Appendix E

Geotechnical Exploration Report for
1440-1462 Artesia Boulevard

GEOTECHNICAL EXPLORATION
PROPOSED WAREHOUSE REDEVELOPMENT
1440 - 1462 ARTESIA BOULEVARD
GARDENA, CALIFORNIA

Prepared For:

InSite Property Group
19191 S. Vermont Avenue, Suite 680
Torrance, California 90502

Project No. PWAS_20210916

February 4, 2022

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Project No. PWAS_20210916

Insite Property Group
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Torrance, California 90502

Attention: Mr. Brian Sorensen

Subject: **Geotechnical Exploration**
Proposed Warehouse Redevelopment
1440 - 1462 Artesia Boulevard
Gardena, California

In response to your request, Carl Kim Geotechnical, Inc. (Carl Kim Geo) has performed geotechnical exploration for the subject project. The purpose of this study was to characterize engineering properties of onsite soils, identify geologic and seismic hazards that may impact the site, and develop foundation and earthwork recommendations.

The project site is located at the southwest corner of Artesia Boulevard and Normandie Avenue in the city of Gardena, California (latitude +33.8724, longitude +118.3011). The project includes redevelopment of a total of four parcels with addresses of 1450 through 1462 Artesia Boulevard. The site is a Brownfield development known as the Gardena Sumps project regulated under the California Department of Toxic Substances (DTSC). The site is partially underlain by industrial derived materials that were stockpiled in the sumps.

We have reviewed relevant subsurface information contained in prior environmental reports and executed a subsurface geotechnical investigation of the site with five cone penetrometer test soundings and two hollow-stem-auger borings. The results of the explorations, laboratory testing, engineering analyses, and geotechnical recommendations for the design and construction of the proposed development are included in this report.

The current site concept shows a 4-level L-shaped building with a footprint of 62,000 square feet. The building will include 186,000 square feet for self-storage over 4 levels, 62,000 square feet of industrial warehouse, and 10,000 square feet of office/retail. Most of the building is sited over areas outside documented sump pits. The southeastern portion of the building is planned over a reworked former sump area (Haack Rework Area). Ancillary improvements will include driveways, paved parking, landscape, hardscape, and utilities. The existing buildings will be demolished to accommodate the planned development.

Based on the results of our study, it is our opinion that the proposed development is feasible from a geotechnical standpoint provided that the recommendations presented herein are implemented in the design and construction of the project. No evidence of adverse geological or geotechnical hazards was noted at the site that will preclude the development of the project as currently

planned. Due to the documented presence of buried petroleum production byproducts (sludge) on site, special earthwork techniques and construction personnel with current 40-hour OSHA HAZWOPER training certification will likely be required.

We appreciate the opportunity to work with you on this project. If you have any questions, or if we can be of further service, please contact us at your convenience.

Respectfully submitted,

Carl Kim Geotechnical, Inc.

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Senior Principal Engineer

Andrew Hillstrand
Consulting Engineering Geologist

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Distribution: (1) Addressee

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1.0 INTRODUCTION

1.1 SITE LOCATION AND DESCRIPTION

The project site (Site) is located at the southwest corner of Artesia Boulevard and Normandie Avenue in the city of Gardena, California (latitude +33.8724, longitude +118.3011) (Figure 1, *Site Location*). The Site covers about 6½ acres and is subdivided into five privately owned parcels. The largest of these parcels is the Cooper property covering approximately 3 acres. The Haack property covers approximately 2.6 acres. The southwestern portion of the Site consists of three residential parcels (referred to as Residences).

The Site is partially bordered on the south by Los Angeles County Department of Public Works (LACDPW) property and the concrete-lined Dominguez Flood Channel (Figure 1 and Plate 1). Commercial and light industrial buildings exist to the north, east, and west of the Site. Two sumps containing primarily petroleum refining wastes (referred to as 'sludge') occupy over 80% of the Cooper property. These sumps are referred to as the Cooper North Sump and Cooper South Sump in this report.

A smaller sump containing sludge underlies the northeastern portion of the Haack property and is referred to as the Haack North Sump. There is also an area south of the Haack North Sump that partially underlies a portion of the Haack Property and a small portion of the Residences that is referred to as the Haack Rework Area. The Haack Rework Area contains sludge material, brick, and concrete debris and soil disturbed by excavation and replacement.

Currently the Cooper Sumps and a portion of the Haack Rework Area are covered with an engineered geomembrane while the Haack North Sump is covered by soil and hardscape.

The Site is in a generally low-lying coastal plain that is relatively flat with gentle drainage to the east and southeast toward the Los Angeles River. The current grade ranges from about Elevation (El.) +38 feet mean sea level (msl) in the southern portion of the site to about El. +19 feet msl along the east edge of the Cooper Parcel. In general, onsite drainage is toward the north and east with localized areas on the west and east sides of the site that vary.

Artesia Boulevard to the north ranges from approximately El. +22 to +25 feet msl in the Site vicinity and slopes gently. Normandie Avenue and a segment of the Union Pacific Railroad to the east ranges from approximately El. +27 to +25 feet msl and slopes downward to the north.

The thalweg of the Dominguez Channel to the south of the Site is at approximately El. +6 feet msl and flows to the east toward the Los Angeles River. The Residences generally range from El. +25 to +38 feet msl and slope downward to the west, north, and east.

The ground surface of the Cooper North, Cooper South, and Haack Sumps is at approximately El. +20 feet msl. The Haack Rework Area ranges from approximately El. +20 to +35 feet msl.

Since the 1920's, portions of the site served various industrial uses that ranged from clay mining and brick making to sump operations. Portions of the site have been excavated and filled and redeveloped several times based on aerial photo review.

As shown on Figure 1A, *Site Location, 1924 Topographic Map* (USGS, 1924a, b), prior to most grading and development, the lowlands associated with the natural drainage course for Dominguez Creek was north of the site and Artesia Boulevard. Much of the site appears to be within a former terrace a few to several feet above the adjacent channel/ slough. The 1924 maps also indicate that excavation of the sumps on the Cooper property was likely on-going. We understand that during this era active clay mining and brick manufacturing were occurring onsite.

Around 1958, the Dominguez Channel was excavated and constructed to its current configuration south of the site draining eastward. For further description of the known prior uses of the site, as well as aerial photo chronology, refer to Stantec (2008)[1] and Geosyntec (2021). These data record several events that include excavation and filling in portions of the site.

1.2 PROJECT DESCRIPTION

The current site concept shows a 4-level, L-shaped building with a footprint of 62,000 square feet. The building will include 186,000 square feet for self-storage over 4 levels, 62,000 square feet of industrial warehouse, and 10,000 square feet of office/retail. Most of the building is sited over areas outside documented sump pits. The southeastern portion of the building is planned over a reworked former sump area (Haack Rework Area). Ancillary improvements will include driveways, paved parking, landscape, hardscape, and utilities. The existing buildings will be demolished to accommodate the planned development. Structural loading information was not yet available at the time this report was prepared.

[1] Refer to the report text and Appendix C of Stantec (2008) for additional details about prior site uses. https://www.envirostor.dtsc.ca.gov/public/final_documents2?global_id=19490135&doc_id=6018260

1.3 PURPOSE AND SCOPE

The purpose of this study was to characterize engineering properties of onsite soils, identify geologic and seismic hazards impacting the Site, and develop geotechnical recommendations for foundations and earthwork. The tasks completed as part of this study are described below in more detail.

TASK 1 - DOCUMENT REVIEW AND PLANNING

As part of our study, we reviewed several geotechnical documents and maps pertinent to the subject site. The documents reviewed are referenced in Appendix A.

Other tasks included site reconnaissance, marking of boring locations, contacting DigAlert, subcontracting specialty drilling contractors, and obtaining boring permits from the County of Los Angeles.

TASK 2 – SUBSURFACE EXPLORATION AND LABORATORY TESTING

Two (2) hollow-stem auger borings and 5 cone penetrometer test (CPT) soundings were advanced to obtain representative subsurface data for grading and foundation design. Exploration locations are shown on Plate 1. In general, explorations were advanced to a target depth of 50 to 65 feet below the existing ground surface (bgs). The locations of exploration performed by Carl Kim Geo and selected prior environmental explorations are shown on Plate 1 while logs of borings are included in Appendix B, Explorations.

Geotechnical laboratory testing was performed as part of the current study. Results are attached in Appendix C, Laboratory Test Results. The program consisted of testing selected representative specimens, prepared from representative samples, of the earth materials to obtain the following properties and characteristics:

- Soil classification (ASTM D2488);
- Moisture and density (ASTM D 2216 and D 2937);
- Particle size distribution (ASTM D 422);
- Plasticity Index (ASTM D 4318);
- Expansion Index (ASTM D 4829);
- Direct Shear (ASTM D3080);
- Consolidation (ASTM D 2435);
- Compaction (ASTM D 1557);

- R-value (CTM 301); and
- Corrosivity (CTM 643, 417, 422).

TASK 3 –GEOLOGIC/SEISMIC HAZARDS EVALUATION

Using available geologic data, we have developed information on the general geologic conditions beneath the project including the locations of documented active and potentially active faults near the site. This study addresses the potential for primary earthquake hazards (ground shaking and surface rupture) and secondary earthquake hazards (liquefaction, seismic settlement, seiches, and earthquake-induced landsliding) impacting the site. Seismic Design Parameters are attached in Appendix D.

TASK 4 - ENGINEERING ANALYSIS AND REPORT

The results of subsurface exploration, laboratory testing, geologic-seismic hazards, and geotechnical design recommendations are summarized below.

2.0 GEOLOGIC CONDITIONS

2.1 GEOLOGIC SETTING

The Site is within the Los Angeles Coastal Plain and is underlain by a thick sequence of marine and continental sediments that were deposited in a broad basin, generally referred to as the Los Angeles Basin. The Los Angeles Basin is bisected by the northwest trending Newport-Inglewood Fault Zone (NIFZ), which divides the Coastal Plain into two smaller synclinal troughs. The Site is located in the West Coast Basin, west of the NIFZ (Yerkes, 1965; Water Replenishment District of Southern California, 2021). The Plain is generally a broad, near-featureless area only slightly dissected by the Dominguez Creek (Dominguez Channel). Regional geographic features predating much of the development of the area are shown on Figure 1A while regional geologic features are shown on Figure 2, *Geologic Map*.

Regional geologic mapping indicates that near-surface native soils beneath the site consist of Pleistocene-age older alluvium comprised predominantly of silt and sand and that Holocene-age alluvium may be present along the natural Dominguez Creek channel under Artesia Boulevard and developments to the north.

2.2 SITE GEOLOGY

As encountered in current and prior subsurface investigations the site is generally underlain by varying amounts of undocumented fill, sludge-bearing undocumented fill, and older alluvium. Descriptions of the earth units are below while the mapped limits of the materials are shown on Plate 1.

Undocumented Artificial Fill (map symbol Afu): Approximately 5 feet of material that appeared to be uncertified cover fill was encountered in CKG-1. Based on current and prior investigations undocumented fill soils primarily classify as silty sand and sandy silts. Because of the prior development and land uses, isolated areas may contain buried debris, such as bricks, asphalt, and concrete rubble.

Sludge-Bearing Undocumented Fill (Afs): Based on review of the referenced environmental reports, Afs materials are generally localized to the confines of mapped sump locations. For geotechnical purposes Afs is an undocumented fill with material described as sludge present. Afs includes admixtures of sand, silt clay, brick or other debris, along with zones of material described as “sludge”.

The sludge is generally described as acidic, black, soft to dense, dry to wet, vitreous to fibrous, semi-solidified to solidified tar. It is common for the sludge material to be interlayered with layers of fine sand, and occasionally silt and clay soil. Occasional

concrete and brick debris and potential voids are noted in some of Stantec (2008) explorations.

Quaternary Alluvium (Map Symbol - Qalo): Quaternary, Pleistocene-age alluvium encountered in Carl Kim Geo's borings CKG-1 and 2, consisted generally of interlayered silty sand, sandy silt, silt, and few clay interbeds. The sand and silty sand layers encountered were logged as medium dense to dense and dry to wet. Cone penetration test (CPT) logs from the current exploration and the logs from prior investigations (Stantec, 2008) indicate the alluvium is interbedded fine sand, silty sand, silt, clay, and admixtures. Clay layers commonly have calcium carbonate nodules. At depths below El. -30 feet msl, the occurrence of fine-grained (clay and silt) interlayers appear to increase. Calcium carbonate nodules and presence of shells suggest the depositional facies typical of low energy fluvial and estuarine depositional environment.

The mapped limits of the identified earth materials on Plate 1 and estimated spot elevations for the bottoms of undocumented fills are largely based on review of the referenced aerial photos and exploration logs and figures contained in Stantec (2008) and Carl Kim Geo's explorations. The depths and limits of Afu and Afs reflected on Plates 1 through 3 are approximate.

Much of the site is anticipated to be underlain by about 3 to 5 feet of undocumented fill. In sump areas, undocumented fill, including sludge deposits, will be deeper. As shown on Plate 1, portions of the Haach North Sump may have up to 16 feet of undocumented fill and sludge present.

2.3 GROUNDWATER

Groundwater was encountered at El. +4 to +12 feet msl during current explorations. In addition, the California Geological Survey (CGS) performed a groundwater elevation evaluation for the Torrance Quadrangle within the alluvial soils to evaluate the liquefaction potential of the soils (CGS, 1998). Near the project site, the historically shallowest groundwater depth is reported to be approximately 10 feet bgs (Figure 3, *Historic High Groundwater Level*). Therefore, we recommend that a groundwater level of 10 feet bgs be assumed for design and construction.

Fluctuations of groundwater level and localized zones of perched water should be anticipated below grade during and following the rainy season. Irrigation of landscaped areas on or immediately adjacent to the site can also cause a fluctuation of local groundwater levels.

2.3.1 INFILTRATION

Due to the presence of contaminated soils at the Site, onsite infiltration of stormwater is not recommended or deemed feasible.

3.0 GEOLOGIC HAZARDS

Geologic hazards include surface faulting, ground lurching, seismic shaking, landslides, liquefaction, seismically-induced settlement, lateral spreading, seismically-induced landslides, flooding, expansive soils, corrosive soils, and soil gas. The following sections discuss these hazards and their potential impacts at the site in more detail.

3.1 FAULTING AND SEISMICITY

In general, the primary seismic hazards for sites in the region include strong ground shaking and surface fault rupture. Our discussion of faults potentially impacting the site is prefaced with a discussion of California legislation and state policies concerning the classification and land-use criteria associated with faults. Per the California Geological Survey (CGS), an active fault is a fault which has had surface displacement within Holocene time (about the last 11,000 years). Similarly, a fault whose recency of past movement is older than 11,700 years is a pre-Holocene fault and does not meet State criteria as "active". Age-undetermined faults are those whose age of most recent movement is not known and is unconstrained. These updated definitions were necessary to eliminate agency and practitioner confusion for fault investigation reports as mandated by the Alquist-Priolo Earthquake Faulting Zones Act of 1972 (AP Act) and recently revised Special Publication 42 (CGS, 2018). The intent of this act is to prevent citing of habitable structures across traces of "active" faults.

3.1.1 SURFACE RUPTURE HAZARD

According to the State of California *Earthquake Fault Zones* map for the Los Angeles Quadrangle (CGS, 2017; Bryant and Hart, 2007), the site is **not** located within a currently established *Alquist-Priolo Earthquake Fault Zone*. Therefore, a surface fault rupture hazard evaluation is not mandated for this site and the potential for surface fault rupture at the site is expected to be low.

The location of the closest active faults to the site was evaluated using the United States Geological Survey (USGS) Earthquake Hazards Program National Seismic Hazard Maps (USGS, 2008b). The closest active fault to the site with known potential for surface fault rupture is the NIFZ located approximately 2.6 miles east of the site (Figure 4, *Regional Faults*).

3.1.2 STRONG GROUND SHAKING

The principal seismic hazard to the site is ground shaking resulting from an earthquake occurring along any of several major active and potentially active faults in southern California (Figure 5, *Historic Seismicity*). The intensity of ground shaking at a given location depends primarily upon the earthquake magnitude, the distance from the source, and the site response characteristics.

Accordingly, design of the project should be performed in accordance with all applicable current codes and standards utilizing the appropriate seismic design parameters to reduce seismic risk as defined by California Geological Survey (CGS) Chapter 2 of Special Publication 117A (CGS, 2008). The 2019 edition of the California Building Code (CBC) is the current edition of the code. Through compliance with these regulatory requirements and the utilization of appropriate seismic design parameters selected by the design professionals, potential effects relating to seismic shaking can be reduced.

The following code-based seismic parameters should be considered for design under the 2019 CBC:

2019 CBC Based Ground Motion Parameters

Categorization/Coefficient	Code-Based
Site Latitude	33.8724°
Site Longitude	-118.3011°
Site Class	D
Mapped Spectral Response Acceleration at Short Period (0.2 sec), S_S	1.769 g
Mapped Spectral Response Acceleration at Long Period (1 sec), S_1	0.629
Short Period (0.2 sec) Site Coefficient, F_a	1.0
Long Period (1 sec) Site Coefficient, F_v	null[1]
Adjusted Spectral Response Acceleration at Short Period (0.2 sec), S_{MS}	1.769 g
Adjusted Spectral Response Acceleration at Long Period (1 sec), S_{M1}	null[1]
Design Spectral Response Acceleration at Short Period (0.2 sec), S_{DS}	1.180 g
Design Spectral Response Acceleration at Long Period (1 sec), S_{D1}	null[1]
Site Amplification Factor, F_{PGA}	1.1
Site Modified Peak Ground Acceleration, PGA_M	0.844 g

[1]Per Exception 2 in Section 11.4.8 of ASCE 7-16, seismic response coefficient C_S to be determined by Eq. 12.8-2 for values of $T \leq 1.5T_s$ and taken as equal to 1.5 times the value computed in accordance with either Eq. 12.8-3 for $T_L \geq T > 1.5T_s$ or Eq. 12.8-4 for $T > T_L$

3.2 SECONDARY SEISMIC HAZARDS

In general, secondary seismic hazards for sites in the region could include soil liquefaction, seismically-induced settlement, lateral spreading, landsliding, seiches and tsunamis. These potential secondary seismic hazards are discussed below.

3.2.1 LIQUEFACTION

Liquefaction is a seismic phenomenon in which loose, saturated, fine-grained granular soils behave similarly to a fluid when subjected to high-intensity ground shaking. Liquefaction occurs when three general conditions exist: 1) shallow groundwater; 2) low density, fine, clean sandy soils; and 3) high-intensity ground motion. Studies indicate that saturated, loose and medium dense, near-surface cohesionless soils exhibit the highest liquefaction potential, while dry, dense, cohesionless soils and cohesive soils exhibit low to negligible liquefaction potential.

As shown on Figure 6, *Seismic Hazards*, a liquefaction hazard zone as delineated by the State of California (CGS, 1999) along the northern edge of the site. Based on our site-specific evaluation using the historic high groundwater level of 10 feet bgs, PGA_M, and a modal magnitude of 7.3, liquefaction hazard is deemed generally low. The results are presented in Appendix E.

3.2.2 SEISMICALLY-INDUCED SETTLEMENT

Seismically-induced settlement consists of dynamic settlement of unsaturated soil (above groundwater) and liquefaction-induced settlement (below groundwater). These settlements occur primarily within low density sandy soil due to reduction in volume during and shortly after an earthquake event.

Based on our evaluation using the historic high groundwater level of 10 feet bgs, PGA_M, and a modal magnitude of 7.3, the potential total earthquake-induced settlement is estimated to be on the order of 1 inch or less (Appendix E). The differential settlement can be taken as half the total settlement over a horizontal distance of 30 feet.

3.2.3 LATERAL SPREADING OR FLOW FAILURE

Liquefaction may also cause lateral spreading. For lateral spreading to occur, the liquefiable zone must be continuous, unconstrained laterally, and free to move along gently sloping ground toward an unconfined area. Because liquefaction hazard is anticipated to be generally low, the potential for lateral spreading is deemed low. Based on our evaluation using the historic high groundwater level of 10 feet bgs, PGA_M, and a modal magnitude of 7.3, the potential lateral spreading toward the Dominguez Channel is estimated to be on the order of 2 inches or less (Appendix E).

3.2.4 SEISMICALLY-INDUCED LANDSLIDES

As shown on Figure 6, *Seismic Hazards*, the site is not mapped within a seismically-induced landslide hazard zone identified by the State of California (CGS, 1999). In addition, due to project site lacking significant slopes, it is our opinion that the potential for seismically-induced landslide hazard at the site is negligible.

3.2.5 SEICHES AND TSUNAMIS

Seiches are large waves generated in enclosed bodies of water in response to ground shaking. Tsunamis are waves generated in large bodies of water by fault displacement or major ground movement. Based on the absence of an enclosed water body near the site and the inland location of the site, seiche and tsunami risks at the site are considered negligible (Figure 7, *Tsunami Inundation*).

3.3 FLOODING HAZARDS

According to a Federal Emergency Management Agency (FEMA) flood insurance rate map (FEMA, 2018), the project site is located within a flood hazard area identified as “Zone X”, which is defined as an area of minimal flood hazard. Regionally, storm runoff flow is generally directed to the south. As shown on Figure 8, *Flood Hazard Map*, the site is **not** located within a flood hazard zone.

Earthquake-induced flooding can be caused by failure of dams or other water-retaining structures as a result of earthquakes. The site does not appear to be mapped within an inundation zone per the California Department of Safety of Dams (DSOD, 2022). Therefore, the risk of seismically-induced flooding due to dam failure is considered low.

3.4 EXPANSIVE SOILS

Expansive soils contain significant amounts of clay particles that swell considerably when wetted and which shrink when dried. Foundations constructed on these soils are subject to uplifting forces caused by the swelling. Without proper mitigation measures, heaving and cracking of both building foundations and slabs-on-grade could result.

Based on the soil types logged in prior and current explorations and laboratory test results, the site soils are anticipated to have low to very low expansion potential. Accordingly, expansive soils will likely not impact the proposed construction. Variance in expansion potential of onsite soil is anticipated; therefore, additional testing is recommended upon completion of site grading and excavation to confirm the expansion potential presented in this report. For purposes of this report, and based upon visual characterization of alluvial materials at approximate foundation depth, very low expansion potential of site materials may be considered to support design and verified upon completion of excavation.

3.5 CORROSIVE SOILS

Near-surface subsurface materials at the site are classified as severely corrosive to very severely corrosive to metals with moderate sulfate and chloride exposure to concrete and steel reinforcing. Corrosivity test results are attached in Appendix C. Due to the documented presence of sump materials at the Site, we recommend that enhanced corrosion protection be considered to address potential impacts of contact with corrosive sump materials and seepage.

3.6 SUBSURFACE GASES

Much of the Site is underlain by sump materials. Accordingly, the presence of hazardous soil gases cannot be precluded; therefore, mitigation measures will be required.

3.7 SUBSIDENCE

Based on review of referenced reports the site is not within an area of known significant subsidence associated with groundwater or petroleum withdrawal, peat oxidation, or hydro-compaction (USGS, 2022c).

A single idle oil well (API number 0403717350) is located roughly 480 feet southeast of the site (CalGEM, 2022). The nearest oil field is the Dominguez Oil Field located roughly 7,500 feet east of the Site.

4.0 CONCLUSIONS

Based on the results of our study, it is our opinion that the proposed development is feasible from a geotechnical standpoint. In our opinion, the following geotechnical factors should be considered:

- We anticipate undocumented fill and sump materials underlain by alluvium at the site.
- Our review of the geologic literature indicate there are no known active faults mapped across the site.
- The main seismic hazard that may affect the site is strong ground shaking.
- Groundwater was encountered at El. +4 to +12 feet msl in recent explorations. The historically shallowest groundwater depth is reported to be approximately 10 feet bgs. We recommend that a design groundwater level of 10 feet bgs be assumed for design and construction.
- The expansion potential of near-surface onsite soils is expected to be low.
- The onsite soils are deemed very severely corrosive to buried ferrous metals and moderately deleterious to concrete. Due to the documented presence of sump materials at the Site, we recommend that enhanced corrosion protection be considered to address potential impacts of contact with corrosive sump materials and seepage.
- If the undocumented fill and sump materials are removed and replaced with engineered fill, the proposed building may be supported on spread footings and its floor slab supported on grade.
- In lieu of remedial grading, ground improvement may be performed to avoid excavating and handling contaminated materials. Feasible ground improvement alternatives include surcharging, drilled displacement columns, stone columns, and Geopiers.
- Based on the preliminary development plan, it appears that the site grade may be raised above El. +30 feet msl. In that case, considerable soil may have to be imported and stockpiled onsite, which will enhance the cost effectiveness of the surcharging option.
- Deep foundations may also be used to support the proposed building. However, neither driven nor drilled pile options are deemed economically viable. Driven piles will require noise and vibration mitigation due to existing developments surrounding the Site. Drilled piles and any pre-drilling for the driven piles will require excavation, handling, and disposal of contaminated materials.

- Due to the documented presence of buried petroleum production byproducts (sludge) on site, special earthwork techniques and construction personnel with current 40-hour OSHA HAZWOPER training certification will likely be required.

5.0 RECOMMENDATIONS

The proposed development for the subject site is feasible from a geotechnical standpoint, provided that the recommendations presented in this report are properly incorporated in design and construction.

The proposed warehouse building may be supported on shallow spread-type foundations established in engineered fill or undisturbed natural soils. The floor slab may then be supported directly on grade. Due to the presence of sump materials, mitigation measures against hazardous soil gases will likely be required, including underslab vapor barriers and possibly vapor collection and extraction systems.

The required excavation for remedial grading may require shoring to protect adjacent improvements. There may be existing underground utilities that will also be impacted. Information on these utilities should be provided to Carl Kim Geo for evaluation.

The recommendations presented below are based upon the exhibited geotechnical engineering properties of the soils and their anticipated response both during and after construction. The recommendations are also based upon proper field observation and testing during construction. The project geotechnical engineer should be notified of suspected variances in field conditions to determine the effect upon the recommendations subsequently presented. These recommendations are considered minimal and may be superseded by more restrictive requirements of the civil and structural engineers, the City of Gardena, and other governing agencies.

Carl Kim Geo should review the grading, shoring and foundation plans and project specifications as they become available to verify that the recommendations presented in this report have been incorporated into the plans for this project.

5.1 EARTHWORK AND GRADING

All site grading should be performed in accordance with the applicable local codes and in accordance with the project specifications that are prepared by the appropriate design professional.

5.1.1 SITE PREPARATION

Prior to construction, the site should be cleared of any vegetation, trash, and/or debris within the area of proposed improvements. These materials should be removed from the site. Any underground obstructions onsite should be removed. Efforts should be made to locate any existing utility lines to be removed or rerouted where interfering with the proposed construction. Any resulting cavities should be properly backfilled and compacted. After the site is cleared, the soils should be carefully observed for the removal

of all unsuitable deposits. All undocumented fill or man-made debris, unsuitable native soils and former foundation remnants should be excavated and removed from the footprint area of the proposed building prior to any fill placement.

5.1.2 EXCAVATION

Most of the project site is likely covered with artificial fill (estimated at approximately 5 feet bgs at non-sump locations and up to 11 feet at sump locations). Localized thicker accumulations of undocumented fill materials or former foundation remnants should be anticipated during future earthwork construction. All existing artificial fill and man-made materials should be removed in areas planned for new structural improvements. *It is essential that site excavation not undermine existing building foundations adjacent to the site that are to remain or other site improvements that are sensitive to movement.*

Once excavated, Carl Kim Geo should evaluate the exposed soil conditions at the foundation bearing grade to verify conditions are as anticipated.

5.1.3 SUBGRADE PREPARATION

After excavating, the bearing grade soils should be evaluated by Carl Kim Geo. The moisture content should be determined, and the soils slowly and uniformly moistened (or dried) as necessary to bring the soils to a uniform moist condition. The moisture content of the anticipated relatively non-expansive soils should be conditioned to within 2 percent above optimum moisture content to a depth of 18 inches. The moisture content of the subgrade should be checked and approved by Carl Kim Geo prior to placement of reinforcing steel or structural concrete.

5.1.4 FILL MATERIALS

On-site soil that is free of sludge contamination, construction debris, organics, cobbles, boulders, rubble, or rock larger than 4-inches in largest dimension is suitable to be used as fill for support of structures. Any imported fill soil should be approved by the geotechnical engineer prior to import or use onsite.

5.1.5 FILL PLACEMENT AND COMPACTION

Fill soils should be placed in loose lifts not exceeding 8 inches, moisture-conditioned to within 2 percent above optimum moisture content, and compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM Test Method D 1557. Aggregate base should be compacted to a minimum of 95 percent relative compaction.

5.2 SHORING

Shoring may consist of soldier piles and lagging. Soldier piles may consist of steel H-beams set in pre-drilled holes and backfilled with lean-mix concrete to the ground surface. The pre-drilling auger diameter should be smaller than the diagonal dimension of the H-beam. The potential for raveling and caving of sand layers, and the presence of dense sand may pose difficulties in the installation of the soldier piles. Accordingly, the shoring contractor should be prepared to use special techniques and measures, if necessary, to permit the proper installation of the soldier piles.

5.2.1 LATERIAL EARTH PRESSURES

For design of cantilevered shoring, where the surface of the backfill is level, it can be assumed that drained soils will exert a lateral pressure equal to that developed by a fluid with a density of 35 pounds per cubic foot (pcf). In addition to the recommended earth pressure, the shoring should be designed to resist any applicable surcharge loads due to foundation, storage, traffic, or other anticipated loads.

In addition to the recommended earth pressure, the upper 10 feet of shoring adjacent to streets should be designed to resist a uniform lateral pressure 100 psf, acting as a result of an assumed 100 psf surcharge behind the shoring due to normal street traffic. If the traffic is kept back at least 10 feet from the shoring, the traffic surcharge may be neglected. We can determine lateral surcharge pressures for specific cases, such as construction crane, concrete trucks, and other heavy construction equipment adjacent to shoring, if requested.

5.2.2 SURCHARGE PRESSURE FROM ADJACENT BUILDINGS

Where existing building foundations are within a 1:1 plane projected upward from the bottom of the planned shoring and basement walls, a lateral surcharge load should be applied to the active earth pressure to account for the pressure imposed by the foundation. To calculate the design surcharge pressures from adjacent building foundations, the tributary loading area may be assumed to extend from the shoring a distance equal to the depth of excavation. Gravity (dead plus live) loads from the existing building foundations within the tributary loading area should be included in the evaluation of surcharge loads. A coefficient of 0.45 may be used to convert gravity loads to horizontal surcharge loads. The horizontal surcharge load should be applied at a depth equal to 1/3 of the shored excavation height.

5.3 FOUNDATIONS

Conventional spread footings established in undisturbed natural soils or engineered fill may be used to support the proposed building. Footings should be embedded a minimum 18 inches below the lowest adjacent grade. An allowable soil bearing pressure of 3,000 pounds per square foot (psf) may be used for footings with a minimum width of 18 inches for continuous footings and 24 inches for isolated footings.

A one-third increase in the bearing value for short duration loading, such as wind or seismic forces may be used. The ultimate bearing capacity can be taken as 9,000 psf, which does not incorporate a factor of safety. A resistance factor of 0.45 should be used for initial bearing capacity evaluation with factored loads.

The allowable bearing capacity for shallow footings is based on a total static settlement of 1 inch. Differential settlement can be taken as half the total settlement over a horizontal distance of 30 feet.

For static loading, 25 pounds per cubic inch (pci) may be assumed as the modulus of subgrade reaction (*k*). For seismic loading, a *k* value of 100 pci may be assumed.

Resistance to lateral loads will be provided by a combination of friction between the soil and structure interface and passive pressure acting against the vertical portion of the footings structures. For calculating lateral resistance, a passive pressure of 300 psf per foot of depth to a maximum of 3,000 psf and a frictional coefficient of 0.30 may be used. Note that the passive and frictional coefficients do not include a factor of safety. The frictional resistance and the passive resistance of the soils can be combined without reduction in determining the total lateral resistance.

5.4 SLABS-ON-GRADE

Concrete slabs may be designed using a modulus of subgrade reaction of 100 pci provided the subgrade is prepared as described in Section 3.1. From a geotechnical standpoint, we recommend slab-on-grade be a minimum 5 inches thick with No. 3 rebar placed at the center of the slab at 24 inches on center in each direction. The structural engineer should design the actual thickness and reinforcement based on anticipated loading conditions. Where moisture-sensitive floor coverings or equipment is planned, the slabs should be protected by a minimum 10-mil-thick vapor barrier between the slab and subgrade. A coefficient of friction of 0.35 can be used between the floor slab and the vapor barrier.

Minor cracking of concrete after curing due to drying and shrinkage is normal and should be expected; however, concrete is often aggravated by a high water/cement ratio, high concrete temperature at the time of placement, small nominal aggregate size, and rapid moisture loss due to hot, dry, and/or windy weather conditions during placement and curing. Cracking due to

temperature and moisture fluctuations can also be expected. The use of low-slump concrete or low water/cement ratios can reduce the potential for shrinkage cracking. Additionally, our experience indicates that the use of reinforcement in slabs and foundations can generally reduce the potential but not eliminate for concrete cracking.

To reduce the potential for excessive cracking, concrete slabs-on-grade should be provided with construction or weakened plane joints at frequent intervals. Joints should be laid out to form approximately square panels.

5.5 CEMENT TYPE AND CORROSION PROTECTION

Based on the soil types encountered at the site, site soils expected to have severe exposure to water-soluble sulfates in the soil. Type II/V cement may be used for concrete construction onsite and the concrete should be designed in accordance with 2019 CBC requirements.

The onsite soil is anticipated to be severely corrosive to ferrous metals. Ferrous pipe should be avoided by using high-density polyethylene (HDPE) or other non-ferrous pipe when possible. Ferrous pipe, if used, should be protected by polyethylene bags, tap or coatings, di-electric fittings or other means to separate the pipe from onsite soils.

5.6 LATERAL EARTH PRESSURES

Recommended lateral earth pressures are provided as equivalent fluid unit weights, in psf/ft. or pcf., for retaining walls in drained conditions using onsite sandy soils as backfill.

	Equivalent Fluid Unit Weight (psf/ft)
Condition	Level Backfill, Static Condition
Active	35
At-Rest	60
Passive*	300
Coefficient of Friction	0.35

The above passive resistance values do not contain an appreciable factor of safety, so the structural engineer should apply the applicable factors of safety and/or load factors during design.

Cantilever walls that are designed for a deflection at the top of the wall of at least 0.001H, where H is equal to the wall height, may be designed using the active earth pressure condition. Rigid walls that are not free to rotate, walls that are braced at the top, and walls that provide indirect support for foundations should be designed using the at-rest condition. A seismic increment of 25 pcf may be added to the active earth pressure above to evaluate seismic loading on walls.

The above lateral earth pressures are based on fully drained conditions. Infiltrating surface water may build-up behind proposed basement walls. Therefore, walls below grade should be designed

to resist hydrostatic pressures (additional fluid pressure of 45 pounds per cubic foot) or be provided with positive drainage behind the wall.

Lateral load resistance will be provided by the sliding resistance at the base of the foundation and the passive pressure developed along the front of the foundation. A frictional resistance coefficient of 0.35 may be used at the concrete and soil interface.

In addition to the above lateral forces due to retained earth, the appropriate loads due to surcharges should be considered in the design of retaining structures.

5.7 TEMPORARY EXCAVATIONS

All temporary excavations, including utility trenches, retaining wall excavations, and foundation excavations should be performed in accordance with project plans, specifications, and all OSHA requirements. Excavations 4 feet or deeper should be laid back or shored in accordance with OSHA requirements before personnel are allowed to enter.

No surcharge loads should be permitted within a horizontal distance equal to the height of cut or 5 feet, whichever is greater from the top of the cut, unless the cut is shored appropriately. Excavations that extend below an imaginary plane inclined at 45 degrees below the edge of any adjacent existing site foundation should be properly shored to maintain support of the adjacent structure.

Temporary excavations should be treated in accordance with the State of California version of OSHA excavation regulations, Construction Safety Orders for Excavation General Requirements, Article 6, Section 1541, effective October 1, 1995. The sides of excavations should be shored or sloped in accordance with OSHA regulations. OSHA allows the sides of unbraced excavations, up to a maximum height of 20 feet, to be cut to a ¾H:1V (horizontal:vertical) slope for Type A soils, 1H:1V for Type B soils, and 1½H:1V for Type C soils. Onsite sandy soils are to be considered Type C soils which are subject to collapse in shallow unbraced excavations (i.e. approximately 3-feet in vertical height).

During construction, the soil conditions should be regularly evaluated to verify that conditions are as anticipated. The contractor shall be responsible for providing the “competent person” required by OSHA standards to evaluate soil conditions. Close coordination between the competent person and the geotechnical engineer should be maintained to facilitate construction while providing safe excavations.

5.8 TRENCH BACKFILL

Utility trenches should be backfilled with compacted fill in accordance with Sections 306-1 and 306-6 of the Standard Specifications for Public Works Construction, (“Greenbook”), 2018 Edition. Utility trenches can be backfilled with onsite sandy material free of rubble, debris, organic and oversized material up to (≤) 3-inches in largest dimension. Prior to backfilling trenches, pipes should be bedded in and covered with either:

(1) **Sand:** A uniform, sand material that has a Sand Equivalent (SE) greater-than-or-equal-to (≥) 30, passing the No. 4 U.S. Standard Sieve (or as specified by the pipe manufacturer), water densified in place, or

(2) **CLSM:** Controlled Low Strength Material (CLSM) conforming to Section 201-6 of the *Standard Specifications for Public Works Construction,* ("Greenbook"), 2018 Edition.

Pipe bedding should extend at least 4 inches below the pipeline invert and at least 12 inches over the top of the pipeline. Native and clean fill soils can be used as backfill over the pipe bedding zone, and should be placed in thin lifts, moisture conditioned above optimum, and mechanically compacted to at least 90 percent relative compaction, relative to the ASTM D 1557 laboratory maximum density.

5.9 DRAINAGE AND LANDSCAPING

Building walls below grade should be waterproofed or at least damp proofed, depending upon the degree of moisture protection desired. Surface drainage should be designed to direct water away from foundations and toward approved drainage devices. Irrigation of landscaping should be controlled to maintain, as much as possible, consistent moisture content sufficient to provide healthy plant growth without overwatering.

5.10 ADDITIONAL GEOTECHNICAL SERVICES

The geotechnical recommendations presented in this report are based on subsurface conditions as interpreted from limited subsurface explorations and limited laboratory testing. Our conclusions and recommendations presented in this report should be reviewed and verified by Carl Kim Geo during site construction and revised accordingly if exposed geotechnical conditions vary from our findings and interpretations. The recommendations presented in this report are only valid if Carl Kim Geo verifies the site conditions during construction. Geotechnical observation and testing should be provided during the following activities:

- Grading and excavation of the site;
- Overexcavation and compaction;
- Compaction of all fill materials;
- Excavation and installation of foundations;
- After excavation of all slabs and footings and prior to placement of steel or concrete to confirm the slabs and footings are founded in firm, compacted fill;
- Utility trench backfilling and compaction; and

- When any conditions are encountered that varies significantly from the conditions described in this report.

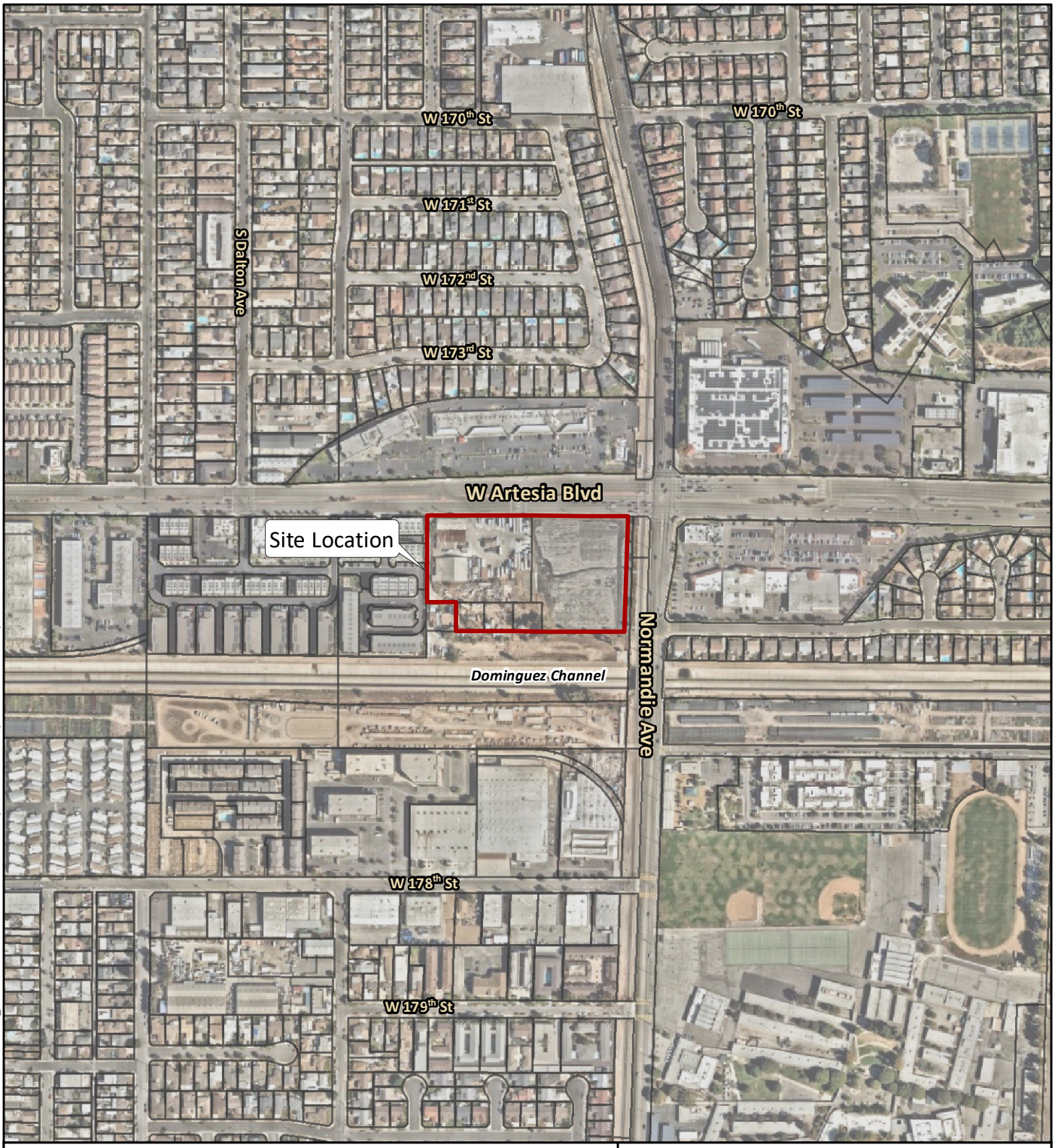
Carl Kim Geo should review the final grading and foundation plans and specifications, when available, to comment on the geotechnical aspects. Our recommendations should be revised, as necessary, based on future plans and incorporated into the final design plans and specifications.

7.0 LIMITATIONS

The geotechnical engineering analyses presented in this geotechnical exploration report have been conducted in general accordance with current practice and the standard of care exercised by geotechnical consultants performing similar tasks in the project area. No other warranty, express or implied, is made regarding the conclusions, recommendations, and opinions presented in this report.

Please also note that our evaluation was limited to assessment of the geologic and seismic aspects of the site, and did not include evaluation of structural issues, environmental concerns or the presence of hazardous materials. Our conclusions, recommendations and opinions are based on an analysis of the observed site conditions, engineering characteristics of the observed site soils and our review of the referenced geologic literature and reports. If geologic conditions different from those described in this report are encountered, our office should be notified and additional recommendations, if warranted, will be provided upon request.

FIGURES



0 250 500 1,000 Feet

1 inch = 500 feet

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N

Legend

- Site Boundary
- LA County Parcels

Imagery Source: Nearmap, September 21st, 2021

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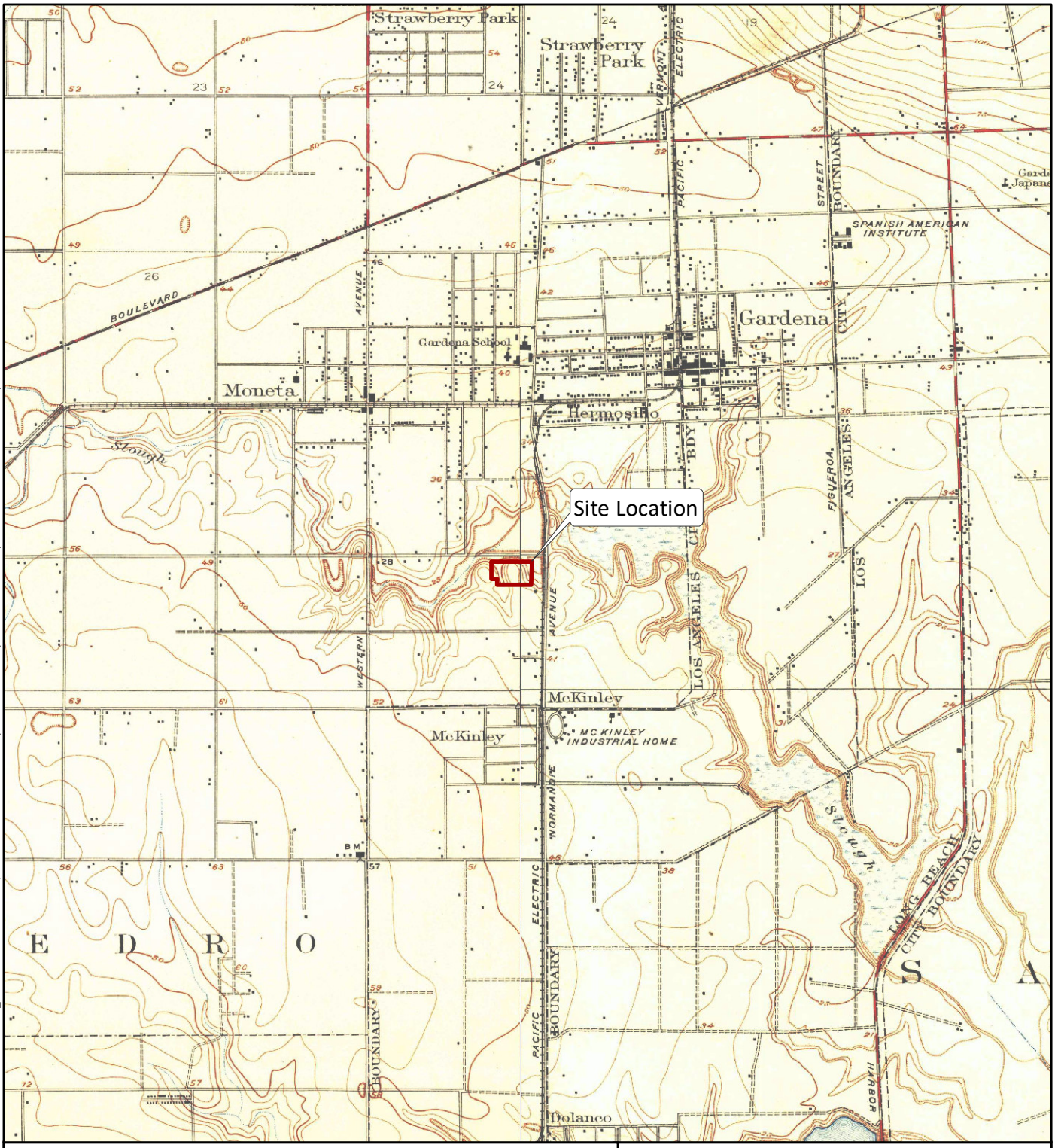
PROJECT: Proposed Warehouse Redevelopment
1450-1462 Artesia Boulevard, Gardena, California

PROJECT NUMBER: PWAS 20210916

Site Location

FIGURE 1

File: N:\GIS\Prj\S050_Carl Kim Geotechnical\S050.005_CKG - 1450 Artesia Blvd\MXDs\F1_Site Location.mxd 2/3/2022 Created by: BKO Checked by: AH Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet



0 1,250 2,500 5,000 Feet

1 inch = 2,500 feet

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N

Legend

Approximate Site Boundary

Base Map Source: USGS Historic Files, Topographic Division.

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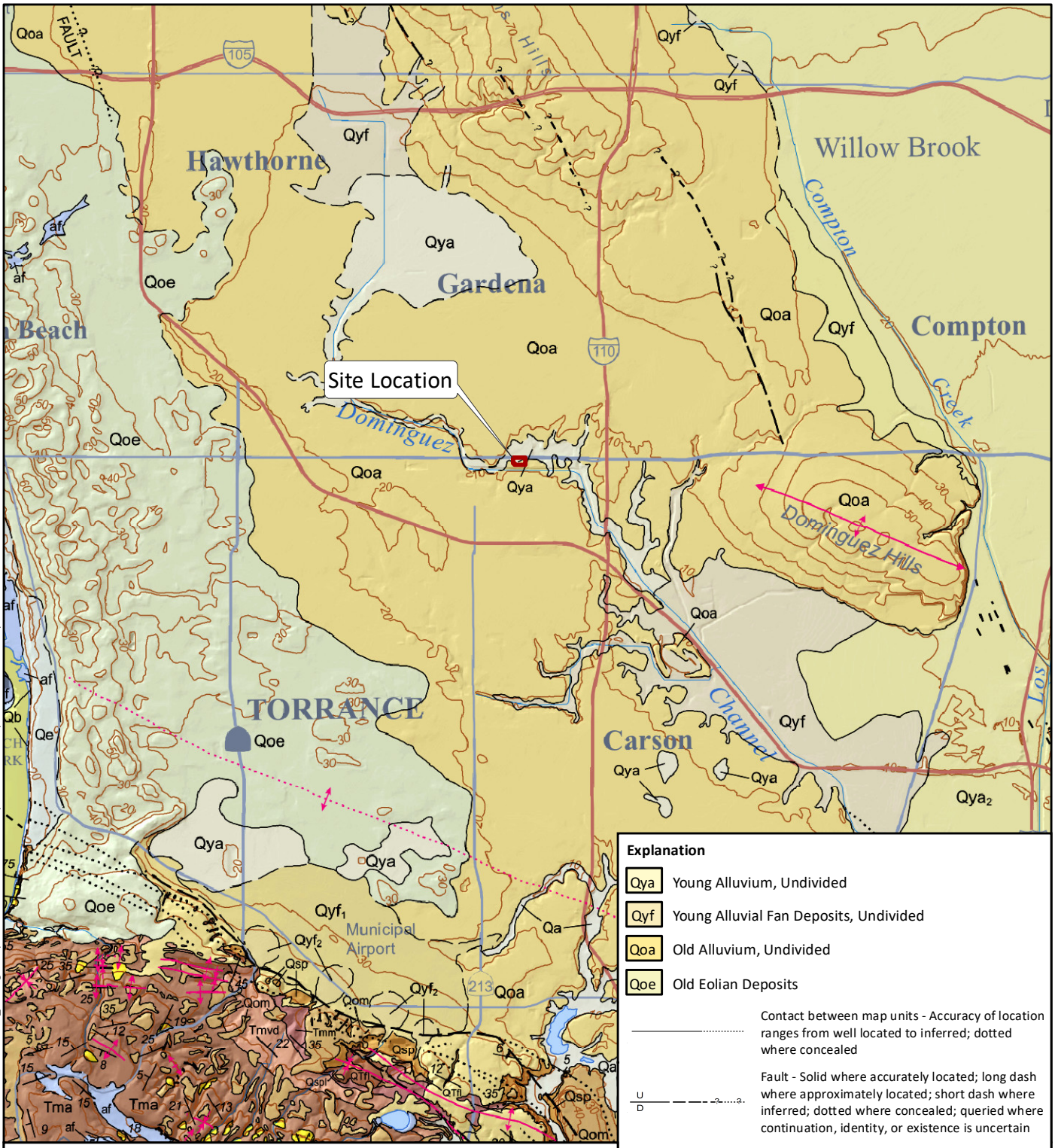
Site Location
1924 Topographic Map

FIGURE 1A

File: N:\GIS\Prj\S050_Carl Kim Geotechnical\S050.005_CKG - 1450 Artesia Blvd\MXDs\F1A_Site Location - Historic Topo.mxd 2/3/2022 Created by: BKO Checked by: AH Coordinate System: North American 1927 Polyconic



Explanation

- Qya — Young Alluvium, Undivided
- Qyf — Young Alluvial Fan Deposits, Undivided
- Qoa — Old Alluvium, Undivided
- Qoe — Old Eolian Deposits

Contact between map units - Accuracy of location ranges from well located to inferred; dotted where concealed

Fault - Solid where accurately located; long dash where approximately located; short dash where inferred; dotted where concealed; queried where continuation, identity, or existence is uncertain

Anticline - Solid where accurately located; long dash where approximately located; short dash where inferred; dotted where concealed. Plunge direction indicated by arrowhead on fold axis

Base Map

Geologic Map of the Long Beach 30' × 60' Quadrangle, California
Compiled by George J. Saucedo, H. Gary Greene, Michael P Kennedy, and Stephen P Bezore - 2016

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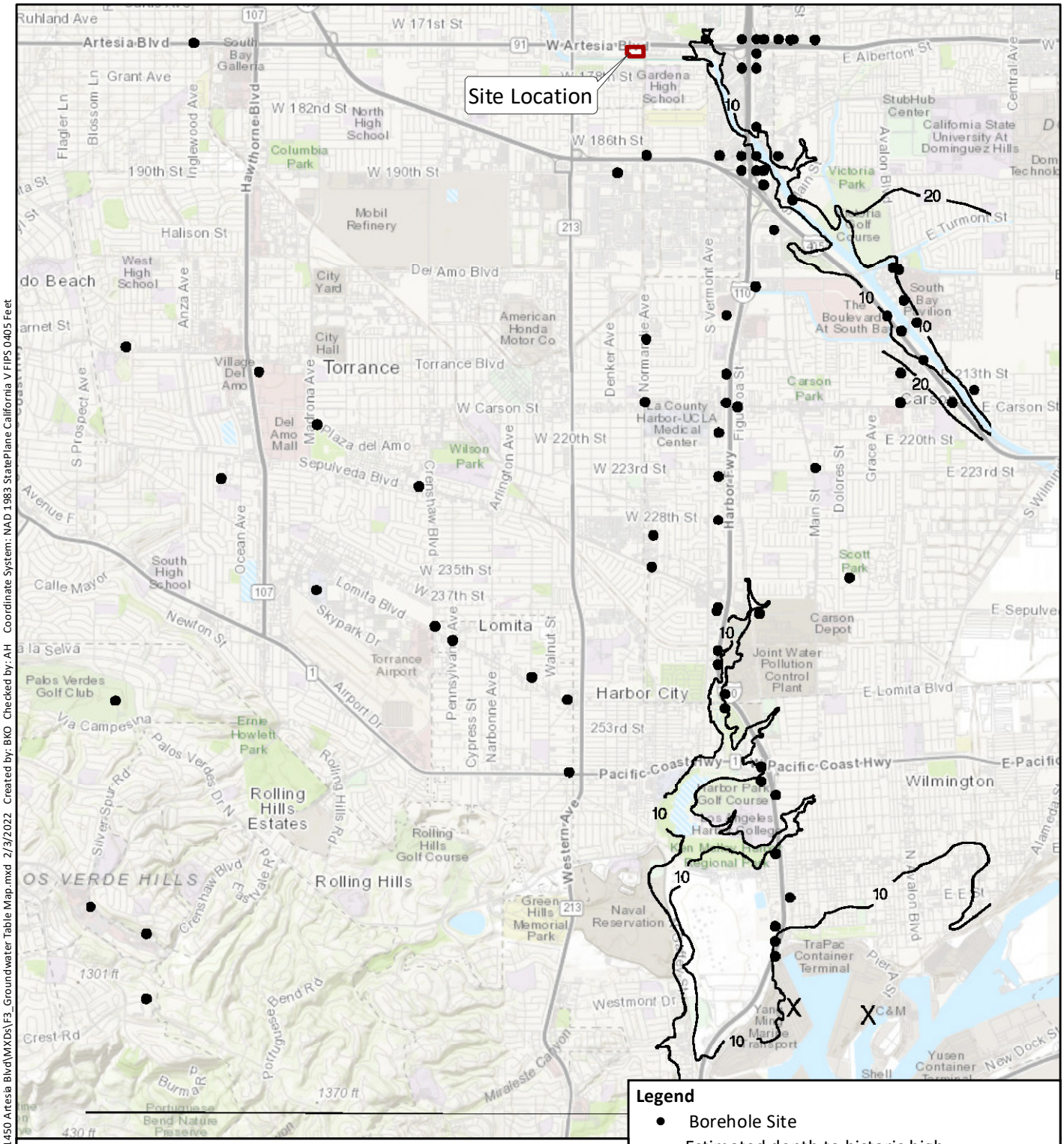
Geologic Map

FIGURE 2

File: N:\GIS\Prj\S050_Carl Kim Geotechnical\S050.005_CKG - 1450 Artesia Blvd\MXDs\F2_Geologic Map.mxd 2/3/2022 Created by: BO Checked by: AH Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet



Legend

- Borehole Site
- Estimated depth to historic high groundwater level in feet
- Site Boundary

Base Map: Seismic Hazard Zone Report for the Torrance 7.5 Quadrangle 1998, Plate 1.2 Historically Highest Ground Water Contours andBorhole Log Data Locations

0 3,000 6,000 12,000 Feet

1 inch = 6,000 feet

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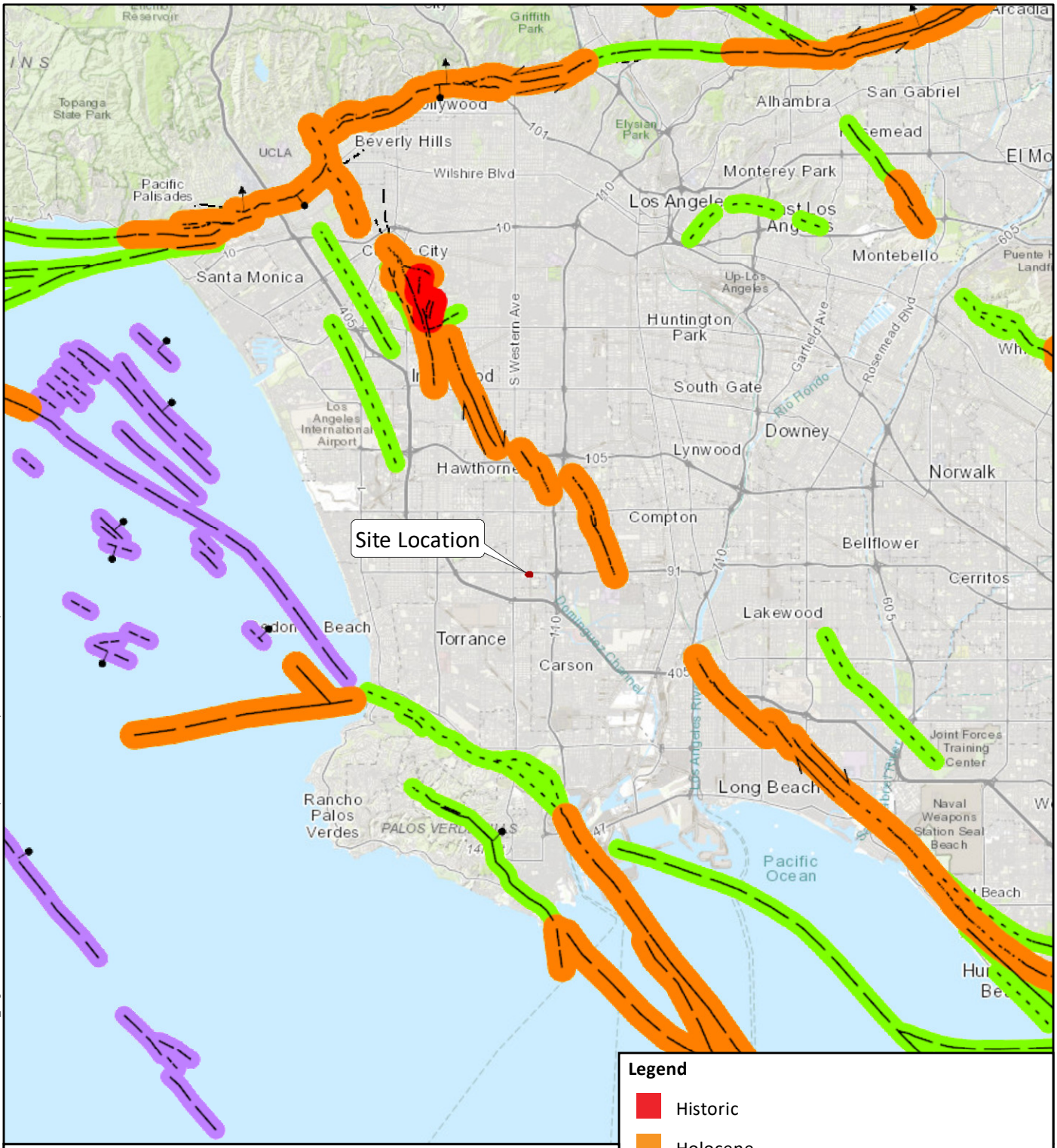
Historic High Groundwater Level

FIGURE 3

File: N:\GIS\Prj\S050_Carl Kim Geotechnical\S050.005_CKG - 1450 Artesia Blvd\MXDs\F3_Groundwater Table Map.mxd 2/3/2022 Created by: BKO Checked by: AH Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet



Legend

- Historic
- Holocene
- Late Quaternary
- Quaternary

Base Map: Fault Activity Map of California, California Department of Conservation

0 12,500 25,000 50,000 Feet

1 inch = 25,000 feet

N

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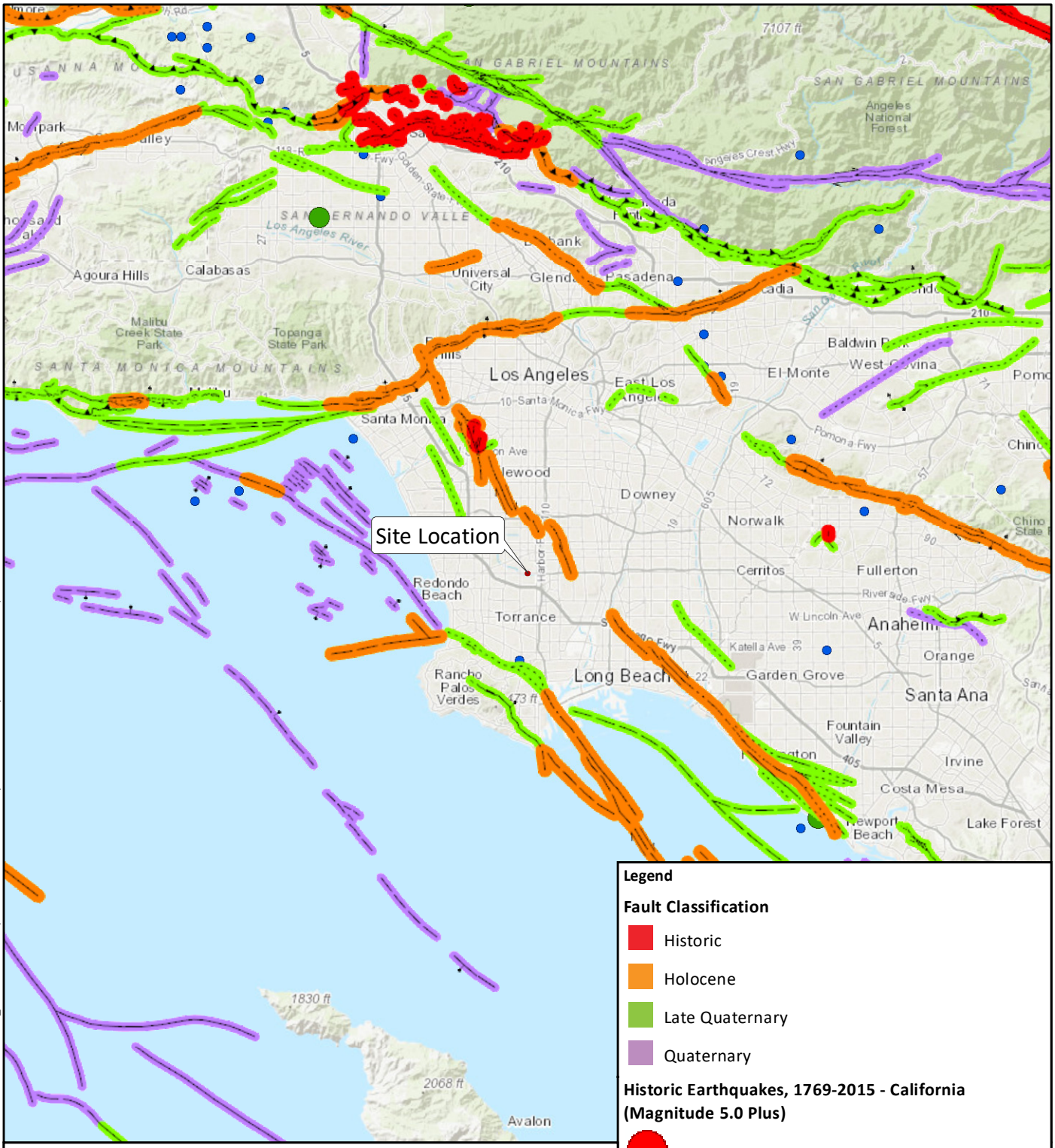
Regional Faults

FIGURE 4

File: N:\GIS\Prj\S050_Carl Kim Geotechnical\S050.005_CKG - 1450 Artesia Blvd\MXDs\F4_Regional Faults.mxd 2/3/2022 Created by: BKO Checked by: AH Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet



Legend

Fault Classification

- Historic
- Holocene
- Late Quaternary
- Quaternary

Historic Earthquakes, 1769-2015 - California (Magnitude 5.0 Plus)

- 7+
- 6 - 7
- 5 - 6

Base Map: Historic Earthquakes, 1769-2015 - California (Magnitude 5.0 Plus), California Department of Conservation

0 25,000 50,000 100,000 Feet

1 inch = 50,000 feet

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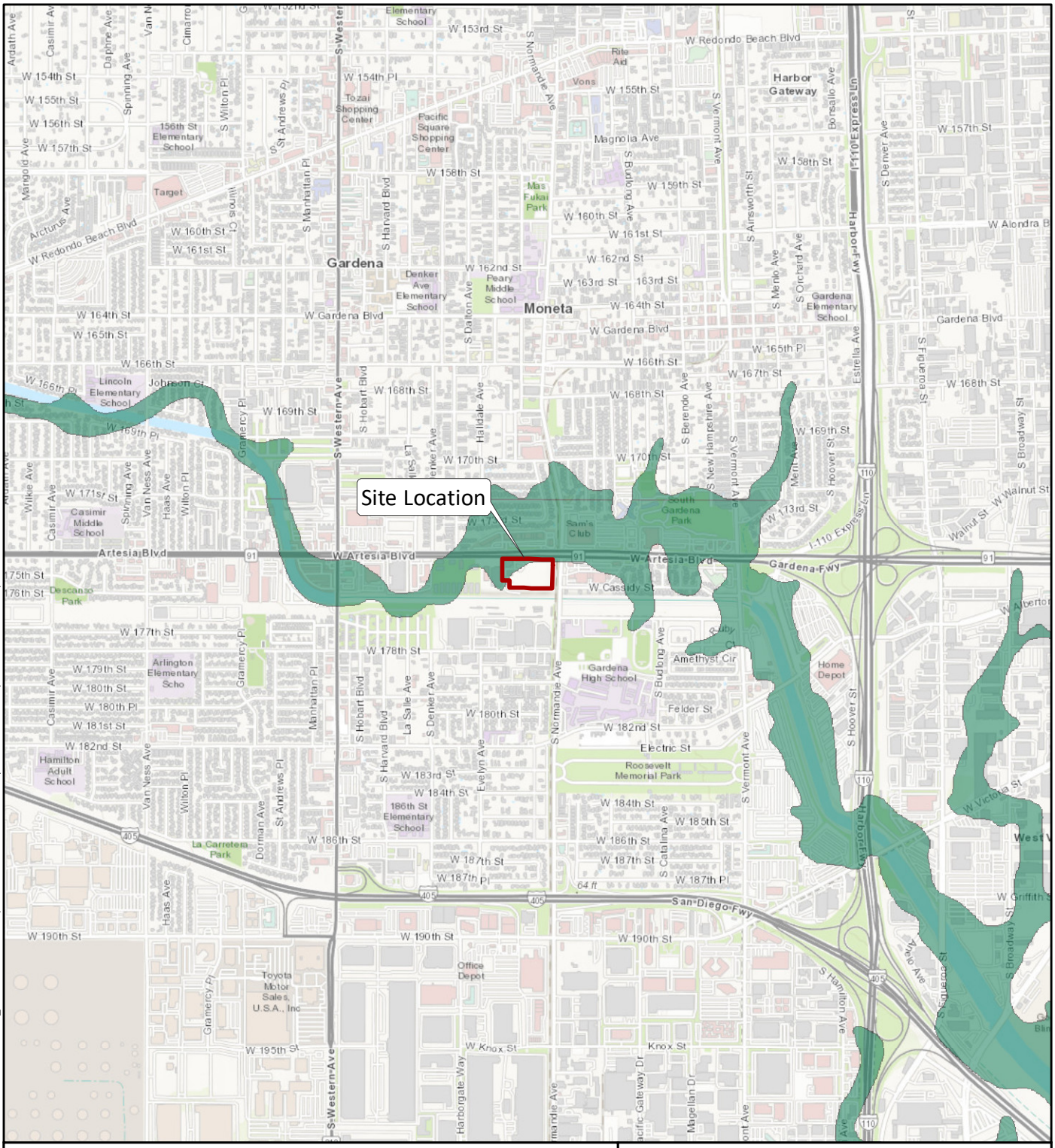
Historic Seismicity

FIGURE 5

File: N:\GIS\Prj\S050_Carl Kim Geotechnical\S050.005_CKG - 1450 Artesia Blvd\MXDs\F5_Historic Seismicity.mxd 2/3/2022 Created by: BKO Checked by: AH Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet



0 1,000 2,000 4,000 Feet

1 inch = 2,000 feet

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N

Legend

Site Boundary

Liquefaction Zones

Base Map: CGS Seismic Hazards Program: Liquefaction and Landslide Zones, California Department of Conservation

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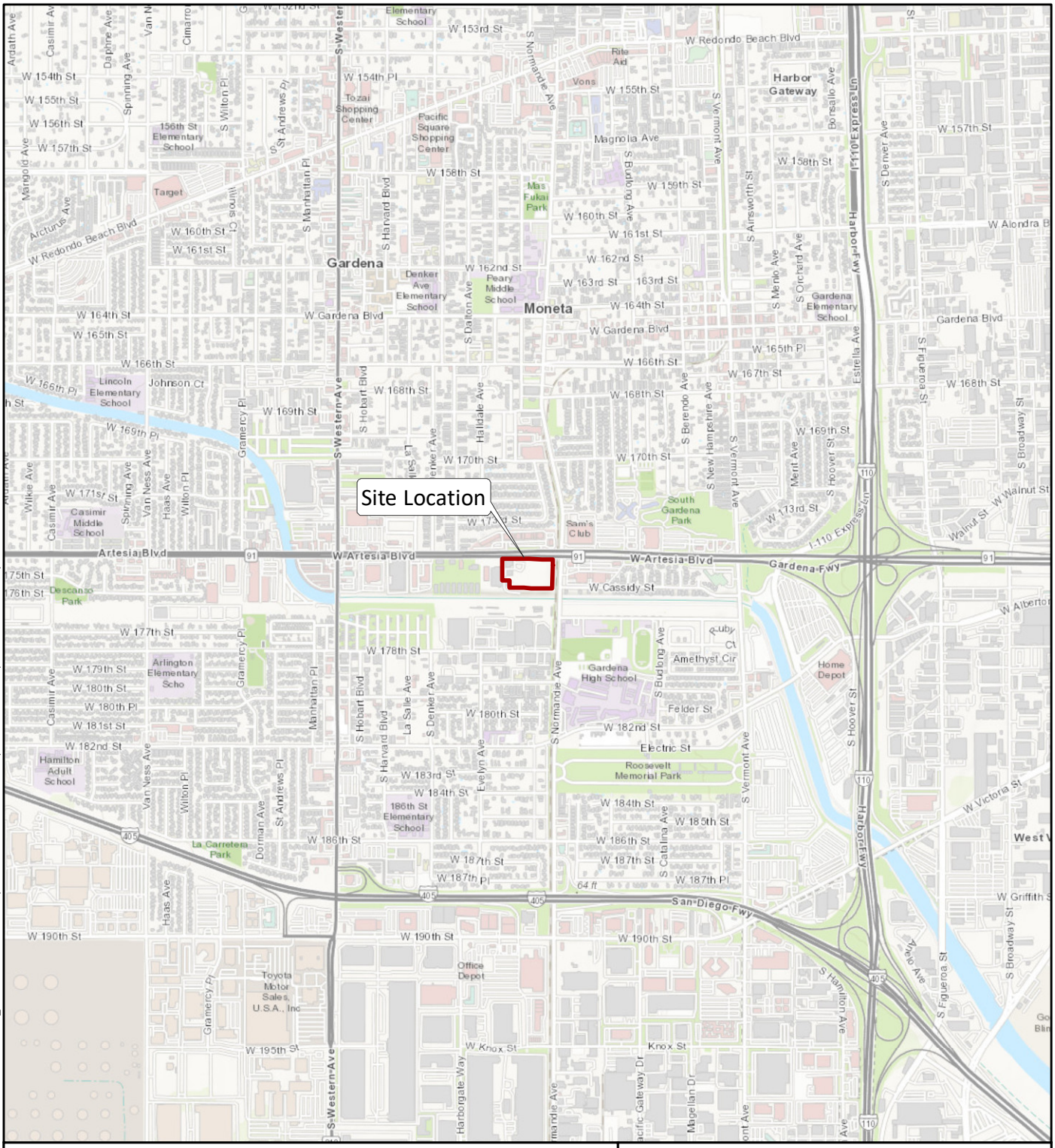
Seismic Hazards

FIGURE 6

File: N:\GIS\Prj\S050_Carl Kim Geotechnical\S050.005_CKG - 1450 Artesia Blvd\MXDs\F6_Seismic Hazards Map.mxd 2/3/2022 Created by: BKO Checked by: AH Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet



0 1,000 2,000 4,000 Feet

1 inch = 2,000 feet

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N

Legend

Site Boundary

Tsunami Inundation (Not Shown in Extent)

Tsunami Layer Source: California Geological Survey, CalEMA, Tsunami Research Cener- University of Southern California

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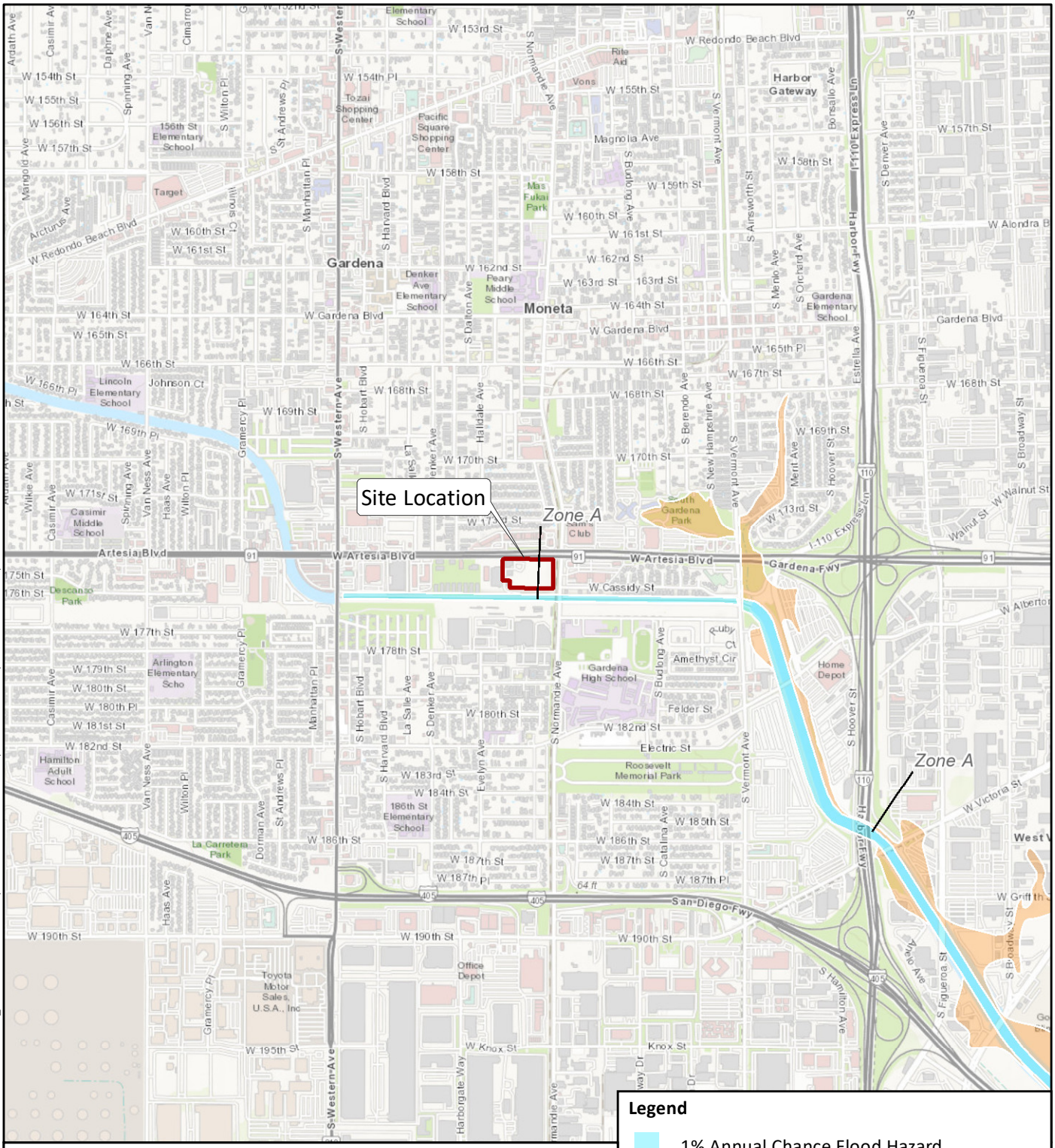
Tsunami Inundation

FIGURE 7

File: N:\GIS\Prj\S050_Carl Kim Geotechnical\S050.005_CKG - 1450 Artesia Blvd\MXDs\F7_Tsunami Inundation Map.mxd 2/3/2022 Created by: BKO Checked by: AH Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet



0 1,000 2,000 4,000 Feet

1 inch = 2,000 feet

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Legend

- 1% Annual Chance Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Site Boundary

Flood Layer Source: FEMA's National Flood Hazard Layer

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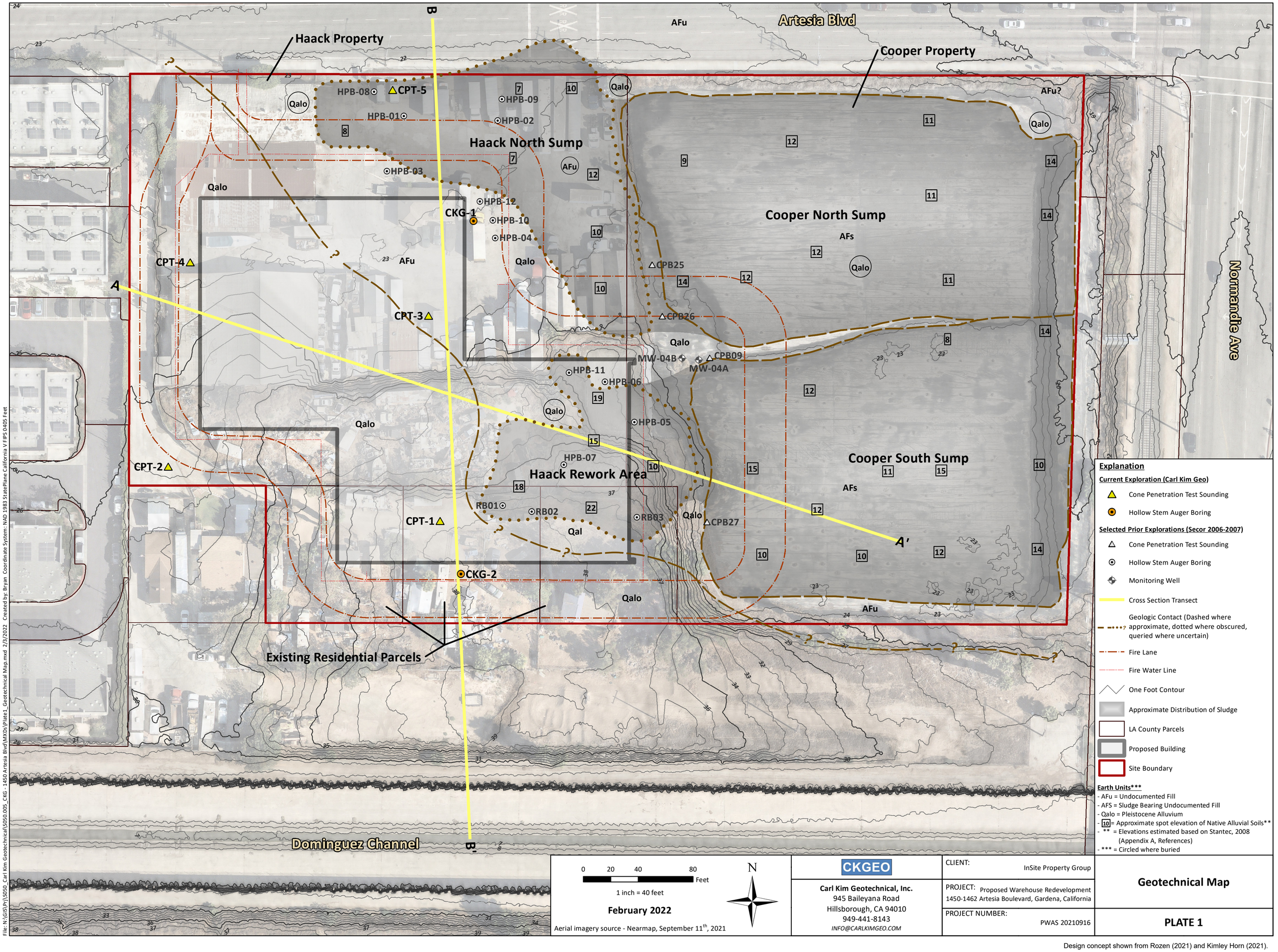
Flood Hazards Map

FIGURE 8

File: N:\GIS\Prj\S050_Carl Kim Geotechnical\S050.005_CKG - 1450 Artesia Blvd\MXDs\F8_Flood Hazard Zones Map.mxd 2/3/2022 Created by: BKO Checked by: AH Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet

PLATES



Explanation

Current Exploration (Carl Kim Geo)

- Cone Penetration Test Sounding
- Hollow Stem Auger Boring

Selected Prior Explorations (Secor 2006-2007)

- Cone Penetration Test Sounding
- Hollow Stem Auger Boring
- Monitoring Well
- Cross Section Transect
- Geologic Contact (Dashed where approximate, dotted where obscured, queried where uncertain)
- Fire Lane
- Fire Water Line
- One Foot Contour
- Approximate Distribution of Sludge
- LA County Parcels
- Proposed Building
- Site Boundary

Earth Units***

- AFu = Undocumented Fill
- AFS = Sludge Bearing Undocumented Fill
- Qalo = Pleistocene Alluvium
- [10] = Approximate spot elevation of Native Alluvial Soils**
- ** = Elevations estimated based on Stantec, 2008 (Appendix A, References)
- *** = Circled where buried

0 20 40 80 Feet

1 inch = 40 feet

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Aerial imagery source - Nearmap, September 11th, 2021

N

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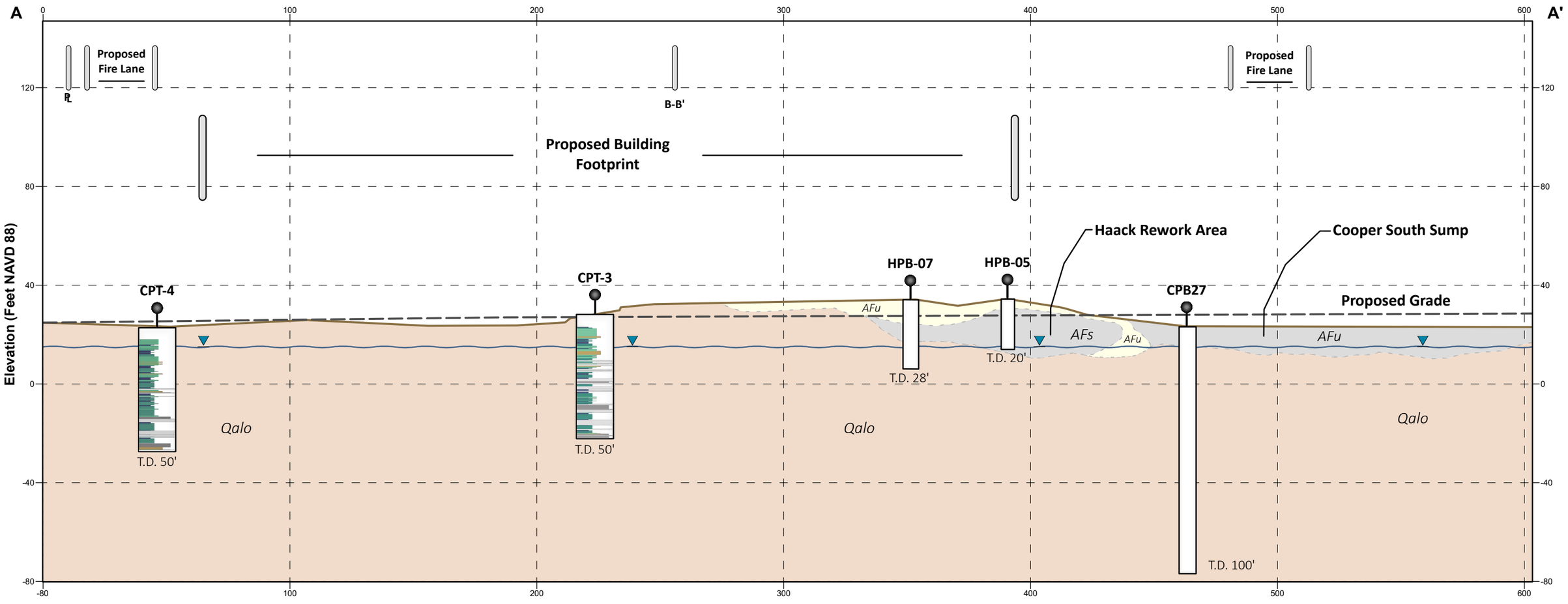
Geotechnical Map

PLATE 1

Design concept shown from Rozen (2021) and Kimley Horn (2021).

File: N:\GIS\Prj\5050_Carl Kim Geotechnical\5050.005_CKG - 1450 Artesia Blvd\MXDs\Plate1_Geotechnical Map.mxd 2/3/2022 Created by: Bryan Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet



Horizontal Distance (feet)

Explanation
- Boring
- Approximate Proposed Grade
- Existing Grade
- Design Groundwater Elevation
- AFs Sludge Bearing Undocumented Fill
- AFu Undocumented Fill
- Qalo Pleistocene Alluvium

CPT Log Explanation
- Clays
- Gravelly Sand to Sand
- Organic Soils
- Sands
- Sand Mixtures
- Silt Mixtures
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained

Notes
- NAVD 88: North American Vertical Datum of 1988

0 20 40 80 Feet

Vertical Exaggeration = 1X

1 inch = 40 feet

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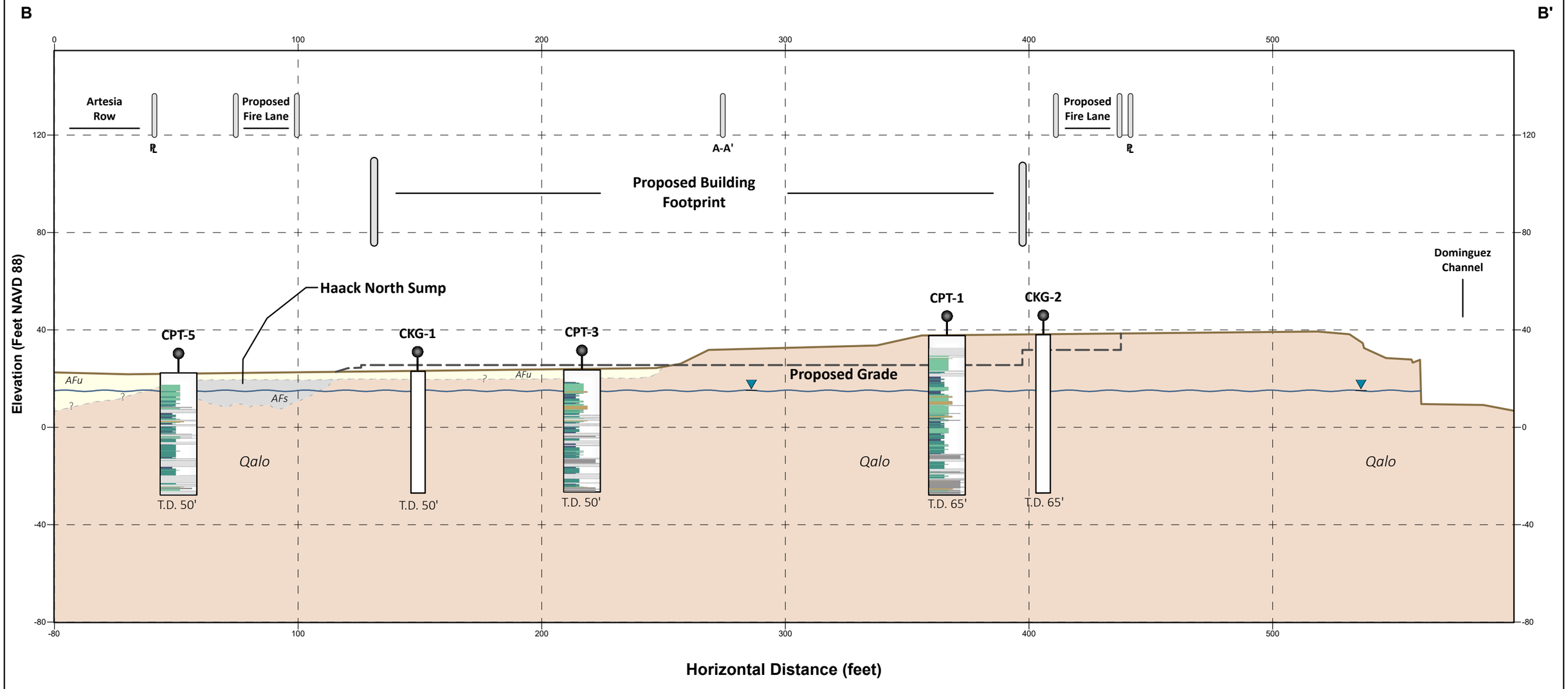
Geotechnical Cross Section A-A'

PLATE 2



Explanation
- Boring
- Approximate Proposed Grade
- Existing Grade
- Design Groundwater Elevation
- AFs Sludge Bearing Undocumented Fill
- AFu Undocumented Fill
- Qalo Pleistocene Alluvium

CPT Log Explanation
- Clays
- Gravelly Sand to Sand
- Organic Soils
- Sands
- Sand Mixtures
- Silt Mixtures
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained

Notes
- NAVD 88: North American Vertical Datum of 1988

0 20 40 80 Feet

Vertical Exaggeration = 1X

1 inch = 40 feet

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PROJECT NUMBER: PWAS 20210916

Geotechnical Cross Section B-B'

PLATE 3

APPENDIX A

REFERENCES

APPENDIX A

REFERENCES

American Concrete Institute (ACI), 2014, Building Code Requirements for Structural Concrete (ACI 318-14) and Commentary, an ACI Standard, reported by ACI Committee 318.

American Society of Civil Engineers (ASCE), 2013, Minimum Design Loads for Buildings and Other Structures, ASCE/SEI 7-10, Third Printing, Errata Incorporated through March 15.

Barrows, A.G., 1974, Review of the Geology and Earthquake History of the Newport-Inglewood Structural Zone, Southern California, California Division of Mines and Geology Special Report 114.

Bryant, W.A., and Hart, E.W., 2007, Fault Rupture Hazard Zones in California, Alquist-Priolo Earthquake Fault Zoning Act with Index to Earthquake Zones Maps, Department of Conservation, California Geological Survey, Special Publication 42, 2007 Interim Revision.

California Building Standards Commission, 2019, 2019 California Building Code (CBC), California Code of Regulations, Title 24, Part 2, Volume 2 of 2, Based on 2018 International Building Code, Effective January 1, 2020.

California Department of Conservation Geologic Energy Management Division (CalGEM), 2022, Interactive Wellfinder Website, https://maps.conservation.ca.gov/doggr/wellfinder

California Department of Safety of Dams (DSOD), 2022, California Dam Breach Inundation Maps [Web interface] https://fmds.water.ca.gov/webgis/?appid=dam_prototype_v2

California Department of Water Resources, 1961, Planned utilization of the ground water basins of the coastal plain of Los Angeles County: Bulletin 104, Appendix A, dated June 1961.

California Geological Survey (CGS; formerly California Division of Mines and Geology, CDMG), 1998, Seismic Hazard Zone Report for the Torrance 7.5-Minute Quadrangle, Los Angeles County, California, Seismic Hazard Zone Report No. 035.

_____, 1999, Seismic Hazard Zones, Torrance Quadrangle, map scale 1:24,000, Official Map, released March 25, 1999.

_____, 2000, CD-ROM containing digital images of Official Maps of Alquist-Priolo Earthquake Fault Zones that affect the Southern Region, DMG CD 2000-003 2000.

_____, 2008, Special Publication 117A, Guidelines for Evaluating and Mitigating Seismic Hazards in California.

_____, 2017, Earthquake Fault Zones, Los Angeles Quadrangle, map scale 1:24,000, Revised Official Map, released June 15, 2017.

_____, 2018, Earthquake Fault Zones, A Guide for Government Agencies, Property Owners / Developers, and Geoscience Practitioners for Assessing Fault Rupture Hazards in California, Special Publication 42, Revised 2018.

Carl Kim Geotechnical, Inc., 2021a, Proposal for Geotechnical Exploration, Proposed Warehouse Redevelopment, Gardena Sumps, Southwest Corner of Artesia Boulevard and Normandie Avenue, Gardena, California, proposal number PWAS_202110916, dated September 16, 2021.

City of Gardena, 2020, City of Gardena, General Plan 2020, Draft Technical Background Report, prepared by USC Center for Economic Development, dated 2020.

Dibblee, Jr., T.W., 1989, Geologic Map of the Los Angeles Quadrangle, Los Angeles County, California, Dibblee Geologic Foundation Map #DF-22, map scale 1:24,000.

Federal Emergency Management Agency, 2018, Flood Insurance Rate Map, Los Angeles County and Incorporated Areas, Map Number 06037C1638G, dated December 21, 2018.

Geosyntec Consultants, 2021, Draft Remedial Action Plan, Gardena Sumps, Gardena, California, Project Number SC0467A, dated 18 January 2021.

_____, 2014, Final Feasibility Study, Gardena Sumps, Gardena, California, Project Number SC0467A, dated July 2014.

Jennings, C.W., 2010, Fault Activity Map of California, California Geological Survey, Geologic Data Map No. 6, map scale 1:750,000.

Kimley Horn, 2021, Gardena – Fire Utilities [Plan], Scale of 1-inch to 30 feet, dated December 6, 2021.

Rozen Design Solutions, LLC (Rozen), 2021, 1450 W Artesia Blvd Entitlement, Architectural Site Plan, Scale of 1-inch to 30 feet, dated September 1, 2021.

Saucedo, G.J., Greene, H.G., Kennedy, M.P., and Bezore, S.P., 2016, Geologic Map of the Long Beach 30' x 60' quadrangle, California (ver. 2.0): California Geological Survey, Regional Geologic Map , scale 1:100,000

Stantec, 2008, Revised Draft 2006 Remedial Investigation Report, Gardena Sumps Site, Gardena, California, August 22, 2008.

United States Geological Survey (USGS), 1924a, Torrance Quadrangle California - Los Angeles County, Topographic Map, map scale 1:24,000, dated March 13, 1924.

_____, 1924b, Compton Quadrangle California - Los Angeles County, Topographic Map, map scale 1:24,000, dated Aug. 1924.

_____, 2008a, Unified Hazard Tool for Deaggregations, https://earthquake.usgs.gov/hazards/interactive/

_____, 2008b, National Seismic Hazard Maps – Fault Parameters, https://earthquake.usgs.gov/cfusion/hazfaults_2008_search/query_main.cfm

_____, 2022a, Interactive Fault Map, http://earthquake.usgs.gov/hazards/qfaults/map/

_____, 2022b, Interactive Geologic Map, http://ngmdb.usgs.gov/maps/MapView/

_____, 2022c, Areas of Land Subsidence, https://ca.water.usgs.gov/land_subsidence/california-subsidence-areas.html.

Water Replenishment District of Southern California (WRD),2021, Regional Groundwater Monitoring Report, Water Year 2019-2020, Central and West Coast Basins, Los angeles County, California, dated March 2021 http://www.wrd.org.

Yerkes, R.F., McCulloh, T.H., Schoellhamer, J.E. and Vedder, J.G., 1965, Geology of the Los Angeles Basin, California -- An Introduction: U.S. Geological Survey, Professional Paper 420-A, 57 p.

Aerial Photos Reviewed – University of California Santa Barbara Collection

Fairchild Aerial Surveys, 1927, Flight C-113, Frame 209, Scale of 1: 18,000, dated 1927-08-01 through 1927-08-31.

Fairchild Aerial Surveys, 1941a, Flight C-6972, Frame 53, Scale of 1: 12,000, dated 1941-03-06.

Fairchild Aerial Surveys, 1941b, Flight C-7347, Frame 45, Scale of 1: 12,000, dated 1941-08-30.

Fairchild Aerial Surveys, 1941c, Flight C-7558, Frame 4, Scale of 1: 14,400, dated 1941-12-01

Fairchild Aerial Surveys, 1956, Flight C-22555, Frame 23-25, Scale of 1: 14,400, dated 1956-07-01 through 1956-09-30.

Fairchild Aerial Surveys, 1960, Flight C-23870, Frame 628, Scale of 1: 14,400, dated 1960-05-01 through 1960-07-31.

Fairchild Aerial Surveys, 1965, Flight C-25019, Frame 358, Scale of 1: 24,000, dated 1965-09-22 through 1965-11-28.

APPENDIX B

FIELD EXPLORATIONS

APPENDIX B

FIELD EXPLORATIONS

General, Current Investigation

Subsurface explorations during the current geotechnical investigation consisted of drilling and sampling using hollow-stem-auger drilling and cone penetration test (CPT) soundings. Explorations were supervised and logged by qualified representatives. Earth materials encountered were visually classified in accordance with the Unified Soil Classification System (USCS), as practicable. Stratigraphic boundaries are indicated on the logs. Some soil/material types transition gradually. The logs of the borings and the report presenting the results of the CPT soundings are presented in this appendix.

Work was performed in accordance with means and methods approved by the County of Los Angeles Environmental Health [Boring] Permit No. SR0276785.

Carl Kim Geotechnical prepared and implemented a site-specific Health and Safety Plan (Plans) for all staff and subcontractor site work.

Reconnaissance and Logistics

Locations of the borings and CPT soundings were chosen to obtain subsurface information at locations appropriate for the objective of this report. Prior to conducting the subsurface explorations, Carl Kim Geotechnical personnel evaluated each drill site for equipment access and marked proposed locations.

Underground Service Alert (USA) was contacted greater than 48 hours in advance of subsurface work. USA contacted members (i.e. utility infrastructure owners) to provide clearance for drilling with respect to underground utility lines. No underground utilities were encountered with drilling equipment during the current investigation.

Subsurface Exploration

Two hollow stem auger borings, designated CKG-1 and CKG-2 were drilled December 15, 2021 by ABC Liovan Drilling of Signal Hill, California. Drilling was performed using a truck mounted CME 85 drill rig operated by a driller and two driller's assistants. Borings ranged in depth of from 50 to 65 feet below ground surface.

Cone Penetrometer Test (CPT) soundings were performed at 5 locations December 13, 2021. CPT soundings are designated CPT-1 through CPT-5. Shear wave measurements were obtained at CPT-1 and CPT-5 on 5-foot increments.

CPT interpretations are included in this appendix.

Borehole Sealing

Each borehole was abandoned using positive displacement methods (tremie pipe) with neat cement grout. As noted in the logs some borings presumably encountered subsurface voids that cause the neat cement grout to settle below ground surface. In these locations borings were partially backfilled with hydrated bentonite chips to bridge the voids.

Sampling

Representative relatively undisturbed and bulk (bag) samples were obtained from the borings. Samples were logged, labeled, and retained for laboratory testing. Sample depths are indicated on the logs.

Relatively undisturbed samples were obtained by driving a Modified California Split-Spoon Sampler, with a 3.0-inch outside diameter, into the bottom of the boring at desired depths. The barrel of the sampler was lined with 1-inch-tall by 2.41-inch inside diameter geotechnical sampling rings. The rings containing the undisturbed samples were placed in plastic cans, labeled, and transported to Smith-Emery Labs of Los Angles via courier.

The number of blows to achieve a 6-inch penetration of the sampler was recorded and is shown on the logs. The blow counts provide an indication of the density or consistency of the in-situ earth materials.

In addition to obtaining undisturbed and large bulk samples, Standard Penetration Tests (SPT) were performed in each of the hollow-stem auger borings. The SPTs were performed in accordance with the ASTM D1586 Test Method. The results of the tests are indicated on the boring logs, where blow counts or N-values are given for each 6 inches of driving. Samples of the materials obtained from the SPT sampler were placed in plastic bags for transport to the laboratory.

Samples were screened for organic vapors using a Minirae 3000 photoionization detector (PID) for safety reasons.

EXPLORATION LOGS (Current Investigation)

CKG-1 through CKG-10
CPT-1 through 10

EXPLORATION LOGS (Stantec, 2008)

HPB01 through HPB12
MW-04-A
MW-04-B
RB01 through RB03
CPB09-GW
CPB25-GW through CPB27-GW
HPB-10

Project: **Proposed Warehouse Redevelopment**
Project Location: **1440-1462 Artesia Boulevard, Gardena, CA**
Project Number: **PWAS_20210916**

Log of Boring CKG-1
Sheet 1 of 2

Date(s) Drilled **12/15/2021**	Logged By **Vanya Keyes**	Checked By **Andrew Hillstrand**
Drilling Method **Hollow Stem Auger**	Drill Bit Size/Type **8" Hollow Stem Auger**	Total Depth of Borehole **65.5 feet bgs**
Drill Rig Type **CME-85**	Drilling Contractor **ABC Liovin**	Approximate Surface Elevation **23 feet**
Groundwater Level and Date Measured **19 feet bgs**	Sampling Method(s) **SPT & CAL MOD**	Hammer Data **140lb Auto, 30" Drop**
Borehole Backfill **Neat cement 5% bentonite grout**	Location **Approximately 33.87248, -118.30080**	

Elevation (feet)	Depth (feet)	Sample Number	Sample Type	Sampling Resistance, blows/ft	USCS Symbol	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
23	0					~7" of asphalt, 3" of base			
		B-1			SM	FILL: - SILTY SAND, brown, moist, mostly subrounded fine to medium grained sand, few coarse grained sand, some silt, trace clay ~30% fines			COMP, DS(r), EI, CONS, R, CHEM
18	5	R-1		3 4 11	SM	ALLUVIUM (?): - SILTY SAND, dark reddish brown, moist, loose, mostly subangular to subrounded fine to medium grained sand, few coarse grained sand, little silt, trace fine gravels, some red oxidation staining, little lighter brown mottling, ~15% fines	14	117	
		SPT-1		4 5 5	SM	SILTY SAND, yellowish brown, moist, loose, mostly rounded very fine to fine grained sand, little medium grained sand, little silt, micaceous ~20% fines	13		
13	10	R-2		4 5 7	SM	SILTY SAND, light olive brown, moist, loose, some rounded very fine to fine grained sand, some silt, little clay, micaceous, ~20% fines	23	103	CONS, DS
		SPT-2		2 3 4	SM	SILTY SAND, brown, moist, loose, mostly subrounded fine grained sand, little medium grained sand, some silt, trace clay, ~35% fines	24		
8	15	R-3		3 4 10	SM	SILTY SAND, light olive brown, wet, loose, mostly subangular to subrounded fine to medium grained sand, some silt, ~30% fines	23	104	Wet soils encountered during drilling CONS, DS
3	20								Gauged water depth at completion of drilling

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Project: **Proposed Warehouse Redevelopment**
Project Location: **1440-1462 Artesia Boulevard, Gardena, CA**
Project Number: **PWAS_20210916**

Log of Boring CKG-1

Sheet 2 of 2

Elevation (feet)	Depth (feet)	Sample Number	Sample Type	Sampling Resistance, blows/ft	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
3	20	SPT-3		7 13 16	SM		SILTY SAND, light olive brown, moist, medium dense, mostly subangular to subrounded fine grained sand, some silt, micaceous, ~30% fines	14		
-2	25	R-4		4 9 10	SM		SILTY SAND, grayish brown, moist, medium dense, mostly subrounded fine grained sand, trace medium grained sand, some silt, highly micaceous,~25% fines	22	106	WA (37% pass #200)
					SM		Increased fines content			
-7	30	SPT-4		3 5 9	SM		SILTY SAND, olive, moist, medium dense, some rounded very fine to fine grained sand, some silt, trace clay, highly micaceous, ~40% fines	22		
-12	35	R-5		3 6 11	SM		SILTY SAND, light olive brown, moist, medium dense, mostly subrounded fine grained sand, some silt, trace clay, highly micaceous, trace grey brown mottling, ~35% fines	21	107	
-17	40	SPT-5		3 4 8	SM		SILTY SAND, olive gray, moist, medium dense, some rounded very fine to fine grained sand, some silt, trace clay, highly micaceous, ~40% fines	25		
-22	45	R-6		10 19 28	SM		SILTY SAND, light yellowish brown, moist, dense, mostly subangular to subrounded fine grained sand, trace medium grained sand, some silt, trace clay, ~30% fines	25	105	Shoe from bottom of sample R-6
		G-1			SM		SILTY SAND, grey, moist to wet, some fine to medium grained sand, little coarse grained sand, little silt, mostly white and gray shell fragments, ~25% fines	25		
-27	50	SPT-6		10 16 21	SM		SILTY SAND, grayish brown, moist to wet, dense, mostly subrounded fine grained sand, few coarse grained sand, little silt, dense white and gray shell fragments seen at the top of the sample, highly micaceous			
-32	55						TOTAL DEPTH DRILLED = 50 FEET TOTAL DEPTH SAMPLED = 51.5 FEET GROUNDWATER ENCOUNTERED AT 19 FEET BGS BACKFILLED WITH NEAT CEMENT GROUT ON 12/15/2021			

R:\Projects\S050 - Carl Kim Geotechnical\005 - Gardena Sumps, Gardena, CA\Technical\Boring Logs\S050.005 Borings 12.15.21.bg4[CK Geotech - samp, pid, blows, moist, weight.tpl]

CKGEO

Project: **Proposed Warehouse Redevelopment** Project Location: **1440-1462 Artesia Boulevard, Gardena, CA** Project Number: **PWAS_20210916**	Log of Boring CKG-2 **Sheet 1 of 3**

Date(s) Drilled **12/15/2021**	Logged By **Vanya Keyes**	Checked By **Andrew Hillstrand**
Drilling Method **Hollow Stem Auger**	Drill Bit Size/Type **8" Hollow Stem Auger**	Total Depth of Borehole **65.5 feet bgs**
Drill Rig Type **CME-85**	Drilling Contractor **ABC Liovin**	Approximate Surface Elevation **38 feet amsl**
Groundwater Level and Date Measured **26 feet bgs**	Sampling Method(s) **SPT & CAL MOD**	Hammer Data **140lb Auto, 30" Drop**
Borehole Backfill **Neat cement 5% bentonite grout**	Location **Appx. 33.87170, -118.30079**	

Elevation (feet)	Depth (feet)	Sample Number	Sample Type	Sampling Resistance, blows/ft	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
38	0						FILL: - Topsoil and assorted plastic debris			
		B-1			SM		ALLUVIUM (?): - SILTY SAND, strong brown, slightly moist, mostly subangular very fine to medium grained sand, little coarse grained sand, some silt, few fine gravels, ~15% fines			EI, DS(r), CHEM, COMP
					SP-SM		SAND with SILT, yellowish red, moist, medium dense, mostly subangular fine grained sand, trace medium grained sand, few silt, trace clay, ~10% fines			
33	5	SPT-1		8 11 18	SM		SILTY SAND, strong brown, moist, mostly subangular to subrounded fine to medium grained sand, some silt, trace clay, ~15% fines	14		
		B-2								
28	10	R-1		4 5 10	SM		SILTY SAND, brown to yellowish brown, moist, loose, mostly rounded fine grained sand, little medium to very coarse grained sand, some silt, trace clay, ~15% fines, color change below 11 feet	12	111	
		B-3								
23	15	SPT-2		8 10 11	SM		SILTY SAND, light yellowish brown, moist, medium dense, mostly subrounded very fine to fine grained sand, some silt, slightly micaceous, ~20% fines	11		
		R-2		5 8 12	SM		SILTY SAND, dark yellowish brown, moist, medium dense, mostly subrounded fine grained sand, trace medium grained sand, some silt, trace dark red oxidation spotting, trace bioturbation, ~15% fines	13	115	
18	20									

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CKGEO

Project: **Proposed Warehouse Redevelopment**
Project Location: **1440-1462 Artesia Boulevard, Gardena, CA**
Project Number: **PWAS_20210916**

Log of Boring CKG-2

Sheet 2 of 3

Elevation (feet)	Depth (feet)	Sample Number	Sample Type	Sampling Resistance, blows/ft	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
18	20	SPT-3		4 8 11	SM		SILTY SAND, light yellowish brown, moist, medium dense, mostly rounded fine grained sand, some silt, ~15% fines	21		
		R-3		3 6 12	SM		SILTY SAND, light yellowish brown, moist, medium dense, mostly rounded very fine to fine grained sand, trace medium grained sand, some silt, few dark red oxidation staining, ~20% fines	13	111	
13	25	SPT-4		3 5 9	SM		SILTY SAND, yellowish brown, very moist, medium dense, mostly subangular fine grained sand, some silt, ~20% fines ▼	13		Gauged at completion of drilling
		R-4		2 4 11	SM		SILTY SAND, yellowish brown, wet, loose, mostly subangular to subrounded fine grained sand, few medium grained sand, some silt, highly micaceous, ~15% fines ▽	23	100	Wet soils encountered during drilling
8	30	SPT-5		5 10 11	SM		SILTY SAND, light olive brown, wet, medium dense, mostly subangular fine grained sand, some silt, trace clay, highly micaceous, ~25% fines	21		
3	35	R-5		2 3 8	SM		SILTY SAND, grayish brown, very moist, loose, mostly subangular to subrounded fine to medium grained sand, some silt, micaceous, ~20% fines	21	105	
-2	40	SPT-6		5 11 14	SM		SILTY SAND, pale olive, very moist, medium dense, mostly subangular fine grained sand, some silt, micaceous, ~20% fines	25		
-7	45	R-6		6 8 17	SM		SILTY SAND, light olive brown, moist, medium dense, mostly subangular to subrounded very fine to fine grained sand, some silt, trace clay, few dark brown mineralization spotting, ~25% fines	24	105	
-12	50	SPT-7		6 12 23	SM		SILTY SAND, light brownish gray, moist, dense, mostly subrounded very fine to fine grained sand, some silt, micaceous, ~25% fines	19		
-17	55									

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Project: **Proposed Warehouse Redevelopment**
Project Location: **1440-1462 Artesia Boulevard, Gardena, CA**
Project Number: **PWAS_20210916**

Log of Boring CKG-2

Sheet 3 of 3

Elevation (feet)	Depth (feet)	Sample Number	Sample Type	Sampling Resistance, blows/ft	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
-17	55	R-7		4 11 16	SM		SILTY SAND, light brownish gray, moist, medium dense, some subrounded very fine to fine grained sand, trace medium grained sand, some silt, trace orange oxidation staining, ~30% fines	33	91	
-22	60	SPT-8		7 12 25	SM		SILTY SAND, light gray, very moist, dense, mostly subangular very fine to fine grained sand, some silt, few clay, dense white and gray shell fragments in bottom of sample	23		
-27	65	R-8		17 28 47	SM		SILTY SAND, gray, very moist, dense, mostly subangular to subrounded fine grained sand, trace medium grained sand, some silt, micaceous, ~25% fines	24	100	
							TOTAL DEPTH DRILLED = 65 FEET TOTAL DEPTH SAMPLED = 66.5 FEET GROUNDWATER ENCOUNTERED AT 26 FEET BGS BACKFILLED WITH NEAT CEMENT GROUT ON 12/15/2021			
-32	70									
-37	75									
-42	80									
-47	85									
-52	90									

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Project: **Proposed Warehouse Redevelopment**
Project Location: **1440-1462 Artesia Boulevard, Gardena, CA**
Project Number: **PWAS_20210916**

Key to Log of Boring
Sheet 1 of 1

1 Elevation (feet)	2 Depth (feet)	3 Sample Number	4 Sample Type	5 Sampling Resistance, blows/ft	6 USCS Symbol	7 Graphic Log	8 MATERIAL DESCRIPTION	9 Water Content, %	10 Dry Unit Weight, pcf	11 REMARKS AND OTHER TESTS

COLUMN DESCRIPTIONS

1 Elevation (feet): Elevation (MSL, feet).
2 Depth (feet): Depth in feet below the ground surface.
3 Sample Number: Sample identification number.
4 Sample Type: Type of soil sample collected at the depth interval shown.
5 Sampling Resistance, blows/ft: Number of blows to advance driven sampler one foot (or distance shown) beyond seating interval using the hammer identified on the boring log.
6 USCS Symbol: USCS symbol of the subsurface material.
7 Graphic Log: Graphic depiction of the subsurface material encountered.
8 MATERIAL DESCRIPTION: Description of material encountered. May include consistency, moisture, color, and other descriptive text.
9 Water Content, %: Water content of the soil sample, expressed as percentage of dry weight of sample.
10 Dry Unit Weight, pcf: Dry weight per unit volume of soil sample measured in laboratory, in pounds per cubic foot.
11 REMARKS AND OTHER TESTS: Comments and observations regarding drilling or sampling made by driller or field personnel.

FIELD AND LABORATORY TEST ABBREVIATIONS

CHEM: Chemical tests to assess corrosivity
COMP: Compaction test
CONS: One-dimensional consolidation test
DS: Direct Shear
LL: Liquid Limit, percent
PI: Plasticity Index, percent
R: R-Value
(r): Remolded
SA: Sieve analysis (percent passing No. 200 Sieve)
UC: Unconfined compressive strength test, Qu, in ksf
WA: Wash sieve (percent passing No. 200 Sieve)

MATERIAL GRAPHIC SYMBOLS

Asphaltic Concrete (AC)
Artificial Fill
Silty SAND (SM)
Poorly graded SAND with Silt (SP-SM)

TYPICAL SAMPLER GRAPHIC SYMBOLS

Bulk Sample
Grab Sample
3-inch-OD Modified California
2-inch-OD unlined split spoon (SPT)

OTHER GRAPHIC SYMBOLS

Water level (at time of drilling, ATD)
Water level (after waiting, AW)
Minor change in material properties within a stratum
Inferred/gradational contact between strata
Queried contact between strata

GENERAL NOTES

1: Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive, and actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
2: Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.
3: Driller used AWJ rod and a hydraulically driven standard 140 pound above ground hammer with a 30 inch drop to advance split spoon samplers.
4: Standard Penetration Test samplers were unlined

CKGEO

SUMMARY

OF

CONE PENETRATION TEST DATA

Project:

1452 Artesia Blvd.
Gardena, CA
December 13, 2021

Prepared for:

Mr. Andy Hillstrand
Carl Kim Geotechnical, Inc.
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TABLE OF CONTENTS

SUMMARY

OF

CONE PENETRATION TEST DATA

1. INTRODUCTION

This report presents the results of a Cone Penetration Test (CPT) program carried out for the project located at 1452 Artesia Blvd. in Gardena, California. The work was performed by Kehoe Testing & Engineering (KTE) on December 13, 2021. The scope of work was performed as directed by Carl Kim Geotechnical, Inc. personnel.

2. SUMMARY OF FIELD WORK

The fieldwork consisted of performing CPT soundings at five locations to determine the soil lithology. A summary is provided in **TABLE 2.1**.

LOCATION	DEPTH OF CPT (ft)	COMMENTS/NOTES:
CPT-1	65	
CPT-2	55	
CPT-3	50	
CPT-4	50	
CPT-5	50	

TABLE 2.1 - Summary of CPT Soundings

3. FIELD EQUIPMENT & PROCEDURES

The CPT soundings were carried out by **KTE** using an integrated electronic cone system manufactured by Vertek. The CPT soundings were performed in accordance with ASTM standards (D5778). The cone penetrometers were pushed using a 30-ton CPT rig. The cone used during the program was a 15 cm^2 cone with a cone net area ratio of 0.83. The following parameters were recorded at approximately 2.5 cm depth intervals:

- Cone Resistance (qc)
- Sleeve Friction (fs)
- Dynamic Pore Pressure (u)
- Inclination
- Penetration Speed
- Pore Pressure Dissipation (at selected depths)

At locations CPT-1 & CPT-2, shear wave measurements were obtained at approximately 5-foot intervals. The shear wave is generated using an air-actuated hammer, which is located inside the front jack of the CPT rig. The cone has a triaxial geophone, which recorded the shear wave signal generated by the air hammer.

The above parameters were recorded and viewed in real time using a laptop computer. Data is stored at the KTE office for up to 2 years for future analysis and reference. A complete set of baseline readings was taken prior to each sounding to determine temperature shifts and any zero load offsets. Monitoring base line readings ensures that the cone electronics are operating properly.

4. CONE PENETRATION TEST DATA & INTERPRETATION

The Cone Penetration Test data is presented in graphical form in the attached Appendix. These plots were generated using the CPeT-IT program. Penetration depths are referenced to ground surface. The soil behavior type on the CPT plots is derived from the attached CPT SBT plot (Robertson, "Interpretation of Cone Penetration Test…", 2009) and presents major soil lithologic changes. The stratigraphic interpretation is based on relationships between cone resistance (qc), sleeve friction (fs), and penetration pore pressure (u). The friction ratio (Rf), which is sleeve friction divided by cone resistance, is a calculated parameter that is used along with cone resistance to infer soil behavior type. Generally, cohesive soils (clays) have high friction ratios, low cone resistance and generate excess pore water pressures. Cohesionless soils (sands) have lower friction ratios, high cone bearing and generate little (or negative) excess pore water pressures.

The CPT data files have also been provided. These files can be imported in CPeT-IT (software by GeoLogismiki) and other programs to calculate various geotechnical parameters.

It should be noted that it is not always possible to clearly identify a soil type based on qc, fs and u. In these situations, experience, judgement and an assessment of the pore pressure data should be used to infer the soil behavior type.

If you have any questions regarding this information, please do not hesitate to call our office at (714) 901-7270.

Sincerely,

KEHOE TESTING & ENGINEERING

Steven P. Kehoe
President

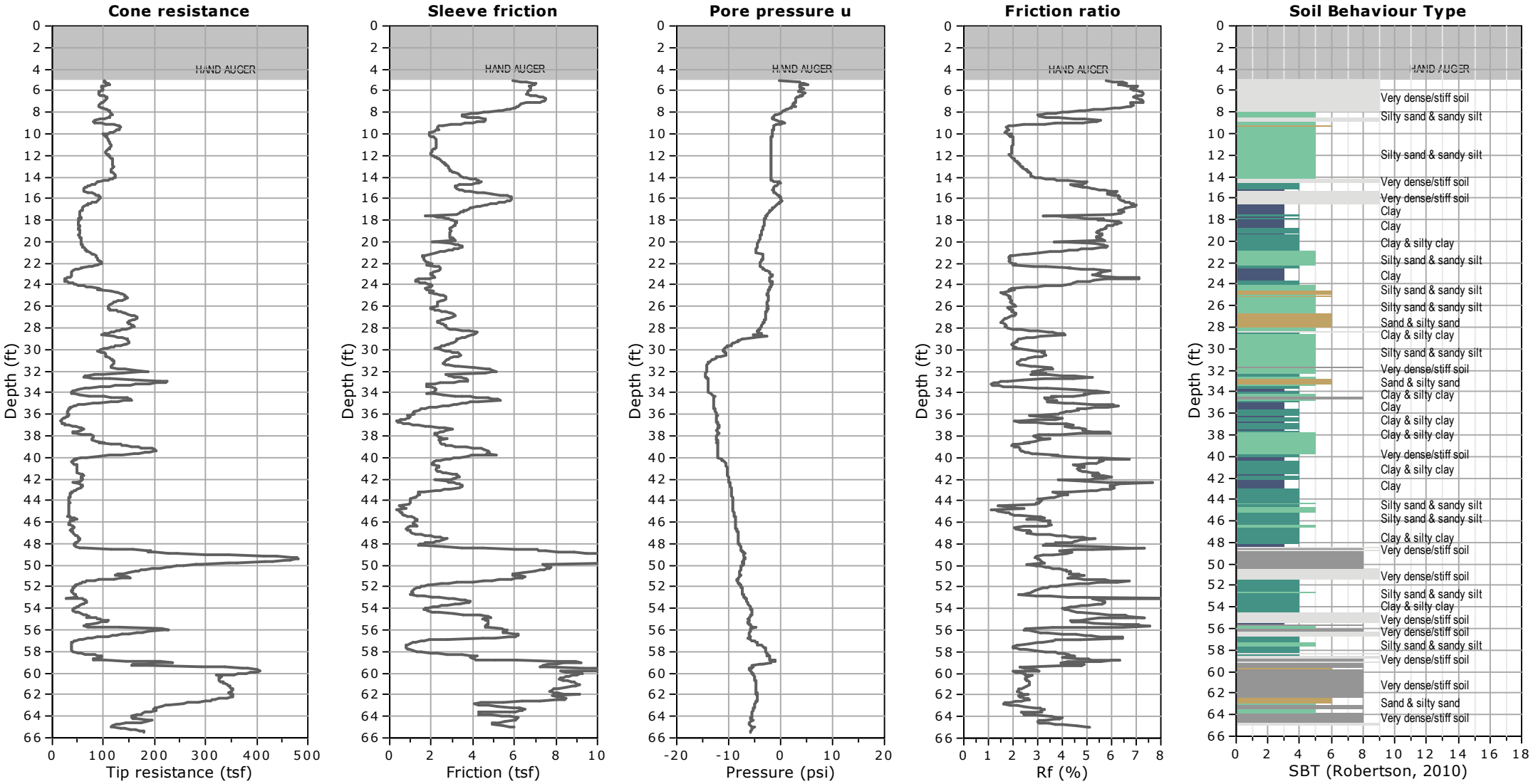
12/15/21-kk-3521

APPENDIX

Kehoe Testing and Engineering
714-901-7270
steve@kehoetesting.com
www.kehoetesting.com

Project: **Carl Kim Geotechnical**
Location: **1452 Artesia Blvd, Gardena, CA**

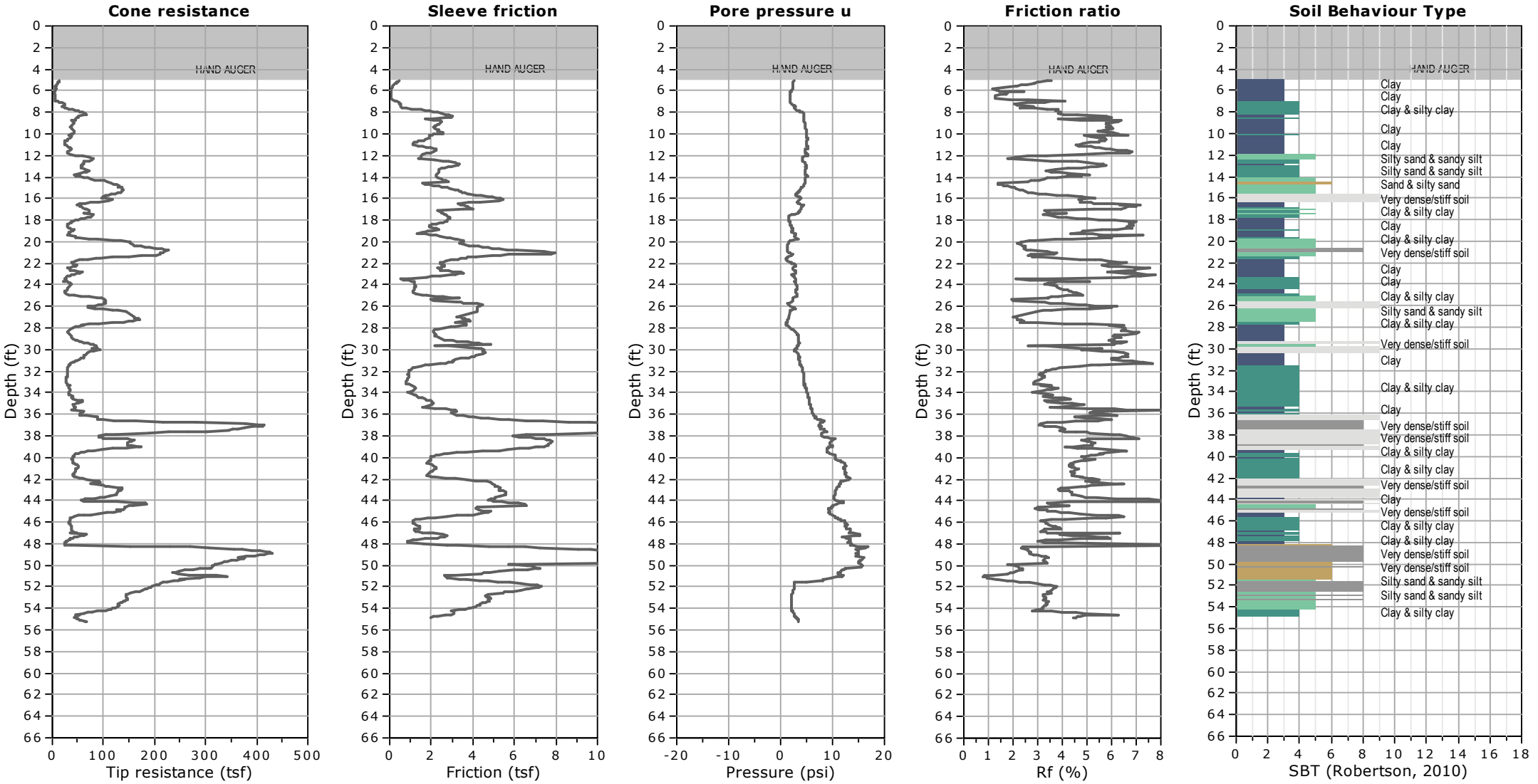
CPT-1
Total depth: 65.47 ft, Date: 12/13/2021



Kehoe Testing and Engineering
714-901-7270
steve@kehoetesting.com
www.kehoetesting.com

Project: **Carl Kim Geotechnical**
Location: **1452 Artesia Blvd, Gardena, CA**

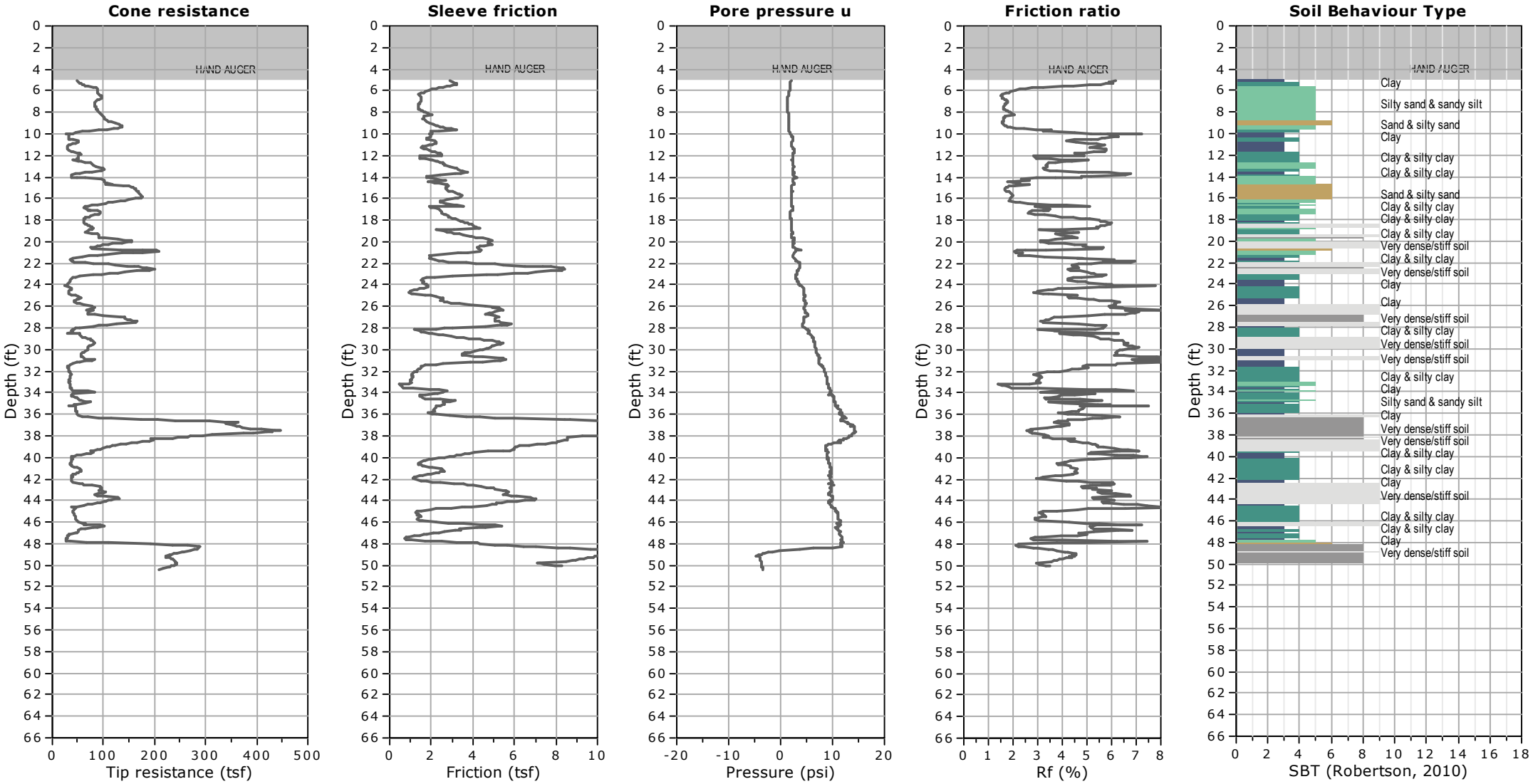
CPT-2
Total depth: 55.26 ft, Date: 12/13/2021



Kehoe Testing and Engineering
714-901-7270
steve@kehoetesting.com
www.kehoetesting.com

Project: **Carl Kim Geotechnical**
Location: **1452 Artesia Blvd, Gardena, CA**

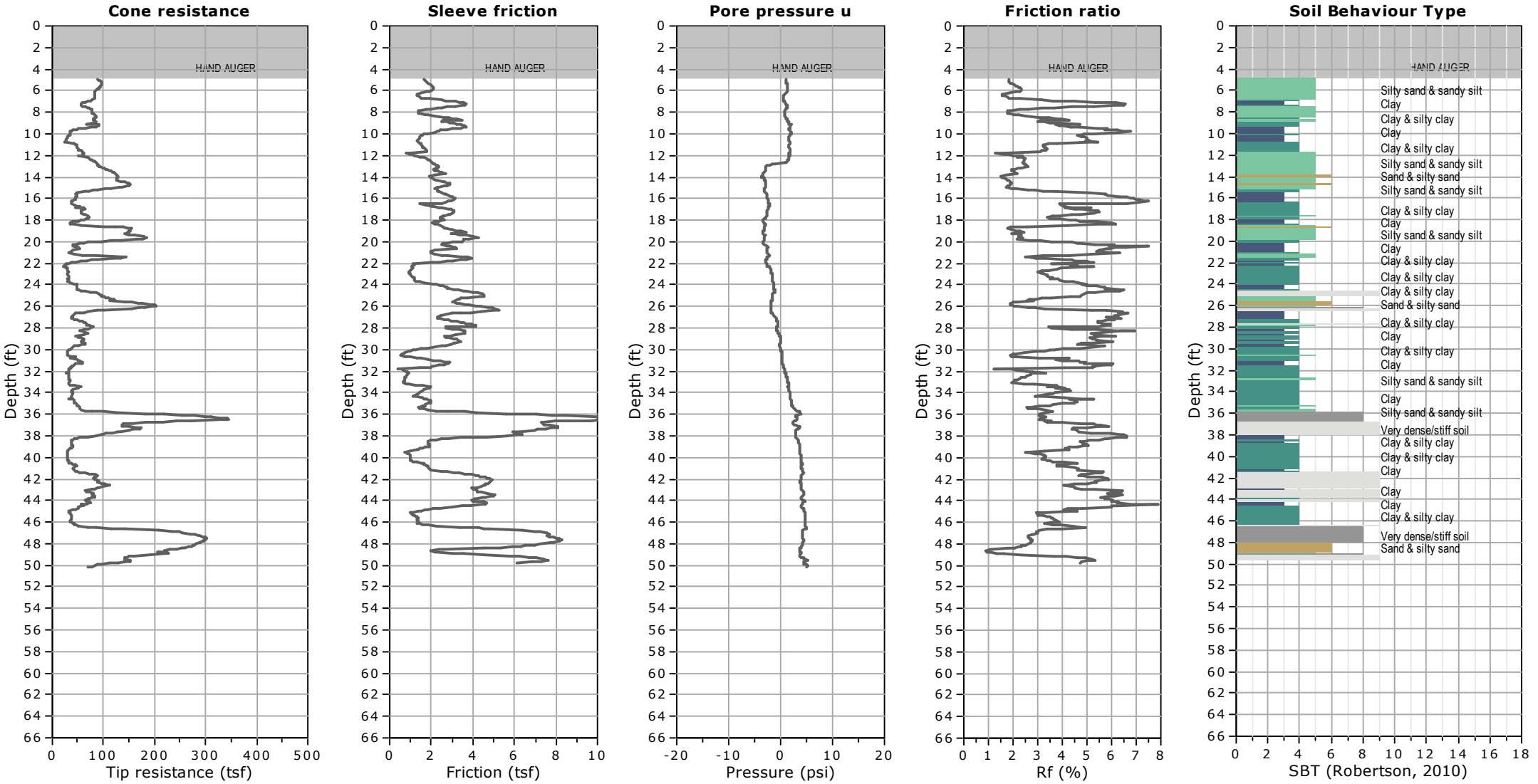
CPT-3
Total depth: 50.38 ft, Date: 12/13/2021



Kehoe Testing and Engineering
714-901-7270
steve@kehoetesting.com
www.kehoetesting.com

Project: **Carl Kim Geotechnical**
Location: **1452 Artesia Blvd, Gardena, CA**

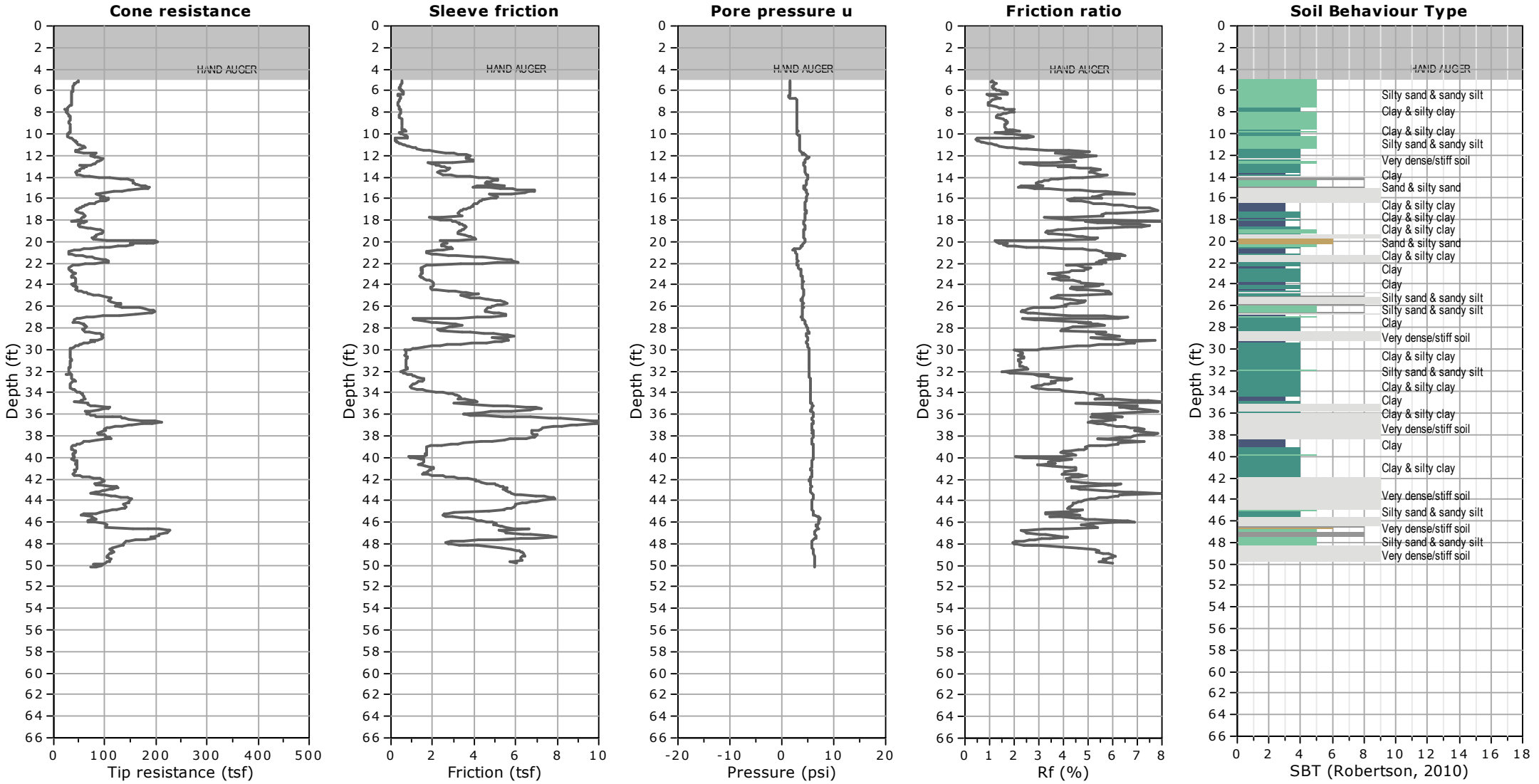
CPT-4
Total depth: 50.15 ft, Date: 12/13/2021



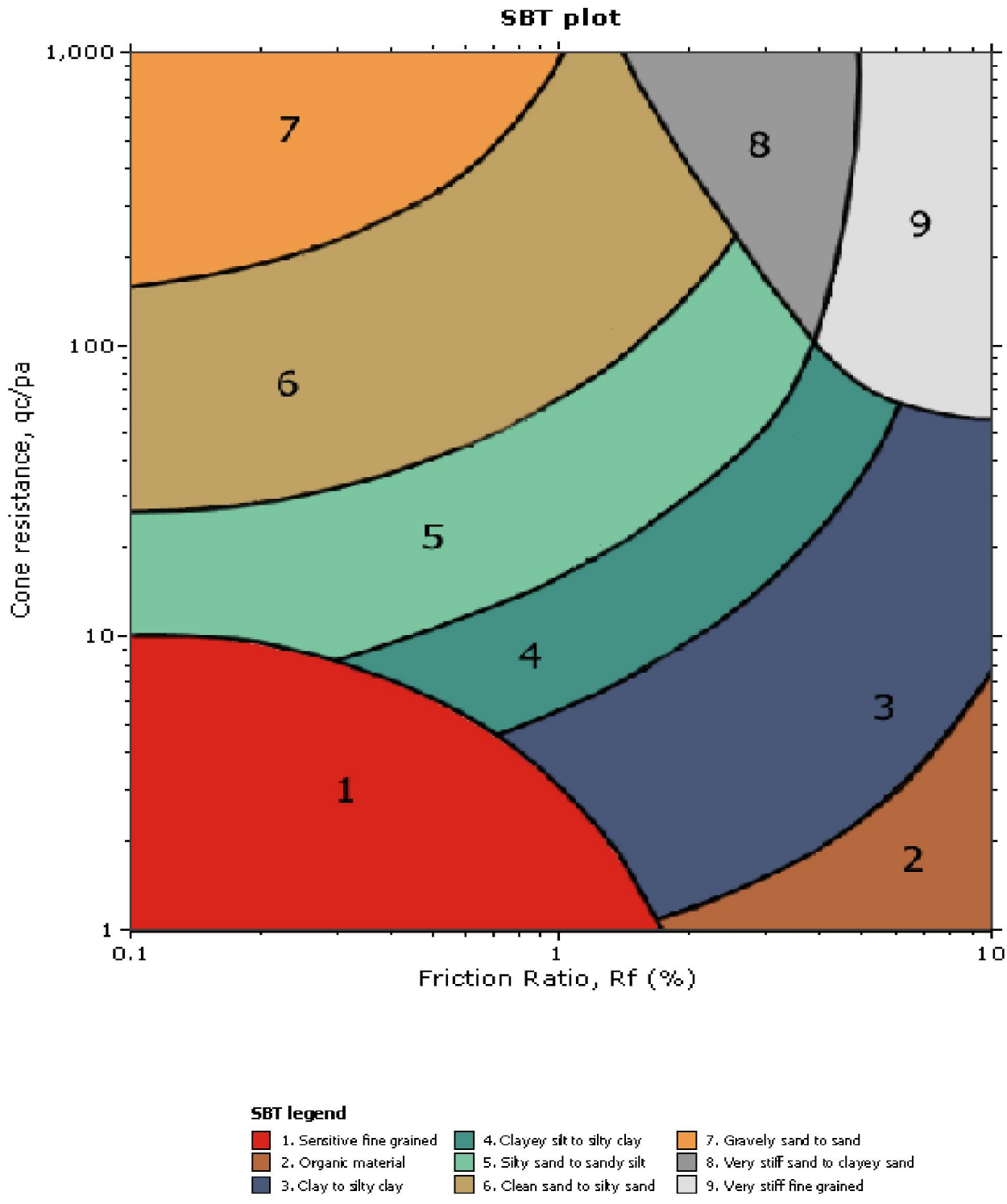
Kehoe Testing and Engineering
714-901-7270
steve@kehoetesting.com
www.kehoetesting.com

Project: **Carl Kim Geotechnical**
Location: **1452 Artesia Blvd, Gardena, CA**

CPT-5
Total depth: 50.15 ft, Date: 12/13/2021



Kehoe Testing and Engineering
714-901-7270
rich@kehoetesting.com
www.kehoetesting.com



Carl Kim Geotechnical
1452 Artesia Blvd.
Gardena, CA

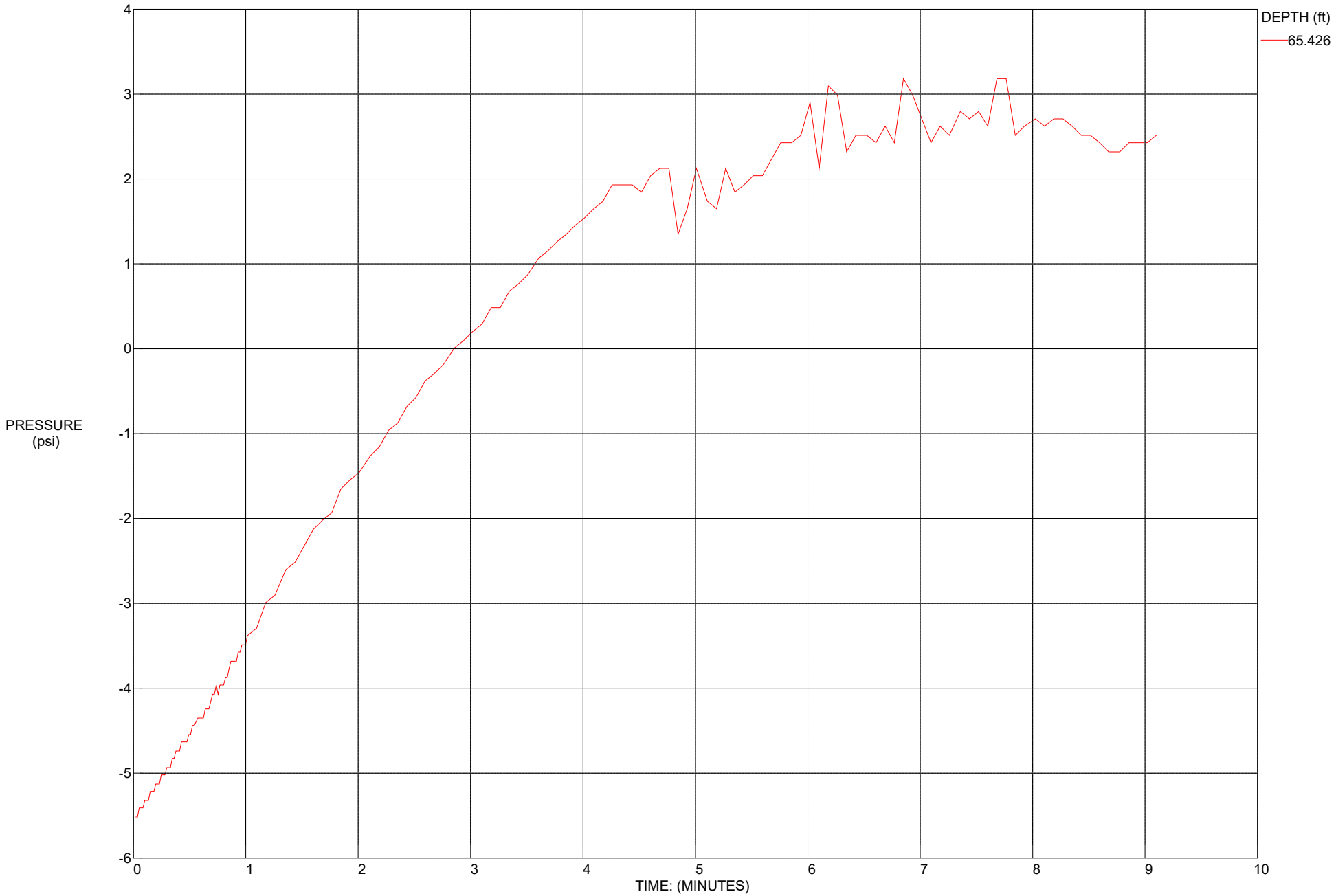
CPT Shear Wave Measurements

Location	Tip Depth (ft)	Geophone Depth (ft)	Travel Distance (ft)	S-Wave Arrival (msec)	S-Wave Velocity from Surface (ft/sec)	Interval S-Wave Velocity (ft/sec)
CPT-1	5.05	4.05	4.52	5.24	862	
	10.04	9.04	9.26	9.84	941	1031
	15.03	14.03	14.17	14.88	952	975
	20.21	19.21	19.31	19.16	1008	1201
	25.00	24.00	24.08	23.24	1036	1169
	30.15	29.15	29.22	27.52	1062	1200
	35.14	34.14	34.20	31.88	1073	1142
	40.12	39.12	39.17	36.28	1080	1130
	45.11	44.11	44.16	40.88	1080	1084
	50.13	49.13	49.17	44.96	1094	1229
	55.05	54.05	54.09	49.56	1091	1069
	60.07	59.07	59.10	54.36	1087	1045
	65.42	64.42	64.45	58.24	1107	1378
CPT-5	5.15	4.15	4.61	6.42	718	
	10.14	9.14	9.36	15.52	603	522
	15.16	14.16	14.30	22.46	637	712
	20.14	19.14	19.24	27.08	711	1070
	25.26	24.26	24.34	31.24	779	1226
	30.31	29.31	29.38	35.84	820	1095
	35.20	34.20	34.26	40.56	845	1034
	40.16	39.16	39.21	44.74	876	1185
	45.28	44.28	44.33	49.56	894	1061
	50.13	49.13	49.17	54.18	908	1049

Shear Wave Source Offset - 2 ft

S-Wave Velocity from Surface = Travel Distance/S-Wave Arrival
Interval S-Wave Velocity = (Travel Dist2-Travel Dist1)/(Time2-Time1)

TEST ID: CPT-1


DEPTH (ft)
65.426
PRESSURE
(psi)
4
3
2
1
0
-1
-2
-3
-4
-5
-6
0
1
2
3
4
5
6
7
8
9
10
TIME: (MINUTES)

ENVIRONMENTAL HEALTH

Drinking Water Program

5050 Commerce Drive, Baldwin Park, CA 91706
Telephone: (626) 430-5420 • http://publichealth.lacounty.gov/eh/ep/dw/dw_main.htm

Work Plan Approval

WORK SITE ADDRESS	CITY	ZIP	EMAIL ADDRESS
1450 Artesia Blvd	Gardena	90248	geoandy@gmail.com carlkimgeo@gmail.com

NOTICE:

- WORK PLAN APPROVALS ARE VALID FOR 180 DAYS. 30 DAY EXTENSIONS OF WORK PLAN APPROVALS ARE CONSIDERED ON AN INDIVIDUAL (CASE-BY-CASE) BASIS AND MAY BE SUBJECT TO ADDITIONAL PLAN REVIEW FEES (HOURLY RATE AS APPLICABLE).
- WORK PLAN MODIFICATIONS MAY BE REQUIRED IF WELL AND GEOLOGIC CONDITIONS ENCOUNTERED AT THE SITE INSPECTION ARE FOUND TO DIFFER FROM THE SCOPE OF WORK PRESENTED TO THE DEPARTMENT OF PUBLIC HEALTH—DRINKING WATER PROGRAM.
- WORK PLAN APPROVALS ARE LIMITED TO COMPLIANCE WITH THE CALIFORNIA WELL STANDARDS AND THE LOS ANGELES COUNTY CODE AND DOES NOT GRANT ANY RIGHTS TO CONSTRUCT, RENOVATE, OR DECOMMISSION ANY WELL. THE APPLICANT IS RESPONSIBLE FOR SECURING ALL OTHER NECESSARY PERMITS SUCH AS WATER RIGHTS, PROPERTY RIGHTS, COASTAL COMMISSION APPROVALS, USE COVENANTS, ENCROACHMENT PERMISSIONS, UTILITY LINE SETBACKS, CITY/COUNTY PUBLIC WORKS RIGHTS OF WAY, ETC.
- THIS PERMIT IS NOT COMPLETE UNTIL ALL OF THE FOLLOWING REQUIREMENTS ARE SIGNED BY THE DEPUTY HEALTH OFFICER. WORK SHALL NOT BE INITIATED WITHOUT A WORK PLAN APPROVAL STAMPED BY THE DEPARTMENT OF PUBLIC HEALTH—DRINKING WATER PROGRAM.

TO BE COMPLETED BY DEPARTMENT OF PUBLIC HEALTH—DRINKING WATER PROGRAM:

X	WORK PLAN APPROVED FOR: 4 CPT/Hollow Stem Borings	**PERMIT NUMBER:**	SR0276785	**DATE:**	11-9-2021

ADDITIONAL APPROVAL CONDITIONS:

- Work plan approval is issued for scope of work submitted to the Drinking Water Program. Any modifications to the scope of work will require additional work plan review.
- Ensure the boring/exploration hole is backfilled within 24 hours of boring construction.
- Ensure to backfill using a tremie pipe under pressure or equivalent equipment with approved cement grout, proceeding upward from the bottom of the boring/exploration hole.
- Ensure soil borings are sealed per California Well Standards 74-90
  - Cement grout mix ratio of 5-6 gallons of water per 94-pound bag of Portland cement.
  - Up to 6% of Bentonite may be added to the cement-based mix.
  - No hydrated Bentonite chips
- Borings/Exploration holes must comply with all applicable requirements published in the California Well Standards (Bulletins 74-81 and 74-90) and the Los Angeles County Code, Title 11.

REHS NO. 5838

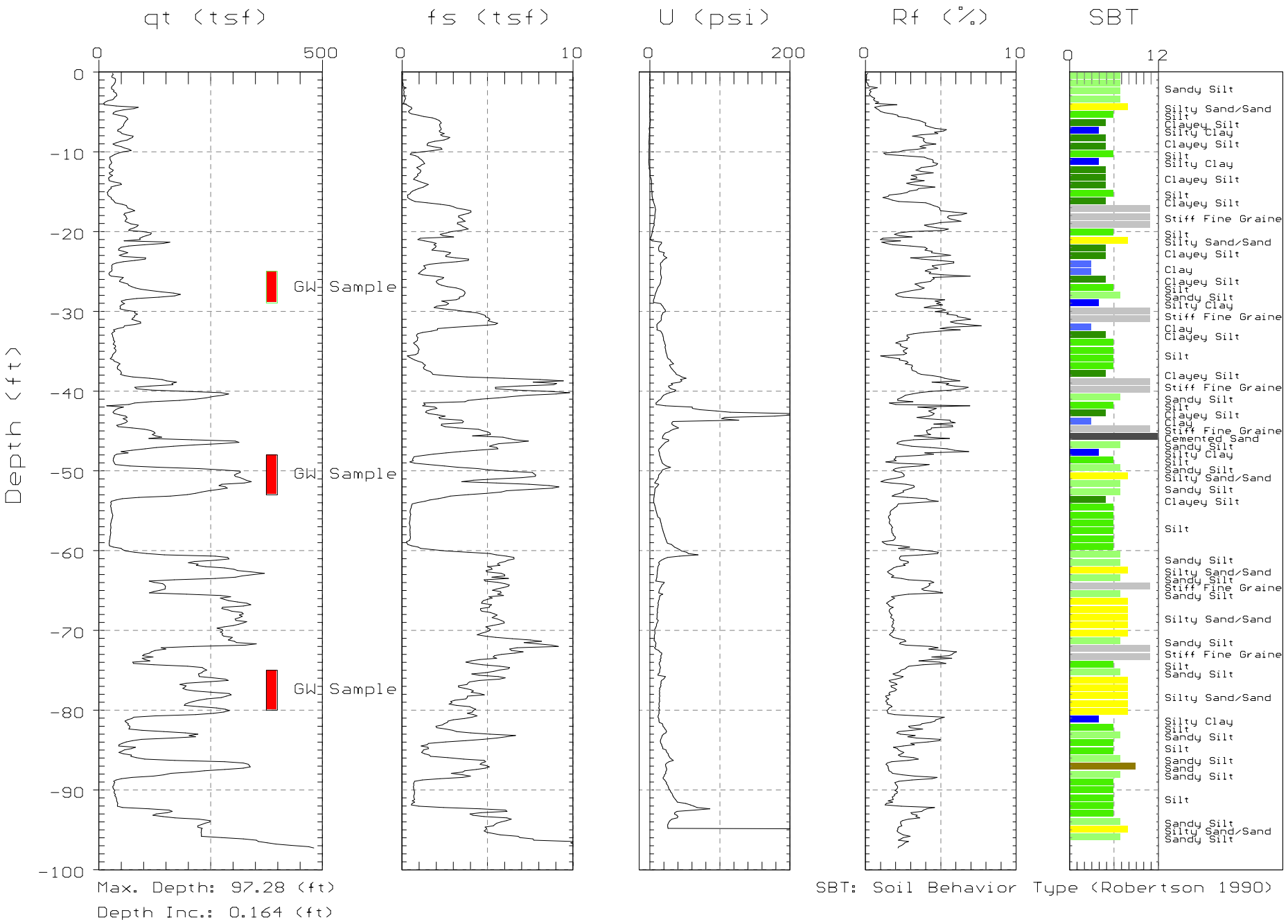
SELECTED EXPLORATIONS BY OTHERS

GREGG

SECOR

Site: GARDENA SUMPS
Location: CPB09-GW

Engineer: P.KINNEY
Date: 01:23:06 09:31

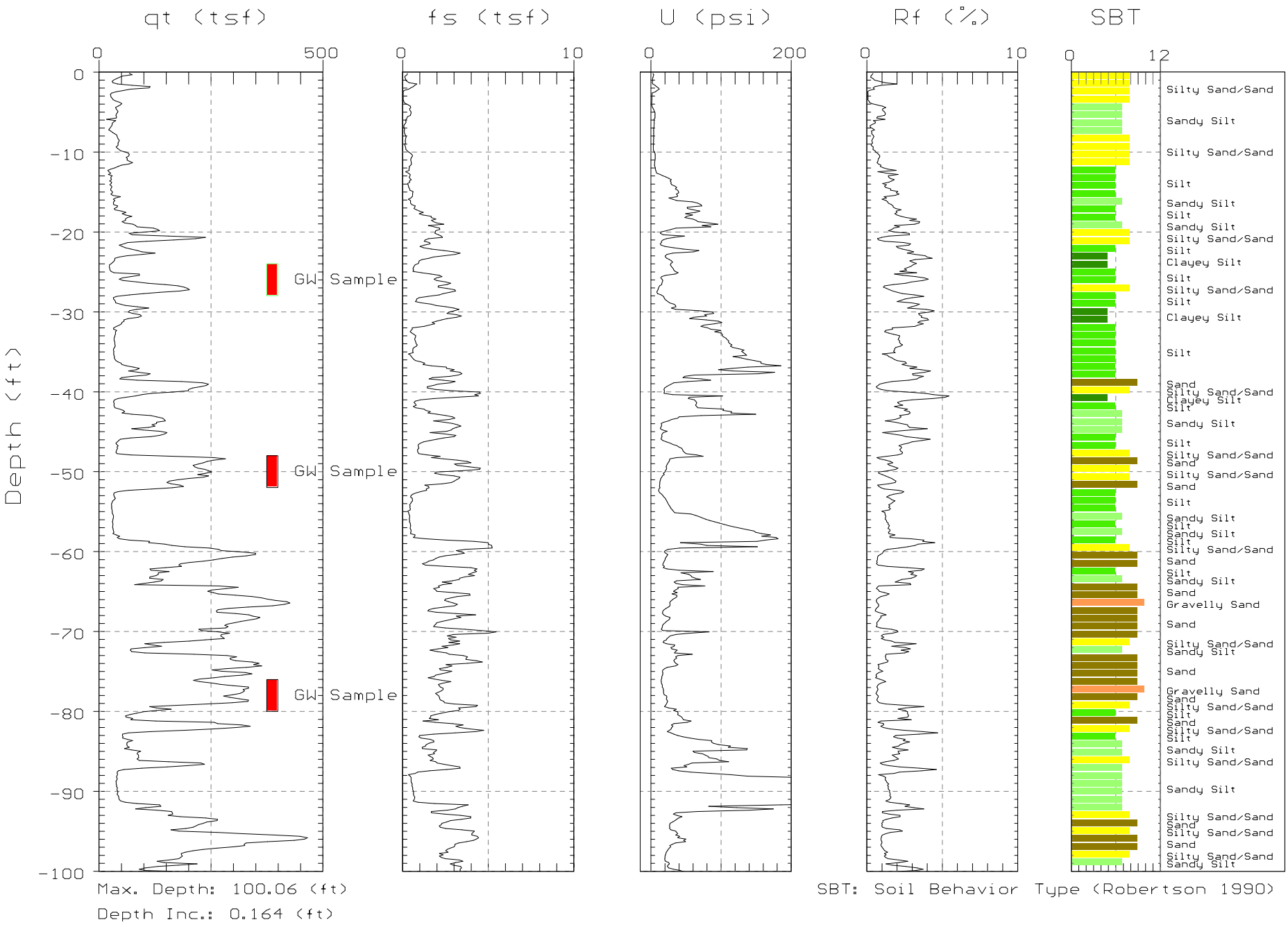


GREGG

SECOR

Site: GARDENA SUMPS
Location: CPB25-GW

Engineer: P.KINNEY
Date: 01:25:06 09:20



Max. Depth: 100.06 (ft)
Depth Inc.: 0.164 (ft)

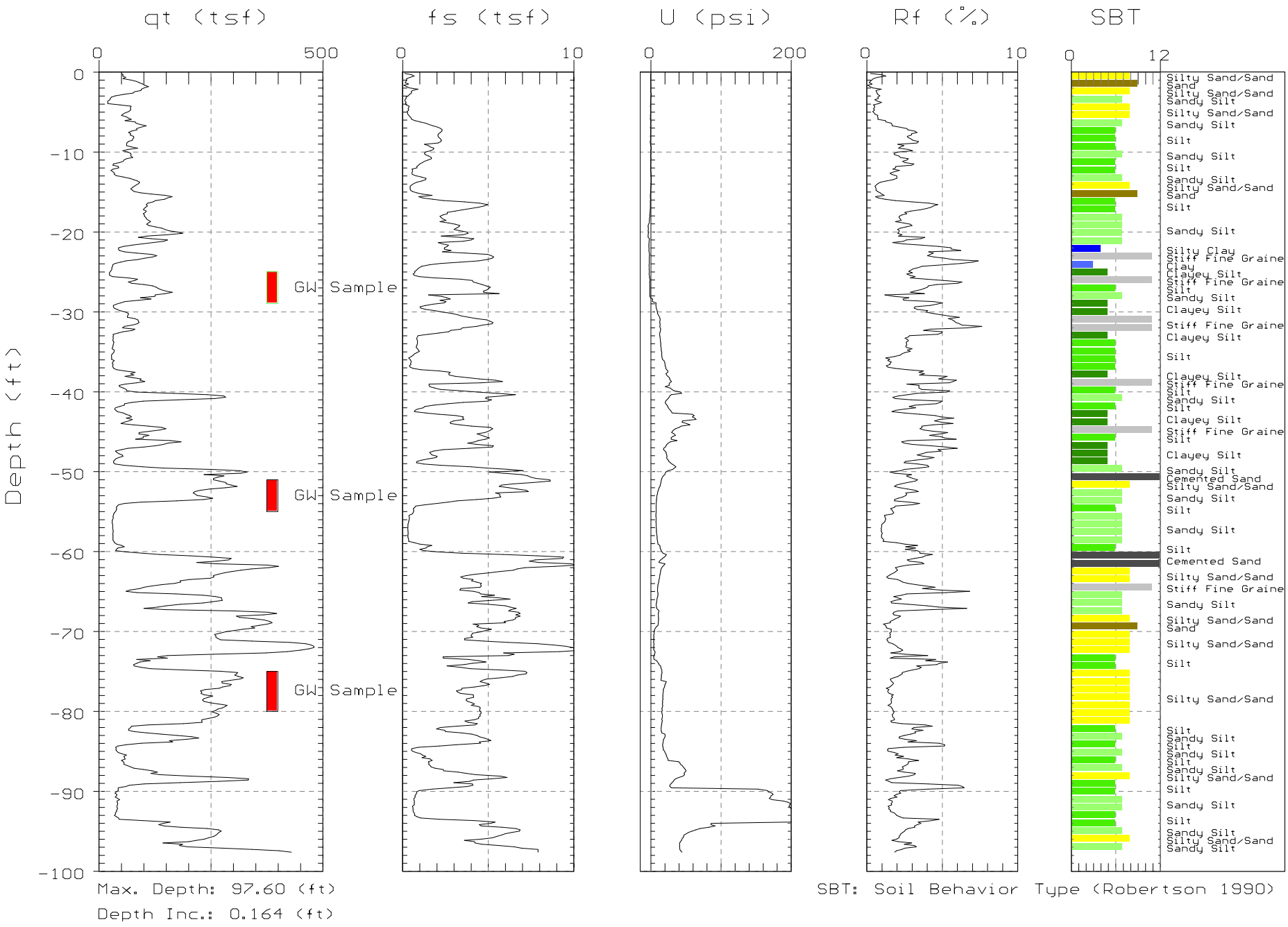
SBT: Soil Behavior Type (Robertson 1990)

GREGG

SECOR

Site: GARDENA SUMPS
Location: CPB26-GW

Engineer: P.KINNEY
Date: 01:23:06 13:31



Max. Depth: 97.60 (ft)
Depth Inc.: 0.164 (ft)

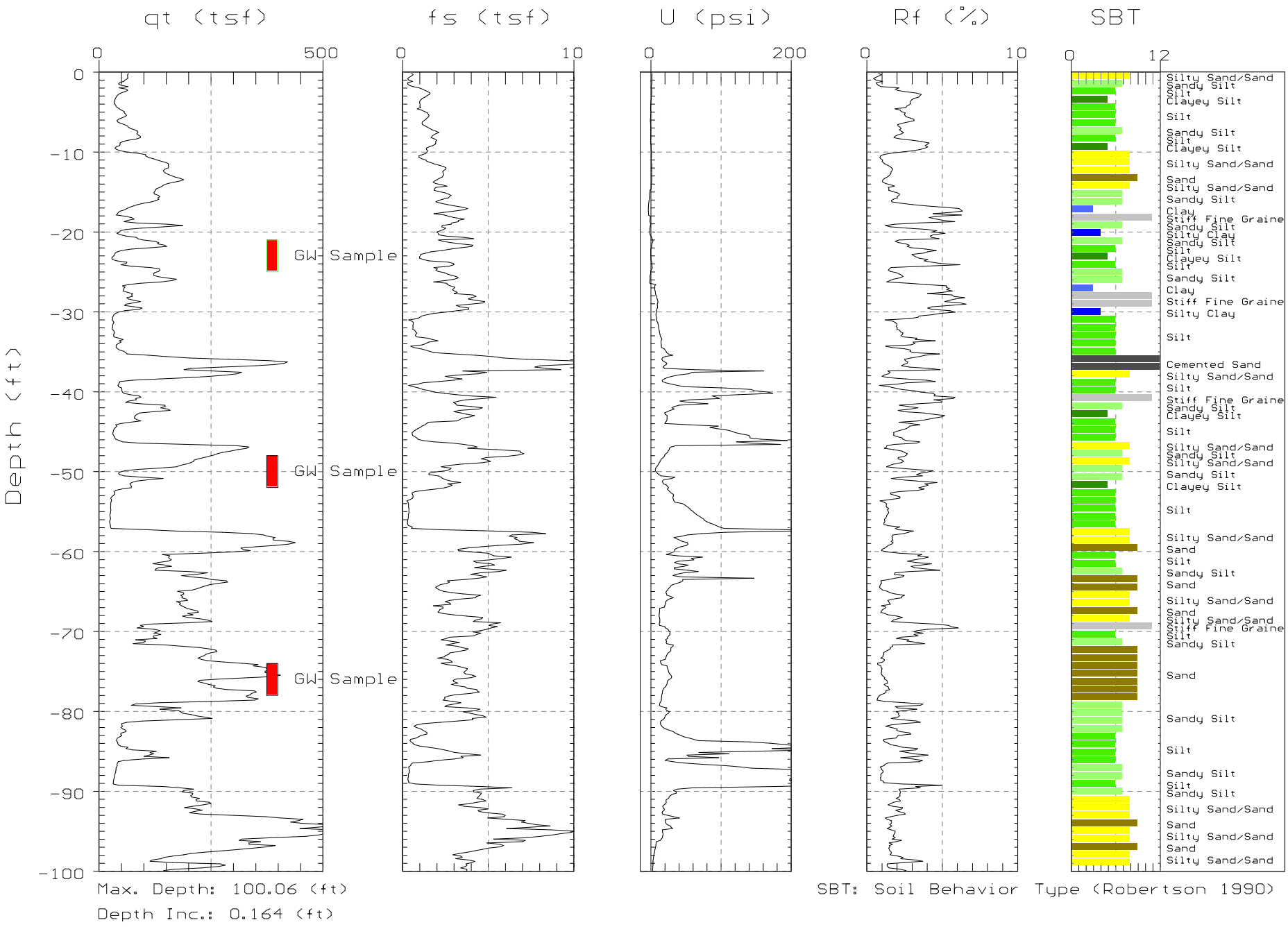
SBT: Soil Behavior Type (Robertson 1990)

GREGG

SECOR

Site: GARDENA SUMPS
Location: CPB27-GW

Engineer: P.KINNEY
Date: 01:24:06 09:21



Max. Depth: 100.06 (ft)
Depth Inc.: 0.164 (ft)

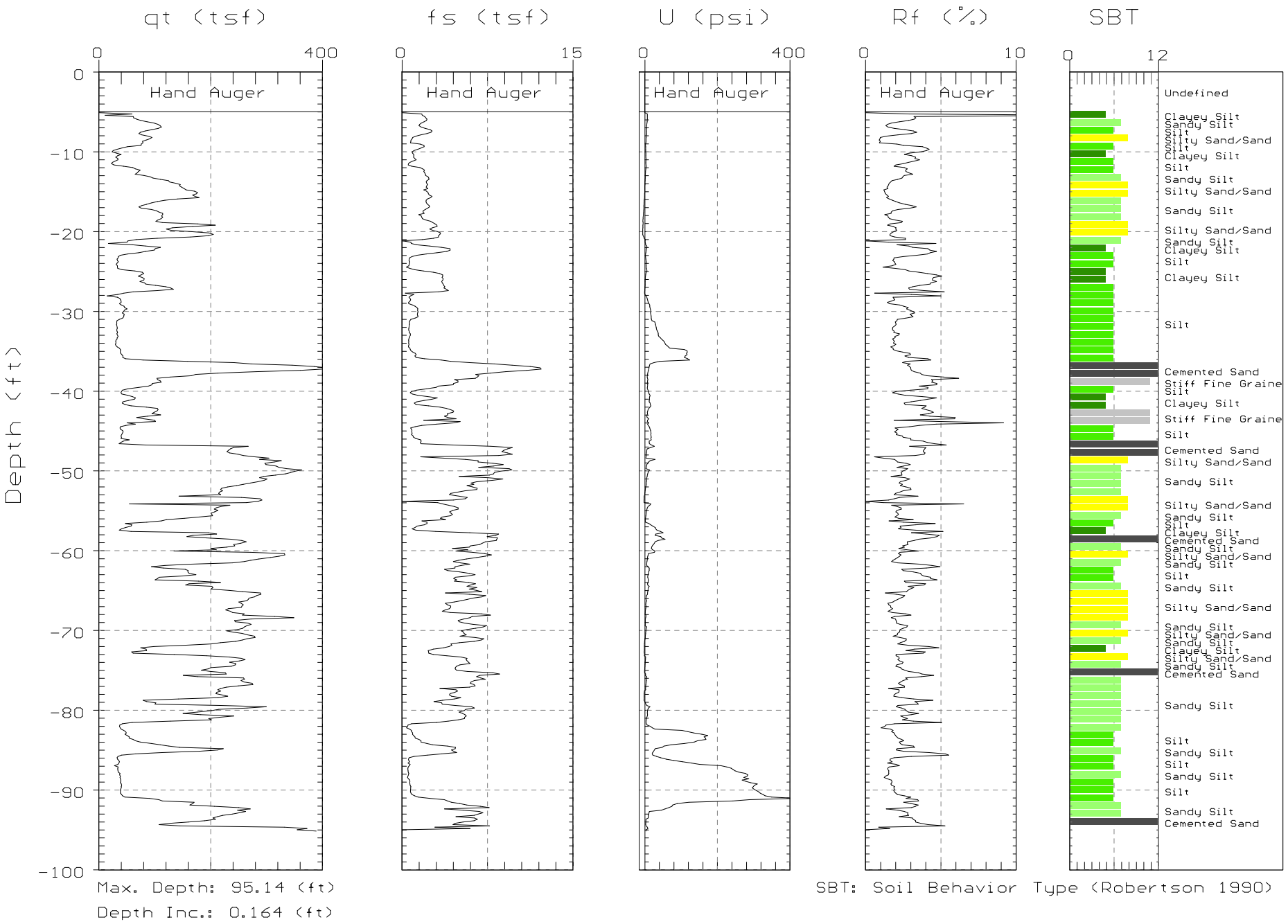
SBT: Soil Behavior Type (Robertson 1990)

GREGG

SECOR

Site: GARDENA SUMPS
Location: HPB-10

Engineer: R.COUTURE
Date: 02/23/06 07:51



Max. Depth: 95.14 (ft)
Depth Inc.: 0.164 (ft)

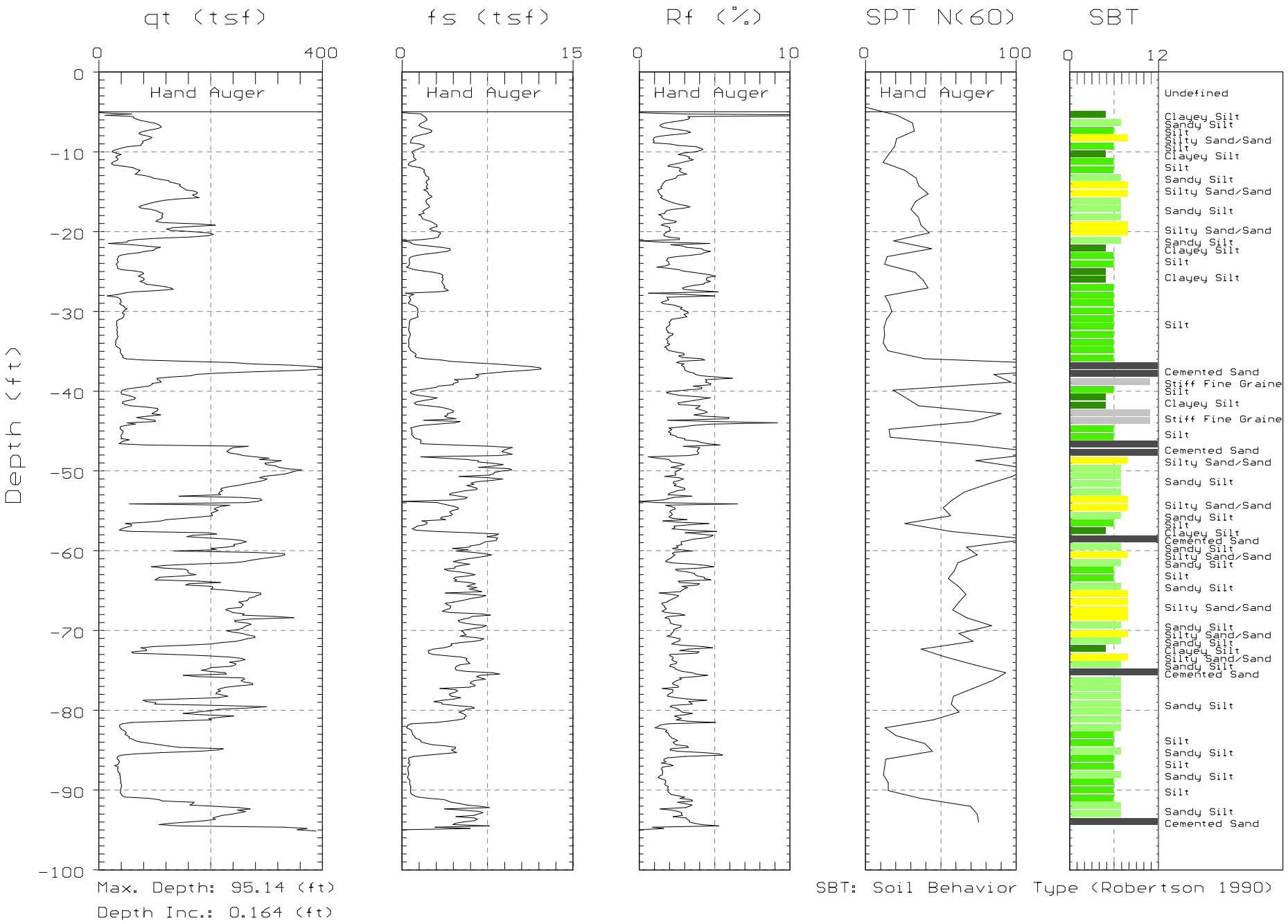
SBT: Soil Behavior Type (Robertson 1990)

GREGG

SECOR

Site: GARDENA SUMPS
Location: HPB-10

Engineer: R.COUTURE
Date: 02/23/06 07:51



Max. Depth: 95.14 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB01** PAGE 1 OF 3

SECOR

DATE: STARTED **2/8/2006** COMPLETED: **2/8/2006**
TIME: STARTED **10:50:00 AM** COMPLETED: **11:40:00 AM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,776,171.26492** EASTING (ft): **6,470,307.0931**
LATITUDE: **33° 52' 21.51876"** LONGITUDE: **-118° 18' 3.45"**
GROUND ELEV (ft): **20.82** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **13.5 2/8/06** BOREHOLE DEPTH (ft): **24.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
10:50		SM	**SILTY SAND** ; SM; (2.5Y 4/3) olive brown; dense; moist; no odor; oxidation staining; ~80% fine-grained sand; trace iron debris fragments; trace medium to coarse-grained sand; trace fine gravel		11:00 HPB01-SL-1.5	60"/60"	E/J/R	316.0	2
		SM	SM; same as above		11:05 HPB01-SL-5	30"/36"	E/J/R	11.3	6
		SM	SM; (2.5Y 4/3) olive brown; soft to loose; saturated; no odor; ~55% fine-grained sand with trace medium to coarse-grained fragments of debris (brick & iron); oxidation staining	NR	11:15 HPB01-SL-10	30"/48'	E/J/R		8
10			**SLUDGE**; (Acidic); (GLEY 1 2.5/N) black; oily tar; ~6" lense					70.2	10
			Assume	NR					

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB01** PAGE 2 OF 3

SECOR

DATE: STARTED **2/8/2006** COMPLETED: **2/8/2006**
TIME: STARTED **10:50:00 AM** COMPLETED: **11:40:00 AM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,776,171.26492** EASTING (ft): **6,470,307.0931**
LATITUDE: **33° 52' 21.51876"** LONGITUDE: **-118° 18' 3.45"**
GROUND ELEV (ft): **20.82** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **13.5 2/8/06** BOREHOLE DEPTH (ft): **24.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
			SILTY SAND/SANDY SILT SM/ML; (2.5Y 3/3) dark olive brown; low plasticity; firm; very moist; no hydrocarbon odor; interbedded with dark brown clayey silt layers		-			2,319	
		SM	**SILTY SAND** ; SM; saturated; ~75% fine-grained sand			36"/48"			
14					11:20 HPB01-SL-15		E/J/R		14
				NR					
16		SM	**SILTY SAND** ; SM; (2.5Y 4/4) olive brown; soft; moist; (pH=6.25; field test)		- -			60.9	16
18						48"/48"			18
		SM	SM; dense; ~45% silt; fines; (pH=5.52; field test)						
					11:30 HPB01-SL-20		E/J/R	49.1	
20		SM	**SILTY SAND** ; SM; 2.5Y 5/3) light olive brown; non plastic; loose; saturated; ~85% fine-grained sand						20
22						48"/48"			22
		ML	**SILT** ; ML; (2.5Y 5/3) light olive brown; non plastic; hard; moist; no hydrocarbon odor; no staining; ~80% silt; (pH=6.40; field test)						
					11:40 HPB01-SL-24		E/J/R	49.2	

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB01** PAGE 3 OF 3

SECOR

DATE: STARTED **2/8/2006** COMPLETED: **2/8/2006**
TIME: STARTED **10:50:00 AM** COMPLETED: **11:40:00 AM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,776,171.26492** EASTING (ft): **6,470,307.0931**
LATITUDE: **33° 52' 21.51876"** LONGITUDE: **-118° 18' 3.45"**
GROUND ELEV (ft): **20.82** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **13.5 2/8/06** BOREHOLE DEPTH (ft): **24.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
11:40			Hole terminated at 24 feet.						
			SAMPLE METHOD NR = No Recovery						
			SAMPLE TYPE E = Encore collected from either Piston/Split Barrel or Continuous Core Barrel. PT = Geotechnical Samples/Physical Properties R = Brass Ring/Acetate Liner J = Glass Jars						
26			**NOTES:** 1. At this location a Geoprobe™ track-mounted Limited Access Rig (LAR) advanced a Two-inch diameter boring for the purposes of sample collection and acid sludge vertical delineation. In addition, this boring was advanced and logged by geophysical methods. See the associated geophysical logs.						26
			2. The lithology represented on this log was obtained from observations collected from soil recovered in continuous cores driven by Piston/Core Barrel sampler. Typically, continuous cores were performed first and supplemental samples were collected in successive borings advanced through a particular depth interval.						
28			3. Soil samples for chemical analysis were collected from recovered material in the continuous cores using the Encore™ sampling device according to EPA Method 5035, brass rings, and 4 oz. glass jars.						28
			4. Driven samples Piston/Core Barrel were advanced with the Geoprobe™ reciprocating hydraulic hammer, no blow counts were recorded.						
30			5. Depth to first encountered groundwater was determined by depth of saturated soil.						30
			6. Borehole backfill were completed with hydrated bentonite chips, and capped with existing surface material.						
			7. Survey data at the top of the boring logs are location specific per horizontal datum NAD 83 California State Planes, Zone 5 (ft.) and vertical datum NGVD 28 (ft.).						
32									32
34									34

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB02** PAGE 1 OF 3

SECOR

DATE: STARTED **2/9/2006** COMPLETED: **2/9/2006**
TIME: STARTED **9:50:00 AM** COMPLETED: **11:00:00 AM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,776,167.68063** EASTING (ft): **6,470,375.9583**
LATITUDE: **33° 52' 21.48528"** LONGITUDE: **-118° 18' 2.63"**
GROUND ELEV (ft): **20.95** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **13.10 2/9/06** BOREHOLE DEPTH (ft): **24.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
09:50		~8" asphalt at surface						
	ML	**SILT** ; ML; (10YR 4/4) dark yellowish brown; non plastic; dense; moist; no odor; trace fine-grained sand		10:00 HPB02-SL-1.5		E/J/R	207	
2					60"/60"			2
4								4
	SM	**SILTY SAND** ; SM; (5Y 4/1) dark gray; non plastic; dense; wet; faint hydrocarbon odor; ~75% fine-grained sand		10:15 HPB02-SL-5 10:16 HPB02-2SL-5		E/J/R	11.3	
6					24"/36'			6
		Assume	NR					
8	ML	**SANDY SILT** ; ML; (5Y 4/1) dark gray; non plastic; soft; moist; strong hydrocarbon odor; oxidation staining; ~40% fine-grained sand						8
		SLUDGE; (Acidic); (GLEY 1 2.5/N) black; soft; wet; fibrous; semi solidified tar; (pH=4.71; field test)						
10		**SILTY SAND/SILT** SM/ML; (5Y 7/4) pale yellow; lensed		10:30 HPB02-SL-10	48"/48"	E/J/R	16.7	10
	ML	**SILT** ; ML; (5Y 4/3) olive; non plastic; dense; moist; trace fine-grained sand						

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB02** PAGE 2 OF 3

SECOR

DATE: STARTED **2/9/2006** COMPLETED: **2/9/2006**
TIME: STARTED **9:50:00 AM** COMPLETED: **11:00:00 AM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,776,167.68063** EASTING (ft): **6,470,375.9583**
LATITUDE: **33° 52' 21.48528"** LONGITUDE: **-118° 18' 2.63"**
GROUND ELEV (ft): **20.95** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **13.10 2/9/06** BOREHOLE DEPTH (ft): **24.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
		ML							
		SM	**SILTY SAND** ; SM; (GLEY 1 4/10Y) dark greenish gray; very loose; saturated; 70% very fine-grained sand						▽
14						48"/48"			14
					10:40 HPB02-SL-15		E/J/R	24.5	
16									16
		ML	**SILT** ; ML; (2.5Y 4/3) olive brown; non plastic; dense; moist; no odor; trace fine-grained sand						
18						48"/48"			18
					10:50 HPB02-SL-20		E/J/R	13.8	
20			Gradational **SANDY SILT/SILTY SAND** ML/SM; (2.5Y 5/2) light olive brown; non plastic; loose; ~45-60% fine-grained sand						20
			@21.5-23' bgs; free water; very loose; (pH=5.84; field test)						
22						48"/48'			22
			Faint hydrocarbon odor						
					11:00 HPB02-SL-24		E/J/R	8.7	

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB02** PAGE 3 OF 3

SECOR

DATE: STARTED **2/9/2006** COMPLETED: **2/9/2006**
TIME: STARTED **9:50:00 AM** COMPLETED: **11:00:00 AM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,776,167.68063** EASTING (ft): **6,470,375.9583**
LATITUDE: **33° 52' 21.48528"** LONGITUDE: **-118° 18' 2.63"**
GROUND ELEV (ft): **20.95** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **13.10 2/9/06** BOREHOLE DEPTH (ft): **24.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
11:00			Hole terminated at 24 feet.						
			SAMPLE METHOD NR = No Recovery						
			SAMPLE TYPE E = Encore collected from either Piston/Split Barrel or Continuous Core Barrel. PT = Geotechnical Samples/Physical Properties R = Brass Ring/Acetate Liner J = Glass Jars						
26			**NOTES:** 1. At this location a Geoprobe™ track-mounted Limited Access Rig (LAR) advanced a Two-inch diameter boring for the purposes of sample collection and acid sludge vertical delineation. In addition, this boring was advanced and logged by geophysical methods. See the associated geophysical logs.						26
28			2. The lithology represented on this log was obtained from observations collected from soil recovered in continuous cores driven by Piston/Core Barrel sampler. Typically, continuous cores were performed first and supplemental samples were collected in successive borings advanced through a particular depth interval.						28
			3. Soil samples for chemical analysis were collected from recovered material in the continuous cores using the Encore™ sampling device according to EPA Method 5035, brass rings, and 4 oz. glass jars.						
			4. Driven samples Piston/Core Barrel were advanced with the Geoprobe™ reciprocating hydraulic hammer, no blow counts were recorded.						
30			5. Depth to first encountered groundwater was determined by depth of saturated soil.						30
			6. Borehole backfill were completed with hydrated bentonite chips, and capped with existing surface material.						
			7. Survey data at the top of the boring logs are location specific per horizontal datum NAD 83 California State Planes, Zone 5 (ft.) and vertical datum NGVD 28 (ft.).						
32									32
34									34

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB03** PAGE 1 OF 4

SECOR

DATE: STARTED **2/8/2006** COMPLETED: **2/8/2006**
TIME: STARTED **1:50:00 PM** COMPLETED: **3:45:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,776,129.39622** EASTING (ft): **6,470,295.2791**
LATITUDE: **33° 52' 21.1044"** LONGITUDE: **-118° 18' 3.51"**
GROUND ELEV (ft): **21.20** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **20.3 2/8/06** BOREHOLE DEPTH (ft): **32.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
13:50			~6" asphalt at surface						
			SANDY SILT/SILTY SAND ML/SM; (10YR 4/4) dark yellowish brown; non plastic; firm; moist; ~50/50% fines/fine sand		14:05 HPB03-SL-1.5		E/J/R	14.3	
2						60"/60"			2
4					14:10 HPB03-SL-5		E/J/R	64.5	4
		ML	**SILT WITH SAND** ; ML; (10YR 4/4) dark yellowish brown; non plastic; dense to hard; moist; ~35% fine-grained sand						
6						36"/36"			6
8			Gradational						8
		ML	**SILT** ; ML; (GLEY 1 3/5 GY) greenish gray; non plastic; hard; moist; strong hydrocarbon odor; hydrocarbon staining; ~15% fine-grained sand					14.8	
10					14:15 HPB03-SL-10 14:16 HPB03-2SL-10	48"/48"	E/J/R		10

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB03** PAGE 2 OF 4

SECOR

DATE: STARTED **2/8/2006** COMPLETED: **2/8/2006**
TIME: STARTED **1:50:00 PM** COMPLETED: **3:45:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,776,129.39622** EASTING (ft): **6,470,295.2791**
LATITUDE: **33° 52' 21.1044"** LONGITUDE: **-118° 18' 3.51"**
GROUND ELEV (ft): **21.20** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **20.3 2/8/06** BOREHOLE DEPTH (ft): **32.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
14		ML				48"/48"			14
					14:25 HPB03-SL-15		E/J/R	13.3	
16		ML	ML; soft; moist; strong hydrocarbon odor; same as above						16
18		ML	**SILT** ; ML; (2.5Y 4/3) olive brown; non plastic; dense; moist; trace fine-grained sand			48"/48'			18
					14:40 HPB03-SL-20		E/J/R	14.2	
20		SP	**SAND** ; SP; (5Y 3/2) dark olive gray; fine-grained; non plastic; loose; saturated; slight hydrocarbon odor; poorly graded; homogeneous; slight oily sheen; ~10% fines; (pH=5.84; field test)						20 ▽
22						48"/48"			22

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB03** PAGE 3 OF 4

SECOR

DATE: STARTED **2/8/2006** COMPLETED: **2/8/2006**
TIME: STARTED **1:50:00 PM** COMPLETED: **3:45:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,776,129.39622** EASTING (ft): **6,470,295.2791**
LATITUDE: **33° 52' 21.1044"** LONGITUDE: **-118° 18' 3.51"**
GROUND ELEV (ft): **21.20** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **20.3 2/8/06** BOREHOLE DEPTH (ft): **32.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
		SP							
		SP	SP; same as above		15:15 HPB03-SL-25		E/J/R	16.1	
		ML	**CLAYEY SILT** ; ML; (2.5Y 4/3) olive brown; low plasticity; stiff; moist; strong HCL reaction; trace $CaCO_3$ nodules			36"/48"			
26									26
		SM	**SILTY SAND** ; SM; (2.5Y 4/3) olive brown; fine-grained; non plastic; stiff; moist; ~30% fines						
			Assume	NR					
28		ML	**SANDY SILT** ; ML; (2.5Y 4/4) olive brown; non plastic; stiff; moist; trace fine-grained sand; strong HCL reaction; ~15% $CaCO_3$ nodules ≤~1"						28
					15:40 HPB03-SL-30		E/J/R	9.1	
30						48"/48"			30
15:45 32			Hole terminated at 32 feet.						32
34									34

SAMPLE METHOD
NR = No Recovery

SAMPLE TYPE
E = Encore collected from either Piston/Split Barrel or Continuous Core Barrel.
PT = Geotechnical Samples/Physical Properties
R = Brass Ring/Acetate Liner
J = Glass Jars

NOTES:
1. At this location a Geoprobe™ track-mounted Limited Access Rig (LAR) advanced a Two-inch diameter boring for the purposes of sample collection and acid sludge vertical delineation. In addition, this boring was advanced and logged by geophysical methods. See the associated geophysical logs.

2. The lithology represented on this log was obtained from observations collected from soil recovered in continuous cores driven by Piston/Core Barrel sampler. Typically, continuous cores were

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB03** PAGE 4 OF 4

SECOR

DATE: STARTED **2/8/2006** COMPLETED: **2/8/2006**
TIME: STARTED **1:50:00 PM** COMPLETED: **3:45:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,776,129.39622** EASTING (ft): **6,470,295.2791**
LATITUDE: **33° 52' 21.1044"** LONGITUDE: **-118° 18' 3.51"**
GROUND ELEV (ft): **21.20** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **20.3 2/8/06** BOREHOLE DEPTH (ft): **32.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
			performed first and supplemental samples were collected in successive borings advanced through a particular depth interval.						
			3. Soil samples for chemical analysis were collected from recovered material in the continuous cores using the Encore™ sampling device according to EPA Method 5035, brass rings, and 4 oz. glass jars.						
			4. Driven samples Piston/Core Barrel were advanced with the Geoprobe™ reciprocating hydraulic hammer, no blow counts were recorded.						
38			5. Depth to first encountered groundwater was determined by depth of saturated soil.						38
			6. Borehole backfill were completed with hydrated bentonite chips, and capped with existing surface material.						
			7. Survey data at the top of the boring logs are location specific per horizontal datum NAD 83 California State Planes, Zone 5 (ft.) and vertical datum NGVD 28 (ft.).						
40									40
42									42
44									44
46									46

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB04** PAGE 1 OF 3

SECOR

DATE: STARTED **2/9/2006** COMPLETED: **2/9/2006**
TIME: STARTED **2:15:00 PM** COMPLETED: **3:10:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,776,078.48315** EASTING (ft): **6,470,380.0328**
LATITUDE: **33° 52' 20.60321"** LONGITUDE: **-118° 18' 2.58"**
GROUND ELEV (ft): **21.56** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **17 2/9/06** BOREHOLE DEPTH (ft): **23.5**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
14:15			~8" asphalt & road base at surface						
		ML	**SILT** ; ML; (10YR 5/4) yellowish brown; non plastic; firm; moist; no odor; trace fine-grained sand		14:25 HPB04-SL-1.5		E/J/R	7.2	
2						60"/60"			2
4					14:35 HPB04-SL-5		E/J/R	5.3	4
6						36"/36"			6
8		ML	**SILT** ; ML; 2.5Y 4/3) olive brown; non plastic; firm; trace fine-grained sand					2.7	8
10					14:40 HPB04-SL-10 14:41 HPB04-2SL-10	48"/48"	E/J/R	6.7	10

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB04** PAGE 2 OF 3

SECOR

DATE: STARTED **2/9/2006** COMPLETED: **2/9/2006**
TIME: STARTED **2:15:00 PM** COMPLETED: **3:10:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,776,078.48315** EASTING (ft): **6,470,380.0328**
LATITUDE: **33° 52' 20.60321"** LONGITUDE: **-118° 18' 2.58"**
GROUND ELEV (ft): **21.56** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **17 2/9/06** BOREHOLE DEPTH (ft): **23.5**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
		ML	ML; same as above		-			27.0	
		SM	**SILTY SAND** ; SM; (2.5Y 4/4) olive brown; non plastic; loose; moist; ~65% fine-grained sand						
14						42"/48"			14
					14:50 HPB04-SL-15			6.2	
				NR					
16		SM	SM; wet; ~70% fine-grained sand; same as above						16
		SM	SM; saturated						▽
18						48"/48"			18
					14:55 HPB04-SL-20		E/J/R	6.7	
20		SM	**SILTY SAND** ; SM; (2.5Y 4/4) olive brown; loose; saturated						20
22						42"/48"			22
					15:10 HPB04-SL-24		E/J/R		
15:10			Hole terminated at 23.5 feet.						

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB04** PAGE 3 OF 3

SECOR

DATE: STARTED **2/9/2006** COMPLETED: **2/9/2006**
TIME: STARTED **2:15:00 PM** COMPLETED: **3:10:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,776,078.48315** EASTING (ft): **6,470,380.0328**
LATITUDE: **33° 52' 20.60321"** LONGITUDE: **-118° 18' 2.58"**
GROUND ELEV (ft): **21.56** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **17 2/9/06** BOREHOLE DEPTH (ft): **23.5**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)

SAMPLE METHOD
NR = No Recovery

SAMPLE TYPE
E = Encore collected from either Piston/Split Barrel or Continuous Core Barrel.
PT = Geotechnical Samples/Physical Properties
R = Brass Ring/Acetate Liner
J = Glass Jars

NOTES:
1. At this location a Geoprobe™ track-mounted Limited Access Rig (LAR) advanced a Two-inch diameter boring for the purposes of sample collection and acid sludge vertical delineation. In addition, this boring was advanced and logged by geophysical methods. See the associated geophysical logs.
2. The lithology represented on this log was obtained from observations collected from soil recovered in continuous cores driven by Piston/Core Barrel sampler. Typically, continuous cores were performed first and supplemental samples were collected in successive borings advanced through a particular depth interval.
3. Soil samples for chemical analysis were collected from recovered material in the continuous cores using the Encore™ sampling device according to EPA Method 5035, brass rings, and 4 oz. glass jars.
4. Driven samples Piston/Core Barrel were advanced with the Geoprobe™ reciprocating hydraulic hammer, no blow counts were recorded.
5. Depth to first encountered groundwater was determined by depth of saturated soil.
6. Borehole backfill were completed with hydrated bentonite chips, and capped with existing surface material.
7. Survey data at the top of the boring logs are location specific per horizontal datum NAD 83 California State Planes, Zone 5 (ft.) and vertical datum NGVD 28 (ft.).

26
28
30
32
34

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB05** PAGE 1 OF 3

SECOR

DATE: STARTED **2/6/2006** COMPLETED: **2/6/2006**
TIME: STARTED **11:00:00 AM** COMPLETED: **12:00:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,775,983.70511** EASTING (ft): **6,470,422.6768**
LATITUDE: **33° 52' 19.66692"** LONGITUDE: **-118° 18' 2.07"**
GROUND ELEV (ft): **26.48** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **See Notes** BOREHOLE DEPTH (ft): **20.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
11:00			**GEO FABRIC LINER/MEMBRANE**; Top sheet (0.45 mm)						
		SP	**SAND** ; SP; (2.5Y 5/4) light olive brown; fine-grained; loose; moist; poorly graded						
			(pH=0.58; field test)		11:10 HPB05-SL-1.5	36"/48"	E/J/R	0.2	
2			**SLUDGE**; (Acidic); (GLEY 1 2.5/N) black; soft; wet; fibrous; semi solidified tar						2
			Possible void area; driller reports drop	NR					
4					- - 11:25 HPB05-SL-5 11:26 HPB05-2SL-5	24"/24"	E/J/R	19.8 2.4	4
		SP	**SAND** ; SP; (10YR 7/1) light gray; fine-grained; loose; moist; poorly graded						
6				NR					6
8			Assume		- -			1.1	8
			SLUDGE; (Acidic); (GLEY 1 2.5/N) black; soft; wet; fibrous; semi solidified tar						
		ML	**SANDY SILT** ; ML; (5Y 6/3) pale olive; low plasticity; firm; moist; slight hydrocarbon odor; ~10% fine-grained sand			36"/48"			
10					11:40 HPB05-SL-10		E/J/R	0.3	10
				NR	-				

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB05** PAGE 2 OF 3

SECOR

DATE: STARTED **2/6/2006** COMPLETED: **2/6/2006**
TIME: STARTED **11:00:00 AM** COMPLETED: **12:00:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,775,983.70511** EASTING (ft): **6,470,422.6768**
LATITUDE: **33° 52' 19.66692"** LONGITUDE: **-118° 18' 2.07"**
GROUND ELEV (ft): **26.48** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **See Notes** BOREHOLE DEPTH (ft): **20.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
			SANDY SILT/SILTY SAND ML/SM; (2.5Y 5/4) light olive brown; non plastic; firm; slightly moist; no hydrocarbon odor; no staining; ~50% fine-grained sand; ~50% fines		-			0.5	
14						48"/48"			14
					11:45 HPB05-SL-15		E/J/R	0.2	
16		SM	**SILTY SAND** ; SM; (10YR 4/4) dark yellowish brown; non plastic; firm; moist; no odor; poorly graded; ~90% fine-grained sand		- -			0.3	16
						32"/48"			
18					11:50 HPB05-SL-20		E/J/R	0.3	18
				NR					
12:00 20			Hole terminated at 20 feet.						20
22									22

SAMPLE METHOD
NR = No Recovery

SAMPLE TYPE
E = Encore collected from either Piston/Split Barrel or Continuous Core Barrel.
PT = Geotechnical Samples/Physical Properties
R = Brass Ring/Acetate Liner
J = Glass Jars

NOTES:
1. At this location a Geoprobe™ track-mounted Limited Access Rig (LAR) advanced a Two-inch diameter boring for the purposes of sample collection and acid sludge vertical delineation. In addition, this boring was advanced and logged by geophysical methods. See the associated geophysical logs.

2. The lithology represented on this log was obtained from observations collected from soil recovered in continuous cores driven by Piston/Core Barrel sampler. Typically, continuous cores were

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB05** PAGE 3 OF 3

SECOR

DATE: STARTED **2/6/2006** COMPLETED: **2/6/2006**
TIME: STARTED **11:00:00 AM** COMPLETED: **12:00:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,775,983.70511** EASTING (ft): **6,470,422.6768**
LATITUDE: **33° 52' 19.66692"** LONGITUDE: **-118° 18' 2.07"**
GROUND ELEV (ft): **26.48** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **See Notes** BOREHOLE DEPTH (ft): **20.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
			performed first and supplemental samples were collected in successive borings advanced through a particular depth interval.						
			3. Soil samples for chemical analysis were collected from recovered material in the continuous cores using the Encore™ sampling device according to EPA Method 5035, brass rings, and 4 oz. glass jars.						
			4. Driven samples Piston/Core Barrel were advanced with the Geoprobe™ reciprocating hydraulic hammer, no blow counts were recorded.						
26			5. Depth to first encountered groundwater was estimated by the depth of moist soil at a range of 16.0-20.0 ft-bgs.						26
			6. Borehole backfill were completed with hydrated bentonite chips, and capped with existing surface material.						
			7. Survey data at the top of the boring logs are location specific per horizontal datum NAD 83 California State Planes, Zone 5 (ft.) and vertical datum NGVD 28 (ft.).						
28									28
30									30
32									32
34									34

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB06** PAGE 1 OF 3

SECOR

DATE: STARTED **2/6/2006** COMPLETED: **2/6/2006**
TIME: STARTED **9:30:00 AM** COMPLETED: **10:55:00 AM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,775,976.40116** EASTING (ft): **6,470,452.5158**
LATITUDE: **33° 52' 19.59553"** LONGITUDE: **-118° 18' 1.72"**
GROUND ELEV (ft): **26.93** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **15.5 2/6/06** BOREHOLE DEPTH (ft): **28.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
09:30		SP	**GEO FABRIC LINER/MEMBRANE**; Top sheet (0.45 mm)						
			SAND ; SP; (10YR 4/6) dark yellowish brown; fine-grained; non plastic; loose; dry; poorly graded; ~<10% fines		09:45 HPB06-SL-1.5	36"/48"	E/J/R	9.9	
2									2
			Assume	NR					
4		ML	**SILT WITH SAND** ; ML; (10YR 4/4) dark yellowish brown; dense; moist; non plastic to low plasticity; ~40% fine-grained sand		10:00 HPB06-SL-5	48"/48"	E/J/R	14.4	4
6									6
		ML	ML; sand decreasing with depth						
8									8
					10:10 HPB06-SL-10	48"/48"	E/J/R	8.9	
10									10

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB06** PAGE 2 OF 3

SECOR

DATE: STARTED **2/6/2006** COMPLETED: **2/6/2006**
TIME: STARTED **9:30:00 AM** COMPLETED: **10:55:00 AM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,775,976.40116** EASTING (ft): **6,470,452.5158**
LATITUDE: **33° 52' 19.59553"** LONGITUDE: **-118° 18' 1.72"**
GROUND ELEV (ft): **26.93** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **15.5 2/6/06** BOREHOLE DEPTH (ft): **28.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
		ML	**SANDY SILT** ; ML; (10YR 5/4) yellowish brown; firm; moist; non plastic to low plasticity; ~20% fine-grained sand			48"/48"			
14			@14.5' bgs; moist; soft; grading back into silty fine sand		10:20 HPB06-SL-15		E/J/R	4.9	14
16			Gradational						16
		SP-SM	**SAND WITH SILT** ; SP-SM; (10YR 5/2) grayish brown; loose; wet; ~65% fine-grained sand; ~35% fines			24"/48"			
18									18
			Assume	NR					
20		ML	**SANDY SILT** ; ML; (10YR 4/6) dark yellowish brown; firm; moist; ~10% fine-grained sand		10:30 HPB06-SL-20		E/J/R	15.4	20
		SP-SM	**SAND WITH SILT** ; SP-SM; (2.5Y 4/2) dark grayish brown; loose; saturated; ~65% fine-grained sand			36"/48"			
22				NR					22

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB06** PAGE 3 OF 3

SECOR

DATE: STARTED **2/6/2006** COMPLETED: **2/6/2006**
TIME: STARTED **9:30:00 AM** COMPLETED: **10:55:00 AM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,775,976.40116** EASTING (ft): **6,470,452.5158**
LATITUDE: **33° 52' 19.59553"** LONGITUDE: **-118° 18' 1.72"**
GROUND ELEV (ft): **26.93** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **15.5 2/6/06** BOREHOLE DEPTH (ft): **28.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
		SP-SM			10:40 HPB06-SL-25 10:41 HPB06-2SL-25	32"/48"	E/J/R	0.0	
		SP-SM	SP-SM; wet; ~65% fine-grained sand						
26		ML	**SILT** ; ML; firm; moist; no odor; oxidation staining; lens						26
		SM	**SILTY SAND** ; SM; (2.5Y 4/2) dark grayish brown; loose; saturated; ~65% fine-grained sand	NR					
10:55 28			Hole terminated at 28 feet.						28
30									30
32									32
34									34

SAMPLE METHOD
NR = No Recovery

SAMPLE TYPE
E = Encore collected from either Piston/Split Barrel or Continuous Core Barrel.
PT = Geotechnical Samples/Physical Properties
R = Brass Ring/Acetate Liner
J = Glass Jars

NOTES:
1. At this location a Geoprobe™ track-mounted Limited Access Rig (LAR) advanced a Two-inch diameter boring for the purposes of sample collection and acid sludge vertical delineation. In addition, this boring was advanced and logged by geophysical methods. See the associated geophysical logs.
2. The lithology represented on this log was obtained from observations collected from soil recovered in continuous cores driven by Piston/Core Barrel sampler. Typically, continuous cores were performed first and supplemental samples were collected in successive borings advanced through a particular depth interval.
3. Soil samples for chemical analysis were collected from recovered material in the continuous cores using the Encore™ sampling device according to EPA Method 5035, brass rings, and 4 oz. glass jars.
4. Driven samples Piston/Core Barrel were advanced with the Geoprobe™ reciprocating hydraulic hammer, no blow counts were recorded.
5. Depth to first encountered groundwater was determined by depth of wet soil.
6. Borehole backfill were completed with hydrated bentonite chips, and capped with existing surface material.
7. Survey data at the top of the boring logs are location specific per horizontal datum NAD 83 California State Planes, Zone 5 (ft.) and vertical datum NGVD 28 (ft.).

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB07** PAGE 1 OF 3

SECOR

DATE: STARTED **2/6/2006** COMPLETED: **2/7/2006**
TIME: STARTED **1:30:00 PM** COMPLETED: **11:20:00 AM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,775,909.29700** EASTING (ft): **6,470,423.8100**
LATITUDE: **33° 52' 18.94465"** LONGITUDE: **-118° 18' 2.07"**
GROUND ELEV (ft): **35.22** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **See Notes** BOREHOLE DEPTH (ft): **28.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
13:30		ML	**SILT** ; ML; (10YR 2/1) very dark brown; non plastic; loose; dry; color changes down hole to (10YR 4/4) dark yellowish brown; abundant rootlets; trace fine-grained sand; trace fine gravel		13:40 HPB07-SL-1.5	30"/48'	E/J/R	0.0	
2			@ 2-2.5' bgs brick debris, staining	NR					2
4		ML	**SILT** ; ML; (7.5YR 4/4) brown; loose; dry; stratified; some black staining; mixed debris (wood, aluminum); fine gravel; tar clasts up to ~1.5' thick		13:45 HBP07-SL-5 13:46 HPB07-2SL-5	24"/48"	E/J/R	0.0	4
6			Assume	NR					6
8		ML	**SILT WITH FINE GRAVEL** ; ML; (7.5YR 2.5/3) very dark brown; low plasticity; loose; dry to moist; stratified layers of silt,tar stained/coated fine gravel (~15%)		13:50 HPB07-SL-10	30"/48"	E/J/R	0.0	8
10			**SLUDGE**; (Acidic); (GLEY 1 2.5/N) black; firm; fine-grained; oily						10
			Assume	NR					

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB07** PAGE 2 OF 3

SECOR

DATE: STARTED **2/6/2006** COMPLETED: **2/7/2006**
TIME: STARTED **1:30:00 PM** COMPLETED: **11:20:00 AM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,775,909.29700** EASTING (ft): **6,470,423.8100**
LATITUDE: **33° 52' 18.94465"** LONGITUDE: **-118° 18' 2.07"**
GROUND ELEV (ft): **35.22** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **See Notes** BOREHOLE DEPTH (ft): **28.0**
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WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
		ML	**SANDY SILT** ; ML; (7.5YR 2.5/2) very dark brown; non plastic; loose; dry; ~10% fine-grained sand						
			@13' bgs iron oxide staining; hydrocarbon staining						
			SILTY SAND/SANDY SILT SM/ML; (10YR 5/8) yellowish brown; loose; dry; no hydrocarbon odor; ~50% sand interbedded silty sand to sandy silt			36"/48"			
14									14
					13:55 HPB07-SL-15		E/J/R	0.0	
			Gradational	NR					
16		ML	**SILT WITH SAND** ; ML; (2.5Y 6/4) light yellowish brown; non plastic; firm; moist; homogeneous; ~35% fine-grained sand						16
18						48"/48"			18
					14:00 HPB07-SL-20		E/J/R		
20			@20-20.25' bgs; debris (fabric, wood, concrete, glass); ~4" organic staining					7.8	20
		ML	**SILT** ; ML; (2.5Y 5/4) light olive brown; non plastic; firm; moist			12"/48"			
22				NR					22

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB07** PAGE 3 OF 3

SECOR

DATE: STARTED **2/6/2006** COMPLETED: **2/7/2006**
TIME: STARTED **1:30:00 PM** COMPLETED: **11:20:00 AM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,775,909.29700** EASTING (ft): **6,470,423.8100**
LATITUDE: **33° 52' 18.94465"** LONGITUDE: **-118° 18' 2.07"**
GROUND ELEV (ft): **35.22** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **See Notes** BOREHOLE DEPTH (ft): **28.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
		ML ML	**SILT** ; ML; (2.5Y 3/3) dark olive brown; non plastic; firm; dry; slight hydrocarbon odor; moderate staining; slight HCL reaction; trace fine gravel & trace well graded sand; rootlets; trace small wood fragments		11:15 HPB07-SL-25		E/J/R	180	
26		ML	**SILT** ; ML; (2.5Y 4/3) olive brown; firm; dry; no odor; 10% fine sand; no HCL reaction			48"/48"			26
11:20 28			Hole terminated at 28 feet.						28
30									30
32									32
34									34

SAMPLE METHOD
NR = No Recovery

SAMPLE TYPE
E = Encore collected from either Piston/Split Barrel or Continuous Core Barrel.
PT = Geotechnical Samples/Physical Properties
R = Brass Ring/Acetate Liner
J = Glass Jars

NOTES:
1. At this location a Geoprobe™ track-mounted Limited Access Rig (LAR) advanced a Two-inch diameter boring for the purposes of sample collection and acid sludge vertical delineation. In addition, this boring was advanced and logged by geophysical methods. See the associated geophysical logs.
2. The lithology represented on this log was obtained from observations collected from soil recovered in continuous cores driven by Piston/Core Barrel sampler. Typically, continuous cores were performed first and supplemental samples were collected in successive borings advanced through a particular depth interval.
3. Soil samples for chemical analysis were collected from recovered material in the continuous cores using the Encore™ sampling device according to EPA Method 5035, brass rings, and 4 oz. glass jars.
4. Driven samples Piston/Core Barrel were advanced with the Geoprobe™ reciprocating hydraulic hammer, no blow counts were recorded.
5. Depth to first encountered groundwater was estimated by the depth of moist soil at a range of 15.5-24.0 ft-bgs.
6. Borehole backfill were completed with hydrated bentonite chips, and capped with existing surface material.
7. Survey data at the top of the boring logs are location specific per horizontal datum NAD 83 California State Planes, Zone 5 (ft.) and vertical datum NGVD 28 (ft.).

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB08** PAGE 1 OF 3

SECOR

DATE: STARTED **2/8/2006** COMPLETED: **2/8/2006**
TIME: STARTED **8:45:00 AM** COMPLETED: **10:00:00 AM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,776,189.32556** EASTING (ft): **6,470,282.3223**
LATITUDE: **33° 52' 21.69678"** LONGITUDE: **-118° 18' 3.75"**
GROUND ELEV (ft): **20.65** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **20.2 2/8/06** BOREHOLE DEPTH (ft): **24.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
8:45			Asphalt and road base (~6-8")						
		SM	**SILTY SAND** ; SM; (2.5Y 4/4) olive brown; non plastic; loose; moist; ~60% fine-grained sand; ~10% tar clasts ~≤1.5"		09:00 HPB08-SL-1.5		E/J/R	45.5	
2									2
			SLUDGE; (Acidic); (GLEY 1 2.5/N) black; dense; vitreous to granular, oily; brittle (collected in auger bucket)	NR					
		ML	**SILT** ; ML; (5Y 3/2) dark olive gray; low plasticity; soft; moist; no odor; homogeneous; ~5-10% fine-grained sand						
4									4
					09:05 HPB08-SL-5		E/J/R	4,015	
						42"/48"			
6									6
				NR					
8					- -			>9,999	8
						36"/48"			
					09:10 HPB08-SL-10		E/J/R	3,494	
10			**SLUDGE**; (Acidic); (GLEY 1 2.5/N) black; dense; vitreous to granular, oily; brittle; brick fragments; (pH=2.60; field test)						10
		ML	**SILT** ; ML; (2.5Y 3/2) very dark grayish brown; non plastic; firm; moist; weak staining; trace fine-grained sand; trace ceramic fragments						
			Assume	NR					

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB08** PAGE 2 OF 3

SECOR

DATE: STARTED **2/8/2006** COMPLETED: **2/8/2006**
TIME: STARTED **8:45:00 AM** COMPLETED: **10:00:00 AM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,776,189.32556** EASTING (ft): **6,470,282.3223**
LATITUDE: **33° 52' 21.69678"** LONGITUDE: **-118° 18' 3.75"**
GROUND ELEV (ft): **20.65** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **20.2 2/8/06** BOREHOLE DEPTH (ft): **24.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
		SM	**SILTY SAND** ; SM; (2.5Y 4/4) olive brown; non plastic; firm; moist; ~60% fine-grained sand			36"/48"			
14					09:15 HPB08-SL-15 09:16 HPB08-2SL-15		E/J/R	233.0	14
			Assume	NR					
16		ML	**SANDY SILT** ; ML; (2.5Y 4/4) olive brown; non plastic; soft; moist; ~10% fine-grained sand; color changes to (10YR 4/3) brown @ 16.5' bgs						16
18						48"/48"			18
		ML	ML; firm; ~15% fine-grained sand		09:20 HPB08-SL-20 - -		E/J/R		
20		SM	**SILTY SAND** ; SM; (2.5Y 4/3) olive brown; non plastic; loose; saturated; ~80% fine-grained sand					4,672	20 ▽
22		ML	**SILT** ; ML; (2.5Y 4/3) olive brown; non plastic; stiff; moist; weak iron oxide staining & streaking; ~85% fines; ~10% $CaCO_3$ nodules; trace fine-grained sand			48"/48"			22
					09:25 HPB08-SL-24		E/J/R	224.0	

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB08** PAGE 3 OF 3

SECOR

DATE: STARTED **2/8/2006** COMPLETED: **2/8/2006**
TIME: STARTED **8:45:00 AM** COMPLETED: **10:00:00 AM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,776,189.32556** EASTING (ft): **6,470,282.3223**
LATITUDE: **33° 52' 21.69678"** LONGITUDE: **-118° 18' 3.75"**
GROUND ELEV (ft): **20.65** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **20.2 2/8/06** BOREHOLE DEPTH (ft): **24.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
10:00			Hole terminated at 24 feet.						
			SAMPLE METHOD NR = No Recovery						
			SAMPLE TYPE E = Encore collected from either Piston/Split Barrel or Continuous Core Barrel. PT = Geotechnical Samples/Physical Properties R = Brass Ring/Acetate Liner J = Glass Jars						
26			**NOTES:** 1. At this location a Geoprobe™ track-mounted Limited Access Rig (LAR) advanced a Two-inch diameter boring for the purposes of sample collection and acid sludge vertical delineation. In addition, this boring was advanced and logged by geophysical methods. See the associated geophysical logs.						26
			2. The lithology represented on this log was obtained from observations collected from soil recovered in continuous cores driven by Piston/Core Barrel sampler. Typically, continuous cores were performed first and supplemental samples were collected in successive borings advanced through a particular depth interval.						
28			3. Soil samples for chemical analysis were collected from recovered material in the continuous cores using the Encore™ sampling device according to EPA Method 5035, brass rings, and 4 oz. glass jars.						28
			4. Driven samples Piston/Core Barrel were advanced with the Geoprobe™ reciprocating hydraulic hammer, no blow counts were recorded.						
30			5. Depth to first encountered groundwater was determined by depth of saturated soil.						30
			6. Borehole backfill were completed with hydrated bentonite chips, and capped with existing surface material.						
			7. Survey data at the top of the boring logs are location specific per horizontal datum NAD 83 California State Planes, Zone 5 (ft.) and vertical datum NGVD 28 (ft.).						
32									32
34									34

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB09** PAGE 1 OF 4

SECOR

DATE: STARTED **2/9/2006** COMPLETED: **2/9/2006**
TIME: STARTED **8:50:00 AM** COMPLETED: **1:30:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,776,196.93499** EASTING (ft): **6,470,372.8830**
LATITUDE: **33° 52' 21.77472"** LONGITUDE: **-118° 18' 2.67"**
GROUND ELEV (ft): **19.83** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **16.4 2/9/06** BOREHOLE DEPTH (ft): **32.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
08:50			~6-8" asphalt & roadbase at surface						
		ML	**SILT** ; ML; (2.5Y 3/3) dark olive brown; non plastic; firm; moist; no odor; trace fine-grained sand		09:10 HPB09-SL-1.5 09:11 HPB09-2SL-1.5		E/J/R	6.5	
2		ML	ML; (GLEY 1 4/10Y) dark greenish gray; same as above			60"/60"			2
4									4
		SM	**SILTY SAND** ; SM; (GLEY 1 4/10Y) dark greenish gray; non plastic; soft; moist; no odor; ~70% fine-grained sand; trace rootlets		09:15 HPB09-SL-5		E/J/R	6.9	
6						36"/36"			6
8			**SLUDGE**; (Acidic); (GLEY 1 2.5/N) black; soft; wet; vitreous; semi solidified tar		- -			168	8
		SM	**SILTY SAND** ; SM; (GLEY 1 4/10Y) dark greenish gray; non plastic; soft; saturated; ~70% fine-grained sand						
					09:20 HPB09-SL-10 09:21 HPB09-2SL-10		E/J/R		
10		SM	SM; same as above; @9.8-10' bgs; tar fragments; hydrocarbon staining (oily); mild hydrocarbon odor		- -	48"/48"		24.5	10
		SP	**SAND** ; SP; (2.5Y 7/2) light gray; fine-grained; firm; moist; poorly graded; lens						

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB09** PAGE 2 OF 4

SECOR

DATE: STARTED **2/9/2006** COMPLETED: **2/9/2006**
TIME: STARTED **8:50:00 AM** COMPLETED: **1:30:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,776,196.93499** EASTING (ft): **6,470,372.8830**
LATITUDE: **33° 52' 21.77472"** LONGITUDE: **-118° 18' 2.67"**
GROUND ELEV (ft): **19.83** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **16.4 2/9/06** BOREHOLE DEPTH (ft): **32.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
		SM	**SILTY SAND** ; SM; (2.5Y 5/3) light olive brown; low plasticity; loose; moist; stratified; interbedded light olive brown to greenish gray (~2" lenses); poorly graded sand content ~55-80%						
14						48"/48"			14
					09:30 HPB09-SL-15 09:31 HPB09-2SL-15		E/J/R	9.2	
16		SM	**SILTY SAND** ; SM; (5Y 4/2) olive gray; non plastic; loose; saturated; strong hydrocarbon odor; ~65% fine-grained sand						16
18		SM	**SILTY SAND** ; SM; (5Y 5/2) olive gray; loose; saturated; slight hydrocarbon odor; ~55% fine-grained sand; trace 3/4" tar clasts			48"/48"			18
					09:40 HPB09-SL-20		E/J/R	1,431	
20									20
22						48"/48"			22
			Gradational						
		SM	**SILTY SAND** ; SM; dense; moist; same as above; ~85-90% fine-grained sand; no tar clasts		09:50 HPB09-SL-24			240	

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB09** PAGE 3 OF 4

SECOR

DATE: STARTED **2/9/2006** COMPLETED: **2/9/2006**
TIME: STARTED **8:50:00 AM** COMPLETED: **1:30:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,776,196.93499** EASTING (ft): **6,470,372.8830**
LATITUDE: **33° 52' 21.77472"** LONGITUDE: **-118° 18' 2.67"**
GROUND ELEV (ft): **19.83** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **16.4 2/9/06** BOREHOLE DEPTH (ft): **32.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
		SM	**SILTY SAND** ; SM; (2.5Y 4/2) dark grayish brown; non plastic; dense; moist; ~65% fine-grained sand; ; trace $CaCO_3$ nodules; moderate to strong HCL reaction; sand decreasing with depth						
26						48"/48"			26
					13:10 HPB09-SL-28		E/J/R	10.2	
28		ML	**SILT** ; ML; (10YR 5/2) grayish brown; firm; moist; trace fine-grained sand; ~10% $CaCO_3$ nodules; fine sand to fine gravel in size (~1"); trace rootlets						28
30						48"/48"			30
13:30 32			Hole terminated at 32 feet.		13:30 HPB09-SL-32		E/J/R	25.2	32
34									34

SAMPLE METHOD
NR = No Recovery

SAMPLE TYPE
E = Encore collected from either Piston/Split Barrel or Continuous Core Barrel.
PT = Geotechnical Samples/Physical Properties
R = Brass Ring/Acetate Liner
J = Glass Jars

NOTES:
1. At this location a Geoprobe™ track-mounted Limited Access Rig (LAR) advanced a Two-inch diameter boring for the purposes of sample collection and acid sludge vertical delineation. In addition, this boring was advanced and logged by geophysical methods. See the associated geophysical logs.

2. The lithology represented on this log was obtained from observations collected from soil recovered in continuous cores driven by Piston/Core Barrel sampler. Typically, continuous cores were

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB09** PAGE 4 OF 4

SECOR

DATE: STARTED **2/9/2006** COMPLETED: **2/9/2006**
TIME: STARTED **8:50:00 AM** COMPLETED: **1:30:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,776,196.93499** EASTING (ft): **6,470,372.8830**
LATITUDE: **33° 52' 21.77472"** LONGITUDE: **-118° 18' 2.67"**
GROUND ELEV (ft): **19.83** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **16.4 2/9/06** BOREHOLE DEPTH (ft): **32.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
			performed first and supplemental samples were collected in successive borings advanced through a particular depth interval.						
			3. Soil samples for chemical analysis were collected from recovered material in the continuous cores using the Encore™ sampling device according to EPA Method 5035, brass rings, and 4 oz. glass jars.						
			4. Driven samples Piston/Core Barrel were advanced with the Geoprobe™ reciprocating hydraulic hammer, no blow counts were recorded.						
38			5. Depth to first encountered groundwater was determined by depth of saturated soil.						38
			6. Borehole backfill were completed with hydrated bentonite chips, and capped with existing surface material.						
			7. Survey data at the top of the boring logs are location specific per horizontal datum NAD 83 California State Planes, Zone 5 (ft.) and vertical datum NGVD 28 (ft.).						
40									40
42									42
44									44
46									46

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB11** PAGE 1 OF 3

SECOR

DATE: STARTED **2/7/2006** COMPLETED: **2/7/2006**
TIME: STARTED **1:30:00 PM** COMPLETED: **3:00:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,776,078.23360** EASTING (ft): **6,470,376.6515**
LATITUDE: **33° 52' 20.60065"** LONGITUDE: **-118° 18' 2.62"**
GROUND ELEV (ft): **27.49** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **See Notes** BOREHOLE DEPTH (ft): **28.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
13:30		SM	**SILTY SAND** ; SM; (10YR 4/3)-(10YR 3/3) dark brown to dark yellowish brown; non plastic; loose; dry; no odor; ~80% fine-grained sand; charcoal fragments (1/8-1/4")		13:40 HPB11-SL-1.5		E/J/R	2.2	
2		SM	SM; oxidation staining; ~2" lens			48"/48"			2
4		SM	SM; no odor; ~2" charcoal lens; no HCL reaction						4
			SLUDGE; (Acidic); (GLEY 1 2.5/N) black; dense; dry; vitreous, vesicular fractures into granulars		13:45 HPB11-SL-5		E/J/R	6.9	
6		SP	**SAND** ; SP; (10YR 8/2) pale brown; fine-grained; non plastic; dense; poorly graded; yellowish staining; (pH=3.5; field test)			36"/48"			6
			Assume	NR					
8		ML	**SILT** ; ML; (10YR 5/4) yellowish brown; low plasticity; firm; dry; no odor; ~30% fine-grained sand						8
			(pH=3.5; field test)			41"/48"			
10		ML	ML; same as above		13:50 HPB11-SL-10		E/J/R	44.5	10
				NR					

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB11** PAGE 2 OF 3

SECOR

DATE: STARTED **2/7/2006** COMPLETED: **2/7/2006**
TIME: STARTED **1:30:00 PM** COMPLETED: **3:00:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,776,078.23360** EASTING (ft): **6,470,376.6515**
LATITUDE: **33° 52' 20.60065"** LONGITUDE: **-118° 18' 2.62"**
GROUND ELEV (ft): **27.49** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **See Notes** BOREHOLE DEPTH (ft): **28.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
		SM	**SILTY SAND** ; SM; (10YR 7/6) yellow; non plastic; stiff; dry; no odor; ~80% fine-grained sand; no HCL reaction (pH=3.25; field test)						
14		ML	**SANDY SILT** ; ML; (10YR 6/6) brownish yellow; non plastic; firm; dry; no odor; ~15% fine-grained sand Same as above; (pH=4.3; field test)		13:55 HPB11-SL-15	48"/48"	E/J/R	28.1	14
16									16
18		SM	**SILTY SAND** ; SM; (10YR 5/6) yellowish brown; non plastic; dense; moist; no odor		14:00 HPB11-SL-20	36"/48"	E/J/R	12.2	18
			Assume	NR					
20		ML	**SANDY SILT** ; ML; (10YR 5/6) yellowish brown; non plastic; firm; moist; no odor; oxidation staining						20
22		SM	**SILTY SAND** ; SM; (10YR 4/4) dark yellowish brown; non plastic; loose; saturated; no odor; homogeneous; ~80% fine-grained sand			48"/48"			22

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB11** PAGE 3 OF 3

SECOR

DATE: STARTED **2/7/2006** COMPLETED: **2/7/2006**
TIME: STARTED **1:30:00 PM** COMPLETED: **3:00:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,776,078.23360** EASTING (ft): **6,470,376.6515**
LATITUDE: **33° 52' 20.60065"** LONGITUDE: **-118° 18' 2.62"**
GROUND ELEV (ft): **27.49** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **See Notes** BOREHOLE DEPTH (ft): **28.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
		SM	**SILTY SAND** ; (10YR 4/4) dark yellowish brown; non plastic; loose; saturated; no odor; homogeneous; ~80% fine-grained sand		14:05 HPB11-SL-25		E/J/R	7.6	
					14:06 HPB11-2SL-25		E/J/R		
26						48"/48"			26
		SP	**SAND** ; SP; (2.5Y 4/3) olive brown; fine-grained; non plastic; dense; saturated; no odor; poorly graded; ~10% fine-grained						
15:00 28			Hole terminated at 28 feet.		14:10 HPB11-SL-28				28

SAMPLE METHOD
NR = No Recovery

SAMPLE TYPE
E = Encore collected from either Piston/Split Barrel or Continuous Core Barrel.
PT = Geotechnical Samples/Physical Properties
R = Brass Ring/Acetate Liner
J = Glass Jars

NOTES:

1. At this location a Geoprobe™ track-mounted Limited Access Rig (LAR) advanced a Two-inch diameter boring for the purposes of sample collection and acid sludge vertical delineation. In addition, this boring was advanced and logged by geophysical methods. See the associated geophysical logs.
2. The lithology represented on this log was obtained from observations collected from soil recovered in continuous cores driven by Piston/Core Barrel sampler. Typically, continuous cores were performed first and supplemental samples were collected in successive borings advanced through a particular depth interval.
3. Soil samples for chemical analysis were collected from recovered material in the continuous cores using the Encore™ sampling device according to EPA Method 5035, brass rings, and 4 oz. glass jars.
4. Driven samples Piston/Core Barrel were advanced with the Geoprobe™ reciprocating hydraulic hammer, no blow counts were recorded.
5. Depth to first encountered groundwater was estimated by the depth of saturated soil at a range of 21.0-28.0 ft-bgs.
6. Borehole backfill were completed with hydrated bentonite chips, and capped with existing surface material.
7. Survey data at the top of the boring logs are location specific per horizontal datum NAD 83 California State Planes, Zone 5 (ft.) and vertical datum NGVD 28 (ft.).

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB12** PAGE 1 OF 5

SECOR

DATE: STARTED **12/4/2006** COMPLETED: **12/4/2006**
TIME: STARTED **12:30:00 PM** COMPLETED: **4:40:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **Mobile B-63**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Mod. CA. Split Spoon**

NORTHING (ft): **1,776,106.51000** EASTING (ft): **6,470,363.4200**
LATITUDE: **33° 52' 20.87976"** LONGITUDE: **-118° 18' 2.78"**
GROUND ELEV (ft): **20.34** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **20 12/4/06** BOREHOLE DEPTH (ft): **90.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **8**
LOGGED BY: **R. Couture** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
12:30			Asphalt 4" thick						
			Road base 6" thick						
2		ML	**SILT** ; ML; (10YR 4/6) dark yellowish brown; ~5-10% fine-grained sand; damp; trace mica; no odor						2
4			@ 4.2' bgs; increase sand content (~20%); trace clay; no odor						4
6		ML	**SANDY SILT** ; ML; (10YR 4/6) dark yellowish brown; dense; damp; ~25-30% fine sands		1300 HPB-12-SL-5-7	24"/24"	10 11 22 25		6
8			Increased clay content (~10%)						8
10		ML	**SANDY SILT** ; ML; (10YR 4/6) dark yellowish brown; very dense; damp; organic staining; no odor		1305 HPB-12-SL-10-12	24"/24"	14 14 26 32		10
12		SM	**SILTY SAND** ; SM; fine-grained; very dense; subangular to subrounded; trace mica; no odor						12
14									14
16		SM	**SILTY SAND** ; SM; (10YR 4/6) dark yellowish brown; dense; damp to wet; fine grained sand ~45%; trace medium grained sand; subrounded to subangular; trace mica; oxidation stains; no odor		1315 HPB-12-SL-15-17	24"/24"	11 16 18 11		16
18			@ 20' first encountered groundwater (saturated soil)						18

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB12** PAGE 2 OF 5

SECOR

DATE: STARTED **12/4/2006** COMPLETED: **12/4/2006**
TIME: STARTED **12:30:00 PM** COMPLETED: **4:40:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **Mobile B-63**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Mod. CA. Split Spoon**

NORTHING (ft): **1,776,106.51000** EASTING (ft): **6,470,363.4200**
LATITUDE: **33° 52' 20.87976"** LONGITUDE: **-118° 18' 2.78"**
GROUND ELEV (ft): **20.34** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **20 12/4/06** BOREHOLE DEPTH (ft): **90.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **8**
LOGGED BY: **R. Couture** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
22		SM	**SILTY SAND** ; (2.5Y 4/4) olive brown; fine-grained; very dense; saturated; no odor; oxidation staining; fines; pH (field test)=5.04	NR		18"/24"	16 36 31 28		22
24									24
26		SM	SM; same as above			24"/24"	6 18 18 12		26
28			Assume						28
30		CL-ML	**SILTY CLAY** ; CL-ML; (2.5Y 5/4) light olive brown; dense; damp; ~30% fines; ~10% fine-grained sand; $CaCO_3$ nodules; medium to high dry strength; no odor; strong HCL reaction		1345 HPB-12-SL-30-32	24"/24"	7 14 16 19		30
32									32
34									34
36			Assume						36
38									38

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB12** PAGE 3 OF 5

SECOR

DATE: STARTED **12/4/2006** COMPLETED: **12/4/2006**
TIME: STARTED **12:30:00 PM** COMPLETED: **4:40:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **Mobile B-63**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Mod. CA. Split Spoon**

NORTHING (ft): **1,776,106.51000** EASTING (ft): **6,470,363.4200**
LATITUDE: **33° 52' 20.87976"** LONGITUDE: **-118° 18' 2.78"**
GROUND ELEV (ft): **20.34** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **20 12/4/06** BOREHOLE DEPTH (ft): **90.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **8**
LOGGED BY: **R. Couture** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
42		CL	CL; **LEAN CLAY**; CL; (2.5Y 5/4) light olive brown; very hard; moist; fines; abundant $CaCO_3$ nodules (0.5-1.5"); strong HCL reaction ; high dry strength; no odor	NR	1420 HPB-12-SL-40-42	20"/24"	6 17 30 21		42
44									44
46			Assume						46
48									48
50		ML	**SILT** ; ML; (2.5Y 5/4) light olive brown; firm to hard; wet; no odor; abundant shell fragments; $CaCO_3$ nodules (0.25"-0.50"); strong HCL reaction			24"/24"	9 11 13 17		50
52									52
54			Assume						54
56		SP	**SAND** ; SP; (2.5Y 7/2) light gray; dense; wet; no odor; poorly graded; ~75% fine-grained sand; trace medium grained sand; ~15% fines; trace mica @ 56.3'- 2 inch lens (white/black) abundant shell fragments			24"/24"	11 14 19 21		56
58									58
			Assume						

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB12** PAGE 4 OF 5

SECOR

DATE: STARTED **12/4/2006** COMPLETED: **12/4/2006**
TIME: STARTED **12:30:00 PM** COMPLETED: **4:40:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **Mobile B-63**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Mod. CA. Split Spoon**

NORTHING (ft): **1,776,106.51000** EASTING (ft): **6,470,363.4200**
LATITUDE: **33° 52' 20.87976"** LONGITUDE: **-118° 18' 2.78"**
GROUND ELEV (ft): **20.34** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **20 12/4/06** BOREHOLE DEPTH (ft): **90.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **8**
LOGGED BY: **R. Couture** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
		ML	**SANDY SILT** ; ML; (2.5Y 7/2) light gray; soft to firm; wet; no odor; fines; ~50% fine-grained sand; trace mica		1510 HPB-12-SL-60-62	12"/24"	5 9 7 9		
				NR					
62									62
64									64
			Assume						
66									66
68									68
70		SM	**SILTY SAND** ; SM; (GLEY 1 5GY 5/1) greenish gray; fine-grained; dense; saturated; no odor; fines; subrounded			12"/24"	8 12 18 23		70
				NR					
72									72
74									74
76									76
78		SM	SM; same as above; possible slough; saturated; organic odor						78
		ML	**SILT** ; ML; (GLEY 1 5GY 5/1) greenish gray; hard; damp; fines; organic odor; trace mica		1615 HPB-12-SL-78-80	24"/24"	7 10 11 13		

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **HPB12** PAGE 5 OF 5

SECOR

DATE: STARTED **12/4/2006** COMPLETED: **12/4/2006**
TIME: STARTED **12:30:00 PM** COMPLETED: **4:40:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **Mobile B-63**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Mod. CA. Split Spoon**

NORTHING (ft): **1,776,106.51000** EASTING (ft): **6,470,363.4200**
LATITUDE: **33° 52' 20.87976"** LONGITUDE: **-118° 18' 2.78"**
GROUND ELEV (ft): **20.34** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **20 12/4/06** BOREHOLE DEPTH (ft): **90.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **8**
LOGGED BY: **R. Couture** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
		ML							
82									82
84			Assume						84
86									86
88		CL	**LEAN CLAY** ; CL; (GLEY 1 5GY 5/1) greenish gray; low plasticity; soft to firm; slight organic odor; low dry strength; trace shell & wood fragments						88
16:40 90					1635 HPB-12-SL-88-90	24"/24"	7 11 12 14		90
			Hole terminated at 90 feet.						
92									92
94									94
96									96
98									98

SAMPLE
NR = No Recovery

NOTES:
1. At this location a Mobile B-63 drill rig advanced an eight-inch diameter hollow stem auger for the purposes of sample collection and soil logging.
2. Soil samples for chemical analysis were collected from recovered material using a California Modified Split Spoon Core Barrel
3. Samples consisted of an Encore™ sample (EPA Method 5035), brass rings, and 4 oz. glass jars.
4. Depth to first encountered groundwater was determined by depth of saturated soil.
5. Boreholes were completed with a bentonite grout, topped with hydrated bentonite chips and capped with cold patch asphalt.
6. Survey data at the top of the boring logs are location specific per horizontal datum NAD 83 California State Planes, Zone 5 (ft.) and vertical datum NGVD 28 (ft.). Survey completed by W.M. Holdings, Inc. on March 1, 2007.

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **MW-04-A** PAGE 1 OF 2

SECOR

DATE: STARTED **2/16/2007** COMPLETED: **2/16/2007**
TIME: STARTED **12:30:00 PM** COMPLETED: **5:00:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **Mobile B-63**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Mod. CA. Split Spoon**

NORTHING (ft): **1,775,988.91000** EASTING (ft): **6,470,523.3700**
LATITUDE: **33° 52' 19.72128"** LONGITUDE: **-118° 18' 0.88"**
GROUND ELEV (ft): **21.08** TOC ELEV (ft): **24.02**
INITIAL DTW (ft): **26 2/16/07** BOREHOLE DEPTH (ft): **30.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **28**
WELL CASING DIAMETER (in): **4** BOREHOLE DIAMETER (in): **8**
LOGGED BY: **R. Couture** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
		SM	**GEO FABRIC LINER/MEMBRANE**; Top sheet (0.45 mm)						
			SILTY SAND ; SM; **Fill Material, hand augered to 2 feet BGS**			2/2			
2		ML	**SILT** ; ML; trace red brick fragments				10		2
						1.5/1.5	18		
							15		
4			From 4.2 to 5.2 feet BGS, lense of red brick debris				18		4
						1.5/1.5	21		
							27		
						1.0/1.5	7		
6				NR			50		6
8									8
10									10
			(ASSUMED)						
12									12
14									14
		SM	**SILTY SAND** ; SM; (7.5 YR 5/3) brown; fine-grained; dense; moist				12		
16						1.5/1.5	21		16
			Trace iron oxidation				24		
						1.5/1.5	6		
							11		
18							19		18
						2.0/2.0	9		
							12		
							31		
		ML	**SANDY SILT** ; ML; interbedded sandy silt/silty sand; no dry strength				50		

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **MW-04-A** PAGE 2 OF 2

SECOR

DATE: STARTED **2/16/2007** COMPLETED: **2/16/2007**
TIME: STARTED **12:30:00 PM** COMPLETED: **5:00:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **Mobile B-63**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Mod. CA. Split Spoon**

NORTHING (ft): **1,775,988.91000** EASTING (ft): **6,470,523.3700**
LATITUDE: **33° 52' 19.72128"** LONGITUDE: **-118° 18' 0.88"**
GROUND ELEV (ft): **21.08** TOC ELEV (ft): **24.02**
INITIAL DTW (ft): **26 2/16/07** BOREHOLE DEPTH (ft): **30.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **28**
WELL CASING DIAMETER (in): **4** BOREHOLE DIAMETER (in): **8**
LOGGED BY: **R. Couture** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
		ML	S.A.A. (same as above)			1.5/1.5	15 38 40		
22									22
24									24
26			@ 26 feet, first encountered ground water						26 ▽
28									28
30			Hole terminated at 30 feet.						30
32									32
34									34
36									36
38									38

SAMPLE
NR = No Recovery

NOTES:
1. At this location a Mobile B-63 drill rig advanced an eight-inch diameter hollow stem auger for the purposes of soil logging.
2. No analytical samples were collected from this boring.
3. Depth to first encountered groundwater was determined by depth of saturated soil.
4. Borehole was converted to a monitoring well.
5. Survey data at the top of the boring logs are location specific per horizontal datum NAD 83 California State Planes, Zone 5 (ft.) and vertical datum NGVD 28 (ft.). Survey completed by W.M. Holdings, Inc. on March 1, 2007.6.

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **MW-04-B** PAGE 1 OF 5

SECOR

DATE: STARTED **12/7/2006** COMPLETED: **12/8/2006**
TIME: STARTED **11:15:00 AM** COMPLETED: **3:25:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **B-63 Mobile**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Mod. CA. Split Spoon**

NORTHING (ft): **1,775,989.46000** EASTING (ft): **6,470,511.0200**
LATITUDE: **33° 52' 19.72632"** LONGITUDE: **-118° 18' 1.03"**
GROUND ELEV (ft): **20.99** TOC ELEV (ft): **23.99**
INITIAL DTW (ft): **13.2 1/13/06** BOREHOLE DEPTH (ft): **90.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **88**
WELL CASING DIAMETER (in): **4** BOREHOLE DIAMETER (in): **10**
LOGGED BY: **R. Couture** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
			NOTE: Due to close proximity to boring # CPB-09, this hole was not logged until 28 feet B.G.S.. For lithology above 28 feet at this location refer to Boring CPB-09.						
20					- MW04-PT-21	18"/18"	11 37 40		20

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 5/29/07

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **MW-04-B** PAGE 2 OF 5

SECOR

DATE: STARTED **12/7/2006** COMPLETED: **12/8/2006**
TIME: STARTED **11:15:00 AM** COMPLETED: **3:25:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **B-63 Mobile**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Mod. CA. Split Spoon**

NORTHING (ft): **1,775,989.46000** EASTING (ft): **6,470,511.0200**
LATITUDE: **33° 52' 19.72632"** LONGITUDE: **-118° 18' 1.03"**
GROUND ELEV (ft): **20.99** TOC ELEV (ft): **23.99**
INITIAL DTW (ft): **13.2 1/13/06** BOREHOLE DEPTH (ft): **90.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **88**
WELL CASING DIAMETER (in): **4** BOREHOLE DIAMETER (in): **10**
LOGGED BY: **R. Couture** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
			No log at this location until 28 feet B.G.S..						
26									26
28		ML	**SILT** ; ML; Low dry strength		12:05 MW04-SL-28-30	18"/24"	14 24 50		28
30				NR					30
32									32
34			(Assumed)						34
36									36
38			**SILTY SAND/SANDY SILT** SM/ML; (10yr 5/2) grayish brown; damp; medium dense; ~40-50% fines; ~40-50% sand; interbedded lenses; mica; subrounded; low dry strength; no odor		13:30 MW04-SL-38-40	18"/18"	6 17 50		38
40									40
42									42
44			(Assumed)						44
46									46
48		CL	CL; **LEAN CLAY** CL; (10YR 5/2) grayish brown; fines; low to medium plasticity; high toughness						48
		ML	**SILT** ; ML; abundant shells fragments to 51.2' bgs; 2" clay lense		14:10 MW04-SL-48-50	24"/24"	11 19 20 34		

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **MW-04-B** PAGE 3 OF 5

SECOR

DATE: STARTED **12/7/2006** COMPLETED: **12/8/2006**
TIME: STARTED **11:15:00 AM** COMPLETED: **3:25:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **B-63 Mobile**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Mod. CA. Split Spoon**

NORTHING (ft): **1,775,989.46000** EASTING (ft): **6,470,511.0200**
LATITUDE: **33° 52' 19.72632"** LONGITUDE: **-118° 18' 1.03"**
GROUND ELEV (ft): **20.99** TOC ELEV (ft): **23.99**
INITIAL DTW (ft): **13.2 1/13/06** BOREHOLE DEPTH (ft): **90.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **88**
WELL CASING DIAMETER (in): **4** BOREHOLE DIAMETER (in): **10**
LOGGED BY: **R. Couture** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
		ML	S.A.A. (same as above)			18"/18"	12 19 50		
52		SP-SM	SP-SM; **SILTY SAND/SAND** SM/SP; abundant shell fragments (white/black); fine-grained sand			18"/18"	20 44 50		52
		CH	**FAT CLAY** ; CH; (GLEY-1 5GY 6/1) GREENISH GRAY; high plasticity; firm; oxidation staining; high toughness; damp			15"/24"	5 14 36 50		
54					15:00 MW04-PT-54.5				54
				NR					
56									56
			(Assumed)						
58		CL	**LEAN CLAY** ; CL; (GLEY-1 5GY 4/1) dark greenish gray; high plasticity; damp; high toughness; moderate dry strength; trace organic fragments						58
					15:25 MW04-SL-58-60	24"/24"	11 22 40 49		
60									60
62									62
64			(Assumed)						64
66									66
68		SM	**SILTY SAND** ; SM; (GLEY-1 5GY 4/1) dark greenish gray; fine-grained; moist; ~10-12% fines			15"/24"	15 48 50		68
					16:00 MW04-SL-68-70				
70				NR					70
72			(Assumed)						72
74		MH	**ELASTIC SILT** ; MH; (GLEY-1 N 4/1) dark gray; low plasticity; no odor; damp; fines; trace shell fragments; organic fragments; no odor			15"/18"	10 40		74

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **MW-04-B** PAGE 4 OF 5

SECOR

DATE: STARTED **12/7/2006** COMPLETED: **12/8/2006**
TIME: STARTED **11:15:00 AM** COMPLETED: **3:25:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **B-63 Mobile**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Mod. CA. Split Spoon**

NORTHING (ft): **1,775,989.46000** EASTING (ft): **6,470,511.0200**
LATITUDE: **33° 52' 19.72632"** LONGITUDE: **-118° 18' 1.03"**
GROUND ELEV (ft): **20.99** TOC ELEV (ft): **23.99**
INITIAL DTW (ft): **13.2 1/13/06** BOREHOLE DEPTH (ft): **90.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **88**
WELL CASING DIAMETER (in): **4** BOREHOLE DIAMETER (in): **10**
LOGGED BY: **R. Couture** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
		MH		NR			50		
76			**INTERBEDDED SILTY SAND/SANDY SILT** SM/ML; (GLEY-1 N 4/1); dark grey; lensed; moist; increased fine-grained sand		09:50 MW04-PT-76	18"/18"	9 21 36		76
78		SM	**SILTY SAND** ; SM; (GLEY-1 4/N) dark gray; fine-grained; non plastic; moist; no odor; subrounded; ~10-15% fines			12"/24"	39 50		78
				NR					
80			**INTERBEDDED SILTY SAND/SANDY SILT** SM/ML; (GLEY-1 N 4/1); dark grey; lensed; moist; increased fine-grained sand		10:20 MW04-SL-79-80	10"/18"	21 50		80
				NR					
		ML	**SILT** ; ML; (GLEY-1 4/N) dark gray; hard; no odor; trace organics & shell fragment; fines; mica; low dry strength; trace clays			17"/18"	23 30 50		
82		ML	**SILT** ; ML; (GLEY-1 4/N) dark gray; low plasticity; no odor; low dry strength; increased clay to ~20%; grading downhole to an elastic silt			24"/24"	14 50 50 50		82
84									84
86			(Assumed)						86
88		SM	**SILTY SAND** ; SM; fine-grained; wet; no odor; contact in ring		11:25 MW04-SL-88-90	21"/24"	11 26 38 50		88
		CH	**FAT CLAY** ; CH; high plasticity; moderate toughness; high dry strength		MW04-PT-90				
90				NR					90

Hole terminated at 90 feet.

SAMPLE
NR = No Recovery

NOTES:

1. At this location a Mobile B-63 drill rig advanced an eight-inch diameter hollow stem auger for the purposes of sample collection and soil logging.
2. Soil samples for chemical analysis were collected from recovered material using a California Modified Split Spoon Core Barrel
3. Samples consisted of an Encore™ sample (EPA Method 5035), brass rings, and 4 oz. glass jars.
4. Depth to first encountered groundwater was determined by depth of saturated soil. On this well the depth was inferred from the depth to water logged on the adjacent boring of CPB-09 on 1-13-06
5. Borehole was converted to a monitoring well.
6. Survey data at the top of the boring logs are location specific per horizontal datum NAD 83 California State Planes, Zone 5 (ft.) and vertical datum NGVD 28 (ft.). Survey completed by W.M. Holdings, Inc. on March 1, 2007.

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **MW-04-B** PAGE 5 OF 5

SECOR

DATE: STARTED **12/7/2006** COMPLETED: **12/8/2006**
TIME: STARTED **11:15:00 AM** COMPLETED: **3:25:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **B-63 Mobile**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Mod. CA. Split Spoon**

NORTHING (ft): **1,775,989.46000** EASTING (ft): **6,470,511.0200**
LATITUDE: **33° 52' 19.72632"** LONGITUDE: **-118° 18' 1.03"**
GROUND ELEV (ft): **20.99** TOC ELEV (ft): **23.99**
INITIAL DTW (ft): **13.2 1/13/06** BOREHOLE DEPTH (ft): **90.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **88**
WELL CASING DIAMETER (in): **4** BOREHOLE DIAMETER (in): **10**
LOGGED BY: **R. Couture** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
			7. This boring was not logged from 0 to 28 feet B.G.S., due it's proximity to the adjacent soil boring CPB-09, drilled on 1-13-06.						
102									102
104									104
106									106
108									108
110									110
112									112
114									114
116									116
118									118
120									120
122									122
124									124

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **RB01** PAGE 1 OF 4

SECOR

DATE: STARTED **2/14/2006** COMPLETED: **2/14/2006**
TIME: STARTED **9:20:00 AM** COMPLETED: **11:30:00 AM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,775,881.39860** EASTING (ft): **6,470,370.3740**
LATITUDE: **33° 52' 18.65334"** LONGITUDE: **-118° 18' 2.69"**
GROUND ELEV (ft): **37.33** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **28.2 2/14/06** BOREHOLE DEPTH (ft): **36.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
09:20		ML	**SILT** ; ML; (10YR 4/3) brown; low plasticity; hard; dry; no odor; micaceous; trace fine-grained sand; trace fine gravel; weak HCL reaction		09:40 RB01-SL-1.5		E/J/R	1.1	
2		ML	ML; @2' bgs red brick debris			60"/60"			2
4									4
6			**SLUDGE**; (Acidic); (GLEY 1 2.5/N) black; soft; wet; fiberous; semi solidified tar; ~4" wood debris; (pH=2.5; field test)		09:50 RB01-SL-5	24"/36"	E/J/R	17.6	6
			~2" layer of gravel						
			Assume	NR					
8			~2" gravel lense; subrounded; fine gravel (sloughing)						8
		ML	**SANDY SILT** ; ML; (10YR 4/4) dark yellowish brown; low plasticity; stiff; moist; no odor; ~25% fine-grained sand						
10					10:15 RB01-SL-10	48"/48"	E/J/R	2.4	10
		SP	**SAND** ; SP; soft; moist; poorly graded; ~75% fine to medium-grained sand; ~25% fines						

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **RB01** PAGE 2 OF 4

SECOR

DATE: STARTED **2/14/2006** COMPLETED: **2/14/2006**
TIME: STARTED **9:20:00 AM** COMPLETED: **11:30:00 AM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,775,881.39860** EASTING (ft): **6,470,370.3740**
LATITUDE: **33° 52' 18.65334"** LONGITUDE: **-118° 18' 2.69"**
GROUND ELEV (ft): **37.33** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **28.2 2/14/06** BOREHOLE DEPTH (ft): **36.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
		GM	**SILTY GRAVEL** ; GM; dry; ~50% gravel; ~50% silt						
		SP	**SAND** ; SP; (10YR 7/3) pale brown; loose; dry; poorly graded; ~95% fine to medium-grained sand; trace silt						
14						48"/48"			14
					10:25 RB01-SL-15		E/J/R	2.2	
		ML	**SANDY SILT** ; ML; (10YR 5/4) yellowish brown; non plastic; firm; moist; no odor; ~5-10% fine-grained sand						
16									16
		ML	ML; (10YR 4/4) dark yellowish brown; trace fine-grained sand						
18						48"/48"			18
					10:35 RB01-SL-20		E/J/R	2.1	
					10:36 RB01-2SL-20		E/J/R		
20			**SANDY SILT** ; (10YR 4/3) brown; non plastic; hard; moist; ~10-15% fine-grained sand						20
22						48"/48"			22

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **RB01** PAGE 3 OF 4

SECOR

DATE: STARTED **2/14/2006** COMPLETED: **2/14/2006**
TIME: STARTED **9:20:00 AM** COMPLETED: **11:30:00 AM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,775,881.39860** EASTING (ft): **6,470,370.3740**
LATITUDE: **33° 52' 18.65334"** LONGITUDE: **-118° 18' 2.69"**
GROUND ELEV (ft): **37.33** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **28.2 2/14/06** BOREHOLE DEPTH (ft): **36.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
		ML	Same as above		10:55 RB01-SL-25		E/J/R	1.3	
26						48"/48"			26
		SM	**SILTY SAND** ; SM; (2.5Y 4/3) olive brown; ~70% fine-grained sand						
			@27.5' bgs; organic staining						
28		SM	**SILTY SAND** ; SM; (2.5Y 4/2) dark grayish brown; fine-grained; non plastic; loose; saturated; no odor						28 ▽
					11:10 RB01-SL-30		E/J/R	2.0	
30						48"/48"			30
32		SM	SM; loose; saturated; same as above						32
						36"/48"			
34		ML	**SANDY SILT** ; ML; non plastic; firm; ~35% fine-grained sand		11:25 RB01-SL-35		E/J/R	1.8	34
				NR					

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **RB01** PAGE 4 OF 4

SECOR

DATE: STARTED **2/14/2006** COMPLETED: **2/14/2006**
TIME: STARTED **9:20:00 AM** COMPLETED: **11:30:00 AM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,775,881.39860** EASTING (ft): **6,470,370.3740**
LATITUDE: **33° 52' 18.65334"** LONGITUDE: **-118° 18' 2.69"**
GROUND ELEV (ft): **37.33** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **28.2 2/14/06** BOREHOLE DEPTH (ft): **36.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
11:30			Hole terminated at 36 feet.						
			SAMPLE METHOD NR = No Recovery						
			SAMPLE TYPE E = Encore collected from either Piston/Split Barrel or Continuous Core Barrel. PT = Geotechnical Samples/Physical Properties R = Brass Ring/Acetate Liner J = Glass Jars						
38			**NOTES:** 1. At this location a Geoprobe™ track-mounted Limited Access Rig (LAR) advanced a Two-inch diameter boring for the purposes of sample collection and acid sludge vertical delineation. In addition, this boring was advanced and logged by geophysical methods. See the associated geophysical logs.						38
			2. The lithology represented on this log was obtained from observations collected from soil recovered in continuous cores driven by Piston/Core Barrel sampler. Typically, continuous cores were performed first and supplemental samples were collected in successive borings advanced through a particular depth interval.						
40			3. Soil samples for chemical analysis were collected from recovered material in the continuous cores using the Encore™ sampling device according to EPA Method 5035, brass rings, and 4 oz. glass jars.						40
			4. Driven samples Piston/Core Barrel were advanced with the Geoprobe™ reciprocating hydraulic hammer, no blow counts were recorded.						
42			5. Depth to first encountered groundwater was determined by depth of saturated soil.						42
			6. Borehole backfill were completed with hydrated bentonite chips, and capped with existing surface material.						
44			7. Survey data at the top of the boring logs are location specific per horizontal datum NAD 83 California State Planes, Zone 5 (ft.) and vertical datum NGVD 28 (ft.).						44
46									46

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **RB02** PAGE 1 OF 4

SECOR

DATE: STARTED **2/14/2006** COMPLETED: **2/14/2006**
TIME: STARTED **1:25:00 PM** COMPLETED: **4:00:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,775,880.24205** EASTING (ft): **6,470,403.4530**
LATITUDE: **33° 52' 18.64286"** LONGITUDE: **-118° 18' 2.3"**
GROUND ELEV (ft): **37.63** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **28.9 2/14/06** BOREHOLE DEPTH (ft): **36.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
13:25		ML	**SILT** ; ML; (10YR 6/2) light brownish gray; non plastic; firm; dry; no odor; micaceous; slight HCL reaction		13:40 RB02-SL-1.5	60"/60"	E/J/R	1.9	2
4			@5.2' bgs; brick fragments						4
6		SM	**SILTY SAND** ; SM; (10YR 4/4) dark gray; non plastic; loose; dry; ~80% fine to medium-grained sand; ~15% fines; trace brick fragments			30"/36"			6
		ML	**SILT** ; ML; low plasticity; firm; moist; no odor; sludge staining; trace fine-grained sand		13:55 RB02-SL-5		E/J/R	17.6	
			Assume	NR					
8		GM	**SILTY GRAVEL** ; GM						8
			SLUDGE; (Acidic); (GLEY 1 2.5/N) black; soft; wet; fiberous; semi solidified tar; ~3" lens						
		ML	**SANDY SILT** ; ML; (10YR 3/3) dark brown; non plastic; hard; moist; no odor; hydrocarbon staining						
10					14:05 RB02-SL-10			2.4	10
		ML	ML; hydrocarbon staining		14:10 RB02-SL-10.5	48"/48"	E/J/R		
		SP	**SAND** ; SP; (10YR 5/4) yellowish brown; loose; dry; subangular; poorly graded						

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **RB02** PAGE 2 OF 4

SECOR

DATE: STARTED **2/14/2006** COMPLETED: **2/14/2006**
TIME: STARTED **1:25:00 PM** COMPLETED: **4:00:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,775,880.24205** EASTING (ft): **6,470,403.4530**
LATITUDE: **33° 52' 18.64286"** LONGITUDE: **-118° 18' 2.3"**
GROUND ELEV (ft): **37.63** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **28.9 2/14/06** BOREHOLE DEPTH (ft): **36.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
		ML	**SANDY SILT** ; ML; hard; dry; fine brick fragments						
		SP	**SAND** ; SP; (10YR 7/2) light gray; dry; subangular; poorly graded; ~95% fine-grained sand			36"/48"			
14					14:15 RB02-SL-15		E/J/R	2.2	14
					14:16 RB02-2SL-15		E/J/R		
			Assume	NR					
16		ML	**SANDY SILT** ; ML; (10YR 4/4) dark yellowish brown; hard; moist; no odor; oxidation staining; ~30% fine-grained sand; upper 4 inches abundant brick fragments						16
18						48"/48"			18
					14:20 RB02-SL-20		E/J/R	2.1	
20		ML	ML; (10YR 3/3) dark brown; moist; ~10" of brick fragments; trace fine gravel						20
		ML	**SANDY SILT** ; ML; (10YR 4/4) dark yellowish brown; non plastic; moist; no odor; ~25% fine-grained sand			42"/48"			
22				NR					22

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **RB02** PAGE 3 OF 4

SECOR

DATE: STARTED **2/14/2006** COMPLETED: **2/14/2006**
TIME: STARTED **1:25:00 PM** COMPLETED: **4:00:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,775,880.24205** EASTING (ft): **6,470,403.4530**
LATITUDE: **33° 52' 18.64286"** LONGITUDE: **-118° 18' 2.3"**
GROUND ELEV (ft): **37.63** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **28.9 2/14/06** BOREHOLE DEPTH (ft): **36.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
		ML	**SANDY SILT** ; ML; ~30% medium to coarse-grained sand						
					14:25 RB02-SL-25		E/J/R	1.3	
			@25.5' bgs; abundant brick fragments & rootlets						
26						48"/48"			26
		SM	**SILTY SAND** ; SM; (10YR 4/4) dark yellowish brown; hard; moist; subangular; ~70% fine-grained sand						
28									28
			INTERBEDDED SILT; ML; (10YR 4/4) dark yellowish brown; hard; ~1'; medium and coarse-grained sand with brick fragments; lensed						
		SM	**SILTY SAND** ; SM; (2.5Y 4/2) dark grayish brown; non plastic; soft; saturated; ~75% fine-grained sand; ~25% fines; free water		14:35 RB02-SL-30		E/J/R	2.0	
30						48"/48"			30
32		SM	**SILTY SAND** ; SM; (10YR 4/4/) dark yellowish brown; loose; wet; no odor; ~70% fine-grained sand; ~30% fines						32
34						48"/48"			34
					15:50 RB02-SL-35		E/J/R	1.8	

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **RB02** PAGE 4 OF 4

SECOR

DATE: STARTED **2/14/2006** COMPLETED: **2/14/2006**
TIME: STARTED **1:25:00 PM** COMPLETED: **4:00:00 PM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,775,880.24205** EASTING (ft): **6,470,403.4530**
LATITUDE: **33° 52' 18.64286"** LONGITUDE: **-118° 18' 2.3"**
GROUND ELEV (ft): **37.63** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **28.9 2/14/06** BOREHOLE DEPTH (ft): **36.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
16:00			Hole terminated at 36 feet.						
			SAMPLE METHOD NR = No Recovery						
			SAMPLE TYPE E = Encore collected from either Piston/Split Barrel or Continuous Core Barrel. PT = Geotechnical Samples/Physical Properties R = Brass Ring/Acetate Liner J = Glass Jars						
38			**NOTES:** 1. At this location a Geoprobe™ track-mounted Limited Access Rig (LAR) advanced a Two-inch diameter boring for the purposes of sample collection and acid sludge vertical delineation. In addition, this boring was advanced and logged by geophysical methods. See the associated geophysical logs.						38
			2. The lithology represented on this log was obtained from observations collected from soil recovered in continuous cores driven by Piston/Core Barrel sampler. Typically, continuous cores were performed first and supplemental samples were collected in successive borings advanced through a particular depth interval.						
40			3. Soil samples for chemical analysis were collected from recovered material in the continuous cores using the Encore™ sampling device according to EPA Method 5035, brass rings, and 4 oz. glass jars.						40
			4. Driven samples Piston/Core Barrel were advanced with the Geoprobe™ reciprocating hydraulic hammer, no blow counts were recorded.						
42			5. Depth to first encountered groundwater was determined by depth of saturated soil.						42
			6. Borehole backfill were completed with hydrated bentonite chips, and capped with existing surface material.						
44			7. Survey data at the top of the boring logs are location specific per horizontal datum NAD 83 California State Planes, Zone 5 (ft.) and vertical datum NGVD 28 (ft.).						44
46									46

PROJECT: **Gardena Sumps**
LOCATION: **1440 Artesia Blvd., Artesia, CA**
PROJECT NUMBER: **37BP.XBOO6.05.0347**

WELL / PROBEHOLE / BOREHOLE NO: **RB03** PAGE 1 OF 4

SECOR

DATE: STARTED **2/15/2006** COMPLETED: **2/15/2006**
TIME: STARTED **9:00:00 AM** COMPLETED: **11:15:00 AM**
DRILLING COMPANY: **Gregg Drilling & Testing, Inc.**
DRILLING EQUIPMENT: **MARL 5T (LAR)**
DRILLING METHOD: **Continuous Core with Geo-Probe**
SAMPLING EQUIPMENT: **See Notes**

NORTHING (ft): **1,775,871.41577** EASTING (ft): **6,470,478.8521**
LATITUDE: **33° 52' 18.5578"** LONGITUDE: **-118° 18' 1.4"**
GROUND ELEV (ft): **35.86** TOC ELEV (ft): **N/A**
INITIAL DTW (ft): **29.2 2/15/06** BOREHOLE DEPTH (ft): **36.0**
STATIC DTW (ft): **N/A** WELL DEPTH (ft): **N/A**
WELL CASING DIAMETER (in): **N/A** BOREHOLE DIAMETER (in): **2**
LOGGED BY: **M. Mason** CHECKED BY: **P. Kinney**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (inch/inch)	Sample Type	Headspace PID (ppm)	Depth (feet)
09:00		ML	**SILT** ; ML; (10YR 3/2) very dark grayish brown; low plasticity; hard; moist; no odor; micaceous; rootlets		09:15 RB03-SL-1.5 09:16 RB03-2SL-1.5	60"/60"	E/J/R	1.5	2
4		ML	ML; same as above; ~40% cement debris with trace brick fragments; trace charcoal clasts		09:45 RB03-SL-5	36"/36"	E/J/R	6.1	4, 6
8		ML	**CLAYEY SILT** ; ML; (10YR 2/2) very dark brown; low plasticity; ~40% concrete debris; increase clay; (pH=2.56; field test)						8
			SLUDGE; (Acidic); (GLEY 1 2.5/N) black; soft; wet; fiberous; semi solidified tar; ~20% concrete debris (~1.5")		09:50 RB03-SL-10	24"/48"	E/J/R	36.1	10
			Assume	NR					

GEO FORM 304_TOEDITS GARDENASUMPS.GPJ GARDENASUMPS.GDT 8/5/08

APPENDIX C

GEOTECHNICAL LABORATORY TESTS

SMITH-EMERY-LABORATORIES
791/781 East Washington Boulevard, Los Angeles, CA 90021
Tel.: (213) 745-5333; Fax (213)741-8621

ASTM D2435-11

One-Dimensional Consolidation Properties of Soils Using Incremental Loading

Client: Carl Kim Geotechnical — SEL File No.: 47743-1
Project: PWAS_20210916 — SEL Report No.: G-22-2768
Location: Artesia & Normandie — Date Sampled : 12/15/22
Remold to 90% relative density of 127.1 pcf at 10.7% OMC. — Date Received: 12/15/22
BORING NO.: CKG-1 SAMPLE NO.: B1 DEPTH (FT.): 2-5' Date Tested : 1/11/22

SOIL DESCRIPTION: Brown Clayey SAND

CONSOL NO. 1

NORMAL PRESSURE (KSF)	DIAL READING (INCH)	TOTAL DEFLECTION (INCH)	DEVICE CORRECTION (INCH)	NORMAL PRESSURE (KSF)	CORRECTED DEFLECTION (%)	Graph
0	0.30530	0.00000	0.00000	0	0.00	0
0.1	0.30385	0.00145	0.00050	0.1	0.095	0.048
0.2	0.30285	0.00245	0.00105	0.2	0.140	0.070
0.2	0.32000	-0.01470	0.00105	0.2	-1.575	-0.788
0.4	0.31850	-0.01320	0.00213	0.4	-1.533	-0.767
0.8	0.31550	-0.01020	0.00373	0.8	-1.393	-0.696
1.6	0.30845	-0.00315	0.00558	1.6	-0.873	-0.436
3.2	0.29925	0.00605	0.00743	3.2	-0.138	-0.069
6.4	0.28770	0.01760	0.01043	6.4	0.717	0.359
12.8	0.26565	0.03965	0.01188	12.8	2.777	1.389
3.201	0.27120	0.03410	0.00980	3.201	2.430	1.215
0.801	0.27970	0.02560	0.00735	0.801	1.825	0.913
0.101	0.29340	0.01190	0.00500	0.101	0.690	0.345

SAMPLE MOISTURE CONTENT/DRY DENSITY

Measure Sample Ht. (in)	1.0030	1.0035	1.0015	1.0035

Height of sample (in) 1.0029
Final Height of sample (in) 0.9632
Diameter of sample (in) 2.416
Volume of sample (ft^3) 0.002661 ***75.34*** (cm^3)
Final volume of sample (ft3) 0.002555 ***72.36*** (cm^3)
Assumed Sp. Gr. (SG) 2.650 Unit of Water (pcf): 62.4

	Before	After
1) wt. of wet soil + Ring (g)	195.7	204.5
2) wt. of dry soil + Ring	181.9	181.9
3) wt. of Ring (g)	43.3	43.3
4) wt of moisture (g)	13.8	22.6
5) % moisture content	10.0	16.3
6) wt. of dry soil Ws (g)	138.6	138.6
7) Wet density (pcf)	126.2	138.9
8) dry density (pcf)	114.7	119.5
9) Vs=Ws/GS	52.3	52.3
10) Voids Ratio (V-Vs)/(Vs)	0.44	0.38
Degree of Saturation	59.8	112.5

SMITH-EMERY LABORATORIES
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Tel. No. (213) 745-5333; Fax no.: (213) 741-8621

ASTM D2435-11

One-Dimensional Consolidation Properties of Soils Using Incremental Loading

SEL File No.:	47743-1
SEL Report No.:	G-22-2768
Date:	1/17/22
BH No.:	CKG-1
Depth:	2-5'
Sample No.:	B1
Moisture Content:	10.0
Saturation:	59.8
Voids Ratio	0.44
Dry Density:	114.7

Client:	Carl Kim Geotechnical
Project :	PWAS_20210916
Location:	Artesia & Normandie
Description:	Brown Clayey SAND

Consolidation Test Results

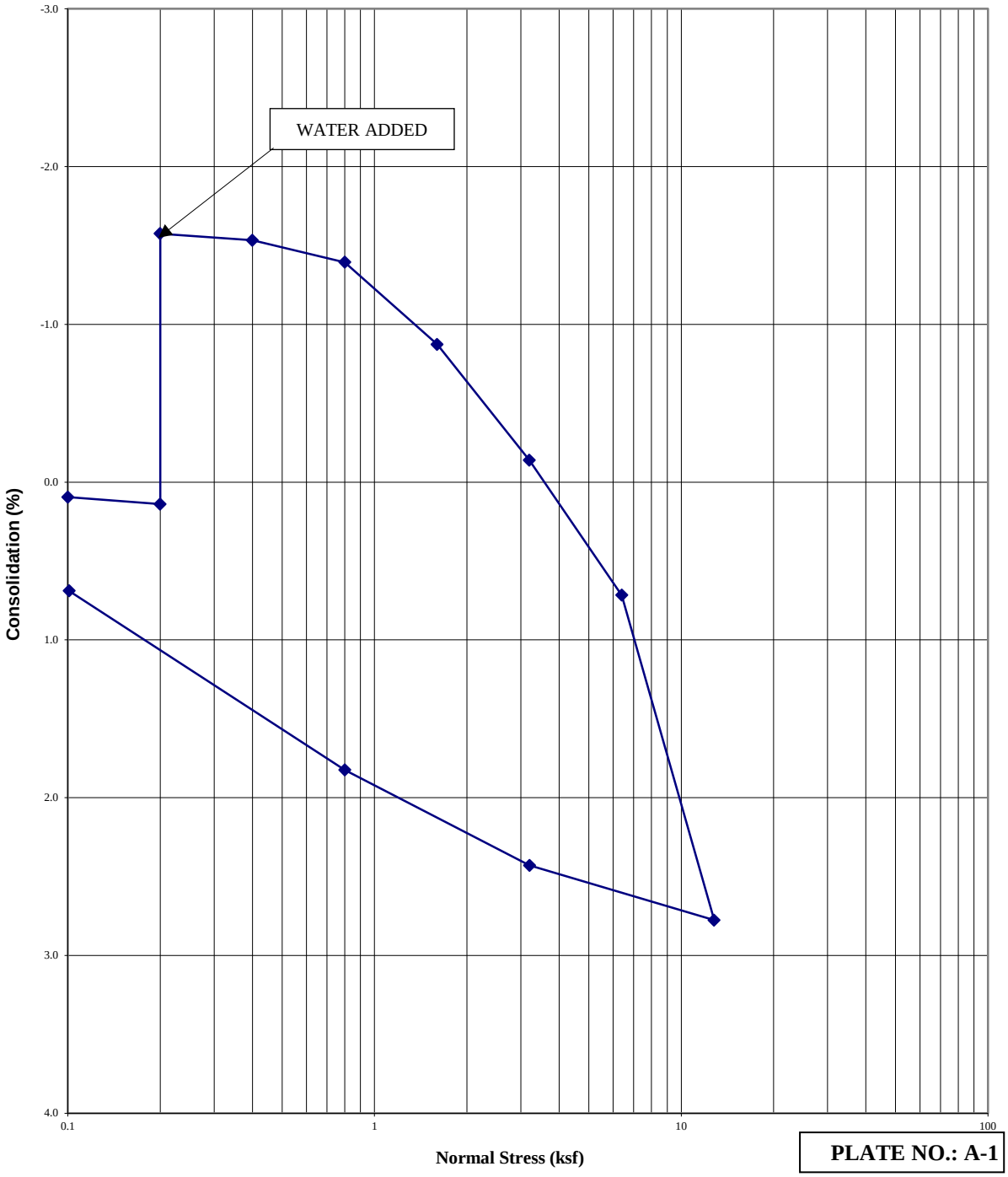

PLATE NO.: A-1

SMITH-EMERY LABORATORIES
791 E. Washington Boulevard, Los Angeles, CA 90021
Tel. No. (213) 745-5333; Fax no.: (213) 741-8621

SEL File No.: 47743-1
Client: Carl Kim Geotechnical — SEL Report No.: G-22-2768
Project: PWAS_20210916 — Date Sampled : 12/15/21
Location: Artesia & Normandie — Date Received: 12/15/21
Remarks: Remold to 90% relative density of 127.1 pcf at 10.7% OMC. — Date Tested : 1/12/22
BORING NO.: CKG-1 SAMPLE NO.: B1 DEPTH (FT.): 2-5'
SOIL DESCRIPTION: Brown Silty SAND

CONSOL NO. 1

Loading (Kips) 0.4

LOG of TIME (min)	DIAL READING (INCH)	TOTAL DEFLECTION (INCH)	DEVICE CORRECTION (INCH)	LOG of TIME (Min.)	DEFORMATION (in)	Graph
0	-0.32000	0.0000	-0.00223	0	0.2230	0.1115
0.1	-0.31935	0.00065	-0.00223	0.1	0.2880	0.1440
0.25	-0.31930	0.00070	-0.00223	0.25	0.2930	0.1465
0.50	-0.31925	0.00075	-0.00223	0.5	0.2980	0.1490
1	-0.31920	0.00080	-0.00223	1	0.3030	0.1515
2	-0.31915	0.00085	-0.00223	2	0.3080	0.1540
4	-0.31910	0.00090	-0.00223	4	0.3130	0.1565
8	-0.31905	0.00095	-0.00223	8	0.3180	0.1590
15	-0.31900	0.00100	-0.00223	15	0.3230	0.1615
30	-0.31900	0.00100	-0.00223	30	0.3230	0.1615
1	-0.31905	0.00095	-0.00223	60	0.3180	0.1590
2	-0.31905	0.00095	-0.00223	120	0.3180	0.1590
4	-0.31905	0.00095	-0.00223	240	0.3180	0.1590
8	-0.31890	0.00110	-0.00223	480	0.3330	0.1665
24	-0.31850	0.00150	-0.00223	1440	0.3730	0.1865

SAMPLE MOISTURE CONTENT/DRY DENSITY

Measure Sample Ht. (in)	1.0030	1.0035	1.0015	1.0035

Height of sample (in) 1.0029 — Volume of sample (ft^3) 0.002661 — ***75.34*** (cm^3)
Height of sample (in) 1.0029 — Final volume of sample (ft^3) 0.002661 — ***75.05*** (cm^3)
Final Height of sample (in) 0.9990 — Assumed Sp. Gr. (SG) 2.650
Diameter of sample (in) 2.416 — Unit of Water (pcf): 62.4

	Before	After
1) wt. of wet soil + Ring (g)	195.7	199.4
2) wt. of dry soil + Ring	181.9	181.9
3) wt. of Ring (g)	43.3	43.3
4) wt of moisture (g)	13.8	17.5
5) % moisture content	10.0	12.6
6) wt. of dry soil Ws (g)	138.6	138.6
7) Wet density (pcf)	126.2	129.2
8) dry density (pcf)	114.7	114.7
9) Vs=Ws/GS	52.3	52.3
10) Voids Ratio (V-Vs)/(Vs)	0.44	0.43
Degree of Saturation	18.9	23.9

SMITH-EMERY LABORATORIES
791 E. Washington Boulevard, Los Angeles, CA 90021
Tel. No. (213) 745-5333; Fax no.: (213) 741-8621

SEL File No.: 47743-1

Client: Carl Kim Geotechnical
SEL Report No.: G-22-2768
Project: PWAS_20210916
Date Sampled : 12/6/21
Location: Artesia & Normandie
Date Received: 12/6/21
Remarks: Remold to 95% relative density of 115.1 pcf at 12.3% OMC.
Date Tested : 12/15/21
BORING NO.: CKG-1 SAMPLE NO.: B1 DEPTH (FT.): 2-5'

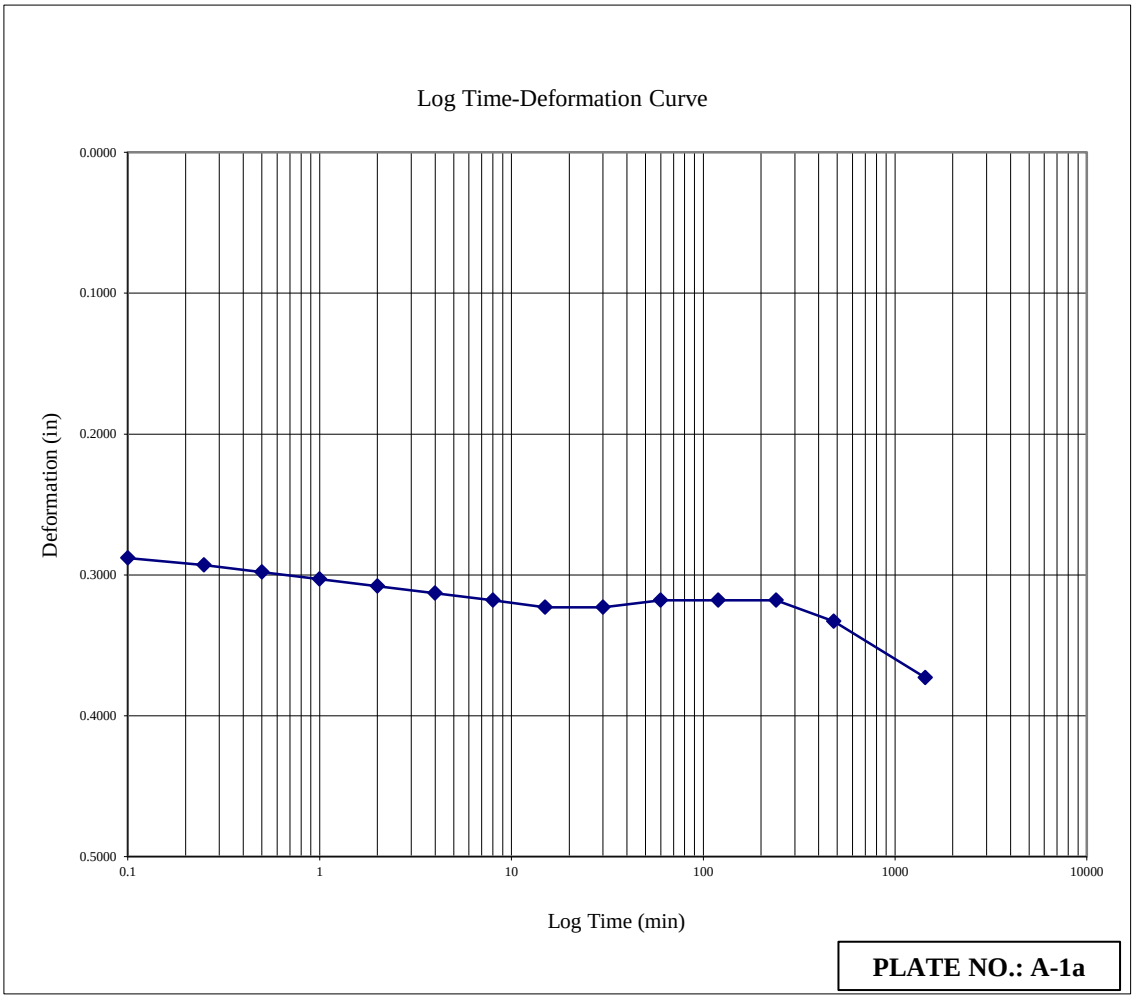

PLATE NO.: A-1a

SMITH-EMERY-LABORATORIES
791/781 East Washington Boulevard, Los Angeles, CA 90021
Tel.: (213) 745-5333; Fax (213)741-8621

ASTM D2435-11

One-Dimensional Consolidation Properties of Soils Using Incremental Loading

Client: Carl Kim Geotechnical — SEL File No.: 47743-1
Project: PWAS_20210916 — SEL Report No.: G-22-2768
Location: Artesia & Normandie — Date Sampled : 7/17/19
Remold to 90% relative density of 129.9 pcf at 9.6% OMC. — Date Received: 7/17/19
BORING NO.: CKG-2 SAMPLE NO.: B-1 DEPTH (FT.): 2-5' Date Tested : 1/11/22

SOIL DESCRIPTION: Brown Silty SAND

CONSOL NO. 2

NORMAL PRESSURE (KSF)	DIAL READING (INCH)	TOTAL DEFLECTION (INCH)	DEVICE CORRECTION (INCH)	NORMAL PRESSURE (KSF)	CORRECTED DEFLECTION (%)	Graph
0.0	0.30425	0.00000	0.00000	0	0.0000	0
0.1	0.30115	0.00310	0.00115	0.1	0.20	0.0975
0.2	0.29705	0.00720	0.00167	0.2	0.55	0.2765
0.2	0.29875	0.00550	0.00167	0.2	0.38	0.1915
0.4	0.29705	0.00720	0.00247	0.4	0.47	0.2365
0.8	0.29455	0.00970	0.00370	0.8	0.60	0.3000
1.6	0.29065	0.01360	0.00560	1.6	0.80	0.4000
3.2	0.28620	0.01805	0.00735	3.2	1.07	0.5350
6.4	0.28050	0.02375	0.00962	6.4	1.41	0.7065
12.8	0.27135	0.03290	0.01230	12.8	2.06	1.0300
3.201	0.27555	0.02870	0.00922	3.201	1.95	0.9740
0.801	0.27975	0.02450	0.00690	0.801	1.76	0.8800
0.101	0.28500	0.01925	0.00525	0.101	1.40	0.7000

SAMPLE MOISTURE CONTENT/DRY DENSITY

Measure Sample Ht. (in)	1.0030	1.0035	1.0035	1.0035

Height of sample (in) 1.0034
Final Height of sample (in) 0.9705
Diameter of sample (in) 2.416
Volume of sample (ft^3) 0.002662 ***75.38*** (cm^3)
Final volume of sample (ft3) 0.002575 ***72.91*** (cm^3)
Assumed Sp. Gr. (SG) 2.650 Unit of Water (pcf): 62.4

	Before	After
1) wt. of wet soil + Ring (g)	197.4	204.0
2) wt. of dry soil + Ring	184.2	184.2
3) wt. of Ring (g)	43.3	43.3
4) wt of moisture (g)	13.2	19.8
5) % moisture content	9.4	14.1
6) wt. of dry soil Ws (g)	140.9	140.9
7) Wet density (pcf)	127.5	137.5
8) dry density (pcf)	116.6	120.5
9) Vs=Ws/GS	53.2	53.2
10) Voids Ratio (V-Vs)/(Vs)	0.42	0.37
Degree of Saturation	59.3	100.2

SMITH-EMERY LABORATORIES
791 E. Washington Boulevard, Los Angeles, CA 90021
Tel. No. (213) 745-5333; Fax no.: (213) 741-8621

ASTM D2435-11

One-Dimensional Consolidation Properties of Soils Using Incremental Loading

SEL File No.:	47743-1
SEL Report No.:	G-22-2768
Date:	1/17/22
BH No.:	CKG-2
Depth:	2-5'
Sample No.:	B-1
Moisture Content:	9.4
Saturation:	59.3
Voids Ratio	0.42
Dry Density:	116.6

Client:	Carl Kim Geotechnical
Project :	PWAS_20210916
Location:	Artesia & Normandie
Description:	Brown Silty SAND

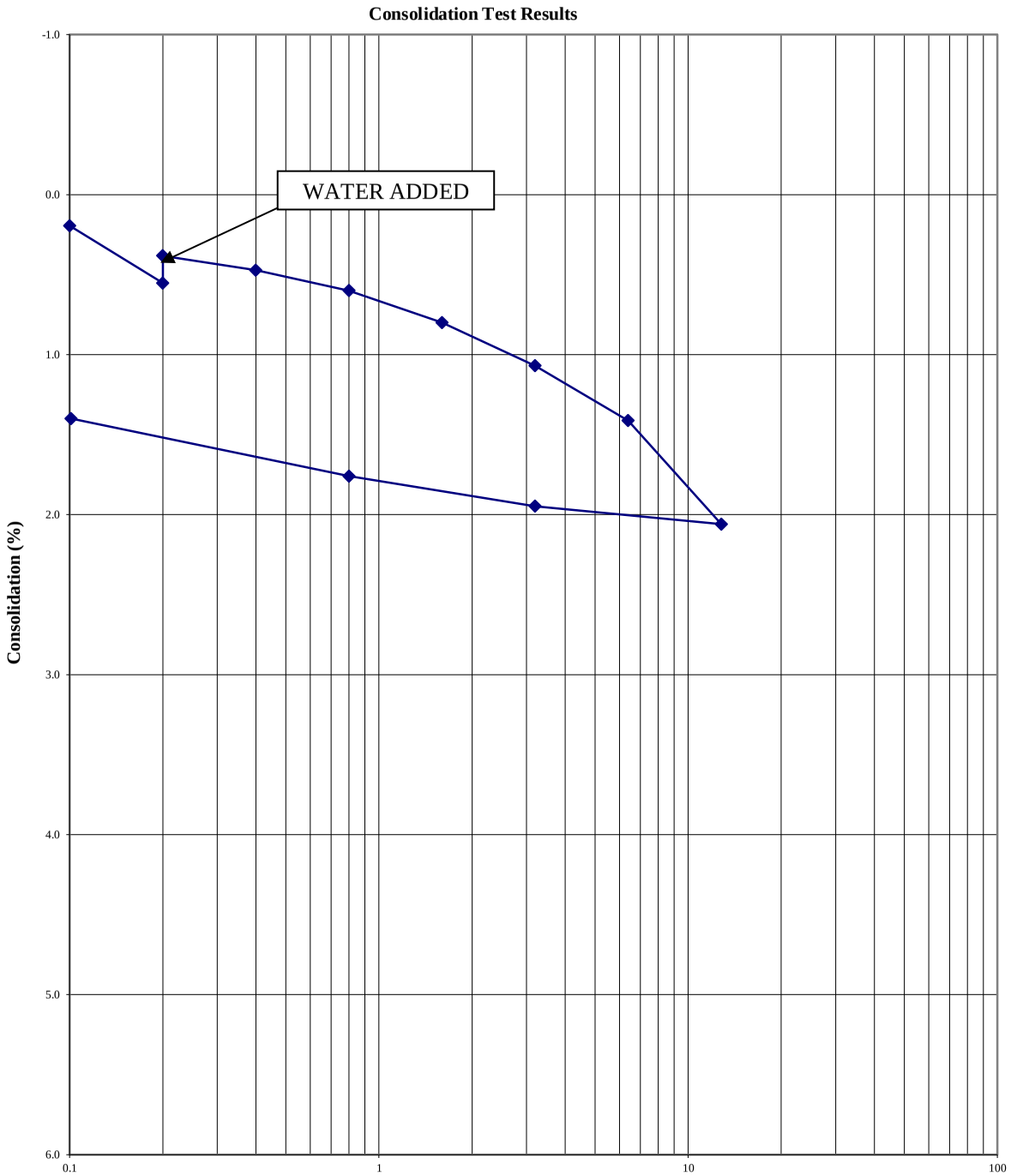

PLATE NO.: A-2

SMITH-EMERY LABORATORIES
791 E. Washington Boulevard, Los Angeles, CA 90021
Tel. No. (213) 745-5333; Fax no.: (213) 741-8621

SEL File No.: 47743-1
Client: Carl Kim Geotechnical — SEL Report No.: G-22-2768
Project: PWAS_20210916 — Date Sampled : 12/15/21
Location: Artesia & Normandie — Date Received: 12/15/21
Remarks: Remold to 90% relative density of 129.9 pcf at 9.6% OMC. — Date Tested : 1/12/22
BORING NO.: CKG-2 SAMPLE NO.: B1 DEPTH (FT.): 2-5'
SOIL DESCRIPTION: Brown Silty Clayey SAND

CONSOL NO. 2

Loading (Kips) 0.4

LOG of TIME (min)	DIAL READING (INCH)	TOTAL DEFLECTION (INCH)	DEVICE CORRECTION (INCH)	LOG of TIME (Min.)	DEFORMATION (in)	Graph
0	-0.29875	0.0000	-0.00610	0	0.6100	0.305
0.1	-0.29785	0.00090	-0.00610	0.1	0.7000	0.3500
0.25	-0.29780	0.00095	-0.00610	0.25	0.7050	0.3525
0.50	-0.29775	0.00100	-0.00610	0.5	0.7100	0.3550
1	-0.29770	0.00105	-0.00610	1	0.7150	0.3575
2	-0.29770	0.00105	-0.00610	2	0.7150	0.3575
4	-0.29765	0.00110	-0.00610	4	0.7200	0.3600
8	-0.29760	0.00115	-0.00610	8	0.7250	0.3625
15	-0.29760	0.00115	-0.00610	15	0.7250	0.3625
30	-0.29750	0.00125	-0.00610	30	0.7350	0.3675
1	-0.29750	0.00125	-0.00610	60	0.7350	0.3675
2	-0.29740	0.00135	-0.00610	120	0.7450	0.3725
4	-0.29730	0.00145	-0.00610	240	0.7550	0.3775
8	-0.29715	0.00160	-0.00610	480	0.7700	0.3850
24	-0.29705	0.00170	-0.00610	1440	0.7800	0.3900

SAMPLE MOISTURE CONTENT/DRY DENSITY

Measure Sample Ht. (in)	1.0030	1.0035	1.0035	1.0035

Height of sample (in) 1.0034 — Volume of sample (ft^3) 0.002662 — ***75.38*** (cm^3)
Height of sample (in) 1.0034 — Final volume of sample (ft^3) 0.002662 — ***75.03*** (cm^3)
Final Height of sample (in) 0.9988 — Assumed Sp. Gr. (SG) 2.650
Diameter of sample (in) 2.416 — Unit of Water (pcf): 62.4

	Before	After
1) wt. of wet soil + Ring (g)	197.4	204.0
2) wt. of dry soil + Ring	184.2	184.2
3) wt. of Ring (g)	43.3	43.3
4) wt of moisture (g)	13.2	19.8
5) % moisture content	9.4	14.1
6) wt. of dry soil Ws (g)	140.9	140.9
7) Wet density (pcf)	127.5	133.0
8) dry density (pcf)	116.6	116.6
9) Vs=Ws/GS	53.2	53.2
10) Voids Ratio (V-Vs)/(Vs)	0.42	0.41
Degree of Saturation	18.0	27.1

SMITH-EMERY LABORATORIES
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Tel. No. (213) 745-5333; Fax no.: (213) 741-8621

SEL File No.: 47743-1

Client: Carl Kim Geotechnical
SEL Report No.: G-22-2768
Project: PWAS_20210916
Date Sampled : 12/6/21
Location: Artesia & Normandie
Date Received: 12/6/21
Remarks: Remold to 95% relative density of 115.1 pcf at 12.3% OMC.
Date Tested : 12/15/21
BORING NO.: CKG-2 SAMPLE NO.: B1 DEPTH (FT.): 2-5'

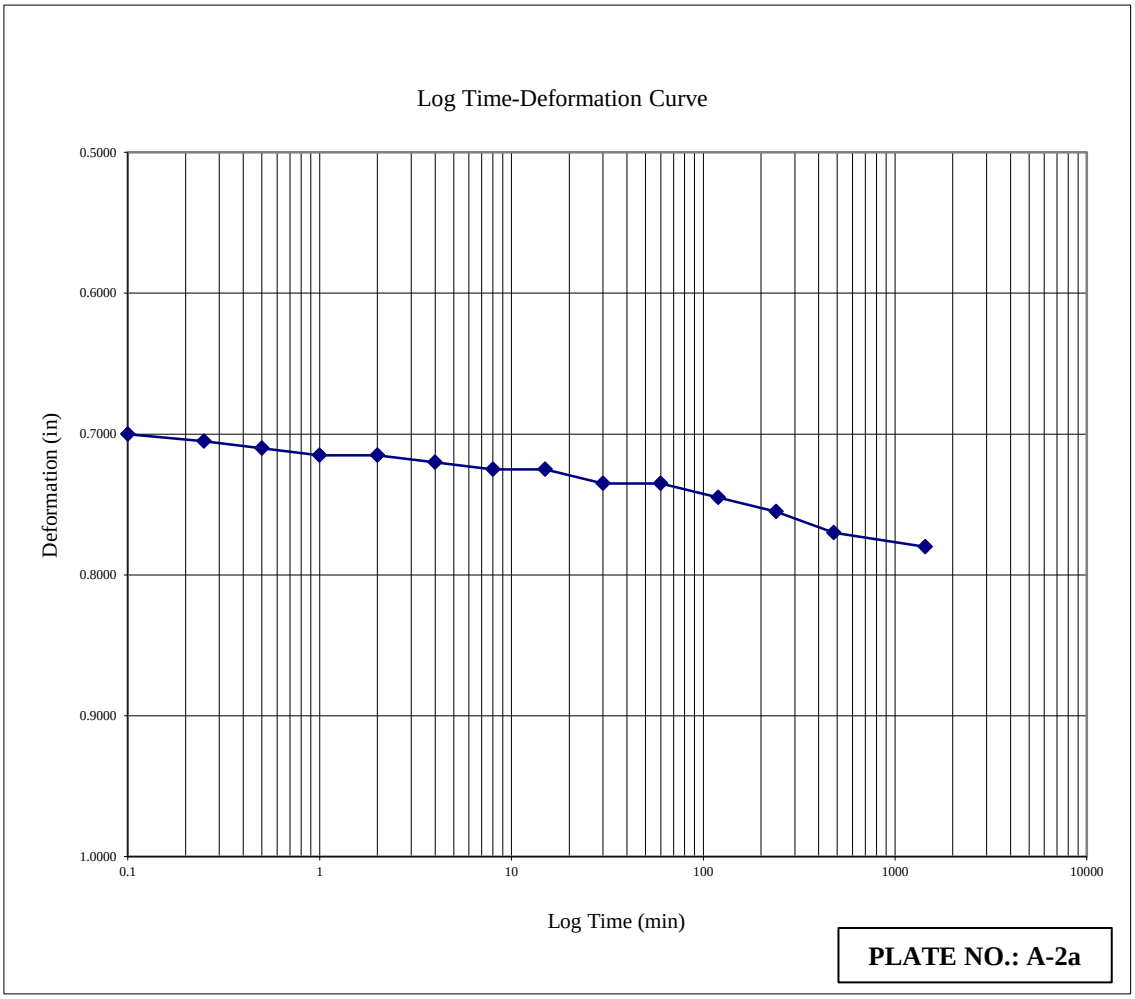

PLATE NO.: A-2a

SMITH-EMERY-LABORATORIES
791/781 East Washington Boulevard, Los Angeles, CA 90021
Tel.: (213) 745-5333; Fax (213)741-8621

ASTM D2435-11

One-Dimensional Consolidation Properties of Soils Using Incremental Loading

Client: Carl Kim Geotechnical
Project: PWAS_20210916
Location: Artesia & Normandie

SEL File No.: 47743-1
SEL Report No.: G-22-2768
Date Sampled : 12/15/22
Date Received: 12/15/22
Date Tested : 1/11/22

BORING NO.: CKG-1 SAMPLE NO.: R-2 DEPTH (FT.): 10-10.5

SOIL DESCRIPTION: Olive Brown Silty SAND

CONSOL NO. 3

NORMAL PRESSURE (KSF)	DIAL READING (INCH)	TOTAL DEFLECTION (INCH)	DEVICE CORRECTION (INCH)	NORMAL PRESSURE (KSF)	CORRECTED DEFLECTION (%)	Graph
0	0.31680	0.00000	0.00000	0	0.000	0
0.1	0.30535	0.01145	0.00253	0.1	0.892	0.446
0.2	0.29765	0.01915	0.00295	0.2	1.620	0.810
0.4	0.28795	0.02885	0.00562	0.4	2.323	1.162
0.4	0.28775	0.02905	0.00562	0.4	2.343	1.172
0.8	0.27505	0.04175	0.00540	0.8	3.635	1.8175
1.6	0.26405	0.05275	0.00712	1.6	4.563	2.282
3.2	0.24845	0.06835	0.00932	3.2	5.903	2.952
6.4	0.22980	0.08700	0.01193	6.4	7.507	3.754
12.8	0.20485	0.11195	0.01460	12.8	9.735	4.8675
3.201	0.21000	0.10680	0.01163	3.201	9.517	4.759
0.801	0.21720	0.09960	0.00903	0.801	9.057	4.5285
0.101	0.22820	0.08860	0.00705	0.101	8.155	4.078

SAMPLE MOISTURE CONTENT/DRY DENSITY

Measure Sample Ht. (in)	0.9835	0.9820	0.9995	0.9895

Height of sample (in) 0.9886
Final Height of sample (in) 0.8767
Diameter of sample (in) 2.416
Volume of sample (ft^3) 0.002623 ***74.27*** (cm^3)
Final volume of sample (ft3) 0.002326 ***65.86*** (cm^3)
Assumed Sp. Gr. (SG) 2.650 Unit of Water (pcf): 62.4

	Before	After
1) wt. of wet soil + Ring (g)	196.5	194.0
2) wt. of dry soil + Ring	168.0	168.0
3) wt. of Ring (g)	45.1	45.1
4) wt of moisture (g)	28.5	26.0
5) % moisture content	23.2	21.2
6) wt. of dry soil Ws (g)	122.9	122.9
7) Wet density (pcf)	127.1	141.0
8) dry density (pcf)	103.2	116.4
9) Vs=Ws/GS	46.4	46.4
10) Voids Ratio (V-Vs)/(Vs)	0.60	0.42
Degree of Saturation	102.1	133.2

SMITH-EMERY LABORATORIES
791 E. Washington Boulevard, Los Angeles, CA 90021

ASTM D2435-11

One-Dimensional Consolidation Properties of Soils Using Incremental Loading

SEL File No.:	47743-1
SEL Report No.:	G-22-2768
Date:	1/17/22
BH No.:	CKG-1
Depth:	10-10.5
Sample No.:	R-2
Moisture Content:	23.2
Saturation:	102.1
Voids Ratio	0.60
Dry Density:	103.2

Client:	Carl Kim Geotechnical
Project :	PWAS_20210916
Location:	Artesia & Normandie
Description:	Olive Brown Silty SAND

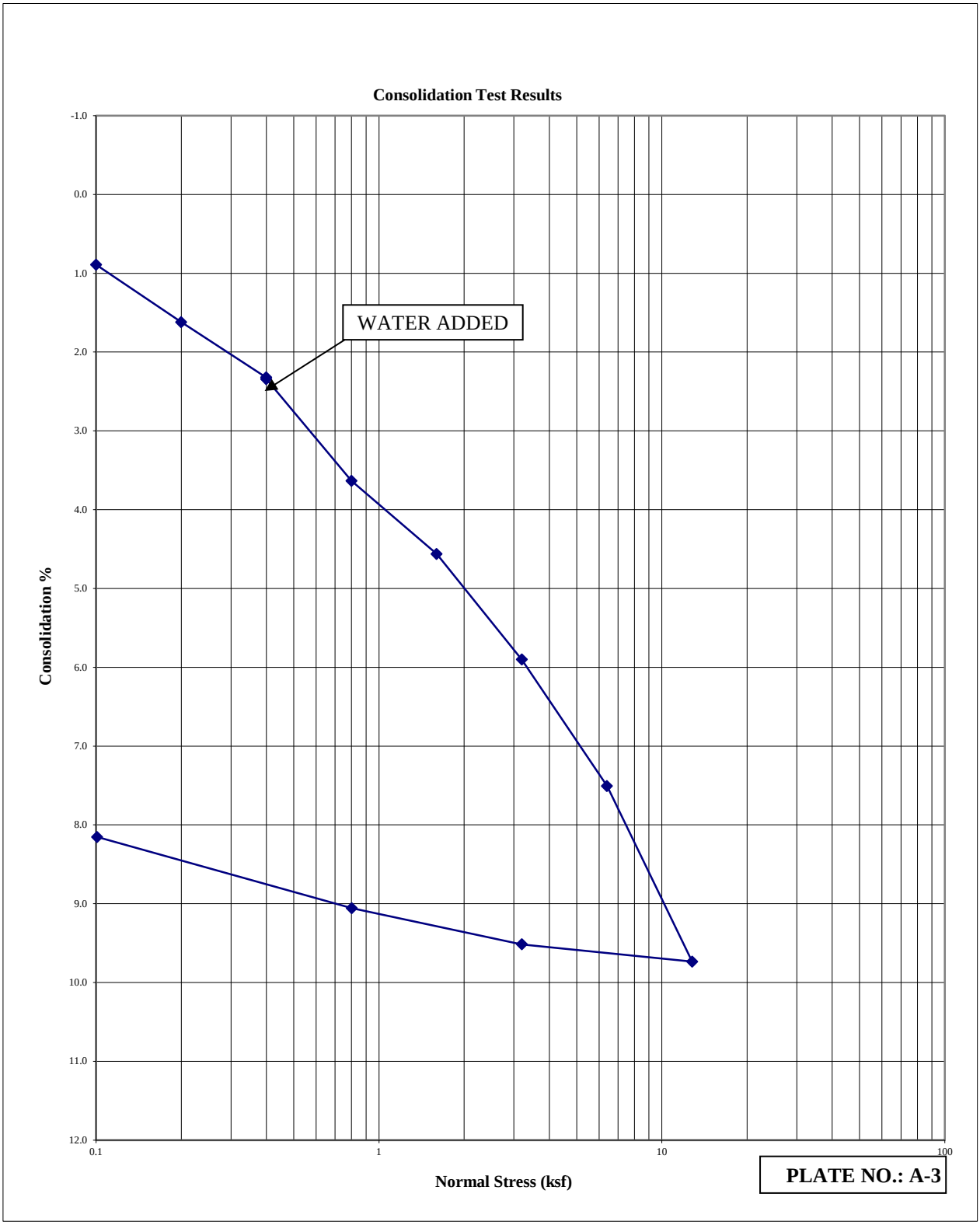

PLATE NO.: A-3

SMITH-EMERY LABORATORIES
791 E. Washington Boulevard, Los Angeles, CA 90021
Tel. No. (213) 745-5333; Fax no.: (213) 741-8621

SEL File No.: 47743-1
Client: Carl Kim Geotechnical — SEL Report No.: G-22-2768
Project: PWAS_20210916 — Date Sampled : 12/15/21
Location: Artesia & Normandie — Date Received: 12/15/21
Remarks: — Date Tested : 1/12/22
BORING NO.: CKG-1 SAMPLE NO.: R-2 DEPTH (FT.): 10-10.5'
SOIL DESCRIPTION: Brown Silty SAND

CONSOL NO. 3

Loading (Kips) 0.8

LOG of TIME (min)	DIAL READING (INCH)	TOTAL DEFLECTION (INCH)	DEVICE CORRECTION (INCH)	LOG of TIME (Min.)	DEFORMATION (in)	Graph
0	-0.28775	0.0000	-0.00540	0	0.5400	0.27
0.1	-0.28355	0.00420	-0.00540	0.1	0.9600	0.4800
0.25	-0.28310	0.00465	-0.00540	0.25	1.0050	0.5025
0.50	-0.28250	0.00525	-0.00540	0.5	1.0650	0.5325
1	-0.28150	0.00625	-0.00540	1	1.1650	0.5825
2	-0.28075	0.00700	-0.00540	2	1.2400	0.6200
4	-0.27975	0.00800	-0.00540	4	1.3400	0.6700
8	-0.27855	0.00920	-0.00540	8	1.4600	0.7300
15	-0.27680	0.01095	-0.00540	15	1.6350	0.8175
30	-0.27630	0.01145	-0.00540	30	1.6850	0.8425
1	-0.27600	0.01175	-0.00540	60	1.7150	0.8575
2	-0.27580	0.01195	-0.00540	120	1.7350	0.8675
4	-0.27565	0.01210	-0.00540	240	1.7500	0.8750
8	-0.27540	0.01235	-0.00540	480	1.7750	0.8875
24	-0.27505	0.01270	-0.00540	1440	1.8100	0.9050

SAMPLE MOISTURE CONTENT/DRY DENSITY

Measure Sample Ht. (in)	0.9835	0.9820	0.9995	0.9895

Height of sample (in) 0.9886 — Volume of sample (ft^3) 0.002623 — ***74.27*** (cm^3)
Height of sample (in) 0.9886 — Final volume of sample (ft^3) 0.002623 — ***74.26*** (cm^3)
Final Height of sample (in) 0.9886 — Assumed Sp. Gr. (SG) 2.650
Diameter of sample (in) 2.416 — Unit of Water (pcf): 62.4

	Before	After
1) wt. of wet soil + Ring (g)	196.5	194.0
2) wt. of dry soil + Ring	168.0	168.0
3) wt. of Ring (g)	45.1	45.1
4) wt of moisture (g)	28.5	26
5) % moisture content	23.2	21.2
6) wt. of dry soil Ws (g)	122.9	122.9
7) Wet density (pcf)	127.1	125.0
8) dry density (pcf)	103.2	103.2
9) Vs=Ws/GS	46.4	46.4
10) Voids Ratio (V-Vs)/(Vs)	0.60	0.60
Degree of Saturation	39.4	35.9

SMITH-EMERY LABORATORIES
791 E. Washington Boulevard, Los Angeles, CA 90021
Tel. No. (213) 745-5333; Fax no.: (213) 741-8621

SEL File No.: 47743-1

Client: Carl Kim Geotechnical
SEL Report No.: G-22-2768

Project: PWAS_20210916
Date Sampled : 12/6/21

Location: Artesia & Normandie
Date Received: 12/6/21

Remarks:
Date Tested : 1/12/22

BORING NO.: CKG-1 SAMPLE NO.: R-2 DEPTH (FT.): 10-10.5'

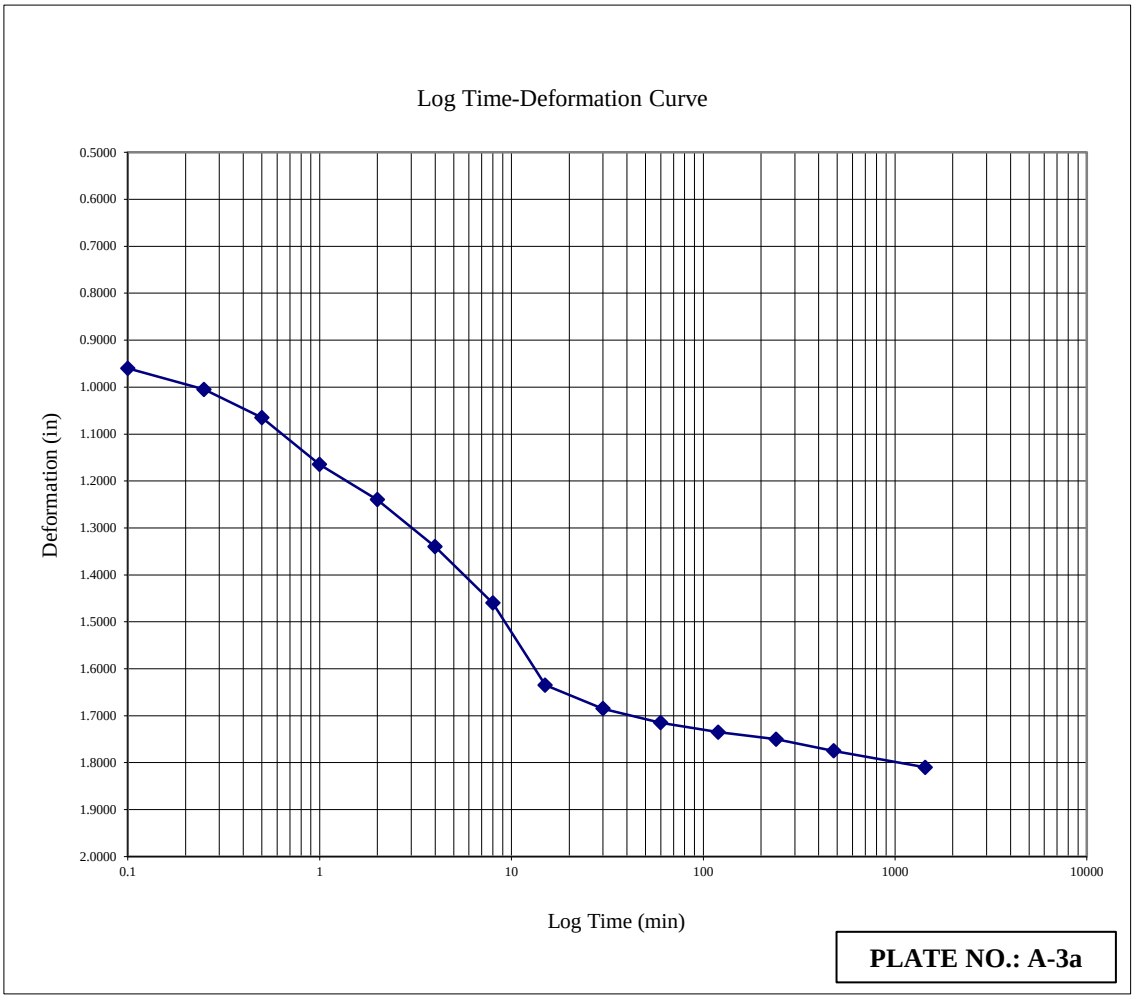

PLATE NO.: A-3a

SMITH-EMERY-LABORATORIES
791/781 East Washington Boulevard, Los Angeles, CA 90021
Tel.: (213) 745-5333; Fax (213)741-8621

ASTM D2435-11

One-Dimensional Consolidation Properties of Soils Using Incremental Loading

Client: Carl Kim Geotechnical
Project: PWAS_20210916
Location: Artesia & Normandie

SEL File No.: 47743-1
SEL Report No.: G-22-2768
Date Sampled : 12/15/22
Date Received: 12/15/22
Date Tested : 1/11/22

BORING NO.: CKG-1 SAMPLE NO.: R-3 DEPTH (FT.): 11-11.5

SOIL DESCRIPTION: Gray Poorly Graded SAND w/ Silt/ Silty SAND

CONSOL NO. 4

NORMAL PRESSURE (KSF)	DIAL READING (INCH)	TOTAL DEFLECTION (INCH)	DEVICE CORRECTION (INCH)	NORMAL PRESSURE (KSF)	CORRECTED DEFLECTION (%)	Graph
0	0.31380	0.00000	0.00000	0	0.0000	0
0.1	0.31130	0.00250	0.00022	0.1	0.2280	0.1140
0.2	0.30955	0.00425	0.00010	0.2	0.4150	0.2075
0.4	0.30640	0.00740	0.00087	0.4	0.6530	0.3265
0.4	0.30600	0.00780	0.00087	0.4	0.6930	0.3465
0.8	0.30175	0.01205	0.00215	0.8	0.9900	0.4950
1.6	0.29665	0.01715	0.00375	1.6	1.3400	0.6700
3.2	0.28880	0.02500	0.00580	3.2	1.9200	0.9600
6.4	0.28085	0.03295	0.00798	6.4	2.4970	1.2485
12.8	0.27085	0.04295	0.01010	12.8	3.2850	1.6425
3.201	0.27400	0.03980	0.00805	3.201	3.1750	1.5875
0.801	0.27770	0.03610	0.00603	0.801	3.0070	1.5035
0.101	0.28230	0.03150	0.00450	0.101	2.7000	1.3500

SAMPLE MOISTURE CONTENT/DRY DENSITY

Measure Sample Ht. (in)	1.0020	1.0035	0.9905	1.0005

Height of sample (in) 0.9991
Final Height of sample (in) 0.9562
Diameter of sample (in) 2.416
Volume of sample (ft3) 0.002651 ***75.06*** (cm^3)
Final volume of sample (ft3) 0.002537 ***71.83*** (cm^3)
Assumed Sp. Gr. (SG) 2.650 Unit of Water (pcf): 62.4

	Before	After
1) wt. of wet soil + Ring (g)	200.1	197.6
2) wt. of dry soil + Ring	170.9	170.9
3) wt. of Ring (g)	45.9	45.9
4) wt of moisture (g)	29.2	26.7
5) % moisture content	23.4	21.4
6) wt. of dry soil Ws (g)	125.0	125.0
7) Wet density (pcf)	128.1	131.7
8) dry density (pcf)	103.9	108.5
9) Vs=Ws/GS	47.2	47.2
10) Voids Ratio (V-Vs)/(Vs)	0.59	0.52
Degree of Saturation	104.6	108.1

SMITH-EMERY LABORATORIES
791 E. Washington Boulevard, Los Angeles, CA 90021

ASTM D2435-11

One-Dimensional Consolidation Properties of Soils Using Incremental Loading

SEL File No.:	47743-1
SEL Report No.:	G-22-2768
Date:	1/17/22
BH No.:	CKG-1
Depth:	11-11.5
Sample No.:	R-3
Moisture Content:	23.4
Saturation:	104.6
Voids Ratio	0.59
Dry Density:	103.9

Client:	Carl Kim Geotechnical
Project :	PWAS_20210916
Location:	Artesia & Normandie
Description:	Gray Poorly Graded SAND w/ Silt/ Silty SAND

Consolidation Test Results

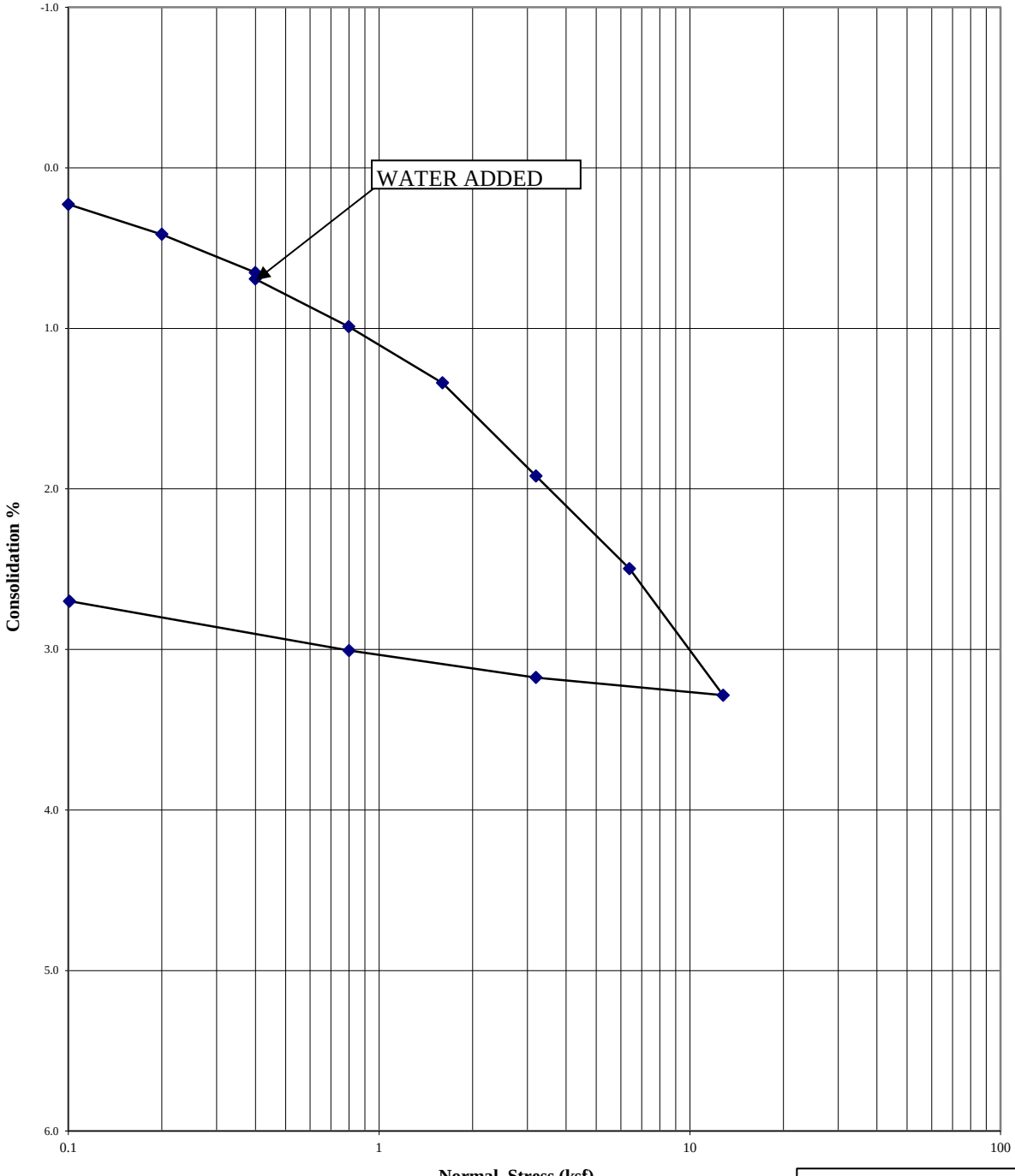

PLATE NO.: A-4

SMITH-EMERY LABORATORIES
791 E. Washington Boulevard, Los Angeles, CA 90021
Tel. No. (213) 745-5333; Fax no.: (213) 741-8621

SEL File No.: 47743-1
Client: Carl Kim Geotechnical — SEL Report No.: G-22-2768
Project: PWAS_20210916 — Date Sampled : 12/15/21
Location: Artesia & Normandie — Date Received: 12/15/21
Remarks: — Date Tested : 1/12/22

BORING NO.: CKG-1 SAMPLE NO.: R-2 DEPTH (FT.): 15-15.5'
SOIL DESCRIPTION: Gray Poorly Graded SAND w/ Silt/ Silty SAND

CONSOL NO. 4

Loading (Kips) 0.8

LOG of TIME (min)	DIAL READING (INCH)	TOTAL DEFLECTION (INCH)	DEVICE CORRECTION (INCH)	LOG of TIME (Min.)	DEFORMATION (in)	Graph
0	-0.30600	0.0000	-0.00215	0	0.2150	0.1075
0.1	-0.30360	0.00240	-0.00215	0.1	0.4550	0.2275
0.25	-0.30330	0.00270	-0.00215	0.25	0.4850	0.2425
0.50	-0.30320	0.00280	-0.00215	0.5	0.4950	0.2475
1	-0.30310	0.00290	-0.00215	1	0.5050	0.2525
2	-0.30300	0.00300	-0.00215	2	0.5150	0.2575
4	-0.30285	0.00315	-0.00215	4	0.5300	0.2650
8	-0.30280	0.00320	-0.00215	8	0.5350	0.2675
15	-0.30270	0.00330	-0.00215	15	0.5450	0.2725
30	-0.30260	0.00340	-0.00215	30	0.5550	0.2775
1	-0.30250	0.00350	-0.00215	60	0.5650	0.2825
2	-0.30235	0.00365	-0.00215	120	0.5800	0.2900
4	-0.30225	0.00375	-0.00215	240	0.5900	0.2950
8	-0.30205	0.00395	-0.00215	480	0.6100	0.3050
24	-0.30175	0.00425	-0.00215	1440	0.6400	0.3200

SAMPLE MOISTURE CONTENT/DRY DENSITY

Measure Sample Ht. (in)	1.0020	1.0035	0.9950	1.0005

Height of sample (in) 1.0003 — Volume of sample (ft^3) 0.002654 — ***75.14*** (cm^3)
Height of sample (in) 1.0003 — Final volume of sample (ft^3) 0.002654 — ***74.87*** (cm^3)
Final Height of sample (in) 0.9966 — Assumed Sp. Gr. (SG) 2.650
Diameter of sample (in) 2.416 — Unit of Water (pcf): 62.4

	Before	After
1) wt. of wet soil + Ring (g)	200.1	197.6
2) wt. of dry soil + Ring	170.9	170.9
3) wt. of Ring (g)	45.9	45.9
4) wt of moisture (g)	29.2	26.7
5) % moisture content	23.4	21.4
6) wt. of dry soil Ws (g)	125.0	125.0
7) Wet density (pcf)	128.0	125.9
8) dry density (pcf)	103.8	103.8
9) Vs=Ws/GS	47.2	47.2
10) Voids Ratio (V-Vs)/(Vs)	0.59	0.59
Degree of Saturation	39.9	36.5

SMITH-EMERY LABORATORIES
791 E. Washington Boulevard, Los Angeles, CA 90021
Tel. No. (213) 745-5333; Fax no.: (213) 741-8621

SEL File No.: 47743-1

Client: Carl Kim Geotechnical
SEL Report No.: G-22-2768

Project: PWAS_20211025
Date Sampled : 12/6/21

Location: 1711 East 15th Street, Los Angeles, CA
Date Received: 12/6/21

Remarks:
Date Tested : 1/12/22

BORING NO.: CKG-1 SAMPLE NO.: R-2 DEPTH (FT.): 15-15.5'

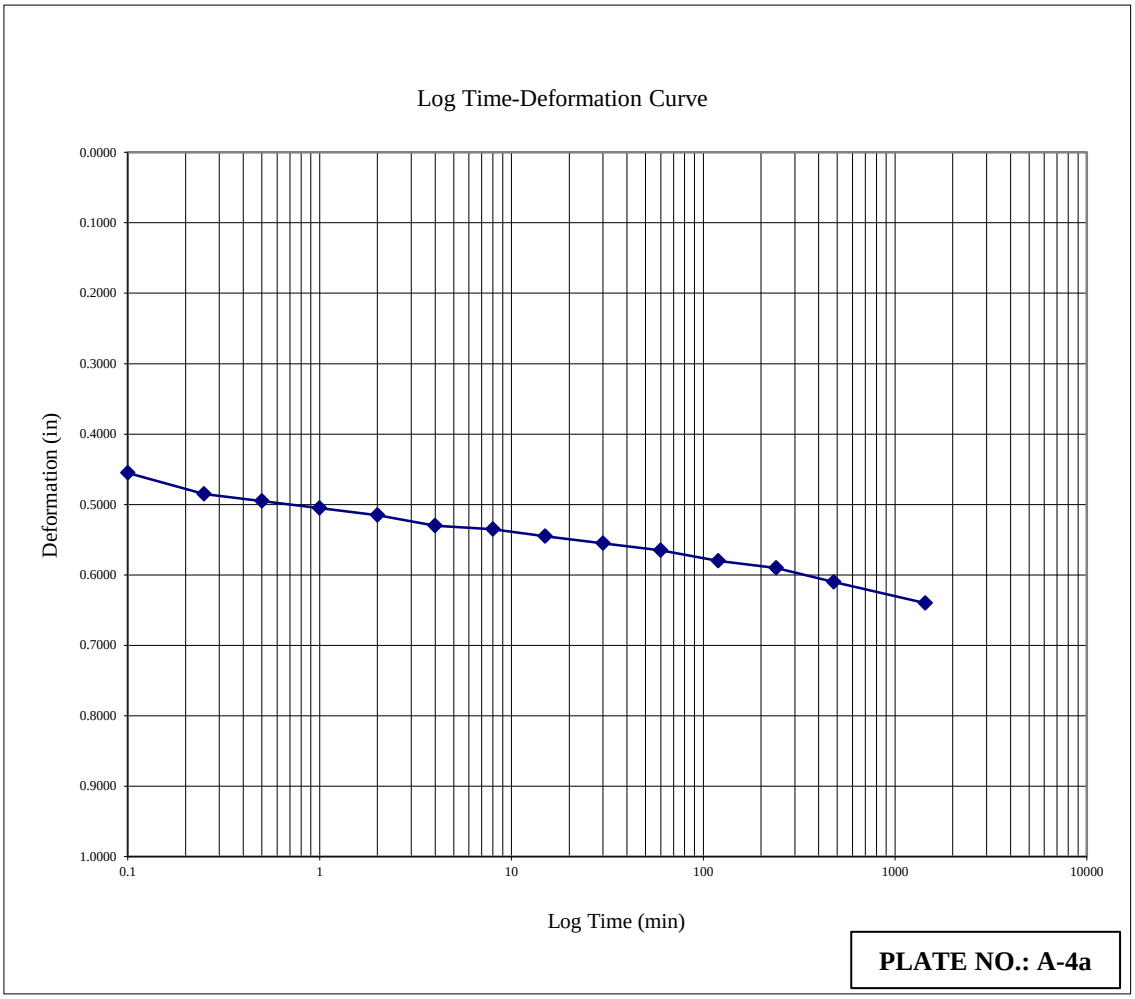

PLATE NO.: A-4a

SMITH-EMERY Laboratories
791/781 East Washington Boulevard, Los Angeles 90021
Tel. No. (213) 745-5333: Fax No.: (213) 741-8621

DIRECT SHEAR TEST
ASTM D3080

Lab. Ref. No.: 546

Client:	Carl Km Geotechnical	SEG Report No.:	G-22-2768
Project:	PWAS_20210916	SEG File No.:	47743-1
Location:	Artesia & Normadie	Date Sampled:	12/15/21
Remark:	Remold to 90% RD of 127.1 pcf at 10.7% OMC	Date Received:	12/15/21
		Date Tested:	1/5/22

Boring No.: **CKG-1** Sample No.: B1 Depth(ft): **2.0-5.0ft**

Normal Stress (psf)	Moisture Content Initial (%)	Moisture Content Final (%)	Dry Density (psf)	Peak Stress (psf)	Deflection (in)	Degree Saturation
1000	10.5	13.8	114.8	804	0.02	60.4
4000	10.5	17.2	114.0	2436	0.25	59.5
8000	10.4	23.7	114.7	4068	0.22	60.1
	.		114.5			

Soil Classification:	Sample #1	Sample #2	Sample #3
	Olive Brown Silty SAND	Olive Brown Silty SAND	Olive Brown Silty SAND

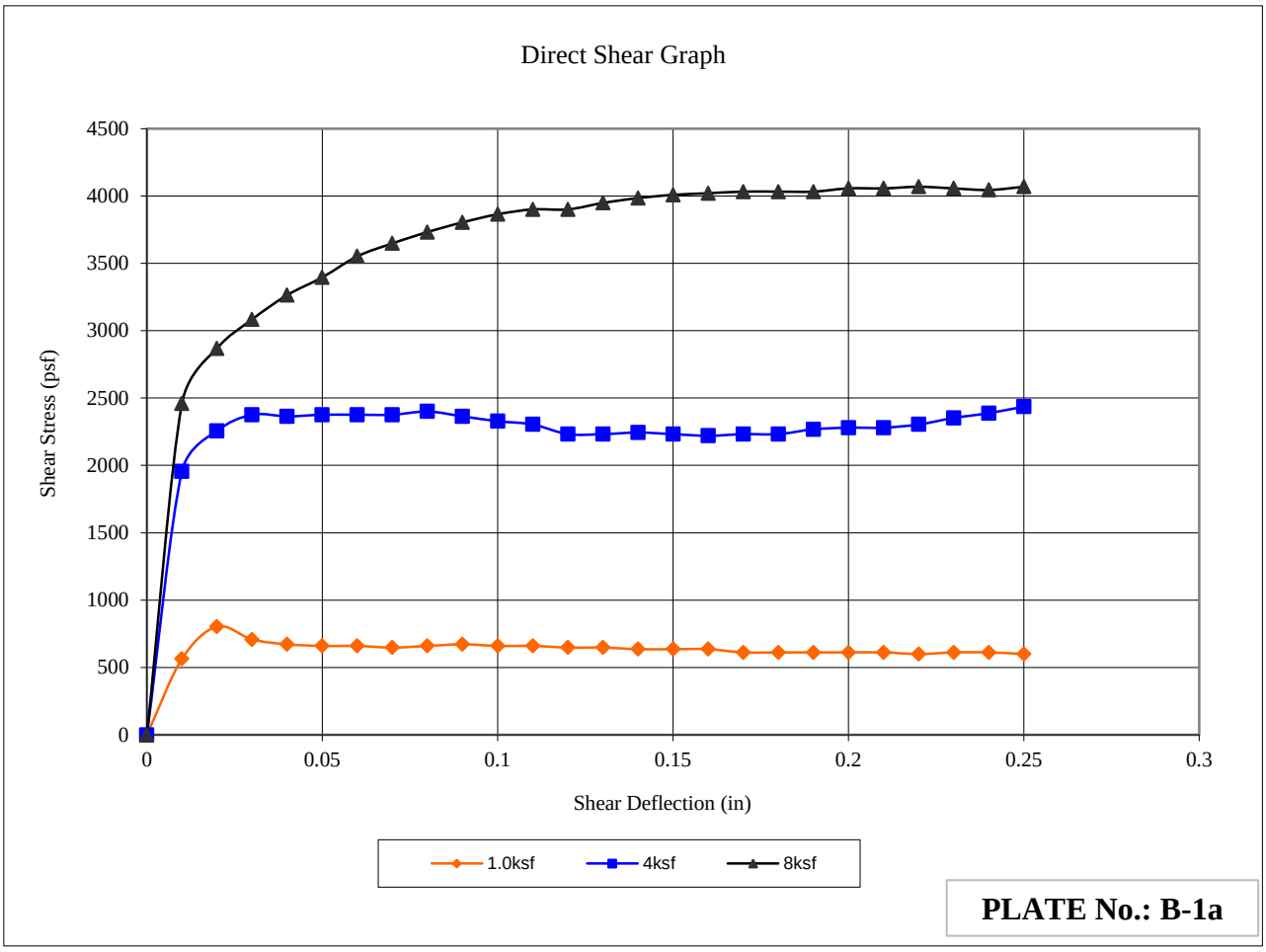

PLATE No.: B-1a

Shear manufacture by: Geomatic
Model: 8804

SMITH-EMERY Laboratories
791/ 781 East Washington Boulevard, Los Angeles 90021
Tel. No. (213) 745-5333: Fax No.: (213) 741-8621

DIRECT SHEAR TEST
ASTM D3080

Client:	Carl Km Geotechnical	SEG Report No.:	G-22-2768
Project:	PWAS_20210916	SEG File No.:	47743-1
Location:	Artesia & Normadie	Date Sampled:	12/15/21
Remark:	Remold to 90% RD of 127.1 pcf at 10.7% OMC	Date Received:	12/15/21
		Date Tested:	1/5/22

Boring No.: CKG-1 Sample No.: B1 Depth(ft): 2.0-5.0ft

	Sample #1	Sample #2	Sample #3
Soil Classification:	Olive Brown Silty SAND	Olive Brown Silty SAND	Olive Brown Silty SAND

PEAK STRENGTH

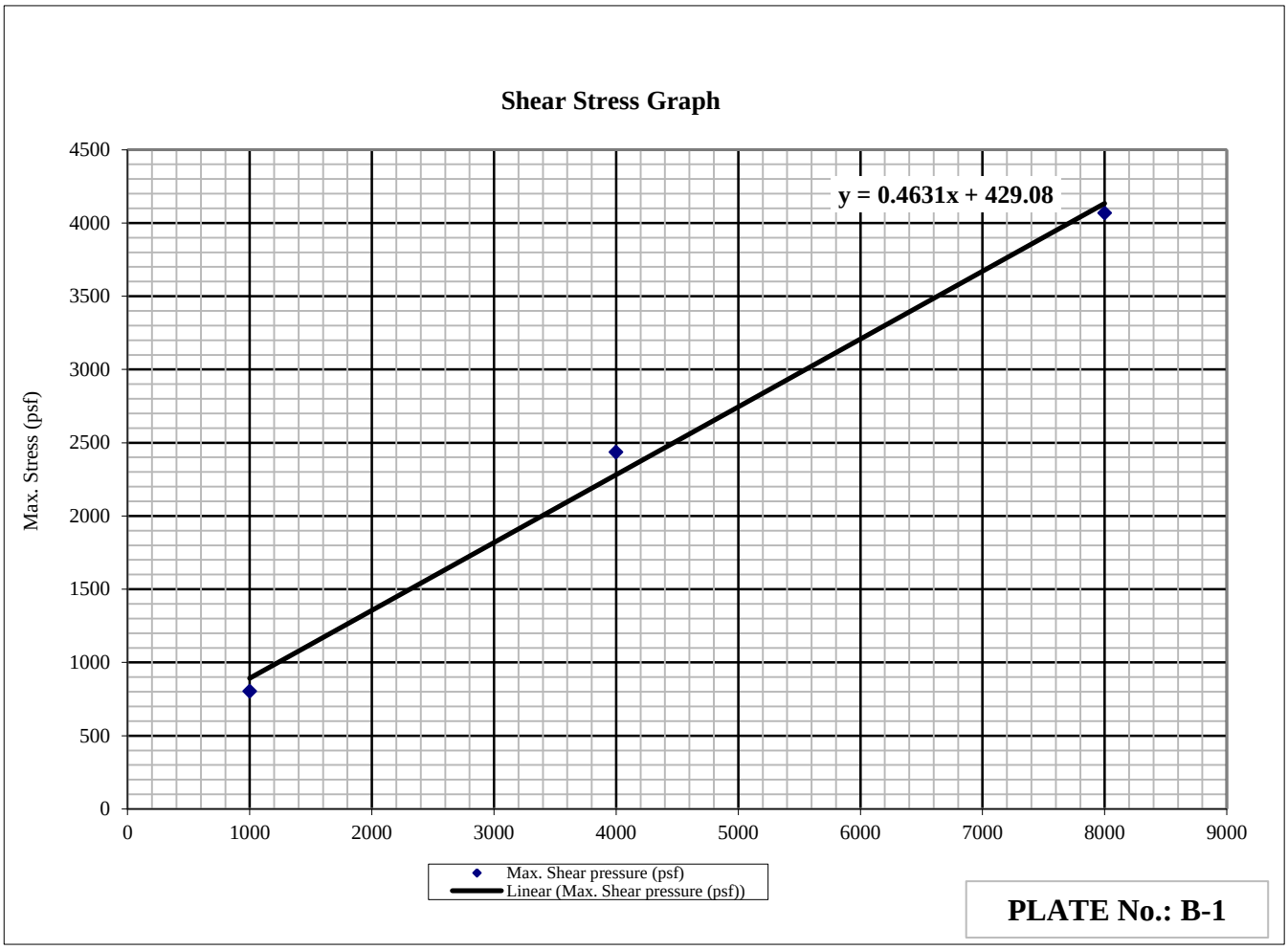

PLATE No.: B-1

STRENGTH INTERCEPT (KSF)= **0.429**
FRICTION ANGLE (θ) PHI in ° = **25.0**
Ave. Degree of saturation: **60.0**
Ave. Initial Voids: **0.47**

Reconstituted relative dry density % **90.1**
Max dry density ASTM D1557 127.1
Ave. Reconstituted dry density (pcf): 114.5

SMITH-EMERY Laboratories

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DIRECT SHEAR TEST

ASTM D3080

DATA

Shear	1.0ksf	4ksf	8ksf
Deflection (in)	1000	4000	8000
0	0	0	0
0.01	564	1956	2460
0.02	804	2256	2868
0.03	708	2376	3084
0.04	672	2364	3264
0.05	660	2376	3396
0.06	660	2376	3552
0.07	648	2376	3648
0.08	660	2400	3732
0.09	672	2364	3804
0.10	660	2328	3864
0.11	660	2304	3900
0.12	648	2232	3900
0.13	648	2232	3948
0.14	636	2244	3984
0.15	636	2232	4008
0.16	636	2220	4020
0.17	612	2232	4032
0.18	612	2232	4032
0.19	612	2268	4032
0.20	612	2280	4056
0.21	612	2280	4056
0.22	600	2304	4068
0.23	612	2352	4056
0.24	612	2388	4044
0.25	600	2436	4068

Applied Load (psf)	x. Shear pressure (	Deflection(in)
1000	804	0.02
4000	2436	0.25
8000	4068	0.22

Water Density (pcf): 62.4 **Initial Moisture Density**

Sample Dia. (in)	Sample ht. (in)	Vol.(pcf)	sp. gr. (assumed)
2.419	1.00	0.002659616	2.700

	1.0ksf	4ksf	8ksf
Wet sample + ring	196.4	195.0	196.1
Dry sample + dish	194.8	190.3	188.3
wt. Ring	43.3	42.9	43.2
wt dish	56.2	52.7	49.9
wt. Dry soil	138.6	137.6	138.4
wt. Loss moist.	14.5	14.5	14.5
moist. Content%	10.5	10.5	10.4
wet density (pcf)	126.8	126.0	126.6
dry density (pcf)	114.8	114.0	114.7
Vs= (Ws/GS)	51.33	50.96	51.27
Initial Voids Ratio	0.467	0.478	0.469
Degree of Sat.:	**60.4**	**59.5**	**60.1**

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791 East Washington Boulevard, Los Angeles 90021
DIRECT SHEAR TEST
ASTM D3080

Slope= 2.144607843

		Degrees -90°	Friction Angle
Slope=	1.13	65.0	25.0
Tan Ø=	2.144608		

Final Moisture Content

Wet of sample + dish(g)	213.9	213.9	221.1
Dry of sample + dish(g)	194.8	190.3	188.3
wt dish (g)	56.2	52.7	49.9
wt. Loss moist.(g)	19.1	23.6	32.8
moist. Content%	13.8	17.2	23.7

SMITH-EMERY Laboratories
791/781 East Washington Boulevard, Los Angeles 90021
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DIRECT SHEAR TEST
ASTM D3080

Lab. Ref. No.: 547

Client: Carl Km Geotechnical
Project: PWAS_20210916
Location: Artesia & Normadie
Remark: Remold to 90% RD of 129.9 pcf at 9.6% OMC

SEG Report No.: G-22-2768
SEG File No.: 47743-1
Date Sampled: 12/15/21
Date Received: 12/15/21
Date Tested: 1/5/22

Boring No.: **CKG-2** Sample No.: B1 Depth(ft): **2.0-5.0ft**

Normal Stress (psf)	Moisture Content Initial (%)	Moisture Content Final (%)	Dry Density (psf)	Peak Stress (psf)	Deflection (in)	Degree Saturation
1000	9.7	16.7	116.3	792	0.02	58.3
4000	9.6	17.7	116.1	2292	0.23	57.2
8000	9.6	16.7	116.8	4548	0.24	58.4
	.		116.4			

Soil Classification:	Sample #1	Sample #2	Sample #3
	Olive Brown Silty SAND	Olive Brown Silty SAND	Olive Brown Silty SAND

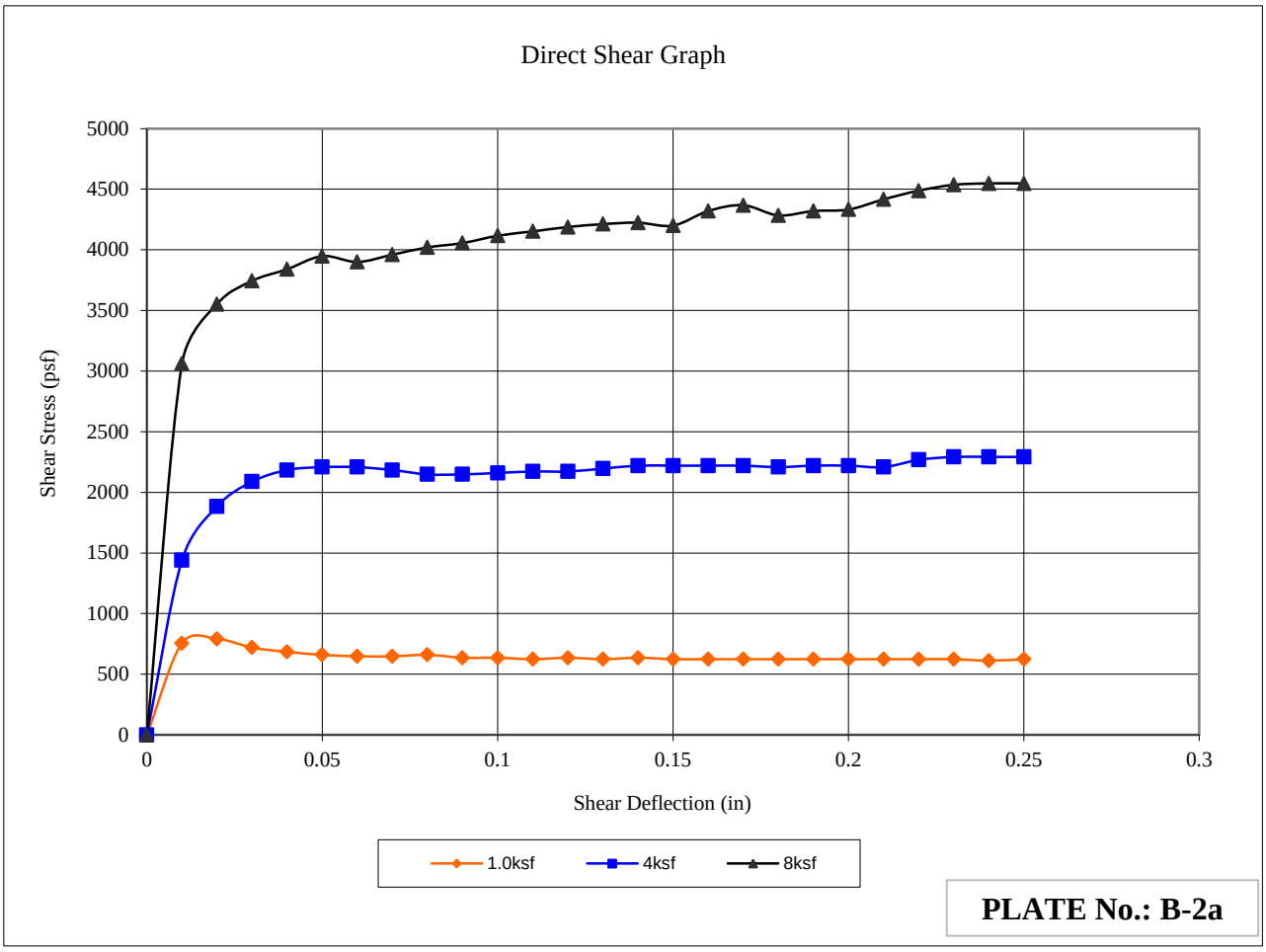

PLATE No.: B-2a

Shear manufacture by: Geomatic
Model: 8804

SMITH-EMERY Laboratories
791/ 781 East Washington Boulevard, Los Angeles 90021
Tel. No. (213) 745-5333: Fax No.: (213) 741-8621

DIRECT SHEAR TEST
ASTM D3080

Client:	Carl Km Geotechnical	SEG Report No.:	G-22-2768
Project:	PWAS_20210916	SEG File No.:	47743-1
Location:	Artesia & Normadie	Date Sampled:	12/15/21
Remark:	Remold to 90% RD of 129.9 pcf at 9.6% OMC	Date Received:	12/15/21
		Date Tested:	1/5/22

Boring No.: CKG-2 Sample No.: B1 Depth(ft): 2.0-5.0ft

	Sample #1	Sample #2	Sample #3
Soil Classification:	Olive Brown Silty SAND	Olive Brown Silty SAND	Olive Brown Silty SAND

PEAK STRENGTH

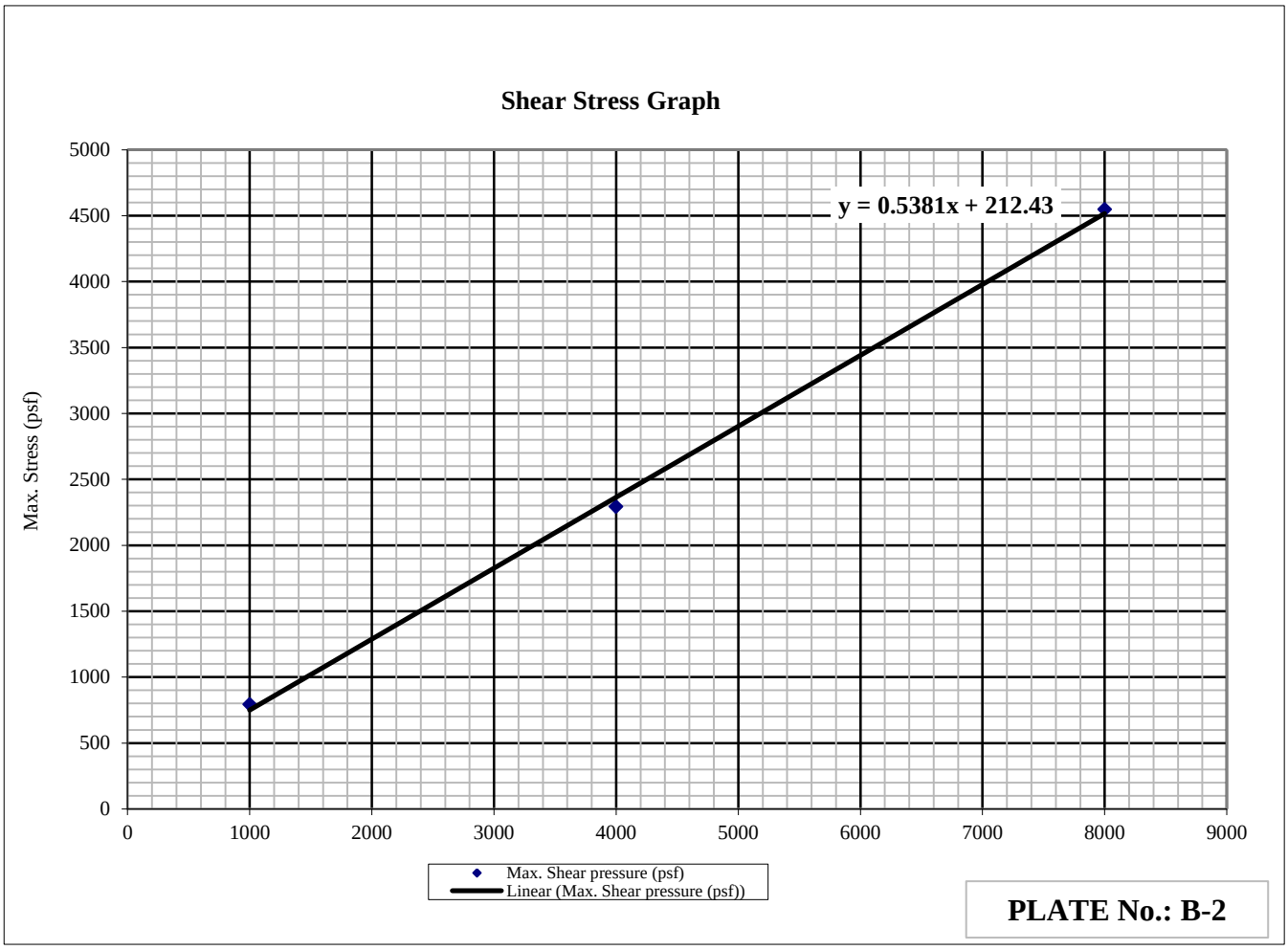

PLATE No.: B-2

STRENGTH INTERCEPT (KSF)= **0.212**
FRICTION ANGLE (θ) PHI in ° = **28.3**
Ave. Degree of saturation: **58.0**
Ave. Initial Voids: **0.45**

Reconstituted relative dry density % **89.6**
Max dry density ASTM D1557 129.9
Ave. Reconstituted dry density (pcf): 116.4

SMITH-EMERY Laboratories

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DIRECT SHEAR TEST

ASTM D3080

DATA

Shear	1.0ksf	4ksf	8ksf
Deflection (in)	1000	4000	8000
0	0	0	0
0.01	756	1440	3060
0.02	792	1884	3552
0.03	720	2088	3744
0.04	684	2184	3840
0.05	660	2208	3948
0.06	648	2208	3900
0.07	648	2184	3960
0.08	660	2148	4020
0.09	636	2148	4056
0.10	636	2160	4116
0.11	624	2172	4152
0.12	636	2172	4188
0.13	624	2196	4212
0.14	636	2220	4224
0.15	624	2220	4200
0.16	624	2220	4320
0.17	624	2220	4368
0.18	624	2208	4284
0.19	624	2220	4320
0.20	624	2220	4332
0.21	624	2208	4416
0.22	624	2268	4488
0.23	624	2292	4536
0.24	612	2292	4548
0.25	624	2292	4548

Applied Load (psf)	x. Shear pressure (	Deflection(in)
1000	792	0.02
4000	2292	0.23
8000	4548	0.24

Water Density (pcf): 62.4

Initial Moisture Density

Sample Dia. (in)	Sample ht. (in)	Vol.(pcf)	sp. gr. (assumed)
2.419	1.00	0.002659616	2.700

	1.0ksf	4ksf	8ksf
Wet sample + ring	197.3	199.7	197.8
Dry sample + dish	190.5	189.1	197.5
wt. Ring	43.3	46.1	43.3
wt dish	50.1	48.9	56.5
wt. Dry soil	140.4	140.2	141.0
wt. Loss moist.	13.6	13.4	13.5
moist. Content%	9.7	9.6	9.6
wet density (pcf)	127.5	127.2	128.0
dry density (pcf)	116.3	116.1	116.8
Vs= (Ws/GS)	52.00	51.93	52.22
Initial Voids Ratio	0.448	0.450	0.442
Degree of Sat.:	**58.3**	**57.2**	**58.4**

SMITH-EMERY Laboratories

791 East Washington Boulevard, Los Angeles 90021
DIRECT SHEAR TEST
ASTM D3080

Slope= 1.856477192

		Degrees -90°	Friction Angle
Slope=	1.08	61.7	28.3
Tan Ø=	1.856477		

Final Moisture Content

Wet of sample + dish(g)	213.9	213.9	221.1
Dry of sample + dish(g)	190.5	189.1	197.5
wt dish (g)	50.1	48.9	56.5
wt. Loss moist.(g)	23.4	24.8	23.6
moist. Content%	16.7	17.7	16.7

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791/781 East Washington Boulevard, Los Angeles 90021
Tel. No. (213) 745-5333: Fax No.: (213) 741-8621

DIRECT SHEAR TEST
ASTM D3080

Lab. Ref. No.: 547

Client: Carl Km Geotechnical
Project: PWAS_20210916
Location: Artesia & Normadie
Remark:

SEG Report No.: G-21-2768
SEG File No.: 47743-1
Date Sampled: 12/15/21
Date Received: 12/15/21
Date Tested: 12/28/21

Boring No.: **CKG-1** Sample No.: R2 Depth(ft): **10.0-10.5ft**

Normal Stress (psf)	Moisture Content Initial (%)	Moisture Content Final (%)	Dry Density (psf)	Peak Stress (psf)	Deflection (in)	Degree Saturation
1000	29.6	30.0	96.2	732	0.11	106.4
4000	24.4	27.3	101.2	2412	0.22	99.0
8000	28.3	29.9	95.7	4428	0.18	100.5
	.		97.7			

Soil Classification:	Sample #1	Sample #2	Sample #3
	Olive Brown SILT w/ SAND	Olive Brown SILT w/ SAND	Olive Brown SILT w/ SAND

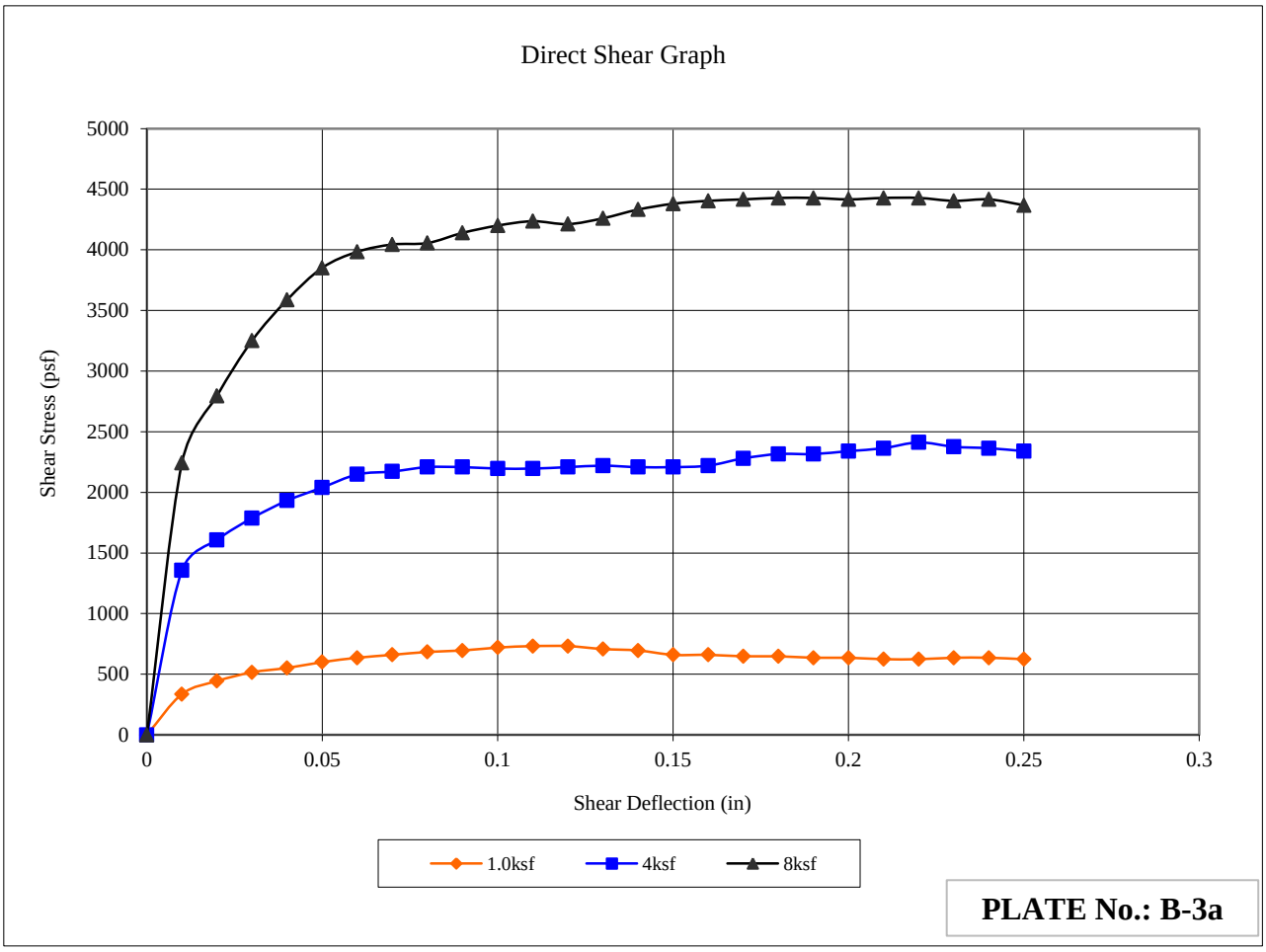

PLATE No.: B-3a

Shear manufacture by: Geomatic
Model: 8804

SMITH-EMERY Laboratories
791/ 781 East Washington Boulevard, Los Angeles 90021
Tel. No. (213) 745-5333: Fax No.: (213) 741-8621

DIRECT SHEAR TEST
ASTM D3080

Client:	Carl Km Geotechnical	SEG Report No.:	G-21-2768
Project:	PWAS_20210916	SEG File No.:	47743-1
Location:	Artesia & Normadie	Date Sampled:	12/15/21
Remark:		Date Received:	12/15/21
		Date Tested:	12/28/21

Boring No.: CKG-1 Sample No.: R2 Depth(ft): 10.0-10.5ft

Soil Classification:	Sample #1	Sample #2	Sample #3
	Olive Brown SILT w/ SAND	Olive Brown SILT w/ SAND	Olive Brown SILT w/ SAND

PEAK STRENGTH

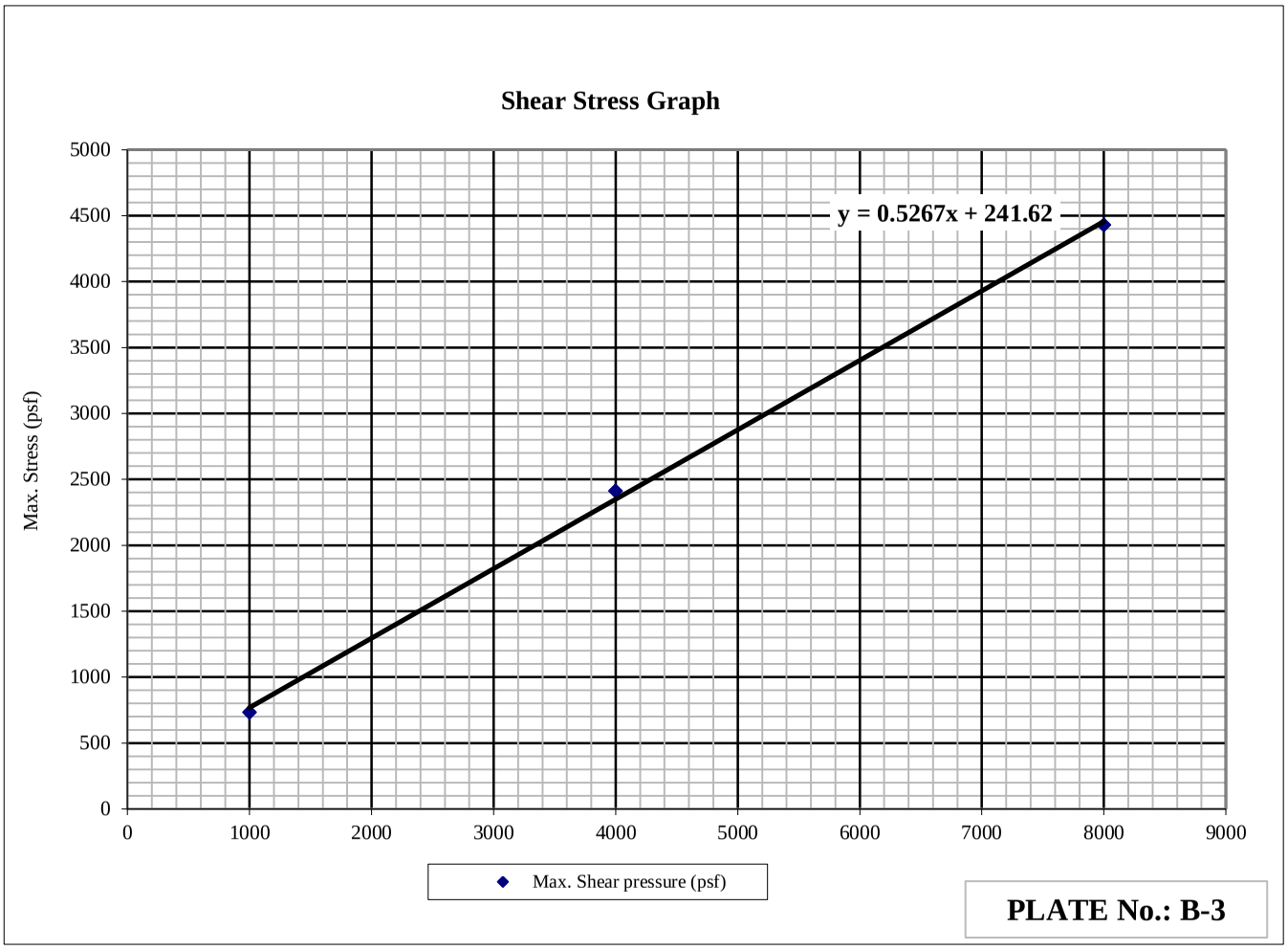

PLATE No.: B-3

STRENGTH INTERCEPT (KSF)= **0.241**
FRICTION ANGLE (θ) PHI in ° = **27.8**
Ave. Degree of saturation: **102.0**
Ave. Initial Voids: **0.72**

Reconstituted relative dry density % **73.7**
Max dry density ASTM D1557 132.5
Ave. Reconstituted dry density (pcf): 97.7

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DIRECT SHEAR TEST

ASTM D3080

DATA

Shear	1.0ksf	4ksf	8ksf
Deflection (in)	1000	4000	8000
0	0	0	0
0.01	336	1356	2244
0.02	444	1608	2796
0.03	516	1788	3252
0.04	552	1932	3588
0.05	600	2040	3852
0.06	636	2148	3984
0.07	660	2172	4044
0.08	684	2208	4056
0.09	696	2208	4140
0.10	720	2196	4200
0.11	732	2196	4236
0.12	732	2208	4212
0.13	708	2220	4260
0.14	696	2208	4332
0.15	660	2208	4380
0.16	660	2220	4404
0.17	648	2280	4416
0.18	648	2316	4428
0.19	636	2316	4428
0.20	636	2340	4416
0.21	624	2364	4428
0.22	624	2412	4428
0.23	636	2376	4404
0.24	636	2364	4416
0.25	624	2340	4368

Applied Load (psf)	x. Shear pressure (	Deflection(in)
1000	732	0.11
4000	2412	0.22
8000	4428	0.18

Water Density (pcf): 62.4

Initial Moisture Density

Sample Dia. (in)	Sample ht. (in)	Vol.(pcf)	sp. gr. (assumed)
2.419	1.00	0.002659616	2.700

	1.0ksf	4ksf	8ksf
Wet sample + ring	193.9	196.6	192.4
Dry sample + dish	171.5	173.7	165.2
wt. Ring	43.4	44.6	44.1
wt dish	55.4	51.5	49.6
wt. Dry soil	116.1	122.2	115.6
wt. Loss moist.	34.4	29.8	32.7
moist. Content%	29.6	24.4	28.3
wet density (pcf)	124.6	125.9	122.8
dry density (pcf)	96.2	101.2	95.7
Vs= (Ws/GS)	43.00	45.26	42.81
Initial Voids Ratio	0.751	0.664	0.759
Degree of Sat.:	**106.4**	**99.0**	**100.5**

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DIRECT SHEAR TEST
ASTM D3080

Slope= 1.896912611

		Degrees -90°	Friction Angle
Slope=	1.09	62.2	27.8
Tan Ø=	1.896913		

Final Moisture Content

Wet of sample + dish(g)	206.3	207.0	199.8
Dry of sample + dish(g)	171.5	173.7	165.2
wt dish (g)	55.4	51.5	49.6
wt. Loss moist.(g)	34.8	33.3	34.6
moist. Content%	30.0	27.3	29.9

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DIRECT SHEAR TEST
ASTM D3080

Lab. Ref. No.: 546

Client: Carl Km Geotechnical
Project: PWAS_20210916
Location: Artesia & Normadie
Remark:

SEG Report No.: G-21-2768
SEG File No.: 47743-1
Date Sampled: 12/15/21
Date Received: 12/15/21
Date Tested: 1/4/22

Boring No.: **CKG-1** Sample No.: R3 Depth(ft): **15.0-15.5ft**

Normal Stress (psf)	Moisture Content Initial (%)	Moisture Content Final (%)	Dry Density (psf)	Peak Stress (psf)	Deflection (in)	Degree Saturation
1000	23.8	25.1	102.7	696	0.09	100.3
4000	23.9	24.8	100.8	2496	0.15	96.1
8000	23.9	24.3	103.4	4932	0.09	102.3
	.		102.3			

Soil Classification:	Sample #1	Sample #2	Sample #3
	Olive Brown SP-SM/SM	Olive Brown SP-SM/SM	Olive Brown SP-SM/SM

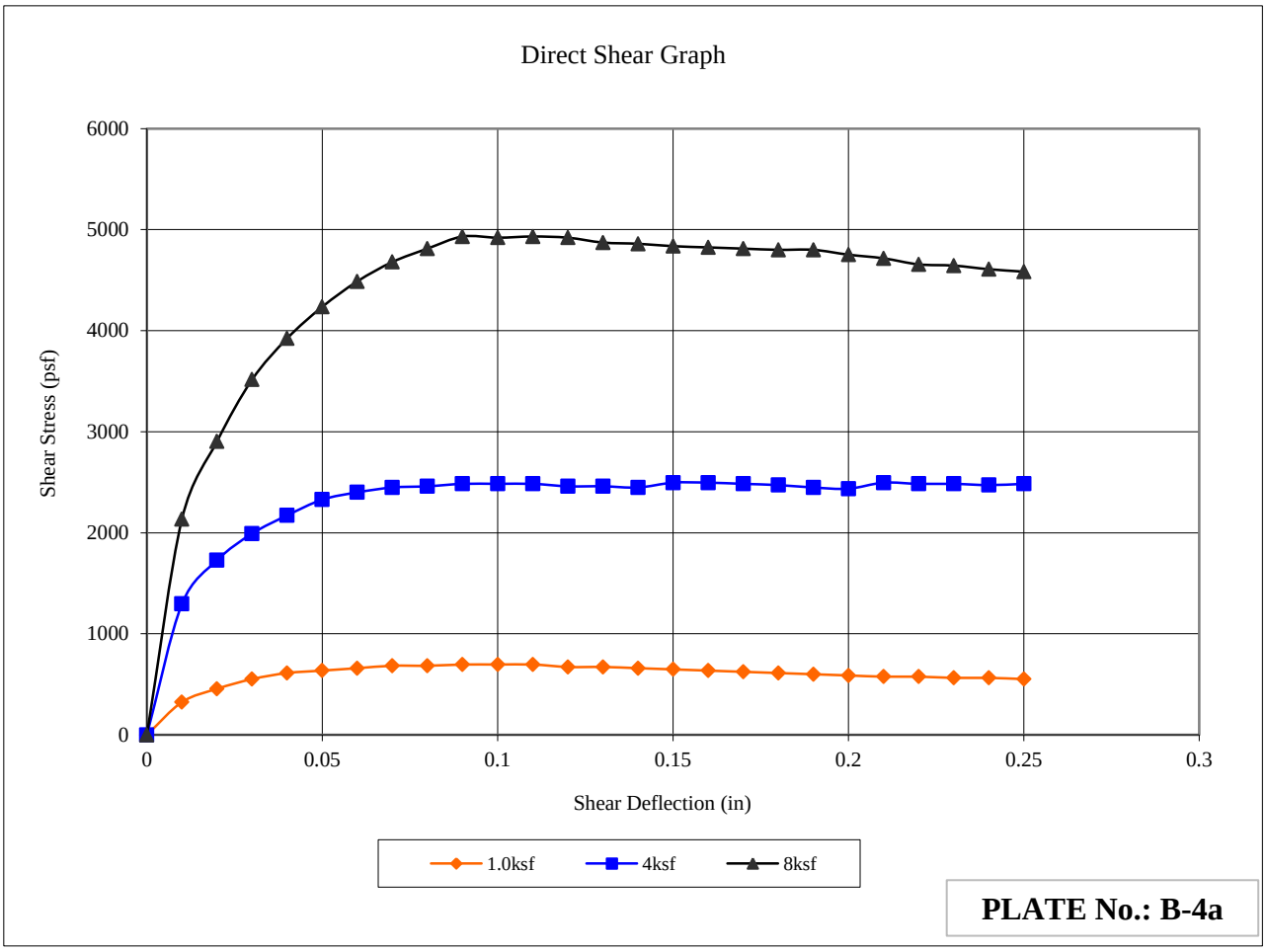

PLATE No.: B-4a

Shear manufacture by: Geomatic
Model: 8804

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Tel. No. (213) 745-5333: Fax No.: (213) 741-8621

DIRECT SHEAR TEST
ASTM D3080

Client:	Carl Km Geotechnical	SEG Report No.:	G-21-2768
Project:	PWAS_20210916	SEG File No.:	47743-1
Location:	Artesia & Normadie	Date Sampled:	12/15/21
Remark:		Date Received:	12/15/21
		Date Tested:	1/4/22

Boring No.: CKG-1 Sample No.: R3 Depth(ft): 15.0-15.5ft

	Sample #1	Sample #2	Sample #3
Soil Classification:	Olive Brown SP-SM/SM	Olive Brown SP-SM/SM	Olive Brown SP-SM/SM

PEAK STRENGTH

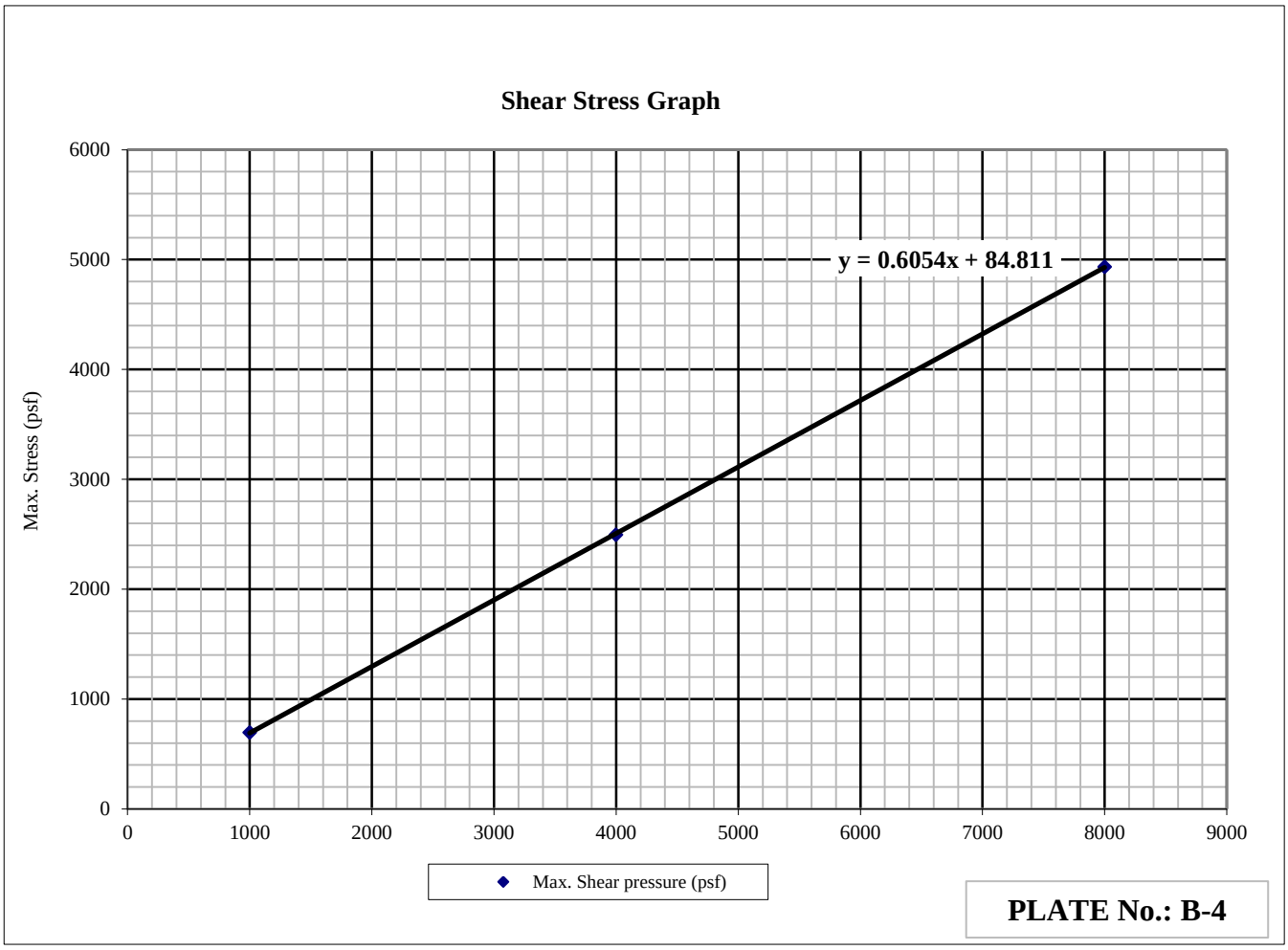

PLATE No.: B-4

STRENGTH INTERCEPT (KSF)= **0.085**
FRICTION ANGLE (θ) PHI in ° = **31.2**
Ave. Degree of saturation: **99.6**
Ave. Initial Voids: **0.65**

Reconstituted relative dry density % **77.2**
Max dry density ASTM D1557 132.5
Ave. Reconstituted dry density (pcf): 102.3

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DIRECT SHEAR TEST

ASTM D3080

DATA

Shear	1.0ksf	4ksf	8ksf
Deflection (in)	1000	4000	8000
0	0	0	0
0.01	324	1296	2136
0.02	456	1728	2904
0.03	552	1992	3516
0.04	612	2172	3924
0.05	636	2328	4236
0.06	660	2400	4488
0.07	684	2448	4680
0.08	684	2460	4812
0.09	696	2484	4932
0.10	696	2484	4920
0.11	696	2484	4932
0.12	672	2460	4920
0.13	672	2460	4872
0.14	660	2448	4860
0.15	648	2496	4836
0.16	636	2496	4824
0.17	624	2484	4812
0.18	612	2472	4800
0.19	600	2448	4800
0.20	588	2436	4752
0.21	576	2496	4716
0.22	576	2484	4656
0.23	564	2484	4644
0.24	564	2472	4608
0.25	552	2484	4584

Applied Load (psf)	x. Shear pressure (	Deflection(in)
1000	696	0.09
4000	2496	0.15
8000	4932	0.09

Water Density (pcf): 62.4

Initial Moisture Density

Sample Dia. (in)	Sample ht. (in)	Vol.(pcf)	sp. gr. (assumed)
2.419	1.00	0.002659616	2.700

	1.0ksf	4ksf	8ksf
Wet sample + ring	197.1	195.9	197.2
Dry sample + dish	173.9	171.7	174.3
wt. Ring	43.6	45.1	42.6
wt dish	49.9	50.0	49.5
wt. Dry soil	124.0	121.7	124.8
wt. Loss moist.	29.5	29.1	29.8
moist. Content%	23.8	23.9	23.9
wet density (pcf)	127.1	124.9	128.0
dry density (pcf)	102.7	100.8	103.4
Vs= (Ws/GS)	45.93	45.07	46.22
Initial Voids Ratio	0.640	0.671	0.629
Degree of Sat.:	**100.3**	**96.1**	**102.3**

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DIRECT SHEAR TEST
ASTM D3080

Slope= 1.651904403

		Degrees -90°	Friction Angle
Slope=	1.03	58.8	31.2
Tan Ø=	1.651904		

Final Moisture Content

Wet of sample + dish(g)	205.0	201.9	204.6
Dry of sample + dish(g)	173.9	171.7	174.3
wt dish (g)	49.9	50.0	49.5
wt. Loss moist.(g)	31.1	30.2	30.3
moist. Content%	25.1	24.8	24.3

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LABORATORY COMPACTION CHARACTERISTICS
ASTM D1557-12

Client: **Carl Kim Geotechnical** | Lab. Ref No.: 546
Project: PWAS_20210916 | SEL File No.: 47743-1
Location: Artesia & Normandie | Date Sampled: 12/15/21
Soil Class: Dark Olive Brown Silty SAND | Date Received: 12/15/21
Source: CKG-1 | Date Tested: 12/22/21
Remarks: B1 *:if 5-25%ret,rock correction reqr'd* | Sampled by: Client

Equipment: Scale: B90416085/B846769478 **Drying:** Oven [X] Burner: [ ] Microwave [ ] *Method A* [X] (+)#4≤25% Calibrated Mold Vol. cc:
Rammer: **Mechnical** 10 lbs [X] **Manual** 10 lbs [ ] PREPARATION: *Method B* [ ] (+) 3/8"≤25%
Pie [ ] Round [X] 5.5 lbs [ ] [X] **Wet** [ ] **Dry** *Method C* [ ] (+) 3/4"≤30%

4" dia.	6" dia
943	2124

Rock Correction: OD Gs.: 0.00 MC%: 9.5 % Ret'd #4 0.3
ZAV Assumed Gs.: 2.70 % Pass #4 99.7 Water density: 62.428 Calibrated Mold Vol. cc: 943
Soil Gs ass: 2.70 Boring No.: CKG-1 Sample No.: **B1** Depth (ft): **2'-5'** Water Density: 62.23

Test no.	1	2	3	4	5
wt. of mold + wet soil (g)	3990.0	4108.0	4137.5	4071.0	
wt. of mold (g)	2001.5	2001.5	2001.5	2001.5	
wt. of wet soil (g)	1988.5	2106.5	2136.0	2069.5	
wet density of soil (g/cc)	2.109	2.234	2.265	2.195	
wt. wet soil + tare (g)	536.0	545.0	613.5	683.0	
wt.dry soil + tare (g)	512.2	507.8	562.0	615.7	
Wt of tare (g)	177.0	134.0	133.5	133.5	
moisture content %	7.1	10.0	12.0	14.0	
Density of soil (pcf)	122.9	126.8	126.2	120.2	
corrected moisture content %					
Density of soil (pcf)corrected					
Dry Density @ ZAV	115	120	125	130	
100 % Saturation @ ZAV	17.1	14.8	12.7	10.8	

sieve size	ret'd (g)	% ret'd
3/4"		
3/8"		
#4	47.5	0.3
Total	**15901.2**	

pass #4 %Moist content 2.5
wet pass #4 (g) 16250.0
dry pass #4 (g) 15853.7
ASTM D127
wt OD (g)
wt SSD
wt in water (g)
OD Gs
moist % 9.5

Max Dry Density (pcf) : **127.1** **OWC %** **10.7** % Saturation: **89.7**
Max Dry Density (pcf) corrected : **OWC % Corr** % Saturation:

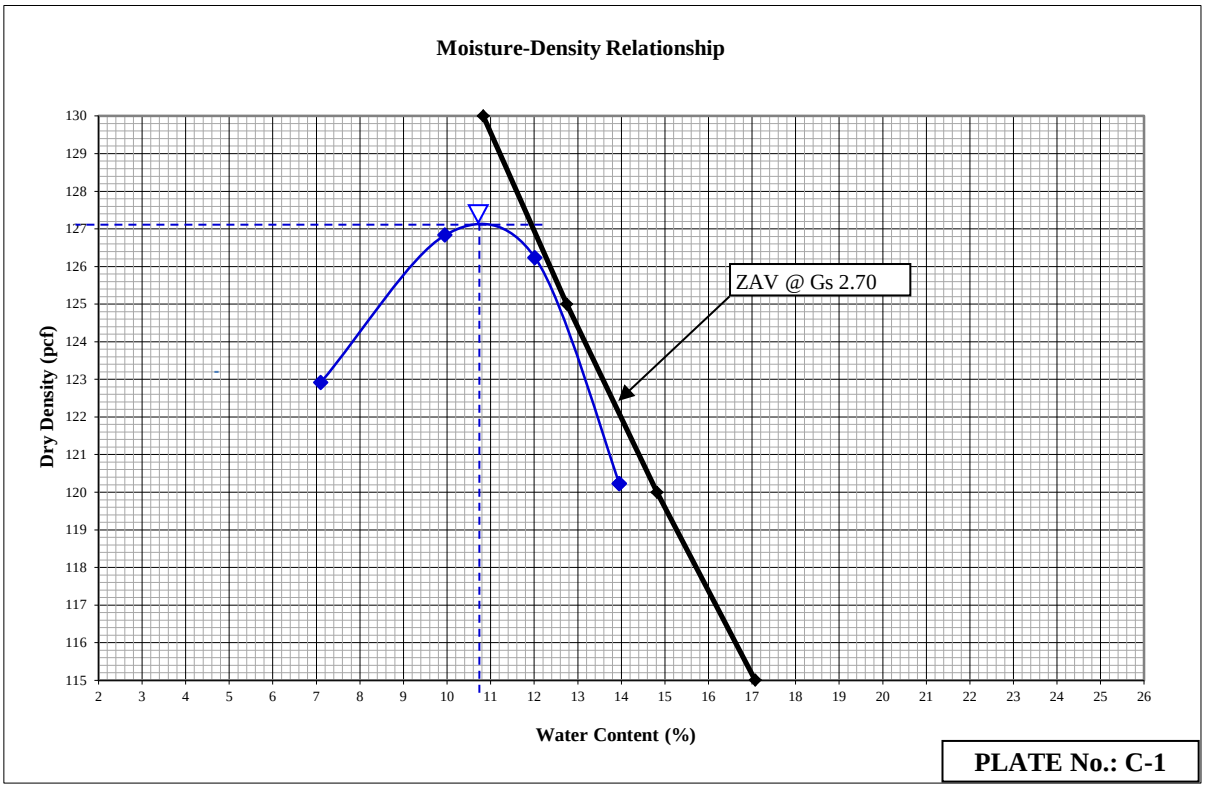

PLATE No.: C-1

Tested by: I. Resurreccion Checked by: A. Cabanilla

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LABORATORY COMPACTION CHARACTERISTICS
ASTM D1557-12

Client: **Carl Kim Geotechnical** | Lab. Ref No.: 547
Project: PWAS_20210916 | SEL File No.: 47743-1
Location: Artesia & Normandie | Date Sampled: 12/15/21
Soil Class: Reddish Brown Silty SAND | Date Received: 12/15/21
Source: CKG-2 | Date Tested: 12/22/21
Remarks: B1 *:if 5-25%ret,rock correction reqr'd* | Sampled by: Client

Equipment: Scale: B90416085/B846769478 **Drying:** Oven [X] Burner: [ ] Microwave [ ] *Method A* [X] (+)#4≤25%
Rammer: **Mechnical** 10 lbs [X] **Manual** 10 lbs [ ] PREPARATION: *Method B* [ ] (+) 3/8"≤25%
Pie [ ] Round [X] 5.5 lbs [ ] [X] **Wet** [ ] **Dry** *Method C* [ ] (+) 3/4"≤30%

Calibrated Mold Vol. cc:	4" dia.	6" dia
	943	2124

Rock Correction: OD Gs.: 0.00 MC%: 9.5 % Ret'd #4 0.7
ZAV Assumed Gs.: 2.70 % Pass #4 99.3 Water density: 62.428 Calibrated Mold Vol. cc: 943
Soil Gs ass: 2.70 Boring No.: CKG-2 Sample No.: **B1** Depth (ft): **2'-5'** Water Density: 62.23

Test no.	1	2	3	4	5
wt. of mold + wet soil (g)	3970.0	4058.0	4155.5	4081.5	
wt. of mold (g)	2001.5	2001.5	2001.5	2001.5	
wt. of wet soil (g)	1968.5	2056.5	2154.0	2080.0	
wet density of soil (g/cc)	2.087	2.181	2.284	2.206	
wt. wet soil + tare (g)	585.0	576.5	564.0	663.0	
wt.dry soil + tare (g)	561.5	544.4	525.1	606.4	
Wt of tare (g)	131.5	127.0	127.5	131.5	
moisture content %	5.5	7.7	9.8	11.9	
Density of soil (pcf)	123.6	126.4	129.9	123.0	
corrected moisture content %					
Density of soil (pcf)corrected					
Dry Density @ ZAV	120	125	130	135	
100 % Saturation @ ZAV	14.8	12.7	10.8	9.1	

sieve size	ret'd (g)	% ret'd
3/4"		
3/8"		
#4	100.0	0.7
Total	**14007.3**	

pass #4 %Moist content 2.5
wet pass #4 (g) 14255.0
dry pass #4 (g) 13907.3
ASTM D127
wt OD (g)
wt SSD
wt in water (g)
OD Gs
moist % 9.5

Max Dry Density (pcf) : **129.9** **OWC %** **9.6** % Saturation: **88.3**
Max Dry Density (pcf) corrected : **OWC % Corr** % Saturation:

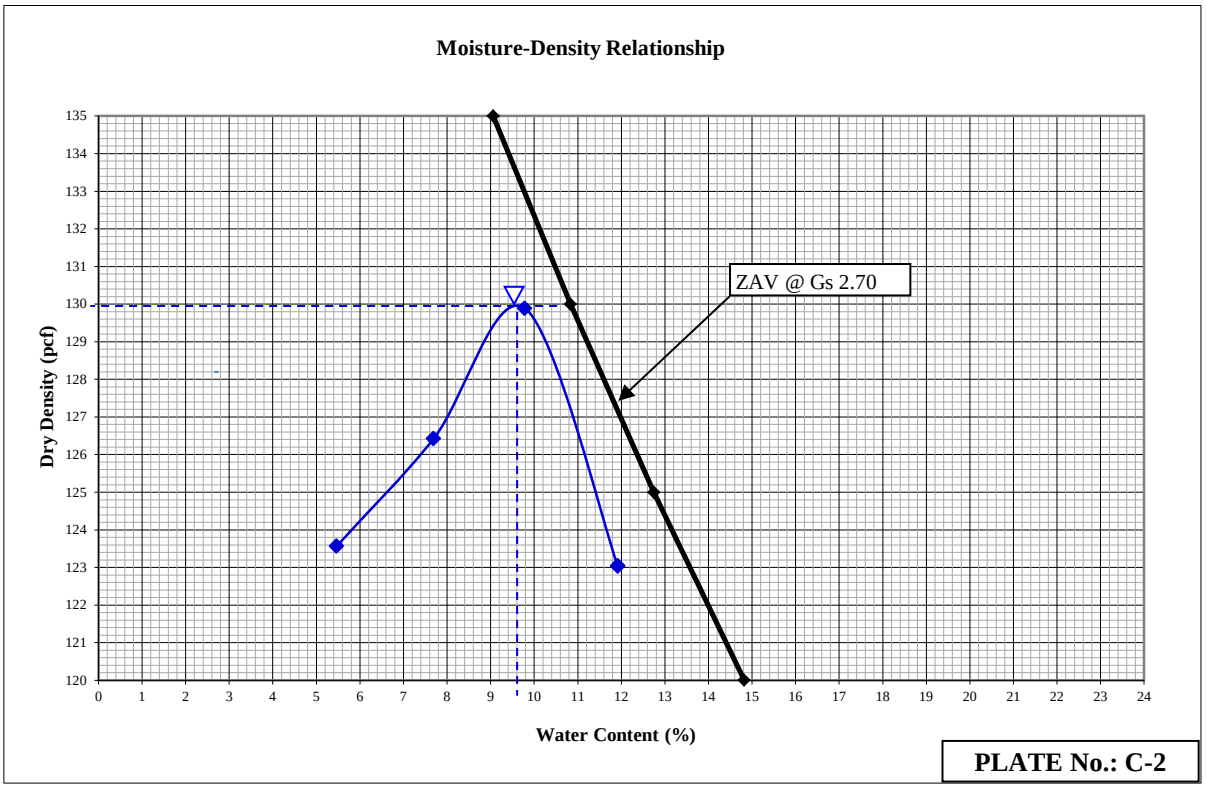

PLATE No.: C-2

Tested by: I. Resurreccion Checked by: A. Cabanilla

SMITH-EMERY LABORATORIES

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Expansion Index

UBC 18-2/ASTM D4829-11

Client: Carl Kim Geotechnical, Inc. | Lab. Ref. No.: 546
Project: PWAS_20210916 | SEL File No.: 47743-1
Location: Artesia & Normandie | Date Sampled: 12/15/21
Material Description: Olive Brown Silty Clayey fine SAND | Date Received: 12/15/21
Boring No.: CKG-1 | Sample No. B-1 | Depth (ft.) 2-5ft | Date Tested: 1/12/22
Equipment: Used: | Ring I.D.: A | Oven: SE SQ-1 | Chamber No.: 1
Balance: B846769478 | 5 #Rammer: SE SH-1

						Height Measurement
Area of specimen (in^2)	12.57	Initial Ht. (in)	1.0000	Final Ht. (in)	1.0417	1.0000
Ring Diameter (in)	4.00	Initial Vol. ft^3	0.00727	Final Vol. ft^3	0.00758	1.0000
Undisturbed Sample		Assumed sp. gr. of soil =		2.700		1.0000
Remolded Sample	X	% Saturation:	(%mcx sp.grx Dd)/(sp.grx 62.4-Dd)			1.0000

Initial Moisture content	
wt.wet soil + tare	380.60
wt. of dry soil + tare	369.70
wt. of tare	252.00
Moisture content %	9.3

REMARKS
Sampled by VMK

Moisture and Density Data

	Initial	Final
Wt. of wet soil + Ring	769.9	812.2
Wt. of dry soil+ Ring	734.3	734.3
Wt. of Moisture	35.6	77.9
Wt. of Ring	366.9	366.9
Wt of dry soil	367.4	367.4
Moisture Content %	9.7	21.2
Wet Density (pcf)	122.1	129.5
Dry Density (pcf)	111.3	106.8
% Saturation	51	99

Date	Time	Time Lapsed	Load (kPa)/(psi)	Dial Reading	deflection (in.)	
1/12/22	14:26:00 AM		0	0.0000	0.0000	
			6.9 kPa/ 1 psi	0.0000	0.0000	
	14:36:00 AM	10 min		0.0045	0.0045	
		6sec	Saturated	0.0046		
1/12/22		15sec		0.0042	0.0003	
		30sec		0.0036	0.0009	
		1min		-0.0001	0.0046	
		2min		-0.0041	0.0086	
		4min		-0.0098	0.0143	
		8min		-0.0169	0.0214	
		15min		-0.0249	0.0294	
		30min		-0.0299	0.0344	
	15:36	1hr		-0.0362	0.0407	REPORT
	16:36	2hrs		-0.0379	0.0424	AS
1/13/22	10:36	20hrs		-0.0417	0.0462	
				EI 50	**46**	**46**

*Note: **EI 50** prepare the test specimen in accordance with 8.1-8.4 to achieve degree of saturation 50 ±2%. The deformation of the specimen is recorded for 24H or until the rate of deformation becomes less than 0.0002 in/h.whichever occur first. A minimum recording time of 3 h is required Report EI zero (0) when result is negative (-).*

TABLE 18-1-B

Expansion Index	Potential Expansion Result	
0 - 20	.....	VERY LOW
21 - 50	.....	**LOW**
51 - 90	.....	MEDIUM
91 - 130	.....	HIGH
> 130	.....	VERY HIGH

PLATE NO.: D-1

Tested By: A. Cabanilla | Checked By: A. Cabanilla

SMITH-EMERY LABORATORIES

791/781 E. Washington Blvd., Los Angeles CA 90021
Tel.No.: (213) 745-5333; Fax No. (213) 741-8621

Expansion Index

UBC 18-2/ASTM D4829-11

Client: Carl Kim Geotechnical. | Lab. Ref. No.: 547
Project: PWAS_20210916 | SEL File No.: 47743-1
Location: Artesia & Normandie | Date Sampled: 12/15/21
Material Description: Olive Brown Silty SAND | Date Received: 12/15/21
Boring No.: CKG-2 | Sample No. B1 | Depth (ft.) 2-5ft | Date Tested: 1/4/22
Equipment: Used: | Ring I.D.: C | Oven: SE SQ-1 | Chamber No.: 1
Balance: B846769478 | 5 #Rammer: SE SH-1

						Height Measurement
Area of specimen (in^2)	12.57	Initial Ht. (in)	1.0000	Final Ht. (in)	1.0122	1.0000
Ring Diameter (in)	4.00	Initial Vol. ft^3	0.00727	Final Vol. ft^3	0.00736	1.0000
Undisturbed Sample		Assumed sp. gr. of soil =			2.700	1.0000
Remolded Sample	X	% Saturation: (%mc*x* sp.gr*x* Dd)/(sp.gr*x* 62.4-Dd)				1.0000

Initial Moisture content	
wt.wet soil + tare	261.5
wt. of dry soil + tare	253.7
wt. of tare	160.0
Moisture content %	8.3

REMARKS
Sampled by client

Moisture and Density Data

	Initial	Final
Wt. of wet soil + Ring	776.6	808.7
Wt. of dry soil+ Ring	745.0	745.0
Wt. of Moisture	31.6	63.7
Wt. of Ring	366.1	366.1
Wt of dry soil	378.9	378.9
Moisture Content %	8.3	16.8
Wet Density (pcf)	124.3	132.4
Dry Density (pcf)	114.8	113.4
% Saturation	48	93

Date	Time	Time Lapsed	Load (kPa)/(psi)	Dial Reading	deflection (in.)	
1/4/22	12:53		0	0.0000	0.0000	
			6.9 kPa/ 1 psi	0.0000	0.0000	
	13:03	10 min		0.0039	0.0039	
		6sec	Saturated	0.0040		
1/4/22		15sec		0.0041	-0.0002	
		30sec		0.0047	-0.0008	
		1min		0.0030	0.0009	
		2min		0.0024	0.0015	
		4min		-0.0011	0.0050	
		8min		-0.0048	0.0087	
		15min		-0.0064	0.0103	
		30min		-0.0074	0.0113	
	14:03	1hr		-0.0083	0.0122	REPORT
	15:03	2hr		-0.0095	0.0134	AS
1/5/21	9:03	21hr		-0.0122	0.0161	
				EI $_{50}$	**16**	**16**

*Note: **EI $_{50}$** prepare the test specimen in accordance with 8.1-8.4 to achieve degree of saturation 50 ±2%. The deformation of the specimen is recorded for 24H or until the rate of deformation becomes less than 0.0002 in/h.whichever occur first. A minimum recording time of 3 h is required Report EI zero (0) when result is negative (-).*

TABLE 18-1-B

Expansion Index	Potential Expansion Result
0 - 20	..... **VERY LOW**
21 - 50	..... LOW
51 - 90	..... MEDIUM
91 - 130	..... HIGH
> 130	..... VERY HIGH

PLATE NO.: D-2

Tested By: E. Dela Cruz | Checked By: A. Cabanilla

SMITH-EMERY Laboratories

Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

791/781 East Washington Blvd., Los Angeles, CA

Tel. No.: (213) 745-5333; Direct (213)699-7807; Fax No.: (213) 741-8621

ASTM D2216

Client: Carl Kim
Project Name: PWAS_20210916
Location: Aertesia & Normandie

Lab. Ref. No. 546-547
SEG File No.: 47743-1
Date Sampled: 12/15/21
Date Received: 12/15/21
Date Tested: 12/20/21
Sampled by: Client

CKG-1 & CKG-2

MOISTURE CONTENT

Boring No.	Sample No.	Sample Depth (ft)	Soil Description	wet wt (g)	dry wt (g)	can wt (g)	can no	moist. cont. (%)
CGK-1	SPT-1	7.5-8.0	Brown Silty SAND	202.6	184.5	49.7	3	13.4
	SPT-2	12.5-13	Brown Silty SAND	229.1	194.9	51.9	34	23.9
	SPT-3	20-20.5	Brown Silty SAND	213.4	194.2	54.7	66	13.8
	SPT-4	30-30.5	Brown Silty SAND	233.3	199.9	50.8	110	22.4
	SPT-5	40-40.5	Brown Silty SAND	231.9	195.6	49.4	146	24.8
	G-1	45.5	Brown Silty SAND	338.2	281.1	49.7	155	24.7
CKG-2	SPT-1	5.0-5.5	Yellowish Brown Silty SAND	290.2	260.1	50.5	24	14.4
	SPT-2	15.0-15.5	Brown Silty SAND	258.0	237.1	51.7	46	11.3
	SPT-3	20.0-20.5	Olive Brown Silty SAND	270.6	232.7	51.4	79	20.9
	SPT-4	25.0-25.5	Brown Silty SAND	295.8	267.7	50.1	89	12.9
	SPT-5	30.0-30.5	Brown Silty SAND	295.1	252.5	49.1	98	20.9
	SPT-6	40.0-40.5	Brown Silty SAND	292.7	244.9	50.5	122	24.6
	SPT-7	50.0-50.5	Brown Silty SAND	287.9	250.4	50.3	143	18.7
	SPT-8	60.0-60.5	Brown Silty SAND	297.3	250.3	49.8	174	23.4

Tested By: E. Dela Cruz
Checked By: A.Cabanilla

Date Tested: 12/20/21
Date Checked: 12/21/21

PLATE NO.: E

SMITH-EMERY Laboratories

MOISTURE CONTENT AND IN SITU DENSITY DETERMINATIONS AND DEGREE OF SATURATION

791/781 East Washington Blvd., Los Angeles, CA

Tel. No.: (213) 745-5333; Fax No.: (213) 741-8621

ASTM D2216/1587

Client: Carl Kim | Lab. Ref. No.: 546-547

Project Name: PWAS_20210916 | SEG File No.: 47743-1

Location: Artesia & Normandie | Date Sampled: 12/15/21

Date Received: 12/15/21

BH No.: **CKG-1 & 2** Sp.gr. 2.650 | Date Tested: 12/27/21

Ring dia: 2.416 Area in^2 4.584 | Sampled by: Client

				DENSITY OF SAMPLE					**MOISTURE CONTENT**						
Boring No.	Sample No.	Sample Depth (ft)	Soil Description	Sample Ht (in)	Wt. of soil & Rings (g)	Wt. of Rings (g)	wet Density pcf	Dry Density Pcf	wet wt (g)	dry wt (g)	can wt (g)	can no	moist. cont. (%)	initial Void e	% Saturation
CKG-1	R-1	5.0-5.5	Brown Silty SAND (Fill)	5	1020.8	220.0	133.0	116.9	186.0	169.5	49.6	4	13.8	0.41	87.9
	R-4	25-25.5	Olive Brown Silty SAND	6	1199.5	262.8	129.6	106.3	207.4	179.0	49.8	13	22.0	0.56	104.7
	R-5	35-35.5	Olive Brown Silty SAND	6	1206.9	265.8	130.2	107.4	210.1	182.1	50.0	31	21.2	0.54	104.2
	R-6	45-45.5	Brown Silty SAND	6	1211.7	265.9	130.9	105.0	204.6	174.7	53.6	43	24.7	0.58	113.7
CKG-2	R-1	10-10.5	Brown Silty SAND	6	1169.6	264.2	125.3	111.5	193.9	178.1	49.9	58	12.3	0.48	67.7
	R-2	17.5-18	Brown Silty SAND	6	1193.2	256.9	129.6	115.2	204.1	187.6	55.5	61	12.5	0.44	76.0
	R-3	22.5-23	Brown Silty SAND	6	1172.3	268.4	125.1	110.6	200.0	183.1	54.2	69	13.1	0.50	70.1
	R-4	27.5-28	Olive Brown Silty SAND	6	1150.1	265.3	122.4	99.7	202.0	173.7	49.4	93	22.8	0.66	91.7
	R-5	35-35.5	Olive Brown Silty SAND	6	1169.9	259.2	126.0	104.6	200.9	175.3	50.5	109	20.5	0.58	93.5
	R-6	45-45.5	Brown Silty SAND	6	1194.3	259.1	129.4	104.8	199.3	171.1	51.2	118	23.5	0.58	107.8
	R-7	55-55.5	Brown Silty SAND	6	1147.4	270.6	121.3	91.4	192.9	157.6	49.9	128	32.8	0.81	107.3
	R-8	65-65.5	Gray SP-SM/Silty SAND	6	1167.6	266.8	124.6	100.5	199.1	170.1	49.2	167	24.0	0.64	98.6

Tested By: E. Dela Cruz | Date Tested: 12/27/21

Checked By: A.Cabanilla | Date Checked: 1/3/22

PLATE NO.: F

SMITH-EMERY Laboratories

791/781 E. Washington Blvd., Los Angeles CA 90021
Tel.No.: (213) 745-5333; Fax No. (213) 741-8621

Materials Finer Than No. 200 (75-µm) Sieve
ASTM D1140-17

Client: **Carl Kim Geotechnical**
Project: PWAS_20210916
Location: Artesia & Normandie
Source: on site
Description: see box description
Method: A [X] Without dispersed prior to wash sieve
B [ ] Dispersed by soaking in water containing a deflocculating agent (Hexametaphospate) prior washed sieve.

Lab. Ref. No.: 547
SEL File No.: 47743-1
Date Sampled: 12/15/21
Date Received: 12/15/21
Date Tested: 1/11/22
Sampled By: Client

MATERIAL PASSING SIEVE #200

SOAK TIME (Hrs or in Minutes)	2Hr	3Hrs								
Boring No.										
Sample No.	1	2								
Depth (ft)										
Description	Olv Brw Silty SAND									
Dish No.	89									
A). wt. of dry soil + can before wash (g)	267.7									
B). wt. dry soil + can after washed (g)	187.0									
C). wt. of soil passing sieve #200 (g) = (A-B)	80.7									
D). wt. of can (g)	50.1									
E). wt of dry soil before wash (g) = (A-D)	217.6									
F). Matls Finer than #200 sieve % =(C)/(E) x100	**37.1**									

Mass of Test Specimen (Dry mass)

Max particle size (100% passing)	0.425mm	2mm of less	4.75 mm	9.5mm	19.0 mm	25.4mm	38.1mm	50.8 mm	76.2mm
Standard Sieve Size	No.40	No.10	No.4	3/8"	3/4"	1 "	1 1/2"	2"	3"
Min. Mass of Test Specimens if reported to the nearest 0.1%	75g	100g	200g	-	-	-	-	-	-
Min. Mass of Test Specimens if reported to the nearest 1%	-	-	-	165 g	1.3 kg	3 kg	10 kg	25kg	70kg

Note: Water temperature should not exceed 32°C (90°F) during spraying (washing) to avoid expanding the sieve fabric.
2) Used two sieves which larger openning (sieve No. 40 or larger) on top of sieve no. 200.

Tested by: E. Dela Cruz
Checked by: A. Cabanilla

PLATE NO.: G

Standard: ASTM D1140
Rev.3: Date: September 24,2019

S M I TH- E M E RY LABORATORIES
1195 N. Tustin, Anaheim, CA 92807 Tel. (714) 238-6133 Fax (714) 238-6144

R-VALUE (CT 301/ ASTM D2844)

Lab Report # A22-001

Client: Smith Emery Los Angeles — Report Date: 01/12/22
Project: PWAS_20210916 — Tested By: CL — Date 01/11/22
Project #: 47743-1 — Checked By: CL — Date 01/12/22
Project/Site: On Site
Sample Location: Artesia & Normandie — BH No.: **CGK-1** — Sampled By: VMK
Description: **Brown Silty Sand** — Sample No.: B-1 — Date: 12/15/21
Depth (ft): 2-5ft

Test Specimen ID:	A	B	C	D
Prepared weight (g)	1100	1100	1100	
Compaction Foot Pressure (psi)	150	150	150	
Initial Moisture, %	10.0	10.0	10.0	
Soak Water (ml)	35	35	35	
Water Added for Saturation (g)	31	15	0	
Moisture at Compaction, %	16.6	15.0	13.5	
Exudation Load (Lb.)				
Exudation Pressure (psi)	**216**	**334**	**558**	
Height of Specimen, (in.)	2.34	2.58	2.54	
Wt. of Specimen & Mold (g)	3035	3170	3115	
Wt. of Mold (g)	2098	2094	2100	
Wt. of Specimen (g)	937	1076	1015	
Dry Density (pcf)	104.1	109.9	106.7	
Expansion Dial Reading, In.	0.0005	0.001	0.0021	
Expansion Pressure (psi)	0.152	0.303	0.636	
Stabilometer P_H @ 2000lb (160psi)	96	82	51	
Turns Displacement, d	4.57	4.05	3.83	
R-Value By Stabilometer	**27**	**37**	**58**	
R-Value By Stab. (corrected)	**23**	**37**	**58**	
Thickness by Stabilometer, in	14.7	12.1	8.0	
Thickness by Exp. Pressure, in	2.0	4.0	8.5	

Equilibrium Thickness, in = 8 (from right chart below)

Initial Moisture:

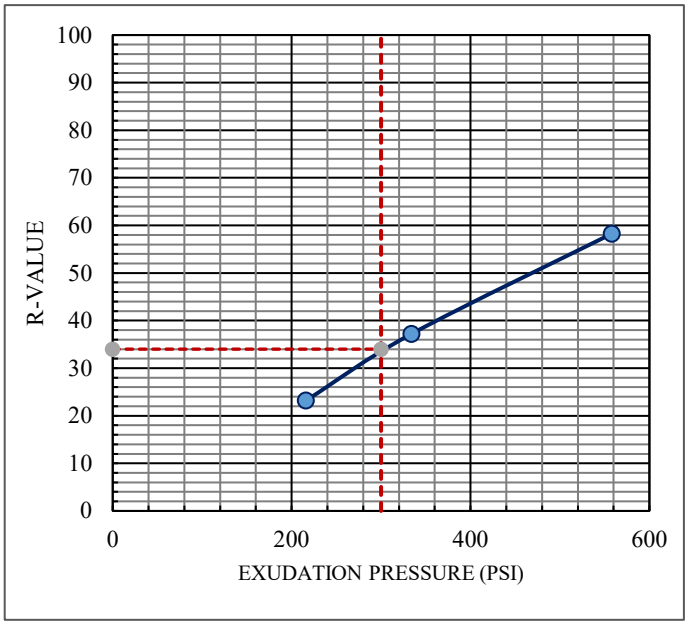
Mass of Wet Soil + Can, g =	100.0
Mass of Can,g =	0.0
Oven-dry Soil +Can,g =	90.9
Moisture Content,% =	10.0

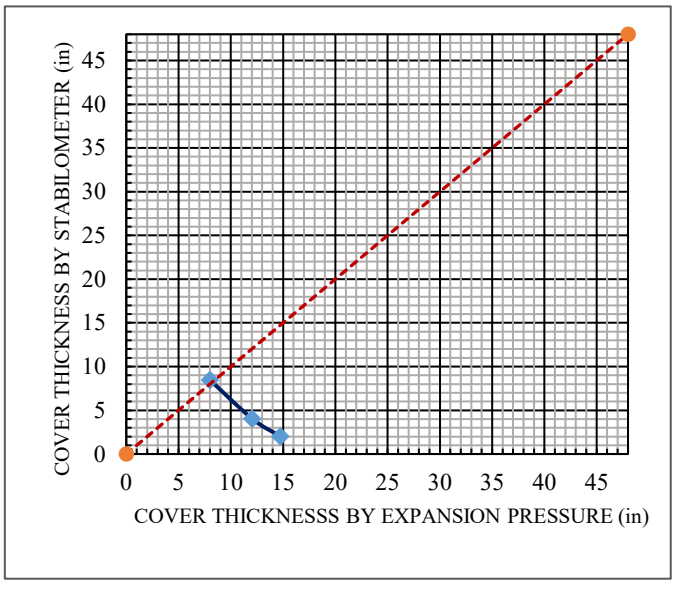
Pavement/Traffic Data

Surface	
Base	
Subbase	

Gravel Equivalent Factor (Gf)

Gf =	1.00
Traffic Index, TI=	5.0 (assumed)
Unit Mass of Cover Mat. =	130 (pcf)
Spring Constant for deflection	303 psi/in





R-VALUE RESULT

BY EXPANSION PRESSURE:	58
BY EXCUDATION PRESSURE (from left chart):	34
R-VALUE, AT EQUILIBRIUM:	**34**

Remarks

S M I TH- E M E RY LABORATORIES
1195 N. Tustin, Anaheim, CA 92807 Tel. (714) 238-6133 Fax (714) 238-6144

R-VALUE (CT 301/ ASTM D2844)

Lab Report # A22-001

Client: Smith Emery Los Angeles — Report Date: 01/12/22
Project: PWAS_20210916 — Tested By: CL — Date 01/11/22
Project #: 47743-1 — Checked By: CL — Date 01/12/22
Project/Site: On Site
Sample Location: Artesia & Normandie — BH No.: **CGK-2** — Sampled By: VMK
Description: **Brown Silty Sand** — Sample No.: B-1 — Date: 12/15/21
Depth (ft) 2-5ft

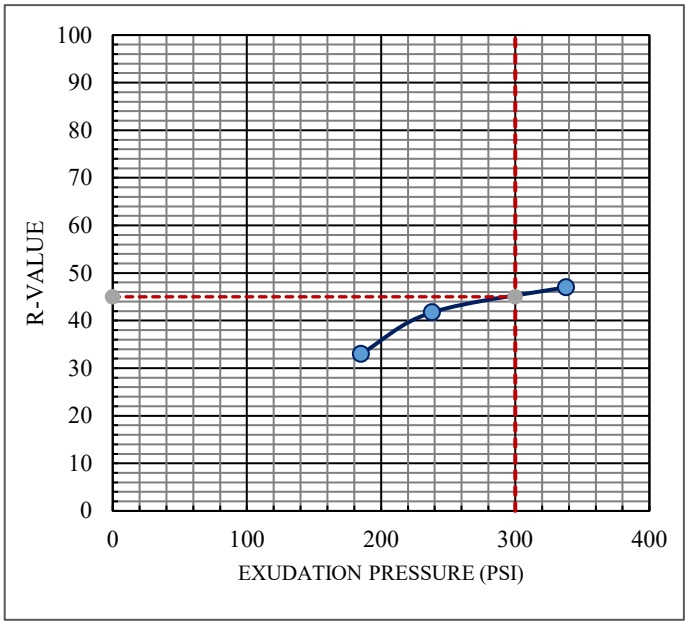
Test Specimen ID:	A	B	C	D
Prepared weight (g)	1100	1100	1100	
Compaction Foot Pressure (psi)	150	150	150	
Initial Moisture, %	7.0	7.0	7.0	
Soak Water (ml)	45	45	45	
Water Added for Saturation (g)	21	11	0	
Moisture at Compaction, %	13.4	12.4	11.3	
Exudation Load (Lb.)				
Exudation Pressure (psi)	**185**	**238**	**338**	
Height of Specimen, (in.)	2.42	2.48	2.41	
Wt. of Specimen & Mold (g)	3174	3168	3165	
Wt. of Mold (g)	2095	2100	2094	
Wt. of Specimen (g)	1079	1068	1071	
Dry Density (pcf)	119.2	116.2	121.0	
Expansion Dial Reading, In.	0.0015	0.0025	0.0039	
Expansion Pressure (psi)	0.455	0.758	1.182	
Stabilometer P_H @ 2000lb (160psi)	76	65	53	
Turns Displacement, d	4.89	5.1	5	
R-Value By Stabilometer	**36**	**42**	**50**	
R-Value By Stab. (corrected)	**33**	**42**	**47**	
Thickness by Stabilometer, in	12.9	11.2	10.2	
Thickness by Exp. Pressure, in	6.0	10.1	15.7	

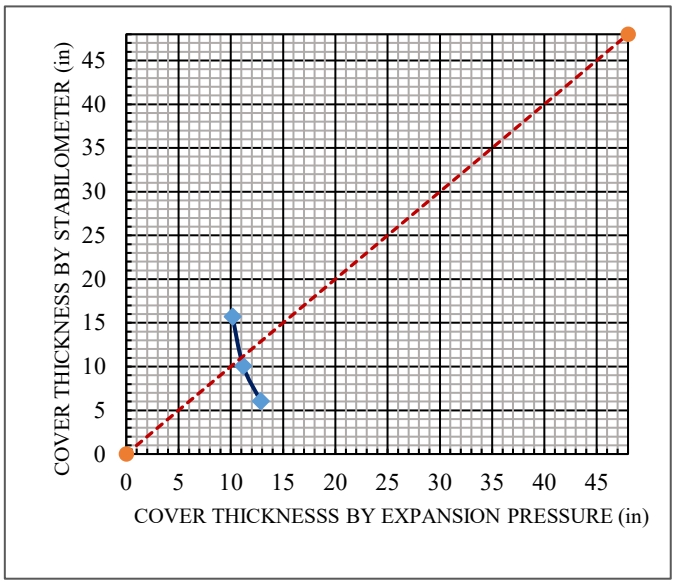
Equilibrium Thickness, in = 11 (from right chart below)

Initial Moisture:
Mass of Wet Soil + Can, g = 100.0
Mass of Can,g = 0.0
Oven-dry Soil +Can,g = 93.5
Moisture Content,% = 7.0

Pavement/Traffic Data
Surface
Base
Subbase

Gravel Equivalent Factor (Gf)
Gf = 1.00
Traffic Index, TI= 5.0 (assumed)
Unit Mass of Cover Mat. = 130 (pcf)
Spring Constant for deflection 303 psi/in





R-VALUE RESULT

BY EXPANSION PRESSURE:	43
BY EXCUDATION PRESSURE (from left chart):	45
R-VALUE, AT EQUILIBRIUM:	**43**

Remarks

POSITIVE LAB SERVICE

781 East Washington Blvd., Los Angeles, CA 90021
(213) 745-5312 FAX (213) 745-6372

January 06, 2022

Angelito Cabanilla
Smith Emery Laboratories
791 East Washington Blvd.
Los Angeles, CA 90021

Report No.: 2112418
Project Name: Carl Kim Geotechnical PWAS_20210916, Artesia & Normandie / 47743-1

Dear Angelito Cabanilla,

This report contains the analytical results for the sample(s) received under chain of custody(s) by Positive Lab Service on December 22, 2021.

The test results in this report are performed in compliance with ELAP accreditation requirements for the certified parameters. The laboratory report may not be produced, except in full, without the written approval of the laboratory.

The issuance of the final Certificate of Analysis takes precedence over any previous Preliminary Report. Preliminary data should not be used for regulatory purposes. Authorized signature(s) is provided on final report only.

If you have any questions in reference to this report, please contact your Positive Lab Service coordinator.

Project Manager

POSITIVE LAB SERVICE

781 East Washington Blvd., Los Angeles, CA 90021
(213) 745-5312 FAX (213) 745-6372

Certificate of Analysis

Smith Emery Laboratories
791 East Washington Blvd.
Los Angeles, CA 90021

Attn: Angelito Cabanilla Phone: (213) 745-5333 FAX:(213) 746-0744

File #:73419
Report Date: 01/06/22
Submitted: 12/22/21
PLS Report No.: 2112418

Project: Carl Kim Geotechnical PWAS_20210916, Artesia & Normandie / 47743-1

Sample ID: CKG-1 @ 2-5' Soil (2112418-01) Sampled: 12/15/21 00:00 Received: 12/22/21 10:15

Analyte	Results	Flag	D.F.	Units	PQL		Prep/Test Method	Prepared	Analyzed	By	Batch
Resistivity, Minimum	**930**		1	ohm-cm	1.00	-	CTM 643	12/29/21	12/29/21	dd	BL13023
Analyte	Results	Flag	D.F.	Units	PQL		Prep/Test Method	Prepared	Analyzed	By	Batch
Soluble Chloride	**193**		1	mg/kg	5.00	-	EPA 300.0M	12/28/21	01/03/22	dd	BL11328
Soluble Sulfate	**841**		5	mg/kg	25.0	-	EPA 300.0M	12/28/21	01/04/22	dd	BL11328
Analyte	Results	Flag	D.F.	Units	PQL		Prep/Test Method	Prepared	Analyzed	By	Batch
pH	**7.9**		1	pH Units	0.1	-	EPA 9045C	12/28/21	12/28/21	vc	BL13018

Sample ID: CKG-2 @ 2-5' Soil (2112418-02) Sampled: 12/15/21 00:00 Received: 12/22/21 10:15

Analyte	Results	Flag	D.F.	Units	PQL		Prep/Test Method	Prepared	Analyzed	By	Batch
Resistivity, Minimum	**651**		1	ohm-cm	1.00	-	CTM 643	12/29/21	12/29/21	dd	BL13023
Analyte	Results	Flag	D.F.	Units	PQL		Prep/Test Method	Prepared	Analyzed	By	Batch
Soluble Chloride	**308**		5	mg/kg	25.0	-	EPA 300.0M	12/28/21	01/04/22	dd	BL11328
Soluble Sulfate	**685**		5	mg/kg	25.0	-	EPA 300.0M	12/28/21	01/04/22	dd	BL11328
Analyte	Results	Flag	D.F.	Units	PQL		Prep/Test Method	Prepared	Analyzed	By	Batch
pH	**7.8**		1	pH Units	0.1	-	EPA 9045C	12/28/21	12/28/21	vc	BL13018

Quality Control Data

Analyte		Result	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch BL11328 - -											
Blank		**Prepared: 12/28/21 Analyzed: 01/03/22**									
Soluble Chloride		ND	5.00	mg/kg							
Soluble Sulfate		ND	5.00	mg/kg							
LCS		**Prepared: 12/28/21 Analyzed: 01/03/22**									
Soluble Chloride		75.7	5.00	mg/kg	100.0		75.7	70-130			
Soluble Sulfate		90.3	5.00	mg/kg	100.0		90.3	70-130			
Duplicate	**Source: 2112418-01**	**Prepared: 12/28/21 Analyzed: 01/04/22**									
Soluble Chloride		397	25.0	mg/kg		193			69.2	30	V-2
Soluble Sulfate		1030	25.0	mg/kg		841			20.0	30	
Matrix Spike	**Source: 2112418-01**	**Prepared: 12/28/21 Analyzed: 01/03/22**									
Soluble Chloride		210	5.00	mg/kg	50.00	193	34.5	70-130			M
Matrix Spike	**Source: 2112418-01**	**Prepared: 12/28/21 Analyzed: 01/04/22**									
Soluble Sulfate		732	25.0	mg/kg	250.0	841	NR	70-130			M
Matrix Spike Dup	**Source: 2112418-01**	**Prepared: 12/28/21 Analyzed: 01/03/22**									
Soluble Chloride		214	5.00	mg/kg	50.00	193	42.6	70-130	20.9	30	M
Matrix Spike Dup	**Source: 2112418-01**	**Prepared: 12/28/21 Analyzed: 01/04/22**									
Soluble Sulfate		723	25.0	mg/kg	250.0	841	NR	70-130	NR	30	M
Batch BL13018 - -											
Duplicate	**Source: 2112418-01**	**Prepared & Analyzed: 12/28/21**									
pH		7.9	0.1	pH Units		7.9			0.253	5	

POSITIVE LAB SERVICE

781 East Washington Blvd., Los Angeles, CA 90021
(213) 745-5312 FAX (213) 745-6372

Certificate of Analysis

Smith Emery Laboratories
791 East Washington Blvd.
Los Angeles, CA 90021

Attn: Angelito Cabanilla Phone: (213) 745-5333 FAX:(213) 746-0744

File #:73419
Report Date: 01/06/22
Submitted: 12/22/21
PLS Report No.: 2112418

Project: Carl Kim Geotechnical PWAS_20210916, Artesia & Normandie / 47743-1

Notes and Definitions

V-2	Out-of-Range recovery was due to sample Heterogeneity.
M	Matrix interference
NA	Not Applicable
ND	Analyte NOT DETECTED at or above the detection limit
NR	Not Reported
MDL	Method Detection Limit
PQL	Practical Quantitation Limit

Environmental Laboratory Accreditation Program Certificate No. 1131, Mobile Lab No. 2534, LACSD No. 10138

Authorized Signature(s)

791/781 East Washington Blvd., Los Angeles, CA 90021
Tel. No. (213) 745-5333;Fax No. (213) 741-8621

Chain of Custody

12/22/18

Client: CARL KIM GEOTECHNICAL Date: 12/22/2021 Page 1 of 1

Project Name: PWAS-20210916 Project No.: 47743-1

Location: ARTESIA & NORMANDIE Source: ON SITE Sampled By: CLIENT

Sample Number	Boring No. / Depth in Ft.	Description	Date Sampled	Time	Container Type	No.	Test Requested and Standard
B1	CKG-1 @ 2-5'	SOIL / SILTY SAND	12/15/21	—	PLASTIC	1	PH VALUE, MIN. RESISTIVITY, SOL. SULFATE, SOL. CHLORIDE
B1	CKG-2 @ 2-5'	SOIL / SILTY SAND	12/15/21	—	PLASTIC	1	PH VALUE, MIN. RESISTIVITY, SOL. SULFATE, SOL. CHLORIDE

Turnaround Time: Same Day 24hr (5 day) Other: _____

Results Attn: ANGELITO Phone / Fax #: _____ / _____

CHAIN OF CUSTODY:

1. _____ (Signature) Lab Manager (Title) 12/22/21 10:15 (Inclusive Dates)
2. _____ (Signature) Lab Manager (Title) 12/22/21 @ 10:15AM (Inclusive Dates) Δ.T. (#12 CF = 0.4) 25°C
3. _____ (Signature) _____ (Title) _____ (Inclusive Dates)

GEOTECHNICAL LABORATORY TESTS BY OTHERS

PTS File No: 36244
Client: SECOR International

DRY BULK DENSITY OF IN-PLACE SOIL and TOTAL POROSITY (CALCULATED)

(METHODOLOGY: ASTM D2937, calculation)

PROJECT NAME Gardena Sump S
PROJECT NO: 37BP.XB006.06

SAMPLE ID.	DEPTH, ft.	TOTAL SAMPLE VOLUME, cc	MOISTURE CONTENT, % wt	VOLUMETRIC WATER CONTENT, fraction Vb	DRY BULK DENSITY, g/cc	TOTAL (1) POROSITY, fraction Vb	VOLUME OF SOLIDS, cc	VOLUME OF VOIDS, cc	VOID RATIO	SATURATION
SV07-PT-6.0	6.0-6.30	99.40	14.4	0.230	1.60	0.407	59.0	40.4	0.686	0.565
SV07-PT-14.8	14.8-15.3	209.34	18.2	0.336	1.84	0.321	142.1	67.3	0.473	1.046
SV02-SS-5.0	5.0-5.3	99.76	12.9	0.212	1.64	0.394	60.4	39.3	0.651	0.538
SV02-SS-15	15.0-15.5	207.54	20.3	0.366	1.80	0.337	137.7	69.9	0.508	1.086
SV28-PT-14.4	13.4-13.9	211.00	20.2	0.362	1.79	0.337	139.9	71.1	0.508	1.074
SV28-PT-6.0	5.0-5.6	202.55	23.9	0.383	1.60	0.396	122.4	80.1	0.655	0.968
SV18-PT-6.0	5.0-5.6	203.66	11.2	0.191	1.70	0.360	130.3	73.3	0.563	0.530
SV18-PT-15.0	14.0-14.5	207.68	22.4	0.388	1.73	0.349	135.2	72.4	0.536	1.113

* Measured specific gravity used for calculation of bulk density; Water = 0.9986 g/cc; Vb = Bulk Volume; (1) Total Porosity by calculated method

PTS File No: 36244
Client: SECOR International

PTS Laboratories

SPECIFIC GRAVITY OF SOILS BY PYCNOMETER

(METHODOLOGY: ASTM D854)

PROJECT NAME: Gardena Sump S
PROJECT NO: 37BP.XB006.06

SAMPLE ID.	DEPTH, ft.	TEMPERATURE, °C	TEMPERATURE CORRECTION FACTOR	MASS OF PYCNOMETER AND WATER, grams	MASS OF OVEN DRY SOIL, grams	MASS OF PYCNOMETER, OVEN DRY SOIL, AND WATER, grams	SPECIFIC GRAVITY AT TEMPERATURE	SPECIFIC GRAVITY AT 20°C
SV07-PT-6.0	6.0-6.30	21.5	0.9979	68.76	14.57	77.9	2.70	2.69
SV07-PT-14.8	14.8-15.3	21.5	0.9979	71.42	13.54	80.0	2.72	2.72
SV02-SS-5.0	5.0-5.3	21.5	0.9979	71.04	16.26	81.3	2.72	2.72
SV02-SS-15	15.0-15.5	21.5	0.9979	75.07	15.00	84.6	2.72	2.71
SV28-PT-14.4	13.4-13.9	21.5	0.9979	72.19	15.62	82.0	2.70	2.69
SV28-PT-6.0	5.0-5.6	21.5	0.9979	71.80	16.07	81.8	2.66	2.65
SV18-PT-6.0	5.0-5.6	21.5	0.9979	70.79	16.83	81.3	2.66	2.65
SV18-PT-15.0	14.0-14.5	21.5	0.9979	68.68	13.91	77.4	2.66	2.65

PTS File No: 36244
Client: SECOR International

PHYSICAL PROPERTIES DATA - PERMEABILITY TO AIR

(METHODOLOGY: API RP40

PROJECT NAME: Gardena Sump S
PROJECT NO: 37BP.XB006.06

SAMPLE ID.	DEPTH, ft.	SAMPLE ORIENTATION (1)	25 PSI CONFINING STRESS EFFECTIVE (2) PERMEABILITY TO AIR millidarcy
SV07-PT-6.0	6.4	V	70.3
SV07-PT-14.8	15.4	V	1.07
SV02-SS-5.0	5.4	V	28.3
SV02-SS-15	15.6	V	0.560
SV28-PT-14.4	14.0	V	0.015
SV28-PT-6.0	5.7	V	0.088
SV18-PT-6.0	5.7	V	91.0
SV18-PT-15.0	14.6	V	0.079

(1) Sample Orientation: H = horizontal; V = vertical (2) Native State or Effective = With as-received pore fluids in place

PTS File No: 36244
Client: SECOR International

ORGANIC CARBON DATA - TOC

PROJECT NAME: Gardena Sump S
PROJECT NO: 37BP.XB006.06

		METHOD:	WALKLEY-BLACK
SAMPLE ID.	DEPTH, ft.	SAMPLE MATRIX	TOTAL ORGANIC CARBON, mg/kg
SV07-PT-6.0	6.0	SOIL	980
SV07-PT-14.8	14.8	SOIL	680
SV02-SS-5.0	5.0	SOIL	1200
SV02-SS-15	15.0	SOIL	630
SV28-PT-14.4	14.4	SOIL	1250
SV28-PT-6.0	6.0	SOIL	9900
SV18-PT-6.0	6.0	SOIL	18700
SV18-PT-15.0	15.0	SOIL	1350

PTS Laboratories, Inc.

SECOR International
PTS File No: 36244

PARTICLE SIZE SUMMARY

(METHODOLOGY: ASTM D422/D4464M)

PROJECT NAME: Gardena Sump S
PROJECT NO: 37BP.XB006.06

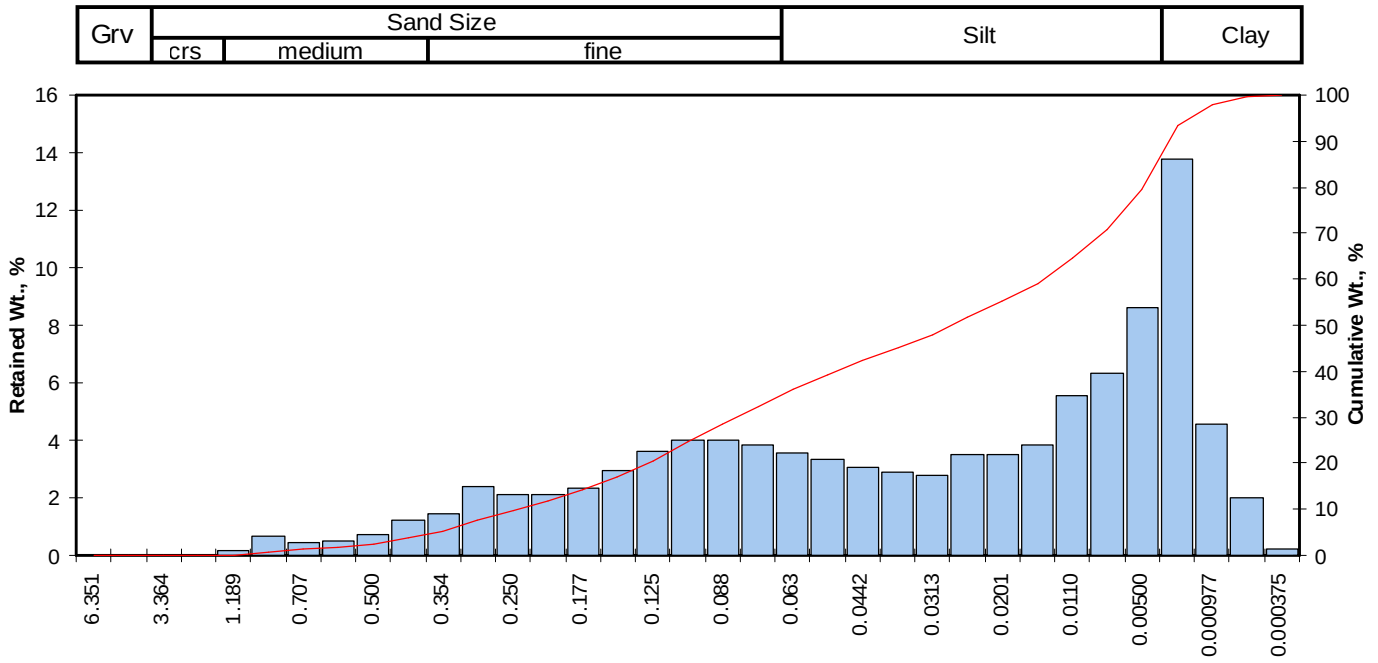
Sample ID	Depth, ft.	Mean Grain Size Description (1)	Median Grain Size mm	Particle Size Distribution, wt. percent						Silt & Clay
					Sand Size					
				Gravel	Coarse	Medium	Fine	Silt	Clay	
SV07-PT-6.0	6.0-6.3	Silt	0.028	0.00	0.00	3.79	28.67	47.01	20.54	67.55
SV07-PT-14.8	14.8-15.3	Fine sand	0.055	0.00	0.00	2.12	43.51	40.56	13.80	54.36
SV02-SS-5.0	5.0-5.3	Fine sand	0.057	0.00	0.00	4.37	41.22	36.55	17.87	54.41
SV02-SS-15	15.0-15.5	Fine sand	0.057	0.00	0.00	3.10	41.50	40.18	15.21	55.40
SV28-PT-14.4	13.4-13.9	Fine sand	0.083	0.00	0.00	11.40	40.29	33.50	14.81	48.31
SV28-PT-6.0	5.0-5.6	Silt	0.011	0.00	0.00	0.00	15.00	52.59	32.41	85.00
SV18-PT-6.0	5.0-5.6	Silt	0.038	0.00	0.00	4.37	32.15	49.90	13.58	63.48
SV18-PT-15.0	14.0-14.5	Fine sand	0.087	0.00	0.00	5.22	48.76	33.23	12.79	46.01

(1) Based on Mean from Trask

PTS Laboratories, Inc.

Particle Size Analysis - ASTM D4464M

Client:	SECOR International	**PTS File No:**	36244
Project:	Gardena Sump S	**Sample ID:**	SV07-PT-6.0
Project No:	37BP.XB006.06	**Depth, ft:**	6.0-6.3



Particle Size, mm

Opening		Phi of	U.S.	Sample	Increment	Cumulative
Inches	Millimeters	Screen	No.	Weight, grams	Weight, percent	Weight, percent
0.2500	6.351	-2.67	1/4	0.00	0.00	0.00
0.1873	4.757	-2.25	4	0.00	0.00	0.00
0.1324	3.364	-1.75	6	0.00	0.00	0.00
0.0787	2.000	-1.00	10	0.00	0.00	0.00
0.0468	1.189	-0.25	16	0.17	0.17	0.17
0.0331	0.841	0.25	20	0.69	0.69	0.86
0.0278	0.707	0.50	25	0.47	0.47	1.33
0.0234	0.595	0.75	30	0.51	0.51	1.84
0.0197	0.500	1.00	35	0.73	0.73	2.57
0.0166	0.420	1.25	40	1.22	1.22	3.79
0.0139	0.354	1.50	45	1.44	1.44	5.23
0.0117	0.297	1.75	50	2.38	2.38	7.61
0.0098	0.250	2.00	60	2.09	2.09	9.70
0.0083	0.210	2.25	70	2.09	2.09	11.78
0.0070	0.177	2.50	80	2.31	2.31	14.09
0.0059	0.149	2.75	100	2.94	2.94	17.03
0.0049	0.125	3.00	120	3.60	3.60	20.63
0.0041	0.105	3.25	140	4.00	4.00	24.63
0.0035	0.088	3.50	170	4.01	4.01	28.64
0.0029	0.074	3.75	200	3.82	3.82	32.45
0.0025	0.063	4.00	230	3.56	3.56	36.01
0.0021	0.053	4.25	270	3.31	3.31	39.32
0.00174	0.0442	4.50	325	3.08	3.08	42.40
0.00146	0.0372	4.75	400	2.90	2.90	45.30
0.00123	0.0313	5.00	450	2.78	2.78	48.08
0.000986	0.0250	5.32	500	3.51	3.51	51.58
0.000790	0.0201	5.64	635	3.52	3.52	55.10
0.000615	0.0156	6.00		3.83	3.83	58.93
0.000435	0.0110	6.50		5.58	5.58	64.51
0.000308	0.00781	7.00		6.32	6.32	70.82
0.000197	0.00500	7.65		8.64	8.64	79.46
0.000077	0.00195	9.00		13.80	13.79	93.25
0.000038	0.000977	10.00		4.57	4.57	97.82
0.000019	0.000488	11.00		1.98	1.98	99.80
0.000015	0.000375	11.38		0.20	0.20	100.00
TOTALS				**100.10**	**100.00**	**100.00**

Cumulative Weight Percent greater than			
Weight percent	Phi Value	Particle Size Inches	Particle Size Millimeters
5	1.46	0.0143	0.363
10	2.04	0.0096	0.244
16	2.66	0.0062	0.158
25	3.27	0.0041	0.103
40	4.31	0.0020	0.051
50	5.18	0.0011	0.028
60	6.10	0.0006	0.015
75	7.31	0.0002	0.006
84	8.09	0.0001	0.004
90	8.68	0.0001	0.002
95	9.38	0.0001	0.001

Measure	Trask	Inman	Folk-Ward
Median, phi	5.18	5.18	5.18
Median, in.	0.0011	0.0011	0.0011
Median, mm	0.028	0.028	0.028
Mean, phi	4.19	5.38	5.31
Mean, in.	0.0022	0.0009	0.0010
Mean, mm	0.055	0.024	0.025
Sorting	4.054	2.714	2.557
Skewness	0.922	0.074	0.068
Kurtosis	0.201	0.459	0.804
Grain Size Description (ASTM-USCS Scale)		Silt (based on Mean from Trask)	

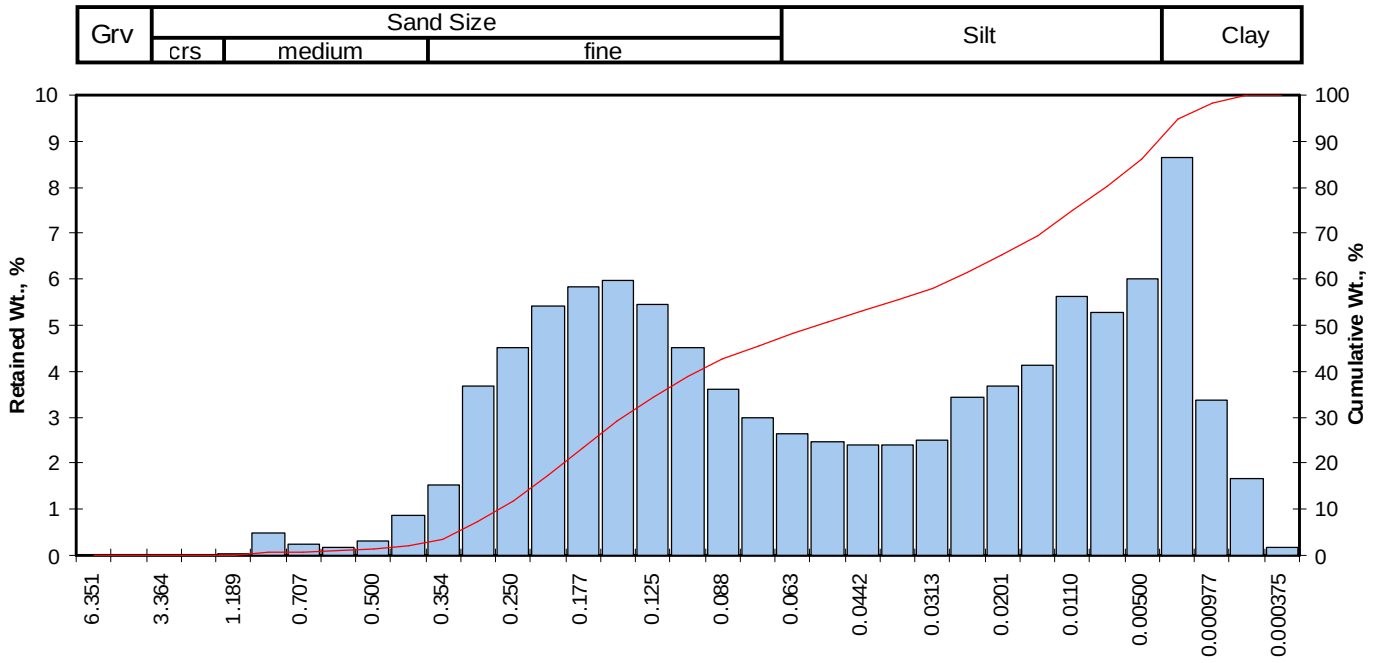
Description	Retained on Sieve #	Weight Percent
Gravel	4	0.00
Coarse Sand	10	0.00
Medium Sand	40	3.79
Fine Sand	200	28.67
Silt	>0.005 mm	47.01
Clay	<0.005 mm	20.54
	Total	**100**

PTS Laboratories, Inc.

Particle Size Analysis - ASTM D4464M

Client: SECOR International
Project: Gardena Sump S
Project No: 37BP.XB006.06

PTS File No: 36244
Sample ID: SV07-PT-14.8
Depth, ft: 14.8-15.3



Opening Inches	Opening Millimeters	Phi of Screen	U.S. No.	Sample Weight, grams	Increment Weight, percent	Cumulative Weight, percent
0.2500	6.351	-2.67	1/4	0.00	0.00	0.00
0.1873	4.757	-2.25	4	0.00	0.00	0.00
0.1324	3.364	-1.75	6	0.00	0.00	0.00
0.0787	2.000	-1.00	10	0.00	0.00	0.00
0.0468	1.189	-0.25	16	0.05	0.05	0.05
0.0331	0.841	0.25	20	0.47	0.47	0.52
0.0278	0.707	0.50	25	0.26	0.26	0.78
0.0234	0.595	0.75	30	0.18	0.18	0.96
0.0197	0.500	1.00	35	0.30	0.30	1.26
0.0166	0.420	1.25	40	0.86	0.86	2.12
0.0139	0.354	1.50	45	1.52	1.52	3.64
0.0117	0.297	1.75	50	3.69	3.69	7.33
0.0098	0.250	2.00	60	4.50	4.50	11.83
0.0083	0.210	2.25	70	5.41	5.41	17.24
0.0070	0.177	2.50	80	5.85	5.85	23.09
0.0059	0.149	2.75	100	5.98	5.98	29.07
0.0049	0.125	3.00	120	5.44	5.44	34.51
0.0041	0.105	3.25	140	4.53	4.53	39.05
0.0035	0.088	3.50	170	3.60	3.60	42.65
0.0029	0.074	3.75	200	2.99	2.99	45.64
0.0025	0.063	4.00	230	2.65	2.65	48.29
0.0021	0.053	4.25	270	2.48	2.48	50.77
0.00174	0.0442	4.50	325	2.39	2.39	53.16
0.00146	0.0372	4.75	400	2.41	2.41	55.57
0.00123	0.0313	5.00	450	2.51	2.51	58.08
0.000986	0.0250	5.32	500	3.43	3.43	61.51
0.000790	0.0201	5.64	635	3.67	3.67	65.18
0.000615	0.0156	6.00		4.13	4.13	69.31
0.000435	0.0110	6.50		5.61	5.61	74.92
0.000308	0.00781	7.00		5.27	5.27	80.19
0.000197	0.00500	7.65		6.01	6.01	86.20
0.000077	0.00195	9.00		8.63	8.63	94.83
0.000038	0.000977	10.00		3.36	3.36	98.19
0.000019	0.000488	11.00		1.65	1.65	99.84
0.000015	0.000375	11.38		0.16	0.16	100.00
TOTALS				**100.00**	**100.00**	**100.00**

Cumulative Weight Percent greater than

Weight percent	Phi Value	Particle Size Inches	Particle Size Millimeters
5	1.59	0.0131	0.332
10	1.90	0.0106	0.268
16	2.19	0.0086	0.219
25	2.58	0.0066	0.167
40	3.32	0.0040	0.100
50	4.17	0.0022	0.055
60	5.18	0.0011	0.028
75	6.51	0.0004	0.011
84	7.41	0.0002	0.006
90	8.24	0.0001	0.003
95	9.05	0.0001	0.002

Measure	Trask	Inman	Folk-Ward
Median, phi	4.17	4.17	4.17
Median, in.	0.0022	0.0022	0.0022
Median, mm	0.055	0.055	0.055
Mean, phi	3.49	4.80	4.59
Mean, in.	0.0035	0.0014	0.0016
Mean, mm	0.089	0.036	0.041
Sorting	3.902	2.608	2.434
Skewness	0.773	0.241	0.274
Kurtosis	0.295	0.430	0.778

Grain Size Description (ASTM-USCS Scale)	Fine sand (based on Mean from Trask)

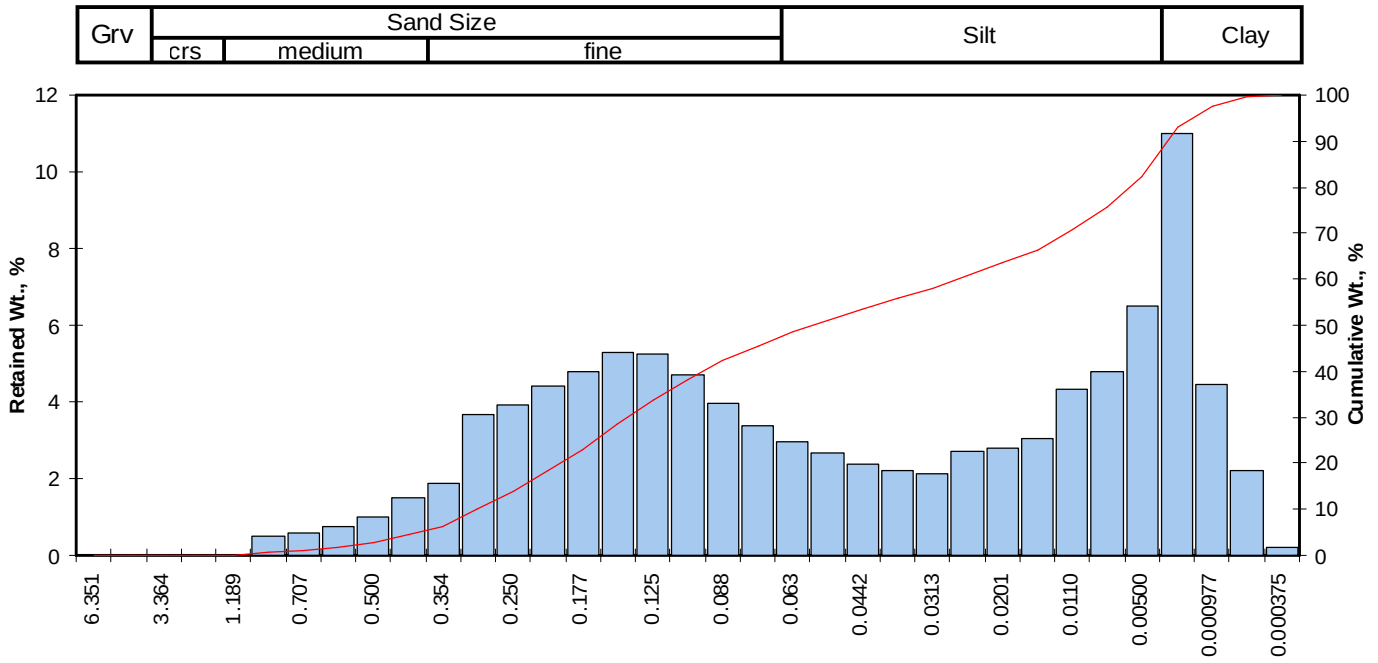
Description	Retained on Sieve #	Weight Percent
Gravel	4	0.00
Coarse Sand	10	0.00
Medium Sand	40	2.12
Fine Sand	200	43.51
Silt	>0.005 mm	40.56
Clay	<0.005 mm	13.80
	Total	**100**

Phone: (562) 907-3607
Fax: (562) 907-3610

PTS Laboratories, Inc.

Particle Size Analysis - ASTM D4464M

Client:	SECOR International	**PTS File No:**	36244
Project:	Gardena Sump S	**Sample ID:**	SV02-SS-5.0
Project No:	37BP.XB006.06	**Depth, ft:**	5.0-5.3



Particle Size, mm

Opening		Phi of	U.S.	Sample	Increment	Cumulative
Inches	Millimeters	Screen	No.	Weight, grams	Weight, percent	Weight, percent
0.2500	6.351	-2.67	1/4	0.00	0.00	0.00
0.1873	4.757	-2.25	4	0.00	0.00	0.00
0.1324	3.364	-1.75	6	0.00	0.00	0.00
0.0787	2.000	-1.00	10	0.00	0.00	0.00
0.0468	1.189	-0.25	16	0.01	0.01	0.01
0.0331	0.841	0.25	20	0.52	0.52	0.53
0.0278	0.707	0.50	25	0.60	0.60	1.13
0.0234	0.595	0.75	30	0.75	0.75	1.88
0.0197	0.500	1.00	35	1.00	1.00	2.88
0.0166	0.420	1.25	40	1.49	1.49	4.37
0.0139	0.354	1.50	45	1.86	1.86	6.23
0.0117	0.297	1.75	50	3.67	3.67	9.90
0.0098	0.250	2.00	60	3.93	3.93	13.83
0.0083	0.210	2.25	70	4.41	4.41	18.25
0.0070	0.177	2.50	80	4.80	4.80	23.05
0.0059	0.149	2.75	100	5.27	5.27	28.32
0.0049	0.125	3.00	120	5.24	5.24	33.56
0.0041	0.105	3.25	140	4.71	4.71	38.27
0.0035	0.088	3.50	170	3.95	3.95	42.23
0.0029	0.074	3.75	200	3.36	3.36	45.59
0.0025	0.063	4.00	230	2.96	2.96	48.55
0.0021	0.053	4.25	270	2.65	2.65	51.20
0.00174	0.0442	4.50	325	2.39	2.39	53.59
0.00146	0.0372	4.75	400	2.21	2.21	55.80
0.00123	0.0313	5.00	450	2.13	2.13	57.93
0.000986	0.0250	5.32	500	2.72	2.72	60.65
0.000790	0.0201	5.64	635	2.77	2.77	63.42
0.000615	0.0156	6.00		3.04	3.04	66.47
0.000435	0.0110	6.50		4.35	4.35	70.82
0.000308	0.00781	7.00		4.80	4.80	75.62
0.000197	0.00500	7.65		6.51	6.51	82.13
0.000077	0.00195	9.00		11.00	11.00	93.14
0.000038	0.000977	10.00		4.45	4.45	97.59
0.000019	0.000488	11.00		2.19	2.19	99.78
0.000015	0.000375	11.38		0.22	0.22	100.00
TOTALS				**100.00**	**100.00**	**100.00**

Cumulative Weight Percent greater than			
Weight percent	Phi Value	Particle Size Inches	Particle Size Millimeters
5	1.33	0.0156	0.396
10	1.76	0.0117	0.296
16	2.12	0.0090	0.230
25	2.59	0.0065	0.166
40	3.36	0.0038	0.097
50	4.14	0.0022	0.057
60	5.24	0.0010	0.026
75	6.94	0.0003	0.008
84	7.87	0.0002	0.004
90	8.61	0.0001	0.003
95	9.42	0.0001	0.001

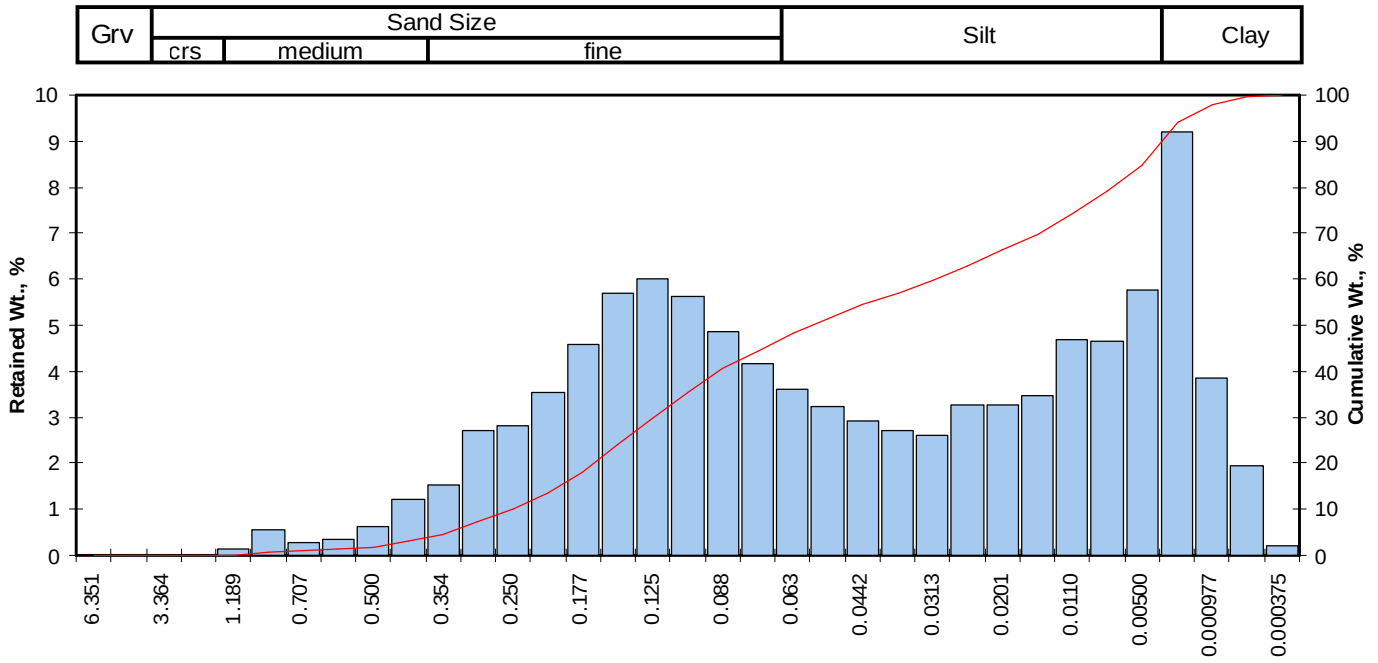
Measure	Trask	Inman	Folk-Ward
Median, phi	4.14	4.14	4.14
Median, in.	0.0022	0.0022	0.0022
Median, mm	0.057	0.057	0.057
Mean, phi	3.52	5.00	4.71
Mean, in.	0.0034	0.0012	0.0015
Mean, mm	0.087	0.031	0.038
Sorting	4.505	2.876	2.663
Skewness	0.647	0.300	0.303
Kurtosis	0.269	0.405	0.763
Grain Size Description (ASTM-USCS Scale)		Fine sand (based on Mean from Trask)	

Description	Retained on Sieve #	Weight Percent
Gravel	4	0.00
Coarse Sand	10	0.00
Medium Sand	40	4.37
Fine Sand	200	41.22
Silt	>0.005 mm	36.55
Clay	<0.005 mm	17.87
	Total	**100**

PTS Laboratories, Inc.

Particle Size Analysis - ASTM D4464M

Client:	SECOR International	**PTS File No:**	36244
Project:	Gardena Sump S	**Sample ID:**	SV02-SS-15
Project No:	37BP.XB006.06	**Depth, ft:**	15.0-15.5



Opening Inches	Opening Millimeters	Phi of Screen	U.S. No.	Sample Weight, grams	Increment Weight, percent	Cumulative Weight, percent
0.2500	6.351	-2.67	1/4	0.00	0.00	0.00
0.1873	4.757	-2.25	4	0.00	0.00	0.00
0.1324	3.364	-1.75	6	0.00	0.00	0.00
0.0787	2.000	-1.00	10	0.00	0.00	0.00
0.0468	1.189	-0.25	16	0.13	0.13	0.13
0.0331	0.841	0.25	20	0.54	0.54	0.67
0.0278	0.707	0.50	25	0.29	0.29	0.96
0.0234	0.595	0.75	30	0.33	0.33	1.29
0.0197	0.500	1.00	35	0.61	0.61	1.90
0.0166	0.420	1.25	40	1.20	1.20	3.10
0.0139	0.354	1.50	45	1.51	1.51	4.61
0.0117	0.297	1.75	50	2.70	2.70	7.31
0.0098	0.250	2.00	60	2.80	2.80	10.11
0.0083	0.210	2.25	70	3.54	3.54	13.65
0.0070	0.177	2.50	80	4.57	4.57	18.23
0.0059	0.149	2.75	100	5.69	5.69	23.92
0.0049	0.125	3.00	120	6.02	6.02	29.94
0.0041	0.105	3.25	140	5.64	5.64	35.58
0.0035	0.088	3.50	170	4.87	4.87	40.45
0.0029	0.074	3.75	200	4.15	4.15	44.60
0.0025	0.063	4.00	230	3.60	3.60	48.20
0.0021	0.053	4.25	270	3.22	3.22	51.43
0.00174	0.0442	4.50	325	2.92	2.92	54.35
0.00146	0.0372	4.75	400	2.72	2.72	57.07
0.00123	0.0313	5.00	450	2.60	2.60	59.67
0.000986	0.0250	5.32	500	3.28	3.28	62.95
0.000790	0.0201	5.64	635	3.25	3.25	66.20
0.000615	0.0156	6.00		3.48	3.48	69.68
0.000435	0.0110	6.50		4.69	4.69	74.37
0.000308	0.00781	7.00		4.66	4.66	79.03
0.000197	0.00500	7.65		5.75	5.75	84.79
0.000077	0.00195	9.00		9.19	9.19	93.98
0.000038	0.000977	10.00		3.87	3.87	97.85
0.000019	0.000488	11.00		1.95	1.95	99.80
0.000015	0.000375	11.38		0.20	0.20	100.00
TOTALS				**100.00**	**100.00**	**100.00**

Cumulative Weight Percent greater than			
Weight percent	Phi Value	Particle Size Inches	Particle Size Millimeters
5	1.54	0.0136	0.345
10	1.99	0.0099	0.252
16	2.38	0.0076	0.192
25	2.79	0.0057	0.144
40	3.48	0.0035	0.090
50	4.14	0.0022	0.057
60	5.03	0.0012	0.031
75	6.57	0.0004	0.011
84	7.56	0.0002	0.005
90	8.41	0.0001	0.003
95	9.26	0.0001	0.002

Measure	Trask	Inman	Folk-Ward
Median, phi	4.14	4.14	4.14
Median, in.	0.0022	0.0022	0.0022
Median, mm	0.057	0.057	0.057
Mean, phi	3.69	4.97	4.69
Mean, in.	0.0030	0.0013	0.0015
Mean, mm	0.077	0.032	0.039
Sorting	3.697	2.589	2.466
Skewness	0.687	0.320	0.323
Kurtosis	0.268	0.492	0.840
Grain Size Description (ASTM-USCS Scale)		Fine sand (based on Mean from Trask)	

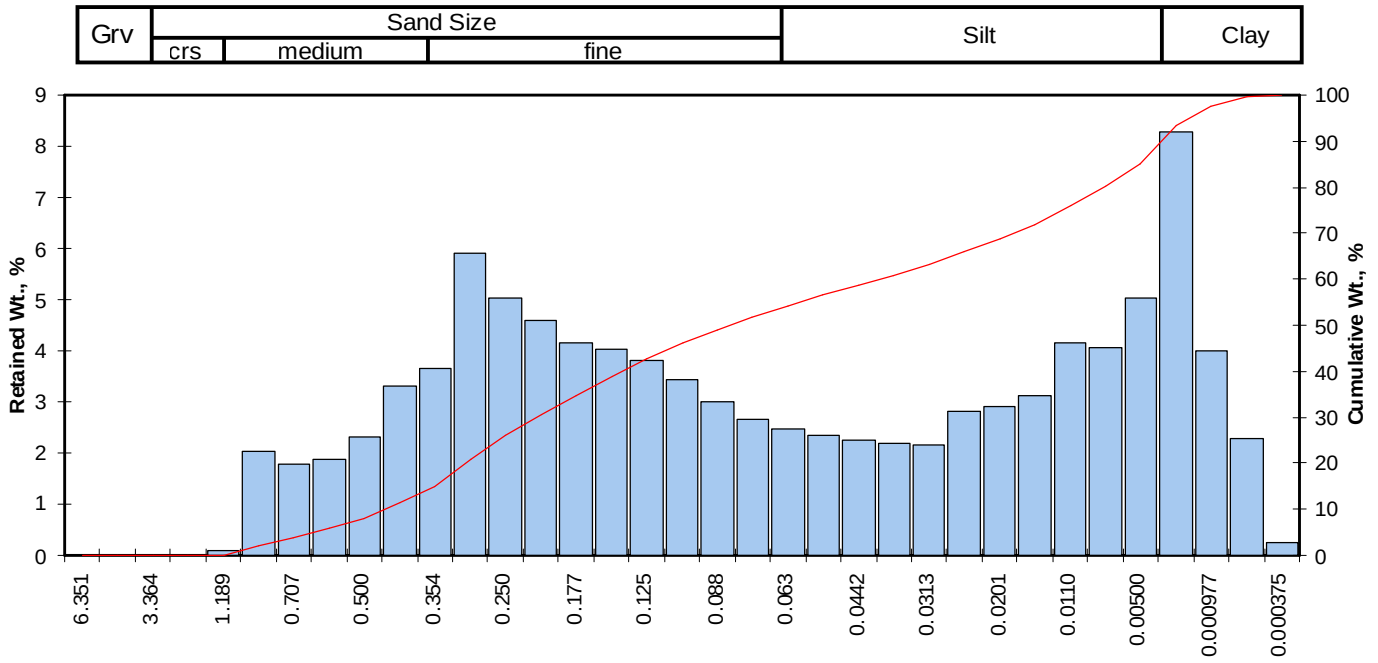
Description	Retained on Sieve #	Weight Percent
Gravel	4	0.00
Coarse Sand	10	0.00
Medium Sand	40	3.10
Fine Sand	200	41.50
Silt	>0.005 mm	40.18
Clay	<0.005 mm	15.21
	Total	**100**

Phone: (562) 907-3607 Fax: (562) 907-3610

PTS Laboratories, Inc.

Particle Size Analysis - ASTM D4464M

Client:	SECOR International	**PTS File No:**	36244
Project:	Gardena Sump S	**Sample ID:**	SV28-PT-14.4
Project No:	37BP.XB006.06	**Depth, ft:**	13.4-13.9



Particle Size, mm

Opening		Phi of	U.S.	Sample	Increment	Cumulative
Inches	Millimeters	Screen	No.	Weight, grams	Weight, percent	Weight, percent
0.2500	6.351	-2.67	1/4	0.00	0.00	0.00
0.1873	4.757	-2.25	4	0.00	0.00	0.00
0.1324	3.364	-1.75	6	0.00	0.00	0.00
0.0787	2.000	-1.00	10	0.00	0.00	0.00
0.0468	1.189	-0.25	16	0.09	0.09	0.09
0.0331	0.841	0.25	20	2.04	2.04	2.13
0.0278	0.707	0.50	25	1.77	1.77	3.91
0.0234	0.595	0.75	30	1.87	1.87	5.78
0.0197	0.500	1.00	35	2.31	2.31	8.09
0.0166	0.420	1.25	40	3.31	3.31	11.40
0.0139	0.354	1.50	45	3.66	3.66	15.06
0.0117	0.297	1.75	50	5.92	5.92	20.98
0.0098	0.250	2.00	60	5.04	5.04	26.02
0.0083	0.210	2.25	70	4.59	4.59	30.61
0.0070	0.177	2.50	80	4.15	4.15	34.76
0.0059	0.149	2.75	100	4.02	4.02	38.78
0.0049	0.125	3.00	120	3.81	3.81	42.60
0.0041	0.105	3.25	140	3.44	3.44	46.04
0.0035	0.088	3.50	170	2.99	2.99	49.03
0.0029	0.074	3.75	200	2.66	2.66	51.69
0.0025	0.063	4.00	230	2.46	2.46	54.15
0.0021	0.053	4.25	270	2.35	2.35	56.50
0.00174	0.0442	4.50	325	2.25	2.25	58.75
0.00146	0.0372	4.75	400	2.18	2.18	60.93
0.00123	0.0313	5.00	450	2.16	2.16	63.09
0.000986	0.0250	5.32	500	2.82	2.82	65.91
0.000790	0.0201	5.64	635	2.89	2.89	68.80
0.000615	0.0156	6.00		3.13	3.13	71.93
0.000435	0.0110	6.50		4.16	4.16	76.09
0.000308	0.00781	7.00		4.07	4.07	80.16
0.000197	0.00500	7.65		5.02	5.02	85.19
0.000077	0.00195	9.00		8.29	8.29	93.48
0.000038	0.000977	10.00		4.00	4.00	97.48
0.000019	0.000488	11.00		2.28	2.28	99.76
0.000015	0.000375	11.38		0.24	0.24	100.00
TOTALS				**100.00**	**100.00**	**100.00**

Cumulative Weight Percent greater than

Weight percent	Phi Value	Particle Size Inches	Particle Size Millimeters
5	0.65	0.0252	0.639
10	1.14	0.0178	0.452
16	1.54	0.0135	0.344
25	1.95	0.0102	0.259
40	2.83	0.0055	0.141
50	3.59	0.0033	0.083
60	4.64	0.0016	0.040
75	6.37	0.0005	0.012
84	7.49	0.0002	0.006
90	8.43	0.0001	0.003
95	9.38	0.0001	0.002

Measure	Trask	Inman	Folk-Ward
Median, phi	3.59	3.59	3.59
Median, in.	0.0033	0.0033	0.0033
Median, mm	0.083	0.083	0.083
Mean, phi	2.88	4.52	4.21
Mean, in.	0.0053	0.0017	0.0021
Mean, mm	0.136	0.044	0.054
Sorting	4.625	2.976	2.812
Skewness	0.675	0.311	0.318
Kurtosis	0.275	0.467	0.810

Grain Size Description (ASTM-USCS Scale)	Fine sand (based on Mean from Trask)

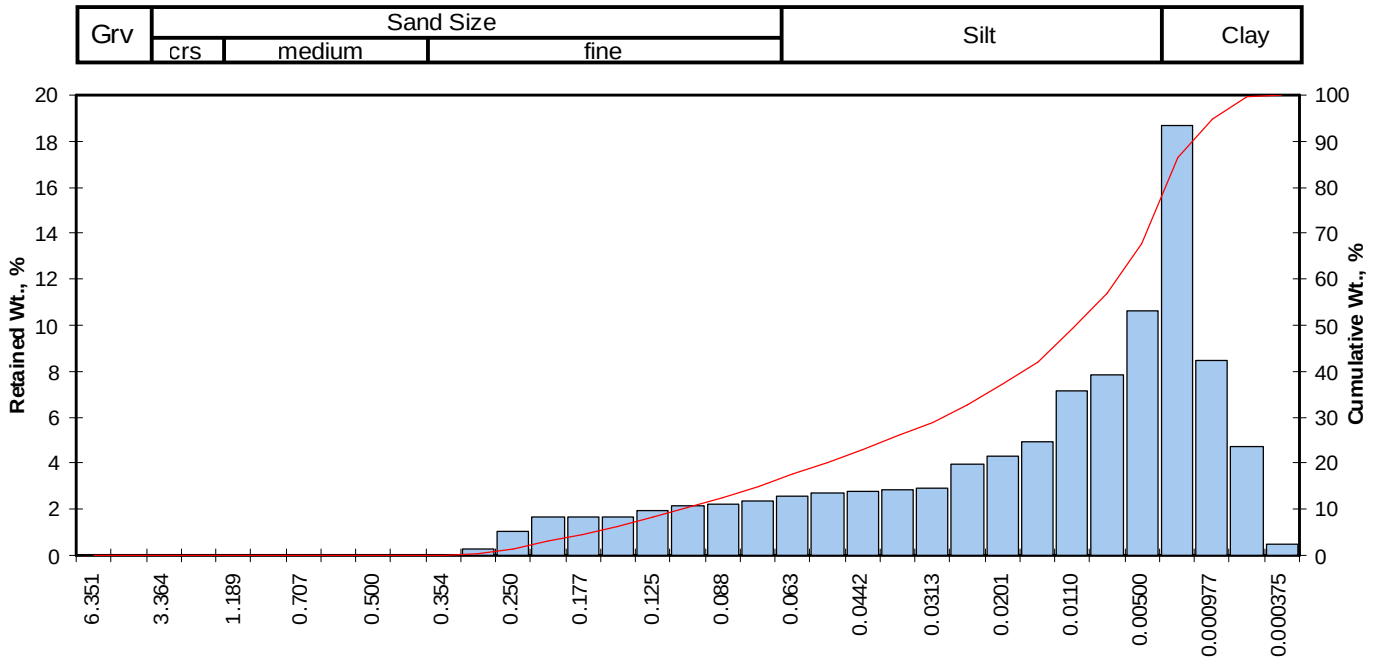
Description	Retained on Sieve #	Weight Percent
Gravel	4	0.00
Coarse Sand	10	0.00
Medium Sand	40	11.40
Fine Sand	200	40.29
Silt	>0.005 mm	33.50
Clay	<0.005 mm	14.81
	Total	**100**

PTS Laboratories, Inc.

Particle Size Analysis - ASTM D4464M

Client: SECOR International
Project: Gardena Sump S
Project No: 37BP.XB006.06

PTS File No: 36244
Sample ID: SV28-PT-6.0
Depth, ft: 5.0-5.6



Opening		Phi of	U.S.	Sample	Increment	Cumulative
Inches	Millimeters	Screen	No.	Weight, grams	Weight, percent	Weight, percent
0.2500	6.351	-2.67	1/4	0.00	0.00	0.00
0.1873	4.757	-2.25	4	0.00	0.00	0.00
0.1324	3.364	-1.75	6	0.00	0.00	0.00
0.0787	2.000	-1.00	10	0.00	0.00	0.00
0.0468	1.189	-0.25	16	0.00	0.00	0.00
0.0331	0.841	0.25	20	0.00	0.00	0.00
0.0278	0.707	0.50	25	0.00	0.00	0.00
0.0234	0.595	0.75	30	0.00	0.00	0.00
0.0197	0.500	1.00	35	0.00	0.00	0.00
0.0166	0.420	1.25	40	0.00	0.00	0.00
0.0139	0.354	1.50	45	0.01	0.01	0.01
0.0117	0.297	1.75	50	0.26	0.26	0.27
0.0098	0.250	2.00	60	1.01	1.01	1.28
0.0083	0.210	2.25	70	1.68	1.68	2.96
0.0070	0.177	2.50	80	1.70	1.70	4.65
0.0059	0.149	2.75	100	1.66	1.66	6.31
0.0049	0.125	3.00	120	1.93	1.93	8.24
0.0041	0.105	3.25	140	2.18	2.18	10.42
0.0035	0.088	3.50	170	2.24	2.24	12.66
0.0029	0.074	3.75	200	2.34	2.34	15.00
0.0025	0.063	4.00	230	2.55	2.55	17.55
0.0021	0.053	4.25	270	2.73	2.73	20.28
0.00174	0.0442	4.50	325	2.79	2.79	23.07
0.00146	0.0372	4.75	400	2.82	2.82	25.89
0.00123	0.0313	5.00	450	2.91	2.91	28.80
0.000986	0.0250	5.32	500	3.99	3.99	32.78
0.000790	0.0201	5.64	635	4.32	4.32	37.10
0.000615	0.0156	6.00		4.92	4.92	42.02
0.000435	0.0110	6.50		7.15	7.15	49.17
0.000308	0.00781	7.00		7.83	7.83	57.00
0.000197	0.00500	7.65		10.60	10.60	67.59
0.000077	0.00195	9.00		18.70	18.69	86.28
0.000038	0.000977	10.00		8.47	8.47	94.75
0.000019	0.000488	11.00		4.74	4.74	99.49
0.000015	0.000375	11.38		0.51	0.51	100.00
TOTALS				**100.00**	**100.00**	**100.00**

Cumulative Weight Percent greater than

Weight percent	Phi Value	Particle Size Inches	Particle Size Millimeters
5	2.55	0.0067	0.171
10	3.20	0.0043	0.109
16	3.85	0.0027	0.069
25	4.67	0.0015	0.039
40	5.85	0.0007	0.017
50	6.55	0.0004	0.011
60	7.18	0.0003	0.007
75	8.18	0.0001	0.003
84	8.83	0.0001	0.002
90	9.44	0.0001	0.001
95	10.05	0.0000	0.001

Measure	Trask	Inman	Folk-Ward
Median, phi	6.55	6.55	6.55
Median, in.	0.0004	0.0004	0.0004
Median, mm	0.011	0.011	0.011
Mean, phi	5.55	6.34	6.41
Mean, in.	0.0008	0.0005	0.0005
Mean, mm	0.021	0.012	0.012
Sorting	3.376	2.493	2.383
Skewness	1.092	-0.085	-0.076
Kurtosis	0.167	0.504	0.876

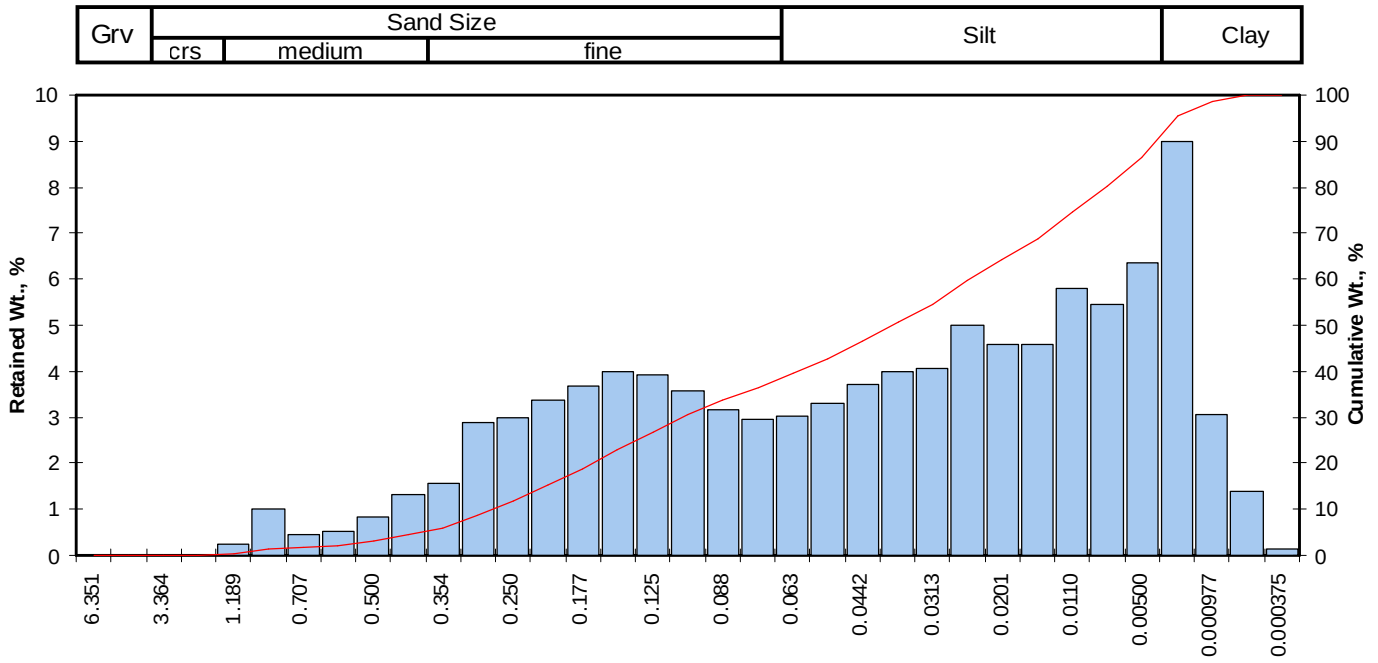
Grain Size Description (ASTM-USCS Scale)	Silt (based on Mean from Trask)

Description	Retained on Sieve #	Weight Percent
Gravel	4	0.00
Coarse Sand	10	0.00
Medium Sand	40	0.00
Fine Sand	200	15.00
Silt	>0.005 mm	52.59
Clay	<0.005 mm	32.41
	Total	**100**

PTS Laboratories, Inc.

Particle Size Analysis - ASTM D4464M

Client:	SECOR International	**PTS File No:**	36244
Project:	Gardena Sump S	**Sample ID:**	SV18-PT-6.0
Project No:	37BP.XB006.06	**Depth, ft:**	5.0-5.6



Opening Inches	Opening Millimeters	Phi of Screen	U.S. No.	Sample Weight, grams	Increment Weight, percent	Cumulative Weight, percent
0.2500	6.351	-2.67	1/4	0.00	0.00	0.00
0.1873	4.757	-2.25	4	0.00	0.00	0.00
0.1324	3.364	-1.75	6	0.00	0.00	0.00
0.0787	2.000	-1.00	10	0.00	0.00	0.00
0.0468	1.189	-0.25	16	0.26	0.26	0.26
0.0331	0.841	0.25	20	1.00	1.00	1.26
0.0278	0.707	0.50	25	0.45	0.45	1.71
0.0234	0.595	0.75	30	0.52	0.52	2.23
0.0197	0.500	1.00	35	0.82	0.82	3.05
0.0166	0.420	1.25	40	1.32	1.32	4.37
0.0139	0.354	1.50	45	1.57	1.57	5.94
0.0117	0.297	1.75	50	2.89	2.89	8.83
0.0098	0.250	2.00	60	2.99	2.99	11.82
0.0083	0.210	2.25	70	3.38	3.38	15.20
0.0070	0.177	2.50	80	3.69	3.69	18.89
0.0059	0.149	2.75	100	4.00	4.00	22.89
0.0049	0.125	3.00	120	3.94	3.94	26.83
0.0041	0.105	3.25	140	3.59	3.59	30.42
0.0035	0.088	3.50	170	3.16	3.16	33.58
0.0029	0.074	3.75	200	2.94	2.94	36.52
0.0025	0.063	4.00	230	3.01	3.01	39.53
0.0021	0.053	4.25	270	3.31	3.31	42.84
0.00174	0.0442	4.50	325	3.72	3.72	46.56
0.00146	0.0372	4.75	400	4.01	4.01	50.57
0.00123	0.0313	5.00	450	4.07	4.07	54.64
0.000986	0.0250	5.32	500	4.99	4.99	59.63
0.000790	0.0201	5.64	635	4.58	4.58	64.21
0.000615	0.0156	6.00		4.59	4.59	68.80
0.000435	0.0110	6.50		5.80	5.80	74.60
0.000308	0.00781	7.00		5.46	5.46	80.06
0.000197	0.00500	7.65		6.36	6.36	86.42
0.000077	0.00195	9.00		8.98	8.98	95.40
0.000038	0.000977	10.00		3.07	3.07	98.47
0.000019	0.000488	11.00		1.39	1.39	99.86
0.000015	0.000375	11.38		0.14	0.14	100.00
TOTALS				**100.00**	**100.00**	**100.00**

Cumulative Weight Percent greater than

Weight percent	Phi Value	Particle Size Inches	Particle Size Millimeters
5	1.35	0.0154	0.392
10	1.85	0.0109	0.278
16	2.30	0.0080	0.202
25	2.88	0.0053	0.135
40	4.04	0.0024	0.061
50	4.71	0.0015	0.038
60	5.35	0.0010	0.025
75	6.54	0.0004	0.011
84	7.40	0.0002	0.006
90	8.19	0.0001	0.003
95	8.94	0.0001	0.002

Measure	Trask	Inman	Folk-Ward
Median, phi	4.71	4.71	4.71
Median, in.	0.0015	0.0015	0.0015
Median, mm	0.038	0.038	0.038
Mean, phi	3.77	4.85	4.81
Mean, in.	0.0029	0.0014	0.0014
Mean, mm	0.073	0.035	0.036
Sorting	3.546	2.548	2.424
Skewness	1.003	0.054	0.084
Kurtosis	0.227	0.489	0.852

Grain Size Description (ASTM-USCS Scale)	Silt (based on Mean from Trask)

Description	Retained on Sieve #	Weight Percent
Gravel	4	0.00
Coarse Sand	10	0.00
Medium Sand	40	4.37
Fine Sand	200	32.15
Silt	>0.005 mm	49.90
Clay	<0.005 mm	13.58
	Total	**100**

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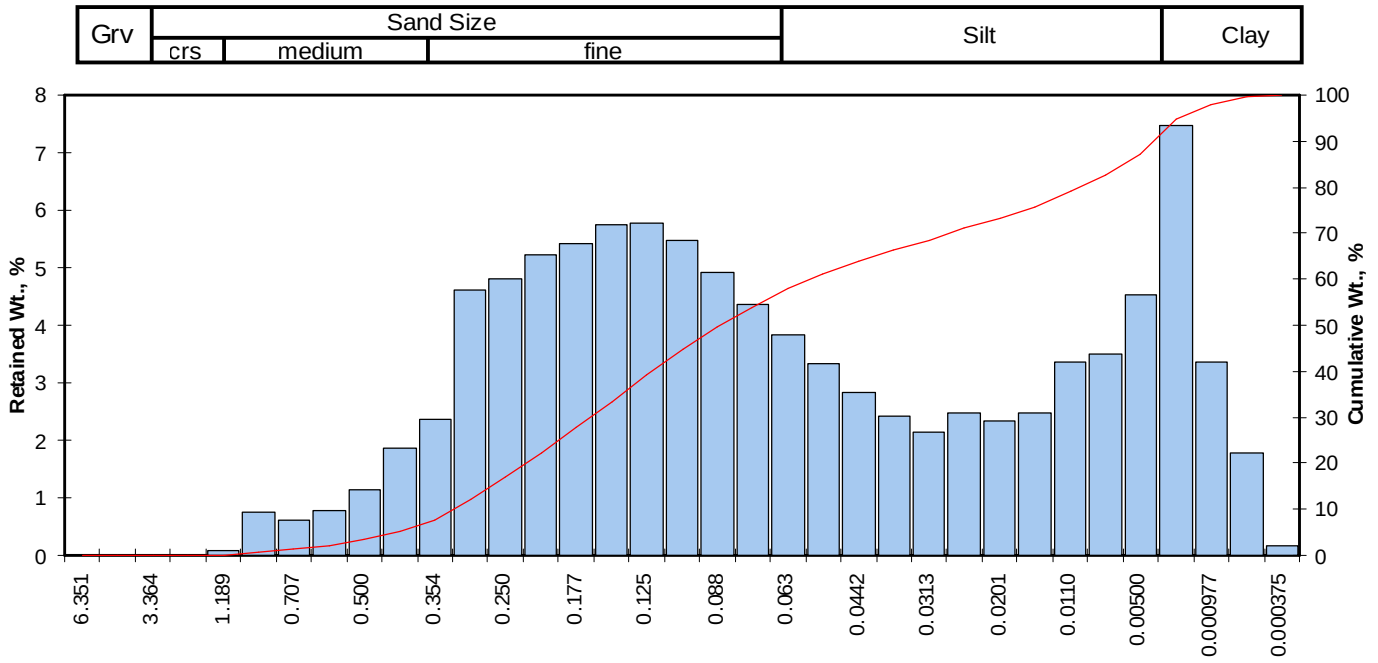
PTS Laboratories, Inc.

Particle Size Analysis - ASTM D4464M

Client: SECOR International
Project: Gardena Sump S
Project No: 37BP.XB006.06

PTS File No: 36244
Sample ID: SV18-PT-15.0
Depth, ft: 14.0-14.5



Opening Inches	Opening Millimeters	Phi of Screen	U.S. No.	Sample Weight, grams	Increment Weight, percent	Cumulative Weight, percent
0.2500	6.351	-2.67	1/4	0.00	0.00	0.00
0.1873	4.757	-2.25	4	0.00	0.00	0.00
0.1324	3.364	-1.75	6	0.00	0.00	0.00
0.0787	2.000	-1.00	10	0.00	0.00	0.00
0.0468	1.189	-0.25	16	0.08	0.08	0.08
0.0331	0.841	0.25	20	0.76	0.76	0.84
0.0278	0.707	0.50	25	0.62	0.62	1.46
0.0234	0.595	0.75	30	0.78	0.78	2.24
0.0197	0.500	1.00	35	1.13	1.13	3.37
0.0166	0.420	1.25	40	1.85	1.85	5.22
0.0139	0.354	1.50	45	2.36	2.36	7.58
0.0117	0.297	1.75	50	4.61	4.61	12.19
0.0098	0.250	2.00	60	4.82	4.82	17.01
0.0083	0.210	2.25	70	5.23	5.23	22.24
0.0070	0.177	2.50	80	5.43	5.43	27.67
0.0059	0.149	2.75	100	5.76	5.76	33.43
0.0049	0.125	3.00	120	5.79	5.79	39.22
0.0041	0.105	3.25	140	5.48	5.48	44.70
0.0035	0.088	3.50	170	4.92	4.92	49.62
0.0029	0.074	3.75	200	4.37	4.37	53.99
0.0025	0.063	4.00	230	3.84	3.84	57.83
0.0021	0.053	4.25	270	3.34	3.34	61.17
0.00174	0.0442	4.50	325	2.84	2.84	64.01
0.00146	0.0372	4.75	400	2.42	2.42	66.42
0.00123	0.0313	5.00	450	2.13	2.13	68.55
0.000986	0.0250	5.32	500	2.48	2.48	71.03
0.000790	0.0201	5.64	635	2.34	2.34	73.37
0.000615	0.0156	6.00		2.46	2.46	75.83
0.000435	0.0110	6.50		3.36	3.36	79.19
0.000308	0.00781	7.00		3.50	3.50	82.69
0.000197	0.00500	7.65		4.52	4.52	87.21
0.000077	0.00195	9.00		7.48	7.48	94.69
0.000038	0.000977	10.00		3.35	3.35	98.04
0.000019	0.000488	11.00		1.78	1.78	99.82
0.000015	0.000375	11.38		0.18	0.18	100.00
TOTALS				**100.00**	**100.00**	**100.00**

Cumulative Weight Percent greater than

Weight percent	Phi Value	Particle Size Inches	Particle Size Millimeters
5	1.22	0.0169	0.429
10	1.63	0.0127	0.323
16	1.95	0.0102	0.259
25	2.38	0.0076	0.193
40	3.04	0.0048	0.122
50	3.52	0.0034	0.087
60	4.16	0.0022	0.056
75	5.88	0.0007	0.017
84	7.19	0.0003	0.007
90	8.15	0.0001	0.004
95	9.09	0.0001	0.002

Measure	Trask	Inman	Folk-Ward
Median, phi	3.52	3.52	3.52
Median, in.	0.0034	0.0034	0.0034
Median, mm	0.087	0.087	0.087
Mean, phi	3.25	4.57	4.22
Mean, in.	0.0041	0.0017	0.0021
Mean, mm	0.105	0.042	0.054
Sorting	3.365	2.620	2.503
Skewness	0.657	0.399	0.407
Kurtosis	0.275	0.503	0.922

Grain Size Description (ASTM-USCS Scale)	Fine sand (based on Mean from Trask)

Description	Retained on Sieve #	Weight Percent
Gravel	4	0.00
Coarse Sand	10	0.00
Medium Sand	40	5.22
Fine Sand	200	48.76
Silt	>0.005 mm	33.23
Clay	<0.005 mm	12.79
	Total	**100**

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Laboratories
ENVIRONMENTAL SERVICES

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

COMPANY	SECOR Int'l, Inc
ADDRESS / CITY / ZIP CODE	290 Conejo Ridge, Thousand Oaks 91361
PROJECT MANAGER	Phil Kinney - 805-230-1266
PROJECT NAME / PHONE NUMBER	Gardena Sumps - 805-230-1277
PROJECT NUMBER / FAX NUMBER	37BP.XB006.06
SITE LOCATION	1440 Artesia Blvd, Gardena, CA
SAMPLER SIGNATURE	Randy T. Carter

ANALYSIS REQUEST

SAMPLE ID NUMBER	DATE	TIME	DEPTH, FT	NUMBER OF SAMPLES	SOIL PROPERTIES PACKAGE	HYDRAULIC CONDUCTIVITY PACKAGE	PORE FLUID SATURATIONS PACKAGE	TCEQ/TNRCC PROPERTIES PACKAGE	CAPILLARITY PACKAGE	FLUID PROPERTIES PACKAGE	PHOTOLOG: CORE PHOTOGRAPHY	MOISTURE CONTENT, ASTM D2216	POROSITY: TOTAL, API RP40 CALculated	POROSITY: EFFECTIVE, ASTM D425M	SPECIFIC GRAVITY, ASTM D854	BULK DENSITY (DRY), ~~API RP40~~ or ASTM D2937	AIR PERMEABILITY, API RP40	HYDRAULIC CONDUCTIVITY, EPA9100, API RP40, D5084	GRAIN SIZE DISTRIBUTION, ASTM D422/4464M	TOC: WALKLEY-BLACK	ATTERBERG LIMITS, ASTM D4318	Grain Density ASTM D854	Grain Size ASTM D422/D4464	Soil Moisture ASTM D2216	COMMENTS
SV07-PT-6.0	03/08/06	1330	6.0	1									X			X	X		X	X		X	X	X	
SV07-PT-14.8	03/08/06	1400	14.8	1									X			X	X		X	X		X	X	X	
SV02-SS-5.0	03/13/06	1300	5.0	1									X			X	X		X	X		X	X	X	
SV02-SS-15	03/13/06	1310	15.0	1									X			X	X		X	X		X	X	X	
SV28-PT-14.4	03/13/06	1510	14.4	1									X			X	X		X	X		X	X	X	
SV28-PT-6.0	03/13/06	~~1500~~ 1400	6.0	1									X			X	X		X	X		X	X	X	
SV18-PT-6.0	03/08/06	1530	6.0	1									X			X	X		X	X		X	X	X	
SV18-PT-15.0	03/08/06	1540	15.0	1									X			X	X		X	X		X	X	X	

PO#

TURNAROUND TIME
24 HOURS ☐ 5 DAYS ☐
48 HOURS ☐ NORMAL ☐
72 HOURS ☐
OTHER: _____

SAMPLE INTEGRITY (CHECK):
INTACT ___ ON ICE ___

PTS QUOTE NO.

PTS FILE:

1. RELINQUISHED BY	2. RECEIVED BY	3. RELINQUISHED BY	4. RECEIVED BY
MARK MASON			
COMPANY: SECOR INT. INC.	COMPANY: PTS LABS	COMPANY	COMPANY
DATE: 4-17-06 TIME: 1150	DATE: 04/17/06 TIME: 1150	DATE TIME	DATE TIME

PTS Laboratories, Inc. • 8100 Secura Way • Santa Fe Springs, CA 90670 • Phone (562) 907-3607 • Fax (562) 907-3610
PTS GeoLabs, Inc. • 4342 W. 12th St. • Houston, TX 77055 • Phone (713) 680-2291 • Fax (713) 680-0763

June 1, 2007

BVNA No. 45007-000136.00

SECOR International Incorporated
290 Conejo Ridge Avenue
Thousand Oaks, California 91361

Attention: Mr. Garry Maurath

Re: Geotechnical Laboratory Soil Testing
SECTOR Project No.: 37BP.XB006.11

Dear Mr. Maurath:

Bureau Veritas North America, Inc., dba BTC Laboratories (BVNA) completed the geotechnical laboratory testing services for the referenced project. The samples were delivered to our laboratory and the following laboratory tests were performed in general accordance with ASTM procedures:

- Natural Water Content (ASTM D 2216) (4)
- Dry Bulk Density (ASTM D 2937) (4)
- Grain Size Distribution (ASTM D422) (4)
- Specific Gravity (ASTM D 854) (4)
- Porosity (API RP40) (4)
- TOC [Walky-Black Method] (4)

The following table summarizes the test results obtained from the laboratory testing programs:

SAMPLE	Moisture Content (%)	Total Organic Carbon (mg/kg)	Dry Bulk Density (pcf)	Porosity (%)
MW-04-PT-21	20.8	ND	107.4	35.9
MW-04-PT-54.5	42.0	ND	77.6	52.3
MW-04-PT-76	29.3	ND	89.8	45.8
MW-04-PT-90	42.5	5600	77.4	52.7

[ND – Not Detected]

We at BVNA appreciate the opportunity to be of service to you on this project. Should you have any questions or comments concerning this letter, please contact us at 805-656-6074.

Respectfully Submitted,
Bureau Veritas North America, Inc.

Young Chang, PhD, PE
Chief Engineer

Scott Moors, CEG
Business Unit Manager, V.P.

Attachment: Laboratory Test Results

MATERIALS LABORATORY
BTC LABORATORIES, INC. Established 1959
2978 Seaborg Ave., Ventura, CA 93003 ♦ (805) 656-6074 ♦ (805) 656-1263 Fax

Project:
Client: Secor, Thousend Oaks
Material:
Location:

BTC JOB No: 45007-000136
LAB No: ---
Date Tested: 5/15/07
Tested By: pfh

Moisture & Density of Driven Samples

Sample ID		MW-04	MW-04	MW-04	MW-04	
Discription		Brown Silty Sand (SM)	Brown-Gray Clay (CL)	Gray Silty Sand (SM)	Gray Clay (CL)	
Depth		21.0'	54.5'	76.0'	90.0'	
Sample Height	mm	145.7	153.6	143.9	142.0	
Sample Diameter	mm	49.3	49.3	49.3	49.3	
Volume of Sample	cm^3	278.1	293.1	274.6	270.9	
Weight of Sample + Ring	gm	739.6	695.4	688.7	657.0	
Ring Weight (-)	gm	161.6	176.9	176.9	176.7	
Density **WET WEIGHT**	pcf	129.7	110.1	116.0	110.3	

Moisture Determination @ 60°c

Wet Weight	279.0	154.0	174.3	239.8	
Dry Weight	233.8	112.3	134.3	176.2	
Percent Moisture	19.3	37.1	29.8	36.1	
Density **DRY WEIGHT**	108.7	80.3	89.4	81.1	

Moisture Determination @ 110°c

Wet Weight	gm	271.1	300.4	305.6	232.8	
Dry Weight	gm	224.4	211.6	236.4	163.4	
Percent Moisture	%	20.8	42.0	29.3	42.5	
Density **DRY WEIGHT**	pcf	107.4	77.6	89.8	77.4	

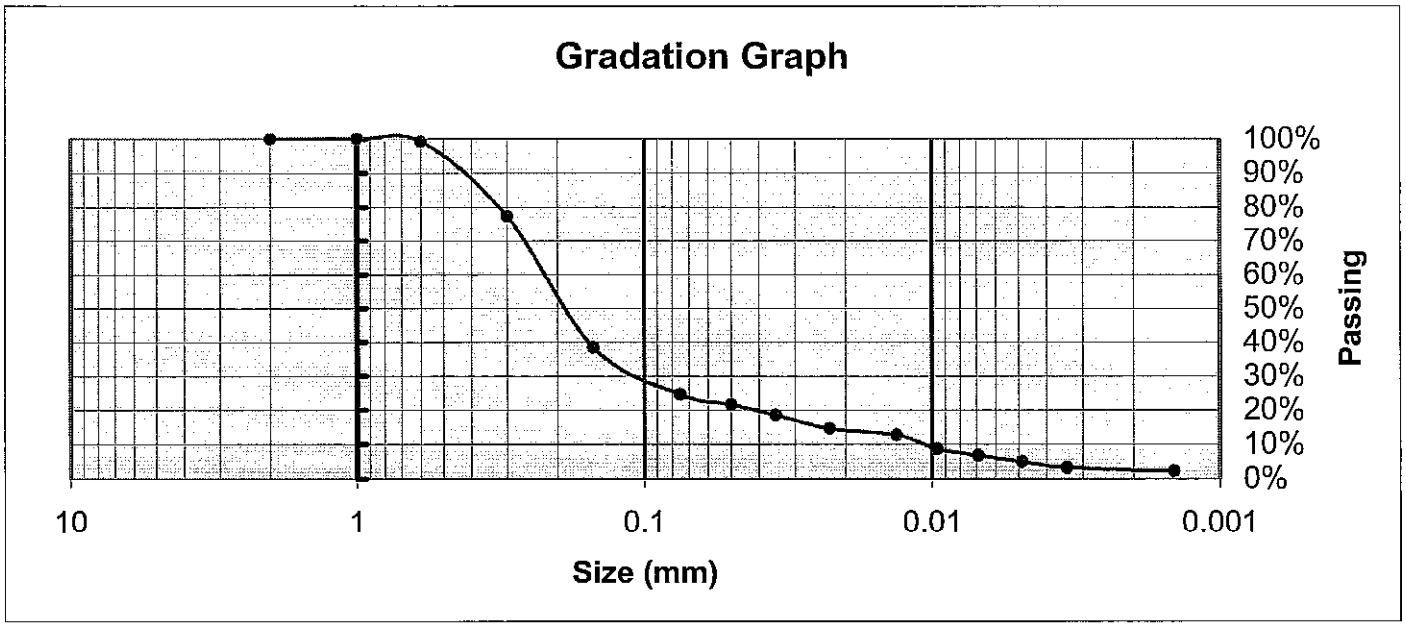
Specific Gravity (ASTM D854)

MW-04	MW-04	MW-04	MW-04	
2.684	2.607	2.655	2.623	

BTC LABORATORIES, INC

Gardena Slumps
GRADED HYDROMETER TEST (ASTM D422)
MW-4 @ 21.0'

BTC # 45007-000136
LAB # 0



Gravel	3" to #4	76.2 to 4.76 mm		100.0%	100.0%	0.0%	
Sand	#4 to #200	4.76 to 0.074		100.0%	24.6%	75.4%	
Coarse Sand	#4 to #10		4.76 to 1.68 mm	100.0%	100.0%		0.0%
Medium Sand	#10 to #40		1.68 to 0.42	100.0%	88.3%		11.7%
Fine Sand	#40 to #200		0.42 to 0.074	88.3%	24.6%		63.7%
Silt		0.074 to 0.005		24.6%	5.0%	19.6%	
Clay		Less than 0.005		5.0%		5.0%	
Colloids			Less than 0.001				
						100.0%	

Grain Size Factors

D60 =	0.23 mm
D30 =	0.102 mm
D10 =	0.01 mm

Cu =	23
Cc =	4.5

Apparent Plasticity (Visual per ASTM D2488)		#N/A
Atterberg Limits		
	Liquid Limit	
	Plastic Limit	
	Plasticity Index	

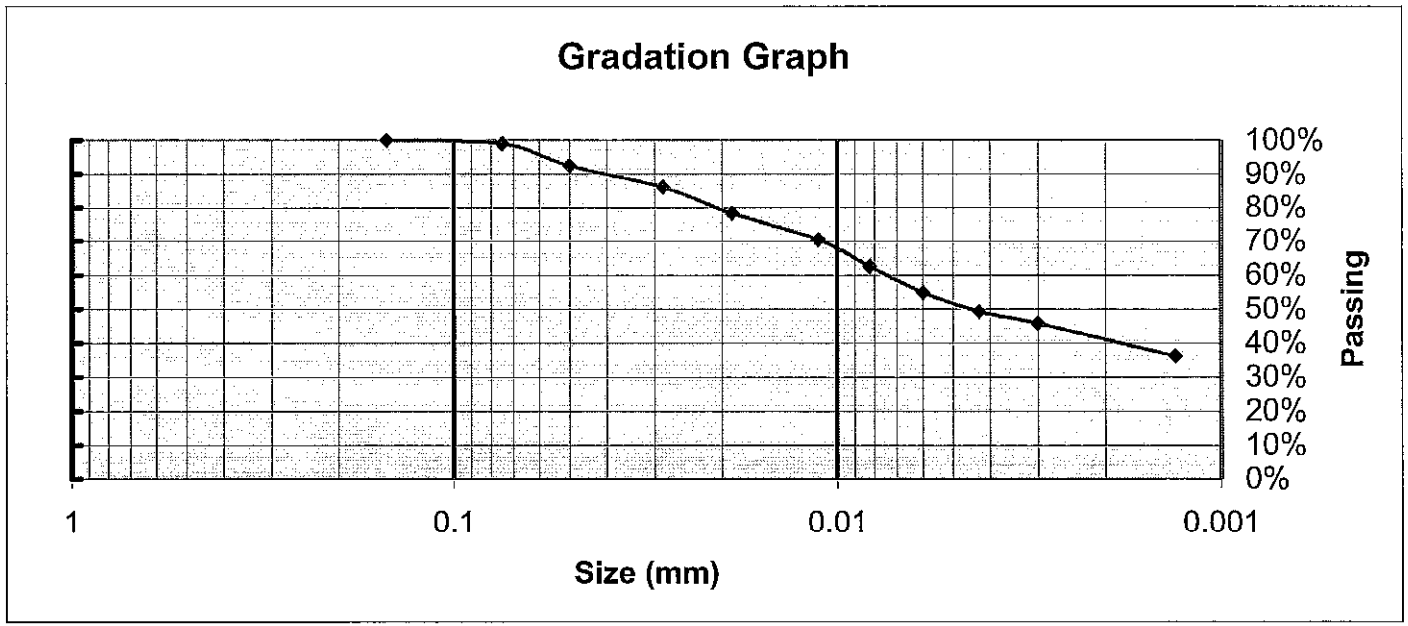
Grain Size Groups	
Gravel	0.0%
Sand	75.4%
Silt	19.6%
Clay	5.0%

Sieve	Size (mm)	Passing
3/4"	19.0000	100%
1/2"	12.5000	100%
3/8"	9.5000	100%
#4	4.7500	100.0%
#8	2.3600	100.0%
#10	2.0000	100.0%
#16	1.0000	100.0%
#30	0.6000	99.2%
#50	0.3000	77.3%
#100	0.1500	38.4%
#200	0.0750	24.6%
Hydrometer	0.0500	21.6%
	0.0350	18.6%
	0.0228	14.6%
	0.0133	12.7%
	0.0096	8.7%
	0.0069	6.8%
	0.0049	5.0%
	0.0034	3.2%
	0.0014	2.3%

BTC LABORATORIES, INC

Gardena Slumps
GRADED HYDROMETER TEST (ASTM D422)
MW-4 @ 54.5'

BTC # 45007-000136
LAB # 0



Gravel	3" to #4	76.2 to 4.76 mm		100.0%	100.0%	0.0%	
Sand	#4 to #200	4.76 to 0.074		100.0%	99.0%	1.0%	
Coarse Sand	#4 to #10		4.76 to 1.68 mm	100.0%	100.0%		0.0%
Medium Sand	#10 to #40		1.68 to 0.42	100.0%	100.0%		0.0%
Fine Sand	#40 to #200		0.42 to 0.074	100.0%	99.0%		1.0%
Silt		0.074 to 0.005		99.0%	49.3%	49.8%	
Clay		Less than 0.005		49.3%		49.3%	
Colloids			Less than 0.001				
						100.0%	

Grain Size Factors

D60 =	0.045 mm
D30 =	mm
D10 =	mm

Cu =	#DIV/0!
Cc =	#DIV/0!

Apparent Plasticity (Visual per ASTM D2488)		#N/A
Atterberg Limits		
	Liquid Limit	
	Plastic Limit	
	Plasticity Index	

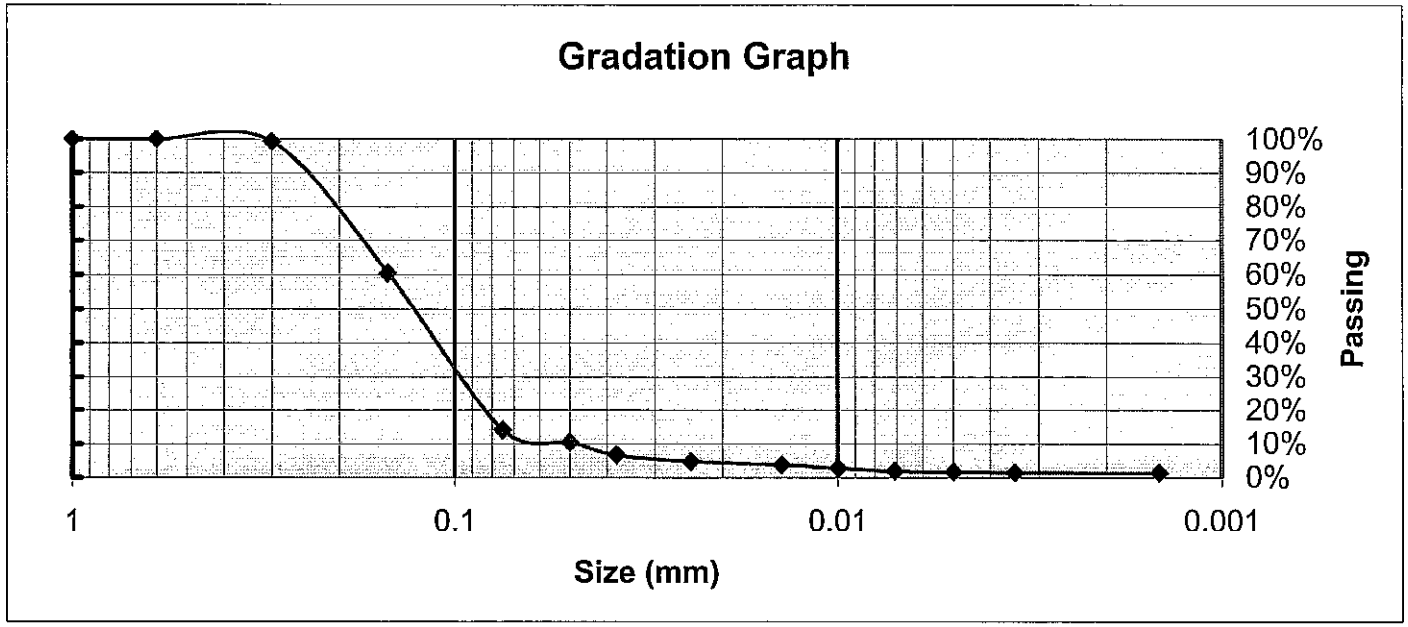
Grain Size Groups	
Gravel	0.0%
Sand	1.0%
Silt	49.8%
Clay	49.3%

Sieve	Size (mm)	Passing
3/4"	19.0000	100%
1/2"	12.5000	100%
3/8"	9.5000	100%
#4	4.7500	100.0%
#8	2.3600	100.0%
#10	2.0000	100.0%
#16	1.0000	100.0%
#30	0.6000	100.0%
#50	0.3000	100.0%
#100	0.1500	100.0%
#200	0.0750	99.0%
Hydrometer	0.0500	92.5%
	0.0285	86.1%
	0.0188	78.2%
	0.0112	70.4%
	0.0082	62.6%
	0.0060	54.9%
	0.0043	49.3%
	0.0030	45.7%
	0.0013	36.1%

BTC LABORATORIES, INC

Gardena Slumps
GRADED HYDROMETER TEST (ASTM D422)
MW-4 @ 76.0'

BTC # 45007-000136
LAB # 0



Gravel	3" to #4	76.2 to 4.76 mm		100.0%	100.0%	0.0%	
Sand	#4 to #200	4.76 to 0.074		100.0%	14.1%	85.9%	
Coarse Sand	#4 to #10		4.76 to 1.68 mm	100.0%	100.0%		0.0%
Medium Sand	#10 to #40		1.68 to 0.42	100.0%	99.7%		0.3%
Fine Sand	#40 to #200		0.42 to 0.074	99.7%	14.1%		85.6%
Silt		0.074 to 0.005		14.1%	1.6%	12.4%	
Clay		Less than 0.005		1.6%		1.6%	
Colloids			Less than 0.001				
						100.0%	

Grain Size Factors

D60 =	0.15 mm
D30 =	0.098 mm
D10 =	0.04 mm

Cu =	4
Cc =	1.6

Apparent Plasticity (Visual per ASTM D2488)		#N/A
Atterberg Limits		
	Liquid Limit	
	Plastic Limit	
	Plasticity Index	

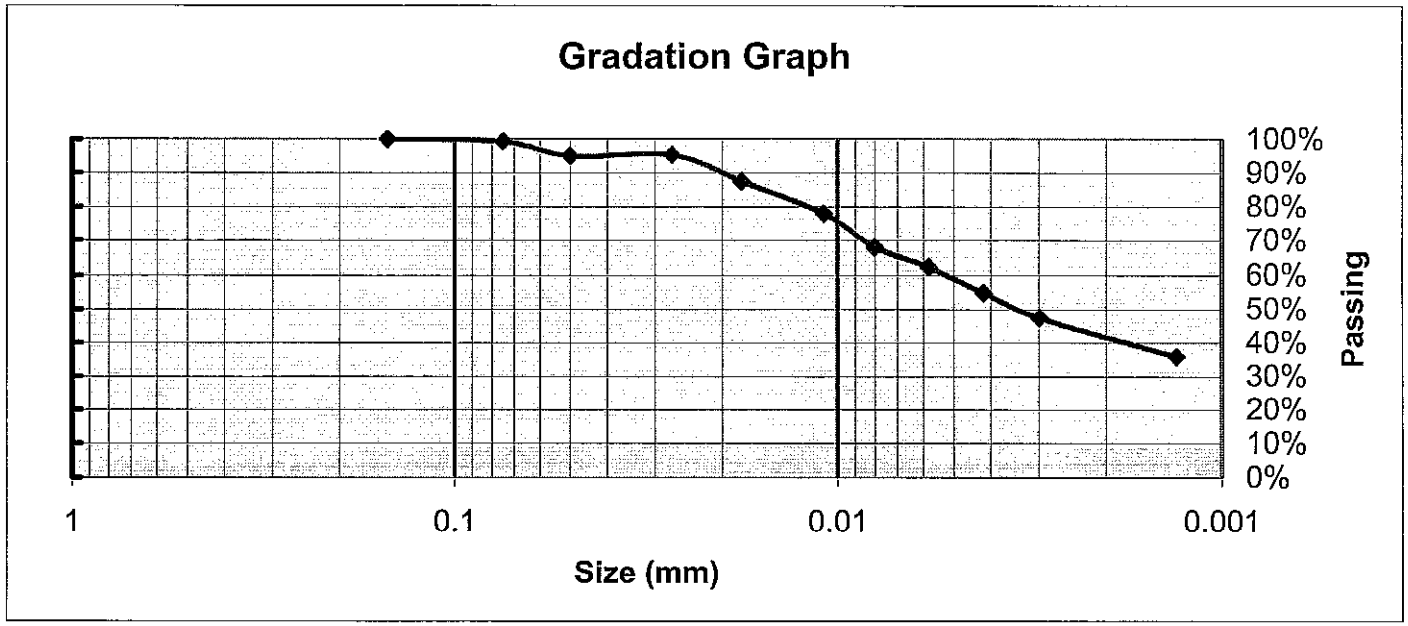
Grain Size Groups	
Gravel	0.0%
Sand	85.9%
Silt	12.4%
Clay	1.6%

Sieve	Size (mm)	Passing
3/4"	19.0000	100%
1/2"	12.5000	100%
3/8"	9.5000	100%
#4	4.7500	100.0%
#8	2.3600	100.0%
#10	2.0000	100.0%
#16	1.0000	100.0%
#30	0.6000	100.0%
#50	0.3000	99.3%
#100	0.1500	60.5%
#200	0.0750	14.1%
Hydrometer	0.0500	10.4%
	0.0378	6.7%
	0.0241	4.7%
	0.0140	3.8%
	0.0100	2.8%
	0.0071	1.9%
	0.0050	1.6%
	0.0034	1.4%
	0.0015	1.3%

BTC LABORATORIES, INC

Gardena Slumps
GRADED HYDROMETER TEST (ASTM D422)
MW-4 @ 90.0'

BTC # 45007-000136
LAB # 0



Gravel	3" to #4	76.2 to 4.76 mm		100.0%	100.0%	0.0%	
Sand	#4 to #200	4.76 to 0.074		100.0%	99.2%	0.8%	
Coarse Sand	#4 to #10		4.76 to 1.68 mm	100.0%	100.0%		0.0%
Medium Sand	#10 to #40		1.68 to 0.42	100.0%	100.0%		0.0%
Fine Sand	#40 to #200		0.42 to 0.074	100.0%	99.2%		0.8%
Silt		0.074 to 0.005		99.2%	54.8%	44.4%	
Clay		Less than 0.005		54.8%		54.8%	
Colloids			Less than 0.001				
						100.0%	

Grain Size Factors

D60 =	0.0042 mm
D30 =	mm
D10 =	mm

Cu =	#DIV/0!
Cc =	#DIV/0!

Apparent Plasticity (Visual per ASTM D2488)		#N/A
Atterberg Limits		
	Liquid Limit	
	Plastic Limit	
	Plasticity Index	

Grain Size Groups	
Gravel	0.0%
Sand	0.8%
Silt	44.4%
Clay	54.8%

Sieve	Size (mm)	Passing
3/4"	19.0000	100%
1/2"	12.5000	100%
3/8"	9.5000	100%
#4	4.7500	100.0%
#8	2.3600	100.0%
#10	2.0000	100.0%
#16	1.0000	100.0%
#30	0.6000	100.0%
#50	0.3000	100.0%
#100	0.1500	100.0%
#200	0.0750	99.2%
Hydrometer	0.0500	95.0%
	0.0271	95.3%
	0.0178	87.5%
	0.0109	77.8%
	0.0080	68.1%
	0.0058	62.4%
	0.0042	54.8%
	0.0030	47.4%
	0.0013	35.8%

TestAmerica
ANALYTICAL TESTING CORPORATION
17461 Derian Avenue. Suite 100, Irvine, CA 92614 (949) 261-1022 Fax:(949) 260-3297

LABORATORY REPORT

Prepared For: CAPCO Laboratories
1536 Eastman, Suite B
Ventura, CA 93003
Attention: Dan Farah

Project: TOC
7572

Sampled: 12/08/06
Received: 05/17/07
Issued: 05/29/07 14:26

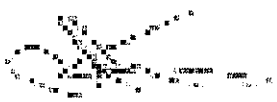
NELAP #01108CA California ELAP#1197 CSDLAC #10256

This entire report was reviewed and approved for release.

SAMPLE CROSS REFERENCE

LABORATORY ID	CLIENT ID	MATRIX
IQE2025-01	070937-01	Soil
IQE2025-02	070937-02	Soil
IQE2025-03	070937-03	Soil
IQE2025-04	070937-04	Soil

Reviewed By:



TestAmerica - Irvine, CA
Lena Davidkova
Project Manager

TestAmerica
ANALYTICAL TESTING CORPORATION
17461 Derian Avenue. Suite 100, Irvine, CA 92614 (949) 261-1022 Fax:(949) 260-3297

CAPCO Laboratories
1536 Eastman, Suite B
Ventura, CA 93003
Attention: Dan Farah

Project ID: TOC
7572
Report Number: IQE2025

Sampled: 12/08/06
Received: 05/17/07

TOTAL ORGANIC CARBON (EPA 9060A MOD.)

Analyte	Method	Batch	Reporting Limit	Sample Result	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: IQE2025-01 (070937-01 - Soil)								
Reporting Units: mg/kg								
Total Organic Carbon	EPA 9060A MOD.	7E24119	5000	ND	1	5/24/2007	5/24/2007	H3
Sample ID: IQE2025-02 (070937-02 - Soil)								
Reporting Units: mg/kg								
Total Organic Carbon	EPA 9060A MOD.	7E24119	5000	ND	1	5/24/2007	5/24/2007	H3
Sample ID: IQE2025-03 (070937-03 - Soil)								
Reporting Units: mg/kg								
Total Organic Carbon	EPA 9060A MOD.	7E24119	5000	ND	1	5/24/2007	5/24/2007	H3
Sample ID: IQE2025-04 (070937-04 - Soil)								
Reporting Units: mg/kg								
Total Organic Carbon	EPA 9060A MOD.	7E24119	5000	**5600**	1	5/24/2007	5/24/2007	H3

TestAmerica - Irvine, CA
Lena Davidkova
Project Manager

TestAmerica
ANALYTICAL TESTING CORPORATION
17461 Derian Avenue, Suite 100, Irvine, CA 92614 (949) 261-1022 Fax:(949) 260-3297

CAPCO Laboratories
1536 Eastman, Suite B
Ventura, CA 93003
Attention: Dan Farah

Project ID: TOC 7572
Report Number: IQE2025

Sampled: 12/08/06
Received: 05/17/07

METHOD BLANK/QC DATA

TOTAL ORGANIC CARBON (EPA 9060A MOD.)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 7E24119 Extracted: 05/24/07										
Blank Analyzed: 05/24/2007 (7E24119-BLK1)										
Total Organic Carbon	ND	5000	mg/kg							
LCS Analyzed: 05/24/2007 (7E24119-BS1)										
Total Organic Carbon	10800	5000	mg/kg	10000		108	90-110			
Matrix Spike Analyzed: 05/24/2007 (7E24119-MS1)					**Source: IQE2025-01**					
Total Organic Carbon	21500	5000	mg/kg	25000	ND	86	70-130			
Matrix Spike Dup Analyzed: 05/24/2007 (7E24119-MSD1)					**Source: IQE2025-01**					
Total Organic Carbon	19600	5000	mg/kg	25000	ND	78	70-130	9	30	

TestAmerica - Irvine, CA
Lena Davidkova
Project Manager

TestAmerica
ANALYTICAL TESTING CORPORATION
17461 Derian Avenue. Suite 100, Irvine, CA 92614 (949) 261-1022 Fax:(949) 260-3297

CAPCO Laboratories
1536 Eastman, Suite B
Ventura, CA 93003
Attention: Dan Farah

Project ID: TOC
7572
Report Number: IQE2025

Sampled: 12/08/06
Received: 05/17/07

DATA QUALIFIERS AND DEFINITIONS

H3	Sample was received and analyzed past holding time.
ND	Analyte NOT DETECTED at or above the reporting limit or MDL, if MDL is specified.
RPD	Relative Percent Difference

TestAmerica - Irvine, CA
Lena Davidkova
Project Manager

TestAmerica
ANALYTICAL TESTING CORPORATION
17461 Derian Avenue, Suite 100, Irvine, CA 92614 (949) 261-1022 Fax:(949) 260-3297

CAPCO Laboratories
1536 Eastman, Suite B
Ventura, CA 93003
Attention: Dan Farah

Project ID: TOC
7572
Report Number: IQE2025

Sampled: 12/08/06
Received: 05/17/07

Certification Summary

TestAmerica - Irvine, CA

Method	Matrix	Nelac	California
EPA 9060A MOD.	Soil	N/A	N/A

Nevada and NELAP provide analyte specific accreditations. Analyte specific information for TestAmerica may be obtained by contacting the laboratory or visiting our website at www.testamericainc.com

TestAmerica - Irvine, CA
Lena Davidkova
Project Manager

APPENDIX D

SEISMIC PARAMETERS

InSite Gardena Sumps

Latitude, Longitude: 33.8724167128112, -118.30106334663678

Date	11/14/2021, 11:01:36 AM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Stiff Soil

Type	Value	Description
S_S	1.769	MCE_R ground motion. (for 0.2 second period)
S_1	0.629	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.769	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	1.18	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.767	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA
PGA_M	0.844	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	1.769	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	1.96	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	2.427	Factored deterministic acceleration value. (0.2 second)
S1RT	0.629	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.7	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.835	Factored deterministic acceleration value. (1.0 second)
PGAd	0.988	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.903	Mapped value of the risk coefficient at short periods
C_{R1}	0.899	Mapped value of the risk coefficient at a period of 1 s

DISCLAIMER

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U.S. Geological Survey - Earthquake Hazards Program

Unified Hazard Tool

Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the U.S. Seismic Design Maps web tools (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

Input

Edition

Dynamic: Conterminous U.S. 2014 (update) (v4.2.0)

Spectral Period

Peak Ground Acceleration

Latitude

Decimal degrees

33.8724

Time Horizon

Return period in years

2475

Longitude

Decimal degrees, negative values for western longitudes

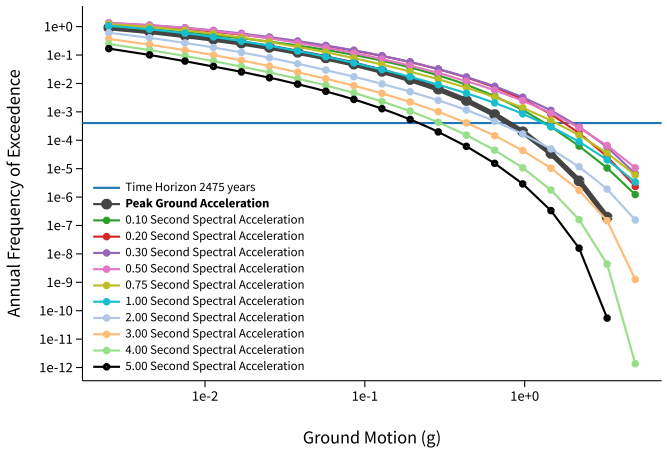
-118.3011

Site Class

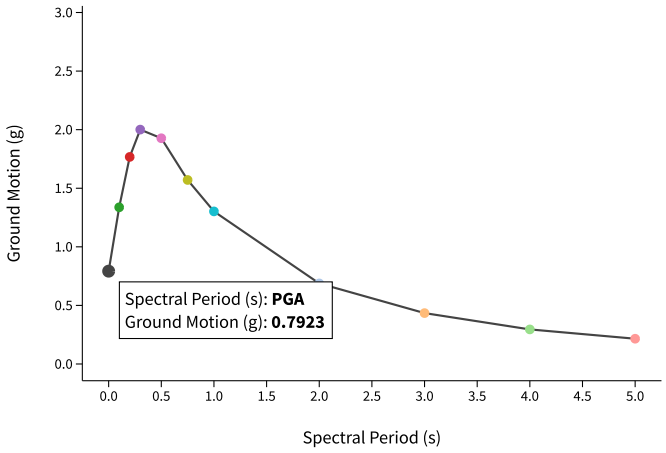
259 m/s (Site class D)

Hazard Curve

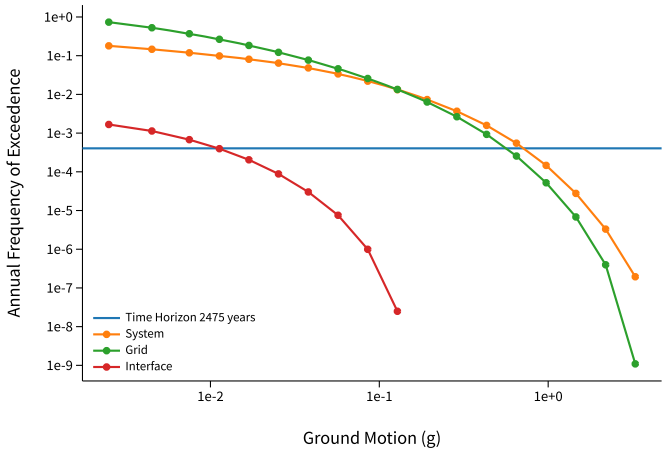
Hazard Curves



Uniform Hazard Response Spectrum



Component Curves for Peak Ground Acceleration

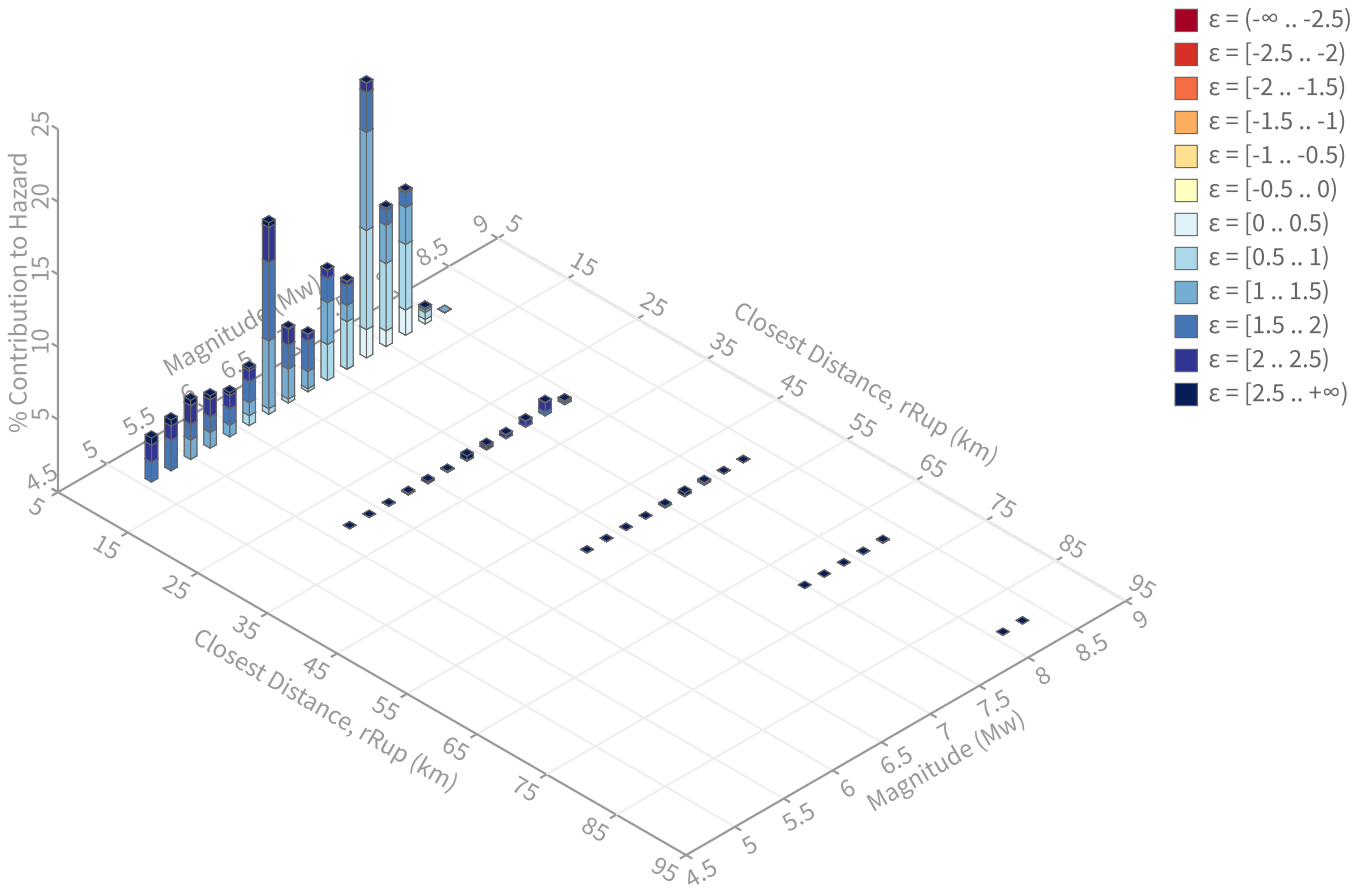


View Raw Data

Deaggregation

Component

Total



Summary statistics for, Deaggregation: Total

Deaggregation targets

Return period: 2475 yrs
Exceedance rate: 0.0004040404 yr^{-1}
PGA ground motion: 0.79227258 g

Recovered targets

Return period: 2930.2562 yrs
Exceedance rate: 0.00034126709 yr^{-1}

Totals

Binned: 100 %
Residual: 0 %
Trace: 0.07 %

Mean (over all sources)

m: 6.78
r: 8.62 km
ε_0: 1.42 σ

Mode (largest m-r bin)

m: 7.3
r: 8.01 km
ε_0: 1.13 σ
Contribution: 18.93 %

Mode (largest m-r-ε_0 bin)

m: 7.29
r: 6.31 km
ε_0: 0.74 σ
Contribution: 6.83 %

Discretization

r: min = 0.0, max = 1000.0, Δ = 20.0 km
m: min = 4.4, max = 9.4, Δ = 0.2
ε: min = -3.0, max = 3.0, Δ = 0.5 σ

Epsilon keys

ε0: [-∞ .. -2.5)
ε1: [-2.5 .. -2.0)
ε2: [-2.0 .. -1.5)
ε3: [-1.5 .. -1.0)
ε4: [-1.0 .. -0.5)
ε5: [-0.5 .. 0.0)
ε6: [0.0 .. 0.5)
ε7: [0.5 .. 1.0)
ε8: [1.0 .. 1.5)
ε9: [1.5 .. 2.0)
ε10: [2.0 .. 2.5)
ε11: [2.5 .. +∞]

Deaggregation Contributors

Source Set ↳ Source	Type	r	m	ε_0	lon	lat	az	%
UC33brAvg_FM31	System							38.05
Newport-Inglewood alt 1 [6]		3.91	7.33	0.87	118.271°W	33.893°N	50.67	11.34
Palos Verdes [11]		9.69	7.22	1.55	118.349°W	33.796°N	207.67	7.12
Compton [2]		7.58	7.30	0.75	118.325°W	33.833°N	206.14	6.20
Newport-Inglewood alt 1 [7]		7.06	6.36	1.66	118.316°W	33.933°N	348.63	5.11
Compton [1]		8.67	6.99	1.08	118.286°W	33.817°N	166.94	1.27
UC33brAvg_FM32	System							34.09
Newport-Inglewood alt 2 [6]		4.33	7.32	0.90	118.267°W	33.896°N	50.77	8.85
Compton [2]		7.58	7.36	0.73	118.325°W	33.833°N	206.14	6.81
Palos Verdes [11]		9.69	7.36	1.50	118.349°W	33.796°N	207.67	6.62
Newport-Inglewood alt 2 [7]		6.96	6.37	1.64	118.305°W	33.933°N	357.31	3.75
Compton [1]		8.67	6.97	1.09	118.286°W	33.817°N	166.94	1.06
Puente Hills (LA) [0]		15.89	7.26	1.86	118.209°W	33.989°N	33.23	1.05
Puente Hills (Santa Fe Springs) [1]		16.21	7.18	1.95	118.144°W	33.926°N	67.50	1.01
UC33brAvg_FM31 (opt)	Grid							14.15
PointSourceFinite: -118.301, 33.904		6.14	5.68	1.53	118.301°W	33.904°N	0.00	3.43
PointSourceFinite: -118.301, 33.904		6.14	5.68	1.53	118.301°W	33.904°N	0.00	3.43
PointSourceFinite: -118.301, 33.958		9.79	5.90	1.97	118.301°W	33.958°N	0.00	1.63
PointSourceFinite: -118.301, 33.958		9.79	5.90	1.97	118.301°W	33.958°N	0.00	1.63
UC33brAvg_FM32 (opt)	Grid							13.71
PointSourceFinite: -118.301, 33.904		6.14	5.67	1.53	118.301°W	33.904°N	0.00	3.30
PointSourceFinite: -118.301, 33.904		6.14	5.67	1.53	118.301°W	33.904°N	0.00	3.30
PointSourceFinite: -118.301, 33.958		9.79	5.90	1.97	118.301°W	33.958°N	0.00	1.56
PointSourceFinite: -118.301, 33.958		9.79	5.90	1.97	118.301°W	33.958°N	0.00	1.56

APPENDIX E

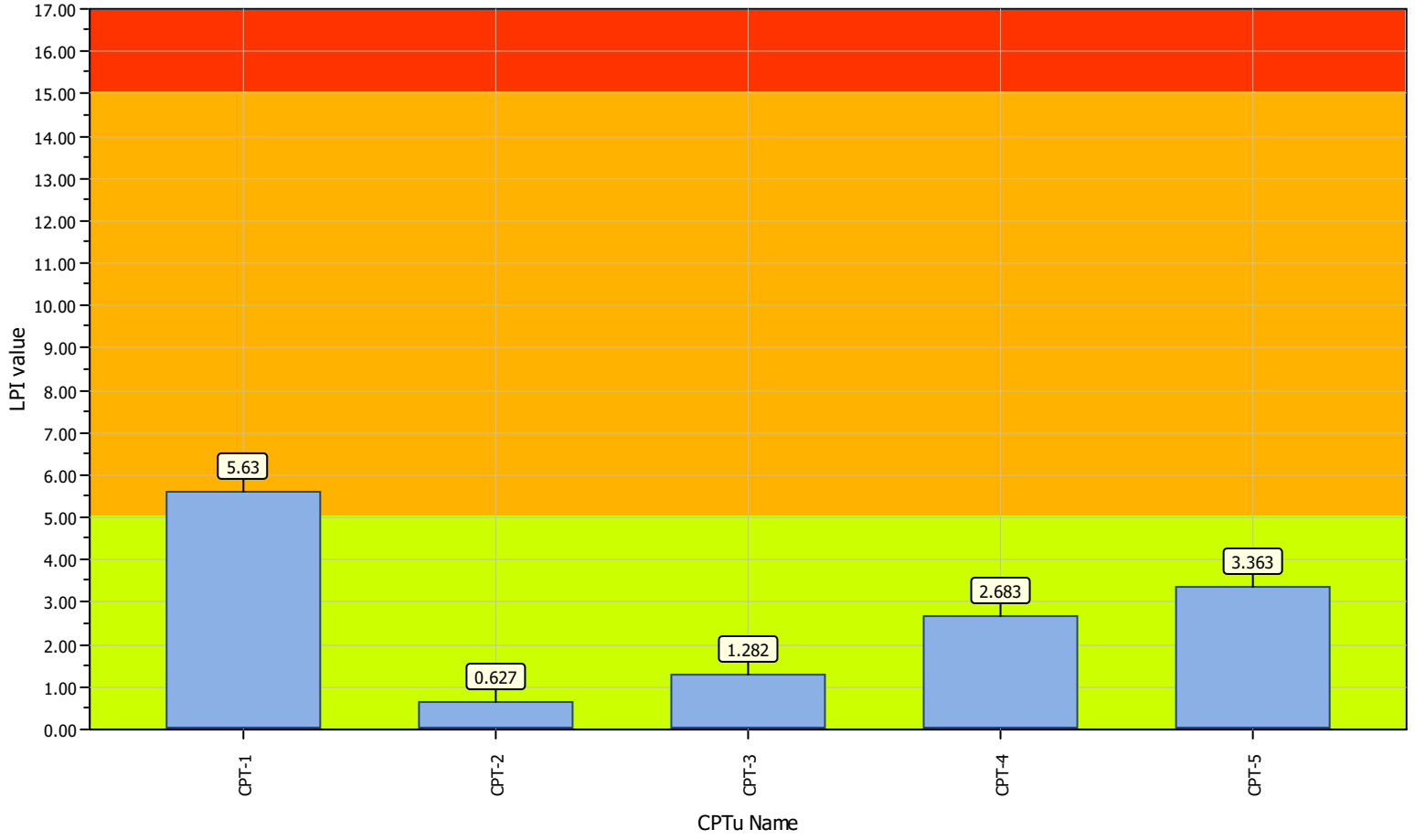
LIQUEFACTION ANALYSIS

Carl Kim Geotechnical, Inc.
945 Baileyana Road
Hillsborough, CA 94010
carlkimgeo@gmail.com

Project title : Carl Kim Geotechnical

Location : 1452 Artesia Blvd, Gardena, CA

Overall Liquefaction Potential Index report



LPI color scheme

- Very high risk
- High risk
- Low risk

Basic statistics

Total CPT number: 5
80% low risk
20% high risk
0% very high risk

Carl Kim Geotechnical, Inc.
945 Baileyana Road
Hillsborough, CA 94010
carlkimgeo@gmail.com

Project title : Carl Kim Geotechnical

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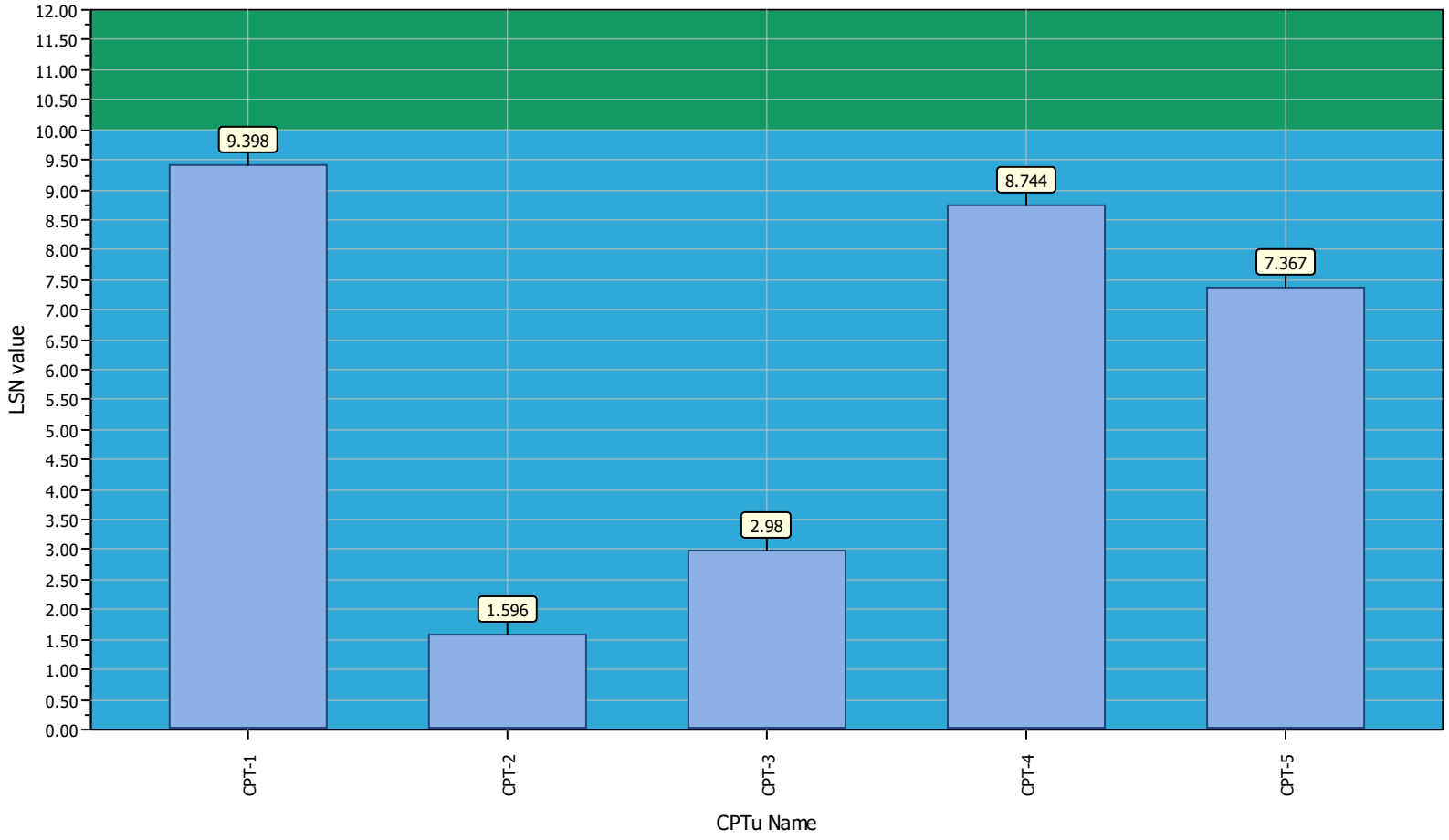
Overall Liquefaction Severity Number report



LSN color scheme

- Severe damage
- Major expression of liquefaction
- Moderate to severe exp. of liquefaction
- Moderate expression of liquefaction
- Minor expression of liquefaction
- Little to no expression of liquefaction

Basic statistics

Total CPT number: 5

100% little liquefaction

0% minor liquefaction

0% moderate liquefaction

0% moderate to major liquefaction

0% major liquefaction

0% severe liquefaction

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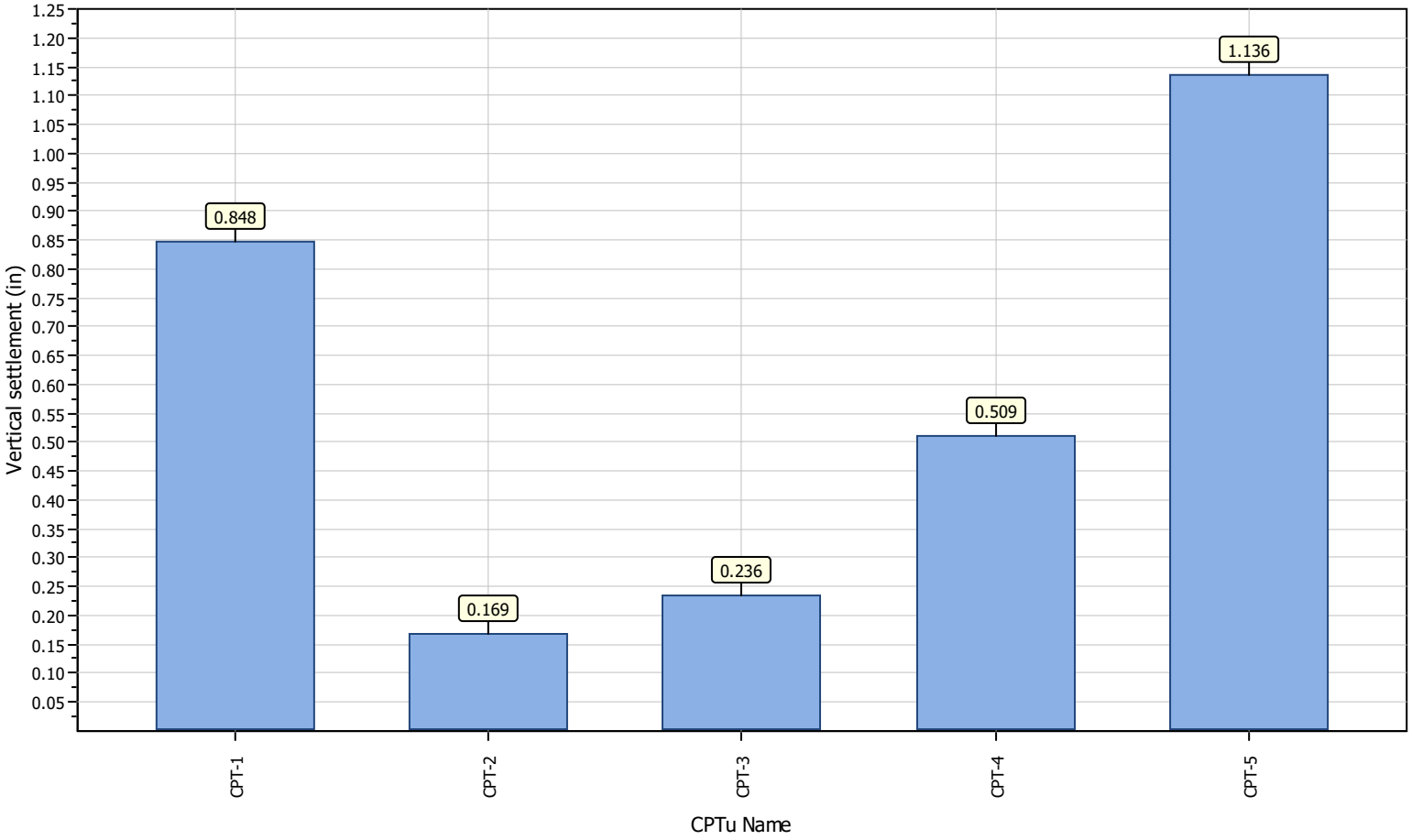
Overall vertical settlements report



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Hillsborough, CA 94010
carlkimgeo@gmail.com

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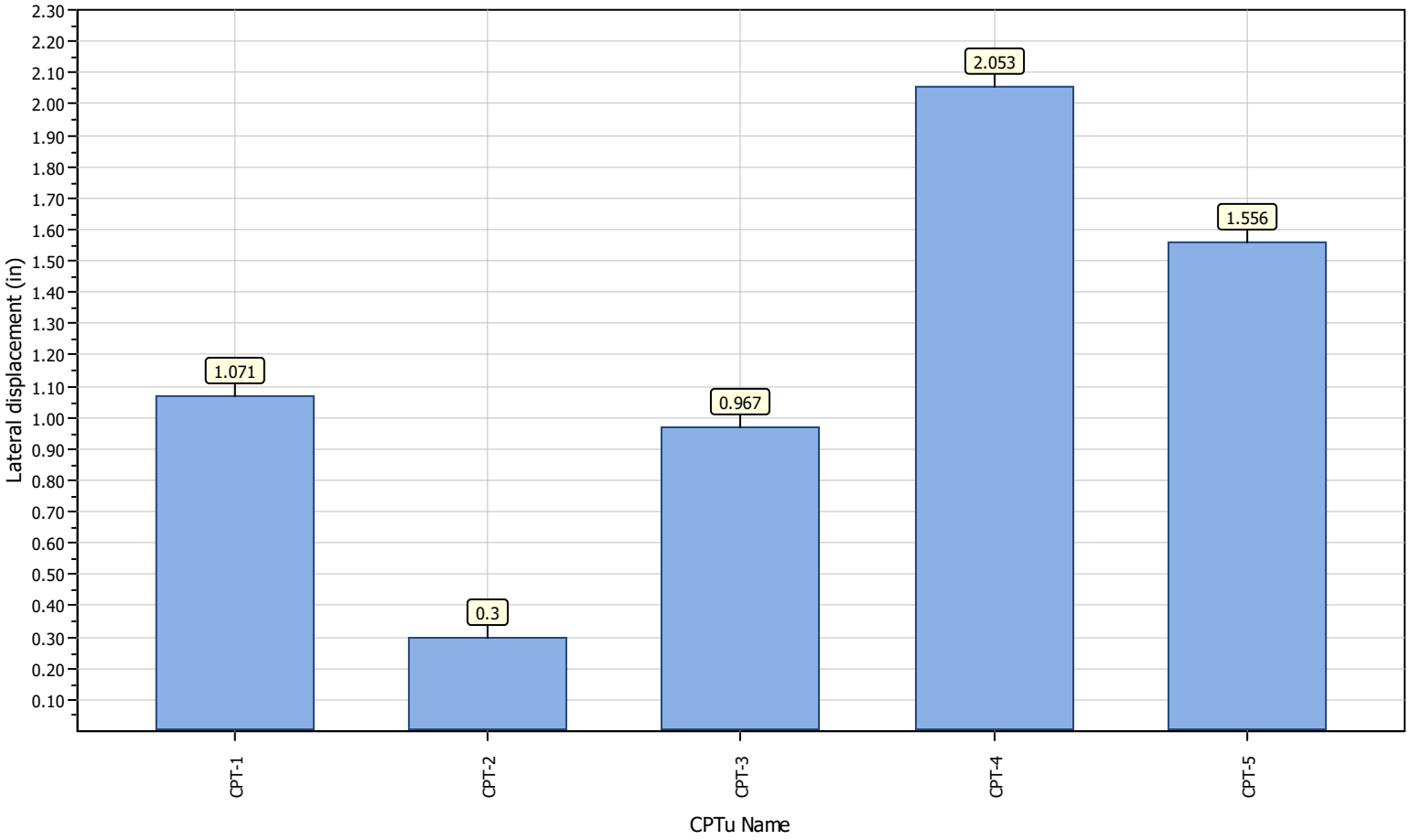
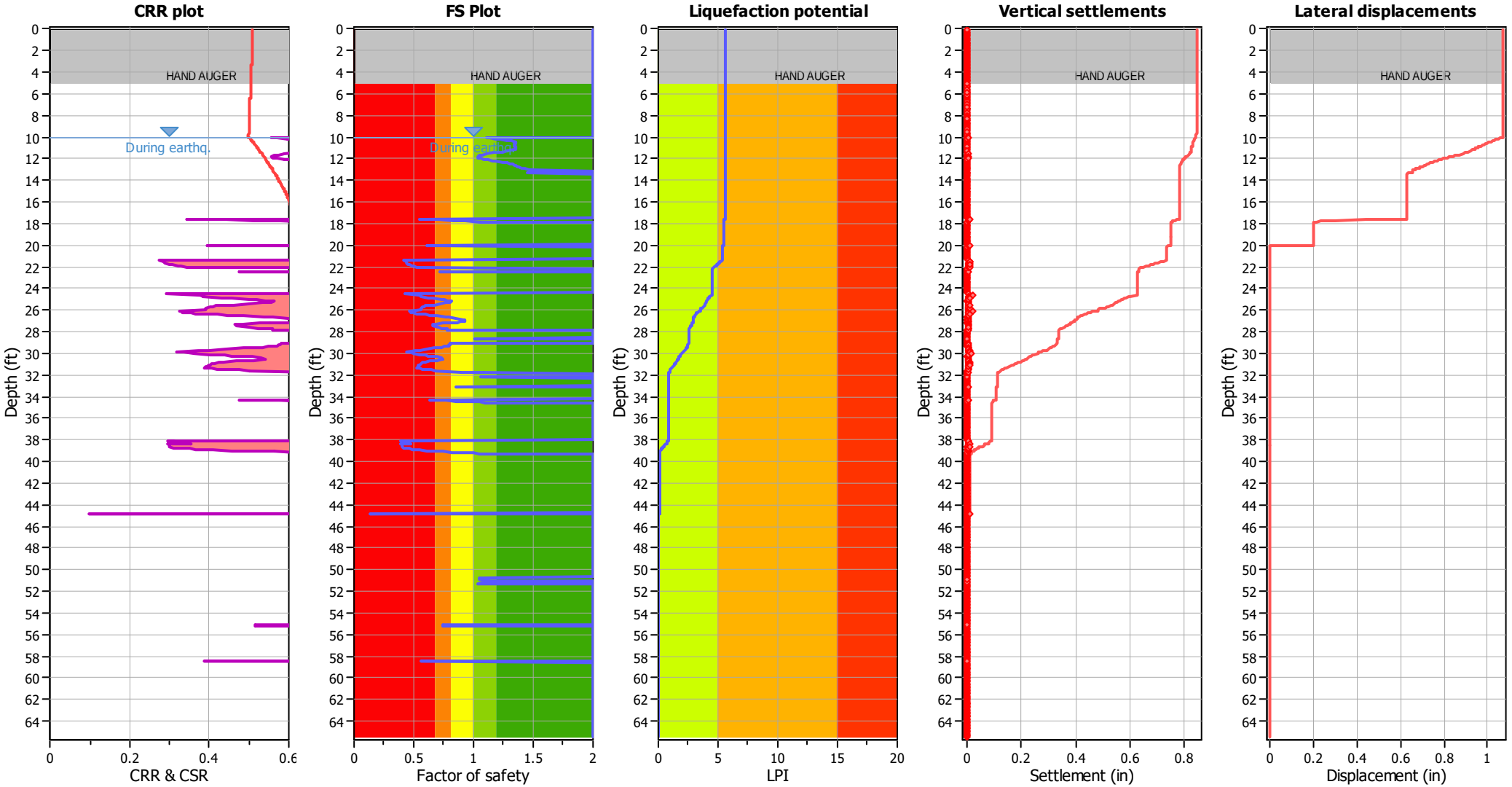
Overall lateral displacements report



Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	10.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.30	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.84	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	10.00 ft	Fill height:	N/A	Limit depth:	60.00 ft

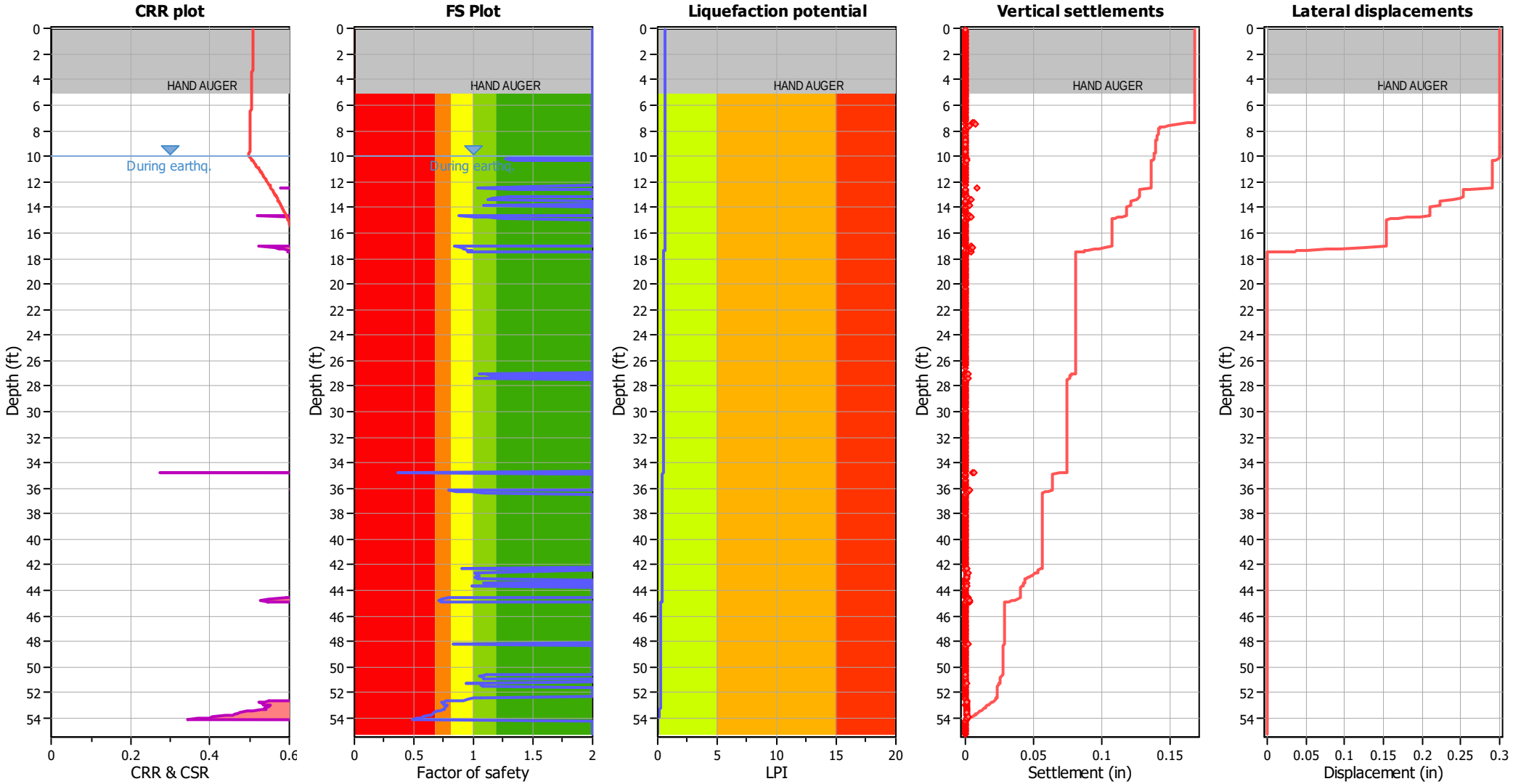
F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis overall plots



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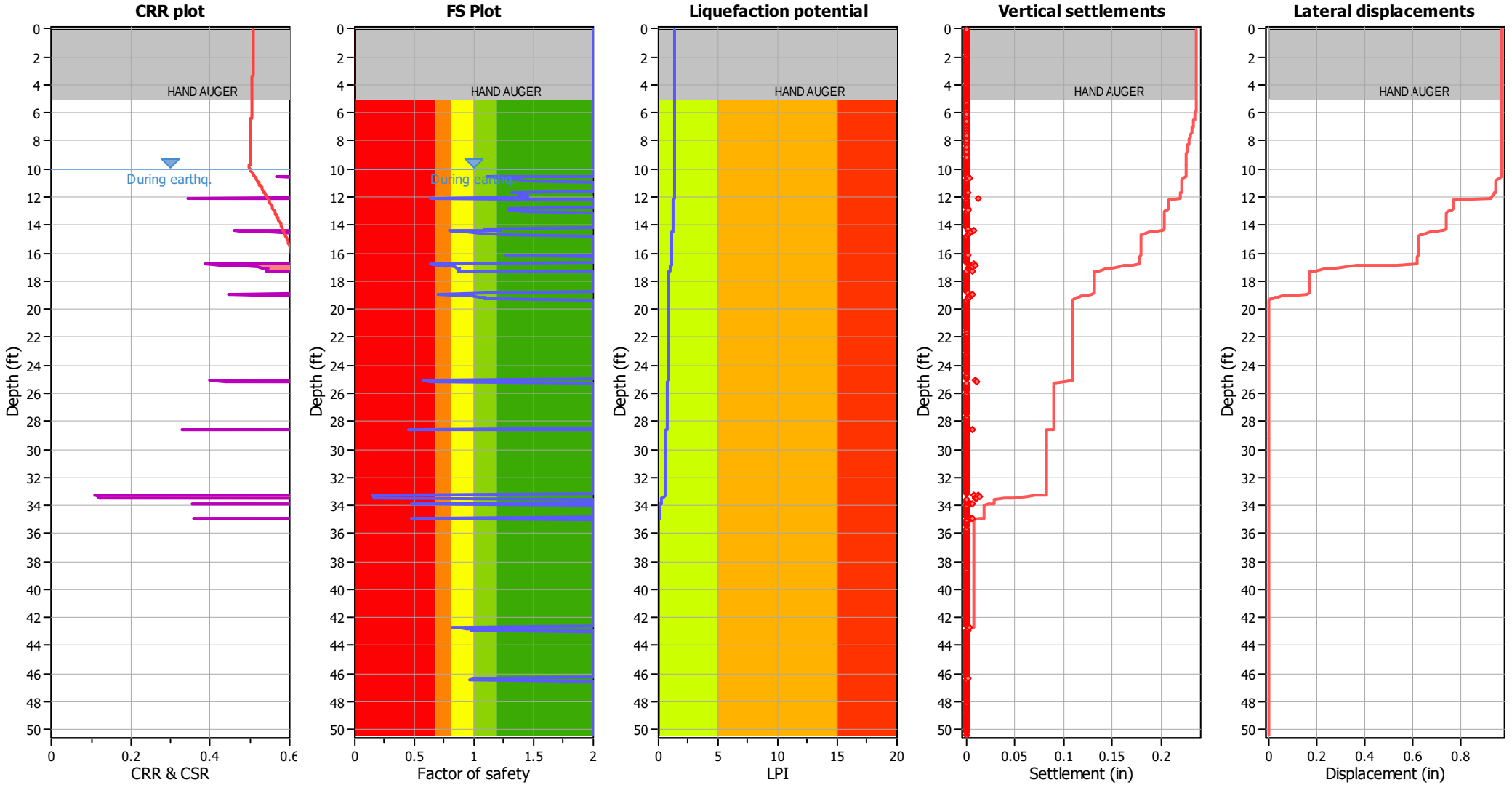

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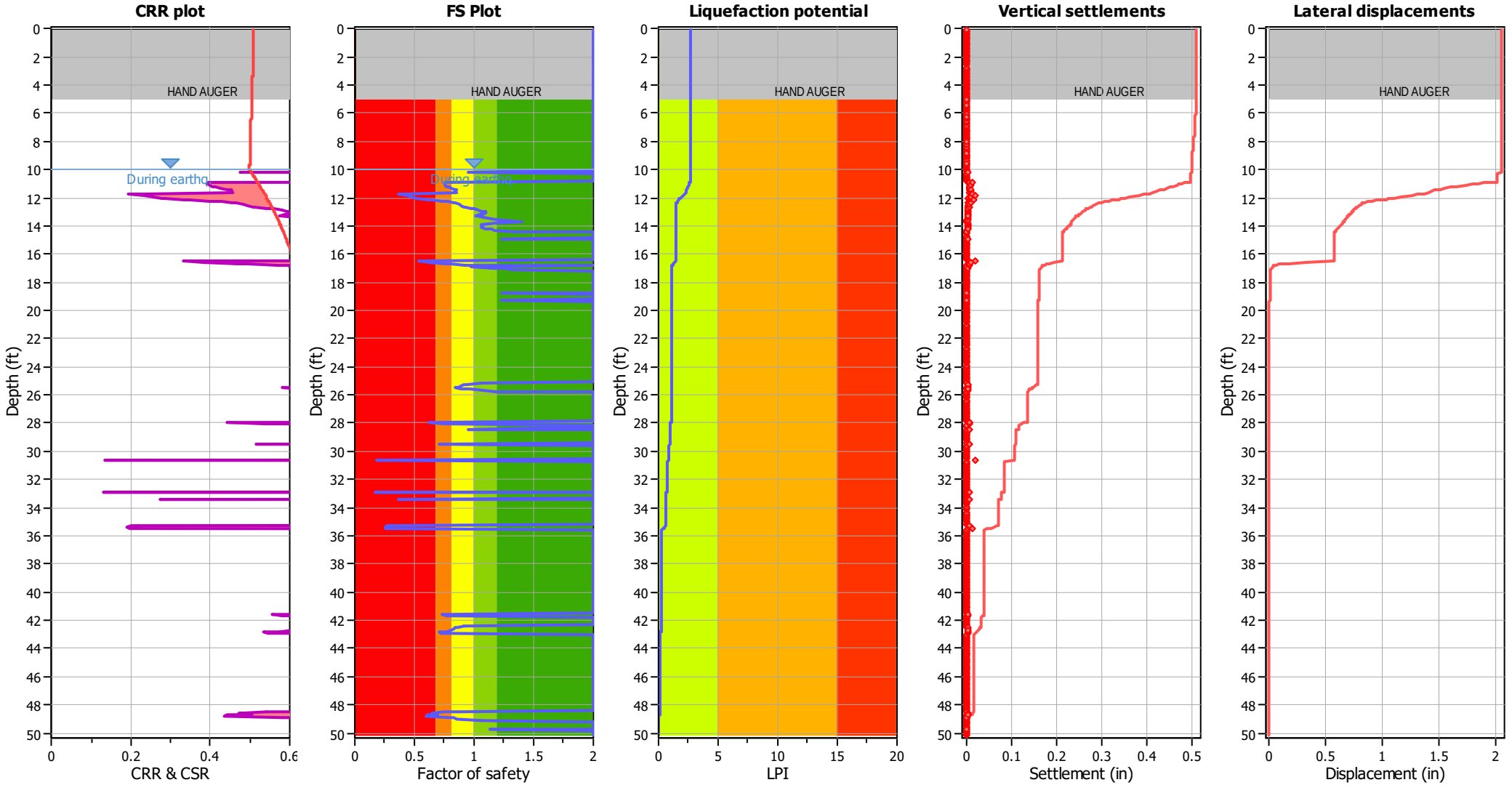

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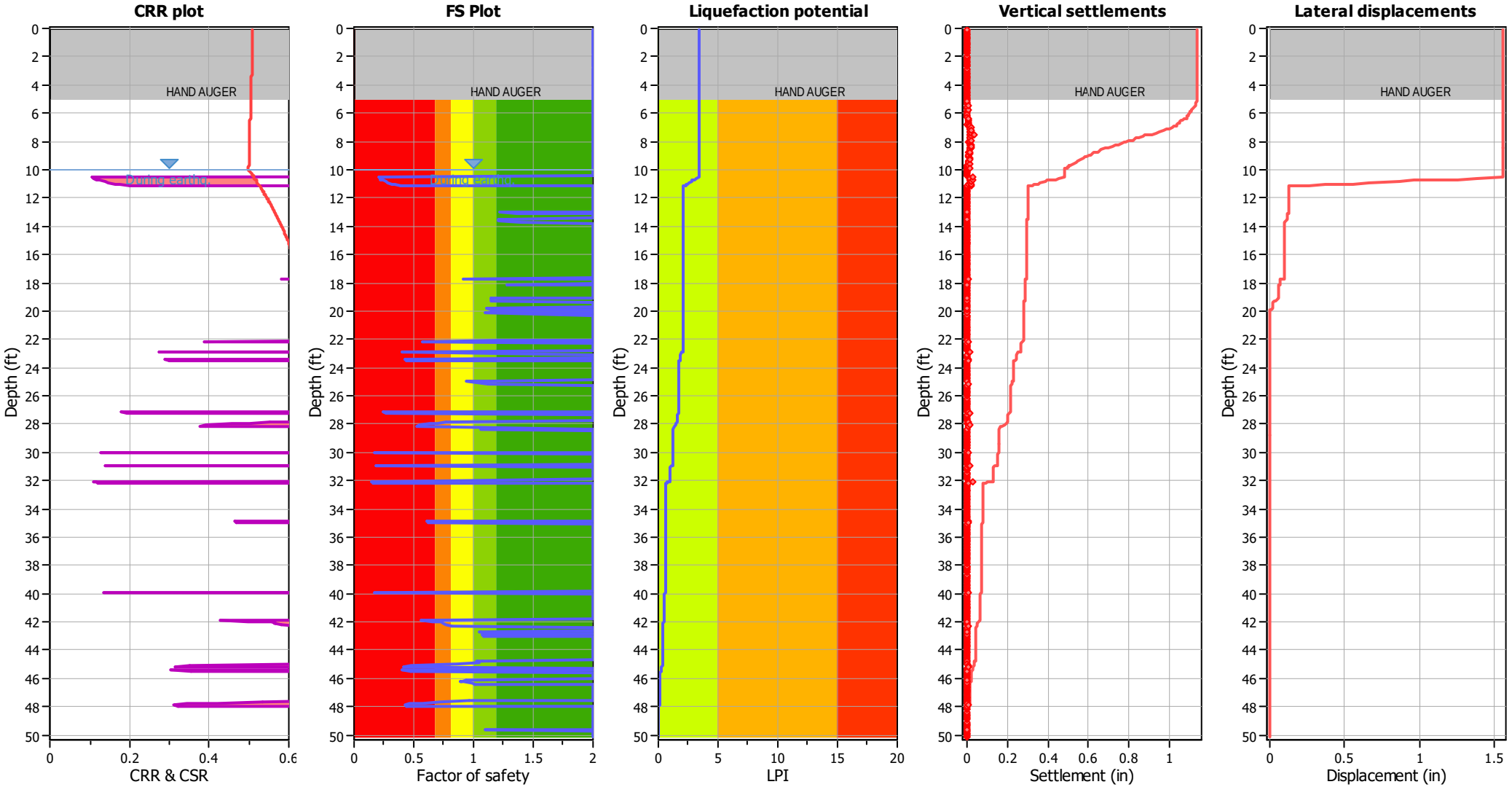

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