminated Soil[d]			
Large Trucks	0	0	0
10-Wheelers	0	0	0
Protective Cover			
TASW	0	0	0
MRF Fines	0	0	0
Tire Shred	0	0	0
C&D Fines	0	0	0
Road Base			
Concrete	0	0	0
Asphalt	0	0	0
Processed C&D Material	0	0	0
Composting[e]	0	0	0
Outbound			
Clean Soil	0	0	0
Compost Products	0	0	0
Other	0	0	0
Special Projects[f]			
Cell Construction			
Mobilize/Demobilize Traffic	0	0	0
Contractor Employees	0	0	0
Employees			
Landfill – Permanent	21	21	42
Landfill – Temporary	0	0	0
LFGTE Plant	1	1	2
Transfer Drivers	0	0	0
Total	**594**	**1,166**	**2,332**

Notes:
[a] These numbers are one-way trips and based on 5 days per week.
[b] The maximum number of trash vehicles in each category does not happen simultaneously. The daily maximum tonnage is still 12,000 tons per day.
[c] Regardless of actual vehicle mix, incoming waste tonnage would not exceed 12,000 tons per day.
[d] Contaminated soils may also be disposed and not put to beneficial reuse.
[e] The existing CUP allows for operation of up to a 560-tons-per-day composting facility for windrow or in-vessel technology composting operation.
[f] These projects occur periodically. Typically once every 2 to 3 years.

TABLE 4-4
CCL Time of Day Vehicle Distribution based on Historical Gate Receipts

Time of Day			Inbound Vehicles	Outbound Vehicles
12:00 AM	to	1:00 AM	3	3
1:00 AM	to	2:00 AM	2	2
2:00 AM	to	3:00 AM	5	5
3:00 AM	to	4:00 AM	7	7
4:00 AM	to	5:00 AM	21	21
5:00 AM	to	6:00 AM	21	21
6:00 AM	to	7:00 AM	19	19
7:00 AM	to	8:00 AM	27	27
8:00 AM	to	9:00 AM	30	30
9:00 AM	to	10:00 AM	41	41
10:00 AM	to	11:00 AM	57	57
11:00 AM	to	12:00 PM	47	47
12:00 PM	to	1:00 PM	34	34
1:00 PM	to	2:00 PM	32	32
2:00 PM	to	3:00 PM	38	38
3:00 PM	to	4:00 PM	36	36
4:00 PM	to	5:00 PM	31	31
5:00 PM	to	6:00 PM	0	0
6:00 PM	to	7:00 PM	0	0
7:00 PM	to	8:00 PM	0	0
8:00 PM	to	9:00 PM	0	0
9:00 PM	to	10:00 PM	0	0
10:00 PM	to	11:00 PM	11	11
11:00 PM	to	12:00 AM	10	10
Daily Total			**472**	**472**

Note: Data based on three-day weekday average collected in April 2013. Data represents actual vehicles entering the site (not PCEs).

The proposed project will remove the existing CCL entrance which is currently located on SR-126 between Chiquito Canyon Road and Wolcott Way and construct a new entrance on the corner of Wolcott Way and Franklin Parkway. Therefore, existing and new CCL trips will access CCL from Wolcott Way. It is assumed that the new entrance will operate as an all-way stop controlled intersection at Wolcott Way and Franklin Parkway. The intersection of SR-126 and Wolcott Way will see a change in traffic patterns due to the fact that all CCL trips (existing and new) will take access to the site via Wolcott Way. These changes are noted in Figure 4-2. Additional discussion and analysis of the new entrance is provided in Section 7 and 8 of this report.

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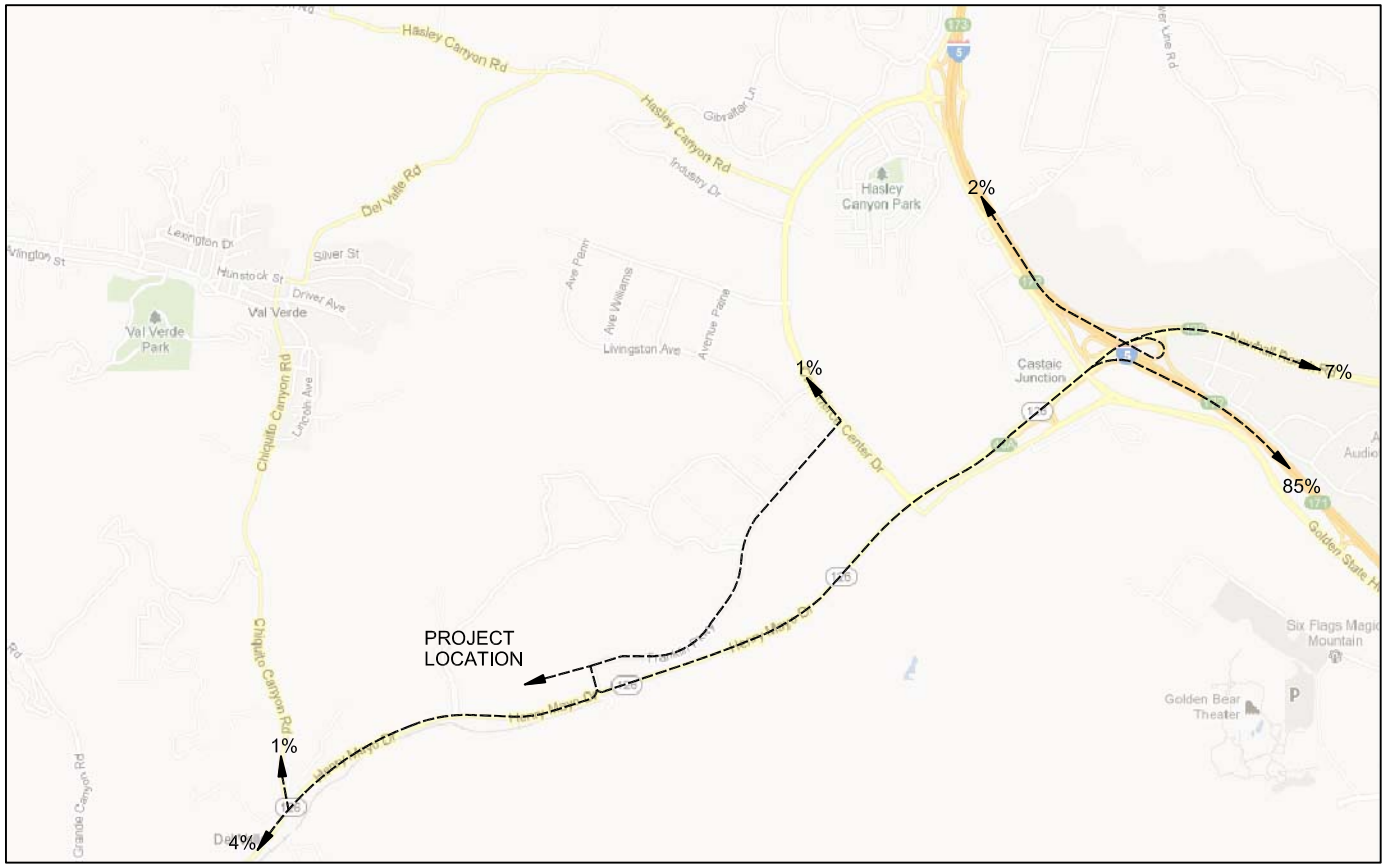

LEGEND:

XX% Project Distribution (to/from distribution assumed to be identical)

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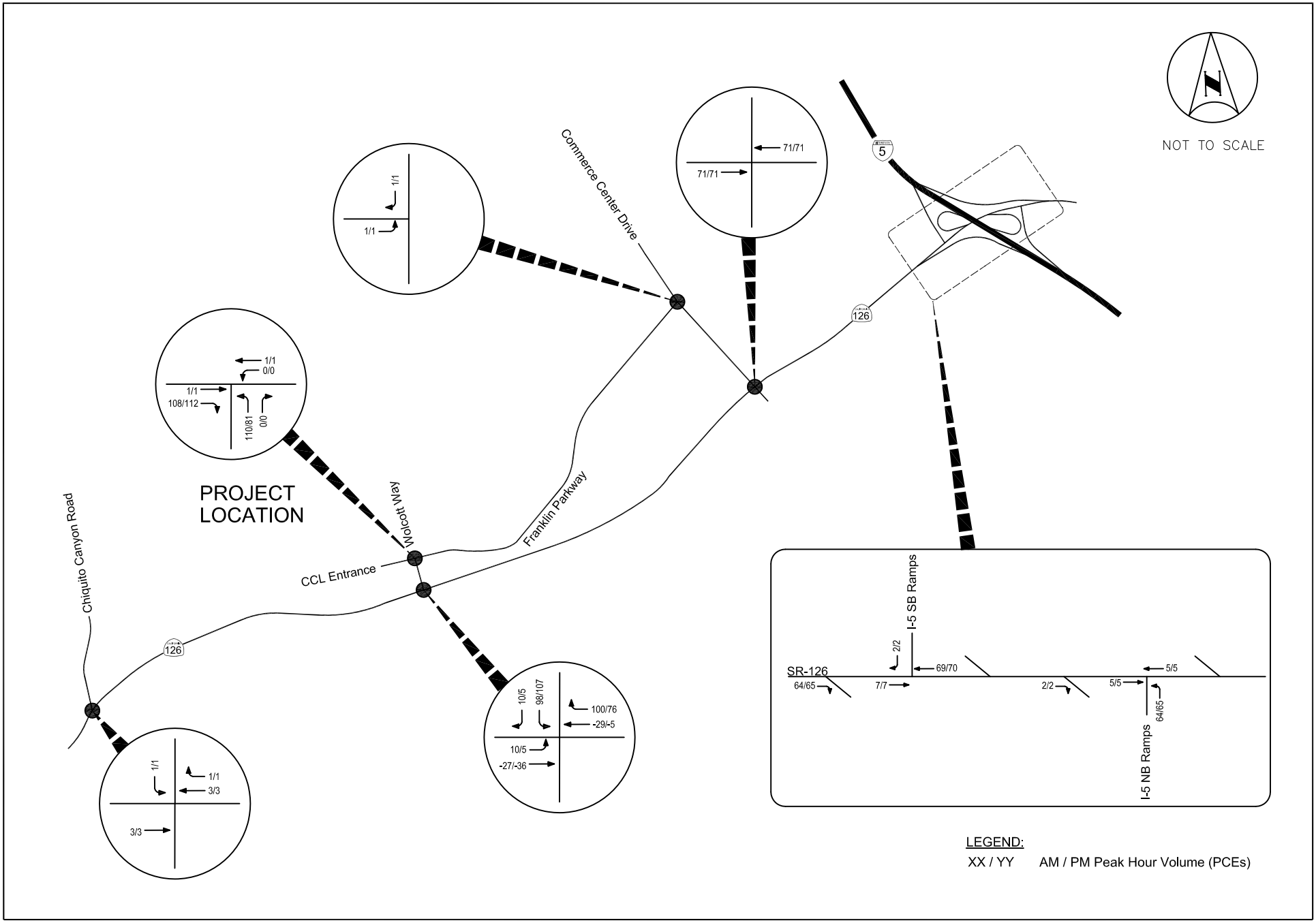
PROPOSED PROJECT TRIP DISTRIBUTION

FIGURE 4-1



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CHIQUITA CANYON LANDFILL MASTER PLAN REVISION

PROPOSED PROJECT PEAK HOUR VOLUMES

FIGURE 4-2

5. Project Buildout Year with Project Conditions

5.1 Level of Service Analysis

Project traffic volumes were added to the 2015 buildout year conditions (Existing plus Growth, Existing plus Growth plus Other Development) to assess potential traffic impacts. The resulting Existing plus Growth plus Project traffic volumes are shown on Figure 5-1. Existing plus Growth plus Other Development plus Project traffic volumes are shown on Figure 5-2. The study intersections were re-analyzed with these traffic volumes to determine the project's impact on peak hour intersection operations. The results of the analysis are summarized on Table 5-1 and 5-2. Table 5-1 summarizes Existing plus Growth conditions with and without project. Table 5-2 summarizes Existing plus Growth plus Other Development conditions with and without project. Tables 5-1 and 5-2 also indicate whether or not the project has a significant impact at any of the study intersections. Copies of intersection analysis worksheets are provided in Appendix C.

5.1.1 Existing plus Growth plus Project Conditions

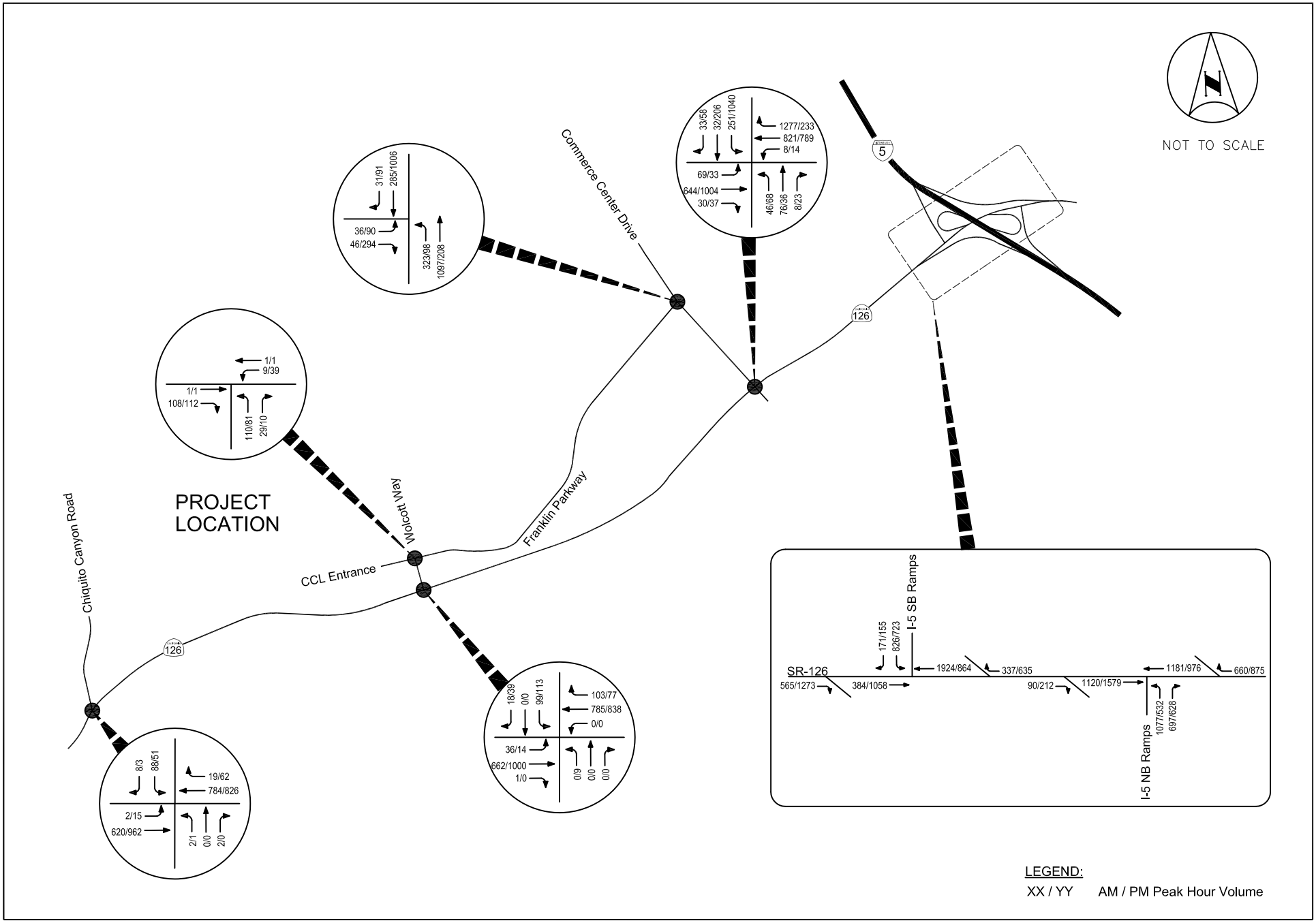
Table 5-1 shows that all study intersections will operate at LOS D or better using the ICU methodology in the Existing plus Growth plus Project condition.

Using the HCM methodology, the following intersections will operate at LOS E or worse:

- Chiquito Canyon Road @ SR-126 (two-way stop controlled, LOS F in the AM and PM)
- Commerce Center Drive @ SR-126 (signalized, LOS E in the PM)

The proposed project will have a significant impact at the intersection of Commerce Center Drive and SR-126 based on the Los Angeles County CMP guidelines (see Section 1.5 of this report). However, the intersection of Commerce Center Drive and SR-126 will still be under construction in 2015 as part of the Commerce Center Drive/SR-126 improvement project. The Commerce Center Drive/SR-126 improvement project is schedule to be complete in 2016. Upon completion, the planned improvements at this intersection (interchange) will return operations to LOS D or better in both the morning and evening peak hours. Therefore, no mitigation is required of the CCL project since mitigation measures during construction conditions would interfere with the planned staging of the Commerce Center Drive/SR-126 improvement project.

Peak hour volume traffic signal warrants indicate that signals are not warranted at Chiquito Canyon Road/SR-126 under Existing plus Growth plus Project conditions. Copies of the peak hour volume warrant worksheets are provided in Appendix D.



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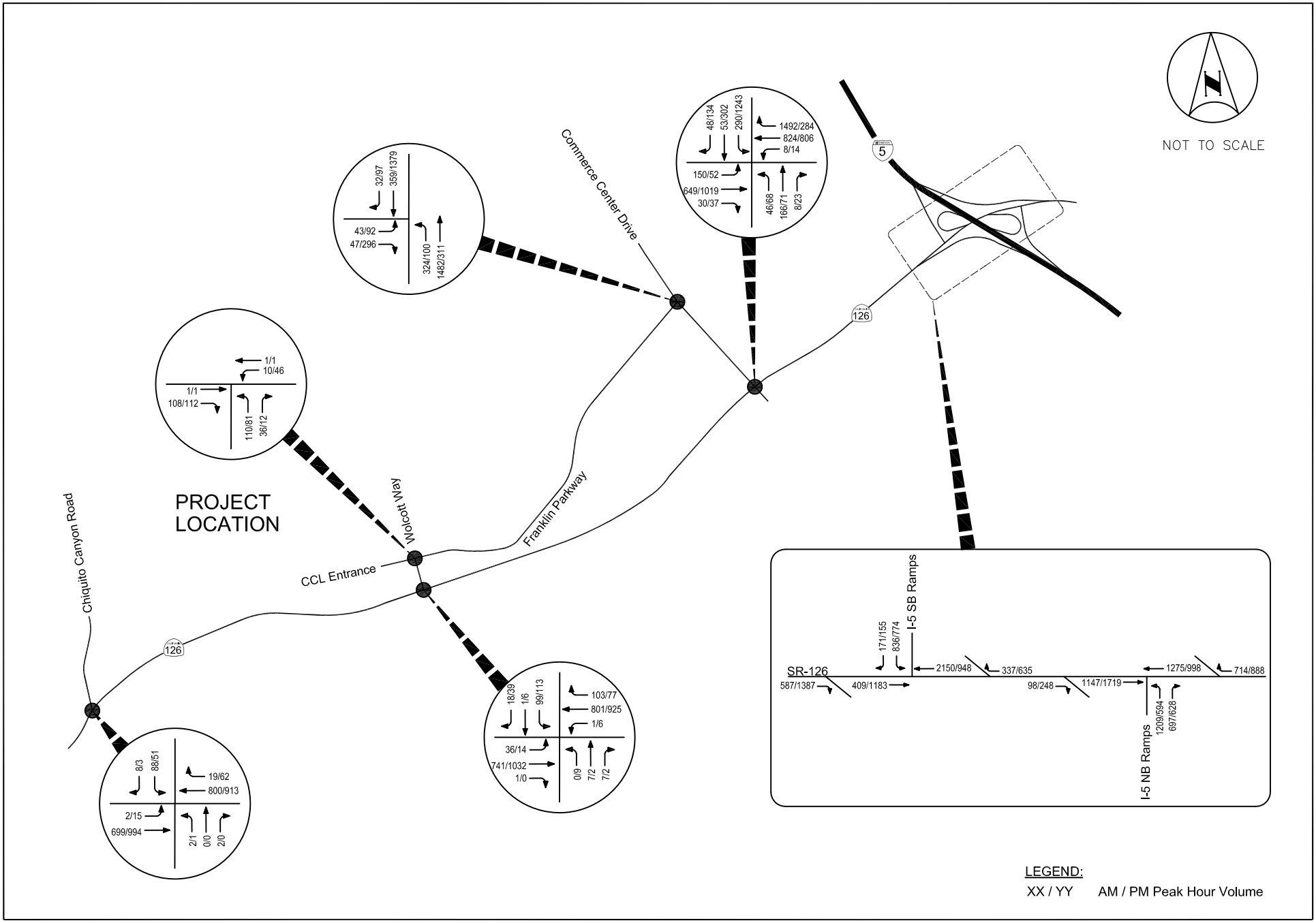
EXISTING PLUS GROWTH WITH PROJECT PEAK HOUR VOLUMES

FIGURE 5-1



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EXISTING PLUS GROWTH PLUS OTHER DEVELOPMENT WITH PROJECT PEAK HOUR VOLUMES

FIGURE 5-2

TABLE 5-1
Summary of Intersection Analysis – Existing plus Growth plus Project Conditions

			Existing plus Growth Conditions								Existing plus Growth plus Project Conditions									
			AM Peak				PM Peak				AM Peak					PM Peak				
Intersection		Control	Delay (sec/veh)	LOS	ICU	LOS	Delay (sec/veh)	LOS	ICU	LOS	Delay (sec/veh)	LOS	ICU	LOS	Significant Impact?	Delay (sec/veh)	LOS	ICU	LOS	Significant Impact?
1	Chiquito Canyon Road @ SR-126	Unsignalized*	49.7	E	0.402	A	65.9	F	0.432	A	50.8	F	0.404	A	No	68.0	F	0.433	A	No
2	Chiquita Canyon Landfill Entrance @ SR-126	Unsignalized*	25.7	D	0.369	A	45.5	E	0.439	A	Intersection does not exist with project									
3	Wolcott Way @ SR-126	Signalized	14.2	B	0.371	A	29.2	C	0.432	A	13.6	B	0.409	A	No	27.3	C	0.465	A	No
4	Commerce Center Drive @ SR-126	Signalized	27.0	C	0.546	A	71.0	E	0.852	D	28.1	C	0.568	A	No	73.9	E	0.875	D	**Yes**
5	I-5 Southbound Ramps @ SR-126	Signalized	20.6	C	0.773	C	11.8	B	0.516	A	21.1	C	0.788	C	No	12.0	B	0.531	A	No
6	I-5 Northbound Ramps @ SR-126	Signalized	26.3	C	0.556	A	26.7	C	0.443	A	26.2	C	0.570	A	No	26.5	C	0.458	A	No
7	Franklin Parkway @ Commerce Center Drive	Signalized	9.1	A	0.383	A	19.2	B	0.426	A	9.1	A	0.384	A	No	19.2	B	0.427	A	No
8	Wolcott Way @ Franklin Parkway	Unsignalized**	Intersection does not exist without project								7.8	A	0.206	A	No	8.0	A	0.199	A	No

* HCM results (delay) reported for worst stop controlled approach

** HCM results (delay) reported for overall stop controlled intersection

TABLE 5-2
Summary of Intersection Analysis – Existing plus Growth plus Other Development plus Project Conditions

			Existing plus Growth plus Other Development Conditions								Existing plus Growth plus Other Development plus Project Conditions									
			AM Peak				PM Peak				AM Peak					PM Peak				
Intersection		Control	Delay (sec/veh)	LOS	ICU	LOS	Delay (sec/veh)	LOS	ICU	LOS	Delay (sec/veh)	LOS	ICU	LOS	Significant Impact?	Delay (sec/veh)	LOS	ICU	LOS	Significant Impact?
1	Chiquito Canyon Road @ SR-126	Unsignalized*	58.7	F	0.407	A	88.9	F	0.442	A	60.3	F	0.409	A	No	90.5	F	0.443	A	No
2	Chiquita Canyon Landfill Entrance @ SR-126	Unsignalized*	27.9	D	0.374	A	55.7	F	0.449	A	Intersection does not exist with project									
3	Wolcott Way @ SR-126	Signalized	35.0	D	0.385	A	42.6	D	0.448	A	50.9	D	0.423	A	No	37.1	D	0.481	A	No
4	Commerce Center Drive @ SR-126	Signalized	36.0	D	0.667	B	97.8	F	0.949	E	37.7	D	0.689	B	No	105.8	F	0.972	E	**Yes**
5	I-5 Southbound Ramps @ SR-126	Signalized	24.0	C	0.824	D	12.6	B	0.553	A	25.4	C	0.838	D	No	12.8	B	0.566	A	No
6	I-5 Northbound Ramps @ SR-126	Signalized	27.4	C	0.603	A	26.7	C	0.478	A	27.4	C	0.618	B	No	26.5	C	0.492	A	No
7	Franklin Parkway @ Commerce Center Drive	Signalized	8.3	A	0.435	A	19.5	B	0.507	A	8.3	A	0.436	A	No	19.5	B	0.507	A	No
8	Wolcott Way @ Franklin Parkway	Unsignalized**	Intersection does not exist without project								7.7	A	0.206	A	No	8	A	0.199	A	No

* HCM results (delay) reported for worst stop controlled approach

** HCM results (delay) reported for overall stop controlled intersection

5.1.2 Existing plus Growth plus Other Development plus Project Conditions

Table 5-2 shows that all but one of the study intersections will operate at LOS D or better using the ICU methodology in the Existing plus Growth plus Other Development plus Project condition. The intersection of Commerce Center Drive and SR-126 is projected to operate at LOS E in the PM peak hour.

Using the HCM methodology, the following intersections will operate at LOS E or worse:

- Chiquito Canyon Road @ SR-126 (two-way stop controlled, LOS F in the AM and PM)
- Commerce Center Drive @ SR-126 (signalized, LOS F in the PM)

The proposed project will have a significant impact at the intersection of Commerce Center Drive and SR-126 based on the Los Angeles County CMP guidelines (see Section 1.5 of this report). However, the intersection of Commerce Center Drive and SR-126 will still be under construction in 2015 as part of the Commerce Center Drive/SR-126 improvement project. The Commerce Center Drive/SR-126 improvement project is schedule to be complete in 2016. Upon completion, the planned improvements at this intersection (interchange) will return operations to LOS D or better in both the morning and evening peak hours. Therefore, no mitigation is required of the CCL project since mitigation measures during construction conditions would interfere with the planned staging of the Commerce Center Drive/SR-126 improvement project.

Peak hour volume traffic signal warrants indicate that signals are not warranted at Chiquito Canyon Road/SR-126 under Existing plus Growth plus Other Development plus Project conditions. Copies of the peak hour volume warrant worksheets are provided in Appendix D.

6. I-5 Freeway Ramp Queuing Analysis

Queue lengths at the northbound and southbound I-5 off-ramps were examined to evaluate whether or not adequate storage is available to accommodate peak hour traffic with the proposed project. Table 6-1 reports the available I-5 northbound and southbound off-ramp storage at SR-126 and the anticipated queue lengths in the following scenarios:

- Existing Conditions
- Existing plus Growth (2015) Conditions without Project
- Existing plus Growth (2015) plus Other Development Conditions without Project
- Existing plus Growth (2015) Conditions with Project
- Existing plus Growth (2015) plus Other Development Conditions with Project

The queue lengths reported in Table 6-1 represent the 95th percentile queue length as calculated in Synchro. The worse peak hour queue length is reported.

Review of the anticipated 95th percentile queue lengths in Table 6-1 shows that the peak hour queue lengths do not exceed the available off-ramp storage in any of the five scenarios analyzed. In addition, the proposed project will only cause a slight increase (less than 10 feet) the queue length in the Existing plus Growth plus Other Development plus Project conditions (based on Synchro analysis).

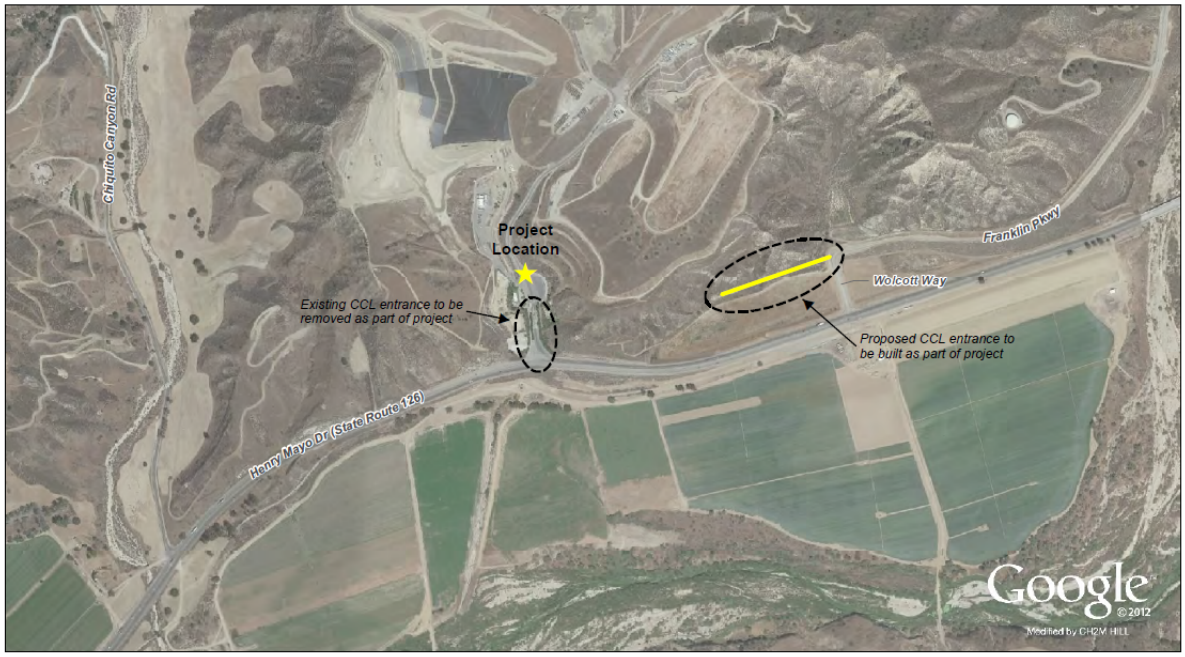
TABLE 6-1
I-5 Off-Ramp Queue Analysis at SR-126

	I-5 Southbound off-ramp and SR-126	I-5 Northbound off-ramp and SR-126
Available Off-Ramp Storage Length (ft)	1,600	1,300
Existing Conditions Queue Length (ft)	237	507
Existing plus Growth Queue Length (ft)	281	556
Existing plus Growth plus Other Development Queue Length (ft)	303	564
Existing plus Growth plus Project Queue Length (ft)	281	556
Existing plus Growth plus Other Development plus Project Queue Length (ft)	311	565

7. Project Site Entrance Queuing Analysis

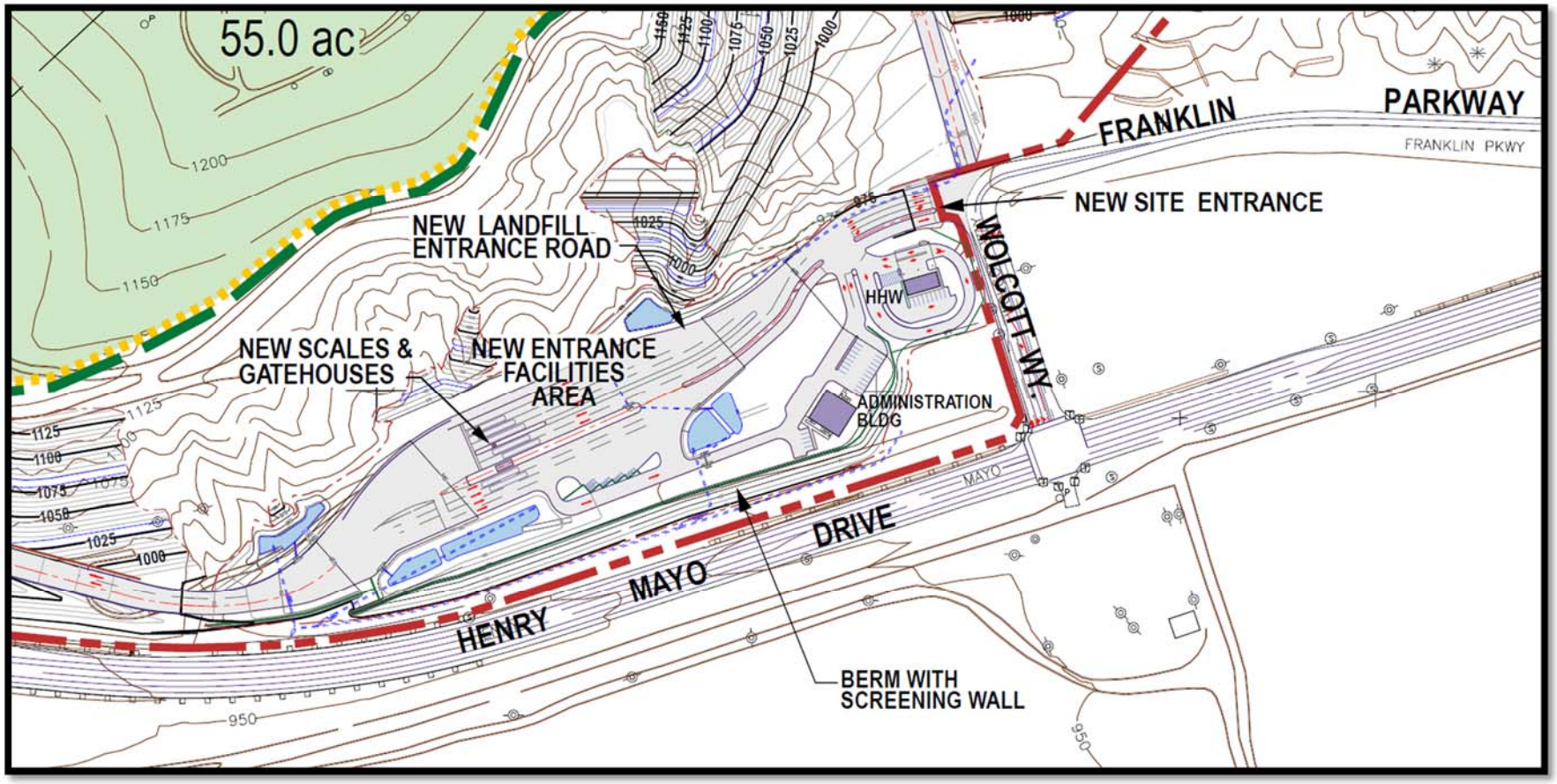
The proposed project will remove the existing CCL entrance which is currently located on SR-126 between Chiquito Canyon Road and Wolcott Way and construct a new entrance on the corner of Wolcott Way and Franklin Parkway. Figure 7-1 illustrates the location of the existing entrance and proposed entrance to CCL. Figure 7-2 illustrates a detailed plan of the proposed entrance. It is assumed that the new entrance will operate as an all-way stop controlled intersection at Wolcott Way and Franklin Parkway.

FIGURE 7-1
Location of Existing and Proposed CCL Entrance



The new entrance of the CCL facility will bring vehicles to the site from Wolcott Way/Franklin Parkway. Vehicles will enter the site and drive westbound to the scales and gatehouses located approximately 900 feet west of the intersection of Wolcott Way and Franklin Parkway.

FIGURE 7-2
Proposed CCL Entrance Plan



7.1 Main Entrance

Queuing calculations were done for the main entrance to ensure that projected CCL traffic will not queue through the Wolcott Way/Franklin Parkway intersection. The following factors were used in the queue calculations:

- The distance between the Wolcott Way and the limit line where vehicles must wait to enter the scales is 900 feet.
- There are two lanes of storage between the limit line where vehicles must wait to enter the scales and Wolcott Street (site entrance). These two lanes provide a total of 1,800 feet of storage.
- There is a third lane that extends from the limit line to approximately 480 feet east.
- There is a fourth lane that extends from the limit line to approximately 290 feet east.
- There is a fifth lane that extends from the limit line to approximately 200 feet east.
- There is a sixth lane that extends from the limit line to approximately 130 feet east.
- The combined storage of these four lanes is 2,900 feet.
- The average vehicle length is assumed to be 50 feet (truck).
- The proposed entrance can store 58 vehicles (50 feet per vehicle) at any given time.
- Based on historical gate receipt data, the average wait time at the scales is one minute per vehicle.
- The proposed entrance will have four scales on opening day. Each scale can process 60 vehicles per hour based on historical data. This will allow the CCL entrance to process approximately 240 vehicles per hour (4 vehicles per minute).
- CCL is permitted to be open 24 hours per day, 6 days per week. This gives CCL the operational flexibility to coordinate with customers and truck arrival times and can arrange to be open when loads are anticipated. Therefore, there are never extended periods of time when vehicles would not be processed through the scales and forced to queue without release. Table 4-4 shows that historically there are no trips between 5:00 PM and 10:00 PM. This is because CCL customers have historically not arranged to bring loads during this time. If needed, CCL would serve customers during this time as well.
- The vehicle arrival rate is typically spread out over the course of each hour. However, a peak 15-minute analysis was completed to analyze a worst-case scenario. A peak hour factor (PHF) of 0.95 was used to generate the anticipated peak 15-minute arrival rate. The PHF of 0.95 was chosen because this is consistent with the PHF observed on SR-126 in the study area during the peak periods (see Appendix B). This type of analysis will project the worst-case queue length at the CCL entrance.

Based on the factors above, queue calculations were done for the projected CCL traffic that will arrive over the course of a typical day. Table 7-1 summarizes the results of the queue calculations. The analysis shows that the storage provided at the new CCL entrance will be able to accommodate the projected number of vehicles arriving to the site throughout the day. In addition, the peak 15-minute analysis shows that the provided storage will also accommodate the peak periods within each hour and not queue through the Wolcott Way/Franklin Parkway intersection. Therefore, the proposed CCL entrance will provide enough storage to accommodate projected CCL traffic without queuing onto public roadways.

Intersection spacing on Wolcott Way between Franklin Parkway and SR-126 was also evaluated to assess the available storage for queuing on Wolcott Way. When the proposed CCL entrance is constructed, there will be approximately 450 feet of storage on Wolcott Way between SR-126 and Franklin Parkway/CCL entrance. Peak hour intersection analysis shows that the northbound queue at Wolcott Way/Franklin Parkway and the southbound queue at Wolcott Way/SR-126 will not exceed 100 feet in either peak hour. Therefore, there is adequate storage on Wolcott Way to accommodate the increase in traffic due to the proposed CCL entrance.

7.2 Household Hazardous Waste Facility Entrance

As shown in Figure 7-2, the project will build a Household Hazardous Waste (HHW) facility located immediately south of the main entrance to CCL (west of Wolcott Way). Drivers will enter the CCL main entrance and turn left to enter the HHW facility through a two-way driveway located immediately west of Wolcott Way. Upon completion of their drop-off at the HHW facility, drivers will exit through the same driveway they came in and turn right to exit through the CCL main driveway.

Queuing calculations were also done for the HHW facility driveway to determine how many vehicles the HHW facility can accommodate on a typical event day without queuing through the CCL main entrance. The following factors were used in the queue calculations:

- The HHW facility will be a permanent center which offers a twice a month service, between the hours 9 AM and 3 PM (off-peak hours of the surrounding roadway network).
- It is assumed that the peak arrival period will occur between 9 and 11 AM.
- It takes approximately 10 minutes per car to unload.
- The entrance driveway for the HHW facility provides 680 feet of storage.
- The average vehicle length is assumed to be 25 feet (passenger car).
- The proposed entrance can store 27 vehicles (25 feet per vehicle) at any given time.

TABLE 7-1
Summary of Queuing Analysis at Proposed CCL Main Entrance

Time of Day	(A) Hourly Processing Rate (veh/hour)*	(B) Total Inbound Vehicles per hour	Will Queue Exceed Storage (Is B > A)?	(C) Peak 15-Minute Processing Rate (veh/15-minute)**	(D) Total Inbound Vehicles per peak 15 minutes***	Will Queue Exceed Storage (Is D > C)?
12:00 AM to 1:00 AM	240	10	No	60	3	No
1:00 AM to 2:00 AM	240	7	No	60	2	No
2:00 AM to 3:00 AM	240	17	No	60	4	No
3:00 AM to 4:00 AM	240	24	No	60	6	No
4:00 AM to 5:00 AM	240	73	No	60	19	No
5:00 AM to 6:00 AM	240	73	No	60	19	No
6:00 AM to 7:00 AM	240	66	No	60	17	No
7:00 AM to 8:00 AM	240	94	No	60	25	No
8:00 AM to 9:00 AM	240	104	No	60	27	No
9:00 AM to 10:00 AM	240	142	No	60	37	No
10:00 AM to 11:00 AM	240	198	No	60	52	No
11:00 AM to 12:00 PM	240	163	No	60	43	No
12:00 PM to 1:00 PM	240	118	No	60	31	No
1:00 PM to 2:00 PM	240	111	No	60	29	No
2:00 PM to 3:00 PM	240	132	No	60	35	No
3:00 PM to 4:00 PM	240	125	No	60	33	No
4:00 PM to 5:00 PM	240	108	No	60	28	No
5:00 PM to 6:00 PM	240	0	No	60	0	No
6:00 PM to 7:00 PM	240	0	No	60	0	No
7:00 PM to 8:00 PM	240	0	No	60	0	No
8:00 PM to 9:00 PM	240	0	No	60	0	No
9:00 PM to 10:00 PM	240	0	No	60	0	No
10:00 PM to 11:00 PM	240	38	No	60	10	No
11:00 PM to 12:00 AM	240	35	No	60	9	No

* Number of 50-foot vehicles that can be processed per hour at CCL entrance without queueing.

** Number of 50-foot vehicles that can be processed per 15-minutes at CCL entrance without queueing.

*** Assumes a peak hour factor of 0.95 to calculate the peak 15-minute arrival rate.

Indicates peak arrival rate of CCL.

- The proposed drop-off area has two lanes and can process six cars at one time (three cars in each lane). Given the average unload time of 10 minutes per car, the drop-off area can process 36 cars per hour.

Table 7-2 summarizes the results of the queue calculations. The analysis shows that the HHW facility can accommodate up to 243 vehicles on a typical event day without queuing through the CCL main entrance driveway.

It is important to note that if the HHW facility event day occurs on a weekday, the HHW facility traffic will mix with the CCL truck traffic as they both enter the project site. As shown in Figure 7-2, the left-turn pocket into the HHW facility will ensure that HHW traffic does not block truck traffic entering the site and continuing west to the CCL scales. Based on the queueing analysis summarized in Table 7-1, it can also be concluded that truck traffic is not projected to queue and block the entrance to the HHW facility since the number of projected trucks entering CCL will never exceed the service rate at the scales.

TABLE 7-2
Summary of Queuing Analysis at Proposed CCL HHW Facility Entrance

Time of Day	Arrival Rate (veh per 10 mins)	Processing Rate (veh per 10 mins)	Queue at end of this period (veh)	Queue at end of this period (ft)	Available Storage (ft)	Will Demand Exceed Storage?
9:10 AM	7	6	1.0	25	680	No
9:20 AM	7	6	2.0	50	680	No
9:30 AM	8	6	4.0	100	680	No
9:40 AM	8	6	6.0	150	680	No
9:50 AM	8	6	8.0	200	680	No
10:00 AM	8	6	10.0	250	680	No
10:10 AM	8	6	12.0	300	680	No
10:20 AM	8	6	14.0	350	680	No
10:30 AM	8	6	16.0	400	680	No
10:40 AM	8	6	18.0	450	680	No
10:50 AM	8	6	20.0	500	680	No
11:00 AM	8	6	22.0	550	680	No
11:10 AM	7	6	23.0	575	680	No
11:20 AM	7	6	24.0	600	680	No
11:30 AM	7	6	25.0	625	680	No
11:40 AM	7	6	26.0	650	680	No
11:50 AM	7	6	27.0	675	680	No
12:00 PM	6	6	27.0	675	680	No
12:10 PM	6	6	27.0	675	680	No
12:20 PM	6	6	27.0	675	680	No
12:30 PM	6	6	27.0	675	680	No
12:40 PM	6	6	27.0	675	680	No
12:50 PM	6	6	27.0	675	680	No
1:00 PM	6	6	27.0	675	680	No
1:10 PM	6	6	27.0	675	680	No
1:20 PM	6	6	27.0	675	680	No
1:30 PM	6	6	27.0	675	680	No
1:40 PM	6	6	27.0	675	680	No
1:50 PM	6	6	27.0	675	680	No
2:00 PM	6	6	27.0	675	680	No
2:10 PM	6	6	27.0	675	680	No
2:20 PM	6	6	27.0	675	680	No
2:30 PM	6	6	27.0	675	680	No
2:40 PM	6	6	27.0	675	680	No
2:50 PM	6	6	27.0	675	680	No
3:00 PM	6	6	27.0	675	680	No
Total Number of Vehicles	**243**	**Maximum Queue Legth (ft)**		**675**	**Will Queue Exceed Storage**	**No**

8. Project Features on Wolcott Way/Franklin Parkway

8.1 Project Entrance and Wolcott Way/Franklin Parkway Intersection

The project proposes to install an all-way stop controlled intersection at the new project entrance and the corner of Wolcott Way and Franklin Parkway. An analysis based on the Manual on Uniform Traffic Control Devices (MUTCD) multi-way stop control methodology was done for this proposed intersection. The MUTCD multi-way stop control methodology consists of warrants based on eight-hour minimum volumes, collision history and other criteria such as limited sight distance at the intersections. The MUTCD multi-way stop warrant was not included in the signed MOU with the County of Los Angeles Traffic and Lighting Division staff. Therefore, the necessary data to conduct the multi-way stop warrant was not collected for the study (i.e., crash data, eight consecutive hours of traffic and pedestrian data, and speed study data along Wolcott Way and Franklin Parkway). However, the MUTCD states the following optional criteria that can be used to meet the multi-way stop warrant:

A. The need to control left-turn conflicts;
B. The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes;
C. Locations where a road user, after stopping, cannot see conflicting traffic and is not able to negotiate the intersection unless conflicting cross traffic is also required to stop; and
D. An intersection of two residential neighborhood collectors (through) streets of similar design and operating characteristics where multi-way stop control would improve traffic operational characteristics of the intersection.

Figure 7-2 (presented previously) illustrates the proposed configuration of the new project entrance and the Wolcott Way/Franklin Parkway intersection. The proposed project entrance will essentially create a T-intersection with Wolcott Way and Franklin Parkway (the driveway shown to the north is a future leg of the intersection that will be built at a later date). Because of the geometry, several movements will have difficulty seeing conflicting movements (i.e., traffic travelling westbound on Franklin Parkway will not be able to see traffic making a northbound left-turn from Wolcott Way until they arrive at the intersection). This satisfies optional criteria C (listed above) of the MUTCD multi-way stop warrant. Therefore, it is recommended that the proposed project entrance and Wolcott Way/Franklin Parkway Intersection be built as an all-way stop controlled intersection.

8.2 Improvements along Wolcott Way and Franklin Parkway

As part of the project improvements, striping and signing changes will be made along the northbound approach on Wolcott Way and the westbound approach along Franklin Parkway. These striping/signing modifications will provide the configuration shown in Figure 7-2 (lane assignment, limit lines, stop signs, and guidance signs). No additional improvements will be made on Wolcott Way or Franklin Parkway as part of the project.

9. Traffic Index Calculations

The traffic index (TI) is a measure of the deteriorating effects that truck traffic has on asphalt concrete pavement. TI calculations were performed along Wolcott Way and SR-126 for the project. TI calculations were performed in accordance with the *County of Los Angeles Department of Public Works, Traffic Index Guidelines* (Traffic and Lighting Division, June 2002). 10-year TI calculations were performed for both Wolcott Way and SR-126 in the study area. Table 9-1 summarizes the 10-year TI calculations for 2014 conditions with and without the project. Table 9-2 summarizes the 20-year TI calculations for 2014 conditions with and without the project. These comparisons help understand the effect the proposed project traffic will have on pavement deterioration. TI worksheets are provided in Appendix F.

TABLE 9-1
Summary of 10-Year TI Calculations

Roadway	10-Year TI based on 2014 without Project Volumes	10-Year TI based on 2014 with Project Volumes
SR-126 between Wolcott Way and Commerce Center Drive	12.0	12.0
Wolcott Way between SR-126 and Franklin Parkway	7.5	9.0

TABLE 9-2
Summary of 20-Year TI Calculations

Roadway	20-Year TI based on 2014 without Project Volumes	20-Year TI based on 2014 with Project Volumes
SR-126 between Wolcott Way and Commerce Center Drive	13.5	13.5
Wolcott Way between SR-126 and Franklin Parkway	8.0	10.0

The TI calculations show that the proposed project will have no effect on the 10-year or 20-year TI's for SR-126. The increase in truck traffic on SR-126 with the proposed project is minimal compared to the amount of truck traffic already using SR-126. On Wolcott Way, the proposed project will increase the 10-year TI from 7.5 to 9.0 and the 20-year TI from 8.0 to 10.0. This is expected because the location of the new project entrance will increase the amount of truck traffic on Wolcott Way.

APPENDIX A
LOS ANGELES COUNTY TRAFFIC STUDY MEMORANDUM OF UNDERSTANDING

SCOPING FOR TRAFFIC STUDY

Project Name:	Chiquita Canyon Landfill Master Plan Revision

This Memorandum of Understanding (MOU) acknowledges Los Angeles County Department of Public Works, Traffic and Lighting Division (TLD) requirements of traffic impact analysis for the project and is subject to change:

Project Address:	29201 Henry Mayo Drive, Castaic, CA 91384		
Project Description:	The Chiquita Canyon Landfill (CCL) Master Plan Revision (Proposed Project) would extend the waste footprint at CCL by approximately 143 acres, better utilize the landfill's remaining and potential disposal capacity, and allow for the disposal of all nonhazardous wastes acceptable at a Class III solid waste disposal landfill. The Proposed Project would also include the continued diversion of such materials as green waste, asphalt/concrete, and metal through ongoing landfill waste diversion programs on which numerous jurisdictions depend to comply with state-mandated waste diversion goals.		
City:	Castaic		
Project Buildout Year:	2014	**Ambient or CMP Growth Rate per Year:**	2.75%
Closest Intersection (Xtn) to the Project: SR-126/Chiquita Canyon Landfill Entrance			
Xtn N/S Street Name:	Chiquita Canyon Landfill Entrance		
Xtn E/W Street Name:	SR-126		
Thomas Guide Pg+Grid:	4549, D2	**Los Angeles County Supervisorial District:**	5

	Consultant	Developer
Company:	CH2M HILL	
Name:	Jim Roldan	
Address:	6 Hutton Centre Drive, Suite 700	
City, State, Zip Code:	Santa Ana, CA 92707	
Phone #:	714-435-6225	
Fax #:	714-424-2187	
Email:	jim.roldan@ch2m.com	

By: J. Roldan

Print Name: JIM ROLDAN, CH2MHILL

Reviewed By:

Print Name:

SCOPING FOR TRAFFIC STUDY

Project Name:	Chiquita Canyon Landfill Master Plan Revision

Consultant/Developer's Representative	**Date**	**TLD's Representative**	**Date**

1. Traffic Distribution: Figure(s) illustrating project trip distribution in percentages and volumes at the studied intersections analyzed.

	N: 4%	
W:4%	N	E 7%
	S: 85%	

SEE ATTACHED TRIP DISTRIBUTION ON FIGURE 1 FOR GREATER DETAIL. TRAFFIC DISTRUBUTIONS ARE BASED ON HISTORICAL GATE RECEIPT INFORMATION PROVIDED BY CCL.

Trip Credit: Exact amount of credit subject to approval by TLD.

Transportation Demand Management (TDM)	NO	
Existing Active Land Use	YES	Trip generation numbers in this MOU only reflect the net new trips. Existing land use trips accounted for in existing/background data.
Previous Land Use	NO	
Internal Trip Reduction	NO	
Pass-by Trip Reduction	NO	

2. Trip Generation

In addition to traffic at CCL that results from incoming waste, there are several other sources of in- and outbound traffic at CCL. A wide variety of material that is diverted from the waste stream is accepted at CCL for other uses, including alternative daily cover, road base, compost, and erosion control material. Material from CCL, including clean soil, compost products, and recycled materials, may also be trucked from the site to other locations. Additionally, periodic cell construction occurs at CCL, during which time additional traffic related to construction occurs. Table 1 details the potential maximum daily traffic volume at CCL under Baseline Conditions. Table 2 details the potential maximum daily traffic volume at CCL under Proposed Project Conditions. Table 3 details the potential maximum daily net new trips of the Proposed Project (i.e., Proposed Project minus Baseline Project). Although Tables 1 through 3 are based on historical records for different vehicle and material types, it does not represent a specific day.

AM and PM peak hour project trips (net new trips) will be developed in the traffic report to reflect the peak of the surrounding network system. Project peak hour trips will represent a percentage of the daily trips summarized in Table 3 and will be based on historical time of day data collected at CCL (i.e., CCL gate receipts).

SCOPING FOR TRAFFIC STUDY

Project Name:	Chiquita Canyon Landfill Master Plan Revision

Table 1
Summary of Baseline Peak Potential Daily
Inbound and Outbound Traffic
Chiquita Canyon Landfill

Traffic Source	Number of Vehicles Peak Potential Daily[a,b]	Number of Vehicles Peak Potential Daily - PCE	Number of Trip Ends Peak Potential Daily - PCE
Inbound			
Trash (Disposal)[c]			
Transfer	273	546	1092
Route	300	600	1200
Roll-offs	460	920	1840
Self Haul	500	500	1000
Other Materials (Beneficial Reuse)			
Shredded Curbside Green Waste	40	80	160
Clean Soil	200	400	800
Contaminated Soil[d]			
Large Trucks	300	600	1200
10-Wheelers	60	120	240
Protective Cover			
TASW	200	400	800
MRF Fines	40	80	160
Tire Shred	15	30	60
C&D Fines	25	50	100
Road Base			
Concrete	50	100	200
Asphalt	50	100	200
Processed C&D Material	30	60	120
Composting[e]	55	110	220
Outbound			
Clean Soil	100	200	400
Compost Products	8	16	32
Other	25	50	100
Special Projects[f]			
Cell Construction			
Mobilize/Demobilize Traffic	20	20	40
Contractor Employees	80	80	160
Employees			
Landfill – Permanent	34	34	68
Landfill – Temporary	25	25	50
LFGTE Plant	2	2	4
Transfer Drivers	4	4	8
Total	**2,896**	**5,127**	**10,254**

Notes:

[a] These numbers are one-way trips and based on 5

[b] The maximum number of trash vehicles in each category does not happen simultaneously. The daily

[c] Regardless of actual vehicle mix, incoming waste tonnage would not exceed 6,000 tons per day per

[d] Contaminated soils may also be disposed and not

[e] The existing CUP allows for operation of up to a 560-tons-per-day composting facility for windrow or

[f] These projects occur periodically. Typically once

TASW = treated auto shredder waste

Table 2
Summary of Proposed Peak Potential Daily
Inbound and Outbound Traffic
Chiquita Canyon Landfill

Traffic Source	Number of Vehicles Peak Potential Daily[a,b]	Number of Vehicles Peak Potential Daily - PCE	Number of Trip Ends Peak Potential Daily - PCE
Inbound			
Trash (Disposal)[c]			
Transfer	545	1090	2180
Route	600	1200	2400
Roll-offs	460	920	1840
Self Haul	500	500	1000
Other Materials (Beneficial Reuse)			
Shredded Curbside Green Waste	40	80	160
Clean Soil	200	400	800
Contaminated Soil[d]			
Large Trucks	300	600	1200
10-Wheelers	60	120	240
Protective Cover			
TASW	200	400	800
MRF Fines	40	80	160
Tire Shred	15	30	60
C&D Fines	25	50	100
Road Base			
Concrete	50	100	200
Asphalt	50	100	200
Processed C&D Material	30	60	120
Composting[e]	55	110	220
Outbound			
Clean Soil	100	200	400
Compost Products	8	16	32
Other	25	50	100
Special Projects[f]			
Cell Construction			
Mobilize/Demobilize Traffic	20	20	40
Contractor Employees	80	80	160
Employees			
Landfill – Permanent	55	55	110
Landfill – Temporary	25	25	50
LFGTE Plant	3	3	6
Transfer Drivers	4	4	8
Total	**3,490**	**6,293**	**12,586**

Notes:

[a] These numbers are one-way trips and based on 5

[b] The maximum number of trash vehicles in each category does not happen simultaneously. The daily

[c] Regardless of actual vehicle mix, incoming waste tonnage would not exceed 12,000 tons per day.

[d] Contaminated soils may also be disposed and not

[e] The existing CUP allows for operation of up to a 560-tons-per-day composting facility for windrow or

[f] These projects occur periodically. Typically once

Table 3
Summary of Proposed Net New Peak Potential
Daily Inbound and Outbound Traffic
Chiquita Canyon Landfill

Traffic Source	Number of Vehicles Peak Potential Daily[a,b]	Number of Vehicles Peak Potential Daily - PCE	Number of Trip Ends Peak Potential Daily - PCE
Inbound			
Trash (Disposal)[c]			
Transfer	272	544	1088
Route	300	600	1200
Roll-offs	0	0	0
Self Haul	0	0	0
Other Materials (Beneficial Reuse)			
Shredded Curbside Green Waste	0	0	0
Clean Soil	0	0	0
Contaminated Soil[d]			
Large Trucks	0	0	0
10-Wheelers	0	0	0
Protective Cover			
TASW	0	0	0
MRF Fines	0	0	0
Tire Shred	0	0	0
C&D Fines	0	0	0
Road Base			
Concrete	0	0	0
Asphalt	0	0	0
Processed C&D Material	0	0	0
Composting[e]	0	0	0
Outbound			
Clean Soil	0	0	0
Compost Products	0	0	0
Other	0	0	0
Special Projects[f]			
Cell Construction			
Mobilize/Demobilize Traffic	0	0	0
Contractor Employees	0	0	0
Employees			
Landfill – Permanent	21	21	42
Landfill – Temporary	0	0	0
LFGTE Plant	1	1	2
Transfer Drivers	0	0	0
Total	**594**	**1,166**	**2,332**

Notes:

[a] These numbers are one-way trips and based on 5

[b] The maximum number of trash vehicles in each category does not happen simultaneously. The daily

[c] Regardless of actual vehicle mix, incoming waste tonnage would not exceed 12,000 tons per day.

[d] Contaminated soils may also be disposed and not

[e] The existing CUP allows for operation of up to a 560-tons-per-day composting facility for windrow or

[f] These projects occur periodically. Typically once

SCOPING FOR TRAFFIC STUDY

Project Name:	Chiquita Canyon Landfill Master Plan Revision

3. Study Intersections: At minimum, the study shall include the following intersections. The list is subject to change after related projects, trip generation and distribution are determined. Consultant should check with adjoining Cities regarding their requirements in addition to the following County/City intersections. Documentation of the consultation from these agencies shall be included in the traffic study.

Xtn #	% County	Thomas Guide Page+Grid	N/S/E/W Street Name	City	Signalized	CMP
1	0%	4549, C3	Chiquito Canyon Road @ SR-126	LA County	NO	YES
2	0%	4549, D2	CCL Entrance @ SR-126	LA County	NO	NO
3	0%	4549, F2	Wolcott Way @ SR-126	LA County	YES	NO
4	0%	4549, H1	Commerce Center Drive @ SR-126	LA County	YES	NO
5	0%	4459, J7	I-5 SB Ramps @ SR-126	LA County	YES	NO
6	0%	4460, A6	I-5 NB Ramps @ SR-126	Santa Clarita	YES	NO
7	100%	4549, F2	Wolcott Way @ Franklin Parkway (future project entrance)	LA County	NO	NO
8	100%	4549, H1	Franklin Parkway @ Commerce Center Drive	LA County	YES	NO
9						
10						

Cites to be consulted: Santa Clarita and CALTRANS

SCOPING FOR TRAFFIC STUDY

Project Name:	Chiquita Canyon Landfill Master Plan Revision

4. Related Projects: Consultant should check with Los Angeles County Department of Regional Planning and planning departments of adjoining Cities. Documentation of the consultation from these agencies shall be included in the traffic study. Related projects list shall be submitted to TLD for our review and approval before being incorporated in the study.

5. Congested Management Program (CMP): A CMP TIA is required for all projects required to prepare an Environmental Assessment based on local determination or projects requiring a traffic study. Where the project meets the criteria established in the Transportation Impact Analysis (TIA section of the County of Los Angeles' CMP TIA Land Use Analysis Guidelines, a CMP analysis must be prepared. At a minimum, the geographic area examined in the TIA must include the following:

- All CMP arterial monitoring intersections (see Appendix A, exhibit A-2, page A-15 of the 2002 Guidelines), including freeway on- or off-ramp intersections, where the proposed project will add 50 or more trips during either the a.m. or p.m. peak hours.

- Main line freeway monitoring locations (see Chapter 2, exhibit 2-4, page 16 of the 2002 Guidelines) where the project will add 150 or more trips, in either direction, during the a.m. or p.m. weekday peak hours.

A copy of the 2002 CMP Land Use Analysis Guidelines can be obtained by calling the CMP Hotline at (213) 922-2830.

6. Freeway Analysis: The potential traffic impact on the following Freeway(s) must be considered.

Queuing analysis at the I-5 SB Ramps/SR-126 and I-5 NB Ramp/SR-126 intersections

will be included in the analysis.

The applicant shall consult with the State of California Department of Transportation (Caltrans) to determine the California Environmental Quality Act levels of significance with regard to traffic impacts on Caltrans' freeway facilities. This consultation shall also include a determination of Caltrans requirements for the study of traffic impacts to its facilities and the mitigation of any such impacts. This analysis must follow the most current Caltrans' Guide for the Preparation of Traffic Impact Studies (December 2002) and can be obtained from http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/reports/tiguide.pdf. If Caltrans finds that the project has a significant impact on the freeway, Caltrans shall be requested to include the basis for this finding in their response. If fees are proposed to mitigate the freeway impact, Caltrans shall be requested to identify the specific project to which the fees will apply. These written comments from Caltrans shall be included with the traffic study and submitted to Public Works for review and approval. If a documented good faith effort is made to consult with Caltrans and written comments cannot be obtained from within a reasonable amount of time, an analysis of the freeway impact shall be made using the County of Los Angeles' CMP Land Use Analysis Guidelines.

SCOPING FOR TRAFFIC STUDY

Project Name:	Chiquita Canyon Landfill Master Plan Revision

7. Other:

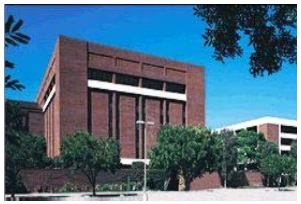
Traffic counts may be conducted immediately per the following:
• Must be taken on Tuesdays, Wednesdays or Thursdays.
• Must exclude holidays, and the first weekdays before and after the holiday.
• Must be taken on days when local schools or colleges are in session.
• Must be taken on days of good weather, and avoid atypical conditions (e.g., road construction, detours, or major traffic incidents).
• Traffic counts used for other traffic studies in the area shall **NOT** be reused again, unless 25% of the counts conducted for that particular traffic study are validated with new counts. The difference in volumes between the old and new counts at each corresponding movement should not be more than 10%.
• New traffic counts shall be checked to ensure the difference in volumes at corresponding approaches, if applicable, between two adjacent intersections is no more than 10% unless the difference can be justified.
For all proposed mitigation measures, a conceptual plan for the improvements shall be submitted to our Traffic Studies section for review and approval prior to the approval of the Traffic Impact Analysis. All proposed improvements shall be within the right-of-way.
For all cumulative mitigation measures, a cost estimate for the improvement shall be submitted.
Traffic Indices Calculations shall be conducted along Wolcott Way and SR-126
On-sites as well as I-5 Off Ramp and SR-126 Queuing Analyses shall be included in the Traffic Impact Analysis

This analysis must follow the most current Traffic Impact Analysis Report Guidelines.

SCOPING FOR TRAFFIC STUDY

Project Name:	Chiquita Canyon Landfill Master Plan Revision

Please return signed page 1 of 9 in person, by Mail or by Fax

In Person	**By Mail**
Los Angeles County Department of Public Works Traffic and Lighting Division, **Traffic Studies Section, Traffic Studies Unit** **1000 South Fremont Avenue** **Building A-9E, 4th Floor** **Alhambra, CA 91803-8800** **Our building, on the left with parking structure on the right.** **Check the following web site, for additional information:** **http://www.thealhambra.net** 	**Los Angeles County Department of Public Works** **Traffic and Lighting Division,** **Traffic Studies Section, Traffic Studies Unit** **P.O. Box 1460** **Alhambra, CA 91802-1460**

By Fax

	Processing Engineer	**Telephone No.**	**Fax No.**	**E-Mail Address**
	Jeffrey PLETYAK	(626) 300-4721	(626) 300-4736	JPlety@dpw.lacounty.gov
	Suen Fei LAU	(626) 300-4820		SFLau@dpw.lacounty.gov
	Gerald LEY	(626) 300-4822		GLey@dpw.lacounty.gov
	Thanh LE	(626) 300-4730		TLe@dpw.lacounty.gov
	Diran YANIKIAN	(626) 300-4756		DYanikian@dpw.lacounty.gov
	Lindsay SAGORSKI	(626) 300-4784		LSagorski@dpw.lacounty.gov
	Isaac WONG	(626) 300-4796		IsWong@dpw.lacounty.gov
	Virgilio (Gil) LAZATIN	(626) 300-4866		VLazatin@dpw.lacounty.gov

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
TRAFFIC AND LIGHTING DIVISION
APPLICATION FOR ENVIRONMENTAL IMPACT REPORT
TRAFFIC STUDY REVIEW SERVICES, ORDINANCE NO. 91-0101

Road Fund No:	B03	Revenue Source	9254	Program No:	R291

Department Receipt No.:		**Date:**	
Project No.:	R2004-00559-(5)	**Studies No.:**	
Project Name:	Chiquita Canyon Landfill Master Plan Revision		
Applicant/Engineer:	Chiquita Canyon Landfill LLC	**Telephone No.:**	(661) 257-3655
Company:		**Fax No.:**	
Address:	29201 Henry Mayo Drive		
City, State:	Castaic, CA	**Zip:**	91384

The traffic study (TS), required as part of the environmental review process, has been received. **Before a traffic study review can begin, the indicated fee must be paid to this Department.** The fee may be paid in person or mailed to:

In Person	By Mail
Cashier, Mezzanine Level (626) 458-6399 **Los Angeles County Department of Public Works** **900 South Fremont Avenue** **Alhambra, CA 91803-1331**	**Cashier, Mezzanine Level** **Los Angeles County Department of Public Works** **P.O. Box 1460** **Alhambra, CA 91802-1460**

Please **return this form** along with your payment to insure proper credit to your account. Make check payable to the **Los Angeles County Department of Public Works.**

TS review fees are based on the number of Average Daily Trips (ADT's) generated by the project and for six traffic conditions as indicated on page 5 of our 1997 guidelines, as follows:

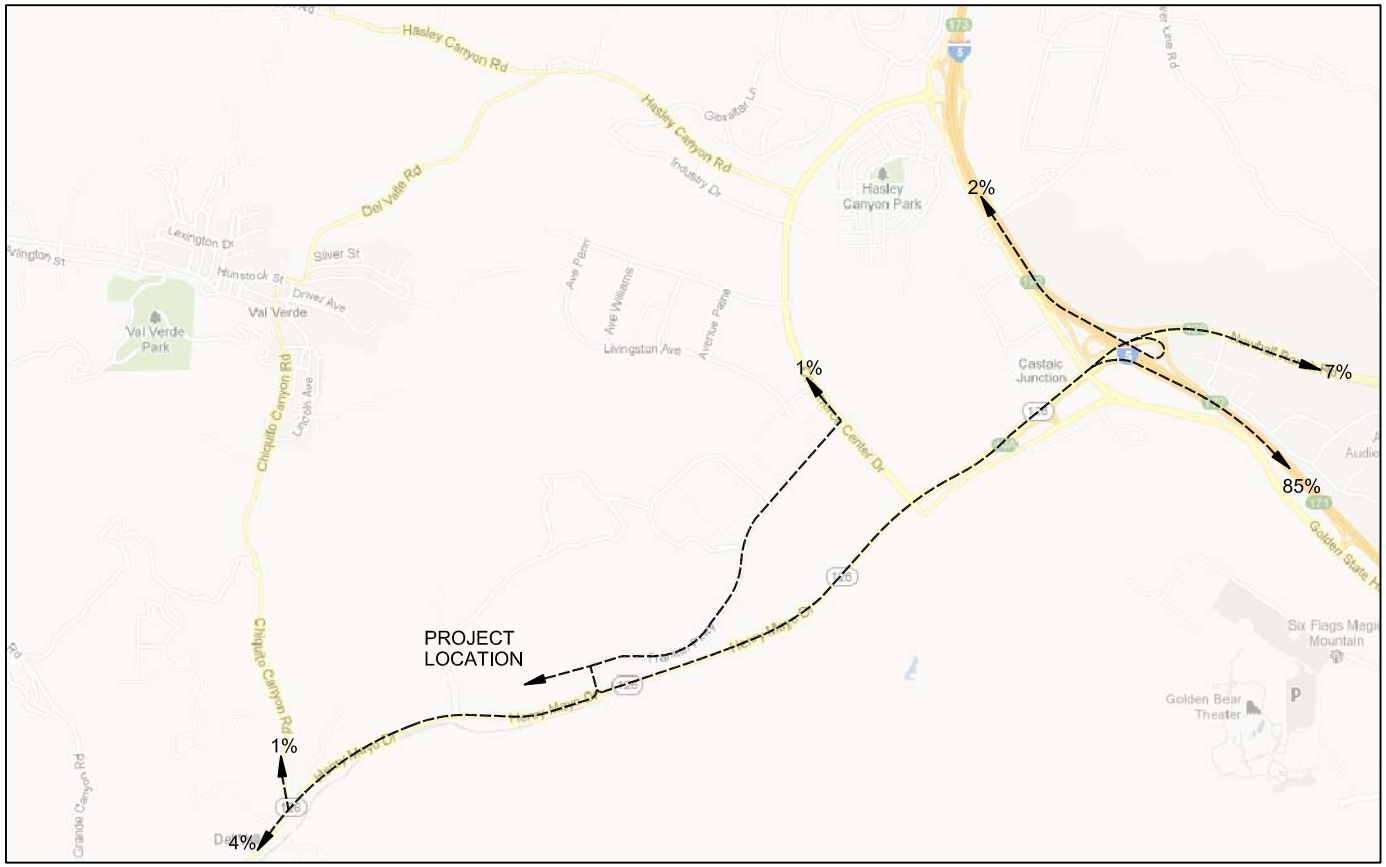
ADT's		**FEE (Effective March 1, 2012)*	
1 - 1,000		**$1,662**	
1,001 - 5,000		**$3,322**	
5,001 - 10,000		**$4,154**	
10,001 and over		**$4,984**	
ADT For This Project:		Fee:	

* For additional information, http://planning.co.la.ca.us/
** Additional fee is required for additional traffic conditions/phases

Processing Engineer	Telephone No.	Fax No.	E-Mail Address
Jeffrey PLETYAK	(626) 300-4721	(626) 300-4736	JPlety@dpw.lacounty.gov
Suen Fei LAU	(626) 300-4820		SFLau@dpw.lacounty.gov
Gerald LEY	(626) 300-4822		GLey@dpw.lacounty.gov
Thanh LE	(626) 300-4730		TLe@dpw.lacounty.gov
Diran YANIKIAN	(626) 300-4756		DYanikian@dpw.lacounty.gov
Lindsay SAGORSKI	(626) 300-4784		LSagorski@dpw.lacounty.gov
Isaac WONG	(626) 300-4796		IsWong@dpw.lacounty.gov
Virgilio (Gil) LAZATIN	(626) 300-4866		VLazatin@dpw.lacounty.gov

cc: Cashier Note: Normal review time is 6-8 weeks after review fee is paid and receipt is received by Studies Unit.
P:\tlpub\WPFILES\FILES\STU\VL\MOU\LA County MOU 03-01-11 Blank.docx Updated 03/01/11

NOT TO SCALE



LEGEND:

XX% Project Distribution (to/from distribution assumed to be identical)

CH2MHILL

CHIQUITA CANYON LANDFILL MASTER PLAN REVISION

PROPOSED PROJECT TRIP DISTRIBUTION

FIGURE 1

APPENDIX B
EXISTING TURNING MOVEMENT DATA COLLECTION SHEETS

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA13_5149_001 **Day:** TUESDAY

City: City of Castaic **Date:** 03/26/2013

AM

NS/EW Streets:	Chiquito Canyon Rd			Chiquito Canyon Rd			SR-126			SR-126			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	1	1	1	1	2	0	0	2	1	
7:00 AM	0		0	26		5	0	134	0		200	6	371
7:15 AM	1		2	21		2	1	135	0		171	5	338
7:30 AM	1		0	23		0	1	159	0		183	4	371
7:45 AM	0		0	12		1	0	157	0		186	2	358
8:00 AM	0		0	11		3	0	134	0		183	2	333
8:15 AM	0		0	13		2	0	109	0		171	9	304
8:30 AM	0		0	11		1	0	137	1		151	3	304
8:45 AM	0		0	14		1	1	134	0		109	3	262
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	2	0	2	131	0	15	3	1099	1	0	1354	34	2641
APPROACH %'s :	50.00%	0.00%	50.00%	89.73%	0.00%	10.27%	0.27%	99.64%	0.09%	0.00%	97.55%	2.45%	
PEAK HR START TIME :	700 AM												TOTAL
PEAK HR VOL :	2	0	2	82	0	8	2	585	0	0	740	17	1438
PEAK HR FACTOR :		0.333			0.726			0.917			0.919		0.969

CONTROL : 1-Way Stop (SB)

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA13_5149_001 **Day:** TUESDAY

City: City of Castaic **Date:** 03/26/2013

PM

NS/EW Streets:	Chiquito Canyon Rd			Chiquito Canyon Rd			SR-126			SR-126			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	1	1	1	1	2	0	0	2	1	
4:00 PM	0		1	15	2	0	3	198	0		184	11	414
4:15 PM	1		1	15	0	6	9	184	0		186	12	414
4:30 PM	0		0	11	0	2	1	213	1		191	7	426
4:45 PM	0		0	11	0	0	4	244	0		216	16	491
5:00 PM	0		0	9	0	2	3	214	0		190	14	432
5:15 PM	1		0	13	0	0	4	213	0		193	18	442
5:30 PM	0		0	14	0	1	3	238	0		181	10	447
5:45 PM	0		0	12	0	2	4	242	0		161	11	432
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	2	0	2	100	2	13	31	1746	1	0	1502	99	3498
APPROACH %'s :	50.00%	0.00%	50.00%	86.96%	1.74%	11.30%	1.74%	98.20%	0.06%	0.00%	93.82%	6.18%	
PEAK HR START TIME :	445 PM												TOTAL
PEAK HR VOL :	1	0	0	47	0	3	14	909	0	0	780	58	1812
PEAK HR FACTOR :		0.250			0.833			0.930			0.903		0.923

CONTROL : 1-Way Stop (SB)

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA13_5149_002 **Day:** TUESDAY

City: City of Castaic **Date:** 03/26/2013

AM

NS/EW Streets:	Chiquito Canyon Landfill Entrance			Chiquito Canyon Landfill Entrance			SR-126			SR-126			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	0	0	0	1	1	1	2	0	0	2	1	
7:00 AM				6		2	0	154			200	6	368
7:15 AM				7		1	3	149			179	10	349
7:30 AM				9		2	1	173			182	7	374
7:45 AM				5		1	2	176			190	6	380
8:00 AM				4		2	0	144			179	9	338
8:15 AM				7		0	0	123			184	7	321
8:30 AM				5		0	1	143			147	12	308
8:45 AM				6		0	1	151			119	7	284
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	0	0	49	0	8	8	1213	0	0	1380	64	2722
APPROACH %'s :	#DIV/0!	#DIV/0!	#DIV/0!	85.96%	0.00%	14.04%	0.66%	99.34%	0.00%	0.00%	95.57%	4.43%	
PEAK HR START TIME :	700 AM												TOTAL
PEAK HR VOL :	0	0	0	27	0	6	6	652	0	0	751	29	1471
PEAK HR FACTOR :		0.000			0.750			0.924			0.947		0.968

CONTROL : 1-Way Stop (SB)

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA13_5149_002 **Day:** TUESDAY

City: City of Castaic **Date:** 03/26/2013

PM

NS/EW Streets:	Chiquito Canyon Landfill Entrance			Chiquito Canyon Landfill Entrance			SR-126			SR-126			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	0	0	0	1	1	1	2	0	0	2	1	
4:00 PM				13		0	0	208			189	10	420
4:15 PM				8		0	1	205			203	8	425
4:30 PM				10		2	0	218			190	7	427
4:45 PM				9		0	1	252			225	5	492
5:00 PM				4		0	0	225			211	0	440
5:15 PM				13		1	0	222			209	0	445
5:30 PM				10		0	0	256			191	0	457
5:45 PM				0		0	0	249			169	0	418
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	0	0	67	0	3	2	1835	0	0	1587	30	3524
APPROACH %'s :	#DIV/0!	#DIV/0!	#DIV/0!	95.71%	0.00%	4.29%	0.11%	99.89%	0.00%	0.00%	98.14%	1.86%	
PEAK HR START TIME :	445 PM												TOTAL
PEAK HR VOL :	0	0	0	36	0	1	1	955	0	0	836	5	1834
PEAK HR FACTOR :		0.000			0.661			0.934			0.914		0.932

CONTROL : 1-Way Stop (SB)

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA13_5149_003 **Day:** TUESDAY

City: City of Castaic **Date:** 03/26/2013

AM

NS/EW Streets:	Wolcott Way			Wolcott Way			SR-126			SR-126			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	1.5	.5	1	1	2	0	1	2	1	
7:00 AM				0		1	3	150	0	0	199	1	354
7:15 AM				0		2	4	159	0	0	193	0	358
7:30 AM				1		2	13	165	1	0	187	0	369
7:45 AM				0		3	5	179	0	0	193	2	382
8:00 AM				0		5	3	141	0	0	178	0	327
8:15 AM				1		4	1	133	0	0	192	2	333
8:30 AM				0		0	1	140	1	0	156	0	298
8:45 AM				0		0	4	159	0	1	129	1	294
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	0	0	2	0	17	34	1226	2	1	1427	6	2715
APPROACH %'s :	#DIV/0!	#DIV/0!	#DIV/0!	10.53%	0.00%	89.47%	2.69%	97.15%	0.16%	0.07%	99.51%	0.42%	
PEAK HR START TIME :	700 AM												TOTAL
PEAK HR VOL :	0	0	0	1	0	8	25	653	1	0	772	3	1463
PEAK HR FACTOR :		0.000			0.750			0.923			0.969		0.957

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA13_5149_003 **Day:** TUESDAY

City: City of Castaic **Date:** 03/26/2013

PM

NS/EW Streets:	Wolcott Way			Wolcott Way			SR-126			SR-126			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	1.5	.5	1	1	2	0	1	2	1	
4:00 PM	1			0		12	3	214	1	1	182	0	414
4:15 PM	0			0		3	1	215	0	0	211	0	430
4:30 PM	0			5		19	5	220	0	0	174	0	423
4:45 PM	2			3		13	5	249	0	0	214	1	487
5:00 PM	0			3		9	2	234	0	0	203	0	451
5:15 PM	1			0		8	2	225	0	0	193	0	429
5:30 PM	6			0		2	0	274	0	0	189	0	471
5:45 PM	0			1		1	2	243	0	0	161	1	409
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	10	0	0	12	0	67	20	1874	1	1	1527	2	3514
APPROACH %'s :	100.00%	0.00%	0.00%	15.19%	0.00%	84.81%	1.06%	98.89%	0.05%	0.07%	99.80%	0.13%	
PEAK HR START TIME :	445 PM												TOTAL
PEAK HR VOL :	9	0	0	6	0	32	9	982	0	0	799	1	1838
PEAK HR FACTOR :		0.375			0.594			0.904			0.930		0.944

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA13_5149_004 **Day:** TUESDAY

City: City of Castaic **Date:** 03/26/2013

AM

NS/EW Streets:	Commerce Center Dr			Commerce Center Dr			SR-126			SR-126			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1	1	2	1	1	1	2	0	1	2	2	
7:00 AM	14	13	1	57	10	14	17	142	6	2	156	196	628
7:15 AM	13	18	1	31	6	5	12	117	6	2	181	281	673
7:30 AM	9	17	3	73	9	6	15	150	13	1	189	297	782
7:45 AM	10	20	1	76	7	10	21	150	5	2	173	357	832
8:00 AM	12	17	3	58	8	10	17	126	4	3	168	275	701
8:15 AM	5	10	2	49	10	5	8	116	5	5	174	209	598
8:30 AM	6	15	1	74	9	7	7	141	6	5	147	187	605
8:45 AM	12	7	4	46	5	7	12	136	7	4	120	159	519
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	81	117	16	464	64	64	109	1078	52	24	1308	1961	5338
APPROACH %'s :	37.85%	54.67%	7.48%	78.38%	10.81%	10.81%	8.80%	87.01%	4.20%	0.73%	39.72%	59.55%	
PEAK HR START TIME :	715 AM												TOTAL
PEAK HR VOL :	44	72	8	238	30	31	65	543	28	8	711	1210	2988
PEAK HR FACTOR :		0.969			0.804			0.893			0.906		0.898

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA13_5149_004 **Day:** TUESDAY

City: City of Castaic **Date:** 03/26/2013

PM

NS/EW Streets:	Commerce Center Dr			Commerce Center Dr			SR-126			SR-126			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1	1	2	1	1	1	2	0	1	2	2	
4:00 PM	31	8	6	234	40	15	6	186	5	2	166	48	747
4:15 PM	10	7	2	184	18	6	5	216	6	4	175	60	693
4:30 PM	23	10	7	324	74	12	6	185	9	3	156	63	872
4:45 PM	18	6	4	204	36	15	6	262	10	4	188	58	811
5:00 PM	13	11	9	274	67	22	14	221	10	2	162	40	845
5:15 PM	19	9	4	188	26	11	6	208	7	1	164	44	687
5:30 PM	18	3	6	228	19	16	11	237	7	2	163	31	741
5:45 PM	14	7	2	129	15	7	8	230	7	3	148	35	605
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	146	61	40	1765	295	104	62	1745	61	21	1322	379	6001
APPROACH %'s :	59.11%	24.70%	16.19%	81.56%	13.63%	4.81%	3.32%	93.42%	3.27%	1.22%	76.77%	22.01%	
PEAK HR START TIME :	415 PM												TOTAL
PEAK HR VOL :	64	34	22	986	195	55	31	884	35	13	681	221	3221
PEAK HR FACTOR :		0.750			0.754			0.854			0.915		0.923

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA13_5149_005 **Day:** TUESDAY

City: City of Castaic **Date:** 03/26/2013

AM

NS/EW Streets:	I-5 SB Ramps			I-5 SB Ramps			SR-126			SR-126			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	0	0	2	0	2	0	4	1	0	3	1	
7:00 AM				99		33		111	113		321	61	738
7:15 AM				171		40		69	90		428	70	868
7:30 AM				276		42		93	142		435	64	1052
7:45 AM				202		44		103	136		488	90	1063
8:00 AM				134		34		92	107		407	95	869
8:15 AM				128		40		82	109		353	69	781
8:30 AM				134		35		99	125		296	70	759
8:45 AM				111		32		103	89		249	82	666
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	0	0	1255	0	300	0	752	911	0	2977	601	6796
APPROACH %'s :	#DIV/0!	#DIV/0!	#DIV/0!	80.71%	0.00%	19.29%	0.00%	45.22%	54.78%	0.00%	83.20%	16.80%	
PEAK HR START TIME :	715 AM												TOTAL
PEAK HR VOL :	0	0	0	783	0	160	0	357	475	0	1758	319	3852
PEAK HR FACTOR :		0.000			0.741			0.870			0.898		0.906

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA13_5149_005 **Day:** TUESDAY

City: City of Castaic **Date:** 03/26/2013

PM

NS/EW Streets:	I-5 SB Ramps			I-5 SB Ramps			SR-126			SR-126			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	0	0	2	0	2	0	4	1	0	3	1	
4:00 PM				173		52		175	322		171	99	992
4:15 PM				160		39		187	233		213	76	908
4:30 PM				187		36		249	333		197	209	1211
4:45 PM				148		45		245	268		204	126	1036
5:00 PM				187		34		271	299		176	137	1104
5:15 PM				163		30		231	245		176	130	975
5:30 PM				131		30		256	265		162	127	971
5:45 PM				116		31		210	178		144	108	787
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	0	0	1265	0	297	0	1824	2143	0	1443	1012	7984
APPROACH %'s :	#DIV/0!	#DIV/0!	#DIV/0!	80.99%	0.00%	19.01%	0.00%	45.98%	54.02%	0.00%	58.78%	41.22%	
PEAK HR START TIME :	430 PM												TOTAL
PEAK HR VOL :	0	0	0	685	0	145	0	996	1145	0	753	602	4326
PEAK HR FACTOR :		0.000			0.930			0.920			0.834		0.893

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA13_5149_006 **Day:** TUESDAY

City: City of Castaic **Date:** 03/26/2013

AM

NS/EW Streets:	I-5 NB Ramps			I-5 NB Ramps			SR-126			SR-126			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	3	0	1	0	0	0	0	4	1	0	3	1	
7:00 AM	197		122					190	26		191	92	818
7:15 AM	215		129					215	19		278	134	990
7:30 AM	246		174					356	17		262	134	1189
7:45 AM	281		190					282	19		287	207	1266
8:00 AM	218		168					204	28		288	151	1057
8:15 AM	174		173					183	21		244	140	935
8:30 AM	166		158					215	23		202	116	880
8:45 AM	147		162					191	18		182	82	782
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	1644	0	1276	0	0	0	0	1836	171	0	1934	1056	7917
APPROACH %'s :	56.30%	0.00%	43.70%	#DIV/0!	#DIV/0!	#DIV/0!	0.00%	91.48%	8.52%	0.00%	64.68%	35.32%	
PEAK HR START TIME :	715 AM												TOTAL
PEAK HR VOL :	960	0	661	0	0	0	0	1057	83	0	1115	626	4502
PEAK HR FACTOR :		0.860			0.000			0.764			0.881		0.889

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA13_5149_006 **Day:** TUESDAY

City: City of Castaic **Date:** 03/26/2013

PM

NS/EW Streets:	I-5 NB Ramps			I-5 NB Ramps			SR-126			SR-126			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	3	0	1	0	0	0	0	4	1	0	3	1	
4:00 PM	100		149					323	34		174	151	931
4:15 PM	118		128					293	46		167	182	934
4:30 PM	126		133					399	46		284	190	1178
4:45 PM	118		143					354	46		213	194	1068
5:00 PM	104		164					394	56		209	230	1157
5:15 PM	95		155					345	51		214	215	1075
5:30 PM	102		148					333	52		184	199	1018
5:45 PM	88		186					283	52		173	177	959
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	851	0	1206	0	0	0	0	2724	383	0	1618	1538	8320
APPROACH %'s :	41.37%	0.00%	58.63%	#DIV/0!	#DIV/0!	#DIV/0!	0.00%	87.67%	12.33%	0.00%	51.27%	48.73%	
PEAK HR START TIME :	430 PM												TOTAL
PEAK HR VOL :	443	0	595	0	0	0	0	1492	199	0	920	829	4478
PEAK HR FACTOR :		0.968			0.000			0.939			0.922		0.950

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA13_5149_007 **Day:** TUESDAY

City: City of Castaic **Date:** 03/26/2013

AM

NS/EW Streets:	Commerce Center Dr			Commerce Center Dr			Franklin Parkway			Franklin Parkway			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	3	0	0	3	1	1	0	1	0	0	0	
7:00 AM	30	203			47	5	4		34				323
7:15 AM	62	246			43	3	9		6				369
7:30 AM	80	249			83	10	7		14				443
7:45 AM	102	291			77	8	11		10				499
8:00 AM	62	254			67	7	6		14				410
8:15 AM	43	192			60	2	2		3				302
8:30 AM	20	196			75	8	4		8				311
8:45 AM	17	168			58	3	8		5				259
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	416	1799	0	0	510	46	51	0	94	0	0	0	2916
APPROACH %'s :	18.78%	81.22%	0.00%	0.00%	91.73%	8.27%	35.17%	0.00%	64.83%	#DIV/0!	#DIV/0!	#DIV/0!	
PEAK HR START TIME :	715 AM												TOTAL
PEAK HR VOL :	306	1040	0	0	270	28	33	0	44	0	0	0	1721
PEAK HR FACTOR :		0.856			0.801			0.917			0.000		0.862

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: CA13_5149_007 **Day:** TUESDAY

City: City of Castaic **Date:** 03/26/2013

PM

NS/EW Streets:	Commerce Center Dr			Commerce Center Dr			Franklin Parkway			Franklin Parkway			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	3	0	0	3	1	1	0	1	0	0	0	
4:00 PM	18	48			203	29	21		81				400
4:15 PM	28	46			182	20	13		37				326
4:30 PM	24	45			286	24	28		123				530
4:45 PM	30	48			195	25	25		47				370
5:00 PM	11	58			291	16	18		72				466
5:15 PM	14	46			174	10	13		42				299
5:30 PM	10	33			226	10	3		32				314
5:45 PM	8	45			120	9	4		31				217
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	143	369	0	0	1677	143	125	0	465	0	0	0	2922
APPROACH %'s :	27.93%	72.07%	0.00%	0.00%	92.14%	7.86%	21.19%	0.00%	78.81%	#DIV/0!	#DIV/0!	#DIV/0!	
PEAK HR START TIME :	415 PM												TOTAL
PEAK HR VOL :	93	197	0	0	954	85	84	0	279	0	0	0	1692
PEAK HR FACTOR :		0.929			0.838			0.601			0.000		0.798

CONTROL : Signalized

APPENDIX C
TRAFFIC ANALYSIS WORKSHEETS

INTERSECTION CAPACITY UTILIZATION WORKSHEET

INTERSECTION: 1 **N / S:** Chiquito Canyon Road **E / W:** SR-126

AM PEAK HOUR

Move-ment	Existing Conditions					Existing plus Growth Conditions					Existing plus Growth plus Other Dev. Conditions					Existing plus Growth plus Project Conditions					Existing plus Growth plus Other Dev. plus Proj. Conditions				
	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.
NL	0.0	0	2	0.000	0	0.0	0	2	0.000	0	0.0	0	2	0.000	0	0.0	0	2	0.000	0	0.0	0	2	0.000	0
NR	0.0	0	2	0.000	0	0.0	0	2	0.000	0	0.0	0	2	0.000	0	0.0	0	2	0.000	0	0.0	0	2	0.000	0
NT	1.0	1600	0	0.003	1	1.0	1600	0	0.003	1	1.0	1600	0	0.003	1	1.0	1600	0	0.003	1	1.0	1600	0	0.003	1
SL	1.0	1600	82	0.051	1	1.0	1600	87	0.054	1	1.0	1600	87	0.054	1	1.0	1600	88	0.055	1	1.0	1600	88	0.055	1
SR	1.0	1600	8	0.005	1	1.0	1600	8	0.005	1	1.0	1600	8	0.005	1	1.0	1600	8	0.005	1	1.0	1600	8	0.005	1
ST	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
EL	1.0	1600	2	0.001	1	1.0	1600	2	0.001	1	1.0	1600	2	0.001	1	1.0	1600	2	0.001	1	1.0	1600	2	0.001	1
ER	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
ET	2.0	3200	585	0.183	0	2.0	3200	617	0.193	0	2.0	3200	696	0.218	0	2.0	3200	620	0.194	0	2.0	3200	699	0.218	0
WL	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
WR	1.0	1600	17	0.011	0	1.0	1600	18	0.011	0	1.0	1600	18	0.011	0	1.0	1600	19	0.012	0	1.0	1600	19	0.012	0
WT	2.0	3200	740	0.231	1	2.0	3200	781	0.244	1	2.0	3200	797	0.249	1	2.0	3200	784	0.245	1	2.0	3200	800	0.250	1
N/S component					0.054	N/S component				0.057	N/S component				0.057	N/S component				0.058	N/S component				0.058
E/W component					0.233	E/W component				0.245	E/W component				0.250	E/W component				0.246	E/W component				0.251
Clearance					0.100	Clearance				0.100	Clearance				0.100	Clearance				0.100	Clearance				0.100
				ICU LOS	**0.386 A**				**ICU LOS**	**0.402 A**				**ICU LOS**	**0.407 A**				**ICU LOS**	**0.404 A**				**ICU LOS**	**0.409 A**

PM PEAK HOUR

Move-ment	Existing Conditions					Existing plus Growth Conditions					Existing plus Growth plus Other Dev. Conditions					Existing plus Growth plus Project Conditions					Existing plus Growth plus Other Dev. plus Proj. Conditions				
	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.
NL	0.0	0	1	0.000	0	0.0	0	1	0.000	0	0.0	0	1	0.000	0	0.0	0	1	0.000	0	0.0	0	1	0.000	0
NR	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
NT	1.0	1600	0	0.001	1	1.0	1600	0	0.001	1	1.0	1600	0	0.001	1	1.0	1600	Z	0.001	1	1.0	1600	0	0.001	1
SL	1.0	1600	47	0.029	1	1.0	1600	50	0.031	1	1.0	1600	50	0.031	1	1.0	1600	51	0.032	1	1.0	1600	51	0.032	1
SR	1.0	1600	3	0.002	0	1.0	1600	3	0.002	0	1.0	1600	3	0.002	0	1.0	1600	3	0.002	0	1.0	1600	3	0.002	0
ST	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
EL	1.0	1600	14	0.009	0	1.0	1600	15	0.009	0	1.0	1600	15	0.009	0	1.0	1600	15	0.009	0	1.0	1600	15	0.009	0
ER	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
ET	2.0	3200	909	0.284	1	2.0	3200	959	0.300	1	2.0	3200	991	0.310	1	2.0	3200	962	0.301	1	2.0	3200	994	0.311	1
WL	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1
WR	1.0	1600	58	0.036	0	1.0	1600	61	0.038	0	1.0	1600	61	0.038	0	1.0	1600	62	0.039	0	1.0	1600	62	0.039	0
WT	2.0	3200	780	0.244	0	2.0	3200	823	0.257	0	2.0	3200	910	0.284	0	2.0	3200	826	0.258	0	2.0	3200	913	0.285	0
N/S component					0.030	N/S component				0.032	N/S component				0.032	N/S component				0.033	N/S component				0.033
E/W component					0.284	E/W component				0.300	E/W component				0.310	E/W component				0.301	E/W component				0.311
Clearance					0.100	Clearance				0.100	Clearance				0.100	Clearance				0.100	Clearance				0.100
				ICU LOS	**0.414 A**				**ICU LOS**	**0.432 A**				**ICU LOS**	**0.442 A**				**ICU LOS**	**0.433 A**				**ICU LOS**	**0.443 A**

Critical movement identified by a 1.

Ten lanes for a right turn indicates free movement.

INTERSECTION CAPACITY UTILIZATION WORKSHEET

INTERSECTION: 2 **N / S:** Chiquita Canyon Landfill Entrance **E / W:** SR-126

AM PEAK HOUR

Move-ment	Existing Conditions					Existing plus Growth Conditions					Existing plus Growth plus Other Dev. Conditions					Existing plus Growth plus Project Conditions					Existing plus Growth plus Other Dev. plus Proj. Conditions				
	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.
NL	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	Intersection does not exist with project					Intersection does not exist with project				
NR	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0										
NT	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1										
SL	1.0	1600	27	0.017	1	1.0	1600	28	0.018	1	1.0	1600	28	0.018	1										
SR	1.0	1600	6	0.004	0	1.0	1600	6	0.004	0	1.0	1600	6	0.004	0										
ST	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0										
EL	1.0	1600	6	0.004	1	1.0	1600	6	0.004	1	1.0	1600	6	0.004	1										
ER	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0										
ET	2.0	3200	652	0.204	0	2.0	3200	688	0.215	0	2.0	3200	767	0.240	0										
WL	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0										
WR	1.0	1600	29	0.018	0	1.0	1600	31	0.019	0	1.0	1600	31	0.019	0										
WT	2.0	3200	751	0.235	1	2.0	3200	792	0.248	1	2.0	3200	808	0.253	1										
N/S component					0.017	N/S component				0.018	N/S component				0.018										
E/W component					0.238	E/W component				0.251	E/W component				0.256										
Clearance					0.100	Clearance				0.100	Clearance				0.100										
				ICU	**0.355**				ICU	**0.369**				ICU	**0.374**										
				LOS	**A**				LOS	**A**				LOS	**A**										

PM PEAK HOUR

Move-ment	Existing Conditions					Existing plus Growth Conditions					Existing plus Growth plus Other Dev. Conditions					Existing plus Growth plus Project Conditions					Existing plus Growth plus Other Dev. plus Proj. Conditions				
	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.
NL	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	Intersection does not exist with project					Intersection does not exist with project				
NR	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0										
NT	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1										
SL	1.0	1600	36	0.023	1	1.0	1600	38	0.024	1	1.0	1600	38	0.024	1										
SR	1.0	1600	1	0.001	0	1.0	1600	1	0.001	0	1.0	1600	1	0.001	0										
ST	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0										
EL	1.0	1600	1	0.001	0	1.0	1600	1	0.001	0	1.0	1600	1	0.001	0										
ER	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0										
ET	2.0	3200	955	0.298	1	2.0	3200	1008	0.315	1	2.0	3200	1040	0.325	1										
WL	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1										
WR	1.0	1600	5	0.003	0	1.0	1600	5	0.003	0	1.0	1600	5	0.003	0										
WT	2.0	3200	836	0.261	0	2.0	3200	882	0.276	0	2.0	3200	969	0.303	0										
N/S component					0.023	N/S component				0.024	N/S component				0.024										
E/W component					0.298	E/W component				0.315	E/W component				0.325										
Clearance					0.100	Clearance				0.100	Clearance				0.100										
				ICU	**0.421**				ICU	**0.439**				ICU	**0.449**										
				LOS	**A**				LOS	**A**				LOS	**A**										

Critical movement identified by a 1.

Ten lanes for a right turn indicates free movement.

INTERSECTION CAPACITY UTILIZATION WORKSHEET

INTERSECTION: 3 **N / S:** Wolcott Way **E / W:** SR-126

AM PEAK HOUR

Move-ment	Existing Conditions					Existing plus Growth Conditions					Existing plus Growth plus Other Dev. Conditions					Existing plus Growth plus Project Conditions					Existing plus Growth plus Other Dev. plus Proj. Conditions				
	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.
NL	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
NR	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	7	0.000	0	0.0	0	0	0.000	0	0.0	0	7	0.000	0
NT	1.0	1600	0	0.000	1	1.0	1600	0	0.000	1	1.0	1600	7	0.009	1	1.0	1600	0	0.000	1	1.0	1600	7	0.009	1
SL	1.5	2400	1	0.000	1	1.5	2400	1	0.000	1	1.5	2400	1	0.000	1	1.5	2400	99	0.041	1	1.5	2400	99	0.041	1
SR	1.0	1600	8	0.005	0	1.0	1600	8	0.005	0	1.0	1600	8	0.005	0	1.0	1600	18	0.011	0	1.0	1600	18	0.011	0
ST	0.5	800	0	0.000	0	0.5	800	0	0.000	0	0.5	800	1	0.001	0	0.5	800	0	0.000	0	0.5	800	1	0.001	0
EL	1.0	1600	25	0.016	1	1.0	1600	26	0.016	1	1.0	1600	26	0.016	1	1.0	1600	36	0.023	1	1.0	1600	36	0.023	1
ER	0.0	0	1	0.000	0	0.0	0	1	0.000	0	0.0	0	1	0.000	0	0.0	0	1	0.000	0	0.0	0	1	0.000	0
ET	2.0	3200	653	0.204	0	2.0	3200	689	0.216	0	2.0	3200	768	0.240	0	2.0	3200	662	0.207	0	2.0	3200	741	0.232	0
WL	1.0	1600	0	0.000	0	1.0	1600	0	0.000	0	1.0	1600	1	0.001	0	1.0	1600	0	0.000	0	1.0	1600	1	0.001	0
WR	1.0	1600	3	0.002	0	1.0	1600	3	0.002	0	1.0	1600	3	0.002	0	1.0	1600	103	0.064	0	1.0	1600	103	0.064	0
WT	2.0	3200	772	0.241	1	2.0	3200	814	0.254	1	2.0	3200	830	0.259	1	2.0	3200	785	0.245	1	2.0	3200	801	0.250	1
N/S component					0.000	N/S component				0.000	N/S component				0.009	N/S component				0.041	N/S component				0.050
E/W component					0.257	E/W component				0.271	E/W component				0.276	E/W component				0.268	E/W component				0.273
Clearance					0.100	Clearance				0.100	Clearance				0.100	Clearance				0.100	Clearance				0.100
				ICU LOS	**0.357 A**				**ICU LOS**	**0.371 A**				**ICU LOS**	**0.385 A**				**ICU LOS**	**0.409 A**				**ICU LOS**	**0.423 A**

PM PEAK HOUR

Move-ment	Existing Conditions					Existing plus Growth Conditions					Existing plus Growth plus Other Dev. Conditions					Existing plus Growth plus Project Conditions					Existing plus Growth plus Other Dev. plus Proj. Conditions				
	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.
NL	0.0	0	9	0.000	0	0.0	0	9	0.000	0	0.0	0	9	0.000	0	0.0	0	9	0.000	0	0.0	0	9	0.000	0
NR	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	2	0.000	0	0.0	0	0	0.000	0	0.0	0	2	0.000	0
NT	1.0	1600	0	0.006	1	1.0	1600	0	0.006	1	1.0	1600	2	0.008	1	1.0	1600	0	0.006	1	1.0	1600	2	0.008	1
SL	1.5	2400	6	0.003	1	1.5	2400	6	0.003	1	1.5	2400	6	0.003	1	1.5	2400	113	0.047	1	1.5	2400	113	0.047	1
SR	1.0	1600	32	0.020	1	1.0	1600	34	0.021	1	1.0	1600	34	0.021	1	1.0	1600	39	0.024	1	1.0	1600	39	0.024	1
ST	0.5	800	0	0.000	0	0.5	800	0	0.000	0	0.5	800	6	0.008	0	0.5	800	0	0.000	0	0.5	800	6	0.008	0
EL	1.0	1600	9	0.006	0	1.0	1600	9	0.006	0	1.0	1600	9	0.006	0	1.0	1600	14	0.009	0	1.0	1600	14	0.009	0
ER	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
ET	2.0	3200	982	0.307	1	2.0	3200	1036	0.324	1	2.0	3200	1068	0.334	1	2.0	3200	1000	0.313	1	2.0	3200	1032	0.323	1
WL	1.0	1600	0	0.000	1	1.0	1600	0	0.000	1	1.0	1600	6	0.004	1	1.0	1600	0	0.000	1	1.0	1600	6	0.004	1
WR	1.0	1600	1	0.001	0	1.0	1600	1	0.001	0	1.0	1600	1	0.001	0	1.0	1600	77	0.048	0	1.0	1600	77	0.048	0
WT	2.0	3200	799	0.250	0	2.0	3200	843	0.263	0	2.0	3200	930	0.291	0	2.0	3200	838	0.262	0	2.0	3200	925	0.289	0
N/S component					0.008	N/S component				0.008	N/S component				0.011	N/S component				0.053	N/S component				0.055
E/W component					0.307	E/W component				0.324	E/W component				0.338	E/W component				0.313	E/W component				0.326
Clearance					0.100	Clearance				0.100	Clearance				0.100	Clearance				0.100	Clearance				0.100
				ICU LOS	**0.415 A**				**ICU LOS**	**0.432 A**				**ICU LOS**	**0.448 A**				**ICU LOS**	**0.465 A**				**ICU LOS**	**0.481 A**

Critical movement identified by a 1.

Ten lanes for a right turn indicates free movement.

INTERSECTION CAPACITY UTILIZATION WORKSHEET

INTERSECTION: 4 **N / S:** Commerce Center Drive **E / W:** SR-126

AM PEAK HOUR

Move-ment	Existing Conditions					Existing plus Growth Conditions					Existing plus Growth plus Other Dev. Conditions					Existing plus Growth plus Project Conditions					Existing plus Growth plus Other Dev. plus Proj. Conditions				
	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.
NL	1.0	1600	44	0.028	0	0.0	0	46	0.000	0	0.0	0	46	0.000	0	0.0	0	46	0.000	0	0.0	0	46	0.000	0
NR	1.0	1600	8	0.005	0	0.0	0	8	0.000	0	0.0	0	8	0.000	0	0.0	0	8	0.000	0	0.0	0	8	0.000	0
NT	1.0	1600	72	0.045	1	1.0	1600	76	0.081	1	1.0	1600	166	0.138	1	1.0	1600	76	0.081	1	1.0	1600	166	0.138	1
SL	2.0	2880	238	0.083	1	2.0	2880	251	0.087	1	2.0	2880	290	0.101	1	2.0	2880	251	0.087	1	2.0	2880	290	0.101	1
SR	1.0	1600	31	0.019	0	1.0	1600	33	0.021	0	1.0	1600	48	0.030	0	1.0	1600	33	0.021	0	1.0	1600	48	0.030	0
ST	1.0	1600	30	0.019	0	1.0	1600	32	0.020	0	1.0	1600	53	0.033	0	1.0	1600	32	0.020	0	1.0	1600	53	0.033	0
EL	1.0	1600	65	0.041	1	1.0	1600	69	0.043	1	1.0	1600	150	0.094	1	1.0	1600	69	0.043	1	1.0	1600	150	0.094	1
ER	0.0	0	28	0.000	0	0.0	0	30	0.000	0	0.0	0	30	0.000	0	0.0	0	30	0.000	0	0.0	0	30	0.000	0
ET	2.0	3200	543	0.178	0	2.0	3200	573	0.188	0	2.0	3200	578	0.190	0	2.0	3200	644	0.211	0	2.0	3200	649	0.212	0
WL	1.0	1600	8	0.005	0	1.0	1600	8	0.005	0	1.0	1600	8	0.005	0	1.0	1600	8	0.005	0	1.0	1600	8	0.005	0
WR	1.0	1600	1210	0.756	1	1.0	1600	1277	0.798	1	1.0	1600	1492	0.933	1	1.0	1600	1277	0.798	1	1.0	1600	1492	0.933	1
WT	2.0	3200	711	0.222	1	2.0	3200	750	0.234	1	2.0	3200	753	0.235	1	2.0	3200	821	0.257	1	2.0	3200	824	0.258	1
N/S component					0.128	N/S component				0.168	N/S component				0.238	N/S component				0.168	N/S component				0.238
E/W component					0.263	E/W component				0.278	E/W component				0.329	E/W component				0.300	E/W component				0.351
Clearance					0.100	Clearance				0.100	Clearance				0.100	Clearance				0.100	Clearance				0.100
				ICU LOS	**0.490 A**				**ICU LOS**	**0.546 A**				**ICU LOS**	**0.667 B**				**ICU LOS**	**0.568 A**				**ICU LOS**	**0.689 B**

PM PEAK HOUR

Move-ment	Existing Conditions					Existing plus Growth Conditions					Existing plus Growth plus Other Dev. Conditions					Existing plus Growth plus Project Conditions					Existing plus Growth plus Other Dev. plus Proj. Conditions				
	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.
NL	1.0	1600	64	0.040	0	0.0	0	68	0.000	0	0.0	0	68	0.000	0	0.0	0	68	0.000	0	0.0	0	68	0.000	0
NR	1.0	1600	22	0.014	0	0.0	0	23	0.000	0	0.0	0	23	0.000	0	0.0	0	23	0.000	0	0.0	0	23	0.000	0
NT	1.0	1600	34	0.021	1	1.0	1600	36	0.079	1	1.0	1600	71	0.101	1	1.0	1600	36	0.079	1	1.0	1600	71	0.101	1
SL	2.0	2880	986	0.342	1	2.0	2880	1040	0.361	1	2.0	2880	1243	0.432	1	2.0	2880	1040	0.361	1	2.0	2880	1243	0.432	1
SR	1.0	1600	55	0.034	0	1.0	1600	58	0.036	0	1.0	1600	134	0.084	0	1.0	1600	58	0.036	0	1.0	1600	134	0.084	0
ST	1.0	1600	195	0.122	0	1.0	1600	206	0.129	0	1.0	1600	302	0.189	0	1.0	1600	206	0.129	0	1.0	1600	302	0.189	0
EL	1.0	1600	31	0.019	0	1.0	1600	33	0.021	0	1.0	1600	52	0.033	0	1.0	1600	33	0.021	0	1.0	1600	52	0.033	0
ER	0.0	0	35	0.000	0	0.0	0	37	0.000	0	0.0	0	37	0.000	0	0.0	0	37	0.000	0	0.0	0	37	0.000	0
ET	2.0	3200	884	0.287	1	2.0	3200	933	0.303	1	2.0	3200	948	0.308	1	2.0	3200	1004	0.325	1	2.0	3200	1019	0.330	1
WL	1.0	1600	13	0.008	1	1.0	1600	14	0.009	1	1.0	1600	14	0.009	1	1.0	1600	14	0.009	1	1.0	1600	14	0.009	1
WR	1.0	1600	221	0.138	0	1.0	1600	233	0.146	0	1.0	1600	284	0.178	0	1.0	1600	233	0.146	0	1.0	1600	284	0.178	0
WT	2.0	3200	681	0.213	0	2.0	3200	718	0.224	0	2.0	3200	735	0.230	0	2.0	3200	789	0.247	0	2.0	3200	806	0.252	0
N/S component					0.364	N/S component				0.440	N/S component				0.533	N/S component				0.440	N/S component				0.533
E/W component					0.295	E/W component				0.312	E/W component				0.317	E/W component				0.334	E/W component				0.339
Clearance					0.100	Clearance				0.100	Clearance				0.100	Clearance				0.100	Clearance				0.100
				ICU LOS	**0.759 C**				**ICU LOS**	**0.852 D**				**ICU LOS**	**0.949 E**				**ICU LOS**	**0.875 D**				**ICU LOS**	**0.972 E**

Critical movement identified by a 1.

Ten lanes for a right turn indicates free movement.

INTERSECTION CAPACITY UTILIZATION WORKSHEET

INTERSECTION: 5 **N / S:** I-5 SB Ramps **E / W:** SR-126

AM PEAK HOUR

Move-ment	Existing Conditions					Existing plus Growth Conditions					Existing plus Growth plus Other Dev. Conditions					Existing plus Growth plus Project Conditions					Existing plus Growth plus Other Dev. plus Proj. Conditions				
	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.
NL	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
NR	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
NT	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1
SL	2.0	2880	783	0.272	1	2.0	2880	826	0.287	1	2.0	2880	836	0.290	1	2.0	2880	826	0.287	1	2.0	2880	836	0.290	1
SR	2.0	3200	160	0.050	1	2.0	3200	169	0.053	1	2.0	3200	169	0.053	1	2.0	3200	171	0.053	1	2.0	3200	171	0.053	1
ST	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
EL	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1
ER	10.0	16000	475	0.030	0	10.0	16000	501	0.031	0	10.0	16000	523	0.033	0	10.0	16000	565	0.035	0	10.0	16000	587	0.037	0
ET	4.0	6400	357	0.056	0	4.0	6400	377	0.059	0	4.0	6400	402	0.063	0	4.0	6400	384	0.060	0	4.0	6400	409	0.064	0
WL	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
WR	10.0	16000	319	0.020	0	10.0	16000	337	0.021	0	10.0	16000	337	0.021	0	10.0	16000	337	0.021	0	10.0	16000	337	0.021	0
WT	3.0	4800	1758	0.366	1	3.0	4800	1855	0.386	1	3.0	4800	2081	0.434	1	3.0	4800	1924	0.401	1	3.0	4800	2150	0.448	1
N/S component					0.272	N/S component				0.287	N/S component				0.290	N/S component				0.287	N/S component				0.290
E/W component					0.366	E/W component				0.386	E/W component				0.434	E/W component				0.401	E/W component				0.448
Clearance					0.100	Clearance				0.100	Clearance				0.100	Clearance				0.100	Clearance				0.100
				ICU LOS	**0.738 C**				**ICU LOS**	**0.773 C**				**ICU LOS**	**0.824 D**				**ICU LOS**	**0.788 C**				**ICU LOS**	**0.838 D**

PM PEAK HOUR

Move-ment	Existing Conditions					Existing plus Growth Conditions					Existing plus Growth plus Other Dev. Conditions					Existing plus Growth plus Project Conditions					Existing plus Growth plus Other Dev. plus Proj. Conditions				
	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.
NL	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
NR	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
NT	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1
SL	2.0	2880	685	0.238	1	2.0	2880	723	0.251	1	2.0	2880	774	0.269	1	2.0	2880	723	0.251	1	2.0	2880	774	0.269	1
SR	2.0	3200	145	0.045	1	2.0	3200	153	0.048	1	2.0	3200	153	0.048	1	2.0	3200	155	0.048	1	2.0	3200	155	0.048	1
ST	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
EL	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	0	0.0	0	0	0.000	1	0.0	0	0	0.000	1
ER	10.0	16000	1145	0.072	0	10.0	16000	1208	0.076	0	10.0	16000	1322	0.083	0	10.0	16000	1273	0.080	0	10.0	16000	1387	0.087	0
ET	4.0	6400	996	0.156	0	4.0	6400	1051	0.164	0	4.0	6400	1176	0.184	1	4.0	6400	1058	0.165	0	4.0	6400	1183	0.185	0
WL	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	1	0.0	0	0	0.000	0	0.0	0	0	0.000	0
WR	10.0	16000	602	0.038	0	10.0	16000	635	0.040	0	10.0	16000	635	0.040	0	10.0	16000	635	0.040	0	10.0	16000	635	0.040	0
WT	3.0	4800	753	0.157	1	3.0	4800	794	0.165	1	3.0	4800	878	0.183	0	3.0	4800	864	0.180	1	3.0	4800	948	0.198	1
N/S component					0.238	N/S component				0.251	N/S component				0.269	N/S component				0.251	N/S component				0.269
E/W component					0.157	E/W component				0.165	E/W component				0.184	E/W component				0.180	E/W component				0.198
Clearance					0.100	Clearance				0.100	Clearance				0.100	Clearance				0.100	Clearance				0.100
				ICU LOS	**0.495 A**				**ICU LOS**	**0.516 A**				**ICU LOS**	**0.553 A**				**ICU LOS**	**0.531 A**				**ICU LOS**	**0.566 A**

Critical movement identified by a 1.

Ten lanes for a right turn indicates free movement.

INTERSECTION CAPACITY UTILIZATION WORKSHEET

INTERSECTION: 6 **N / S:** I-5 NB Ramps **E / W:** SR-126

AM PEAK HOUR

Move-ment	Existing Conditions					Existing plus Growth Conditions					Existing plus Growth plus Other Dev. Conditions					Existing plus Growth plus Project Conditions					Existing plus Growth plus Other Dev. plus Proj. Conditions				
	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.
NL	3.0	4800	960	0.200	1	3.0	4800	1013	0.211	1	3.0	4800	1145	0.239	1	3.0	4800	1077	0.224	1	3.0	4800	1209	0.252	1
NR	1.0	1600	661	0.413	1	1.0	1600	697	0.436	1	1.0	1600	697	0.436	1	1.0	1600	697	0.436	1	1.0	1600	697	0.436	1
NT	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
SL	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
SR	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
ST	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1
EL	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1
ER	10.0	16000	83	0.005	0	10.0	16000	88	0.006	0	10.0	16000	96	0.006	0	10.0	16000	90	0.006	0	10.0	16000	98	0.006	0
ET	4.0	6400	1057	0.165	0	4.0	6400	1115	0.174	0	4.0	6400	1142	0.178	0	4.0	6400	1120	0.175	0	4.0	6400	1147	0.179	0
WL	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
WR	10.0	16000	626	0.039	0	10.0	16000	660	0.041	0	10.0	16000	714	0.045	0	10.0	16000	660	0.041	0	10.0	16000	714	0.045	0
WT	3.0	4800	1115	0.232	1	3.0	4800	1176	0.245	1	3.0	4800	1270	0.265	1	3.0	4800	1181	0.246	1	3.0	4800	1275	0.266	1
N/S component					0.200	N/S component				0.211	N/S component				0.239	N/S component				0.224	N/S component				0.252
E/W component					0.232	E/W component				0.245	E/W component				0.265	E/W component				0.246	E/W component				0.266
Clearance					0.100	Clearance				0.100	Clearance				0.100	Clearance				0.100	Clearance				0.100
				ICU LOS	**0.532 A**				**ICU LOS**	**0.556 A**				**ICU LOS**	**0.603 A**				**ICU LOS**	**0.570 A**				**ICU LOS**	**0.618 B**

PM PEAK HOUR

Move-ment	Existing Conditions					Existing plus Growth Conditions					Existing plus Growth plus Other Dev. Conditions					Existing plus Growth plus Project Conditions					Existing plus Growth plus Other Dev. plus Proj. Conditions				
	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.
NL	3.0	4800	443	0.092	1	3.0	4800	467	0.097	1	3.0	4800	529	0.110	1	3.0	4800	532	0.111	1	3.0	4800	594	0.124	1
NR	1.0	1600	595	0.372	1	1.0	1600	628	0.393	1	1.0	1600	628	0.393	1	1.0	1600	628	0.393	1	1.0	1600	628	0.393	1
NT	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
SL	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
SR	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
ST	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1
EL	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
ER	10.0	16000	199	0.012	0	10.0	16000	210	0.013	0	10.0	16000	246	0.015	0	10.0	16000	212	0.013	0	10.0	16000	248	0.016	0
ET	4.0	6400	1492	0.233	1	4.0	6400	1574	0.246	1	4.0	6400	1714	0.268	1	4.0	6400	1579	0.247	1	4.0	6400	1719	0.269	1
WL	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1
WR	10.0	16000	829	0.052	0	10.0	16000	875	0.055	0	10.0	16000	888	0.056	0	10.0	16000	875	0.055	0	10.0	16000	888	0.056	0
WT	3.0	4800	920	0.192	0	3.0	4800	971	0.202	0	3.0	4800	993	0.207	0	3.0	4800	976	0.203	0	3.0	4800	998	0.208	0
N/S component					0.092	N/S component				0.097	N/S component				0.110	N/S component				0.111	N/S component				0.124
E/W component					0.233	E/W component				0.246	E/W component				0.268	E/W component				0.247	E/W component				0.269
Clearance					0.100	Clearance				0.100	Clearance				0.100	Clearance				0.100	Clearance				0.100
				ICU LOS	**0.425 A**				**ICU LOS**	**0.443 A**				**ICU LOS**	**0.478 A**				**ICU LOS**	**0.458 A**				**ICU LOS**	**0.492 A**

Critical movement identified by a 1.

Ten lanes for a right turn indicates free movement.

INTERSECTION CAPACITY UTILIZATION WORKSHEET

INTERSECTION: 7 **N / S:** Commerce Center Drive **E / W:** Franklin Parkway

AM PEAK HOUR

Move-ment	Existing Conditions					Existing plus Growth Conditions					Existing plus Growth plus Other Dev. Conditions					Existing plus Growth plus Project Conditions					Existing plus Growth plus Other Dev. plus Proj. Conditions				
	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.
NL	1.0	1600	306	0.191	1	1.0	1600	323	0.202	1	1.0	1600	324	0.203	0	1.0	1600	323	0.202	1	1.0	1600	324	0.203	0
NR	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
NT	3.0	4800	1040	0.217	0	3.0	4800	1097	0.229	0	3.0	4800	1482	0.309	1	3.0	4800	1097	0.229	0	3.0	4800	1482	0.309	1
SL	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	1	0.0	0	0	0.000	0	0.0	0	0	0.000	1
SR	1.0	1600	28	0.018	0	1.0	1600	30	0.019	0	1.0	1600	31	0.019	0	1.0	1600	31	0.019	0	1.0	1600	32	0.020	0
ST	3.0	4800	270	0.056	1	3.0	4800	285	0.059	1	3.0	4800	359	0.075	0	3.0	4800	285	0.059	1	3.0	4800	359	0.075	0
EL	1.0	1600	33	0.021	1	1.0	1600	35	0.022	1	1.0	1600	42	0.026	1	1.0	1600	36	0.023	1	1.0	1600	43	0.027	1
ER	1.0	1600	44	0.028	0	1.0	1600	46	0.029	0	1.0	1600	47	0.029	0	1.0	1600	46	0.029	0	1.0	1600	47	0.029	0
ET	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
WL	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
WR	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
WT	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1
N/S component					0.248	N/S component				0.261	N/S component				0.309	N/S component				0.261	N/S component				0.309
E/W component					0.021	E/W component				0.022	E/W component				0.026	E/W component				0.023	E/W component				0.027
Clearance					0.100	Clearance				0.100	Clearance				0.100	Clearance				0.100	Clearance				0.100
				ICU LOS	**0.368 A**				**ICU LOS**	**0.383 A**				**ICU LOS**	**0.435 A**				**ICU LOS**	**0.384 A**				**ICU LOS**	**0.436 A**

PM PEAK HOUR

Move-ment	Existing Conditions					Existing plus Growth Conditions					Existing plus Growth plus Other Dev. Conditions					Existing plus Growth plus Project Conditions					Existing plus Growth plus Other Dev. plus Proj. Conditions				
	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.
NL	1.0	1600	93	0.058	1	1.0	1600	98	0.061	1	1.0	1600	100	0.063	1	1.0	1600	98	0.061	1	1.0	1600	100	0.063	1
NR	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
NT	3.0	4800	197	0.041	0	3.0	4800	208	0.043	0	3.0	4800	311	0.065	0	3.0	4800	208	0.043	0	3.0	4800	311	0.065	0
SL	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
SR	1.0	1600	85	0.053	0	1.0	1600	90	0.056	0	1.0	1600	96	0.060	0	1.0	1600	91	0.057	0	1.0	1600	97	0.061	0
ST	3.0	4800	954	0.199	1	3.0	4800	1006	0.210	1	3.0	4800	1379	0.287	1	3.0	4800	1006	0.210	1	3.0	4800	1379	0.287	1
EL	1.0	1600	84	0.053	1	1.0	1600	89	0.056	1	1.0	1600	91	0.057	1	1.0	1600	90	0.056	1	1.0	1600	92	0.058	1
ER	1.0	1600	279	0.174	1	1.0	1600	294	0.184	1	1.0	1600	296	0.185	1	1.0	1600	294	0.184	1	1.0	1600	296	0.185	1
ET	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
WL	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
WR	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0	0.0	0	0	0.000	0
WT	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1	0.0	0	0	0.000	1
N/S component					0.257	N/S component				0.271	N/S component				0.350	N/S component				0.271	N/S component				0.350
E/W component					0.053	E/W component				0.056	E/W component				0.057	E/W component				0.056	E/W component				0.058
Clearance					0.100	Clearance				0.100	Clearance				0.100	Clearance				0.100	Clearance				0.100
				ICU LOS	**0.409 A**				**ICU LOS**	**0.426 A**				**ICU LOS**	**0.507 A**				**ICU LOS**	**0.427 A**				**ICU LOS**	**0.507 A**

Critical movement identified by a 1.

Ten lanes for a right turn indicates free movement.

INTERSECTION CAPACITY UTILIZATION WORKSHEET

INTERSECTION: 8 **N / S:** Wolcott Way **E / W:** Franklin Parkway

AM PEAK HOUR

Move-ment	Existing Conditions					Existing plus Growth Conditions					Existing plus Growth plus Other Dev. Conditions					Existing plus Growth plus Project Conditions					Existing plus Growth plus Other Dev. plus Proj. Conditions				
	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.
NL	Intersection does not exist without project					Intersection does not exist without project					Intersection does not exist without project					2.0	2880	110	0.038	1	2.0	2880	110	0.038	1
NR																1.0	1600	29	0.018	1	1.0	1600	36	0.023	1
NT																0.0	0	0	0.000	0	0.0	0	0	0.000	0
SL																0.0	0	0	0.000	0	0.0	0	0	0.000	0
SR																0.0	0	0	0.000	0	0.0	0	0	0.000	0
ST																0.0	0	0	0.000	1	0.0	0	0	0.000	1
EL																0.0	0	0	0.000	0	0.0	0	0	0.000	0
ER																0.0	0	108	0.000	0	0.0	0	108	0.000	0
ET																1.0	1600	1	0.068	1	1.0	1600	1	0.068	1
WL																0.0	0	9	0.000	1	0.0	0	10	0.000	1
WR																0.0	0	0	0.000	0	0.0	0	0	0.000	0
WT																1.0	1600	1	0.006	0	1.0	1600	1	0.007	0
																N/S component				0.038	N/S component				0.038
																E/W component				0.068	E/W component				0.068
																Clearance				0.100	Clearance				0.100
																			ICU	**0.206**				**ICU**	**0.206**
																			LOS	**A**				**LOS**	**A**

PM PEAK HOUR

Move-ment	Existing Conditions					Existing plus Growth Conditions					Existing plus Growth plus Other Dev. Conditions					Existing plus Growth plus Project Conditions					Existing plus Growth plus Other Dev. plus Proj. Conditions				
	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.	No. Lanes	Cap.	Volume	V/C	Crit. Mvmt.
NL	Intersection does not exist without project					Intersection does not exist without project					Intersection does not exist without project					2.0	2880	81	0.028	1	2.0	2880	81	0.028	1
NR																1.0	1600	10	0.006	1	1.0	1600	12	0.008	1
NT																0.0	0	0	0.000	0	0.0	0	0	0.000	0
SL																0.0	0	0	0.000	0	0.0	0	0	0.000	0
SR																0.0	0	0	0.000	0	0.0	0	0	0.000	0
ST																0.0	0	0	0.000	1	0.0	0	0	0.000	1
EL																0.0	0	0	0.000	0	0.0	0	0	0.000	0
ER																0.0	0	112	0.000	0	0.0	0	112	0.000	0
ET																1.0	1600	1	0.071	1	1.0	1600	1	0.071	1
WL																0.0	0	39	0.000	1	0.0	0	46	0.000	1
WR																0.0	0	0	0.000	0	0.0	0	0	0.000	0
WT																1.0	1600	1	0.025	0	1.0	1600	1	0.029	0
																N/S component				0.028	N/S component				0.028
																E/W component				0.071	E/W component				0.071
																Clearance				0.100	Clearance				0.100
																			ICU	**0.199**				**ICU**	**0.199**
																			LOS	**A**				**LOS**	**A**

Critical movement identified by a 1.

Ten lanes for a right turn indicates free movement.

EXISTING CONDITIONS

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	2	585	0	0	740	17	2	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	-	-	200	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10
Mvmt Flow	2	585	0	0	740	17	2	0	2

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	740	0	0	585	0	0	959	1329	293
Stage 1	-	-	-	-	-	-	589	589	-
Stage 2	-	-	-	-	-	-	370	740	-
Critical Hdwy	4.3	-	-	4.3	-	-	7.7	6.7	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	6.7	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.7	5.7	-
Follow-up Hdwy	2.3	-	-	2.3	-	-	3.6	4.1	3.4
Pot Cap-1 Maneuver	812	-	-	933	-	-	200	144	680
Stage 1	-	-	-	-	-	-	442	474	-
Stage 2	-	-	-	-	-	-	601	403	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	812	-	-	933	-	-	197	144	680
Mov Cap-2 Maneuver	-	-	-	-	-	-	197	144	-
Stage 1	-	-	-	-	-	-	441	473	-
Stage 2	-	-	-	-	-	-	593	403	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	17
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	305	812	-	-	933	-	-	174	605
HCM Lane V/C Ratio	0.013	0.002	-	-	-	-	-	0.471	0.013
HCM Control Delay (s)	17	9.4	-	-	0	-	-	42.9	11
HCM Lane LOS	C	A	-	-	A	-	-	E	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	2.2	0

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	82	0	8
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	0	-	200
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	10	10	10
Mvmt Flow	82	0	8

Major/Minor	Minor2		
Conflicting Flow All	1037	1329	370
Stage 1	740	740	-
Stage 2	297	589	-
Critical Hdwy	7.7	6.7	7.1
Critical Hdwy Stg 1	6.7	5.7	-
Critical Hdwy Stg 2	6.7	5.7	-
Follow-up Hdwy	3.6	4.1	3.4
Pot Cap-1 Maneuver	175	144	605
Stage 1	357	403	-
Stage 2	665	474	-
Platoon blocked, %			
Mov Cap-1 Maneuver	174	144	605
Mov Cap-2 Maneuver	174	144	-
Stage 1	356	403	-
Stage 2	661	473	-

Approach	SB
HCM Control Delay, s	40.1
HCM LOS	E

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	6	652	751	29	27	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	200	-	-	200	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	6	652	751	29	27	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	751	0	-	0	1089	376
Stage 1	-	-	-	-	751	-
Stage 2	-	-	-	-	338	-
Critical Hdwy	4.3	-	-	-	7	7.1
Critical Hdwy Stg 1	-	-	-	-	6	-
Critical Hdwy Stg 2	-	-	-	-	6	-
Follow-up Hdwy	2.3	-	-	-	3.6	3.4
Pot Cap-1 Maneuver	804	-	-	-	198	599
Stage 1	-	-	-	-	407	-
Stage 2	-	-	-	-	671	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	804	-	-	-	197	599
Mov Cap-2 Maneuver	-	-	-	-	197	-
Stage 1	-	-	-	-	407	-
Stage 2	-	-	-	-	666	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	23.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	804	-	-	-	197	599
HCM Lane V/C Ratio	0.007	-	-	-	0.137	0.01
HCM Control Delay (s)	9.5	-	-	-	26.2	11.1
HCM Lane LOS	A	-	-	-	D	B
HCM 95th %tile Q(veh)	0	-	-	-	0.5	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	25	653	1	0	772	3	0	0	0	1	0	8
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1600	1455	1455	1455	1600	1455	1600	1455	1455	1455
Adj Flow Rate, veh/h	25	653	1	0	772	3	0	0	0	1	0	8
Adj No. of Lanes	1	2	0	1	2	1	0	1	0	2	0	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	33	1307	2	3	973	414	0	3	0	1016	0	453
Arrive On Green	0.02	0.45	0.45	0.00	0.33	0.33	0.00	0.00	0.00	0.37	0.00	0.37
Sat Flow, veh/h	1385	2904	4	1385	2909	1236	0	1455	0	2771	0	1236
Grp Volume(v), veh/h	25	327	327	0	772	3	0	0	0	1	0	8
Grp Sat Flow(s),veh/h/ln	1385	1455	1454	1385	1455	1236	0	1455	0	1385	0	1236
Q Serve(g_s), s	0.8	7.0	7.0	0.0	10.5	0.1	0.0	0.0	0.0	0.0	0.0	0.2
Cycle Q Clear(g_c), s	0.8	7.0	7.0	0.0	10.5	0.1	0.0	0.0	0.0	0.0	0.0	0.2
Prop In Lane	1.00		0.00	1.00		1.00	0.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	33	655	654	3	973	414	0	3	0	1016	0	453
V/C Ratio(X)	0.75	0.50	0.50	0.00	0.79	0.01	0.00	0.00	0.00	0.00	0.00	0.02
Avail Cap(c_a), veh/h	127	655	654	127	1200	510	0	533	0	1016	0	453
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.2	8.5	8.5	0.0	13.2	9.7	0.0	0.0	0.0	8.8	0.0	8.8
Incr Delay (d2), s/veh	28.5	0.6	0.6	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	2.8	2.8	0.0	4.6	0.0	0.0	0.0	0.0	0.0	0.0	0.1
LnGrp Delay(d),s/veh	49.6	9.1	9.1	0.0	16.2	9.7	0.0	0.0	0.0	8.8	0.0	8.9
LnGrp LOS	D	A	A		B	A				A		A
Approach Vol, veh/h		679			775			0			9	
Approach Delay, s/veh		10.6			16.2			0.0			8.9	
Approach LOS		B			B						A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		0.0	0.0	23.6		20.0	5.0	18.6
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	4.0	18.0		16.0	4.0	18.0
Max Q Clear Time (g_c+I1), s		0.0	0.0	9.0		2.2	2.8	12.5
Green Ext Time (p_c), s		0.0	0.0	5.1		0.0	0.0	2.1

Intersection Summary	
HCM 2010 Ctrl Delay	13.5
HCM 2010 LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	65	543	28	8	711	1210	44	72	8	238	30	31
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1600	1455	1455	1600	1600	1455	1600	1309	1455	1455
Adj Flow Rate, veh/h	65	543	28	8	711	0	44	72	8	238	30	31
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	2	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	76	1082	56	11	1011	0	104	170	19	486	284	241
Arrive On Green	0.05	0.39	0.39	0.01	0.35	0.00	0.21	0.21	0.21	0.20	0.20	0.20
Sat Flow, veh/h	1385	2743	141	1385	2909	0	502	821	91	2494	1455	1236
Grp Volume(v), veh/h	65	288	283	8	711	0	124	0	0	238	30	31
Grp Sat Flow(s),veh/h/ln	1385	1455	1430	1385	1455	0	1413	0	0	1247	1455	1236
Q Serve(g_s), s	3.8	12.2	12.3	0.5	17.3	0.0	6.3	0.0	0.0	7.0	1.4	1.7
Cycle Q Clear(g_c), s	3.8	12.2	12.3	0.5	17.3	0.0	6.3	0.0	0.0	7.0	1.4	1.7
Prop In Lane	1.00		0.10	1.00		0.00	0.35		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	76	574	564	11	1011	0	293	0	0	486	284	241
V/C Ratio(X)	0.85	0.50	0.50	0.71	0.70	0.00	0.42	0.00	0.00	0.49	0.11	0.13
Avail Cap(c_a), veh/h	118	1720	1691	68	3334	0	293	0	0	486	284	241
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.4	18.7	18.8	40.6	23.1	0.0	28.2	0.0	0.0	29.4	27.1	27.2
Incr Delay (d2), s/veh	28.5	0.7	0.7	58.5	0.9	0.0	4.4	0.0	0.0	3.5	0.7	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	5.0	4.9	0.4	7.0	0.0	2.8	0.0	0.0	2.6	0.6	0.7
LnGrp Delay(d),s/veh	67.0	19.4	19.5	99.1	24.0	0.0	32.7	0.0	0.0	32.9	27.9	28.3
LnGrp LOS	E	B	B	F	C		C			C	C	C
Approach Vol, veh/h		636			719			124			299	
Approach Delay, s/veh		24.3			24.8			32.7			31.9	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		21.0	4.7	36.3		20.0	8.5	32.5
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		17.0	4.0	97.0		16.0	7.0	94.0
Max Q Clear Time (g_c+I1), s		8.3	2.5	14.3		9.0	5.8	19.3
Green Ext Time (p_c), s		0.3	0.0	9.2		0.6	0.0	9.2

Intersection Summary	
HCM 2010 Ctrl Delay	26.4
HCM 2010 LOS	C

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	357	1758	0	783	160
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1455	1455	0	1309	1309
Adj Flow Rate, veh/h	0	357	1758	0	783	160
Adj No. of Lanes	0	4	3	0	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	10	10	0	10	10
Cap, veh/h	0	3121	2341	0	888	793
Arrive On Green	0.00	0.54	0.54	0.00	0.36	0.36
Sat Flow, veh/h	0	5818	4364	0	2494	2225
Grp Volume(v), veh/h	0	357	1758	0	783	160
Grp Sat Flow(s),veh/h/ln	0	1455	1455	0	1247	1113
Q Serve(g_s), s	0.0	2.3	23.3	0.0	22.0	3.7
Cycle Q Clear(g_c), s	0.0	2.3	23.3	0.0	22.0	3.7
Prop In Lane	0.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	3121	2341	0	888	793
V/C Ratio(X)	0.00	0.11	0.75	0.00	0.88	0.20
Avail Cap(c_a), veh/h	0	3121	2341	0	1070	955
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	8.5	13.4	0.0	22.5	16.6
Incr Delay (d2), s/veh	0.0	0.1	2.3	0.0	7.6	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.9	9.8	0.0	8.4	1.1
LnGrp Delay(d),s/veh	0.0	8.6	15.7	0.0	30.2	16.8
LnGrp LOS		A	B		C	B
Approach Vol, veh/h		357	1758		943	
Approach Delay, s/veh		8.6	15.7		27.9	
Approach LOS		A	B		C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				49.4		30.6		49.4
Change Period (Y+Rc), s				4.0		4.0		4.0
Max Green Setting (Gmax), s				40.0		32.0		40.0
Max Q Clear Time (g_c+I1), s				4.3		24.0		25.3
Green Ext Time (p_c), s				19.4		2.6		10.7

Intersection Summary	
HCM 2010 Ctrl Delay	18.6
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1057	0	0	1115	960	661
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	0	0	1455	1309	1455
Adj Flow Rate, veh/h	1057	0	0	1115	960	661
Adj No. of Lanes	4	0	0	3	3	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	0	0	10	10	10
Cap, veh/h	1745	0	0	1309	2244	742
Arrive On Green	0.30	0.00	0.00	0.30	0.60	0.60
Sat Flow, veh/h	5818	0	0	4364	3740	1236
Grp Volume(v), veh/h	1057	0	0	1115	960	661
Grp Sat Flow(s),veh/h/ln	1455	0	0	1455	1247	1236
Q Serve(g_s), s	12.4	0.0	0.0	19.2	11.0	36.8
Cycle Q Clear(g_c), s	12.4	0.0	0.0	19.2	11.0	36.8
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1745	0	0	1309	2244	742
V/C Ratio(X)	0.61	0.00	0.00	0.85	0.43	0.89
Avail Cap(c_a), veh/h	1745	0	0	1309	2244	742
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.0	0.0	0.0	26.3	8.6	13.8
Incr Delay (d2), s/veh	1.6	0.0	0.0	7.1	0.6	15.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	0.0	0.0	8.5	3.9	15.4
LnGrp Delay(d),s/veh	25.5	0.0	0.0	33.5	9.2	28.9
LnGrp LOS	C			C	A	C
Approach Vol, veh/h	1057			1115	1621	
Approach Delay, s/veh	25.5			33.5	17.2	
Approach LOS	C			C	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		52.0		28.0				28.0
Change Period (Y+Rc), s		4.0		4.0				4.0
Max Green Setting (Gmax), s		48.0		24.0				24.0
Max Q Clear Time (g_c+I1), s		38.8		14.4				21.2
Green Ext Time (p_c), s		4.8		7.5				2.4

Intersection Summary	
HCM 2010 Ctrl Delay	24.3
HCM 2010 LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	33	44	306	1040	270	28
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1455	1455	1455	1455
Adj Flow Rate, veh/h	33	44	306	1040	270	28
Adj No. of Lanes	1	1	1	3	3	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	75	67	355	3377	1882	533
Arrive On Green	0.05	0.05	0.26	0.77	0.43	0.43
Sat Flow, veh/h	1385	1236	1385	4364	4364	1236
Grp Volume(v), veh/h	33	44	306	1040	270	28
Grp Sat Flow(s),veh/h/ln	1385	1236	1385	1455	1455	1236
Q Serve(g_s), s	1.1	1.6	9.8	3.3	1.7	0.6
Cycle Q Clear(g_c), s	1.1	1.6	9.8	3.3	1.7	0.6
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	75	67	355	3377	1882	533
V/C Ratio(X)	0.44	0.66	0.86	0.31	0.14	0.05
Avail Cap(c_a), veh/h	476	425	476	3377	1882	533
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.3	21.6	16.5	1.6	8.0	7.7
Incr Delay (d2), s/veh	4.0	10.4	11.6	0.2	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	1.3	4.9	1.3	0.7	0.2
LnGrp Delay(d),s/veh	25.3	32.0	28.1	1.8	8.2	7.9
LnGrp LOS	C	C	C	A	A	A
Approach Vol, veh/h	77			1346	298	
Approach Delay, s/veh	29.1			7.8	8.2	
Approach LOS	C			A	A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		40.0		6.5	15.9	24.1		
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0		
Max Green Setting (Gmax), s		36.0		16.0	16.0	16.0		
Max Q Clear Time (g_c+I1), s		5.3		3.6	11.8	3.7		
Green Ext Time (p_c), s		10.3		0.1	0.4	6.5		

Intersection Summary	
HCM 2010 Ctrl Delay	8.8
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	14	909	0	0	780	58	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	-	-	200	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10
Mvmt Flow	14	909	0	0	780	58	1	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	780	0	0	909	0	0	1327	1717	455
Stage 1	-	-	-	-	-	-	937	937	-
Stage 2	-	-	-	-	-	-	390	780	-
Critical Hdwy	4.3	-	-	4.3	-	-	7.7	6.7	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	6.7	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.7	5.7	-
Follow-up Hdwy	2.3	-	-	2.3	-	-	3.6	4.1	3.4
Pot Cap-1 Maneuver	783	-	-	697	-	-	106	82	531
Stage 1	-	-	-	-	-	-	269	324	-
Stage 2	-	-	-	-	-	-	584	385	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	783	-	-	697	-	-	104	81	531
Mov Cap-2 Maneuver	-	-	-	-	-	-	104	81	-
Stage 1	-	-	-	-	-	-	264	318	-
Stage 2	-	-	-	-	-	-	581	385	-

Approach	EB	WB	NB
HCM Control Delay, s	0.1	0	40
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	104	783	-	-	697	-	-	116	587
HCM Lane V/C Ratio	0.01	0.018	-	-	-	-	-	0.405	0.005
HCM Control Delay (s)	40	9.7	-	-	0	-	-	55.7	11.2
HCM Lane LOS	E	A	-	-	A	-	-	F	B
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	1.7	0

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	47	0	3
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	0	-	200
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	10	10	10
Mvmt Flow	47	0	3

Major/Minor	Minor2		
Conflicting Flow All	1263	1717	390
Stage 1	780	780	-
Stage 2	483	937	-
Critical Hdwy	7.7	6.7	7.1
Critical Hdwy Stg 1	6.7	5.7	-
Critical Hdwy Stg 2	6.7	5.7	-
Follow-up Hdwy	3.6	4.1	3.4
Pot Cap-1 Maneuver	118	82	587
Stage 1	337	385	-
Stage 2	513	324	-
Platoon blocked, %			
Mov Cap-1 Maneuver	116	81	587
Mov Cap-2 Maneuver	116	81	-
Stage 1	331	385	-
Stage 2	504	318	-

Approach	SB
HCM Control Delay, s	53
HCM LOS	F

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	1	955	836	5	36	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	200	-	-	200	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	1	955	836	5	36	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	836	0	-	0	1316	418
Stage 1	-	-	-	-	836	-
Stage 2	-	-	-	-	480	-
Critical Hdwy	4.3	-	-	-	7	7.1
Critical Hdwy Stg 1	-	-	-	-	6	-
Critical Hdwy Stg 2	-	-	-	-	6	-
Follow-up Hdwy	2.3	-	-	-	3.6	3.4
Pot Cap-1 Maneuver	744	-	-	-	139	562
Stage 1	-	-	-	-	366	-
Stage 2	-	-	-	-	566	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	744	-	-	-	139	562
Mov Cap-2 Maneuver	-	-	-	-	139	-
Stage 1	-	-	-	-	366	-
Stage 2	-	-	-	-	565	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	38.9
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	744	-	-	-	139	562
HCM Lane V/C Ratio	0.001	-	-	-	0.259	0.002
HCM Control Delay (s)	9.8	-	-	-	39.7	11.4
HCM Lane LOS	A	-	-	-	E	B
HCM 95th %tile Q(veh)	0	-	-	-	1	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	9	982	0	0	799	1	9	0	0	6	0	32
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1600	1455	1455	1455	1600	1455	1600	1455	1455	1455
Adj Flow Rate, veh/h	9	982	0	0	799	1	9	0	0	6	0	32
Adj No. of Lanes	1	2	0	1	2	1	0	1	0	2	0	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	13	1159	0	2	974	414	303	0	0	606	0	270
Arrive On Green	0.01	0.40	0.00	0.00	0.33	0.33	0.22	0.00	0.00	0.22	0.00	0.22
Sat Flow, veh/h	1385	2909	0	1385	2909	1236	1385	0	0	2771	0	1236
Grp Volume(v), veh/h	9	982	0	0	799	1	9	0	0	6	0	32
Grp Sat Flow(s),veh/h/ln	1385	1455	0	1385	1455	1236	1385	0	0	1385	0	1236
Q Serve(g_s), s	0.5	22.4	0.0	0.0	18.4	0.0	0.4	0.0	0.0	0.1	0.0	1.5
Cycle Q Clear(g_c), s	0.5	22.4	0.0	0.0	18.4	0.0	0.4	0.0	0.0	0.1	0.0	1.5
Prop In Lane	1.00		0.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	13	1159	0	2	974	414	303	0	0	606	0	270
V/C Ratio(X)	0.71	0.85	0.00	0.00	0.82	0.00	0.03	0.00	0.00	0.01	0.00	0.12
Avail Cap(c_a), veh/h	76	1159	0	76	1114	473	303	0	0	606	0	270
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.1	20.0	0.0	0.0	22.3	16.2	22.5	0.0	0.0	22.4	0.0	22.9
Incr Delay (d2), s/veh	53.5	6.0	0.0	0.0	4.5	0.0	0.2	0.0	0.0	0.0	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	9.8	0.0	0.0	7.9	0.0	0.2	0.0	0.0	0.1	0.0	0.6
LnGrp Delay(d),s/veh	89.7	26.0	0.0	0.0	26.8	16.2	22.7	0.0	0.0	22.4	0.0	23.8
LnGrp LOS	F	C			C	B	C			C		C
Approach Vol, veh/h		991			800			9			38	
Approach Delay, s/veh		26.6			26.8			22.7			23.6	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		20.0	0.0	33.2		20.0	4.7	28.5
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	4.0	28.0		16.0	4.0	28.0
Max Q Clear Time (g_c+I1), s		2.4	0.0	24.4		3.5	2.5	20.4
Green Ext Time (p_c), s		0.0	0.0	2.8		0.0	0.0	4.1

Intersection Summary	
HCM 2010 Ctrl Delay	26.6
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	31	884	35	13	681	221	64	34	22	986	195	55
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1600	1455	1455	1600	1600	1455	1600	1309	1455	1455
Adj Flow Rate, veh/h	31	884	35	13	681	0	64	34	22	986	195	55
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	2	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	35	852	34	16	854	0	112	60	39	977	570	485
Arrive On Green	0.03	0.31	0.31	0.01	0.29	0.00	0.15	0.15	0.15	0.39	0.39	0.39
Sat Flow, veh/h	1385	2780	110	1385	2909	0	733	389	252	2494	1455	1236
Grp Volume(v), veh/h	31	463	456	13	681	0	120	0	0	986	195	55
Grp Sat Flow(s),veh/h/ln	1385	1455	1435	1385	1455	0	1373	0	0	1247	1455	1236
Q Serve(g_s), s	2.6	36.0	36.0	1.1	25.3	0.0	9.5	0.0	0.0	46.0	11.1	3.3
Cycle Q Clear(g_c), s	2.6	36.0	36.0	1.1	25.3	0.0	9.5	0.0	0.0	46.0	11.1	3.3
Prop In Lane	1.00		0.08	1.00		0.00	0.53		0.18	1.00		1.00
Lane Grp Cap(c), veh/h	35	446	440	16	854	0	211	0	0	977	570	485
V/C Ratio(X)	0.89	1.04	1.04	0.80	0.80	0.00	0.57	0.00	0.00	1.01	0.34	0.11
Avail Cap(c_a), veh/h	47	446	440	47	892	0	211	0	0	977	570	485
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.1	40.7	40.7	57.9	38.3	0.0	46.1	0.0	0.0	35.7	25.1	22.7
Incr Delay (d2), s/veh	77.2	52.5	52.8	57.5	5.0	0.0	10.7	0.0	0.0	31.0	1.6	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	20.9	20.6	0.7	10.8	0.0	4.2	0.0	0.0	20.0	4.7	1.2
LnGrp Delay(d),s/veh	134.3	93.2	93.5	115.3	43.2	0.0	56.8	0.0	0.0	66.7	26.7	23.2
LnGrp LOS	F	F	F	F	D		E			F	C	C
Approach Vol, veh/h		950			694			120			1236	
Approach Delay, s/veh		94.7			44.6			56.8			58.5	
Approach LOS		F			D			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		22.0	5.4	40.0		50.0	6.9	38.4
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		18.0	4.0	36.0		46.0	4.0	36.0
Max Q Clear Time (g_c+I1), s		11.5	3.1	38.0		48.0	4.6	27.3
Green Ext Time (p_c), s		0.2	0.0	0.0		0.0	0.0	5.4

Intersection Summary	
HCM 2010 Ctrl Delay	66.7
HCM 2010 LOS	E

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	996	753	0	685	145
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1455	1455	0	1309	1309
Adj Flow Rate, veh/h	0	996	753	0	685	145
Adj No. of Lanes	0	4	3	0	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	10	10	0	10	10
Cap, veh/h	0	2957	2217	0	864	771
Arrive On Green	0.00	0.51	0.51	0.00	0.35	0.35
Sat Flow, veh/h	0	5818	4364	0	2494	2225
Grp Volume(v), veh/h	0	996	753	0	685	145
Grp Sat Flow(s),veh/h/ln	0	1455	1455	0	1247	1113
Q Serve(g_s), s	0.0	5.6	5.7	0.0	13.6	2.5
Cycle Q Clear(g_c), s	0.0	5.6	5.7	0.0	13.6	2.5
Prop In Lane	0.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	2957	2217	0	864	771
V/C Ratio(X)	0.00	0.34	0.34	0.00	0.79	0.19
Avail Cap(c_a), veh/h	0	2957	2217	0	1991	1777
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	8.0	8.1	0.0	16.2	12.6
Incr Delay (d2), s/veh	0.0	0.3	0.4	0.0	1.7	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.3	2.3	0.0	4.9	0.8
LnGrp Delay(d),s/veh	0.0	8.3	8.5	0.0	17.9	12.7
LnGrp LOS		A	A		B	B
Approach Vol, veh/h		996	753		830	
Approach Delay, s/veh		8.3	8.5		17.0	
Approach LOS		A	A		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				56.9		23.1		56.9
Change Period (Y+Rc), s				4.0		4.0		4.0
Max Green Setting (Gmax), s				28.0		44.0		28.0
Max Q Clear Time (g_c+I1), s				7.6		15.6		7.7
Green Ext Time (p_c), s				11.0		3.5		11.0

Intersection Summary	
HCM 2010 Ctrl Delay	11.2
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1492	0	0	920	443	595
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	0	0	1455	1309	1455
Adj Flow Rate, veh/h	1492	0	0	920	443	595
Adj No. of Lanes	4	0	0	3	3	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	0	0	10	10	10
Cap, veh/h	1818	0	0	1364	2197	726
Arrive On Green	0.31	0.00	0.00	0.31	0.59	0.59
Sat Flow, veh/h	5818	0	0	4364	3740	1236
Grp Volume(v), veh/h	1492	0	0	920	443	595
Grp Sat Flow(s),veh/h/ln	1455	0	0	1455	1247	1236
Q Serve(g_s), s	19.0	0.0	0.0	14.7	4.4	30.6
Cycle Q Clear(g_c), s	19.0	0.0	0.0	14.7	4.4	30.6
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1818	0	0	1364	2197	726
V/C Ratio(X)	0.82	0.00	0.00	0.67	0.20	0.82
Avail Cap(c_a), veh/h	1818	0	0	1364	2197	726
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.4	0.0	0.0	24.0	7.7	13.1
Incr Delay (d2), s/veh	4.3	0.0	0.0	2.7	0.2	10.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.1	0.0	0.0	6.2	1.6	12.3
LnGrp Delay(d),s/veh	29.7	0.0	0.0	26.6	7.9	23.1
LnGrp LOS	C			C	A	C
Approach Vol, veh/h	1492			920	1038	
Approach Delay, s/veh	29.7			26.6	16.6	
Approach LOS	C			C	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		51.0		29.0				29.0
Change Period (Y+Rc), s		4.0		4.0				4.0
Max Green Setting (Gmax), s		47.0		25.0				25.0
Max Q Clear Time (g_c+I1), s		32.6		21.0				16.7
Green Ext Time (p_c), s		3.9		3.6				7.1

Intersection Summary	
HCM 2010 Ctrl Delay	25.0
HCM 2010 LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	84	279	93	197	954	85
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1455	1455	1455	1455
Adj Flow Rate, veh/h	84	279	93	197	954	85
Adj No. of Lanes	1	1	1	3	3	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	351	314	110	2665	2023	573
Arrive On Green	0.25	0.25	0.08	0.61	0.46	0.46
Sat Flow, veh/h	1385	1236	1385	4364	4364	1236
Grp Volume(v), veh/h	84	279	93	197	954	85
Grp Sat Flow(s),veh/h/ln	1385	1236	1385	1455	1455	1236
Q Serve(g_s), s	2.8	12.8	3.9	1.1	8.8	2.3
Cycle Q Clear(g_c), s	2.8	12.8	3.9	1.1	8.8	2.3
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	351	314	110	2665	2023	573
V/C Ratio(X)	0.24	0.89	0.85	0.07	0.47	0.15
Avail Cap(c_a), veh/h	376	336	235	2665	2023	573
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.5	21.2	26.8	4.7	10.9	9.1
Incr Delay (d2), s/veh	0.3	23.2	16.0	0.1	0.8	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	9.9	2.0	0.5	3.7	0.9
LnGrp Delay(d),s/veh	17.8	44.4	42.8	4.7	11.6	9.7
LnGrp LOS	B	D	D	A	B	A
Approach Vol, veh/h	363			290	1039	
Approach Delay, s/veh	38.3			17.0	11.5	
Approach LOS	D			B	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		40.0		19.0	8.7	31.3		
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0		
Max Green Setting (Gmax), s		36.0		16.0	10.0	22.0		
Max Q Clear Time (g_c+I1), s		3.1		14.8	5.9	10.8		
Green Ext Time (p_c), s		9.2		0.2	0.1	5.6		

Intersection Summary	
HCM 2010 Ctrl Delay	18.2
HCM 2010 LOS	B

EXISTING PLUS GROWTH WITHOUT PROJECT CONDITIONS

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	2	617	0	0	781	18	2	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	-	-	200	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10
Mvmt Flow	2	617	0	0	781	18	2	0	2

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	781	0	0	617	0	0	1012	1402	309
Stage 1	-	-	-	-	-	-	621	621	-
Stage 2	-	-	-	-	-	-	391	781	-
Critical Hdwy	4.3	-	-	4.3	-	-	7.7	6.7	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	6.7	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.7	5.7	-
Follow-up Hdwy	2.3	-	-	2.3	-	-	3.6	4.1	3.4
Pot Cap-1 Maneuver	782	-	-	906	-	-	183	129	664
Stage 1	-	-	-	-	-	-	423	458	-
Stage 2	-	-	-	-	-	-	584	385	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	782	-	-	906	-	-	180	129	664
Mov Cap-2 Maneuver	-	-	-	-	-	-	180	129	-
Stage 1	-	-	-	-	-	-	422	457	-
Stage 2	-	-	-	-	-	-	576	385	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	17.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	283	782	-	-	906	-	-	157	586
HCM Lane V/C Ratio	0.014	0.003	-	-	-	-	-	0.554	0.014
HCM Control Delay (s)	17.9	9.6	-	-	0	-	-	53.2	11.2
HCM Lane LOS	C	A	-	-	A	-	-	F	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	2.8	0

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	87	0	8
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	0	-	200
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	10	10	10
Mvmt Flow	87	0	8

Major/Minor	Minor2		
Conflicting Flow All	1094	1402	391
Stage 1	781	781	-
Stage 2	313	621	-
Critical Hdwy	7.7	6.7	7.1
Critical Hdwy Stg 1	6.7	5.7	-
Critical Hdwy Stg 2	6.7	5.7	-
Follow-up Hdwy	3.6	4.1	3.4
Pot Cap-1 Maneuver	158	129	586
Stage 1	337	385	-
Stage 2	650	458	-
Platoon blocked, %			
Mov Cap-1 Maneuver	157	129	586
Mov Cap-2 Maneuver	157	129	-
Stage 1	336	385	-
Stage 2	646	457	-

Approach	SB
HCM Control Delay, s	49.7
HCM LOS	E

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	6	688	792	31	28	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	200	-	-	200	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	6	688	792	31	28	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	792	0	-	0	1148	396
Stage 1	-	-	-	-	792	-
Stage 2	-	-	-	-	356	-
Critical Hdwy	4.3	-	-	-	7	7.1
Critical Hdwy Stg 1	-	-	-	-	6	-
Critical Hdwy Stg 2	-	-	-	-	6	-
Follow-up Hdwy	2.3	-	-	-	3.6	3.4
Pot Cap-1 Maneuver	774	-	-	-	180	581
Stage 1	-	-	-	-	387	-
Stage 2	-	-	-	-	657	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	774	-	-	-	179	581
Mov Cap-2 Maneuver	-	-	-	-	179	-
Stage 1	-	-	-	-	387	-
Stage 2	-	-	-	-	652	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	25.7
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	774	-	-	-	179	581
HCM Lane V/C Ratio	0.008	-	-	-	0.156	0.01
HCM Control Delay (s)	9.7	-	-	-	28.8	11.3
HCM Lane LOS	A	-	-	-	D	B
HCM 95th %tile Q(veh)	0	-	-	-	0.5	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	26	689	1	0	814	3	0	0	0	1	0	8
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1600	1455	1455	1455	1600	1455	1600	1455	1455	1455
Adj Flow Rate, veh/h	26	689	1	0	814	3	0	0	0	1	0	8
Adj No. of Lanes	1	2	0	1	2	1	0	1	0	2	0	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	34	1324	2	3	991	421	0	3	0	1005	0	448
Arrive On Green	0.02	0.46	0.46	0.00	0.34	0.34	0.00	0.00	0.00	0.36	0.00	0.36
Sat Flow, veh/h	1385	2904	4	1385	2909	1236	0	1455	0	2771	0	1236
Grp Volume(v), veh/h	26	345	345	0	814	3	0	0	0	1	0	8
Grp Sat Flow(s),veh/h/ln	1385	1455	1454	1385	1455	1236	0	1455	0	1385	0	1236
Q Serve(g_s), s	0.8	7.5	7.5	0.0	11.3	0.1	0.0	0.0	0.0	0.0	0.0	0.2
Cycle Q Clear(g_c), s	0.8	7.5	7.5	0.0	11.3	0.1	0.0	0.0	0.0	0.0	0.0	0.2
Prop In Lane	1.00		0.00	1.00		1.00	0.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	34	663	663	3	991	421	0	3	0	1005	0	448
V/C Ratio(X)	0.76	0.52	0.52	0.00	0.82	0.01	0.00	0.00	0.00	0.00	0.00	0.02
Avail Cap(c_a), veh/h	126	663	663	126	1187	504	0	528	0	1005	0	448
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.4	8.6	8.6	0.0	13.3	9.6	0.0	0.0	0.0	9.0	0.0	9.0
Incr Delay (d2), s/veh	28.3	0.7	0.7	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	3.1	3.1	0.0	5.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
LnGrp Delay(d),s/veh	49.7	9.3	9.3	0.0	17.4	9.6	0.0	0.0	0.0	9.0	0.0	9.1
LnGrp LOS	D	A	A		B	A				A		A
Approach Vol, veh/h		716			817			0			9	
Approach Delay, s/veh		10.8			17.3			0.0			9.1	
Approach LOS		B			B						A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		0.0	0.0	24.1		20.0	5.1	19.0
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	4.0	18.0		16.0	4.0	18.0
Max Q Clear Time (g_c+I1), s		0.0	0.0	9.5		2.2	2.8	13.3
Green Ext Time (p_c), s		0.0	0.0	5.1		0.0	0.0	1.7

Intersection Summary	
HCM 2010 Ctrl Delay	14.2
HCM 2010 LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	69	573	30	8	750	1277	46	76	8	251	32	33
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1600	1455	1455	1600	1600	1455	1600	1309	1455	1455
Adj Flow Rate, veh/h	69	573	30	8	750	0	46	76	8	251	32	33
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	2	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	81	1133	59	11	1056	0	100	166	17	471	275	233
Arrive On Green	0.06	0.41	0.41	0.01	0.36	0.00	0.20	0.20	0.20	0.19	0.19	0.19
Sat Flow, veh/h	1385	2741	143	1385	2909	0	500	827	87	2494	1455	1236
Grp Volume(v), veh/h	69	304	299	8	750	0	130	0	0	251	32	33
Grp Sat Flow(s),veh/h/ln	1385	1455	1429	1385	1455	0	1414	0	0	1247	1455	1236
Q Serve(g_s), s	4.2	13.1	13.2	0.5	18.7	0.0	6.9	0.0	0.0	7.7	1.5	1.9
Cycle Q Clear(g_c), s	4.2	13.1	13.2	0.5	18.7	0.0	6.9	0.0	0.0	7.7	1.5	1.9
Prop In Lane	1.00		0.10	1.00		0.00	0.35		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	81	602	591	11	1056	0	284	0	0	471	275	233
V/C Ratio(X)	0.85	0.50	0.51	0.71	0.71	0.00	0.46	0.00	0.00	0.53	0.12	0.14
Avail Cap(c_a), veh/h	114	1665	1636	65	3228	0	284	0	0	471	275	233
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.5	18.4	18.4	41.9	23.2	0.0	29.8	0.0	0.0	31.0	28.5	28.6
Incr Delay (d2), s/veh	32.0	0.7	0.7	59.0	0.9	0.0	5.3	0.0	0.0	4.3	0.9	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	5.3	5.3	0.4	7.6	0.0	3.1	0.0	0.0	2.9	0.7	0.7
LnGrp Delay(d),s/veh	71.5	19.1	19.1	100.9	24.1	0.0	35.1	0.0	0.0	35.3	29.4	29.9
LnGrp LOS	E	B	B	F	C		D			D	C	C
Approach Vol, veh/h		672			758			130			316	
Approach Delay, s/veh		24.5			24.9			35.1			34.1	
Approach LOS		C			C			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		21.0	4.7	39.0		20.0	9.0	34.8
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		17.0	4.0	97.0		16.0	7.0	94.0
Max Q Clear Time (g_c+I1), s		8.9	2.5	15.2		9.7	6.2	20.7
Green Ext Time (p_c), s		0.3	0.0	10.0		0.6	0.0	10.0

Intersection Summary	
HCM 2010 Ctrl Delay	27.0
HCM 2010 LOS	C

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	377	1855	0	826	169
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1455	1455	0	1309	1309
Adj Flow Rate, veh/h	0	377	1855	0	826	169
Adj No. of Lanes	0	4	3	0	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	10	10	0	10	10
Cap, veh/h	0	3058	2294	0	921	822
Arrive On Green	0.00	0.53	0.53	0.00	0.37	0.37
Sat Flow, veh/h	0	5818	4364	0	2494	2225
Grp Volume(v), veh/h	0	377	1855	0	826	169
Grp Sat Flow(s),veh/h/ln	0	1455	1455	0	1247	1113
Q Serve(g_s), s	0.0	2.5	26.7	0.0	23.8	3.9
Cycle Q Clear(g_c), s	0.0	2.5	26.7	0.0	23.8	3.9
Prop In Lane	0.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	3058	2294	0	921	822
V/C Ratio(X)	0.00	0.12	0.81	0.00	0.90	0.21
Avail Cap(c_a), veh/h	0	3058	2294	0	1049	936
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	9.2	14.9	0.0	22.6	16.4
Incr Delay (d2), s/veh	0.0	0.1	3.2	0.0	9.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.0	11.3	0.0	9.4	1.2
LnGrp Delay(d),s/veh	0.0	9.2	18.1	0.0	32.1	16.5
LnGrp LOS		A	B		C	B
Approach Vol, veh/h		377	1855		995	
Approach Delay, s/veh		9.2	18.1		29.4	
Approach LOS		A	B		C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				47.9		32.1		47.9
Change Period (Y+Rc), s				4.0		4.0		4.0
Max Green Setting (Gmax), s				40.0		32.0		40.0
Max Q Clear Time (g_c+I1), s				4.5		25.8		28.7
Green Ext Time (p_c), s				20.8		2.3		9.0

Intersection Summary	
HCM 2010 Ctrl Delay	20.6
HCM 2010 LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1115	0	0	1176	1013	697
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	0	0	1455	1309	1455
Adj Flow Rate, veh/h	1115	0	0	1176	1013	697
Adj No. of Lanes	4	0	0	3	3	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	0	0	10	10	10
Cap, veh/h	1818	0	0	1364	2197	726
Arrive On Green	0.31	0.00	0.00	0.31	0.59	0.59
Sat Flow, veh/h	5818	0	0	4364	3740	1236
Grp Volume(v), veh/h	1115	0	0	1176	1013	697
Grp Sat Flow(s),veh/h/ln	1455	0	0	1455	1247	1236
Q Serve(g_s), s	13.0	0.0	0.0	20.3	12.3	42.6
Cycle Q Clear(g_c), s	13.0	0.0	0.0	20.3	12.3	42.6
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1818	0	0	1364	2197	726
V/C Ratio(X)	0.61	0.00	0.00	0.86	0.46	0.96
Avail Cap(c_a), veh/h	1818	0	0	1364	2197	726
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.4	0.0	0.0	25.9	9.3	15.6
Incr Delay (d2), s/veh	1.6	0.0	0.0	7.4	0.7	24.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	0.0	0.0	9.0	4.3	19.3
LnGrp Delay(d),s/veh	24.9	0.0	0.0	33.3	10.0	40.5
LnGrp LOS	C			C	B	D
Approach Vol, veh/h	1115			1176	1710	
Approach Delay, s/veh	24.9			33.3	22.4	
Approach LOS	C			C	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		51.0		29.0				29.0
Change Period (Y+Rc), s		4.0		4.0				4.0
Max Green Setting (Gmax), s		47.0		25.0				25.0
Max Q Clear Time (g_c+I1), s		44.6		15.0				22.3
Green Ext Time (p_c), s		1.7		8.0				2.4

Intersection Summary	
HCM 2010 Ctrl Delay	26.3
HCM 2010 LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	35	46	323	1097	285	30
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1455	1455	1455	1455
Adj Flow Rate, veh/h	35	46	323	1097	285	30
Adj No. of Lanes	1	1	1	3	3	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	77	69	372	3371	1824	517
Arrive On Green	0.06	0.06	0.27	0.77	0.42	0.42
Sat Flow, veh/h	1385	1236	1385	4364	4364	1236
Grp Volume(v), veh/h	35	46	323	1097	285	30
Grp Sat Flow(s),veh/h/ln	1385	1236	1385	1455	1455	1236
Q Serve(g_s), s	1.1	1.7	10.4	3.6	1.9	0.7
Cycle Q Clear(g_c), s	1.1	1.7	10.4	3.6	1.9	0.7
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	77	69	372	3371	1824	517
V/C Ratio(X)	0.45	0.67	0.87	0.33	0.16	0.06
Avail Cap(c_a), veh/h	476	425	476	3371	1824	517
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.3	21.6	16.3	1.6	8.4	8.1
Incr Delay (d2), s/veh	4.1	10.6	13.0	0.3	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	1.4	5.3	1.4	0.8	0.3
LnGrp Delay(d),s/veh	25.4	32.1	29.2	1.9	8.6	8.3
LnGrp LOS	C	C	C	A	A	A
Approach Vol, veh/h	81			1420	315	
Approach Delay, s/veh	29.2			8.1	8.6	
Approach LOS	C			A	A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		40.0		6.6	16.5	23.5		
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0		
Max Green Setting (Gmax), s		36.0		16.0	16.0	16.0		
Max Q Clear Time (g_c+I1), s		5.6		3.7	12.4	3.9		
Green Ext Time (p_c), s		11.0		0.1	0.4	6.8		

Intersection Summary	
HCM 2010 Ctrl Delay	9.1
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	15	959	0	0	823	61	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	-	-	200	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10
Mvmt Flow	15	959	0	0	823	61	1	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	823	0	0	959	0	0	1401	1812	480
Stage 1	-	-	-	-	-	-	989	989	-
Stage 2	-	-	-	-	-	-	412	823	-
Critical Hdwy	4.3	-	-	4.3	-	-	7.7	6.7	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	6.7	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.7	5.7	-
Follow-up Hdwy	2.3	-	-	2.3	-	-	3.6	4.1	3.4
Pot Cap-1 Maneuver	753	-	-	666	-	-	93	71	511
Stage 1	-	-	-	-	-	-	250	306	-
Stage 2	-	-	-	-	-	-	567	368	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	753	-	-	666	-	-	91	70	511
Mov Cap-2 Maneuver	-	-	-	-	-	-	91	70	-
Stage 1	-	-	-	-	-	-	245	300	-
Stage 2	-	-	-	-	-	-	564	368	-

Approach	EB	WB	NB
HCM Control Delay, s	0.2	0	45
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	91	753	-	-	666	-	-	103	567
HCM Lane V/C Ratio	0.011	0.02	-	-	-	-	-	0.485	0.005
HCM Control Delay (s)	45	9.9	-	-	0	-	-	69.2	11.4
HCM Lane LOS	E	A	-	-	A	-	-	F	B
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	2.1	0

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	50	0	3
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	0	-	200
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	10	10	10
Mvmt Flow	50	0	3

Major/Minor	Minor2		
Conflicting Flow All	1333	1812	412
Stage 1	823	823	-
Stage 2	510	989	-
Critical Hdwy	7.7	6.7	7.1
Critical Hdwy Stg 1	6.7	5.7	-
Critical Hdwy Stg 2	6.7	5.7	-
Follow-up Hdwy	3.6	4.1	3.4
Pot Cap-1 Maneuver	105	71	567
Stage 1	317	368	-
Stage 2	494	306	-
Platoon blocked, %			
Mov Cap-1 Maneuver	103	70	567
Mov Cap-2 Maneuver	103	70	-
Stage 1	311	368	-
Stage 2	484	300	-

Approach	SB
HCM Control Delay, s	65.9
HCM LOS	F

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	1	1008	882	5	38	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	200	-	-	200	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	1	1008	882	5	38	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	882	0	-	0	1388	441
Stage 1	-	-	-	-	882	-
Stage 2	-	-	-	-	506	-
Critical Hdwy	4.3	-	-	-	7	7.1
Critical Hdwy Stg 1	-	-	-	-	6	-
Critical Hdwy Stg 2	-	-	-	-	6	-
Follow-up Hdwy	2.3	-	-	-	3.6	3.4
Pot Cap-1 Maneuver	714	-	-	-	124	543
Stage 1	-	-	-	-	346	-
Stage 2	-	-	-	-	548	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	714	-	-	-	124	543
Mov Cap-2 Maneuver	-	-	-	-	124	-
Stage 1	-	-	-	-	346	-
Stage 2	-	-	-	-	547	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	45.5
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	714	-	-	-	124	543
HCM Lane V/C Ratio	0.001	-	-	-	0.306	0.002
HCM Control Delay (s)	10	-	-	-	46.4	11.6
HCM Lane LOS	B	-	-	-	E	B
HCM 95th %tile Q(veh)	0	-	-	-	1.2	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	9	1036	0	0	843	1	9	0	0	6	0	34
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1600	1455	1455	1455	1600	1455	1600	1455	1455	1455
Adj Flow Rate, veh/h	9	1036	0	0	843	1	9	0	0	6	0	34
Adj No. of Lanes	1	2	0	1	2	1	0	1	0	2	0	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	13	1167	0	2	982	417	302	0	0	603	0	269
Arrive On Green	0.01	0.40	0.00	0.00	0.34	0.34	0.22	0.00	0.00	0.22	0.00	0.22
Sat Flow, veh/h	1385	2909	0	1385	2909	1236	1385	0	0	2771	0	1236
Grp Volume(v), veh/h	9	1036	0	0	843	1	9	0	0	6	0	34
Grp Sat Flow(s),veh/h/ln	1385	1455	0	1385	1455	1236	1385	0	0	1385	0	1236
Q Serve(g_s), s	0.5	24.3	0.0	0.0	19.9	0.0	0.4	0.0	0.0	0.1	0.0	1.6
Cycle Q Clear(g_c), s	0.5	24.3	0.0	0.0	19.9	0.0	0.4	0.0	0.0	0.1	0.0	1.6
Prop In Lane	1.00		0.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	13	1167	0	2	982	417	302	0	0	603	0	269
V/C Ratio(X)	0.71	0.89	0.00	0.00	0.86	0.00	0.03	0.00	0.00	0.01	0.00	0.13
Avail Cap(c_a), veh/h	75	1167	0	75	1109	471	302	0	0	603	0	269
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.3	20.5	0.0	0.0	22.7	16.1	22.6	0.0	0.0	22.5	0.0	23.1
Incr Delay (d2), s/veh	53.6	8.6	0.0	0.0	6.3	0.0	0.2	0.0	0.0	0.0	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	11.0	0.0	0.0	8.8	0.0	0.2	0.0	0.0	0.1	0.0	0.6
LnGrp Delay(d),s/veh	89.9	29.1	0.0	0.0	29.0	16.1	22.8	0.0	0.0	22.6	0.0	24.1
LnGrp LOS	F	C			C	B	C			C		C
Approach Vol, veh/h		1045			844			9			40	
Approach Delay, s/veh		29.6			29.0			22.8			23.8	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		20.0	0.0	33.5		20.0	4.7	28.8
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	4.0	28.0		16.0	4.0	28.0
Max Q Clear Time (g_c+I1), s		2.4	0.0	26.3		3.6	2.5	21.9
Green Ext Time (p_c), s		0.0	0.0	1.4		0.1	0.0	2.9

Intersection Summary	
HCM 2010 Ctrl Delay	29.2
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	33	933	37	14	718	233	68	36	23	1040	206	58
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1600	1455	1455	1600	1600	1455	1600	1309	1455	1455
Adj Flow Rate, veh/h	33	933	37	14	718	0	68	36	23	1040	206	58
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	2	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	38	893	35	17	892	0	98	52	33	1016	593	504
Arrive On Green	0.03	0.32	0.32	0.01	0.31	0.00	0.13	0.13	0.13	0.41	0.41	0.41
Sat Flow, veh/h	1385	2779	110	1385	2909	0	736	389	249	2494	1455	1236
Grp Volume(v), veh/h	33	488	482	14	718	0	127	0	0	1040	206	58
Grp Sat Flow(s),veh/h/ln	1385	1455	1435	1385	1455	0	1374	0	0	1247	1455	1236
Q Serve(g_s), s	3.0	41.0	41.0	1.3	29.0	0.0	11.3	0.0	0.0	52.0	12.5	3.7
Cycle Q Clear(g_c), s	3.0	41.0	41.0	1.3	29.0	0.0	11.3	0.0	0.0	52.0	12.5	3.7
Prop In Lane	1.00		0.08	1.00		0.00	0.54		0.18	1.00		1.00
Lane Grp Cap(c), veh/h	38	468	461	17	892	0	183	0	0	1016	593	504
V/C Ratio(X)	0.88	1.04	1.04	0.82	0.81	0.00	0.69	0.00	0.00	1.02	0.35	0.12
Avail Cap(c_a), veh/h	43	468	461	43	935	0	183	0	0	1016	593	504
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.8	43.3	43.3	62.9	40.7	0.0	52.8	0.0	0.0	37.8	26.1	23.5
Incr Delay (d2), s/veh	84.1	53.7	54.0	60.7	5.0	0.0	19.5	0.0	0.0	34.2	1.6	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	23.3	23.1	0.8	12.3	0.0	5.3	0.0	0.0	22.6	5.2	1.3
LnGrp Delay(d),s/veh	146.0	97.0	97.3	123.6	45.8	0.0	72.3	0.0	0.0	72.0	27.7	23.9
LnGrp LOS	F	F	F	F	D		E			F	C	C
Approach Vol, veh/h		1003			732			127			1304	
Approach Delay, s/veh		98.7			47.2			72.3			62.9	
Approach LOS		F			D			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		21.0	5.6	45.0		56.0	7.5	43.1
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		17.0	4.0	41.0		52.0	4.0	41.0
Max Q Clear Time (g_c+I1), s		13.3	3.3	43.0		54.0	5.0	31.0
Green Ext Time (p_c), s		0.2	0.0	0.0		0.0	0.0	6.3

Intersection Summary	
HCM 2010 Ctrl Delay	71.0
HCM 2010 LOS	E

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	1051	794	0	723	153
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1455	1455	0	1309	1309
Adj Flow Rate, veh/h	0	1051	794	0	723	153
Adj No. of Lanes	0	4	3	0	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	10	10	0	10	10
Cap, veh/h	0	2921	2191	0	896	800
Arrive On Green	0.00	0.50	0.50	0.00	0.36	0.36
Sat Flow, veh/h	0	5818	4364	0	2494	2225
Grp Volume(v), veh/h	0	1051	794	0	723	153
Grp Sat Flow(s),veh/h/ln	0	1455	1455	0	1247	1113
Q Serve(g_s), s	0.0	6.3	6.4	0.0	15.1	2.7
Cycle Q Clear(g_c), s	0.0	6.3	6.4	0.0	15.1	2.7
Prop In Lane	0.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	2921	2191	0	896	800
V/C Ratio(X)	0.00	0.36	0.36	0.00	0.81	0.19
Avail Cap(c_a), veh/h	0	2921	2191	0	1856	1657
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	8.7	8.8	0.0	16.7	12.7
Incr Delay (d2), s/veh	0.0	0.3	0.5	0.0	1.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.6	2.6	0.0	5.3	0.8
LnGrp Delay(d),s/veh	0.0	9.1	9.2	0.0	18.5	12.8
LnGrp LOS		A	A		B	B
Approach Vol, veh/h		1051	794		876	
Approach Delay, s/veh		9.1	9.2		17.5	
Approach LOS		A	A		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				55.2		24.8		55.2
Change Period (Y+Rc), s				4.0		4.0		4.0
Max Green Setting (Gmax), s				29.0		43.0		29.0
Max Q Clear Time (g_c+I1), s				8.3		17.1		8.4
Green Ext Time (p_c), s				11.7		3.7		11.7

Intersection Summary	
HCM 2010 Ctrl Delay	11.8
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1574	0	0	971	467	628
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	0	0	1455	1309	1455
Adj Flow Rate, veh/h	1574	0	0	971	467	628
Adj No. of Lanes	4	0	0	3	3	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	0	0	10	10	10
Cap, veh/h	1818	0	0	1364	2197	726
Arrive On Green	0.31	0.00	0.00	0.31	0.59	0.59
Sat Flow, veh/h	5818	0	0	4364	3740	1236
Grp Volume(v), veh/h	1574	0	0	971	467	628
Grp Sat Flow(s),veh/h/ln	1455	0	0	1455	1247	1236
Q Serve(g_s), s	20.4	0.0	0.0	15.7	4.7	34.1
Cycle Q Clear(g_c), s	20.4	0.0	0.0	15.7	4.7	34.1
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1818	0	0	1364	2197	726
V/C Ratio(X)	0.87	0.00	0.00	0.71	0.21	0.86
Avail Cap(c_a), veh/h	1818	0	0	1364	2197	726
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.9	0.0	0.0	24.3	7.8	13.8
Incr Delay (d2), s/veh	5.8	0.0	0.0	3.2	0.2	13.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.9	0.0	0.0	6.7	1.6	14.1
LnGrp Delay(d),s/veh	31.7	0.0	0.0	27.5	8.0	26.9
LnGrp LOS	C			C	A	C
Approach Vol, veh/h	1574			971	1095	
Approach Delay, s/veh	31.7			27.5	18.8	
Approach LOS	C			C	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		51.0		29.0				29.0
Change Period (Y+Rc), s		4.0		4.0				4.0
Max Green Setting (Gmax), s		47.0		25.0				25.0
Max Q Clear Time (g_c+I1), s		36.1		22.4				17.7
Green Ext Time (p_c), s		3.6		2.4				6.4

Intersection Summary	
HCM 2010 Ctrl Delay	26.7
HCM 2010 LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	89	294	98	208	1006	90
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1455	1455	1455	1455
Adj Flow Rate, veh/h	89	294	98	208	1006	90
Adj No. of Lanes	1	1	1	3	3	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	365	326	116	2629	1971	558
Arrive On Green	0.26	0.26	0.08	0.60	0.45	0.45
Sat Flow, veh/h	1385	1236	1385	4364	4364	1236
Grp Volume(v), veh/h	89	294	98	208	1006	90
Grp Sat Flow(s),veh/h/ln	1385	1236	1385	1455	1455	1236
Q Serve(g_s), s	3.0	13.7	4.2	1.2	9.8	2.6
Cycle Q Clear(g_c), s	3.0	13.7	4.2	1.2	9.8	2.6
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	365	326	116	2629	1971	558
V/C Ratio(X)	0.24	0.90	0.84	0.08	0.51	0.16
Avail Cap(c_a), veh/h	371	331	255	2629	1971	558
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.3	21.3	27.0	5.0	11.7	9.7
Incr Delay (d2), s/veh	0.3	26.3	14.8	0.1	0.9	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	10.8	2.1	0.5	4.1	1.0
LnGrp Delay(d),s/veh	17.7	47.6	41.8	5.0	12.6	10.3
LnGrp LOS	B	D	D	A	B	B
Approach Vol, veh/h	383			306	1096	
Approach Delay, s/veh	40.6			16.8	12.4	
Approach LOS	D			B	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		40.0		19.7	9.0	31.0		
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0		
Max Green Setting (Gmax), s		36.0		16.0	11.0	21.0		
Max Q Clear Time (g_c+I1), s		3.2		15.7	6.2	11.8		
Green Ext Time (p_c), s		9.9		0.0	0.1	5.1		

Intersection Summary	
HCM 2010 Ctrl Delay	19.2
HCM 2010 LOS	B

EXISTING PLUS GROWTH PLUS OTHER DEVELOPMENT WITHOUT PROJECT CONDITIONS

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	2	696	0	0	797	18	2	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	-	-	200	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10
Mvmt Flow	2	696	0	0	797	18	2	0	2

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	797	0	0	696	0	0	1099	1497	348
Stage 1	-	-	-	-	-	-	700	700	-
Stage 2	-	-	-	-	-	-	399	797	-
Critical Hdwy	4.3	-	-	4.3	-	-	7.7	6.7	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	6.7	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.7	5.7	-
Follow-up Hdwy	2.3	-	-	2.3	-	-	3.6	4.1	3.4
Pot Cap-1 Maneuver	771	-	-	844	-	-	157	113	625
Stage 1	-	-	-	-	-	-	378	421	-
Stage 2	-	-	-	-	-	-	577	378	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	771	-	-	844	-	-	155	113	625
Mov Cap-2 Maneuver	-	-	-	-	-	-	155	113	-
Stage 1	-	-	-	-	-	-	377	420	-
Stage 2	-	-	-	-	-	-	569	378	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	19.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	248	771	-	-	844	-	-	143	579
HCM Lane V/C Ratio	0.016	0.003	-	-	-	-	-	0.608	0.014
HCM Control Delay (s)	19.8	9.7	-	-	0	-	-	63.1	11.3
HCM Lane LOS	C	A	-	-	A	-	-	F	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	3.2	0

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	87	0	8
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	0	-	200
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	10	10	10
Mvmt Flow	87	0	8

Major/Minor	Minor2		
Conflicting Flow All	1149	1497	399
Stage 1	797	797	-
Stage 2	352	700	-
Critical Hdwy	7.7	6.7	7.1
Critical Hdwy Stg 1	6.7	5.7	-
Critical Hdwy Stg 2	6.7	5.7	-
Follow-up Hdwy	3.6	4.1	3.4
Pot Cap-1 Maneuver	144	113	579
Stage 1	329	378	-
Stage 2	616	421	-
Platoon blocked, %			
Mov Cap-1 Maneuver	143	113	579
Mov Cap-2 Maneuver	143	113	-
Stage 1	328	378	-
Stage 2	612	420	-

Approach	SB
HCM Control Delay, s	58.7
HCM LOS	F

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	6	767	808	31	28	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	200	-	-	200	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	6	767	808	31	28	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	808	0	-	0	1204	404
Stage 1	-	-	-	-	808	-
Stage 2	-	-	-	-	396	-
Critical Hdwy	4.3	-	-	-	7	7.1
Critical Hdwy Stg 1	-	-	-	-	6	-
Critical Hdwy Stg 2	-	-	-	-	6	-
Follow-up Hdwy	2.3	-	-	-	3.6	3.4
Pot Cap-1 Maneuver	763	-	-	-	165	574
Stage 1	-	-	-	-	379	-
Stage 2	-	-	-	-	626	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	763	-	-	-	164	574
Mov Cap-2 Maneuver	-	-	-	-	164	-
Stage 1	-	-	-	-	379	-
Stage 2	-	-	-	-	621	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	27.9
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	763	-	-	-	164	574
HCM Lane V/C Ratio	0.008	-	-	-	0.171	0.01
HCM Control Delay (s)	9.8	-	-	-	31.4	11.3
HCM Lane LOS	A	-	-	-	D	B
HCM 95th %tile Q(veh)	0	-	-	-	0.6	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	26	768	1	1	830	3	0	7	7	1	1	8
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1600	1455	1455	1455	1600	1455	1600	1455	1455	1455
Adj Flow Rate, veh/h	26	768	1	1	830	3	0	7	7	1	1	8
Adj No. of Lanes	1	2	0	1	2	1	0	1	0	1	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	31	963	1	2	902	383	0	149	149	308	324	275
Arrive On Green	0.02	0.33	0.33	0.00	0.31	0.31	0.00	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	1385	2905	4	1385	2909	1236	0	668	668	1385	1455	1236
Grp Volume(v), veh/h	26	385	384	1	830	3	0	0	14	1	1	8
Grp Sat Flow(s),veh/h/ln	1385	1455	1454	1385	1455	1236	0	0	1337	1385	1455	1236
Q Serve(g_s), s	1.3	17.3	17.3	0.1	19.8	0.1	0.0	0.0	0.6	0.0	0.0	0.4
Cycle Q Clear(g_c), s	1.3	17.3	17.3	0.1	19.8	0.1	0.0	0.0	0.6	0.0	0.0	0.4
Prop In Lane	1.00		0.00	1.00		1.00	0.00		0.50	1.00		1.00
Lane Grp Cap(c), veh/h	31	482	482	2	902	383	0	0	297	308	324	275
V/C Ratio(X)	0.83	0.80	0.80	0.52	0.92	0.01	0.00	0.00	0.05	0.00	0.00	0.03
Avail Cap(c_a), veh/h	77	482	482	77	930	395	0	0	297	308	324	275
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.0	21.8	21.8	35.9	24.0	17.2	0.0	0.0	22.0	21.8	21.8	21.9
Incr Delay (d2), s/veh	40.4	9.1	9.1	134.4	13.8	0.0	0.0	0.0	0.3	0.0	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	8.2	8.2	0.1	9.7	0.0	0.0	0.0	0.2	0.0	0.0	0.1
LnGrp Delay(d),s/veh	75.4	31.0	31.0	170.3	37.8	17.2	0.0	0.0	22.3	21.8	21.8	22.1
LnGrp LOS	E	C	C	F	D	B			C	C	C	C
Approach Vol, veh/h		795			834			14			10	
Approach Delay, s/veh		32.4			37.9			22.3			22.0	
Approach LOS		C			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		20.0	4.1	27.8		20.0	5.6	26.3
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	4.0	23.0		16.0	4.0	23.0
Max Q Clear Time (g_c+I1), s		2.6	2.1	19.3		2.4	3.3	21.8
Green Ext Time (p_c), s		0.0	0.0	2.7		0.0	0.0	0.5

Intersection Summary	
HCM 2010 Ctrl Delay	35.0
HCM 2010 LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	150	578	30	8	753	1492	46	166	8	290	53	48
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1600	1455	1455	1600	1600	1455	1600	1309	1455	1455
Adj Flow Rate, veh/h	150	578	30	8	753	0	46	166	8	290	53	48
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	2	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	172	1272	66	11	1011	0	63	226	11	397	232	197
Arrive On Green	0.12	0.46	0.46	0.01	0.35	0.00	0.21	0.21	0.21	0.16	0.16	0.16
Sat Flow, veh/h	1385	2742	142	1385	2909	0	299	1079	52	2494	1455	1236
Grp Volume(v), veh/h	150	306	302	8	753	0	220	0	0	290	53	48
Grp Sat Flow(s),veh/h/ln	1385	1455	1429	1385	1455	0	1430	0	0	1247	1455	1236
Q Serve(g_s), s	10.7	14.3	14.4	0.6	22.9	0.0	14.4	0.0	0.0	11.1	3.2	3.4
Cycle Q Clear(g_c), s	10.7	14.3	14.4	0.6	22.9	0.0	14.4	0.0	0.0	11.1	3.2	3.4
Prop In Lane	1.00		0.10	1.00		0.00	0.21		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	172	675	663	11	1011	0	299	0	0	397	232	197
V/C Ratio(X)	0.87	0.45	0.45	0.72	0.74	0.00	0.74	0.00	0.00	0.73	0.23	0.24
Avail Cap(c_a), veh/h	179	1348	1324	55	2434	0	299	0	0	397	232	197
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.1	18.3	18.3	49.7	28.8	0.0	37.1	0.0	0.0	40.1	36.8	36.9
Incr Delay (d2), s/veh	33.2	0.5	0.5	61.9	1.1	0.0	14.8	0.0	0.0	11.2	2.3	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	5.8	5.7	0.4	9.4	0.0	6.9	0.0	0.0	4.4	1.4	1.3
LnGrp Delay(d),s/veh	76.3	18.7	18.8	111.6	29.9	0.0	51.9	0.0	0.0	51.3	39.1	39.8
LnGrp LOS	E	B	B	F	C		D			D	D	D
Approach Vol, veh/h		758			761			220			391	
Approach Delay, s/veh		30.1			30.8			51.9			48.3	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		25.0	4.8	50.6		20.0	16.5	38.9
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		21.0	4.0	93.0		16.0	13.0	84.0
Max Q Clear Time (g_c+I1), s		16.4	2.6	16.4		13.1	12.7	24.9
Green Ext Time (p_c), s		0.4	0.0	10.1		0.4	0.0	10.0

Intersection Summary	
HCM 2010 Ctrl Delay	36.0
HCM 2010 LOS	D

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	402	2081	0	836	169
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1455	1455	0	1309	1309
Adj Flow Rate, veh/h	0	402	2081	0	836	169
Adj No. of Lanes	0	4	3	0	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	10	10	0	10	10
Cap, veh/h	0	3114	2335	0	905	808
Arrive On Green	0.00	0.54	0.54	0.00	0.36	0.36
Sat Flow, veh/h	0	5818	4364	0	2494	2225
Grp Volume(v), veh/h	0	402	2081	0	836	169
Grp Sat Flow(s),veh/h/ln	0	1455	1455	0	1247	1113
Q Serve(g_s), s	0.0	2.7	33.3	0.0	25.2	4.1
Cycle Q Clear(g_c), s	0.0	2.7	33.3	0.0	25.2	4.1
Prop In Lane	0.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	3114	2335	0	905	808
V/C Ratio(X)	0.00	0.13	0.89	0.00	0.92	0.21
Avail Cap(c_a), veh/h	0	3114	2335	0	953	851
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	9.1	16.2	0.0	24.0	17.2
Incr Delay (d2), s/veh	0.0	0.1	5.7	0.0	13.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.1	14.3	0.0	10.3	1.3
LnGrp Delay(d),s/veh	0.0	9.2	21.9	0.0	37.8	17.4
LnGrp LOS		A	C		D	B
Approach Vol, veh/h		402	2081		1005	
Approach Delay, s/veh		9.2	21.9		34.4	
Approach LOS		A	C		C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				47.5		32.5		47.5
Change Period (Y+Rc), s				4.0		4.0		4.0
Max Green Setting (Gmax), s				42.0		30.0		42.0
Max Q Clear Time (g_c+I1), s				4.7		27.2		35.3
Green Ext Time (p_c), s				24.6		1.3		6.0

Intersection Summary	
HCM 2010 Ctrl Delay	24.0
HCM 2010 LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1142	0	0	1270	1145	697
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	0	0	1455	1309	1455
Adj Flow Rate, veh/h	1142	0	0	1270	1145	697
Adj No. of Lanes	4	0	0	3	3	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	0	0	10	10	10
Cap, veh/h	1891	0	0	1418	2151	711
Arrive On Green	0.32	0.00	0.00	0.32	0.57	0.57
Sat Flow, veh/h	5818	0	0	4364	3740	1236
Grp Volume(v), veh/h	1142	0	0	1270	1145	697
Grp Sat Flow(s),veh/h/ln	1455	0	0	1455	1247	1236
Q Serve(g_s), s	13.2	0.0	0.0	22.2	15.0	43.9
Cycle Q Clear(g_c), s	13.2	0.0	0.0	22.2	15.0	43.9
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1891	0	0	1418	2151	711
V/C Ratio(X)	0.60	0.00	0.00	0.90	0.53	0.98
Avail Cap(c_a), veh/h	1891	0	0	1418	2151	711
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.7	0.0	0.0	25.7	10.4	16.6
Incr Delay (d2), s/veh	1.4	0.0	0.0	9.1	0.9	29.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	0.0	0.0	10.0	5.3	20.5
LnGrp Delay(d),s/veh	24.1	0.0	0.0	34.8	11.4	45.9
LnGrp LOS	C			C	B	D
Approach Vol, veh/h	1142			1270	1842	
Approach Delay, s/veh	24.1			34.8	24.4	
Approach LOS	C			C	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		50.0		30.0				30.0
Change Period (Y+Rc), s		4.0		4.0				4.0
Max Green Setting (Gmax), s		46.0		26.0				26.0
Max Q Clear Time (g_c+I1), s		45.9		15.2				24.2
Green Ext Time (p_c), s		0.1		8.9				1.7

Intersection Summary	
HCM 2010 Ctrl Delay	27.4
HCM 2010 LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	42	47	324	1482	359	31
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1455	1455	1455	1455
Adj Flow Rate, veh/h	42	47	324	1482	359	31
Adj No. of Lanes	1	1	1	3	3	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	81	72	373	3361	1813	514
Arrive On Green	0.06	0.06	0.27	0.77	0.42	0.42
Sat Flow, veh/h	1385	1236	1385	4364	4364	1236
Grp Volume(v), veh/h	42	47	324	1482	359	31
Grp Sat Flow(s),veh/h/ln	1385	1236	1385	1455	1455	1236
Q Serve(g_s), s	1.4	1.7	10.4	5.5	2.4	0.7
Cycle Q Clear(g_c), s	1.4	1.7	10.4	5.5	2.4	0.7
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	81	72	373	3361	1813	514
V/C Ratio(X)	0.52	0.65	0.87	0.44	0.20	0.06
Avail Cap(c_a), veh/h	474	423	474	3361	1813	514
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.4	21.5	16.3	1.9	8.7	8.2
Incr Delay (d2), s/veh	5.0	9.3	13.1	0.4	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	1.4	5.3	2.2	1.0	0.3
LnGrp Delay(d),s/veh	26.4	30.9	29.4	2.3	8.9	8.4
LnGrp LOS	C	C	C	A	A	A
Approach Vol, veh/h	89			1806	390	
Approach Delay, s/veh	28.7			7.2	8.9	
Approach LOS	C			A	A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		40.0		6.7	16.6	23.4		
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0		
Max Green Setting (Gmax), s		36.0		16.0	16.0	16.0		
Max Q Clear Time (g_c+I1), s		7.5		3.7	12.4	4.4		
Green Ext Time (p_c), s		15.4		0.2	0.3	8.3		

Intersection Summary	
HCM 2010 Ctrl Delay	8.3
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	15	991	0	0	910	61	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	-	-	200	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10
Mvmt Flow	15	991	0	0	910	61	1	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	910	0	0	991	0	0	1476	1931	496
Stage 1	-	-	-	-	-	-	1021	1021	-
Stage 2	-	-	-	-	-	-	455	910	-
Critical Hdwy	4.3	-	-	4.3	-	-	7.7	6.7	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	6.7	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.7	5.7	-
Follow-up Hdwy	2.3	-	-	2.3	-	-	3.6	4.1	3.4
Pot Cap-1 Maneuver	696	-	-	647	-	-	81	60	499
Stage 1	-	-	-	-	-	-	239	295	-
Stage 2	-	-	-	-	-	-	534	334	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	696	-	-	647	-	-	79	59	499
Mov Cap-2 Maneuver	-	-	-	-	-	-	79	59	-
Stage 1	-	-	-	-	-	-	234	289	-
Stage 2	-	-	-	-	-	-	531	334	-

Approach	EB	WB	NB
HCM Control Delay, s	0.2	0	51.2
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	79	696	-	-	647	-	-	86	531
HCM Lane V/C Ratio	0.013	0.022	-	-	-	-	-	0.581	0.006
HCM Control Delay (s)	51.2	10.3	-	-	0	-	-	93.5	11.8
HCM Lane LOS	F	B	-	-	A	-	-	F	B
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	2.6	0

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	50	0	3
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	0	-	200
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	10	10	10
Mvmt Flow	50	0	3

Major/Minor	Minor2		
Conflicting Flow All	1436	1931	455
Stage 1	910	910	-
Stage 2	526	1021	-
Critical Hdwy	7.7	6.7	7.1
Critical Hdwy Stg 1	6.7	5.7	-
Critical Hdwy Stg 2	6.7	5.7	-
Follow-up Hdwy	3.6	4.1	3.4
Pot Cap-1 Maneuver	87	60	531
Stage 1	280	334	-
Stage 2	483	295	-
Platoon blocked, %			
Mov Cap-1 Maneuver	86	59	531
Mov Cap-2 Maneuver	86	59	-
Stage 1	274	334	-
Stage 2	473	289	-

Approach	SB
HCM Control Delay, s	88.9
HCM LOS	F

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	1	1040	969	5	38	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	200	-	-	200	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	1	1040	969	5	38	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	969	0	-	0	1491	485
Stage 1	-	-	-	-	969	-
Stage 2	-	-	-	-	522	-
Critical Hdwy	4.3	-	-	-	7	7.1
Critical Hdwy Stg 1	-	-	-	-	6	-
Critical Hdwy Stg 2	-	-	-	-	6	-
Follow-up Hdwy	2.3	-	-	-	3.6	3.4
Pot Cap-1 Maneuver	660	-	-	-	106	507
Stage 1	-	-	-	-	311	-
Stage 2	-	-	-	-	538	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	660	-	-	-	106	507
Mov Cap-2 Maneuver	-	-	-	-	106	-
Stage 1	-	-	-	-	311	-
Stage 2	-	-	-	-	537	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	55.7
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	660	-	-	-	106	507
HCM Lane V/C Ratio	0.002	-	-	-	0.358	0.002
HCM Control Delay (s)	10.5	-	-	-	56.8	12.1
HCM Lane LOS	B	-	-	-	F	B
HCM 95th %tile Q(veh)	0	-	-	-	1.4	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	9	1068	0	6	930	1	9	2	2	6	6	34
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1600	1455	1455	1455	1600	1455	1600	1455	1455	1455
Adj Flow Rate, veh/h	9	1068	0	6	930	1	9	2	2	6	6	34
Adj No. of Lanes	1	2	0	1	2	1	0	1	0	1	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	13	1065	0	9	1057	449	198	44	44	290	304	259
Arrive On Green	0.01	0.37	0.00	0.01	0.36	0.36	0.21	0.21	0.21	0.21	0.21	0.21
Sat Flow, veh/h	1385	2909	0	1385	2909	1236	948	211	211	1385	1455	1236
Grp Volume(v), veh/h	9	1068	0	6	930	1	13	0	0	6	6	34
Grp Sat Flow(s),veh/h/ln	1385	1455	0	1385	1455	1236	1370	0	0	1385	1455	1236
Q Serve(g_s), s	0.5	28.0	0.0	0.3	22.9	0.0	0.6	0.0	0.0	0.3	0.3	1.7
Cycle Q Clear(g_c), s	0.5	28.0	0.0	0.3	22.9	0.0	0.6	0.0	0.0	0.3	0.3	1.7
Prop In Lane	1.00		0.00	1.00		1.00	0.69		0.15	1.00		1.00
Lane Grp Cap(c), veh/h	13	1065	0	9	1057	449	287	0	0	290	304	259
V/C Ratio(X)	0.71	1.00	0.00	0.69	0.88	0.00	0.05	0.00	0.00	0.02	0.02	0.13
Avail Cap(c_a), veh/h	72	1065	0	72	1065	453	287	0	0	290	304	259
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.8	24.2	0.0	37.9	22.8	15.5	24.1	0.0	0.0	24.0	24.0	24.6
Incr Delay (d2), s/veh	54.1	28.2	0.0	67.7	8.6	0.0	0.3	0.0	0.0	0.1	0.1	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	15.3	0.0	0.3	10.4	0.0	0.2	0.0	0.0	0.1	0.1	0.7
LnGrp Delay(d),s/veh	91.9	52.5	0.0	105.6	31.4	15.5	24.4	0.0	0.0	24.1	24.1	25.6
LnGrp LOS	F	F		F	C	B	C			C	C	C
Approach Vol, veh/h		1077			937			13			46	
Approach Delay, s/veh		52.8			31.9			24.4			25.2	
Approach LOS		D			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		20.0	4.5	32.0		20.0	4.7	31.8
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	4.0	28.0		16.0	4.0	28.0
Max Q Clear Time (g_c+I1), s		2.6	2.3	30.0		3.7	2.5	24.9
Green Ext Time (p_c), s		0.0	0.0	0.0		0.1	0.0	2.6

Intersection Summary	
HCM 2010 Ctrl Delay	42.6
HCM 2010 LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	52	948	37	14	735	284	68	71	23	1243	302	134
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1600	1455	1455	1600	1600	1455	1600	1309	1455	1455
Adj Flow Rate, veh/h	52	948	37	14	735	0	68	71	23	1243	302	134
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	2	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	38	847	33	16	842	0	75	78	25	1114	650	552
Arrive On Green	0.03	0.30	0.30	0.01	0.29	0.00	0.13	0.13	0.13	0.45	0.45	0.45
Sat Flow, veh/h	1385	2781	109	1385	2909	0	584	609	197	2494	1455	1236
Grp Volume(v), veh/h	52	496	489	14	735	0	162	0	0	1243	302	134
Grp Sat Flow(s),veh/h/ln	1385	1455	1435	1385	1455	0	1391	0	0	1247	1455	1236
Q Serve(g_s), s	4.0	45.0	45.0	1.5	35.5	0.0	17.0	0.0	0.0	66.0	21.4	9.9
Cycle Q Clear(g_c), s	4.0	45.0	45.0	1.5	35.5	0.0	17.0	0.0	0.0	66.0	21.4	9.9
Prop In Lane	1.00		0.08	1.00		0.00	0.42		0.14	1.00		1.00
Lane Grp Cap(c), veh/h	38	443	437	16	842	0	179	0	0	1114	650	552
V/C Ratio(X)	1.39	1.12	1.12	0.85	0.87	0.00	0.91	0.00	0.00	1.12	0.46	0.24
Avail Cap(c_a), veh/h	38	443	437	38	886	0	179	0	0	1114	650	552
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	71.9	51.4	51.4	72.9	49.9	0.0	63.5	0.0	0.0	40.9	28.5	25.4
Incr Delay (d2), s/veh	280.6	79.4	79.6	68.2	9.3	0.0	46.3	0.0	0.0	64.7	2.4	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	27.7	27.4	0.9	15.4	0.0	8.8	0.0	0.0	32.6	9.0	3.5
LnGrp Delay(d),s/veh	352.5	130.7	131.0	141.0	59.2	0.0	109.8	0.0	0.0	105.6	30.9	26.4
LnGrp LOS	F	F	F	F	E		F			F	C	C
Approach Vol, veh/h		1037			749			162			1679	
Approach Delay, s/veh		142.0			60.7			109.8			85.8	
Approach LOS		F			E			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		23.0	5.7	49.0		70.0	8.0	46.7
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		19.0	4.0	45.0		66.0	4.0	45.0
Max Q Clear Time (g_c+I1), s		19.0	3.5	47.0		68.0	6.0	37.5
Green Ext Time (p_c), s		0.0	0.0	0.0		0.0	0.0	5.2

Intersection Summary	
HCM 2010 Ctrl Delay	97.8
HCM 2010 LOS	F

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	1176	878	0	774	153
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1455	1455	0	1309	1309
Adj Flow Rate, veh/h	0	1176	878	0	774	153
Adj No. of Lanes	0	4	3	0	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	10	10	0	10	10
Cap, veh/h	0	2834	2126	0	944	842
Arrive On Green	0.00	0.49	0.49	0.00	0.38	0.38
Sat Flow, veh/h	0	5818	4364	0	2494	2225
Grp Volume(v), veh/h	0	1176	878	0	774	153
Grp Sat Flow(s),veh/h/ln	0	1455	1455	0	1247	1113
Q Serve(g_s), s	0.0	7.7	7.7	0.0	16.7	2.7
Cycle Q Clear(g_c), s	0.0	7.7	7.7	0.0	16.7	2.7
Prop In Lane	0.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	2834	2126	0	944	842
V/C Ratio(X)	0.00	0.41	0.41	0.00	0.82	0.18
Avail Cap(c_a), veh/h	0	2834	2126	0	1801	1607
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	9.8	9.8	0.0	16.7	12.3
Incr Delay (d2), s/veh	0.0	0.4	0.6	0.0	1.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.2	3.2	0.0	5.9	0.8
LnGrp Delay(d),s/veh	0.0	10.3	10.4	0.0	18.5	12.4
LnGrp LOS		B	B		B	B
Approach Vol, veh/h		1176	878		927	
Approach Delay, s/veh		10.3	10.4		17.5	
Approach LOS		B	B		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				53.5		26.5		53.5
Change Period (Y+Rc), s				4.0		4.0		4.0
Max Green Setting (Gmax), s				29.0		43.0		29.0
Max Q Clear Time (g_c+I1), s				9.7		18.7		9.7
Green Ext Time (p_c), s				12.4		3.9		12.5

Intersection Summary	
HCM 2010 Ctrl Delay	12.6
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1714	0	0	993	529	628
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	0	0	1455	1309	1455
Adj Flow Rate, veh/h	1714	0	0	993	529	628
Adj No. of Lanes	4	0	0	3	3	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	0	0	10	10	10
Cap, veh/h	1964	0	0	1473	2104	695
Arrive On Green	0.34	0.00	0.00	0.34	0.56	0.56
Sat Flow, veh/h	5818	0	0	4364	3740	1236
Grp Volume(v), veh/h	1714	0	0	993	529	628
Grp Sat Flow(s),veh/h/ln	1455	0	0	1455	1247	1236
Q Serve(g_s), s	22.1	0.0	0.0	15.6	5.8	36.1
Cycle Q Clear(g_c), s	22.1	0.0	0.0	15.6	5.8	36.1
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1964	0	0	1473	2104	695
V/C Ratio(X)	0.87	0.00	0.00	0.67	0.25	0.90
Avail Cap(c_a), veh/h	1964	0	0	1473	2104	695
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.9	0.0	0.0	22.7	8.9	15.6
Incr Delay (d2), s/veh	5.7	0.0	0.0	2.5	0.3	17.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.6	0.0	0.0	6.6	2.0	15.5
LnGrp Delay(d),s/veh	30.6	0.0	0.0	25.2	9.2	32.8
LnGrp LOS	C			C	A	C
Approach Vol, veh/h	1714			993	1157	
Approach Delay, s/veh	30.6			25.2	22.0	
Approach LOS	C			C	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		49.0		31.0				31.0
Change Period (Y+Rc), s		4.0		4.0				4.0
Max Green Setting (Gmax), s		45.0		27.0				27.0
Max Q Clear Time (g_c+I1), s		38.1		24.1				17.6
Green Ext Time (p_c), s		2.9		2.7				8.3

Intersection Summary	
HCM 2010 Ctrl Delay	26.7
HCM 2010 LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	91	296	100	311	1379	96
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1455	1455	1455	1455
Adj Flow Rate, veh/h	91	296	100	311	1379	96
Adj No. of Lanes	1	1	1	3	3	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	367	327	118	2625	1961	556
Arrive On Green	0.26	0.26	0.09	0.60	0.45	0.45
Sat Flow, veh/h	1385	1236	1385	4364	4364	1236
Grp Volume(v), veh/h	91	296	100	311	1379	96
Grp Sat Flow(s),veh/h/ln	1385	1236	1385	1455	1455	1236
Q Serve(g_s), s	3.1	13.8	4.3	1.8	15.2	2.8
Cycle Q Clear(g_c), s	3.1	13.8	4.3	1.8	15.2	2.8
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	367	327	118	2625	1961	556
V/C Ratio(X)	0.25	0.90	0.85	0.12	0.70	0.17
Avail Cap(c_a), veh/h	370	331	185	2625	1961	556
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.3	21.3	27.0	5.1	13.3	9.8
Incr Delay (d2), s/veh	0.3	26.7	18.6	0.1	2.1	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	10.9	2.2	0.7	6.4	1.0
LnGrp Delay(d),s/veh	17.7	48.0	45.6	5.2	15.4	10.5
LnGrp LOS	B	D	D	A	B	B
Approach Vol, veh/h	387			411	1475	
Approach Delay, s/veh	40.9			15.0	15.1	
Approach LOS	D			B	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		40.0		19.8	9.1	30.9		
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0		
Max Green Setting (Gmax), s		36.0		16.0	8.0	24.0		
Max Q Clear Time (g_c+I1), s		3.8		15.8	6.3	17.2		
Green Ext Time (p_c), s		15.1		0.0	0.0	5.1		

Intersection Summary	
HCM 2010 Ctrl Delay	19.5
HCM 2010 LOS	B

EXISTING PLUS GROWTH WITH PROJECT CONDITIONS

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	2	620	0	0	784	19	2	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	-	-	200	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10
Mvmt Flow	2	620	0	0	784	19	2	0	2

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	784	0	0	620	0	0	1016	1408	310
Stage 1	-	-	-	-	-	-	624	624	-
Stage 2	-	-	-	-	-	-	392	784	-
Critical Hdwy	4.3	-	-	4.3	-	-	7.7	6.7	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	6.7	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.7	5.7	-
Follow-up Hdwy	2.3	-	-	2.3	-	-	3.6	4.1	3.4
Pot Cap-1 Maneuver	780	-	-	904	-	-	181	128	663
Stage 1	-	-	-	-	-	-	421	457	-
Stage 2	-	-	-	-	-	-	583	384	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	780	-	-	904	-	-	178	128	663
Mov Cap-2 Maneuver	-	-	-	-	-	-	178	128	-
Stage 1	-	-	-	-	-	-	420	456	-
Stage 2	-	-	-	-	-	-	575	384	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	18
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	281	780	-	-	904	-	-	156	585
HCM Lane V/C Ratio	0.014	0.003	-	-	-	-	-	0.564	0.014
HCM Control Delay (s)	18	9.6	-	-	0	-	-	54.4	11.2
HCM Lane LOS	C	A	-	-	A	-	-	F	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	2.9	0

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	88	0	8
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	0	-	200
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	10	10	10
Mvmt Flow	88	0	8

Major/Minor	Minor2		
Conflicting Flow All	1098	1408	392
Stage 1	784	784	-
Stage 2	314	624	-
Critical Hdwy	7.7	6.7	7.1
Critical Hdwy Stg 1	6.7	5.7	-
Critical Hdwy Stg 2	6.7	5.7	-
Follow-up Hdwy	3.6	4.1	3.4
Pot Cap-1 Maneuver	157	128	585
Stage 1	335	384	-
Stage 2	650	457	-
Platoon blocked, %			
Mov Cap-1 Maneuver	156	128	585
Mov Cap-2 Maneuver	156	128	-
Stage 1	334	384	-
Stage 2	646	456	-

Approach	SB
HCM Control Delay, s	50.8
HCM LOS	F

Minor Lane/Major Mvmt

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	36	662	1	0	785	103	0	0	0	99	0	18
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1600	1455	1455	1455	1600	1455	1600	1455	1455	1455
Adj Flow Rate, veh/h	36	662	1	0	785	103	0	0	0	99	0	18
Adj No. of Lanes	1	2	0	1	2	1	0	1	0	2	0	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	45	1330	2	3	975	414	0	3	0	1001	0	447
Arrive On Green	0.03	0.46	0.46	0.00	0.34	0.34	0.00	0.00	0.00	0.36	0.00	0.36
Sat Flow, veh/h	1385	2904	4	1385	2909	1236	0	1455	0	2771	0	1236
Grp Volume(v), veh/h	36	332	331	0	785	103	0	0	0	99	0	18
Grp Sat Flow(s),veh/h/ln	1385	1455	1454	1385	1455	1236	0	1455	0	1385	0	1236
Q Serve(g_s), s	1.1	7.1	7.1	0.0	10.9	2.7	0.0	0.0	0.0	1.0	0.0	0.4
Cycle Q Clear(g_c), s	1.1	7.1	7.1	0.0	10.9	2.7	0.0	0.0	0.0	1.0	0.0	0.4
Prop In Lane	1.00		0.00	1.00		1.00	0.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	45	666	666	3	975	414	0	3	0	1001	0	447
V/C Ratio(X)	0.80	0.50	0.50	0.00	0.81	0.25	0.00	0.00	0.00	0.10	0.00	0.04
Avail Cap(c_a), veh/h	125	666	666	125	1183	503	0	526	0	1001	0	447
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.3	8.4	8.4	0.0	13.4	10.7	0.0	0.0	0.0	9.4	0.0	9.2
Incr Delay (d2), s/veh	27.2	0.6	0.6	0.0	3.5	0.3	0.0	0.0	0.0	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	2.9	2.9	0.0	4.8	1.0	0.0	0.0	0.0	0.4	0.0	0.2
LnGrp Delay(d),s/veh	48.5	9.0	9.0	0.0	16.9	11.0	0.0	0.0	0.0	9.6	0.0	9.3
LnGrp LOS	D	A	A		B	B				A		A
Approach Vol, veh/h		699			888			0			117	
Approach Delay, s/veh		11.0			16.2			0.0			9.5	
Approach LOS		B			B						A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		0.0	0.0	24.3		20.0	5.4	18.8
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	4.0	18.0		16.0	4.0	18.0
Max Q Clear Time (g_c+I1), s		0.0	0.0	9.1		3.0	3.1	12.9
Green Ext Time (p_c), s		0.0	0.0	5.3		0.3	0.0	2.0

Intersection Summary	
HCM 2010 Ctrl Delay	13.6
HCM 2010 LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	69	644	30	8	821	1277	46	76	8	251	32	33
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1600	1455	1455	1600	1600	1455	1600	1309	1455	1455
Adj Flow Rate, veh/h	69	644	30	8	821	0	46	76	8	251	32	33
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	2	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	82	1218	57	11	1137	0	99	164	17	439	256	218
Arrive On Green	0.06	0.44	0.44	0.01	0.39	0.00	0.20	0.20	0.20	0.18	0.18	0.18
Sat Flow, veh/h	1385	2758	128	1385	2909	0	500	827	87	2494	1455	1236
Grp Volume(v), veh/h	69	339	335	8	821	0	130	0	0	251	32	33
Grp Sat Flow(s),veh/h/ln	1385	1455	1432	1385	1455	0	1414	0	0	1247	1455	1236
Q Serve(g_s), s	4.5	15.4	15.5	0.5	21.8	0.0	7.4	0.0	0.0	8.4	1.7	2.1
Cycle Q Clear(g_c), s	4.5	15.4	15.5	0.5	21.8	0.0	7.4	0.0	0.0	8.4	1.7	2.1
Prop In Lane	1.00		0.09	1.00		0.00	0.35		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	82	642	632	11	1137	0	280	0	0	439	256	218
V/C Ratio(X)	0.85	0.53	0.53	0.72	0.72	0.00	0.46	0.00	0.00	0.57	0.12	0.15
Avail Cap(c_a), veh/h	91	1537	1513	61	3010	0	280	0	0	439	256	218
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.4	18.5	18.5	45.0	23.5	0.0	32.2	0.0	0.0	34.3	31.5	31.7
Incr Delay (d2), s/veh	45.2	0.7	0.7	60.1	0.9	0.0	5.4	0.0	0.0	5.3	1.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	6.2	6.2	0.4	8.8	0.0	3.3	0.0	0.0	3.2	0.7	0.8
LnGrp Delay(d),s/veh	87.6	19.1	19.2	105.1	24.4	0.0	37.6	0.0	0.0	39.6	32.5	33.2
LnGrp LOS	F	B	B	F	C		D			D	C	C
Approach Vol, veh/h		743			829			130			316	
Approach Delay, s/veh		25.5			25.1			37.6			38.2	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		22.0	4.7	44.1		20.0	9.3	39.5
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		18.0	4.0	96.0		16.0	6.0	94.0
Max Q Clear Time (g_c+I1), s		9.4	2.5	17.5		10.4	6.5	23.8
Green Ext Time (p_c), s		0.3	0.0	11.8		0.6	0.0	11.8

Intersection Summary	
HCM 2010 Ctrl Delay	28.1
HCM 2010 LOS	C

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	384	1924	0	826	171
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1455	1455	0	1309	1309
Adj Flow Rate, veh/h	0	384	1924	0	826	171
Adj No. of Lanes	0	4	3	0	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	10	10	0	10	10
Cap, veh/h	0	3058	2293	0	921	822
Arrive On Green	0.00	0.53	0.53	0.00	0.37	0.37
Sat Flow, veh/h	0	5818	4364	0	2494	2225
Grp Volume(v), veh/h	0	384	1924	0	826	171
Grp Sat Flow(s),veh/h/ln	0	1455	1455	0	1247	1113
Q Serve(g_s), s	0.0	2.6	28.5	0.0	23.8	4.0
Cycle Q Clear(g_c), s	0.0	2.6	28.5	0.0	23.8	4.0
Prop In Lane	0.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	3058	2293	0	921	822
V/C Ratio(X)	0.00	0.13	0.84	0.00	0.90	0.21
Avail Cap(c_a), veh/h	0	3058	2293	0	1048	936
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	9.2	15.3	0.0	22.6	16.4
Incr Delay (d2), s/veh	0.0	0.1	3.9	0.0	9.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.0	12.0	0.0	9.4	1.2
LnGrp Delay(d),s/veh	0.0	9.3	19.2	0.0	32.1	16.5
LnGrp LOS		A	B		C	B
Approach Vol, veh/h		384	1924		997	
Approach Delay, s/veh		9.3	19.2		29.4	
Approach LOS		A	B		C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				47.9		32.1		47.9
Change Period (Y+Rc), s				4.0		4.0		4.0
Max Green Setting (Gmax), s				40.0		32.0		40.0
Max Q Clear Time (g_c+I1), s				4.6		25.8		30.5
Green Ext Time (p_c), s				21.7		2.3		7.9

Intersection Summary	
HCM 2010 Ctrl Delay	21.1
HCM 2010 LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1120	0	0	1181	1077	697
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	0	0	1455	1309	1455
Adj Flow Rate, veh/h	1120	0	0	1181	1077	697
Adj No. of Lanes	4	0	0	3	3	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	0	0	10	10	10
Cap, veh/h	1818	0	0	1364	2197	726
Arrive On Green	0.31	0.00	0.00	0.31	0.59	0.59
Sat Flow, veh/h	5818	0	0	4364	3740	1236
Grp Volume(v), veh/h	1120	0	0	1181	1077	697
Grp Sat Flow(s),veh/h/ln	1455	0	0	1455	1247	1236
Q Serve(g_s), s	13.1	0.0	0.0	20.4	13.3	42.6
Cycle Q Clear(g_c), s	13.1	0.0	0.0	20.4	13.3	42.6
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1818	0	0	1364	2197	726
V/C Ratio(X)	0.62	0.00	0.00	0.87	0.49	0.96
Avail Cap(c_a), veh/h	1818	0	0	1364	2197	726
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.4	0.0	0.0	25.9	9.6	15.6
Incr Delay (d2), s/veh	1.6	0.0	0.0	7.6	0.8	24.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	0.0	0.0	9.2	4.6	19.3
LnGrp Delay(d),s/veh	25.0	0.0	0.0	33.5	10.3	40.5
LnGrp LOS	C			C	B	D
Approach Vol, veh/h	1120			1181	1774	
Approach Delay, s/veh	25.0			33.5	22.2	
Approach LOS	C			C	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		51.0		29.0				29.0
Change Period (Y+Rc), s		4.0		4.0				4.0
Max Green Setting (Gmax), s		47.0		25.0				25.0
Max Q Clear Time (g_c+I1), s		44.6		15.1				22.4
Green Ext Time (p_c), s		1.7		8.0				2.3

Intersection Summary	
HCM 2010 Ctrl Delay	26.2
HCM 2010 LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	36	46	323	1097	285	31
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1455	1455	1455	1455
Adj Flow Rate, veh/h	36	46	323	1097	285	31
Adj No. of Lanes	1	1	1	3	3	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	78	69	372	3370	1823	517
Arrive On Green	0.06	0.06	0.27	0.77	0.42	0.42
Sat Flow, veh/h	1385	1236	1385	4364	4364	1236
Grp Volume(v), veh/h	36	46	323	1097	285	31
Grp Sat Flow(s),veh/h/ln	1385	1236	1385	1455	1455	1236
Q Serve(g_s), s	1.2	1.7	10.4	3.6	1.9	0.7
Cycle Q Clear(g_c), s	1.2	1.7	10.4	3.6	1.9	0.7
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	78	69	372	3370	1823	517
V/C Ratio(X)	0.46	0.66	0.87	0.33	0.16	0.06
Avail Cap(c_a), veh/h	475	424	475	3370	1823	517
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.3	21.6	16.3	1.6	8.5	8.1
Incr Delay (d2), s/veh	4.2	10.3	13.0	0.3	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	1.3	5.3	1.4	0.8	0.3
LnGrp Delay(d),s/veh	25.6	31.9	29.2	1.9	8.6	8.3
LnGrp LOS	C	C	C	A	A	A
Approach Vol, veh/h	82			1420	316	
Approach Delay, s/veh	29.1			8.1	8.6	
Approach LOS	C			A	A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		40.0		6.6	16.5	23.5		
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0		
Max Green Setting (Gmax), s		36.0		16.0	16.0	16.0		
Max Q Clear Time (g_c+I1), s		5.6		3.7	12.4	3.9		
Green Ext Time (p_c), s		11.0		0.1	0.4	6.8		

Intersection Summary	
HCM 2010 Ctrl Delay	9.1
HCM 2010 LOS	A

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBU	NBL	NBR
Vol, veh/h	0	1	108	0	9	1	0	110	29
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	1	108	0	9	1	0	110	29
Number of Lanes	0	1	0	0	0	1	0	2	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	3	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	3	0	1
HCM Control Delay	7.7	8.3	7.9
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	NBLn3	EBLn1	WBLn1
Vol Left, %	100%	100%	0%	0%	90%
Vol Thru, %	0%	0%	0%	1%	10%
Vol Right, %	0%	0%	100%	99%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	55	55	29	109	10
LT Vol	0	0	0	1	1
Through Vol	0	0	29	108	0
RT Vol	55	55	0	0	9
Lane Flow Rate	55	55	29	109	10
Geometry Grp	7	7	7	7	7
Degree of Util (X)	0.082	0.082	0.019	0.131	0.015
Departure Headway (Hd)	5.379	5.379	2.303	4.322	5.543
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	661	661	1513	835	649
Service Time	3.157	3.157	0.08	2.022	3.246
HCM Lane V/C Ratio	0.083	0.083	0.019	0.131	0.015
HCM Control Delay	8.6	8.6	5.1	7.7	8.3
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.3	0.3	0.1	0.5	0

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	15	962	0	0	826	62	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	-	-	200	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10
Mvmt Flow	15	962	0	0	826	62	1	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	826	0	0	962	0	0	1405	1818	481
Stage 1	-	-	-	-	-	-	992	992	-
Stage 2	-	-	-	-	-	-	413	826	-
Critical Hdwy	4.3	-	-	4.3	-	-	7.7	6.7	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	6.7	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.7	5.7	-
Follow-up Hdwy	2.3	-	-	2.3	-	-	3.6	4.1	3.4
Pot Cap-1 Maneuver	751	-	-	664	-	-	92	71	510
Stage 1	-	-	-	-	-	-	249	305	-
Stage 2	-	-	-	-	-	-	566	366	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	751	-	-	664	-	-	90	70	510
Mov Cap-2 Maneuver	-	-	-	-	-	-	90	70	-
Stage 1	-	-	-	-	-	-	244	299	-
Stage 2	-	-	-	-	-	-	563	366	-

Approach	EB	WB	NB
HCM Control Delay, s	0.2	0	45.4
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	90	751	-	-	664	-	-	102	566
HCM Lane V/C Ratio	0.011	0.02	-	-	-	-	-	0.5	0.005
HCM Control Delay (s)	45.4	9.9	-	-	0	-	-	71.3	11.4
HCM Lane LOS	E	A	-	-	A	-	-	F	B
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	2.2	0

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	51	0	3
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	0	-	200
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	10	10	10
Mvmt Flow	51	0	3

Major/Minor	Minor2		
Conflicting Flow All	1337	1818	413
Stage 1	826	826	-
Stage 2	511	992	-
Critical Hdwy	7.7	6.7	7.1
Critical Hdwy Stg 1	6.7	5.7	-
Critical Hdwy Stg 2	6.7	5.7	-
Follow-up Hdwy	3.6	4.1	3.4
Pot Cap-1 Maneuver	104	71	566
Stage 1	316	366	-
Stage 2	493	305	-
Platoon blocked, %			
Mov Cap-1 Maneuver	102	70	566
Mov Cap-2 Maneuver	102	70	-
Stage 1	310	366	-
Stage 2	483	299	-

Approach	SB
HCM Control Delay, s	68
HCM LOS	F

Minor Lane/Major Mvmt

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	14	1000	0	0	838	77	9	0	0	113	0	39
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1600	1455	1455	1455	1600	1455	1600	1455	1455	1455
Adj Flow Rate, veh/h	14	1000	0	0	838	77	9	0	0	113	0	39
Adj No. of Lanes	1	2	0	1	2	1	0	1	0	2	0	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	19	1172	0	2	975	414	301	0	0	601	0	268
Arrive On Green	0.01	0.40	0.00	0.00	0.34	0.34	0.22	0.00	0.00	0.22	0.00	0.22
Sat Flow, veh/h	1385	2909	0	1385	2909	1236	1385	0	0	2771	0	1236
Grp Volume(v), veh/h	14	1000	0	0	838	77	9	0	0	113	0	39
Grp Sat Flow(s),veh/h/ln	1385	1455	0	1385	1455	1236	1385	0	0	1385	0	1236
Q Serve(g_s), s	0.7	23.0	0.0	0.0	19.8	3.3	0.4	0.0	0.0	2.5	0.0	1.9
Cycle Q Clear(g_c), s	0.7	23.0	0.0	0.0	19.8	3.3	0.4	0.0	0.0	2.5	0.0	1.9
Prop In Lane	1.00		0.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	19	1172	0	2	975	414	301	0	0	601	0	268
V/C Ratio(X)	0.75	0.85	0.00	0.00	0.86	0.19	0.03	0.00	0.00	0.19	0.00	0.15
Avail Cap(c_a), veh/h	75	1172	0	75	1105	470	301	0	0	601	0	268
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.2	20.0	0.0	0.0	22.9	17.4	22.7	0.0	0.0	23.5	0.0	23.3
Incr Delay (d2), s/veh	44.2	6.3	0.0	0.0	6.4	0.2	0.2	0.0	0.0	0.7	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	10.2	0.0	0.0	8.8	1.1	0.2	0.0	0.0	1.0	0.0	0.7
LnGrp Delay(d),s/veh	80.4	26.3	0.0	0.0	29.2	17.6	22.9	0.0	0.0	24.2	0.0	24.5
LnGrp LOS	F	C			C	B	C			C		C
Approach Vol, veh/h		1014			915			9			152	
Approach Delay, s/veh		27.0			28.3			22.9			24.3	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		20.0	0.0	33.7		20.0	5.0	28.7
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	4.0	28.0		16.0	4.0	28.0
Max Q Clear Time (g_c+I1), s		2.4	0.0	25.0		4.5	2.7	21.8
Green Ext Time (p_c), s		0.0	0.0	2.4		0.3	0.0	2.9

Intersection Summary	
HCM 2010 Ctrl Delay	27.3
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	33	1004	37	14	789	233	68	36	23	1040	206	58
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1600	1455	1455	1600	1600	1455	1600	1309	1455	1455
Adj Flow Rate, veh/h	33	1004	37	14	789	0	68	36	23	1040	206	58
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	2	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	38	962	35	16	960	0	85	45	29	1046	610	519
Arrive On Green	0.03	0.35	0.35	0.01	0.33	0.00	0.12	0.12	0.12	0.42	0.42	0.42
Sat Flow, veh/h	1385	2788	103	1385	2909	0	736	389	249	2494	1455	1236
Grp Volume(v), veh/h	33	524	517	14	789	0	127	0	0	1040	206	58
Grp Sat Flow(s),veh/h/ln	1385	1455	1436	1385	1455	0	1374	0	0	1247	1455	1236
Q Serve(g_s), s	3.5	51.0	51.0	1.5	36.8	0.0	13.3	0.0	0.0	61.4	14.1	4.2
Cycle Q Clear(g_c), s	3.5	51.0	51.0	1.5	36.8	0.0	13.3	0.0	0.0	61.4	14.1	4.2
Prop In Lane	1.00		0.07	1.00		0.00	0.54		0.18	1.00		1.00
Lane Grp Cap(c), veh/h	38	502	496	16	960	0	158	0	0	1046	610	519
V/C Ratio(X)	0.88	1.04	1.04	0.85	0.82	0.00	0.80	0.00	0.00	0.99	0.34	0.11
Avail Cap(c_a), veh/h	38	502	496	38	1004	0	158	0	0	1046	610	519
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	71.6	48.4	48.4	72.9	45.5	0.0	63.7	0.0	0.0	42.7	29.0	26.1
Incr Delay (d2), s/veh	100.1	51.9	52.1	68.2	5.4	0.0	33.7	0.0	0.0	26.4	1.5	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	27.6	27.3	0.9	15.5	0.0	6.6	0.0	0.0	24.9	5.9	1.5
LnGrp Delay(d),s/veh	171.7	100.2	100.5	141.0	50.9	0.0	97.4	0.0	0.0	69.1	30.5	26.5
LnGrp LOS	F	F	F	F	D		F			E	C	C
Approach Vol, veh/h		1074			803			127			1304	
Approach Delay, s/veh		102.6			52.5			97.4			61.1	
Approach LOS		F			D			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		21.0	5.7	55.0		66.0	8.0	52.7
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		17.0	4.0	51.0		62.0	4.0	51.0
Max Q Clear Time (g_c+I1), s		15.3	3.5	53.0		63.4	5.5	38.8
Green Ext Time (p_c), s		0.1	0.0	0.0		0.0	0.0	7.8

Intersection Summary	
HCM 2010 Ctrl Delay	73.9
HCM 2010 LOS	E

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	1058	864	0	723	155
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1455	1455	0	1309	1309
Adj Flow Rate, veh/h	0	1058	864	0	723	155
Adj No. of Lanes	0	4	3	0	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	10	10	0	10	10
Cap, veh/h	0	2951	2213	0	892	796
Arrive On Green	0.00	0.51	0.51	0.00	0.36	0.36
Sat Flow, veh/h	0	5818	4364	0	2494	2225
Grp Volume(v), veh/h	0	1058	864	0	723	155
Grp Sat Flow(s),veh/h/ln	0	1455	1455	0	1247	1113
Q Serve(g_s), s	0.0	6.5	7.2	0.0	15.5	2.8
Cycle Q Clear(g_c), s	0.0	6.5	7.2	0.0	15.5	2.8
Prop In Lane	0.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	2951	2213	0	892	796
V/C Ratio(X)	0.00	0.36	0.39	0.00	0.81	0.19
Avail Cap(c_a), veh/h	0	2951	2213	0	1770	1580
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	8.8	9.0	0.0	17.2	13.1
Incr Delay (d2), s/veh	0.0	0.3	0.5	0.0	1.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.6	3.0	0.0	5.5	0.9
LnGrp Delay(d),s/veh	0.0	9.1	9.5	0.0	19.0	13.2
LnGrp LOS		A	A		B	B
Approach Vol, veh/h		1058	864		878	
Approach Delay, s/veh		9.1	9.5		18.0	
Approach LOS		A	A		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				54.8		25.2		54.8
Change Period (Y+Rc), s				4.0		4.0		4.0
Max Green Setting (Gmax), s				30.0		42.0		30.0
Max Q Clear Time (g_c+I1), s				8.5		17.5		9.2
Green Ext Time (p_c), s				12.5		3.6		12.2

Intersection Summary	
HCM 2010 Ctrl Delay	12.0
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1579	0	0	976	532	628
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	0	0	1455	1309	1455
Adj Flow Rate, veh/h	1579	0	0	976	532	628
Adj No. of Lanes	4	0	0	3	3	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	0	0	10	10	10
Cap, veh/h	1818	0	0	1364	2197	726
Arrive On Green	0.31	0.00	0.00	0.31	0.59	0.59
Sat Flow, veh/h	5818	0	0	4364	3740	1236
Grp Volume(v), veh/h	1579	0	0	976	532	628
Grp Sat Flow(s),veh/h/ln	1455	0	0	1455	1247	1236
Q Serve(g_s), s	20.5	0.0	0.0	15.8	5.5	34.1
Cycle Q Clear(g_c), s	20.5	0.0	0.0	15.8	5.5	34.1
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1818	0	0	1364	2197	726
V/C Ratio(X)	0.87	0.00	0.00	0.72	0.24	0.86
Avail Cap(c_a), veh/h	1818	0	0	1364	2197	726
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.9	0.0	0.0	24.4	7.9	13.8
Incr Delay (d2), s/veh	5.9	0.0	0.0	3.2	0.3	13.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.0	0.0	0.0	6.7	1.9	14.1
LnGrp Delay(d),s/veh	31.9	0.0	0.0	27.6	8.2	26.9
LnGrp LOS	C			C	A	C
Approach Vol, veh/h	1579			976	1160	
Approach Delay, s/veh	31.9			27.6	18.3	
Approach LOS	C			C	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		51.0		29.0				29.0
Change Period (Y+Rc), s		4.0		4.0				4.0
Max Green Setting (Gmax), s		47.0		25.0				25.0
Max Q Clear Time (g_c+I1), s		36.1		22.5				17.8
Green Ext Time (p_c), s		3.9		2.3				6.3

Intersection Summary	
HCM 2010 Ctrl Delay	26.5
HCM 2010 LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	90	294	98	208	1006	91
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1455	1455	1455	1455
Adj Flow Rate, veh/h	90	294	98	208	1006	91
Adj No. of Lanes	1	1	1	3	3	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	365	326	116	2629	1971	558
Arrive On Green	0.26	0.26	0.08	0.60	0.45	0.45
Sat Flow, veh/h	1385	1236	1385	4364	4364	1236
Grp Volume(v), veh/h	90	294	98	208	1006	91
Grp Sat Flow(s),veh/h/ln	1385	1236	1385	1455	1455	1236
Q Serve(g_s), s	3.1	13.7	4.2	1.2	9.8	2.6
Cycle Q Clear(g_c), s	3.1	13.7	4.2	1.2	9.8	2.6
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	365	326	116	2629	1971	558
V/C Ratio(X)	0.25	0.90	0.84	0.08	0.51	0.16
Avail Cap(c_a), veh/h	371	331	255	2629	1971	558
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.3	21.3	27.0	5.0	11.7	9.7
Incr Delay (d2), s/veh	0.3	26.3	14.8	0.1	0.9	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	10.8	2.1	0.5	4.1	1.0
LnGrp Delay(d),s/veh	17.7	47.6	41.8	5.0	12.6	10.3
LnGrp LOS	B	D	D	A	B	B
Approach Vol, veh/h	384			306	1097	
Approach Delay, s/veh	40.6			16.8	12.4	
Approach LOS	D			B	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		40.0		19.7	9.0	31.0		
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0		
Max Green Setting (Gmax), s		36.0		16.0	11.0	21.0		
Max Q Clear Time (g_c+I1), s		3.2		15.7	6.2	11.8		
Green Ext Time (p_c), s		9.9		0.0	0.1	5.1		

Intersection Summary	
HCM 2010 Ctrl Delay	19.2
HCM 2010 LOS	B

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBU	NBL	NBR
Vol, veh/h	0	1	112	0	39	1	0	81	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	1	112	0	39	1	0	81	10
Number of Lanes	0	1	0	0	0	1	0	2	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	3	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	3	0	1
HCM Control Delay	7.6	8.5	8.2
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	NBLn3	EBLn1	WBLn1
Vol Left, %	100%	100%	0%	0%	97%
Vol Thru, %	0%	0%	0%	1%	3%
Vol Right, %	0%	0%	100%	99%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	41	41	10	113	40
LT Vol	0	0	0	1	1
Through Vol	0	0	10	112	0
RT Vol	41	41	0	0	39
Lane Flow Rate	40	40	10	113	40
Geometry Grp	7	7	7	7	7
Degree of Util (X)	0.062	0.062	0.007	0.133	0.061
Departure Headway (Hd)	5.54	5.54	2.46	4.253	5.481
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	650	650	1459	848	657
Service Time	3.247	3.247	0.168	1.957	3.187
HCM Lane V/C Ratio	0.062	0.062	0.007	0.133	0.061
HCM Control Delay	8.6	8.6	5.2	7.6	8.5
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.2	0.2	0	0.5	0.2

EXISTING PLUS GROWTH PLUS OTHER DEVELOPMENT WITH PROJECT CONDITIONS

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	2	699	0	0	800	19	2	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	-	-	200	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10
Mvmt Flow	2	699	0	0	800	19	2	0	2

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	800	0	0	699	0	0	1103	1503	350
Stage 1	-	-	-	-	-	-	703	703	-
Stage 2	-	-	-	-	-	-	400	800	-
Critical Hdwy	4.3	-	-	4.3	-	-	7.7	6.7	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	6.7	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.7	5.7	-
Follow-up Hdwy	2.3	-	-	2.3	-	-	3.6	4.1	3.4
Pot Cap-1 Maneuver	769	-	-	842	-	-	156	112	624
Stage 1	-	-	-	-	-	-	376	419	-
Stage 2	-	-	-	-	-	-	576	377	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	769	-	-	842	-	-	154	112	624
Mov Cap-2 Maneuver	-	-	-	-	-	-	154	112	-
Stage 1	-	-	-	-	-	-	375	418	-
Stage 2	-	-	-	-	-	-	568	377	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	19.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	247	769	-	-	842	-	-	142	578
HCM Lane V/C Ratio	0.016	0.003	-	-	-	-	-	0.62	0.014
HCM Control Delay (s)	19.8	9.7	-	-	0	-	-	64.8	11.3
HCM Lane LOS	C	A	-	-	A	-	-	F	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	3.3	0

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	88	0	8
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	0	-	200
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	10	10	10
Mvmt Flow	88	0	8

Major/Minor	Minor2		
Conflicting Flow All	1154	1503	400
Stage 1	800	800	-
Stage 2	354	703	-
Critical Hdwy	7.7	6.7	7.1
Critical Hdwy Stg 1	6.7	5.7	-
Critical Hdwy Stg 2	6.7	5.7	-
Follow-up Hdwy	3.6	4.1	3.4
Pot Cap-1 Maneuver	143	112	578
Stage 1	328	377	-
Stage 2	614	419	-
Platoon blocked, %			
Mov Cap-1 Maneuver	142	112	578
Mov Cap-2 Maneuver	142	112	-
Stage 1	327	377	-
Stage 2	610	418	-

Approach	SB
HCM Control Delay, s	60.3
HCM LOS	F

Minor Lane/Major Mvmt

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	36	741	1	1	801	103	0	7	7	99	1	18
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1600	1455	1455	1455	1600	1455	1600	1455	1455	1455
Adj Flow Rate, veh/h	36	741	1	1	801	103	0	7	7	100	0	18
Adj No. of Lanes	1	2	0	1	2	1	0	1	0	2	0	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	40	850	1	2	770	327	0	157	157	652	0	291
Arrive On Green	0.03	0.29	0.29	0.00	0.26	0.26	0.00	0.24	0.24	0.24	0.00	0.24
Sat Flow, veh/h	1385	2904	4	1385	2909	1236	0	668	668	2771	0	1236
Grp Volume(v), veh/h	36	371	371	1	801	103	0	0	14	100	0	18
Grp Sat Flow(s),veh/h/ln	1385	1455	1454	1385	1455	1236	0	0	1337	1385	0	1236
Q Serve(g_s), s	1.8	16.5	16.5	0.0	18.0	4.5	0.0	0.0	0.6	1.9	0.0	0.8
Cycle Q Clear(g_c), s	1.8	16.5	16.5	0.0	18.0	4.5	0.0	0.0	0.6	1.9	0.0	0.8
Prop In Lane	1.00		0.00	1.00		1.00	0.00		0.50	1.00		1.00
Lane Grp Cap(c), veh/h	40	426	426	2	770	327	0	0	315	652	0	291
V/C Ratio(X)	0.90	0.87	0.87	0.49	1.04	0.31	0.00	0.00	0.04	0.15	0.00	0.06
Avail Cap(c_a), veh/h	82	426	426	82	770	327	0	0	315	652	0	291
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	32.9	22.8	22.8	33.9	25.0	20.0	0.0	0.0	20.1	20.6	0.0	20.2
Incr Delay (d2), s/veh	43.2	17.6	17.6	120.5	43.2	0.5	0.0	0.0	0.3	0.5	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	8.7	8.7	0.1	11.8	1.6	0.0	0.0	0.2	0.8	0.0	0.3
LnGrp Delay(d),s/veh	76.1	40.4	40.4	154.4	68.2	20.6	0.0	0.0	20.3	21.1	0.0	20.6
LnGrp LOS	E	D	D	F	F	C			C	C		C
Approach Vol, veh/h		778			905			14			118	
Approach Delay, s/veh		42.0			62.9			20.3			21.0	
Approach LOS		D			E			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		20.0	4.1	23.9		20.0	6.0	22.0
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	4.0	18.0		16.0	4.0	18.0
Max Q Clear Time (g_c+I1), s		2.6	2.0	18.5		3.9	3.8	20.0
Green Ext Time (p_c), s		0.0	0.0	0.0		0.3	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	50.9
HCM 2010 LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	150	649	30	8	824	1492	46	166	8	290	53	48
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1600	1455	1455	1600	1600	1455	1600	1309	1455	1455
Adj Flow Rate, veh/h	150	649	30	8	824	0	46	166	8	290	53	48
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	2	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	159	1336	62	11	1098	0	60	217	10	382	223	190
Arrive On Green	0.11	0.48	0.48	0.01	0.38	0.00	0.20	0.20	0.20	0.15	0.15	0.15
Sat Flow, veh/h	1385	2759	127	1385	2909	0	299	1079	52	2494	1455	1236
Grp Volume(v), veh/h	150	342	337	8	824	0	220	0	0	290	53	48
Grp Sat Flow(s),veh/h/ln	1385	1455	1432	1385	1455	0	1430	0	0	1247	1455	1236
Q Serve(g_s), s	11.2	16.5	16.6	0.6	25.7	0.0	15.2	0.0	0.0	11.6	3.3	3.6
Cycle Q Clear(g_c), s	11.2	16.5	16.6	0.6	25.7	0.0	15.2	0.0	0.0	11.6	3.3	3.6
Prop In Lane	1.00		0.09	1.00		0.00	0.21		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	159	704	694	11	1098	0	288	0	0	382	223	190
V/C Ratio(X)	0.94	0.49	0.49	0.73	0.75	0.00	0.76	0.00	0.00	0.76	0.24	0.25
Avail Cap(c_a), veh/h	159	1296	1276	53	2369	0	288	0	0	382	223	190
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.8	18.1	18.2	51.7	28.2	0.0	39.4	0.0	0.0	42.3	38.8	38.9
Incr Delay (d2), s/veh	54.2	0.5	0.5	62.6	1.1	0.0	17.4	0.0	0.0	13.2	2.5	3.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.7	6.7	6.7	0.4	10.5	0.0	7.4	0.0	0.0	4.7	1.5	1.4
LnGrp Delay(d),s/veh	100.1	18.7	18.7	114.3	29.3	0.0	56.8	0.0	0.0	55.6	41.3	42.1
LnGrp LOS	F	B	B	F	C		E			E	D	D
Approach Vol, veh/h		829			832			220			391	
Approach Delay, s/veh		33.4			30.1			56.8			52.0	
Approach LOS		C			C			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		25.0	4.8	54.6		20.0	16.0	43.4
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		21.0	4.0	93.0		16.0	12.0	85.0
Max Q Clear Time (g_c+I1), s		17.2	2.6	18.6		13.6	13.2	27.7
Green Ext Time (p_c), s		0.4	0.0	11.9		0.4	0.0	11.7

Intersection Summary	
HCM 2010 Ctrl Delay	37.7
HCM 2010 LOS	D

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	409	2150	0	836	171
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1455	1455	0	1309	1309
Adj Flow Rate, veh/h	0	409	2150	0	836	171
Adj No. of Lanes	0	4	3	0	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	10	10	0	10	10
Cap, veh/h	0	3153	2365	0	891	795
Arrive On Green	0.00	0.54	0.54	0.00	0.36	0.36
Sat Flow, veh/h	0	5818	4364	0	2494	2225
Grp Volume(v), veh/h	0	409	2150	0	836	171
Grp Sat Flow(s),veh/h/ln	0	1455	1455	0	1247	1113
Q Serve(g_s), s	0.0	2.7	35.3	0.0	25.7	4.2
Cycle Q Clear(g_c), s	0.0	2.7	35.3	0.0	25.7	4.2
Prop In Lane	0.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	3153	2365	0	891	795
V/C Ratio(X)	0.00	0.13	0.91	0.00	0.94	0.22
Avail Cap(c_a), veh/h	0	3153	2365	0	911	813
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	9.0	16.4	0.0	24.7	17.8
Incr Delay (d2), s/veh	0.0	0.1	6.6	0.0	16.7	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.1	15.4	0.0	10.9	1.3
LnGrp Delay(d),s/veh	0.0	9.0	23.0	0.0	41.4	17.9
LnGrp LOS		A	C		D	B
Approach Vol, veh/h		409	2150		1007	
Approach Delay, s/veh		9.0	23.0		37.4	
Approach LOS		A	C		D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				47.6		32.4		47.6
Change Period (Y+Rc), s				4.0		4.0		4.0
Max Green Setting (Gmax), s				43.0		29.0		43.0
Max Q Clear Time (g_c+I1), s				4.7		27.7		37.3
Green Ext Time (p_c), s				26.0		0.6		5.2

Intersection Summary	
HCM 2010 Ctrl Delay	25.4
HCM 2010 LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1147	0	0	1275	1209	697
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	0	0	1455	1309	1455
Adj Flow Rate, veh/h	1147	0	0	1275	1209	697
Adj No. of Lanes	4	0	0	3	3	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	0	0	10	10	10
Cap, veh/h	1891	0	0	1418	2151	711
Arrive On Green	0.32	0.00	0.00	0.32	0.57	0.57
Sat Flow, veh/h	5818	0	0	4364	3740	1236
Grp Volume(v), veh/h	1147	0	0	1275	1209	697
Grp Sat Flow(s),veh/h/ln	1455	0	0	1455	1247	1236
Q Serve(g_s), s	13.3	0.0	0.0	22.3	16.2	43.9
Cycle Q Clear(g_c), s	13.3	0.0	0.0	22.3	16.2	43.9
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1891	0	0	1418	2151	711
V/C Ratio(X)	0.61	0.00	0.00	0.90	0.56	0.98
Avail Cap(c_a), veh/h	1891	0	0	1418	2151	711
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.7	0.0	0.0	25.7	10.7	16.6
Incr Delay (d2), s/veh	1.5	0.0	0.0	9.4	1.1	29.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.0	0.0	10.1	5.7	20.5
LnGrp Delay(d),s/veh	24.2	0.0	0.0	35.1	11.7	45.9
LnGrp LOS	C			D	B	D
Approach Vol, veh/h	1147			1275	1906	
Approach Delay, s/veh	24.2			35.1	24.2	
Approach LOS	C			D	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		50.0		30.0				30.0
Change Period (Y+Rc), s		4.0		4.0				4.0
Max Green Setting (Gmax), s		46.0		26.0				26.0
Max Q Clear Time (g_c+I1), s		45.9		15.3				24.3
Green Ext Time (p_c), s		0.1		8.8				1.6

Intersection Summary	
HCM 2010 Ctrl Delay	27.4
HCM 2010 LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Volume (veh/h)	43	47	324	1482	359	32		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1455	1455	1455	1455	1455	1455		
Adj Flow Rate, veh/h	43	47	324	1482	359	32		
Adj No. of Lanes	1	1	1	3	3	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	10	10	10	10	10	10		
Cap, veh/h	82	73	373	3360	1812	513		
Arrive On Green	0.06	0.06	0.27	0.77	0.42	0.42		
Sat Flow, veh/h	1385	1236	1385	4364	4364	1236		
Grp Volume(v), veh/h	43	47	324	1482	359	32		
Grp Sat Flow(s),veh/h/ln	1385	1236	1385	1455	1455	1236		
Q Serve(g_s), s	1.4	1.7	10.4	5.5	2.5	0.7		
Cycle Q Clear(g_c), s	1.4	1.7	10.4	5.5	2.5	0.7		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	82	73	373	3360	1812	513		
V/C Ratio(X)	0.53	0.64	0.87	0.44	0.20	0.06		
Avail Cap(c_a), veh/h	474	423	474	3360	1812	513		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	21.4	21.5	16.3	1.9	8.7	8.2		
Incr Delay (d2), s/veh	5.2	9.2	13.2	0.4	0.2	0.2		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	0.7	1.4	5.3	2.2	1.0	0.3		
LnGrp Delay(d),s/veh	26.5	30.7	29.4	2.3	9.0	8.4		
LnGrp LOS	C	C	C	A	A	A		
Approach Vol, veh/h	90			1806	391			
Approach Delay, s/veh	28.7			7.2	8.9			
Approach LOS	C			A	A			

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		40.0		6.8	16.6	23.4		
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0		
Max Green Setting (Gmax), s		36.0		16.0	16.0	16.0		
Max Q Clear Time (g_c+I1), s		7.5		3.7	12.4	4.5		
Green Ext Time (p_c), s		15.4		0.2	0.3	8.3		

Intersection Summary	
HCM 2010 Ctrl Delay	8.3
HCM 2010 LOS	A

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBU	NBL	NBR
Vol, veh/h	0	1	108	0	10	1	0	110	36
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	1	108	0	10	1	0	110	36
Number of Lanes	0	1	0	0	0	1	0	2	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	3	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	3	0	1
HCM Control Delay	7.7	8.4	7.7
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	NBLn3	EBLn1	WBLn1
Vol Left, %	100%	100%	0%	0%	91%
Vol Thru, %	0%	0%	0%	1%	9%
Vol Right, %	0%	0%	100%	99%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	55	55	36	109	11
LT Vol	0	0	0	1	1
Through Vol	0	0	36	108	0
RT Vol	55	55	0	0	10
Lane Flow Rate	55	55	36	109	11
Geometry Grp	7	7	7	7	7
Degree of Util (X)	0.082	0.082	0.023	0.131	0.017
Departure Headway (Hd)	5.38	5.38	2.305	4.33	5.556
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	660	660	1511	833	648
Service Time	3.16	3.16	0.083	2.03	3.258
HCM Lane V/C Ratio	0.083	0.083	0.024	0.131	0.017
HCM Control Delay	8.6	8.6	5.1	7.7	8.4
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.3	0.3	0.1	0.5	0.1

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	15	994	0	0	913	62	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	-	-	200	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10
Mvmt Flow	15	994	0	0	913	62	1	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	913	0	0	994	0	0	1481	1937	497
Stage 1	-	-	-	-	-	-	1024	1024	-
Stage 2	-	-	-	-	-	-	457	913	-
Critical Hdwy	4.3	-	-	4.3	-	-	7.7	6.7	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	6.7	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.7	5.7	-
Follow-up Hdwy	2.3	-	-	2.3	-	-	3.6	4.1	3.4
Pot Cap-1 Maneuver	694	-	-	645	-	-	81	59	498
Stage 1	-	-	-	-	-	-	238	294	-
Stage 2	-	-	-	-	-	-	532	333	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	694	-	-	645	-	-	79	58	498
Mov Cap-2 Maneuver	-	-	-	-	-	-	79	58	-
Stage 1	-	-	-	-	-	-	233	288	-
Stage 2	-	-	-	-	-	-	529	333	-

Approach	EB	WB	NB
HCM Control Delay, s	0.2	0	51.2
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	79	694	-	-	645	-	-	86	529
HCM Lane V/C Ratio	0.013	0.022	-	-	-	-	-	0.593	0.006
HCM Control Delay (s)	51.2	10.3	-	-	0	-	-	95.1	11.8
HCM Lane LOS	F	B	-	-	A	-	-	F	B
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	2.7	0

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	51	0	3
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	0	-	200
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	10	10	10
Mvmt Flow	51	0	3

Major/Minor	Minor2		
Conflicting Flow All	1440	1937	457
Stage 1	913	913	-
Stage 2	527	1024	-
Critical Hdwy	7.7	6.7	7.1
Critical Hdwy Stg 1	6.7	5.7	-
Critical Hdwy Stg 2	6.7	5.7	-
Follow-up Hdwy	3.6	4.1	3.4
Pot Cap-1 Maneuver	87	59	529
Stage 1	279	333	-
Stage 2	482	294	-
Platoon blocked, %			
Mov Cap-1 Maneuver	86	58	529
Mov Cap-2 Maneuver	86	58	-
Stage 1	273	333	-
Stage 2	472	288	-

Approach	SB
HCM Control Delay, s	90.5
HCM LOS	F

Minor Lane/Major Mvmt

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	14	1032	0	6	925	77	9	2	2	113	6	39
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1600	1455	1455	1455	1600	1455	1600	1455	1455	1455
Adj Flow Rate, veh/h	14	1032	0	6	925	77	9	2	2	117	0	39
Adj No. of Lanes	1	2	0	1	2	1	0	1	0	2	0	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	19	1066	0	9	1045	444	198	44	44	579	0	259
Arrive On Green	0.01	0.37	0.00	0.01	0.36	0.36	0.21	0.21	0.21	0.21	0.00	0.21
Sat Flow, veh/h	1385	2909	0	1385	2909	1236	948	211	211	2771	0	1236
Grp Volume(v), veh/h	14	1032	0	6	925	77	13	0	0	117	0	39
Grp Sat Flow(s),veh/h/ln	1385	1455	0	1385	1455	1236	1370	0	0	1385	0	1236
Q Serve(g_s), s	0.8	26.7	0.0	0.3	22.9	3.3	0.6	0.0	0.0	2.7	0.0	2.0
Cycle Q Clear(g_c), s	0.8	26.7	0.0	0.3	22.9	3.3	0.6	0.0	0.0	2.7	0.0	2.0
Prop In Lane	1.00		0.00	1.00		1.00	0.69		0.15	1.00		1.00
Lane Grp Cap(c), veh/h	19	1066	0	9	1045	444	286	0	0	579	0	259
V/C Ratio(X)	0.75	0.97	0.00	0.69	0.89	0.17	0.05	0.00	0.00	0.20	0.00	0.15
Avail Cap(c_a), veh/h	72	1066	0	72	1065	452	286	0	0	579	0	259
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	37.6	23.8	0.0	37.9	23.0	16.8	24.2	0.0	0.0	25.0	0.0	24.7
Incr Delay (d2), s/veh	44.9	20.2	0.0	67.7	9.0	0.2	0.3	0.0	0.0	0.8	0.0	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	13.6	0.0	0.3	10.4	1.1	0.2	0.0	0.0	1.1	0.0	0.8
LnGrp Delay(d),s/veh	82.6	44.0	0.0	105.6	32.0	16.9	24.5	0.0	0.0	25.8	0.0	25.9
LnGrp LOS	F	D		F	C	B	C			C		C
Approach Vol, veh/h		1046			1008			13			156	
Approach Delay, s/veh		44.5			31.3			24.5			25.8	
Approach LOS		D			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		20.0	4.5	32.0		20.0	5.0	31.5
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	4.0	28.0		16.0	4.0	28.0
Max Q Clear Time (g_c+I1), s		2.6	2.3	28.7		4.7	2.8	24.9
Green Ext Time (p_c), s		0.0	0.0	0.0		0.4	0.0	2.6

Intersection Summary	
HCM 2010 Ctrl Delay	37.1
HCM 2010 LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	52	1019	37	14	806	284	68	71	23	1243	302	134
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1600	1455	1455	1600	1600	1455	1600	1309	1455	1455
Adj Flow Rate, veh/h	52	1019	37	14	806	0	68	71	23	1243	302	134
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	2	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	37	892	32	16	886	0	75	78	25	1077	628	534
Arrive On Green	0.03	0.32	0.32	0.01	0.30	0.00	0.13	0.13	0.13	0.43	0.43	0.43
Sat Flow, veh/h	1385	2790	101	1385	2909	0	584	609	197	2494	1455	1236
Grp Volume(v), veh/h	52	531	525	14	806	0	162	0	0	1243	302	134
Grp Sat Flow(s),veh/h/ln	1385	1455	1437	1385	1455	0	1391	0	0	1247	1455	1236
Q Serve(g_s), s	4.0	47.4	47.4	1.5	39.5	0.0	17.0	0.0	0.0	64.0	22.0	10.2
Cycle Q Clear(g_c), s	4.0	47.4	47.4	1.5	39.5	0.0	17.0	0.0	0.0	64.0	22.0	10.2
Prop In Lane	1.00		0.07	1.00		0.00	0.42		0.14	1.00		1.00
Lane Grp Cap(c), veh/h	37	465	460	16	886	0	178	0	0	1077	628	534
V/C Ratio(X)	1.39	1.14	1.14	0.85	0.91	0.00	0.91	0.00	0.00	1.15	0.48	0.25
Avail Cap(c_a), veh/h	37	465	460	37	923	0	178	0	0	1077	628	534
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	72.1	50.4	50.4	73.1	49.5	0.0	63.7	0.0	0.0	42.1	30.2	26.8
Incr Delay (d2), s/veh	282.3	86.7	87.0	68.3	12.5	0.0	46.8	0.0	0.0	80.1	2.6	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.5	30.2	29.9	0.9	17.4	0.0	8.9	0.0	0.0	34.0	9.3	3.7
LnGrp Delay(d),s/veh	354.3	137.1	137.3	141.4	62.0	0.0	110.6	0.0	0.0	122.1	32.8	27.9
LnGrp LOS	F	F	F	F	E		F			F	C	C
Approach Vol, veh/h		1108			820			162			1679	
Approach Delay, s/veh		147.4			63.4			110.6			98.6	
Approach LOS		F			E			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		23.0	5.8	51.4		68.0	8.0	49.1
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		19.0	4.0	47.0		64.0	4.0	47.0
Max Q Clear Time (g_c+I1), s		19.0	3.5	49.4		66.0	6.0	41.5
Green Ext Time (p_c), s		0.0	0.0	0.0		0.0	0.0	3.7

Intersection Summary	
HCM 2010 Ctrl Delay	105.8
HCM 2010 LOS	F

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	1183	948	0	774	155
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1455	1455	0	1309	1309
Adj Flow Rate, veh/h	0	1183	948	0	774	155
Adj No. of Lanes	0	4	3	0	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	10	10	0	10	10
Cap, veh/h	0	2864	2148	0	939	838
Arrive On Green	0.00	0.49	0.49	0.00	0.38	0.38
Sat Flow, veh/h	0	5818	4364	0	2494	2225
Grp Volume(v), veh/h	0	1183	948	0	774	155
Grp Sat Flow(s),veh/h/ln	0	1455	1455	0	1247	1113
Q Serve(g_s), s	0.0	7.9	8.6	0.0	17.1	2.8
Cycle Q Clear(g_c), s	0.0	7.9	8.6	0.0	17.1	2.8
Prop In Lane	0.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	0	2864	2148	0	939	838
V/C Ratio(X)	0.00	0.41	0.44	0.00	0.82	0.18
Avail Cap(c_a), veh/h	0	2864	2148	0	1718	1533
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	9.9	10.0	0.0	17.2	12.7
Incr Delay (d2), s/veh	0.0	0.4	0.7	0.0	1.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.2	3.6	0.0	6.1	0.9
LnGrp Delay(d),s/veh	0.0	10.3	10.7	0.0	19.1	12.8
LnGrp LOS		B	B		B	B
Approach Vol, veh/h		1183	948		929	
Approach Delay, s/veh		10.3	10.7		18.0	
Approach LOS		B	B		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				53.0		27.0		53.0
Change Period (Y+Rc), s				4.0		4.0		4.0
Max Green Setting (Gmax), s				30.0		42.0		30.0
Max Q Clear Time (g_c+I1), s				9.9		19.1		10.6
Green Ext Time (p_c), s				13.2		3.8		12.9

Intersection Summary	
HCM 2010 Ctrl Delay	12.8
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1719	0	0	998	594	628
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	0	0	1455	1309	1455
Adj Flow Rate, veh/h	1719	0	0	998	594	628
Adj No. of Lanes	4	0	0	3	3	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	0	0	10	10	10
Cap, veh/h	1964	0	0	1473	2104	695
Arrive On Green	0.34	0.00	0.00	0.34	0.56	0.56
Sat Flow, veh/h	5818	0	0	4364	3740	1236
Grp Volume(v), veh/h	1719	0	0	998	594	628
Grp Sat Flow(s),veh/h/ln	1455	0	0	1455	1247	1236
Q Serve(g_s), s	22.2	0.0	0.0	15.7	6.6	36.1
Cycle Q Clear(g_c), s	22.2	0.0	0.0	15.7	6.6	36.1
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1964	0	0	1473	2104	695
V/C Ratio(X)	0.88	0.00	0.00	0.68	0.28	0.90
Avail Cap(c_a), veh/h	1964	0	0	1473	2104	695
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.9	0.0	0.0	22.8	9.1	15.6
Incr Delay (d2), s/veh	5.8	0.0	0.0	2.5	0.3	17.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.6	0.0	0.0	6.6	2.3	15.5
LnGrp Delay(d),s/veh	30.8	0.0	0.0	25.3	9.4	32.8
LnGrp LOS	C			C	A	C
Approach Vol, veh/h	1719			998	1222	
Approach Delay, s/veh	30.8			25.3	21.5	
Approach LOS	C			C	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		49.0		31.0				31.0
Change Period (Y+Rc), s		4.0		4.0				4.0
Max Green Setting (Gmax), s		45.0		27.0				27.0
Max Q Clear Time (g_c+I1), s		38.1		24.2				17.7
Green Ext Time (p_c), s		3.1		2.6				8.2

Intersection Summary	
HCM 2010 Ctrl Delay	26.5
HCM 2010 LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	92	296	100	311	1379	97
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1455	1455	1455	1455	1455	1455
Adj Flow Rate, veh/h	92	296	100	311	1379	97
Adj No. of Lanes	1	1	1	3	3	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10	10	10	10
Cap, veh/h	367	327	118	2625	1961	556
Arrive On Green	0.26	0.26	0.09	0.60	0.45	0.45
Sat Flow, veh/h	1385	1236	1385	4364	4364	1236
Grp Volume(v), veh/h	92	296	100	311	1379	97
Grp Sat Flow(s),veh/h/ln	1385	1236	1385	1455	1455	1236
Q Serve(g_s), s	3.1	13.8	4.3	1.8	15.2	2.8
Cycle Q Clear(g_c), s	3.1	13.8	4.3	1.8	15.2	2.8
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	367	327	118	2625	1961	556
V/C Ratio(X)	0.25	0.90	0.85	0.12	0.70	0.17
Avail Cap(c_a), veh/h	370	331	185	2625	1961	556
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.3	21.3	27.0	5.1	13.3	9.8
Incr Delay (d2), s/veh	0.4	26.7	18.6	0.1	2.1	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	10.9	2.2	0.7	6.4	1.0
LnGrp Delay(d),s/veh	17.7	48.0	45.6	5.2	15.4	10.5
LnGrp LOS	B	D	D	A	B	B
Approach Vol, veh/h	388			411	1476	
Approach Delay, s/veh	40.8			15.0	15.1	
Approach LOS	D			B	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		40.0		19.9	9.1	30.9		
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0		
Max Green Setting (Gmax), s		36.0		16.0	8.0	24.0		
Max Q Clear Time (g_c+I1), s		3.8		15.8	6.3	17.2		
Green Ext Time (p_c), s		15.1		0.0	0.0	5.1		

Intersection Summary	
HCM 2010 Ctrl Delay	19.5
HCM 2010 LOS	B

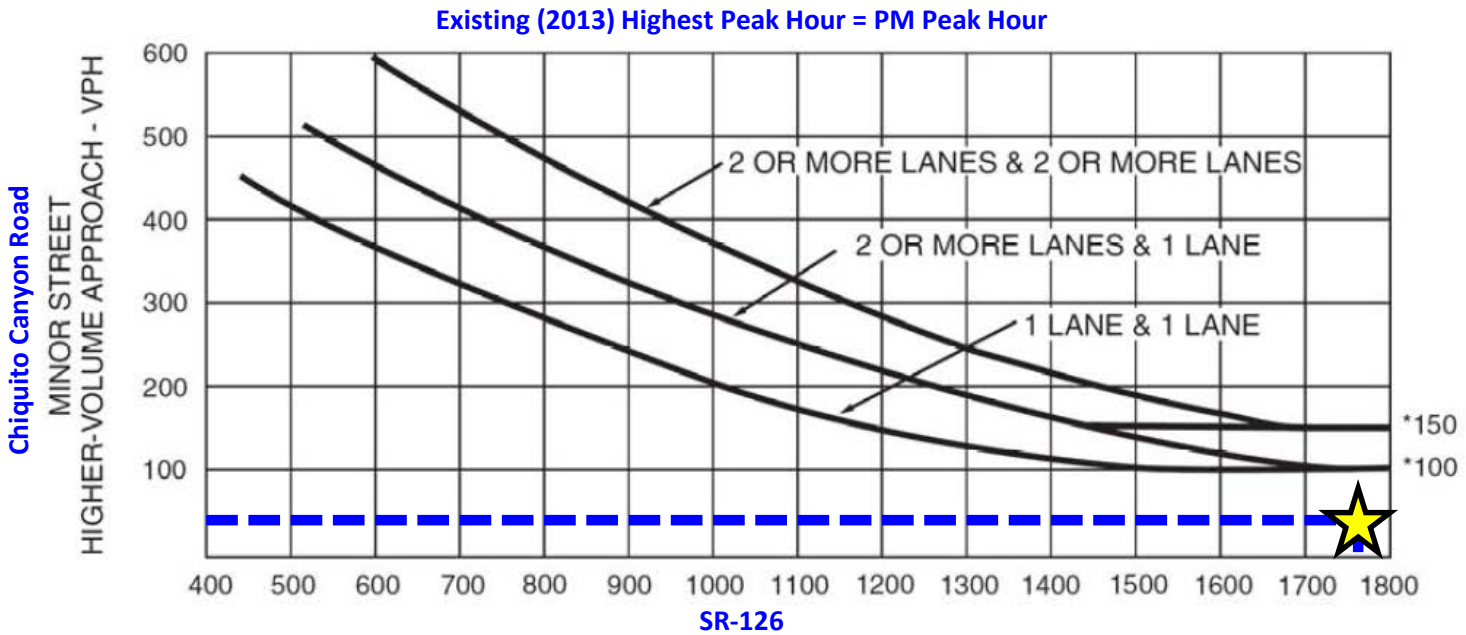
Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBU	NBL	NBR
Vol, veh/h	0	1	112	0	46	1	0	81	12
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	1	112	0	46	1	0	81	12
Number of Lanes	0	1	0	0	0	1	0	2	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	3	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	3	0	1
HCM Control Delay	7.6	8.6	8.2
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	NBLn3	EBLn1	WBLn1
Vol Left, %	100%	100%	0%	0%	98%
Vol Thru, %	0%	0%	0%	1%	2%
Vol Right, %	0%	0%	100%	99%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	41	41	12	113	47
LT Vol	0	0	0	1	1
Through Vol	0	0	12	112	0
RT Vol	41	41	0	0	46
Lane Flow Rate	40	40	12	113	47
Geometry Grp	7	7	7	7	7
Degree of Util (X)	0.063	0.063	0.008	0.134	0.072
Departure Headway (Hd)	5.558	5.558	2.479	4.261	5.485
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	647	647	1446	845	656
Service Time	3.27	3.27	0.19	1.97	3.195
HCM Lane V/C Ratio	0.062	0.062	0.008	0.134	0.072
HCM Control Delay	8.6	8.6	5.2	7.6	8.6
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.2	0.2	0	0.5	0.2

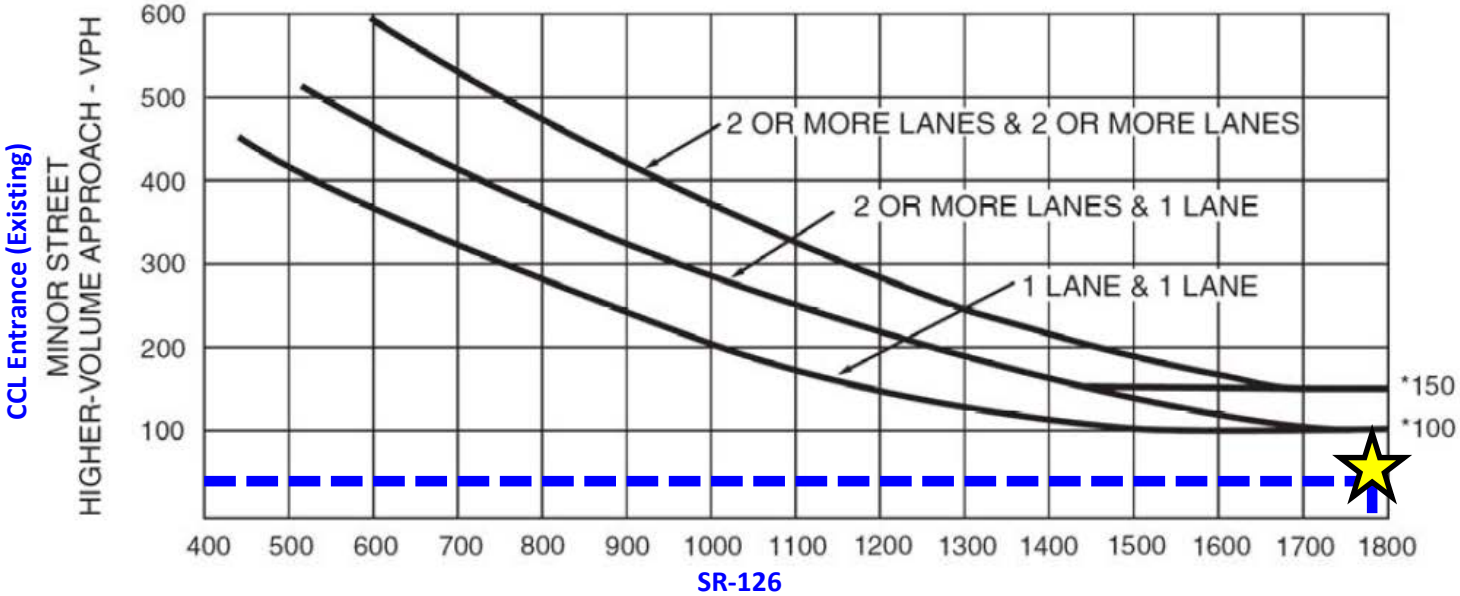
APPENDIX D
TRAFFIC SIGNAL WARRANT WORKSHEETS



MAJOR STREET—TOTAL OF BOTH APPROACHES—
VEHICLES PER HOUR (VPH)

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

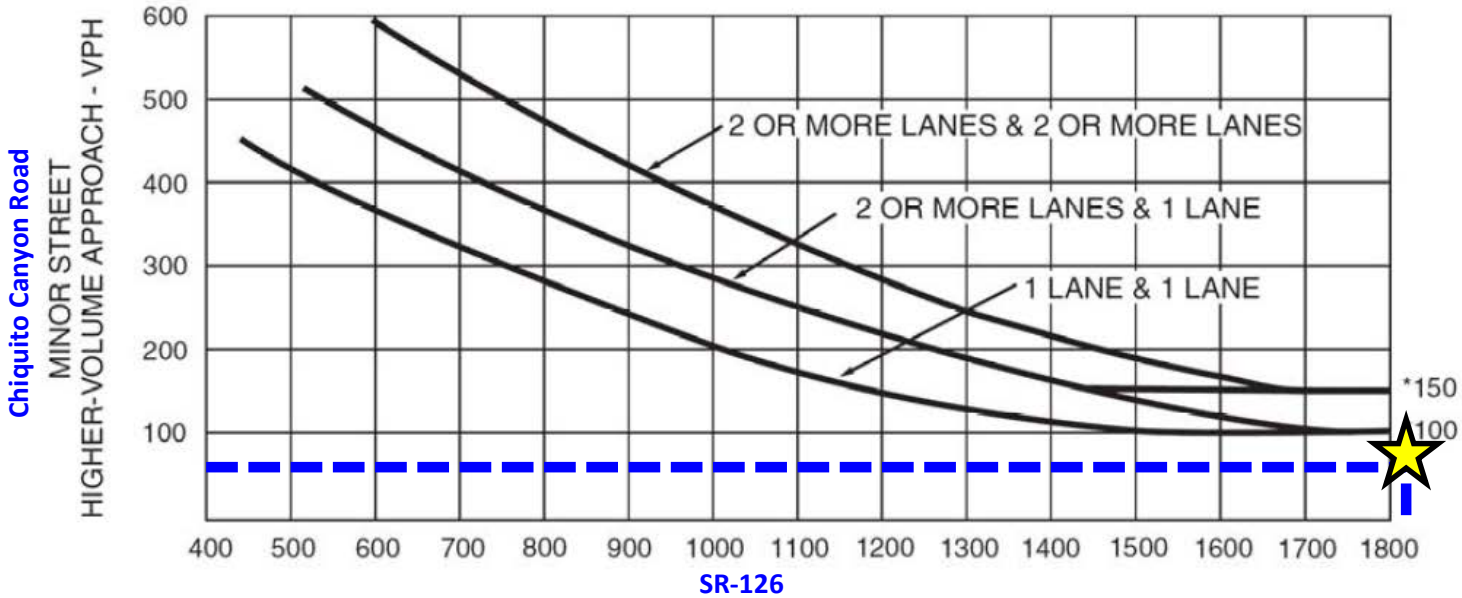
Existing (2013) Highest Peak Hour = PM Peak Hour



MAJOR STREET—TOTAL OF BOTH APPROACHES—
VEHICLES PER HOUR (VPH)

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

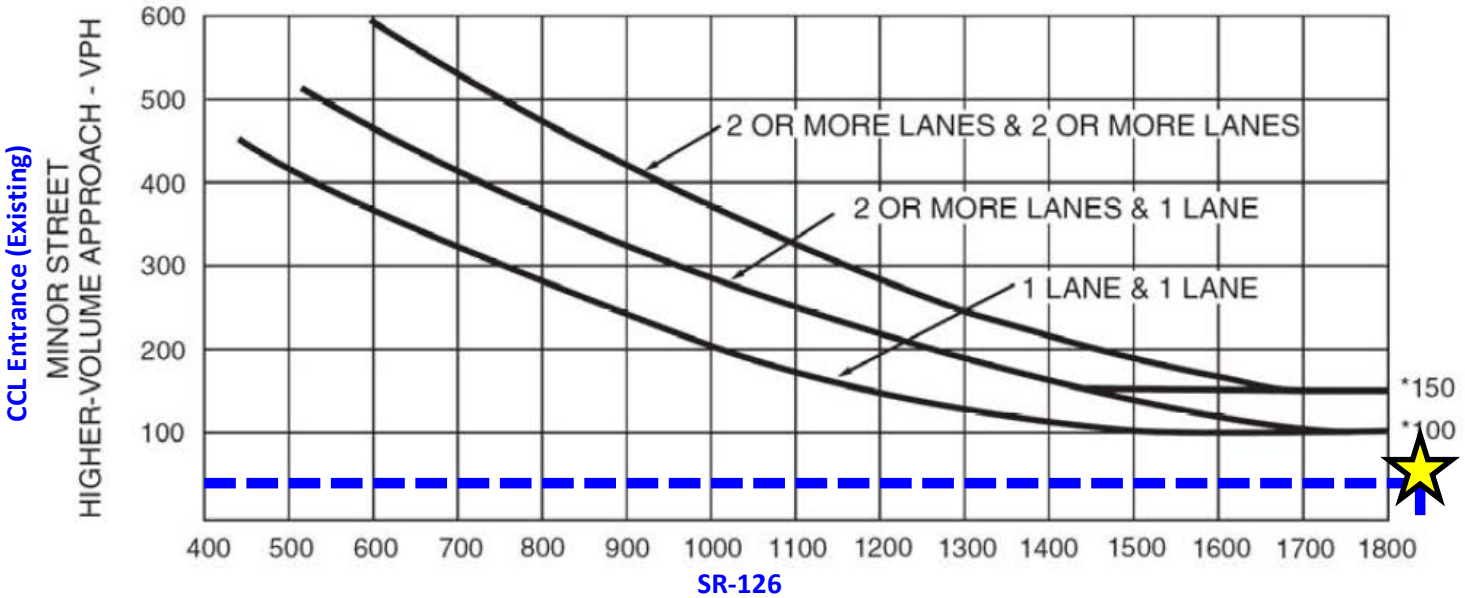
Existing plus Growth without Project Highest Peak Hour = PM Peak Hour



MAJOR STREET—TOTAL OF BOTH APPROACHES—
VEHICLES PER HOUR (VPH)

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

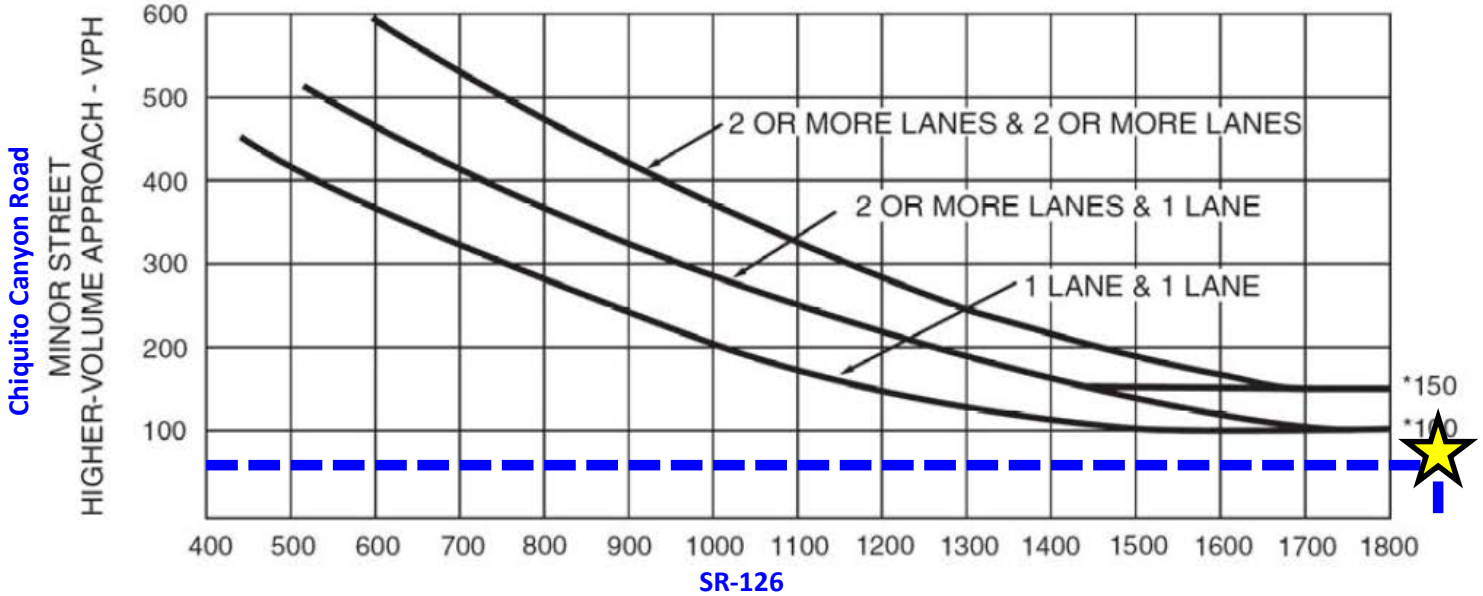
Existing plus Growth without Project Highest Peak Hour = PM Peak Hour



MAJOR STREET—TOTAL OF BOTH APPROACHES—
VEHICLES PER HOUR (VPH)

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

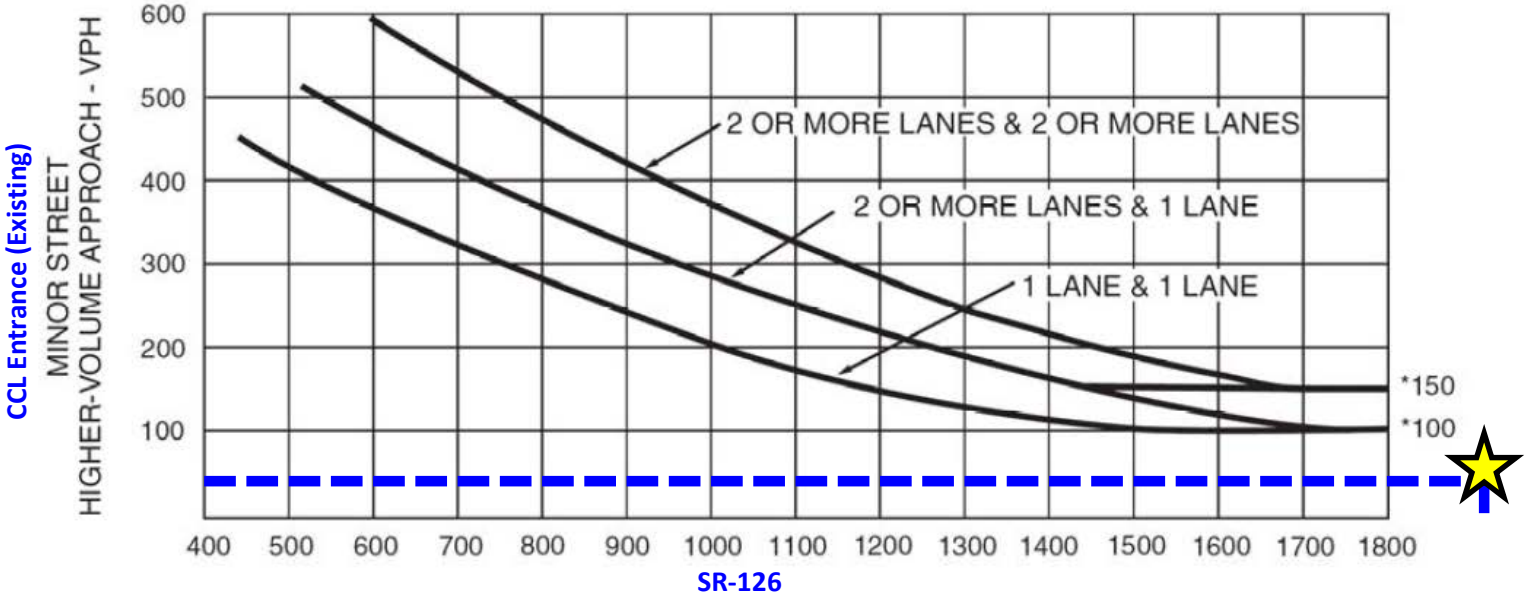
Existing plus Growth plus Other Development without Project Highest Peak Hour = PM Peak Hour



MAJOR STREET—TOTAL OF BOTH APPROACHES—
VEHICLES PER HOUR (VPH)

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

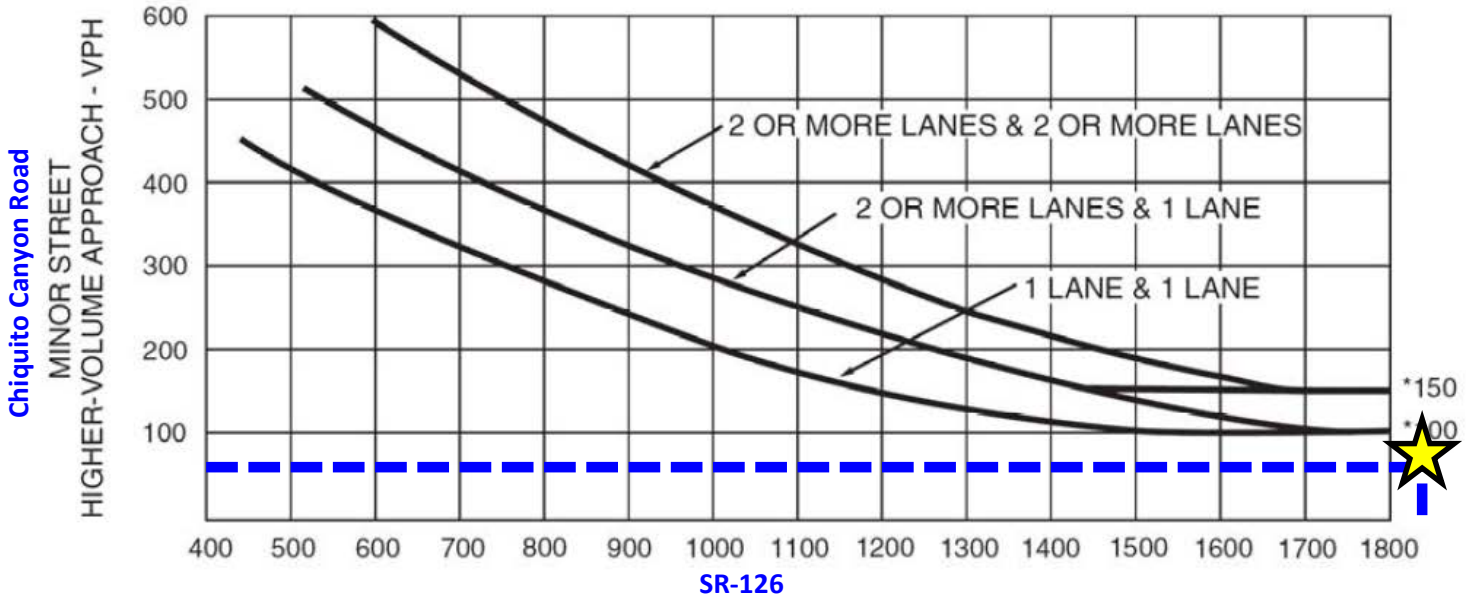
Existing plus Growth plus Other Development without Project Highest Peak Hour = PM Peak Hour



MAJOR STREET—TOTAL OF BOTH APPROACHES—
VEHICLES PER HOUR (VPH)

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

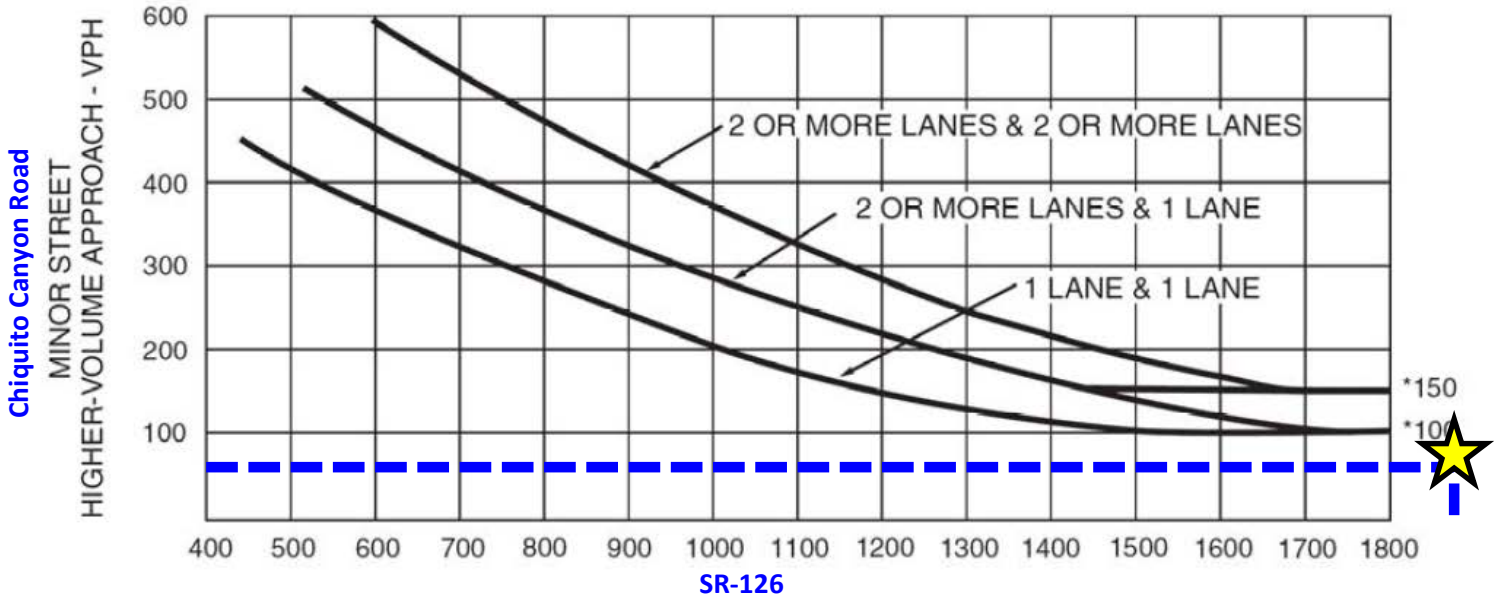
Existing plus Growth with Project Highest Peak Hour = PM Peak Hour



MAJOR STREET—TOTAL OF BOTH APPROACHES—
VEHICLES PER HOUR (VPH)

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Existing plus Growth plus Other Development with Project Highest Peak Hour = PM Peak Hour



MAJOR STREET—TOTAL OF BOTH APPROACHES—
VEHICLES PER HOUR (VPH)

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

APPENDIX E
TRAFFIC INDEX CALCULATION WORKSHEETS

10-Year Traffic Index Calculations

Roadway: SR-126 **Limits:** Wolcott Way to Commerce Center

	2014 without Project			10-Year		
	(A)	(B)	(C)	(D)	(E)	(F)
Axle	**24-Hour TAB Volumes**	**EWL Constants**	**Existing EWL (A) x (B)**	**Ambient Growth***	**24-Hour TAB Volumes (A) x $(1+D/100)^{10}$**	**10 Year EWL (E) x (B)**
2	802	300	240,600	2.75	1052	315,600
3	593	920	545,560	2.75	778	715,760
4	373	1320	492,360	2.75	489	645,480
5	2601	4080	10,612,080	2.75	3412	13,920,960
Total			**11,890,600**			**15,597,800**

* Based on LA County CMP and signed MOU.

10-Year EWL = $\frac{\text{(C) Total + (F) Total}}{2}$ **x 10 = 137,442,000**

10-Year TI = 12.0 (based on 2014 without project volumes)

Roadway: Wolcott Way **Limits:** SR-126 to Franklin Pkwy

	2014 without Project			10-Year		
	(A)	(B)	(C)	(D)	(E)	(F)
Axle	**24-Hour TAB Volumes**	**EWL Constants**	**Existing EWL (A) x (B)**	**Ambient Growth***	**24-Hour TAB Volumes (A) x $(1+D/100)^{10}$**	**10 Year EWL (E) x (B)**
2	13	300	3,900	2.75	17	5,100
3	10	920	9,200	2.75	13	11,960
4	6	1320	7,920	2.75	8	10,560
5	43	4080	175,440	2.75	56	228,480
Total			**196,460**			**256,100**

* Based on LA County CMP and signed MOU.

10-Year EWL = $\frac{\text{(C) Total + (F) Total}}{2}$ **x 10 = 2,262,800**

10-Year TI = 7.5 (based on 2014 without project volumes)

Roadway: SR-126 **Limits:** Wolcott Way to Commerce Center

	2014 with Project			10-Year		
	(A)	(B)	(C)	(D)	(E)	(F)
Axle	24-Hour TAB Volumes	EWL Constants	Existing EWL (A) x (B)	Ambient Growth*	24-Hour TAB Volumes (A) x $(1+D/100)^{10}$	10 Year EWL (E) x (B)
2	846	300	253,800	2.75	1110	333,000
3	626	920	575,920	2.75	821	755,320
4	394	1320	520,080	2.75	517	682,440
5	2745	4080	11,199,600	2.75	3600	14,688,000
Total			**12,549,400**			**16,458,760**

* Based on LA County CMP and signed MOU.

10-Year EWL = $\frac{\text{(C) Total + (F) Total}}{2}$ **x 10 = 145,040,800**

10-Year TI = 12.0 (based on 2014 with project volumes)

Roadway: Wolcott Way **Limits:** SR-126 to Franklin Pkwy

	2014 with Project			10-Year		
	(A)	(B)	(C)	(D)	(E)	(F)
Axle	24-Hour TAB Volumes	EWL Constants	Existing EWL (A) x (B)	Ambient Growth*	24-Hour TAB Volumes (A) x $(1+D/100)^{10}$	10 Year EWL (E) x (B)
2	76	300	22,800	2.75	100	30,000
3	56	920	51,520	2.75	73	67,160
4	35	1320	46,200	2.75	46	60,720
5	245	4080	999,600	2.75	321	1,309,680
Total			**1,120,120**			**1,467,560**

* Based on LA County CMP and signed MOU.

10-Year EWL = $\frac{\text{(C) Total + (F) Total}}{2}$ **x 10 = 12,938,400**

10-Year TI = 9.0 (based on 2014 with project volumes)

20-Year Traffic Index Calculations

Roadway: SR-126 **Limits:** Wolcott Way to Commerce Center

	2014 without Project			20-Year		
	(A)	(B)	(C)	(D)	(E)	(F)
Axle	24-Hour TAB Volumes	EWL Constants	Existing EWL (A) x (B)	Ambient Growth*	24-Hour TAB Volumes (A) x $(1+D/100)^{20}$	20 Year EWL (E) x (B)
2	802	300	240,600	2.75	1380	414,000
3	593	920	545,560	2.75	1020	938,400
4	373	1320	492,360	2.75	642	847,440
5	2601	4080	10,612,080	2.75	4475	18,258,000
Total			**11,890,600**			**20,457,840**

* Based on LA County CMP and signed MOU.

20-Year EWL = $\frac{\text{(C) Total + (F) Total}}{2}$ **x 20 = 323,484,400**

20-Year TI = 13.5 (based on 2014 without project volumes)

Roadway: Wolcott Way **Limits:** SR-126 to Franklin Pkwy

	2014 without Project			20-Year		
	(A)	(B)	(C)	(D)	(E)	(F)
Axle	24-Hour TAB Volumes	EWL Constants	Existing EWL (A) x (B)	Ambient Growth*	24-Hour TAB Volumes (A) x $(1+D/100)^{20}$	20 Year EWL (E) x (B)
2	13	300	3,900	2.75	22	6,600
3	10	920	9,200	2.75	17	15,640
4	6	1320	7,920	2.75	10	13,200
5	43	4080	175,440	2.75	74	301,920
Total			**196,460**			**337,360**

* Based on LA County CMP and signed MOU.

20-Year EWL = $\frac{\text{(C) Total + (F) Total}}{2}$ **x 20 = 5,338,200**

20-Year TI = 8.0 (based on 2014 without project volumes)

Roadway: SR-126 **Limits:** Wolcott Way to Commerce Center

	2014 with Project			20-Year		
	(A)	(B)	(C)	(D)	(E)	(F)
Axle	24-Hour TAB Volumes	EWL Constants	Existing EWL (A) x (B)	Ambient Growth*	24-Hour TAB Volumes (A) x $(1+D/100)^{20}$	20 Year EWL (E) x (B)
2	846	300	253,800	2.75	1455	436,500
3	626	920	575,920	2.75	1077	990,840
4	394	1320	520,080	2.75	678	894,960
5	2745	4080	11,199,600	2.75	4723	19,269,840
Total			**12,549,400**			**21,592,140**

* Based on LA County CMP and signed MOU.

20-Year EWL = $\frac{\text{(C) Total + (F) Total}}{2}$ **x 20 = 341,415,400**

20-Year TI = 13.5 (based on 2014 with project volumes)

Roadway: Wolcott Way **Limits:** SR-126 to Franklin Pkwy

	2014 with Project			20-Year		
	(A)	(B)	(C)	(D)	(E)	(F)
Axle	24-Hour TAB Volumes	EWL Constants	Existing EWL (A) x (B)	Ambient Growth*	24-Hour TAB Volumes (A) x $(1+D/100)^{20}$	20 Year EWL (E) x (B)
2	76	300	22,800	2.75	131	39,300
3	56	920	51,520	2.75	96	88,320
4	35	1320	46,200	2.75	60	79,200
5	245	4080	999,600	2.75	422	1,721,760
Total			**1,120,120**			**1,928,580**

* Based on LA County CMP and signed MOU.

20-Year EWL = $\frac{\text{(C) Total + (F) Total}}{2}$ **x 20 = 30,487,000**

20-Year TI = 10.0 (based on 2014 with project volumes)

Appendix H
Air Quality

Air Quality Appendix H1
Methodology

H.1 Methodology

This section presents the methodology used to estimate emissions and perform dispersion modeling for the Proposed Project. Emissions were estimated for the incremental increase in activity associated with the Proposed Project, and were not calculated for activity associated with the existing landfill.

H.1.1 Emission Calculation Methodology

Three years were determined to be representative of maximum impacts from construction and operation of the Proposed Project and were selected for further analysis: 2016, 2021, and 2032. The first year of cell construction for the Proposed Project would be 2016. Construction activities associated with entrance relocation would occur in 2014; however emissions calculated for entrance relocation were lower than emissions calculated for cell construction. Maximum impacts from cell construction would occur in 2016 because emissions from off-road diesel equipment would decrease over time as engines are replaced to meet the California Air Resources Board (CARB) emission requirements for a large fleet (CARB, 2013a). It was assumed that operation of the Proposed Project would ramp up over a 7-year period starting January 1, 2014. Therefore partial operation of the Proposed Project would also occur in 2016. Full operational buildout would occur in 2021, the same year in which the first new flare would be added and construction of the second cell would occur. Therefore, 2021 would be the worst case combined operation and construction year. Year 2033 represents the maximum year of landfill fugitive emissions; however the landfill closure date is 2032, and emissions would be higher when operation and landfill gas (LFG) generation overlap. A second new flare would be added in 2030, and all operational sources would be the same in 2032 as in 2030; therefore 2032 will be modeled as the worst case LFG generation year.

H.1.1.1 Construction Emissions

Short-term emissions of oxides of nitrogen (NOx), volatile organic compounds (VOC), CO, sulfur oxides (SOx), particulate matter with aerodynamic diameter less than or equal to 10 microns (PM_{10}), and particulate matter with aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$) would be generated during entrance relocation and construction of new landfill modules. Construction activities during entrance relocation include site preparation, road construction, and foundation construction. Construction activities during landfill module construction include site preparation and excavation. Onsite and offsite construction emissions were divided into three categories: vehicle and construction equipment exhaust, fugitive dust generated by paved and unpaved road travel, and fugitive dust generated from earthmoving activities and paving activities. During onsite construction, activities are assumed to occur during daylight hours, for 5 days per week, or 20 days per month, and for 6 months a year during the late spring, summer, and early fall.

The Proposed Project would include best management practices (BMP) to reduce emissions during construction. Therefore, the following emission reductions were included in the unmitigated construction emissions to account for implementation of BMPs:

- The construction equipment would be equipped with engines meeting CARB requirements for a large fleet at the time of construction (CARB, 2013a). This would include a combination of Tier 3 and Tier 4 compliant equipment.
- The construction equipment would be equipped with diesel particulate filters (DPF) and lean NOx catalyst, which would result in an 85 percent reduction for particulate matter and a 40 percent reduction for NOx (EPA, 2013f).
- Unnecessary truck and equipment idling would be limited to less than 2 minutes, to the extent feasible.
- Use of all construction equipment would be suspended during second stage smog alerts (SCAQMD, 1993).
- Fugitive dust from vehicle travel on paved roads would be controlled using a 25-foot-long gravel trackout apron, which would result in a 46 percent reduction in particulate matter emissions (South Coast Air Quality Management District [SCAQMD], 2013a and 2013b). Paved roads would be cleaned three times

daily using a SCAQMD-approved street sweeper, which would result in an additional 45 percent emissions reduction for particulate matter (Western Regional Air Partnership [WRAP], 2006a).

- Fugitive dust from vehicle travel on unpaved roads would be controlled through watering two times daily, the use of dust palliatives, paving as much as possible, and limiting the maximum vehicle speed to 15 miles per hour, which would result in a combined effective control efficiency of 90 percent (SCAQMD, 2013c; WRAP, 2006b).
- Fugitive dust from soil disturbance would be suppressed with hourly watering and dust suppressant application, which would reduce particulate matter emissions by 90 percent (WRAP, 2006c).

Construction Exhaust Emissions

Construction equipment exhaust emissions of VOC, CO, and SOx were estimated using SCAQMD OFFROAD 2007 emission factors, while NOx, PM_{10}, and $PM_{2.5}$ emissions were estimated using CARB emission factors by engine tier level. Though CARB has released an updated version of the OFFROAD model, OFFROAD 2011, it was not used for this analysis as it provides inventory level emissions, not equipment specific emission factors. The construction equipment and trucks used for routine maintenance activities were considered onsite emission sources while worker commutes were considered offsite emission sources. As previously discussed, it was assumed that the construction equipment fleet would meet CARB requirements for a large fleet and be equipped with DPF as a project BMP. On-road vehicle exhaust emissions were estimated using EMFAC2011 average emission factors for SCAQMD. It was assumed that maintenance trucks would travel 5 miles per day onsite and employees would commute a distance of 40 miles roundtrip each. The vehicle exhaust emission calculation spreadsheets are included in Appendix H-2.

Construction Fugitive Dust Emissions from Vehicles and Equipment

Fugitive dust would result from vehicle travel on unpaved and paved roads, and soil disturbing activities such as module excavation. Fugitive dust emissions from vehicle travel on unpaved and paved roads were estimated using United States Environmental Protection Agency (EPA)-approved emission factors and methodology published in AP-42 (EPA, 2006). As discussed above, it was assumed that a gravel trackout apron would be used and paved roads would be cleaned three times daily as project BMPs; therefore, unmitigated particulate matter emissions from vehicle travel on paved roads were reduced by 90 percent. It was also assumed that unpaved roads would be watered two times daily, dust palliatives would be applied, and vehicle speed on unpaved roads would be reduced to 15 miles per hour as project BMPs. Therefore, the unmitigated unpaved road emissions were reduced by 90 percent. The fugitive dust emission calculation spreadsheets are included in Appendix H-2.

Fugitive dust emissions from soil disturbance (e.g., grading activities) were estimated using recommended emission factors from the SCAQMD *California Environmental Quality Act (CEQA) Air Quality Handbook* (SCAQMD, 1993). As previously discussed, it was assumed that areas with soil disturbance would be watered hourly and palliatives would be applied as project BMPs. Therefore, the unmitigated fugitive dust emissions from disturbed areas were reduced by 90 percent. The fugitive dust emission calculation spreadsheets are included in Appendix H-2.

H.1.1.2 Operation Emissions

Long-term emissions of NOx, VOC, CO, SOx, PM_{10}, and $PM_{2.5}$ would be generated from operation of the Proposed Project. Proposed Project operation emissions would be generated from routine landfill maintenance activities, worker commute trips, haul truck trips, fugitive LFG, and LFG flares operated onsite. Onsite and offsite operation emissions were divided into five categories: vehicle exhaust, stationary source exhaust, fugitive dust generated by paved and unpaved road travel, fugitive dust generated from earthmoving activities, and fugitive LFG. Operations at the landfill are assumed to occur 6 days per week, for a total of 312 days per year.

The project would include BMPs to reduce emissions during operation. Therefore, the following emission reductions were included in the unmitigated operation emissions to account for implementation of BMPs:

- Additional off-road diesel equipment would be equipped with engines meeting Tier 4 emission standards.
- Additional off-road diesel equipment would be equipped with DPF, which would result in an 85 percent reduction for particulate matter and a 40 percent reduction for NOx (EPA, 2013f).
- Unnecessary truck and equipment idling would be limited to less than 2 minutes, to the extent feasible.
- Use of all off-road diesel equipment would be suspended during second stage smog alerts (SCAQMD, 1993).
- Fugitive dust from vehicle travel on paved roads would be controlled through the use of a 25-foot-long gravel trackout apron and three times daily cleaning of the paved roads, which would result in a 90 percent reduction in particulate matter emissions (SCAQMD, 2013a and 2013b; WRAP, 2006a).
- Fugitive dust from vehicle travel on unpaved roads would be controlled through watering two times daily, applying dust palliatives at least twice a year, paving as much as possible, and limiting the maximum vehicle speed to 15 miles per hour, which would result in a combined effective control efficiency of 90 percent (SCAQMD, 2013c; WRAP, 2006b).
- Fugitive dust from soil disturbance would be suppressed with hourly watering and application of dust suppressants, which would reduce particulate matter emissions by 90 percent (SCAQMD, 2013a; WRAP, 2006c).

Operation Exhaust Emissions

Off-road diesel equipment exhaust emissions of VOC, CO, and SOx were estimated using SCAQMD OFFROAD 2007 emission factors, while NOx, PM_{10}, and $PM_{2.5}$ emissions were estimated using CARB emission factors by engine tier level. Though CARB has released an updated version of the OFFROAD model, OFFROAD 2011, it was not used for this analysis as it provides inventory level emissions, not equipment specific emission factors. Vehicle exhaust emissions were estimated using EMFAC2011 average emission factors for SCAQMD. Trucks used for routine maintenance activities were considered onsite emission sources while worker commutes were considered offsite emission sources. It was assumed that service trucks would travel 5 miles per day onsite and that there would be 25 onsite employees commuting a distance of 40 miles roundtrip each.

Waste trucks would travel both onsite and offsite. As described in Chapter 18.0, Project Alternatives, car and truck traffic associated with transport of solid waste for the Proposed Project would be redirected to other landfills if the Proposed Project were not approved, relocating those daily operational emissions to other locations within the same air basin (South Coast Air Basin). Transportation-related air quality impacts would increase with transport of waste to more distant locations (i.e., Riverside and Imperial counties); therefore the Proposed Project would result in a net reduction in vehicle exhaust emissions from transport of solid waste. Vehicle exhaust emissions from waste trucks were calculated and included in the air dispersion modeling and health risk assessment (HRA) to determine potential impacts to local receptors, but were not included in the maximum daily operational totals per the SCAQMD *CEQA Air Quality Handbook* (SCAQMD, 1993). It was assumed that waste trucks would travel 6 miles per day offsite and 4 miles per day onsite with an idling time of 3.5 minutes. The vehicle exhaust emission calculation spreadsheets are included in Appendix H-2.

It was assumed that since CCL is a large operator of diesel off-road equipment, all additional pieces of off-road diesel equipment used for operational activities would be model year 2014 or would meet model year 2014 emission control requirements (Tier 4). Additionally, all additional pieces of off-road diesel equipment would be equipped with DPF as a project BMP.

Stationary Source Exhaust Emissions

CCL currently operates two LFG flares onsite. As part of the Proposed Project, two additional flares would be installed—the first in 2021 and the second in 2030. Emissions from the project flares were estimated based on the potential to emit (PTE) rates of the existing flares. Facility data indicates that on average, 85 percent of LFG generated is combusted in the flares. Therefore, it was assumed that 85 percent of future LFG generated would be combusted by the flares. The stationary source exhaust emission calculation spreadsheets are included in Appendix H-2.

Operation Fugitive Dust Emissions from Vehicles and Equipment

Fugitive dust would result from vehicle travel on unpaved and paved roads, and soil disturbing activities such as daily landfill covering and compacting. Fugitive dust emissions from vehicle travel on unpaved and paved roads were estimated using EPA-approved emission factors and methodology published in AP-42[1]. As previously discussed, it was assumed that a gravel trackout apron and three times daily street cleaning would be used as project BMPs; therefore, unmitigated particulate matter emissions from vehicle travel on paved roads were reduced by 90 percent. It was also assumed that unpaved roads would be watered two times daily, dust palliatives would be applied at least twice a year, paving would be completed as much as possible, and vehicle speed on unpaved roads would be reduced to 15 miles per hour as project BMPs. Therefore, the unmitigated unpaved road emissions were reduced by 90 percent. The fugitive dust emission calculation spreadsheets are included in Appendix H-2.

Fugitive dust emissions from soil disturbance (e.g., grading activities) were estimated using recommended emission factors from the SCAQMD *CEQA Air Quality Handbook* (SCAQMD, 1993). As previously discussed, it was assumed that areas with soil disturbance would be watered hourly and would receive application of dust suppressants as project BMPs. Therefore, the unmitigated fugitive dust from disturbed areas was reduced by 90 percent. The fugitive dust emission calculation spreadsheets are included in Appendix H-2.

Fugitive Landfill Gas Emissions

Fugitive LFG emissions would result from the aerobic decomposition of organic waste and the anaerobic bacterial digestion of buried waste. CCL is required to treat 75 percent of all LFG emissions per 40 *Code of Federal Regulations* (CFR) 60 Subpart WWW; however facility data indicate that, on average, 85 percent of LFG generated is combusted in the flare. Based on the LFG capture rate, it was determined that 15 percent of LFG generated would be emitted as fugitive. The fugitive LFG calculation spreadsheets are included in Appendix H-2.

H.1.2 Dispersion Modeling Methodology

Dispersion modeling was conducted to assess the potential NOx, CO, sulfur dioxide (SO_2), PM_{10}, and $PM_{2.5}$ emissions from construction and operation of the Proposed Project. Emissions were modeled using the EPA-approved AERMOD dispersion modeling system (Version 12345). The AERMOD model is a steady-state, multiple-source, dispersion model that incorporates hourly meteorological data inputs and local surface characteristics. The AERMOD modeling system uses the terrain preprocessor AERMAP and meteorological data preprocessor AERMET. The AERMOD model was run using regulatory default control options and rural dispersion mode. Results from the dispersion modeling analysis for each pollutant and averaging time were compared to their respective thresholds.

AERMAP (Version 11103) was used to determine receptor and source base elevations. United States Geological Survey (USGS) National Elevation Dataset (NED) 1 arc second format data were used as the input to AERMAP. All coordinates were referenced to Universal Transverse Mercator North American Datum 1983, Zone 11. Source elevations were based on the most recent land surveys for the facility.

[1] United States Environmental Protection Agency. 2006. AP-42, Compilation of Air Pollutant Emission Factors. Chapter 13. Volume 1. Fifth Edition.

Receptors were placed at existing residences, commercial properties, and sensitive receptors. This is consistent with the SCAQMD Localized Significance Threshold (LST) methodology (SCAQMD, 2006). Receptors were selected based initially on USGS land use/land classification (LULC) maps for year 2006. These receptor locations were then further refined based on the most recent USGS satellite imagery available.

Meteorological data for the modeling analysis was available pre-processed using AERMET (Version 12345) from SCAQMD for the years 2005 through 2009 for the Santa Clarita station. These data were downloaded from the SCAQMD Web site.

The emissions sources included in the modeling and the source types used for the modeling are summarized in Table H-1.

TABLE H-1
Source Type Used in Air Dispersion Modeling

Source Name	Source Type
Construction Sources	
Landfill Module Construction (Fugitive Dust)	Area
Landfill Module Construction (Exhaust)	Gridded Point
Operational Sources	
Flares	Point
Landfill Operation (Fugitive Dust)	Area
Landfill Operation (Exhaust)	Gridded Point
Onsite Paved Road Truck Travel (Onsite Construction Service Trucks, Onsite Service Trucks, and Waste Trucks)	Volume
Onsite Unpaved Road Truck Travel (Waste Trucks Only)	Volume
Entrance Truck Idling	Gridded Point
Offsite Travel (Landfill Employees, Construction Employees, and Waste Trucks)	Volume

As described above, modeling was conducted for the Proposed Project initial construction year (2016), peak operations year (2021), and final landfill closeout year (2032). AERMOD was run separately for the construction and operation of the project to better characterize potential impacts for comparison to SCAQMD thresholds.

To better characterize the conversion of modeled NOx to nitrogen dioxide (NO_2), initial impacts assumed a 100 percent conversion of NOx to NO_2. If further refinement of the NOx to NO_2 conversion was required, the annual impacts then assumed the default ambient ratio of NOx to NO_2 conversion of 0.75. For the 1-hour short-term conversion of NOx to NO_2, the LST distance methodology was utilized (SCAQMD, 2006).

H.1.3 Health Risk Assessment

The HRA was performed following the latest guidance outlined in the "*Air Toxics Hot Spots Program Risk Assessment Guidelines*" (Office of Environmental Health Hazard Assessment [OEHHA], 2003). HRA modeling was performed using the CARB Hotspots Analysis and Reporting Program (HARP), Version 1.4f, along with the HARP On-Ramp program (Version 1.0). The HARP On-Ramp tool was used to import the AERMOD air dispersion modeling results (predicted concentrations at specific locations) into the HARP Risk Module. The HARP Risk Module predicts health impacts in terms of cancer risk, acute hazard index (HIA), and chronic hazard index (HIC) by factoring AERMOD-predicted pollutant concentrations by pollutant-specific cancer potency values and chronic/acute reference exposure levels (REL) obtained from OEHHA (CARB, 2003a).

Following the OEHHA guidance and SCAQMD guideline, the HRA included potential health impacts from homegrown produce, dermal absorption, soil ingestion, and mother's milk. In addition, because inhalation is the dominant pathway of cancer risks, the Derived (Adjusted) Method in HARP was used for the cancer risk evaluation based on the *CARB Recommended Interim Risk Management Policy for Inhalation-Based Residential Cancer Risk* (CARB, 2003b).

For the purposes of quantifying emission increases and performing HRA analysis, impacts were characterized as either associated with construction or operation of the landfill. Emission sources associated with the landfill expansion for operation were divided into four categories: (1) LFG flares, (2) fugitive LFG, (3) onsite equipment and vehicle travel, and (4) offsite vehicle travel. The emission increases from the first three source categories are onsite emissions associated with the proposed landfill operation. The fourth category covers the offsite diesel particulate matter (DPM) emissions from all landfill associated vehicles, which include waste trucks, landfill employee vehicles, and construction employee vehicles, traveling on a 3-mile portion of State Route 126 (SR-126) near the landfill. The offsite diesel emissions were included in the HRA to represent a more conservative case for future landfill operation.

For determining impacts during construction, emission sources were only categorized for the onsite areas where active construction would be occurring. These were characterized as fugitive dust and construction equipment exhaust.

For the emissions associated with landfill operation during 2016 and 2021, a conservative exposure duration of 30 years was selected for both residential and commercial/industrial receptors, although the duration of the Proposed Project would be less than 30 years. For landfill operation emissions associated with 2032 operation, a 70-year exposure was conservatively assumed. In addition, since inhalation is the dominant pathway of cancer risks, the Derived (Adjusted) Method in HARP was used for the cancer risk evaluation.

For construction periods, the cancer risks were estimated using highly-conservative assumptions of a 9-year exposure duration for residential and worker receptors.

The modeled impacts of cancer and noncancer risks associated with toxic air contaminant (TAC) emissions were evaluated and compared to the applicable SCAQMD significance thresholds. Maximally exposed individual (MEI) locations were selected from the modeled receptor grids of the residential and commercial/ industrial receptors. The residential MEI (MEIR) was selected from receptors in residential areas in the facility vicinity, especially in the northwest and northeast areas. The worker MEI (MEIW) was selected from receptors in commercial areas near the facility. Both carcinogenic and non-carcinogenic impacts were compared to the SCAQMD thresholds.

H.1.4 CO Hotspot Analysis

Localized CO impacts resulting from the Proposed Project were assessed by using the California LINE Source Dispersion Model, Version 4 (CALINE4), to estimate CO concentrations in the vicinity of the affected intersection for the project year 2014. This is consistent with the traffic analysis described in Chapter 10.0, Traffic and Transportation. CO concentrations for year 2014 are expected to be higher than CO concentrations for the project horizon year, 2032, due to improvements in emission control technology.

Five signalized intersections were screened using level of service (LOS) and traffic data estimates to identify the intersections most likely to create a CO hot spot. The University of California, Davis *Transportation Project-Level Carbon Monoxide Protocol* recommends further analysis at signalized intersections where the LOS is E or F or where the LOS is degraded to E or F as a result of the project (Niemeier et al., 1997). Signalized intersections where the LOS was D were also considered due to the high percentage of heavy duty trucks in the vehicle mix. Using these criteria, two intersections were identified as areas where potential CO hot spots could occur: SR-126 and Wolcott Way, which is the entrance to the landfill, and SR-126 and Commerce Center Drive.

The CO hotspot modeling was performed according to the methodology outlined in the University of California, Davis *Transportation Project-Level Carbon Monoxide Protocol*. CO emission factors were calculated using EMFAC2011. All receptors used were located at a height of 1.8 meters. Receptors for the intersection analysis were located 3 meters from the roadway so they were not within the mixing zone of the travel lanes and were spaced at 0, 25, and 50 meters from the intersection for both the 1-hour and 8-hour analyses (Niemeier et al., 1997). The predicted concentrations were compared to the National and California Ambient Air Quality Standards (NAAQS and CAAQS) for CO to determine whether the Proposed Project would cause a hotspot at this intersection.

H.1.5 Odor Analysis

As bacterial decomposition proceeds, odoriferous compounds can escape from the landfill surface through cracks in the surface cover. Other possible sources of odors are the actual wastes. Some household and consumer products contain substances with distinctive odors. Because offensive odors rarely cause any physical harm and no requirements for their control are included in state or federal air quality regulations, SCAQMD does not currently have any rules or regulations that place quantifiable limitations on emissions of odorous substances. Any actions related to odors are based on citizen complaints to local governments and SCAQMD.

SCAQMD has not established specific thresholds for determining the significance of odor impacts. Therefore, the Bay Area Air Quality Management District (BAAQMD) guidelines are used to qualitatively evaluate the potential for a significant odor impact.

According to the BAAQMD *CEQA Air Quality Guidelines* (2012), determining the significance of possible odor impacts involves determining whether the project would result in an odor source in relation to the sensitive receptors nearby. Two qualitative steps are followed in the odor significance determination: disclosure of odor parameters and odor complaint history.

Step 1: Disclosure of Odor Parameters

Potential odors associated with the Proposed Project may originate from waste delivered to the landfill for disposal, as well as bacterial decomposition of buried waste. The landfill is open Monday to Saturday, with operation hours from 4:30 a.m. to 5:00 p.m. on Mondays, 3:00 a.m. to 5:00 p.m. Tuesdays through Fridays, and 4:30 a.m. to 2:00 p.m. on Saturdays.

The nearest sensitive receptor is a residence located approximately 500 feet northwest of the landfill property boundary. Sensitive receptors were evaluated using LULC maps for year 2006 in order to best align with receptor placement used for the HRA and dispersion modeling analyses, as described in Section H.1.2. Figure 11-1 shows the various land use/land classifications surrounding the landfill. As shown in the figure, low intensity to high intensity developed land is located immediately northwest, northeast, and east of the landfill, indicating residential and commercial use areas. Fortunately, the landfill is situated in a valley with the closest sensitive receptors located on the other side of the Val Verde hills. The sensitive receptors are generally located upwind of the landfill.

Step 2: Odor Complaint History

The impact of an existing odor source on surrounding sensitive receptors is also evaluated by identifying the number of confirmed complaints received for that specific odor source. BAAQMD *CEQA Air Quality Guidelines* recommend reviewing odor complaints from the past 3 years for the source in question. BAAQMD considers a source to have a substantial number of odor complaints if the complaint history includes five or more confirmed complaints per year averaged over a 3-year period.

A confirmed complaint is any complaint in which the District Inspector performs an odor survey in response to the complaint and confirms the presences of an odor outside of the landfill boundaries emitting from CCL. Odor complaints for CCL were requested from SCAQMD. Of the 20 complaints filed over the past 3 years

(April 30, 2010 through April 30, 2013), 13[2] of them were confirmed complaints. This calculates to an average of 4.33 confirmed complaints per year over a 3-year period, signifying an insignificant odor impact per BAAQMD *CEQA Air Quality Guidelines.*

Significance Determination

BAAQMD recognizes that there is not one piece of information that can solely be used to determine the significance of an odor impact. Therefore, the information provided above was collectively evaluated to determine the potential for a significant odor impact.

[2] The confirmed odor complaint total conservatively includes multiple complaints on the same day that only had one combined inspection, excluding the multiple complaints combined into one inspection results in seven confirmed complaints over the past 3 years, calculating to an average of 2.33 confirmed complaints per year.

Air Quality Appendix H2
Tables

Summary Data Request

Construction

Sources included in the proposed project:	*Schedule*	*Notes and Assumptions*
Construction Sources / Assumptions (See Construction Tab for information provided by CCL - for rows 5-11)		
Construction of modules 6	4/2016 - 10/2016	Construction equipment assumptions based on data provided on July 20, 2011 and included in construction tab (attached). The construction fleet average models that are compliant with CARB requirements at the time of construction would be used (2016 Large Fleet - combination of Tier 3 and Tier 4 values). Diesel off-road equipment would be equipped with diesel particulate filters as a project control. When there are inconsistencies associated with the # and type of equipment for the activities (ex water truck should be used for the entire project duration, need a paver for paving activities, the project specific data provided have been supplemented with the appropriate equipment for consistency). The total area for the proposed lateral expansion is 142.7 acres as per Figure 2-1, Existing and Proposed Landfill footprint.
Construction of modules 7	4/2021 - 10/2021	
Construction of modules 8	4/2023 - 10/2023	
Construction of modules 9	4/2024 - 10/2024	
Construction of modules 10	4/2025 - 10/2025	
Construction of modules 11	4/2026 - 10/2026	
New Entrance Area and Construction		
Construction of new paved road entrance	**10 days**	**Area paved: 1.5 miles long <u>from entrance into landfill</u> - assumes an average road width of 20 feet wide for total area to be paved of approximately 8 acres**. Note: we have modified the equipment provided to include a paver based on the construction of the paved entrance. **2 weeks to pave road**
Other Construction Activities (Construction of parking, administration building, larger berm, and scale house)	3/2014 - 9/2014	Size and volumes were estimated from site plans. Approximate size of buildings: 22,925 square feet. Approximate area to be paved for parking: 116,875 square feet (~2.7 acres). Approximate volume of soil to be cut / filled for construction of the berm 1,317,911 cubic feet. Air Quality team made assumptions regarding the type and number of equipment needed to build these buildings based on model default schedule and # of equipment. Assumed the berm material was excavated from onsite soil and not imported.Total area for new entrance (including new paved road): Approx. 30 acres (based on maps and estimated areas).

Construction Truck Trips (See Construction Tab for information provided by CCL - also taken from previous analysis)		
Construction employees: Data provided on 07/20/2011 will be used instead of what is provided in project description which indicates 100 daily construction workers and is not schedule specific	Corresponds with construction module schedule	40 workers for module construction, 10 workers for new entrance construction, workers for other construction activities based on AQ model to generate default # of construction workers for other construction activities based on size of buildings. All construction worker travel would be offsite on paved roads and is about 20 miles one-way (including 3 miles from the interstate to the facility entrance).
Onsite pickup trucks:		Based on previous data provided it is assumed that an onsite truck travels about 1.25 miles / hr (~10 miles in an 8 hr day). Based on previous data 20% of that travel is on paved roads and 80% is on unpaved roads. Based on data provided on construction tab (07/20/2011) that the truck would operate 4hrs / day: each truck would travel ~1 mile on paved roads and ~4 miles on unpaved roads per day
Other construction equipment:		Additional travel other than equipment operation is minimal and not included in analysis

Summary Data Request

Operation

Operational Sources / Assumptions:	*Schedule*	*Notes and Assumptions*
Landfill operational emissions based on disposal capacity: Total from build out (89.3 total - 23.2 from existing facility) = 66.1 MMCY spread out over construction of 6 new modules = 11 MMCY per module increase	Emissions at 2016, 2021, and 2032	***Source of Data - Based on data provided by Golder Associates (04/2011)*** Annual LFG recovery rate is 85% based on actual facility data, therefore it is assumed that 85% of the LFG will be combusted by the flares and 15% will be fugitive. The fugitive landfill emissions will be calculated using the LFG generation for each year, the amount not recovered (15%), and emission factors for CH4 and CO2 based on the 2011 % concentration (50 / 50%) and the toxic pollutants based on the landfill source test data. For air dispersion modeling the source characteristics will be chosen so that they are representative of the landfill area. (representative data will be used)

Operation of 2 additional flares (Source: Golder Associates 4/11 LFG Report)		***The project does not include the operation of the existing two flares. The operating schedule is based Golder Associates 4/11 LFG report.***
Flare 1 Location: (UTM NAD 27): **X,Y Coordinates Needed**	1 Flare will start operation in 2021	Flare emissions: **Flare emission rates from the 2011 source test will be used to represent the emissions associated with the two new flares.** Flare Stack parameters (temperature, flow rate, stack diameter): Based on existing flares source test data provided (height 50 feet, diameter 11.3 feet, exhaust temperature 1720 F, exhaust velocity 12.5 feet per second)
Flare 2 Location (UTM NAD 27): **X,Y Coordinates Needed**	2nd flare will start operation in 2030	

Operation Assumptions (See Operation Tab for information provided by CCL - also taken from previous analysis)	*Schedule*	*Notes and Assumptions*
Operation Workers: include 25 new staff (total 50 but project only includes 25) - **Source: Project Description**	Ramp-up: 2014-2020 Full Operation: 2021	Assumes operation of the Proposed Project would ramp up evenly over a seven year period starting January 1, 2014, with full operation beginning in 2021. This assumes that the new equipment and employees will be used to operate the additional capacity from the existing landfill. **(Air Quality Assumption)**
Operation Onsite Off-road Equipment: **Source Data Provided 7-20-11: Project description data inconsistent and less specific, therefore it is not used: (***18 new pieces of equipment (two motor graders, three bulldozers, three landfill compactors, two scrapers, two water trucks, five trailer-mounted light plants, and one water wagon*)	Ramp-up: 2014-2020 Full Operation: 2021	Assumes operation of the Proposed Project would ramp up evenly over a seven year period starting January 1, 2014, with full operation beginning in 2021. Approximate hours of use for each piece of equipment are based on data provided on July 20, 2011 and are included in the operation tab (attached). ***It is also assumed that since CCL is a large operator of diesel off-road equipment, all off-road diesel equipment used for operational activities will be model year 2014 or meet model year 2014 emission control requirements (Tier 4) unless otherwise indicated. Diesel off-road equipment would be equipped with diesel particulate filters as a project control. Note that the values provided are different that what is included in the project description - Air Quality Team will use specific data provided on 7-20-11 unless otherwise indicated.***

Need Information	*Schedule*	*Notes and Assumptions*
Operation on temporary dirt haul roads	N/A	No truck deliveries will occur on temporary dirt roads. **(Air Quality Assumption)**

Operational Waste Deliveries Assumptions	*Schedule*	*Notes and Assumptions*

Summary Data Request

Truck Trips

Operational Truck deliveries (from Project Description: Tables 2-4 in the Project Description dated 03/27/13): [1]

	Number of vehicles
HHDT	277
MHDT	63
LHDT2	40
LDT2	0
LDT1	4
LDA	25

All truck deliveries will start at the beginning of the operation of the project and will continue at the same rate for the duration of the project. **All distances are roundtrip**

Waste Trucks: Onsite travel on paved roads: 4 miles, Onsite travel on unpaved roads (gravel): 0 miles; road paved as project control.

Onsite service truck: Operate 4hrs per day which equates to 5 miles traveled total (~1 miles on paved and 4 miles on unpaved roads - same assumption as for construction service trucks

Offsite vehicle travel (employees, waste trucks): 40 miles on paved roads (Includes 6 miles on paved roads from the interstate)

Total duration of waste trucks idling time is 3.5 min

Assumes operation of the Proposed Project would ramp up evenly over a seven year period starting January 1, 2014, with full operation beginning in 2021.

Sources not a part of the proposed project and not included in the evaluation:

Landfill gas emissions for existing capacity
Operation of 2 existing flares
Operation of the waste to energy generation unit

Notes:

1 Average weight data from Table 2-6 of Project Description dated 3/09/12. Per EMFAC Users guide truck classification is as follows: HHDT (33001 - 60000), MHDT (14001 - 33000), LHDT2 (100001 - 14000), LHDT1 (8501 - 10000), LDT2 (3751- 5750), LDT1 (0 - 3750), LDA (all passenger cars))

Methodology Assumptions:

The project would include Best Management Practices (BMPs) to reduce fugitive dust emissions during construction and operation.
Total annual project emissions are compared to the SCAQMD emission thresholds
MM measures are used whenever the annual project emissions exceed the SCAQMD daily thresholds
Annual emissions estimated for each year of construction activity
Annual emissions estimated for operation in 2016, 2021, and 2030

Air Dispersion Modeling

AERMOD used to evaluate the emissions associated with combined construction and operational worst case years (2016, 2021, and 2032)
Modeling done for the sources as indicated in summaryReq tab
HRA modeling done for all the same sources identified in the AERMOD analyses except for fugitive dust sources.
CO Hot spot analysis done as per CO Protocol

Truck Emissions

It is assumed that only the emissions associated with travel along the road from the I5 to the landfill are associated with the project. This is because it is assumed that the truck emissions associated with trash collection are already accounted for in the SCAB, and that the 'new project' emissions are from sending the trash to CCL over another landfill location.

CCLF Air Quality Modeling
Summary of emission sources

The years to be modeled

Project Construction Sources	2014 [1]	2016	2021	2032	Source Location	Description
Construction equipment exhaust *	x	x	x	No	Onsite	Based on a representative module
Fugitives from construction earth moving* [2]	x	x	x	No	Onsite	Based on a representative module
Offsite (employee commute) *	x	x	x	No	Offsite	NA - not modeled
ROG fugitives from paving	x	No	No	No	Onsite	NA - not modeled

Project Operation Sources	2014	2016 [3]	2021	2032 [4]	Source Location	Description
Operation equipment exhaust *	No	x	same as 2016	same as 2016	Onsite	Based on a representative module
Fugitives from operations earth moving *	No	x	same as 2016	same as 2016	Onsite	Based on a representative module
Roadway fugitive Onsite *	No	x	Include full build out of truck trips	same as 2021	Onsite only	roads (paved / unpaved)
Roadway fugitive Offsite	No	x	Include full build out of truck trips	same as 2021	Emissions only	Paved Roads
Flares *	No	no	1 Flare	2 Flares	Onsite	Assume located at existing flare locations
Landfill gas *	No	x	Increase from 2016	Increase from 2021	Onsite	Fugitive landfill gas
DPM from offsite trucks *	No	x	Include full build out of truck trips	decrease from 2021	Offsite	Emissions from I5 to landfill
DPM from onsite trucks *	No	x	Include full build out of truck trips	decrease from 2021	Onsite	located on roads within facility
Time Averaged Emission Requirements:	Daily & Annual	modeling averages	modeling averages	modeling averages		

Modeling Averages:
NOx: 1hr, 24hr, annual
PM10: 24hr, annual
PM2.5: 24hr, annual
CO: 1hr, 8hr
VOC: 1hr, 24hr, annual
SOx: 1hr, 24hr, annual (1hr = 3hr)

Notes:

1 Entrance construction includes buildings and roads and is the only activity occurring in 2014

2 Onsite fugitive dust from travel on paved and unpaved roads is included in the total onsite emission estimates for construction and is a small % of the total onsite fugitive emissions during construction. The only unpaved travel on roads is travel on gravel.

3 Operation of the Proposed Project would ramp up evenly over a seven year period starting January 1, 2014, with full operation beginning in 2021.

4 2030 is the year when a second flare would be installed. 2032 represents the maximum year of landfill fugitive emissions during which landfill operation would occur. All other sources would be the same as in 2030.

* Sources to be included in the HRA modeling analysis

Chiquita Canyon Landfill EIR

Summary Construction and Operation Emissions

Controlled Emissions

Year: 2014	Emissions (lb/hr)												Emissions (lb/day)							
Emission Activity	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**	**CO2**	**CH4**	**N2O**	**CO2e**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Construction (exhaust / fugitive from earth moving/service	14.65	38.01	3.98	0.04	2.07	1.91	2.29	0.48	N/A	N/A	N/A	N/A	114.17	314.80	32.15	0.36	16.24	14.94	22.90	4.76
Off-site Construction Mobile Sources (trucks / cars)	1.02	0.09	0.03	0.00	0.00	0.00	0.40	0.10	N/A	N/A	N/A	N/A	2.04	0.18	0.05	0.01	0.00	0.00	0.80	0.21
On-site Construction Mobile Sources (trucks / cars)	0.03	0.00	0.00	0.00	0.00	0.00	0.37	0.04	N/A	N/A	N/A	N/A	0.26	0.01	0.01	0.00	0.00	0.00	3.75	0.40
Yearly Construction Total	15.69	38.10	4.01	0.05	2.07	1.91	3.07	0.62	N/A	N/A	N/A	N/A	116.47	315.00	32.21	0.37	16.24	14.94	27.45	5.38
Flares	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Landfill gas	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation (exhaust / fugitive from earth moving)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Off-site Operational Mobile Sources (trucks / cars)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
On-site Operational Mobile Sources (trucks / cars)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation: Indirect Emissions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Yearly Operational Total	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Yearly Total	**15.69**	**38.10**	**4.01**	**0.05**	**2.07**	**1.91**	**3.07**	**0.62**	**N/A**	**N/A**	**N/A**	**N/A**	**116.47**	**315.00**	**32.21**	**0.37**	**16.24**	**14.94**	**27.45**	**5.38**

Year: 2016	Emissions (lb/hr)												Emissions (lb/day)							
Emission Activity	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**	**CO2**	**CH4**	**N2O**	**CO2e**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Construction (exhaust / fugitive from earth moving/service	33.43	48.75	8.63	0.10	0.64	0.59	5.83	1.21	N/A	N/A	N/A	N/A	312.79	462.16	81.58	0.93	5.96	5.49	58.28	12.12
Off-site Construction Mobile Sources (trucks / cars)	1.64	0.14	0.04	0.01	0.00	0.00	0.80	0.21	N/A	N/A	N/A	N/A	3.29	0.29	0.07	0.01	0.00	0.00	1.60	0.42
On-site Construction Mobile Sources (trucks / cars)	0.01	0.00	0.00	0.00	0.00	0.00	0.19	0.02	N/A	N/A	N/A	N/A	0.11	0.01	0.00	0.00	0.00	0.00	1.87	0.20
Yearly Construction Total	35.09	48.90	8.66	0.10	0.64	0.59	6.82	1.44	N/A	N/A	N/A	N/A	316.19	462.45	81.65	0.94	5.97	5.49	61.76	12.74
Flares	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Landfill gas	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation (exhaust / fugitive from earth moving)	3.40	0.80	0.93	0.01	0.01	0.01	0.61	0.13	N/A	N/A	N/A	N/A	20.14	5.28	5.39	0.06	0.07	0.06	6.07	1.26
Off-site Operational Mobile Sources (trucks / cars)	0.58	1.97	0.03	0.00	0.01	0.01	0.33	0.09	N/A	N/A	N/A	N/A	2.14	19.42	0.24	0.03	0.13	0.12	1.55	0.41
On-site Operational Mobile Sources (trucks / cars)	0.79	2.51	0.14	0.00	0.01	0.01	1.68	0.40	N/A	N/A	N/A	N/A	7.94	25.14	1.41	0.04	0.12	0.11	16.84	4.02
Operation: Indirect Emissions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Yearly Operational Total	4.77	5.28	1.11	0.02	0.04	0.03	2.62	0.62	N/A	N/A	N/A	N/A	30.22	49.84	7.05	0.13	0.32	0.29	24.46	5.70
Yearly Total	**39.86**	**54.18**	**9.77**	**0.12**	**0.68**	**0.62**	**9.44**	**2.06**	**N/A**	**N/A**	**N/A**	**N/A**	**346.40**	**512.29**	**88.70**	**1.07**	**6.29**	**5.78**	**86.22**	**18.44**

Year: 2021	Emissions (lb/hr)												Emissions (lb/day)							
Emission Activity	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**	**CO2**	**CH4**	**N2O**	**CO2e**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Construction (exhaust / fugitive from earth moving/service	28.85	47.80	6.54	0.10	0.63	0.58	5.83	1.21	N/A	N/A	N/A	N/A	269.44	453.20	61.94	0.93	5.85	5.38	58.28	12.12
Off-site Construction Mobile Sources (trucks / cars)	1.12	0.10	0.02	0.01	0.00	0.00	0.80	0.21	N/A	N/A	N/A	N/A	2.24	0.20	0.04	0.01	0.00	0.00	1.60	0.42
On-site Construction Mobile Sources (trucks / cars)	0.01	0.00	0.00	0.00	0.00	0.00	0.19	0.02	N/A	N/A	N/A	N/A	0.07	0.00	0.00	0.00	0.00	0.00	1.87	0.20
Yearly Construction Total	29.97	47.90	6.56	0.10	0.63	0.58	6.82	1.44	N/A	N/A	N/A	N/A	271.75	453.40	61.98	0.94	5.85	5.38	61.76	12.74
Flares	1.38	1.38	0.28	1.81	0.14	0.14	N/A	N/A	N/A	N/A	N/A	N/A	33.12	33.12	6.67	43.44	3.36	3.36	N/A	N/A
Landfill gas	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation (exhaust / fugitive from earth moving)	5.90	1.53	1.38	0.02	0.02	0.02	0.61	0.13	N/A	N/A	N/A	N/A	44.17	12.99	10.71	0.15	0.17	0.15	6.07	1.26
Off-site Operational Mobile Sources (trucks / cars)	0.97	3.15	0.07	0.01	0.02	0.02	0.76	0.20	N/A	N/A	N/A	N/A	4.14	30.97	0.56	0.08	0.24	0.22	3.58	0.96
On-site Operational Mobile Sources (trucks / cars)	2.12	4.18	0.38	0.01	0.02	0.02	3.89	0.93	N/A	N/A	N/A	N/A	21.22	41.81	3.79	0.08	0.21	0.20	38.94	9.34
Operation: Indirect Emissions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Yearly Operational Total	10.37	10.23	2.11	1.85	0.21	0.20	5.26	1.26	N/A	N/A	N/A	N/A	102.65	118.89	21.74	43.76	3.98	3.93	48.59	11.57
Yearly Total	**40.35**	**58.14**	**8.66**	**1.95**	**0.83**	**0.78**	**12.08**	**2.70**	**N/A**	**N/A**	**N/A**	**N/A**	**374.40**	**572.30**	**83.71**	**44.70**	**9.83**	**9.32**	**110.36**	**24.31**

Year: 2032	Emissions (lb/hr)												Emissions (lb/day)							
Emission Activity	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**	**CO2**	**CH4**	**N2O**	**CO2e**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Construction (exhaust / fugitive from earth moving/service	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Off-site Construction Mobile Sources (trucks / cars)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
On-site Construction Mobile Sources (trucks / cars)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Yearly Construction Total	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flares	2.76	2.76	0.56	3.62	0.28	0.28	N/A	N/A	N/A	N/A	N/A	N/A	66.24	66.24	13.34	86.88	6.72	6.72	N/A	N/A
Landfill gas	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation (exhaust / fugitive from earth moving) [1]	5.44	1.53	1.15	0.02	0.02	0.02	0.61	0.13	N/A	N/A	N/A	N/A	40.39	12.99	8.92	0.15	0.17	0.15	6.07	1.26
Off-site Operational Mobile Sources (trucks / cars) [1]	0.85	1.71	0.06	0.01	0.02	0.02	0.76	0.20	N/A	N/A	N/A	N/A	3.88	16.66	0.58	0.08	0.20	0.18	3.58	0.96
On-site Operational Mobile Sources (trucks / cars) [1]	2.21	3.01	0.40	0.01	0.02	0.02	3.89	0.93	N/A	N/A	N/A	N/A	22.10	30.14	3.97	0.08	0.18	0.17	38.94	9.34
Operation: Indirect Emissions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Yearly Operational Total	11.26	9.01	2.17	3.66	0.34	0.33	5.26	1.26	N/A	N/A	N/A	N/A	132.62	126.04	26.82	87.19	7.26	7.22	48.59	11.57
Yearly Total	**11.26**	**9.01**	**2.17**	**3.66**	**0.34**	**0.33**	**5.26**	**1.26**	**N/A**	**N/A**	**N/A**	**N/A**	**132.62**	**126.04**	**26.82**	**87.19**	**7.26**	**7.22**	**48.59**	**11.57**

Chiquita Canyon Landfill EIR
Summary Construction and Operation Emissions
Controlled Emissions

Year: 2014	Emissions (lb/day) (cont.)				Emissions (lb/yr)											
Emission Activity	**CO2**	**CH4**	**N2O**	**CO2e**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**	**CO2**	**CH4**	**N2O**	**CO2e**
Construction (exhaust / fugitive from earth moving/service	N/A	N/A	N/A	N/A	7,599.53	20,723.27	2,094.93	23.40	1,140.16	1,048.95	984.22	204.72	2,241,872.04	N/A	N/A	2,241,872.04
Off-site Construction Mobile Sources (trucks / cars)	N/A	N/A	N/A	N/A	244.87	21.80	6.14	0.63	0.42	0.21	96.28	25.10	60,079.12	N/A	N/A	60,079.12
On-site Construction Mobile Sources (trucks / cars)	N/A	N/A	N/A	N/A	30.90	1.78	0.83	0.03	0.01	0.00	449.93	48.51	3,463.92	N/A	N/A	3,463.92
Yearly Construction Total	N/A	N/A	N/A	N/A	7,875.29	20,746.85	2,101.89	24.06	1,140.59	1,049.16	1,530.43	278.33	2,305,415.08	N/A	N/A	2,305,415.08
Flares	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Landfill gas	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation (exhaust / fugitive from earth moving)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Off-site Operational Mobile Sources (trucks / cars)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
On-site Operational Mobile Sources (trucks / cars)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation: Indirect Emissions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Yearly Operational Total	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Yearly Total	**N/A**	**N/A**	**N/A**	**N/A**	**7,875.29**	**20,746.85**	**2,101.89**	**24.06**	**1,140.59**	**1,049.16**	**1,530.43**	**278.33**	**2,305,415.08**	**N/A**	**N/A**	**2,305,415.08**

Year: 2016	Emissions (lb/day) (cont.)				Emissions (lb/yr)											
Emission Activity	**CO2**	**CH4**	**N2O**	**CO2e**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**	**CO2**	**CH4**	**N2O**	**CO2e**
Construction (exhaust / fugitive from earth moving/service	N/A	N/A	N/A	N/A	19,678.43	29,487.49	5,198.86	59.49	374.51	344.55	3,465.36	720.79	5,792,024.01	N/A	N/A	5,792,024.01
Off-site Construction Mobile Sources (trucks / cars)	N/A	N/A	N/A	N/A	394.50	34.71	8.47	1.27	0.42	0.42	192.56	50.21	120,269.57	3.81	N/A	120,269.57
On-site Construction Mobile Sources (trucks / cars)	N/A	N/A	N/A	N/A	12.75	0.73	0.30	0.02	0.00	0.00	224.97	24.25	1,735.14	0.11	N/A	1,735.14
Yearly Construction Total	N/A	N/A	N/A	N/A	20,085.68	29,522.93	5,207.62	60.77	374.94	344.98	3,882.88	795.26	5,914,028.73	3.92	N/A	5,914,028.73
Flares	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Landfill gas	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	30,966,082.32	11,285,979.56	N/A	267,971,653.06
Operation (exhaust / fugitive from earth moving)	N/A	N/A	N/A	N/A	6,284.14	1,647.39	1,682.15	18.87	21.15	19.46	2,152.74	447.77	1,817,839.47	N/A	N/A	1,817,839.47
Off-site Operational Mobile Sources (trucks / cars)	N/A	N/A	N/A	N/A	666.70	6,058.79	75.69	10.83	41.61	38.09	482.50	129.38	1,058,980.88	3.36	N/A	1,058,980.88
On-site Operational Mobile Sources (trucks / cars)	N/A	N/A	N/A	N/A	2,476.50	7,844.00	440.78	11.03	37.18	34.06	5,253.05	1,255.03	1,095,681.52	0.57	N/A	1,095,681.52
Operation: Indirect Emissions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	195,548.10	8.59	1.83	196,296.36
Yearly Operational Total	N/A	N/A	N/A	N/A	9,427.34	15,550.18	2,198.62	40.74	99.95	91.61	7,888.29	1,832.18	35,134,132.28	11,285,992.07	1.83	272,140,451.29
Yearly Total	**N/A**	**N/A**	**N/A**	**N/A**	**29,513.02**	**45,073.11**	**7,406.24**	**101.51**	**474.89**	**436.58**	**11,771.17**	**2,627.43**	**41,048,161.01**	**11,285,995.99**	**1.83**	**278,054,480.02**

Year: 2021	Emissions (lb/day) (cont.)				Emissions (lb/yr)											
Emission Activity	**CO2**	**CH4**	**N2O**	**CO2e**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**	**CO2**	**CH4**	**N2O**	**CO2e**
Construction (exhaust / fugitive from earth moving/service	N/A	N/A	N/A	N/A	16,901.21	28,916.25	3,955.77	59.49	367.24	337.86	3,465.36	720.79	5,791,999.80	N/A	N/A	5,791,999.80
Off-site Construction Mobile Sources (trucks / cars)	N/A	N/A	N/A	N/A	268.36	23.70	4.23	1.27	0.42	0.42	192.56	50.21	120,429.15	2.96	N/A	120,429.15
On-site Construction Mobile Sources (trucks / cars)	N/A	N/A	N/A	N/A	8.50	0.48	0.16	0.02	0.00	0.00	224.97	24.25	1,741.46	0.08	N/A	1,741.46
Yearly Construction Total	N/A	N/A	N/A	N/A	17,178.07	28,940.44	3,960.16	60.77	367.67	338.29	3,882.88	795.26	5,914,170.41	3.04	N/A	5,914,170.41
Flares	N/A	N/A	N/A	N/A	12,088.80	12,088.80	2,435.28	15,855.60	1,226.40	1,226.40	N/A	N/A	34,914,761.77	N/A	N/A	34,914,761.77
Landfill gas	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	42,768,128.76	15,587,384.35	N/A	370,103,200.10
Operation (exhaust / fugitive from earth moving)	N/A	N/A	N/A	N/A	13,782.16	4,053.84	3,341.32	48.08	51.96	47.80	2,152.74	447.77	4,626,874.34	N/A	N/A	4,626,874.34
Off-site Operational Mobile Sources (trucks / cars)	N/A	N/A	N/A	N/A	1,291.07	9,663.42	175.47	25.18	75.11	69.65	1,116.75	299.52	2,288,851.20	5.81	N/A	2,288,851.20
On-site Operational Mobile Sources (trucks / cars)	N/A	N/A	N/A	N/A	6,621.29	13,044.27	1,183.25	25.70	66.96	61.93	12,149.46	2,915.38	2,366,096.41	0.87	N/A	2,366,096.41
Operation: Indirect Emissions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	195,548.10	8.59	1.83	196,296.36
Yearly Operational Total	N/A	N/A	N/A	N/A	33,783.31	38,850.33	7,135.33	15,954.56	1,420.43	1,405.78	15,418.96	3,662.67	87,160,260.57	15,587,399.61	1.83	414,496,080.18
Yearly Total	**N/A**	**N/A**	**N/A**	**N/A**	**50,961.38**	**67,790.77**	**11,095.49**	**16,015.33**	**1,788.10**	**1,744.07**	**19,301.84**	**4,457.92**	**93,074,430.98**	**15,587,402.66**	**1.83**	**420,410,250.59**

Year: 2032	Emissions (lb/day) (cont.)				Emissions (lb/yr)											
Emission Activity	**CO2**	**CH4**	**N2O**	**CO2e**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**	**CO2**	**CH4**	**N2O**	**CO2e**
Construction (exhaust / fugitive from earth moving/service	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Off-site Construction Mobile Sources (trucks / cars)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
On-site Construction Mobile Sources (trucks / cars)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Yearly Construction Total	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flares	N/A	N/A	N/A	N/A	24,177.60	24,177.60	4,870.56	31,711.20	2,452.80	2,452.80	N/A	N/A	181,670,305.12	N/A	N/A	181,670,305.12
Landfill gas	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	68,772,870.36	25,065,140.66	N/A	595,140,824.28
Operation (exhaust / fugitive from earth moving) [1]	N/A	N/A	N/A	N/A	12,602.96	4,053.84	2,783.79	48.08	51.96	47.80	2,152.74	447.77	4,626,742.10	N/A	N/A	4,626,742.10
Off-site Operational Mobile Sources (trucks / cars) [1]	N/A	N/A	N/A	N/A	1,210.14	5,198.66	182.43	24.04	60.95	56.05	1,116.75	299.52	2,263,535.40	4.62	N/A	2,263,535.40
On-site Operational Mobile Sources (trucks / cars) [1]	N/A	N/A	N/A	N/A	6,896.28	9,404.38	1,238.63	24.93	56.29	52.15	12,149.46	2,915.38	2,348,668.47	0.45	N/A	2,348,668.47
Operation: Indirect Emissions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	195,548.10	8.59	1.83	196,296.36
Yearly Operational Total	N/A	N/A	N/A	N/A	44,886.98	42,834.49	9,075.41	31,808.25	2,622.00	2,608.80	15,418.96	3,662.67	259,877,669.55	25,065,154.33	1.83	786,246,371.73
Yearly Total	**N/A**	**N/A**	**N/A**	**N/A**	**44,886.98**	**42,834.49**	**9,075.41**	**31,808.25**	**2,622.00**	**2,608.80**	**15,418.96**	**3,662.67**	**259,877,669.55**	**25,065,154.33**	**1.83**	**786,246,371.73**

Chiquita Canyon Landfill EIR
Summary Construction and Operation Emissions
Controlled Emissions

GHG Global Warming Potentials			
Greenhouse Gas	**Formula**	**Atmospheric Lifetime**	**Global Warming Potential**
Carbon Dioxide	CO_2	50-200	1
Methane	CH_4	12	21
Nitrous Oxide	N_2O	114	310

[1] Operational emissions are expected to be very similar in the last few years of operation. As such, 2030 operational emissions were assumed representative of 2032 operational emissions for purposes of determining the worst-case emissions year.

Chiquita Canyon Landfill EIR
Mobile Sources

Assumptions:
40 workers for module construction and 20 workers for new entrance construction (new entrance construction includes construction of the admin building, scale house, and berm).
Operation of the Proposed Project would ramp up evenly over a seven year period starting January 1, 2014, with full operation beginning in 2021. Number of vehicles for 2016 has been calculated as 3/7 of total for Proposed Project, rounded to the nearest vehicle.
All distances are roundtrip.
Worker commute is 40 miles on paved roads (includes 6 miles on paved roads from the interstate).
Travel Offsite, including Along Landfill travel, was assumed to occur on paved roads only.
Travel On-site was assumed to occur on both paved and unpaved roads.
One mile of onsite unpaved road traveled by waste trucks from the end of the onsite paved road to the dump site would be paved as a project control.
Onsite service trucks would be equipped with diesel particulate filters as a project control.

	Construction	Construction	Operation	Operation					
Operating Schedule:	Entrance Construction	Module Construction	Module	Module					
Duration	2014	2016 - 2026	2016	2021 - 2030					
Employee Commute Hours [1]	2	2	2	2					
weeks/yr	24	24	52	52					
days/week	5	5	6	6			**RT Travel On-site**		**Operation**
hrs/day	10	10	10	10	**RT Travel Offsite (miles)**		**(miles)**		**(hrs/day)**
On Road Vehicles:	**# / day (ea)**	**# / day (ea)**	**# / day (ea)**	**# / day (ea)**	**Along**	**Total Offsite**	**Paved**	**Gravel Road**	
Employees (LDA)	20	40	11	25	0.2	40	0	0	2
Onsite Service Truck (LDT1) [2]	8	4	2	4	0	0	1	4	10
Waste Trucks (HHDT) [3]	NA	NA	119	277	0.2	6	4	0	10
Waste Trucks (MHDT) [3]	NA	NA	27	63	0.2	6	4	0	10
Waste Trucks (LHDT2) [3]	NA	NA	17	40	0.2	6	4	0	10
Waste Trucks (LDT2) [3]	NA	NA	0	0	0.2	6	4	0	10
Entrance Gate Idle Time for Trucks (hrs) [4]	NA	NA	163	380	0.000	0	0.058	0	10

Operation Emission Calculations
Emission Calculations
Operation Year: 2016

Emission Factors

Equipment Type	SCAQMD Equipment Type	Equipment Code	Operation Year	Emission Factor Unit	CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO_2	CH_4
Employees (LDA)	Passenger Cars	5	2016	lb/VMT	2.05E-03	1.81E-04	4.41E-05	6.61E-06	2.20E-06	2.20E-06	6.26E-01	1.98E-05
Onsite Service Truck (LDT1)	Light-Light Duty Trucks	5	2016	lb/VMT	5.31E-03	3.06E-04	1.23E-04	6.61E-06	9.92E-07	9.92E-07	7.23E-01	4.63E-05
Waste Trucks (HHDT)	Heavy-Heavy Duty Trucks	5	2016	lb/VMT	1.26E-03	2.43E-02	2.36E-04	3.75E-05	1.50E-04	1.37E-04	3.68E+00	0.00E+00
Waste Trucks (MHDT)	Medium-Heavy Duty Trucks	5	2016	lb/VMT	9.39E-04	9.88E-03	2.19E-04	2.43E-05	1.36E-04	1.26E-04	2.34E+00	0.00E+00
Waste Trucks (LHDT2)	Light-Heavy Duty Trucks	5	2016	lb/VMT	1.77E-03	3.52E-03	1.90E-04	1.10E-05	3.31E-05	3.09E-05	1.08E+00	1.98E-05
Waste Trucks (LDT2)	Light-Duty Trucks	5	2016	lb/VMT	2.93E-03	3.24E-04	5.73E-05	8.82E-06	2.20E-06	2.20E-06	8.54E-01	2.87E-05
Truck Idle	Truck Idle	2	2016	lb/hr	7.43E-02	1.29E-01	1.33E-02	1.48E-04	3.25E-04	2.99E-04	1.50E+01	0.00E+00

Chiquita Canyon Landfill EIR
Mobile Sources

Emission Calculations
Operation Year: 2021

Emission Factors

Equipment Type	SCAQMD Equipment Type	Equipment Code	Operation Year	Emission Factor Unit	CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO_2	CH_4
Employees (LDA)	Passenger Cars	5	2021	lb/VMT	1.40E-03	1.23E-04	2.20E-05	6.61E-06	2.20E-06	2.20E-06	6.27E-01	1.54E-05
Onsite Service Truck (LDT1)	Light-Light Duty Trucks	5	2021	lb/VMT	3.54E-03	2.01E-04	6.61E-05	6.61E-06	6.61E-07	6.61E-07	7.26E-01	3.31E-05
Waste Trucks (HHDT)	Heavy-Heavy Duty Trucks	5	2021	lb/VMT	1.33E-03	1.73E-02	2.67E-04	3.75E-05	1.23E-04	1.15E-04	3.39E+00	0.00E+00
Waste Trucks (MHDT)	Medium-Heavy Duty Trucks	5	2021	lb/VMT	7.24E-04	4.13E-03	1.75E-04	2.43E-05	7.14E-05	6.53E-05	2.16E+00	0.00E+00
Waste Trucks (LHDT2)	Light-Heavy Duty Trucks	5	2021	lb/VMT	1.04E-03	2.38E-03	1.28E-04	1.10E-05	2.65E-05	2.43E-05	1.08E+00	1.32E-05
Waste Trucks (LDT2)	Light-Duty Trucks	5	2021	lb/VMT	1.91E-03	1.94E-04	2.87E-05	8.82E-06	2.20E-06	2.20E-06	8.54E-01	1.98E-05
Truck Idle	Truck Idle	2	2021	lb/hr	8.72E-02	9.58E-02	1.55E-02	1.48E-04	2.51E-04	2.31E-04	1.40E+01	0.00E+00

Emission Calculations
Operation Year: 2030

Emission Factors

Equipment Type	SCAQMD Equipment Type	Equipment Code	Operation Year	Emission Factor Unit	CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO_2	CH_4
Employees (LDA)	Passenger Cars	5	2030	lb/VMT	1.15E-03	1.01E-04	1.54E-05	6.61E-06	4.41E-06	2.20E-06	6.27E-01	1.32E-05
Onsite Service Truck (LDT1)	Light-Light Duty Trucks	5	2030	lb/VMT	1.89E-03	1.01E-04	2.87E-05	6.61E-06	6.61E-07	6.61E-07	7.28E-01	1.98E-05
Waste Trucks (HHDT)	Heavy-Heavy Duty Trucks	5	2030	lb/VMT	1.39E-03	9.28E-03	2.93E-04	3.53E-05	9.70E-05	9.04E-05	3.34E+00	0.00E+00
Waste Trucks (MHDT)	Medium-Heavy Duty Trucks	5	2030	lb/VMT	7.01E-04	2.24E-03	1.71E-04	2.43E-05	6.75E-05	6.22E-05	2.15E+00	0.00E+00
Waste Trucks (LHDT2)	Light-Heavy Duty Trucks	5	2030	lb/VMT	6.44E-04	1.19E-03	7.28E-05	1.10E-05	1.76E-05	1.54E-05	1.08E+00	6.61E-06
Waste Trucks (LDT2)	Light-Duty Trucks	5	2030	lb/VMT	1.42E-03	1.34E-04	1.98E-05	8.82E-06	4.41E-06	2.20E-06	8.54E-01	1.54E-05
Truck Idle	Truck Idle	2	2030	lb/hr	9.13E-02	8.62E-02	1.62E-02	1.48E-04	2.40E-04	2.20E-04	1.40E+01	0.00E+00

Construction Emission Calculations
Entrance Construction
Construction Year: 2014

Emission Factors

Equipment Type	SCAQMD Equipment Type	Equipment Code	Construction Year	Emission Factor Unit	CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO_2	CH_4
Employees (LDA)	Passenger Cars	5	2014	lb/VMT	2.55E-03	2.27E-04	6.39E-05	6.61E-06	4.41E-06	2.20E-06	6.26E-01	2.43E-05
Onsite Service Truck (LDT1)	Light-Light Duty Trucks	5	2014	lb/VMT	6.44E-03	3.70E-04	1.72E-04	6.61E-06	1.32E-06	9.92E-07	7.22E-01	5.51E-05

Chiquita Canyon Landfill EIR
Mobile Sources

Construction Emission Calculations
Module Construction
Construction Year: 2016

Emission Factors

Equipment Type	SCAQMD Equipment Type	Equipment Code	Construction Year	Emission Factor Unit	CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO_2	CH_4
Employees (LDA)	Passenger Cars	5	2016	lb/VMT	2.05E-03	1.81E-04	4.41E-05	6.61E-06	2.20E-06	2.20E-06	6.26E-01	1.98E-05
Onsite Service Truck (LDT1)	Light-Light Duty Trucks	5	2016	lb/VMT	5.31E-03	3.06E-04	1.23E-04	6.61E-06	9.92E-07	9.92E-07	7.23E-01	4.63E-05

Construction Emission Calculations
Module Construction
Construction Year: 2021

Emission Factors

Equipment Type	SCAQMD Equipment Type	Equipment Code	Construction Year	Emission Factor Unit	CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO_2	CH_4
Employees (LDA)	Passenger Cars	5	2021	lb/VMT	1.40E-03	1.23E-04	2.20E-05	6.61E-06	2.20E-06	2.20E-06	6.27E-01	1.54E-05
Onsite Service Truck (LDT1)	Light-Light Duty Trucks	5	2021	lb/VMT	3.54E-03	2.01E-04	6.61E-05	6.61E-06	6.61E-07	6.61E-07	7.26E-01	3.31E-05

Reference: Data Provided by Mike Dean on 7-20-2011 to Brenda Eells via e-mail

[1] Assume that total commute occurs over 1 hr in the morning and 1 hr in the evening.
[2] Onsite service trucks: Operate 4 hrs per day which equates to 5 miles traveled total (~1 mile on paved roads and 4 miles on unpaved roads, which is the same assumption as for construction service trucks).
[3] Total truck travel distance is only based on the distance from the interstate because the truck would be operating within the SCAQMD without the project.
[4] Assume Idle EF for HHDT for all trucks and idle time is 3.5 minutes.
[5] Includes emissions from tire and brake wear.
[6] The total hourly, total daily, and total annual emissions are calculated assuming all vehicles are used at the same time.

Operation Emission Calculations

Emission Calculations

Operation Year: 2016

Emission Factors

Equipment Type	Fugitive from Road Travel - Controlled							
	All VMT [5]		Offsite VMT (Paved)		Onsite VMT (Paved)		Onsite VMT (Unpaved)	
	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
Employees (LDA)	9.92E-05	3.97E-05	9.04E-04	2.22E-04	2.42E-02	5.93E-03	1.11E-01	1.11E-02
Onsite Service Truck (LDT1)	9.92E-05	3.97E-05	9.04E-04	2.22E-04	2.42E-02	5.93E-03	1.11E-01	1.11E-02
Waste Trucks (HHDT)	2.16E-04	7.72E-05	9.04E-04	2.22E-04	2.42E-02	5.93E-03	1.11E-01	1.11E-02
Waste Trucks (MHDT)	3.13E-04	1.30E-04	9.04E-04	2.22E-04	2.42E-02	5.93E-03	1.11E-01	1.11E-02
Waste Trucks (LHDT2)	1.61E-04	6.39E-05	9.04E-04	2.22E-04	2.42E-02	5.93E-03	1.11E-01	1.11E-02
Waste Trucks (LDT2)	9.92E-05	3.97E-05	9.04E-04	2.22E-04	2.42E-02	5.93E-03	1.11E-01	1.11E-02
Truck Idle	NA	NA	NA	NA	NA	NA	NA	NA

Chiquita Canyon Landfill EIR
Mobile Sources

Emission Calculations
Operation Year: 2021

Emission Factors

Equipment Type	Fugitive from Road Travel - Controlled							
	All VMT [5]		Offsite VMT (Paved)		Onsite VMT (Paved)		Onsite VMT (Unpaved)	
	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
Employees (LDA)	9.92E-05	3.97E-05	9.04E-04	2.22E-04	2.42E-02	5.93E-03	1.11E-01	1.11E-02
Onsite Service Truck (LDT1)	9.92E-05	3.97E-05	9.04E-04	2.22E-04	2.42E-02	5.93E-03	1.11E-01	1.11E-02
Waste Trucks (HHDT)	2.16E-04	7.72E-05	9.04E-04	2.22E-04	2.42E-02	5.93E-03	1.11E-01	1.11E-02
Waste Trucks (MHDT)	3.13E-04	1.30E-04	9.04E-04	2.22E-04	2.42E-02	5.93E-03	1.11E-01	1.11E-02
Waste Trucks (LHDT2)	1.61E-04	6.39E-05	9.04E-04	2.22E-04	2.42E-02	5.93E-03	1.11E-01	1.11E-02
Waste Trucks (LDT2)	9.92E-05	3.97E-05	9.04E-04	2.22E-04	2.42E-02	5.93E-03	1.11E-01	1.11E-02
Truck Idle	NA	NA	NA	NA	NA	NA	NA	NA

Emission Calculations
Operation Year: 2030

Emission Factors

Equipment Type	Fugitive from Road Travel - Controlled							
	All VMT [5]		Offsite VMT (Paved)		Onsite VMT (Paved)		Onsite VMT (Unpaved)	
	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
Employees (LDA)	9.92E-05	3.97E-05	9.04E-04	2.22E-04	2.42E-02	5.93E-03	1.11E-01	1.11E-02
Onsite Service Truck (LDT1)	9.92E-05	3.97E-05	9.04E-04	2.22E-04	2.42E-02	5.93E-03	1.11E-01	1.11E-02
Waste Trucks (HHDT)	2.16E-04	7.72E-05	9.04E-04	2.22E-04	2.42E-02	5.93E-03	1.11E-01	1.11E-02
Waste Trucks (MHDT)	3.13E-04	1.30E-04	9.04E-04	2.22E-04	2.42E-02	5.93E-03	1.11E-01	1.11E-02
Waste Trucks (LHDT2)	1.61E-04	6.39E-05	9.04E-04	2.22E-04	2.42E-02	5.93E-03	1.11E-01	1.11E-02
Waste Trucks (LDT2)	9.92E-05	3.97E-05	9.04E-04	2.22E-04	2.42E-02	5.93E-03	1.11E-01	1.11E-02
Truck Idle	NA	NA	NA	NA	NA	NA	NA	NA

Construction Emission Calculations
Entrance Construction
Construction Year: 2014

Emission Factors

Equipment Type	Fugitive from Road Travel - Controlled							
	All VMT [5]		Offsite VMT (Paved)		Onsite VMT (Paved)		Onsite VMT (Unpaved)	
	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
Employees (LDA)	9.92E-05	3.97E-05	9.04E-04	2.22E-04	2.42E-02	5.93E-03	1.11E-01	1.11E-02
Onsite Service Truck (LDT1)	9.92E-05	3.97E-05	9.04E-04	2.22E-04	2.42E-02	5.93E-03	1.11E-01	1.11E-02

Chiquita Canyon Landfill EIR
Mobile Sources

Construction Emission Calculations
Module Construction
Construction Year: 2016

Emission Factors

Equipment Type	Fugitive from Road Travel - Controlled							
	All VMT [5]		Offsite VMT (Paved)		Onsite VMT (Paved)		Onsite VMT (Unpaved)	
	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
Employees (LDA)	9.92E-05	3.97E-05	9.04E-04	2.22E-04	2.42E-02	5.93E-03	1.11E-01	1.11E-02
Onsite Service Truck (LDT1)	9.92E-05	3.97E-05	9.04E-04	2.22E-04	2.42E-02	5.93E-03	1.11E-01	1.11E-02

Construction Emission Calculations
Module Construction
Construction Year: 2021

Emission Factors

Equipment Type	Fugitive from Road Travel - Controlled							
	All VMT [5]		Offsite VMT (Paved)		Onsite VMT (Paved)		Onsite VMT (Unpaved)	
	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
Employees (LDA)	9.92E-05	3.97E-05	9.04E-04	2.22E-04	2.42E-02	5.93E-03	1.11E-01	1.11E-02
Onsite Service Truck (LDT1)	9.92E-05	3.97E-05	9.04E-04	2.22E-04	2.42E-02	5.93E-03	1.11E-01	1.11E-02

Operation Emission Calculations

Emission Calculations

Operation Year: 2016 **Along Landfill**

Emission Factors		**Hourly Emissions (lb/hr)**									
Equipment Type	**Equipment Type**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	Employees (LDA)	2.26E-03	1.99E-04	4.85E-05	7.28E-06	2.43E-06	2.43E-06	6.89E-01	2.18E-05	1.10E-03	2.88E-04
Onsite Service Truck (LDT1)	Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Trucks (HHDT)	Waste Trucks (HHDT)	3.00E-03	5.79E-02	5.61E-04	8.92E-05	3.57E-04	3.25E-04	8.76E+00	0.00E+00	2.66E-03	7.12E-04
Waste Trucks (MHDT)	Waste Trucks (MHDT)	5.07E-04	5.34E-03	1.18E-04	1.31E-05	7.33E-05	6.79E-05	1.26E+00	0.00E+00	6.57E-04	1.90E-04
Waste Trucks (LHDT2)	Waste Trucks (LHDT2)	6.01E-04	1.20E-03	6.45E-05	3.75E-06	1.12E-05	1.05E-05	3.68E-01	6.75E-06	3.62E-04	9.72E-05
Waste Trucks (LDT2)	Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	Truck Idle	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA
	Total [6]	**6.37E-03**	**6.47E-02**	**7.92E-04**	**1.13E-04**	**4.44E-04**	**4.06E-04**	**1.11E+01**	**2.86E-05**	**4.79E-03**	**1.29E-03**

Chiquita Canyon Landfill EIR
Mobile Sources

Emission Calculations
Operation Year: 2021 **Along Landfill**

Emission Factors		**Hourly Emissions (lb/hr)**									
Equipment Type	**Equipment Type**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	Employees (LDA)	3.49E-03	3.09E-04	5.51E-05	1.65E-05	5.51E-06	5.51E-06	1.57E+00	3.86E-05	2.51E-03	6.54E-04
Onsite Service Truck (LDT1)	Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Trucks (HHDT)	Waste Trucks (HHDT)	7.39E-03	9.57E-02	1.48E-03	2.08E-04	6.84E-04	6.35E-04	1.88E+01	0.00E+00	6.20E-03	1.66E-03
Waste Trucks (MHDT)	Waste Trucks (MHDT)	9.13E-04	5.21E-03	2.21E-04	3.06E-05	9.00E-05	8.22E-05	2.73E+00	0.00E+00	1.53E-03	4.43E-04
Waste Trucks (LHDT2)	Waste Trucks (LHDT2)	8.32E-04	1.90E-03	1.02E-04	8.82E-06	2.12E-05	1.94E-05	8.65E-01	1.06E-05	8.52E-04	2.29E-04
Waste Trucks (LDT2)	Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	Truck Idle	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA
	Total [6]	**1.26E-02**	**1.03E-01**	**1.86E-03**	**2.64E-04**	**8.01E-04**	**7.42E-04**	**2.39E+01**	**4.92E-05**	**1.11E-02**	**2.98E-03**

Emission Calculations
Operation Year: 2030 **Along Landfill**

Emission Factors		**Hourly Emissions (lb/hr)**									
Equipment Type	**Equipment Type**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	Employees (LDA)	2.88E-03	2.54E-04	3.86E-05	1.65E-05	1.10E-05	5.51E-06	1.57E+00	3.31E-05	2.51E-03	6.54E-04
Onsite Service Truck (LDT1)	Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Trucks (HHDT)	Waste Trucks (HHDT)	7.69E-03	5.14E-02	1.62E-03	1.95E-04	5.37E-04	5.01E-04	1.85E+01	0.00E+00	6.20E-03	1.66E-03
Waste Trucks (MHDT)	Waste Trucks (MHDT)	8.83E-04	2.82E-03	2.15E-04	3.06E-05	8.50E-05	7.83E-05	2.71E+00	0.00E+00	1.53E-03	4.43E-04
Waste Trucks (LHDT2)	Waste Trucks (LHDT2)	5.15E-04	9.49E-04	5.82E-05	8.82E-06	1.41E-05	1.23E-05	8.64E-01	5.29E-06	8.52E-04	2.29E-04
Waste Trucks (LDT2)	Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	Truck Idle	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA
	Total [6]	**1.20E-02**	**5.55E-02**	**1.94E-03**	**2.51E-04**	**6.48E-04**	**5.97E-04**	**2.37E+01**	**3.84E-05**	**1.11E-02**	**2.98E-03**

Construction Emission Calculations
Entrance Construction
Construction Year: 2014 **Along Landfill**

Emission Factors		**Hourly Emissions (lb/hr)**									
Equipment Type	**Equipment Type**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	Employees (LDA)	5.10E-03	4.54E-04	1.28E-04	1.32E-05	8.82E-06	4.41E-06	1.25E+00	4.85E-05	2.01E-03	5.23E-04
Onsite Service Truck (LDT1)	Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Total [6]	**5.10E-03**	**4.54E-04**	**1.28E-04**	**1.32E-05**	**8.82E-06**	**4.41E-06**	**1.25E+00**	**4.85E-05**	**2.01E-03**	**5.23E-04**

Chiquita Canyon Landfill EIR
Mobile Sources

Construction Emission Calculations
Module Construction
Construction Year: 2016 **Along Landfill**

Emission Factors

Equipment Type	Equipment Type	Hourly Emissions (lb/hr) CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO_2	CH_4	PM_{10} Fugitive	$PM_{2.5}$ Fugitive
Employees (LDA)	Employees (LDA)	8.22E-03	7.23E-04	1.76E-04	2.65E-05	8.82E-06	8.82E-06	2.51E+00	7.94E-05	4.01E-03	1.05E-03
Onsite Service Truck (LDT1)	Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Total [6]	**8.22E-03**	**7.23E-04**	**1.76E-04**	**2.65E-05**	**8.82E-06**	**8.82E-06**	**2.51E+00**	**7.94E-05**	**4.01E-03**	**1.05E-03**

Construction Emission Calculations
Module Construction
Construction Year: 2021 **Along Landfill**

Emission Factors

Equipment Type	Equipment Type	Hourly Emissions (lb/hr) CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO_2	CH_4	PM_{10} Fugitive	$PM_{2.5}$ Fugitive
Employees (LDA)	Employees (LDA)	5.59E-03	4.94E-04	8.82E-05	2.65E-05	8.82E-06	8.82E-06	2.51E+00	6.17E-05	4.01E-03	1.05E-03
Onsite Service Truck (LDT1)	Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Total [6]	**5.59E-03**	**4.94E-04**	**8.82E-05**	**2.65E-05**	**8.82E-06**	**8.82E-06**	**2.51E+00**	**6.17E-05**	**4.01E-03**	**1.05E-03**

Operation Emission Calculations

Emission Calculations

Operation Year: 2016

Emission Factors	**Daily Emissions (lb/day)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	4.52E-03	3.98E-04	9.70E-05	1.46E-05	4.85E-06	4.85E-06	1.38E+00	4.37E-05	2.21E-03	5.75E-04
Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Trucks (HHDT)	3.00E-02	5.79E-01	5.61E-03	8.92E-04	3.57E-03	3.25E-03	8.76E+01	0.00E+00	2.66E-02	7.12E-03
Waste Trucks (MHDT)	5.07E-03	5.34E-02	1.18E-03	1.31E-04	7.33E-04	6.79E-04	1.26E+01	0.00E+00	6.57E-03	1.90E-03
Waste Trucks (LHDT2)	6.01E-03	1.20E-02	6.45E-04	3.75E-05	1.12E-04	1.05E-04	3.68E+00	6.75E-05	3.62E-03	9.72E-04
Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA
	0.046	**0.645**	**0.008**	**0.001**	**0.004**	**0.004**	**105.330**	**0.000**	**0.039**	**0.011**

Chiquita Canyon Landfill EIR
Mobile Sources

Emission Calculations
Operation Year: 2021

Emission Factors	**Daily Emissions (lb/day)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	6.99E-03	6.17E-04	1.10E-04	3.31E-05	1.10E-05	1.10E-05	3.14E+00	7.72E-05	5.01E-03	1.31E-03
Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Trucks (HHDT)	7.39E-02	9.57E-01	1.48E-02	2.08E-03	6.84E-03	6.35E-03	1.88E+02	0.00E+00	6.20E-02	1.66E-02
Waste Trucks (MHDT)	9.13E-03	5.21E-02	2.21E-03	3.06E-04	9.00E-04	8.22E-04	2.73E+01	0.00E+00	1.53E-02	4.43E-03
Waste Trucks (LHDT2)	8.32E-03	1.90E-02	1.02E-03	8.82E-05	2.12E-04	1.94E-04	8.65E+00	1.06E-04	8.52E-03	2.29E-03
Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA
	0.098	**1.029**	**0.018**	**0.003**	**0.008**	**0.007**	**226.764**	**0.000**	**0.091**	**0.025**

Emission Calculations
Operation Year: 2030

Emission Factors	**Daily Emissions (lb/day)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	5.75E-03	5.07E-04	7.72E-05	3.31E-05	2.20E-05	1.10E-05	3.14E+00	6.61E-05	5.01E-03	1.31E-03
Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Trucks (HHDT)	7.69E-02	5.14E-01	1.62E-02	1.95E-03	5.37E-03	5.01E-03	1.85E+02	0.00E+00	6.20E-02	1.66E-02
Waste Trucks (MHDT)	8.83E-03	2.82E-02	2.15E-03	3.06E-04	8.50E-04	7.83E-04	2.71E+01	0.00E+00	1.53E-02	4.43E-03
Waste Trucks (LHDT2)	5.15E-03	9.49E-03	5.82E-04	8.82E-05	1.41E-04	1.23E-04	8.64E+00	5.29E-05	8.52E-03	2.29E-03
Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA
	0.097	**0.553**	**0.019**	**0.002**	**0.006**	**0.006**	**224.059**	**0.000**	**0.091**	**0.025**

Construction Emission Calculations
Entrance Construction
Construction Year: 2014

Emission Factors	**Daily Emissions (lb/day)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	1.02E-02	9.08E-04	2.56E-04	2.65E-05	1.76E-05	8.82E-06	2.50E+00	9.70E-05	4.01E-03	1.05E-03
Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	1.02E-02	**9.08E-04**	**2.56E-04**	**2.65E-05**	**1.76E-05**	**8.82E-06**	**2.50E+00**	**9.70E-05**	**4.01E-03**	**1.05E-03**

Chiquita Canyon Landfill EIR
Mobile Sources

Construction Emission Calculations
Module Construction
Construction Year: 2016

Emission Factors	**Daily Emissions (lb/day)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	1.64E-02	1.45E-03	3.53E-04	5.29E-05	1.76E-05	1.76E-05	5.01E+00	1.59E-04	8.02E-03	2.09E-03
Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	1.64E-02	**1.45E-03**	**3.53E-04**	**5.29E-05**	**1.76E-05**	**1.76E-05**	**5.01E+00**	**1.59E-04**	**8.02E-03**	**2.09E-03**

Construction Emission Calculations
Module Construction
Construction Year: 2021

Emission Factors	**Daily Emissions (lb/day)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	1.12E-02	9.88E-04	1.76E-04	5.29E-05	1.76E-05	1.76E-05	5.02E+00	1.23E-04	8.02E-03	2.09E-03
Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	1.12E-02	**9.88E-04**	**1.76E-04**	**5.29E-05**	**1.76E-05**	**1.76E-05**	**5.02E+00**	**1.23E-04**	**8.02E-03**	**2.09E-03**

Operation Emission Calculations

Emission Calculations

Operation Year: 2016

Emission Factors	**Annual Emissions (lb/yr)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	1.41E+00	1.24E-01	3.03E-02	4.54E-03	1.51E-03	1.51E-03	4.30E+02	1.36E-02	6.88E-01	1.79E-01
Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Trucks (HHDT)	9.36E+00	1.81E+02	1.75E+00	2.78E-01	1.11E+00	1.01E+00	2.73E+04	0.00E+00	8.31E+00	2.22E+00
Waste Trucks (MHDT)	1.58E+00	1.67E+01	3.68E-01	4.09E-02	2.29E-01	2.12E-01	3.94E+03	0.00E+00	2.05E+00	5.93E-01
Waste Trucks (LHDT2)	1.88E+00	3.73E+00	2.01E-01	1.17E-02	3.51E-02	3.27E-02	1.15E+03	2.10E-02	1.13E+00	3.03E-01
Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA
	14.231	**201.256**	**2.351**	**0.335**	**1.379**	**1.261**	**32862.901**	**0.035**	**12.182**	**3.296**

Chiquita Canyon Landfill EIR
Mobile Sources

Emission Calculations
Operation Year: 2021

Emission Factors	**Annual Emissions (lb/yr)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	2.18E+00	1.93E-01	3.44E-02	1.03E-02	3.44E-03	3.44E-03	9.78E+02	2.41E-02	1.56E+00	4.08E-01
Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Trucks (HHDT)	2.31E+01	2.99E+02	4.61E+00	6.48E-01	2.13E+00	1.98E+00	5.86E+04	0.00E+00	1.94E+01	5.17E+00
Waste Trucks (MHDT)	2.85E+00	1.63E+01	6.90E-01	9.53E-02	2.81E-01	2.57E-01	8.50E+03	0.00E+00	4.78E+00	1.38E+00
Waste Trucks (LHDT2)	2.60E+00	5.94E+00	3.19E-01	2.75E-02	6.60E-02	6.05E-02	2.70E+03	3.30E-02	2.66E+00	7.13E-01
Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA
	30.680	**321.023**	**5.654**	**0.781**	**2.484**	**2.302**	**70750.281**	**0.057**	**28.359**	**7.672**

Emission Calculations
Operation Year: 2030

Emission Factors	**Annual Emissions (lb/yr)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	1.80E+00	1.58E-01	2.41E-02	1.03E-02	6.88E-03	3.44E-03	9.79E+02	2.06E-02	1.56E+00	4.08E-01
Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Trucks (HHDT)	2.40E+01	1.60E+02	5.07E+00	6.10E-01	1.68E+00	1.56E+00	5.78E+04	0.00E+00	1.94E+01	5.17E+00
Waste Trucks (MHDT)	2.76E+00	8.81E+00	6.71E-01	9.53E-02	2.65E-01	2.44E-01	8.45E+03	0.00E+00	4.78E+00	1.38E+00
Waste Trucks (LHDT2)	1.61E+00	2.96E+00	1.82E-01	2.75E-02	4.40E-02	3.85E-02	2.70E+03	1.65E-02	2.66E+00	7.13E-01
Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA
	30.165	**172.392**	**5.945**	**0.743**	**1.993**	**1.849**	**69906.265**	**0.037**	**28.359**	**7.672**

Construction Emission Calculations
Entrance Construction
Construction Year: 2014

Emission Factors	**Annual Emissions (lb/yr)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	1.22E+00	1.09E-01	3.07E-02	3.17E-03	2.12E-03	1.06E-03	3.00E+02	1.16E-02	4.81E-01	1.26E-01
Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	1.22E+00	**1.09E-01**	**3.07E-02**	**3.17E-03**	**2.12E-03**	**1.06E-03**	**3.00E+02**	**1.16E-02**	**4.81E-01**	**1.26E-01**

Chiquita Canyon Landfill EIR
Mobile Sources

Construction Emission Calculations
Module Construction
Construction Year: 2016

Emission Factors	**Annual Emissions (lb/yr)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	1.97E+00	1.74E-01	4.23E-02	6.35E-03	2.12E-03	2.12E-03	6.01E+02	1.90E-02	9.63E-01	2.51E-01
Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	1.97E+00	**1.74E-01**	**4.23E-02**	**6.35E-03**	**2.12E-03**	**2.12E-03**	**6.01E+02**	**1.90E-02**	**9.63E-01**	**2.51E-01**

Construction Emission Calculations
Module Construction
Construction Year: 2021

Emission Factors	**Annual Emissions (lb/yr)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	1.34E+00	1.19E-01	2.12E-02	6.35E-03	2.12E-03	2.12E-03	6.02E+02	1.48E-02	9.63E-01	2.51E-01
Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	1.34E+00	**1.19E-01**	**2.12E-02**	**6.35E-03**	**2.12E-03**	**2.12E-03**	**6.02E+02**	**1.48E-02**	**9.63E-01**	**2.51E-01**

Operation Emission Calculations

Emission Calculations

Operation Year: 2016 **Total Offsite**

Emission Factors		**Hourly Emissions (lb/hr)**									
Equipment Type	**Equipment Type**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	Employees (LDA)	4.52E-01	3.98E-02	9.70E-03	1.46E-03	4.85E-04	4.85E-04	1.38E+02	4.37E-03	2.21E-01	5.75E-02
Onsite Service Truck (LDT1)	Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Trucks (HHDT)	Waste Trucks (HHDT)	9.00E-02	1.74E+00	1.68E-02	2.68E-03	1.07E-02	9.76E-03	2.63E+02	0.00E+00	7.99E-02	2.13E-02
Waste Trucks (MHDT)	Waste Trucks (MHDT)	1.52E-02	1.60E-01	3.54E-03	3.93E-04	2.20E-03	2.04E-03	3.79E+01	0.00E+00	1.97E-02	5.70E-03
Waste Trucks (LHDT2)	Waste Trucks (LHDT2)	1.80E-02	3.59E-02	1.93E-03	1.12E-04	3.37E-04	3.15E-04	1.11E+01	2.02E-04	1.09E-02	2.91E-03
Waste Trucks (LDT2)	Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	Truck Idle	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA
	Total [6]	**5.75E-01**	**1.97E+00**	**3.20E-02**	**4.64E-03**	**1.37E-02**	**1.26E-02**	**4.50E+02**	**4.57E-03**	**3.31E-01**	**8.75E-02**

Chiquita Canyon Landfill EIR
Mobile Sources

Emission Calculations
Operation Year: 2021 **Total Offsite**

Emission Factors		**Hourly Emissions (lb/hr)**									
Equipment Type	**Equipment Type**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	Employees (LDA)	6.99E-01	6.17E-02	1.10E-02	3.31E-03	1.10E-03	1.10E-03	3.14E+02	7.72E-03	5.01E-01	1.31E-01
Onsite Service Truck (LDT1)	Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Trucks (HHDT)	Waste Trucks (HHDT)	2.22E-01	2.87E+00	4.43E-02	6.23E-03	2.05E-02	1.91E-02	5.63E+02	0.00E+00	1.86E-01	4.97E-02
Waste Trucks (MHDT)	Waste Trucks (MHDT)	2.74E-02	1.56E-01	6.63E-03	9.17E-04	2.70E-03	2.47E-03	8.18E+01	0.00E+00	4.60E-02	1.33E-02
Waste Trucks (LHDT2)	Waste Trucks (LHDT2)	2.50E-02	5.71E-02	3.07E-03	2.65E-04	6.35E-04	5.82E-04	2.59E+01	3.17E-04	2.56E-02	6.86E-03
Waste Trucks (LDT2)	Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	Truck Idle	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA
	Total [6]	**9.73E-01**	**3.15E+00**	**6.51E-02**	**1.07E-02**	**2.50E-02**	**2.32E-02**	**9.85E+02**	**8.03E-03**	**7.59E-01**	**2.01E-01**

Emission Calculations
Operation Year: 2030 **Total Offsite**

Emission Factors		**Hourly Emissions (lb/hr)**									
Equipment Type	**Equipment Type**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	Employees (LDA)	5.75E-01	5.07E-02	7.72E-03	3.31E-03	2.20E-03	1.10E-03	3.14E+02	6.61E-03	5.01E-01	1.31E-01
Onsite Service Truck (LDT1)	Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Trucks (HHDT)	Waste Trucks (HHDT)	2.31E-01	1.54E+00	4.87E-02	5.86E-03	1.61E-02	1.50E-02	5.56E+02	0.00E+00	1.86E-01	4.97E-02
Waste Trucks (MHDT)	Waste Trucks (MHDT)	2.65E-02	8.47E-02	6.45E-03	9.17E-04	2.55E-03	2.35E-03	8.13E+01	0.00E+00	4.60E-02	1.33E-02
Waste Trucks (LHDT2)	Waste Trucks (LHDT2)	1.54E-02	2.85E-02	1.75E-03	2.65E-04	4.23E-04	3.70E-04	2.59E+01	1.59E-04	2.56E-02	6.86E-03
Waste Trucks (LDT2)	Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	Truck Idle	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA
	Total [6]	**8.48E-01**	**1.71E+00**	**6.46E-02**	**1.04E-02**	**2.13E-02**	**1.88E-02**	**9.76E+02**	**6.77E-03**	**7.59E-01**	**2.01E-01**

Construction Emission Calculations
Entrance Construction
Construction Year: 2014 **Total Offsite**

Emission Factors		**Hourly Emissions (lb/hr)**									
Equipment Type	**Equipment Type**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	Employees (LDA)	1.02E+00	9.08E-02	2.56E-02	2.65E-03	1.76E-03	8.82E-04	2.50E+02	9.70E-03	4.01E-01	1.05E-01
Onsite Service Truck (LDT1)	Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Total [6]	**1.02E+00**	**9.08E-02**	**2.56E-02**	**2.65E-03**	**1.76E-03**	**8.82E-04**	**2.50E+02**	**9.70E-03**	**4.01E-01**	**1.05E-01**

Chiquita Canyon Landfill EIR
Mobile Sources

Construction Emission Calculations
Module Construction
Construction Year: 2016 **Total Offsite**

Emission Factors		**Hourly Emissions (lb/hr)**									
Equipment Type	**Equipment Type**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	Employees (LDA)	1.64E+00	1.45E-01	3.53E-02	5.29E-03	1.76E-03	1.76E-03	5.01E+02	1.59E-02	8.02E-01	2.09E-01
Onsite Service Truck (LDT1)	Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Total [6]	**1.64E+00**	**1.45E-01**	**3.53E-02**	**5.29E-03**	**1.76E-03**	**1.76E-03**	**5.01E+02**	**1.59E-02**	**8.02E-01**	**2.09E-01**

Construction Emission Calculations
Module Construction
Construction Year: 2021 **Total Offsite**

Emission Factors		**Hourly Emissions (lb/hr)**									
Equipment Type	**Equipment Type**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	Employees (LDA)	1.12E+00	9.88E-02	1.76E-02	5.29E-03	1.76E-03	1.76E-03	5.02E+02	1.23E-02	8.02E-01	2.09E-01
Onsite Service Truck (LDT1)	Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Total [6]	**1.12E+00**	**9.88E-02**	**1.76E-02**	**5.29E-03**	**1.76E-03**	**1.76E-03**	**5.02E+02**	**1.23E-02**	**8.02E-01**	**2.09E-01**

Operation Emission Calculations

Emission Calculations

Operation Year: 2016

Emission Factors	**Daily Emissions (lb/day)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	9.04E-01	7.95E-02	1.94E-02	2.91E-03	9.70E-04	9.70E-04	2.76E+02	8.73E-03	4.41E-01	1.15E-01
Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Trucks (HHDT)	9.00E-01	1.74E+01	1.68E-01	2.68E-02	1.07E-01	9.76E-02	2.63E+03	0.00E+00	7.99E-01	2.13E-01
Waste Trucks (MHDT)	1.52E-01	1.60E+00	3.54E-02	3.93E-03	2.20E-02	2.04E-02	3.79E+02	0.00E+00	1.97E-01	5.70E-02
Waste Trucks (LHDT2)	1.80E-01	3.59E-01	1.93E-02	1.12E-03	3.37E-03	3.15E-03	1.11E+02	2.02E-03	1.09E-01	2.91E-02
Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA
	2.14E+00	**1.94E+01**	**2.43E-01**	**3.47E-02**	**1.33E-01**	**1.22E-01**	**3.39E+03**	**1.08E-02**	**1.55E+00**	**4.15E-01**

Chiquita Canyon Landfill EIR
Mobile Sources

Emission Calculations
Operation Year: 2021

Emission Factors	**Daily Emissions (lb/day)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	1.40E+00	1.23E-01	2.20E-02	6.61E-03	2.20E-03	2.20E-03	6.27E+02	1.54E-02	1.00E+00	2.61E-01
Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Trucks (HHDT)	2.22E+00	2.87E+01	4.43E-01	6.23E-02	2.05E-01	1.91E-01	5.63E+03	0.00E+00	1.86E+00	4.97E-01
Waste Trucks (MHDT)	2.74E-01	1.56E+00	6.63E-02	9.17E-03	2.70E-02	2.47E-02	8.18E+02	0.00E+00	4.60E-01	1.33E-01
Waste Trucks (LHDT2)	2.50E-01	5.71E-01	3.07E-02	2.65E-03	6.35E-03	5.82E-03	2.59E+02	3.17E-03	2.56E-01	6.86E-02
Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA
	4.14E+00	**3.10E+01**	**5.62E-01**	**8.07E-02**	**2.41E-01**	**2.23E-01**	**7.34E+03**	**1.86E-02**	**3.58E+00**	**9.60E-01**

Emission Calculations
Operation Year: 2030

Emission Factors	**Daily Emissions (lb/day)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	1.15E+00	1.01E-01	1.54E-02	6.61E-03	4.41E-03	2.20E-03	6.27E+02	1.32E-02	1.00E+00	2.61E-01
Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Trucks (HHDT)	2.31E+00	1.54E+01	4.87E-01	5.86E-02	1.61E-01	1.50E-01	5.56E+03	0.00E+00	1.86E+00	4.97E-01
Waste Trucks (MHDT)	2.65E-01	8.47E-01	6.45E-02	9.17E-03	2.55E-02	2.35E-02	8.13E+02	0.00E+00	4.60E-01	1.33E-01
Waste Trucks (LHDT2)	1.54E-01	2.85E-01	1.75E-02	2.65E-03	4.23E-03	3.70E-03	2.59E+02	1.59E-03	2.56E-01	6.86E-02
Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA
	3.88E+00	**1.67E+01**	**5.85E-01**	**7.71E-02**	**1.95E-01**	**1.80E-01**	**7.25E+03**	**1.48E-02**	**3.58E+00**	**9.60E-01**

Construction Emission Calculations
Entrance Construction
Construction Year: 2014

Emission Factors	**Daily Emissions (lb/day)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	2.04E+00	1.82E-01	5.11E-02	5.29E-03	3.53E-03	1.76E-03	5.01E+02	1.94E-02	8.02E-01	2.09E-01
Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	2.04E+00	**1.82E-01**	**5.11E-02**	**5.29E-03**	**3.53E-03**	**1.76E-03**	**5.01E+02**	**1.94E-02**	**8.02E-01**	**2.09E-01**

Chiquita Canyon Landfill EIR
Mobile Sources

Construction Emission Calculations
Module Construction
Construction Year: 2016

Emission Factors	**Daily Emissions (lb/day)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	3.29E+00	2.89E-01	7.05E-02	1.06E-02	3.53E-03	3.53E-03	1.00E+03	3.17E-02	1.60E+00	4.18E-01
Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	3.29E+00	**2.89E-01**	**7.05E-02**	**1.06E-02**	**3.53E-03**	**3.53E-03**	**1.00E+03**	**3.17E-02**	**1.60E+00**	**4.18E-01**

Construction Emission Calculations
Module Construction
Construction Year: 2021

Emission Factors	**Daily Emissions (lb/day)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	2.24E+00	1.98E-01	3.53E-02	1.06E-02	3.53E-03	3.53E-03	1.00E+03	2.47E-02	1.60E+00	4.18E-01
Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	2.24E+00	**1.98E-01**	**3.53E-02**	**1.06E-02**	**3.53E-03**	**3.53E-03**	**1.00E+03**	**2.47E-02**	**1.60E+00**	**4.18E-01**

Operation Emission Calculations

Emission Calculations

Operation Year: 2016

Emission Factors	**Annual Emissions (lb/yr)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	2.82E+02	2.48E+01	6.05E+00	9.08E-01	3.03E-01	3.03E-01	8.60E+04	2.72E+00	1.38E+02	3.59E+01
Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Trucks (HHDT)	2.81E+02	5.42E+03	5.25E+01	8.35E+00	3.34E+01	3.04E+01	8.20E+05	0.00E+00	2.49E+02	6.66E+01
Waste Trucks (MHDT)	4.74E+01	5.00E+02	1.11E+01	1.23E+00	6.86E+00	6.35E+00	1.18E+05	0.00E+00	6.15E+01	1.78E+01
Waste Trucks (LHDT2)	5.63E+01	1.12E+02	6.03E+00	3.51E-01	1.05E+00	9.82E-01	3.45E+04	6.31E-01	3.39E+01	9.09E+00
Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA
	6.67E+02	**6.06E+03**	**7.57E+01**	**1.08E+01**	**4.16E+01**	**3.81E+01**	**1.06E+06**	**3.36E+00**	**4.82E+02**	**1.29E+02**

Chiquita Canyon Landfill EIR
Mobile Sources

Emission Calculations
Operation Year: 2021

Emission Factors	**Annual Emissions (lb/yr)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	4.36E+02	3.85E+01	6.88E+00	2.06E+00	6.88E-01	6.88E-01	1.96E+05	4.81E+00	3.13E+02	8.16E+01
Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Trucks (HHDT)	6.92E+02	8.96E+03	1.38E+02	1.94E+01	6.40E+01	5.94E+01	1.76E+06	0.00E+00	5.81E+02	1.55E+02
Waste Trucks (MHDT)	8.54E+01	4.88E+02	2.07E+01	2.86E+00	8.42E+00	7.70E+00	2.55E+05	0.00E+00	1.43E+02	4.15E+01
Waste Trucks (LHDT2)	7.79E+01	1.78E+02	9.57E+00	8.25E-01	1.98E+00	1.82E+00	8.10E+04	9.90E-01	7.97E+01	2.14E+01
Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA
	1.29E+03	**9.66E+03**	**1.75E+02**	**2.52E+01**	**7.51E+01**	**6.96E+01**	**2.29E+06**	**5.81E+00**	**1.12E+03**	**3.00E+02**

Emission Calculations
Operation Year: 2030

Emission Factors	**Annual Emissions (lb/yr)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	3.59E+02	3.16E+01	4.81E+00	2.06E+00	1.38E+00	6.88E-01	1.96E+05	4.13E+00	3.13E+02	8.16E+01
Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Trucks (HHDT)	7.20E+02	4.81E+03	1.52E+02	1.83E+01	5.03E+01	4.69E+01	1.73E+06	0.00E+00	5.81E+02	1.55E+02
Waste Trucks (MHDT)	8.27E+01	2.64E+02	2.01E+01	2.86E+00	7.96E+00	7.33E+00	2.54E+05	0.00E+00	1.43E+02	4.15E+01
Waste Trucks (LHDT2)	4.82E+01	8.88E+01	5.45E+00	8.25E-01	1.32E+00	1.16E+00	8.09E+04	4.95E-01	7.97E+01	2.14E+01
Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA
	1.21E+03	**5.20E+03**	**1.82E+02**	**2.40E+01**	**6.10E+01**	**5.60E+01**	**2.26E+06**	**4.62E+00**	**1.12E+03**	**3.00E+02**

Construction Emission Calculations
Entrance Construction
Construction Year: 2014

Emission Factors	**Annual Emissions (lb/yr)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	2.45E+02	2.18E+01	6.14E+00	6.35E-01	4.23E-01	2.12E-01	6.01E+04	2.33E+00	9.63E+01	2.51E+01
Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	2.45E+02	**2.18E+01**	**6.14E+00**	**6.35E-01**	**4.23E-01**	**2.12E-01**	**6.01E+04**	**2.33E+00**	**9.63E+01**	**2.51E+01**

Chiquita Canyon Landfill EIR
Mobile Sources

Construction Emission Calculations
Module Construction
Construction Year: 2016

Emission Factors	**Annual Emissions (lb/yr)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	3.94E+02	3.47E+01	8.47E+00	1.27E+00	4.23E-01	4.23E-01	1.20E+05	3.81E+00	1.93E+02	5.02E+01
Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	3.94E+02	**3.47E+01**	**8.47E+00**	**1.27E+00**	**4.23E-01**	**4.23E-01**	**1.20E+05**	**3.81E+00**	**1.93E+02**	**5.02E+01**

Construction Emission Calculations
Module Construction
Construction Year: 2021

Emission Factors	**Annual Emissions (lb/yr)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	2.68E+02	2.37E+01	4.23E+00	1.27E+00	4.23E-01	4.23E-01	1.20E+05	2.96E+00	1.93E+02	5.02E+01
Onsite Service Truck (LDT1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	2.68E+02	**2.37E+01**	**4.23E+00**	**1.27E+00**	**4.23E-01**	**4.23E-01**	**1.20E+05**	**2.96E+00**	**1.93E+02**	**5.02E+01**

Operation Emission Calculations

Emission Calculations

Operation Year: 2016 **Total Onsite**

Emission Factors

Equipment Type	Equipment Type	Hourly Emissions (lb/hr) CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO_2	CH_4	PM_{10} Fugitive	$PM_{2.5}$ Fugitive
Employees (LDA)	Employees (LDA)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Onsite Service Truck (LDT1)	Onsite Service Truck (LDT1)	5.31E-03	3.06E-04	1.23E-04	6.61E-06	9.92E-07	9.92E-07	7.23E-01	4.63E-05	9.37E-02	1.01E-02
Waste Trucks (HHDT)	Waste Trucks (HHDT)	6.00E-02	1.16E+00	1.12E-02	1.78E-03	7.14E-03	6.51E-03	1.75E+02	0.00E+00	1.16E+00	2.86E-01
Waste Trucks (MHDT)	Waste Trucks (MHDT)	1.01E-02	1.07E-01	2.36E-03	2.62E-04	1.47E-03	1.36E-03	2.53E+01	0.00E+00	2.64E-01	6.54E-02
Waste Trucks (LHDT2)	Waste Trucks (LHDT2)	1.20E-02	2.39E-02	1.29E-03	7.50E-05	2.25E-04	2.10E-04	7.37E+00	1.35E-04	1.65E-01	4.08E-02
Waste Trucks (LDT2)	Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	Truck Idle	7.06E-01	1.22E+00	1.26E-01	1.41E-03	3.09E-03	2.84E-03	1.43E+02	0.00E+00	NA	NA
	Total [6]	**7.94E-01**	**2.51E+00**	**1.41E-01**	**3.54E-03**	**1.19E-02**	**1.09E-02**	**3.51E+02**	**1.81E-04**	**1.68E+00**	**4.02E-01**

Chiquita Canyon Landfill EIR
Mobile Sources

Emission Calculations
Operation Year: 2021 **Total Onsite**

Emission Factors

Equipment Type	Equipment Type	Hourly Emissions (lb/hr) CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO_2	CH_4	PM_{10} Fugitive	$PM_{2.5}$ Fugitive
Employees (LDA)	Employees (LDA)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Onsite Service Truck (LDT1)	Onsite Service Truck (LDT1)	7.08E-03	4.02E-04	1.32E-04	1.32E-05	1.32E-06	1.32E-06	1.45E+00	6.61E-05	1.87E-01	2.02E-02
Waste Trucks (HHDT)	Waste Trucks (HHDT)	1.48E-01	1.91E+00	2.96E-02	4.15E-03	1.37E-02	1.27E-02	3.75E+02	0.00E+00	2.70E+00	6.66E-01
Waste Trucks (MHDT)	Waste Trucks (MHDT)	1.83E-02	1.04E-01	4.42E-03	6.11E-04	1.80E-03	1.64E-03	5.45E+01	0.00E+00	6.17E-01	1.53E-01
Waste Trucks (LHDT2)	Waste Trucks (LHDT2)	1.66E-02	3.81E-02	2.05E-03	1.76E-04	4.23E-04	3.88E-04	1.73E+01	2.12E-04	3.89E-01	9.59E-02
Waste Trucks (LDT2)	Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	Truck Idle	1.93E+00	2.12E+00	3.43E-01	3.28E-03	5.56E-03	5.11E-03	3.10E+02	0.00E+00	NA	NA
	Total [6]	**2.12E+00**	**4.18E+00**	**3.79E-01**	**8.24E-03**	**2.15E-02**	**1.98E-02**	**7.58E+02**	**2.78E-04**	**3.89E+00**	**9.34E-01**

Emission Calculations
Operation Year: 2030 **Total Onsite**

Emission Factors

Equipment Type	Equipment Type	Hourly Emissions (lb/hr) CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO_2	CH_4	PM_{10} Fugitive	$PM_{2.5}$ Fugitive
Employees (LDA)	Employees (LDA)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Onsite Service Truck (LDT1)	Onsite Service Truck (LDT1)	3.77E-03	2.01E-04	5.73E-05	1.32E-05	1.32E-06	1.32E-06	1.46E+00	3.97E-05	1.87E-01	2.02E-02
Waste Trucks (HHDT)	Waste Trucks (HHDT)	1.54E-01	1.03E+00	3.25E-02	3.91E-03	1.07E-02	1.00E-02	3.70E+02	0.00E+00	2.70E+00	6.66E-01
Waste Trucks (MHDT)	Waste Trucks (MHDT)	1.77E-02	5.65E-02	4.30E-03	6.11E-04	1.70E-03	1.57E-03	5.42E+01	0.00E+00	6.17E-01	1.53E-01
Waste Trucks (LHDT2)	Waste Trucks (LHDT2)	1.03E-02	1.90E-02	1.16E-03	1.76E-04	2.82E-04	2.47E-04	1.73E+01	1.06E-04	3.89E-01	9.59E-02
Waste Trucks (LDT2)	Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	Truck Idle	2.02E+00	1.91E+00	3.59E-01	3.28E-03	5.31E-03	4.88E-03	3.09E+02	0.00E+00	NA	NA
	Total [6]	**2.21E+00**	**3.01E+00**	**3.97E-01**	**7.99E-03**	**1.80E-02**	**1.67E-02**	**7.53E+02**	**1.46E-04**	**3.89E+00**	**9.34E-01**

Construction Emission Calculations
Entrance Construction
Construction Year: 2014 **Total Onsite**

Emission Factors

Equipment Type	Equipment Type	Hourly Emissions (lb/hr) CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO_2	CH_4	PM_{10} Fugitive	$PM_{2.5}$ Fugitive
Employees (LDA)	Employees (LDA)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Onsite Service Truck (LDT1)	Onsite Service Truck (LDT1)	2.57E-02	1.48E-03	6.88E-04	2.65E-05	5.29E-06	3.97E-06	2.89E+00	2.20E-04	3.75E-01	4.04E-02
	Total [6]	**2.57E-02**	**1.48E-03**	**6.88E-04**	**2.65E-05**	**5.29E-06**	**3.97E-06**	**2.89E+00**	**2.20E-04**	**3.75E-01**	**4.04E-02**

Chiquita Canyon Landfill EIR
Mobile Sources

Construction Emission Calculations
Module Construction
Construction Year: 2016 **Total Onsite**

Emission Factors		**Hourly Emissions (lb/hr)**									
Equipment Type	**Equipment Type**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	Employees (LDA)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Onsite Service Truck (LDT1)	Onsite Service Truck (LDT1)	1.06E-02	6.11E-04	2.47E-04	1.32E-05	1.98E-06	1.98E-06	1.45E+00	9.26E-05	1.87E-01	2.02E-02
	Total [6]	**1.06E-02**	**6.11E-04**	**2.47E-04**	**1.32E-05**	**1.98E-06**	**1.98E-06**	**1.45E+00**	**9.26E-05**	**1.87E-01**	**2.02E-02**

Construction Emission Calculations
Module Construction
Construction Year: 2021 **Total Onsite**

Emission Factors		**Hourly Emissions (lb/hr)**									
Equipment Type	**Equipment Type**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	Employees (LDA)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Onsite Service Truck (LDT1)	Onsite Service Truck (LDT1)	7.08E-03	4.02E-04	1.32E-04	1.32E-05	1.32E-06	1.32E-06	1.45E+00	6.61E-05	1.87E-01	2.02E-02
	Total [6]	**7.08E-03**	**4.02E-04**	**1.32E-04**	**1.32E-05**	**1.32E-06**	**1.32E-06**	**1.45E+00**	**6.61E-05**	**1.87E-01**	**2.02E-02**

Operation Emission Calculations

Emission Calculations

Operation Year: 2016

Emission Factors	**Daily Emissions (lb/day)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Onsite Service Truck (LDT1)	5.31E-02	3.06E-03	1.23E-03	6.61E-05	9.92E-06	9.92E-06	7.23E+00	4.63E-04	9.37E-01	1.01E-01
Waste Trucks (HHDT)	6.00E-01	1.16E+01	1.12E-01	1.78E-02	7.14E-02	6.51E-02	1.75E+03	0.00E+00	1.16E+01	2.86E+00
Waste Trucks (MHDT)	1.01E-01	1.07E+00	2.36E-02	2.62E-03	1.47E-02	1.36E-02	2.53E+02	0.00E+00	2.64E+00	6.54E-01
Waste Trucks (LHDT2)	1.20E-01	2.39E-01	1.29E-02	7.50E-04	2.25E-03	2.10E-03	7.37E+01	1.35E-03	1.65E+00	4.08E-01
Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	7.06E+00	1.22E+01	1.26E+00	1.41E-02	3.09E-02	2.84E-02	1.43E+03	0.00E+00	NA	NA
	7.94E+00	**2.51E+01**	**1.41E+00**	**3.54E-02**	**1.19E-01**	**1.09E-01**	**3.51E+03**	**1.81E-03**	**1.68E+01**	**4.02E+00**

Chiquita Canyon Landfill EIR
Mobile Sources

Emission Calculations
Operation Year: 2021

Emission Factors	**Daily Emissions (lb/day)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Onsite Service Truck (LDT1)	7.08E-02	4.02E-03	1.32E-03	1.32E-04	1.32E-05	1.32E-05	1.45E+01	6.61E-04	1.87E+00	2.02E-01
Waste Trucks (HHDT)	1.48E+00	1.91E+01	2.96E-01	4.15E-02	1.37E-01	1.27E-01	3.75E+03	0.00E+00	2.70E+01	6.66E+00
Waste Trucks (MHDT)	1.83E-01	1.04E+00	4.42E-02	6.11E-03	1.80E-02	1.64E-02	5.45E+02	0.00E+00	6.17E+00	1.53E+00
Waste Trucks (LHDT2)	1.66E-01	3.81E-01	2.05E-02	1.76E-03	4.23E-03	3.88E-03	1.73E+02	2.12E-03	3.89E+00	9.59E-01
Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	1.93E+01	2.12E+01	3.43E+00	3.28E-02	5.56E-02	5.11E-02	3.10E+03	0.00E+00	NA	NA
	2.12E+01	**4.18E+01**	**3.79E+00**	**8.24E-02**	**2.15E-01**	**1.98E-01**	**7.58E+03**	**2.78E-03**	**3.89E+01**	**9.34E+00**

Emission Calculations
Operation Year: 2030

Emission Factors	**Daily Emissions (lb/day)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Onsite Service Truck (LDT1)	3.77E-02	2.01E-03	5.73E-04	1.32E-04	1.32E-05	1.32E-05	1.46E+01	3.97E-04	1.87E+00	2.02E-01
Waste Trucks (HHDT)	1.54E+00	1.03E+01	3.25E-01	3.91E-02	1.07E-01	1.00E-01	3.70E+03	0.00E+00	2.70E+01	6.66E+00
Waste Trucks (MHDT)	1.77E-01	5.65E-01	4.30E-02	6.11E-03	1.70E-02	1.57E-02	5.42E+02	0.00E+00	6.17E+00	1.53E+00
Waste Trucks (LHDT2)	1.03E-01	1.90E-01	1.16E-02	1.76E-03	2.82E-03	2.47E-03	1.73E+02	1.06E-03	3.89E+00	9.59E-01
Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	2.02E+01	1.91E+01	3.59E+00	3.28E-02	5.31E-02	4.88E-02	3.09E+03	0.00E+00	NA	NA
	2.21E+01	**3.01E+01**	**3.97E+00**	**7.99E-02**	**1.80E-01**	**1.67E-01**	**7.53E+03**	**1.46E-03**	**3.89E+01**	**9.34E+00**

Construction Emission Calculations
Entrance Construction
Construction Year: 2014

Emission Factors	**Daily Emissions (lb/day)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Onsite Service Truck (LDT1)	2.57E-01	1.48E-02	6.88E-03	2.65E-04	5.29E-05	3.97E-05	2.89E+01	2.20E-03	3.75E+00	4.04E-01
	2.57E-01	**1.48E-02**	**6.88E-03**	**2.65E-04**	**5.29E-05**	**3.97E-05**	**2.89E+01**	**2.20E-03**	**3.75E+00**	**4.04E-01**

Chiquita Canyon Landfill EIR
Mobile Sources

Construction Emission Calculations
Module Construction
Construction Year: 2016

Emission Factors	**Daily Emissions (lb/day)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Onsite Service Truck (LDT1)	1.06E-01	6.11E-03	2.47E-03	1.32E-04	1.98E-05	1.98E-05	1.45E+01	9.26E-04	1.87E+00	2.02E-01
	1.06E-01	**6.11E-03**	**2.47E-03**	**1.32E-04**	**1.98E-05**	**1.98E-05**	**1.45E+01**	**9.26E-04**	**1.87E+00**	**2.02E-01**

Construction Emission Calculations
Module Construction
Construction Year: 2021

Emission Factors	**Daily Emissions (lb/day)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Onsite Service Truck (LDT1)	7.08E-02	4.02E-03	1.32E-03	1.32E-04	1.32E-05	1.32E-05	1.45E+01	6.61E-04	1.87E+00	2.02E-01
	7.08E-02	**4.02E-03**	**1.32E-03**	**1.32E-04**	**1.32E-05**	**1.32E-05**	**1.45E+01**	**6.61E-04**	**1.87E+00**	**2.02E-01**

Operation Emission Calculations

Emission Calculations

Operation Year: 2016

Emission Factors	**Annual Emissions (lb/yr)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Onsite Service Truck (LDT1)	1.66E+01	9.53E-01	3.85E-01	2.06E-02	3.10E-03	3.10E-03	2.26E+03	1.44E-01	2.92E+02	3.15E+01
Waste Trucks (HHDT)	1.87E+02	3.61E+03	3.50E+01	5.57E+00	2.23E+01	2.03E+01	5.47E+05	0.00E+00	3.62E+03	8.92E+02
Waste Trucks (MHDT)	3.16E+01	3.33E+02	7.37E+00	8.17E-01	4.58E+00	4.23E+00	7.88E+04	0.00E+00	8.25E+02	2.04E+02
Waste Trucks (LHDT2)	3.75E+01	7.46E+01	4.02E+00	2.34E-01	7.02E-01	6.55E-01	2.30E+04	4.21E-01	5.16E+02	1.27E+02
Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	2.20E+03	3.82E+03	3.94E+02	4.40E+00	9.64E+00	8.87E+00	4.45E+05	0.00E+00	NA	NA
	2.48E+03	**7.84E+03**	**4.41E+02**	**1.10E+01**	**3.72E+01**	**3.41E+01**	**1.10E+06**	**5.65E-01**	**5.25E+03**	**1.26E+03**

Chiquita Canyon Landfill EIR
Mobile Sources

Emission Calculations
Operation Year: 2021

Emission Factors	**Annual Emissions (lb/yr)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Onsite Service Truck (LDT1)	2.21E+01	1.25E+00	4.13E-01	4.13E-02	4.13E-03	4.13E-03	4.53E+03	2.06E-01	5.85E+02	6.31E+01
Waste Trucks (HHDT)	4.61E+02	5.97E+03	9.22E+01	1.30E+01	4.27E+01	3.96E+01	1.17E+06	0.00E+00	8.43E+03	2.08E+03
Waste Trucks (MHDT)	5.70E+01	3.25E+02	1.38E+01	1.91E+00	5.62E+00	5.13E+00	1.70E+05	0.00E+00	1.92E+03	4.76E+02
Waste Trucks (LHDT2)	5.19E+01	1.19E+02	6.38E+00	5.50E-01	1.32E+00	1.21E+00	5.40E+04	6.60E-01	1.21E+03	2.99E+02
Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	6.03E+03	6.63E+03	1.07E+03	1.02E+01	1.73E+01	1.60E+01	9.66E+05	0.00E+00	NA	NA
	6.62E+03	**1.30E+04**	**1.18E+03**	**2.57E+01**	**6.70E+01**	**6.19E+01**	**2.37E+06**	**8.67E-01**	**1.21E+04**	**2.92E+03**

Emission Calculations
Operation Year: 2030

Emission Factors	**Annual Emissions (lb/yr)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Onsite Service Truck (LDT1)	1.18E+01	6.27E-01	1.79E-01	4.13E-02	4.13E-03	4.13E-03	4.54E+03	1.24E-01	5.85E+02	6.31E+01
Waste Trucks (HHDT)	4.80E+02	3.21E+03	1.01E+02	1.22E+01	3.35E+01	3.12E+01	1.16E+06	0.00E+00	8.43E+03	2.08E+03
Waste Trucks (MHDT)	5.51E+01	1.76E+02	1.34E+01	1.91E+00	5.30E+00	4.89E+00	1.69E+05	0.00E+00	1.92E+03	4.76E+02
Waste Trucks (LHDT2)	3.21E+01	5.92E+01	3.63E+00	5.50E-01	8.80E-01	7.70E-01	5.39E+04	3.30E-01	1.21E+03	2.99E+02
Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	6.32E+03	5.96E+03	1.12E+03	1.02E+01	1.66E+01	1.52E+01	9.66E+05	0.00E+00	NA	NA
	6.90E+03	**9.40E+03**	**1.24E+03**	**2.49E+01**	**5.63E+01**	**5.21E+01**	**2.35E+06**	**4.54E-01**	**1.21E+04**	**2.92E+03**

Construction Emission Calculations
Entrance Construction
Construction Year: 2014

Emission Factors	**Annual Emissions (lb/yr)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Onsite Service Truck (LDT1)	3.09E+01	1.78E+00	8.25E-01	3.17E-02	6.35E-03	4.76E-03	3.46E+03	2.65E-01	4.50E+02	4.85E+01
	3.09E+01	**1.78E+00**	**8.25E-01**	**3.17E-02**	**6.35E-03**	**4.76E-03**	**3.46E+03**	**2.65E-01**	**4.50E+02**	**4.85E+01**

Chiquita Canyon Landfill EIR
Mobile Sources

Construction Emission Calculations
Module Construction
Construction Year: 2016

Emission Factors	**Annual Emissions (lb/yr)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Onsite Service Truck (LDT1)	1.28E+01	7.33E-01	2.96E-01	1.59E-02	2.38E-03	2.38E-03	1.74E+03	1.11E-01	2.25E+02	2.43E+01
	1.28E+01	**7.33E-01**	**2.96E-01**	**1.59E-02**	**2.38E-03**	**2.38E-03**	**1.74E+03**	**1.11E-01**	**2.25E+02**	**2.43E+01**

Construction Emission Calculations
Module Construction
Construction Year: 2021

Emission Factors	**Annual Emissions (lb/yr)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Onsite Service Truck (LDT1)	8.50E+00	4.83E-01	1.59E-01	1.59E-02	1.59E-03	1.59E-03	1.74E+03	7.94E-02	2.25E+02	2.43E+01
	8.50E+00	**4.83E-01**	**1.59E-01**	**1.59E-02**	**1.59E-03**	**1.59E-03**	**1.74E+03**	**7.94E-02**	**2.25E+02**	**2.43E+01**

Operation Emission Calculations

Emission Calculations

Operation Year: 2016 **Total**

Emission Factors		**Hourly Emissions (lb/hr)**									
Equipment Type	**Equipment Type**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	Employees (LDA)	4.52E-01	3.98E-02	9.70E-03	1.46E-03	4.85E-04	4.85E-04	1.38E+02	4.37E-03	2.21E-01	5.75E-02
Onsite Service Truck (LDT1)	Onsite Service Truck (LDT1)	5.31E-03	3.06E-04	1.23E-04	6.61E-06	9.92E-07	9.92E-07	7.23E-01	4.63E-05	9.37E-02	1.01E-02
Waste Trucks (HHDT)	Waste Trucks (HHDT)	1.50E-01	2.90E+00	2.81E-02	4.46E-03	1.78E-02	1.63E-02	4.38E+02	0.00E+00	1.24E+00	3.07E-01
Waste Trucks (MHDT)	Waste Trucks (MHDT)	2.53E-02	2.67E-01	5.90E-03	6.55E-04	3.67E-03	3.39E-03	6.32E+01	0.00E+00	2.84E-01	7.11E-02
Waste Trucks (LHDT2)	Waste Trucks (LHDT2)	3.01E-02	5.98E-02	3.22E-03	1.87E-04	5.62E-04	5.25E-04	1.84E+01	3.37E-04	1.76E-01	4.37E-02
Waste Trucks (LDT2)	Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	Truck Idle	7.06E-01	1.22E+00	1.26E-01	1.41E-03	3.09E-03	2.84E-03	1.43E+02	0.00E+00	NA	NA
	Total [6]	**1.37E+00**	**4.49E+00**	**1.73E-01**	**8.17E-03**	**2.56E-02**	**2.35E-02**	**8.01E+02**	**4.75E-03**	**2.01E+00**	**4.90E-01**

Chiquita Canyon Landfill EIR
Mobile Sources

Emission Calculations
Operation Year: 2021 **Total**

Emission Factors		**Hourly Emissions (lb/hr)**									
Equipment Type	**Equipment Type**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	Employees (LDA)	6.99E-01	6.17E-02	1.10E-02	3.31E-03	1.10E-03	1.10E-03	3.14E+02	7.72E-03	5.01E-01	1.31E-01
Onsite Service Truck (LDT1)	Onsite Service Truck (LDT1)	7.08E-03	4.02E-04	1.32E-04	1.32E-05	1.32E-06	1.32E-06	1.45E+00	6.61E-05	1.87E-01	2.02E-02
Waste Trucks (HHDT)	Waste Trucks (HHDT)	3.69E-01	4.79E+00	7.39E-02	1.04E-02	3.42E-02	3.18E-02	9.39E+02	0.00E+00	2.89E+00	7.15E-01
Waste Trucks (MHDT)	Waste Trucks (MHDT)	4.56E-02	2.61E-01	1.11E-02	1.53E-03	4.50E-03	4.11E-03	1.36E+02	0.00E+00	6.63E-01	1.66E-01
Waste Trucks (LHDT2)	Waste Trucks (LHDT2)	4.16E-02	9.52E-02	5.11E-03	4.41E-04	1.06E-03	9.70E-04	4.32E+01	5.29E-04	4.15E-01	1.03E-01
Waste Trucks (LDT2)	Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	Truck Idle	1.93E+00	2.12E+00	3.43E-01	3.28E-03	5.56E-03	5.11E-03	3.10E+02	0.00E+00	NA	NA
	Total [6]	**3.10E+00**	**7.33E+00**	**4.44E-01**	**1.90E-02**	**4.64E-02**	**4.31E-02**	**1.74E+03**	**8.31E-03**	**4.65E+00**	**1.14E+00**

Emission Calculations
Operation Year: 2030 **Total**

Emission Factors		**Hourly Emissions (lb/hr)**									
Equipment Type	**Equipment Type**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	Employees (LDA)	5.75E-01	5.07E-02	7.72E-03	3.31E-03	2.20E-03	1.10E-03	3.14E+02	6.61E-03	5.01E-01	1.31E-01
Onsite Service Truck (LDT1)	Onsite Service Truck (LDT1)	3.77E-03	2.01E-04	5.73E-05	1.32E-05	1.32E-06	1.32E-06	1.46E+00	3.97E-05	1.87E-01	2.02E-02
Waste Trucks (HHDT)	Waste Trucks (HHDT)	3.85E-01	2.57E+00	8.12E-02	9.77E-03	2.69E-02	2.50E-02	9.26E+02	0.00E+00	2.89E+00	7.15E-01
Waste Trucks (MHDT)	Waste Trucks (MHDT)	4.42E-02	1.41E-01	1.08E-02	1.53E-03	4.25E-03	3.92E-03	1.35E+02	0.00E+00	6.63E-01	1.66E-01
Waste Trucks (LHDT2)	Waste Trucks (LHDT2)	2.57E-02	4.74E-02	2.91E-03	4.41E-04	7.05E-04	6.17E-04	4.32E+01	2.65E-04	4.15E-01	1.03E-01
Waste Trucks (LDT2)	Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	Truck Idle	2.02E+00	1.91E+00	3.59E-01	3.28E-03	5.31E-03	4.88E-03	3.09E+02	0.00E+00	NA	NA
	Total [6]	**3.06E+00**	**4.72E+00**	**4.62E-01**	**1.83E-02**	**3.93E-02**	**3.56E-02**	**1.73E+03**	**6.92E-03**	**4.65E+00**	**1.14E+00**

Construction Emission Calculations
Entrance Construction
Construction Year: 2014 **Total**

Emission Factors		**Hourly Emissions (lb/hr)**									
Equipment Type	**Equipment Type**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	Employees (LDA)	1.02E+00	9.08E-02	2.56E-02	2.65E-03	1.76E-03	8.82E-04	2.50E+02	9.70E-03	4.01E-01	1.05E-01
Onsite Service Truck (LDT1)	Onsite Service Truck (LDT1)	2.57E-02	1.48E-03	6.88E-04	2.65E-05	5.29E-06	3.97E-06	2.89E+00	2.20E-04	3.75E-01	4.04E-02
	Total [6]	**1.05E+00**	**9.23E-02**	**2.63E-02**	**2.67E-03**	**1.77E-03**	**8.86E-04**	**2.53E+02**	**9.92E-03**	**7.76E-01**	**1.45E-01**

Chiquita Canyon Landfill EIR
Mobile Sources

Construction Emission Calculations
Module Construction
Construction Year: 2016 **Total**

Emission Factors		**Hourly Emissions (lb/hr)**									
Equipment Type	**Equipment Type**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	Employees (LDA)	1.64E+00	1.45E-01	3.53E-02	5.29E-03	1.76E-03	1.76E-03	5.01E+02	1.59E-02	8.02E-01	2.09E-01
Onsite Service Truck (LDT1)	Onsite Service Truck (LDT1)	1.06E-02	6.11E-04	2.47E-04	1.32E-05	1.98E-06	1.98E-06	1.45E+00	9.26E-05	1.87E-01	2.02E-02
	Total [6]	**1.65E+00**	**1.45E-01**	**3.55E-02**	**5.30E-03**	**1.77E-03**	**1.77E-03**	**5.03E+02**	**1.60E-02**	**9.90E-01**	**2.29E-01**

Construction Emission Calculations
Module Construction
Construction Year: 2021 **Total**

Emission Factors		**Hourly Emissions (lb/hr)**									
Equipment Type	**Equipment Type**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	Employees (LDA)	1.12E+00	9.88E-02	1.76E-02	5.29E-03	1.76E-03	1.76E-03	5.02E+02	1.23E-02	8.02E-01	2.09E-01
Onsite Service Truck (LDT1)	Onsite Service Truck (LDT1)	7.08E-03	4.02E-04	1.32E-04	1.32E-05	1.32E-06	1.32E-06	1.45E+00	6.61E-05	1.87E-01	2.02E-02
	Total [6]	**1.13E+00**	**9.92E-02**	**1.78E-02**	**5.30E-03**	**1.77E-03**	**1.77E-03**	**5.03E+02**	**1.24E-02**	**9.90E-01**	**2.29E-01**

Operation Emission Calculations

Emission Calculations

Operation Year: 2016

Emission Factors	**Daily Emissions (lb/day)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	9.04E-01	7.95E-02	1.94E-02	2.91E-03	9.70E-04	9.70E-04	2.76E+02	8.73E-03	4.41E-01	1.15E-01
Onsite Service Truck (LDT1)	5.31E-02	3.06E-03	1.23E-03	6.61E-05	9.92E-06	9.92E-06	7.23E+00	4.63E-04	9.37E-01	1.01E-01
Waste Trucks (HHDT)	1.50E+00	2.90E+01	2.81E-01	4.46E-02	1.78E-01	1.63E-01	4.38E+03	0.00E+00	1.24E+01	3.07E+00
Waste Trucks (MHDT)	2.53E-01	2.67E+00	5.90E-02	6.55E-03	3.67E-02	3.39E-02	6.32E+02	0.00E+00	2.84E+00	7.11E-01
Waste Trucks (LHDT2)	3.01E-01	5.98E-01	3.22E-02	1.87E-03	5.62E-03	5.25E-03	1.84E+02	3.37E-03	1.76E+00	4.37E-01
Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	7.06E+00	1.22E+01	1.26E+00	1.41E-02	3.09E-02	2.84E-02	1.43E+03	0.00E+00	NA	NA
	1.01E+01	**4.46E+01**	**1.66E+00**	**7.01E-02**	**2.53E-01**	**2.31E-01**	**6.91E+03**	**1.26E-02**	**1.84E+01**	**4.44E+00**

Chiquita Canyon Landfill EIR
Mobile Sources

Emission Calculations
Operation Year: 2021

Emission Factors	Daily Emissions (lb/day)									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	1.40E+00	1.23E-01	2.20E-02	6.61E-03	2.20E-03	2.20E-03	6.27E+02	1.54E-02	1.00E+00	2.61E-01
Onsite Service Truck (LDT1)	7.08E-02	4.02E-03	1.32E-03	1.32E-04	1.32E-05	1.32E-05	1.45E+01	6.61E-04	1.87E+00	2.02E-01
Waste Trucks (HHDT)	3.69E+00	4.79E+01	7.39E-01	1.04E-01	3.42E-01	3.18E-01	9.39E+03	0.00E+00	2.89E+01	7.15E+00
Waste Trucks (MHDT)	4.56E-01	2.61E+00	1.11E-01	1.53E-02	4.50E-02	4.11E-02	1.36E+03	0.00E+00	6.63E+00	1.66E+00
Waste Trucks (LHDT2)	4.16E-01	9.52E-01	5.11E-02	4.41E-03	1.06E-02	9.70E-03	4.32E+02	5.29E-03	4.15E+00	1.03E+00
Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	1.93E+01	2.12E+01	3.43E+00	3.28E-02	5.56E-02	5.11E-02	3.10E+03	0.00E+00	NA	NA
	2.54E+01	**7.28E+01**	**4.35E+00**	**1.63E-01**	**4.55E-01**	**4.22E-01**	**1.49E+04**	**2.14E-02**	**4.25E+01**	**1.03E+01**

Emission Calculations
Operation Year: 2030

Emission Factors	Daily Emissions (lb/day)									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	1.15E+00	1.01E-01	1.54E-02	6.61E-03	4.41E-03	2.20E-03	6.27E+02	1.32E-02	1.00E+00	2.61E-01
Onsite Service Truck (LDT1)	3.77E-02	2.01E-03	5.73E-04	1.32E-04	1.32E-05	1.32E-05	1.46E+01	3.97E-04	1.87E+00	2.02E-01
Waste Trucks (HHDT)	3.85E+00	2.57E+01	8.12E-01	9.77E-02	2.69E-01	2.50E-01	9.26E+03	0.00E+00	2.89E+01	7.15E+00
Waste Trucks (MHDT)	4.42E-01	1.41E+00	1.08E-01	1.53E-02	4.25E-02	3.92E-02	1.35E+03	0.00E+00	6.63E+00	1.66E+00
Waste Trucks (LHDT2)	2.57E-01	4.74E-01	2.91E-02	4.41E-03	7.05E-03	6.17E-03	4.32E+02	2.65E-03	4.15E+00	1.03E+00
Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	2.02E+01	1.91E+01	3.59E+00	3.28E-02	5.31E-02	4.88E-02	3.09E+03	0.00E+00	NA	NA
	2.60E+01	**4.68E+01**	**4.55E+00**	**1.57E-01**	**3.76E-01**	**3.47E-01**	**1.48E+04**	**1.63E-02**	**4.25E+01**	**1.03E+01**

Construction Emission Calculations
Entrance Construction
Construction Year: 2014

Emission Factors	Daily Emissions (lb/day)									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	2.04E+00	1.82E-01	5.11E-02	5.29E-03	3.53E-03	1.76E-03	5.01E+02	1.94E-02	8.02E-01	2.09E-01
Onsite Service Truck (LDT1)	2.57E-01	1.48E-02	6.88E-03	2.65E-04	5.29E-05	3.97E-05	2.89E+01	2.20E-03	3.75E+00	4.04E-01
	2.30E+00	**1.96E-01**	**5.80E-02**	**5.56E-03**	**3.58E-03**	**1.80E-03**	**5.30E+02**	**2.16E-02**	**4.55E+00**	**6.13E-01**

Chiquita Canyon Landfill EIR
Mobile Sources

Construction Emission Calculations
Module Construction
Construction Year: 2016

Emission Factors	**Daily Emissions (lb/day)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	3.29E+00	2.89E-01	7.05E-02	1.06E-02	3.53E-03	3.53E-03	1.00E+03	3.17E-02	1.60E+00	4.18E-01
Onsite Service Truck (LDT1)	1.06E-01	6.11E-03	2.47E-03	1.32E-04	1.98E-05	1.98E-05	1.45E+01	9.26E-04	1.87E+00	2.02E-01
	3.39E+00	**2.95E-01**	**7.30E-02**	**1.07E-02**	**3.55E-03**	**3.55E-03**	**1.02E+03**	**3.27E-02**	**3.48E+00**	**6.21E-01**

Construction Emission Calculations
Module Construction
Construction Year: 2021

Emission Factors	**Daily Emissions (lb/day)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	2.24E+00	1.98E-01	3.53E-02	1.06E-02	3.53E-03	3.53E-03	1.00E+03	2.47E-02	1.60E+00	4.18E-01
Onsite Service Truck (LDT1)	7.08E-02	4.02E-03	1.32E-03	1.32E-04	1.32E-05	1.32E-05	1.45E+01	6.61E-04	1.87E+00	2.02E-01
	2.31E+00	**2.02E-01**	**3.66E-02**	**1.07E-02**	**3.54E-03**	**3.54E-03**	**1.02E+03**	**2.54E-02**	**3.48E+00**	**6.21E-01**

Operation Emission Calculations

Emission Calculations

Operation Year: 2016

Emission Factors	**Annual Emissions (lb/yr)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	2.82E+02	2.48E+01	6.05E+00	9.08E-01	3.03E-01	3.03E-01	8.60E+04	2.72E+00	1.38E+02	3.59E+01
Onsite Service Truck (LDT1)	1.66E+01	9.53E-01	3.85E-01	2.06E-02	3.10E-03	3.10E-03	2.26E+03	1.44E-01	2.92E+02	3.15E+01
Waste Trucks (HHDT)	4.68E+02	9.04E+03	8.76E+01	1.39E+01	5.57E+01	5.07E+01	1.37E+06	0.00E+00	3.87E+03	9.59E+02
Waste Trucks (MHDT)	7.91E+01	8.33E+02	1.84E+01	2.04E+00	1.14E+01	1.06E+01	1.97E+05	0.00E+00	8.86E+02	2.22E+02
Waste Trucks (LHDT2)	9.38E+01	1.87E+02	1.01E+01	5.85E-01	1.75E+00	1.64E+00	5.75E+04	1.05E+00	5.50E+02	1.36E+02
Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	2.20E+03	3.82E+03	3.94E+02	4.40E+00	9.64E+00	8.87E+00	4.45E+05	0.00E+00	NA	NA
	3.14E+03	**1.39E+04**	**5.16E+02**	**2.19E+01**	**7.88E+01**	**7.21E+01**	**2.15E+06**	**3.92E+00**	**5.74E+03**	**1.38E+03**

Chiquita Canyon Landfill EIR
Mobile Sources

Emission Calculations
Operation Year: 2021

Emission Factors	**Annual Emissions (lb/yr)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	4.36E+02	3.85E+01	6.88E+00	2.06E+00	6.88E-01	6.88E-01	1.96E+05	4.81E+00	3.13E+02	8.16E+01
Onsite Service Truck (LDT1)	2.21E+01	1.25E+00	4.13E-01	4.13E-02	4.13E-03	4.13E-03	4.53E+03	2.06E-01	5.85E+02	6.31E+01
Waste Trucks (HHDT)	1.15E+03	1.49E+04	2.31E+02	3.24E+01	1.07E+02	9.91E+01	2.93E+06	0.00E+00	9.01E+03	2.23E+03
Waste Trucks (MHDT)	1.42E+02	8.13E+02	3.45E+01	4.77E+00	1.40E+01	1.28E+01	4.25E+05	0.00E+00	2.07E+03	5.18E+02
Waste Trucks (LHDT2)	1.30E+02	2.97E+02	1.60E+01	1.38E+00	3.30E+00	3.03E+00	1.35E+05	1.65E+00	1.29E+03	3.21E+02
Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	6.03E+03	6.63E+03	1.07E+03	1.02E+01	1.73E+01	1.60E+01	9.66E+05	0.00E+00	NA	NA
	7.91E+03	**2.27E+04**	**1.36E+03**	**5.09E+01**	**1.42E+02**	**1.32E+02**	**4.65E+06**	**6.67E+00**	**1.33E+04**	**3.21E+03**

Emission Calculations
Operation Year: 2030

Emission Factors	**Annual Emissions (lb/yr)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	3.59E+02	3.16E+01	4.81E+00	2.06E+00	1.38E+00	6.88E-01	1.96E+05	4.13E+00	3.13E+02	8.16E+01
Onsite Service Truck (LDT1)	1.18E+01	6.27E-01	1.79E-01	4.13E-02	4.13E-03	4.13E-03	4.54E+03	1.24E-01	5.85E+02	6.31E+01
Waste Trucks (HHDT)	1.20E+03	8.02E+03	2.53E+02	3.05E+01	8.38E+01	7.81E+01	2.89E+06	0.00E+00	9.01E+03	2.23E+03
Waste Trucks (MHDT)	1.38E+02	4.40E+02	3.35E+01	4.77E+00	1.33E+01	1.22E+01	4.23E+05	0.00E+00	2.07E+03	5.18E+02
Waste Trucks (LHDT2)	8.03E+01	1.48E+02	9.08E+00	1.38E+00	2.20E+00	1.93E+00	1.35E+05	8.25E-01	1.29E+03	3.21E+02
Waste Trucks (LDT2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Truck Idle	6.32E+03	5.96E+03	1.12E+03	1.02E+01	1.66E+01	1.52E+01	9.66E+05	0.00E+00	NA	NA
	8.11E+03	**1.46E+04**	**1.42E+03**	**4.90E+01**	**1.17E+02**	**1.08E+02**	**4.61E+06**	**5.08E+00**	**1.33E+04**	**3.21E+03**

Construction Emission Calculations
Entrance Construction
Construction Year: 2014

Emission Factors	**Annual Emissions (lb/yr)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	2.45E+02	2.18E+01	6.14E+00	6.35E-01	4.23E-01	2.12E-01	6.01E+04	2.33E+00	9.63E+01	2.51E+01
Onsite Service Truck (LDT1)	3.09E+01	1.78E+00	8.25E-01	3.17E-02	6.35E-03	4.76E-03	3.46E+03	2.65E-01	4.50E+02	4.85E+01
	2.76E+02	**2.36E+01**	**6.96E+00**	**6.67E-01**	**4.30E-01**	**2.16E-01**	**6.35E+04**	**2.59E+00**	**5.46E+02**	**7.36E+01**

Chiquita Canyon Landfill EIR
Mobile Sources

Construction Emission Calculations
Module Construction
Construction Year: 2016

Emission Factors	**Annual Emissions (lb/yr)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	3.94E+02	3.47E+01	8.47E+00	1.27E+00	4.23E-01	4.23E-01	1.20E+05	3.81E+00	1.93E+02	5.02E+01
Onsite Service Truck (LDT1)	1.28E+01	7.33E-01	2.96E-01	1.59E-02	2.38E-03	2.38E-03	1.74E+03	1.11E-01	2.25E+02	2.43E+01
	4.07E+02	**3.54E+01**	**8.76E+00**	**1.29E+00**	**4.26E-01**	**4.26E-01**	**1.22E+05**	**3.92E+00**	**4.18E+02**	**7.45E+01**

Construction Emission Calculations
Module Construction
Construction Year: 2021

Emission Factors	**Annual Emissions (lb/yr)**									
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CH_4**	**PM_{10} Fugitive**	**$PM_{2.5}$ Fugitive**
Employees (LDA)	2.68E+02	2.37E+01	4.23E+00	1.27E+00	4.23E-01	4.23E-01	1.20E+05	2.96E+00	1.93E+02	5.02E+01
Onsite Service Truck (LDT1)	8.50E+00	4.83E-01	1.59E-01	1.59E-02	1.59E-03	1.59E-03	1.74E+03	7.94E-02	2.25E+02	2.43E+01
	2.77E+02	**2.42E+01**	**4.39E+00**	**1.29E+00**	**4.25E-01**	**4.25E-01**	**1.22E+05**	**3.04E+00**	**4.18E+02**	**7.45E+01**

Chiquita Canyon Landfill EIR

Construction Emissions - Proposed Project Exhaust Emissions

Assumptions: [1]

Construction Schedule:	4	weeks/month
	5	days/week
	10	hrs/day

Additional travel other than equipment operation is minimal and not included in this analysis.
Since CCL and the construction contractor are large operators of diesel off-road equipment, all off-road diesel equipment fleet will be compliant with CARB requirements at the time of construction (combination of Tier 3 and Tier 4 equipment). Off-road diesel equipment would be equipped with diesel particulate filters as a project control.

Entrance Construction

Construction Period:	3/1/2014	to	9/1/2014
Number of workers: [2]	20	Duration (weeks):	24

Off Road Equipment Type	Number (ea)	Daily Hours	Annual Days Equipment Used [3]
Demolition			
Scraper - CAT 657	6	10	12
Water Truck - 4000 gal, 3 axle, 58000 gvw	2	8	12
Site Preparation			
Bulldozer - CAT D9, D7	2	8	30
Compactor - CAT 825/835	1	10	20
Trailer Mounted Light Plant	2	8	30
Tractors/Loaders/Backhoes [4, 5]	4	8	20
Rubber Tired Dozers [4, 5]	3	8	30
Water Truck - 4000 gal, 3 axle, 58000 gvw	2	8	30
Grading			
Graders - CAT 14G	2	8	12
Backhoe/Loader - CAT 440	2	8	20
Rubber Tired Dozers [4, 5]	1	8	20
Tractors/Loaders/Backhoes [4, 5]	3	8	20
Graders [4, 5]	1	8	12
Excavators [4, 5]	1	8	12
Water Truck - 4000 gal, 3 axle, 58000 gvw	2	8	20
Berm Construction [6]			
Grader	1	6	62
Tractors/Loaders/Backhoes	1	6	62
Rubber Tired Dozers	1	7	62
Soil Haul Trucks [7]	5	8	62
Water Truck - 4000 gal, 3 axle, 58000 gvw	1	8	62
Building Construction [4,8]			
Cranes	1	4	48
Forklifts	2	6	48
Tractors/Loaders/Backhoes	2	8	48
Water Truck - 4000 gal, 3 axle, 58000 gvw	2	8	48
Paving [9]			
Paver	2	8	10
Cement and Mortar Mixers	1	8	10
Rollers	2	8	10
Tractors/Loaders/Backhoes	1	8	10
Paving Equipment	1	8	10

Chiquita Canyon Landfill EIR
Construction Emissions - Proposed Project Exhaust Emissions

Entrance Construction

Emission Factors

Equipment Type	SCAQMD Equipment Type	Equipment Code	Construction Year	Emission Factor Unit	CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO_2
Demolition											
Scraper	Scrapers	1	2014	lb/hr	9.89E-01	1.35E+00	2.65E-01	2.69E-03	1.69E-02	1.55E-02	2.62E+02
Water Truck	Off-Highway Trucks	1	2014	lb/hr	6.15E-01	1.45E+00	2.03E-01	2.66E-03	1.81E-02	1.66E-02	2.60E+02
Site Preparation											
Bulldozer	Rubber Tired Dozers	1	2014	lb/hr	1.11E+00	1.36E+00	2.85E-01	2.45E-03	1.70E-02	1.56E-02	2.39E+02
Compactor	Plate Compactors	1	2014	lb/hr	2.63E-02	5.93E-02	5.02E-03	6.71E-05	1.55E-03	1.43E-03	4.31E+00
Trailer Mounted Light Plant	Generator Sets	1	2014	lb/hr	2.97E-01	3.72E-01	7.02E-02	6.98E-04	7.95E-03	7.32E-03	6.10E+01
Backhoe/Loader	Tractors/Loaders/Backhoes	1	2014	lb/hr	3.75E-01	3.32E-01	7.28E-02	7.75E-04	7.10E-03	6.53E-03	6.68E+01
Bulldozer	Rubber Tired Dozers	1	2014	lb/hr	1.11E+00	1.36E+00	2.85E-01	2.45E-03	1.70E-02	1.56E-02	2.39E+02
Water Truck	Off-Highway Trucks	1	2014	lb/hr	6.15E-01	1.45E+00	2.03E-01	2.66E-03	1.81E-02	1.66E-02	2.60E+02
Grading											
Graders	Graders	1	2014	lb/hr	5.99E-01	6.15E-01	1.36E-01	1.50E-03	1.13E-02	1.04E-02	1.33E+02
Backhoe/Loader	Tractors/Loaders/Backhoes	1	2014	lb/hr	3.75E-01	3.32E-01	7.28E-02	7.75E-04	7.10E-03	6.53E-03	6.68E+01
Bulldozer	Rubber Tired Dozers	1	2014	lb/hr	1.11E+00	1.36E+00	2.85E-01	2.45E-03	1.70E-02	1.56E-02	2.39E+02
Backhoe/Loader	Tractors/Loaders/Backhoes	1	2014	lb/hr	3.75E-01	3.32E-01	7.28E-02	7.75E-04	7.10E-03	6.53E-03	6.68E+01
Graders	Graders	1	2014	lb/hr	5.99E-01	6.15E-01	1.36E-01	1.50E-03	1.13E-02	1.04E-02	1.33E+02
Excavator	Excavators	1	2014	lb/hr	5.29E-01	5.96E-01	1.14E-01	1.32E-03	1.09E-02	1.00E-02	1.20E+02
Water Truck	Off-Highway Trucks	1	2014	lb/hr	6.15E-01	1.45E+00	2.03E-01	2.66E-03	1.81E-02	1.66E-02	2.60E+02
Berm Construction											
Graders	Graders	1	2014	lb/hr	5.99E-01	6.15E-01	1.36E-01	1.50E-03	1.13E-02	1.04E-02	1.33E+02
Backhoe/Loader	Tractors/Loaders/Backhoes	1	2014	lb/hr	3.75E-01	3.32E-01	7.28E-02	7.75E-04	7.10E-03	6.53E-03	6.68E+01
Bulldozer	Rubber Tired Dozers	1	2014	lb/hr	1.11E+00	1.36E+00	2.85E-01	2.45E-03	1.70E-02	1.56E-02	2.39E+02
Haul Truck	Off-Highway Trucks	1	2014	lb/hr	6.15E-01	1.45E+00	2.03E-01	2.66E-03	1.81E-02	1.66E-02	2.60E+02
Water Truck	Off-Highway Trucks	1	2014	lb/hr	6.15E-01	1.45E+00	2.03E-01	2.66E-03	1.81E-02	1.66E-02	2.60E+02
Building Construction											
Crane	Cranes	1	2014	lb/hr	4.55E-01	7.90E-01	1.28E-01	1.38E-03	9.87E-03	9.08E-03	1.29E+02
Forklift	Forklifts	1	2014	lb/hr	2.21E-01	5.66E-01	4.97E-02	6.03E-04	1.04E-02	9.53E-03	5.44E+01
Backhoe/Loader	Tractors/Loaders/Backhoes	1	2014	lb/hr	3.75E-01	3.32E-01	7.28E-02	7.75E-04	7.10E-03	6.53E-03	6.68E+01
Water Truck	Off-Highway Trucks	1	2014	lb/hr	6.15E-01	1.45E+00	2.03E-01	2.66E-03	1.81E-02	1.66E-02	2.60E+02
Paving											
Paver	Pavers	1	2014	lb/hr	5.28E-01	3.94E-01	1.43E-01	8.95E-04	8.43E-03	7.75E-03	7.79E+01
Cement and Mortar Mixer	Cement and Mortar Mixers	1	2014	lb/hr	4.20E-02	6.67E-02	8.94E-03	1.09E-04	1.74E-03	1.60E-03	7.25E+00
Roller	Rollers	1	2014	lb/hr	4.02E-01	3.72E-01	9.12E-02	7.70E-04	7.95E-03	7.32E-03	6.71E+01
Backhoe/Loader	Tractors/Loaders/Backhoes	1	2014	lb/hr	3.75E-01	3.32E-01	7.28E-02	7.75E-04	7.10E-03	6.53E-03	6.68E+01
Paving Equipment	Paving Equipment	1	2014	lb/hr	4.27E-01	3.63E-01	1.08E-01	7.93E-04	7.76E-03	7.14E-03	6.89E+01

Chiquita Canyon Landfill EIR
Construction Emissions - Proposed Project

Entrance Construction

	Hourly Emissions (lb/hr)							Daily Emissions (lb/day)							Annual Emissions (lb/yr)						
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**
Demolition																					
Scraper	5.934	8.110	1.589	0.016	0.101	0.093	1,574.956	59.338	81.102	15.886	0.161	1.014	0.933	15,749.562	712.059	973.219	190.631	1.935	12.165	11.192	188,994.744
Water Truck	1.230	2.893	0.407	0.005	0.036	0.033	520.127	9.837	23.146	3.254	0.043	0.289	0.266	4,161.019	118.046	277.750	39.046	0.510	3.472	3.194	49,932.229
Site Preparation																					
Bulldozer	2.212	2.719	0.571	0.005	0.034	0.031	478.188	17.694	21.749	4.566	0.039	0.272	0.250	3,825.501	530.805	652.458	136.980	1.177	8.156	7.503	114,765.021
Compactor	0.026	0.059	0.005	0.000	0.002	0.001	4.314	0.263	0.593	0.050	0.001	0.015	0.014	43.138	5.268	11.852	1.004	0.013	0.310	0.285	862.761
Trailer Mounted Light Plant	0.595	0.744	0.140	0.001	0.016	0.015	121.985	4.759	5.949	1.124	0.011	0.127	0.117	975.883	142.764	178.478	33.715	0.335	3.818	3.512	29,276.488
Backhoe/Loader	1.499	1.328	0.291	0.003	0.028	0.026	267.201	11.989	10.624	2.330	0.025	0.227	0.209	2,137.610	239.784	212.474	46.594	0.496	4.545	4.181	42,752.200
Bulldozer	3.318	4.078	0.856	0.007	0.051	0.047	717.281	26.540	32.623	6.849	0.059	0.408	0.375	5,738.251	796.208	978.687	205.470	1.765	12.234	11.255	172,147.532
Water Truck	1.230	2.893	0.407	0.005	0.036	0.033	520.127	9.837	23.146	3.254	0.043	0.289	0.266	4,161.019	295.115	694.376	97.616	1.276	8.680	7.985	124,830.572
Grading																					
Graders	1.197	1.230	0.272	0.003	0.023	0.021	265.486	9.579	9.842	2.179	0.024	0.180	0.166	2,123.889	114.949	118.099	26.151	0.287	2.162	1.989	25,486.662
Backhoe/Loader	0.749	0.664	0.146	0.002	0.014	0.013	133.601	5.995	5.312	1.165	0.012	0.114	0.105	1,068.805	119.892	106.237	23.297	0.248	2.272	2.091	21,376.100
Bulldozer	1.106	1.359	0.285	0.002	0.017	0.016	239.094	8.847	10.874	2.283	0.020	0.136	0.125	1,912.750	176.935	217.486	45.660	0.392	2.719	2.501	38,255.007
Backhoe/Loader	1.124	0.996	0.218	0.002	0.021	0.020	200.401	8.992	7.968	1.747	0.019	0.170	0.157	1,603.208	179.838	159.355	34.945	0.372	3.409	3.136	32,064.150
Graders	0.599	0.615	0.136	0.001	0.011	0.010	132.743	4.790	4.921	1.090	0.012	0.090	0.083	1,061.944	57.474	59.049	13.076	0.144	1.081	0.994	12,743.331
Excavator	0.529	0.596	0.114	0.001	0.011	0.010	120.000	4.231	4.769	0.914	0.011	0.087	0.080	960.000	50.774	57.227	10.970	0.126	1.047	0.964	11,520.000
Water Truck	1.230	2.893	0.407	0.005	0.036	0.033	520.127	9.837	23.146	3.254	0.043	0.289	0.266	4,161.019	196.743	462.917	65.077	0.851	5.786	5.324	83,220.382
Berm Construction																					
Graders	0.599	0.615	0.136	0.001	0.011	0.010	132.743	3.592	3.691	0.817	0.009	0.068	0.062	796.458	222.714	228.816	50.668	0.557	4.188	3.853	49,380.409
Backhoe/Loader	0.375	0.332	0.073	0.001	0.007	0.007	66.800	2.248	1.992	0.437	0.005	0.043	0.039	400.802	139.374	123.500	27.083	0.288	2.642	2.430	24,849.717
Bulldozer	1.106	1.359	0.285	0.002	0.017	0.016	239.094	7.741	9.515	1.998	0.017	0.119	0.109	1,673.657	479.936	589.931	123.853	1.064	7.374	6.784	103,766.707
Haul Truck	3.074	7.233	1.017	0.013	0.090	0.083	1,300.318	24.593	57.865	8.135	0.106	0.723	0.665	10,402.548	1,524.761	3,587.608	504.348	6.593	44.845	41.257	644,957.957
Water Truck	0.615	1.447	0.203	0.003	0.018	0.017	260.064	4.919	11.573	1.627	0.021	0.145	0.133	2,080.510	304.952	717.522	100.870	1.319	8.969	8.251	128,991.591
Building Construction																					
Crane	0.455	0.790	0.128	0.001	0.010	0.009	128.635	1.821	3.159	0.510	0.006	0.039	0.036	514.541	87.412	151.633	24.490	0.264	1.895	1.744	24,697.959
Forklift	0.443	1.131	0.099	0.001	0.021	0.019	108.792	2.658	6.789	0.596	0.007	0.124	0.114	652.749	127.578	325.864	28.629	0.347	5.965	5.487	31,331.956
Backhoe/Loader	0.749	0.664	0.146	0.002	0.014	0.013	133.601	5.995	5.312	1.165	0.012	0.114	0.105	1,068.805	287.741	254.968	55.912	0.595	5.454	5.018	51,302.641
Water Truck	1.230	2.893	0.407	0.005	0.036	0.033	520.127	9.837	23.146	3.254	0.043	0.289	0.266	4,161.019	472.184	1,111.001	156.185	2.042	13.888	12.777	199,728.916
Paving																					
Paver	1.055	0.788	0.286	0.002	0.017	0.016	155.868	8.443	6.303	2.287	0.014	0.135	0.124	1,246.942	84.426	63.034	22.871	0.143	1.348	1.240	12,469.420
Cement and Mortar Mixer	0.042	0.067	0.009	0.000	0.002	0.002	7.248	0.336	0.533	0.071	0.001	0.014	0.013	57.985	3.357	5.333	0.715	0.009	0.139	0.128	579.852
Roller	0.804	0.744	0.182	0.002	0.016	0.015	134.104	6.428	5.949	1.459	0.012	0.127	0.117	1,072.835	64.282	59.493	14.590	0.123	1.273	1.171	10,728.346
Backhoe/Loader	0.375	0.332	0.073	0.001	0.007	0.007	66.800	2.997	2.656	0.582	0.006	0.057	0.052	534.403	29.973	26.559	5.824	0.062	0.568	0.523	5,344.025
Paving Equipment	0.427	0.363	0.108	0.001	0.008	0.007	68.942	3.418	2.904	0.866	0.006	0.062	0.057	551.536	34.184	29.038	8.658	0.063	0.621	0.571	5,515.363
Total [11]	**14.647**	**22.807**	**3.985**	**0.043**	**0.311**	**0.286**	**4,108.116**	**114.175**	**188.883**	**32.153**	**0.362**	**2.436**	**2.241**	**35,264.555**	**7,599.526**	**12,433.963**	**2,094.928**	**23.397**	**171.024**	**157.342**	**2,241,872.038**

Chiquita Canyon Landfill EIR
Construction Emissions - Proposed Project Exhaust Emissions

Module 6-11: Excavation and Construction [10]

Number of workers: 40 Duration (weeks): 24

Equipment Type	Number (ea)	Daily Hours	Annual Days Equipment Used [3]
Scraper push/pull - CAT 657 [13]	23	10	72
Scraper elevating - CAT 623	2	10	10
Bulldozer - large - CAT D9	2	8	60
Bulldozer - large - CAT D7	2	8	60
Bulldozer - small - CAT D3	1	8	30
Compactor- CAT 825/835 [13]	1	10	72
Graders - 16G	2	8	40
Backhoe/Loader - CAT 416, 440	2	4	60
Water Truck - 4,000 gal 3 axle 58,000 gvw	3	10	72
Water Wagon - CAT 631G 10,000 gal	1	10	60
Trailer Mounted Light Plant	1	2	60
Wheel tractor - Case 535	1	8	10
Backhoe/Loader - CAT 416	1	8	20
Loader - CAT 966	1	8	20
Off road fork lift - CAT TH83	1	8	10

Chiquita Canyon Landfill EIR
Construction Emissions - Proposed Project Exhaust Emissions

Module 6: Excavation and Construction

Construction Period: 4/1/2016 to 10/1/2016

Emission Factors

Equipment Type	SCAQMD Equipment Type	Equipment Code	Construction Year	Emission Factor Unit	CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO_2
Scraper	Scrapers	1	2016	lb/hr	9.05E-01	1.31E+00	2.38E-01	2.69E-03	1.64E-02	1.51E-02	2.62E+02
Scraper	Scrapers	1	2016	lb/hr	9.05E-01	1.31E+00	2.38E-01	2.69E-03	1.64E-02	1.51E-02	2.62E+02
Bulldozer	Rubber Tired Dozers	1	2016	lb/hr	9.83E-01	1.32E+00	2.59E-01	2.45E-03	1.65E-02	1.52E-02	2.39E+02
Bulldozer	Rubber Tired Dozers	1	2016	lb/hr	9.83E-01	1.32E+00	2.59E-01	2.45E-03	1.65E-02	1.52E-02	2.39E+02
Bulldozer	Rubber Tired Dozers	1	2016	lb/hr	9.83E-01	1.32E+00	2.59E-01	2.45E-03	1.65E-02	1.52E-02	2.39E+02
Compactor	Plate Compactors	1	2016	lb/hr	2.63E-02	5.93E-02	5.02E-03	6.71E-05	1.52E-03	1.40E-03	4.31E+00
Graders	Graders	1	2016	lb/hr	5.88E-01	5.97E-01	1.20E-01	1.50E-03	1.09E-02	1.00E-02	1.33E+02
Backhoe/Loader	Tractors/Loaders/Backhoes	1	2016	lb/hr	3.69E-01	3.22E-01	6.10E-02	7.75E-04	6.88E-03	6.33E-03	6.68E+01
Water Truck	Off-Highway Trucks	1	2016	lb/hr	5.83E-01	1.40E+00	1.82E-01	2.66E-03	1.75E-02	1.61E-02	2.60E+02
Water Truck	Off-Highway Trucks	1	2016	lb/hr	5.83E-01	1.40E+00	1.82E-01	2.66E-03	1.75E-02	1.61E-02	2.60E+02
Trailer Mounted Light Plant	Generator Sets	1	2016	lb/hr	2.86E-01	3.60E-01	5.81E-02	6.98E-04	7.70E-03	7.08E-03	6.10E+01
Tractor	Tractors/Loaders/Backhoes	1	2016	lb/hr	3.69E-01	3.22E-01	6.10E-02	7.75E-04	6.88E-03	6.33E-03	6.68E+01
Backhoe/Loader	Tractors/Loaders/Backhoes	1	2016	lb/hr	3.69E-01	3.22E-01	6.10E-02	7.75E-04	6.88E-03	6.33E-03	6.68E+01
Loader	Tractors/Loaders/Backhoes	1	2016	lb/hr	3.69E-01	3.22E-01	6.10E-02	7.75E-04	6.88E-03	6.33E-03	6.68E+01
Forklift	Forklifts	1	2016	lb/hr	2.19E-01	5.49E-01	4.27E-02	6.03E-04	1.00E-02	9.23E-03	5.44E+01

Module 7: Excavation and Construction

Construction Period: 4/1/2021 to 10/1/2021

Emission Factors

Equipment Type	SCAQMD Equipment Type	Equipment Code	Construction Year	Emission Factor Unit	CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO_2
Scraper	Scrapers	1	2021	lb/hr	7.75E-01	1.29E+00	1.81E-01	2.69E-03	1.61E-02	1.48E-02	2.62E+02
Scraper	Scrapers	1	2021	lb/hr	7.75E-01	1.29E+00	1.81E-01	2.69E-03	1.61E-02	1.48E-02	2.62E+02
Bulldozer	Rubber Tired Dozers	1	2021	lb/hr	7.66E-01	1.29E+00	2.02E-01	2.45E-03	1.62E-02	1.49E-02	2.39E+02
Bulldozer	Rubber Tired Dozers	1	2021	lb/hr	7.66E-01	1.29E+00	2.02E-01	2.45E-03	1.62E-02	1.49E-02	2.39E+02
Bulldozer	Rubber Tired Dozers	1	2021	lb/hr	7.66E-01	1.29E+00	2.02E-01	2.45E-03	1.62E-02	1.49E-02	2.39E+02
Compactor	Plate Compactors	1	2021	lb/hr	2.63E-02	5.93E-02	5.02E-03	6.71E-05	1.51E-03	1.39E-03	4.31E+00
Graders	Graders	1	2021	lb/hr	5.75E-01	5.85E-01	8.61E-02	1.50E-03	1.07E-02	9.83E-03	1.33E+02
Backhoe/Loader	Tractors/Loaders/Backhoes	1	2021	lb/hr	3.61E-01	3.15E-01	4.07E-02	7.75E-04	6.73E-03	6.20E-03	6.68E+01
Water Truck	Off-Highway Trucks	1	2021	lb/hr	5.48E-01	1.38E+00	1.37E-01	2.66E-03	1.72E-02	1.58E-02	2.60E+02
Water Truck	Off-Highway Trucks	1	2021	lb/hr	5.48E-01	1.38E+00	1.37E-01	2.66E-03	1.72E-02	1.58E-02	2.60E+02
Trailer Mounted Light Plant	Generator Sets	1	2021	lb/hr	2.71E-01	3.53E-01	3.63E-02	6.98E-04	7.54E-03	6.94E-03	6.10E+01
Tractor	Tractors/Loaders/Backhoes	1	2021	lb/hr	3.61E-01	3.15E-01	4.07E-02	7.75E-04	6.73E-03	6.20E-03	6.68E+01
Backhoe/Loader	Tractors/Loaders/Backhoes	1	2021	lb/hr	3.61E-01	3.15E-01	4.07E-02	7.75E-04	6.73E-03	6.20E-03	6.68E+01
Loader	Tractors/Loaders/Backhoes	1	2021	lb/hr	3.61E-01	3.15E-01	4.07E-02	7.75E-04	6.73E-03	6.20E-03	6.68E+01
Forklift	Forklifts	1	2021	lb/hr	2.15E-01	5.38E-01	2.94E-02	6.03E-04	9.83E-03	9.04E-03	5.44E+01

Chiquita Canyon Landfill EIR
Construction Emissions - Proposed Project

Module 6: Excavation and Construction

	Hourly Emissions (lb/hr)							Daily Emissions (lb/day)							Annual Emissions (lb/yr)						
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**
Scraper	20.822	30.153	5.480	0.062	0.377	0.347	6,037.269	208.221	301.532	54.804	0.618	3.769	3.468	60,372.693	14,991.929	21,710.280	3,945.903	44.498	271.379	249.668	4,346,833.889
Scraper	1.811	2.622	0.477	0.005	0.033	0.030	524.980	18.106	26.220	4.766	0.054	0.328	0.302	5,249.799	181.062	262.201	47.656	0.537	3.278	3.015	52,497.994
Bulldozer	1.967	2.637	0.518	0.005	0.033	0.030	478.181	15.734	21.094	4.146	0.039	0.264	0.243	3,825.448	944.052	1,265.638	248.742	2.354	15.820	14.555	229,526.853
Bulldozer	1.967	2.637	0.518	0.005	0.033	0.030	478.181	15.734	21.094	4.146	0.039	0.264	0.243	3,825.448	944.052	1,265.638	248.742	2.354	15.820	14.555	229,526.853
Bulldozer	0.983	1.318	0.259	0.002	0.016	0.015	239.090	7.867	10.547	2.073	0.020	0.132	0.121	1,912.724	236.013	316.409	62.185	0.588	3.955	3.639	57,381.713
Compactor	0.026	0.059	0.005	0.000	0.002	0.001	4.314	0.263	0.593	0.050	0.001	0.015	0.014	43.138	18.965	42.667	3.615	0.048	1.097	1.009	3,105.938
Graders	1.177	1.193	0.239	0.003	0.022	0.020	265.486	9.413	9.545	1.915	0.024	0.175	0.161	2,123.888	376.516	381.812	76.604	0.957	6.981	6.422	84,955.509
Backhoe/Loader	0.738	0.644	0.122	0.002	0.014	0.013	133.596	2.951	2.575	0.488	0.006	0.055	0.051	534.383	177.083	154.479	29.287	0.372	3.300	3.036	32,062.998
Water Truck	1.749	4.209	0.545	0.008	0.053	0.048	780.155	17.493	42.092	5.449	0.080	0.526	0.484	7,801.547	1,259.474	3,030.636	392.343	5.742	37.883	34.852	561,711.381
Water Wagon	0.583	1.403	0.182	0.003	0.018	0.016	260.052	5.831	14.031	1.816	0.027	0.175	0.161	2,600.516	349.854	841.843	108.984	1.595	10.523	9.681	156,030.939
Trailer Mounted Light Plant	0.286	0.360	0.058	0.001	0.008	0.007	60.993	0.572	0.721	0.116	0.001	0.015	0.014	121.985	34.347	43.254	6.970	0.084	0.924	0.850	7,319.122
Tractor	0.369	0.322	0.061	0.001	0.007	0.006	66.798	2.951	2.575	0.488	0.006	0.055	0.051	534.383	29.514	25.746	4.881	0.062	0.550	0.506	5,343.833
Backhoe/Loader	0.369	0.322	0.061	0.001	0.007	0.006	66.798	2.951	2.575	0.488	0.006	0.055	0.051	534.383	59.028	51.493	9.762	0.124	1.100	1.012	10,687.666
Loader	0.369	0.322	0.061	0.001	0.007	0.006	66.798	2.951	2.575	0.488	0.006	0.055	0.051	534.383	59.028	51.493	9.762	0.124	1.100	1.012	10,687.666
Forklift	0.219	0.549	0.043	0.001	0.010	0.009	54.396	1.752	4.390	0.342	0.005	0.080	0.074	435.166	17.517	43.897	3.419	0.048	0.803	0.738	4,351.661
Total [12]	**33.435**	**48.750**	**8.629**	**0.098**	**0.638**	**0.587**	**9,517.086**	**312.792**	**462.157**	**81.575**	**0.932**	**5.963**	**5.486**	**90,449.884**	**19,678.432**	**29,487.488**	**5,198.856**	**59.488**	**374.513**	**344.552**	**5,792,024.015**

Module 7: Excavation and Construction

	Hourly Emissions (lb/hr)							Daily Emissions (lb/day)							Annual Emissions (lb/yr)						
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**
Scraper	17.814	29.568	4.173	0.062	0.370	0.340	6,037.138	178.144	295.683	41.735	0.618	3.696	3.400	60,371.378	12,826.383	21,289.175	3,004.918	44.497	266.115	244.826	4,346,739.205
Scraper	1.549	2.571	0.363	0.005	0.032	0.030	524.969	15.491	25.712	3.629	0.054	0.321	0.296	5,249.685	154.908	257.116	36.291	0.537	3.214	2.957	52,496.850
Bulldozer	1.532	2.586	0.403	0.005	0.032	0.030	478.166	12.258	20.685	3.224	0.039	0.259	0.238	3,825.326	735.487	1,241.089	193.450	2.353	15.514	14.273	229,519.548
Bulldozer	1.532	2.586	0.403	0.005	0.032	0.030	478.166	12.258	20.685	3.224	0.039	0.259	0.238	3,825.326	735.487	1,241.089	193.450	2.353	15.514	14.273	229,519.548
Bulldozer	0.766	1.293	0.202	0.002	0.016	0.015	239.083	6.129	10.342	1.612	0.020	0.129	0.119	1,912.663	183.872	310.272	48.362	0.588	3.878	3.568	57,379.887
Compactor	0.026	0.059	0.005	0.000	0.002	0.001	4.314	0.263	0.593	0.050	0.001	0.015	0.014	43.138	18.965	42.667	3.615	0.048	1.086	0.999	3,105.939
Graders	1.149	1.170	0.172	0.003	0.021	0.020	265.486	9.196	9.360	1.377	0.024	0.171	0.157	2,123.888	367.821	374.407	55.090	0.957	6.840	6.293	84,955.507
Backhoe/Loader	0.721	0.631	0.081	0.002	0.013	0.012	133.598	2.885	2.524	0.326	0.006	0.054	0.050	534.391	173.090	151.431	19.540	0.372	3.232	2.974	32,063.474
Water Truck	1.643	4.128	0.411	0.008	0.052	0.047	780.249	16.427	41.276	4.109	0.080	0.516	0.475	7,802.495	1,182.738	2,971.852	295.874	5.743	37.148	34.176	561,779.606
Water Wagon	0.548	1.376	0.137	0.003	0.017	0.016	260.083	5.476	13.759	1.370	0.027	0.172	0.158	2,600.832	328.538	825.515	82.187	1.595	10.319	9.493	156,049.891
Trailer Mounted Light Plant	0.271	0.353	0.036	0.001	0.008	0.007	60.993	0.542	0.707	0.073	0.001	0.015	0.014	121.985	32.494	42.401	4.354	0.084	0.905	0.833	7,319.122
Tractor	0.361	0.315	0.041	0.001	0.007	0.006	66.799	2.885	2.524	0.326	0.006	0.054	0.050	534.391	28.848	25.239	3.257	0.062	0.539	0.496	5,343.912
Backhoe/Loader	0.361	0.315	0.041	0.001	0.007	0.006	66.799	2.885	2.524	0.326	0.006	0.054	0.050	534.391	57.697	50.477	6.513	0.124	1.077	0.991	10,687.825
Loader	0.361	0.315	0.041	0.001	0.007	0.006	66.799	2.885	2.524	0.326	0.006	0.054	0.050	534.391	57.697	50.477	6.513	0.124	1.077	0.991	10,687.825
Forklift	0.215	0.538	0.029	0.001	0.010	0.009	54.396	1.719	4.305	0.235	0.005	0.079	0.072	435.166	17.186	43.045	2.350	0.048	0.786	0.723	4,351.661
Total [12]	**28.849**	**47.805**	**6.538**	**0.098**	**0.625**	**0.575**	**9,517.036**	**269.441**	**453.200**	**61.941**	**0.932**	**5.847**	**5.379**	**90,449.446**	**16,901.212**	**28,916.251**	**3,955.765**	**59.488**	**367.244**	**337.865**	**5,791,999.799**

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Chiquita Canyon Landfill EIR
Construction Emissions - Proposed Project Exhaust Emissions

Module 8: Excavation and Construction
Construction Period: 4/1/2023 to 10/1/2023

Emission Factors

Equipment Type	SCAQMD Equipment Type	Equipment Code	Construction Year	Emission Factor Unit	CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO_2
Scraper	Scrapers	1	2023	lb/hr	7.43E-01	1.29E+00	1.64E-01	2.69E-03	1.61E-02	1.48E-02	2.62E+02
Scraper	Scrapers	1	2023	lb/hr	7.43E-01	1.29E+00	1.64E-01	2.69E-03	1.61E-02	1.48E-02	2.62E+02
Bulldozer	Rubber Tired Dozers	1	2023	lb/hr	7.08E-01	1.29E+00	1.83E-01	2.45E-03	1.62E-02	1.49E-02	2.39E+02
Bulldozer	Rubber Tired Dozers	1	2023	lb/hr	7.08E-01	1.29E+00	1.83E-01	2.45E-03	1.62E-02	1.49E-02	2.39E+02
Bulldozer	Rubber Tired Dozers	1	2023	lb/hr	7.08E-01	1.29E+00	1.83E-01	2.45E-03	1.62E-02	1.49E-02	2.39E+02
Compactor	Plate Compactors	1	2023	lb/hr	2.63E-02	5.93E-02	5.02E-03	6.71E-05	1.51E-03	1.39E-03	4.31E+00
Graders	Graders	1	2023	lb/hr	5.72E-01	5.85E-01	7.58E-02	1.50E-03	1.07E-02	9.83E-03	1.33E+02
Backhoe/Loader	Tractors/Loaders/Backhoes	1	2023	lb/hr	3.59E-01	3.15E-01	3.65E-02	7.75E-04	6.73E-03	6.20E-03	6.68E+01
Water Truck	Off-Highway Trucks	1	2023	lb/hr	5.42E-01	1.38E+00	1.24E-01	2.66E-03	1.72E-02	1.58E-02	2.60E+02
Water Truck	Off-Highway Trucks	1	2023	lb/hr	5.42E-01	1.38E+00	1.24E-01	2.66E-03	1.72E-02	1.58E-02	2.60E+02
Trailer Mounted Light Plant	Generator Sets	1	2023	lb/hr	2.68E-01	3.53E-01	3.21E-02	6.98E-04	7.54E-03	6.94E-03	6.10E+01
Tractor	Tractors/Loaders/Backhoes	1	2023	lb/hr	3.59E-01	3.15E-01	3.65E-02	7.75E-04	6.73E-03	6.20E-03	6.68E+01
Backhoe/Loader	Tractors/Loaders/Backhoes	1	2023	lb/hr	3.59E-01	3.15E-01	3.65E-02	7.75E-04	6.73E-03	6.20E-03	6.68E+01
Loader	Tractors/Loaders/Backhoes	1	2023	lb/hr	3.59E-01	3.15E-01	3.65E-02	7.75E-04	6.73E-03	6.20E-03	6.68E+01
Forklift	Forklifts	1	2023	lb/hr	2.15E-01	5.38E-01	2.59E-02	6.03E-04	9.83E-03	9.04E-03	5.44E+01

Module 9: Excavation and Construction
Construction Period: 4/1/2024 to 10/1/2024

Emission Factors

Equipment Type	SCAQMD Equipment Type	Equipment Code	Construction Year	Emission Factor Unit	CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO_2
Scraper	Scrapers	1	2024	lb/hr	7.30E-01	1.29E+00	1.56E-01	2.69E-03	1.61E-02	1.48E-02	2.62E+02
Scraper	Scrapers	1	2024	lb/hr	7.30E-01	1.29E+00	1.56E-01	2.69E-03	1.61E-02	1.48E-02	2.62E+02
Bulldozer	Rubber Tired Dozers	1	2024	lb/hr	6.83E-01	1.29E+00	1.75E-01	2.45E-03	1.62E-02	1.49E-02	2.39E+02
Bulldozer	Rubber Tired Dozers	1	2024	lb/hr	6.83E-01	1.29E+00	1.75E-01	2.45E-03	1.62E-02	1.49E-02	2.39E+02
Bulldozer	Rubber Tired Dozers	1	2024	lb/hr	6.83E-01	1.29E+00	1.75E-01	2.45E-03	1.62E-02	1.49E-02	2.39E+02
Compactor	Plate Compactors	1	2024	lb/hr	2.63E-02	5.93E-02	5.02E-03	6.71E-05	1.51E-03	1.39E-03	4.31E+00
Graders	Graders	1	2024	lb/hr	5.71E-01	5.85E-01	7.14E-02	1.50E-03	1.07E-02	9.83E-03	1.33E+02
Backhoe/Loader	Tractors/Loaders/Backhoes	1	2024	lb/hr	3.59E-01	3.15E-01	3.49E-02	7.75E-04	6.73E-03	6.20E-03	6.68E+01
Water Truck	Off-Highway Trucks	1	2024	lb/hr	5.40E-01	1.38E+00	1.19E-01	2.66E-03	1.72E-02	1.58E-02	2.60E+02
Water Truck	Off-Highway Trucks	1	2024	lb/hr	5.40E-01	1.38E+00	1.19E-01	2.66E-03	1.72E-02	1.58E-02	2.60E+02
Trailer Mounted Light Plant	Generator Sets	1	2024	lb/hr	2.67E-01	3.53E-01	3.03E-02	6.98E-04	7.54E-03	6.94E-03	6.10E+01
Tractor	Tractors/Loaders/Backhoes	1	2024	lb/hr	3.59E-01	3.15E-01	3.49E-02	7.75E-04	6.73E-03	6.20E-03	6.68E+01
Backhoe/Loader	Tractors/Loaders/Backhoes	1	2024	lb/hr	3.59E-01	3.15E-01	3.49E-02	7.75E-04	6.73E-03	6.20E-03	6.68E+01
Loader	Tractors/Loaders/Backhoes	1	2024	lb/hr	3.59E-01	3.15E-01	3.49E-02	7.75E-04	6.73E-03	6.20E-03	6.68E+01
Forklift	Forklifts	1	2024	lb/hr	2.15E-01	5.38E-01	2.46E-02	6.03E-04	9.83E-03	9.04E-03	5.44E+01

Chiquita Canyon Landfill EIR
Construction Emissions - Proposed Project

Module 8: Excavation and Construction

	Hourly Emissions (lb/hr)							Daily Emissions (lb/day)							Annual Emissions (lb/yr)						
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**
Scraper	17.093	29.568	3.773	0.062	0.370	0.340	6,037.108	170.934	295.683	37.733	0.618	3.696	3.400	60,371.081	12,307.216	21,289.175	2,716.775	44.497	266.115	244.826	4,346,717.856
Scraper	1.486	2.571	0.328	0.005	0.032	0.030	524.966	14.864	25.712	3.281	0.054	0.321	0.296	5,249.659	148.638	257.116	32.811	0.537	3.214	2.957	52,496.592
Bulldozer	1.416	2.586	0.366	0.005	0.032	0.030	478.161	11.324	20.685	2.929	0.039	0.259	0.238	3,825.284	679.465	1,241.089	175.712	2.353	15.514	14.273	229,517.066
Bulldozer	1.416	2.586	0.366	0.005	0.032	0.030	478.161	11.324	20.685	2.929	0.039	0.259	0.238	3,825.284	679.465	1,241.089	175.712	2.353	15.514	14.273	229,517.066
Bulldozer	0.708	1.293	0.183	0.002	0.016	0.015	239.080	5.662	10.342	1.464	0.020	0.129	0.119	1,912.642	169.866	310.272	43.928	0.588	3.878	3.568	57,379.266
Compactor	0.026	0.059	0.005	0.000	0.002	0.001	4.314	0.263	0.593	0.050	0.001	0.015	0.014	43.138	18.965	42.667	3.615	0.048	1.086	0.999	3,105.938
Graders	1.144	1.170	0.152	0.003	0.021	0.020	265.486	9.149	9.360	1.212	0.024	0.171	0.157	2,123.888	365.952	374.407	48.490	0.957	6.840	6.293	84,955.514
Backhoe/Loader	0.719	0.631	0.073	0.002	0.013	0.012	133.595	2.875	2.524	0.292	0.006	0.054	0.050	534.381	172.479	151.431	17.505	0.372	3.232	2.974	32,062.859
Water Truck	1.627	4.128	0.373	0.008	0.052	0.047	780.222	16.266	41.276	3.729	0.080	0.516	0.475	7,802.221	1,171.136	2,971.852	268.511	5.742	37.148	34.176	561,759.902
Water Wagon	0.542	1.376	0.124	0.003	0.017	0.016	260.074	5.422	13.759	1.243	0.027	0.172	0.158	2,600.740	325.316	825.515	74.586	1.595	10.319	9.493	156,044.417
Trailer Mounted Light Plant	0.268	0.353	0.032	0.001	0.008	0.007	60.993	0.537	0.707	0.064	0.001	0.015	0.014	121.985	32.201	42.401	3.847	0.084	0.905	0.833	7,319.123
Tractor	0.359	0.315	0.036	0.001	0.007	0.006	66.798	2.875	2.524	0.292	0.006	0.054	0.050	534.381	28.746	25.239	2.918	0.062	0.539	0.496	5,343.810
Backhoe/Loader	0.359	0.315	0.036	0.001	0.007	0.006	66.798	2.875	2.524	0.292	0.006	0.054	0.050	534.381	57.493	50.477	5.835	0.124	1.077	0.991	10,687.620
Loader	0.359	0.315	0.036	0.001	0.007	0.006	66.798	2.875	2.524	0.292	0.006	0.054	0.050	534.381	57.493	50.477	5.835	0.124	1.077	0.991	10,687.620
Forklift	0.215	0.538	0.026	0.001	0.010	0.009	54.396	1.717	4.305	0.207	0.005	0.079	0.072	435.166	17.165	43.045	2.069	0.048	0.786	0.723	4,351.661
Total [12]	**27.737**	**47.805**	**5.911**	**0.098**	**0.625**	**0.575**	**9,516.948**	**258.960**	**453.200**	**56.008**	**0.932**	**5.847**	**5.379**	**90,448.614**	**16,231.596**	**28,916.251**	**3,578.150**	**59.487**	**367.244**	**337.865**	**5,791,946.308**

Module 9: Excavation and Construction

	Hourly Emissions (lb/hr)							Daily Emissions (lb/day)							Annual Emissions (lb/yr)						
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**
Scraper	16.794	29.568	3.598	0.062	0.370	0.340	6,037.101	167.944	295.683	35.985	0.618	3.696	3.400	60,371.014	12,091.993	21,289.175	2,590.886	44.497	266.115	244.826	4,346,713.033
Scraper	1.460	2.571	0.313	0.005	0.032	0.030	524.965	14.604	25.712	3.129	0.054	0.321	0.296	5,249.653	146.039	257.116	31.291	0.537	3.214	2.957	52,496.534
Bulldozer	1.367	2.586	0.350	0.005	0.032	0.030	478.158	10.935	20.685	2.797	0.039	0.259	0.238	3,825.265	656.125	1,241.089	167.791	2.353	15.514	14.273	229,515.921
Bulldozer	1.367	2.586	0.350	0.005	0.032	0.030	478.158	10.935	20.685	2.797	0.039	0.259	0.238	3,825.265	656.125	1,241.089	167.791	2.353	15.514	14.273	229,515.921
Bulldozer	0.683	1.293	0.175	0.002	0.016	0.015	239.079	5.468	10.342	1.398	0.020	0.129	0.119	1,912.633	164.031	310.272	41.948	0.588	3.878	3.568	57,378.980
Compactor	0.026	0.059	0.005	0.000	0.002	0.001	4.314	0.263	0.593	0.050	0.001	0.015	0.014	43.138	18.965	42.667	3.615	0.048	1.086	0.999	3,105.938
Graders	1.141	1.170	0.143	0.003	0.021	0.020	265.486	9.130	9.360	1.143	0.024	0.171	0.157	2,123.889	365.197	374.407	45.712	0.957	6.840	6.293	84,955.544
Backhoe/Loader	0.718	0.631	0.070	0.002	0.013	0.012	133.594	2.871	2.524	0.279	0.006	0.054	0.050	534.376	172.287	151.431	16.749	0.372	3.232	2.974	32,062.563
Water Truck	1.620	4.128	0.357	0.008	0.052	0.047	780.210	16.202	41.276	3.566	0.080	0.516	0.475	7,802.097	1,166.540	2,971.852	256.737	5.742	37.148	34.176	561,750.995
Water Wagon	0.540	1.376	0.119	0.003	0.017	0.016	260.070	5.401	13.759	1.189	0.027	0.172	0.158	2,600.699	324.039	825.515	71.316	1.595	10.319	9.493	156,041.943
Trailer Mounted Light Plant	0.267	0.353	0.030	0.001	0.008	0.007	60.993	0.535	0.707	0.061	0.001	0.015	0.014	121.985	32.093	42.401	3.639	0.084	0.905	0.833	7,319.122
Tractor	0.359	0.315	0.035	0.001	0.007	0.006	66.797	2.871	2.524	0.279	0.006	0.054	0.050	534.376	28.715	25.239	2.792	0.062	0.539	0.496	5,343.760
Backhoe/Loader	0.359	0.315	0.035	0.001	0.007	0.006	66.797	2.871	2.524	0.279	0.006	0.054	0.050	534.376	57.429	50.477	5.583	0.124	1.077	0.991	10,687.521
Loader	0.359	0.315	0.035	0.001	0.007	0.006	66.797	2.871	2.524	0.279	0.006	0.054	0.050	534.376	57.429	50.477	5.583	0.124	1.077	0.991	10,687.521
Forklift	0.215	0.538	0.025	0.001	0.010	0.009	54.396	1.717	4.305	0.197	0.005	0.079	0.072	435.166	17.170	43.045	1.970	0.048	0.786	0.723	4,351.660
Total [12]	**27.277**	**47.805**	**5.638**	**0.098**	**0.625**	**0.575**	**9,516.915**	**254.620**	**453.200**	**53.427**	**0.932**	**5.847**	**5.379**	**90,448.310**	**15,954.177**	**28,916.251**	**3,413.403**	**59.487**	**367.244**	**337.865**	**5,791,926.957**

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Chiquita Canyon Landfill EIR
Construction Emissions - Proposed Project Exhaust Emissions

Module 10: Excavation and Construction
Construction Period: 4/1/2025 to 10/1/2025

Emission Factors

Equipment Type	SCAQMD Equipment Type	Equipment Code	Construction Year	Emission Factor Unit	CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO_2
Scraper	Scrapers	1	2025	lb/hr	7.19E-01	1.29E+00	1.50E-01	2.69E-03	1.61E-02	1.48E-02	2.62E+02
Scraper	Scrapers	1	2025	lb/hr	7.19E-01	1.29E+00	1.50E-01	2.69E-03	1.61E-02	1.48E-02	2.62E+02
Bulldozer	Rubber Tired Dozers	1	2025	lb/hr	6.62E-01	1.29E+00	1.67E-01	2.45E-03	1.62E-02	1.49E-02	2.39E+02
Bulldozer	Rubber Tired Dozers	1	2025	lb/hr	6.62E-01	1.29E+00	1.67E-01	2.45E-03	1.62E-02	1.49E-02	2.39E+02
Bulldozer	Rubber Tired Dozers	1	2025	lb/hr	6.62E-01	1.29E+00	1.67E-01	2.45E-03	1.62E-02	1.49E-02	2.39E+02
Compactor	Plate Compactors	1	2025	lb/hr	2.63E-02	5.93E-02	5.02E-03	6.71E-05	1.51E-03	1.39E-03	4.31E+00
Graders	Graders	1	2025	lb/hr	5.70E-01	5.85E-01	6.76E-02	1.50E-03	1.07E-02	9.83E-03	1.33E+02
Backhoe/Loader	Tractors/Loaders/Backhoes	1	2025	lb/hr	3.59E-01	3.15E-01	3.36E-02	7.75E-04	6.73E-03	6.20E-03	6.68E+01
Water Truck	Off-Highway Trucks	1	2025	lb/hr	5.38E-01	1.38E+00	1.14E-01	2.66E-03	1.72E-02	1.58E-02	2.60E+02
Water Truck	Off-Highway Trucks	1	2025	lb/hr	5.38E-01	1.38E+00	1.14E-01	2.66E-03	1.72E-02	1.58E-02	2.60E+02
Trailer Mounted Light Plant	Generator Sets	1	2025	lb/hr	2.67E-01	3.53E-01	2.88E-02	6.98E-04	7.54E-03	6.94E-03	6.10E+01
Tractor	Tractors/Loaders/Backhoes	1	2025	lb/hr	3.59E-01	3.15E-01	3.36E-02	7.75E-04	6.73E-03	6.20E-03	6.68E+01
Backhoe/Loader	Tractors/Loaders/Backhoes	1	2025	lb/hr	3.59E-01	3.15E-01	3.36E-02	7.75E-04	6.73E-03	6.20E-03	6.68E+01
Loader	Tractors/Loaders/Backhoes	1	2025	lb/hr	3.59E-01	3.15E-01	3.36E-02	7.75E-04	6.73E-03	6.20E-03	6.68E+01
Forklift	Forklifts	1	2025	lb/hr	2.15E-01	5.38E-01	2.36E-02	6.03E-04	9.83E-03	9.04E-03	5.44E+01

Module 11: Excavation and Construction
Construction Period: 4/1/2026 to 10/1/2026

Emission Factors

Equipment Type	SCAQMD Equipment Type	Equipment Code	Construction Year	Emission Factor Unit	CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO_2
Scraper	Scrapers	1	2026	lb/hr	7.19E-01	1.29E+00	1.50E-01	2.69E-03	1.61E-02	1.48E-02	2.62E+02
Scraper	Scrapers	1	2026	lb/hr	7.19E-01	1.29E+00	1.50E-01	2.69E-03	1.61E-02	1.48E-02	2.62E+02
Bulldozer	Rubber Tired Dozers	1	2026	lb/hr	6.62E-01	1.29E+00	1.67E-01	2.45E-03	1.62E-02	1.49E-02	2.39E+02
Bulldozer	Rubber Tired Dozers	1	2026	lb/hr	6.62E-01	1.29E+00	1.67E-01	2.45E-03	1.62E-02	1.49E-02	2.39E+02
Bulldozer	Rubber Tired Dozers	1	2026	lb/hr	6.62E-01	1.29E+00	1.67E-01	2.45E-03	1.62E-02	1.49E-02	2.39E+02
Compactor	Plate Compactors	1	2026	lb/hr	2.63E-02	5.93E-02	5.02E-03	6.71E-05	1.51E-03	1.39E-03	4.31E+00
Graders	Graders	1	2026	lb/hr	5.70E-01	5.85E-01	6.76E-02	1.50E-03	1.07E-02	9.83E-03	1.33E+02
Backhoe/Loader	Tractors/Loaders/Backhoes	1	2026	lb/hr	3.59E-01	3.15E-01	3.36E-02	7.75E-04	6.73E-03	6.20E-03	6.68E+01
Water Truck	Off-Highway Trucks	1	2026	lb/hr	5.38E-01	1.38E+00	1.14E-01	2.66E-03	1.72E-02	1.58E-02	2.60E+02
Water Truck	Off-Highway Trucks	1	2026	lb/hr	5.38E-01	1.38E+00	1.14E-01	2.66E-03	1.72E-02	1.58E-02	2.60E+02
Trailer Mounted Light Plant	Generator Sets	1	2026	lb/hr	2.67E-01	3.53E-01	2.88E-02	6.98E-04	7.54E-03	6.94E-03	6.10E+01
Tractor	Tractors/Loaders/Backhoes	1	2026	lb/hr	3.59E-01	3.15E-01	3.36E-02	7.75E-04	6.73E-03	6.20E-03	6.68E+01
Backhoe/Loader	Tractors/Loaders/Backhoes	1	2026	lb/hr	3.59E-01	3.15E-01	3.36E-02	7.75E-04	6.73E-03	6.20E-03	6.68E+01
Loader	Tractors/Loaders/Backhoes	1	2026	lb/hr	3.59E-01	3.15E-01	3.36E-02	7.75E-04	6.73E-03	6.20E-03	6.68E+01
Forklift	Forklifts	1	2026	lb/hr	2.15E-01	5.38E-01	2.36E-02	6.03E-04	9.83E-03	9.04E-03	5.44E+01

Chiquita Canyon Landfill EIR
Construction Emissions - Proposed Project

Module 10: Excavation and Construction

	Hourly Emissions (lb/hr)							Daily Emissions (lb/day)							Annual Emissions (lb/yr)						
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**
Scraper	16.530	29.568	3.439	0.062	0.370	0.340	6,037.101	165.300	295.683	34.389	0.618	3.696	3.400	60,371.014	11,901.597	21,289.175	2,475.990	44.497	266.115	244.826	4,346,712.982
Scraper	1.437	2.571	0.299	0.005	0.032	0.030	524.965	14.374	25.712	2.990	0.054	0.321	0.296	5,249.653	143.739	257.116	29.903	0.537	3.214	2.957	52,496.534
Bulldozer	1.324	2.586	0.334	0.005	0.032	0.030	478.156	10.593	20.685	2.675	0.039	0.259	0.238	3,825.249	635.558	1,241.089	160.484	2.353	15.514	14.273	229,514.920
Bulldozer	1.324	2.586	0.334	0.005	0.032	0.030	478.156	10.593	20.685	2.675	0.039	0.259	0.238	3,825.249	635.558	1,241.089	160.484	2.353	15.514	14.273	229,514.920
Bulldozer	0.662	1.293	0.167	0.002	0.016	0.015	239.078	5.296	10.342	1.337	0.020	0.129	0.119	1,912.624	158.889	310.272	40.121	0.588	3.878	3.568	57,378.730
Compactor	0.026	0.059	0.005	0.000	0.002	0.001	4.314	0.263	0.593	0.050	0.001	0.015	0.014	43.138	18.965	42.667	3.615	0.048	1.086	0.999	3,105.938
Graders	1.139	1.170	0.135	0.003	0.021	0.020	265.486	9.114	9.360	1.082	0.024	0.171	0.157	2,123.889	364.541	374.407	43.292	0.957	6.840	6.293	84,955.555
Backhoe/Loader	0.717	0.631	0.067	0.002	0.013	0.012	133.593	2.869	2.524	0.269	0.006	0.054	0.050	534.372	172.130	151.431	16.113	0.372	3.232	2.974	32,062.333
Water Truck	1.615	4.128	0.342	0.008	0.052	0.047	780.196	16.154	41.276	3.421	0.080	0.516	0.475	7,801.956	1,163.069	2,971.852	246.339	5.742	37.148	34.176	561,740.838
Water Wagon	0.538	1.376	0.114	0.003	0.017	0.016	260.065	5.385	13.759	1.140	0.027	0.172	0.158	2,600.652	323.075	825.515	68.428	1.595	10.319	9.493	156,039.122
Trailer Mounted Light Plant	0.267	0.353	0.029	0.001	0.008	0.007	60.993	0.533	0.707	0.058	0.001	0.015	0.014	121.985	31.999	42.401	3.450	0.084	0.905	0.833	7,319.123
Tractor	0.359	0.315	0.034	0.001	0.007	0.006	66.797	2.869	2.524	0.269	0.006	0.054	0.050	534.372	28.688	25.239	2.686	0.062	0.539	0.496	5,343.722
Backhoe/Loader	0.359	0.315	0.034	0.001	0.007	0.006	66.797	2.869	2.524	0.269	0.006	0.054	0.050	534.372	57.377	50.477	5.371	0.124	1.077	0.991	10,687.444
Loader	0.359	0.315	0.034	0.001	0.007	0.006	66.797	2.869	2.524	0.269	0.006	0.054	0.050	534.372	57.377	50.477	5.371	0.124	1.077	0.991	10,687.444
Forklift	0.215	0.538	0.024	0.001	0.010	0.009	54.396	1.718	4.305	0.189	0.005	0.079	0.072	435.166	17.183	43.045	1.888	0.048	0.786	0.723	4,351.661
Total [12]	**26.871**	**47.805**	**5.390**	**0.098**	**0.625**	**0.575**	**9,516.889**	**250.798**	**453.200**	**51.081**	**0.932**	**5.847**	**5.379**	**90,448.064**	**15,709.744**	**28,916.251**	**3,263.537**	**59.487**	**367.244**	**337.865**	**5,791,911.268**

Module 11: Excavation and Construction

	Hourly Emissions (lb/hr)							Daily Emissions (lb/day)							Annual Emissions (lb/yr)						
Equipment Type	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**	**CO**	**NOx**	**ROG**	**SOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**	**CO_2**
Scraper	16.530	29.568	3.439	0.062	0.370	0.340	6,037.101	165.300	295.683	34.389	0.618	3.696	3.400	60,371.014	11,901.597	21,289.175	2,475.990	44.497	266.115	244.826	4,346,712.982
Scraper	1.437	2.571	0.299	0.005	0.032	0.030	524.965	14.374	25.712	2.990	0.054	0.321	0.296	5,249.653	143.739	257.116	29.903	0.537	3.214	2.957	52,496.534
Bulldozer	1.324	2.586	0.334	0.005	0.032	0.030	478.156	10.593	20.685	2.675	0.039	0.259	0.238	3,825.249	635.558	1,241.089	160.484	2.353	15.514	14.273	229,514.920
Bulldozer	1.324	2.586	0.334	0.005	0.032	0.030	478.156	10.593	20.685	2.675	0.039	0.259	0.238	3,825.249	635.558	1,241.089	160.484	2.353	15.514	14.273	229,514.920
Bulldozer	0.662	1.293	0.167	0.002	0.016	0.015	239.078	5.296	10.342	1.337	0.020	0.129	0.119	1,912.624	158.889	310.272	40.121	0.588	3.878	3.568	57,378.730
Compactor	0.026	0.059	0.005	0.000	0.002	0.001	4.314	0.263	0.593	0.050	0.001	0.015	0.014	43.138	18.965	42.667	3.615	0.048	1.086	0.999	3,105.938
Graders	1.139	1.170	0.135	0.003	0.021	0.020	265.486	9.114	9.360	1.082	0.024	0.171	0.157	2,123.889	364.541	374.407	43.292	0.957	6.840	6.293	84,955.555
Backhoe/Loader	0.717	0.631	0.067	0.002	0.013	0.012	133.593	2.869	2.524	0.269	0.006	0.054	0.050	534.372	172.130	151.431	16.113	0.372	3.232	2.974	32,062.333
Water Truck	1.615	4.128	0.342	0.008	0.052	0.047	780.196	16.154	41.276	3.421	0.080	0.516	0.475	7,801.956	1,163.069	2,971.852	246.339	5.742	37.148	34.176	561,740.838
Water Wagon	0.538	1.376	0.114	0.003	0.017	0.016	260.065	5.385	13.759	1.140	0.027	0.172	0.158	2,600.652	323.075	825.515	68.428	1.595	10.319	9.493	156,039.122
Trailer Mounted Light Plant	0.267	0.353	0.029	0.001	0.008	0.007	60.993	0.533	0.707	0.058	0.001	0.015	0.014	121.985	31.999	42.401	3.450	0.084	0.905	0.833	7,319.123
Tractor	0.359	0.315	0.034	0.001	0.007	0.006	66.797	2.869	2.524	0.269	0.006	0.054	0.050	534.372	28.688	25.239	2.686	0.062	0.539	0.496	5,343.722
Backhoe/Loader	0.359	0.315	0.034	0.001	0.007	0.006	66.797	2.869	2.524	0.269	0.006	0.054	0.050	534.372	57.377	50.477	5.371	0.124	1.077	0.991	10,687.444
Loader	0.359	0.315	0.034	0.001	0.007	0.006	66.797	2.869	2.524	0.269	0.006	0.054	0.050	534.372	57.377	50.477	5.371	0.124	1.077	0.991	10,687.444
Forklift	0.215	0.538	0.024	0.001	0.010	0.009	54.396	1.718	4.305	0.189	0.005	0.079	0.072	435.166	17.183	43.045	1.888	0.048	0.786	0.723	4,351.661
Total [12]	**26.871**	**47.805**	**5.390**	**0.098**	**0.625**	**0.575**	**9,516.889**	**250.798**	**453.200**	**51.081**	**0.932**	**5.847**	**5.379**	**90,448.064**	**15,709.744**	**28,916.251**	**3,263.537**	**59.487**	**367.244**	**337.865**	**5,791,911.268**

Reference: Data (Equipment Type, Number, Hours of Operation, Daily Hours/Annual Days Used, Number of Workers) Provided by Mike Dean on 7-20-2011 to Brenda Eells via e-mail

[1] Unless otherwise noted, the total number of annual days equipment are used is based on data provided by CCL on 7/2011.

[2] The number of workers were estimated by summing the value provided by CCL for the new paved road entrance (10) and the default derived from Appendix A of the CalEEMod User's Guide, which assumes 1.25 workers per construction equipment during site preparation, grading, and paving and 0.42 worker trips per 1,000 square feet during building construction.

[3] It is assumed that a water truck is used every day of construction except for during paving activities.

[4] Equipment type, quantity, and daily hours of operation added to values provided by CCL for the construction of parking, administration building, and scale house. Values are based on default data in Table 3.2 of Appendix D of the CalEEMod User's Guide, 2011 based on the total project area (5.9 acres) and building area (0.5 acres).

[5] Site Preparation, Grading, and Paving duration is assumed equal to the CCL-provided durations for similar equipment. These durations are generally consistent with the CalEEMod defaults from Table 3.1 of Appendix D of the CalEEMod User's Guide, 2011 (scaled to fit a 6-month schedule).

[6] Berm Construction: assumed to occur simultaneously with the Demolition, Site Preparation, and Grading phases for a total of 62 days. Duration is generally consistent with the default duration in URBEMIS 2007, based on the berm area (2.7 acres). Equipment type, quantity, and daily hours of operation for the Berm Construction phase taken as the default from URBEMIS 2007, based on the berm area and a cut / fill volume of 48,811 cy.

[7] Assuming a truck haul capacity of 20 cy/truck, and the berm construction duration, 40 soil haul truck trips will need to occur each day during Berm Construction. It was assumed that 1 truck would make up to 5 trips per hour of operation to accomplish this task.

[8] Assuming activities occur sequentially, the total number of annual days equipment are used during Building Construction was assumed to be the difference between the total Entrance Construction duration and the durations of the other phases. This duration is approximately half of that derived from the CalEEMod default from Table 3.1 of Appendix D of the CalEEMod User's Guide, 2011 (scaled to fit a 6-month schedule), which is reasonable given the simple nature of these buildings.

[9] Two weeks to pave the new entrance road per CCL meeting on 3/29/12. Equipment type, quantity, and daily hours of operation for the Paving phase taken from Table 3.2 of Appendix D of the CalEEMod User's Guide, 2011 based on the parking area of 116,875 square feet (2.7 acres), which was estimated from Figure 2-1 as the unused land surrounding the Administration Building, plus 1 paver used for the construction entrance as per CCL.

[10] Typical cell construction based on Module 8; 2,965,000 cy total excavation per module.

[11] Entrance Construction total daily emissions and total hourly emissions are the maximum emissions given the assumed schedule (i.e., that all phases occur sequentially except for Berm Construction, which occurs simultaneously with Demolition, Site Preparation, and Grading). The total annual emissions represent the sum of all construction activities occurring within the year.

[12] Module Construction Total Emissions: To provide flexibility, the total hourly, total daily, and total annual emissions are calculated assuming all equipment can be used at the same time.

[13] Cell construction limited from 12 hours per day to 10 hours per day. Days of equipment use increased to keep total hours of equipment use consistent with estimate provided.

Chiquita Canyon Landfill EIR

Operation Emissions - Proposed Project Exhaust Emissions

Assumptions:

Equipment for Operation During:	2015 - 2032	
Operation Schedule:	52	weeks/yr
	6	days/week
	10	hrs/day

Since CCL and the construction contractor are large operators of diesel off-road equipment, all off-road diesel equipment used for operation will be model year 2014 or meet model year 2014 emission control requirements (Tier 4) unless otherwise indicated.

Off-Road Equipment	2021 - 2030		2016 [1]	
	Number (ea)	Hrs of Operation (day)	Number (ea)	Hrs of Operation (day)
Scraper -CAT 636G	2	5.5	1	5.5
Bulldozer - CAT D8 [5], D6 [1]	3	9.5	1	9.5
Compactor - CAT 836G	3	10	1	10
Water Truck - 4,000 gal, 3 axle, 58,000 gvw [2]	1	8	1	3.4
Water Wagon - CAT 631G 10,000 gal [2]	1	7	1	3
Trailer Mounted Light Plant	3	5	1	5
Tipper	2	12	1	12

Emission Calculations

Operation Year: 2016

Emission Factors

Equipment Type	SCAQMD Equipment Type	Equipment Code	Operation year	Emission factor unit	CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO2
Scraper	Scrapers	1	2016	lb/hr	9.05E-01	1.41E-01	2.38E-01	2.69E-03	1.77E-03	1.62E-03	2.62E+02
Bulldozer	Rubber Tired Dozers	1	2016	lb/hr	9.83E-01	1.42E-01	2.59E-01	2.45E-03	1.78E-03	1.63E-03	2.39E+02
Compactor	Plate Compactors	1	2016	lb/hr	2.63E-02	5.93E-02	5.02E-03	6.71E-05	7.94E-04	7.30E-04	4.31E+00
Water Truck	Off-Highway Trucks	1	2016	lb/hr	5.83E-01	1.51E-01	1.82E-01	2.66E-03	1.89E-03	1.74E-03	2.60E+02
Water Truck	Off-Highway Trucks	1	2016	lb/hr	5.83E-01	1.51E-01	1.82E-01	2.66E-03	1.89E-03	1.74E-03	2.60E+02
Trailer Mounted Light Plant	Generator Sets	1	2016	lb/hr	2.86E-01	3.33E-02	5.81E-02	6.98E-04	4.17E-04	3.83E-04	6.10E+01
Tipper	Dumpers/Tenders	1	2016	lb/hr	3.14E-02	1.19E-01	9.26E-03	9.67E-05	1.59E-03	1.46E-03	7.62E+00

Chiquita Canyon Landfill EIR
Operation Emissions - Proposed Project

Onsite Emissions

	Daily Emissions (lb/day)							Hourly Emissions (lb/hr)							Annual Emissions (lb/yr)						
	CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO2	CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO2	CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO2
Scraper	4.979	0.777	1.311	0.015	0.010	0.009	1443.695	0.905	0.141	0.238	0.003	0.002	0.002	262.490	1553.511	242.423	408.887	4.611	3.030	2.788	450432.787
Bulldozer	9.342	1.350	2.462	0.023	0.017	0.016	2271.359	0.983	0.142	0.259	0.002	0.002	0.002	239.090	2914.761	421.084	767.990	7.266	5.264	4.842	708664.159
Compactor	0.263	0.593	0.050	0.001	0.008	0.007	43.138	0.026	0.059	0.005	0.000	0.001	0.001	4.314	82.180	184.892	15.667	0.209	2.476	2.278	13459.063
Water Truck	1.999	0.518	0.623	0.009	0.006	0.006	891.605	0.583	0.151	0.182	0.003	0.002	0.002	260.052	623.739	161.733	194.303	2.844	2.022	1.860	278180.874
Water Truck	1.749	0.454	0.545	0.008	0.006	0.005	780.155	0.583	0.151	0.182	0.003	0.002	0.002	260.052	545.772	141.517	170.015	2.488	1.769	1.627	243408.265
Trailer Mounted Light Plant	1.431	0.167	0.290	0.003	0.002	0.002	304.963	0.286	0.033	0.058	0.001	0.000	0.000	60.993	446.505	52.001	90.613	1.089	0.650	0.598	95148.587
Tipper	0.377	1.422	0.111	0.001	0.019	0.018	91.493	0.031	0.119	0.009	0.000	0.002	0.001	7.624	117.668	443.741	34.674	0.362	5.943	5.468	28545.736
Total	20.141	5.280	5.392	0.060	0.068	0.062	5826.409	3.399	0.797	0.933	0.011	0.010	0.009	1094.614	6284.138	1647.391	1682.149	18.870	21.154	19.461	1817839.471

Chiquita Canyon Landfill EIR

Operation Emissions - Proposed Project Exhaust Emissions

Emission Calculations
Operation Year: 2021

Emission Factors

Equipment Type	SCAQMD Equipment Type	Equipment Code	Operation year	Emission factor unit	CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO2
Scraper	Scrapers	1	2021	lb/hr	7.75E-01	1.41E-01	1.81E-01	2.69E-03	1.77E-03	1.62E-03	2.62E+02
Bulldozer	Rubber Tired Dozers	1	2021	lb/hr	7.66E-01	1.42E-01	2.02E-01	2.45E-03	1.78E-03	1.63E-03	2.39E+02
Compactor	Plate Compactors	1	2021	lb/hr	2.63E-02	5.93E-02	5.02E-03	6.71E-05	7.94E-04	7.30E-04	4.31E+00
Water Truck	Off-Highway Trucks	1	2021	lb/hr	5.48E-01	1.51E-01	1.37E-01	2.66E-03	1.89E-03	1.74E-03	2.60E+02
Water Truck	Off-Highway Trucks	1	2021	lb/hr	5.48E-01	1.51E-01	1.37E-01	2.66E-03	1.89E-03	1.74E-03	2.60E+02
Trailer Mounted Light Plant	Generator Sets	1	2021	lb/hr	2.71E-01	3.33E-02	3.63E-02	6.98E-04	4.17E-04	3.83E-04	6.10E+01
Tipper	Dumpers/Tenders	1	2021	lb/hr	3.14E-02	1.19E-01	9.20E-03	9.67E-05	1.59E-03	1.46E-03	7.62E+00

Emission Calculations
Operation Year: 2030

Emission Factors

Equipment Type	SCAQMD Equipment Type	Equipment Code	Operation year	Emission factor unit	CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO2
Scraper	Scrapers	1	2030	lb/hr	7.19E-01	1.41E-01	1.50E-01	2.69E-03	1.77E-03	1.62E-03	2.62E+02
Bulldozer	Rubber Tired Dozers	1	2030	lb/hr	6.62E-01	1.42E-01	1.67E-01	2.45E-03	1.78E-03	1.63E-03	2.39E+02
Compactor	Plate Compactors	1	2030	lb/hr	2.63E-02	5.93E-02	5.02E-03	6.71E-05	7.94E-04	7.30E-04	4.31E+00
Water Truck	Off-Highway Trucks	1	2030	lb/hr	5.38E-01	1.51E-01	1.14E-01	2.66E-03	1.89E-03	1.74E-03	2.60E+02
Water Truck	Off-Highway Trucks	1	2030	lb/hr	5.38E-01	1.51E-01	1.14E-01	2.66E-03	1.89E-03	1.74E-03	2.60E+02
Trailer Mounted Light Plant	Generator Sets	1	2030	lb/hr	2.67E-01	3.33E-02	2.88E-02	6.98E-04	4.17E-04	3.83E-04	6.10E+01
Tipper	Dumpers/Tenders	1	2030	lb/hr	3.14E-02	1.19E-01	9.20E-03	9.67E-05	1.59E-03	1.46E-03	7.62E+00

Chiquita Canyon Landfill EIR
Operation Emissions - Proposed Project

Onsite Emissions

	Daily Emissions (lb/day)							Hourly Emissions (lb/hr)							Annual Emissions (lb/yr)						
	CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO2	CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO2	CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO2
Scraper	8.520	1.554	1.996	0.030	0.019	0.018	2887.327	1.549	0.283	0.363	0.005	0.004	0.003	524.969	2658.221	484.847	622.758	9.222	6.061	5.576	900845.951
Bulldozer	21.835	4.049	5.743	0.070	0.051	0.047	6813.862	2.298	0.426	0.605	0.007	0.005	0.005	717.249	6812.452	1263.251	1791.831	21.799	15.791	14.527	2125924.811
Compactor	0.790	1.778	0.151	0.002	0.024	0.022	129.414	0.079	0.178	0.015	0.000	0.002	0.002	12.941	246.540	554.676	47.001	0.628	7.429	6.834	40377.203
Water Truck	4.381	1.210	1.096	0.021	0.015	0.014	2080.665	0.548	0.151	0.137	0.003	0.002	0.002	260.083	1366.719	377.378	341.898	6.636	4.717	4.340	649167.545
Water Truck	3.833	1.058	0.959	0.019	0.013	0.012	1820.582	0.548	0.151	0.137	0.003	0.002	0.002	260.083	1195.879	330.206	299.161	5.806	4.128	3.797	568021.602
Trailer Mounted Light Plant	4.062	0.500	0.544	0.010	0.006	0.006	914.890	0.812	0.100	0.109	0.002	0.001	0.001	182.978	1267.269	156.003	169.792	3.267	1.950	1.794	285445.770
Tipper	0.753	2.844	0.221	0.002	0.038	0.035	182.985	0.063	0.237	0.018	0.000	0.003	0.003	15.249	235.077	887.482	68.882	0.724	11.886	10.935	57091.463
Total	44.174	12.993	10.709	0.154	0.167	0.153	14829.725	5.897	1.526	1.384	0.021	0.019	0.018	1973.552	13782.158	4053.843	3341.324	48.082	51.961	47.804	4626874.345

Onsite Emissions

	Daily Emissions (lb/day)							Hourly Emissions (lb/hr)							Annual Emissions (lb/yr)						
	CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO2	CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO2	CO	NOx	ROG	SOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO2
Scraper	7.906	1.554	1.645	0.030	0.019	0.018	2887.309	1.437	0.283	0.299	0.005	0.004	0.003	524.965	2466.563	484.847	513.140	9.222	6.061	5.576	900840.517
Bulldozer	18.868	4.049	4.764	0.070	0.051	0.047	6813.724	1.986	0.426	0.502	0.007	0.005	0.005	717.234	5886.853	1263.251	1486.487	21.798	15.791	14.527	2125881.950
Compactor	0.790	1.778	0.151	0.002	0.024	0.022	129.414	0.079	0.178	0.015	0.000	0.002	0.002	12.941	246.540	554.676	47.001	0.628	7.429	6.834	40377.193
Water Truck	4.308	1.210	0.912	0.021	0.015	0.014	2080.522	0.538	0.151	0.114	0.003	0.002	0.002	260.065	1343.991	377.378	284.659	6.635	4.717	4.340	649122.747
Water Truck	3.769	1.058	0.798	0.019	0.013	0.012	1820.456	0.538	0.151	0.114	0.003	0.002	0.002	260.065	1175.992	330.206	249.076	5.806	4.128	3.797	567982.403
Trailer Mounted Light Plant	4.000	0.500	0.431	0.010	0.006	0.006	914.890	0.800	0.100	0.086	0.002	0.001	0.001	182.978	1247.946	156.003	134.550	3.267	1.950	1.794	285445.806
Tipper	0.753	2.844	0.221	0.002	0.038	0.035	182.986	0.063	0.237	0.018	0.000	0.003	0.003	15.249	235.077	887.482	68.874	0.724	11.886	10.935	57091.480
Total	40.394	12.993	8.922	0.154	0.167	0.153	14829.302	5.442	1.526	1.148	0.021	0.019	0.018	1973.498	12602.962	4053.843	2783.788	48.081	51.961	47.804	4626742.096

Reference: Data (Equipment Type, Number, Hours of Operation) Provided by Mike Dean on 7-20-2011 to Brenda Eells via e-mail

[1] Operation of the Proposed Project would ramp up evenly over a seven year period starting January 1, 2014, with full operation beginning in 2021. Number of vehicles for 2016 has been calculated as 3/7 of total for Proposed Project,

[2] Only one piece of equipment indicated. Hours of operation adjusted by a factor

Chiquita Canyon Landfill EIR

Operation Emissions - Proposed Project Flare Emissions

Assumptions:

The operating schedule is based Golder Associates 4/11 LFG report. 2021: 1 New (3rd) flare will be added. 2030: 4th flare added (2030 emissions = 2032 emissions)

The project does not include the operation of the existing two flares.

Flare emissions are based on existing source test data (CCL meeting, 3/29/12) [1]

Year 2032 LFG generation is used to represent 2030 LFG generation. Although the second flare would be in operation in 2030, the maximum LFG flow rate during operation of the landfill would occur in 2032.

Operating scenario: 24 hrs/ day

365 days / yr

LFG Recovery [2]: 85%

Parameter	Operations Year		
	2021	2030	2032
Landfill Generation Gas(scfm):	9,353	14,097	15,040
New Flare	1,353	6,097	7,040
Number of New Flares	1	2	2

Existing Flare Capacity (SCFM):
8000

	Emission Rates (lb/hr)						
Pollutant	CO [3]	NO_X	ROG (as CH4)	SO_2	PM_{10}	CO2 (kg/scf) [4]	Source Test Inlet Gas Flow Rate (dscfm) [5]
Source Test of Flare 2 [1]	1.38	1.38	0.278	1.81	0.14	0.0262	2,166
Permitted Limit Flare 1	5.6	3.9	0.92	2.5	1.4	-	4,000
Permitted Limit Flare 2	7.2	2.4	1.33	2.5	1.4	-	4,000

	2021: 1 New Flare Operation							2030 or 2032: 2 New Flares Operation						
Pollutant	CO	NO_X	ROG (as CH4) [6]	SO_2	PM_{10}	$PM_{2.5}$ [7]	CO2	CO	NO_X	ROG (as CH4) [6]	SO_2	PM_{10}	$PM_{2.5}$ [7]	CO2
Hourly Emissions (lb/hr)	1.38	1.38	0.278	1.81	0.14	0.14	-	2.76	2.76	0.556	3.62	0.28	0.28	-
Daily Emissions (lb/day)	33	33	7	43	3	3	-	66.24	66.24	13.344	86.88	6.72	6.72	-
Annual Emissions (lb/year)	12,089	12,089	2,435	15,856	1,226	1,226	34,914,762	24,178	24,178	4,871	31,711	2,453	2,453	181,670,305

Conversion:

lb/kg conversion: 2.20

min/yr: 525600

[1] Reference: Source test report Horizon Air Measurement Services, INC Test # C33-013-FR, Report February 16, 2012. CCL Compliance Test on Landfill Gas Flare #2. Prepared for the SCAQMD. Initial test 1/5/2012, re-test for PM only on 2/2/12. The final values are included as representative.

[2] LFG recovery is 85% based on data provided by Golder Associates (04/2011) using EPA's LandGEM Model version 3.02

[3] CO emissions were measured as 0.6 lb/hr. However this is less than 20% of the full scale of the analyzer. A low scale calibration gas (10% or 1.38 lb/hr) of range was used to verify the low level emissions. Therefore, the 1.38 lb/hr is used since the measured value was below the analyzer minimum acceptable range.

[4] CO2 Flare emissions based on 2011 GHG Inventory by Cameron-Cole, LLC (EF=0.0262 kg/scf) and Golder Associates 4/11 LFG report (2021&2030 LFG flow rate)

[5] Source Test Inlet Gas Flow Rate was reported as 2,167 dscfm in Table 2-1 of the source test report but as 2,166 dscfm in Table 5-1 of the source test report. Value listed as 2,166 dscfm here to be consistent with values used to estimate toxic emissions.

[6] Total Non-Methane Hydrocarbons (ROG) measured as methane equivalent per source test report: Horizon Air Measurement Services, INC Test # C33-013-FR, Report February 16, 2012. No methane emitted in flare exhaust gas.

[7] PM2.5 equals 100% of PM10 for flares burning gaseous fuel per Appendix A, Table A of the SCAQMD Final –Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds, October 2006.

Chiquita Canyon Landfill EIR

Operation Emissions - Proposed Project Flare Emissions

Assumptions:

Landfill Gas Emission Rates [1]	CO2 (%)	CH4 (%)
	0.5	0.5

LFG Recovery [2]:	85%	
Operating scenario:	24	hrs/ day
	365	days / yr

Year	Landfill Gas Generation (scfm) [2]
2016	6772
2021	9353
2030	14097
2032	15040

Calculated Landfill Gas Emissions

Year	lb/hr		lb/day		lb/yr	
	CO2	CH4	CO2	CH4	CO2	CH4
2016	3,535	1,288	84,839	30,920	30,966,082	11,285,980
2021	4,882	1,779	117,173	42,705	42,768,129	15,587,384
2030	7,359	2,682	176,605	64,366	64,460,848	23,493,570
2032	7,851	2,861	188,419	68,672	68,772,870	25,065,141

Constants:

min/hr	60
scf / lb-mol	379.40
lbs CO2/lb-mol	44.01
lbs CH4/lb-mol	16.04

[1] CH4 content is 50% by volume per Golder Associate (04/2011); assume CO2 is also 50% (conservative). Note that CO2 is 36.75% per volume from source test report Horizon Air Measurement Services1/2012.

[2] LFG recovery is 85% based on data provided by Golder Associates (04/2011) using EPA's LandGEM Model version 3.02.

Chiquita Canyon Landfill EIR
Operation Emissions - Proposed Project Indirect Emissions

Electricity Emission Factors

	Emission Factor (lb/MWh) [1, 2]		
	CO_2	CH_4	N_2O
Purchased Electricity	658.68	0.0289	0.00617

[1] Emission factors taken from U.S. EPA eGRID2012 Version 1.0 (2009 data) for the WECC California subregion.

[2] Future emission factors are not available, therefore the latest available emission factors will be used to calculate emissions from all years of operation.

Indirect Electricity Emissions from Operation of Support Buildings

Emissions would be the same for all years of operation: 2015 - 2032

Emission Source	Building Size (sqft) [1]	Electricity Usage Rate (kWh/sqft/year) [2]	Emissions (lbs/yr)			Emissions (lbs/day) [3]			Emissions (lbs/hr) [3]		
			CO_2	CH_4	N_2O	CO_2	CH_4	N_2O	CO_2	CH_4	N_2O
Support Buildings (Administration Building, Scale House)	22,925	12.95	195,548.095	8.592	1.832	535.748	0.024	0.005	22.323	0.001	0.000
Total	**--**	**--**	**195,548.095**	**8.592**	**1.832**	**535.748**	**0.024**	**0.005**	**22.323**	**0.001**	**0.000**

[1] Approximate size of buildings estimated from site plans.

[2] Electricity Usage Rate from Table A9-11-A of the CEQA Handbook (1993) for Office Buildings.

[3] Daily and hourly emissions conservatively assume that electricity may be consumed outside of standard working hours (i.e., for emergency lighting, indoor lighting left on, etc.).

Chiquita Canyon Landfill EIR

Construction Emissions - Proposed Project Fugitive Emissions From Activities

Project Data [1]

Expansion Landfill Footprint	142.7	acres
Average Module Footprint	24	acres
New Entrance and Road	30	acres
Construction Activity	*Per Module*	*For Entrance*
Total Excavation [2] (cy)	2,965,000	360,000
Excavation Schedule (days)	60	30
Grading Schedule (days)	40	12
Paving [3] (acres)	0	11
Paving Schedule (days)	NA	10
Berm - Onsite Cut / Fill (ft^3) [12]	NA	1,317,911
Berm Schedule [4] (days)	NA	62

General Assumptions

Construction Schedule	Operational Schedule	
10	10	hrs / day
5	6	days / week
4	(52 weeks / yr)	weeks / month

Emission Factors

Activity	Fugitive PM_{10} EF	Fugitive $PM_{2.5}$ EF [5]	Unit
Excavation [6]	0.00042	0.00009	lb/ft^3/day
Grading [6]	26.4	5.5	lb/acre/day
Onsite Cut / Fill [7]	0.059	0.012	ton/1,000 cy
	ROG EF	**Unit**	
Paving [8]	2.62	lb ROG / acre	

Conversion: ft^3/cy 27

Control Measures

Measure	Control Efficiency	Applicable Source	Reference
Water Hourly and apply dust suppressant	90.00%	Excavation / Grading	Western Regional Air Partnership Fugitive Dust Handbook, Table 3-7.
Total Control Efficiency	90.00%	Excavation / Grading	

	Construction Period (months)	Duration (days)	YR
Entrance Construction	6	120	2014

		Fugitive Particulate Emissions						ROG Emissions			Controlled Emissions: Fugitive Particulate Emissions						Controlled Emissions: ROG Emissions		
		(lb/day)		(lb/hr)		(lb/yr)		(lb/day)	(lb/hr)	(lb/yr)	(lb/day)		(lb/hr)		(lb/yr)		(lb/day)	(lb/hr)	(lb/yr)
Activity	**Max. Activity per day**	**PM_{10}**	**$PM_{2.5}$**	**PM_{10}**	**$PM_{2.5}$**	**PM_{10}**	**$PM_{2.5}$**	**ROG**	**ROG**	**ROG**	**PM_{10}**	**$PM_{2.5}$**	**PM_{10}**	**$PM_{2.5}$**	**PM_{10}**	**$PM_{2.5}$**	**ROG**	**ROG**	**ROG**
Grading (acres/day)	2.5	66.00	13.73	6.60	1.37	792.00	164.74	NA	NA	NA	6.60	1.37	0.66	0.14	79.20	16.47	NA	NA	NA
Excavation (cy/day)	12,000	136.08	28.30	13.61	2.83	4,082.40	849.14	NA	NA	NA	13.61	2.83	1.36	0.28	408.24	84.91	NA	NA	NA
Paving [6] (acres/day)	1.1	NA	NA	NA	NA	NA	NA	2.88	0.29	28.82	NA	NA	NA	NA	NA	NA	NA	NA	NA
Berm - Onsite Cut / Fill (ft^3/day)	21,257	92.90	19.32	9.29	1.93	5,759.76	1,198.03	NA	NA	NA	9.29	1.93	0.93	0.19	575.98	119.80	NA	NA	NA
Total [9]		**228.98**	**47.63**	**22.90**	**4.76**	**10,634.16**	**2,211.91**	**2.88**	**0.29**	**28.82**	**22.90**	**4.76**	**2.29**	**0.48**	**984.22**	**204.72**	**NA**	**NA**	**NA**

Chiquita Canyon Landfill EIR

Construction Emissions - Proposed Project Fugitive Emissions From Activities

	Construction Period (months)	Duration (days)	YR	
Module Construction	6	120	2016 - 2026	Emissions are the same for each yr of module construction

		Fugitive Particulate Emissions						Controlled Emissions					
		(lb/day)		(lb/hr)		(lb/yr)		(lb/day)		(lb/hr)		(lb/yr)	
Activity	**Max. Activity per day**	**PM_{10}**	**$PM_{2.5}$**	**PM_{10}**	**$PM_{2.5}$**	**PM_{10}**	**$PM_{2.5}$**	**PM_{10}**	**$PM_{2.5}$**	**PM_{10}**	**$PM_{2.5}$**	**PM_{10}**	**$PM_{2.5}$**
Grading (acres/day)	0.6	15.84	3.29	1.58	0.33	633.60	131.79	1.58	0.33	0.16	0.03	63.36	13.18
Excavation (cy/day)	50,000	567.00	117.94	56.70	11.79	34,020.00	7,076.16	56.70	11.79	5.67	1.18	3,402.00	707.62
Total [10, 11]		**582.84**	**121.23**	**58.28**	**12.12**	**34,653.60**	**7,207.95**	**58.28**	**12.12**	**5.83**	**1.21**	**3,465.36**	**720.79**

	YR	Annual Duration (days)	
Module Operation	2015 - 2032	312	Emissions are the same for each yr of operation and are for all modules

		Fugitive Particulate Emissions						Controlled Emissions					
		(lb/day)		(lb/hr)		(lb/yr)		(lb/day)		(lb/hr)		(lb/yr)	
Activity	**Assumed Max. Activity**	**PM_{10}**	**$PM_{2.5}$**	**PM_{10}**	**$PM_{2.5}$**	**PM_{10}**	**$PM_{2.5}$**	**PM_{10}**	**$PM_{2.5}$**	**PM_{10}**	**$PM_{2.5}$**	**PM_{10}**	**$PM_{2.5}$**
Grading (acres/day)	2.3	60.72	12.63	6.07	1.26	18,944.64	3,940.49	6.07	1.26	0.61	0.13	1,894.46	394.05
Excavation (cy/day)	730	8.28	1.72	0.83	0.17	2,582.80	537.22	0.83	0.17	0.08	0.02	258.28	53.72
Total		**69.00**	**14.35**	**6.90**	**1.44**	**21,527.44**	**4,477.71**	**6.07**	**1.26**	**0.61**	**0.13**	**2,152.74**	**447.77**

[1] Unless otherwise noted data provided in the Assumptions tab and are based on project specific inputs.

[6] Source: SCAQMD CEQA Air Quality Handbook, November 1993. Table 9-9, assumed soil density of 1.8 ton/yd^3.

[7] Source: Table 3-2 of the WRAP Fugitive Dust Handbook (Countess Environmental, 2006), which is consistent with the approach used by URBEMIS2007, the previously ARB-approved emission calculation estimator.

[8] Source: Section 4.8 of Appendix A of the CalEEMod User's Guide, 2011.

[5] Source: SCAQMD Particulate Matter (PM) 2.5 Significance Thresholds and Calculation Methodology, October 2006. For construction fugitive dust sources, it is assumed that 20.8% of the PM_{10} would be $PM_{2.5}$. For paved and unpaved road fugitive dust sources, it is assumed that 16.9% and 21.2% of the PM_{10} would be $PM_{2.5}$, respectively.

[7] Fugitive Emissions are based on maximum amount of earth disturbed. Emission factors are independent of operating year. Maximum daily activity data provided by CCL, July 2011 .

[2] Typical module size based on Module 8 as per data provided by CCL July 2011. Data provided for entrance construction is 12,000 cy/day.

[3] Total area to be paved includes approximately 8 acres for road and 3 acres for new parking area as per assumptions sheet.

[4] The Berm schedule was taken as described on the Construction PP - Exhaust tab.

[9] The Total Daily and Total Hourly emissions are the maximum emissions given the assumed schedule (i.e., that Grading and Excavation activities do not occur simultaneously and that Berm activities may overlap with Grading and/or Excavation activities). The Total Annual emissions represent the sum of all construction activities occurring within the year.

[10] It is assumed that the construction phases excavation and grading could occur simultaneously for the module construction as consistent with the exhaust construction tab.

[11] Totals for Module Construction represent total emissions from construction of one Module since one module is constructed per year.

[12] Volume of cut / fill for the Berm Construction taken from design drawings (ccl_berm-calcs-r01.pdf).

Chiquita Canyon Landfill EIR

Operation Emissions - Proposed Project Flare Emissions

Assumptions:

The operating schedule is based Golder Associates 4/11 LFG report. 2021: 1 New (3rd) flare will be added. 2030: 4th flare added (2030 emissions = 2032 emissions)
Flare and LFG emissions are based on existing source test data from 1/5/12 (CCL meeting, 3/29/12) [1]
Gas flow rate data provided by Golder Associates (04/2011) using EPA's LandGEM Model version 3.02 (Table 2 and Attachment A Results table).
Annual LFG recovery rate is 85% based on data provided by Golder Associates (04/2011) using EPA's LandGEM Model version 3.02..
Emissions for the new flares would be the same as the existing flares.
Year 2032 LFG generation is used to represent 2030 LFG generation. Although the second flare would be in operation in 2030, the maximum LFG flow rate during operation of the landfill would occur in 2032.

Year	Landfill Gas Generation (scfm)	Fugitive Emissions (scfm)	New Flare (scfm)	Existing Flare Capacity (SCFM):
2021	9353		1353	8000
2030	14097		6097	
2032	15040		7040	
	14945			
	424			
Control Efficiency of Flares	85%		Fugitive LFG Emission Rate	15%

	Source Test Data [1]						Average Flare	Average Landfill	MW
	Run 1		Run 2		Run 3				
	LFG-inlet	Flare outlet	LFG-inlet	Flare outlet	LFG-inlet	Flare outlet			
	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	g/g-mole
Hydrogen sulfide	64400	200	64400	200	64400	200	200	64400	34.08
Benzene	3250	0.8	3250	0.8	3250	0.8	0.8	3250	78.11
Benzylchloride	380	1.5	380	1.5	380	1.5	1.5	380	126.58
Chlorobenzene	320	1	320	1	320	1	1	320	112.56
Dichlorobenzene	604	2	604	2	604	2	2	604	147
1,1-Dichloroethane	320	1	320	1	320	1	1	320	98.97
1,2-Dichloroethane	402	1	402	1	402	1	1	402	98.96
1,1-Dichloroethylene	320	1	320	1	320	1	1	320	96.94
Dichloromethane	648	1	648	1.2	648	1.5	1.2	648	84.94
1,2-dibromoethane	320	1	320	1	320	1	1	320	187.86
Perchloroethene	553	0.8	553	0.8	553	0.8	0.8	553	165.83
Carbon tetrachloride	280	0.8	280	0.8	280	0.8	0.8	280	153.82
Toluene	26200	1	26200	2.48	26200	2.83	2.1	26200	92.13
1,1,1-trichloroethane	280	0.8	280	0.8	280	0.8	0.8	280	133.4
Trichloroethene	280	0.8	280	0.8	280	0.8	0.8	280	131.4
Chloroform	280	0.8	280	0.8	280	0.8	0.8	280	119.38
Vinyl chloride	280	1	280	1	280	1	1	280	62.5
m-Xylene	12600	1	12600	1	12600	1	1	12600	106.16
o+p-Xylene	3630	1	3630	1	3630	1	1	3630	106.16
Total Non-methane HC [2]	7926000	3524	7926000	3524	7926000	3524	3524	7926000	16.04

Flare exhaust gas (dscfm)		31,185		31,185		31,185	
LFG Flow rate (dscfm)	2166		2166		2166		
Temperature (°F)		1500		1500		1500	1500
Flare Stack Information							

Calculated Emissions			
2021 Emissions (g/s)		2032 Emissions (g/s)	
Flare	Fugitive LFG	Flare	Fugitive LFG
3.48E-05	8.60E-03	1.81E-04	4.56E-02
3.19E-07	9.94E-04	1.66E-06	5.27E-03
9.68E-07	1.88E-04	5.04E-06	9.99E-04
5.74E-07	1.41E-04	2.99E-06	7.48E-04
1.50E-06	3.48E-04	7.80E-06	1.84E-03
5.05E-07	1.24E-04	2.63E-06	6.58E-04
5.05E-07	1.56E-04	2.63E-06	8.26E-04
4.94E-07	1.22E-04	2.57E-06	6.44E-04
5.34E-07	2.16E-04	2.78E-06	1.14E-03
9.58E-07	2.35E-04	4.99E-06	1.25E-03
6.77E-07	3.59E-04	3.52E-06	1.90E-03
6.28E-07	1.69E-04	3.27E-06	8.94E-04
9.88E-07	9.45E-03	5.14E-06	5.01E-02
5.44E-07	1.46E-04	2.83E-06	7.76E-04
5.36E-07	1.44E-04	2.79E-06	7.64E-04
4.87E-07	1.31E-04	2.53E-06	6.94E-04
3.19E-07	6.85E-05	1.66E-06	3.63E-04
5.41E-07	5.24E-03	2.82E-06	2.78E-02
5.41E-07	1.51E-03	2.82E-06	8.00E-03
2.88E-04	4.98E-01	1.50E-03	2.64E+00

Chiquita Canyon Landfill EIR

Operation Emissions - Proposed Project Flare Emissions

D (feet)	12
H (feet)	50

Stack height and diameter are confirmed based on source test report.

[1] Reference: Source test report Horizon Air Measurement Services, INC Test # C33-013-FR, Report February 16, 2012. CCL Compliance Test on Landfill Gas Flare #2. Prepared for the SCAQMD. Initial test 1/5/2012, re-test for PM only on 2/2/12.
[2] Total Non-Methane Hydrocarbons (ROG) measured as methane equivalent per source test report, so MW of methane used to represent MW of TNMHC.

Calculation: ppm_act / 24 (L/mol)* MW (g/mol) * Tstp/Tact * Qact (ft3/m)
Calculation: ppmv = ul/L
MV/24.45 (L/mol)*ppb/1000 = ug
V2 = V1P1/P2*T2/T1
1 uL = 35.32 ft^3
g/s = ppb/24.45*Ts/T1*MW*Q/60/35.32/1000000

Chiquita Canyon Landfill EIR

Operation Emissions - Proposed Project Flare Emissions

Assumptions:

The operating schedule is based Golder Associates 4/11 LFG report. 2021: 1 New (3rd) flare will be added. 2030: 4th flare added (2030 emissions = 2032 emissions)
Flare and LFG emissions are based on existing source test data from 1/5/12 (CCL meeting, 3/29/12) [1]
Gas flow rate data provided by Golder Associates (04/2011) using EPA's LandGEM Model version 3.02 (Table 2 and Attachment A Results table).
Annual LFG recovery rate is 85% based on data provided by Golder Associates (04/2011) using EPA's LandGEM Model version 3.02..
Emissions for the new flares would be the same as the existing flares.
Year 2032 LFG generation is used to represent 2030 LFG generation. Although the second flare would be in operation in 2030, the maximum LFG flow rate during operation of the landfill would occur in 2032.

Year	Landfill Gas Generation (scfm)	Fugitive Emissions (scfm)	New Flare (scfm)	Existing Flare Capacity (SCFM):
2021	9353		1353	8000
2030	14097		6097	
2032	15040		7040	
	14945			
	424			
Control Efficiency of Flares	85%		Fugitive LFG Emission Rate	15%

	Source Test Data [1]						Average Flare	Average Landfill	MW
	Run 1		Run 2		Run 3				
	LFG-inlet	Flare outlet	LFG-inlet	Flare outlet	LFG-inlet	Flare outlet			
	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	g/g-mole
Hydrogen sulfide	64400	200	64400	200	64400	200	200	64400	34.08
Benzene	3250	0.8	3250	0.8	3250	0.8	0.8	3250	78.11
Benzylchloride	380	1.5	380	1.5	380	1.5	1.5	380	126.58
Chlorobenzene	320	1	320	1	320	1	1	320	112.56
Dichlorobenzene	604	2	604	2	604	2	2	604	147
1,1-Dichloroethane	320	1	320	1	320	1	1	320	98.97
1,2-Dichloroethane	402	1	402	1	402	1	1	402	98.96
1,1-Dichloroethylene	320	1	320	1	320	1	1	320	96.94
Dichloromethane	648	1	648	1.2	648	1.5	1.2	648	84.94
1,2-dibromoethane	320	1	320	1	320	1	1	320	187.86
Perchloroethene	553	0.8	553	0.8	553	0.8	0.8	553	165.83
Carbon tetrachloride	280	0.8	280	0.8	280	0.8	0.8	280	153.82
Toluene	26200	1	26200	2.48	26200	2.83	2.1	26200	92.13
1,1,1-trichloroethane	280	0.8	280	0.8	280	0.8	0.8	280	133.4
Trichloroethene	280	0.8	280	0.8	280	0.8	0.8	280	131.4
Chloroform	280	0.8	280	0.8	280	0.8	0.8	280	119.38
Vinyl chloride	280	1	280	1	280	1	1	280	62.5
m-Xylene	12600	1	12600	1	12600	1	1	12600	106.16
o+p-Xylene	3630	1	3630	1	3630	1	1	3630	106.16
Total Non-methane HC [2]	7926000	3524	7926000	3524	7926000	3524	3524	7926000	16.04

Calculated Emissions			
2021 Emissions (g/s)		2032 Emissions (g/s)	
Flare	Fugitive LFG	Flare	Fugitive LFG
3.48E-05	8.60E-03	1.81E-04	4.56E-02
3.19E-07	9.94E-04	1.66E-06	5.27E-03
9.68E-07	1.88E-04	5.04E-06	9.99E-04
5.74E-07	1.41E-04	2.99E-06	7.48E-04
1.50E-06	3.48E-04	7.80E-06	1.84E-03
5.05E-07	1.24E-04	2.63E-06	6.58E-04
5.05E-07	1.56E-04	2.63E-06	8.26E-04
4.94E-07	1.22E-04	2.57E-06	6.44E-04
5.34E-07	2.16E-04	2.78E-06	1.14E-03
9.58E-07	2.35E-04	4.99E-06	1.25E-03
6.77E-07	3.59E-04	3.52E-06	1.90E-03
6.28E-07	1.69E-04	3.27E-06	8.94E-04
9.88E-07	9.45E-03	5.14E-06	5.01E-02
5.44E-07	1.46E-04	2.83E-06	7.76E-04
5.36E-07	1.44E-04	2.79E-06	7.64E-04
4.87E-07	1.31E-04	2.53E-06	6.94E-04
3.19E-07	6.85E-05	1.66E-06	3.63E-04
5.41E-07	5.24E-03	2.82E-06	2.78E-02
5.41E-07	1.51E-03	2.82E-06	8.00E-03
2.88E-04	4.98E-01	1.50E-03	2.64E+00

Flare exhaust gas (dscfm)		31,185		31,185		31,185	
LFG Flow rate (dscfm)	2166		2166		2166		
Temperature (°F)		1500		1500		1500	1500
Flare Stack Information							

Chiquita Canyon Landfill EIR

Operation Emissions - Proposed Project Flare Emissions

D (feet)	12
H (feet)	50

Stack height and diameter are confirmed based on source test report.

[1] Reference: Source test report Horizon Air Measurement Services, INC Test # C33-013-FR, Report February 16, 2012. CCL Compliance Test on Landfill Gas Flare #2. Prepared for the SCAQMD. Initial test 1/5/2012, re-test for PM only on 2/2/12.
[2] Total Non-Methane Hydrocarbons (ROG) measured as methane equivalent per source test report, so MW of methane used to represent MW of TNMHC.

Calculation: ppm_act / 24 (L/mol)* MW (g/mol) * Tstp/Tact * Qact (ft^3/m)
Calculation: ppmv = µl/L
MV/24.45 (L/mol)*ppb/1000 = µg
V2 = V1P1/P2*T2/T1 µ
1 µL = 35.32 ft^3
g/s = ppb/24.45*Ts/T1*MW*Q/60/35.32/1000000

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Construction

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2014	2014Arial Lifts	Arial Lifts	34	0.1877	0.2473	0.0483	0.0004	0.0048	0.0044	34.7	2
2014	2014Air Compressors	Air Compressors	78	0.3313	0.3453	0.0842	0.0007	0.0074	0.0068	63.6	4
2014	2014Bore/Drill Rigs	Bore/Drill Rigs	82	0.5030	0.3630	0.0729	0.0017	0.0078	0.0071	165	4
2014	2014Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0420	0.0667	0.0089	0.0001	0.0017	0.0016	7.2	1
2014	2014Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.4031	0.3585	0.0917	0.0007	0.0077	0.0071	58.5	4
2014	2014Cranes	Cranes	208	0.4553	0.7898	0.1276	0.0014	0.0099	0.0091	129	6
2014	2014Crawler Tractors	Crawler Tractors	82	0.5767	0.3630	0.1499	0.0013	0.0078	0.0071	114	4
2014	2014Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6651	0.3763	0.1597	0.0015	0.0080	0.0074	132	4
2014	2014Dumpers/Tenders	Dumpers/Tenders	16	0.0317	0.1185	0.0095	0.0001	0.0031	0.0029	7.6	1
2014	2014Excavators	Excavators	157	0.5289	0.5961	0.1143	0.0013	0.0109	0.0100	120.0	5
2014	2014Forklifts	Forklifts	149	0.2215	0.5657	0.0497	0.0006	0.0104	0.0095	54.4	5
2014	2014Generator Sets	Generator Sets	84	0.2974	0.3718	0.0702	0.0007	0.0080	0.0073	61.0	4
2014	2014Graders	Graders	162	0.5987	0.6151	0.1362	0.0015	0.0113	0.0104	133	5
2014	2014Off-Highway Tractors	Off-Highway Tractors	160	0.7438	0.6075	0.1986	0.0017	0.0111	0.0102	151	5
2014	2014Off-Highway Trucks	Off-Highway Trucks	381	0.6148	1.4466	0.2034	0.0027	0.0181	0.0166	260	6
2014	2014Other Construction Equipment	Other Construction Equipment	327	0.3697	1.2416	0.0820	0.0013	0.0155	0.0143	123	6
2014	2014Other General Industrial Equipm	Other General Industrial Equipment	150	0.4985	0.5695	0.1448	0.0016	0.0104	0.0096	152	5
2014	2014Other Material Handling Equipm	Other Material Handling Equipment	196	0.4814	0.7442	0.1381	0.0015	0.0093	0.0086	141	6
2014	2014Pavers	Pavers	89	0.5277	0.3940	0.1429	0.0009	0.0084	0.0078	77.9	4
2014	2014Paving Equipment	Paving Equipment	82	0.4273	0.3630	0.1082	0.0008	0.0078	0.0071	68.9	4
2014	2014Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0015	0.0014	4.3	1
2014	2014Pressure Washers	Pressure Washers	13	0.0603	0.0963	0.0145	0.0001	0.0025	0.0023	9.4	1
2014	2014Pumps	Pumps	84	0.2873	0.3718	0.0683	0.0006	0.0080	0.0073	49.6	4
2014	2014Rollers	Rollers	84	0.4018	0.3718	0.0912	0.0008	0.0080	0.0073	67.1	4
2014	2014Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4608	0.3674	0.0929	0.0008	0.0079	0.0072	70.3	4
2014	2014Rubber Tired Dozers	Rubber Tired Dozers	358	1.1058	1.3593	0.2854	0.0025	0.0170	0.0156	239	6
2014	2014Rubber Tired Loaders	Rubber Tired Loaders	87	0.4683	0.3851	0.1122	0.0012	0.0082	0.0076	109	4
2014	2014Scrapers	Scrapers	356	0.9890	1.3517	0.2648	0.0027	0.0169	0.0155	262	6
2014	2014Signal Boards	Signal Boards	6	0.0929	0.0444	0.0181	0.0002	0.0012	0.0011	16.7	1
2014	2014Skid Steer Loaders	Skid Steer Loaders	37	0.2262	0.2691	0.0406	0.0004	0.0053	0.0048	30.3	2
2014	2014Surfacing Equipment	Surfacing Equipment	392	0.4930	1.4884	0.1194	0.0017	0.0186	0.0171	166	6
2014	2014Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.5086	0.3895	0.1029	0.0009	0.0083	0.0077	78.5	4
2014	2014Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3747	0.3320	0.0728	0.0008	0.0071	0.0065	66.8	4
2014	2014Trenchers	Trenchers	69	0.4606	0.5019	0.1350	0.0007	0.0065	0.0060	58.7	3
2014	2014Welders	Welders	46	0.2041	0.3346	0.0589	0.0003	0.0065	0.0060	25.6	2
2015	2015Arial Lifts	Arial Lifts	34	0.1837	0.2443	0.0439	0.0004	0.0047	0.0043	34.7	2
2015	2015Air Compressors	Air Compressors	78	0.3257	0.3347	0.0773	0.0007	0.0072	0.0066	63.6	4
2015	2015Bore/Drill Rigs	Bore/Drill Rigs	82	0.5022	0.3519	0.0673	0.0017	0.0075	0.0069	165	4
2015	2015Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0419	0.0667	0.0088	0.0001	0.0017	0.0016	7.2	1
2015	2015Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3982	0.3476	0.0835	0.0007	0.0074	0.0068	58.5	4
2015	2015Cranes	Cranes	208	0.4395	0.7660	0.1204	0.0014	0.0096	0.0088	129	6
2015	2015Crawler Tractors	Crawler Tractors	82	0.5650	0.3519	0.1415	0.0013	0.0075	0.0069	114	4
2015	2015Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6549	0.3647	0.1465	0.0015	0.0078	0.0072	132	4
2015	2015Dumpers/Tenders	Dumpers/Tenders	16	0.0315	0.1185	0.0093	0.0001	0.0030	0.0028	7.6	1
2015	2015Excavators	Excavators	157	0.5248	0.5782	0.1064	0.0013	0.0106	0.0097	120	5
2015	2015Forklifts	Forklifts	149	0.2200	0.5487	0.0459	0.0006	0.0100	0.0092	54.4	5
2015	2015Generator Sets	Generator Sets	84	0.2913	0.3605	0.0640	0.0007	0.0077	0.0071	61.0	4
2015	2015Graders	Graders	162	0.5931	0.5966	0.1277	0.0015	0.0109	0.0100	133	5
2015	2015Off-Highway Tractors	Off-Highway Tractors	160	0.7244	0.5892	0.1893	0.0017	0.0108	0.0099	151	5

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Construction

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2015	2015Off-Highway Trucks	Off-Highway Trucks	381	0.5974	1.4031	0.1924	0.0027	0.0175	0.0161	260	6
2015	2015Other Construction Equipment	Other Construction Equipment	327	0.3645	1.2042	0.0768	0.0013	0.0151	0.0138	123	6
2015	2015Other General Industrial Equipm	Other General Industrial Equipment	150	0.4843	0.5524	0.1355	0.0016	0.0101	0.0093	152	5
2015	2015Other Material Handling Equipm	Other Material Handling Equipment	196	0.4698	0.7218	0.1289	0.0015	0.0090	0.0083	141	6
2015	2015Pavers	Pavers	89	0.5203	0.3819	0.1347	0.0009	0.0082	0.0075	77.9	4
2015	2015Paving Equipment	Paving Equipment	82	0.4234	0.3519	0.1023	0.0008	0.0075	0.0069	68.9	4
2015	2015Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0015	0.0014	4.3	1
2015	2015Pressure Washers	Pressure Washers	13	0.0590	0.0963	0.0133	0.0001	0.0025	0.0023	9.4	1
2015	2015Pumps	Pumps	84	0.2825	0.3605	0.0621	0.0006	0.0077	0.0071	49.6	4
2015	2015Rollers	Rollers	84	0.3979	0.3605	0.0851	0.0008	0.0077	0.0071	67.0	4
2015	2015Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4577	0.3562	0.0850	0.0008	0.0076	0.0070	70.3	4
2015	2015Rubber Tired Dozers	Rubber Tired Dozers	358	1.0420	1.3184	0.2721	0.0025	0.0165	0.0152	239	6
2015	2015Rubber Tired Loaders	Rubber Tired Loaders	87	0.4615	0.3733	0.1050	0.0012	0.0080	0.0073	109	4
2015	2015Scrapers	Scrapers	356	0.9443	1.3110	0.2513	0.0027	0.0164	0.0151	262	6
2015	2015Signal Boards	Signal Boards	6	0.0925	0.0444	0.0171	0.0002	0.0011	0.0011	16.7	1
2015	2015Skid Steer Loaders	Skid Steer Loaders	37	0.2220	0.2659	0.0352	0.0004	0.0051	0.0047	30.3	2
2015	2015Surfacing Equipment	Surfacing Equipment	392	0.4705	1.4436	0.1116	0.0017	0.0180	0.0166	166	6
2015	2015Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.5034	0.3776	0.0913	0.0009	0.0081	0.0074	78.5	4
2015	2015Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3716	0.3218	0.0666	0.0008	0.0069	0.0063	66.8	4
2015	2015Trenchers	Trenchers	69	0.4541	0.4958	0.1274	0.0007	0.0063	0.0058	58.7	3
2015	2015Welders	Welders	46	0.1994	0.3305	0.0534	0.0003	0.0063	0.0058	25.6	2
2016	2016Arial Lifts	Arial Lifts	34	0.1800	0.2443	0.0397	0.0004	0.0047	0.0043	34.7	2
2016	2016Air Compressors	Air Compressors	78	0.3207	0.3347	0.0704	0.0007	0.0072	0.0066	63.6	4
2016	2016Bore/Drill Rigs	Bore/Drill Rigs	82	0.5016	0.3519	0.0623	0.0017	0.0075	0.0069	165	4
2016	2016Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0418	0.0667	0.0088	0.0001	0.0017	0.0016	7.2	1
2016	2016Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3936	0.3476	0.0756	0.0007	0.0074	0.0068	58.5	4
2016	2016Cranes	Cranes	208	0.4263	0.7660	0.1137	0.0014	0.0096	0.0088	129	6
2016	2016Crawler Tractors	Crawler Tractors	82	0.5549	0.3519	0.1335	0.0013	0.0075	0.0069	114	4
2016	2016Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6461	0.3647	0.1337	0.0015	0.0078	0.0072	132	4
2016	2016Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0093	0.0001	0.0030	0.0028	7.6	1
2016	2016Excavators	Excavators	157	0.5213	0.5782	0.0988	0.0013	0.0106	0.0097	120	5
2016	2016Forklifts	Forklifts	149	0.2190	0.5487	0.0427	0.0006	0.0100	0.0092	54.4	5
2016	2016Generator Sets	Generator Sets	84	0.2862	0.3605	0.0581	0.0007	0.0077	0.0071	61.0	4
2016	2016Graders	Graders	162	0.5883	0.5966	0.1197	0.0015	0.0109	0.0100	133	5
2016	2016Off-Highway Tractors	Off-Highway Tractors	160	0.7067	0.5892	0.1803	0.0017	0.0108	0.0099	151	5
2016	2016Off-Highway Trucks	Off-Highway Trucks	381	0.5831	1.4031	0.1816	0.0027	0.0175	0.0161	260	6
2016	2016Other Construction Equipment	Other Construction Equipment	327	0.3602	1.2042	0.0720	0.0013	0.0151	0.0138	123	6
2016	2016Other General Industrial Equipm	Other General Industrial Equipment	150	0.4731	0.5524	0.1267	0.0016	0.0101	0.0093	152	5
2016	2016Other Material Handling Equipm	Other Material Handling Equipment	196	0.4608	0.7218	0.1202	0.0015	0.0090	0.0083	141	6
2016	2016Pavers	Pavers	89	0.5135	0.3819	0.1269	0.0009	0.0082	0.0075	77.9	4
2016	2016Paving Equipment	Paving Equipment	82	0.4198	0.3519	0.0965	0.0008	0.0075	0.0069	68.9	4
2016	2016Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0015	0.0014	4.3	1
2016	2016Pressure Washers	Pressure Washers	13	0.0579	0.0963	0.0121	0.0001	0.0025	0.0023	9.4	1
2016	2016Pumps	Pumps	84	0.2785	0.3605	0.0562	0.0006	0.0077	0.0071	49.6	4
2016	2016Rollers	Rollers	84	0.3944	0.3605	0.0792	0.0008	0.0077	0.0071	67.0	4
2016	2016Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4549	0.3562	0.0775	0.0008	0.0076	0.0070	70.3	4
2016	2016Rubber Tired Dozers	Rubber Tired Dozers	358	0.9834	1.3184	0.2591	0.0025	0.0165	0.0152	239	6
2016	2016Rubber Tired Loaders	Rubber Tired Loaders	87	0.4557	0.3733	0.0983	0.0012	0.0080	0.0073	109	4
2016	2016Scrapers	Scrapers	356	0.9053	1.3110	0.2383	0.0027	0.0164	0.0151	262	6

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Construction

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2016	2016Signal Boards	Signal Boards	6	0.0921	0.0444	0.0161	0.0002	0.0011	0.0011	16.7	1
2016	2016Skid Steer Loaders	Skid Steer Loaders	37	0.2184	0.2659	0.0305	0.0004	0.0051	0.0047	30.3	2
2016	2016Surfacing Equipment	Surfacing Equipment	392	0.4506	1.4436	0.1045	0.0017	0.0180	0.0166	166	6
2016	2016Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4988	0.3776	0.0810	0.0009	0.0081	0.0074	78.5	4
2016	2016Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3689	0.3218	0.0610	0.0008	0.0069	0.0063	66.8	4
2016	2016Trenchers	Trenchers	69	0.4479	0.4958	0.1200	0.0007	0.0063	0.0058	58.7	3
2016	2016Welders	Welders	46	0.1951	0.3305	0.0482	0.0003	0.0063	0.0058	25.6	2
2017	2017Arial Lifts	Arial Lifts	34	0.1768	0.2443	0.0358	0.0004	0.0047	0.0043		2
2017	2017Air Compressors	Air Compressors	78	0.3165	0.3347	0.0641	0.0007	0.0072	0.0066		4
2017	2017Bore/Drill Rigs	Bore/Drill Rigs	82	0.5013	0.3519	0.0578	0.0017	0.0075	0.0069		4
2017	2017Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0417	0.0667	0.0087	0.0001	0.0017	0.0016		1
2017	2017Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3892	0.3476	0.0679	0.0007	0.0074	0.0068		4
2017	2017Cranes	Cranes	208	0.4152	0.7660	0.1073	0.0014	0.0096	0.0088		6
2017	2017Crawler Tractors	Crawler Tractors	82	0.5464	0.3519	0.1258	0.0013	0.0075	0.0069		4
2017	2017Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6388	0.3647	0.1219	0.0015	0.0078	0.0072		4
2017	2017Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0030	0.0028		1
2017	2017Excavators	Excavators	157	0.5184	0.5782	0.0916	0.0013	0.0106	0.0097		5
2017	2017Forklifts	Forklifts	149	0.2181	0.5487	0.0399	0.0006	0.0100	0.0092		5
2017	2017Generator Sets	Generator Sets	84	0.2821	0.3605	0.0527	0.0007	0.0077	0.0071		4
2017	2017Graders	Graders	162	0.5844	0.5966	0.1121	0.0015	0.0109	0.0100		5
2017	2017Off-Highway Tractors	Off-Highway Tractors	160	0.6906	0.5892	0.1716	0.0017	0.0108	0.0099		5
2017	2017Off-Highway Trucks	Off-Highway Trucks	381	0.5722	1.4031	0.1712	0.0027	0.0175	0.0161		6
2017	2017Other Construction Equipment	Other Construction Equipment	327	0.3568	1.2042	0.0675	0.0013	0.0151	0.0138		6
2017	2017Other General Industrial Equipm	Other General Industrial Equipment	150	0.4650	0.5524	0.1187	0.0016	0.0101	0.0093		5
2017	2017Other Material Handling Equipm	Other Material Handling Equipment	196	0.4544	0.7218	0.1123	0.0015	0.0090	0.0083		6
2017	2017Pavers	Pavers	89	0.5073	0.3819	0.1193	0.0009	0.0082	0.0075		4
2017	2017Paving Equipment	Paving Equipment	82	0.4165	0.3519	0.0910	0.0008	0.0075	0.0069		4
2017	2017Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0015	0.0014		1
2017	2017Pressure Washers	Pressure Washers	13	0.0570	0.0963	0.0111	0.0001	0.0025	0.0023		1
2017	2017Pumps	Pumps	84	0.2751	0.3605	0.0508	0.0006	0.0077	0.0071		4
2017	2017Rollers	Rollers	84	0.3913	0.3605	0.0736	0.0008	0.0077	0.0071		4
2017	2017Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4522	0.3562	0.0704	0.0008	0.0076	0.0070		4
2017	2017Rubber Tired Dozers	Rubber Tired Dozers	358	0.9300	1.3184	0.2465	0.0025	0.0165	0.0152		6
2017	2017Rubber Tired Loaders	Rubber Tired Loaders	87	0.4510	0.3733	0.0920	0.0012	0.0080	0.0073		4
2017	2017Scrapers	Scrapers	356	0.8713	1.3110	0.2257	0.0027	0.0164	0.0151		6
2017	2017Signal Boards	Signal Boards	6	0.0918	0.0444	0.0151	0.0002	0.0011	0.0011		1
2017	2017Skid Steer Loaders	Skid Steer Loaders	37	0.2161	0.2659	0.0274	0.0004	0.0051	0.0047		2
2017	2017Surfacing Equipment	Surfacing Equipment	392	0.4333	1.4436	0.0981	0.0017	0.0180	0.0166		6
2017	2017Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4962	0.3776	0.0737	0.0009	0.0081	0.0074		4
2017	2017Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3666	0.3218	0.0559	0.0008	0.0069	0.0063		4
2017	2017Trenchers	Trenchers	69	0.4422	0.4958	0.1129	0.0007	0.0063	0.0058		3
2017	2017Welders	Welders	46	0.1912	0.3305	0.0434	0.0003	0.0063	0.0058		2
2018	2018Arial Lifts	Arial Lifts	34	0.1740	0.2424	0.0322	0.0004	0.0046	0.0042		2
2018	2018Air Compressors	Air Compressors	78	0.3130	0.3281	0.0582	0.0007	0.0070	0.0064		4
2018	2018Bore/Drill Rigs	Bore/Drill Rigs	82	0.5011	0.3449	0.0539	0.0017	0.0074	0.0068		4
2018	2018Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0416	0.0667	0.0087	0.0001	0.0017	0.0016		1
2018	2018Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3850	0.3407	0.0605	0.0007	0.0073	0.0067		4
2018	2018Cranes	Cranes	208	0.4060	0.7511	0.1012	0.0014	0.0094	0.0086		6
2018	2018Crawler Tractors	Crawler Tractors	82	0.5387	0.3449	0.1185	0.0013	0.0074	0.0068		4

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Construction

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2018	2018Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6328	0.3575	0.1109	0.0015	0.0076	0.0070		4
2018	2018Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0030	0.0028		1
2018	2018Excavators	Excavators	157	0.5160	0.5670	0.0848	0.0013	0.0104	0.0095		5
2018	2018Forklifts	Forklifts	149	0.2173	0.5381	0.0372	0.0006	0.0098	0.0090		5
2018	2018Generator Sets	Generator Sets	84	0.2786	0.3533	0.0477	0.0007	0.0075	0.0069		4
2018	2018Graders	Graders	162	0.5812	0.5850	0.1049	0.0015	0.0107	0.0098		5
2018	2018Off-Highway Tractors	Off-Highway Tractors	160	0.6762	0.5778	0.1631	0.0017	0.0106	0.0097		5
2018	2018Off-Highway Trucks	Off-Highway Trucks	381	0.5634	1.3759	0.1613	0.0027	0.0172	0.0158		6
2018	2018Other Construction Equipment	Other Construction Equipment	327	0.3542	1.1809	0.0633	0.0013	0.0148	0.0136		6
2018	2018Other General Industrial Equipm	Other General Industrial Equipment	150	0.4591	0.5417	0.1113	0.0016	0.0099	0.0091		5
2018	2018Other Material Handling Equipm	Other Material Handling Equipment	196	0.4495	0.7078	0.1050	0.0015	0.0088	0.0081		6
2018	2018Pavers	Pavers	89	0.5017	0.3744	0.1121	0.0009	0.0080	0.0074		4
2018	2018Paving Equipment	Paving Equipment	82	0.4136	0.3449	0.0857	0.0008	0.0074	0.0068		4
2018	2018Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0015	0.0014		1
2018	2018Pressure Washers	Pressure Washers	13	0.0562	0.0963	0.0101	0.0001	0.0025	0.0023		1
2018	2018Pumps	Pumps	84	0.2722	0.3533	0.0458	0.0006	0.0075	0.0069		4
2018	2018Rollers	Rollers	84	0.3885	0.3533	0.0683	0.0008	0.0075	0.0069		4
2018	2018Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4499	0.3491	0.0638	0.0008	0.0075	0.0069		4
2018	2018Rubber Tired Dozers	Rubber Tired Dozers	358	0.8819	1.2928	0.2343	0.0025	0.0162	0.0149		6
2018	2018Rubber Tired Loaders	Rubber Tired Loaders	87	0.4470	0.3660	0.0861	0.0012	0.0078	0.0072		4
2018	2018Scrapers	Scrapers	356	0.8418	1.2856	0.2135	0.0027	0.0161	0.0148		6
2018	2018Signal Boards	Signal Boards	6	0.0916	0.0444	0.0143	0.0002	0.0011	0.0010		1
2018	2018Skid Steer Loaders	Skid Steer Loaders	37	0.2146	0.2638	0.0253	0.0004	0.0050	0.0046		2
2018	2018Surfacing Equipment	Surfacing Equipment	392	0.4187	1.4156	0.0923	0.0017	0.0177	0.0163		6
2018	2018Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4946	0.3702	0.0681	0.0009	0.0079	0.0073		4
2018	2018Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3647	0.3155	0.0513	0.0008	0.0067	0.0062		4
2018	2018Trenchers	Trenchers	69	0.4368	0.4920	0.1061	0.0007	0.0062	0.0057		3
2018	2018Welders	Welders	46	0.1876	0.3280	0.0388	0.0003	0.0062	0.0057		2
2019	2019Arial Lifts	Arial Lifts	34	0.1715	0.2424	0.0288	0.0004	0.0046	0.0042		2
2019	2019Air Compressors	Air Compressors	78	0.3100	0.3281	0.0526	0.0007	0.0070	0.0064		4
2019	2019Bore/Drill Rigs	Bore/Drill Rigs	82	0.5009	0.3449	0.0506	0.0017	0.0074	0.0068		4
2019	2019Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0416	0.0667	0.0086	0.0001	0.0017	0.0016		1
2019	2019Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3812	0.3407	0.0536	0.0007	0.0073	0.0067		4
2019	2019Cranes	Cranes	208	0.3982	0.7511	0.0954	0.0014	0.0094	0.0086		6
2019	2019Crawler Tractors	Crawler Tractors	82	0.5319	0.3449	0.1115	0.0013	0.0074	0.0068		4
2019	2019Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6280	0.3575	0.1011	0.0015	0.0076	0.0070		4
2019	2019Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0030	0.0028		1
2019	2019Excavators	Excavators	157	0.5140	0.5670	0.0787	0.0013	0.0104	0.0095		5
2019	2019Forklifts	Forklifts	149	0.2166	0.5381	0.0345	0.0006	0.0098	0.0090		5
2019	2019Generator Sets	Generator Sets	84	0.2755	0.3533	0.0431	0.0007	0.0075	0.0069		4
2019	2019Graders	Graders	162	0.5787	0.5850	0.0982	0.0015	0.0107	0.0098		5
2019	2019Off-Highway Tractors	Off-Highway Tractors	160	0.6634	0.5778	0.1549	0.0017	0.0106	0.0097		5
2019	2019Off-Highway Trucks	Off-Highway Trucks	381	0.5565	1.3759	0.1524	0.0027	0.0172	0.0158		6
2019	2019Other Construction Equipment	Other Construction Equipment	327	0.3522	1.1809	0.0596	0.0013	0.0148	0.0136		6
2019	2019Other General Industrial Equipm	Other General Industrial Equipment	150	0.4549	0.5417	0.1044	0.0016	0.0099	0.0091		5
2019	2019Other Material Handling Equipm	Other Material Handling Equipment	196	0.4458	0.7078	0.0983	0.0015	0.0088	0.0081		6
2019	2019Pavers	Pavers	89	0.4966	0.3744	0.1053	0.0009	0.0080	0.0074		4
2019	2019Paving Equipment	Paving Equipment	82	0.4109	0.3449	0.0806	0.0008	0.0074	0.0068		4
2019	2019Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0015	0.0014		1

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Construction

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2019	2019Pressure Washers	Pressure Washers	13	0.0554	0.0963	0.0092	0.0001	0.0025	0.0023		1
2019	2019Pumps	Pumps	84	0.2695	0.3533	0.0412	0.0006	0.0075	0.0069		4
2019	2019Rollers	Rollers	84	0.3859	0.3533	0.0632	0.0008	0.0075	0.0069		4
2019	2019Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4479	0.3491	0.0579	0.0008	0.0075	0.0069		4
2019	2019Rubber Tired Dozers	Rubber Tired Dozers	358	0.8388	1.2928	0.2227	0.0025	0.0162	0.0149		6
2019	2019Rubber Tired Loaders	Rubber Tired Loaders	87	0.4436	0.3660	0.0805	0.0012	0.0078	0.0072		4
2019	2019Scrapers	Scrapers	356	0.8161	1.2856	0.2021	0.0027	0.0161	0.0148		6
2019	2019Signal Boards	Signal Boards	6	0.0913	0.0444	0.0135	0.0002	0.0011	0.0010		1
2019	2019Skid Steer Loaders	Skid Steer Loaders	37	0.2134	0.2638	0.0236	0.0004	0.0050	0.0046		2
2019	2019Surfacing Equipment	Surfacing Equipment	392	0.4061	1.4156	0.0871	0.0017	0.0177	0.0163		6
2019	2019Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4933	0.3702	0.0632	0.0009	0.0079	0.0073		4
2019	2019Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3630	0.3155	0.0472	0.0008	0.0067	0.0062		4
2019	2019Trenchers	Trenchers	69	0.4317	0.4920	0.0995	0.0007	0.0062	0.0057		3
2019	2019Welders	Welders	46	0.1843	0.3280	0.0344	0.0003	0.0062	0.0057		2
2020	2020Arial Lifts	Arial Lifts	34	0.1696	0.2424	0.0261	0.0004	0.0046	0.0042		2
2020	2020Air Compressors	Air Compressors	78	0.3077	0.3281	0.0483	0.0007	0.0070	0.0064		4
2020	2020Bore/Drill Rigs	Bore/Drill Rigs	82	0.5008	0.3449	0.0480	0.0017	0.0074	0.0068		4
2020	2020Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0415	0.0667	0.0086	0.0001	0.0017	0.0016		1
2020	2020Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3783	0.3407	0.0484	0.0007	0.0073	0.0067		4
2020	2020Cranes	Cranes	208	0.3917	0.7511	0.0898	0.0014	0.0094	0.0086		6
2020	2020Crawler Tractors	Crawler Tractors	82	0.5260	0.3449	0.1049	0.0013	0.0074	0.0068		4
2020	2020Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6247	0.3575	0.0934	0.0015	0.0076	0.0070		4
2020	2020Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0030	0.0028		1
2020	2020Excavators	Excavators	157	0.5124	0.5670	0.0733	0.0013	0.0104	0.0095		5
2020	2020Forklifts	Forklifts	149	0.2160	0.5381	0.0320	0.0006	0.0098	0.0090		5
2020	2020Generator Sets	Generator Sets	84	0.2732	0.3533	0.0395	0.0007	0.0075	0.0069		4
2020	2020Graders	Graders	162	0.5765	0.5850	0.0919	0.0015	0.0107	0.0098		5
2020	2020Off-Highway Tractors	Off-Highway Tractors	160	0.6517	0.5778	0.1470	0.0017	0.0106	0.0097		5
2020	2020Off-Highway Trucks	Off-Highway Trucks	381	0.5514	1.3759	0.1443	0.0027	0.0172	0.0158		6
2020	2020Other Construction Equipment	Other Construction Equipment	327	0.3508	1.1809	0.0563	0.0013	0.0148	0.0136		6
2020	2020Other General Industrial Equipm	Other General Industrial Equipment	150	0.4517	0.5417	0.0983	0.0016	0.0099	0.0091		5
2020	2020Other Material Handling Equipm	Other Material Handling Equipment	196	0.4429	0.7078	0.0924	0.0015	0.0088	0.0081		6
2020	2020Pavers	Pavers	89	0.4920	0.3744	0.0989	0.0009	0.0080	0.0074		4
2020	2020Paving Equipment	Paving Equipment	82	0.4084	0.3449	0.0757	0.0008	0.0074	0.0068		4
2020	2020Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0015	0.0014		1
2020	2020Pressure Washers	Pressure Washers	13	0.0549	0.0963	0.0085	0.0001	0.0025	0.0023		1
2020	2020Pumps	Pumps	84	0.2674	0.3533	0.0376	0.0006	0.0075	0.0069		4
2020	2020Rollers	Rollers	84	0.3837	0.3533	0.0584	0.0008	0.0075	0.0069		4
2020	2020Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4464	0.3491	0.0533	0.0008	0.0075	0.0069		4
2020	2020Rubber Tired Dozers	Rubber Tired Dozers	358	0.8006	1.2928	0.2118	0.0025	0.0162	0.0149		6
2020	2020Rubber Tired Loaders	Rubber Tired Loaders	87	0.4406	0.3660	0.0753	0.0012	0.0078	0.0072		4
2020	2020Scrapers	Scrapers	356	0.7938	1.2856	0.1914	0.0027	0.0161	0.0148		6
2020	2020Signal Boards	Signal Boards	6	0.0912	0.0444	0.0129	0.0002	0.0011	0.0010		1
2020	2020Skid Steer Loaders	Skid Steer Loaders	37	0.2125	0.2638	0.0222	0.0004	0.0050	0.0046		2
2020	2020Surfacing Equipment	Surfacing Equipment	392	0.3953	1.4156	0.0823	0.0017	0.0177	0.0163		6
2020	2020Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4916	0.3702	0.0584	0.0009	0.0079	0.0073		4
2020	2020Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3616	0.3155	0.0436	0.0008	0.0067	0.0062		4
2020	2020Trenchers	Trenchers	69	0.4270	0.4920	0.0933	0.0007	0.0062	0.0057		3
2020	2020Welders	Welders	46	0.1816	0.3280	0.0310	0.0003	0.0062	0.0057		2

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Construction

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2021	2021Arial Lifts	Arial Lifts	34	0.1677	0.2424	0.0238	0.0004	0.0046	0.0042	34.7	2
2021	2021Air Compressors	Air Compressors	78	0.3051	0.3281	0.0442	0.0007	0.0070	0.0064	63.6	4
2021	2021Bore/Drill Rigs	Bore/Drill Rigs	82	0.5007	0.3449	0.0460	0.0017	0.0074	0.0068	165	4
2021	2021Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0415	0.0667	0.0086	0.0001	0.0017	0.0016	7.2	1
2021	2021Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3761	0.3407	0.0444	0.0007	0.0073	0.0067	58.5	4
2021	2021Cranes	Cranes	208	0.3865	0.7511	0.0846	0.0014	0.0094	0.0086	129	6
2021	2021Crawler Tractors	Crawler Tractors	82	0.5208	0.3449	0.0988	0.0013	0.0074	0.0068	114	4
2021	2021Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6224	0.3575	0.0872	0.0015	0.0076	0.0070	132	4
2021	2021Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0030	0.0028	7.6	1
2021	2021Excavators	Excavators	157	0.5113	0.5670	0.0687	0.0013	0.0104	0.0095	120	5
2021	2021Forklifts	Forklifts	149	0.2148	0.5381	0.0294	0.0006	0.0098	0.0090	54.4	5
2021	2021Generator Sets	Generator Sets	84	0.2708	0.3533	0.0363	0.0007	0.0075	0.0069	61.0	4
2021	2021Graders	Graders	162	0.5747	0.5850	0.0861	0.0015	0.0107	0.0098	133	5
2021	2021Off-Highway Tractors	Off-Highway Tractors	160	0.6413	0.5778	0.1394	0.0017	0.0106	0.0097	151	5
2021	2021Off-Highway Trucks	Off-Highway Trucks	381	0.5476	1.3759	0.1370	0.0027	0.0172	0.0158	260	6
2021	2021Other Construction Equipment	Other Construction Equipment	327	0.3497	1.1809	0.0534	0.0013	0.0148	0.0136	122	6
2021	2021Other General Industrial Equipm	Other General Industrial Equipment	150	0.4479	0.5417	0.0915	0.0016	0.0099	0.0091	152	5
2021	2021Other Material Handling Equipm	Other Material Handling Equipment	196	0.4392	0.7078	0.0860	0.0015	0.0088	0.0081	141	6
2021	2021Pavers	Pavers	89	0.4878	0.3744	0.0928	0.0009	0.0080	0.0074	77.9	4
2021	2021Paving Equipment	Paving Equipment	82	0.4062	0.3449	0.0710	0.0008	0.0074	0.0068	68.9	4
2021	2021Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0015	0.0014	4.3	1
2021	2021Pressure Washers	Pressure Washers	13	0.0543	0.0963	0.0079	0.0001	0.0025	0.0023	9.4	1
2021	2021Pumps	Pumps	84	0.2652	0.3533	0.0344	0.0006	0.0075	0.0069	49.6	4
2021	2021Rollers	Rollers	84	0.3816	0.3533	0.0540	0.0008	0.0075	0.0069	67.0	4
2021	2021Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4454	0.3491	0.0497	0.0008	0.0075	0.0069	70.3	4
2021	2021Rubber Tired Dozers	Rubber Tired Dozers	358	0.7661	1.2928	0.2015	0.0025	0.0162	0.0149	239	6
2021	2021Rubber Tired Loaders	Rubber Tired Loaders	87	0.4381	0.3660	0.0705	0.0012	0.0078	0.0072	109	4
2021	2021Scrapers	Scrapers	356	0.7745	1.2856	0.1815	0.0027	0.0161	0.0148	262	6
2021	2021Signal Boards	Signal Boards	6	0.0911	0.0444	0.0125	0.0002	0.0011	0.0010	16.7	1
2021	2021Skid Steer Loaders	Skid Steer Loaders	37	0.2119	0.2638	0.0212	0.0004	0.0050	0.0046	30.3	2
2021	2021Surfacing Equipment	Surfacing Equipment	392	0.3860	1.4156	0.0779	0.0017	0.0177	0.0163	166	6
2021	2021Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4882	0.3702	0.0536	0.0009	0.0079	0.0073	78.5	4
2021	2021Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3606	0.3155	0.0407	0.0008	0.0067	0.0062	66.8	4
2021	2021Trenchers	Trenchers	69	0.4226	0.4920	0.0874	0.0007	0.0062	0.0057	58.7	3
2021	2021Welders	Welders	46	0.1788	0.3280	0.0280	0.0003	0.0062	0.0057	25.6	2
2022	2022Arial Lifts	Arial Lifts	34	0.1667	0.2424	0.0222	0.0004	0.0046	0.0042		2
2022	2022Air Compressors	Air Compressors	78	0.3041	0.3281	0.0414	0.0007	0.0070	0.0064		4
2022	2022Bore/Drill Rigs	Bore/Drill Rigs	82	0.5007	0.3449	0.0446	0.0017	0.0074	0.0068		4
2022	2022Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0414	0.0667	0.0085	0.0001	0.0017	0.0016		1
2022	2022Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3743	0.3407	0.0411	0.0007	0.0073	0.0067		4
2022	2022Cranes	Cranes	208	0.3822	0.7511	0.0798	0.0014	0.0094	0.0086		6
2022	2022Crawler Tractors	Crawler Tractors	82	0.5163	0.3449	0.0931	0.0013	0.0074	0.0068		4
2022	2022Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6208	0.3575	0.0820	0.0015	0.0076	0.0070		4
2022	2022Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0030	0.0028		1
2022	2022Excavators	Excavators	157	0.5104	0.5670	0.0648	0.0013	0.0104	0.0095		5
2022	2022Forklifts	Forklifts	149	0.2146	0.5381	0.0274	0.0006	0.0098	0.0090		5
2022	2022Generator Sets	Generator Sets	84	0.2694	0.3533	0.0340	0.0007	0.0075	0.0069		4
2022	2022Graders	Graders	162	0.5732	0.5850	0.0807	0.0015	0.0107	0.0098		5
2022	2022Off-Highway Tractors	Off-Highway Tractors	160	0.6320	0.5778	0.1322	0.0017	0.0106	0.0097		5

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Construction

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2022	2022Off-Highway Trucks	Off-Highway Trucks	381	0.5447	1.3759	0.1303	0.0027	0.0172	0.0158		6
2022	2022Other Construction Equipment	Other Construction Equipment	327	0.3488	1.1809	0.0507	0.0013	0.0148	0.0136		6
2022	2022Other General Industrial Equipm	Other General Industrial Equipment	150	0.4464	0.5417	0.0867	0.0016	0.0099	0.0091		5
2022	2022Other Material Handling Equipm	Other Material Handling Equipment	196	0.4378	0.7078	0.0813	0.0015	0.0088	0.0081		6
2022	2022Pavers	Pavers	89	0.4840	0.3744	0.0870	0.0009	0.0080	0.0074		4
2022	2022Paving Equipment	Paving Equipment	82	0.4042	0.3449	0.0666	0.0008	0.0074	0.0068		4
2022	2022Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0015	0.0014		1
2022	2022Pressure Washers	Pressure Washers	13	0.0539	0.0963	0.0075	0.0001	0.0025	0.0023		1
2022	2022Pumps	Pumps	84	0.2640	0.3533	0.0322	0.0006	0.0075	0.0069		4
2022	2022Rollers	Rollers	84	0.3799	0.3533	0.0500	0.0008	0.0075	0.0069		4
2022	2022Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4445	0.3491	0.0467	0.0008	0.0075	0.0069		4
2022	2022Rubber Tired Dozers	Rubber Tired Dozers	358	0.7353	1.2928	0.1919	0.0025	0.0162	0.0149		6
2022	2022Rubber Tired Loaders	Rubber Tired Loaders	87	0.4359	0.3660	0.0661	0.0012	0.0078	0.0072		4
2022	2022Scrapers	Scrapers	356	0.7579	1.2856	0.1724	0.0027	0.0161	0.0148		6
2022	2022Signal Boards	Signal Boards	6	0.0910	0.0444	0.0121	0.0002	0.0011	0.0010		1
2022	2022Skid Steer Loaders	Skid Steer Loaders	37	0.2114	0.2638	0.0204	0.0004	0.0050	0.0046		2
2022	2022Surfacing Equipment	Surfacing Equipment	392	0.3778	1.4156	0.0739	0.0017	0.0177	0.0163		6
2022	2022Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4867	0.3702	0.0498	0.0009	0.0079	0.0073		4
2022	2022Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3599	0.3155	0.0384	0.0008	0.0067	0.0062		4
2022	2022Trenchers	Trenchers	69	0.4186	0.4920	0.0819	0.0007	0.0062	0.0057		3
2022	2022Welders	Welders	46	0.1773	0.3280	0.0260	0.0003	0.0062	0.0057		2
2023	2023Arial Lifts	Arial Lifts	34	0.1658	0.2424	0.0208	0.0004	0.0046	0.0042	34.7	2
2023	2023Air Compressors	Air Compressors	78	0.3035	0.3281	0.0390	0.0007	0.0070	0.0064	63.6	4
2023	2023Bore/Drill Rigs	Bore/Drill Rigs	82	0.5007	0.3449	0.0436	0.0017	0.0074	0.0068	165	4
2023	2023Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0414	0.0667	0.0085	0.0001	0.0017	0.0016	7.2	1
2023	2023Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3728	0.3407	0.0382	0.0007	0.0073	0.0067	58.5	4
2023	2023Cranes	Cranes	208	0.3786	0.7511	0.0754	0.0014	0.0094	0.0086	129	6
2023	2023Crawler Tractors	Crawler Tractors	82	0.5125	0.3449	0.0879	0.0013	0.0074	0.0068	114	4
2023	2023Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6199	0.3575	0.0773	0.0015	0.0076	0.0070	132	4
2023	2023Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0030	0.0028	7.6	1
2023	2023Excavators	Excavators	157	0.5097	0.5670	0.0615	0.0013	0.0104	0.0095	120	5
2023	2023Forklifts	Forklifts	149	0.2146	0.5381	0.0259	0.0006	0.0098	0.0090	54.4	5
2023	2023Generator Sets	Generator Sets	84	0.2683	0.3533	0.0321	0.0007	0.0075	0.0069	61.0	4
2023	2023Graders	Graders	162	0.5718	0.5850	0.0758	0.0015	0.0107	0.0098	133	5
2023	2023Off-Highway Tractors	Off-Highway Tractors	160	0.6238	0.5778	0.1255	0.0017	0.0106	0.0097	151	5
2023	2023Off-Highway Trucks	Off-Highway Trucks	381	0.5422	1.3759	0.1243	0.0027	0.0172	0.0158	260	6
2023	2023Other Construction Equipment	Other Construction Equipment	327	0.3482	1.1809	0.0483	0.0013	0.0148	0.0136	123	6
2023	2023Other General Industrial Equipm	Other General Industrial Equipment	150	0.4454	0.5417	0.0824	0.0016	0.0099	0.0091	152	5
2023	2023Other Material Handling Equipm	Other Material Handling Equipment	196	0.4369	0.7078	0.0771	0.0015	0.0088	0.0081	141	6
2023	2023Pavers	Pavers	89	0.4805	0.3744	0.0815	0.0009	0.0080	0.0074	77.9	4
2023	2023Paving Equipment	Paving Equipment	82	0.4024	0.3449	0.0624	0.0008	0.0074	0.0068	68.9	4
2023	2023Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0015	0.0014	4.3	1
2023	2023Pressure Washers	Pressure Washers	13	0.0536	0.0963	0.0072	0.0001	0.0025	0.0023	9.4	1
2023	2023Pumps	Pumps	84	0.2631	0.3533	0.0302	0.0006	0.0075	0.0069	49.6	4
2023	2023Rollers	Rollers	84	0.3784	0.3533	0.0465	0.0008	0.0075	0.0069	67.0	4
2023	2023Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4439	0.3491	0.0439	0.0008	0.0075	0.0069	70.3	4
2023	2023Rubber Tired Dozers	Rubber Tired Dozers	358	0.7078	1.2928	0.1830	0.0025	0.0162	0.0149	239	6
2023	2023Rubber Tired Loaders	Rubber Tired Loaders	87	0.4340	0.3660	0.0622	0.0012	0.0078	0.0072	109	4
2023	2023Scrapers	Scrapers	356	0.7432	1.2856	0.1641	0.0027	0.0161	0.0148	262	6

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Construction

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2023	2023Signal Boards	Signal Boards	6	0.0909	0.0444	0.0117	0.0002	0.0011	0.0010	16.7	1
2023	2023Skid Steer Loaders	Skid Steer Loaders	37	0.2110	0.2638	0.0196	0.0004	0.0050	0.0046	30.3	2
2023	2023Surfacing Equipment	Surfacing Equipment	392	0.3707	1.4156	0.0703	0.0017	0.0177	0.0163	166	6
2023	2023Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4855	0.3702	0.0464	0.0009	0.0079	0.0073	78.5	4
2023	2023Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3593	0.3155	0.0365	0.0008	0.0067	0.0062	66.8	4
2023	2023Trenchers	Trenchers	69	0.4150	0.4920	0.0767	0.0007	0.0062	0.0057	58.7	3
2023	2023Welders	Welders	46	0.1762	0.3280	0.0242	0.0003	0.0062	0.0057	25.6	2
2024	2024Arial Lifts	Arial Lifts	34	0.1652	0.2424	0.0195	0.0004	0.0046	0.0042	34.7	2
2024	2024Air Compressors	Air Compressors	78	0.3031	0.3281	0.0369	0.0007	0.0070	0.0064	63.6	4
2024	2024Bore/Drill Rigs	Bore/Drill Rigs	82	0.5007	0.3449	0.0431	0.0017	0.0074	0.0068	165	4
2024	2024Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0414	0.0667	0.0085	0.0001	0.0017	0.0016	7.2	1
2024	2024Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3716	0.3407	0.0358	0.0007	0.0073	0.0067	58.5	4
2024	2024Cranes	Cranes	208	0.3759	0.7511	0.0715	0.0014	0.0094	0.0086	129	6
2024	2024Crawler Tractors	Crawler Tractors	82	0.5092	0.3449	0.0832	0.0013	0.0074	0.0068	114	4
2024	2024Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6193	0.3575	0.0731	0.0015	0.0076	0.0070	132	4
2024	2024Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0030	0.0028	7.6	1
2024	2024Excavators	Excavators	157	0.5091	0.5670	0.0585	0.0013	0.0104	0.0095	120	5
2024	2024Forklifts	Forklifts	149	0.2146	0.5381	0.0246	0.0006	0.0098	0.0090	54.4	5
2024	2024Generator Sets	Generator Sets	84	0.2674	0.3533	0.0303	0.0007	0.0075	0.0069	61.0	4
2024	2024Graders	Graders	162	0.5706	0.5850	0.0714	0.0015	0.0107	0.0098	133	5
2024	2024Off-Highway Tractors	Off-Highway Tractors	160	0.6165	0.5778	0.1192	0.0017	0.0106	0.0097	151	5
2024	2024Off-Highway Trucks	Off-Highway Trucks	381	0.5401	1.3759	0.1189	0.0027	0.0172	0.0158	260	6
2024	2024Other Construction Equipment	Other Construction Equipment	327	0.3477	1.1809	0.0462	0.0013	0.0148	0.0136	123	6
2024	2024Other General Industrial Equipm	Other General Industrial Equipment	150	0.4446	0.5417	0.0784	0.0016	0.0099	0.0091	152	5
2024	2024Other Material Handling Equipm	Other Material Handling Equipment	196	0.4362	0.7078	0.0733	0.0015	0.0088	0.0081	141	6
2024	2024Pavers	Pavers	89	0.4773	0.3744	0.0764	0.0009	0.0080	0.0074	77.9	4
2024	2024Paving Equipment	Paving Equipment	82	0.4007	0.3449	0.0584	0.0008	0.0074	0.0068	68.9	4
2024	2024Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0015	0.0014	4.3	1
2024	2024Pressure Washers	Pressure Washers	13	0.0534	0.0963	0.0069	0.0001	0.0025	0.0023	9.4	1
2024	2024Pumps	Pumps	84	0.2624	0.3533	0.0285	0.0006	0.0075	0.0069	49.6	4
2024	2024Rollers	Rollers	84	0.3772	0.3533	0.0435	0.0008	0.0075	0.0069	67.0	4
2024	2024Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4433	0.3491	0.0416	0.0008	0.0075	0.0069	70.3	4
2024	2024Rubber Tired Dozers	Rubber Tired Dozers	358	0.6835	1.2928	0.1748	0.0025	0.0162	0.0149	239	6
2024	2024Rubber Tired Loaders	Rubber Tired Loaders	87	0.4324	0.3660	0.0588	0.0012	0.0078	0.0072	109	4
2024	2024Scrapers	Scrapers	356	0.7302	1.2856	0.1565	0.0027	0.0161	0.0148	262	6
2024	2024Signal Boards	Signal Boards	6	0.0909	0.0444	0.0114	0.0002	0.0011	0.0010	16.7	1
2024	2024Skid Steer Loaders	Skid Steer Loaders	37	0.2107	0.2638	0.0190	0.0004	0.0050	0.0046	30.3	2
2024	2024Surfacing Equipment	Surfacing Equipment	392	0.3644	1.4156	0.0669	0.0017	0.0177	0.0163	166	6
2024	2024Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4846	0.3702	0.0434	0.0009	0.0079	0.0073	78.5	4
2024	2024Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3589	0.3155	0.0349	0.0008	0.0067	0.0062	66.8	4
2024	2024Trenchers	Trenchers	69	0.4116	0.4920	0.0719	0.0007	0.0062	0.0057	58.7	3
2024	2024Welders	Welders	46	0.1753	0.3280	0.0227	0.0003	0.0062	0.0057	25.6	2
2025	2025Arial Lifts	Arial Lifts	34	0.1646	0.2424	0.0184	0.0004	0.0046	0.0042	34.7	2
2025	2025Air Compressors	Air Compressors	78	0.3027	0.3281	0.0349	0.0007	0.0070	0.0064	63.6	4
2025	2025Bore/Drill Rigs	Bore/Drill Rigs	82	0.5007	0.3449	0.0428	0.0017	0.0074	0.0068	165	4
2025	2025Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0414	0.0667	0.0085	0.0001	0.0017	0.0016	7.2	1
2025	2025Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3706	0.3407	0.0337	0.0007	0.0073	0.0067	58.5	4
2025	2025Cranes	Cranes	208	0.3738	0.7511	0.0681	0.0014	0.0094	0.0086	129	6
2025	2025Crawler Tractors	Crawler Tractors	82	0.5065	0.3449	0.0789	0.0013	0.0074	0.0068	114	4

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Construction

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2025	2025Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6187	0.3575	0.0693	0.0015	0.0076	0.0070	132	4
2025	2025Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0030	0.0028	7.6	1
2025	2025Excavators	Excavators	157	0.5086	0.5670	0.0559	0.0013	0.0104	0.0095	120	5
2025	2025Forklifts	Forklifts	149	0.2148	0.5381	0.0236	0.0006	0.0098	0.0090	54.4	5
2025	2025Generator Sets	Generator Sets	84	0.2667	0.3533	0.0288	0.0007	0.0075	0.0069	61.0	4
2025	2025Graders	Graders	162	0.5696	0.5850	0.0676	0.0015	0.0107	0.0098	133	5
2025	2025Off-Highway Tractors	Off-Highway Tractors	160	0.6101	0.5778	0.1134	0.0017	0.0106	0.0097	151	5
2025	2025Off-Highway Trucks	Off-Highway Trucks	381	0.5385	1.3759	0.1140	0.0027	0.0172	0.0158	260	6
2025	2025Other Construction Equipment	Other Construction Equipment	327	0.3474	1.1809	0.0442	0.0013	0.0148	0.0136	123	6
2025	2025Other General Industrial Equipm	Other General Industrial Equipment	150	0.4438	0.5417	0.0747	0.0016	0.0099	0.0091	152	5
2025	2025Other Material Handling Equipm	Other Material Handling Equipment	196	0.4355	0.7078	0.0696	0.0015	0.0088	0.0081	141	6
2025	2025Pavers	Pavers	89	0.4745	0.3744	0.0717	0.0009	0.0080	0.0074	77.9	4
2025	2025Paving Equipment	Paving Equipment	82	0.3993	0.3449	0.0548	0.0008	0.0074	0.0068	68.9	4
2025	2025Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0015	0.0014	4.3	1
2025	2025Pressure Washers	Pressure Washers	13	0.0531	0.0963	0.0066	0.0001	0.0025	0.0023	9.4	1
2025	2025Pumps	Pumps	84	0.2617	0.3533	0.0270	0.0006	0.0075	0.0069	49.6	4
2025	2025Rollers	Rollers	84	0.3763	0.3533	0.0410	0.0008	0.0075	0.0069	67.0	4
2025	2025Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4430	0.3491	0.0396	0.0008	0.0075	0.0069	70.3	4
2025	2025Rubber Tired Dozers	Rubber Tired Dozers	358	0.6620	1.2928	0.1672	0.0025	0.0162	0.0149	239	6
2025	2025Rubber Tired Loaders	Rubber Tired Loaders	87	0.4311	0.3660	0.0559	0.0012	0.0078	0.0072	109	4
2025	2025Scrapers	Scrapers	356	0.7187	1.2856	0.1495	0.0027	0.0161	0.0148	262	6
2025	2025Signal Boards	Signal Boards	6	0.0909	0.0444	0.0111	0.0002	0.0011	0.0010	16.7	1
2025	2025Skid Steer Loaders	Skid Steer Loaders	37	0.2104	0.2638	0.0186	0.0004	0.0050	0.0046	30.3	2
2025	2025Surfacing Equipment	Surfacing Equipment	392	0.3590	1.4156	0.0638	0.0017	0.0177	0.0163	166	6
2025	2025Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4840	0.3702	0.0410	0.0009	0.0079	0.0073	78.5	4
2025	2025Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3586	0.3155	0.0336	0.0008	0.0067	0.0062	66.8	4
2025	2025Trenchers	Trenchers	69	0.4085	0.4920	0.0674	0.0007	0.0062	0.0057	58.7	3
2025	2025Welders	Welders	46	0.1745	0.3280	0.0214	0.0003	0.0062	0.0057	25.6	2
2026	2026Arial Lifts	Arial Lifts	34	0.1646	0.2424	0.0184	0.0004	0.0046	0.0042	34.7	2
2026	2026Air Compressors	Air Compressors	78	0.3027	0.3281	0.0349	0.0007	0.0070	0.0064	63.6	4
2026	2026Bore/Drill Rigs	Bore/Drill Rigs	82	0.5007	0.3449	0.0428	0.0017	0.0074	0.0068	165	4
2026	2026Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0414	0.0667	0.0085	0.0001	0.0017	0.0016	7.2	1
2026	2026Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3706	0.3407	0.0337	0.0007	0.0073	0.0067	58.5	4
2026	2026Cranes	Cranes	208	0.3738	0.7511	0.0681	0.0014	0.0094	0.0086	129	6
2026	2026Crawler Tractors	Crawler Tractors	82	0.5065	0.3449	0.0789	0.0013	0.0074	0.0068	114	4
2026	2026Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6187	0.3575	0.0693	0.0015	0.0076	0.0070	132	4
2026	2026Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0030	0.0028	7.6	1
2026	2026Excavators	Excavators	157	0.5086	0.5670	0.0559	0.0013	0.0104	0.0095	120	5
2026	2026Forklifts	Forklifts	149	0.2148	0.5381	0.0236	0.0006	0.0098	0.0090	54.4	5
2026	2026Generator Sets	Generator Sets	84	0.2667	0.3533	0.0288	0.0007	0.0075	0.0069	61.0	4
2026	2026Graders	Graders	162	0.5696	0.5850	0.0676	0.0015	0.0107	0.0098	133	5
2026	2026Off-Highway Tractors	Off-Highway Tractors	160	0.6101	0.5778	0.1134	0.0017	0.0106	0.0097	151	5
2026	2026Off-Highway Trucks	Off-Highway Trucks	381	0.5385	1.3759	0.1140	0.0027	0.0172	0.0158	260	6
2026	2026Other Construction Equipment	Other Construction Equipment	327	0.3474	1.1809	0.0442	0.0013	0.0148	0.0136	123	6
2026	2026Other General Industrial Equipm	Other General Industrial Equipment	150	0.4438	0.5417	0.0747	0.0016	0.0099	0.0091	152	5
2026	2026Other Material Handling Equipm	Other Material Handling Equipment	196	0.4355	0.7078	0.0696	0.0015	0.0088	0.0081	141	6
2026	2026Pavers	Pavers	89	0.4745	0.3744	0.0717	0.0009	0.0080	0.0074	77.9	4
2026	2026Paving Equipment	Paving Equipment	82	0.3993	0.3449	0.0548	0.0008	0.0074	0.0068	68.9	4
2026	2026Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0015	0.0014	4.3	1

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Construction

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2026	2026Pressure Washers	Pressure Washers	13	0.0531	0.0963	0.0066	0.0001	0.0025	0.0023	9.4	1
2026	2026Pumps	Pumps	84	0.2617	0.3533	0.0270	0.0006	0.0075	0.0069	49.6	4
2026	2026Rollers	Rollers	84	0.3763	0.3533	0.0410	0.0008	0.0075	0.0069	67.0	4
2026	2026Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4430	0.3491	0.0396	0.0008	0.0075	0.0069	70.3	4
2026	2026Rubber Tired Dozers	Rubber Tired Dozers	358	0.6620	1.2928	0.1672	0.0025	0.0162	0.0149	239	6
2026	2026Rubber Tired Loaders	Rubber Tired Loaders	87	0.4311	0.3660	0.0559	0.0012	0.0078	0.0072	109	4
2026	2026Scrapers	Scrapers	356	0.7187	1.2856	0.1495	0.0027	0.0161	0.0148	262	6
2026	2026Signal Boards	Signal Boards	6	0.0909	0.0444	0.0111	0.0002	0.0011	0.0010	16.7	1
2026	2026Skid Steer Loaders	Skid Steer Loaders	37	0.2104	0.2638	0.0186	0.0004	0.0050	0.0046	30.3	2
2026	2026Surfacing Equipment	Surfacing Equipment	392	0.3590	1.4156	0.0638	0.0017	0.0177	0.0163	166	6
2026	2026Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4840	0.3702	0.0410	0.0009	0.0079	0.0073	78.5	4
2026	2026Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3586	0.3155	0.0336	0.0008	0.0067	0.0062	66.8	4
2026	2026Trenchers	Trenchers	69	0.4085	0.4920	0.0674	0.0007	0.0062	0.0057	58.7	3
2026	2026Welders	Welders	46	0.1745	0.3280	0.0214	0.0003	0.0062	0.0057	25.6	2
2027	2027Arial Lifts	Arial Lifts	34	0.1646	0.2424	0.0184	0.0004	0.0046	0.0042		2
2027	2027Air Compressors	Air Compressors	78	0.3027	0.3281	0.0349	0.0007	0.0070	0.0064		4
2027	2027Bore/Drill Rigs	Bore/Drill Rigs	82	0.5007	0.3449	0.0428	0.0017	0.0074	0.0068		4
2027	2027Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0414	0.0667	0.0085	0.0001	0.0017	0.0016		1
2027	2027Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3706	0.3407	0.0337	0.0007	0.0073	0.0067		4
2027	2027Cranes	Cranes	208	0.3738	0.7511	0.0681	0.0014	0.0094	0.0086		6
2027	2027Crawler Tractors	Crawler Tractors	82	0.5065	0.3449	0.0789	0.0013	0.0074	0.0068		4
2027	2027Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6187	0.3575	0.0693	0.0015	0.0076	0.0070		4
2027	2027Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0030	0.0028		1
2027	2027Excavators	Excavators	157	0.5086	0.5670	0.0559	0.0013	0.0104	0.0095		5
2027	2027Forklifts	Forklifts	149	0.2148	0.5381	0.0236	0.0006	0.0098	0.0090		5
2027	2027Generator Sets	Generator Sets	84	0.2667	0.3533	0.0288	0.0007	0.0075	0.0069		4
2027	2027Graders	Graders	162	0.5696	0.5850	0.0676	0.0015	0.0107	0.0098		5
2027	2027Off-Highway Tractors	Off-Highway Tractors	160	0.6101	0.5778	0.1134	0.0017	0.0106	0.0097		5
2027	2027Off-Highway Trucks	Off-Highway Trucks	381	0.5385	1.3759	0.1140	0.0027	0.0172	0.0158		6
2027	2027Other Construction Equipment	Other Construction Equipment	327	0.3474	1.1809	0.0442	0.0013	0.0148	0.0136		6
2027	2027Other General Industrial Equipm	Other General Industrial Equipment	150	0.4438	0.5417	0.0747	0.0016	0.0099	0.0091		5
2027	2027Other Material Handling Equipm	Other Material Handling Equipment	196	0.4355	0.7078	0.0696	0.0015	0.0088	0.0081		6
2027	2027Pavers	Pavers	89	0.4745	0.3744	0.0717	0.0009	0.0080	0.0074		4
2027	2027Paving Equipment	Paving Equipment	82	0.3993	0.3449	0.0548	0.0008	0.0074	0.0068		4
2027	2027Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0015	0.0014		1
2027	2027Pressure Washers	Pressure Washers	13	0.0531	0.0963	0.0066	0.0001	0.0025	0.0023		1
2027	2027Pumps	Pumps	84	0.2617	0.3533	0.0270	0.0006	0.0075	0.0069		4
2027	2027Rollers	Rollers	84	0.3763	0.3533	0.0410	0.0008	0.0075	0.0069		4
2027	2027Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4430	0.3491	0.0396	0.0008	0.0075	0.0069		4
2027	2027Rubber Tired Dozers	Rubber Tired Dozers	358	0.6620	1.2928	0.1672	0.0025	0.0162	0.0149		6
2027	2027Rubber Tired Loaders	Rubber Tired Loaders	87	0.4311	0.3660	0.0559	0.0012	0.0078	0.0072		4
2027	2027Scrapers	Scrapers	356	0.7187	1.2856	0.1495	0.0027	0.0161	0.0148		6
2027	2027Signal Boards	Signal Boards	6	0.0909	0.0444	0.0111	0.0002	0.0011	0.0010		1
2027	2027Skid Steer Loaders	Skid Steer Loaders	37	0.2104	0.2638	0.0186	0.0004	0.0050	0.0046		2
2027	2027Surfacing Equipment	Surfacing Equipment	392	0.3590	1.4156	0.0638	0.0017	0.0177	0.0163		6
2027	2027Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4840	0.3702	0.0410	0.0009	0.0079	0.0073		4
2027	2027Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3586	0.3155	0.0336	0.0008	0.0067	0.0062		4
2027	2027Trenchers	Trenchers	69	0.4085	0.4920	0.0674	0.0007	0.0062	0.0057		3
2027	2027Welders	Welders	46	0.1745	0.3280	0.0214	0.0003	0.0062	0.0057		2

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Construction

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2028	2028Arial Lifts	Arial Lifts	34	0.1646	0.2424	0.0184	0.0004	0.0046	0.0042		2
2028	2028Air Compressors	Air Compressors	78	0.3027	0.3281	0.0349	0.0007	0.0070	0.0064		4
2028	2028Bore/Drill Rigs	Bore/Drill Rigs	82	0.5007	0.3449	0.0428	0.0017	0.0074	0.0068		4
2028	2028Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0414	0.0667	0.0085	0.0001	0.0017	0.0016		1
2028	2028Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3706	0.3407	0.0337	0.0007	0.0073	0.0067		4
2028	2028Cranes	Cranes	208	0.3738	0.7511	0.0681	0.0014	0.0094	0.0086		6
2028	2028Crawler Tractors	Crawler Tractors	82	0.5065	0.3449	0.0789	0.0013	0.0074	0.0068		4
2028	2028Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6187	0.3575	0.0693	0.0015	0.0076	0.0070		4
2028	2028Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0030	0.0028		1
2028	2028Excavators	Excavators	157	0.5086	0.5670	0.0559	0.0013	0.0104	0.0095		5
2028	2028Forklifts	Forklifts	149	0.2148	0.5381	0.0236	0.0006	0.0098	0.0090		5
2028	2028Generator Sets	Generator Sets	84	0.2667	0.3533	0.0288	0.0007	0.0075	0.0069		4
2028	2028Graders	Graders	162	0.5696	0.5850	0.0676	0.0015	0.0107	0.0098		5
2028	2028Off-Highway Tractors	Off-Highway Tractors	160	0.6101	0.5778	0.1134	0.0017	0.0106	0.0097		5
2028	2028Off-Highway Trucks	Off-Highway Trucks	381	0.5385	1.3759	0.1140	0.0027	0.0172	0.0158		6
2028	2028Other Construction Equipment	Other Construction Equipment	327	0.3474	1.1809	0.0442	0.0013	0.0148	0.0136		6
2028	2028Other General Industrial Equipm	Other General Industrial Equipment	150	0.4438	0.5417	0.0747	0.0016	0.0099	0.0091		5
2028	2028Other Material Handling Equipm	Other Material Handling Equipment	196	0.4355	0.7078	0.0696	0.0015	0.0088	0.0081		6
2028	2028Pavers	Pavers	89	0.4745	0.3744	0.0717	0.0009	0.0080	0.0074		4
2028	2028Paving Equipment	Paving Equipment	82	0.3993	0.3449	0.0548	0.0008	0.0074	0.0068		4
2028	2028Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0015	0.0014		1
2028	2028Pressure Washers	Pressure Washers	13	0.0531	0.0963	0.0066	0.0001	0.0025	0.0023		1
2028	2028Pumps	Pumps	84	0.2617	0.3533	0.0270	0.0006	0.0075	0.0069		4
2028	2028Rollers	Rollers	84	0.3763	0.3533	0.0410	0.0008	0.0075	0.0069		4
2028	2028Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4430	0.3491	0.0396	0.0008	0.0075	0.0069		4
2028	2028Rubber Tired Dozers	Rubber Tired Dozers	358	0.6620	1.2928	0.1672	0.0025	0.0162	0.0149		6
2028	2028Rubber Tired Loaders	Rubber Tired Loaders	87	0.4311	0.3660	0.0559	0.0012	0.0078	0.0072		4
2028	2028Scrapers	Scrapers	356	0.7187	1.2856	0.1495	0.0027	0.0161	0.0148		6
2028	2028Signal Boards	Signal Boards	6	0.0909	0.0444	0.0111	0.0002	0.0011	0.0010		1
2028	2028Skid Steer Loaders	Skid Steer Loaders	37	0.2104	0.2638	0.0186	0.0004	0.0050	0.0046		2
2028	2028Surfacing Equipment	Surfacing Equipment	392	0.3590	1.4156	0.0638	0.0017	0.0177	0.0163		6
2028	2028Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4840	0.3702	0.0410	0.0009	0.0079	0.0073		4
2028	2028Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3586	0.3155	0.0336	0.0008	0.0067	0.0062		4
2028	2028Trenchers	Trenchers	69	0.4085	0.4920	0.0674	0.0007	0.0062	0.0057		3
2028	2028Welders	Welders	46	0.1745	0.3280	0.0214	0.0003	0.0062	0.0057		2
2029	2029Arial Lifts	Arial Lifts	34	0.1646	0.2424	0.0184	0.0004	0.0046	0.0042		2
2029	2029Air Compressors	Air Compressors	78	0.3027	0.3281	0.0349	0.0007	0.0070	0.0064		4
2029	2029Bore/Drill Rigs	Bore/Drill Rigs	82	0.5007	0.3449	0.0428	0.0017	0.0074	0.0068		4
2029	2029Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0414	0.0667	0.0085	0.0001	0.0017	0.0016		1
2029	2029Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3706	0.3407	0.0337	0.0007	0.0073	0.0067		4
2029	2029Cranes	Cranes	208	0.3738	0.7511	0.0681	0.0014	0.0094	0.0086		6
2029	2029Crawler Tractors	Crawler Tractors	82	0.5065	0.3449	0.0789	0.0013	0.0074	0.0068		4
2029	2029Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6187	0.3575	0.0693	0.0015	0.0076	0.0070		4
2029	2029Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0030	0.0028		1
2029	2029Excavators	Excavators	157	0.5086	0.5670	0.0559	0.0013	0.0104	0.0095		5
2029	2029Forklifts	Forklifts	149	0.2148	0.5381	0.0236	0.0006	0.0098	0.0090		5
2029	2029Generator Sets	Generator Sets	84	0.2667	0.3533	0.0288	0.0007	0.0075	0.0069		4
2029	2029Graders	Graders	162	0.5696	0.5850	0.0676	0.0015	0.0107	0.0098		5
2029	2029Off-Highway Tractors	Off-Highway Tractors	160	0.6101	0.5778	0.1134	0.0017	0.0106	0.0097		5

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Construction

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2029	2029Off-Highway Trucks	Off-Highway Trucks	381	0.5385	1.3759	0.1140	0.0027	0.0172	0.0158		6
2029	2029Other Construction Equipment	Other Construction Equipment	327	0.3474	1.1809	0.0442	0.0013	0.0148	0.0136		6
2029	2029Other General Industrial Equipm	Other General Industrial Equipment	150	0.4438	0.5417	0.0747	0.0016	0.0099	0.0091		5
2029	2029Other Material Handling Equipm	Other Material Handling Equipment	196	0.4355	0.7078	0.0696	0.0015	0.0088	0.0081		6
2029	2029Pavers	Pavers	89	0.4745	0.3744	0.0717	0.0009	0.0080	0.0074		4
2029	2029Paving Equipment	Paving Equipment	82	0.3993	0.3449	0.0548	0.0008	0.0074	0.0068		4
2029	2029Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0015	0.0014		1
2029	2029Pressure Washers	Pressure Washers	13	0.0531	0.0963	0.0066	0.0001	0.0025	0.0023		1
2029	2029Pumps	Pumps	84	0.2617	0.3533	0.0270	0.0006	0.0075	0.0069		4
2029	2029Rollers	Rollers	84	0.3763	0.3533	0.0410	0.0008	0.0075	0.0069		4
2029	2029Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4430	0.3491	0.0396	0.0008	0.0075	0.0069		4
2029	2029Rubber Tired Dozers	Rubber Tired Dozers	358	0.6620	1.2928	0.1672	0.0025	0.0162	0.0149		6
2029	2029Rubber Tired Loaders	Rubber Tired Loaders	87	0.4311	0.3660	0.0559	0.0012	0.0078	0.0072		4
2029	2029Scrapers	Scrapers	356	0.7187	1.2856	0.1495	0.0027	0.0161	0.0148		6
2029	2029Signal Boards	Signal Boards	6	0.0909	0.0444	0.0111	0.0002	0.0011	0.0010		1
2029	2029Skid Steer Loaders	Skid Steer Loaders	37	0.2104	0.2638	0.0186	0.0004	0.0050	0.0046		2
2029	2029Surfacing Equipment	Surfacing Equipment	392	0.3590	1.4156	0.0638	0.0017	0.0177	0.0163		6
2029	2029Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4840	0.3702	0.0410	0.0009	0.0079	0.0073		4
2029	2029Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3586	0.3155	0.0336	0.0008	0.0067	0.0062		4
2029	2029Trenchers	Trenchers	69	0.4085	0.4920	0.0674	0.0007	0.0062	0.0057		3
2029	2029Welders	Welders	46	0.1745	0.3280	0.0214	0.0003	0.0062	0.0057		2
2030	2030Arial Lifts	Arial Lifts	34	0.1646	0.2424	0.0184	0.0004	0.0046	0.0042	34.7	2
2030	2030Air Compressors	Air Compressors	78	0.3027	0.3281	0.0349	0.0007	0.0070	0.0064	63.6	4
2030	2030Bore/Drill Rigs	Bore/Drill Rigs	82	0.5007	0.3449	0.0428	0.0017	0.0074	0.0068	165	4
2030	2030Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0414	0.0667	0.0085	0.0001	0.0017	0.0016	7.2	1
2030	2030Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3706	0.3407	0.0337	0.0007	0.0073	0.0067	58.5	4
2030	2030Cranes	Cranes	208	0.3738	0.7511	0.0681	0.0014	0.0094	0.0086	129	6
2030	2030Crawler Tractors	Crawler Tractors	82	0.5065	0.3449	0.0789	0.0013	0.0074	0.0068	114	4
2030	2030Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6187	0.3575	0.0693	0.0015	0.0076	0.0070	132	4
2030	2030Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0030	0.0028	7.6	1
2030	2030Excavators	Excavators	157	0.5086	0.5670	0.0559	0.0013	0.0104	0.0095	120	5
2030	2030Forklifts	Forklifts	149	0.2148	0.5381	0.0236	0.0006	0.0098	0.0090	54.4	5
2030	2030Generator Sets	Generator Sets	84	0.2667	0.3533	0.0288	0.0007	0.0075	0.0069	61.0	4
2030	2030Graders	Graders	162	0.5696	0.5850	0.0676	0.0015	0.0107	0.0098	133	5
2030	2030Off-Highway Tractors	Off-Highway Tractors	160	0.6101	0.5778	0.1134	0.0017	0.0106	0.0097	151	5
2030	2030Off-Highway Trucks	Off-Highway Trucks	381	0.5385	1.3759	0.1140	0.0027	0.0172	0.0158	260	6
2030	2030Other Construction Equipment	Other Construction Equipment	327	0.3474	1.1809	0.0442	0.0013	0.0148	0.0136	123	6
2030	2030Other General Industrial Equipm	Other General Industrial Equipment	150	0.4438	0.5417	0.0747	0.0016	0.0099	0.0091	152	5
2030	2030Other Material Handling Equipm	Other Material Handling Equipment	196	0.4355	0.7078	0.0696	0.0015	0.0088	0.0081	141	6
2030	2030Pavers	Pavers	89	0.4745	0.3744	0.0717	0.0009	0.0080	0.0074	77.9	4
2030	2030Paving Equipment	Paving Equipment	82	0.3993	0.3449	0.0548	0.0008	0.0074	0.0068	68.9	4
2030	2030Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0015	0.0014	4.3	1
2030	2030Pressure Washers	Pressure Washers	13	0.0531	0.0963	0.0066	0.0001	0.0025	0.0023	9.4	1
2030	2030Pumps	Pumps	84	0.2617	0.3533	0.0270	0.0006	0.0075	0.0069	49.6	4
2030	2030Rollers	Rollers	84	0.3763	0.3533	0.0410	0.0008	0.0075	0.0069	67.0	4
2030	2030Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4430	0.3491	0.0396	0.0008	0.0075	0.0069	70.3	4
2030	2030Rubber Tired Dozers	Rubber Tired Dozers	358	0.6620	1.2928	0.1672	0.0025	0.0162	0.0149	239	6
2030	2030Rubber Tired Loaders	Rubber Tired Loaders	87	0.4311	0.3660	0.0559	0.0012	0.0078	0.0072	109	4
2030	2030Scrapers	Scrapers	356	0.7187	1.2856	0.1495	0.0027	0.0161	0.0148	262	6

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Construction

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2030	2030Signal Boards	Signal Boards	6	0.0909	0.0444	0.0111	0.0002	0.0011	0.0010	16.7	1
2030	2030Skid Steer Loaders	Skid Steer Loaders	37	0.2104	0.2638	0.0186	0.0004	0.0050	0.0046	30.3	2
2030	2030Surfacing Equipment	Surfacing Equipment	392	0.3590	1.4156	0.0638	0.0017	0.0177	0.0163	166	6
2030	2030Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4840	0.3702	0.0410	0.0009	0.0079	0.0073	78.5	4
2030	2030Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3586	0.3155	0.0336	0.0008	0.0067	0.0062	66.8	4
2030	2030Trenchers	Trenchers	69	0.4085	0.4920	0.0674	0.0007	0.0062	0.0057	58.7	3
2030	2030Welders	Welders	46	0.1745	0.3280	0.0214	0.0003	0.0062	0.0057	25.6	2
2031	2031Arial Lifts	Arial Lifts	34	0.1646	0.2424	0.0184	0.0004	0.0046	0.0042		2
2031	2031Air Compressors	Air Compressors	78	0.3027	0.3281	0.0349	0.0007	0.0070	0.0064		4
2031	2031Bore/Drill Rigs	Bore/Drill Rigs	82	0.5007	0.3449	0.0428	0.0017	0.0074	0.0068		4
2031	2031Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0414	0.0667	0.0085	0.0001	0.0017	0.0016		1
2031	2031Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3706	0.3407	0.0337	0.0007	0.0073	0.0067		4
2031	2031Cranes	Cranes	208	0.3738	0.7511	0.0681	0.0014	0.0094	0.0086		6
2031	2031Crawler Tractors	Crawler Tractors	82	0.5065	0.3449	0.0789	0.0013	0.0074	0.0068		4
2031	2031Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6187	0.3575	0.0693	0.0015	0.0076	0.0070		4
2031	2031Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0030	0.0028		1
2031	2031Excavators	Excavators	157	0.5086	0.5670	0.0559	0.0013	0.0104	0.0095		5
2031	2031Forklifts	Forklifts	149	0.2148	0.5381	0.0236	0.0006	0.0098	0.0090		5
2031	2031Generator Sets	Generator Sets	84	0.2667	0.3533	0.0288	0.0007	0.0075	0.0069		4
2031	2031Graders	Graders	162	0.5696	0.5850	0.0676	0.0015	0.0107	0.0098		5
2031	2031Off-Highway Tractors	Off-Highway Tractors	160	0.6101	0.5778	0.1134	0.0017	0.0106	0.0097		5
2031	2031Off-Highway Trucks	Off-Highway Trucks	381	0.5385	1.3759	0.1140	0.0027	0.0172	0.0158		6
2031	2031Other Construction Equipment	Other Construction Equipment	327	0.3474	1.1809	0.0442	0.0013	0.0148	0.0136		6
2031	2031Other General Industrial Equipm	Other General Industrial Equipment	150	0.4438	0.5417	0.0747	0.0016	0.0099	0.0091		5
2031	2031Other Material Handling Equipm	Other Material Handling Equipment	196	0.4355	0.7078	0.0696	0.0015	0.0088	0.0081		6
2031	2031Pavers	Pavers	89	0.4745	0.3744	0.0717	0.0009	0.0080	0.0074		4
2031	2031Paving Equipment	Paving Equipment	82	0.3993	0.3449	0.0548	0.0008	0.0074	0.0068		4
2031	2031Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0015	0.0014		1
2031	2031Pressure Washers	Pressure Washers	13	0.0531	0.0963	0.0066	0.0001	0.0025	0.0023		1
2031	2031Pumps	Pumps	84	0.2617	0.3533	0.0270	0.0006	0.0075	0.0069		4
2031	2031Rollers	Rollers	84	0.3763	0.3533	0.0410	0.0008	0.0075	0.0069		4
2031	2031Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4430	0.3491	0.0396	0.0008	0.0075	0.0069		4
2031	2031Rubber Tired Dozers	Rubber Tired Dozers	358	0.6620	1.2928	0.1672	0.0025	0.0162	0.0149		6
2031	2031Rubber Tired Loaders	Rubber Tired Loaders	87	0.4311	0.3660	0.0559	0.0012	0.0078	0.0072		4
2031	2031Scrapers	Scrapers	356	0.7187	1.2856	0.1495	0.0027	0.0161	0.0148		6
2031	2031Signal Boards	Signal Boards	6	0.0909	0.0444	0.0111	0.0002	0.0011	0.0010		1
2031	2031Skid Steer Loaders	Skid Steer Loaders	37	0.2104	0.2638	0.0186	0.0004	0.0050	0.0046		2
2031	2031Surfacing Equipment	Surfacing Equipment	392	0.3590	1.4156	0.0638	0.0017	0.0177	0.0163		6
2031	2031Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4840	0.3702	0.0410	0.0009	0.0079	0.0073		4
2031	2031Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3586	0.3155	0.0336	0.0008	0.0067	0.0062		4
2031	2031Trenchers	Trenchers	69	0.4085	0.4920	0.0674	0.0007	0.0062	0.0057		3
2031	2031Welders	Welders	46	0.1745	0.3280	0.0214	0.0003	0.0062	0.0057		2
2035	2035Arial Lifts	Arial Lifts	34	0.1646	0.2424	0.0184	0.0004	0.0046	0.0042		2
2035	2035Air Compressors	Air Compressors	78	0.3027	0.3281	0.0349	0.0007	0.0070	0.0064		4
2035	2035Bore/Drill Rigs	Bore/Drill Rigs	82	0.5007	0.3449	0.0428	0.0017	0.0074	0.0068		4
2035	2035Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0414	0.0667	0.0085	0.0001	0.0017	0.0016		1
2035	2035Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3706	0.3407	0.0337	0.0007	0.0073	0.0067		4
2035	2035Cranes	Cranes	208	0.3738	0.7511	0.0681	0.0014	0.0094	0.0086		6
2035	2035Crawler Tractors	Crawler Tractors	82	0.5065	0.3449	0.0789	0.0013	0.0074	0.0068		4

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Construction

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2035	2035Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6187	0.3575	0.0693	0.0015	0.0076	0.0070		4
2035	2035Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0030	0.0028		1
2035	2035Excavators	Excavators	157	0.5086	0.5670	0.0559	0.0013	0.0104	0.0095		5
2035	2035Forklifts	Forklifts	149	0.2148	0.5381	0.0236	0.0006	0.0098	0.0090		5
2035	2035Generator Sets	Generator Sets	84	0.2667	0.3533	0.0288	0.0007	0.0075	0.0069		4
2035	2035Graders	Graders	162	0.5696	0.5850	0.0676	0.0015	0.0107	0.0098		5
2035	2035Off-Highway Tractors	Off-Highway Tractors	160	0.6101	0.5778	0.1134	0.0017	0.0106	0.0097		5
2035	2035Off-Highway Trucks	Off-Highway Trucks	381	0.5385	1.3759	0.1140	0.0027	0.0172	0.0158		6
2035	2035Other Construction Equipment	Other Construction Equipment	327	0.3474	1.1809	0.0442	0.0013	0.0148	0.0136		6
2035	2035Other General Industrial Equipm	Other General Industrial Equipment	150	0.4438	0.5417	0.0747	0.0016	0.0099	0.0091		5
2035	2035Other Material Handling Equipm	Other Material Handling Equipment	196	0.4355	0.7078	0.0696	0.0015	0.0088	0.0081		6
2035	2035Pavers	Pavers	89	0.4745	0.3744	0.0717	0.0009	0.0080	0.0074		4
2035	2035Paving Equipment	Paving Equipment	82	0.3993	0.3449	0.0548	0.0008	0.0074	0.0068		4
2035	2035Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0015	0.0014		1
2035	2035Pressure Washers	Pressure Washers	13	0.0531	0.0963	0.0066	0.0001	0.0025	0.0023		1
2035	2035Pumps	Pumps	84	0.2617	0.3533	0.0270	0.0006	0.0075	0.0069		4
2035	2035Rollers	Rollers	84	0.3763	0.3533	0.0410	0.0008	0.0075	0.0069		4
2035	2035Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4430	0.3491	0.0396	0.0008	0.0075	0.0069		4
2035	2035Rubber Tired Dozers	Rubber Tired Dozers	358	0.6620	1.2928	0.1672	0.0025	0.0162	0.0149		6
2035	2035Rubber Tired Loaders	Rubber Tired Loaders	87	0.4311	0.3660	0.0559	0.0012	0.0078	0.0072		4
2035	2035Scrapers	Scrapers	356	0.7187	1.2856	0.1495	0.0027	0.0161	0.0148		6
2035	2035Signal Boards	Signal Boards	6	0.0909	0.0444	0.0111	0.0002	0.0011	0.0010		1
2035	2035Skid Steer Loaders	Skid Steer Loaders	37	0.2104	0.2638	0.0186	0.0004	0.0050	0.0046		2
2035	2035Surfacing Equipment	Surfacing Equipment	392	0.3590	1.4156	0.0638	0.0017	0.0177	0.0163		6
2035	2035Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4840	0.3702	0.0410	0.0009	0.0079	0.0073		4
2035	2035Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3586	0.3155	0.0336	0.0008	0.0067	0.0062		4
2035	2035Trenchers	Trenchers	69	0.4085	0.4920	0.0674	0.0007	0.0062	0.0057		3
2035	2035Welders	Welders	46	0.1745	0.3280	0.0214	0.0003	0.0062	0.0057		2

Source: SCAQMD CEQA Handbook website: http://www.aqmd.gov/ceqa/handbook/offroad/offroad.html
Emission factors only available up to 2025; therefore, it was conservatively assumed that the emission factors for years 2026 through 2035 were the same as 2025.
NOx and PM10 emission factors taken as a combination of the Tier 3 and Tier 4 emission standards based on the required BACT turnover rate for large fleets per the ARB's Diesel Off-road Equipment Regulation (13 CCR 2449). Source: Table 1. ARB and USEPA Off-Road Compression-Ignition (Diesel) Engine Standards (NMHC+NOx/CO/PM in g/bhp-hr).:
http://www.arb.ca.gov/msprog/ordiesel/documents/Off-Road_Diesel_Stds.xls.

Emission factors for PM2.5 not available; therefore, it was assumed that 92% of diesel off-road equipment PM10 emissions were PM2.5 (SCAQMD Particulate Matter (PM) 2.5 Significance Thresholds and Calculation Methodology, October 2006; Appendix A – Updated CEIDARS List with PM2.5 Fractions, http://www.aqmd.gov/ceqa/handbook/PM2_5/finalAppA.doc).
Default hp taken from CalEEMod User Guide Appendix D, Table 3.3 (February 2011).
Off-road diesel equipment would be equipped with diesel particulate filters as a project control.

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Operation

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2014	2014Arial Lifts	Arial Lifts	34	0.1877	0.1574	0.0483	0.0004	0.0002	0.0002	34.7	2
2014	2014Air Compressors	Air Compressors	78	0.3313	0.0310	0.0842	0.0007	0.0004	0.0004	63.6	4
2014	2014Bore/Drill Rigs	Bore/Drill Rigs	82	0.5030	0.0325	0.0729	0.0017	0.0004	0.0004	165	4
2014	2014Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0420	0.0667	0.0089	0.0001	0.0009	0.0008	7.2	1
2014	2014Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.4031	0.0321	0.0917	0.0007	0.0004	0.0004	58.5	4
2014	2014Cranes	Cranes	208	0.4553	0.0825	0.1276	0.0014	0.0010	0.0009	129	6
2014	2014Crawler Tractors	Crawler Tractors	82	0.5767	0.0325	0.1499	0.0013	0.0004	0.0004	114	4
2014	2014Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6651	0.0337	0.1597	0.0015	0.0004	0.0004	132	4
2014	2014Dumpers/Tenders	Dumpers/Tenders	16	0.0317	0.1185	0.0095	0.0001	0.0016	0.0015	7.6	1
2014	2014Excavators	Excavators	157	0.5289	0.0623	0.1143	0.0013	0.0008	0.0007	120.0	5
2014	2014Forklifts	Forklifts	149	0.2215	0.0591	0.0497	0.0006	0.0007	0.0007	54.4	5
2014	2014Generator Sets	Generator Sets	84	0.2974	0.0333	0.0702	0.0007	0.0004	0.0004	61.0	4
2014	2014Graders	Graders	162	0.5987	0.0643	0.1362	0.0015	0.0008	0.0007	133	5
2014	2014Off-Highway Tractors	Off-Highway Tractors	160	0.7438	0.0635	0.1986	0.0017	0.0008	0.0007	151	5
2014	2014Off-Highway Trucks	Off-Highway Trucks	381	0.6148	0.1512	0.2034	0.0027	0.0019	0.0017	260	6
2014	2014Other Construction Equipment	Other Construction Equipment	327	0.3697	0.1298	0.0820	0.0013	0.0016	0.0015	123	6
2014	2014Other General Industrial Equipm	Other General Industrial Equipment	150	0.4985	0.0595	0.1448	0.0016	0.0007	0.0007	152	5
2014	2014Other Material Handling Equipm	Other Material Handling Equipment	196	0.4814	0.0778	0.1381	0.0015	0.0010	0.0009	141	6
2014	2014Pavers	Pavers	89	0.5277	0.0353	0.1429	0.0009	0.0004	0.0004	77.9	4
2014	2014Paving Equipment	Paving Equipment	82	0.4273	0.0325	0.1082	0.0008	0.0004	0.0004	68.9	4
2014	2014Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0008	0.0007	4.3	1
2014	2014Pressure Washers	Pressure Washers	13	0.0603	0.0963	0.0145	0.0001	0.0013	0.0012	9.4	1
2014	2014Pumps	Pumps	84	0.2873	0.0333	0.0683	0.0006	0.0004	0.0004	49.6	4
2014	2014Rollers	Rollers	84	0.4018	0.0333	0.0912	0.0008	0.0004	0.0004	67.1	4
2014	2014Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4608	0.0329	0.0929	0.0008	0.0004	0.0004	70.3	4
2014	2014Rubber Tired Dozers	Rubber Tired Dozers	358	1.1058	0.1421	0.2854	0.0025	0.0018	0.0016	239	6
2014	2014Rubber Tired Loaders	Rubber Tired Loaders	87	0.4683	0.0345	0.1122	0.0012	0.0004	0.0004	109	4
2014	2014Scrapers	Scrapers	356	0.9890	0.1413	0.2648	0.0027	0.0018	0.0016	262	6
2014	2014Signal Boards	Signal Boards	6	0.0929	0.0444	0.0181	0.0002	0.0006	0.0005	16.7	1
2014	2014Skid Steer Loaders	Skid Steer Loaders	37	0.2262	0.1713	0.0406	0.0004	0.0002	0.0002	30.3	2
2014	2014Surfacing Equipment	Surfacing Equipment	392	0.4930	0.1556	0.1194	0.0017	0.0019	0.0018	166	6
2014	2014Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.5086	0.0349	0.1029	0.0009	0.0004	0.0004	78.5	4
2014	2014Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3747	0.0298	0.0728	0.0008	0.0004	0.0003	66.8	4
2014	2014Trenchers	Trenchers	69	0.4606	0.3195	0.1350	0.0007	0.0005	0.0004	58.7	3
2014	2014Welders	Welders	46	0.2041	0.2130	0.0589	0.0003	0.0003	0.0003	25.6	2
2015	2015Arial Lifts	Arial Lifts	34	0.1837	0.1574	0.0439	0.0004	0.0002	0.0002	34.7	2
2015	2015Air Compressors	Air Compressors	78	0.3257	0.0310	0.0773	0.0007	0.0004	0.0004	63.6	4
2015	2015Bore/Drill Rigs	Bore/Drill Rigs	82	0.5022	0.0325	0.0673	0.0017	0.0004	0.0004	165	4
2015	2015Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0419	0.0667	0.0088	0.0001	0.0009	0.0008	7.2	1
2015	2015Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3982	0.0321	0.0835	0.0007	0.0004	0.0004	58.5	4
2015	2015Cranes	Cranes	208	0.4395	0.0825	0.1204	0.0014	0.0010	0.0009	129	6
2015	2015Crawler Tractors	Crawler Tractors	82	0.5650	0.0325	0.1415	0.0013	0.0004	0.0004	114	4
2015	2015Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6549	0.0337	0.1465	0.0015	0.0004	0.0004	132	4
2015	2015Dumpers/Tenders	Dumpers/Tenders	16	0.0315	0.1185	0.0093	0.0001	0.0016	0.0015	7.6	1
2015	2015Excavators	Excavators	157	0.5248	0.0623	0.1064	0.0013	0.0008	0.0007	120	5
2015	2015Forklifts	Forklifts	149	0.2200	0.0591	0.0459	0.0006	0.0007	0.0007	54.4	5
2015	2015Generator Sets	Generator Sets	84	0.2913	0.0333	0.0640	0.0007	0.0004	0.0004	61.0	4
2015	2015Graders	Graders	162	0.5931	0.0643	0.1277	0.0015	0.0008	0.0007	133	5
2015	2015Off-Highway Tractors	Off-Highway Tractors	160	0.7244	0.0635	0.1893	0.0017	0.0008	0.0007	151	5

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Operation

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2015	2015Off-Highway Trucks	Off-Highway Trucks	381	0.5974	0.1512	0.1924	0.0027	0.0019	0.0017	260	6
2015	2015Other Construction Equipment	Other Construction Equipment	327	0.3645	0.1298	0.0768	0.0013	0.0016	0.0015	123	6
2015	2015Other General Industrial Equipm	Other General Industrial Equipment	150	0.4843	0.0595	0.1355	0.0016	0.0007	0.0007	152	5
2015	2015Other Material Handling Equipm	Other Material Handling Equipment	196	0.4698	0.0778	0.1289	0.0015	0.0010	0.0009	141	6
2015	2015Pavers	Pavers	89	0.5203	0.0353	0.1347	0.0009	0.0004	0.0004	77.9	4
2015	2015Paving Equipment	Paving Equipment	82	0.4234	0.0325	0.1023	0.0008	0.0004	0.0004	68.9	4
2015	2015Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0008	0.0007	4.3	1
2015	2015Pressure Washers	Pressure Washers	13	0.0590	0.0963	0.0133	0.0001	0.0013	0.0012	9.4	1
2015	2015Pumps	Pumps	84	0.2825	0.0333	0.0621	0.0006	0.0004	0.0004	49.6	4
2015	2015Rollers	Rollers	84	0.3979	0.0333	0.0851	0.0008	0.0004	0.0004	67.0	4
2015	2015Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4577	0.0329	0.0850	0.0008	0.0004	0.0004	70.3	4
2015	2015Rubber Tired Dozers	Rubber Tired Dozers	358	1.0420	0.1421	0.2721	0.0025	0.0018	0.0016	239	6
2015	2015Rubber Tired Loaders	Rubber Tired Loaders	87	0.4615	0.0345	0.1050	0.0012	0.0004	0.0004	109	4
2015	2015Scrapers	Scrapers	356	0.9443	0.1413	0.2513	0.0027	0.0018	0.0016	262	6
2015	2015Signal Boards	Signal Boards	6	0.0925	0.0444	0.0171	0.0002	0.0006	0.0005	16.7	1
2015	2015Skid Steer Loaders	Skid Steer Loaders	37	0.2220	0.1713	0.0352	0.0004	0.0002	0.0002	30.3	2
2015	2015Surfacing Equipment	Surfacing Equipment	392	0.4705	0.1556	0.1116	0.0017	0.0019	0.0018	166	6
2015	2015Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.5034	0.0349	0.0913	0.0009	0.0004	0.0004	78.5	4
2015	2015Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3716	0.0298	0.0666	0.0008	0.0004	0.0003	66.8	4
2015	2015Trenchers	Trenchers	69	0.4541	0.3195	0.1274	0.0007	0.0005	0.0004	58.7	3
2015	2015Welders	Welders	46	0.1994	0.2130	0.0534	0.0003	0.0003	0.0003	25.6	2
2016	2016Arial Lifts	Arial Lifts	34	0.1800	0.1574	0.0397	0.0004	0.0002	0.0002	34.7	2
2016	2016Air Compressors	Air Compressors	78	0.3207	0.0310	0.0704	0.0007	0.0004	0.0004	63.6	4
2016	2016Bore/Drill Rigs	Bore/Drill Rigs	82	0.5016	0.0325	0.0623	0.0017	0.0004	0.0004	165	4
2016	2016Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0418	0.0667	0.0088	0.0001	0.0009	0.0008	7.2	1
2016	2016Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3936	0.0321	0.0756	0.0007	0.0004	0.0004	58.5	4
2016	2016Cranes	Cranes	208	0.4263	0.0825	0.1137	0.0014	0.0010	0.0009	129	6
2016	2016Crawler Tractors	Crawler Tractors	82	0.5549	0.0325	0.1335	0.0013	0.0004	0.0004	114	4
2016	2016Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6461	0.0337	0.1337	0.0015	0.0004	0.0004	132	4
2016	2016Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0093	0.0001	0.0016	0.0015	7.6	1
2016	2016Excavators	Excavators	157	0.5213	0.0623	0.0988	0.0013	0.0008	0.0007	120	5
2016	2016Forklifts	Forklifts	149	0.2190	0.0591	0.0427	0.0006	0.0007	0.0007	54.4	5
2016	2016Generator Sets	Generator Sets	84	0.2862	0.0333	0.0581	0.0007	0.0004	0.0004	61.0	4
2016	2016Graders	Graders	162	0.5883	0.0643	0.1197	0.0015	0.0008	0.0007	133	5
2016	2016Off-Highway Tractors	Off-Highway Tractors	160	0.7067	0.0635	0.1803	0.0017	0.0008	0.0007	151	5
2016	2016Off-Highway Trucks	Off-Highway Trucks	381	0.5831	0.1512	0.1816	0.0027	0.0019	0.0017	260	6
2016	2016Other Construction Equipment	Other Construction Equipment	327	0.3602	0.1298	0.0720	0.0013	0.0016	0.0015	123	6
2016	2016Other General Industrial Equipm	Other General Industrial Equipment	150	0.4731	0.0595	0.1267	0.0016	0.0007	0.0007	152	5
2016	2016Other Material Handling Equipm	Other Material Handling Equipment	196	0.4608	0.0778	0.1202	0.0015	0.0010	0.0009	141	6
2016	2016Pavers	Pavers	89	0.5135	0.0353	0.1269	0.0009	0.0004	0.0004	77.9	4
2016	2016Paving Equipment	Paving Equipment	82	0.4198	0.0325	0.0965	0.0008	0.0004	0.0004	68.9	4
2016	2016Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0008	0.0007	4.3	1
2016	2016Pressure Washers	Pressure Washers	13	0.0579	0.0963	0.0121	0.0001	0.0013	0.0012	9.4	1
2016	2016Pumps	Pumps	84	0.2785	0.0333	0.0562	0.0006	0.0004	0.0004	49.6	4
2016	2016Rollers	Rollers	84	0.3944	0.0333	0.0792	0.0008	0.0004	0.0004	67.0	4
2016	2016Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4549	0.0329	0.0775	0.0008	0.0004	0.0004	70.3	4
2016	2016Rubber Tired Dozers	Rubber Tired Dozers	358	0.9834	0.1421	0.2591	0.0025	0.0018	0.0016	239	6
2016	2016Rubber Tired Loaders	Rubber Tired Loaders	87	0.4557	0.0345	0.0983	0.0012	0.0004	0.0004	109	4
2016	2016Scrapers	Scrapers	356	0.9053	0.1413	0.2383	0.0027	0.0018	0.0016	262	6

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Operation

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2016	2016Signal Boards	Signal Boards	6	0.0921	0.0444	0.0161	0.0002	0.0006	0.0005	16.7	1
2016	2016Skid Steer Loaders	Skid Steer Loaders	37	0.2184	0.1713	0.0305	0.0004	0.0002	0.0002	30.3	2
2016	2016Surfacing Equipment	Surfacing Equipment	392	0.4506	0.1556	0.1045	0.0017	0.0019	0.0018	166	6
2016	2016Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4988	0.0349	0.0810	0.0009	0.0004	0.0004	78.5	4
2016	2016Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3689	0.0298	0.0610	0.0008	0.0004	0.0003	66.8	4
2016	2016Trenchers	Trenchers	69	0.4479	0.3195	0.1200	0.0007	0.0005	0.0004	58.7	3
2016	2016Welders	Welders	46	0.1951	0.2130	0.0482	0.0003	0.0003	0.0003	25.6	2
2017	2017Arial Lifts	Arial Lifts	34	0.1768	0.1574	0.0358	0.0004	0.0002	0.0002		2
2017	2017Air Compressors	Air Compressors	78	0.3165	0.0310	0.0641	0.0007	0.0004	0.0004		4
2017	2017Bore/Drill Rigs	Bore/Drill Rigs	82	0.5013	0.0325	0.0578	0.0017	0.0004	0.0004		4
2017	2017Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0417	0.0667	0.0087	0.0001	0.0009	0.0008		1
2017	2017Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3892	0.0321	0.0679	0.0007	0.0004	0.0004		4
2017	2017Cranes	Cranes	208	0.4152	0.0825	0.1073	0.0014	0.0010	0.0009		6
2017	2017Crawler Tractors	Crawler Tractors	82	0.5464	0.0325	0.1258	0.0013	0.0004	0.0004		4
2017	2017Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6388	0.0337	0.1219	0.0015	0.0004	0.0004		4
2017	2017Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0016	0.0015		1
2017	2017Excavators	Excavators	157	0.5184	0.0623	0.0916	0.0013	0.0008	0.0007		5
2017	2017Forklifts	Forklifts	149	0.2181	0.0591	0.0399	0.0006	0.0007	0.0007		5
2017	2017Generator Sets	Generator Sets	84	0.2821	0.0333	0.0527	0.0007	0.0004	0.0004		4
2017	2017Graders	Graders	162	0.5844	0.0643	0.1121	0.0015	0.0008	0.0007		5
2017	2017Off-Highway Tractors	Off-Highway Tractors	160	0.6906	0.0635	0.1716	0.0017	0.0008	0.0007		5
2017	2017Off-Highway Trucks	Off-Highway Trucks	381	0.5722	0.1512	0.1712	0.0027	0.0019	0.0017		6
2017	2017Other Construction Equipment	Other Construction Equipment	327	0.3568	0.1298	0.0675	0.0013	0.0016	0.0015		6
2017	2017Other General Industrial Equipm	Other General Industrial Equipment	150	0.4650	0.0595	0.1187	0.0016	0.0007	0.0007		5
2017	2017Other Material Handling Equipm	Other Material Handling Equipment	196	0.4544	0.0778	0.1123	0.0015	0.0010	0.0009		6
2017	2017Pavers	Pavers	89	0.5073	0.0353	0.1193	0.0009	0.0004	0.0004		4
2017	2017Paving Equipment	Paving Equipment	82	0.4165	0.0325	0.0910	0.0008	0.0004	0.0004		4
2017	2017Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0008	0.0007		1
2017	2017Pressure Washers	Pressure Washers	13	0.0570	0.0963	0.0111	0.0001	0.0013	0.0012		1
2017	2017Pumps	Pumps	84	0.2751	0.0333	0.0508	0.0006	0.0004	0.0004		4
2017	2017Rollers	Rollers	84	0.3913	0.0333	0.0736	0.0008	0.0004	0.0004		4
2017	2017Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4522	0.0329	0.0704	0.0008	0.0004	0.0004		4
2017	2017Rubber Tired Dozers	Rubber Tired Dozers	358	0.9300	0.1421	0.2465	0.0025	0.0018	0.0016		6
2017	2017Rubber Tired Loaders	Rubber Tired Loaders	87	0.4510	0.0345	0.0920	0.0012	0.0004	0.0004		4
2017	2017Scrapers	Scrapers	356	0.8713	0.1413	0.2257	0.0027	0.0018	0.0016		6
2017	2017Signal Boards	Signal Boards	6	0.0918	0.0444	0.0151	0.0002	0.0006	0.0005		1
2017	2017Skid Steer Loaders	Skid Steer Loaders	37	0.2161	0.1713	0.0274	0.0004	0.0002	0.0002		2
2017	2017Surfacing Equipment	Surfacing Equipment	392	0.4333	0.1556	0.0981	0.0017	0.0019	0.0018		6
2017	2017Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4962	0.0349	0.0737	0.0009	0.0004	0.0004		4
2017	2017Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3666	0.0298	0.0559	0.0008	0.0004	0.0003		4
2017	2017Trenchers	Trenchers	69	0.4422	0.3195	0.1129	0.0007	0.0005	0.0004		3
2017	2017Welders	Welders	46	0.1912	0.2130	0.0434	0.0003	0.0003	0.0003		2
2018	2018Arial Lifts	Arial Lifts	34	0.1740	0.1574	0.0322	0.0004	0.0002	0.0002		2
2018	2018Air Compressors	Air Compressors	78	0.3130	0.0310	0.0582	0.0007	0.0004	0.0004		4
2018	2018Bore/Drill Rigs	Bore/Drill Rigs	82	0.5011	0.0325	0.0539	0.0017	0.0004	0.0004		4
2018	2018Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0416	0.0667	0.0087	0.0001	0.0009	0.0008		1
2018	2018Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3850	0.0321	0.0605	0.0007	0.0004	0.0004		4
2018	2018Cranes	Cranes	208	0.4060	0.0825	0.1012	0.0014	0.0010	0.0009		6
2018	2018Crawler Tractors	Crawler Tractors	82	0.5387	0.0325	0.1185	0.0013	0.0004	0.0004		4

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Operation

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2018	2018Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6328	0.0337	0.1109	0.0015	0.0004	0.0004		4
2018	2018Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0016	0.0015		1
2018	2018Excavators	Excavators	157	0.5160	0.0623	0.0848	0.0013	0.0008	0.0007		5
2018	2018Forklifts	Forklifts	149	0.2173	0.0591	0.0372	0.0006	0.0007	0.0007		5
2018	2018Generator Sets	Generator Sets	84	0.2786	0.0333	0.0477	0.0007	0.0004	0.0004		4
2018	2018Graders	Graders	162	0.5812	0.0643	0.1049	0.0015	0.0008	0.0007		5
2018	2018Off-Highway Tractors	Off-Highway Tractors	160	0.6762	0.0635	0.1631	0.0017	0.0008	0.0007		5
2018	2018Off-Highway Trucks	Off-Highway Trucks	381	0.5634	0.1512	0.1613	0.0027	0.0019	0.0017		6
2018	2018Other Construction Equipment	Other Construction Equipment	327	0.3542	0.1298	0.0633	0.0013	0.0016	0.0015		6
2018	2018Other General Industrial Equipm	Other General Industrial Equipment	150	0.4591	0.0595	0.1113	0.0016	0.0007	0.0007		5
2018	2018Other Material Handling Equipm	Other Material Handling Equipment	196	0.4495	0.0778	0.1050	0.0015	0.0010	0.0009		6
2018	2018Pavers	Pavers	89	0.5017	0.0353	0.1121	0.0009	0.0004	0.0004		4
2018	2018Paving Equipment	Paving Equipment	82	0.4136	0.0325	0.0857	0.0008	0.0004	0.0004		4
2018	2018Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0008	0.0007		1
2018	2018Pressure Washers	Pressure Washers	13	0.0562	0.0963	0.0101	0.0001	0.0013	0.0012		1
2018	2018Pumps	Pumps	84	0.2722	0.0333	0.0458	0.0006	0.0004	0.0004		4
2018	2018Rollers	Rollers	84	0.3885	0.0333	0.0683	0.0008	0.0004	0.0004		4
2018	2018Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4499	0.0329	0.0638	0.0008	0.0004	0.0004		4
2018	2018Rubber Tired Dozers	Rubber Tired Dozers	358	0.8819	0.1421	0.2343	0.0025	0.0018	0.0016		6
2018	2018Rubber Tired Loaders	Rubber Tired Loaders	87	0.4470	0.0345	0.0861	0.0012	0.0004	0.0004		4
2018	2018Scrapers	Scrapers	356	0.8418	0.1413	0.2135	0.0027	0.0018	0.0016		6
2018	2018Signal Boards	Signal Boards	6	0.0916	0.0444	0.0143	0.0002	0.0006	0.0005		1
2018	2018Skid Steer Loaders	Skid Steer Loaders	37	0.2146	0.1713	0.0253	0.0004	0.0002	0.0002		2
2018	2018Surfacing Equipment	Surfacing Equipment	392	0.4187	0.1556	0.0923	0.0017	0.0019	0.0018		6
2018	2018Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4946	0.0349	0.0681	0.0009	0.0004	0.0004		4
2018	2018Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3647	0.0298	0.0513	0.0008	0.0004	0.0003		4
2018	2018Trenchers	Trenchers	69	0.4368	0.3195	0.1061	0.0007	0.0005	0.0004		3
2018	2018Welders	Welders	46	0.1876	0.2130	0.0388	0.0003	0.0003	0.0003		2
2019	2019Arial Lifts	Arial Lifts	34	0.1715	0.1574	0.0288	0.0004	0.0002	0.0002		2
2019	2019Air Compressors	Air Compressors	78	0.3100	0.0310	0.0526	0.0007	0.0004	0.0004		4
2019	2019Bore/Drill Rigs	Bore/Drill Rigs	82	0.5009	0.0325	0.0506	0.0017	0.0004	0.0004		4
2019	2019Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0416	0.0667	0.0086	0.0001	0.0009	0.0008		1
2019	2019Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3812	0.0321	0.0536	0.0007	0.0004	0.0004		4
2019	2019Cranes	Cranes	208	0.3982	0.0825	0.0954	0.0014	0.0010	0.0009		6
2019	2019Crawler Tractors	Crawler Tractors	82	0.5319	0.0325	0.1115	0.0013	0.0004	0.0004		4
2019	2019Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6280	0.0337	0.1011	0.0015	0.0004	0.0004		4
2019	2019Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0016	0.0015		1
2019	2019Excavators	Excavators	157	0.5140	0.0623	0.0787	0.0013	0.0008	0.0007		5
2019	2019Forklifts	Forklifts	149	0.2166	0.0591	0.0345	0.0006	0.0007	0.0007		5
2019	2019Generator Sets	Generator Sets	84	0.2755	0.0333	0.0431	0.0007	0.0004	0.0004		4
2019	2019Graders	Graders	162	0.5787	0.0643	0.0982	0.0015	0.0008	0.0007		5
2019	2019Off-Highway Tractors	Off-Highway Tractors	160	0.6634	0.0635	0.1549	0.0017	0.0008	0.0007		5
2019	2019Off-Highway Trucks	Off-Highway Trucks	381	0.5565	0.1512	0.1524	0.0027	0.0019	0.0017		6
2019	2019Other Construction Equipment	Other Construction Equipment	327	0.3522	0.1298	0.0596	0.0013	0.0016	0.0015		6
2019	2019Other General Industrial Equipm	Other General Industrial Equipment	150	0.4549	0.0595	0.1044	0.0016	0.0007	0.0007		5
2019	2019Other Material Handling Equipm	Other Material Handling Equipment	196	0.4458	0.0778	0.0983	0.0015	0.0010	0.0009		6
2019	2019Pavers	Pavers	89	0.4966	0.0353	0.1053	0.0009	0.0004	0.0004		4
2019	2019Paving Equipment	Paving Equipment	82	0.4109	0.0325	0.0806	0.0008	0.0004	0.0004		4
2019	2019Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0008	0.0007		1

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Operation

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2019	2019Pressure Washers	Pressure Washers	13	0.0554	0.0963	0.0092	0.0001	0.0013	0.0012		1
2019	2019Pumps	Pumps	84	0.2695	0.0333	0.0412	0.0006	0.0004	0.0004		4
2019	2019Rollers	Rollers	84	0.3859	0.0333	0.0632	0.0008	0.0004	0.0004		4
2019	2019Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4479	0.0329	0.0579	0.0008	0.0004	0.0004		4
2019	2019Rubber Tired Dozers	Rubber Tired Dozers	358	0.8388	0.1421	0.2227	0.0025	0.0018	0.0016		6
2019	2019Rubber Tired Loaders	Rubber Tired Loaders	87	0.4436	0.0345	0.0805	0.0012	0.0004	0.0004		4
2019	2019Scrapers	Scrapers	356	0.8161	0.1413	0.2021	0.0027	0.0018	0.0016		6
2019	2019Signal Boards	Signal Boards	6	0.0913	0.0444	0.0135	0.0002	0.0006	0.0005		1
2019	2019Skid Steer Loaders	Skid Steer Loaders	37	0.2134	0.1713	0.0236	0.0004	0.0002	0.0002		2
2019	2019Surfacing Equipment	Surfacing Equipment	392	0.4061	0.1556	0.0871	0.0017	0.0019	0.0018		6
2019	2019Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4933	0.0349	0.0632	0.0009	0.0004	0.0004		4
2019	2019Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3630	0.0298	0.0472	0.0008	0.0004	0.0003		4
2019	2019Trenchers	Trenchers	69	0.4317	0.3195	0.0995	0.0007	0.0005	0.0004		3
2019	2019Welders	Welders	46	0.1843	0.2130	0.0344	0.0003	0.0003	0.0003		2
2020	2020Arial Lifts	Arial Lifts	34	0.1696	0.1574	0.0261	0.0004	0.0002	0.0002		2
2020	2020Air Compressors	Air Compressors	78	0.3077	0.0310	0.0483	0.0007	0.0004	0.0004		4
2020	2020Bore/Drill Rigs	Bore/Drill Rigs	82	0.5008	0.0325	0.0480	0.0017	0.0004	0.0004		4
2020	2020Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0415	0.0667	0.0086	0.0001	0.0009	0.0008		1
2020	2020Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3783	0.0321	0.0484	0.0007	0.0004	0.0004		4
2020	2020Cranes	Cranes	208	0.3917	0.0825	0.0898	0.0014	0.0010	0.0009		6
2020	2020Crawler Tractors	Crawler Tractors	82	0.5260	0.0325	0.1049	0.0013	0.0004	0.0004		4
2020	2020Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6247	0.0337	0.0934	0.0015	0.0004	0.0004		4
2020	2020Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0016	0.0015		1
2020	2020Excavators	Excavators	157	0.5124	0.0623	0.0733	0.0013	0.0008	0.0007		5
2020	2020Forklifts	Forklifts	149	0.2160	0.0591	0.0320	0.0006	0.0007	0.0007		5
2020	2020Generator Sets	Generator Sets	84	0.2732	0.0333	0.0395	0.0007	0.0004	0.0004		4
2020	2020Graders	Graders	162	0.5765	0.0643	0.0919	0.0015	0.0008	0.0007		5
2020	2020Off-Highway Tractors	Off-Highway Tractors	160	0.6517	0.0635	0.1470	0.0017	0.0008	0.0007		5
2020	2020Off-Highway Trucks	Off-Highway Trucks	381	0.5514	0.1512	0.1443	0.0027	0.0019	0.0017		6
2020	2020Other Construction Equipment	Other Construction Equipment	327	0.3508	0.1298	0.0563	0.0013	0.0016	0.0015		6
2020	2020Other General Industrial Equipm	Other General Industrial Equipment	150	0.4517	0.0595	0.0983	0.0016	0.0007	0.0007		5
2020	2020Other Material Handling Equipm	Other Material Handling Equipment	196	0.4429	0.0778	0.0924	0.0015	0.0010	0.0009		6
2020	2020Pavers	Pavers	89	0.4920	0.0353	0.0989	0.0009	0.0004	0.0004		4
2020	2020Paving Equipment	Paving Equipment	82	0.4084	0.0325	0.0757	0.0008	0.0004	0.0004		4
2020	2020Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0008	0.0007		1
2020	2020Pressure Washers	Pressure Washers	13	0.0549	0.0963	0.0085	0.0001	0.0013	0.0012		1
2020	2020Pumps	Pumps	84	0.2674	0.0333	0.0376	0.0006	0.0004	0.0004		4
2020	2020Rollers	Rollers	84	0.3837	0.0333	0.0584	0.0008	0.0004	0.0004		4
2020	2020Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4464	0.0329	0.0533	0.0008	0.0004	0.0004		4
2020	2020Rubber Tired Dozers	Rubber Tired Dozers	358	0.8006	0.1421	0.2118	0.0025	0.0018	0.0016		6
2020	2020Rubber Tired Loaders	Rubber Tired Loaders	87	0.4406	0.0345	0.0753	0.0012	0.0004	0.0004		4
2020	2020Scrapers	Scrapers	356	0.7938	0.1413	0.1914	0.0027	0.0018	0.0016		6
2020	2020Signal Boards	Signal Boards	6	0.0912	0.0444	0.0129	0.0002	0.0006	0.0005		1
2020	2020Skid Steer Loaders	Skid Steer Loaders	37	0.2125	0.1713	0.0222	0.0004	0.0002	0.0002		2
2020	2020Surfacing Equipment	Surfacing Equipment	392	0.3953	0.1556	0.0823	0.0017	0.0019	0.0018		6
2020	2020Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4916	0.0349	0.0584	0.0009	0.0004	0.0004		4
2020	2020Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3616	0.0298	0.0436	0.0008	0.0004	0.0003		4
2020	2020Trenchers	Trenchers	69	0.4270	0.3195	0.0933	0.0007	0.0005	0.0004		3
2020	2020Welders	Welders	46	0.1816	0.2130	0.0310	0.0003	0.0003	0.0003		2

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Operation

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2021	2021Arial Lifts	Arial Lifts	34	0.1677	0.1574	0.0238	0.0004	0.0002	0.0002	34.7	2
2021	2021Air Compressors	Air Compressors	78	0.3051	0.0310	0.0442	0.0007	0.0004	0.0004	63.6	4
2021	2021Bore/Drill Rigs	Bore/Drill Rigs	82	0.5007	0.0325	0.0460	0.0017	0.0004	0.0004	165	4
2021	2021Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0415	0.0667	0.0086	0.0001	0.0009	0.0008	7.2	1
2021	2021Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3761	0.0321	0.0444	0.0007	0.0004	0.0004	58.5	4
2021	2021Cranes	Cranes	208	0.3865	0.0825	0.0846	0.0014	0.0010	0.0009	129	6
2021	2021Crawler Tractors	Crawler Tractors	82	0.5208	0.0325	0.0988	0.0013	0.0004	0.0004	114	4
2021	2021Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6224	0.0337	0.0872	0.0015	0.0004	0.0004	132	4
2021	2021Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0016	0.0015	7.6	1
2021	2021Excavators	Excavators	157	0.5113	0.0623	0.0687	0.0013	0.0008	0.0007	120	5
2021	2021Forklifts	Forklifts	149	0.2148	0.0591	0.0294	0.0006	0.0007	0.0007	54.4	5
2021	2021Generator Sets	Generator Sets	84	0.2708	0.0333	0.0363	0.0007	0.0004	0.0004	61.0	4
2021	2021Graders	Graders	162	0.5747	0.0643	0.0861	0.0015	0.0008	0.0007	133	5
2021	2021Off-Highway Tractors	Off-Highway Tractors	160	0.6413	0.0635	0.1394	0.0017	0.0008	0.0007	151	5
2021	2021Off-Highway Trucks	Off-Highway Trucks	381	0.5476	0.1512	0.1370	0.0027	0.0019	0.0017	260	6
2021	2021Other Construction Equipment	Other Construction Equipment	327	0.3497	0.1298	0.0534	0.0013	0.0016	0.0015	122	6
2021	2021Other General Industrial Equipm	Other General Industrial Equipment	150	0.4479	0.0595	0.0915	0.0016	0.0007	0.0007	152	5
2021	2021Other Material Handling Equipm	Other Material Handling Equipment	196	0.4392	0.0778	0.0860	0.0015	0.0010	0.0009	141	6
2021	2021Pavers	Pavers	89	0.4878	0.0353	0.0928	0.0009	0.0004	0.0004	77.9	4
2021	2021Paving Equipment	Paving Equipment	82	0.4062	0.0325	0.0710	0.0008	0.0004	0.0004	68.9	4
2021	2021Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0008	0.0007	4.3	1
2021	2021Pressure Washers	Pressure Washers	13	0.0543	0.0963	0.0079	0.0001	0.0013	0.0012	9.4	1
2021	2021Pumps	Pumps	84	0.2652	0.0333	0.0344	0.0006	0.0004	0.0004	49.6	4
2021	2021Rollers	Rollers	84	0.3816	0.0333	0.0540	0.0008	0.0004	0.0004	67.0	4
2021	2021Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4454	0.0329	0.0497	0.0008	0.0004	0.0004	70.3	4
2021	2021Rubber Tired Dozers	Rubber Tired Dozers	358	0.7661	0.1421	0.2015	0.0025	0.0018	0.0016	239	6
2021	2021Rubber Tired Loaders	Rubber Tired Loaders	87	0.4381	0.0345	0.0705	0.0012	0.0004	0.0004	109	4
2021	2021Scrapers	Scrapers	356	0.7745	0.1413	0.1815	0.0027	0.0018	0.0016	262	6
2021	2021Signal Boards	Signal Boards	6	0.0911	0.0444	0.0125	0.0002	0.0006	0.0005	16.7	1
2021	2021Skid Steer Loaders	Skid Steer Loaders	37	0.2119	0.1713	0.0212	0.0004	0.0002	0.0002	30.3	2
2021	2021Surfacing Equipment	Surfacing Equipment	392	0.3860	0.1556	0.0779	0.0017	0.0019	0.0018	166	6
2021	2021Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4882	0.0349	0.0536	0.0009	0.0004	0.0004	78.5	4
2021	2021Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3606	0.0298	0.0407	0.0008	0.0004	0.0003	66.8	4
2021	2021Trenchers	Trenchers	69	0.4226	0.3195	0.0874	0.0007	0.0005	0.0004	58.7	3
2021	2021Welders	Welders	46	0.1788	0.2130	0.0280	0.0003	0.0003	0.0003	25.6	2
2022	2022Arial Lifts	Arial Lifts	34	0.1667	0.1574	0.0222	0.0004	0.0002	0.0002		2
2022	2022Air Compressors	Air Compressors	78	0.3041	0.0310	0.0414	0.0007	0.0004	0.0004		4
2022	2022Bore/Drill Rigs	Bore/Drill Rigs	82	0.5007	0.0325	0.0446	0.0017	0.0004	0.0004		4
2022	2022Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0414	0.0667	0.0085	0.0001	0.0009	0.0008		1
2022	2022Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3743	0.0321	0.0411	0.0007	0.0004	0.0004		4
2022	2022Cranes	Cranes	208	0.3822	0.0825	0.0798	0.0014	0.0010	0.0009		6
2022	2022Crawler Tractors	Crawler Tractors	82	0.5163	0.0325	0.0931	0.0013	0.0004	0.0004		4
2022	2022Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6208	0.0337	0.0820	0.0015	0.0004	0.0004		4
2022	2022Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0016	0.0015		1
2022	2022Excavators	Excavators	157	0.5104	0.0623	0.0648	0.0013	0.0008	0.0007		5
2022	2022Forklifts	Forklifts	149	0.2146	0.0591	0.0274	0.0006	0.0007	0.0007		5
2022	2022Generator Sets	Generator Sets	84	0.2694	0.0333	0.0340	0.0007	0.0004	0.0004		4
2022	2022Graders	Graders	162	0.5732	0.0643	0.0807	0.0015	0.0008	0.0007		5
2022	2022Off-Highway Tractors	Off-Highway Tractors	160	0.6320	0.0635	0.1322	0.0017	0.0008	0.0007		5

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Operation

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2022	2022Off-Highway Trucks	Off-Highway Trucks	381	0.5447	0.1512	0.1303	0.0027	0.0019	0.0017		6
2022	2022Other Construction Equipment	Other Construction Equipment	327	0.3488	0.1298	0.0507	0.0013	0.0016	0.0015		6
2022	2022Other General Industrial Equipm	Other General Industrial Equipment	150	0.4464	0.0595	0.0867	0.0016	0.0007	0.0007		5
2022	2022Other Material Handling Equipm	Other Material Handling Equipment	196	0.4378	0.0778	0.0813	0.0015	0.0010	0.0009		6
2022	2022Pavers	Pavers	89	0.4840	0.0353	0.0870	0.0009	0.0004	0.0004		4
2022	2022Paving Equipment	Paving Equipment	82	0.4042	0.0325	0.0666	0.0008	0.0004	0.0004		4
2022	2022Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0008	0.0007		1
2022	2022Pressure Washers	Pressure Washers	13	0.0539	0.0963	0.0075	0.0001	0.0013	0.0012		1
2022	2022Pumps	Pumps	84	0.2640	0.0333	0.0322	0.0006	0.0004	0.0004		4
2022	2022Rollers	Rollers	84	0.3799	0.0333	0.0500	0.0008	0.0004	0.0004		4
2022	2022Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4445	0.0329	0.0467	0.0008	0.0004	0.0004		4
2022	2022Rubber Tired Dozers	Rubber Tired Dozers	358	0.7353	0.1421	0.1919	0.0025	0.0018	0.0016		6
2022	2022Rubber Tired Loaders	Rubber Tired Loaders	87	0.4359	0.0345	0.0661	0.0012	0.0004	0.0004		4
2022	2022Scrapers	Scrapers	356	0.7579	0.1413	0.1724	0.0027	0.0018	0.0016		6
2022	2022Signal Boards	Signal Boards	6	0.0910	0.0444	0.0121	0.0002	0.0006	0.0005		1
2022	2022Skid Steer Loaders	Skid Steer Loaders	37	0.2114	0.1713	0.0204	0.0004	0.0002	0.0002		2
2022	2022Surfacing Equipment	Surfacing Equipment	392	0.3778	0.1556	0.0739	0.0017	0.0019	0.0018		6
2022	2022Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4867	0.0349	0.0498	0.0009	0.0004	0.0004		4
2022	2022Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3599	0.0298	0.0384	0.0008	0.0004	0.0003		4
2022	2022Trenchers	Trenchers	69	0.4186	0.3195	0.0819	0.0007	0.0005	0.0004		3
2022	2022Welders	Welders	46	0.1773	0.2130	0.0260	0.0003	0.0003	0.0003		2
2023	2023Arial Lifts	Arial Lifts	34	0.1658	0.1574	0.0208	0.0004	0.0002	0.0002	34.7	2
2023	2023Air Compressors	Air Compressors	78	0.3035	0.0310	0.0390	0.0007	0.0004	0.0004	63.6	4
2023	2023Bore/Drill Rigs	Bore/Drill Rigs	82	0.5007	0.0325	0.0436	0.0017	0.0004	0.0004	165	4
2023	2023Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0414	0.0667	0.0085	0.0001	0.0009	0.0008	7.2	1
2023	2023Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3728	0.0321	0.0382	0.0007	0.0004	0.0004	58.5	4
2023	2023Cranes	Cranes	208	0.3786	0.0825	0.0754	0.0014	0.0010	0.0009	129	6
2023	2023Crawler Tractors	Crawler Tractors	82	0.5125	0.0325	0.0879	0.0013	0.0004	0.0004	114	4
2023	2023Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6199	0.0337	0.0773	0.0015	0.0004	0.0004	132	4
2023	2023Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0016	0.0015	7.6	1
2023	2023Excavators	Excavators	157	0.5097	0.0623	0.0615	0.0013	0.0008	0.0007	120	5
2023	2023Forklifts	Forklifts	149	0.2146	0.0591	0.0259	0.0006	0.0007	0.0007	54.4	5
2023	2023Generator Sets	Generator Sets	84	0.2683	0.0333	0.0321	0.0007	0.0004	0.0004	61.0	4
2023	2023Graders	Graders	162	0.5718	0.0643	0.0758	0.0015	0.0008	0.0007	133	5
2023	2023Off-Highway Tractors	Off-Highway Tractors	160	0.6238	0.0635	0.1255	0.0017	0.0008	0.0007	151	5
2023	2023Off-Highway Trucks	Off-Highway Trucks	381	0.5422	0.1512	0.1243	0.0027	0.0019	0.0017	260	6
2023	2023Other Construction Equipment	Other Construction Equipment	327	0.3482	0.1298	0.0483	0.0013	0.0016	0.0015	123	6
2023	2023Other General Industrial Equipm	Other General Industrial Equipment	150	0.4454	0.0595	0.0824	0.0016	0.0007	0.0007	152	5
2023	2023Other Material Handling Equipm	Other Material Handling Equipment	196	0.4369	0.0778	0.0771	0.0015	0.0010	0.0009	141	6
2023	2023Pavers	Pavers	89	0.4805	0.0353	0.0815	0.0009	0.0004	0.0004	77.9	4
2023	2023Paving Equipment	Paving Equipment	82	0.4024	0.0325	0.0624	0.0008	0.0004	0.0004	68.9	4
2023	2023Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0008	0.0007	4.3	1
2023	2023Pressure Washers	Pressure Washers	13	0.0536	0.0963	0.0072	0.0001	0.0013	0.0012	9.4	1
2023	2023Pumps	Pumps	84	0.2631	0.0333	0.0302	0.0006	0.0004	0.0004	49.6	4
2023	2023Rollers	Rollers	84	0.3784	0.0333	0.0465	0.0008	0.0004	0.0004	67.0	4
2023	2023Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4439	0.0329	0.0439	0.0008	0.0004	0.0004	70.3	4
2023	2023Rubber Tired Dozers	Rubber Tired Dozers	358	0.7078	0.1421	0.1830	0.0025	0.0018	0.0016	239	6
2023	2023Rubber Tired Loaders	Rubber Tired Loaders	87	0.4340	0.0345	0.0622	0.0012	0.0004	0.0004	109	4
2023	2023Scrapers	Scrapers	356	0.7432	0.1413	0.1641	0.0027	0.0018	0.0016	262	6

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Operation

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2023	2023Signal Boards	Signal Boards	6	0.0909	0.0444	0.0117	0.0002	0.0006	0.0005	16.7	1
2023	2023Skid Steer Loaders	Skid Steer Loaders	37	0.2110	0.1713	0.0196	0.0004	0.0002	0.0002	30.3	2
2023	2023Surfacing Equipment	Surfacing Equipment	392	0.3707	0.1556	0.0703	0.0017	0.0019	0.0018	166	6
2023	2023Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4855	0.0349	0.0464	0.0009	0.0004	0.0004	78.5	4
2023	2023Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3593	0.0298	0.0365	0.0008	0.0004	0.0003	66.8	4
2023	2023Trenchers	Trenchers	69	0.4150	0.3195	0.0767	0.0007	0.0005	0.0004	58.7	3
2023	2023Welders	Welders	46	0.1762	0.2130	0.0242	0.0003	0.0003	0.0003	25.6	2
2024	2024Arial Lifts	Arial Lifts	34	0.1652	0.1574	0.0195	0.0004	0.0002	0.0002	34.7	2
2024	2024Air Compressors	Air Compressors	78	0.3031	0.0310	0.0369	0.0007	0.0004	0.0004	63.6	4
2024	2024Bore/Drill Rigs	Bore/Drill Rigs	82	0.5007	0.0325	0.0431	0.0017	0.0004	0.0004	165	4
2024	2024Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0414	0.0667	0.0085	0.0001	0.0009	0.0008	7.2	1
2024	2024Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3716	0.0321	0.0358	0.0007	0.0004	0.0004	58.5	4
2024	2024Cranes	Cranes	208	0.3759	0.0825	0.0715	0.0014	0.0010	0.0009	129	6
2024	2024Crawler Tractors	Crawler Tractors	82	0.5092	0.0325	0.0832	0.0013	0.0004	0.0004	114	4
2024	2024Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6193	0.0337	0.0731	0.0015	0.0004	0.0004	132	4
2024	2024Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0016	0.0015	7.6	1
2024	2024Excavators	Excavators	157	0.5091	0.0623	0.0585	0.0013	0.0008	0.0007	120	5
2024	2024Forklifts	Forklifts	149	0.2146	0.0591	0.0246	0.0006	0.0007	0.0007	54.4	5
2024	2024Generator Sets	Generator Sets	84	0.2674	0.0333	0.0303	0.0007	0.0004	0.0004	61.0	4
2024	2024Graders	Graders	162	0.5706	0.0643	0.0714	0.0015	0.0008	0.0007	133	5
2024	2024Off-Highway Tractors	Off-Highway Tractors	160	0.6165	0.0635	0.1192	0.0017	0.0008	0.0007	151	5
2024	2024Off-Highway Trucks	Off-Highway Trucks	381	0.5401	0.1512	0.1189	0.0027	0.0019	0.0017	260	6
2024	2024Other Construction Equipment	Other Construction Equipment	327	0.3477	0.1298	0.0462	0.0013	0.0016	0.0015	123	6
2024	2024Other General Industrial Equipm	Other General Industrial Equipment	150	0.4446	0.0595	0.0784	0.0016	0.0007	0.0007	152	5
2024	2024Other Material Handling Equipm	Other Material Handling Equipment	196	0.4362	0.0778	0.0733	0.0015	0.0010	0.0009	141	6
2024	2024Pavers	Pavers	89	0.4773	0.0353	0.0764	0.0009	0.0004	0.0004	77.9	4
2024	2024Paving Equipment	Paving Equipment	82	0.4007	0.0325	0.0584	0.0008	0.0004	0.0004	68.9	4
2024	2024Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0008	0.0007	4.3	1
2024	2024Pressure Washers	Pressure Washers	13	0.0534	0.0963	0.0069	0.0001	0.0013	0.0012	9.4	1
2024	2024Pumps	Pumps	84	0.2624	0.0333	0.0285	0.0006	0.0004	0.0004	49.6	4
2024	2024Rollers	Rollers	84	0.3772	0.0333	0.0435	0.0008	0.0004	0.0004	67.0	4
2024	2024Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4433	0.0329	0.0416	0.0008	0.0004	0.0004	70.3	4
2024	2024Rubber Tired Dozers	Rubber Tired Dozers	358	0.6835	0.1421	0.1748	0.0025	0.0018	0.0016	239	6
2024	2024Rubber Tired Loaders	Rubber Tired Loaders	87	0.4324	0.0345	0.0588	0.0012	0.0004	0.0004	109	4
2024	2024Scrapers	Scrapers	356	0.7302	0.1413	0.1565	0.0027	0.0018	0.0016	262	6
2024	2024Signal Boards	Signal Boards	6	0.0909	0.0444	0.0114	0.0002	0.0006	0.0005	16.7	1
2024	2024Skid Steer Loaders	Skid Steer Loaders	37	0.2107	0.1713	0.0190	0.0004	0.0002	0.0002	30.3	2
2024	2024Surfacing Equipment	Surfacing Equipment	392	0.3644	0.1556	0.0669	0.0017	0.0019	0.0018	166	6
2024	2024Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4846	0.0349	0.0434	0.0009	0.0004	0.0004	78.5	4
2024	2024Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3589	0.0298	0.0349	0.0008	0.0004	0.0003	66.8	4
2024	2024Trenchers	Trenchers	69	0.4116	0.3195	0.0719	0.0007	0.0005	0.0004	58.7	3
2024	2024Welders	Welders	46	0.1753	0.2130	0.0227	0.0003	0.0003	0.0003	25.6	2
2025	2025Arial Lifts	Arial Lifts	34	0.1646	0.1574	0.0184	0.0004	0.0002	0.0002	34.7	2
2025	2025Air Compressors	Air Compressors	78	0.3027	0.0310	0.0349	0.0007	0.0004	0.0004	63.6	4
2025	2025Bore/Drill Rigs	Bore/Drill Rigs	82	0.5007	0.0325	0.0428	0.0017	0.0004	0.0004	165	4
2025	2025Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0414	0.0667	0.0085	0.0001	0.0009	0.0008	7.2	1
2025	2025Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3706	0.0321	0.0337	0.0007	0.0004	0.0004	58.5	4
2025	2025Cranes	Cranes	208	0.3738	0.0825	0.0681	0.0014	0.0010	0.0009	129	6
2025	2025Crawler Tractors	Crawler Tractors	82	0.5065	0.0325	0.0789	0.0013	0.0004	0.0004	114	4

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Operation

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2025	2025Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6187	0.0337	0.0693	0.0015	0.0004	0.0004	132	4
2025	2025Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0016	0.0015	7.6	1
2025	2025Excavators	Excavators	157	0.5086	0.0623	0.0559	0.0013	0.0008	0.0007	120	5
2025	2025Forklifts	Forklifts	149	0.2148	0.0591	0.0236	0.0006	0.0007	0.0007	54.4	5
2025	2025Generator Sets	Generator Sets	84	0.2667	0.0333	0.0288	0.0007	0.0004	0.0004	61.0	4
2025	2025Graders	Graders	162	0.5696	0.0643	0.0676	0.0015	0.0008	0.0007	133	5
2025	2025Off-Highway Tractors	Off-Highway Tractors	160	0.6101	0.0635	0.1134	0.0017	0.0008	0.0007	151	5
2025	2025Off-Highway Trucks	Off-Highway Trucks	381	0.5385	0.1512	0.1140	0.0027	0.0019	0.0017	260	6
2025	2025Other Construction Equipment	Other Construction Equipment	327	0.3474	0.1298	0.0442	0.0013	0.0016	0.0015	123	6
2025	2025Other General Industrial Equipm	Other General Industrial Equipment	150	0.4438	0.0595	0.0747	0.0016	0.0007	0.0007	152	5
2025	2025Other Material Handling Equipm	Other Material Handling Equipment	196	0.4355	0.0778	0.0696	0.0015	0.0010	0.0009	141	6
2025	2025Pavers	Pavers	89	0.4745	0.0353	0.0717	0.0009	0.0004	0.0004	77.9	4
2025	2025Paving Equipment	Paving Equipment	82	0.3993	0.0325	0.0548	0.0008	0.0004	0.0004	68.9	4
2025	2025Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0008	0.0007	4.3	1
2025	2025Pressure Washers	Pressure Washers	13	0.0531	0.0963	0.0066	0.0001	0.0013	0.0012	9.4	1
2025	2025Pumps	Pumps	84	0.2617	0.0333	0.0270	0.0006	0.0004	0.0004	49.6	4
2025	2025Rollers	Rollers	84	0.3763	0.0333	0.0410	0.0008	0.0004	0.0004	67.0	4
2025	2025Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4430	0.0329	0.0396	0.0008	0.0004	0.0004	70.3	4
2025	2025Rubber Tired Dozers	Rubber Tired Dozers	358	0.6620	0.1421	0.1672	0.0025	0.0018	0.0016	239	6
2025	2025Rubber Tired Loaders	Rubber Tired Loaders	87	0.4311	0.0345	0.0559	0.0012	0.0004	0.0004	109	4
2025	2025Scrapers	Scrapers	356	0.7187	0.1413	0.1495	0.0027	0.0018	0.0016	262	6
2025	2025Signal Boards	Signal Boards	6	0.0909	0.0444	0.0111	0.0002	0.0006	0.0005	16.7	1
2025	2025Skid Steer Loaders	Skid Steer Loaders	37	0.2104	0.1713	0.0186	0.0004	0.0002	0.0002	30.3	2
2025	2025Surfacing Equipment	Surfacing Equipment	392	0.3590	0.1556	0.0638	0.0017	0.0019	0.0018	166	6
2025	2025Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4840	0.0349	0.0410	0.0009	0.0004	0.0004	78.5	4
2025	2025Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3586	0.0298	0.0336	0.0008	0.0004	0.0003	66.8	4
2025	2025Trenchers	Trenchers	69	0.4085	0.3195	0.0674	0.0007	0.0005	0.0004	58.7	3
2025	2025Welders	Welders	46	0.1745	0.2130	0.0214	0.0003	0.0003	0.0003	25.6	2
2026	2026Arial Lifts	Arial Lifts	34	0.1646	0.1574	0.0184	0.0004	0.0002	0.0002	34.7	2
2026	2026Air Compressors	Air Compressors	78	0.3027	0.0310	0.0349	0.0007	0.0004	0.0004	63.6	4
2026	2026Bore/Drill Rigs	Bore/Drill Rigs	82	0.5007	0.0325	0.0428	0.0017	0.0004	0.0004	165	4
2026	2026Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0414	0.0667	0.0085	0.0001	0.0009	0.0008	7.2	1
2026	2026Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3706	0.0321	0.0337	0.0007	0.0004	0.0004	58.5	4
2026	2026Cranes	Cranes	208	0.3738	0.0825	0.0681	0.0014	0.0010	0.0009	129	6
2026	2026Crawler Tractors	Crawler Tractors	82	0.5065	0.0325	0.0789	0.0013	0.0004	0.0004	114	4
2026	2026Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6187	0.0337	0.0693	0.0015	0.0004	0.0004	132	4
2026	2026Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0016	0.0015	7.6	1
2026	2026Excavators	Excavators	157	0.5086	0.0623	0.0559	0.0013	0.0008	0.0007	120	5
2026	2026Forklifts	Forklifts	149	0.2148	0.0591	0.0236	0.0006	0.0007	0.0007	54.4	5
2026	2026Generator Sets	Generator Sets	84	0.2667	0.0333	0.0288	0.0007	0.0004	0.0004	61.0	4
2026	2026Graders	Graders	162	0.5696	0.0643	0.0676	0.0015	0.0008	0.0007	133	5
2026	2026Off-Highway Tractors	Off-Highway Tractors	160	0.6101	0.0635	0.1134	0.0017	0.0008	0.0007	151	5
2026	2026Off-Highway Trucks	Off-Highway Trucks	381	0.5385	0.1512	0.1140	0.0027	0.0019	0.0017	260	6
2026	2026Other Construction Equipment	Other Construction Equipment	327	0.3474	0.1298	0.0442	0.0013	0.0016	0.0015	123	6
2026	2026Other General Industrial Equipm	Other General Industrial Equipment	150	0.4438	0.0595	0.0747	0.0016	0.0007	0.0007	152	5
2026	2026Other Material Handling Equipm	Other Material Handling Equipment	196	0.4355	0.0778	0.0696	0.0015	0.0010	0.0009	141	6
2026	2026Pavers	Pavers	89	0.4745	0.0353	0.0717	0.0009	0.0004	0.0004	77.9	4
2026	2026Paving Equipment	Paving Equipment	82	0.3993	0.0325	0.0548	0.0008	0.0004	0.0004	68.9	4
2026	2026Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0008	0.0007	4.3	1

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Operation

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2026	2026Pressure Washers	Pressure Washers	13	0.0531	0.0963	0.0066	0.0001	0.0013	0.0012	9.4	1
2026	2026Pumps	Pumps	84	0.2617	0.0333	0.0270	0.0006	0.0004	0.0004	49.6	4
2026	2026Rollers	Rollers	84	0.3763	0.0333	0.0410	0.0008	0.0004	0.0004	67.0	4
2026	2026Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4430	0.0329	0.0396	0.0008	0.0004	0.0004	70.3	4
2026	2026Rubber Tired Dozers	Rubber Tired Dozers	358	0.6620	0.1421	0.1672	0.0025	0.0018	0.0016	239	6
2026	2026Rubber Tired Loaders	Rubber Tired Loaders	87	0.4311	0.0345	0.0559	0.0012	0.0004	0.0004	109	4
2026	2026Scrapers	Scrapers	356	0.7187	0.1413	0.1495	0.0027	0.0018	0.0016	262	6
2026	2026Signal Boards	Signal Boards	6	0.0909	0.0444	0.0111	0.0002	0.0006	0.0005	16.7	1
2026	2026Skid Steer Loaders	Skid Steer Loaders	37	0.2104	0.1713	0.0186	0.0004	0.0002	0.0002	30.3	2
2026	2026Surfacing Equipment	Surfacing Equipment	392	0.3590	0.1556	0.0638	0.0017	0.0019	0.0018	166	6
2026	2026Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4840	0.0349	0.0410	0.0009	0.0004	0.0004	78.5	4
2026	2026Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3586	0.0298	0.0336	0.0008	0.0004	0.0003	66.8	4
2026	2026Trenchers	Trenchers	69	0.4085	0.3195	0.0674	0.0007	0.0005	0.0004	58.7	3
2026	2026Welders	Welders	46	0.1745	0.2130	0.0214	0.0003	0.0003	0.0003	25.6	2
2027	2027Arial Lifts	Arial Lifts	34	0.1646	0.1574	0.0184	0.0004	0.0002	0.0002		2
2027	2027Air Compressors	Air Compressors	78	0.3027	0.0310	0.0349	0.0007	0.0004	0.0004		4
2027	2027Bore/Drill Rigs	Bore/Drill Rigs	82	0.5007	0.0325	0.0428	0.0017	0.0004	0.0004		4
2027	2027Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0414	0.0667	0.0085	0.0001	0.0009	0.0008		1
2027	2027Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3706	0.0321	0.0337	0.0007	0.0004	0.0004		4
2027	2027Cranes	Cranes	208	0.3738	0.0825	0.0681	0.0014	0.0010	0.0009		6
2027	2027Crawler Tractors	Crawler Tractors	82	0.5065	0.0325	0.0789	0.0013	0.0004	0.0004		4
2027	2027Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6187	0.0337	0.0693	0.0015	0.0004	0.0004		4
2027	2027Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0016	0.0015		1
2027	2027Excavators	Excavators	157	0.5086	0.0623	0.0559	0.0013	0.0008	0.0007		5
2027	2027Forklifts	Forklifts	149	0.2148	0.0591	0.0236	0.0006	0.0007	0.0007		5
2027	2027Generator Sets	Generator Sets	84	0.2667	0.0333	0.0288	0.0007	0.0004	0.0004		4
2027	2027Graders	Graders	162	0.5696	0.0643	0.0676	0.0015	0.0008	0.0007		5
2027	2027Off-Highway Tractors	Off-Highway Tractors	160	0.6101	0.0635	0.1134	0.0017	0.0008	0.0007		5
2027	2027Off-Highway Trucks	Off-Highway Trucks	381	0.5385	0.1512	0.1140	0.0027	0.0019	0.0017		6
2027	2027Other Construction Equipment	Other Construction Equipment	327	0.3474	0.1298	0.0442	0.0013	0.0016	0.0015		6
2027	2027Other General Industrial Equipm	Other General Industrial Equipment	150	0.4438	0.0595	0.0747	0.0016	0.0007	0.0007		5
2027	2027Other Material Handling Equipm	Other Material Handling Equipment	196	0.4355	0.0778	0.0696	0.0015	0.0010	0.0009		6
2027	2027Pavers	Pavers	89	0.4745	0.0353	0.0717	0.0009	0.0004	0.0004		4
2027	2027Paving Equipment	Paving Equipment	82	0.3993	0.0325	0.0548	0.0008	0.0004	0.0004		4
2027	2027Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0008	0.0007		1
2027	2027Pressure Washers	Pressure Washers	13	0.0531	0.0963	0.0066	0.0001	0.0013	0.0012		1
2027	2027Pumps	Pumps	84	0.2617	0.0333	0.0270	0.0006	0.0004	0.0004		4
2027	2027Rollers	Rollers	84	0.3763	0.0333	0.0410	0.0008	0.0004	0.0004		4
2027	2027Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4430	0.0329	0.0396	0.0008	0.0004	0.0004		4
2027	2027Rubber Tired Dozers	Rubber Tired Dozers	358	0.6620	0.1421	0.1672	0.0025	0.0018	0.0016		6
2027	2027Rubber Tired Loaders	Rubber Tired Loaders	87	0.4311	0.0345	0.0559	0.0012	0.0004	0.0004		4
2027	2027Scrapers	Scrapers	356	0.7187	0.1413	0.1495	0.0027	0.0018	0.0016		6
2027	2027Signal Boards	Signal Boards	6	0.0909	0.0444	0.0111	0.0002	0.0006	0.0005		1
2027	2027Skid Steer Loaders	Skid Steer Loaders	37	0.2104	0.1713	0.0186	0.0004	0.0002	0.0002		2
2027	2027Surfacing Equipment	Surfacing Equipment	392	0.3590	0.1556	0.0638	0.0017	0.0019	0.0018		6
2027	2027Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4840	0.0349	0.0410	0.0009	0.0004	0.0004		4
2027	2027Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3586	0.0298	0.0336	0.0008	0.0004	0.0003		4
2027	2027Trenchers	Trenchers	69	0.4085	0.3195	0.0674	0.0007	0.0005	0.0004		3
2027	2027Welders	Welders	46	0.1745	0.2130	0.0214	0.0003	0.0003	0.0003		2

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Operation

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2028	2028Arial Lifts	Arial Lifts	34	0.1646	0.1574	0.0184	0.0004	0.0002	0.0002		2
2028	2028Air Compressors	Air Compressors	78	0.3027	0.0310	0.0349	0.0007	0.0004	0.0004		4
2028	2028Bore/Drill Rigs	Bore/Drill Rigs	82	0.5007	0.0325	0.0428	0.0017	0.0004	0.0004		4
2028	2028Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0414	0.0667	0.0085	0.0001	0.0009	0.0008		1
2028	2028Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3706	0.0321	0.0337	0.0007	0.0004	0.0004		4
2028	2028Cranes	Cranes	208	0.3738	0.0825	0.0681	0.0014	0.0010	0.0009		6
2028	2028Crawler Tractors	Crawler Tractors	82	0.5065	0.0325	0.0789	0.0013	0.0004	0.0004		4
2028	2028Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6187	0.0337	0.0693	0.0015	0.0004	0.0004		4
2028	2028Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0016	0.0015		1
2028	2028Excavators	Excavators	157	0.5086	0.0623	0.0559	0.0013	0.0008	0.0007		5
2028	2028Forklifts	Forklifts	149	0.2148	0.0591	0.0236	0.0006	0.0007	0.0007		5
2028	2028Generator Sets	Generator Sets	84	0.2667	0.0333	0.0288	0.0007	0.0004	0.0004		4
2028	2028Graders	Graders	162	0.5696	0.0643	0.0676	0.0015	0.0008	0.0007		5
2028	2028Off-Highway Tractors	Off-Highway Tractors	160	0.6101	0.0635	0.1134	0.0017	0.0008	0.0007		5
2028	2028Off-Highway Trucks	Off-Highway Trucks	381	0.5385	0.1512	0.1140	0.0027	0.0019	0.0017		6
2028	2028Other Construction Equipment	Other Construction Equipment	327	0.3474	0.1298	0.0442	0.0013	0.0016	0.0015		6
2028	2028Other General Industrial Equipm	Other General Industrial Equipment	150	0.4438	0.0595	0.0747	0.0016	0.0007	0.0007		5
2028	2028Other Material Handling Equipm	Other Material Handling Equipment	196	0.4355	0.0778	0.0696	0.0015	0.0010	0.0009		6
2028	2028Pavers	Pavers	89	0.4745	0.0353	0.0717	0.0009	0.0004	0.0004		4
2028	2028Paving Equipment	Paving Equipment	82	0.3993	0.0325	0.0548	0.0008	0.0004	0.0004		4
2028	2028Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0008	0.0007		1
2028	2028Pressure Washers	Pressure Washers	13	0.0531	0.0963	0.0066	0.0001	0.0013	0.0012		1
2028	2028Pumps	Pumps	84	0.2617	0.0333	0.0270	0.0006	0.0004	0.0004		4
2028	2028Rollers	Rollers	84	0.3763	0.0333	0.0410	0.0008	0.0004	0.0004		4
2028	2028Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4430	0.0329	0.0396	0.0008	0.0004	0.0004		4
2028	2028Rubber Tired Dozers	Rubber Tired Dozers	358	0.6620	0.1421	0.1672	0.0025	0.0018	0.0016		6
2028	2028Rubber Tired Loaders	Rubber Tired Loaders	87	0.4311	0.0345	0.0559	0.0012	0.0004	0.0004		4
2028	2028Scrapers	Scrapers	356	0.7187	0.1413	0.1495	0.0027	0.0018	0.0016		6
2028	2028Signal Boards	Signal Boards	6	0.0909	0.0444	0.0111	0.0002	0.0006	0.0005		1
2028	2028Skid Steer Loaders	Skid Steer Loaders	37	0.2104	0.1713	0.0186	0.0004	0.0002	0.0002		2
2028	2028Surfacing Equipment	Surfacing Equipment	392	0.3590	0.1556	0.0638	0.0017	0.0019	0.0018		6
2028	2028Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4840	0.0349	0.0410	0.0009	0.0004	0.0004		4
2028	2028Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3586	0.0298	0.0336	0.0008	0.0004	0.0003		4
2028	2028Trenchers	Trenchers	69	0.4085	0.3195	0.0674	0.0007	0.0005	0.0004		3
2028	2028Welders	Welders	46	0.1745	0.2130	0.0214	0.0003	0.0003	0.0003		2
2029	2029Arial Lifts	Arial Lifts	34	0.1646	0.1574	0.0184	0.0004	0.0002	0.0002		2
2029	2029Air Compressors	Air Compressors	78	0.3027	0.0310	0.0349	0.0007	0.0004	0.0004		4
2029	2029Bore/Drill Rigs	Bore/Drill Rigs	82	0.5007	0.0325	0.0428	0.0017	0.0004	0.0004		4
2029	2029Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0414	0.0667	0.0085	0.0001	0.0009	0.0008		1
2029	2029Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3706	0.0321	0.0337	0.0007	0.0004	0.0004		4
2029	2029Cranes	Cranes	208	0.3738	0.0825	0.0681	0.0014	0.0010	0.0009		6
2029	2029Crawler Tractors	Crawler Tractors	82	0.5065	0.0325	0.0789	0.0013	0.0004	0.0004		4
2029	2029Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6187	0.0337	0.0693	0.0015	0.0004	0.0004		4
2029	2029Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0016	0.0015		1
2029	2029Excavators	Excavators	157	0.5086	0.0623	0.0559	0.0013	0.0008	0.0007		5
2029	2029Forklifts	Forklifts	149	0.2148	0.0591	0.0236	0.0006	0.0007	0.0007		5
2029	2029Generator Sets	Generator Sets	84	0.2667	0.0333	0.0288	0.0007	0.0004	0.0004		4
2029	2029Graders	Graders	162	0.5696	0.0643	0.0676	0.0015	0.0008	0.0007		5
2029	2029Off-Highway Tractors	Off-Highway Tractors	160	0.6101	0.0635	0.1134	0.0017	0.0008	0.0007		5

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Operation

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2029	2029Off-Highway Trucks	Off-Highway Trucks	381	0.5385	0.1512	0.1140	0.0027	0.0019	0.0017		6
2029	2029Other Construction Equipment	Other Construction Equipment	327	0.3474	0.1298	0.0442	0.0013	0.0016	0.0015		6
2029	2029Other General Industrial Equipm	Other General Industrial Equipment	150	0.4438	0.0595	0.0747	0.0016	0.0007	0.0007		5
2029	2029Other Material Handling Equipm	Other Material Handling Equipment	196	0.4355	0.0778	0.0696	0.0015	0.0010	0.0009		6
2029	2029Pavers	Pavers	89	0.4745	0.0353	0.0717	0.0009	0.0004	0.0004		4
2029	2029Paving Equipment	Paving Equipment	82	0.3993	0.0325	0.0548	0.0008	0.0004	0.0004		4
2029	2029Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0008	0.0007		1
2029	2029Pressure Washers	Pressure Washers	13	0.0531	0.0963	0.0066	0.0001	0.0013	0.0012		1
2029	2029Pumps	Pumps	84	0.2617	0.0333	0.0270	0.0006	0.0004	0.0004		4
2029	2029Rollers	Rollers	84	0.3763	0.0333	0.0410	0.0008	0.0004	0.0004		4
2029	2029Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4430	0.0329	0.0396	0.0008	0.0004	0.0004		4
2029	2029Rubber Tired Dozers	Rubber Tired Dozers	358	0.6620	0.1421	0.1672	0.0025	0.0018	0.0016		6
2029	2029Rubber Tired Loaders	Rubber Tired Loaders	87	0.4311	0.0345	0.0559	0.0012	0.0004	0.0004		4
2029	2029Scrapers	Scrapers	356	0.7187	0.1413	0.1495	0.0027	0.0018	0.0016		6
2029	2029Signal Boards	Signal Boards	6	0.0909	0.0444	0.0111	0.0002	0.0006	0.0005		1
2029	2029Skid Steer Loaders	Skid Steer Loaders	37	0.2104	0.1713	0.0186	0.0004	0.0002	0.0002		2
2029	2029Surfacing Equipment	Surfacing Equipment	392	0.3590	0.1556	0.0638	0.0017	0.0019	0.0018		6
2029	2029Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4840	0.0349	0.0410	0.0009	0.0004	0.0004		4
2029	2029Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3586	0.0298	0.0336	0.0008	0.0004	0.0003		4
2029	2029Trenchers	Trenchers	69	0.4085	0.3195	0.0674	0.0007	0.0005	0.0004		3
2029	2029Welders	Welders	46	0.1745	0.2130	0.0214	0.0003	0.0003	0.0003		2
2030	2030Arial Lifts	Arial Lifts	34	0.1646	0.1574	0.0184	0.0004	0.0002	0.0002	34.7	2
2030	2030Air Compressors	Air Compressors	78	0.3027	0.0310	0.0349	0.0007	0.0004	0.0004	63.6	4
2030	2030Bore/Drill Rigs	Bore/Drill Rigs	82	0.5007	0.0325	0.0428	0.0017	0.0004	0.0004	165	4
2030	2030Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0414	0.0667	0.0085	0.0001	0.0009	0.0008	7.2	1
2030	2030Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3706	0.0321	0.0337	0.0007	0.0004	0.0004	58.5	4
2030	2030Cranes	Cranes	208	0.3738	0.0825	0.0681	0.0014	0.0010	0.0009	129	6
2030	2030Crawler Tractors	Crawler Tractors	82	0.5065	0.0325	0.0789	0.0013	0.0004	0.0004	114	4
2030	2030Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6187	0.0337	0.0693	0.0015	0.0004	0.0004	132	4
2030	2030Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0016	0.0015	7.6	1
2030	2030Excavators	Excavators	157	0.5086	0.0623	0.0559	0.0013	0.0008	0.0007	120	5
2030	2030Forklifts	Forklifts	149	0.2148	0.0591	0.0236	0.0006	0.0007	0.0007	54.4	5
2030	2030Generator Sets	Generator Sets	84	0.2667	0.0333	0.0288	0.0007	0.0004	0.0004	61.0	4
2030	2030Graders	Graders	162	0.5696	0.0643	0.0676	0.0015	0.0008	0.0007	133	5
2030	2030Off-Highway Tractors	Off-Highway Tractors	160	0.6101	0.0635	0.1134	0.0017	0.0008	0.0007	151	5
2030	2030Off-Highway Trucks	Off-Highway Trucks	381	0.5385	0.1512	0.1140	0.0027	0.0019	0.0017	260	6
2030	2030Other Construction Equipment	Other Construction Equipment	327	0.3474	0.1298	0.0442	0.0013	0.0016	0.0015	123	6
2030	2030Other General Industrial Equipm	Other General Industrial Equipment	150	0.4438	0.0595	0.0747	0.0016	0.0007	0.0007	152	5
2030	2030Other Material Handling Equipm	Other Material Handling Equipment	196	0.4355	0.0778	0.0696	0.0015	0.0010	0.0009	141	6
2030	2030Pavers	Pavers	89	0.4745	0.0353	0.0717	0.0009	0.0004	0.0004	77.9	4
2030	2030Paving Equipment	Paving Equipment	82	0.3993	0.0325	0.0548	0.0008	0.0004	0.0004	68.9	4
2030	2030Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0008	0.0007	4.3	1
2030	2030Pressure Washers	Pressure Washers	13	0.0531	0.0963	0.0066	0.0001	0.0013	0.0012	9.4	1
2030	2030Pumps	Pumps	84	0.2617	0.0333	0.0270	0.0006	0.0004	0.0004	49.6	4
2030	2030Rollers	Rollers	84	0.3763	0.0333	0.0410	0.0008	0.0004	0.0004	67.0	4
2030	2030Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4430	0.0329	0.0396	0.0008	0.0004	0.0004	70.3	4
2030	2030Rubber Tired Dozers	Rubber Tired Dozers	358	0.6620	0.1421	0.1672	0.0025	0.0018	0.0016	239	6
2030	2030Rubber Tired Loaders	Rubber Tired Loaders	87	0.4311	0.0345	0.0559	0.0012	0.0004	0.0004	109	4
2030	2030Scrapers	Scrapers	356	0.7187	0.1413	0.1495	0.0027	0.0018	0.0016	262	6

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Operation

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2030	2030Signal Boards	Signal Boards	6	0.0909	0.0444	0.0111	0.0002	0.0006	0.0005	16.7	1
2030	2030Skid Steer Loaders	Skid Steer Loaders	37	0.2104	0.1713	0.0186	0.0004	0.0002	0.0002	30.3	2
2030	2030Surfacing Equipment	Surfacing Equipment	392	0.3590	0.1556	0.0638	0.0017	0.0019	0.0018	166	6
2030	2030Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4840	0.0349	0.0410	0.0009	0.0004	0.0004	78.5	4
2030	2030Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3586	0.0298	0.0336	0.0008	0.0004	0.0003	66.8	4
2030	2030Trenchers	Trenchers	69	0.4085	0.3195	0.0674	0.0007	0.0005	0.0004	58.7	3
2030	2030Welders	Welders	46	0.1745	0.2130	0.0214	0.0003	0.0003	0.0003	25.6	2
2031	2031Arial Lifts	Arial Lifts	34	0.1646	0.1574	0.0184	0.0004	0.0002	0.0002		2
2031	2031Air Compressors	Air Compressors	78	0.3027	0.0310	0.0349	0.0007	0.0004	0.0004		4
2031	2031Bore/Drill Rigs	Bore/Drill Rigs	82	0.5007	0.0325	0.0428	0.0017	0.0004	0.0004		4
2031	2031Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0414	0.0667	0.0085	0.0001	0.0009	0.0008		1
2031	2031Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3706	0.0321	0.0337	0.0007	0.0004	0.0004		4
2031	2031Cranes	Cranes	208	0.3738	0.0825	0.0681	0.0014	0.0010	0.0009		6
2031	2031Crawler Tractors	Crawler Tractors	82	0.5065	0.0325	0.0789	0.0013	0.0004	0.0004		4
2031	2031Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6187	0.0337	0.0693	0.0015	0.0004	0.0004		4
2031	2031Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0016	0.0015		1
2031	2031Excavators	Excavators	157	0.5086	0.0623	0.0559	0.0013	0.0008	0.0007		5
2031	2031Forklifts	Forklifts	149	0.2148	0.0591	0.0236	0.0006	0.0007	0.0007		5
2031	2031Generator Sets	Generator Sets	84	0.2667	0.0333	0.0288	0.0007	0.0004	0.0004		4
2031	2031Graders	Graders	162	0.5696	0.0643	0.0676	0.0015	0.0008	0.0007		5
2031	2031Off-Highway Tractors	Off-Highway Tractors	160	0.6101	0.0635	0.1134	0.0017	0.0008	0.0007		5
2031	2031Off-Highway Trucks	Off-Highway Trucks	381	0.5385	0.1512	0.1140	0.0027	0.0019	0.0017		6
2031	2031Other Construction Equipment	Other Construction Equipment	327	0.3474	0.1298	0.0442	0.0013	0.0016	0.0015		6
2031	2031Other General Industrial Equipm	Other General Industrial Equipment	150	0.4438	0.0595	0.0747	0.0016	0.0007	0.0007		5
2031	2031Other Material Handling Equipm	Other Material Handling Equipment	196	0.4355	0.0778	0.0696	0.0015	0.0010	0.0009		6
2031	2031Pavers	Pavers	89	0.4745	0.0353	0.0717	0.0009	0.0004	0.0004		4
2031	2031Paving Equipment	Paving Equipment	82	0.3993	0.0325	0.0548	0.0008	0.0004	0.0004		4
2031	2031Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0008	0.0007		1
2031	2031Pressure Washers	Pressure Washers	13	0.0531	0.0963	0.0066	0.0001	0.0013	0.0012		1
2031	2031Pumps	Pumps	84	0.2617	0.0333	0.0270	0.0006	0.0004	0.0004		4
2031	2031Rollers	Rollers	84	0.3763	0.0333	0.0410	0.0008	0.0004	0.0004		4
2031	2031Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4430	0.0329	0.0396	0.0008	0.0004	0.0004		4
2031	2031Rubber Tired Dozers	Rubber Tired Dozers	358	0.6620	0.1421	0.1672	0.0025	0.0018	0.0016		6
2031	2031Rubber Tired Loaders	Rubber Tired Loaders	87	0.4311	0.0345	0.0559	0.0012	0.0004	0.0004		4
2031	2031Scrapers	Scrapers	356	0.7187	0.1413	0.1495	0.0027	0.0018	0.0016		6
2031	2031Signal Boards	Signal Boards	6	0.0909	0.0444	0.0111	0.0002	0.0006	0.0005		1
2031	2031Skid Steer Loaders	Skid Steer Loaders	37	0.2104	0.1713	0.0186	0.0004	0.0002	0.0002		2
2031	2031Surfacing Equipment	Surfacing Equipment	392	0.3590	0.1556	0.0638	0.0017	0.0019	0.0018		6
2031	2031Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4840	0.0349	0.0410	0.0009	0.0004	0.0004		4
2031	2031Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3586	0.0298	0.0336	0.0008	0.0004	0.0003		4
2031	2031Trenchers	Trenchers	69	0.4085	0.3195	0.0674	0.0007	0.0005	0.0004		3
2031	2031Welders	Welders	46	0.1745	0.2130	0.0214	0.0003	0.0003	0.0003		2
2035	2035Arial Lifts	Arial Lifts	34	0.1646	0.1574	0.0184	0.0004	0.0002	0.0002		2
2035	2035Air Compressors	Air Compressors	78	0.3027	0.0310	0.0349	0.0007	0.0004	0.0004		4
2035	2035Bore/Drill Rigs	Bore/Drill Rigs	82	0.5007	0.0325	0.0428	0.0017	0.0004	0.0004		4
2035	2035Cement and Mortar Mixers	Cement and Mortar Mixers	9	0.0414	0.0667	0.0085	0.0001	0.0009	0.0008		1
2035	2035Concrete/Industrial Saws	Concrete/Industrial Saws	81	0.3706	0.0321	0.0337	0.0007	0.0004	0.0004		4
2035	2035Cranes	Cranes	208	0.3738	0.0825	0.0681	0.0014	0.0010	0.0009		6
2035	2035Crawler Tractors	Crawler Tractors	82	0.5065	0.0325	0.0789	0.0013	0.0004	0.0004		4

Chiquita Canyon Landfill EIR

Controlled Off-road Construction Equipment Emission Factors (lb/hour): Operation

		Eq Name	Default Hp	CO	NOx	VOC	SOx	PM10	PM2.5	CO2	Range
2035	2035Crushing/Proc. Equipment	Crushing/Proc. Equipment	85	0.6187	0.0337	0.0693	0.0015	0.0004	0.0004		4
2035	2035Dumpers/Tenders	Dumpers/Tenders	16	0.0314	0.1185	0.0092	0.0001	0.0016	0.0015		1
2035	2035Excavators	Excavators	157	0.5086	0.0623	0.0559	0.0013	0.0008	0.0007		5
2035	2035Forklifts	Forklifts	149	0.2148	0.0591	0.0236	0.0006	0.0007	0.0007		5
2035	2035Generator Sets	Generator Sets	84	0.2667	0.0333	0.0288	0.0007	0.0004	0.0004		4
2035	2035Graders	Graders	162	0.5696	0.0643	0.0676	0.0015	0.0008	0.0007		5
2035	2035Off-Highway Tractors	Off-Highway Tractors	160	0.6101	0.0635	0.1134	0.0017	0.0008	0.0007		5
2035	2035Off-Highway Trucks	Off-Highway Trucks	381	0.5385	0.1512	0.1140	0.0027	0.0019	0.0017		6
2035	2035Other Construction Equipment	Other Construction Equipment	327	0.3474	0.1298	0.0442	0.0013	0.0016	0.0015		6
2035	2035Other General Industrial Equipm	Other General Industrial Equipment	150	0.4438	0.0595	0.0747	0.0016	0.0007	0.0007		5
2035	2035Other Material Handling Equipm	Other Material Handling Equipment	196	0.4355	0.0778	0.0696	0.0015	0.0010	0.0009		6
2035	2035Pavers	Pavers	89	0.4745	0.0353	0.0717	0.0009	0.0004	0.0004		4
2035	2035Paving Equipment	Paving Equipment	82	0.3993	0.0325	0.0548	0.0008	0.0004	0.0004		4
2035	2035Plate Compactors	Plate Compactors	8	0.0263	0.0593	0.0050	0.0001	0.0008	0.0007		1
2035	2035Pressure Washers	Pressure Washers	13	0.0531	0.0963	0.0066	0.0001	0.0013	0.0012		1
2035	2035Pumps	Pumps	84	0.2617	0.0333	0.0270	0.0006	0.0004	0.0004		4
2035	2035Rollers	Rollers	84	0.3763	0.0333	0.0410	0.0008	0.0004	0.0004		4
2035	2035Rough Terrain Forklifts	Rough Terrain Forklifts	83	0.4430	0.0329	0.0396	0.0008	0.0004	0.0004		4
2035	2035Rubber Tired Dozers	Rubber Tired Dozers	358	0.6620	0.1421	0.1672	0.0025	0.0018	0.0016		6
2035	2035Rubber Tired Loaders	Rubber Tired Loaders	87	0.4311	0.0345	0.0559	0.0012	0.0004	0.0004		4
2035	2035Scrapers	Scrapers	356	0.7187	0.1413	0.1495	0.0027	0.0018	0.0016		6
2035	2035Signal Boards	Signal Boards	6	0.0909	0.0444	0.0111	0.0002	0.0006	0.0005		1
2035	2035Skid Steer Loaders	Skid Steer Loaders	37	0.2104	0.1713	0.0186	0.0004	0.0002	0.0002		2
2035	2035Surfacing Equipment	Surfacing Equipment	392	0.3590	0.1556	0.0638	0.0017	0.0019	0.0018		6
2035	2035Sweepers/Scrubbers	Sweepers/Scrubbers	88	0.4840	0.0349	0.0410	0.0009	0.0004	0.0004		4
2035	2035Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	75	0.3586	0.0298	0.0336	0.0008	0.0004	0.0003		4
2035	2035Trenchers	Trenchers	69	0.4085	0.3195	0.0674	0.0007	0.0005	0.0004		3
2035	2035Welders	Welders	46	0.1745	0.2130	0.0214	0.0003	0.0003	0.0003		2

Source: SCAQMD CEQA Handbook website: http://www.aqmd.gov/ceqa/handbook/offroad/offroad.html

Emission factors only available up to 2025; therefore, it was conservatively assumed that the emission factors for years 2026 through 2035 were the same as 2025.
NOx and PM10 emission factors taken as the Tier 4 emission standards per the ARB's Diesel Off-road Equipment Regulation (13 CCR 2449). Source: Table 1. ARB and USEPA Off-Road Compression-Ignition (Diesel) Engine Standards (NMHC+NOx/CO/PM in g/bhp-hr).: http://www.arb.ca.gov/msprog/ordiesel/documents/Off-Road_Diesel_Stds.xls.

Emission factors for PM2.5 not available; therefore, it was assumed that 92% of diesel off-road equipment PM10 emissions were PM2.5 (SCAQMD Particulate Matter (PM) 2.5 Significance Thresholds and Calculation Methodology, October 2006; Appendix A – Updated CEIDARS List with PM2.5 Fractions, http://www.aqmd.gov/ceqa/handbook/PM2_5/finalAppA.doc).
Default hp taken from CalEEMod User Guide Appendix D, Table 3.3 (February 2011).
Off-road diesel equipment would be equipped with diesel particulate filters as a project control.

Construction

453.592 g/lb

	Engine Size (hp)			Tier 3 (g/bhp-hr) [2]		Tier 4 (g/bhp-hr)	
	Min [1]	Max	Range	NOx	PM	NOx (final)	PM
Baseline	0	24	1	5.6	0.6	5.6	0.3
Baseline	25	49	2	5.6	0.45	3.5	0.02
Baseline	50	74	3	5.6	0.3	3.5	0.02
Baseline	75	99	4	3.5	0.3	0.3	0.015
Baseline	100	174	5	3	0.22	0.3	0.015
Baseline	175	749	6	3	0.15	0.3	0.015

[1] Tier EFs not available for equipment with less than 25 hp; EFs assumed equal to EFs for equipment with 25-49 hp.

[2] Tier 3 EFs not available for equipment with less than 75 hp. Tier 2 EFs conservatively used.
Source: Table 1. ARB and USEPA Off-Road Compression-Ignition (Diesel) Engine Standards (NMHC+NOx/CO/PM in g/bhp-hr).: http://www.arb.ca.gov/msprog/ordiesel/documents/Off-Road_Diesel_Stds.xls

Combined Emission Factors by Year						Controlled*	
	Engine Size (hp)			EF lbs/bhp-hr		EF lbs/bhp-hr	
Year	Min	Max	Level	NOx	PM	NOx	PM
2014	0	24	1	0.0123	0.00129	0.00740754	0.00019365
2014	25	49	2	0.0121	0.00095	0.0072742	0.00014199
2014	50	74	3	0.0121	0.00063	0.0072742	9.4764E-05
2014	75	99	4	0.0074	0.00063	0.00442653	9.4684E-05
2014	100	174	5	0.0063	0.00046	0.00379689	6.9499E-05
2014	175	749	6	0.0063	0.00032	0.00379689	4.7461E-05
2015	0	24	1	0.0123	0.00127	0.00740754	0.00019048
2015	25	49	2	0.0120	0.00092	0.00718531	0.00013744
2015	50	74	3	0.0120	0.00061	0.00718531	9.1801E-05
2015	75	99	4	0.0072	0.00061	0.00429108	9.1668E-05
2015	100	174	5	0.0061	0.00045	0.0036826	6.7329E-05
2015	175	749	6	0.0061	0.00031	0.0036826	4.6033E-05
2016	0	24	1	0.0123	0.00127	0.00740754	0.00019048
2016	25	49	2	0.0120	0.00092	0.00718531	0.00013744
2016	50	74	3	0.0120	0.00061	0.00718531	9.1801E-05
2016	75	99	4	0.0072	0.00061	0.00429108	9.1668E-05
2016	100	174	5	0.0061	0.00045	0.0036826	6.7329E-05
2016	175	749	6	0.0061	0.00031	0.0036826	4.6033E-05
2017	0	24	1	0.0123	0.00127	0.00740754	0.00019048
2017	25	49	2	0.0120	0.00092	0.00718531	0.00013744
2017	50	74	3	0.0120	0.00061	0.00718531	9.1801E-05
2017	75	99	4	0.0072	0.00061	0.00429108	9.1668E-05
2017	100	174	5	0.0061	0.00045	0.0036826	6.7329E-05
2017	175	749	6	0.0061	0.00031	0.0036826	4.6033E-05
2018	0	24	1	0.0123	0.00126	0.00740754	0.0001885
2018	25	49	2	0.0119	0.00090	0.00712976	0.00013459
2018	50	74	3	0.0119	0.00060	0.00712976	8.9949E-05
2018	75	99	4	0.0070	0.00060	0.00420642	8.9783E-05
2018	100	174	5	0.0060	0.00044	0.00361117	6.5973E-05

***DPF Reduction:**

PM Reduction	85%
NOx Reduction	40%

Source: EPA Technologies, Diesel Retrofit Devices webpage (http://www.epa.gov/otaq/diesel/technologies/retrofits.htm#dpf)

Large Fleet Phase In		
Year	Tier 3	Tier 4
2014	95.2%	4.8%
2015	92.0%	8.0%
2016	92.0%	8.0%
2017	92.0%	8.0%
2018	90.0%	10.0%
2019	90.0%	10.0%
2020	90.0%	10.0%
2021	90.0%	10.0%
2022	90.0%	10.0%
2023	90.0%	10.0%
2024	90.0%	10.0%
2025	90.0%	10.0%
2026	90.0%	10.0%
2027	90.0%	10.0%
2028	90.0%	10.0%
2029	90.0%	10.0%
2030	90.0%	10.0%
2031	90.0%	10.0%
2032	90.0%	10.0%
2033	90.0%	10.0%
2034	90.0%	10.0%
2035	90.0%	10.0%

Source: ARB Diesel Off-road Equipment Regulation (13 CCR 2449)

Construction

453.592 g/lb

2018	175	749	6	0.0060	0.00030	0.00361117	4.514E-05
2019	0	24	1	0.0123	0.00126	0.00740754	0.0001885
2019	25	49	2	0.0119	0.00090	0.00712976	0.00013459
2019	50	74	3	0.0119	0.00060	0.00712976	8.9949E-05
2019	75	99	4	0.0070	0.00060	0.00420642	8.9783E-05
2019	100	174	5	0.0060	0.00044	0.00361117	6.5973E-05
2019	175	749	6	0.0060	0.00030	0.00361117	4.514E-05
2020	0	24	1	0.0123	0.00126	0.00740754	0.0001885
2020	25	49	2	0.0119	0.00090	0.00712976	0.00013459
2020	50	74	3	0.0119	0.00060	0.00712976	8.9949E-05
2020	75	99	4	0.0070	0.00060	0.00420642	8.9783E-05
2020	100	174	5	0.0060	0.00044	0.00361117	6.5973E-05
2020	175	749	6	0.0060	0.00030	0.00361117	4.514E-05
2021	0	24	1	0.0123	0.00126	0.00740754	0.0001885
2021	25	49	2	0.0119	0.00090	0.00712976	0.00013459
2021	50	74	3	0.0119	0.00060	0.00712976	8.9949E-05
2021	75	99	4	0.0070	0.00060	0.00420642	8.9783E-05
2021	100	174	5	0.0060	0.00044	0.00361117	6.5973E-05
2021	175	749	6	0.0060	0.00030	0.00361117	4.514E-05
2022	0	24	1	0.0123	0.00126	0.00740754	0.0001885
2022	25	49	2	0.0119	0.00090	0.00712976	0.00013459
2022	50	74	3	0.0119	0.00060	0.00712976	8.9949E-05
2022	75	99	4	0.0070	0.00060	0.00420642	8.9783E-05
2022	100	174	5	0.0060	0.00044	0.00361117	6.5973E-05
2022	175	749	6	0.0060	0.00030	0.00361117	4.514E-05
2023	0	24	1	0.0123	0.00126	0.00740754	0.0001885
2023	25	49	2	0.0119	0.00090	0.00712976	0.00013459
2023	50	74	3	0.0119	0.00060	0.00712976	8.9949E-05
2023	75	99	4	0.0070	0.00060	0.00420642	8.9783E-05
2023	100	174	5	0.0060	0.00044	0.00361117	6.5973E-05
2023	175	749	6	0.0060	0.00030	0.00361117	4.514E-05
2024	0	24	1	0.0123	0.00126	0.00740754	0.0001885
2024	25	49	2	0.0119	0.00090	0.00712976	0.00013459
2024	50	74	3	0.0119	0.00060	0.00712976	8.9949E-05
2024	75	99	4	0.0070	0.00060	0.00420642	8.9783E-05
2024	100	174	5	0.0060	0.00044	0.00361117	6.5973E-05
2024	175	749	6	0.0060	0.00030	0.00361117	4.514E-05
2025	0	24	1	0.0123	0.00126	0.00740754	0.0001885
2025	25	49	2	0.0119	0.00090	0.00712976	0.00013459
2025	50	74	3	0.0119	0.00060	0.00712976	8.9949E-05
2025	75	99	4	0.0070	0.00060	0.00420642	8.9783E-05
2025	100	174	5	0.0060	0.00044	0.00361117	6.5973E-05
2025	175	749	6	0.0060	0.00030	0.00361117	4.514E-05
2026	0	24	1	0.0123	0.00126	0.00740754	0.0001885
2026	25	49	2	0.0119	0.00090	0.00712976	0.00013459
2026	50	74	3	0.0119	0.00060	0.00712976	8.9949E-05
2026	75	99	4	0.0070	0.00060	0.00420642	8.9783E-05
2026	100	174	5	0.0060	0.00044	0.00361117	6.5973E-05
2026	175	749	6	0.0060	0.00030	0.00361117	4.514E-05
2027	0	24	1	0.0123	0.00126	0.00740754	0.0001885
2027	25	49	2	0.0119	0.00090	0.00712976	0.00013459
2027	50	74	3	0.0119	0.00060	0.00712976	8.9949E-05

Construction

453.592 g/lb

2027	75	99	4	0.0070	0.00060	0.00420642	8.9783E-05
2027	100	174	5	0.0060	0.00044	0.00361117	6.5973E-05
2027	175	749	6	0.0060	0.00030	0.00361117	4.514E-05
2028	0	24	1	0.0123	0.00126	0.00740754	0.0001885
2028	25	49	2	0.0119	0.00090	0.00712976	0.00013459
2028	50	74	3	0.0119	0.00060	0.00712976	8.9949E-05
2028	75	99	4	0.0070	0.00060	0.00420642	8.9783E-05
2028	100	174	5	0.0060	0.00044	0.00361117	6.5973E-05
2028	175	749	6	0.0060	0.00030	0.00361117	4.514E-05
2029	0	24	1	0.0123	0.00126	0.00740754	0.0001885
2029	25	49	2	0.0119	0.00090	0.00712976	0.00013459
2029	50	74	3	0.0119	0.00060	0.00712976	8.9949E-05
2029	75	99	4	0.0070	0.00060	0.00420642	8.9783E-05
2029	100	174	5	0.0060	0.00044	0.00361117	6.5973E-05
2029	175	749	6	0.0060	0.00030	0.00361117	4.514E-05
2030	0	24	1	0.0123	0.00126	0.00740754	0.0001885
2030	25	49	2	0.0119	0.00090	0.00712976	0.00013459
2030	50	74	3	0.0119	0.00060	0.00712976	8.9949E-05
2030	75	99	4	0.0070	0.00060	0.00420642	8.9783E-05
2030	100	174	5	0.0060	0.00044	0.00361117	6.5973E-05
2030	175	749	6	0.0060	0.00030	0.00361117	4.514E-05
2031	0	24	1	0.0123	0.00126	0.00740754	0.0001885
2031	25	49	2	0.0119	0.00090	0.00712976	0.00013459
2031	50	74	3	0.0119	0.00060	0.00712976	8.9949E-05
2031	75	99	4	0.0070	0.00060	0.00420642	8.9783E-05
2031	100	174	5	0.0060	0.00044	0.00361117	6.5973E-05
2031	175	749	6	0.0060	0.00030	0.00361117	4.514E-05
2032	0	24	1	0.0123	0.00126	0.00740754	0.0001885
2032	25	49	2	0.0119	0.00090	0.00712976	0.00013459
2032	50	74	3	0.0119	0.00060	0.00712976	8.9949E-05
2032	75	99	4	0.0070	0.00060	0.00420642	8.9783E-05
2032	100	174	5	0.0060	0.00044	0.00361117	6.5973E-05
2032	175	749	6	0.0060	0.00030	0.00361117	4.514E-05
2033	0	24	1	0.0123	0.00126	0.00740754	0.0001885
2033	25	49	2	0.0119	0.00090	0.00712976	0.00013459
2033	50	74	3	0.0119	0.00060	0.00712976	8.9949E-05
2033	75	99	4	0.0070	0.00060	0.00420642	8.9783E-05
2033	100	174	5	0.0060	0.00044	0.00361117	6.5973E-05
2033	175	749	6	0.0060	0.00030	0.00361117	4.514E-05
2034	0	24	1	0.0123	0.00126	0.00740754	0.0001885
2034	25	49	2	0.0119	0.00090	0.00712976	0.00013459
2034	50	74	3	0.0119	0.00060	0.00712976	8.9949E-05
2034	75	99	4	0.0070	0.00060	0.00420642	8.9783E-05
2034	100	174	5	0.0060	0.00044	0.00361117	6.5973E-05
2034	175	749	6	0.0060	0.00030	0.00361117	4.514E-05
2035	0	24	1	0.0123	0.00126	0.00740754	0.0001885
2035	25	49	2	0.0119	0.00090	0.00712976	0.00013459
2035	50	74	3	0.0119	0.00060	0.00712976	8.9949E-05
2035	75	99	4	0.0070	0.00060	0.00420642	8.9783E-05
2035	100	174	5	0.0060	0.00044	0.00361117	6.5973E-05
2035	175	749	6	0.0060	0.00030	0.00361117	4.514E-05

Operation

Engine Size (hp)			Tier 4 (g/bhp-hr)		Tier 4 (lbs/bhp-hr)	
Min [1]	Max	Range	NOx (final)	PM	NOx (final)	PM
0	24	1	5.6	0.3	0.012346	0.000661
25	49	2	3.5	0.02	0.007716	4.41E-05
50	74	3	3.5	0.02	0.007716	4.41E-05
75	99	4	0.3	0.015	0.000661	3.31E-05
100	174	5	0.3	0.015	0.000661	3.31E-05
175	749	6	0.3	0.015	0.000661	3.31E-05

[1] Tier EFs not available for equipment with less than 25 hp; EFs assumed equal to EFs for equipment with 25-49 hp.
Source: Table 1. ARB and USEPA Off-Road Compression-Ignition (Diesel) Engine Standards (NMHC+NOx/CO/PM in g/bhp-hr).:
http://www.arb.ca.gov/msprog/ordiesel/documents/Off-Road_Diesel_Stds.xls

Operation Controlled

Engine Size (hp)			Tier 4 (g/bhp-hr)		Tier 4 (lbs/bhp-hr)	
Min [1]	Max	Range	NOx (final)	PM	NOx (final)	PM
0	24	1	3.36	0.045	0.007408	9.92E-05
25	49	2	2.1	0.003	0.00463	6.61E-06
50	74	3	2.1	0.003	0.00463	6.61E-06
75	99	4	0.18	0.00225	0.000397	4.96E-06
100	174	5	0.18	0.00225	0.000397	4.96E-06
175	749	6	0.18	0.00225	0.000397	4.96E-06

Controls:

DPF Emission Reduction:

PM	85%
NOx	40%

Source: EPA Technologies, Diesel Retrofit Devices webpage (http://www.epa.gov/otaq/diesel/technologies/retrofits.htm#dpf)

Chiquita Canyon Landfill EIR

EMFAC2011 Onroad Vehicle Emission Factors

EMFAC2011-Light Duty: Passenger Cars (LDA), Light-Duty Trucks (LDT2), Light-Heavy-Duty Trucks (LHD2),

Exhaust emission factors from EMFAC2011-LD for the South Coast Air Basin, calendar years 2014, 2015, 2016, 2021, 2023-2026, 2030. A speed of 40 mph was assumed for offsite vehicles and worker commutes, which is consistent with the CalEEMod defaults. An average temperature of 68°F and humidity of 55% were used per Table B-1 of CT-EMFAC: A Computer Model to Estimate Transportation Project Emissions. Version: Emfac2011-LDV V2.50.57.246; Run Date : 2012/03/19 15:24:37, 2012/04/16 09:01:54, and 2013/03/28 11:23:39; Season: Annual; Area: South Coast AQMD; Table 1 Running Exhaust Emissions

EMFAC 2011- Heavy Duty: Medium-Heavy-Duty Trucks (MHDT), Heavy-Heavy_Duty Trucks (HHDT)

EMFAC Emission Rates Database (http://www.arb.ca.gov/jpub/webapp//EMFAC2011WebApp/rateSelectionPage_1.jsp), EMFAC2011 Vehicle Categories; Region: Los Angeles (SC), calendar years 2015, 2016, 2021, 2030, Season: annual average, Fuel: diesel, Model Year: combined; Speed: 40mph (combined speeds for PM fugitive and SOx). MHDT is average of T6 instate construction heavy, T6 instate construction small, T6 instate heavy, T6 instate small, and T6 Public. HHDT is T7 SWCV (Solid Waste Collection Truck). EMFAC does not predict methane emissions from MHDT and HHDT.

Note: Emissions calculated for all GHGs for which the EMFAC model provides EFs: CO2 and CH4. EMFAC does not predict methane emissions from MHDT and HHDT.

Running Exhaust Emissions **(grams/mile)**

Year	Vehicle Category		CO	NOx	ROG	SOx	PM_{10}	PM_{10}-Tire Wear	PM_{10}-Break Wear	PM10 Fugitive	$PM_{2.5}$	$PM^{2.5}$ - Tire Wear	$PM^{2.5}$-Break Wear (Fugitive)	PM2.5 Fugitive	CO2	CH4
			g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi
2014	Heavy-Heavy Duty Trucks	HHDT								0				0		
2014	Medium-Heavy Duty Trucks	MHDT								0				0		
2014	Light-Heavy Duty Trucks	LHD2	1.019	1.853	0.101	0.005	0.017	0.01	0.063	0.073	0.015	0.002	0.027	0.029	492.117	0.011
2014	Light-Duty Trucks	LDT2	1.631	0.188	0.035	0.004	0.002	0.008	0.037	0.045	0.001	0.002	0.016	0.018	387.423	0.016
2014	Passenger Cars	LDA	1.157	0.103	0.029	0.003	0.002	0.008	0.037	0.045	0.001	0.002	0.016	0.018	283.872	0.011
2014	Light-Light Duty Trucks	LDT1	2.92	0.28	0.078	0.003	0.004	0.008	0.037	0.045	0.003	0.002	0.016	0.018	327.338	0.025
2015	Heavy-Heavy Duty Trucks	HHDT	0.56742	11.7985	0.10495	0.017	0.0705	0.036	0.06174	0.09773949	0.06488687	0.009	0.0264599	0.03546	1692.74	
2015	Medium-Heavy Duty Trucks	MHDT	0.47447	5.13267	0.10867	0.011	0.0706	0.012	0.130339	0.14233926	0.0649636	0.003	0.0558597	0.05886	1074.24	
2015	Light-Heavy Duty Trucks	LHD2	0.903	1.702	0.092	0.005	0.016	0.01	0.063	0.073	0.014	0.002	0.027	0.029	491.516	0.01
2015	Light-Duty Trucks	LDT2	1.472	0.167	0.03	0.004	0.001	0.008	0.037	0.045	0.001	0.002	0.016	0.018	387.384	0.014
2015	Passenger Cars	LDA	1.034	0.092	0.024	0.003	0.001	0.008	0.037	0.045	0.001	0.002	0.016	0.018	284.015	0.01
2015	Light-Light Duty Trucks	LDT1	2.658	0.255	0.067	0.003	0.004	0.008	0.037	0.045	0.003	0.002	0.016	0.018	327.62	0.023
2016	Heavy-Heavy Duty Trucks	HHDT	0.572	11.041	0.107	0.017	0.068	0.036	0.062	0.098	0.062	0.009	0.026	0.035	1670.17	
2016	Medium-Heavy Duty Trucks	MHDT	0.4258	4.4836	0.10	0.011	0.0616	0.012	0.13	0.142	0.057	0.003	0.056	0.059	1061.34	
2016	Light-Heavy Duty Trucks	LHD2	0.802	1.596	0.086	0.005	0.015	0.01	0.063	0.073	0.014	0.002	0.027	0.029	491.443	0.009
2016	Light-Duty Trucks	LDT2	1.329	0.147	0.026	0	0.001	0.008	0.037	0.045	0.001	0.002	0.016	0.018	387.352	0.013
2016	Passenger Cars	LDA	0.932	0.082	0.02	0	0.001	0.008	0.037	0.045	0.001	0.002	0.016	0.018	284.135	0.009
2016	Light-Light Duty Trucks	LDT1	2.41	0.231	0.056	0	0.003	0.008	0.037	0.045	0.003	0.002	0.016	0.018	327.94	0.021
2021	Heavy-Heavy Duty Trucks	HHDT	0.605	7.837	0.121	0.017	0.056	0.036	0.062	0.098	0.052	0.009	0.026	0.035	1537.04	

2021	Medium-Heavy Duty Trucks	MHDT	0.3286	1.8756	0.0796	0.011	0.0324	0.012	0.13	0.142	0.0296	0.003	0.056	0.059	981.069	
2021	Light-Heavy Duty Trucks	LHD2	0.472	1.079	0.058	0.005	0.012	0.01	0.063	0.073	0.011	0.002	0.027	0.029	490.413	0.006
2021	Light-Duty Trucks	LDT2	0.867	0.088	0.013	0.004	0.001	0.008	0.037	0.045	0.001	0.002	0.016	0.018	387.3	0.009
2021	Passenger Cars	LDA	0.634	0.056	0.01	0.003	0.001	0.008	0.037	0.045	0.001	0.002	0.016	0.018	284.512	0.007
2021	Light-Light Duty Trucks	LDT1	1.606	0.152	0.03	0.003	0.002	0.008	0.037	0.045	0.002	0.002	0.016	0.018	329.134	0.015
2023	Heavy-Heavy Duty Trucks	HHDT								0				0		
2023	Medium-Heavy Duty Trucks	MHDT								0				0		
2023	Light-Heavy Duty Trucks	LHD2	0.405	0.916	0.05	0.005	0.011	0.01	0.063	0.073	0.01	0.002	0.027	0.029	490.135	0.005
2023	Light-Duty Trucks	LDT2	0.778	0.078	0.012	0.004	0.001	0.008	0.037	0.045	0.001	0.002	0.016	0.018	387.289	0.008
2023	Passenger Cars	LDA	0.59	0.052	0.009	0.003	0.001	0.008	0.037	0.045	0.001	0.002	0.016	0.018	284.537	0.006
2023	Light-Light Duty Trucks	LDT1	1.379	0.13	0.025	0.003	0.002	0.008	0.037	0.045	0.002	0.002	0.016	0.018	329.44	0.013
2024	Heavy-Heavy Duty Trucks	HHDT								0				0		
2024	Medium-Heavy Duty Trucks	MHDT								0				0		
2024	Light-Heavy Duty Trucks	LHD2	0.379	0.848	0.047	0.005	0.01	0.01	0.063	0.073	0.009	0.002	0.027	0.029	490.003	0.005
2024	Light-Duty Trucks	LDT2	0.746	0.074	0.011	0.004	0.001	0.008	0.037	0.045	0.001	0.002	0.016	0.018	387.279	0.008
2024	Passenger Cars	LDA	0.571	0.051	0.008	0.003	0.001	0.008	0.037	0.045	0.001	0.002	0.016	0.018	284.519	0.006
2024	Light-Light Duty Trucks	LDT1	1.281	0.12	0.023	0.003	0.002	0.008	0.037	0.045	0.002	0.002	0.016	0.018	329.549	0.013
2025	Heavy-Heavy Duty Trucks	HHDT								0				0		
2025	Medium-Heavy Duty Trucks	MHDT								0				0		
2025	Light-Heavy Duty Trucks	LHD2	0.356	0.771	0.043	0.005	0.01	0.01	0.063	0.073	0.009	0.002	0.027	0.029	490.009	0.004
2025	Light-Duty Trucks	LDT2	0.72	0.071	0.011	0.004	0.001	0.008	0.037	0.045	0.001	0.002	0.016	0.018	387.271	0.008
2025	Passenger Cars	LDA	0.559	0.05	0.008	0.003	0.001	0.008	0.037	0.045	0.001	0.002	0.016	0.018	284.513	0.006
2025	Light-Light Duty Trucks	LDT1	1.194	0.111	0.021	0.003	0.002	0.008	0.037	0.045	0.002	0.002	0.016	0.018	329.648	0.012
2026	Heavy-Heavy Duty Trucks	HHDT								0				0		
2026	Medium-Heavy Duty Trucks	MHDT								0				0		
2026	Light-Heavy Duty Trucks	LHD2	0.339	0.714	0.041	0.005	0.009	0.01	0.063	0.073	0.008	0.002	0.027	0.029	489.951	0.004
2026	Light-Duty Trucks	LDT2	0.697	0.068	0.01	0.004	0.001	0.008	0.037	0.045	0.001	0.002	0.016	0.018	387.259	0.008
2026	Passenger Cars	LDA	0.549	0.049	0.008	0.003	0.001	0.008	0.037	0.045	0.001	0.002	0.016	0.018	284.523	0.006
2026	Light-Light Duty Trucks	LDT1	1.115	0.103	0.019	0.003	0.002	0.008	0.037	0.045	0.002	0.002	0.016	0.018	329.767	0.011
2030	Heavy-Heavy Duty Trucks	HHDT	0.63	4.211	0.133	0.016	0.044	0.036	0.062	0.098	0.041	0.009	0.026	0.035	1516.31	
2030	Medium-Heavy Duty Trucks	MHDT	0.318	1.0164	0.0774	0.011	0.0306	0.012	0.13	0.142	0.0282	0.003	0.056	0.059	975.233	
2030	Light-Heavy Duty Trucks	LHD2	0.292	0.538	0.033	0.005	0.008	0.01	0.063	0.073	0.007	0.002	0.027	0.029	489.772	0.003
2030	Light-Duty Trucks	LDT2	0.642	0.061	0.009	0.004	0.002	0.008	0.037	0.045	0.001	0.002	0.016	0.018	387.202	0.007
2030	Passenger Cars	LDA	0.522	0.046	0.007	0.003	0.002	0.008	0.037	0.045	0.001	0.002	0.016	0.018	284.52	0.006
2030	Light-Light Duty Trucks	LDT1	0.856	0.076	0.013	0.003	0.002	0.008	0.037	0.045	0.002	0.002	0.016	0.018	330.227	0.009

Diesel Particulate Filter Control

Emission Reduction	
PM	85%
NO2	40%

Source: EPA Technologies, Diesel Retrofit Devices webpage (http://www.epa.gov/otaq/diesel/technologies/retrofits.htm#dpf)

Controlled Running Exhaust Emissions **(grams/mile)**

Chiquita Canyon Landfill EIR

Year	Vehicle Category		CO	NOx	ROG	SOx	PM_{10}	PM_{10}-Tire Wear	PM_{10}-Break Wear	PM10 Fugitive	$PM_{2.5}$	$PM^{2.5}$-Tire Wear	$PM^{2.5}$-Break Wear (Fugitive)	PM2.5 Fugitive	CO2	CH4
			g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi
2014	Heavy-Heavy Duty Trucks	HHDT		0			0			0	0			0		
2014	Medium-Heavy Duty Trucks	MHDT		0			0			0	0			0		
2014	Light-Heavy Duty Trucks	LHD2	1.019	1.1118	0.101	0.005	0.0026	0.01	0.063	0.073	0.00225	0.002	0.027	0.029	492.117	0.011
2014	Light-Duty Trucks	LDT2	1.631	0.1128	0.035	0.004	0.0003	0.008	0.037	0.045	0.00015	0.002	0.016	0.018	387.423	0.016
2014	Passenger Cars	LDA	1.157	0.0618	0.029	0.003	0.002	0.008	0.037	0.045	0.001	0.002	0.016	0.018	283.872	0.011
2014	Light-Light Duty Trucks	LDT1	2.92	0.168	0.078	0.003	0.0006	0.008	0.037	0.045	0.00045	0.002	0.016	0.018	327.338	0.025
2015	Heavy-Heavy Duty Trucks	HHDT	0.56742	7.07912	0.10495	0.017	0.0106	0.036	0.06174	0.09773949	0.00973303	0.009	0.0264599	0.03546	1692.74	
2015	Medium-Heavy Duty Trucks	MHDT	0.47447	3.0796	0.10867	0.011	0.0106	0.012	0.130339	0.14233926	0.00974454	0.003	0.0558597	0.05886	1074.24	
2015	Light-Heavy Duty Trucks	LHD2	0.903	1.0212	0.092	0.005	0.0024	0.01	0.063	0.073	0.0021	0.002	0.027	0.029	491.516	0.01
2015	Light-Duty Trucks	LDT2	1.472	0.1002	0.03	0.004	0.0002	0.008	0.037	0.045	0.00015	0.002	0.016	0.018	387.384	0.014
2015	Passenger Cars	LDA	1.034	0.0552	0.024	0.003	0.001	0.008	0.037	0.045	0.001	0.002	0.016	0.018	284.015	0.01
2015	Light-Light Duty Trucks	LDT1	2.658	0.153	0.067	0.003	0.0006	0.008	0.037	0.045	0.00045	0.002	0.016	0.018	327.62	0.023
2016	Heavy-Heavy Duty Trucks	HHDT	0.572	6.6246	0.107	0.017	0.0102	0.036	0.062	0.098	0.0093	0.009	0.026	0.035	1670.17	
2016	Medium-Heavy Duty Trucks	MHDT	0.4258	2.69016	0.10	0.011	0.0092	0.012	0.13	0.142	0.00855	0.003	0.056	0.059	1061.34	
2016	Light-Heavy Duty Trucks	LHD2	0.802	0.9576	0.086	0.005	0.0023	0.01	0.063	0.073	0.0021	0.002	0.027	0.029	491.443	0.009
2016	Light-Duty Trucks	LDT2	1.329	0.0882	0.026	0	0.0002	0.008	0.037	0.045	0.00015	0.002	0.016	0.018	387.352	0.013
2016	Passenger Cars	LDA	0.932	0.0492	0.02	0	0.001	0.008	0.037	0.045	0.001	0.002	0.016	0.018	284.135	0.009
2016	Light-Light Duty Trucks	LDT1	2.41	0.1386	0.056	0	0.0005	0.008	0.037	0.045	0.00045	0.002	0.016	0.018	327.94	0.021
2021	Heavy-Heavy Duty Trucks	HHDT	0.605	4.7022	0.121	0.017	0.0084	0.036	0.062	0.098	0.0078	0.009	0.026	0.035	1537.04	
2021	Medium-Heavy Duty Trucks	MHDT	0.3286	1.12536	0.0796	0.011	0.0049	0.012	0.13	0.142	0.00444	0.003	0.056	0.059	981.069	
2021	Light-Heavy Duty Trucks	LHD2	0.472	0.6474	0.058	0.005	0.0018	0.01	0.063	0.073	0.00165	0.002	0.027	0.029	490.413	0.006
2021	Light-Duty Trucks	LDT2	0.867	0.0528	0.013	0.004	0.0002	0.008	0.037	0.045	0.00015	0.002	0.016	0.018	387.3	0.009
2021	Passenger Cars	LDA	0.634	0.0336	0.01	0.003	0.001	0.008	0.037	0.045	0.001	0.002	0.016	0.018	284.512	0.007
2021	Light-Light Duty Trucks	LDT1	1.606	0.0912	0.03	0.003	0.0003	0.008	0.037	0.045	0.0003	0.002	0.016	0.018	329.134	0.015
2023	Heavy-Heavy Duty Trucks	HHDT		0			0			0	0			0		
2023	Medium-Heavy Duty Trucks	MHDT		0			0			0	0			0		
2023	Light-Heavy Duty Trucks	LHD2	0.405	0.5496	0.05	0.005	0.0017	0.01	0.063	0.073	0.0015	0.002	0.027	0.029	490.135	0.005
2023	Light-Duty Trucks	LDT2	0.778	0.0468	0.012	0.004	0.0002	0.008	0.037	0.045	0.00015	0.002	0.016	0.018	387.289	0.008
2023	Passenger Cars	LDA	0.59	0.0312	0.009	0.003	0.001	0.008	0.037	0.045	0.001	0.002	0.016	0.018	284.537	0.006
2023	Light-Light Duty Trucks	LDT1	1.379	0.078	0.025	0.003	0.0003	0.008	0.037	0.045	0.0003	0.002	0.016	0.018	329.44	0.013
2024	Heavy-Heavy Duty Trucks	HHDT		0			0			0	0			0		
2024	Medium-Heavy Duty Trucks	MHDT		0			0			0	0			0		
2024	Light-Heavy Duty Trucks	LHD2	0.379	0.5088	0.047	0.005	0.0015	0.01	0.063	0.073	0.00135	0.002	0.027	0.029	490.003	0.005
2024	Light-Duty Trucks	LDT2	0.746	0.0444	0.011	0.004	0.0002	0.008	0.037	0.045	0.00015	0.002	0.016	0.018	387.279	0.008
2024	Passenger Cars	LDA	0.571	0.0306	0.008	0.003	0.001	0.008	0.037	0.045	0.001	0.002	0.016	0.018	284.519	0.006
2024	Light-Light Duty Trucks	LDT1	1.281	0.072	0.023	0.003	0.0003	0.008	0.037	0.045	0.0003	0.002	0.016	0.018	329.549	0.013

2025	Heavy-Heavy Duty Trucks	HHDT		0			0			0	0			0		
2025	Medium-Heavy Duty Trucks	MHDT		0			0			0	0			0		
2025	Light-Heavy Duty Trucks	LHD2	0.356	0.4626	0.043	0.005	0.0015	0.01	0.063	0.073	0.00135	0.002	0.027	0.029	490.009	0.004
2025	Light-Duty Trucks	LDT2	0.72	0.0426	0.011	0.004	0.0002	0.008	0.037	0.045	0.00015	0.002	0.016	0.018	387.271	0.008
2025	Passenger Cars	LDA	0.559	0.03	0.008	0.003	0.001	0.008	0.037	0.045	0.001	0.002	0.016	0.018	284.513	0.006
2025	Light-Light Duty Trucks	LDT1	1.194	0.0666	0.021	0.003	0.0003	0.008	0.037	0.045	0.0003	0.002	0.016	0.018	329.648	0.012
2026	Heavy-Heavy Duty Trucks	HHDT		0			0			0	0			0		
2026	Medium-Heavy Duty Trucks	MHDT		0			0			0	0			0		
2026	Light-Heavy Duty Trucks	LHD2	0.339	0.4284	0.041	0.005	0.0014	0.01	0.063	0.073	0.0012	0.002	0.027	0.029	489.951	0.004
2026	Light-Duty Trucks	LDT2	0.697	0.0408	0.01	0.004	0.0002	0.008	0.037	0.045	0.00015	0.002	0.016	0.018	387.259	0.008
2026	Passenger Cars	LDA	0.549	0.0294	0.008	0.003	0.001	0.008	0.037	0.045	0.001	0.002	0.016	0.018	284.523	0.006
2026	Light-Light Duty Trucks	LDT1	1.115	0.0618	0.019	0.003	0.0003	0.008	0.037	0.045	0.0003	0.002	0.016	0.018	329.767	0.011
2030	Heavy-Heavy Duty Trucks	HHDT	0.63	2.5266	0.133	0.016	0.0066	0.036	0.062	0.098	0.00615	0.009	0.026	0.035	1516.31	
2030	Medium-Heavy Duty Trucks	MHDT	0.318	0.60984	0.0774	0.011	0.0046	0.012	0.13	0.142	0.00423	0.003	0.056	0.059	975.233	
2030	Light-Heavy Duty Trucks	LHD2	0.292	0.3228	0.033	0.005	0.0012	0.01	0.063	0.073	0.00105	0.002	0.027	0.029	489.772	0.003
2030	Light-Duty Trucks	LDT2	0.642	0.0366	0.009	0.004	0.0003	0.008	0.037	0.045	0.00015	0.002	0.016	0.018	387.202	0.007
2030	Passenger Cars	LDA	0.522	0.0276	0.007	0.003	0.002	0.008	0.037	0.045	0.001	0.002	0.016	0.018	284.52	0.006
2030	Light-Light Duty Trucks	LDT1	0.856	0.0456	0.013	0.003	0.0003	0.008	0.037	0.045	0.0003	0.002	0.016	0.018	330.227	0.009

lbs/VMT

1gram = 0.0022046 lbs

Year		Vehicle Category		CO	NOx	ROG	SOx	PM_{10}	PM_{10} (Fugitive)	$PM_{2.5}$	$PM^{2.5}$ (Fugitive)	CO2	CH4
				lb/VMT	lb/VMT	lb/VMT	lb/VMT	lb/VMT	lb/VMT	lb/VMT	lb/VMT	lb/VMT	lb/VMT
2014	2014Heavy-Heavy Duty Trucks	Heavy-Heavy Duty Trucks	HHDT	0	0	0	0	0	0	0	0	0	0
2014	2014Medium-Heavy Duty Trucks	Medium-Heavy Duty Trucks	MHDT	0	0	0	0	0	0	0	0	0	0
2014	2014Light-Heavy Duty Trucks	Light-Heavy Duty Trucks	LHD2	0.0022465	0.0040851	0.000223	1.1E-05	3.75E-05	0.000161	3.31E-05	6.39E-05	1.084921	2.43E-05
2014	2014Light-Duty Trucks	Light-Duty Trucks	LDT2	0.0035957	0.0004145	7.72E-05	8.82E-06	4.41E-06	9.92E-05	2.2E-06	3.97E-05	0.854113	3.53E-05
2014	2014Passenger Cars	Passenger Cars	LDA	0.0025507	0.0002271	6.39E-05	6.61E-06	4.41E-06	9.92E-05	2.2E-06	3.97E-05	0.625824	2.43E-05
2014	2014Light-Light Duty Trucks	Light-Light Duty Trucks	LDT1	0.0064374	0.0006173	0.000172	6.61E-06	8.82E-06	9.92E-05	6.61E-06	3.97E-05	0.721649	5.51E-05
2015	2015Heavy-Heavy Duty Trucks	Heavy-Heavy Duty Trucks	HHDT	0.0012509	0.0260111	0.000231	3.7E-05	0.000155	0.000215	0.000143	7.82E-05	3.731821	0
2015	2015Medium-Heavy Duty Trucks	Medium-Heavy Duty Trucks	MHDT	0.001046	0.0113155	0.00024	2.37E-05	0.000156	0.000314	0.000143	0.00013	2.368276	0
2015	2015Light-Heavy Duty Trucks	Light-Heavy Duty Trucks	LHD2	0.0019908	0.0037522	0.000203	1.1E-05	3.53E-05	0.000161	3.09E-05	6.39E-05	1.083596	2.2E-05
2015	2015Light-Duty Trucks	Light-Duty Trucks	LDT2	0.0032452	0.0003682	6.61E-05	8.82E-06	2.2E-06	9.92E-05	2.2E-06	3.97E-05	0.854027	3.09E-05
2015	2015Passenger Cars	Passenger Cars	LDA	0.0022796	0.0002028	5.29E-05	6.61E-06	2.2E-06	9.92E-05	2.2E-06	3.97E-05	0.626139	2.2E-05
2015	2015Light-Light Duty Trucks	Light-Light Duty Trucks	LDT1	0.0058598	0.0005622	0.000148	6.61E-06	8.82E-06	9.92E-05	6.61E-06	3.97E-05	0.722271	5.07E-05
2016	2016Heavy-Heavy Duty Trucks	Heavy-Heavy Duty Trucks	HHDT	0.001261	0.024341	0.000236	3.75E-05	0.00015	0.000216	0.000137	7.72E-05	3.682057	0
2016	2016Medium-Heavy Duty Trucks	Medium-Heavy Duty Trucks	MHDT	0.0009387	0.0098845	0.000219	2.43E-05	0.000136	0.000313	0.000126	0.00013	2.339832	0
2016	2016Light-Heavy Duty Trucks	Light-Heavy Duty Trucks	LHD2	0.0017681	0.0035185	0.00019	1.1E-05	3.31E-05	0.000161	3.09E-05	6.39E-05	1.083435	1.98E-05
2016	2016Light-Duty Trucks	Light-Duty Trucks	LDT2	0.0029299	0.0003241	5.73E-05	8.82E-06	2.2E-06	9.92E-05	2.2E-06	3.97E-05	0.853956	2.87E-05
2016	2016Passenger Cars	Passenger Cars	LDA	0.0020547	0.0001808	4.41E-05	6.61E-06	2.2E-06	9.92E-05	2.2E-06	3.97E-05	0.626404	1.98E-05
2016	2016Light-Light Duty Trucks	Light-Light Duty Trucks	LDT1	0.0053131	0.0005093	0.000123	6.61E-06	6.61E-06	9.92E-05	6.61E-06	3.97E-05	0.722977	4.63E-05
2021	2021Heavy-Heavy Duty Trucks	Heavy-Heavy Duty Trucks	HHDT	0.0013338	0.0172775	0.000267	3.75E-05	0.000123	0.000216	0.000115	7.72E-05	3.388558	0

2021	2021Medium-Heavy Duty Trucks	Medium-Heavy Duty Trucks	MHDT	0.0007244	0.0041349	0.000175	2.43E-05	7.14E-05	0.000313	6.53E-05	0.00013	2.162865	0
2021	2021Light-Heavy Duty Trucks	Light-Heavy Duty Trucks	LHD2	0.0010406	0.0023788	0.000128	1.1E-05	2.65E-05	0.000161	2.43E-05	6.39E-05	1.081164	1.32E-05
2021	2021Light-Duty Trucks	Light-Duty Trucks	LDT2	0.0019114	0.000194	2.87E-05	8.82E-06	2.2E-06	9.92E-05	2.2E-06	3.97E-05	0.853842	1.98E-05
2021	2021Passenger Cars	Passenger Cars	LDA	0.0013977	0.0001235	2.2E-05	6.61E-06	2.2E-06	9.92E-05	2.2E-06	3.97E-05	0.627235	1.54E-05
2021	2021Light-Light Duty Trucks	Light-Light Duty Trucks	LDT1	0.0035406	0.0003351	6.61E-05	6.61E-06	4.41E-06	9.92E-05	4.41E-06	3.97E-05	0.725609	3.31E-05
2023	2023Heavy-Heavy Duty Trucks	Heavy-Heavy Duty Trucks	HHDT	0	0	0	0	0	0	0	0	0	0
2023	2023Medium-Heavy Duty Trucks	Medium-Heavy Duty Trucks	MHDT	0	0	0	0	0	0	0	0	0	0
2023	2023Light-Heavy Duty Trucks	Light-Heavy Duty Trucks	LHD2	0.0008929	0.0020194	0.00011	1.1E-05	2.43E-05	0.000161	2.2E-05	6.39E-05	1.080552	1.1E-05
2023	2023Light-Duty Trucks	Light-Duty Trucks	LDT2	0.0017152	0.000172	2.65E-05	8.82E-06	2.2E-06	9.92E-05	2.2E-06	3.97E-05	0.853817	1.76E-05
2023	2023Passenger Cars	Passenger Cars	LDA	0.0013007	0.0001146	1.98E-05	6.61E-06	2.2E-06	9.92E-05	2.2E-06	3.97E-05	0.62729	1.32E-05
2023	2023Light-Light Duty Trucks	Light-Light Duty Trucks	LDT1	0.0030401	0.0002866	5.51E-05	6.61E-06	4.41E-06	9.92E-05	4.41E-06	3.97E-05	0.726283	2.87E-05
2024	2024Heavy-Heavy Duty Trucks	Heavy-Heavy Duty Trucks	HHDT	0	0	0	0	0	0	0	0	0	0
2024	2024Medium-Heavy Duty Trucks	Medium-Heavy Duty Trucks	MHDT	0	0	0	0	0	0	0	0	0	0
2024	2024Light-Heavy Duty Trucks	Light-Heavy Duty Trucks	LHD2	0.0008355	0.0018695	0.000104	1.1E-05	2.2E-05	0.000161	1.98E-05	6.39E-05	1.080261	1.1E-05
2024	2024Light-Duty Trucks	Light-Duty Trucks	LDT2	0.0016446	0.0001631	2.43E-05	8.82E-06	2.2E-06	9.92E-05	2.2E-06	3.97E-05	0.853795	1.76E-05
2024	2024Passenger Cars	Passenger Cars	LDA	0.0012588	0.0001124	1.76E-05	6.61E-06	2.2E-06	9.92E-05	2.2E-06	3.97E-05	0.627251	1.32E-05
2024	2024Light-Light Duty Trucks	Light-Light Duty Trucks	LDT1	0.0028241	0.0002646	5.07E-05	6.61E-06	4.41E-06	9.92E-05	4.41E-06	3.97E-05	0.726524	2.87E-05
2025	2025Heavy-Heavy Duty Trucks	Heavy-Heavy Duty Trucks	HHDT	0	0	0	0	0	0	0	0	0	0
2025	2025Medium-Heavy Duty Trucks	Medium-Heavy Duty Trucks	MHDT	0	0	0	0	0	0	0	0	0	0
2025	2025Light-Heavy Duty Trucks	Light-Heavy Duty Trucks	LHD2	0.0007848	0.0016997	9.48E-05	1.1E-05	2.2E-05	0.000161	1.98E-05	6.39E-05	1.080274	8.82E-06
2025	2025Light-Duty Trucks	Light-Duty Trucks	LDT2	0.0015873	0.0001565	2.43E-05	8.82E-06	2.2E-06	9.92E-05	2.2E-06	3.97E-05	0.853778	1.76E-05
2025	2025Passenger Cars	Passenger Cars	LDA	0.0012324	0.0001102	1.76E-05	6.61E-06	2.2E-06	9.92E-05	2.2E-06	3.97E-05	0.627237	1.32E-05
2025	2025Light-Light Duty Trucks	Light-Light Duty Trucks	LDT1	0.0026323	0.0002447	4.63E-05	6.61E-06	4.41E-06	9.92E-05	4.41E-06	3.97E-05	0.726742	2.65E-05
2026	2026Heavy-Heavy Duty Trucks	Heavy-Heavy Duty Trucks	HHDT	0	0	0	0	0	0	0	0	0	0
2026	2026Medium-Heavy Duty Trucks	Medium-Heavy Duty Trucks	MHDT	0	0	0	0	0	0	0	0	0	0
2026	2026Light-Heavy Duty Trucks	Light-Heavy Duty Trucks	LHD2	0.0007474	0.0015741	9.04E-05	1.1E-05	1.98E-05	0.000161	1.76E-05	6.39E-05	1.080146	8.82E-06
2026	2026Light-Duty Trucks	Light-Duty Trucks	LDT2	0.0015366	0.0001499	2.2E-05	8.82E-06	2.2E-06	9.92E-05	2.2E-06	3.97E-05	0.853751	1.76E-05
2026	2026Passenger Cars	Passenger Cars	LDA	0.0012103	0.000108	1.76E-05	6.61E-06	2.2E-06	9.92E-05	2.2E-06	3.97E-05	0.627259	1.32E-05
2026	2026Light-Light Duty Trucks	Light-Light Duty Trucks	LDT1	0.0024581	0.0002271	4.19E-05	6.61E-06	4.41E-06	9.92E-05	4.41E-06	3.97E-05	0.727004	2.43E-05
2030	2030Heavy-Heavy Duty Trucks	Heavy-Heavy Duty Trucks	HHDT	0.0013889	0.0092836	0.000293	3.53E-05	9.7E-05	0.000216	9.04E-05	7.72E-05	3.342857	0
2030	2030Medium-Heavy Duty Trucks	Medium-Heavy Duty Trucks	MHDT	0.0007011	0.0022408	0.000171	2.43E-05	6.75E-05	0.000313	6.22E-05	0.00013	2.149999	0
2030	2030Light-Heavy Duty Trucks	Light-Heavy Duty Trucks	LHD2	0.0006437	0.0011861	7.28E-05	1.1E-05	1.76E-05	0.000161	1.54E-05	6.39E-05	1.079751	6.61E-06
2030	2030Light-Duty Trucks	Light-Duty Trucks	LDT2	0.0014154	0.0001345	1.98E-05	8.82E-06	4.41E-06	9.92E-05	2.2E-06	3.97E-05	0.853626	1.54E-05
2030	2030Passenger Cars	Passenger Cars	LDA	0.0011508	0.0001014	1.54E-05	6.61E-06	4.41E-06	9.92E-05	2.2E-06	3.97E-05	0.627253	1.32E-05
2030	2030Light-Light Duty Trucks	Light-Light Duty Trucks	LDT1	0.0018871	0.0001675	2.87E-05	6.61E-06	4.41E-06	9.92E-05	4.41E-06	3.97E-05	0.728018	1.98E-05

lbs/VMT

1gram = 0.0022046 lbs

Year		Vehicle Category		CO	NOx	ROG	SOx	PM_{10}	PM_{10} (Fugitive)	$PM_{2.5}$	$PM^{2.5}$ (Fugitive)	CO2	CH4
				lb/VMT	lb/VMT	lb/VMT	lb/VMT	lb/VMT	lb/VMT	lb/VMT	lb/VMT	lb/VMT	lb/VMT
2014	2014Heavy-Heavy Duty Trucks	Heavy-Heavy Duty Trucks	HHDT	0	0	0	0	0	0	0	0	0	0
2014	2014Medium-Heavy Duty Trucks	Medium-Heavy Duty Trucks	MHDT	0	0	0	0	0	0	0	0	0	0
2014	2014Light-Heavy Duty Trucks	Light-Heavy Duty Trucks	LHD2	0.0022465	0.0024511	0.000223	1.1E-05	5.62E-06	0.000161	4.96E-06	6.39E-05	1.084921	2.43E-05
2014	2014Light-Duty Trucks	Light-Duty Trucks	LDT2	0.0035957	0.0002487	7.72E-05	8.82E-06	6.61E-07	9.92E-05	3.31E-07	3.97E-05	0.854113	3.53E-05
2014	2014Passenger Cars	Passenger Cars	LDA	0.0025507	0.0001362	6.39E-05	6.61E-06	4.41E-06	9.92E-05	2.2E-06	3.97E-05	0.625824	2.43E-05
2014	2014Light-Light Duty Trucks	Light-Light Duty Trucks	LDT1	0.0064374	0.0003704	0.000172	6.61E-06	1.32E-06	9.92E-05	9.92E-07	3.97E-05	0.721649	5.51E-05
2015	2015Heavy-Heavy Duty Trucks	Heavy-Heavy Duty Trucks	HHDT	0.0012509	0.0156066	0.000231	3.7E-05	2.33E-05	0.000215	2.15E-05	7.82E-05	3.731821	0
2015	2015Medium-Heavy Duty Trucks	Medium-Heavy Duty Trucks	MHDT	0.001046	0.0067893	0.00024	2.37E-05	2.34E-05	0.000314	2.15E-05	0.00013	2.368276	0
2015	2015Light-Heavy Duty Trucks	Light-Heavy Duty Trucks	LHD2	0.0019908	0.0022513	0.000203	1.1E-05	5.29E-06	0.000161	4.63E-06	6.39E-05	1.083596	2.2E-05
2015	2015Light-Duty Trucks	Light-Duty Trucks	LDT2	0.0032452	0.0002209	6.61E-05	8.82E-06	3.31E-07	9.92E-05	3.31E-07	3.97E-05	0.854027	3.09E-05
2015	2015Passenger Cars	Passenger Cars	LDA	0.0022796	0.0001217	5.29E-05	6.61E-06	2.2E-06	9.92E-05	2.2E-06	3.97E-05	0.626139	2.2E-05
2015	2015Light-Light Duty Trucks	Light-Light Duty Trucks	LDT1	0.0058598	0.0003373	0.000148	6.61E-06	1.32E-06	9.92E-05	9.92E-07	3.97E-05	0.722271	5.07E-05
2016	2016Heavy-Heavy Duty Trucks	Heavy-Heavy Duty Trucks	HHDT	0.001261	0.0146046	0.000236	3.75E-05	2.25E-05	0.000216	2.05E-05	7.72E-05	3.682057	0
2016	2016Medium-Heavy Duty Trucks	Medium-Heavy Duty Trucks	MHDT	0.0009387	0.0059307	0.000219	2.43E-05	2.04E-05	0.000313	1.88E-05	0.00013	2.339832	0
2016	2016Light-Heavy Duty Trucks	Light-Heavy Duty Trucks	LHD2	0.0017681	0.0021111	0.00019	1.1E-05	4.96E-06	0.000161	4.63E-06	6.39E-05	1.083435	1.98E-05
2016	2016Light-Duty Trucks	Light-Duty Trucks	LDT2	0.0029299	0.0001944	5.73E-05	8.82E-06	3.31E-07	9.92E-05	3.31E-07	3.97E-05	0.853956	2.87E-05
2016	2016Passenger Cars	Passenger Cars	LDA	0.0020547	0.0001085	4.41E-05	6.61E-06	2.2E-06	9.92E-05	2.2E-06	3.97E-05	0.626404	1.98E-05
2016	2016Light-Light Duty Trucks	Light-Light Duty Trucks	LDT1	0.0053131	0.0003056	0.000123	6.61E-06	9.92E-07	9.92E-05	9.92E-07	3.97E-05	0.722977	4.63E-05
2021	2021Heavy-Heavy Duty Trucks	Heavy-Heavy Duty Trucks	HHDT	0.0013338	0.0103665	0.000267	3.75E-05	1.85E-05	0.000216	1.72E-05	7.72E-05	3.388558	0
2021	2021Medium-Heavy Duty Trucks	Medium-Heavy Duty Trucks	MHDT	0.0007244	0.002481	0.000175	2.43E-05	1.07E-05	0.000313	9.79E-06	0.00013	2.162865	0
2021	2021Light-Heavy Duty Trucks	Light-Heavy Duty Trucks	LHD2	0.0010406	0.0014273	0.000128	1.1E-05	3.97E-06	0.000161	3.64E-06	6.39E-05	1.081164	1.32E-05
2021	2021Light-Duty Trucks	Light-Duty Trucks	LDT2	0.0019114	0.0001164	2.87E-05	8.82E-06	3.31E-07	9.92E-05	3.31E-07	3.97E-05	0.853842	1.98E-05
2021	2021Passenger Cars	Passenger Cars	LDA	0.0013977	7.407E-05	2.2E-05	6.61E-06	2.2E-06	9.92E-05	2.2E-06	3.97E-05	0.627235	1.54E-05
2021	2021Light-Light Duty Trucks	Light-Light Duty Trucks	LDT1	0.0035406	0.0002011	6.61E-05	6.61E-06	6.61E-07	9.92E-05	6.61E-07	3.97E-05	0.725609	3.31E-05
2023	2023Heavy-Heavy Duty Trucks	Heavy-Heavy Duty Trucks	HHDT	0	0	0	0	0	0	0	0	0	0
2023	2023Medium-Heavy Duty Trucks	Medium-Heavy Duty Trucks	MHDT	0	0	0	0	0	0	0	0	0	0
2023	2023Light-Heavy Duty Trucks	Light-Heavy Duty Trucks	LHD2	0.0008929	0.0012116	0.00011	1.1E-05	3.64E-06	0.000161	3.31E-06	6.39E-05	1.080552	1.1E-05
2023	2023Light-Duty Trucks	Light-Duty Trucks	LDT2	0.0017152	0.0001032	2.65E-05	8.82E-06	3.31E-07	9.92E-05	3.31E-07	3.97E-05	0.853817	1.76E-05
2023	2023Passenger Cars	Passenger Cars	LDA	0.0013007	6.878E-05	1.98E-05	6.61E-06	2.2E-06	9.92E-05	2.2E-06	3.97E-05	0.62729	1.32E-05
2023	2023Light-Light Duty Trucks	Light-Light Duty Trucks	LDT1	0.0030401	0.000172	5.51E-05	6.61E-06	6.61E-07	9.92E-05	6.61E-07	3.97E-05	0.726283	2.87E-05
2024	2024Heavy-Heavy Duty Trucks	Heavy-Heavy Duty Trucks	HHDT	0	0	0	0	0	0	0	0	0	0
2024	2024Medium-Heavy Duty Trucks	Medium-Heavy Duty Trucks	MHDT	0	0	0	0	0	0	0	0	0	0
2024	2024Light-Heavy Duty Trucks	Light-Heavy Duty Trucks	LHD2	0.0008355	0.0011217	0.000104	1.1E-05	3.31E-06	0.000161	2.98E-06	6.39E-05	1.080261	1.1E-05
2024	2024Light-Duty Trucks	Light-Duty Trucks	LDT2	0.0016446	9.788E-05	2.43E-05	8.82E-06	3.31E-07	9.92E-05	3.31E-07	3.97E-05	0.853795	1.76E-05
2024	2024Passenger Cars	Passenger Cars	LDA	0.0012588	6.746E-05	1.76E-05	6.61E-06	2.2E-06	9.92E-05	2.2E-06	3.97E-05	0.627251	1.32E-05
2024	2024Light-Light Duty Trucks	Light-Light Duty Trucks	LDT1	0.0028241	0.0001587	5.07E-05	6.61E-06	6.61E-07	9.92E-05	6.61E-07	3.97E-05	0.726524	2.87E-05

2025	2025Heavy-Heavy Duty Trucks	Heavy-Heavy Duty Trucks	HHDT	0	0	0	0	0	0	0	0	0	0
2025	2025Medium-Heavy Duty Trucks	Medium-Heavy Duty Trucks	MHDT	0	0	0	0	0	0	0	0	0	0
2025	2025Light-Heavy Duty Trucks	Light-Heavy Duty Trucks	LHD2	0.0007848	0.0010198	9.48E-05	1.1E-05	3.31E-06	0.000161	2.98E-06	6.39E-05	1.080274	8.82E-06
2025	2025Light-Duty Trucks	Light-Duty Trucks	LDT2	0.0015873	9.392E-05	2.43E-05	8.82E-06	3.31E-07	9.92E-05	3.31E-07	3.97E-05	0.853778	1.76E-05
2025	2025Passenger Cars	Passenger Cars	LDA	0.0012324	6.614E-05	1.76E-05	6.61E-06	2.2E-06	9.92E-05	2.2E-06	3.97E-05	0.627237	1.32E-05
2025	2025Light-Light Duty Trucks	Light-Light Duty Trucks	LDT1	0.0026323	0.0001468	4.63E-05	6.61E-06	6.61E-07	9.92E-05	6.61E-07	3.97E-05	0.726742	2.65E-05
2026	2026Heavy-Heavy Duty Trucks	Heavy-Heavy Duty Trucks	HHDT	0	0	0	0	0	0	0	0	0	0
2026	2026Medium-Heavy Duty Trucks	Medium-Heavy Duty Trucks	MHDT	0	0	0	0	0	0	0	0	0	0
2026	2026Light-Heavy Duty Trucks	Light-Heavy Duty Trucks	LHD2	0.0007474	0.0009445	9.04E-05	1.1E-05	2.98E-06	0.000161	2.65E-06	6.39E-05	1.080146	8.82E-06
2026	2026Light-Duty Trucks	Light-Duty Trucks	LDT2	0.0015366	8.995E-05	2.2E-05	8.82E-06	3.31E-07	9.92E-05	3.31E-07	3.97E-05	0.853751	1.76E-05
2026	2026Passenger Cars	Passenger Cars	LDA	0.0012103	6.482E-05	1.76E-05	6.61E-06	2.2E-06	9.92E-05	2.2E-06	3.97E-05	0.627259	1.32E-05
2026	2026Light-Light Duty Trucks	Light-Light Duty Trucks	LDT1	0.0024581	0.0001362	4.19E-05	6.61E-06	6.61E-07	9.92E-05	6.61E-07	3.97E-05	0.727004	2.43E-05
2030	2030Heavy-Heavy Duty Trucks	Heavy-Heavy Duty Trucks	HHDT	0.0013889	0.0055701	0.000293	3.53E-05	1.46E-05	0.000216	1.36E-05	7.72E-05	3.342857	0
2030	2030Medium-Heavy Duty Trucks	Medium-Heavy Duty Trucks	MHDT	0.0007011	0.0013445	0.000171	2.43E-05	1.01E-05	0.000313	9.33E-06	0.00013	2.149999	0
2030	2030Light-Heavy Duty Trucks	Light-Heavy Duty Trucks	LHD2	0.0006437	0.0007116	7.28E-05	1.1E-05	2.65E-06	0.000161	2.31E-06	6.39E-05	1.079751	6.61E-06
2030	2030Light-Duty Trucks	Light-Duty Trucks	LDT2	0.0014154	8.069E-05	1.98E-05	8.82E-06	6.61E-07	9.92E-05	3.31E-07	3.97E-05	0.853626	1.54E-05
2030	2030Passenger Cars	Passenger Cars	LDA	0.0011508	6.085E-05	1.54E-05	6.61E-06	4.41E-06	9.92E-05	2.2E-06	3.97E-05	0.627253	1.32E-05
2030	2030Light-Light Duty Trucks	Light-Light Duty Trucks	LDT1	0.0018871	0.0001005	2.87E-05	6.61E-06	6.61E-07	9.92E-05	6.61E-07	3.97E-05	0.728018	1.98E-05

Chiquita Canyon Landfill EIR

EMFAC2011 Idling Emission Rates for HHDT, South Coast Air Basin; Annual Average

	CO	NOx	ROG	SOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4
	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr
2015	0.075983	0.141229	0.013973	0.000148	0.000591031	0.000544	15.1172408	0
2016	0.074277	0.128781	0.01328	0.000148	0.000324965	0.000299	14.99248558	0
2021	0.087178	0.095813	0.015478	0.000148	0.000250771	0.000231	13.96953045	0
2030	0.091341	0.086164	0.016195	0.000148	0.000239527	0.00022	13.96140275	0

Note: EMFAC does not predict methane emissions from idling.

Conversion gram/lb: 1 gram = 0.002205 lb

Chiquita Canyon Landfill EIR

Fugitive PM_{10} Emission Factors for Roads

Assumptions:

Assume PM_{10} control efficiencies are the same for $PM_{2.5}$

Fugitive Emissions Used in Analysis [1]

Trucks:

	Uncontrolled / Unmitigated Fugitive Emission Factors (lb/VMT)				Controlled Fugitive Emission Factors (lb/VMT)			
	Onsite PM_{10}	Offsite PM_{10}	Onsite $PM_{2.5}$	Offsite $PM_{2.5}$	Onsite PM_{10}	Offsite PM_{10}	Onsite $PM_{2.5}$	Offsite $PM_{2.5}$
Paved Roads	2.42E-01	9.04E-03	5.93E-02	2.22E-03	2.42E-02	9.04E-04	5.93E-03	2.22E-04
Unpaved Roads	1.11	NA	0.11	NA	1.11E-01	NA	1.11E-02	NA

Control Measures:

Measure	**Control Efficiency**	**Applicable Source**	**Reference**
25-foot-long gravel trackout apron, paved roads cleaned 3x daily using a SCAQMD-approved street sweeper.	90%	Paved Roads	Western Regional Air Partnership Fugitive Dust Handbook, Table 3-7; SCAQMD CEQA Handbook, Table XI-C.
Watering 2x daily, use of dust palliatives, paving as much as possible, and limiting the maximum vehicle speed to 15 miles per hour.	90%	Unpaved Roads	Western Regional Air Partnership Fugitive Dust Handbook, Table 6-6; SCAQMD CEQA Handbook, Table XI-D.

Chiquita Canyon Landfill EIR
Fugitive PM_{10} Emission Factors for Roads

Emission Factor Calculations

Travel On Paved Roads [2]

$EF^{(1)}$ = k [(sL)^0.91] [(W)^1.02] [1-P/4N] lb/vehicle mile traveled (vmt)

Parameter	*Description*	*Value*		
k	Constant used to calculate PM_{10}	0.0022		
k	Constant used to calculate $PM_{2.5}$	0.00054		
P	Number of Days > 0.01 in. Precipitation (Annual Ave. for SCAB)[4]:	34		
N	Number of Days in Averaging Period:	365		
		Onsite SL (Paved Roads)	Offsite SL (Paved Roads)	
SL (Paved Roads)	Silt Loading (g/m2)[5]	7.4		0.2

Vehicle Travel on Unpaved Surfaces at Industrial Sites[3]

$EF^{(1)}$ = k [(s/12)^a] [(W/3)^b] [(365-P)/365] lb/vehicle mile traveled (vmt)

Parameter	*Description*	*Value*
s	Silt Loading (g/m2)[6]	4.0
P	Number of Days > 0.01 in. Precipitation (Annual Ave. for SCAB)[4]:	34

	Constants: PM_{10}	Constants: $PM_{2.5}$
k	1.5	0.15
a	0.9	0.9
b	0.45	0.45

Vehicle Type	W: Mean Vehicle Weight (tons)	Vehicle Fleet Mix (Percent) [7]	Fugitive Emission Factors on Paved Roads (lb/VMT)			
			Onsite PM_{10}	Offsite PM_{10}	Onsite $PM_{2.5}$	Offsite $PM_{2.5}$
LDA	0.94	0.08	1.24E-02	4.65E-04	3.05E-03	1.14E-04
HHDT	23.25	0.65	3.29E-01	1.23E-02	8.07E-02	3.02E-03
MHDT	11.75	0.14	1.64E-01	6.13E-03	4.02E-02	1.51E-03
LHDT2	2.38	0.11	3.21E-02	1.20E-03	7.88E-03	2.95E-04
LDT2	6.00	0	8.26E-02	3.09E-03	2.03E-02	7.58E-04
LDT1	4.63	0.02	6.33E-02	2.37E-03	1.55E-02	5.81E-04
Average	17.19	-	2.42E-01	9.04E-03	5.93E-02	0.00221814

Fugitive Emission Factors on Unpaved Roads (lb/VMT)	
Onsite PM_{10}	Onsite $PM_{2.5}$
0.30	0.03
1.27	0.13
0.94	0.09
0.46	0.05
0.69	0.07
0.61	0.06
1.11	0.11

Chiquita Canyon Landfill EIR

Fugitive PM_{10} Emission Factors for Roads

Vehicle Class	Vehicle Weight Class (lbs)[8] Low	High	Median Weight (lbs)	Median Weight (tons)
LDA	0	3750	1875	0.94
HHDT	33001	60000	46500.5	23.25
MHDT	14001	33000	23500.5	11.75
LDT2	3751	5750	4750.5	2.38
LHD2	10001	14000	12000.5	6.00
LHD1	8501	10000	9250.5	4.63
LDT1	0	3750	1875	0.9375

Offsite SL Loading:

ADT:	< 500	500 - 5,000	5,000 - 10,000	>10,000
SL Loading (g/m2)[5]:	0.6	0.2	0.06	.03 / 0.015 limited

[1]Emissions are based on average weight of vehicles on the roadway and are not calculated individually as per AP42 13.2.1. Emission factor calculations are not intended to be used to calculate a separate emission factor for each vehicle weight class, but only one EF to represent the "fleet" average weight of all vehicles traveling the road.

[2]Emission factors were calculated using EPA AP-42 13.2.1, equation 2 to estimate emission factor on an annual basis. The hourly emission calculation was not used because hourly precipitation data are not available and the predictive analysis is more appropriate for this application. The daily emissions and hourly emissions are scaled based on the annual emission factors and operating scenario.

[3]Emission factors were calculated using EPA AP-42 13.2.2, equations 1a and 2.

[4]Average SCAB precipitation conditions were taken from SCAQMD CEQA Handbook, Table A9-9-D-4.

[5]Silt content was obtained from EPA AP42 Table 13.2.1-3. The value for municipal solid waste landfill was used for onsite. The ubiquitous baseline value for road with 500 < ADT , 5,000 was used for offsite, since the project will generate at least 1,500 ADT.

[6]Silt content was obtained from SCAQMD CEQA Handbook, Table A9-9 in order to account for the gravel roads

[7]Based on the existing fleet mix and the addition of vehicles from the proposed project.

[8]Vehicle Weight Class taken from EMFAC2011 LDV User Guide Table 3.1 for LDV vehicles and EMFAC2007 User Guide Table 1 for HD vehicles. Assume that passenger cars have the same median weight as light duty trucks (LDT1).

Air Quality Appendix H3
Carbon Storage Analysis

Environmental Consultants
and Contractors

3117 Fite Circle
Suite 108
Sacramento, CA 95827

916 361-1297
FAX 916 361-1299
www.scsengineers.com

SCS ENGINEERS

June 2, 2014
File No. 01204123.11

Mr. Tom Reilly
Waste Connections, Inc.
1385 Promontory Point Drive
El Dorado Hills, CA 95762

Subject: Carbon Storage in Chiquita Canyon Landfill

Dear Mr. Reilly:

SCS Engineers (SCS) understands that Waste Connections, Inc. (WCI) is planning to increase the capacity of the Chiquita Canyon Landfill (CCL). This increase will result in a change in the amount of carbon stored in the CCL. To quantify the mass of the carbon stored in the CCL and the equivalent mass of the carbon dioxide (CO_2e), SCS has utilized the Solid Waste Industry for Climate Solutions (SWICS) methodology, available at (http://www.scsengineers.com/Papers/Sullivan_SWICS_White_Paper_Version_2.2_Final.pdf). The mass of carbon stored is expressed in metric tons (MT) of CO_2e, which is the most common unit used to quantify greenhouse gas (GHG) impacts.

SCS has evaluated the carbon storage under two scenarios. The first scenario assumes that waste is placed in the landfill at the maximum permitted disposal rate of 12,000 tons per day (tpd) or 3,120,000 tons per year (tpy) (Scenario 1). The second scenario assumes that waste placement increases from 6,000 tpd (1,560,000 tpy) to 12,000 tpd (3,120,000 tpy), continuing until the landfill reaches capacity (Scenario 2). Scenario 2 evaluates the average annual disposal rate for waste disposed under the proposed expansion, or 2,958,113 tpy.

The average waste composition for landfills in California derived from the California Integrated Waste Management Board (CIWMB, now CalRecycle) was used when calculating the carbon storage factor (CSF) for CCL. ***Table 1*** shows the information needed to determine the CSF, including the fraction of each waste component, the estimated moisture content, the carbon storage factor, and the carbon storage factor by waste type.

Table 1 - Carbon Storage Factor Determination

Waste Type	Fraction of California Waste Stream	Moisture Content	Carbon Storage Factor (dry kg C/dry kg waste)	Carbon Storage Factor (MT C/wet ton)
Newspapers	1%	6%	0.42	0.395
Office Paper	2%	6%	0.05	0.047
Mixed Paper	3%	6%	0.24	0.226
Magazines/Catalogs	1%	6%	0.27	0.254
Cardboard/Kraft Paper	5%	5%	0.26	0.247
Remainder/Comp Paper	5%	6%	0.25	0.235
Textiles	2%	10%	0.01	0.009
Wood	1%	20%	0.38	0.304
Food Waste	16%	70%	0.08	0.024
Yard Trimmings	6%	60%	0.34	0.136
Misc. Organics	8%	50%	0.27	0.135
Other waste	50%	NA	NA	0
Composite CSF				0.0645

NA = not applicable (not used in calculations)

The waste placement, amount of carbon stored, and the CO_2e for each year of the landfill expansion are shown in ***Table 2***. Based on the analysis completed, the proposed expansion of the CCL will result in the following amounts of carbon storage:

- Maximum annual carbon storage: 738,386 $MTCO_2e$
- Average annual carbon storage: 696,703 $MTCO_2e$
- Total carbon storage over remaining life of landfill: 21,597,781 $MTCO_2e$

Table 2 - Carbon Storage in CCL

Year	Waste Placed	Carbon Stored	CO2e Stored
	tpy	Mg	MT
1	1,671,429	107,783	395,564
2	1,894,286	122,154	448,306
3	2,117,143	136,525	501,047
4	2,340,000	150,896	553,789
5	2,562,857	165,267	606,531
6	2,785,714	179,638	659,273
7	3,008,571	194,009	712,015
8	3,120,000	201,195	738,386
9	3,120,000	201,195	738,386
10	3,120,000	201,195	738,386
11	3,120,000	201,195	738,386
12	3,120,000	201,195	738,386
13	3,120,000	201,195	738,386
14	3,120,000	201,195	738,386
15	3,120,000	201,195	738,386
16	3,120,000	201,195	738,386
17	3,120,000	201,195	738,386
18	3,120,000	201,195	738,386
19	3,120,000	201,195	738,386
20	3,120,000	201,195	738,386
21	3,120,000	201,195	738,386
22	3,120,000	201,195	738,386
23	3,120,000	201,195	738,386
24	3,120,000	201,195	738,386
25	3,120,000	201,195	738,386
26	3,120,000	201,195	738,386
27	3,120,000	201,195	738,386
28	3,120,000	201,195	738,386
29	3,120,000	201,195	738,386
30	3,120,000	201,195	738,386
31	3,120,000	201,195	738,386
TOTAL	91,260,000	5,884,954	21,597,781
AVERAGE	2,943,871	189,837	696,703
MAXIMUM	3,120,000	201,195	738,386

A comprehensive description of the methodology is available in the SWICS document.

If you have any questions please do not hesitate to contact the undersigned at 916-361-1297.

Sincerely,

John Henkelman
Senior Project Professional
SCS Engineers

Patrick S. Sullivan
Senior Vice President
SCS Engineers

Noise Appendix I-1
Noise Monitoring Site Photographs

Site 1
Short-Term Background
Noise Monitoring Location
Windsor Road / Hunstock Street

Site 2
Short-Term Background
Noise Monitoring Location
Wolcott Way / Franklin Parkway

Site 3
Long-Term Background
Noise Monitoring Location
Extension Area (East)

Site 4
Long-Term Background
Noise Monitoring Location
Property Line of Landfill (West)

Noise Appendix I-2
Measured Existing Noise Levels

Short-term Noise Level Measurement Data

Date: 9/16/05	Project: Chiquita Canyon Landfill

Monitoring Location: #1 – In the community of Val Verde at the intersection of Windsor Road and Hunstock Street (directly across the street from the residence 28959 Windsor Road)

Equipment: Sound level meter LD 824

Weather: Temp. 75 – 80°F clear Wind Conditions: calm Humidity: 50%

Measurement Start Time	Duration (mins)	L_{eq}	L_{min}	L_{max}	SEL	L_n				
						L_8	L_{25}	L_{50}	L_{90}	
2:25 p.m.	15	51.6	41.9	75.7	81.1	53.5	50.7	48.4	44.7	

Notes (site characteristics, pertinent distances, elevations, traffic speed, other):

The monitoring equipment was set up at the closest (approximate) location to the Chiquita Canyon Landfill (in the Val Verde community). The equipment was located directly across the street from a residence (28959 Windsor Road) at the gate to a hillside that was marked private property.

Data by: Walter Gonzales

CH2MHILL

Short-term Noise Level Measurement Data

Date: 9/16/05	Project: Chiquita Canyon Landfill

Monitoring Location: #2 – North of SR-126, at the proposed new entrance to the landfill. The intersection of Wolcott Way and Franklin Parkway.

Equipment: Sound level meter LD 824

Weather: Temp. 75 – 80°F clear Wind Conditions: calm Humidity: 50%

Measurement Start Time	Duration (mins)	L_{eq}	L_{min}	L_{max}	SEL	L_n				
						L_8	L_{25}	L_{50}	L_{90}	
2:55 p.m.	15	57.2	47.3	71.9	86.8	58.9	56.2	52.2	45.8	

Notes (site characteristics, pertinent distances, elevations, traffic speed, other):

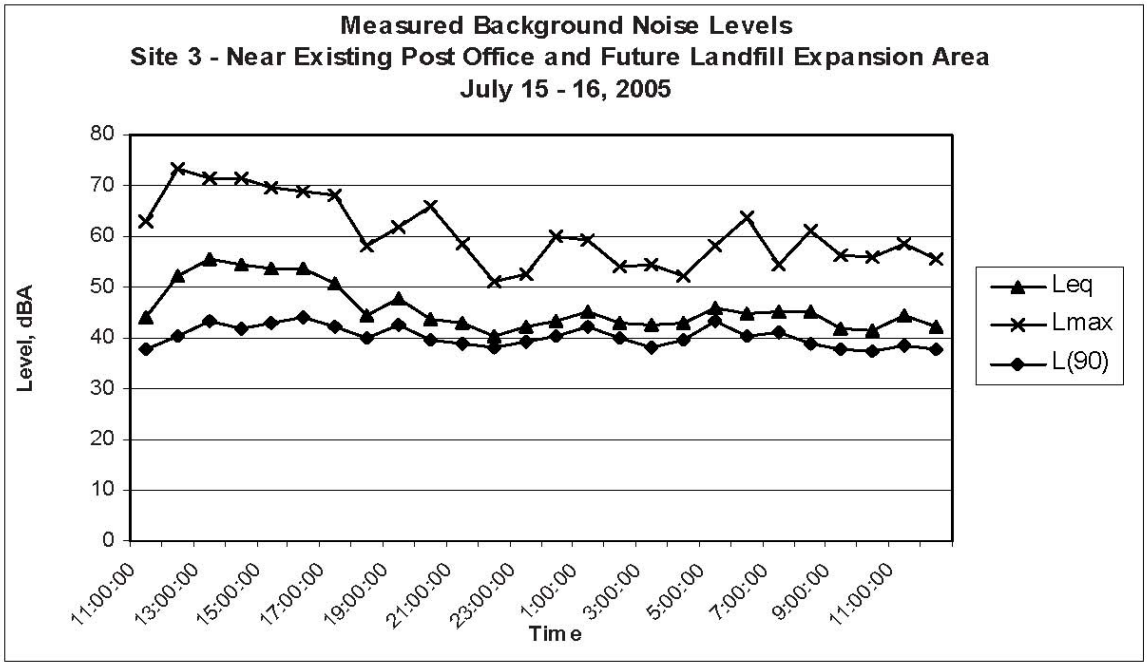
The microphone and monitor were set up approximately 250 feet from SR–126, at the end of Wolcott Way where it turns/curves into Franklin Parkway. There is a significant level of noise coming from SR–126. There was an occasional car driving west on Franklin Parkway towards Wolcott.

Data by: Walter Gonzales

CH2MHILL

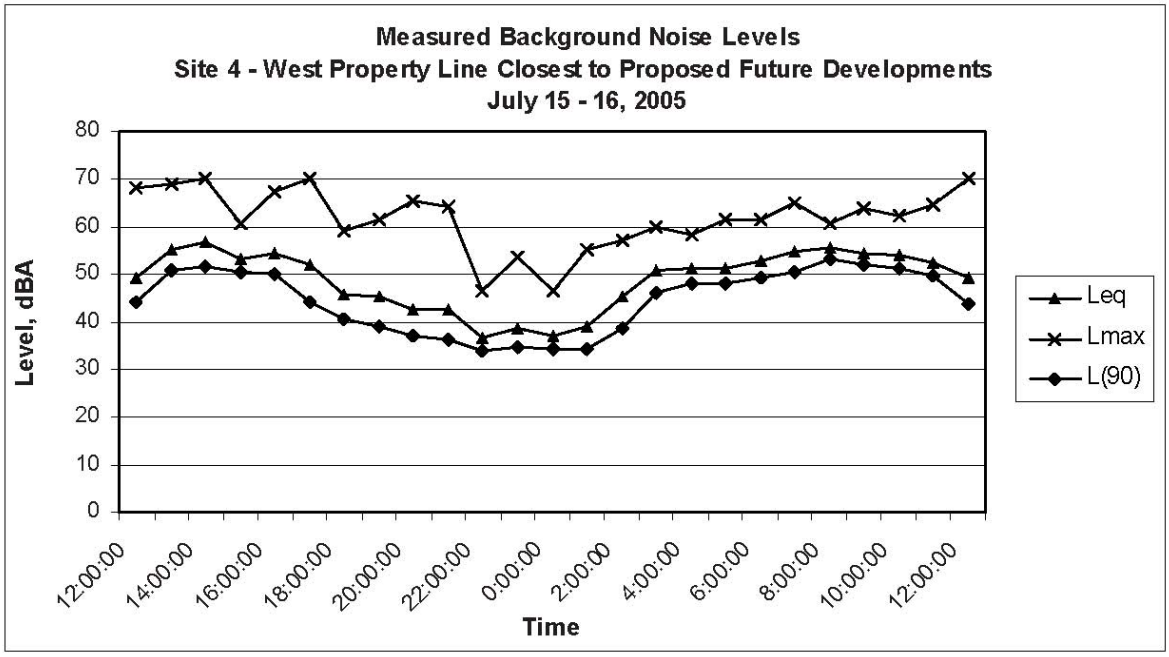
Measured Background Noise Levels
Site 3 - Near Existing Post Office and Future Landfill Expansion Area
July 15 - 16, 2005

Date	Time	Duration	Leq	Lmax	Lmin	L(8)	L(25)	L(50)	L(90)
15-Sep	11:00:00	3600	44.2	62.9	35.6	47.6	43.4	40.8	37.6
15-Sep	12:00:00	3600	52.2	73.5	37.1	56.5	52.2	47.5	40.5
15-Sep	13:00:00	3600	55.6	71.6	37.7	60.4	56	51.3	43.2
15-Sep	14:00:00	3600	54.4	71.3	38.7	59.5	54.5	49.7	41.9
15-Sep	15:00:00	3600	53.8	69.8	37.6	58.7	53.9	48.6	42.8
15-Sep	16:00:00	3600	53.8	68.8	39.8	58.3	53.6	49.7	44.1
15-Sep	17:00:00	3600	50.6	68	39	54.5	50.7	47.2	42.3
15-Sep	18:00:00	3600	44.6	58.2	38.1	47.8	44.3	42.7	40
15-Sep	19:00:00	3600	47.6	61.9	39.6	51.6	47.1	44.9	42.5
15-Sep	20:00:00	3600	43.6	66	37.8	43.7	42	41.1	39.7
15-Sep	21:00:00	3600	42.8	58.4	37	44.4	42.2	40.8	39
15-Sep	22:00:00	3600	40.4	51.2	35.8	42.1	40.4	39.5	38
15-Sep	23:00:00	3600	42.3	52.5	36.6	44.3	42.8	41.8	39.4
16-Sep	0:00:00	3600	43.3	59.9	38.5	45.6	43.8	42.4	40.3
16-Sep	1:00:00	3600	45	59.4	40.5	46.8	45.7	44.5	42.1
16-Sep	2:00:00	3600	42.8	53.9	37.9	45.1	43.2	41.9	40
16-Sep	3:00:00	3600	42.5	54.3	34	45.5	43.2	41.5	38.1
16-Sep	4:00:00	3600	43	52.4	37.7	45.7	44.1	42.2	39.6
16-Sep	5:00:00	3600	46	58.2	41.3	48.2	46.8	45.5	43.4
16-Sep	6:00:00	3600	44.9	63.8	37.3	48.4	45.1	43.6	40.2
16-Sep	7:00:00	3600	45.1	54.5	37.4	47.4	46.2	45	41
16-Sep	8:00:00	3600	45.2	61.2	35.2	49.1	46.1	43.6	38.8
16-Sep	9:00:00	3600	41.9	56.3	35.2	44.4	41.9	40.2	37.6
16-Sep	10:00:00	3600	41.6	56.1	35.2	44.5	41.8	39.9	37.4
16-Sep	11:00:00	3600	44.5	58.7	35.8	48.6	44.3	41.5	38.6
16-Sep	12:00:00	3600	42.3	55.7	35.8	45.8	42.2	40.2	37.7



Measured Background Noise Levels
Site 4 - West Property Line Closest to Proposed Future Developments
July 15 - 16, 2005

Date	Time	Duration	Leq	Lmax	Lmin	L(8)	L(25)	L(50)	L(90)
15-Sep-05	12:00:00	3600	49.1	68	39.9	51.7	49.4	47.2	44.1
15-Sep-05	13:00:00	3600	55.2	68.8	45.3	58.2	55.5	53.8	51
15-Sep-05	14:00:00	3600	56.6	70.3	48.9	60.6	56.6	54.2	51.5
15-Sep-05	15:00:00	3600	53.1	60.5	47.7	55.4	53.8	52.6	50.6
15-Sep-05	16:00:00	3600	54.5	67.5	45.7	57.4	54.6	52.9	50.2
15-Sep-05	17:00:00	3600	51.9	70.1	40.1	55.1	51.1	48.1	44.2
15-Sep-05	18:00:00	3600	45.6	59	36.8	48.8	46.3	44.2	40.5
15-Sep-05	19:00:00	3600	45.4	61.5	36.5	49.8	44.7	41.4	39
15-Sep-05	20:00:00	3600	42.7	65.5	34.6	42.2	40.8	39.2	36.9
15-Sep-05	21:00:00	3600	42.5	64.3	33.3	41.9	40.2	37.9	36.1
15-Sep-05	22:00:00	3600	36.8	46.6	30.8	39	37.1	35.9	33.8
15-Sep-05	23:00:00	3600	38.5	53.4	32.5	40.6	38.4	37	34.7
16-Sep-05	0:00:00	3600	37	46.4	32.2	39	37.8	36.5	34.3
16-Sep-05	1:00:00	3600	39	55	32.2	40.8	37.7	36.1	34.2
16-Sep-05	2:00:00	3600	45.3	57.1	35.5	48.6	46.4	44.5	38.6
16-Sep-05	3:00:00	3600	50.9	59.9	41.6	53.9	51.9	50.1	46.1
16-Sep-05	4:00:00	3600	51.4	58.5	44.3	54.1	52.4	50.8	48.1
16-Sep-05	5:00:00	3600	51.2	61.3	44.2	53.7	52.1	50.8	48.2
16-Sep-05	6:00:00	3600	52.7	61.4	44.6	55.2	53.6	52.1	49.2
16-Sep-05	7:00:00	3600	54.9	64.9	45.9	57.5	56	54.5	50.5
16-Sep-05	8:00:00	3600	55.4	60.6	50.6	57.2	55.9	55	53.3
16-Sep-05	9:00:00	3600	54.4	64	50.1	56.4	55.2	54.1	52.1
16-Sep-05	10:00:00	3600	54	62.3	48.2	56.3	54.9	53.7	51.2
16-Sep-05	11:00:00	3600	52.6	64.6	47.3	54.8	53.1	51.9	49.7
16-Sep-05	12:00:00	3600	49.2	70.3	40.3	51.3	48.6	46.8	43.8



Valencia Water Company

24631 Avenue Rockefeller • Valencia, CA 91355
(661) 294-0828 • Fax (661) 294-3806

April 25, 2011

Paul McCarthy
Supervising Regional Planner-Impact Analysis Section
County of Los Angeles
Department of Regional Planning
320 West Temple Street
Los Angeles, California 90012

Re: *Chiquita Canyon Landfill Water Supply Assessment*

Dear Mr. McCarthy,

In response to the County of Los Angeles's request, I have enclosed a copy of the Water Supply Assessment (WSA) for the Chiquita Canyon Landfill Expansion (County Project Number R2004-00559). The Valencia Water Company's governing board approved the WSA on March 22, 2011. A copy of the approval resolution also is enclosed for your files.

Please feel free to contact me at (661) 295-6501 if you have any questions.

Sincerely,

Keith Abercrombie
General Manager

Enclosures

cc: Mike Dean, Chiquita Canyon Landfill (by e-mail)
Brenda Grogg Eells, CH2M HILL (by e-mail)

CERTIFICATION

I, Greg Milleman, Secretary of Valencia Water Company, a corporation created and existing under the laws of the State of California, do hereby certify and declare that the foregoing is a full, true and correct copy of the resolution duly passed and adopted by the Board of Directors of said corporation, at a meeting of said Board duly and regularly called, noticed and held on March 22, 2011, at which meeting a quorum of the Board of Directors was present and voted in favor of said resolution; that said resolution is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand of said corporate effective this April 25, 2011.

Greg Milleman,
Secretary of Valencia Water Company, a corporation

VALENCIA WATER COMPANY

March 22, 2011

RESOLUTION TO APPROVE WATER SUPPLY ASSESSMENT

FOR

CHIQUITA CANYON LANDFILL
County Project Number R2004-00559

WHEREAS, the State of California requires public water agencies' governing board's to review and approve water supply assessments made with respect to water supply planning, and

WHEREAS, notwithstanding that this corporation is not a public agency, the Board of Directors of this corporation received from management and evaluated the water supply assessment regarding the commercial use project commonly known as Chiquita Canyon Landfill County Project Number R2004-00559, located in the northwestern portion of unincorporated Los Angeles County, California.

NOW, THEREFORE BE IT RESOLVED that the water supply assessment made by management for the commercial use project commonly known as Chiquita Canyon Landfill County Project Number R2004-00559, located in the northwestern portion of unincorporated Los Angeles County, California be and hereby is approved.

WATER SUPPLY ASSESSMENT

Chiquita Canyon Landfill Expansion
County Project No. R2004-00559

Prepared for:

The County of Los Angeles
Department of Regional Planning

December 2010

Prepared by

Valencia Water Company
24631 Avenue Rockefeller
Valencia, CA 91355
Phone: (661) 294-0828 Fax: (661) 294-3806
www.valenciawater.com

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1.0 INTRODUCTION

This report provides information necessary to complete the Water Supply Assessment ("WSA") for the Chiquita Canyon Landfill Expansion Project, LA County Project No.R2004-00559 ("Project"). The Project is located in unincorporated area of the Santa Clarita Valley in northern Los Angeles County ("County ").

The WSA has been prepared pursuant to the requirements of Senate Bill 610 (Costa; Chapter 643, Stats. 2001) ("SB 610"), which requires public water agencies, parties or purveyors that may supply water to certain proposed development projects to prepare a WSA for use by the County in environmental documentation for such projects, pursuant to the California Environmental Quality Act ("CEQA").[1] This WSA contains information from the 2005 Urban Water Management Plan ("2005 UWMP"), which was adopted by Castaic Lake Water Agency ("CLWA"), Valencia Water Company ("Valencia") and other water purveyors. It also includes published information provided by the California Department of Water Resources ("DWR") concerning the reliability of water supplies delivered to CLWA from the State Water Project ("SWP").

The Project site is contiguous with Valencia's existing service area and Valencia is the operator of the public water system that will provide water to the proposed Project.[2, 3]

A WSA is required for any project that is subject to CEQA[4] and proposes, among other things, a industrial, manufacturing or processing plant occupying more than 40 acres or having more than 650,000 square feet of floor area[5] This Project is a qualifying project under this definition.[6] This WSA will provide information to the County for its consideration in making a determination, based on the entire record, as to whether there is a sufficient water supply available to meet the Project's water demand, in addition to Valencia's existing and planned future uses, including agricultural and manufacturing uses.[7] The County requested that Valencia

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1 SB 610 amended section 21151.9 of the California Public Resources Code, and amended sections 10631, 10656, 10910, 19811, 19812, and 19815, repealed section 10913, and added and amended section 10657, of the California Water Code.

2 For purposes of this WSA, Valencia is the "public water system," as defined by Water Code §10912(c), because it has 3,000 or more service connections and provides piped water to the public for human consumption.

3 Water Code §10910(b).

4 Public Resources Code §21080.

5 Water Code §10912(a)(5). This section also includes other types of development that are defined as a "project" by this section of the code.

6 Water Code §10912(a)(5). This section also includes other types of development that are defined as a "project" by this section of the code.

7 Water Code §10910(c).

prepare this WSA for the Project, and it reflects the best available information as of the date of this report.

1.1 Chiquita Canyon Landfill Expansion

The Project (County Project No.R2004-00559) consists of approximately 369 acres and is located in the northwestern portion of unincorporated Los Angeles County, approximately 3 miles west of the Interstate 5 and State Route (SR) 126 intersection. The Project is located in Section 15, Township 4 North, Range 17 West, San Bernardino Baseline and Meridian. The Project latitude and longitude are 34°25'N and 118°39'W, respectively.

The Proposed Project includes the following elements: relocated entrance and support facilities; horizontal extension of the existing waste footprint, increased maximum elevation, increased disposal rate and volume, better utilization of the landfill's disposal capacity, and acceptance of all non-hazardous wastes acceptable at a Class III solid waste disposal landfill.

As part of the Proposed Project, the site entrance would be relocated to Wolcott Way. Vehicles traveling to the site would turn from SR-126 onto Wolcott Way, which is a signalized intersection, and then west onto a landfill access road. Access to the site would be controlled by a gate located on the access road.

The Proposed Project would expand the landfill footprint by approximately 112 acres into the existing landfill entrance area, East Canyon, and North Canyon. The landfill footprint would increase from the currently permitted approximately 257 acres to approximately 369 acres. The Proposed Project would also increase the maximum elevation to 1,573 feet.

The Proposed Project includes an increase of daily and weekly disposal tonnage. The permitted maximum daily disposal tonnage would increase from 6,000 tons to 12,000 tons. The permitted maximum weekly disposal tonnage would increase from 30,000 to 60,000 tons. This increase in daily and weekly disposal tonnage would allow Chiquita Canyon Landfill to be responsive to the current and anticipated disposal needs of the residents of the Santa Clarita Valley and the greater Los Angeles County area. Assuming the disposal rates under the Proposed Project begins in 2020, the landfill would reach capacity in 2033 and would close at that time.

At build-out, non-potable water demand for the Landfill is estimated to be approximately 150 acre-feet per year ("afy"). Between 2002 and 2009, the Chiquita Canyon Landfill used an average of 93 acre-feet of non-potable water per year. Drinking water is provided to employees by a bottled-water distributor who delivers drinking water by truck; current potable water consumption is approximately 100 gallons a day.

1.2 Purpose of WSA

The purpose of this WSA is to provide the County with an analysis of whether Valencia's water system has sufficient projected water supplies to meet the demands of the Project, in addition to existing and planned future uses in the Santa Clarita Valley.[8] Specifically, this WSA evaluates whether the total projected water supply determined to be available during normal, single dry, and multiple dry water years over the next 25 years, will meet the projected water demand associated with the Project, in addition to Valencia's existing and planned future water uses, including agriculture and manufacturing uses.[9] If the water supply is anticipated to be insufficient, the WSA must describe measures being taken to obtain an adequate supply.[10] The WSA is required to be included in the Environmental Impact Report ("EIR") prepared by the County for the Project pursuant to CEQA.[11]

1.3 Castaic Lake Water Agency

CLWA is a public water agency that serves an area of 195 square miles in Los Angeles and Ventura counties. CLWA is a water wholesaler that provides about half of the water used by Santa Clarita households and businesses. CLWA operates two potable water treatment plants, storage facilities, and over 17 miles of transmission pipelines. CLWA supplements local groundwater supplies with SWP water and other imported water from Northern and Central California. This water is treated and delivered to the local water retailers in the Santa Clarita Valley. The four retail purveyors served by CLWA are Valencia, Los Angeles County Water District #36, Newhall County Water District ("NCWD") and Santa Clarita Water Division of CLWA ("SCWD").

CLWA also delivers highly treated recycled water from one of the two existing water reclamation plants in the Santa Clarita Valley owned by the Sanitation Districts of Los Angeles County. The recycled water is used to meet a portion of the non-potable water demands (golf courses and landscape irrigation, etc.) in the Santa Clarita Valley.

1.4 Valencia Water Company

Valencia is a public water utility regulated by the California Public Utilities Commission ("CPUC"). Valencia's current service area includes a mix of residential and commercial land uses, mostly comprised of single-family homes, apartments, condominiums and a number of local shopping centers and neighborhood commercial developments. Valencia has access to

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[8] Water Code §10910(c).

[9] Water Code §10910(c)(4).

[10] Water Code §10911(a).

[11] Water Code §10911(b), (c).

multiple sources of supply in order to meet existing and planned future water demands. These diverse sources include groundwater from two local aquifers and imported water provided by CLWA that include imported sources from the State Water Project (SWP) and non-SWP supplies, two groundwater banking programs in Kern County and recycled water. The City of Santa Clarita and Los Angeles County special landscape irrigation districts are the largest overall water users for irrigation purposes. Magic Mountain Amusement Park is the largest individual commercial water user. The service area includes three golf courses, the Valencia Industrial Center, and the Valencia Commerce Center. All water services are metered, with the exception of fire services.

1.5 2005 Urban Water Management Plan and Recent Events Affecting the SWP System

The California Urban Water Management Planning Act ("UWMP Act") requires most water utilities to update and submit an Urban Water Management Plan ("UWMP") every five years. In 2005, the Valley's UWMP was updated by CLWA, in cooperation with Valencia and the other retail water purveyors. The 2005 UWMP was adopted by CLWA's Board of Directors in November 2005 and by Valencia's Board of Directors in December 2005. The 2005 UWMP is a compilation of information collected from various water resource documents listed in Section 1.6. The 2005 UWMP contains information on water use, water resources, recycled water, water quality, reliability planning, demand management measures, best management practices and water shortage contingency planning.

The WSA also includes information prepared by DWR regarding the reliability of imported water supplies delivered from the SWP. In December 2007, a federal court imposed interim rules that restrict the operations of both the SWP and the Central Valley Project ("CVP") while a new federal biological opinion for the Delta smelt was prepared by the U.S. Fish and Wildlife Service in 2008. In August 2008, DWR prepared an update to its 2005 Reliability Report, which is issued biennially to indicate how much SWP water is available during varying hydrologic scenarios (i.e., normal and dry years). The DWR 2007 SWP Delivery Reliability Report (August 2008) reduced the average long term reliability of SWP supply from 77% to 66% in order to account for the operational changes required by the federal court to protect the Delta smelt and other constraints on the SWP system.

On November 14, 2008, the California Fish and Game Commission listed the longfin smelt as a threatened species under the California Endangered Species Act. The Commission also voted to change the state-protected status of the Delta smelt from threatened to endangered. In response, on December 9, 2008, the State Water Contractors and others filed litigation challenging the Commission's decision on the longfin smelt. The litigation is still pending, and the outcome of the litigation cannot be predicted at this time.

On December 15, 2008, the U.S. Fish and Wildlife Service issued the new Biological Opinion for the Delta smelt. The new Biological Opinion continues restrictions on SWP and CVP

operations that have been in place under the federal court's interim rules concerning the Delta smelt. However, the Biological Opinion also imposed new requirements for the Bay-Delta that may further erode SWP water delivery reliability under the current, constrained operations. In response to the Biological Opinion, on March 5, 2009, the State Water Contractors and others filed litigation challenging the new Biological Opinion. The litigation is still pending although an initial decision has been released by the Court. The ultimate outcome of the litigation cannot be predicted at this time.

On January 4, 2009, the National Marine Fisheries Services (NMFS) issued a new Biological Opinion based on its review of the proposed long-term coordinated Central Valley Project/State Water Project (CVP/SWP) operations in the Central Valley, California, and its effects on listed fish and designated and proposed critical habitats. Specifically, the 2009 BO concluded that the CVP/SWP operations are likely to jeopardize continued existence of federally-listed Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead, green sturgeon, and Southern Resident killer whales, and the designated critical habitats of the salmon, steelhead, and sturgeon.

The 2009 BO contains new measures causing water supply impacts, in addition to requiring a number of habitat measures and associated studies. According to the NMFS, the 2009 BO's restrictions on CVP/SWP operations will impact an estimated five to seven percent of the available annual water on average moved by the federal and state pumping plants, or about 330,000 acre-feet per year (afy); however, water operations will not be affected by the 2009 BO immediately and will be tied to water year type. The 2009 BO also includes exception procedures for drought and health and safety issues.

In December 2009, DWR prepared an update to its 2007 Reliability Report. The Draft 2009 SWP Delivery Reliability Report (December 2009) further reduced the average long term reliability of SWP supply from 66% to 60% in order to account for the operational changes required due to federal Biological Opinions to protect endangered fish such as Delta smelt and spring-run salmon, climate change and other constraints on the SWP system. Using the lower percentages from the DWR Draft 2009 SWP Delivery Reliability Report (December 2009), and updating information related to other sources of supply in the Santa Clarita Valley, Tables 1, 2, 3, and 4, below, are consistent with the best available information provided by DWR concerning the long term reliability of SWP supply and other sources of supply.[12]

[12] The information presented in Tables 1-4 of this WSA is based on the 2005 UWMP, with the additional information provided by the DWR Draft 2009 SWP Delivery Reliability Report, December 2009 (and changes and updated information regarding other sources of supply). The discussion of water supply in this WSA and in environmental documents should be tempered, though, by noting that while the Draft 2009 SWP Delivery Reliability Report (December 2009) represents a reasonable scenario as required by CEQA, recent reductions in supply close the gap between the available supply and demand in the future, thereby making the CLWA service area more susceptible to shortages in certain dry years. Accordingly, the reduction in SWP supply reinforces the need to continue diligent efforts to conserve potable water and increase the use of recycled water, both to meet the goals in the 2005 UWMP and to maximize utilization of potable water supplies. CLWA and the retail water purveyors will continue to work diligently with Los Angeles County and the City of Santa Clarita with

The total projected water demand for this Project is estimated to be 150 acre-feet per year and was accounted for in the 2005 UWMP. The timing of the Project places it within the timeframe for calculating "planned future uses" within the 25 year water supply projection included in the 2005 UWMP. This information is incorporated by reference in this WSA. SB 610 requires the WSA to document the water demand for the proposed Project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses. (Water Code §10910(c).) Water Code §10910(c)(2) states that if the proposed Project was accounted for in the most recently adopted UWMP, the public water system may incorporate the requested information from the UWMP in preparing the WSA. The 2005 UWMP projects an annual growth rate in water demand of approximately 2.2 percent over a 25-year period for the Santa Clarita Valley. The Project's associated water demand was included by Valencia in the water demand projections contained in the 2005 UWMP (see Table 2-6 in the 2005 UWMP); and, therefore, is accounted for in the 2005 UWMP.

1.6 Documents Relied upon in Preparing this WSA

The following list identifies the documentation that has been relied upon in the preparation of this WSA. The documents are incorporated by reference in this WSA as if fully set forth herein. Copies of the referenced documents are available for review at Valencia Water Company by contacting Keith Abercrombie, (661) 295-6504, and can be obtained upon the payment of the costs of reproduction. These documents, which are part of Valencia Water Company's record for the preparation of this WSA, are organized below by subject matter and are presented chronologically (earliest first):

DWR Documents

California Department of Water Resources, Groundwater Basins in California, Bulletin 118-80, January 1980. (DWR Bulletin 118-80, 1980).

California Department of Water Resources, The State Water Project Delivery Reliability Report 2002, May 2003. (DWR Reliability Report, 2003).

California Department of Water Resources, California's Groundwater, Bulletin 118, Santa Clara River Valley Groundwater Basin, Santa Clara River Valley East Subbasin, February, 2004.

California Department of Water Resources, Excerpts from the Working Draft of 2005 State Water Project Delivery Reliability, May 25, 2005. (DWR Reliability Report Excerpts, 2005)

California Department of Water Resources, The State Water Project Delivery Reliability Report 2005, Final, April 2006. (DWR Reliability Report, 2006).

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water conservation ordinances and the enforcement mechanisms to aggressively implement water conservation in the CLWA service area.

California Department of Water Resources, The State Water Project Delivery Reliability Report 2007, Draft, December 2007. (DWR Reliability Report Draft, 2007).

California Department of Water Resources, The State Water Project Delivery Reliability Report 2007, Final, August 2008. (DWR Reliability Report, 2007).

*California Department of Water Resources, The State Water Project Delivery Reliability Report 2009, Draft***,** December 2009. (DWR Draft Reliability Report Draft, 2009).

CLWA Documents

Water Supply Contract between the State of California Department of Water Resources and CLWA, 1963 (plus amendments, including the "Monterey Amendment," 1995, and Amendment No. 19, 1999, the transfer of 41,000 acre-feet of entitlement from Kern County Water Agency to CLWA).

2002 Draft Recycled Water Master Plan prepared for CLWA by Kennedy/Jenks Consultants.

2002 Semitropic Groundwater Storage Program and Point of Delivery Agreement Among the Department of Water Resources of the State of California, CLWA and Kern County Water Agency.

2003 Semitropic Groundwater Storage Program prepared for CLWA by Kennedy/Jenks Consultants.

Water Supply Reliability Plan Draft Report prepared for CLWA by Kennedy/Jenks Consultants, September 2003.

Draft Environmental Impact Report – Supplemental Water Project Transfer of 41,000 acre-feet of State Water Project Table A Amount, prepared for CLWA by Science Applications International Corporation, June 2004 (SCH No. 1998041127).

Final Environmental Impact Report – Supplemental Water Project Transfer of 41,000 acre-feet of State Water Project Table A Amount, prepared for CLWA by Science Applications International Corporation, December 2004 (SCH No. 1998041127).

Draft Environmental Impact Report - Rosedale-Rio Bravo Water Storage District (RRBWSD) Water Banking and Exchange Program, prepared for CLWA by Science Applications International Corporation, August 2005 (SCH No. 2005061157).

Final Environmental Impact Report - Rosedale-Rio Bravo Water Storage District (RRBWSD) Water Banking and Exchange Program, prepared for CLWA by Science Applications International Corporation, October 2005 (SCH No. 2005061157).

Draft Environmental Impact Report - Castaic Lake Water Agency Water Acquisition from the Buena Vista Water Storage District and Rosedale-Rio Bravo Water Storage District Water Banking and Recovery Program, prepared for CLWA by Science Applications International Corporation, June 2006 (SCH No. 2006021003).

Final Environmental Impact Report - Castaic Lake Water Agency Water Acquisition from the Buena Vista Water Storage District and Rosedale-Rio Bravo Water Storage District Water

Banking and Recovery Program, prepared for CLWA by Science Applications International Corporation, October 2006 (SCH No. 2006021003).

Draft Program Environmental Impact Report - Recycled Water Master Plan, prepared for CLWA by Bon Terra Consulting, November 2006 (SCH No. 2005041138).

Final Program Environmental Impact Report - Recycled Water Master Plan, prepared for CLWA by Bon Terra Consulting, March 2007 (SCH No. 2005041138).

CLWA Letter to City of Santa Clarita and Los Angeles County Department of Regional Planning, June 2007.

CLWA Letter to Los Angeles County Department of Regional Planning, February 2008.

CLWA Data Document/Capital Improvement Program, dated November 12, 2008.

CLWA Letter to Los Angeles County Department of Regional Planning, February 24th, 2010 providing comments on the One Valley One Vision Draft Environmental Impact Report, including revised estimates of the water supply projections contained in the 2005 UWMP, (CLWA Letter, February 2010).

Groundwater Documents

Memorandum of Understanding Between the Santa Clara River Valley Upper Basin Water Purveyors and United Water Conservation District, August 2001. (MOU, 2001).

2001 Update Report: Hydrogeologic Conditions in the Alluvial and Saugus Formation Aquifer Systems, prepared for Santa Clarita Valley Water Purveyors by Richard C. Slade and Associates, LLC, July 2002. (Slade, 2002).

Groundwater Management Plan - Santa Clara River Valley Groundwater Basin, East Subbasin, prepared for CLWA by Luhdorff & Scalmanini Consulting Engineers, December 2003.

Regional Groundwater Flow Model for the Santa Clarita Valley: Model Development and Calibration, prepared for Upper Basin Water Purveyors (CLWA, CLWA Santa Clarita Water Division, Newhall County Water District and Valencia Water Company) by CH2M HILL, April 2004.

Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California, prepared for Upper Basin Water Purveyors in Support of the Department of Health Services 97-005 Permit Application by CH2M HILL, December 2004.

Analysis of Near-Term Groundwater Capture Areas for Production Wells Located Near the Whittaker-Bermite Property (Santa Clarita, California), prepared for Upper Basin Water Purveyors in support of the amended 2000 UWMP by CH2M HILL, December 21, 2004.

Impact and Response to Perchlorate Contamination, Valencia Water Company Well Q2, prepared by Luhdorff & Scalmanini Consulting Engineers, April 2005 (Q2 Report).

Mitigated Negative Declaration - Groundwater Containment, Treatment and Restoration Project, CLWA, August 2005.

Interim Remedial Action Plan, to facilitate and restore pumping of groundwater from two Saugus Formation production wells impacted by perchlorate, prepared for Castaic Lake Water Agency by Kennedy/Jenks Consultants, and approved by the Department of Toxic Substances Control, December 2005.

Analysis of Groundwater Basin Yield, Upper Santa Clara River Groundwater Basin, East Subbasin, Los Angeles County, California, prepared in support of the August 2001 Memorandum of Understanding between the Upper Basin Water Purveyors and the United Water Conservation District, prepared by CH2M HILL in cooperation with Luhdorff & Scalmanini, August 2005. (Basin Yield Study, 2005).

Analysis of Groundwater Supplies and Groundwater Basin Yield, Upper Santa Clara River Groundwater Basin, East Subbasin, August 2009, prepared by Luhdorff & Scalmanini and GSI Water Solutions. (Basin Yield Study, 2009).

Water Planning Documents

2005 Urban Water Management Plan, prepared for Castaic Lake Water Agency, CLWA Santa Clarita Water Division, Newhall County Water District, Valencia Water Company, Los Angeles County Waterworks District No. 36, prepared by Black & Veatch, Nancy Clemm, Kennedy Jenks Consultants, Jeff Lambert, Luhdorff & Scalmanini, Richard Slade and Associates, November 2005. (2005 UWMP).

Santa Clarita Valley Water Report 2005, prepared for CLWA, Los Angeles County Waterworks District No. 36, Santa Clarita Water Division, Newhall County Water District and Valencia Water Company by Luhdorff and Scalmanini, Consulting Engineers, April 2006. (SCVWR, 2006).

Santa Clarita Valley Water Report 2006, prepared for CLWA, Los Angeles County Waterworks District No. 36, Santa Clarita Water Division, Newhall County Water District and Valencia Water Company by Luhdorff and Scalmanini, Consulting Engineers, May 2007. (SCVWR, 2007).

Santa Clarita Valley Water Report 2007, prepared for CLWA, Los Angeles County Waterworks District No. 36, Santa Clarita Water Division, Newhall County Water District and Valencia Water Company by Luhdorff and Scalmanini, Consulting Engineers, April 2008. (SCVWR, 2008).

Santa Clarita Valley Water Report 2008, prepared for CLWA, Los Angeles County Waterworks District No. 36, Santa Clarita Water Division, Newhall County Water District and Valencia Water Company by Luhdorff and Scalmanini, Consulting Engineers, April 2009. (SCVWR, 2009).

Santa Clarita Valley Water Report 2009, prepared for CLWA, Los Angeles County Waterworks District No. 36, Santa Clarita Water Division, Newhall County Water District and Valencia Water Company by Luhdorff and Scalmanini, Consulting Engineers, May 2010. (SCVWR, 2010).

2.0 WATER SUPPLY ASSESSMENT

The preparation of this WSA relies upon information from the 2005 UWMP and numerous water resource and planning documents listed in Section 1.6. Based on this supporting information, Valencia concludes that there is sufficient water supply available to meet the Project's demand, in addition to Valencia's existing and other planned future uses, including agricultural and manufacturing uses.

Valencia and CLWA have existing water entitlements, rights, and contracts to meet future demand as needed over time, and have committed sufficient capital resources and planned investments in various water programs and facilities to serve all of its existing and planned customers. Valencia also has identified operational strategies and a prudent and flexible management approach that demonstrates water supply reliability for the Project.

In 2009, Valencia's service area-wide demands were 30,355 af, and the total municipal demand for both imported, groundwater and non-potable recycled water in CLWA's service area was approximately 70,000 af. Based on information provided by the Project's consultant, Valencia has estimated that the Project will require approximately 150 afy of non-potable water (recycled water) at build-out. This represents an increased demand of 57 afy of non-potable water over 2009 levels. In the event that recycled water is not yet available at the Project site, this demand can be met from potable water sources.

Provided below is a summary of water supply and demand projections for all of the scenarios (average/normal year, single dry year and multiple dry year) presented in the 2005 UWMP that address the SB610 requirements for this Project. The 2005 UWMP projections have been revised based on updated water supply projections provided to Los Angeles County Regional Planning Department by CLWA in their letter dated February 24, 2010.

The 2005 UWMP contains information about water use (Chapter 2), water resources (Chapter 3), recycled water (Chapter 4), water quality (Chapter 5), reliability planning (Chapter 6), demand management measures (Chapter 7) and shortage contingency planning (Chapter 8).

Table 1: Summary of Current and Planned Water Supplies and Banking Programs (1)

Water Supply Sources	Supply (af)				
	2010	2015	2020	2025	2030
Existing Supplies (1)					
Wholesale (Imported)	***75,787***	***75,787***	***74,407***	***74,407***	***74,407***
SWP Table A Supply (2)	57,120	57,120	57,120	57,120	57,120
Buena Vista-Rosedale	11,000	11,000	11,000	11,000	11,000
Nickel Water - Newhall Land	1,607	1,607	1,607	1,607	1,607
Flexible Storage Account (CLWA) (3)	4,680	4,680	4,680	4,680	4,680
Flexible Storage Account (Ventura County) (4)	1,380	1,380	0	0	0
Local Supplies					
Groundwater	*46,000*	*46,000*	*46,000*	*46,000*	*46,000*
Alluvial Aquifer	35,000	35,000	35,000	35,000	35,000
Saugus Formation	11,000	11,000	11,000	11,000	11,000
Recycled Water	1,700	1,700	1,700	1,700	1,700
Total Existing Supplies	**123,487**	**123,487**	**122,107**	**122,107**	**122,107**
Existing Banking Programs (3)					
Semitropic Water Bank (5)	50,870	0	0	0	0
Rosedale-Rio Bravo (7)	64,898	64,898	64,898	64,898	64,898
Semitropic Water Bank Newhall Land (8)	18,828	18,828	18,828	18,828	18,828
Total Existing Banking Programs	**134,596**	**83,726**	**83,726**	**83,726**	**83,726**
Planned Supplies (1)					
Local Supplies					
Groundwater	*10,000*	*10,000*	*20,000*	*20,000*	*20,000*
Restored wells (Saugus Formation)	10,000	10,000	10,000	10,000	10,000
New Wells (Saugus Formation)	0	0	10,000	10,000	10,000
Recycled Water - CLWA (6)	0	1,600	6,300	11,000	15,700
Recycled Water - Newhall Ranch	0	1,500	2,500	3,500	5,400
Total Planned Supplies	**10,000**	**13,100**	**28,800**	**34,500**	**41,100**
Planned Banking Programs (3)					
Additional Planned Banking	0	20,000	20,000	20,000	20,000
Total Planned Banking Programs	**0**	**20,000**	**20,000**	**20,000**	**20,000**

1. The values shown under "Existing Supplies" and "Planned Supplies" are supplies projected to be available in average/normal years. The values shown under "Existing Banking Programs" are total amounts currently in storage and "Planned Banking Programs" are total amounts projected to be available.
2. SWP supplies are calculated by multiplying CLWA's Table A Amount of 95,200 af by percentages of average deliveries projected to be available, based on Tables 6-12 and 6-13 of DWR's "State Water Project Delivery Reliability Report 2009". Year 2030 figure is calculated by multiplying by DWR's 2029 percentage of 60%.
3. Supplies shown are total amounts that can be withdrawn, and would typically be used only during dry years. Each water bank has annual limitations on withdrawals that are reflected in Tables 3 and 4.
4. Initial term of the Ventura County entities' flexible storage account is ten years (from 2006 to 2015).
5. Supplies shown are the total amount currently in storage, and would typically be used only during dry years. Once the current storage amount is withdrawn, this supply would no longer be available and in any event, is not available after 2013.
6. Recycled water supplies based on projections provided in CLWA's 2005 UWMP Chapter 4, Recycled Water.
7. CLWA has 64,898 af of recoverable water as of 12/31/09 in the Rosedale-Rio Bravo Water Banking and Recovery Program.
8. Supplies shown are the total amounts currently in storage. As of December 31, 2009, there is 18,828 af of water stored in the Semitropic Groundwater Storage Bank by The Newhall Land and Farming Company for the Newhall Ranch Specific Plan. The stored water can be extracted from the bank in dry years in amounts up to 4,950 afy. Newhall Ranch is located within the CLWA service area.

2.1 Average/Normal Year, Single Dry Year and Multiple Dry Year Water Assessment

The amount of available water supply is summarized in Table 1 below. Table 1 is not intended to be an operational plan for how supplies would be used in a particular year, but rather identifies the complete range of water supplies available under a range of hydrologic conditions. Diversity of supply allows Valencia and the other purveyors the option of drawing on multiple sources of supply in response to changing conditions such as varying climatic conditions (average/normal years, single dry years, multiple dry years), natural disasters and contamination with substances such as perchlorate.

It is the stated goal of Valencia, CLWA and the other retail water purveyors to deliver a reliable and high quality water supply for their customers, even during dry periods. Based on conservative water supply and demand assumptions over the next 25 years in combination with conservation of non-essential demand during certain dry years, the water supply plan described in the 2005 UWMP successfully achieves this goal.

The subject of perchlorate contamination and its impact on groundwater supplies was extensively discussed in the 2005 UWMP. The source of the contamination is believed to be the Whittaker-Bermite property, located in the center of the Santa Clarita Valley and used as a munitions manufacturing facility for over 50 years. Significant progress has been made toward characterizing the extent of perchlorate contamination, along with implementing necessary measures for on-site and off-site containment and treatment. The reliability analysis provided in the 2005 UWMP takes into account the impact on water supply operations while the planning, design and construction of perchlorate treatment, containment and other restoration activities are implemented. For additional information on this topic, please see Chapters 5 and 6, Appendixes D and E in the 2005 UWMP and the latest annual Santa Clarita Valley Water Report (2009).

2.1.1 Average/Normal Water Year

Table 2 summarizes the water supplies available to Valencia, CLWA and the other retail water purveyors over the 25 year planning period during an average/normal year. The water supplies are broken down into existing and planned water supply sources, including wholesale (imported) water, local supplies, transfers, and banking programs. Demands are shown with and without the effects of an assumed 10 percent urban demand reduction resulting from conservation.

Table 2: Projected Average/Normal Year Supplies and Demands

Water Supply Sources	Supply (af)				
	2010	2015	2020	2025	2030
Existing Supplies					
Wholesale (Imported)	***69,727***	***69,727***	***69,727***	***69,727***	***69,727***
SWP Table A Supply (1)	57,120	57,120	57,120	57,120	57,120
Buena Vista-Rosedale	11,000	11,000	11,000	11,000	11,000
Nickel Water - Newhall Land	1,607	1,607	1,607	1,607	1,607
Flexible Storage Account (CLWA) (2)	0	0	0	0	0
Flexible Storage Account (Ventura County) (2)	0	0	0	0	0
Local Supplies					
Groundwater	46,000	46,000	46,000	46,000	46,000
Alluvial Aquifer	35,000	35,000	35,000	35,000	35,000
Saugus Formation	11,000	11,000	11,000	11,000	11,000
Recycled Water	1,700	1,700	1,700	1,700	1,700
Total Existing Supplies	**117,427**	**117,427**	**117,427**	**117,427**	**117,427**
Existing Banking Programs					
Semitropic Water Bank (2)	0	0	0	0	0
Rosedale-Rio Bravo (2)	0	0	0	0	0
Semitropic Water Bank – Newhall Land (2)	0	0	0	0	0
Total Existing Banking Programs	**0**	**0**	**0**	**0**	**0**
Planned Supplies					
Local Supplies					
Groundwater	0	0	0	0	0
Restored wells (Saugus Formation) (2)	0	0	0	0	0
New Wells (Saugus Formation) (2)	0	0	0	0	0
Recycled Water - CLWA (3)	0	1,600	6,300	11,000	15,700
Recycled Water - Newhall Ranch	0	1,500	2,500	3,500	5,400
Total Planned Supplies	**0**	**3,100**	**8,800**	**14,500**	**21,100**
Planned Banking Programs					
Additional Planned Banking (2)	0	0	0	0	0
Total Planned Banking Programs	0	0	0	0	0
Total Existing and Planned Supplies and Banking	**117,427**	**120,527**	**126,227**	**131,927**	**138,527**
Total Estimated Demand (w/o conservation) (4)	100,050	109,400	117,150	128,400	138,300
Conservation (5)	(8,600)	(9,700)	(10,700)	(11,900)	(12,900)
Total Adjusted Demand	91,450	99,700	106,450	116,500	125,400

1. SWP supplies are calculated by multiplying CLWA's Table A Amount of 95,200 af by percentages of average deliveries projected to be available, based on Tables 6-12 and 6-13 of DWR's "State Water Project Delivery Reliability Report 2009". Year 2030 figure is calculated by multiplying by DWR's 2029 percentage of 60%.
2. Not needed during average/normal years.
3. Recycled water supplies based on projections provided in CLWA's 2005 UWMP Chapter 4, Recycled Water.
4. Demands are for uses within the existing CLWA service area. Demands for any annexations to the CLWA service area are not included.
5. Assumes 10 percent reduction on urban portion of total demand resulting from conservation best management practices, as discussed in CLWA's 2005 UWMP, Chapter 7.

2.1.2 Single-Dry Year

Table 3 summarizes the existing and planned water supplies available to Valencia, CLWA and the other retail water purveyors over the 25 year planning period should a single-dry year event occur, similar to the drought that occurred in California in 1977. Demand during single-dry years was assumed to increase by 10 percent. During prolonged dry periods, experience indicates that a reduction in demand of 10 percent is achievable through the implementation of conservation best management practices.

Table 3: Projected Single-Dry Year Supplies and Demands

Water Supply Sources	Supply (af)				
	2010	2015	2020	2025	2030
Existing Supplies					
Wholesale (Imported)	***25,331***	***26,283***	***25,855***	***26,807***	***27,759***
SWP Table A Supply (1)	6,664	7,616	8,568	9,520	10,472
Buena Vista-Rosedale	11,000	11,000	11,000	11,000	11,000
Nickel Water - Newhall Land	1,607	1,607	1,607	1,607	1,607
Flexible Storage Account (CLWA)	4,680	4,680	4,680	4,680	4,680
Flexible Storage Account (Ventura County)(2)	1,380	1,380	0	0	0
Local Supplies					
Groundwater	*47,500*	*47,500*	*47,500*	*47,500*	*47,500*
Alluvial Aquifer	32,500	32,500	32,500	32,500	32,500
Saugus Formation	15,000	15,000	15,000	15,000	15,000
Recycled Water	1,700	1,700	1,700	1,700	1,700
Total Existing Supplies	**74,531**	**75,483**	**75,055**	**76,007**	**76,959**
Existing Banking Programs					
Semitropic Water Bank (3)	17,000	0	0	0	0
Rosedale-Rio Bravo (5)	20,000	20,000	20,000	20,000	20,000
Semitropic Water Bank – Newhall Land (10)	4,950	4,950	4,950	4,950	4,950
Total Existing Banking Programs	**41,950**	**24,950**	**24,950**	**24,950**	**24,950**
Planned Supplies					
Local Supplies					
Groundwater	*10,000*	*10,000*	*20,000*	*20,000*	*20,000*
Restored wells (Saugus Formation)	10,000	10,000	10,000	10,000	10,000
New Wells (Saugus Formation)	0	0	10,000	10,000	10,000
Recycled Water - CLWA (4)	0	1,600	6,300	11,000	15,700
Recycled Water - Newhall Ranch	0	1,500	2,500	3,500	5,400
Total Planned Supplies	**10,000**	**13,100**	**28,800**	**34,500**	**41,100**
Planned Banking Programs					
Additional Planned Banking (6)	0	20,000	20,000	20,000	20,000
Total Planned Banking Programs	0	20,000	20,000	20,000	20,000
Total Existing and Planned Supplies and Banking	**126,481**	**133,533**	**148,805**	**155,457**	**163,009**
Total Estimated Demand (w/o conservation) (7) (8)	110,100	120,300	128,900	141,200	152,100
Conservation (9)	(9,500)	(10,700)	(11,700)	(13,100)	(14,200)
Total Adjusted Demand	100,600	109,600	117,200	128,100	137,900

1. SWP supplies are calculated by multiplying CLWA's Table A Amount of 95,200 af by percentages of single dry year deliveries projected to be available on Tables 6-4 and 6-13 of DWR's "State Water Project Delivery Reliability Report 2009". Year 2030 figure is calculated by multiplying by DWR's 2029 percentage of 11%.
2. Initial term of the Ventura County entities' flexible storage account is ten years (from 2006 to 2015).
3. The total amount of water currently in storage is 50,870 af, available through 2013. Withdrawals of up to this amount are potentially available in a dry year, but given possible competition for withdrawal capacity with other Semitropic banking partners in extremely dry years, it is assumed here that about one third of the total amount stored could be withdrawn.
4. Recycled water supplies based on projections provided in CLWA's 2005 UWMP Chapter 4, Recycled Water.
5. CLWA has 64,898 af of recoverable water as of 12/31/09 in the Rosedale-Rio Bravo Water Banking and Recovery Program.
6. Assumes additional planned banking supplies available by 2014.
7. Assumes increase in total demand of 10 percent during dry years.
8. Demands are for uses within the existing CLWA service area. Demands for any annexations to the CLWA service area are not included.
9. Assumes 10 percent reduction on urban portion of total normal year demand resulting from conservation best management practices ([urban portion of total normal year demand x 1.10] * 0.10), as discussed in CLWA's 2005 UWMP, Chapter 7.
10. Delivery of stored water from the Newhall Land Semitropic Groundwater Bank requires further agreements between CLWA and Newhall Land.

2.1.3 Multiple Dry Years

Table 4 summarizes the existing and planned water supplies available to Valencia, CLWA and the other retail water purveyors over the 25 year planning period should a four year multiple dry year event occur, similar to the drought that occurred in California during the years 1931 to 1934. Demand during dry years was assumed to increase by 10 percent. During prolonged dry periods, experience indicates that a reduction in demand of 10 percent is achievable through the implementation of conservation best management practices.

Table 4: Projected Multiple-Dry Year Supplies and Demands (1)

Water Supply Sources	Supply (af)				
	2010	2015	2020	2025	2030
Existing Supplies					
Wholesale (Imported)	***46,485***	***46,485***	***47,097***	***47,097***	***47,097***
SWP Table A Supply (2)	**32,368**	**32,368**	**33,320**	**33,320**	**33,320**
Buena Vista-Rosedale	11,000	11,000	11,000	11,000	11,000
Nickel Water - Newhall Land	1,607	1,607	1,607	1,607	1,607
Flexible Storage Account (CLWA) (3)	1,170	1,170	1,170	1,170	1,170
Flexible Storage Account (Ventura County) (3)	340	340	0	0	0
Local Supplies					
Groundwater	*47,500*	*47,500*	*47,500*	*47,500*	*47,500*
Alluvial Aquifer	32,500	32,500	32,500	32,500	32,500
Saugus Formation (4)	15,000	15,000	15,000	15,000	15,000
Recycled Water	1,700	1,700	1,700	1,700	1,700
Total Existing Supplies	**95,685**	**95,685**	**96,297**	**96,297**	**96,297**
Existing Banking Programs					
Semitropic Water Bank (3)	12,700	0	0	0	0
Rosedale-Rio Bravo (6) (7)	5,000	15,000	15,000	15,000	15,000
Semitropic Water Bank – Newhall Land (12)	4,950	4,950	4,950	4,950	4,950
Total Existing Banking Programs	**22,650**	**19,950**	**19,950**	**19,950**	**19,950**
Planned Supplies					
Local Supplies					
Groundwater	*6,500*	*6,500*	*6,500*	*6,500*	*6,500*
Restored wells (Saugus Formation) (4)	6,500	6,500	5,000	5,000	5,000
New Wells (Saugus Formation) (4)	0	0	1,500	1,500	1,500
Recycled Water (5)	0	1,600	6,300	11,000	15,700
Recycled Water - Newhall Ranch	0	1,500	2,500	3,500	5,400
Total Planned Supplies	**6,500**	**9,600**	**15,300**	**21,000**	**27,600**
Planned Banking Programs					
Additional Planned Banking (7) (8)	0	5,000	15,000	15,000	15,000
Total Planned Banking Programs	0	5,000	15,000	15,000	15,000
Total Existing and Planned Supplies and Banking	**124,835**	**130,235**	**146,547**	**152,247**	**158,847**
Total Estimated Demand (w/o conservation) (9) (10)	110,100	120,300	128,900	141,200	152,100
Conservation (11)	(9,500)	(10,700)	(11,700)	(13,100)	(14,200)
Total Adjusted Demand	100,600	109,600	117,200	128,100	137,900

1. Supplies shown are annual averages over four consecutive dry years (unless otherwise noted).
2. SWP supplies are calculated by multiplying CLWA's Table A Amount of 95,200 af by percentages of average deliveries projected to be available during the worst case four-year drought of 1931-1934 as provided in Tables 6-4 and 6-13 of DWR's "State Water Project Delivery Reliability Report 2009." Year 2030 figure is calculated by multiplying by DWR's 2029 percentage of 35%.
3. Based on total amount of storage available divided by 4 (4-year dry period). Initial term of the Ventura County entities' flexible storage account is ten years (from 2006 to 2015).
4. Total Saugus pumping is the average annual amount that would be pumped under the groundwater operating plan, as summarized in Table 3-6 of the 2005 UWMP ([11,000+15,000+25,000+35,000]/4).
5. Recycled water supplies based on projections provided in CLWA's 2005 UWMP Chapter 4, Recycled Water.
6. CLWA has 64,898 af of recoverable water as of 12/31/09 in the Rosedale-Rio Bravo Water Banking and Recovery Program.
7. Average dry year period supplies could be up to 20,000 af for each program depending on storage amounts at the beginning of the dry period.
8. Assumes additional planned banking supplies available by 2014.
9. Assumes increase in total demand of 10 percent during dry years.
10. Demands are for uses within the existing CLWA service area. Demands for any annexations to the CLWA service area are not included.
11. Assumes 10 percent reduction on urban portion of total normal year demand resulting from conservation best management practices ([urban portion of total normal year demand x 1.10] * 0.10), as discussed in CLWA's 2005 UWMP, Chapter 7.
12. Delivery of stored water from the Newhall Land Semitropic Groundwater Bank requires further agreements between CLWA and Newhall Land.

3.0 IDENTIFICATION OF EXISTING WATER SUPPLY SOURCES

3.1 Annual Existing Water Supply Entitlements, Water Rights, or Water Service Contracts

The first substantive "content" requirement for a WSA is the identification and description of the existing water supply sources in the public water system that will serve the Project. Water Code §10910(d) requires that the WSA identify any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed Project, and describe the quantities of water received in prior years by the public water system. The identification of existing water supplies must be demonstrated by providing information related to the following:

- Written contracts or other proof of entitlement to an identified water supply;
- Copies of a capital outlay program for financing the delivery of a water supply that has been adopted by the public water system;
- Federal, state, and local permits for construction of necessary infrastructure associated with delivering the water supply; and
- Any necessary regulatory approvals that are required in order to be able to convey or deliver the water supply.

The 2005 UWMP summarizes the current water supplies available for the Project and the Santa Clarita Valley as a whole. Such supplies are derived from five primary sources:

- Groundwater from the Alluvial aquifer;
- Groundwater from the Saugus Formation;
- SWP supplies and other imported sources;
- Dry-year groundwater banking programs; and
- Recycled water.

Within the CLWA service area, these sources of water supply can be characterized as: (1) *local supplies*, consisting of groundwater and recycled water; and (2) *imported supplies*, transported via the SWP consisting of SWP contract amounts, other imported water sources and dry year supplies delivered from groundwater banking programs. As required by SB 610 (Water Code §10910(d)), Chapter 2 of the 2005 UWMP and the SCVWR 2009 summarize the quantities of water used by each of the water purveyors in the Santa Clarita Valley to meet water demands since importation of SWP water began in 1980. Also, Section 1.6, above, contains a list of documents identifying the existing water supply entitlements, water rights, or water service contracts relevant to meet the Project's water demand as well as future estimated demands reported in the 2005 UWMP.

Potential future water sources include acquisition of additional imported water supplies, recycled water, desalination, storm water runoff, increased short term pumping from the Saugus Formation during dry years and additional groundwater banking programs. Demand side management programs (conservation) are also considered an important component of water supply resulting from efforts by CLWA, Valencia and the other retailers to reduce long-term water demands.

3.2 Groundwater

Water Code §10910(f) requires a WSA to include specific information describing groundwater resources if the water supply for a proposed Project includes groundwater. Over the last 25 years, the water purveyors have developed a groundwater operating plan that includes municipal, agricultural and other smaller uses while maintaining the local Basin in a sustainable condition (i.e., no long term depletion of groundwater or interrelated surface water). This has resulted in preparation of the following important studies funded by the purveyors to ensure sustainability of the local groundwater resources:

1. Slade (2002) updates prior reports and includes a detailed review of the hydrologic conditions and description of groundwater resources available to Valencia and other large municipal and agriculture groundwater producers, including SCWD, NCWD, The Newhall Land and Farming Company ("Newhall") and the Wayside Honor Ranch operating within the Santa Clara River Valley East Subbasin, one of several subbasins identified along the Santa Clara River in Los Angeles and Ventura counties by Updated Bulletin 118 of the California Department of Water Resources. The shallow aquifer system is designated the Alluvial aquifer and the deeper aquifer is designated the Saugus Formation. Slade reported that both aquifer systems were in good operating condition and not in an overdraft condition. Also included are hundreds of other small scale water producers that account for less than 1 percent of total production from these aquifer systems (SCVWR 2008).
2. In 2003, CLWA in cooperation with Valencia and the other retail water purveyors completed and adopted a Groundwater Management Plan (“Plan”) in accordance with Water Code §10753. Among the elements of the adopted Plan is the preparation of annual groundwater management reports, such as the Santa Clarita Valley Water Report, that provides information about local groundwater conditions, SWP supplies, water conservation and recycled water. The Plan also contemplated preparing other technical reports to address specific aspects of basin management. Recently, technical reports have been prepared on the development and calibration of a numerical groundwater flow model, an analysis of perchlorate containment in groundwater and a groundwater yield study of the Upper Basin.

3. In August 2005, work was completed in support of a Memorandum of Understanding (MOU) entered into by the Valencia, CLWA and the other water purveyors and United Water Conservation District. The MOU is a commitment by the water purveyors to expand on the previous knowledge of groundwater conditions in the Upper Basin and, using a regional groundwater flow model, evaluate the long-term sustainability of the purveyor's groundwater operating plan under a range of existing and potential future hydrologic conditions. The primary conclusion of the modeling analysis is that the groundwater operating plan will not cause detrimental short-term or long-term effects to the groundwater and surface water resources in the Santa Clarita Valley and, therefore, is sustainable (Basin Yield Study, 2005).
4. In August 2009, the Basin Yield Study 2005 was updated by Luhdorff and Scalmanini and GSI Solutions. The study essentially updated previous groundwater modeling work but included important additional analyses. The additional work included analyzing different groundwater operating scenarios and assessing the potential impact from several climate change scenarios. The updated study concluded that continuation of the region's current groundwater operating plan is sustainable; that the groundwater basin has not been and is not projected to be in overdraft; and that the water purveyors' groundwater operating plan can be relied upon for long term planning purposes (Basin Yield Study, 2009).

The following sub-parts respond to specific requirements of Water Code §10910(f):

3.2.1 Water Code §10910(f)(1). Review of relevant information contained in the urban water management plan.

The 2005 UWMP contains relevant information about groundwater resources available for the Project in Chapter 3, Water Resources and Appendix C, Groundwater Resources and Yield. This includes a description of the local Alluvial and Saugus Formation aquifer systems, their respective yields as well as historical and projected production consistent with the purveyor's groundwater operating plan.

3.2.2 Water Code §10910(f) (2). Description of any groundwater basin or basins from which the proposed project will be supplied, including information concerning adjudication and overdraft.

Slade (2002) provides a detailed description of the Santa Clara River Valley East Sub-basin ("Basin") and the two aquifer systems, the Alluvial aquifer and the Saugus Formation. The Basin is about 22 miles long east to west and 13 miles wide. The Alluvial Aquifer has an estimated storage capacity of about 240,000 acre-feet (af) of water and approximately 1.65

million af of potentially usable groundwater is present from depths of 300 to 2,500 feet in the Saugus Formation (Slade 2002).

In 2003, CLWA with the cooperation of Valencia and the other retail water purveyors completed and adopted a Groundwater Management Plan in accordance with Water Code §10753. The management objectives of the Plan is to ensure the ongoing use of local groundwater by maintaining the Basin in good operating condition (no overdraft), protecting water quality and preventing adverse impacts to surface waters. The groundwater basin has not been adjudicated and has not been identified as overdrafted or projected to be overdrafted by the Department of Water Resources (DWR Bulletin 118, California's Groundwater, 2003, page 98).

The most current analysis and update of operational yield for both aquifers is included in the Basin Yield Study completed by CH2MHill/Scalmanini in 2005, as updated by Luhdorff and Scalmanini and GSI Solutions in 2009. The updated report analyzes the operational yield of both aquifers and other parameters of production capacity. The study concluded neither aquifer system is in overdraft and the purveyor's groundwater operating plan as described in the Groundwater Management Plan is sustainable (Basin Yield Study, 2009).

3.2.3 Water Code §10910(f)(3). Description and analysis of the amount and location of groundwater pumped by the public water system for the past 5 years from any groundwater basin from which the proposed project will be supplied.

During the past 5-year period, Valencia's production averaged 12,807 afy from the Alluvial aquifer and 2,307 afy from the Saugus Formation. See Table 2-1 in the SCVWR 2010 for a summary of the historical groundwater production for the past five years by the retail water purveyors.

Total pumpage from the Alluvial aquifer in 2009 was 39,986 af. Of the total Alluvial pumpage in 2009, 24,396 af was for municipal water supply, and the balance, 15,590 af, was for agriculture and other (minor) miscellaneous uses (SCVWR 2010). Since 1980, when imported water deliveries began from the SWP, total pumpage from the Alluvial aquifer has ranged from a low of about 20,200 afy (in 1983) to slightly more than 43,400 afy (in 1999) (SCVWR 2010).

Total pumpage from the Saugus Formation in 2009 was 7,678 af (SCVWR 2010). Of the total Saugus Formation pumpage in 2009, 6,704 af was for municipal water supply, and the balance 974 af was for agricultural and other (minor) uses (SCVWR 2010). Groundwater pumpage from the Saugus peaked in the early 1990s and then declined steadily. On a long-term average basis since the importation of SWP water, total pumpage from the Saugus Formation has ranged from a low of 3,716 afy (in 1999) to a high of 14,917 afy in (1991) (SCVWR 2010).

3.2.4 Water Code §10910(f)(4). Description and analysis of the amount and location of groundwater that is projected to be pumped by the public water system from any basin from which the proposed project will be supplied.

See Table 3-8 in the 2005 UWMP for a summary of the range of groundwater production projected by Valencia and the other the retail water purveyors. To ensure sustainability, the purveyors have committed that the annual use of groundwater pumped collectively in any given year will not exceed the purveyors' operating plan as described in the Basin Yield Study (August 2009) and reported annually in the Santa Clarita Valley Water Report. A portion of the project's potable and non-potable water demand of 150 afy may be supplied in any given year from groundwater produced from the Alluvial and Saugus aquifers located in Los Angeles County.

3.2.5 Water Code §10910(f)(5). Analysis of the sufficiency of the groundwater from the basin or basins from which the proposed project will be supplied to meet the projected water demand associated with the proposed project.

As stated previously, the water purveyors have developed a groundwater operating plan to meet the requirements of municipal, agricultural and other smaller uses while maintaining the local Alluvial Aquifer and Saugus Formation in a sustainable condition (i.e., no long term depletion of groundwater or interrelated surface water). The groundwater operating plan is based on the concept that pumping can vary from year to year to allow increased groundwater use in dry year periods and increased recharge during wet periods and collectively assure that the groundwater Basin is adequately replenished through various wet/dry cycles. A description of the groundwater operating plan is found in the 2005 UWMP and the Basin Yield Study (August 2009). Based on these studies, the groundwater Basin is in good operating condition (not in a condition of overdraft). The purveyor's groundwater operating plan is a reliable long term component of water supply for the Santa Clarita Valley.

As stated in this WSA, an analysis and discussion regarding the discovery and impact of perchlorate contamination on the sufficiency of groundwater supplies is contained in the 2005 UWMP and most recent annual Santa Clarita Valley Water Report. The reliability analysis contained in the 2005 UWMP takes into account the impact of perchlorate on water supply operations while the planning, design and construction of treatment and other restoration activities are implemented.

3.2.6 Sustainability of Existing Groundwater Supplies and Projected Supplies

Groundwater supplies were reviewed in the 2005 UWMP and evaluated in the Basin Yield Study (August 2009) to determine whether supply projections were realistic over varying hydrologic conditions. The review made the following critical findings:

(1) Both the Alluvial aquifer and the Saugus Formation are reasonable and sustainable sources at the yields represented in the 2005 UWMP over the next 25 years;

(2) The yields are not overstated and will not deplete or "dry up" the groundwater basin; and

(3) There is no need to reduce the yields for purposes of planning in the context of the 2005 UWMP.

Additionally, the 2005 UWMP and Basin Yield Study (August 2009) concluded that both aquifers are in good operating condition (not in a condition of overdraft) and are not projected to become overdrafted.

3.4 Recycled Water

Wastewater that has been highly treated and disinfected can be reused for landscape irrigation. In 1993, CLWA completed a *Reclaimed Water System Master Plan* to use recycled water as a reliable water source to meet a portion of the non-potable demand within Santa Clarita Valley. The Master Plan was updated in 2002 and again in 2007, and the amount of recycled water expected to be produced in the future is approximately 17,000 af per year in 2030 (2005 UWMP, CLWA Final Program EIR Recycled Water Master Plan, 2007). CLWA is currently under contract for 1,700 af per year that became available in 2003.

The source of recycled water (non-potable water) for the Project will be from the existing Valencia WRP and from the future Newhall Ranch WRP. Once recycled water is available to the Project site, then recycled water would be used to meet the non-potable demands of the Project. Non-potable uses on the site that would be met with recycled water include water for dust control, irrigation, fire prevention, and soil compaction during on-site construction projects such as liner construction.

4.0 CONCLUSION

Based on the analysis set forth in this revised WSA and as supported by the documents relied on for its preparation, Valencia Water Company's total existing and projected water supplies will meet the water demands associated with the Project in combination with existing and other planned uses within Valencia's service area. This determination is consistent with the best available information, including the updated 2005 UWMP, DWR's 2009 Delivery Reliability Report, the updated 2009 Basin Yield Study and the most recent annual Santa Clarita Valley Water Report (SCVWR 2010).

County of Los Angeles
Countywide Integrated Waste Management Plan

2012 Annual Report

County of Los Angeles
Department of Public Works
August 2013

Countywide Summary Plan &
Countywide Siting Element

COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

"To Enrich Lives Through Effective and Caring Service"

GAIL FARBER, Director

900 SOUTH FREMONT AVENUE
ALHAMBRA, CALIFORNIA 91803-1331
Telephone: (626) 458-5100
http://dpw.lacounty.gov

ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460

August 1, 2013

IN REPLY PLEASE REFER TO FILE: EP-5

Ms. Caroll Mortensen
Director
Department of Resources
Recycling and Recovery
Cal/EPA Building
1001 I Street
Sacramento, CA 95812-4025

Dear Ms. Mortensen:

TRANSMITTAL OF THE 2012 ANNUAL REPORT
LOS ANGELES COUNTY COUNTYWIDE INTEGRATED WASTE MANAGEMENT PLAN
SUMMARY PLAN AND SITING ELEMENT ASSESSMENTS

Enclosed for your review and approval is the 2012 Annual Report for the Summary Plan and Siting Element of the Los Angeles County Countywide Integrated Waste Management Plan pursuant to Section 41821 of the Public Resources Code.

The 2012 Annual Report includes discussion on the status of the revised Siting Element which is anticipated to be disseminated for public comment during 2014 and submitted to CalRecycle in 2016. Also included in the 2012 Annual Report are permit changes, in-depth assessments of the County's disposal capacity needs, detailed updates on the remaining permitted in-County disposal capacity, and the County's strategies for maintaining adequate disposal capacity through 2027.

Through the analyses of nine scenarios, the 2012 Annual Report demonstrates that the County would meet the disposal capacity requirements of Assembly Bill 939 through a multi-pronged approach which includes successfully permitting and developing proposed in-County landfill expansions, utilizing available or planned out-of-County disposal capacity, developing necessary infrastructure to facilitate exportation of waste to out-of-County landfills, and developing conversion and other alternative technologies. Additionally, by continuing to enhance diversion programs and increasing the Countywide diversion rate, jurisdictions in Los Angeles County may further ensure adequate disposal capacity is available to serve the needs of the residents and businesses through the planning period.

If you have any questions regarding this Annual Report, please contact me at (626) 458-3500 or Mr. Bahman Hajialiakbar at (626) 458-3502, Monday through Thursday, 7 a.m. to 5:30 p.m.

Very truly yours,

GAIL FARBER
Director of Public Works

PAT PROANO
Assistant Deputy Director
Environmental Programs Division

JB:dy
P:\Sec\2012 AR Cover Letter

Enc.

cc: California Department of Resources Recycling and Recovery Office of Local Assistance for Southern California
Each City Mayor in the County of Los Angeles
Each City Recycling Coordinator in the County of Los Angeles
Each Member of the Los Angeles County Integrated Waste Management Committee/Integrated Waste Management Task Force
Each Member of the Los Angeles County Regional Planning Commission

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ACRONYMS AND GLOSSARY OF TERMS

ADC	Alternative Daily Cover
CSE	Countywide Siting Element (Siting Element)
CUP	Conditional Use Permit
DRS	Disposal Reporting System
EIR	Environmental Impact Report
FOC	Finding of Conformance
IDEFO	Inert Debris Engineered Fill Operation
LARA	Los Angeles Regional Agency
LEA	Local Enforcement Agency
Public Works	County of Los Angeles Department of Public Works
Regional Planning	County of Los Angeles Department of Regional Planning
Sanitation Districts	Sanitation Districts of Los Angeles County
SRRE	Source Reduction and Recycling Element
Summary Plan	Los Angeles County Countywide Integrated Waste Management Summary Plan
SWFP	Solid Waste Facility Permit
SWIMS	Solid Waste Information Management System
Task Force	Los Angeles County Solid Waste Management Committee/Integrated Waste Management Task Force
TPD	Tons per Day, Based on 6 Operating Days per Week
TPW	Tons per Week
TPY	Tons per Year
UCLA	University of California, Los Angeles
CalRecycle	California Department of Resources Recycling and Recovery
WTE	Waste-to-Energy

WHAT IS THE ANNUAL REPORT?

The California Integrated Waste Management Act of 1989, also known as Assembly Bill 939 (AB 939), mandates jurisdictions to meet a diversion goal of 50 percent by year 2000 and thereafter. In addition, each county is required to prepare and administer a Countywide Integrated Waste Management Plan. This plan is comprised of the County's and the cities' solid waste reduction planning documents, an Integrated Waste Management Summary Plan (Summary Plan), and a Countywide Siting Element (CSE). In order to assess jurisdiction's compliance with AB 939, the Disposal Reporting System was established to measure the amount of disposal from each jurisdiction and determine if it has met the goals.

The County of Los Angeles Department of Public Works (Public Works) is responsible for preparing and administering the Summary Plan and the CSE. These documents were approved by the County, a majority of the cities within the County containing a majority of the cities' population, the County Board of Supervisors, and the California Department of Resources, Recycling, and Recovery (CalRecycle).

The Summary Plan, approved by CalRecycle on June 23, 1999, describes the steps to be taken by local agencies, acting independently and in concert, to achieve the mandated state diversion rate by integrating strategies aimed toward reducing, reusing, recycling, diverting, and marketing solid waste generated within the County.

The CSE, approved by CalRecycle on June 24, 1998, identifies how, for a 15-year planning period, the county and the cities within would meet their long-term disposal capacity needs to safely handle solid waste generated in the county that cannot be reduced, recycled, or composted.

The purpose of the Annual Report is to provide an annual update to the Los Angeles County Countywide Integrated Waste Management Plan. Public Works prepares the Annual Report to summarize the changes that have taken place since the approval of the Summary Plan and the CSE by the jurisdictions and CalRecycle. It consists of Section D: Summary Plan Assessment and Section E: Siting Element Assessment. The other sections pertaining to individual jurisdictions, namely, Sections A, B, C, and H, are included in a separate annual report from each jurisdiction.

SECTION D: SUMMARY PLAN ASSESSMENT (FORM)

Check each item as completed, providing attachments as applicable.

[✓] **D-1** Does the Summary Plan need to be revised? For example, have there been any significant changes in the financing of Countywide or regional programs and/or facilities, in demographics, in solid waste management infrastructure, or in planning documents; i.e., Source Reduction and Recycling Element (SRRE), Household Hazardous Waste Element, or Non-Disposal Facility Element from any of the jurisdictions within the County?

[ ] Yes. Discuss below. Include a time schedule for revising the Summary Plan.

[✓] No.

Discussion

Please see **Summary Plan** (Page 3) and **Regional Solid Waste Issues** (Page 4) for a discussion of the Summary Plan.

SUMMARY PLAN

The Summary Plan, approved by CalRecycle in 1999, was prepared and administered by the County to describe the steps to be taken by jurisdictions, acting independently and in concert, to achieve the 50 percent waste diversion mandate. Since then, a number of changes have occurred, such as regional solid waste management, demographics, and public awareness of environmental stewardship. At the same time, the County and cities continue to enhance and expand their waste reduction efforts in response to changing conditions.

Jurisdictions in the County of Los Angeles continue to implement and enhance the waste reduction, recycling, special waste, and public education programs identified in their SRREs, Household Hazardous Waste Element, and Non-Disposal Facility Element (as updated through their Annual Reports).

These efforts, together with Countywide and regional programs implemented by the County and the cities, acting in concert or independently, have achieved significant, measurable results.
As such, CalRecycle approved the County's second Five-Year Review Report in August 2010, which concluded that an update to the Summary Plan is not necessary.

The following section is a summary discussion on the various regional solid waste issues that currently play a significant role in the County's continuing solid waste management efforts, including markets for recyclable materials, development of alternative technology facilities, diversion credit for such technology, and the State's 75-percent recycling goal.

REGIONAL SOLID WASTE ISSUES

Disposal Trend During Economic Recession

Although the economy has shown signs of improvement, the amount of waste that residents and businesses generated as well as disposed of in Los Angeles County continued to remain relatively low.

Figure 1: Disposal Trend

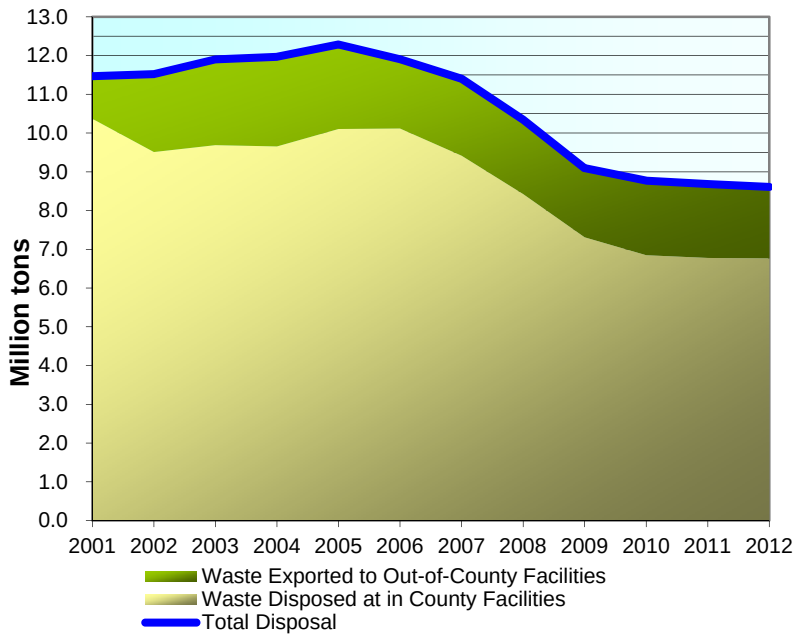
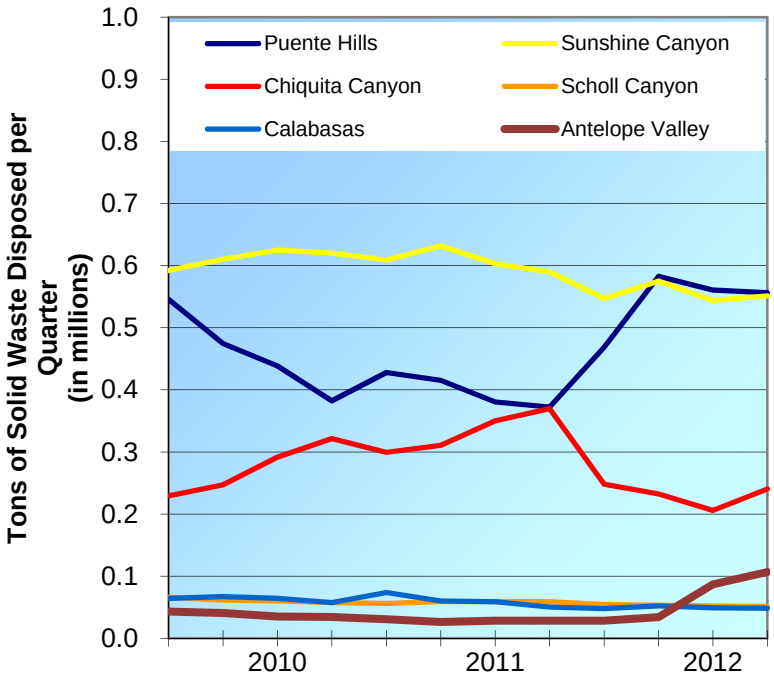


Figure 1 shows a downward disposal trend from 2005 to 2010 and plateaus thereafter. **Figure 2** shows disposal trends of selected facilities within the County.

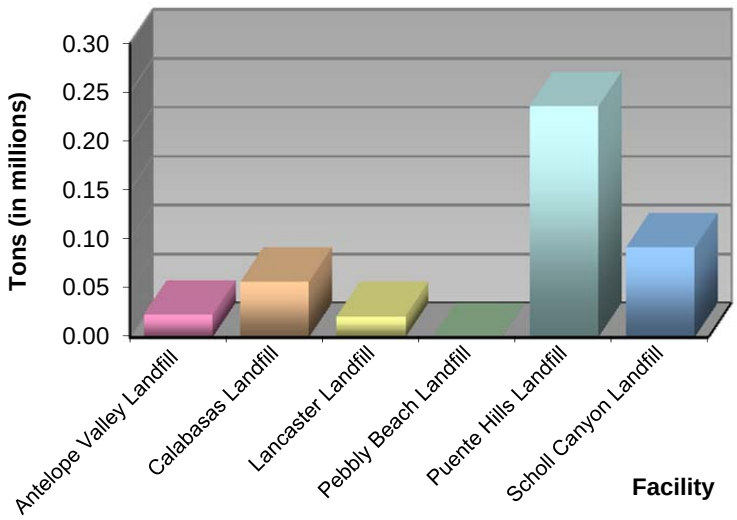
Figure 2: Disposal Trend at Major Landfills



Green Waste as Alternative Daily Cover

As the closure of Puente Hills Landfill in 2013 draws near, jurisdictions that currently depend on the facility to recycle their green waste as alternative daily cover (ADC) must secure alternative sites to recycle or compost their green waste in order to continue to meet their diversion goals. As shown in **Figure 3**, of the 428,923tons of green waste ADC used at in-County landfills, Puente Hills Landfill alone accepted 55 percent, or 235,692 tons, which is equivalent to an average of 755 tons per day (tpd)

Figure 3: Use of Green Waste as ADC in 2012



Cities, the County, and the waste management industry are working towards developing alternatives for the management of greenwaste in anticipation of the closure of Puente Hills Landfill. There are many challenges associated with green waste management, such as inadequate green waste management capacity in the County due to difficulties encountered in permitting and developing composting facilities, limited markets for compost made from green waste, and increasing costs for long-distance transportation to out-of-County facilities and operations.

Projected Shortfall of Available Permitted Disposal Capacity

As detailed in the **Strategy for Maintaining Adequate Disposal Capacity** section (Page 28), a shortfall of permitted solid waste disposal capacity in the County is anticipated under current conditions. To meet their disposal needs during the planning period, jurisdictions in the County must further enhance their waste reduction and diversion efforts, continue to encourage development of alternative technologies such as waste-to-energy and conversion technology facilities, support the use of waste-by-rail system to Mesquite Regional Landfill, as well as expand solid waste processing facilities in areas where processing capacity is inadequate if found to be environmentally sound and technically feasible.

Los Angeles County's Conversion Technology Efforts

Los Angeles County continues to support alternatives to landfills through our Conversion Technology Program. Focusing on processes that convert non-recyclable materials into renewable energy, bio-fuels, and other useful products, this innovative program emphasizes local project development and statewide outreach and education.

Over the past year, the County has worked with stakeholders on a state and local level to identify the barriers to project development in California and develop solutions to overcoming those barriers.

In September 2012, the County Board of Supervisors directed the County to work with the Chief Executive Office to pursue legislation that would establish a more clearly defined permitting pathway for conversion technologies in state statute. This has led the County to conduct several educational visits with Sacramento legislators and state agencies such as Air Resources Board, Energy Commission, and Natural Resources Agency.

Currently the County is partnering with the California State Association of Counties (CSAC) to sponsor Senate Bill 804, conversion technology legislation introduced by Senator Ricardo Lara (D-33), with the goal of establishing clear definitions in statute that promote the highest and best use of resources while supporting the state's key environmental goals. If passed, the bill would assist in meeting California's 75 percent waste reduction goal by assessing how the tens of millions of tons of materials that cannot be reduced, recycled or composted can better be handled. Additionally, the bill would assist in meeting the goals of the state's Bioenergy Action Plan, which has identified municipal solid waste as a substantially underutilized resource for biomass feedstock.

County Engineers visit Waste Management's Reclaimable Anaerobic Composter Demonstration in Lancaster, CA

The County continues to chair the Conversion Technology Working Group hosted by CSAC as well as the Los Angeles County Integrated Waste Management Task Force's Alternative Technology Advisory Subcommittee. These groups monitor the development of projects in California, such as the CR&R

Incorporated anaerobic digester project in Perris, CA, which is closer to the final stages of design and construction. As a part of its partnership with CR&R, the County assisted the project in earning a $4.5 million grant from the Energy Commission under the State's Alternative and Renewable Fuel, Vehicle Technology, Clean Air, and Carbon Reduction Program (commonly known as AB 118). Other companies and jurisdictions have approached the County about potential projects at approximately 2 dozen locations throughout the County, and a number of projects are being considered or moving forward at several of these sites.

City of Los Angeles' Alternative Technology Efforts

In May 2011, the City of Los Angeles (City), Board of Public Works (Board) authorized the Bureau of Sanitation (Bureau) to enter into contract negotiations with Green Conversion Systems (GCS) for development of the first commercial scale alternative technology facility. GCS proposed to build a 1,100 ton per day facility that would include an upfront mechanical pre-processing system to separate and recover recyclables materials, followed by an advanced thermal recycling system to produce energy and recover by-products.

Additionally, in December 2012, the City's Board authorized the Bureau to enter into contract negotiations with Urbaser-Keppel Seghers for development of an integrated scale alternative technology facility. The proposed facility could include a combination of one or more of the following technologies: upfront mechanical pre-processing system, anaerobic digestion, composting, advanced thermal recycling, and/or gasification, and would include the flexibility to negotiate for increased tonnage commitments. The Bureau is currently in contract negotiations with GCS and Urbaser-Keppel Seghers for the development of a commercial and emerging alternative technology facility, respectively.

California's 75-Percent "Recycling" Goal

On October 6, 2011, Governor Brown signed Assembly Bill 341 establishing a State policy goal that no less than 75-percent of solid waste generated be source reduced, recycled, or composted by 2020, and requiring CalRecycle to provide a report to the Legislature that recommends strategies to achieve the policy goal by January 1, 2014. The bill also mandates local jurisdictions to implement commercial recycling by July 1, 2012. Subsequently, CalRecycle began holding workshops to receive feedback from stakeholders and released for public comment a draft report entitled, *California's New Goal: 75 Percent Recycling*.

Consequently, the County and the Los Angeles County Integrated Waste Management Task Force (Task Force) provided their comments and recommendations on the 75-Percent Recycling Goal to CalRecycle. The recommendations include to: (1) revise the hierarchy to reflect the best management practices that puts the highest emphasis on product redesign and producer responsibility, followed in order of preference by waste prevention, reuse, recycling, composting, conversion technologies, transformation, and lastly, landfill disposal if no other management option is reasonably feasible; (2) conduct a comprehensive, peer-

reviewed life-cycle analysis of each solid waste management option; (3) continue diversion credit for green waste when used as alternate daily cover at landfills due to lack of markets for compost and composting infrastructure; (4) support local and state policies that would promote the development of technologies as an alternative to landfilling, such as conversion technologies; and (5) pursue strategies that would promote and provide for the use of recyclables at in-state facilities only. In addition, comments were made on definitions of some terms including the definition of "Recycling" which is inconsistent with the California Public Resources Code definition.

Jurisdictions in Los Angeles County will still be working with CalRecycle during the stakeholder process to assist in developing the strategies with an emphasis on State policies and activities that supplement and enhance existing statewide and local recycling efforts; sound, science-based recommendations; minimal potential impacts of the proposal on cities' and County's AB 939 compliance; and continued diversion credit for green waste as an alternate daily cover at landfills.

AB 32 – Reducing Greenhouse Gas Emissions in California

The California Air Resources Board (CARB) is currently developing their 2013 Scoping Plan that will provide an update on how the State is meeting our greenhouse gas (GHG) emission reduction targets specified in AB 32. In 2008, CARB developed the original Scoping Plan with only a small portion dedicated to solid waste and recycling. The single solid waste measure with an associated measurable goal was methane reduction at landfills. The 2013 Scoping Plan will include a more comprehensive discussion of the waste management sector, including measures relating to waste reduction and recycling, anaerobic digestion and composting, biomass conversion, landfills, thermal waste conversion, and procurement of recyclable products. The waste management sector GHG target is tied to State's AB 341 goal. CalRecycle estimates that if the 75 percent waste reduction, recycling, and composting goal are met by 2020 it will result in a 20-30 Million Metric Ton of Carbon Dioxide-Equivalent (MMTCO2e) reduction. The County and Task Force have both submitted comments to CalRecycle and CARB. The comments re-emphasized concerns made regarding the 75-percent goal, as well as highlighted the need for the Scoping Plan update to include the connection between sustainable feedstock suppliers, bioenergy generations and distributions, and end user markets in transportation and water sectors.

Markets for Recovered Materials

The County strongly recommends CalRecycle to continue its efforts to address the need to develop sufficient statewide markets and take a leadership role in the expansion of markets for recycled products. These efforts are in line with the statewide goal of 75 percent "recycling."

State recycling mandates have long created an extensive supply of diverted materials, but have not fully addressed the demand side of the "recycling equation." The result has been a substantial dependence on foreign markets for our recyclable

materials, where there are substantially inadequate environmental controls for processing these materials.

While collection of recyclable materials is an important element of our integrated solid waste management system and is imperative in reducing our dependence on landfills, true success of recycling efforts can only be realized with a strong market demand for recovered materials.

Extended Producer Responsibility

To facilitate a comprehensive solid waste management strategy, the County strongly supports statewide legislation, regulations, and/or policies that establish product stewardship, also known as extended producer responsibility (EPR). EPR is an adopted strategic policy that shifts the responsibility of product waste management from local governments to producers and manufacturers. EPR emphasizes product designs that promote environmental sustainability and minimize the negative impact on human health and the environment, as well as considers the cost of treatment and disposal in the total cost of the product.

Effective July 2012, AB 1343 requires paint manufacturers to take responsibility for the end-of-life management of postconsumer paints sold in California. This state law is the first significant extended producer responsibility bill in California and necessitates the paint industry to take responsibility of the end-of-life management of their product by designing and managing a collection system for postconsumer paint that would potentially save local governments millions of dollars in taxpayer funds each year. As such, AB 1343 is meant to reduce the end-of-life management costs for paint and mitigate the environmental impacts of its disposal.

On October 19, 2012, PaintCare, the stewardship organization, designated by paint manufacturers, implemented a program with a chain of about 300 local paint retail stores to take back postconsumer paint from the public. Currently, there are over 60 retail locations spread throughout Los Angeles County. PaintCare is also working with various existing Household Hazardous Waste programs to add to its collection infrastructure. Currently, the County of Los Angeles is evaluating options for participating in PaintCare's collection infrastructure.

SECTION E: SITING ELEMENT ASSESSMENT (FORM)

Check each item as completed, providing attachments as applicable.

[✓] ***E-1*** *Describe the changes in remaining disposal capacity facility description, pursuant to the California Code of Regulations (CCR) Section 18755.5, since the Los Angeles County Countywide Siting Element (Siting Element) adoption.*

[✓] Attach the remaining capacity description (label as Appendix E-1) that includes the following information for each facility:

a. *Name of the facility and name of facility owner and operator*
b. *Facility permit number, permit expiration date, date of last permit review, and an estimate of remaining site life*
c. *The maximum permitted daily and yearly rates of waste disposal in tons and cubic yards*
d. *The permitted types of wastes*
e. *The expected land use for the site and if site closure is expected to occur within the 15-year planning period*

Discussion

Please see **Solid Waste Disposal Facilities** (Page 14) for a summary of the changes in the remaining disposal capacity facility. Detailed description of each facility is provided in **Appendix E-1**.

*[✓] **E-2** Has the County or regional agency maintained or provided a strategy that provides for the maintenance of 15 years of disposal capacity?*

[✓] Yes. Attach a table (label as Appendix E-2) with the total disposal capacity the County or regional agency has for each year for the next 15 years in tons and cubic yards.

[ ] No. Attach a table (label as Appendix E-2) with the total disposal capacity the County or regional agency has for each year for the next 15 years in tons and cubic yards.

Discussion

Please see **Strategy for Maintaining Adequate Disposal Capacity** (Page 28) for a discussion on how the County will maintain 15 years of disposal capacity. Detailed data is provided in **Appendix E-2, E-3,** and **E-4**.

*[✓] **E-3** Examine the adequacy of the Siting Element. Has the County or regional agency maintained 15 years of disposal capacity, as described in E-2 above.*

[ ] Yes. (No revision necessary.)

[✓] Yes. However, revision will be needed to add new disposal sites and/or strategies. Attach a discussion of the new sites or strategies and include a time schedule for revising the Siting Element and label as Appendix E-4.

[ ] No. Attach a discussion of how additional capacity will be provided, and include a time schedule for revising the Siting Element. Label as Appendix E-4

Discussion

The Siting Element is currently being revised to remove two sites previously identified as potential landfill sites and add new strategies, including expansions of some in-County Class III landfills in order to increase landfill capacities within the County, updates to some of the goals and policies to enhance the comprehensiveness of the County's solid waste management system, fostering the development of alternatives to landfilling such as alternative technology facilities and promoting the development of infrastructure to facilitate exportation of waste to Mesquite Regional Landfill in Imperial County. Please see **Strategy for Maintaining Adequate Disposal Capacity** (Page 28) for a detailed discussion. Data is provided in **Appendices E-1** through **E-4**. **Appendices E-5 and E-6** show locations of current transfer and process facilities and disposal sites within the County.

SITING ELEMENT REVISION

AB 939, as amended, requires each county to prepare a countywide siting element that describes how the county, and the cities within the county plan to manage the disposal of their solid waste for a 15-year planning period. The existing Los Angeles County Countywide Siting Element (CSE) was approved by the majority of the cities in the County containing a majority of the cities' population, the Board of Supervisors in January 1998, and by CalRecycle on June 24, 1998.

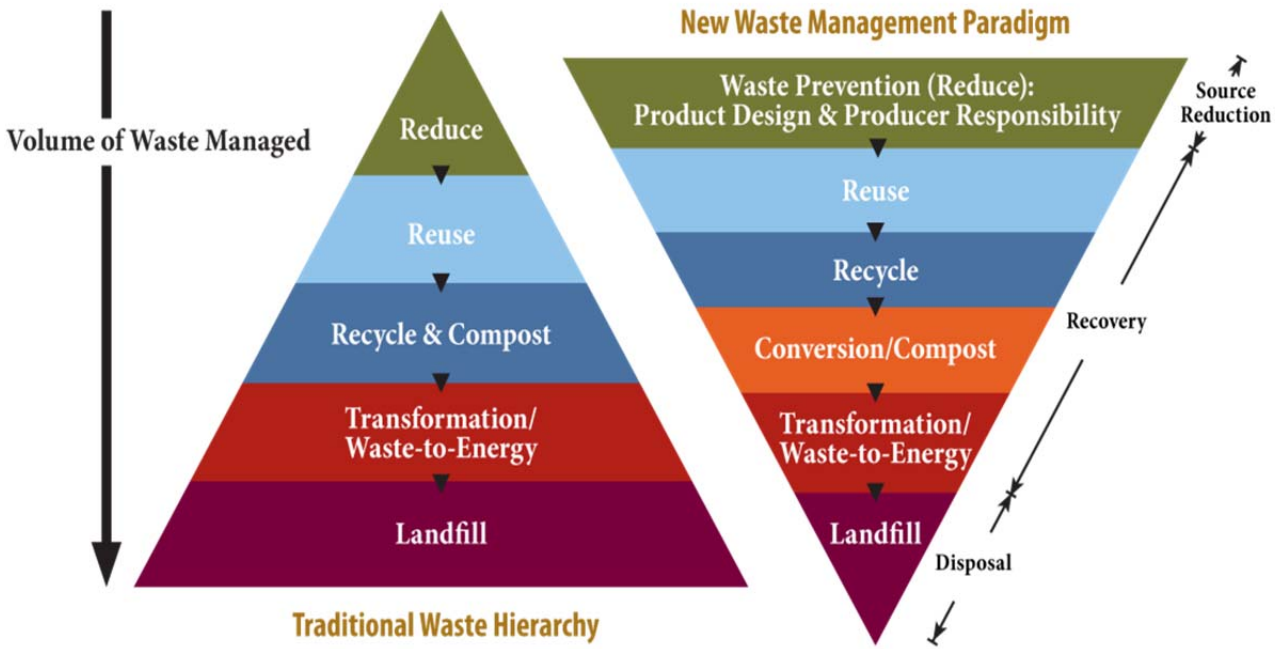
The CSE establishes goals and policies for the County to maintain adequate permitted disposal capacity for a 15-year planning period. To provide the needed disposal capacity, the CSE offers strategies and establishes siting criteria to aid in evaluating the feasibility of potential sites for development of solid waste management and disposal facilities. Out-of-County landfills potentially available to accept waste generated in the County are also identified. Additionally, the CSE includes goals and policies to facilitate the use of out-of-County/remote landfills and foster the development of alternatives to landfill disposal, such as conversion technologies on a Countywide basis.

In August 2010, CalRecycle approved the County's second Five-Year Review Report, which provides a comprehensive analysis on the adequacy of the Summary Plan and Siting Element. The Five-Year Review Report confirmed that an update to the Summary Plan is not necessary; however, there is a need to revise the CSE.

The revised CSE, which would cover the 15-year planning period beginning 2010 through 2025, is anticipated to reflect the following significant changes compared to the current version:

- Removal of Elsmere and Blind Canyons as potential new landfill sites in accordance with the Board of Supervisors' decision on September 30, 2003 to remove those sites from the list of potential new landfill sites;

- Expansion of several in-County Class III landfills in order to increase landfill capacities within the County;



- Updates to the goals and policies to be consistent with a new solid waste management paradigm to enhance the comprehensiveness of the Los Angeles County's solid waste management system and incorporate current and upcoming solid waste management processes and technologies;

- Promotes the development of alternatives to landfilling such as conversion technologies, on a Countywide basis; and

- Promotes the development and use of infrastructure to transport solid waste to out-of-County landfills such as Mesquite Regional Landfill to complement the County's waste management system.

On November 15, 2012, the Los Angeles County Integrated Waste Management Task Force (Task Force) concurred with the draft revised CSE.

The draft revised CSE and its environmental document will undergo a review and approval process in compliance with numerous statutory and regulatory requirements. This includes CEQA review, and review and approval by jurisdictions in Los Angeles County, the County Board of Supervisors, and CalRecycle.

The goal is to complete the entire revision process, disseminate the document for public comment, and submit the final draft CSE and the environmental document to CalRecycle by 2016.

SOLID WASTE DISPOSAL FACILITIES

Expanded Facilities

Lancaster Landfill and Recycling Center

The Lancaster Landfill and Recycling Center is owned and operated by Waste Management of California, Inc. On December 14, 2011, Los Angeles County Regional Planning Commission approved a new CUP to extend landfilling operations by 30 years by increasing the maximum daily disposal capacity from 1,700 tpd to 3,000 tpd , and the acceptance of inert debris and beneficial use materials up to 2,100 tpd effective August 1, 2012. Refer to **Appendix E-1** for more detailed information.

Permit Changes

Lancaster Landfill and Recycling Center

A Finding of Conformance (FOC) was granted for Lancaster Landfill and Recycling Center by the Task Force on March 21, 2013. A new solid waste facility permit (SWFP) was issued by the Local Enforcement Agency and concurred by CalRecycle on February 19, 2013. Refer to **Appendix E-1** for more detailed information.

Proposed Facility Expansions

Chiquita Canyon Landfill Expansion

On December 5, 2008, Republic Services merged with Allied Waste Industries, Inc. As a condition of the merger, Republic Services was required to divest the Chiquita Canyon Landfill. Republic Services and Waste Connections signed a definitive agreement providing for the sale of the Chiquita Canyon Landfill to Waste Connections, Inc. on February 6, 2009. In 2011, Waste Connections, Inc. re-submitted an application to request an expansion of the waste footprint and an increase in the allowable daily tonnage. The County of Los Angeles Department of Regional Planning (Regional Planning) prepared a Notice of Preparation (NOP) for the proposed Chiquita Canyon Landfill Master Plan Revision and circulated it for public comments from November 28, 2011 to February 13, 2012. In September 2012, Waste Connections, Inc. submitted its updated Master Plan Revision to the Regional Planning, which provided a more detailed description of the proposed landfill expansion project. The proposed expansion project includes lateral extension of the existing waste footprint from 257 acres to 400 acres, increase in maximum elevation from 1430 feet to 1,573 feet, and increase in maximum daily disposal capacity from 6,000 tpd to 12,000 tpd. A draft Environmental Impact Report is currently being prepared and is expected to be released for public comment. Refer to **Appendix E-1** for more detailed information.

Scholl Canyon Landfill Expansion

The Scholl Canyon Landfill is located north of the Ventura Freeway in the City of Glendale. The Landfill is operated by the Sanitation Districts of Los Angeles County (Sanitation Districts) pursuant to a Joint Powers Agreement between the Sanitation Districts, City of Glendale, and the County. The Landfill is operating under a Use Variance (Case No. 6668-U) granted on November 27, 1978. The City of Glendale is proposing an expansion consisting of two variations: vertical expansion only, providing approximately five

million tons of additional capacity (Variation 1) and vertical and horizontal expansion, providing approximately six million tons of additional capacity (Variation 2). Under both variations, the landfill would continue to be permitted to receive 3,400 tons per day of non-hazardous solid waste, and existing resource and material recovery programs will continue to be implemented. On December 4, 2007, the Sanitation Districts initiated the CEQA process on behalf of the City of Glendale for the landfill expansion and circulated the Notice of Preparation/Initial Study. Refer to **Appendix E-1** for more detailed information.

Whittier (Savage Canyon) Landfill Expansion

The Whittier Landfill is owned and operated by the City of Whittier. The City Public Works Department is proposing to increase the site capacity from approximately 8.1 million cubic yards, as identified in the current SWFP issued on February 28, 1995, to 12.5 million cubic yards. The City is in the process of obtaining a solid waste facility permit from the Los Angeles County Department of Public Health, the State-approving Local Enforcement Agency. Refer to **Appendix E-1** for more detailed information.

Others

Eagle Mountain Landfill

On May 22, 2013, the Board of Directors of Sanitation District No. 2 took action to cease negotiations for Eagle Mountain Landfill. The site is currently owned by Ontario-based Mine Reclamation Corporation. The 4,654-acre landfill would have taken up to 20,000 tons of waste per day brought by rail from communities in Los Angeles County.

Mesquite Regional Landfill

The Sanitation Districts owns and operates the Mesquite Regional Landfill, located in Imperial County, and anticipates receiving a portion of the County's waste by truck or rail. Refer to **Out-of-County Disposal Facilities** (Page 42) and **Appendix E-1** for more detailed information.

Puente Hills Landfill

The Puente Hills Landfill is owned and operated by the Sanitation Districts. On January 23, 2002, the Sanitation Districts' Board of Directors certified the Final Environmental Impact Report (EIR) for the expansion project. The County of Los Angeles Regional Planning Commission granted a new CUP on December 18, 2002 and extended the life of the landfill to October 31, 2013. The Task Force granted a FOC on February 20, 2003. CalRecycle approved the project on July 11, 2003, and issued a revised SWFP. Operation of the expanded landfill began on November 1, 2003. The expansion increased the life of the landfill by ten years at a maximum daily disposal capacity of 13,200 tpd. Refer to **Appendix E-1** for more detailed information.

DISPOSAL ANALYSIS FOR 2012

Solid Waste Disposal

In 2012, total solid waste disposed at Class III landfills and transformation facilities located in and out of the County was 8.7 million tons. In addition, the amount of inert waste disposed at permitted inert waste landfills totaled 89,142 tons. The following is a breakdown of disposal amounts at each type of disposal facility.

Annual Disposal Tonnage for 2012

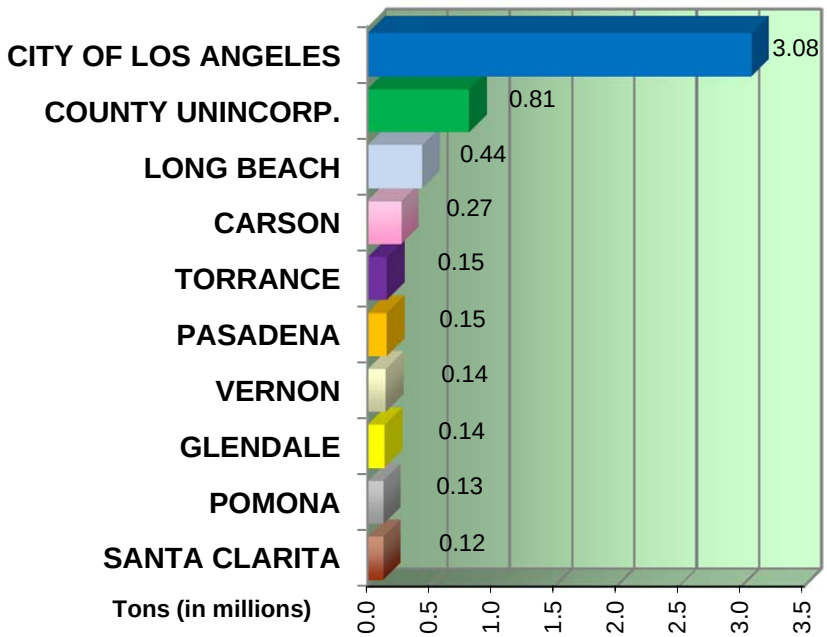
In-County Class III Landfills	6,304,060	tons
Transformation Facilities	569,539	tons
Exports to Out-of-County Landfills	1,844,175	tons
Subtotal Solid Waste Disposed	8,717,773	tons
Permitted Inert Waste Landfills	89,142	tons
Grand Total Disposed	8,806,915	tons

Average Daily Disposal Rate for 2012 (Based on Six Operating Days)

In-County Class III Landfills	20,205	tpd
Transformation Facilities	1825	tpd
Exports to Out-of-County Landfills	5,911	tpd
Subtotal Solid Waste Disposed	27,942	tpd
Permitted Inert Waste Landfills	286	tpd
Grand Total Disposed	28,227	tpd

Figure 4 below shows the top 10 jurisdictions that disposed solid waste, including inert waste disposed at permitted inert waste landfills, in and outside of the County in 2012.

Figure 4: Top 10 Jurisdiction Disposal Quantities in 2012



Waste Generation

For the purpose of long-term disposal capacity planning, a countywide diversion rate of 60 percent was assumed for 2012. Based on the 8.6 million tons of disposal and the 60 percent diversion rate, the County generated approximately 21.5 million tons or an average of 58,987 tpd. Note that the estimates do not include inert waste disposed at permitted inert waste landfills.

SB 1016

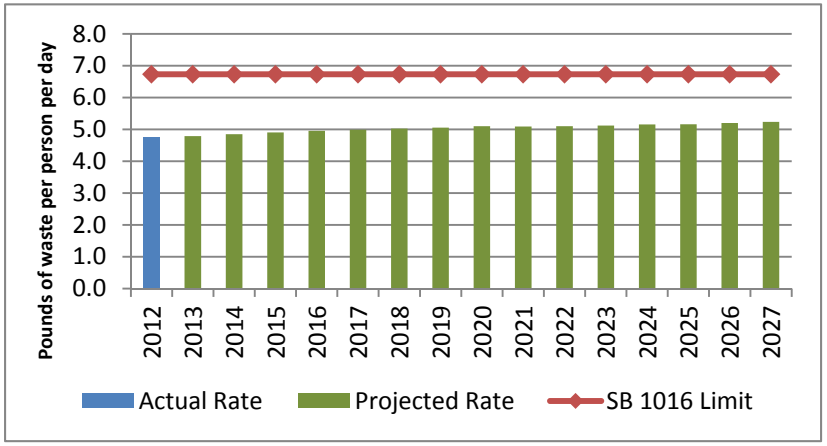
With the implementation of Senate Bill 1016, CalRecycle no longer calculates diversion rate based on actual disposal and estimated annual generation using CalRecycle's Adjustment Methodology. As a result, Countywide diversion rates are no longer calculated. The last diversion rates approved by CalRecycle were for 2006. Considering each jurisdiction's approved diversion rate, a countywide diversion rate for 2006 is estimated at 58 percent.

Under SB 1016, a target per capita disposal rate, which is equivalent to a 50-percent diversion rate, is calculated using an approved jurisdiction-specific average of per capita generation rates of years 2003 to 2006. To establish compliance with AB 939, each jurisdiction's per capita disposal rate is calculated for each reporting year and compared with their individual target rates.

Using projections of population, employment, and real taxable sales from the University of California, Los Angeles (UCLA), it is estimated that in order to meet the per capita disposal requirements, jurisdictions in Los Angeles County would need to continue their diversion programs as well as other disposal reduction strategies.

Figure 5 shows the County meeting the AB 939 diversion mandate through the year 2027 provided that the County as a whole maintains a 60-percent diversion rate. Refer to **Appendix E-3** for detailed data.

Figure 5: Projection of Countywide Disposal Equivalent



Waste Disposal at In-County Facilities

In addition to waste generated within Los Angeles County, Class III landfills, permitted inert waste landfills, and transformation facilities in the County also received 141,145tons, or 452 tpd, of waste from jurisdictions outside the County in 2012. **Figure 6** shows the total amount of solid waste disposed at each Class III landfill and transformation facility, including waste generated from within and outside the County. Refer to **Appendix E-2 Table 1** for detailed data.

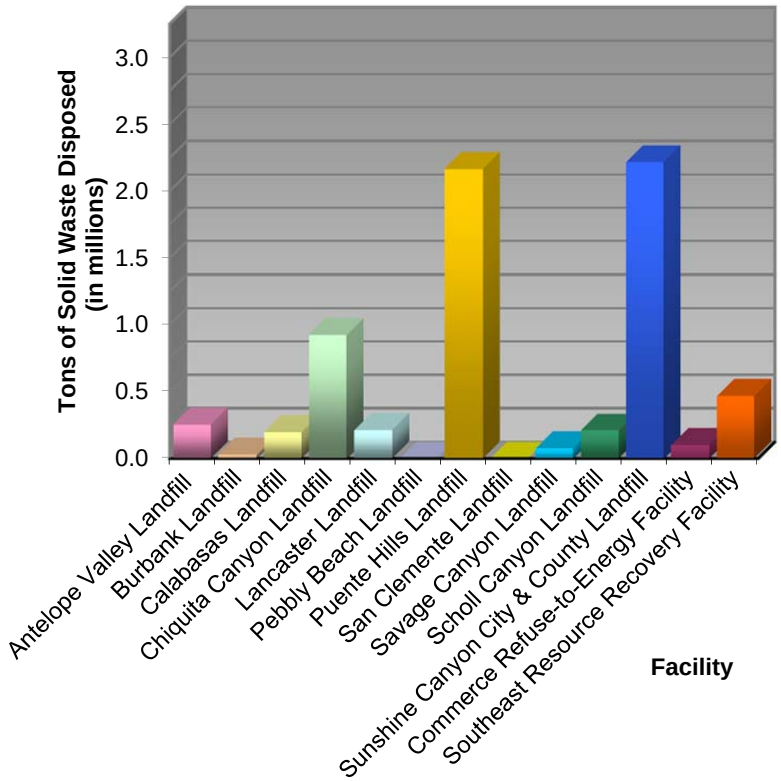
2012 Waste Generation and Disposal Quantities for Municipal Solid Waste

A	B	C	D	E	F
In-County Disposal		Out-of County Class III Landfills (Exports)	Total Disposal*	Estimated Countywide Diversion Rate	Calculated 2012 Solid Waste Generation*
Class III Landfills	Transformation Facilities				
TONS	TONS	TONS	TONS	%	TONS
6,239,143	528,765	1,844,175	8,612,083	60	21,530,206

* Data from permitted inert waste landfills and imports from Out-of-County landfills is excluded from these calculations.

Column A:	Total disposal at Class III landfills in Los Angeles County. Does not include waste imported from jurisdictions outside the County.
Column B:	Total disposal at transformation facilities in Los Angeles County. Does not include waste imported from jurisdictions outside the County.
Column C:	Waste exported by jurisdictions in Los Angeles County to disposal facilities located outside the County.
Column D:	Columns A + B + C.
Column E:	A Countywide Diversion Rate of 60 percent is assumed.
Column F:	Column D ÷ 40% (disposal percentage). This estimate is used to project the County's Class III landfill and transformation disposal needs through the year 2027.

Figure 6: Disposal Quantities by Facility in 2012



When waste is received at Class III landfills and transformation facilities, some of it is recycled for on-site use, such as ADC, and some is sent off-site for recycling or processing. The remaining is landfilled or transformed into energy. If transformed, the residual ash is turned into ashcrete and used for winter deck and other beneficial uses at the Puente Hills Landfill. **Figure 7** quantitatively illustrates these activities. The various types of materials recycled or beneficially used on-site at Class III landfills are further broken down on **Figure 8**.

Figure 7: Solid Waste at In-County Disposal Facilities (tons)

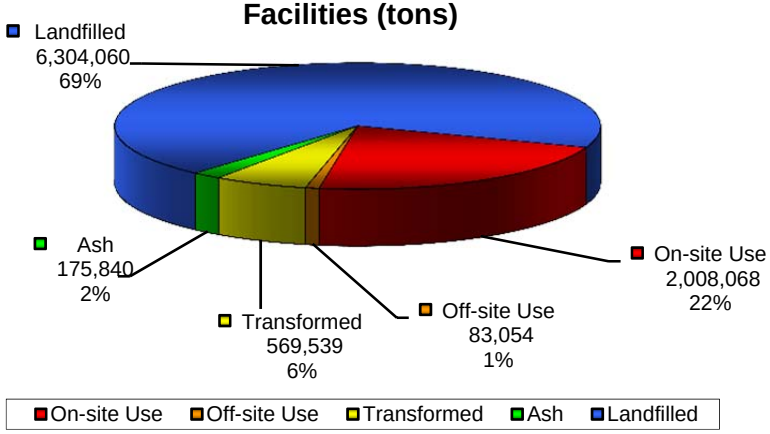
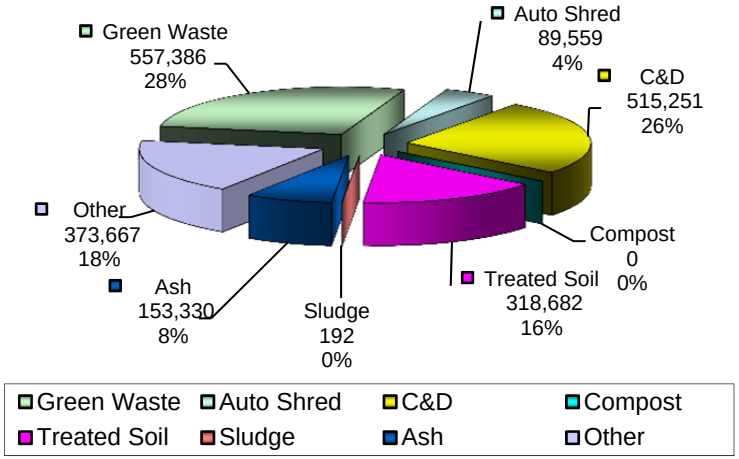


Figure 8: On-site Beneficial Use (tons)



Figures 9 through **21** show the disposal at each in-County facility broken down by jurisdiction. Refer to **Appendix E-5** for a map that shows the location of each facility.

Figure 9: Antelope Valley Landfill
252,000 tons

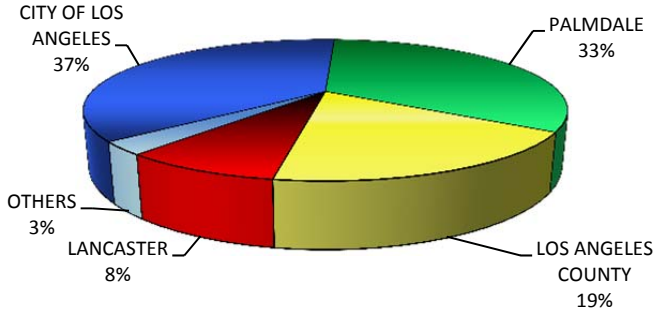


Figure 10: Burbank Landfill
33,000 tons

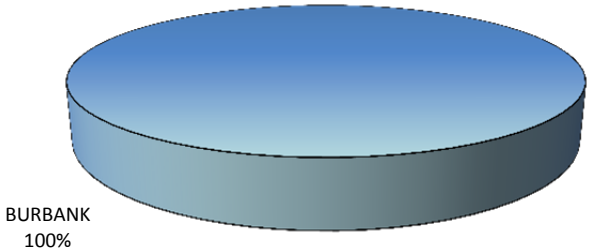


Figure 11: Calabasas Landfill
187,000 tons

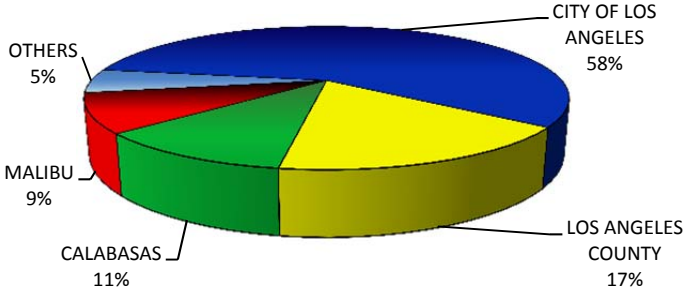


Figure 12: Chiquita Canyon Landfill
906,000 tons

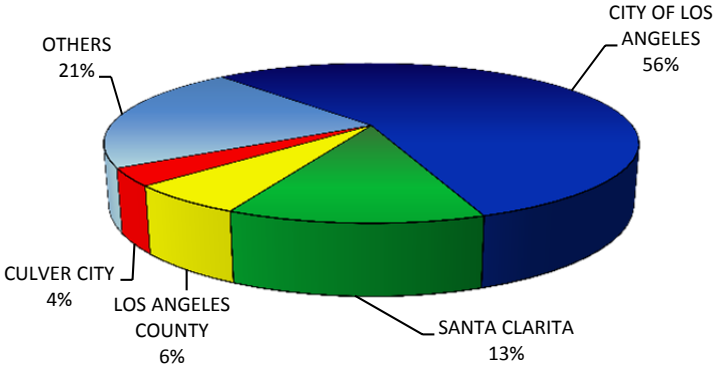


Figure 13: Commerce Refuse-to-Energy Facility
96,000 tons

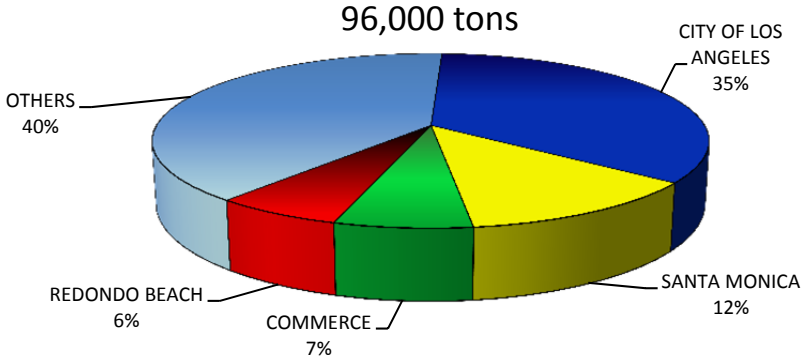


Figure 14: Lancaster Landfill
208, 000 tons

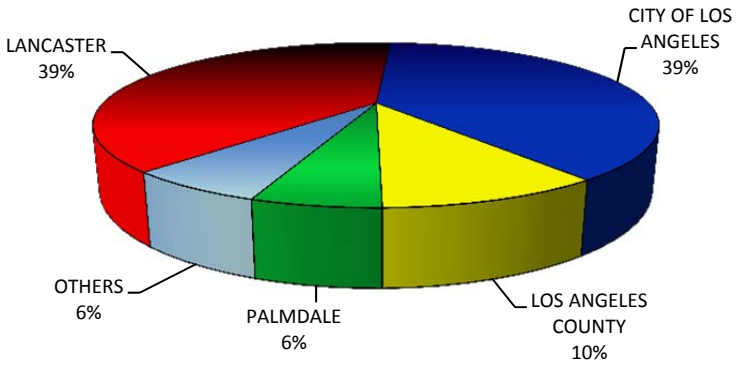


Figure 15: Pebbly Beach Landfill
3,000 tons

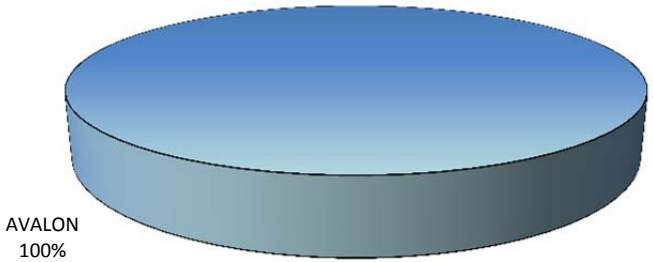


Figure 16: Puente Hills Landfill
2,144,000 tons

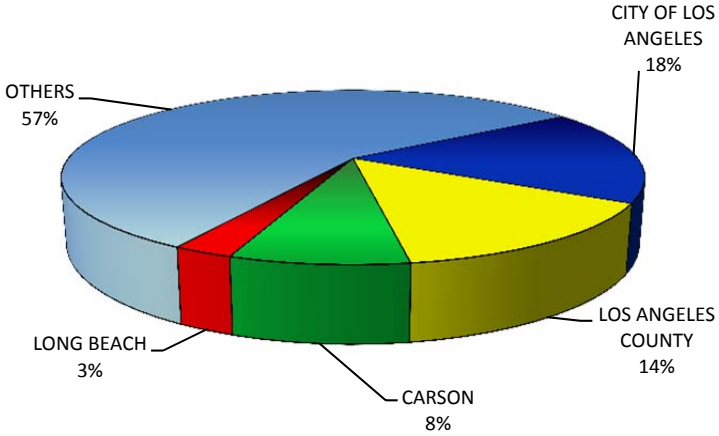


Figure 17: San Clemente Landfill
400 tons

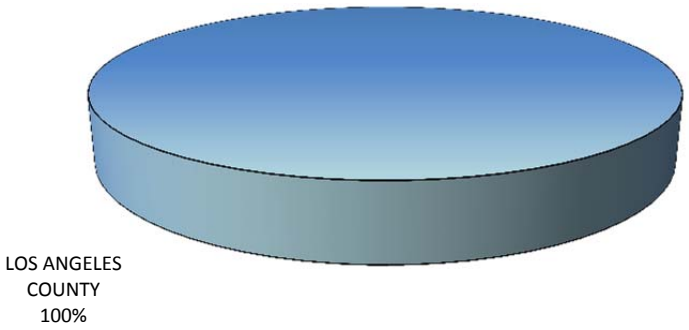


Figure 18: Whittier (Savage Canyon) Landfill
78,000 tons

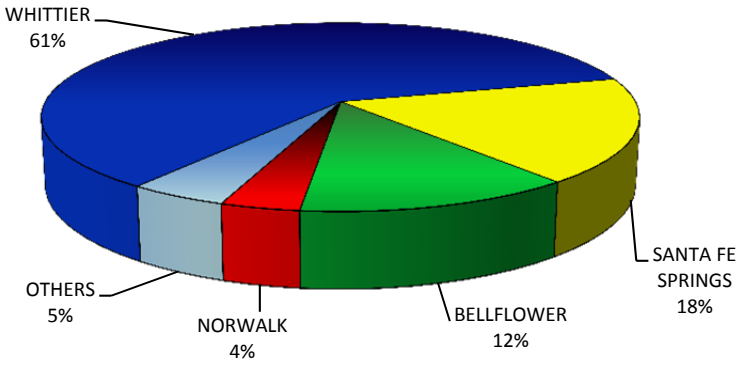


Figure 19: Scholl Canyon Landfill
211,000 tons

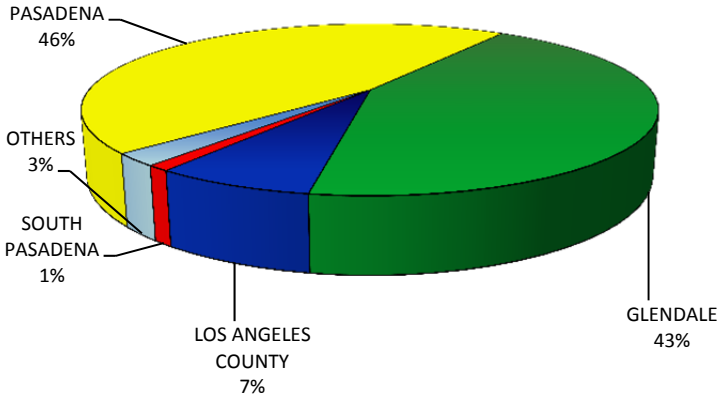


Figure 20: Southeast Resource Recovery Facility
432,000 tons

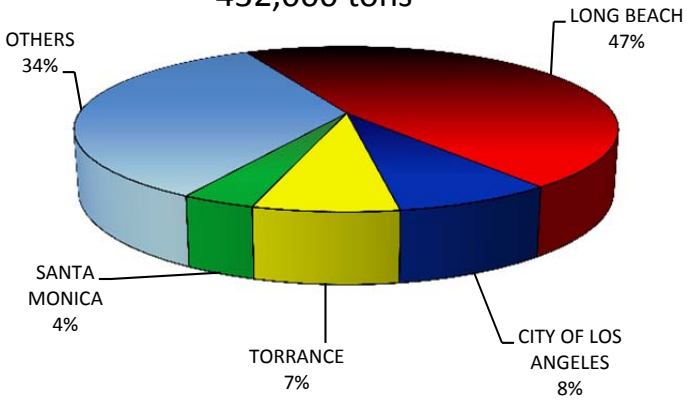
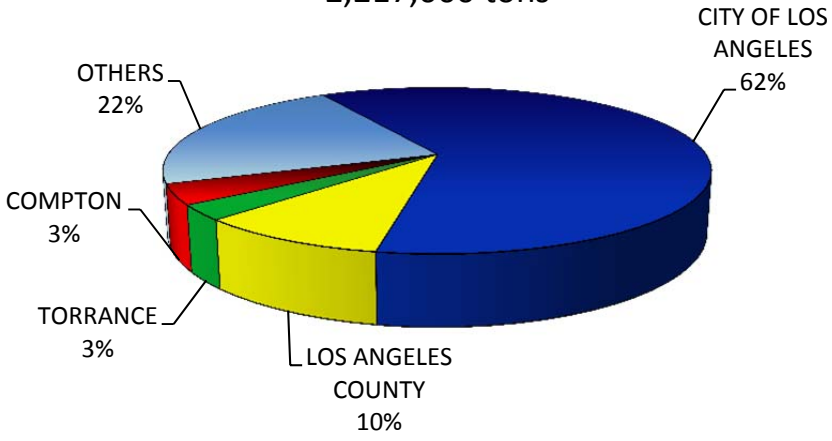


Figure 21: Sunshine Canyon City/County Landfill
2,217,000 tons



Remaining Disposal Capacity at End of 2012

Transformation Facilities

Presently, two transformation facilities operate in the County with a combined average daily tonnage of 2,069 tpd, which is equivalent to 645,600 tpy.

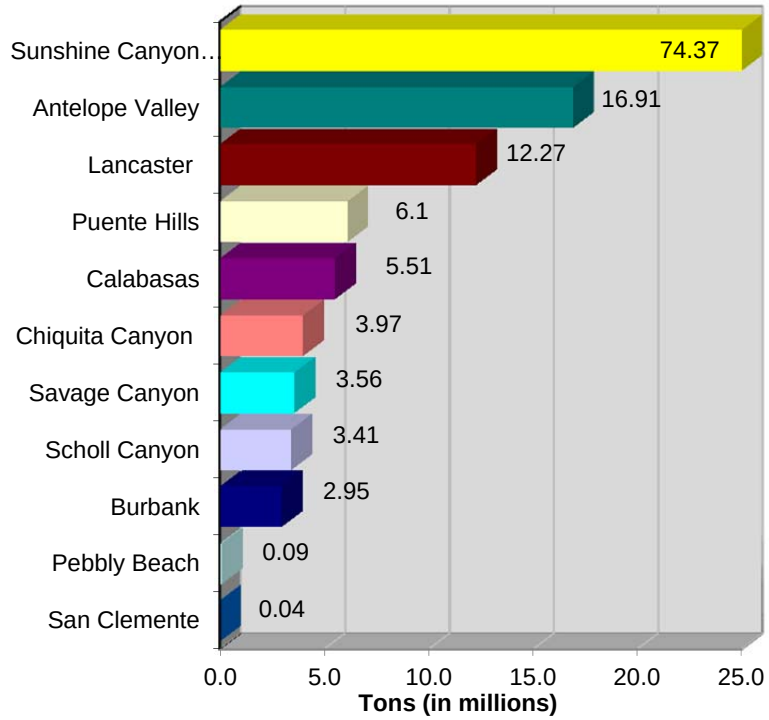
It is expected that these two facilities will continue to operate at their current permitted daily capacity during the planning period of 2012 through 2027. The owners and operators of these facilities indicate that there are no plans to increase the permitted daily capacity.

Class III Landfills

Public Works conducted a survey requesting landfill operators in the County to provide updates to their estimated remaining disposal capacity. Based on the results of the survey and considering permit restrictions, the total remaining permitted Class III landfill capacity in the County is estimated at 129.2 million tons as of December 31, 2012.

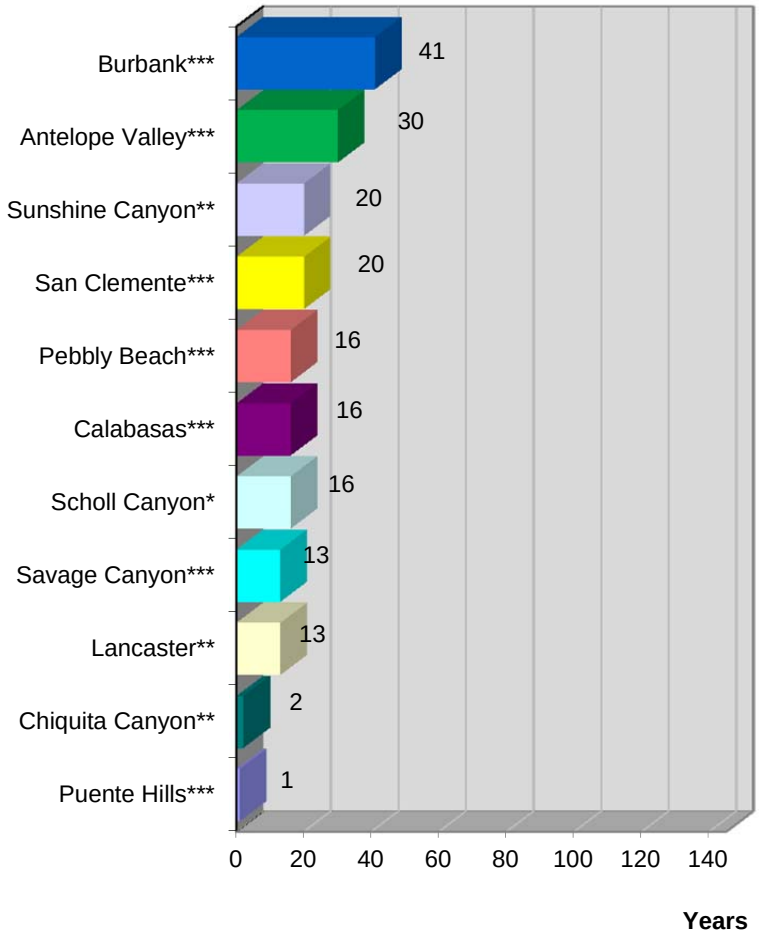
The figure below shows a breakdown of each landfill's remaining capacity in million tons as of December 31, 2012. Refer to **Appendix E-2 Table 1** for detailed data.

Figure 24: Class III Landfill Remaining Capacity



When each landfill's average daily disposal and closure date, if specified in its permits, are accounted for, its lifespan is as shown in the following figure.

Figure 25: Class III Landfill Remaining Life



* Landfill remaining life based on 2012 average daily disposal
** Landfill remaining life based on maximum permitted capacity as of December 31, 2012
*** Landfill remaining life based on land use/solid waste facility permit restrictions as of December 31, 2012.

Permitted Inert Waste Landfill

There is one permitted Inert Waste Landfill that has a full solid waste facility permit (Azusa Land Reclamation) in Los Angeles County in 2012. The remaining capacity of this landfill is estimated at 64.1 million tons or 52.1 million cubic yards. Refer to **Appendix E-2 Table 1** for detailed data. Given the remaining permitted capacity and at the average disposal rate of 286 tpd in 2012, this capacity would be exhausted in 718 years.

Inert Debris Engineered Fill Operations

There are other Inert Waste Landfill operations which are under the State permit tier of Enforcement Agency Notification. These facilities are classified as Inert Debris Engineered Fill Operations (IDEFO). In 2006, CalRecycle reclassified Nu-Way Arrow Reclamation, Inc., Nu-Way Live Oak Reclamation, Inc. and Calmat Reliance Pit #2, and Peck Gravel Road Pit to an IDEFO. These sites and other IDEFOs handled nearly 1.9 million tons or approximately 1.6 million cubic yards of material in the County **(Refer to Appendix E-2 Table 2).**

Transfer and Processing Capacity

There are 44 permitted Large Volume Transfer/Processing and Direct Transfer Facilities, which are permitted to receive 100 tons of waste or more per operating day, and numerous facilities of smaller volume operating in the County. As local waste disposal capacity options diminish in the County, transfer and processing facilities operators are expected to ship waste to out-of-County landfills via truck or rail transport. Refer to **Appendix E-5** for a list of Large Volume Transfer and Processing facilities in the County.

On-going Efforts to Optimize Utilization of Existing Disposal Capacity

Over the last decade, the County has encouraged waste diversion and recycling activities at landfills in the County unincorporated areas through the land use permit process. The process incorporates a Waste Plan Conformance Agreement which requires a landfill operator to implement specified waste diversion and recycling programs as well as other activities on- and off-site to assist jurisdictions in the County in achieving the mandates of AB 939. In addition, the Agreement contains provisions to encourage and assist residents in properly disposing of their wastes. These programs or activities may include:

Conservation of Capacity

- Maximize available fill capacity by improving compaction methods and diverting or reducing high-volume or low-density waste materials;
- Conduct waste characterization studies;

On-Site Reuse

- Utilize waste materials received and processed at the landfill, such as shredded green waste, as a supplement to daily, intermediate, and final cover;
- Use green waste for other beneficial uses, including composting;
- Salvage wood wastes for landscaping and erosion, weed, and fire break control;
- Salvage construction and demolition wastes for road construction, erosion control, and other uses;

Establishment of:

- Materials recovery operations or facilities;
- Used oil collection center;
- Drop-off or buy-back recycling center;

Activities to Encourage Proper Disposal

- Free disposal days;
- Waste tire processing;
- Christmas tree recycling;
- Acceptance of bulky items from residents free of charge;
- As appropriate, providing reduced rates to customers for source-separated materials which can be diverted or otherwise salvaged at the landfill;
- Public education activities;

Provide Funding for:

- Household hazardous and electronic waste collection events; and
- Research and development of alternative technologies;

Active Class III landfills that have a Waste Plan Conformance Agreement with the County include Chiquita Canyon, Lancaster, Puente Hills, and Sunshine Canyon City/County Landfills. Together, these landfills handle over 85 percent of in-County Class III waste. It should be noted that due to the dynamic nature of solid waste management in the County, the provisions of the Waste Plan Conformance Agreement for each landfill are different and tailored to meet the specific needs of the communities serviced by the landfill.

As the economy continues to show signs of improvement, increasing diversion rate, and advancements, such as improving methods in compaction techniques, will impact the remaining capacity of existing landfills not being depleted as quickly as previously projected, and therefore is anticipated to provide longer lifespan.

STRATEGY FOR MAINTAINING ADEQUATE DISPOSAL CAPACITY

This section will discuss how the County plans to maintain adequate solid waste disposal capacity for the next 15 years from 2012 to 2027. The discussion first evaluates whether the existing permitted disposal capacity in the County would be able to accommodate the solid waste generated that cannot be reduced, recycled, or reprocessed. However, as will be shown by the following evaluation, depending on existing infrastructure alone is not sufficient. As a solution, the discussion goes on to present several scenarios utilizing various options to manage the residual solid waste. Note that since the County currently has adequate permitted inert waste landfill capacity as discussed earlier in **Permitted Inert Waste Landfill** (Page 25), inert waste landfills are not included in the discussion.

Definitions

Daily Disposal Demand – The amount of solid waste generated less the amount diverted by means of reuse, recycling, composting, or anaerobic digestion based on a 6-day-per-week operation at permitted solid waste disposal facilities.

Disposal Capacity Reserve – The amount by which the total Daily Available Capacity exceeds Daily Disposal Demand.

Disposal Capacity Shortfall – The amount by which Daily Disposal Demand exceeds the total Daily Available Capacity.

Daily Available Capacity – The amount of waste a permitted to be received at solid waste disposal facilities based on a 6-day-per-week operation in accordance with the terms, conditions, and wasteshed restrictions of the facility's SWFP, land use permit, Waste Discharge Requirements, or any other permit regulating the operation, whichever is more restrictive.

Evaluation of Existing Disposal Infrastructure

Waste Generation Projections

Projections of solid waste generation during the planning period were made using the Adjustment Methodology developed by CalRecycle. The Methodology requires knowledge of the waste distribution by residential and non-residential sectors as well as future population, employment, and real taxable sales.

Population, employment, and real taxable sales projections are available from the State Department of Transportation and UCLA for each year of the planning period. The UCLA Long-Term Forecast, published in July 2012, was utilized since it focuses on the Los Angeles region as compared to the State Department of Transportation, which is Statewide and yields more general projections. Additionally, the UCLA forecast data is updated more frequently. The graph below shows the parameters utilized. The detailed data is also provided in **Appendix E-2 Table 4**.

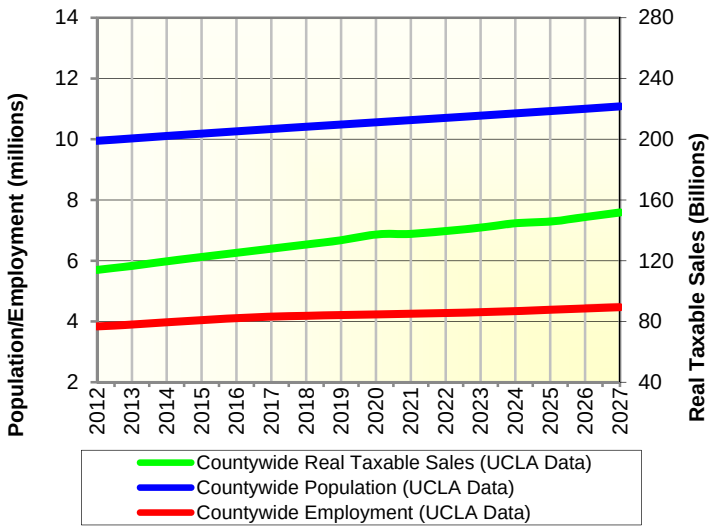


Figure 26: Population, Employment, and Real Taxable Sales

Considering each jurisdiction's SRRE and last approved base generation year as of 2005, the average Countywide distribution by sector is as follows:

Residential Waste Generation = 27 percent of total waste generation

Non-Residential Waste Generation = 73 percent of total waste generation

Daily Disposal Demand Projections

The quantity of Daily Disposal Demand depends on the amount of solid waste that may be diverted. As noted in **Waste Generation** (Page 17), a diversion rate of 60 percent will be assumed for analysis in this report. With this assumption, the amount of residual waste that requires disposal capacity will be 40 percent of the projected waste generation.

Transformation Facility Capacity

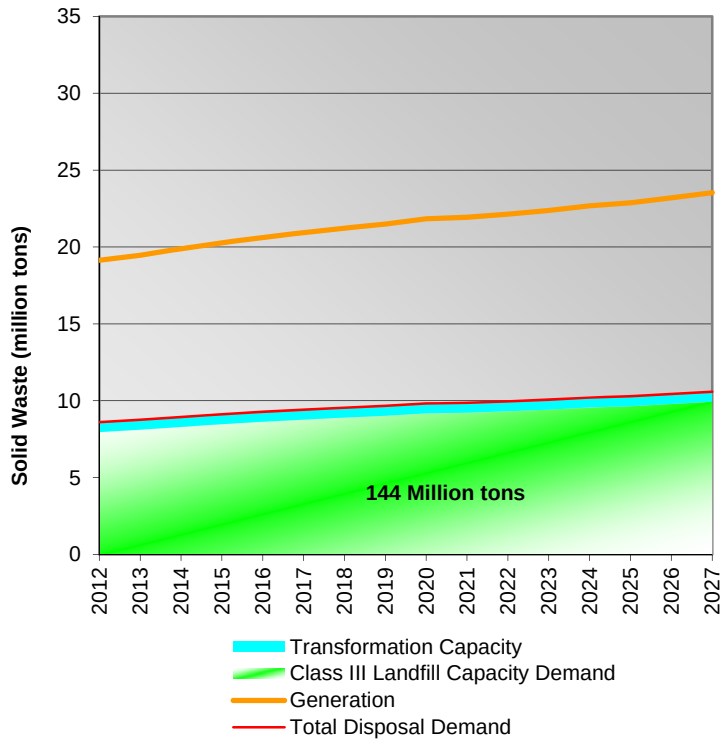
As explained earlier in **Remaining Disposal Capacity at End of 2012** (Page 24), the two transformation facilities in the County are expected to provide up to 2,069 tpd of Daily Available Capacity. The capacity is projected during the planning period.

Class III Landfill Capacity Needed

Assuming no other options are available, such as exporting to out-of-County facilities or development of new alternative technologies, the County's Class III landfill disposal needs are determined after considering the available transformation capacity.

The result of the evaluation is plotted in the graph below. The detailed data is also provided in **Appendix E-2 Table 5**.

Figure 27: Solid Waste Generation and Disposal Trend



The area in green illustrates the amount of Class III landfill capacity needed. By the end of year 2026, the cumulative need for Class III landfill disposal capacity, approximately 134 million tons, will exceed the 2012 remaining permitted Class III landfill capacity of 129 million (Page 24). Refer to **Appendix E-2 Table** 5.. Other constraints that may limit the accessibility of Class III landfill capacity include: wasteshed boundaries, geographic barriers, weather, and natural disasters. In conclusion, further detailed analysis that incorporates capacity options in addition to existing in-County infrastructure as well as permit constraints is necessary to provide a more thorough evaluation.

Scenario Analysis

The scenario analysis utilizes the various capacity options currently available or may become available in the future to assist the County in meeting the Daily Disposal Demand. The analysis will consider the following:

Existing in-County Class III Landfills and Transformation Facilities – The analyses take into account a facility's permitted capacity, termination date, and wasteshed restriction, if any.

Proposed Expansions of In-County Class III Landfills – The analyses assume additional disposal capacity that may be provided by proposed landfill expansions. Detailed discussion is provided in **Proposed Facility Expansions** (Page 14).

Various Levels of Imports and Exports – The analyses consider various levels of imported and exported waste from and to out-of-county jurisdictions. Existing facilities in Orange, Riverside, San Bernardino, and Ventura Counties are currently accepting waste from the County. Future use of Mesquite Regional Landfill in Imperial County is also considered. Refer to **Out-of-County Disposal Facilities** (Page 42) for more detail.

Alternative Technologies – Potential conversion technology facilities or other alternative technologies may be developed in the near future.

Increase in Diversion Rate – Potential increase in diversion rate affected by enhanced diversion programs by jurisdictions within the County.

Given all the various capacity options, the analysis evaluated nine potential scenarios during the 15-year planning period. The table below summarizes the differences between the scenarios.

For all nine scenarios, the projected waste generation and Daily Available Capacity from transformation facilities will remain unchanged from the analysis performed in **Evaluation of Existing Disposal Infrastructure** (Page 28). Given the current diversion rates achieved by jurisdictions in the county, a diversion rate of 60 percent will be applied, except for those scenarios that consider a higher diversion rate. The analysis will examine closely how much Daily Available Capacity from existing Class III landfills is expected to be utilized during each year. No new landfills in the County are expected to be permitted during the planning period. In the case where the Daily Disposal Demand cannot be met, the analysis evaluates when a Disposal Capacity Shortfall is expected to occur. Refer to **Appendix E-4 Disposal Capacity Analysis Scenarios**.

Scenario Comparison Table

Scenario No.	Existing Permitted In-County Class III Landfill Capacity	Current Available Out-of-County Disposal Capacity	Increase in Diversion Rate (up to 65 percent)	Utilization of Alternative Technology Facility Capacity (up to 2,300 tpd)	Proposed Expansions of in-County Class III Landfills	Increase In Available Out-of-County Disposal Capacity	Maximizing Diversion Rate (up to 75 percent)	Increase In Alternative Technology Facility Capacity (up to 3,500 tpd)	Full Utilization of Out-of-County Disposal Capacity
I (Status Quo Scenario)	●	●							
II Increase In Diversion Rate (Up to 65%)	●	●	●						
III Utilization of Alternative Technology Capacity (Up to 2,300 tpd)	●	●	●	●					
IV (In-County Class III Landfills Expansions with out-of-County Disposal Capacity)	●	●	●	●	●				
V (Increase In Available Out-of-County Disposal Capacity)	●	●	●	●	●	●			
VI Maximizing Diversion Rate (Up to 75%, Considering AB 341 goal)	●	●	●	●	●	●	●		
VII Increase In Alternative Technology Capacity (Up to 3,500 tpd)	●	●	●	●	●	●		●	
VIII Full Utilization of Out-of-County Disposal Capacity	●	●	●	●	●	●			●
IX (Best Case Scenario - All Solid Waste Management Options Considered Become Available)	●	●	●	●	●	●	●	●	●

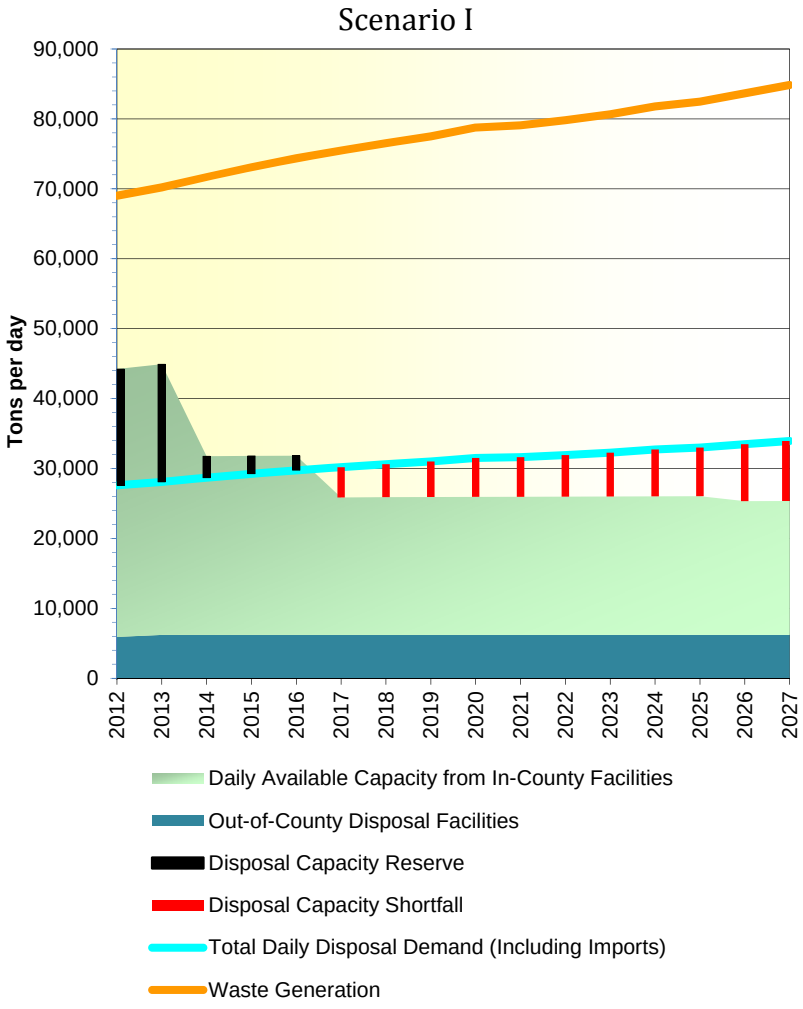
Scenario 1 - (Status Quo)

- Existing In-County Class III Landfills and Transformation Facilities
- Current Available Out-of-County Disposal Capacity

Scenario I considers the use of existing disposal infrastructure and utilizes up to 6,200 tpd of out-of-County landfill capacity. The scenario assumes no expansions of existing landfills, no new landfills, and no additional capacity from alternative technologies.

The following assumptions are made with respect to imports and exports:
Imports – Based on the average rate of 452 tpd for 2012, waste import quantities are projected to be at 500 tpd for 2013 and 700 tpd every year thereafter.
Exports – The amount of waste exported to out-of-County landfills in 2012 was approximately 5,911 tpd and it is assumed to be at 6,200 tpd through the remainder of the planning period.

Based on these assumptions, a Disposal Capacity Shortfall is expected to occur during the planning period. Refer to **Appendix E-4** for detailed data.



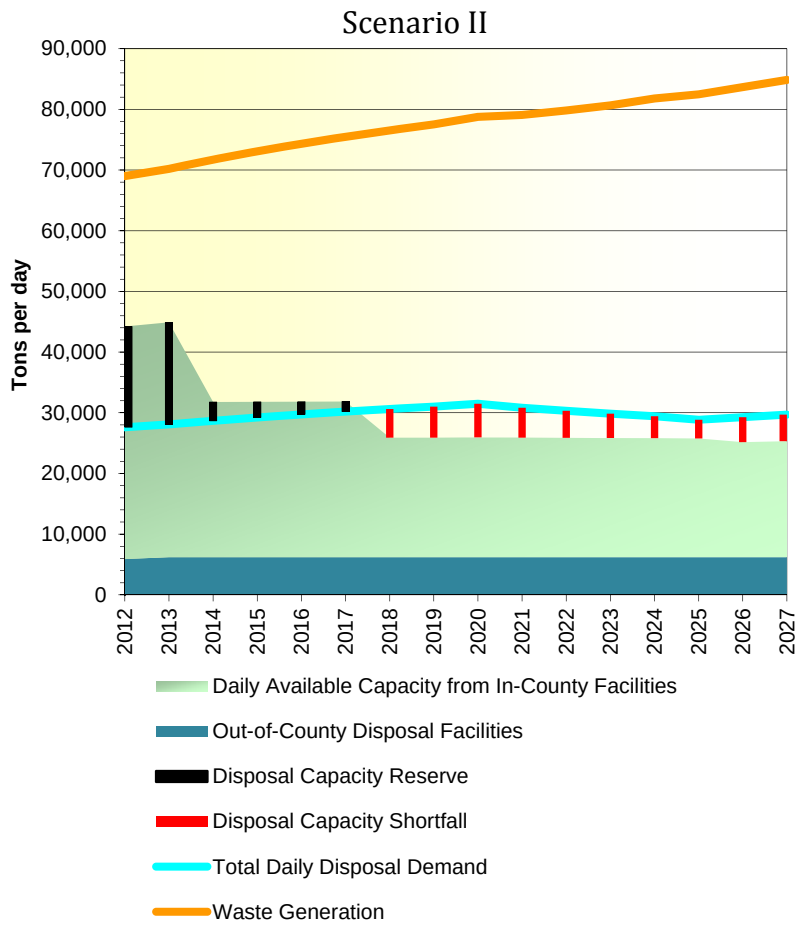
Scenario II - (Increase In Diversion Rate- up to 65%)

- Existing In-County Class III Landfills and Transformation Facilities
- Current Available Out-of-County Disposal Capacity
- Increase in Diversion Rate (up to 65%)

Scenario II assumes that all solid waste disposed would be managed by existing disposal infrastructure and the current available Out-of-County disposal capacity. The scenario also assumes an increase in diversion of up to 65%.

The following assumptions are made with respect to imports and exports:
Imports – Based on the average rate of 452 tpd for 2012, waste import quantities are projected to be 500 tpd for 2013 and 700 tpd every year thereafter.
Exports – The amount of waste exported to out-of-County landfills in 2012 was approximately 5,911 tpd and it is assumed to be at 6,200 tpd through the remainder of the planning period.

Based on these assumptions, a Disposal Capacity Shortfall is expected to occur during the planning period. Refer to **Appendix E-4** for detailed data.



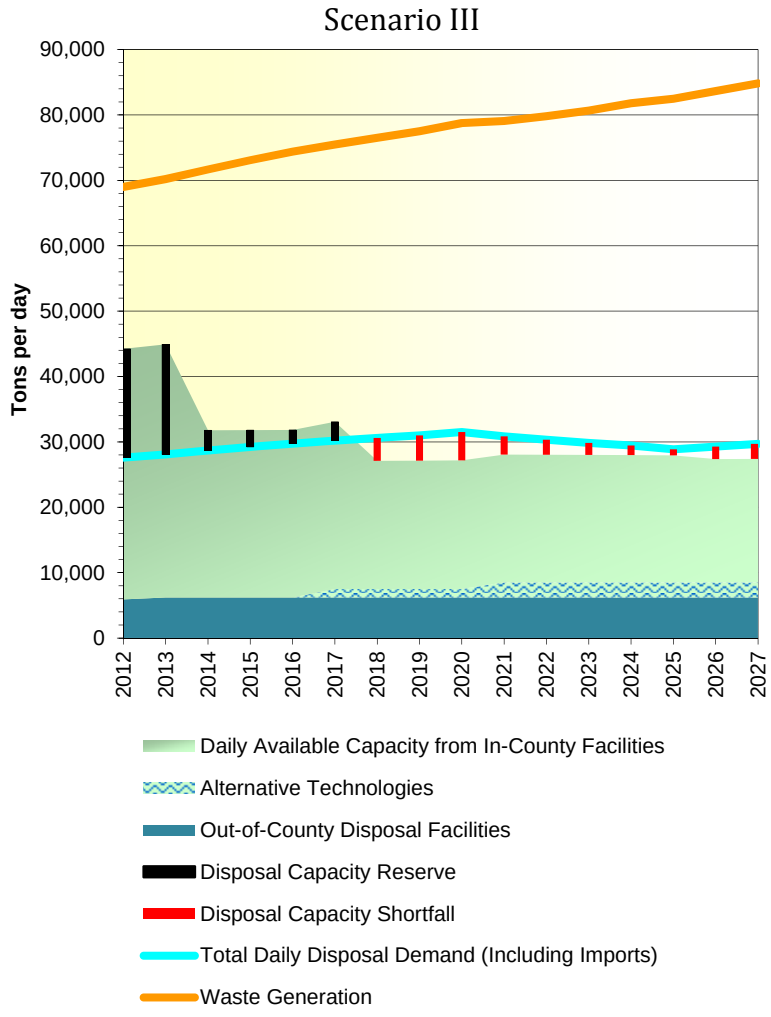
Scenario III - (Utilization of Alternative Technology Capacity- *up to 2,300 tpd)*

- Existing In-County Class III Landfills and Transformation Facilities
- Current Available Out-of-County Disposal Capacity
- Increase in Diversion Rate (up to 65%)
- Utilization of Alternative Technology Capacity (up to 2,300 tpd)

Scenario III assumes that by 2017, alternative technology facilities for residential waste would become operational in the County. The permitted capacity of these facilities is estimated to start at 1,300 tpd in 2017 and increase up to 2,300 tpd in 2021 and throughout the remainder of the planning period.

The following assumptions are made with respect to imports and exports:
Imports – Based on the average rate of 452 tpd for 2012, waste import quantities are projected to be 500 tpd for 2013 and 700 tpd every year thereafter.
Exports – The amount of waste exported to out-of-County landfills in 2012 was approximately 5,911 tpd and it is assumed to be at 6,200 tpd through the remainder of the planning period.

Based on these assumptions, a Disposal Capacity Shortfall is expected to occur during the planning period. Refer to **Appendix E-4** for detailed data.



Scenario IV - (In-County Class III Landfill Expansions with Out-of-County Disposal Capacity)

- Existing In-County Class III Landfills and Transformation Facilities
- Current Available Out-of-County Disposal Capacity
- Increase in Diversion Rate (up to 65%)
- Utilization of Alternative Technology Capacity (up to 2,300 tpd)
- Proposed Expansions of In-County Class III Landfills

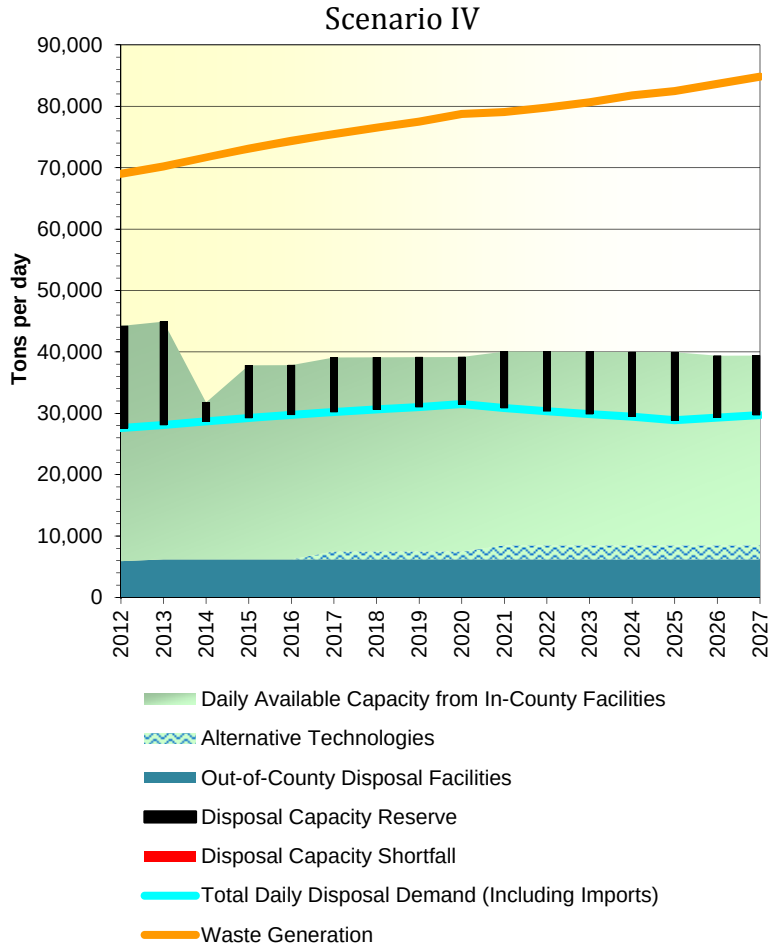
Along with the other assumptions mentioned in Scenario III, Scenario IV assumes the use of additional capacity from proposed expansions of existing in-County disposal infrastructure.

The following assumptions are made with respect to imports and exports:

Imports – Based on the average rate of 452 tpd for 2012, waste import quantities are projected to be 500 tpd for 2013 and 700 tpd every year thereafter.

Exports – The amount of waste exported to out-of-County landfills in 2012 was approximately 5,911 tpd and it is assumed to be at 6,200 tpd through the remainder of the planning period.

Based on these assumptions, a Disposal Capacity Shortfall would not be expected during the 15-year planning period. Refer to **Appendix E-4** for detailed data.



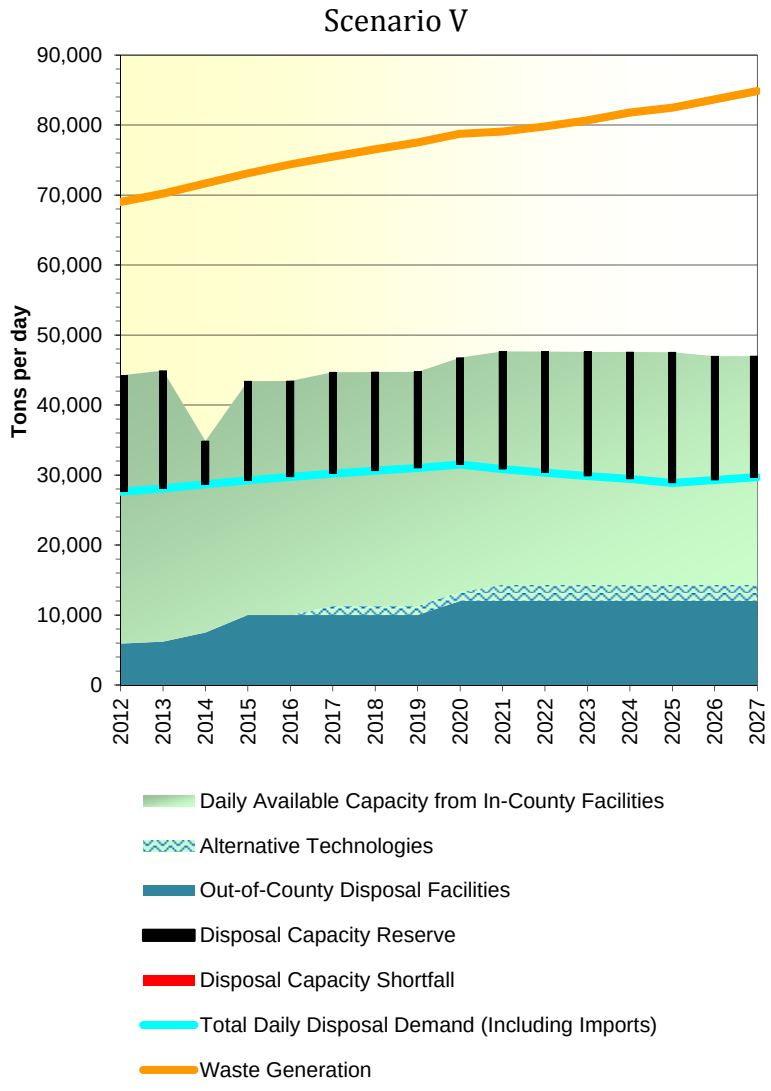
Scenario V - (Increase in Available Out-of-County Disposal Capacity)

- Existing In-County Class III Landfills and Transformation Facilities
- Increase in Available Out-of-County Disposal Capacity (up to 12,000 tpd)
- Increase in Diversion Rate (up to 65%)
- Utilization of Alternative Technology Capacity (up to 2,300 tpd)
- Proposed Expansions of In-County Class III Landfills

Scenario V uses the same assumptions as Scenario IV, with the exception of assuming an increase in available out-of-County disposal capacity of up to 12,000 tpd.

The following assumptions are made with respect to imports and exports:
Imports – Based on the rate of 452 tpd for 2012, waste import quantities are projected at 500 tpd for 2013 and increase to 700 tpd every year thereafter.
Exports – The amount of waste exported to out-of-County landfills in 2012 was approximately 5,911 tpd and will be assumed to increase up to 12,000 tpd during the planning period.

Based on these assumptions, a Disposal Capacity Shortfall would not be expected during the 15-year planning period. Refer to **Appendix E-4** for detailed data.



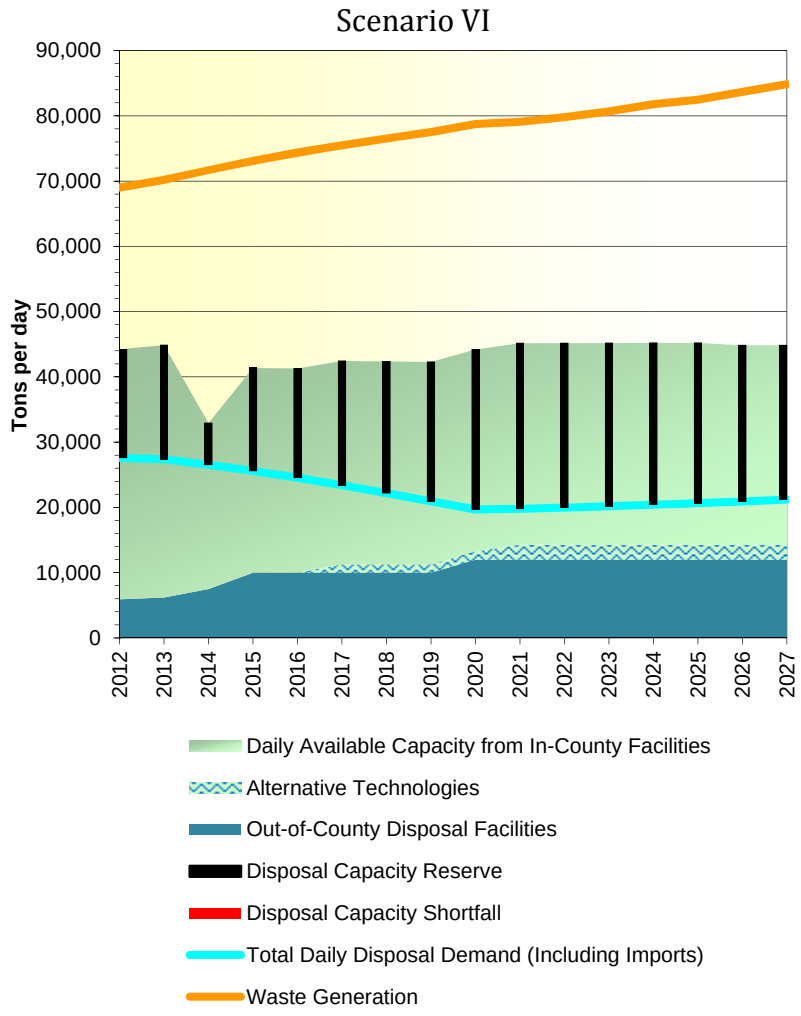
Scenario VI - (Maximizing Diversion Rate- up to 75%, Considering AB 341 Goal)

- Existing In-County Class III Landfills and Transformation Facilities
- Increase in Available Out-of-County Disposal Capacity (up to 12,000 tpd)
- Maximizing Diversion Rate (up to 75%)
- Increase in Alternative Technology Capacity (up to 2,300 tpd)
- Proposed Expansions of In-County Class III Landfills

Scenario VI is similar to Scenario V, with the exception of the diversion rate, which is assumed to increase each year beginning in 2013 until it reaches 75 percent in 2020. It will remain at 75 percent through 2027. This scenario maximizes the diversion rate by complying with the AB 341 goal.

The following assumptions are made with respect to imports and exports:
Imports – Based on the rate of 452 tpd for 2012, waste import quantities are projected at 500 tpd for 2013 and increase to 700 tpd every year thereafter.
Exports – The amount of waste exported to out-of-County landfills in 2012 was approximately 5,911 tpd and will be assumed to increase up to 12,000 tpd during the planning period.

Based on these assumptions, a Disposal Capacity Shortfall would not be expected during the 15-year planning period. Refer to **Appendix E-4** for detailed data.



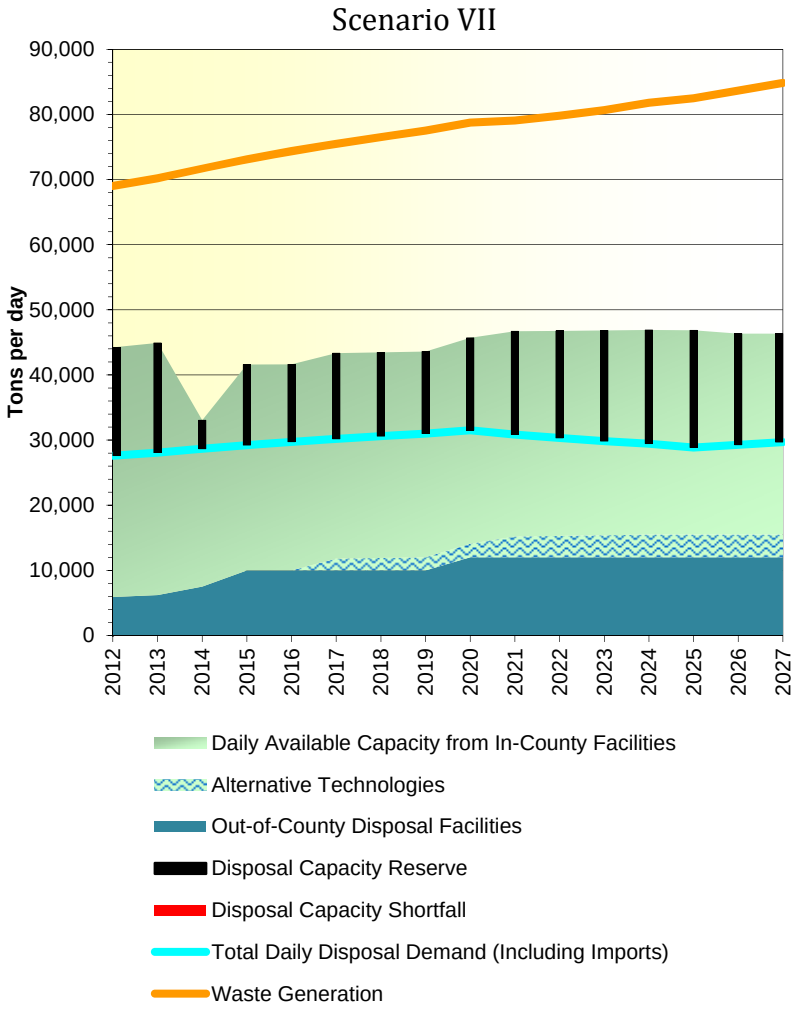
Scenario VII - (Increase in Alternative Technology Capacity- up to 3,500 tpd)

- Existing In-County Class III Landfills and Transformation Facilities
- Increase in Available Out-of-County Disposal Capacity (up to 12,000 tpd)
- Increase in Diversion Rate (up to 65%)
- Increase in Alternative Technology Capacity (up to 3,500 tpd)
- Proposed Expansions of In-County Class III Landfills

Scenario VII is similar to Scenario V, with the exception of the increased alternative technology capacity of up to 3,500 tpd.

The following assumptions are made with respect to imports and exports:
Imports – Based on the rate of 452 tpd for 2012, waste import quantities are projected at 500 tpd for 2013 and increase to 700 tpd every year thereafter.
Exports – The amount of waste exported to out-of-County landfills in 2012 was approximately 5,911 tpd and will be assumed to increase up to 10,000 tpd during the planning period.

Based on these assumptions, a Disposal Capacity Shortfall would not be expected during the 15-year planning period. Refer to **Appendix E-4** for detailed data.



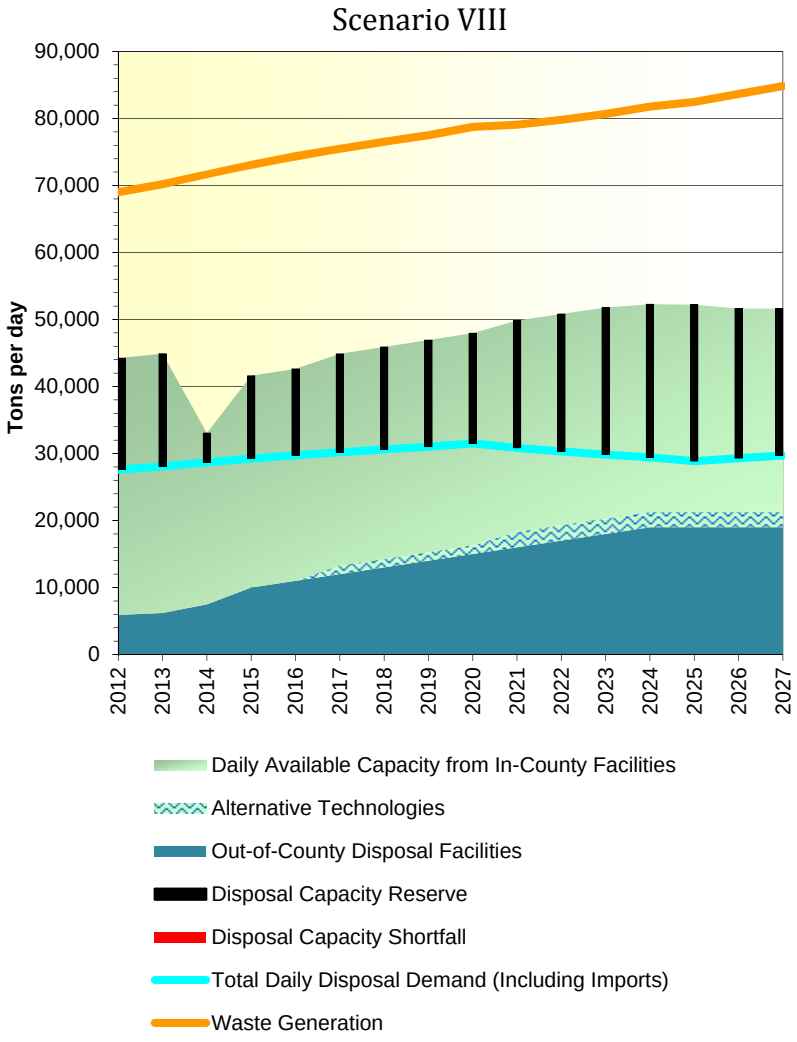
Scenario VIII - (Full Utilization of Available Out-of-County Disposal Capacity)

- Existing In-County Class III Landfills and Transformation Facilities
- Full Utilization of Available Out-of-County Disposal Capacity (up to 19,000 tpd)
- Increase in Diversion Rate (up to 65%)
- Utilization of Alternative Technology Capacity (up to 2,300 tpd)
- Proposed Expansions of In-County Class III Landfills

Scenario VIII is similar to Scenario V, with the exception of the full utilization of available out-of-County disposal capacity of up to 19,000 tpd.

The following assumptions are made with respect to imports and exports:
Imports – Based on the rate of 452 tpd for 2012, waste import quantities are projected at 500 tpd for 2013 and increase to 700 tpd every year thereafter.
Exports – The amount of waste exported to out-of-County landfills in 2012 was approximately 5,911 tpd and will be assumed to gradually increase up to 19,000 tpd during the planning period.

Based on these assumptions, a Disposal Capacity Shortfall would not be expected during the 15-year planning period. Refer to **Appendix E-4** for detailed data.



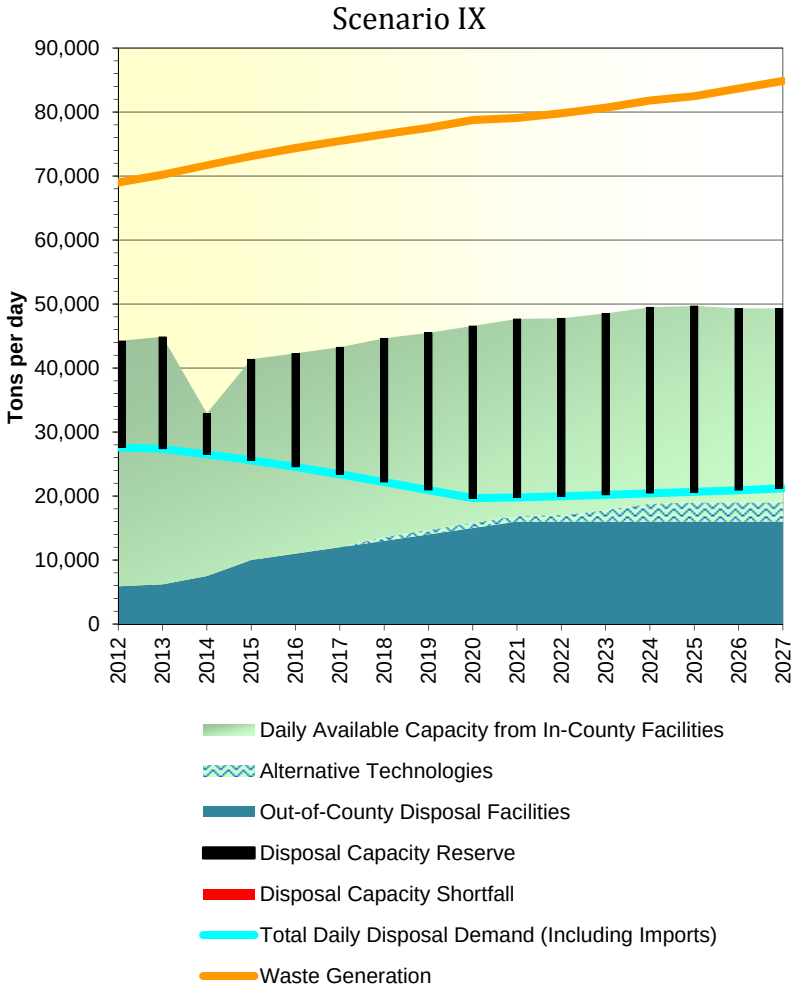
Scenario IX - (Best Case)

- Existing In-County Class III Landfills and Transformation Facilities
- Utilization of Out-of-County Disposal Capacity (up to 16,000 tpd)
- Maximizing Diversion Rate (up to 75%)
- Increase in Alternative Technology Capacity (up to 3,000 tpd)
- Proposed Expansions of In-County Class III Landfills

Scenario IX includes all solid waste management options mentioned in all of the previous scenarios.

The following assumptions are made with respect to imports and exports:
Imports – Based on the rate of 452 tpd for 2012, waste import quantities are projected at 500 tpd for 2013 and increase to 700 tpd every year thereafter.
Exports – The amount of waste exported to out-of-County landfills in 2012 was approximately 5,911 tpd and will be assumed to gradually increase up to 16,000 tpd during the planning period.

Based on these assumptions, a Disposal Capacity Shortfall would not be expected during the 15-year planning period. Refer to **Appendix E-4** for detailed data.



Out-of-County Disposal Facilities

The scenario analysis considers the availability or potential availability of these out-of County disposal facilities:

El Sobrante Landfill, Riverside County – It has a remaining capacity of 179 million tons and an expected design lifespan of about 33 years as of January 1, 2012. It is permitted to receive 16,054 tpd of waste for disposal. In 2012, the landfill received an average of 6,179 tpd, of which 2,640 tpd were imported from Los Angeles County. It is assumed that the landfill could receive up to 4,000 tpd from Los Angeles County during the planning period.

Frank R. Bowerman Sanitary Landfill, Olinda Alpha Sanitary Landfill, and Prima Deshecha Sanitary Landfill, Orange County –Orange County currently has waste importation agreements with various entities in Los Angeles County. It is assumed that these landfills could collectively receive up to 4,500 tpd from Los Angeles County through 2015. In 2012, Frank R Bowerman Sanitary Landfill, Olinda Alpha Sanitary Landfill, and Prima Deshecha Sanitary Lanfill received 158 tpd, 1,878 tpd, and 60 tpd from Los Angeles County, respectively.

Simi Valley Landfill & Recycling Center, Ventura County – The Landfill is permitted to receive a maximum of 6,000 tpd, of which 766 tpd came from Los Angeles County in 2012. It is assumed that the landfill could receive up to 3,000 tpd from Los Angeles County during the planning period.

Mesquite Regional Landfill, Imperial County – The Sanitation Districts acquired the landfill in 2002 and completed construction of all infrastructures on December 24, 2008. The landfill is permitted to accept up to 20,000 tpd with a total disposal capacity of 582 million tons, which is equivalent to a lifespan of nearly 100 years. It is assumed that the Landfill could receive up to 12,000 tpd from Los Angeles County during the planning period.

Eagle Mountain Landfill, Riverside County - Eagle Mountain Landfill, owned by Mine Reclamation Corporation, is located in Riverside County. It is permitted to accept 10,000 tpd for the first 10 years, with the option of increasing the daily limit to 20,000 tpd after a review of environmental performance. Its permitted capacity of 460 million tons and total capacity of 708 million tons would provide an approximate lifespan of 100 years. Due in part to a Federal litigation and bankruptcy filing by the landfill developer, on May 22, 2013, the Sanitation Districts took action to cease negotiations forEagle Mountain Landfill.

These out-of-County landfills could potentially handle up to approximately 21,350 tpd of waste from Los Angeles County. Refer to **Appendix E-2 Table 3** for more detailed data.

Conclusion

The scenario analysis discussed earlier assessed the County's ability to meet the Daily Disposal Demand under 9 scenarios.

Under *Scenario I Status Quo*, without expanding existing landfills in the County, available disposal capacity would be inadequate to meet the Daily Disposal Demand of all 88 cities and the unincorporated County areas.

Scenario II: Increase In Diversion Rate of up to 65% by 2027 shows that available disposal capacity would still be inadequate to meet the Daily Disposal Demand. Considering existing in-County landfill disposal capacity and utilization of up to 6,200 tpd of out-of-County disposal capacity, *Scenario III: Utilization of Alternative Technology Up to 2,300 tpd by 2027* shows a shortfall would still be experienced beginning 2018. This demonstrates that jurisdictions in Los Angeles County would need to pursue additional strategies to meet the needs of residents and businesses through the 15-year planning period.

Scenario IV: In-County Class III Landfill Expansions with Out-of-County Disposal Capacity assesses the effects of expanding existing Class III in-County landfills with the current available out-of-County disposal capacity. Based on this assumption, a disposal shortfall would not occur during the planning period. Scenarios V through IX assess the effects of a multi-pronged strategies, including maximizing the Countywide diversion rate up to 75 percent by 2027, consistent with the State's recycling goal; increasing alternative technology capacity up to 3,500 tpd by 2027; and the full utilization of out-of-County disposal capacity of up to 19,000 tpd by 2027.

Through various combinations of these options, Scenarios IV through IX demonstrate that the jurisdictions in Los Angeles County would be able to meet the disposal needs through the 15-year planning period. In conclusion, in order to avert a disposal shortfall, jurisdictions in Los Angeles County must continue to pursue all of the following strategies:

- **Expand Existing Landfills** – Expanded landfill capacity is necessary, provided it can be done in a technically feasible and environmentally safe manner.

- **Study, Promote, and Develop Conversion Technologies** – Development of commercial-scale state-of-the-art conversion technologies, as an alternative to landfilling, appears within reach. Jurisdictions must invest and actively participate in the research, promotion, and development of alternative technology facilities. Actions that may be taken by jurisdictions include:
    - Supporting legislation that places these facilities higher than landfilling in the waste management hierarchy.
    - Entering into waste commitment agreements.
    - Establishing partnerships with facilities and technology vendors.

- **Expand Transfer and Processing Infrastructure** – Development of additional in-County solid waste management infrastructure, such as transfer/processing,

composting, and anaerobic digestion facilities, to assist jurisdictions in achieving higher levels of diversion and to facilitate transport to out-of-County landfills.

- **Develop a Waste-by-Rail System** – Currently, nearly all solid waste in Los Angeles County is transported to disposal sites in the metropolitan area by truck. However, as public opposition to siting new or expanding existing disposal facilities near urban areas has grown, sites farther from the Los Angeles Basin have become more desirable, despite the costs associated with longer transport distances. For some sites, such as the Mesquite Regional Landfill in Imperial County which is 210 miles from downtown Los Angeles, rail transport is an efficient means to transport solid waste to remote disposal sites. Transitioning to remote disposal of solid waste that involves rail transport requires new infrastructure and continues to be developed by the Sanitation Districts. The Waste-by-Rail system will provide long-term disposal capacity to replace local landfills as they reach capacity and close. The starting point of the Waste-by-Rail System is the Puente Hills Intermodal Facility (PHIMF), located near the Puente Hills Materials Recovery Facility. Residual waste from materials recovery facilities and transfer stations located throughout the County will be loaded unto rail carts at the PHIMF, and then transported via rail to the Mesquite Regional Landfill for disposal.

- **Maximize Waste Reduction and Recycling** – A steady increase in the Countywide diversion rate could significantly reduce the Daily Disposal Demand, extend landfill life, and assure that Los Angeles County will be able to meet the disposal needs of its residents and businesses.

All jurisdictions are strongly encouraged to continue to expand and enhance programs to maximize Diversion.

It should be noted that future conditions considered in this report are projections, and may change based on factors such as decisions made by the 89 jurisdictions or their waste management service providers and other conditions such as changes in regulatory requirements, disposal rates, fuel costs, and traffic congestion.

Nevertheless, the preceding scenario analysis provides a useful tool to assess the ability of jurisdictions in Los Angeles County to meet the disposal needs of their residents and businesses under various conditions. Given that solid waste disposal is an essential public service, it must be provided without interruption in order to protect public health and safety as well as the environment. Accordingly, major concerted actions must continue to be taken by jurisdictions towards expanding and enhancing waste reduction and recycling programs, and implementing prudent solid waste management strategies.

JURISDICTION/REGIONAL AGENCY CONTACT

Primary Contact

PAT PROANO
Assistant Deputy Director
Environmental Programs Division

Phone: (626) 458-3500
Fax: (626) 458-3569
E-Mail: pproano@dpw.lacounty.gov

Mailing Address

County of Los Angeles Department of Public Works
Environmental Programs Division
P.O. Box 1460
Alhambra, CA 91802-1460

Secondary Contact

BAHMAN HAJIALIAKBAR
Assistant Division Engineer
Environmental Programs Division

Phone: (626) 458-3502
Fax: (626) 458-3569
E-Mail: bhaji@dpw.lacounty.gov

CARLOS RUIZ
Assistant Division Engineer
Environmental Programs Division

Phone: (626) 458-3501
Fax: (626) 458-3569
E-Mail: caruiz@dpw.lacounty.gov

Appendix E-1 Solid Waste Facility Fact Sheets

Antelope Valley Recycling & Disposal Facility

1. FACILITY INFORMATION

Owner: Waste Management of California, Inc.
Operator: Waste Management of California, Inc.

Address: 1200 West City Ranch Road, Palmdale 93551
Operating Days: Monday-Saturday
SWFP No: 19-AA-5624
SWFP Issue Date: 11/16/2011
Last 5-year Review Date: 09/28/2011
5-year Review Due Date: 11/16/2016

2. REMAINING PERMITTED CAPACITY (as of December 31, 2012)

Remaining Permitted Capacity:	16,913,937 tons	19,952,356 cubic yards
Estimated Remaining Life:	30 years (based on the current SWFP estimated closure date)	
In-Place Density:	0.76 tons/cubic yard	

3. MAXIMUM PERMITTED DAILY CAPACITY

Daily:	1,800 tons	[2,368 cubic yards]
Yearly Equivalent:	[561,600 tons]	[738,947 cubic yards]

4. 2012 AVERAGE WASTE QUANTITIES DISPOSED

Daily:	832 tons	[1,095 cubic yards]

5. LAND USE/CONDITIONAL USE PERMIT

Permit No.: 98-12 **Effective:** 06/09/2011 **Expiration:** Completion of Project

6. WASTE DISCHARGE REQUIREMENTS

Order No.: 6-95-119A2 **Effective:** 10/10/2001

7. FOC GRANT DATE – 11/17/2011

8. PERMITTED WASTE TYPES - Solid waste

9. FUTURE LAND USE - No plans at this time

10. RESTRICTIONS - There is no wasteshed or restriction on origin of waste.

11. REMARKS/STATUS - The City of Palmdale approved the expansion of Antelope Valley Landfill, which consolidates Unit 1 and Unit 2, on June 9, 2011

Note: Calculated or assumed quantities are shown in brackets.

Azusa Land Reclamation Landfill

1. FACILITY INFORMATION

Owner: USA Waste of California, Inc.

Operator: USA Waste of California, Inc.

Address: 1211 West Gladstone Street, Azusa, CA 91702
SWFP No: 19-AA-0013
Last 5-year Review Date: 03/10/2011

Operating Days: Monday-Saturday
SWFP Issue Date: 12/08/1989
5-year Review Due Date: 03/10/2016

2. REMAINING PERMITTED CAPACITY (as of December 31, 2012)

Remaining Permitted Capacity:	64, 125,859 tons	52,134,844 cubic yards
Estimated Remaining Life:	718 years (based on average daily disposal of 286 tpd, 312 days per year)	
In-Place Density: `	1.23tons/cubic yard	

3. MAXIMUM PERMITTED DAILY CAPACITY

Daily:	6,500 tons	[5,285 cubic yards]
Yearly Equivalent:	[2,028,000 tons]	[1,648,780 cubic yards]

4. 2012 AVERAGE WASTE QUANTITIES DISPOSED

Daily:	[286] tons	[232 cubic yards]

5. LAND USE/CONDITIONAL USE PERMIT

Permit No.: Owner Participation Agreement No.1 (incorporated CUP No. C-151 of 4/9/75)
Effective: 01/27/1984

6. WASTE DISCHARGE REQUIREMENTS

Order No.: R4-2009-0098 Effective: 09/03/2009

7. FOC GRANT DATE – 05/16/1996

8. PERMITTED WASTE TYPES – Inert Solid waste

9. FUTURE LAND USE - Open space

10. RESTRICTIONS - 6,500 tpd per SWFP. Only accepts inert solid waste.

11. REMARKS/STATUS - By Court Order, on October 2, 1996, the California Regional Water Quality Control Board-Los Angeles region ordered the Azusa Land Reclamation Landfill to stop accepting Municipal Solid Waste. Permitted daily capacity of 6,500 tpd consists of 6,000 tpd of refuse and 500 tpd of inert waste. Facility currently accepts inert waste only.

Note: Calculated or assumed quantities are shown in brackets.

Burbank Landfill

1. FACILITY INFORMATION

Owner: City of Burbank **Operator:** City of Burbank

Address: 3000 Bel Aire Drive, Burbank, CA 91504 **Operating Days:** Monday-Friday
SWFP No.: 19-AA-0040 **SWFP Issue Date:** 06/03/1997
Last 5-year Review Date: 07/11/2011 **5-year Review Due Date:** 07/11/2016

2. REMAINING PERMITTED CAPACITY (as of December 31, 2012)

Remaining Permitted Capacity: [2,950,200 tons] 5,364,000 cubic yards
Estimated Remaining Life: 41 years (based on the current SWFP estimated closure date)
In-Place Density: 0.55 tons/cubic yard

3. MAXIMUM PERMITTED DAILY CAPACITY

Daily: 240 tons [436 cubic yards]

Yearly Equivalent: [62,400] [113,455 cubic yards]

4. 2012 AVERAGE WASTE QUANTITIES DISPOSED

Daily: 128 tons [233 cubic yards]

5. LAND USE/CONDITIONAL USE PERMIT

Permit No.: 2000-16 Effective: 11/13/2000

6. WASTE DISCHARGE REQUIREMENTS

Order No.: R4-2011-0052 Effective 03/03/2011

7. FOC GRANT DATE – 12/18/1986

8. PERMITTED WASTE TYPES - Solid waste

9. FUTURE LAND USE - Irrigated open space.

10. RESTRICTIONS - Origin of waste limited to the City of Burbank and is not open to the public.

11. REMARKS/STATUS - Limited to the City of Burbank use only.

Note: Calculated or assumed quantities are shown in brackets.

Calabasas Landfill

1. FACILITY INFORMATION

Owner: County of Los Angeles

Operator: County Sanitation District 2 of Los Angeles County

Address: 5300 Lost Hills Road, Agoura, CA 91301
(Los Angeles County unincorporated area)

Operating Days: Monday-Saturday

SWFP No.: 19-AA-0056

SWFP Issue Date: 08/05/2002

Last 5-year Review Date: 08/11/2009

5-year Review Due Date: 08/11/2014

2. REMAINING PERMITTED CAPACITY (as of December 31, 2012)

Remaining Permitted Capacity:	5,514,921 tons	12,337,631 cubic yards
Estimated Remaining Life:	16 years (based on the current SWFP estimated closure date)	
In-Place Density:	0.447 tons/cubic yard	

3. MAXIMUM PERMITTED DAILY CAPACITY

Daily:	3,500 tons	[7,830 cubic yards]
Yearly Equivalent:	[1,092,000 tons]	[2,442,953 cubic yards]

4. 2012AVERAGE WASTE QUANTITIES DISPOSED

Daily:	604 tons	[1,351 cubic yards]

5. LAND USE/CONDITIONAL USE PERMIT

Permit No.: 5022-(5) **Effective:** 08/08/1972

6. WASTE DISCHARGE REQUIREMENTS

Order No.: 93-062 **Effective:** 09/27/1993
Order No.: R4-2006-0007 **Effective:** 01/19/2006
Order No.: R4-2009-0088 **Effective:** 07/16/2009
Order No.: R4-2011-0052 **Effective:** 03/03/2011

7. FOC GRANT DATE – None

8. PERMITTED WASTE TYPES - Solid waste

9. FUTURE LAND USE - Open space

10. RESTRICTIONS - Origin of waste is limited to that generated in the Calabasas Wasteshed as defined by Los Angeles County Ordinance No. 91-0003.

11. REMARKS/STATUS - Limited to the Calabasas Wasteshed as defined by Los Angeles County Ordinance No. 91-0003.

Note: Calculated or assumed quantities are shown in brackets.

Chiquita Canyon Landfill

1. FACILITY INFORMATION

Owner: Chiquita Canyon, LLC, a subsidiary of Waste Connections, Inc.

Operator: Waste Connections Inc.

Address: 29201 Henry Mayo Drive, Valencia 91355 (Los Angeles County unincorporated area)

Operating Days: Monday-Saturday

SWFP No.: 19-AA-0052

SWFP Issue Date: 07/07/2008

Last 5-year Review Date: 12/01/2006

5-year Review Due Date: 12/01/2011

2. REMAINING PERMITTED CAPACITY (as of December 31, 2012)

Remaining Permitted Capacity:	[3,972,886 tons]	[6,019,524 cubic yards]
Estimated Remaining Life:	2 years (based on maximum permitted rate of disposal of 6,000 tpd)	
In-Place Density:	0.66 tons/cubic yard	

3. MAXIMUM PERMITTED DAILY CAPACITY

Daily:	6,000 tons	[9,091 cubic yards]
Yearly Equivalent:	[1,560,000 tons]	[2,836,364 cubic yards]

4. 2012 AVERAGE WASTE QUANTITIES DISPOSED

Daily:	2,970 tons	[4,500 cubic yards]

5. LAND USE/CONDITIONAL USE PERMIT

Permit No.: 89-081(5) **Effective:** 05/20/1997 **Expiration:** 11/24/2019 or upon completion of approved filled design, whichever is sooner.

6. WASTE DISCHARGE REQUIREMENTS

Order No.: 93-062	**Effective:** 09/27/1993
Order No.: 98-086	**Effective:** 11/02/1998
Order No.: R4-2006-0007	**Effective:** 01/19/2006
Order No.: R4-2011-0052	**Effective:** 03/03/2011

7. FOC GRANT DATE - 02/19/1998

8. PERMITTED WASTE TYPES - Solid waste

9. FUTURE LAND USE - Open space

10. RESTRICTIONS - Landfill cannot accept biosolids (water and wastewater sludge). There is no wasteshed restriction on origin of waste.

11. REMARKS/STATUS - On December 5, 2008, Republic Services, Inc. merged with Allied Waste Industries, Inc. Due to the merger, Republic Services must divest Chiquita Canyon Landfill. On February 6, 2009, Republic Services and Waste Connections signed a definitive agreement providing for the sale of the Chiquita Canyon Landfill to Waste Connections, Inc. LUP limits waste disposal to 30,000 tons per week.

Note: Calculated or assumed quantities are shown in brackets.

Proposed Expansion

Chiquita Canyon Landfill Expansion

1. **FACILITY TYPE -** Class III landfill

2. **OWNER/OPERATOR –** Chiquita Canyon, LLC, a subsidiary of Waste Connections, Inc.

3. **LOCATION -** 29201 Henry Mayo Drive, Valencia 91355 (Los Angeles County Unincorporated Area)

4. **SIZE**

Increase in Proposed Disposal Area:	143 acres	(Total 400 acres)
Increase in Total Acreage of Site:	0 acres	(Total 639 acres)
Increase in Vertical Elevation:	143 feet	

5. **PROPOSED VOLUMETRIC CAPACITY**

Daily:	12,000 tons	[20,000 cubic yards]
Weekly:	60,000 tons	[100,000 tons]
Yearly Equivalent:	[3,120,000 tons]	[5,200,000 cubic yards]
Additional Facility Capacity:	[53,312,400tons]	88,854,000 cubic yards
In-Place Density:	0.6 tons/cubic yard	

6. **LAND USE/CONDITIONAL USE PERMIT** – **Effective**: 05/09/1997 **Expiration**: 11/24/2019.

7. **LIFE EXPECTANCY –** An additional of 26 years based on 2011 average daily disposal of 4,264 tpd or 9 years based on the maximum permitted rate of disposal of 12,000 tpd.

8. **EXPANSION OPTIONS -** Proposed horizontal and vertical expansion of disposal area. The final elevation of the site increases from 1430' to 1573'.

9. **POST-CLOSURE USES -** Open space

10. On December 5, 2008, Republic Services, Inc. merged with Allied Waste Industries, Inc, and was required to divest Chiquita Canyon Landfill. On February 6, 2009, Republic Services and Waste Connections signed an agreement providing for the sale of the Chiquita Canyon Landfill to Waste Connections, Inc. Subsequently, Waste Connections, Inc. applied for a new CUP to increase the daily disposal capacity to 12,000 tpd. The County of Los Angeles Department of Regional Planning prepared a Notice of Preparation and circulated it for public comments from November 28, 2011 to February 13, 2012. On June 5, 2013, the County of Los Angeles Department of Regional Planning initiated the CEQA process on behalf of Waste Connections, Inc. for the landfill expansion and circulated the Draft Environmental Impact Report for County agencies' reviews and comments from June 5, 2013 to August 5, 2013.

Note: Calculated or assumed quantities are shown in brackets.

Commerce Refuse-to-Energy Facility (CREF)

1. **FACILITY INFORMATION**

Owner: Commerce Refuse-to-Energy Authority (City of Commerce and County Sanitation District No. 2 of Los Angeles County)

Operator: County Sanitation District No. 2 of Los Angeles County

Address: 5926 Sheila Street, Commerce, CA 90040
SWFP No.: 19-AA-0506
Last 5-year Review Date: 08/15/2007

Operating Days: Monday-Sunday
SWFP Issue Date: 07/09/1997
5-year Review Due Date: 08/15/2012

2. **MAXIMUM PERMITTED DAILY CAPACITY**

Daily: 1,000 tons (SWFP Requirement)
Weekly: 2,800 tons (SWFP Requirement)

3. **2012 AVERAGE WASTE QUANTITIES**

Daily Received: 363 tpd **Daily Processed:** 360 tpd

4. **LAND USE/CONDITIONAL USE PERMIT** – Not Applicable

5. **WASTE DISCHARGE REQUIREMENTS** - Not Applicable

6. **PERMITTED WASTE TYPES -** Solid waste

7. **FOC GRANT DATE –** 10/20/1983

8. **FUTURE LAND USE** - Not applicable

9. **RESTRICTIONS -** Facility requires high energy content waste. The City of Commerce Planning Commission made a written determination that the facility is consistent with the City's Plan, and the adjacent zoning and surrounding land use is compatible with its operation.

Lancaster Landfill and Recycling Center

1. FACILITY INFORMATION

Owner: Waste Management of California, Inc.

Operator: Waste Management of California, Inc.

Address: 600 East Avenue "F", Lancaster 93535
(Los Angeles County Unincorporated Area)

Operating Days: Monday-Saturday

SWFP No.: 19-AA-0050

SWFP Issue Date: 02/19/2013

Last 5-year Review Date: 08/18/2011

5-year Review Due Date: 02/19/2018

2. REMAINING PERMITTED CAPACITY (as of December 31, 2012)

Remaining Permitted Capacity:	12,273,633 tons	14,490,712 cubic yards
Estimated Remaining Life:	13 years (based on maximum permitted rate of disposal of 3,000 tpd)	
In-Place Density:	0.80 tons/cubic yard	

3. MAXIMUM PERMITTED DAILY CAPACITY

Daily:	3,000 tons	[3,750 cubic yards]
Yearly Equivalent:	[936,000 tons]	[1,170,000 cubic yards]

4. 2012 AVERAGE WASTE QUANTITIES DISPOSED

Daily:	690 tons	[812 cubic yards]

5. LAND USE/CONDITIONAL USE PERMIT

Permit No.: 03-170-(5) **Effective:** 12/14/2011 **Expiration:** 12/14/2041

6. WASTE DISCHARGE REQUIREMENTS

Order No.: 6-00-55 **Effective:** 06/14/2000

7. FOC GRANT DATE - 04/20/2000

8. PERMITTED WASTE TYPES - Solid waste

9. FUTURE LAND USE - Open space

10. RESTRICTIONS - The Landfill cannot accept more than 10 tpd of biosolids (sewage sludge). There is no wasteshed restriction on origin of waste.

Note: Calculated or assumed quantities are shown in brackets.

Out-of-County Landfill

Mesquite Regional Landfill

1. FACILITY INFORMATION

Owner: County of Los Angeles Sanitation District 2
Operator: County of Los Angeles Sanitation District 2 of Los Angeles County
Address: 6502 E Hwy 78, Brawley 92227
Operating Days: Not yet operational
SWFP No.: 13-AA-0026
SWFP Issue Date: 04/08/97
Last 5-year Review Date: 10/03/2011
5-year Review Due Date: 10/03/2016

2. REMAINING PERMITTED CAPACITY (as of December 31, 2012)

Remaining Permitted Capacity:	[600,000,000 tons]	[1,000,000,000 cubic yards]
Estimated Remaining Life:	100 years	
In-Place Density:	0.60 tons/cubic yard	

3. MAXIMUM PERMITTED CAPACITY

Daily:	20,000 tons	[33,333 cubic yards]
Yearly Equivalent:	[7.3 million tons]	[12.2 million cubic yards]

4. 2012 AVERAGE WASTE QUANTITIES DISPOSED

Daily: Not yet operational

5. LAND USE/CONDITIONAL USE PERMIT

Permit No.: NO. 060003 **Effective:** 04/27/2011 **Expiration:** To Be Determined

6. WASTE DISCHARGE REQUIREMENTS

Order No.: R7-2009-0003 **Effective:** 06/18/2009

7. PERMITTED WASTE TYPES - Solid Waste

8. FUTURE LAND USE – Disposal

9. RESTRICTIONS/CURRENT STATUS

In February 2007, the Sanitation Districts submitted an application to Imperial County to amend the Mesquite Regional Landfill CUP for the receipt of up to 4,000 tpd of municipal solid waste by truck. Once the waste-by-rail system is operational, the ability to receive waste by truck will provide operational flexibility with the ability to ramp up until enough tonnage is received to make up a unit train.

Imperial County Planning and Development Services issued a Notice of Availability of the Final Subsequent EIR on October 6, 2010. The Board of Supervisors held a public hearing on the project on April 5, 2011, and subsequently approved the CUP. The Sanitation Districts also obtained a revised Solid Waste Facility Permit (SWFP) from CalRecycle/Local Enforcement Agency on October 1, 2011 for truck haul and other entitlements granted by the new CUP.

Note: Calculated or assumed quantities are shown in brackets.

Pebbly Beach Landfill

1. FACILITY INFORMATION

Owner: City of Avalon
Operator: Seagull Sanitation Systems (Republic Services, Inc.)
Address: 1 Dump Road, Avalon 90704 (Los Angeles County Unincorporated Area)
Operating Days: Monday-Sunday
SWFP No.: 19-AA-0061
SWFP Issue Date: 04/10/2001
Last 5-year Review Date: 05/03/2015
5-year Review Due Date: 05/03/2010

2. REMAINING PERMITTED CAPACITY (as of December 31, 2012)

Remaining Permitted Capacity:	[93,066 tons]	104,568 cubic yards
Estimated Remaining Life:	16 years (based on Land Use Permit Restriction)	
In-Place Density:	0.89 tons/cubic yard	

3. MAXIMUM PERMITTED DAILY CAPACITY

Daily:	49 tons	[55 cubic yards]
Yearly Equivalent:	[17,885 tons]	[20,095 cubic yards]

4. 2012 AVERAGE WASTE QUANTITIES DISPOSED

Daily:	8 tons	[9 cubic yards]

5. LAND USE/CONDITIONAL USE PERMIT

Permit No.: 96-162-(4) **Effective:** 07/29/1998 **Expiration:** 07/29/2028

6. WASTE DISCHARGE REQUIREMENTS

Order No.: R4-2002-0058 **Effective:** 02/28/2002

7. FOC GRANT DATE - 01/21/1999

8. PERMITTED WASTE TYPES - Solid waste

9. FUTURE LAND USE - Open space

10. RESTRICTIONS - There is no wasteshed restriction on origin of waste. However, due to its location on Santa Catalina Island, only the City of Avalon and adjacent unincorporated County areas have access to this facility.

Note: Calculated or assumed quantities are shown in brackets.

Puente Hills Landfill

1. FACILITY INFORMATION

Owner: County Sanitation District No. 18 of Los Angeles County
Operator: County Sanitation District 2 of Los Angeles County
Address: 13130 Crossroads Parkway South, Industry 91746 (Los Angeles County Unincorporated Area)
Operating Days: Monday-Saturday
SWFP No.: 19-AA-0053
SWFP Issue Date: 06/08/2010
Last 5-year Review Date: 7/11/2008
5-year Review Due Date: 06/08/2015

2. REMAINING PERMITTED CAPACITY (as of December 31, 2012)

Remaining Permitted Capacity: 6,096,969 tons [11,085,398 cubic yards]
Estimated Remaining Life: 1 year (based on Land Use Permit Restriction)
Aggregate Density: 0.55 tons/cubic yard

3. MAXIMUM PERMITTED DAILY CAPACITY

Daily: 13,200 tons [24,000 cubic yards]
Yearly Equivalent: [4,118,400 tons] [7,488,000 cubic yards]

4. 2012 AVERAGE WASTE QUANTITIES DISPOSED

Daily: 6,625 tons [12,045 cubic yards]

5. LAND USE/CONDITIONAL USE PERMIT

Permit No.: 02-027-(4) **Effective:** 12/18/2002 **Expiration:** 10/31/2013

6. WASTE DISCHARGE REQUIREMENTS

Order No.: 93-062 **Effective:** 09/27/1993, amended by:
Order No.: R4-2006-0007 **Effective:** 01/19/2006

7. FOC GRANT DATE - 02/20/2003

8. PERMITTED WASTE TYPES - Solid waste

9. FUTURE LAND USE - Open space and recreational use

10. RESTRICTIONS - Limited to 13,200 tpd of solid waste, 11,700 tpd of soil, and 33,000 tpw of beneficial reuse material. The Landfill can only accept treated incinerator ash, and biosolids sewage (sludge) from the operator's wastewater treatment facilities. The County of Los Angeles Regional Planning Commission granted a new Conditional Use Permit on December 18, 2002 and the limited life of the project to October 31, 2013.

Note: Calculated or assumed quantities are shown in brackets.

San Clemente Landfill

1. FACILITY INFORMATION

Owner: U.S. Department of the Navy

Operator: U.S. Department of the Navy

Address: Naval Auxiliary Landing Field, San Clemente Island 92135

Operating Days: 2 days/week (Tuesday and Thursday)

SWFP No.: 19-AA-0063

SWFP Issue Date: 11/19/2002

Last 5-year Review Date: 01/07/2008

5-year Review Due Date: 01/07/2013

2. REMAINING PERMITTED CAPACITY (as of December 31, 2012)

Remaining Permitted Capacity:	[39,735 tons]	317,882 cubic yards (based on 12/9/2011)
Estimated Remaining Life:	20 years (based on the current SWFP estimated closure date)	
In-Place Density:	0.125 tons/cubic yard	

3. MAXIMUM PERMITTED DAILY CAPACITY

Daily:	10 tons	[80 cubic yards]
Yearly Equivalent:	[1,040 tons]	[8,320 cubic yards]

4. 2012 AVERAGE WASTE QUANTITIES DISPOSED

Daily:	2 ton	[16 cubic yards]

5. LAND USE/CONDITIONAL USE PERMIT – Not Applicable

6. WASTE DISCHARGE REQUIREMENTS – Not Applicable

7. FOC GRANT DATE – None

8. PERMITTED WASTE TYPES - Solid waste

9. FUTURE LAND USE - Open space

10. RESTRICTIONS - This landfill is used solely by the U.S. Department of the Navy. SWFP is still under review by the CalRecycle as they address new Title 27 methane monitoring requirements.

Note: Calculated or assumed quantities are shown in brackets.

Scholl Canyon Landfill

1. FACILITY INFORMATION

Owner: City of Glendale & County of Los Angeles
Operator: County Sanitation Districts 2 of Los Angeles County
Address: 3001 Scholl Canyon Road, Glendale, CA 91206
Operating Days: Monday-Saturday
SWFP No.: 19-AA-0012
SWFP Issue Date: 12/13/2011
Last 5-year Review Date: 12/03/2009
5-year Review Due Date: 12/03/2014

2. REMAINING PERMITTED CAPACITY (as of December 31, 2012)

Remaining Permitted Capacity:	3,407,178 tons	7,010,654 cubic yards
Estimated Remaining Life:	16 years (based on average daily disposal of [675 tpd], 312 days per year)	
In-Place Density:	0.486 tons/cubic yard	

3. MAXIMUM PERMITTED DAILY CAPACITY

Daily:	3,400 tons	[6,996 cubic yards]
Yearly Equivalent:	[1,060,800 tons]	[2,182,716 cubic yards]

4. 2012 AVERAGE WASTE QUANTITIES DISPOSED

Daily:	[675 tons]	[1,389 cubic yards]

5. LAND USE/CONDITIONAL USE PERMIT

Permit No.: 6668-U (Zoning Variance) **Effective:** 11/27/1978 **Expiration:** Completion of Project

6. WASTE DISCHARGE REQUIREMENTS

Order No.: 01-132 **Effective**: 09/19/1988;
Order No.: R4-2011-0052 **Effective:** 03/03/2011

7. FOC GRANT DATE - None

8. PERMITTED WASTE TYPES - Solid waste

9. FUTURE LAND USE - Open space

10. RESTRICTIONS - The use of the Landfill is restricted by the City of Glendale Ordinance 4780 to the County of Los Angeles Cities of Glendale, La Canada Flintridge, Pasadena, South Pasadena, San Marino, and Sierra Madre; and the Los Angeles County unincorporated areas of Altadena, La Crescenta, Montrose; the unincorporated area bordered by the incorporated cities of San Gabriel, Rosemead, Temple City, Arcadia and Pasadena; and the unincorporated area immediately to the north of the City of San Marino bordered by the City of Pasadena on the west, north, and east sides.

Note: Calculated or assumed quantities are shown in brackets.

Proposed Expansion

Scholl Canyon Landfill Expansion

1. **FACILITY TYPE** - Class III landfill

2. **OWNER:** City of Glendale & County of Los Angeles **OPERATOR:** County Sanitation Districts 2 of Los Angeles County

3. **LOCATION** - 3001 Scholl Canyon Road, Glendale, CA 91206

4. **SIZE**

Increase in Proposed Disposal Area:	0 acres
Increase in Total Acreage of Site:	Variation 1: None
	Variation 2: To Be Determined
Increase in Vertical Elevation:	Variation 1: None
	Variation 2: To Be Determined

5. **PROPOSED VOLUMETRIC CAPACITY**

Daily:	3,400 tons	[7,556 cubic yards]
Yearly Equivalent:	[1,060,800 tons]	[2,271,520 cubic yards]
Additional Facility Capacity:	Variation 1: 5.0 million tons (vertical expansion only):	
	Variation 2: 6.0 million tons (horizontal and vertical expansion)	
In-Place Density:	0.486 tons/cubic yard	

6. **ADDITIONAL LIFE DUE TO EXPANSION**

Variation 1:
[5 years] based on 5.0 million tons of remaining disposal capacity, at 3,400 tpd, and 312 operating days/year (based on permitted capacity); or
[21 years] based on 5.0 million tons of remaining disposal capacity, at 754 tpd, and 312 operating days/year (based on 2012 Average Daily Rate).

Variation 2:
[6 years] based on 6.0 million tons, at 3,400 tpd, and 312 operating days/year (based on permitted capacity); or
[26 years] based on 6.0 million tons, at 754 tpd, and 312 operating days/year (based on 2012 Average Daily Rate).

7. **EXPANSION OPTIONS -** The potential expansion of this Landfill is recognized in the Joint Powers Authority governing the operation of the site; however, details on the expansion have not been finalized. The currently proposed expansion consists of two variations: Variation 1 (vertical expansion only) and Variation 2 (vertical and horizontal expansion). The Landfill would continue to be permitted to receive 3,400 tpd of non-hazardous solid waste, and all resource and material recovery programs will continue to be implemented.

8. **POST-CLOSURE USES -** Park, recreation, and roadway purposes; or for the implementation of solid waste management alternatives or other facilities related to the operation of a sanitary landfill on the premises.

9. **REMARKS/STATUS -** It is estimated that once the permitted capacity is exhausted, approximately 6 million tons of potentially available capacity would remain at the site.

Note: Calculated or assumed quantities are shown in brackets.

Southeast Resource Recovery Facility (SERRF)

1. **FACILITY INFORMATION**

Owner: City of Long Beach

Operator: Monterey Pacific Power Corporation

Address: 120 Pier South Avenue, Long Beach 90802

Operating Days: Monday-Friday (receive)
Monday-Sunday (process)

SWFP No.: 19-AK-0083

SWFP Issue Date: 03/03/1998

Last 5-year Review Date: 08/27/2009

5-year Review Due Date: 08/27/2014

2. **MAXIMUM PERMITTED DAILY CAPACITY**

Daily: 2,240 tons (SWFP Requirement)
Yearly: 500,000 tons (Environmental Protection Agency requirement)

3. **2012 AVERAGE WASTE QUANTITIES**

Daily Received: 1,510 tpd **Daily Processed:** 1,509 tpd

4. **LAND USE/CONDITIONAL USE PERMIT**

Permit No.: HDP-84174

5. **WASTE DISCHARGE REQUIREMENTS** - Not Applicable

6. **PERMITTED WASTE TYPES -** Solid waste

7. **FOC GRANT DATE -** 09/18/1997

8. **FUTURE LAND USE** - Not applicable

9. **RESTRICTIONS -** There is no wasteshed or restriction on origin of waste.

Sunshine Canyon City/County Landfill

1. FACILITY INFORMATION

Owner: Republic Services, Inc. **Operator:** Republic Services, Inc. **Address:** 14747 San Fernando Road, Sylmar 91342 **Operating Days:** Monday-Saturday
SWFP No.: 19-AA-2000 **SWFP Issue Date:** 07/07/2008
Last 5-year Review Date: 07/07/2008 **5-year Review Due Date:** 07/07/2013

2. REMAINING PERMITTED CAPACITY (as of December 31, 2012)

Remaining Permitted Capacity:	74,367,562 tons	96,393,470 cubic yards
Estimated Remaining Life:	20 years (based on maximum permitted rate of disposal of 12,100 tpd)	
In-Place Density:	0.77 tons/cubic yard	

3. MAXIMUM PERMITTED DAILY CAPACITY

Daily:	12,100 tons	[15,714 cubic yards]
Yearly Equivalent:	[3,775,200 tons]	[4,902,857 cubic yards]

4. 2012 AVERAGE WASTE QUANTITIES DISPOSED

Daily:	7,221 tons	[9,378 cubic yards]

5. LAND USE/CONDITIONAL USE PERMIT

Permit No.:00-194-(5) **Effective:** 05/24/2007 **Expiration:** 02/06/2037

6. WASTE DISCHARGE REQUIREMENTS

Order No.: 93-062	**Effective:** 09/27/1993
Order No.: R4-2006-0007	**Effective:** 01/19/2006
Order No.: R4-2007-0064	**Effective:** 12/06/2007
Order No.: R4-2008-0088	**Effective:** 10/02/2008
Order No.: R4-2011-0052	**Effective:** 03/03/2011

7. FOC GRANT DATE – 12/18/2008

8. PERMITTED WASTE TYPES - Solid waste

9. FUTURE LAND USE - Open space

10. RESTRICTIONS - The Landfill cannot accept incinerator ash or biosolids (sewage sludge). The Landfill is prohibited from accepting any solid waste generated outside the County.

11. REMARKS/STATUS - On December 31, 2008, operations in the Sunshine Canyon County Landfill and the Sunshine Canyon City Landfill were combined into one to what is known as the Sunshine Canyon City/County Landfill.

Note: Calculated or assumed quantities are shown in brackets.

Whittier (Savage Canyon) Landfill

1. FACILITY INFORMATION

Owner: City of Whittier
Address: 13919 E. Penn St., Whittier, CA 90602

Operator: City of Whittier
Operating Days: Monday-Saturday

SWFP No.: 19-AH-0001
Last 5-year Review Date: 01/27/2009

SWFP Issue Date: 02/28/1995
5-year Review Due Date: 01/27/2014

2. REMAINING PERMITTED CAPACITY (as of December 31, 2012)

Remaining Permitted Capacity:	3,556,023 tons	[5,926,705 cubic yards]
Estimated Remaining Life:	13 years (based on the current SWPF estimated closure date)	
In-Place Density:	0.6 tons/cubic yard	

3. MAXIMUM PERMITTED DAILY CAPACITY

Daily:	350 tons	[584 cubic yards]
Yearly Equivalent:	109,200 tons	[182,000 cubic yards]

4. 2012AVERAGE WASTE QUANTITIES DISPOSED

Daily:	240 tons	[400 cubic yards]

5. LAND USE/CONDITIONAL USE PERMIT

Permit No.: City Resolution No. 4907 **Effective:** 08/23/1977 **Expiration:** Completion of project

6. WASTE DISCHARGE REQUIREMENTS

Order No. 93-062	**Effective:** 09/27/1993
Order No.: R4-2006-0007	**Effective:** 01/19/2006
Order No.: R4-2006-0080	**Effective:** 10/24/2006
Order No.: R4-2011-0052	**Effective:** 03/03/2011

7. FOC GRANT DATE – 11/30/1978

8. PERMITTED WASTE TYPES - Mixed municipal, Construction/demolition, Industrial, Green Materials, and Inert waste.

9. FUTURE LAND USE - Open space

10. RESTRICTIONS - Hazardous, radioactive, liquid, or medical waste are all prohibited per Chapter 6.1, Division 20 of California Health and Safety Code.

Note: Calculated or assumed quantities are shown in brackets.

Proposed Expansion

Whittier (Savage Canyon) Landfill Expansion

1. **FACILITY TYPE** - Class III landfill

2. **OWNER/OPERATOR** - City of Whittier

3. **LOCATION** - 13919 E. Penn St., Whittier, CA 90602

4. **SIZE**

Increase in Proposed Disposal Area:	0 acres
Increase in Total Acreage of Site:	0 acres
Increase in Vertical Elevation:	To Be Determined

5. **PROPOSED VOLUMETRIC CAPACITY**

Daily:	350 tons	[584 cubic yards]
Yearly Equivalent:	109,200 tons	[182,000 cubic yards]
Additional Facility Capacity:	[2.63 million tons]	4.4 million cubic yards
In-Place Density:	0.6 tons/cubic yard	

6. **LIFE EXPECTANCY –** An additional 35 years based on the 2011 average daily disposal of 241 tpd or 24 years based on the maximum permitted rate of disposal of 350 tpd.

7. **EXPANSION OPTIONS –** See No. 4 for details

8. **POST-CLOSURE USES -** Open Space

9. **REMARKS/STATUS -** Whittier Landfill is owned and operated by the City of Whittier. The City Public Works Department is proposing to increase the site capacity from approximately 8.1 million cubic yards, as identified in the current SWFP issued on February 28, 1995, to 12.5 million cubic yards. The Local Enforcement Agency received an application for Solid Waste Facility Permit revision on March 2, 2012.

Note: Calculated or assumed quantities are shown in brackets.

Appendix E-2 Tables

2012 ANNUAL REPORT
LOS ANGELES COUNTY COUNTYWIDE INTEGRATED WASTE MANAGEMENT PLAN

APPENDIX E-2 TABLE 1
REMAINING PERMITTED DISPOSAL CAPACITY OF EXISTING SOLID WASTE DISPOSAL FACILITIES IN LOS ANGELES COUNTY

Facility	Solid Waste Facility Permit Number	Location: City or Unincoporated Area	Permitted Operation	SWFP Maximum Daily Capacity	LUP Maximum Daily Capacity	2012 Annual Disposal (Million Tons) (See Note 1)			2012 Average Daily Disposal tpd-6 (See Note 1)			Estimated Remaining Permitted Capacity (as of December 31, 2012) (See Note 2)		Remaining Life (b)	Comments
			days/week	Tons	Tons	In-County	Out-of-County	Total	In-County	Out-of-County	Total	Million Tons	Million (a) Cubic Yards	Years	
Antelope Valley	19-AA-5624	Palmdale	6	1,800	1,800	0.252	0.004	0.256	808	14	822	16.91	19.95	30	The City of Palmdale approved the expansion and combined Antelope Valley Landfills #1 & #2 on September 19, 2011. The estimated remaining capacity of 16.09 million tons includes an addition of 9 million tons as a result of the expansion.
Burbank	19-AA-0040	Burbank	5	240	---	0.033	0.000	0.033	107	0	107	2.95	5.36	41	Limited to the City of Burbank use only.
Calabasas	19-AA-0056	Unincorporated Area	6	3,500	3,500	0.187	0.011	0.197	599	34	633	5.51	12.34	16	Limited to the Calabasas Wasteshed as defined by Los Angeles County Ordinance No. 91-0003.
Chiquita Canyon	19-AA-0052	Unincorporated Area	6	6,000	6,000	0.906	0.021	0.927	2,903	68	2,971	3.97	6.02	2	Proposed expansion pending. LUP limits waste disposal to 30,000 tons per week.
Lancaster	19-AA-0050	Unincorporated Area	6	3,000	5,100	0.208	0.005	0.213	667	15	682	12.27	14.49	13	New CUP became effective on December 14,2011, which allowed usage of the remaining design capacity of 12.3 million tons.
Pebbly Beach	19-AA-0061	Unincorporated Area	7	49	49	0.003	0.000	0.003	9	0	9	0.09	0.10	16	LUP expires July 29, 2028.
Puente Hills	19-AA-0053	Unincorporated Area	6	13,200	13,200	2.144	0.024	2.168	6,872	78	6,950	6.10	11.09	1	LUP limits waste disposal to 13,200 tons per day. The closure date is scheduled for October 31, 2013.
San Clemente	19-AA-0063	San Clemente Island	2	9.6	---	0.000	0.000	0.000	1	0	1	0.04	0.32	20	Landfill owned and operated by the U.S. Navy.
Scholl Canyon	19-AA-0012	Glendale/ Unincorporated Area	6	3,400	---	0.211	0.000	0.211	675	0	675	3.41	7.01	16	Limited to the Scholl Canyon Wasteshed as defined by City of Glendale Ordinance No. 4780.
Sunshine Canyon City/County	19-AA-2000	Los Angeles/ Unincorporated Area	6	12,100	12,100	2.217	0.000	2.217	7,107	0	7,107	74.37	96.39	20	The combined Sunshine Canyon City/County Landfill became effective December 31, 2008, based on a memorandum of understanding between the City and County of Los Angeles.
Whittier (Savage Canyon)	19-AH-0001	Whittier	6	350	---	0.078	0.000	0.078	250	0	250	3.56	5.93	13	Limited to use by City of Whittier and waste haulers contracted with the City of Whittier.
TOTAL					41,749	6.239	0.065	6.304	19,997	208	20,205	129.19	367.00	188	
Waste-to-Energy (Transformation) Facilities															
Commerce Refuse To-Energy Facility	19-AA-0506	Commerce	7	1,000	---	0.096	0.006	0.102	308	18	326	466.64 **(c)**	777.73	--	Assumed to remain operational during the 15-year planning period.
Southeast Resource Recovery Facility	19-AK-0083	Long Beach	7	2,240	---	0.433	0.035	0.468	1,386	113	1,499	1,601.96 **(d)**	2,669.94	--	Assumed to remain operational during the 15-year planning period.
TOTAL				3,240		0.529	0.041	0.570	1,695	131	1,825	2,068.60 **(e)**	3,447.67	--	
Permitted Inert Landfills															
Azusa Land Reclamation	19-AA-0013	Azusa	6	6,500	---	0.054	0.035	0.089	172	114	286	64.13	52.13	718	By Court Order, on October 2, 1996, the California Regional Water Quality Control Board-Los Angeles region ordered the Azusa Land Reclamation Landfill to stop accepting Municipal Solid Waste. Permitted daily capacity of 6,500 tons per day consists of 6,000 tons per day of refuse and 500 tons per day of inert waste. Facility currently accepts inert waste only.
TOTAL				6,500		0.054	0.035	0.089	172	114	286	64.13	52.13		

Out-of-County Disposal Los Angeles County Waste Exported in 2012 to Out-of-County Class III Disposal Facilities = 1,844,175 tons or 5,911 tpd-6

NOTES:
1. Disposal quantities are based on actual tonnages reported by owners/operators of permitted solid waste disposal facilities to the Los Angeles County Department of Public Works' Solid Waste Information Management System (www.LACountySWIMS.org.)
2. Estimated Remaining Permitted Capacity based on landfill owner/operator's response in a written survey conducted by Los Angeles County Department of Public Works in May 2013 as well as site-specific permit criteria established by local land use agencies,

Abbreviation:
LUP Land Use Permit or Conditional Use Permit
SWFP Solid Waste Facility Permit

FOOTNOTES:
(a) Conversion factor based on in-place solid waste density is provided by landfill operators, otherwise a conversion factor of 1,200 lb/cy was used for Class III landfills.
(b) Remaing Life is based on either the 2012 average daily disposal tonnage or the facility's permit expiration date.
(c) Based on the Solid Waste Facility Permit limit of 2,800 tons per week, expressed as a daily average, six days per week.
(d) Based on EPA limit of 500,000 tons per year, expressed as a daily average, six days per week.
(e) Tonnage expressed as a daily average, six days per week.

Source: Los Angeles County Department of Public Works, August 2013

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LOS ANGELES COUNTY COUNTYWIDE INTEGRATED WASTE MANAGEMENT PLAN

APPENDIX E-2 TABLE 2

DISPOSAL CAPACITY OF INERT DEBRIS ENGINEERED FILL OPERATIONS IN LOS ANGELES COUNTY

Facility	Solid Waste Facility Permit	Location	Operation days/week	SWFP Maximum Daily Capacity		2012 Average Daily Disposal [1]		2012 Annual Disposal [2]	
				(cubic yards)[3]	(tpd-6)[3]	(cubic yards)	(tpd-6)	(million cubic yards)	(million tons)
Atkinson Brick Company	N/A	Los Angeles	6	N/A	N/A	178	223	0.06	0.07
Chandler's Palos Verdes Sand & Gravel	19-AE-0004	Rolling Hills Estates	6	1,282	1,603	225	282	0.07	0.09
Durbin Inert Debris Engineered Fill Site	19-AA-1111	Irwindale	5	3,200	4,000	172	215	0.02	0.03
Hanson Aggregates (Livingston-Graham)	19-AA-0044[4]	Irwindale	6	526	657	0	0	0.00	0.00
Lower Azusa Reclamation Project	19-AA-0868	Arcadia	6	3,205	4,006	1,696	2,120	0.53	0.66
Montebello Land & Water Co.	19-AA-0019	Montebello	6	0	1	0	0	0.00	0.00
Nu-Way Arrow	19-AA-1074	Irwindale	6	2,000	2,500	967	1,208	0.30	0.38
Peck Road Gravel Pit	19-AA-0838	Monrovia	6	1,120	1,400	0	0	0.00	0.00
Reliance Landfill	19-AA-0854	Irwindale	6	5,608	7,010	775	969	0.24	0.30
Sun Valley	19-AR-1160	Los Angeles	6	1,215	1,519	1,066	1,333	0.33	0.42
United Rock	19-AA-0046	Irwindale	6	3,077	3,846	0	0	0.00	0.00
TOTAL				21,233	26,541	5,080	6,350	1.55	1.94

NOTES:

1. Disposal quantities for 2012 are based on actual tonnages reported by owners/operators through the Solid Waste Management Fee invoice receipt.
2. Conversion factor based on in-place solid waste density if provided by landfill operators, otherwise a conversion factor of 2,500 lb/cy was used.
3. Derived from the permit values noted in the CalRecycle Website as of April 2013.
4. Operator submitted an Inactive Notification to LEA on August 2007. The facility was still in-active based on the January 23, 2013 inspection.

Source: Los Angeles County Department of Public Works, August 2013

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LOS ANGELES COUNTY COUNTYWIDE INTEGRATED WASTE MANAGEMENT PLAN

APPENDIX E-2 TABLE 3
OUT-OF-COUNTY LANDFILLS CURRENTLY AVAILABLE FOR USE BY JURISDICTIONS IN LOS ANGELES COUNTY

Facility Location Owner/Operator	Rail Access	Distance from Los Angeles County[1]	2012 Average Daily Disposal Rate (tpd-6)	Potential Available Disposal Capacity from Los Angeles County (tpd)	2012 Average Disposal from Los Angeles County[2,3] (tpd-6)	Operation days/week	Permitted Daily Disposal (tpd-6)	Remaining Permitted Disposal Capacity (million tons)[4]	Remaining Design Life (years)	Tipping Fees[5]	Import Surcharge	Comments
El Sobrante Landfill Riverside County USA Waste Services of California, Inc.	NO	60 miles	6,179	4,000	2640	6	16,054	179	33	$35.12 per ton	$5 per ton	Landfill can accept up to 11,054 tpd from other counties, including Los Angeles County. Remaining capacity and design life are based on the SWFP which was approved by CalRecycle on August 18, 2009.
Frank R. Bowerman Sanitary Landfill[6] Orange County O.C. Waste and Recycling	NO	45 miles	7,123	1,500	158	6	11,500	119	41	$55.37 per ton	0	The County of Orange has three import waste agreements with waste hauling companies to import waste into Orange County. Olinda Alpha Landfill's waste import agreement will expire on June 30, 2016. Frank R. Bowerman and Prima Desecha Landfills' waste import agreement will end on December 31, 2015.
Olinda Alpha Sanitary Landfill[6] Orange County O.C. Waste and Recycling	NO	30 miles	7,633	1,500	1878	6	8,000	27	9	$55.37 per ton	0	
Prima Deshecha Sanitary Landfill[6] Orange County O.C. Waste and Recycling	NO	60 miles	1,678	1,500	60	6	4,000	74	55	$55.37 per ton	0	
Simi Valley Landfill & Recycling Center Ventura County Waste Management of California, Inc.	NO	50 miles	2,124	850	766	7	6,000	94	40	$58.00 per ton	0	Waste Management received all necessary permits to increase the daily maximum disposal tonnage from 3,000 tpd to 6,000 tpd.
Mesquite Regional Landfill Imperial County County Sanitation District No. 2 of Los Angeles County	YES	210 miles	—	12,000	—	—	20,000	582	85	—	$1-$5 per ton	Not yet operational. Permitted to reserve up to 1,000 tpd of available capacity for Imperial County. Up to 4,000 tpd may be transported by truck haul.
TOTAL				21,350	5502							

NOTES:

1. Distance is measured from Downtown Los Angeles, California.
2. Estimated quantity based on the Disposal Reporting System information from the respective Counties.
3. Waste exported to other Out of County landfills accounts for another 409 tons per day. Total Waste exported in 2012 is approximately 5,911 tons per day.
4. Estimated quantity provided by landfill operators in tons, otherwise a conversion factor of 1,200 lb/cy was used.
5. Tipping fees are based on current waste disposal fees provided by landfill operators.
6. Remaining Permitted Disposal Capacity for Frank R. Bowerman Sanitary Landfill, Olinda Alpha Sanitary Landfill, and Prima Deshecha Sanitary Landfill were provided by OC Waste and Recycling Landfill Capacity Data Report as of June 30, 2012.

Source: Los Angeles County Department of Public Works, August 2013

2012 ANNUAL REPORT

LOS ANGELES COUNTY COUNTYWIDE INTEGRATED WASTE MANAGEMENT PLAN

APPENDIX E-2 TABLE 4

POPULATION, EMPLOYMENT, AND REAL TAXABLE SALES IN LOS ANGELES COUNTY

YEAR	POPULATION		EMPLOYMENT		REAL TAXABLE SALES	
	(persons)	(millions of persons)	(persons)	(millions of persons)	(dollars)	(billions of dollars)
2012	9,948,000	10	3,840,100	4	114,000,000,000	114.0
2013	10,021,000	10	3,896,400	4	116,600,000,000	116.6
2014	10,104,000	10	3,974,200	4	119,600,000,000	119.6
2015	10,187,000	10	4,050,300	4	122,500,000,000	122.5
2016	10,265,000	10	4,111,600	4	125,300,000,000	125.3
2017	10,339,000	10	4,156,900	4	127,900,000,000	127.9
2018	10,412,000	10	4,188,600	4	130,700,000,000	130.7
2019	10,485,000	10	4,213,500	4	133,500,000,000	133.5
2020	10,557,000	11	4,236,400	4	137,300,000,000	137.3
2021	10,629,000	11	4,255,700	4	137,700,000,000	137.7
2022	10,702,000	11	4,277,200	4	139,600,000,000	139.6
2023	10,777,000	11	4,305,100	4	141,800,000,000	141.8
2024	10,852,000	11	4,342,400	4	144,700,000,000	144.7
2025	10,928,000	11	4,384,700	4	145,800,000,000	145.8
2026	11,004,000	11	4,427,100	4	148,800,000,000	148.8
2027	11,080,000	11	4,468,800	4	151,800,000,000	151.8

Source: UCLA Anderson Longterm Forecast for Los Angeles County, dated July 2012.

2012 ANNUAL REPORT
LOS ANGELES COUNTY COUNTYWIDE INTEGRATED WASTE MANAGEMENT PLAN

APPENDIX E-2 TABLE 5
LOS ANGELES COUNTY SOLID WASTE DISPOSAL CAPACITY

A	B	C	D	E	F	G	H	I	J
				PROJECTED	AVAILABLE	CLASS III LANDFILL DISPOSAL NEED			
	TOTAL GENERATION	PERCENT DIVERSION	TOTAL DIVERSION	TRANSFORMATION & CLASS III LANDFILL	TRANSFORMATION CAPACITY	ANNUAL		CUMULATIVE (YEAR'S END)	
YEAR	TONS	(ASSUMED)	TONS	DISPOSAL (TONS)	TONS	TONS	CUBIC YARDS	TONS	CUBIC YARDS
2012	21,530,206	60%	12,918,124	8,612,083	645,600	7,966,483	13,277,471	7,966,483	13,277,471
2013	21,900,137	60%	13,140,082	8,760,055	645,600	8,114,455	13,524,091	16,080,937	26,801,562
2014	22,357,705	60%	13,414,623	8,943,082	645,600	8,297,482	13,829,137	24,378,419	40,630,699
2015	22,803,001	60%	13,681,800	9,121,200	645,600	8,475,600	14,126,000	32,854,020	54,756,700
2016	23,202,826	60%	13,921,696	9,281,131	645,600	8,635,531	14,392,551	41,489,550	69,149,251
2017	23,546,415	60%	14,127,849	9,418,566	645,600	8,772,966	14,621,610	50,262,516	83,770,860
2018	23,873,090	60%	14,323,854	9,549,236	645,600	8,903,636	14,839,393	59,166,152	98,610,254
2019	24,183,298	60%	14,509,979	9,673,319	645,600	9,027,719	15,046,199	68,193,871	113,656,452
2020	24,569,938	60%	14,741,963	9,827,975	645,600	9,182,375	15,303,959	77,376,247	128,960,411
2021	24,670,525	60%	14,802,315	9,868,210	645,600	9,222,610	15,371,017	86,598,856	144,331,427
2022	24,899,088	60%	14,939,453	9,959,635	645,600	9,314,035	15,523,392	95,912,892	159,854,819
2023	25,168,209	60%	15,100,925	10,067,283	645,600	9,421,683	15,702,806	105,334,575	175,557,625
2024	25,517,190	60%	15,310,314	10,206,876	645,600	9,561,276	15,935,460	114,895,851	191,493,085
2025	25,731,750	60%	15,439,050	10,292,700	645,600	9,647,100	16,078,500	124,542,951	207,571,585
2026	26,101,533	60%	15,660,920	10,440,613	645,600	9,795,013	16,325,022	134,337,964	223,896,607
2027	26,469,621	60%	15,881,773	10,587,849	645,600	9,942,249	16,570,414	144,280,213	240,467,022

NOTES:

1. Waste generation (Column B) is calculated using CalRecycle's Adjustment Methodology, utilizing employment, population, and taxable sales projections from UCLA Anderson Long-term Forecast.
2. Waste generation for 2012 is based on actual in-County and out-of-County transformation and Class III landfill disposal by jurisdictions in Los Angeles County. A 60 percent diversion rate is assumed. These tonnages DO NOT include inert waste disposed at permitted inert landfills.
3. The 2012 transformation and Class III landfill disposal quantity (first figure under Column E) is based on tonnages reported by permitted solid waste disposal facility operators in Los Angeles County and export quantities reported by other counties to County of Los Angeles Department of Public Works as part of the 2012 Disposal Quantity Reporting data.
4. Columns H and J are based on Columns G and I, respectively, using an in-place waste density of 1,200 lb/cy.

Source: County of Los Angeles Department of Public Works, August 2013

Appendix E-3
Comparison of Daily Disposal Demand and SB 1016 Limit

2012 ANNUAL REPORT
LOS ANGELES COUNTY COUNTYWIDE INTEGRATED WASTE MANAGEMENT PLAN

APPENDIX E-3

BASE YEAR PROJECTIONS BASED ON SB 1016 LIMIT

Year	Generation (Annual Tons)	Population	Per Capita Generation (Lbs/Resident/Day)
2003	23,798,794	9,767,000	13.35
2004	23,933,735	9,793,000	13.39
2005	24,623,753	9,786,000	13.79
2006	23,614,933	9,738,000	13.29
Four-year Average of Generation:			13.45
Diversion Requirement Level:			50%
Per Capita Disposal Limit:			**6.73**
Per Capita Transformation Credit Cap (=10% x 13.45):			1.35
Year	**Disposal (Annual Tons)**	**Population**	**Per Capita Disposal without Transformation Credit (Lbs/Resident/Day)**
2012	8,612,083	9,948,000	**4.74**
Transformation (Annual Tons)	**Transformation Credit (Lbs/Resident/Day)**		**Per Capita Disposal with Transformation Credit (Lbs/Resident/Day)**
528,765	0.29		4.45
Is the per capita disposal less than the per capita disposal limit?			**Yes**

Note: Per Capita Generation = $\frac{\text{(Generation)*(2000 lb/ton)}}{\text{(Population)*(365 days)}}$

Per Capita Disposal Limit = (Four-Year Avg of Generation)*(1-Diversion Requirement Level)

Source: Los Angeles County Department of Public Works, August 2013

2012 ANNUAL REPORT
LOS ANGELES COUNTY COUNTYWIDE INTEGRATED WASTE MANAGEMENT PLAN

APPENDIX E-3
COMPARISON OF DAILY DISPOSAL DEMAND AND SB 1016 DISPOSAL LIMIT
Status Quo

Daily Disposal Demand						SB 1016 Disposal Limit		
Year	Total Annual Waste Generation[1]	Diversion Rate[2] Status Quo	Total Annual Waste Disposal	Los Angeles County Population[3]	SB 1016 Per Capita Disposal	SB 1016 Per Capita Disposal Limit[2]	SB 1016 Annual Disposal Limit (yearly)	Minimum Diversion Rate Equivalent To Meet SB 1016
	A	**B**	**C = A*(1 - B)**	**D**	**E = (C*2000lb/ton)/(D*365 days)**	**F**	**G = (D*F*365days)/(2000lb/ton)**	**I = (1 - G/A)*100**
	(tons)			(Residents)	(lb/res/day)	(lb/res/day)	(tons)	
2012	21,530,206	60%	8,612,083	9,948,000	4.744	6.73	12,218,382	43%
2013	21,900,137	60%	8,760,055	10,021,000	4.790	6.73	12,308,043	44%
2014	22,357,705	60%	8,943,082	10,021,000	4.890	6.73	12,308,043	45%
2015	22,803,001	60%	9,121,200	10,187,000	4.906	6.73	12,511,928	45%
2016	23,202,826	60%	9,281,131	10,265,000	4.954	6.73	12,607,730	46%
2017	23,546,415	60%	9,418,566	10,339,000	4.992	6.73	12,698,618	46%
2018	23,873,090	60%	9,549,236	10,412,000	5.025	6.73	12,788,279	46%
2019	24,183,298	60%	9,673,319	10,485,000	5.055	6.73	12,877,939	47%
2020	24,569,938	60%	9,827,975	10,557,000	5.101	6.73	12,966,371	47%
2021	24,670,525	60%	9,868,210	10,629,000	5.087	6.73	13,054,804	47%
2022	24,899,088	60%	9,959,635	10,702,000	5.099	6.73	13,144,464	47%
2023	25,168,209	60%	10,067,283	10,777,000	5.119	6.73	13,236,581	47%
2024	25,517,190	60%	10,206,876	10,852,000	5.154	6.73	13,328,698	48%
2025	25,731,750	60%	10,292,700	10,928,000	5.161	6.73	13,422,043	48%
2026	26,101,533	60%	10,440,613	11,004,000	5.199	6.73	13,515,388	48%
2027	26,469,621	60%	10,587,849	11,080,000	5.236	6.73	13,608,733	49%

Footnotes:

1. Waste Generation is estimated using CalRecycle's Adjustment Methodology, utilizing population projection, employment and taxable sales projections from UCLA Long term Forecast, August 2013.
2. Per Capita Disposal Limit is based on 2003-2006 Base Year Projections on SB 1016 Limit.
3. Los Angeles Countywide Population Projection (UCLA, Long Term Forecast of Los Angeles County, August 2013)

Source: Los Angeles County Department of Public Works, August 2013

Appendix E-4 Disposal Capacity Analysis Scenarios

2012 ANNUAL REPORT
LOS ANGELES COUNTY COUNTYWIDE INTEGRATED WASTE MANAGEMENT PLAN

APPENDIX E-4
SCENARIO I - STATUS QUO

- **Existing In-County Class III Landfills and Transformation Facilities**
- **Current Available Out-of-County Disposal Capacity**

Year	Waste Generation Rate[1]	Diversion Rate	Total Daily Disposal Demand	Imports from Other Counties	Daily Available Capacity from Transformation Facilities	Class III Landfill Daily Disposal Demand	1	2	3	4	5	6	7	8	9	10	11	Total	Export Need	Available Daily Out-of-County Disposal Capacity	Class III Landfill Daily Disposal Capacity Shortfall (Reserve)
							IN-COUNTY CLASS III LANDFILLS														
							Antelope Valley	R Burbank	R Calabasas	Chiquita	Lancaster	Pebbly Beach	Puente Hills	R San Clemente	R Scholl	Sunshine City/County Combined	R Whittier (Savage Canyon)	Daily Available Capacity[2] from Class III Landfills			
							Maximum Permitted Daily Capacity (tpd-6) Expected Average Daily Tonnage (tpd-6) Remaining Capacity at Year's End (Million Tons)														
	A	B	C=A(1-B)	D	E	F=C+D-E												G	H=F-G	I	J=H-I
	(tpd-6)		(tpd-6)	(tpd-6)	(tpd-6)	(tpd-6)												(tpd-6)	(tpd-6)	(tpd-6)	(tpd-6)
2012	69,007	60%	27,603	452	1,695	26,360	1,800	240	3,500	6,000	3,000	49	13,200	10	3,400	11,000	350	36,640	(10,280)	5,911	—
							808	107	599	2,903	667	9	6,872	1	675	7,107	250				
							16.9	3.0	5.5	4.0	12.3	0.1	6.1	0.04	3.4	74.4	3.6				
2013	70,193	60%	28,077	500	2,069	26,508	1,800	240	3,500	6,000	3,000	49	13,200	10	3,400	11,000	350	36,650	(10,141)	6,200	(16,341)
							900	107	602	2,919	700	9	7,000	1.28	679	8,000	251				
							16.6	2.9	5.3	3.1	12.1	0.09	CP	0.04	3.2	71.9	3.5				
2014	71,659	60%	28,664	700	2,069	27,295	1,800	240	3,500	6,000	3,000	49		10	3,400	11,000	350	23,499	3,797	6,200	(2,403)
							1,000	111	620	4,000	800	10		1.32	699	9,000	259				
							16.3	2.9	5.1	1.8	11.8	0.09		0.04	3.0	69.1	3.4				
2015	73,087	60%	29,235	700	2,069	27,866	1,800	240	3,500	6,000	3,000	49		10	3,400	11,000	350	23,534	4,332	6,200	(1,868)
							1,100	113	633	4,500	900	10		1.35	713	10,000	264				
							16.0	2.8	4.9	0.4	11.5	0.08		0.04	2.8	65.9	3.3				
2016	74,368	60%	29,747	700	2,069	28,379	1,800	240	3,500	6,000	3,000	49		10	3,400	11,000	350	23,566	4,813	6,200	(1,387)
							1,200	115	644	5,000	1,000	10		1.37	726	11,000	269				
							15.6	2.8	4.7	CC	11.2	0.08		0.04	2.5	62.5	3.2				
2017	75,469	60%	30,188	700	2,069	28,819	1,800	240	3,500		3,000	49		10	3,400	11,000	350	17,593	11,226	6,200	5,026
							1,300	117	654		1,100	10		1.39	738	11,000	273				
							15.2	2.8	4.5		10.9	0.08		0.04	2.3	59.1	3.1				
2018	76,516	60%	30,607	700	2,069	29,238	1,800	240	3,500		3,000	49		10	3,400	11,000	350	17,620	11,618	6,200	5,418
							1,400	118	664		1,200	10		1.41	748	11,000	277				
							14.8	2.7	4.3		10.5	0.07		0.04	2.1	55.6	3.1				
2019	77,511	60%	31,004	700	2,069	29,636	1,800	240	3,500		3,000	49		10	3,400	11,000	350	17,644	11,991	6,200	5,791
							1,500	120	673		1,200	10		1.43	759	11,000	281				
							14.3	2.7	4.1	CP	10.1	0.07		0.04	1.8	52.2	3.0				
2020	78,750	60%	31,500	700	2,069	30,131	1,800	240	3,500		3,000	49		10	3,400	11,000	350	17,675	12,456	6,200	6,256
							1,600	122	684		1,200	11		1.46	771	11,000	285				
							13.8	2.7	3.9		9.7	0.07		0.04	1.6	48.8	2.9				
2021	79,072	60%	31,629	700	2,069	30,260	1,800	240	3,500		3,000	49		10	3,400	11,000	350	17,683	12,577	6,200	6,377
							1,700	123	687		1,200	11		1.46	775	11,000	287				
							13.3	2.6	3.7		9.4	0.06		0.04	1.3	45.4	2.8				
2022	79,805	60%	31,922	700	2,069	30,553	1,800	240	3,500		3,000	49		10	3,400	11,000	350	17,701	12,852	6,200	6,652
							1,800	124	694		1,200	11		1.48	782	11,000	289				
							12.7	2.6	3.5		9.0	0.06		0.03	1.1	41.9	2.7				
2023	80,667	60%	32,267	700	2,069	30,898	1,800	240	3,500		3,000	49		10	3,400	11,000	350	17,723	13,175	6,200	6,975
							1,800	125	702		1,200	11		1.50	791	11,000	293				
							12.1	2.5	3.3		8.6	0.06		0.03	0.9	38.5	2.6				
2024	81,786	60%	32,714	700	2,069	31,346	1,800	240	3,500		3,000	49		10	3,400	11,000	350	17,751	13,595	6,200	7,395
							1,800	127	712		1,200	11		1.52	802	11,000	297				
							11.6	2.5	3.0		8.2	0.05		0.03	0.6	35.1	2.5				
2025	82,474	60%	32,989	700	2,069	31,621	1,800	240	3,500		3,000	49		10	3,400	11,000	350	17,768	13,853	6,200	7,653
							1,800	128	718		1,200	11		1.53	809	11,000	300				
							11.0	2.5	CP		7.9	0.05		0.03	0.4	31.6	2.4				
2026	83,659	60%	33,464	700	2,069	32,095	1,800	240			3,000	49		10	3,400	11,000	350	17,068	15,026	6,200	8,826
							1,800	130			1,200	11		1.55	821	11,000	304				
							10.5	2.4			7.5	0.05		0.03	0.1	28.2	2.3				
2027	84,839	60%	33,935	700	2,069	32,567	1,800	240			3,000	49		10	3,400	11,000	350	17,087	15,480	6,200	9,280
							1,800	132			1,200	11		1.58	834	11,000	308				
							9.9	2.4			7.1	0.04		0.03	CC	24.8	2.2				

ASSUMPTIONS:

1. Waste Generation is estimated using CalRecycle's Adjustment Methodology, utilizing population projection, employment and real taxable sales projections from UCLA's Longterm Forecast, August 2013.
2. Total Daily Available Capacity from Class III Landfills is calculated based on Maximum Permitted Daily Capacity (in blue text) for facilities without a restricted wasteshed or Expected Average Daily Tonnage for facilities with a restricted wasteshed.

LEGEND:

CC/CP -Closure due to exhausted capacity (CC) or permit expiration (CP)
E -Expansion may become effective
R -Restricted wasteshed

Source: Los Angeles County Department of Public Works, August 2013.

APPENDIX E-4
SCENARIO II - INCREASE IN DIVERSION RATE (Up to 65% by 2025)

• **Existing In-County Class III Landfills and Transformation Facilities** • **Current Available Out-of-County Disposal Capacity** • **Increase In Diversion (up to 65% by 2025)**

							1	2	3	4	5	6	7	8	9	10	11	Total			
							IN-COUNTY CLASS III LANDFILLS														
								R	R					R	R		R				
Year	Waste Generation Rate[1]	Diversion Rate	Total Daily Disposal Demand	Imports from Other Counties	Daily Available Capacity from Transformation Facilities	Class III Landfill Daily Disposal Demand	Antelope Valley	Burbank	Calabasas	Chiquita	Lancaster	Pebbly Beach	Puente Hills	San Clemente	Scholl	Sunshine City/County Combined	Whittier (Savage Canyon)	Daily Available Capacity[2] from Class III Landfills	Export Need	Available Daily Out-of-County Disposal Capacity	Class III Landfill Daily Disposal Capacity Shortfall (Reserve)
							Maximum Permitted Daily Capacity (tpd-6) Expected Average Daily Tonnage (tpd-6) Remaining Capacity at Year's End (Million Tons)														
	A	B	C=A(1-B)	D	E	F=C+D-E												G	H=F-G	I	J=H-I
	(tpd-6)		(tpd-6)	(tpd-6)	(tpd-6)	(tpd-6)												(tpd-6)	(tpd-6)	(tpd-6)	(tpd-6)
2012	69,007	60%	27,603	452	1,695	26,360	1,800	240	3,500	6,000	3,000	49	13,200	10	3,400	11,000	350	36,640	(10,280)	5,911	—
							808	107	599	2,903	667	9.3	6,872	1.28	675	7,107	250				
							16.9	3.0	5.5	4.0	12.3	0.09	6.10	0.04	3.4	74.4	3.6				
2013	70,193	60%	28,077	500	2,069	26,508	1,800	240	3,500	6,000	3,000	49	13,200	10	3,400	11,000	350	36,650	(10,141)	6,200	(16,341)
							900	107	602	2,919	700	9	7,000	1.28	679	8,000	251				
							16.6	2.9	5.3	3.1	12.1	0.09	**CP**	0.04	3.2	71.9	3.5				
2014	71,659	60%	28,664	700	2,069	27,295	1,800	240	3,500	6,000	3,000	49		10	3,400	11,000	350	23,499	3,797	6,200	(2,403)
							1,000	111	620	3,006	800	10		1.32	699	9,000	259				
							16.3	2.9	5.1	2.1	11.8	0.09		0.04	3.0	69.1	3.4				
2015	73,087	60%	29,235	700	2,069	27,866	1,800	240	3,500	6,000	3,000	49		10	3,400	11,000	350	23,534	4,332	6,200	(1,868)
							1,100	113	633	3,069	900	10		1.35	713	10,000	264				
							16.0	2.8	4.9	1.2	11.5	0.08		0.04	2.8	65.9	3.3				
2016	74,368	60%	29,747	700	2,069	28,379	1,800	240	3,500	6,000	3,000	49		10	3,400	11,000	350	23,566	4,813	6,200	(1,387)
							1,200	115	644	3,125	1,000	10		1.37	726	11,000	269				
							15.6	2.8	4.7	0.2	11.2	0.08		0.04	2.5	62.5	3.2				
2017	75,469	60%	30,188	700	2,069	28,819	1,800	240	3,500	6,000	3,000	49		10	3,400	11,000	350	23,593	5,226	6,200	(974)
							1,300	117	654	3,174	1,100	10		1.39	738	11,000	273				
							15.2	2.8	4.5	**CC**	10.9	0.08		0.04	2.3	59.1	3.1				
2018	76,516	60%	30,607	700	2,069	29,238	1,800	240	3,500		3,000	49		10	3,400	11,000	350	17,620	11,618	6,200	5,418
							1,400	118	664		1,200	10		1.41	748	11,000	277				
							14.8	2.7	4.3		10.5	0.07		0.04	2.1	55.6	3.1				
2019	77,511	60%	31,004	700	2,069	29,636	1,800	240	3,500		3,000	49		10	3,400	11,000	350	17,644	11,991	6,200	5,791
							1,500	120	673		1,200	10		1.43	759	11,000	281				
							14.3	2.7	4.1	**CP**	10.1	0.07		0.04	1.8	52.2	3.0				
2020	78,750	60%	31,500	700	2,069	30,131	1,800	240	3,500		3,000	49		10	3,400	11,000	350	17,675	12,456	6,200	6,256
							1,600	122	684		1,200	11		1.46	771	11,000	285				
							13.8	2.7	3.9		9.7	0.07		0.04	1.6	48.8	2.9				
2021	79,072	61%	30,838	700	2,069	29,470	1,800	240	3,500		3,000	49		10	3,400	11,000	350	17,634	11,836	6,200	5,636
							1,700	119	669		1,200	10		1.43	754	11,000	279				
							13.3	2.6	3.7		9.4	0.06		0.04	1.4	45.4	2.8				
2022	79,805	62%	30,326	700	2,069	28,957	1,800	240	3,500		3,000	49		10	3,400	11,000	350	17,602	11,355	6,200	5,155
							1,800	117	658		1,200	10		1.40	741	11,000	274				
							12.7	2.6	3.5		9.0	0.06		0.04	1.1	41.9	2.7				
2023	80,667	63%	29,847	700	2,069	28,478	1,800	240	3,500		3,000	49		10	3,400	11,000	350	17,572	10,906	6,200	4,706
							1,800	115	647		1,200	10		1.38	729	11,000	270				
							12.1	2.6	3.3		8.6	0.06		0.03	0.9	38.5	2.6				
2024	81,786	64%	29,443	700	2,069	28,074	1,800	240	3,500		3,000	49		10	3,400	11,000	350	17,547	10,527	6,200	4,327
							1,800	114	638		1,200	10		1.36	719	11,000	266				
							11.6	2.5	3.1		8.2	0.06		0.03	0.7	35.1	2.5				
2025	82,474	65%	28,866	700	2,069	27,497	1,800	240	3,500		3,000	49		10	3,400	11,000	350	17,511	9,986	6,200	3,786
							1,800	111	624		1,200	10		1.33	704	11,000	260				
							11.0	2.5	**CP**		7.9	0.05		0.03	0.4	31.6	2.5				
2026	83,659	65%	29,281	700	2,069	27,912	1,800	240			3,000	49		10	3,400	11,000	350	16,903	11,009	6,200	4,809
							1,800	113			1,200	10		1.35	714	11,000	264				
							10.5	2.4			7.5	0.05		0.03	0.2	28.2	2.4				
2027	84,839	65%	29,693	700	2,069	28,325	1,800	240			3,000	49		10	3,400	11,000	350	17,045	11,280	6,200	5,080
							1,800	240			1,200	10		1.37	725	11,000	268				
							9.9	2.4			7.1	0.0		0.03	0.00	24.8	2.3				

ASSUMPTIONS:

1. Waste Generation is estimated using CalRecycle's Adjustment Methodology, utilizing population projection, employment and real taxable sales projections from UCLA's Longterm Forecast, August 2013.
2. Total Daily Available Capacity from Class III Landfills is calculated based on Maximum Permitted Daily Capacity (in blue text) for facilities without a restricted wasteshed or Expected Average Daily Tonnage for facilities with a restricted wasteshed.

LEGEND:

CC/CP -Closure due to exhausted capacity (CC) or permit expiration (CP)
E -Expansion may become effective
R -Restricted wasteshed

Source: Los Angeles County Department of Public Works, August 2013.

APPENDIX E-4

SCENARIO III - UTILIZATION OF ALTERNATIVE TECHNOLOGY CAPACITY (UP TO 2,300 TPD BY 2021)

- **Existing In-County Class III Landfills and Transformation Facilities**
- **Current Available Out-of-County Disposal Capacity**
- **Increase In Diversion Rate (up to 65% by 2025)**
- **Utilization of Alternative Technology Capacity (Up to 2,300 tpd by 2021)**

Year	Waste Generation Rate[1]	Diversion Rate	Total Daily Disposal Demand	Imports from Other Counties	Daily Available Capacity from Transformation Facilities	Maximum Alternative Technology Capacity	Class III Landfill Daily Disposal Demand	1 Antelope Valley	2 R Burbank	3 R Calabasas	4 Chiquita	5 Lancaster	6 Pebbly Beach	7 Puente Hills	8 R San Clemente	9 R Scholl	10 Sunshine City/County Combined	11 R Whittier (Savage Canyon)	Total Daily Available Capacity[2] from Class III Landfills	Export Need	Available Out-of-County Disposal Capacity	Class III Landfill Daily Disposal Capacity Shortfall (Reserve)
								IN-COUNTY CLASS III LANDFILLS														
								Maximum Permitted Daily Capacity (tpd-6) Expected Average Daily Tonnage (tpd-6) Remaining Capacity at Year's End (Million Tons)														
	A	B	C=A(1-B)	D	E	F	G=C+D-E-F												H	I=G-H	J	K=I-J
	(tpd-6)		(tpd-6)	(tpd-6)	(tpd-6)	(tpd-6)	(tpd-6)												(tpd-6)	(tpd-6)	(tpd-6)	(tpd-6)
2012	69,007	60%	27,603	452	1,695	0	26,360	1,800 808 16.9	240 107 3.0	3,500 599 5.5	6,000 2,903 4.0	3,000 667 12.3	49 9.3 0.09	13,200 6,872 6.1	10 1.28 0.04	3,400 675 3.4	11,000 7,541 74.4	350 250 3.6	36,640	(10,280)	5,911	—
2013	70,193	60%	28,077	500	2,069	0	26,508	1,800 900 16.6	240 107 2.9	3,500 602 5.3	6,000 2,919 3.1	3,000 700 12.1	49 9 0.09	13,200 7,000 CP	10 1.28 0.04	3,400 679 3.2	11,000 8,000 71.9	350 251 3.5	36,650	(10,141)	6,200	(16,341)
2014	71,659	60%	28,664	700	2,069	0	27,295	1,800 1,000 16.3	240 111 2.9	3,500 620 5.1	6,000 3,006 2.1	3,000 800 11.8	49 10 0.09		10 1.32 0.04	3,400 699 3.0	11,000 9,000 69.1	350 259 3.4	23,499	3,797	6,200	(2,403)
2015	73,087	60%	29,235	700	2,069	0	27,866	1,800 1,100 16.0	240 113 2.8	3,500 633 4.9	6,000 3,069 1.2	3,000 900 11.5	49 10 0.08		10 1.35 0.04	3,400 713 2.8	11,000 10,000 65.9	350 264 3.3	23,534	4,332	6,200	(1,868)
2016	74,368	60%	29,747	700	2,069	0	28,379	1,800 1,200 15.6	240 115 2.8	3,500 644 4.7	6,000 3,125 0.2	3,000 1,000 11.2	49 10 0.08		10 1.37 0.04	3,400 726 2.5	11,000 11,000 62.5	350 269 3.2	23,566	4,813	6,200	(1,387)
2017	75,469	60%	30,188	700	2,069	1,300	27,519	1,800 1,300 15.2	240 112 2.8	3,500 625 4.5	6,000 3,031 CC	3,000 1,100 10.9	49 10 0.08		10 1.33 0.04	3,400 704 2.3	11,000 11,000 59.1	350 261 3.1	23,513	4,007	6,200	(2,193)
2018	76,516	60%	30,607	700	2,069	1,300	27,938	1,800 1,400 14.8	240 113 2.7	3,500 634 4.3		3,000 1,200 10.5	49 10 0.07		10 1.35 0.04	3,400 715 2.1	11,000 11,000 55.6	350 265 3.1	17,539	10,399	6,200	4,199
2019	77,511	60%	31,004	700	2,069	1,300	28,336	1,800 1,500 14.3	240 115 2.7	3,500 643 4.1	CP	3,000 1,200 10.1	49 10 0.07		10 1.37 0.04	3,400 725 1.9	11,000 11,000 52.2	350 268 3.0	17,563	10,772	6,200	4,572
2020	78,750	60%	31,500	700	2,069	1,300	28,831	1,800 1,600 13.8	240 117 2.7	3,500 655 3.9		3,000 1,200 9.7	49 10 0.07		10 1.40 0.04	3,400 738 1.6	11,000 11,000 48.8	350 273 2.9	17,594	11,237	6,200	5,037
2021	79,072	61%	30,838	700	2,069	2,300	27,170	1,800 1,700 13.3	240 110 2.6	3,500 617 3.7		3,000 1,200 9.4	49 10 0.07		10 1.31 0.04	3,400 695 1.4	11,000 11,000 45.4	350 257 2.8	17,491	9,679	6,200	3,479
2022	79,805	62%	30,326	700	2,069	2,300	26,657	1,800 1,800 12.7	240 108 2.6	3,500 605 3.6		3,000 1,200 9.0	49 9 0.06		10 1.29 0.04	3,400 682 1.2	11,000 11,000 41.9	350 253 2.7	17,459	9,198	6,200	2,998
2023	80,667	63%	29,847	700	2,069	2,300	26,178	1,800 1,800 12.1	240 106 2.6	3,500 594 3.4		3,000 1,200 8.6	49 9 0.06		10 1.27 0.03	3,400 670 1.0	11,000 11,000 38.5	350 248 2.7	17,429	8,749	6,200	2,549
2024	81,786	64%	29,443	700	2,069	2,300	25,774	1,800 1,800 11.6	240 104 2.5	3,500 585 3.2		3,000 1,200 8.2	49 9 0.06		10 1.25 0.03	3,400 660 0.8	11,000 11,000 35.1	350 244 2.6	17,404	8,370	6,200	2,170
2025	82,474	65%	28,866	700	2,069	2,300	25,197	1,800 1,800 11.0	240 102 2.5	3,500 572 CP		3,000 1,200 7.9	49 9 0.05		10 1.22 0.03	3,400 645 0.6	11,000 11,000 31.6	350 239 2.5	17,368	7,829	6,200	1,629
2026	83,659	65%	29,281	700	2,069	2,300	25,612	1,800 1,800 10.5	240 104 2.5			3,000 1,200 7.5	49 9 0.05		10 1.24 0.03	3,400 656 0.4	11,000 11,000 28.2	350 243 2.4	16,812	8,800	6,200	2,600
2027	84,839	65%	29,693	700	2,069	2,300	26,025	1,800 1,800 9.9	240 105 2.4			3,000 1,200 7.1	49 9 0.05		10 1.26 0.03	3,400 666 C	11,000 11,000 24.8	350 247 2.4	16,829	9,196	6,200	2,996

ASSUMPTIONS:

1. Waste Generation is estimated using CalRecycle's Adjustment Methodology, utilizing population projection, employment and real taxable sales projections from UCLA's Longterm Forecast, August 2013.
2. Total Daily Available Capacity from Class III Landfills is calculated based on Maximum Permitted Daily Capacity (in blue text) for facilities without a restricted wasteshed or Expected Average Daily Tonnage for facilities with a restricted wasteshed.

LEGEND:

CC/CP -Closure due to exhausted capacity (CC) or permit expiration (CP)
E -Expansion may become effective
R -Restricted wasteshed

Source: Los Angeles County Department of Public Works, August 2013.

APPENDIX E-4
SCENARIO IV - IN-COUNTY CLASS III LANDFILLS EXPANSIONS

- **Existing In-County Class III Landfills &Transformation Facilities**
- **Utilization of Alternative Technology Capacity (up to 2,300 tpd by 2021)**
- **Current Available Out-of-County Disposal Capacity**
- **Proposed Expansions of In-County Class III Landfills**
- **Increase In Diversion Rate (up to 65% by 2025)**

Year	Waste Generation Rate[1]	Diversion Rate	Total Daily Disposal Demand	Imports from Other Counties	Daily Available Capacity from Transformation Facilities	Maximum Alternative Technology Capacity	Class III Landfill Daily Disposal Demand	1 Antelope Valley	2 R Burbank	3 R Calabasas	4 Chiquita	5 Lancaster	6 Pebbly Beach	7 Puente Hills	8 R San Clemente	9 R Scholl	10 Sunshine City/County Combined	11 R Whittier (Savage Canyon)	Total Daily Available Capacity[2] from Class III Landfills	Export Need	Available Daily Out-of-County Disposal Capacity	Class III Landfill Daily Disposal Capacity Shortfall (Reserve)
								IN-COUNTY CLASS III LANDFILLS														
	A	B	C=A(1-B)	D	E	F	G=C+D-E-F	Maximum Permitted Daily Capacity (tpd-6) / Expected Average Daily Tonnage (tpd-6) / Remaining Capacity at Year's End (Million Tons)											H	I=G-H	J	K=I-J
	(tpd-6)		(tpd-6)	(tpd-6)	(tpd-6)	(tpd-6)	(tpd-6)												(tpd-6)	(tpd-6)	(tpd-6)	(tpd-6)
2012	69,007	60%	27,603	452	1,695	0	26,360	1,800	240	3,500	6,000	3,000	49	13,200	10	3,400	11,000	350	36,640	(10,280)	5,911	–
								808	107	599	2,903	667	9.3	6,872	1.28	675	7,541	250				
								16.9	3.0	5.5	4.0	12.3	0.09	6.10	0.04	3.4	74.4	3.6				
2013	70,193	60%	28,077	500	2,069	0	26,508	1,800	240	3,500	6,000	3,000	49	13,200	10	3,400	11,000	350	36,650	(10,141)	6,200	(16,341)
								900	107	602	2,919	700	9	7,000	1.28	679	8,000	251				
								16.6	2.9	5.3	3.1	12.1	0.09	CP	0.04	3.2	71.9	3.5				
2014	71,659	60%	28,664	700	2,069	0	27,295	1,800	240	3,500	6,000	3,000	49		10	3,400	11,000	350	23,499	3,797	6,200	(2,403)
								1,000	111	620	4,000	800	10		1.32	699	9,000	259				
								16.3	2.9	5.1	1.8	11.8	0.09		0.04	3.0	69.1	6.0 E				
2015	73,087	60%	29,235	700	2,069	0	27,866	1,800	240	3,500	6,000	3,000	49		10	3,400	11,000	350	23,534	4,332	6,200	(1,868)
								1,100	113	633	5,000	900	10		1.35	713	10,000	264				
								16.0	2.8	4.9	0.3	11.5	0.08		0.04	2.8	65.9	5.9				
2016	74,368	60%	29,747	700	2,069	0	28,379	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	29,566	(1,187)	6,200	(7,387)
								1,200	115	644	6,000	1,000	10		1.37	726	11,000	269				
								15.6	2.8	4.7	57.9 E	11.2	0.08		0.04	2.5	62.5	5.9				
2017	75,469	60%	30,188	700	2,069	1,300	27,519	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	29,513	(1,993)	6,200	(8,193)
								1,300	112	625	7,000	1,100	10		1.33	704	11,000	261				
								15.2	2.8	4.5	55.7	10.9	0.08		0.04	2.3	59.1	5.8				
2018	76,516	60%	30,607	700	2,069	1,300	27,938	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	29,539	(1,601)	6,200	(7,801)
								1,400	113	634	8,000	1,200	10		1.35	715	11,000	265				
								14.8	2.7	4.3	53.2	10.5	0.07		0.04	2.1	55.6	5.7				
2019	77,511	60%	31,004	700	2,069	1,300	28,336	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	29,563	(1,228)	6,200	(7,428)
								1,500	115	643	9,000	1,200	10		1.37	725	11,000	268				
								14.3	2.7	4.1	50.4	10.1	0.07		0.04	1.9	52.2	5.6				
2020	78,750	60%	31,500	700	2,069	1,300	28,831	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	29,594	(763)	6,200	(6,963)
								1,600	117	655	10,000	1,200	10		1.40	738	11,000	273				
								13.8	2.7	3.9	47.3	9.7	0.07		0.04	7.6 E	48.8	5.5				
2021	79,072	61%	30,838	700	2,069	2,300	27,170	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	29,491	(2,321)	6,200	(8,521)
								1,700	110	617	11,000	1,200	10		1.31	695	11,000	257				
								13.3	2.6	3.7	43.8	9.4	0.07		0.04	7.4	45.4	5.5				
2022	79,805	62%	30,326	700	2,069	2,300	26,657	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	29,459	(2,802)	6,200	(9,002)
								1,800	108	605	12,000	1,200	9		1.29	682	11,000	253				
								12.7	2.6	3.6	40.1	9.0	0.06		0.04	7.2	41.9	5.4				
2023	80,667	63%	29,847	700	2,069	2,300	26,178	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	29,429	(3,251)	6,200	(9,451)
								1,800	106	594	12,000	1,200	9		1.27	670	11,000	248				
								12.1	2.6	3.4	36.4	8.6	0.06		0.03	7.0	38.5	5.3				
2024	81,786	64%	29,443	700	2,069	2,300	25,774	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	29,404	(3,630)	6,200	(9,830)
								1,800	104	585	12,000	1,200	9		1.25	660	11,000	244				
								11.6	2.5	3.2	32.6	8.2	0.06		0.03	6.8	35.1	5.2				
2025	82,474	65%	28,866	700	2,069	2,300	25,197	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	29,368	(4,171)	6,200	(10,371)
								1,800	102	572	12,000	1,200	9		1.22	645	11,000	239				
								11.0	2.5	CP	28.9	7.9	0.05		0.03	6.6	31.6	5.1				
2026	83,659	65%	29,281	700	2,069	2,300	25,612	1,800	240		12,000	3,000	49		10	3,400	11,000	350	28,812	(3,200)	6,200	(9,400)
								1,800	104		12,000	1,200	9		1.24	656	11,000	243				
								10.5	2.5		25.1	7.5	0.05		0.03	6.38	28.2	5.1				
2027	84,839	65%	29,693	700	2,069	2,300	26,025	1,800	240		12,000	3,000	49		10	3,400	11,000	350	28,829	(2,804)	6,200	(9,004)
								1,800	105		12,000	1,200	9		1.26	666	11,000	247				
								9.9	2.4		21.4	7.1	0.05		0.03	6.17	24.8	5.0				

ASSUMPTIONS:

1. Waste Generation is estimated using CalRecycle's Adjustment Methodology, utilizing population projection, employment and real taxable sales projections from UCLA's Longterm Forecast, August 2013.
2. Total Daily Available Capacity from Class III Landfills is calculated based on Maximum Permitted Daily Capacity (in blue text) for facilities without a restricted wasteshed or Expected Average Daily Tonnage for facilities with a restricted wasteshed.

LEGEND:

CC/CP -Closure due to exhausted capacity (CC) or permit expiration (CP)
E -Expansion may become effective
R -Restricted wasteshed

Source: Los Angeles County Department of Public Works, August 2013

APPENDIX E-4
SCENARIO V - INCREASE IN AVAILABLE OUT-OF-COUNTY DISPOSAL CAPACITY

- **Existing In-County Class III Landfills & Transformation Facilities**
- **Increase In Available Out-of-County Disposal Capacity**
- **Current Available Out-of-County Disposal Capacity**
- **Utilization of Alternative Technology Capacity (up to 2,300 tpd by 2021)**
- **Increase In Diversion Rate (up to 65% by 2025)**

Year	Waste Generation Rate[1]	Diversion Rate	Total Daily Disposal Demand	Imports from Other Counties	Daily Available Capacity from Transformation Facilities	Maximum Alternative Technology Capacity	Class III Landfill Daily Disposal Demand	1 Antelope Valley	2 R Burbank	3 R Calabasas	4 Chiquita	5 Lancaster	6 Pebbly Beach	7 Puente Hills	8 R San Clemente	9 R Scholl	10 Sunshine City/County Combined	11 R Whittier (Savage Canyon)	Total Daily Available Capacity[2] from Class III Landfills	Export Need	Available Daily Out-of-County Disposal Capacity	Class III Landfill Daily Disposal Capacity Shortfall (Reserve)
								IN-COUNTY CLASS III LANDFILLS														
	A	B	C=A(1-B)	D	E	F	G=C+D-E-F	Maximum Permitted Daily Capacity (tpd-6) / Expected Average Daily Tonnage (tpd-6) / Remaining Capacity at Year's End (Million Tons)											H	I=G-H	J	K=I-J
	(tpd-6)		(tpd-6)	(tpd-6)	(tpd-6)	(tpd-6)	(tpd-6)												(tpd-6)	(tpd-6)	(tpd-6)	(tpd-6)
2012	69,007	60%	27,603	452	1,695	0	26,360	1,800	240	3,500	6,000	3,000	49	13,200	10	3,400	11,000	350	36,640	(10,280)	5,911	—
								808	107	599	2,903	667	9	6,872	1.28	675	7,541	250				
								16.9	3.0	5.5	4.0	12.3	0.09	6.10	0.04	3.4	74.4	3.6				
2013	70,193	60%	28,077	500	2,069	0	26,508	1,800	240	3,500	6,000	3,000	49	13,200	10	3,400	11,000	350	36,650	(10,141)	6,200	(16,341)
								900	107	602	2,919	700	9	7,000	1.28	679	8,000	251				
								16.6	2.9	5.3	3.1	12.1	0.09	CP	0.04	3.2	71.9	3.5				
2014	71,659	60%	28,664	700	2,069	0	27,295	3,600	240	3,500	6,000	3,000	49		10	3,400	11,000	350	25,299	1,997	7,500	(5,503)
								1,000	111	620	4,000	800	10		1.32	699	9,000	259				
								16.3	2.9	5.1	1.8	11.8	0.09		0.04	3.0	69.1	6.0 E				
2015	73,087	60%	29,235	700	2,069	0	27,866	3,600	240	3,500	12,000	3,000	49		10	3,400	11,000	350	31,334	(3,468)	10,000	(13,468)
								1,100	113	633	5,000	900	10		1.35	713	10,000	264				
								16.0	2.8	4.9	0.3	12.3	0.08		0.04	2.8	65.9	5.9				
2016	74,368	60%	29,747	700	2,069	0	28,379	3,600	240	3,500	12,000	3,000	49		10	3,400	11,000	350	31,366	(2,987)	10,000	(12,987)
								1,200	115	644	6,000	1,000	10		1.37	726	11,000	269				
								15.6	2.8	4.7	57.9 E	12.0	0.08		0.04	2.5	62.5	5.9				
2017	75,469	60%	30,188	700	2,069	1,300	27,519	3,600	240	3,500	12,000	3,000	49		10	3,400	11,000	350	31,313	(3,793)	10,000	(13,793)
								1,300	112	625	7,000	1,100	10		1.33	704	11,000	261				
								15.2	2.8	4.5	55.7	11.7	0.08		0.04	2.3	59.1	5.8				
2018	76,516	60%	30,607	700	2,069	1,300	27,938	3,600	240	3,500	12,000	3,000	49		10	3,400	11,000	350	31,339	(3,401)	10,000	(13,401)
								1,400	113	634	8,000	1,200	10		1.35	715	11,000	265				
								14.8	2.7	4.3	53.2	11.3	0.07		0.04	2.1	55.6	5.7				
2019	77,511	60%	31,004	700	2,069	1,300	28,336	3,600	240	3,500	12,000	3,000	49		10	3,400	11,000	350	31,363	(3,028)	10,000	(13,028)
								1,500	115	643	9,000	1,200	10		1.37	725	11,000	268				
								14.3	2.7	4.1	50.4	10.9	0.07		0.04	1.9	52.2	5.6				
2020	78,750	60%	31,500	700	2,069	1,300	28,831	3,600	240	3,500	12,000	3,000	49		10	3,400	11,000	350	31,394	(2,563)	12,000	(14,563)
								1,600	117	655	10,000	1,200	10		1.40	738	11,000	273				
								13.8	2.7	3.9	47.3	10.6	0.07		0.04	7.6 E	48.8	5.5				
2021	79,072	61%	30,838	700	2,069	2,300	27,170	3,600	240	3,500	12,000	3,000	49		10	3,400	11,000	350	31,291	(4,121)	12,000	(16,121)
								1,700	110	617	11,000	1,200	10		1.31	695	11,000	257				
								13.3	2.6	3.7	43.8	10.2	0.07		0.04	7.4	45.4	5.5				
2022	79,805	62%	30,326	700	2,069	2,300	26,657	3,600	240	3,500	12,000	3,000	49		10	3,400	11,000	350	31,259	(4,602)	12,000	(16,602)
								1,800	108	605	12,000	1,200	9		1.29	682	11,000	253				
								12.7	2.6	3.6	40.1	9.8	0.06		0.04	7.2	41.9	5.4				
2023	80,667	63%	29,847	700	2,069	2,300	26,178	3,600	240	3,500	12,000	3,000	49		10	3,400	11,000	350	31,229	(5,051)	12,000	(17,051)
								1,800	106	594	12,000	1,200	9		1.27	670	11,000	248				
								12.1	2.6	3.4	36.4	9.4	0.06		0.03	7.0	38.5	5.3				
2024	81,786	64%	29,443	700	2,069	2,300	25,774	3,600	240	3,500	12,000	3,000	49		10	3,400	11,000	350	31,204	(5,430)	12,000	(17,430)
								1,800	104	585	12,000	1,200	9		1.25	660	11,000	244				
								11.6	2.5	3.2	32.6	9.1	0.06		0.03	6.8	35.1	5.2				
2025	82,474	65%	28,866	700	2,069	2,300	25,197	3,600	240	3,500	12,000	3,000	49		10	3,400	11,000	350	31,168	(5,971)	12,000	(17,971)
								1,800	102	572	12,000	1,200	9		1.22	645	11,000	239				
								11.0	2.5	CP	28.9	8.7	0.05		0.03	6.6	31.6	5.1				
2026	83,659	65%	29,281	700	2,069	2,300	25,612	3,600	240		12,000	3,000	49		10	3,400	11,000	350	30,612	(5,000)	12,000	(17,000)
								1,800	104		12,000	1,200	9		1.24	656	11,000	243				
								10.5	2.5		25.1	8.3	0.05		0.03	6.4	28.2	5.1				
2027	84,839	65%	29,693	700	2,069	2,300	26,025	3,600	240		12,000	3,000	49		10	3,400	11,000	350	30,629	(4,604)	12,000	(16,604)
								1,800	105		12,000	1,200	9		1.26	666	11,000	247				
								9.9	2.4		21.4	7.9	0.05		0.03	6.2	24.8	5.0				

ASSUMPTIONS:

1. Waste Generation is estimated using CalRecycle's Adjustment Methodology, utilizing population projection, employment and real taxable sales projections from UCLA's Longterm Forecast, August 2013.
2. Total Daily Available Capacity from Class III Landfills is calculated based on Maximum Permitted Daily Capacity (in blue text) for facilities without a restricted wasteshed or Expected Average Daily Tonnage for facilities with a restricted wasteshed.

LEGEND:

CC/CP -Closure due to exhausted capacity (CC) or permit expiration (CP)
E -Expansion may become effective
R -Restricted wasteshed

Source: Los Angeles County Department of Public Works, August 2013.

2012 ANNUAL REPORT
LOS ANGELES COUNTY COUNTYWIDE INTEGRATED WASTE MANAGEMENT PLAN

APPENDIX E-4
SCENARIO VI - MAXIMIZING DIVERSION RATE (UP TO 75% BY 2020, COMPLIES WITH AB 341 GOAL)

- **Existing In-County Class III Landfills & Transformation Facilities**
- **Proposed Expansions of In-County Class III Landfil**
- **Maximizing Diversion Rate up to 75% by 2020**
- **Increase In Available Out-of-County Disposal Capacity**
- **Utilization of Alternative Technology Capacity (up to 2,300 tpd by 2021)**

Year	Waste Generation Rate[1]	Diversion Rate	Total Daily Disposal Demand	Imports from Other Counties	Daily Available Capacity from Transformation Facilities	Maximum Alternative Technology Capacity	Class III Landfill Daily Disposal Demand	1 Antelope Valley	2 R Burbank	3 R Calabasas	4 Chiquita	5 Lancaster	6 Pebbly Beach	7 Puente Hills	8 R San Clemente	9 R Scholl	10 Sunshine City/County Combined	11 R Whittier (Savage Canyon)	Total Daily Available Capacity[2] from Class III Landfills	Export Need	Available Daily Out-of-County Disposal Capacity	Class III Landfill Daily Disposal Capacity Shortfall (Reserve)
								IN-COUNTY CLASS III LANDFILLS														
	A	B	C=A(1-B)	D	E	F	G=C+D-E-F	Maximum Permitted Daily Capacity (tpd-6) Expected Average Daily Tonnage (tpd-6) Remaining Capacity at Year's End (Million Tons)											H	I=G-H	J	K=I-J
	(tpd-6)		(tpd-6)	(tpd-6)	(tpd-6)	(tpd-6)	(tpd-6)												(tpd-6)	(tpd-6)	(tpd-6)	(tpd-6)
2012	69,007	60%	27,603	452	1,695	0	26,360	1,800 808 16.9	240 107 3.0	3,500 599 5.5	6,000 2,903 4.0	3,000 667 12.3	49 9.3 0.09	13,200 6,872 6.10	10 1.28 0.04	3,400 675 3.4	11,000 7,541 74.4	350 250 3.6	36,640	(10,280)	5,911	–
2013	70,193	61%	27,375	500	2,069	0	25,807	1,800 900 16.6	240 105 2.9	3,500 586 5.3	6,000 2,842 3.1	3,000 700 12.1	49 9 0.09	13,200 7,000 **CP**	10 1.25 0.04	3,400 661 3.2	11,000 8,000 71.9	350 244 3.5	36,606	(10,799)	6,200	(16,999)
2014	71,659	63%	26,514	700	2,069	0	25,145	1,800 1,000 16.3	240 102 2.9	3,500 571 5.2	6,000 4,000 1.8	3,000 800 11.8	49 9 0.09		10 1.22 0.04	3,400 644 3.0	11,000 9,000 69.1	350 238 6.0 **E**	23,365	1,781	7,500	(5,719)
2015	73,087	65%	25,580	700	2,069	0	24,212	1,800 1,100 16.0	240 98 2.9	3,500 550 5.0	12,000 5,000 0.3	3,000 900 12.3	49 9 0.08		10 1.17 0.04	3,400 620 2.8	11,000 10,000 65.9	350 229 6.0	29,307	(5,095)	10,000	(15,095)
2016	74,368	67%	24,541	700	2,069	0	23,173	1,800 1,200 15.6	240 94 2.8	3,500 526 4.8	12,000 6,000 57.9 **E**	3,000 1,000 12.0	49 8 0.08		10 1.12 0.04	3,400 593 2.6	11,000 11,000 62.5	350 220 5.9	29,242	(6,069)	10,000	(16,069)
2017	75,469	69%	23,395	700	2,069	1,300	20,727	1,800 1,300 15.2	240 84 2.8	3,500 471 4.7	12,000 7,000 55.7	3,000 1,100 11.7	49 7 0.08		10 1.00 0.04	3,400 531 2.5	11,000 11,000 59.1	350 196 5.8	29,090	(8,363)	10,000	(18,363)
2018	76,516	71%	22,190	700	2,069	1,300	19,521	1,800 1,400 14.8	240 79 2.8	3,500 443 4.5	12,000 8,000 53.2	3,000 1,200 11.3	49 7 0.08		10 0.94 0.04	3,400 500 2.3	11,000 11,000 55.6	350 185 5.8	29,015	(9,494)	10,000	(19,494)
2019	77,511	73%	20,928	700	2,069	1,300	18,259	1,800 1,500 14.3	240 74 2.8	3,500 415 4.4	12,000 9,000 50.4	3,000 1,200 10.9	49 6 0.08		10 0.88 0.04	3,400 467 2.2	11,000 11,000 52.2	350 173 5.7	28,936	(10,677)	10,000	(20,677)
2020	78,750	75%	19,687	700	2,069	1,300	17,019	1,800 1,600 13.8	240 69 2.7	3,500 386 4.3	12,000 10,000 47.3	3,000 1,200 10.6	49 6 0.07		10 0.82 0.04	3,400 436 8.0 **E**	11,000 11,000 48.8	350 161 5.7	28,859	(11,840)	12,000	(23,840)
2021	79,072	75%	19,768	700	2,069	2,300	16,099	1,800 1,700 13.3	240 65 2.7	3,500 366 4.2	12,000 11,000 43.9	3,000 1,200 10.2	49 6 0.07		10 0.78 0.04	3,400 412 7.9	11,000 11,000 45.4	350 153 5.6	28,802	(12,702)	12,000	(24,702)
2022	79,805	75%	19,951	700	2,069	2,300	16,283	1,800 1,800 12.7	240 66 2.7	3,500 370 4.1	12,000 12,000 40.1	3,000 1,200 9.8	49 6 0.07		10 0.79 0.04	3,400 417 7.8	11,000 11,000 41.9	350 154 5.6	28,813	(12,531)	12,000	(24,531)
2023	80,667	75%	20,167	700	2,069	2,300	16,498	1,800 1,800 12.1	240 67 2.7	3,500 375 3.9	12,000 12,000 36.4	3,000 1,200 9.4	49 6 0.07		10 0.80 0.04	3,400 422 7.6	11,000 11,000 38.5	350 156 5.5	28,827	(12,328)	12,000	(24,328)
2024	81,786	75%	20,446	700	2,069	2,300	16,778	1,800 1,800 11.6	240 68 2.6	3,500 381 3.8	12,000 12,000 32.6	3,000 1,200 9.1	49 6 0.07		10 0.81 0.04	3,400 429 7.5	11,000 11,000 35.1	350 159 5.5	28,844	(12,066)	12,000	(24,066)
2025	82,474	75%	20,618	700	2,069	2,300	16,950	1,800 1,800 11.0	240 69 2.6	3,500 385 **CP**	12,000 12,000 28.9	3,000 1,200 8.7	49 6 0.06		10 0.82 0.04	3,400 434 7.4	11,000 11,000 31.6	350 161 5.4	28,855	(11,905)	12,000	(23,905)
2026	83,659	75%	20,915	700	2,069	2,300	17,246	1,800 1,800 10.5	240 70 2.6		12,000 12,000 25.1	3,000 1,200 8.3	49 6 0.06		10 0.83 0.04	3,400 441 7.2	11,000 11,000 28.2	350 163 5.4	28,482	(11,236)	12,000	(23,236)
2027	84,839	75%	21,210	700	2,069	2,300	17,541	1,800 1,800 9.9	240 71 2.6		12,000 12,000 21.4	3,000 1,200 7.9	49 6 0.06		10 0.85 0.03	3,400 449 7.1	11,000 11,000 24.8	350 166 5.3	28,493	(10,952)	12,000	(22,952)

ASSUMPTIONS:

1. Waste Generation is estimated using CalRecyle's Adjustment Methodology, utilizing population projection, employment and real taxable sales projections from UCLA's Longterm Forecast, August 2013.
2. Total Daily Available Capacity from Class III Landfills is calculated based on Maximum Permitted Daily Capacity (in blue text) for facilities without a restricted wasteshed or Expected Average Daily Tonnage for facilities with a restricted wasteshed.

LEGEND:

CC/CP -Closure due to exhausted capacity (CC) or permit expiration (CP)
E -Expansion may become effective
R -Restricted wasteshed

Source: Los Angeles County Department of Public Works, August 2013.

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APPENDIX E-4

SCENARIO VII - INCREASE IN ALTERNATIVE TECHNOLOGY CAPACITY (UP TO 3,500 TPD BY 2024)

- **Existing In-County Class III Landfills & Transformation Facilities**
- **Proposed Expansions of In-County Class III**
- **Increase In Diversion Rate up to 65% by 2025**
- **Increase In Available Out-of-County Disposal Capacity**
- **Increase In Alternative Technology Capacity (up to 3,500 tpd by 2024)**

Year	Waste Generation Rate[1]	Diversion Rate	Total Daily Disposal Demand	Imports from Other Counties	Daily Available Capacity from Transformation Facilities	Maximum Alternative Technology Capacity	Class III Landfill Daily Disposal Demand	1 Antelope Valley	2 Burbank (R)	3 Calabasas (R)	4 Chiquita	5 Lancaster	6 Pebble Beach	7 Puente Hills	8 San Clemente (R)	9 Scholl (R)	10 Sunshine City/County Combined	11 Whittier (Savage Canyon) (R)	Total Daily Available Capacity[2] from Class III Landfills	Export Need	Available Daily Out-of-County Disposal Capacity	Class III Landfill Daily Disposal Capacity Shortfall (Reserve)
								IN-COUNTY CLASS III LANDFILLS														
								Maximum Permitted Daily Capacity (tpd-6) Expected Average Daily Tonnage (tpd-6) Remaining Capacity at Year's End (Million Tons)														
	A	B	C=A(1-B)	D	E	F	G=C+D-E-F												H	I=G-H	J	K=I-J
	(tpd-6)		(tpd-6)	(tpd-6)	(tpd-6)	(tpd-6)	(tpd-6)												(tpd-6)	(tpd-6)	(tpd-6)	(tpd-6)
2012	69,007	60%	27,603	452	1,695	0	26,360	1,800	240	3,500	6,000	3,000	49	13,200	10	3,400	11,000	350	36,640	(10,280)	5,911	—
								808	107	599	2,903	667	9.3	6,872	1.28	675	7,541	250				
								16.9	3.0	5.5	4.0	12.3	0.09	6.10	0.04	3.4	74.4	3.6				
2013	70,193	60%	28,077	500	2,069	0	26,508	1,800	240	3,500	6,000	3,000	49	13,200	10	3,400	11,000	350	36,650	(10,141)	6,200	(16,341)
								900	107	602	2,919	700	9	7,000	1.28	679	8,000	251				
								16.6	2.9	5.3	3.1	12.1	0.09	CP	0.04	3.2	71.9	3.5				
2014	71,659	60%	28,664	700	2,069	0	27,295	1,800	240	3,500	6,000	3,000	49		10	3,400	11,000	350	23,499	3,797	7,500	(3,703)
								1,000	111	620	4,000	800	10		1.32	699	9,000	259				
								16.3	2.9	5.1	1.8	11.8	0.09		0.04	3.0	69.1	6.0 E				
2015	73,087	60%	29,235	700	2,069	0	27,866	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	29,534	(1,668)	10,000	(11,668)
								1,100	113	633	5,000	900	10		1.35	713	10,000	264				
								16.0	2.8	4.9	0.3	12.3	0.08		0.04	2.8	65.9	5.9				
2016	74,368	60%	29,747	700	2,069	0	28,379	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	29,566	(1,187)	10,000	(11,187)
								1,200	115	644	6,000	1,000	10		1.37	726	11,000	269				
								15.6	2.8	4.7	57.9 E	12.0	0.08		0.04	2.5	62.5	5.9				
2017	75,469	60%	30,188	700	2,069	1,800	27,019	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	29,481	(2,462)	10,000	(12,462)
								1,300	109	614	7,000	1,100	10		1.31	692	11,000	256				
								15.2	2.8	4.5	55.7	11.7	0.08		0.04	2.3	59.1	5.8				
2018	76,516	60%	30,607	700	2,069	1,900	27,338	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	29,501	(2,163)	10,000	(12,163)
								1,400	111	621	8,000	1,200	10		1.32	700	11,000	259				
								14.8	2.7	4.4	53.2	11.3	0.07		0.04	2.1	55.6	5.7				
2019	77,511	60%	31,004	700	2,069	2,000	27,636	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	29,520	(1,884)	10,000	(11,884)
								1,500	112	628	9,000	1,200	10		1.34	707	11,000	262				
								14.3	2.7	4.2	50.4	10.9	0.07		0.04	1.9	52.2	5.6				
2020	78,750	60%	31,500	700	2,069	2,100	28,031	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	29,544	(1,513)	12,000	(13,513)
								1,600	114	637	10,000	1,200	10		1.36	717	11,000	266				
								13.8	2.7	4.0	47.3	10.6	0.07		0.04	7.6 E	48.8	5.5				
2021	79,072	61%	30,838	700	2,069	3,200	26,270	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	29,435	(3,165)	12,000	(15,165)
								1,700	106	597	11,000	1,200	9		1.27	672	11,000	249				
								13.3	2.6	3.8	43.8	10.2	0.07		0.04	7.4	45.4	5.5				
2022	79,805	62%	30,326	700	2,069	3,300	25,657	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	29,397	(3,739)	12,000	(15,739)
								1,800	104	583	12,000	1,200	9		1.24	657	11,000	243				
								12.7	2.6	3.6	40.1	9.8	0.06		0.04	7.2	41.9	5.4				
2023	80,667	63%	29,847	700	2,069	3,400	25,078	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	29,361	(4,282)	12,000	(16,282)
								1,800	102	570	12,000	1,200	9		1.21	642	11,000	238				
								12.1	2.6	3.4	36.4	9.4	0.06		0.03	7.0	38.5	5.3				
2024	81,786	64%	29,443	700	2,069	3,500	24,574	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	29,329	(4,755)	12,000	(16,755)
								1,800	100	558	12,000	1,200	9		1.19	629	11,000	233				
								11.6	2.5	3.2	32.6	9.1	0.06		0.03	6.8	35.1	5.2				
2025	82,474	65%	28,866	700	2,069	3,500	23,997	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	29,293	(5,296)	12,000	(17,296)
								1,800	97	545	12,000	1,200	8		1.16	614	11,000	227				
								11.0	2.5	CP	28.9	8.7	0.05		0.03	6.6	31.6	5.2				
2026	83,659	65%	29,281	700	2,069	3,500	24,412	1,800	240		12,000	3,000	49		10	3,400	11,000	350	28,765	(4,353)	12,000	(16,353)
								1,800	99		12,000	1,200	9		1.18	625	11,000	231				
								10.5	2.5		25.1	8.3	0.05		0.03	6.5	28.2	5.1				
2027	84,839	65%	29,693	700	2,069	3,500	24,825	1,800	240		12,000	3,000	49		10	3,400	11,000	350	28,781	(3,956)	12,000	(15,956)
								1,800	101		12,000	1,200	9		1.20	635	11,000	235				
								9.9	2.5		21.4	7.9	0.05		0.03	6.3	24.8	5.0				

ASSUMPTIONS:

1. Waste Generation is estimated using CalRecycle's Adjustment Methodology, utilizing population projection, employment and real taxable sales projections from UCLA's Longterm Forecast, August 2013.
2. Total Daily Available Capacity from Class III Landfills is calculated based on Maximum Permitted Daily Capacity (in blue text) for facilities without a restricted wasteshed or Expected Average Daily Tonnage for facilities with a restricted wasteshed.

LEGEND:

CC/CP -Closure due to exhausted capacity (CC) or permit expiration (CP)
E -Expansion may become effective
R -Restricted wasteshed

Source: Los Angeles County Department of Public Works, August 2013.

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APPENDIX E-4

SCENARIO VIII - FULL UTILIZATION OF OUT-OF-COUNTY DISPOSAL CAPACITY

- **Existing In-County Class III Landfills & Transformation Facilities**
- **Full Utilization of Out-of-County Disposal Capacity**
- **Proposed Expansions of In-County Class III Landfills**
- **Utilization of Alternative Technology Capacity (up to 2,300 tpd by 2021)**
- **Increase In Diversion Rate up to 65% by 2025**

Year	Waste Generation Rate[1]	Diversion Rate	Total Daily Disposal Demand	Imports from Other Counties	Daily Available Capacity from Transformation Facilities	Maximum Alternative Technology Capacity	Class III Landfill Daily Disposal Demand	1 Antelope Valley	2 Burbank (R)	3 Calabasas (R)	4 Chiquita	5 Lancaster	6 Pebbly Beach	7 Puente Hills	8 San Clemente (R)	9 Scholl (R)	10 Sunshine City/County Combined	11 Whittier (Savage Canyon) (R)	Total Daily Available Capacity[2] from Class III Landfills	Export Need	Available Daily Out-of-County Disposal Capacity	Class III Landfill Daily Disposal Capacity Shortfall (Reserve)
								IN-COUNTY CLASS III LANDFILLS														
								Maximum Permitted Daily Capacity (tpd-6) Expected Average Daily Tonnage (tpd-6) Remaining Capacity at Year's End (Million Tons)														
	A	B	C=A(1-B)	D	E	F	G=C+D-E-F												H	I=G-H	J	K=I-J
	(tpd-6)		(tpd-6)	(tpd-6)	(tpd-6)	(tpd-6)	(tpd-6)												(tpd-6)	(tpd-6)	(tpd-6)	(tpd-6)
2012	69,007	60%	27,603	452	1,695	0	26,360	1,800 808 16.9	240 107 3.0	3,500 599 5.5	6,000 2,903 4.0	3,000 667 12.3	49 9.3 0.09	13,200 6,872 6.10	10 1.28 0.04	3,400 675 3.4	11,000 7,541 74.4	350 250 3.6	36,640	(10,280)	5,911	–
2013	70,193	60%	28,077	500	2,069	0	26,508	1,800 900 16.6	240 107 2.9	3,500 602 5.3	6,000 2,919 3.1	3,000 700 12.1	49 9 0.09	13,200 7,000 CP	10 1.28 0.04	3,400 679 3.2	11,000 8,000 71.9	350 251 3.5	36,650	(10,141)	6,200	(16,341)
2014	71,659	60%	28,664	700	2,069	0	27,295	1,800 1,000 16.3	240 111 2.9	3,500 620 5.1	6,000 4,000 1.8	3,000 800 11.8	49 10 0.09		10 1.32 0.04	3,400 699 3.0	11,000 9,000 69.1	350 259 6.0 E	23,499	3,797	7,500	(3,703)
2015	73,087	60%	29,235	700	2,069	0	27,866	1,800 1,100 16.0	240 113 2.8	3,500 633 4.9	12,000 5,000 0.3	3,000 900 12.3	49 10 0.08		10 1.35 0.04	3,400 713 2.8	11,000 10,000 65.9	350 264 5.9	29,534	(1,668)	10,000	(11,668)
2016	74,368	60%	29,747	700	2,069	0	28,379	1,800 1,200 15.6	240 115 2.8	3,500 644 4.7	12,000 6,000 57.9 E	3,000 1,000 12.0	49 10 0.08		10 1.37 0.04	3,400 726 2.5	11,000 11,000 62.5	350 269 5.9	29,566	(1,187)	11,000	(12,187)
2017	75,469	60%	30,188	700	2,069	1,300	27,519	1,800 1,300 15.2	240 112 2.8	3,500 625 4.5	12,000 7,000 55.7	3,000 1,100 11.7	49 10 0.08		10 1.33 0.04	3,400 704 2.3	11,000 11,000 59.1	350 261 5.8	29,513	(1,993)	12,000	(13,993)
2018	76,516	60%	30,607	700	2,069	1,300	27,938	1,800 1,400 14.8	240 113 2.7	3,500 634 4.3	12,000 8,000 53.2	3,000 1,200 11.3	49 10 0.07		10 1.35 0.04	3,400 715 2.1	11,000 10,500 55.8	350 265 5.7	29,539	(1,601)	13,000	(14,601)
2019	77,511	60%	31,004	700	2,069	1,300	28,336	1,800 1,500 14.3	240 115 2.7	3,500 643 4.1	12,000 9,000 50.4	3,000 1,200 10.9	49 10 0.07		10 1.37 0.04	3,400 725 1.9	11,000 11,000 52.4	350 268 5.6	29,563	(1,228)	14,000	(15,228)
2020	78,750	60%	31,500	700	2,069	1,300	28,831	1,800 1,600 13.8	240 117 2.7	3,500 655 3.9	12,000 10,000 47.3	3,000 1,200 10.6	49 8 0.07		10 1.40 0.04	3,400 738 7.6 E	11,000 11,000 48.9	350 273 5.5	29,592	(761)	15,000	(15,761)
2021	79,072	61%	30,838	700	2,069	2,300	27,170	1,800 1,700 13.3	240 110 2.6	3,500 617 3.7	12,000 11,000 43.8	3,000 1,200 10.2	49 8 0.07		10 1.31 0.04	3,400 695 7.4	11,000 11,000 45.5	350 257 5.5	29,489	(2,319)	16,000	(18,319)
2022	79,805	62%	30,326	700	2,069	2,300	26,657	1,800 1,800 12.7	240 108 2.6	3,500 605 3.6	12,000 12,000 40.1	3,000 1,200 9.8	49 7 0.06		10 1.29 0.04	3,400 682 7.2	11,000 11,000 42.1	350 253 5.4	29,457	(2,800)	17,000	(19,800)
2023	80,667	63%	29,847	700	2,069	2,300	26,178	1,800 1,800 12.1	240 106 2.6	3,500 594 3.4	12,000 12,000 36.4	3,000 1,200 9.4	49 7 0.06		10 0.50 0.04	3,400 670 7.0	11,000 11,000 38.6	350 248 5.3	29,426	(3,248)	18,000	(21,248)
2024	81,786	64%	29,443	700	2,069	2,300	25,774	1,800 1,800 11.6	240 104 2.5	3,500 585 3.2	12,000 12,000 32.6	3,000 1,200 9.1	49 7 0.06		10 0.50 0.03	3,400 300 6.9	11,000 11,000 35.2	350 125 5.3	28,922	(3,148)	19,000	(22,148)
2025	82,474	65%	28,866	700	2,069	2,300	25,197	1,800 1,800 11.0	240 40 2.5	3,500 572 CP	12,000 12,000 28.9	3,000 1,200 8.7	49 7 0.06		10 0.50 0.03	3,400 300 6.8	11,000 11,000 31.8	350 125 5.2	28,845	(3,648)	19,000	(22,648)
2026	83,659	65%	29,281	700	2,069	2,300	25,612	1,800 1,800 10.5	240 40 2.5		12,000 12,000 25.1	3,000 1,200 8.3	49 7 0.06		10 0.50 0.03	3,400 300 6.7	11,000 11,000 28.3	350 125 5.2	28,273	(2,661)	19,000	(21,661)
2027	84,839	65%	29,693	700	2,069	2,300	26,025	1,800 1,800 9.9	240 40 2.5		12,000 12,000 21.4	3,000 1,200 7.9	49 2 0.05		10 0.50 0.03	3,400 300 6.6	11,000 11,000 24.9	350 125 5.1	28,268	(2,243)	19,000	(21,243)

ASSUMPTIONS:

1. Waste Generation is estimated using CalRecycle's Adjustment Methodology, utilizing population projection, employment and real taxable sales projections from UCLA's Longterm Forecast, August 2013.
2. Total Daily Available Capacity from Class III Landfills is calculated based on Maximum Permitted Daily Capacity (in blue text) for facilities without a restricted wasteshed or Expected Average Daily Tonnage for facilities with a restricted wasteshed.

LEGEND:

CC/CP -Closure due to exhausted capacity (CC) or permit expiration (CP)
E -Expansion may become effective
R -Restricted wasteshed

Source: Los Angeles County Department of Public Works, August 2013.

2012 ANNUAL REPORT
LOS ANGELES COUNTY COUNTYWIDE INTEGRATED WASTE MANAGEMENT PLAN

APPENDIX E-4

SCENARIO IX - BEST CASE (ALL SOLID WASTE MANAGEMENT OPTIONS CONSIDERED BECOME AVAILABLE)

- **Existing In-County Class III Landfills & Transformation Facilities**
- **Full Utilization of Out-of-County Disposal Capacity**
- **Proposed Expansions of In-County Class III Landfills**
- **Increase In Alternative Technology Capacity (up to 3,000 tpd by 2025)**
- **Maximizing Diversion Rate up to 75% by 2020**

Year	Waste Generation Rate[1]	Diversion Rate	Total Daily Disposal Demand	Imports from Other Counties	Daily Available Capacity from Transformation Facilities	Maximum Alternative Technology Capacity	Class III Landfill Daily Disposal Demand	1 Antelope Valley	2 Burbank R	3 Calabasas R	4 Chiquita	5 Lancaster	6 Pebbly Beach	7 Puente Hills	8 San Clemente R	9 Scholl R	10 Sunshine City/County	11 Whittier (Savage Canyon) R	Total Daily Available Capacity[2] from Class III Landfills	Export Need	Available Daily Out-of-County Disposal Capacity	Class III Landfill Daily Disposal Capacity Shortfall (Reserve)
								IN-COUNTY CLASS III LANDFILLS														
								Maximum Permitted Daily Capacity (tpd-6) Expected Average Daily Tonnage (tpd-6) Remaining Capacity at Year's End (Million Tons)														
	A	B	C=A(1-B)	D	E	F	G=C+D-E-F												H	I=G-H	J	K=I-J
	(tpd-6)		(tpd-6)	(tpd-6)	(tpd-6)	(tpd-6)	(tpd-6)												(tpd-6)	(tpd-6)	(tpd-6)	(tpd-6)
2012	69,007	60%	27,603	452	1,695	0	26,360	1,800	240	3,500	6,000	3,000	49	13,200	10	3,400	11,000	350	36,640	(10,280)	5,911	—
								808	107	599	2,903	667	9.3	6,872	1.28	675	7,541	250				
								16.9	3.0	5.5	4.0	12.3	0.09	6.10	0.04	3.4	74.4	3.6				
2013	70,193	61%	27,375	500	2,069	0	25,807	1,800	240	3,500	6,000	3,000	49	13,200	10	3,400	11,000	350	36,606	(10,799)	6,200	(16,999)
								900	105	586	2,842	700	9	7,000	1.25	661	8,000	244				
								25.6	2.9	5.3	3.1	12.1	0.09	CP	0.04	3.2	71.9	3.5				
2014	71,659	63%	26,514	700	2,069	0	25,145	1,800	240	3,500	6,000	3,000	49		10	3,400	11,000	350	23,365	1,781	7,500	(5,719)
								1,000	102	571	4,000	800	9		1.22	644	9,000	238				
								25.3	2.9	5.2	1.8	11.8	0.09		0.04	3.0	69.1	6.0 E				
2015	73,087	65%	25,580	700	2,069	0	24,212	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	29,307	(5,095)	10,000	(15,095)
								1,100	98	550	5,000	900	9		1.17	620	10,000	229				
								24.9	2.9	5.0	0.3	12.3	0.08		0.04	2.8	65.9	6.0				
2016	74,368	67%	24,541	700	2,069	0	23,173	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	29,242	(6,069)	11,000	(17,069)
								1,200	94	526	6,000	1,000	8		1.12	593	11,000	220				
								24.6	2.8	4.8	57.9 E	12.0	0.08		0.04	2.6	62.5	5.9				
2017	75,469	69%	23,395	700	2,069	0	22,027	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	29,171	(7,144)	12,000	(19,144)
								1,300	89	500	7,000	1,100	8		1.07	564	11,000	209				
								24.2	2.8	4.7	55.7	11.7	0.08		0.04	2.4	59.1	5.8				
2018	76,516	71%	22,190	700	2,069	600	20,221	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	28,992	(8,771)	13,000	(21,771)
								1,400	82	459	8,000	1,200	7		0.98	518	11,000	125				
								23.7	2.8	4.5	53.2	11.3	0.08		0.04	2.3	55.6	5.8				
2019	77,511	73%	20,928	700	2,069	700	18,859	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	28,737	(9,878)	14,000	(23,878)
								1,500	76	428	9,000	1,200	7		0.50	300	11,000	125				
								23.3	2.7	4.4	50.4	10.9	0.08		0.04	2.2	52.2	5.8				
2020	78,750	75%	19,687	700	2,069	800	17,519	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	28,701	(11,182)	15,000	(26,182)
								1,600	71	398	10,000	1,200	6		0.50	300	11,000	125				
								22.8	2.7	4.3	47.3	10.6	0.07		0.04	8.1 E	48.8	5.7				
2021	79,072	75%	19,768	700	2,069	900	17,499	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	28,700	(11,201)	16,000	(27,201)
								1,700	71	397	11,000	1,200	6		0.50	300	11,000	125				
								22.2	2.7	4.1	43.9	10.2	0.07		0.04	8.0	45.4	5.7				
2022	79,805	75%	19,951	700	2,069	1,000	17,583	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	28,702	(11,119)	16,000	(27,119)
								1,800	71	399	12,000	1,200	6		0.50	300	11,000	125				
								21.7	2.7	4.0	40.1	9.8	0.07		0.04	7.9	41.9	5.6				
2023	80,667	75%	20,167	700	2,069	1,800	16,998	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	28,644	(11,645)	16,000	(27,645)
								1,800	30	386	12,000	1,200	2		0.50	300	11,000	125				
								21.1	2.7	3.9	36.4	9.4	0.07		0.04	7.8	38.5	5.6				
2024	81,786	75%	20,446	700	2,069	2,800	16,278	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	28,627	(12,349)	16,000	(28,349)
								1,800	30	370	12,000	1,200	2		0.50	300	11,000	125				
								20.5	2.7	3.8	32.6	9.1	0.07		0.04	7.7	35.1	5.6				
2025	82,474	75%	20,618	700	2,069	3,000	16,250	1,800	240	3,500	12,000	3,000	49		10	3,400	11,000	350	28,627	(12,377)	16,000	(28,377)
								1,800	30	369	12,000	1,200	2		0.50	300	11,000	125				
								20.0	2.7	CP	28.9	8.7	0.07		0.04	7.6	31.6	5.5				
2026	83,659	75%	20,915	700	2,069	3,000	16,546	1,800	240		12,000	3,000	49		10	3,400	11,000	350	28,258	(11,711)	16,000	(27,711)
								1,800	30		12,000	1,200	2		0.50	300	11,000	125				
								19.4	2.6		25.1	8.3	0.07		0.04	7.5	28.2	5.5				
2027	84,839	75%	21,210	700	2,069	3,000	16,841	1,800	240		12,000	3,000	49		10	3,400	11,000	350	28,258	(11,416)	16,000	(27,416)
								1,800	30		12,000	1,200	2		0.50	300	11,000	125				
								18.9	2.6		21.4	7.9	0.07		0.04	7.4	24.8	5.4				

ASSUMPTIONS:

1. Waste Generation is estimated using CalRecycle's Adjustment Methodology, utilizing population projection, employment and real taxable sales projections from UCLA's Longterm Forecast, August 2013.
2. Total Daily Available Capacity from Class III Landfills is calculated based on Maximum Permitted Daily Capacity (in blue text) for facilities without a restricted wasteshed or Expected Average Daily Tonnage for facilities with a restricted wasteshed.

LEGEND:

CC/CP -Closure due to exhausted capacity (CC) or permit expiration (CP)
E -Expansion may become effective
R -Restricted wasteshed

Source: Los Angeles County Department of Public Works, August 2013.

Appendix E-5 Map of Transfer and Processing Facilities

Permitted Large Volume Solid Waste Transfer and Processing Facilities in Los Angeles County in 2012

Material Recovery Facility (Dirty)

	Facility Name	Location Address	Permitted Capacity (tpd)	Avg. Daily Tonnage (tpd)
1	Athens Services	14048 East Valley Boulevard, Industry, 91746	5,000	2,539
2	Athens Sun Valley MRF	11121 Pendleton Street, Sun Valley, 91352	1,500	145
3	California Waste Services, LLC	621 West 152nd Street, Gardena, 90247	1,000	300
4	City Terrace Recycling Transfer Station	1511-1525 Fishburn Avenue, City Terrace, 90063	700	280
5	Community Recycling & Resource Recovery, Inc.	9147 De Garmo Avenue, Sun Valley, 91352	1,119	(a) 41
6	Downey Area Recycling & Transfer	9770 Washburn Road, Downey, 90241	5,000	382
7	East Los Angeles Recycling And Transfer	1512 North Bonnie Beach Place, City Terrace, 90063	700	542
8	Falcon Refuse Center, Inc.	3031 East "I" Street, Wilmington, 90744	3,500	404
9	Grand Central Recycling & Transfer Station	999 Hatcher Boulevard, Industry, 91744	5,000	1,800
10	Puente Hills Materials Recovery Facility	2808 Workman Mill Road, Whittier, 90601	4,400	132
11	Waste Management South Gate Transfer Station	4489 Ardine Street, South Gate, 90280	2,000	323
12	Waste Resource Recovery	357 West Compton Boulevard, Gardena, 90248	500	236
		Total	**30,419**	**7,124**

Material Recovery Facility (Clean)

	Facility Name	Location Address	Permitted Capacity (tpd)	Avg. Daily Tonnage (tpd)
1	Allan Company Baldwin Park	14604-14618 Arrow Highway, Baldwin Park, 91706	960	54
2	City Fibers – West Valley Plant	16714 Schoenborn Street, Los Angeles, 91343	350	n/a
3	City Fibers - LA Plant No. 2	2545 East 25th Street Los Angeles, 90058	300	n/a
4	Los Angeles Express Materials Rec. Fac.	6625 Stanford Avenue, Los Angeles, 90001	260	(a) 142
5	Pico Rivera MRF	8405 Loch Lomand Drive, Pico Rivera, 91660	327	(a) 159
6	Sun Valley Paper Stock MRF and TS	8701 North San Fernando Road, Sun Valley, 91352	1,250	620
		Total	**3,447**	**975**

Footnote: (a) – Average Daily Tonnages are based on 2011 Annual Report.

Construction and Demolition/Processing[2]

	Facility Name	Location Address	Permitted Capacity (tpd)	Avg. Daily Tonnage (tpd)
1	Construction and Demolition Recycling	9309 Rayo Avenue, South Gate, 90280	3,000	n/a
2	Looney Bins/East Valley Diversion	11616 Sheldon Street, Sun Valley, 91352	750	261
3	Looney Bins/Downtown Diversion	2424 Olympic Boulevard, Los Angeles, 90021	1,500	396
		Total	**5,250**	**657**

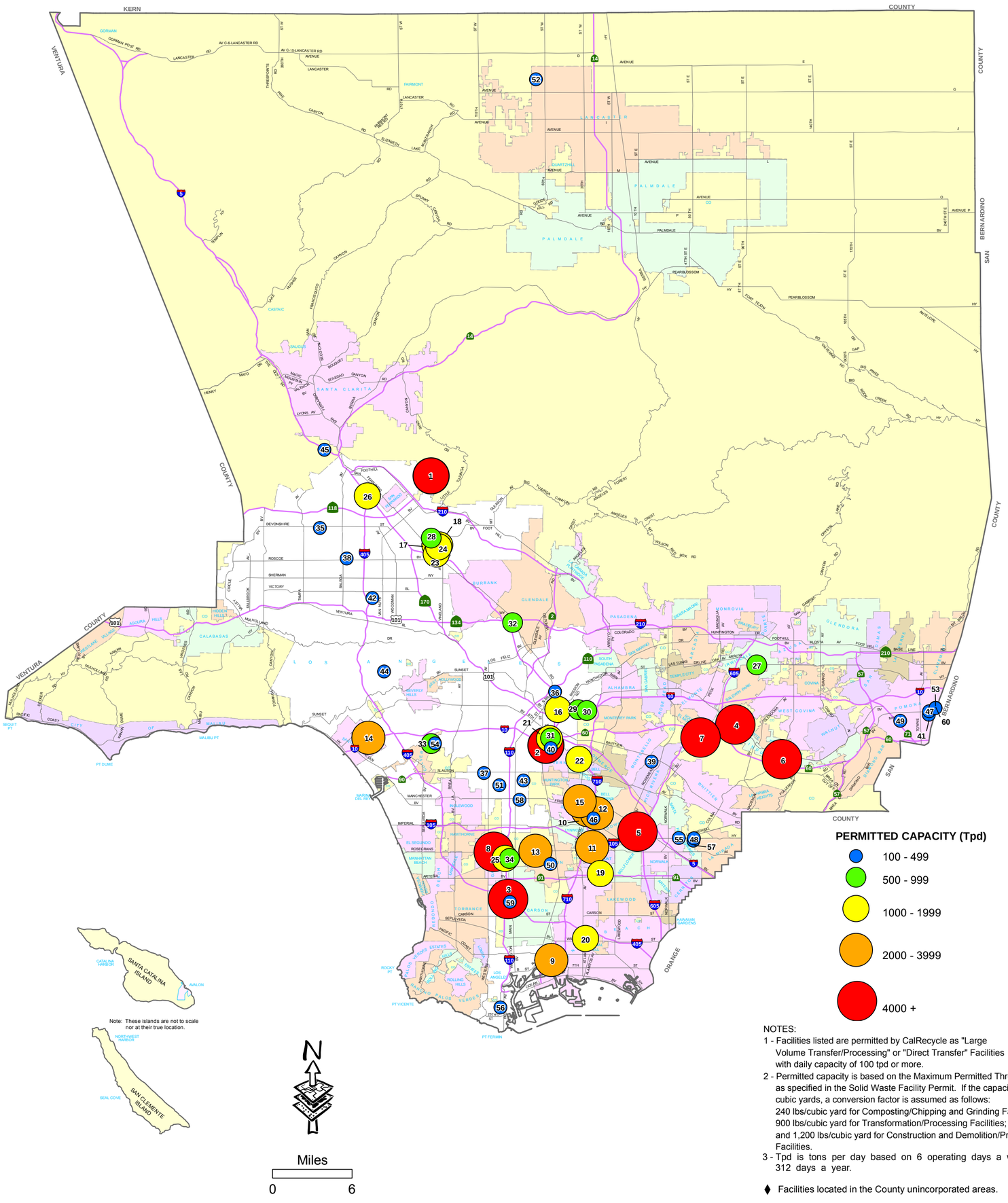
Composting/Chipping and Grinding Facility[2]

	Facility Name	Location Address	Permitted Capacity (tpd)	Avg. Daily Tonnage (tpd)
1	American Reclamation Chipping and Grinding	4560 Doran Street, Los Angeles, 90039	500	59
2	Burbank Green Waste Transfer Operation	3000 Bel Aire Drive, Burbank, 91504	200	74
3	Evergreen Recycling, Inc.	8700 Crocker St., Los Angeles, 90003	100	n/a
4	Foothill Soils, Inc.	22925 Coltrane Ave, Newhall, 91325	200	30
5	Greencycle, Inc.	12815 E. Imperial Hwy., Santa Fe Springs, 90670	135	n/a
6	GS Brothers, Inc.	20331 South Main Street, Carson, 90745	100	n/a
7	GWS, Inc.	10120 Miller Avenue, South Gate, 90280	200	8
8	Harbor Mulching Facility	1400 N Gaffey St., San Pedro, 90731	120	n/a
9	Lopez Canyon Environmental Center	11950 Lopez Canyon Road, Los Angeles, 91342	12,499	n/a
10	North Hills Recycling, Inc.	11700 Blucher Avenue, Granada Hills, 91345	1,000	385
11	Norwalk Industries Green Waste Operation	13780 East Imperial Highway, Santa Fe Springs, 90670	200	n/a
12	Ornales Wood Recovery, Inc.	6635 W. Avenue F, Lancaster, 93536	150	n/a
13	Pomona Municipal Chipping & Grinding Operation	1730 E. First St., Pomona, 91766	100	80
14	Recycled Wood Products	1313 E. Phillipes Blvd., Pomona, 91766	200	n/a
15	RJ's Alondra Chipping and Grinding Operation	355 W Alondra Blvd., Gardena, CA 90248	200	150
16	RJ`s Chipping and Grinding Operation	1135 East Florence Avenue, Inglewood, 90302	200	150
		Total	**16,104**	**936**

Notes: 1. Facilities listed are permitted by the CalRecycle as "Large Volume Transfer/Processing" or "Direct Transfer" Facilities with a permitted daily capacity of at least 100 tpd.
2. Facilities listed are permitted by CalRecycle with a minimum of 100 tpd of permitted capacity or maximum average allowed intake. If capacity is in cubic yards, a conversion factor is assumed as follows: 240 lbs/cubic yard for Composting/Chipping and Grinding facilities; 900 lbs/cubic yard for Transformation/Processing facilities; and 1,200 lbs/cubic yard for Composting/Chipping and Grinding facilities.
3. "n/a" mean Not Available.

Footnote: (a) Average Daily Tonnages are based on 2011 Annual Report.

Permitted Large Volume Solid Waste Transfer and Processing Facilities in Los Angeles County in 2012



Note: These islands are not to scale nor at their true location.

NOTES:

1 - Facilities listed are permitted by CalRecycle as "Large Volume Transfer/Processing" or "Direct Transfer" Facilities with daily capacity of 100 tpd or more.

2 - Permitted capacity is based on the Maximum Permitted Throughput as specified in the Solid Waste Facility Permit. If the capacity is in cubic yards, a conversion factor is assumed as follows:
240 lbs/cubic yard for Composting/Chipping and Grinding Facilities;
900 lbs/cubic yard for Transformation/Processing Facilities;
and 1,200 lbs/cubic yard for Construction and Demolition/Processing Facilities.

3 - Tpd is tons per day based on 6 operating days a week, 312 days a year.

♦ Facilities located in the County unincorporated areas.

△ Construction and Demolition/Processing facilities.

□ Composting/Chipping and Grinding facilities.

NO.	FACILITY NAME AND ADDRESS	PERMITTED CAPACITY (Tpd)
1	Lopez Canyon Environmental Center 11950 Lopez Canyon Road, Los Angeles, 91342	12,499 □ ♦
2	Central LA Recycling & Transfer Station 2201 Washington Boulevard, Los Angeles, 90034	5,500
3	Carson Transfer Station & Materials Recovery Facility 321 West Francisco Street, Carson, 90745	5,300
4	Athens Services 14048 East Valley Boulevard, Industry, 91746	5,000 ♦
5	Downey Area Recycling & Transfer 9770 Washburn Road, Downey, 90241	5,000
6	Grand Central Recycling & Transfer Station 999 Hatcher Boulevard, City of Industry, 91744	5,000
7	Puente Hills Materials Recovery Facility 2808 Workman Mill Road, Whittier, 90601	4,400 ♦
8	American Waste Transfer Station 1449 West Rosecrans Avenue, Gardena, 90247	4,032
9	Falcon Refuse Center, Inc. (Allied/BFI Waste Systems, Falcon) 3031 East "I" Street, Wilmington, 90744	3,500
10	Construction and Demolition Recycling 9309 Rayo Avenue, South Gate, 90280	3,000 △
11	Paramount Resource Recycling Facility 7230 Petterson Lane, Paramount, 90723	2,450
12	South Gate Transfer Station 9530 South Garfield Avenue, South Gate, 90280	2,200
13	Compton Recycling & Transfer Station (Allied/BFI Waste Systems,Compton) 2509 West Rosecrans Avenue, Compton, 90220	2,160
14	Southern California Disposal Company Recycling & Transfer Station 1908 Frank Street, Santa Monica, 90404	2,112
15	Waste Management South Gate Transfer 4489 Ardine Street, South Gate, 90280	2,000
16	Mission Road Recycling & Transfer Station 840 South Mission Road, Los Angeles, 90033	1,785
17	Bradley East Transfer Station 9227 Tujunga Avenue, Sun Valley, 91352	1,640
18	Athens Sun Valley Materials Recycling & Transfer Station 11121 Pendleton Street, Sun Valley, 91352	1,500
19	Bel-Art Waste Transfer Station 2501 East 68th Street, Long Beach, 90805	1,500
20	EDCO Recycling and Transfer 2755 California Avenue, Signal Hill, 90755	1,500
21	Looney Bins/Downtown Diversion 2424 Olympic Boulevard, Los Angeles, 90021	1,500 △
22	Innovative Waste Control 4133 Bandini Boulevard, Vernon, 90023	1,250
23	Sun Valley Paper Stock Materials Recovery Facility & Transfer Station 8701 North San Fernando Road, Sun Valley, 91352	1,250
24	Community Recycling & Resource Recovery, Inc. 9147 De Garmo Avenue, Sun Valley, 91352	1,119
25	California Waste Services, LLC 621 West 152nd Street, Gardena, 90247	1,000
26	North Hills Recycling, Inc. 11700 Blucher Avenue, Granada Hills, 91345	1,000 □
27	Allan Company Baldwin Park 14604-14618 Arrow Highway, Baldwin Park, 91706	960
28	Looney Bins/East Valley Diversion 11616 Sheldon Street, Sun Valley, 91352	750 △
29	City Terrace Recycling Transfer Station 1511-1525 Fishburn Avenue, City Terrace, 90063	700 ♦
30	East Los Angeles Recycling And Transfer 1512 North Bonnie Beach Place, City Terrace, 90063	700 ♦
31	Angelus Western Paper Fibers, Inc. 2474 Porter Street, Los Angeles, 90021	700
32	American Reclamation Chipping & Grinding 4560 Doran Street, Los Angeles, 90039	500 □
33	Culver City Transfer/Recycling Station 9255 West Jefferson Boulevard, Culver City, 90232	500
34	Waste Resource Recovery 357 West Compton Boulevard, Gardena, 90248	500 ♦
35	Granada Hills Street Maintenance District Yard 10210 Etiwanda Avenue, Northridge, 91325	460
36	East Street Maintenance District Yard 452 San Fernando Road, Los Angeles, 90065	460
37	Southwest Street Maintenance District Yard 5860 South Wilton Place, Los Angeles, 90047	460
38	City Fibers - West Valley Plant 16714 Schoenborn Street, Los Angeles, 91343	350
39	Pico Rivera MRF 8405 Loch Lomand Drive, Pico Rivera, 91660	327
40	City Fibers - LA Plant #2 2545 East 25th Street, Los Angeles, 90058	300
41	Mission Recycling/West Coast Recycling 1326 East Ninth Street, Pomona, 91766	300
42	Van Nuys Street Maintenance District Yard 15145 Oxnard Street, Van Nuys, 91411	300
43	Los Angeles Express Materials Rec. Fac. 6625 Stanford Avenue, Los Angeles, 90001	260
44	Burbank Green Waste Transfer Operation 3000 Bel Aire Drive, Burbank, 91504	200 □
45	Foothill Soils, Inc. 22925 Coltrane Avenue, Newhall, 91325	200 □ ♦
46	GWS, Inc. 10120 Miller Avenue, South Gate, 90280	200 □
47	Mission Recycling/West Coast Recycling 1341 East Mission Boulevard, Pomona, 91766	200
48	Norwalk Industries Green Waste Operation 13780 East Imperial Highway, Santa Fe Springs, 90670	200 □
49	Recycled Wood Products 1313 East Phillipes Boulevard, Pomona 91766	200 □
50	RJ's Alondra Chipping & Grinding Operation 355 West Alondra Boulevard, Gardena, 90248	200 □
51	RJ's Chipping & Grinding Operation 1135 East Florence Avenue, Inglewood 90302	200 □
52	Ornales Wood Recovery, Inc. 6635 West Avenue F, Lancaster, 93536	150 □
53	Pomona Municipal Direct Transfer Facility 1730 East First Street, Pomona, 91766	150
54	Western District Satellite Yard 6000 West Jefferson Boulevard, Los Angeles, 90016	149
55	Greencycle, Inc. 12815 East Imperial Highway, Santa Fe Springs, 90670	135 □
56	Harbor Mulching Facility 1400 North Gaffey Street, San Pedro, 90731	120 □
57	Norwalk Transfer Station 13780 East Imperial Highway, Santa Fe Springs, 90670	113
58	Evergreen Recycling, Inc. 8700 Crocker Street, Los Angeles, 90003	100 □
59	GS Brothers, Inc. 20331 South Main Street, Carson, 90745	100 □
60	Pomona Municipal Chipping & Grinding Operation 1730 East First Street, Pomona, 91766	100 □

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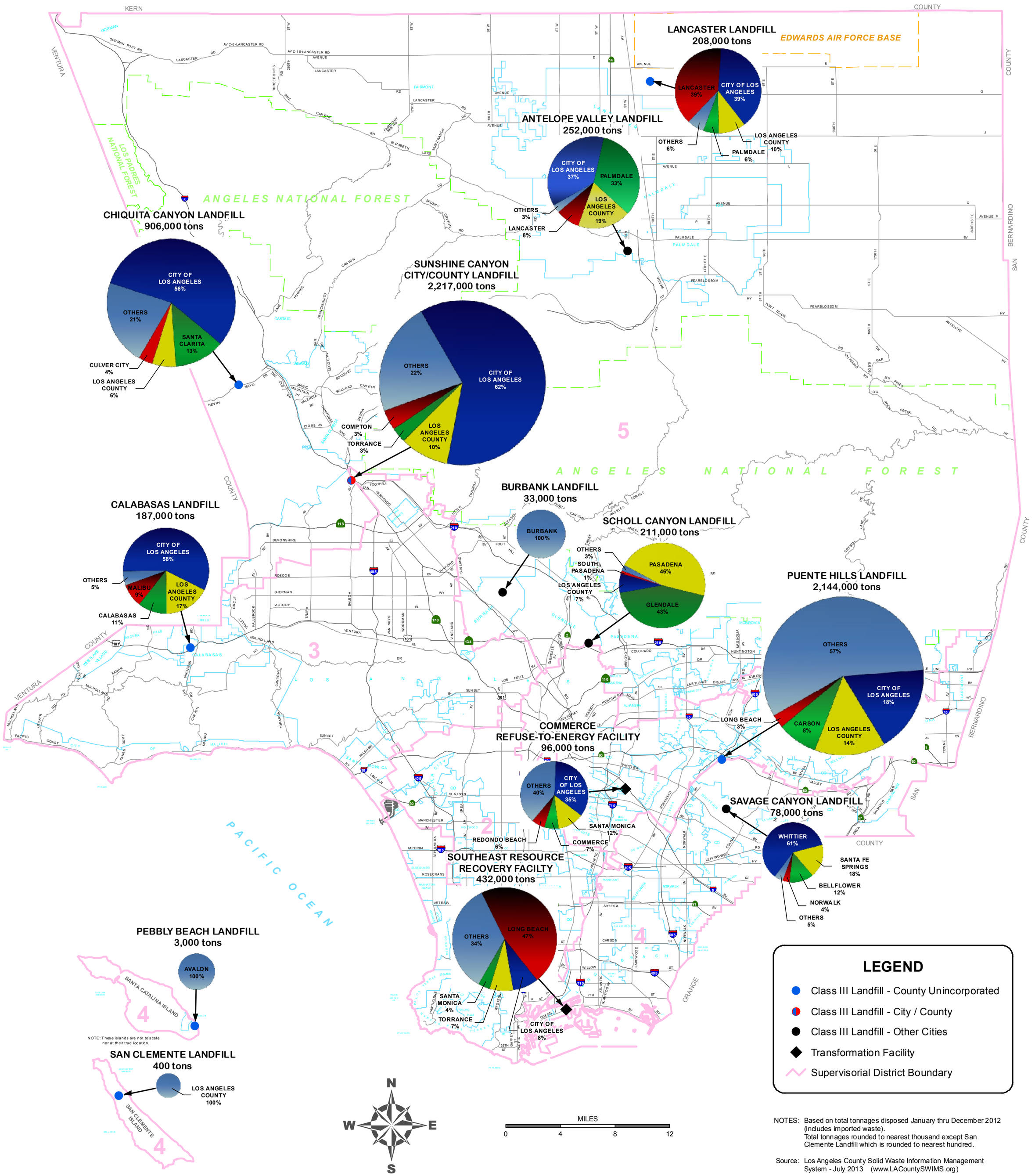
Survey/Mapping and Property Management Division, Mapping and GIS Services Section

Appendix E-6 Map of Landfills

WASTE DISPOSAL BY JURISDICTION OF ORIGIN AT PERMITTED MUNICIPAL SOLID WASTE FACILITIES IN LOS ANGELES COUNTY 2012



LEGEND

- Class III Landfill - County Unincorporated
- Class III Landfill - City / County
- Class III Landfill - Other Cities
- Transformation Facility
- Supervisorial District Boundary

NOTES: Based on total tonnages disposed January thru December 2012 (includes imported waste).
Total tonnages rounded to nearest thousand except San Clemente Landfill which is rounded to nearest hundred.

Source: Los Angeles County Solid Waste Information Management System - July 2013 (www.LACountySWIMS.org)

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Survey/Mapping & Property Management Division, Mapping & GIS Services Section