GEOLOGIC AND SEISMIC HAZARDS REVIEW
PROPOSED SAN CLEMENTE SENIOR HOUSING PROJECT
654 CAMINO DE LOS MARES
CITY OF SAN CLEMENTE, ORANGE COUNTY, CALIFORNIA

Prepared For

MEMORIAL CARE HEALTH SYSTEM
17360 BROOKHURST STREET
FOUNTAIN VALLEY, CALIFORNIA 92708

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Leighton and Associates, Inc.
A Leighton Group Company

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Project No. 13468.002

Memorial Care Health System
17360 Brookhurst Street
Fountain Valley, California 92708

Attention: Mr. Thomas J. Leary

Subject: Geologic and Seismic Hazards Review
Proposed San Clemente Senior Housing Project
654 Camino De Los Mares
City of San Clemente, Orange County, California

Leighton and Associates, Inc. (Leighton) is pleased to submit this Geologic and Seismic Hazards Review Report and Infiltration Feasibility Study in support of development of the proposed Senior Housing project located at 654 Camino De Los Mares in the City of San Clemente, California. This desktop study was performed in general accordance with the California Environmental Quality Act (CEQA) guidelines and Environmental Checklist for Geology and Soils.

The project site is not located within a State of California Alquist-Priolo Zone, or Liquefaction Hazard Zone, however, the slope bounding the southern edge of the site is defined as a potential Earthquake-Induced Landslide hazard zone. Based on our review of readily available regional geologic maps and reports, site-specific geotechnical documents, and soil infiltration feasibility study, site geologic units include artificial fill ranging from 6.5 to 45 feet thick as observed in borings and interpreted up to 70 feet thick within the axes of two buried canyons. The fill is underlain by a succession of non-marine "terrestrial" alluvium and marine terrace deposits characterized as silty clay and sand. The terrace units were deposited upon a marine-cut platform of bedrock assigned to the Miocene age Capistrano Formation.

We appreciate the opportunity to be of service to you on this project. If you have any questions or if we can be of further service, please contact us at ***(866) LEIGHTON***; specifically at the phone extensions or e-mails as listed below.

Respectfully submitted,

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1 INTRODUCTION

1.1 Purpose and Scope

The purpose of our work was to evaluate the geologic and seismic hazards and infiltration feasibility conditions associated with the property located at 654 Camino De Los Mares, San Clemente, California (the site). The location and site boundaries are depicted on attached Figure 1, *Site Location Map*. This desktop study was performed in support of the proposed development, per the California Environmental Quality Act (CEQA) guidelines and Environmental Checklist for Geology and Soils.

The scope of this evaluation included the following tasks:

- *Desktop Review and Data Collection* – Reviewed readily available published geology reports and maps, historical aerial photographs and topographic maps, site-specific geotechnical reports obtained from City of San Clemente files, and other literature relevant to the site contained within our in-house library or in the public domain. We evaluated geological hazards and geotechnical issues considered geologically relevant to site development. A list of review documents is provided in the *References* section at end of text

- *Site Reconnaissance and Boring Markout* – Conducted a reconnaissance of the property to observe existing surface conditions and any visual indications of underlying geologic and soil conditions. Marked the locations of planned subsurface exploration (drilling), and notified the DigAlert agency whose members marked the locations of known underground utilities at the surface prior to drilling.

- *Permitting* – Prior to commencement of fieldwork, we applied for and acquired a permit for soil borings through the City of San Clemente.

- *Field Exploration* – We drilled, logged and sampled a total of three (3) 8-inch diameter hollow-stem auger borings (LB-1, LB-2 and LB-3) in accessible areas of the site. Two (2) additional borings (LP-1 and LP-2) were drilled within the areas of potential drywell installation, along the southwestern top of existing slope.

  Both bulk and relatively undisturbed drive samples were obtained from the borings, and transported to our laboratory for geotechnical testing. The

relatively undisturbed samples were collected using a Modified California Ring sampler in accordance with ASTM Test Method D3550. Standard Penetration Tests (SPT) were also performed within the hollow-stem auger borings in accordance with ASTM Test Method D1586. The samplers were driven for a total penetration of 18 inches, unless practical refusal was encountered, using a 140-pound automatic hammer falling freely for 30 inches. The number of blows per 6 inches of penetration was recorded on the boring logs.

The borings were logged in the field by a Certified Engineering Geologist (CEG) from our technical staff. Each soil sample collected was reviewed and described in accordance with the Unified Soil Classification System (USCS). The samples were sealed and packaged for transportation to our laboratory. Upon completion of drilling, Borings LB-1, -2 and -3 were backfilled with a mixture of bentonite grout and a surface patch of concrete. The boring logs are presented in Appendix A, *Exploratory Boring Logs*. Approximate boring locations are shown on Figure 2, *Exploration Location Map.*

- *Percolation Testing* – Upon completion of drilling, percolation test wells LP-1 and LP-2 were constructed by installing 2-inch diameter blank and 0.020-inch slotted PVC casing with an annular space backfill of #3 Monterey Sand. In-situ percolation testing was performed in general accordance with the County of Orange *Technical Guidance Document for the Preparation of Conceptual/Preliminary and/or project WQMP's (December 2013)*. Results of percolation tests are presented in Appendix B, *Infiltration Test Results*. For a discussion of infiltration rates, the reader is referred to Section 2.3, *Infiltration*. Percolation test wells LP-1 and -2 were retained for possible future use and abandonment as part of a continued exploration program for project design. Well protection measures included sealing annular spaces with bentonite and installing a durable traffic box encased in Asphalt Concrete (AC) at the surface. Approximate percolation test well locations are shown on Figure 2. Test well logs are attached in Appendix A, *Exploratory Boring Logs*.

- *Geotechnical Laboratory Testing* – Geotechnical laboratory tests were conducted on select bulk and undisturbed soil samples obtained from borings. The testing program was designed to evaluate geotechnical (physical) characteristics of site soil and bedrock units. Geotechnical test results are presented in Appendix C, *Laboratory Test Results*. The following laboratory tests were performed:

- Expansion Index (ASTM D4829);
- Atterberg Limits (ASTM D 4318);
- Modified Proctor Compaction Test (ASTM D1557);
- Particle Size Analysis (ASTM D 6913); and
- Corrosivity (Soluble Sulfate ASTM C1580, Soluble Chloride ASTM C1411-09, pH ASTM D4972, and Resistivity ASTM G187-12a).

- *Analysis and Report Preparation* – This report documents our geologic and seismic hazards review and results of infiltration testing. A completed *CEQA questionnaire for Section VI - Geology and Soils* has been included in Appendix D.

1.2 Site Description

The subject property is located at 654 Camino De Los Mares in the City of San Clemente, California (site), on a parcel of land identified by the Orange County Assessor's Office with Assessor Parcel Number (APN) 675-072-19. The site location (latitude 33.4570°, longitude -117.6500°) and immediate vicinity are shown on Figure 1, *Site Location Map*.

The project site is roughly rectangular in shape and improved as a relatively level building pad bounded on the southwest by descending slope terrain ranging in ratios from 1.6:1 to 2:1 (h:v). The property encompasses 6.6 acres fronting Camino De Los Mares on the northeast, and bounded by Ocean View Plaza retail development to the northwest, the existing multi-story San Clemente Villas Senior Living development to the southeast, and the northbound lanes of Interstate 5 freeway to the southwest. Surface relief across pad is gently sloping from northwest to southeast, between approximate elevation (El.) +230 feet above mean sea level (msl) to El. +218 msl.

A hospital facility is centrally located on the pad, having been vacated since approximately 2016. The building generally consists of a single-story structure with local single level subterranean basement of smaller footprint. An abutting detached building exists on the eastern side of the structure. The buildings are surrounded by areas of asphalt-paved parking and concrete-covered truck loading bays.

1.3 Proposed Development

Our understanding of the project is based on review of a *San Clemente Senior Housing Entitlement Set* dated March 21, 2022 prepared by TCA Architects. The set of plans indicate the development will consist of two 3- and 4-story structures accommodating a total of 250 senior housing units. Ground floor areas of retail and other uses are planned, along with a central swimming pool and courtyard area. A detached 2-story 7,500 square foot medical office building is planned at the northeast corner of the pad. Parking and vehicular access will be accommodated at grade through use of carport structures, drive aisles, and new asphalt pavement.

Current project plans indicate stormwater runoff will be controlled in part by an on-site system of deep infiltration via drywells (DW), and that use of infiltration BMPs will be dependent upon the feasibility of geologic units to accommodate infiltration. Plans indicate the locations of three (3) potential drywell sites (DW-1, DW-2 and DW-3), see Figure 2.

1.4 Previous Investigations

Prior geotechnical investigation of the Samaritan Medical Center was performed by Woodward Clyde (1995, 1998, 1999). Their evaluation focused on the identification and mitigation of surface distress within an access road along the top-of-slope portion of the southwestern Samaritan Medical Center property. They reported on the character and distribution geologic units underlying the property, which are generally consistent with conditions yielded by our present/subject study.

2 GEOTECHNICAL CONDITIONS

2.1 Regional Geologic Setting

The project site is situated within the coastal foothill belt of the Peninsular Ranges geomorphic province of California. The province supports a long and active geologic history of deep marine sedimentation, uplift, fluvial and marine erosion, and deposition. More locally, the site lies southwestern of the Santa Ana Mountains. The Peninsular Ranges province extends far beyond the site area, approximately 900 miles southward from the Los Angeles basin to the tip of Baja California (Yerkes, et al., 1965) and is characterized by elongated, northwest-trending, mountain ridges separated by straight-sided, sediment-floored valleys. However, the most dominant structural features of the province are the northwest-trending fault zones, most of which either die out, merge with, or are terminated by the steep reverse faults at the southern margin of the Transverse Ranges province to the north. These fault zones separate large elongated blocks, each standing at different structural elevations. Within this framework, the Santa Ana Mountains are a large flexure, which has been uplifted on the eastern side along the Whittier-Elsinore Fault Zone, producing a tilted, irregular, and complex highland that slopes westward toward the sea.

Geological mapping of the area (Bedrossian and Roffers, 2012) indicate the subject site is underlain by Quaternary to Miocene age sedimentary formations with intermittent artificial fill. The regional geology of the site and vicinity is shown on Figure 3, *Regional Geology Map.*

2.2 Local Geology

Our investigation reveals the site is underlain by undocumented artificial fill encountered at explored locations from 6 to 45 feet in thickness. Review of earlier topography maps suggest fill may be on the order of up to 70 feet thick placed to infill canyons that transected the site prior to construction of the hospital. The fill is underlain by Quaternary age non-marine and marine deposits comprised of silty clay and clay with silt, and sand with gravel, respectively, which is underlain in turn by bedrock assigned to the Miocene to Pliocene Capistrano Formation (Tc) composed of silty claystone and clayey siltstone.

2.3 Infiltration

Per discussions with the project civil engineer and in accordance with our authorized scope of work, Leighton performed two field percolation tests (LP-1 and LP-2) within zones approximately 30 to 40 feet bgs. The test wells were constructed in the vicinity of planned dry wells along the southwest site boundary (see Figure 2, *Exploration Location Map*). The test zones penetrated a Marine Terrace unit comprised of poorly sorted gravelly sand with approximately 4 percent fines (Appendix C). Wells were constructed using 2-inch diameter slotted PVC pipe (0.020 in). Annular space around well pipes was infilled with #3 Monterey Sand to a height of approximately 1-foot above the screened interval.

The wells were pre-soaked prior to testing to model behavior of stormwater quality control devices during a design storm event. Following pre-soaking, and based on the results of preliminary field tests, it was determined that a constant head test procedure was warranted, requiring constant water flow, periodic measurements of water level and total water input inside the well at intervals during the test period. Calculated from the test results are "measured" rates of percolation, by dividing the rate of discharge (cubic inches per hour) by the infiltration surface area (flow area in square inches). Discharge volumes were calculated by adding the total volume of water drop inside the PVC pipe and within the porosity-factored annulus material. The flow area was based on the average water height within the slotted pipe section of the test well only.

Rates of yielded field percolation were converted into measured rates of infiltration, as summarized below in Table 1, in units of inches per hour (in/hr). Test data are also presented in Appendix B, *Infiltration Test Results*. The measured rates are defined as "un-factored" in that no safety factor has been applied.

Table 1 – Field Percolation Testing Summary

Percolation Test Boring/Well Designation	Percolation Test Method	Approximate Depth of Test Zone Below Ground Surface (feet)	Unfactored* Infiltration Rate (in/hr)
LP-1	Constant Head	30 – 40	96.0
LP-2	Constant Head	29 - 39	152.9

The calculated rates of infiltration yielded by the Marine Terrace Deposits indicate the use of dry wells founded within this unit represent an opportunity for on-site stormwater disposal. The calculated rates represent the product of relatively

small-scale tests, performed at specific locations and depths, it is possible that rates collected from similar sediments elsewhere on the site may yield slower or faster rates than indicated. Infiltration rates can be expected to decline over the lifespan of the system, and between BMP maintenance cycles as fine particulates accumulate within an infiltration media. As such, to account for these variations, a factor of safety (FS) should be applied to calculated infiltration rates, to derive a "factored" rate for use in system design. Based on the findings of our exploration and laboratory testing, a minimum factor of safety of 3.0 is recommended.

The measured percolation and calculated infiltration rates presented above may be used for the planning level screening phase of design. During the design phase, it should be noted that an elevated factor or safety may also be used by designers in lieu of additional field testing.

Stormwater Infiltration System Setbacks
(Measured from bottom of infiltration device)

Setback	Distance
Any Foundation, Retaining Wall, Basement Wall, or Utility Trench	The invert of any stormwater infiltration shall be set back at least 15 feet, and outside a 1:1 plane drawn down and out from the bottom of adjacent foundations.
Face of any slope-Building Setback	H/2, 20 feet minimum (H is height of slope)

2.4 Groundwater

The California Department of Water Resources (2022) documents no groundwater wells on or within the nearby site vicinity which might provide information representative of groundwater conditions beneath the subject property. The most useful information is derived from the findings of our exploratory borings. Our borings reveal the presence of very moist soils within Marine Terrace deposits, perched above the claystone bedrock. Such conditions were encountered at depths of 47 feet below existing grade in boring LB-1 as wet gravels, and 36 feet in LB-2 as very moist clayey soil.

2.5 Regional Faulting

There are no active or potentially active faults known to cross the project site and the site is not located within an Alquist-Priolo Earthquake Fault Zone (CGS, 1986; Bryant and Hart, 2007) and as such, the potential for surface fault rupture at the

site is considered low. However, several active and potentially active faults are mapped within approximately 6 (3.7 miles) of the site. Figure 4, *Regional Faults and Historic Seismicity Map*, shows the proximity of known active and potentially active faults within the region. Considering the locations of these mapped faults relative to the site, the potential impact of surface fault rupture occurrence at the site is considered to be low. Therefore, the impact of fault rupture is less than significant.

2.6 Seismicity and Ground Shaking

The principal seismic hazard to the site is ground shaking resulting from an earthquake occurring along any of several major active and potentially active faults in southern California. The intensity of ground shaking at a given location depends primarily upon the earthquake magnitude, the distance from the source, and the site response characteristics. The site should be expected to experience strong ground shaking resulting from an earthquake occurring along one or more of the major regional active faults (Figure 4). Accordingly, the project should be designed in accordance with all applicable current codes and standards utilizing the appropriate seismic design parameters to reduce seismic risk as defined by California Geological Survey (CGS) Chapter 2 of Special Publication 117a (CGS, 2008). The 2019 edition of the CBC is the current edition of the code. Through compliance with these regulatory requirements and the utilization of appropriate seismic design parameters selected by the design professionals, potential effects relating to seismic shaking can be reduced.

The following parameters should be considered for design under the 2019 CBC:

Table 2 - 2019 CBC Seismic Design Parameters

Categorization/Coefficients	Code-Based (1) (2
Site Longitude (decimal degrees) West	-117.6500°
Site Latitude (decimal degrees) North	33.4570°
Site Class	D
Mapped Spectral Response Acceleration at 0.2s Period, S_s	1.173
Mapped Spectral Response Acceleration at 1s Period, S_1	0.423
Short Period Site Coefficient at 0.2s Period, F_a	1.0
Long Period Site Coefficient at 1s Period, F_v	1.877[3]
Adjusted Spectral Response Acceleration at 0.2s Period, S_{MS}	1.209
Adjusted Spectral Response Acceleration at 1s Period, S_{M1}	0.794[3]
Design Spectral Response Acceleration at 0.2s Period, S_{DS}	0.806
Design Spectral Response Acceleration at 1s Period, S_{D1}	0.529[3]

1. All were derived from the SEAOC web page: https://seismicmaps.org/
2. All coefficients in units of g (spectral acceleration)
3. Per Exception 2 in Section 11.4.8 of ASCE 7-16, seismic response coefficient C_s to be determined by Eq. 12.8-2 for values of $T \leq 1.5T_s$ and taken as equal to 1.5 times the value computed in accordance with either Eq. 12.8-3 for $T_L \geq T > 1.5T_s$ or Eq. 12.8-4 for $T > T_L$

The results of this analysis also indicate that the adjusted Peak Ground Acceleration (PGA_M) for this site is 0.557g. The code-based seismic analysis report is included in Appendix E, *Preliminary Seismic Design Parameters*.

3 POTENTIAL GEOTECHNICAL HAZARDS

This section presents the principal geological and geotechnical conditions at the Project site. The potential constraint and impact that each condition may have on the site is subjectively rated as less than significant or potentially significant. Table 3 summarizes the potential geotechnical hazards at the project site. Where the impact is less than significant, no mitigation measures are considered necessary. Where the impact is potentially significant, measures to mitigate the hazard are required. Discussion of these hazards and measures to mitigate these hazards are presented in the following subsections.

Table 3 – Summary of Potential Geotechnical Hazards

Potential Geotechnical Hazard		Hazard Level
Earthquake Damage	Fault Displacement/Ground Rupture	Less than significant
	Seismic Shaking	Potentially significant
	Liquefaction	Less than significant
	Lateral Spreading	Less than significant
	Seismically Induced Settlement	Less than significant
	Seismically Induced Landslides	Less than significant
	Ground Lurching	Less than significant
	Seismically Induced Inundation	Less than significant
	Tsunami	Less than significant
Land Subsidence	Extraction	Less than significant
	Hydroconsolidation	Less than significant
	Compressible Soils	Less than significant
Slope Stability	Unstable Slopes	Less than significant
	Landslides and Mudflows	Less than significant
Soil Erosion		Less than significant
Expansive Soils		Potentially significant
Flooding		Less than significant
Grading Impacts		Less than significant
Volcanic Hazards		Less than significant
Onsite Wastewater Disposal		Less than significant

3.1 Earthquake Damage

3.1.1 Fault Displacement/Ground Rupture

A displacement of the ground surface is possible along faults in earthquakes typically greater than a Magnitude 6.5. The resultant vertical and/or lateral sense of offset can damage structures situated above the fault trace of a fault. No active or sufficiently active faults are known to cross the Project site. The Project site is not located within an Alquist-Priolo Earthquake Fault Zone (Bryant and Hart, 2007). The nearest active or sufficiently active faults are the offshore segment of the Newport-Inglewood / Rose Canyon fault, and Whittier-Elsinore fault, located approximately 4 miles southwest and 20 miles from the site, respectively. The geotechnical hazard posed by ground surface rupture from direct fault offset is considered to be negligible. Therefore, this impact is **less than significant**.

Mitigation Measures: No special precautions or restrictions are considered necessary.

3.1.2 Seismic Shaking

The site is expected to experience ground shaking resulting from an earthquake occurring along several major active or sufficiently active faults located in nearby southern California. The intensity of ground shaking at a given location depends on several factors, but primarily on the earthquake magnitude, the distance from the epicenter to the site of interest, and the response characteristics of the soil and/or bedrock units underlying the site. The peak ground acceleration for the Maximum Considered Earthquake (MCE_G) adjusted for the Site Class effects (PGA_M) is 0.557g. Due to the proximity of known active faults, and given the character of earth materials underlying the site, the site hazard posed by seismic shaking is considered high. This is a **potentially significant** impact.

Mitigation Measures: The site will experience strong ground shaking after the proposed project is developed resulting from an earthquake occurring along one or more of the major active or potentially active faults in southern California. Accordingly, the project should be designed in accordance with all applicable current codes and standards utilizing the appropriate seismic design parameters to reduce seismic risk as defined by California Geological Survey (CGS) Chapter 2 of Special Publication 117a (CGS,

2008). The 2019 edition of the California Building Code (CBC) is the current edition of the code. Through compliance with these regulatory requirements and the utilization of appropriate seismic design parameters selected by the design professionals, potential effects relating to seismic shaking can be reduced to **less than significant**.

3.1.3 Secondary Effects of Seismic Shaking

Secondary effects generally associated with strong seismic shaking include phenomena such as liquefaction, lateral spreading, seismically-induced settlement, seismically-induced landslides and inundation, ground lurching, and tsunamis. Each of these phenomena is discussed below.

Liquefaction: Liquefaction is a seismic phenomenon in which loose, saturated, fine-grained granular soils behave similarly to a fluid when subjected to high-intensity ground shaking. Liquefaction occurs when three general conditions exist: 1) shallow groundwater; 2) low density, fine, clean sandy soils; and 3) high-intensity ground motion. Effects of liquefaction on level ground can include sand boils, settlement, and bearing capacity failures below structural foundations. Effects of liquefaction on pile foundations include reduction in pile's lateral capacities and down drag or negative friction due to settlement of a liquefied layer and the layers above it.

The project site is not located within a liquefaction hazard zone based on the *Seismic Hazard Zone Map for the Orange Quadrangle* (California Geological Survey, 1997) (see Figure 5 *Seismic Hazards Map*). Nor is the site underlain by shallow groundwater or near-surface deposits of non-cohesive soils prone to liquefaction. The effects of liquefaction are expected to be a **less than significant** impact.

Mitigation Measures: No special precautions or restrictions are considered necessary.

Lateral Spreading: Lateral spreading is a phenomenon where large blocks of soil translate laterally along or through a layer of liquefied soil. The mass moves downslope toward an unconfined area, such as the face of a descending slope or riverbank, along adversely oriented subsurface planar structures exhibiting gradients as gentle as one degree. For lateral spreading to occur, a liquefiable material needs to be continuous. As

mentioned in the liquefaction section above, the site is not located in an area susceptible to liquefaction, nor is it prone to liquefaction based on our site-specific subsurface exploration. The effect of lateral spreading is expected to be a **less than significant** impact**.**

Mitigation Measures: No special precautions or restrictions are considered necessary.

Seismically Induced Settlement: This phenomenon, referred to as dry-dynamic settlement (above groundwater) and liquefaction-induced settlement (below groundwater), occur primarily in loose sandy soils due to reduction in volume during or after an earthquake event. The settlement is caused by strong ground shaking that allows the soil particles to become more tightly packed, thereby reducing pore space. If present, poorly compacted artificial fills and poorly consolidated wash deposits are especially susceptible to this phenomenon. And given the potential for different fill thicknesses across the site, relatively different magnitudes of settlement may occur. The impact of seismically induced settlement is **considered potentially significant**.

Mitigation Measures: Future geotechnical field exploration for project design should include Standard Penetration Tests (SPT) and CPT's to evaluate and quantify the extent of existing canyon and other fills, and their settlement potential. In general, engineered fills are not subject to seismically induced settlement. If the existing fills are found to be subject to settlement, certain measures of in-situ mitigation would be required to mitigate anticipated surface effects. Such may include enhanced building design and/or in-place structural improvement of existing ground including but not limited to compaction grouting, deep dynamic compaction or stone column installation. The impacts of seismic induced settlement can be mitigated to **less than significant**.

Seismically Induced Landslides: Marginally stable slopes, including existing landslides, may be subject to landslides caused by seismic shaking. In most cases, this is limited to relatively shallow soil failures on steep slopes, especially where the soil is relatively thick and loose. Areas defined by the state as potentially susceptible to seismically induced landslides are limited to sloping terrain along the southwest margin of the site (CGS,1997). The level area of the site, in areas of planned building construction, are not mapped as susceptible to any landslide hazard. The impacts posed by

landslides within the buildable area of the site is considered **less than significant**.

Mitigation Measures: The potential for landsliding was previously evaluated for a portion of the existing 2.3:1 (horizontal:vertical) 24 foot high southwestern slope by Woodward Clyde (1995, 1998, 1999) indicating Factors of Safety with respect to gross stability ranging from 1.45 to 2.47. The stability of this and other areas of the southwest slope should be analyzed as part of a future geotechnical exploration for project design. Mitigation measures, if required, may consist of construction of shear keys, flattening of the existing slope gradients, or assignments of structural setbacks behind top of slope areas. Incorporation of these mitigation measures is expected to reduce the effects of seismically induced landslides to **less than significant**.

Ground Lurching: Ground lurching is a phenomenon that occurs when masses of soil or rock move at right angles to a cliff or steep slope in response to seismic waves. Structures built within the influence of such conditions can experience significant lateral and vertical deformations in response to ground lurching. As slopes bounding the southwest site margin are flatter than 2:1 (h:v), the potential impact from ground lurching is **less than significant.**

Mitigation Measures: No special precautions or restrictions are considered necessary.

Seismically Induced Inundation: Strong seismic ground motion can cause dams and levees to fail or seiches to occur resulting in damage to structures and properties located downstream. As shown in Figure 6 *Dam Inundation Map*, the Project site is located approximately 0.4 miles downstream of the Palisades Reservoir. Design elements, such as baffles, are required to reduce the potential for seiches in water tanks where overflow or structural failure may result in damage to nearby properties. Criteria for seismic design of water tanks are provided in the American Water Works Association (AWWA) Standards for Design of Steel Water Tanks. We have not reviewed those offsite tanks. Given the measures incorporated into design and construction of the reservoir, the impact of a failure event and resultant site inundation is considered **less than significant**.

Mitigation Measures: No special precautions or restrictions are considered necessary.

Tsunami: Tsunamis are waves generated in large bodies of water by fault displacement or major ground movement. Based on the inland location and elevation of the site, the risk of tsunami impact to the site is considered **less than significant**.

Mitigation Measures: No special precautions or restrictions are considered necessary.

3.2 Land Subsidence

3.2.1 Extraction

Given the site is not located within the nearby influence of any past or present petroleum and/or groundwater withdrawal programs, the effects of potential subsidence due to extraction of these resources is considered **less than significant**.

Mitigation Measures: No special precautions or restrictions are considered necessary.

3.2.2 Hydroconsolidation

Soil collapse, or hydroconsolidation, occurs when saturated soil units undergo a rearrangement of their grains and a loss of cohesion or cementation, resulting in substantial and rapid settlement under relatively light loads. Soil collapse is generally associated with recently deposited, Holocene-age soils that have accumulated in an arid or semi-arid environment. Wind-deposited sands and silts, and alluvial fan and debris flow sediments deposited during flash floods represent soils that are susceptible to collapse. Irrigation, or a rise in the groundwater table could increase surface water infiltration, which when combined with the weight of a building or structure, can start rapid settlement and cause foundations and walls to crack. Differential settlement of structures generally occurs when landscaping is heavily irrigated in close proximity to the structure's foundation. Proper surface drainage design, excavation and recompaction and pre-saturation during earthwork construction of the site will reduce the risk with collapse. .

The deposits of alluvium and existing artificial fill underlying the site are comprised of relatively stiff to very stiff non-cohesive clays and silty clays and medium dense to dense sands. Based on these soil properties and bedrock below the site, the impacts of hydroconsolidation are considered **less than significant**.

Mitigation Measures: No special precautions or restrictions are considered necessary.

3.2.3 Compressible Soil

When a load, such as a fill or a structure, is placed on alluvial soils, the underlying soil layers can undergo a certain amount of compression. This compression is due to the deformation of the soil particles, the relocation of soil particles, expulsion of water or air from the void spaces, and other reasons. This settlement occurs both immediately after a load is applied and over a period of time after placement of the load. For engineering applications, it is important to estimate the total amount of settlement that will occur upon placement of a given load and the rate of consolidation.

Existing deposits of artificial fill as encountered are comprised of stiff to very stiff clays and silty clays. Woodward Clyde in their investigation report (1998) prepared for the site in support of observed distress indicate soils at he site below five feet becomes generally very stiff further indicating in their review of reports prepared by Geotechnical Consultants Inc that the fill was properly placed and compacted. While we did not have the compaction reports to review as part of this study. However, given an absence of groundwater, the fine-grained texture and moisture content, and 60-year period of residency beneath the site, the susceptibility of the fill to consolidation is considered low. The potential for soil compressibility is equally low within underlying deposits of native clayey terrace deposits and bedrock. Remedial grading will include a minimum 6-foot overexcavation and recompaction of existing surface soils, and existing fill will be mitigated through ground improvement if warranted, impacts due to consolidation are considered **less than significant**.

Mitigation Measures: Following mitigation of site soils the impact of compressible soil will be **less than significant**.

3.3 Slope Stability

3.3.1 Unstable Slopes

The slopes bounding the southwesterly site margin were documented as stable based on prior geotechnical exploration and engineering analyses (Woodward Clyde (1995, 1998, 1999). The potential for slope instability is considered **less than significant**.

Mitigation Measures: As additional slope stability analysis correlative with planned project improvements will be performed, and remedial grading measures performed as recommended by the geotechnical engineer and engineering geologist, the impact of unstable slopes is considered **less than significant**.

3.3.2 Landslides and Mudflows

Published maps indicate no mapped landslides or debris flows on or adjacent to the project site. As the potential for landslides, mudflows or other types of slope instability will evaluated as part of future design studies, and mitigated through remedial grading where necessary, the potential impacts of this hazard are considered **less than significant.**

Mitigation Measures: No special precautions or restrictions are considered necessary.

3.4 Soil Erosion

Planned site development, outside new building footprints, will result in paved or landscaped surfaces. The potential for erosion can be mitigated through the application of best management practices (BMPs) and other Storm Water Pollution Prevention Plan (SWPPPs), such as temporary catchment basins and/or sandbagging to control runoff and contain sediment transport within the project site during construction. Following completion of the project, the site will be improved with structures, hardscape, landscaping and appropriate drainage infrastructure. Therefore, sedimentation and erosion impacts upon completion of construction are considered **less than significant**.

Mitigation Measures: Impacts due to erosion are considered **less than significant**.

3.5 Expansive Soils

Results of expansion Index testing of shallow soil samples obtained from borings LB-1 and LB-2 reveal a low to medium expansion potential. In general, the existing fill exhibits a low expansion potential, and native non-marine terrace deposits a medium expansion potential. Import material for replacement fill, if needed, should consist of soils with low expansion potential. Standard engineering and earthwork construction practices, such as proper foundation design and controlled moisture conditioning or mixing with non-expansive soils will reduce the impacts associated with expansive soils. **Mitigation Measures**: As the project structural engineer will account for expansive soil conditions as part of design, the effects of expansive soil will be reduced to **less than significant**.

3.6 Flooding

The Project site is not located within a flood hazard zone as defined by FEMA (see Figure 7 *Flood Hazard Zone Map*). The site is however subject to potential inundation in the event of catastrophic failure of the nearby Palisades Reservoir, located up-gradient from the site approximately 0.4 miles to the northwest. Design elements, such as baffles, are required to reduce the potential for seiches in water tanks where overflow or structural failure may result in damage to nearby properties. Criteria for seismic design of water tanks are provided in the American Water Works Association (AWWA) Standards for Design of Steel Water Tanks. We have not reviewed those offsite tanks the tanks are relatively modern and as such the potential for failure is considered **less than significant** to impact to the site.

Mitigation Measures: As the Palisades Reservoir is designed to counter failure, and actively maintained, the potential for catastrophic failure and site impact due to flooding is considered **less than significant**.

3.7 Grading Impacts

The suitability of existing fill soils to support planned improvements will be determined through future design-level geotechnical studies. If required, mitigation is expected to improve the quality of fill through in-place ground improvement measures that minimizes grading. Minimum site grading will include over-excavation and recompaction of the upper 6 feet of soil. Any changes in soil volume due to compaction during remedial grading is expected to be relatively low. The impacts of grading are considered **less than significant.**

3.8 Volcanic Hazards

The site is not located within an area of known volcanism and no volcanoes are mapped on the site or within the surrounding region. The potential impacts to the site due to a lava flow or ash fall is considered **less than significant**.

Mitigation Measures: No special precautions or restrictions are considered necessary.

3.9 Onsite Wastewater Disposal

The project will be connected to local sewers, therefore impacts due to wastewater disposal are not a consideration for the project.

4 FUTURE DEVEL-LEVEL GEOTECHNICAL STUDIES

Based upon the results of our limited geotechnical evaluation of the site, the proposed improvements are considered feasible from a geotechnical standpoint. The nature of many sites is such that differing geotechnical or geological conditions can occur within small distances and under varying climatic conditions. Changes in subsurface conditions can and do occur over time. Our understanding of site geology and geotechnical conditions relating to project design are based on a limited subsurface exploration as part of an infiltration testing study, and review of past geotechnical reports of site prepared by prior consultants.

A design level geotechnical investigation will be required to obtain permits for the project and to provide earthwork recommendations for support of planned improvements. The scope of future site exploration should include advancement of additional exploratory borings and Cone Penetration Tests (CPT's) to evaluate existing undocumented fill materials. In-situ and composite soil samples should be obtained and subjected to certain laboratory tests to determine in-place moisture and density, gradation, soil plasticity, strength and consolidation characteristics, and corrosivity.

Design of the Project in accordance with standard engineering practice, including requirements of the California Building Code (CBC), City of San Clemente, County of Orange Grading Code, and the recommendations of the project civil and structural engineers, geotechnical consultant and others will reduce the potential for adverse geotechnical conditions impacting the proposed Project.

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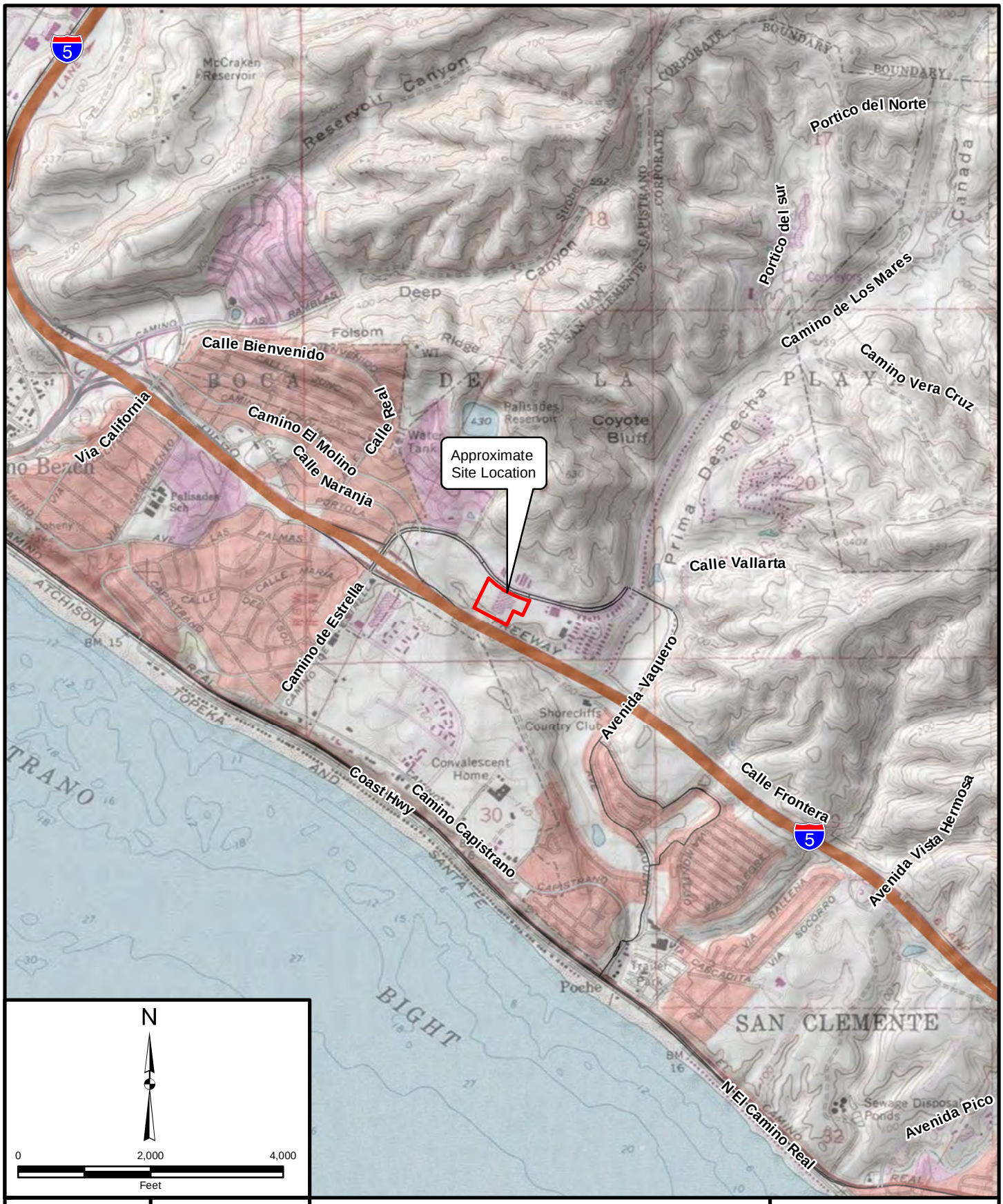

Project: 13468.002	Eng/Geol: JLH
Scale: 1 " = 2,000 '	Date: April 2022

Reference: Copyright:© 2013 National Geographic Society, i-cubed

SITE LOCATION MAP

CEQA-LEVEL GEOLOGIC REVIEW
San Clemente Senior Housing Project
654 Camino De Los Mares, San Clemente, California

FIGURE 1

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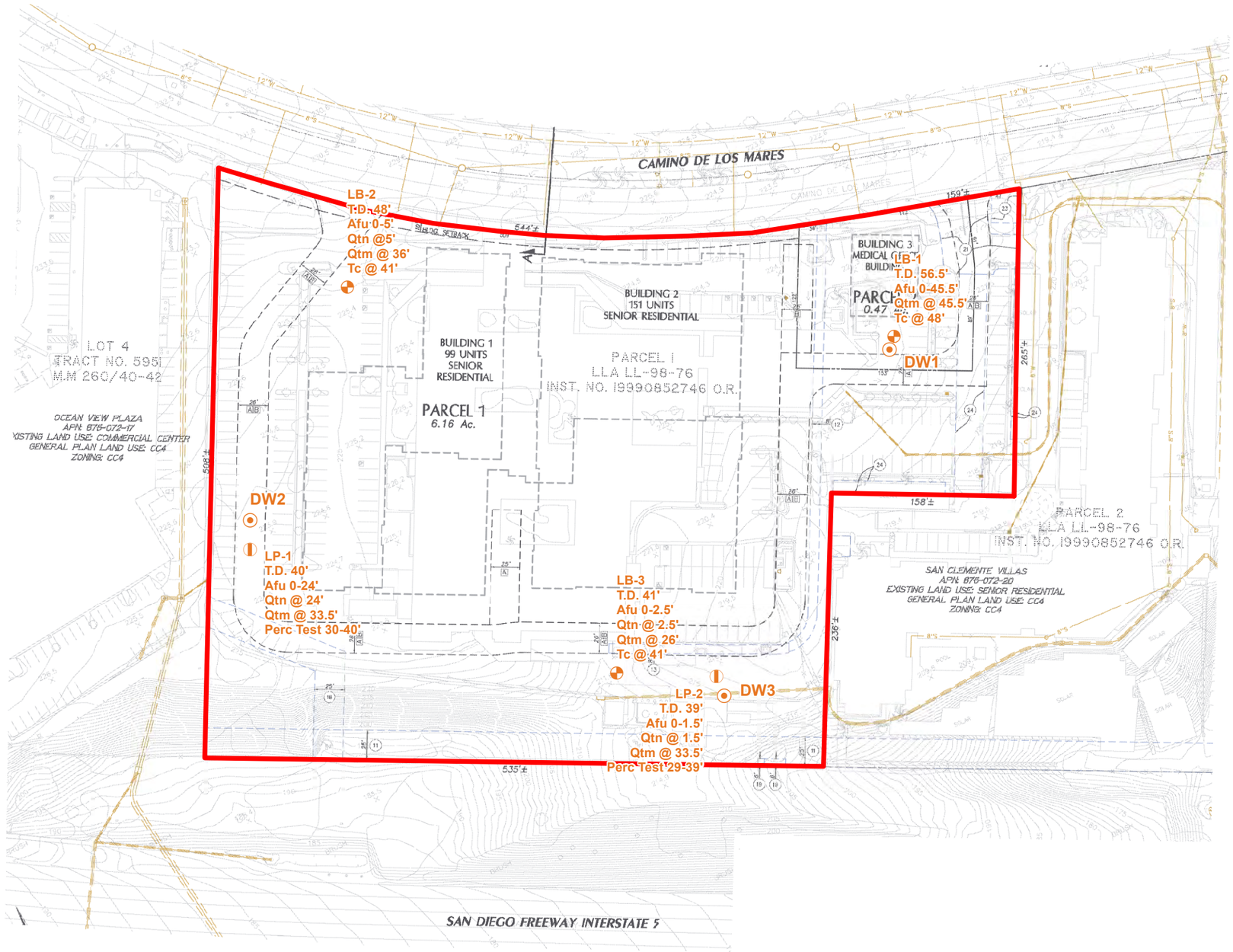

Legend

LB-3 T.D. 41.17' Afu 0-2.5' Qtn @ 2.5' Qtm @ 26' Tc @ 41'	Approximate location of hollow-stem auger boring showing total depth (T.D.), and depth to earth units in feet below existing ground surface.
LP-2 T.D. 39' Afu@0-1.5' Qtn @ 1.5' Qtm @ 33.5' Perc Test 29-39'	Approximate location of percolation test boring showing total depth (T.D.), and depth to earth units in feet below existing ground surface.
DW3	Approximate location of proposed dry well.
Afu	Artificial Fill, Undocumented
Qtn	Quaternary Non-marine Deposits
Qtm	Quaternary Marine Deposits
Tc	Miocene Capistrano Formation
	Approximate site boundary

N

0 100 200
Feet

Project: 13468.002	Eng/Geol: JLH
Scale:1 " = 100 '	Date: May 2022

Reference: Vesting Tentative Parcel, Map No 2022-116, Saddleback Memorial Medical Center

EXPLORATION LOCATION MAP

CEQA-LEVEL GEOLOGIC REVIEW
San Clemente Senior Housing Project
654 Camino De Los Mares, San Clemente, California

FIGURE 2

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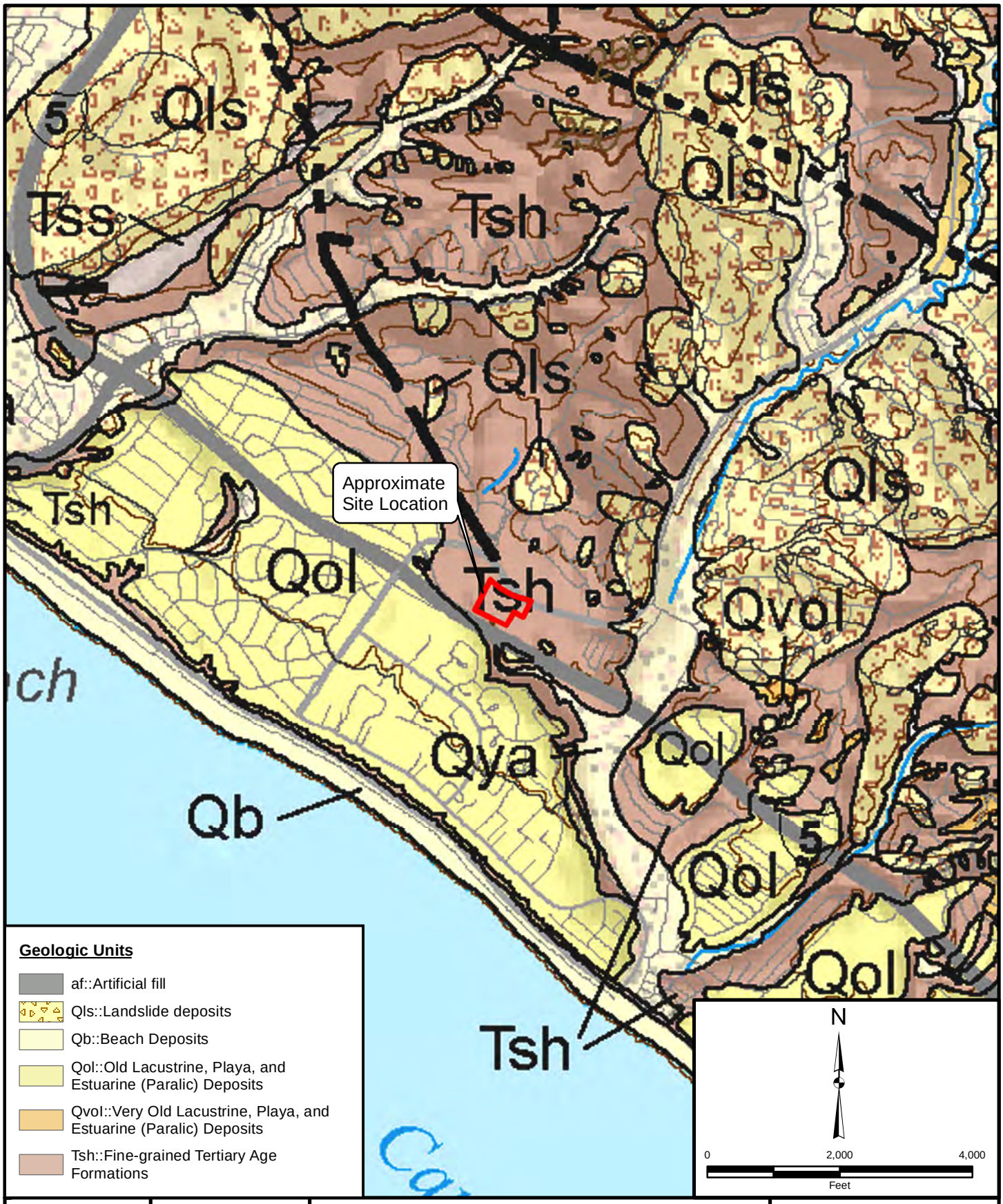

Geologic Units

- af::Artificial fill
- Qls::Landslide deposits
- Qb::Beach Deposits
- Qol::Old Lacustrine, Playa, and Estuarine (Paralic) Deposits
- Qvol::Very Old Lacustrine, Playa, and Estuarine (Paralic) Deposits
- Tsh::Fine-grained Tertiary Age Formations

Project: 13468.002	Eng/Geol: JLH
Scale: 1 " = 2,000 '	Date: May 2022

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REGIONAL GEOLOGY MAP

CEQA-LEVEL GEOLOGIC REVIEW
San Clemente Senior Housing Project
654 Camino De Los Mares, San Clemente, California

FIGURE 3

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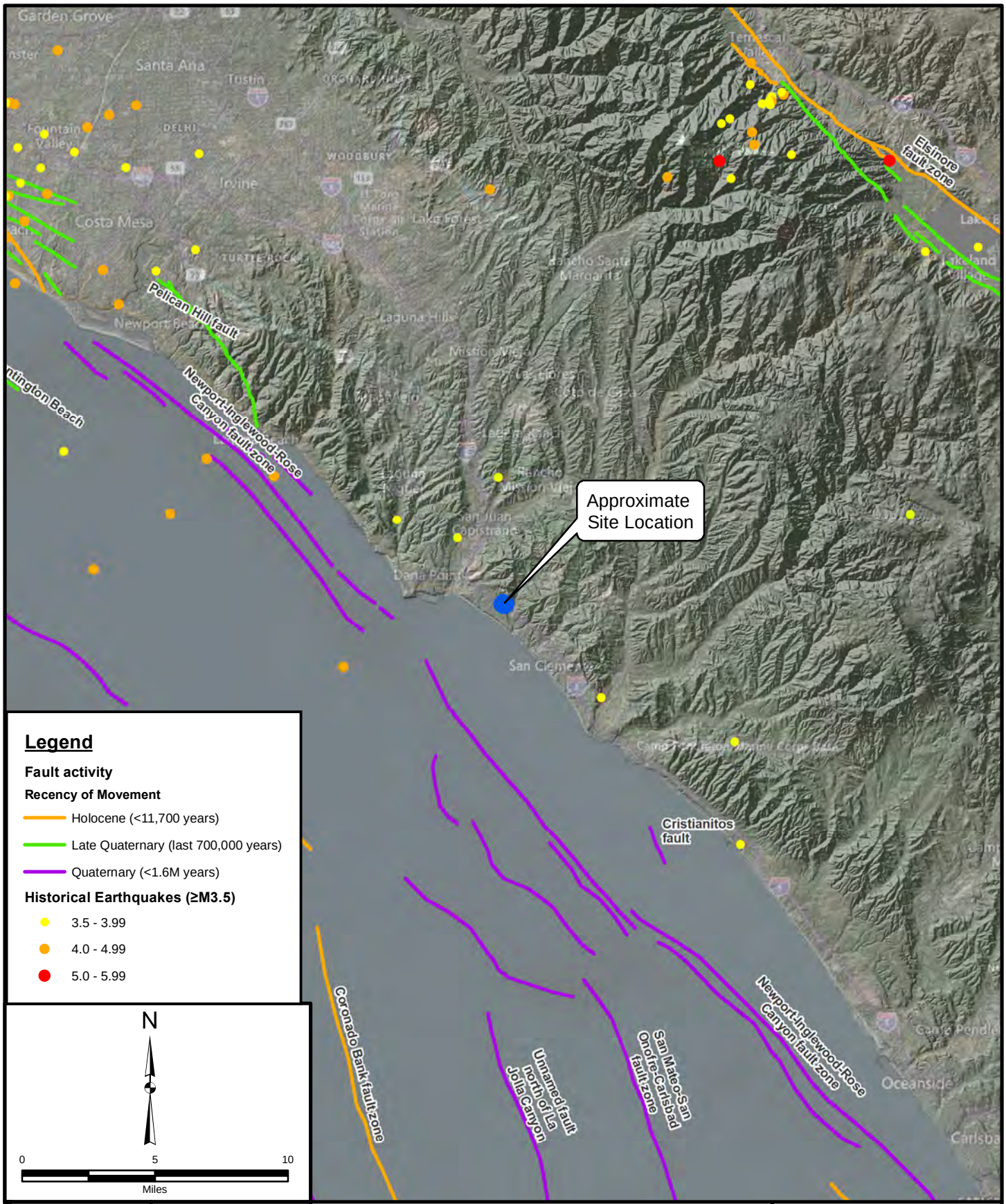

Project: 13468.002	Eng/Geol: JLH
Scale: 1 " = 5 miles	Date: April 2022

Basemap Reference: © 2022 Microsoft Corporation Earthstar Geographics SIO © 2022 TomTom
Seismicity Data Reference: maps.conservation.ca.gov

REGIONAL FAULTS AND HISTORIC SEISMICITY MAP

CEQA-LEVEL GEOLOGIC REVIEW
San Clemente Senior Housing Project
654 Camino De Los Mares, San Clemente, California

FIGURE 4

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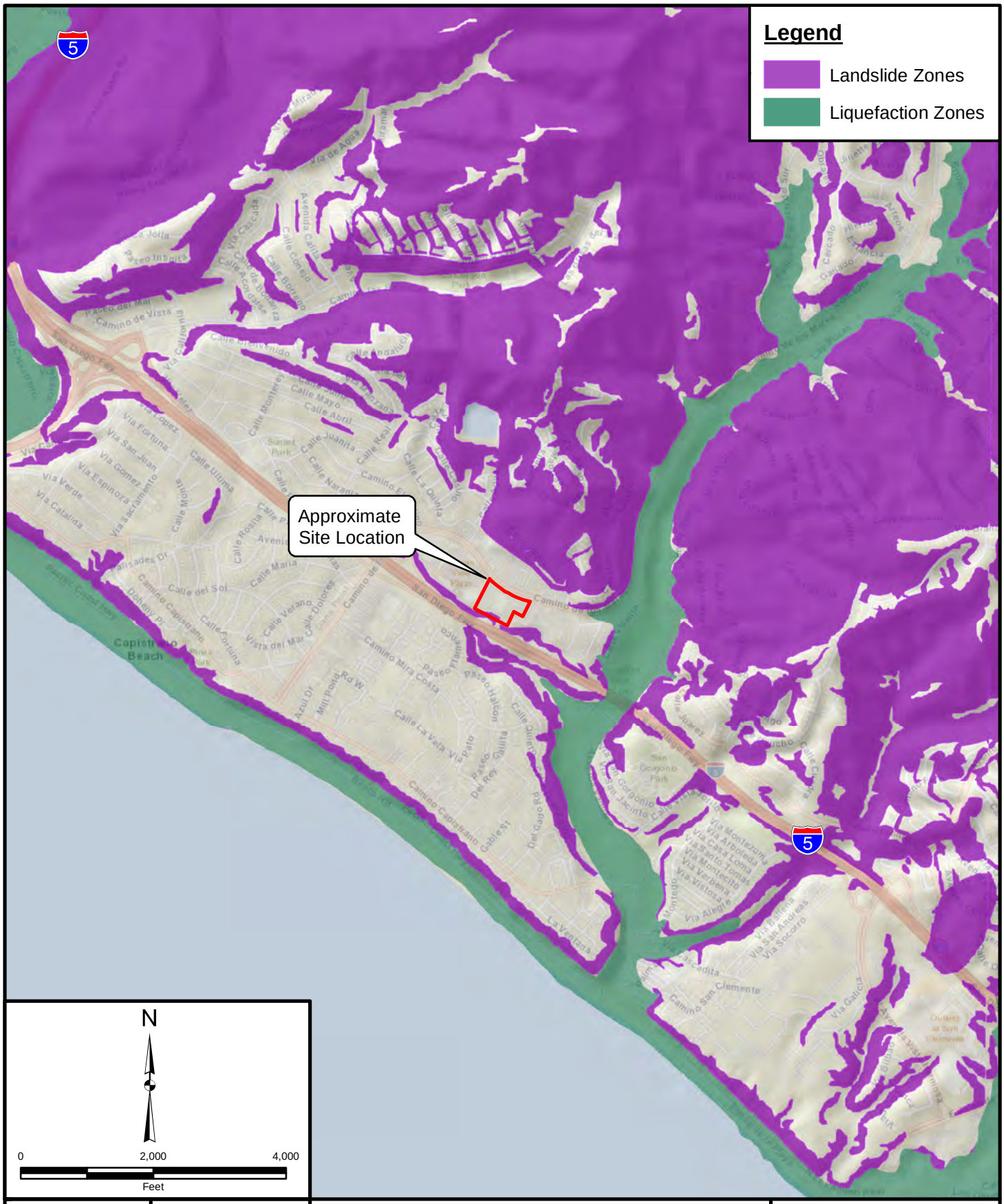

Project: 13468.002	Eng/Geol: JLH
Scale: 1 " = 2,000 '	Date: April 2022

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Seismic Hazards Program, California Geological Survey, California

SEISMIC HAZARD MAP

CEQA-LEVEL GEOLOGIC REVIEW
San Clemente Senior Housing Project
654 Camino De Los Mares, San Clemente, California

FIGURE 5

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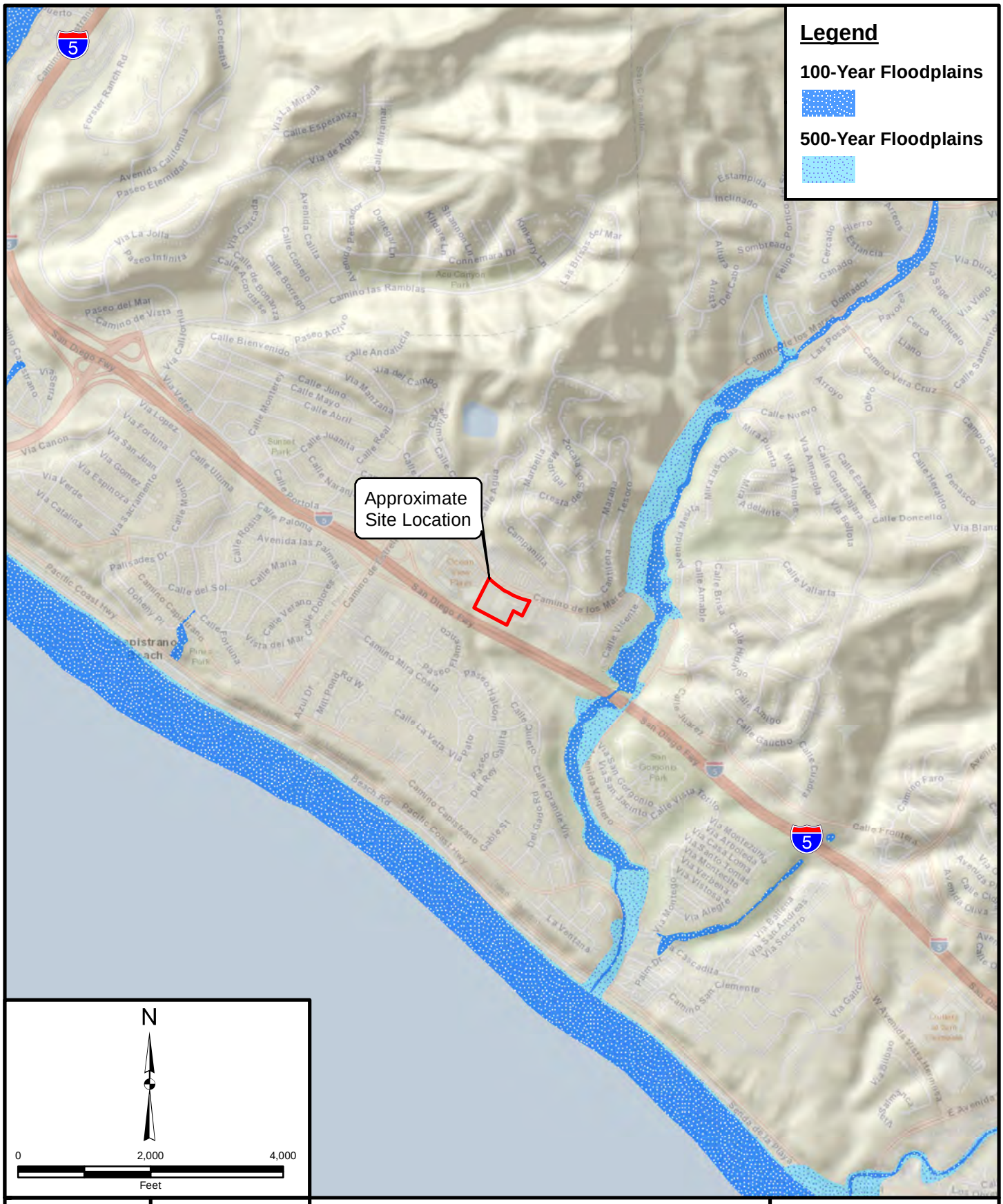

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Reference: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
FEMA (http://www.fema.gov/index.shtm), DWR (http://www.dwr.ca.gov)

FLOOD HAZARD ZONE MAP

CEQA-LEVEL GEOLOGIC REVIEW
San Clemente Senior Housing Project
654 Camino De Los Mares, San Clemente, California

FIGURE 6

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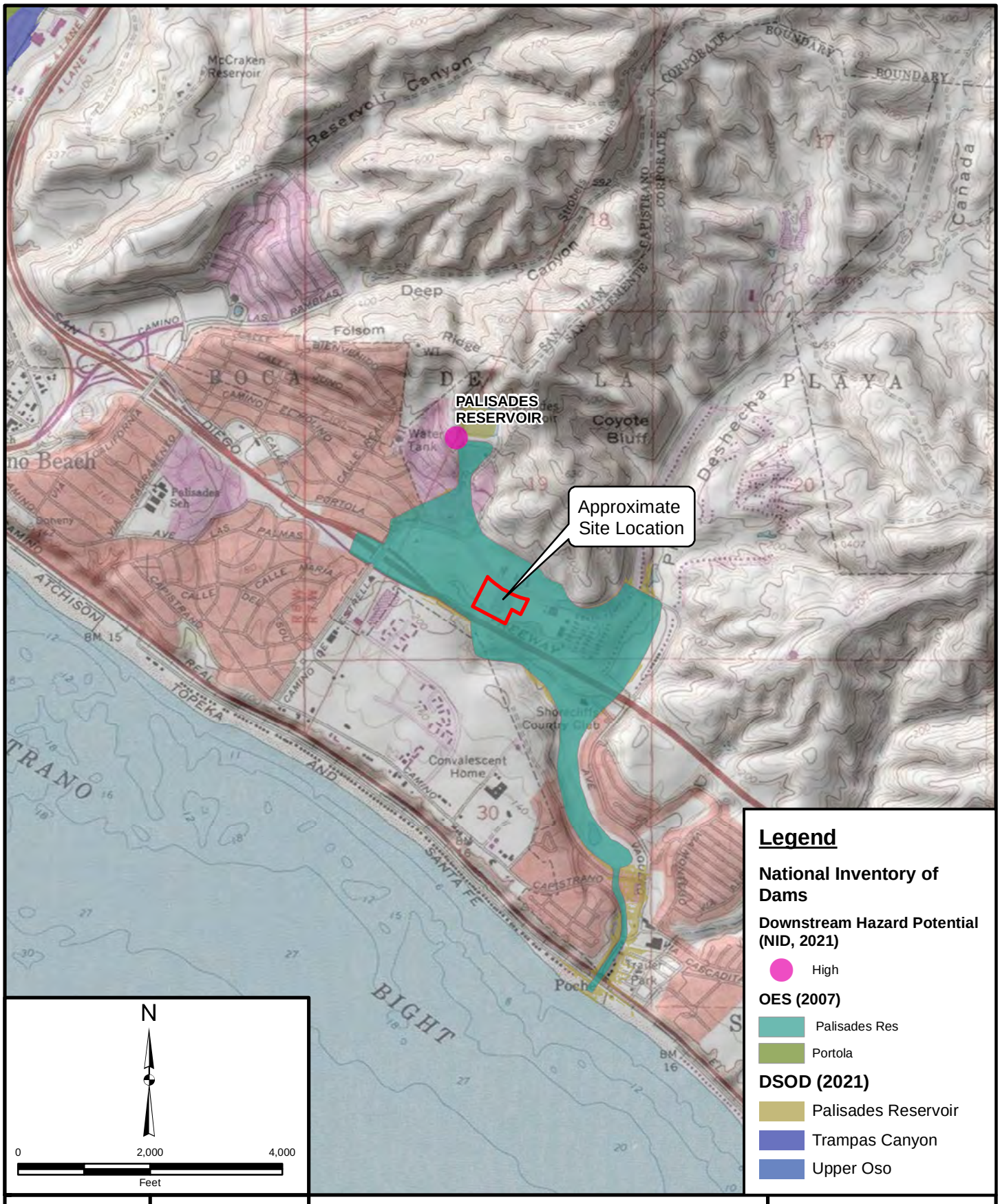

Project: 13468.002	Eng/Geol: JLH
Scale: 1 " = 2,000 '	Date: April 2022

Basemap Reference: Copyright© 2013 National Geographic Society, i-cubed
Reference: Office of Emergency Services (2007), Dept of Safety of Dams (2021)
National Inventory of Dams, Army Corps of Engrs (2021)

DAM INUNDATION MAP

CEQA-LEVEL GEOLOGIC REVIEW
San Clemente Senior Housing Project
654 Camino De Los Mares, San Clemente, California

FIGURE 7

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APPENDIX A

EXPLORATORY BORING LOGS

GEOTECHNICAL BORING LOG LB-1

Project No.	13468.002	**Date Drilled**	4-9-22
Project	Sr, Housing Percolation	**Logged By**	JLH
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	CME-75 HSA Truck - 140lb - Autohammer - 30" Drop	**Ground Elevation**	225'
Location	See Figure 2 - Exploration Location Map	**Sampled By**	JLH

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
225	0								ASPHALT-CONCRETE SAND with gravel (SP), AGGREGATE BASE MATERIAL	
				LB1					**ARTIFICIAL FILL / UNDOCUMENTED (Afu):** @0': Lean CLAY w/ Sand, coarse-grained, medium dark olive gray, moist, plastic	EI, AL
				R-1	5 9 15	112.8	15.0	CL	@2.5': Same as above, medium dense	
220	5			R-2	5 9 12	109.6	13.8	SP-CL	@5': Same as above, medium dense	
									@6.5': dark olive gray, stiff, minor horizontal pressure planes	
				R-3	3 8 11	85.5	34.3	CH	@7.5': Fat CLAY, very stiff, dark olive gray, minor horizontal pressure surfaces, some sand, high plasticity	AL
									@9': Silty CLAY, dark olive gray, moist, firm, unoxidized, plastic, local iron-stained gypsum fragments, scattered siltstone clasts	
215	10			R-4	4 8 9	90.9	27.6	ML-CL	@10': SILT with Clay, stiff medium gray, silty claystone clasts in dark grayish black silty clay matrix, moist, firm/soft, plastic, 2" rounded gravel clast in shoe	
210	15			R-5	4 6 8			ML-CL	@15.5': SILT with Clay, stiff, black to dark olive gray and blue-gray siltstone fragments, locally iron-staining, moistNR	
205	20			R-6	8 10 13			ML-CL	@20': driller reports increased density @21.5': 3" diameter polished well rounded cobble clast in fill	
200	25			S-1	3 4 5			ML-CL	@25.5': Clayey Siltstone fragment of Capistrano Fm bedrock in fill, dry, massive, medium hard, local blebs of iron staining and caliche stringers, black and unoxidized, stiff	
195	30									

The Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG LB-1

Project No.	13468.002	**Date Drilled**	4-9-22
Project	Sr, Housing Percolation	**Logged By**	JLH
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	CME-75 HSA Truck - 140lb - Autohammer - 30" Drop	**Ground Elevation**	225'
Location	See Figure 2 - Exploration Location Map	**Sampled By**	JLH

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
195	30			S-2	4 6 8			ML-CL	**ARTIFICIAL FILL UNDOCUMENTED (Afu): Continued** @30': SILT w/ Clay, very stiff, with local fragments of iron stained gray and black silts	
190	35			S-3	3 5 6			ML-CL	@35': Same as above, very stiff	
185	40			S-4	3 4 6			ML-CL	@40': 1/4" thick horizontal lifts of fill, black to medium gray brown and olive gray, local trace fossils of coprolite (white sandy blebs), very stiff	
180	45			S-5	4 8 11			SP-GP	**QUATERNARY MARINE TERRACE DEPOSITS (Qtm):** @45.5': SAND with Gravel; medium dense, medium olive-brown color, slightly moist, well-rounded gravel/pebble clasts, minor wetness on clast surfaces, scattered shell fragments in matrix	
175	50			S-6	3 5 7				**CAPISTRANO FORMATION (Tc):** @50': Silty CLAYSTONE; medium olive gray to brown, very thinly laminated discontinuous laminae/beds, local trace fossils of coprolite, pervasively iron-stained, moderately weathered, medium hard to soft, massive, structureless, local iron-staining along discontinuous planar joint surfaces, slightly damp, slightly plastic	
170	55			S-7	3 5 11					
165	60								**TOTAL DEPTH 56.5 FEET** **PERCHED GROUNDWATER AT 51.5 FEET** **BACKFILLED TO 2 FEET BGS WITH BENTONITE GROUT (>3% CEMENT); TO 6-INCHES BGS WITH BENTONITE PELLETS, AND QUICKCRETE TO SURFACE**	

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG LB-2

Project No.	13468.002	**Date Drilled**	4-9-22
Project	Sr, Housing Percolation	**Logged By**	JLH
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	CME-75 HSA Truck - 140lb - Autohammer - 30" Drop	**Ground Elevation**	227'
Location	See Figure 2 - Exploration Location Map	**Sampled By**	JLH

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	0								ASPHALT CONCRETE AGGREGATE BASE @7": SAND with Gravel; yellow	
225				LB1						CR, EI, MD
				R-1	6 12 30	112.2	17.9	CL	**ARTIFICIAL FILL UNDOCUMENTED (Afu):** @11.5": Lean CLAY; medium yellow brown, fine-grained sand, moist, soft, plastic	
	5			R-2	9 17 33	109.7	17.9	CL	**QUATERNARY NON-MARINE TERRACE DEPOSITS (Qtn):** @5': CLAY, medium yellow brown with reddish hue, hard, moist, mottled gray, massive	
220				R-3	9 17 24	107.5	19.1	CL	@7.5': CLAY, hard, medium yellow brown, indistinctly horizontal laminations, plastic, blebs of iron-oxide, locali white silt fragments, minor MnO2 stains	AL
	10			R-4 LB2	6 13 21	101.5	21.3	CL-ML		
215				R-5	6 11 17	97.1	25.8	CL-ML	@12.5': SILT w/ Clay, very stiff, medium yellow brown, plastic, horizontal laminae, mottled blue gray	
	15			R-6	6 15 21	99.5	24.2	CL-ML	@15': SILT w/ Clay, hard, alternating thin medium brown to yellow brown and local very thin white sand laminae that is horizontally laminated	
210										
	20			R-7	6 12 22	100.5	24.2	CL-ML	@20': CLAY with Silt, very stiff, composed of scattered bedrock fragments of blue gray and black silty claystone, minor iron-staining	
205										
	25			S-1	3 6 8			CL-ML	@25': Same as above @25.5-26.5': CLAY with Silt; thin horizontal laminations, very stiff, moist, local medium gray silty claystone fragments, minor iron-staining, platy partings	
200										
	30									

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		

Leighton

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

GEOTECHNICAL BORING LOG LB-2

Project No.	13468.002	**Date Drilled**	4-9-22
Project	Sr, Housing Percolation	**Logged By**	JLH
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	CME-75 HSA Truck - 140lb - Autohammer - 30" Drop	**Ground Elevation**	227'
Location	See Figure 2 - Exploration Location Map	**Sampled By**	JLH

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	30			S-2	4 7 8			CL-ML	**QUATERNARY NON-MARINE TERRACE DEPOSITS (Qtn) Continued:** @31.5': CLAY with Silt; thin horizontal laminations, very stiff, moist, local medium gray silty claystone fragments, minor iron-staining @35': CLAY with Silt; thin horizontal laminations, hard, moist, local medium gray silty claystone fragments, minor iron-staining @36': Very moist	
195										
	35			S-3	3 30 43			CL-ML		
190									**QUATERNARY MARINE TERRACE DEPOSITS (Qtm):** @36': medium brown, rounded gravels, /clast, non cohesive, dry, non marine (colluded gravel only)	
	40			S-4	16 34 50			GP	@40': cobble lag, rig/auger, shell fragments, well rounded pebbles, pebbles subrounded to well rounded, very moist	
185									**CAPISTRANO FORMATION (Tc):** @41': SILTY CLAYSTONE; dry, medium hard, medium olive brown, thinnly lamintated, local iron-stained blebs, damp	
	45			S-5					@47': Unoxidized SILTSTONE; masive, dark gray to black, medium hard, indistinct laminae	
180										
	50								**TOTAL DEPTH 48 FEET** **NO GROUNDWATER** **BORING BACKFILLED WITH BENTONITE GROUT (>3% CEMENT) TO WITHIN 2 FEET OF SURFACE, BENTONITE CHIPS TO WITHIN 6 INCHES OF SURFACE, AND QUICKCRETE TO SURRFACE**	
175										
	55									
170										
	60									

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

GEOTECHNICAL BORING LOG LB-3

Project No.	13468.002	**Date Drilled**	4-9-22
Project	Sr, Housing Percolation	**Logged By**	JLH
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	CME-75 HSA Truck - 140lb - Autohammer - 30" Drop	**Ground Elevation**	213'
Location	See Figure 2 - Exploration Location Map	**Sampled By**	JLH

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
	0			LB3					ASPHALT CONCRETE AGGREGATE BASE @3": GRAVEL with Sand; light brown, medium dense, dry	
210								CL	**QUATERNARY NON-MARINE TERRACE DEPOSITS (Qtn):** @2.5': Silty CLAY, medium olive brown, soft, plastic, moist to very moist	
	5									
205										
	10							CL-ML	@10': SILT w/ Clay, medium olive brown, plastic, moist to very moist	
200										
	15								@15': SILT w/ Clay, medium olive brown, plastic, moist to very moist	
195										
	20			S-1	3 4 6			CL-ML	@20': SILT w/ Clay, medium olive brown to tan, moist, very well laminated in thin horizontal layers, local gray silstone clasts, stiff	
190				S-2	3 6 7			CL-ML	@23': very stiff, slightly moist	
	25									
				S-3	4 12 20			SP	**QUATERNARY MARINE TERRACE DEPOSITS (Qtm):** @26': SAND; well sorted, medium-grained, dry, dense, non-cohesive	
185				R-1	11 21 31			SP	@28': minor pebble clasts, dense @29': SAND; well-sorted, medium-grained, non cohesive	SA
	30									

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		

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GEOTECHNICAL BORING LOG LB-3

Project No.	13468.002	**Date Drilled**	4-9-22
Project	Sr, Housing Percolation	**Logged By**	JLH
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	CME-75 HSA Truck - 140lb - Autohammer - 30" Drop	**Ground Elevation**	213'
Location	See Figure 2 - Exploration Location Map	**Sampled By**	JLH

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	30							SP	**QUATERNARY MARINE TERRACE DEPOSITS (Qtm): Continued**	
180				R-2	26 36 40			SPg	@32': SAND with Gravel, very dense, scattered shell fragments (mash), mostly dark mafic clasts, well rounded, poorly graded, slightly moist, non cohesive, medium to light gray, alternating beach ramp to tidal environment changes in section	SA
	35								@36': SAND with Gravel; poorly graded, dry to slightly moist, well rounded igneous clasts, frequent shell fragments	
175				R-3	16 26 32			SPg	@36.5': SAND with Gravel, dense poorly graded, fine-grained, medium brown to gray, damp to slightly moist, non-cohesive, thinly bedded/laminated, (driller reports smooth feel @ 37')	SA
	40			R-4	15 22 50/4			SPg	@40': damp, slightly moist, very dense	SA
170									**CAPISTRANO FORMATION (Tc):** @41': SILTY CLAYSTONE; medium dark gray to olive brown, medium hard, very thinly bedded, local 1/4" wide gypsum seams of high angle, local iron-stained sand blebs @41'2": unoxidized, hard	
	45								**TOTAL DEPTH 41 FEET 2 INCHES** **NO GROUNDWATER** **BORING BACKFILLED WITH BENTONITE SLURRY MIX (>3% CEMENT) TO WITHIN 2 FEET OF SURFACE, BENTONITE CHIPS TO WITHIN 6 INCHES OF SURFACE, AND QUICKCRETE TO SURFACE**	
165										
	50									
160										
	55									
155										
	60									

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		

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GEOTECHNICAL BORING LOG LP-1

Project No.	13468.002	**Date Drilled**	4-9-22
Project	Sr, Housing Percolation	**Logged By**	JLH
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	CME-75 HSA Truck - 140lb - Autohammer - 30" Drop	**Ground Elevation**	224'
Location	See Figure 2 - Exploration Location Map	**Sampled By**	JLH

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	0								**ASPHALT CONCRETE**	
									AGGREGATE BASE	
									@3.5"Asphalt Concrete over 8" Sandy Gravel	
220	5							CL	**ARTIFICIAL FILL UNDOCUMENTED (Afu):**	
									@11.5"-24': CLAY; moist, horizonal lifts	
215	10									
210	15									
205	20									
200										
	25							CL	**QUATERNARY NON-MARINE TERRACE DEPOSITS (Qtn):**	
									@24-33.5': CLAY typical, yellow brown, moist, locally thinly laminated	
195	30									

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG LP-1

Project No.	13468.002	**Date Drilled**	4-9-22
Project	Sr, Housing Percolation	**Logged By**	JLH
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	CME-75 HSA Truck - 140lb - Autohammer - 30" Drop	**Ground Elevation**	224'
Location	See Figure 2 - Exploration Location Map	**Sampled By**	JLH

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	30							CL	**QUATERNARY NON-MARINE TERRACE DEPOSITS (Qtn): Continued**	
190									**QUATERNARY MARINE TERRACE DEPOSITS (Qtm):**	
	35							SPg	@37': increased gravels @38': shell fragments	
185	40								**NOTES** - TOTAL DEPTH 40 FEET BGS - NO GROUNDWATER - TEMPORARY PERCOLATION TEST WELL CONSTRUCTION - 2-INCH DIAMETER PVC CASING - SOLID INTERVAL 0-30 FEET BGS - SCREENED INTERVAL 30-40 FEET BGS - ANNULAR SPACE BACKFILL CONSISTS OF #3 MONTEREY SAND 20.7-40 FEET - BENTONITE CHIP SEAL 16.6-20.7 FEET BGS - NATIVE SOIL 16.6-0.6 - ASPHALT/CONCRETE 0.6-0 FEET BGS - CASING PLUG AND WELL BOX COVER - WELL DESTRUCTION SCHEDULED FOR LATER DATE	
180	45									
175	50									
170	55									
165	60									

SOIL DESCRIPTION: This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG LP-2

Project No.	13468.002	**Date Drilled**	4-9-22
Project	Sr, Housing Percolation	**Logged By**	JLH
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	CME-75 HSA Truck - 140lb - Autohammer - 30" Drop	**Ground Elevation**	216'
Location	See Figure 2 - Exploration Location Map	**Sampled By**	JLH

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
215	0								**ASPHALT CONCRETE**	
									AGGREGATE BASE	
									@3.5"-16.5": SAND with Gravel;	
								CL	**QUATERNARY NON-MARINE TERRACE DEPOSITS (Qtn):**	
									@24-33.5': CLAY typical, yellow brown, moist	
210	5									
205	10									
200	15									
195	20									
190	25									
	30									

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG LP-2

Project No.	13468.002	**Date Drilled**	4-9-22
Project	Sr, Housing Percolation	**Logged By**	JLH
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	CME-75 HSA Truck - 140lb - Autohammer - 30" Drop	**Ground Elevation**	216'
Location	See Figure 2 - Exploration Location Map	**Sampled By**	JLH

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	30							CL-SM	**QUATERNARY NON-MARINE TERRACE DEPOSITS (Qtn):** **Continued**	
185										
									QUATERNARY MARINE TERRACE DEPOSITS (Qtm):	
	35			R-1x	11 11 23			SPg		
180									@37': increased gravels, medium dense @38': shell fragments	
	40								**NOTES** - TOTAL DEPTH 39 FEET BGS - NO GROUNDWATER - TEMPORARY PERCOLATION TEST WELL CONSTRUCTION - 2-INCH DIAMETER PVC CASING - SCREENED INTERVAL 29-39 FEET BGS - SOLID INTERVAL 0-29 FEET BGS - ANNULAR SPACE BACKFILL CONSISTS OF #3 MONTEREY SAND 21.9-39 FEET - BENTONITE CHIP SEAL 21.9-15.5 FEET BGS - NATIVE SOIL 15.5-0.6 - ASPHALT/CONCRETE 0.6-0 FEET BGS - CASING PLUG AND WELL BOX COVER - WELL DESTRUCTION SCHEDULED FOR LATER DATE	
175										
	45									
170										
	50									
165										
	55									
160										
	60									

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		

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APPENDIX B

INFILTRATION TEST RESULTS

Boring Percolation Test Data Sheet

Project Number:	13468.002	**Test Hole Number:**	LP-1
Project Name:	SCL SR CTR	**Date Excavated:**	4/9/2022
Earth Description:	Qtm	**Date Tested:**	4/11/2022
Liquid Description:	Tap Water	**Depth of boring (ft):**	39.42
Tested By:	BTM	**Radius of boring, r (in):**	4
		Diameter of casing (in):	2
		Length of slotted of casing (ft):	10
		Depth to Initial Water Depth (ft):	36.26
		Porosity of Annulus Material, *n* :	0.35
		Bentonite Plug at Bottom:	No

Field Percolation Data

Reading	Time	Time Interval, Δt (minutes)	Depth to Water (feet bgs)	Water Height, H (inches)	Cumulative Water Volume Delivered (gallons)
1	8:32	-	-	-	237.8
2	8:42	10	36.22	38.4	296.9
3	8:52	10	36.15	39.2	368.5
4	9:02	10	36.11	39.7	417.4
5	9:12	10	36.09	40.0	476.8
6	9:22	10	36.07	40.2	537.6
7	9:32	10	36.05	40.4	598.3
8	9:42	10	36.03	40.7	659.1
9	9:52	10	36.02	40.8	720.7
10	10:02	10	36.00	41.0	780.6
11	10:12	10	35.97	41.4	842.2
12	10:22	10	35.94	41.8	904.5
13	10:32	10	35.95	41.6	966.6
14	10:42	10	35.94	41.8	1028.7
15	10:52	10	35.93	41.9	1090.8
16	11:02	10	35.77	43.8	1157.9
17	11:12	10	35.74	44.2	1225.5
18	11:22	10	35.73	44.3	1293.4
19	11:32	10	35.71	44.5	1361.0

High Flowrate Percolation Test Calculation

Total Volume of Water Delivered (gallons)	1361.0
Total Volume of Water Delivered (cubic inches)	314391
Average Water Height (inches)	41.4
Average Percolation Surface Area (cubic Inches)	1091.4
Duration of Test (minutes)	180
Duration of Test (hours)	3.00

Measured Infiltration Rate = (Total Volume)/(Test Duration)/(Surface Area)

Measured Infiltration Rate (inches per hour) = 96.0

Boring Percolation Test Data Sheet

Project Number:	13468.002	**Test Hole Number:**	LP-2
Project Name:	SCL SR CTR	**Date Excavated:**	4/9/2022
Earth Description:	Qtm	**Date Tested:**	4/11/2022
Liquid Description:	Tap Water	**Depth of boring (ft):**	37.92
Tested By:	BTM	**Radius of boring, r (in):**	4
		Diameter of casing (in):	2
		Length of slotted of casing (ft):	10
		Depth to Initial Water Depth (ft):	35.72
		Porosity of Annulus Material, *n* :	0.35
		Bentonite Plug at Bottom:	No

Field Percolation Data

Reading	Time	Time Interval, Δt (minutes)	Depth to Water (feet bgs)	Water Height, H (inches)	Cumulative Water Volume Delivered (gallons)
1	1:30	-	-	-	280.0
2	1:40	10	36.01	22.9	344.0
3	1:50	10	35.97	23.4	404.2
4	2:00	10	35.92	24.0	466.0
5	2:10	10	35.87	24.6	528.1
6	2:20	10	35.84	25.0	590.2
7	2:30	10	35.81	25.3	652.5
8	2:40	10	35.78	25.7	714.6
9	2:50	10	35.76	25.9	776.7
10	3:00	10	35.74	26.2	839.0
11	3:10	10	35.72	26.4	900.8
12	3:20	10	35.70	26.6	962.9
13	3:30	10	35.69	26.8	1025.0
14	3:40	10	35.66	27.1	1087.1
15	3:50	10	35.64	27.4	1149.1
16	4:00	10	35.62	27.6	1211.4
17	4:10	10	35.62	27.6	1273.3
18	4:20	10	35.61	27.7	1335.7
19	4:30	10	35.59	28.0	1397.7

High Flowrate Percolation Test Calculation

Total Volume of Water Delivered (gallons)	1397.7
Total Volume of Water Delivered (cubic inches)	322868.7
Average Water Height (inches)	26.0
Average Percolation Surface Area (cubic Inches)	703.9
Duration of Test (minutes)	180
Duration of Test (hours)	3.00

$$\text{Measured Infiltration Rate} = (\text{Total Volume})/(\text{Test Duration})/(\text{Surface Area})$$

Measured Infiltration Rate (inches per hour) = 152.9

APPENDIX C

LABORATORY TEST RESULTS

TESTS for SULFATE CONTENT
CHLORIDE CONTENT and pH of SOILS

Project Name: Memorial Care Sr, Ctr Tested By : G. Berdy Date: 04/25/22

Project No. : 13468.002 Checked By: A. Santos Date: 04/27/22

Boring No.	LB-2			
Sample No.	LB1			
Sample Depth (ft)	1-5			
Soil Identification:	Olive brown (CL)			
Wet Weight of Soil + Container (g)	0.00			
Dry Weight of Soil + Container (g)	0.00			
Weight of Container (g)	1.00			
Moisture Content (%)	0.00			
Weight of Soaked Soil (g)	100.33			

SULFATE CONTENT, DOT California Test 417, Part II

Beaker No.	10			
Crucible No.	4			
Furnace Temperature (°C)	860			
Time In / Time Out	8:00/8:45			
Duration of Combustion (min)	45			
Wt. of Crucible + Residue (g)	21.6356			
Wt. of Crucible (g)	21.6330			
Wt. of Residue (g) (A)	0.0026			
PPM of Sulfate (A) x 41150	106.99			
PPM of Sulfate, Dry Weight Basis	**107**			

CHLORIDE CONTENT, DOT California Test 422

ml of Extract For Titration (B)	15			
ml of AgNO3 Soln. Used in Titration (C)	0.6			
PPM of Chloride (C -0.2) * 100 * 30 / B	80			
PPM of Chloride, Dry Wt. Basis	**80**			

pH TEST, DOT California Test 643

pH Value	**8.46**			
Temperature °C	20.9			

SOIL RESISTIVITY TEST

DOT CA TEST 643

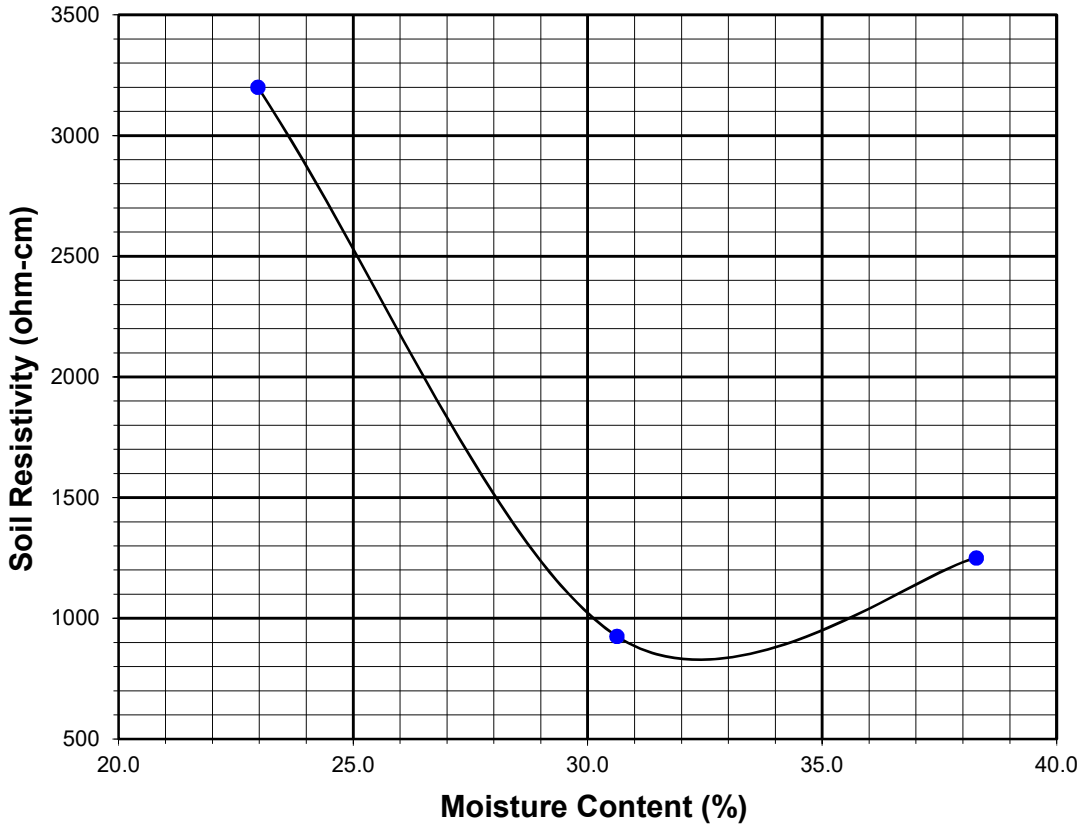
Project Name:	Memorial Care Sr, Ctr		Tested By :	G. Berdy	Date: 04/27/22
Project No. :	13468.002		Checked By:	A. Santos	Date: 04/27/22
Boring No.:	LB-2		Depth (ft.) :	1-5	
Sample No. :	LB1				
Soil Identification:*	Olive brown (CL)				

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	30	22.97	3200	3200
2	40	30.63	925	925
3	50	38.28	1250	1250
4				
5				

Moisture Content (%) (MCi)	0.00
Wet Wt. of Soil + Cont. (g)	0.00
Dry Wt. of Soil + Cont. (g)	0.00
Wt. of Container (g)	1.00
Container No.	
Initial Soil Wt. (g) (Wt)	130.60
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
820	**33.5**	**107**	**80**	**8.46**	**20.9**



EXPANSION INDEX of SOILS
ASTM D 4829

Project Name:	Memorial Care Sr. Ctr	Tested By:	G. Berdy	Date:	04/25/22
Project No.:	13468.002	Checked By:	A. Santos	Date:	04/27/22
Boring No.:	LB-1	Depth (ft.):	13.5"-5'		
Sample No.:	LB1				
Soil Identification:	Grayish brown lean clay with sand (CL)s				

Dry Wt. of Soil + Cont. (g)	1000.00
Wt. of Container No. (g)	0.00
Dry Wt. of Soil (g)	1000.00
Weight Soil Retained on #4 Sieve	0.00
Percent Passing # 4	100.00

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	1.0390
Wt. Comp. Soil + Mold (g)	609.60	443.30
Wt. of Mold (g)	203.30	0.00
Specific Gravity (Assumed)	2.70	2.70
Container No.	O	O
Wet Wt. of Soil + Cont. (g)	808.60	646.60
Dry Wt. of Soil + Cont. (g)	738.50	574.35
Wt. of Container (g)	0.00	203.30
Moisture Content (%)	9.49	19.47
Wet Density (pcf)	122.6	128.7
Dry Density (pcf)	111.9	107.7
Void Ratio	0.506	0.565
Total Porosity	0.336	0.361
Pore Volume (cc)	69.6	77.6
Degree of Saturation (%) [S_{meas}]	**50.6**	93.1

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
04/25/22	13:48	1.0	0	0.6685
04/25/22	13:58	1.0	10	0.6665
Add Distilled Water to the Specimen				
04/25/22	14:20	1.0	22	0.6880
04/26/22	16:04	1.0	1566	0.7075
04/26/22	17:05	1.0	1627	0.7075

Expansion Index (EI_{meas}) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	**41**

EXPANSION INDEX of SOILS
ASTM D 4829

Project Name:	Memorial Care Sr. Ctr	Tested By:	G. Berdy	Date:	04/25/22
Project No.:	13468.002	Checked By:	A. Santos	Date:	04/27/22
Boring No.:	LB-2	Depth (ft.):	1-5		
Sample No.:	LB1				
Soil Identification:	Olive brown lean clay (CL)				

Dry Wt. of Soil + Cont.	(g)	1000.00
Wt. of Container No.	(g)	0.00
Dry Wt. of Soil	(g)	1000.00
Weight Soil Retained on #4 Sieve		0.00
Percent Passing # 4		100.00

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	1.0830
Wt. Comp. Soil + Mold (g)	586.00	438.90
Wt. of Mold (g)	201.30	0.00
Specific Gravity (Assumed)	2.70	2.70
Container No.	O	O
Wet Wt. of Soil + Cont. (g)	780.10	640.20
Dry Wt. of Soil + Cont. (g)	703.40	548.19
Wt. of Container (g)	0.00	201.30
Moisture Content (%)	10.90	26.52
Wet Density (pcf)	116.0	122.2
Dry Density (pcf)	104.6	96.6
Void Ratio	0.611	0.745
Total Porosity	0.379	0.427
Pore Volume (cc)	78.5	95.7
Degree of Saturation (%) [S_{meas}]	**48.2**	96.1

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
04/25/22	14:20	1.0	0	0.6020
04/25/22	14:30	1.0	10	0.6000
Add Distilled Water to the Specimen				
04/25/22	16:00	1.0	90	0.6440
04/26/22	16:03	1.0	1533	0.6845
04/26/22	17:12	1.0	1602	0.6850

Expansion Index (EI_{meas}) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	**85**

MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name:	Memorial Care Sr. Ctr	Tested By:	J. Gonzalez	Date:	04/25/22
Project No.:	13468.002	Checked By:	A. Santos	Date:	04/26/22
Boring No.:	LB-2	Depth (ft.):	1-5		
Sample No.:	LB1				
Soil Identification:	Olive brown lean clay (CL)				

Preparation Method: [X] Moist [ ] Dry

[X] Mechanical Ram [ ] Manual Ram

Mold Volume (ft³) 0.03330 *Ram Weight = 10 lb.; Drop = 18 in.*

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	3629	3789	3795			
Weight of Mold (g)	1826	1826	1826			
Net Weight of Soil (g)	1803	1963	1969			
Wet Weight of Soil + Cont. (g)	462.8	473.6	448.8			
Dry Weight of Soil + Cont. (g)	427.9	426.8	396.5			
Weight of Container (g)	39.2	38.8	39.6			
Moisture Content (%)	8.98	12.06	14.65			
Wet Density (pcf)	119.4	130.0	130.4			
Dry Density (pcf)	109.5	116.0	113.7			

Maximum Dry Density (pcf) **116.1** **Optimum Moisture Content (%)** **12.5**

PROCEDURE USED

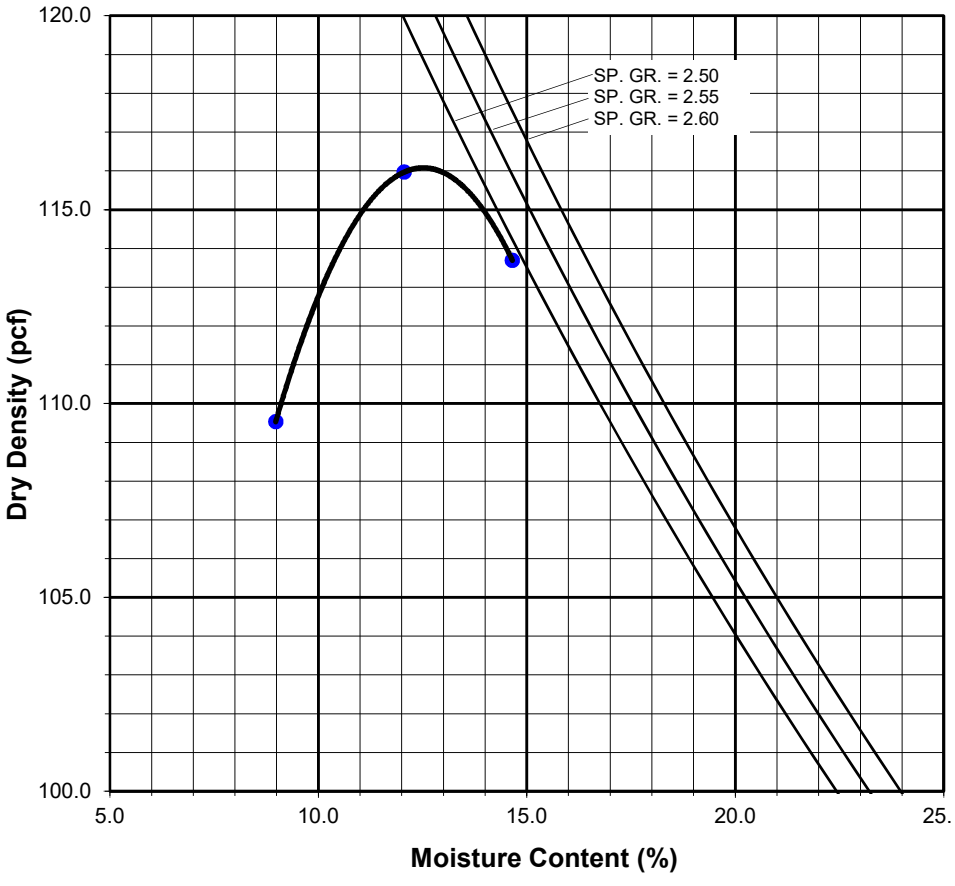
[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:
GR:SA:FI

Atterberg Limits:
LL,PL,PI



ATTERBERG LIMITS
ASTM D 4318

Project Name:	Memorial Care Sr. Ctr	Tested By:	J. Domingo	Date:	04/25/22
Project No. :	13468.002	Input By:	G. Bathala	Date:	04/27/22
Boring No.:	LB-1	Checked By:	A. Santos		
Sample No.:	LB1	Depth (ft.)	13.5"-5.0		
Soil Identification:	Grayish brown lean clay with sand (CL)s				

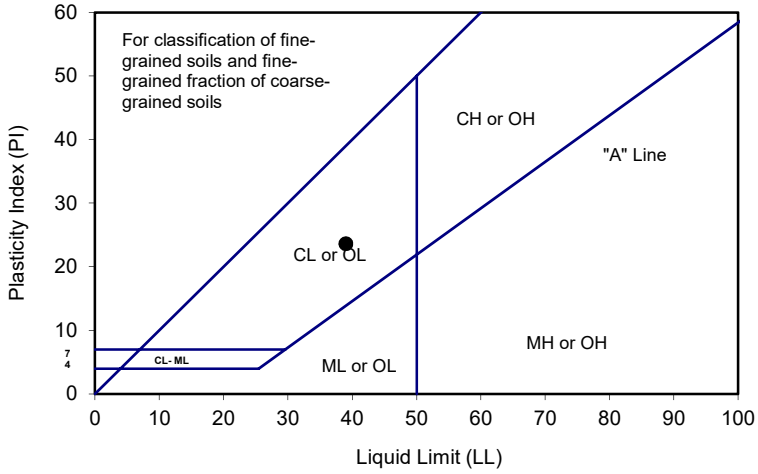
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			31	24	17	
Wet Wt. of Soil + Cont. (g)	9.31	9.12	21.24	21.35	21.60	
Dry Wt. of Soil + Cont. (g)	8.20	8.04	15.71	15.65	15.57	
Wt. of Container (g)	0.99	1.03	1.03	1.10	1.02	
Moisture Content (%) [Wn]	15.40	15.41	37.67	39.18	41.44	

Liquid Limit	**39**
Plastic Limit	**15**
Plasticity Index	**24**
Classification	**CL**

PI at "A" - Line = 0.73(LL-20) 13.87

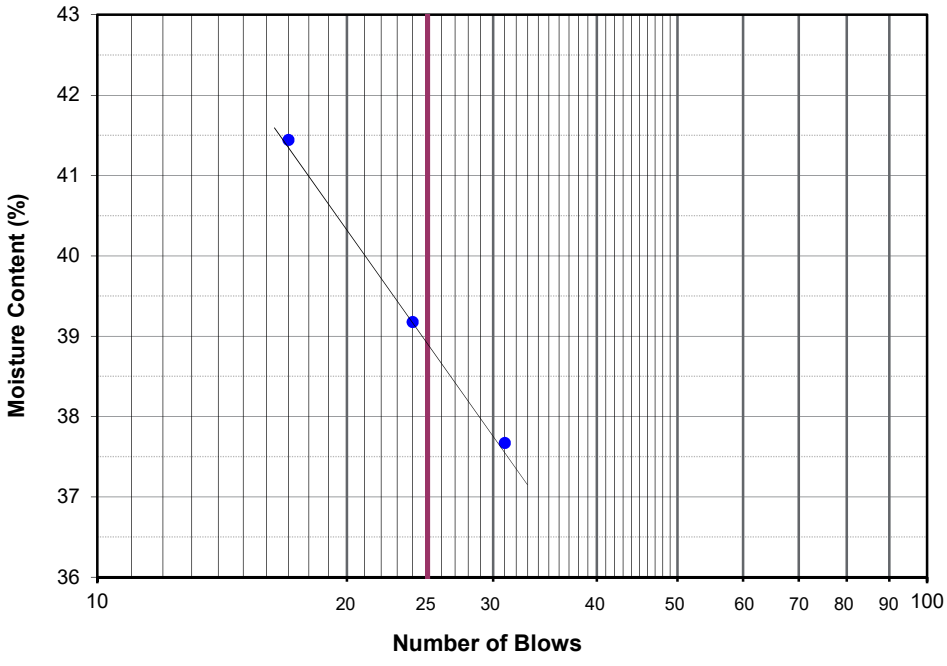
One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



PROCEDURES USED

- [ ] Wet Preparation
  Multipoint - Wet
- [X] Dry Preparation
  Multipoint - Dry
- [X] Procedure A
  Multipoint Test
- [ ] Procedure B
  One-point Test



ATTERBERG LIMITS

ASTM D 4318

Project Name:	Memorial Care Sr. Ctr	Tested By:	S. Felter	Date:	04/20/22
Project No. :	13468.002	Input By:	G. Bathala	Date:	04/27/22
Boring No.:	LB-1	Checked By:	A. Santos		
Sample No.:	R-3	Depth (ft.)	7.5		
Soil Identification:	Brown fat clay (CH)				

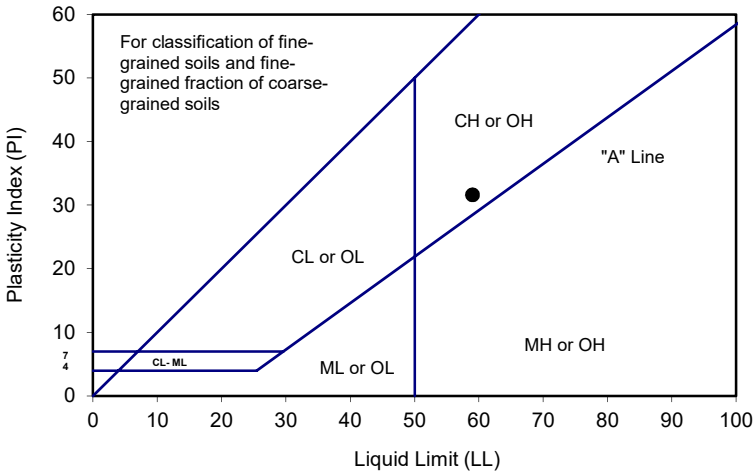
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			32	26	20	
Wet Wt. of Soil + Cont. (g)	9.46	9.44	20.46	20.48	20.64	
Dry Wt. of Soil + Cont. (g)	7.66	7.65	13.38	13.26	13.26	
Wt. of Container (g)	1.04	1.15	1.04	1.08	1.12	
Moisture Content (%) [Wn]	27.19	27.54	57.37	59.28	60.79	

Liquid Limit	**59**
Plastic Limit	**27**
Plasticity Index	**32**
Classification	**CH**

PI at "A" - Line = 0.73(LL-20) 28.47

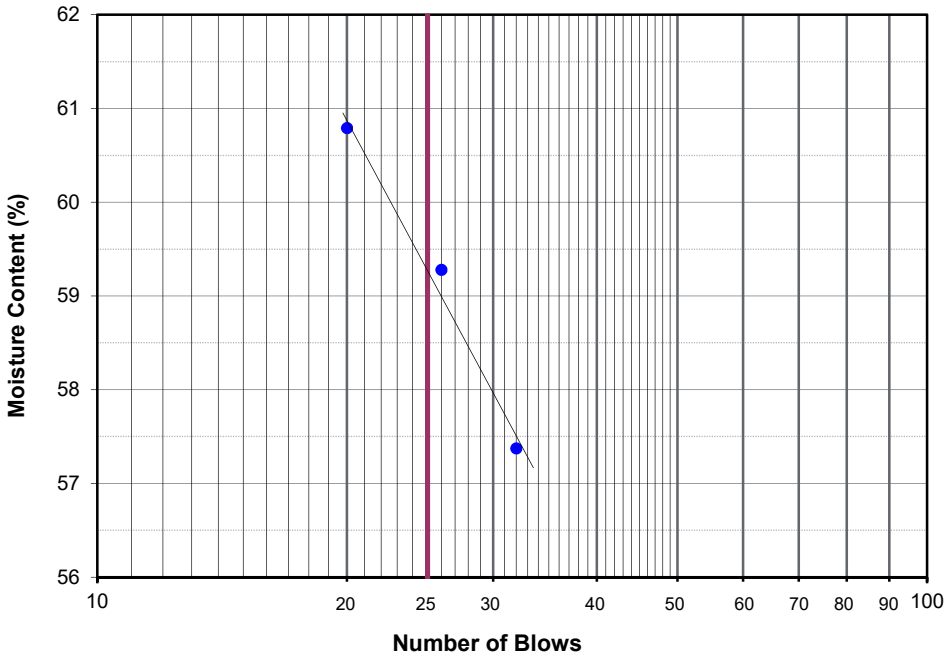
One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



PROCEDURES USED

- [ ] Wet Preparation
  Multipoint - Wet
- [X] Dry Preparation
  Multipoint - Dry
- [X] Procedure A
  Multipoint Test
- [ ] Procedure B
  One-point Test



ATTERBERG LIMITS
ASTM D 4318

Project Name:	Memorial Care Sr. Ctr	Tested By:	S. Felter	Date:	04/20/22
Project No. :	13468.002	Input By:	G. Bathala	Date:	04/22/22
Boring No.:	LB-2	Checked By:	A. Santos		
Sample No.:	R-3	Depth (ft.)	7.5		
Soil Identification:	Brown lean clay (CL)				

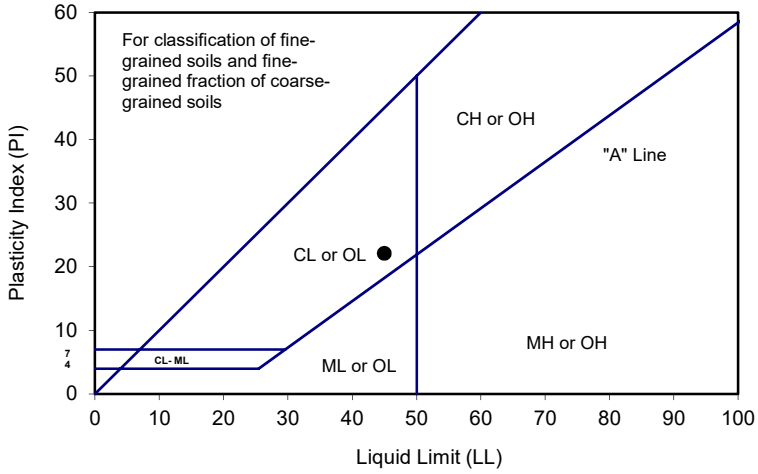
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			34	26	20	
Wet Wt. of Soil + Cont. (g)	10.11	10.11	20.22	21.53	20.06	
Dry Wt. of Soil + Cont. (g)	8.46	8.41	14.53	15.24	14.07	
Wt. of Container (g)	1.12	1.12	1.10	1.14	1.06	
Moisture Content (%) [Wn]	22.48	23.32	42.37	44.61	46.04	

Liquid Limit	**45**
Plastic Limit	**23**
Plasticity Index	**22**
Classification	**CL**

PI at "A" - Line = 0.73(LL-20) 18.25

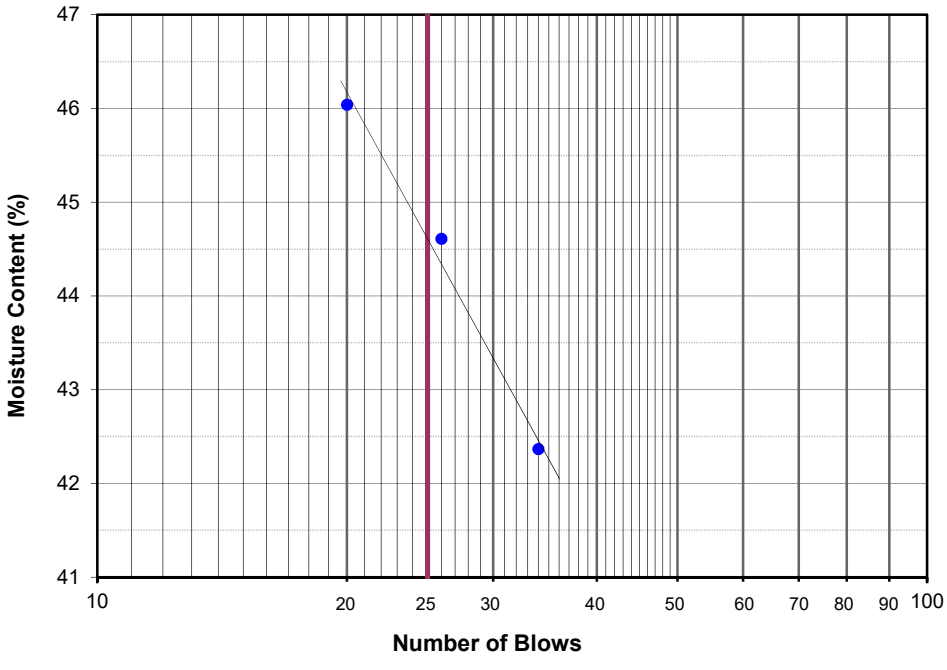
One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



PROCEDURES USED

	Wet Preparation
	Multipoint - Wet
X	Dry Preparation
	Multipoint - Dry
X	Procedure A
	Multipoint Test
	Procedure B
	One-point Test



PARTICLE-SIZE DISTRIBUTION (GRADATION) of SOILS USING SIEVE ANALYSIS

ASTM D6913

Project Name: Memorial Care Sr. Ctr
Project No.: 13468.002
Boring No.: LB-3
Sample No.: R-1x thru R-4ax, Composite
Soil Identification: Grayish brown poorly-graded sand (SP)g

Tested By: J. Domingo Date: 04/25/22
Checked By: A. Santos Date: 04/27/22
Depth (feet): 29-41.4

Calculation of Dry Weights	Whole Sample	Sample Passing #4	Moisture Contents	Whole Sample	Sample passing #4
Container No.:	SP-03	912	Wt. of Air-Dry Soil + Cont.(g)	0.0	0.0
Wt. Air-Dried Soil + Cont.(g)	9671.5	626.7	Wt. of Dry Soil + Cont. (g)	0.0	0.0
Wt. of Container (g)	745.4	106.1	Wt. of Container No._____(g)	1.0	1.0
Dry Wt. of Soil (g)	8926.1	520.6	Moisture Content (%)	0.0	0.0

Passing #4 Material After Wet Sieve		
	Container No.	912
	Wt. of Dry Soil + Container (g)	604.4
	Wt. of Container (g)	106.1
	Dry Wt. of Soil Retained on # 200 Sieve (g)	498.3

U. S. Sieve Size		Cumulative Weight of Dry Soil Retained (g)		Percent Passing (%)
	(mm.)	Whole Sample	Sample Passing #4	
3"	75.0			
1 1/2"	37.5	0.0		100.0
1"	25.0	181.9		98.0
3/4"	19.0	402.5		95.5
1/2"	12.5	680.1		92.4
3/8"	9.5	905.3		89.9
#4	4.75	1553.6		82.6
#8	2.36		34.5	77.1
#16	1.18		65.8	72.2
#30	0.600		113.8	64.5
#50	0.300		154.0	58.2
#100	0.150		338.3	28.9
#200	0.075		493.6	4.3
PAN				

GRAVEL: **17 %**
SAND: **79 %**
FINES: **4 %**
GROUP SYMBOL: **(SP)g**

Cu = D60/D10 = 3.56
Cc = $(D30)^2/(D60*D10)$ = 1.00

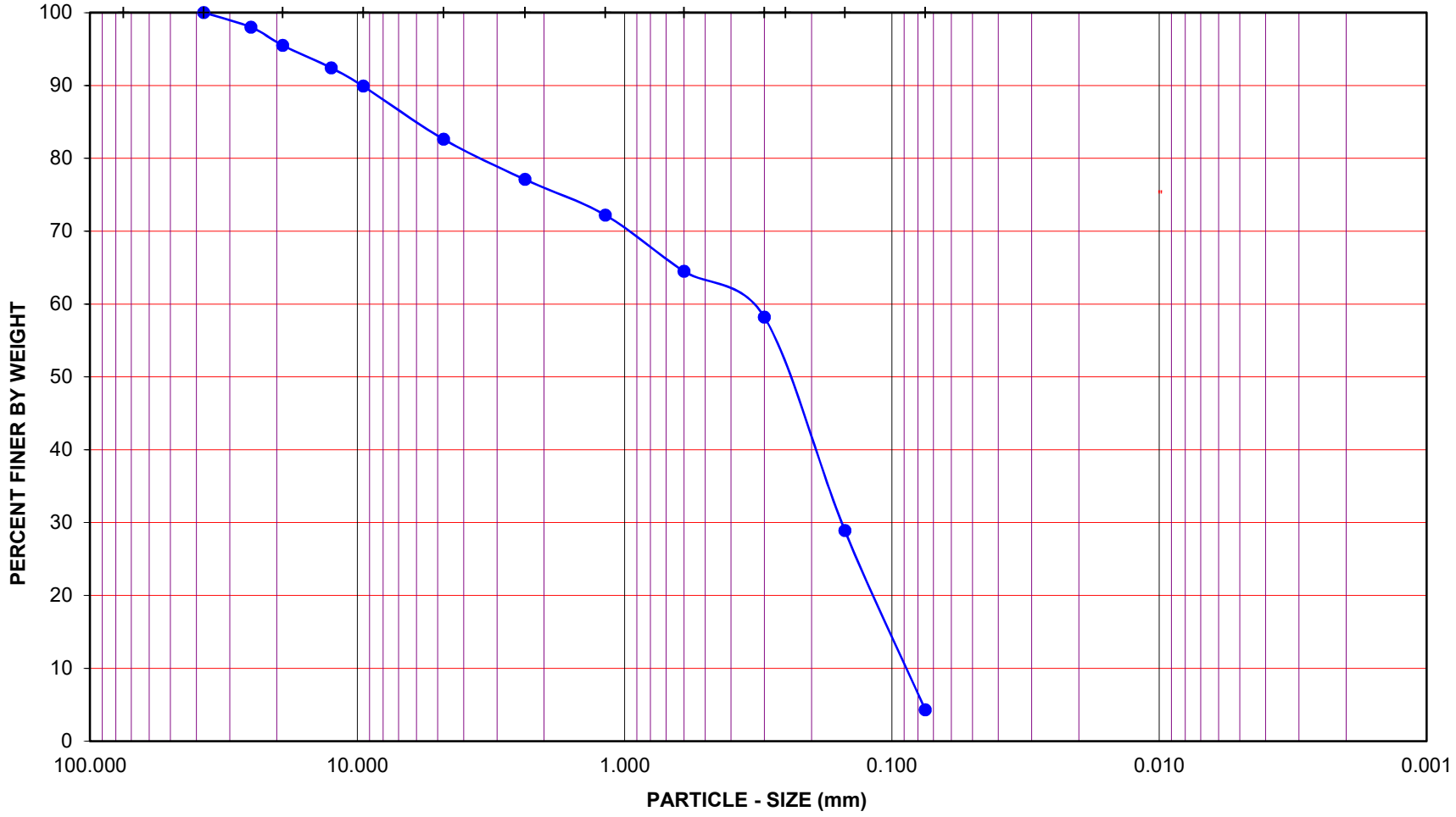
Remarks:

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY

U.S. STANDARD SIEVE OPENING: 3.0" 1 1/2" 3/4" 3/8"

U.S. STANDARD SIEVE NUMBER: #4 #8 #16 #30 #50 #100 #200

HYDROMETER



Project Name: Memorial Care Sr. Ctr

Project No.: 13468.002

Boring No.: LB-3 Sample No.: R-1x thru R-4ax, Composite

Depth (feet): 29-41.4 Soil Type : (SP)g

Soil Identification: Grayish brown poorly-graded sand (SP)g

GR:SA:FI : (%) 17 : 79 : 4

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

Apr-22

Sieve LB-3, R-1x thru R-4ax @ 29-41.4 Composite

APPENDIX D

CEQA QUESTIONNAIRE FOR GEOLOGY AND SOILS

Print Form

Appendix G

Environmental Checklist Form

NOTE: The following is a sample form and may be tailored to satisfy individual agencies' needs and project circumstances. It may be used to meet the requirements for an initial study when the criteria set forth in CEQA Guidelines have been met. Substantial evidence of potential impacts that are not listed on this form must also be considered. The sample questions in this form are intended to encourage thoughtful assessment of impacts, and do not necessarily represent thresholds of significance.

1. Project title:_____

2. Lead agency name and address:
_____
_____
_____

3. Contact person and phone number: _____

4. Project location: _____

5. Project sponsor's name and address:
_____
_____
_____

6. General plan designation: _____ 7. Zoning:_____

8. Description of project: (Describe the whole action involved, including but not limited to later phases of the project, and any secondary, support, or off-site features necessary for its implementation. Attach additional sheets if necessary.)
_____
_____
_____
_____

9. Surrounding land uses and setting: Briefly describe the project's surroundings:
_____
_____
_____
_____

10. Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement.)
_____
_____
_____
_____

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agriculture and Forestry Resources	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Geology /Soils
☐ Greenhouse Gas Emissions	☐ Hazards & Hazardous Materials	☐ Hydrology / Water Quality
☐ Land Use / Planning	☐ Mineral Resources	☐ Noise
☐ Population / Housing	☐ Public Services	☐ Recreation
☐ Transportation/Traffic	☐ Utilities / Service Systems	☐ Mandatory Findings of Significance

DETERMINATION: (To be completed by the Lead Agency)

On the basis of this initial evaluation:

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

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

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

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

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

_____ _____

Signature Date

_____ _____

Signature Date

EVALUATION OF ENVIRONMENTAL IMPACTS:

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

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

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

4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from "Earlier Analyses," as described in (5) below, may be cross-referenced).

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

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

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

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

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

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

8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9) The explanation of each issue should identify:

    a) the significance criteria or threshold, if any, used to evaluate each question; and

    b) the mitigation measure identified, if any, to reduce the impact to less than significance.

SAMPLE QUESTION
Issues:

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
I. AESTHETICS -- Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☐
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☐
II. AGRICULTURE AND FOREST RESOURCES: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. -- Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☐
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☐
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland	☐	☐	☐	☐

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Production (as defined by Government Code section 51104(g))?				
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☐
de) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☐
III. AIR QUALITY -- Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☐	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☐	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☐
IV. BIOLOGICAL RESOURCES -- Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	☐	☐	☐	☐
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of	☐	☐	☐	☐

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☐
V. CULTURAL RESOURCES -- Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5?	☐	☐	☐	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	☐	☐	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☐	☐
VI. GEOLOGY AND SOILS -- Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	☐	☐	☒	☐
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐
ii) Strong seismic ground shaking?	☐	☒	☐	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☒	☐	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☒	☐	☐
VII. GREENHOUSE GAS EMISSIONS -- Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☐	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☐	☐
VIII. HAZARDS AND HAZARDOUS MATERIALS - Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☐	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☐
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard	☐	☐	☐	☐

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
for people residing or working in the project area?				
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☐
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☐
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☐
IX. HYDROLOGY AND WATER QUALITY -- Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☐	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☐	☐
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☐	☐
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	☐
f) Otherwise substantially degrade water quality?	☐	☐	☐	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☐

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☐
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☐
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☐
X. LAND USE AND PLANNING - Would the project:				
a) Physically divide an established community?	☐	☐	☐	☐
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☐
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☐
XI. MINERAL RESOURCES -- Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☐
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☐
XII. NOISE -- Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☐	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☐	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☐

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☐
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☐
XIII. POPULATION AND HOUSING -- Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☐
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☐
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☐
XIV. PUBLIC SERVICES				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?	☐	☐	☐	☐
Police protection?	☐	☐	☐	☐
Schools?	☐	☐	☐	☐
Parks?	☐	☐	☐	☐
Other public facilities?	☐	☐	☐	☐
XV. RECREATION --				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☐

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☐
XVI. TRANSPORTATION/TRAFFIC -- Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☐	☐
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☐
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☐
e) Result in inadequate emergency access?	☐	☐	☐	☐
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☐	☐
XVII. UTILITIES AND SERVICE SYSTEMS -- Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☐
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☐
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which	☐	☐	☐	☐

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
could cause significant environmental effects?				
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☐
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☐
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☐
XVIII. MANDATORY FINDINGS OF SIGNIFICANCE --				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☐	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	☐

Note: Authority cited: Sections 21083, 21083.05, Public Resources Code. Reference: Section 65088.4, Gov. Code; Sections 21080, 21083.05, 21095, Pub. Resources Code; *Eureka Citizens for Responsible Govt. v. City of Eureka* (2007) 147 Cal.App.4th 357; *Protect the Historic Amador Waterways v. Amador Water Agency* (2004) 116 Cal.App.4th at 1109; *San Franciscans Upholding the Downtown Plan v. City and County of San Francisco* (2002) 102 Cal.App.4th 656.

Revised 2009

APPENDIX E

PRELIMINARY SEISMIC DESIGN PARAMETERS

13468.002

Latitude, Longitude: 33.4570, -117.6500

Date	4/22/2022, 4:13:48 PM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Stiff Soil

Type	Value	Description
S_S	1.173	MCE_R ground motion. (for 0.2 second period)
S_1	0.423	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.209	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	0.806	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1.031	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.507	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA
PGA_M	0.557	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	1.173	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	1.273	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	3.204	Factored deterministic acceleration value. (0.2 second)
S1RT	0.423	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.455	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	1.033	Factored deterministic acceleration value. (1.0 second)
PGAd	1.285	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.922	Mapped value of the risk coefficient at short periods
C_{R1}	0.93	Mapped value of the risk coefficient at a period of 1 s

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U.S. Geological Survey - Earthquake Hazards Program

Unified Hazard Tool

Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the U.S. Seismic Design Maps web tools (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

Input

Edition

Dynamic: Conterminous U.S. 2014 (update…

Spectral Period

Peak Ground Acceleration

Latitude

Decimal degrees

33.457

Time Horizon

Return period in years

2475

Longitude

Decimal degrees, negative values for western longitudes

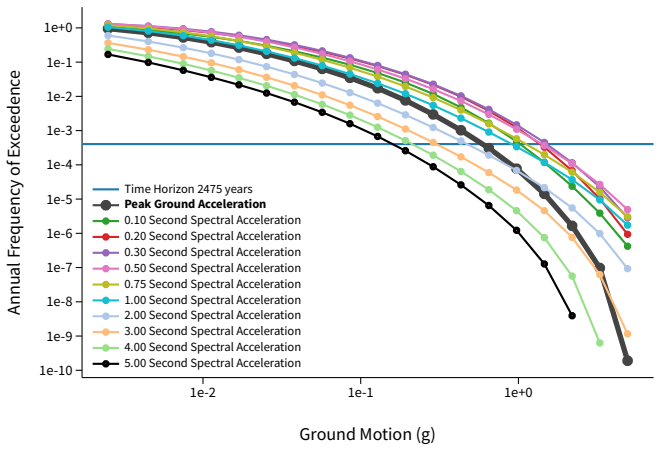
-117.65

Site Class

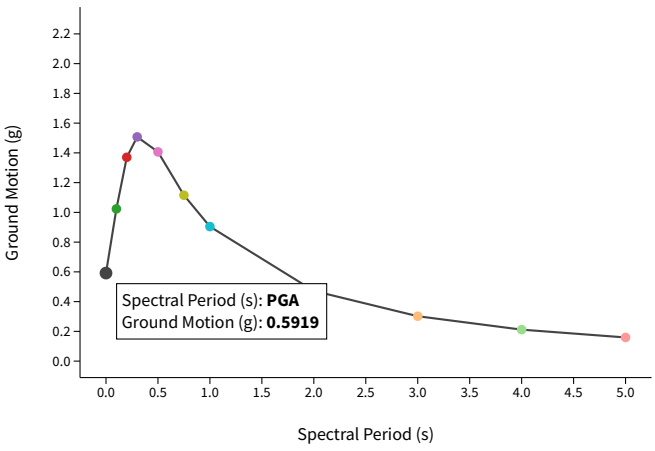
259 m/s (Site class D)

Hazard Curve

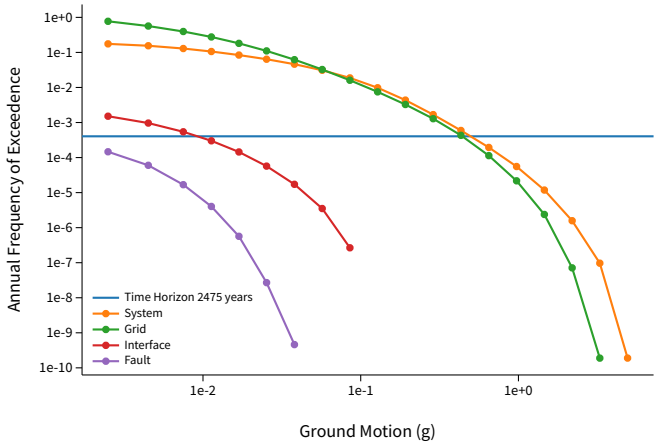
Hazard Curves



Uniform Hazard Response Spectrum



Component Curves for Peak Ground Acceleration

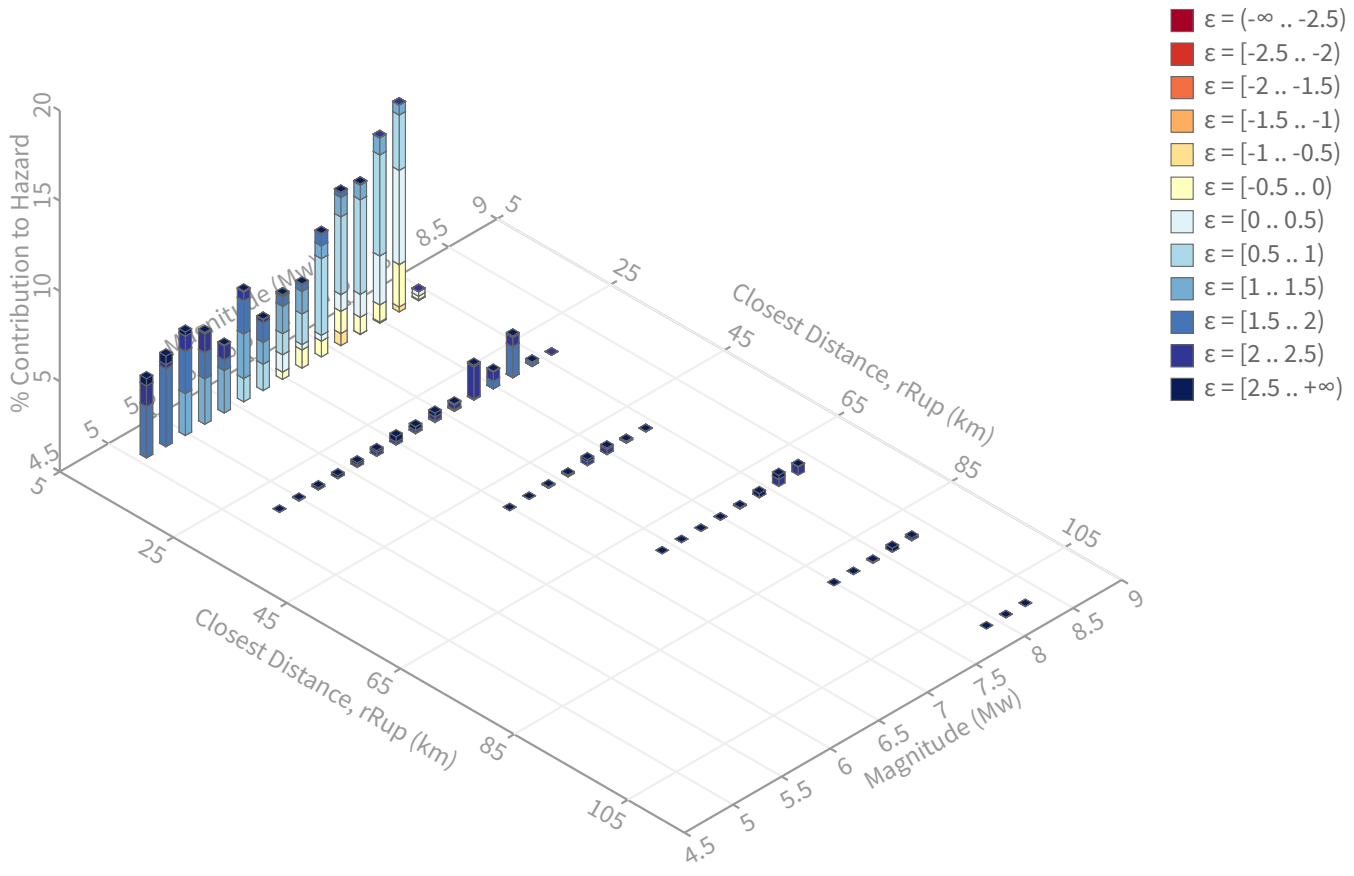


View Raw Data

Deaggregation

Component

Total



Summary statistics for, Deaggregation: Total

Deaggregation targets

Return period: 2475 yrs
Exceedance rate: 0.0004040404 yr^{-1}
PGA ground motion: 0.59185776 g

Recovered targets

Return period: 2845.7638 yrs
Exceedance rate: 0.00035139951 yr^{-1}

Totals

Binned: 100 %
Residual: 0 %
Trace: 0.12 %

Mean (over all sources)

m: 6.72
r: 11.85 km
ε_0: 1.09 σ

Mode (largest m-r bin)

m: 7.69
r: 6.46 km
ε_0: 0.25 σ
Contribution: 11.46 %

Mode (largest m-r-ε_0 bin)

m: 7.49
r: 6.95 km
ε_0: 0.65 σ
Contribution: 5.6 %

Discretization

r: min = 0.0, max = 1000.0, Δ = 20.0 km
m: min = 4.4, max = 9.4, Δ = 0.2
ε: min = -3.0, max = 3.0, Δ = 0.5 σ

Epsilon keys

ε0: [-∞ .. -2.5)
ε1: [-2.5 .. -2.0)
ε2: [-2.0 .. -1.5)
ε3: [-1.5 .. -1.0)
ε4: [-1.0 .. -0.5)
ε5: [-0.5 .. 0.0)
ε6: [0.0 .. 0.5)
ε7: [0.5 .. 1.0)
ε8: [1.0 .. 1.5)
ε9: [1.5 .. 2.0)
ε10: [2.0 .. 2.5)
ε11: [2.5 .. +∞]

Deaggregation Contributors

Source Set ↳ Source	Type	r	m	ϵ_0	lon	lat	az	%
UC33brAvg_FM31	System							34.49
Oceanside alt1 [5]		6.20	7.28	0.07	117.768°W	33.419°N	249.11	15.32
Newport-Inglewood (Offshore) [5]		6.74	7.26	0.75	117.704°W	33.417°N	228.59	10.85
Elsinore (Glen Ivy) rev [3]		35.82	7.59	2.07	117.412°W	33.711°N	37.93	1.29
Palos Verdes [1]		31.30	7.25	2.19	117.941°W	33.315°N	239.73	1.29
UC33brAvg_FM32	System							28.13
Newport-Inglewood (Offshore) [5]		6.74	7.24	0.76	117.704°W	33.417°N	228.59	10.94
San Joaquin Hills [2]		10.99	6.97	0.86	117.685°W	33.577°N	346.37	5.14
Oceanside alt2 [11]		6.19	7.62	0.02	117.769°W	33.420°N	249.75	5.04
Palos Verdes [1]		31.30	7.46	2.04	117.941°W	33.315°N	239.73	1.46
Elsinore (Glen Ivy) rev [3]		35.82	7.62	2.05	117.412°W	33.711°N	37.93	1.37
UC33brAvg_FM31 (opt)	Grid							18.73
PointSourceFinite: -117.650, 33.515		8.03	5.70	1.38	117.650°W	33.515°N	0.00	4.12
PointSourceFinite: -117.650, 33.515		8.03	5.70	1.38	117.650°W	33.515°N	0.00	4.12
PointSourceFinite: -117.650, 33.524		8.96	5.61	1.56	117.650°W	33.524°N	0.00	2.49
PointSourceFinite: -117.650, 33.524		8.96	5.61	1.56	117.650°W	33.524°N	0.00	2.49
UC33brAvg_FM32 (opt)	Grid							18.64
PointSourceFinite: -117.650, 33.515		8.03	5.70	1.38	117.650°W	33.515°N	0.00	4.14
PointSourceFinite: -117.650, 33.515		8.03	5.70	1.38	117.650°W	33.515°N	0.00	4.14
PointSourceFinite: -117.650, 33.524		8.96	5.61	1.56	117.650°W	33.524°N	0.00	2.48
PointSourceFinite: -117.650, 33.524		8.96	5.61	1.56	117.650°W	33.524°N	0.00	2.48