CHRISTIAN WHEELER
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REPORT OF PRELIMINARY GEOTECHNICAL INVESTIGATION

MORROW RESIDENCE
8460 El PASEO GRANDE
LA JOLLA, CALIFORNIA

PREPARED FOR

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September 27, 2023

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Los Angeles, California 92025

CWE 2230041.01

Subject: **Report of Preliminary Geotechnical Investigation**
Morrow Residence, 8460 El Paseo Grande, San Diego, California

Ladies and Gentlemen:

In accordance with your request and our proposal dated March 9, 2023, we have completed a preliminary geotechnical investigation for a proposed single-family residence to be constructed at the subject property. We are presenting herewith a report of our findings and recommendations.

It is our opinion that no geotechnical conditions exist at or in the vicinity of the subject property that would preclude the construction of the development as presently proposed. The main geotechnical conditions affecting the proposed construction are potentially compressible artificial fill soils and slopewash in the area of the proposed improvements. These conditions are described hereinafter.

If you have any questions after reviewing this report, please do not hesitate to contact our office. This opportunity to be of professional service is sincerely appreciated.

Respectfully submitted,
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CHRISTIAN WHEELER
ENGINEERING

PRELIMINARY GEOTECHNICAL INVESTIGATION

MORROW RESIDENCE,
8460 EL PASEO GRANDE,
LA JOLLA, CALIFORNIA

INTRODUCTION AND PROJECT DESCRIPTION

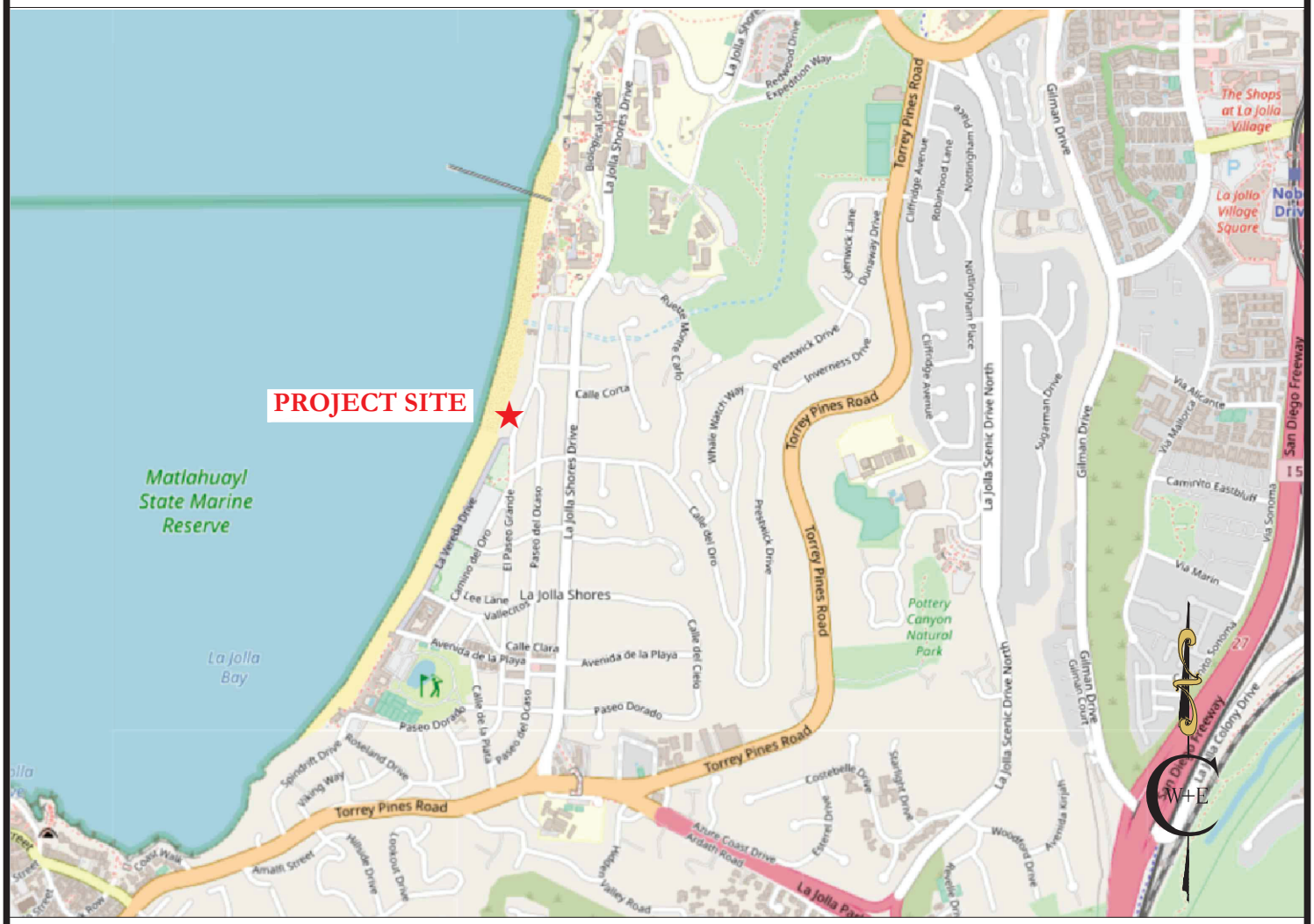
This report presents the results of a preliminary geotechnical investigation performed for the proposed construction of a new single-family residence at 8460 El Paseo Grande, a developed lot which is located adjacent to and west of El Paseo Grande and east of La Jolla Shores beach in the La Jolla area of San Diego, California. Figure Number 1, presented on the following page, provides a vicinity map showing the location of the property.

Although no plans are presently available, is our understanding, based on communications with the project architect, Bailey Robertson of Marmol Radziner and Associates, that the existing structure and associated improvements at the site will be demolished entirely and that a new 2 story residential structure will be constructed. The new structure may include a basement. We anticipate that the structure will be of wood frame, concrete, and/or masonry construction, and will have on-grade concrete floor slabs. The structure will be supported by either conventional, shallow foundations or a deep foundation system consisting of drilled, cast-in-place concrete piers. Grading to accommodate the proposed construction is expected to be limited to minor cuts and fill of less than 2 feet from existing site grades or cuts up to about 11 feet deep, if a basement is constructed.

At the time of this report preparation, architectural plans have not yet been provided to us. A Topographic Survey of the lot by Coffey Engineering, Inc, dated November 1, 2022 has been provided. To assist in the preparation of this report, we have reviewed previous geotechnical reports prepared by our firm for sites in the immediate vicinity of the subject site. A copy of the Topographic Survey was used as the base map for our Site Plan & Geologic Map, which is included herein as Plate No. 1.

SITE VICINITY

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MORROW RESIDENCE
8460 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	SEPTEMBER 2023	JOB NO.:	2230041.01
BY:	SD	FIGURE NO.:	1

CHRISTIAN WHEELER
ENGINEERING

This report has been prepared for the exclusive use of Atlas Sun I, LLC, and their design consultants, for specific application to the project described herein. Should the project be modified, the conclusions and recommendations presented in this report should be reviewed by Christian Wheeler Engineering for conformance with our recommendations and to determine whether any additional subsurface investigation, laboratory testing and/or recommendations are necessary. Our professional services have been performed, our findings obtained and our recommendations prepared in accordance with generally accepted engineering principles and practices. This warranty is in lieu of all other warranties, expressed or implied.

SCOPE OF SERVICES

Our preliminary geotechnical investigation consisted of surface reconnaissance, limited subsurface exploration, obtaining soil samples, laboratory testing, analysis of field and laboratory data, and review of relevant, readily available geologic literature, and preparation of this report. In consideration of the conditions at the site, the proposed construction, and site access constraints, the following services were provided as part of our investigation.

- Obtaining a boring permit to conduct the proposed subsurface exploration from the County of San Diego.
- Drilling 3 small diameter borings at the site with a limited access, tripod mounted drill rig, and advancing 1 hand auger boring, in order to explore the existing subsurface conditions of the site and collect soil samples.
- Backfilling the borings using bentonite as required by the County of San Diego Department of Environmental Health.
- Excavating 1 hand-dug test pit to explore the existing subsurface conditions and to collect representative soil samples.
- Backfilling the test pit with the removed soil. It should be noted that the soil was not mechanically compacted and will have to be removed and replaced as compacted fill during future site construction.
- Evaluating, by laboratory tests and our past experience with similar soil types, the engineering properties of the various soil strata that may influence the proposed construction, including bearing capacities, expansive characteristics, and settlement potential.
- Describing the general geology at the site including possible geologic hazards that could have an effect on the proposed construction, and provide the seismic design parameters in accordance with

the 2022 edition of the California Building Code. A liquefaction analysis is not within the scope of this investigation.

- Discussing potential construction difficulties that may be encountered due to soil conditions, groundwater or geologic hazards, and provide geotechnical recommendations to mitigate identified construction difficulties.
- Providing site preparation and grading recommendations for the anticipated work, as necessary.
- Providing design recommendations for shored and unshored temporary cut slopes.
- Providing earth retaining wall design recommendations.
- Providing foundation recommendations for the type of construction anticipated and develop soil engineering design criteria for the recommended foundation designs.
- Providing design parameters for restrained and unrestrained retaining walls.
- Providing a preliminary geotechnical report presenting the results of our investigation, including plot plans showing the location of our subsurface explorations, excavation logs, laboratory test results, and our conclusions and recommendations for the proposed project.

FINDINGS

SITE DESCRIPTION

The subject site is a developed residential lot, with a single-family house structure, garage, patios in the central and western portion of the site, and a series of up to 3 tiered retaining walls in the rear yard area. The lowest retaining wall extends down to the La Jolla Shores beach. The lot is identified as Assessor's Parcel Number 346-050-04-00, which is located adjacent to and west of El Paseo Grande in the La Jolla area of San Diego, California. For the purposes of this report, the subject site is assumed to face east towards El Paseo Grande, when in actuality it faces east-southeast. The site is bound to the north and south by similarly developed residential lots; to the west by La Jolla Shores beach; and to the east by El Paseo Grande. Topographically, the developed portions of the lot are relatively level with the series of retaining walls and patios within the western portion of the lot descending approximately 13 feet to the adjacent beach area. On-site elevations range from 7 feet along the western property line and beach area to 20 feet in the building pad area in the central portion of the site. Elevation information was obtained from the Topographic Survey (Coffey Engineering, Inc., 2022).

SITE HISTORY

To understand the development history of the parcel, we have reviewed available historical aerial photographs and topographic maps from the San Diego History Center (2023), National Environmental Title Research, LLC (2023) and the United States Geological Survey Historical Topographic Map Explorer (2023).

Based upon our research, it appears the site and general vicinity was graded around the 1930's to 1940's. The residence and retaining wall(s) along the west side of the site appear to have been constructed in the late 1940's to early 1950's. Review of oblique angle historical photos from the San Diego History Center captured in 1947 appear to be taken prior to development of the residences along El Paseo Grande, however review of the United States Department of Agriculture aerial photograph survey of San Diego County in 1953 shows the residence and neighboring properties were developed by that time.

GENERAL GEOLOGY AND SUBSURFACE CONDITIONS

GEOLOGIC SETTING AND SOIL DESCRIPTION: The subject site is located in the Coastal Plains Physiographic Province of San Diego County. Based upon the findings of our subsurface exploration and review of readily available, pertinent geologic and geotechnical literature, it was determined that the developed portions of the site are underlain by a relatively thin veneer of man-placed artificial fill soils overlying Quaternary-age slopewash and Quaternary-age old paralic deposits. In the western portion of the lot, marine beach deposits (beach sand) were encountered. These materials are described below.

ARTIFICIAL FILL (Qaf): Artificial fill soils were encountered underlying the entire developed portion of the site, and in subsurface explorations B-1 to B-3 and P-1. This material generally extended to a maximum depth of about 5 feet below existing grade. Deeper fill soils may exist in areas of the site not investigated. The fill material was comprised of a variety of soils, consisting of dark brown, lean clay and sandy lean clay (CL), yellowish brown, poorly-graded sand (SP), reddish brown, clayey sand (SC), and reddish brown-dark reddish, brown silty sand (SM). The fine-grain (clay) fill materials were dry to moist, and generally soft in consistency. The coarse-grained (sand) fill materials were damp to moist, and very loose to loose in consistency. The fill soils were judged to have a low to medium Expansion Index (EI between 21 and 90).

SLOPEWASH (Qsw): Quaternary-age **s**lopewash materials were encountered underlying the artificial fill in subsurface explorations B-1 to B-3 and P-1. The slopewash ranged in thickness from about 3½ to 12½ feet, and extended to a maximum depth of about 6½ to 14 feet below existing site grades. Deeper

slopewash may exist in areas of the site not investigated. The slopewash consisted of light brown to dark brown, lean clay with sand and sandy lean clay (CL). The slopewash materials were moist to very moist, and soft to very stiff in consistency. The slopewash materials were judged to have a low to medium Expansion Index (EI between 21 and 90). The sample tested had a medium expansion index (EI=70).

OLD PARALIC DEPOSITS (Qop): Quaternary-age old paralic deposit materials were encountered underlying the slopewash in subsurface explorations B-1 to B-3 and P-1. The old paralic deposit materials extended to the maximum depth of exploration at about 20 feet below existing grade in the exploratory borings B-1 to B-3. The old paralic deposit materials consisted of mottled brown to dark reddish brown, lean clay (CL) and silty sand (SM). The old paralic deposit materials were moist to very moist (saturated below the groundwater elevation), and medium dense/ stiff to very stiff in consistency. The old paralic deposits were found to have a low Expansion Index (EI=26 and 31).

MARINE BEACH DEPOSITS (Qmb): Marine beach deposits (beach sand) were encountered in subsurface exploration HA-1, west of the retaining wall along the west side of the site. The marine beach deposits extended in thickness up to 4 feet where refusal was encountered, but likely extend to significantly deeper depths across the beach vicinity. The marine beach deposits consist of light gray to pale yellow, poorly graded sand (SP). The marine beach deposits were moist to very moist and loose to medium dense. The marine beach deposits were judged to have a very low Expansion Index (EI=<20).

GEOLOGIC STRUCTURE: The old paralic deposits generally have near horizontal bedding. Near horizontal bedding is generally considered neutral to favorable from a global stability perspective. Furthermore, it is our opinion that the geologic structure is generally neutral to favorable and the proposed development is low risk.

GROUNDWATER: Groundwater was encountered at 18 feet below existing grade in boring B-3 at approximately the same elevation as sea level. It is our opinion that the groundwater encountered does not present a significant or adverse groundwater condition and should not affect the proposed development. We do not expect any further adverse groundwater related conditions during or after construction. However, it should be recognized that minor groundwater seepage problems might occur after construction and landscaping are completed, even at a site where none were present before construction. These are usually minor phenomena and are often the result of an alteration in drainage patterns and/or an increase in irrigation water. Based on the anticipated construction and the permeability of the on-site soils, it is our opinion that any seepage problems that may occur will be minor in extent. Furthermore, it is our opinion that these problems can be most effectively corrected on an individual basis if and when they occur.

TECTONIC SETTING: No active faults are known to traverse the subject site. A concealed fault is mapped on the City of San Diego Seismic Safety Study (2008), grid tile 30, approximately 100 feet north of the site and orientated at N70^{O}E. The fault zone is classified by the City as Geologic Hazard Category (GHC) 12, which is described as "Potentially active, Inactive, Presumed Inactive, or Activity Unknown". The fault zone buffer traverses the northwestern corner of the site. Review of the "Geologic Map of the San Diego 30' x 60' Quadrangle, California" by Kennedy and Tan (2008) shows the same fault categorized as concealed and mapped in approximately the same location as the City of San Diego Seismic Safety Study. Approximately 2,700 feet northeast of the site, Kennedy and Tan map the fault offsetting the Tertiary-Aged Scripps Formation and Ardath Shale. The remainder of the fault is mapped as concealed beneath Quaternary-aged landslide deposits, old paralic deposit and very old paralic deposit geologic units. The oldest of these unbroken overlying geologic units is the Very Old Paralic Deposits, Unit 11, approximately dated at 698,000 years before present (Kennedy and Tan, 2008), and therefore any movement on the fault should have occurred prior to 698,000 years ago. The mapped fault is also orientated roughly perpendicular to the orientation of the known active faults in the La Jolla area. Therefore, it is our opinion that the mapped fault in the vicinity of the suite is not active, and should be classified as a Pre-Holocene Fault. Classification of faults is described below and further information about the City of San Diego Seismic Safety Study is described in the Geologic Hazards section of this report.

It should be noted that much of Southern California, including the San Diego County area, is characterized by a series of Quaternary-age fault zones that consist of several individual, en echelon faults that generally strike in a northerly to northwesterly direction. Some of these fault zones (and the individual faults within the zone) are classified as "active" according to the criteria of the 2018 revision of *'Special Publication 42, Earthquake Fault Zones'* by the California Geologic Survey (CGS). The CGS use the following three-tier fault classification system:

- *'Holocene-active faults'*; Faults with displacement within the Holocene epoch (the last 11,700 years). Commonly referred to as active faults.
- *'Pre-Holocene faults'*; Faults with displacement with the Pleistocene epoch (between 11,700 to 2.6 million years ago), but not within the Holocene epoch. Previously terminology by the CGS referred to these faults as *'potentially active',* however this terminology is being phased out.
- *'Age-undetermined faults'*; Faults with displacement unconstrained by dating methods or limitations in stratigraphic resolution.

Faults older than Quaternary-age (older than the Pleistocene epoch) are not specifically defined in Special Publication 42, however, it is generally accepted that faults showing no movement during the Quaternary period (up to 2.6 million years) may be considered to be *'inactive'*.

Projects near *Holocene-active faults* are regulated by the Alquist-Priolo Earthquake Fault Zoning Act of 1972. The Act prohibits the development of structures for human occupancy across the surface trace of an active fault in California, with certain exceptions. Faults determined by the CGS as *sufficiently active* and *well-defined* are identified on Alquist-Priolo regulatory maps as *Active Fault Traces* and bounded by buffers called *Earthquake Fault Zones*. Sites within these zones are required to undergo fault hazard studies as part of the geotechnical investigation. Review of the local Alquist-Priolo regulatory maps indicates that the subject site is not underlain by a known active fault and is not within an Earthquake Fault Zone.

A review of available geologic maps indicates that the Rose Canyon Fault Zone is the closest active fault zone and is located approximately 0.6 miles southwest of the subject site. Other active fault zones in the region that could possibly affect the site include the Coronado Bank, San Diego Trough and San Clemente Fault Zones to the southwest, the Newport-Inglewood and Palos Verdes Fault Zones to the northwest, and the Elsinore, Earthquake Valley, San Jacinto, and San Andreas Fault Zones to the northeast. A portion of these fault zones are summarized in Table I below.

TABLE I: PROXIMAL FAULT ZONES

Fault Zone	Distance
Rose Canyon	0.6 mi
Coronado Bank	12 mi
Newport-Inglewood	1 mi
San Diego Trough	23 mi
Elsinore (Julian)	37 mi
San Clemente	47 mi
Earthquake Valley	48 mi
Palos Verdes	52 mi
San Jacinto (Anza)	59 mi
San Andreas	82 mi

GEOLOGIC HAZARDS

SEISMIC SAFETY STUDY: As part of our investigation, we have reviewed the City of San Diego Seismic Safety Study. This study is the result of a comprehensive investigation of the city, which rates areas according to geological risk potential (nominal, low, moderate and high), stability, and identifies any potential geotechnical hazards and/or describes geomorphic conditions. The City of San Diego Seismic Safety Study, grid tile 30, places most of the eastern portion of the site in Geologic Hazard Category 52, which is assigned to low risk, gently sloping to steep terrain with favorable geologic structure. The western portion of the site is within Geologic Hazard Category 48, which is assigned to generally stable, broad beach areas and coastal harbors. As previously discussed, the northwestern corner of the site is also within a fault buffer zone, Geologic Hazard Category 12,

which is assigned to areas around faults that are considered to be potentially active, in active, presumed inactive, or of unknown activity. However, it is our opinion that this fault zone is not active and does not underlie the site. Furthermore, it is our opinion that the site geology is stable and that the site does not have any geologic hazard that cannot be mitigated to an acceptable level, or that would preclude the proposed site development.

STRONG GROUND MOTION: The most likely geologic hazard to affect the site is strong ground motion as a result of movement along one of the major, active fault zones mentioned above. Probable ground shaking levels at the site could range from moderate to strong, depending on such factors as the magnitude of the seismic event and the distance to the epicenter. It is likely that the site will experience the effects of at least one moderate to large earthquake during the life of the proposed improvements. The seismic design factors applicable to the subject site are provided hereinafter in the Seismic Design Factors section of this report. Construction in accordance with the California Building Code and the requirements of the City of San Diego will minimize damage from strong ground motions and mitigate risk to an acceptable level.

SURFACE RUPTURE: Sites susceptible to ground rupture are typically underlain by active fault zones. The site is not underlain by an active fault, nor is it within an Alquist-Priolo Earthquake Fault Zone, and therefore it is our opinion that the site is not considered susceptible to surface rupture.

LANDSLIDE POTENTIAL AND SLOPE STABILITY: The Relative Landslide Susceptibility and Landslide Distribution Map of the La Jolla Quadrangle prepared by the California Division of Mines and Geology (Tan, 1995) indicates that the site is situated within Relative Landslide Susceptibility Area 2. Area 2 is considered to be "marginally susceptible" to slope failures, where the topography is mostly gentle to moderate slopes and factor of safety values for most slopes are over 1.5. Based on our investigation, the site was found to be underlain at relatively shallow depths by soft to stiff slopewash over stiff to very stiff/medium dense old paralic deposits. It is our opinion that the site is not underlain by a landslide deposit and that the risk of landsliding or global slope failures at the site is negligible.

LIQUEFACTION: The earth materials underlying the developable portions of the site are not considered subject to liquefaction due to such factors as soil density, cohesion and grain-size distribution.

TSUNAMIS: Tsunamis are great sea waves produced by submarine earthquakes, submarine landslides, volcanic eruptions or meteorite impacts. According to the Tsunami Hazard Area Map, San Diego County published by the California Geological Survey, dated 2022, the site is located within a "Tsunami Hazard Area". Historically, tsunamis occurring along the San Diego coastline have fallen within the normal swell and

tidal range. The largest historical tsunami to reach San Diego's coast was 4.6 feet high, generated by the 1960 earthquake off the coast of Chile. It is thought that the wide continental margin off the coast acts to diffuse and reflect the wave energy of remotely generated tsunamis and the bathymetry of the San Diego coastline is generally considered to be favorable in regard to minimizing tsunami risk. Furthermore, an unprecedented tsunami event would be required to cause property destruction and loss of life at the site. However, a lack of understanding and data about the offshore fault systems and tsunamis along the San Diego coastline makes it difficult to assess the tsunami risk. To minimize the tsunami risk at the site, we recommend that consideration be given to developing the site at the highest permissible elevations. The owner should also educate themselves about tsunami preparedness and tsunami evacuation routes.

SEICHES: Seiches are periodic oscillations in large bodies of water such as lakes, harbors, bays or reservoirs. Due to the site's location, it will not be affected by seiches.

FLOODING: As delineated on the *Flood Insurance Rate Map (FIRM)*, map number 06073C1582H prepared by the Federal Emergency Management Agency, dated December 20, 2019, the western portion of the site (west of the existing retaining wall along the west side of the site) is within Zone VE, designated as *"Special Flood Hazard Area"* with a Base Flood Elevation of 15'. The eastern portion of the site (the area of the site to be developed) is within Zone X, designated as *"Area of Minimal Flood Hazard"*. Areas of minimal flood hazards are located outside of the boundaries of both the 100-year and 500-year flood zones.

OTHER POTENTIAL GEOLOGIC HAZARDS: Other potential geologic hazards such as volcanoes and naturally occurring asbestos should be considered to be negligible or nonexistent.

CONCLUSIONS

It is our professional opinion that no geotechnical conditions exist at or in the general vicinity of the subject property that would preclude the construction of the proposed residential project, provided the recommendations presented herein are followed. The main geotechnical consideration affecting the proposed construction is potentially compressible fill soils and slopewash materials underlying the portion of the site to be re-developed, expansive soils, and temporary cut slopes.

Potentially compressible artificial fill and slopewash underlie the site. As encountered in our subsurface exploration these materials extend to a maximum combined depth of about 14 feet below existing grade (boring B-1). Deeper compressible soils may exist in areas of the site not investigated. The potentially compressible soils are considered unsuitable, in their resent condition, for the support of settlement sensitive

improvements. In order to mitigate this condition, it is recommended that these materials be partially removed and replaced as compacted fill where on-grade construction is proposed. It is further recommended that footing to support the proposed structure extend into old paralic deposits and a structural slab-on-grade be utilized. Extending the proposed foundations will require concrete cast-in-place drilled piers if no basement is constructed or for on-grade portions of the structure. Depending on the basement depth piers may still be necessary for the entire structure to lessen the impact of ground water during construction.

The prevailing foundation soils were found to have a medium expansive potential (EI between 51 and 90). The recommendations contained herein reflect expansive potential of these soils. It should be recognized that the intent of this report is to provide cost-effective site preparation and foundation recommendations to mitigate the potential detrimental effect of the on-site expansive soils on the proposed structure. However, soils with medium expansion potential may detrimentally affect light-weight exterior improvements such as site walls, sidewalks, and driveways. Select grading consisting of replacing the expansive soils with a soil that has a low expansive potential is one of the best ways to mitigate for expansive soil conditions. If select grading is not performed, consideration should be given to utilizing materials that are tolerant to movement, implementing drought tolerant landscaping, providing positive drainage away from exterior improvements, and providing concrete surfaces with appropriate weakened plane joints. Regardless of these or other similar measures, some distress to exterior improvements requiring future maintenance or even replacement should be anticipated, due to expansive soils. The recommendations contained in this report assume that select grading will not be performed.

Temporary cut slopes up to about 12 feet deep may be required if a basement is proposed. Temporary shoring will be necessary for proposed basement construction.

The site is located in an area that is relatively free of geologic hazards that have an unacceptable level of risk or significant detrimental effect on the proposed construction. The most likely geologic hazard that could affect the site is ground shaking due to seismic activity along one of the regional active faults. However, construction in accordance with the requirements of the most recent edition of the California Building Code and the local governmental agencies should provide a level of life-safety suitable for the type of development proposed.

RECOMMENDATIONS

GRADING AND EARTHWORK

GENERAL: All grading should conform to the guidelines presented in the current edition of the California Building Code, the minimum requirements of the City of San Diego, and the recommended Grading Specifications and Special Provisions attached hereto, except where specifically superseded in the text of this report.

PREGRADE MEETING: It is recommended that a pregrade meeting including the grading contractor, the client, and a representative from Christian Wheeler Engineering be performed, to discuss the recommendations of this report and address any issues that may affect grading operations.

OBSERVATION OF GRADING: Continuous observation by the Geotechnical Consultant is essential during the grading operation to confirm conditions anticipated by our investigation, to allow adjustments in design criteria to reflect actual field conditions exposed, and to determine that the grading proceeds in general accordance with the recommendations contained herein.

CLEARING AND GRUBBING: Site preparation should begin with the removal of all existing improvements slated for demolition. The resulting debris as well as all vegetation and other deleterious materials in areas of the site to receive the proposed improvements and/or fill materials should be disposed of off-site.

SITE PREPARATION: Existing fill soils and slopewash underlying proposed settlement-sensitive structures and improvements should be removed to a minimum depth of 3 feet below existing or proposed grade, whichever is more. Deeper removals may be necessary due to unforeseen conditions. The horizontal limits of the removals should include all areas that will support settlement-sensitive improvements such as structures, patios and walkways, and new fills. The removals should extend to the property lines. No removals are recommended within 2 feet of existing improvements to remain and beyond property lines. All areas cleaned out of unsuitable soils should be approved by the geotechnical engineer or his representative prior to replacing any of the excavated soils. The excavated materials can be replaced as properly compacted fill in accordance with the recommendations presented in the "Compaction and Method of Filling" section of this report.

PROCESSING OF FILL AREAS: Prior to placing any new fill soils in areas that have been cleaned out to receive fill and have been approved by the Geotechnical Consultant or his representative, the exposed soils should be scarified to a depth of about 12 inches, moisture conditioned, and compacted as described hereinafter.

IMPORTED FILL SOILS: Imported fill soils will be necessary for retaining wall backfill. Imported fill soils should consist of clayey and/or silty sands that have a low expansion potential (EI between 21 and 50), relatively high strength, and relatively low permeability characteristics. At least 5 working days will be necessary to perform necessary laboratory test to approve an import source. As an alternative, gravel wrapped in filter fabric may be use as retaining wall backfill. In this case, a minimum 2-feet compacted soil cap is recommended over the gravel.

COMPACTION AND METHOD OF FILLING: In general, all structural fill placed at the site should be compacted to a relative compaction of at least 90 percent of its maximum laboratory dry density as determined by ASTM Laboratory Test D1557. Fills should be placed at or slightly above optimum moisture content, in lifts six to eight inches thick, with each lift compacted by mechanical means. Fills should consist of approved earth material, free of trash or debris, roots, vegetation, or other materials determined to be unsuitable by the Geotechnical Consultant. Fill material should be free of rocks or lumps of soil in excess of three inches in maximum dimension.

Utility trench backfill within five feet of the proposed structure and beneath all concrete flatwork or pavements should be compacted to a minimum of 90 percent of its maximum dry density.

SURFACE DRAINAGE: The drainage around the proposed improvements should be designed to collect and direct surface water away from proposed improvements toward appropriate drainage facilities. Rain gutters with downspouts that discharge runoff away from the structure into controlled drainage devices are recommended.

The ground around the proposed improvements should be graded so that surface water flows rapidly away from the improvements without ponding. In general, we recommend that the ground adjacent to structure slope away at a gradient of at least 5 percent for a minimum distance of 10 feet. If the minimum distance of 10 feet cannot be achieved, an alternative method of drainage runoff away from the building at the termination of the 5 percent slope will need to be used. Swales and impervious surfaces that are located within 10 feet of the building should have a minimum slope of 2 percent. It is essential that new and existing drainage patterns be coordinated to produce proper drainage.

Drainage patterns provided at the time of construction should be maintained throughout the life of the proposed improvements. Site irrigation should be limited to the minimum necessary to sustain landscape growth. Over watering should be avoided. Should excessive irrigation, impaired drainage, or unusually high rainfall occur, zones of wet or saturated soil may develop.

TEMPORARY CUT SLOPES: The contractor is solely responsible for designing and constructing stable, temporary excavations and will need to shore, slope, or bench the sides of trench excavations as required to maintain the stability of the excavation sides. The contractor's "competent person", as defined in the OSHA Construction Standards for Excavations, 29 CFR, Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety process. We anticipate that the existing on-site fill soils and slopewash will consist of Type C material. In accordance with OSHA guidelines temporary cut slopes in Type C materials can be excavated at a 1.5:1 (horizontal to vertical) inclination. Our firm should be contacted to observe all temporary cut slopes during grading to ascertain that no unforeseen adverse conditions exist. No surcharge loads such as foundation loads, or soil or equipment stockpiles, vehicles, etc. should be allowed within a distance from the top of temporary slopes equal to half the slope height. Where it is not possible to construct temporary construction slopes as recommended, shoring will be required.

TEMPORARY SHORING

GENERAL: Shoring may be necessary for the proposed construction. It is anticipated that the shoring system will utilize soldier beams with wooden lagging. The following design parameters may be assumed to calculate earth pressures on shoring.

TABLE II: TEMPORARY SHORING DESIGN PARAMETERS

Soil Type	Existing Fill/Slopewash
Angle of friction	20°
Apparent cohesion	550 pounds per square foot
Soil unit weight	125 pounds per cubic foot

Active pressures can be applied to shoring that is capable of rotating 0.002 radians. At-rest pressures should be applied to a shoring system that is unyielding and not able to rotate. These values do not include surcharge loads. Construction surcharge loads should be evaluated on a case-by-case basis. Vertical and lateral movements of the temporary shoring are expected to be small assuming an adequate lateral support system.

DRILLING CHARACTERISTICS: It is anticipated that the proposed piers may be drilled utilizing conventional heavy-duty drilling equipment in good working condition; however, groundwater requiring special drilling techniques should be anticipated.

FOUNDATIONS

GENERAL: Based on our findings and engineering judgment, the proposed structure may be supported on foundations extending into competent old paralic deposits. Depending on the depth of these materials, conventional shallow foundations or cast-in-place concrete piers will be suitable. However, consideration should be given to supporting the basement on drilled piers to minimize potential groundwater issues. Light exterior improvements may be founded on newly compacted fill. The following recommendations are considered the minimum based on the anticipated soil conditions, and are not intended to be lieu of structural considerations. All foundations should be designed by a qualified engineer.

SHALLOW FOUNDATIONS

DIMENSIONS: Spread footings supporting the proposed structure should be embedded at least 18 inches below lowest adjacent finish pad grade, and extend at least 12 inches into old paralic deposits, whichever is more. Continuous and isolated footings should have a minimum width of 12 inches and 24 inches, respectively. Retaining wall footings should be at least 18 inches deep and 24 inches wide.

BEARING CAPACITY: Spread footings supporting the proposed structure may be designed for an allowable soil bearing pressure of 4,000 pounds per square foot (psf). This value may be increased by 800 psf for each additional foot of embedment and 600 psf for each additional foot of width up to a maximum of 6,000 psf. These values may be increased by one-third for combinations of temporary loads such as those due to wind or seismic loads.

FOOTING REINFORCING: Reinforcement requirements for foundations should be provided by a structural designer. However, based on the expected soil conditions, we recommend that the minimum reinforcing for continuous footings consist of at least 2 No. 5 bars positioned near the bottom of the footing and 2 No. 5 bars positioned near the top of the footing.

LATERAL LOAD RESISTANCE: Lateral loads against foundations may be resisted by friction between the bottom of the footing and the supporting soil, and by the passive pressure against the footing. The coefficient of friction between concrete and soil may be considered to be 0.2. The passive

resistance may be considered to be equal to an equivalent fluid weight of 200 pounds per cubic foot. These values are based on the assumption that the footings are poured tight against undisturbed soil. If a combination of the passive pressure and friction is used, the friction value should be reduced by one-third.

CONCRETE CAST-IN-PLACE PIERS

MINIMUM PIER DIMENSIONS: Cast-in-place concrete pier foundations should have a minimum diameter of 24 inches. The piers should extend to a minimum depth of 10 feet below grade and 5 feet into old paralic deposits, whichever is more. At this depth, a bearing capacity of 8,000 pounds per square foot (psf) may be assumed for said piers. This bearing pressure may be increased by 800 psf for each additional foot of depth, and 600 psf for each additional foot of width, up to a maximum bearing pressure of 20,000 psf. This value may be increased by one-third when considering wind and/or seismic loads. Piers should be connected by grade beams as recommended by the project structural engineer.

PIER REINFORCING: The reinforcing steel for the piers should be specified by the project structural designer. As a minimum, we recommend that the pier reinforcing extend the full depth of the pier excavation.

LATERAL BEARING CAPACITY: The allowable lateral bearing resistance to lateral loads for the portion of the piers embedded in fill soils and slopewash may be assumed to be 150 pounds per square foot per foot of depth up to a maximum of 1,500 pounds per square foot. The allowable lateral bearing resistance to lateral loads for the portion of the piers embedded in very old paralic deposits or the San Diego Formation may be assumed to be 200 pounds per square foot per foot of depth up to a maximum of 2,000 pounds per square foot. These values may be assumed to act below the setback line and on an area equal to twice the pier diameter.

PIER EXCAVATION OBSERVATION AND CLEANING: The pier excavations should be observed by a member of our staff during drilling to determine that the minimum embedment recommend in this report is achieved. Prior to placing the steel reinforcing cages, all loose or disturbed soils at the bottom of the pier excavations should be removed. The cleanout of the pier excavations should be approved by the geotechnical engineer.

DRILLING CHARACTERISTICS: It is anticipated that the proposed piers may be drilled utilizing conventional heavy-duty drilling equipment in good working condition; however, groundwater requiring special drilling techniques should be anticipated.

SHALLOW FOUNDATIONS EXTERIOR IMPROVEMENTS

DIMENSIONS: Assumming select grading is not performed, spread footings supporting the miscellaneous light exterior improvements should be embedded at least 18 inches below lowest adjacent finish pad grade deposits. Continuous and isolated footings should have a minimum width of 12 inches and 24 inches, respectively.

BEARING CAPACITY: Spread footings supporting the proposed miscellaneous exterior improvements with a minimum depth of 318inches and a minimum width of 12 inches may be designed for an allowable soil bearing pressure of 1,500 pounds per square foot (psf). This value may be increased by one-third for combinations of temporary loads such as those due to wind or seismic loads.

FOOTING REINFORCING: Reinforcement requirements for foundations should be provided by a structural designer. However, based on the expected soil conditions, we recommend that the minimum reinforcing for continuous footings consist of at least 2 No. 5 bars positioned near the bottom of the footing and 2 No. 5 bars positioned near the top of the footing.

LATERAL LOAD RESISTANCE: Lateral loads against foundations may be resisted by friction between the bottom of the footing and the supporting soil, and by the passive pressure against the footing. The coefficient of friction between concrete and soil may be considered to be 0.2. The passive resistance may be considered to be equal to an equivalent fluid weight of 200 pounds per cubic foot. These values are based on the assumption that the footings are poured tight against undisturbed soil. If a combination of the passive pressure and friction is used, the friction value should be reduced by one-third.

FOUNDATION EXCAVATION OBSERVATION: All footing excavations should be observed by Christian Wheeler Engineering prior to placing of forms and reinforcing steel to determine whether the foundation recommendations presented herein are followed and that the foundation soils are as anticipated in the preparation of this report. All footing excavations should be excavated neat, level, and square. All loose or unsuitable material should be removed prior to the placement of concrete.

SETTLEMENT CHARACTERISTICS: The anticipated total and differential settlement is expected to be less than about 1 inch and ½ inch over 40 feet, respectively, provided the recommendations presented in this report are followed. It should be recognized that minor cracks normally occur in concrete slabs and foundations due to concrete shrinkage during curing or redistribution of stresses, therefore some cracks should be anticipated. Such cracks are not necessarily an indication of excessive vertical movements.

EXPANSIVE CHARACTERISTICS: The prevailing foundation soils are expected to have a medium expansive potential (EI between 51 to 90). The recommendations within this report reflect these conditions.

FOUNDATION PLAN REVIEW: The final foundation plan and accompanying details and notes should be submitted to this office for review. The intent of our review will be to verify that the plans used for construction reflect the minimum dimensioning and reinforcing criteria presented in this section and that no additional criteria are required due to changes in the foundation type or layout. It is not our intent to review structural plans, notes, details, or calculations to verify that the design engineer has correctly applied the geotechnical design values. It is the responsibility of the design engineer to properly design/specify the foundations and other structural elements based on the requirements of the structure and considering the information presented in this report.

SOLUBLE SULFATES: The water-soluble sulfate content of selected soil samples from the site was determined in accordance with California Test Method 417. The results of the tests indicate that the soil sample had a soluble sulfate content of 0.013 and 0.006 percent. A soluble sulfate content of less than 0.1 percent is considered to have a negligible potential for causing adverse effects on concrete and structural steel materials of the proposed footings. However, it should be recognized that the sulfate content of surficial soils may increase with time due to soluble sulfate in the irrigation water or fertilized use.

It should be understood Christian Wheeler Engineering does not practice corrosion engineering. If a corrosivity analysis is considered necessary, we recommend that the client retain an engineering firm that specializes in this field to consult with them on this matter. The results of our corrosion testing should only be used as a guideline to determine if additional testing and analysis is necessary.

SEISMIC DESIGN FACTORS

The seismic design factors applicable to the subject site are provided below. The seismic design factors were determined in accordance with the 2022 California Building Code. The site coefficients and adjusted maximum considered earthquake spectral response acceleration parameters are presented in the following Table III.

TABLE III: SEISMIC DESIGN FACTORS

Site Coordinates: Latitude Longitude	32.860° -117.255°
Site Class	D
Site Coefficient F_a	1.0
Site Coefficient F_v	1.81
Spectral Response Acceleration at Short Periods S_s	1.400 g
Spectral Response Acceleration at 1 Second Period S_1	0.490 g
$S_{MS}=F_aS_s$	1.400 g
$S_{M1}=F_vS_1$	0.887 g
$S_{DS}=2/3*S_{MS}$	0.933 g
$S_{D1}=2/3*S_{M1}$	0.591 g

Probable ground shaking levels at the site could range from moderate to strong, depending on such factors as the magnitude of the seismic event and the distance to the epicenter. It is likely that the site will experience the effects of at least one moderate to large earthquake during the life of the proposed improvements.

ON-GRADE CONCRETE SLABS

PROPOSED STRUCTURE: It is our understanding that the floor system for proposed structure will of concrete slab-on-grade construction. The slab should be designed by the project structural engineer based on the findings of this report. A design coefficient of subgrade reaction, Kv1, of 50 pounds per cubic inch (pci) may be used for slab-on-grade design. Regardless, the minimum on-grade slab thickness should be 6 inches (actual) and the slab should be reinforced with at least No. 4 bars spaced at 12 inches on center each way. Slab reinforcement should be supported on chairs such that the reinforcing bars are positioned at mid-height in the floor slab. The slab reinforcement should extend down into the perimeter footings at least 6 inches.

UNDER-SLAB VAPOR RETARDERS: Steps should be taken to minimize the transmission of moisture vapor from the subsoil through the interior slabs where it can potentially damage the interior floor coverings. Local industry standards typically include the placement of a vapor retarder, such as plastic, in a layer of coarse sand placed directly beneath the concrete slab. Two inches of sand are typically used above and below the plastic. The vapor retarder should be at least 15-mil Stegowrap® or similar material with sealed seams and

should extend at least 12 inches down the sides of the interior and perimeter footings. The sand should have a sand equivalent of at least 30, and contain less than 10% passing the Number 100 sieve and less than 5% passing the Number 200 sieve. The membrane should be placed in accordance with the recommendation and consideration of ACI 302, "Guide for Concrete Floor and Slab Construction" and ASTM E1643, "Standards Practice for Installation of Water Vapor Retarder Used in Contact with Earth or Granular Fill Under Concrete Slabs." It is the flooring contractor's responsibility to place floor coverings in accordance with the flooring manufacturer specifications.

EXTERIOR CONCRETE FLATWORK: Exterior concrete slabs on grade should have a minimum thickness of 5 inches and be reinforced with at least No. 4 bars placed at 18 inches on center each way (ocew). Driveway slabs should have a minimum thickness of 5 inches and be reinforced with at least No. 4 bars placed at 12 inches ocew. Driveway slabs should be provided with a thickened edge a least 18 inches deep and 6 inches wide. All slabs should be provided with weakened plane joints in accordance with the American Concrete Institute (ACI) guidelines. Special attention should be paid to the method of concrete curing to reduce the potential for excessive shrinkage cracking. It should be recognized that minor cracks occur normally in concrete slabs due to shrinkage. Some shrinkage cracks should be expected and are not necessarily an indication of excessive movement or structural distress.

EARTH RETAINING WALLS

FOUNDATIONS: Foundations for any proposed retaining walls should be constructed in accordance with the recommendations for shallow foundations presented previously in this report.

PASSIVE PRESSURE: The passive pressure for the anticipated foundation soils may be considered to be 200 pounds per square foot per foot of depth. The upper foot of embedment should be neglected when calculating passive pressures, unless the foundation abuts a hard surface such as a concrete slab. The passive pressure may be increased by one-third for seismic loading. The coefficient of friction for concrete to soil may be assumed to be 0.20 for the resistance to lateral movement. When combining frictional and passive resistance, the friction should be reduced by one-third.

ACTIVE PRESSURE: The active soil pressure for the design of "unrestrained" and "restrained" earth retaining structures with level backfill may be assumed to be equivalent to the pressure of a fluid weighing 39 and 59 pounds per cubic foot, respectively. These pressures do not consider any other surcharge. If any are anticipated, this office should be contacted for the necessary increase in soil pressure. These values are based on a granular and drained backfill condition. It is anticipated that backfill soils will have to be imported.

Seismic lateral earth pressures may be assumed to equal an inverted triangle starting at the bottom of the wall with the maximum pressure equal to 11.9H pounds per square foot (where H = wall height in feet) occurring at the top of the wall.

WATERPROOFING AND WALL DRAINAGE SYSTEMS: The need for waterproofing should be evaluated by others. If required, the project architect should provide (or coordinate) waterproofing details for the retaining walls. The design values presented above are based on a drained backfill condition and do not consider hydrostatic pressures. Unless hydrostatic pressures are incorporated into the design, the retaining wall designer should provide a detail for a wall drainage system. Typical retaining wall drain system details will be provided as Plate No. 5 for informational purposes. Additionally, outlet points for the retaining wall drain system should be coordinated with the project civil engineer.

BACKFILL: Retaining wall backfill soils should be compacted to at least 90 percent relative compaction. Expansive or clayey soils should not be used for backfill material. It is anticipated that backfill soils will have to be imported. The wall should not be backfilled until the masonry has reached an adequate strength.

LIMITATIONS

REVIEW, OBSERVATION AND TESTING

The recommendations presented in this report are contingent upon our review of final plans and specifications. Such plans and specifications should be made available to the geotechnical engineer and engineering geologist so that they may review and verify their compliance with this report and with the California Building Code.

It is recommended that Christian Wheeler Engineering be retained to provide continuous soil engineering services during the earthwork operations. This is to verify compliance with the design concepts, specifications or recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to start of construction.

UNIFORMITY OF CONDITIONS

The recommendations and opinions expressed in this report reflect our best estimate of the project requirements based on an evaluation of the subsurface soil conditions encountered at the subsurface exploration locations and on the assumption that the soil conditions do not deviate appreciably from those

encountered. It should be recognized that the performance of the foundations and/or cut and fill slopes may be influenced by undisclosed or unforeseen variations in the soil conditions that may occur in the intermediate and unexplored areas. Any unusual conditions not covered in this report that may be encountered during site development should be brought to the attention of the geotechnical engineer so that he may make modifications if necessary.

CHANGE IN SCOPE

This office should be advised of any changes in the project scope or proposed site grading so that we may determine if the recommendations contained herein are appropriate. This should be verified in writing or modified by a written addendum.

TIME LIMITATIONS

The findings of this report are valid as of this date. Changes in the condition of a property can, however, occur with the passage of time, whether they be due to natural processes or the work of man on this or adjacent properties. In addition, changes in the Standards-of-Practice and/or Government Codes may occur. Due to such changes, the findings of this report may be invalidated wholly or in part by changes beyond our control. Therefore, this report should not be relied upon after a period of two years without a review by us verifying the suitability of the conclusions and recommendations.

PROFESSIONAL STANDARD

In the performance of our professional services, we comply with that level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions and in the same locality. The client recognizes that subsurface conditions may vary from those encountered at the locations where our borings, surveys, and explorations are made, and that our data, interpretations, and recommendations be based solely on the information obtained by us. We will be responsible for those data, interpretations, and recommendations, but shall not be responsible for the interpretations by others of the information developed. Our services consist of professional consultation and observation only, and no warranty of any kind whatsoever, express or implied, is made or intended in connection with the work performed or to be performed by us, or by our proposal for consulting or other services, or by our furnishing of oral or written reports or findings.

CLIENT'S RESPONSIBILITY

It is the responsibility of the Client, or their representatives, to ensure that the information and recommendations contained herein are brought to the attention of the structural engineer and architect for the project and incorporated into the project's plans and specifications. It is further their responsibility to take the necessary measures to insure that the contractor and his subcontractors carry out such recommendations during construction.

FIELD EXPLORATIONS

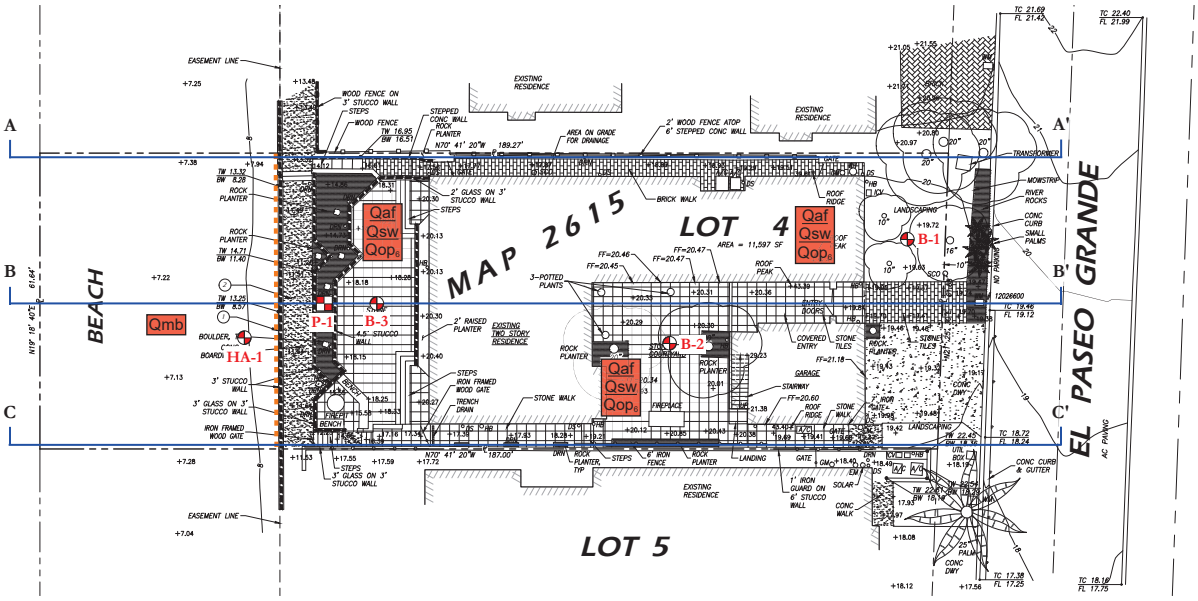
Five subsurface explorations were made on April 13 and June 5, 2023, at the locations indicated on the Site Plan and Geotechnical Map, included herewith as Plate No. 1. These explorations consisted of three borings drilled utilizing a limited access tripod drill rig, one hand auger boring, and one hand-dug test pit. The fieldwork was conducted under the observation and direction of our engineering geology personnel.

The explorations were carefully logged when made. The logs are presented in Appendix A. The soils are described in accordance with the Unified Soils Classification System. In addition, a verbal textural description, the wet color, the apparent moisture, and the density or consistency is provided. The relative density of granular soils is given as very loose, loose, medium dense, dense or very dense. The consistency of silts or clays is given as either very soft, soft, medium stiff, stiff, very stiff, or hard.

Relatively undisturbed drive samples were collected using a modified California sampler. The sampler, with an external diameter of 3.0 inches, is lined with 1-inch long, thin brass rings with inside diameters of approximately 2.4 inches. The sample barrel was driven into the ground with the weight of a 140-pound hammer free falling 30 inches in general accordance with ASTM D 3550-17. The number of blows per foot of driving, or as indicated, is presented on the boring logs as an index to the relative resistance of the sampled materials. The samples were removed from the sample barrel in the brass rings, and sealed. Disturbed bulk samples of the earth materials encountered were also collected. Samples were transported to our laboratory for testing.

LABORATORY TESTING

Laboratory tests were performed in accordance with the generally accepted American Society for Testing and Materials (ASTM) test methods or suggested procedures. A brief description of the tests performed and the subsequent results are presented in Appendix B.



CWE LEGEND

B-3	APPROXIMATE BORING LOCATION	Qaf / Qsw / Qop6	ARTIFICIAL FILL over SLOPEWASH over OLD PARALIC DEPOSITS, UNIT 6
P-1	APPROXIMATE TEST PIT LOCATION	Qmb	MARINE BEACH DEPOSITS
HA-1	APPROXIMATE HAND AUGER BORING LOCATION		GEOLOGIC CONTACT
	CROSS SECTION LOCATION		

W-E

0 20 40

SCALE: 1" = 20'

COFFEY ENGINEERING, INC.

Morrow Residence
8460 El Paseo Grande
La Jolla, CA 92037

TOPOGRAPHIC SURVEY
Topographic Survey

DRAWN BY: EM/ GC
CHECKED BY: JC
ORIGINAL 11/1/22
REVISION 1
REVISION 2
REVISION 3
REVISION 4
REVISION 5
SCALE: 1" = 10'

C.0

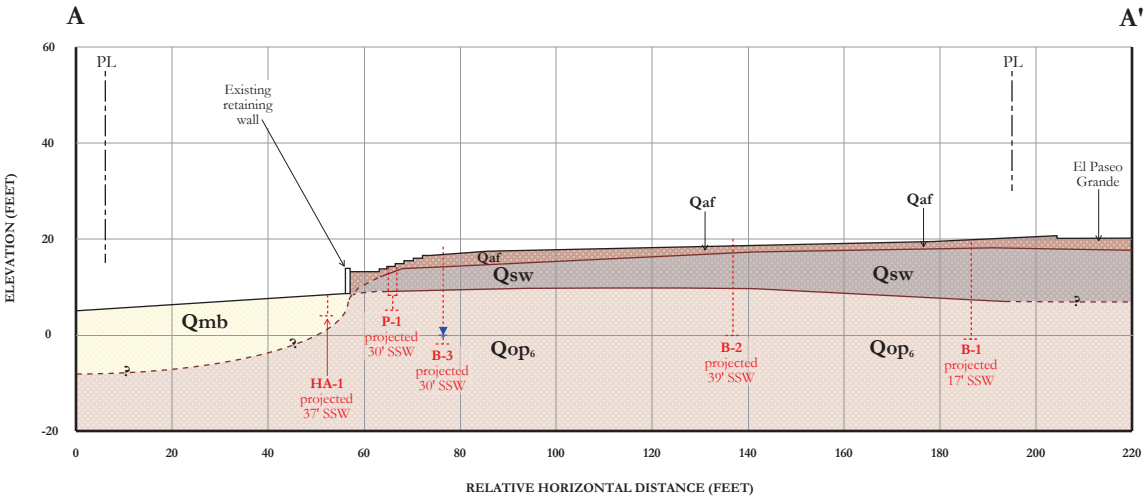
SITE PLAN AND GEOTECHNICAL MAP

MORROW RESIDENCE
8460 EL PASEO GRANDE, LA JOLLA, CA

DATE:	SEPTEMBER 2023	REPORT NO.:	2230041.01
BY:	JMM	PLATE NO.:	1

CHRISTIAN WHEELER ENGINEERING

←N71°W



CWE LEGEND

Qaf	ARTIFICIAL FILL
Qsw	SLOPEWASH
Qmb	MARINE BEACH DEPOSITS
Qop$_6$	OLD PARALIC DEPOSITS, UNIT 6
—?—	GEOLOGIC CONTACT - QUERIED WHERE INFERRED
▼	GROUNDWATER ELEVATION IN BORING

0 20 40

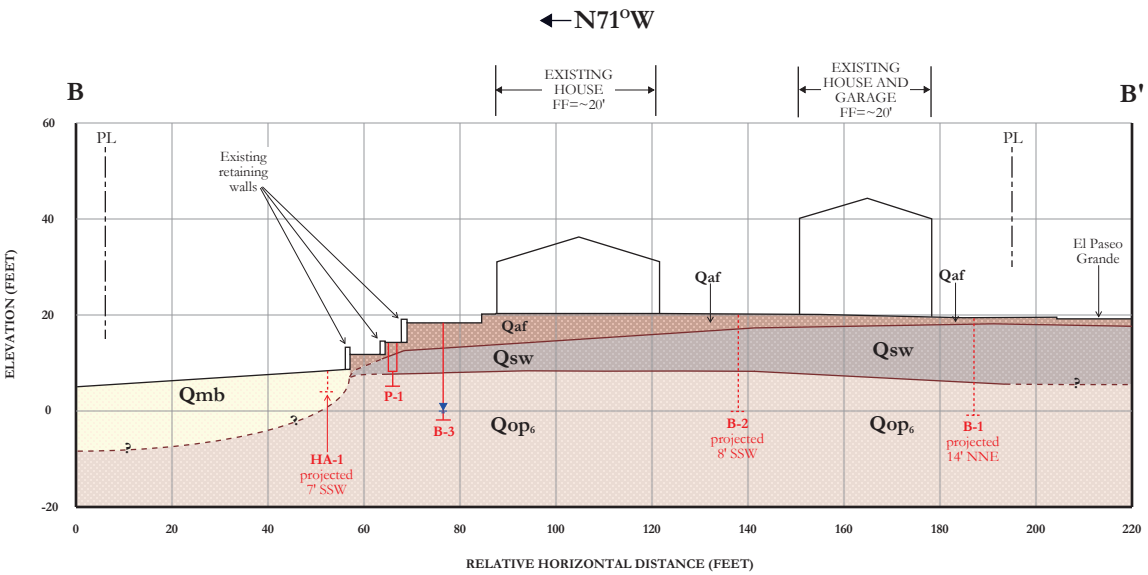
SCALE: 1" = 20'

GEOLOGIC CROSS-SECTION A-A'

MORROW RESIDENCE
8460 EL PASEO GRANDE, LA JOLLA, CA

DATE:	SEPTEMBER 2023	REPORT NO.:	2230041.01
BY:	JMM	PLATE NO.:	2

CHRISTIAN WHEELER ENGINEERING



CWE LEGEND

Qaf	ARTIFICIAL FILL
Qsw	SLOPEWASH
Qmb	MARINE BEACH DEPOSITS
Qop$_6$	OLD PARALIC DEPOSITS, UNIT 6
—?—	GEOLOGIC CONTACT - QUERIED WHERE INFERRED
▼	GROUNDWATER ELEVATION IN BORING

0 20 40

SCALE: 1" = 20'

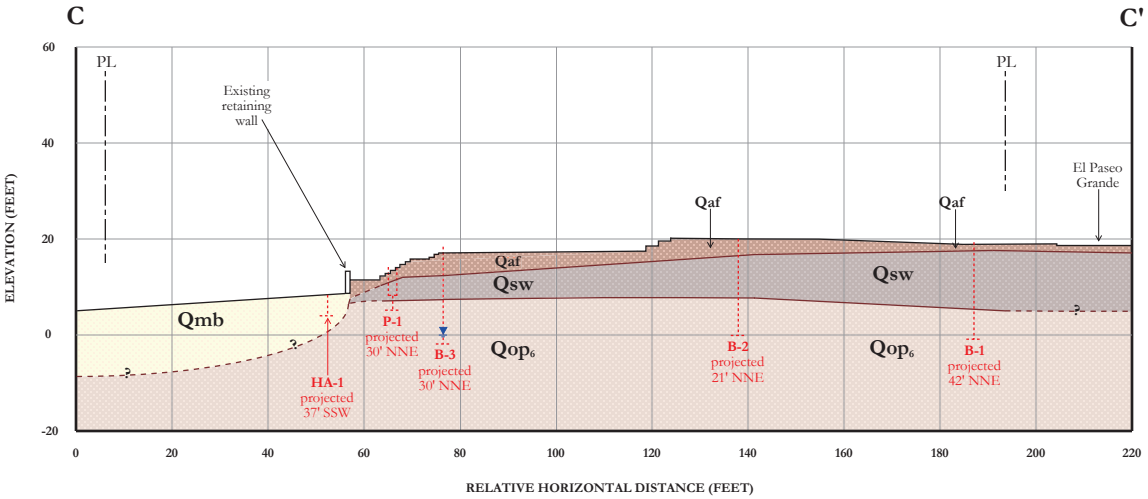
GEOLOGIC CROSS-SECTION B-B'

MORROW RESIDENCE
8460 EL PASEO GRANDE, LA JOLLA, CA

DATE:	SEPTEMBER 2023	REPORT NO.:	2230041.01
BY:	JMM	PLATE NO.:	3

CHRISTIAN WHEELER ENGINEERING

←N71°W



CWE LEGEND

Qaf	ARTIFICIAL FILL
Qsw	SLOPEWASH
Qmb	MARINE BEACH DEPOSITS
Qop$_6$	OLD PARALIC DEPOSITS, UNIT 6
—?—	GEOLOGIC CONTACT - QUERIED WHERE INFERRED
▼	GROUNDWATER ELEVATION IN BORING

0 20 40

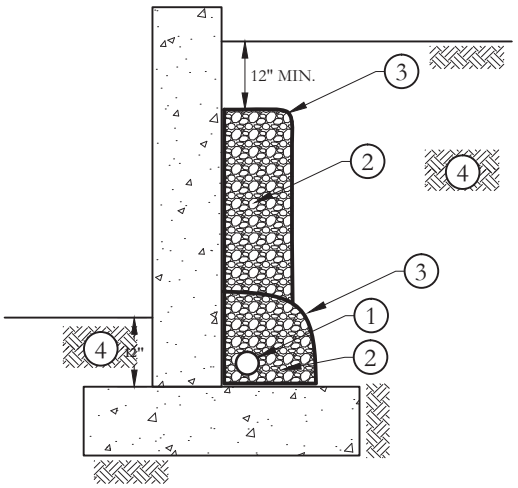
SCALE: 1" = 20'

GEOLOGIC CROSS-SECTION C-C'

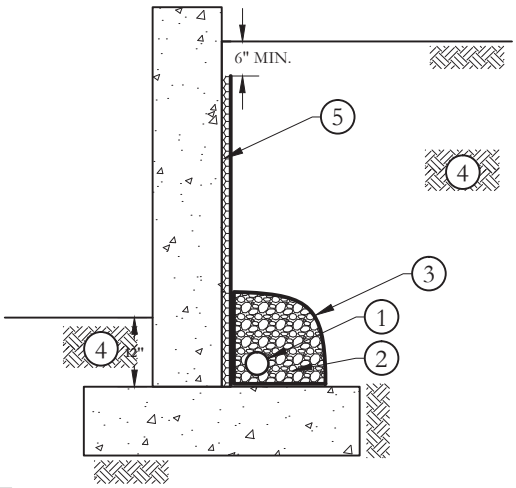
MORROW RESIDENCE
8460 EL PASEO GRANDE, LA JOLLA, CA

DATE:	SEPTEMBER 2023	REPORT NO.:	2230041.01
BY:	JMM	PLATE NO.:	4

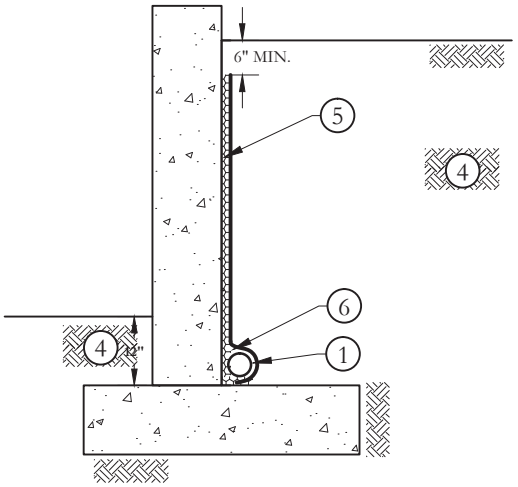
CHRISTIAN WHEELER ENGINEERING



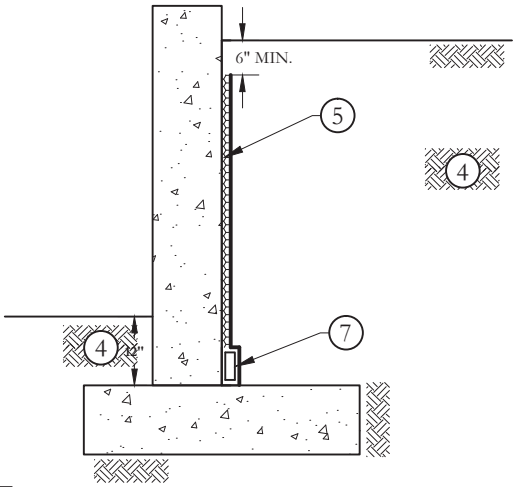
1 DETAIL



2 DETAIL



3 DETAIL



4 DETAIL

NOTES AND DETAILS

GENERAL NOTES:

1) THE NEED FOR WATERPROOFING SHOULD BE EVALUATED BY OTHERS.
2) WATERPROOFING TO BE DESIGNED BY OTHERS (CWE CAN PROVIDE A DESIGN IF REQUESTED).
3) EXTEND DRAIN TO SUITABLE DISCHARGE POINT PER CIVIL ENGINEER.
4) DO NOT CONNECT SURFACE DRAINS TO SUBDRAIN SYSTEM.

DETAILS:

1. 4-INCH PERFORATED PVC PIPE ON TOP OF FOOTING, HOLES POSITIONED DOWNWARD (SDR 35, SCHEDULE 40, OR EQUIVALENT).
2. ¾ INCH OPEN-GRADED CRUSHED AGGREGATE.
3. GEOFARBRIC WRAPPED COMPLETELY AROUND ROCK.
4. PROPERLY COMPACTED BACKFILL SOIL.
5. WALL DRAINAGE PANELS (MIRADRAIN OR EQUIVALENT) PLACED PER MANUFACTURER'S REC'S.
6. UNDERLAY SUBDRAIN WITH AND CUT FABRIC BACK FROM DRAINAGE PANELS AND WRAP FABRIC AROUND PIPE.
7. COLLECTION DRAIN (TOTAL DRAIN OR EQUIVALENT) LOCATED AT BASE OF WALL DRAINAGE PANEL PER MANUFACTURER'S RECOMMENDATIONS.

CANTILEVER RETAINING WALL DRAINAGE SYSTEMS

MORROW RESIDENCE
8460 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	SEPTEMBER 2023	JOB NO.:	2230041.01
BY:	SD	PLATE NO.:	5

CHRISTIAN WHEELER
ENGINEERING

Appendix A

Logs of Subsurface Explorations

LOG OF TEST BORING B-1

Date Logged:	4/13/23	Equipment:	Tripod
Logged By:	JM	Auger Type:	6" Solid Stem
Existing Elevation:	19.5'	Drive Type:	140lbs/30 inches
Proposed Elevation:	Unknown	Depth to Water:	Unknown

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0		**6" Fine Crushed Rock Landscape Gravel**							
	SM	**Artificial Fill (Qaf):** Dark brown, moist, soft, LEAN CLAY.							
	CL	**Slopewash (Qsw):** Light brown, very moist, firm, LEAN CLAY. Expansion Index = 70 (Medium)							HA, EI MD, PI SO4 DS
5		Light tan brown.	14	Cal		23.2	99.5		DS
	ML-CL	Light brown, moist, soft to firm, SILTY CLAY. Expansion Index = 26 (Low)	8	Cal		15.0	103.5		CP
10		Very moist.							HA EI SO4
	CL	Light brown, very moist, soft to firm, SANDY, LEAN CLAY, trace rounded gravel.							
	CL	**Old Paralic Deposits, Unit 6 (Qop6):** Dark reddish-brown to dark orangish-brown to dark brown, mottled, SANDY, LEAN CLAY, trace rounded gravel, trace manganese dendrites.	38	Cal		12.1	118.8		HA
15									
20			36	Cal		15.9	113.8		DS
		Terminated at 20 feet. No groundwater or seepage encountered.							
25									
30									

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- ⁘ Apparent Seepage
- * No Sample Recovery
- ** Non-Representative Blow Count (rocks present)

MORROW RESIDENCE
8460 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	SEPTEMBER 2023	JOB NO.:	2230041.01
BY:	SD	APPENDIX:	A-1

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST BORING B-2

Date Logged:	4/13/23	Equipment:	Tripod
Logged By:	JM	Auger Type:	6" Solid Stem
Existing Elevation:	20'	Drive Type:	140lbs/30 inches
Proposed Elevation:	Unknown	Depth to Water:	Unknown

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0		**7" Concrete Slab**							
	CL	**Artificial Fill (Qaf):** Dark brown, dry to damp, soft, SANDY, LEAN CLAY, trace rounded gravel.							
	SP	Yellowish-brown, damp, very loose to loose, POORLY GRADED SAND.							
	CL	**Slopewash (Qsw):** Brown to light tan brown, moist, firm to stiff, LEAN CLAY, pitted.	18	Cal		11.8	108.9		
5		Stiff to very stiff.							
			49	Cal		9.5	127.0		CP
10	CL	Brown, moist, stiff to very stiff, SANDY, LEAN CLAY.							
	SM	**Old Paralic Deposits, Unit 6 (Qop6):** Dark reddish-brown to orangish-brown to dark brown, mottled, moist, medium dense, SILTY SAND, coarse sand lens at 14', weak cementation.							
15			45	Cal		9.5	112.6		
	CL	Dark brown to dark reddish-brown to gray, mottled, moist, very stiff, SANDY, LEAN CLAY.							
			39	Cal		13.6	118.4		
20		Terminated at 20 feet. No groundwater or seepage encountered.							
25									
30									

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- ⁘ Apparent Seepage
- * No Sample Recovery
- ** Non-Representative Blow Count (rocks present)

MORROW RESIDENCE
8460 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	SEPTEMBER 2023	JOB NO.:	2230041.01
BY:	SD	APPENDIX:	A-2

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST BORING B-3

Date Logged:	4/13/23	Equipment:	Tripod
Logged By:	JM	Auger Type:	6" Solid Stem
Existing Elevation:	18'	Drive Type:	140lbs/30 inches
Proposed Elevation:	Unknown	Depth to Water:	18'

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0		**7" Concrete Slab**							
	SC	**Artificial Fill (Qaf):** Reddish-brown, damp to moist, very loose, CLAYEY SAND.							
	SM	Reddish-brown to dark reddish-brown, moist, very loose, SILTY SAND, minor clay content.							
5			6	Cal					
	CL	**Slopewash (Qsw):** Brown to tan brown, moist to very moist, soft, LEAN CLAY.							HA
			7	Cal		21.4	99.8		
10	CL	**Old Paralic Deposits, Unit 6 (Qop6):** Dark brown to dark reddish-brown to gray to orangish-brown, mottled, moist, stiff to very stiff, LEAN CLAY, trace manganese dendrites, minor pitting. Expansion Index = 31 (Low)							EI
			28	Cal		16.3	112.4		
15		Saturated.							
			24	Cal					
20		Terminated at 20 feet. Groundwater encountered at 18 feet.							
25									
30									

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- Apparent Seepage
- * No Sample Recovery
- ** Non-Representative Blow Count (rocks present)

MORROW RESIDENCE
8460 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	SEPTEMBER 2023	JOB NO.:	2230041.01
BY:	SD	APPENDIX:	A-3

CHRISTIAN WHEELER ENGINEERING

LOG OF HAND AUGER HA-1

Date Logged:	4/13/23	Equipment:	Hand auger
Logged By:	JM	Auger Type:	N/A
Existing Elevation:	7'	Drive Type:	N/A
Proposed Elevation:	Unknown	Depth to Water:	Unknown

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0			SP	**Marine Beach Deposits (Qmb):** Light gray to pale yellow, moist, loose to medium dense, POORLY GRADED SAND.							
5				Refusal at 4 feet. No groundwater or seepage encountered.							
10											
15											
20											
25											
30											

Notes:

Symbol Legend

▽	Groundwater Level During Drilling
▼	Groundwater Level After Drilling
⁘	Apparent Seepage
*	No Sample Recovery
**	Non-Representative Blow Count (rocks present)

MORROW RESIDENCE
8460 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	SEPTEMBER 2023	JOB NO.:	2230041.01
BY:	SD	APPENDIX:	A-4

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST PIT P-1

Date Logged:	6/5/23	Equipment:	Hand tools
Logged By:	JM	Auger Type:	N/A
Existing Elevation:	14.5'	Drive Type:	N/A
Proposed Elevation:	Unknown	Depth to Water:	Unknown

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	SAMPLE TYPE
0	SM	**Artificial Fill (Qaf):** Brown to dark brown, moist, very loose to loose, SILTY SAND, minor amount of clay, trace angular gravel.	CK
		Very moist.	
	CL	**Slopewash (Qsw):** Light brown to brown, very moist, soft, LEAN CLAY.	CK
5			Cal
		Hand auger below 6'.	
	CL	**Old Paralic Deposits (Qop):** Brown to dark reddish-brown, mottled, CLAYEY SAND/SANDY, LEAN CLAY, trace rounded gravel.	CK
			Cal
10		Terminated at 9 feet. No groundwater or seepage encountered.	
15			
20			
25			
30			

PENETRATION (blows per foot)	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- ⁹⁹ Apparent Seepage
- * No Sample Recovery
- ** Non-Representative Blow Count (rocks present)

MORROW RESIDENCE
8460 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	SEPTEMBER 2023	JOB NO.:	2230041.01
BY:	SD	APPENDIX:	A-5

CHRISTIAN WHEELER ENGINEERING

Appendix B

Laboratory Test Results

Laboratory tests were performed in accordance with the generally accepted American Society for Testing and Materials (ASTM) test methods or suggested procedures. Brief descriptions of the tests performed are presented below:

a) **CLASSIFICATION:** Field classifications were verified in the laboratory by visual examination. The final soil classifications are in accordance with the Unified Soil Classification System and are presented on the exploration logs in Appendix A.

b) **MOISTURE-DENSITY:** In-place moisture contents and dry densities were determined for selected soil samples in accordance with ATM D 2937. The results are summarized in the subsurface exploration logs presented in Appendix A.

c) **MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT TEST:** The maximum dry density and optimum moisture content of a selected soil sample was determined in the laboratory in accordance with ASTM D 1557, Method A.

d) **DIRECT SHEAR:** Direct shear tests were performed on selected samples of the on-site soils in accordance with ASTM D 3080.

e) **EXPANSION INDEX TEST:** Expansion index tests were performed on selected remolded soil samples in accordance with ASTM D 4829.

f) **GRAIN SIZE DISTRIBUTION:** The grain size distribution of selected samples was determined in accordance with ASTM C136 and/or ASTM D 422.

g) **COLLAPSE POTENTIAL:** A collapse potential test was performed on elected undisturbed soil samples in accordance with ASTM D 5333.

h) **ATTERBERG LIMITS:** The Liquid Limit, Plastic Limit and Plastic Index of a selected soil sample were determined in accordance with ASTM D424.

i) **SOLUBLE SULFATES:** The soluble sulfate content of selected soil samples was determined in accordance with California Test Method 417.

LABORATORY TEST RESULTS

MORROW RESIDENCE

8460 EL PASEO GRANDE

LA JOLLA, CALIFORNIA

MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT (ASTM D1557)

Sample Location	**Boring B-1 @ 1½'-3½'**
Sample Description	Reddish-Gray Clayey Silt (ML)
Maximum Density	117.0 pcf
Optimum Moisture	13.5 %

DIRECT SHEAR (ASTM D3080)

Sample Location	**Boring B-1 @ 1½'-3½'**	**Boring B-1 @ 5'**	**Boring B-1 @ 20'**
Sample Type	Remolded to 90 %	Rel. Undisturbed	Rel. Undisturbed
Friction Angle	16°	22°	29°
Cohesion	550 psf	550 psf	300 psf

EXPANSION INDEX TESTS (ASTM D4829)

Sample Location	**Boring B-1 @ 1½'-3½'**	**Boring B-1 @ 10'-12'**	**Boring B-3 @ 12'-13½'**
Initial Moisture	11.0 %	9.0 %	9.6 %
Initial Dry Density	104.5 pcf	114.0 pcf	109.5 pcf
Final Moisture	24.7 %	19.0 %	19.2 %
Expansion Index	70 (Medium)	26 (Low)	31 (Low)

GRAIN SIZE DISTRIBUTION (ASTM D422)

Sample Location	**Boring B-1 @ 1½'-3½'**	**Boring B-1 @ 10'-12'**	**Boring B-1 @ 15'-18'**	**Boring B-3 @ 6'-8'**
Sieve Size	*Percent Passing*	*Percent Passing*	*Percent Passing*	*Percent Passing*
1"		100		
¾"		95		
½"		94		
⅜"		94		
#4		94	100	100
#8		91	98	96
#16		88	95	94
#30	100	84	88	90
#50	98	74	72	78
#100	92	62	58	59
#200	80	47	47	38
0.05 mm	71			
0.005 mm	29			
0.001 mm	21			

LABORATORY TEST RESULTS (CONT.)

COLLAPSE POTENTIAL (ASTM D 5333)

Sample Location	**Boring B-1 @ 10'**	**Boring B-2 @ 9½'**
Initial Moisture Content	15.0 %	9.5 %
Initial Density	103.5 pcf	127.0 pcf
Consolidation Before Water Added	3.9 %	2.1 %
Consolidation After Water Added	4.6 %	2.5 %
Final Moisture	17.4 %	10.1 %

ATTERBERG LIMITS (ASTM D424)

Sample Location	**Boring B-1 @ 1½'-3½'**
Liquid Limit	48
Plastic Limit	19
Plasticity Index	29 (CL)

SOLUBLE SULFATES (CALIFORNIA TEST 417)

Sample Location	**Boring B-1 @ 1½'-3½'**	**Boring B-1 @ 10'-12'**
Soluble Sulfate	0.013 % (SO_4)	0.006 % (SO_4)

Appendix C

References

REFERENCES

American Society of Civil Engineers; ASCE 7 Hazard Tool; https://asce7hazardtool.online

California Geological Survey; 2010; Fault Activity Map of California; https://maps.conservation.ca.gov/cgs/Dataviewer/; accessed July 24, 2023.

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

California Geological Survey; 2022; Earthquake Zones of Required Investigation; https://maps.conservation.ca.gov/cgs/informationwarehouse/, accessed July 24, 2023.

City of San Diego, 2008, Seismic Safety Study, Sheet 30.

City of San Diego, 2004, Coastal Beaches and Bluffs Guidelines, San Diego Municipal Code/Land Development Code.

Emery, K. O. and Kuhn, G. G., 1980, Erosion of rock shores at La Jolla, California: Marine Geology, v. 37, pp. 197-208.

Emery, K. O. and Kuhn, G. G., 1982, Sea cliffs: their processes, profiles, and classification: Geological Society of America Bulletin, v. 93, pp. 644-654

Federal Emergency Management Agency, San Diego County, California and Incorporated Areas Flood Insurance Rate Map, Map Number 06073C1582H, effective December 20, 2019.

Graehl, N.G.; and Wilson, R.I.; 2022; Tsunami Hazard Area Map, San Diego County; produced by the California Geological Survey and the California Governors Office of Emergency Services; dated 2022; displayed at multiple scales.

Jennings, C.W. and Bryant, W. A., 2010, Fault Activity Map, California Geological Survey, Geologic Data Map No. 6, http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

Kennedy, Michael P. and Tan, Siang S., 2008, Geologic Map of the San Diego 30'x60' Quadrangle, California, California Geologic Survey, Map No. 3.

Southern California Earthquake Data Center; 2023; Earthquake Information, Fault Name Index; https://scedc.caltech.edu/earthquake/faults.html; accessed July 24, 2023.

Tan, S.S.; 1995; Landslide Hazards in the Southern Part of the San Diego Metropolitan Area, San Diego County, California; Relative Landslide Susceptibility and Landslide Distribution Map; Open File Report 95-03; Map No. 33; Plate A.

United States Geological Survey; 2017; Quaternary fault and fold database for the United States; https://www.usgs.gov/natural-hazards/earthquake-hazards/faults.; accessed July 24, 2023.

TOPOGRAPHIC MAPS

City of San Diego, 1953, Topographic Map Sheet 250-1689; Scale: 1 inch = 200 feet

United States Geological Survey, 1904, Topographic Quadrangle Map Southern California Sheet No. 2; Scale 1:250,000

PHOTOGRAPHS

San Diego County (US. Navy), 1928, Aerial Photographs, Packet 52, Photographs C1; Scale: 1 inch = 1000 feet (approximate).

Appendix D

Recommended Grading Specifications – General Provisions

RECOMMENDED GRADING SPECIFICATIONS - GENERAL PROVISIONS

MORROW RESIDENCE,
8460 EL PASEO GRANDE,
LA JOLLA, CALIFORNIA

GENERAL INTENT

The intent of these specifications is to establish procedures for clearing, compacting natural ground, preparing areas to be filled, and placing and compacting fill soils to the lines and grades shown on the accepted plans. The recommendations contained in the preliminary geotechnical investigation report and/or the attached Special Provisions are a part of the Recommended Grading Specifications and shall supersede the provisions contained hereinafter in the case of conflict. These specifications shall only be used in conjunction with the geotechnical report for which they are a part. No deviation from these specifications will be allowed, except where specified in the geotechnical report or in other written communication signed by the Geotechnical Engineer.

OBSERVATION AND TESTING

Christian Wheeler Engineering shall be retained as the Geotechnical Engineer to observe and test the earthwork in accordance with these specifications. It will be necessary that the Geotechnical Engineer or his representative provide adequate observation so that he may provide his opinion as to whether or not the work was accomplished as specified. It shall be the responsibility of the contractor to assist the Geotechnical Engineer and to keep him appraised of work schedules, changes and new information and data so that he may provide these opinions. In the event that any unusual conditions not covered by the special provisions or preliminary geotechnical report are encountered during the grading operations, the Geotechnical Engineer shall be contacted for further recommendations.

If, in the opinion of the Geotechnical Engineer, substandard conditions are encountered, such as questionable or unsuitable soil, unacceptable moisture content, inadequate compaction, adverse weather, etc., construction should be stopped until the conditions are remedied or corrected or he shall recommend rejection of this work.

Tests used to determine the degree of compaction should be performed in accordance with the following American Society for Testing and Materials test methods:

Maximum Density & Optimum Moisture Content - ASTM D1557
Density of Soil In-Place - ASTM D1556 or ASTM D2922

All densities shall be expressed in terms of Relative Compaction as determined by the foregoing ASTM testing procedures.

PREPARATION OF AREAS TO RECEIVE FILL

All vegetation, brush and debris derived from clearing operations shall be removed, and legally disposed of. All areas disturbed by site grading should be left in a neat and finished appearance, free from unsightly debris.

After clearing or benching the natural ground, the areas to be filled shall be scarified to a depth of 6 inches, brought to the proper moisture content, compacted and tested for the specified minimum degree of compaction. All loose soils in excess of 6 inches thick should be removed to firm natural ground which is defined as natural soil which possesses an in-situ density of at least 90 percent of its maximum dry density.

When the slope of the natural ground receiving fill exceeds 20 percent (5 horizontal units to 1 vertical unit), the original ground shall be stepped or benched. Benches shall be cut to a firm competent formational soil. The lower bench shall be at least 10 feet wide or 1-1/2 times the equipment width, whichever is greater, and shall be sloped back into the hillside at a gradient of not less than two (2) percent. All other benches should be at least 6 feet wide. The horizontal portion of each bench shall be compacted prior to receiving fill as specified herein for compacted natural ground. Ground slopes flatter than 20 percent shall be benched when considered necessary by the Geotechnical Engineer.

Any abandoned buried structures encountered during grading operations must be totally removed. All underground utilities to be abandoned beneath any proposed structure should be removed from within 10 feet of the structure and properly capped off. The resulting depressions from the above described procedure should be backfilled with acceptable soil that is compacted to the requirements of the Geotechnical Engineer. This includes, but is not limited to, septic tanks, fuel tanks, sewer lines or leach lines, storm drains and water lines. Any buried structures or utilities not to be abandoned should be brought to the attention of the Geotechnical Engineer so that he may determine if any special recommendation will be necessary.

All water wells which will be abandoned should be backfilled and capped in accordance to the requirements set forth by the Geotechnical Engineer. The top of the cap should be at least 4 feet below finish grade or 3 feet

below the bottom of footing whichever is greater. The type of cap will depend on the diameter of the well and should be determined by the Geotechnical Engineer and/or a qualified Structural Engineer.

FILL MATERIAL

Materials to be placed in the fill shall be approved by the Geotechnical Engineer and shall be free of vegetable matter and other deleterious substances. Granular soil shall contain sufficient fine material to fill the voids. The definition and disposition of oversized rocks and expansive or detrimental soils are covered in the geotechnical report or Special Provisions. Expansive soils, soils of poor gradation, or soils with low strength characteristics may be thoroughly mixed with other soils to provide satisfactory fill material, but only with the explicit consent of the Geotechnical Engineer. Any import material shall be approved by the Geotechnical Engineer before being brought to the site.

PLACING AND COMPACTION OF FILL

Approved fill material shall be placed in areas prepared to receive fill in layers not to exceed 6 inches in compacted thickness. Each layer shall have a uniform moisture content in the range that will allow the compaction effort to be efficiently applied to achieve the specified degree of compaction. Each layer shall be uniformly compacted to the specified minimum degree of compaction with equipment of adequate size to economically compact the layer. Compaction equipment should either be specifically designed for soil compaction or of proven reliability. The minimum degree of compaction to be achieved is specified in either the Special Provisions or the recommendations contained in the preliminary geotechnical investigation report. When the structural fill material includes rocks, no rocks will be allowed to nest and all voids must be carefully filled with soil such that the minimum degree of compaction recommended in the Special Provisions is achieved. The maximum size and spacing of rock permitted in structural fills and in non-structural fills is discussed in the geotechnical report, when applicable.

Field observation and compaction tests to estimate the degree of compaction of the fill will be taken by the Geotechnical Engineer or his representative. The location and frequency of the tests shall be at the Geotechnical Engineer's discretion. When the compaction test indicates that a particular layer is at less than the required degree of compaction, the layer shall be reworked to the satisfaction of the Geotechnical Engineer and until the desired relative compaction has been obtained.

Fill slopes shall be compacted by means of sheepsfoot rollers or other suitable equipment. Compaction by sheepsfoot roller shall be at vertical intervals of not greater than four feet. In addition, fill slopes at a ratio of

two horizontal to one vertical or flatter, should be trackrolled. Steeper fill slopes shall be over-built and cut-back to finish contours after the slope has been constructed. Slope compaction operations shall result in all fill material six or more inches inward from the finished face of the slope having a relative compaction of at least 90 percent of maximum dry density or the degree of compaction specified in the Special Provisions section of this specification. The compaction operation on the slopes shall be continued until the Geotechnical Engineer is of the opinion that the slopes will be surficially stable.

Density tests in the slopes will be made by the Geotechnical Engineer during construction of the slopes to determine if the required compaction is being achieved. Where failing tests occur or other field problems arise, the Contractor will be notified that day of such conditions by written communication from the Geotechnical Engineer or his representative in the form of a daily field report.

If the method of achieving the required slope compaction selected by the Contractor fails to produce the necessary results, the Contractor shall rework or rebuild such slopes until the required degree of compaction is obtained, at no cost to the Owner or Geotechnical Engineer.

CUT SLOPES

The Engineering Geologist shall inspect cut slopes excavated in rock or lithified formational material during the grading operations at intervals determined at his discretion. If any conditions not anticipated in the preliminary report such as perched water, seepage, lenticular or confined strata of a potentially adverse nature, unfavorably inclined bedding, joints or fault planes are encountered during grading, these conditions shall be analyzed by the Engineering Geologist and Geotechnical Engineer to determine if mitigating measures are necessary.

Unless otherwise specified in the geotechnical report, no cut slopes shall be excavated higher or steeper than that allowed by the ordinances of the controlling governmental agency.

ENGINEERING OBSERVATION

Field observation by the Geotechnical Engineer or his representative shall be made during the filling and compaction operations so that he can express his opinion regarding the conformance of the grading with acceptable standards of practice. Neither the presence of the Geotechnical Engineer or his representative or the observation and testing shall release the Grading Contractor from his duty to compact all fill material to the specified degree of compaction.

SEASON LIMITS

Fill shall not be placed during unfavorable weather conditions. When work is interrupted by heavy rain, filling operations shall not be resumed until the proper moisture content and density of the fill materials can be achieved. Damaged site conditions resulting from weather or acts of God shall be repaired before acceptance of work.

RECOMMENDED GRADING SPECIFICATIONS - SPECIAL PROVISIONS

RELATIVE COMPACTION: The minimum degree of compaction to be obtained in compacted natural ground, compacted fill, and compacted backfill shall be at least 90 percent. For street and parking lot subgrade, the upper twelve inches should be compacted to at least 95 percent relative compaction.

EXPANSIVE SOILS: Detrimentally expansive soil is defined as clayey soil which has an expansion index of 50 or greater when tested in accordance with the American Society of Testing Materials (ASTM) Laboratory Test D4829-95.

OVERSIZED MATERIAL: Oversized fill material is generally defined herein as rocks or lumps of soil over six inches in diameter. Oversized materials should not be placed in fill unless recommendations of placement of such material is provided by the Geotechnical Engineer. At least 40 percent of the fill soils shall pass through a No. 4 U.S. Standard Sieve.

TRANSITION LOTS: Where transitions between cut and fill occur within the proposed building pad, the cut portion should be undercut a minimum of one foot below the base of the proposed footings and recompacted as structural backfill. In certain cases that would be addressed in the geotechnical report, special footing reinforcement or a combination of special footing reinforcement and undercutting may be required.

CHRISTIAN WHEELER
ENGINEERING

October 15, 2024

Atlas Sun I, LLC
c/o Marmol Radziner
12210 Nebraska Avenue,
Los Angeles, California 92025

CWE 2230041.03

Subject: **Response to DSD-Geology Review Comments, Project Issues Report 1113364, dated August 7, 2024, Morrow Residence, 8460 El Paseo Grande, San Diego, California**

References: 1) City of San Diego, DSD Geology Review Comments, Project Issues Report 1113364, dated August 7, 2024.
2) Marmol Radziner AIA, Architectural Plans, El Paseo Grande Residence, 8460 El Paseo Grande, La Jolla, CA 92037, dated September 23, 2024.
3) Christian Wheeler Engineering, Report of Preliminary Geotechnical Investigation, CWE 2230041.01, September 27, 2023.

Ladies and Gentlemen:

In accordance with the request of the project architect, we have prepared this report to present additional information required by the City of San Diego regarding the geotechnical issues at the site. The comments in the DSD-Geology portion of the Project Issue Report and our responses to the comments are presented below.

City Comment 00022: The requested addendum/update letter be uploaded with the "Geotechnical Investigation Report Addendum" PDF file option only. To avoid additional reviews, do not attempt to submit any additional document using the "Geotechnical Investigation Report" PDF file option as this will overwrite the previously submitted record geotechnical document for the project. Please note, geotechnical documents that are uploaded incorrectly are unacceptable as record documents.

CWE Response: Noted.

City Comment 00023: The project's geotechnical consultant must submit an addendum geotechnical or update for the purpose of an environmental review that references the development plans and addresses the following:

CWE Response: This report has been prepared as an addendum to our referenced Report of Preliminary Geotechnical Investigation. As such, unless specifically modified herein, all of the findings, conclusions, and recommendations presented in our referenced geotechnical report remain applicable to the subject project.

City Comment 00024: The geotechnical investigation report must update geologic/geotechnical map and geologic cross-sections with the proposed new development and building locations.

CWE Response: Plate No. 1 of this report presents an updated site plan and geotechnical map that shows the distribution of fill and site geology, which circumscribes the limits of recommended remedial grading, and which depicts the proposed construction. Updated geologic cross sections are presented on Plate Nos 2-4 of this report.

City Comment 00025: Circumscribe the limits of anticipated remedial grading on the geologic/ geotechnical map to delineate the proposed footprint of the project.

CWE Response: The limits of anticipated remedial grading are circumscribed on the revised Site Plan and Geotechnical map included as Plate No. 1 of this report.

City Comment 00026: Submit a fault-rupture hazard investigation report that addresses whether or not active or potentially active faults on or adjacent to the site. The investigation and report should be conducted in accordance with the City's Guidelines for Geotechnical Reports.

CWE Response: Excavation and geologic logging of fault trenches across the subject site was not within our authorized scope of services. It has been our experience that for sites within Geologic Hazard Category 12, fault trenching is not typically required, provided a professional geologic conclusion as to the presence or absence of active or potentially active faulting can be made that is based on tangible geologic evidence/data.

The Scripps Fault, which is a relatively small, southwest to northeast trending fault, has been mapped by others approximately 100 feet to 125 feet north of the site (Kennedy and Tan, 2008). Where exposed in

the canyon approximately ½ mile (¾ km) to the northeast of the subject site, the Scripps Fault juxtaposes Tertiary-age sedimentary deposits of the Scripps Formation and Ardath Shale. The Scripps Fault has not been mapped as bisecting the middle to early Pleistocene-aged very old paralic deposits that crop out approximately 0.6 miles (1 km) to the northeast of the subject site. As such, it is our professional opinion and judgment that the Scripps Fault may be considered inactive.

Included in Appendix A of this report is a previous fault hazard study performed by others on a nearby residential lot located two lots to the north of the subject lot (CTE, 2007). Comparison of the subsurface data presented in that report with the findings of our site-specific investigation indicate lateral continuity of the old paralic deposits beneath the subject site and the nearby lot located at 8466 El Paseo Grande. Based on this condition and the fact that the Scripps Fault is not known to bisect or displace the mid to early Pleistocene-aged very old paralic deposits in the vicinity of the site, it is our professional opinion and judgment that the Scripps Fault is not active or potentially active. As such, no structural setbacks from the Scripps Fault are considered necessary for the proposed site development.

City Comment 00027: A geotechnical investigation report must be submitted that provides an explicit opinion whether or not an "active" or "potentially active" fault trace passes beneath the proposed development and whether or not structural setbacks are recommended. The opinion must be supported by adequate data.

CWE Response: Based on the conditions described above, it is our professional opinion and judgment that the Scripps Fault is not active or potentially active. As such, no structural setbacks from the Scripps Fault are considered necessary for the proposed site development.

City Comment 00028: The project's geotechnical consultant has indicated the site is within the tsunami inundation area. Indicate if there are significant risks associated with tsunamis and provide recommendations to mitigate the potential impacts. The consultant could consider San Diego Municipal Code 143.0146(g) in formulating their response.

CWE Response: As presented on pages 8-9 of our referenced geotechnical report, "Tsunamis are great sea waves produced by submarine earthquakes, submarine landslides, volcanic eruptions or meteorite impacts. According to the Tsunami Hazard Area Map, San Diego County published by the California Geological Survey, dated 2022, the site is located within a "Tsunami Hazard Area". Historically, tsunamis occurring along the San Diego coastline have fallen within the normal swell and tidal range. The largest historical tsunami to reach San Diego's coast was 4.6 feet high, generated by the 1960 earthquake off the

coast of Chile. It is thought that the wide continental margin off the coast acts to diffuse and reflect the wave energy of remotely generated tsunamis and the bathymetry of the San Diego coastline is generally considered to be favorable in regard to minimizing tsunami risk. Furthermore, an unprecedented tsunami event would be required to cause property destruction and loss of life at the site. However, a lack of understanding and data about the offshore fault systems and tsunamis along the San Diego coastline makes it difficult to assess the tsunami risk. To minimize the tsunami risk at the site, we recommend that consideration be given to developing the site at the highest permissible elevations. The owner should also educate themselves about tsunami preparedness and tsunami evacuation routes."

The client should recognize that the County of San Diego and the City of San Diego have developed a tsunami alert and evacuation plan. As recommended by the California Geological Survey, if a person is in a tsunami hazard "area after feeling an earthquake that lasts a long time, or you receive an official evacuation notification", they should evacuate by foot immediately to an area outside of the tsunami hazard area (GGS, 2022). As a mitigative measure, the City has posted signs throughout the community showing routes of evacuation in the event of a tsunami warning, evacuation center locations, and the limits of tsunami hazard areas. The mapped limit of the tsunami inundation zone at the subject lot is just east of the adjacent portion of El Paseo Grande.

It should also be noted that as delineated on the *Flood Insurance Rate Map (FIRM)*, map number 06073C1582H prepared by the Federal Emergency Management Agency, dated December 20, 2019, the central and eastern portions of the site (the area of the site to be developed) are within Zone X, designated as *"Area of Minimal Flood Hazard"*. Areas of minimal flood hazards are located outside of the boundaries of both the 100-year and 500-year flood zones.

City Comment 00029: Provide a professional opinion regarding the suitability of the existing fill to support the recommended remedial grading and the proposed structures not founded on deep foundations.

CWE Response: Provided the recommended remedial grading operations presented in our geotechnical report are followed, which include the removal and replacement of at least the uppermost 3 feet of existing fills and slopewash beneath proposed finish pad grades, it is our professional opinion and judgment that the existing fill to be left in-place will support the recommended remedial grading and the proposed improvements that are not considered to be settlement sensitive and which are founded on shallow foundations.

City Comment 00030: Provide a conclusion regarding if the proposed development will destabilize or result in settlement of adjacent property or the right of way.

CWE Response: Provided the recommendations presented in our referenced geotechnical report as well as sound construction practices are implemented over the design and construction of the proposed project, the proposed development will not destabilize or result in settlement of adjacent property or the right of way.

City Comment 00031: Provide a statement as to whether or not the site is geotechnically suitable for the proposed development.

CWE Response: The site is considered geotechnically suitable for the proposed development.

If you have any questions regarding this addendum report, please do not hesitate to contact this office. Christian Wheeler Engineering appreciates this opportunity of providing professional services for you for the subject project.

Respectfully submitted,
CHRISTIAN WHEELER ENGINEERING

Daniel B. Adler, RCE #36037

David R. Russell, CEG #2215

DRR:drr:dba
cc: holmess@marmol-radziner.com





REFERENCES

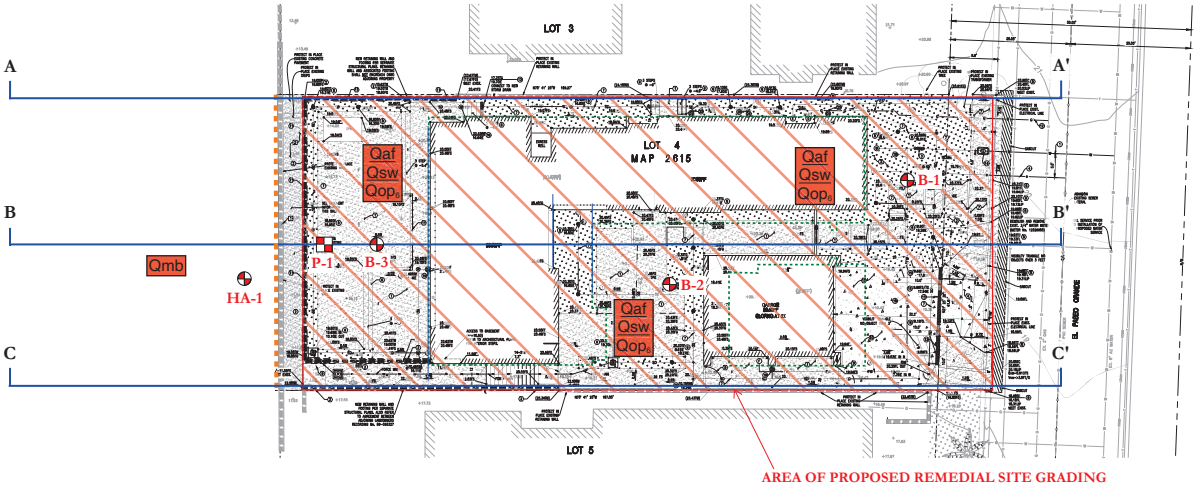
1) Christian Wheeler Engineering, Report of Preliminary Geotechnical Investigation, Morrow Residence, 8460 El Paseo Grande, San Diego, California, CWE 2230041.01, September 27, 2023.

2) City of San Diego, DSD Geology Review Comments, Project Issues Report 1113364, dated August 7, 2024.

3) Construction Testing and Engineering, Inc., 2007, Faulting and Bluff Geologic Evaluation, Proposed Lusardi Residence, 8466 El Paseo Grande, La Jolla, California, CTE Job No. 10-8264G, dated February 12, 2007.

4) Graehl, N.G.; and Wilson, R.I.; 2022; Tsunami Hazard Area Map, San Diego County; produced by the California Geological Survey and the California Governor's Office of Emergency Services; dated 2022; displayed at multiple scales. https://maps.conservation.ca.gov/cgs/informationwarehouse/ts_evacuation/

5) Marmol Radziner AIA, Architectural Plans, El Paseo Grande Residence, 8460 El Paseo Grande, La Jolla, CA 92037, dated September 23, 2024.



CWE LEGEND

B-3	APPROXIMATE BORING LOCATION	Qaf / Qsw / Qop6	ARTIFICIAL FILL over SLOPEWASH over OLD PARALIC DEPOSITS, UNIT 6
P-1	APPROXIMATE TEST PIT LOCATION	Qmb	MARINE BEACH DEPOSITS
HA-1	APPROXIMATE HAND AUGER BORING LOCATION		GEOLOGIC CONTACT
	CROSS SECTION LOCATION		
	LINE OF EXISTING STRUCTURE		

W-E

0 20 40

SCALE: 1" = 20'

COFFEY ENGINEERING, INC.

Morrow Residence
8460 El Paseo Grande
La Jolla, CA 92037

TOPOGRAPHIC SURVEY
Topographic Survey

DRAWN BY: EM/ GC
CHKD BY: JC
ORIGINAL 11/1/22
REVISION 1
REVISION 2
REVISION 3
REVISION 4
REVISION 5
SCALE 1" = 10'

C.0

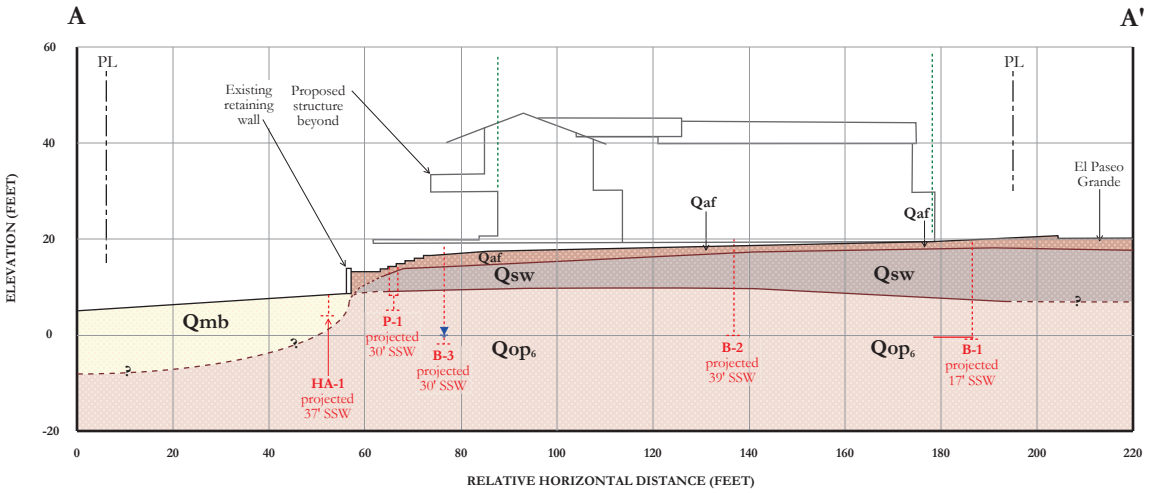
SITE PLAN AND GEOTECHNICAL MAP

MORROW RESIDENCE
8460 EL PASEO GRANDE, LA JOLLA, CA

DATE:	OCTOBER 2023	REPORT NO.:	2230041.03
BY:	JMM/SD	PLATE NO.:	1

CHRISTIAN WHEELER ENGINEERING

←N71°W



CWE LEGEND

Qaf	ARTIFICIAL FILL
Qsw	SLOPEWASH
Qmb	MARINE BEACH DEPOSITS
Qop$_6$	OLD PARALIC DEPOSITS, UNIT 6
—?—	GEOLOGIC CONTACT - QUERIED WHERE INFERRED
▼	GROUNDWATER ELEVATION IN BORING
·····	LINE OF EXISTING STRUCTURE

0 20 40

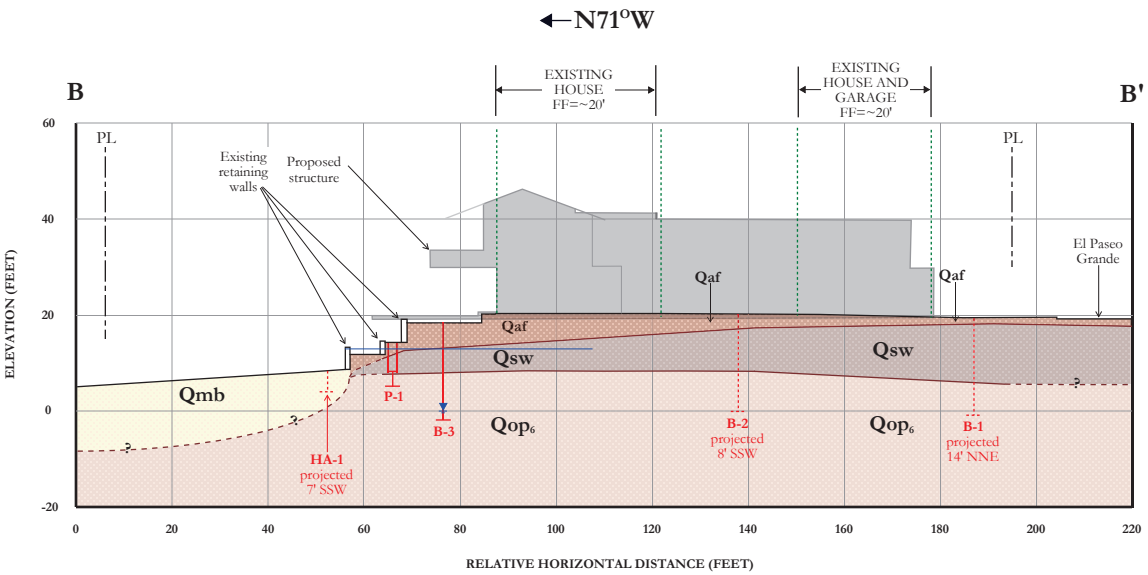
SCALE: 1" = 20'

GEOLOGIC CROSS-SECTION A-A'

MORROW RESIDENCE
8460 EL PASEO GRANDE, LA JOLLA, CA

DATE:	OCTOBER 2023	REPORT NO.:	2230041.03
BY:	JMM/SD	PLATE NO.:	2

CHRISTIAN WHEELER ENGINEERING



CWE LEGEND

Qaf	ARTIFICIAL FILL
Qsw	SLOPEWASH
Qmb	MARINE BEACH DEPOSITS
Qop$_6$	OLD PARALIC DEPOSITS, UNIT 6
—?—	GEOLOGIC CONTACT - QUERIED WHERE INFERRED
▼	GROUNDWATER ELEVATION IN BORING
·····	LINE OF EXISTING STRUCTURE

0 20 40

SCALE: 1" = 20'

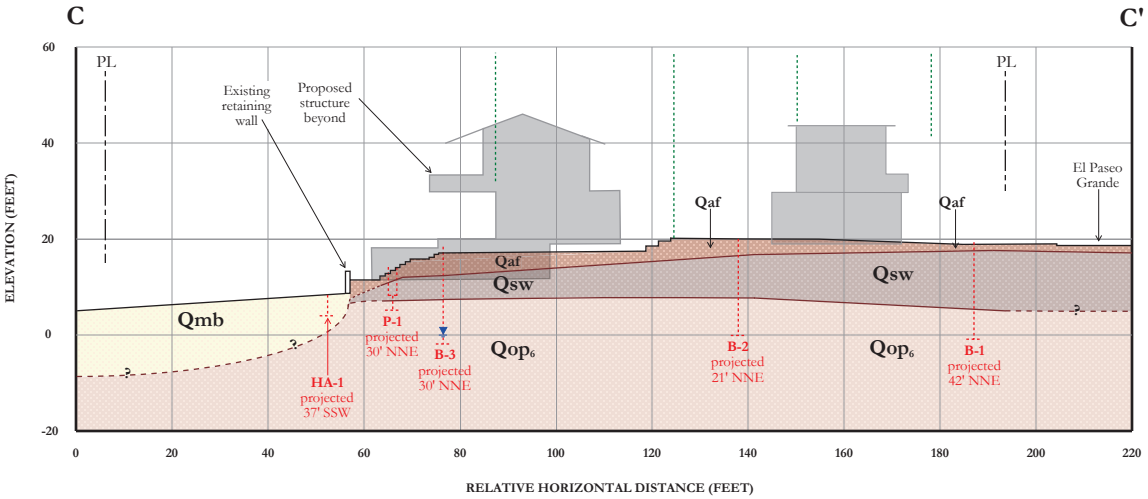
GEOLOGIC CROSS-SECTION B-B'

MORROW RESIDENCE
8460 EL PASEO GRANDE, LA JOLLA, CA

DATE:	OCTOBER 2023	REPORT NO.:	2230041.03
BY:	JMM/SD	PLATE NO.:	3

CHRISTIAN WHEELER ENGINEERING

←N71°W



CWE LEGEND	
Qaf	ARTIFICIAL FILL
Qsw	SLOPEWASH
Qmb	MARINE BEACH DEPOSITS
Qop_6	OLD PARALIC DEPOSITS, UNIT 6
—?—	GEOLOGIC CONTACT - QUERIED WHERE INFERRED
▼	GROUNDWATER ELEVATION IN BORING
·····	LINE OF EXISTING STRUCTURE

0 20 40

SCALE: 1" = 20'

GEOLOGIC CROSS-SECTION C-C'

MORROW RESIDENCE
8460 EL PASEO GRANDE, LA JOLLA, CA

DATE:	OCTOBER 2023	REPORT NO.:	2230041.03
BY:	JMM/SD	PLATE NO.:	4

CHRISTIAN WHEELER ENGINEERING

Appendix A

(Construction Testing and Engineering, Inc., 2007)

FAULTING AND BLUFF GEOLOGIC EVALUATION
PROPOSED LUSARDI RESIDENCE
8466 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

PREPARED FOR:

LUSARDI CONSTRUCTION
ATTENTION: MR MIKE RAMSEY
1570 LINDA VISTA DRIVE
SAN MARCOS, CALIFORNIA 92078

PREPARED BY:

CONSTRUCTION TESTING & ENGINEERING, INC.
1441 MONTIEL ROAD, SUITE 115
ESCONDIDO, CALIFORNIA 92026

CTE JOB NO. 10-8264G

FEBRUARY 12, 2007

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1.0 INTRODUCTION AND SCOPE OF SERVICES

1.1 Introduction

Construction Testing & Engineering, Inc. (CTE) has completed the requested fault and bluff evaluation for the proposed Lusardi residence, located at 8466 El Paseo Grande, in La Jolla, California. Figure 1 is an index map showing the approximate location of the site. It is our understanding that the proposed project calls for the demolition of the existing residence, and the construction of a new two-story residential structure, and associated improvements, including a retaining wall along the western side of the property landward of the existing seawall. It is also our understanding that the existing seawall is to remain as constructed.

A portion of the subject site is situated within the City of San Diego Seismic Safety Study, Hazard Category 12 for fault zones, and Category 48 for Coastal Bluffs. The remaining portion of the site is zoned as other terrain, Category 52. Figure 2 shows the location of the site and associated zone boundaries. The Category 12 zones are for faults considered potentially active, inactive, or activity level unknown, and a zone has been established around the interpreted location of the Scripps Fault that transects the northwestern corner of the site (Figure 2). A surface rupture hazard evaluation was requested by the City of San Diego for the subject site in their cycle review comments dated, July, 19, 2006.

Category 48 is a zone delineating generally stable broad beach areas. Category 52 zones are classified as other level areas, gently sloping to steep terrain with favorable geologic structure, and low risk.

The City of San Diego has published the "Coastal Bluffs and Beaches Guidelines", and the "Steep Hillside Guidelines" documents to assists in the interpretation and implementation of the Environmentally Sensitive Lands Regulations regarding proposed developments. Combined, these documents provide the criteria used to classify and establish appropriate regulations for the low lying cliffs delineating the boundary between the coastal beach and other terrain.

The purpose of our investigation and evaluation was to: 1) establish if faulting associated with Scripps fault transected the subject site, and if so, is there a surface rupture hazard and are associated structural setbacks required for the site; 2) Evaluate if the western margin (landward of the coastal beach) classifies as a sensitive coastal bluff, coastal bluff, or does not meet the criteria of either following the definitions of the Environmentally Sensitive Lands Regulations, the criteria outlined in the Coastal Bluffs and Beaches, and Steep Hillside Guidelines.

Based on the data available for review and the data from our investigation, it is our professional opinion that the site is not underlain by active faults and there is no indication of faulting from potentially active faults to the depths of our investigation. Therefore, we are not recommending any structural setbacks from the interpreted location of the Scripps fault at the northwest corner of the property.

Based on our interpretation of the height and location of the bluffs prior to previous site development, as well as our review and understanding of the Coastal Bluffs and Beaches and Steep Hillside Guidelines, it is our professional opinion that the site does not fall under the

jurisdiction of the Sensitive Coastal Bluffs and does not classify as a Coastal Bluff (Steep Hillside).

CTE previously completed a preliminary geotechnical investigation of the site and presented the findings and geotechnical recommendations in our report, dated March 24, 2006. The Preliminary Geotechnical Investigation report included previous field exploration, laboratory testing, geologic hazard evaluation, and engineering analysis. Specific recommendations for site grading and structure design for the proposed improvements were presented in our previous report. Information from our preliminary geotechnical investigation was used to supplement our current fault and bluff evaluation. The additional field exploration and laboratory testing completed for this report can also be used to supplement the findings from our preliminary investigation. However, the specific recommendations for site grading and structure design for the proposed improvements previously presented remain unchanged.

1.2 Scope of Services

The scope of services provided included:

- A review of available geologic and soils reports pertinent to the site and adjacent areas. References reviewed are presented in Appendix A.
- Evaluate potential faulting by establishing structural and stratigraphic continuity across the site, or lack thereof.
- Establish the geomorphology and topographic relief of the site area, prior to the construction of the seawall, to establish the bluff geometries prior to modification resulting from past construction.
- Laboratory testing of representative soil samples to provide data to substantiate field classifications and evaluate the geotechnical design characteristics of the soils.
- Preparation of this summary report of the investigations performed including at least three geologic cross-sections perpendicular to the bluff face.

2.0 SITE DESCRIPTION

2.1 General Conditions

The site is located at 8466 El Paseo Grande, in La Jolla, California. The property consists of an ocean front parcel located north of Kellogg Park on the west side of El Paseo Grande (Figure 1). Based upon available site plans, proposed improvements for the currently developed residential site include razing of the existing structure in order to construct a new two-story, single-family residence and associated improvements. The residential structure is expected to be supported by conventional shallow spread foundations with slabs-on-grade construction. Grading is expected to be limited to the elevation of the proposed structure. However, overexcavation and recompaction will be required.

It is our understanding that proposed design plans have been drawn under the assumption that the site does not classify as a sensitive coastal bluff, or coastal bluff based on previously completed projects of similar scope to the north and south of the subject site.

2.2 Site Topography

The site is situated at approximate elevations ranging from 25-feet above mean sea level near El Paseo Grande, to approximately 14–feet above mean sea level along the sidewalk behind the existing seawall. The property parcel extends across the coastal beach to the mean low water, with beach elevations ranging from approximately eight-feet below mean sea level at the base of the seawall to sea level. The present surface, east of the seawall, is generally flat with a slight westward slope ranging between two to three degrees. The beach profile at the time of this study

also has a gentle westward slope of approximately three degrees. A more detailed discussion of the site topography is presented in Section 6.1.

3.0 FIELD AND LABORATORY INVESTIGATIONS

3.1 Field Investigations

Field explorations were conducted on February 9, 2006 as part of the preliminary geotechnical investigation, and included site reconnaissance and the excavation of two subsurface exploratory borings, Borings B-1 and B-2, using a limited access portable drill-rig. The borings were advanced to a maximum depth of just less than twenty feet below grade (fbg), and sampled on approximately five-foot intervals.

Field explorations conducted as part of this study were completed from October 2 through October 12, 2006 and included the advancement of 13 additional borings (B-3 through B-15) that were either continuously sampled or sampled at select intervals to define the subsurface stratigraphy. The borings were advanced to maximum depths ranging between 11 and 41 feet below exiting grade. A geologist visually classified and logged soils in the field using the Unified Soil Classification System.

The field descriptions have been modified, where appropriate, to reflect laboratory test results. Exploration logs, including descriptions of the soil, are included in Appendix B. Approximate exploration locations are shown on Figure 2.

As shown on Figure 2, the borings were located around the perimeter of the existing structures with a distribution that provided the correlation of subsurface stratigraphy along three east-west oriented cross-section lines, A-A', B-B', and C-C' (Figures, 3, 4, and 5 respectively), and two additional cross-sections, D-D', along a north-south orientation, and E-E' along a northwest-southeast orientation (Figures 6 and 7, respectively).

Bulk and ring soil samples were collected from the borings, B-1 and B-2, for geotechnical laboratory analysis. Borings B-3 through B-15 were sampled with a Standard Penetration Sampler (SPT). Select soil samples were collected and placed in sealed plastic bags and transported to the CTE geotechnical laboratory for analysis.

3.2 Laboratory Investigation

Select soil samples were collected as part of this investigation for classification purposes and to provide supplemental data of the physical properties and engineering characteristics that were characterized during the preliminary investigation. The laboratory tests performed on the soil samples collected for this investigation included, Particle-Size Analysis, Atterberg Limits, Hydrometer, and Expansion Index Testing. Test method descriptions and laboratory results are included in Appendix C. Previous Laboratory tests were reported in the Preliminary Geotechnical Investigation dated March 24, 2006

4.0 GEOLOGY

4.1 General Geologic Setting

San Diego is located within the Peninsular Ranges physiographic province that is characterized by its northwest-trending mountain ranges, intervening valleys, and predominantly northwest-trending active regional faults. The San Diego Region can be further subdivided into the coastal plain area, a central mountain–valley area and the eastern mountain valley area. The project site lies within the coastal plain area of low relief that slopes gently toward the Pacific Ocean.

The coastal plain is characterized by geomorphic landforms known as marine terraces, which are ancient erosion surfaces or abrasion platforms cut by ocean –wave processes along past coastlines. These surfaces are recognized today as the relatively flat-lying mesas and terraces that range in elevation across the coastal plain of San Diego. The elevation differences of these marine terraces are the result of sea level changes that are associated with glacial retreat and advance throughout the Pleistocene, and uplift associated with activity on the Rose Canyon Fault Zone over the past two million years. The mesas or terraces have been incised by westward flowing drainages that have adjusted to the relative sea level changes in elevation. The combined effect of these processes is that older marine terraces are found at progressively higher elevations. Several distinct marine terraces present in the San Diego area include the Linda Vista Mesa (cut approximately 1.3 million years ago), the Nestor Terrace (cut approximately 120,000 years ago), and the Bird Rock Terrace (cut approximately 80,000 years ago). The marine terraces are typically covered with marine sediments, overlain by younger non-marine terrestrial deposits.

4.2 Site Geologic Conditions

According to mapping by Kennedy (1975), soils at the site consist of units of Quaternary Beach Deposits, Undifferentiated Quaternary-aged Alluvium and Slopewash deposits, and deposits of the Quaternary Bay Point Formation. The findings from our investigation were consistent with the mapping completed by Kennedy (1975). The sequence of deposits observed at the site included from the existing surface downward; Fill and disturbed material, Quaternary Slopewash (Qsw), a transitional unit between the slopewash and underlying Bay Point Formation (Qsw/QBp-1), and Quaternary Bay Point Formation.

4.2.1 Fill

This unit consists loose to medium stiff, re-worked Quaternary Slopewash as described below, with loose, silty sand, abundant organics, roots, and topsoil from turf and planter areas, with minor debris. Based on our aerial photograph review, the area behind the existing seawall consists of fill material. However, this area was not drilled during our investigation. Fill thicknesses are interpreted to typically range between two and five feet, with thicknesses up to eleven feet behind the seawall.

Depths of fill material ranging up to ten feet were reported in the geotechnical investigation completed for the residence just south of the subject site at 8450 El Paseo Grande by Earthworks Engineering, Inc., dated December 18, 2000. The description of this material appears to correlate with the base of the material we interpreted as Slopewash deposits.

4.2.2 Quaternary Slopewash (Qsw)

Quaternary Slopewash deposits were encountered near surface and in gradational contact with the overlying Fill material. The thickness of this deposit ranged between four to eight feet, and extended from the fill to depths of approximately 10 feet below existing grade. The lower contact is gradational with the underlying Bay Point Formation. Our current interpreted base of the slopewash material differs from our initial investigation, where the base of the slopewash material was the top of a distinctive "beach' sand. This "beach" sand is presently considered a unit within the underlying Quaternary Bay Point Formation, Unit Qbp- 4 on the geologic cross-sections.

The Quaternary Slopewash consists of a homogeneous deposit of loose to stiff, moist to wet, yellowish –gray brown to yellowish - olive brown, slightly mottled, silty to sandy Clay, varying to sandy clayey Silt, with rootlets, locally developed pinhole structure, some carbonate near the upper contact, and occasional carbon fragments. The unit is massive with locally developed weak discontinuous laminations. Upper and lower contacts are gradational.

4.2.3 Transitional (?) Quaternary Slopewash/Bay Point Formation; (Qsw / QBp-1)

Map Unit Qsw /QBp-1 is considered a transitional unit between the overlying Quaternary Slopewash and underlying Quaternary Bay Point Formation. The upper and lower contacts are both gradational. The stratigraphic position of unit, above a moderately well developed paleosol, the higher sand content and scattered pebbles indicate that this unit is the basal unit to the Quaternary Slopewash material. However, an overall increased

density, change in color, degree of mottling, locally weak soil development, and gradational nature of the lower contact suggest it is part of the Bay Point Formation. Regardless of the interpretation, the unit could be mapped and correlated as distinct stratigraphic layer across the site.

Qsw /Bp1: consists of medium stiff to stiff, locally loose when saturated, moist to wet, dark gray brown, light brown, orange brown, black, variably mottled, sandy Clay with visually estimated medium to coarse grained sand percentages up 30 percent, scattered pebbles, abundant organics (carbon fragments and disseminated carbon) throughout. Upper contact is locally gradational to distinct, and the lower contact is gradational with Bp2.

4.2.3 Bay Point Formation; (QBp-2 to QBp-4)

Quaternary-aged sedimentary deposits identified as the Bay Point Formation were encountered within our subsurface explorations beneath the slopewash. These soils were divided into three, map units based on lithologic differences, and degree of soil development. Contacts were gradational with overlying and underlying units. The units are described below and depicted on the geologic-cross-sections (Figures 3 through 7).

Map Unit (Bp2): Bp2 consists of stiff to very stiff, locally hard, moist to wet, dark reddish brown, dark gray-brown, black, dark orange-brown, extensively mottled, silty to sandy Clay, with distinctive coarse-red sand grains throughout, scattered organics (carbon

fragments, disseminated carbon, massive to moderate, subangular- blocky soil structure, with clay films. Soil horizonation Btb to Btvb. Diffuse upper and lower contacts.

Map Unit (Bp3): Bp3 is a transitional unit between the overlying (Bp2) clay and sands of the underlying unit (Bp4). Bp3 is stiff to very stiff silty sandy Clay to medium dense clayey Sand, moist to wet, mottled brown, orange-brown, gray, with black, weaker soil structure than overlying unit Bp2, granular to massive, with locally moderate subangular-blocky soil structure.

Unit (Bp4): Bp4 consists of a distinctive change in lithology from the clay and silt of the overlying units to medium dense to dense, wet, gray to black, fine-to coarse-grained silty to clayey Sand that grades downward into a poorly graded Sand with silt, abundant mafic mineral concentrations consisting primarily of black (biotite) mica. Unit is interpreted as a paleo-beach sand.

4.3 Groundwater Conditions

Groundwater was encountered within our subsurface explorations at the time of drilling at elevations consistent with the contact between map units Bp-3 and Bp-4 at an approximate elevation ranging between -2 feet below mean sea level to mean sea level. Perched groundwater was encountered during drilling locally along the top of map unit Bp-2 (paleosol) at approximate elevations ranging between 7- to 10- feet above mean sea level. The deposits above Bp-2, within Qsw/Bp-1 were loose to soft where the perched groundwater was observed. Although groundwater conditions will likely vary, especially during periods of sustained precipitation, and

tidal fluctuations it is not expected to affect the proposed development if recommendations regarding site drainage are carried out during design and construction.

5.0 LOCAL AND REGIONAL FAULTING

5.1 Regional Faulting

According to the California Geologic Survey, a fault is considered active if it displays evidence of activity in the last 11,000 years (Hart and Bryant, revised 1997). A potentially active fault displays evidence of activity prior to 11,000 years, but within the last 1.6 million years; or when supporting geologic evidence indicates timing of faulting as potentially active or non-active, but direct geologic evidence is lacking that could unequivocally prove timing of activity.

The onshore portion of the Rose Canyon Fault Zone (RCFZ) is located approximately 0.6 kilometers to the southwest of the subject site, and is the closest known active fault. The RCFZ generally extends southeastward along the eastern slopes of Mount Soledad, and along the eastern shore of Mission Bay. Further to the south, north of downtown San Diego, the fault appears to diverge into three distinct strands, the Coronado, Spanish Bight, and Silver Strand faults. These strands generally extend to the south and southwest, through San Diego Bay, into Coronado, and eventually to the Pacific Ocean.

Evidence of Holocene (within the last 11,000 years) surface rupture on strands of the RCFZ has been discovered and summarized in Treiman, 1993. In addition, several recent studies, including; Woodward-Clyde Consults [WCC] 1994; Rockwell and Murbach, 1998; Leighton and

Associates, 1998; Kleinfelder, 1999 and 2001 have further substantiated activity along the RCFZ.

Other principal active faults in this region include the Elsinore, Coronado Banks, San Jacinto, and San Andreas faults as shown on the Regional Fault Map, Figure 8. Epicenters of earthquakes with magnitudes greater than 5.0 that occurred between 1800 to 1999 are shown on Figure 8, (Toppazada and others, 2000).

5.2 Site Specific Faulting

The site is not located within a State of California defined Alquist-Priolo Earthquake Fault Zone. However, based on our review of the City of San Diego Seismic Safety Study, it appears that a concealed segment of the Scripps Fault is mapped across the extreme northwest corner of the property (Figure 9). The Scripps fault is considered to be a potentially active fault, and has been zoned as a Category 12 seismic hazard, according to the City of San Diego Seismic Safety Study. Category 12 zones are for faults considered potentially active, inactive, or activity level unknown. A surface rupture hazard evaluation was requested by the City of San Diego for the subject site in their cycle review comments dated, July, 19, 2006.

Excavation of fault trenches is considered to be the best method to investigate faulting. However, fault trench excavations were not feasible at the subject site due to limited access, and groundwater elevations that would prohibit trenching to the anticipated depths needed to expose the stratigraphy of sufficient age to evaluate the timing of faulting. Given these restraints, the faulting was evaluated by advancing and continuous sampling borings to sufficient depths to

establish stratigraphic and structural continuity across the site. This is considered a standard of practice methodology according the Note 49, "Guidelines For Evaluating Surface Rupture" (California Geological Survey, 2002).

A total of 15 borings were advanced at the site (B-1 through B-15) to depths ranging from 11 to 41 feet below existing grades. As shown on Figure 2, the borings were located around the perimeter of the existing structures with a distribution that provided the correlation of subsurface stratigraphy along three east-west oriented cross-section lines, A-A', B-B', and C-C' (Figures, 3, 4, and 5, respectively), and two additional cross-sections, D-D', along a north-south orientation, and E-E' along a northwest-southeast oriented (Figures 6 and 7, respectively). Lithostratigraphic (similar lithology) and a chronostratigraphic (time boundary) horizon could be correlated across the entire site. The cross-sections were correlated at there intersection points to provide internal consistency of the geologic interpretations. The lithostratigraphic horizons include the contact between map units Qsw and Qsw/Bp1, Bp-2 and Bp-3, Bp-3 and Bp-4. The chronostratigraphic horizon is the contact between map units Qsw/Bp-1 and Bp-2. This is based on the buried soil profile (paleosol) that represents the top of unit Bp-2. The correlations of these units are depicted on the Geologic cross-section A-A' through E-E' (Figures 3 through 7, respectively).

Based on our interpretation, the subsurface stratigraphy is laterally continuous and displays structural and stratigraphic continuity across the entire site. The mapped units have a slight westward dip of approximately three degrees, similar to the present slope of the coastal beach

and terrace surface. This slope is probably best represented by the contact between units Qsw/Bp-1 and Bp-2, with the top of Bp-2 at average elevation of 12 feet above mean sea level at the eastern end of the property, sloping westward to approximately mean sea level at the western end of the property adjacent to the seawall. This is a distance of approximately 160 feet with 12 feet of fall that equates to a gradient of 0.075, or approximately three degrees from horizontal. All the mapped contacts had similar gradients and therefore this gradient was taken as the average slope used to estimate the bluff edge (discussed below).

The Bay Point Formation is considered to have formed approximately 120,000 to 80,000 years before present in this area (Kennedy, 1975). Kuhn, 1984, reported that a fossil horse bone was found to the north within the alluvial bluffs, and yielded an age of 55,000 years as determined by amino acid dating techniques (Bada, et al. 1974). In addition, based on Carbon -14 dating, 5,460 to 7,370 year old remains from Indian burial sites were discovered in the bluffs north of the Scripps Biology buildings (Shumway et.al. 1961; as reported in Kuhn, 1984). These bluffs, referred to as the low-lying alluvial bluffs, extend from just north of Scripps to Kellogg Park, and include the bluffs present at the subject site.

Based on the lateral and vertical stratigraphic and structural continuity of the deposits across the site, as depicted in Figures 3 through 7, and the age-constraints discussed above, it is clear that active faults do not cross the site. The existence of potentially active faults (faults older than 10,000 years and younger than 1.6 million years) could be present at depths below the limits of our investigation. However, there is no indication of faulting within the depths explored and it is

our professional opinion that the risk of surface rupture is very low to nil. Furthermore, because we found no evidence of faulting, such as offset lithology, structural warping, thickness changes or steps in lithologic units, we are not recommending any structural setbacks from the interpreted trace of the Scripps fault along the northwest property corner.

6.0 BLUFF EVALUATION

6.1 Review of Historic Topography

A series of topographic maps of the La Jolla Quadrangle were collected from EDR Environmental Data Resources, Inc., and from the County of San Diego Public Works. The topographic maps reviewed are presented in the table below.

TABLE 1

Quadrangle	Year	Series	Scale
La Jolla	1930	15 minute	1:62500
La Jolla	1953	7.5 minute	1:24000
La Jolla	1967	7.5 minute	1:24000
La Jolla	1975	7.5 minute	1:24000
La Jolla	1977	1" = 200'	1:2400
La Jolla	1996	7.5 minute	1:24000

Based on our review, it appears that the site surface elevation was lower than 25 feet msl, and possibly lower than 20 feet msl on the 1930 and 1953 maps. The 1967, 1975, and 1996 maps indicate the surface elevation was between 20 to 25 feet msl. The 1977 map at a smaller scale than the other maps reviewed, indicated the surface elevation was between 15 to 25 feet from west to east across the site. The present surface elevations, as shown on Figure 2, range from 14 feet on the sidewalk behind the seawall, then approximately 17 feet msl from behind the retaining wall to 24 feet msl at the eastern end of the existing structures. Copies of the topographic maps are presented in Appendix D.

6.2 Review of Historic Photography

Aerial and surface photographs of the site and surrounding area were reviewed to help re-construct the site development history and provide correlative data with the review of the historic topographic maps. Aerial photographs were collected from the California Coastal Records Project (www.californiacoastline.org), (Appendix E), and a data search completed by EDR Environmental Data Resources Inc., (Appendix F), and historic surface photographs of the general site area were collected from Kuhn and Shepard, 1984 (Appendix G).

6.2.1 Aerial Photographs

Oblique aerial photographs of the La Jolla Shores area available from the California Coastal Project included photographs from 1972, 1979, 1987, 1989, 1995, and 2004. Aerial photographs from the EDR data search included photographs from 1948, 1953, 1963, 1974, 1989, 1994, and 2002.

Review of the aerial photographs shows the seawall and the residences south of the intersection of El Paseo Grande and Paseo Del Ocaso were constructed between the years of 1948 to 1953. It appears that some grading occurred at the subject site prior to or during 1948. Interpretation of the 1948 photograph suggests that the grading was to create beach access for the construction of the seawall. Parcels north of the subject site appeared to have been affected more from the grading, and only the western portion of the subject site appears to have been graded. It is apparent that the seawall was constructed on the coastal beach, seaward of the bluff face as it existed at that time. Indicating that fill was placed behind the seawall and in front of the bluff face.

6.2.2 Historic Area Photographs

Historic photographs of the area were collected from Kuhn and Sheppard, 1984. These photographs show the general La Jolla Shores area and particularly a section of the bluffs north of the subject site (approximately eight houses/parcels north of the subject site). A series of photographs at this location were taken in 1936, and during the winter storms of 1978, and subsequently in 1979. The 1936 photographs shows that the bluffs were steeply faced, with steps, gullies, and uneven surface topography, with a slope decreasing in elevation toward the south, consistent with historic and present day topography. Portions of the seawall were destroyed, but the seawall to the south remained intact. The step in the seawall in the 1979 photograph is a good reference point for location of the area in the more recent photographs collected from the California Coastal Records Protect Photographs.

According to Kuhn (1984), climatic conditions prior to 1978 were milder and the bluff faces became rounded and more vegetated than the steep faces show in the 1936 photograph. This implies the gradient of the bluff faces decreased during this time of mild climatic conditions.

6.3 Bluff Profiles

Three cross-sections were constructed perpendicular to the bluff, Cross-Section A-A', B-B' and C-C' (Figures 4, 5, and 6). The locations of the sections are shown on the Site Exploration and Location Map (Figure 3). Estimates of the coastal bluff edge were made following the Coastal Bluffs and Beaches Guidelines, and estimates of the toe of bluff were interpreted based on information from the western most boring on each section, the estimated location of the present day abrasion platform, and estimates of the width of fill placed behind the constructed seawall based on our aerial photograph and literature reviews. Additionally, it is our understanding, substantiated from conversations with the representatives of the City of San Diego Land Development Review Department, that the coastal bluff height criteria is not an elevation above mean sea level, but the actual vertical relief of the bluff between the toe of bluff and bluff edge.

Previous studies along the San Diego coastline have established the toe of bluff at the intersection of the bluff face with the top of present day beach deposits. Based on our review of historical topography, the coastal beach deposits within the site vicinity typically range in elevation from 7 to 10 feet above msl. During typical years, the vertical relief of the bluff – as measured from the top of the coastal beach deposits intersection with the bluff face to the top of bluff edge – varies from 2 to 5 feet.

In an atypical year, such as in severe storm years, like those in 1978, the beach deposits may be removed to the elevation of the abrasion platform. In such years, the vertical relief of the bluff as measured from the intersection of the present day abrasion platform with the bluff face to the top of the bluff would be approximately 10-feet along the western margin of the property.

6.4 Regulations

As previously mentioned, The City of San Diego Land Development documents "Coastal Bluffs and Beaches Guidelines", and the "Steep Hillside Guidelines" classify and establish appropriate regulations for the low-lying cliffs delineating the boundary between the coastal beach and other terrain at the site.

The subject site is located immediately adjacent to the La Jolla Shoes beach and is within The City of San Diego Seismic Safety Category 48, "Generally stable, board beach areas, coastal harbors". As a designated Coastal Beach area, the site first falls under the Coastal Bluffs and Beach Guidelines. The Steep Hillside guidelines apply to coastal bluffs that are not sensitive coastal bluffs and landforms that meet different criterion for steep hillsides than the coastal bluff criterion.

6.4.1 Coastal Beach

The Environmentally Sensitive Lands Regulations define a Coastal Beach as:

Coastal Beach means the land between the edge of the sea and the first line of terrestrial vegetation or development or the toe of an adjacent sensitive coastal bluff, whichever is most seaward.

In addition, the Coastal Bluffs and Beaches Guidelines state that "if a seawall exists, the landward limit of the beach is still the toe of the bluff. The seawall would represent encroachment onto the beach".

The subject site parcel extends from El Paseo Grande on the east to the mean low water line on the west, and therefore a portion of the site contains a coastal beach. Based on our interpretation, the eastward extent of the coastal beach is approximately five to seven feet east of the seawall. A line connecting the interpreted toe of bluff along the site is depicted on Figure 3. This line delineates the boundary between the City of San Diego Seismic Safety Study Category 48 (coastal beach) and Category 52 (other terrain).

6.4.2 Coastal Bluff verses Sensitive Coastal Bluff

As Shown on Figure 4, 5, and 6, an escarpment exists between the coastal beach and other terrain boundary at the site. To address the questions of whether this escarpment classifies as a Coastal Bluff, Steep Hillside, or a Sensitive Coastal Bluff the pre-modified (pre-grading, pre-seawall construction) geometry of the escarpment was required to be established and compared to the geometric criteria as defined in the Coastal Bluff and Beach and Steep Hillside Guidelines.

An escarpment located along the shoreline and adjacent to coastal beaches must qualify as a coastal bluff before it can qualify as a sensitive coastal bluff.

6.4.2.1 Definition of Coastal Bluff

The Environmentally Sensitive Lands Regulations define a Coastal Bluff as:

Coastal Bluff means an escarpment or steep face of rock, decomposed rock, or soil resulting from erosion, faulting, or folding of the land mass that has a vertical relief of 10 feet or more and is located in the coastal zone.

In addition, a "coastal bluff is a naturally formed precipitous landform that generally has a gradient of at least 200 percent (1:2 slope) with a vertical elevation of at least 10 feet."

Based on our analysis, the vertical relief along the escarpment varies from 2 to 5 feet if measured from the top of the coastal beach deposits intersection with the bluff face to the top of bluff edge or approximately 10 feet if measured from the abrasion platform along the western (seaward) portion of the property. The elevation change across the entire parcel ranges from sea level (measured from the abrasion platform) to approximately 25 feet above mean sea level.

For the escarpment to meet the classification of a coastal bluff, some portion of the vertical relief along the site has to have a gradient of at least 200 percent. To address this criterion, the site gradient was calculated across the area of the bluff face, between the abrasion platform and the bluff edge. This area is the potential steep hillside (discussed below), or coastal bluff portion of the site. As shown on Cross –Sections A-A', B-B' and C-C' (Figures 4, 5 and 6, respectively) the

gradients range from approximately 154 percent on Cross-Section A-A', to 166 percent on Cross-Section B-B', and 182 percent along Cross-Section C-C'. The average gradient across the entire site, from the base of the seawall to the eastern property limit, is approximately 17 percent.

The above calculated gradients across the site do not meet the criteria for a coastal bluff.

6.4.2.2 Definition of Sensitive Coastal Bluff

The Environmentally Sensitive Lands Regulations define a Sensitive Coastal Bluff as: "*Sensitive Coastal Bluff means a coastal bluff that is designated within Hazard Category Numbers 41 through 47, inclusive, on the City's Geologic Hazard Maps, plus an additional 100-foot landward strip located and contiguous to the coastal bluff edge.*"

Also according to the Coastal Bluff and Beach Guidelines, "[s]ensitive coastal bluffs are a form of coastal bluffs that are generally located along the shoreline and adjacent to coastal beaches.

As previously mentioned, our review of the City's Geologic Hazard Maps show the site falls within Hazard Categories 48 and 52, "coastal beaches" and "other terrain", respectively. Based on the City of San Diego classification of the site area as Categories 48 and 52, the escarpment at the site does not classify as a

sensitive coastal bluff, and therefore not as a coastal bluff, based on the site's location adjacent to a coastal beach. The City of San Diego Geologic Hazard Categories in the site area are shown on Figure 9.

Our interpretation that the escarpment at the site does not meet the criteria of a coastal bluff, based on the findings of our site specific investigation, is consistent with City of San Diego's more general classification of the site area that the escarpment is not a sensitive coastal bluff.

6.4.2.3 Definition of Steep Hillsides

According to the Environmentally Sensitive Lands Regulations, there are two criteria used to establish when steep hillside regulations are applicable to a proposed development. The first criterion is applicable if any portion of the site contains a natural gradient of at least 200 percent (200 feet of vertical distance for every 100 feet of horizontal distance) and a vertical elevation (vertical relief) of at least 10 feet. This is the same criteria for a coastal bluff, as described in the Coastal Bluff and Beach Guidelines, and discussed above in section 6.4.2.2.

The second criterion is when a development is proposed on a site containing any portions with a natural gradient of 25 percent (25 feet of vertical distance for every 100 feet of horizontal distance) and a vertical elevation of at least 50. This criterion is not applicable to the subject site, because the site elevation has been

and is presently today below 25 feet in elevation based on our review of historical topographic maps, and the present surveyed site topography.

Therefore, it is our professional opinion that the site does not classify as a steep hillside and is not subject to the steep hillside regulations. This finding is consistent with previous findings and rulings by the City of San Diego for similar projects to the north and south of the subject site.

7.0 CONCLUSION AND RECOMMENDATIONS

Based on the data available for review, as well as the data from our investigations, it is our professional opinion that the site is not underlain by active faults and there is no indication of faulting from potentially active faults to the depths of our investigation. Therefore, we are not recommending any structural setbacks from the interpreted location of the Scripps fault at the northwest corner of the property.

Based on the information obtained from our investigations, our interpretation of the height and location of the bluffs prior to development of the site, the calculated site gradients, and our review and understanding of the Coastal Bluffs and Beaches and Steep Hillside Guidelines, it is our professional opinion that the site does not fall under the jurisdiction of the Sensitive Coastal Bluffs and does not classify as a Coastal Bluff or Steep Hillside. These site specific findings support the regional Seismic Safety Study Category boundaries established City of San Diego for the site area.

8.0 LIMITATIONS OF INVESTIGATION

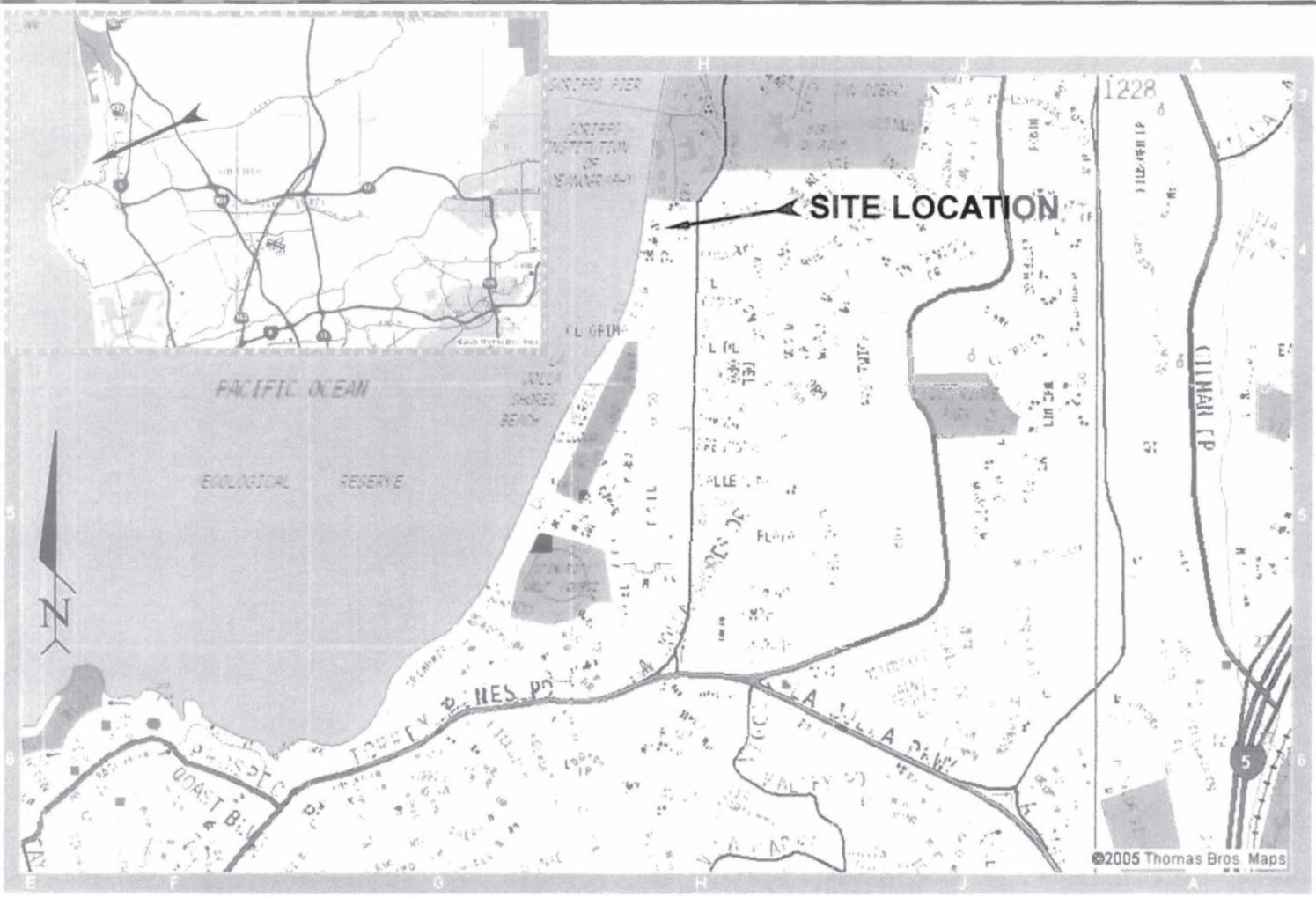
The field evaluation, laboratory testing and geotechnical and geologic analysis presented in this report have been conducted according to current engineering practice and the standard of care exercised by reputable geotechnical consultants performing similar tasks in this area. No other warranty, expressed or implied, is made regarding the conclusions, recommendations and opinions expressed in this report. Variations may exist and conditions not observed or described in this report may be encountered during construction.

Our conclusions and recommendations are based on an analysis of the observed conditions. If conditions different from those described in this report are encountered, our office should be notified and additional recommendations, if required, will be provided upon request. We appreciate this opportunity to be of service on this project. If you have any questions regarding this report, please do not hesitate to contact the undersigned.

Respectfully submitted,
CONSTRUCTION TESTING & ENGINEERING, INC.

Martin E. Siem CEG #2311
Senior Engineering Geologist

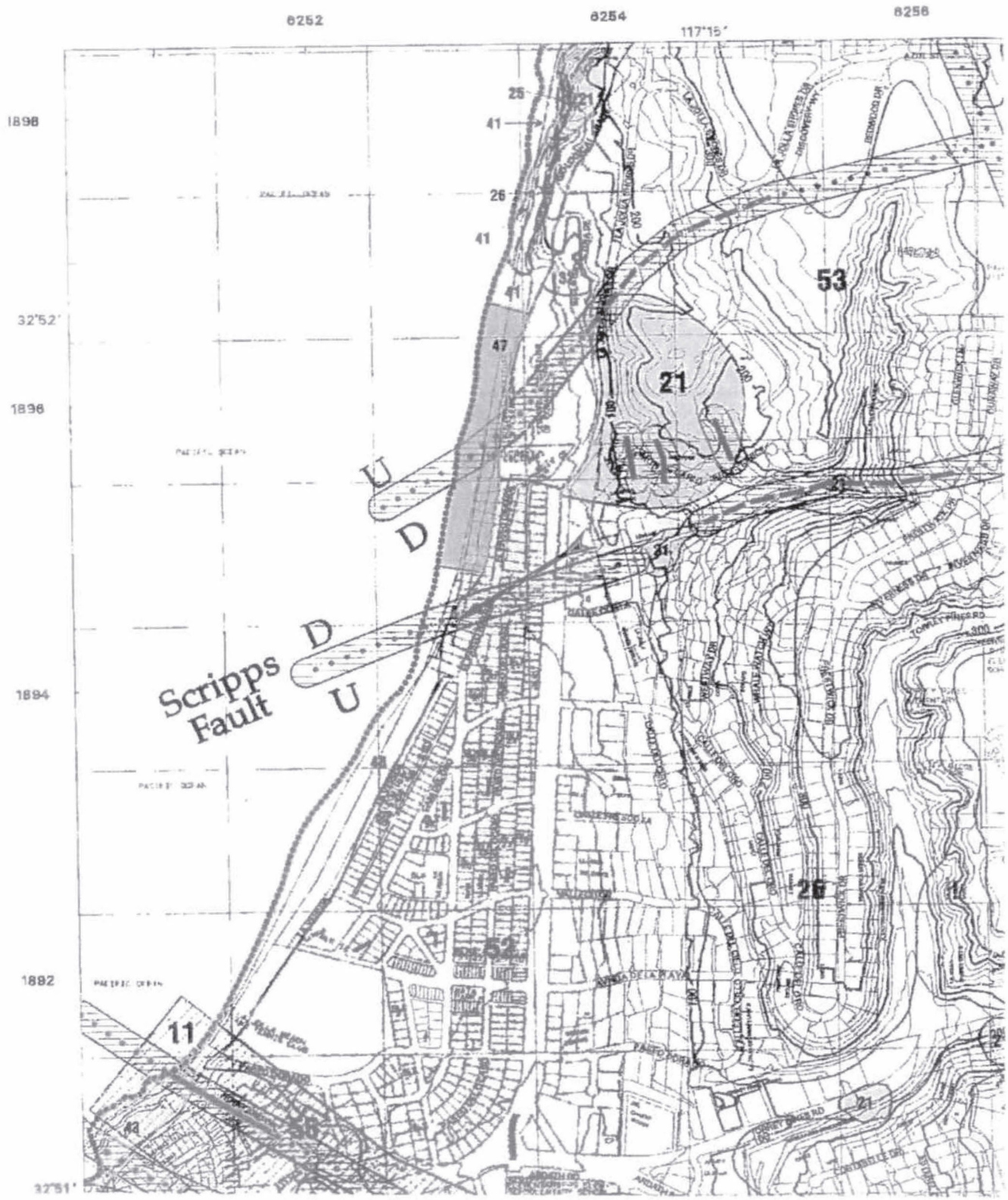
Dan T. Math, GE#2665
Principal Engineer



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GEOTECHNICAL AND CONSTRUCTION ENGINEERING TESTING AND INSPECTION
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SITE INDEX MAP
PROPOSED LUSARDI RESIDENCE
8466 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

CTE JOB NO	10-8264G
SCALE	NO SCALE
DATE 1/07	FIGURE 1

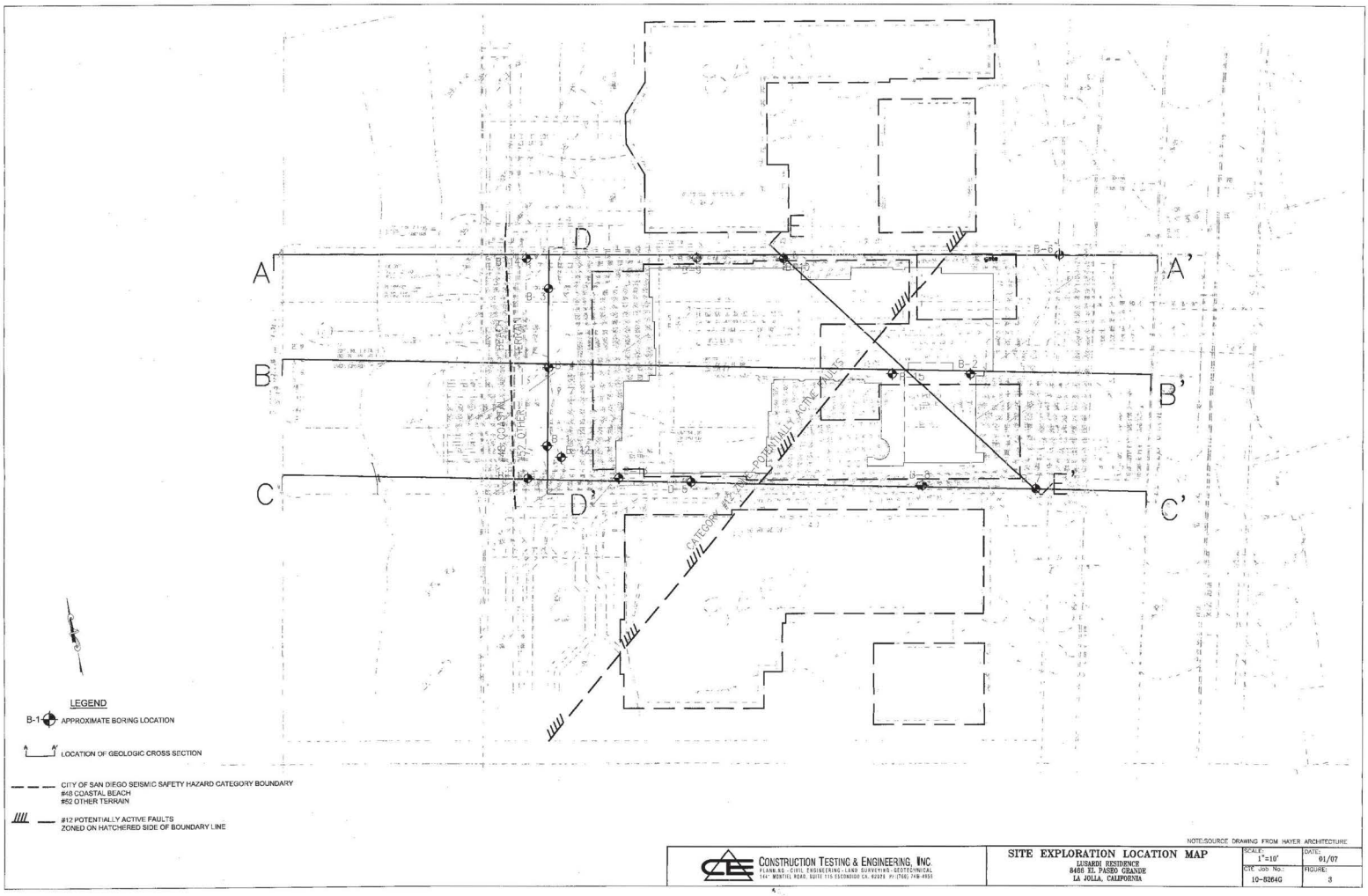


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SEISMIC SAFETY STUDY MAP

LUSARDI RESIDENCE
LA JOLLA, CALIFORNIA

CTE JOB NO.	10-8264G
SCALE	NO SCALE
DATE	1/07
FIGURE	2



LEGEND

B-1 APPROXIMATE BORING LOCATION

LOCATION OF GEOLOGIC CROSS SECTION

CITY OF SAN DIEGO SEISMIC SAFETY HAZARD CATEGORY BOUNDARY
#48 COASTAL BEACH
#52 OTHER TERRAIN

#12 POTENTIALLY ACTIVE FAULTS
ZONED ON HATCHERED SIDE OF BOUNDARY LINE

NOTE:SOURCE DRAWING FROM HAYER ARCHITECTURE

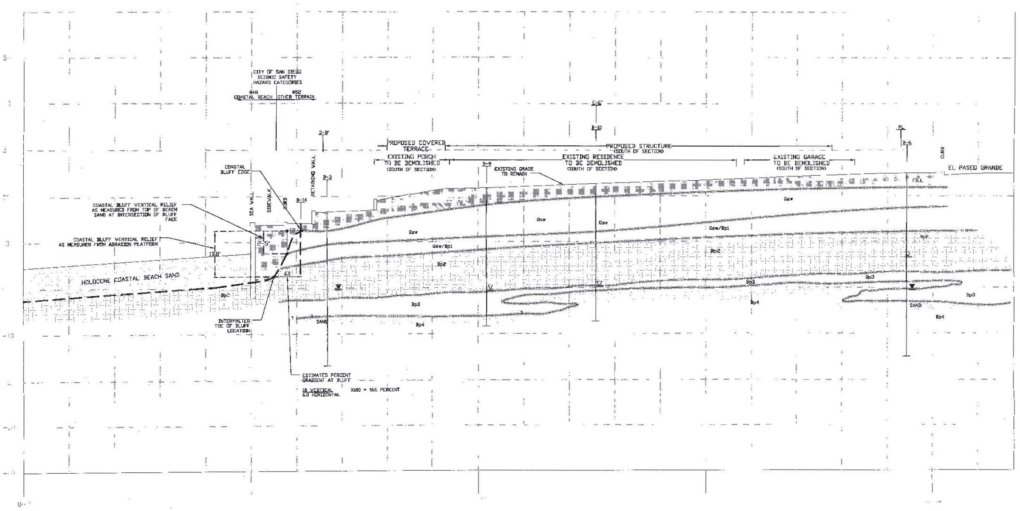
CONSTRUCTION TESTING & ENGINEERING, INC.
PLANNING - CIVIL ENGINEERING - LAND SURVEYING - GEOTECHNICAL
144 MONTIEL ROAD, SUITE 115 ESCONDIDO CA. 92026 PH:(760) 746-4955

SITE EXPLORATION LOCATION MAP

LUSARDI RESIDENCE
8468 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

SCALE:	DATE:
1"=10'	01/07
CTE JOB NO.:	FIGURE:
10-8264G	3

VIEW LOOKING NORTH



Explanation

Fill: Consists of loose to medium stiff, reworked Quaternary Slope Wash as described below, with loose, silty sand, abundant organics, roots, topsoil form turf and planter areas, minor debris.

Quaternary Slope Wash (Qsw): consists of loose to stiff, moist to wet, yellowish -gray brown to yellowish - olive brown, slightly mottled, silty to sandy Clay, varying to sandy clayey Silt, with rootlets, locally developed pinhole structure, some carbonate near the upper contact, and occasional carbon fragments. The unit is massive with locally developed weak discontinuous laminations. Upper and lower contacts are gradational.

Unit 1 (Qsw/Bp1): consists of medium stiff to stiff, locally loose when saturated, moist to wet, dark gray brown, light brown, orange brown, black, variably mottled, sandy Clay with variably estimated medium to coarse grained sand percentages up 30 percent, scattered pebbles, abundant organics (carbon fragments and disseminated carbon) throughout. Upper contact is locally gradational to distinct, and the lower contact is gradational with Bp2.

Quaternary Bay Point Formation

Unit 2 (Bp2): Bp2 consists of stiff to very stiff, locally hard, moist to wet, dark reddish brown, dark gray-brown, black, dark orange-brown, extensively mottled, silty to sandy Clay, with distinctive coarse-red sand grains throughout, scattered organics (carbon fragments, disseminated carbon, massive to moderate, subangular- blocky soil structure, with clay films Soil horizonation: Btb to Btvb, Diffuse upper and lower contacts.

Unit 3 (Bp3): Bp3 consists appears to be a transitional unit between the overlying (Bp2) clay and sands of the underlying unit (Bp4). Bp3 is stiff to very stiff silty sandy Clay to medium dense clayey Sand, moist to wet, mottled brown, orange-brown, gray, with black, weaker soil structure than overlying unit Bp2, granular to massive, with locally moderate subangular-blocky soil structure.

Unit 4 (Bp4): Bp4 consists of a distinctive change in lithology from the clay and silt of the overlying units to medium dense to dense, wet, gray to black, fine-to-coarse-grained silty to clayey Sand that grades downward into a poorly graded Sand with silt, abundant black mica. Unit is interpreted as a paleo-beach sand.

Gradation contact between mapped units.

Approximate location or inferred (?) location of geologic contacts

Zones of carbonate accumulation

Existing Grade

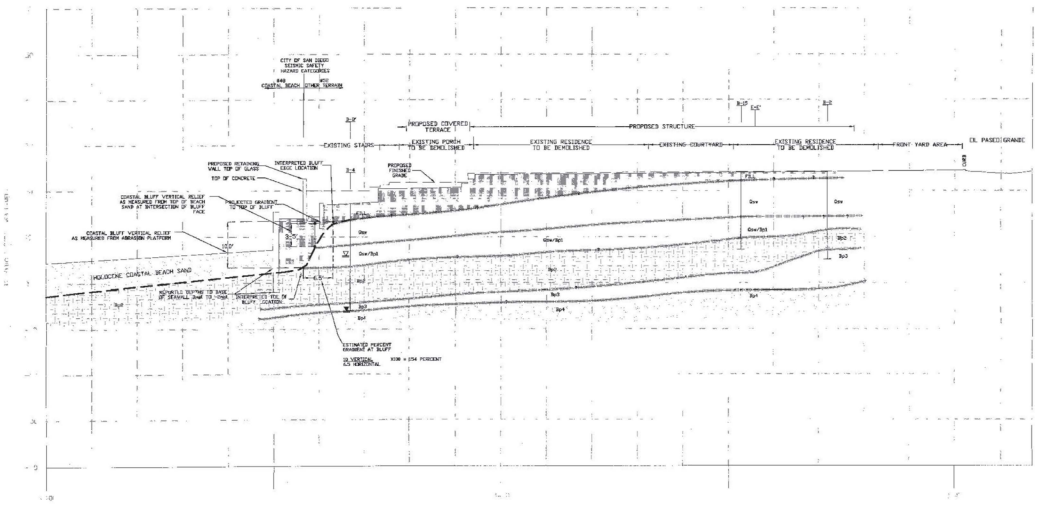
Proposed Final grade

Perched groundwater observed

Groundwater at time of drilling

CONSTRUCTION TESTING & ENGINEERING, INC. PLANNING - CIVIL ENGINEERING - LAND SURVEYING - GEOTECHNICAL 1441 MONTIEL ROAD, SUITE 115 ESCONDIDO CA. 92026, PH:(760) 746-4955	**CROSS SECTION A–A'** LUSARDI RESIDENCE 8498 EL PASEO GRANDE LA JOLLA, CALIFORNIA	SCALE: 1"=10' CTE Job No.: 10-8264G	DATE: 01/07 FIGURE: 4

VIEW LOOKING NORTH



Explanation

Fill: Consists of loose to medium stiff, reworked Quaternary Slope Wash as described below, with loose, silty sand, abundant organics, roots, topsoil form turf and planter areas, minor debris.

Quaternary Slope Wash (Qsw): consists of loose to stiff, moist to wet, yellowish -gray brown to yellowith - olive brown, slightly mottled, silty to sandy Clay, varying to sandy clayey Silt, with rootlets, locally developed pinhole structure, some carbonate near the upper contact, and occasional carbon fragments. The unit is massive with locally developed weak discontinuous laminations. Upper and lower contacts are gradational.

Unit 1 (Qsw/Bp1): consists of mediurn stiff to stiff, locally loose when saturated, moist to wet, dark gray brown, light brown, orange brown, black, variably mottled, sandy Clay with visually estimated medium to coarse grained sand percentages up 50 percent, scattered pebbles, abundant organics (carbon fragments and disseminated carbon) throughout. Upper contact is locally gradational to distinct, and the lower contact is gradational with Bp2.

Quaternary Bay Point Formation

Unit 2 (Bp2): Bp2 consists of stiff to very stiff, locally hard, moist to wet, dark reddish brown, dark gray-brown, black, dark orange-brown, extensively mottled, silty to sandy Clay, with distinctive coarse-red sand grains throughout, scattered organics (carbon fragments, disseminated carbon, massive to moderate, subangular- blocky soil structure, with clay films Soil horizonation Btb to Btvb. Diffuse upper and lower contacts.

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Unit 4 (Bp4): Bp4 consists of a distinctive change in lithology from the clay and silt of the overlying units to medium dense to dense, wet, gray to black, fine-to coarse-grained silty to clayey Sand that grades downward into a poorly graded Sand with silt, abundant black mica. Unit is interpreted as a paleo-beach sand.

Gradation contact between mapped units.

Approximate location or inferred (?) location of geologic contacts

Zones of carbonate accumulation

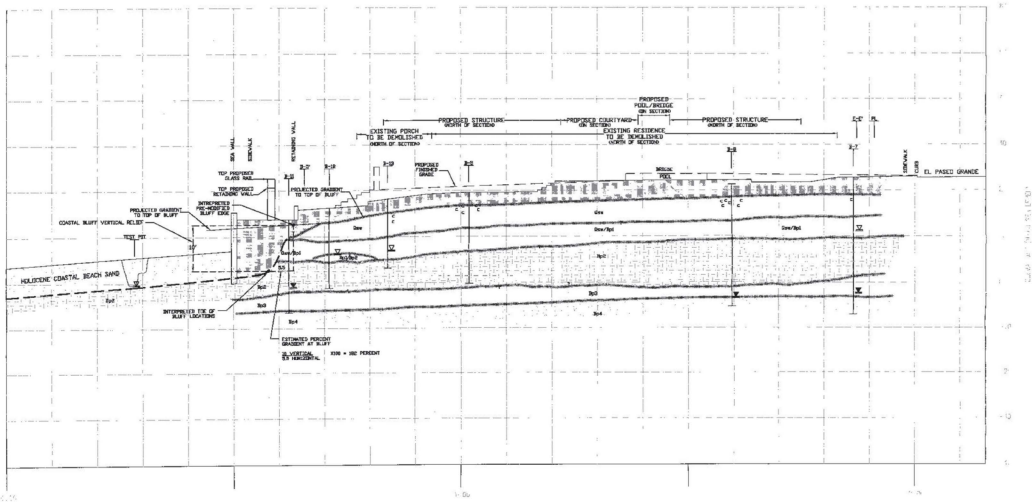
Existing Grade

Proposed Final grade

Perched groundwater observed

Groundwater at time of drilling

CONSTRUCTION TESTING & ENGINEERING, INC. PLANNING - CIVIL ENGINEERING - LAND SURVEYING - GEOTECHNICAL 1441 MONTIEL ROAD, SUITE 115 ESCONDIDO CA. 92025, PH:(761) 746-4505	CROSS SECTION B-B' LUSARDI RESIDENCE 6466 EL PASEO GRANDE LA JOLLA, CALIFORNIA	SCALE: 1"=10' CTE JOB No.: 10-8264G	DATE: 01/07 SHEET: 5



Explanation

Fill: Consists of loose to medium stiff, reworked Quaternary Slope Wash as described below, with loose, silty sand, abundant organics, roots, topsoil form turf and planter areas, minor debris.

Quaternary Slope Wash (Qsw): consists of loose to stiff, moist to wet, yellowish -gray brown to yellowish - olive brown, slightly mottled, silty to sandy Clay, varying to sandy clayey Silt, with rootlets, locally developed pinhole structure, some carbonate near the upper contact, and occasional carbon fragments, The unit is massive with locally developed weak discontinuous laminations. Upper and lower contacts are gradational.

Unit 1 (Qsw/Bp1): consists of medium stiff to stiff, locally loose when saturated, moist to wet, dark gray brown, light brown, orange brown, black, variably mottled, sandy Clay with visually estimated medium to coarse grained sand percentages up 30 percent, scattered pebbles, abundant organics (carbon fragments and disseminated carbon) throughout. Upper contact is locally gradational to distinct, and the lower contact is gradational with Bp2.

Quaternary Bay Point Formation

Unit 2 (Bp2): Bp2 consists of stiff to very stiff, locally hard, moist to wet, dark reddish brown, dark gray-brown, black, dark orange-brown, colonalvely mottled, silty to sandy Clay, with distinctive coarse-ed sand grains throughout, scattered organics (carbon fragments, disseminated carbon, massive to moderate, subangular- blocky soil structure, with clay films Soil horizonation Btb to Btvb. Diffuse upper and lower contacts.

Unit 3 (Bp3): Bp3 consists appears to be a transitional unit between the overlying (Bp2) clay and sands of the underlying unit (Bp4). Bp3 is stiff to very stiff silty sandy Clay to medium dense clayey Sand, moist to wet, mottled brown, orange-brown, gray, with black, weaker soil structure than overlying unit Bp2, granular to massive, with locally moderate subangular-blocky soil structure.

Unit 4 (Bp4): Bp4 consists of a distinctive change in lithology from the clay and silt of the overlying units to medium dense to dense, wet, gray to black, fine-to coarse-grained silty to clayey sand that grades downward into a poorly graded Sand with silt, abundant black zones. Unit is interpreted as a paleo-beach sand.

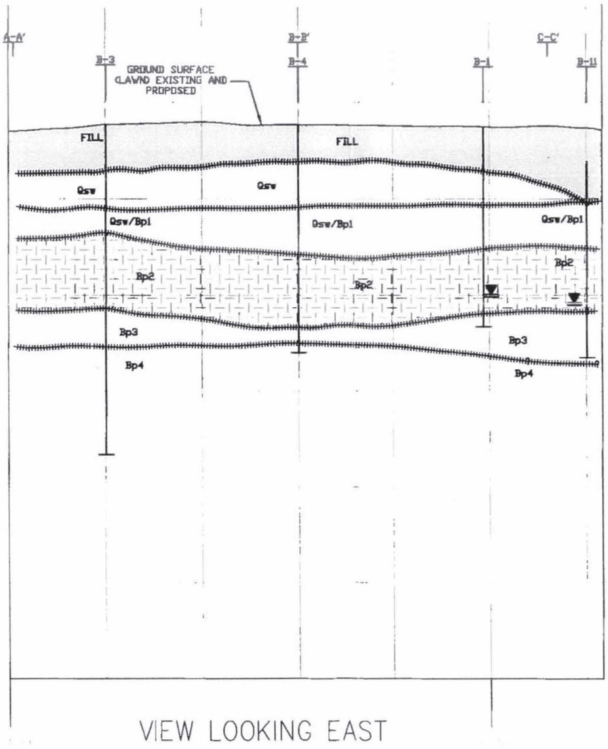
- Gradation contact between mapped units.
- Approximate location or inferred (?) location of geologic contacts
- c°c°c Zones of carbonate accumulation
- Existing Grade
- Proposed Final grade
- Perched groundwater observed
- Groundwater at time of drilling

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CROSS SECTION C-C'
LUSARDI RESIDENCE
8468 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

SCALE:	DATE:
1"=10'	01/07
CTE Job No.:	FIGURE:
10-8264G	6



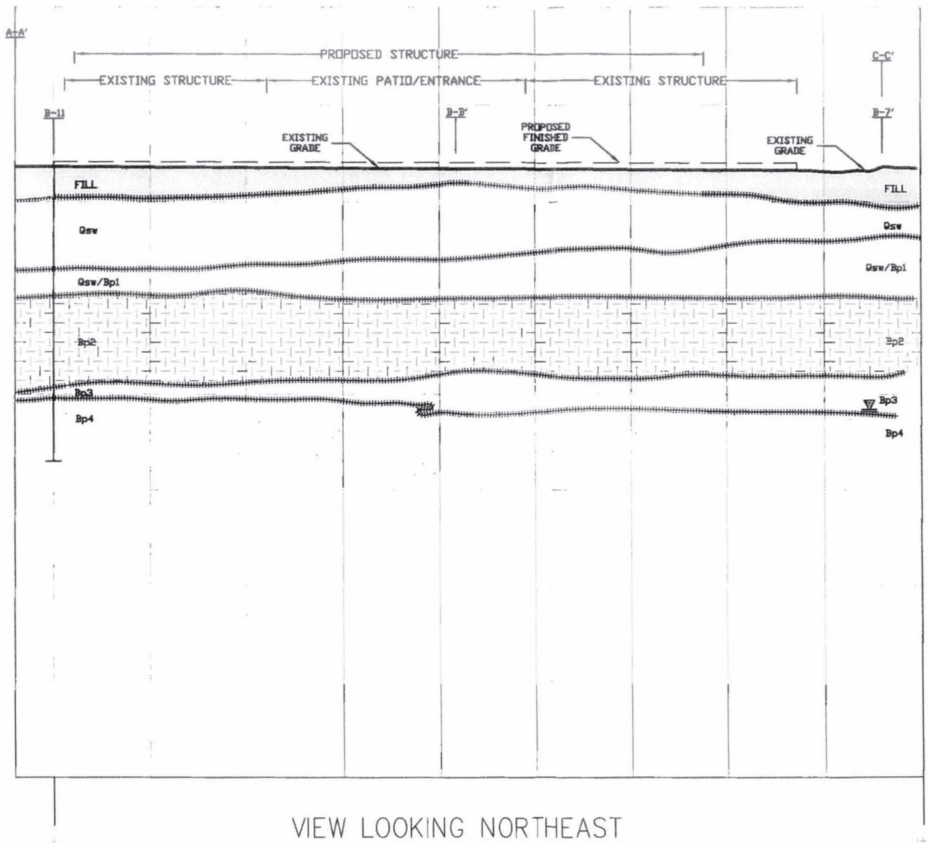
VIEW LOOKING EAST

SEE FIGURE 3 FOR EXPLANATION

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CROSS SECTION D–D'
LUSARDI RESIDENCE
8466 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

CTE JOB NO. 10-8284G
SCALE: 1"=10'
DATE: 01/07
FIGURE: 7



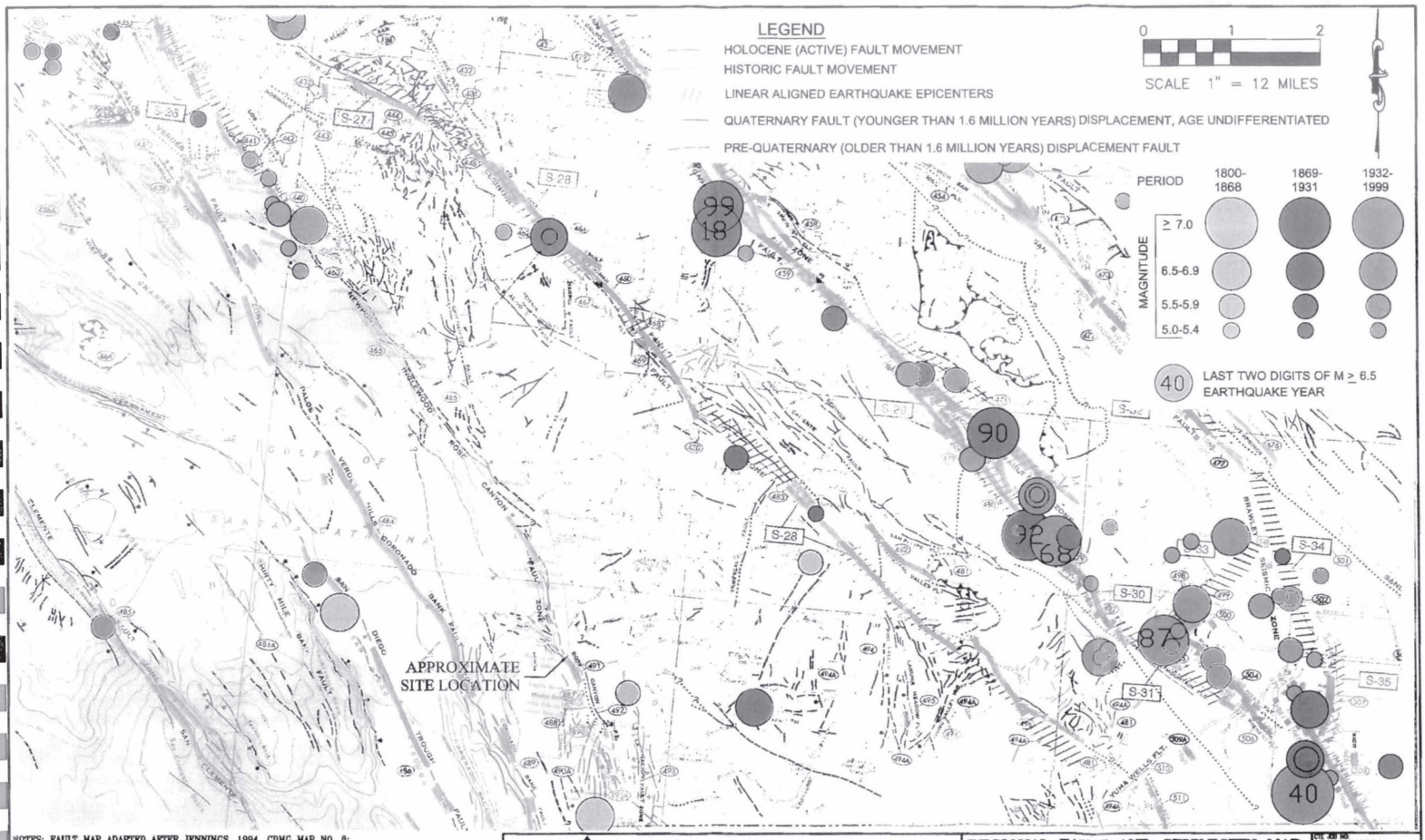
VIEW LOOKING NORTHEAST

SEE FIGURE 3 FOR EXPLANATION

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CROSS SECTION E-E'
LUSARDI RESIDENCE
8466 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

CTE JOB NO: 10-8284G
SCALE: 1"=10'
DATE: 01/07
FIGURE: 8



NOTES: FAULT MAP ADAPTED AFTER JENNINGS, 1994, CDMG MAP NO. 6; REFERENCE FOR ADDITIONAL EXPLANATION

EPICENTERS OF AND AREAS DAMAGED BY M≥5 CALIFORNIA EARTHQUAKES, 1800-1999 ADAPTED AFTER TOPPOZADA, BRANUM, PETERSEN, HALLSTORM, CRAMER, AND REICHLE, 2000, CDMG MAP SHEET 49

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REGIONAL FAULT AND SEISMICITY MAP

LUSARDI RESIDENCE
8466 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

CTE JOB NO: 10-8264G
SCALE: 1 inch = 12 miles
DATE: 01/07
PLATE: 9

APPENDIX A

REFERENCES CITED

REFERENCES CITED

1. Hart, E.W. and Bryant, E., 1997, "Fault-Rupture Hazard Zones in California, Alquist Priolo, Special Studies Zones Act of 1972," California Division of Mines and Geology, Special Publication 42, revised.

2. Martin, Ross, 2000, "Digital Images of Official Maps of Alquist-Priolo Earthquake Fault Zones of California, Southern Region," California Division of Mines and Geology, CD 2000-003.

3. Tan, S.S. and Giffen, D.G., 1995, "Landslide Hazards in the Southern Part of the San Diego Metropolitan Area, San Diego County, California," California Division of Mines and Geology, Landslide Hazard Identification Map No. 33.

4. Tan, S. S. and M. P. Kennedy, 1975, "Geology of the San Diego Metropolitan Area, California", La Jolla Quadrangle, California Division of Mines and Geology, DMG Bulletin 200.

APPENDIX B

EXPLORATION LOGS

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1441 MONTIEL ROAD, SUITE 115 | ESCONDIDO, CA 92026 | 760 746 4955

PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 1
CTE JOB NO:	10-8264G	DRILL METHOD:	TRIPOD DRILL RIG	DRILLING DATE:	2/9/2006
LOGGED BY:	STEVE H.	SAMPLE METHOD:	BULK AND RING	ELEVATION:	~

BORING: B-1

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC	Fill	Medium dense, very moist, medium to dark grayish brown clayey SAND (SC).	WA MAX
5			7			CL	Qsw	Stiff, moist, medium grayish brown sandy CLAY (CL).	WA, MD AL
						SC	Qsw	Dense, moist, medium to dark brown, fine to medium-grained clayey SAND (SC).	
10			20				BP_1		WA
								? ? ? ? ?	
							BP_2	Based on cross-section correlations.	
15									
									WA
			26				BP_3	Dense, saturated, medium gray and brown, fine to medium-grained clayey SAND (SC).	
20								Total Depth 20' Groundwater Observed at 18'	
25									

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1441 MONTIEL ROAD SUITE 115 | ESCONDIDO CA 92026 | 760 747 4988

PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 1
CTE JOB NO:	10-8264G	DRILL METHOD:	TRIPOD DRILL RIG	DRILLING DATE:	2/9/2006
LOGGED BY:	STEVE H.	SAMPLE METHOD:	BULK AND RING	ELEVATION:	~23

BORING: B-2

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC	Fill	Medium dense, moist, medium yellowish brown fine to medium-grained clayey SAND (SC).	
						CL	Qsw	SLOPEWASH (Qsw): Stiff, moist, medium brown sandy CLAY (CL).	
5			10						EI CHEM
									MD
								? ? ? ? ?	
10			12				Qsw BP$_1$		
						SC	BP$_2$	Medium dense, moist, medium to dark brown fine to medium-grained clayey SAND (SC).	
15			22						
			27				BP$_2$	Dense, saturated, medium grayish brown, fine to medium-grained clayey SAND (SC).	
20								Total Depth 19' Groundwater Not Observed	
25									

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 2
CTE JOB NO:	10-8264G	DRILL METHOD:	TRIPOD, SOLID STEM	DRILLING DATE:	10/2/2006
LOGGED BY:	D. RIES	SAMPLE METHOD:	BULK AND CONTINUES SPT	ELEVATION:	17.5

BORING: B-3

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0						CL		0-0.3' TURF: 0.3'-1.5': Soft, very moist, (irrigation), grayish brown fine sandy CLAY (CL) with silt, fine roots.	Hand Augered to 1.5 feet
			3			SC	Fill	1.5'-2.5': Soft to loose, moist to very moist, grayish brown clayey fine SAND (SC) with thin rootlets, occasional fine gravel, (possible fill). 2.5'-3': Soft, moist, yellowish grayish brown, CLAY (CL), trace fine sand, no roots, pinholes, porous.	EI
			5					3'-3.3': Continues soft to loose, moist to very moist, clayey fine SAND (SC) with thin rootlets, occasional fine gravel, (possible fill).	
5			4			CL		3.3'-6': Soft, moist, yellowish gray brown, CLAY (CL), trace fine sand, no roots, pinholes porous.	
			7				Qsw	6'-7': medium stiff, moist, yellowish gray brown CLAY (CL), at 7' becomes dark brown, less porous.	GA AL
							Qsw		
			10				BP_1	8.5'-10': Stiff, moist, dark yellow, gray, brown, orange, mottling, silty CLAY (CL) with trace fine to medium grained sand, scattered coarse grains, and organics.	
10			14					10'-11.5': Stiff, moist, mottled dark gray, brown, with dark orange brown blotches, silty CLAY (CL), with fine sand, scattered medium to coarse sand, trace fine gravel.	
			8			CL	BP_2	11.5'-15': Increasing sand content, grading to fine sandy CLAY (CL), mottled.	
			10						
15			18					15'-16.5': Becomes very stiff.	
					▼			Groundwater at 17'	
			12					17'-18.5': Stiff, wet, mottled dark reddish brown and dark gray dark brown, fine sandy CLAY (CL).	
			17			CL-SC	BP_3	18.5'-20': Grades to very stiff to medium dense, wet, mottled gray brown, orange brown, sandy CLAY to clayey fine SAND (SC), with medium to coarse grains.	
20			24			CL-ML		20'-21.5': Very stiff, wet, mottled gray, gray orange brown sandy silty CLAY to clayey sandy SILT.	GA
			18			SM	BP_4	22'-24': Medium dense, wet, yellowish brown, silty fine SAND (SM) with CLAY.	
			24			SP		24'-24.5': Medium dense, wet, dark brownish gray, SAND (SP), silt to clay, fine to medium grained, at 24.2' a 1/2" thick clay trace layer.	
25									

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	2 of 2
CTE JOB NO:	10-8264G	DRILL METHOD:	TRIPOD, SOLID STEM	DRILLING DATE:	10/2/2006
LOGGED BY:	D. RIES	SAMPLE METHOD:	BULK AND CONTINUES SPT	ELEVATION:	17.5

BORING: B-3

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
25			38			SP-SM		25'-26.5': Dense, wet, dark brown gray and black poorly graded, SAND with silt (SP-SM), fine to medium grained with occasional coarse sand grains, light and dark laminations.	GA
			16					26.5'-27.8': Becomes medium dense.	
			9			SM		27.8'-28': Medium dense, wet, brown silty SAND (SM).	
						SP-SM		28'-29': Medium dense, wet, dark brown, gray, black, poorly graded SAND with silt (SP-SM).	
30						SP		29'-29.5': Loose, wet, brown silty SAND (SM).	
			46					30.5': Dense, wet, grading from last sample to yellow gray clean medium grained SAND (SP).	
			40					32': Dense, wet, yellow, gray, SAND (SP).	
35								Total Depth 33.5'	
								Groundwater at 17'	
								Backfill with Bentonite	
40									
45									
50									

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 1
CTE JOB NO	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S.C.	SAMPLE METHOD:	SPT	ELEVATION:	17.5

BORING: B-4

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0									
			4			CL	Fill	0-0.3' TURF: 0.3'-1.5': Soft, very moist, gray brown fine sandy CLAY with silt and roots. 1.5'-2.5': Same as above.	
			3			CL	Qsw	3': Soft, moist, yellow, gray, brown, black silty CLAY (CL), lots of roots, weak laminations. Becomes mottled yellow, gray, brown silty CLAY with small roots, porous.	AL
5			4					5'-7.5': Soft, moist, mottled yellow, gray, brown silty CLAY with small roots, porous.	
			5			ML		7.5'-8': Medium stiff, moist, gray brown clayey SILT (ML) with rootlets, porous.	
			8			CL	Qsw BP_1	8'-9.5': Stiff, moist, mottled faint orange to orange tint, dark brown, gray silty CLAY, porous, with sand (increasing content with depth).	
10			7		▽			9.5'-11': Medium stiff, moist, dark gray with light gray brown patches silty CLAY with fine to medium grained sand, porous, noroots, small concretions of fine orange SAND.	
			12					11': No recovery	
			12				BP_2	13'-14': Stiff, moist, mottled orange, reddish brown, gray, dark gray with black abundant organics, silty CLAY. 14'-14.5': Hard clay seam with stiff, moist, orange gray silty CLAY.	
15			17			CL		15'-16.5': Very stiff, moist, mottled dark brown, dark red, dary gray red brown, black silty CLAY with trace sand, organics, roots, black root casts.	
			17			ML-CL		17'-18.5': Very stiff, moist, mottled dark brown dark red, dark gray red brown, gray, silty CLAY to clayey SILT with sand.	
			24			SM-ML		18.5'-20': Very stiff, slightly moist, mottled reddish, light brown, gray silty CLAY to sandy SILT and small red inclusions.	
20			16			SC	BP_3	20'-20.5': Very stiff to stiff to medium dense, moist, orange brown, brown gray sandy CLAY to clayey SAND with organic fragments. 20.5'-21.5': Pockets of gray sandy CLAY occasional fine gravel, root casts.	
			23		▽	SP-SM SC	BP_4	21.9'-22.5': Dense, wet, black, gray, yellow SAND (SP) with silt. 22.5'-23': Dense, wet, yellow, gray, brown, black clayey SAND (SC).	
25								End of Boring at 23' Perched Groundwater at 11' Groundwater observed during drilling at 22'	

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 1
CTE JOB NO:	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S.C.	SAMPLE METHOD:	SPT	ELEVATION:	20.5

BORING: B-5

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0								Cored Cement	
			7			CL	Fill	1.5'-2.75': Medium stiff, moist, yellow gray brown, silty CLAY with trace sand, no roots, porous.	
			12				Qsw	3'-4.5': Medium stiff, moist, gray brown CLAY, non-porous, with carbonate.	
5			8			CL		5.5'-7.5': Stiff, moist, yellow brown silty CLAY with fine to medium grained sand, occasional coarse black grains, faint laminations.	HA
			11			ML	Qsw	7.5'-8': Stiff, moist, red brown clayey SILT with trace sand.	
							BP_1		
10					▽			Groundwater at 13'	
			16			CL-SC	BP_2	13'-14.5': Very stiff, slightly moist, mottled orange gray brown sandy CLAY to clayey SAND with layers of red brown sandy SILT.	
15			18					15.5'-17': Very stiff, slightly moist, mottled orange brown gray with areas of red brown sandy CLAY to clayey SAND and coarse black grains organics.	
			34			CL		18.5'-20': Hard, slightly moist, mottled red, gray, brown, sandy CLAY lots of coarse black grains, roots near 20'.	
20								Total Depth 20' bgs Groundwater Observed 13' bgs	
25									

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 2
CTE JOB NO:	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S C.	SAMPLE METHOD:	SPT	ELEVATION:	24.5

BORING: B-6

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0						SM		0-0.33': Medium dense, slightly moist, yellow gray silty fine to medium SAND (SM).	
						ML		0.33'-0.5': Becomes red brown.	
						CL	Fill	0.5'-2.5': Slightly moist, brown SILT with clay (ML), occasional roots.	
								2.5': Moist, yellow brown CLAY with fine SAND.	
			4					3'-4.5': Stiff, moist, mottled yellow gray brown, fine to medium sandy CLAY, porous, visible bedding.	
5			5				Qsw	4.5'-6': Medium stiff, slightly moist, mottled yellow gray, CLAY, occasional rootlets.	
			11					6'-8': Becomes stiff.	
			11				Qsw	8'-9': Stiff, slightly moist, dark gray light gray brown, fine sandy CLAY with occasional pebbles and coarse grain size charcoal.	
10			14				BP_1	9'-10.5': Stiff, moist, dark gray brown, silty CLAY with trace sand.	
			16			ML		11'-12.5': Very stiff, moist, brown to black, abundant organics, sandy SILT to sandy CLAY.	
						ML/CL			
			17				BP_2	12.5'-17' Very stiff, moist, mottled dark brown, reddish orange brown, dark gray, orange gray, brown siltyCLAY to clayey SILT with trace sand and oxidized orange red coarse sand grains.	
15			21			CL-SC			
			17						
					▼	SC		18'-19.5': Very stiff, wet, mottled dark gray dark red orange gray, clayey SAND with organics.	
			21						
20			32					20'-21.5': Becomes hard.	
						CL	BP_3	22'-23': Hard, moist, mottled orange brown, gray, black with organics, sandy CLAY with red oxidized coarse pebbles.	
			25			SM		23': Medium dense, wet, gray silty fine to coarse silty SAND with	
							BP_4	clay lense.	
							BP_3	24.5'-25.5': Stiff, slightly moist, mottled orange gray brown, black	
25			26					organics, sandy CLAY with bright red coarse grains.	

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	2 of 2
CTE JOB NO	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S.C.	SAMPLE METHOD:	SPT	ELEVATION:	24.5

BORING: B-6

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
25									
			22			CL	BP_3	26'-27.5': Medium dense, moist, mottled orange brown, brown gray, sandy CLAY with black organics.	
			44			SC	BP_4	28'-28.75': Very dense, wet, mottled orange black brown, clayey SAND.	
30			49			SP-SM		28.75'-29.5': Very dense, wet, black yellow clayey medium grained SAND with occasional pebbles. 29.5'-31.5': Very dense, wet, black yellow clayey medium grained, poorly graded SAND (SP-SM) with SILT and occasional fine gravel.	GA
35			54					@ 35' Becomes very dense.	
								End of Boring at 36.5' Groundwater Observed during Drillat at 18' and 23'	
40									
45									
50									

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1441 MONTIEL ROAD SUITE 115 | ESCONDIDO, CA 92026 | 760.746.4955

PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 2
CTE JOB NO.	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S C.	SAMPLE METHOD:	SPT	ELEVATION:	-23.5

BORING: B-7

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0						CL		0-1.5': Excavates medium stiff, moist, yellow gray brown, fine to medium-grained sandy CLAY (CL).	
						SC	Fill	@ 1.5' Clayey SAND (SC).	
						CL		@ 2' Sandy CLAY (CL).	
			6					2.5'-4': Medium stiff, moist, yellow gray CLAY with roots, trace sand.	
								Medium stiff, moist, yellow gray CLAY with carbonate.	
5							Qsw	5'-6.5': Becoming brown with depth.	
			5						
								? ? ? ? ?	
							Qsw BP1		
10					▼	SC		10'-11.5': Loose, wet, yellow gray brown, with black organics clayey fine to coarse SAND with pebbles, and red coarse grains.	
			7						
			7					11.5'-13': Loose, moist, yellow brown sandy SILT with organics.	
								? ? ? ? ?	
15							BP2		
						CL			
			21					18'-19.5': Medium dense, moist, mottled dark red, brown, gray sandy CLAY with red coarse grains.	
20			18						
							BP3	20.75'-21': Stiff, moist, mottled orange brown, gray, orange brown clayey sandy SILT to sandy CLAY.	
						ML-CL			
25									

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GEOTECHNICAL : CONSTRUCTION ENGINEERING TESTING AND INSPECTION
1441 MONTIEL ROAD, SUITE 115 : ESCONDIDO, CA 92026 : 760 746 4955

PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	2 of 2
CTE JOB NO:	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S.C.	SAMPLE METHOD:	SPT	ELEVATION:	-23.5

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	BORING: B-7 DESCRIPTION	Laboratory Tests/Comments
25			18		▼	CL-SC		Medium dense, moist to wet, mottled yellow gray brown with black organics.	
								Dug to 30', caved in up to 24'	
30								End of Boring at 30' Peached Groundwater at 10' Groundwater Observed during drilling at 25'	
35									
40									
45									
50									

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 1
CTE JOB NO:	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S.C	SAMPLE METHOD:	SPT	ELEVATION:	21 8

BORING: B-8

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0									
			8			SC ML CL	Fill	UNDOCUMENTED FILL: 0.5': Loose, dry, light brown clayey medium grained SAND. 0.5'-1': Soft, slightly moist, brown, SILT. 1'-2.5': Stiff, slightly moist, brown silty CLAY with occasional fine gravel.	
			5				Qsw	2.5'-3': Medium stiff, slightly moist, mottled yellow gray, brown silty CLAY with roots, occasional black organics, carbonate stringers.	
5									
			5						
			8				Qsw	7.5'-8': Stiff, moist, yellow brown, CLAY, occasional organics. 8'-9': Stiff, moist, brown CLAY with silt.	
			8				BP_1	9'-10.5': Stiff, moist, yellow gray CLAY with sand and organics.	
10									
			18			CL		10.5'-11.75': Very stiff, moist, brown, sandy fine to medium CLAY.	
						CL	BP_2	11.75-17': Very stiff, moist, mottled orange, gray, brown with black organics sandy CLAY.	
15									
			17					17-17.75': Medium dense, moist, mottled orange, gray, brown, black organics clayey SAND.	
			12			CL		17.75'-18.5': Very stiff, slightly moist, mottled dark gray, dark reddish brown sandy CLAY. 18.5': Becomes stiff.	GA
20									
					▼		BP_3		
						SC		23'-24.5': Hard medium dense, moist to wet, mottled orange, gray, brown clayey fine to medium-grained silty SAND.	
			16						
25							BP_4	24.5.5-26': Medium dense, wet, mottled orange, gray, brown, black clayey sandy SILT to fine to coarse-grained silty SAND with silt layers/patches.	
			16						
								End of Boring at 26' Observed Groundwater at time of Drilling 22.4'	

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 2
CTE JOB NO:	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S.C.	SAMPLE METHOD:	SPT	ELEVATION:	22

BORING: B-9

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0									
			7			CL	Fill	1'-2.5': Medium stiff, moist, yellow brown sandy CLAY with fine gravel.	
			4					2.5'-4': Becomes soft.	
5			12					4'-5.5': Stiff, slightly moist, yellow gray, fine sandy CLAY.	
			7			CL	Qsw	5.5'-7': 0.75' Becomes medium stiff.	
10			10			CL	BP_1	10'-13': Stiff, slightly moist, orange to dark brown, with black organics, sandy CLAY.	
			12						
								? ? ? ? ?	
15							BP_2	Upper BP_2 contact based on cross-section intrpretation.	
			27					18'-19.5': Very stiff, moist, mottled dark red brown with, black organics fine sandy CLAY.	
20			28			CL-SC		19.5'-21: Very stiff, moist, dark red brown, with black organics fine sandy CLAY to clayey SAND.	
						CL		21'-21.5': Very stiff, moist, mottled orange, dark red brown, with black organics fine sandy CLAY.	
			30		▼	SC		21.5'-22.5': Dense, wet, mottled, orange gray brown, clayey SAND, with red coarse grain-fine gravel size inclusions.	
25									

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	2 of 2
CTE JOB NO:	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S.C.	SAMPLE METHOD:	SPT	ELEVATION:	22

BORING: B-9

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
25								21.5'-22.5': Dense, wet, mottled, orange gray brown, clayey SAND, with red coarse grain-fine gravel size inclusions.	
			25			SC		27.5'-29': Very stiff, wet, light brown, gray, with black organics sandy CLAY with silt. Approaching silty SAND with clay. ~ 30' Cave in	
30								Total Depth 30' Groundwater Observed during Drilling at 22'	
35									
40									
45									
50									

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 1
CTE JOB NO:	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S.C.	SAMPLE METHOD:	SPT	ELEVATION:	23.5

BORING: B-10

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0									
			7			CL	Fill	1'-2.5': Medium stiff, moist, brown sandy SILT to silty SAND, with roots with coarse oxidized red grains	
			11				Qsw	3': Stiff, moist, yellow brown sandy SILT with CLAY.	
5									
			7			SC		6.5'-6.75': Medium stiff, moist, yellow brown gray, clayey fine to medium grainded SAND, with trace fine gravel.	
			9			CL		6.75'-7': Stiff, moist, gray brown fine sandy CLAY to sandy SILT.	
								7.5'-9': Becomes yellow brown.	
10			12			CL		9'-10.5': Stiff, moist, mottled yellow gray brown, fine sandy CLAY occasional black organics.	
			18				BP_1	10.5'-12': Very stiff, moist, slightly mottled dark brown to brown with distinctive orange fine gravel and black organics, sandy CLAY.	
								? ? ? ? ?	
							BP_2		
15							BP_4		
			14			CL		18-19.5': Stiff, slightly moist, mottled dark brown dark red brown gray with black organics, sandy CLAY.	GS AL
20			19					19.5'-21': Becomes increasing organic precentage very stiff.	
			16					21'-22.5': Less organics.	
					▼	CL	BP_3	Medium dense, wet, mottled, orange, dark red brown fine sandy CLAY.	
			15			SC	BP_4	23'-24.5': Medium dense, wet, orange, gray black clayey medium grained SAND.	
25									

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 1
CTE JOB NO:	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S.C.	SAMPLE METHOD:	SPT	ELEVATION:	~14.5

BORING: B-11

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0									
			2			SC	Fill	SLOPEWASH: 1'-2.5': Wet, brown clayey fine SAND with gravel.	
			2					2.5'-4': No recovery.	
5			6				BP_1	4'-5.5': Medium stiff, moist, brown to mottled orange brown black, organics, fine sandy CLAY, last two inches are medium stiff, moist, dark brown	
			5			CL		CLAY. 5.5'-6.25': Medium stiff, moist, mottled light to dark gray brown sandy CLAY with black organic fragments (charcoal).	
			9					7'-8': Medium stiff, moist, mottled dark gray, brown with black organics, sandy CLAY, trace coarse sand and pebbles.	
						SC-CL		8'-8.5': Stiff, moist, dark brown sandy CLAY, to clayey SAND with coarse orange grains	
			18			CL		8.5'-9.5': Stiff to very stiff, moist, mottled brown to orange brown sandy CLAY with coarse orange grains and with wood chips.	
10			11				BP_2	9.5'-10': Very stiff, moist, heavily mottled orange reddish brown sandy CLAY with fine gravel.	
			13					10'-13': Stiff, moist, mottled dark brown orange brown, dark gray sandy CLAY, with abundant black organics.	
			13					13'-14.5': Stiff, moist, mottled dark reddish brown, dark brown, gray sandy CLAY, with black organics	
15			17			CL-SC		14.5'-16': Very stiff, moist to wet, mottled dark brown, dark red, orange gray brown with black organics, sandy CLAY, with coarse red grains.	
			16			SC	BP_3	16'-19.5': Grades to stiff to very stiff, mottled orange brown, brown, gray, clayey SAND.	
			11						
20						SC	BP_4	Hole cave back to 10'. Clayey sands at bottom.	
								End of Boring 20.5' Groundwater Observed during Drilling at 14.5'	
25									

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 1
CTE JOB NO:	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S C	SAMPLE METHOD:	SPT	ELEVATION:	~17.5

BORING: B-12

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0						SC	Fill	0-1.8': Loose, moist, orange brown clayey fine to medium SAND with small roots. @ 1.8': Loose, moist, gray brown clayey fine SAND. 2'-2.5': Soft, slightly moist, yellow brown clayey fine SAND with roots.	
			3					2.5'-3.5': Very soft, moist, yellow gray clayey fine to coarse SAND with gravel and roots (orange oxidation on gravel).	
			5			CL	Qsw	4'-7': Medim stiff, slightly moist, yellow gray fine sandy CLAY, black root casts.	
5			9			CL-SC		7'-7.5': Medium stiff, moist, brown to spotty yellow sandy CLAY to clayey SAND.	
			14			CL	Qsw / BP_1	7.6'-9': Stiff, moist, mottled yellow orange, gray-brown fine sandy CLAY with occasional coarse sand grains and black organics, roots.	
			9		▼	CL	BP_1	9'-9.5': Stiff, moist to wet, dark brown with brick red grains silty CLAY with sand.	
10			18			CL	BP_2	10.5'-12.5': Very stiff, moist, mottled brown, orange gray sandy CLAY.	
			18				BP_2	12.5': Very stiff, slightly moist, red brown clayey SAND to sandy CLAY.	
			15						
15			14			CL		15'-16.5': Very stiff to stiff, moist, mottled dark brown, dark gray to red sandy to silty CLAY with organics (charcoal) abundant organics at 15' interval.	
								End of Boring at 16.5' Groundwater Observed at 9.5'	
20									
25									

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 1
CTE JOB NO.	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE	9/3/2006
LOGGED BY:	S.C.	SAMPLE METHOD:	SPT	ELEVATION	19

BORING: B-13

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0								0-1'	
			3			SC	Fill	@ 1' Loose, slightly moist, yellow light gray, clayey SAND with micas. 1'-1.5': Very loose, slightly moist, yellow gray clayey fine to medium SAND.	
								1.5'-2.5': Very soft, slightly moist, yellow gray sandy CLAY.	
			5					3'-6': Medium stiff, slightly moist, yellow gray fine sandy CLAY with rootlets.	
5			4			CL	Qsw	4.5'-6': With carbonate.	
			5					6'-8.25': Becomes soft.	
			3						
			9				Qsw BP_1	8.25'-10': Moist, dark gray orange brown dark green, gray fine to coarse sandy CLAY, with occassional pebbles.	
10			9			CL		10.5': Stiff, moist to wet, mottled dark orange brown, light brown to dark brown, gray, sandy SILT with clay to sandy CLAY, grading downward to clayey fine to coarse-grained SAND.	
			12		▼	SC			
			20			CL	BP_2	13.5': Vert stiff, moist, mottled dark brown dark red orange gray brown sandy CLAY.	
15								End of Boring at 15' Groundwater Observed during Drilling at 13.5'	
20									
25									

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 1
CTE JOB NO:	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S.C	SAMPLE METHOD:	SPT	ELEVATION:	14.5

BORING: B-14

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0						SC	Fill	0-1' TOPSOIL: @ 1' Loose, moist, yellow gray, clayey SAND with roots.	
			2			CL		1.5'-3': Very soft, moist, yellow gray fine sandy CLAY.	
			5				Qsw	3'-3.75': Becomes soft.	
			5					3.75'-6': Medium stiff, moist, gray brown sandy CLAY.	
5			11			CL	Qsw BP_1	6'-7.25': Stiff, moist, dark gray silty CLAY with sand.	
			11					7.25'-7.5': Stiff, slightly moist, orange brown sandy CLAY. 7.5'-8': Becomes mottled orange to gray brown. 8'-9': Becomes mottled orange to gray brown..	
10			17			SC-CL	BP_2	9'-10.5': Very stiff, slightly moist, mottled red gray brown, clayey SAND to sandy CLAYwith gravel size pieces of charoal.	
								End of Boring at 10.5' Groundwater Not Observed	
15									
20									
25									

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 1
CTE JOB NO.	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S.C	SAMPLE METHOD:	SPT	ELEVATION:	~23

BORING: B-15

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0						SC	Fill	0-1.5': Loose, moist, brown, clayey SAND with roots.	
						CL	Qsw	2'-3.5': Soft, moist, yellow brown, fine sandy CLAY with roots.	
			3						
			9					3.5'-5': Medium stiff, moist, gray brown sandy CLAY with occasional charcoal.	
5			3					5'-6.5': Soft, moist, yellow gray sandy CLAY with occasional orange grains.	
			6					6.5'-8': Becomes medium stiff.	
			5						
10			9			CL-SC	Qsw	9.25'-9.5': Medium stiff, moist, dark brown, fine to coarse sandy CLAY to clayey SAND.	
						CL	BP_1	9.5'-10.25': Stiff, moist, dark brown sandy CLAY.	
						SC		10.25'-11': Stiff, moist, mottled orange ,gray, brown clayey SAND.	
								? ? ? ? ?	
15			15			CL	BP_2	15'-16.5': Very stiff, moist, mottled dark orange reddish orange dark gray, dark brown, sandy CLAY with some black charcoal fragments.	
								End of Boring at 16.5' Groundwater Not Observed during Drilling	
20									
25									

APPENDIX C

LABORATORY METHODS AND RESULTS

APPENDIX C
LABORATORY METHODS AND RESULTS

Laboratory tests were performed on representative soil samples to detect their relative engineering properties. Tests were performed following test methods of the American Society for Testing Materials or other accepted standards. The following presents a brief description of the various test methods used. Laboratory results are presented in the following section of this Appendix.

Classification

Soils were classified visually according to the Unified Soil Classification System. Visual classifications were supplemented by laboratory testing of selected samples according to ASTM D2487.

Particle-Size Analysis

Particle-size analyses were performed on selected representative samples according to ASTM D422.

Expansion Index

Expansion testing was performed on selected samples of the matrix of the onsite soils according to Building Code Standard No. 29-2.

Atterberg Limits

The procedure of ASTM D4518-84 was used to measure the liquid limit, plastic limit and plasticity index of representative samples.

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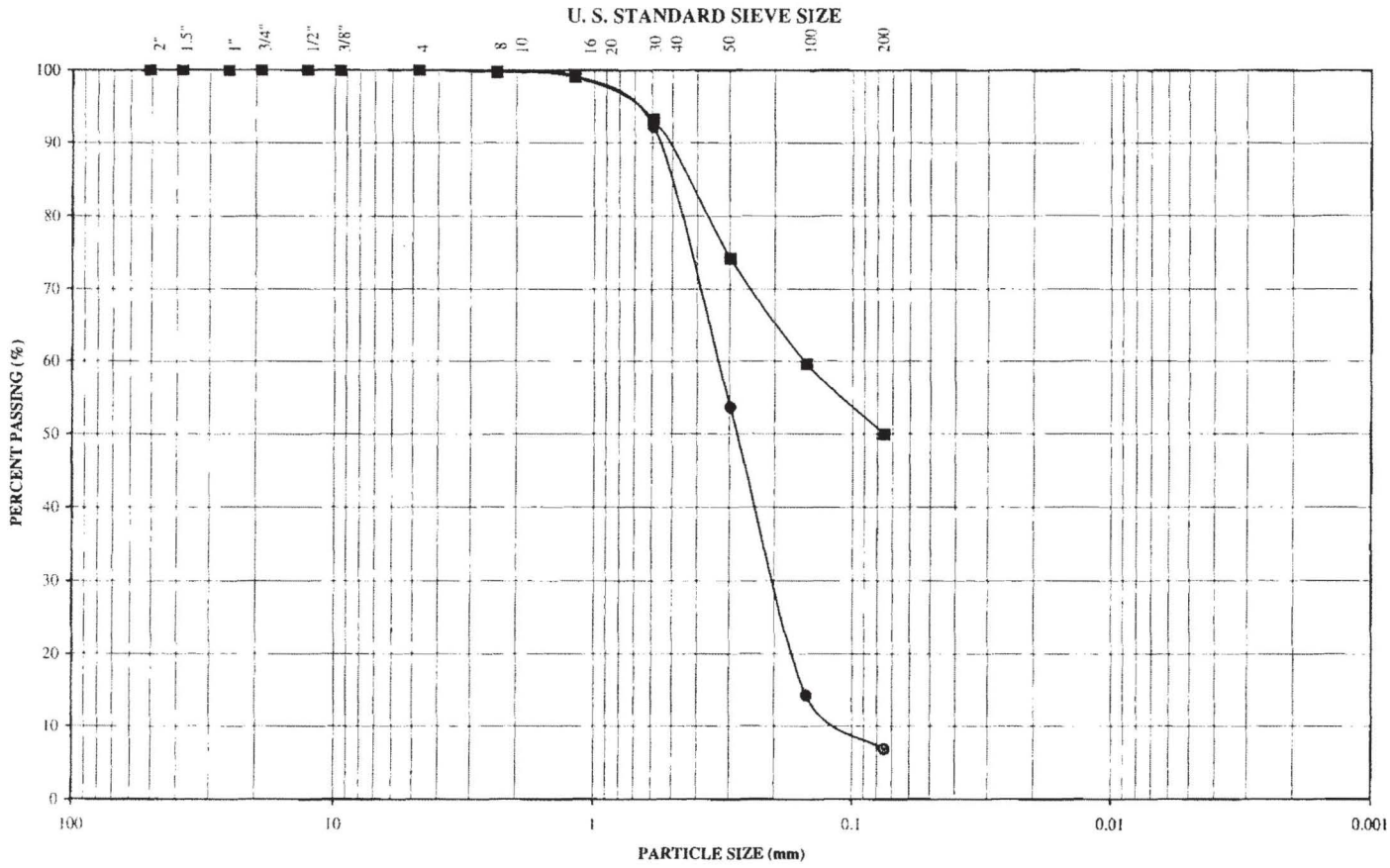
EXPANSION INDEX TEST

UBC 18-2

LOCATION	DEPTH (feet)	EXPANSION INDEX	EXPANSION POTENTIAL
B-3	2-7	41	LOW

ATTERBERG LIMITS

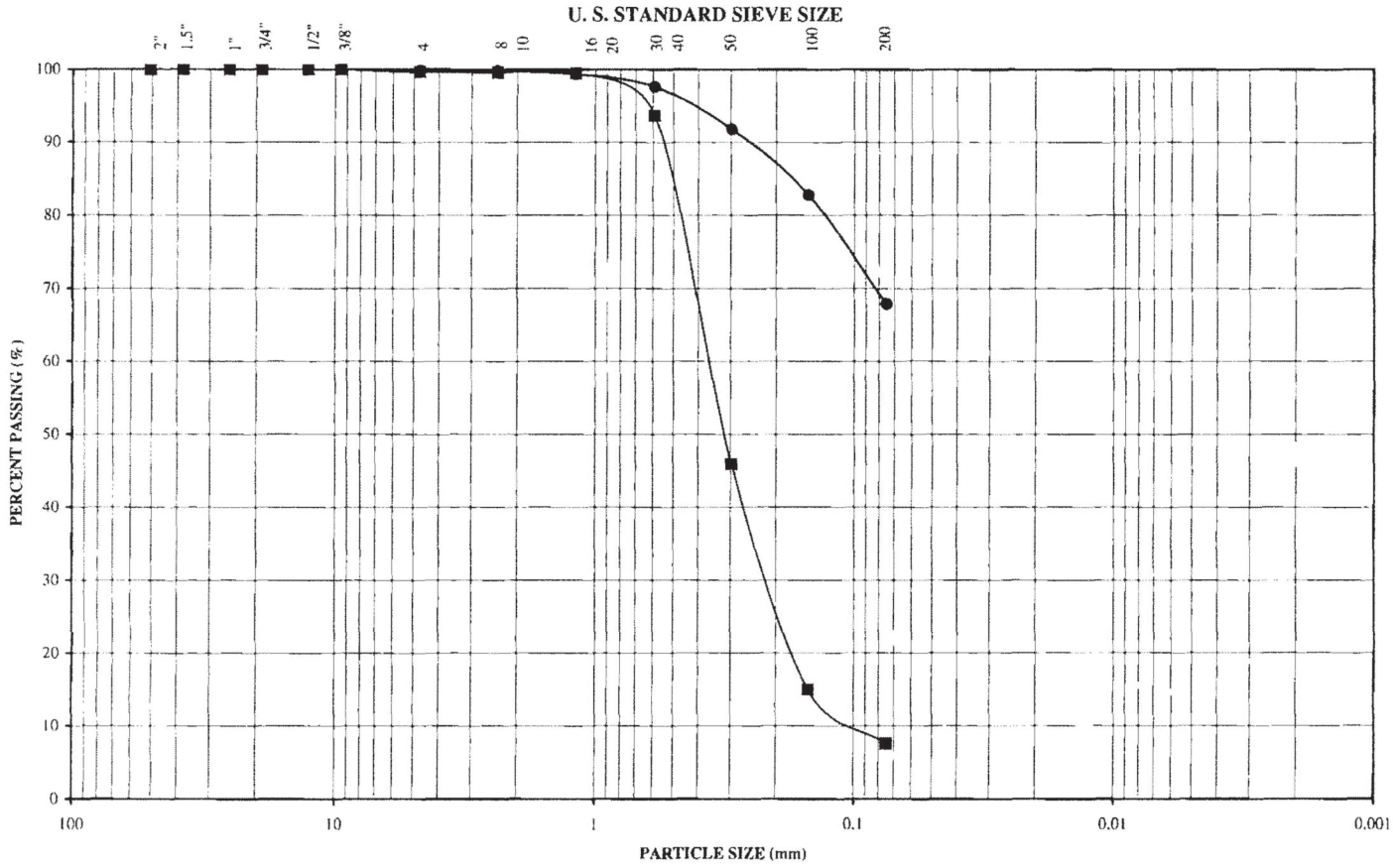
LOCATION	DEPTH	LIQUID LIMIT	PLASTICITY INDEX	CLASSIFICATION
B-3	6-7.5	37	26	CL
B-4	3-4.5	41	29	CL
B-10	18-19.5	27	16	CL



PARTICLE SIZE ANALYSIS

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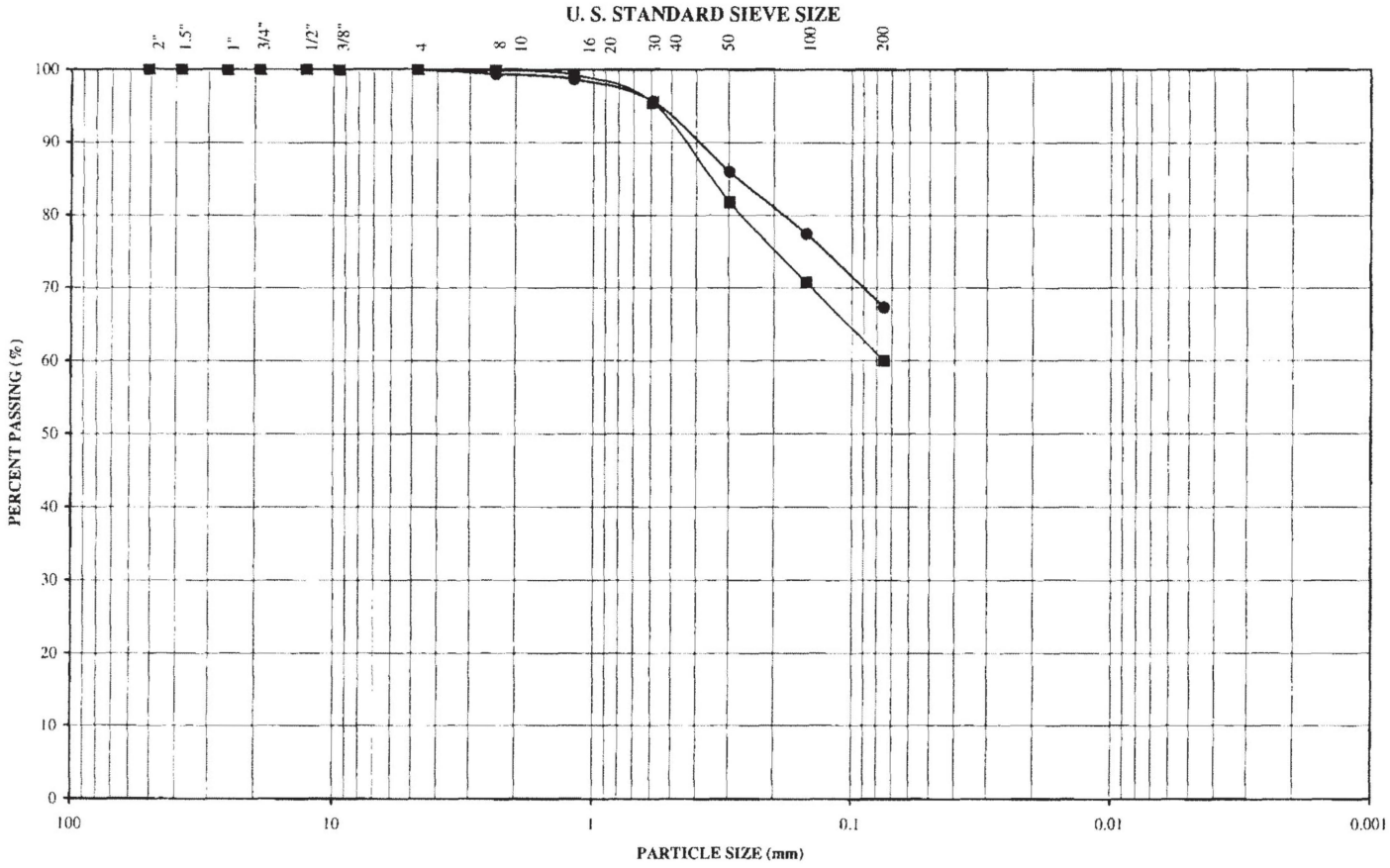
Sample Designation	Sample Depth (feet)	Symbol	Liquid Limit (%)	Plasticity Index	Classification
B-3	25-26.5	●	-	-	SP-SM
B-3	20-21.5	■	-	-	CL-SC
CTE JOB NUMBER:		10-8264G		FIGURE:	C-1



PARTICLE SIZE ANALYSIS

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Sample Designation	Sample Depth (feet)	Symbol	Liquid Limit (%)	Plasticity Index	Classification
B-3	6-7.5	●	-	-	CL
B-6	29.5-31.5	■	-	-	SP-SM
CTE JOB NUMBER:		10-8264G		FIGURE:	C-2

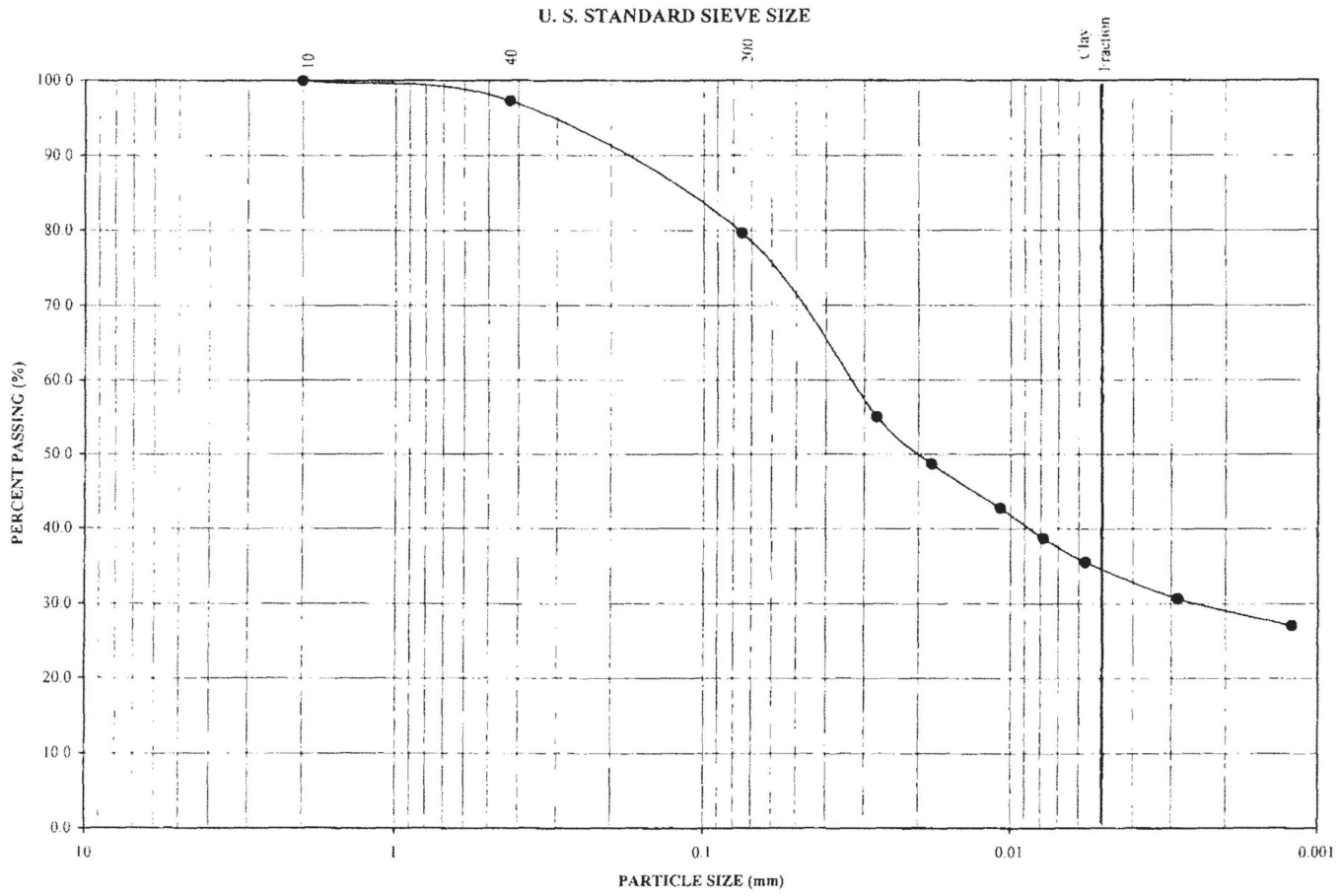


PARTICLE SIZE ANALYSIS

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Sample Designation	Sample Depth (feet)	Symbol	Liquid Limit (%)	Plasticity Index	Classification
B-8	17-18.5	●	-	-	CL
B-10	18-19.5	■	-	-	Cl
CTE JOB NUMBER:		10-8264G		FIGURE:	C-3

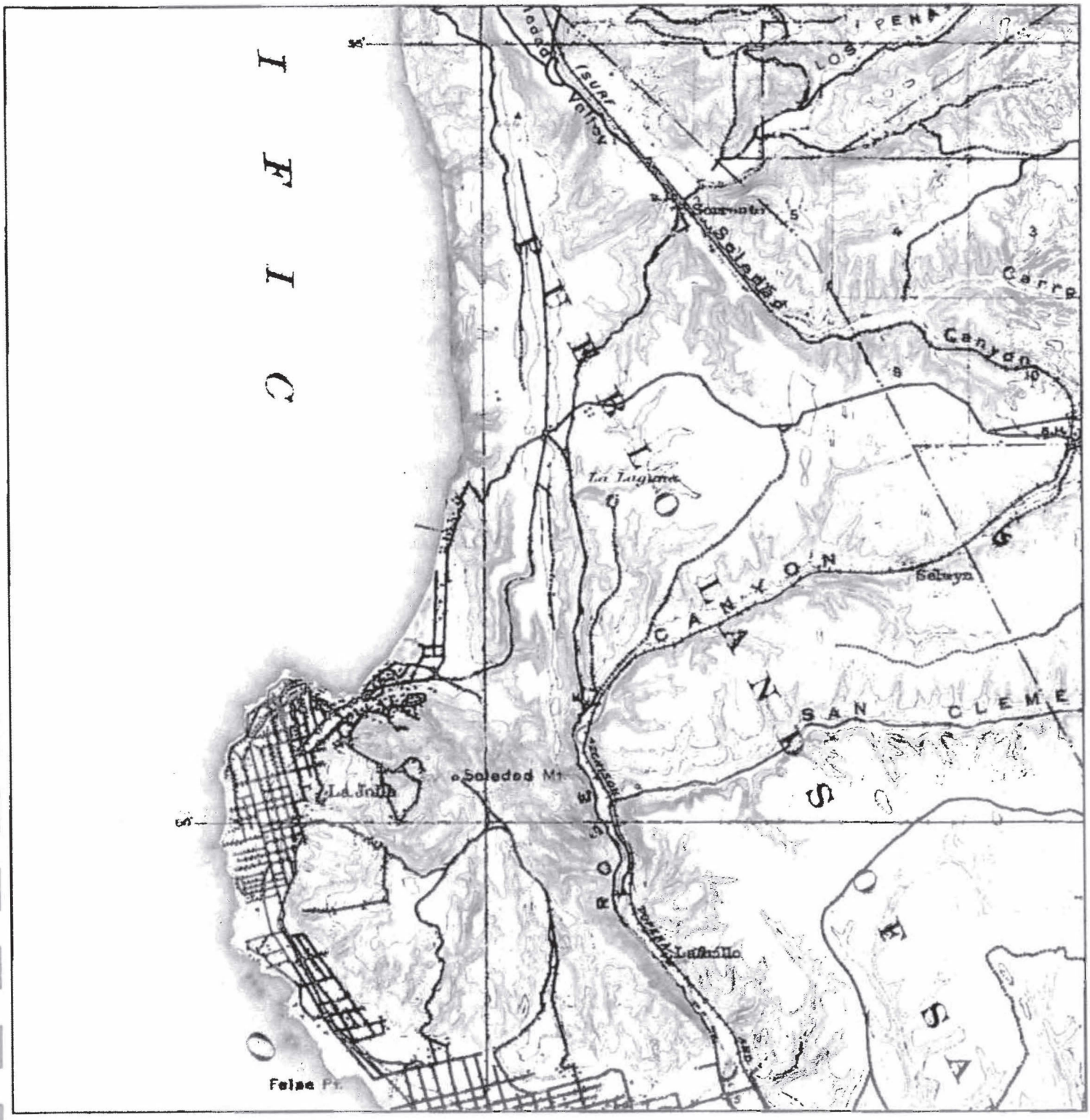
Lusardi Residence
10-8264G
Lab#16769 B5@5.5-7.0'



APPENDIX D

HISTORIC TOPOGRAPHIC MAPS

Historical Topographic Map

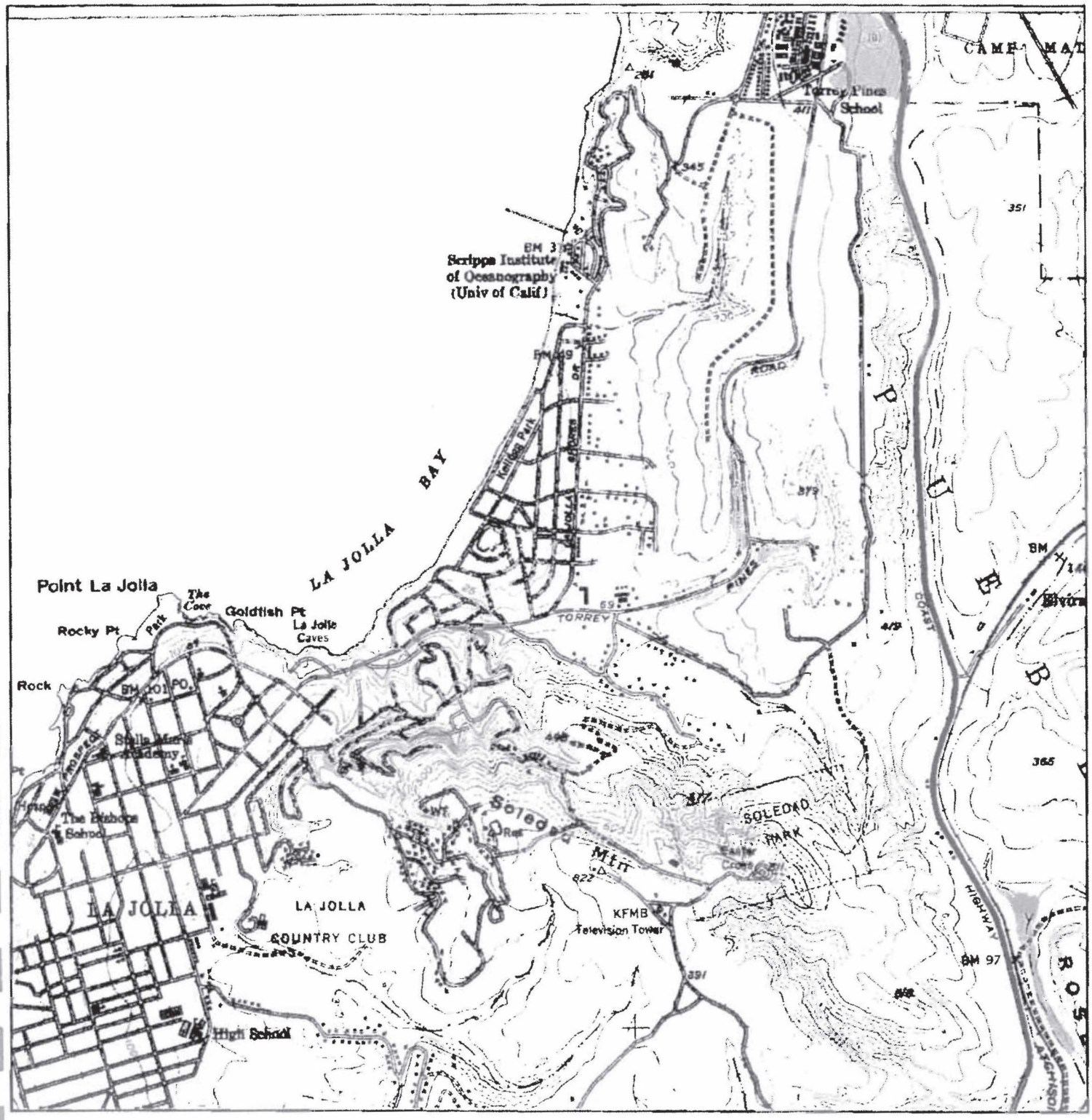


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LA JOLLA 15' QUAD. 1930
LUSARDI RESIDENCE
LA JOLLA, CALIFORNIA

CTE JOB NO.	10-8264G
SCALE	1:62500
DATE	12/06
FIGURE	D-1

Historical Topographic Map

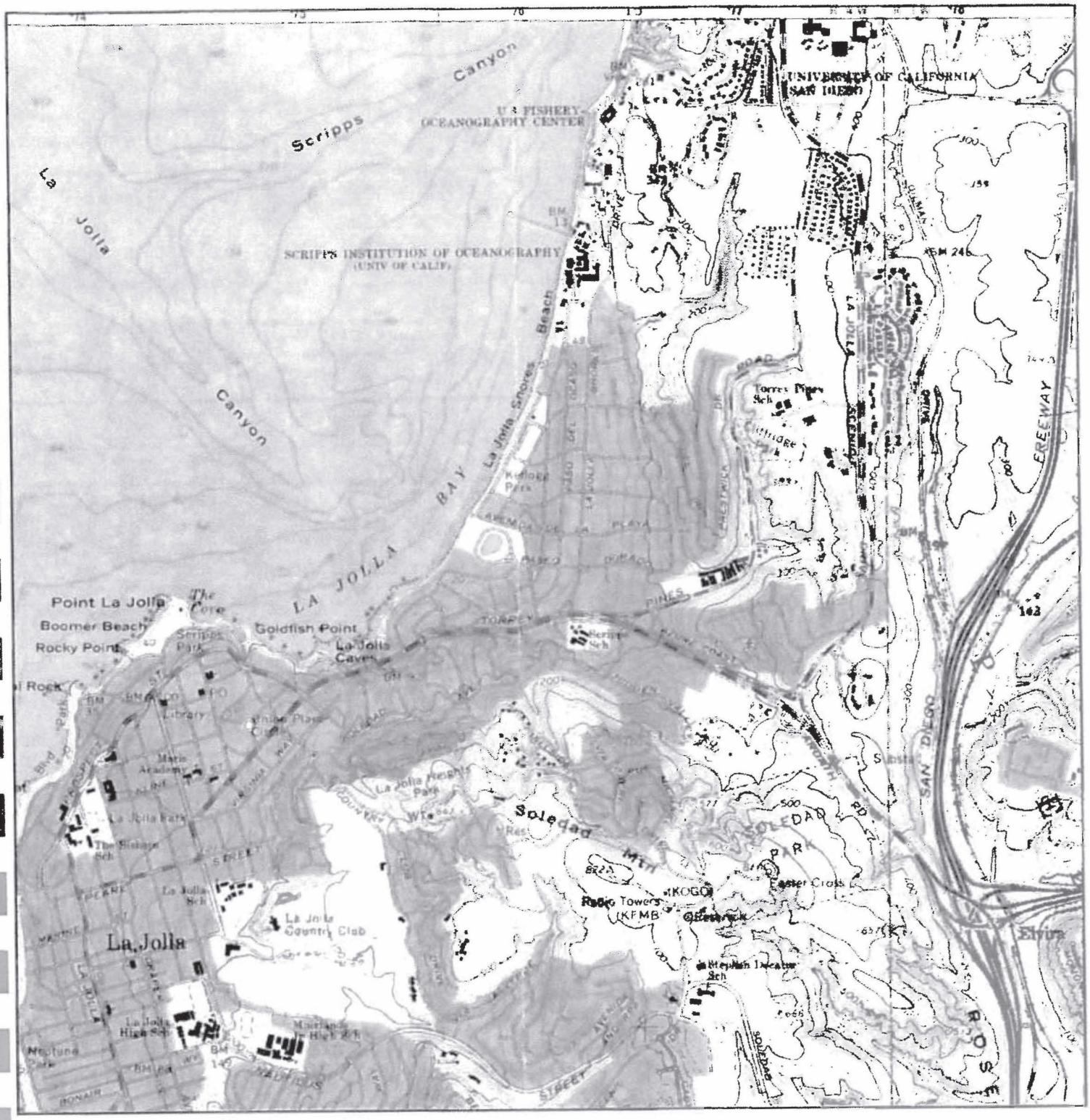


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LA JOLLA 7.5' QUAD. 1953
LUSARDI RESIDENCE
LA JOLLA, CALIFORNIA

CTE JOB NO	10-8264G
SCALE	1:24000
DATE	12/06
FIGURE	D-2

Historical Topographic Map



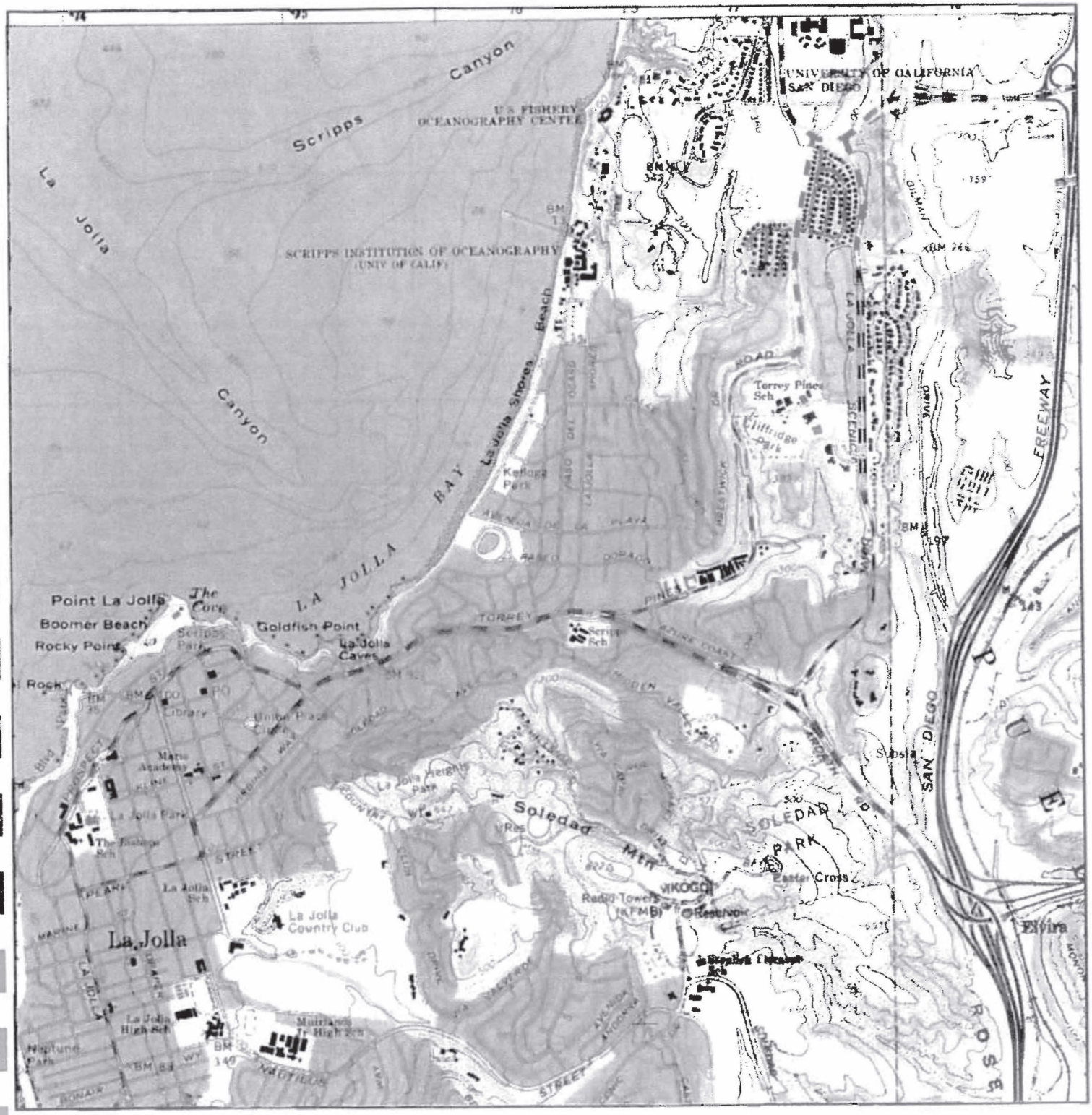


CONSTRUCTION TESTING & ENGINEERING, INC.
GEOTECHNICAL AND CONSTRUCTION ENGINEERING TESTING AND INSPECTION
1441 MONTIEL ROAD, STE 115 ESCONDIDO CA 92026 (760) 746-4955

LA JOLLA 7.5' QUAD. 1967
LUSARDI RESIDENCE
LA JOLLA, CALIFORNIA

CTE JOB NO.	10-8264G
SCALE	1:24000
DATE	12/06
FIGURE	D-3

Historical Topographic Map





CONSTRUCTION TESTING & ENGINEERING, INC.
GEOTECHNICAL AND CONSTRUCTION ENGINEERING TESTING AND INSPECTION
1441 MONTIEL ROAD, STE 115 ESCONDIDO CA 92026 (760) 746-4955

LA JOLLA 7.5' QUAD. 1975
LUSARDI RESIDENCE
LA JOLLA, CALIFORNIA

CTE JOB NO.	10-8264G
SCALE	1:24000
DATE	12/06
FIGURE	D-4

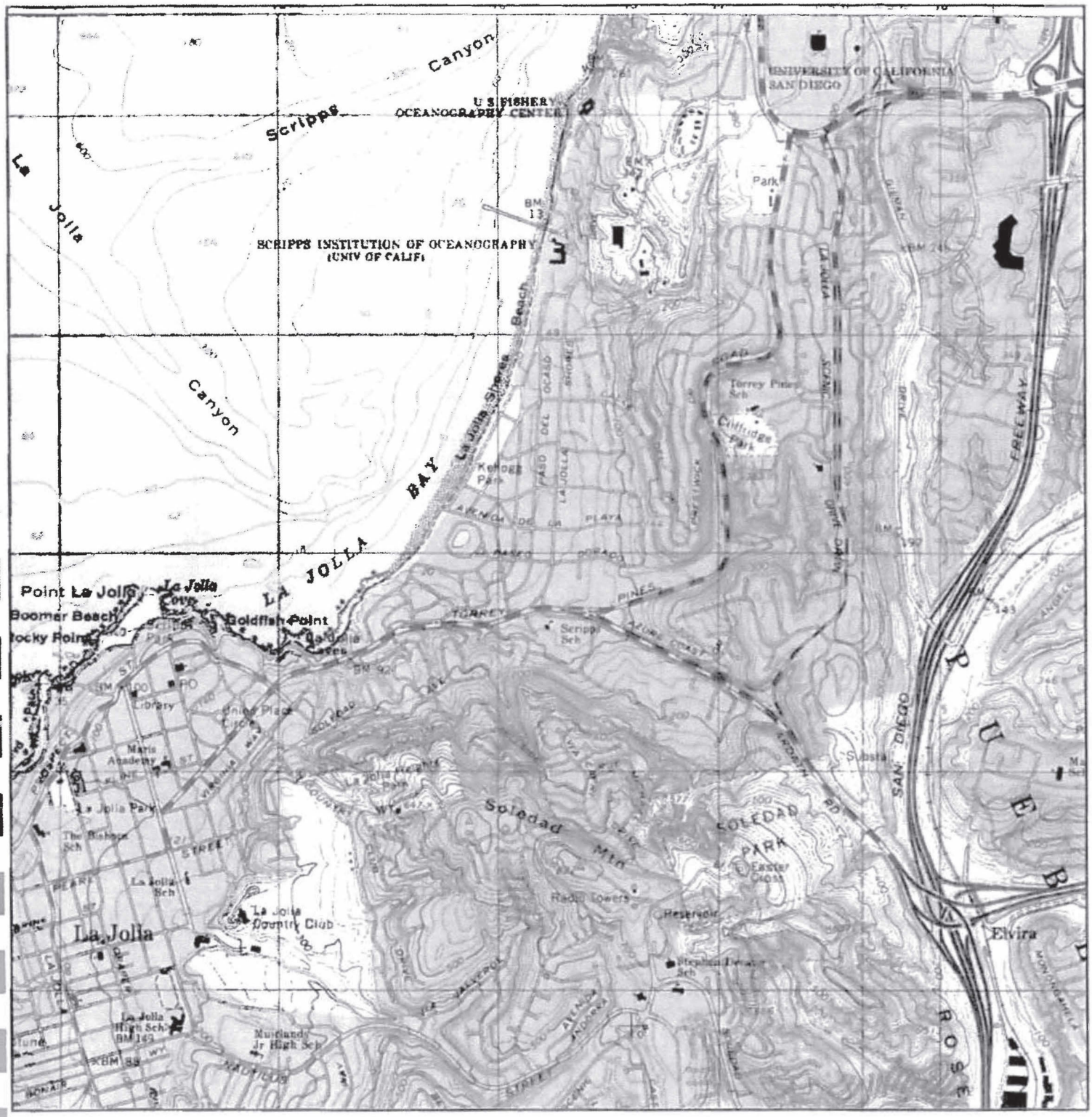


CONSTRUCTION TESTING & ENGINEERING, INC.
GEOTECHNICAL AND CONSTRUCTION ENGINEERING TESTING AND INSPECTION
1441 MONTIEL ROAD, STE 115 ESCONDIDO CA. 92026 (760) 746-4955

LA JOLLA QUAD. 1977
LUSARDI RESIDENCE
LA JOLLA, CALIFORNIA

CTE JOB NO. 10-8264G
SCALE 1:2400
DATE 12/06
FIGURE D-5

Historical Topographic Map



CONSTRUCTION TESTING & ENGINEERING, INC.
GEOTECHNICAL AND CONSTRUCTION ENGINEERING TESTING AND INSPECTION
1441 MONTIEL ROAD, STE 115 ESCONDIDO CA 92026 (760) 746-4955

LA JOLLA 7.5' QUAD. 1996
LUSARDI RESIDENCE
LA JOLLA, CALIFORNIA

CTE JOB NO.	10-8264G
SCALE	1:24000
DATE	12/06
FIGURE	D-6

APPENDIX E

CALIFORNIA COASTAL RECORDS PROJECT PHOTOGRAPHS







E–3

1979



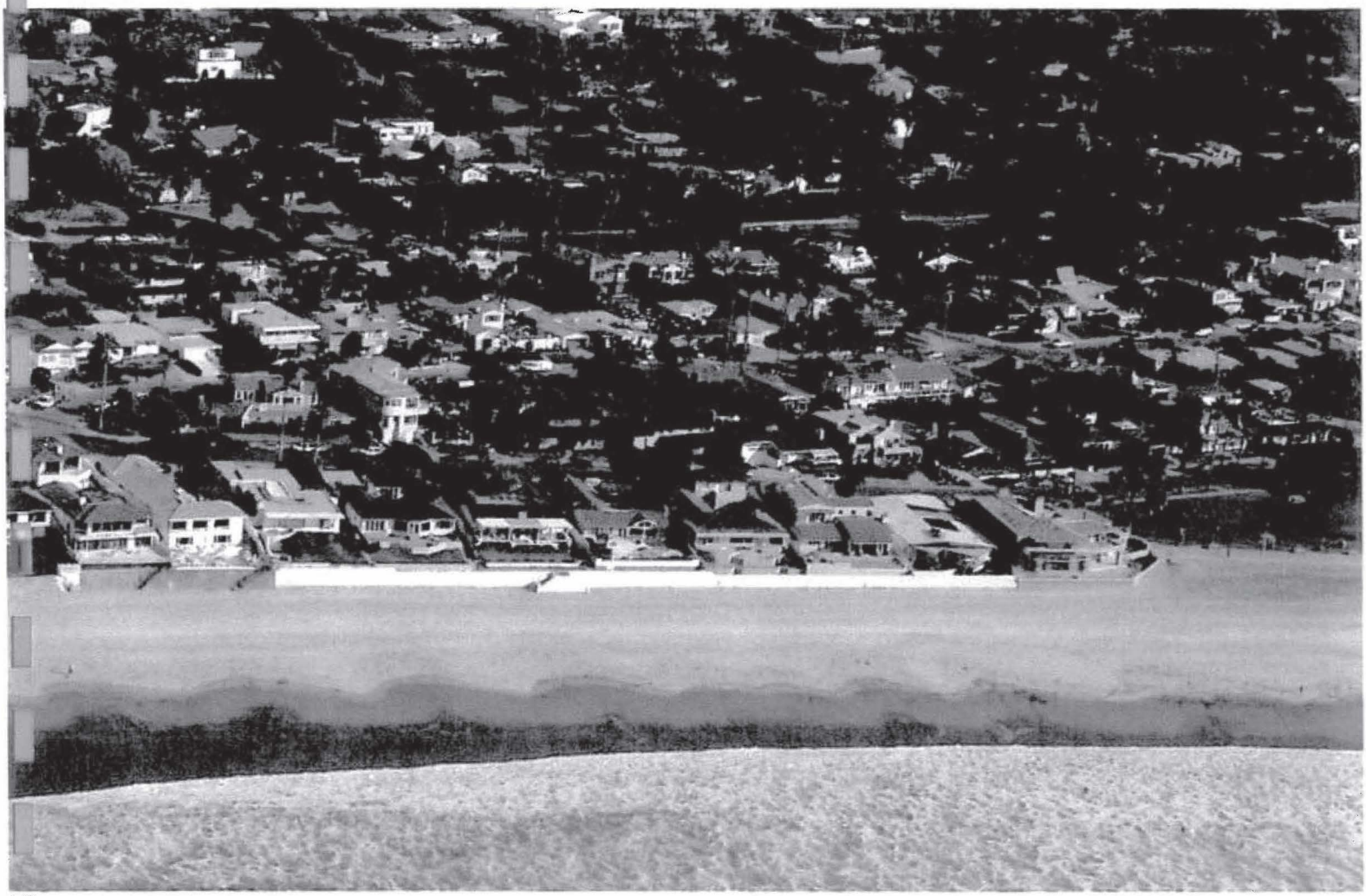
E-4

1987



E-5

1989





E–7

2004

APPENDIX F

EDR HISTORICAL AERIAL PHOTOGRAPHS

Date EDR Searched Historical Sources:

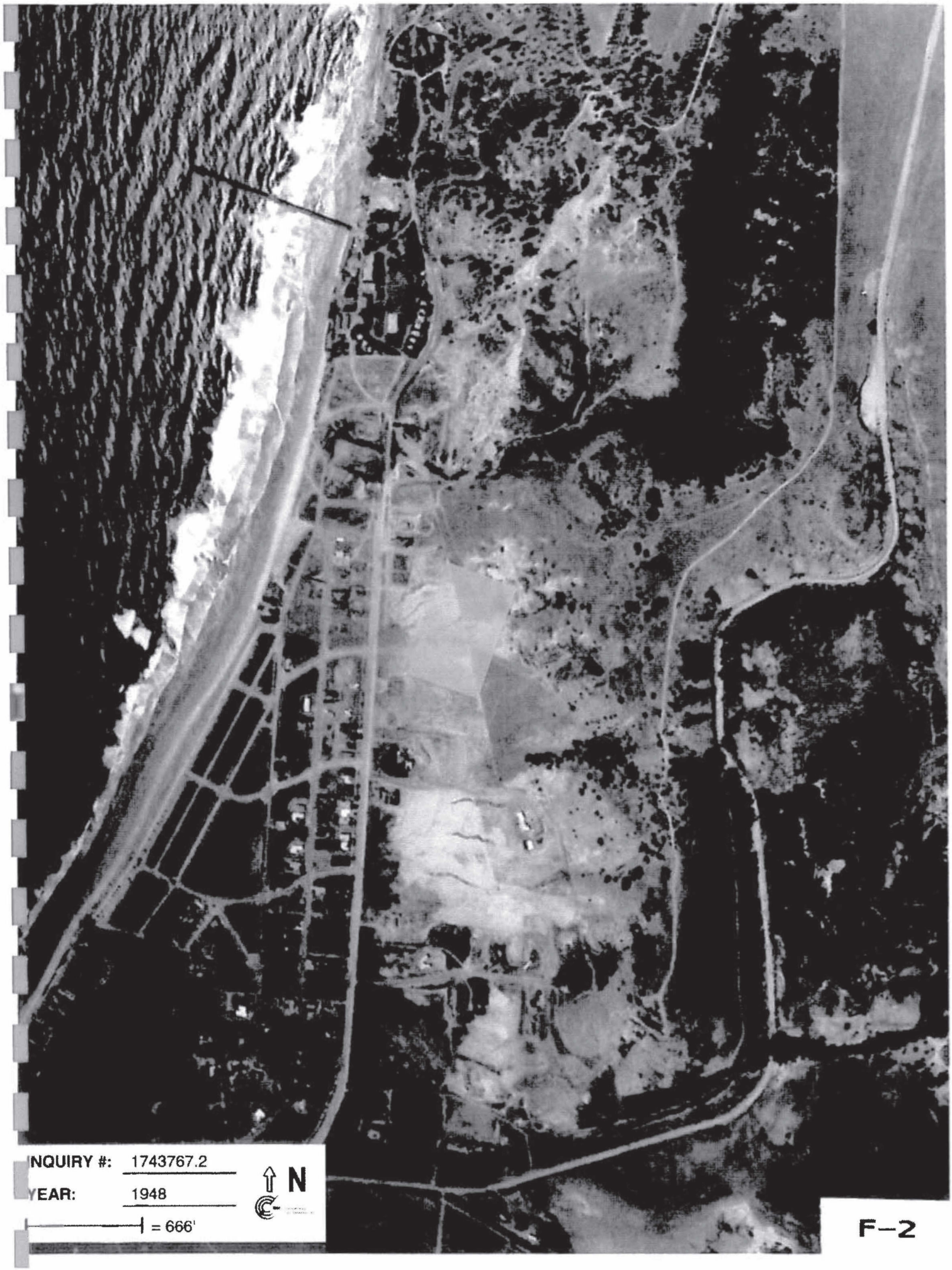
Aerial Photography August 28, 2006

Target Property:

8466 El Paseo Grande

La Jolla, CA 92037

Year	*Scale*	*Details*	*Source*
1948	Aerial Photograph. Scale: 1"=666'	Flight Year: 1948	Pacific Air
1953	Aerial Photograph. Scale: 1"=555'	Flight Year: 1953	Park
1963	Aerial Photograph. Scale: 1"=555'	Flight Year: 1963	Cartwright
1974	Aerial Photograph. Scale: 1"=600'	Flight Year: 1974	AMI
1989	Aerial Photograph. Scale: 1"=666'	Flight Year: 1989	USGS
1994	Aerial Photograph. Scale: 1"=666'	Flight Year: 1994	USGS
2002	Aerial Photograph. Scale: 1"=666'	Flight Year: 2002	USGS



F-2



F-3



F-4


INQUIRY #: 1743767.2
YEAR: 1974
= 600'
N
F-5



F-6


INQUIRY #: 1743767.2
YEAR: 1994
= 666'
N
F-7


NQUIRY #: 1743767.2
EAR: 2002
= 666'
N
F-8

APPENDIX G

PUBLISHED HISTORICAL PHOTOGRAPHS

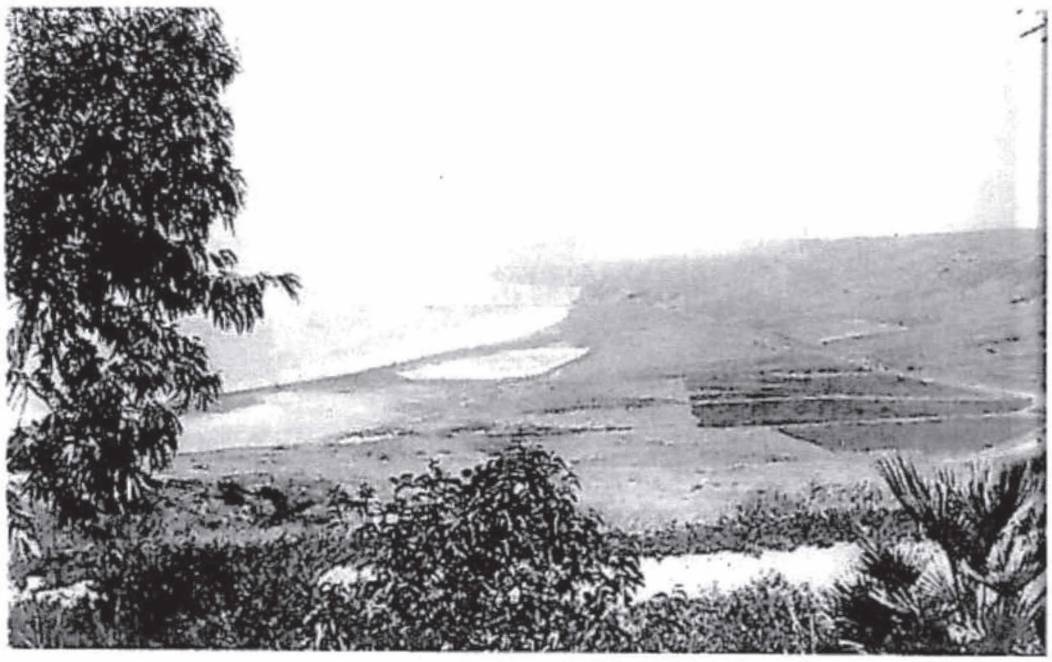


Photo #1: La Jolla Shores 1930 (T. Shepard Collection; in Kuhn, 1984)



Photo #2: View of low-lying alluvial cliffs 1936 (approximate location at 8516 El Paseo Grande Cliff erosion rate at that time estimated at one foot per year (photo from U.S. Grant View Kuhu, 1984)



Photo #3: View at same location as Photo #2 during heavy storms of 1978 (Kuhn, 1984)

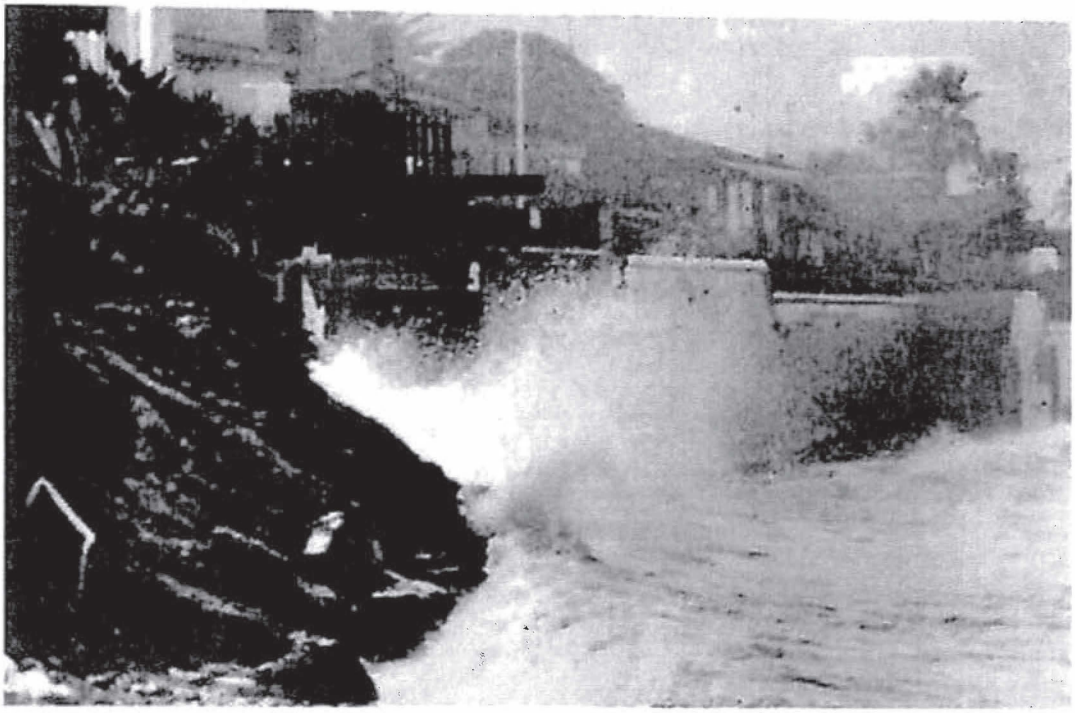


Photo #4: Same Location as Photo #3 1978 (Kuhn, 1984)



Photo #5: Same location as Photo #2-#5, showing partial collapse of seawall in 1978 (Kuhn, 1984)



Photo #6: Up to 15 feet local retreat in general area as Photo #5 (Kuhn, 1984)



Photo #7: 1979 view at 8516 El Paseo Grande with new seawall constructed (Kuhn, 1984)

CHRISTIAN WHEELER
ENGINEERING

April 18, 2025

Atlas Sun I, LLC
c/o Marmol Radziner
12210 Nebraska Avenue
Los Angeles, California 92025

CWE 2230041.04

Subject: **Response to DSD-Geology Review Comments, Project Issues Report 1113364, dated December 19, 2024, Morrow Residence, 8460 El Paseo Grande, San Diego, California**

References:
1) City of San Diego, DSD Geology Review Comments, Project Issues Report 1113364, dated December 19, 2024.
2) Marmol Radziner AIA, Architectural Plans, El Paseo Grande Residence, 8460 El Paseo Grande, La Jolla, CA 92037, dated September 23, 2024.
3) Christian Wheeler Engineering, Report of Preliminary Geotechnical Investigation, CWE 2230041.01, September 27, 2023.
4) Christian Wheeler Engineering, Response to DSD-Geology Review Comments, Project Issues Report 1113364, dated December 19, 2024, CWE 2230041.03, October 15, 2024.
5) Geosoils Inc., Coastal Hazard Analysis, 8466 El Paseo Grande, La Jolla, San Diego County, California, dated August 22, 2016

Ladies and Gentlemen:

In accordance with the request of the project architect, we have prepared this report to present additional information required by the City of San Diego regarding the geotechnical issues at the site. The new comments in the DSD-Geology portion of the Project Issue Report and our responses to the comments are presented below. Comments 00022 through 00031 of the referenced Project issues report have been provided under separate cover (CWE 2230041.03).

City Comment 00100: The following DSD-Geology comments are based on the review of comments provided to Development Services by the Coastal Commission. The project's geotechnical consultant must submit an addendum geotechnical or update for the purpose of an environmental review that references the development plans and addresses the following:

CWE Response: Noted.

City Comment 00101: The project's geotechnical consultant should include an analysis of the potential effects on site stability of rising sea levels, using latest scientific data (SDMC 143.0143(B)) and an analysis of the potential effects of past and projected El Nino events on stability (SDMC 143.0143(C)). The report must also provide an analysis of whether this section of coastline is under a process of retreat (SDMC 143.0143(D)).

CWE Response: Although Christian Wheeler Engineering does not practice oceanography or climatology, during our recent studies of various coastal sites within the La Jolla and Point Loma areas of San Diego we have worked with Richard J. Seymour, Ph.D., consultant of Oceanography, to evaluate the potential effects on local bluff stability of rising sea levels and to analyze the potential effects of past and projected El Niño events on local coastline stability and retreat.

For sites within both La Jolla and Point Loma, Dr. Seymour's papers, prepared using the latest scientific data, conclude that coastal recession at the properties studied can be expected to continue at the historically measured rates. This is because although the sea level is anticipated to rise over the design life of the proposed construction at the sites studied (and at the subject site), the anticipated magnitude of sea level rise and the fact that normal tidal fluctuations and previous, temporary rises in sea level associated with El Niño events are and have been of significantly greater magnitudes than the anticipated rise in sea level. As such, it is our professional opinion and judgment that the rate of episodic coastal recession at the site and adjacent beach areas, which has occurred over the last several decades, should continue into the future and be expected over the design life of the proposed development. It should also be noted that the lack of appreciable coastal retreat at the site over the last few decades occurred over a time frame that included the significant El Niño events of 1982-83 and 1997-98.

The sensitive coastal beach on and adjacent to the site, like nearly all areas of the Southern California coastline, is under an episodic process of retreat. The beach sands along the west side of the subject lot are seasonally transitory, and changes to the configuration of the beach should be expected over the design life of the proposed improvements. Such changes will include rising (accumulation) and lowering (recession) of the beach sands in the area.

City Comment 00102: The project's geotechnical consultant should consider conducting a Sea-Level Rise analysis in accordance with Chapter 6 of the California Coastal Commission Sea Level Rise Policy Guidance, Interpretive Guidelines for Addressing Sea Level Rise in Local Coastal Programs and Coastal Development Permits, adopted August 12, 2015.

CWE Response: Please find GeoSoils' Coastal Hazards Analysis for 8466 El Paseo Grande. The purpose of this analysis is to provide the California Coastal Commission the necessary coastal hazard information.

City Comment 00103: The project's geotechnical consultant should clarify the methods used to determine if a coastal bluff edge is present at the site, update the three cross sections with the coastal bluff properties. Show the distribution of geologic units, depict geologic structure, and represent ground water conditions on the cross sections.

CWE Response: Updated geologic cross sections are presented on Plate Nos. 2-4 of this report. Determination of the presence or absence of a coastal bluff and thus a coastal bluff edge at the site was conducted by comparing the definitions of "Coastal Bluff," "Sensitive Coastal Bluff," "Coastal Beach," "Coastal Bluff Edge," and "Coastal Bluff Face," which are presented in Sections I.A through I.E of the City's Coastal Bluffs and Beaches Guidelines and Municipal Code.

City Comment 00104: The project's geotechnical consultant should clarify whether or not a coastal bluff (as defined in the Land Development Code) is present under the existing structure on the subject site.

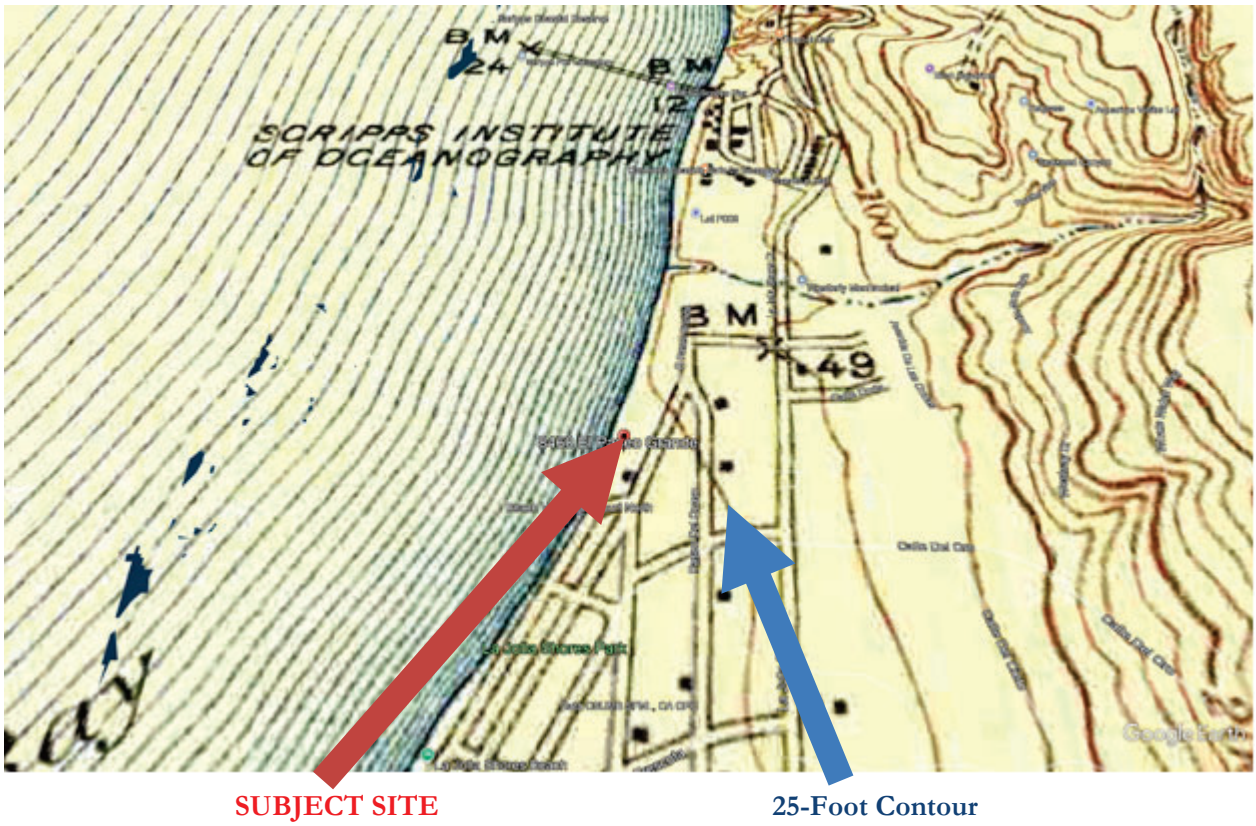
CWE Response: Section I.A of the City's Land Development Code – Coastal Bluffs and Beaches Guidelines, defines a coastal bluff as "an escarpment or steep face of rock, decomposed rock, or soil resulting from erosion, faulting, or folding of the land mass that has a vertical relief of 10 feet or more and is located in the coastal zone." The section further describes a coastal bluff as "a naturally formed precipitous landform that generally has a gradient of at least 200 percent (1:2 slope) with a vertical elevation of at least 10 feet. … The gradient of a coastal bluff could be less than 200 percent but the vertical elevation must always be at least 10 feet. A coastal bluff is a form of environmentally sensitive lands that is included in the definition of steep hillsides. The coastal bluff includes the bluff face which is all the area between the toe of the bluff and the bluff edge. Steep landforms meeting the criteria of coastal bluffs occur both inside and outside the Coastal Zone."

During our analysis of whether or not a coastal bluff exists at the site, we have examined the geomorphology of the subject lot. Specifically, we analyzed the gradient and the vertical relief of the natural landform along the west side of the site, which is obscured by the existing pedestrian walkway, retaining walls, and artificial fill. From north to south, the natural landform along geologic cross sections A-A', B-B', and C-C' displays gradients of ± 150%, 175%, and 200%, respectively. These values are consistent with the definitions presented in Section I.A of the Coastal Bluffs and Beaches Guidelines. However, the natural landform along geologic cross sections A-A', B-B', and C-C' displays maximum vertical reliefs of 9½ feet, 9 feet, and 8 feet, respectively. Section I.A of the Coastal Bluffs and Beaches Guidelines states that the relief of coastal bluffs "must always be at least 10 feet." As such, consistent with the City's own mapping shown on Sheet 30 of the Seismic Safey Study Geologic Hazards and Faults, it is

our professional opinion and judgment that the western portion of the subject lot contains a broad beach area (Hazard Category 48) and doesn't not contain a coastal bluff (Hazard Categories 41-47).

The Following Figure No. 1 shows the location of the subject site plotted on the USGS 1943 edition of the La Jolla Topographic Quadrangle. The pre-development topography of the site presented on Figure No. 1 is consistent with our determination that the subject site does not contain a coastal bluff and that the western portion of the site is indeed located on a broad, stable beach. The natural coastal bluff to the north of the site is clearly expressed along that portion of the 25-foot contour line that closely parallels the shoreline. Along those areas, the elevations of the natural ground surface are as much as 15 feet above the maximum elevation of the subject lot.

Figure No. 1



City Comment 00105: If a bluff edge is determined to be present at the subject site, update the geologic/geotechnical map that clearly depicts the location of the coastal bluff edge in accordance with the Coastal Bluffs and Beaches Guidelines. The geologic/geotechnical map should be on a topographic base map of suitable scale to show details of the coastal landforms, existing improvements, and proposed development. Label mapped features pertinent to the study of coastal landforms as well as standard geologic information.

CWE Response: An Updated Site Plan and Geotechnical Map is included on Plate No. 1 of this report and updated geologic cross sections are presented on Plate Nos. 2-4 of this report. The Site Plan and Geotechnical Map is on a topographic base map of suitable scale to show details of the coastal landforms, existing improvements, and proposed development. As described in our response to City Comment 00104 above, we have determined that a bluff edge is not present at the site. Rather, the geologic and geomorphic conditions of the site are considered consistent with definition of a Coastal Beach within Section I.C of the City's Coastal bluffs and beaches Guidelines.

City Comment 00106: Address coastal shoreline (beach) recession rates. Provide copies of the aerial photographs or historic maps used to determine coastal recession rates, if any. Clearly show where distances were measured on the aerial photographs or historic maps.

CWE Response: As presented on page 3 of the GeoSoils Coastal Hazards Analysis for 8466 El Paseo Grande, "Because of the abundance of sand at this beach, and the refraction of wave energy due to the adjacent submarine canyons, the beach may be considered to be in quasi-equilibrium. The shoreline does recede during large waves and high tides, but it recovers during small waves." On page 4 of that analysis Geosoils states that with the seawall in place, the shoreline cannot move further landward. The documents concludes that the seawall is in good condition and mentioned that no recommendations for additional shoreline protection will be needed for the next 75 years on pages 9-10 of the report.

City Comment 00107: The geotechnical consultant must address if a shoreline erosion control devise will be necessary to protect the proposed development during the reasonable economic life of the development (next 75-year period). Note that if site has a bluff, the development is approved with a less than 40-foot distance to the coastal bluff-edge, future erosion control measures are precluded.

CWE Response: No additional shoreline erosion control devices will be necessary to protect the proposed development during the reasonable economic life of the development (next 75-year period). The site does not contain a sensitive coastal bluff.

City Comment 00108: Clarify if wave hazards (under the effect of sea level rise) could negatively impact the site.

CWE Response: Page 8 of the GeoSoils' Coastal Hazards Analysis for the lot at 8466 El Paseo Grande states, "You will note that even under 200 cm (6.5 feet) of SLR the area, the site

improvements are not in the flooding or inundation zone. The proposed residence is well landward of this limit."

City Comment 00109: Clarify if the project will be impacted by coastal bluff instability or recession during the reasonable economic life of the development (next 75-year period).

CWE Response: No coastal bluff has been identified at the subject site. The area of the site to be developed would be impacted by coastal erosion if the existing boardwalk and retaining wall, which serve to protect the subject lot as well as several adjacent lots, was removed. Please reference our response to Comment 00106.

If you have any questions regarding this addendum report, please do not hesitate to contact this office. Christian Wheeler Engineering appreciates this opportunity of providing professional services for you for the subject project.

Respectfully submitted,
CHRISTIAN WHEELER ENGINEERING

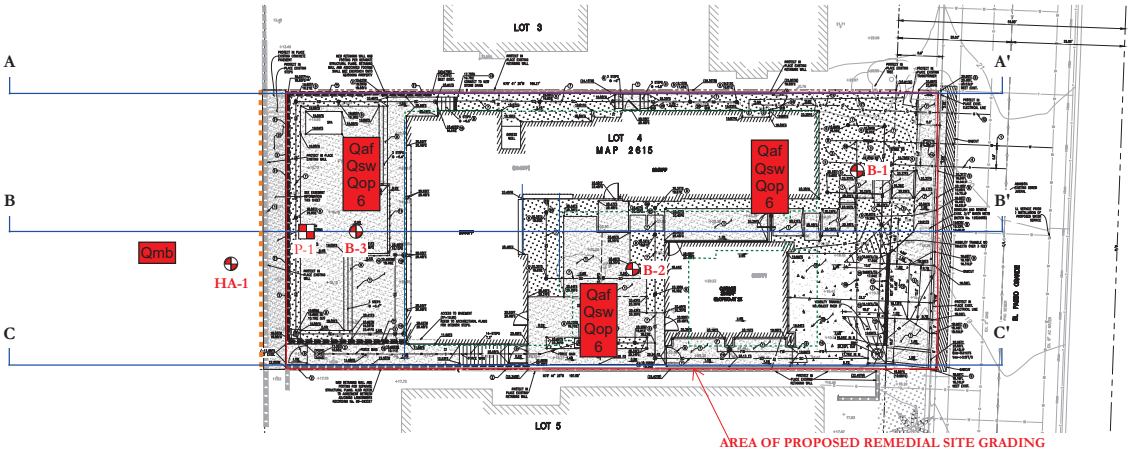
Daniel B. Adler, RCE #36037

David R. Russell, CEG #2215

DRR:drr:dba
cc: holmess@marmol-radziner.com







CWE LEGEND

B-3	APPROXIMATE BORING LOCATION	Qaf / Qsw / Qop / 6	ARTIFICIAL FILL over SLOPEWASH over OLD PARALIC DEPOSITS, UNIT 6
P-1	APPROXIMATE TEST PIT LOCATION	Qmb	MARINE BEACH DEPOSITS
HA-1	APPROXIMATE HAND AUGER BORING LOCATION		GEOLOGIC CONTACT
	CROSS SECTION LOCATION		
	LINE OF EXISTING STRUCTURE		

W+E

0 10 20

SCALE: 1" = 10'
HORIZONTAL AND VERTICAL

GEOLOGIC CROSS SECTION C-C'

MORROW RESIDENCE
8460 EL PASEO GRANDE, LA JOLLA, CA

DATE:	APRIL 2024	REPORT NO.:	22-5041-04
BY:	JMM	PLATE NO.:	2

CHRISTIAN WHEELER ENGINEERING

COFFEY ENGINEERING, INC.

No. 8733
11/1/22

Morrow Residence
8460 El Paseo Grande
La Jolla, CA 92037

DRAWN BY: EM/ GC
CHECKED BY: JC
ORIGINAL 11/1/22
REVISION 1
REVISION 2
REVISION 3
REVISION 4
REVISION 5

DATE OF SURVEY: 10/24/2022
SURVEY CREW CHIEF: E. Mendoza

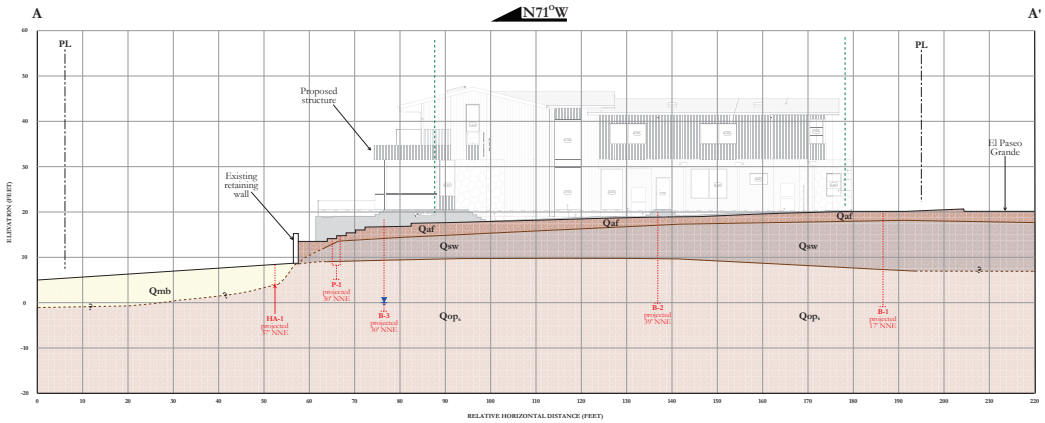
TOPOGRAPHIC SURVEY

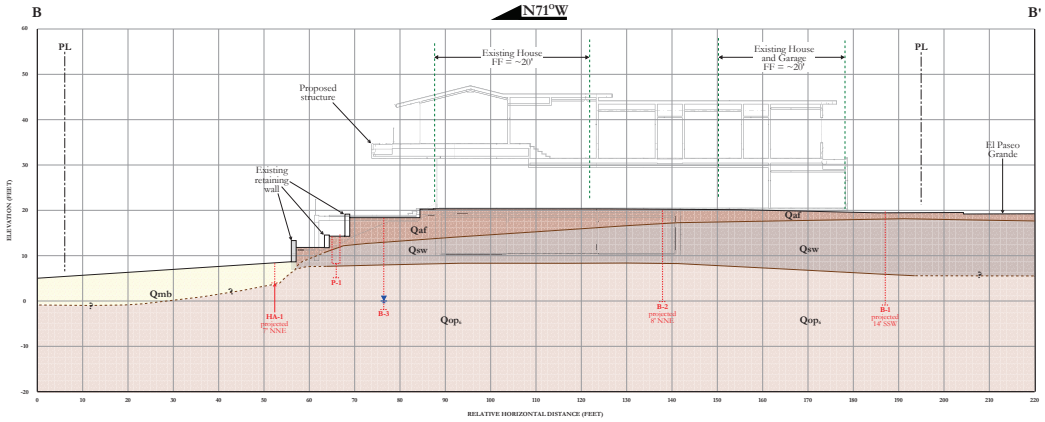
Topographic Survey

SCALE: 1" = 10'

C.0

SHT 1 OF 1 SHTS





CWE LEGEND

Qaf	ARTIFICIAL FILL
Qsw	SLOPEWASH
Qmb	MARINE BEACH DEPOSITS
Qop4	OLD PARALIC DEPOSITS, UNIT 6
	GEOLOGIC CONTACT - QUERIED WHERE INFERRED
	GROUNDWATER ELEVATION IN BORING
	LINE OF EXISTING STRUCTURE

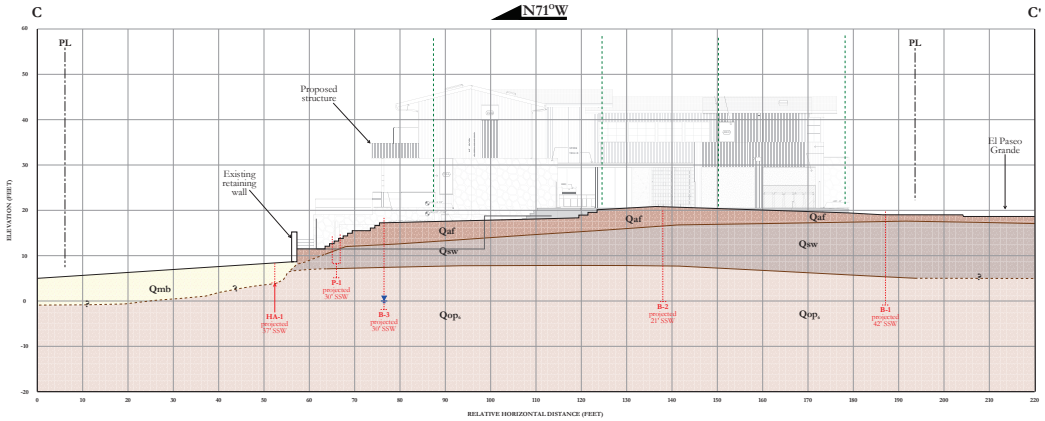
0 10 20
SCALE: 1" = 10'
HORIZONTAL AND VERTICAL

GEOLOGIC CROSS SECTIONS A-A' AND B-B'

MORROW RESIDENCE
9460 EL PASEO GRANDE, LA JOLLA, CA

DATE:	APRIL 2024	REPORT NO.:	225/041.04
BY:	JMM	PLATE NO.:	2

CHRISTIAN WHEELER ENGINEERING



CWE LEGEND

Qaf	ARTIFICIAL FILL
Qsw	SLOPEWASH
Qmb	MARINE BEACH DEPOSITS
Qop$_5$	OLD PARALIC DEPOSITS, UNIT 6
	GEOLOGIC CONTACT - QUERIED WHERE INFERRED
	GROUNDWATER ELEVATION IN BORING
	LINE OF EXISTING STRUCTURE

0 10 20

SCALE: 1" = 10'
HORIZONTAL AND VERTICAL

GEOLOGIC CROSS SECTION C-C'

MORROW RESIDENCE
8460 EL PASEO GRANDE, LA JOLLA, CA

DATE:	APRIL 2024	REPORT NO.:	225/0141.04
BY:	JMM	PLATE NO.:	5

CHRISTIAN WHEELER ENGINEERING