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GEOTECHNICAL INVESTIGATION
PROPOSED DEL MAR CITY HALL
1050 CAMINO DEL MAR
DEL MAR, CALIFORNIA

PREPARED FOR:

MR. TIM THIELE
CITY OF DEL MAR
1050 CAMINO DEL MAR
DEL MAR, CALIFORNIA 92014

PREPARED BY:

SOUTHERN CALIFORNIA SOIL & TESTING, INC.
6280 RIVERDALE STREET
SAN DIEGO, CALIFORNIA 92120

Providing Professional Engineering Services Since 1959

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May 15, 2015

SCST No. 140576P3.3
Report No. 1

Mr. Tim Thiele
City of Del Mar
1050 Camino Del Mar
Del Mar, California 92014

Subject: GEOTECHNICAL INVESTIGATION
PROPOSED DEL MAR CITY HALL
1050 CAMINO DEL MAR
DEL MAR, CALIFORNIA

Dear Mr. Thiele:

Southern California Soil & Testing, Inc. (SCST) is pleased to present our report describing the geotechnical investigation performed for the subject project. SCST conducted the geotechnical investigation in general conformance with the scope of work presented in our proposal dated April 30, 2015. If you have any questions, please call us at (619) 280-4321.

Respectfully Submitted,
SOUTHERN CALIFORNIA SOIL & TESTING, INC.

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EXECUTIVE SUMMARY

This report presents the results of the geotechnical investigation Southern California Soil & Testing, Inc. (SCST) performed for the subject project. We understand that the project will consist of the design and construction of a new City Hall. The project is located at 1050 Camino Del Mar in the City of Del Mar, California. We anticipate the building will be of wood frame construction with conventional spread footings and a slab-on-grade floor placed near existing grade and an underground parking garage. The purpose of our work is to provide conclusions and recommendations regarding the geotechnical aspects of the project.

SCST explored the subsurface conditions by drilling four borings to depths of between about 26 feet and 29½ feet below the existing ground surface using a truck-mounted drill rig equipped with a hollow stem auger. Additionally, three soil borings were manually excavated to depths of between about 2½ feet and 5 feet below the existing ground surface. An SCST geologist logged the borings and collected samples of the materials encountered for laboratory testing. SCST tested selected samples from the borings to evaluate pertinent soil classification and engineering properties to assist in developing geotechnical conclusions and recommendations. One soil sample was further tested for chemical constituents to include Total Petroleum Hydrocarbons (TPH), Volatile Organic Compounds (VOC's), and Lead.

The materials encountered in the borings consist of fill and old paralic deposits. The fill consists of loose silty sand with varying amounts of soft sandy clay. The old paralic deposits consist of medium dense to very dense silty sand. Groundwater was not encountered in the test borings but seepage may be present at basement depth. No TPH, VOC's, or Lead were reported above the laboratory reporting limits in the sample selected for chemical constituents.

To improve building slab support, the fill material and the old paralic deposits should be excavated to provide for 1 foot or more of compacted fill beneath slabs and flatwork or rigid pavement. The planned City Hall building can be supported on shallow spread footings with bottom levels on either old paralic deposits or compacted fill. Should grading of the site create a cut/fill transition within the final pad elevation, an undercut of the cut portion of the pad should be performed such that final building foundation bottoms are supported entirely on a uniform layer of compacted fill.

The grading and foundation recommendations presented herein may need to be updated once final plans are developed.

1 INTRODUCTION

This report presents the results of the geotechnical investigation Southern California Soil & Testing, Inc. (SCST) performed for the subject project. We understand that the project will consist of the design and construction of a new City Hall. The project is located at 1050 Camino Del Mar in the City of Del Mar, California. We anticipate the building will be of wood frame construction with conventional spread footings and a slab-on-grade floor placed near existing grade and an underground parking garage. The purpose of our work is to provide conclusions and recommendations regarding the geotechnical aspects of the project. In addition, the proximity of the proposed City Hall to a former gasoline station (previously known with hydrocarbon-impact in soil and groundwater), and formerly located southeast of the subject site, prompted field screening for organic vapor concentrations during the drilling operations. Figure 1 presents a site vicinity map.

2 SCOPE OF WORK

2.1 FIELD INVESTIGATION

We explored the subsurface conditions by drilling borings B-1 through B-4, to depths of between about 26 feet and 29½ feet below the existing ground surface using a truck-mounted drill rig equipped with a hollow stem auger. Three manually excavated borings were also advanced, via a hand auger, to depths of between about 2½ feet and 5 feet. Figure 2 shows the approximate locations of the borings. An SCST geologist logged the borings and collected samples of the materials encountered for laboratory testing. Additionally, the SCST geologist conducted field screening of the samples for organic vapor concentrations using a Photo-Ionization Detector (PID) at the boring locations. The logs of the borings are presented in Appendix I. Soils are classified according to the Unified Soil Classification System illustrated on Figure I-1.

2.2 LABORATORY TESTING

Selected samples obtained from the borings were tested to evaluate pertinent soil classification and engineering properties and enable development of geotechnical conclusions and recommendations. The laboratory tests consisted of:

- In Situ Moisture and Density
- Grain Size Distribution
- Expansion Index
- Corrosivity
- Direct Shear

The results of the laboratory tests, and brief explanations of test procedures, are presented in Appendix II. The soil sample selected for chemical constituents was submitted to Eurofins-

Calscience Environmental Laboratory, Inc., a CDPH state-certified laboratory for analysis. This sample was tested for Total Petroleum Hydrocarbons (TPH), Volatile Organic Compounds (VOC's), and Lead. The laboratory results for the chemical analyses are presented in Appendix III.

2.3 ANALYSIS AND REPORT

The results of the field and laboratory tests were evaluated to develop conclusions and recommendations regarding:

- Subsurface conditions beneath the site
- Potential geologic hazards
- Criteria for seismic design in accordance with the 2013 California Building Code (CBC)
- Site preparation and grading
- Excavation characteristics
- Foundation support along with geotechnical engineering criteria for design of the foundations
- Estimated foundation settlements
- Support for concrete slabs-on-grade
- Pavement design
- Storm water infiltration parameters
- Corrosion potential
- Potential hydrocarbon-impact in soil

3 SITE AND SUBSURFACE CONDITIONS

3.1 SITE DESCRIPTION

The site located at 1050 Camino Del Mar in the city of Del Mar, County of San Diego, California. The property is located south of 10th Street and north of 11th Street. The site is bounded on the north and south by commercial businesses, on the east by Camino Del Mar with commercial businesses further east and on the west by residences. The City of Del Mar City Hall currently occupies the property.

3.2 SUBSURFACE CONDITIONS

The materials encountered in our borings consist of fill material and old paralic deposits. Descriptions of the materials are presented below.

Fill - The fill material consists of dry, loose silty sand with varying amounts of soft sandy clay. The fill material was encountered to depths of between 1 to 7 feet below existing grade.

Old Paralic Deposits - The old paralic deposits consist of medium dense to very dense silty sand. Deposits near conceptual basement grade were found to be friable and wet. The old paralic deposits extent to the maximum depth explored of about 29½ feet below existing ground surface.

Groundwater - Groundwater was not encountered in any of the borings. However, seepage conditions were observed in B-2 at an approximate depth of 15 feet. Groundwater levels could rise in the future due to rainfall, irrigation, broken pipes, or changes in site drainage.

4 GEOLOGIC HAZARDS

4.1 FAULTING AND SURFACE RUPTURE

The closest known active fault is the Rose Canyon fault zone (Oceanside section) located offshore about 4 miles west-southwest of the site (USGS, 2014). The site is not located in an Alquist-Priolo Earthquake Fault Zone (California Department of Conservation, 2012). No active faults are known to underlie or project toward the site. Therefore, the probability of fault rupture is low.

4.2 CBC SEISMIC DESIGN PARAMETERS

A geologic hazard likely to affect the project is groundshaking as a result of movement along an active fault zone in the vicinity of the subject site. The site coefficients and adjusted maximum considered earthquake spectral response accelerations in accordance with the 2013 CBC are presented below:

Site Coordinates: Latitude 32.9551°
Longitude -117.2640°
Site Class: D
Site Coefficients, F_a = 1.018
F_v = 1.534
Mapped Spectral Response Acceleration at Short Periods, S_s = 1.205g
Mapped Spectral Response Acceleration at 1-Second Period, S_1 = 0.466g
S_{DS} = 0.818g
S_{D1} = 0.476g
PGA_M = 0.517g

4.3 LIQUEFACTION AND DYNAMIC SETTLEMENT

Liquefaction occurs when loose, saturated, generally fine sands and silts are subjected to strong ground shaking. The soils lose shear strength and become liquid, potentially resulting in large total and differential ground surface settlements as well as possible lateral spreading during an earthquake. Due to the lack of shallow groundwater, and given the relatively dense nature of the materials beneath the site, the potential for liquefaction and dynamic settlement to occur is considered low.

4.4 TSUNAMIS, SEICHES AND FLOODING

The site is not located within a mapped area on the State of California Tsunami Inundation Maps (Cal EMA, 2009); therefore, damage due to tsunamis is considered low. Seiches are periodic oscillations in large bodies of water such as lakes, harbors, bays, or reservoirs. The site is not located adjacent to any lakes or confined bodies of water; therefore, the potential for a seiche to affect the site is considered low. The site is not located within a flood zone or dam inundation area (County of San Diego, 2012).

4.5 LANDSLIDES AND SLOPE STABILITY

Evidence of landslides or slope instabilities was not observed. The potential for landslides or slope instabilities to occur at the site is considered low.

4.6 SUBSIDENCE

The site is not located in an area of known subsidence associated with fluid withdrawal (groundwater or petroleum); therefore, the potential for subsidence due to the extraction of fluids is negligible.

4.7 HYDRO-CONSOLIDATION

Hydro-consolidation can occur in recently deposited (less than 10,000 years old) sediments that were deposited in a semi-arid environment. Examples of such sediments are aolian sands, alluvial fan deposits, and mudflow sediments deposited during flash floods. The pore space between particle grains can re-adjust when inundated by groundwater causing the material to consolidate. The relatively dense materials underlying the site are not susceptible to hydro-consolidation.

5 CONCLUSIONS

The main geotechnical consideration affecting the planned improvements is the presence of existing fill material, as well as the potential for strong ground shaking as is with much of Southern California. Because of the potentially compressible nature of the fill material, some site preparation will need to be performed to reduce the potential for distress to the proposed structures and improvements. Cemented and friable zones within the formational material (old paralic deposits) may be encountered making neat excavations difficult. However, fill and formational soils are generally expected to be readily excavatable with conventional excavation equipment.

The planned structure can be supported on shallow spread footings with bottom levels on formational material or compacted fill material. Should grading of the site create a cut/fill transition within the final pad elevation, an undercut of the cut portion of the pad should be performed such that final building foundation bottoms are supported entirely on a uniform layer of compacted fill.

Groundwater was not encountered in the borings. However, groundwater levels may fluctuate in the future due to rainfall, irrigation, broken pipes, or changes in site drainage. Because groundwater rise or seepage is difficult to predict, such conditions are typically mitigated if and when they occur. The seepage observed in B-2 at a depth of 15 feet may be the result of lateral migration and not actual groundwater conditions. No TPH, VOC's, or Lead were reported in the sample selected for chemical analyses.

6 RECOMMENDATIONS

6.1 SITE PREPARATION AND GRADING

6.1.1 Site Preparation

Site preparation should begin with the removal of existing improvements. To improve building slab support, the existing fill material in its present condition should be excavated in its entirety (approximately up to 7 feet). Further, the excavation should extent to at least 1 foot below the pad grade or rigid pavement grade elevation. Horizontally, the excavations should extend at least 2 feet outside the planned building perimeter or the planned hardscape and pavements, or up to existing improvements or shoring, whichever is less. An SCST representative should observe conditions exposed in the bottom of the excavation to determine if additional excavation is needed.

6.1.2 Earthwork

The surface exposed in the bottom of excavations should be scarified to a depth of 12 inches, moisture conditioned to generally above optimum moisture content and compacted to at least 90% relative compaction based on ASTM 1557 laboratory test procedure. All references to relative compaction and optimum moisture content in this report are based on this test procedure. Excavated material, except for roots, debris and rocks greater than 6 inches, can be used as compacted fill material. Material with an expansion index of 20 or less determined in accordance with ASTM D4829 should be placed from 2 feet below grade to finished pad grade elevation. Exterior slabs should be underlain by at least 2 feet of compacted fill with an expansion index of 20 or less. We expect that the onsite materials will generally meet the expansion index criteria.

Fill should be moisture conditioned to generally above optimum moisture content and compacted to at least 90% relative compaction. Fill should be placed in horizontal lifts at a thickness appropriate for the equipment spreading, mixing, and compacting the material, but generally should not exceed 8 inches in loose thickness. Utility trench backfill beneath structures, pavements and hardscape should be compacted to at least 90% relative compaction. The top 12 inches of subgrade beneath pavements should be compacted to at least 95% relative compaction.

6.1.3 Site Excavation Characteristics

It is anticipated that excavations can be achieved with conventional earthwork equipment in good working order. Cemented zones within the formational soil may be present. Contract documents should specify that the contractor mobilize equipment capable of excavating and compacting materials under such conditions.

6.1.4 Oversized Material

Although site explorations did not encounter oversize materials, excavations may generate oversized material. Oversized material is defined as rocks or cemented clasts greater than 6 inches in largest dimension. Based on the planned construction, there does not appear to be suitable space onsite for disposal of oversized material within fills. Oversized material should be broken down to no greater than 6 inches in largest dimension for use in fill, used as landscape material, or disposed offsite.

6.1.5 Temporary Excavations

Temporary excavations 4 feet deep or less can be made vertically. Deeper temporary excavations should be laid back no steeper than 1:1 (horizontal: vertical). The faces of temporary slopes should be inspected daily by the contractor's Competent Person before personnel are allowed to enter the excavation. Any zones of potential instability, sloughing or raveling should be brought to the attention of the Engineer and corrective action implemented before personnel begin working in the excavation. Excavated soils should not be stockpiled behind temporary excavations within a distance equal to the depth of the excavation. SCST should be notified if other surcharge loads are anticipated so that lateral load criteria can be developed for the specific situation. If temporary slopes are to be maintained during the rainy season, berms are recommended along the tops of slopes to prevent runoff water from entering the excavation and eroding the slope faces. Slopes steeper than those described above will require shoring. A shoring system consisting of soldier piles and lagging can be used.

6.1.6 Temporary Shoring

For design of cantilevered shoring, an active soil pressure equal to a fluid weighing 35 pcf can be used for level retained ground or 55 pcf for 2:1 (horizontal:vertical) sloping ground. The surcharge loads on shoring from traffic and construction equipment adjacent to the excavation can be modeled by assuming an additional 2 feet of soil behind the shoring. For design of soldier piles embedded in compacted fill, an allowable passive pressure of 350 psf per foot of embedment over three times the pile diameter or the spacing of the piles, whichever is less, up to a maximum of 5,000 psf can be used. Soldier piles should be spaced at least three pile diameters, center to center. Continuous lagging will be

required throughout. The soldier piles should be designed for the full-anticipated lateral pressure; however, the pressure on the lagging will be less due to arching in the soils. For design of lagging, the earth pressure but can be limited to a maximum value of 400 psf.

6.1.7 Temporary Dewatering

Groundwater seepage may occur locally due to local irrigation or following heavy rain. Temporary dewatering can be accomplished by sloping the excavation bottom to a sump and pumping from the sump. A layer of gravel about 6 inches thick placed in the bottom of the excavation will facilitate groundwater flow and can be used as a working platform.

6.1.8 Expansive Soil

The onsite soils are granular and are expected to have a very low expansion potential. The grading and foundation recommendations presented in this report reflect a very low expansion potential.

6.1.9 Imported Soil

Imported soil should consist of predominately granular soil free of organic matter and rocks greater than 6 inches. Imported soil should have an expansion index of 20 or less and should be inspected and, if appropriate, tested by SCST prior to transport to the site.

6.1.10 Slopes

Permanent slopes should be constructed no steeper than 2:1 (horizontal: vertical). Faces of fill slopes should be compacted either by rolling with a sheep-foot roller or other suitable equipment, or by overfilling and cutting back to design grade. Because slopes are susceptible to surficial slope failure and erosion, water should not be allowed to flow over the top of slopes. Additionally, slopes should be planted with vegetation that will reduce the potential for erosion.

6.1.11 Surface Drainage

Final surface grades around structures should be designed to collect and direct surface water away from the structure and toward appropriate drainage facilities. The ground around the structure should be graded so that surface water flows rapidly away from the structure without ponding. In general, we recommend that the ground adjacent to the structure slope away at a gradient of at least 2%. Densely vegetated areas where runoff can be impaired should have a minimum gradient of at least 5% within the first 5 feet from the structure. Roof gutters with downspouts that discharge directly into a closed drainage system are recommended on structures.

Drainage patterns established at the time of fine grading should be maintained throughout the life of the proposed structures. Site irrigation should be limited to the minimum

necessary to sustain landscape growth. Should excessive irrigation, impaired drainage, or unusually high rainfall occur, saturated zones of perched groundwater can develop.

6.1.12 Grading Plan Review

SCST should review the grading plans and earthwork specifications to ascertain whether the intent of the recommendations contained in this report have been implemented, and that no revised recommendations are needed due to changes in the development scheme.

6.2 FOUNDATIONS

6.2.1 Shallow Spread Footings

The planned building can be supported on shallow spread footings with bottom levels entirely on formational soils or compacted fill material. Footings should extend at least 18 inches below lowest adjacent finished grade. A minimum width of 12 inches is recommended for continuous footings and 24 inches for isolated or retaining wall footings. An allowable bearing capacity of 2,000 psf can be used. The allowable bearing capacity can be increased by 500 psf for each foot of depth below the minimum and 250 psf for each foot of width beyond the minimum up to a maximum of 4,000 psf. The bearing value can be increased by ⅓ when considering the total of all loads, including wind or seismic forces. Footings located adjacent to or within slopes should be extended to a depth such that a minimum horizontal distance of 7 feet exists between the lower outside footing edge and the face of the slope. Lateral loads will be resisted by friction between the bottoms of footings and passive pressure on the faces of footings and other structural elements below grade. An allowable coefficient of friction of 0.30 can be used. Passive pressure can be computed using an allowable lateral pressure of 350 psf per foot of depth below the ground surface for level ground conditions. Reductions for sloping ground should be made. The passive pressure can be increased by ⅓ when considering the total of all loads, including wind or seismic forces. The upper 1 foot of soil should not be relied on for passive support unless the ground is covered with pavements or slabs.

6.2.2 Settlement Characteristics

Total foundation settlements are estimated to be less than 1 inch. Differential settlements between adjacent columns and across continuous footings are estimated to be less than ¾ inch over a distance of 40 feet. Settlements should be completed shortly after structural loads are applied.

6.2.3 Foundation Plan Review

SCST should review the foundation plans to ascertain that the intent of the recommendations in this report has been implemented and that revised recommendations are not necessary as a result of changes after this report was completed.

6.2.4 Foundation Excavation Observations

A representative from SCST should observe the foundation excavations prior to forming or placing reinforcing steel.

6.3 SLABS-ON-GRADE

6.3.1 Interior Slab-on-Grade

The project structural engineer should design the interior concrete slabs-on-grade floor. However, we recommend that building slabs be at least 5 inches thick and reinforced with at least No. 4 bars at 18 inches on center each way. A moisture vapor retarder/barrier should be placed beneath slabs where moisture sensitive floor coverings will be installed. Typically, plastic is used as a vapor retardant. If plastic is used, a minimum 10-mil is recommended. The plastic should comply with ASTM E1745. Plastic installation should comply with ASTM E1643.

Current construction practice typically includes placement of a 2-inch thick sand cushion between the bottom of the concrete slab and the moisture vapor retarder/barrier. This cushion can provide some protection to the vapor retarder/barrier during construction, and may assist in reducing the potential for edge curling in the slab during curing. However, the sand layer also provides a source of moisture vapor to the underside of the slab that can increase the time required to reduce moisture vapor emissions to limits acceptable for the type of floor covering placed on top of the slab. The slab can be placed directly on the vapor retarder/barrier. The floor covering manufacturer should be contacted to determine the volume of moisture vapor allowable and any treatment needed to reduce moisture vapor emissions to acceptable limits for the particular type of floor covering installed.

6.3.2 Exterior Slabs-on-Grade

The top 2 feet of material below exterior concrete slabs-on-grade should have an expansion index of 20 or less determined in accordance with ASTM D4829. Exterior slabs should be at least 4 inches thick and reinforced with at least No. 3 bars at 18 inches on center each way. Slabs should be provided with weakened plane joints. Joints should be placed in accordance with the American Concrete Institute (ACI) guidelines. The project architect should select the final joint patterns. A 1-inch maximum size aggregate mix is recommended for concrete for exterior slabs. The corrosion potential of on-site soils with respect to reinforced concrete will need to be taken into account in concrete mix design. Coarse and fine aggregate in concrete should conform to the “Greenbook” Standard Specifications for Public Works Construction.

6.4 CONVENTIONAL RETAINING WALLS

6.4.1 Foundations

The recommendations provided in the foundation section of this report are also applicable to conventional retaining walls.

6.4.2 Lateral Earth Pressures

The at-rest earth pressure for the design of restrained earth retaining structures with level backfills can be taken as equivalent to the pressure of a fluid weighing 55 pcf. The active earth pressure for the design of unrestrained earth retaining structures with level backfills can be taken as equivalent to the pressure of a fluid weighing 40 pcf. The above values assume a granular and drained backfill condition. An additional 20 pcf should be added to these values for walls with a 2:1 (horizontal: vertical) sloping backfill. An increase in earth pressure equivalent to an additional 2 feet of retained soil can be used to account for surcharge loads from light traffic. The above values do not include a factor of safety. Appropriate factors of safety should be incorporated into the design. If any other surcharge loads are anticipated, SCST should be contacted for the necessary increase in soil pressure.

Retaining walls should be designed to resist hydrostatic pressures or be provided with a backdrain to reduce the accumulation of hydrostatic pressures. Backdrains may consist of a 2-foot wide zone of ¾-inch crushed rock. The backdrain should be separated from the adjacent soils using a non-woven filter fabric, such as Mirafi 140N or equivalent. Weep holes should be provided or a perforated pipe (Schedule 40 PVC) should be installed at the base of the backdrain and sloped to discharge to a suitable storm drain facility. As an alternative, a geocomposite drainage system such as Miradrain 6000 or equivalent placed behind the wall and connected to a suitable storm drain facility can be used. The project architect should provide waterproofing specifications and details. Figure 6 shows typical conventional retaining wall backdrain details.

6.4.3 Seismic Earth Pressure

If required, the seismic earth pressures can be taken as equivalent to the pressure of a fluid weighing 40 pounds per cubic foot (pcf) for stiff walls and 20 pcf for flexible walls. These values are for level backfill conditions and do not include a factor of safety. Appropriate factors of safety should be incorporated into the design. This pressure is in addition to the un-factored static active pressures. The allowable passive pressure and bearing capacity can be increased by ⅓ in determining the stability of the wall.

6.4.4 Backfill

All backfill soils should be compacted to at least 90% relative compaction. Expansive or clayey soil should not be used for backfill material. Additionally, fill within 3 feet from the back of the wall should not contain rocks greater than 3 inches in any dimension. The wall should not be backfilled until the grout has reached an adequate strength.

6.5 PAVEMENT SECTION RECOMMENDATIONS

The pavement support characteristics of the soils encountered during our investigation are considered good. An R-value of 30 was assumed for design of preliminary pavement sections. The actual R-value of the subgrade soils should be determined after grading and final pavement sections be provided. Based on an R-value of 30, the following pavement structural sections are recommended for the assumed Traffic Indices.

Flexible Pavement Sections

Traffic Type	Traffic Index	Asphalt Concrete (inches)	Aggregate Base* (inches)
Parking Stalls	4.5	3	4
Drive Lanes	6.0	3	8
Heavy Traffic Areas	7.0	4	9

***Aggregate Base should conform to Class 2 Aggregate Base in accordance with the Caltrans Standard Specifications or Crushed Miscellaneous Base in accordance with the Standard Specifications for Public Works Construction.**

Portland Cement Concrete Pavement Sections

Traffic Type	Traffic Index	Full-Depth JPCP* (inches)
Parking Stalls	4.5	5½
Drive Lanes	6.0	6
Heavy Traffic Areas	7.0	6

***Jointed Plain Concrete Pavement**

The top 12 inches of subgrade should be scarified, moisture conditioned to near optimum moisture content, and compacted to at least 95% relative compaction. All soft or yielding areas should be removed and replaced with compacted fill. If the subgrade consists of competent old paralic deposits, scarification and recompaction need not be performed. The aggregate base material should be compacted to at least 95% relative compaction. All materials and methods of construction should conform to good engineering practices and the minimum standards of the City of Del Mar.

6.6 SOIL CORROSIVITY

A representative sample of the onsite soils was tested to evaluate corrosion potential. The test results are presented in Appendix II. The project design engineer can use the sulfate results in conjunction with ACI 318 to specify the water/cement ratio, compressive strength and cementitious material types for concrete exposed to soil. A corrosion engineer should be contacted to provide specific corrosion control recommendations, if needed.

6.7 INFILTRATION

SCST did not perform onsite infiltration rate testing as part of this investigation. However, based on our drilling and laboratory test results, the old paralic deposits underlying the shallow site fill are considered poor to favorable for infiltration when approximately 10 feet or more away from the building. Additionally, lateral migration of infiltrated water can occur. Once the depths and locations of the infiltration devices are selected, we can provide site testing to verify the assumptions and provide specific design recommendations.

7 GEOTECHNICAL ENGINEERING DURING CONSTRUCTION

The geotechnical engineer should review project plans and specifications prior to bidding and construction to check that the intent of the recommendations in this report has been incorporated. Observations and tests should be performed during construction. If the conditions encountered during construction differ from those anticipated based on the subsurface exploration program, the presence of the geotechnical engineer during construction will enable an evaluation of the exposed conditions and modifications of the recommendations in this report or development of additional recommendations in a timely manner.

8 CLOSURE

SCST should be advised of any changes in the project scope so that the recommendations contained in this report can be evaluated with respect to the revised plans. Changes in recommendations will be verified in writing. The findings in this report are valid as of the date of this report. Changes in the condition of the site can, however, occur with the passage of time, whether they are due to natural processes or work on this or adjacent areas. In addition, changes in the standards of practice and government regulations can occur. Thus, the findings in this report may be invalidated wholly or in part by changes beyond our control. This report should not be relied upon after a period of two years without a review by us verifying the suitability of the conclusions and recommendations to site conditions at that time.

In the performance of our professional services, we comply with that level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions

and in the same locality. The client recognizes that subsurface conditions may vary from those encountered at the boring locations, and that our data, interpretations, and recommendations are based solely on the information obtained by us. We will be responsible for those data, interpretations, and recommendations, but shall not be responsible for interpretations by others of the information developed. Our services consist of professional consultation and observation only, and no warranty of any kind whatsoever, express or implied, is made or intended in connection with the work performed or to be performed by us, or by our proposal for consulting or other services, or by our furnishing of oral or written reports or findings.

9 REFERENCES

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Public Works Standards, Inc. (2011), "Greenbook," Standard Specifications for Public Works Construction, 2012 Edition.

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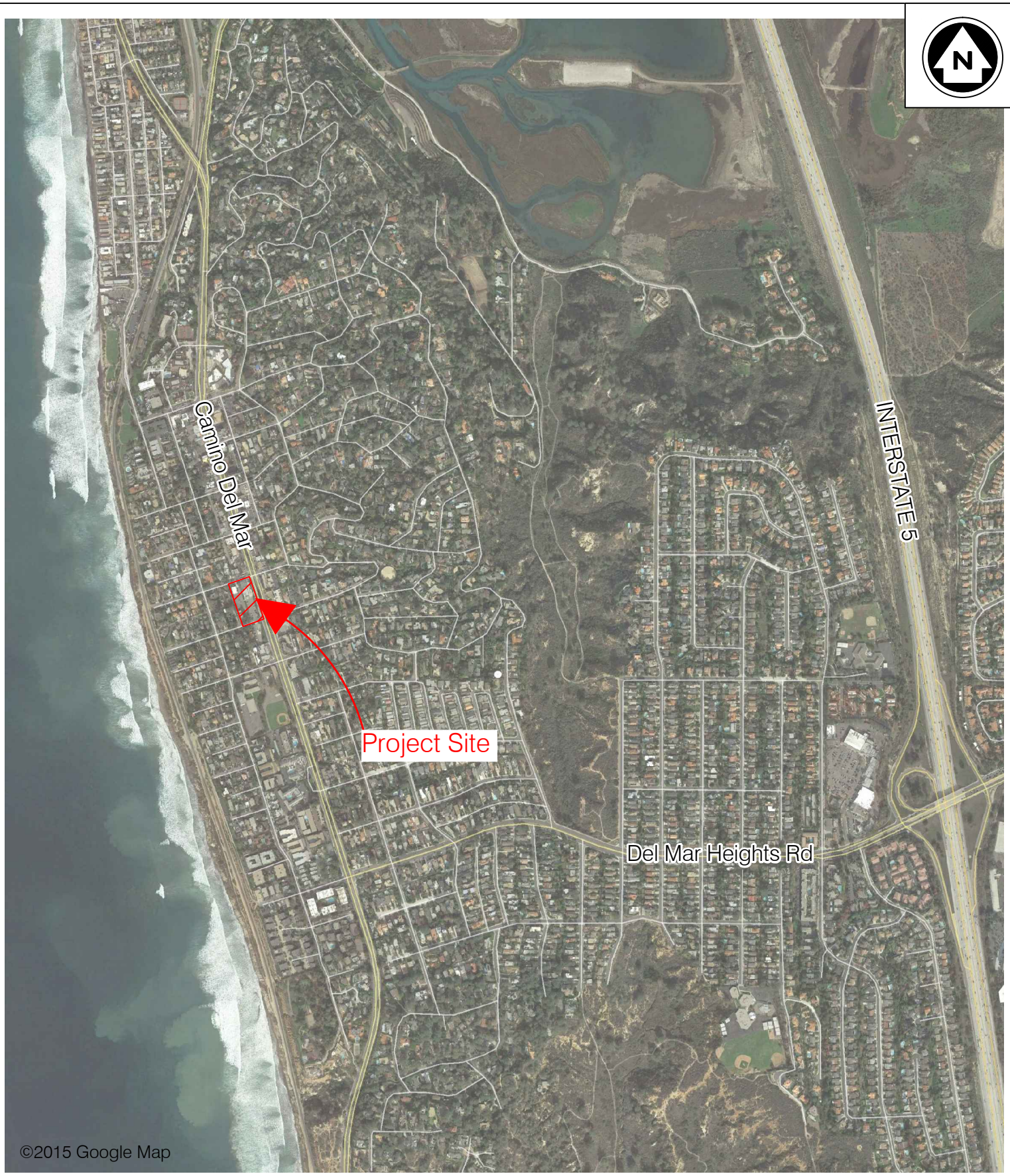
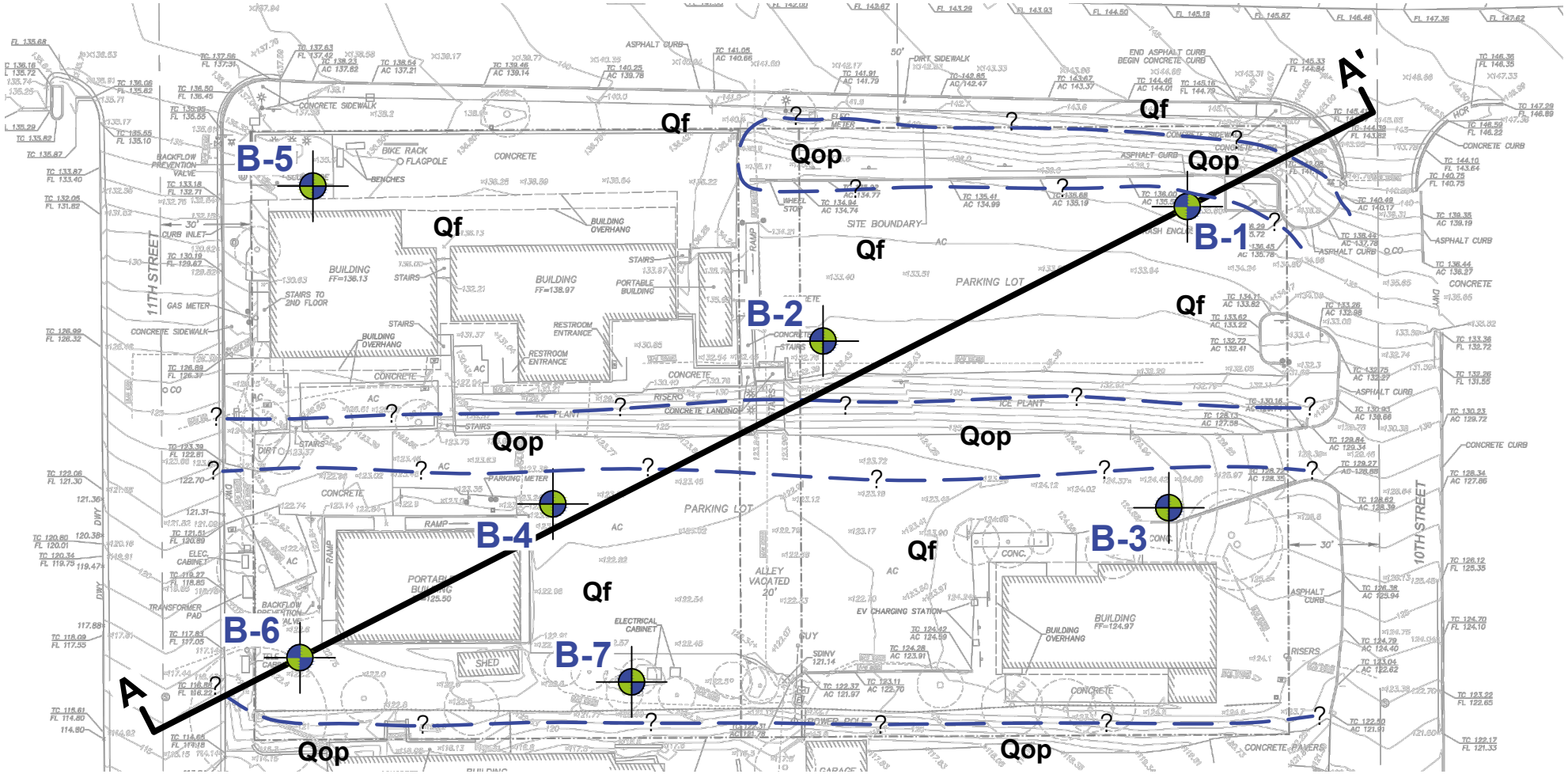


SOUTHERN CALIFORNIA SOIL & TESTING, INC.

SITE VICINITY MAP
1050 Camino Del Mar
Del Mar, California

Date:	May, 2015
By:	JGA
Job No.:	140576P3.3
Scale:	Not to Scale

Figure: 1



SCST LEGEND:

Qf	Fill
Qop	Old Paralic Deposits

B-6 Approximate Location of Boring

A A' Approximate Location of Geologic Cross Section

Approximate Location of Geologic Contact, Queried Where Uncertain

N

0 50′

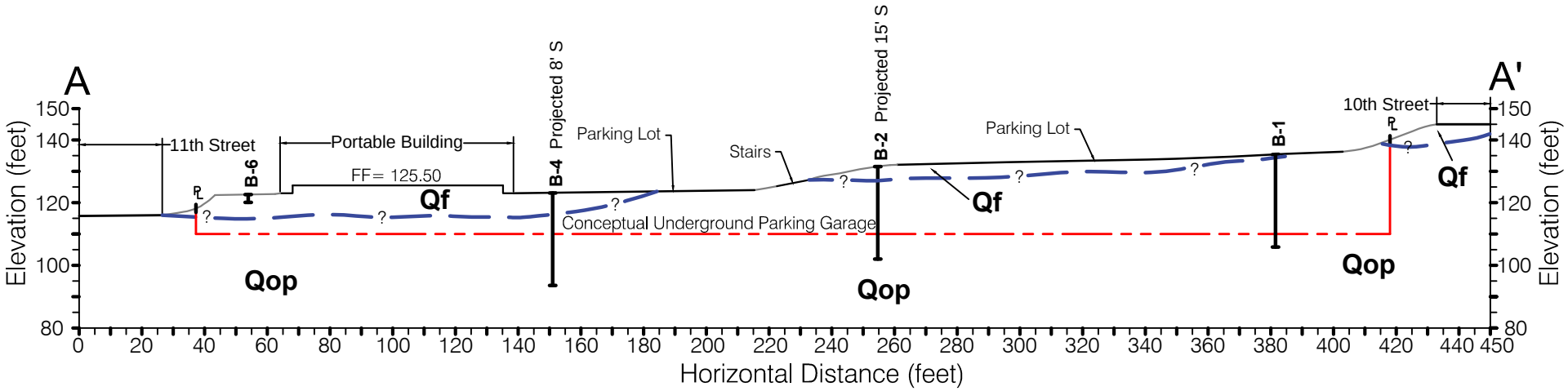
Scale

SOUTHERN CALIFORNIA SOIL & TESTING, INC.

SUBSURFACE EXPLORATION MAP
1050 Camino Del Mar
Del Mar, California

Date: May, 2015
By: JGA
Job No.: 140576P3.3

Figure: 2



SCST LEGEND:

Qf Fill

Qop Old Paralic Deposits

B-6 Approximate Location of Boring

Approximate Location of Geologic Contact, Queried Where Uncertain

Conceptual Underground Parking Garage

SOUTHERN CALIFORNIA SOIL & TESTING, INC.	GEOLOGIC CROSS SECTION A-A' 1050 Camino Del Mar Del Mar, California	Date: May, 2015 By: JGA Job No.: 140576P3.3	Figure: 3

APPENDIX I
FIELD INVESTIGATION

Our field investigation consisted of drilling four borings, on April 30, 2015, to depths of about 26 feet and 29½ feet below the existing ground surface using a truck-mounted drill rig equipped with a hollow stem auger and three shallow manually excavated borings to depths of about 2½ feet and 5 feet. Figure 2 shows the approximate locations of the borings. The field investigation was performed under the observation of an SCST geologist who also logged the borings and obtained samples of the materials encountered. Relatively undisturbed samples were obtained using a modified California (CAL) sampler, which is ring-lined split tube sampler with a 3-inch outer diameter and 2½-inch inner diameter. Standard Penetration Tests (SPT) were performed using a 2-inch outer diameter and 1⅜-inch inner diameter split tube sampler. The CAL and SPT samplers were driven with a 140-pound weight dropping 30 inches. The number of blows needed to drive the samplers the final 12 inches of an 18-inch drive is noted on the borings logs as "Driving Resistance (blows/ft of drive)." SPT and CAL sampler refusal was encountered when 50 blows were applied during any one of the three 6-inch intervals, a total of 100 blows was applied, or there was no discernible sampler advancement during the application of 10 successive blows. Because the SPT sampler was driven with a cathead and rope, the driving resistance is representative of a 60% energy transfer ratio (N_{60}). Disturbed bulk samples were obtained from the SPT sampler and the drill cuttings.

The soils are classified in accordance with the Unified Soil Classification System as illustrated on Figure I-1. Logs of the borings are presented on Figures I-2 and I-12.

SUBSURFACE EXPLORATION LEGEND

UNIFIED SOIL CLASSIFICATION CHART

SOIL DESCRIPTION		GROUP SYMBOL	TYPICAL NAMES
I. COARSE GRAINED, more than 50% of material is larger than No. 200 sieve size.			
GRAVELS More than half of coarse fraction is larger than No. 4 sieve size but smaller than 3".	CLEAN GRAVELS	GW	Well graded gravels, gravel-sand mixtures, little or no fines
		GP	Poorly graded gravels, gravel sand mixtures, little or no fines.
	GRAVELS WITH FINES (Appreciable amount of fines)	GM	Silty gravels, poorly graded gravel-sand-silt mixtures.
		GC	Clayey gravels, poorly graded gravel-sand, clay mixtures.
SANDS More than half of coarse fraction is smaller than No. 4 sieve size.	CLEAN SANDS	SW	Well graded sand, gravelly sands, little or no fines.
		SP	Poorly graded sands, gravelly sands, little or no fines.
		SM	Silty sands, poorly graded sand and silty mixtures.
		SC	Clayey sands, poorly graded sand and clay mixtures.
II. FINE GRAINED, more than 50% of material is smaller than No. 200 sieve size.			
	SILTS AND CLAYS (Liquid Limit less than 50)	ML	Inorganic silts and very fine sands, rock flour, sandy silt or clayey-silt-sand mixtures with slight plasticity.
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		OL	Organic silts and organic silty clays or low plasticity.
	SILTS AND CLAYS (Liquid Limit greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
		CH	Inorganic clays of high plasticity, fat clays.
		OH	Organic clays of medium to high plasticity.
III. HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils.

SAMPLE SYMBOLS

- ☒ - Bulk Sample
- CAL - Modified California sampler
- CK - Undisturbed Chunk sample
- MS - Maximum Size of Particle
- ST - Shelby Tube
- SPT - Standard Penetration Test sampler

GROUNDWATER SYMBOLS

- ▽ - Water level at time of excavation or as indicated
- ≈ - Water seepage at time of excavation or as indicated

LABORATORY TEST SYMBOLS

- AL - Atterberg Limits
- CON - Consolidation
- COR - Corrosivity Tests (Resistivity, pH, Chloride, Sulfate)
- DS - Direct Shear
- EI - Expansion Index
- MAX - Maximum Density
- RV - R-Value
- SA - Sieve Analysis
- UC - Unconfined Compression

SOUTHERN CALIFORNIA SOIL & TESTING, INC.

1050 Camino Del Mar
Del Mar, California

By:	JGA	Date:	May, 2015
Job Number:	140576P3.3	Figure:	I-1

LOG OF BORING B-1

Date Drilled:	4/30/2015	Logged by:	AH
Equipment:	Ingersoll Rand A-300, 6" Auger	Project Manager:	ER
Elevation (ft):	134	Depth to Groundwater (ft):	Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1		**Asphalt Concrete** - 7 inches.							
	SM	**FILL (Qf)** - SILTY SAND, dry, loose.							
2	SM	**OLD PARALIC DEPOSITS (Qop)** - SILTY SAND, grayish brown, dry, medium dense.							
3									
4									
5			CAL		50/6"		5.8	111.2	
6									
7									
8									
9									
10		…becomes moderate brown, trace of medium grained sand, moist, medium dense.	SPT		25				
11									
12									
13									
14									
15		… becomes dusky brown, fine grained, very dense.	CAL		72				
16									
17									
18									
19									
20									

BORING LOG CONTINUED ON FIGURE I-3

LOG OF BORING B-1 (CONTINUED)

Date Drilled:	4/30/2015	Logged by:	AH
Equipment:	Ingersoll Rand A-300, 6" Auger	Project Manager:	ER
Elevation (ft):	134	Depth to Groundwater (ft):	Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
21	SM	**OLD PARALIC DEPOSITS (Qop)**							
		…becomes moderate brown, dry, medium dense, friable.	SPT	X	24				SA
22									
23									
24									
25		…becomes, moist, dense.							
26			SPT		44				
27									
28									
29		… becomes moderately cemented SANDSTONE, pockets of medium gray clayey sand, moist, very dense.	CAL		50/5"				
30		**BORING TERMINATED AT 29½ FEET**							
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									

LOG OF BORING B-2

Date Drilled:	4/30/2015	Logged by:	AH
Equipment:	Ingersoll Rand A-300, 6" Auger	Project Manager:	ER
Elevation (ft):	133	Depth to Groundwater (ft):	Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
		Asphalt Concrete - 5 inches.							
1	SM	**FILL (Qf)** - SILTY SAND, moderate and dusky brown, dry, loose.		X					
2									
3									
4									
5	SM	**OLD PARALIC DEPOSITS (Qop)** - SILTY SAND, moderate brown, dry, medium dense.							
6			SPT	X	15				
7									
8									
9									
10		… becomes dense, sand content increases.							
11			CAL		42		6.4	113.6	
12									
13									
14									
15		…becomes wet, medium dense, medium grained sand, friable.							
16			SPT		13		13.5		SA
17									
18									
19									
20									

BORING LOG CONTINUED ON FIGURE I-5

LOG OF BORING B-2 (CONTINUED)

Date Drilled:	4/30/2015	Logged by:	AH
Equipment:	Ingersoll Rand A-300, 6" Auger	Project Manager:	ER
Elevation (ft):	133	Depth to Groundwater (ft):	Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
21	SM	**OLD PARALIC DEPOSITS (Qop)** …becomes moist, very dense.	CAL		66		11.5	119.2	
22									
23									
24									
25									
26		…becomes medium dense.	SPT		24		6.4		
27									
28									
29		… becomes dense, bottom of sampler shows sandier conditions.	CAL		48				
30		**BORING TERMINATED AT 29½ FEET**							
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									

LOG OF BORING B-3

Date Drilled:	4/30/2015	Logged by:	AH
Equipment:	Ingersoll Rand A-300, 6" Auger	Project Manager:	ER
Elevation (ft):	124	Depth to Groundwater (ft):	Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
		Asphalt Concrete - 4 inches.							
1	SM	**FILL (Qf)** - SILTY SAND, moderate brown, moist, loose, trace gravel at 1½ feet.							
2	SM	**OLD PARALIC DEPOSITS (Qop)** - SILTY SAND, moderate brown, moist, very dense, weakly cemented.		X					CO
3				X					
4				X					
5									
6			CAL		63		5.4	108.3	
7									
8									
9									
10		… becomes dense, trace medium grained sand.							
11			SPT		31				
12									
13									
14									
15		… becomes very dense, fine grained sand, silt content increases.							
16			CAL		80		5.2	122.9	
17									
18									
19									
20									

BORING LOG CONTINUED ON FIGURE I-7

LOG OF BORING B-3 (CONTINUED)

Date Drilled:	4/30/2015	Logged by:	AH
Equipment:	Ingersoll Rand A-300, 6" Auger	Project Manager:	ER
Elevation (ft):	124	Depth to Groundwater (ft):	Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
21	SM	**OLD PARALIC DEPOSITS (Qop)** …becomes dry, medium dense, friable.	SPT		19				
22									
23									
24									
25		…becomes very dense, moderately cemented SANDSTONE.							
26			CAL		50/5½"				
		BORING TERMINATED AT 26 FEET							
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									

LOG OF BORING B-4

Date Drilled:	4/30/2015	Logged by:	AH
Equipment:	Ingersoll Rand A-300, 6" Auger	Project Manager:	ER
Elevation (ft):	123	Depth to Groundwater (ft):	Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
		Asphalt Concrete - 4½ inches.							
1	CL	**FILL (Qf)** - SANDY CLAY, grayish brown, moist, soft.							
	SM	SILTY SAND, moderate brown, medium grained, moist, loose.							EI
2									
3									
4									
5									
6			SPT		8				
7	SM	**OLD PARALIC DEPOSITS (Qop)** - SILTY SAND, grayish brown, moist, medium dense.							
8									
9									
10									
11			CAL		23		8.9	110.4	
12									
13									
14									
15									
16			SPT		20				
17									
18									
19									
20									

BORING LOG CONTINUED ON FIGURE I-9

LOG OF BORING B-4 (CONTINUED)

Date Drilled:	4/30/2015	Logged by:	AH
Equipment:	Ingersoll Rand A-300, 6" Auger	Project Manager:	ER
Elevation (ft):	123	Depth to Groundwater (ft):	Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
21	SM	**OLD PARALIC DEPOSITS (Qop)** - SILTY SAND, moderate brown, moist, medium dense, trace gravel to ½ inch size.	CAL		27		8.6	116.4	SH
22									
23									
24									
25		…moist, medium dense, friable							
26			SPT		25				
27		…becomes dark reddish brown							
28									
29			SPT		23				
30		**BORING TERMINATED AT 29½ FEET**							
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									

LOG OF BORING B-5

Date Drilled:	4/30/2015	Logged by:	AH
Equipment:	Hand Tools	Project Manager:	ER
Elevation (ft):	135	Depth to Groundwater (ft):	Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
		Topsoil / Mulch - 5 inches.							
1	SM	**FILL (Qf)** - SILTY SAND, moderate brown, moist, loose.		X					
2									
3									
4									
5		**BORING TERMINATED AT 5 FEET**							
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

SOUTHERN CALIFORNIA SOIL & TESTING, INC.

1050 Camino Del Mar
Del Mar, California

By:	JGA	Date:	May, 2015
Job Number:	140576P3.3	Figure:	I-10

LOG OF BORING B-6

Date Drilled:	4/30/2015	Logged by:	AH
Equipment:	Hand Tools	Project Manager:	ER
Elevation (ft):	122	Depth to Groundwater (ft):	Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
		Topsoil / Mulch - 6 inches.							
1	SM	**FILL (Qf)** - SILTY SAND, grayish brown, dry, loose, some roots.		X					
2		abundant roots at bottom of excavation							
3		**REFUSAL AT 2½ FEET**							
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

SOUTHERN CALIFORNIA SOIL & TESTING, INC.

1050 Camino Del Mar
Del Mar, California

By:	JGA	Date:	May, 2015
Job Number:	140576P3.3	Figure:	I-11

LOG OF BORING B-7

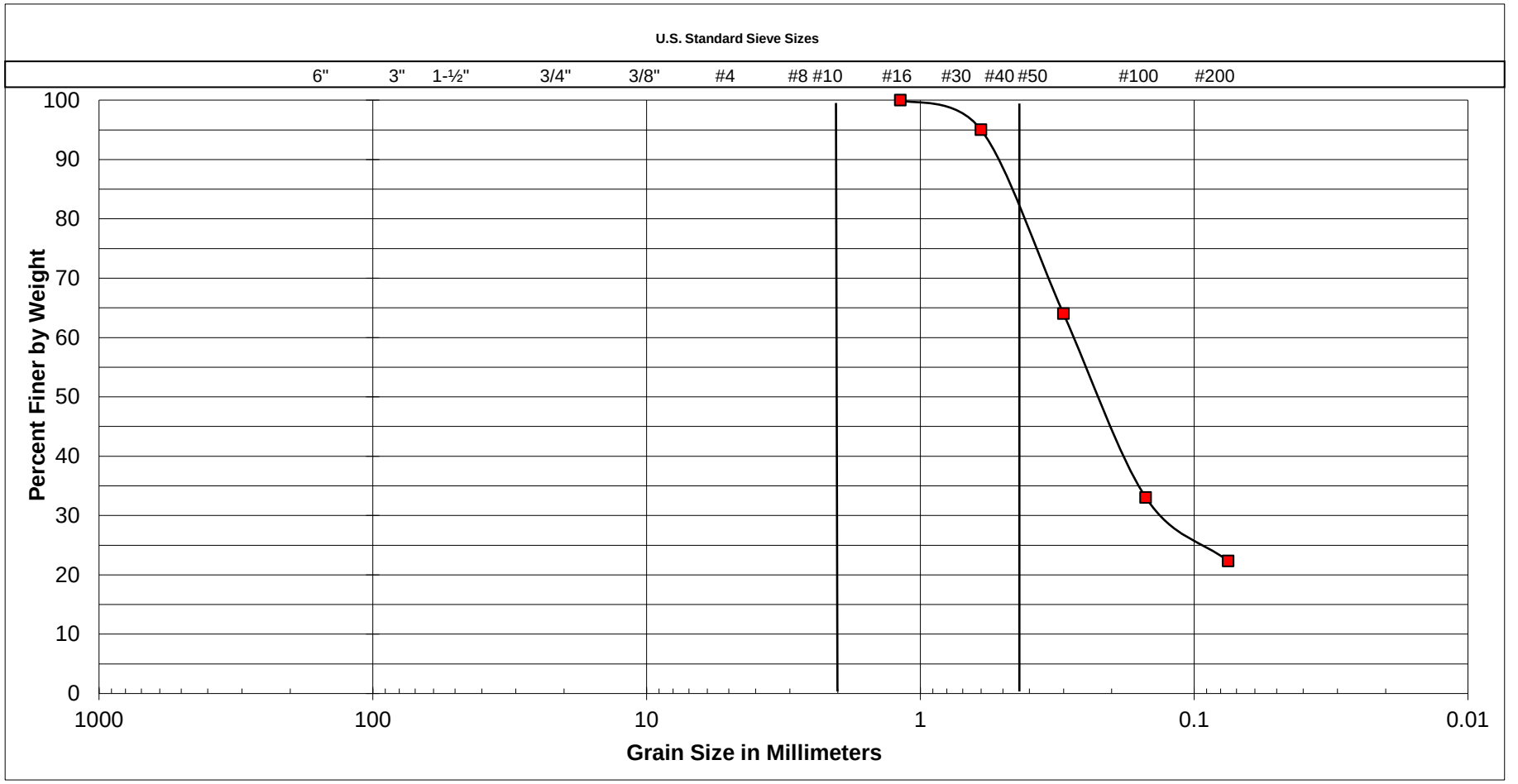
Date Drilled:	4/30/2015	Logged by:	AH
Equipment:	Hand Tools	Project Manager:	ER
Elevation (ft):	123	Depth to Groundwater (ft):	Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
		Topsoil / Mulch - 6 inches.							
1	SM	**FILL (Qf)** - SILTY SAND, grayish brown, dry, loose, trace coarse gravel to 1 inch size.		X					
2									
3		**REFUSAL AT 3 FEET**							
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

APPENDIX II
LABORATORY TESTING

Laboratory tests were performed to provide geotechnical parameters for engineering analyses. The following tests were performed:

- **CLASSIFICATION:** Field classifications were verified in the laboratory by visual examination. The final soil classifications are in accordance with the Unified Soil Classification System.
- **IN SITU MOISTURE AND DENSITY:** The in situ moisture content and dry unit weight were determined on three samples collected from the borings. The test results are presented on the boring logs in Appendix I.
- **GRAIN SIZE DISTRIBUTION:** The grain size distribution was determined on three soil samples in accordance with ASTM D422. Figures II-1, II-2 and II-3 presents the test results.
- **EXPANSION INDEX:** The expansion index was determined on one soil sample in accordance with ASTM D4829. Figure II-4 presents the test result.
- **CORROSIVITY**: Corrosivity tests were performed on one sample. The pH and minimum resistivity were determined in general accordance with California Test 643. The soluble sulfate content was determined in accordance with California Test 417. The total chloride ion content was determined in accordance with California Test 422. Figure II-4 presents the test results.
- **DIRECT SHEAR**: A direct shear test was performed on a sample in accordance with ASTM D3080. The shear stress was applied at a constant rate of strain of 0.003 inch per minute. Figure II-5 presents the test results.



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
B-1@20.5-21.5

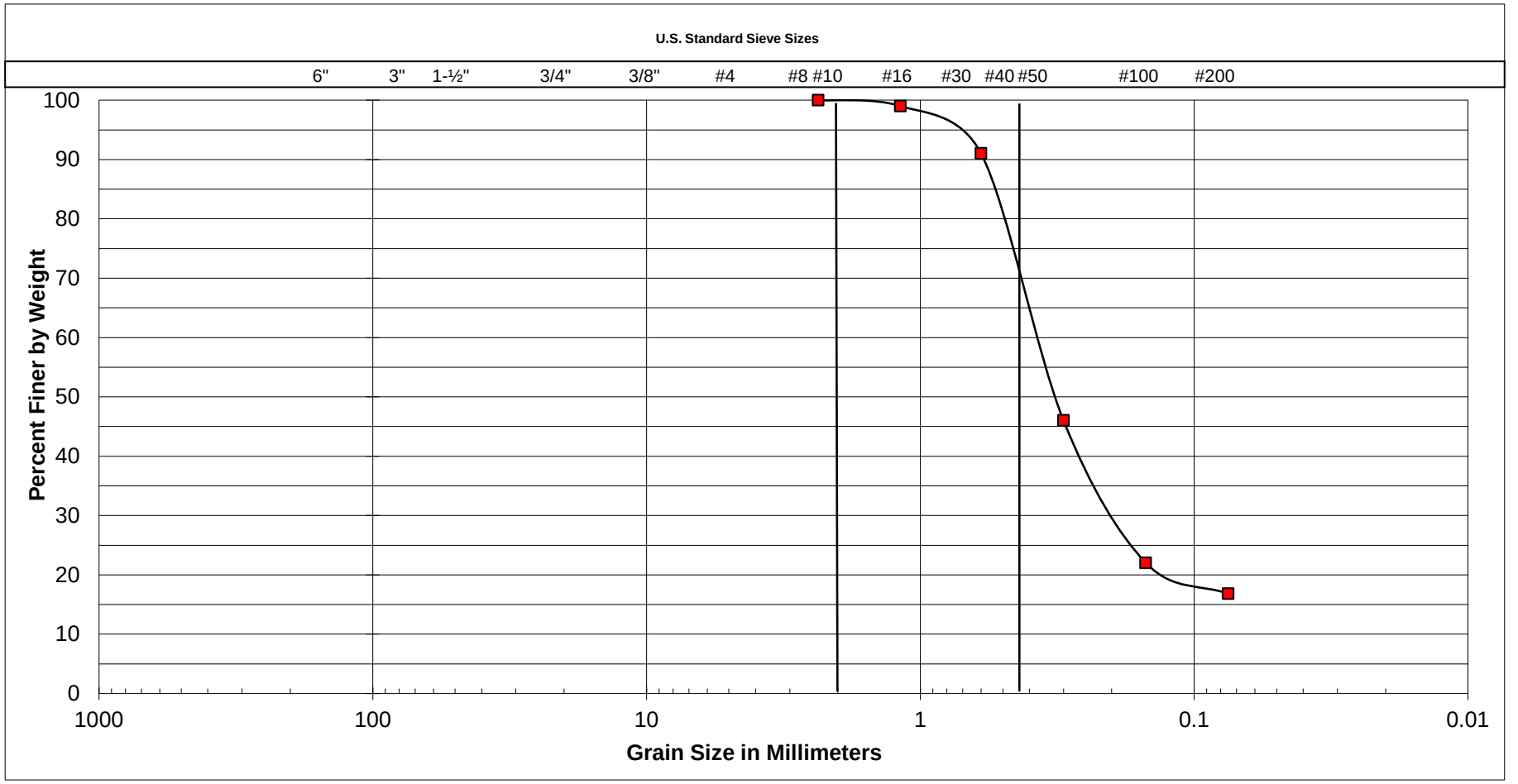
UNIFIED SOIL CLASSIFICATION:	SM
DESCRIPTION	Silty Sand

ATTERBERG LIMITS	
LIQUID LIMIT	-
PLASTIC LIMIT	-
PLASTICITY INDEX	-

SOUTHERN CALIFORNIA SOIL & TESTING, INC.

1050 Camino Del Mar
Del Mar, California

By:	AH	Date:	May, 2015
Job Number:	140576P3.3	Figure:	II-1



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
B-2@15.5-16.5

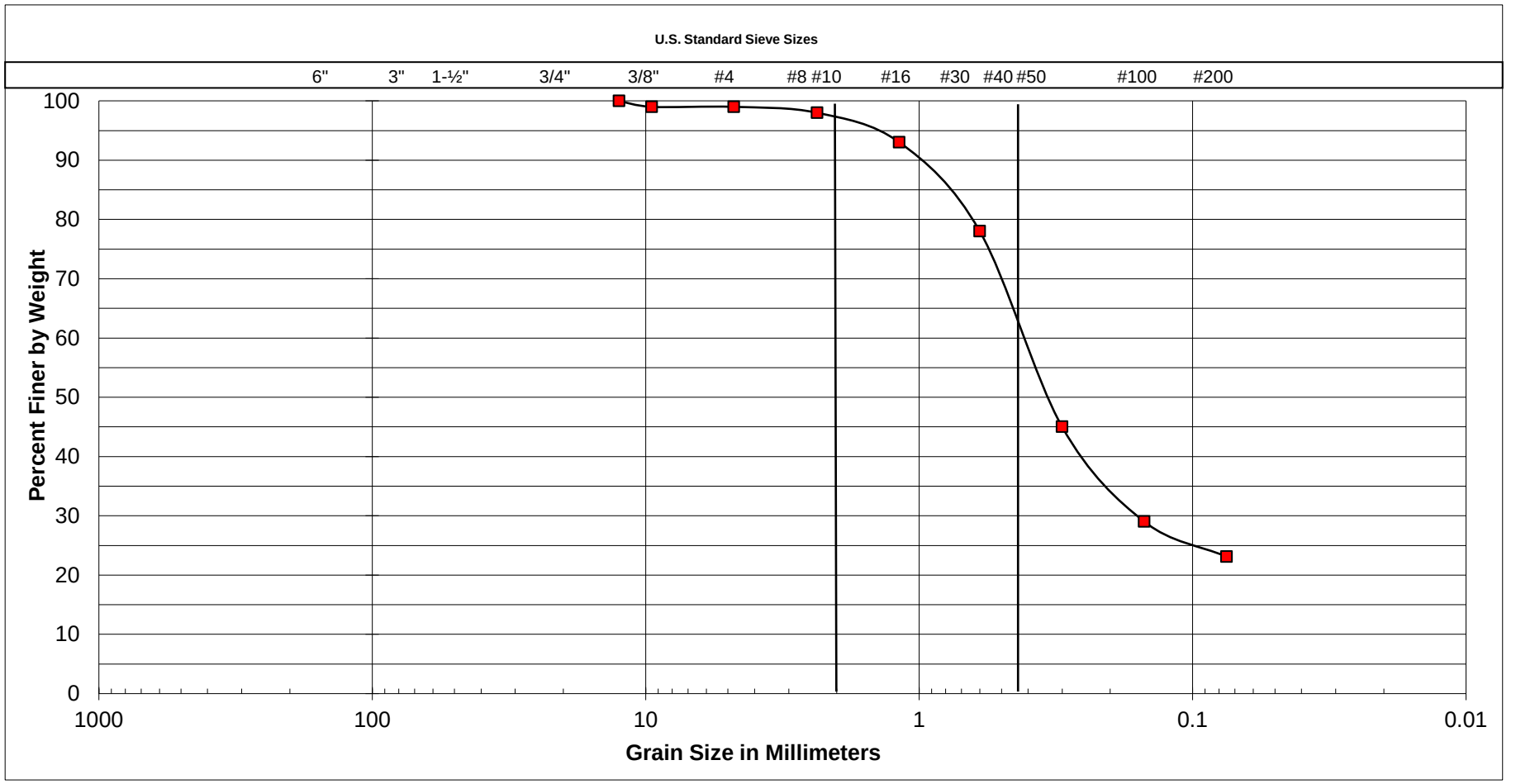
UNIFIED SOIL CLASSIFICATION:	SM
DESCRIPTION	Silty Sand

ATTERBERG LIMITS	
LIQUID LIMIT	-
PLASTIC LIMIT	-
PLASTICITY INDEX	-

SOUTHERN CALIFORNIA SOIL & TESTING, INC.

1050 Camino Del Mar
Del Mar, California

By:	AH	Date:	May, 2015
Job Number:	140576P3.3	Figure:	II-2



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
B-4@1-5

UNIFIED SOIL CLASSIFICATION:	SM
DESCRIPTION	Silty Sand

ATTERBERG LIMITS	
LIQUID LIMIT	-
PLASTIC LIMIT	-
PLASTICITY INDEX	-

SOUTHERN CALIFORNIA SOIL & TESTING, INC.

1050 Camino Del Mar
Del Mar, California

By:	AH	Date:	May, 2015
Job Number:	140576P3.3	Figure:	II-3

EXPANSION INDEX

ASTM D4829

SAMPLE	DESCRIPTION	EXPANSION INDEX
B-4 at 1 foot to 5 feet	SILTY SAND, moderate brown	1

CLASSIFICATION OF EXPANSIVE SOIL [1]

EXPANSION INDEX	POTENTIAL EXPANSION
1 - 20	Very Low
21 - 50	Low
51 - 90	Medium
91 - 130	High
Above 130	Very High

1. ASTM - D4829

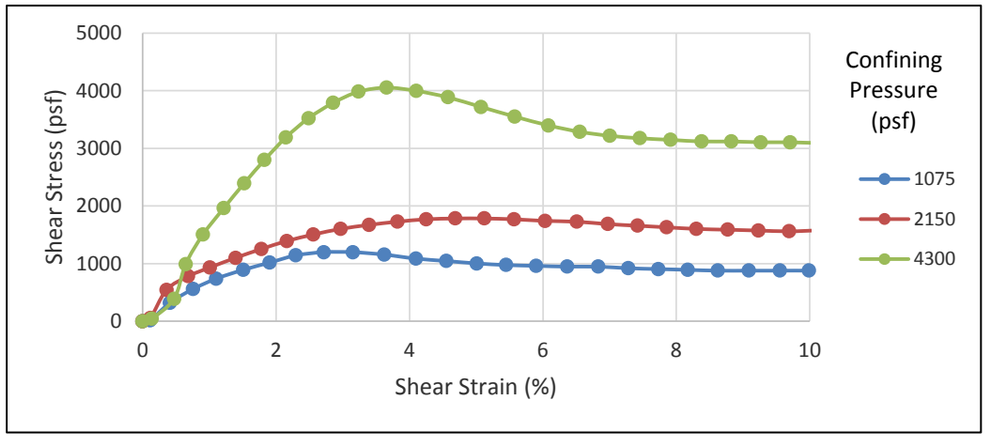
RESISTIVITY, pH, SOLUBLE CHLORIDE and SOLUBLE SULFATE

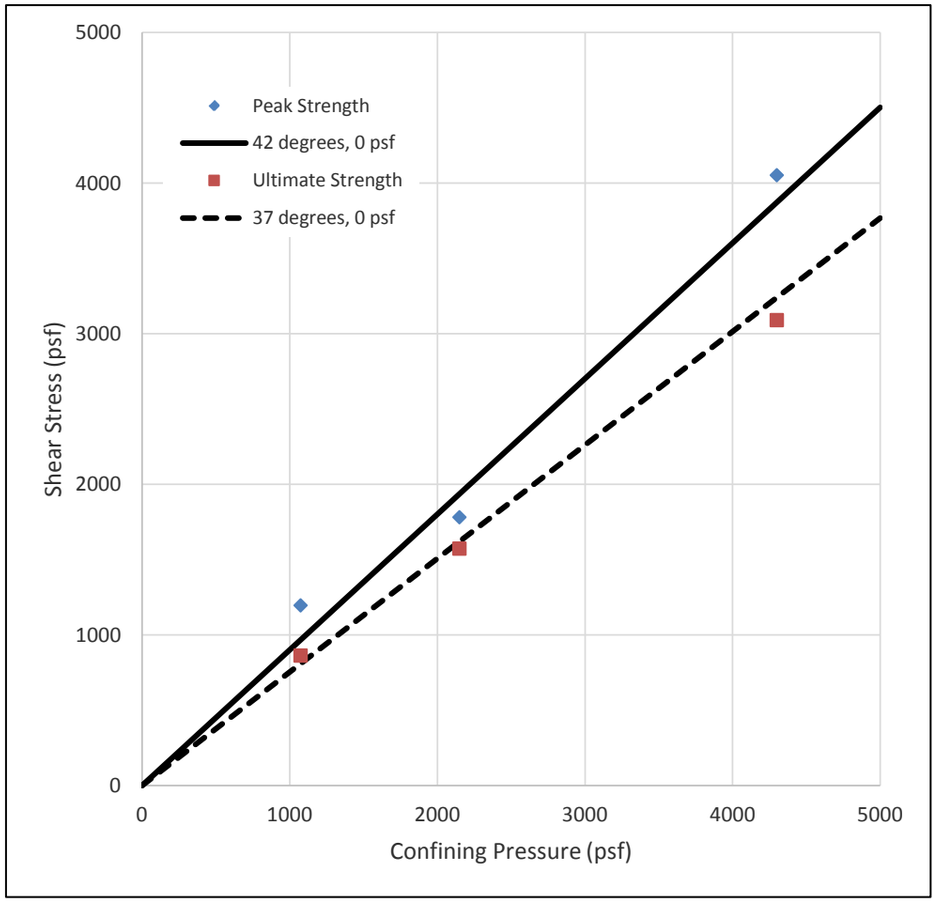
SAMPLE	RESISTIVITY (Ω-cm)	pH	CHLORIDE (%)	SULFATE (%)
B-3 at 1½ feet to 4 feet	5,220	8.02	0.009	0.000

SULFATE EXPOSURE CLASSES [2]

Class	Severity	Water-Soluble Sulfate (SO_4) in Soil, Percent by Mass
S0	Not applicable	$SO_4 < 0.10$
S1	Moderate	$0.10 \leq SO_4 < 0.20$
S2	Severe	$0.20 \leq SO_4 \leq 2.00$
S3	Very Severe	$SO_4 > 2.00$

2. ACI 318, Table 4.2.1





SAMPLE ID: B-4@21-21.5

Brown Fine to Medium SILTY SAND

NOTES: Insitu
Strain Rate: 0.003 in/min
Sample was consolidated and drained

	Peak	Ultimate
Φ	42 °	37 °
c	0 psf	0 psf

	Initial	Final
γ_d	118.3 pcf	118.3 pcf
w_c	7.9 %	13.4 %
Saturation	51 %	87 %

SOUTHERN CALIFORNIA SOIL & TESTING, INC.

1050 Camino Del Mar
Del Mar, California

By:	CTL	Date:	May,2015
Job Number:	140576P3.3	Figure:	II-5

APPENDIX III
CHEMICAL LABORATORY TESTING

Chemical laboratory tests were performed in one of the samples to screen for the potential presence of hydrocarbon constituents and lead. The following tests were performed:

- **TOTAL PETROLEUM HYDRCARBONS (TPH):** The sample was analyzed for TPH by EPA Method 8015B.
- **Volatile Organic Compound (VOC's):** The sample included EPA test method 8260B.
- **Lead:** The sample was analyzed by EPA Method 6010B.

The laboratory report for the above analyses is included in this appendix.

Soil samples not tested are now stored in our laboratory for future reference and analysis, if needed. Unless notified to the contrary, all samples will be disposed of 30 days from the date of this report.

eurofins | Calscience

WORK ORDER NUMBER: 15-05-0090

The difference is service

AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: Southern California Soil & Testing, Inc.

Client Project Name: Del Mar City Hall / 140576P3.3

Attention: Andrew Neuhaus
6280 Riverdale Street
San Diego, CA 92120-3308

Approved for release on 05/11/2015 by:
Terri Chang
Project Manager

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Client Project Name: Del Mar City Hall / 140576P3.3
Work Order Number: 15-05-0090

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Work Order Narrative

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Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 05/01/15. They were assigned to Work Order 15-05-0090.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

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Sample Summary

Client:	Southern California Soil & Testing, Inc. 6280 Riverdale Street San Diego, CA 92120-3308	Work Order:	15-05-0090
		Project Name:	Del Mar City Hall / 140576P3.3
		PO Number:	
		Date/Time Received:	05/01/15 19:30
		Number of Containers:	1
Attn:	Andrew Neuhaus		

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
B-1@16'-16.5'	15-05-0090-1	04/30/15 08:59	1	Solid

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Analytical Report

Southern California Soil & Testing, Inc.
6280 Riverdale Street
San Diego, CA 92120-3308

Project: Del Mar City Hall / 140576P3.3

Date Received: 05/01/15
Work Order: 15-05-0090
Preparation: EPA 5030C
Method: EPA 8015B (M)
Units: mg/kg

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
B-1@16'-16.5'	**15-05-0090-1-A**	**04/30/15 08:59**	**Solid**	**GC 24**	**05/04/15**	**05/04/15 13:14**	**150504L023**

Parameter	Result	RL	DF	Qualifiers
TPH as Gasoline	ND	0.50	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
1,4-Bromofluorobenzene - FID	84	42-126	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-14-571-2310**	**N/A**	**Solid**	**GC 24**	**05/04/15**	**05/04/15 12:06**	**150504L023**

Parameter	Result	RL	DF	Qualifiers
TPH as Gasoline	ND	0.50	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
1,4-Bromofluorobenzene - FID	82	42-126	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Southern California Soil & Testing, Inc.
6280 Riverdale Street
San Diego, CA 92120-3308

Date Received: 05/01/15
Work Order: 15-05-0090
Preparation: EPA 3050B
Method: EPA 6010B
Units: mg/kg

Project: Del Mar City Hall / 140576P3.3

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
B-1@16'-16.5'	**15-05-0090-1-A**	**04/30/15 08:59**	**Solid**	**ICP 7300**	**05/04/15**	**05/05/15 12:53**	**150504L02A**

Parameter	Result	RL	DF	Qualifiers
Antimony	ND	0.735	0.980	
Arsenic	1.58	0.735	0.980	
Barium	17.0	0.490	0.980	
Beryllium	0.254	0.245	0.980	
Cadmium	ND	0.490	0.980	
Chromium	12.7	0.245	0.980	
Cobalt	4.20	0.245	0.980	
Copper	2.53	0.490	0.980	
Lead	2.94	0.490	0.980	
Molybdenum	ND	0.245	0.980	
Nickel	3.04	0.245	0.980	
Selenium	ND	0.735	0.980	
Silver	ND	0.245	0.980	
Thallium	ND	0.735	0.980	
Vanadium	39.7	0.245	0.980	
Zinc	9.73	0.980	0.980	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Southern California Soil & Testing, Inc.
6280 Riverdale Street
San Diego, CA 92120-3308

Date Received: 05/01/15
Work Order: 15-05-0090
Preparation: EPA 3050B
Method: EPA 6010B
Units: mg/kg

Project: Del Mar City Hall / 140576P3.3

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**097-01-002-20921**	**N/A**	**Solid**	**ICP 7300**	**05/04/15**	**05/05/15 13:43**	**150504L02A**

Parameter	Result	RL	DF	Qualifiers
Antimony	ND	0.743	0.990	
Arsenic	ND	0.743	0.990	
Barium	ND	0.495	0.990	
Beryllium	ND	0.248	0.990	
Cadmium	ND	0.495	0.990	
Chromium	ND	0.248	0.990	
Cobalt	ND	0.248	0.990	
Copper	ND	0.495	0.990	
Lead	ND	0.495	0.990	
Molybdenum	ND	0.248	0.990	
Nickel	ND	0.248	0.990	
Selenium	ND	0.743	0.990	
Silver	ND	0.248	0.990	
Thallium	ND	0.743	0.990	
Vanadium	ND	0.248	0.990	
Zinc	ND	0.990	0.990	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Southern California Soil & Testing, Inc.
6280 Riverdale Street
San Diego, CA 92120-3308

Project: Del Mar City Hall / 140576P3.3

Date Received: 05/01/15
Work Order: 15-05-0090
Preparation: EPA 7471A Total
Method: EPA 7471A
Units: mg/kg

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
B-1@16'-16.5'	**15-05-0090-1-A**	**04/30/15 08:59**	**Solid**	**Mercury 05**	**05/06/15**	**05/06/15 15:16**	**150506L01**

Parameter	Result	RL	DF	Qualifiers
Mercury	ND	0.0794	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-16-272-1223**	**N/A**	**Solid**	**Mercury 05**	**05/06/15**	**05/06/15 14:12**	**150506L01**

Parameter	Result	RL	DF	Qualifiers
Mercury	ND	0.0833	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Southern California Soil & Testing, Inc.
6280 Riverdale Street
San Diego, CA 92120-3308

Date Received: 05/01/15
Work Order: 15-05-0090
Preparation: EPA 5030C
Method: EPA 8260B
Units: ug/kg

Project: Del Mar City Hall / 140576P3.3

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
B-1@16'-16.5'	**15-05-0090-1-A**	**04/30/15 08:59**	**Solid**	**GC/MS XX**	**05/04/15**	**05/04/15 15:28**	**150504L010**

Parameter	Result	RL	DF	Qualifiers
Acetone	ND	130	1.00	
Benzene	ND	5.1	1.00	
Bromobenzene	ND	5.1	1.00	
Bromochloromethane	ND	5.1	1.00	
Bromodichloromethane	ND	5.1	1.00	
Bromoform	ND	5.1	1.00	
Bromomethane	ND	26	1.00	
2-Butanone	ND	51	1.00	
n-Butylbenzene	ND	5.1	1.00	
sec-Butylbenzene	ND	5.1	1.00	
tert-Butylbenzene	ND	5.1	1.00	
Carbon Disulfide	ND	51	1.00	
Carbon Tetrachloride	ND	5.1	1.00	
Chlorobenzene	ND	5.1	1.00	
Chloroethane	ND	5.1	1.00	
Chloroform	ND	5.1	1.00	
Chloromethane	ND	26	1.00	
2-Chlorotoluene	ND	5.1	1.00	
4-Chlorotoluene	ND	5.1	1.00	
Dibromochloromethane	ND	5.1	1.00	
1,2-Dibromo-3-Chloropropane	ND	10	1.00	
1,2-Dibromoethane	ND	5.1	1.00	
Dibromomethane	ND	5.1	1.00	
1,2-Dichlorobenzene	ND	5.1	1.00	
1,3-Dichlorobenzene	ND	5.1	1.00	
1,4-Dichlorobenzene	ND	5.1	1.00	
Dichlorodifluoromethane	ND	5.1	1.00	
1,1-Dichloroethane	ND	5.1	1.00	
1,2-Dichloroethane	ND	5.1	1.00	
1,1-Dichloroethene	ND	5.1	1.00	
c-1,2-Dichloroethene	ND	5.1	1.00	
t-1,2-Dichloroethene	ND	5.1	1.00	
1,2-Dichloropropane	ND	5.1	1.00	
1,3-Dichloropropane	ND	5.1	1.00	
2,2-Dichloropropane	ND	5.1	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Southern California Soil & Testing, Inc.	Date Received:	05/01/15
6280 Riverdale Street	Work Order:	15-05-0090
San Diego, CA 92120-3308	Preparation:	EPA 5030C
	Method:	EPA 8260B
	Units:	ug/kg
Project: Del Mar City Hall / 140576P3.3		Page 2 of 4

Parameter	Result	RL	DF	Qualifiers
1,1-Dichloropropene	ND	5.1	1.00	
c-1,3-Dichloropropene	ND	5.1	1.00	
t-1,3-Dichloropropene	ND	5.1	1.00	
Ethylbenzene	ND	5.1	1.00	
2-Hexanone	ND	51	1.00	
Isopropylbenzene	ND	5.1	1.00	
p-Isopropyltoluene	ND	5.1	1.00	
Methylene Chloride	ND	51	1.00	
4-Methyl-2-Pentanone	ND	51	1.00	
Naphthalene	ND	51	1.00	
n-Propylbenzene	ND	5.1	1.00	
Styrene	ND	5.1	1.00	
1,1,1,2-Tetrachloroethane	ND	5.1	1.00	
1,1,2,2-Tetrachloroethane	ND	5.1	1.00	
Tetrachloroethene	ND	5.1	1.00	
Toluene	ND	5.1	1.00	
1,2,3-Trichlorobenzene	ND	10	1.00	
1,2,4-Trichlorobenzene	ND	5.1	1.00	
1,1,1-Trichloroethane	ND	5.1	1.00	
1,1,2-Trichloroethane	ND	5.1	1.00	
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	51	1.00	
Trichloroethene	ND	5.1	1.00	
1,2,3-Trichloropropane	ND	5.1	1.00	
1,2,4-Trimethylbenzene	ND	5.1	1.00	
Trichlorofluoromethane	ND	51	1.00	
1,3,5-Trimethylbenzene	ND	5.1	1.00	
Vinyl Acetate	ND	51	1.00	
Vinyl Chloride	ND	5.1	1.00	
p/m-Xylene	ND	5.1	1.00	
o-Xylene	ND	5.1	1.00	
Methyl-t-Butyl Ether (MTBE)	ND	5.1	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
1,4-Bromofluorobenzene	93	60-132	
Dibromofluoromethane	111	63-141	
1,2-Dichloroethane-d4	122	62-146	
Toluene-d8	98	80-120	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Southern California Soil & Testing, Inc.
6280 Riverdale Street
San Diego, CA 92120-3308

Date Received: 05/01/15
Work Order: 15-05-0090
Preparation: EPA 5030C
Method: EPA 8260B
Units: ug/kg

Project: Del Mar City Hall / 140576P3.3

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-12-796-9638**	**N/A**	**Solid**	**GC/MS XX**	**05/04/15**	**05/04/15 14:22**	**150504L010**

Parameter	Result	RL	DF	Qualifiers
Acetone	ND	120	1.00	
Benzene	ND	5.0	1.00	
Bromobenzene	ND	5.0	1.00	
Bromochloromethane	ND	5.0	1.00	
Bromodichloromethane	ND	5.0	1.00	
Bromoform	ND	5.0	1.00	
Bromomethane	ND	25	1.00	
2-Butanone	ND	50	1.00	
n-Butylbenzene	ND	5.0	1.00	
sec-Butylbenzene	ND	5.0	1.00	
tert-Butylbenzene	ND	5.0	1.00	
Carbon Disulfide	ND	50	1.00	
Carbon Tetrachloride	ND	5.0	1.00	
Chlorobenzene	ND	5.0	1.00	
Chloroethane	ND	5.0	1.00	
Chloroform	ND	5.0	1.00	
Chloromethane	ND	25	1.00	
2-Chlorotoluene	ND	5.0	1.00	
4-Chlorotoluene	ND	5.0	1.00	
Dibromochloromethane	ND	5.0	1.00	
1,2-Dibromo-3-Chloropropane	ND	10	1.00	
1,2-Dibromoethane	ND	5.0	1.00	
Dibromomethane	ND	5.0	1.00	
1,2-Dichlorobenzene	ND	5.0	1.00	
1,3-Dichlorobenzene	ND	5.0	1.00	
1,4-Dichlorobenzene	ND	5.0	1.00	
Dichlorodifluoromethane	ND	5.0	1.00	
1,1-Dichloroethane	ND	5.0	1.00	
1,2-Dichloroethane	ND	5.0	1.00	
1,1-Dichloroethene	ND	5.0	1.00	
c-1,2-Dichloroethene	ND	5.0	1.00	
t-1,2-Dichloroethene	ND	5.0	1.00	
1,2-Dichloropropane	ND	5.0	1.00	
1,3-Dichloropropane	ND	5.0	1.00	
2,2-Dichloropropane	ND	5.0	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Southern California Soil & Testing, Inc.	Date Received:	05/01/15
6280 Riverdale Street	Work Order:	15-05-0090
San Diego, CA 92120-3308	Preparation:	EPA 5030C
	Method:	EPA 8260B
	Units:	ug/kg
Project: Del Mar City Hall / 140576P3.3		Page 4 of 4

Parameter	Result	RL	DF	Qualifiers
1,1-Dichloropropene	ND	5.0	1.00	
c-1,3-Dichloropropene	ND	5.0	1.00	
t-1,3-Dichloropropene	ND	5.0	1.00	
Ethylbenzene	ND	5.0	1.00	
2-Hexanone	ND	50	1.00	
Isopropylbenzene	ND	5.0	1.00	
p-Isopropyltoluene	ND	5.0	1.00	
Methylene Chloride	ND	50	1.00	
4-Methyl-2-Pentanone	ND	50	1.00	
Naphthalene	ND	50	1.00	
n-Propylbenzene	ND	5.0	1.00	
Styrene	ND	5.0	1.00	
1,1,1,2-Tetrachloroethane	ND	5.0	1.00	
1,1,2,2-Tetrachloroethane	ND	5.0	1.00	
Tetrachloroethene	ND	5.0	1.00	
Toluene	ND	5.0	1.00	
1,2,3-Trichlorobenzene	ND	10	1.00	
1,2,4-Trichlorobenzene	ND	5.0	1.00	
1,1,1-Trichloroethane	ND	5.0	1.00	
1,1,2-Trichloroethane	ND	5.0	1.00	
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	50	1.00	
Trichloroethene	ND	5.0	1.00	
1,2,3-Trichloropropane	ND	5.0	1.00	
1,2,4-Trimethylbenzene	ND	5.0	1.00	
Trichlorofluoromethane	ND	50	1.00	
1,3,5-Trimethylbenzene	ND	5.0	1.00	
Vinyl Acetate	ND	50	1.00	
Vinyl Chloride	ND	5.0	1.00	
p/m-Xylene	ND	5.0	1.00	
o-Xylene	ND	5.0	1.00	
Methyl-t-Butyl Ether (MTBE)	ND	5.0	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
1,4-Bromofluorobenzene	95	60-132	
Dibromofluoromethane	108	63-141	
1,2-Dichloroethane-d4	118	62-146	
Toluene-d8	97	80-120	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Quality Control - Spike/Spike Duplicate

Southern California Soil & Testing, Inc.		Date Received:	05/01/15
6280 Riverdale Street		Work Order:	15-05-0090
San Diego, CA 92120-3308		Preparation:	EPA 5030C
		Method:	EPA 8015B (M)
Project: Del Mar City Hall / 140576P3.3			Page 1 of 4

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
B-1@16'-16.5'	**Sample**	**Solid**	**GC 24**	**05/04/15**	**05/04/15 13:14**	**150504S013**
B-1@16'-16.5'	**Matrix Spike**	**Solid**	**GC 24**	**05/04/15**	**05/04/15 13:48**	**150504S013**
B-1@16'-16.5'	**Matrix Spike Duplicate**	**Solid**	**GC 24**	**05/04/15**	**05/04/15 14:22**	**150504S013**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
TPH as Gasoline	ND	10.00	9.274	93	8.832	88	48-114	5	0-23	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Southern California Soil & Testing, Inc.	Date Received:	05/01/15
6280 Riverdale Street	Work Order:	15-05-0090
San Diego, CA 92120-3308	Preparation:	EPA 3050B
	Method:	EPA 6010B
Project: Del Mar City Hall / 140576P3.3		Page 2 of 4

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
15-05-0123-1	**Sample**	**Solid**	**ICP 7300**	**05/04/15**	**05/04/15 18:25**	**150504S02**
15-05-0123-1	**Matrix Spike**	**Solid**	**ICP 7300**	**05/04/15**	**05/04/15 18:26**	**150504S02**
15-05-0123-1	**Matrix Spike Duplicate**	**Solid**	**ICP 7300**	**05/04/15**	**05/04/15 18:27**	**150504S02**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Antimony	ND	25.00	10.75	43	10.02	40	50-115	7	0-20	3
Arsenic	5.077	25.00	28.84	95	29.70	98	75-125	3	0-20	
Barium	145.7	25.00	161.5	4X	186.5	4X	75-125	4X	0-20	Q
Beryllium	0.2729	25.00	24.79	98	25.33	100	75-125	2	0-20	
Cadmium	ND	25.00	23.79	95	24.06	96	75-125	1	0-20	
Chromium	15.66	25.00	39.85	97	41.62	104	75-125	4	0-20	
Cobalt	2.382	25.00	26.77	98	27.04	99	75-125	1	0-20	
Copper	4.761	25.00	29.90	101	31.40	107	75-125	5	0-20	
Lead	1.908	25.00	25.99	96	26.33	98	75-125	1	0-20	
Molybdenum	2.289	25.00	25.24	92	26.06	95	75-125	3	0-20	
Nickel	8.476	25.00	32.50	96	33.44	100	75-125	3	0-20	
Selenium	ND	25.00	20.75	83	21.32	85	75-125	3	0-20	
Silver	ND	12.50	12.04	96	12.47	100	75-125	4	0-20	
Thallium	ND	25.00	23.44	94	24.11	96	75-125	3	0-20	
Vanadium	23.08	25.00	48.21	101	51.51	114	75-125	7	0-20	
Zinc	15.56	25.00	41.21	103	41.49	104	75-125	1	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Southern California Soil & Testing, Inc.		Date Received:	05/01/15
6280 Riverdale Street		Work Order:	15-05-0090
San Diego, CA 92120-3308		Preparation:	EPA 7471A Total
		Method:	EPA 7471A
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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
15-05-0040-2	**Sample**	**Solid**	**Mercury 05**	**05/06/15**	**05/06/15 14:17**	**150506S01**
15-05-0040-2	**Matrix Spike**	**Solid**	**Mercury 05**	**05/06/15**	**05/06/15 14:19**	**150506S01**
15-05-0040-2	**Matrix Spike Duplicate**	**Solid**	**Mercury 05**	**05/06/15**	**05/06/15 14:21**	**150506S01**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Mercury	ND	0.8350	0.9788	117	1.013	121	71-137	3	0-14	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Southern California Soil & Testing, Inc.	Date Received:	05/01/15
6280 Riverdale Street	Work Order:	15-05-0090
San Diego, CA 92120-3308	Preparation:	EPA 5030C
	Method:	EPA 8260B
Project: Del Mar City Hall / 140576P3.3		Page 4 of 4

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
B-1@16'-16.5'	**Sample**	**Solid**	**GC/MS XX**	**05/04/15**	**05/04/15 15:28**	**150504S004**
B-1@16'-16.5'	**Matrix Spike**	**Solid**	**GC/MS XX**	**05/04/15**	**05/04/15 16:50**	**150504S004**
B-1@16'-16.5'	**Matrix Spike Duplicate**	**Solid**	**GC/MS XX**	**05/04/15**	**05/04/15 17:17**	**150504S004**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Benzene	ND	50.00	45.90	92	46.09	92	61-127	0	0-20	
Carbon Tetrachloride	ND	50.00	51.45	103	52.58	105	51-135	2	0-29	
Chlorobenzene	ND	50.00	50.23	100	50.15	100	57-123	0	0-20	
1,2-Dibromoethane	ND	50.00	51.66	103	52.02	104	64-124	1	0-20	
1,2-Dichlorobenzene	ND	50.00	48.68	97	49.31	99	35-131	1	0-25	
1,2-Dichloroethane	ND	50.00	52.69	105	53.47	107	80-120	1	0-20	
1,1-Dichloroethene	ND	50.00	48.36	97	48.69	97	47-143	1	0-25	
Ethylbenzene	ND	50.00	51.38	103	51.19	102	57-129	0	0-22	
Toluene	ND	50.00	49.11	98	49.15	98	63-123	0	0-20	
Trichloroethene	ND	50.00	48.82	98	49.43	99	44-158	1	0-20	
Vinyl Chloride	ND	50.00	41.26	83	40.63	81	49-139	2	0-47	
p/m-Xylene	ND	100.0	106.4	106	105.9	106	70-130	0	0-30	
o-Xylene	ND	50.00	54.07	108	53.97	108	70-130	0	0-30	
Methyl-t-Butyl Ether (MTBE)	ND	50.00	52.77	106	52.82	106	57-123	0	0-21	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

Southern California Soil & Testing, Inc.		Date Received:	05/01/15
6280 Riverdale Street		Work Order:	15-05-0090
San Diego, CA 92120-3308		Preparation:	EPA 5030C
		Method:	EPA 8015B (M)
Project: Del Mar City Hall / 140576P3.3			Page 1 of 4

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-14-571-2310	**LCS**	**Solid**	**GC 24**	**05/04/15**	**05/04/15 11:32**	**150504L023**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
TPH as Gasoline	10.00	9.047	90	70-124	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

Southern California Soil & Testing, Inc.		Date Received:	05/01/15
6280 Riverdale Street		Work Order:	15-05-0090
San Diego, CA 92120-3308		Preparation:	EPA 3050B
		Method:	EPA 6010B
Project: Del Mar City Hall / 140576P3.3			Page 2 of 4

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
097-01-002-20921	**LCS**	**Solid**	**ICP 7300**	**05/04/15**	**05/04/15 17:47**	**150504L02A**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	ME CL	Qualifiers
Antimony	25.00	23.49	94	80-120	73-127	
Arsenic	25.00	23.07	92	80-120	73-127	
Barium	25.00	26.97	108	80-120	73-127	
Beryllium	25.00	22.68	91	80-120	73-127	
Cadmium	25.00	24.21	97	80-120	73-127	
Chromium	25.00	24.95	100	80-120	73-127	
Cobalt	25.00	25.16	101	80-120	73-127	
Copper	25.00	24.17	97	80-120	73-127	
Lead	25.00	24.92	100	80-120	73-127	
Molybdenum	25.00	23.88	96	80-120	73-127	
Nickel	25.00	24.94	100	80-120	73-127	
Selenium	25.00	23.08	92	80-120	73-127	
Silver	12.50	12.80	102	80-120	73-127	
Thallium	25.00	23.76	95	80-120	73-127	
Vanadium	25.00	24.37	97	80-120	73-127	
Zinc	25.00	24.26	97	80-120	73-127	

Total number of LCS compounds: 16
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

Southern California Soil & Testing, Inc.		Date Received:	05/01/15
6280 Riverdale Street		Work Order:	15-05-0090
San Diego, CA 92120-3308		Preparation:	EPA 7471A Total
		Method:	EPA 7471A
Project: Del Mar City Hall / 140576P3.3			Page 3 of 4

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-16-272-1223	**LCS**	**Solid**	**Mercury 05**	**05/06/15**	**05/06/15 14:15**	**150506L01**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Mercury	0.8350	0.9846	118	85-121	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

Southern California Soil & Testing, Inc.		Date Received:	05/01/15
6280 Riverdale Street		Work Order:	15-05-0090
San Diego, CA 92120-3308		Preparation:	EPA 5030C
		Method:	EPA 8260B
Project: Del Mar City Hall / 140576P3.3			Page 4 of 4

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-12-796-9638	**LCS**	**Solid**	**GC/MS XX**	**05/04/15**	**05/04/15 13:17**	**150504L010**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	ME CL	Qualifiers
Benzene	50.00	49.04	98	78-120	71-127	
Carbon Tetrachloride	50.00	55.75	111	49-139	34-154	
Chlorobenzene	50.00	53.64	107	79-120	72-127	
1,2-Dibromoethane	50.00	53.38	107	80-120	73-127	
1,2-Dichlorobenzene	50.00	52.75	105	75-120	68-128	
1,2-Dichloroethane	50.00	56.18	112	80-120	73-127	
1,1-Dichloroethene	50.00	51.34	103	74-122	66-130	
Ethylbenzene	50.00	54.66	109	76-120	69-127	
Toluene	50.00	52.18	104	77-120	70-127	
Trichloroethene	50.00	51.80	104	80-120	73-127	
Vinyl Chloride	50.00	43.83	88	68-122	59-131	
p/m-Xylene	100.0	112.9	113	75-125	67-133	
o-Xylene	50.00	57.50	115	75-125	67-133	
Methyl-t-Butyl Ether (MTBE)	50.00	53.36	107	77-120	70-127	

Total number of LCS compounds: 14
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

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RPD: Relative Percent Difference. CL: Control Limits

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Sample Analysis Summary Report

Work Order: 15-05-0090 Page 1 of 1

Method	Extraction	Chemist ID	Instrument	Analytical Location
EPA 6010B	EPA 3050B	935	ICP 7300	1
EPA 7471A	EPA 7471A Total	915	Mercury 05	1
EPA 8015B (M)	EPA 5030C	715	GC 24	2
EPA 8260B	EPA 5030C	849	GC/MS XX	2

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Glossary of Terms and Qualifiers

Work Order: 15-05-0090 Page 1 of 1

Qualifiers	Definition
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
CI	See case narrative.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

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Calscience Environmental Laboratories, Inc.

7440 Lincoln Way, Garden Grove, CA 92841-1427 • (714) 895-5494
Other CA office locations: Concord and San Luis Obispo
For courier service / sample drop off information,
contact sales@calscience.com or call us.

CHAIN OF CUSTODY RECORD

WO # / LAB USE ONLY: **15-05-0090**

Date: 4-30-15

Page: 1 of 1

LABORATORY CLIENT: Southern California Soil & Testing

ADDRESS: 6280 Riverdale Street

CITY: San Diego STATE: CA ZIP: 92120

TEL: 619-280-4321 E-MAIL: anevhaus@scst.com

CLIENT PROJECT NAME / NUMBER: Del Mar City Hall

P.O. NO.: 140576 P3.3

PROJECT CONTACT: Andrew Nevhaus

SAMPLER(S): (PRINT) Arturo M. Hoyos

TURNAROUND TIME:
☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☒ STANDARD

☐ COELT EDF GLOBAL ID LOG CODE

SPECIAL INSTRUCTIONS:

REQUESTED ANALYSES

Please check box or fill in blank as needed.

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Unpreserved	Preserved	Field Filtered	☒ TPH(g) ☐ GRO	☐ TPH(d) ☐ DRO	TPH ☐ C6-C36 ☐ C6-C44	TPH ____	BTEX / MTBE ☒ 8260 ☐ ____	VOCs (8260)	Oxygenates (8260)	Prep (5035) ☐ En Core ☐ Terra Core	SVOCs (8270)	Pesticides (8081)	PCBs (8082)	PAHs ☐ 8270 ☐ 8270 SIM	T22 Metals ☒ 6010/747X ☐ 6020/747X	Cr(VI) ☐ 7196 ☐ 7199 ☐ 218.6
1	B-1@ 16'-16.5'	4-30-15	0859	S	1				☒				☒	☒							☒	

Relinquished by: (Signature) Received by: (Signature/Affiliation) Date: 05/01/15 Time: 1555

Relinquished by: (Signature) Received by: (Signature/Affiliation) ECR Date: 5/1/15 Time: 1930

Relinquished by: (Signature) Received by: (Signature/Affiliation) Date: Time:

DISTRIBUTION: White with final report, Green and Yellow to Client.
Please note that pages 1 and 2 of 2 of our T/Cs are printed on the reverse side of the Green and Yellow copies respectively.

11/01/12 Revision

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WORK ORDER NUMBER: 15-05- 0090

SAMPLE RECEIPT CHECKLIST

COOLER 1 OF 1

CLIENT: SCSST

DATE: 05 / 01 / 2015

TEMPERATURE: (Criteria: 0.0°C – 6.0°C, not frozen except sediment/tissue)

Thermometer ID: SC2 (CF:-0.3°C); Temperature (w/o CF): 2.1 °C (w/ CF): 1.8 °C; ☑ Blank ☐ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: _____)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling

☐ Sample(s) received at ambient temperature; placed on ice for transport by courier

Ambient Temperature: ☐ Air ☐ Filter Checked by: 671

CUSTODY SEAL:

Cooler ☐ Present and Intact ☐ Present but Not Intact ☑ Not Present ☐ N/A Checked by: 671

Sample(s) ☐ Present and Intact ☐ Present but Not Intact ☑ Not Present ☐ N/A Checked by: 965

SAMPLE CONDITION:	Yes	No	N/A
Chain-of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Sampling date ☐ Sampling time ☐ Matrix ☐ Number of containers			
☐ No analysis requested ☐ Not relinquished ☐ No relinquished date ☐ No relinquished time			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and in good condition	☑	☐	☐
Proper containers for analyses requested	☑	☐	☐
Sufficient volume/mass for analyses requested	☑	☐	☐
Samples received within holding time	☑	☐	☐
Aqueous samples for certain analyses received within 15-minute holding time			
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfide ☐ Dissolved Oxygen	☐	☐	☑
Proper preservation chemical(s) noted on COC and/or sample container	☐	☐	☑
Unpreserved aqueous sample(s) received for certain analyses			
☐ Volatile Organics ☐ Total Metals ☐ Dissolved Metals			
Container(s) for certain analysis free of headspace	☐	☐	☑
☐ Volatile Organics ☐ Dissolved Gases (RSK-175) ☐ Dissolved Oxygen (SM 4500)			
☐ Carbon Dioxide (SM 4500) ☐ Ferrous Iron (SM 3500) ☐ Hydrogen Sulfide (Hach)			
Tedlar™ bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE: (Trip Blank Lot Number: _____)

Aqueous: ☐ VOA ☐ VOA**h** ☐ VOA**na$_2$** ☐ 100PJ ☐ 100PJ**na$_2$** ☐ 125AGB ☐ 125AGB**h** ☐ 125AGB**p** ☐ 125PB

☐ 125PB**znna** ☐ 250AGB ☐ 250CGB ☐ 250CGB**s** ☐ 250PB ☐ 250PB**n** ☐ 500AGB ☐ 500AGJ ☐ 500AGJ**s**

☐ 500PB ☐ 1AGB ☐ 1AGB**na$_2$** ☐ 1AGB**s** ☐ 1PB ☐ 1PB**na** ☐ _____ ☐ _____ ☐ _____ ☐ _____

Solid: ☐ 4ozCGJ ☐ 8ozCGJ ☐ 16ozCGJ ☐ Sleeve (_____) ☐ EnCores® (_____) ☐ TerraCores® (_____) ☑ 24oz PJ (tall)

Air: ☐ Tedlar™ ☐ Canister ☐ Sorbent Tube ☐ PUF ☐ _____ **Other Matrix** (_____): ☐ _____ ☐ _____

Container: **A** = Amber, **B** = Bottle, **C** = Clear, **E** = Envelope, **G** = Glass, **J** = Jar, **P** = Plastic, and **Z** = Ziploc/Resealable Bag

Preservative: **b** = buffered, **f** = filtered, **h** = HCl, **n** = HNO_3, **na** = NaOH, **na$_2$** = $Na_2S_2O_3$, **p** = H_3PO_4, **s** = H_2SO_4, **u** = ultra-pure, **znna** = $Zn(CH_3CO_2)_2$ + NaOH

Labeled/Checked by: 965

Reviewed by: 681

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