Appendix E

Geotechnical Feasibility Assessment
July 15, 2021
Project No. 20-2730

Kornerstone Park, LLC
2500 East Ball Road, Suite 260
Anaheim, California 92806

Attention: Mr. Abdul Saquib

Subject: Geotechnical Feasibility Assessment, Proposed Palmyra Cemetery, 2205 E. Palmyra Avenue and 290 South Yorba Street, Orange, California.

Dear Mr. Saquib:

Per your request, presented herewith is Hamilton & Associates, Inc. (H&A) Geotechnical Feasibility Assessment Report for the subject project. H&A’s work was conducted in accordance with our change order dated May 11, 2021 and your subsequent authorization. The accompanying geotechnical feasibility assessment presents a review of available geotechnical data and reports with conclusions and preliminary recommendations regarding cemetery development of the site. Our findings indicate that the study area is suitable for the proposed redevelopment of the site provided the preliminary recommendations and guidelines provided in this report are implemented during project planning. Additional design-level geotechnical exploration services will be required for building department level grading plan preparation, construction, and foundation design. We are pleased to have been of service to you on this project and are prepared to consult further with you and your design team as the project progresses.

Respectfully submitted,

HAMILTON & ASSOCIATES, INC.

Andrew Sover
Staff Engineer

David T. Hamilton, PE, GE
President/Geotechnical Engineer
# Table of Contents

**Introduction** ....................................................................................................................................... 1

**Project Description** ............................................................................................................................ 1

- Project Concept .................................................................................................................................. 1
- Existing Site Conditions and Background ......................................................................................... 2
- Structural Loading .............................................................................................................................. 2

**Review of Available Reports** ............................................................................................................ 2

**Historical Topographic Maps and Aerial Photographs** .................................................................... 7

**Field Exploration and Laboratory Testing** ....................................................................................... 8

- Field Exploration ............................................................................................................................... 8
- Laboratory Testing .............................................................................................................................. 9

**Site and Subsurface Conditions** ...................................................................................................... 9

- Geologic Setting ............................................................................................................................... 9
- Geologic Materials ........................................................................................................................... 10

- Fill (Af) ............................................................................................................................................... 10
- Landfill (Municipal Solid Waste, Burnt Debris, Construction Debris, Soil) .................................... 10
- Young Alluvial Fan Deposits (Qyfssa and Qyfsg) ............................................................................. 10

**Field Observations** .......................................................................................................................... 10

**Manometer Floor Level Survey** ......................................................................................................... 11

**Groundwater and Caving** ................................................................................................................ 11

**Seismological and Geologic Hazards** .............................................................................................. 12

- Ground Shaking Analysis .................................................................................................................. 12
- Surface Fault Rupture ........................................................................................................................ 12
- Seismic Settlements (Liquefaction) ..................................................................................................... 12
- Seismically Induced Landslides ......................................................................................................... 12
- Expansive Soils ................................................................................................................................. 13

**Discussion, Conclusions and Recommendations** ........................................................................... 13

**Site Preparation and Grading** ......................................................................................................... 15

- Existing Construction Debris, Disturbed Soils .................................................................................. 15
- Remedial Grading .............................................................................................................................. 15
- New Fills ........................................................................................................................................... 15
- Backfilling and Compaction Requirements ...................................................................................... 16
- Imported Soils ................................................................................................................................... 16
- Observation and Testing During Construction ................................................................................. 16

**Foundation Design** .......................................................................................................................... 17

- Foundation Capacity ......................................................................................................................... 17
- Lateral Resistance .............................................................................................................................. 18
- Foundation Settlements/Displacements ............................................................................................ 18

**Seismic Design Parameters** ............................................................................................................ 18

**Retaining Walls** .............................................................................................................................. 19

**Pavement, Paths, Slab-on-Grade** ..................................................................................................... 20

**Asphalt Pavement** ............................................................................................................................ 20

**Site Drainage** ................................................................................................................................... 22
UTILITY TRENCHES .......................................................................................................................... 22
PLAN REVIEW, OBSERVATIONS AND TESTING ................................................................. 22

CLOSURE ................................................................................................................................. 22

FIGURES
Figure 1 – Site Location Map
Figure 2 – Regional Geology Map
Figure 3 – Regional Fault Map
Figure 4 – Seismic Hazard Zones Map
Figure 5 – Landslide Inventory Map
Figure 6 – Historic High Groundwater

REFERENCES

APPENDIX
Appendix A – Geotechnical / Geological Plates
Appendix B – Borings and Test Pits by Others
INTRODUCTION

This report presents the results of H&A’s geotechnical feasibility assessment for the Project (described below in Project Concept) to be conducted at 2205 E. Palmyra Avenue, and 290 South Yorba Street, Orange, California, approximately 33.7839°N, 117.8300°W (Site). Figure 1, “Site Location Map” presents the Site’s location.

Preliminary geotechnical recommendations for design and construction of the Project were developed based on the review of select published and unpublished literature, including previous field investigation and laboratory analysis by others. This report summarizes the data collected and presents geotechnical findings, conclusions, and recommendations. The information presented in this report may be used for general land planning and entitlement purposes.

PROJECT DESCRIPTION

The Project concept was provided during conversations and in emails with Mr. Abdul Saquib, Owner’s Representative and Mr. Rick Fox, Project Architect. Plans of the proposed project were provided to H&A for this report.

Project Concept

It is H&A’s understanding that the Project will consist of a new cemetery development as presented on Plate A-1a, “Architectural Site Plan” and Plate A-1b “Grading Plan”.

The usable portion of the site will be developed to accommodate approximately 3,500 gravesites, an outdoor gathering area north of the building, vehicle parking, a loading zone, and pedestrian paths of travel.

The basic site planning module for grave sites is 4’ x 8’ which allows space for individual liners and a narrow space between them. Each gravesite will be excavated to approximately 5 feet below ground surface (bgs), and a 2-foot buffer is proposed between the underlying landfill and gravesite. A concrete bottomless frame will be placed at the bottom of each gravesite. The bodies will be placed within the concrete frame, filled with soil, and closed with a concrete lid. The remaining portion of each gravesite will then be backfilled and compacted with soil.

A small storage shed is proposed (20’ x 40’) for the storage of excavation equipment, and miscellaneous cemetery supplies such as pre-cast grave liners, pebbles, and headstones.
Open the Topo program by going through Hamilton Team Folder – Programs – TOPO! – TOPO application file.
The existing building will be re-purposed to provide support for several activities central to funeral and burial practice, as well as administrative offices needed to operate the cemetery. A small portion of the first floor (124 +/- SF) will be demolished and removed, thereby reducing the total existing building area to 5,138 SF. A significant portion of the first-floor interior (approx. 1,540 SF) will be devoted to the Prayer Hall and Women’s Prayer Room. The remainder of the first floor will consist of the Bathing Room, Viewing Room, and other miscellaneous support spaces. The second floor will be used exclusively for business and administrative offices accessed only by staff.

**Existing Site Conditions and Background**

The 5.95 acre irregularly shaped site is generally bounded by the Orange Dog Park to the north, the Orange Unified School District Child Development Center to the east, Palmyra Avenue and residential lots to the south, and the California State Route 55 freeway and Santiago Creek Bank and Bike Path to the west (Figure 1).

Portions of the Site consist of an old landfill operated by County of Orange for waste disposal activities from approximately 1953-1956, while other offsite landfill operations took place from 1946-1956 and included green waste, construction debris, municipal solid waste, and burnt debris.

The site consists of an abandoned YMCA property that was built in approximately 1972 and includes: an abandoned YMCA building; a parking lot to the southeast; a BMX bicycle track to the north; a soccer field to the south-southeast; and outdoor fields to the south.

With the exception of the BMX track, which consists of a variety of 5- to 10-ft constructed soil mounds, the ground surface of the Site is generally flat (gently undulating, minor slopes).

**Structural Loading**

In the absence of actual structural loading information, we will assume that the proposed shed and retaining walls will be supported by shallow conventional foundations with maximum continuous and spread footing loads on the order of 2 kips per linear foot and 10 kips, respectively.

**REVIEW OF AVAILABLE REPORTS**

H&A reviewed select available reports, documents and maps pertinent to the Project. The purpose of records review was to obtain any potential geotechnical information regarding the Site and incorporate it into this report. A list of reviewed documents obtained or provided to H&A by other design team members are provided in the “References” section.
of this report. A summary of pertinent documents and information is provided below. Excerpts of pertinent data from reports is provided in Appendix B.

**July 1972 YMCA/Woodward-McNeill & Associates Geotechnical Investigation & Addendums**

In June of 1972, Woodward-McNeill excavated 3 borings on the Site ranging in depth from 52 to 89 feet. The borings were excavated using a 6-in continuous flight auger. Disturbed samples of rubbish were obtained from the cuttings and drive tube samples of native soils were obtained. Boring logs were not included in the report however findings of the field investigation were summarized as such:

- Newspapers and magazines were 13 to 15 years old and still readable
- Temperatures were reported to be 91.5°F.
- Rubbish did not appear to contain highly bio-degradable material and mainly contained construction debris and paper
- Water content of rubbish was relatively low.

In the vicinity of the of the proposed structure, existing YMCA building, indicate depth of refuse was approximately 25 feet. Drilling was difficult due to heavy large construction debris. Soils beneath the rubbish consisted of about 7 feet of medium dense silty sands under which lie dense to very dense clayey gravels to maximum depth explored of 89 feet.

The report recommended that the proposed structure be supported on driven piles and utilities should be flexible to account for future possible settlement of the refuse. The proposed structure floor should be sealed to prevent possible methane gas and venting it out from under the building. At a minimum, four feet of fill should exist between the foundation and refuse.

Woodward-McNeill provided a map with the location of the 3 mentioned borings, 7 test pits, and an approximation of the location of rubbish fill. A typical drawing of pile supported floor with a barrier and ventilation system was also obtained. It is unknown if this was provided with the original report or as an addendum. No other figures referenced in the report or following addendums were obtained by H&A.

An addendum to the report prepared in July 1972 recommend that the floor be a raised structural floor either wood deck or concrete slab due to possible settlement under the proposed structure. Recommendations were for the proposed fill under the structure to extend out from the structure a distance of 2 times the maximum depth.
A second addendum to the geotechnical report was prepared in January 1973 detailing a conversation on pile specifications and barrier under the floor and ventilation system specifications.

Based on a letter dated March 5, 1973, driven piles were in the process of installation on the Site beginning sometime around February or March 1973.

What may be a portion of a set of foundation plans was obtained by H&A. While very faded information obtained from the plans suggest that piles were capped with gradebeams that had 2-inch diameter plastic pipes running through crushed rock with 10ml visqueen barriers beneath the slabs. A pile schedule on the plan suggests that piles are on the order of 40 feet to 44 feet in length, depending on the pile type chosen.

1972 LA. Biven Grading Plans
A set of grading and drainage plans, dated December 12, 1972 for the proposed YMCA development were reviewed by H&A. A note for the teen center called for removal and recompaction of 6.6 feet of soil below finish floor elevation and recompact with clean fill to 90%. Also noted was that waste, inflammable waste, vegetation, and refuse shall be removed prior to grading. No compaction reports or as-built plans were obtained by this firm.

Based on a letter obtained by this firm it appears that driven piles were installed on the Site sometime around February 1973, however Woodward-McNeill was not retained to perform observation of pile driving operations. No compaction reports or as-built plans were available.

1991 Earth Technology
Earth Tech (ET) investigated the La Veta Landfill, Site, in an effort to determine if the landfill material would affect groundwater quality in the area. Four groundwater monitoring wells were drilled from October 10 to November 20, 1990, to depths of 247 to 253 feet below the ground surface. Soil samples were collected at 5 feet intervals from 5 feet to 100 feet and 20 foot intervals until termination. Copies of the pertinent boring logs are presented in Appendix B. Water levels at the Site, measured by onsite monitoring wells, indicate that water resides in a confined aquifer 220 feet below the surface, and it flows from north to south. Approximately 50 feet of clay overlie the aquifer. Based on testing and monitoring of the Site it was determined that the landfill is not affecting groundwater quality below the Site. It was noted in ET report that based on their interpretation of aerial photos and research that the northwest portion of the La Veta landfill, subject Site, likely had construction debris placed in the excavation along the creek bed side to aid in
reducing erosion from the Santiago Creek. Refuse was noted as not being placed in the creek bed.

April 2007 California Integrated Waste Management Board Work Plan
The California Integrated Waste Management Board (CIWMB) prepared a report in April 2007 to assess the YMCA site and attempt to determine the footprint of the waste and potential for methane gas to impact the onsite structures or if it was mitigating to nearby areas. Gas monitoring wells were installed. A thorough review of prior documents was performed by the CIWMB in preparation of their report. Review of the 1997 report by Orange County Water District/TRG noted that approximately four feet of soil covered fill material and landfill debris was present up to 22 feet. Under landfill red sandy clay was encountered. The top 10 feet of landfill material contained auto parts, yard clippings, construction debris, wood scraps, newspapers, tin cans and glass bottles. Lower 10 feet contained construction debris, wood chips, soil matrix and newspaper. Review of the 2005 report prepared by US EPA/Weston Solutions noted the subsidence in the parking lot. Additional environmental reports were reviewed by CIWMB but are not listed here as no other geotechnical pertinent data was mentioned. Exhibits and data provided in the work plan are provided in Appendix B.

Geosyntec Reports
Geosyntec performed multiple studies on the Site primarily concerned with the potential of harmful gases. Some studies included soil sampling and summaries are provided here.

2009 Santiago Creek Bed Borings On December 3rd and 4th 2009, Geosyntec advanced 7 borings to depths of 15 to 20 feet along the Santiago Creek bed. Attempts were made to hand auger the first 5 feet but were unsuccessful. A direct push drill rig was used to core each borehole. Of these borings two were located to the west of the Site along the creek bed. Material encountered in the borings near the Site consisted of fill silty sands, likely from CA-55 construction, to depths of 17.5 feet and 15 respectively. SS-2 had a small layer, 0.25 feet, of burned material at a depth of 13 feet below ground surface. Data from this report is provided in Appendix B.

2010 Revised Site Assessment Report Geosyntec drilled a total of 37 soil borings mainly via the use Geoprobe® 6600 and 6610 DT direct-push drill rigs. Soil cores were continuously recovered using a 4 ft sampler lined with acetate sleeves and were advanced to a depth of at least 15 ft bgs. If waste was observed, the boring was advanced to a depth of approximately 5 ft below the observable base of waste. Samples and observations were made of the material which included native soils, fill soils, burned material, and municipal solid waste (MSW). Boring logs from this report are presented in Appendix B. Waste materials, consisting of either fill soil with burnt debris, fill soil with
MSW, or fill soil with a combination of burnt debris and MSW, were observed in 15 of the 37 borings drilled at the Site. Remaining borings were observed to contain native and/or fill soils. Where observed at the YMCA site waste material was generally covered by 5 feet of soil.

**February 19, 2020 Ardent Environmental Group, Inc., Draft Report**

On November 19, 2019, a preliminary geophysical survey was completed by Subsurface Surveys & Associates (SSS) to attempt to identify the distance of the surface to the landfill debris in the northern portion of the site. The results of the survey were also compared to the former soil borings drilled by Geosyntec. Based on the results of the preliminary geophysical survey data, SSS indicated that clear evidence of the landfill debris/soil interface was not identified. SSS also compared the geophysical survey data to the Geosyntec soil boring logs; however, SSS could not identify a strong correlation, likely as a result of the margin of error in Geosyntec’s boring location map and surface elevation changes over the last 10 years. Based on these results, the site-wide geophysical survey was not completed, and Ardent recommended the excavation of test pits in select areas of the site to further assess the depth to the top of the landfill debris.

In January 2020, a total of 54 test pits were excavated in select areas of the proposed cemetery. The test pits were approximately 9 to 57 feet in length and excavated to depths of up to 10 feet bgs.

Test pits TP1 through TP22 were excavated in the northern portion of the site in the area of the former BMX track. The depth to the landfill debris ranged from approximately 5 to 9 feet bgs. Shallow zones of construction debris were also noted from approximately 3 to 9 feet bgs in select areas. The zone of construction debris was not consistent and was mostly soil with an intermittent mix of small to large concrete waste, brick, and rebar. The landfill debris consisted of municipal waste and was generally observed as a more consistent layer.

Test pits TP23 through TP51 were excavated in the southern portion of the site in the area of the soccer field. The landfill debris was generally encountered at approximately 6 to 9 feet bgs, with a few shallower zones observed. Shallow construction debris from approximately 1 to 6 feet bgs was also observed in sporadic locations throughout the southern portion of the site. The landfill debris consisted of materials similar to those noted in the northern portion of the site.

The report recommended that importing two to three feet of clean soil to obtain an approximate 7 to 8 foot zone of soil over the Site above potential landfill debris.
HISTORIC TOPOGRAPHIC MAPS AND AERIAL PHOTOGRAPHS

H&A reviewed historical United States Geological Survey (USGS) topographic maps, Anaheim Sheet 1896 and Orange Quadrangle 1935, 1949, and 1964. Portions of these maps are presented as Plates H-1 through H-4 “Historical Topographic Map” and are located in Appendix A.

The Site resides to the east of Santiago Creek, a major watercourse in Orange County that drains the Santa Ana Mountains before becoming a tributary of the Santa Ana River. The Santiago Creek lies approximately 15 to 20 feet below the Site.

Based on the topographic maps the Site and general area gently descend to the south-southwest. The Site appears to be relatively unchanged from the 1896 to 1949 topographic maps based on the contour expression.

The 1949 topographic map depicts a gravel pit to the northeast of the Site that is a present-day dog park.

It is noted that based on historical documents landfills in the vicinity were active from 1946-1956, with the subject Site active from 1953-1956. This is consistent with the 1949 topographic map, where no expression of site-specific landfill operation is present.

Historical aerial photographs spanning from 1931 to 1990 were reviewed and are presented on Plates H-5 through H-18 “Historical Aerial Photography” and are located in Appendix A.

The 1931, 1938 and 1939 aerial image shows the Site is in use for agricultural purposes. Land around the Site to the east and south is also in use as agricultural land.

In 1947 the Site has been cleared of vegetation and to the north the gravel pit appears to be in use with a haul road graded to the creek bed below. No landfill operations are evident at the Site at this time. Land around the Site remains in use as agricultural land.

The 1952 aerial image shows the Site has been excavated and haul roads appear to connect the Site to the gravel pit to the north. The 1953 and 1955 images suggest continued use of the Site. The 1957 image presents the Site as possibly having been filled in and no longer in active use.

The 1960 image depicts the Site cleared of vegetation and graded. The gravel pit to the north has also been graded.
The 1965 aerial image shows that the area is being developed with housing seen to the east and west of the Site.

The 1970 aerial depicts the lot to the east has begun development of what is the present day OUSD Child Development Center.

The 1973 aerial depicts a structure on the south portion of the Site however a majority of the Site remains undeveloped. At the time of this image, January 19, 1973, it does not appear that construction of the YMCA building has begun. A majority of the agricultural land has been developed into residential lots except for the plot directly to the south.

The 1974 aerial, dated December 9, 1974, depicts the present-day vacant YMCA building on the Site. The north portions of the Site appear to have been graded in a manner similar to what would become the BMX dirt track. The existing parking lot does not appear to have been completed at the time of this image. The residential lots to the south are in a state of development at this time.

The 1980 and 1990 aerial images show the Site similar to present day conditions.

Based an aerial imagery hosted by Google Earth, the southern structure was removed sometime in 2015 or early 2016.

**FIELD EXPLORATION AND LABORATORY TESTING**

This report utilizes pertinent geotechnical data from previous reports including field exploration, logging, sampling, and geotechnical testing of Site earth materials as presented on Plate A-1c, “Geotechnical Map”. Subsurface explorations as well as the surficial distribution of earth materials were presented based on drafting techniques and are approximate. This report is geotechnical only and did not include any evaluation or assessment of hazardous or toxic materials, which may or may not exist on or beneath the site.

**FIELD EXPLORATION**

No field exploration was conducted by H&A in preparation of this report. Prior field work performed by Woodward-McNeill, 1972, Earth Technology, 1991, CIWMB 2007, Geosyntec, 2010, and Ardent, 2020 was reviewed in preparation of this report.
LABORATORY TESTING
Laboratory testing of samples by prior firms consisted of environmental constituent testing in the soil or air at the Site. Limited geotechnical laboratory test data was obtained from reviewed records.

SITE AND SUBSURFACE CONDITIONS

GEOLOGIC SETTING
The Site is located within eastern limits of the City of Orange. Figure 2, “Regional Geology Map”, depicts the Site and vicinity as underlain by young alluvial fan deposits (Qyf5a).

The Site is located within a seismically active region of Southern California within the zone of influence of several active and potentially active faults. Review of selected maps published by the California Geologic Survey (CGS) and the United States Geologic Survey (USGS) include Figure 3 “Regional Fault Map” and Figure 4 “Seismic Hazards Map”. Review of the USGS Interactive Quaternary Faults database and the USGS Unified Hazard Tool, indicate that the faults of most influence to the Site are the:

- Elsinore Fault, located approximately 14 miles east of the Site and capable of a M6.5 earthquake,
- Whittier Fault, located approximately 8.8 miles northeast of the Site and capable of producing an M7.4 earthquake,
- Chino Hills Fault, located about 10 miles north of the Site and capable of producing a M6.6 earthquake,
- Peralta Hills Fault, located approximately 3.8 miles north of the Site and capable of producing a M6.8 earthquake.

At this time, the Elsinore, and Chino Hills are delineated as active by the CGS according to the Alquist-Priolo Earthquake Fault Zones Act and are currently zoned.

On January 17, 1994 the M6.7 Northridge earthquake occurred approximately 37 miles northwest of the subject site, at a focal depth of 17.5 km (10.9 miles), on a south-dipping blind thrust fault with no direct surface rupture. The M5.9 Whittier Narrows earthquake occurred October 1, 1987 approximately 27 miles northeast of the Site on a previously unknown, north-dipping blind thrust fault in the eastern Los Angeles region, with no recorded surface rupture (Woods, 1995). On February 9, 1971 the M6.5 San Fernando Earthquake occurred along previously mapped faults about 47 miles north of the Site, producing 12 miles of ground rupture. And, on March 10, 1933, the historic Long Beach M6.2 earthquake occurred approximately 18 miles southeast of the subject site (Zony,
Young alluvial-fan deposits (Holocene and late Pleistocene)—Unconsolidated to moderately consolidated silt, sand, pebbly cobbly sand, and bouldery alluvial-fan deposits having slightly to moderately dissected surfaces.

Old alluvial fan deposits (late to middle Pleistocene)—Reddish brown, gravel and sand alluvial fan deposits; indurated, commonly slightly dissected. In places includes thin alluvial fan deposits of Holocene age.
Site

Contour Interval 20 Feet

MAP EXPLANATION

OVERLAPPING EARTHQUAKE FAULT AND SEISMIC HAZARD ZONES

Overlap of Earthquake Fault Zone and Liquefaction Zone
Areas that are covered by both Earthquake Fault Zone and Liquefaction Zone.

Overlap of Earthquake Fault Zone and Earthquake-induced Landslide Zone
Areas that are covered by both Earthquake Fault Zone and Earthquake-induced Landslide Zone.

Note: Mitigation methods differ for each zone. AP Act only allows assistance. Seismic Hazard Mapping Act allows mitigation by engineering/geotechnical design as well as assistance.
1985). All of these earthquakes caused considerable damage near their epicenters and in surrounding cities.

Review of select geologic maps of the area published by the CGS and the United States Geologic Survey (USGS) depict no landslide on or near the Site as shown on Figure 2 and Figure 5, “Landslide Inventory Map”.

**GEOLOGIC MATERIALS**
Onsite earth materials underlying the Site were found to consist of artificial fill, landfill debris, and natural soils. The relationships of the various earth materials in the subsurface are illustrated in the “A” Plates in Appendix A at the end of this report. More detailed descriptions of the soils encountered, and conditions observed during the subsurface exploration are shown in the Boring Logs prepared by Earth Tech, CIWMB, GeoSyntec, 2010 and Test Pit Sections prepared by Ardent are included in Appendix B. Earth materials and geologic conditions described by the consultants above were reviewed and are described below.

**Fill (Af)**
Artificial (man-made) fill was encountered immediately beneath the surface in all borings and test pits, and generally consisted of Silty Sand to Silty Sand with Gravel and some cobbles. The fill was dry to moist and generally loose in consistency at the time of subsurface exploration.

**Landfill (Municipal Solid Waste, Burnt Debris, Construction Debris, Soil)**
Landfill debris was encountered below the fill and consisted of municipal solid waste, burnt debris or a combination, mixed with various amounts of sand, silt and gravel. The landfill included wood, glass, newspaper, cardboard, organic wood fragments, at times odorous. Landfill was generally loose in consistency at the time of subsurface exploration.

**Young Alluvial Fan Deposits (Qyfsa and Qyfag)**
Natural Young Alluvial Fan Deposits underlie the landfill. The Alluvial Fan Deposits generally consisted of silty sand, sandy silt, sand with gravel, gravel with sand, Native soils near the surface include some silt and clay. The natural soil was brown, yellowish brown and grayish brown, dry to moist, and loose to dense in consistency.

**FIELD OBSERVATIONS**
At the time of this report the site consisted of an abandoned YMCA property that was built in approximately 1972 and included an abandoned YMCA building; a parking lot to the southeast; remnants of a BMX bicycle track to the north a soccer field to the south-southeast; and outdoor fields to the south.
LANDSLIDE INVENTORY MAP

Landslide Types

- Debris Flow
- Debris Slide, Soil Slide, or Soil Topples
- Earth Flow
- Rock Fall, Rock Topples, or Soil Fall
- Rock Slide
- Rock Spread
- Debris Fan
- Uncertain
- Type Undifferentiated

Landslide Activity

- Scarp or Main Scarp
- Internal Scarp
- Debris Flow or Slide Scarp
- Debris Flow Track
- Gully or Rock Fall Chute
- Track or Rock Fall Source
- Inner Gorge
- Small Debris Flow Scarp or Track
- Small Slide Source, Type Undifferentiated
- Source Scarp

Produced from Landslide Inventory

Retrieved from https://maps.conservation.ca.gov/cgs/lsi/app/

Date retrieved: May 24, 2021


PROJECT: Kornerstone (Palmyra Cemetery)  PROJECT NO: 20-2730  DATE: July 2021

ADDRESS: 2205 E. Palmyra Avenue, Orange, California  FIGURE: 5
H&A was able to observe the interior and exterior of the YMCA building on numerous occasions and on the day of manometer floor level survey described below. The interior building walls and slabs were in relatively good condition and showed very little distress for a building of its age. Slabs exhibited only typical hairline cracks. Observations of the exterior showed that sidewalks were tilted and leaning away from the building. Small masonry retaining walls at the site were intact and in good condition.

MANOMETER FLOOR LEVEL SURVEY
On June 14, 2021, an interior floor level survey was performed inside the vacant YMCA building on site by using water level manometer equipment. A copy of the floor level survey is included on Plates M-1 and M-2 “Manometer Floor Level Survey” located in Appendix A.

The results of the survey indicated the structure is relatively level. The eastern restroom was identified as the lowest point of the structure. A total of maximum differential of 1.5 inches was recorded across the structure’s first floor, some of which is attributed to flooring and as-built conditions, such as sloping floors to drains in the restrooms. Another possibility for perimeter undulation could be small perimeter additions that may or may not have been pile supported.

Manometer readings were taken in the second-floor rooms of the structure. Readings indicate that there is approximately 1.5 inches of differential across each room, primarily attributed to framing and an exterior footprint that is extended or cantilevered outside the first floor.

GROUNDWATER AND CAVING
Groundwater was not encountered during the Geosyntec, 2010 and Ardent, 2020 field exploration to the total depth explored of 40 feet bgs. According to the State of California Seismic Hazard Zone Report No. 011 Figure 6, “Historic High Groundwater” indicates site historic high groundwater could be on the order of 20 to 30 feet bgs. Seasonal and long-term fluctuations in the groundwater conditions may occur as a result of variations in irrigation, rainfall, surface run-off and other factors. Earth Tech, 1991 drilled four (4) groundwater monitoring wells from October 10 to November 20, 1990, to depths of 247 to 253 feet below the ground surface. Water levels at the Site, measured by onsite monitoring wells, indicate that water resides in a confined aquifer 220 feet below the surface, and it flows from north to south. Approximately 50 feet of clay overlie the aquifer.

The potential for caving in excavations is likely due to the granular cohesionless nature of on-Site earth material and relatively loose conditions described in explorations.
HISTORIC HIGH GROUNDWATER (SHZR #011)

From: “Seismic Hazard Zone Report for the Orange 7.5 Minute Quadrangle, Los Angeles County, California” 1997

PROJECT: Kornerstone (Palmyra Cemetery)  PROJECT NO: 20-2730  DATE: July 2021
ADDRESS: 2205 E. Palmyra Avenue, Orange, California  FIGURE: 6
SEISMOLOGICAL AND GEOLOGIC HAZARDS

Ground Shaking Analysis
The Site was located within a seismically active region of Southern California, within the zone of influence of several active and potentially active fault systems. Neither the location nor magnitude of earthquakes could accurately be predicted at the time of this report. In the past, the Site has been periodically subject to moderate to intense earthquake-induced ground shaking from nearby faults. Considerable damage could occur at the Site and structural improvements during a strong seismic event. There are a number of faults in the area that were, at the time of this report, considered ‘active’ and that could produce moderate to strong ground shaking at the Site. The possibility of ground acceleration or shaking at the Site could be considered as approximately similar to the Southern California region as a whole. Based on the USGS Deaggregation Application (2014 V4.2.0), the peak ground acceleration for earth materials at the Site was reported to be 0.40g, with a 10% probability of being exceeded in 50 years, and 0.67g for a 2% probabilistic of exceedance in 50 years.

Surface Fault Rupture
The Site does not lie within a designated Alquist-Priolo Earthquake Fault Zone Figure 4. Therefore, the potential for surface fault rupture at the Site during the design life of onsite structures is considered low.

Seismic Settlements (Liquefaction)
The term “liquefaction” describes a phenomenon in which a saturated cohesionless soil loses strength and acquires a degree of mobility as a result of strong ground shaking during an earthquake. The factors known to influence liquefaction potential include soil type and depth, grain size, relative density, groundwater level, degree of saturation, and both the intensity and duration of ground shaking. Hazard data published by the State of California is presented on Figure 4 and indicates that the subject site is within an area identified as having a potential for soil liquefaction. Boring MW-3 (Earthtech, 1991) located in the gravel parking lot southeast of the YMCA building indicates that the upper 50+ feet of the subsurface consists of dense sands, gravels, clayey sands, and a stiff sandy clay layer. Material type and sample blow counts indicate low potential for liquefaction at the Site.

Seismically Induced Landslides
According to Figure 4 published by the State of California, the subject site is not indicated to lie within an area of potential for seismically induced landsliding. Based on site topographic conditions and published literature, the potential for earthquake-induced landslides in the future is considered low.
Expansive Soils

Expansive soils are soils that have a potential to swell or shrink based on the introduction or removal of water from the soil. Expansion occurs due to clay particles in the soil with some particular clays such as montmorillonite and bentonite having significant shrink and swelling capacity. Over time wet and dry season can cause clays to expand and shrink which can cause damage to structure, foundations, and hardscapes if proper construction and preventative measures are not taken.

Based on the reviewed reports and existing borings logs, fill and native soil on Site are generally classified as silty sand or sand with gravel. Silty sand and sand are considered to generally have “Low” soil expansion potential (EI<50) as defined in the latest edition of ASTM D4829. It is H&A’s opinion that a ‘Low’ soil expansion may be used in project planning. The degree of soil expansion should be confirmed by additional tests during or after rough grading operations.

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

This geotechnical feasibility assessment presents a review of available geotechnical data and reports with conclusions and preliminary recommendations regarding cemetery development of the site. Findings indicate that the study area is suitable for the proposed redevelopment. Additional “design-level” geotechnical exploration services will be required to update this report for building department level grading plan preparation, construction, and foundation design.

Geotechnical considerations for design and construction of the planned cemetery development include 1) the presence of loose undocumented artificial fill, 2) potential for decomposition and/or compression of landfill debris, including municipal solid waste, burnt debris and construction debris, 3) total and differential settlement, including short-term, long-term and seismic-induced, 4) preservation of landfill soil cover and surface drainage 5) expected long-term maintenance, repair, or replacement of various components of the proposed development.

The following discussion and preliminary geotechnical recommendations are provided:

- **End Use Landfill Site Development** The proposed cemetery is an excellent end-use development for the landfill Site. Gravesites are particularly compatible with potential total and differential landfill settlement. The gravesite section will ensure 2-feet of soil cap over landfill debris, and an additional 5 feet of cover. The ground surface of the gravesite development can be maintained to provide for surface drainage.
• **Existing Building** Records indicate the 1972 building foundation likely consists of piles that penetrate landfill and extend into underlying natural soil. The building foundation, slabs and walls are in relatively good condition. It is proposed that the existing YMCA building undergo remodel for cemetery use, without purview of a geotechnical report.

• **Landfill Limits** Portions of the perimeter site are outside the limits of buried landfill debris, which further facilitates development of a proposed new shed, storm water detention pipe, and westerly retaining walls using traditional grading and foundation systems.

• **Utilities** Records indicate that existing subsurface utilities within the structure footprint may be secured by a vault. During “design-level” assessment, existing utilities should be located and examined for their condition. Utility lines servicing the structure should be protected from bending stresses and increase in length due to potential differential settlements. Utility pipes should be designed as flexible as possible. Proposed utilities should avoid the existing parking lot area, which appears to have experienced past settlement, and new fill loading to raise grades will induce further settlement.

• **Settlements** Short- and long-term ground settlement can be attributed to several sources including presence of buried refuse, applied loads from new fills, new structure surcharge, settlement due to decomposition, loose fill and landfill matrix breakdown, hydro-settlement from concentrated water intrusion, or seismic.

• **Foundation / Ground Performance** In concept, pile supported structures through refuse and fill into natural soil typically exhibit less than ½ inch of settlement. Foundations located outside of refuse limits in firm natural soil or approved compacted fill typically experience less than 1 inch of settlement. Settlements in landfill portions of the site could be as large as 1- to 3-feet, depending on conditions. Therefore, planning should include long-term future maintenance, repair, or replacement of improvements, infrastructure, grade, pavement, landscaping, etc… Ideally, pavement, paths, drainage swales and gravesites should be soil (or flexible engineered) surfaces that can be easily maintained and leveled to preserve grade and drainage conditions.

• **New Fill Placement** It will be advantageous to place new fills as early as possible in the construction sequence to allow for settlement. Fill settlement shall be monitored by the geotechnical consultant during and following fill placement. The fill should be left in place until settlement monitoring shows desired results, possibly 2-months or more.

• **Stormwater** No stormwater infiltration systems are permitted at the landfill site.

• **Landfill Gas** As a reminder, in order to protect structures from gas accumulation, gas proofing and ventilation schemes should be incorporated in design. Gas and environmental aspects should be provided by other specialists.
The proposed shed is anticipated to be located outside the landfill footprint and may be supported by conventional foundations embedded into approved compacted fill, underlain by natural soil. The proposed easterly property line retaining wall and 72-inch diameter storm water storage pipe are anticipated to be located outside the landfill footprint and may be supported by approved compacted fill underlain by natural soil. Site retaining walls less than 3-feet that are located within or outside the landfill footprint, may be considered garden walls not under purview of the geotechnical report. Site retaining walls greater than 3 feet that are located within the refuse footprint, are recommended to be graded slopes or flexible reinforced earth walls. The following preliminary geotechnical recommendations are provided.

SITE PREPARATION AND GRADING

Existing Construction Debris, Disturbed Soils
Prior to grading operations, it will be necessary to remove designated existing construction, including any remaining buried obstructions, which may be in the areas of proposed construction. Concrete flatwork should also be removed from areas of proposed construction. Concrete fragments from Site demolition operations should be disposed of off-Site. Any disturbed soils in areas of proposed foundations and slab on grade construction should be reworked.

Remedial Grading
To provide support for the shed and easterly retaining wall/storm water storage pipe it is recommended that subgrade soil be over-excavated uniformly to a minimum depth of not less than 3 feet below footings/pipe and replaced with properly compacted fill. Prior to placement of fills, parking, paths, or landscaping, the upper 2 feet of site soils shall be excavated and replaced with properly compacted fill. Soils should be recompacted to a minimum of 90 percent relative compaction near optimum moisture content for granular soils and above optimum moisture content for clayey soils. A six-inch scarification and recompaction of in-place soils to 90 percent relative compaction above optimum moisture contents may be taken equivalent to six-inches of approved compacted fill, when computing total excavation requirements.

The depth of over excavation should be reviewed by the Geotechnical Consultant during construction. Any subsurface obstruction, buried structural elements, and unsuitable material encountered during grading, should be immediately brought to the attention of the Geotechnical Consultant for proper exposure, removal and processing, as recommended. Exposed excavation bottoms should be observed by the Geotechnical consultant or his representative.
New Fills
The upper two (2) feet of Site soils should be excavated and recompacted to a minimum of 90 percent relative compaction near optimum moisture content prior to placement of any new fills, where required, to achieve finish grade elevations. Exposed excavation bottoms should be scarified a minimum 6-inches and recompacted to at least 90 percent relative compaction at near optimum moisture content. Excavation bottoms should be firm and unyielding prior to backfilling.

Backfilling and Compaction Requirements
On-Site and import materials approved for use should be placed in horizontal lifts not exceeding 8-inches in loose thickness, moisture conditioned to near optimum moisture content for granular soil and above optimum moisture content for clayey soils and compacted to a minimum of 90 percent of the maximum dry density as determined by the latest edition of ASTM Test Method D1557. Existing Site soils, unless indicated otherwise, are considered suitable for re-use during Site grading and backfilling, provided they are free of debris, particles greater than 4 inches in maximum dimension, organic matter or other deleterious materials, and are to a suitable moisture condition to permit achieving the required compaction.

Imported Soils
Any imported soil required to complete grading operations should consist of predominantly granular material which exhibits an Expansion Index (“EI”) of less than 20 when tested in accordance ASTM Expansion Test Procedures and should be free of debris and particles greater than 4 inches in maximum dimension, organic matter or other deleterious materials, and should be approved by the Geotechnical Consultant or his representative. Potential import material should be identified, sampled and provided to the Geotechnical Consultant at least 72 hours prior to importation to the Site. Final acceptance of any imported soil will be based upon review and testing of the soil actually delivered to the Site.

Observation and Testing During Construction
All piles, grading, compaction, and backfill operations should be performed under the observation of and testing by the Geotechnical Consultant’s designated representative. The consultant should be notified at least two days in advance of the start of construction. A joint meeting between the contractor and geotechnical consultant is required prior to the start of construction to discuss specific procedures and scheduling.

Grading Observation and Testing
Prior to placing any fill the exposed excavation bottoms should be observed by the Project Geotechnical Consultant or their representative. If it is determined during grading that site
soils require overexcavation to greater depths for obtaining proper support for the proposed structure, this additional work should be performed in accordance with the recommendations of the Geotechnical Consultant. Any subsurface obstruction, buried structural elements, and unsuitable material encountered during grading, should be immediately brought to the attention of the Geotechnical Consultant for proper exposure, removal and processing, as recommended. Field moisture and density tests should be taken during grading in accordance with this report and local ordinances. All foundation excavations should be observed by the Geotechnical Consultant's representative to verify minimum embedment depths and competency of bearing soils. Such observations should be made prior to placement of any reinforcing steel or concrete.

**Settlement Monuments**
Monitoring monuments should be installed at the base of the fill to be reworked or placed. Monitoring monuments shall be protected from damage at all times during fill placement by survey stakes, barricades, flags, ribbon, etc. to protect and preserve the monuments throughout the time of fill placement. A typical monitoring monument can be assembled from 2-, 3-, or 5-foot threaded sections of pipe or conduit as the fill progresses in height. Monitoring the monuments during fill placement should be coordinated and directed by the Project Geotechnical Engineer and performed under direction of a California-Licensed Land Surveyor. The success of settlement monitoring depends on the geotechnical engineering firm’s ability to correctly monitor the performance of soils under the fill, and therefore proper installation and protection of instrumentation and accurate and timely readings is crucial to success.

**FOUNDATION DESIGN**
The proposed shed is anticipated to be located outside the landfill footprint and may be supported by conventional foundations embedded into approved compacted fill, underlain by natural soil. The proposed easterly property line retaining wall and 72-inch diameter storm water storage pipe are anticipated to be located outside the landfill footprint and may be supported by approved compacted fill underlain by natural soil. Site retaining walls less than 3-feet, located within or outside the landfill footprint, may be considered garden walls not under purview of the geotechnical report. Site retaining walls greater than 3 feet, located within the refuse footprint, are recommended to be graded slopes or flexible reinforced earth walls. Foundation design details such as concrete strength, reinforcements, etc. should be established by the Project Structural Engineer.

**Foundation Capacity**
A dead plus live load allowable bearing pressure of 1,500 pounds per square foot may be used in the design of both continuous and spread footings, when supported in approved compacted fill or firm natural soil. Recommended minimum footing embedment is 18
inches below lowest adjacent soil grade. The above bearing pressures may be increased by one-third when considering short term loading from wind or seismic forces.

**Lateral Resistance**
Resistance to lateral loads can be assumed to be provided by pressure acting on structural components in contact with approved compacted fill or natural soil. Lateral resistance on the sides of footings may be computed using a passive pressure of 200 pounds per square foot per foot embedment into approved compacted fill or natural soil, subject to a maximum of 2,000 pounds per square foot. Friction between the base of the footings and the underlying material may be assumed as 0.30. Friction and lateral pressure may be combined, provided either is limited to two-thirds of the allowable.

**Foundation Settlements/Displacements**
Total settlements for conventional foundations located outside the landfill footprint into approved compacted fill or natural soil and designed and constructed in accordance with the above criteria and supporting maximum assumed column and wall loads of 30 kips and 2 kips per linear foot, respectively, are not anticipated to exceed 1 inch. A differential settlement on the order of 3/4 inch is anticipated between similarly loaded pad footings and for continuous wall footings over a distance of approximately 30 feet.

**SEISMIC DESIGN PARAMETERS**
The Site-specific seismic design parameters were determined as a part of this study in accordance with the 2019 California Building Code, which is based on the 2018 International Building Code (IBC). Additionally, seismic design parameters were determined using the Applied Technology Council (ATC) website which uses the USGS Seismic Design Web Services for the hazard loads. The 2019 CBC seismic design parameters that apply to the Site are as follows:

<table>
<thead>
<tr>
<th>CBC Seismic Parameter</th>
<th>Value or Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Classification (per Table ASCE/SEI 7-10 Table 20.3-1)</td>
<td>D</td>
</tr>
<tr>
<td>Mapped Spectral Response at 0.2 Sec Acceleration, $S_s$</td>
<td>1.632</td>
</tr>
<tr>
<td>Mapped Spectral Response at 1.0 Sec Acceleration, $S_1$</td>
<td>0.591</td>
</tr>
<tr>
<td>Maximum Considered Earthquake Spectral Acceleration, $S_{MS}$</td>
<td>1.632</td>
</tr>
<tr>
<td>Maximum Considered Earthquake Spectral Acceleration, $S_{M1}$</td>
<td>*null</td>
</tr>
<tr>
<td>5-Percent Damped Design Spectral Acceleration, $S_{DS}$</td>
<td>1.088</td>
</tr>
<tr>
<td>5-Percent Damped Design Spectral Acceleration, $S_{D1}$</td>
<td>*null</td>
</tr>
</tbody>
</table>

*See ASCE 7-16 Section 11.4.8
The Structural Consultant should review the above parameters and the 2019 CBC to evaluate the seismic design. Final selection of design coefficients should be made by the structural consultant based on the local laws and ordinances, expected structure response, and the desired level of conservatism.

**RETAINING WALLS**

Retaining walls planned should be adequately designed to resist the lateral soil pressures and the anticipated construction loadings and service conditions. The earth pressure acting on retaining walls depends primarily on the allowable wall movement, type of backfill materials, backfill slopes, wall inclination, surcharges, and any hydrostatic pressure. The following equivalent fluid pressures are recommended for vertical walls with no hydrostatic pressure and no surcharge loading:

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Backfill Slope Behind Walls</th>
<th>EARTH PRESSURE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Equivalent Fluid Pressure (pcf)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Active(Cantilever)</td>
</tr>
<tr>
<td>Granular Non-Expansive</td>
<td>Level</td>
<td>40</td>
</tr>
</tbody>
</table>

These values are applicable for granular non-expansive fill soils placed between the wall sides and an imaginary plane rising at 45 degrees from below the edges (heel) of wall bottoms. The surcharge effect of anticipated loads on the wall backfill (e.g., traffic, construction equipment, footings) should be included in the wall design. Depending on whether the wall is free to deflect or restrained, 33 or 50 percent, respectively, of a maximum surcharge load located within a distance equal to the retained height of the wall should be used in design.

If it is determined that retaining walls require an additional seismic design pressure in accordance with the CBC, the following is provided for lateral earth pressures of site retaining walls. A resultant lateral force acting on proposed retaining walls as a result of seismic forces may be computed as 19 pcf-equivalent fluid pressure. This seismic resultant force may be applied to the retaining wall at a point located at $(2/3)H$, measured from the bottom of the wall.

Positive drainage measures should be incorporated in design. Retaining wall subdrains should be located below the basement slab elevation and consist of a minimum four-inch diameter perforated ABS-SDR-35 or PVC SCH-40, or equivalent, connected to similar non-perforated outlet pipe. The perforated portion of the pipe should be embedded in at least three cubic feet per lineal foot of 3/4 inch crushed rock or equivalent material which has been wrapped in fabric, consisting of Mirafi 140N or equivalent, and approved by the
Geotechnical Consultant. The filter fabric should overlap at least 12 inches at the ends of the fabric. Other subdrainage alternatives may be considered but should first be reviewed and approved by the Geotechnical Consultant prior to implementation.

**PAVEMENT, PATHS, SLAB-ON-GRADE**

Soil surface, such as decomposed granite, would be ideal for parking, walkways and paths.

Concrete slabs within the landfill footprint are subject to differential settlement. If flatwork is planned, at a minimum should be supported on properly compacted soils in accordance with the site preparation and grading section of this report. Slab subgrade soils should not be allowed to dry out and should be maintained at the placement moisture condition until concreting. From a geotechnical standpoint, as a minimum, slabs should be 6-inches thick and reinforced with #4 reinforcing bars spaced at 12-inches on center each way.

Slabs should be properly designed and reinforced for the construction and service loading conditions. The structural details, such as slab thickness, concrete strength, amount and type of reinforcements, joint spacing, etc., should be established by the Project Structural Engineer.

**ASPHALT PAVEMENT**

The finish grade at the subject site is anticipated to be underlain by compacted fill consisting of site “granular” soils, (and landfill at some locations). For preliminary pavement design purposes, an R-Value of 25 has been utilized considering the site soils as subgrade soils. Four (4) traffic indices (TI) of 4.5, 5.5, 7, and 9 together with the assumed minimum R-Value, have been assumed and utilized for the development of preliminary recommendations for the pavement sections. Analyses performed in accordance with the current edition of the Caltrans Highway Design Manual, and assuming compliance with site preparation recommendations, it is recommended that the following AC pavement structural sections be used.
Asphalt Pavement Design Summary

<table>
<thead>
<tr>
<th>Traffic Index (TI)</th>
<th>Pavement Section Alternatives</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AC$^{(1)}$ (inches)</td>
<td>AB$^{(2)}$ (inches)</td>
</tr>
<tr>
<td>4.5</td>
<td>4.0</td>
<td>4.0</td>
</tr>
<tr>
<td>5.5</td>
<td>4.0</td>
<td>6.0</td>
</tr>
<tr>
<td>7.0</td>
<td>5.0</td>
<td>9.0</td>
</tr>
<tr>
<td>9.0</td>
<td>5.0</td>
<td>15.0</td>
</tr>
</tbody>
</table>

(1) Asphalt Concrete (AC);  
(2) Aggregate Base (CAB or CMB), Green book section 200-2.2 and 200-2.4, respectively, compacted to at least 95% relative compaction.  
(3) Subgrade: The upper 24-inches of subgrade soils in pavement areas should be compacted to at least 90% relative compaction of the Modified Proctor (ASTM D1557), including deeper removal and recompaction of any encountered undocumented fill, as necessary.

Please be aware that the above preliminary pavement section recommendations have been established based purely on procedures stipulated in the Caltrans Manual. Local government authority should be consulted for minimum pavement section requirements and, if more stringent than that recommended by the Hamilton and Associates, be complied with.

It is recommended that R-Value testing be performed on representative soil samples after rough grading operations on the upper 2 feet to confirm/modify applicability of the above pavement sections.

The asphalt concrete pavement should be compacted to 95% of the unit weight as tested in accordance with the Hveem procedure. The asphalt concrete material shall conform to Type III, Class C2 or C3, of the Greenbook. All subgrade and aggregate base materials should be proof-rolled by heavy rubber tire equipment to verify that the subgrade and base grade are in a non-yielding condition.

If the paved areas are to be used during construction, or if the type and frequency of traffic is greater than assumed in the design, the pavement section should be re-evaluated for the anticipated traffic.

Kornerstone (Palmyra Cemetery)  
20-2730  
July 15, 2021
SITE DRAINAGE
For potential for total and differential settlement, larger than building code minimums should be considered for sloping ground. Building code minimums call for the ground immediately adjacent to buildings should be sloped away from the building at a slope of 5% for the first 10 feet. If physical obstructions or lot lines prohibit 10 feet of horizontal distance, the 5% slope should be provided to an alternate method of diverting water from the foundation system, such as swales (sloped at 2%). Impervious surfaces within 10 feet of the building foundation shall be sloped a minimum of 2% away from the building.

UTILITY TRENCHES
All trenches should be backfilled with approved fill material, compacted to relative compaction of not less than 90 percent of maximum density. Care should be taken during backfilling to prevent utility line damage. The on-Site soils may be used for backfilling utility trenches from one foot above the top of pipe to the surface, provided the material is free of organic matter and deleterious substances. Any soft and/or loose materials or fill encountered at a pipe invert should be removed and replaced with properly compacted fill or adequate bedding material. Imported soils for pipe bedding should consist of non-expansive granular soils. The walls of temporary construction trenches may not be stable when excavated nearly vertical due to the potential for caving. Shoring of excavation walls or flattening of slopes will be required for temporary excavations deeper than 4 feet. All work associated with trenches, excavations and shoring must conform to the State of California Safety Code.

PLAN REVIEW, OBSERVATIONS AND TESTING
As foundation and earthwork plans are completed, Hamilton & Associates should be retained to provide plan review for intent of our recommendations. The review will enable us to modify our recommendations should the final design conditions not be as we understand them. During construction, we should provide field observation and testing to check that Site preparation, grading, and foundation installation conform to the intent of our recommendations and to the project plans and specifications. As needed, during construction, we should be retained to consult on geotechnical questions, construction problems, and unanticipated conditions. This would allow us to develop supplemental recommendations as appropriate for the actual subsurface conditions encountered and the specific construction techniques. Furthermore, we would prepare a construction observation and testing report for the building department.

CLOSURE
This report has been prepared for the exclusive use of Kornerstone Park, LLC and their design team for the proposed project at the subject site. The report has not been prepared
for use by other parties and may not contain sufficient information for purposes of other parties.

The Owner or their representatives are responsible for ensuring the information and recommendations contained in this report are brought to the attention of the project engineers and architects, incorporated into the project plans, and implemented by project contractors. This report should be named on project grading plans as a part of the project specifications.

We request and recommend notification should any of the following occur:

1. Final plans for site development indicate utilization of areas not originally proposed for construction.
2. Structural loading conditions vary from those utilized for evaluation and preparation of this report.
3. The site is not developed within 12 months following the date of this report.
4. Change of ownership of property occurs.

If changes or delays do occur, this office should be notified and provided with finalized plans of site development for our review to enable us to provide the necessary recommendations for additional work and/or updating of the report. Any charges for such review and necessary recommendations would be at the prevailing rate at the time of performing review work.

The findings contained in this report are based upon our evaluation and interpretation of the information obtained from existing subsurface exploration. It had been assumed that the geotechnical conditions which exist across the area of study are indicative to those encountered in the subsurface exploration. However, no warranty is expressed or implied as to the conditions at locations or depths other than those excavated. Should any conditions encountered during construction differ from those described herein, this office should be contacted immediately for recommendations prior to continuation of work.

Our findings and recommendations were obtained in accordance with generally accepted current professional principles and local practice in geotechnical engineering and reflect our best professional judgment. We make no other warranty, either express or implied.

These recommendations are, however, dependent on the above assumption of proper quality control of construction. Geotechnical observations and testing should be provided on a continuous basis during temporary and foundation construction at the site to confirm design assumptions and to verify conformance with the intent of our recommendations. If
parties other than Hamilton & Associates, Inc., are engaged to provide geotechnical services during construction they must be informed that they will be required to assume complete responsibility for the geotechnical phase of the project by concurring with the recommendations in this report or providing alternative recommendations.

This concludes our scope of services as described during our proposal dated May 11, 2021, however, this report is subject to review by the controlling authorities for the project. Any further geotechnical services that may be required of our office to respond to questions/comments of the controlling authorities after their review of the report will be performed on a time and expense basis as per our current fee schedule. We would not proceed with any response to report review comments/questions without authorization from your office.

We appreciate your business and hope that we can assist you during construction related services.
REFERENCES

L.A. Bivens and Associates, Grading Plan, dated December 12, 1972


Earth Technology Corporation, Solid Waste Assessment Test, La Veta Disposal Station and Chapman and Yorba Disposal Station, Orange, California, Project No 89-823, dated March 5, 1991.

TRC, Environmental Assessment Report, Former La Veta Refuse Disposal Station, Project No 00-175, dated July 2000.


Ninyo and Moore, Supplemental Site Assessment, Portion of the Former La Veta Refuse Disposal Station, 334. S. Jennifer Lane, Orange, California SWIS # 30-CR-0094, Project No. 104690030, dated February 11, 2008.

Geosyntec Consultants, Memorandum, Soil Boring Investigation Results, Santiago Creek Bank, Orange, California, dated February 5, 2009.

Ardent Environmental Group, Inc., Landfill Cover Investigation, Former La Veta Refuse Disposal Station, 2205 East Palmyra Avenue and 290 Yorba Street, Orange California, Project No. 100081004, dated May 22, 2020.

Ardent Environmental Group, Inc., Soil Management Plan, Former La Veta Refuse Disposal Station, 2205 East Palmyra Avenue and 290 Yorba Street, Orange California, Project No. 100081005, dated October 9, 2020.

Ardent Environmental Group, Inc., Post Closure Land Use Plan, Former La Veta Refuse Disposal Station, 2205 East Palmyra Avenue and 290 Yorba Street, Orange California, Project No. 100081005, dated October 9, 2020.
## APPENDIX A

<table>
<thead>
<tr>
<th>Plate A-1a</th>
<th>Architectural Site Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate A-1b</td>
<td>Grading Plan</td>
</tr>
<tr>
<td>Plate A-1c</td>
<td>Geotechnical Plan</td>
</tr>
<tr>
<td>Plates A-2 through A-4</td>
<td>Geological Cross Sections</td>
</tr>
<tr>
<td>Plates H-1 through H-4</td>
<td>Historical Topographic Maps</td>
</tr>
<tr>
<td>Plates H-5 through H-19</td>
<td>Historical Aerial Photography</td>
</tr>
<tr>
<td>Plates M-1 and M-2</td>
<td>Manometer</td>
</tr>
</tbody>
</table>
**GEOLOGIC CROSS SECTION A-A’**

**Explanation**

**FILL.** Silty Sand to Silty Sand with Gravel and some cobbles

**CONSTRUCTION DEBRIS.** Landfill primarily consisting of construction debris such as concrete, bricks, granular soil.

**LANDFILL.** Municipal solid waste, burnt debris or a combination, mixed with various amounts of sand, silt and gravel. Includes wood, glass, newspaper, cardboard, organic wood fragments.

**NATIVE SOIL.** Young Alluvial Fan Deposits (Qyfsa and Qyfag), silty sand, sandy silt, sand with gravel, gravel with sand. Native soils near the surface include some silt and clay.

---

**Project:** Kornerstone (Palmyra Cemetery) – 2205 E. Palmyra Avenue, Orange, California

**Hamilton & Associates**

**Project No:** 20-2730

**Plate No:** A-2

**Date:** July 2021
**Explanation**

FILL, Silty Sand to Silty Sand with Gravel and some cobbles

CONSTRUCTION DEBRIS, Landfill primarily consisting of construction debris such as concrete, bricks, granular soil.

LANDFILL, municipal solid waste, burnt debris or a combination, mixed with various amounts of sand, silt and gravel. Includes wood, glass, newspaper, cardboard, organic wood fragments

NATIVE SOIL, Young Alluvial Fan Deposits (Qyfsa and Qyfag), silty sand, sandy silt, sand with gravel, gravel with sand, Native soils near the surface include some silt and clay.
**Explanation**

FILL, Silty Sand to Silty Sand with Gravel and some cobbles
CONSTRUCTION DEBRIS, Landfill primarily consisting of construction debris such as concrete, bricks, granular soil.
LANDFILL, municipal solid waste, burnt debris or a combination, mixed with various amounts of sand, silt and gravel. Includes wood, glass, newspaper, cardboard, organic wood fragments
NATIVE SOIL, Young Alluvial Fan Deposits (Qyfsa and Qyfag), silty sand, sandy silt, sand with gravel, gravel with sand, Native soils near the surface include some silt and clay.
**GEOLOGIC CROSS SECTION C-C’**

- **Proposed Grade**
- **FILL**
- **NATIVE SOIL**
- **LANDFILL**
- **CONSTRUCTION DEBRIS**

**Explanation**

- **FILL**: Silty Sand to Silty Sand with gravel and some cobbles
- **CONSTRUCTION DEBRIS**: Landfill primarily consisting of construction debris such as concrete, bricks, granular soil.
- **LANDFILL**: Municipal solid waste, burnt debris or a combination, mixed with various amounts of sand, silt and gravel. Includes wood, glass, newspaper, cardboard, organic wood fragments.
- **NATIVE SOIL**: Young Alluvial Fan Deposits (Qyfsa and Qyfag), silty sand, sandy silt, sand with gravel, gravel with sand. Native soils near the surface include some silt and clay.

---

**Project**: Kornerstone (Palmyra Cemetery) – 2205 E. Palmyra Avenue, Orange, California  
**Project No.**: 20-2730  
**Plate No.**: A-4b  
**Date**: July 2021
**Explanation**

**FILL**, Silty Sand to Silty Sand with Gravel and some cobbles

**CONSTRUCTION DEBRIS**, Landfill primarily consisting of construction debris such as concrete, bricks, granular soil.

**LANDFILL**, Municipal solid waste, burnt debris or a combination, mixed with various amounts of sand, silt and gravel. Includes wood, glass, newspaper, cardboard, organic wood fragments.

**NATIVE SOIL**, Young Alluvial Fan Deposits (Qyfsa and Qyfag), silty sand, sandy silt, sand with gravel, gravel with sand. Native soils near the surface include some silt and clay.
HISTORICAL AERIAL PHOTOGRAPHY: 1938

Retrieved from: https://www.ocgis.com/ocpw/historicalimagery/

Project: Kornerstone (Palmyra Cemetery) – 2205 E. Palmyra Avenue, Orange, California

Project No.: 20-2730

Plate No.: H-6

Date: July 2021
HISTORICAL AERIAL PHOTOGRAPHY: 1947

Project: Kornerstone (Palmyra Cemetery) – 2205 E. Palmyra Avenue, Orange, California

Project No: 20-2730
Plate No: H-8
Date: July 2021

Hamilton & Associates
HISTORICAL AERIAL PHOTOGRAPHY: 1952

Project: Kornerstone (Palmyra Cemetery) – 2205 E. Palmyra Avenue, Orange, California

Project No: 20-2730

Plate No: H-9

Date: July 2021

Hamilton & Associates
Project: Kornerstone (Palmyra Cemetery) – 2205 E. Palmyra Avenue, Orange, California

Project No: 20-2730
Plate No: H-12
Date: July 2021
HISTORICAL AERIAL PHOTOGRAPHY: 1960

Project: Kornerstone (Palmyra Cemetery) – 2205 E. Palmyra Avenue, Orange, California

Location: 2205 E. Palmyra Avenue, Orange, California

Date: July 2021

Hamilton & Associates
Kornerstone (Palmyra Cemetery) – 2205 E. Palmyra Avenue, Orange, California

HISTORICAL AERIAL PHOTOGRAPHY: 1970

Retrieved from: https://www.ocgis.com/ocpw/historicalimagery/

Project: Kornerstone (Palmyra Cemetery) – 2205 E. Palmyra Avenue, Orange, California

Project No.: 20-2730

Plate No.: H-15

Date: July 2021

Hamilton & Associates
Kornerstone (Palmyra Cemetery) – 2205 E. Palmyra Avenue, Orange, California

Project: Kornerstone (Palmyra Cemetery) – 2205 E. Palmyra Avenue, Orange, California

HISTORICAL AERIAL PHOTOGRAPHY: 1974

Project No: 20-2730
Plate No: H-17
Date: July 2021

Hamilton & Associates
Kornerstone (Palmyra Cemetery) – 2205 E. Palmyra Avenue, Orange, California

HISTORICAL AERIAL PHOTOGRAPHY: 1980

Retrieved from: https://www.ocgis.com/ocpw/historicalimagery/
HISTORICAL AERIAL PHOTOGRAPHY: 1990

Retrieved from: https://www.ocgis.com/ocpw/historicalimagery/

Project: Kornerstone (Palmyra Cemetery) – 2205 E. Palmyra Avenue, Orange, California

Hamilton & Associates

Project No: 20-2730
Plate No: H-19
Date: July 2021
APPENDIX B

BORING AND TEST PIT BY OTHERS

2. Earth Tech Location of Borings and Boring Logs MW-3 and VZ-3
3. California Integrated Waste Management Board Site Plans and Borings
4. Geosyntec Site Plans and Borings Logs
5. Ardent Site Plans and Test Pit Sections
WOODWARD-McNEILL & ASSOCIATES
CONSULTING ENGINEERS AND GEOLGOISTS
AN AFFILATE OF WOODWARD-CLYDE CONSULTANTS

Young Mens Christian Association
P.O. Box 5828
Orange, California 92667

Attention: Mr. Donald E. Kent
Executive Director

SUBJECT: PROPOSAL FOR GEOTECHNICAL INVESTIGATION
YMCA-CONRECK SITE
ORANGE, CALIFORNIA

Gentlemen:

Woodward-McNeill & Associates is pleased to submit this proposal as requested by Mr. Kent, 9 December 1971. It is based on a site plan prepared by Leason F. Pomero & Associates, 6 December 1971. We understand that a group of single-story and possibly two-story activities buildings and a swimming pool are planned for this area over the next few years. Building layout is awaiting definition of subsurface conditions.

The site is located between the southeast bank of Santiago Creek and Parkside Elementary School. Soil Conservation Service photographs AXK-2K-38 and 39 (December 1952) revealed that the site was once a gravel quarry. Uncontrolled fill has been dumped into the quarry pit to an unknown depth. No records exist as to dates of fill-start or completion, nor is anything known of the character of the fill. No previous geotechnical investigations have been made. The approximate top-of-slope of the pit (as shown on the 1952 photos) has been drawn on the above-referred drawing.

We propose to carry out an investigation to (a) confirm the approximate location of the easterly top-of-slope line of the pit; and (2) to determine the approximate depth and character of the
uncontrolled fill along its north-south axis. We will obtain soil samples from the material east of the easterly pit rim; from the fill and from the floor of the original pit below the fill. This will allow preliminary design of shallow foundations for structures on the unfilled area and possible deep foundations for structures built over the fill. A letter report will be prepared in five copies. The investigation will not include design recommendations for structures; sample testing will be withheld until a specific building layout is developed. At that time, samples will have to be tested and a supplementary report prepared giving design recommendations for all structures.

We propose to carry out the investigation for an estimated cost of $650-$850, excluding the supplementary (design) report or conferences related thereto. This will cover all field, office engineering and administrative costs necessary to prepare the written report. The fee will be based on the attached schedule.

We have scheduled field work for the near future, based on your verbal approval of the above scope of work. In this connection, we will assume responsibility for safeguarding only those utilities whose location has been furnished by you. Also, we assume no responsibility for injury to YMCA-related persons lingering near our field equipment. Please return one signed copy of this proposal at your convenience. We expect to deliver the report to you not later than 24 December 1971.

Very truly yours,

WOODWARD-McNEILL & ASSOCIATES

[Signature]

John T. Gaffey, II
Vice President

JTG/mh

Accepted by Young Mens Christian Association

Date

WOODWARD-McNEILL & ASSOCIATES
AN AFFILIATE OF WOODWARD-CLYDE CONSULTANTS
WOODWARD-McNEILL & ASSOCIATES
CONSULTING ENGINEERS AND GEOLOGISTS
AN AFFILIATE OF WOODWARD-CLYDE CONSULTANTS

2440 W. Olympic Blvd.
Los Angeles, Ca. 90006
(213) 380-1966

788 N. Baseline
Orange, Ca. 92668
(714) 633-6316

Please Reply to:

Orange
11 July 1972
Project No. B13418

Young Mens Christian Association
P.O. Box 5818
Orange, California 92667

Attention: Mr. Donald E. Kent
Executive Director

SUBJECT: GEOTECHNICAL INVESTIGATION
YMCA-CONROCK SITE
ORANGE, CALIFORNIA

Gentlemen:

In accordance with the provisions of our proposal dated 7 June 1972 and your subsequent authorization, we have completed a subsurface investigation of the subject site. This report provides recommendations for foundation design of the proposed recreation structure. You have requested that we consider only driven pile foundations to minimize the maintenance to the structure. The report includes consideration of the following items:

- Depth and character of refuse
- Bearing capacity of driven pile foundation vs. length
- Lateral load resistance of grade beams
- Site grading
- Provisions for venting methane gas from beneath the structure
- Protection of utilities

The results of this investigation are presented in the paragraphs which follow.

BACKGROUND

The site is located between the southwest bank of Santiago Creek and Parkside Elementary School. Our Preliminary geotechnical investigation which was submitted to you on 20 December 1971 presented area information on the entire site. It is our understanding that the proposed structure is to be located so that its southeast corner is about 135 ft north of the south property line and 130 ft west of the east property line. Further, the proposed structure will be a 2-story, wood-frame structure of irregular plane shape having exterior plan dimensions of about 30 by 75 ft. Based on discussions with Mr. L. A. Bivens, the Project Structural Engineer, maximum column loads of 95 kips are anticipated.

FIELD INVESTIGATION

Under the supervision of engineering personnel from this office, 3 borings varying from 32 to 85 ft in depth were completed on 30 June 1972. The locations...
of the borings are indicated on the Site Plan, Fig. 1. Borings were excavated utilizing a 6-in. continuous flight auger. Disturbed samples of rubbish fill were obtained from auger cuttings in the borings. Drive-tube samples of the native soils were also obtained in borings. Temperature and gas measurements were made in borings at the time of drilling in order to better evaluate the present state of decomposition.

The soils and refuse at the site are not stratified, and interpretation of data on Logs of Borings by an uninitiated individual may lead to erroneous conclusions. For these reasons, and in the interest of brevity, the Logs of Borings have been omitted from this report. The original boring logs will be retained in our files, available for your future reference. The significant findings of our field investigation are tabulated on Table 1.

DISCUSSIONS

Subsurface Conditions

Observations made during our preliminary investigation indicate that the refuse fill has undergone very little decomposition and that decomposition is presently occurring at a very slow rate. Observations made in our preliminary report are listed as follows:

1. Newspapers and magazines 13 to 15 years old were readable.

2. Temperatures were less than 91.5°F. For high rate of decomposition, the temperature should be in excess of 110 to 120°F.

3. Rubbish did not appear to contain highly bio-degradable material such as vegetable matter, but did appear to contain mainly construction debris and paper.

4. The water content of the rubbish appeared to be relatively low. In order for anaerobic decomposition to occur water must be present in significant quantities.

The data obtained from the borings completed during the present investigation, as presented in Table 1, indicate that the decomposition of refuse has not progressed significantly. In fact the rate of decomposition is likely lower as reflected by lower temperatures recorded during the present investigation than those recorded during the previous investigation. All borings in the vicinity of the proposed structure indicate the depth of refuse is on the order of 25 ft. Some difficulty in penetrating refuse was encountered during drilling, presumably due to the presence of scattered heavy construction debris. The soils beneath the refuse were found to consist of about 7 ft of medium dense silty sands overlying dense to very dense clayey gravels extending to the maximum depth explored, 89 ft.

Settlement and Methane Gas Generation

The refuse is composed predominately of construction debris and paper with a relatively low moisture content. The temperature and moisture content indicate the rate as well as degree of decomposition of refuse is relatively low at present.

Anticipated settlement can be attributed to several sources. The sources are physical compressions of the refuse due to applied structural load (including fill), settlement due to decomposition and local settlement due to the raveling of soil into underlying voids. The refuse could become wetter in the future. The presence of water will cause an increase in decomposition but, due to the high paper content (therefore relatively low organic content), will probably not increase the rate of decomposition significantly. Water could also provide the mechanism for raveling.
Settlements can be minimized if the structure is supported on pile foundations. The piles should be designed considering structural loads and downdrag loads due to friction of near surface settling fill against the perimeter of piles, and deep perimeter grade beams should be used to provide lateral stability as tilting of vertical piling is a common problem in sanitary landfill construction. Adequate pile embedment also provides some lateral stability if the piling is adequately tied together at the ground surface. Utilities should be protected and provided with flexible connections to maintain continuous service.

The anaerobic decomposition produces methane gas. The presence of this gas should be considered and included in design and construction planning. During construction the hazard of igniting combustible gas is considered remote as long as it is not confined and is allowed to vent if refuse is exposed. Fire fighting equipment should be made easily accessible as a safety precaution.

The structure should be protected from the migrating gas entering or collecting around it. This protection can be implemented by sealing the structure below flooring, similar to water proofing, and venting gas from beneath the structure. In addition, it is prudent design to provide a buffer layer of compacted fill between the structural foundation and the refuse. As a minimum, 4 ft of fill has been found to provide an adequate cover between foundation and refuse.

RECOMMENDATIONS

Pile Foundation

It is recommended that driven piles be used to support the foundation and floor of the structure. Possible pile types analyzed include, but are not limited to, steel H-section, precast and prestressed concrete, cast-in-place concrete with mandrel-driven shells and cast-in-place pipe piles. The theoretical capacities for individual piles presented on Fig. 2 are recommended for preliminary design. It is recommended that prior to final design that actual pile capacities and lengths be verified in the field by driving of a few piles near boring locations. The purpose of driving piles near boring locations is to evaluate the driving characteristics of a pile with a suitable dynamic pile-driving formula and to evaluate the necessity of jetting piling through dense gravel materials to attain a minimum pile penetration. Depending on driving resistance, subsequent driving at the site may be controlled by a simple blow-count criterion. In order to ensure penetration of the piles through the refuse fill the locations should be predrilled to native material. It is further recommended that all piling be tied together structurally by grade beams or other structural elements and that the floor slab be designed as a diaphragm to provide shear distribution between the various grade beams and ties.

It is recommended that the soil engineer inspect all pile driving. The piles and pile-driving operation should adhere to the requirements set forth in Appendix A.

Site Grading

A minimum of a 4-ft fill cover should be placed over refuse between finished grade or the base of grade beam and the surface of the refuse. The area to receive fill should be proof-rolled and fill should be placed in 8 in. lifts (loose measurement). The top 3 ft of fill should be compacted to a minimum of 90% of the maximum density determined with ASTM Test Method D 1557. It will be advantageous to place the fill as early as possible in the construction sequence to encourage arcal settlement. The settlement of the fill should be monitored during and after construction. The fill should be left in place for about
2 months (depending on settlement readings) prior to the commencement of pile driving. After construction the exterior grade should be maintained to a predetermined elevation, so that the lateral stability of the foundation is not compromised by the loss of passive pressure resistance due to settlement of soil adjacent to deep perimeter grade beams. In this regard a passive pressure against perimeter grade beams equivalent to that exerted by a fluid weighing 300 pcf may be used for design.

All site preparation and grading should be done under the observation of a soil engineer in accordance with the provisions set forth in Appendix B to this report.

Utilities

Utility lines servicing the structure should be protected from bending stresses and increases in length due to differential settlements. To accomplish this, utility pipes should be designed as flexible as possible. A typical detail of a flexible connection is included as Fig. 3a. Outside of structure, where located over refuse fill, utilities should be placed in a protective vault. A typical schematic diagram of such a vault is shown in Fig. 3b.

Gas Protection of Structure

In order to protect the structure from gas accumulation, gas proofing and ventilating schemes should be incorporated in the foundation design. A typical detail for venting and sealing the structure is included as Fig. 4.

Settlement

If the recommendations for pile foundations are followed we anticipate less than 1/2 in. settlement, total and differential, for the pile supported structure. Settlements in the areas surrounding the structure may be as large as 1/4 to 3 ft, depending on grading. Therefore, long term future maintenance of the grade, pavements and landscaping should be planned.

Future Gas Problem

If the foregoing recommendation for venting and sealing the structure are followed the likelihood of a gas related problem occurring within the structure is remote. If, however, cracks should form in flooring or vents should clog repairs should be initiated immediately. This means that maintenance of the structure should include inspection of vents and the flooring on at least a monthly basis by a resident employee.

The gas concentration monitored in borings indicate that combustible gases are present in the refuse in quantities above the combustible limit. For this reason construction at the site which involves exposing the refuse should be completed carefully with the contemplated grading being done in a manner which would preclude the creation of confined excavations into the refuse. Another potential hazard would be the rupturing of a discarded container of flammable material during excavation. During the progress of such excavation into refuse a substantial supply of water and other fire fighting equipment should be present and easily accessible.

It should be noted that there are case histories of injury where children have tunneled into the refuse or cover material and ignited confined gas. We do not have any control over this potential problem; however, we recommend that future grading be carefully planned to discourage such activity on this site.
We hope that this report provides the required information. If you require clarification on any part of this report or further information, please contact this office.

Very truly yours,

WOODWARD-McNEILL & ASSOCIATES

By John A. Barneich

JAB/mh

Attachments

cc: Mr. Leason F. Pomeroy
    Mr. L. A. Bivens
2" Plastic Pipe thru Grade Beams near Center of Crushed Rock Fill - T
8" Concrete Slab

Finish Flr 21

Pipes approx 6'-0" O.C.
(Concrete Slab)

High wall of Steel Beams

For 1-24
WOODWARD-McNEILL & ASSOCIATES
CONSULTING ENGINEERS AND GEOLOGISTS
AN AFFILIATE OF WOODWARD-CLYDE CONSULTANTS

240 W Olympic Blvd
Los Angeles, Ca. 90012
(213) 360-1066

755 N. Batavia
Orange, Ca. 92668
(714) 633-6336

Please Reply To:
Orange
31 July 1972
Project No. B13418

Young Mens Christian Association
P.O. Box 5828
Orange, California 92667

Attention: Mr. Donald E. Kent
Executive Director

SUBJECT: ADDENDUM NO. 1 TO
GEOTECHNICAL INVESTIGATION
YMCA-CONROCK SITE
ORANGE, CALIFORNIA.

Gentlemen:

At the request of Mr. Bivens, the Structural Engineer for this project, we
have prepared a detail for a pile supported, structural concrete slab floor to
be constructed on grade and have considered the lateral extent of the placement
of compacted fill for the proposed recreation structure. Detailed recommenda-
tions for the proposed facility have been transmitted in our letter report
dated 11 July 1972. The results of our consideration of the above items are
presented in the paragraphs which follow.

PILE-SUPPORTED FLOOR

Details for raised wood and concrete flooring were presented in Fig. 4 of
the aforementioned letter report. We understand that it may be desirable to uti-
ize a slab-on-grade floor in lieu of a raised floor for the proposed structure.
It is anticipated that settlements under the structure will be significant;
therefore, it will be necessary that the slab-on-grade floor be designed in the
same way as recommended for the raised concrete floor. Further, it will be nec-
essary to provide positive venting under the slab for gas which might collect
in the void created by settlement, and a gas barrier will have to be included in
the design. It is our opinion that a combination of drain tile underlying the
slab areas and blowers or fans should be incorporated into the slab design.
For your convenience we have included a typical detail of such a design on Fig. 1.
It is important that all under floor blowers or fans be designed by a mechanical
engineer to the maximum specification suggested by Fig. 4 of the previous report
for a raised floor and Fig. 1 of this report for a slab-on-grade floor.

AREAL EXTENT OF COMPACTED FILL

The site grading for the proposed recreation structure includes a minimum
of 4 ft of fill beneath structural elements. The top 3 ft of this fill are to
be compacted to a minimum of 90% of the maximum density determined with ASTM

AFFILIATES LOCATED IN:
San Francisco   Oakland   San Jose   Los Angeles   Orange   San Diego   Denver
Anchorage   Kansas City   St. Louis   Philadelphia   Clifton, New Jersey   New York City   Washington, D.C.
Test Method D1557-70. Further, this fill is to meet the gradation specifications set forth in Appendix B of the 11 July 1972 report. It is recommended that the bottom of the fill extend a distance laterally from the perimeter of the structure equal to 2 times the maximum fill depth. The purpose for this recommendation is to provide the maximum passive resistance of the fill to the lateral loads on the structure. For this reason, the finished exterior grades should be maintained at the same minimum elevation as used in calculating design lateral resistance for this same distance (2 times the maximum fill depth) around the perimeter of the structure.

We hope that this letter provides the information requested. If you should have further questions, please call.

Very truly yours,

WOODWARD-McNEILL & ASSOCIATES

By John A. Barneich

JAB/mh

Attachment

cc: Mr. Leason F. Pomeroy
    Mr. L. A. Bivens
NOTE:

1. Install mechanical blowers and/or fans under the floor. The ventilation system must vent all air from below slab at least once every hour, assuming 2 feet clear space beneath the slab.

2. Barriers may be designed using materials of polyvinyl chloride; neoprene; hot mopped asphalt and fifteen pound construction felt paper.

3. Spacing and size of drain tile should be designed for adequate removal of gas. (One change per hour.)
Young Mens Christian Association  
P. O. Box 5828  
Orange, California  92667  

Attention: Mr. Donald E. Kent  
Executive Director  

SUBJECT: ADDENDUM NO. 2 TO GEOTECHNICAL INVESTIGATION  
YMCA-CONROCK SITE, ORANGE, CALIFORNIA  

Gentlemen:

This letter confirms verbal information pertinent to  
the subject construction transmitted by telephone to  
Mr. Bivens and Mr. Pomeroy, project structural engineer  
and architect, respectively. This information is listed  
below for ease in reference and supplements our letter-  
report, dated 11 July 1972 and Addendum No. 1 to that report,  
dated 31 July 1972.  

Telecon--Mr. Bivens--23 January 1973  

- advised Mr. Bivens of typographical error on  
 Fig. 2 of our 11 July 1972 report--"12" x 12"  
 H-Pile BP12 @ 55 lb/ft" should read "12" x 12"  
 H-Pile BP12 @ 74 lb/ft"  

- advised Mr. Bivens that the BP12 pile and any  
 other 12" x 12" piles proposed should be checked  
 by him structurally for axial load stability  
 over the unsupported length equal to the  
 thickness of refuse (25 ft)  

- all other proposed piles of a size different  
than those sizes shown on Fig. 2 of the  
11 July 1972 report should be checked by  
Woodward-McNeill for soil bearing capacity and  
should be checked structurally by Mr. Bivens
Telecon--Mr. Pomeroy--29 January 1973

the barrier adjacent to the floor slab shown on Fig. 1 of the 31 July 1972 Addendum No. 1 should consist of either:

(a) hot mopped asphalt and 15-lb construction paper (min. 1/8-in. thickness of asphalt placed above paper just prior to placement of concrete), or

(b) 10 mil. (minimum) polyvinyl chloride membrane. Any other proposed membrane should be reviewed by this office.

a second membrane of 10 mil. (minimum) should be placed below the aggregate base beneath the building.

the permeable material below the floor slab indicated in Fig. 1 of Addendum No. 1, should conform to the State of California Standard Specifications for Class-2 permeable material (Section 68-1.025)

the ventilation system, exterior vents, interior vents and drain pipe should be designed such that it could accommodate a volume per unit time equal to 2 ft times the plan area of the structure per hour as indicated on Fig 1 of the 31 July 1972 Addendum No. 1

It should be noted that at the present time there is little quantitative data on which to base recommendations such as those presented in this letter. The recommendations presented herein are based on our understanding of the limited experience and general specifications of others such as the County of Los Angeles and research projects. We cannot give any assurance as to building performance based on these recommendations.

I hope this letter provides the required information. Please don't hesitate to call if further questions should arise.

Very truly yours,

WOODWARD-MCNEILL & ASSOCIATES

By John A. Barneich By Steven C. Haley

JAB/SCH/cjo

cc: Mr. L. A. Bivens, Structural Engineer
    Mr. L. F. Pomeroy, AIA
WOODWARD - McNEILL & ASSOCIATES
CONSULTING ENGINEERS AND GEOLOGISTS
AN AFFILIATE OF WOODWARD-CLYDE CONSULTANTS

Please Reply to:
Orange
5 March 1973
Project No. B134F

YMCA
P.O. Box 5828
Orange, California 92667

Attention: Mr. Donald Kent
Executive Director

SUBJECT: YMCA PILE DRIVING OPERATIONS
YMCA CONROCK SITE;
ORANGE, CALIFORNIA

Gentlemen:

We understand that pile driving operations have commenced at the subject site. Our recommendations pertinent to these operations were conveyed in our Soil Investigation Report dated 11 July 1972, and Addendums 1 and 2 to that report dated 31 July 1972 and 31 January 1973.

We have not been furnished with specifications for review, but we understand that the formula for driving criteria was set in the specifications. This, coupled with the fact that we were not notified of the commencement of pile driving operations, leads us to the conclusion that you are satisfied with the value in the specifications; and that you are properly documenting compliance to the specifications.

If you have any question pertinent to this letter, please contact the undersigned.

Very truly yours,

WOODWARD-McNEILL & ASSOCIATES

By John A. Barneich
By

JAB/kt
cc: Mr. L. A. Bivens, Structural Engineer
Mr. L. F. Pomeroy, AIA

AFFILIATES LOCATED IN:
San Francisco  -  Oakland  -  San Jose  -  Los Angeles  -  Orange  -  San Diego  -  Denver
Anchorage  -  Kansas City  -  St. Louis  -  Philadelphia  -  Clifton, New Jersey  -  New York City  -  Washington, D.C.
KEY TO WELL CONSTRUCTION DIAGRAM

1. Blank PVC Casing In Portland Cement Concrete
2. Blank PVC Casing In Portland Cement Grout With 5% Bentonite
3. Blank PVC Casing In Bentonite Plug
4. Blank PVC Casing In Filter Pack
5. Screen With Filter Pack
6. Filter Pack Below PVC Casing Or Heaving Native Sand
**BOREHOLE/WELL CONSTRUCTION LOG**

Project Name: Orange County SWAT La Veta and Yorba Landfills  
Project Number: 89-823

Borehole Location: In gravel parking lot S.E. of YMCA  
Borehole Number: MW-3  
Sheet: 1 of 7

<table>
<thead>
<tr>
<th>Log</th>
<th>Lithologic Description</th>
<th>Remarks</th>
</tr>
</thead>
</table>
| SM  | SILTY SAND (SM); moderate yellowish brown, dry, dense, fine-grained sand, low plastic silt, moderately porous | Cristy Box. Concrete and 12" OD steel protective casing from 0 to 3'. BG @ 4.6 ppm  
     | wood and ceramic fragments, organic odor |  
     | dark yellowish brown to moderate brown, dry to moist |  
     | glass and wood fragments |  
     | moister to wet, very dense |  
     | SILTY SAND (SM); moderate yellowish brown, dry to moist, fine-grained sand, low plastic silt, some fine to coarse gravel, moderately to highly porous |  
     | SAND (SW); moderate yellowish brown, dry to moist, dense, fine- to coarse-grained sand, some fine gravel, highly porous, no trash | Resume Drilling on 11/6  
     | SAND (SW); moderate yellowish brown, dry to moist, very dense, fine- to coarse-grained sand, some fine to coarse gravel, trace silt, highly porous |  
     | moister to wet, fine to coarse gravel |  
     | CLAYEY SAND (SC); see below |  

<table>
<thead>
<tr>
<th>Sample</th>
<th>Field Analysis</th>
<th>Log</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>140 lbs</td>
<td>18.31</td>
</tr>
<tr>
<td>5</td>
<td>1517</td>
<td>BG @ 3</td>
</tr>
<tr>
<td>6</td>
<td>1517</td>
<td>16.30</td>
</tr>
<tr>
<td>6.5</td>
<td>D1</td>
<td>15146</td>
</tr>
<tr>
<td>7</td>
<td>1513</td>
<td>15.46</td>
</tr>
<tr>
<td>10</td>
<td>D2</td>
<td>1464</td>
</tr>
<tr>
<td>11</td>
<td>11/5</td>
<td>09.03</td>
</tr>
<tr>
<td>20</td>
<td>D4</td>
<td>2230</td>
</tr>
<tr>
<td>22</td>
<td>11</td>
<td>09.18</td>
</tr>
</tbody>
</table>

*S/B = sample reading/background reading; NA = not analyzed*
BOREHOLE/WELL CONSTRUCTION LOG

<table>
<thead>
<tr>
<th>Sample</th>
<th>Field Analysis</th>
<th>Log</th>
<th>Lithologic Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Qa</td>
<td>SC</td>
<td>CLAYEY SAND (SC); light olive gray, moist, medium dense, fine-grained sand, slightly to moderately porous</td>
</tr>
<tr>
<td>140 lbs</td>
<td></td>
<td>SW</td>
<td>SAND (SW); moderate yellowish brown, moist, medium dense, fine- to medium-grained sand, silt, moderately to highly porous</td>
</tr>
<tr>
<td>D6</td>
<td>5</td>
<td>GP</td>
<td>GRAVEL (GP); light gray to grayish yellow, moist, fine gravel, trace subrounded coarse gravel, highly porous</td>
</tr>
<tr>
<td>50</td>
<td>9</td>
<td>SW</td>
<td>SAND (SW); yellowish gray, dry to moist, very dense, fine- to coarse-grained sand, some fine gravel, trace subrounded coarse gravel, highly porous</td>
</tr>
<tr>
<td>D8</td>
<td>8</td>
<td>GW</td>
<td>GRAVEL (GW); light gray, medium dense</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>CH</td>
<td>SANDY CLAY (CH); medium dense, fine-grained sand, slightly to moderately porous</td>
</tr>
<tr>
<td>50</td>
<td>13</td>
<td>SC</td>
<td>CLAYEY SAND (SC); moderate brown, moist, medium dense to dense, fine-grained sand, highly plastic clay, trace fine gravel, slightly to moderately porous</td>
</tr>
<tr>
<td>60</td>
<td>18</td>
<td>SP</td>
<td>SAND (SP); moderate brown to yellowish brown, moist, medium dense, fine-grained sand, trace subrounded gravel, highly porous</td>
</tr>
<tr>
<td>60</td>
<td>8</td>
<td>SW</td>
<td>SAND (SW); yellowish gray, dry to moist</td>
</tr>
<tr>
<td>60</td>
<td>8</td>
<td>GW</td>
<td>GRAVEL (GW)</td>
</tr>
</tbody>
</table>

Remarks:
- BG @ 10 ppm
- BZ @ 11 ppm
- BG @ 10 ppm
- BZ @ 10 ppm
- BG @ 10 ppm
- BZ @ 10 ppm
- BG @ 10 ppm
- BZ @ 10 ppm
- BG @ 11 ppm
- BZ @ 12 ppm
- BG @ 11 ppm
- BZ @ 11 ppm
- PID is not working; therefore, using PID.

* S/B = sample reading/background reading; NA = not analyzed
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sample Number</th>
<th>Type</th>
<th>Blowing Count</th>
<th>Drilling Time</th>
<th>SW</th>
<th>Log</th>
<th>Lithologic Description</th>
<th>Remarks</th>
</tr>
</thead>
</table>
| 70        | D13            | 3    | 140           | 12:35         |     | Qa  | SAND (SW); yellowish gray, dry to moist, medium dense, fine- to coarse-grained sand, fine gravel, trace silt, highly porous | BG @ 0.1 ppm  
BZ @ 0.1 ppm |
| 75        | D14            | 6/7  | 60            | 13:13         |     |     | trace subrounded coarse gravel |         |
| 80        | D15            | 8    | 25            | 13:29         |     |     | very dense, trace to some silt |         |
| 85        | D16            | 15   | 50            | 13:51         |     | CL  | SANDY CLAY (CL); dark yellowish brown, moist, very stiff, low plastic clay, fine-grained sand, slightly to moderately porous | BG @ 0.1 ppm  
BZ @ 0.1 ppm |
| 90        | D17            | 5    | 7             | 14:11         |     | SC  | CLAYEY SAND (SC); moderate yellowish brown, moist, medium dense, fine-grained sand, low plastic clay, slightly to moderately porous | BG @ 0.1 ppm  
BZ @ 0.1 ppm |
| 95        |               |      |               |               |     |     | some low plastic clay, trace fine gravel |         |
| 100       | D18            | 14   | 16            | 15:08         |     | SW  | SAND (SW); moderate yellowish brown, moist, very dense, fine- to coarse-grained sand, some fine gravel, trace coarse gravel and silt, moderately to highly porous | BG @ 0.1 ppm  
BZ @ 0.1 ppm |
| 105       |               |      |               |               |     |     | trace to some subrounded coarse-gravel and silt |         |
|           |               |      |               |               |     |     | trace to some silt |         |

* S/B = sample reading/background reading; NA = not analyzed
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sample</th>
<th>Field Analysis</th>
<th>Log</th>
<th>Lithologic Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>110</td>
<td>140</td>
<td>SW</td>
<td>Qal</td>
<td>SAND (SW); see above</td>
<td>BG @ 0.1 ppm BZ @ 0.1 ppm</td>
</tr>
<tr>
<td></td>
<td>15:36</td>
<td>37</td>
<td>1.3</td>
<td>moist to wet, no silt, trace clay</td>
<td></td>
</tr>
<tr>
<td>115</td>
<td>D19</td>
<td>SW</td>
<td></td>
<td>very dense, fine gravel</td>
<td></td>
</tr>
<tr>
<td>120</td>
<td>15:51</td>
<td>37</td>
<td>1.3</td>
<td>trace to some clay</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-cobble clast up to 4&quot; in diameter</td>
<td></td>
</tr>
<tr>
<td>125</td>
<td>16:33</td>
<td>SW</td>
<td></td>
<td>some fine gravel</td>
<td></td>
</tr>
<tr>
<td>130</td>
<td>D21</td>
<td>SW</td>
<td></td>
<td>fine gravel</td>
<td>Resume Drilling on 11/7 Using different FID #9.</td>
</tr>
<tr>
<td></td>
<td>08:34</td>
<td>35</td>
<td>1.2</td>
<td>GRAVEL (GW); light gray, dry to moist, very dense, fine to coarse gravel, some fine- to coarse-grained sand, trace cobbles up to 5&quot; in diameter, highly porous</td>
<td>BG @ 0.8 ppm BZ @ 0.8 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GP</td>
<td></td>
<td>-1/2' thick sandy clay lense</td>
<td></td>
</tr>
<tr>
<td>135</td>
<td>12</td>
<td>SC</td>
<td></td>
<td>CLAYEY SAND (SC); moderate yellowish brown, moist, medium dense, fine-grained sand, medium plastic clay, some medium-grained sand, slightly to moderately porous</td>
<td></td>
</tr>
</tbody>
</table>
# BOREHOLE/WELL CONSTRUCTION LOG

**Project Name:** Orange County SWAT La Veta and Yorba Landfills  
**Project Number:** 89-823  
**Borehole Location:** In gravel parking lot S.E. of YMCA  
**Borehole Number:** MW-3  
**Sheet 5 of 7**

<table>
<thead>
<tr>
<th>Depth (ft.)</th>
<th>Sample</th>
<th>Field Analysis</th>
<th>Log</th>
<th>Lithologic Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>140</td>
<td>140</td>
<td></td>
<td>Qai</td>
<td>CLAY (CH); moderate yellowish brown, moist, stiff, highly plastic clay, trace fine-grained sand, slightly porous</td>
</tr>
<tr>
<td>145</td>
<td>11</td>
<td>00:40</td>
<td>0.8</td>
<td>LANDS CLAY (CH); fine-grained sand, trace coarse gravel</td>
</tr>
<tr>
<td>150</td>
<td>23</td>
<td>10:26</td>
<td>1.1</td>
<td>CLAYEY SAND (SC/SP); moderate yellowish brown, moist, medium dense, fine-grained sand, highly plastic clay, moderately porous</td>
</tr>
<tr>
<td>155</td>
<td>23</td>
<td>08:20</td>
<td>1.3</td>
<td>CLAY (CH); moderate yellowish brown, moist, stiff, highly plastic clay, trace fine-grained sand, slightly porous</td>
</tr>
<tr>
<td>160</td>
<td>23</td>
<td>11:34</td>
<td>1.3</td>
<td>CLAYEY SAND (SC/SP); moderate yellowish brown, moist, loose, fine- to coarse-grained sand, highly plastic clay, trace fine gravel, moderately porous</td>
</tr>
<tr>
<td>165</td>
<td>8</td>
<td>12:20</td>
<td>2.6</td>
<td>SAND (SW); moderate yellowish brown, moist, medium dense, fine- to coarse-grained sand, some fine gravel, trace clay, moderately to highly porous</td>
</tr>
</tbody>
</table>

* S/B = sample reading/background reading; NA = not analyzed
<table>
<thead>
<tr>
<th>Depth (feet)</th>
<th>Sample</th>
<th>Field Analysis</th>
<th>Log</th>
<th>Lithologic Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>26</td>
<td>160</td>
<td>lbs</td>
<td>Qa</td>
</tr>
<tr>
<td>186</td>
<td></td>
<td></td>
<td></td>
<td><strong>SAND (SW):</strong> moderate yellowish brown, moist, medium dense, fine- to coarse-grained sand, some fine gravel, trace clay, moderately to highly porous</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>some fine to coarse gravel</td>
</tr>
<tr>
<td>100</td>
<td>12</td>
<td>13:32</td>
<td>1.8</td>
<td><strong>CLAYEY SAND (SC/SP):</strong> moderate yellowish brown, moist, medium dense, fine-grained sand, highly plastic clay, slightly to moderately porous</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td></td>
<td></td>
<td>highly plastic clay</td>
</tr>
<tr>
<td>195</td>
<td>20</td>
<td></td>
<td></td>
<td><strong>SANDY CLAY (CH):</strong> moderate yellowish brown, moist, stiff, highly plastic clay, fine-grained sand, slightly to moderately porous</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>trace medium- to coarse-grained sand and fine gravel</td>
</tr>
<tr>
<td>200</td>
<td>12</td>
<td>14:37</td>
<td>1.0</td>
<td><strong>CLAY (CH):</strong> moderate yellowish brown, moist, stiff, highly plastic clay, trace fine-grained sand, slightly porous</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td></td>
<td></td>
<td><strong>Bentonite Plug.</strong></td>
</tr>
<tr>
<td>215</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*S/B = sample reading/background reading; NA = not analyzed
# Borehole/Well Construction Log

**Project Name:** Orange County SWAT La Veta and Yorba Landfills  
**Borehole Location:** In gravel parking lot S.E. of YMCA  
**Borehole Number:** MW-3  
**Sheet:** 7 of 7

<table>
<thead>
<tr>
<th>Depth (ft.)</th>
<th>Sample</th>
<th>Field Analysis</th>
<th>Log</th>
<th>Lithologic Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>220.0</td>
<td>140 lbs</td>
<td>15:22</td>
<td>Qal</td>
<td>CLAY (CH); moderate yellowish brown, moist, stiff, highly plastic clay, trace fine-grained sand, slightly porous</td>
</tr>
<tr>
<td>226.0</td>
<td>20</td>
<td>16:57</td>
<td>1.7</td>
<td>-6&quot; thick CLAYEY SAND (SC) lens</td>
</tr>
<tr>
<td>230.0</td>
<td>24</td>
<td>08:20</td>
<td>SC</td>
<td>CLAYEY SAND (SC); moderate yellowish brown, moist to wet, very dense, fine- to coarse-grained sand, highly plastic clay, some fine gravel, moderately to highly porous</td>
</tr>
<tr>
<td>236.0</td>
<td>63</td>
<td>09:00</td>
<td>SW</td>
<td>SAND (SW); moderate yellowish brown, wet, very dense, fine- to coarse-grained sand, fine gravel, some clay, highly porous</td>
</tr>
<tr>
<td>240.0</td>
<td>23</td>
<td>10:00</td>
<td>SC/SP</td>
<td>SAND (SP); moderate yellowish brown, wet, very dense, fine-grained sand, fine to coarse gravel, trace to some clay, highly porous</td>
</tr>
<tr>
<td>245.0</td>
<td>63</td>
<td></td>
<td></td>
<td>some subrounded igneous cobble clasts up to 7&quot; in diameter</td>
</tr>
<tr>
<td>250.0</td>
<td>10:00</td>
<td></td>
<td>CH</td>
<td>CLAY (CH); moderate yellowish brown, moist, hard, highly plastic clay, trace fine-grained sand, slightly porous</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Boring terminated at 253 feet. Groundwater encountered at approximately 237 feet.</td>
</tr>
</tbody>
</table>

**Remarks:**  
- BG @ < 1 ppm  
- BZ @ < 1 ppm  
- Filter pack consists of Lapis Luster #1/c sand.  
- Screen consists of 0.01" slot 4" ID Sch 80 PVC casing from 222.5' to 232.5'.  
- Resume Drilling on 11/8  
- BG @ 1.7 ppm  
- BZ @ 1.7 ppm  

* S/B = sample reading/background reading; NA = not analyzed
# BOREHOLE LOG

**Project Name:** Orange County SWAT La Veta and Yorba Landfills  
**Borehole Number:** MW-3A  
**Drilling Agency:** Layne Environmental  
**Driller:** Louie Monje  
**Date Started:** 11/5/90  
**Date Finished:** 11/5/90  
**Depth to Bedrock:** 10.5 feet

**Completion Information:** Boring backfilled with Portland cement with 5% Bentonite to ground surface.

<table>
<thead>
<tr>
<th>Depth (feet)</th>
<th>Sample</th>
<th>Field Analysis</th>
<th>Lithologic Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>13:42</td>
<td>af</td>
<td>SILTY SAND (SM); grayish orange, dry, dense, fine-grained sand, low plastic silt, some fine to coarse gravel, moderately to highly porous</td>
</tr>
<tr>
<td>2</td>
<td>BG @ 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>13:50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>40</td>
<td></td>
<td>SAND (SW); yellowish gray, dry to moist, very dense, fine- to coarse-grained sand, fine gravel, trace coarse gravel, highly porous</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>14:00</td>
<td>210</td>
<td>black, municipal trash consisting of wood, plastic and metal fragments, strong organic odor, very stained</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td>Boring terminated at 10.5 feet. No free groundwater encountered.</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* S/B = sample reading/background reading; NA = not analyzed
**BOREHOLE LOG**

**Project Name:** Orange County SWAT La Veta and Yorba Landfills  
**Project Number:** 89-823

**Borehole Location:** In gravel parking lot S.E. of YMCA  
**Borehole Number:** MW-3B  
**Sheet:** 1 of 1

**Drilling Agency:** Layne Environmental  
**Driller:** Louie Monje

**Drilling Equipment:** AP1000 Perc. Hammer  
**Date Started:** 11/5/90  
**Total Depth (feet):** 10.5

**Drilling Method:** Reverse Air Dual Wall  
**Date Finished:** 11/5/90  
**Depth to Bedrock (feet):**

**Drilling Fluid:** none used  
**Number of Samples:** 2  
**Depth to Water (feet):**

**Completion Information:**  
Boring backfilled with Portland cement with 5% Bentonite to ground surface.

<table>
<thead>
<tr>
<th>Depth (feet)</th>
<th>Sample</th>
<th>Field Analysis</th>
<th>Log</th>
<th>Lithologic Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>af</td>
<td></td>
<td></td>
<td>SILTY SAND (SM); dark yellowish brown, dry to moist, very dense, fine-grained sand, low plastic silt, some fine to coarse gravel, moderately to highly porous</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>BG @ 10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>D1</td>
<td>14:39 12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>21</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>D2</td>
<td>14:46</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* S/B = sample reading/background reading; NA = not analyzed

**Boring terminated at 10.5 feet.**  
No free groundwater encountered.
## BOREHOLE LOG

**Project Name:** Orange County SWAT La Veta and Yorba Landfills  
**Borehole Location:** In gravel parking lot S. of YMCA.  
**Borehole Number:** VZ-3  
**Project Number:** 89-823

**Drilling Agency:** Layne Environmental  
**Driller:** Louie Monje

**Drilling Equipment:** AP 1000 Perc. Hammer  
**Date Started:** 11/9/90  
**Total Depth (feet):** 49.0

**Drilling Method:** Reverse Air Dual Wall Percussion  
**Date Finished:** 11/10/90  
**Depth to Bedrock (feet):** N/A

**Drilling Fluid:** none used  
**Number of Samples:** 4

### Completion Information:

See well completion diagram. Timco 2'-2' lysimeter with 200 mesh silica slurry from 49' to 47'. Sch 40 2'-0' PVC with two nylon hoses from 47' to 41', silica sand 60 from 47' to 42'. Bentonite plug from 42' to 39'. Valve head 1' to 0'.

**Borehole Diameter (in):** 9 5/8  
**Elevation and Datum:** 236.64

**Logged By:** D. Dawson  
**Checked By:** G. Miller

<table>
<thead>
<tr>
<th>Depth (feet)</th>
<th>Sample Type</th>
<th>Sample Size</th>
<th>Blown Count (blows)</th>
<th>Dropped Count (blows)</th>
<th>Blow Time</th>
<th>Field Analysis</th>
<th>Log</th>
<th>Lithologic Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>140</td>
<td>lbs</td>
<td></td>
<td></td>
<td></td>
<td>af</td>
<td>SM</td>
<td>SILTY SAND (SM); dark yellowish brown to moderate brown, dry to moist, dense, fine-grained sand, low plastic silt, slightly to moderately porous</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>municipal trash, wood and metal, organic odor</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>some fine gravel and trace coarse gravel</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>rubber, glass and wood</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>D1</td>
<td>16</td>
<td>12:17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cristy Box. Steel protective casing 12' OD from 0 to 3', ready mix concrete from 3' to 0.5'</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>18</td>
<td>12:31</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3' ID sch 40 PVC from 47' to 1'</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Portland cement with 5% bentonite from 39' to 3'</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BG @ 1.7 ppm</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BZ @ 1.9 ppm</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* S/B = sample reading/background reading; NA = not analyzed
**BOREHOLE LOG**

**Project Name:** Orange County SWAT La Veta and Yorba Landfills

**Borehole Location:** In gravel parking lot S. of YMCA.

**Borehole Number:** VZ-3

<table>
<thead>
<tr>
<th>Depth (feet)</th>
<th>Sample</th>
<th>Field Analysis</th>
<th>Log</th>
<th>Lithologic Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Borehole Location: In gravel parking lot S. of YMCA.</td>
<td>Borehole Number: VZ-3</td>
<td>Sheet 2 of 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blow Count</td>
<td>140</td>
<td>Qa</td>
<td>SM</td>
<td>SAND (SW); yellowish gray, dry to moist, dense, fine- to coarse-grained sand, fine to coarse gravel, trace to some silt, trace subrounded cobbles up to 4&quot; in diameter, moderately porous</td>
</tr>
<tr>
<td>Drilling Time</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Borehole Location: In gravel parking lot S. of YMCA.</td>
<td>Borehole Number: VZ-3</td>
<td>Sheet 2 of 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>lbs</td>
<td>13:00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D2</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* S/B = sample reading/background reading; NA = not analyzed
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sample</th>
<th>Field Analysis</th>
<th>Lithologic Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>34</td>
<td>34</td>
<td>140</td>
<td>SW</td>
<td>Bentonite Plug.</td>
</tr>
<tr>
<td>35</td>
<td>35</td>
<td>13:33</td>
<td></td>
<td>BG @ &lt;1 ppm, BZ @ &lt;1 ppm</td>
</tr>
<tr>
<td>36</td>
<td>36</td>
<td></td>
<td></td>
<td>Silica Sand 60 from 42' to 47'.</td>
</tr>
<tr>
<td>37</td>
<td>37</td>
<td>13:39</td>
<td></td>
<td>BG @ &lt;1 ppm, BZ @ &lt;1 ppm</td>
</tr>
<tr>
<td>38</td>
<td>38</td>
<td></td>
<td></td>
<td>200 mesh silica slurry.</td>
</tr>
<tr>
<td>39</td>
<td>39</td>
<td></td>
<td></td>
<td>Ceramic cup.</td>
</tr>
<tr>
<td>40</td>
<td>40</td>
<td>13:58</td>
<td></td>
<td>Boring terminated at 49 feet. No free groundwater encountered.</td>
</tr>
<tr>
<td>41</td>
<td>41</td>
<td>13:58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>42</td>
<td>13:58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>43</td>
<td>13:58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>44</td>
<td>13:58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>45</td>
<td>13:58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>46</td>
<td>13:58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>47</td>
<td>14:20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>48</td>
<td>14:20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>49</td>
<td>49</td>
<td>14:20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>50</td>
<td>14:20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>51</td>
<td>51</td>
<td>14:20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>52</td>
<td>52</td>
<td>14:20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*S/B = sample reading/background reading; NA = not analyzed*
Exhibit 10

Exhibit 10

Legend

Woodward McNeill & Associates:
(Geotechnical Investigation YMCA- Conro. Site,
July 1972)
- Approximate boring location
  (3 borings completed on June 20, 1972)
- Approximate test pit location
  (7 pits were completed)
- Approximate edge of refuse fill

Note: This investigation indicated refuse fill to contain mainly construction debris and papers and did not show to contain highly decomposable materials such as green waste. Estimated waste depth based on borings is in the order of 25 feet.

UC Santa Barbara Map and Imagery
Laboratory, Davidson Library:
(Aerial Photographic Files 1938-2002)
- Estimated refuse boundary/1953 Aerial photo
- Estimated refuse boundary/1958 aerial photo

California Integrated Waste Management Board
1001 I Street - Sacramento, CA 95814
(Closed Illegal & Abandoned Sites Investigation Unit)

Date: 3/13/07
Prepared By: AMC

Site Map
Estimated Refuse Boundary
La Veta DS – Orange County
Woodward McNeill & Associates: (Geotechnical Investigation YMCA - Comstock Site, July 1972)

This drawing depicts the subsurface investigation of the site needed for the design of the foundation for one of the proposed YMCA structures to be built onsite.

Under the supervision of Woodward McNeill and Associates engineers, the following was accomplished:

- 3 borings varying from 52 to 89 ft and completed on June 22, 1972. Borings were excavated using a 6 ft. continuous flight auger.
- 7 test pits

Subsurface conditions observed during investigation:

This investigation indicated refuse fill to contain mainly construction debris and papers and did not show to contain highly decomposable materials such as green waste. Estimated waste depth based on borings is in the order of 25 feet. It was also found that the water content of the refuse appeared to be relatively low. Soils beneath the refuse fill were found to consist of about 7 ft of medium dense silty sands overlying dense to very dense clayey gravels extending to the maximum depth explored (89 ft).
California Integrated Waste Management Board
1001 I Street - Sacramento, CA 95814
(Closed Illegal & Abandoned Sites Investigation Unit)

Date: 9/4/07
Prepared By: AMC

Site Map
Gas Monitoring Well Locations
La Veta (YMCA) – Orange County

LEGEND
New Gas Monitoring Well Locations
- Multi-nested gas monitoring probes to determine gas generation potential (2 locations).
- Multi-nested gas monitoring probes to determine gas offsite migration (3 locations).

Existing Gas Monitoring Wells
Orange County Water District:
- (Santiago Creek Recharge Project/Dump Site Study-La Veta, September 1997)

Multi-nested gas monitoring probes to determine gas offsite migration (2 locations).

BMX Racetracks
YMCA Facilities
ROP School Facilities
Fence/Property Boundary
Residential
S. Tracy Ln
S. Jennifer Ln
S. Palmyra Ave
Santiago Creek

Scale: 1 inch = 100 ft
**La Veta Refuse Disposal Station**
2241 E. Palmyra Ave.
Orange, CA 92869

**BORING LOG**

**BORING/PROBE NUMBER:** LFG-1

**JOB NUMBER:** 01206053.12 Task 2

**COORDINATES:** N: 2232699.85 E: 6081632.1

---

**Depth (meters/feet)**

- 0 ft
- 1 ft
- 2 ft
- 3 ft
- 4 ft
- 5 ft
- 6 ft
- 7 ft
- 8 ft
- 9 ft
- 10 ft
- 11 ft
- 12 ft
- 13 ft
- 14 ft
- 15 ft
- 16 ft
- 17 ft
- 18 ft
- 19 ft
- 20 ft
- 21 ft
- 22 ft
- 23 ft
- 24 ft
- 25 ft
- 26 ft
- 27 ft
- 28 ft
- 29 ft
- 30 ft

**USCS Soil Class:** SP-SM

**GVM (gpm):**

- Medium brown fine to medium sand underlain by dark gray silty sand with slight organic odor
- Galvanized scrap metal and plastic bags
- Dark gray, sandy silt with some 3-4" cobbles, metal/glass debris; organic odor; small gravel throughout
- 8 to 18 feet - No cuttings

**USCS Class:** CL

**Description:**

- Wood fragments in sampler
- Wood with some metal and plastic in dark gray, silty clay matrix
- Wood debris, dry
- Dark brown and black striated clay with wood fragments
- Refuse with wood and newspaper (c. 1957) underlain with dark brown, silty clay
- Refuse with wood and organics underlain with medium brown clay/silt mixture

**Completion Detail:**

- FlUSH-Mount, Traffic-Rated Well Box
- 1/4" Labcock Valve
- 1/2" dia. sch 80 PVC blank
- 1/2" dia. sch 80 PVC screen (0.020-inch slot size)
- Endcap
- Monterey #3 sand
- Hydrated bentonite plug

---

**Drilling Company:** Layne Christensen

**Drilling Method:** Dual-Wall Casing Advance

**Logged By:** A. Widowin

**Sampling Method:** Cuttings

**Date Started:** 5/14/07
**Time Started:** 08:20

**Date Ended:** 5/14/07
**Time Ended:** 12:30

**Boring Diameter:** 9 in.
**Elevation:** 229.5 ft.

**Well Diameter:** 1/2 in.
**Total Depth:** 30.5 ft.
<table>
<thead>
<tr>
<th>Depth (feet)</th>
<th>Graphical Log</th>
<th>USC Soil Class</th>
<th>CuM (ppm)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SP</td>
<td>&lt;1</td>
<td>Medium brown fine to medium sand with some gravel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SP</td>
<td>&lt;1</td>
<td>Dark brown fine to medium sand with some gravel</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No cuttings (possible obstruction)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt;1</td>
<td>Wood debris, rubber, glass fragments in dark sand with gravel matrix</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SM</td>
<td>&lt;1</td>
<td>Gray clay with some wood and roots</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Wood debris and glass fragments underlain by medium brown sand-gravel mixture</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt;1</td>
<td>Large chunks of wood debris underlain by brown, silty sand with some gravel, moist</td>
</tr>
</tbody>
</table>

**Completion Detail**

- 1/2" dia. sch. 80 PVC blank
- 1/4" Labcoidi Valve
- I.D. Tag
- 1/2" dia. sch. 80 PVC screen (0.025-inch slot size)
- Endcap
- Monterey #3 sand
- Hydrated bentonite plug

**Drilling Information**

- Drilling Company: Layne Christensen
- Drilling Method: Dual Wall Casing Advance
- Logged By: A Wdowin
- Sampling Method: Cuttings
- Date Started: 5/14/07
- Time Started: 14:00
- Date Ended: 5/14/07
- Time Ended: 16:20
- Boring Diameter: 9 in.
- Elevation: 229.4 ft.
- Total Depth: 30.9 ft.
- Well Diameter: 1/2 in.
**BORING LOG**

La Veta Refuse Disposal Station  
2241 E. Palmyra Ave.  
Orange, CA 92869

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Graphical Log</th>
<th>Soil Class</th>
<th>OVM (gpm)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>SM</td>
<td>&lt;1</td>
<td>Surface: gravel and mixture, slightly moist, no odor</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>SP</td>
<td>&lt;1</td>
<td>Medium brown silty sand, slightly moist, no odor</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>SM</td>
<td>&lt;1</td>
<td>Medium brown fine to medium sand with gravel, slightly moist, no odor</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>SM</td>
<td>&lt;1</td>
<td>Medium brown silty sand with cobbles and gravel, slightly moist, no odor</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>GP</td>
<td>&lt;1</td>
<td>Medium brown gravelly sand with cobbles, slightly moist, no odor</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>GW</td>
<td>&lt;1</td>
<td>Medium brown gravelly sand with large cobbles, slightly moist, no odor</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>SC</td>
<td>&lt;1</td>
<td>Reddish brown clayey sand, slightly moist, no odor</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>CL</td>
<td>&lt;1</td>
<td>Reddish brown sandy clay, slightly moist, no odor</td>
</tr>
</tbody>
</table>

**Drilling Company:** Layne Christensen  
**Drilling Method:** Dual-Wall Casing Advance  
**Logged By:** A. Wdowin  
**Sampling Method:** Cuttings

**Date Started:** 5/15/07  
**Time Started:** 12:10  
**Date Ended:** 5/15/07  
**Time Ended:** 14:50

**Boring Diameter:** 9 in.  
**Elevation:** 235.0 ft.  
**Well Diameter:** 1/2 in.  
**Total Depth:** 35.0 ft.
## Boring Log

**La Veta Refuse Disposal Station**  
2241 E. Palmyra Ave.  
Orange, CA 92869

### Table: Depth vs. Description
<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Graphical Log</th>
<th>USCS Soil Class</th>
<th>OWM (ppm)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1</td>
<td>SW</td>
<td>&lt;1</td>
<td></td>
<td>Medium brown fine to medium sand with some fine gravel, slightly moist, no odor</td>
</tr>
<tr>
<td>1-2</td>
<td>SW</td>
<td>&lt;1</td>
<td></td>
<td>Concrete chunk, broken up</td>
</tr>
<tr>
<td>2-3</td>
<td>SW</td>
<td>&lt;1</td>
<td></td>
<td>Medium brown fine to medium sand with gravel and cobbles, slightly moist, no odor</td>
</tr>
<tr>
<td>3-4</td>
<td>SP</td>
<td>&lt;1</td>
<td></td>
<td>Medium brown coarse sand with fine gravel, slightly moist, no odor</td>
</tr>
<tr>
<td>4-5</td>
<td>SP</td>
<td>&lt;1</td>
<td></td>
<td>Medium brown fine sand with some cobbles, slightly moist, no odor</td>
</tr>
<tr>
<td>5-6</td>
<td>SP</td>
<td>&lt;1</td>
<td></td>
<td>Medium brown fine sand with gravel, slightly moist, no odor</td>
</tr>
<tr>
<td>6-7</td>
<td>SM</td>
<td>&lt;1</td>
<td></td>
<td>Medium brown silty sand, slightly moist, no odor</td>
</tr>
<tr>
<td>7-8</td>
<td>SC</td>
<td>&lt;1</td>
<td></td>
<td>Reddish brown sandy clay, slightly moist, no odor</td>
</tr>
</tbody>
</table>

### Drilling Information
- **Company:** Layne Christensen  
- **Method:** Dual-Wall Casing Advance  
- **Logged By:** A. Widowin  
- **Sampling Method:** Cuttings

### Boring Details
- **Date Started:** 5/15/07  
- **Time Started:** 08:00  
- **Date Ended:** 5/15/07  
- **Time Ended:** 11:32  
- **Boring Diameter:** 9 in.  
- **Elevation:** 230.9 ft.  
- **Well Diameter:** 1/2 in.  
- **Total Depth:** 35.0 ft.
<table>
<thead>
<tr>
<th>DEPTH (ft-bgs)</th>
<th>DESCRIPTION</th>
<th>GRAPHIC LOG</th>
<th>ELEV. (ft)</th>
<th>SAMPLE NO.</th>
<th>TYPE</th>
<th>BLOWS PER 6&quot;</th>
<th>N VALUE</th>
<th>RECOVERY (%)</th>
<th>PID READING (ppm)</th>
<th>TIME (00:00)</th>
<th>COMMENTS</th>
</tr>
</thead>
</table>
| 5             | **FILL** Silty Sand (SM): Dark grayish brown; dry; fine grained, trace gravel; (5, 60, 35); loose, shards of glass  
@ 2' - w/ small cobbles, trace wood  
@ 4' - nail, piece of ceramic material  
No Recovery                                                                                                                                         | -----       | 0         | SS-1-0.5   |      |              |         |             |                              |             | Start hand augering  
P H = 7.0                                                                                       |
| 10            | **FILL** Silty Sand (SM): Dark grayish brown; dry; fine grained, trace gravel; (5, 60, 35); loose  
@ 7' - Slightly larger, increased gravel content  
@ 8' - Charred/burned wood fragments for 0.25'  
@ 9' - predominantly gravels, Light gray; fine  
No Recovery                                                                                                                                         | -----       | 80        | SS-1-1.5   |      |              |         |             |                              |             | Very difficult to hand auger  
Unable to get deeper with hand auger, begin drilling at 4'                                             |
| 15            | **FILL** Silty Sand (SM): Dark grayish brown; dry; fine grained, trace gravel; (5, 60, 35); loose  
@ 13' - Dark red for 0.25'; hard, dry  
@ 14' - Wood chunks  
@ 14.5' - Dark red, hard fragments  
@ 16.5' - Red fragments, hard  
Terminated boring at 20 ft bgs                                                                                                                      | -----       | 60        | SS-1-2.5   |      |              |         |             |                              |             |                                                                                           |
| 20            | **NATIVE** Sand with cobbles and gravel (SW): Grayish brown; dry to moist; (20, 70, 10); medium                                                                                                               | -----       | 95        | SS-1-10   |      |              |         |             |                              |             | Boring Completed                                                                          |
**BOREHOLE LOG**

<table>
<thead>
<tr>
<th>DEPTH (f-bgs)</th>
<th>DESCRIPTION</th>
<th>GRAPHIC LOG</th>
<th>ELEV. (ft)</th>
<th>SAMPLE NO.</th>
<th>TYPE</th>
<th>BLOWS PER 6&quot;</th>
<th>N.VALUE</th>
<th>RECOVERY (%)</th>
<th>PI READING (ppm)</th>
<th>TIME (00:00)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>FILL: Silty Sand (SM): Grayish brown; dry; fine grained; (5, 60, 35) @ 1' - with cobbles; (20, 50, 30) @ 2' - red; solid fragments @ 4' - 0.5' whitish gray for 0.5'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>FILL: Silty Sand (SM): Grayish brown; dry; fine grained; (5, 60, 35) @ 8' - 0.25' whitish gray</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>@ 13' - 0.25' burned material @ 13.5' - red; solid fragments @ 14' - increased gravels Terminated boring at 15 ft bgs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**COMMENTS**

- Start hand augering
- pH = 7.0
- Hand auger broken on cobbles, replaced
- Unable to advance beyond 1', step over 1' to try again
- Receive approval from OC W & R to drill at 1'
- Boring completed

**NOTES:** Boring backfilled with Enviroplug No. 8 hydrated bentonite

**CONTACT:**

- InterPhase
- Geoprobe 6610 DT
- Direct Push
- 2 in.
- A. S.

**PROJECT:** La Veta Landfill

**LOCATION:** Orange, CA

**ELEVATION DATA:**

- HG1075 F07
- La Veta Landfill
- 2100 Main St, Suite 150, Huntington Beach, CA 92648

**COORDINATE SYSTEM:**

- EASTING
- NORTHING

**EQUIPMENT:**

- Geoprobe 6610 DT

**DRILL MTHD:**

- Direct Push

**DIAMETER:**

- 2 in.

**LOGGER:**

- A. S.

**REVIEWER:**

- M. R.
Legend:

- Existing Soil Gas Probe [CIWMB, 2007]
- Soil Gas Probe [Geosyntec, 2009]
- Soil Gas Probe and Soil Boring [Geosyntec, 2009]
- Soil Boring [Geosyntec, 2009]
- Fill Excavated
- Estimated Waste Boundary
  [Ninyo & Moore, 2008; Earth Tech, 1991]

Note: Sample locations and boundaries are approximate.

Date: November 2009  Project No: HG1075

County of Orange, California

Figure 3
Soil Boring and Soil Gas Probe Locations
La Veta Former Refuse Disposal Station
Note: Sample locations and boundaries are approximate. MSW = Municipal Solid Waste
* Borings performed by Ninio and Moore in 2007 [Ninio & Moore, 2008] observed by Geosyntec.
Figure 5
Soil/Waste Arsenic, Lead and Dioxin/Furan Results
YMCA Area
La Veta Former Refuse Disposal Station
County of Orange, California

Notes:
- As - Arsenic; Pb - Lead; D/F - Dioxins and Furans
- MSW - Municipal Solid Waste
- Highlighted values indicate exceedance of the DTSC background arsenic criteria of 12 mg/kg; the California Human Health Screening Level for lead in residential soil of 80 mg/kg; and/or the California residential soil goal for D/F-TEQ of 50 pg/g.
- NA - Not Analyzed
- As and Pb Concentrations in mg/kg; D/F TEQ in pg/g.

Depths in feet below ground surface.
Sample dates are February/March 2009 unless stated otherwise.
Sample locations and boundaries are approximate.
## BOREHOLE LOG

### DESCRIPTION

<table>
<thead>
<tr>
<th>DEPTH (ft-bgs)</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>FILL Silty Sand (SM): Dark grayish brown; dry; fine grained, trace gravel; (5, 60, 35); loose; shards of glass</td>
</tr>
<tr>
<td></td>
<td>@ 2’ - w/ small cobbles, trace wood</td>
</tr>
<tr>
<td>4</td>
<td>@ 4’ - nail, piece of ceramic material</td>
</tr>
<tr>
<td>10</td>
<td>FILL Silty Sand (SM): Dark grayish brown; dry; fine grained, trace gravel; (5, 60, 35); loose</td>
</tr>
<tr>
<td></td>
<td>@ 7’ - Slightly larger, increased gravel content</td>
</tr>
<tr>
<td></td>
<td>@ 8’ - Charred/burned wood fragments for 0.25’</td>
</tr>
<tr>
<td></td>
<td>@ 9’ - predominantly gravels, Light gray; fine</td>
</tr>
<tr>
<td>15</td>
<td>FILL Silty Sand (SM): Dark grayish brown; dry; fine grained, trace gravel; (5, 60, 35); loose</td>
</tr>
<tr>
<td></td>
<td>@ 13’ - Dark red for 0.25’, hard, dry</td>
</tr>
<tr>
<td></td>
<td>@ 14’ - Wood chunks</td>
</tr>
<tr>
<td></td>
<td>@ 14.5’ - Dark red, hard fragments</td>
</tr>
<tr>
<td>16.5</td>
<td>@ 16.5’ - Red fragments, hard</td>
</tr>
<tr>
<td>20</td>
<td>NATIVE Sand with cobbles and gravel (SW): Grayish brown; dry to moist; (20, 70, 10); medium</td>
</tr>
</tbody>
</table>

### NOTES:
- Boring backfilled with Enviroplug No. 8 hydrated bentonite
<table>
<thead>
<tr>
<th>DEPTH (ft-bgs)</th>
<th>DESCRIPTION</th>
<th>GRAPHIC LOG</th>
<th>ELEV. (ft)</th>
<th>SAMPLE</th>
<th>TYPE</th>
<th>BLOWS PER 6&quot;</th>
<th>N.VALUE</th>
<th>RECOVERY (%)</th>
<th>PID READING (ppm)</th>
<th>TIME (00:00:00)</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Soil Name (USCS Sym.)</td>
<td>6 Plasticity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Color</td>
<td>7 Density/Consistency</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Moisture</td>
<td>8 Other (Mineral Content, Discoloration, Odor, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Grain Size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Percentage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>FILL</td>
<td>Silty Sand (SM): Grayish brown; dry; fine grained; (5, 60, 35)</td>
<td></td>
<td>SS-2-5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>@ 1' - with cobbles; (20, 50, 30)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>@ 2' - red; solid fragments</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>@ 4' - 0.5' whitish gray for 0.5'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>No Recovery</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>FILL</td>
<td>Silty Sand (SM): Grayish brown; dry; fine grained; (5, 60, 35)</td>
<td></td>
<td>SS-2-7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>@ 8' - 0.25' whitish gray</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>@ 13' - 0.25' burned material</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>@ 13.5' - red; solid fragments</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>@ 14' - Increased gravels</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>Terminated boring at 15 ft bgs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
50
62

BOREHOLE LOG

6) Plasticity
7) Density/Consistency
8) Other (Mineral Content, Discoloration, Odor, etc.)

1) Soil Name (USCS Sym.)
2) Color
3) Moisture
4) Grain Size
5) Percentage

@ 12:05, Begin Hand Auger to 1.5 ft, collect surface sample.

2 inches of Asphalt
FILL
Silty SAND with Gravel (SM); brown (10YR 4/3); moist, fine-grained Sand; (5,80,15); loose.
@ 2.5 ft bgs: 0.25 inch layer of light gray broken cobble (10YR 7/1).

No Recovery 4 ft - 6 ft

5
FILL
Silty SAND with Gravel (SM); brown (10YR 4/3); moist, fine-grained Sand; (5,80,15); loose.

@ 12:15

Collect Sample @ 12:35

@ 2.5 ft bgs: 0.25 inch layer of light gray broken cobble (10YR 7/1).

No Recovery 8 ft - 9.5 ft

10
FILL
Silty SAND with gravel (SM); Dark brown (10YR 3/3); moist, fine-grained Sand with gravel; (5,85,10); loose; trace wood and glass fragments; broken cobbles.
@ 10.75 ft bgs: 0.25 inch broken cobble layer; light gray (10YR 7/2).

No Recovery 12 ft - 14.5 ft

15
FILL
Broken Cobble; pale brown (10YR 6/3).
@ 15 ft bgs: 6 inch layer of black and white Sand with gravel.

FILL
SAND with Gravel (SM); white (10YR 8/1); dry; fine-to coarse-grained Sand; (10,90,0); loose.

@ 16 ft bgs: Color change to light brownish gray (10YR 6/2).

FILL
SAND with Gravel (SW); white (10YR 8/1); dry; fine-to coarse-grained Sand; (10,90,0); loose.

@ 18 ft bgs: Color change to light brownish gray (10YR 6/2).

FILL
Silty SAND with Gravel (SW); brown (10YR 5/3); dry;
**BOREHOLE LOG**

**DEPTH** (ft-bgs)  | **DESCRIPTION**  | **ELEV.** (ft)  | **GRAPHIC LOG**  | **SAMPLE**  | **COMMENTS**
---|---|---|---|---|---
25  | Fine- to coarse-grained Sand; (15, 75, 15); loose; broken cobbles. No Recovery 20 ft - 22 ft  |  |  |  |  |
25  | **FILL**  | SAND with Gravel (SW); white (10YR 8/1); dry; fine- to coarse-grained Sand; (10,90,0); loose.  |  |  |  |
25  | **NATIVE**  | SAND with Gravel (SP); dark grayish brown (10YR 4/2); dry; fine-grained Sand; (10,90,0); loose.  |  |  |  |
25  | **NATIVE**  | Silty SAND with Gravel (SM); brown (10YR 4/3); moist; fine-grained Sand with gravel; (10,70,20); loose. No Recovery 24 ft - 25.5 ft  |  |  |  |
30  | **NATIVE**  | Well graded SAND with Gravel (SW); grayish brown f (10YR 5/2); moist; fine- to coarse-grained Sand; (30,70,0); loose.  |  |  |  |
30  | **NATIVE**  | Silty SAND (SM); brown (10YR 4/3); moist; fine-grained Sand; (0,80,20); loose to medium consistency.  |  |  |  |
@ 29.5 ft bgs: increase in broken cobbles; (20,60,20). Terminated boring at 30 ft bgs. Backfill to surface with No. 8 Bentonite Chips, and asphalt patch at surface.  |  |  |  |  | Boring Complete @ 13:05

**NOTES:** Boring backfilled with Enviroplug No. 8 hydrated bentonite

**REVIEWER:** M. Reardon

**CONTRACTOR:** InterPhase

**EQUIPMENT:** Geoprobe 6610 DT

**DRILL MTHD:** Direct Push

**COORDINATE SYSTEM:**

**DIAMETER:** 2.25"

**LOGGER:** E. Ortenberg

**NOTES:** SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS
<table>
<thead>
<tr>
<th>DEPTH (ft-bgs)</th>
<th>DESCRIPTION</th>
<th>GRAPHIC LOG</th>
<th>SAMPLE</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>FILL Silty SAND with Gravel (SM); brown (10YR 4/3); moist; fine-grained Sand with small gravel; (0,90,10); loose; cobbles.</td>
<td></td>
<td></td>
<td>@ 10:55, Begin Hand Auger to 2 ft. Collect surface sample.</td>
</tr>
<tr>
<td>3</td>
<td>@ 3 ft bgs: 0.25 inch color change to light gray (10YR 7/1).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.75</td>
<td>@ 3.75 ft bgs: 0.25 inch color change to light gray (10YR 7/1).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>No Recovery 4 ft - 6.5 ft</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>FILL Silty SAND with Gravel (SM); brown (10YR 4/3); moist; fine-grained Sand with small gravel; (0,90,10); loose; cobbles.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>FILL with Silt and Gravel (SP); very dark gray (10YR 3/1); moist; fine- to medium-grained Sand; (5,90,5); loose; wood, glass, newspaper and cardboard fragments; odor.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>No Recovery 8 ft - 9.5 ft</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>FILL with Silt and Gravel (SP); black (10YR 2/1); moist; fine- to medium-grained Sand; (5,90,5); loose; wood, glass, newspaper and cardboard fragments; odor.</td>
<td></td>
<td></td>
<td>Collect Sample @ 11:20</td>
</tr>
<tr>
<td>12</td>
<td>No Recovery 12 ft - 14 ft</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>FILL with Silt and Gravel (SP); very dark gray (10YR 3/1); moist; fine- to medium-grained Sand; (5,90,5); loose; wood, glass, newspaper and cardboard fragments; odor.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>@ 15.5 ft bgs: 6 inch zone of broken cobble with reddish color @ 16 ft bgs: light gray broken cobbles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>@ 16 ft bgs: light gray broken cobbles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>No Recovery 16 ft - 18 ft</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>FILL with Gravel (SW); light gray (10YR 7/2); moist to dry; fine- to coarse-grained Sand; (15,85,0); loose; broken cobbles.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Clayey SAND (SC); white (10YR 8/1) with fryable thin</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:** Boring backfilled with Enviroplug No. 8 hydrated bentonite
### Easting/Passing Log

#### Project Details
- **Project Name:** La Veta Landfill
- **Location:** Orange, CA
- **Start Date:** Feb 26, 09
- **Finish Date:** Feb 26, 09

#### Elevations

<table>
<thead>
<tr>
<th>Depth (ft-bgs)</th>
<th>Graphic Log</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>

#### Samples

<table>
<thead>
<tr>
<th>Sample</th>
<th>Type</th>
<th>Blows Per 6&quot;</th>
<th>N Value</th>
<th>Recovery (%)</th>
<th>PID Reading (ppm)</th>
<th>Time (00:00)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS-09-23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Description:**
- Strips of black (10YR 2/1); moist; fine-grained Sand; (0,8,20); medium consistency.
- Silty SAND with Gravel (SW); brown (10YR 5/3); moist; fine-to coarse-grained Sand; (10,80,10); loose; broken cobbles.
- Terminated boring at 26 ft bgs. Backfill to surface with No. 8 Bentonite Chips.

**Comments:**
- Collect Sample @ 11:55
- Boring Complete @ 11:25

#### Boring Details
- **Logger:** E. Ortenberg
- **Contractor:** InterPhase
- **Equipment:** Geoprobe 6610 DT
- **Drill Method:** Direct Push
- **Coordinate System:**
- **Easting:**
- **Nording:**
- **Datum:**
- **Start Date:** Feb 26, 09
- **Finish Date:** Feb 26, 09

**Notes:** Boring backfilled with Enviroplug No. 8 hydrated bentonite.

**See Key Sheet for Symbols and Abbreviations**

**Contact Information:**
- **Geosyntec Consultants**
  - 2100 Main St
  - Suite 150
  - Huntington Beach, CA 92648
  - Tel: (714) 969-0800
  - Fax: (714) 969-0820
### Borehole Log

#### Sample

<table>
<thead>
<tr>
<th>Soil Name (USCS Sym.)</th>
<th>Color</th>
<th>Moisture</th>
<th>Grain Size</th>
<th>Percentage</th>
<th>Plasticity</th>
<th>Density/Consistency</th>
<th>Other (Mineral Content, Discoloration, Odor, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silt (SM)</td>
<td>Brown (10YR 5/3)</td>
<td>Moist</td>
<td>Fine-grained Sand</td>
<td>(0,80,20)</td>
<td>Loose</td>
<td>Trace gravel</td>
<td></td>
</tr>
</tbody>
</table>

**No Recovery to 4 ft - 12 ft**

<table>
<thead>
<tr>
<th>Borehole Log Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DESCRIPTION</strong></td>
</tr>
<tr>
<td>Silt (SM); brown (10YR 5/3); moist; fine-grained Sand; (0,80,20); loose; trace gravel.</td>
</tr>
<tr>
<td><strong>DATE</strong></td>
</tr>
<tr>
<td>Feb 26, 09</td>
</tr>
<tr>
<td><strong>TIME (00:00)</strong></td>
</tr>
<tr>
<td>14:15</td>
</tr>
<tr>
<td><strong>COMMENTS</strong></td>
</tr>
<tr>
<td>@ 14:15, Begin Hand Auger, Collect surface sample. Begin Drilling 14:20</td>
</tr>
</tbody>
</table>

---

### Boring Details

- **SS-10**
- **Start Drill Date**: Feb 26, 09
- **Finish Drill Date**: Feb 26, 09
- **Location**: Orange, CA
- **Project**: La Veta Landfill
- **Number**: HG1075 F07

**Elevation Data**

- **Ground Surf.**: HG1075 F07
- **Datum**: 0 ft

**Equipment**

- **Equipment**: Geoprobe 6610 DT
- **Logger**: E. Ortenberg
- **Contractor**: InterPhase
- **REVIEWER**: M. Reardon

**Notes**

- Boring backfilled with Enviroplug No. 8 hydrated bentonite

See key sheet for symbols and abbreviations.
<table>
<thead>
<tr>
<th>DEPTH (ft-bgs)</th>
<th>DESCRIPTION</th>
<th>GRAPHIC LOG</th>
<th>SAMPLE</th>
<th>ELEV. (ft)</th>
<th>BLOWS PER 6&quot;</th>
<th>N VALUE</th>
<th>RECOVERY (%)</th>
<th>PID READING (ppm)</th>
<th>TIME (00:00)</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>@ 14:50 Begin drilling</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Silty SAND (SM); brown (10YR 4/3); moist; fine-grained Sand; (0,80,20); loose.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>@ 2.5 ft bgs: 0.25 inch layer of broken cobbles.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No Recovery 4 ft - 6 ft</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>NATIVE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Collect Sample @ 15:20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SAND with Gravel (SW); brown (10YR 5/3); dry; fine-to coarse-grained Sand; (15,85,0); loose to very loose; broken cobbles.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No Recovery 8 ft - 16 ft</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Terminated boring at 16 ft bgs. Encounter refusal. Backfill to surface with No. 8 Bentonite Chips.
Borehole log

**DESCRIPTION**

1. Soil Name (USCS Sym.)
2. Color
3. Moisture
4. Grain Size
5. Percentage
6. Plasticity
7. Density/Consistency
8. Other (Mineral Content, Discoloration, Odor, etc.)

**GRAPHIC LOG**

**SAMPLE**

<table>
<thead>
<tr>
<th>ELEV. (ft)</th>
<th>SAMPLE NO.</th>
<th>TYPE</th>
<th>BLOWSPER 6&quot;</th>
<th>N.VALUE</th>
<th>RECOVERY (%)</th>
<th>PID READING (ppm)</th>
<th>TIME (00:00)</th>
</tr>
</thead>
</table>

**COMMENTS**

- @ 08:40, Begin Hand Auger to 2 ft, collect surface sample.
- Begin Drilling @ 09:00
- Collect Sample @ 09:15
- No Recovery 4 ft - 5.5 ft
- No Recovery 8 ft - 11 ft
- No Recovery 12 ft - 16 ft
- No Recovery 16 ft - 19 ft

**LOCATION**

Orange, CA

**PROJECT**

La Veta Landfill

**NUMBER**

HG1075 F07

**DATE**

Feb 26, 09

**NOTE:**

Boring backfilled with Enviroplug No. 8 hydrated bentonite
**BOREHOLE LOG**

**DEPTH**
1. Soil Name (USCS Sym.)
2. Color
3. Moisture
4. Grain Size
5. Percentage

**ELEV. (ft)**

**PID READING (ppm)**

**DESCRIPTION**
- **SAMPLE NO.**
- **BLOWS PER 6”**
- **RECOVERY (%)**
- **TIME (00:00)**

**COMMENTS**
- 1) Rig Behavior
- 2) Air Monitoring
- 3) Pocket Pen
- 4) Tor Vane

**GRAPHIC LOG**

**SS-11-27’**

**SAMPLE**

Collect Sample @ 09:30

Terminated boring at 32 ft bgs. Backfill to surface with No. 8 Bentonite Chips.

**Boring Complete @ 09:30**

**NOTES:** Boring backfilled with Enviroplug No. 8 hydrated bentonite.
<table>
<thead>
<tr>
<th>DEPTH (ft-bgs)</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>SS-12-0'</td>
</tr>
<tr>
<td>2.25</td>
<td>FILL</td>
</tr>
<tr>
<td>6.6</td>
<td>@ 09:45, Begin Hand Auger to 2 ft, collect surface sample.</td>
</tr>
<tr>
<td>4.75</td>
<td>FILL</td>
</tr>
<tr>
<td>7</td>
<td>Collect Sample @ 10:25</td>
</tr>
<tr>
<td>15.5</td>
<td>@ 15.5 ft bgs: Prevalent glass and wood shards/fragments.</td>
</tr>
<tr>
<td>20</td>
<td>FILL</td>
</tr>
<tr>
<td>18.5</td>
<td>No Recovery 16 ft - 18.5 ft</td>
</tr>
<tr>
<td>20</td>
<td>FILL</td>
</tr>
</tbody>
</table>

**Sample Log**

<table>
<thead>
<tr>
<th>DEPTH (ft-bgs)</th>
<th>GRAPHIC LOG</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.25</td>
<td>SS-12-6'</td>
<td>Silty SAND with Gravel (SM); brown (10YR 4/3); moist; fine- to medium-grained Sand; (5,80,15); loose.</td>
</tr>
<tr>
<td>9.5</td>
<td>FILL</td>
<td>Silty SAND (SM); very dark gray (10YR 3/1); moist to dry; fine-grained Sand with some gravel; (5,85,10); loose; wood fragments; strong odor.</td>
</tr>
<tr>
<td>12.5</td>
<td>Collect VOC Sample</td>
<td></td>
</tr>
<tr>
<td>14.75</td>
<td>@ 6.5 ft bgs: Color change to black (10YR 2/1)</td>
<td></td>
</tr>
<tr>
<td>16.25</td>
<td>Collect VOC Sample</td>
<td></td>
</tr>
<tr>
<td>18.75</td>
<td>@ 13.75 ft bgs: Change to fine- to medium-grained Sand (SW).</td>
<td></td>
</tr>
</tbody>
</table>

**Comments**

- @ 09:45, Begin Hand Auger to 2 ft, collect surface sample.
- Begin Drilling @ 09:55
- Collect Sample @ 10:25
- Collect VOC Sample
- Collect VOC Sample
- Collect VOC Sample
- Boring backfilled with Enviroplug No. 8 hydrated bentonite
### BOREHOLE LOG

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>GRAPHIC LOG</th>
<th>ELEV.</th>
<th>SAMPLE</th>
<th>BLOWS PER 6&quot;</th>
<th>N.RECOVERY</th>
<th>PID READING (pm)</th>
<th>TIME (00:00)</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Soil Name (USCS Sym.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Color</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) Moisture</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4) Grain Size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5) Percentage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6) Plasticity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7) Density/Consistency</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8) Other (Mineral Content, Discoloration, Odor, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DEPTH (ft-bgs)**

- **@ 20 ft bgs:** Black wood fragments  
  No Recovery 20 ft - 21 ft

**FILL**

- Silty SAND (SM); dark gray (10YR 4/1); moist fine-grained Sand; (0,80,20); loose; strong odor.

**NATIVE**

- Silty SAND to Sandy SILT (SP-SM); gray (10YR 5/1); moist, fine-grained Sand; (0,50,50); medium consistency.

  - No Recovery 24 ft - 25 ft

  - **@ 27 ft bgs:** Broken Cobbles
  - **@ 27.5 ft bgs:** Color change to yellowish brown (10YR 5/6)

**SAMPLE**

- Terminated boring at 28 ft bgs. Backfill to surface with No. 8 Bentonite Chips.

**COLLECT SAMPLE**

- **@ 27.5 ft bgs:** Color change to yellowish brown (10YR 5/6)

**TERMINATED**

- **@ 28 ft bgs:** Black wood fragments

**RECOVERY (%)**

- 75

**TIME (00:00)**

- 10:30

**COMMENTS**

- Collect Sample @ 10:30

**TERMINATED**

- Boring Complete @ 10:20
**DESCRIPTION**

1) Soil Name (USCS Sym.)
2) Color
3) Moisture
4) Grain Size
5) Percentage
6) Plasticity
7) Density/Consistency
8) Other (Mineral Content, Discoloration, Odor, etc.)

**FILL**

Silty SAND with trace Gravel (SM); brown (10YR 4/3); dry; fine-grained Sand with trace gravel; (0.80,20); loose.

**NATIVE**

SAND with Silt and Gravel (SW); gray (10YR 5/1); dry; fine- to coarse-grained Sand; (15,75,10); loose; broken cobbles.

No Recovery 4 ft - 6 ft

**NATIVE**

SAND with Silt and Gravel (SW); gray (10YR 5/1); dry; fine- to coarse-grained Sand; (15,75,10); loose; broken cobbles.

**NATIVE**

Silty SAND with trace Gravel (SM); brown (10YR 4/3); dry; fine-grained Sand with trace gravel; (0.80,20); loose.

**NATIVE**

SAND with Silt and Gravel (SW); gray (10YR 5/1); dry; fine- to coarse-grained Sand; (15,75,10); loose; broken cobbles.

No Recovery 8 ft - 11 ft

**NATIVE**

SAND with Silt and Gravel (SW); gray (10YR 5/1); dry; fine- to coarse-grained Sand; (15,75,10); loose; broken cobbles.

No Recovery 12 ft - 14 ft

**NATIVE**

SAND with Silt and Gravel (SW); gray (10YR 5/1); dry; fine- to coarse-grained Sand; (15,75,10); loose; broken cobbles.

**NATIVE**

Silty SAND with trace Gravel (SM); brown (10YR 4/3); dry; fine-grained Sand with trace gravel; (0,80,20); loose.

**COMMENTS**

- @ 15:40, Begin Hand Auger to 2 ft. Collect surface sample. Begin Drilling @ 15:45
- Collect Sample @ 16:00
- Boring Complete @ 15:55

**NOTES:**

- Boring backfilled with Enviroplug No. 8 hydrated bentonite

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS
**BOREHOLE LOG**

**DEPT**

1. **Soil Name (USCS Sym.)**
2. **Color**
3. **Moisture**
4. **Grain Size**
5. **Percentage**
6. **Plasticity**
7. **Density/Consistency**
8. **Other (Mineral Content, Discoloration, Odor, etc.)**

**GRAPHIC LOG**

- **FILL** Silty SAND with Gravel (SM); brown (10YR 4/3); moist; fine-grained Sand with small gravel; (5,80,15); loose.
  - @ 1.5 ft bgs: color change to very dark gray (10YR 3/1)

- **FILL** Silty SAND (SM); black (10YR 4/3); moist; fine-grained Sand; (0,80, 20); loose; odor; wood fragments.
  - No Recovery 4 ft - 6.5 ft

- **FILL** Silty SAND (SM); black (10YR 4/3); moist; fine-grained Sand; (0,80, 20); loose; odor; wood and glass fragments.
  - No Recovery 8 ft - 10 ft

- **FILL** Sandy CLAY with Silt (CL); dark gray (10YR 4/1); moist; fine-grained Sand; (0,10, 90); medium plasticity (only 10% silt); trace wood organic fragments.

- **FILL** Silty SAND (SM); black (10YR 4/3); moist; fine-grained Sand; (0,80, 20); loose; odor; wood fragments.
  - No Recovery 12 ft - 15.5 ft

- **FILL** Clayey SAND with Gravel (SC); dark gray (10YR 4/1); moist; fine- to coarse-grained Sand with gravel; (10,75,15); medium to loose consistency; some broken cobbles.
  - No Recovery 16 ft - 19.5 ft

**SAMPLE**

- **SAMPLE NO.**
- **TYPE**
- **BLOWS PER 6"**
- **N VALUE**
- **RECOVERY (%)**
- **PID READING (ppm)**
- **TIME (00:00)**

**NOTES:** Boring backfilled with Enviroplug No. 8 hydrated bentonite

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS
<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>GRAPHIC LOG</th>
<th>ELEV. (ft)</th>
<th>SAMPLE NO.</th>
<th>TYPE</th>
<th>BLOWS PER 6&quot;</th>
<th>N VALUE</th>
<th>RECOVERY (%)</th>
<th>PID READING (ppm)</th>
<th>TIME (00:00)</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Silty SAND (SP)</em>; black (10YR 4/3); moist; fine-grained Sand; (0,80, 20); loose; odor; wood fragments.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No Recovery 20 ft - 29 ft</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>FILL</em></td>
<td>Silty SAND (SP); black (10YR 4/3); moist; fine-grained Sand; (0,80, 20); loose; odor; wood fragments.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NATIVE</td>
<td>SAND with Gravel (SW); dark grayish brown (10YR 4/2); moist; fine- to coarse-grained well graded Sand; (15,85,0); loose.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No Recovery 32 ft - 33 ft</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NATIVE</td>
<td>SAND with Gravel (SW); dark grayish brown (10YR 4/2); moist; fine- to coarse-grained well graded Sand; (15,85,0); loose.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>@ 35 ft bgs: Color change for 0.25 inch zone to reddish brown (2.5YR 4/4).</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Terminated boring at 36 ft bgs. Backfill to surface with No. 8 Bentonite Chips.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CONTRACTER</th>
<th>InterPhase</th>
<th>NORTHING</th>
<th>EASTING</th>
<th>DRILL MTHD</th>
<th>Direct Push</th>
<th>DIAMETER</th>
<th>2.25&quot;</th>
<th>LOGGER</th>
<th>E. Ortenberg</th>
<th>REVIEWER</th>
<th>M. Reardon</th>
</tr>
</thead>
</table>

**NOTES:** Boring backfilled with Enviroplug No. 8 hydrated bentonite
<table>
<thead>
<tr>
<th>DEPTH (ft-bgs)</th>
<th>DESCRIPTION</th>
<th>ELEV. (ft)</th>
<th>GRAPHIC LOG</th>
<th>SAMPLE</th>
<th>BLOWS PER 6&quot;</th>
<th>N.VALUE</th>
<th>RECOVERY (%)</th>
<th>PID READING (ppm)</th>
<th>TIME (00:00)</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.75</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>@ 15:20, Begin Hand Auger to 1.5 ft, collect surface sample.</td>
</tr>
<tr>
<td>0.75</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Begin Drilling @ 15:30</td>
</tr>
<tr>
<td>4</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Collect Sample @ 16:00</td>
</tr>
<tr>
<td>10</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19.5</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19.5</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTES: Boring backfilled with Enviroplug No. 8 hydrated bentonite.
### BOREHOLE LOG

<table>
<thead>
<tr>
<th>DEPTH (ft-bgs)</th>
<th>DESCRIPTION</th>
<th>GRAPHIC LOG</th>
<th>SAMPLE</th>
<th>ELEV. (ft)</th>
<th>SAMPLE NO.</th>
<th>TYPE</th>
<th>BLOWS PER 6&quot;</th>
<th>N. VALUE</th>
<th>RECOVERY (%)</th>
<th>PID READING (ppm)</th>
<th>TIME (00:00)</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>FILL</td>
<td>SAND with Silt, Gravel and Debris (SP); black (10YR 2/1); moist; fine-grained Sand with gravel; (10,85,5); loose to medium consistency; burnt wood and glass fragments; strong odor.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td><em>No Recovery 20 ft - 23 ft</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>FILL</td>
<td>SAND with Silt, Gravel and Debris (SP); black (10YR 2/1); moist; fine-grained Sand with gravel; (10,85,5); loose to medium consistency; burnt wood and glass fragments; strong odor.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td><em>No Recovery 24 ft - 25 ft</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>FILL</td>
<td>SAND with Silt, Gravel and Debris (SP); black (10YR 2/1); moist; fine-grained Sand with gravel; (10,85,5); loose to medium consistency; burnt wood and glass fragments; strong odor.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>NATIVE</td>
<td>SAND to Silty SAND (SP); very dark grayish greenish gray (10G 3/1); moist; fine-grained Sand; (0,80,20); medium consistency.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>@ 28 ft bgs: Color change to grayish brown (10YR 5/2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Collect Sample @ 16:05</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td><em>No Recovery 32 ft - 23 ft</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>NATIVE</td>
<td>SAND with Silt and Gravel (SW); light brownish gray (10YR 6/2); moist; fine- to coarse-grained Sand with small gravel and broken cobble; (20,75,5); loose.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terminated boring at 34 ft bgs. Backfill to surface with No. 8 Bentonite Chips.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Boring Complete @ 16:10</td>
<td></td>
</tr>
</tbody>
</table>

### COMMENTS
- No Recovery 20 ft - 23 ft
- No Recovery 24 ft - 25 ft
- Collect Sample @ 16:05
- Boring Complete @ 16:10

### NOTES:
Boring backfilled with Enviroplug No. 8 hydrated bentonite
### BOREHOLE LOG

<table>
<thead>
<tr>
<th>DEPTH (ft-bgs)</th>
<th>DESCRIPTION</th>
<th>ELEV. (ft)</th>
<th>GRAPHIC LOG</th>
<th>SAMPLE</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>FILL Silty SAND (SM); brown (10YR 4/3); moist; fine-grained Sand; (0,80,40); loose, root fragments.</td>
<td>2.0</td>
<td></td>
<td></td>
<td>@ 14:10, Begin Hand Auger to 5 ft, collect surface sample.</td>
</tr>
<tr>
<td>10</td>
<td>FILL Clayey SAND (SC); dark grayish brown (10YR 4/2); wet; fine-grained Sand; (0,70,30); medium consistency.</td>
<td>75</td>
<td></td>
<td></td>
<td>Begin Drilling @ 14:30</td>
</tr>
<tr>
<td></td>
<td>FILL SAND with Clay (SP); bluish black (10B 2.5/1); wet; fine-grained Sand with gravel; (5,85,15); medium consistency; burnt debris prevalent; wood and glass fragments; strong odor.</td>
<td>87.5</td>
<td></td>
<td></td>
<td>Collect Sample and duplicate @ 14:45</td>
</tr>
<tr>
<td>15</td>
<td>FILL SAND with Clay (SP); bluish black (10B 2.5/1); wet; fine-grained Sand with gravel; (5,85,15); medium consistency; burnt debris prevalent; wood and glass fragments; strong odor.</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### NOTES:
- Boring backfilled with Enviroplug No. 8 hydrated bentonite

---

**CONTRACTOR**
InterPhase

**EQUIPMENT**
Geoprobe 6600

**DRILL MTHD**
Direct Push

**COORDINATE SYSTEM:**
InterPhase

**DIAMETER**
2.25"

**LOGGER**
E. Ortenberg

**REVIEWER**
M. Reardon

---

**GS FORM:**
GEOTECH1 01/04

**PROJECT**
La Veta Landfill

**LOCATION**
Orange, CA

---

**ELEVATION DATA:**

<table>
<thead>
<tr>
<th>ELEV. (ft)</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0</td>
<td>FILL Silty SAND (SM); brown (10YR 4/3); moist; fine-grained Sand; (0,80,40); loose, root fragments.</td>
</tr>
<tr>
<td>75</td>
<td>FILL Clayey SAND (SC); dark grayish brown (10YR 4/2); wet; fine-grained Sand; (0,70,30); medium consistency.</td>
</tr>
<tr>
<td>87.5</td>
<td>FILL SAND with Clay (SP); bluish black (10B 2.5/1); wet; fine-grained Sand with gravel; (5,85,15); medium consistency; burnt debris prevalent; wood and glass fragments; strong odor.</td>
</tr>
<tr>
<td>25</td>
<td>FILL SAND with Clay (SP); bluish black (10B 2.5/1); wet; fine-grained Sand with gravel; (5,85,15); medium consistency; burnt debris prevalent; wood and glass fragments; strong odor.</td>
</tr>
</tbody>
</table>

**RECOVERY (%):**
- 1.1
- 4.2
- 25
- 2.0

---

**GROUND SURF.**

**TOP OF CASING**

---

**PROJECT NUMBER**
HG1075 F07

---

**DATUM**

---

**GS FORM:**

---

**NOTES:**
- Boring backfilled with Enviroplug No. 8 hydrated bentonite

---

**SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS**
**DESCRIPTION**

1. **Soil Name (USCS Sym.)**
2. **Color**
3. **Moisture**
4. **Grain Size**
5. **Percentage**
6. **Plasticity**
7. **Density/Consistency**
8. **Other (Mineral Content, Discoloration, Odor, etc.)**

**GRAPHIC LOG**

<table>
<thead>
<tr>
<th>DEPTH (f-bgs)</th>
<th>DESCRIPTION</th>
<th>ELEV. (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Native Sand with Silt and Gravel (SW); grayish brown (10YR 5/2); moist, fine- to coarse-grained Sand with gravel and some broken cobbles; (20,75,5); loose.</td>
<td>14:48</td>
</tr>
<tr>
<td>20</td>
<td>No Recovery 20 ft - 21 ft</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Native Sand with Silt and Gravel (SW); grayish brown (10YR 5/2); moist, fine- to coarse-grained Sand with gravel and some broken cobbles; (20,75,5); loose.</td>
<td>38</td>
</tr>
<tr>
<td>28</td>
<td>Terminated boring at 28 ft bgs. Backfill to surface with No. 8 Bentonite Chips.</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td><strong>Fill</strong></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Native Sand with Silt and Gravel (SW); grayish brown (10YR 5/2); moist, fine- to coarse-grained Sand with gravel and some broken cobbles; (20,75,5); loose.</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td><strong>Native</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Sample Table**

<table>
<thead>
<tr>
<th>SAMPLE NO.</th>
<th>TYPE</th>
<th>BLOWS PER 6&quot;</th>
<th>N VALUE</th>
<th>RECOVERY (%)</th>
<th>PID READING (ppm)</th>
<th>TIME (00:00)</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1) Rig Behavior</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2) Air Monitoring</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3) Pocket Pen</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4) Tor Vane</td>
</tr>
</tbody>
</table>

**Graphic Log**

- Consistency: burnt debris prevalent; wood and glass fragments; strong odor.
- No Recovery 20 ft - 21 ft.
- Fill: Sand with Clay (SP); bluish black (10B 2.5/1); wet; fine-grained Sand with gravel; (5,85,15); medium consistency; burnt debris, glass fragments; strong odor; 6 inch zone of prevalent wood fragments.
- Native: Sand with Silt and Gravel (SW); grayish brown (10YR 5/2); moist, fine- to coarse-grained Sand with gravel and some broken cobbles; (20,75,5); loose.
- No Recovery 24 ft - 26.5 ft

**Boring**

- Start Drill Date: Feb 25, 09
- Finish Drill Date: Feb 25, 09
- Location: Orange, CA
- Project: La Veta Landfill
- Number: HG1075
- F07

**Comments**

- Collect Sample @ 15:00
- Boring Complete @ 15:00

**Notations**

- Boring backfilled with Enviroplug No. 8 hydrated bentonite

**Contractor**

- InterPhase

**Equipment**

- Geoprobe 6600

**Drill Method**

- Direct Push

**Coordinate System**

- See Key Sheet for symbols and abbreviations

**Notes**

- E. Ortenberg
- M. Reardon

**Leslie Top of Casing**

- Orange, CA
- 2100 Main St
- Huntington Beach, CA 92648
- Tel: (714) 969-0800
- Fax: (714) 969-0820

**Notes**

- Boring backfilled with Enviroplug No. 8 hydrated bentonite
Boring Log:

**Date:** Feb 27, 09

**Location:** Orange, CA

**Project:** La Veta Landfill

**Number:** HG1075 F07

- **Description:**
  - **Fill:** Silty SAND with Gravel (SM); brown (10YR 4/3); moist, fine-grained Sand; (5,75,20); loose.
  - **Fill:** Silty SAND with Gravel (SM); brown (10YR 4/3); moist, fine-grained Sand; (5,75,20); loose.
  - **Fill:** Silty SAND with Gravel (SM); brown (10YR 4/3); moist, fine-grained Sand; (5,75,20); loose.

- **Elevation Data:**
  - **Datum:** SS-17
  - **Elevation:** 0.8
  - **Depth:** 3 ft

- **Comments:**
  - @ 09:55, Begin Hand Auger to 3.5 ft. Collect surface sample.
  - No Recovery 4 ft - 5.5 ft
  - Begin Drilling
  - Collect Sample @ 10:15
  - No Recovery 8 ft - 9.5 ft
  - 10.75 ft bgs: 0.25 inch zone of broken cobble; light gray (10YR 7/1).
  - 0.25 inch zone of broken cobble; light gray (10YR 7/1).
  - 7.25 ft bgs: 6 inch zone of broken cobble; light gray (10YR 7/1).
  - No Recovery 12 ft - 12.5 ft
  - @ 3 ft bgs: Becomes fine- to coarse-grained well graded Sand.

- **Terminated boring at 15 ft bgs. Backfill to 1.5 ft bgs with No. 8 Bentonite Chips, 1.0 ft bgs with No. 3 Cemex Lapis Lustre, and to surface with concrete per city specifications.**

- **Boring Complete @ 10:20**

**Notes:**

- Boring backfilled with Enviropug No. 8 hydrated bentonite.

**Equipment:**

- Geoprobe 6600

**Contractor:**

- InterPhase

**Reviewer:**

- M. Reardon

**Equipment:**

- Geoprobe 6600

**Log:**

- E. Ortenberg

**Notes:**

- See key sheet for symbols and abbreviations.
**BORING LOG**

**DEPTH (ft-bgs)**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>SAMPLE NO.</th>
<th>TYPE</th>
<th>BLOWS PER 6&quot;</th>
<th>N VALUE</th>
<th>RECOVERY (%)</th>
<th>TIME (00.00)</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 inches of Asphalt</td>
<td>SS-18-0</td>
<td></td>
<td>0.3</td>
<td>Begin Drilling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silty SAND with Gravel (SM); brown (10YR 4/3); moist, fine-grained Sand; (5,75,20); loose.</td>
<td>SS-18-6</td>
<td></td>
<td>62</td>
<td>Collect Sample</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Recovery 4 ft - 5.5 ft</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FILL</td>
<td>SS-18-4</td>
<td></td>
<td>0.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>@ 5.5 ft bgs: Sand becomes well graded fine- to coarse-grained.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Recovery 6 ft - 11.75 ft</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NATIVE</td>
<td>SS-18-0</td>
<td></td>
<td>0.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAND with Gravel (SW); light gray (10YR 7/1); dry; fine- to coarse-grained Sand; (20,80,0); loose; broken cobbles.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Recovery 12 ft - 13 ft</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NATIVE</td>
<td>SS-18-4</td>
<td></td>
<td>0.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silty SAND with Gravel (SW); brown (10YR 4/3); moist; fine- to coarse-grained well graded Sand; (5,75,20); loose.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terminated boring at 15 ft bgs. Backfill to 1.5 ft bgs with No. 8 Bentonite Chips, 1.0 ft bgs with No. 3 Cemex Lapis Lustre, and to surface with concrete per city specifications.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boring Complete @ 11:40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ELEVATION DATA:**

- Feb 27, 09
- Orange, CA
- La Veta Landfill
- SS-18
- HG1075 F07

**NOTES:** Boring backfilled with Enviroplug No. 8 hydrated bentonite

**COORDINATE SYSTEM:**

- EASTING: Geoprobe 6600
- NORTHING: Direct Push
- DRILL MTHD: Direct Push
- DIAMETER: 2.25"
<table>
<thead>
<tr>
<th>DEPTH (ft-bgs)</th>
<th>DESCRIPTION</th>
<th>GRAPHIC LOG</th>
<th>WELL LOG</th>
<th>GROUNDWATER OR STRUCTURE</th>
<th>ELEVATION (ft)</th>
<th>SAMPLE NO.</th>
<th>BLOWS PER 6&quot;</th>
<th>RECOVERY (%)</th>
<th>PID READING (ppm)</th>
<th>TIME (00:00)</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.5</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.75</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:**
- Probe: 4.75" - 5.25"; SS: 6.15" SS; Tubing: 0.25" NylaFlow; Backfill (5.5" - 40"); No. 3 Enviropolug Chips, hydrated; Filter pack (4.5" - 5.5"); Cemex No. 3 Sand; Seal (1" - 4.5"); Same as Backfill; Completion: 6" traffic rated well box set in concrete.

**COORDINATE SYSTEM:**
SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS
### WELL LOG

<table>
<thead>
<tr>
<th>SAMPLE</th>
<th>RECOVERY (%)</th>
<th>PID READING (ppm)</th>
<th>ELEVATION (ft)</th>
<th>ELEVATION DATA:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DESCRIPTION**

- **FILL**
  - Silty SAND to Sandy SILT (SP-SM); brown (10YR 4/3); moist; fine-grained SAND with trace gravel; (0,50,50); loose to medium consistency; debris still prevalent, some appears burnt; strong odor.
  - No Recovery 24 ft - 29 ft
  - ELEVATION 75
  - BLOWS PER 6" 1.6
  - COMMENTS Collect Sample @ 11:50

- **NATIVE**
  - SAND with Silt and Gravel (SW); light brownish gray (10YR 6/2); moist; fine-grained sand with gravel and broken cobbles; (25,65,10); loose.
  - No Recovery 36 ft - 37 ft
  - ELEVATION 75
  - BLOWS PER 6" 0.8

- **NATIVE**
  - SAND with Silt and Gravel (SW); light brownish gray (10YR 6/2); moist; fine-grained sand with gravel and broken cobbles; (25,65,10); loose.
  - Terminated boring at 40 ft bgs.
  - ELEVATION 75

**NOTES:**

Probe (4.75' - 5.25'); 6" SS; Tubing: 0.25" NylaFlow; Backfill (5.5' - 40'): No. 8 Enviroplug Chips, hydrated; Filter pack (4.5' - 5.5'); Cemex No. 3 Sand; Seal (1' - 3.5'); Same as Backfill; Completion: 6" traffic rated well box set in concrete.

**SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS**
### BOREHOLE LOG

<table>
<thead>
<tr>
<th>DEPTH (ft-bgs)</th>
<th>DESCRIPTION</th>
<th>GRAPHIC LOG</th>
<th>WELL LOG</th>
<th>GROUNDWATER OR STRUCTURE</th>
<th>ELEVATION (ft)</th>
<th>SAMPLE</th>
<th>BLOWS PER 6&quot;</th>
<th>RECOVERY (%)</th>
<th>PID READING (ppm)</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>FILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 - 5</td>
<td>FILL</td>
<td>Well Graded SAND with Gravel (SW); brown (10YR 5/3); moist; fine- to coarse-grained Sand with small gravel; (10,90,0); loose to very loose.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 - 10</td>
<td>FILL</td>
<td>Silty SAND with Gravel (SM); brown (10YR 4/3); moist; fine-grained Sand; (10,70,20); medium consistency.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 - 15</td>
<td>FILL</td>
<td>(SAND with Silt and Gravel (SP)); dark gray (10YR 4/1); moist; fine- to medium-grained poorly graded Sand; (10,80,10); loose; some burned debris.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 - 20</td>
<td>FILL</td>
<td>Silty SAND (SM); brown (10YR 4/3); moist; fine-grained Sand; (0,80,20); medium consistency; loose.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 - 25</td>
<td>NATIVE</td>
<td>Well Graded SAND with Gravel (SW); gray (10YR 6/1); moist; fine- to coarse-grained Sand with small and medium gravel; (30,70,0); loose; some cobbles.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### COMMENTS
- 1) Rig Behavior
- 2) Air Monitoring

### NOTES
- Probe (4.75’ - 5.25’): 6” SS; Tubing: 0.25” NylaFlow; Backfill (5.5’ - 15’): No. 8 Enviroplug Chips, hydrated; Filter pack (4.5’ - 5.5’): Cemex No. 3 Sand; Seal (1’ - 4.5’): Same as Backfill; Completion: 6” traffic rated well box set in concrete.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS
FILL
Well Graded SAND with Gravel (SW); brown (10YR 5/3); moist; fine- to coarse-grained Sand; (10,90,0).

No Recovery 1.5 ft - 3 ft

FILL
Well Graded SAND with Gravel (SW); brown (10YR 5/3); moist; fine- to coarse-grained Sand; (10,90,0).

5

FILL
Silty SAND (SM); brown (10YR 5/3); moist; fine-grained Sand with gravel; (10,60,30).

Terminated boring at 5.5 ft bgs.

13:30
Boring Complete

13:15
Begin Drilling

13:05
Begin Hand Auger to 1.5 ft.
PROPOSED CEMETERY AND SOIL ANALYTICAL RESULTS

FORMER LA VETA REFUSE DISPOSAL STATION
2241 EAST PALMYRA AVENUE
ORANGE, CALIFORNIA

FIGURE 3

Approximate Scale, in feet

NOTE: Dimensions, directions, and locations are approximate.

LEGEND
- Approximate Property Line
- Soil Boring Location
- Depth
- Ar
  - Arsenic concentration in milligrams per kilogram (mg/kg)
- Pb
  - Lead concentration in mg/kg
- Dioxin
  - Dioxin Toxicity Equivalent concentration in picograms per gram
- NA
  - Not Analyzed

DTSC
California Department of Toxic Substances Control

Concentration exceeds the DTSC soil screening level for industrial/commercial land use or the 12 mg/kg DTSC arsenic screening level for school sites

Designates a sample that was collected within the landfill debris

NOTES:
1. Base Map Source: Conceptual Site Plan, Palmyra Cemetery, 2205 East Palmyra Avenue & 290 South Yorba Street, Orange, California, prepared by Stratos Form, undated.
2. Soil boring locations and concentrations based on Revised Site Assessment Report, La Veta Former Refuse Disposal Station, City of Orange, California, prepared by Geosyntec Consultants, dated January 12, 2010.
3. Dimensions, directions, and locations are approximate.

PROJECT NO. 100081004
DATE DRAFT

Approximate Property Line

Soil Boring Location

Depth
Soil sample depth in feet below the ground surface (bgs)

Ar
Arsenic concentration in milligrams per kilogram (mg/kg)
Pb
Lead concentration in mg/kg
Dioxin
Dioxin Toxicity Equivalent concentration in picograms per gram
NA
Not Analyzed

DTSC
California Department of Toxic Substances Control

Concentration exceeds the DTSC soil screening level for industrial/commercial land use or the 12 mg/kg DTSC arsenic screening level for school sites

Designates a sample that was collected within the landfill debris

NOTES:
1. Base Map Source: Conceptual Site Plan, Palmyra Cemetery, 2205 East Palmyra Avenue & 290 South Yorba Street, Orange, California, prepared by Stratos Form, undated.
2. Soil boring locations and concentrations based on Revised Site Assessment Report, La Veta Former Refuse Disposal Station, City of Orange, California, prepared by Geosyntec Consultants, dated January 12, 2010.
3. Dimensions, directions, and locations are approximate.
TEST PIT AND CROSS-SECTION LOCATIONS

NOTES:
1. Base Map Source: Conceptual Site Plan, Palmyra Cemetery, 2205 East Palmyra Avenue & 290 South Portola Street, Orange, California, prepared by Stratos Form, undated.
3. Dimensions, directions, and locations are approximate.
Geosyntec reported landfill debris from 8 to 16 feet bgs in boring SS-9. 

Geosyntec reported landfill debris from 5 to 20 feet bgs in boring SS-12. 

Geosyntec reported landfill debris from 11 to 23 feet bgs in boring SS-11. 

Geosyntec reported landfill debris from 8 to 18 feet bgs in boring SS-9. 

Geosyntec reported no landfill debris from 0 to 30 feet bgs in boring SS-8.
Geosyntec reported landfill debris from 8 to 18 feet bgs in boring SS-9.

Geosyntec reported landfill debris from 5 to 20 feet bgs in boring SS-12.
Geosyntec reported landfill debris from 5.5 to 22.5 feet bgs in boring SS-16. Ardent encountered the top of the landfill debris at approximately 6 feet bgs.
Geosyntec reported landfill debris from 7.5 to 26 feet bgs in boring SS-16. Ardent encountered the top of the landfill debris at approximately 9 feet bgs.

Geosyntec reported landfill debris from 5.5 to 22.5 feet bgs in boring SS-16. Ardent encountered the top of the landfill debris at approximately 7 feet bgs.