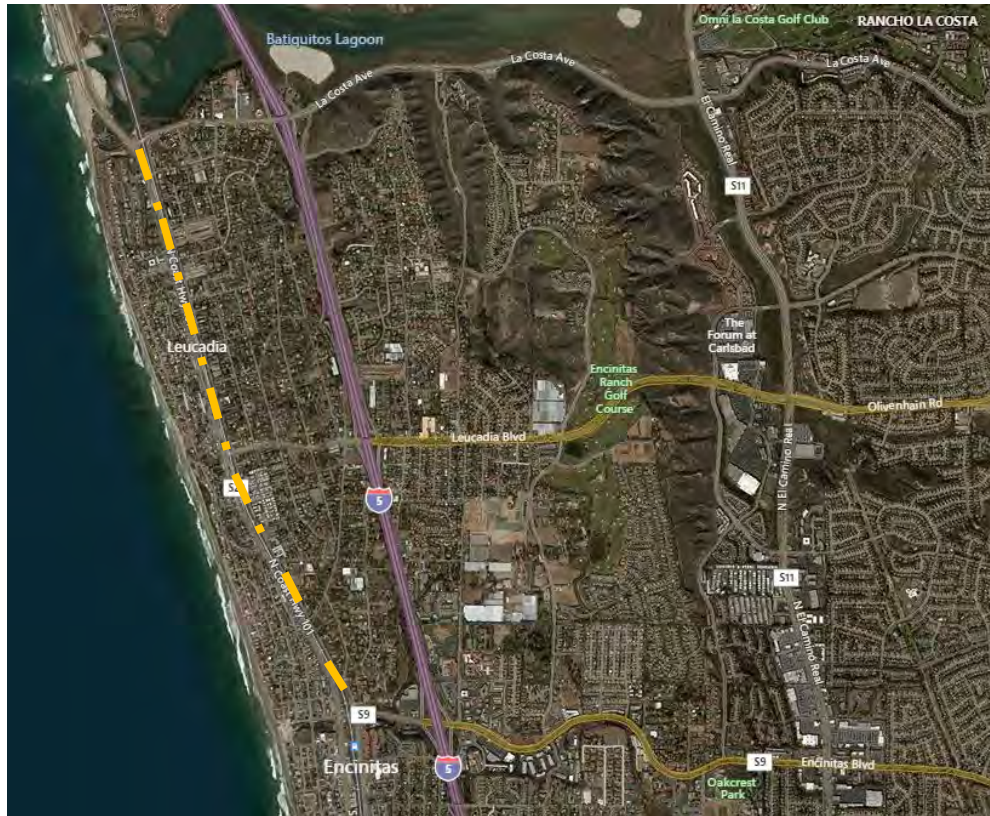

ATTACHMENT P.

GEOTECHNICAL ASSESSMENT REPORT

Geotechnical Assessment Report

HIGHWAY 101 STREETSCAPE PROJECT

Encinitas, California



Prepared for:

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June 14, 2019
Project No. TET 18-162E



Project No. TET 18-162E
June 14, 2019

Mr. Merrill Taylor
Tetra Tech
9444 Balboa Avenue, Suite 215
San Diego, CA 92123

Subject: **GEOTECHNICAL ASSESSMENT REPORT
HIGHWAY 101 STREETScape PROJECT
Encinitas, California**

Dear Mr. Taylor,

Presented herein is Tetra Tech's geotechnical assessment and infiltration report for the proposed Highway 101 Streetscape project including among others new pavements, and stormwater infiltration facilities in the City of Encinitas, California. The project covers approximately a 2.5-mile stretch of North County Coast Highway 101 from A Street on the south end of the project to La Costa Avenue on the north end.

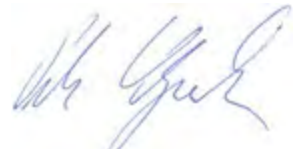
This report summarizes the results of our geotechnical investigation and infiltration testing to characterize the soils below the anticipated invert depth of the proposed stormwater infiltration facilities at the site and provides geotechnical assessment of the feasibility of the proposed facilities. In addition, this report includes the existing asphalt pavement section thicknesses encountered during the field investigation and the proposed design asphalt pavement sections for new pavements. The report also includes recommendations for new sidewalk thicknesses. The appendices of the report include logs of borings from the current investigation, and results of laboratory and infiltration tests.

We appreciate the opportunity to provide our professional services on this project. If you have any questions regarding this report or if we can be of further service, please do not hesitate to contact the undersigned.

Respectfully submitted,
Tetra Tech


Fernando Cuenca, Ph.D., G.E.
Senior Project Engineer




Peter Skopek, Ph.D., G.E.
Principal Engineer



Distribution: Addressee (pdf by email merril.taylor@tetrattech.com)

Filename: 2019-06-14 HWY 101 Geotechnical Report RPT.docx

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- Appendix A – Logs of Exploratory Borings
- Appendix B – Laboratory Testing
- Appendix C – Field Infiltration Testing Results

1. INTRODUCTION

This report presents the results of Tetra Tech's geotechnical assessment and infiltration report for the proposed Highway 101 Streetscape project in the City of Encinitas, California (see Figure 1). In addition, this report includes the existing asphalt pavement section thicknesses encountered during the field investigation and the proposed design asphalt pavement sections for new asphalt pavements. The report also includes recommendations for new sidewalk thicknesses.

The Highway 101 streetscape project aims at enhancing the Highway 101 corridor and a concept plan has been created to provide beautification, landscape, pedestrian, circulation, traffic management, and parking improvements for the approximately 2.5-mile stretch of North County Coast Highway 101 from A Street on the south end of the project to La Costa Avenue on the north end. The project includes new sidewalks, curbs, gutters, enhanced crosswalks, raised medians, roundabouts, bike lanes, increased parking options, public art, and landscaping elements.

Temporary improvements have been approved to provide an east side parking design. The temporary concept would allow gravel parking and a Decomposed Granite pathway in the North County Transit District right-of-way along Highway 101. It would also include ultimate improvements on Highway 101 including west-side parking, all street improvements, roundabouts, bicycle and pedestrian facilities, and the planting of 531 new trees (304 proposed along the west side of Highway 101, 227 proposed in the median) and 250 existing trees to remain. An additional 300 trees will be installed along the east side of Highway 101 in the future as part of the final design.

The purpose of this study was to evaluate the subsurface conditions at the site, perform infiltration testing at selected locations, and provide recommendations regarding the feasibility of the proposed construction.

2. SCOPE OF WORK

Tetra Tech's scope of services for this project consisted of the following tasks:

- Review of readily available background data, including in-house geotechnical data from our soil explorations in the vicinity of the project area.
- Perform a reconnaissance site visit to observe ground conditions and mark boring locations.
- Coordinate with Underground Service Alert (USA) for access and clearance of buried utilities prior to drilling.
- Provide traffic control during drilling and infiltration testing in accordance with the approved Traffic Control plans developed by the City of Encinitas.
- Meet with the City Inspector to present the work plan and traffic control plan.
- Conduct a subsurface investigation within the general area where the proposed infiltration and facilities could be located, including excavating, logging, and geotechnical sampling of 23 soil exploratory borings to a maximum depth of 16.5 feet.
- Advance 23 small diameter percolation borings to a maximum depth of 3.8 feet adjacent to the soil exploratory borings and perform boring percolation tests in general accordance with the City of Encinitas BMP Design Manual, Appendix D (2016). It is anticipated that the infiltration facilities will be relatively shallow with an estimated invert depth ranging between 2 and 3.5 feet.
- Drill at 10 additional asphalt pavement locations to determine existing pavement section thicknesses.
- Perform laboratory testing of selected soil samples recovered from the borings to evaluate geotechnical engineering properties of the on-site soils.
- Conduct an evaluation of the geotechnical data to develop preliminary geotechnical considerations for the design and construction of the proposed structures including the following items:
 - ♦ An evaluation of general subsurface conditions and description of types, distribution, and engineering characteristics of subsurface materials;
 - ♦ An evaluation of the suitability of on-site soils for infiltration;
 - ♦ An evaluation of the existing asphalt pavement sections and recommendations for new asphalt pavements.
 - ♦ Recommendations for new sidewalks and driveways.
- Prepare this written report documenting the work performed, physical data acquired, laboratory testing performed, and geotechnical assessment.

3. SUBSURFACE EXPLORATIONS

A screening subsurface investigation was conducted at the locations indicated on Figures 2a and 2b - Boring Location Map. The subsurface soil and groundwater conditions were explored on May 13th to May 17th, 2019 and included:

- Drilling, logging, and sampling of 23 shallow hollow stem auger exploratory borings B-1 through B-23 to a maximum depth of 16.5 feet to determine soil stratigraphy and groundwater conditions.
- Drilling of 23 shallow hollow stem auger borings denoted P-1 through P-23 to a maximum depth of 3.8 feet to determine percolation rates.
- Surficial drilling at 10 asphalt pavement locations C-1 to C-10 to determine existing asphalt pavement section thicknesses.

The approximate latitude and longitude of the soil exploration locations, the approximate top of boring elevations, and boring depths are included in Table 1. Where explorations were drilled off the road pavement, no pavement section was recorded, i.e., n/a notation.

Prior to starting the field exploration program, a field reconnaissance was conducted to observe surface conditions and to mark the locations of the planned boreholes. Underground Service Alert was notified of the drilling at least 48 hours prior to drilling. Prior to the field work, traffic control measures were implemented at each location in accordance with the Traffic Control Plans developed by the City of Encinitas. Additionally, a meeting with the City Inspector took place at the site, and the work plan to perform the field work was approved ahead of time.

Table 1
Field Exploration Summary Data

Boring No.	Latitude ¹ (degrees)	Longitude ¹ (degrees)	Depth (ft)	Top of Borehole Elevation ² (ft)	Asphalt Thickness (in)	Aggregate Base Thickness (in)	Note
B-1/P-1	33.050726	-117.294722	15.8	75	4	0	Shoulder
B-2/P-2	33.051041	-117.294623	11.5	73	n/a		Off road
B-3a/P-3a	33.053861	-117.296562	11.5	77	6	9	Slow lane
B-4/P-4	33.053315	-117.296020	11.5	77	n/a		Off road
B-5/P-5	33.055908	-117.297873	11.5	69	6.5	7	Slow lane
B-6/P-6	33.056190	-117.297867	16.5	66	n/a		Off road
B-7/P-7	33.057025	-117.298589	11.5	63	8	0	Slow lane
B-8/P-8	33.057441	-117.298674	11.5	64	4	0	Shoulder
B-9/P-9	33.061024	-117.301069	16.5	63	12	0	Slow lane

Boring No.	Latitude ¹ (degrees)	Longitude ¹ (degrees)	Depth (ft)	Top of Borehole Elevation ² (ft)	Asphalt Thickness (in)	Aggregate Base Thickness (in)	Note
B-10/P-10	33.060801	-117.300765	11.5	64	4	0	Shoulder
B-11/P-11	33.062630	-117.301753	11.5	58	11	0	Slow lane
B-12a/P-12a	33.065167	-117.302600	16.5	57	9	0	Slow lane
B-13/P-13	33.066123	-117.302714	11.5	56	n/a		Off road
B-14/P-14	33.067927	-117.303310	11.5	53	n/a		Off road
B-15/P-15	33.068286	-117.303672	4.0	53	7	4.5	Parking lane
B-16a/P-16a	33.071772	-117.304792	16.5	51	11	0	Slow lane
B-17/P-17	33.071838	-117.304576	11.5	52	n/a		Off road
B-18/P-18	33.074374	-117.305450	11.5	55	n/a		Off road
B-19a/P-19a	33.075600	-117.306114	16.5	53	10	0	Parking lane
B-20a/P-20a	33.078555	-117.306834	11.0	53	n/a		Off road
B-21a/P-21a	33.079503	-117.307390	16.5	54	11	0	Slow lane
B-22a/P-22a	33.081667	-117.308256	3.3	55	9	0	Slow lane
B-23/P-23	33.081431	-117.307914	16.5	57	6	8	Bike/turn lane
C-1	33.050525	-117.294644	~1.5	74	3	0	Shoulder
C-2	33.054792	-117.297193	~1.5	72	7	0	Parking lane
C-3	33.056225	-117.298074	~1.5	67	6	10	Slow lane
C-4	33.057275	-117.298752	~1.5	64	8.5	0	Slow lane
C-5	33.061479	-117.30129	~1.5	60	12	0	Slow lane
C-6	33.064704	-117.302447	~1.5	55	6	6	Slow lane
C-7	33.072563	-117.305088	~1.5	54	12	0	Parking lane
C-8	33.076494	-117.306402	~1.5	55	8.5	0	Parking lane
C-9a	33.078668	-117.30712	~1.5	53	9	0	Parking lane
C-10a	33.081898	-117.308441	~1.5	55	5.5	6	Bike lane
¹ Garmin Handheld GPS ($\pm$ 3 meters)							
² Estimated from Google Earth Pro							

Exploratory Borings:

The 23 exploratory borings were excavated using a CME-75 truck-mounted drill rig equipped with an 8-inch diameter hollow stem auger. Bulk, driven ring-type, and small bag samples were retrieved at selected depths during drilling of the exploratory borings. Standard Penetration Testing (SPT) was performed using an SPT sampler driven by an automatic 140-pound hammer with a drop of 30 inches in general accordance with ASTM D1586. The hammer calibration record indicated an energy transfer ratio of approximately 81 percent. Ring-type samples were collected utilizing a California-type sampler driven by the same equipment used for the SPTs. Sampling was generally carried out at 2.5-foot vertical intervals.

The soil borings were surface-logged in general accordance with the visual-manual procedure for description and identification of soils, ASTM D2488. The recovered samples were prepared for subsequent reference and laboratory testing. The soil boring logs are presented in Appendix A.

After conclusion of drilling and soil sampling, the boreholes were backfilled with tamped soil cuttings, and the asphalt was replaced with a compacted and properly moisturized aquaphalt cold patch.

Percolation boreholes and testing:

The 23 percolation testing boreholes P1 through P-23 were drilled within 5 to 10 feet of the corresponding exploratory boring location to a depth ranging between 3.4 to 3.8 feet, i.e., within the anticipated depth range for the invert of the infiltration facilities. Borehole percolation tests were then conducted using the test procedure described in the City of Encinitas BMP Design Manual, Appendix D (2016).

A 3-inch-diameter perforated PVC pipe with 5/8-inch-diameter holes was installed in all the borings. The casing was wrapped in a protective cloth sock to limit migration of soil particles into the pipe. The pipe was surrounded by a free-draining gravel pack with a hydraulic conductivity significantly larger than that of the surrounding soil.

Percolation boreholes were presoaked for at least 1 hour before the test. For the percolation testing an initial constant water level was maintained above the bottom of the borehole at each percolation location. The readings to determine the water depth were taken with a well sounder every 10 minutes or every 30 minutes depending on the infiltration rate observed during presoaking as required by the BMP Design Manual. Readings were taken until a stabilized drop rate was obtained, when the highest and lowest readings are within 10 percent from each other for 3 consecutive readings. However, testing was not completed until a minimum 6 readings were obtained, i.e., minimum testing time of 1 hour for borings with readings every 10 minutes, and minimum testing time of 3 hours for borings with readings every 30 minutes. Logs of the percolation testing are included in Appendix C. After conclusion of the boring percolation testing, the boreholes were backfilled with tamped soil cuttings, and the asphalt was replaced with a compacted and properly moisturized aquaphalt cold patch.

The field percolation rate expressed in inches per hour was adjusted as explained below and on the percolation logs. A testing method reduction factor RF_t of 2 was applied as required by the guidelines to account for the direction of flow during the test and the reliability of the method. To account for effects related to limited number of tests and large area considered for the project, a reduction factor RF_v of 1.2 was used (typical range between 1 and 3). Lastly, to account for long-term siltation, and plugging, a reduction factor RF_s of 2 was considered (typical range between 1 and 3). Consequently, the compounded reduction factor was 4.8. The results of the borehole percolation testing and calculation of the adjusted design infiltration rates are summarized in Table 2.

Table 2
Adjusted Design Infiltration Rates

Boring No.	Latitude	Longitude	Percolation Borehole Depth (ft)	Elevation (ft)	Adjusted Design Infiltration Rate (inches/hour)	Pass/Fail
P-1	33.050726	-117.294722	3.7	75	0.09	Fail
P-2	33.051041	-117.294623	3.7	73	0.08	Fail
P-3a	33.053861	-117.296562	3.4	77	0.72	Pass
P-4	33.053315	-117.296020	3.7	77	1.07	Pass
P-5	33.055908	-117.297873	3.4	69	0.50	Pass
P-6	33.056190	-117.297867	3.7	66	0.40	Fail
P-7	33.057025	-117.298589	3.8	63	0.49	Marginal Fail
P-8	33.057441	-117.298674	3.7	64	0.56	Pass
P-9	33.061024	-117.301069	3.4	63	0.83	Pass
P-10	33.060801	-117.300765	3.7	64	0.72	Pass
P-11	33.062630	-117.301753	3.7	58	0.27	Fail
P-12a	33.065167	-117.302600	3.7	57	0.79	Pass
P-13	33.066123	-117.302714	3.8	56	0.55	Pass
P-14	33.067927	-117.303310	3.7	53	1.11	Pass
P-15	33.068286	-117.303672	3.4	53	0.58	Pass
P-16a	33.071772	-117.304792	3.8	51	1.59	Pass
P-17	33.071838	-117.304576	3.7	52	0.52	Pass
P-18	33.074374	-117.305450	3.8	55	1.01	Pass
P-19a	33.075600	-117.306114	3.7	53	0.80	Pass

Boring No.	Latitude	Longitude	Percolation Borehole Depth (ft)	Elevation (ft)	Adjusted Design Infiltration Rate (inches/hour)	Pass/Fail
P-20a	33.078555	-117.306834	3.8	53	0.54	Pass
P-21a	33.079503	-117.307390	3.8	54	0.64	Pass
P-22a	33.081667	-117.308256	3.5	55	0.08	Fail
P-23	33.081431	-117.307914	3.7	57	0.65	Pass

The percolation results from this exploration indicate that the adjusted design infiltration rates for the project alignment range between 0.08 and 1.59 inches/hour. The low adjusted design infiltration rate for P-22 was apparently affected by the presence of low permeability cementitious materials i.e., concrete or soil cement, encountered at the bottom of the borehole and the result is deemed unreliable. A minimum acceptable infiltration rate of 0.5 inches/hour is required by the City of Encinitas BMP Design Manual.

Existing Asphalt Pavement Sections:

A total of 10 additional asphalt pavement sections were measured to better assess existing asphalt pavement thicknesses. The measured thicknesses of the asphalt pavement sections are included in Table 1. Asphalt pavement section thicknesses were also measured at each exploratory borehole location whenever possible and these are also reported in Table 1. The notes in Table 1 indicate the location of the asphalt pavement section in relation to the existing road i.e., fast lane (number one lane), slow lane (number two lane), parking lane, bike lane, and shoulder.

4. LABORATORY TESTING

Laboratory tests were performed on selected soil samples recovered from the soil borings to aid in the classification of soils and to evaluate pertinent engineering properties. The following tests were performed:

- Moisture Content of Soil, ASTM D2216;
- Density of Soil Specimens, ASTM D7263;
- Particle Size Analysis of Soils, ASTM D6913 and ASTM D7928;
- R-value, ASTM D2844.

Results of all laboratory tests are presented in Appendix B. For ease of referral to the soil profile, most of the laboratory results have also been included on the boring logs in Appendix A.

5. SUBSURFACE CONDITIONS

5.1. Regional Geology

The site is located within the coastal portion of the Peninsular Ranges Geomorphic Province (Province), a region characterized by northwest-trending structural blocks and intervening fault zones, and therefore an area that could be subject to increased seismic risk due to the presence of multiple earthquake fault zones. The Province extends approximately 920 miles from the Los Angeles Basin to the southern tip of Baja California and varies in width from approximately 30 to 100 miles. Bedrock units in the Peninsular Ranges Province include Jurassic (approximately 144 million to 206 million years old) metavolcanic and metasedimentary rocks, and Cretaceous (approximately 65 to 144 million years old) igneous rocks of the Southern California Batholith (a large igneous intrusive body). The project site is within the Coastal Plain region. The coastal portion of the Province in San Diego County typically includes a sequence of marine and non-marine sedimentary rock units including upper Cretaceous, Tertiary (approximately 2 to 65 million years old), and Quaternary (less than approximately two million years old) forming a dissected coastal plain.

Topographically, the Province is composed of generally parallel ranges of steep-sloping hills and mountains separated by alluvial valleys. More recent uplift and erosion has produced the characteristic canyon and mesa topography present today in western San Diego County, as well as the deposition of surficial materials including Quaternary alluvium, colluvium, and topsoil. Topography within the site area is characterized by relatively flat terrain sloping slightly down towards the north forming a narrow valley to the east of the beach cliffs, and surrounded by low hills located to the east and to the west of Highway 101.

5.2. Site Geology

The site is situated about 0.2 miles east of the Pacific Ocean shoreline and is located approximately in the northern half of the span between the Batiquitos Lagoon located immediately to the north of the site and the San Elijo Lagoon located about 2.8 miles to the south. Based on a review of the geologic map of the Oceanside 30' x 60' Quadrangle (Kennedy and Tan, 2007), the subject site is underlain by old Quaternary paralic deposits of middle to late Pleistocene age consisting of poorly sorted, moderately permeable, reddish brown, interfingered strandline, beach, estuarine and colluvial deposits composed of siltstone, sandstone and conglomerate.

Geologic units encountered during our reconnaissance and subsurface exploration of the project site included fill soils below the asphalt paved surfaces, which mantle the underlying native materials. Additional descriptions are provided on the boring logs in Appendix A. A geologic map of the region is presented on Figure 3. A generalized description of the encountered units is provided below.

5.2.1. Fill

At 15 of the 23 exploratory boring locations the surface was covered with asphalt pavement. At all the 10 surficial drilling locations the surface was also covered with asphalt pavement. The

asphalt pavement thickness measured at all the 25 locations where pavement was present varied between 3 and 12 inches. In 18 of the 25 locations, the asphalt was placed without an aggregate base. Below the pavement, fill materials were encountered in all soil borings extending to a depth ranging between 2.5 and 9.5 feet. As observed, the fill materials were generally very similar throughout the whole site and consisted mostly of moist, loose to dense reddish-brown silty sand.

5.2.2. Old Paralic Deposits

Underlying the fill materials, old paralic deposits of middle to late Pleistocene age were encountered. These deposits mainly consisted of yellow loose to very dense poorly-graded sands with SPT blowcounts ranging between 8 and over 50. At a few locations the native materials consisted of loose to dense silty sands with SPT blowcounts ranging between 7 and over 50.

At two locations B-17/P-17 and B-19a/P-19a located between Jupiter Street and Grandview Street, bedrock was encountered at a depth ranging between 11.5 and 12.5 feet. The bedrock consisted of gray Siltstone with SPT blowcounts exceeding 50 indicating for the most part very dense conditions.

5.3. Expansive Soils

The coarse-grained materials encountered during our exploration both within the fill materials and the underlying old Paralic deposits are considered non-plastic and not expected to be potentially expansive.

5.4. Collapsible Soils

Soil deposits most likely to collapse upon wetting are loose fills, altered wind-blown sands, hill wash of loose consistency and decomposed granite or other acid igneous rocks. The fill materials below a depth of 4 feet were found to be generally coarse-grained and medium dense thus, the potential for collapse is negligible except for fill soils encountered at B-8/P-8 and B-11/P-11 located north of El Portal Street and south of Europa Street, respectively, where the fill and native deposits were found to be loose to a depth of about 9 feet and could therefore be potentially susceptible to collapse.

5.5. USDA Surficial Soil Classification

According to the United States Department of Agriculture (USDA) website (<https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>) the surficial soils at the site (within the upper 5 feet) consist mainly of Marina loamy coarse sands with a saturated hydraulic conductivity K_{sat} ranging between 0.57 and 1.98 inches/hour belonging to Hydrologic Soil Group B. Soils in this group have moderately low runoff potential when thoroughly wet. Water transmission through the soil is generally unimpeded.

5.6. Groundwater

Groundwater was not encountered during the geotechnical exploration and it is not expected to be a design issue for this project. According to the City of Encinitas BMP Design Manual Appendix C, Figure C-3 (2016), the historic shallowest groundwater near the site has been mapped corresponding to a depth greater than 15 feet (Figure 4 – Historic High Groundwater Map). In order to maintain the 10-foot clearance between the invert of the infiltration facility and the groundwater depth required by City of Encinitas (2016), it is recommended that infiltration facilities be considered with invert depths less than 5 feet, unless more detailed information regarding groundwater depths in the project area becomes available.

Based on the research and observed conditions, groundwater is not expected to impact the design or the construction of the proposed surficial facilities. Fluctuations of the groundwater level, localized zones of perched water, and increased soil moisture content should be anticipated during and following the rainy season. Irrigation of landscaped areas on or adjacent to the site can also cause a fluctuation of local groundwater levels. Evaluation of such factors is beyond the scope of our services.

6. ENGINEERING SEISMOLOGY AND GEOLOGIC HAZARDS

6.1. General Seismic Setting

The Southern California region is known to be seismically active. Earthquakes occurring within approximately 60 miles of the site are generally capable of generating ground shaking of engineering significance to the proposed construction. The project area is located in the general proximity of several active and potentially active faults, as shown on Figure 5 – Regional Faults and Seismicity Map. Active faults are defined as those that have experienced surface displacement within the Holocene period (approximately the last 11,000 years).

Table 3 lists selected principal known active faults that may affect the subject site and the maximum moment magnitude (M_{max}) as published by Cao et al. (2003) for the California Geological Survey (CGS). The approximate distance was calculated from Jennings (2010). Table 3 also indicates the direction relative to the site.

Superimposed on the area map in Figure 5 are earthquake epicenters recorded by the USGS between 1900 to present day. A large amount of seismic activity and associated events with their epicenters have been recorded surrounding the project site. Notable historic earthquakes in Southern California of significance to the project are listed in Table 4.

Table 3
Main Active Faults

Fault Name	Approximate Fault Distance to Site (miles)	Direction Relative to the Site	Maximum Moment Magnitude (M_{max})
Rose Canyon fault zone (Oceanside section)	3.0	W	6.8
Newport-Inglewood-Rose Canyon fault zone (San Diego section)	13.7	S	6.8
Coronado Bank fault zone (Coronado Bank section)	18.2	SW	7.4
Newport-Inglewood-Rose Canyon fault zone (Silver Strand section)	23.1	SE	6.8
Coronado Bank fault zone (Palos-Verdes section)	24.8	NW	7.2
Elsinore (Temecula section)	26.6	NE	7.7
San Diego Trough fault zone	29	W	7.3
Elsinore (Julian section)	31.6	E	7.7
Elsinore (Glen Ivy section)	32.8	NE	7.7
San Jacinto (Anza)	50.9	NE	7.7
San Clemente fault	58.6	SW	7.5

Note: Maximum moment magnitude is based on Caltrans Fault Database (2012) and Cao et al. (2003)

Table 4
Historic Earthquakes in Southern California

Earthquake Name	Year	Fault and Fault Type	Earthquake Magnitude*	Epicenter	
				Latitude	Longitude
Chino Hills	2008	Whittier Fault (Yorba Linda Trend) (left- lateral thrust)	5.5 M _w	33.95°N	117.76°W
Northridge	1994	Northridge Thrust (Blind Thrust) (a.k.a. Pico Thrust)	6.7 M _w	34.21°N	118.54°W
Sierra Madre	1991	Clamshell-Sawpit Canyon Fault (Reverse)	5.8 M _L	34.20°N	118.14°W
Whittier Narrows	1987	Puente Hills Fault (Blind Thrust Fault)	5.9 M _L	34.06°N	118.08°W
Superstition Hills Earthquake	1987	Elmore Ranch / Lone Tree / Kane Spring Faults (left-lateral strike-slip)	6.6 M _w	33.04°N	115.90°W
White Wash Earthquake	1980	Anza Seismic Gap (right-lateral strike-slip)	5.5 M _L	33.59°N	116.54°W
Imperial Valley Earthquake	1979	Imperial / Brawley / Rico Faults (right-lateral strike-slip)	6.4 M _w	32.79°N	115.67°W
San Fernando	1971	San Fernando Fault (thrust)	6.5-6.7 M _w	34.42°N	118.37°W
Borrego Mountain Earthquake	1968	Coyote Creek Fault (right-lateral strike-slip)	6.5 M _w	33.18°N	116.10°W
San Jacinto Fault Earthquake	1954	San Jacinto / Clark Faults (right-lateral strike-slip)	6.4 M _w	33.22°N	116.08°W
Torrance-Gardena	1941	Palos Verdes Fault (right-reverse)	4.8 M _L	33.82°N 33.78°N	118.22°W 118.25°W
Imperial Valley Earthquake	1940	Imperial Fault (right-lateral strike-slip)	6.9 M _w	32.73°N	115.50°W
San Jacinto Fault (Terwilliger Valley) Earthquake	1937	San Jacinto Fault (right-lateral strike-slip)	6.0 M _w	33.29°N	116.28°W
Long Beach	1933	Newport-Inglewood Fault (right- lateral strike-slip)	6.4 M _w	33.63°N	118.00°W
San Jacinto	1923	San Jacinto Fault (right- lateral strike-slip)	6.3 M _L	34.00°N	117.24°W
San Jacinto Earthquake	1918	San Jacinto Fault (right- lateral strike-slip)	6.8 M _w	33.75°N	116.88°W
Elsinore	1910	Elsinore Fault (right- lateral strike-slip)	6.0 M _L	33.75°N	117.45°W
*M _w refers to Moment Magnitude scale M _L refers to Local Magnitude scale					

6.2. Surface Fault Rupture

Official Maps of Earthquake Fault Zones were reviewed to evaluate the location of the project site relative to active fault zones. Earthquake Fault Zones (known as Special Studies Zones prior to 1994) have been established in accordance with the Alquist-Priolo Special Studies Zones Act enacted in 1972. The Act directs the State Geologist to delineate the regulatory zones that encompass surface traces of active faults that have a potential for future surface fault rupture. The purpose of the Alquist-Priolo Act is to regulate development near active faults in order to mitigate the hazard of surface fault rupture.

The site is not located within a designated Earthquake Fault Zone for fault surface rupture hazard. Based on a review of State of California Earthquake Fault Zone maps, the closest zoned fault for surface rupture is the Newport-Inglewood-Rose Canyon Fault Zone, San Diego Section, located approximately 13.7 miles south of the site and is mapped within the La Jolla Quadrangle (CGS, 1991).

No surface traces of any active or potentially active faults are known to pass directly through the site or project towards it. Neither our field exploration nor literature review disclosed an active fault trace projecting to the ground surface in the project area. Therefore, the potential for surface rupture due to faulting occurring beneath the site during the design life of the proposed development is considered low.

6.3. Seismic Hazard Zones

Maps of seismic hazard zones are issued by the California Geological Survey (CGS, formerly California Department of Conservation, Division of Mines and Geology (CDMG)) in accordance with the Seismic Hazards Mapping Act enacted in April 1997. The intent of the Seismic Hazards Mapping Act is to provide for a statewide seismic hazard mapping and technical advisory program to assist cities and counties in developing compliance requirements to protect the public health and safety from the effects of strong ground shaking, liquefaction, landslides, or other ground failure and other seismic hazards caused by earthquakes.

There are no Official Maps of Seismic Hazard Zones issued for the Encinitas Quadrangle. However, the City of Encinitas BMP Design Manual (2017) (see Figure 6), maps the proposed site as not located within an area identified as subject to the hazard of liquefaction.

6.4. Earthquake-Induced Landslides

No evidence of landsliding was observed on or in the immediate vicinity of the site and no maps for earthquake-induced landslides have been generated for the Encinitas Quadrangle. Therefore an occurrence of an earthquake-induced landslide is not considered to be a hazard to the site.

6.5. Tsunami Risk

Based on the review of the Encinitas Quadrangle Tsunami Inundation Map issued June 1, 2009 by the California Geological Survey, the site is not located within an area that is mapped as tsunami

inundation area. The nearest mapped tsunami inundation area is about 0.15 miles to the west of the site along the Pacific shoreline below the cliffs and 0.15 miles to the north of the site in the Batiquitos Lagoon area which is a depressed area about 50 feet lower than the elevation on the northern end of the project. Therefore, a tsunami is not considered to be a potential seismic hazard to the site. Due to the lack of known occurrences of tsunamis in the historical records, the map does not include information about the probability of any tsunami affecting the site within a specific period of time.

6.6. Subsidence

Land subsidence is the lowering of the ground surface due to extraction or lowering of water levels or other fluids within the subsurface soil pores, or due to seismic activity. The fluid withdrawal causes the alluvial sediments in the basin to compact. Damage caused by subsidence can be visible cracks, fissures, or surface depression.

The site is not located in an area mapped by the USGS (https://ca.water.usgs.gov/land_subsidence/california-subsidence-areas.html) where either historical or current subsidence has been recorded. Therefore, subsidence is not considered a hazard for this site.

7. DESIGN CONSIDERATIONS

Based on the results of the field exploration and engineering analyses for the proposed Highway 101 Project, it is Tetra Tech's opinion that the proposed project is feasible from a geotechnical standpoint, provided that the recommendations contained in this report are incorporated into the design plans and implemented during construction.

The main design issues to be considered in this report according to our scope of work included:

- Infiltration feasibility
- Evaluation of existing asphalt concrete sections and proposed new asphalt pavement section thicknesses
- Recommendations for new sidewalks and driveways

7.1. Infiltration Feasibility

Stormwater infiltration is a viable option throughout most of the site since the adjusted design infiltration rates at the majority of the locations where borehole percolation tests were performed meet the minimum required infiltration rate of 0.5 inches/hour stipulated in the City of Encinitas BMP Design Manual (2016). The exceptions include:

- The area near the southern end of the project close to A Street (both P-1 and P-2 significantly failed the minimum infiltration criterion).
- The area south of El Portal Street (P-6 failed the minimum infiltration criterion) and the area just north of El Portal Street (P-7 failed marginally the minimum infiltration criterion).
- The area south of Europa Street (P-11 failed the minimum infiltration criterion).
- The area southbound south of La Costa Avenue indicated low infiltration rates but as previously commented the low design infiltration rate for P-22 was apparently affected by the presence of low permeability cementitious materials i.e., concrete or soil cement, encountered at the bottom of the borehole at this location.

It is noted that the infiltration rates were controlled at all the percolation sites by the infiltration capacity of the fill materials which generally consisted of silty sands. Native materials found below the fill materials were in general observed to be coarser than the fill materials and are expected to have a greater capacity for infiltration than the fill materials. Therefore, it is likely that increasing the depth of the invert of the proposed facilities to a depth between 6 and 8 feet would likely provide higher infiltration rates at those locations where the rates did not meet the minimum specified infiltration criterion. If this option is considered viable, the infiltration rates would need to be verified by additional percolation testing at those depths and possibly drilling of deeper exploratory soil borings to verify the 10-foot-vertical clearance required between the invert of the facility and the groundwater.

7.2. Pavement Sections

This section presents the proposed new asphalt pavement section thicknesses required according to the Caltrans design method as well as an evaluation of the existing pavement thicknesses based on the current soil exploration program.

7.2.1. Subgrade Preparation for Total Replacement or New Pavements

The soils below pavements should be overexcavated and recompacted to a depth of at least 1 foot below the proposed subgrade elevation, or to uniform acceptable soils, whichever is deeper. To the extent practicable, the zone of overexcavation should extend a horizontal distance of at least 2 feet beyond the outside perimeter of the pavement. The upper 1 foot of soils below the pavements should be processed and compacted to at least 95 percent of the maximum dry density (per ASTM D1557) and wet of optimum. If the base course layer is not placed immediately on the subgrade and the subgrade surface experiences desiccation, the subgrade should then be scarified to at least 6 inches, moisture-conditioned wet of optimum, and re-compacted just prior to placement of the base course layer to 95 percent of the maximum dry density per ASTM D1557.

7.2.2. Asphalt Concrete Pavement Design

The design recommendations for flexible pavement for Highway 101 are based on a Traffic Index of 9 for a design period of 20 years. For parking lots, a Traffic Index of 5 for light traffic and a Traffic Index of 6 for commercial trucks have been assumed. The design of the flexible pavement has been performed per Caltrans Highway Design Manual (6th Edition, 2018). Laboratory testing for R-value on two representative samples of the surficial materials along the site indicated that an R-value of about 65 could be used for design. Although the surficial materials are in general very uniform throughout the whole 2.5-mile long highway stretch, to account for possible variations in subgrade materials and R-value of 45 for the pavement subgrade materials was selected for design. A standard R-value of 78 was used in the design for the Aggregate Base (AB) course. The recommended pavement sections are presented in Table 5.

Table 5 also presents an alternate recommended pavement section for the highway for the case where a triaxial geogrid (Tensar TX-7 or equivalent) is placed between the Aggregate Base layer and the subgrade. Although the presence of a triaxial geogrid may provide an alternate highway pavement section that could be potentially be more appealing in terms of costs, the feasibility of maintaining the integrity of the geogrid and the proper restoration procedures must be considered in the selection process if future works in the paved areas required for repairs or utility relocation involve any type of excavations below the geogrid level.

Table 5
Flexible Pavement Section
Assumed Design R-value of 45 and Design Period of 20 years

Design Traffic Index	Location	Geogrid on top of subgrade	Composite Pavement Section		Full Asphalt Section (inches)
			Asphalt Concrete (inches)	AB (inches)	
9	Highway 101 and bike lanes connected to the highway	no	5.5	8	9.5
		Yes TX-7	4	6.5	n/a
5 or less	Parking Lots/drive aisles with light traffic	no	3	4.5	5
6	Parking Lots/drive aisles used by commercial trucks	no	3.5	4.5	6.5

Asphalt concrete and AB should conform to the Specifications for Public Works Construction (Green Book) Sections 203-6 and 200-2, respectively. The AB course should be compacted to 95 percent or more of the maximum dry density and wet of optimum as evaluated by the latest version of ASTM D1557.

7.2.3. Existing Asphalt Pavement Sections

At 15 of the 23 exploratory boring locations the surface was covered with asphalt pavement. Furthermore, 10 additional surficial drilling locations provided information regarding thicknesses of the asphalt pavement. It was observed that in general the pavement section thicknesses were highly variable throughout the whole site. The asphalt concrete thickness measured at all the 25 locations where pavement was present varied between 3 and 12 inches. In 18 of the 25 locations, the asphalt concrete was placed without an aggregate base layer. The aggregate base layer thickness at the 7 locations where it was encountered varied between 4.5 and 10 inches. The non-uniformity of the pavement sections makes it difficult to present an assessment of the suitability of the existing pavement in terms of the structural section improvements required for specific highway stretches. It is understood that the design intent is to keep the same pavement section for both the traveled lanes and the adjacent bike lanes. It can be observed that most highway stretches have an adequate pavement section per the Caltrans design methodology, but others are somewhat deficient.

7.2.4. Pavement Construction Observations

The preparation of the pavement subgrade and the placement of base course and pavement sections should be observed by Tetra Tech personnel. Careful observation is recommended to evaluate that the pavement subgrade is consistent with the design assumptions and that it is uniform and uniformly compacted and that the recommended pavement and base course thickness are achieved. Paved areas should be properly sloped, and surface drainage facilities should be established to reduce water infiltration into the pavement subgrade. Curbing located adjacent to paved areas

should be founded in the soil subgrade in order to provide a cutoff to reduce water infiltration into the base course.

7.3. Portland Cement Concrete Sidewalks and Driveways

Flatwork areas including sidewalks and driveways should be overexcavated and recompact to a depth of at least 1 foot below the proposed subgrade elevation, or to uniform acceptable soils, whichever is deeper. To the extent practicable, the zone of overexcavation should extend a horizontal distance of at least 2 feet beyond the outside perimeter of the pavement. The upper 1 foot of soils below driveways and walkways should be processed and compacted to at least 95 percent of the maximum dry density (per ASTM D1557). The subgrade should be moist but should not be wetted or saturated prior to the placement of concrete.

Portland Cement Concrete (PCC) sidewalks and driveways in commercial zones should be designed according to County of San Diego Standards. PCC sidewalks should be designed with a minimum thickness of 4 inches. For maintenance walkways adjacent to the curb a minimum thickness of 6 inches is recommended. PCC driveways should have a minimum thickness of 7.5 inches.

8. LIMITATIONS

This report presents a geotechnical assessment of viability for the proposed Highways 101 Streetscape project in Encinitas. Additional field investigation, infiltration testing, laboratory testing, and engineering analyses may be required once the final configuration, location, and extent of the project are determined including the precise type of facilities that will be built, depths of the inverts, etc.

The recommendations and opinions expressed in this report are based on Tetra Tech's review of background documents and on information obtained from the current geotechnical investigation and infiltration testing. It should be noted that this study did not evaluate the possible presence of hazardous materials on any portion of the site.

Due to the limited nature of the field explorations and the large area encompassed by the project, conditions not observed and described in this report may be present on the site. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration and infiltration testing at different depths and locations. Additional subsurface evaluation and infiltration testing, as well as additional laboratory testing can be performed upon request. It should be understood that conditions different from those anticipated in this report may be encountered during grading operations, for example, the extent of unsuitable soil, actual thickness of existing pavement and aggregate base layers, the depth of fill to be removed, and the associated additional effort required to mitigate them.

Site conditions, including groundwater level, can change with time as a result of natural processes or the activities of man at the subject site or at nearby sites. Changes to the applicable laws, regulations, codes, and standards of practice may occur as a result of government action or the broadening of knowledge. The findings of this document may, therefore, be invalidated over time, in part or in whole, by changes over which Tetra Tech has no control. Therefore, this report should be reviewed and recertified if it were to be used for a project design commencing more than 1 year after the date of issuance of this report.

Tetra Tech's recommendations for this site are dependent upon verification of the actual encountered field conditions, appropriate quality control of grading operations including overexcavation, processing, and recompaction of the on-site material, subgrade preparation, and foundation construction. Accordingly, the recommendations are made contingent upon the opportunity for Tetra Tech to observe all aspects of subgrade preparation and fill placement for the proposed development. If parties other than Tetra Tech are engaged to provide such services, such parties are assuming complete responsibility as the Geotechnical Engineer of Record for the geotechnical phase of the project and implicitly concur with the recommendations provided in this report or need to provide alternative superseding recommendations.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Tetra Tech should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document. Reliance by others on the data presented herein or for purposes other than those stated in the text is authorized only if so permitted

in writing by Tetra Tech. It should be understood that such an authorization may incur additional expenses and charges.

Tetra Tech has endeavored to perform its evaluation using the degree of care and skill ordinarily exercised under similar circumstances by reputable geotechnical professionals with experience in this area in similar soil conditions. No other warranty, either expressed or implied, is made as to the conclusions and recommendations contained in this report.

9. SELECTED REFERENCES

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Figures

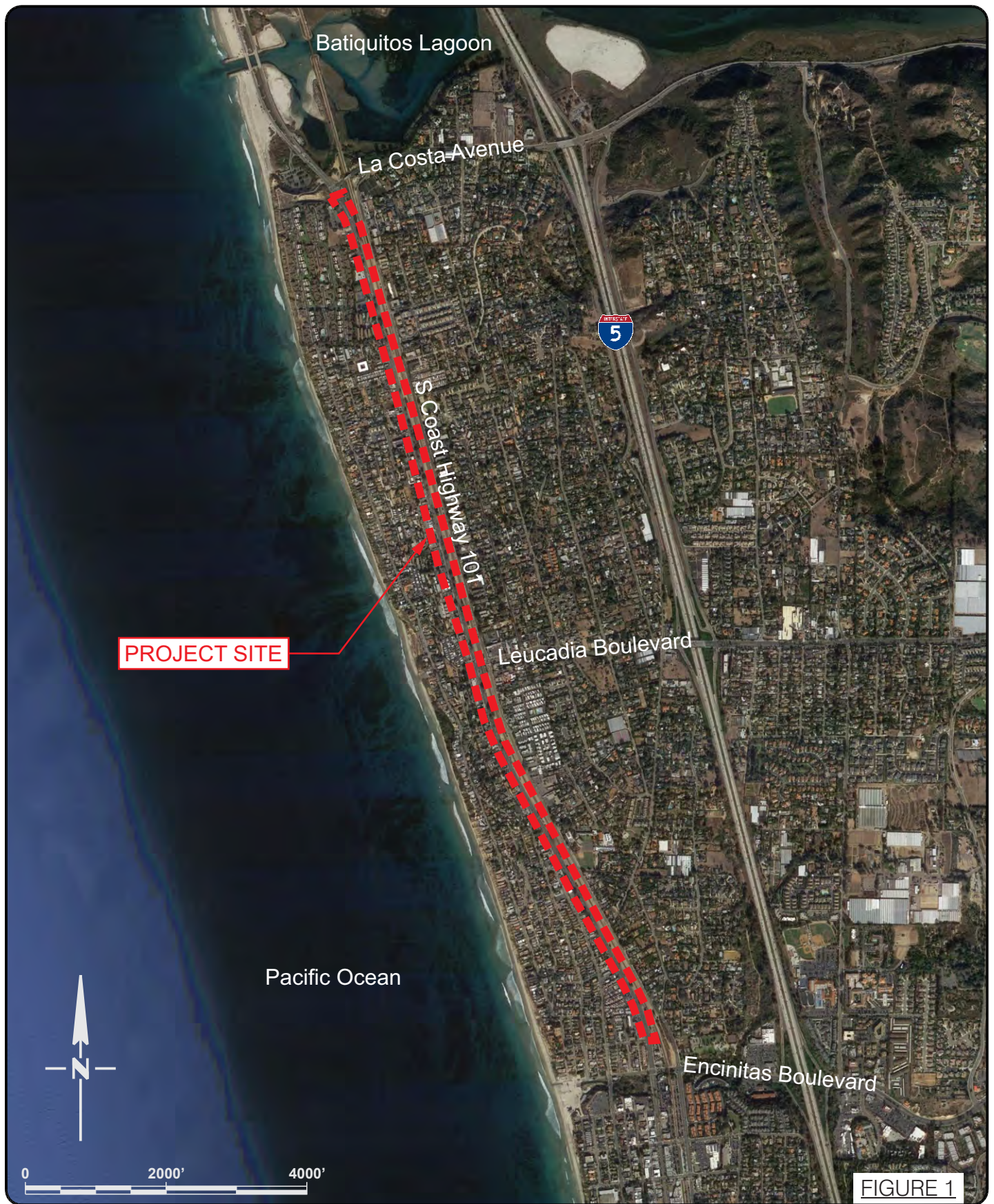


FIGURE 1



TETRA TECH

21700 Copley Drive #200, Diamond Bar, CA 91765
TEL 909.860.7777 FAX 909.860.8017

HIGHWAY 101 STREETSCAPE – ENCINITAS, CA

SITE LOCATION MAP

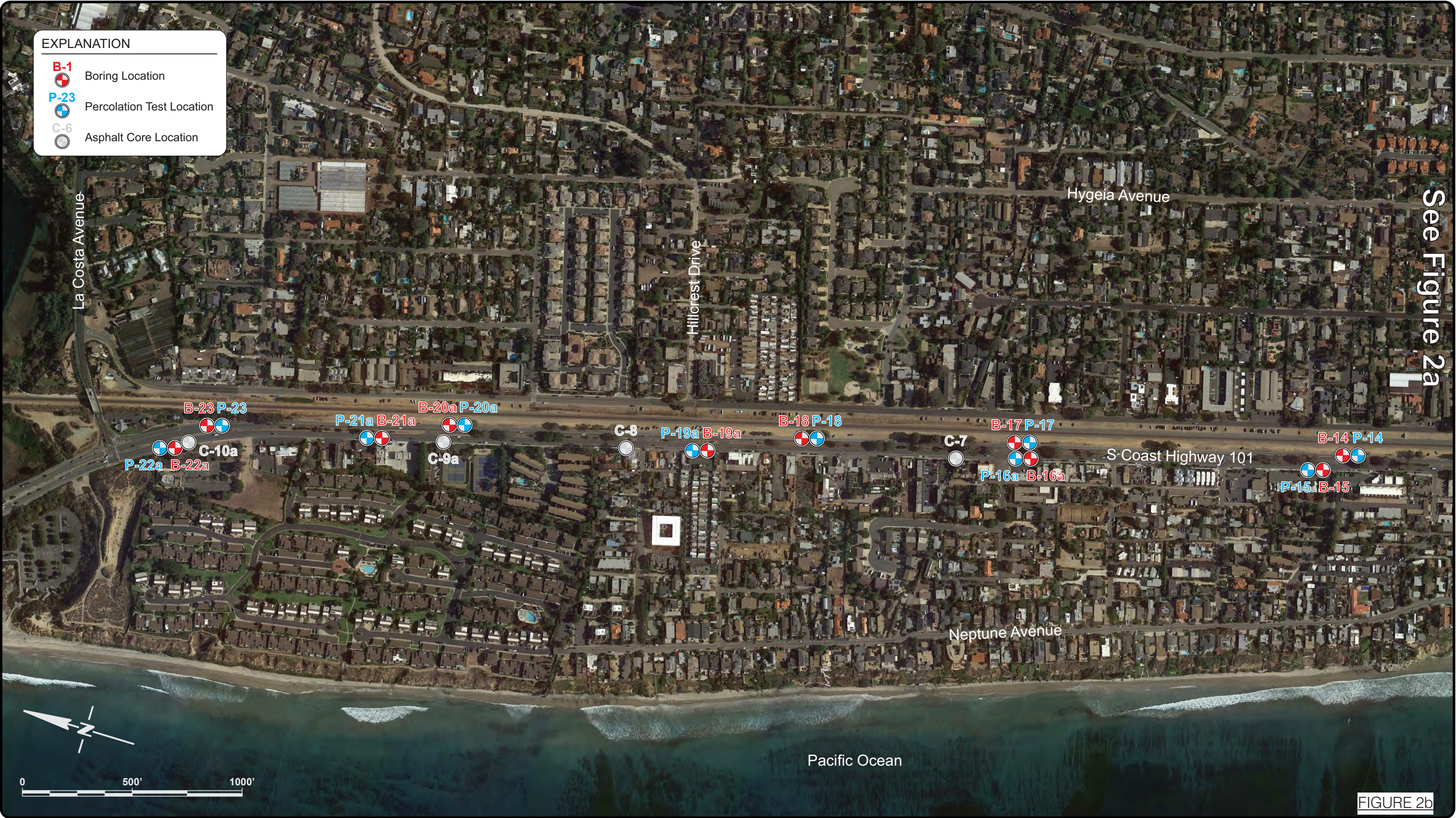
JOB NO.
TET 18-162E

DATE
MAY 2019

DRAWN BY
SCM

CHECKED BY
FC





PORTION OF THE GEOLOGIC MAP OF THE
OCEANSIDE 30' x 60' QUADRANGLE, CALIFORNIA
Compiled by Michael P. Kennedy and Siang S. Tan 2007

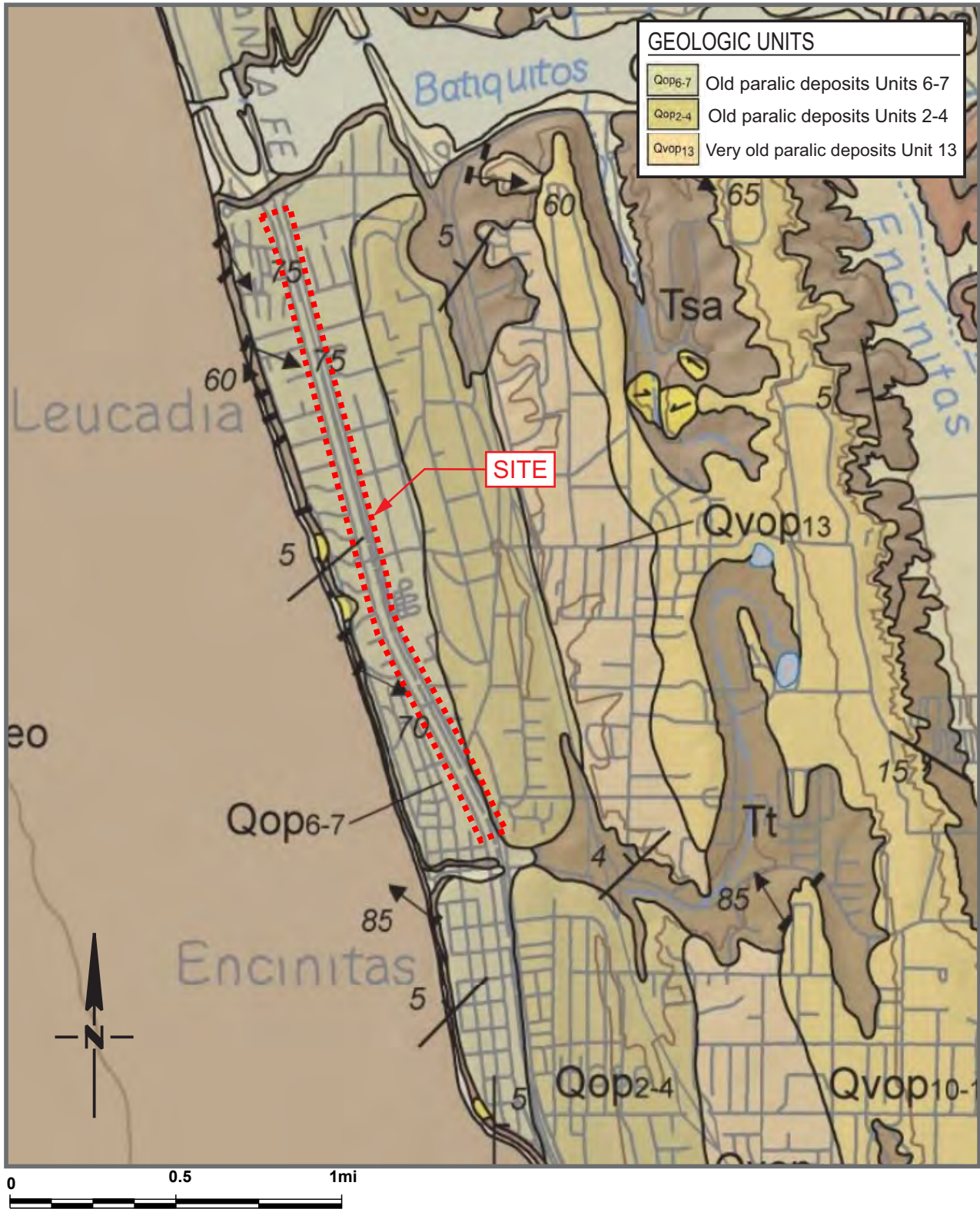


FIGURE 3



TETRA TECH

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HIGHWAY 101 STREETSCAPE - ENCINITAS, CA

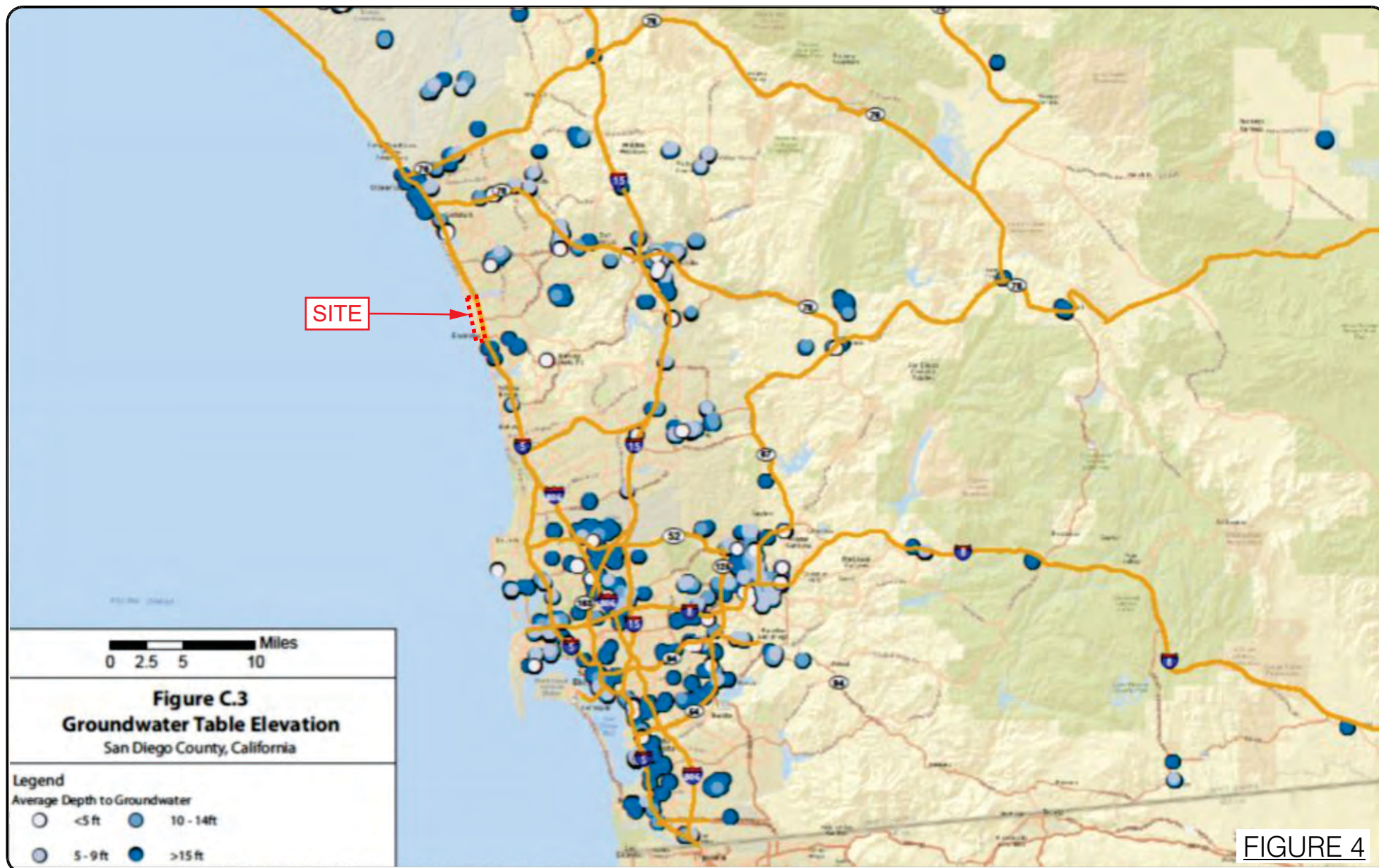
GEOLOGIC MAP

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TET 18-162E

DATE
JUNE 2019

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FC



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HIGHWAY 101 STREETSCAPE - ENCINITAS, CA

HISTORIC HIGH GROUNDWATER MAP

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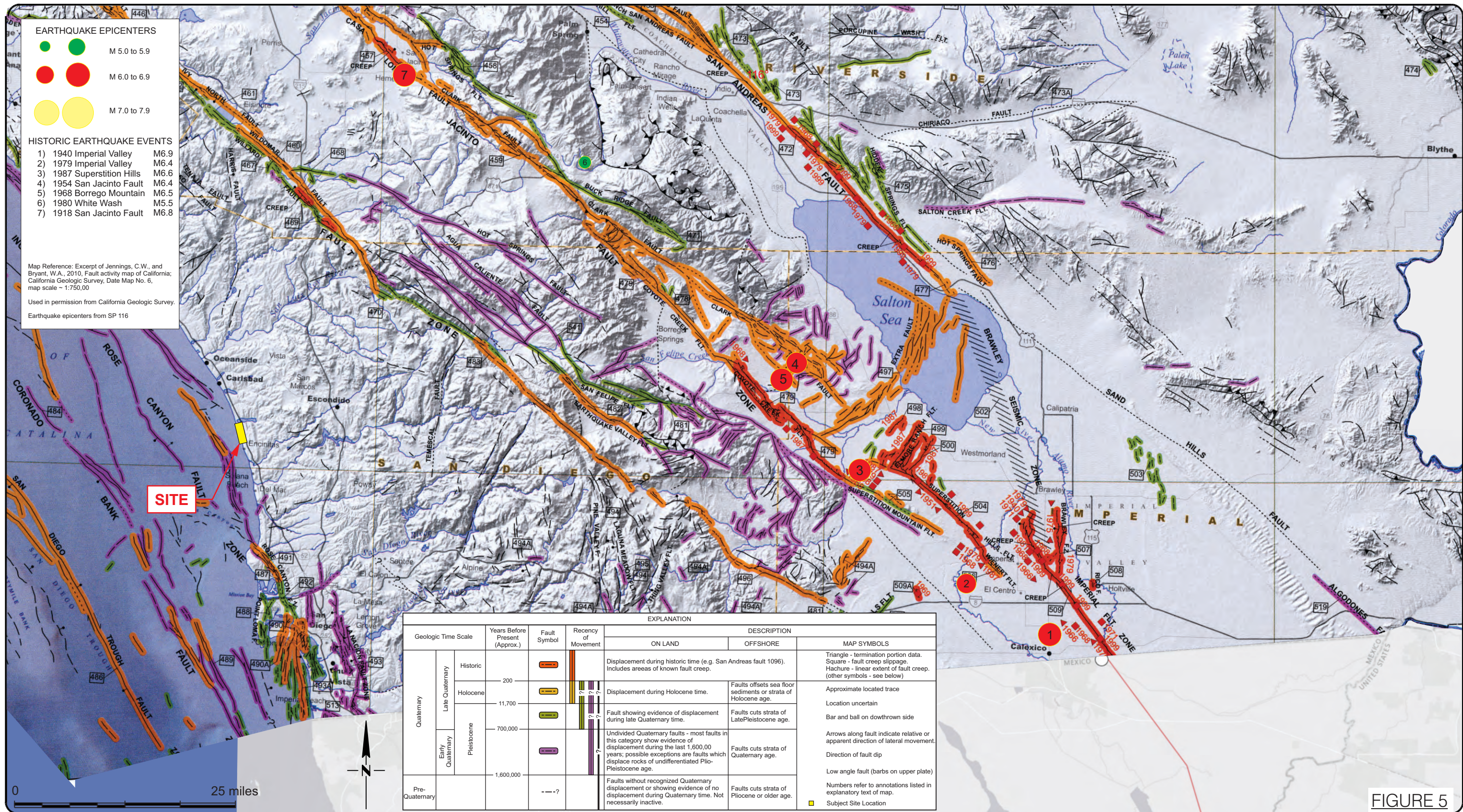
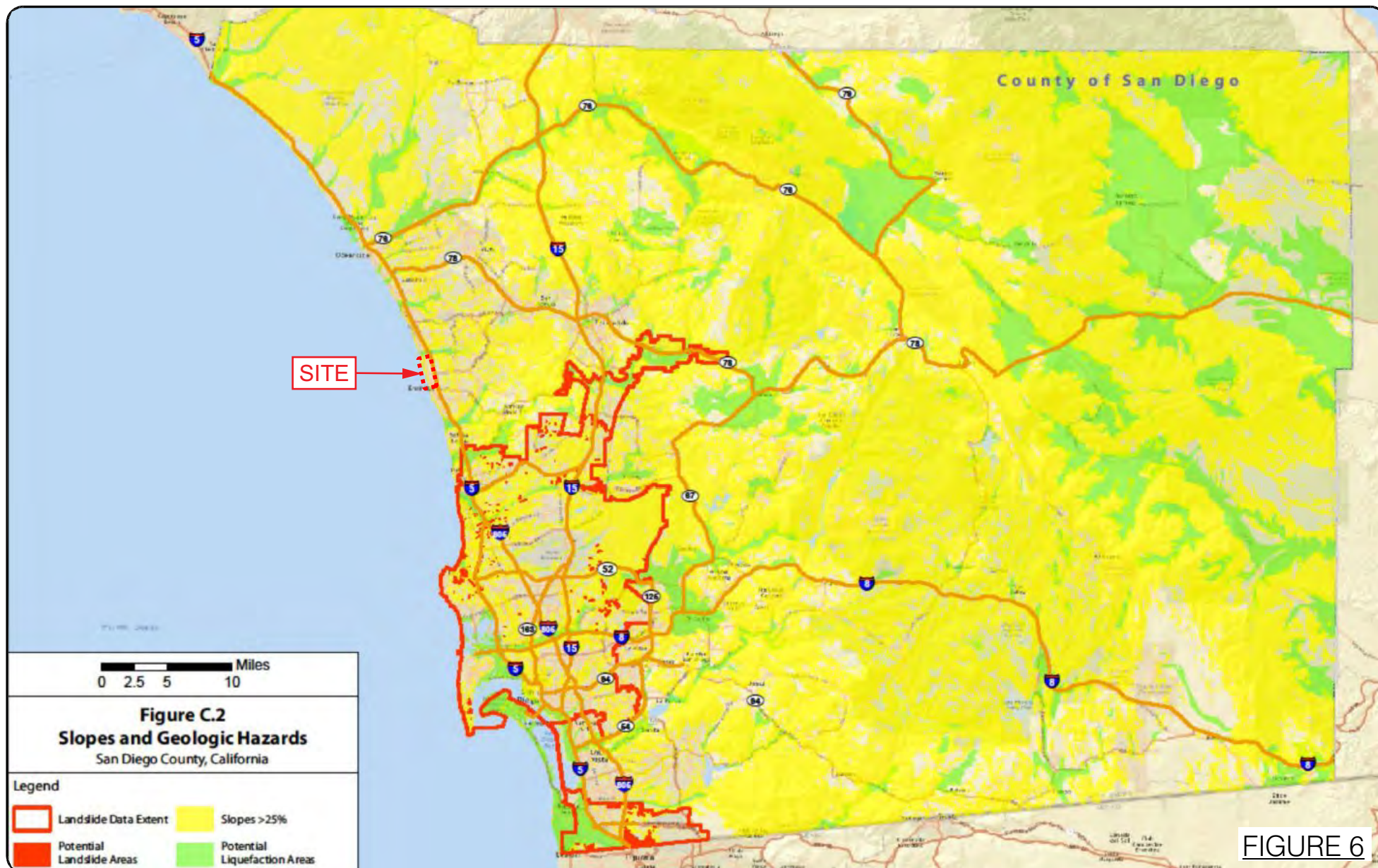


FIGURE 5



TETRA TECH

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HIGHWAY 101 STREETSCAPE - ENCINITAS, CA

SEISMIC HAZARD ZONES MAP

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Appendix A

Logs of Exploratory Borings

Project: **Highway 101 Streetscape**Project Location: **Encinitas, CA**Project Number: **TET 18-162E**

Log of Boring B-1/P-1

Sheet 1 of 1

Date(s) Drilled 5/13/2019	Logged By SCM	Checked By FC
Drilling Method Hollow-Stem Auger (HSA)	Drill Bit Size/Type 8" Hollow-Stem Auger	Total Depth of Borehole 15.8 ft
Drill Rig Type CME 75	Drilling Contractor 2R Drilling	Approximate Surface Elevation 75 ft
Groundwater Level and Date Measured Not Encountered	Sampling Method(s) SPT, Modified California, Grab Bag	Hammer Data CME Auto trip; 140 pounds with 30-inch drop
Borehole Backfill Soil cuttings with Aquaphalt cap	Location Latitude: 33.050726°, Longitude: -117.294722° (North of A Street, shoulder)	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/6"	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Well Log	REMARKS AND OTHER TESTS
75	0				Asphalt SM		4 inches asphalt [FILL] Silty SAND, medium dense, dark reddish brown (2.5YR 3/3), damp, fine grained, trace of clay @3.0'- reddish brown (2.5YR 5/4)				3 inch diameter PVC pipe perforated
		SPT-1		2 3 7							Gravel
		R-2		15 18 23				128.9	9.2		G=0%, S=68%, F=32%, 2μ=11%
	5	GB-3									
					SP		[NATIVE] Poorly-graded SAND, medium dense, yellow (10YR 7/6), damp, fine grained				
		SPT-4		3 6 7							
	10	R-5		11 17 25							
											
	15	SPT-6		33 50-4"			@15.0'- very dense				
							- Total Depth- 15.8' - No groundwater encountered - Backfilled with tamped soil cuttings and Aquaphalt cap				
55	20										

Project: **Highway 101 Streetscape**Project Location: **Encinitas, CA**Project Number: **TET 18-162E**

Log of Boring B-2/P-2

Sheet 1 of 1

Date(s) Drilled 5/13/2019	Logged By SCM	Checked By FC
Drilling Method Hollow-Stem Auger (HSA)	Drill Bit Size/Type 8" Hollow-Stem Auger	Total Depth of Borehole 11.5 ft
Drill Rig Type CME 75	Drilling Contractor 2R Drilling	Approximate Surface Elevation 73 ft
Groundwater Level and Date Measured Not Encountered	Sampling Method(s) SPT, Modified California, Grab Bag	Hammer Data CME Auto trip; 140 pounds with 30-inch drop
Borehole Backfill Soil cuttings with Aquaphalt cap	Location Latitude: 33.051041°, Longitude: -117.294623° (North of A Street, off of road)	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/6"	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Well Log	REMARKS AND OTHER TESTS
73	0				SM		[FILL] Silty SAND, medium dense, reddish brown (2.5YR 5/4), damp, fine grained, trace of clay				
			SPT-1	13 9 9							
			R-2	13 14 14							
68	5		GB-3								
					SP		[NATIVE] Poorly-graded SAND, medium dense, mottled reddish brown (2.5YR 5/4) to light yellowish brown (10YR 6/4), damp, fine grained				
			SPT-4	6 7 8							
63	10		R-5	11 17 22			@10'- yellow (10YR 7/6), fine to medium grained				
							- Total Depth- 11.5' - No groundwater encountered - Backfilled with tamped soil cuttings and Aquaphalt cap				
58	15										
53	20										

Project: **Highway 101 Streetscape**Project Location: **Encinitas, CA**Project Number: **TET 18-162E**

Log of Boring B-3a/P-3a

Sheet 1 of 1

Date(s) Drilled 5/13/2019	Logged By SCM	Checked By FC
Drilling Method Hollow-Stem Auger (HSA)	Drill Bit Size/Type 8" Hollow-Stem Auger	Total Depth of Borehole 11.5 ft
Drill Rig Type CME 75	Drilling Contractor 2R Drilling	Approximate Surface Elevation 77 ft
Groundwater Level and Date Measured Not Encountered	Sampling Method(s) SPT, Modified California, Grab Bag	Hammer Data CME Auto trip; 140 pounds with 30-inch drop
Borehole Backfill Soil cuttings with Aquaphalt cap	Location Latitude: 33.053861°, Longitude: -117.296562° (South of Marcheta Street, slow lane)	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/6"	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Well Log	REMARKS AND OTHER TESTS
77	0				Asphalt		6 inches asphalt				
					GP-GM		9 inches Aggregate Base, dark brown (7.5YR 3/4), damp				3 inch diameter PVC pipe perforated
					SM		[FILL] Silty SAND, loose, reddish brown (2.5YR 5/4), damp, fine grained, trace of clay				Gravel
			SPT-1	5 4 4							
			R-2	15 22 44			@3.5'- dense, yellow (10YR 7/6)	122.8	5.3		G=0%, S=78%, F=22%, 2μ=6
72	5		GB-3								
					SP		[NATIVE] Poorly-graded SAND, medium dense, mottled yellow (10YR 7/6) to light yellowish brown (10YR 6/4), damp, fine grained				
			SPT-4	8 12 13							
67	10		R-5	24 33 44			@10.0'- very dense				
							- Total Depth- 11.5' - No groundwater encountered - Backfilled with tamped soil cuttings and Aquaphalt cap				
62	15										
57	20										

Project: **Highway 101 Streetscape**Project Location: **Encinitas, CA**Project Number: **TET 18-162E**

Log of Boring B-5/P-5

Sheet 1 of 1

Date(s) Drilled 5/13/2019	Logged By SCM	Checked By FC
Drilling Method Hollow-Stem Auger (HSA)	Drill Bit Size/Type 8" Hollow-Stem Auger	Total Depth of Borehole 11.5 ft
Drill Rig Type CME 75	Drilling Contractor 2R Drilling	Approximate Surface Elevation 69 ft
Groundwater Level and Date Measured Not Encountered	Sampling Method(s) SPT, Modified California, Grab Bag	Hammer Data CME Auto trip; 140 pounds with 30-inch drop
Borehole Backfill Soil cuttings with Aquaphalt cap	Location Latitude: 33.055908°, Longitude: -117.297873° (South of El Portal Street, slow lane)	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/6"	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Well Log	REMARKS AND OTHER TESTS
69	0				Asphalt		6.5 inches asphalt				3 inch diameter PVC pipe perforated
					GP-GM		7 inches Aggregate Base, dark brown (7.5YR 3/4), damp				
					SM		[NATIVE]? Silty SAND, loose, yellowish brown (10YR 5/6), damp, fine grained				Gravel
		SPT-1		2 3 3							
		R-2		11 20 50			@3.5'- dense	116.7	6		G=05%, S=73%, F=27%, 2μ=10%
64	5	GB-3									
							@7.5'- less silt				
		SPT-4		14 16 15							
59	10	R-5		28 40 47			@10.0'- very dense				
							- Total Depth- 11.5' - No groundwater encountered - Backfilled with tamped cuttings and Aquaphalt cap				
54	15										
49	20										

Project: Highway 101 Streetscape Project Location: Encinitas, CA Project Number: TET 18-162E	Log of Boring B-4/P-4 Sheet 1 of 1
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Date(s) Drilled	5/13/2019	Logged By	SCM	Checked By	FC
Drilling Method	Hollow-Stem Auger (HSA)	Drill Bit Size/Type	8" Hollow-Stem Auger	Total Depth of Borehole	11.5 ft
Drill Rig Type	CME 75	Drilling Contractor	2R Drilling	Approximate Surface Elevation	77 ft
Groundwater Level and Date Measured	Not Encountered	Sampling Method(s)	SPT, Modified California, Grab Bag	Hammer Data	CME Auto trip; 140 pounds with 30-inch drop
Borehole Backfill	Soil cuttings with Aquaphalt cap	Location	Latitude: 33.053315°, Longitude: -117.296020° (South of Marcheta Street, off of road)		

[illegible]

Project: **Highway 101 Streetscape**Project Location: **Encinitas, CA**Project Number: **TET 18-162E**

Log of Boring B-6/P-6

Sheet 1 of 1

Date(s) Drilled 5/13/2019	Logged By SCM	Checked By FC
Drilling Method Hollow-Stem Auger (HSA)	Drill Bit Size/Type 8" Hollow-Stem Auger	Total Depth of Borehole 16.5 ft
Drill Rig Type CME 75	Drilling Contractor 2R Drilling	Approximate Surface Elevation 66 ft
Groundwater Level and Date Measured Not Encountered	Sampling Method(s) SPT, Modified California, Grab Bag	Hammer Data CME Auto trip; 140 pounds with 30-inch drop
Borehole Backfill Soil cuttings with Aquaphalt cap	Location Latitude: 33.056190°, Longitude: -117.297867° (South of El Portal Street, off of road)	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/6"	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Well Log	REMARKS AND OTHER TESTS
66	0				SM		[FILL] Silty SAND, medium dense, reddish brown (2.5YR 5/4), damp, fine grained				
			SPT-1	3 5 6							
			R-2	10 17 28							
			GB-3								
61	5										
			SPT-4	4 6 8	SP		[NATIVE] Poorly-graded SAND, medium dense, light yellowish brown (10YR 6/4), damp, fine grained				
			R-5	16 19 28			@10.0'- dense, mottled yellow (10YR 7/6) to light yellowish brown (10YR 6/4)				
56	10										
			SPT-6	27 40 44			@15.0'- very dense				
51	15										
							- Total Depth- 16.5' - No groundwater encountered - Backfilled with tamped soil cuttings and Aquaphalt cap				
46	20										

Project: **Highway 101 Streetscape**Project Location: **Encinitas, CA**Project Number: **TET 18-162E**

Log of Boring B-7/P-7

Sheet 1 of 1

Date(s) Drilled 5/14/2019	Logged By SCM	Checked By FC
Drilling Method Hollow-Stem Auger (HSA)	Drill Bit Size/Type 8" Hollow-Stem Auger	Total Depth of Borehole 11.5 ft
Drill Rig Type CME 75	Drilling Contractor 2R Drilling	Approximate Surface Elevation 63 ft
Groundwater Level and Date Measured Not Encountered	Sampling Method(s) SPT, Modified California, Grab Bag	Hammer Data CME Auto trip; 140 pounds with 30-inch drop
Borehole Backfill Soil cuttings with Aquaphalt cap	Location Latitude: 33.057025°, Longitude: -117.298589° (North of El Portal Street, slow lane)	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/6"	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Well Log	REMARKS AND OTHER TESTS
63	0				Asphalt		8 inches asphalt				3 inch diameter PVC pipe perforated
					SM		[FILL] Silty SAND, loose, reddish brown (2.5YR 5/4), damp, fine to medium grained, trace of pea gravel				Gravel
			SPT-1	2 2 2							
			R-2	14 16 18			@3.5'- medium dense	129.7	7.6		G=0%, S=75%, F=25%, 2μ=06%
58	5		GB-3								
					SP		[NATIVE] Poorly-graded SAND, medium dense, light yellowish brown (10YR 6/4), damp, fine grained				
			SPT-4	6 7 8							
53	10		R-5	14 23 30			@10.0'- dense, mottled light yellowish brown (10YR 6/4) to reddish yellow (5YR 6/6)				
							- Total Depth- 11.5' - No groundwater encountered - Backfilled with tamped soil cuttings and Aquaphalt cap				
48	15										
43	20										

Project: **Highway 101 Streetscape**Project Location: **Encinitas, CA**Project Number: **TET 18-162E**

Log of Boring B-8/P-8

Sheet 1 of 1

Date(s) Drilled 5/14/2019	Logged By SCM	Checked By FC
Drilling Method Hollow-Stem Auger (HSA)	Drill Bit Size/Type 8" Hollow-Stem Auger	Total Depth of Borehole 11.5 ft
Drill Rig Type CME 75	Drilling Contractor 2R Drilling	Approximate Surface Elevation 64 ft
Groundwater Level and Date Measured Not Encountered	Sampling Method(s) SPT, Modified California, Grab Bag	Hammer Data CME Auto trip; 140 pounds with 30-inch drop
Borehole Backfill Soil cuttings with Aquaphalt cap	Location Latitude: 33.057441°, Longitude: -117.298674° (North of El Portal Street, shoulder)	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/6"	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Well Log	REMARKS AND OTHER TESTS
64	0				Asphalt SM		4 inches asphalt [FILL] Silty SAND, loose, reddish brown (2.5YR 5/4), damp, fine grained				3 inch diameter PVC pipe perforated
			SPT-1	3 3 5			@3.5'- medium dense				Gravel
59	5		R-2 GB-3	9 12 17							
			SPT-4	4 4 5	SP		[NATIVE] Poorly-graded SAND, loose, mottled light yellowish brown (10YR 6/4) to reddish yellow (5YR 6/6), damp, fine grained				
54	10		R-5	13 13 21			@10.0'- medium dense				
							- Total Depth- 11.5' - No groundwater encountered - Backfilled with tamped soil cuttings and Aquaphalt cap				
49	15										
44	20										

Project: **Highway 101 Streetscape**Project Location: **Encinitas, CA**Project Number: **TET 18-162E**

Log of Boring B-10/P-10

Sheet 1 of 1

Date(s) Drilled 5/14/2019	Logged By SCM	Checked By FC
Drilling Method Hollow-Stem Auger (HSA)	Drill Bit Size/Type 8" Hollow-Stem Auger	Total Depth of Borehole 11.5 ft
Drill Rig Type CME 75	Drilling Contractor 2R Drilling	Approximate Surface Elevation 64 ft
Groundwater Level and Date Measured Not Encountered	Sampling Method(s) SPT, Modified California, Grab Bag	Hammer Data CME Auto trip; 140 pounds with 30-inch drop
Borehole Backfill Soil cuttings with Aquaphalt cap	Location Latitude: 33.060801°, Longitude: -117.300765° (North of Cadmus Street, shoulder)	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/6"	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Well Log	REMARKS AND OTHER TESTS
64	0				Asphalt SM		4 inches asphalt [FILL] Silty SAND, medium dense, reddish brown (2.5YR 5/4), damp, fine grained, trace of clay				3 inch diameter PVC pipe perforated
			SPT-1	4 4 6			@3.5'- medium dense				Gravel
			R-2	11 13 13							
59	5		GB-3								
			SPT-4	11 13 12	SP		[NATIVE] Poorly-graded SAND, medium dense, mottled light yellowish brown (10YR 6/4) to reddish brown (2.5YR 5/4), damp, fine grained, micaceous				
54	10		R-5	12 13 20			@10.0'- mottled light yellowish brown (10YR 6/4) to light brownish gray (2.5Y 6/2)				
							- Total Depth- 11.5' - No groundwater encountered - Backfilled with tamped soil cuttings and Aquaphalt cap				
49	15										
44	20										

Project Number: **TET 18-162E**

Sheet 1 of 1

Date(s) Drilled	5/14/2019	Logged By	SCM	Checked By	FC
Drilling Method	Hollow-Stem Auger (HSA)	Drill Bit Size/Type	8" Hollow-Stem Auger	Total Depth of Borehole	16.5 ft
Drill Rig Type	CME 75	Drilling Contractor	2R Drilling	Approximate Surface Elevation	63 ft
Groundwater Level and Date Measured	Not Encountered	Sampling Method(s)	SPT, Modified California, Grab Bag	Hammer Data	CME Auto trip; 140 pounds with 30-inch drop
Borehole Backfill	Soil cuttings with Aquaphalt cap	Location	Latitude: 33.061024°, Longitude: -117.301069° (North of Cadmus Street, slow lane)		

[illegible]

Project Number: **TET 18-162E**

Sheet 1 of 1

Date(s) Drilled	5/16/2019	Logged By	SCM	Checked By	FC
Drilling Method	Hollow-Stem Auger (HSA)	Drill Bit Size/Type	8" Hollow-Stem Auger	Total Depth of Borehole	11.5 ft
Drill Rig Type	CME 75	Drilling Contractor	2R Drilling	Approximate Surface Elevation	56 ft
Groundwater Level and Date Measured	Not Encountered	Sampling Method(s)	SPT, Modified California, Grab Bag	Hammer Data	CME Auto trip; 140 pounds with 30-inch drop
Borehole Backfill	Soil cuttings with Aquaphalt cap	Location	Latitude: 33.066123°, Longitude: -117.302714° (North of Jasper Street, off of road)		

[illegible]

Project: **Highway 101 Streetscape**Project Location: **Encinitas, CA**Project Number: **TET 18-162E**

Log of Boring B-15/P-15

Sheet 1 of 1

Date(s) Drilled 5/17/2019	Logged By SCM	Checked By FC
Drilling Method Hollow-Stem Auger (HSA)	Drill Bit Size/Type 8" Hollow-Stem Auger	Total Depth of Borehole 4.0 ft
Drill Rig Type CME 75	Drilling Contractor 2R Drilling	Approximate Surface Elevation 53 ft
Groundwater Level and Date Measured Not Encountered	Sampling Method(s) SPT, Modified California, Grab Bag	Hammer Data CME Auto trip; 140 pounds with 30-inch drop
Borehole Backfill Soil cuttings with Aquaphalt cap	Location Latitude: 33.068286°, Longitude: -117.303672° (North of W Glaucus Street, parking lane)	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/6"	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Well Log	REMARKS AND OTHER TESTS
53	0				Asphalt		7 inches asphalt				3 inch diameter PVC pipe perforated
					GP-GM SM		4.5 inches Aggregate Base, dark brown (7.5YR 3/4), damp				Gravel
							[FILL] Silty SAND, medium dense, yellowish brown (10YR 5/6), damp, fine grained				
							@3.5'- medium dense				
							@ 3.9'- trace wood chips				
48	5						- Total Depth- 4.0' - No groundwater encountered - Backfilled with tamped soil cuttings and Aquaphalt cap				@4'- practical refusal, bouncing on concrete
43	10										
38	15										
33	20										

Project: **Highway 101 Streetscape**Project Location: **Encinitas, CA**Project Number: **TET 18-162E**

Log of Boring B-16a/P-16a

Sheet 1 of 1

Date(s) Drilled 5/15/2019	Logged By SCM	Checked By FC
Drilling Method Hollow-Stem Auger (HSA)	Drill Bit Size/Type 8" Hollow-Stem Auger	Total Depth of Borehole 16.5 ft
Drill Rig Type CME 75	Drilling Contractor 2R Drilling	Approximate Surface Elevation 51 ft
Groundwater Level and Date Measured Not Encountered	Sampling Method(s) SPT, Modified California, Grab Bag	Hammer Data CME Auto trip; 140 pounds with 30-inch drop
Borehole Backfill Soil cuttings with Aquaphalt cap	Location Latitude: 33.071772°, Longitude: -117.304792° (South of Jupiter Street, slow lane)	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/6"	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Well Log	REMARKS AND OTHER TESTS
51	0				Asphalt		11 inches asphalt				
					SM		[FILL] Silty SAND, medium dense, light yellowish brown (10YR 6/4), damp, fine grained				
		SPT-1		4							
				5							
				8							
		R-2		17			@3.5'- dense, mottled light yellowish brown (10YR 6/4) to reddish yellow (5YR 6/6)	4.3	120		3 inch diameter PVC pipe perforated
				28							Gravel
		GB-3		26							
46	5										
							@7.5'- medium dense				
		SPT-4		9							
				11							
				13							
41	10				SP		[NATIVE] Poorly-graded SAND, very dense, mottled light olive gray (5Y 6/2) to reddish yellow (5YR 6/6), damp, fine grained, micaceous, slightly indurated				
		R-5		19							
				38							
				42							
							@15.0'- gray (N 6/1), slightly indurated				
		SPT-6		19							
				33							
				50							
36	15										
							- Total Depth- 16.5'				
							- No groundwater encountered				
							- Backfilled with tamped soil cuttings and Aquaphalt cap				
31	20										

Project Number: **TET 18-162E**

Sheet 1 of 1

Date(s) Drilled	5/16/2019	Logged By	SCM	Checked By	FC
Drilling Method	Hollow-Stem Auger (HSA)	Drill Bit Size/Type	8" Hollow-Stem Auger	Total Depth of Borehole	11.5 ft
Drill Rig Type	CME 75	Drilling Contractor	2R Drilling	Approximate Surface Elevation	52 ft
Groundwater Level and Date Measured	Not Encountered	Sampling Method(s)	SPT, Modified California, Grab Bag	Hammer Data	CME Auto trip; 140 pounds with 30-inch drop
Borehole Backfill	Soil cuttings with Aquaphalt cap	Location	Latitude: 33.071838°, Longitude: -117.304576° (South of Jupiter Street, off of road)		

[illegible]

Project: **Highway 101 Streetscape**Project Location: **Encinitas, CA**Project Number: **TET 18-162E**

Log of Boring B-18/P-18

Sheet 1 of 1

Date(s) Drilled 5/16/2019	Logged By SCM	Checked By FC
Drilling Method Hollow-Stem Auger (HSA)	Drill Bit Size/Type 8" Hollow-Stem Auger	Total Depth of Borehole 11.5 ft
Drill Rig Type CME 75	Drilling Contractor 2R Drilling	Approximate Surface Elevation 55 ft
Groundwater Level and Date Measured Not Encountered	Sampling Method(s) SPT, Modified California, Grab Bag	Hammer Data CME Auto trip; 140 pounds with 30-inch drop
Borehole Backfill Soil cuttings with Aquaphalt cap	Location Latitude: 33.074374°, Longitude: -117.305450° (South of Edgeburt Drive, off of road)	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/6"	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Well Log	REMARKS AND OTHER TESTS
55	0				SM		[FILL] Silty SAND, medium dense, yellowish brown (10YR 5/6), damp, fine grained				
			SPT-1	10							
			R-2	17							
			GB-3	12							
				16							
				16							
				17							
50	5							6.1	120.3		
			SPT-4	5	SP		[NATIVE] Poorly-graded SAND, medium dense, mottled light yellowish brown (10YR 6/4) to olive yellow (2.5Y 6/6), damp, fine grained				
				6							
				8							
45	10		R-5	19			@10.0'- dense				
				18							
				32							
							- Total Depth- 11.5' - No groundwater encountered - Backfilled with tamped soil cuttings and Aquaphalt cap				
40	15										
35	20										

Project: **Highway 101 Streetscape**Project Location: **Encinitas, CA**Project Number: **TET 18-162E**

Log of Boring B-19a/P-19a

Sheet 1 of 1

Date(s) Drilled 5/15/2019	Logged By SCM	Checked By FC
Drilling Method Hollow-Stem Auger (HSA)	Drill Bit Size/Type 8" Hollow-Stem Auger	Total Depth of Borehole 16.5 ft
Drill Rig Type CME 75	Drilling Contractor 2R Drilling	Approximate Surface Elevation 53 ft
Groundwater Level and Date Measured Not Encountered	Sampling Method(s) SPT, Modified California, Grab Bag	Hammer Data CME Auto trip; 140 pounds with 30-inch drop
Borehole Backfill Soil cuttings with Aquaphalt cap	Location Latitude: 33.075600°, Longitude: -117.306114° (North of Avocado Street, parking lane)	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/6"	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Well Log	REMARKS AND OTHER TESTS
53	0				Asphalt		10 inches asphalt				
					SM		[NATIVE]? Silty SAND, loose, light yellowish brown (10YR 6/4), damp, fine grained				
		SPT-1		3							
				3							
				4							
		R-2		3			@3.5'- medium dense, mottled light yellowish brown (10YR 6/4) to reddish yellow (5YR 6/6)	6.7	108		G=0%, S=84%, F=16%, 2μ=05%
		GB-3		8							
				10							
48	5										
							@7.5'- reddish yellow (5YR 6/6)				
		SPT-4		4							
				4							
				9							
43	10						@10.0'- very dense				
		R-5		32			@11.0'- pale olive (5Y 6/4), fine to coarse grained, moist, micaceous				
				50-5"							
					Siltstone		[BEDROCK] SILTSTONE, gray (N 6/1) to reddish brown (2.5YR 5/4)				
38	15										
		SPT-6		16							
				25							
				26							
							- Total Depth- 16.5'				
							- No groundwater encountered				
							- Backfilled with tamped soil cuttings and Aquaphalt cap				
33	20										

Project: **Highway 101 Streetscape**Project Location: **Encinitas, CA**Project Number: **TET 18-162E**

Log of Boring B-21a/P-21a

Sheet 1 of 1

Date(s) Drilled 5/15/2019	Logged By SCM	Checked By FC
Drilling Method Hollow-Stem Auger (HSA)	Drill Bit Size/Type 8" Hollow-Stem Auger	Total Depth of Borehole 16.5 ft
Drill Rig Type CME 75	Drilling Contractor 2R Drilling	Approximate Surface Elevation 54 ft
Groundwater Level and Date Measured Not Encountered	Sampling Method(s) SPT, Modified California, Grab Bag	Hammer Data CME Auto trip; 140 pounds with 30-inch drop
Borehole Backfill Soil cuttings with Aquaphalt cap	Location Latitude: 33.079503°, Longitude: -117.307390° (North of Bishops Gate Road, slow lane)	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/6"	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Well Log	REMARKS AND OTHER TESTS
54	0				Asphalt		11 inches asphalt				
					SM		[FILL] Silty SAND, medium dense, yellowish brown (10YR 5/6), damp, fine grained, trace of clay				
			SPT-1	5 6 6							
			R-2	16 19 22			@3.5'- dense				
49	5		GB-3								
					SP		[NATIVE] Poorly-graded SAND, medium dense, light yellowish brown (10YR 6/4), damp, fine grained, micaceous				
			SPT-4	5 7 10							
44	10		R-5	17 28 44			@10.0'- dense, mottled light yellowish brown (10YR 6/4) to reddish yellow (5YR 6/6)				
39	15		SPT-6	9 12 16			@15.0'- medium dense, fine to medium grained				
							- Total Depth- 16.5' - No groundwater encountered - Backfilled with tamped soil cuttings and Aquaphalt cap				
34	20										

Project: **Highway 101 Streetscape**Project Location: **Encinitas, CA**Project Number: **TET 18-162E**

Log of Boring B-22a/P-22a

Sheet 1 of 1

Date(s) Drilled	5/15/2019	Logged By	SCM	Checked By	FC
Drilling Method	Hollow-Stem Auger (HSA)	Drill Bit Size/Type	8" Hollow-Stem Auger	Total Depth of Borehole	3.4 ft
Drill Rig Type	CME 75	Drilling Contractor	2R Drilling	Approximate Surface Elevation	55 ft
Groundwater Level and Date Measured	Not Encountered	Sampling Method(s)	SPT, Modified California, Grab Bag	Hammer Data	CME Auto trip; 140 pounds with 30-inch drop
Borehole Backfill	Soil cuttings with Aquaphalt cap	Location	Latitude: 33.081667°, Longitude: -117.308256° (South of La Costa Avenue, slow lane)		

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/6"	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Well Log	REMARKS AND OTHER TESTS
55	0				Asphalt		9 inches asphalt				3 inch diameter PVC pipe perforated
					SM		[FILL] Silty SAND, light brownish gray (2.5Y 6/2), damp, fine to medium grained, trace of gravel				
			SPT-1	8 12 22-4"	GP-GM		Poorly-graded GRAVEL with SILT and SAND, dark brown (7.5YR 3/4), angular concrete fragments				SPT- taken as two bag samples (2-3' and 3-3.5')
							- Total Depth- 3.4' - No groundwater encountered - Backfilled with tamped soil cuttings and Aquaphalt cap				
50	5										
45	10										
40	15										
35	20										

Project: **Highway 101 Streetscape**Project Location: **Encinitas, CA**Project Number: **TET 18-162E**

Log of Boring B-23/P-23

Sheet 1 of 1

Date(s) Drilled 5/15/2019	Logged By SCM	Checked By FC
Drilling Method Hollow-Stem Auger (HSA)	Drill Bit Size/Type 8" Hollow-Stem Auger	Total Depth of Borehole 16.5 ft
Drill Rig Type CME 75	Drilling Contractor 2R Drilling	Approximate Surface Elevation 57 ft
Groundwater Level and Date Measured Not Encountered	Sampling Method(s) SPT, Modified California, Grab Bag	Hammer Data CME Auto trip; 140 pounds with 30-inch drop
Borehole Backfill Soil cuttings with Aquaphalt cap	Location Latitude: 33.081431°, Longitude: -117.307914° (South of La Costa Avenue, bike/turn lane)	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/6"	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Well Log	REMARKS AND OTHER TESTS
57	0				Asphalt		6 inches asphalt				3 inch diameter PVC pipe perforated
					GP-GM		8 inches Aggregate Base, dark brown (7.5YR 3/4), damp				
					SM		[FILL] Silty SAND, loose, reddish brown (2.5YR 5/4), damp, fine grained				Gravel
			SPT-1	3 3 3			@3.5'- medium dense				
			R-2	14 16 23							
52	5		GB-3								GB-3, poor sample recovery
							@7.5'- loose				
			SPT-4	3 3 4							
47	10		R-5	9 10 9	SP		[NATIVE] Poorly-graded SAND, medium dense, mottled light yellowish brown (10YR 6/4) to reddish yellow (5YR 6/6), damp, fine grained, trace of rootlets				
42	15		SPT-6	9 22 26			@15.0'- dense, fine to medium grained				
37	20						- Total Depth- 16.5' - No groundwater encountered - Backfilled with tamped soil cuttings and Aquaphalt cap				

Project: **Highway 101 Streetscape**

Project Location: **Encinitas, CA**

Project Number: **TET 18-162E**

Key to Log of Boring

Sheet 1 of 1

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/6"	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Well Log	REMARKS AND OTHER TESTS
1	2	3	4	5	6	7	8	9	10	11	12

COLUMN DESCRIPTIONS

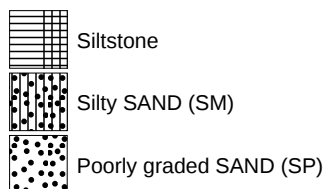
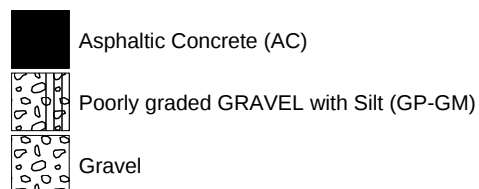
- | | |
|---|--|
| <p>1 Elevation (feet): Elevation (MSL, feet).</p> <p>2 Depth (feet): Depth in feet below the ground surface.</p> <p>3 Sample Type: Type of soil sample collected at the depth interval shown.</p> <p>4 Sample Number: Sample identification number.</p> <p>5 Sampling Resistance, blows/6": Number of blows to advance driven sampler one foot (or distance shown) beyond seating interval using the hammer identified on the boring log.</p> <p>6 Material Type: Type of material encountered.</p> <p>7 Graphic Log: Graphic depiction of the subsurface material encountered.</p> <p>8 MATERIAL DESCRIPTION: Description of material encountered. May include consistency, moisture, color, and other descriptive text.</p> | <p>9 Water Content, %: Water content of the soil sample, expressed as percentage of dry weight of sample.</p> <p>10 Dry Unit Weight, pcf: Dry weight per unit volume of soil sample measured in laboratory, in pounds per cubic foot.</p> <p>11 Well Log: Graphical representation of well installed upon completion of drilling and sampling.</p> <p>12 REMARKS AND OTHER TESTS: Comments and observations regarding drilling or sampling made by driller or field personnel.</p> |
|---|--|

FIELD AND LABORATORY TEST ABBREVIATIONS

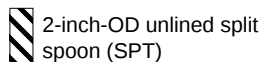
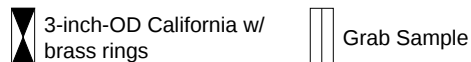
CHEM: Chemical tests to assess corrosivity
 COMP: Compaction test
 CONS: One-dimensional consolidation test
 DS: Direct Shear
 EI: Expansion Index

LL: Liquid Limit, percent
 PI: Plasticity Index, percent
 SA: Sieve analysis (percent passing No. 200 Sieve)
 UC: Unconfined compressive strength test, Qu, in ksf
 WA: Wash sieve (percent passing No. 200 Sieve)

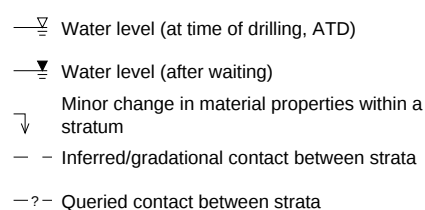
MATERIAL GRAPHIC SYMBOLS



TYPICAL SAMPLER GRAPHIC SYMBOLS



OTHER GRAPHIC SYMBOLS



GENERAL NOTES

- 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.
- 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.

Appendix B

Laboratory Testing

MOISTURE CONTENT AND DENSITY

ASTM D2937

Job Name: Highway 101 Streetscape
Job Number: 197-4552-0162
Tested By: M.G

Date Sampled: 5/17/19
Date Completed: 5/26/2019
Note: Page 1 of 2

Boring / Test Pit / Trench		B-1	B-3a	B-5	B-7	B-9	B-11
Sample Number		R-2	R-2	R-2	R-2	R-2	R-2
Sample Depth	feet	3.5-5	3.5-5	3.5-5	3.5-5	5-6.5	3.5-5
USCS Soil Description		Reddish Brown SM, Fill	Yellowish Brown SP, Native	Yellowish Brown SP, Native	Reddish Brown SM, Fill	Reddish Brown SM, Fill	Reddish Brown SM, Fill
Number of Rings		6	6	6	6	6	6
Total Weight Rings + Soil	grams	1292.70	1209.50	1169.50	1283.70	1169.60	1136.90
* Volume of Rings	ft ³	0.0159	0.0159	0.0159	0.0159	0.0159	0.0159
* Weight of Rings	grams	274.86	274.86	274.86	274.86	274.86	274.86
* Weight of Soil	grams	1017.84	934.64	894.64	1008.84	894.74	862.04
* Wet Density	pcf	140.73	129.23	123.70	139.49	123.71	119.19
Container ID		X4	X13	X6	X2	X5	X7
Tare	grams	10.3	10.3	10.3	10.3	10.3	10.3
Wet Soil + Tare	grams	511.5	455.2	449.1	508.6	454.9	423.4
Dry Soil + Tare	grams	469.2	432.9	424.4	473.6	430.3	401.8
* Weight of Water	grams	42.3	22.3	24.7	35	24.6	21.6
* Dry Density	pcf	128.9	122.8	116.7	129.7	116.9	113.0
* Moisture Content	%	9.2	5.3	6.0	7.6	5.9	5.5

MOISTURE CONTENT AND DENSITY

ASTM D2937

Job Name: Highway 101 Streetscape
Job Number: 197-4552-0162
Tested By: M.G

Date Sampled: 5/17/19
Date Completed: 5/26/2019
Note: Page 2 of 2

Boring / Test Pit / Trench		B-12a	B-14	B-16a	B-18	B-19a
Sample Number		R-2	R-2	R-2	R-2	R-2
Sample Depth	feet	3.5-5	3.5-5	3.5-5	3.5-5	3.5-5
USCS Soil Description		Yellowish Brown SM, Fill	Yellowish Brown SP, Native	Yellowish Brown SM, Fill	Yellowish Brown SM, Fill	Olive Yellow SP, Native
Number of Rings		6	6	6	6	6
Total Weight Rings + Soil	grams	1240.90	1201.00	1180.20	1198.30	1107.80
* Volume of Rings	ft ³	0.0159	0.0159	0.0159	0.0159	0.0159
* Weight of Rings	grams	274.86	274.86	274.86	274.86	274.86
* Weight of Soil	grams	966.04	926.14	905.34	923.44	832.94
* Wet Density	pcf	133.57	128.05	125.18	127.68	115.17
Container ID		X25	X8	X3	X11	X1
Tare	grams	10.3	10.3	10.3	10.3	10.3
Wet Soil + Tare	grams	479.3	495.8	436.4	477.9	435.1
Dry Soil + Tare	grams	446.2	455.4	418.7	451	408.5
* Weight of Water	grams	33.1	40.4	17.7	26.9	26.6
* Dry Density	pcf	124.1	117.4	120.0	120.3	108.0
* Moisture Content	%	7.6	9.1	4.3	6.1	6.7

GRAIN SIZE DISTRIBUTION ANALYSIS

ASTM C136/C117/D422

Job Name: Highway 101 Streetscape

Tested By : MG

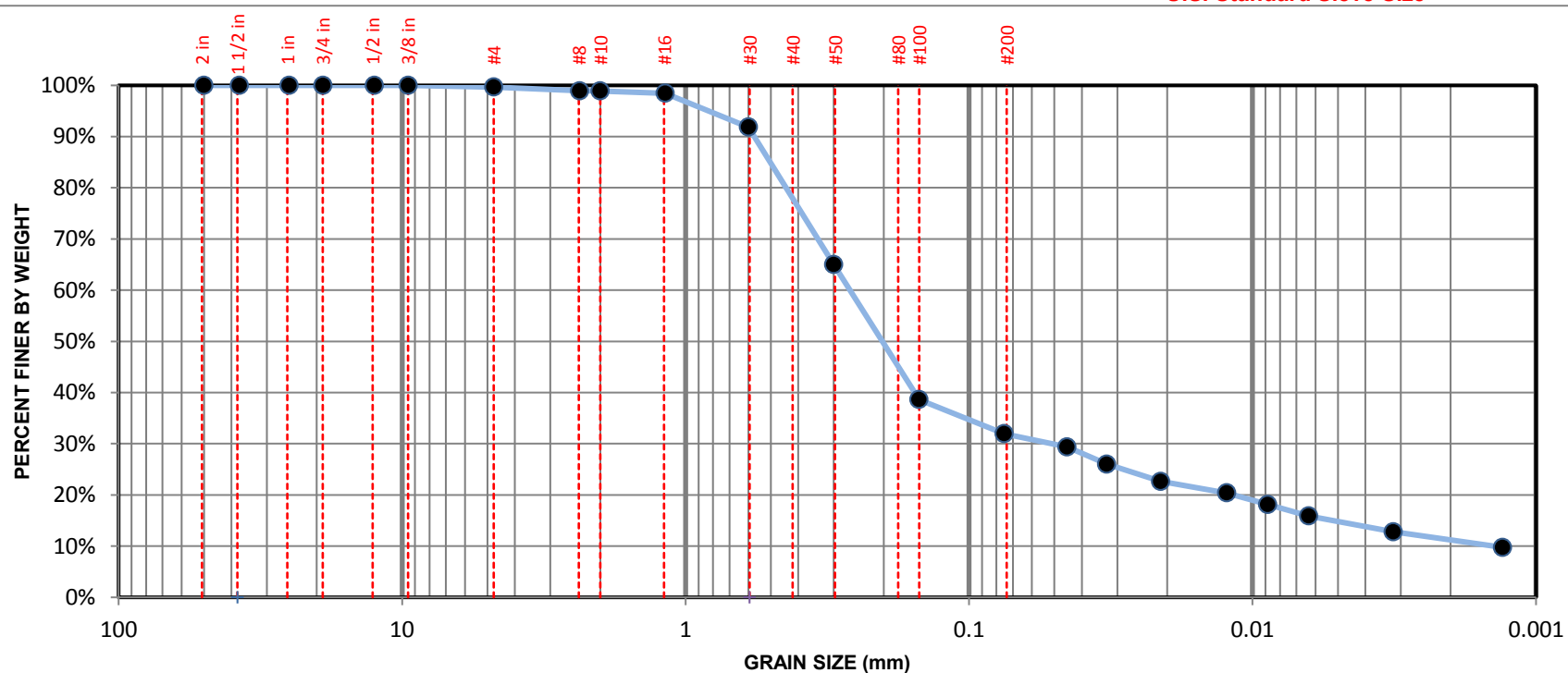
Job Number: 197-4552-0162

Date Completed: May 27, 2019

Address:

Date Sampled: May 17, 2019

U.S. Standard Sieve Size



Symbol	Boring No.	Sample #	Depth (feet)	LL	PI	USCS	Gravel	Sand	Fines	2 μ
●	B-1	R-2	3.5-5ft			SM	0%	68%	32%	11%

GRAIN SIZE DISTRIBUTION ANALYSIS

ASTM C136/C117/D422

Job Name: Highway 101 Streetscape

Tested By : MG

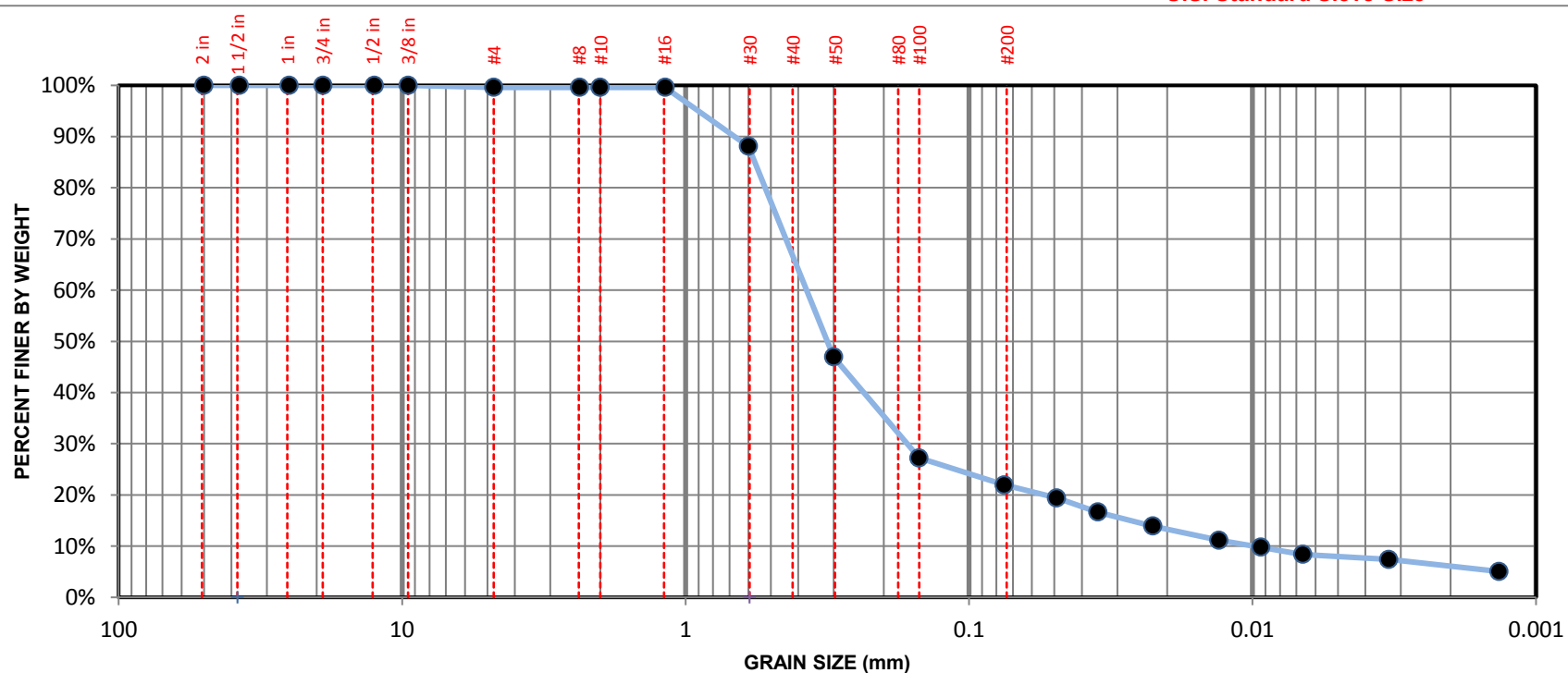
Job Number: 197-4552-0162

Date Completed: May 27, 2019

Address:

Date Sampled: May 17, 2019

U.S. Standard Sieve Size



Symbol	Boring No.	Sample #	Depth (feet)	LL	PI	USCS	Gravel	Sand	Fines	2 μ
●	B-3a	R-2	3.5-5ft			SM	0%	78%	22%	6%

GRAIN SIZE DISTRIBUTION ANALYSIS

ASTM C136/C117/D422

Job Name: Highway 101 Streetscape

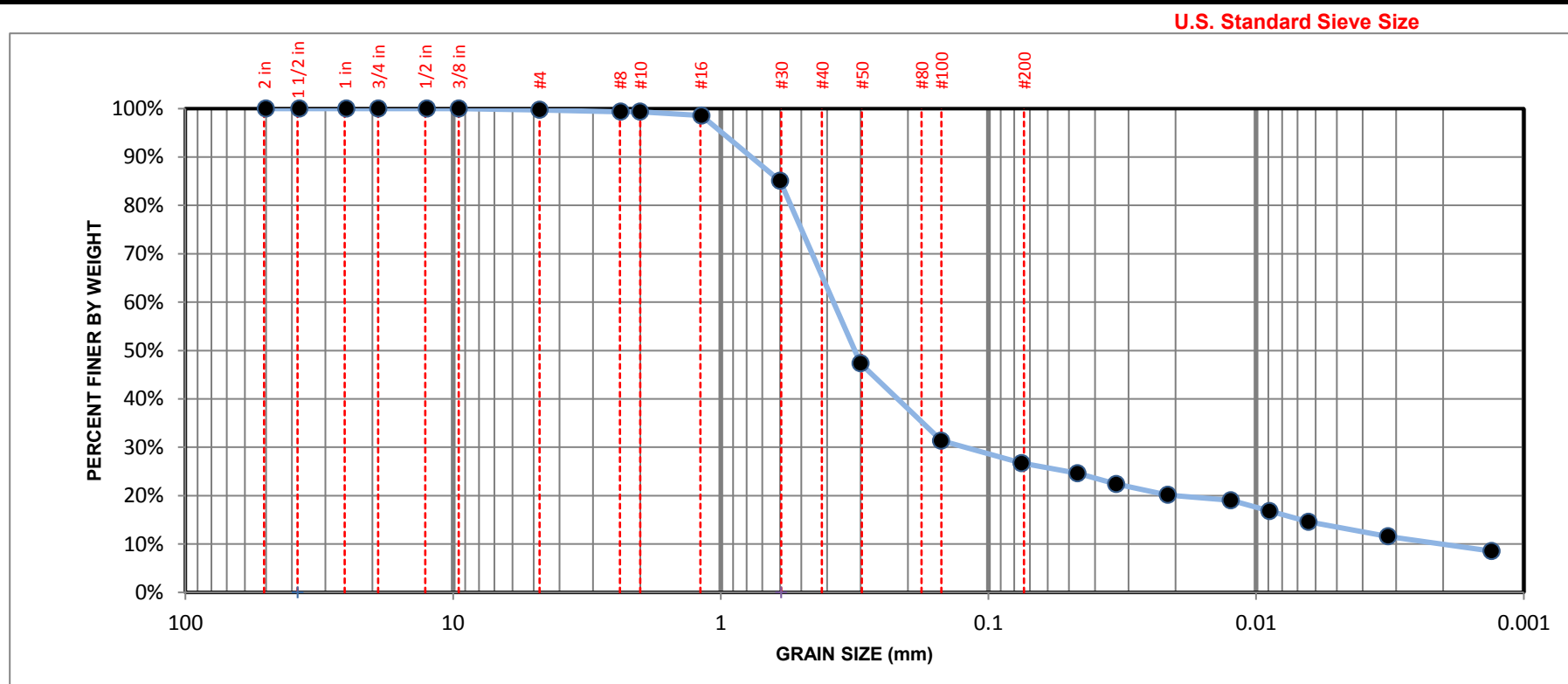
Tested By : MG

Job Number: 197-4552-0162

Date Completed: May 27, 2019

Address:

Date Sampled: May 17, 2019



Symbol	Boring No.	Sample #	Depth (feet)	LL	PI	USCS	Gravel	Sand	Fines	2 μ
●	B-5	R-2	3.5-5ft			SM	0%	73%	27%	10%

GRAIN SIZE DISTRIBUTION ANALYSIS

ASTM C136/C117/D422

Job Name: Highway 101 Streetscape

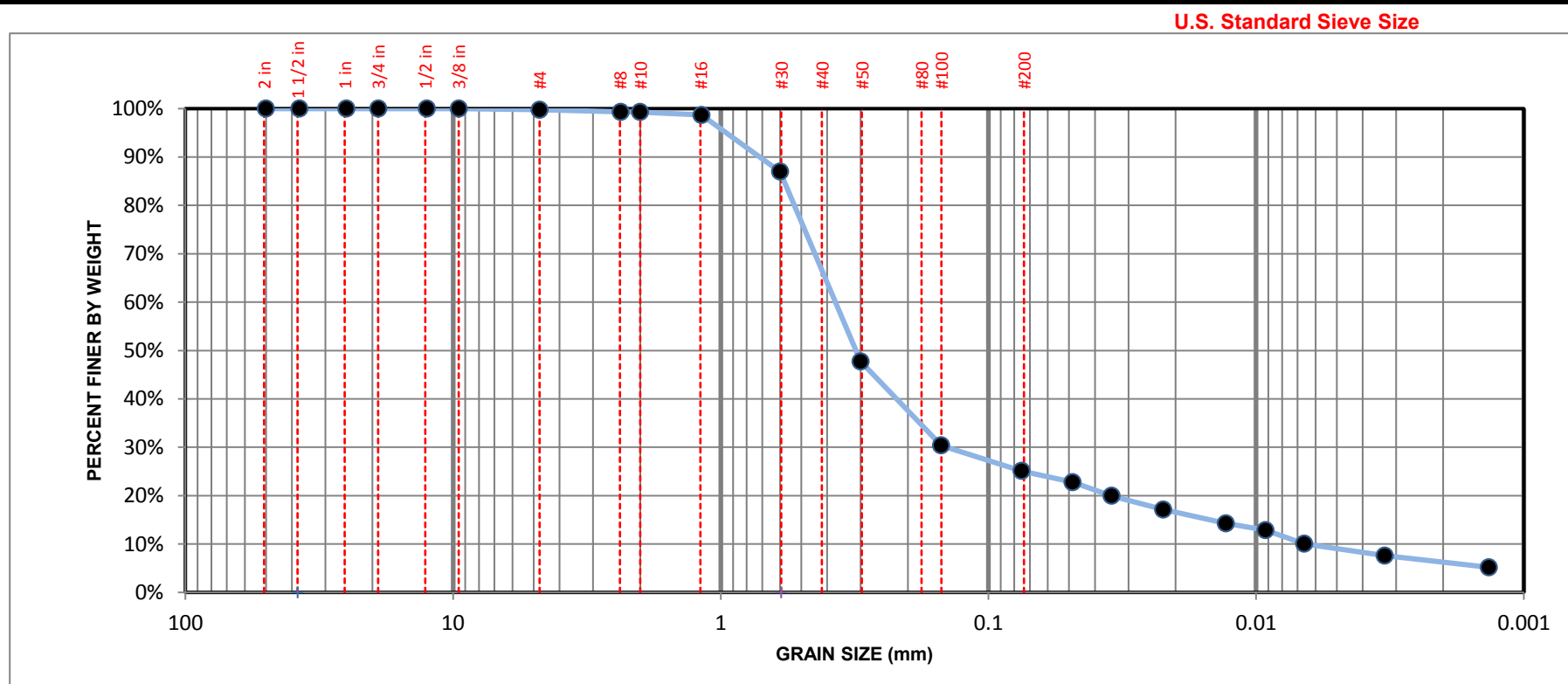
Tested By : MG

Job Number: 197-4552-0162

Date Completed: May 27, 2019

Address:

Date Sampled: May 17, 2019



Symbol	Boring No.	Sample #	Depth (feet)	LL	PI	USCS	Gravel	Sand	Fines	2 μ
●	B-7	R-2	3.5-5ft			SM	0%	75%	25%	6%

GRAIN SIZE DISTRIBUTION ANALYSIS

ASTM C136/C117/D422

Job Name: Highway 101 Streetscape

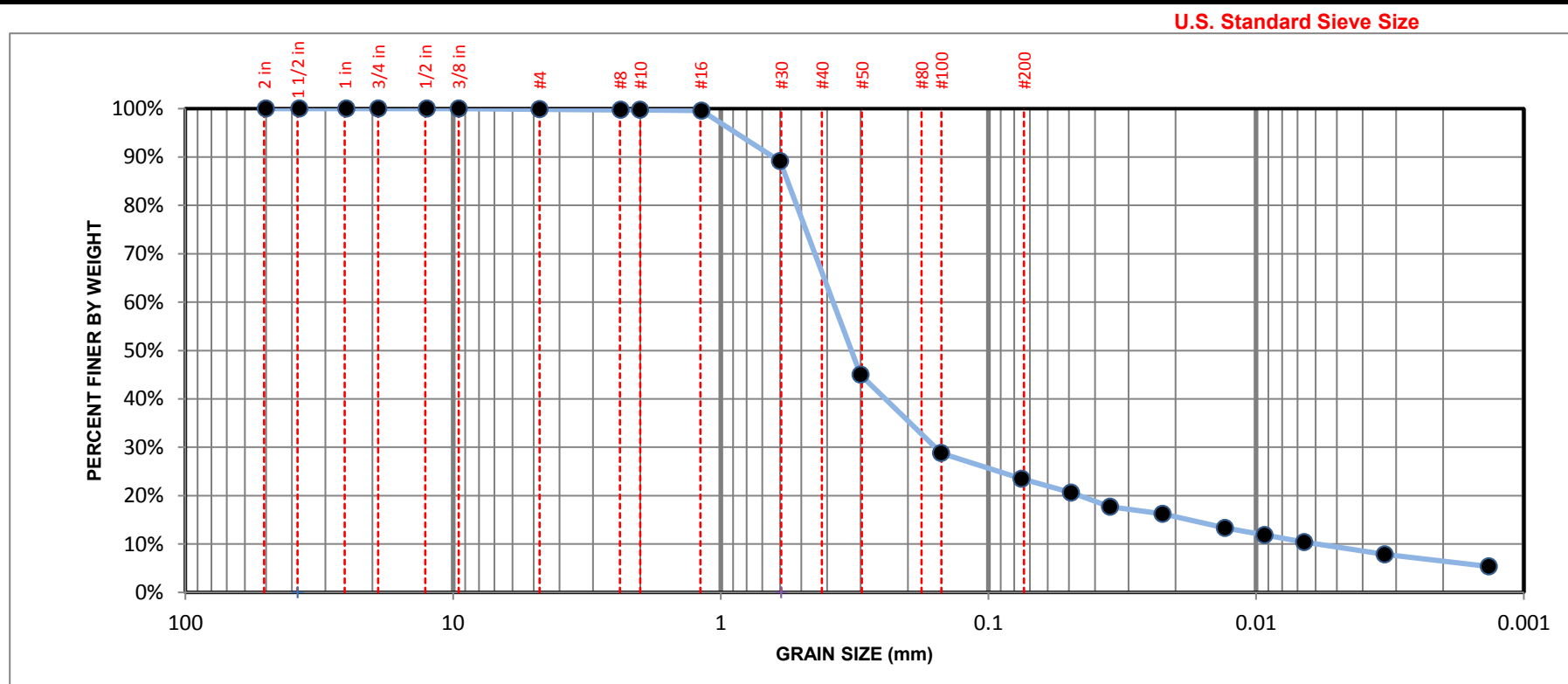
Tested By : MG

Job Number: 197-4552-0162

Date Completed: May 27, 2019

Address:

Date Sampled: May 17, 2019



Symbol	Boring No.	Sample #	Depth (feet)	LL	PI	USCS	Gravel	Sand	Fines	2 μ
●	B-9	R-2	5-6.5ft			SM	0%	77%	23%	7%

GRAIN SIZE DISTRIBUTION ANALYSIS

ASTM C136/C117/D422

Job Name: Highway 101 Streetscape

Tested By : MG

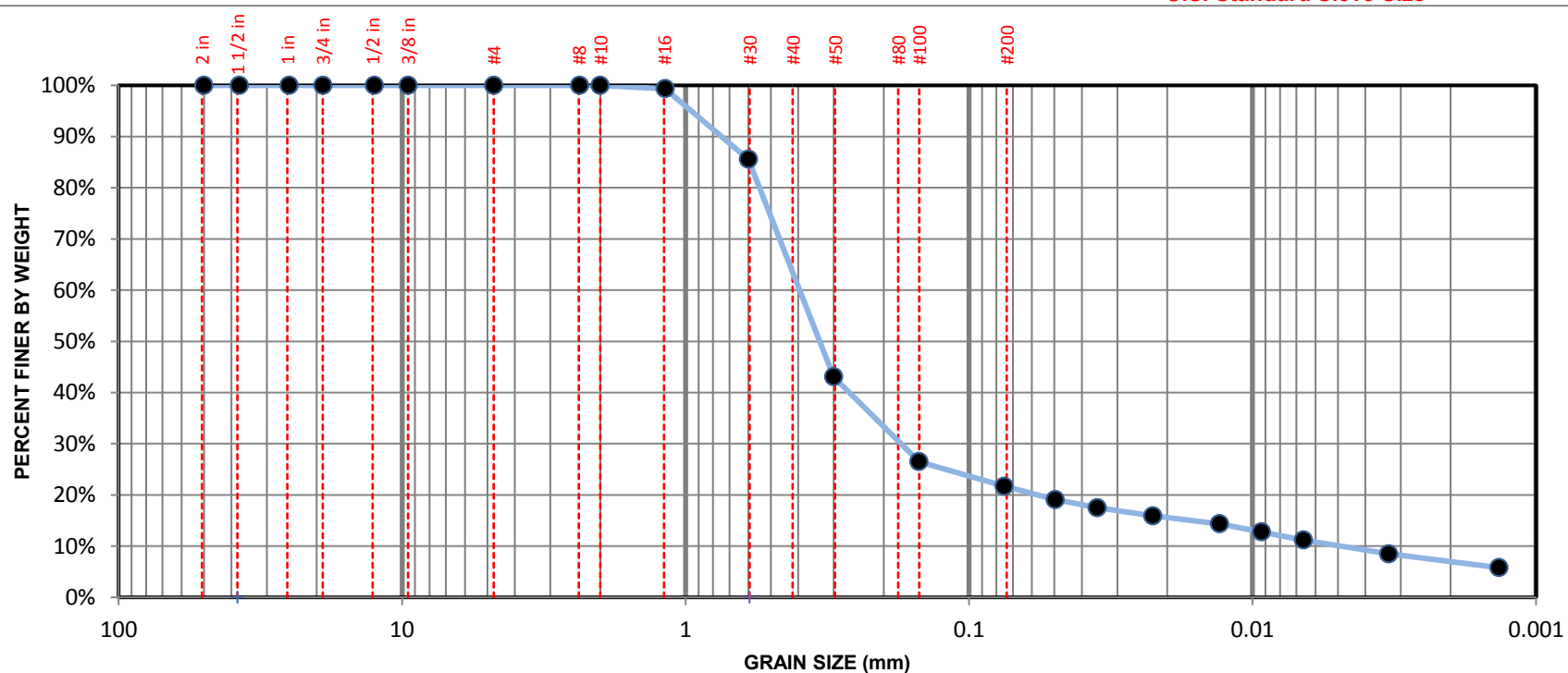
Job Number: 197-4552-0162

Date Completed: May 27, 2019

Address:

Date Sampled: May 17, 2019

U.S. Standard Sieve Size



Symbol	Boring No.	Sample #	Depth (feet)	LL	PI	USCS	Gravel	Sand	Fines	2 μ
●	B-11	SPT-1	2-3.5ft			SM	0%	78%	22%	7%

GRAIN SIZE DISTRIBUTION ANALYSIS

ASTM C136/C117/D422

Job Name: Highway 101 Streetscape

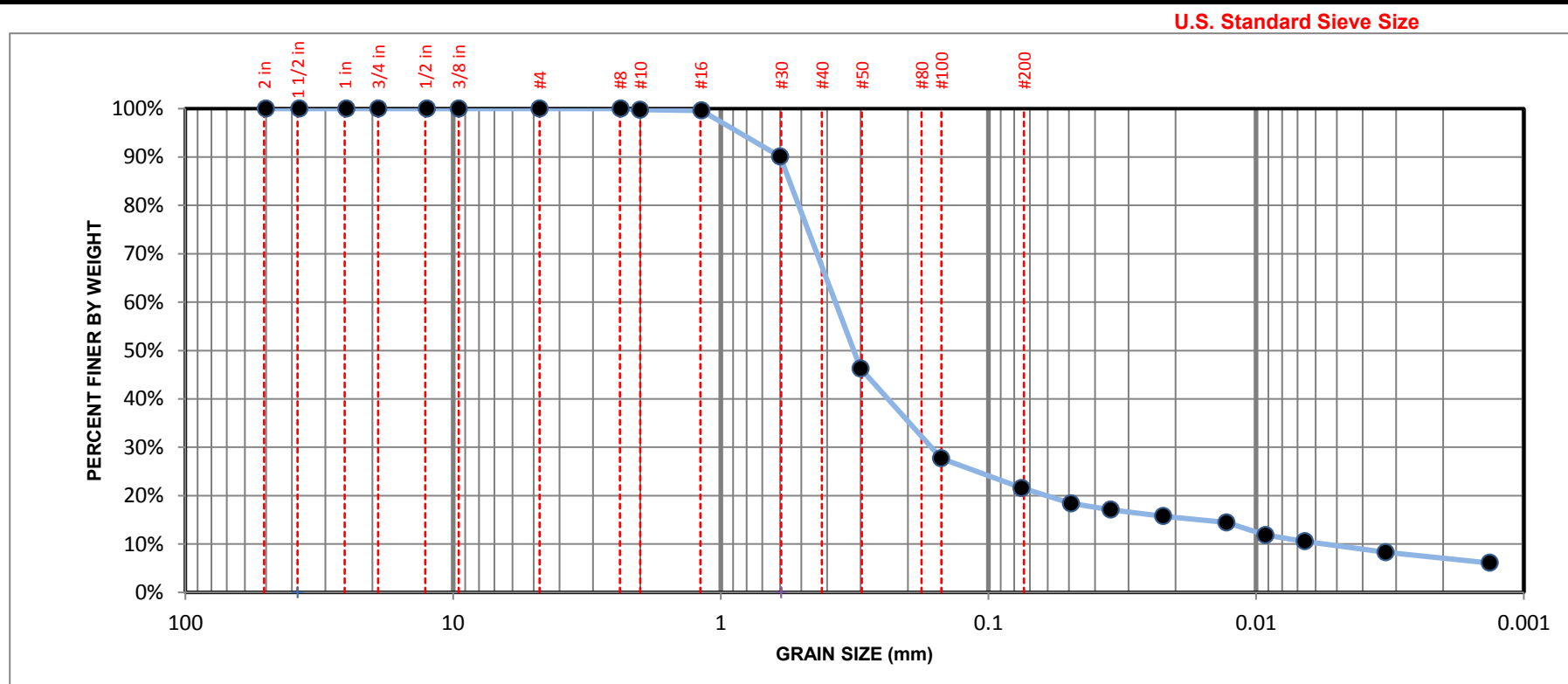
Tested By : MG

Job Number: 197-4552-0162

Date Completed: May 27, 2019

Address:

Date Sampled: May 17, 2019



Symbol	Boring No.	Sample #	Depth (feet)	LL	PI	USCS	Gravel	Sand	Fines	2 μ
●	B-12a	R-2	3.5-5ft			SM	0%	78%	22%	7%

GRAIN SIZE DISTRIBUTION ANALYSIS

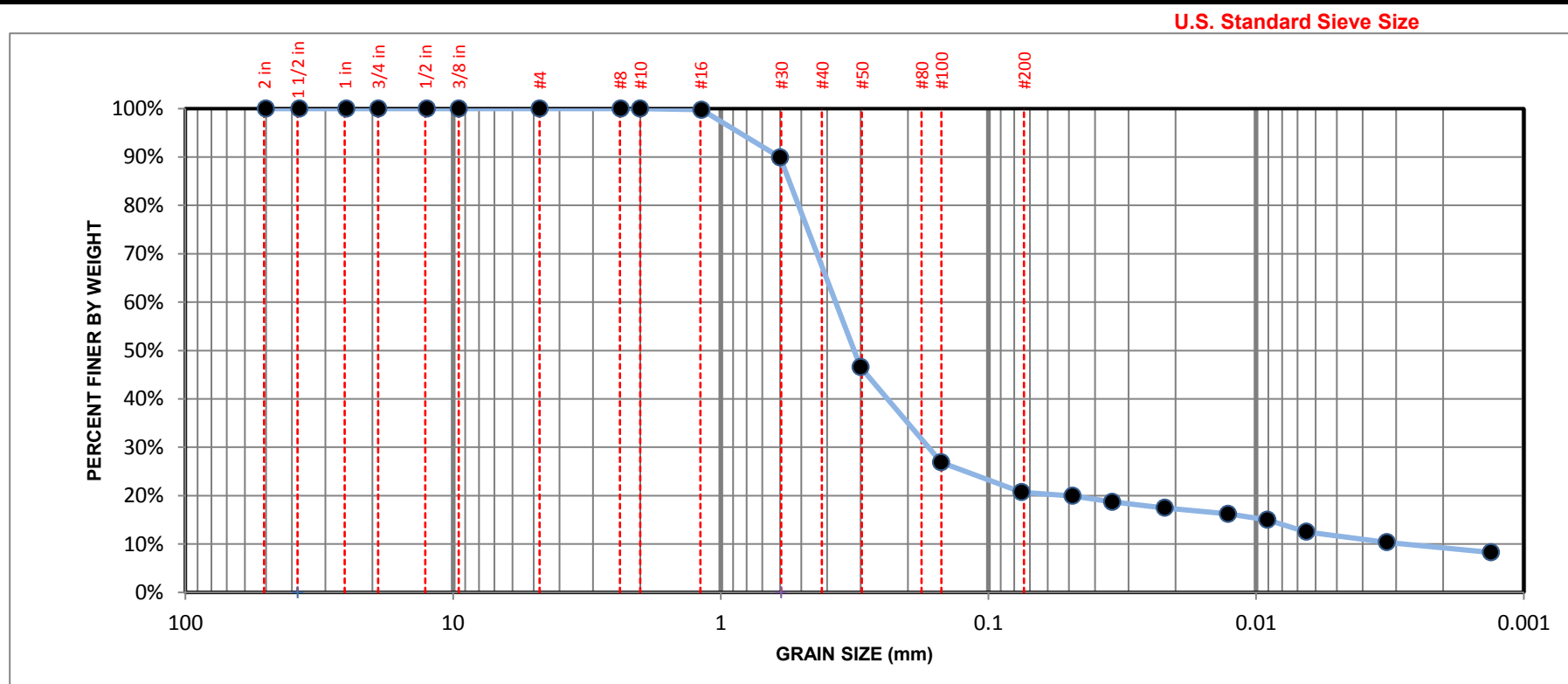
ASTM C136/C117/D422

Job Name: Highway 101 Streetscape

Tested By : MG

Job Number: 197-4552-0162

Date Completed: May 27, 2019

Address:
Date Sampled: May 17, 2019


Symbol	Boring No.	Sample #	Depth (feet)	LL	PI	USCS	Gravel	Sand	Fines	2 μ
●	B-14	R-2	3.5-5ft			SM	0%	79%	21%	9%

GRAIN SIZE DISTRIBUTION ANALYSIS

ASTM C136/C117/D422

Job Name: Highway 101 Streetscape

Tested By : MG

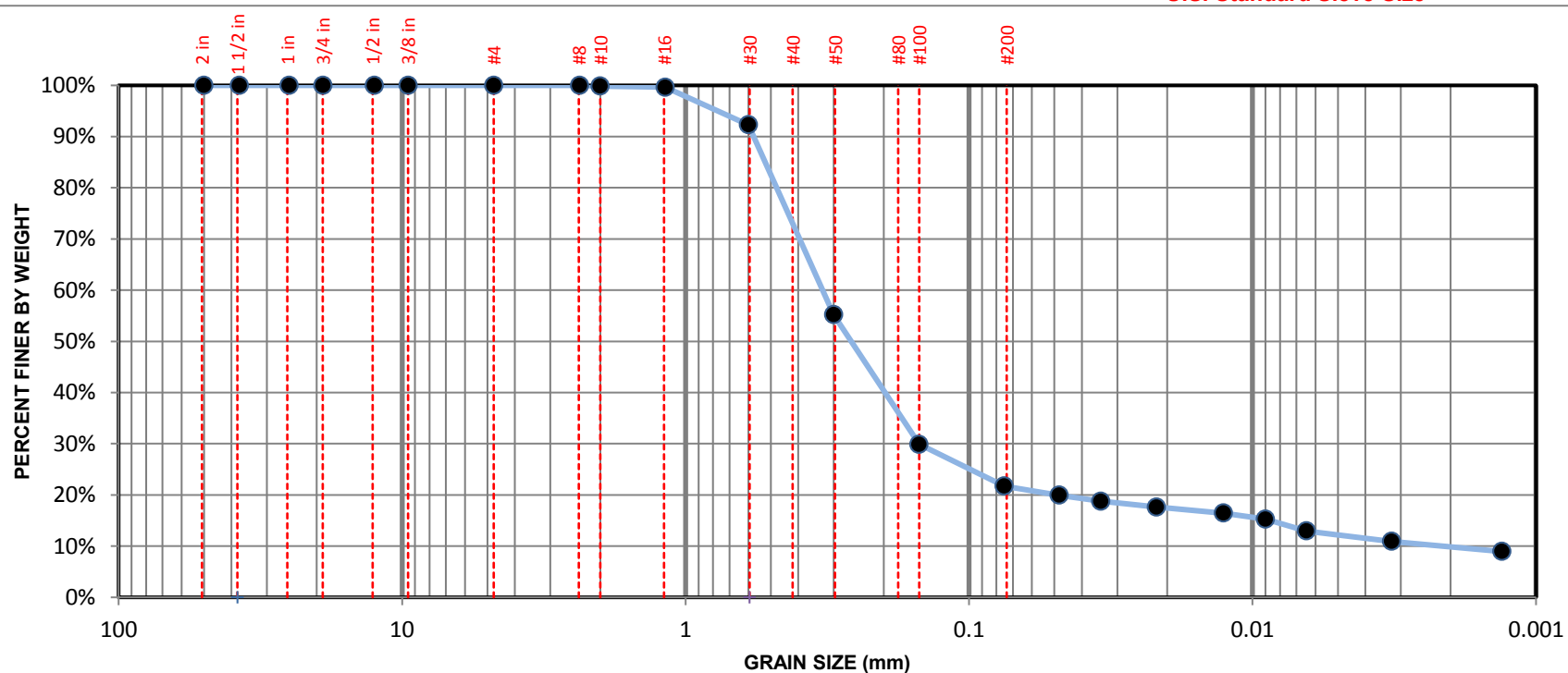
Job Number: 197-4552-0162

Date Completed: May 27, 2019

Address:

Date Sampled: May 17, 2019

U.S. Standard Sieve Size



Symbol	Boring No.	Sample #	Depth (feet)	LL	PI	USCS	Gravel	Sand	Fines	2 μ
●	B-16a	R-2	3.5-5ft			SM	0%	78%	22%	10%

GRAIN SIZE DISTRIBUTION ANALYSIS

ASTM C136/C117/D422

Job Name: Highway 101 Streetscape

Tested By : MG

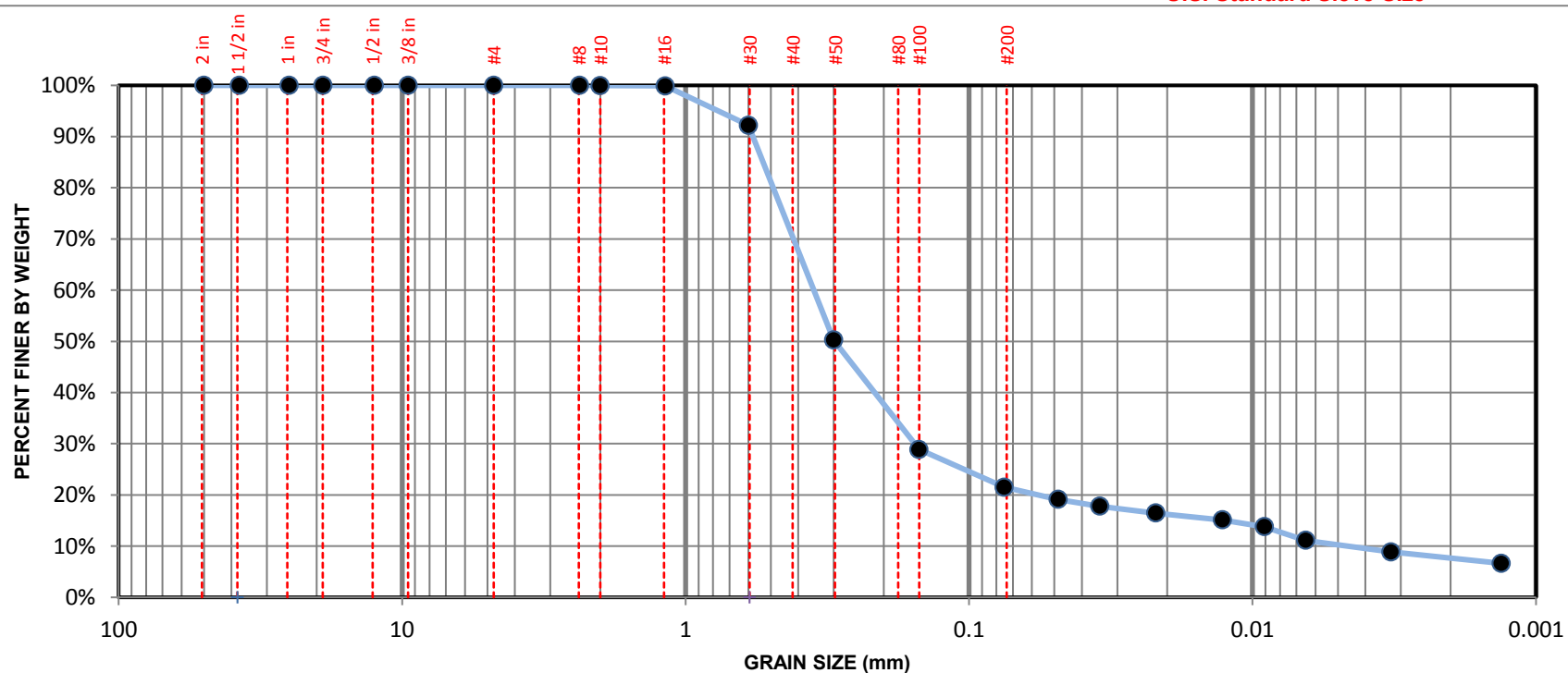
Job Number: 197-4552-0162

Date Completed: May 27, 2019

Address:

Date Sampled: May 17, 2019

U.S. Standard Sieve Size



Symbol	Boring No.	Sample #	Depth (feet)	LL	PI	USCS	Gravel	Sand	Fines	2 μ
●	B-18	GB-3	3.5-5ft			SM	0%	79%	21%	8%

GRAIN SIZE DISTRIBUTION ANALYSIS

ASTM C136/C117/D422

Job Name: Highway 101 Streetscape

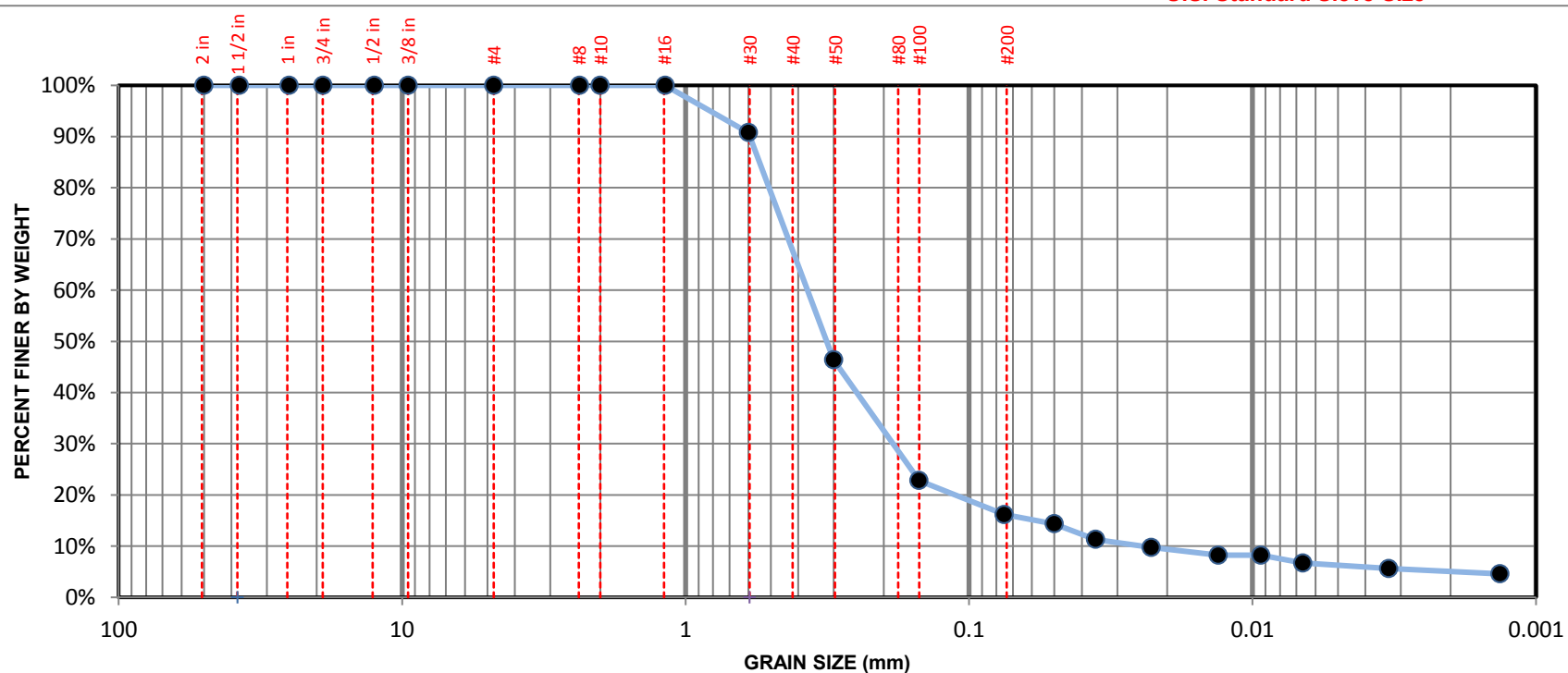
Tested By : MG

Job Number: 197-4552-0162

Date Completed: May 27, 2019

Address:
Date Sampled: May 17, 2019

U.S. Standard Sieve Size



Symbol	Boring No.	Sample #	Depth (feet)	LL	PI	USCS	Gravel	Sand	Fines	2 μ
●	B-19a	SPT-1	3.5-5ft			SM	0%	84%	16%	5%

Appendix C

Field Infiltration Testing Results

PERCOLATION DATA SHEET

Project:	HWY 101 Streetscape- Encinitas		Job No:	TET 18-162E	
Test Hole No:	P-1		Date Excavated:	Monday, May 13, 2019	
Test Hole Depth (feet)	3.67	feet	Soil Classification:	Poorly graded SAND w/ silt (SP-SM)	
Stick up Length (feet):	1.42	feet			
Sandy Soil Criteria Tested By:	SCM		Date:	Monday, May 13, 2019	Presoak: 1 hour
Actual Percolation Tested By:	JLM		Date:	Monday, May 13, 2019	
Test Hole Diameter Inches):	8	inches	Latitude:	33.050726	Longitude: -117.294722
Casing Diameter:	3	inches	Elevation:	75 ft	

PERCOLATION TEST (presoaking for a minimum of 1 hour)							
Time	Time Interval (min)	Initial Reading (feet below the top of the pipe)	Final Reading (feet below the top of the pipe)	Initial Water Level (feet above bottom of hole)	Final Water Level (feet above bottom of hole)	Δ in Water Level (inches)	Measured Raw Percolation Rate (inches/hour)
2:16 PM	10.0	3.43	3.55	1.65	1.53	1.44	0.82
2:26 PM							
2:26 PM	11.0	3.55	3.65	1.53	1.43	1.20	0.66
2:37 PM							
2:37 PM	10.0	3.65	3.72	1.43	1.36	0.84	0.54
2:47 PM							
2:48 PM	10.0	3.72	3.79	1.36	1.29	0.84	0.56
2:58 PM							
2:58 PM	10.0	3.79	3.84	1.29	1.24	0.60	0.42
3:08 PM							
3:08 PM	30.0	3.84	3.97	1.24	1.11	1.56	0.39
3:38 PM							
							0.46

Reduction factor for boring percolation

$RF_t = 2.00$

Site variability, number of tests, and thoroughness of subsurface investigation

$RF_v = 1.20$

Long-term siltation, plugging, and maintenance

$RF_s = 2.00$

Percolation Test performed according to the Administrative Manual, County of Los Angeles, Department of Public Works, Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, GS 200.2 (6/30/17)

Corrected Percolation Rate (Infiltration Rate) =	0.09	in/hour
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PERCOLATION DATA SHEET

Project:	HWY 101 Streetscape- Encinitas		Job No:	TET 18-162E	
Test Hole No:	P-2		Date Excavated:	Monday, May 13, 2019	
Test Hole Depth (feet):	3.67	feet	Soil Classification:	Poorly graded SAND w/ silt (SP-SM)	
Stick up Length (feet):	1.58	feet			
Sandy Soil Criteria Tested By:	SCM		Date:	Monday, May 13, 2019	Presoak: 1 hour
Actual Percolation Tested By:	JLM		Date:	Monday, May 13, 2019	
Test Hole Diameter Inches):	8	inches	Latitude:	33.051041	Longitude: -117.294623
Casing Diameter:	3	inches	Elevation:	73 ft	

PERCOLATION TEST (presoaking for a minimum of 1 hour)							
Time	Time Interval (min)	Initial Reading (feet below the top of the pipe)	Final Reading (feet below the top of the pipe)	Initial Water Level (feet above bottom of hole)	Final Water Level (feet above bottom of hole)	Δ in Water Level (inches)	Measured Raw Percolation Rate (inches/hour)
10:07 AM	30.0	4.10	4.70	1.15	0.55	7.20	2.36
10:37 AM							
11:39 AM	30.0	4.31	4.45	0.94	0.80	1.68	0.54
12:09 PM							
12:10 PM	30.0	4.08	4.20	1.17	1.05	1.44	0.38
12:40 PM							
12:42 PM	30.0	3.86	4.00	1.39	1.25	1.68	0.38
1:12 PM							
1:12 PM	30.0	4.00	4.13	1.25	1.12	1.56	0.38
1:42 PM							
1:44 PM	30.0	3.77	3.91	1.48	1.34	1.68	0.36
2:14 PM							
2:15 PM	30.0	3.91	4.05	1.34	1.20	1.68	0.39
2:45 PM							
							0.38

Reduction factor for boring percolation

RF_t = 2.00

Site variability, number of tests, and thoroughness of subsurface investigation

RF_v = 1.20

Long-term siltation, plugging, and maintenance

RF_s = 2.00

Percolation Test performed according to the Administrative Manual, County of Los Angeles, Department of Public Works, Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, GS 200.2 (6/30/17)

Corrected Percolation Rate (Infiltration Rate) =	0.08	in/hour
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PERCOLATION DATA SHEET

Project:	HWY 101 Streetscape- Encinitas		Job No:	TET 18-162E	
Test Hole No:	P-3a		Date Excavated:	Monday, May 13, 2019	
Test Hole Depth (feet):	3.42	feet	Soil Classification:	Silty SAND (SM)	
Stick up Length (feet):	1.46	feet			
Sandy Soil Criteria Tested By:	SCM		Date:	Monday, May 13, 2019	Presoak: 1 hour
Actual Percolation Tested By:	JLM		Date:	Monday, May 13, 2019	
Test Hole Diameter Inches):	8	inches	Latitude:	33.051041	Longitude: -117.296562
Casing Diameter:	3	inches	Elevation:	77 ft	

PERCOLATION TEST (presoaking for a minimum of 1 hour)							
Time	Time Interval (min)	Initial Reading (feet below the top of the pipe)	Final Reading (feet below the top of the pipe)	Initial Water Level (feet above bottom of hole)	Final Water Level (feet above bottom of hole)	Δ in Water Level (inches)	Measured Raw Percolation Rate (inches/hour)
12:55 PM	10.0	3.41	3.86	1.47	1.02	5.40	3.84
1:05 PM							
1:05 PM	10.0	3.86	4.19	1.02	0.69	3.96	3.90
1:15 PM							
1:15 PM	10.0	3.75	4.02	1.13	0.86	3.24	2.80
1:25 PM							
1:27 PM	10.0	3.67	4.05	1.21	0.83	4.56	3.86
1:37 PM							
1:38 PM	10.0	3.67	3.96	1.21	0.92	3.48	2.84
1:48 PM							
1:49 PM	10.0	3.60	3.90	1.28	0.98	3.60	2.79
1:59 PM							
2:00 PM	10.0	3.42	3.75	1.46	1.13	3.96	2.72
2:10 PM							
2:10 PM	10.0	3.75	4.20	1.13	0.68	5.40	5.06
2:20 PM							
2:22 PM	10.0	3.57	3.86	1.31	1.02	3.48	2.62
2:32 PM							
							3.47

Reduction factor for boring percolation

$RF_t = 2.00$

Site variability, number of tests, and thoroughness of subsurface investigation

$RF_v = 1.20$

Long-term siltation, plugging, and maintenance

$RF_s = 2.00$

Percolation Test performed according to the Administrative Manual, County of Los Angeles, Department of Public Works, Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, GS 200.2 (6/30/17)

Corrected Percolation Rate (Infiltration Rate) =	0.72	in/hour
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PERCOLATION DATA SHEET

Project:	HWY 101 Streetscape- Encinitas		Job No:	TET 18-162E	
Test Hole No:	P-4		Date Excavated:	Monday, May 13, 2019	
Test Hole Depth (feet):	3.67	feet	Soil Classification:	Poorly graded SAND (SP)	
Stick up Length (feet):	1.67	feet			
Sandy Soil Criteria Tested By:	SCM		Date:	Monday, May 13, 2019	Presoak: 1 hour
Actual Percolation Tested By:	JLM		Date:	Monday, May 13, 2019	
Test Hole Diameter Inches):	8	inches	Latitude:	33.053315	Longitude: -117.296020
Casing Diameter:	3	inches	Elevation:	77 ft	

PERCOLATION TEST (presoaking for a minimum of 1 hour)							
Time	Time Interval (min)	Initial Reading (feet below the top of the pipe)	Final Reading (feet below the top of the pipe)	Initial Water Level (feet above bottom of hole)	Final Water Level (feet above bottom of hole)	Δ in Water Level (inches)	Measured Raw Percolation Rate (inches/hour)
10:51 AM	10.0	3.80	4.21	1.53	1.12	4.92	3.29
11:01 AM							
11:01 AM	10.0	4.21	4.85	1.12	0.48	7.68	7.92
11:11 AM							
11:13 AM	12.0	4.10	4.52	1.23	0.81	5.04	3.53
11:25 AM							
11:28 AM	10.0	3.77	4.37	1.56	0.96	7.20	5.03
11:39 AM							
11:43 AM	10.0	3.89	4.35	1.44	0.98	5.52	4.00
11:53 AM							
11:55 AM	10.0	3.78	4.22	1.55	1.11	5.28	3.52
12:05 PM							
12:05 PM	10.0	4.22	4.85	1.11	0.48	7.56	7.83
12:15 PM							
							5.12

Reduction factor for boring percolation

RF_t = 2.00

Site variability, number of tests, and thoroughness of subsurface investigation

RF_v = 1.20

Long-term siltation, plugging, and maintenance

RF_s = 2.00

Percolation Test performed according to the Administrative Manual, County of Los Angeles, Department of Public Works, Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, GS 200.2 (6/30/17)

Corrected Percolation Rate (Infiltration Rate) =	1.07	in/hour
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PERCOLATION DATA SHEET

Project:	HWY 101 Streetscape- Encinitas		Job No:	TET 18-162E	
Test Hole No:	P-5		Date Excavated:	Monday, May 13, 2019	
Test Hole Depth (feet):	3.42	feet	Soil Classification:	Silty SAND (SM)	
Stick up Length (feet):	1.79	feet			
Sandy Soil Criteria Tested By:	SCM		Date:	Monday, May 13, 2019	Presoak: 1.5 hours
Actual Percolation Tested By:	JLM		Date:	Monday, May 13, 2019	
Test Hole Diameter Inches):	8	inches	Latitude:	33.055908	Longitude: -117.297873
Casing Diameter:	3	inches	Elevation:	69 ft	

PERCOLATION TEST (presoaking for a minimum of 1 hour)							
Time	Time Interval (min)	Initial Reading (feet below the top of the pipe)	Final Reading (feet below the top of the pipe)	Initial Water Level (feet above bottom of hole)	Final Water Level (feet above bottom of hole)	Δ in Water Level (inches)	Measured Raw Percolation Rate (inches/hour)
11:35 AM	10.0	4.31	4.55	0.90	0.66	2.88	3.05
11:45 AM							
11:47 AM	10.0	4.31	4.51	0.90	0.70	2.40	2.49
11:57 AM							
12:25 PM	10.0	4.11	4.37	1.10	0.84	3.12	2.75
12:35 PM							
12:35 PM	10.0	3.97	4.30	1.24	0.91	3.96	3.19
12:45 PM							
12:47 PM	10.0	4.00	4.27	1.21	0.94	3.24	2.61
12:57 PM							
1:20 PM	10.0	4.20	4.40	1.01	0.81	2.40	2.23
1:30 PM							
1:55 PM	10.0	4.02	4.26	1.19	0.95	2.88	2.33
2:05 PM							
							2.39

Reduction factor for boring percolation

$RF_t = 2.00$

Site variability, number of tests, and thoroughness of subsurface investigation

$RF_v = 1.20$

Long-term siltation, plugging, and maintenance

$RF_s = 2.00$

Percolation Test performed according to the Administrative Manual, County of Los Angeles, Department of Public Works, Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, GS 200.2 (6/30/17)

Corrected Percolation Rate (Infiltration Rate) =	0.50	in/hour
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PERCOLATION DATA SHEET

Project:	HWY 101 Streetscape- Encinitas		Job No:	TET 18-162E	
Test Hole No:	P-6		Date Excavated:	Monday, May 13, 2019	
Test Hole Depth (feet):	3.67	feet	Soil Classification:	Silty SAND (SM)	
Stick up Length (feet):	1.75	feet			
Sandy Soil Criteria Tested By:	SCM		Date:	Monday, May 13, 2019	Presoak: 1 hour
Actual Percolation Tested By:	JLM		Date:	Monday, May 13, 2019	
Test Hole Diameter Inches):	8	inches	Latitude:	33.056190	Longitude: -117.297867
Casing Diameter:	3	inches	Elevation:	66 ft	

PERCOLATION TEST (presoaking for a minimum of 1 hour)							
Time	Time Interval (min)	Initial Reading (feet below the top of the pipe)	Final Reading (feet below the top of the pipe)	Initial Water Level (feet above bottom of hole)	Final Water Level (feet above bottom of hole)	Δ in Water Level (inches)	Measured Raw Percolation Rate (inches/hour)
10:19 AM	35.0	4.40	4.86	1.02	0.56	5.52	1.65
10:54 AM							
11:30 AM	30.0	3.10	3.95	2.32	1.47	10.20	1.65
12:00 PM							
12:00 PM	30.0	3.95	4.52	1.47	0.90	6.84	1.69
12:30 PM							
12:32 PM	30.0	3.11	3.92	2.31	1.50	9.72	1.57
1:02 PM							
1:02 PM	30.0	3.92	4.50	1.50	0.92	6.96	1.69
1:32 PM							
1:33 PM	30.0	3.67	4.45	1.75	0.97	9.36	2.05
2:03 PM							
2:05 PM	30.0	3.79	4.50	1.63	0.92	8.52	1.97
2:35 PM							
							1.90

Reduction factor for boring percolation

$RF_t = 2.00$

Site variability, number of tests, and thoroughness of subsurface investigation

$RF_v = 1.20$

Long-term siltation, plugging, and maintenance

$RF_s = 2.00$

Percolation Test performed according to the Administrative Manual, County of Los Angeles, Department of Public Works, Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, GS 200.2 (6/30/17)

Corrected Percolation Rate (Infiltration Rate) =	0.40	in/hour
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PERCOLATION DATA SHEET

Project:	HWY 101 Streetscape- Encinitas		Job No:	TET 18-162E	
Test Hole No:	P-7		Date Excavated:	Tuesday, May 14, 2019	
Test Hole Depth (feet):	3.75	feet	Soil Classification:	Silty SAND (SM)	
Stick up Length (feet):	1.75	feet			
Sandy Soil Criteria Tested By:	SCM		Date:	Tuesday, May 14, 2019	Presoak: 1 hour
Actual Percolation Tested By:	JLM		Date:	Tuesday, May 14, 2019	
Test Hole Diameter Inches):	8	inches	Latitude:	33.057025	Longitude: -117.298589
Casing Diameter:	3	inches	Elevation:	63 ft	

PERCOLATION TEST (presoaking for a minimum of 1 hour)							
Time	Time Interval (min)	Initial Reading (feet below the top of the pipe)	Final Reading (feet below the top of the pipe)	Initial Water Level (feet above bottom of hole)	Final Water Level (feet above bottom of hole)	Δ in Water Level (inches)	Measured Raw Percolation Rate (inches/hour)
1:54 PM	10.0	4.02	4.32	1.48	1.18	3.60	2.41
2:04 PM							
2:04 PM	10.0	4.32	4.62	1.18	0.88	3.60	3.01
2:14 PM							
2:15 PM	10.0	4.13	4.40	1.37	1.10	3.24	2.31
2:25 PM							
2:25 PM	10.0	4.40	4.79	1.10	0.71	4.68	4.37
2:35 PM							
2:36 PM	10.0	4.01	4.26	1.49	1.24	3.00	1.96
2:46 PM							
2:46 PM	10.0	4.26	4.52	1.24	0.98	3.12	2.44
2:56 PM							
2:57 PM	10.0	3.89	4.17	1.61	1.33	3.36	2.05
3:07 PM							
3:07 PM	10.0	4.17	4.46	1.33	1.04	3.48	2.57
3:17 PM							
							2.36

Reduction factor for boring percolation

$RF_t = 2.00$

Site variability, number of tests, and thoroughness of subsurface investigation

$RF_v = 1.20$

Long-term siltation, plugging, and maintenance

$RF_s = 2.00$

Percolation Test performed according to the Administrative Manual, County of Los Angeles, Department of Public Works, Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, GS 200.2 (6/30/17)

Corrected Percolation Rate (Infiltration Rate) =	0.49	in/hour
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Project:	HWY 101 Streetscape- Encinitas		Job No:	TET 18-162E	
Test Hole No:	P-8		Date Excavated:	Tuesday, May 14, 2019	
Test Hole Depth (feet):	3.67	feet	Soil Classification:	Silty SAND (SM)	
Stick up Length (feet):	1.58	feet			
Sandy Soil Criteria Tested By:	SCM		Date:	Tuesday, May 14, 2019	Presoak: 1 hour
Actual Percolation Tested By:	JLM		Date:	Tuesday, May 14, 2019	
Test Hole Diameter Inches):	8	inches	Latitude:	33.057441	Longitude: -117.298674
Casing Diameter:	3	inches	Elevation:	64 ft	

PERCOLATION TEST (presoaking for a minimum of 1 hour)							
Time	Time Interval (min)	Initial Reading (feet below the top of the pipe)	Final Reading (feet below the top of the pipe)	Initial Water Level (feet above bottom of hole)	Final Water Level (feet above bottom of hole)	Δ in Water Level (inches)	Measured Raw Percolation Rate (inches/hour)
9:03 AM	10.0	3.79	4.12	1.46	1.13	3.96	2.71
9:13 AM							
9:14 AM	10.0	3.62	3.97	1.63	1.28	4.20	2.59
9:24 AM							
9:25 AM	10.0	3.72	4.05	1.53	1.20	3.96	2.59
9:35 AM							
9:36 AM	10.0	3.51	3.86	1.74	1.39	4.20	2.43
9:46 AM							
9:47 AM	10.0	3.74	4.07	1.51	1.18	3.96	2.62
9:57 AM							
9:58 AM	10.0	3.65	4.03	1.60	1.22	4.56	2.89
10:08 AM							
10:09 AM	10.0	3.74	4.06	1.51	1.19	3.84	2.53
10:19 AM							
							2.68

Reduction factor for boring percolation

$$RF_t = 2.00$$

Site variability, number of tests, and thoroughness of subsurface investigation

$$RF_v = 1.20$$

Long-term siltation, plugging, and maintenance

$$RF_{\varsigma} = 2.00$$

Percolation Test performed according to the Administrative Manual, County of Los Angeles, Department of Public Works, Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, GS 200.2 (6/30/17)

Corrected Percolation Rate (Infiltration Rate) =	0.56	in/hour
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Project:	HWY 101 Streetscape- Encinitas		Job No:	TET 18-162E	
Test Hole No:	P-9		Date Excavated:	Tuesday, May 14, 2019	
Test Hole Depth (feet):	3.42	feet	Soil Classification:	Silty SAND (SM)	
Stick up Length (feet):	1.71	feet			
Sandy Soil Criteria Tested By:	SCM		Date:	Tuesday, May 14, 2019	Presoak: 1 hour
Actual Percolation Tested By:	JLM		Date:	Tuesday, May 14, 2019	
Test Hole Diameter Inches):	8	inches	Latitude:	33.061024	Longitude: -117.301069
Casing Diameter:	3	inches	Elevation:	63 ft	

PERCOLATION TEST (presoaking for a minimum of 1 hour)							
Time	Time Interval (min)	Initial Reading (feet below the top of the pipe)	Final Reading (feet below the top of the pipe)	Initial Water Level (feet above bottom of hole)	Final Water Level (feet above bottom of hole)	Δ in Water Level (inches)	Measured Raw Percolation Rate (inches/hour)
12:13 PM	10.0	3.62	4.13	1.51	1.00	6.12	4.32
12:24 PM							
12:24 PM	10.0	3.76	4.23	1.37	0.90	5.64	4.35
12:34 PM							
12:35 PM	10.0	3.48	3.89	1.65	1.24	4.92	3.06
12:45 PM							
12:46 PM	10.0	3.71	4.16	1.42	0.97	5.40	3.98
12:56 PM							
12:56 PM	10.0	3.76	4.21	1.37	0.92	5.40	4.13
1:06 PM							
1:08 PM	10.0	3.79	4.25	1.34	0.88	5.52	4.34
1:18 PM							
1:19 PM	10.0	3.62	4.05	1.51	1.08	5.16	3.54
1:29 PM							
							4.01

Reduction factor for boring percolation

$$RF_t = 2.00$$

Site variability, number of tests, and thoroughness of subsurface investigation

$$RF_v = 1.20$$

Long-term siltation, plugging, and maintenance

$$RF_{\varsigma} = 2.00$$

Percolation Test performed according to the Administrative Manual, County of Los Angeles, Department of Public Works, Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, GS 200.2 (6/30/17)

Corrected Percolation Rate (Infiltration Rate) =	0.83	in/hour
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PERCOLATION DATA SHEET

Project:	HWY 101 Streetscape- Encinitas		Job No:	TET 18-162E	
Test Hole No:	P-10		Date Excavated:	Tuesday, May 14, 2019	
Test Hole Depth (feet):	3.67	feet	Soil Classification:	Silty SAND (SM)	
Stick up Length (feet):	1.67	feet			
Sandy Soil Criteria Tested By:	SCM		Date:	Tuesday, May 14, 2019	Presoak: 1 hour
Actual Percolation Tested By:	JLM		Date:	Tuesday, May 14, 2019	
Test Hole Diameter Inches):	8	inches	Latitude:	33.060801	Longitude: -117.300765
Casing Diameter:	3	inches	Elevation:	64 ft	

PERCOLATION TEST (presoaking for a minimum of 1 hour)							
Time	Time Interval (min)	Initial Reading (feet below the top of the pipe)	Final Reading (feet below the top of the pipe)	Initial Water Level (feet above bottom of hole)	Final Water Level (feet above bottom of hole)	Δ in Water Level (inches)	Measured Raw Percolation Rate (inches/hour)
9:30 AM	10.0	3.62	4.14	1.71	1.19	6.24	3.85
9:40 AM							
9:41 AM	10.0	3.55	4.03	1.78	1.30	5.76	3.37
9:51 AM							
9:52 AM	10.0	3.62	4.10	1.71	1.23	5.76	3.51
10:02 AM							
10:03 AM	10.0	3.75	4.17	1.58	1.16	5.04	3.27
10:13 AM							
10:14 AM	10.0	3.75	4.19	1.58	1.14	5.28	3.45
10:24 AM							
10:25 AM	13.0	3.47	4.07	1.86	1.26	7.20	3.20
10:38 AM							
10:39 AM	10.0	3.28	3.75	2.05	1.58	5.64	2.84
10:49 AM							
10:49 AM	12.0	3.75	4.38	1.58	0.95	7.56	4.39
11:01 AM							
							3.48

Reduction factor for boring percolation

$RF_t = 2.00$

Site variability, number of tests, and thoroughness of subsurface investigation

$RF_v = 1.20$

Long-term siltation, plugging, and maintenance

$RF_s = 2.00$

Percolation Test performed according to the Administrative Manual, County of Los Angeles, Department of Public Works, Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, GS 200.2 (6/30/17)

Corrected Percolation Rate (Infiltration Rate) =	0.72	in/hour
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PERCOLATION DATA SHEET

Project:	HWY 101 Streetscape- Encinitas		Job No:	TET 18-162E	
Test Hole No:	P-11		Date Excavated:	Tuesday, May 14, 2019	
Test Hole Depth (feet):	3.67	feet	Soil Classification:	Silty SAND (SM)	
Stick up Length (feet):	1.58	feet			
Sandy Soil Criteria Tested By:	SCM		Date:	Tuesday, May 14, 2019	Presoak: 1 hour
Actual Percolation Tested By:	JLM		Date:	Tuesday, May 14, 2019	
Test Hole Diameter Inches):	8	inches	Latitude:	33.062630	Longitude: -117.301753
Casing Diameter:	3	inches	Elevation:	58 ft	

PERCOLATION TEST (presoaking for a minimum of 1 hour)							
Time	Time Interval (min)	Initial Reading (feet below the top of the pipe)	Final Reading (feet below the top of the pipe)	Initial Water Level (feet above bottom of hole)	Final Water Level (feet above bottom of hole)	Δ in Water Level (inches)	Measured Raw Percolation Rate (inches/hour)
11:24 AM	10.0	3.97	4.18	1.28	1.07	2.52	1.88
11:34 AM							
11:36 AM	10.0	3.80	3.96	1.45	1.29	1.92	1.25
11:46 AM							
11:47 AM	12.0	3.77	3.95	1.48	1.30	2.16	1.16
11:59 AM							
11:59 AM	10.0	3.95	4.16	1.30	1.09	2.52	1.85
12:09 PM							
12:10 PM	10.0	3.80	3.95	1.45	1.30	1.80	1.17
12:20 PM							
12:21 PM	10.0	3.67	3.84	1.58	1.41	2.04	1.23
12:31 PM							
12:31 PM	10.0	3.84	4.02	1.41	1.23	2.16	1.45
12:41 PM							
							1.28

Reduction factor for boring percolation

$RF_t = 2.00$

Site variability, number of tests, and thoroughness of subsurface investigation

$RF_v = 1.20$

Long-term siltation, plugging, and maintenance

$RF_s = 2.00$

Percolation Test performed according to the Administrative Manual, County of Los Angeles, Department of Public Works, Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, GS 200.2 (6/30/17)

Corrected Percolation Rate (Infiltration Rate) =	0.27	in/hour
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PERCOLATION DATA SHEET

Project:	HWY 101 Streetscape- Encinitas		Job No:	TET 18-162E	
Test Hole No:	P-12a		Date Excavated:	Tuesday, May 14, 2019	
Test Hole Depth (feet):	3.67	feet	Soil Classification:	Silty SAND (SM)	
Stick up Length (feet):	1.17	feet			
Sandy Soil Criteria Tested By:	SCM		Date:	Tuesday, May 14, 2019	Presoak: 1 hour
Actual Percolation Tested By:	JLM		Date:	Tuesday, May 14, 2019	
Test Hole Diameter Inches):	8	inches	Latitude:	33.065167	Longitude: -117.302600
Casing Diameter:	3	inches	Elevation:	57 ft	

PERCOLATION TEST (presoaking for a minimum of 1 hour)							
Time	Time Interval (min)	Initial Reading (feet below the top of the pipe)	Final Reading (feet below the top of the pipe)	Initial Water Level (feet above bottom of hole)	Final Water Level (feet above bottom of hole)	Δ in Water Level (inches)	Measured Raw Percolation Rate (inches/hour)
10:45 AM	10.0	3.54	3.82	1.29	1.01	3.36	2.55
10:55 AM							
10:55 AM	10.0	3.82	4.17	1.01	0.66	4.20	4.18
11:05 AM							
11:07 AM	10.0	3.68	3.95	1.15	0.88	3.24	2.73
11:17 AM							
11:18 AM	13.0	3.40	3.75	1.43	1.08	4.20	2.27
11:31 AM							
11:31 AM	10.0	3.75	4.21	1.08	0.62	5.52	5.41
11:41 AM							
11:43 AM	12.0	3.20	3.57	1.63	1.26	4.44	2.29
11:55 AM							
11:55 AM	10.0	3.57	3.95	1.26	0.88	4.56	3.68
12:05 PM							
							3.79

Reduction factor for boring percolation

RF_t = 2.00

Site variability, number of tests, and thoroughness of subsurface investigation

RF_v = 1.20

Long-term siltation, plugging, and maintenance

RF_s = 2.00

Percolation Test performed according to the Administrative Manual, County of Los Angeles, Department of Public Works, Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, GS 200.2 (6/30/17)

Corrected Percolation Rate (Infiltration Rate) =	0.79	in/hour
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PERCOLATION DATA SHEET

Project:	HWY 101 Streetscape- Encinitas		Job No:	TET 18-162E	
Test Hole No:	P-13b		Date Excavated:	Thursday, May 16, 2019	
Test Hole Depth (feet):	3.75	feet	Soil Classification:	Silty SAND (SM)	
Stick up Length (feet):	1.33	feet			
Sandy Soil Criteria Tested By:	SCM		Date:	Thursday, May 16, 2019	Presoak: 1 hour
Actual Percolation Tested By:	JLM		Date:	Thursday, May 16, 2019	
Test Hole Diameter Inches):	8	inches	Latitude:	33.066123	Longitude: -117.302714
Casing Diameter:	3	inches	Elevation:	56 ft	

PERCOLATION TEST (presoaking for a minimum of 1 hour)							
Time	Time Interval (min)	Initial Reading (feet below the top of the pipe)	Final Reading (feet below the top of the pipe)	Initial Water Level (feet above bottom of hole)	Final Water Level (feet above bottom of hole)	Δ in Water Level (inches)	Measured Raw Percolation Rate (inches/hour)
12:38 PM	10.0	3.75	4.11	1.33	0.97	4.32	3.27
12:48 PM							
12:49 PM	10.0	3.72	4.05	1.36	1.03	3.96	2.90
12:59 PM							
1:00 PM	10.0	3.51	3.90	1.57	1.18	4.68	3.03
1:10 PM							
1:10 PM	10.0	3.90	4.17	1.18	0.91	3.24	2.67
1:20 PM							
1:23 PM	10.0	3.69	4.00	1.39	1.08	3.72	2.65
1:33 PM							
1:34 PM	10.0	3.76	4.05	1.32	1.03	3.48	2.59
1:44 PM							
1:44 PM	10.0	3.84	4.12	1.24	0.96	3.36	2.65
1:54 PM							
							2.63

Reduction factor for boring percolation

$RF_t = 2.00$

Site variability, number of tests, and thoroughness of subsurface investigation

$RF_v = 1.20$

Long-term siltation, plugging, and maintenance

$RF_s = 2.00$

Percolation Test performed according to the Administrative Manual, County of Los Angeles, Department of Public Works, Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, GS 200.2 (6/30/17)

Corrected Percolation Rate (Infiltration Rate) =	0.55	in/hour
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PERCOLATION DATA SHEET

Project:	HWY 101 Streetscape- Encinitas		Job No:	TET 18-162E	
Test Hole No:	P-14		Date Excavated:	Thursday, May 16, 2019	
Test Hole Depth (feet):	3.67	feet	Soil Classification:	Poorly graded SAND (SP)	
Stick up Length (feet):	1.33	feet			
Sandy Soil Criteria Tested By:	SCM		Date:	Thursday, May 16, 2019	Presoak: 1 hour
Actual Percolation Tested By:	JLM		Date:	Thursday, May 16, 2019	
Test Hole Diameter Inches):	8	inches	Latitude:	33.067927	Longitude: -117.303310
Casing Diameter:	3	inches	Elevation:	53 ft	

PERCOLATION TEST (presoaking for a minimum of 1 hour)							
Time	Time Interval (min)	Initial Reading (feet below the top of the pipe)	Final Reading (feet below the top of the pipe)	Initial Water Level (feet above bottom of hole)	Final Water Level (feet above bottom of hole)	Δ in Water Level (inches)	Measured Raw Percolation Rate (inches/hour)
1:15 PM	10.0	3.88	4.25	1.12	0.75	4.44	4.03
1:25 PM							
1:26 PM	10.0	3.28	3.83	1.72	1.17	6.60	4.10
1:36 PM							
1:36 PM	10.0	3.83	4.25	1.17	0.75	5.04	4.47
1:46 PM							
1:48 PM	10.0	3.31	3.80	1.69	1.20	5.88	3.65
1:58 PM							
1:58 PM	10.0	3.80	4.34	1.20	0.66	6.48	5.91
2:08 PM							
2:09 PM	10.0	3.57	4.00	1.43	1.00	5.16	3.73
2:19 PM							
2:19 PM	10.0	4.00	4.49	1.00	0.51	5.88	6.38
2:29 PM							
							5.34

Reduction factor for boring percolation

$RF_t = 2.00$

Site variability, number of tests, and thoroughness of subsurface investigation

$RF_v = 1.20$

Long-term siltation, plugging, and maintenance

$RF_s = 2.00$

Percolation Test performed according to the Administrative Manual, County of Los Angeles, Department of Public Works, Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, GS 200.2 (6/30/17)

Corrected Percolation Rate (Infiltration Rate) =	1.11	in/hour
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PERCOLATION DATA SHEET

Project:	HWY 101 Streetscape- Encinitas		Job No:	TET 18-162E	
Test Hole No:	P-15		Date Excavated:	Friday, May 17, 2019	
Test Hole Depth (feet):	3.42	feet	Soil Classification:	Silty SAND (SM)	
Stick up Length (feet):	2.17	feet			
Sandy Soil Criteria Tested By:	SCM		Date:	Friday, May 17, 2019	Presoak: 1 hour
Actual Percolation Tested By:	JLM		Date:	Friday, May 17, 2019	
Test Hole Diameter Inches):	8	inches	Latitude:	33.068286	Longitude: -117.303672
Casing Diameter:	3	inches	Elevation:	53 ft	

PERCOLATION TEST (presoaking for a minimum of 1 hour)							
Time	Time Interval (min)	Initial Reading (feet below the top of the pipe)	Final Reading (feet below the top of the pipe)	Initial Water Level (feet above bottom of hole)	Final Water Level (feet above bottom of hole)	Δ in Water Level (inches)	Measured Raw Percolation Rate (inches/hour)
8:22 AM	10.0	3.70	3.98	1.88	1.60	3.36	1.76
8:32 AM							
8:33 AM	13.0	3.01	3.80	2.57	1.78	9.48	3.11
8:46 AM							
8:46 AM	10.0	3.80	4.30	1.78	1.28	6.00	3.53
8:56 AM							
8:58 AM	10.0	3.78	4.24	1.80	1.34	5.52	3.17
9:08 AM							
9:09 AM	10.0	3.41	3.87	2.17	1.71	5.52	2.62
9:19 AM							
9:19 AM	10.0	3.87	4.31	1.71	1.27	5.28	3.18
9:29 AM							
9:30 AM	10.0	3.59	4.00	1.99	1.58	4.92	2.52
9:40 AM							
							2.77

Reduction factor for boring percolation

$RF_t = 2.00$

Site variability, number of tests, and thoroughness of subsurface investigation

$RF_v = 1.20$

Long-term siltation, plugging, and maintenance

$RF_s = 2.00$

Percolation Test performed according to the Administrative Manual, County of Los Angeles, Department of Public Works, Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, GS 200.2 (6/30/17)

Corrected Percolation Rate (Infiltration Rate) =	0.58	in/hour
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PERCOLATION DATA SHEET

Project:	HWY 101 Streetscape- Encinitas		Job No:	TET 18-162E	
Test Hole No:	P-16a		Date Excavated:	Wednesday, May 15, 2019	
Test Hole Depth (feet):	3.75	feet	Soil Classification:	Poorly graded SAND (SP)	
Stick up Length (feet):	1.46	feet			
Sandy Soil Criteria Tested By:	SCM		Date:	Wednesday, May 15, 2019	Presoak: 1 hour
Actual Percolation Tested By:	JLM		Date:	Wednesday, May 15, 2019	
Test Hole Diameter Inches):	8	inches	Latitude:	33.071772	Longitude: -117.304792
Casing Diameter:	3	inches	Elevation:	51 ft	

PERCOLATION TEST (presoaking for a minimum of 1 hour)							
Time	Time Interval (min)	Initial Reading (feet below the top of the pipe)	Final Reading (feet below the top of the pipe)	Initial Water Level (feet above bottom of hole)	Final Water Level (feet above bottom of hole)	Δ in Water Level (inches)	Measured Raw Percolation Rate (inches/hour)
1:42 PM	5.0	3.72	4.20	1.49	1.01	5.76	8.14
1:47 PM							
1:48 PM	5.0	3.68	4.11	1.53	1.10	5.16	6.97
1:53 PM							
1:54 PM	5.0	3.67	4.10	1.54	1.11	5.16	6.93
1:59 PM							
2:00 PM	5.0	3.50	3.92	1.71	1.29	5.04	6.05
2:05 PM							
2:06 PM	5.0	3.72	4.12	1.49	1.09	4.80	6.60
2:11 PM							
2:12 PM	5.0	3.90	4.28	1.31	0.93	4.56	7.10
2:17 PM							
2:18 PM	5.0	4.14	4.52	1.07	0.69	4.56	8.73
2:23 PM							
2:23 PM	4.0	4.52	4.70	0.69	0.51	2.16	7.06
2:25 PM							
							7.63

Reduction factor for boring percolation

$RF_t = 2.00$

Site variability, number of tests, and thoroughness of subsurface investigation

$RF_v = 1.20$

Long-term siltation, plugging, and maintenance

$RF_s = 2.00$

Percolation Test performed according to the Administrative Manual, County of Los Angeles, Department of Public Works, Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, GS 200.2 (6/30/17)

Corrected Percolation Rate (Infiltration Rate) =	1.59	in/hour
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PERCOLATION DATA SHEET

Project: HWY 101 Streetscape- Encinitas	Job No: TET 18-162E
Test Hole No: P-17	Date Excavated: Thursday, May 16, 2019
Test Hole Depth (feet): 3.67 feet	Soil Classification: Silty SAND (SM)
Stick up Length (feet): 1.50 feet	
Sandy Soil Criteria Tested By: SCM	Date: Thursday, May 16, 2019 Presoak: 1 hour
Actual Percolation Tested By: JLM	Date: Thursday, May 16, 2019
Test Hole Diameter Inches: 8 inches	Latitude: 33.071838 Longitude: -117.304576
Casing Diameter: 3 inches	Elevation: 52 ft

PERCOLATION TEST (presoaking for a minimum of 1 hour)							
Time	Time Interval (min)	Initial Reading (feet below the top of the pipe)	Final Reading (feet below the top of the pipe)	Initial Water Level (feet above bottom of hole)	Final Water Level (feet above bottom of hole)	Δ in Water Level (inches)	Measured Raw Percolation Rate (inches/hour)
1:52 PM	10.0	3.30	3.75	1.87	1.42	5.40	2.99
2:02 PM							
2:02 PM	10.0	3.75	4.09	1.42	1.08	4.08	2.89
2:12 PM							
2:13 PM	10.0	3.51	3.87	1.66	1.30	4.32	2.63
2:23 PM							
2:23 PM	10.0	3.87	4.17	1.30	1.00	3.60	2.74
2:33 PM							
2:34 PM	10.0	3.61	3.97	1.56	1.20	4.32	2.80
2:44 PM							
2:44 PM	10.0	3.97	4.22	1.20	0.95	3.00	2.42
2:54 PM							
2:55 PM	10.0	3.51	3.82	1.66	1.35	3.72	2.23
1:05 PM							
							2.48

Reduction factor for boring percolation

$RF_t = 2.00$

Site variability, number of tests, and thoroughness of subsurface investigation

$RF_v = 1.20$

Long-term siltation, plugging, and maintenance

$RF_s = 2.00$

Percolation Test performed according to the Administrative Manual, County of Los Angeles, Department of Public Works, Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, GS 200.2 (6/30/17)

Corrected Percolation Rate (Infiltration Rate) =	0.52	in/hour
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PERCOLATION DATA SHEET

Project:	HWY 101 Streetscape- Encinitas		Job No:	TET 18-162E	
Test Hole No:	P-18		Date Excavated:	Thursday, May 16, 2019	
Test Hole Depth (feet):	3.75	feet	Soil Classification:	Silty SAND (SM)	
Stick up Length (feet):	1.46	feet			
Sandy Soil Criteria Tested By:	SCM		Date:	Thursday, May 16, 2019	Presoak: 1 hour
Actual Percolation Tested By:	JLM		Date:	Thursday, May 16, 2019	
Test Hole Diameter Inches):	8	inches	Latitude:	33.074374	Longitude: -117.305450
Casing Diameter:	3	inches	Elevation:	55 ft	

PERCOLATION TEST (presoaking for a minimum of 1 hour)							
Time	Time Interval (min)	Initial Reading (feet below the top of the pipe)	Final Reading (feet below the top of the pipe)	Initial Water Level (feet above bottom of hole)	Final Water Level (feet above bottom of hole)	Δ in Water Level (inches)	Measured Raw Percolation Rate (inches/hour)
2:15 PM	10.0	3.59	4.32	1.62	0.89	8.76	6.17
2:25 PM							
2:26 PM	10.0	3.79	4.39	1.42	0.82	7.20	5.60
2:37 PM							
2:37 PM	10.0	3.64	4.25	1.57	0.96	7.32	5.12
2:47 PM							
2:48 PM	10.0	3.57	4.20	1.64	1.01	7.56	5.07
2:58 PM							
2:59 PM	11.0	3.42	4.15	1.79	1.06	8.76	5.01
3:10 PM							
3:12 PM	10.0	3.42	4.07	1.79	1.14	7.80	4.79
3:22 PM							
3:23 PM	10.0	3.35	4.02	1.86	1.19	8.04	4.76
3:33 PM							
							4.85

Reduction factor for boring percolation

$RF_t = 2.00$

Site variability, number of tests, and thoroughness of subsurface investigation

$RF_v = 1.20$

Long-term siltation, plugging, and maintenance

$RF_s = 2.00$

Percolation Test performed according to the Administrative Manual, County of Los Angeles, Department of Public Works, Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, GS 200.2 (6/30/17)

Corrected Percolation Rate (Infiltration Rate) =	1.01	in/hour
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PERCOLATION DATA SHEET

Project:	HWY 101 Streetscape- Encinitas		Job No:	TET 18-162E	
Test Hole No:	P-19a		Date Excavated:	Wednesday, May 15, 2019	
Test Hole Depth (feet):	3.67	feet	Soil Classification:	Poorly graded SAND (SP)	
Stick up Length (feet):	1.67	feet			
Sandy Soil Criteria Tested By:	SCM		Date:	Wednesday, May 15, 2019	Presoak: 1 hour
Actual Percolation Tested By:	JLM		Date:	Wednesday, May 15, 2019	
Test Hole Diameter Inches):	8	inches	Latitude:	33.075600	Longitude: -117.306114
Casing Diameter:	3	inches	Elevation:	53 ft	

PERCOLATION TEST (presoaking for a minimum of 1 hour)							
Time	Time Interval (min)	Initial Reading (feet below the top of the pipe)	Final Reading (feet below the top of the pipe)	Initial Water Level (feet above bottom of hole)	Final Water Level (feet above bottom of hole)	Δ in Water Level (inches)	Measured Raw Percolation Rate (inches/hour)
11:15	10.0	3.34	3.89	1.99	1.44	6.60	3.50
11:25 AM							
11:25 AM	10.0	3.89	4.35	1.44	0.98	5.52	4.00
11:35 AM							
11:37 AM	10.0	3.56	3.98	1.77	1.35	5.04	2.91
11:47 AM							
11:48 AM	10.0	3.98	4.67	1.35	0.66	8.28	7.05
11:58 AM							
12:02 PM	10.0	3.58	4.03	1.75	1.30	5.40	3.19
12:12 PM							
12:14 PM	10.0	3.51	3.89	1.82	1.44	4.56	2.53
12:24 PM							
12:24 PM	10.0	3.89	4.52	1.44	0.81	7.56	5.84
12:34 PM							
							3.85

Reduction factor for boring percolation

RF_t = 2.00

Site variability, number of tests, and thoroughness of subsurface investigation

RF_v = 1.20

Long-term siltation, plugging, and maintenance

RF_s = 2.00

Percolation Test performed according to the Administrative Manual, County of Los Angeles, Department of Public Works, Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, GS 200.2 (6/30/17)

Corrected Percolation Rate (Infiltration Rate) =	0.80	in/hour
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PERCOLATION DATA SHEET

Project:	HWY 101 Streetscape- Encinitas		Job No:	TET 18-162E	
Test Hole No:	P-20a		Date Excavated:	Wednesday, May 15, 2019	
Test Hole Depth (feet):	3.75	feet	Soil Classification:	Silty SAND (SM)	
Stick up Length (feet):	1.67	feet			
Sandy Soil Criteria Tested By:	SCM		Date:	Wednesday, May 15, 2019	Presoak: 1 hour
Actual Percolation Tested By:	JLM		Date:	Wednesday, May 15, 2019	
Test Hole Diameter Inches):	8	inches	Latitude:	33.078555	Longitude: -117.306834
Casing Diameter:	3	inches	Elevation:	53 ft	

PERCOLATION TEST (presoaking for a minimum of 1 hour)							
Time	Time Interval (min)	Initial Reading (feet below the top of the pipe)	Final Reading (feet below the top of the pipe)	Initial Water Level (feet above bottom of hole)	Final Water Level (feet above bottom of hole)	Δ in Water Level (inches)	Measured Raw Percolation Rate (inches/hour)
9:11 AM	10.0	3.89	4.26	1.53	1.16	4.44	2.94
9:21 AM							
9:22 AM	10.0	3.91	4.24	1.51	1.18	3.96	2.63
9:32 AM							
9:33 AM	10.0	3.76	4.11	1.66	1.31	4.20	2.55
9:43 AM							
9:44 AM	10.0	3.75	4.09	1.67	1.33	4.08	2.45
9:54 AM							
9:55 AM	10.0	3.55	3.95	1.87	1.47	4.80	2.62
10:05 AM							
10:05 AM	10.0	3.95	4.25	1.47	1.17	3.60	2.43
10:15 AM							
10:16 AM	10.0	3.78	4.14	1.64	1.28	4.32	2.66
10:26 AM							
							2.57

Reduction factor for boring percolation

RF_t = 2.00

Site variability, number of tests, and thoroughness of subsurface investigation

RF_v = 1.20

Long-term siltation, plugging, and maintenance

RF_s = 2.00

Percolation Test performed according to the Administrative Manual, County of Los Angeles, Department of Public Works, Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, GS 200.2 (6/30/17)

Corrected Percolation Rate (Infiltration Rate) =	0.54	in/hour
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PERCOLATION DATA SHEET

Project:	HWY 101 Streetscape- Encinitas		Job No:	TET 18-162E	
Test Hole No:	P-21a		Date Excavated:	Wednesday, May 15, 2019	
Test Hole Depth (feet):	3.75	feet	Soil Classification:	Silty SAND (SM)	
Stick up Length (feet):	1.58	feet			
Sandy Soil Criteria Tested By:	SCM		Date:	Wednesday, May 15, 2019	Presoak: 1 hour
Actual Percolation Tested By:	JLM		Date:	Wednesday, May 15, 2019	
Test Hole Diameter Inches):	8	inches	Latitude:	33.079503	Longitude: -117.307390
Casing Diameter:	3	inches	Elevation:	54 ft	

PERCOLATION TEST (presoaking for a minimum of 1 hour)							
Time	Time Interval (min)	Initial Reading (feet below the top of the pipe)	Final Reading (feet below the top of the pipe)	Initial Water Level (feet above bottom of hole)	Final Water Level (feet above bottom of hole)	Δ in Water Level (inches)	Measured Raw Percolation Rate (inches/hour)
10:38 AM	10.0	3.84	4.27	1.49	1.06	5.16	3.57
10:48 AM							
10:49 AM	10.0	3.46	3.94	1.87	1.39	5.76	3.20
10:59 AM							
10:59 AM	10.0	3.94	4.30	1.39	1.03	4.32	3.13
11:09 AM							
11:10 AM	10.0	3.12	3.68	2.21	1.65	6.72	3.20
11:20 AM							
11:20 AM	10.0	3.68	4.07	1.65	1.26	4.68	2.88
11:30 AM							
11:31 AM	10.0	3.71	4.14	1.62	1.19	5.16	3.28
11:41 AM							
11:43 AM	10.0	3.77	4.16	1.56	1.17	4.68	3.05
11:53 AM							
							3.07

Reduction factor for boring percolation

$RF_t = 2.00$

Site variability, number of tests, and thoroughness of subsurface investigation

$RF_v = 1.20$

Long-term siltation, plugging, and maintenance

$RF_s = 2.00$

Percolation Test performed according to the Administrative Manual, County of Los Angeles, Department of Public Works, Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, GS 200.2 (6/30/17)

Corrected Percolation Rate (Infiltration Rate) =	0.64	in/hour
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PERCOLATION DATA SHEET

Project:	HWY 101 Streetscape- Encinitas		Job No:	TET 18-162E	
Test Hole No:	P-22a		Date Excavated:	Wednesday, May 15, 2019	
Test Hole Depth (feet):	3.50	feet	Soil Classification:	Base material, Gravel/may be cement	
Stick up Length (feet):	1.46	feet			
Sandy Soil Criteria Tested By:	SCM		Date:	Wednesday, May 15, 2019	Presoak: 1 hour
Actual Percolation Tested By:	JLM		Date:	Wednesday, May 15, 2019	
Test Hole Diameter Inches):	8	inches	Latitude:	33.081667	Longitude: -117.308256
Casing Diameter:	3	inches	Elevation:	55	

PERCOLATION TEST (presoaking for a minimum of 1 hour)							
Time	Time Interval (min)	Initial Reading (feet below the top of the pipe)	Final Reading (feet below the top of the pipe)	Initial Water Level (feet above bottom of hole)	Final Water Level (feet above bottom of hole)	Δ in Water Level (inches)	Measured Raw Percolation Rate (inches/hour)
10:34 AM	30.0	3.61	3.79	1.35	1.17	2.16	0.51
11:04 AM							
11:04 AM	30.0	3.79	3.92	1.17	1.04	1.56	0.41
11:34 AM							
11:34 AM	30.0	3.92	4.05	1.04	0.91	1.56	0.46
12:04 PM							
12:06 PM	30.0	3.68	3.81	1.28	1.15	1.56	0.38
12:36 PM							
12:36 PM	30.0	3.81	3.92	1.15	1.04	1.32	0.35
1:06 PM							
1:06 PM	30.0	3.93	4.04	1.03	0.92	1.32	0.39
1:36 PM							
							0.37

Reduction factor for boring percolation

$RF_t = 2.00$

Site variability, number of tests, and thoroughness of subsurface investigation

$RF_v = 1.20$

Long-term siltation, plugging, and maintenance

$RF_s = 2.00$

Percolation Test performed according to the Administrative Manual, County of Los Angeles, Department of Public Works, Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, GS 200.2 (6/30/17)

Corrected Percolation Rate (Infiltration Rate) =	0.08	in/hour
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Project:	HWY 101 Streetscape- Encinitas		Job No:	TET 18-162E	
Test Hole No:	P-23		Date Excavated:	Wednesday, May 15, 2019	
Test Hole Depth (feet):	3.67	feet	Soil Classification:	Poorly graded SAND w/ silt (SP-SM)	
Stick up Length (feet):	1.75	feet			
Sandy Soil Criteria Tested By:	SCM		Date:	Wednesday, May 15, 2019	Presoak: 1 hour
Actual Percolation Tested By:	JLM		Date:	Wednesday, May 15, 2019	
Test Hole Diameter Inches):	8	inches	Latitude:	33.081431	Longitude: -117.307914
Casing Diameter:	3	inches	Elevation:	57 ft	

PERCOLATION TEST (presoaking for a minimum of 1 hour)							
Time	Time Interval (min)	Initial Reading (feet below the top of the pipe)	Final Reading (feet below the top of the pipe)	Initial Water Level (feet above bottom of hole)	Final Water Level (feet above bottom of hole)	Δ in Water Level (inches)	Measured Raw Percolation Rate (inches/hour)
9:37 AM	10.0	3.65	4.20	1.77	1.22	6.60	3.98
9:47 AM							
9:48 AM	10.0	3.49	3.96	1.93	1.46	5.64	3.03
9:58 AM							
9:58 AM	10.0	3.96	4.46	1.46	0.96	6.00	4.37
10:08 AM							
10:09 AM	10.0	3.57	3.97	1.85	1.45	4.80	2.65
10:19 AM							
10:19 AM	10.0	3.97	4.42	1.45	1.00	5.40	3.89
10:29 AM							
10:31 AM	10.0	3.82	4.21	1.60	1.21	4.68	2.98
10:41 AM							
10:42 AM	10.0	3.53	3.92	1.89	1.50	4.68	2.52
10:52 AM							
							3.13

Reduction factor for boring percolation

$$RF_t = 2.00$$

Site variability, number of tests, and thoroughness of subsurface investigation

$$RF_v = 1.20$$

Long-term siltation, plugging, and maintenance

$$RF_s = 2.00$$

Percolation Test performed according to the Administrative Manual, County of Los Angeles, Department of Public Works, Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, GS 200.2 (6/30/17)

Corrected Percolation Rate (Infiltration Rate) =	0.65	in/hour
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